



Rivers and Streams

River channels and banks have been highly modified by man throughout England. However, in Cumbria a high proportion of rivers have semi-natural features, and many river corridors retain a significant degree of naturalness. This makes Cumbrian rivers of considerable national importance.

Current status

Rivers and streams are dynamic systems which, in their natural state, continually modify their form. They have a diverse range of features, such as riffles, shingle banks and pools, which each support a diverse range of plant and animal species. These channel features are complemented by bank features, such as earth or rock cliffs, stands of reeds, woodland or herb-rich grasslands. The nature of individual rivers changes along their length, with small, fast-flowing upland streams developing into broad, slow moving, meandering rivers in their lower reaches. The water chemistry of rivers also varies considerably and is often dictated by the geology underlying the catchment. River water chemistry also changes along the length of the river as both the underlying geology changes and as the nature of natural and man-made inputs change. The nutrient status and physical structure of the river are the main determinants of river habitat quality. The key feature of rivers and streams is the role of fluvial processes (such as sediment transport, deposition and flooding) in influencing river habitats and maintaining diversity. Conservation of rivers

and streams should aim to allow these processes to shape river and floodplain habitats.

Although there are few examples of pristine river systems in England, a high proportion of Cumbrian rivers are considered semi-natural, with characteristic bed, channel and bank features. There are also many river corridors in Cumbria which retain a significant degree of naturalness, with a diverse range of adjacent habitats. Examples include the Brathay between Elterwater and Lake Windermere, River Irthing upstream of Brampton, River Eden through Eden Gorge, the River Duddon, River Lune at Killington, Rawthey above Sedbergh and the Dee above Dent.

Man's activities can be seen to varying degrees on many Cumbrian rivers. Flood defence works, canalisation and removal of riparian habitats have restricted some rivers, reducing the natural processes of erosion and deposition with a resulting reduction in natural new habitat creation/formation. Despite the modifications many of these rivers still support a number of important biodiversity species such as otter.

Riparian habitats such as woodland, grassland, tall herb and fen, marsh and wet woodland are important features within Cumbrian river corridors. The presence of these habitats within the corridor significantly contributes to the nature conservation interest of rivers. Where man's influence has reduced or replaced these habitats eg. intensive grazing, there is generally a corresponding reduction in conservation interest.

624 km of Cumbria's rivers have been designated as Sites of Special Scientific Interest. This is around half the total length of river SSSI designated nationally. The four river SSSI in Cumbria are also candidate Special Areas of Conservation designated under the EU Habitats Directive.

Characteristic wildlife

Most rivers in Cumbria exhibit a range of river types, from their source to sea. This is because of the diversity of topography and geology in Cumbria. However, the extent of the above features varies between rivers. The mountain streams are relatively impoverished in vascular plants but are rich in low growing bryophytes anchored to rocks and boulders. Within these streams there are macro-invertebrates amongst the stones and cobbles, providing food for dippers and salmonids. In the Lake District, many of these mountain streams have highly dynamic channels caused by severe flash floods after rainstorms. Conversely, they may also dry up in summer droughts. Pennine mountain streams have perhaps more stable flow regimes, as the extensive peatlands on the Pennines and the limestone and sandstone geology buffer against extremes of runoff.

At lower altitudes the streams and rivers have more stable flow regimes and, importantly, their gravel and stony beds are more stable. Also, in backwaters and quieter stretches, sediments can settle to form silt beds. Usually the first sign of a more stable flow regime is the appearance of the moss *Fontinalis* on submerged rocks and stones. There may also be aquatic plants such as water crowfoots and water-milfoil. Streams running off limestone or other, mineral-rich rocks may have a more diverse aquatic flora with, for example, curled pondweed, opposite-leaved pondweed, watercress and water mint.

In these small streams much of the animal life of the river lives under the relatively stable bed of stones and gravels. Here, there will be macro-invertebrates, the roots and anchoring points of aquatic plants, smaller fish and, in gravels, the spawning beds of fish like salmonids and lampreys. Apart from young salmon and trout, other fish species found in Cumbrian streams include bullhead, minnows, eels and stone loaches. In calcium-rich streams, such as on the Kent and upper Eden catchments, white-clawed crayfish are also found. These smaller streams are used by dippers, grey wagtails, kingfishers and, in places, otters and water voles. A few of the oligotrophic streams and rivers in Cumbria still have populations of the rare freshwater pearl mussel.

Further downstream there is much greater development of channel width and depth. On floodplains, the river may meander, with extensive development of silt deposition and in-channel features such as islands and shingle bars. Lowland and floodplain rivers may retain many of the habitats and species found in the higher reaches, particularly fish and birds. However, in addition, the aquatic plant flora can be much more diverse, with pondweeds, emergent species, such as flowering rush, and extensive beds of water crowfoot. Backwaters and cut-off channels may have an aquatic flora similar to ponds with, for example, water plantain, unbranched bur-reed, iris and lesser pond-sedge. Juvenile lampreys live in the silt beds of quieter reaches whilst the adults make use of the gravel beds for spawning. Birds include common sandpipers, goosanders and, wherever there are earth banks, sand martins.

The floodplain wetlands of the Irthing and a few other rivers in Cumbria include riparian habitats of sedge-swamp, reedswamp and alder or willow woodland. The latter can include bay, crack and purple willows as well as grey and goat willow.

On some rivers, such as the Eden, Derwent and the Lune, there are extensive gravel banks adjacent to the channel. These are an important habitat for specialised invertebrates, particularly certain rare species of ground beetle. The invertebrate populations on these habitats are also an important food source for riverside birds.

Key species

The following rare or threatened species are associated with rivers and streams in Cumbria. Species were selected on the basis that they are UK BAP Priority Species (marked P) or species of County importance in Cumbria. Where species of County importance are also UK BAP Species of Conservation Concern, they are marked C.

water vole	<i>Arvicola terrestris</i>	P
European otter	<i>Lutra lutra</i>	P
Daubenton's bat	<i>Myotis daubentonii</i>	C
Natterer's bat	<i>Myotis nattereri</i>	C
noctule	<i>Nyctalus noctula</i>	C
common pipistrelle	<i>Pipistrellus pipistrellus</i>	P
reed bunting	<i>Emberiza schoeniclus</i>	P
yellow wagtail	<i>Motacilla flava</i>	C
allis shad	<i>Alosa alosa</i>	P
twaithe shad	<i>Alosa fallax</i>	P
bullhead	<i>Cottus gobio</i>	C
river lamprey	<i>Lampetra fluviatilis</i>	C
brook lamprey	<i>Lampetra planeri</i>	C
sea lamprey	<i>Petromyzon marinus</i>	C
Atlantic salmon	<i>Salmo salar</i>	C
grayling	<i>Thymallus thymallus</i>	C
giant lacewing	<i>Osmylus fulvicephalus</i>	
a lacewing	<i>Sisyra dalii</i>	
a mayfly	<i>Siphonurus lacustris</i>	
a caddisfly	<i>Erotesis baltica</i>	
a caddisfly	<i>Glossosoma intermedium</i>	C
a caddisfly	<i>Hydroptila tigurina</i>	
a caddisfly	<i>Ithytrichia clavata</i>	C
a stiletto fly	<i>Spiriverpa (=Thereva) lunulata</i>	P
a stiletto fly	<i>Chorisima/Psilocephala rustica</i>	P
a cranefly	<i>Gonomyia (Idiocera) punctata</i>	
a hoverfly	<i>Parasyrphus nigritarsis</i>	C
a rove beetle	<i>Carpelimus schneideri</i>	
a ground beetle	<i>Dyschirius angustatus</i>	P
a water beetle	<i>Hydraena pulchella</i>	
a water beetle	<i>Hydraena pygmaea</i>	
a water beetle	<i>Hydroporus rufifrons</i>	P
a rove beetle	<i>Thinobius newberyi</i>	P
a syncarid crustacean	<i>Antrobathynella stammeri</i>	
white-clawed crayfish	<i>Austropotamobius pallipes</i>	P
banded demoiselle	<i>Calopteryx splendens</i>	
beautiful demoiselle	<i>Calopteryx virgo</i>	
netted carpet moth	<i>Eustroma reticulata</i>	P
a bug	<i>Saldula fucicola</i>	
freshwater pearl mussel	<i>Margaritifera margaritifera</i>	P
Lilljeborg's whorl snail	<i>Vertigo lilljeborgi</i>	C

river jelly lichen	<i>Collema dichotomum</i>	P
a liverwort	<i>Lophocolea fragrans</i>	
a liverwort	<i>Porella pinnata</i>	
a liverwort	<i>Radula voluta</i>	C
a moss	<i>Fissidens exiguus</i>	P
a moss	<i>Orthotrichum sprucei</i>	P
floating water-plantain	<i>Luronium natans</i>	P

Best management practice

Best practice has developed from the acknowledgement that river management has to be addressed in a more holistic manner; not a site by site basis, taking account of catchment influences on the river.

Recognition of the role of fluvial processes in creating sustainable river habitats and the link between the river and floodplain is growing. In addition, the importance of the natural functions of floodplains, for example flood and sediment storage, are being recognised. Consequently, opportunities for river restoration and rehabilitation must not be overlooked both in terms of engineering and wildlife benefits. They not only offer the opportunity to reverse past damage but may also reduce costly levels of maintenance. EA sponsored a PhD study (author: Harriet Orr) on fluvial processes in the Lune, which is now available. It identified physical factors and land-use factors which determine how the catchment functions, and gives valuable management information.

Current issues

Channel and bankside management

- Intensive grazing up to the river's edge leads to the loss of natural riparian habitat and results in bank instability and increased erosion/ sedimentation and widening of channels
- Inappropriate or insensitive bankside maintenance can lead to a direct loss of wildlife habitat and have damaging impacts on the river geomorphology, e.g. transferring energy downstream to the next erodible bank where more damage is caused.
- In-channel works such as gravel removal can affect fish spawning and nursery sites and invertebrate habitat, with loss of natural channel features. Removal (or addition) of large quantities of sediment also has adverse effects on the river geomorphology leading to increased erosion.

- Culverting of watercourses which effectively results in the loss of all wildlife interest.
- Spread of invasive and non-native plant species such as Japanese knotweed, Himalayan balsam, giant hogweed and other pernicious weeds.

Pollution

- Nutrient enrichment of rivers can lead to excessive algal and plant growth, changes in the plant and animal community and can deplete dissolved oxygen levels locally. These nutrients arise from a variety of sources, both specific and diffuse. Specific point sources include effluents from sewage treatment works and storm discharges, whilst diffuse sources would include agricultural run-off arising from catchment-wide high input (fertiliser and slurry) farming practices. Groundwater sources feeding into rivers and streams may become polluted by leakage from wastewater facilities and farm runoff.
- Toxic pollution can be detrimental to all aquatic life. This arises from a number of sources including industrial discharges, mining (operational and abandoned) and atmospheric fallout (acid rain etc).
- Contamination by synthetic pyrethroid sheep dips can devastate river invertebrate populations.

Catchment Land Use

- Alteration of the flow regime of a river, such as the regulated flow downstream of a reservoir, can have significant impact. Such rivers have their spate characteristics modified and cease to naturally evolve geomorphologically.
- Intensification of agriculture arising from past land drainage improvements have reduced habitat diversity within river flood plains. Wet grassland and wet woodlands have been replaced by improved pasture. Loss of such habitats and the improved drainage also results in faster movement of water into rivers, increasing the potential for flooding and low summer flows.
- Development within the catchment such as roads, car parks and housing may reduce the potential of what was a permeable medium to absorb rain water, thereby increasing run off from the catchment and resulting in higher flood discharges.
- Development on flood plains reduce their natural flood capacity, resulting in higher flood discharges downstream.

- Intensive fish farming/rearing, leading to potential problems of water quality and quantity and the possible escape of non-native species or genetic strains.

Disturbance

- High and increasing use of rivers as areas for recreation, leading to problems of bank erosion, litter and disturbance to wildlife.

Alteration of Hydrology

- Water abstraction from ground water and surface water sources can reduce flows and are particularly significant during periods of drought. This can affect the ability of the river to support wildlife, particularly species requiring high levels of dissolved oxygen and low temperatures.
- Reduction of groundwater and surface water levels, due to agricultural drainage (occasionally pumped), modifying flood plain wetlands and reducing their extent.

Current action

Legislation

- The soon-to-be-adopted Water Framework Directive is the most significant piece of European water legislation for over 20 years. It aims to present a coherent legislative framework for the protection and improvement of the water environment, taking an holistic approach to water management, including whole river basin management. It applies to all waters (including both ground- and surface-waters), utilises ecological and chemical standards and aims to involve the public as well as Agencies and organisations in the management of river basins. Its implications for current management/ regulatory systems remain to be determined.

Channel and bankside management

- English Nature and the Environment Agency have produced conservation strategies and consenting protocols for the Eden and tributaries, Derwent and tributaries, and Ehen SSSIs
- The Environment Agency is supporting Farming and Wildlife Advisory Group and, through them, promoting the importance of farming practice on the health of our rivers. The Sustainable Rivers Project has centred on the Ehen and now on the Ellen in Cumbria. It aims to enhance and restore parts of the landscape and river, through advice

and financial support (from available grants) for managing land in a way which is sensitive to the environment, while remaining realistic and productive.

- The Eden Rivers Trust is providing advice and grants to achieve sustainable management of the Eden and its tributaries as a fishery and a wildlife resource.
- English Nature is providing management agreements and grants for habitat improvements on the Rivers Eden and Derwent. This is in partnership with river trusts and, on the Derwent, with the Lake District National Park Authority.
- The Calder Conservancy Committee is a partnership between British Nuclear Fuels Ltd, Environment Agency, angling and riparian interests. It has been set up following a fish kill in 1997 caused by a British Nuclear Fuels Ltd sourced pollution. The committee is managing a British Nuclear Fuels Ltd funded study into the apparent declines of migratory fish runs.
- The West Cumberland Rivers Foundation is investigating habitat conditions on selected west Cumbrian rivers, notably the River Irt.
- The Lune Habitat Group undertakes work to restore and enhance bankside habitats. They have identified 120 km of bankside for enhancement work in the Lune system.
- The Environment Agency is funding a project into the feasibility of re-naturalising certain rivers in south Cumbria. Ways will be examined of improving the habitat on two pilot rivers, the Winster and Rusland Pool. The crux of the project is to demonstrate the impact that such proposals may have on flooding susceptibility.
- The Environment Agency has been working on, and is about to implement, a national policy regarding culverts. The Environment Agency is generally opposed to the culverting of watercourses because of the adverse ecological, flood defence and other effects likely to arise. The policy has a presumption against culverting unless there is no reasonably practicable alternative or if the detrimental effects would be so minor that they would not justify a more costly alternative.
- A LIFE Nature Project "Safeguarding Natura 2000 Rivers in the UK" is jointly proposed by the UK conservation and environmental protection agencies. If the application to the EU is successful this will be a 4½ year project to develop

management schemes for selected river cSACs, including the River Eden. There will also be a number of topic based projects looking at fisheries management, techniques for silt management, habitat restoration and enhancing species. The latter includes freshwater pearl mussel and white-clawed crayfish, both found in Cumbrian rivers.

- Invasive weed control programmes with the aim of eradicating giant hogweed on the Eden and Kent catchments are undertaken annually by the Environment Agency.
- The National Trust has commissioned a scoping study into river management and restoration options for a number of rivers in its ownership.

Pollution

- The Environment Agency undertakes an ongoing programme of water quality monitoring which underpins its statutory pollution control duties. This includes strategic surveys of river invertebrates and chemical water quality, reactive surveys in response to pollution incidents and more specialised surveys to investigate or target particular water quality problems.
- The Environment Agency has raised awareness of the synthetic pyrethroid sheep dip problem within the County. It has instigated a series of targeted catchment campaigns to monitor the problem and produced risk assessments of all dipping facilities within these vulnerable catchments (Derwent, Lowther, Caldew and Kent). Further improvements to the situation should come with the implementation of the Groundwater Regulations 1998 and a code of practice for dipping operations has been produced. In 1999 a survey was conducted for sheep dip pollution in the Lune catchment; no Cumbrian sites were found to be polluted.
- The Environment Agency and Cumbria County Council have collaborated to create a trial artificial wetland on the river Keele to treat minewater discharge from a coal spoil tip.

Catchment land use

- Local Environment Agency Plans (LEAPs) produced by the Environment Agency (formerly called Catchment Management Plans). Five plans cover Cumbria and these will be complete by 2000. LEAPs cover all aspects of the Agency's work and detail the present status, uses and issues in each catchment in the county, and set

targets for improvements and enhancements over a five year period.

- Ministry of Agriculture, Fisheries and Food agri-environment schemes contribute to the protection and enhancement of rivers. Countryside Stewardship agreements are offered in targeted areas, under the Waterside Landscape option. Environmentally Sensitive Areas agreements, although in Cumbria not targeted specifically at rivers, have benefits to them by promoting low input agriculture to land bordering watercourses and stock exclusion to meet specific biodiversity objectives.
- Local Authorities are including river corridor protection policies in their Local Plans.
- A review of consents is being undertaken by the Environment Agency within the Ehen, Eden and tributaries and Derwent and tributaries cSACs, under the Habitats Regulations 1994.
- The Moorland Objective 5b scheme for the North Pennines includes a number of prescriptions which may indirectly benefit rivers on the Cumbrian side of the Pennines. This includes winter housing of sheep and drain blocking.

Alteration of hydrology

- North West Water Ltd and the EA have collaborated on the Gelt to construct a fish pass, giving migratory fish re-access to the New Water tributary of the Gelt. The Gelt is also an AMP3 low flow project and flows in the New Water tributary are to be improved as a consequence of this.
- The Environment Agency is funding a project to provide River Flow Objectives for the River Ehen. This is a detailed investigation into the likely effects of different flow regimes on the river's water quality, ecology and fishery. It will allow informed decisions to be made in relation to water abstraction within the catchment. On the River Liza upstream of Ennerdale Water, a pipe bridge is being removed to aid migration of salmonids.
- There is ongoing work between the Environment Agency and North West Water Ltd on ecological mitigation works in the Lowther catchment. This has resulted in the submission of a re-designed intake and screening regime on Cawdale Beck.
- Augmentation water from the Haweswater Shap Aqueduct goes into the Lune via Crookdale then Borrow Beck, to support water abstraction from

Forge Weir (Lancs.). The facility is only used occasionally, and an ecological survey of its impact was commissioned by NWW.

- The Environment Agency has instigated a drought-related project to identify information requirements to effectively address future drought order applications on those catchments identified by North West Water Ltd as the most likely candidates.
- The Environment Agency are involved with North West Water Ltd and District Councils in the design and promotion of Sustainable Urban Drainage Systems. These can provide enhancement by creating habitats, controlling discharge rates to watercourses to prevent flooding and providing opportunity for limited biological treatment to improve water quality from urban area run-off. A pilot project is being created on a new housing development in South Lakeland District.
- Policies in Local Plans include those for the prevention of development in river floodplains.

Interpretation and awareness

- East Cumbria Countryside Project is planning an extensive interpretation strategy based on the river Eden and its adjacent landscape. The programme will facilitate, in close collaboration with the other agencies and resident communities, an environmental experience for quiet recreation, which embraces and raises awareness of conservation.

Context in relation to other plans:

UK Habitat Action Plans

Biodiversity: The UK Steering Group Report (1995) contains a habitat statement for rivers and streams, which gives the following conservation direction: Maintain and improve the quality, state and structure of all UK rivers and streams and their associated floodplains. Restore degraded rivers and streams taking account of water quality and quantity, structure and hydraulic connection with the floodplain.

National Lead Agency

None.

Local contacts

Environment Agency - Steve Garner. Phone: 01768 866666

English Nature - Allan Stewart. Phone: 01539 792800

Associated plans in the Cumbria BAP

The following Cumbria species and habitat action plans are of relevance to rivers and streams:

Phase I

- water vole
- bats
- barn owl
- great crested newt
- vendace
- *Hydroporus rufifrons* (a water beetle)

- marsh fritillary
- *Glossosoma intermedium* (a caddis fly)
- netted carpet moth
- wet woodland
- reedbed
- mesotrophic standing waters

Phase II

- schelly
- Atlantic salmon
- white-clawed crayfish
- freshwater pearl mussel
- invertebrates of exposed river shingle
- river jelly lichen
- coastal and flood plain grazing marsh
- valley mires
- oligotrophic lakes

Objectives, targets and proposed actions for rivers and streams in Cumbria**Broad Objective A Maintain the quality of existing natural channels, flood plain features and dependent wildlife**

Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
1 Ensure appropriate representation of rivers and streams, their wildlife and natural features in statutory and non-statutory sites eg SSSIs, Wildlife Sites, RIGS	1 Complete designation of sites of National importance as SSSI by 2002.	EN	M	SS
	2 Identify as Wildlife Sites the most important areas for wildlife in the County outside of statutory sites. Agree criteria for rivers and streams and implement by 2010.	CWT, LAs	M	SS
	3 Review & designate sites of county importance for geological and geomorphological interest by 2002.	RIGS group	M	SS
2 Ensure that planning and legislation systems protect rivers and streams	1 Seek to ensure that Local Authority Development Plans contain policies that do not allow development that would significantly damage river corridors and associated flood plains.	LAs, EA EN, CWT	M	SS

Broad Objective A		Maintain the quality of existing natural channels, flood plain features and dependent wildlife		
Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
	2 No new Agency works undertaken, or third party applications (land drainage consents) consented which significantly damage river corridors and associated floodplains.	EA	O	SS
Broad Objective B		Protect, maintain and wherever appropriate improve river and stream water quality		
Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
I Maintain and enhance the water quality of Cumbria's rivers to defined standards	1 Seek to ensure that all river ecosystem quality standards are maintained.	EA	O	SS
	2 Seek to ensure that all rivers and streams in Cumbria meet EU Directives in terms of designation and / or water quality.	EA	O	SS
	3 Seek to ensure that all discharges and trade effluent meet consent standards.	EA, Dischargers	O	SS
	4 Develop appropriate biological quality objectives for Cumbria's rivers.	EA	M	RM/PL
	5 Review the discharge consents potentially impacting upon the cSAC rivers by 2004.	EA, EN	S/M	SS
	6 Undertake catchment surveys / campaigns on appropriate rivers re sheep dip pollution.	EA	O	RM
	7 Implement APM3 agreements for water quality improvements, including phosphate stripping at Penrith, Cockermouth and Cleator Moor STWs by 2005.	NWW	M	SS

Broad Objective C **Protect, maintain and wherever appropriate improve river and stream flows**

Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
1 Ensure future drought events are managed effectively, whilst not compromising river dependent wildlife and ecology	1 Complete Area drought management plan enabling a strategic approach to future drought episodes by 2000.	EA, NWW	S	PL
	2 Ensure effective leakage control, demand management and other ways of minimising wastage of water supplies.	NWW, EA, OFWAT	O	SS
2 Ensure that current and future water abstractions do not compromise river dependent wildlife and ecology	1 Review the abstraction licences potentially impacting upon cSAC rivers by 2004.	EA, EN	M	SS
	2 Investigate river flow objectives for the River Ehen by 2000.	EA	S	PL/SS
	3 Produce abstraction management strategies for all river catchments in Cumbria by 2005.	EA	M	PL/SS

Broad Objective D **Enhance degraded river channels, flood plain features and dependent wildlife**

Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
1 Progress towards the sustainable management of Cumbria's rivers, which benefit river dependent wildlife and ecology	1 Continue with the sustainable rivers project until 2001.	EA, FWAG	S/M	SS
	2 Target Countryside Stewardship to enhance riparian corridors.	MAFF	O	SS
	3 Influence MAFF in the revision of ESA prescriptions to maximise the positive benefit to river corridors in ESA prescriptions.	EN, LDNPA	O	PL
	4 Implement riparian habitat improvements. Target is to restore riparian habitats on at least 15km of river each year for next ten years.	ERT, CRF, EN, EA, NT, AAs, LDNPA, FWAG, FC, MAFF, ECCP	O	SS

Broad Objective D		Enhance degraded river channels, flood plain features and dependent wildlife		
Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
2 Increase local habitat diversity within flood plains	1 Identify suitable sites for 2-3 large new wet woodlands (each >25ha) by 2005.	FC, EA, EN, CWT, NWW, NT, LDNPA, CB, ECCP.	M	RM/SS
	2 Identify areas where restoration and creation of lowland wet grassland and reedbed could be targeted in Cumbria by 2000, and draw up strategy for implementation by 2002.	RSPB, EA, EN, CWT, FWAG	S/M	RM/SS
	3 Complete at least one river/floodplain restoration project by 2010.	EA, NT, CWT, EN, LDNPA, ERT	L	SS
Broad Objective E		Promote a wider awareness, understanding and appreciation of rivers and streams, their conservation needs and their sustainable use		
Operational Objective	Action Required	Suggested organisational involvement	Time-scale	Type
1 Improve our knowledge of rivers and streams, to inform their sustainable planning, management and use	1 Develop and implement a GIS system to hold information about rivers in the County, compatible with partner organisations by 2001.	EA, EN	O	RM
	2 Implement joint working agreement between Cumbria Biological Data Network members regarding the sharing of ecological information relevant to rivers and streams by 2000.	CBDN members	S	RM
2 Promote sustainable river management in the County	1 Establish a forum of agencies and organisations, the aim of which is to establish best practice and, ultimately, co-ordinate effort towards achieving a more unified management of rivers and their catchments within the County. Establish by 2001.	EA, EN, FWAG, LDNPA, MAFF, ERT, CRF, NT, RSPB, CWT	M	A

Key to Tables

Suggested organisational involvement: Key Deliverers in bold type; Partners in plain type.

AAs=Angling Associations; BNFL = British Nuclear Fuels Ltd; CB = Cumbria Broadleaves; CBDN = Cumbria Biological Data Network; CCC = Cumbria County Council; CRF = Cumberland Rivers Foundation; CWT = Cumbria Wildlife Trust; EA = Environment Agency; ECCP = East Cumbria Countryside Project; EN = English Nature; ERT = Eden Rivers Trust; FC = Forestry Commission; FE = Forest Enterprise ; FWAG = Farming and Wildlife Advisory Group; LDNP = Lake District National Park; LAs = Local Authorities; MAFF = Ministry of Agriculture, Fisheries and Food; NT = National Trust; NWW = North West Water; RIGS group = Regionally Important Geological Sites group; RSPB = Royal Society for the Protection of Birds; STW = sewage treatment works.

Timescale: O=ongoing; S=short term (2000-2001); M=medium (2002-2005); L=long (2006-2010).

Type: Type of action; PL=Policy & Legislation; SS=Site Safeguard & Management; SP=Species Management and Protection (species plans only); A=Advisory; RM=Research & Monitoring; CP=Communications and Publicity.