



LORNE GILL/SNH

GLEN ARTNEY, PERTSHIRE

DEFINITION

Rivers and burns are flowing watercourses and in their natural state are dynamic systems continually modifying their form.

The rivers and burns habitat consists not only of the watercourse itself - the “wetted channel”, but also the bank and associated land or riparian zone.

This definition provides for overlap with Habitat Action Plans for other habitats closely associated with rivers such as Wet Woodland. These valuable habitats are covered by other action plans which should be referred to in conjunction with this one.

Key Features

Rivers and burns support a wide range of plants and animals. A watercourse's biodiversity is determined by its mosaic of features, geographical area, underlying geology and water quality. The rivers and burns in Tayside tend to be fast-flowing and nutrient poor and hold a wealth of habitats and rare wildlife. The Highland boundary fault separates the metamorphic bedrock of the highlands and the old red sandstone underlying the lowlands. The rivers and burns rush down the Highland mountains and only after breaching the Highland boundary fault with famous waterfalls such as Reekie Linn and Rumbling Bridge do they begin to slow slightly and meander across the lowlands. In the lowland stretches the rivers deposit silt on land underlain by relatively more nutrient rich sandstone. Here they have created fertile agricultural land such as that in the lowlands of Angus which the North and South Esks flow through.

In addition to their intrinsic value rivers and burns also act as important wildlife corridors, enabling dispersion and migration of species. They allow mobile species to utilise patchy areas of habitat and interconnect fragmented populations. They are particularly valuable in Tayside with a total length of over 5,000km not only making them essential to wildlife but also a familiar and important part of everyone's environment.

The River Tay has the largest mean average annual flow of any river in the UK in terms of volume at nearly 200 cubic metres per second. Many of its tributaries are significant rivers in their own right and include the Lyon, Tummel, Isla, Almond and Earn. In addition the Rivers North and South Esk and the Dighty Water drain the Angus and Dundee areas on their way to the North Sea. All the rivers of the Tayside catchment eventually converge on the Firth of Tay.

CURRENT STATUS AND EXTENT OF HABITAT

Tayside rivers and burns have a rich natural heritage and provide numerous resources. Many parts of the system have been modified in urbanisation and for agriculture, forestry and industries such as hydro-power generation. However, the majority of rivers and burns maintain good water quality and rich, diverse habitats.

Habitat Quality

The River Habitat Survey (RHS) assesses the physical structure of watercourses, including the channel, the banks and the river corridor. A survey of Scottish sites undertaken between 1995 and 1997 revealed that of 34 RHS sites on major rivers and burns in Tayside, 56% were 'semi-natural', 8% were 'predominantly unmodified', 18% were 'obviously modified' and 18% were 'significantly modified'. No sites were 'severely modified'. Compared to the rest of Scotland, these results confirm the relative good health of Tayside's rivers and burns.

Water Quality

SEPA currently classifies about half of mainland Scotland's rivers (over 50,000 km) based on their chemical and biological quality. SEPA's river classification scheme, as applied to 1996 monitoring data, shows that about 91% of the classified river length was of excellent or good water quality. The remaining 4,000 km of rivers were classified as polluted (defined as fair, poor or seriously polluted). In 2000, of a total monitored Tayside river length of nearly 800km, about 75% were classed as either of excellent or good water quality. Less than 3% were classed as poor or seriously polluted.

KEY SITES

Tayside has an abundance of high quality rivers and burns. Many of these have features which, if not necessarily unique, are uncommon in the United Kingdom. Although this section highlights key sites within the Tay catchment, the whole catchment can itself be viewed as a key site. Reaches of unmodified rivers adjoined by natural or semi-natural habitat are not uncommon in Tayside and all can justifiably be regarded as being of importance. In a similar fashion the whole area could be regarded as a key site in the UK and European context for the Freshwater Pearl Mussel *Margaritifera margaritifera*.

There are a number of sites in the Tay catchment which stand out in the national context for their intact or unique habitat, their size or for the diversity or rarity of the species they support:

River Tay pSAC	A large site that includes all key parts of the river and its tributaries accessible to Salmon <i>Salmo salar</i> . The site is also of international importance for its populations of Otter <i>Lutra lutra</i> , Sea lamprey <i>Petromyzon marinus</i> , River lamprey <i>Lampetra fluviatilis</i> , and Brook lamprey <i>Lampetra planeri</i> .
South Esk cSAC	This site was designated for its internationally important populations of Salmon and Freshwater Pearl Mussel.
Craighall Gorge SSSI on the River Ericht	A river gorge containing a diverse assemblage of species, including the River Jelly Lichen <i>Collema dichotomum</i> . There is an excellent continuity of habitat from a high quality river into broad-leaved, mixed and yew woodland.
The Den of Airlie SSSI, River Isla	Similar in many ways to Craighall Gorge.
The Lunan Burn system between Dunkeld and Blairgowrie	The lochs on the system are discussed further in the Mesotrophic Lochs Habitat Action Plan, but the burn itself, especially between Clunie and Marlee lochs (SSSI), is the best example of a lowland burn in Tayside.
Meikleour SSSI, River Tay	A section of the River Tay in the lowlands with large shingle banks adjoining unimproved lowland pastures and fen vegetation. This area is important for the diversity of habitats and species it supports, including over-wintering wildfowl.

Tayside Biodiversity Partnership

Shingle Islands cSAC

An area of shingle banks and islands formed by the River Tummel and Tay showing a variety of transition and mosaic communities from bare shingle, grassland and important fluvial alder woodlands. It has an extremely high biodiversity in terms of flowering plants, lichens, mosses and liverworts.

NATURE CONSERVATION IMPORTANCE

The **Freshwater Pearl Mussel (FWPM)** *Margaritifera margaritifera*, is a filter-feeding bivalve mollusc with a compressed kidney-shaped, black-brown shell; it may grow to 15cm in length. It is one of our longest living invertebrates - perhaps up to 140 years, although normally living between 80 - 100 years.

Fertilised eggs develop into tiny bivalve larvae called glochidia. In late summer the female sheds these into the water column. An estimated 0.01% of perhaps 3 million per female will survive to be inhaled by a host salmonid fish where they lodge on the gills. The following spring the juvenile mussels fall off into clear, calcium-poor, fast flowing rivers where they have to find a fine gravel site amongst large stones in which to partially bury themselves. There they will grow and mature. Perhaps only 1% of the juvenile mussels will survive, but adults have few natural predators and can tolerate moderate disturbance.

FWPM populations have declined by about 90% across Europe in the last 20 - 30 years and Scotland now accounts for 60% of the remaining vulnerable population. On a European scale causes of the decline include pollution, nutrient enrichment and acidification of the water; siltation of gravel beds; decline of host salmonid populations; habitat destruction through river engineering; and overfishing for pearls. In the Tay Catchment the main problem has been overfishing. The FWPM is protected under the Wildlife and Countryside Act, so it is illegal to purposefully kill or injure them. Although fishing for pearls was banned in 1998, it still goes on and actions are being taken to ensure it is stopped. Any publicity of sites containing pearl mussel can act as a stimulus for illegal fishing, so caution over publicity is required. SNH's surveys and monitoring are establishing the locations and health of populations. These, together with general awareness raising, will help to improve prospects for the FWPM's long term survival in Tayside.



SUE SCOTT

Myth has it that the Romans invaded Scotland in search of pearls.

Strictly speaking, lampreys are not true fish at all, but form a separate, more primitive group of jawless vertebrates. These ancient fish superficially resemble eels and have a large sucker-like mouth as adults. Fossils - clearly recognisable as lampreys - have recently been found in 500 million year old rocks in China.

There are three species: **Brook lamprey** *Lampetra planeri* live entirely in fresh water; **River lamprey** *Lampetra fluviatilis* and **Sea lamprey** *Petromyzon marinus* migrate downstream to the sea, returning to spawn later in their lifecycles. They hatch in gravel riverbeds and migrate as larvae to silty parts of the river. Here they live in burrows and filter feed, helping to keep the water clean. As adults they leave these nursery grounds and ultimately migrate and spawn.

The numbers and distribution of lampreys have declined in some parts of Europe because of increased pressure on the habitats on which they rely. These include water pollution, siltation clogging gravel beds used for spawning, and river engineering that may destroy important habitats or impede migration. However, the Tay's catchment size and suitable habitat mean that it supports an important population of all three lamprey species.

Actions being taken to ensure long term survival of the lampreys includes avoiding disturbance of spawning and nursery areas; avoiding migration impedance; carrying out surveys and monitoring to establish locations and health of populations; awareness raising.



SEPA

The most unusual and unfamiliar fish of the Tay.

KEY SPECIES

Key species have been selected for Tayside for a number of different reasons. Tayside contains nationally or internationally important populations of some species, including River jelly lichen and Freshwater Pearl Mussel.

Ospreys *Pandion haliaetus* and Otters *Lutra lutra* have been selected as species representing a success story, illustrating what can be achieved. The Atlantic salmon is of economic importance and a notable feature of the region's rivers. Other species, including the stiletto fly *Thereva lunulata*, are nationally rare and their distributions uncertain, but they have been recorded in our region in the past. A locally important species, the Daubenton's bat *Myotis daubentoni*, feeds on insects flying over the rivers and roosts nearby in the hollow limbs of old trees.

P = UK Priority species **C** = UK species of conservation concern

Mammals	Water vole	<i>Arvicola terrestris</i>	P
	Otter	<i>Lutra lutra</i>	P
	Pipistrelle bat	<i>Pipistrellus pipistrellus</i>	P
	Daubenton's bat	<i>Myotis daubentoni</i>	C
Birds	Goosander	<i>Mergus merganser</i>	C
	Dipper	<i>Cinclus cinclus</i>	C
	Kingfisher	<i>Alcedo atthis</i>	C
	Osprey	<i>Pandion haliaetus</i>	C
Fish	Salmon	<i>Salmo salar</i>	C
	Sea trout/brown trout	<i>Salmo trutta</i>	
	Sparling/smelt	<i>Osmerus eperlanus</i>	C
	Sea lamprey	<i>Petromyzon marinus</i>	C
	River lamprey	<i>Lampetra fluviatilis</i>	C
	Brook lamprey	<i>Lampetra planeri</i>	C
	Allis shad	<i>Alosa alosa</i>	P
Invertebrates	a cranefly	<i>Rhabdomastrix laeta</i>	P
	a stiletto fly	<i>Spiriverpa lunulata</i>	P
	a stonefly	<i>Brachyptera putata</i> poss extinct	
	Freshwater pearl mussel	<i>Margaritifera margaritifera</i>	P
Plants	River water-crowfoot	<i>Ranunculus fluitans</i>	C
	River jelly lichen	<i>Collema dichotomum</i>	P
	Ear-lobed dog-lichen	<i>Peltigera lepidophora</i>	P
	Spruce's bristle moss	<i>Orthotrichum spruce</i>	P

NATIONAL BIODIVERSITY CONTEXT

The UK BAP provides guidance for the direction Local Habitat Action Plans can take with the conservation of rivers and burns. Its recommendation is:

Maintain and improve the quality, state and structure of all UK rivers and streams and their associated flood plains. Restore degraded river systems taking account of water quality and quantity, structure and hydraulic connection with the floodplain.

Tayside Biodiversity Partnership

In the UK Habitat Statement for Rivers and Streams measures to consider further include:

- Development and implementation of integrated catchment management plans including work on nutrient budgeting.
- Use existing measures such as the Rural Stewardship Scheme Water Margin option to support the appropriate management of rivers and streams and their associated habitats, in particular flood plains.
- Review the powers and duties of water management institutions to manage water for nature conservation objectives.
- Integrated working between agencies and landowners to provide guidance and training.

There are UK BAP priority species associated with this habitat and they, along with the key species of conservation concern, can benefit from the actions undertaken for rivers and burns.

ECOLOGY AND MANAGEMENT

The information for this section is detailed elsewhere: see particularly the Management, Research and Guidance section of this Plan.

CURRENT FACTORS CAUSING LOSS OR DECLINE

The ecology of a river or burn is dependent on the quality and quantity of its water and on the nature and quality of the instream and riparian habitat. Man's influence through many different factors can sometimes be detrimental, but sensitive management can mean that the biodiversity and the physical structure and functioning of rivers and burns are retained.

Factors Affecting Water Quality - Pollution

Pollution is a significant threat to the biodiversity of rivers and burns. SEPA detailed in its 1999 State of the Environment Report the seven most important causes of polluted water in Scotland. The most important factor nationally causing water pollution in rivers was sewage effluent.

Diffuse and point source agricultural pollution are the most significant influences on water quality in Tayside. They pose a serious long-term threat to lochs and are of concern for rivers. Current projections suggest that by 2010, on a national level, diffuse agricultural pollution may be the most important cause of river pollution.

Whilst licensing is required for sheep dip disposal there is still concern regarding the policing and monitoring of this. Sewage effluent, urban drainage, mine drainage and industrial effluent are not significant impacts on the major rivers in Tayside, although a few stretches are affected. Overgrazing of riparian corridors is a problem on some stretches, for example, the Isla, Tilt and Lyon. This makes soil erosion more likely and reduces the abundance and diversity of terrestrial invertebrates which are an important food source for some fish, including Salmon.

Factors Affecting Water Quantity

There are three main categories of pressures affecting water quantity in rivers:

- Groundwater abstraction.
- Surface water abstraction.
- Flow regulation.

Groundwater abstraction via boreholes has increased dramatically in Scotland in the last two decades. Groundwater abstractions in Tayside predominantly take place for agricultural purposes in the lowland areas. In the absence of a comprehensive scheme for controlling abstractions from groundwater there are no means of ensuring that aquifer fed rivers are guaranteed protection.

Surface water abstraction for various purposes has a major impact on a number of Tayside rivers. The most significant of these are those for hydro-electric purposes, with the River Garry being the most marked example. Drinking water abstractions such as the one from the River Earn take significant amounts of water.

Agricultural irrigation has a marked impact on many of the Angus coastal burns which can run dry. Fish farms, too, abstract significant amounts of water. In contrast to some other river systems, however, industrial abstraction is not significant in Tayside.

Hydro-electric power generation has led to significant flow regulations in parts of the Tay Catchment. Dams change the dynamics of a system and this can be very detrimental to a river's biological, chemical and physical integrity if they are poorly managed. However, impacts can be minimised and altered systems can remain rich in habitats and species, the Dunalastair Reservoir SSSI being a good example.

Case Study

Hydro-Electricity Generation in Tayside

Hydro-electricity schemes can be a sustainable form of power generation. The potential of Tayside was recognised as early as the 1930s. There are now two major schemes in the Tay catchment, namely the Breadalbane and Tummel schemes. They maximise the use of a relatively small amount of water to produce about 3.3 % of Scotland's annual power requirements.

The Tummel Valley scheme has nine power stations and includes the Rivers Garry, Tummel, Errochty and Lochs Rannoch, Tummel and Ericht. The Breadalbane scheme develops the water resources of the mountainous region around Lochs Lyon, Tay and Earn, with a total of seven main power stations.

Scottish and Southern Energy operate these hydro-electricity schemes and take great care to minimise any detrimental impacts on the habitats and species of the Tay Catchment. Water flow patterns have to be modified to make efficient use of the available power. However, compensation flows are used to ensure sufficient flows remain downstream of a dam and 'freshets' can mimic natural spates. Many of the power stations also have fish ladders and screens to minimise the impedance of, particularly, migrating salmon. They may also have fish counters which can provide invaluable information about the health of salmon populations.



LORNE GILL/SNH

LOCH LYON, PERTSHIRE

Factors Affecting Physical Quality

The quality of habitats in or near water is an important measure of the overall quality of the aquatic environment. The physical condition of river channels is subject to a wide range of pressures and some have been degraded to varying degrees in Tayside. Damage may occur by direct modification of the habitat structure by river engineering involving flood defence, erosion control or drainage work. Indirect impacts result from land management practices such as grazing, ploughing or the application of herbicides. Habitat destruction and simplification can occur when the following examples are used inappropriately - culverting, dredging, "hard" engineering works, construction and operation of dams and

reservoirs, bank reinforcement, excessive “gardening” and inappropriate bank management (including overgrazing) leading to bankside and instream habitat destruction.

Engineering and river management works may lead to habitat fragmentation rather than its total loss. For instance, culverting or the construction of weirs may render watercourses impassable to fish and other wildlife. Loss of bankside habitat due to hard engineering or agriculture may damage the value of a river as a wildlife corridor. Flood defence work may separate the river from its floodplain habitat, preventing seasonal inundation of valuable wetland habitats. An important issue for Tayside is the amount of ad-hoc and uncoordinated bank and river engineering works undertaken for both fisheries and agricultural purposes. A more co-ordinated catchment or whole river approach, together with ‘soft’ engineering options, dramatically lessens detrimental impacts. River restoration work is also appropriate in some places, with for example, the re-introduction of more natural bends and ox-bows.

Biological Pressures

The self-colonising plants such as Giant hogweed, Himalayan balsam and Japanese knotweed are already familiar features on some sections of river in Tayside, notably around Perth. Less well-known species such as Australian swamp stonecrop are also significant threats. Invasive plants such as these can dominate bankside vegetation to the exclusion of native species. Certain species can form stands dense enough to prevent access, for example, for recreation and may pose a health hazard. Other species, including non-native ornamental species, may be planted as an environmental “improvement” and some for amenity value, such as cultivated grass species, which are also often mown to the very edge of the riverbank.

Japanese knotweed forms dense stands on the River Earn and often prevents fishermen going down to good fishing spots. On areas of the lower Dighty Burn, Giant hogweed forms impenetrable stands; its sap can produce a blistering burn on contact with skin. In the summer it produces broad leaves and large flower heads that suppress all other riparian vegetation, leaving banks exposed and vulnerable to erosion by winter spates.

Animal species may have been introduced by a variety of means. American mink are present on many rivers and represent a major threat to waterfowl and Water voles *Arvicola terrestris*. The non-native Bullhead fish and other species such as the Signal crayfish are already present in Scotland and have the potential to thrive in Tayside rivers. Rainbow trout are raised on fish farms in the catchment and escapees compete against the native Sea and Brown trout *Salmo trutta* for food and habitat.

Invasion by alien species may represent one of the most significant long-term threats to running waters because once established their elimination may prove impossible. In many cases the spread of alien species requires human intervention, for instance the selling of invasive plants through garden centres or the deliberate introduction of fish species. Lack of awareness is frequently a key issue. Any removal programme will require a co-ordinated approach between interested groups and organisations and the work starting upstream of all the areas suffering invasion.

Recreational Pressures

Increasing recreational pressures such as walking, angling, boating and watersports are likely to cause disturbance to species such as Otters *Lutra lutra* and breeding wildfowl. Areas particularly popular for recreational access such as shingle banks may have a high degree of disturbance. This could lead to disruption to nesting birds and damage to colonies of invertebrates which use these habitats. Vehicular access, in particular, can rapidly cause serious damage to fragile habitats. Pressures to open up areas to ease angling access may result in the removal of important riparian vegetation.

At Nature Reserves such as the RSPB's Loch of Kinnordy access is managed so that people can enjoy their time there whilst causing minimal disturbance to the fauna and flora. This is done in part by only opening some areas up with footpaths and by providing hides. The new Access Code, along with other Codes of Practice, will also help to raise awareness of these issues.

Urban Watercourses

Within an urban area the riparian zone is frequently replaced with either a built environment or landscaped open space “amenity” areas, both of which may be of limited biodiversity and conservation value. Culverts, bridges, weirs and hard engineering of channels, as well as poor water quality and low flows, can also threaten the continuity of these important wildlife corridors. However, if urban rivers, burns and the adjacent riparian zone are sensitively managed they can provide valuable habitats for many species and act as a recreational and educational resource for the community. A separate Urban Waters Habitat Action Plan will provide details of action that can be taken for rivers and burns in an urban environment.

Climate Change

A potential threat which may over-ride all the others is climate change. This may alter the character of rivers by a rise in temperature or changes in throughput of freshwater and could produce wide-ranging effects such as accelerated plant growth and colonisation by non-native species. More important is the likely amount of soil run-off in autumn/winter from arable fields in light of the forecasts for increased autumn rainfall and resultant sediment loads. Changes in flooding patterns may lead to pressures for increased flood defences and loss of seasonal inundation of riparian habitats.

MAIN THREATS TO KEY SPECIES

Otter	National factors have been identified in the UK Species Action Plan - <ul style="list-style-type: none"> - pollution of watercourses, especially by PCBs - insufficient prey associated with poor water quality Probably neither are significant in Tayside. Locally important factors in Tayside are - <ul style="list-style-type: none"> - impoverished bankside habitat features needed for breeding and resting - incidental mortality, primarily by road deaths and drowning in eel traps
	UK importance of Tayside population: Moderate
Water vole	<ul style="list-style-type: none"> - Loss and fragmentation of habitats. - Disturbance of riparian habitats. - Predation by mink. - Pollution of watercourses and poisoning by rodenticides.
	UK importance of Tayside population: Moderate
Pipistrelle Bat	<ul style="list-style-type: none"> - Reduction in insect prey abundance because of high intensity farming practices and inappropriate riparian management. - Reduction in insect-rich feeding habitats and flyways due to loss of wetlands, hedgerows and other suitable habitats. - Loss of winter roosting sites in buildings and trees. - Disturbance and destruction of roosts, including loss of maternity roosts by inappropriate use of toxic timber treatment chemicals.
	UK importance of Tayside population: Moderate
Allis/Twaite shad	<ul style="list-style-type: none"> - Pollution. - River and estuary barriers. - Overfishing. - Habitat destruction.
	UK importance of Tayside population: Uncertain - not known whether it breeds in Tayside rivers.

A water beetle <i>Hydroporus rufifrons</i>	<ul style="list-style-type: none"> - Loss of unimproved pasture. - Damage to waterside marginal pool complexes. - Inundation through impoundment for reservoirs. 	UK importance of Tayside population: Uncertain
A cranefly <i>Rhabdomastix hilaris</i>	<ul style="list-style-type: none"> - Removal of sandy sediment from rivers and riverbanks for aggregate. - Deepening and canalisation of watercourses. - Water abstraction from rivers resulting in changes in sedimentation. 	UK importance of Tayside population: Uncertain
A stiletto fly <i>Thereva lunulata</i>	<ul style="list-style-type: none"> - Removal of sandy sediment from rivers and riverbanks for aggregate. - Deepening and canalisation of watercourses. - Water abstraction from rivers resulting in changes in sedimentation. 	UK importance of Tayside population: Uncertain
A stonefly <i>Brachyptera putata</i>	<ul style="list-style-type: none"> - Acidification in headwaters and upland lochs. - Agricultural pollution from modern insecticides used in sheep and cattle farming. - Decline in water quality due to eutrophication from sewage and agricultural run-off. 	UK importance of Tayside population: uncertain - historic records for Rannoch area
Freshwater Pearl Mussel	<ul style="list-style-type: none"> - Poor water quality and nutrient enrichment (which also effects the numbers of host fish) - Habitat removal and alteration through development, drainage schemes, flow regulation and fisheries management. - A decline in populations of host fish. - Conifer planting, exacerbating the effects of river acidification. - Pearl fishing - now illegal. - Poor land management in the catchment (including overgrazing leading to sedimentation from soil erosion). 	UK importance of Tayside population: High
River jelly lichen	<ul style="list-style-type: none"> - Eutrophication of rivers leading to the species being replaced by algae. - Increased silt loads in rivers and streams. - Water acidification. - Reduced water levels caused by water abstraction (including small-scale hydro-electric schemes). 	UK importance of Tayside population: High
Ear-lobed dog lichen	Known only from one location - factors not identified.	

OPPORTUNITIES AND CURRENT ACTION

Policy and Legal Status

Rivers and burns are offered better protection than many natural habitats by several pieces of legislation, both UK and European. Gross pollution is largely under control through discharge consents and codes of conduct and efforts are now turning towards the control of non-point sources such as road/housing development and agricultural run-off which have the potential to cause "diffuse pollution". In parallel with this there is a growing recognition of the importance of river habitats not only in supporting physical structures for wildlife, but as key components giving resilience to the system as a whole - enabling pollutants, for instance, to be processed and rendered harmless. These latter areas of activity are not covered by current legislation and a co-operative approach is therefore needed to achieve effective management.

Various statutory bodies have a role in the current actions to maintain and improve the status of rivers and burns in Tayside. These include the Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH) Scottish Executive Environment and Rural Affairs Department (SEERAD), Tay, Esk and Forth District Salmon Fisheries Boards (TDSFB, EDSFB and FDSFB), Local Authority Planning Units, Scottish Water and the Forestry Commission (FC).

Some areas of rivers and burns in Tayside are designated under the various natural heritage conservation acts and all are controlled waters under the various pollution control acts.

Legislation and associated policy which can provide or encourage protection of rivers and burns in Scotland includes:

- Natural heritage conservation legislation including the designation of Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs), Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).
- UK Biodiversity Action Plan.
- Planning legislation and policies.
- Pollution control legislation.
- Agri-environment schemes such as the Rural Stewardship Scheme.

Some of the Acts which provide the framework for these functions are given below.

- Rivers (Prevention of Pollution)(Scotland) Act 1951
- Rivers (Prevention of Pollution)(Scotland) Act 1965
- Control of Pollution Act 1974
- Control of Pollution (Amendment) Act 1989
- Salmon and Freshwater Fisheries Act 1975
- EC Directive on the Conservation of Wild Birds (Directive 79/409/EEC)
- Wildlife and Countryside Act 1981
- Water Act 1989
- The Town and Country Planning (Scotland) Act 1997
- Environmental Protection Act 1990
- The Flood Prevention and Land Drainage Act 1997
- Natural Heritage (Scotland) Act 1991
- Wildlife and Countryside (Amendment) Act 1991
- EC Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (Directive 92/43/EEC)
- Conservation (Natural Habitats) Regulations 1994

- Environment Act 1995
- Scottish Office Circular 6/1995, Habitats and Birds Directives.
- Urban Wastewater Treatment Directive.

Management, Research and Guidance

At a national level most of the regulatory bodies, in addition to their core regulatory duties, are actively involved in management, research and guidance activities relating to rivers and burns. Many other organisations such as the Farming and Wildlife Advisory Group (FWAG), Scottish Agricultural College (SAC), Scottish Wildlife Trust (SWT), World Wide Fund for Nature (WWF), and Royal Society for the Protection of Birds (RSPB) not only conduct research and provide advice and guidance but some also manage rivers and burns for conservation purposes. Many landowners and estates manage the resources under their control to enhance biodiversity. Numerous individuals put in considerable amounts of time in voluntary work helping to manage or create important areas for conservation, recording wildlife or becoming acknowledged experts for various species.

In Tayside comparatively few rivers and burns are actively managed with the specific intention of enhancing biodiversity, although options under the Rural Stewardship Scheme and the promotion of good management practice by organisations such as SEPA, FWAG, SAC and WWF are leading to more sensitive management of rivers and their associated riparian zones. Rivers in Tayside are often managed for fisheries purposes and well directed fisheries management aimed at restoring degraded instream and riparian habitat can have considerable consequential biodiversity benefit. Inspiration for further management for conservation can be gained from the successful projects that already exist.

Current Action

- Environmental grants for farmers such as those available under the Rural Stewardship Scheme have encouraged and funded the modification of farming activities to help protect watercourses.
- SNH produce site management statements for SSSIs, undertake a 6 yearly programme of site condition monitoring and are undertaking to have most designated sites under positive management schemes in the forthcoming 10 years.
- Esk and Tay District Salmon Fishery Boards carry out scientific work and employ fishery managers to enhance the potential of the salmonid fishery.
- SEPA routinely assesses the ecological and water quality in all of Tayside's rivers.
- Some wildlife reserves include rivers e.g. Balnaguard Glen (SWT reserve) and Blackspout Wood (Perth and Kinross Council).
- The WWF Wild Rivers project demonstration sites show examples of how rivers can be managed to support biodiversity.
- FWAG and SAC have undertaken 20 Farming and Water Management Plans in Tayside.
- Perth and Kinross Council, in partnership with SEPA's Habitat Enhancement Initiative, developers and local volunteers have undertaken a restoration project on the Craigie Burn in Perth.
- Flood Appraisal Groups promote environmentally sensitive flood alleviation schemes.
- The River Restoration Centre provides advice to organisations and individuals about habitat restoration projects and practices.

FURTHER OPPORTUNITIES

Together with other existing initiatives the implementation of the Local Biodiversity Action Plan, the designation of Special Areas of Conservation, implementation of options under the Rural Stewardship Schemes and the introduction of the Water Framework Directive will provide a stronger mechanism for the protection and enhancement of rivers and burns than has ever previously existed. New statutory objectives will exist for the ecological status of rivers and burns, putting responsibilities upon statutory bodies which have previously been outwith their remits. To achieve these objectives, partnership approaches will be required and there is, for the first time, the very real prospect of integrated management for Tayside's rivers and burns.

OBJECTIVES AND TARGETS

Objectives		Targets
1	Conserve river and burn systems supporting semi-natural assemblages of animals and plants in both the channel and the riparian zone.	Establish and maintain an inventory of rivers and burns which provides information on environmental quality, biodiversity quality, impacts on biodiversity etc. By 2006. Ensure no net loss in area or reduction in quality of natural river habitats.
2	Maintain and improve water quality standards according to Scottish Environment Protection Agency River Classification System.	Improve or maintain the water quality classification of all rivers and burns in the region.
3	Identify and address, on a site by site basis, the factors having a detrimental effect on aquatic biodiversity, including the quality of the physical architecture, water quality and the impact of non-native species.	Prepare Catchment Management Plans for all main watercourses involving both statutory and non-statutory organisations. Seek to have these plans adopted by the appropriate Local Authority to inform planning decisions and provide a framework for integrated management. By 2011.
4	Increase public awareness of biodiversity, the wildlife value of river and burns and their importance as an asset to the community.	Set up public awareness programme. Establish communications with residents, groups, community councils, farming groups and local environment groups etc. to provide a forum for discussion and to understand their wishes for their local environment. By 2007.
5	Encourage good management practice by river users/interests.	Exchange views and disseminate best management practice guidelines to river and land managers.

Stakeholders

- Landowners, land managers, including the hydro-power industry, and advisors; developers; angling clubs; tourists and local users.

ACTION FOR BIODIVERSITY

		Action - Rivers and Burns	Deliverers		To take place by								Meets Objective No.
			Lead Partners	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	A	Policy and legislation											
WW2	1	Ensure that all statutory water quality and discharge standards are maintained and where necessary improved.	SEPA Scottish Water					#					2
WW2	2	Seek to develop and promote policies to control alien species and favour establishment of appropriate native species.	SEPA	SNH PKC DCC AC Angling Groups DSFBs, Land-owners				#					3
WW2	3	Develop policies to promote soft engineering of rivers as an alternative to harder options. Emphasise a presumption against further culverting and promote re-opening of culverted burns.	PKC DCC AC SEPA	SNH Scottish Water DSFBs	#				#				1
WW2	4	Develop policies to ensure an agreed consistent approach to in-river works, river channel and bank maintenance.	SEPA PKC DCC AC Scottish Water DSFBs	SNH					#				1
WW2	5	Ensure that adequate consultation takes place when developments are proposed in river catchments.	PKC DCC AC	SEPA SNH	#	#	#	#	#	#	#	#	3
WW2	6	Contribute to the development of policies within land use development plans to safeguard rivers and burns and associated wildlife in the region, with no net loss of this habitat promoted.	PKC DCC AC SEPA	SNH TBP	#	#	#	#	#	#	#	#	3
WW2	7	Develop and implement Catchment Management Plans as directed in the Water Framework Directive.	SEPA	PKC DCC AC Scottish & Southern Electricity, DSFBs							#		5
WW2	8	Complete SAC designation process in consultation with all interested parties.	SNH		#	#	#						
	B	Site safeguard and management											
WW2	1	Implement policy, through management work, for control of alien species.	Community Groups Angling Groups	SEPA SNH PKC DCC AC				#	#	#			3
WW2	2	Ensure that existing nature reserves and SSSIs which include rivers are managed appropriately.	RSPB SNH SWT	PKC DCC AC	#	#	#	#	#	#	#	#	1
WW2	3	Encourage fisheries interests to establish management schemes which enhance populations of important local fish species but not to the detriment of biodiversity. Ensure these management actions are included in catchment plans.	SEPA	SNH Angling Groups DSFBs, Fisheries Research Services Freshwater Lab	#	#	#	#	#	#	#	#	1
WW2	4	Maintain or introduce appropriate fishery management.	Angling Groups DSFBs	SEPA, PKC DCC, AC	#	#	#	#	#	#	#	#	1
WW2	5	Encourage appropriate management of rivers and their banks in existing developments in urban areas.	SEPA		#	#	#	#	#	#	#	#	1, 5

WW2	6	Promote adoption of SUDS (Sustainable Urban Drainage Systems) principles such as swales, infiltration basins, detention/retention ponds, wetlands, reedbeds in new developments.	PKC DCC AC Scottish Water		# # # # # # # # #	1
WW2	7	Encourage better management and protection of watercourses on farmland and forestry, such as buffer strips etc.	FWAG SAC	SEPA	# # # # # # # # #	3, 5
WW2	8	Encourage the full implementation of the Forestry Commission Water Guidelines i.e. buffer strips and the strategic planting of broadleaf trees along watercourses.	Forestry Commission		# # # # # # # #	5
WW2	9	Where possible continue to minimise detrimental impacts of hydro-power schemes on riverine habitats and species; where appropriate provide fish ladders to allow migration of salmon; ensure sufficient flows remain downstream of dams and use freshets to mimic natural spates as directed by the Water Framework Directive.	Scottish & Southern Energy	SEPA DSFBs	#	
C		Advisory				
WW2	1	Provide advice for managers and users of rivers and burns to promote the conservation of biodiversity of this habitat.	TBP		# # # # # # # # #	5
WW2	2	Promote best practice in farming, including use of Agric. CoPs and encourage the preparation and implementation of Farm Waste Management Plans.	FWAG SAC	SEPA	# # # # # # # # #	5
WW2	3	Develop guidelines for best practice in fishery management.	SEPA (HEI)		#	1, 5
D		Research and monitoring				
WW2	1	Review current water quality to identify causes of down grading, particularly where biodiversity priorities may be important.	SEPA		#	3
WW2	2	Continue to monitor the impact and extent of acidification in the region.	SEPA	SNH	#	3
WW2	3	Monitor impact of diffuse pollution such as phosphates, nitrates etc.	SEPA	SNH	# # #	3
WW2	4	Survey rivers and burns in the region and designate, where possible, important sites as 'Local Wildlife Sites' and incorporate them into the planning system.	SWT	PKC DCC AC	#	1, 3
WW2	5	Continue river habitat surveys.	SEPA	SWT	# # # # #	3
WW2	6	Continue Site Condition Monitoring for SACs and SSSIs.	SNH		# # #	
WW2	7	Review data on rivers as a precursor to the preparation of Catchment Management Plans and updating of existing CMPs as directed by WFD.	SWT SEPA DSFBs PKC DCC AC	SNH Local Biological Records Centre	# # #	1, 3, 5
WW2	8	Establish whether there are self-maintaining populations of Allis/Twaite shad in Tayside.	SNH	Fisheries Research Services Freshwater Lab	#	3
WW2	9	Encourage and support local community projects and involvement	TBP	SEPA SNH PKC DCC AC	# # # # # # # #	4, 5
WW2	10	Monitor the delivery of the action plan yearly and in detail every five years, starting in 2003.	TBP		# # # # # # # #	

Rivers and Burns

WW2

	E	Promotion and awareness-raising				
WW2	1	Provide a regular progress report to raise awareness and report good practice management for biodiversity in river and burn habitats.	TBP		# # #	4
WW2	2	Liaise with and compile a list of private landowners and local interest groups who would be receptive to participation in discussions about local rivers and burns.	TBP	SNH SWT SEPA FWAG	#	4, 5
WW2	3	Compile an information resource of key legislative, policy, management, guidance and research documents to be available for public consultation at key locations e.g. libraries, museums, council offices.	TBP	SNH SWT SEPA	#	5
WW2	4	Consider action required to raise awareness of this habitat amongst key stakeholders and devise plans to implement.	SNH SWT TBP	PKC DCC AC RSPB SEPA	# #	5
WW2	5	Raise awareness amongst the anglers of the differences in angling law in Scotland, compared with those south of the border.	Angling Groups DSFBs		# # # # # # # #	5
WW2	6	Undertake awareness raising training for Competent Authorities to help with planning issues.	SNH	DSFBs SEPA SEERAD	# # #	3, 5

Rivers and Burns

This illustrative map shows a few key examples of the habitat. Please note that many sites of interest are privately owned and owners' permission should be sought for any access.



Tayside Biodiversity Partnership



