The River South Esk
Catchment Partnership

The South Esk Catchment Management Plan




Foreword

The River South Esk catchment covers a large area of Angus and is drained by the River South Esk and its tributaries. The catchment supports a wide range of economic activity in industries such as farming, forestry, fisheries, tourism and recreation and is a source of private drinking water. The river and the area support a rich variety of wildlife. The river itself has been designated a Special Area of Conservation (SAC) under the European Habitat's Directive as it is home to internationally important populations of Atlantic salmon and freshwater pearl mussel. At first glance this attractive area would appear to be in perfect condition due to the wide range of wildlife it supports. However, monitoring and consultation suggest otherwise.

- The ecological status of some tributaries is poor or moderate.
- Fish stocks and freshwater pearl mussels, at certain life stages, are reducing in numbers.
- Non-native invasive weeds are spreading in the middle and lower areas of the catchment.
- Flooding is a serious concern in some areas.
- Long-term economic development of the area is in its very early stages.

Ongoing pressures placed on the area and continual changes in the law which affect activities carried out in the area have reinforced the need to develop a more joined-up approach to the way this water resource is managed. We need to develop ways of protecting and improving the quality of the water, the wildlife of the area and the social and economic well-being of communities along the river and its tributaries.

To tackle these matters, representatives of various organisations have been meeting regularly since 2004 with the aim of developing a catchment management plan. Gradually we formed an informal steering group which included representatives from The Esk District Salmon Fishery Board, Angus Council, Scottish Natural Heritage, Esk Rivers and Fisheries Trust, the Scottish Environment Protection Agency, Atlantic Salmon Trust, Scottish Agricultural College, Forestry Commission Scotland, Farming and Wildlife Advisory Group, Cairngorms National Park Authority, Macaulay Institute, Scottish Water, National Farmers Union Scotland, Scottish Rural Property and Business Association and the Scottish Government (Rural Payments and Inspections Directorate).

The process of developing the catchment management plan began in earnest in 2008 when we employed a part-time project officer to oversee a dedicated, intensive two-year project which was launched at the Angus Show in June 2008. We also carried a great deal of consultation with the public over the following year to capture people's views on what they considered the main environmental, social and economic issues to be. From the initial consultation we drew up an 'Issues Document' which was available for further public consultation before the responses and direction from within the steering group were used to group the issues into seven topics, each of which has a strategic aim and a list of actions.

This plan sets out a framework, which will help us protect and improve the quality of the water, wildlife and local area. At the same time, we recognise the opportunities there are to use the river and the area it is in to improve social and economic well-being well into the future. Perhaps, one of the main strengths which lies behind the success of this plan is in how the steering group have managed to gain the support and involvement of all those with an interest in the River South Esk and its tributaries. Throughout this development phase, organisations, agencies and individuals have all shown they are committed to working together. Future success of this plan will depend on continuing levels of co-operation and commitment to work towards achieving the strategic aims and actions of the seven topics outlined in the plan.

We would like to take this opportunity to thank all those who have been involved in developing the plan, either in the public consultations or by contributing their valued time or expertise to developing the topics in the plan. Unfortunately we have not been able to include every view expressed during the development phase of this plan, some of which may be different from the views given in this document. The opinions in this plan represent a general agreement reached among those with an interest, through a great deal of enthusiastic and positive co-operation.

South Esk Catchment Partnership Steering Group
December 2009

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1 Introduction

The South Esk catchment is the area of land drained by the River South Esk and its tributaries. This includes its lochs, groundwaters, wetlands and the unique enclosed estuary of Montrose Basin (see Appendix A - map of the South Esk catchment). The area is very important to Angus and beyond for a variety of reasons,as a source of livelihood (for example, farming, forestry, fisheries and tourism), for recreation, as a supply of private drinking water. It is also a habitat of great value for wildlife. The River South Esk is of such importance for nature conservation that it has, under the European Habitat's Directive, been designated a Special Area of Conservation (SAC) for its populations of Atlantic salmon and freshwater pearl mussel.

1.1 Why do we need a plan?

Because the area is so important to the rural economy of Angus, as explained above, it must stay a water resource capable of withstanding the many demands placed on it, while still being able to support valuable wildlife habitats.

At first glance the area would appear to be in perfect condition, especially compared with more heavily built-up areas. We can see this from the wide range of wildlife the area supports – from Atlantic salmon and freshwater pearl mussels to otters and water voles, to name a few. However, monitoring reports and consultation with those who use the area or regulate the activities that happen in it, suggest otherwise. Flooding is a concern in some parts of the area such as at Brechin; fish stocks and freshwater pearl mussels are reducing in number; non-native invasive weeds are spreading in the middle and lower areas; and the ecological status of some tributaries is poor or moderate rather than the good status it should be. (See Appendix I: Ecological status assessments for the River South Esk and its tributaries.) Also, the economy of the area is poorly understood which may be limiting opportunities for long-term economic development.

There are already many organisations, landowners and land managers involved in managing activities that take place in the catchment. However, all in all, the area is not currently being managed in a shared, co-ordinated or joined-up way.

The aims of this plan are to:

- bring together all those who use the catchment to decide the main environmental, social and economic issues affecting the area; and
- agree action that will guide the way activities are managed in the future in a joined-up and long-term way.

As a result, the plan should act as a useful framework for managing the catchment over the long term.

1.2 Timescale and process for completing the plan

Although representatives of some organisations had been meeting regularly since 2004 to move the catchment management plan forward, the process of developing the plan only began properly when a part-time project officer began work in April 2008. The project officer reports to a steering group who form the South Esk catchment partnership (See Appendix D for details of the members of the steering group.) The project was launched at the Angus Show in June 2008 and we produced an introductory leaflet and questionnaire to gather people's views on what they consider to be the main environmental, social and economic concerns within the area. We then drew up an 'Issues Document' which was available for a seven-week public consultation period from 30 October to 19 December 2008. You can download a copy of the issues document at http://www.angusahead.com/southesk. We also held two public meetings, in the evenings, during the public consultation period, on 19 and 20 November 2008 at Memus and Brechin where we gathered people's views. About 70 people came to these meetings.

We have put the draft plan together using responses to our consultation on the Issues Document, and through discussion with members of the steering group. We held a workshop for members of the steering group in February 2009, followed by five further meetings during March and April to develop the strategic aims and actions for each of the main topics highlighted in the Issues Document. The topics were:

- water quality;
- water resources;
- river engineering;
- habitats and species; and
- socio-economic.

We added two new sections – flood management, which had previously been included under the water resources section in the issues document, and a seventh section called 'delivering the plan'.

We have summarised the main stages of the process of developing the plan in the table over the page.

Phase 1: Consult on main issues affecting the South Esk catchment – completed July 2008
Phase 2: Develop an "Issues Document" – completed October 2008
Issues document consultation period closed on 19 December 2008
Phase 3: Create a draft plan which will include strategic aims and actions by topic
One-day workshop for steering group members 'Turning issues into action' – February 2009
Working groups to develop topic strategic aims and actions – March to April 2009
Consult on the draft plan – June to September 2009
Phase 4: Launch the final plan by December 2009
Phase 5: Putting the action in the plan into practice – from 2010 onwards

Figure 1: The main phases in developing the river South Esk catchment management plan.

1.3 The legal framework

There is no legal responsibility to produce a catchment management plan. However, we hope that we can include outcomes and proposals developed during this process in other documents such as the Tay Area Management Plan or codes of practice. This will, in turn, help manage the area. We also hope that the final plan will go further than the legal duties of the organisations already involved in managing the South Esk and the protection that the many designations already give as outlined below.

1.3.1 Designations and protected areas

The main Act of Parliament which is central to managing the catchment is a European directive commonly known as the 'Habitats Directive'. This 1992 directive was translated into UK law by the Conservation (Natural Habitats & c) Regulations 1994.

The River South Esk is a Special Area of Conservation (SAC) for Atlantic salmon and freshwater pearl mussels, and forms part of a network of SACs across Europe. The main aim of SACs is to protect the habitats and species they are designated for (in other words, the habitat and species covered by the SAC). In the case of the River South Esk SAC, although it is Atlantic salmon and freshwater pearl mussels that are the species covered by the SAC, the habitats that support them are also essential in protecting these species. The South Esk SAC is not supported by a Site of Special Scientific Interest (SSSI), as some other river SACs are.

We describe other important designations below.

- **Montrose Basin Ramsar site, Special Protection Area (SPA) and SSSI**
  Montrose Basin is a wetland of international importance for the wildfowl and waders it supports, particularly over the winter. It was designated as a SPA in 1994 under the European Birds Directive and in 1995 as a Ramsar site under the Convention on Wetlands of international importance signed in Ramsar, Iran in 1971. Together, Special Areas of Conservation and Special Protection Areas form a network of sites designed to protect the most seriously threatened habitats and species across Europe. The network of sites is known as Natura 2000.
- **Caenlochan SAC, SPA and SSSI and Corrie Fee National Nature Reserve**
  Caenlochan is an area of upland plateau, bog, fen and heath supporting a number of rare arctic-alpine plants and birds such as dotterel and golden eagles, protected under the European Habitats and Birds Directives. Corrie Fee is a glacial corrie with magnificent cliffs.

Corrie Fee National Nature Reserve and the Fee Burn, a tributary of the River South Esk.

There are a further eight SSSIs within or next to the area (See the map in Appendix B of the designated areas within the South Esk catchment.) These SSSIs are:

- Red Craig (geology);
- Loch Brandy (mosses, dragonfly and a oligotrophic loch – which is low in nutrients);
- Crossbog Pinewood (native pinewood which lies in what is thought of as the natural extent of the Caledonian Pinewood and is the only wood of its kind in Angus);
- Balloch Moss (raised bog);
- Den of Ogil (willow and alder carr and valley fen);
- Forestmuir (wet heath and species-rich grassland);
- Rossie Moor (heath and fen); and
- Dun's Dish (nutrient-rich loch, fen, wildfowl and waders).

1.3.2 European Water Framework Directive (WFD)

The WFD, which came into force in 2000, created a new legal framework to protect and improve the water environment. The main goal of the WFD is for all rivers, lochs, estuaries and coastal waters (water bodies) to be of good ecological and chemical status in other words, as close to their best natural state as possible, by 2015. Groundwater should also achieve good status for both quality and quantity. In some cases, achieving this by 2015 would be too costly or technically not possible, so a later deadline of either 2021 or 2027 is possible. At the same time, if these water bodies have already met these levels, we need to maintain them. There must also be no deterioration of water bodies (see Appendix I for the current ecological status assessments for the River South Esk and its tributaries). Two of the main changes that the WFD has brought into practice have been to:

- introduce new regulations – the Controlled Activities Regulations (CAR) April 2006 covering pollution, abstraction (taking water from any source, either temporarily or permanently), impoundments (a dam, weir or other structure that can raise the water level of a water body above its natural level) and engineering controls in and around water bodies and transitional waters (coastal waters which contain a certain level of salt); and
- introduce plans to manage river basins.

In Scotland, SEPA have responsibility for planning how river basins are managed at a national level. There will effectively be one river-basin management plan (RBMP) for Scotland, although there are also two

cross-border RBMPs covering the Solway and Tweed and Northumbrian areas that include parts of Scotland. We will further divide the Scotland RBMP into different geographical areas with a network of area advisory groups (AAGs) drawing up their own plans for each geographical area. The Tay AAG is working on river-basin planning for the Tay area, which covers seven major areas – only one of which is the South Esk. (See Appendix J for a map of the Tay AAG area.) The draft Tay Area Management Plan was published in December 2008 for a six-month public consultation period ending on 22 June 2009. You can see a copy at http://www.sepa.org.uk/water/river_basin_planning.aspx.

The draft South Esk catchment management plan has similar goals to the draft Tay Area Management Plan, but the main difference is that, because it is on as it is at a smaller scale, it will have much more focused action, specific to the area. Also we have no legal duty to produce the draft South Esk plan, whereas river-basin management plans are covered by the WFD.

1.3.3 The Cairngorms National Park Authority

The Cairngorms were made a national park in 2003 under the National Parks (Scotland) Act 2000. The aims of the park include protecting and improving the natural and cultural heritage within it. But, they also involve promoting the long-term use of the area's natural resources and promoting the long-term economic and social development of the area's communities. The upper reaches of Glens Prosen and Clova are within the park boundary.

1.3.4 European Freshwater Fisheries Directive

The salmonid fishery of the South Esk is legally protected as it was designated in 1980 as a 'salmonid water' under the EU Freshwater Fisheries Directive. This recognises the economic importance of the fishery. The purpose of the directive is to protect or improve the quality of running or standing fresh water, which supports fish life.

1.3.5 European Nitrates Directive

In 2002, the Scottish Executive, under the European Nitrates Directive, designated certain areas as Nitrate Vulnerable Zones (NVZs), the aim being to reduce water pollution caused by nitrates from agricultural sources and prevent further pollution of this kind. The lower end of the area (from Finavon downstream) is within the Strathmore and Fife NVZ.

1.3.6 Drinking water protected area

These are areas that are used to abstract (take) drinking water of more than $10m^3$ a day (on average) or serving more than 50 people, or water meant for this kind of use in the future. Glenogil Reservoir, which feeds into the Noran Water, and the Borrowfield Boreholes, near Montrose, are sources of water that have been identified in the catchment as possible public water backup supplies (for example, during a drought). The Noran Water is a drinking water protected area because of this.

1.3.7 Urban Waste Water Treatment Directive (UWWTD) Sensitive Area

The UWWTD regulates how wastewater (sewage) is collected and treated. Sensitive areas are those which would be affected by sewage being released. The South Esk is a UWWTD sensitive area from just below where the Prosen Water meets the South Esk to Montrose Basin.

1.3.8 Bathing Water Directive

The main aim of this directive is to protect public health and the environment from pollution from faeces (bowel movements) in bathing water. Montrose is a bathing water site.

1.3.9 Floods Directive

The European Directive on the Assessment and Management of Flood Risks (the Floods Directive) is designed to help members of the European Union prevent and limit floods and their damaging effects on human health, the environment, infrastructure (roads, railways and so on) and property. The Floods Directive came into force on 26 November 2007 and member states have two years in which to turn the directive into law within their own country. The Flood Risk Management (Scotland) Bill was introduced to the Scottish Parliament on 29 September 2008. The bill passed stage 1 on 22 January 2009. Amendments to stage 2 may now be put forward by a member of the Scottish Parliament (MSP) to the clerks to the Rural Affairs and Environment Committee.

Specific measures within the Flood Risk Management (Scotland) Bill include:

- a framework for co-operation between all organisations involved in managing flood risk;
- an assessment of flood risk and how to prepare plans to manage flood risk;
- new responsibilities for SEPA, Scottish Water and local authorities in terms of managing flood risk;
- a revised, streamlined process for managing flood risk;
- new methods to allow those with an interest and the public to contribute to managing flood risk; and
- one enforcement agency responsible for making sure Scotland's reservoirs are run safely.

A Natural Flood Management Group was also set up by Scottish Government in September 2008 to help them develop a new policy for managing floods in a natural way. These measures are currently being tested to see how much of a role natural methods can play in managing floods in the long term. The aim is to reduce the rate of run-off in the uplands, the rate of flow in the watercourse and increase water storage in the lowlands. It is a process that may work with rivers using natural processes alongside land-use planning measures. It has been defined by the Scottish Government as 'Working with or restoring natural flooding processes with the aim of reducing flood risk and delivering other benefits'. However, it will be some years before we see the results of these tests and so measure the possible effect on flood risk and the practical use it can be put to.

1.4 Putting the plan into practice

Some action within the draft plan is already ongoing. However, the continued work and support of the Catchment Partnership should help to make sure they continue to be put into practice. Many of the new actions identified in the draft plan will need to be put into practice after the intended launch of the final plan in December 2009. It will not be possible to take forward all of the actions at once. As a result, members of the steering group and the wider catchment partnership will need to meet to agree the priorities for putting the plan into action and a programme of work. This will set out timescales for putting the action into practice. We then hope to create groups which include members of the steering group and the wider catchment partnership to take forward specific action. This will also mean involving other people with an interest, such as landowners and land managers, and other organisations within the catchment as appropriate.

The final plan will be a 'living document'. As such, we will need to regularly review and update it. .

2 Overview of the catchment

2.1 Waters

The South Esk catchment is on the East coast of Scotland and is entirely within the county of Angus. It rises high above Loch Esk on the slopes of Cairn Bannoch in the Eastern Cairngorms at an altitude of about 975 metres before flowing down into Glen Clova where it is joined by the White Water below Glen Doll. Further down, the Prosen Water significantly adds to the size of the river before it passes through the fertile area of Strathmore and into the unique enclosed estuary of Montrose Basin before entering the North Sea at Montrose Harbour. The river South Esk is about 49 miles long (79 km) from its source to the sea and has the following main tributaries.

- White Water
- Prosen Water
- Burn of Glenmoye
- Noran Water

Major standing waters in the area are:

- the hill lochs of Loch Esk, Loch Brandy, and Loch Wharral in the upper area;
- Den of Ogil and Glenogil reservoirs in the middle area;
- Dun's Dish; and
- the vast enclosed estuary of Montrose Basin in the lower area.

2.2. Hydrogeology

Angus straddles the Highland Boundary Fault, a geologic fault that travels through Scotland from Stonehaven on the East coast to Arran on the West coast. It separates two distinctly different regions – the Highlands from the Lowlands, but in most places it is only recognisable as a change in the appearance of the land.Within Angus, east of the faultline, lie the broad, flat fertile straths (mountain valleys) of Strathmore, corresponding with soft areas of sandstone mainly from the lower Devonian age and some conglomerates (course grained rock), which have been eroded by glaciers. The fertile soils which now cover these areas are the result of deposits from these glaciers and the material carried down by rivers from the glens. These sandstone and conglomerate areas also form good aquifers (rock which allows groundwater to pass through it). They are highly permeable and it is possible to drill for the water through the boreholes. To the north-west of the fault line lie the harder rocks of the Dalradian age which are generally in the upland areas which support less fertile soil, and are often covered by heather moorland.

2.3 Climate

Being on the drier and sunnier East coast of Scotland, Angus has comparatively lower rainfall. We receive around 175 days of rain each year compared to 250 days a year in much of the Highlands. The Angus Glens still attract snow and so there is an increased river flow when the snow melts in spring. And, sea fog from the North Sea, known as 'haar' often reaches far inland. We can already clearly see the effects of climate change in Scotland when we look at trends in temperature, rainfall and snow cover, higher river flows leading to flood risk and rising sea levels causing erosion.

2.4 Land use

Angus is home to 40% of Scotland's class-1 agricultural land and produces 27.5% of the country's vegetables (potatoes, peas and beans for canning) (This information comes from the Agricultural Census carried out by the Scottish Government in June 2008 – see www.scotland.gov.uk/publicatioons/2008/10/agriccensus2008.) The fertile soils and mild climate are ideal for growing top-quality soft fruit, vegetables, grain and seed potatoes in particular. Cattle and sheep are also raised in the hill and upland areas. So, it is not surprising that two-thirds of the catchment is used for agricultural production. Improved pasture for grazing on the floodplain is a feature of the upper catchment, while the middle and lower areas are dominated by arable (crop) production.

Other main land uses in the area are forestry and heather moorland. Heather moor is confined to the slopes of the upper area where it is managed for grouse shooting and deer stalking. Montreathmont Forest in the lower area is the largest conifer plantation. Other smaller but still significant plantations are found in the Angus Glens of the upper catchment, and pockets of semi-natural woodland are found throughout.

2.5 People

The South Esk flows through the Angus towns of Brechin (population 7199) and Montrose (population 10, 845). However, most of the area is within rural Angus, which is sparsely populated with a number of villages along its length. The catchment faces growing pressures for new housing developments as the two main towns Brechin and Montrose expand and also from the development of new single houses and farm conversions in the countryside which need facilities to remove sewage.

2.6 Cultural history

The catchment has a great deal of cultural history. The town of Montrose dates back to about 1140, when the natural harbour and rich agricultural areas allowed Montrose to flourish as a port. Early exports from the area were skins, hides and cured salmon. From the 17th century exports of wheat and malted barley became important while timber and flax were imported from the Baltic and wines, fruit and salt were imported from France and Portugal. The town of Brechin, upstream of Montrose, also has connections to the river being built on a hill sloping gently back from the river. By the middle of the 19th century, Brechin had a paper mill, two flax mills, five linen factories, two bleachfields, two distilleries, a brewery, two saw mills and two nurseries, all of which needed water.

There are also several historical buildings connected with the river in the area. Inverquharity Castle, just north of Kirriemuir, was home to the Ogilvies from 1420. It takes its name from the Quharity Burn, which joins the main river by the castle. Further up is Cortachy Castle, the family home of the Earl of Airlie. Airlie Estates is one of the many landowners in the area who manage the land for conservation purposes, and for shooting and fishing. Near Cortachy lies Burnside Cottage, now Burnside Lodge, where Dr Wilson, who accompanied Captain Robert Scott on his Antarctic expedition in 1912, wrote his definitive work on diseases of grouse. Just up river is the Doulin Haugh mill lade, one of several former lades – (man-made channels) that fed water to sawmills and watermills for grinding grain and processing cloth.

Half a mile along the road from Dykehead lies the hamlet of Cullow, where a cattle and sheep fair used to be held. In the 1840s between 8000 and 12,000 sheep were brought in, over Jock's Road, to the head of the White Water and over Capel Mounth to the South Esk, to sell at Cullow in April and October.

In those days the population of the parish was much bigger. In 1755 Cortachy and Clova had 1233 inhabitants, and in the 1790s the area supported three smiths, four carpenters, three millers, three shopkeepers and 10 sellers of strong drink. Today the population has fallen to around 380. The Minister's Path, which links Glen Clova and Glen Prosen takes its name from the fact that the Manse in Clova served both the Glen Clova and Glen Prosen churches, and this is the route the minister would regularly take.

In the early 19th century there was a commercial fresh-water pearl fishery at Gella Bridge. At Milton of Clova, beside the Clova Hotel stands a partially restored meal mill. From Milton of Clova, a single track road runs a further three miles up the glen, passing what is left of Clova Castle – just the stump of a tower on a low hill. At the end of the public road lies, on the west, the entrance to Glen Doll and on the east, the Capel Mounth. This old drove road from Glen Clova to Glen Muick was surveyed in the 1830s with the aim of improving it into a proper road to encourage trade. However, the plan was dropped in favour of a road through Glen Shee.

2.7 Recreation and tourism

A wide variety of outdoor activities is available in the area. The Angus Glens, a popular tourist destination for walking, climbing, angling and mountain biking, provide good access to the Eastern Cairngorms all year round. The Forestry Commission car park at the head of Glen Doll caters for around 70,000 visitors each year, and a new ranger base with interpretation and educational facilities has recently opened (See "Towards Sustainable Prosperity – An Economic Development Strategy for Angus".) Although the Scottish Youth Hostel Association (SYHA) youth hostel and the campsite previously in Glen Doll have now closed, the nearby Glen Clova Hotel helps to cater for this site by providing a restaurant, a hotel, a bunkhouse and self-catering chalet accommodation. The 'Glen Prosen Cottages' holiday cottages business has a number of self-catering cottages in Glen Prosen along with a recently-opened hostel. Other B&B and hotel accommodation is found in the nearby towns of Brechin, Forfar, Kirriemuir and Montrose. There are also a number of hotspots for picnicking, with the Glen Doll picnic site and Gella Bridge being two favourites. Sea trout and salmon fishing in particular, are popular activities along much of the main river. There are two trout farms, Loch Heath part of the Glen Clova Hotel business and Kinnnaird Mill trout farm, near Brechin. Canoeing takes place, although to a much lesser extent than on the neighbouring River Tay. Montrose Basin with the Scottish Wildlife Trust visitor centre is well placed for bird watching, particularly during winter when thousands of geese stop off at the basin on their yearly migration.

2.8 Industry and energy

Montrose Harbour is the main focus of industrial activity within the area. It is a historically- important port that can be traced back to the 12th century and recent years have seen its further development as an offshore support facility. It currently caters for oil-related and commercial shipping, including handling and exporting pulp, timber, grain and paper as well as providing significant storage facilities.

In times past, the area had a number of sawmills and watermills for grinding grain and producing cloth. Although the need for these mills has mostly now gone, long-term methods of producing energy are high on the agenda. A small-scale hydro-electric scheme is now in place by the Rottal Burn at the top of the catchment with another planned for further up Glen Clova by the Glen Clova hotel. The possibilities for tidal generation within Montrose Harbour are also being investigated.

2.9 Economy

Agriculture has always played a central role in the prosperity of Angus and is estimated to be worth £99.2 million to the Angus economy. It is also estimated that the salmonid fishery of the South Esk produces about £2-3 million each year for the local economy. There is about £60 million of investment in the forestry sector in Angus every year, which goes into industries including processing wood, timber haulage, manufacturing pulp and general forest management. (See the "Angus Rural Strategy 2007-2012".) Economic growth in the forestry sector has, however, been slow, due to investment in forestry being long-term and the market being dominated by low-cost foreign imports. Field sports such as grouse and pheasant shooting, together with deer stalking, provide extra income for landowners in the upper catchment.

3 Issues

3.1 Water quality

We can consider that there are two main types of pollution.

- Point source pollution is pollution that can be traced to one specific place, for example, the end of a pipe.
- Diffuse pollution is a gradual and often unnoticed seepage of polluting material from a number of sources into the environment, making it harder to define, find and control. On their own these releases can be of little significance, but together they can lead to a major deterioration in the quality of water.

As the South Esk does not flow through an industrial or heavily built-up area, it has escaped from much of the contamination and pollution that many urban rivers suffered from in the past. Indeed, the wildlife that it supports (from salmon, otters and water voles, to freshwater pearl mussels to name a few) shows just how unpolluted it is. So, it is not surprising that much of the area has recorded good or high ecological status by monitoring carried out by SEPA. (See Appendix I: Ecological status assessments for the River South Esk and its tributaries.) However, certain parts of the area have been recorded as being of poor or moderate ecological status as a result of nutrient enrichment which is usually due to too much of the chemical nutrients nitrogen, phosphorous, or both. This applies at the Pow Burn (moderate), Melgund Burn (moderate), Lemno Burn (moderate) and Montrose Basin (poor) – all in the lower half of the catchment. For all of these water bodies, part of the reason for this lower status is diffuse pollution caused by a combination of arable and mixed farming, forestry and leaks from septic tanks.

Nutrient enrichment and too much sediment in watercourses from farming and so on can lead to a number of problems such as:

- harsher treatment needed before the water can be used as drinking water;
- the threat of diseases carried in water from sewage contamination (animal and human);
- the smothering of freshwater pearl mussel beds and spawning gravels; and
- more general effects on river life and habitat such as algal blooms which happen regularly at Montrose Basin, Although,here natural causes such as an increase in salt water from the tide can influence algal growth.

Agriculture

Diffuse agricultural pollution arises from activities such as livestock grazing causing the riverbanks to wear away, ploughing and drainage being carried out too close to the river, fertiliser and pesticides used to grow crops, and from run-off from farms. These activities can release potential pollutants such as sediments, nitrates and phosphates, which individually may not have an effect, but together, at the scale of a river catchment, can affect the quality of water. Much of this pollution is not deliberate and good agricultural practice can help tackle the problem. However, we know that diffuse agricultural pollution is already an issue in the area. This is clear as the lower half of the catchment downstream of Finavon, was designated as a Nitrate Vulnerable Zone (NVZ) by the Scottish Executive in June 2002. SEPA has also recorded poor and moderate ecological status results for the Pow, Melgund, and Lemno Burns and Montrose Basin. The aim of NVZs is largely to tackle contamination of groundwater from agricultural sources. NVZs were designated in areas where groundwater (water stored in permeable rocks below the surface, known as aquifers) has concentrations of nitrates over a certain level (> 50 mg/litre nitrate). This also coincides with the main land use in these areas – agriculture.

Forestry

Diffuse forestry pollution can result from fertilisers that were used in the past that have built up in soil and in the sediment of watercourses because forestry operations meant that the soil was disturbed. This can be worse on steep slopes and in wet conditions. Forests planted before the 1990s were often planted right up to the river's edge, which is the case in much of the area and has lead to the loss of bankside vegetation and the riverbanks wearing away. Good forestry practice can help tackle these problems, such as leaving buffer strips between watercourses and areas of new planting. The Pow Burn has been recorded as being of moderate ecological status for diffuse pollution as a result of these forestry operations.

Treating wastewater

Wastewater, commonly referred to as sewage, is a mixture of water from domestic sources such as baths, sinks, toilets and washing machines, and from industrial pollution and rainwater run-off from roofs, roads and other hard-surfaced areas. There are different systems for treating wastewater.

- Surface-water sewers take rainwater run-off from roads, yards and roofs, often releasing it without treatment back into the environment.
- Combined sewers carry domestic sewage, trade waste and some rainwater run-off to wastewater treatment works (WwTWs) such as the ones at Brechin and Montrose. This water is then released back into the environment.
- Individual properties that are not served by WwTWs have their own smaller individual systems such as septic tanks with soakaways or secondary treatment systems, all of which can release wastewater to the land.

Scottish Water collects and treats wastewater, while smaller treatment systems for individual properties are the responsibility of each owner. Scottish Water has a capital investment programme known as Quality and Standards, to maintain and upgrade WwTWs across Scotland. Local authorities are responsible for drainage systems to deal with run-off from roads.

All systems which release wastewater into water or onto land are now licensed by SEPA under a new regulatory regime, the Controlled Activities Regulations (CAR) April 2006, as part of the Water Framework Directive. Smaller treatment systems for individual properties are sometimes not maintained well enough and this leads to pollution. For example, the Lemno Burn has been recorded as being of moderate ecological status for diffuse pollution due to pollution from septic tanks. Under old laws, the Control of Pollution Act 1974 (CoPA), people did not need to get permission from SEPA to release sewage into soakaways in most cases. However, the introduction of CAR means that all new releases of sewage must be authorised. We would expect that any that are not currently registered will be picked up when people move properties.

Point source pollution from wastewater can result from old and poor infrastructure. For example the volume of wastewater in combined sewer overflows increases a lot during wet weather. This can sometimes result in them overflowing and releasing untreated wastewater into the environment. However, combined sewers are needed to prevent wastewater from backing up in the system during wet weather, and all are licensed by SEPA. Surface-water sewers can also lead to pollution of watercourses, as run-off from roads, roofs and other hard surfaces is generally untreated. New housing developments present opportunities for SEPA to promote more long-term designs for drainage systems (often referred to as sustainable urban drainage systems (SUDS)). These operate on the principle of reducing the amount of run-off to the environment and include techniques such as swales, which help to filter the run-off and reduce how fast it flows, removing polluting solids.

Industry

Much of the focus of industrial activity within the area is around Montrose Harbour. Such a busy port flanked by a pharmaceuticals company poses the risk of occasional pollution incidents such as oil spills or trade waste and also ballast (from production of, for example, concrete) water being released. Dredging the estuary each year to allow ships to pass safely also will result in temporary releases of sediment. All of these activities can affect the quality of water and species such as migratory salmonids that enter the area at the harbour mouth.

The main issues raised during the consultation to do with the quality of water

- Diffuse pollution caused by agriculture and forestry operations (nutrient enrichment and sediment loading)
- Point source pollution from releases of public wastewater (where old infrastructure may be an issue, for example, the wastewater treatment works at Brechin)
- Point source pollution from releasing private wastewater including domestic (from septic tanks and secondary treatment plants), industrial and businesses
- How to encourage the public to get rid of chemicals, liquids, oils and solids appropriately rather than by putting them down sinks, toilets and drains

3.2 Water resources

Climate change

Overall, Scotland has become much wetter during the winter since 1961 while areas in the east are becoming drier in the summer months. Rain and snowfall in winter has increased by almost 60% in the north and west. Scotland's yearly average of rain and snowfall has increased by 20%. If we look at information on Scottish river flow, we can see an increase in high flow frequencies for western rivers over the past 20 years. In contrast, in the east, values were highest in the 1950s and 1960s. Average spring, summer and winter temperatures have risen by more than 1.0∞C since 1961. Over the same period, the number of days of frost (both air and ground frost) across the country has fallen by over 20% and the growing length of the seasons has increased significantly, with the greatest change happening at the beginning of the season (See http://www.sepa.org.uk/consultation/closed/2008/swmi_scotland/contents.html.)

By the 2080s, scientists predict that:

- yearly temperatures across Scotland will rise by up to 3.5ºC in the summer and 2.5ºC in the winter;
- summers will become generally drier across Scotland (there may only be a slight reduction in rainfall in the north-west but as much as a 40% reduction in the south and east);
- Scotland's sea levels will rise, perhaps by up to 600 millimetres around the mainland;
- there will be more extreme rainfall in the east, with an expected increase every two years of up to 25% of rain falling in 24 hours from storms ; and
- the average snowfall will reduce - by up to 90% depending on the area, and winters with no snow may become normal in some parts. (See http://www.angus.gov.uk/sustainability/climatechange.htm.)

Significant changes in average temperature, rainfall and snowfall as predicted above, are likely to have a considerable effect on water availability within the area. The need for water is likely to increase across the East coast, together with the need for a greater public water supply.

Abstraction – drinking-water supplies

Public water supplies are generally taken from rivers, lochs, reservoirs and groundwater. People who live within the catchment receive their public drinking-water supply from sources outwith the area (Loch Lee in the North Esk area, and Loch of Lintrathen and the Backwater Reservoir in the Isla area). However Glenogil reservoir which feeds into the Noran Water, has been identified as a backup water supply, for example,,during drought conditions. There are some private drinking water supplies within the area. Water is taken for 'Strathmore Springs' bottled water from the Devonian sandstone aquifer which crosses the middle and lower sections of the catchment, but this is actually relatively little. Attempts to use these aquifers have met with mixed success as much depends on the materials between the aquifer and the surface, which can prevent water from being drilled. The Borrowfield borehole near Montrose was meant to take water direct from the aquifer there, but would only be used as a backup supply. Climate change could put even more pressure on drinking water supplies from the area in future years.

Abstraction - agricultural purposes

Currently the biggest pressure on the catchment is water taken for agricultural purposes. Water is needed to irrigate crops such as potatoes, although drinking water is also needed for livestock. When river levels are low during periods of summer drought, taking the water can reduce the flow, which affects the ecology of the river. Migrating fish may become trapped in pools, and the effects of pollution may become more severe due to the lack of water available to dilute them. SEPA has recently carried out a review of all abstraction licences under CAR. However, further measures such as storing water in irrigation ponds during times of high flows may be needed if climate change predictions become reality. These should aim at conserving water to use in times of shortages, recognising that farmers, among others, need water for their livelihoods.

The main issues raised during consultation to do with water resources

- Taking water when it is scarce can affect in-stream ecology such as salmonids and freshwater pearl mussels.
- Existing information on abstraction rates is based on estimated values.

3.3 Flood management

In recent years, the focus on flooding within the catchment has been in the city of Brechin, which suffered serious flooding in 2002. Since then Angus Council has been carrying out a detailed appraisal of options to deal with floods, including:

- man-made flood water storage areas;
- an over-flow channel which would by-pass Brechin; and
- a wall which could be permanent or be built when needed, using removable panels..

The preferred option is to develop further flood defences along the north bank of the South Esk, and Angus Council is currently developing the design of this work. The council is also considering whether there may be short-term measures available to deal with the current flood risk.

There are also other localised areas of flooding, such as at Bridge of Dun and over rural areas, such as in Glen Clova. Some tributaries have been dredged in recent years to try and prevent flooding of agricultural fields nearby. However, we believe that the new Flood Directive may see a change of emphasis in managing floods towards area-based solutions. The evidence from the field trials supports the success of these solutions (see section 1.3.5 Flood Directive).

The main issues raised during the consultation to do with managing floods

- Lack of firm solutions to flooding
- Continued flood risk, for example, at Brechin
- Lack of natural floodplain storage
- The effect of floodwaters on people's lives and livelihoods

3.4 River engineering

In the past river engineering in the area has been carried out for a number of purposes including:

- to stabilise the banks to prevent erosion and loss of agricultural land;
- to create canals to move flood waters away from areas of flooding;
- to install river bed engineering to improve fisheries;
- to create weirs to divert water for mills and to reclaim land for building houses on;
- to build groynes (low walls) to prevent waves wearing away land;
- to carry out dredging to allow ships into Montrose Harbour;
- to build embankments to protect houses built on floodplains; and
- to dig out gravel to maintain fishing pools.

Drainage activities when managing land use such as moorland, forestry and agriculture are also ongoing in the area. And, all of these are difficult to regulate. The main method of regulation is the Environmental Impact Assessment (EIA) regulations for forestry and agriculture. While some engineering activities do have a continuing role to play in managing rivers, many have lead to changes in the natural processes which happen in the river system. These, in turn affect the wildlife that the river can support, while not always producing the desired solutions. However, all engineering work close to or on a river is now licensed by SEPA under new regulations – the Controlled Activities Regulations (CAR) April 2006, as part of the Water Framework Directive. The following are some examples where river engineering has been carried out in the area in the past.

Upper catchment – The Burn of Heughs (Rottal Burn) and the March Burn in the upper catchment are examples of burns, which have been straightened to try and prevent flooding of nearby agricultural land, although there are many other burns which have been engineered.

Middle catchment – The Noran water which has Glenogil reservoir and the Den of Ogil reservoir, both man-made structures designed to act as backup public water supplies. The river South Esk has had gravel extracted and has a number of weirs along it. The Lemno Burn has also been straightened.

Lower catchment - Many burns have been straightened across the area, with the Pow Burn being the largest. Parts of Montrose Basin have been reclaimed for development and are defended with gabions (wire baskets filled with earth and stones). The South Esk Estuary is routinely dredged and the coast is protected at the estuary mouth using groynes and gabions.

The main issues raised during consultation to do with river engineering

- Inappropriate river engineering can affect the natural way river systems work.
- The physical characteristics of a river that allow it to support the habitats and species it does can be damaged by engineering.
- Weirs, culverts and poor drainage practice and so on can prevent fish from migrating.
- Dredging and digging up gravel can destroy in-stream habitats and smother spawning gravels and freshwater pearl mussel beds.
- Inappropriate river engineering to improve fisheries can have negative effects on the environment.
- The links between the hydrological and geomorphological elements and processes of the river, and good ecological status or potential need to be clearer defined.

3.5 Habitats and species

This section deals with habitats and species that are threatened within the catchment and non-native species which are starting to invade the area. The catchment supports a wide range of habitats and species, from the uplands on the edge of the Cairngorms to the tidal wetland area of Montrose Basin with its tens of thousands of wildfowl which stay here over winter. A number of these habitats are recognised natural heritage designations (see 1C The Legal framework), which highlights just how important the area is for nature conservation. However, natural heritage designations only protect the best examples of habitats and species that have been recognised because they are important at an international, European or national level. There are several habitats of local importance within the area that contribute a lot, as well as providing valuable functions such as helping to contain flood waters and break down pollutants. Riparian woodlands and wet grasslands are examples of habitats that are becoming increasingly broken up across the area. A good example is found at the Den of Ogil SSSI, where the Burn of Ogil joins the Noran water. Here willow and alder woodland contains species such as marsh marigold and ragged robin growing beneath them and are interspersed with sedge-rich areas. These areas have reduced in number across the catchment, where floodplains have been drained for development, agriculture and forestry. Land drainage activities also lead to more sediment released into the catchment, leading to effects on spawning gravels and freshwater pearl mussel beds.

There are a number of invasive non-native species in the area that affect our native species and the habitats that support them. These include invasive weeds such as giant hogweed which take over the riverbank and, when they die back in autumn, leave exposed bare banks that make riverbank erosion worse. Mink threaten water voles, while the North American signal crayfish eat fish eggs and quickly take over the river. The Esk Rivers and Fisheries Trust have recently produced a 'bio-security plan' (2009) which looks at ways of managing these invasive non-native species already in the area and reducing the risk of new invasive

non-native species entering the area such as the salmon parasite, Gyrodactylus salaris and the Chinese mitten crab. Both of these could have severe consequences on the economy as well as threatening our native species.

Native species

Water vole

Water voles are native to the UK. They were once plentiful but have been reducing in numbers drastically, especially since the 1990s. The two main reasons for this are thought to be loss of suitable bankside habitat and the spread of the American mink. Small populations are thought to exist in the upper areas but these may be lost altogether without active management.

Otter

After a long decline in the 1960s and 1970s, otter populations appear to be thriving across Scotland. Mink, a non-native species in the area can compete with otters for food and territories, although otter surveys which were last carried out on the river South Esk in the early 1990s, showed the presence of otters along much of its length. However, despite the protection otters receive, they can still be threatened by management work such as bankside engineering or forestry operations destroying holts or resting places if an otter survey has not first been carried out.

Salmon

The South Esk and its tributaries are Special Areas of Conservation SAC for their populations of Atlantic salmon. According to Scottish Natural Heritage's SNH) last assessment of the salmon population of the River South Esk SAC, completed in 2005, summer and autumn numbers of salmon were shown to be doing well. However, spring fish numbers were shown to have dropped, and juvenile salmon numbers were also found to be low. Overall, salmon were assessed to be in an 'unfavourable ' condition. Water quality, in terms of nutrient enrichment, and in particular high levels of soluble reactive phosphorus, was identified by SNH as one of the possible issues affecting the salmon population. Other factors that have been raised during the consultation process include low river flows, birds and seals eating the fish, barriers preventing the fish from migrating and mixed-stock netting stations which are nets precisely placed to intercept coastal migratory salmon and sea trout from many different catchments.

Sea trout

Sea trout are a migratory form of the brown trout. The South Esk is quite famous as a sea trout river, although sea trout numbers are also reducing, for many of the same reasons as salmon, as outlined above.

Other fish species

We do not have much information about the status of other fish species in the area. In particular, we do not know the status of brown trout even though it is an important resource in terms of fishing. The European eel is now considered to be outwith safe biological limits in terms of its population size and recent EU regulation says that member states must produce eel management plans to find measures to increase the stock of eels. The Fisheries Research Service has now produced an eel management plan for the Scotland river basin district.

Freshwater pearl mussel

The River South Esk SAC was designated for its freshwater pearl mussel populations, together with Atlantic salmon. In 2003 SNH carried out a freshwater pearl mussel survey of the River South Esk SAC and found that the population was not as healthy as it should be. It had a low population of mussels and, in particular, low numbers of young mussels (juveniles). Overall, freshwater pearl mussels were assessed as being in an 'unfavourable' condition. The survey is being repeated in 2009, and we will use the results to decide how the pearl mussel population has changed since 2003 and to help us make management decisions in the future. Some of the possible reasons for the 'unfavourable condition' are thought to include:

- nutrient enrichment and, in particular, high levels of soluble reactive phosphorus;
- illegal pearl mussel fishing;
- river engineering in the past that has altered the hydrological and geomorphological elements and processes of the river and may have damaged mussel habitat; and
- low numbers of juvenile salmonids (trout and salmon) which act as hosts for freshwater pearl mussels when they are larva.

Non-native species which are invading the area

Giant hogweed, Himalayan Balsam, Japanese Knotweed.

All of these non-native plant species were introduced to Britain as ornamental plants in the 19th century. Plants that have spread from gardens have now colonised many areas of wasteland and riverbanks. They all grow rapidly and spread easily, forming dense colonies that prevent native plants and grasses from growing. When they die back in autumn, they leave large bare areas that can lead to the riverbank being worn away by the water. Giant hogweed is also a danger to health as its poisonous sap causes painful blistering and severe skin irritation. All three invasive plant species are in the area, although giant hogweed, which can grow up to 5 metres high has become the most common in the middle and lower areas of the catchment as plants spread from seeds washed downstream. At the moment, there is no particular co-operation taking place in controlling the growth and spread of these invasive plant species in the catchment.

Signal crayfish

Signal crayfish, a North American species, were introduced in England in the mid-1970s and have now found their way into some Scottish river systems. Once introduced, they can take over a river system very quickly due to their rapid reproduction cycle and their ability to travel over land between river systems. Signal crayfish eat almost anything from vegetation to dead animals and small fish and fish eggs. They also hide in the same crevices under rocks which are used as shelter by young fish in winter and during sudden flooding. Until recently the nearest known incidence of signal crayfish to the river South Esk was in ponds next to the river, North Esk, near Edzell, where they were thought to be first introduced illegally in 1998. However, in August 2008, signal crayfish were reported from the Pow Burn, which joins the river South Esk just upstream of Montrose Basin. Once in a river, the crayfish are very difficult to get rid of due to the problems associated with preventing the poisons used to kill them from contaminating the river and killing off other species.

Rainbow trout

From time to time people have caught rainbow trout in the South Esk. Rainbow trout have been introduced into a number of ponds as well as being stocked within the two fish farms within the area. These ponds, together with trout farms can lead to rainbow trout getting out. They then start to breed in the area, threatening native fish.

Mink

Mink were first brought to Britain in 1929 from North America and were farmed for their fur. However, since 1956, they have been confirmed as having escaped or been released into the wild, and are now widespread across Britain. Mink hunt water voles, other small mammals and birds, and fish. Some individuals and the Cairngorms Water Vole Conservation Project carry out some mink control.

The main issues raised during the consultation to do with habitats and species

- The riparian woodlands and wet grasslands have now become fragmented.
- The number of water voles, salmon, sea trout, and freshwater pearl mussels have reduced..
- Illegal freshwater pearl mussel fishing has been carried out.
- There is poor water quality (nutrients and sediments) possibly affecting freshwater pearl mussels and salmon.
- Threats from invasive non-native species.
- Lack of information relating to the status of other fish species in the area.

3.6 Socio-economic

Economic activity - land use, energy and industry

Agricultural production has already been highlighted as the main economic activity within the area, together with forestry. Both agriculture and forestry also appear as "issues" in terms of how they can affect the quality of water. Industrial activity is focused around the harbour and also appears as an issue with the potential to affect the quality of water. These land and industrial uses, together with ideas to create a tidal electricity generation project in the harbour area next to Montrose Basin, and the potential for future hydro-schemes within the catchment, all may be essential to the economy of the area. Balancing economic development with environmental restrictions is no easy task. Long-term economic development is likely to gain momentum in the years ahead, However, in the light of the Scottish Government's new 'overarching purpose', created in 2007, which is 'to focus government and public services on creating a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth'. This catchment management plan has a vital role to play in providing a framework for this.

Recreation and access

The area is used by thousands of people each year, both visitors to the area and locals, for walking, cycling, angling, camping, canoeing, and bird watching among other outdoor activities. An example of the popularity of the area for walkers is the Angus Glens Walking Festival. This has taken place during a May weekend for the past seven years. The festival provides a range of guided walks in the Angus Glens over a four-day period. However, pressure from the sheer numbers of walkers using the paths in the upper catchment, often as an onward route into the Eastern Cairngorms can lead to problems such as paths wearing away and littering from camping. A new business group, 'the Outdoor Angus Group' was formed in 2008 to promote outdoor activities in Angus.

The Eastern Cairngorms Access Project (ECAP) was a £2.4 million programme set up in 2003 to develop countryside access that restored damaged landscapes and improved visitor facilities within the mountains and glens of Angus and Upper Deeside. As part of this, the Jock's Road path, which follows the White Water, and Loch Brandy paths was restored in the upper area. The project also developed a series of walking and cycling leaflets which aim to promote responsible access in the countryside.

The new Scottish Outdoor Access Code (SOAC) which SNH produced under the Land Reform (Scotland) Act 2003, sets out access rights and responsibilities and helps to deal with any possible conflicts of use. The Land Reform Act also placed a duty on local authorities to develop a core path plan within three years of the act coming into force. The aim of the plan was to allow the public reasonable access throughout the county. We have produced a draft core path plan, which includes established routes within the area. The upper area and lower catchment have a greater network of paths than the middle area.

The river South Esk is used by canoeists, although it has generally a lower level of use compared to other rivers with more reliable water levels. Although largely considered a beginner's open canoeist river, it does offer challenging canoeing in high water. Canoeing guidebooks list access points within the main river as Glen Doll car park, Clova Bridge, Gella Bridge, Cortachy Bridge, Prosen Bridge, Tannadice Church, Finavon Bridge, Brechin Leisure Centre, Bridge of Dun, Old Montrose, and Montrose Sailing Club. Access to the river with canoes and car parking can be a problem in some places, but is generally good. There has been little conflict so far between canoeists and anglers on the South Esk, although it could become a problem. The Scottish Canoe Association have produced a useful leaflet, 'Paddlers Access Code – Access Advice for Paddlers in Scotland'.

Enjoying the outdoors can improve people's quality of life, leading to a more healthy, active lifestyle. 'Health and well-being' is one of the Scottish Government's five strategic aims (wealthier and fairer, smarter, healthier, safer and stronger and greener) that will deliver the overall purpose of long-term economic growth. As a result, there may be more emphasis on exploring opportunities for promoting health and well-being within the catchment in the years to come.

Education and community

There are about 15 high schools and primary schools and a number of rural communities, spread throughout the catchment. Current education initiatives that have been connected to the river and its environment include guided walks along the river in Glen Clova by the Angus Glens Ranger Service and guided walks around Montrose Basin from the Montrose Basin rangers. A 'Salmon in the Classroom Project' pulling together the expertise of ranger services, District Fisheries Boards and SNH has been run in primary schools throughout Tayside since 2004. This project allows children to learn all about the life cycle of the salmon, and has involved at least one primary school in the catchment. There is no doubt the potential for more education opportunities or to raise awareness generally about the area. The new ranger base which opened within Glen Doll during summer 2008 may provide even more educational opportunities.

Tourism

Tourism, which is central to the Angus rural economy, is a growth sector. It is estimated that Angus currently only achieves around 13% of the tourism income that comes into Tayside. The river South Esk has 11 fishing areas along its length for salmon and sea-trout fishing ranging in price from £15 per rod per day to over £100 per rod per day. There are also two trout farms. The salmonid fishery of the South Esk generates an estimated £2-3 million each year for the local economy. However, reducing salmonid populations and measures introduced to help tackle the problem such as 'catch and release' does affect returning anglers. Tourists come to Angus for many other reasons too. Most relevant to the catchment are the other outdoor activities on offer as described above under access and recreation as well as stalking and shooting. Accommodation providers (such as Glen Prosen holiday cottages and youth hostel, Glen Clova Hotel, bunkhouse and chalet accommodation, and rural hotels such as the Royal Jubilee Arms at Dykehead, the Drover's Inn at Glamis, Finavon Hotel as well as other providers in the nearby towns of Kirriemuir, Brechin and Montrose) benefit from these visitors. The upper catchment is not well served by public transport, although festivals such as the Angus Glens Walking Festival do provide opportunities for tourists to be transported to and from organised walks, and often lift-sharing and other types of transport such as community buses, provided as a result of demand can overcome the lack of public transport.

The main issues raised during the consultation to do with social and economic factors

- Opportunities are restricted by the lack of information on the social and economic effect of the area.
- Long-term ways of creating income (farming, forestry, fisheries, industry, renewable energy and river-related recreation and tourism) need to continue to develop.
- Tourism is affected by the reducing number of fish in the area.
- There is a lack of public transport and communications (satellite television, mobile phone, broadband) in some areas.
- There are possible gaps in the market for walking, cycling, angling and package holidays.
- There is also a lack of riverside paths, campsite and roadside parking facilities in the middle area in particular.
- There is also a possible conflict over access, such as boundary fencing limiting access for people visiting the area for recreation.
- There is an opportunity for more community and school use of the river for education purposes.
- Lack of general awareness of the history and culture of the area.
- Limited accommodation options, which have been accredited, for tourists.

4 Action cards

The following section contains a series of 'action cards', one for each of 17 draft catchment objectives that have been drawn up relating to the six topics of:

- quality of water;
- water resources;
- managing floods;
- river engineering;
- habitats and species; and
- socio- economic factors.

There is also a seventh new topic, delivering the plan.

Each of the seven topics also has a strategic aim, and a list of actions, making up 65 actions in all. The draft strategic aims and actions were drawn up by the steering group and project officer during a series of 'action setting' meetings held during February to April 2009. The main points raised during the consultation on issues (listed in the previous section 3 at the end of each topic) formed the starting point for discussion during the process for setting action. Strategic aims for each of the seven topics were then suggested to cover the main points. These were then drawn up to help focus where we could target work to help deal with the main issues.

Each action card sets out the following information.

- The strategic aim
- The topic aim
- Why is this aim necessary
- What are the benefits?
- Action table – listing the agreed action
- Links to other action cards

4.1 Action card – Water quality

Strategic aim

To maintain and improve the quality of water within the area.

Area aim

1. To reduce diffuse and point source pollution from agricultural, forestry, public wastewater, private wastewater, surface water, road run-off, and industrial sources.

Why is this needed?

Water quality within the area has been highlighted as a main issue in the issues document, and information on monitoring confirms that some watercourses are of significantly lower water quality than others. For example, Pow, Melgund, Lemno Burns, downstream of Brechin Waste water Treatment Works (WwTWs), and Montrose Basin. The lower half of the area is designated as a nitrate vulnerable zone. Many sources have been identified as contributing to poor water quality – agricultural, forestry, public wastewater, private wastewater, urban surface-water run-off, and industry. Nutrient enrichment and sediment loading are known to be two of the main issues to do with water quality.

What are the benefits?

Good water quality is central to how the area functions and the habitats and species it supports such as freshwater pearl mussel and salmonids. Good water quality is also needed for the economic uses it serves such as irrigation and drinking water, even as a backup supply.

Table of action

New actions required.	Who needs to implement action (lead in bold)	Who needs to be involved
1 Use baseline information on the quality of water across the area to identify the source and nature of pollution so we can identify priority areas for action.	Scottish Environmental Protection Agency **(SEPA)**, steering group.	Landowners and land managers.
2 Investigate other water-quality monitoring needs across the area.	**SEPA**	Academic organisations.
3 Actively encourage people to use long-term forest plans across the area.	Forestry Commission Scotland (FCS).	Landowners and land managers.
4 Actively encourage initiatives that aim to reduce sediment and nutrient inputs to the area.	Scotland's Environmental and Rural Services (SEARS).	Landowners and land managers.
5 Encourage people to use best practice land-drainage techniques.	FCS, Scottish Government Rural Payments and Inspections Directorate (SGRIPD).	Landowners and land managers.

Work in progress	Who is involved
Salmon LIFE project - fencing off 26 miles of riverbank to protect from overgrazing. The work is completed but maintenance and monitoring is ongoing. http://www.snh.org.uk/salmonLIFEproject/index.asp	Scottish Natural Heritage SNH, Esk District Salmon Fishery Board (EDSFB), Stirling University.
Scottish Water's Quality and Standards 3b investment programme – Brechin WwTWs due for upgrade during April 2010 to March 2014 but still to be agreed by ministers. SEPA and SW are consulting on any infrastructure issues and any need for improvement.	Scottish Water, SEPA, Scottish Government.
Restoration proposals for the Pow Burn.	Esk Rivers and Fisheries Trust (ERFT), FCS/FE.
River South Esk Code of Practice for Developers (in draft).	SNH, Angus Council, SEPA.
Collaborative and individual SRDP applications.	SEARS, landowners and land managers.
Forest Design Plans – Glen Doll and Montreathmont.	FCS
New developments need sustainable drainage systems SUDs to be built for surface-water drainage which will help with pollution from surface water run-off in urban areas.	SEPA, developers.
Priority catchments raising awareness project. Where diffuse pollution is known to be causing problems this project will raise awareness of it, its causes and measures that can be taken. Also, natura site interests and how these should be managed; the legal requirements and opportunities available under SRDP and the River Restoration Fund.	SNH, SEPA, project officer, steering group.

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Water resources** – improvements in water quality will protect water used for irrigation purposes and as a back-up drinking water supply.
- **River engineering** – land drainage practices have contributed to poor water quality in some parts of the area. This mainly relates to sediment in watercourse from agricultural and moorland drainage, which has been carried out without any controls.
- **Habitats and species** – improvements in water quality should benefit the habitats and species they support within the area such as salmonids and freshwater pearl mussel.
- **Social and economic factors** – the main sources of income within the area such as agriculture, forestry, fisheries, industry, and river-related recreation and tourism all rely on good water quality.
- **Delivering the plan** – effective communication and working in partnership is essential in delivering improvements in water quality.

See also:

Appendix F: The main Acts of Parliament which are relevant

Appendix G: The main plans, policies, strategies, programmes and projects

Appendix H: Best practice guidance

Appendix L: Glossary

Appendix M: Acronyms and abbreviations

4.1 Action card – Water quality

Strategic aim

To maintain and improve the quality of water within the area.

Area aim

2. To raise awareness and understanding of how to avoid pollution from agricultural, forestry, public wastewater, private wastewater, surface water, road run-off, and industrial sources.

Why is this needed?

There are already several Acts of Parliament and best practice guidance designed to prevent the deterioration of water quality. These include:

- Good Agricultural and Environmental Conditions (GAEL);
- the Water Framework Directive Controlled Activities Regulations; and
- the Prevention of Environmental Pollution from Agricultural Activity (PEPFAA) Code.

However, people often are just not aware of these laws and guidance. By raising awareness of existing laws and best practice guidance, we can achieve a lot in terms of improvements to the quality of water within the area.

What are the benefits?

Raising awareness should lead to more people keeping to the laws and best-practice guidance, and so water quality will improve. Good water quality is central to how the area functions and the habitats and species it supports such as freshwater pearl mussel and salmonids. Good water quality is also needed for the economic uses it serves such as irrigation and drinking water, even as a backup supply.

Table of action

New actions required	Who needs to implement action	Who needs to be involved
6 Develop a promotional strategy for raising awareness of maintaining septic tanks.	**Project officer**, steering group.	Landowners and land managers.
7 Develop and publish a reference guide that will highlight the relevant legal requirements and methods of best practice for improving water quality.	**Project officer**, steering group.	Landowners and land managers.
8 Develop a varied programme of events to raise awareness of the relevant legal requirements and best-practice methods for improving water quality among a variety of sectors.	**Project officer**, steering group.	Landowners and land managers.

Work in progress	Who is involved
Salmon LIFE project - fencing off 26 miles of riverbank to protect from overgrazing. The work is completed but maintenance and monitoring are ongoing. Produce a website raising awareness of the project. http://www.snh.org.uk/salmonLIFEproject/index.asp	Scottish Natural Heritage SNH, Esk District Salmon Fishery Board (EDSFB) Stirling University, landowners and land managers.
Various leaflets and guidance are available as hard copy or on the internet, for example, SEPA septic tanks – important changes when controlling small release of sewage from private premises.	Scottish Environmental Protection Agency (SEPA), Scottish Water.

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Water resources** – improvements in the quality of water will protect water used for irrigation purposes and as a backup drinking water supply.
- **Habitats and species** – improvements in water quality should benefit the habitats and species they support within the area such as salmonids and freshwater pearl mussel.
- **Social and economic factors** – raising awareness of the area among schools and within the community should help people to understand the need for good water quality.
- **Delivering the plan** – effective communication and working in partnerships is essential to delivering improvements in the quality of water.

See also:

Appendix F: Key relevant legislation
Appendix G: Key plans, policies, strategies, programmes and projects
Appendix H: Best practice guidance
Appendix L: Glossary
Appendix M: Acronyms and Abbreviations.

4.2 Action card – Water resources

Strategic aim

To encourage the long-term use and management of the area's water resources.

Area aim

3. To encourage management and use of water for private water supplies, industrial and agricultural purposes which will be effective in the long term.

Why is this aim needed?

Low flows can affect the general ecology of the river including salmonids and freshwater pearl mussels whose habitats and life cycles can be threatened by lack of water. The amount of water in the area is affected by the climate, which is likely to change in future years as a result of climate change. As a result, there could be more pressure on existing water resources. Currently the main use of the area's water resources is for agricultural purposes. This is because the public water supply for those living in the area comes from outside the area, from Lintrathen and Backwater reservoirs. There are some private water supplies within the area but as these are not licensed, it is impossible to tell how much water is used for private water supplies. Water taken for agricultural purposes is licensed by SEPA, and a recent review of these licences has given us a better picture of the amount being taken. However, current information on these rates is still inaccurate as water use is not metered at the pump. Some users will use less than their abstraction licence rate, and some will use more.

What are the benefits?

Storing and capturing water in times of plenty for use in times of low flows can help reduce the effect on the environment. There could also be an economic benefit as crops will be less likely to fail if there is enough water for irrigation in times of need. Increasing storage on floodplains such as through riparian woodland, buffer strips, and wet grassland also increases biodiversity because when new habitats are created, species will colonise these and take advantage of food sources and shelter.

Table of action

New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
9 Actively encourage people to record accurate abstraction rates within the area.	Scottish Environmental Protection Agency **(SEPA).**	Land owners and land managers.
10 Promote off-line winter water storage systems, reservoirs where excess streamflow is diverted to prevent flooding, using existing financial methods (SRDP, SEPA's charging schemes).	Scottish Government Rural Payments and Inspections Directorate (**SGRIPD**) SEPA.	Land owners and land managers.
11 Promote other, new methods for storing water other than off-line storage.	SGRIPD, SEPA.	Land owners and land managers.
Work in Progress	**Who is involved**	
People are already meeting the controlled activity regulations under the Water Framework Directive and Good Agricultural and Environmental Condition under the single farm payment.	SGRIPD, SEPA, landowners and land managers.	
Monitoring river levels (available on the SEPA website).	SEPA	

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action card

- **Habitats and species** – if irrigation ponds or other ponds within the area are no longer used for their original purpose, they are sometimes then stocked with fish such as rainbow trout, which could threaten native fish if they then escape. However, licensing controls for introducing new species of fish, which are enforced by the Freshwater Fisheries Laboratory at Pitlochry, should prevent this from happening. More long-term use of the water resource will benefit the general ecology of the river by reducing,as far as possible, the effects of low flows on spawning habitats and so on.
- **Social and economic factors** – water shortages can affect all of the main industries which generate an income within the area, such as farming, forestry, fisheries, industry, renewable energy and river–related recreation and tourism. This is because they all use water in some way.

See also:

Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

Appendix H: Best practice guidance

Appendix L: Glossary

Appendix M: Acronyms and Abbreviations.

4.2 Action card – Water resources

Strategic aim

To make sure the area's water resources are used and managed effectively over the long term.

Area aim

4. To raise awareness of methods of best practice relating to managing water resources effectively over the long term.

Why is this aim needed?

Capturing and storing water for use in times of water shortage can help deal with the demand for water and in turn avoid negative effects on the environment. However, there is currently limited water storage in the area with only a handful of irrigation ponds. It is likely that people are not aware of the financial incentives available for water storage. Catching water such as from polly tunnels is a relatively new technology but may be a useful technique in the future.

What are the benefits?

Capturing and storing water in times of plenty for use in times of low flows can help deal with the effects on the environment. There could also be direct benefits as crops will be less likely to fail if there is enough water for irrigation. And fisheries are likely to be more productive if there is enough water to support all the stages of salmonid life cycles.

Table of action

New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
12 Produce an information leaflet showing methods of capturing and storing water.	**Project officer,** Steering group.	Landowners and land managers.

Work in Progress	Who is involved
Scottish Rural Development Programme – 'Business re-structuring' financial packages relates to storing water.	Scotland's Environmental and Rural Services (SEARS), landowners and land managers.

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Habitats and species** – if irrigation ponds or other ponds within the area are no longer used for their original purpose, they are sometimes then stocked with fish such as rainbow trout, which could threaten native fish if they then escape. However, licensing controls for introducing new species of fish, which are enforced by the Freshwater Fisheries Laboratory at Pitlochry, should prevent this from happening. More long-term use of the water resource will benefit the general ecology of the river by reducing,as far as possible, the effects of low flows on spawning habitats and so on.
- **Social and economic factors** – water shortages can affect all of the main industries which generate an income within the area, such as farming, forestry, fisheries, industry, renewable energy and river–related recreation and tourism. This is because they all use water in some way.

See also:

Appendix F: Key relevant legislation.

Appendix G: Key plans, policies, strategies, programmes and projects.

Appendix H: Best practice guidance.

Appendix L: Glossary.

Appendix M: Acronyms and Abbreviations.

4.3 Action card – Flood management

Strategic aim

To make sure, where possible, we use a long-term approach to managing floods, recognising the effect on people's lives and livelihoods.

Area aims

5. To be aware of the risk of flooding and encourage consultation from the appropriate agencies.

Why is this aim needed?

Flooding was raised as a major issue within the area at both public meetings during the issues document consultation period. This was because of the effects they have on people's lives and livelihoods. Flooding can lead to financial losses from flood damage and a drop in property prices, and can be a significant health and safety risk. Brechin last suffered serious flooding in 2002 and is waiting for a flood alleviation scheme. Other areas have also suffered from flooding in the past (including Bridge of Dun, Finavon and agricultural land in Glen Clova). Being aware of flood risk and the measure that people can take is central to reducing as far as possible the effect flooding can have. However, it is also necessary that in areas prone to flooding, flood alleviation measures are put in place to reduce the risk of flooding. And, consultation should take place between the appropriate agencies and the people who are affected at all stages of the process of developing measures to deal with flooding.

What are the benefits?

Raising awareness of measures individuals can take in flood-prone areas should help to reduce the effect that flooding has on people's lives and livelihoods. Good communication and consultation between agencies and the public will also help to improve understanding of both the problems of flooding and the possible solutions.

Table of action

New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
13 Actively encourage good communication between relevant authorities and the public over flooding at Brechin and other areas prone to flooding.	Steering Group.	General public.
14 Actively encourage the use of current flooding information sources (SEPA's Floodline and flood maps) that provide information on protection against flooding.	Steering Group.	General public.

Work in Progress	Who is involved
SEPA's Floodline and Flood Maps provide information. See http://www.sepa.org.uk/flooding.aspx	Scottish Environmental Protection Agency (SEPA).
Brechin flood scheme – public meetings have been held to let the public know about progress towards developing a flood alleviation scheme.	Angus Council, Scottish Natural Heritage (SNH), SEPA, general public.

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **River engineering** – some engineering of rivers has been carried out in the past to try and solve the problem of flooding. However, often the problem of flooding relates to lack of floodplain storage due to how the floodplains have been developed and used. Creating more floodplain storage within the area and restoring some engineering channels should help to deal with flooding problems.
- **Delivering the plan** – building on better working relationships between agencies, organisations and the general public is a central aim that we hope to achieve with the plan.

See also:

Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

Appendix H: Best practice guidance

Appendix L: Glossary

Appendix M: Acronyms and Abbreviations.

4.3 Action card – Flood management

Strategic aim

To make sure, where possible, we provide a long-term approach to managing floods, recognising the effect on people's lives and livelihoods.

Area aim

6. To help promote long-term methods of managing floods and new technology if this is appropriate.

Why is this aim needed?

Flooding is a common problem to most areas, and the South Esk area is no exception. The new Flood Directive will bring about changes in how the risk of flooding is managed and the flooding itself, with a much greater emphasis on long-term solutions. This will include an area-based approach. This plan has an important role to play in helping promote this kind of management, recognising that all management in the area should be considered in context, rather than in isolated units.

What are the benefits?

Managing floods over the long term includes 'natural flood management', which is an area-based approach, that aims to:

- reduce the rate of run-off in the uplands;
- reduce the rate of flow in the watercourse; and
- increase water storage in the lowlands.

This approach is likely to benefit the people in the area who are affected by flooding, though how significantly is currently being investigated. It will also benefit the general environment by moving away from hard engineering solutions, if this is appropriate, and linking natural river processes with planning for how land is used. It may also significantly help to tackle the causes of flooding rather than the effects. Though it is impossible to measure the potential effect of this at this time.

Table of action

New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
15 Actively encourage increased floodplain storage such as through creating riparian woodland, buffer strips, and wet grassland.	Steering Group.	
16 16 Promote best practice in managing land (for example, contour ploughing which slows water run-off during rainstorms, prevents soil erosion and allows water time to settle into the soil) as opposed to bare fallow farming which does not.	Steering Group.	

Work in Progress	Who is involved
Promoting sustainable drainage systems (SUDS across the area to help reduce the effect of excess flows.	Scottish Environmental Protection Agency (SEPA).
Current SRDP applications are in place for buffer strips and riparian woodland (in progress) that will indirectly benefit floodplain storage.	Scotland's Environmental and Rural Services (SEARS), Landowners and land managers.
Cross compliance for controlled activity regulations under Water Framework Directive and GAEC under single farm payment.	Scottish Government Rural Payments and Inspections Directorate (SGRIPD), SEPA.

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Habitats and species** – creating floodplain storage using buffer strips, riparian woodland and wet grassland will directly benefit many habitats and species.

See also:

Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

Appendix H: Best practice guidance

Appendix L: Glossary

Appendix M: Acronyms and Abbreviations.

4.4 Action card – River engineering

Strategic aim

To encourage the natural flow of the area.

Area aim

7. To promote river engineering which will be effective and not harm the environment in the long term.

Why is this aim needed?

In the past, the watercourses of the area have been engineered for a number of different purposes including:

- managing fisheries;
- helping to deal with flooding;
- protecting riverbanks from being worn away; and
- creating reservoirs.

This has lead to effects on the habitats and species the area supports, while not necessarily having achieved the desired result for which the engineering was carried out in the first place.

What are the benefits?

The action will prevent further damage to the water environment from inappropriate river engineering while recognising that some engineering is needed and, if carried out appropriately, can have little effect on the environment. Using long-term river engineering techniques will also prevent further deterioration of the environment and its habitats and species. This will help meet Water Framework Directive targets of achieving 'good ecological status'.

Table of action

New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
17 Promote existing guidance on best practice and information sources on river engineering techniques to all land managers and users.	Esk Rivers and Fisheries Trust (ERFT) /Fishery Board, Scottish Environmental Protection Agency **(SEPA)**, Scottish Natural Heritage (SNH).	Land owners and land managers.
18 Promote ecological survey work before river engineering proposals through pre-licence or pre-planning application discussions.	SEPA, SNH, Angus Council.	Land owners and land managers.
19 Encourage people to use best-practice land drainage techniques.	SEPA, Scottish Government Rural Payments and Inspections Directorate (SGRIPD), Esk District Salmon Fishery Board (EDSFB).	Land owners and land managers.
Work in progress	**Who is involved**	
Various site-specific ecological surveys are being carried out before engineering work is carried out around the watercourse.	Angus Council.	
Current regulations and guidance (CAR Regs, Working Around Water, Pools, Ponds and Lochans).	SEPA, Angus Council.	

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Water quality** – long-term effective river engineering should help to reduce, as far as possible, riverbanks from wearing away compared to less sustainable river engineering. This will then reduce sediment in the area.
- **Managing floods** – the forthcoming Flood Bill will place greater emphasis on long-term management of floods, moving away from traditional engineering solutions, and looking to new effective solutions.
- **Habitats and species** – long-term river engineering will have benefits for habitats and species such as Atlantic salmon and freshwater pearl mussel.

See also:

Appendix F: Key relevant legislation
Appendix G: Key plans, policies, strategies, programmes and projects
Appendix H: Best practice guidance
Appendix L: Glossary
Appendix M: Acronyms and Abbreviations.

4.4 Action card – River engineering

Strategic aim

To encourage the natural flow and function of the area.

Area aim

8. To raise awareness of regulations relating to river engineering.

Why is this aim needed?

Raising awareness of regulations relating to river engineering should make sure more people keep to them. This will then mean that engineering activities are carried out in a controlled way to prevent further deterioration of the water environment.

What are the benefits?

To prevent further damage to the water environment from inappropriate river engineering whilst recognising that some engineering is necessary and if carried out appropriately can have minimal environmental effects. To prevent further deterioration of the water environment and its habitats and species, and to help meet Water Framework Directive targets of achieving 'good ecological status'.

Table of action

New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
20 Organise a series of drop-in sessions around the area to promote the regulations relating to river engineering.	Scottish Environmental Protection Agency **(SEPA)**, Angus Council, Project officer.	Landowners and land managers.

Work in progress	Who is involved
Various leaflets and best-practice guides relating to CAR regulations, fisheries management and so on are already produced.	SEPA

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Water quality** – land drainage practices for agriculture and moorland management have not always been carried out in line with best-practice guidelines. This then contributes to poor water quality in some parts of the area as a result of sediment being released.
- **Habitats and species** – river engineering over the long term will have benefits for habitats and species such as Atlantic salmon and freshwater pearl mussel. In the past, traditional techniques have lead to problems with the habitat such as loss of spawning habitat due to in-river work.
- **Delivering the plan** - raising awareness.

See also:

Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

Appendix H: Best practice guidance

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Appendix M: Acronyms and Abbreviations.

4.4 Action card – River engineering

Strategic aim

To encourage the natural flow and function of the area.

Area aim

9. To identify and act on opportunities for restoration within the area.

Why is this aim needed?

Some practices for managing the land now and in the past are having a negative effect on the area. River engineering and practices to drain the land, if not carried out to best-practice standards, can damage the water environment. Identifying areas for restoration in the area will allow opportunities to restore and improve the water environment while including best-practice techniques. Restoration opportunities should also include increasing the stability of the bank (where appropriate) to avoid too much sediment being released from man-made sources.

What are the benefits?

The action will restore some degraded watercourses and habitats, and prevent further deterioration of the water environment and its habitats and species. It will also help meet Water Framework Directive targets of achieving 'good ecological status'.

Table of action

New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
21 Take on the good examples of river restoration techniques from similar areas.	Steering group.	Land owners and land managers.
22 Develop restoration proposals for the Rottal, Pow and Lemno Burns, and identify and prioritise other watercourses for restoration.	Esk Rivers and Fisheries Trust (ERFT)/ Esk District Salmon Fishery Board **(EDSFB).**	Land owners and land managers.
23 Identify and prioritise action to remove man-made obstacles to fish, and make sure future engineering work is both fish- and eel-friendly.	**ERFT/EDSFB.**	Land owners and land managers.
Work in progress	**Who is involved**	
Salmon LIFE project - fencing off 26 miles of riverbank to protect from overgrazing. The work has been completed but maintenance and monitoring is ongoing. See http://www.snh.org.uk/salmonLIFEproject/index.asp	Scottish Natural Heritage (SNH), EDSFB, Stirling University, Landowners and land managers.	
Forestry restructuring – Adielinne burn, Glen Clova.	ERFT landowner.	
Scottish Government consultation on 'Restoration of the Water Environment' January 2009: See http://www.scotland.gov.uk/Publications/2008/12/18145403/0	Scottish Government.	
Funding available through SEPA's Water Environment Restoration fund. See http://www.sepa.org.uk/water/river_basin_planning/restoration_fund.aspx	Scottish Environmental Protection Agency (SEPA).	

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Water quality** – land drainage practices have contributed to poor water quality in some parts of the area. This mainly relates to sediment going into watercourses from agricultural and moorland drainage, which have been carried out without being controlled.
- **Habitats and species** – long-term effective river engineering will have benefits for habitats and species such as Atlantic salmon and freshwater pearl mussel. In the past, traditional techniques have lead to problems with the habitat such as loss of spawning habitat due to in-river work.

See also:

Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

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4.4 Action card – River engineering

Strategic aim

To encourage the natural flow and function of the area.

Area aim

10. To develop some of the area as a demonstration site.

Why is this aim needed?

Demonstration projects can help to raise awareness of best-practice techniques both within and outwith the area, along with raising the profile of the area to a wider audience. They can also help to attract further funding opportunities.

What are the benefits?

There can be social and economic benefits from demonstration projects, such as raising the profile of the area to a wider audience.

Table of action

New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
24 Identify what funding is available for specific projects suitable for demonstration.	Steering Group, **Project Officer.**	Land owners and land managers.

Work in progress	Who is involved
Salmon LIFE project - fencing off 26 miles of riverbank to protect from overgrazing. The work has been completed but maintenance and monitoring is ongoing. See http://www.snh.org.uk/salmonLIFEproject/index.asp	Scottish Natural Heritage (SNH), Esk District Salmon Fishery Board (EDSFB), Stirling University, landowners and land managers.
Restoration proposals for the Rottal and Pow Burns.	Esk Rivers and Fisheries Trust (ERFT), Forestry Commission Scotland (FCS), Landowners and land managers.

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Habitats and species** – long-term effective river engineering will have benefits for habitats and species such as Atlantic salmon and freshwater pearl mussel. In the past, traditional techniques have lead to problems with the habitat such as loss of spawning habitat due to in-river work.
- **Social and economic factors** – demonstration projects can attract more funding, raise the profile of the area to a wider audience and have educational opportunities.

See also:

Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

Appendix H: Best practice guidance

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Appendix M: Acronyms and Abbreviations.

4.5 Action card – habitats and species

Strategic aim

To maintain and improve the native habitats and species within the area.

Area aim

11. Protect and improve native species and habitats, particularly those which are protected by law.

Why is this aim needed?

The River South Esk is a Special Area of Conservation for Atlantic salmon and freshwater pearl mussel. However, monitoring carried out by SNH has found that both species are currently in an unfavourable condition. This means that they are not as healthy as they should be for a variety of reasons, which include:

- some tributaries having downgraded water quality;
- there is a lack of suitable habitat; and
- illegal pearl mussel fishing.

There are also problems when managing salmonids to do with overfishing, the fish being hunted and not enough food for the fish to eat. Mixed-stock netting stations along the coast and rod fisheries (angling) are helping to reduce salmonid stocks. But, we must remember that both also provide a livelihood and income. Species considered to be to blame for reducing salmonid numbers are fish-eating birds and seals. However, both are native to the area and so are protected. As a result they can only be killed under licence. These present challenges for the managing the habitats and species within the area over the long term.

What are the benefits?

Some species such as salmonids are economically important to the area. Habitats also form the backbone of the landscape of the area, and species such as otters are a magnet for local visitors and tourists. Both habitats and species contribute to the environmental health of the area, which many people enjoy for recreational purposes.

Table of action

New Actions required	Who needs to implement action (lead in bold)	Who needs to be involved
25 Actively change the structure of existing woodland to improve riparian habitats to benefit species.	Scotland's Environmental and Rural Services (SEARS) Forestry Commission Scotland **(FCS)**, Esk Rivers and Fisheries Trust (ERFT), Angus Council.	Land owners and land managers.
26 Actively create new riparian woodland in the area to extend the existing habitat network.	SEARS **(FCS)**, ERFT, Angus Council.	Land owners and land managers.
27 Actively create, restore and manage wetlands and wet grassland habitats.	SEARS **(SNH, SGRIPD)** .	Land owners and land managers.
28 Actively encourage best practice in relation to drainage to reduce sediment in the area.	SEARS, FCS, Scottish Government Rural Payments and Inspections Directorate (SGRIPD), Scottish Environmental Protection Agency (SEPA).	Land owners and land managers.
29 Actively encourage best practice in relation to preparing the ground to reduce sediment going into the river.	SEARS FCS, SGRIPD.	Land owners and land managers.
30 Identify gaps in the understanding of the role of Montrose Basin in the ecology (for example, in producing fish) of the area.	Scottish Wildlife Trust (SWT), SEPA, SNH, ERFT, Angus Council.	Land owners and land managers.
31 Support the expansion of the Cairngorms and the North East water vole project across the lower area.	SEARS Cairngorm National Park Authority (CNPA).	Landowners and land managers general public.
32 Adopt a 'river watch' scheme for reporting activities which could be illegal, for example relating to poaching, pearl mussel fishing, unauthorised tipping, and spreading invasive weeds.	ERFT/EDSFB, Tayside police, SNH.	Land owners and land managers general public.
33 Reduce fishing of spring running salmon and sea trout.	**EDSFB**	SNH, Marine Scotland.
34 Ensure mixed stock fisheries and other means of exploitation do not threaten stock status.	EDSFB	SNH, Marine Scotland.
35 Investigate the significance of different predators on fish to help license those animals which hunt fish.	**ERFT**	SNH
36 Actively encourage further research into the ecology of sea trout, eel and other fish species in the area.	SEPA, ERFT, EDSFB.	Academic organisations.

Work in progress	Who is involved
Salmon LIFE project - fencing off 26 miles of riverbank to protect from overgrazing. The work has been completed but maintenance and monitoring is ongoing. See http://www.snh.org.uk/salmonLIFEproject/index.asp	SNH, EDSFB, Stirling University, landowners and land managers.
South Esk Fisheries Management Plan 2008.	Esk Rivers and Fisheries Trust (ERFT).
Tayside LBAP – have developed HAPS and SAPs.	Tayside Biodiversity Partnership.
Angus Forest and Woodland Framework.	Angus Council.
Successful applications to the Rural Priorities grant, which is related to habitats and species, and beneficial land diversification management through Land Management Options.	Landowners and land managers, SEARS.
Montrose Basin Management Plan.	SWT
Glen Doll Forest Design Plan.	FCS
Water Vole Project.	CNPA

NB Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Water quality** – sediment and nutrients going into the water are the main issues relating to downgraded water quality which affect species such as salmonids and freshwater pearl mussels. Creating habitat can help to act as buffers to sediment and nutrients, preventing them reaching the river and watercourses.
- **Managing floods** – creating riparian woodland habitat, wetlands and wet grasslands can help create extra flood storage.
- **River engineering** – restoration proposals on watercourses such as the Rottal, Lemno and Pow Burns will benefit habitats and species.

See also:

Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

Appendix H: Best practice guidance

Appendix L: Glossary

Appendix M: Acronyms and Abbreviations.

4.5 Action card – habitats and species

Strategic aim

To maintain and improve the native habitats and species in the area.

Area aim

12. To raise awareness and understanding of the habitats and species in the area and the link between them.

Why is this aim needed?

There are some conflicts for managing habitats and species within the area such as salmonids where both the predator and the prey are protected species. Raising awareness of these links will help to promote a better understanding, which in turn should lead to better management.

What are the benefits?

Raising awareness of both native and invasive habitats and species within the area will help to improve understanding of their needs and also how they interact with each other. Both should help to encourage a sense of ownership within the area, in terms of protecting native habitats and species.

Table of action

New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
37 Raise awareness of protected habitats and species within the area and the non-native species which threaten them.	Scottish Natural Heritage (SNH), Esk Rivers and Fisheries Trust (ERFT), Project officer.	General public, landowners and land managers.
38 Provide widely the police leaflet relating to illegal pearl mussel fishing.	Steering Group, Project Officer.	General public, landowners and land managers.
39 Promote the Cairngorms and the North East water vole project across the lower area.	Cairngorm National Park Authority (CNPA), Scotland's Environmental and Rural Services (SEARS).	Landowners and land managers

Work in progress	Who is involved
Water Vole Project.	CNPA
Investigations into illegal freshwater pearl mussel fishing in the South Esk.	Police
Dissemination of alien species leaflet.	ERFT

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

Delivering the plan – raising awareness.

See also:

Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

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4.5 Action card – habitats and species

Strategic aim

To maintain and improve the native habitats and species within the area.

Area aim

13. To aim to have the area free of invasive non-native species.

Why is this aim needed?

There are a number of invasive non-native species already in the area, which include invasive weeds (Japanese knotweed, giant hogweed and Himalayan balsam), signal crayfish, mink, and rainbow trout. There are also a number of species, which could develop in the area if we do not do enough now to prevent this such as the salmonid parasite (Gyrodactylus glomorata). These can then threaten native species and habitats such as salmonids and freshwater pearl mussels. Non-native invasive species also have other negative effects on the environment. For example, when invasive weeds die back in autumn they leave large bare areas of riverbank that can be worn away, which contributes to a lot of sediment going into the area.

What are the benefits?

Some species such as salmonids are economically important to the area and generate income, but these are being threatened by some non-native invasive species such as mink and signal crayfish. Getting rid of invasive non-native weeds would help to improve water quality and bankside habitat. Giant hogweed also poses a danger to health, as the sap is poisonous. So getting rid of it from the area would benefit public health.

Table of action

New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
40 Investigate sources of funding for a programme to get rid of invasive weeds in the area based on co-ordinated action.	Esk Rivers and Fisheries Trust (ERFT).	Landowners and land managers, SEARS, Angus Council.
41 Support the development of a reporting system for all sightings of invasive non-native species, and a rapid response system as appropriate for new species.	ERFT.	Landowners and land managers, general public, SEARS.
42 Support the expansion of the Cairngorms and the North East water vole project across the lower area.	Scotland's Environmental and Rural Services (SEARS), Cairngorm National Park Authority (CNPA), Ranger Service, land managers.	Land owners and land managers.
Work in progress	**Who is involved**	
South Esk invasive weeds survey.	Esk District Salmon Fishery Board (EDSFB) /ERFT, Scottish Natural Heritage (SNH), Angus Council.	
Esk District Biosecurity plan 2009.	ERFT	
Scottish squirrel survey reporting system–reports of both red and grey squirrels wanted. This can be provided online at http://www.scottishsquirrelsurvey.co.uk/records.html	SWT	
Preparation of a bio-security leaflet.	ERFT	

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Water quality** – invasive weeds can contribute to downgraded water quality when they die back in autumn, exposing bare areas that then wear away, releasing sediments into the river.
- **River engineering** – restoring degraded watercourses can lead to benefits for habitats and species.
- **Social and economic factors** – non-native invasive species threaten species which are economically important such as salmonids.

See also:

Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

Appendix H: Best practice guidance

Appendix L: Glossary

Appendix M: Acronyms and Abbreviations.

4.6 Action card – social and economic factors

Strategic aim

To support the long-term use and enjoyment of the area for the benefit of current and future generations.

Area aim

14. To better understand how the economy of the area works.

Why is this needed?

There is a lack of information about how the area is used in relation to the income it provides. For example, without information that tells us who is using the area, and for what purposes, it is difficult to focus on the areas that can be developed further.

What are the benefits?

If we better understand how the economy of the area works, it will allow us to make a focused effort on developing areas that are not being used to the best effect.

Table of action		
New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
43 Identify shortfalls in information and encourage research.	Steering group, Cairngorm National Park Authority (CNPA).	Academic organisations.
Work in progress	**Who is involved**	
Tourist Accommodation in Angus study, Richard Gerald Associates.	Angus Council.	
Scottish Government – agricultural census.	Scottish Government.	
Fisheries – information on numbers caught	Esk District Salmon Fishery Board (EDSFB).	
Forestry statistics.	Forestry Commission Scotland (FCS).	
Agriculture – information on the single farm payment.	Scottish Government Rural Payments and Inspections Directorate SGRIPD.	

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Water quality** – we need good water quality for people to earn a living (farming, forestry, fisheries, industry, renewable energy, and river-related tourism and recreation).
- **Water resources** – the water resource is crucial for watering crops and as a private drinking water supply and backup public supply. If managed well, there should be enough water for everyone to use.
- **Managing floods** – the social and economic benefits to people from improved methods of managing floods should reap benefits in terms of reduced risk of damage to homes and reduced health and safety risks.
- **River engineering** – demonstration projects can lead to social and economic benefits in terms of education and raising awareness to a wider audience.
- **Habitats and species** – the reduction of salmonid stocks can lead to reduced economic benefits. As a result, any action being taken to improve salmonid stocks should benefit the local economy.

See also:

Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

Appendix H: Best practice guidance

Appendix L: Glossary

Appendix M: Acronyms and Abbreviations.

4.6 Action card – Social and economic factors

Strategic aim

To support the long-term use and enjoyment of the area for the benefit of current and future generations.

Area aim

15. To promote long-term economic development of the main methods of producing an income.

Why is this needed?

There are many people that use the area's resources for their livelihoods and enjoyment (farming, forestry, fisheries, industry, renewable energy and river-related tourism and recreation). These economic forces also help to protect and improve the area, as long as they are carried out in a way that will work over the long term. The aim of this plan is to provide a framework for management that will pull together those who use the area and help support economic development which will be effective over the long term but is not damaging to the environment.

What are the benefits?

There are many social and economic benefits including;

- maintaining people's livelihoods and incomes;
- making sure the area can support the land uses and industries it is needed for; and
- an improved quality of life through appreciating and enjoying the wildlife, habitats and landscapes in the area.

Table of action

New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
44 Actively encourage individual, community and business groups to use SRDP and other funding opportunities across all sectors.	Scotland's Environmental and Rural Services (SEARS).	RuralDirect, Business Gateway, Landowners and land managers.
45 Support conservation measures which improve the economic value of angling tourism.	Esk District Salmon Fishery Board (EDSFB).	Landowner and land managers.
46 Support business groups such as the Outdoor Angus Group in developing opportunities for tourism focusing on activities.	Angus Council.	Private sector Business Gateway, Visit Scotland, Scottish Enterprise.
47 Encourage best practice to balance the income produced with long-term effective management.	Angus Council, SEARS.	Land owners and land managers.
48 Support initiatives to enhance communication provision within the catchment.	Angus Council, Scottish Government.	

Work in progress	Who is involved
More organisations applying for SRDP, LEADER and other sources of funding.	SEARS, Landowners and Land managers.
Business support activities.	Business Gateway, Angus Council and Scottish Enterprise.

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Water quality** – we need good water quality for people to earn a living (farming, forestry, fisheries, industry, renewable energy, and river-related tourism and recreation).
- **Water resources** – the water resource is crucial for watering crops and as a private drinking water supply and backup public supply. If managed well, there should be enough water for everyone to use.
- **Managing floods** – the social and economic benefits to people from improved methods of managing floods should reap benefits in terms of reduced risk of damage to homes and reduced health and safety risks.
- **River engineering** – demonstration projects can lead to social and economic benefits in terms of education and raising awareness to a wider audience.
- **Habitats and species** – the reduction of salmonid stocks can lead to reduced economic benefits. As a result, any action being taken to improve salmonid stocks should benefit the local economy.

See also:

Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

Appendix H: Best practice guidance

Appendix L: Glossary

Appendix M: Acronyms and Abbreviations.

4.6 Action card – social and economic factors

Strategic aim

To support the long-term use and enjoyment of the area for the benefit of current and future generations.

Area aim

16. To support management, promotion and long-term development of the area for recreation, community, culture and education.

Why is this needed?

There are many people who use the area for recreation such as canoeing, walking, angling, bird watching, and cycling. The area also has a rich cultural history as well as a number of communities living and using the area for a variety of purposes. There will likely be opportunities that haven't yet been explored to further develop recreation, community, culture and education that this plan should investigate.

What are the benefits?

There are many social and economic benefits including:

- maintaining people's livelihoods and incomes;
- making sure the catchment can support the land uses and industries it is needed for; and
- an improved quality of life through appreciating and enjoying the wildlife and habitats that are in the area.

Table of action

New actions required	Who needs to implement action (lead in bold)	Who needs to be involved
49 Review and improve existing materials to inform people about the area	Steering Group, Project Officer.	Ranger Service, Cairngorm National Park Authority (CNPA).
50 Encourage path links along the river to create a 'source to sea' riverside route.	Steering Group.	
51 Support the development of educational resources.	Project Officer.	RHET Angus Countryside Initiative, SCAET, schools.

Work in progress	Who is involved
Salmon in the Classroom Project.	Scottish Natural Heritage (SNH), Scottish Natural Heritage (EDSFB), Esk Rivers and Fisheries Trust (ERFT).
Angus Draft Core Paths Plan.	Angus Council.
Angus Council Ranger Service.	Angus Council, CNPA.
SWT ranger service and visitor centre.	Scottish Wildlife Trust (SWT), Angus Council.
FCS Glen Doll forest Design Plan.	Forestry Commission Scotland (FCS), Landowners and land managers.

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards

- **Water quality** – we need good water quality for people to earn a living (farming, forestry, fisheries, industry, renewable energy, and river-related tourism and recreation).
- **Water resources** – the water resource is crucial for watering crops and as a private drinking water supply and backup public supply. If managed well, there should be enough water for everyone to use.
- **Managing floods** – the social and economic benefits to people from improved methods of managing floods should reap benefits in terms of reduced risk of damage to homes and reduced health and safety risks.
- **River engineering** – demonstration projects can lead to social and economic benefits in terms of education and raising awareness to a wider audience.
- **Habitats and species** – the reduction of salmonid stocks can lead to reduced economic benefits. As a result, any action being taken to improve salmonid stocks should benefit the local economy.

See also:

Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

Appendix H: Best practice guidance

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Appendix M: Acronyms and Abbreviations.

4.7 Action card – delivering the plan

Strategic aim

To make sure the final plan is put into practice in good time, through effective communication and working in partnership.

Some action mentioned in the plan is already being carried out but the continued work and support of the Catchment Partnership should help to make sure they continue to be put into practice. Many of the new actions identified in the draft plan need to be put into practice after the intended launch of the final plan in December 2009. It will not be possible to take forward all of the action at once. As a result, members of the steering group and the wider Catchment Partnership will need to meet to agree the priorities and set timescales. We then hope that 'implementation groups' made up of members of the steering group and the wider Catchment Partnership will be set up to take forward specific action. This will also involve getting other people involved such as landowners and land managers and other organisations within the area as appropriate. Putting the plan into action is likely to the project officer to continue to act as a central co-ordinator.

The plan will be a living document, and so will need to be regularly reviewed and updated with new action.

Area aim

17. To look at the partnership and members of staff needed to co-ordinate the plan and put it into practice.

Why are these aims needed?

There are a number of aims that cut through all of the sections of the plan (water quality, water resources, managing floods, river engineering, habitats and species and social and economic factors), which have been pulled together in this one action card.

What are the benefits?

Putting the plan into action is essential for the future development of the area.

Table of action

New actions required	Who needs to implement action(lead in bold)	Who needs to be involved
52 Pull together a summary of all sources of funding available for putting the plan into practice.	Project Officer	
53 53 Develop an up-to-date database of landowners and land managers within the area and show their ownership and tenancy in map form.	Project Officer	
54 Develop a 'source to sea' video and other materials to help inform the public.	Project Officer, Angus Council	
55 Develop an independent website for the South Esk, or develop the site in its present location.	Project Officer	
56 Go to public events such as the Angus show, under the banner of the South Esk Catchment Partnership.	Project Officer, Steering Group	
57 Promote the idea of including the plan in relevant plans and strategies.	Project Officer, Steering Group	
58 Encourage academic involvement with the area	Project Officer, Steering Group	
59 After the plan is launched, develop a programme to put action into practice.	Project Officer, Steering Group	
60 Build better working relationships between agencies, organisations and the general public.	Project Officer, Steering Group	
61 Raise awareness of the plan and what it is trying to achieve.	Project Officer, Steering Group	
62 62 Identify gaps in knowledge and information through all sections of the plan and aim to put the situation right.	Project Officer, Steering Group	
63 Set up a monitoring programme to assess how effective the plan is.	Project Officer, Steering Group	
64 The plan needs to take into account effects of climate change when it is revised in the future.	Project Officer, Steering Group	
65 Maintain the South Esk Steering Group.	Project Officer, Steering Group	

Ongoing Projects Work in Progress	Who is involved
Database of landowner contact details.	Project officer.
South Esk webpage – Angus Ahead http://www.angusahead.com/southesk	Project officer, Angus Council.

Landowners and land managers include agents, contractors and others working on behalf of landowners and land managers.

Links to other action cards
The area and actions in the action card for delivering the plan link with all of the other action cards as these actions cut through all topic areas.

See also:
Appendix F: Key relevant legislation

Appendix G: Key plans, policies, strategies, programmes and projects

Appendix H: Best practice guidance

Appendix L: Glossary

Appendix M: Acronyms and Abbreviations.

Appendix

Appendix A: Map of the South Esk catchment

Appendix B: Map of designated areas within the South Esk catchment

Appendix C: Map of the Strathmore and Fife Nitrate Vulnerable Zone (NVZ)

Appendix D: Members of the South Esk Catchment Partnership

Appendix E: Invasive non-native species already present in the catchment and those that pose a threat

Appendix F: The main laws which are relevant to the plan (in alphabetical order)

Appendix G: The main plans, policies, strategies, programmes and projects (in alphabetical order)

Appendix H: Best practice guidance

Appendix I: Ecological status assessments for the catchment

Appendix J: Map of the Tay Area Advisory Group Area

Appendix K: Map of status of the surface waters in the Tay area

Appendix L: Glossary

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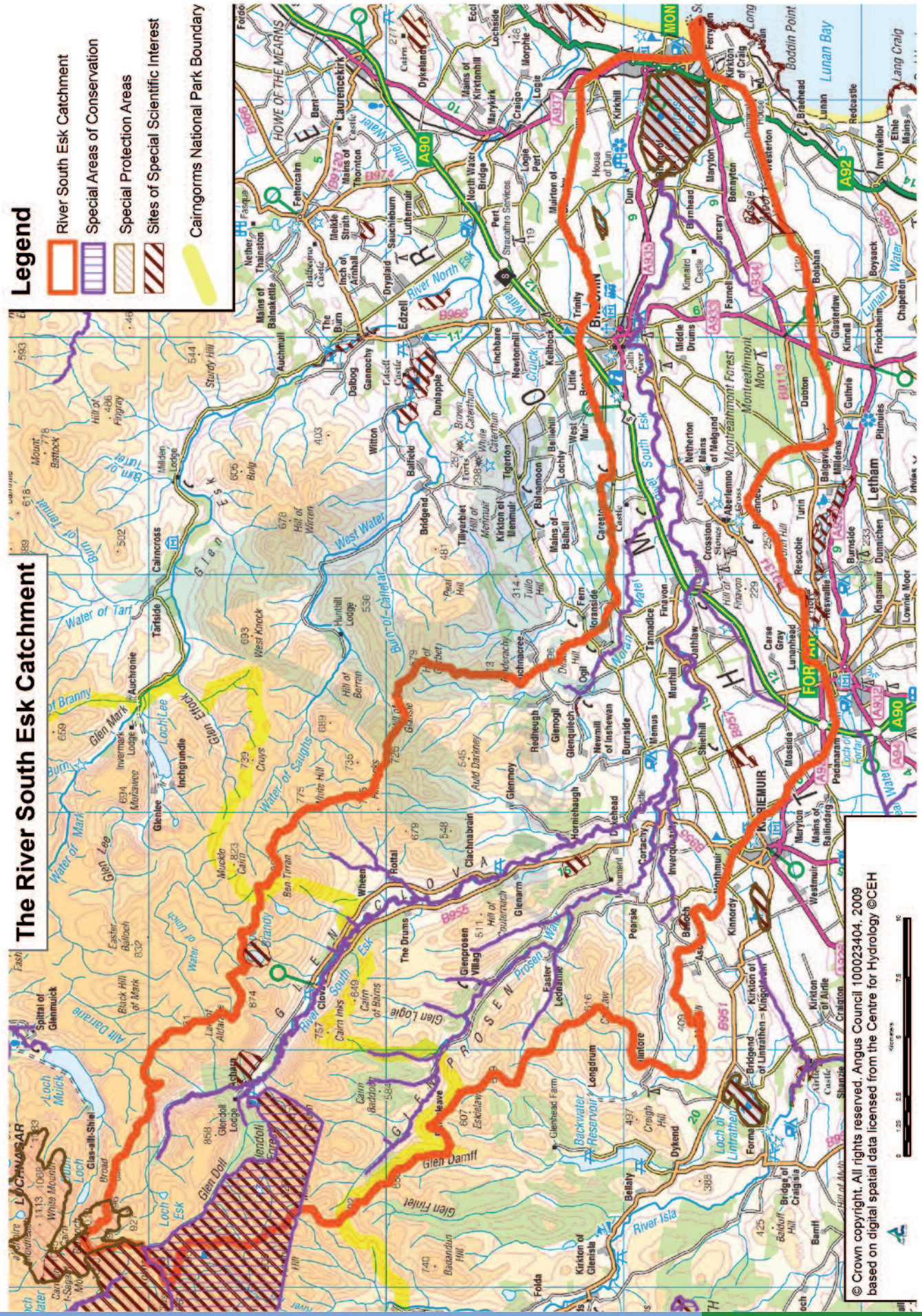
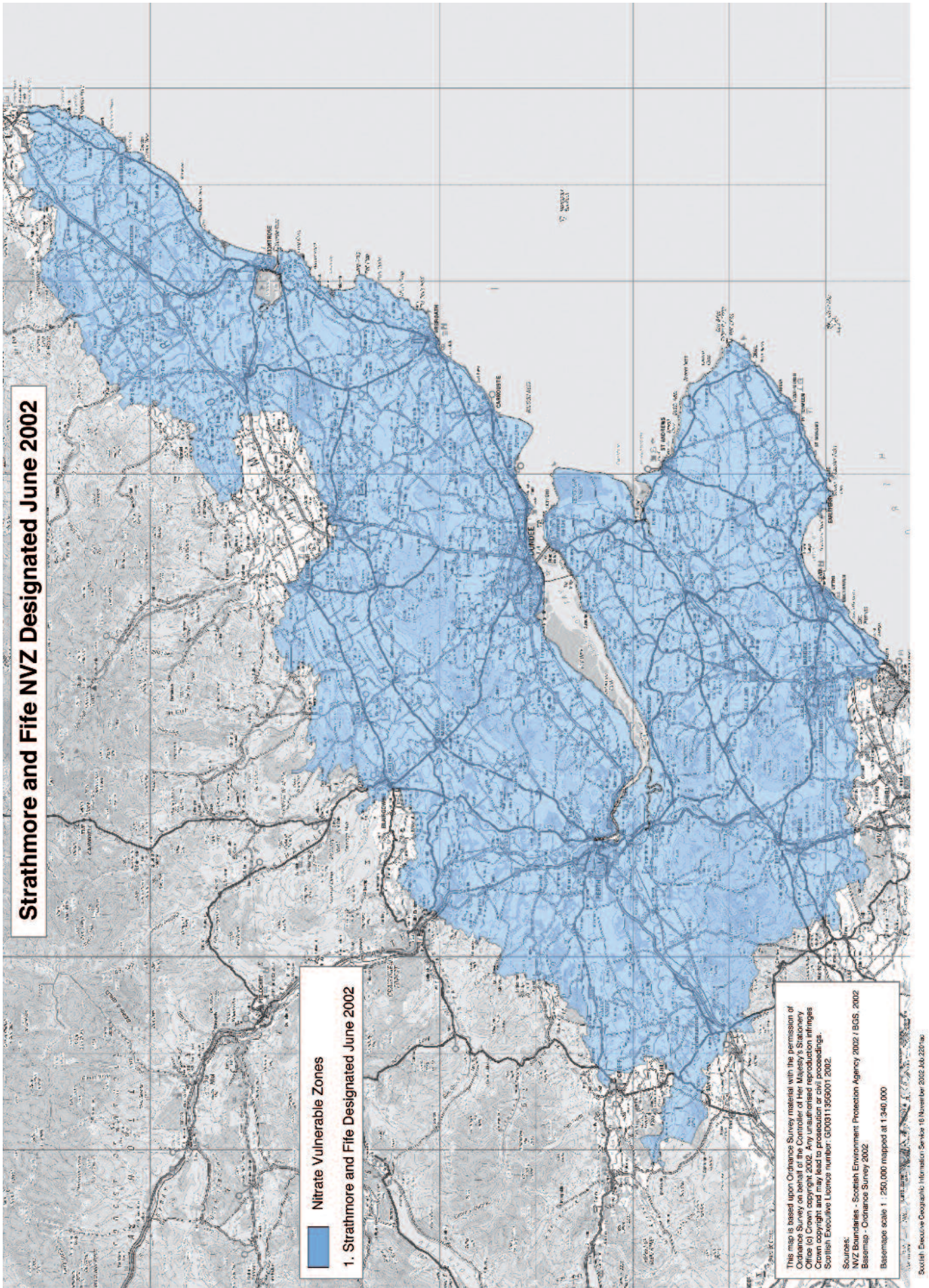
Appendix A: Map of the South Esk catchment

Appendix B: Map of designated areas within the South Esk catchment



Appendix C: Map of the Strathmore and Fife Nitrate Vulnerable Zone (NVZ)



Appendix D: Members of the South Esk Catchment Partnership

Angus Council (provide funding)
Economic Development Division, Planning and Transport, Roads
County Buildings
Market Street
Forfar
DD8 3WD
http://www.angus.gov.uk

Littlewood Land Care
25, Borrowfield Crescent
Montrose
ANGUS
DD10 9BR
www.littlewoodlandcare.co.uk

Scottish Government Rural Payments and Inspections Directorate (SGRPID)
Broxden Business Park
Lamberkine Drive
Perth
PH1 1RX
http://www.scotland.gov.uk/Topics/Agriculture

Cairngorms National Park Authority (CNPA)
14 The Square
Grantown on Spey
PH26 3HG
http://www.cairngorms.co.uk

Macaulay Institute (MLURI)
Craigiebuckler
Aberdeen
AB15 8QH
http://www.macaulay.ac.uk

Scottish Natural Heritage (SNH) (provide funding)
West Lodge
Airlie
By Kirriemuir
DD8 5NP
http://www.snh.org.uk

Esk District Salmon Fishery Board (EDSFB) (provide funding)
Woodside Croft
Ecclesgreig
St Cyrus
DD10 0DP
http://asfb.hub.uk.com/default.asp

National Farmers Union Scotland – Angus Branch (NFUS)
The Bungalow
Shandford
Fern
Brechin
DD8 7 RS
http://www.nfus.org.uk

Scottish Rural Property and Business Association (SRPBA)
The Cottage
Barclayhill
Guildtown
Perth
PH2 6AD
http://www.srpba.com

Esk Rivers and Fisheries Trust (ERFT) (provide funding)
Woodside Croft
Ecclesgreig
St Cyrus
DD10 0DP

Scottish Agricultural College – Farm Business Services (SAC)
77 North Street
Forfar
DD8 3BL
http://www.sac.ac.uk

Scottish Water
Water Framework Directive team
Juniper House
Heriot Walk Research Park
Avenue North
Edinburgh
EH14 4AP
http://www.scottishwater.co.uk

Forestry Commission Scotland (FCS)
Perth and Argyll Conservancy
Algo Business Centre
Glenearn Road
Perth
PH2 0NJ
http://www.forestry.gov.uk/scotland

Scottish Environment Protection Agency (SEPA)
Arbroath Office
62 High Street
ARBROATH
DD11 1AW
http://www.sepa.org.uk

Appendix E: Invasive non-native species already present in the catchment and those that pose a threat

Source: adapted from: 'Esk District Bio-security Plan' ERFT 2009
a) Invasive non-native species already present in the catchment.

MAMMALS	From where	Ways into the area	The effect	Action
Mink (Mustela vison)	Introduced form North America in the 1920s. Widely spread in the upper areas of the South Esk.	Many escaped from mink farms (not in the immediate area). Spread throughout the area.	Kills water fowl, small mammals and fish. Linked to the reduction of water voles in the Cairngorms National Park where 94% of sites where water voles lived in the 1950s are now empty.	There is a trapping policy in most estates in the Cairngorms National Park area. We are creating 'mink free' zones, which are surrounded by a ring of monitoring rafts to track and catch any incoming mink.
Grey squirrel (Sciurus carolinensis).	Grey squirrels are an alien species and were introduced to the UK from the USA in the late 19th and early 20th century.	Spreads through habitat networks and by eating food our native red squirrels would eat.	There are a very large number compared to our native red squirrel. They also carry the squirrel pox virus, which is fatal to red squirrels.	Trapping carried out across the country by individual landowners and red squirrel groups.

FISH	From where	Ways into the area	The effect	Action
Rainbow trout (Salmo gairdneri).	Farmed at Kinnaird on the South Esk. Introduced to ponds throughout the area for angling. There are no complete records of all the areas where the fish can be found.	The fish escape from fish farms and ponds. Some are deliberately introduced for angling purposes.	Fish transported for stocking can be a source of disease. Those which escape can compete for resources with native species. They may also be more able to withstand effects of climate change.	There are laws which control the health, movement and release of non-indigenous stocks. There are preventative measures in place to reduce the number which escape. We will survey the area for sources of rainbow trout.
Minnow (Phoxinus phoxinus) Translocational species.	Introduced to parts of Scotland from England and Wales. Widespread in most areas.	Natural movement along waterways.	Compete for food and territory with native species. Provides a source of food for kingfishers, herons, sawbill ducks, otters and other larger fish species.	None, except for a ban on using live bait.

CRUSTACEA	DISTRIBUTION	PATHWAYS	IMPACTS	MITIGATION
North American signal crayfish (Pacifasticus leniusculus).	One crayfish was caught in summer 2008 at Farnell on the Pow Burn.	Unlawful accidental introductions. They then spread naturally.	It burrows into riverbanks causing them to be less stable. Their diet includes small fish and invertebrates.	There are laws preventing their introduction or keeping them (without a licence). Controlling or getting rid of them involves using pyblast (a natural insecticide). Treatment in running waters is not always possible due to environmental regulations. Trapping may limit populations from developing.

PLANTS	From where	Ways into the area	The effect	Action
Nuttall's pondweed (Elodea nutallii).	One area in the upper Pow Burn, a tributary of the South Esk.	Garden plant trade. Escape from garden ponds. People getting rid of garden waste near waterways. Possibility of spreading seeds by birds and animals.	Dominates native plants living in the rivers and watercourses, which can lead to them dying out. It also affects local invertebrate communities. It removes metals from sediments and then releases them into the water.	
Canadian pondweed (Elodea Canadensis).	Throughout the middle and lower areas of most rivers and tributaries.	Garden plant trade. Escape from garden ponds. People getting rid of garden waste near waterways. Possibility of spreading seeds by birds and animals.	Dominates native plants living in the rivers and watercourses, which can lead to them dying out. It also affects local invertebrate communities. It removes metals from sediments and then releases them into the water.	
Rhododendron (Rhododendron ponticum & hybrids).	Throughout the middle and lower areas of most rivers.	Planted in gardens, parks and other areas. Natural spread of seeds and people planting them in gardens.	Forms dense thickets and 'drowns out' native plants. Affects fish and invertebrate communities. It also forms barriers to access in areas.	Cut down areas to allow more light into the watercourse.
Japanese Knotweed (Fallopia japonica).	Some spread throughout the area.	Parts of the plant can be moved by the wind and by water. Movement of contaminated soil. Plant material on vehicles can spread this to new areas.	Forms dense thickets which prevent native plants from reproducing and also affects access to areas. They alter the habitat for wildlife and can grow through concrete and tarmac.	The area is due to be surveyed in 2009. Treatment options include spraying, injecting and cutting and biological control – the latter is still being researched. How long the seeds and root systems last will result in control measures which need long-term efforts.
Himalayan balsam (Impatiens glandulifera).	Present in large areas.	It escapes from gardens. Natural spread of seed. Contamination of soil.	The balsam shades out low-level native plants. As a result, the banks become empty of low-level vegetation. It dies back in winter exposing bare soil which can then be more easily worn away. Greater nectar production makes the flowers more attractive to bumble bees and so they are less likely to pollinate native species.	The area is due to be surveyed in 2009. We can get rid of the plant most effectively by pulling up plants in the summer.
Giant Hogweed (Hercaleum mantegazzianum).	Present in large areas.	Seeds are spread, particularly by water. They are also transported in contaminated soil.	The hogweed 'drowns out' native vegetation for space and resources. As a result it kills off other plants and invertebrates. It dies back in winter and this exposes bare soil which can then wear away more easily. It is a public health hazard due to the toxins in the sap which react with UV light to blister skin. It can block rights of access.	The area is due to be surveyed in 2009. We can effectively get rid of the plant by spraying.

b) Invasive non-native species with severe economic consequences not already present in the catchment but posing a threat.

SPECIES	Ways into the area	The effects	Action
Gyrodactylus salaris Freshwater external parasite of salmon	Introduced through contaminated fish. Can be spread by clothing and equipment which has been in contact with infected water including canoes, and some ballast water.	It could wipe out Atlantic salmon (Salmo salar) populations throughout Scotland. Local opportunities for spreading the parasite include: • visiting anglers, canoeists and ballast water.	There are laws and national and local awareness campaigns in place. Local disinfectant procedures have been put into practice.
Zebra mussel (Dreissena polymorpha) Freshwater mussel	Often the mussels are attached to hulls of boats. They are spread naturally in freshwater and in ballast water.	Major economic effect on all water structures beneath the water, for example, blocking pipes and affecting hydro-electric schemes Varied and unpredictable effects on the environment causing: • changes to freshwater nutrient cycles; • the extinction of local mussels; and • changes to stream substrate, meaning the composition of the stream bed, affecting spawning areas. Local opportunities for spreading the mussels include: • in ballast water.	
Chinese mitten crab (Eriocher sinensis) Lives in freshwater but moves to the sea for breeding.	Introduced through: ballast water from ships and hull fouling, –the process in which organisms attach themselves to the hull of a ship during a voyage and transport themselves long distances; the illegal trade in live food; and larva spread naturally by coastal currents.	The effects include: • burrowing can damage riverbanks; • concern over the effects on local species; and • it can carry the lung fluke Paragonimus ringer, which affects mammals and is known to infect humans.	

c) Invasive non-native species with moderate economic consequences and probability of introduction to catchment:

PLANT SPECIES	Ways into the area	The effects	Action
Water primrose (Ludwigia grandiflora).	Garden trade. Getting rid of garden waste.	Low.	Raise awareness.
Fanwort (Cabomba caroliniana).	Garden trade. Getting rid of garden waste especially stem fragments.	Low.	Raise awareness.
Large flowered waterweed (Egeria densa).	Garden trade. Getting rid of garden waste Some labelling issues.	So far only found in East Lothian	Raise awareness.
Floating pennywort (Hydrocotyler ranunculoides).	Garden trade. Disposal of garden waste Some labelling issues.	Low - currently in England up to the midlands	Raise awareness.
Australian swamp stonecrop (Crassula helmsii).	Garden trade. Getting rid of garden waste can be spread by animals and humans.	High – odd locations throughout Scotland, nearest Aberdeen area.	Raise awareness.
Parrot's feather (Myriophyllum aquaticum).	Garden trade. Getting rid of garden waste, especially plant fragments. Accidental spread by footwear and fishing tackle.	Moderate – two areas in the south of Scotland	Raise awareness.
Water fern (Azolla filiculoides).	Garden trade and aquatic trade. Getting rid of garden waste. Through floods.	High – odd places throughout Scotland especially the Edinburgh and Dundee area.	Raise awareness.
Curly waterweed (Lagarosiphon major).	Garden trade and aquatic trade. Problem made worse by wind spreading seeds, boat movement, angling equipment and possibly waterfowl.	High – odd places throughout Scotland especially the Edinburgh and Dundee area.	Raise awareness.
Common cord grass (Spartina anglica).	Planted to make sand dunes more stable. Spreads naturally.	Moderate – one area near St Andrews.	Raise awareness.
Slipper limpet (Crepidula fornicate)	Contaminant of oyster spat and hull fouling.	Moderate – one area offshore in the Firth of Tay.	Raise awareness.
Didemnum Tunicates / sea squirts (Didemnum vexillum).	Not sure of all methods but brought in on boat hulls and through crustaceans which can move such as crabs.	Low – no information on its spread.	Raise awareness.
Wireweed (Sargassum muticum)	Spread naturally. Contaminant of the spawn of an oyster known as oyster spat. Brought in on the hulls of boats.	Moderate – currently recorded form in three areas on the west coast of Scotland.	Raise awareness.
Asian topmouth gudgeon (Pseudorasbora parva)	Aquaria trade. Deliberately introduced as bait. Contaminated water.	Low – currently only recorded from five areas in England.	Raise awareness.
Ruffe (Gymnocephalus cernuus).	Ballast water. Live bait.	Moderate – currently recorded in central Scotland.	Raise awareness.
Orfe (Leuciscus idus).	Live bait Others.	High – Currently recorded in Perthshire.	Raise awareness.
Bullhead (Cotus gobio)	Live bait Others	Moderate –species moving, recorded from central Scotland.	Raise awareness.
Ruddy duck (Oxyura jamaicensis)	Imported as part of wildlife collections.	Moderate – currently recorded in eastern Scotland.	Raise awareness.

Appendix F: The main laws which are relevant to the plan (in alphabetical order)

Legislation

- Revised Bathing Water Directive (2006/7/EC)
- Bathing Water (Scotland) Regulations 2008
- Coast Protection Act 1949 (c 1974)
- Biodiversity Convention - Convention on biological diversity: 1992 United Nations Agreement, Rio Earth Summit
- Cross compliance -Statutory Management Requirements under Single Farm Payment scheme such as Good Agricultural and Environmental Condition (GAEC).
- Control of Pesticides Regulations 1986
- Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999
- Environmental Impact Assessment (Agriculture) (Scotland) Regulations 2006
- EC Birds Directive – Council Directive 79/409/EEC on the conservation of wild birds
- EU Floods Directive - European Directive on the Assessment and Management of Flood Risks (2007/60/EC)
- Flood Risk management (Scotland) bill.
- EU Freshwater Fisheries Directive
- EC Habitats Directive - Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora' and Conservation (Natural Habitats and Species) Regulations 1994
- EC Nitrates Directive – Directive 91/676/eec on nitrates from agricultural sources

  Nitrate Vulnerable Zones (Scotland) Regulations 2002

  The Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008 - supercedes 2003 regulations and came into force 1st January 2009
- EU Strategic Environmental Assessment Directive
- Environmental Assessment of Plans and Programmes (Scotland) Regulations 2004a
- EC Urban Waste Water Treatment Directive
- Urban Waste Water Treatment (Scotland) Amendment Regulations 2003
- EU Urban Waste Water Directive Sensitive Area
- EU Water Framework Directive
- Water Environment and Water Services (Scotland) Act 2003
- Water Environment (Controlled Activities) Scotland Regulations 2005
- Water Environment (Diffuse Pollution) Regulations 2008
- Drinking Water Protected Areas
- Flood Prevention and Land Drainage (Scotland) Act 1997
- Flood Risk Planning Scotland Bill planned for adoption in 2009 under the EU Floods Directive
- Food & Environment Protection Act 1985 (FEPA).
- Groundwater regulations (1998)
- Land Reform (Scotland) Act 2003
- Mandatory controls (2005 –2010) – a ban on salmon netting until the 1st May, mandatory catch and release using barbless hooks until 31st May, - for both salmon and sea trout.
- Nature Conservation (Scotland) Act 2004
- Meeting the Energy Challenge – A White Paper on Energy May 2007
- Pollution Prevention and Control (Scotland) Regulations 2000
- Silage, Slurry and Agricultural Fuel Oil (Scotland) Regulations 2003
- Sewerage (Scotland) Act 1968 (as amended 2002)
- Salmon (fish passes and screens) Scotland Regulations 1994
- UK Forestry Standard – The Government's approach to sustainable forestry 2004
- Wildlife and Countryside Act 1981 (as amended) by the Nature Conservation (Scotland) Act 2004

Appendix G: The main plans, policies, strategies, programmes and projects (in alphabetical order)

Plans

- Angus Council Draft Core Path Plan April 2008
- 2004 Survey of facilities in Rural Communities in Angus Angus Rural Partnership September 2006
- Angus Council Local Plan Review 2006-2011
- Angus Council Shoreline Management Plan
- Bio-security Plan for the Esk District 2009
- Dundee and Angus Structure Plan 2001-2016
- Cairngorms Local Biodiversity Action Plan (LBAP)
- Cairngorms National Park Local Plan 2007

Fisheries Management Plan ERFT draft December 2008

- Flood Management Plans – In progress
- Montrose Basin Local Nature Reserve Management Plan
- Nitrate Vulnerable Zones Action Programme
- Scottish Forestry Strategy Implementation Plan 2008 – 2011
- Scotland River Basin District Eel Management Plan – December 2008
- Scottish Rural Development Programme 2007-2012
- SNH Site Management Statements for SSSIs
- Scottish Water and Standards III b Investment Programme 2010 to 2014
- Tay Draft Area Management Plan 2009-2015 December 2008
- Tay Estuary Forum Management Plan April 2009
- Tayside Local Biodiversity Action Plan (LBAP)
- Woodlands in and around towns (WIAT) programme

Policies and strategies

- Angus Economic Development Strategy Angus Council
- Angus Tourism Strategy (in draft May 2009)
- 2004 Survey of facilities in Rural Communities in Angus, Angus Rural Partnership September 2006
- A 5 year Species Action Framework – Making a difference for Scotland's Species SNH 2007
- The Invasive Non Native Species Framework Strategy for Great Britain – Protecting Our Natural Heritage from Invasive Species (Welsh Assembly Government, Scottish Government, DEFRA) 2008
- Scottish Biodiversity Strategy, "Scotland's Biodiversity: Its in Your Hands'
- Scottish Forestry Strategy 2006
- SNH Natural Heritage Futures Update 2008
- Angus Countryside Access Strategy

Programmes

- Programme of Ranger Service guided walks (Angus Glens and Montrose Basin)

Projects (past and present)

- Angus Millennium Forest
- Angus Glens Walking Festival
- CASS (Conservation of Atlantic Salmon in Scotland) LIFE Project – Glen Clova
- Cairngorms Water Vole Conservation Project
- Eastern Cairngorms Access Project
- Salmon in the Classroom

Appendix H: Best practice guidance

Best Practice guidance

• Agriculture	Four Point Plan - Straightforward Guidance for Livestock Farmers to minimise pollution and benefit your business
	Prevention of Environmental Pollution from Agricultural Activity (PEPFAA) code
	Farm Soils Plan – Protecting Soils and Income in Scotland
	Farming and Watercourse Management – A Good Practice Handbook (SEPA, SNH, WWF Scotland)
• Fisheries	Managing River Habitats for Fisheries – A Guide to Best Practice
	(SEPA, Fisheries Research Service, SNH and Scottish Executive)
	Working Around Water (Angus Council/Aberdeenshire Council)
• Planning	Planning Advice Notes 69: Planning and Building Standards Advice on Flooding
• Recreation and access	Scottish Outdoor Access Code Scottish Canoe Association Paddlers' Access Code – Access Advice for Paddlers in Scotland August 2006
• Forestry	Forests and Water Guidelines. Fourth Edition
	Forests and Soil Conservation Guidelines
• Urban surface water run off	Planning and advice note 61: Planning and sustainable urban drainage systems
	A Dos and Don'ts Guide for planning and designing sustainable urban drainage systems (SUDS) SEPA
	Sustainable Urban Drainage Systems –Setting the Scene in Scotland

Appendix I: Ecological status assessments for the catchment

Source: Information compiled from water body data sheets (2007 classification data) on web-based interactive map at http://www.sepa.org.uk/water/river_basin_planning.aspx

Water body name	Water body category	HMWB	Risk Assessment 2005	Overall classification 2007 – in terms of ecological status	Failing parameters	Classification for failing parameters	Pressures description	Industry sector description	Measures identified in Tay draft area management plan to address pressures listed. (published December 2008)
River South Esk (White burn Confluence to Estuary)	River	No	1a	Good			Abstraction	arable farming	None
							Morphological alterations		None
							Point source pollution	sewage disposal	Increase treatment – Scottish Water
River South Esk (White Water to White Burn Confluences)	River	No	2a	Good			Diffuse source pollution	Agriculture and Forestry- specific industry sector not yet known	None
River South Esk (Source to White Water Confluence)	River	No	2b	Good			None		None
Pow Burn	River	No	1a	Poor	Hydrology	Poor	Diffuse source pollution	forestry	Reduce at source – on track – Forest Enterprise
					Morphology	Moderate	Diffuse source pollution	arable farming	None
					Phytobenthos	Moderate	Abstraction	arable farming	None
							Morphological alterations		None
Melgund Burn	River	No	1b	Moderate	Phytobethos	Moderate	Diffuse source pollution	arable farming	None – assessment insufficiently advanced to make a judgement
							Morphological alterations		None

Water body name	Water body category	HMWB	Risk Assessment 2005	Overall classification 2007 – in terms of ecological status	Failing parameters	Classification for failing parameters	Pressures description	Industry sector description	Measures identified in Tay draft area management plan to address pressures listed. (published December 2008)
Noran Water	River	Yes	1a	Poor ecological potential	Hydrology	Poor	Flow regulation	water collection, purification and distribution	None
					Morphology	Moderate	Morphological alterations – impounding weir/dam	water collection, purification and distribution –impounding – weir/dam	None
							Abstraction	water collection, purification and distribution	None
							Abstraction	arable farming	None
Lemno Burn	River	Yes	1a	Poor ecological potential	Hydrology	Poor	Diffuse source pollution	sewage disposal	None
							Diffuse source pollution	arable farming	None
					Phytobethos	Moderate	Abstraction	Arable farming	None - assessment insufficiently advanced to make a judgement
White Burn	River	No	2b	Good			None	None	None
Quharity Burn	River	No	2b	Good			None	None	None
Prosen Water (Burn of Lednathie to South Esk confluence)	River	No	2b	Good			None	None	None
Prosen Water(Sources (s) to Burn of Lednathie Confluence)	River	No	2b	Good			None	None	None

Water body name	Water body category	HMWB	Risk Assessment 2005	Overall classification 2007 – in terms of ecological status	Failing parameters	Classification for failing parameters	Pressures description	Industry sector description	Measures identified in Tay draft area management plan to address pressures listed. (published December 2008)
West Burn of Glenmoye/ Glenmoye Burn	River	No	2b	Good			None	None	None
Burn of Heughs	River	No	1a	Moderate	Morphology	Moderate	Morphological alterations	Livestock farming. Canalisation/re-alignment/straightening – canalisation flood defence	None
White Water	River	No	2a	Moderate	Morphology	Moderate	Morphological alterations		None - assessment insufficiently advanced to make a judgement
Montrose Basin	Transitional	No	1a	Moderate	Dissolved Inorganic Nitrogen and DIN aggregate	Moderate	Morphological alterations	Land reclamation	None
							Morphological alterations	Water transport (sea, coastal, or inland water transport, dredging resulting in sediment removal)	None
							Diffuse Source pollution	Mixed farming	Non-urban land management measures - SEPA
							Morphological alterations	Chemicals production. Reinforcement – rip rap	None

1a Water bodies at significant risk of failing to meet the Water Framework Directives' environmental objectives by 2015

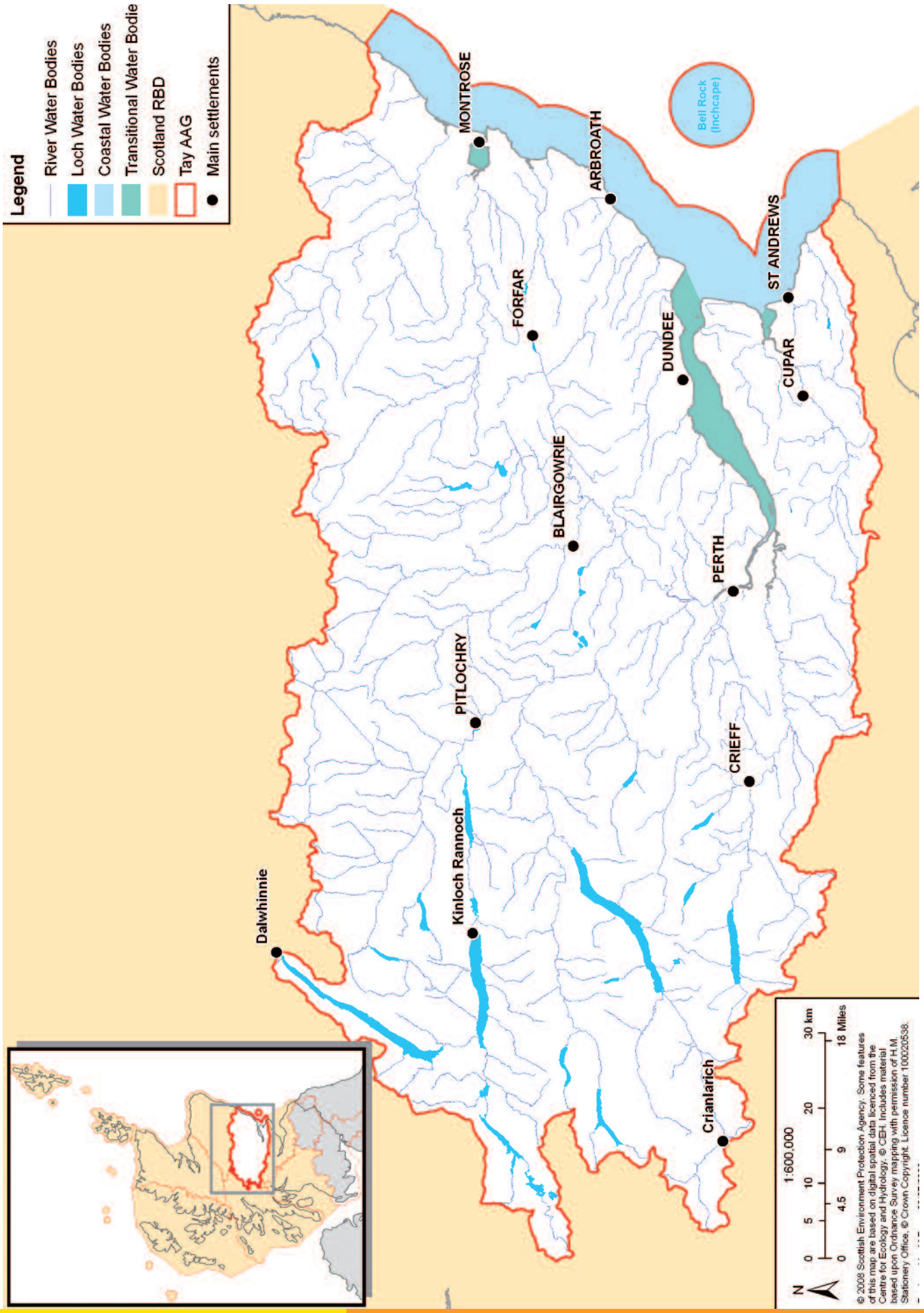
1b Water bodies probably at significant risk of failing to meet the Water Framework Directives' environmental objectives by 2015 but further information is needed to make sure this view is correct

2a Water bodies probably not at significant risk of failing to meet the Water Framework Directives' environmental objectives by 2015 but further information is needed to make sure this view is correct

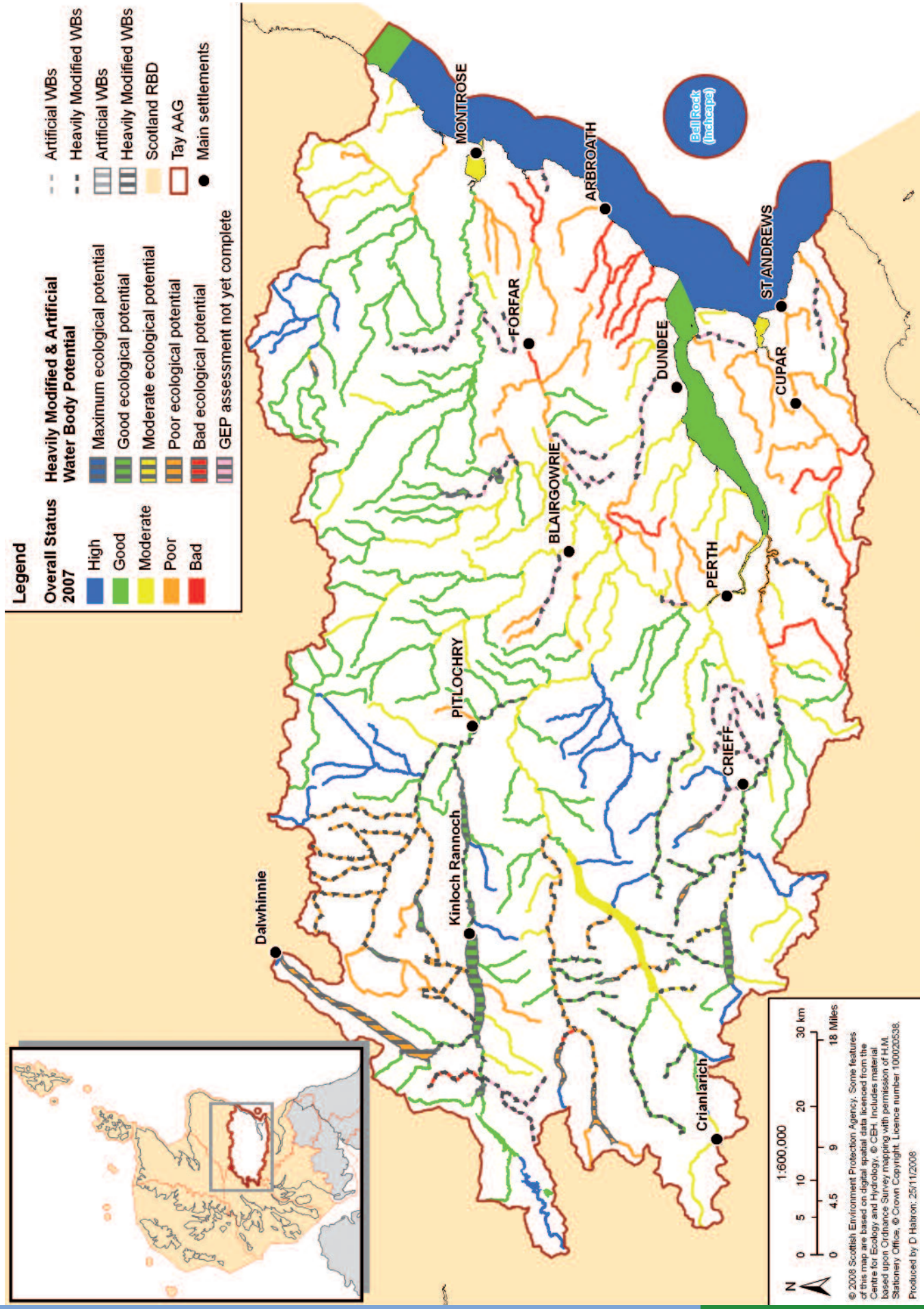
2b Water bodies not at significant risk failing to meet the Water Framework Directives' environmental objectives by 2015

NB SEPA focuses on river and loch water bodies of a certain size (rivers with a catchment area not less than 10km2 and lochs with a surface area of at least 0.5km2). All estuaries and coastal waters are assessed. Rivers and lochs below these threshold sizes are defined as 'small water bodies' and are not reported on.

Appendix J: Map of the Tay Area Advisory Group Area



Appendix K: Map of status of the surface waters in the Tay area



Appendix L: Glossary

- **Abstraction**
  Drawing water out of a river or area for industrial or irrigation purposes (includes public water supply).
- **Agri-environment scheme**
  Government-funded support for long-term agricultural activity with targeted benefits for the environment (for example, Environmentally Sensitive Areas Scheme ESA and The Rural Stewardship Scheme RSS).
- **Algal bloom**
  A huge growth of algae in a loch or reservoir which usually results from high concentrations of nutrients.
- **Biodiversity**
  The total range of life forms on earth, the roles they carry out, and the genetic diversity they contain.
- **Biosecurity planning**
  The act of planning to reduce the probability of something unplanned happening, as we all as deliberate acts to establish and spread non-native species, parasites and diseases in Scotland and the UK.
- **Buffer strip**
  An area of land separating a watercourse (or body of water) from intensively managed land. The aims are to protect or improve water quality. This may also benefit habitat and species.
- **Catchment**
  An area within which all water drains to the same end-point or outflow. Groundwater catchments do not necessarily coincide with surface-water catchments.
- **Catchment management**
  A process where all activities within a loch or river area are considered in terms of their effect on each other and on the quality and quantity of surface and groundwater.
- **Ecological status**
  The structure of aquatic ecosystems associated with surface waters.These waters are classed as being of good ecological status when they meet the requirements of the Water Framework Directive WFD.
- **Floodplain**
  The floor of a strath or river valley which is filled with water when a river floods.
- **Groundwater**
  Water contained in underground rocks, which fills the spaces in soil and other structures which are not completely solid.
- **Indicative forestry strategy**
  A strategy, prepared and included in a structure plan, which aims to deal with future commercial forest planting in an environmentally acceptable way. It does this by identifying preferred, potential and sensitive areas for forestry.
- **Local plan**
  Prepared and used by planning authorities according to the law, expressing specific policy guidance and advice for development in each area, to meet the aims of the structure plan.
- **Invasive non-native species**
  Species which are not found in the area normally but which have successfully established themselves in our aquatic systems, resulting in damage to the natural environment and affecting the economy.
- **Marine Scotland**
  The lead marine management organisation in Scotland. They began work on 1 April 2009 as a Directorate of the Scottish Government (SG). They deal with scientific research, make sure people keep to relevant laws and guidance and manage Scotland's seas.
- **Nutrients**
  Chemical substances needed for growth by organisms (including plants, crops and algae), for example, phosphorus and nitrogen.
- **Overgrazing**
  Where livestock (wild and domestic) numbers are high and they eat too much of the natural vegetation, and increase the risk of erosion of the soil.
- **Phosphorus**
  A nutrient essential in the lifecycle of all living organisms, present in all animal and vegetable matter.
- **Point source pollution**
  Pollution which can be traced to a specific source with a clearly identifiable point of origin. Usually from a pipe or other similar point.
- **Riparian**
  The land bordering a river or burn.
- **Run-off**
  Rainwater draining from an area of land which can transport nutrients, fertilisers, sediment and so on.
- **Rural Direct**
  A service designed to help rural community organisations find funding from a range of sources including the new Scotland Rural Development Programme (SRDP). Rural Direct is a national service delivered locally by the Scottish Council for Voluntary Organisations (SCVO).
- **Salmonid**
  A freshwater fish of the salmonid family (for example, salmon and trout).
- **Sediments**
  The loose material transported by a river. It can be a mixture of particles ranging from fine sediments, usually less than 2mm in diameter (sands, silts and clays), to coarser sediments likepebbles, stones and boulders.
- **Septic tank**
  A tank receiving and treating sewage by bacteria.
- **Spring fish**
  Salmon which return to fresh water in the early part of the year (usually before the end of May).
- **Tributary**
  A smaller burn or stream flowing into a larger river.

Appendix M: Acronyms and Abbreviations.

AAG	Area Advisory Group
AC	Angus Council
CASS	Conservation of Atlantic Salmon in Scotland
CAR	Controlled Activities Regulations
CMP	Catchment Management Plan
CoPA	Control of Pollution Act
CNPA	Cairngorms National Part Authority
ECAP	Eastern Cairngorms Access Project
EDSFB	Esk District Salmon Fishery Board
FEPA	Food and Environment Protection Act
ERFT	Esk Rivers and Fisheries Trust
GAEC	Good Agricultural and Environmental Condition
FCS	Forestry Commission Scotland
NFUS	National Farmers Union Scotland
PEPFA	Prevention of Environmental Pollution from Agricultural Activity
NFM	Natural Flood Management
NVZ	Nitrate Vulnerable Zone
RBMP	River Basin Management Plan
RHET	Royal Highland Education Trust
SAC	Special Area of Conservation or Scottish Agricultural College
SCAET	Scottish Countryside Alliance Educational Trust http://www.scaet.org.uk/
SEPA	Scottish Environment Protection Area
SEARS	Scottish Environment and Rural Services – Sears is a partnership of nine public bodies aiming to provide rural land managers, with an efficient and effective service. http://www.sears.scotland.gov.uk/
SGRIPD	Scottish Government Rural Payments and Inspections Directorate
SNH	Scottish Natural Heritage
SOAC	Scottish Outdoor Access Code
SPA	Special Protection Area
SRDP	Scottish Rural Development Programme The SRDP is a £1.6 billion programme of economic, environmental and social measures designed to develop rural Scotland during 2007 to 2013. http://www.scotland.gov.uk/Topics/Rural/SRDP
SSSI	Site of Special Scientific Interest
SuDS	Sustainable urban Drainage Systems
SW	Scottish Water
SWT	Scottish Wildlife Trust
SYA	Scottish Youth Hostel Association
UWWTD	Urban Wastewater Treatment Directive
WIAT	Woods In and Around Towns
WwTW	Wastewater Treatment Works
WFD	Water Framework Directive

The content of this publication, or sections of it, can be made available in alternative formats or translated into other community languages.

Please contact the Council's ACCESSLine on 08452 777 778 for further information or email accessline@angus.gov.uk.

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