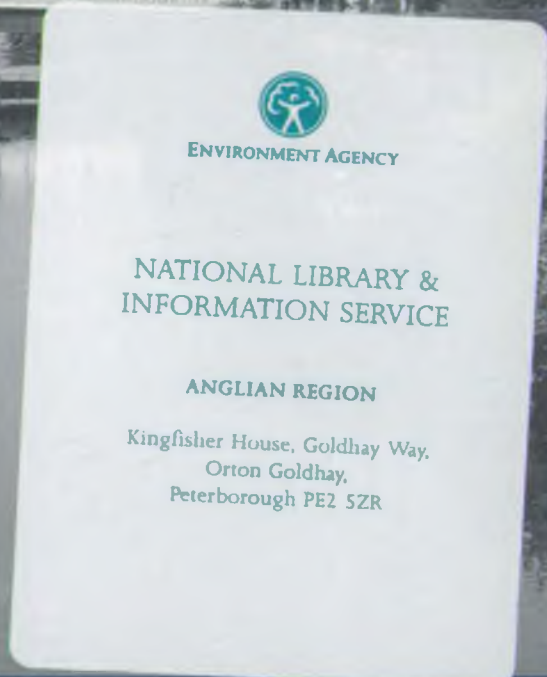
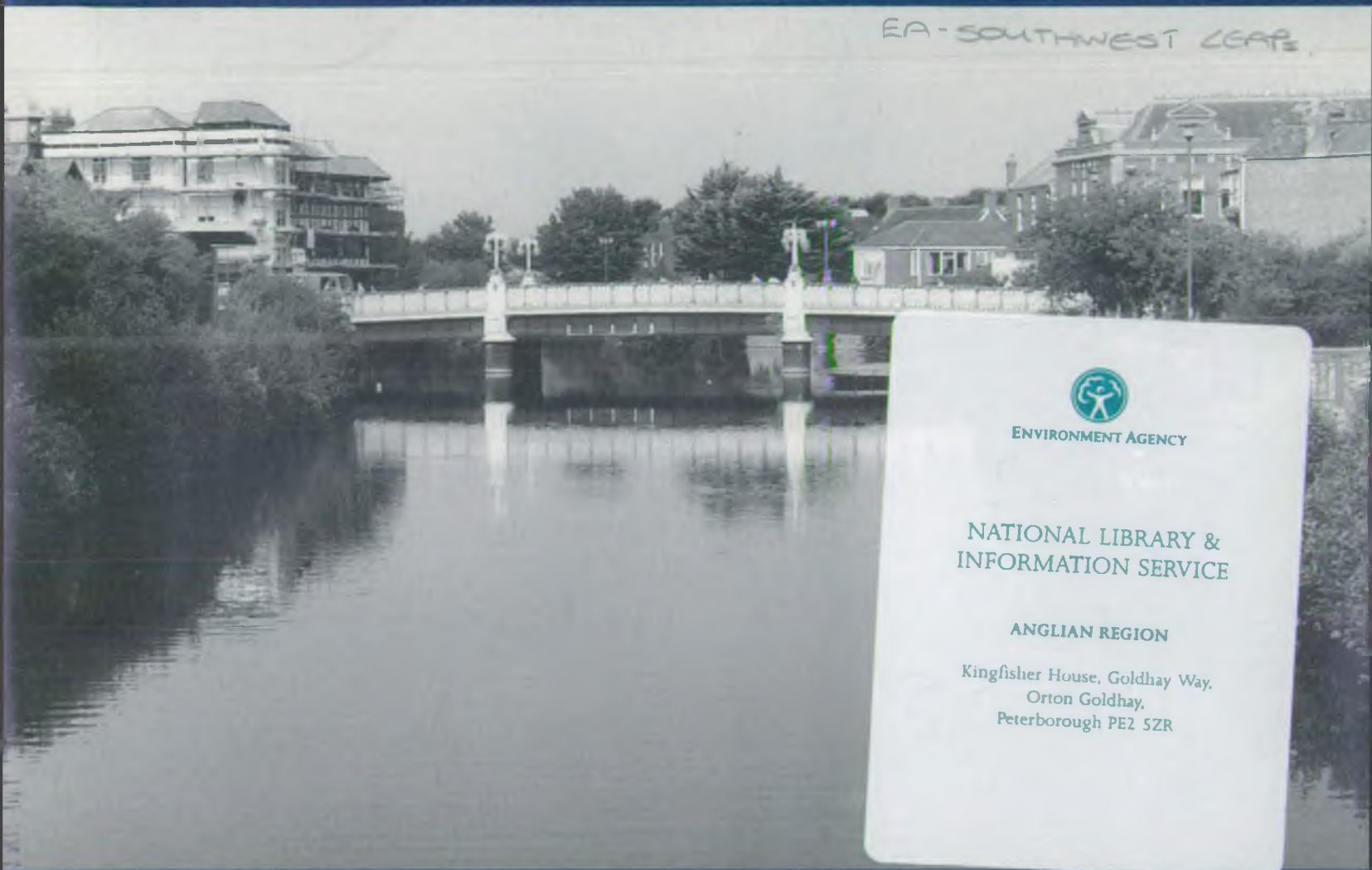


catchment management plan

EA - SOUTHWEST LEAP



RIVER TONE action plan March 1997



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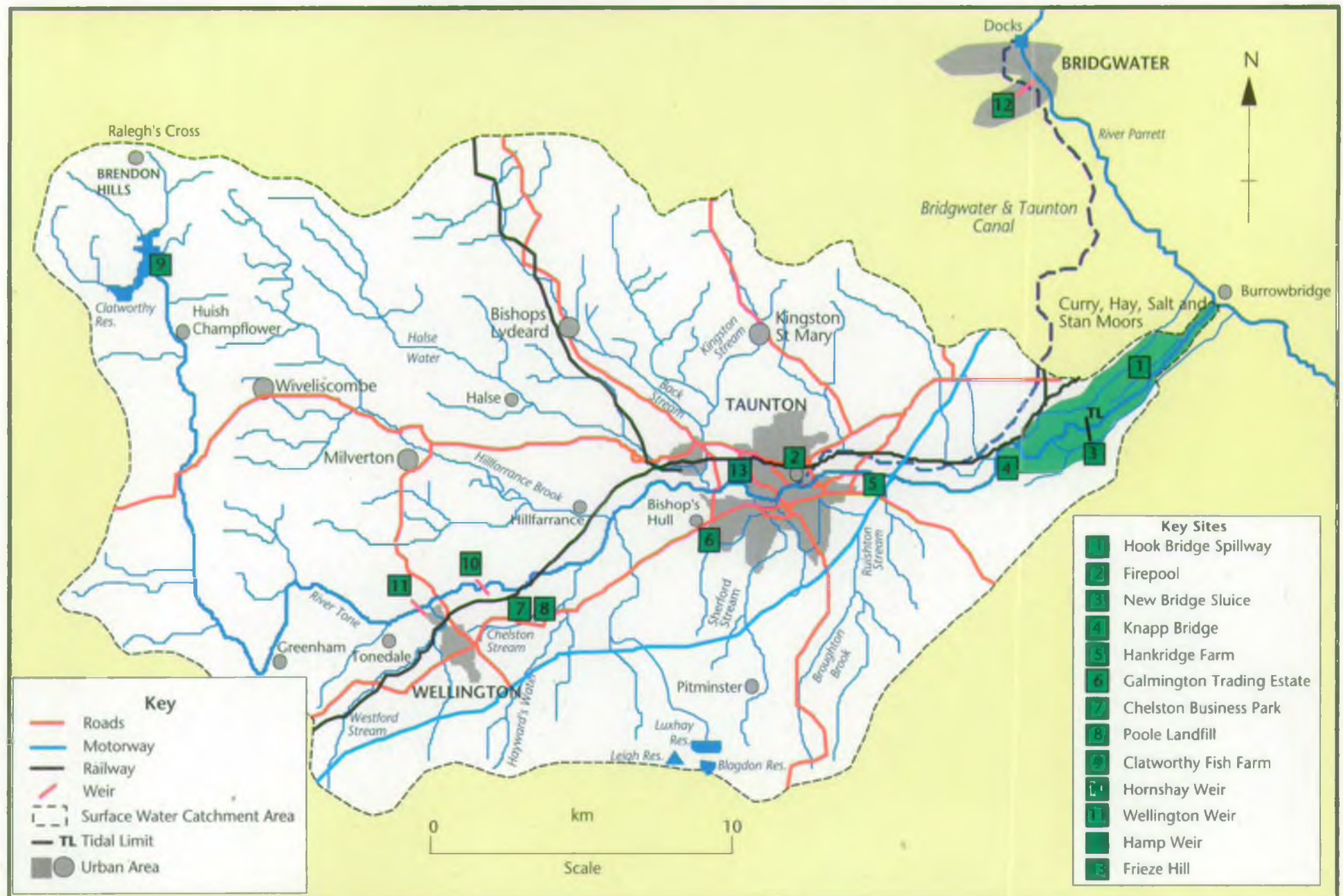


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map 1

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Key Sites Relating to Issues in the River Tone Catchment

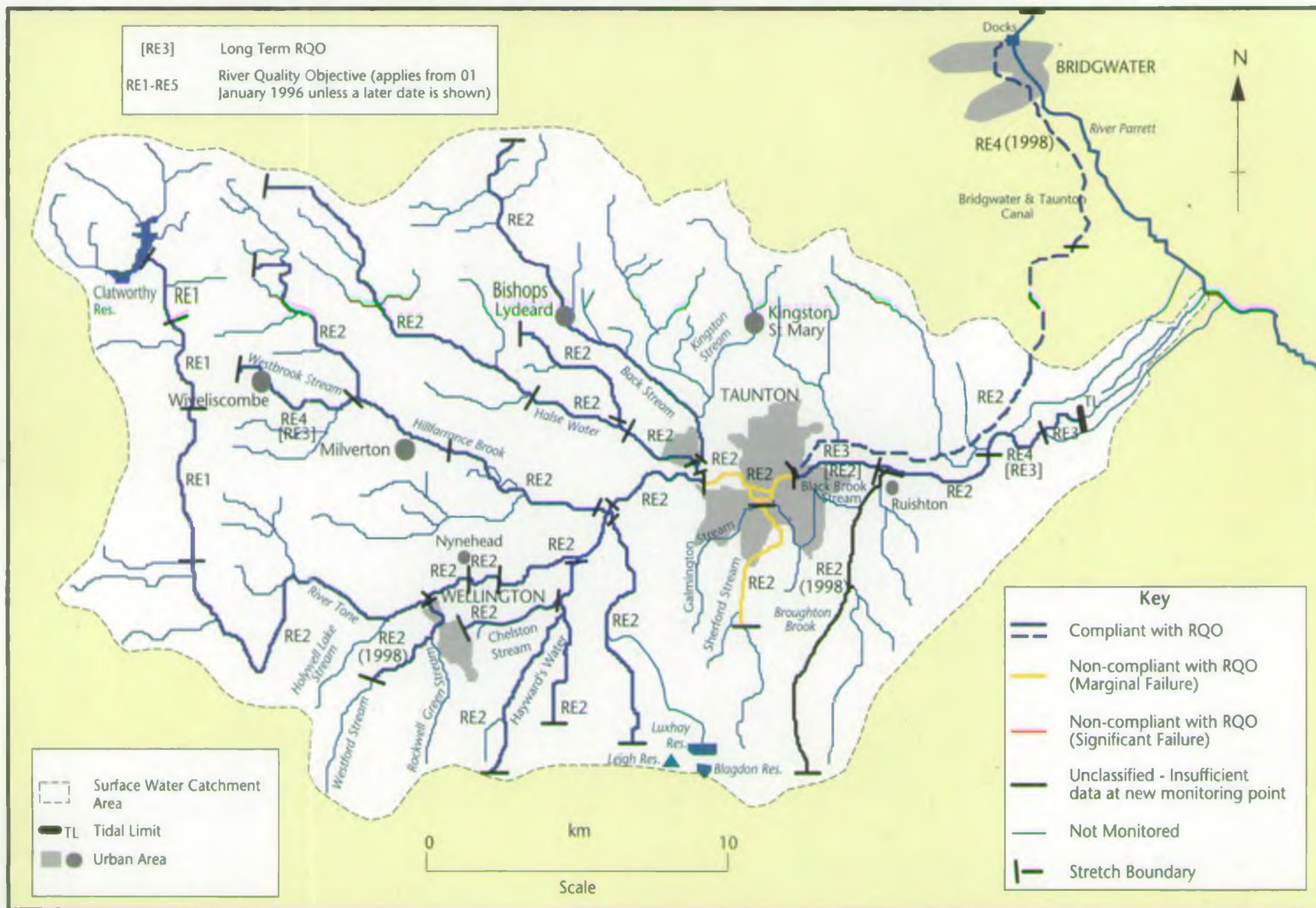
Map 1 - Key Sites Relating to Issues in the River Tone Catchment



map 2

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1995 Compliance with Proposed River Quality Objectives

Map 2 - 1995 Compliance with River Quality Objectives (River Ecosystem Classification)



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Our Vision for the Catchment

Most societies want to achieve economic development to secure a better quality of life, now and in the future. They also seek to protect their environment now and for their children. Sustainable development tries to reconcile these two objectives - meeting the needs of the present without compromising the ability of future generations to meet their own needs. To achieve this, judgements have to be made about the weight to be put on different factors in particular cases. Sometimes environmental costs have to be accepted as the price of economic development but on other occasions a site or an ecosystem, or some other aspect of the environment, has to be regarded as so valuable that it should be protected from exploitation.

The River Tone Catchment has been altered by many generations to control river and tidal floods and to make use of the clean and plentiful supply of surface and underground water. These changes have improved our standard of living and assisted the economic development of the area. However, many environmental features have been lost, groundwater and surface water polluted and a legacy of expensive and ever more vulnerable flood defence works remains for future generations to maintain.

We wish to achieve significant and continuous improvement in the quality of air, land and water, actively encouraging the conservation of flora and fauna.

In an area of such high amenity and ecological value as the Tone Catchment the Environment Agency's vision of the future is towards a catchment where:

- the aquatic biodiversity of the catchment is maintained and extended;
- improvements continue to be made to existing discharges, meeting the most stringent appropriate standards;
- abstractions of water are in balance with the ecological needs of rivers and wetlands;
- an agricultural and forestry system develops which reduces the risk of diffuse pollution, for example the use of buffer strips, and improves the physical habitat of the river system and wetlands for wildlife;
- the public's enjoyment and appreciation of the river system continues to grow;
- the risk to people and property from flooding is minimized.

Vision

2. Introduction

The Environment Agency is one of the largest environmental regulators in the world. Its vision is to achieve a better environment in England and Wales for present and future generations. It provides a comprehensive approach to the protection and management of the environment by combining the regulation of waste to land, water, and industrial releases to air. Its creation on 1 April 1996 was a major and positive step, merging the expertise of the National Rivers Authority, Her Majesty's Inspectorate of Pollution, the Waste Regulation Authorities and several smaller units from the Department of the Environment.

We hope that you will find this plan useful whether you are involved in a local authority, an environmental organization, in industry, or a recreation or other relevant body. It is intended to inform you of our plans and to be a basis for further ideas and initiatives to ensure that the work of the Environment Agency progresses towards more integrated environmental management and regulation.

2.1 Public Consultation

In September 1995 the National Rivers Authority (NRA) published the River Tone Catchment Management Plan Consultation Report which promised an Action Plan for the catchment following a period of Public Consultation. The NRA consulted 202 organizations and individuals directly about the issues which are outlined in this Action Plan and received 46 formal responses. Some of these responses are summarized in the Report on Public Consultation (See 4.3).

This Action Plan outlines how the Environment Agency and other organizations plan to tackle issues which affect the water environment in the River Tone catchment. Issues are grouped and summarized in Activity Tables.

We have set up a Catchment Steering Group to help us produce this Action Plan. The membership of individuals and organizations reflects as many interests in the catchment as possible.

2.2 Future Reviews

We will report progress on carrying out our planned actions annually by publishing an Annual Review Document. This will also be an opportunity to add new issues and actions as they may arise. The Environment Agency hopes to build on the NRA's Catchment Plans to cover its wider range of environmental work. These new plans will be called Local Environment Agency Plans (LEAPs) and it is the intention to have such LEAPs for the whole of England and Wales by the end of the millennium. By that date, the River Tone CMP will be revised, augmented and published as a joint LEAP with the River Parrett.

2.3 Catchment Management Plans and Development Plans

Although we can control some of the things which influence the quality of the water environment or affect flood risk we have very little direct control over the way that land is developed. This is the responsibility of local planning authorities.

Local planning authorities prepare statutory development plans. The policies in these plans will guide the way that land is developed in the future.

The NRA published guidance for local planning authorities to encourage them to adopt policies which protect the water environment from the harmful effects of development. Where we can, the Environment Agency will reinforce these policies when we comment on planning matters or if we are making our own decisions. The Agency will now also advise planning authorities on planning matters related to industrial processes, waste management and the storage, use and disposal of radioactive material.

This Action Plan highlights our concerns about development. The Environment Agency is in detailed discussions with the Local Planning Authority with respect to provision of land allocations for the Local Plan for the Plan period up to 2011.

2.4 The River Tone Catchment

The River Tone Catchment covers an area of approximately 414 km² and has its source in the Brendon Hills near Ralegh's Cross. From its source to the confluence with the River Parrett it is about 33 km long and falls approximately 370 metres. Downstream of its origin, the Tone enters Clatworthy Reservoir. From the reservoir the river runs south towards the village of Greenham. It then does a U-turn, heading north for a short stretch, before turning east. The Tone skirts to the northern side of Wellington, then passes Bishop's Hull before entering Taunton. From Taunton, the river flows past Creech St. Michael, and becomes tidal at New Bridge Sluice before joining the Parrett at Burrowbridge.

The Bridgwater and Taunton Canal leaves the River Tone at Firepool Lock in Taunton. The Canal enters Bridgwater at Hamp. Here, a weir allows excess water to run into the tidal River Parrett. Having passed through the outskirts of Bridgwater the Canal ends at Bridgwater Docks, which it enters via a lock. The Canal has an overall length of 24.5 km (approximately fifteen miles).

The population of the catchment was estimated to be 96,000 in 1995 with most of that concentrated in Taunton (54,000 in 1991) and Wellington (11,300 in 1991).

The predominant land use in the upper reaches of the Tone Catchment is permanent pasture, with woodland (some ancient semi-natural) on the steeper valley sides. As the valley widens in the middle reaches, land use becomes more intensive, with improved and reseeded grassland, maize cultivation and potatoes (principally in the Hillfarrance subcatchment) which are regularly irrigated. Sheep and cattle grazing are common, with increasing numbers of horses. In the lower reaches of the Tone, the floodplain is essentially open moorland with improved permanent pasture, reseeded grassland, withy beds and maize cultivation.

The catchment is characterised by its beautiful landscape with more than half the total area designated as an Area of Outstanding Natural Beauty (AONB) or Special Landscape Area (SLA). The river corridor itself is designated a Landscape Character Area between Taunton and Wellington, and between Creech St. Michael and Burrowbridge, where the river passes through the unique landscape of the Somerset Moors.

The river corridor provides a wide variety of habitats for wildlife including the otter and water-vole. The Tone is an exceptionally varied river in geomorphological terms until it becomes embanked/impounded below Taunton. It has the most kingfishers of any Somerset river; the nationally scarce otters and water-voles are still present in good numbers. There is a rich dragonfly fauna and native crayfish may still be present in the river system.

3. Activity Tables

The Activity Tables which follow outline actions for resolving the issues identified in the Consultation Report and through the public consultation.

The Actions contained in these Tables are as clear, specific and time-bounded as possible, allowing ourselves as well as external organizations and individuals to monitor progress.

For a full discussion of the issues refer to Section 6 of the River Tone Catchment Management Plan Consultation Report. The costs identified represent our planned expenditure over the next five years. However, our policy and priorities may change during this time which may affect how much we will actually be able to spend on specific issues.

The financial years covered by this Plan are represented by a single date, for example, '96' represents the financial year April 1996 to March 1997. Where costs are unknown this is indicated by a 'U' in the tables.

Our everyday work also commits substantial resources to managing and improving the water environment; the scope of that work has been explained in the Consultation Report.

3.1 Water Quality

We aim to maintain and, where appropriate, improve the quality of water for all those who use it. This is achieved by setting water quality targets for the catchment based on:

- River Quality Objectives to protect water quality for recognized uses;
- Standards laid down in EC Directives;
- Reducing the amounts of Annex 1A substances entering tidal waters.

We protect groundwater by implementing our groundwater protection policy set out in the 1992 NRA publication "Policy and Practice for the Protection of Groundwater".

3.1.1 River Quality Objectives

The water quality targets we use in all rivers are known as River Quality Objectives (RQOs). RQOs are used for managing water quality and are based on the River Ecosystem (RE) classification scheme. The River Ecosystem scheme is made up of five water quality classes (RE1 to RE5) (Appendix 1 of the Tone Consultation Report) which reflect the chemical quality needed by different types of animal communities, including the types of fishery they are able to support.

RQO (RE Class)	Class Description
RE1	Water of very good quality suitable for all fish species.
RE2	Water of good quality suitable for all fish species.
RE3	Water of fair quality suitable for high class coarse fish populations.
RE4	Water of fair quality suitable for coarse fish populations.
RE5	Water of poor quality which is likely to limit coarse fish populations.

The Consultation Report introduced proposals for RQOs based on the RE classes. As a result of the consultation process and a review of more recent data (1994/95), these targets have now been finalised and are shown on Map 2. Four stretches (three stretches on the River Tone from downstream of

Clatworthy Reservoir to Stawley and one stretch on the Bridgwater and Taunton Canal from the crossing with the River Tone to Petherton Park Brook) now have more stringent RQOs. A further stretch on the River Tone from the Taunton and Bridgwater Canal to the confluence with the Broughton Brook has had its RQO reduced from RE2 to RE3 but has been set a long term RQO of RE2. It is felt that due to the effects of storm sewer overflows in this stretch RE2 is not yet sustainable (see Issue 1d).

Map 2 also shows where current water quality does not comply with its RQO. The non-compliance is expressed either as a marginal or a significant failure. Significant failures are those where we are 95% certain that the river stretch has failed to meet its RQO. Marginal failures are those where we are between 50% and 95% certain that the stretch has failed to meet its RQO.

The water quality assessment against the proposed RQOs in the Consultation Report, was based on three years of data between 1991 and 1993. We have now updated this assessment based on three years of data between 1993 and 1995. The water quality status of some stretches has improved in this recent assessment. As a result of our farm visit programme along the Westford Stream and improvement work done by British Waterways on the Bridgwater and Taunton Canal both these stretches now comply with their RQOs. We will continue to monitor these sites and will undertake remedial action where necessary to ensure compliance in these stretches is maintained.

A new monitoring site has been found on the Broughton Brook because of the unrepresentative nature of the previous monitoring point (as identified in the Consultation Report). Currently there is not enough data at this new site for us to assess its compliance. Remedial work by one farm, identified as adversely affecting water quality in the brook, has since been undertaken and it is hoped that the Broughton Brook will comply with its RQO of RE2 by 1998 as planned.

Although the Bridgwater and Taunton Canal now complies with its RQOs, algal blooms are still a problem, particularly in the lower stretches and the docks. The formation of blue-green algae is a health risk. The algal blooms and low dissolved oxygen levels are related to the low flows in this part of the canal (see Issue 1a).

The stretch of the Sherford Stream from Pitminster to the confluence with the River Tone marginally failed to comply with its objective of RE2 in 1995. Further investigations point to numerous private sewage treatment plants and septic tanks, a known problematic farm discharge and discharges from a storm sewer overflow at Trull as probable causes of this non-compliance (see Issue 1b).

The stretch of the River Tone between the confluence with the Halse Water and the Bridgwater & Taunton Canal marginally failed to comply with its objective of RE2 in 1995. It is thought that discharges from a factory upstream on the Halse Water were responsible. These have since been rectified.

The stretch of the River Tone from Ham to Knapp does not meet its long term RQO of RE3. The cause is the discharge from Taunton STW. Wessex Water Services Limited (WWSL) have funding in AMP2 to ensure that water quality in this stretch remains at the 1990 level, which is consistent with the RQO of RE4. However, to achieve the long term RQO of RE3, major improvements at Taunton Sewage Treatment Works (STW) are required, and there is currently no funding available in AMP2 (see Issue 1c).

The stretch of the River Tone between the confluence with the Bridgwater and Taunton Canal and the confluence with the Broughton Brook does not meet its long term RQO of RE2. Wessex Water's Priory Storm Overflow discharges into this stretch, which has already received some improvements. We have carried out a joint investigation with WWSL to determine the operation of this overflow and its impact on water quality (see Issue 1d).

3.1.2 EC Water Quality Directives

There are three water quality EC Directives which apply in the catchment: Freshwater Fish; Dangerous Substances and Surface Water Abstraction.

3.1.2.1 EC Freshwater Fish Directive

This Directive ensures that water quality in designated stretches of water is suitable for supporting certain types of fish.

We are responsible for monitoring the quality of identified fisheries and reporting the results to the DoE who decide whether the standards in the Directive have been met. Where the requirements of this Directive are not met, we are responsible for identifying sources of pollution and making sure that improvements are made.

The Tone upstream of Bishop's Hull, the Hillfarrance Brook, Halse Water and Back Stream are designated as a Salmonid Fishery under the EC Freshwater Fish Directive. The Tone downstream of Bishop's Hull to Ham is designated a Cyprinid Fishery together with the Bridgwater and Taunton Canal. The Hillfarrance Brook exceeded the imperative standard for dissolved oxygen (DO) in 1993 the cause of this exceedence is unknown. Since 1993 the Hillfarrance Brook has complied with the standards in this directive and so no further action is planned. The Bridgwater and Taunton Canal exceeded the imperative standard for DO in 1991. The reason is not certain but is thought to be linked to low flows in the canal (see Issue 1a). Since 1991 the canal has complied with the standards in this directive and so no further action is planned. There have been no exceedences of standards in the EC Freshwater Fish Directive in the catchment since 1993.

3.1.2.2 EC Dangerous Substances Directive

We are responsible for monitoring the quality of waters which receive discharges containing Dangerous Substances and reporting the results to DoE who decide whether the standards in the Directive have been met. Where the requirements of this Directive are not met, we are responsible for identifying sources of pollution and making sure that improvements are made.

We monitor the River Tone under the Dangerous Substances Directive at Knapp Bridge for List I substances and downstream of Clatworthy Fish Farm for List II substances; the Halse Water is also monitored for List II substances at Holcombe Fish Farm. There were no exceedences during the Consultation Plan period 1991-93, but exceedences of the copper standard were recorded in 1994 and 1995 and exceedences of the zinc standard were recorded in 1995 in the River Tone downstream of Clatworthy Fish Farm. The fish farm does not appear to be causing the problem as there are high metal levels at the fish farm inlet and in the reservoir upstream (See Issue 1e).

3.1.2.3 EC Surface Water Abstraction Directive

We are responsible for monitoring the quality of designated surface water abstractions and reporting the results to DoE who decide whether the standards in the Directive have been met. Where the requirements of this Directive are not met, we are responsible for identifying sources of pollution and making sure that improvements are made.

We monitor three sites under the Surface Water Abstraction Directive in the River Tone Catchment: Clatworthy Reservoir, Leigh Reservoir and Luxhay Reservoir. Clatworthy Reservoir exceeded the standards for dissolved and emulsified hydrocarbons in 1994. We are currently concerned about the suitability of the methods of analysis used as specified in this directive. We suspect that exceedences may be due to natural compounds resulting from decomposing vegetation. We have asked the DoE to review the analytical methods used. We will continue to report directive exceedences, however, as there are no likely sources of these compounds in the catchment we are not

planning to undertake any further action until we receive direction from the DoE.

3.1.3 Annex 1A Substances

At the second, third and fourth North Sea Conferences in 1987, 1990 and 1995 the UK Government made a commitment to reduce the amount of certain substances known as 'Annex 1A' substances entering tidal waters from rivers and direct discharges (see River Tone Consultation Report) Table 1.

The River Tone at Knapp Bridge is monitored for Annex 1A purposes. Between the years 1991 and 1994 nationally 'significant' loads of the Annex 1A substances copper, arsenic, lead, HCH, trichloroethane, trichloroethylene, dieldrin, atrazine, simazine and chloroform were found as shown in Table 1.

Table 1 River Tone Knapp Bridge: Significant Annex 1A Substances

Substance	Years for which significant load was found in the River Tone
Copper	1991, 1993.
Arsenic	1992, 1993, 1994.
Lead	1994.
HCH	1993, 1994.
Trichloroethane	1991.
Trichloroethylene	1991, 1993.
Dieldrin	1993, 1994.
Atrazine	1993, 1994.
Simazine	1994.
Chloroform	1994.

For many of the substances shown in Table 1, the UK has met the load reduction target. However, nationally, further reductions for copper, HCH, trichloroethylene and chloroform are required.

The concentrations of these substances are much lower than their Environmental Quality Standard (EQS). Therefore we are planning no further specific actions to achieve further load reductions.

We anticipate that nationally, reductions in pesticide loads entering UK tidal waters will be achieved by the government's regulation of pesticide use. However, within the Tone Catchment we are concerned about the possible effect of pesticides on the breeding success of otters. We send all otter carcasses found, to the government Veterinary Laboratories Agency for analysis. Although these analyses show that those otters examined are healthy with no pesticide accumulation, we will continue to monitor concentrations of pesticides at Knapp Bridge (See also Issue 3b). We are also independently examining eel tissue for pesticides.

3.1.4 Biological Quality

We monitor the ecological quality of rivers by sampling benthic macroinvertebrates. These are small animals which live in river sediments. They are unable to move far and so are affected by long term conditions in the river.

We collect samples from the river during the spring and autumn and make a list of the different families (taxa) of macroinvertebrates present. We compare the range of families found to what we would expect to find in a similar unpolluted river using the River Invertebrate Prediction and Classification System (RIVPACS). We have used this information to classify rivers as follows:

Biological Class	Description
A	Good
B	Moderate
C	Poor
D	Very poor

We carry out a routine monitoring programme for general biological quality and also monitor the impact of a number of sewage treatment works (STWs).

Of the thirty-nine sites monitored in the Tone Catchment in 1994, only one site, the Chelston Stream, showed Poor (Class C) biological quality. Biological survey work in June 1996 has indicated that the greatest impacts are likely to be from the Chelston Business Park and discharges from Poole landfill. Subsequent improvements have been made (see Issue 1f).

3.1.5 Other Water Quality Issues

We are concerned at the frequency of oil pollution incidents originating from the Galmington Trading Estate, Taunton, which discharges through a surface water culvert into the River Tone just downstream of Bishop's Hull. It is clear that oil was finding its way into the surface water system causing regular pollution incidents which were sometimes significant. A pollution prevention survey undertaken at Galmington Trading Estate identified one company as the probable cause. In addition WWSL have also replaced damaged sections of both the foul and surface water sewers on the estate in order to eliminate cross contamination which is thought to contribute to oil pollution incidents (see Issue 1g).

English Nature and local conservationists are concerned over recent increases in plants within SSSIs which thrive in nutrient-rich conditions. The source of nutrients may be from within the soils of the Moors or from the summer feed-water from the River Tone. Although we do not have statutory duties or powers to apply special water quality controls in SSSIs we seek to influence the activities of others and have recently published a booklet *Understanding Buffer Strips* (see Issue 1h).

As part of their response to the River Tone Catchment Management Plan Consultation, Taunton Deane Borough Council Environmental Health Department raised concerns about elevated nitrate levels in private water supply boreholes, (see 4.3.1). Nitrate levels exceeding the 50 milligrams per litre limit for drinking water have been found in both shallow and deep boreholes in the Otter Sandstone aquifer. We have agreed to work with Taunton Deane Borough Council to assess the problem and, if possible, identify sources of pollution. Once the investigations are complete, it may be possible to draw up a remediation plan. In addition, our water quality officers will visit farms in the area and we will promote the MAFF *Code of Good Agricultural Practice for the Protection of Water* (see Issue 1i).

On occasions at high tide saline water from the River Parrett has entered the canal via the tidal flap on the Hamp Weir discharge (see Issue 1j).

Issue	Actions	Action By	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
1a. Algal Blooms in the Bridgwater & Taunton Canal.	i. Work with British Waterways to improve flow in the lower stretches of the Canal.	Agency, British Waterways	U	●	●	●		
<i>Marginal failure of RQO at:</i>								
1b. Sherford Stream - Pitminster to confluence with the River Tone.	i. Support options for first time sewerage schemes at Blagdon Hill and Pitminster.	Parish Council, Agency	0.5k	●	●	●		
	ii. Improve farm waste handling facilities.	Farmer	U	●	●	●		
	<i>Notes: We have recommended improvement with a view to total containment in the near future.</i>							
	iii. Investigate impact of discharge from remaining storm overflow at Trull.	Agency	U		●	●		
<i>Notes: During 1995 WWSL decreased the number of Storm Overflows from 3 to 1.</i>								
<i>Failure of Long Term RQOs at:</i>								
1c. River Tone from Ham to Knapp.	i. Negotiate with WWSL to secure improvements to Taunton STW under AMP3 (from 2000).	Agency	U		●	●	●	●
1d. River Tone between the confluence with the Bridgwater and Taunton Canal and the confluence with the Broughton Brook.	i. Evaluate the results of the 1996 study into the impact of Priory storm overflow on water quality.	Agency	U		●			
1e. Non-compliance with EC Dangerous Substances Directive downstream of Clatworthy Reservoir.	i. Carry out investigation work on the reservoir and stream inputs to determine metal levels and likely sources.	Agency	U		●			
1f. Poor (Class C) biological quality on the Chelston Stream.	i. Monitor the effect of recent improvements to discharges from Poole landfill and Chelston Business Park.	Agency	U	●	●	●		

Issue	Actions	Action By	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
1g. Oil Pollution in the River Tone.	i. Monitor effectiveness of the improvement programme at Galmington Trading Estate.	Agency	U		•	•		
1h. Nutrient enrichment in SSSIs.	i. Complete evaluation of water quality in the Curry and Hay Moors SSSI. Repeat survey in 1999/2000.	Agency	15 k	•			•	•
	ii. Work with EN/MAFF and others to prevent further deterioration in water quality by promoting less intensive floodplain agriculture and use of buffer strips.	Agency, EN, MAFF	U	•	•	•	•	•
1i. High nitrate concentrations in groundwater.	i. Collect and analyse existing data and consider the need for additional monitoring.	Agency, TDBC	U		•	•		
	ii. Where necessary investigate sources of pollution identified above and draw up a suitable remediation plan.	Agency	U			•	•	•
	iii. Visit farms to advise on groundwater protection.	Agency	U	•	•	•	•	•
1j. Saline intrusion in the Bridgwater & Taunton Canal.	i. Carry out a study into the feasibility of reducing saline intrusion.	Agency	U			•		

3.2 Water Resources

We aim to manage water resources to achieve the right balance between the needs of the environment and those of legitimate abstractors.

In 1995 the NRA published the Water Resources Development Strategy for South West Region - *Tomorrow's Water*. This Strategy has been adopted by the Agency and sets out how we would like to see water resources developed in the future. Our Strategy forms the basis on which the proper use and sustainable development of resources can be assured well into the next century.

To promote our strategy for the region we will:

- encourage the efficient use of water by everyone;
- expect abstractors to use existing sources efficiently before new sources are developed;
- approve developments that cause the minimum problems for the environment. New water resource developments will be accompanied by measures for environmental protection in their abstraction licence conditions e.g. prescribed minimum flow.

The Tone Catchment forms part of Wessex Water Services Ltd's (WWSL) Somerset Supply Zone. In order to meet current demand, local resources are supplemented by importing water (9 Ml/d) into the supply zone. One such import of 5.5 Ml/d from the River Otter Catchment is under investigation, to establish whether there is an environmental impact on the upper reaches of the River Otter (see the *Sid and Otter Catchment Management Plan Action Plan*, page 16, available from our Exeter office).

Potential options for meeting future increased supply needs are for WWSL to negotiate with South West Water Services Ltd (SWWSL) for an increase in the quantity of water imported from Wimbleball Reservoir, (see the *River Exe Catchment Management Plan Action Plan*, Action 5a) or to develop an abstraction from the Bristol Avon at Newton Meadows, near Bath (see the *Upper Bristol Avon Catchment Management Plan Action Plan*, Actions 7 and 8).

The Agency and SWWSL have recently signed an operating agreement which determines how Wimbleball Reservoir is to be managed. This new agreement incorporates the operation of the new pumped storage scheme from the River Exe and allows for the possibility of allocating additional resources to supply WWSL's Somerset Supply Zone. The latter would require a variation to WWSL's existing abstraction licence.

In very dry summers when river flows are low, abstractions can put additional stress on the water environment. This is of particular concern on the Hillfarrance Brook. However, the effects of abstraction can be mitigated by co-operation between the Agency and the farming community in particular through, for example, the introduction of abstraction rotas. Most abstraction licences contain conditions which require abstraction to cease when river flows reach a prescribed minimum flow (pmf). We will enforce these conditions.

Water is abstracted by British Waterways from the Tone at Firepool, Taunton, to supply the Bridgwater and Taunton Canal. This abstraction is exempt from licensing. WWSL abstract from the canal under a licence held by British Waterways to supply their Durleigh Reservoir. We need to consider whether too much water may, at times, be taken down the canal possibly adversely affecting the ecology of the Tone downstream. However, it is important that sufficient water flows down the canal to supply the Durleigh Reservoir abstraction, to reduce the incidence of algal blooms in the docks and lower reaches (see 1a), and to maintain navigation. An operating agreement may be a prudent way forward.

Issue	Actions	Action By	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
2a. Water demand for spray irrigation.	i. Consider whether bankside storage reservoirs could be used when issuing licences in the catchment.	Agency	U	●	●	●	●	●
	<i>Notes: Excess winter rain can be stored for use during dry summer months.</i>							
	ii. Organize abstraction rotas at times of very low flow.	Agency, Farmers	U	●	●	●	●	●
	<i>Notes: This was done in 1976 in the Hillfarrance Brook Catchment to ensure flow was maintained in the watercourse.</i>							

Issue	Actions	Action By	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
2b. Management of water abstracted from the Tone to the Bridgwater and Taunton Canal.	i. Evaluate the costs and benefits of installing a continuous flow measurement station at the Firepool abstraction.	BW, Agency	5 k					
	<i>Notes: Abstraction for the canal is exempt from licensing. Insufficient data exist on how much water is taken to enable a management plan to be drawn up.</i>							

3.3 Landscape, Wildlife and Archaeology

In fulfilling all our functions we must contribute to the conservation of nature, landscape and archaeological heritage. We have a duty to promote the conservation of flora and fauna dependent on the aquatic environment, as part of local action to conserve biodiversity (the variety of life on earth).

There are 4 wetland Sites of Special Scientific Interest (SSSIs) and 35 wetland County Wildlife Sites in the catchment which indicates the importance of wildlife conservation in this Action Plan.

The recently published document *Biodiversity: the UK Steering Group Report* contains National Biodiversity Action Plans (BAPs) for conserving key habitats and species. Further BAPs will be published, and all must be implemented at a local level. We are committed to playing our part in developing and implementing Local BAPs and we are the contact point for some aquatic species such as the water-vole, native crayfish and otter. Other notable species which are known to occur in the catchment include the kingfisher, white legged damselfly and black poplar. We will seek to safeguard these species in our operational and consenting work, and to develop action plans with other organizations as appropriate.

Independently, but with the same overall aim, the EC Birds Directive and the EC Habitats Directive set the framework for the establishment of Special Protection Areas (SPAs) and Special Areas for Conservation (SACs) respectively, which we must play our part in conserving and enhancing. The kingfisher and Bewick's swan are listed in Article 4.1 of the EC Birds Directive. Holme Moor and Clean Moor SSSI, which is a spring-fed calcareous mire, has been proposed as a SAC.

When these plans and sites are established we can promote them while carrying out our own duties. Meanwhile, we will continue to encourage sound management of rivers and wetlands to promote wildlife conservation in balance with other uses.

3.3.1 Wetlands

We will continue to implement our Somerset Levels and Moors Water Level Management and Nature Conservation Strategy in the Catchment through our review of Flood Defence procedures and through engineering Raised Water Level Areas under the Environmentally Sensitive Area (ESA) Tier 3 scheme.

The Ministry of Agriculture, Fisheries and Food (MAFF) require Water Level Management Plans for all wetland SSSIs by 1998. We will assist in the production of the plan for Curry and Hay Moors, for which the Internal Drainage Board will be the lead agency. There is evidence of increasing eutrophication in the rhynes and ditches of the SSSI. We are monitoring water quality to establish the likely sources of plant nutrients (e.g. take account of rainfall, the summer feed-water from the Tone or runoff from farming activity on the land). As a result of this survey we hope to decide which is the most appropriate agency to deal with the problem (See Issues 1h and 3i).

We will work with others to identify suitable sites for wetland restoration or enhancement using Section 105 surveys (Water Resources Act 1991) and other relevant information.

3.3.2 Landscape

We will continue to safeguard and enhance riverine and wetland landscapes within the catchment through our regulatory work, and seek to restore landscape value in degraded river reaches through appropriate mechanisms.

In the absence of a detailed wetland landscape assessment, we will use documents produced by others (e.g. MAFF, Somerset County Council, English Nature (EN) and the Countryside Commission) to inform us on priorities for action.

3.3.3 Archaeology

The Tone Catchment contains a wealth of archaeological features only a few of which are Scheduled Ancient Monuments. We will liaise with the County Archaeologist and exercise great care when carrying out works within rivers and wetlands.

3.3.4 Biodiversity

The maintenance of the biodiversity of river and wetland species and habitats within the catchment will be a key test of whether the management of the aquatic environment and wetland resource is in fact sustainable.

The Agency is undertaking a National R&D project to improve understanding of the status, ecology and genetic variation of rare fish including the twaite and allis shad. The importance of these species to the tidal reaches of the Tone will not be known until the project is completed.

Issue	Actions	Action By	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
3a. Biodiversity.	i. Continue to work with others to formulate Regional and Local Habitat and Species Action Plans.	Agency, EN, NGOs, MAFF	U	●	●	●		
	<i>Notes: Work has started on regional BAPs. We have specific plans for certain species see Issues 3a to 3i and 5c.</i>							
3b. Otter conservation.	i. Develop Otter Conservation Plan for North Wessex Area.	Agency, EN, SWT, SERC, TDBC	U		●	●		
	<i>Target: Maintain existing otter population and encourage natural expansion into surrounding catchments.</i>							
	ii. Continue to recover road casualties for tissue analysis.	Agency	U	●	●	●	●	●

Issue	Actions	Action By	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
3c. Water-vole conservation.	i. Develop National Species Action Plan.	Agency	U		●			
	ii. Produce technical handbook.	Agency	U		●			
	iii. National R&D study looking at predation and land use.	Agency	Total estimated 70 k			●		
	iv. Continue to support survey of water-voles in Somerset.	Agency	U		●	●	●	●
	<i>Target: Maintain existing population and safeguard known habitats through operational and regulatory work.</i>							
3d. Great crested newt conservation.	i. Improve database of known sites, survey ponds in areas proposed for development.	SERC, SWT, EN, Agency	U	●	●	●	●	●
	<i>Target: Maintain existing known populations and safeguard habitat.</i>							
3e. Marsh fritillary conservation.	i. Safeguard important sites.	SERC, SWT, SBG, Agency	U	●	●	●	●	●
	<i>Target: Maintain existing populations through protection and appropriate management of habitat (principally springline mires within the Blackdown hills ESA).</i>							
3f. Brook lamprey conservation.	i. Increase knowledge of status and distribution within the catchment.	Agency	U		●			
	<i>Notes: Brook Lamprey are present in good numbers on the Dowlish Brook. Our target is to maintain existing populations.</i>							
3g. Black poplar conservation.	i. Develop Action Plan.	Agency, TDBC	U		●	●		
	<i>Notes: Funds for planting and management (e.g. pollarding) would need to be sought outside the Agency.</i>							
3h. The impact of river maintenance downstream of Taunton.	i. Consider opportunities to review river maintenance.	Agency	U	●	●			
	<i>Notes: A number of consultees recognised the potential benefits of reducing the intensity of management of riverside land.</i>							

Issue	Actions	Action By	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
3i. River and wetland restoration and enhancement.	i. Identify suitable sites for wetland restoration and enhancement.	Agency, EN, MAFF, SWT, SERC, TDBC	U	●	●	●		
	ii. Promote river and floodplain habitat restoration schemes.	Agency, Riparian Owners, MAFF, EN, IDBs	U	●	●	●	●	●
	<i>Notes: We are keen to assist with collaborative schemes.</i>							
	iii. Develop and implement a collaborative river corridor enhancement plan for the River Tone through Taunton.	Agency, TDBC, SCC	20 k was spent in 1996 on the Obridge section	●	●			
	iv. Assist in monitoring biological effects of RWLAs, changes in water level management and water quality on the Somerset Levels and Moors.	Agency, EN, MAFF, SCC, SWT	5 k	●	●	●	●	●

3.4 Recreation

Many people spend their spare time enjoying our rivers and coasts. Where possible we will improve recreation facilities on Environment Agency land but we must always safeguard the environment from the damage that people might cause.

The River Tone and its banks are used mainly for angling, walking and bird-watching. However, some canoeing takes place, particularly on the Bridgwater and Taunton Canal, and in the centre of Taunton where Taunton Canoe Club have their headquarters. The Canoe Club wish to have better access to the rest of the river but access arrangements must be negotiated with riparian owners. The Canoe Club enjoys a good relationship with anglers and other river users. We will give technical advice to the British Canoe Union's (BCU) Access Officers, if required, when they are negotiating access agreements. Public access could be improved and we will work with others to this end. There is scope for us to work with Taunton Deane Borough Council and Somerset County Council to provide a cycle-way from Hankridge Farm through the town centre; other recreational routes using the river corridor may be possible.

In particular we will evaluate the scope for better access, educational and recreational use of any land that we own - typically this would be around pumping or gauging stations. The Environment Agency also owns substantial lengths of river bank from Taunton to Burrowbridge with potential for improvements to access points, signage and availability of interpretative material.

Concern was raised during consultation that silt build up at Firepool Weir was causing problems for boats. We have a responsibility to remove silt to maintain a channel for the free flow of water from the river to the canal but we do not have an obligation to maintain rivers for navigation. This is the responsibility of the navigation authority. British Waterways are the navigation authority for this section of the River Tone. Silt removal may be necessary in the future if work is carried out to refurbish the weir or associated structures (Issue 4c).

Issue	Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
4a. Use of Agency owned land for recreation.	i. Survey Agency land to assess its potential for recreation and education use.	Agency	U	●				
4b. Canoe access to the River Tone.	i. Give technical advice to the BCU and Taunton Canoe Club when they are negotiating access agreements. <i>Notes : recreation access could be incorporated as part of an overall enhancement scheme in and around Taunton.</i>	Agency	U	●	●	●		
4c. Siltation at Firepool Weir.	i. Examine need for and feasibility of removing silt at Firepool Weir.	Agency	U	●	●			
4d. Riverside access in Taunton.	i. Develop footpath/cycle-way through Taunton. <i>Notes: See Issue 3i. Work is to go ahead on the cycle path under the A38 bridge.</i>	TDBC, SCC, Agency	U	●	●			

3.5 Fisheries

We will maintain, improve and develop fisheries and regulate fishing. The River Tone above Taunton supports brown trout and some grayling offering fly-fishing to the game angler. In the Bridgwater and Taunton Canal and the Tone downstream of Taunton, (where the Environment Agency owns some of the fishing rights), coarse fishing takes place.

Stocks of fish are generally good though salmon are rare. Salmon parr have been found near Nynhead where Hornshay Weir presently forms a barrier to upstream migration of adults. We wish to see a fish pass at the Weir but have no funds to carry out the work. A further constraint on the successful breeding of salmonids is the silting and compaction of spawning gravels between Clatworthy Reservoir and Taunton, particularly between Wellington and Taunton where the soils are easily eroded. We will encourage improved farming practice to reduce the amount of silt entering the river, see 4.3.2, and investigate the water release regime at Clatworthy Reservoir to see if scouring flows are possible (see Issue 5b).

The status of the native crayfish *Austropotamobius pallipes* in the Tone Catchment has recently been investigated by the Somerset Environmental Records Centre with support from the Agency. Introduction of signal crayfish *Pacifastacus leniusculus* in at least two locations within the catchment has been confirmed and individual signal crayfish have been caught in one of the streams downstream of the site of introduction. Trapping for crayfish on the River Tone at sites between Huish Champflower and Wellington has so far failed to find any native crayfish. Trapping is being extended to target some of the Tone tributaries to see if a remnant population is present.

It is also hoped future work will establish whether crayfish plague is present in the system. Future surveys are planned but on the basis of current findings it seems increasingly likely that the native population has been lost following the introduction of the alien signal species.

Issue	Actions	Action By	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
5a. The need for fish passes at Wellington and Hornshay Weirs.	i. Seek funding to provide fish passes. <i>No funds are available this financial year. Passes will allow access to clean spawning gravels above Greenham for migratory salmonids.</i>	Agency	Approx. 35k per pass					
5b. Siltation of spawning gravels in the upper Tone.	i. Promote the prevention of bank erosion and field runoff by encouraging riparian owners to create buffer strips, fence banks and plant riverside trees. <i>Notes: We will encourage MAFF and other grant-aiding bodies to target the catchment for Stewardship and other grant schemes.</i>	Riparian Owners, Agency, FWAG, NFU, MAFF	U	●	●	●	●	●
	ii. Carry out desk study to understand the flow regime in the upper catchment and its impact on siltation.	Agency	U	●	●	●		
5c. The conservation of native crayfish.	i. Continue to support work to establish status and distribution of white clawed and signal crayfish, and to investigate presence/absence of plague. <i>Notes: Work being done in 1996/1997.</i>	Agency, SERC	4k	●				

3.6 Development Pressures

On the basis of current information available from existing and emerging Local Authority Development Plans, the Tone Catchment is an area of development growth. In the Consultation Draft of the Somerset Structure Plan published February 1995 a housing allocation of 12,900 dwellings was made for the Tone Catchment over the Plan period 1991 to 2011. This figure may change during the Structure Plan process. Is this level of development sustainable? We can consider the requirements for water supply, waste water disposal, solid waste disposal and flood risk associated with such development.

If this increase in dwellings is realised it would result in an increased requirement for public water supply of some 4 MI/day. This increased supply can be provided by Wessex Water Services Ltd (WWSL) from existing licensed sources located outside the Tone Catchment, principally from Wimbleball reservoir. Considering water supplies in a wider context, the Tone Catchment is part of WWSL's Somerset Supply Zone which extends from Lynton in the west to Bruton in the east, and from Highbridge in the north to Chard in the south. In this water supply area, the Somerset County Structure Plan housing allocations are expected to be about 40,000 additional dwellings for the period 1991-2011 (but these figures are not yet finalised). If this total was built then average daily water consumption could be expected to increase by some 14 MI/d. The 1991 average daily consumption for this supply zone was 124 MI/d but the total reliable resources within the zone are 115 MI/d and no viable options have been identified for new water resources developments within the Tone Catchment. Local resources are supplemented by water imported from outside Somerset, and our forecasts indicate that to a greater or lesser extent these imports will

have to increase. However, WWSL consider water supplies in the wider context of an integrated supply system which covers Somerset, and much of Wiltshire and the former County of Avon. We will work with WWSL to determine how future water supply needs can be met across this wider area. As a national regulatory agency we will take into account the environmental impact on the source catchments of any water transfers (see our Regional Water Resources Strategy - Tomorrow's Water).

We expect the water supply companies to manage their existing resources effectively and to implement water demand management practices to make best use of water. This will include leakage control and domestic metering where appropriate. Providing these expectations are realised and WWSL can continue to transfer resources from areas of existing surplus then the increase in demand from such development can be met without the need for any major new resource development in the Structure Plan period up to 2011.

The increased population would result in an increase in sewage flow to existing treatment plants. According to housing allocations in development plans, Taunton and Wellington STWs would be likely to receive the majority of the increase. Wessex Water can accept new connections to the works as long as this does not cause a breach of their present consents.

Although Taunton STW is currently meeting its consent, the discharge is causing non-compliance with the long term RQO of RE3 and any additional crude sewage load will cause a problem with future compliance unless the Works is improved. The Environment Agency is looking for an improvement at Taunton STW to meet the long term RQO of RE3. The Agency will therefore treat it as a high priority in future negotiations for investment by WWSL (AMP3 2005-2010 or 2015). (See Issue 1c).

Wellington STW has some capacity to take an increase in sewage load and still comply with its consent. However, this capacity may not be sufficient to accommodate the planned increases in sewage load without breaching the consent and RQO RE2 quality limits. Housing allocation to other parts of the catchment may pose a threat to the ability of local STWs to comply with their consents. We would not issue less stringent consents nor would we permit current RQOs to be downgraded. We would expect WWSL to make necessary improvements to accommodate additional loads.

We are in detailed negotiations with the Local Planning Authority to ensure that proposed new development allocations are assessed and that they are not at risk from flooding or create a flood risk (See 3.7).

A major challenge posed by such development will be to maintain the biodiversity and wildlife interest within the catchment. As discussed in Section 2.4, the Tone is rich in wildlife and home to species which are listed in the *Biodiversity: The UK Steering Group Report. (Vol. 2 Action Plans)*. If their status and habitat is to be safeguarded, it will require very careful management and planning of the levels of development indicated, to control the impact of: possible reductions in water quantity and quality; associated infrastructure development (e.g. roads and pipelines); and increased recreational pressure and disturbance.

The construction of approximately 12,900 new dwellings in the area represents a significant increase and will have a dramatic effect upon the total amount of waste requiring disposal. Local population statistics demonstrate that an increase of 12,900 new dwellings represents a 33% increase on the 1991 figure of 38,518 households in the Taunton Deane area. This level of growth, assuming all the new residents are moving into the area, could result in a potential increase of 14,835 tonnes of household waste per year. This figure was calculated using the 1994/95 waste arisings survey figure which deduced

that the average household in Somerset produces 1.15 tonnes of household waste per year. A proportional increase in commercial and industrial waste arisings are also likely to occur due to new infrastructure, services and the construction of the buildings themselves. The landfill site at Poole, Wellington accepts all the household, commercial and industrial wastes that require disposal in the Taunton Deane area. The site currently accepts around 120,000 tonnes of waste per year with a life expectancy just beyond 2002. Although domestic waste only makes up 5% of the total waste stream the extra waste generated by the new dwellings in the area is therefore likely to have a significant effect on this life expectancy. However, such predictions will clearly be influenced by the developing concerns over current waste management practices and moves toward reducing waste at source and choosing more sustainable methods such as re-use, recycling and composting will affect the overall impact of the above forecasts.

We will carry out waste surveys and monitor the available waste recovery, recycling and disposal capacity. The Taunton Deane Waste Disposal Authority, who let contracts for the disposal of domestic waste; and the private contractors who develop waste disposal facilities will make use of this information to provide suitable arrangements for the future. We will also promote and give advice on waste reduction, re-use and recovery in order to seek to improve the 'sustainability' of the chosen waste management methods. We will shortly publish a commercial waste minimization and recycling directory and will give advice on the new Packaging Producer Responsibility Regulations which take effect from 1 January 1997. We are the regulatory body for these regulations.

There are major road schemes currently under consideration and development within the catchment which may impact on the water environment.

New road schemes can have a variety of adverse impacts on the environment particularly during construction. There is a threat to water quality from road runoff containing for example silt, oil, fuel, tar, rubber and road salt. There is the possibility of increased flood risk from runoff, the loss of floodplain storage and habitats, risk to groundwater and surface water through discharge of roadside drainage especially from spillage after accidents. Additionally, there can be adverse effects on the ecology of the river corridor through direct shading and modification to banks. The Environment Agency will seek early involvement regarding the planning of new road schemes so that the possible impacts on the water environment can be fully evaluated and any necessary modifications obtained, such as the use of reedbed attenuation/filtration systems.

Issue	Actions	Action By	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
6a. The adverse impact of new development.	i. Ensure District Wide Local Plans contain policies to protect the environment and promote sustainable development.	Agency	U	●	●	●	●	●
	<i>Notes: The Agency works in partnership with local planning authorities to improve environmental protection policies.</i>							
	ii. Work with WWSL to ensure that future needs for water supply and disposal can be sustained without unacceptable impact on the environment.	Agency	U	●	●	●	●	●

Issue	Actions	Action By	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
	iii. Survey waste arisings in the TDBC area.	Agency	U		●			
	iv. Advise Taunton Deane Waste Disposal Authority and the water industry on best practice for waste management.	Agency	U	●	●	●	●	●
	v. Seek the earliest possible discussion with the Local Authority (LA) and road builder.	Agency	U	●	●	●	●	●

3.7 Flood Defence

We aim to provide effective defence for people and property against flooding from rivers and the sea and to provide adequate arrangements for flood forecasting and warning.

All rivers are classified as either main river or non-main river (sometimes referred to as ordinary watercourse). We supervise all flood defence matters but have special powers to carry out or control work on main rivers and sea defences. Local authorities also have powers to carry out sea defence work and are responsible for flood defence on non-main rivers.

Our flood defence work takes up nearly two thirds of our budget, so it is vital to improve efficiency and target resources at the areas of greatest need. We hope to implement our new integrated Flood Defence Management System (FDMS) by the end of 1997 and we should be able to improve the identification of flood problem locations and decide our priorities by 1998. We are producing a Long Term Plan of Needs from which we derive our Medium Term Plan. This is the capital works programme of schemes designed to offer the appropriate level of protection as shown in the indicative standards listed in Table 2. A scheme is being prepared for Hillfarrance which is targeted for implementation in 1997.

Table 2 Flood Defence Levels of Protection

Current Land Use		Return period in years of flooding from:	
		Sea	River
A	High Density urban, containing significant residential and non-residential property.	1 : 100 - 1 : 200	1 : 50 - 1 : 100
B	Medium density urban.	1 : 50 - 1 : 200	1 : 25 - 1 : 100
C	Low density or rural communities. Highly productive farmland.	1 : 10 - 1 : 100	1 : 5 - 1 : 50
D	General arable farming with isolated properties.	1 : 2.5 - 1 : 20	1 : 1.25 - 1 : 10
E	Low productivity land with few properties at risk.	< 1 : 5	< 1 : 2.5

A programme of works has been drawn up to continue the level of service against flood risk to the Moors alongside the lower reaches of the Tone. Hay Moor and Curry Moor banks have been raised and dredging completed on the 2 km reach of the Parrett below Burrowbridge. The settled Hook Bridge spillway will be returned to design level after the raising of Stan Moor Bank has been investigated.

We will continue to advise planning authorities on flooding matters helped by using a catchment drainage model which has been developed. We regulate

proposals for works in watercourses which are likely to impede flows by using the Land Drainage Consenting process. There is a need to check that such works have been consented and that the consent conditions have been complied with.

We will be using our new emergency response strategy (ERLOS) to improve our flood warning system, and from September 1996 we took over from the Police the role of directly warning property owners at risk. No arrangements exist on non-main rivers such as the Hillfarrance Brook where we are looking at the suitability of using Milverton flow gauge for flood warning.

We will contribute to the production of Water Level Management Plans (WLMPs) for those Sites of Special Scientific Interest (SSSIs) identified by English Nature (using MAFF guidelines) as a high priority. Within the catchment Curry and Hay Moors SSSI has been identified as requiring a WLMP. We will work with Curry Moor Internal Drainage Board who are responsible for providing the WLMP by 1998.

WLMPs will provide an important input to our review of Flood Defence practice on the Levels and Moors. The justification of maintenance works exercise, and the Tone and Parrett model development will be used as a basis for negotiations on any suggested change of practice.

Issue	Actions	Action By	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
7a. The need for a system to target resources to the greatest need.	i. Complete the Tone and Parrett model calibration and development for input to the review of Flood Defence practice on the Levels and Moors.	Agency	25 k	●	●			
	<i>Notes: Calibration sites have been identified and structures are in place.</i>							
7b. The need for an audit of land drainage works.	i. Audit land drainage works to ensure consent conditions are complied with and take enforcement action for any unconsented works.	Agency	5 k p.a.	●	●	●	●	●
7c. The need to improve the efficiency and effectiveness of flood defence work.	i. Classify upland reaches in accordance with Standards of Service methodology and compare the current standard of flood protection with the target.	Agency	U	●	●			
	<i>Notes: See Table 2 for indicative Standards of Service.</i>							
	ii. Complete asset survey.	Agency	U		●			
	iii. Provide economic justification for maintenance work in the Somerset Levels and Moors part of the catchment for input to the review of Flood Defence work on the Levels and Moors.	Agency	25 k		●			

Issue	Actions	Action By	Cost to Agency (£)	Financial Year				
				96	97	98	99	2000
7d. The need for WLMPs for SSSIs.	i. Contribute to Curry and Hay Moors SSSI WLMP. <i>Note: Agency contribution to WLMP has been requested by the IDB.</i>	Curry Moor IDB, Agency	U		●			
7e. Stan Moor bank levels.	i. Return Stan Moor bank to its design level.	Agency	415 k			●		
7f. Hook Bridge Spillway levels.	i. Return Hook Bridge Spillway to design levels.	Agency	U			●		
7g. Identifying flood problem locations in the catchment.	i. Complete review of flood problems and use FDMS to identify priorities. <i>Note: (see Issues 7a and 7c).</i>	Agency	U			●		
7h. Flood problems at Hillfarrance.	i. Make the Hillfarrance Brook main river.	Agency	U	●	●			
	ii. Implement the Hillfarrance flood protection scheme. <i>Notes: This scheme is subject to cost benefit analysis before implementation.</i>	Agency	500 k			●		
7i. The lack of flood warning on non-main rivers.	i. Complete the investigation into the suitability of Milverton flow gauge for providing flood warnings for the Hillfarrance Brook catchment. <i>Notes: This will be part of the Levels of Service study for flood warning in the Tone Catchment.</i>	Agency	10 k					

4. Appendix

4.1 Guide to Action Plan and Consultation Report Issues

Former Consultation Report	Issue Reference in this Action Plan
1. Farming activity causing non-compliance with the RQO on the Broughton Brook.	This is no longer an Issue see 3.1.1
2. Non-compliance with the RQO in the Bridgwater and Taunton Canal.	This is no longer an Issue see 3.1.1
3. Farming activity causing non-compliance with the RQO on the Westford Stream.	This is no longer an Issue see 3.1.1
4. Rural sewage problems in the Sherford Stream.	Issue 1b
5. Non-compliance with the EC Freshwater Fish Directive on the Hillfarrance Brook.	This is no longer an Issue see 3.1.2.1
6. Non-compliance with EC Freshwater Fish Directive on the Bridgwater and Taunton Canal.	This is no longer an Issue see 3.1.2.1
7. Significant loads of Annex 1A substances in the River Tone at Knapp Bridge.	See 3.1.3
8. Poor biological quality (Class C) on the Chelston Stream.	Issue 1f
9. Oil pollution from Galmington Trading Estate, Taunton.	Issue 1g
10. Securing future public water supplies.	See 3.2
11. The potential future loss of Otterhead as a resource for the Somerset Supply Zone demand.	See 3.2
12. Water demand for spray irrigation.	Issue 2a
13. Management of water abstracted to the Bridgwater and Taunton Canal.	Issue 2b
14. River restoration projects.	Issue 3i
15. Identification of wetland sites for conservation and enhancement.	Issue 3i
16. Promotion of biodiversity in the catchment.	Issue 3a
17. Nutrient enrichment in the summer feed from the Tone to the Levels and Moors.	Issue 1h
18. The need to protect archaeological features and obtain more information about their location.	See 3.3.3
19. The provision of public access to the river on NRA owned land and the development of educational facilities, where appropriate.	Issue 4a
20. The lack of access to the upper Tone for migratory salmon and the barrier to movement of brown trout due to there being no fish passes at Hornshay Weir and Wellington.	Issue 5a
21. The siltation of spawning gravels in the upper Tone.	Issue 5b
22. The adverse impact of new road schemes.	Issue 6a
23. A fully integrated Flood Defence Management Manual and supporting system are required to improve targeting of resources to the greatest needs.	Issue 7a
24. The need for an audit of land drainage works.	Issue 7b
25. We need to improve the efficiency and effectiveness of our flood defence work.	Issue 7c
26. The need to reverse the decline in botanical interest and improve populations of breeding waders and over-wintering birds on the Somerset Moors within the catchment.	Issue 7d Issue 3i
27. Water Level Management Plans are required for those Sites of Special Scientific Interest where we control water levels, by 1998.	Issue 7d
28. Stan Moor floodbank levels.	Issue 7e
29. The need to identify flood problem locations within the catchment.	Issue 7g
30. Flood problems have been identified at Hillfarrance and on the Tone upstream of Taunton.	Issue 7h
<i>Note: The Tone upstream of Taunton has been investigated but there are no proposals to undertake capital improvements.</i>	
31. No arrangements exist for providing Flood Warning on ordinary (non-main river) watercourses such as flow through Hillfarrance and Bathpool.	Issue 7i

New Issue

- | | |
|----|--|
| 1b | Sherford Stream - Pitminster to confluence with the River Tone. |
| 1c | River Tone from Ham to Knapp. |
| 1d | River Tone between the confluence with the Bridgwater and Taunton Canal and the confluence with the Broughton Brook. |
| 1e | Non-compliance with EC Dangerous Substances Directive downstream of Clatworthy Reservoir. |
| 1i | High nitrate concentrations in groundwater. |
| 1j | Saline intrusion in the Bridgwater & Taunton Canal. |
| 4c | Siltation at Firepool Weir. |
| 4d | Riverside access in Taunton. |

4.2 Organizations Responding to the Consultation Report

British Waterways
 Council for the Protection of Rural England
 Countryside Commission
 Crown Estate
 Farming and Wildlife Advisory Group
 Forest Enterprise South and West England
 Forestry Authority
 Henry W Pollard & Sons Ltd
 Inland Waterways Association
 Mid-Devon District Council
 Nynhead Parish Council
 Royal Society for the Protection of Birds
 Sedgemoor District Council
 Somerset Chamber of Commerce and Industry
 Somerset Wildlife Trust
 Taunton Angling Association
 Taunton Canoe Club
 Taunton Deane Borough Council
 Wellington School
 West Somerset District Council
 Plus 26 Individuals

4.3 Report on Public Consultation

4.3.1 Nitrate in Groundwater

Taunton Deane Borough Council raised concerns about nitrate pollution to the aquifer in upper parts of the catchment. High nitrate levels have been measured in private water supplies from both shallow and deep boreholes.

Our Response

The Water Supply (Water Quality) Regulations (SI 1989 No 1147) set a maximum limit of 50 milligrams per litre for nitrate in drinking water. Some water samples taken by Taunton Deane have exceeded this limit.

Farming activities are the main source of nitrate in groundwater. Nitrate can be released from both the mechanical action of ploughing, particularly of grassland and also from the use of fertilizers. They can also come from point sources such as silage clamps, slurry tanks, and fertilizer stores. Protection from agricultural nitrate pollution is provided by the designation of Nitrate Sensitive Areas (NSAs) and Nitrate Vulnerable Zones (NVZs). NSAs under S98 of the Water Resources Act 1991 rely on government financial support. Public water supplies that are vulnerable to pollution from agricultural nitrate are protected by the designation of NVZs under the EC Nitrate Directive (91/676/EEC). Some farming activities will be controlled in these areas. There are no NVZs in the River Tone Catchment.

We will follow up the concerns of Taunton Deane Borough Council and will work with them to identify areas where nitrate occurs in private boreholes. However, until the UK Government provides additional funds for more NSA designations or extends NVZ designations to include private water supplies, direct measures to control farming activities such as those available in NVZs will not be available. The Code of Good Agricultural Practice for the Protection of Water, MAFF 1991 gives general guidance on ways of minimizing the risk of groundwater pollution from farming activities. See Issue 1i.

4.3.2 Buffer Strips

Buffer strips along rivers are bands of natural or planted vegetation that are either unmanaged such as scrub woodland or managed without the use of pesticides or fertilizers such as reedbeds or rough grassland. If buffer strips are wide enough and

placed appropriately they can prevent silt and chemicals washing off farmland and entering rivers (see Issue 5b). Buffer strips almost always provide riverside habitat that would otherwise not be available in intensively cultivated or grazed landscapes.

A number of consultees recognized the potential benefits of reducing the intensity of management of riverside land. A variety of local and national initiatives were highlighted where advice and/or grant aid could be targeted at riparian landowners for example Landwise (a whole farm management initiative promoted by the Farming and Wildlife Advisory Group) and Countryside Stewardship (a land management scheme operated by MAFF). One consultee pointed out that the design of buffer strips should be researched further.

Our Response

We have recently published a booklet *Understanding Buffer Strips*. It explains types of buffer, their benefits and potential role in reducing pollution. We are keen to help those who want to use buffers to do so effectively. This booklet is available free from Environment Agency offices. We are also undertaking an R&D project to look at the use of wetlands and grass plots for controlling diffuse inputs from agriculture.

4.3.3 Canoeing

We received a number of letters from canoeists. Canoeists were concerned that we had emphasized in the report that there can be conflict between canoeists and anglers. Local canoeists pointed out that they had a long and happy association with the River Tone through and downstream of Taunton and that in their experience conflicts with anglers were very rare. Some canoeists felt that the National Rivers Authority could have been more active in negotiating extended access agreements for canoeists on the Tone.

Our Response

Canoeists and anglers share a common appreciation of rivers and there are many examples where they can share river space without problems. Like the NRA, the Environment Agency has a role to play in helping anglers, riparian owners and canoeists to reach agreement about access to rivers. We welcome requests from the British Canoe Union for advice to facilitate their discussions about access (See Issue 4b).

4.3.4 The Bridgwater and Taunton Canal

A number of consultees referred to the Canal, pointing out the benefits that it brings to the local area. They urged us to continue to safeguard these benefits and seek speedy solutions to the current problems with water quality on parts of the Canal.

British Waterways manage the Bridgwater and Taunton Canal although the Environment Agency sets standards for water quality on the Canal. British Waterways were concerned by the proposed River Quality Objective for the downstream reach of the Canal.

Our Response

Where our current data indicates that the historic river quality objective as set by the National Water Classification scheme is not achievable or sustainable then we must set a lower objective. We have set a lower objective for the Canal because we have calculated that low dissolved oxygen levels will continue to occur at some times of the year.

Issue 1a refers to the problems of algal blooms in the Canal. Issue 2b also refers to the management of water that is abstracted to supply the Canal. These studies may reveal that increasing the flow of water through the canal could alleviate problems with low dissolved oxygen. The potential benefits of increasing the supply of water to the Canal, will however, have to be balanced against the needs of the river downstream of Taunton. A loss of dilution for the effluent from Taunton (Ham) Sewage Treatment Works could jeopardize water quality in this stretch of the river.

We will continue to work closely with British Waterways and seek ways to improve water quality on the Canal.

4.3.5 Biodiversity

The conservation of biodiversity is a key test of sustainable development. Development cannot be sustainable if it causes serious or irreversible damage to wildlife and the very ecosystems on which our well-being depends.

A number of consultees were pleased that we had discussed biodiversity conservation in the Consultation Report. However, they were concerned that we did not give specific commitments to prioritize and deliver species and habitat action plans within the catchment management plan.

Our Response

When we published the Consultation Report Species and Habitat Action Plans under the UK Biodiversity Initiative were still being prepared. The first batch of National Action Plans has now been published. Biodiversity actions that we have carried into this Catchment Management Plan Action Plan are given under Issues 3a to 3i and 5c.

The Agency is a member of the regional biodiversity steering group which contains representatives from all statutory bodies and non-governmental organizations involved in biodiversity in the south west. This group is producing regional action plans for priority habitats and species. These regional plans will help to set the framework for actions at a local level. Biodiversity action plan species which are known to occur in this catchment are native white-clawed crayfish, otter and water-vole. Nationally the Agency is the official contact point for these species.

4.4 The Somerset Levels and Moors Water Level Management and Nature Conservation Summary

The Environment Agency has a statutory duty to further the conservation of the wildlife, landscape and archaeology of watercourses and wetlands under Sections 6 and 7 of the Environment Act 1995. The nature conservation interest of the Somerset Levels and Moors is deteriorating; concern has been expressed over the gradual drying out of the Moors with particular reference to the Sites of Special Scientific Interest. The Somerset Local Flood Defence Committee has examined the situation and has put forward the following strategy:

- 1 The Environment Agency recognizes the outstanding nature conservation interest of the Somerset Levels and Moors and that this is in decline.
- 2 The Agency seeks to restore and maintain the wildlife and landscape of this internationally important wetland, consistent with its given duties, and to conserve the archaeological interest.
- 3 The Agency has statutory obligations as regards water management, including the control of water abstraction, discharges, water quality, drainage and water levels.
- 4 The Agency will give special consideration to the environmental impact of abstraction and discharges throughout the Levels and Moors.
- 5 The Agency will review its flood defence practices and take into account the requirements for nature conservation, to ensure sympathetic management within the Environmentally Sensitive Area (ESA). Formal management plans will be agreed with English Nature (EN) over activities which affect Sites of Special Scientific Interest (SSSIs). English Heritage will be consulted over matters that affect Scheduled Ancient Monuments (SAMs).

- 6 The Agency will adopt a presumption in favour of positive water level management for nature conservation on SSSIs, and in other appropriate areas where there is general agreement. Priority will be given to the core areas of SSSIs.
- 7 Where raised water levels affect agricultural productivity the Agency will support the introduction of a water level premium on ESA payments and/or Section 15 management agreements with English Nature to offset these costs.
- 8 The Agency will liaise with relevant organizations to draw up a list of priority sites where enhanced water levels are required to maintain and restore the nature conservation interest.
- 9 The Agency will take action after consultation with the Ministry of Agriculture, Fisheries and Food, English Nature, Internal Drainage Boards and landowners in order to achieve the conservation objectives.
- 10 The importance of the withy growing industry is fully recognized and in implementing its strategy the Environment Agency will seek to accommodate its special requirements.
- 11 In implementing the strategy the Agency will take special account of the statutory, practical and financial position of Internal Drainage Boards.
- 12 Any changes in strategy must ensure that there is no increase in flood risk to human life, habitation or communications.

The success of the proposed strategy will depend on co-ordinated action by many different individuals and organizations. The Environment Agency believes that this strategy represents an important opportunity to safeguard the special character of the Somerset Moors.

4.5 Publications

- 1 Somerset Levels and Moors Water Level Management and Nature Conservation Strategy (NRA). Now adopted by the Environment Agency.
- 2 Policy and Practice for the Protection of Groundwater, NRA, 1992, ISBN 0-11-885822-X. Now adopted by the Environment Agency.
- 3 Tomorrow's Water, Water Resources Development Strategy, NRA South Western Region, April 1995. SW-4/95-K-B-ANOQ. Adopted by the Environment Agency South West Region.
- 4 Guidance for the Control of Invasive Plants near Watercourses, Japanese Knotweed, Giant Hogweed and Himalayan Balsam. HO-9/94-20k-C-AKVI.
- 5 Environment Act 1995 (HMSO). ISBN 0-10-54259-8.
- 6 River Tone Catchment Management Plan Consultation Report - September 1995. SW-9/95-IK-E-APUT.
- 7 Rivers Sid and Otter Catchment Management Plan Consultation Report - March 1996.
- 8 Upper Bristol Avon Catchment Management Plan Consultation Report - June 1994.

- 9 Understanding Buffer Strips - August 1996 HO 896 SK DAVJK.
- 10 Guidance Notes for Local Planning Authorities on the Methods of Protecting the Water Environment Through Development Plans, NRA, January 1994.
- 11 European Council Directive on the Quality of Freshwaters Needing Protection or Improvement in order to support Fish Life (78/659/EEC). Official Journal of the European Communities No. L222.
- 12 European Council Dangerous Substances Directive 'On Pollution Caused By Certain Substances Discharged In The Aquatic Environment Of The Community' (76/464/EEC).
- 13 European Council Directive on Species and Habitats (92/43/EEC). Official Journal of the European Communities No. L206.
- 14 European Council Directives Concerning Urban Wastewater Treatment (91/271/EEC) and Concerning The Protection Of Waters Against Pollution Caused By Nitrates From Agricultural Sources (91/676/EEC).
- 15 European Council Directive Concerning The Quality Required Of Surface Water Intended For The Abstraction Of Drinking Water In The Member States (75/440/EEC).
- 16 3rd North Sea Conference - Priority Hazardous Substances (Annex 1A List Of Substances).
- 17 European Council Directive 'Concerning The Protection Of Waters Against Pollution Caused By Nitrates From Agricultural Sources' (91/676/EEC).

4.6 Glossary

AONB Area of Outstanding Natural Beauty. Designated by the Countryside Commission under the National Parks and Access to the Countryside Act 1942, to conserve and enhance the natural beauty of the landscape, mainly through Planning controls

Aquifer Rock which holds substantial amounts of water in structure or fissures e.g. chalk, sandstones, limestones

BAP Biodiversity Action Plan

BCU British Canoe Union

Buffer Strip (Bio-buffer) Strip of land, 10-100 m wide, alongside rivers which is removed from intensive agricultural use and managed to provide appropriate habitat types. Benefits include reduction of inputs into the river such as silt, nutrients, livestock waste, as well as improving habitat diversity and landscape

BW British Waterways

CMP Catchment Management Plan

Coarse fish This is a lay-man's term for cyprinid fish and other commonly associated species such as pike, perch and eels of angling significance. Does not normally refer to minor species such as bullhead, stone loach, minnow and stickleback

Consent (Discharge Consent) A legal document raised by the Environment Agency which specifies the conditions under which a discharge may be made

CWS County Wildlife Sites. Sites of Nature Conservation Interest. Sites selected (usually by County Trusts) as sites of "County" ecological importance

Cyprinid Fish of the family Cyprinidae (e.g. roach, bream, carp, chub). In the strict sense pike, perch, eel and some other fish species are not cyprinids

DO Dissolved Oxygen

DoE Department of the Environment

EN English Nature

Environmental Quality Standards (EQS) The concentration of a substance found in the environment which should not be exceeded in order to protect the environment or human health. An EQS is set by the EC through EC Directives and also by the government

ESA Environmentally Sensitive Area (MAFF scheme). A scheme of tiered payments for adopting specific environmentally beneficial farming practices

Eutrophication Nutrient enrichment of water, e.g. increased nitrogen input leaching into rivers from soil treated with chemicals, this chemical enrichment resulting in increased productivity

FDMS Flood Defence Management System

FWAG Farming and Wildlife Advisory Group

Geomorphology The study of earth surface features and their formation

GQA General Quality Assessment

Groundwater Underground water that has come mainly from the seepage of surface water and is held in the soil and in pervious rocks

IDB Internal Drainage Board

LEAP Local Environment Agency Plan

MAFF Ministry of Agriculture, Fisheries and Food

NFU National Farmers Union

NGO Non-governmental organization

NRA National Rivers Authority

NSA Nitrate Sensitive Area

Nutrient Chemical essential for plant growth, e.g. nitrate, phosphate

NVZ Nitrate Vulnerable Zone

Prescribed Minimum Flow (pmf) The low flow which is used to control abstractions to prevent adverse impact on other users, the environment or water quality

R&D Research and Development

RE River Ecosystem

Riparian Owner Owner of land next to river; normally owns river bed and rights to mid-line of channel

RQO River Quality Objective

RWLA Raised Water Level Area

SAC Special Area of Conservation. Site identified under the EC Species and Habitats Directive (92/43/EEC)

Salmonid Fish belonging to the family Salmonidae (salmon, trout, grayling)

SAM Scheduled Ancient Monument. Sites of national importance designated under the Ancient Monuments and Archaeological Areas Act 1979

SCC Somerset County Council

SERC Somerset Environmental Records Centre

SLA Special Landscape Area. Areas of special landscape quality, designated by the County (i.e. not nationally endorsed), justifying the adoption, by the County, of particular development control policies and other safeguarding measures

Source Point of abstraction of water, e.g. well, borehole, spring

SPA Special Protection Area. Sites identified by UK Government under the EC Directive on the Conservation of Wild Birds (79/409/EC)

SSSI Site of Special Scientific Interest. Sites of national importance designated under the Wildlife and Countryside Act 1981. Usually in private ownership, habitats, sites of individual species, geology and land forms may be designated

STW Sewage Treatment Works

Surface Water General term used to describe all the water features such as rivers, streams, springs, ponds and lakes

SWQO Statutory Water Quality Objectives

SWT Somerset Wildlife Trust

SWWSL South West Water Services Limited

TDBC Taunton Deane Borough Council

WLMP Water Level Management Plan

WWSL Wessex Water Services Ltd

4.7 Units

MI/a megalitres per year (one million litres per year)

MI/d megalitres/day (one million litres per day)

km kilometre

km² kilometre squared

Catchment Facts

Area km ²	414 km ²
Population (year)	96,000 (1995)

Flood Defence

Length of statutory main river	56.5 km
Length of tidal embankments	11.6 km

Water Quality*Chemical***General Quality Assessment (GQA) 1993-1995**

Total length assessed for water quality	170.7 km
A (Very Good)	13.1 km
B (Good)	113.3 km
C (Fairly Good)	28.4 km
D (Fair)	6.4 km
E (Poor)	9.5 km
F (Bad)	0 km

Biological (pre 1995 scheme)

A (Good)	111.8 km
B (Moderate)	51.8 km
Unclassified	7.1 km

Water Resources*Licensed abstractions*

surface:	86
groundwater:	316

Licensed abstraction volume

surface:	14,903 Megalitres/annum (MI/a)
groundwater:	1,985 Megalitres/annum (MI/a)

Designated Fisheries

Salmonid (Game) fishery	63.1 km
Cyprinid (Coarse) fishery	29.1 km

Wildlife

Sites of Special Scientific Interest (SSSIs)	6
Water-dependent SSSIs	4
County Wildlife Sites (CWS)	35

Foreword

This Action Plan addresses the issues raised in the Consultation Report which was published in September 1995 and new issues which have arisen as a result of the subsequent consultation.

The area has an expanding population which will put the environment under greater stress. We must ensure that by working with others, underpinned by regulation where necessary, the rich variety of wildlife in the River Tone does not suffer.

The lower reaches of the river flow through the unique landscape of the Somerset Levels and Moors. Here we must strike a balance between the conflicting interests of farming, conservation and the need to limit public expenditure on flood defence.

A great deal to enhance the catchment can be achieved by developing partnerships with other organizations. One example is our increasing involvement with British Waterways to improve the Bridgwater and Taunton Canal.

We are grateful for the responses to our consultation. I am sure that the local authorities, environmental and interest groups as well as the public will continue to help the Agency to take this initiative forward and assist us in refining and developing this Plan as we all work to implement it.



CHRIS BIRKS

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North Wessex Area

MANAGEMENT AND CONTACTS:

The Environment Agency delivers a service to its customers, with the emphasis on authority and accountability at the most local level possible. It aims to be cost-effective and efficient and to offer the best service and value for money.

Head Office is responsible for overall policy and relationships with national bodies including Government.

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0645 333 111

The 24-hour emergency hotline number for reporting all environmental incidents relating to air, land and water.

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