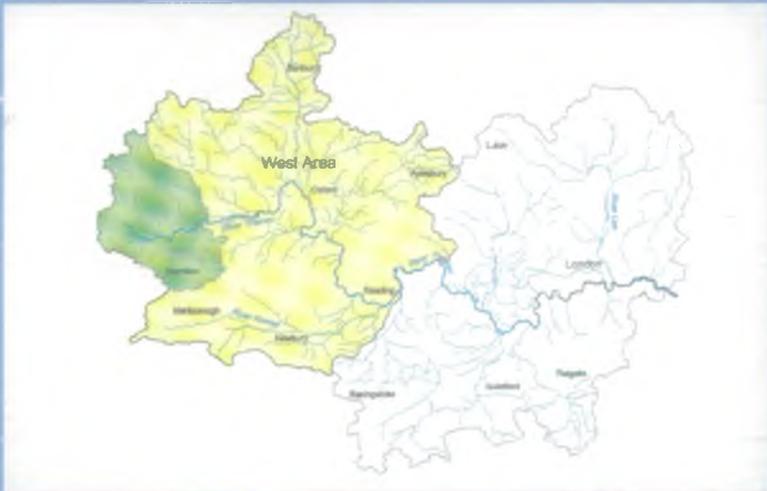


# UPPER THAMES CATCHMENT MANAGEMENT PLAN ACTION PLAN



**NRA**

*National Rivers Authority*

*Thames Region*

*January 1996*

## KEY CATCHMENT STATISTICS

Catchment area: 994km<sup>2</sup>

Average Annual rainfall (1941-70): 770 mm

Main River length: 337 km  
(maintained by NRA for flood defence purposes)

Total length of River Thames in Catchment: 31.5 km

Population (1991 estimate): 230,000

Major towns: Swindon  
Cirencester

### Cotswold Water Park

Contains largest concentration of still water lakes in Great Britain; it covers 5,700ha of which 1,000ha is open water in the form of 120 man made lakes.

## LOCAL AUTHORITIES

County Councils	Area in catchment	
	km <sup>2</sup>	%
Gloucestershire	590	59
Oxfordshire	50	5
Wiltshire	354	36
<b>Total</b>	<b>994</b>	<b>100</b>

District Councils	Area in catchment	
	km <sup>2</sup>	%
Cotswold DC	560	56
Tewkesbury BC	30	3
Vale of White Horse DC	50	5
West Oxfordshire DC	4	<1
North Wilts DC	160	16
Thamesdown BC	190	19
<b>Total</b>	<b>994</b>	<b>100</b>

Statue of  
Old Father  
Thames at  
St. Johns  
Lock,  
Lechlade



Front cover:  
The River  
Thames with  
Lechlade  
Church.

## VISION FOR THE UPPER THAMES CATCHMENT

The Upper Thames forms a unique and attractive part of our national heritage. Together with other water bodies within the catchment, the Upper Thames and its tributaries are valuable as fisheries and for wildlife conservation, as a source of water for potable supply, and as a resource extensively used for recreation and navigation.

*To realise the potential value and optimise the use of the water environment within this catchment, the NRA will work in partnership with local authorities, environmental groups and other interested agencies. The Upper Thames Catchment Management Plan will provide an important focus for this partnership. The NRA's vision therefore is not only to maintain the existing values of the catchment, but also to—*

- a) *ensure that water resources are managed in a sustainable manner which does not adversely affect river flows or other environmental interests;*
- b) *protect and improve the water quality;*
- c) *alleviate local riverside flooding of properties;*
- d) *improve the landscape, conservation value and biodiversity of the catchment where opportunities exist;*
- e) *maintain, improve and develop fish stocks;*
- f) *contribute to the sustainable management of the Cotswold Water Park by providing advice, and resources to monitor the effective implementation of that advice;*
- g) *improve access, information and visitor facilities for water-based recreation where there will not be a detrimental effect upon the environment;*
- b) *recognise and protect the strategic importance of the Thames National Trail; and*
- i) *strengthen links with local communities, for example through contact with Local Agenda 21 groups and County Conservation groups in order to further promote the sustainable management of the water environment.*

The proposals set out in this Action Plan will go some way towards securing the comprehensive protection and enhancement of the natural water environment of the catchment. While these proposed actions alone may not achieve the vision, they will nevertheless form a sound basis for further actions in the future and contribute towards the realisation of the vision.

## LOCAL CONTACT:

Jamal A Hamid  
Catchment Manager  
National Rivers Authority  
Thames Region  
West Area Office  
Isis House  
Howbery Park  
Wallingford  
OX10 8BD  
Tel:- 01734 533304  
Fax:- 01734 535900



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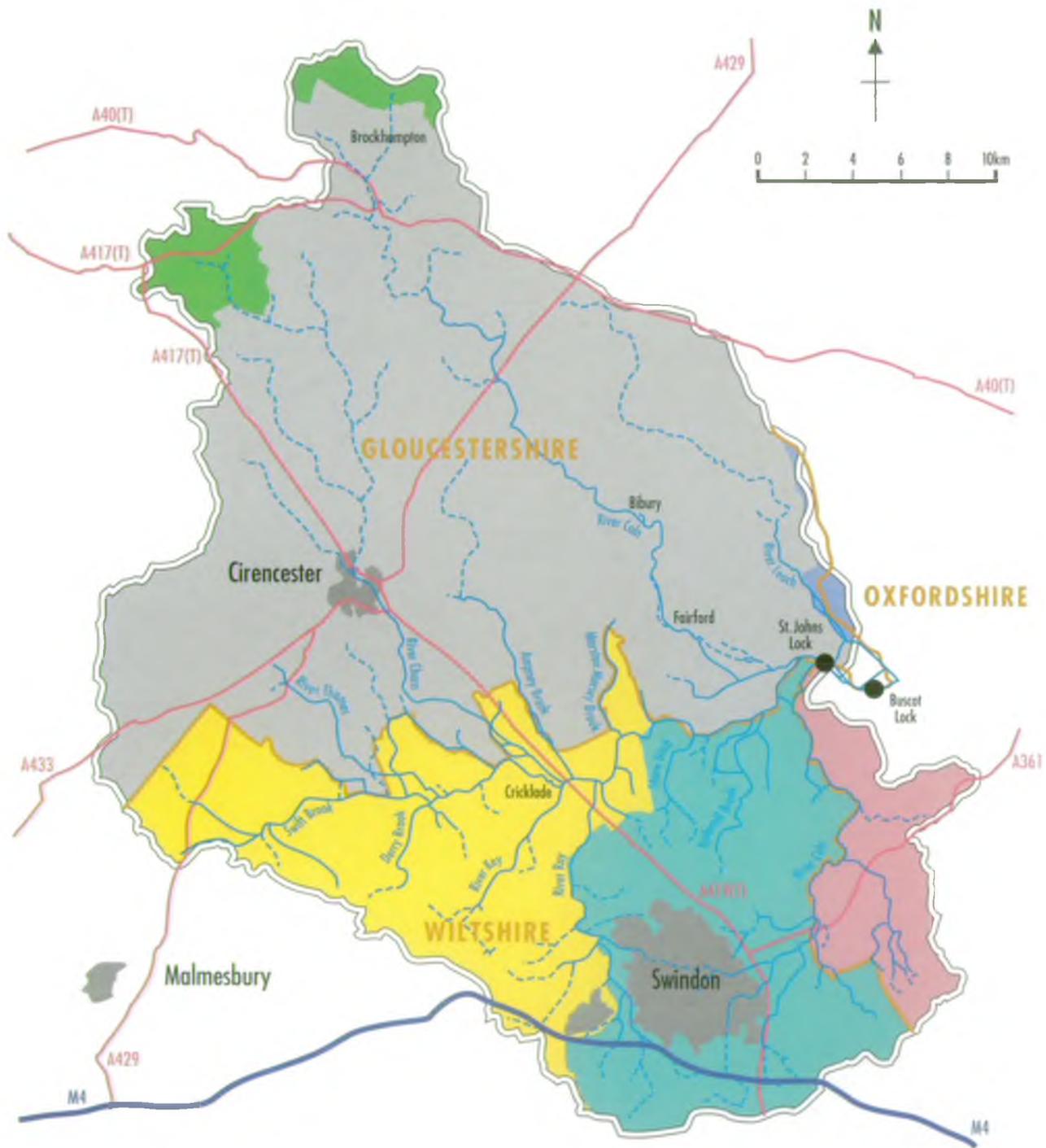
Guildbourne House, Chatsworth Road,  
Worthing, West Sussex BN11 1LD

ENVIRONMENT AGENCY



070514

**UPPER THAMES CMP OVERVIEW MAP**



**GENERAL FEATURES**

- CMP Boundary
- Main Rivers
- Non Main Rivers
- Lock
- County Boundary
- Motorway
- A Road
- Urban Areas

**LOCAL AUTHORITIES**

- Cotswold
- Thamesdown
- West Oxfordshire
- Vale of White Horse
- North Wiltshire
- Tewkesbury

The map and key shown above will appear in colour-tones to match map supplied.

## FOREWORD

The integrated management of river catchments is a fundamental philosophy for the NRA, and Catchment Management Plans (CMPs) are fundamental to integrated management. While catchment planning may be a relatively new concept, CMPs are nevertheless becoming one of the cornerstones to the NRA's corporate business planning process.

CMPs allow for bids to be made for funding against other catchments, and are therefore important in the business planning framework. At the same time they provide a public representation of our commitment to integrated catchment management. CMPs demonstrate our accountability to the customer and to the communities in which we are working.

This Action Plan, its vision and the activities it contains, can only be achieved if the participants work with and influence others who also have an interest in the future well-being of the Upper Thames catchment. While the vision is, by its nature, not constrained by practicalities of budgets and resources, the activity plan sets out our firm proposals for the delivery of real, sustainable improvements to

the local water environment as the first steps towards that vision.

The Upper Thames is an important part of our heritage and this CMP provides a blueprint for the future. The NRA, in partnership with local communities, will use this CMP to ensure that improvements in the local water environment are achieved and that good progress is made towards the vision.

I am sure that the local authorities, environmental and interest groups, and the public will help the NRA to take this initiative forward and will continue to assist us in refining and developing the Plan as we all implement it.



S J Darby, Area Manager (West)



*River Leach at  
Eastleach,  
Turville.*

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## 1.0 INTRODUCTION

- 1.1 The NRA was established in 1989 and is the principal organisation responsible for safeguarding and improving the water environment in England and Wales. It has statutory responsibilities for water quality, water resources, flood defence, fisheries, conservation, navigation and recreation. As Guardians of the Water Environment, the NRA has defined its role in the following mission statement:

### **Mission Statement**

*"The National Rivers Authority will protect and improve the water environment. This will be achieved through effective management of water resources and by substantial reductions in pollution. The Authority aims to provide effective defence for people and property against flooding from rivers and the sea. In discharging its duties it will operate openly and balance the interests of all who benefit from and use rivers, groundwater, estuaries and coastal waters. The Authority will be business-like, efficient and caring towards its employees."*

- 1.2 The NRA places particular importance on planning for the future of the environment through an integrated approach to river management. We recognise the need to work with local authorities, the local community, landowners, interest groups, industry and other agencies whose activities and uses interact with or impact on the water environment.
- 1.3 **The Environment Agency**  
The Environment Act will bring together the NRA, Her Majesty's Inspectorate of Pollution (HMIP) and the local Waste Regulation Authorities (WRAs) into one single Environment Agency in April 1996. Royal assent for the Act was granted on 19 July, and it became the Environment Act 1995. The DoE has now announced the appointments to the Board of the new Environment Agency and these include several members who have strong links not only with the NRA but also the WRAs and HMIP. The creation of an Agency with a remit to protect and enhance the environment as part of the quest for sustainable development is of vital importance as we move towards a new century.
- 1.4 It is expected that the preparation of CMPs will continue to be undertaken but enhanced to cover all the responsibilities of the new Agency. The Annual Review of the Upper Thames CMP is planned to be published by the NRA as an integral part of the new Agency in December 1996.



*River Churn  
at North  
Cerney.*

- 1.5 **Catchment Management Planning**  
The water environment is subject to a wide variety of uses which invariably interact with and sometimes conflict with each other. The process of catchment management planning has been developed to help manage these interactions and conflicts for the overall benefit of the water environment and its users. Through catchment management planning we establish a long term vision for the catchment. To meet this we set objectives for environmental improvement and prevention of future environmental damage whilst considering the many demands on the water environment in the catchment. Catchment Management Plans translate the principles set out in the mission statement into action. The plans describe the vision for each catchment, identify problems and issues and propose actions that may be taken to resolve them.
- 1.6 This document represents the action plan stage of the process and aims to describe the activities that the NRA and others have agreed should be undertaken over the next five to ten years. The plan also provides the means of promoting two key aspects of environmental management - land use planning and water quality objectives. Land use planning is discussed in detail in Section 4 while water quality objectives are outlined in Appendix 1.

## 2.0 STATEMENT OF PUBLIC CONSULTATION AND LIAISON

- 2.1 One of the fundamental objectives of catchment management planning is to involve all interested parties in the planning for the future well-being of a catchment. The NRA is therefore, committed to the concept of public consultation on all its CMPs.
- 2.2 Between April and June 1994 informal consultation took place with over 200 organisations external to the NRA including parish councils, local authorities environmental groups and businesses. The results of this informal process were fed into the Consultation Report so that it would produce "no surprises" when it was published and this seems to have been successfully achieved.
- 2.3 The Consultation Report was printed and distributed in January 1995 to some 300 consultees, marking the start of the formal public consultation process. This number increased through the distribution of further copies to the same organisations, libraries, schools and within the NRA itself, so that around double this number were sent out in total. The report was also advertised through press releases and radio interviews.
- 2.4 Three public meetings were held as a part of the consultation process at Cirencester, Swindon and Lechlade. The aim of the meetings was to allow people the opportunity to discuss the range, adequacy and priorities of the issues identified for the catchment and also to obtain views on the catchment values. Display boards and posters were set up at these meetings and also at council offices and local libraries located throughout the catchment.
- 2.5 Two questionnaires were attached to the consultation report and aimed to encourage the public to respond broadly to all the issues in the CMP and not just their own areas of interest. The consultees were given a period of three months to return any comments and completed questionnaires.
- 2.6 The response from the public was generally positive and constructive. The responses indicated that the following were the most significant issues contained in the consultation report:- river flows and levels; Cotswold Water Park; managing growth in water resources demand; gravel extraction; Meysey Hampton abstraction licence; fisheries biomass failures and integrated management. Many of the written responses were concerned with editing the Consultation Report as it stood rather than providing new information on issues, treating the report as if it were a draft which was not the case. This part of the consultation process will be looked at to see if improvements can be made in future documents.
- 2.7 Overall the consultation exercise was deemed successful and worthwhile. The opportunity to get involved in shaping future NRA activity seems to have been appreciated by the consultees. The vision and the activity plans, which appear within this document take the consultees responses into account and have been greatly assisted by their input. A more detailed statement on Public Consultation is available from NRA TR's West Area Office if required.

*River Thames  
near  
Lechlade.*



## 3.0 OVERVIEW OF THE CATCHMENT

### 3.1 Description

3.1.1 The Upper Thames Catchment comprises all land which drains into the Upper Thames extending from the source south-west of Cirencester to downstream of St Johns Lock, together with its tributaries including the Rivers Churn, Coln, Ray, Key, Cole, Leach and the Swill and Ampney Brook. The catchment can be divided along the River Thames with all the tributaries to the north rising from the Cotswolds and fed by springs, while those to the south are associated largely with clay catchments. (See Fig. 1 The Overview Map and Key Statistics on the front cover)

3.1.2 The character of the catchment is one of contrasts. While the northern part of the catchment is predominately rural with the Cotswold Hills, designated as an Area of Outstanding Natural Beauty (AONB) and the Cotswold Water Park, the southern part is dominated by the urban settlement of Swindon (population 150,000) located on the upper reaches of the Rivers Cole and Ray. Other settlements within the catchment include Cirencester, Wroughton, Cricklade and Highworth.

3.1.3 The area is skirted along its boundary by the M4 motorway and the A40 trunk road crosses in the north. The remains of the Thames and Severn Canal can be found west of Lechlade, and further south are the fragmented remnants of the Wilts and Berks Canal and the North Wiltshire Branch Canal.

3.1.4 The Cotswold Water Park, currently split into an eastern and western section, is the largest concentration of gravel pits and associated land in Great Britain. It covers some 5,700 hectares of which almost 1,000 hectares is open water in the form of about 120 man-made lakes.

3.1.5 River water quality in the Upper Thames catchment is generally good. The 1994 survey shows that 59% of rivers within the catchment are classified as "good", 39% as "fair", 2% as "poor", and there are no stretches classified as "bad" quality. The "good" quality rivers tend to be in the Cotswolds, eg. Churn, Coln. The Ray is classified as "fair". As this catchment is at the top end of the Thames basin it is of particular importance to maintain high water quality to reduce the likelihood of problems in the middle and lower Thames. For more information on water quality see Appendix 1.

### 3.2 Review of Resources, Uses and Activities

3.2.1 These were described in detail in the Consultation Report. The following are key extracts:

#### 3.2.2 Nature Conservation and Landscape

The Cotswold Hills are a high quality landscape characterised by open wolds and deep river valleys. The oolitic limestones support unimproved grasslands and woodlands of a high nature conservation value. The calcareous (lime rich) nature of the water in the Cotswold Water Park makes natural vegetation and invertebrate colonisation extremely rich and varied. There are 26 SSSIs



*River Leach at Eastleach Turville.*

within the entire catchment area, including the Cotswold Water Park SSSI, which encompasses 10 lakes, and Clattinger Farm and North Meadow SSSIs which are now candidate Special Areas of Conservation (SACs) under the European Habitats Directive.

#### 3.2.3 Fisheries

The catchment supports high quality game and coarse fisheries. The limestone streams to the north of the catchment, including the Leach, Coln and Churn, contain good populations of brown trout whilst the streams to the south tend to support coarse fisheries.

#### 3.2.4 Heritage

There are many important archaeological features within the catchment area including earth works, Iron Age hill forts and medieval settlements. There are also many examples of industrial heritage and a large number of buildings of historical or architectural interest.

#### 3.2.5 Amenity and Recreation

The key recreational resources are the River Thames and the Cotswold Water Park. Both are used for a wide range of recreational activities including cruising, canoeing, angling, walking and boating. The River Thames Recreation Strategy seeks to optimise the recreational potential of the River Thames through provision of improved access and visitor facilities whilst conserving its nature conservation, landscape and heritage value.

#### 3.2.6 Navigation

Within the plan area, the Thames is a public navigation between Buscot Lock and Town Bridge at Cricklade (24 km / 15 miles). Above that the river is private and the right to navigate must be negotiated with the riparian landowner. There are various plans to re-open the Thames and Severn and the Wilts and Berks canals.

#### 3.2.7 Water Resources and Supply

In the Upper Thames catchment, both rivers and groundwaters are used to supply various needs. Abstraction from rivers is dominated by the requirements of fish farms whilst public supplies are the main reasons for abstraction from groundwaters. The major aquifers are the Great and

### 3.0 OVERVIEW OF THE CATCHMENT (contd)

Inferior Oolite limestones which form the Cotswold Hills. The catchment as a whole is an importer of water and while existing resources can sustain currently planned levels of local development the management of growth in water demand is critical for the future.

#### 3.2.8 Effluent Disposal

There are 161 consented discharges in the Upper Thames Catchment the majority being from either Thames Water Utilities Ltd (TWUL) or private sewage treatment works (STWs). The River Ray is the most heavily used river in the catchment for effluent disposal. Recently however, the Swindon STW has been upgraded, resulting in markedly improved water quality in the River Ray and a healthier river ecosystem.

#### 3.2.9 Rural Land Use

The catchment is predominately agricultural with many farms changing from pasture to arable in recent years. It is probable that this land use change to arable farming in the riparian zone may have accelerated surface water run-off. One Environmentally Sensitive Area (ESA) has been designated in the Cotswold Hills. The Great Western Community Forest Project covers the southern half of the catchment around the Swindon area. It will offer the opportunity to conserve and enhance waterside landscapes and habitats and integrate conservation and recreation opportunities along the rivers.

#### 3.2.10 Urban Land Use

Swindon is a major regional centre for population and the primary focus for future growth including a large new housing development to the north of the town. The River Ray flows through Swindon where it provides a key open space, and any proposed development should aim to protect this river corridor. Limited development is planned in some of the country towns including Cirencester, Highworth, Wroughton and Cricklade. Road improvements are scheduled for the A417/419 trunk road from Swindon to Gloucester.



*Fishing on the River Coln at Bibury.*

#### 3.2.11 Mineral Extraction and Solid Waste Disposal

The main mineral working activity in the catchment is the extraction of sand and gravel from the Thames Valley and is concentrated within the Cotswold Water Park. There are 22 solid waste disposal sites in the catchment and nearly 75% of these also lie within the area of the Cotswold Water Park.

#### 3.2.12 Flood Defence

Past river management and land use practices have had an effect on flooding. In particular there has been an effect on river systems caused by gravel workings. Land drainage activities may also have increased the effects of run-off into rivers, causing changes in flow patterns and, as a result changes to flora and fauna. The low lying areas of the catchment and sites around the Cotswold Water Park are occasionally subject to flooding. In certain parts of the catchment, flooding is a particular problem; these areas include Somerford Keynes, South Cerney and the Cotswold Water Park.

## 4.0 LAND USE AND THE WATER ENVIROMENT

4.1 The broad objective of catchment management planning is to conserve and enhance the total water environment through effective land and resource management. In this way we can ensure that the needs of the present can be met without compromising the ability of future generations to meet their own needs - this approach is known as sustainable development. To achieve the objective of sustainable development all factors which may influence the water environment must be taken into consideration.

4.2 While the NRA is well placed to influence some of the factors affecting the water environment, particularly in relation to pollution control and the river corridor, it has little direct control over the mechanisms which determine land use activities. This function is primarily the responsibility of Local Planning Authorities through the implementation of Town and Country Planning legislation. The NRA is, nevertheless, involved in the planning system as a statutory consultee, receiving both development plans and planning applications for comment. In this way the NRA has the opportunity to make comments or objections to planning proposals or can recommend conditions for planning permissions.

4.3 Local authority development plans are statutory documents that set out the framework for land use change within the context set by Regional Planning Guidance. These plans act as a key instrument in determining planning applications, and are therefore an important tool in the protection of the water environment. The NRA works closely with the local authorities in the production of development plans, to encourage the inclusion of policies which reflect its concerns and responsibilities. A guidance document produced by the NRA entitled "Guidance Notes for Local Planning Authorities on the Methods of Protecting the Water Environment through Development Plans" has been helpful in setting out the issues which need to be included in development plans.

4.4 As a result of the promotion of NRA guidance and advice many of the local authority development plans which cover the Upper Thames Catchment Area now include comprehensive sets of policies which protect the water environment. This is an important step in achieving the common aim of sustainable development as it helps to reconcile the needs of economic development and effective environmental protection and enhancement.

4.5 **"Thames 21"**  
The NRA TR has published a strategic planning initiative called "Thames 21 - A Planning Perspective and a Sustainable Strategy for the Thames Region", which provides a regional context for the preparation of CMPs by identifying strategic development issues including future development pressure points. Swindon and the Cotswold Water Park have been identified as pressure points within the Upper Thames catchment. Swindon, particularly the Haydon sector to the north of the town, is under continuing pressure to accommodate further housing and employment growth. The

NRA's concerns with future development in this area include limited water resources, water quality in the Ray, control of surface water run-off and also the opportunity to open up and improve the corridor of the River Ray as open space. The Cotswold Water Park is discussed in more detail in Appendix 2.

### 4.6 Section 105 Surveys

The Upper Thames is the pilot area in the NRA TR's West Area for Section 105 Surveys, which are a programme of studies which will define the flood plain for use by local planning authorities in land use planning. Section 105 Surveys arise from the Water Resources Act 1991 in connection with DoE circular 30/92 and the Memorandum of Understanding with local planning authorities.

### 4.7 Working in Partnership

The NRA is able to participate constructively in the land use planning system process across all its functional interests and not just those related to its major functions of flood alleviation, water quality and water resources. It seeks to protect and enhance the landscape and wildlife conservation values of catchments where these values are influenced by water. This is done not just by working with local authorities and seeking to influence development plans and planning applications but also by working with a wide range of other organisations whose cooperation is needed. Further details on this are given in Appendix 3 (Landscape assessment) and in Appendix 4 (Conservation and opportunities for enhancement).



*Holiday home development, Cotswold Water Park*

## 5.0 ACTIVITY PLANS

5.1 The activity plans in this report have been divided into two distinct sections; the first section deals with the activities which are a response to the issues identified in the Consultation Report while the second section deals with other NRA activities which may be of a more routine nature but are nevertheless essential for the future protection and enhancement of the water environment within the Upper Thames Catchment. Both sets of activity plans not only take into account the Environmental Objectives which were also set out in the Consultation Report and which have been repeated at Appendix 5, but also follow and support the Corporate Strategies and aims and objectives of the NRA and its policies.

5.2 Both issue related activities and general activities have been set out in tables which show the following information:

i) Organisations which would be involved with implementing the proposed activities, either in a lead role or as a key supporter, are listed under the heading "Lead/Key Participants". The absence of a hash (/) indicates a cooperative group effort. The different departments of the NRA, which will be directly involved with the activities, have been coded as follows:-

### Key to NRA Departments

1. Environmental Services - Pollution Control(West)
2. Scientific Department
3. Environmental Services - Groundwater Quality (West)
4. Environmental Services - Water Resources (West)
5. Technical Department - Water Resources
6. Technical Department - Hydrological and Hydrometric Services

7. Fisheries and Conservation (West)
8. Flood Defence (West)
9. Catchment Planning (West)
10. Navigation and Recreation (West)
11. Thames Engineering Group

ii) A target timetable of the activity.

iii) An estimate of cost where available. This indicative cost could be attributed to one or all of the participants and has been divided into four broad bands; under £10,000, £10,000-£50,000, £50,000-£100,000 and over £100,000. The initials N/A means that no cost estimate is available at present.

iv) It should be appreciated that some actions will require feasibility studies and cost-benefit appraisal of options prior to work commencing. In some cases, depending on the outcome of these studies and investigations, further action may not be justified. The NRA and the participating organisations have limited resources and powers, and some work may take longer than indicated owing to funding availability, government policy and more urgent priorities.

v) Please refer to the Glossary at Appendix 6 for the definition of acronyms.

vi) Should new issues become apparent during the life span of this Plan, further actions will be added at succeeding reviews.

## 5.3 ISSUE RELATED ACTIVITIES

### 5.3 Issue Related Activities

A brief description of each issue resulting from the Consultation Report is given, followed by the proposed activities, participants, timetable and cost estimate set out in table form. The key issues are as follows:-

1. Abstraction, River Flows and Levels
2. Water Quality Protection and Enhancement
3. Flooding
4. Fisheries
5. Cotswold Water Park
6. Recreation and Canal Restoration
7. Future Water Resources: Meeting Future Demands for Water
8. Integrated Management
9. Communication

## ISSUE 1: ABSTRACTIONS, RIVER FLOWS AND LEVELS

### River Flows and Levels

The drought of 1989-92 exacerbated public concern about river flows, levels, water quality and in-stream ecology in the groundwater-fed watercourses in the northern part of the catchment. The NRA commissioned investigations on the River Coln which were reported in 1992. Further work is being undertaken to monitor the recovery of these streams following the drought.

### Meysey Hampton Great Oolite Abstraction Licence

The current TWUL abstraction licence for the Meysey Hampton Great Oolite source expires in January 1998. Discussions have commenced with TWUL to establish their intention regarding renewal of the licence and the range of investigations required for environmental appraisal. The broad scope of these investigations is identified below. The effects of this abstraction in combination with abstraction at Latton and Baunton may also need to be assessed.

Activity	Lead/ Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
1.a Undertake research on limestone fed streams of the Upper Thames to assess changes in aquatic plants species composition and relationship with river flow / level and establish long term monitoring programme.	NRA <sup>2</sup> / TECT	■					10-50	Initial Survey completed. Monitoring commenced
1.b Establish River Flow Objectives for the Upper Thames rivers.	NRA <sup>5</sup>		■	■			10-50	
1.c Review available groundwater level and river flow and environmental data to assess impact of long term abstractions.	NRA <sup>5</sup> / TWUL	■	■				10-50	
1.d Field investigation and pumping trials.	NRA <sup>5,4</sup> TWUL		■	■			10-50	
1.e Develop integrated ground-and surface water model of Oolite aquifers to assess alternative patterns of groundwater abstractions.	NRA <sup>5</sup>	■	■				50-100	
1.f Carry out investigations on the Ampney Brook and Churn to determine severity of impact of abstraction and where necessary options for improvement.	NRA <sup>5</sup>			■	■		50-100	

## ISSUE 2: WATER QUALITY PROTECTION AND ENHANCEMENT

The NRA aims to maintain the generally good water quality in the catchment. Several reaches require capital investment at Sewage Treatment Works (STW) to allow the River Quality Objectives (RQOs) to be achieved. Several reaches also need further research on their quality before the RQOs can be confirmed. For more information on water quality see Appendix 1.

Activity	Lead/ Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
2.a Improvement of the following Sewage Treatment Works :- Wanborough, Wroughton (including storm tanks), Fairford, Highworth, Kempford, Lechlade (including storm tanks), Purton, Shrivensham (to protect Tuckmill Brook and River Cole), Blunsdon (to protect Share Ditch), Ashton Keynes (to protect Thames), Ampney St. Peter (to protect Ampney Brook and the Thames).	NRA <sup>2</sup> / TWUL			■	■	■	> 100	
2.b Effects of rural STWs to be monitored.	NRA <sup>2</sup>			■	■	■	N/A	Can be implemented as a student project.
2.c Discuss and investigate ways and opportunities for upgrading RQOs in the Upper Thames catchment.	NRA <sup>2</sup> / TWUL, UTFC, TECT			■	■	■	N/A	

## ISSUE 3: FLOODING

The towns affected by localised flooding problems include Somerford Keynes and South Cerney. There is a need to improve available information on flood plains and to consider suitable watercourse maintenance regimes and Water Level Management Plans.

Activity	Lead/ Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
3.a Address local flooding in Somerford Keynes and South Cerney by offering advice on drainage and river bank problems.	NRA <sup>1</sup> / CDC	■	■	■			> 100	
3.b Section 105 land and river bed surveys: from Roundhouse to Buscot Lock. The Upper Thames area is a pilot study and work is in hand. Full survey programme and content to be defined. (see also Monitoring table)	NRA <sup>8</sup> / CDC NWDC	■	■	■			> 100	The requirement to carry out Section 105 Surveys arises from the Water Resources Act 1991 and DoE Circular 30/92.

## ISSUE 4: FISHERIES

The quality of the fisheries in the Rivers Churn, Cole, Ray, Thames and the Ampney Brook is not as good as would be expected despite the ecosystems appearing capable of supporting a good quality fishery. The reasons behind this are uncertain but are probably a combination of low flows and habitat degradation. Fisheries need to be continually monitored, problems investigated and enhanced as

necessary. Concern has been voiced by a number of local angling organisations about the proliferation of emergent vegetation in the River Thames between Lechlade and Cricklade in recent years; complaints are based on difficulties with access and a reduction in fishable area.

Activity	Lead/Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
4.a Fishery surveys in the following rivers: Upper Thames; Wilts Ray; Churn; Coln; Ampney Brook and River Leach.	NRA <sup>7</sup>	■	■	■			10-50 (for each survey)	
4.b Fisheries monitoring in relation to the Rivers Restoration Project on the Cole.	NRA <sup>7</sup> / RRP NT	■	■				10-50	Timescale will depend on funding.
4.c River Leach habitat enhancement monitoring.	NRA <sup>7</sup>	■	■				10-50	
4.d Investigate the nature and extent of the problem of abundant emergent vegetation and identify ameliorative measures if appropriate.	NRA <sup>7</sup> *	■	■	■			N/A	To take account of valuable habitats that this vegetation supports.
4.e Preliminary examination of toxic residues in fish tissue from identified sites in the CMP area.	NRA <sup>7</sup> / Wild CRU	■	■	■			< 10	Joint research project as part of the Water Vole/ Mink Riparian Study with Oxford University's "Wild CRU" with numerous potential spin offs in ecological knowledge of key species and habitats.

## ISSUE 5: COTSWOLD WATER PARK

The Cotswold Water Park (CWP) is a nationally important water feature, especially in terms of wildlife. From a catchment perspective, the Park is important in terms of the fishery, flood hazard management, recreation and conservation. The significance of the Park especially in terms of hydrology is not fully understood. There is also a need for all the interested parties to plan future developments at the park sensitively and in consultation with one another. (See Appendix 2 on the Cotswold Water Park)

Activity	Lead/Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
5.a Monitor effects of mineral extraction on the flooding mechanism of the area. This will partly be achieved by Section 105 floodplain surveys and investigations but may require additional monitoring equipment to be installed.	NRA <sup>3</sup> GCC WCC	█	█	█			> 100	
5.b Initial investigation into groundwater level data is being carried out by NRA using EN data in reference to a number of SSSIs in the CWP. In addition groundwater level data is needed from gravel companies. Install and monitor additional wells, east of A419 as necessary.	NRA <sup>4</sup> EN Gravel Co.s LPAs	█	█	█	█	█	10-100	Some of this activity requires co-operation of gravel companies and is a long term exercise.
5.c The production of a management plan for the Cotswold Water Park area; to include findings from landscape and hydrological study; to take account of EN's site management guidelines for CWP; to include conservation of the aquatic flora and fauna and balancing the needs of recreation and ecology.	NRA <sup>7</sup> GCC WCC CDC NWDC EN	█	█	█			10-50	
5.d Completion of landscape assessment of Upper River Thames - important in forming Upper Thames minerals policies.	NRA <sup>7</sup>	█					< 10	See Appendix 3 on Landscape Assessment of the Upper Thames catchment.
5.e Ensure NRA regulatory activities are compatible with EN's Site Management Guidelines and advice re-Cotswold Water Park.	NRA <sup>7</sup> EN	█	█	█	█	█	N/A	



Sailing club at Cotswold Water Park.

## ISSUE 6: RECREATION AND CANAL RESTORATION

The re-opening of canals represents the development of a valuable recreational resource but has a number of multifunctional implications. Canals require appreciable quantities of water to successfully support navigation. There are already significant water resource constraints in the catchment and the re-opening of the

canals may intensify water resource demands. As a result, any restoration plans would need to account for the storage of winter water to support summer resource requirements and methods to manage those resource requirements such as lining, back-pumping, etc.

Activity	Lead/ Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
6.a The restoration of the Severn and Thames and the Wilts and Berks canals.	CCT/ WBCT BW, LPAs NRA <sup>10</sup>	■	■	■	■		N/A	
6.b Establish feasibility of availability of water resources to supply Severn and Thames and Wilts and Berks canals.	NRA <sup>10</sup> CCT, WBCT, BW, LPAs NRA-SW	■	■	■			50-100	Early discussions needed between all participants. Funding of the scheme is likely to be shared between the various participants.
6.c The biological effects of water transfer from opening disused canals will require baseline surveys and monitoring.	NRA <sup>2,5</sup>	■	■	■			N/A	This may involve algae, bacteria, macrophyte, macro-invertebrate and/or fish parasite studies.

## ISSUE 7: FUTURE WATER RESOURCES: MEETING FUTURE DEMANDS FOR WATER

Meeting future needs for water will require a combination of methods to manage growth in demand. For example, through further leakage control, possibly domestic metering and generally raising awareness of more efficient use of water at work and in the home. If these management practices do not fully balance longer term growth in water demand, new strategic schemes may need to be promoted. A number of potential schemes have been identified, including a new reservoir in south-west Oxfordshire, possible inter-basin transfers between the Severn and the Thames and increasing the re-use of water.

Activity	Lead/ Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
7.a Development of infrastructure to secure adequate resources to meet growth in demand and changes to licensed abstractions.	TWUL NRA4,5/	■	■	■			N/A	
7.b Publication of NRA Water Conservation Strategy.	NRA4,5	■					10-50	
7.c Promoting national and regional policies and initiatives.	NRA4,5	■	■	■	■	■	N/A	
7.d Secure practical and economic levels of leakage losses.	NRA4,5 TWUL	■	■	■	■	■	N/A	
7.e NRA Planning guidance to LPAs:- influencing new and re-development to incorporate water efficient technology to ensure sustainable development planning.	NRA9 LPAs TWUL	■	■	■	■	■	N/A	
7.f Investigations of feasibility of future water resource schemes including: -Severn-Thames Transfer -South West Oxfordshire Reservoir	NRA4,5 TWUL	■	■	■	■	■	> 100	

## ISSUE 8: INTEGRATED MANAGEMENT

As a key part of the move towards sustainability a more integrated approach to natural resource management is required. Developing integrated management approaches represents a substantial challenge to all those who live in and use a catchment. The concept of integration requires specialists to broaden their perspective and appreciate the interaction and impact of specific activities on the entire catchment and over different periods of time.



St Johns Lock  
near  
Lechlade.

Activity	Lead/ Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
8.a Work in concert with Great Western Community Forest to identify the significant potential for river and floodplain restoration in the Ray and Cole catchments, including wetland restoration. Also offering advice to the project officers on water recreation issues.	GWCF NRA <sup>7,9,10,11/</sup> LPAs	█	█	█	█	█	N/A	The Great Western Community Forest will be adjacent to the Upper Thames and should provide access and amenities along the river.
8.b Continue working in partnership with other environmental bodies to facilitate the implementation of the River Cole Restoration Project. This aims to influence and encourage sustainable land use practices. It involves a programme of habitat enhancements to restore degraded rivers and riparian habitats.	NRA <sup>7,10,11/</sup> RRP GWCF NT CoCo EN	█	█				N/A	The Cole RRP project began in 1995 and some lengths of the river have been opened to flows.
8.c Liaise with local authority's drainage and planning departments, to encourage and support more sustainable drainage and surface water management techniques, such as source control, where appropriate.	NRA <sup>1,5,9/</sup> LAs CIRIA	█	█	█	█		N/A	CIRIA will be assessing and setting up demonstration sites where source control principles will be tried out between 1996 and 1999.

## ISSUE 9: COMMUNICATION

The actions of a range of individuals and user groups impact on the catchment and affect different uses. All groups need to communicate effectively to ensure that development at the catchment scale is sustainable and that the ability of the ecosystem to support different uses is sustained. There is also a need to make communication at "grass roots" level with the public as effective as possible. It is hoped that CMPs themselves will be one way of improving communication among the catchment's interested organisations.

A possible approach to encourage communication between the different "players" in the catchment is for the NRA to facilitate a working group. This group could comprise representatives from the statutory agencies and leading interest groups.

Activity	Lead/ Key	95/6	96/7	97/8	98/9	99/on	Cost (\$K)	Comments
9.a Establishment of a working group to facilitate the implementation of the Upper Thames Catchment Management Plan.	NRA <sup>9</sup>	■	■				<10	
9.b The production of Annual Reviews and newsletters as appropriate to monitor the progress of the Action Plan.	NRA <sup>9</sup>	■	■	■	■	■	<10	



*River Coln at Bibury.*

## 5.4 GENERAL ACTIVITIES

### General Activities

This section of the Action Plan describes those activities which have not been prompted by the issues raised during the consultation period but are nonetheless considered to be important in order to safeguard and improve the water environment. The NRA will take full account of the relative importance of these activities to the issue-related activities when deciding annually how to allocate available resources. The "general activities" have been grouped under four main headings. This should facilitate the incorporation of these activities in the NRA's annual work programme and the production of its annual cross functional plans.

#### Table 1 MONITORING (*describe resource*)

Includes: sampling/survey programmes and any other data collection action, modelling, analysis of data, compiling inventories.

#### Table 2 REGULATION & ENFORCEMENT (*safeguard resource*)

Includes: issuing of licences such as abstraction licences and rod licences and indirect regulation such as responding to planning applications.

#### Table 3 OPERATIONS (*maintain resource*)

Includes: emergencies, promotion and advisory services eg. pollution prevention, river maintenance.

#### Table 4 IMPROVEMENTS (*enhance resource*)

Includes: enhancement schemes and improvement of degraded areas.

In the following tables, the general activities have been numbered using the initials of the main headings; eg. M.1, M.2 etc. for Monitoring, R.1, R.2 for Regulation and Enforcement and so on.



Halfpenny  
Bridge,  
Lechlade.

**TABLE 1: MONITORING**

Activity	Lead/Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
M.1 Review of current facilities for boaters. This information needs to be shown on a geographic database.	NRA <sup>10</sup>	■	■	■			< 10	Database will be created 95/96. The Upper Thames reaches will be reviewed during 1997/98
M.2 Review of lock and weir fishing.	NRA <sup>10</sup>	■	■				N/A	Part of an ongoing review of lock weir sites.
M.3 Section 105 Surveys - The Upper Thames has been identified as a Pilot Study Area. The Survey will involve the following work:- -Planning programme of groundwater and surface water level monitoring sites. -Undertake monitoring and examination of flood records, flow routes, landowner survey etc. -Survey including: Photogrammetry, channel survey. -Hydrological and hydraulic modelling to develop flood maps. -Assessment of groundwater data. -Input into canal issues.	NRA <sup>4,8,9,5,7</sup> CDC WCC NWDC GCC TBC	■	■				> 100	Linked with WLMPs and joint project with EN and NRA. Many of these work areas will be reviewed and the programme costs identified within the next few months.
M.4 Assessment of compliance of river quality with stated objectives.	NRA <sup>1</sup>	■	■	■	■	■	N/A	Continuous.
M.5 Assessment of compliance of discharges with consent standards.	NRA <sup>1</sup>	■	■	■	■	■	N/A	Continuous.
M.6 Assessment of changes of chemical quality grades of rivers.	NRA <sup>1,2</sup>	■	■	■	■	■	N/A	Annual.
M.7 Water Quality Modelling of rivers and discharges where necessary.	NRA <sup>1,2</sup>	■	■	■	■	■	N/A	Continuous.
M.8 Measurement of rainfall, groundwater levels, river levels and flow. This information can be used for flood defence and flood warning.	NRA <sup>4,6</sup>	■	■	■	■	■	N/A	On-going.
M.9 Telemetred rain gauge proposed around Coln St Dennis.	NRA <sup>4,6</sup>	■					< 10	
M.10 Additional siting of daily gauges needs to be assessed and finalised.	NRA <sup>4,6</sup>	■	■				< 10	Additional monitoring equipment to be finalised.
M.11 Feasibility study for an ultrasonic flow site at Buscot (Thames) to replace existing monitoring procedure. Depending on outcome of study, build ultrasonic station as appropriate.	NRA <sup>4,6,11</sup>	■	■				10-50 120	Currently flows are measured over the weir. An ultrasonic gauging station provides a more accurate method of monitoring the flow of the Upper Thames.
M.12 Carry out a review of access and signage to and along the Thames Path.	CoCo/ NRA <sup>10</sup>	■	■	■	■	■		The Thames Path will be officially launched in 1996 and signage should be installed by then.
M.13 Review the availability of leaflets on the Thames and establish what is required.	NRA <sup>10</sup> LPA	■					N/A	The Recreation Information Strategy which is currently being implemented covers this area of work.

**TABLE 1: MONITORING**

Activity	Lead/ Key	95/6	96/7	97/8	98/9	99/on	Cost (\$K)	Comments
M.14 Review access and facilities for canoeists.	NRA <sup>10</sup> BCU	■					N/A	This is part of the NRA's ongoing Canoe strategy. See also R.3.
M.15 Co-ordinate analysis of EN borehole monitoring data to assess trends in relation to riparian meadow SSSIs in CMP area. Identify future monitoring needs.	NRA <sup>4,9</sup> EN	■	■				N/A	
M.16 Use data from NRA river corridor and fisheries surveys to assess comparative status of sub-catchments within CMP area and prioritise habitat enhancement and protection measures.	NRA <sup>7</sup>	■	■	■			N/A	
M.17 Planned/programmed and reactive Fishery surveys.	NRA <sup>7</sup>	■	■	■	■	■	N/A	Ongoing assessment of ecological quality.
M.18 Carry out river corridor surveys using published NRA methodology on selected Upper Thames tributaries including R. Leach, Marston Meysey Brook, Swill Brook, Derry Brook, R. Key, Share Ditch and Bydemill Brook.	NRA <sup>7</sup>	■	■				< 10pa	
M.19 Carry out river habitat survey on monitoring sites in the CMP area as part of the National NRA river habitat survey database compilation.	NRA <sup>7</sup>	■	■				< 10pa	
M.20 Monitor recovery of otter population in Upper Thames.	NRA <sup>7</sup> BBONT	■	■	■	■	■	N/A	
M.21 Water quality sampling (manual and automatic).	NRA <sup>1,2</sup>	■	■	■	■	■	N/A	Ongoing statutory duty done in line with national policy.
M.22 Geomorphological audit of parts of Upper Thames including the Churn, Coln and Ray.	NRA <sup>7</sup>	■	■				< 10	This is part of a programme of geomorphological assessments taking place throughout the Thames Region.
M.23 Biological sampling including:- routine invertebrate monitoring; programme of bacteriology; quarterly monitoring of bacteriology in relation to EC abstraction directive; macrophyte monitoring in relation to UWWT; monitoring of STW consent failures on a reactive basis and review of consents; algal sampling; supply of biological information and monitoring of enhancement schemes; supply of specialist advice to LPAs for planning applications; protection of important in-stream flora and fauna.	NRA <sup>2</sup>	■	■	■	■	■	N/A	
M.24 Continuation of the groundwater monitoring network.	NRA <sup>5</sup>	■	■	■	■	■	< 10	Ongoing obligation in line with national policy.
M.25 Full assessment of effects on surface and groundwater should take place at former and operational airfields. In particular discussions with MOD, on site investigation and subsequent remedial measures at RAF Kemble are required.	NRA <sup>3</sup> / MOD	■	■				N/A	

**TABLE 2: REGULATION & ENFORCEMENT**

Activity	Lead/ Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
R.1 Enforcement of Land Drainage Byelaws including consideration of requests for consents and pre-inspections.	NRA <sup>9</sup>	■	■	■	■	■	N/A	Landowner awareness of Byelaws and provisions of Water Resources Act. Policy training also required internally.
R.2 Ensuring that Navigation regulations are enforced ie. collecting registration fees and enforcing Navigation Byelaws.	NRA <sup>10</sup>	■	■	■	■	■	N/A	New Navigation Byelaws were introduced in 1995. These are being introduced on the Thames by a process of education, rather than prosecution.
R.3 The NRA will continue in its role as an impartial mediator between riparian owners and river recreation users to provide access to the river where appropriate. Access would only be promoted where it would not cause any problems with other aspects of the river environment.	NRA <sup>11</sup> BCU riparian landowners	■	■	■	■	■	N/A	Where a public right of navigation does not exist, agreements to use the river must be obtained from the riparian owner. These arrangements are generally referred to as 'access agreements' and are usually initiated by the BCU.
R.4 Enforcement of Salmon and Freshwater Fisheries Act 1975 and Fisheries Byelaws including issuing of consents and licence checking and consented removal of non-native crayfish.	NRA <sup>7</sup>	■	■	■	■	■	N/A	Ongoing activities.
R.5 Respond effectively to individual planning applications and development proposals.	NRA <sup>9</sup> / LPAs	■	■	■	■	■	N/A	Routine ongoing activity.
R.6 Promotion of Guidance Notes for LPAs for incorporation into statutory development plans (ie. structure, local, minerals and waste plans).	NRA <sup>9</sup> / LPAs	■	■	■	■	■	N/A	To ensure adequate environmental safeguards are written into Development Plans to facilitate development control.
R.7 Ensure archaeological interests are protected during NRA activities and consultation occurs on archaeological sites as appropriate.	NRA <sup>7</sup>	■	■	■	■	■	N/A	To protect archaeological interests.
R.8 Licensing of abstractions to protect the water environment.	NRA <sup>4</sup>	■	■	■	■	■	N/A	ongoing.
R.9 Abstraction licence enforcement to ensure compliance with licence conditions.	NRA <sup>4</sup> abstractors	■	■	■	■	■	N/A	ongoing.
R.10 Determine River Flow Objectives/prescribed flows.	NRA <sup>4,2</sup>					■	N/A	long term plan.
R.11 Enforcement of contravention of Water Resources Act 1991 provisions with respect to pollution incidents and consented discharges.	NRA <sup>1</sup>	■	■	■	■	■	N/A	continuous.
R.12 Enforcement of compliance of agricultural regulations Control of Pollution Act 1991 (Silage, Slurry and Agricultural fuel oil) Regulations.	NRA <sup>1</sup>	■	■	■	■	■	N/A	continuous.

**TABLE 2: REGULATION & ENFORCEMENT**

Activity	Lead/ Key	95/6	96/7	97/8	98/9	99/on	Cost (\$K)	Comments
R.13 Continue and improve the conservation input to all planning consultation procedures to conserve the present ecological resource of the water environment and pursue opportunities for habitat enhancement through the planning process.	NRA7	■	■	■	■	■	N/A	See Appendix 4.
R.14 Continue conservation input to NRA regulatory activities in (i) water abstractions to protect river flows for water dependent habitats (ii) land drainage consents to protect riverine habitats and promote sensitive engineering methods, and (iii) discharge consents to protect water dependent habitats from pollution.	NRA7 <sup>9</sup>	■	■	■	■	■	N/A	
R.15 Regulation of crayfish farming to protect native crayfish populations.	MAFF/ EN/NRA <sup>7</sup>	■	■	■	■	■	N/A	
R.16 Respond effectively to Waste Management Licence consultations on both a statutory and non-statutory basis.	LPAs WRAs NRA <sup>4,9</sup>	■	■	■	■	■	N/A	To ensure protection of groundwater and surface water quality.
R.17 Respond effectively to IPC Authorisations.	NRA <sup>4</sup> HMIP	■	■	■	■	■		

**TABLE 3: OPERATIONS**

Activity	Lead/Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
O.1 General river maintenance, carried out as part of the yearly Watercourse Maintenance Plan (R. Thames, Churn, Coln, Cole, Key etc).	NRA <sup>8</sup>	█	█	█			> 100	Priorities may change depending on needs and resources.
O.2 Emergency fisheries response capability including aeration and fish rescues.	NRA <sup>7</sup>	█	█	█	█	█	N/A	On going activities.
O.3 Emergency Flood Responses.	NRA <sup>8</sup>	█	█	█	█	█	50-100	Patrolling during floods. Assistance to Local Authorities etc.
O.4 Flood warning.	NRA <sup>8</sup>	█	█	█	█	█	N/A	To provide a service-issuing warnings.
O.5 River Control Structures Survey.	NRA <sup>8,11</sup>		█	█	█		10-50	Identify ownership, condition, levels etc. Valuable input into Section 105 Surveys, WLMP & FDMM.
O.6 Flood Defence Monitoring Manual/Flood Defence Monitoring System. Objective is maintenance and valuable input into Section 105 Surveys and WLMPs.	NRA <sup>8</sup>	█	█	█	█	█	10-50	Depends on use of Section 105 data for best value for money.
O.7 The Liden Lagoon as a flood storage area to be maintained for recreational use and managed by Thamesdown BC. Other similar projects to be established where possible.	NRA <sup>8,10/</sup> TBC	█	█	█	█		< 10	Liden Lagoon is a flood storage area owned by the NRA and leased to Thamesdown for recreational use. There may be scope for similar projects.
O.8 Planned 'preventative' maintenance on weir structures downstream of the Roundhouse and above St. John's Lock.	NRA <sup>8,11</sup>	█	█	█	█		10-50	Awaiting quotations from IBU under the new contract.
O.9 Removal of shoals, as appropriate, in weir streams, flood defence reaches, and navigation channels to fulfil NRA statutory duties under the Water Resources Act 1991 and the Thames Conservancy Act 1932.	NRA <sup>8</sup>				█		10-50	Flexible programme dependant on weather and rainfall. NRA Fishery & Conservation departments are consulted prior to any work.
O.10 Deformation survey stations on Locks and Weirs.	NRA <sup>11</sup>	█	█				< 10	
O.11 Maintaining and managing Navigation Fairway on River Thames: Cricklade - Buscot.	NRA <sup>10</sup>	█	█	█	█	█	N/A	Part of ongoing activity and includes the operation, 7 days a week, of St John's and Buscot Locks.
O.12 Maintenance where appropriate of NRA navigation and recreation assets, eg. lock sites (St Johns), moorings, gates and bridges.	NRA <sup>10</sup> where owned otherwise LAs and private owners	█	█	█	█	█	N/A	Part of ongoing activity, primarily on the Thames navigation, and along the Thames Path.
O.13 Promoting the use of the Thames and other recreational waterways and associated land for safe recreation.	NRA <sup>10</sup> LAs landowners	█	█	█	█	█	N/A	Part of NRA general duty, offering information and advice to the public at lock sites via information boards (St John's Lock) and NRA lock staff.

**TABLE 3: OPERATIONS (contd)**

Activity	Lead/Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
O.14 Liaison with anglers eg. Upper Thames Fisheries Consultative (UTFC) including communication via their Newscast magazine.	NRA7/ UTFC	■	■	■	■	■	N/A	Routine ongoing activity.
O.15 Provision of advisory services, including fisheries management advice and assistance. (NB all above apply to rivers and still waters).	NRA7	■	■	■	■	■	N/A	Routine ongoing activity.
O.16 Ensure compliance with conservation guidelines for good practice in river maintenance operations including input to trimming and weed cutting practices.	NRA7/ EN	■	■	■	■	■	N/A	Progression of SoS methodology reflects changes to less intensive land use and the need to protect ecological resources including floodplain habitats dependent on flooding.
O.17 Continue to provide advice on all wetland issues/ river management etc. to internal and external customers.	NRA7	■	■	■	■	■	N/A	
O.18 Produce WLMPs for following agreed main river sites and implement completed plans:-N Meadow NNR (1995/96), Cotswold Water Park (1996/97), Clattinger Farm (1996/97), Upper Waterhay Meadow (1996/97), Pike Corner (1996/97), Windon Meadow (1996/97), Coate Water(1997/98), Whelford Meadow (1997/98), Wildmoorway Meadow (1997/98).	NRA7/ EN riparian landowners	■	■	■	■	■	10-50	Interim plans to be produced for all sites 95/96; full plan for North Meadow only in 95/96.
O.19 Produce WLMPs for non-main river sites which include Brassey Reserve and Cockleford Marsh.	LPA. riparian landowners EN/NRA7 <sup>B</sup>	■	■	■	■	■	N/A	
O.20 Promote projects which serve to promote less intensive agriculture practices in flood plains including buffer zones to rivers, habitat enhancement and restoration (eg. Countryside Stewardship).	NRA7/ CoCo MAFF EN etc.	■	■	■	■	■	N/A	
O.21 Response to pollution incidents and emergencies to published response times.	NRA1	■	■	■	■	■	N/A	Ongoing statutory requirement.
O.22 Pollution prevention activity including focused advice and guidance to industrialists and farmers. Also work in close liaison with the emergency services to avoid pollution from accidents etc.	NRA1 Fire & Rescue Services LAs	■	■	■	■	■	N/A	Ongoing rolling programme need to undertake repeated visits to maintain progress.
O.23 Implementation of the national "Policy and Practice for the Protection of Groundwater".	NRA3	■	■	■	■	■	N/A	Ongoing.

**TABLE 4: IMPROVEMENTS**

Activity	Lead/Key	95/6	96/7	97/8	98/9	99/on	Cost (£K)	Comments
I.1 New head lay-by at St John's Lock.	NRA <sup>10</sup>	■					50-100	Completed 1995
I.2 New 24 hour mooring on wharf in Lechlade.	NRA <sup>10</sup>	■	■				10-50	Ongoing 1995/96
I.3 Support and facilitate if possible the construction of a bridge as part of the Thames Path close to St John's Bridge.	NRA <sup>10</sup> CoCo	■	■	■			N/A	The proposed Bloomers Hole Bridge is currently under review.
I.4 Thames Head marks the source of the River Thames which should be safeguarded whilst recognising the need for public access as one end of the Thames National Trail.	CoCo/ NRA <sup>10</sup>		■	■	■		N/A	Access around the source needs to be resolved, and responsibility for its maintenance agreed.
I.5 Identify most important/threatened habitats and species within CMP area and develop strategies for protection and restoration in conjunction with other bodies. <i>*County Wildlife Trusts, other environmental organisations</i>	EN, RSPB, LAs,* NRA <sup>7</sup>	■	■				N/A	This would involve keying into developing county biodiversity initiatives.
I.6 Carry out programme of habitat enhancements funded by Flood Defence Enhancement Budget to restore degraded rivers and riparian habitats. <i>*Riparian landowners, other environmental organisations.</i>	NRA <sup>7</sup> *	■	■	■	■		10-50	See also issue related activities, 8.a-Great Western Community Forest, and 8.b-River Cole Restoration Project.
I.7 Carry out programme of habitat enhancements as identified by Upper Thames Otter Habitat Project and identify further enhancements particularly on R. Churn catchment.	NRA <sup>7</sup> Riparian landowners	■	■	■	■		<10	See M.20
I.8 Identify remaining strongholds of water vole in CMP area and carry out measures to improve habitat as and when research information provides guidelines.	NRA <sup>7</sup> Wild CRU	■	■	■	■		N/A	Joint research project as part of water vole/mink riparian study (see also issue related activities 5.e).
I.9 Special water quality investigation on the River Ray. On completion, target specific industrial sites.	NRA <sup>1-2</sup>	■	■	■	■		N/A	Highest priority for investigation in this catchment.
I.10 Follow up the recommendations set out in the River Coln and Leach Landscape Assessment Report completed in April 1995, including enhancement opportunities near Andoversford and Fairford (R Coln) and improvements to the R Leach at Northleach.	NRA <sup>7</sup> landowners LAs	■	■	■	■		N/A	

## 6.0 IMPLEMENTING THE PLAN: MONITORING AND REVIEW

- 6.1 The NRA is jointly responsible, with other organisations, groups and individuals, for implementing this Action Plan. Progress will be monitored on a regular basis and reported annually by the NRA in a review document to all the key partners. The Annual Review will:
- detail the progress achieved compared with the work shown in the activity plans;
  - identify additional actions required in the light of changes in the catchment;
  - consider the need to update the Catchment Management Plan.

The overall CMP process will usually be repeated every five years.

**Thank you for your interest in the Upper Thames catchment.**

**Note: This is not a legally or scientifically binding document. It is written for both wide public appreciation and information**

**PLEASE LET US KNOW YOUR VIEWS AND YOUR ACTIVITIES BY CONTACTING MR J.A. HAMID AT OUR WEST AREA OFFICE AT ISIS HOUSE, HOWBERY PARK, WALLINGFORD, OXON. OX10 8BD  
Tel. 01734 533304**

## APPENDIX I

### 1.0 WATER QUALITY OBJECTIVES

- 1.1 One of the main aims of the NRA is to maintain or improve the quality of rivers by controlling water pollution. The Water Resources Act (1991) allows the Government to set Statutory Water Quality Objectives (SWQOs). The objectives set will be related to the use of the water. Five such uses have been proposed. Detailed regulations have been published for one, the "River Ecosystem", different classes of which can be summarised as follows:

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 likely to limit coarse fish populations.

The timetable for the setting of SWQOs is largely in the hands of the government. In readiness, the NRA has derived non-statutory River Quality Objectives (RQOs) expressed as RE classes for the rivers within the region.

The table below shows the proposed non-statutory River Quality Objectives (RQOs) for all the watercourses in the Upper Thames Catchment together with their target dates for achievement.

WATERCOURSE	REACH	LENGTH	RQO
		km	RE
AMPNEY BROOK	Source - Poulton Stream	9.3	RE1 (1994)
AMPNEY BROOK	Poulton Stream - Thames	3.3	RE1 (1994)
BLUNSDON BROOK	Broad Blunsdon - Thames	5.1	RE4 (1994)
BYDEMILL BROOK	Source - Thames	10.5	RE4 (1994)
CERNEY WICK BROOK	South Cerney - Thames	5.5	RE4 (1994)
CHURN	Seven Springs - Siddington Mill	25.1	RE1 (1994)
CHURN	Siddington Mill - Thames	12.2	RE1 (1994)
COLE	Walcot - Tuckmill Brook	13.1	RE3 (1994)
COLE	Tuckmill Brook - Thames	14.5	RE3 (1994)
COLN	Bibury Fish Farm - Bibury STW	1.3	RE2 (1994)
COLN	Bibury STW - Fairford Mill	9.2	RE2 (1994)
COLN	Fairford Mill - Dudgrove Stream	7.8	RE1 (1994)
COLN	Dudgrove Stream - Thames	1.0	RE2 (1994)
COLN	Source - Compton Abdale Stream	16.8	RE2 (1994)
COLN	Compton Abdale Stream - Bibury Fish Farm	15.6	RE2 (1994)
DERRY BROOK	Source - Swill Brook	6.7	RE5 (1994)
DUDGROVE STREAM	Source - Coln	7.2	RE2 (1994)
HAYDON WICK BROOK	Haydon Wick - Ray	2.8	RE3 (1994)
KEY	Source - Thames	10.7	RE4 (1994)
LEACH	Little Faringdon FFM - Thames	3.4	RE1 (2006)
LEACH	North Leach - Little Faringdon FFM	27.1	RE1 (1994)
LENTA BROOK	Bishopstone - Cole	6.5	RE2 (1994)
LENTA BROOK EAST	Lenta Brook - Cole (E)	2.5	RE5 (1994)
LERTWELL BROOK	Ashbury - Tuckmill Brook	2.1	RE5 (1994)

## APPENDIX I (contd)

LIDEN BROOK	Liddington - Cole	8.2	RE3 (1994)
LYDIARD BROOK	Source - Rodbourne Tip	3.7	RE3 (1994)
LYDIARD BROOK	Rodbourne Tip - Ray	0.7	RE4 (1994)
MARSTON MEYSEY BROOK	Source - Thames	7.3	RE2 (1994)
RAY	Swindon STW - Haydon Wick Brook	4.2	RE4 (1994)
RAY	Haydon Wick Brook - Thames	7.8	RE4 (1994)
RAY	Wroughton Ditch - Swindon STW	4.5	RE4 (1994)
RAY	Source - Wroughton Ditch	4.5	RE2 (1994)
SHARE DITCH	Source - Thames	6.1	RE4 (1994)
SOUTH MARSTON BROOK	Source - Cole	5.2	RE2 (1994)
SWILL BROOK	Flagham Brook - Thames	3.6	RE2 (1994)
SWILL BROOK	West Crudwell - Flagham Brook	10.0	RE3 (1994)
THAMES	Bydemill Brook - Coln	2.9	RE3 (1994)
THAMES	Swill Brook - Cerney Wick Brook	3.5	RE2 (1994)
THAMES	Cerney Wick Brook - Key	4.0	RE2 (1994)
THAMES	Ray - Share Ditch	7.3	RE3 (1994)
THAMES	Share Ditch - Bydemill Brook	3.8	RE3 (1994)
THAMES	Source - Swill Brook	11.2	RE3 (1994)
THAMES	Key - Ray	1.4	RE2 (1994)
TUCKMILL BROOK	Shrivenham STW - Cole	2.6	RE4 (1994)
TUCKMILL BROOK	Idstone - Shrivenham STW	7.1	RE3 (1994)
VENEYMORE DITCH	Leach - Leach	2.7	RE2 (1994)
WATERLOO DITCH	Source - Cole	4.2	RE2 (1994)
WESTROP BROOK	Source - Bydemill Brook	3.2	RE5 (1994)
WROUGHTON DITCH	Wroughton STW - Ray	0.9	RE5 (1994)

### 2.0 GENERAL QUALITY ASSESSMENT

2.1 As well as taking decisions on measures to maintain or improve river quality, the NRA also publishes the results from regular surveys of the quality of rivers and canals in England and Wales. The NRA believes that it is important to know whether quality is getting better or worse.

2.2 In order to provide a comprehensive picture of the quality of our rivers, different aspects of the water environment will be looked at. The NRA refers to these different aspects as 'windows' because each offers a different perspective on the overall health of the river. A General Quality Assessment scheme comprising four windows is being developed: a **Chemistry Window**, a **Biology Window**, a **Nutrient Window** and an **Aesthetics Window**.

- The **Chemistry GQA Window** has already been produced. It comprises six water quality grades reflecting differing degrees of pollution. These grades are a sub-set of the standards in the River Ecosystem scheme. The Chemistry GQA Grades can be summarised as follows:

A } Good	C } Fair	E } Poor
B } Good	D } Fair	F } Bad

Chemistry data collected for 1990-1992 has been reported using the GQA scheme, and is documented in *The Quality of Rivers and Canals in England and Wales (1990 to 1992)*, Water Quality Series Report No.19, which can be obtained from Her Majesty's Stationery Office (HMSO).

- **Biology GQA Window** is close to completion. It will assess the health of river stretches based upon the diversity of tiny animals living on or in the river bed.
- **The Nutrient GQA Window** is under development. This will take account of the concentration of certain nutrients in rivers, eg nitrogen and phosphorus. Nutrients are simple chemical substances used by plant life. High concentrations may cause excessive plant growth, such as algal blooms.
- **The Aesthetics GQA Window** is under development. This is being developed to address the issue of public perception of water quality, which is influenced largely by its visual appearance and odour. Sometimes the appearance of the water may indicate pollution, such as the presence of litter (eg. sewage-derived). In other cases visually unpleasant sights such as foaming or scums may result from natural causes.

## APPENDIX 2

### 1.0 COTSWOLD WATER PARK

- 1.1 The Cotswold Water Park (CWP) was identified as a pressure point in "Thames 21" (see Section 4 Land use and the Water Environment) because of the variety of developments which focused on this environmentally sensitive area. Minerals extraction in particular is focused on the CWP. However, it must be realised that the Park would not exist without its history of mineral workings. In addition the Park has great potential for recreation and tourism development including significant built development such as holiday village complexes. The Park area also supports a wide diversity of wildlife and habitat features of acknowledged national and international importance. Water areas are ecologically important for wildfowl and a number of wet meadows have been designated as SSSIs.
- 1.2 The main concern of the NRA is to balance the demand for further development with the protection of the water environment. Additional mineral extraction for example could make a significant impact on the landscape of the river corridor unless guidelines are followed and suitable after uses agreed before extraction takes place. Further recreation and tourism development is also likely to impact on the water environment including surface water run-off from built development and disturbance to wildlife by noisy sports. The NRA must therefore work closely with local authorities to ensure that the correct balance is struck which will minimise the impact on the water environment within the catchment.
- 1.3 Many of the responses to the NRA's Upper Thames Consultation Report of January 1995 raised concerns relating to the Cotswold Water Park, particularly the land use strategy known as the Upper Thames Land Use Initiative. The intention of this strategy was that it should be a vision for the Cotswold Water Park which would ensure that any future development would be environmentally sustainable and take account of the sensitivity of the area. It was based on a site by site analysis of the areas of search for minerals.
- 1.4 It was recognised in the Consultation Report that the document was an overview only and as such could not be recognised as a practical planning tool. It was therefore suggested that the existing strategy should be refined and made more specific to water environment issues. It is likely that the refined strategy will not necessarily follow a zoning map as before but will be based on specific policies which fall directly within the NRA's remit. To refine and build upon the findings of the original report two further investigations have been initiated, a landscape assessment which is discussed in Appendix 3 and a hydrological study.
- 1.5 **Hydrological Study:** A detailed hydrological study has been initiated by the NRA. The first priority for the study is the Latton, Down Ampney, Marston Meysey area where there is little information on groundwater and the interest in mineral extraction is high. When sites of existing groundwater monitoring have been plotted, further new sites will be identified and options for providing them



*Windsurfing  
at Cotswold  
Water Park*

determined. The movement of groundwater in the western part of the Cotswold Water Park is likely to be complex. Consequently those parts east of the A419 are initially being targeted as areas of highest priority for the study. It is envisaged that future mineral operators will get better guidance using this information and will carry out monitoring themselves as part of a co-ordinated scheme.

- 1.6 In addition the NRA TR is undertaking an investigation with English Nature in relation to water meadow SSSIs in the Cotswold Water Park. This may lead to identification of further monitoring requirements in the western part of the Park if any adverse trends are detected. The study at present involves an initial analysis of borehole data, supplied by English Nature, from a number of the SSSI's in the area.
- 1.7 English Nature have also provided Site Management Guidelines for the lakes in the Cotswold Water Park which will be taken account of in any future studies or investigations.

## APPENDIX 3

### 1.0 LANDSCAPE ASSESSMENT OF THE UPPER THAMES CATCHMENT

1.1 Landscape consultants were commissioned by the NRA in March 1995 to carry out a strategic landscape assessment of the Upper Thames Catchment Area which has been completed recently. The principal purpose of the study was to report on the broad landscape assessment of the river corridors; and appraise the principal landscape issues affecting the catchment. Full details of the assessment study are now available for view at the NRA Thames Region's West Area Office while the main findings of the study are summarised below.

1.2 The strategic assessment was based on the NRA's publication "River Landscape Assessment - Methods and Procedures", Conservation Technical Handbook No. 2, April 1993. The publication describes a systematic approach for the assessment of river landscapes at both catchment level and individual river corridor scale.

1.3 The landscape characteristics of an area results from the interaction of physical influences, in particular the topographic structure arising from the underlying geology, and the overlay of human influences which affect land cover elements and land use.

1.4 The Upper Thames has a strong physical structure within which a number of distinct Regional Character Areas may be identified. The divisions have principally been established in response to topography and the underlying geology. There are, however, variations in the pattern of land use and land cover between areas, in response to differing physical characteristics. This further emphasises the identity of each Character Area.

1.5 The Regional Character Areas are summarised on the landscape map at Fig.2. Within certain Character Areas, land form variations have created a second tier of classification into Sub-regional Character Areas as set out below.

Regional Character Area	Sub-regional Character Area
Cotswold High Wold	High wold plateau
	High wold valley
Cotswold Dip Slope	Dip slope plateau
	Dip slope valley
Cotswold Dip Slope Lowland	
Upper Thames Basin	Thames Basin floodplain/wetland
	Thames Basin clay lowland
Corallian Limestone Ridge	Corallian hills
	Corallian undulating lowland
Vale of White Horse Lowland	
North Wessex Downs Escarpment	

1.6 From the Strategic Landscape Assessment a number of key landscape issues have been identified which have been set out in the main report. Many of these are "catchment scale" and therefore relevant to any or all of the river corridors. Others, however, are site or regionally specific issues and arise from a particular set of landscape problems or opportunities. From these identified issues recommended actions have been suggested as follows:

#### CATCHMENT SCALE AREAS FOR ACTION

- a) *Encourage reversion of areas of arable land back to permanent pasture and meadows, particularly within:*
  - i) *The High Wold valleys where intensive arable production is encroaching onto the valley heads,*
  - ii) *The Thames floodplain where areas of intensive arable production are inconsistent with the pastoral character of the area.*
- b) *Encourage establishment of continuous or intermittent belts of planting to consolidate "green" wildlife corridors and buffer zones within river valleys.*
- c) *Encourage restoration of improved or straightened sections of rivers, particularly within rural areas, in conjunction with hydrological and habitat assessment and management to reinstate earlier natural river alignment and diverse bank-side vegetation, wetland and wildlife habitats. This is exemplified by pioneer "demonstration" project of River Restoration Project at Colesbill.*
- d) *Encourage limited but sensitively designed facilities for tourists at key locations only within river valleys, to ensure majority of river corridor sections remain unaffected by tourism and public facilities and landscape character is not adversely affected. Avoid encroachment of facilities onto vulnerable river margins.*
- e) *Encourage management of existing and establishment of new planting (where appropriate) to river edges and within valley systems generally, where appropriate to the landscape character to consolidate existing structure.*
- f) *Encourage establishment of a comprehensive riverside footpath network throughout the catchment consolidating the existing gaps within the river edge path network.*

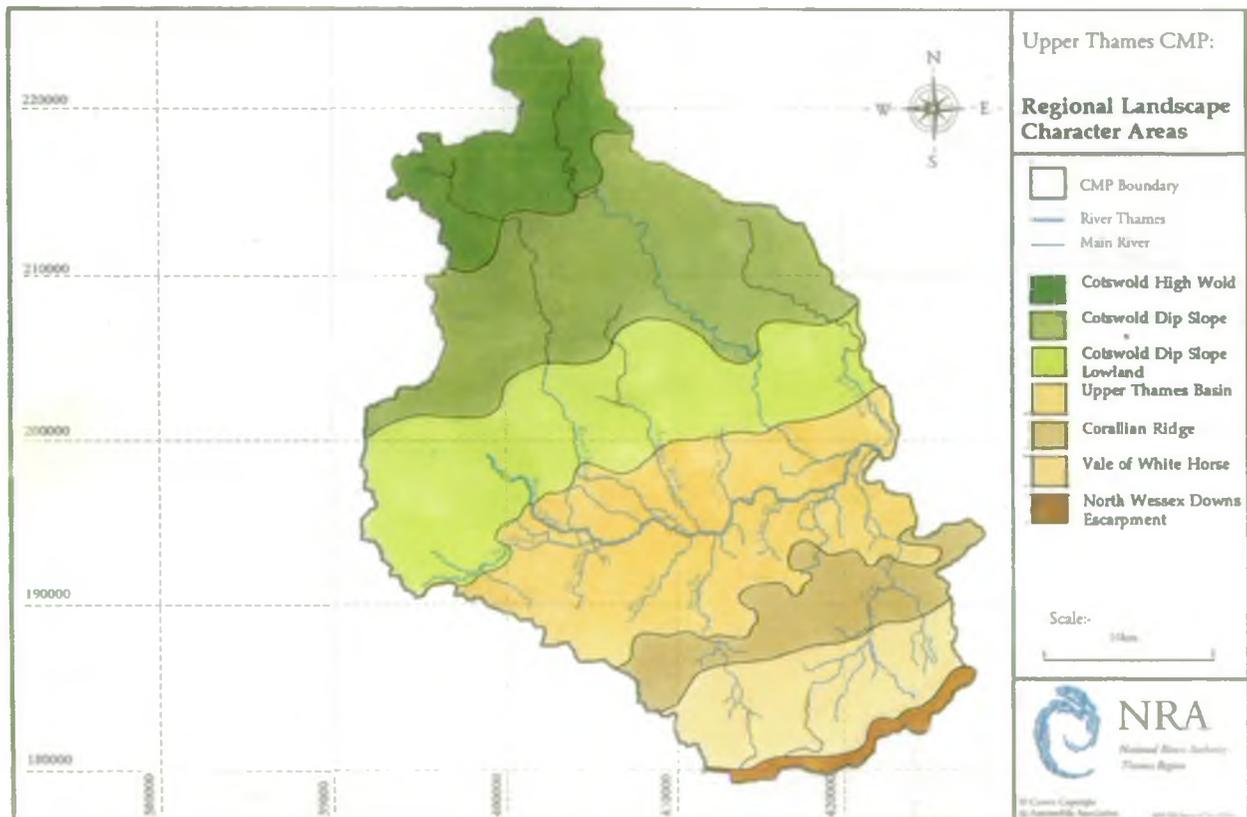
#### SITE OR REGIONALLY SPECIFIC AREAS FOR ACTION

- a) *The NRA should undertake a detailed landscape assessment of the Cotswold Water Park area, including those areas where there are economic reserves with potential for future gravel extraction. The strategic landscape assessment would enable the capacity and vulnerability of the landscape to further change to be determined.*
- b) *Advantage should be taken of the initiatives and framework for landscape restoration and enhancement presented by the Great Western Community Forest Project as there will be opportunities within the river corridor*

## APPENDIX 3 (contd)

- sections of the Project Area to implement planting and management schemes.
- c) Encouragement should be given to restore or enhance degraded sections of the Rivers Ray and Cole where these extend into Swindon.
- d) Further mismanagement and "over cultivation" of private land extending down to river edges within the Cotswolds villages should be discouraged.

- 1.7 Of particular significance is the recommended action for a further detailed landscape assessment of the Cotswold Water Park area, including those areas where there are existing economic reserves with potential for future gravel extraction. This study is being carried out over summer/autumn 1995. Many of the other suggested actions have already been addressed in the activity plans. The remainder will be investigated to see if they can be dealt with under the NRA's remit or whether they could be more appropriately dealt with by other organisations.



## CONSERVATION AND OPPORTUNITIES FOR ENHANCEMENT

1.1 The Upper Thames CMP area comprises a considerable variety of river types, with the northern (Cotswold) tributaries generally of a higher biological diversity, partly due to the limestone influence, than the southern tributaries, which are heavily influenced by their flashy clay catchments but also having generally suffered more from land drainage schemes involving heavy engineering of river channels (such as the River Ray and River Cole). All rivers and flood plain habitats have suffered varying degrees of habitat degradation and, as in the rest of lowland Britain, a significant percentage of the wetland resource has been lost.

1.2 The CMP area contains 26 SSSIs, including North Meadow National Nature Reserve which is of international significance for its herb-rich flora, and contains by far the greatest concentration of Snakes Head Fritillaries in the country, and Cotswold Water Park SSSI, a series of ten lakes within the Water park noted for their marl plant communities and associated invertebrates. There are numerous other sites of regional or local conservation importance within the CMP area.

1.3 English Nature (EN) has recently embarked on an initiative to guide its statutory conservation role, whereby it has identified and delineated a series of 'Natural Areas' throughout the Country. These are essentially distinct landscape types which have characteristic habitats, species and natural features and primarily determined by physical/geological features and modified by past and present land-use patterns. Parts of four of them fall within the CMP area:- The Greater Cotswolds, Oxford Clay Vales, Oxford Heights and Wessex Downs. EN has also identified Prime Biodiversity Areas within Natural Areas, these being discrete areas which contain a significant variety and/or concentration of sites and/or species of ecological value. Two fall within the CMP area. Braydon Forest and the Cotswold Water Park, and the NRA has a significant role to play, particularly in the case of the latter, to ensure that this ecological resource is conserved and enhanced.

1.4 A number of basic environmental objectives, consistent with the NRA's statutory conservation responsibilities, must underpin its approach to the ecological aspects of the water environment. These are:

- i) safeguard existing habitats and landscapes of high value, enhance degraded habitats and landscapes and seek to increase the resource of wetland habitats and species;
- ii) promote the conservation of all native aquatic life and associated non-aquatic organisms in riparian habitats, protect the integrity and achieve a favourable conservation status of all habitats of conservation value.

1.5 There are a multitude of ways in which these objectives can be met, including:

- i) by ensuring that all operational activities are screened carefully for their environmental impact and that for example river maintenance activities follow good practice guidelines to protect ecological resources;
- ii) by ensuring that our regulatory activities deliver protection for all habitats and species;
- iii) by providing strong advice to local authorities through the planning process designed to ensure that development does not compromise the need to sustain and improve the ecological resource, both on a site by site and a wider policy basis;
- iv) by working in collaboration with other statutory and non-statutory organisations, landowners and farmers to develop policies, progress initiatives and identify opportunities which will conserve and enhance biodiversity within the CMP area.

1.6 A number of general and more specific issues are identified in the accompanying Activity Plans, and some of the more significant are briefly outlined below:

- i) As a means of identifying, conserving and enhancing the ecological resource, within the CMP Area, the NRA needs to work with other conservation bodies to identify key habitats and species related to the water environment in order to promote actions designed to achieve target levels of distribution and abundance. For many species and habitats this will not be a simple process, and the NRA needs to feed into existing county biodiversity initiatives currently in progress;
- ii) The NRA's programme of habitat enhancement work is driven largely by opportunity; an analysis of existing river corridor survey, landscape assessment and fisheries surveys, and other available sources and direction coming from the Biodiversity Challenge initiatives, will better serve to identify priority areas for enhancement, where habitats are most degraded and/or where the diversity of habitats and species are greatest and where enhancements are therefore most likely to have significant benefits;
- iii) The Upper Thames Otter Habitat Project fieldwork has been completed but there are a considerable number of informally agreed habitat enhancements which the NRA now intends to carry out in co-operation with the relevant landowners. These enhancements are designed to provide refuge sites for otters in addition to those already identified by the Otter Project Officer, often where there is little cover at present, in order to maximise the chances of successful natural recolonisation by this species. At the moment there is known to be some otter activity in the CMP area and the intention is to see the status of the species consolidated in the Upper Thames in the next decade. Monitoring of its recolonisation is vital;

iv) The water vole population has declined throughout much of Britain now, and the NRA conservation section is co-funding a collaborative study with Oxford University's Wildlife Conservation Research Unit ("WildCRU") in order to investigate its ecological relationships with mink, an alien species deemed to be a significant predator of the voles, and to look at the water voles' general habitat requirements. This long-term study includes a variety of other investigative studies and should produce, among other things, advice on habitat management and restoration for water voles and identification of remaining strongholds;

v) The collaborative project with Oxford University's WildCRU (see above) also aims to carry out some fish tissue analysis from selected areas of the Upper Thames, including sites within the CMP area. This should inform the NRA on levels of certain toxic pollutants (organochlorines, PCBs, heavy metals) within the catchment and should serve to help assessment of any potential threats to, eg. recolonisation by otters as well as other piscivorous predators and aquatic mammals in the catchment;

vi) The native crayfish is still present in parts of the CMP area. Like the otter, it is listed as a species in need of protection under the EC Habitats Directive and protected under schedule 5 of the Wildlife and Countryside Act 1981. It is imperative that its status and distribution within the Upper Thames is ascertained and measures taken to ensure its conservation and range expansion, including ensuring a policy of no-go areas for crayfish farms to minimise the threat of further losses from crayfish plague;

vii) The Cotswold Water Park is a significant ecological resource in its own right, containing nationally significant wintering populations of seven bird species and breeding population of one bird species. English Nature has recently produced site management guidelines to protect 60 of the most important lakes and it is imperative that the NRA's regulatory and operational activities are in sympathy with these guidelines;

viii) The NRA is currently embarking on an analysis of borehole data provided by English Nature with reference to a number of important meadow SSSIs within the Upper Thames in the area of the Cotswold Water Park. This should determine any adverse conditions and the need for any additional monitoring sites. Monitoring data for the area of search for mineral extraction within the wider Cotswold Water Park is needed to inform on the hydrological / ecological implications of extraction. At the same time, mineral extraction east of the A419 provides exciting opportunities for wetland mosaics resulting from carefully designed restoration schemes and the NRA has a vital role to play in balancing the protection of the existing resource and the restoration of rare habitats and associated biotic diversity;

ix) The Great Western Community Forest provides significant opportunities for habitat restoration on the Rivers Ray and Cole and associated flood plains. These is a major challenge here for the NRA in looking at its river maintenance regimes and development control functions in relation to, eg the restoration of alluvial forest in the Ray catchment, and in responding to less intensive land-use;

x) The River Restoration Project on the River Cole at Coleshill provides an excellent opportunity to demonstrate river habitat restoration techniques and the NRA, in conjunction with the RRP, National Trust, English Nature and other bodies, has a significant role to play in ensuring its success;

xi) A total of nine Water Level Management Plans are to be produced for the Upper Thames CMP area in the next three years, all for water-dependent SSSIs. Eight of them only require interim plans by March 1996 but North Meadow NNR requires a full Management Plan. These need to be agreed by NRA, English Nature, relevant landowners and other interested parties and should serve to protect and if possible enhance the ecological integrity of the site while serving to balance these needs with those of agriculture and flood defence. The WLMP should address, where relevant, operation of control structures, trends in groundwater levels and effects of abstractions and discharges, routine river maintenance operations, and any other activities which impinge on the water environment of the site in question.

1.7 The delivery of the NRA's statutory conservation duties includes a considerable amount of action and liaison both internally, within the NRA, and externally with outside bodies and individuals. The challenge is to ensure that there is no net loss of the ecological resource within the water environment, and instead an improvement in the diversity and distribution of wetland habitats and species.

### ENVIRONMENTAL OBJECTIVES

The following environmental objectives were identified in the Consultation Report. These are proposed objectives for the NRA and others to follow as they continue their work. Although they are in sympathy with published NRA aims and strategies, these objectives are not statements of NRA "policies". It is envisaged that the actions set out in the activity plans will go some way to meeting these objectives.

#### Nature Conservation and Landscape

To protect and conserve highly valued river landscapes and habitats and enhance degraded river landscapes and habitats.

To safeguard and enhance the special ecological interest for which sites have been designated (eg. SSSI).

To promote the conservation of all aquatic life and associated non-aquatic organisms in the river corridor, and to protect the integrity of all habitats of nature conservation value. To carry out channel and riparian enhancement schemes on currently degraded rivers and river corridors.

#### Fisheries

To establish diverse and sustainable fish populations within the catchment. To identify and address physical, chemical and biological factors preventing the achievement of the above. With the co-operation of riparian owners and angling interests, increase the recruitment of both brown trout and coarse fish, by the physical manipulation of the habitat.

#### Heritage

To safeguard the special archaeological and heritage interest for which sites have been designated (eg. conservation areas).

To conserve areas of archaeological and heritage value.

#### Amenity and Recreation

To protect and promote all appropriate water-related recreational uses, including the provision of sufficient access as required for recreational purposes. To ensure that the above is balanced and safeguards the riverine environment, nature conservation and landscape value of the Upper Thames.

#### Navigation

To maintain or improve water resources and physical characteristics in the catchment to sustain the Thames navigation.

#### Water Abstraction

To manage water resources to achieve the right balance between the needs of the environment and those of the abstractors. To ensure that licence holders understand and comply with the terms and conditions of the licences. To ensure that abstraction does not cause any deterioration of water quality or have an adverse impact on aquatic or other water-dependent habitats.

#### Water Quality

To improve and enhance water quality and maintain river quality objectives, including the investigation of raising water quality objectives wherever possible.

To control the discharge of effluent to the water environment in such a way that water quality objectives are achieved, and that nature conservation, fisheries interests and other uses are not compromised.

#### Rural Land Use

To influence and control future rural development in order to protect the water environment and seek enhancement through countryside initiatives. Realise opportunities for environmentally sensitive agricultural practices in terms of pollution prevention measures, ESA and NVZ. To de-intensify land use along river corridors and establish buffer zones, and optimize the use of 'set-aside'.

#### Urban Land Use

To influence and control future built development in such a way that the environmental values of the river corridor are maintained and enhanced, and to protect the integrity of the river corridor through urban areas.

To ensure the provision of infrastructure required to protect and enhance the water environment.

To influence and control infrastructure provision in such a way that other uses are not compromised.

Work with the Local Authorities to introduce best practice in surface water source control for some of the new development areas at Swindon.

#### Mineral Extraction and Solid Waste Disposal

To ensure the sustainable use of resources whilst protecting the existing nature conservation value of the Cotswold Water Park, (especially its nationally important bird populations), maintaining the landscape quality along the Thames and maximise the potential for enhancing the conservation value of the area by influencing restoration of future working, where appropriate, to provide wetland and open water habitat mosaics.

To control and influence mineral extraction, restoration and after-use and solid waste disposal in other areas of the catchment in such a way that other uses or resources are not compromised.

#### Flood Defence

To seek a reduction in the localised flood risk at Somerford Keynes and South Cerney and investigate the role of the Cotswold Water Park (gravel extraction) in flooding/ flood alleviation and storage.

To continue weed cutting and other minor channel works as necessary to minimise flood risk and to ensure that conservation guidelines are adhered to for good working practice for environmental sensitivity during river management operations.

To implement the Flood Defence Management Manual and the associated SoS in the Upper Thames catchment satisfactorily.

To implement the Thames Non-Tidal Floodplain Policy.

To improve, as appropriate, arrangements for flood forecasting and warning. To continue to disseminate information on flooding and flood protection measures to local authorities who have permissive powers with respect to flood defence on "non-main" rivers.

To improve availability of monitoring information for operational response to flooding and flood warning.

## APPENDIX 6

### GLOSSARY

#### KEY TO ACTION PLAN PARTICIPANTS

BBONT	Berkshire, Buckinghamshire and Oxfordshire Naturalist Trust
BCU	British Canoe Union
CCT	Cotswold Canal Trust
CDC	Cotswold District Council
CIRIA	Construction Industry Research and Information Association
CoCo	Countryside Commission
EN	English Nature
GCC	Gloucestershire County Council
GWT	Gloucestershire Wildlife Trust
GWCF	Great Western Community Forest
HMIP	Her Majesty's Inspectorate of Pollution
LA	Local Authority
LPA	Local Planning Authority
MAFF	Ministry of Agriculture, Fisheries and Food
NRA	National Rivers Authority
NRA TR	National Rivers Authority - Thames Region
NRA SW	National Rivers Authority - South West Region
NT	National Trust
NWDC	North Wiltshire District Council
OCC	Oxfordshire County Council
OFWAT	Office of Water Services
RSPB	Royal Society for the Protection of Birds
TBC	Thamesdown Borough Council
TECT	The Ernest Cook Trust
TKC	Tewkesbury Borough Council
TWUL	Thames Water Utilities Limited
UTFC	Upper Thames Fisheries Consultative
WBCT	Wilts and Berks Canal Trust
WCC	Wiltshire County Council
WildCRU	Wildlife and Conservation Unit (Oxford University)
WODC	West Oxfordshire District Council

## APPENDIX 6 (contd)

### GENERAL GLOSSARY

AOD	Above Ordnance Datum.
AONB	Area of Outstanding Natural Beauty as designated by the Countryside Commission.
Abstraction	Removal of water from surface or groundwater, usually by pumping.
Abstraction Licence	Licence issued by the NRA under Section 38 of the Water Resources Act 1991 to permit water to be abstracted. The maximum abstraction rates are specified in the licence.
Aquifer	A layer of underground porous rock which contains water and allows water to flow through it.
Base flow	That part of the flow in a watercourse made up of groundwater and discharges. It sustains the watercourse in dry weather.
Biochemical Oxygen Demand (BOD)	A measure of the amount of oxygen consumed in water, usually as a result of organic pollution, under specific conditions relating to natural biochemical breakdown.
Biodiversity	A mixture of habitats and species which increase the ecological value of a site.
CMP	Catchment Management Plan - integrated plan for the catchment which covers all functions of the NRA. These provide the strategy by which the catchment will be managed.
CWP	Cotswold Water Park.
Catchment	Area from which river systems, lakes and reservoirs collect water.
Confluence	The point at which two rivers meet.
Consent	The statutory document issued by NRA under schedule 10 of the Water Resources Act 1991 to indicate any limits and conditions on the discharge of an effluent to a controlled water.
County Structure Plans	Statutory document produced by County Councils outlining their strategy for development over a 10-15 year timescale.
Cross Functional Plans	NRA produced plans which set out planned actions for the coming year based on the functional elements of CMPs. The available resources for the year in question and the relative priorities of the actions are both taken into account.
Cyprinid	Coarse fish of the carp family, ie roach, dace, bream.
DoE	Department of the Environment.
Dangerous Substances	Substances defined by the European Commission as in need of special control because of their toxicity, bioaccumulation or persistence. The substances are classified as List I or List II according to the Dangerous Substances Directive.
Dissolved Oxygen	The amount of oxygen dissolved in water. Oxygen is vital for life so this measurement is an important, but highly variable, indicator of the "health" of the water. It is used to classify waters.
District Local Plan	Statutory document produced by District or Borough Councils to implement the development strategy set out in County Structure Plans. Specific land use allocations are identified.
Directive	A type of legislation issued by the European Community which is binding on the member states.
EA	Environmental Assessment.
EC	European Commission (European Union, EU).
ESA	Environmentally Sensitive Area.
Eutrophic/Eutrophication	The enrichment of water by nutrients, especially compounds of nitrogen and/or phosphorus, causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and the quality of the water concerned.
FDMM	Flood Defence Management Manual.
FDMS	Flood Defence Monitoring System.
Floodplain	This includes all land (and washlands) adjacent to a watercourse over which water flows or would flow but for flood defences in times of flood.
GIS	Geographical Information System.
GQA	General Quality Assessment.
Groundwater	Underground water contained in the pores and fissures of aquifers (water-bearing strata)
ha	hectare = 10,000 square metres.
IBU	Internal Business Unit (of the NRA).
IPC	Integrated Pollution Control.
Invertebrate Fauna	Animals which lack a vertebral column - used for biological classification. Especially macroinvertebrates (animals of sufficient size to be retained in a net with a specified mesh size).
Local Agenda 21	Local Agenda 21 is an initiative arising from the Rio Earth Summit (1992) for implementing sustainable development at a local level by local authorities.

## APPENDIX 6 (contd)

LA	Local Authority.
LPA	Local Planning Authority.
Landfill	Site used for waste disposal into/onto land.
MAFF	Ministry of Agriculture, Fisheries and Food.
MoD	Ministry of Defence.
Macrophytes	Vascular aquatic plants visible to the naked eye.
Main River	Some watercourses are designated as "Main River" - this status must first be approved by MAFF. The NRA has the power to carry out works to improve drainage or protect land and property against flooding on such rivers.
N/A	Not available.
NNR	National Nature Reserve.
NRA TR	National Rivers Authority - Thames Region.
NVZ	Nitrate Vulnerable Zone.
p a	Per annum.
PCBs	Polychlorinated biphenyls.
Percolation	The descent of water through soil pores and rock crevices.
Potable Water	Water suitable for human consumption.
Prescribed Flow (Flow Constraint)	A river flow incorporated as a condition in an abstraction licence, such that abstraction must cease or be reduced appropriately once the flow falls below this value.
RQO	River Quality Objective.
RRP	River Restoration Project Ltd.
Riparian Owner	A person/organisation with property rights on a river bank.
River Corridor	Of particular importance for conservation, such a corridor is a continuous area of land which has visual, physical or ecological links to a watercourse and is dependent on the quality or level of water within the channel.
River Quality Objective (RQO)	The water quality that a river should achieve in order to be suitable for agreed uses.
SoS	The NRA TR Standards of Service (Flood Defence) were developed for use with maintenance works as well as flood alleviation through capital schemes. These SoS differ marginally from the "Indicative Standards of Protection" used by MAFF to guide the prioritisation of capital schemes before they are subject to economic appraisal.
SPA	Special Protection Area (in terms of bird life).
STW	Sewage Treatment Works.
SWQO	Statutory Water Quality Objectives set by the Secretary of State, in relation to controlled waters
Section 105 Surveys	These are surveys and studies being carried out by the NRA under the Water Resources Act 1991 in connection with DoE circular 30/92 and the Memorandum of Understanding with local planning authorities. The aim is to provide a better understanding of the flooding mechanism, risk and extent of flood plain. The Upper Thames is the pilot area in the NRA Thames Region's West Area for the programme of studies over the 5 year period 1995-1999
Septic Tank	A small tank receiving and treating sewage by bacteria.
Set-aside	Temporary withdrawal of agricultural land from agricultural production.
Silage	A winter feed for cattle. Silage is produced in the summer by bacterial action on freshly cut grass.
Site of Special Scientific Interest (SSSI)	A site that is given a statutory designation by English Nature to protect it because of its important conservation value.
Slurry	Animal waste in liquid form.
Source Control	A collective term to describe the management of run-off at or near the point of impact of rainfall and before it reaches the traditional piped drainage and sewer systems of urban areas.
Spring	Natural emergence of groundwater at the surface.
Sustainable	Capable of being maintained at a steady state without exhausting natural resources or causing ecological damage.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Topography	Physical features of a geographical area.
TWUL	Thames Water Utilities.
UWWTD	Urban Waste Water Treatment Directive
WLMP	Water Level Management Plan.
WRA	Waste Regulation Authority.
Watercourse	A stream, river, canal or the channel, bed or route along which they flow.

**HEAD OFFICE**

Rivers House  
Waterside Drive  
Aztec West  
Almondsbury  
Bristol  
BS12 4UD  
Tel: 01454 624 400  
Fax: 01454 624 409

**LONDON OFFICE**

Eastbury House  
30-34 Albert Embankment  
London SE1 7TL  
Tel: 0171 820 0101  
Fax: 0171 820 1603

**ANGLIAN**

Kingfisher House  
Goldhay Way  
Orton Goldhay  
Peterborough PE2 5ZR  
Tel: 01733 371 811  
Fax: 01733 231 840

**NORTHUMBRIA & YORKSHIRE**

Rivers House  
21 Park Square South  
Leeds LS1 2QG  
Tel: 0113 244 0191  
Fax: 0113 246 1889

**NORTH WEST**

Richard Fairclough House  
Knutsford Road  
Warrington WA4 1HG  
Tel: 01925 653 999  
Fax: 01925 415 961

**SEVERN TRENT**

Sapphire East  
550 Streetsbrook Road  
Solihull B91 1QT  
Tel: 0121 711 2324  
Fax: 0121 711 5824

**SOUTHERN**

Guildborne House  
Chatsworth Road  
Worthing  
West Sussex BN11 1LD  
Tel: 01903 820 692  
Fax: 01903 821 832

**SOUTH WESTERN**

Manley House  
Kestrel Way  
Exeter EX2 7LQ  
Tel: 01392 444 000  
Fax: 01392 444 238

**THAMES**

Kings Meadow House  
Kings Meadow Road  
Reading RG1 8DQ  
Tel: 01734 535 000  
Fax: 01734 500 388

**WELSH**

Rivers House/Plas-yr-Afon -  
St Mellons Business Park  
St Mellons  
Cardiff CF3 0LT  
Tel: 01222 770 088  
Fax: 01222 798 555



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The NRA is committed to the principles of stewardship and sustainability. In addition to pursuing its statutory responsibilities as Guardians of the Water Environment, the NRA will aim to establish and demonstrate wise environmental practice throughout all its functions.

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