National Rivers Authority
Thames Region
Western Area

RIVER THAMES (BENSON TO HURLEY) PANG AND WYE

Catchment Review

Document for Internal Circulation Only

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DECEMBER 1994

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1 INTRODUCTION

1.1 The National Rivers Authority (NRA) was established by the 1989 Water Act. The NRA has defined its role in the following "mission statement":

"We will protect and improve the water environment by the effective management of water resources and by substantial reductions in pollution. We will aim to provide effective defence for people and property against flooding from rivers and the sea. In discharging our duties, we will operate openly and balance the interests of all who benefit from and use rivers, groundwaters, estuaries and coastal waters."

1.2 In order to effectively manage the water environment and sustain it for the future, the NRA has adopted the principle of Catchment Management Planning. This entails the preparation of Catchment Management Plans (CMP) for each natural river catchment within England and Wales. Through data evaluation, issues analysis, external liaison and consultation, the CMP provides a vehicle to focus attention on the water environment. The process involves all interested parties, in planning for the future well-being of the catchment and establishes an integrated plan of action for managing the catchment over a period of five years, after which it is reviewed.

1.3 However, as a precursor to the commissioning of the Catchment Management Plans, brief and succinct catchment reviews are being drafted, which:

a) provide a concise summary of the current status of the water environment;

b) make full use of the knowledge of internal staff and their assessments of the value of the catchment to people and wildlife;

c) provide a focus for integrating on-going NRA functional activities;

d) promote, region-wide awareness of issues and opportunities and priorities for action;

e) facilitate the prioritisation and production of Catchment Management Plans.

1.4 The following review will provide a summary of catchment statistics, issues and current and future proposed NRA activity, in order to achieve a broad awareness of potential opportunities and constraints. The document will also form the basis of the full Catchment Management Plan, which will provide the focus for those concerned with the future well-being of the water environment of the area.

2 THE CURRENT STATUS OF THE WATER ENVIRONMENT

Overview

2.1 The catchment review study area covers the Pang catchment to the west of Reading, the Wye catchment north of Marlow and the section of the River Thames from Benson Lock to Hurley Lock, as illustrated in Figure 1. The study area covers approximately 800 km^2 and is predominantly rural in character, with Reading, High Wycombe, Henley and Marlow being the main urban areas within the catchment. The study area has a total population of approximately 300,000 (1986 figures).

Geology and Topography

2.2 The underlying geology of the catchment consists of Upper Greensand, Chalk and younger Eocene sands and clays, dipping in a south easterly direction. To the north of the catchment lie the Upper Greensand deposits which are replaced by chalk deposits just south of Wallingford. The Lower, Middle and Upper Chalk deposits predominate. Towards the south of the catchment around Reading and Pangbourne, lies the transition between the Cretaceous Chalk and the younger Eocene sands, gravels and clays. Within the chalk areas, small outliers of Eocene deposits also exist on higher ground. Within the Thames floodplain and beyond, there are extensive drift deposits overlying much of the solid geology. These are comprised largely of Pleistocene gravels, clays with flints and head deposits.

2.3 In the northern part of the catchment lie the Berkshire Downs and the Chiltern Hills. South of Wallingford, the River Thames has carved its way through these chalk downlands to form the Goring Gap. The highest point within the catchment, 225 m AOD, is on the top of the Chilterns, south west of Stokenchurch (Grid Ref. 723 952). From these upland areas, the land falls away gently southwards towards the Thames Valley.

Hydrology

2.4 The Pang and Wye tributaries originate as springs on the dip slope of the Chalk. When groundwater levels are high (usually in late winter and spring) the rivers rise far up the valley. As water levels gradually decline through the summer and winter the springs decline and the source of the rivers move down the valley. The intermittent length of the river is known as a bourne and the stretch of the river which flows continually is known as the perennial section, with the perennial head marking the top of such a section.

2.5 The River Pang is a rural chalk stream, rising north of Hampstead Norreys in Berkshire, flowing a distance of approximately 23 km to its confluence with the Thames at Pangbourne. The River Pang is joined by a number of small tributaries between Bucklebury and Tidmarsh, the largest of these being the River Bourne.

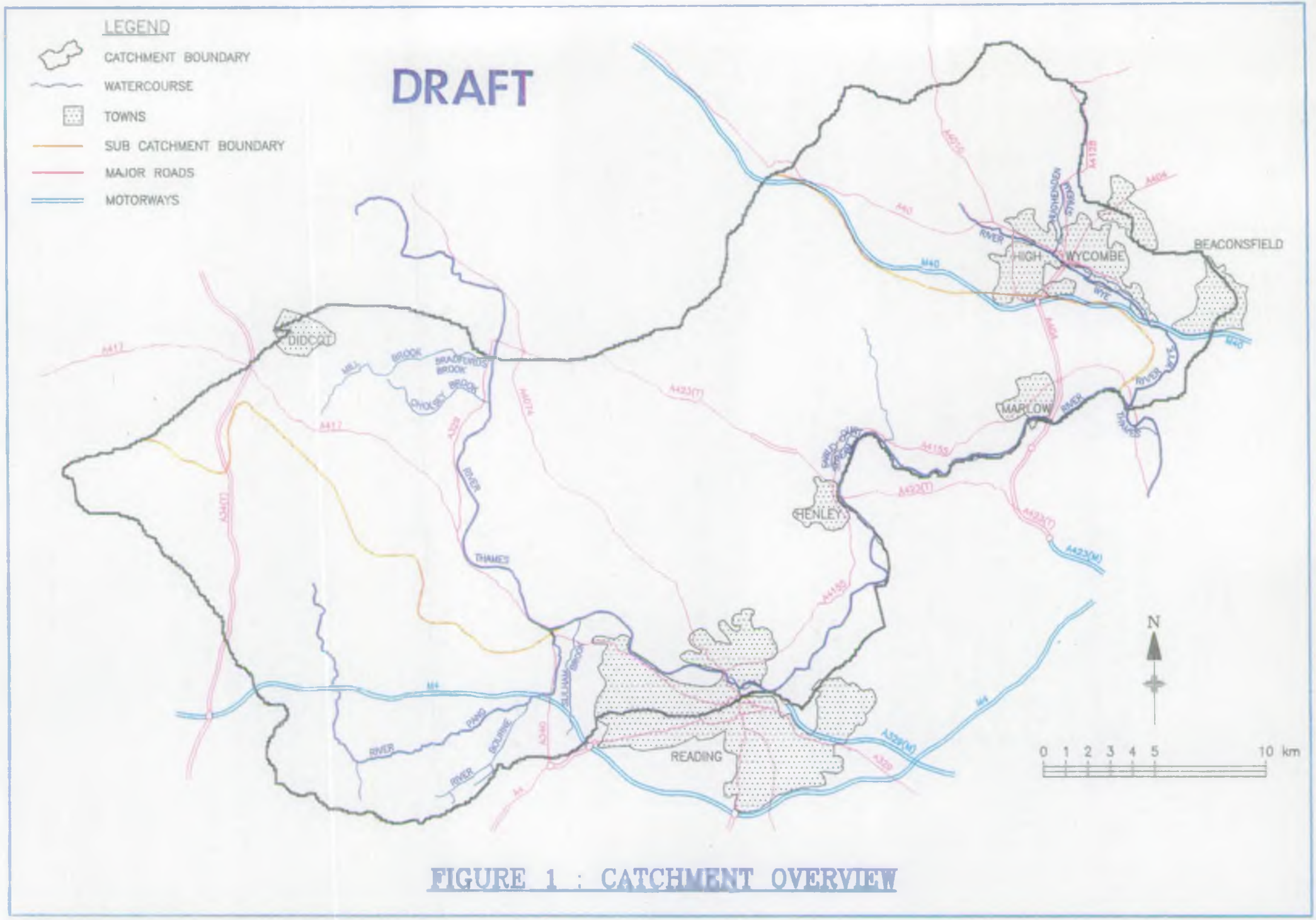


FIGURE 1 : CATCHMENT OVERVIEW

2.6 The River Wye rises from chalk springs to the north west of High Wycombe and flows in a south easterly direction for approximately 17 km, to join the River Thames at Bourne End. Major tributaries of the River Wye include the Hughenden Stream and the Wycombe Marsh Brook.

2.7 Figure 2 shows hydrographs (1984-1993) for the River Thames at Days Weir and Windsor Lock, located to the north and south east of the catchment respectively. No long term flow records exist for the catchment itself, although a flow gauging station was installed at Caversham Bridge, Reading in 1991. The hydrographs show flow increases between Days Weir and Windsor, however, the flow pattern remains constant.

2.8 In hydrogeological terms, the chalk is the major aquifer, and is therefore an important water resource. It supports a number of public water supply abstractions, in addition to many agricultural and domestic supplies. The Upper Greensand contributes to water supply as a minor aquifer and the drift deposits also provide a small supply.

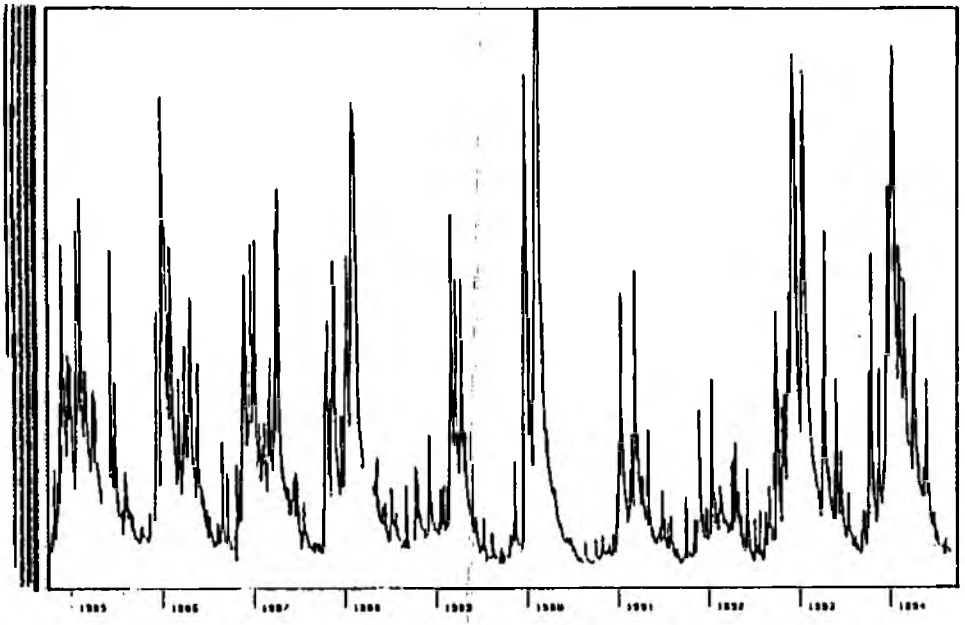
2.9 The Pang Catchment has been adversely affected by groundwater abstraction for public water supply and was identified as one of Thames Region's alleviation of low flow rivers. Following negotiations with Thames Water Utilities Ltd (TWUL), they have agreed to limit their abstractions to 5 Ml/day. This is a voluntary arrangement. A hydrograph for the Pang at Pangbourne, just upstream of its confluence with the Thames, for the period 1984 to 1993 is shown in Figure 2.

2.10 The Wye Catchment carries a fairly high abstraction load upstream of the sewage treatment works discharge point in High Wycombe. These abstractions are largely for public water supply. The Wye has been designated as being fully committed in abstraction licensing policy terms. Below the sewage treatment works, the effluent compensates for the effects of abstraction. In addition to high base flows, flows are augmented by urban run-off. Figure 2 shows a hydrograph for the River Wye at Hedsor, a short distance upstream of the confluence with the Thames.

Water Resources

2.11 The 1941-70 average annual rainfall for the area is 722 mm. This varies from 800 mm in the north of the catchment to 600 mm in the north west, close to the River Thames. A substantial amount of the rainfall is lost to evaporation and transpiration. The 1941-70 average annual effective rainfall, after allowing for such losses, is about 258 mm. Most of this water becomes recharge to the chalk aquifer. The catchment is predominantly underlain by chalk, so base flows are high and, in the area between the Pang and Wye, there are a number of dry valleys.

Hydrograph of the River Thames at Windsor



Hydrograph of the River Wye at Hedsor

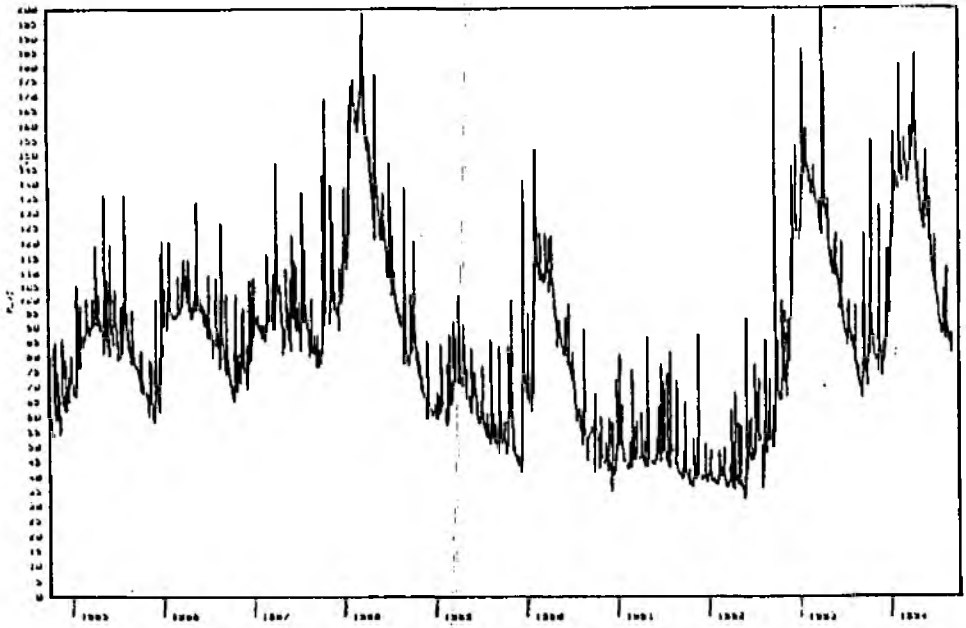
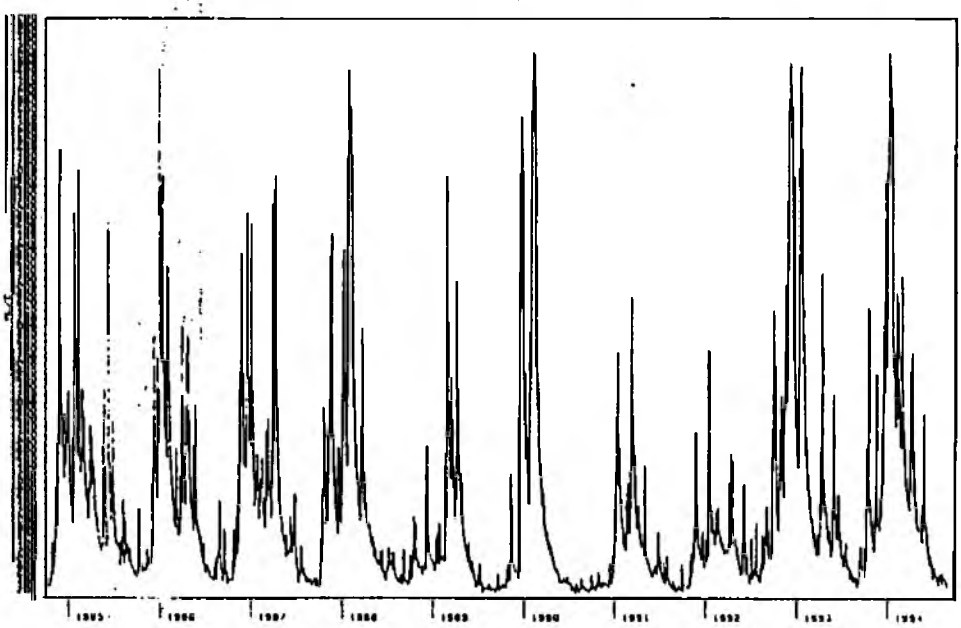
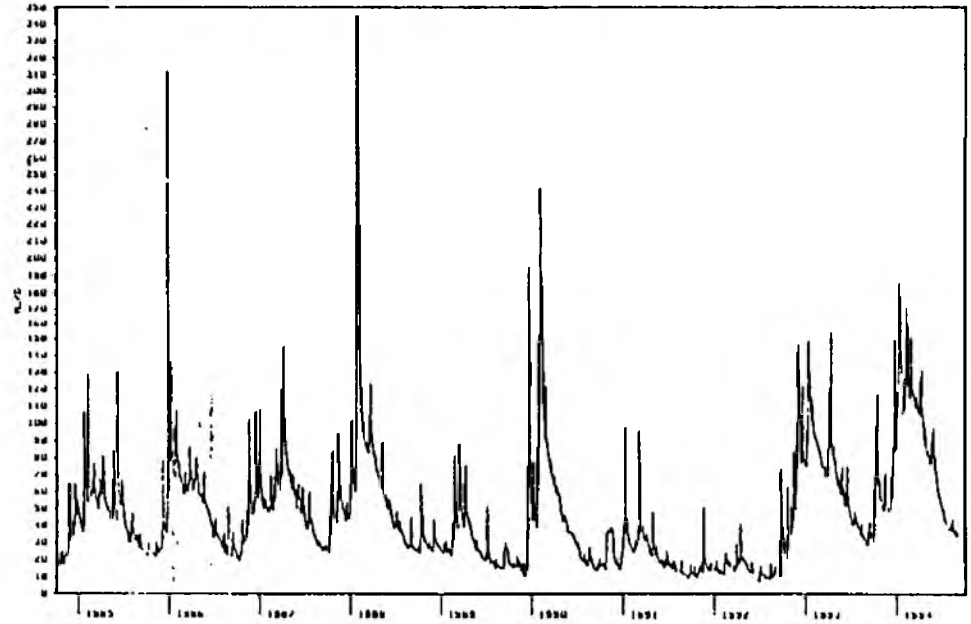


Figure 2 Hydrographs for the Catchment

Hydrograph of the River Thames at Day's Weir



Hydrograph of the River Pang at Pangbourne



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2.12 Water resources data is collected by the NRA from flow gauging stations, groundwater monitoring boreholes, current meter gauges and rain gauges, throughout the catchment.

2.13 TWUL are the main water and sewerage undertakers operating within the study area.

2.14 There are 203 current abstraction licences within the catchment area. Figure 3 shows the location of the major abstraction points and flow gauging stations within the catchment. Table 2.1 details licensed and actual abstractions for 1991.

Table 2.1: Licensed and Actual Abstractions (Ml/day)

Use	Mean Licensed Abstraction			Actual Abstraction (1991)		
	Surface	Groundwater	Total	Surface	Groundwater	Total
Public water supply	-	316.9	316.9	-	181.1	181.1
Private water supply	-	0.9	0.9	-	0.5	0.5
Agricultural spray irrigation	0.8	1.8	2.6	0.1	0.4	0.5
Non-agricultural spray irrigation	-	0.2	0.2	-	0.1	0.1
Agriculture	-	1.4	1.4	-	1.2	1.2
Cooling	0.5	2.4	2.9	0.5	1.0	1.5
Washing	-	3.6	3.6	-	3.0	3.0
Industrial process	3.0	15.0	18.0	0.9	11.9	12.8
Transfer	-	0.1	0.1	-	0.1	0.1
Augmentation	-	65.0	65.0	-	0.2	0.2
Total catchment	4.3	407.3	411.6	1.5	199.5	201

2.15 The Pang Valley benefits from the West Berkshire Augmentation Scheme which is used in drought conditions to augment river flows to support public water supply abstractions. The scheme has been used twice operationally in the past 20 years.

2.16 The NRA, Thames Region have produced a groundwater vulnerability map for the region and are in the process of defining groundwater protection zones. Source protection zones have been defined for two major public water supply abstractions

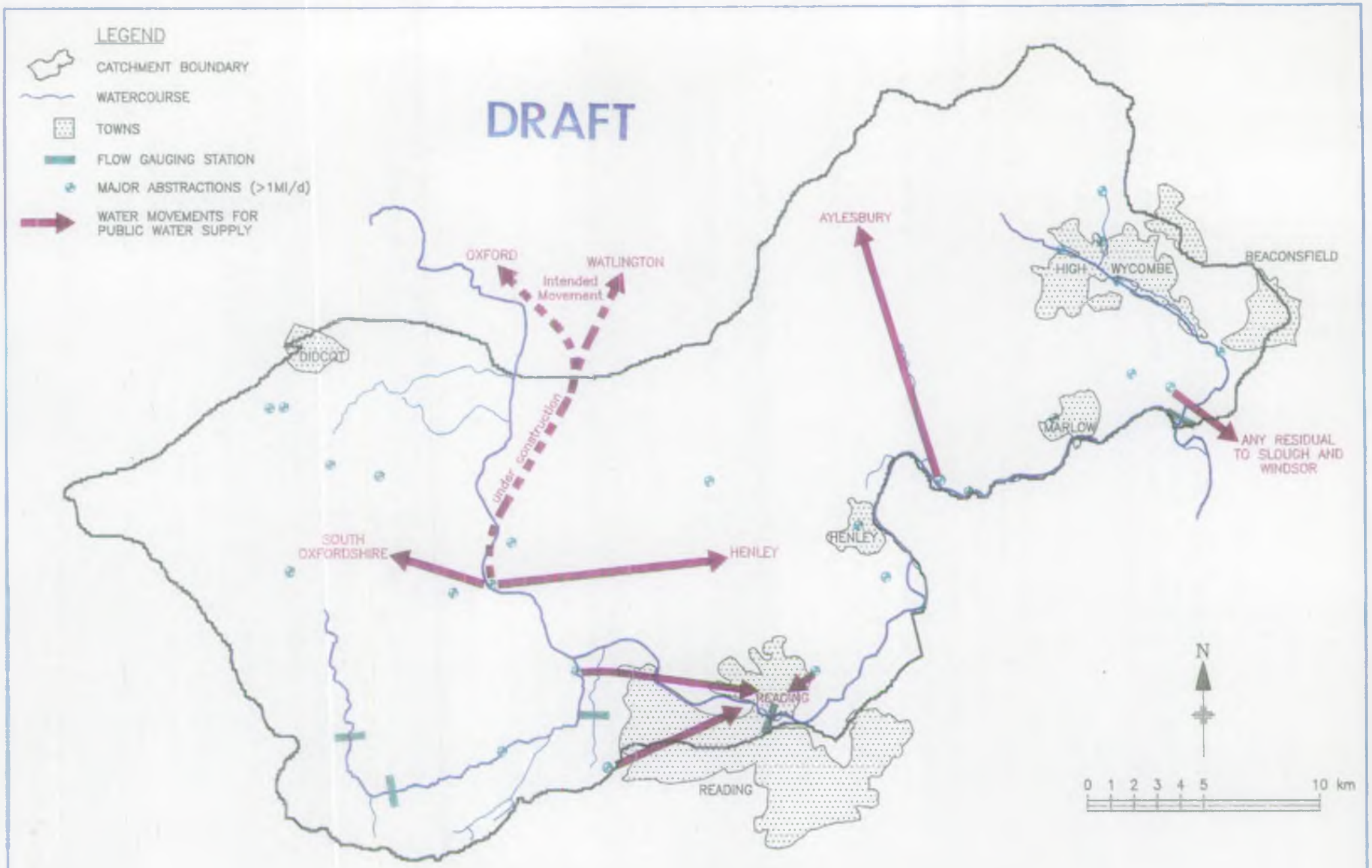

FIGURE 3 : WATER RESOURCES

from the chalk aquifer around High Wycombe. Groundwater is sensitive to pollution in this area and these zones are used in conjunction with the NRA's 'Policy and Practice for the Protection of Groundwater', to protect groundwater quality.

Water Quality

2.17 The NRA uses a range of chemical and biological techniques to assess water quality. Until recently, the quality of individual lengths of rivers have been reported according to a classification system derived by the former National Water Council (NWC). This system classed watercourses in England and Wales on the basis of their concentrations of BOD, DO and ammonia. Due to problems with the application of the NWC scheme, it has been replaced by the General Quality Assessment (GQA), which consists of a number of separate water quality assessments (chemical, biological, aesthetic and nutrient status). The first of these assessments to be developed is the chemical component. Figure 4 shows the three-year GQA (1991-1993) for the study area.

2.18 Since the late 1970s, targets for improving and maintaining water quality have been set via statutory and non-statutory water quality objectives. The statutory water quality objectives are those specified in EC Directives. The non-statutory water quality objectives are known as river quality objectives (RQOs) and were derived from the NWC classification.

2.19 The Water Resources Act (1991) allowed the government to set Statutory Water Quality Objectives (SWQO). These are to replace the RQOs. Five uses have been proposed for rivers (River Ecosystem, Special Ecosystem, Abstraction for Potable Supply, Industrial or Agricultural Abstraction and Water Sport Activity). To date, regulations have been produced for the River Ecosystems (RE) use only.

2.20 The new River Ecosystem WQOs are not direct translations of the NWC objectives. They are designed to be achievable targets, thus the SWQOs will be set with dates by when they must be attained. They must take into account any significant potential or planned changes to water quality (eg. planned investment in sewage treatment works through AMP2). The calculation and setting of these WQOs will be a complex process and the use of direct translations from the NWC system could be misleading. Full details of the WQOs will, therefore, be presented in the full CMP, once detailed analysis has been carried out and realistic targets set.

2.21 The NRA also carries out biological monitoring to provide additional water quality information. The Biological Monitoring Working Party (BMWP) score system, established in 1980, is a nationally accepted means of assessing water quality. The technique assigns scores to different invertebrate taxon, based on their sensitivity to organic pollution. The BMWP score for a site is calculated by summing the scores for each invertebrate group present at the site. As a rough guide, a BMWP

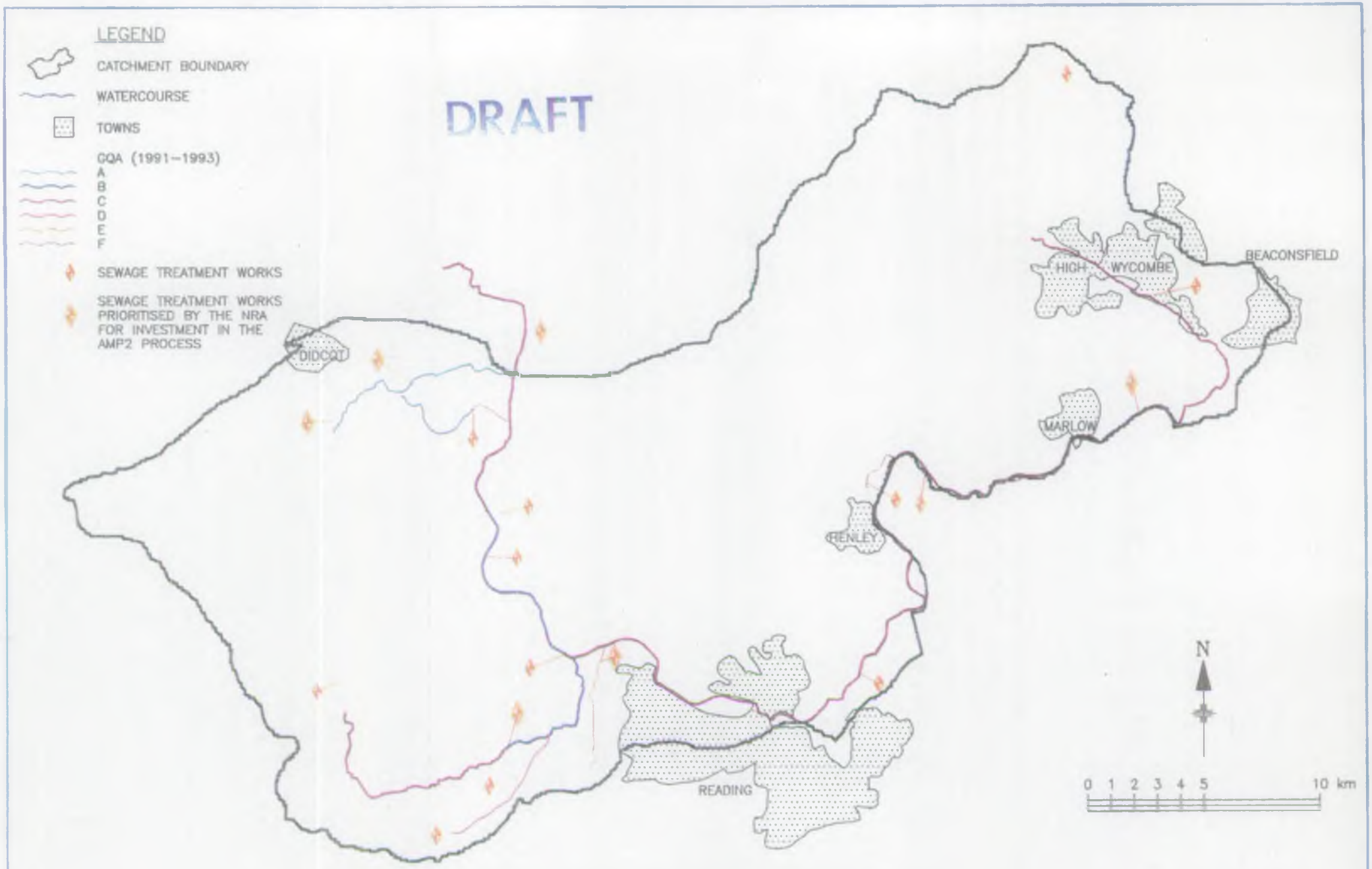

FIGURE 4 : CHEMICAL WATER QUALITY

score of over 100 indicates relatively good water quality, whilst a score of less than 15 indicates poor or unacceptable water quality. Figure 5 shows the biological water quality of the study area for 1993.

2.22 Since 1980, BMWP scores for the Thames (Benson-Hurley) have generally been greater than 100, indicating good faunal diversity.

2.23 Biological results for the Pang vary, excellent faunal diversity has been recorded at a number of sites: Folly Bridge, Tidmarsh and at the gauging station, Pangbourne, with BMWP scores of over 200; at sites further upstream, lower scores have been recorded. The tributaries of the Pang do not have the same diversity of fauna as the main river and scores well below 100 are common. The fauna of these tributaries and the upper reaches of the main river have been affected by low flows.

2.24 Biological results for the Wye are generally much lower, with BMWP scores never exceeding 100. Many of the results for the Wye are derived from non-routine samples (ie. they were taken in relation to pollution incidents), which explains some of the low scores. Regular pollution incidents from the surface water outfalls in High Wycombe have affected the fauna downstream. At the gauging station, Hedsor, there has been an improvement in biological quality since 1988.

2.25 During 1993, sites on the Thames, Pang and Wye have been surveyed for the presence of *Escherichia coli*, an indicator of faecal pollution. This work is part of a rolling programme of river monitoring throughout the catchment to build a baseline data set of bacterial contamination levels.

2.26 Three sites on the River Thames are monitored as part of SWORP studies (South West Oxfordshire Reservoir Proposal): Wallingford, Goring and Caversham. They have been monitored on a fortnightly basis since 1991. Results indicate the seasonality of algal communities, with marked differences in populations at different times of the year but there is little difference between the three sites.

2.27 Data from this monitoring is also being used to study the trophic status of the Thames under the Urban Wastewater Treatment Directive.

2.28 Surveys on the Wycombe Marsh Brook in 1989 and 1991, revealed the presence of native crayfish (*Austropotomobius pallipes*). Despite several outbreaks of crayfish plague, there are still believed to be populations present.

Consented Discharges

2.29 Within the catchment, there are 62 consented discharges of over 5 m^3/day. Figure 6 gives a breakdown of these consents by type, whilst Figure 7 identifies the maximum permissible volumes of discharges.

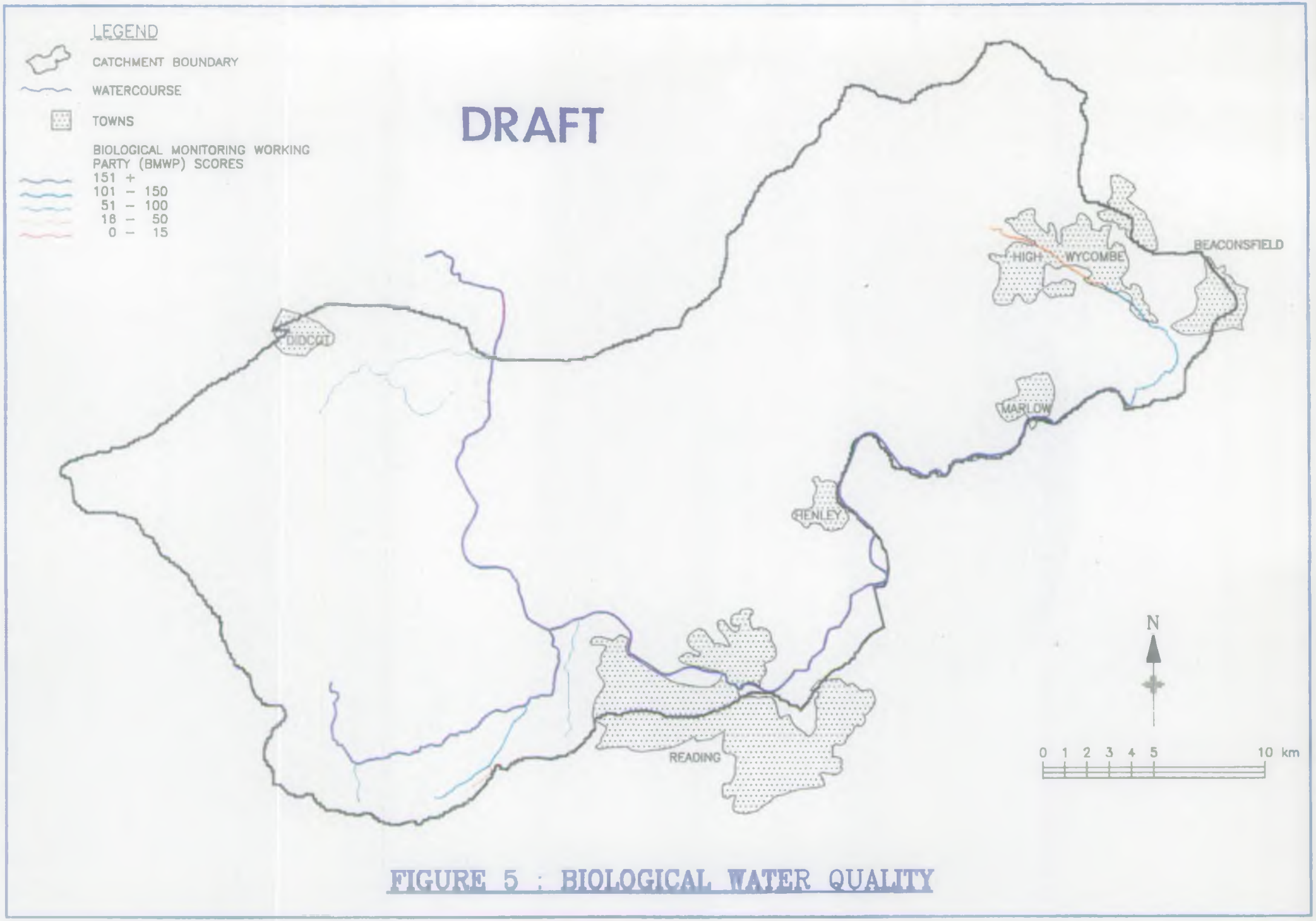

FIGURE 5 : BIOLOGICAL WATER QUALITY

Figure 6 Number of Consented Discharges
Over $5m^3$/day

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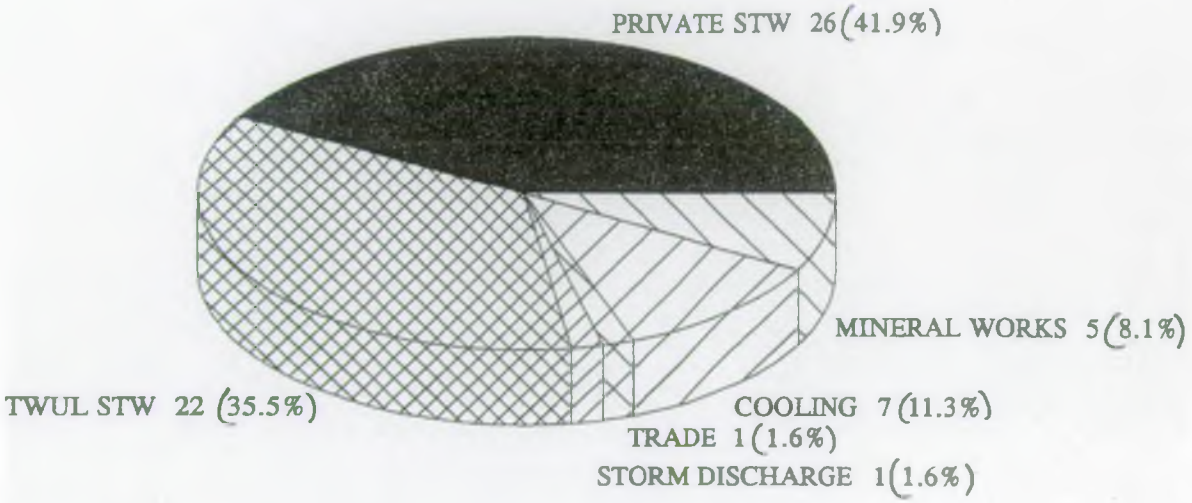
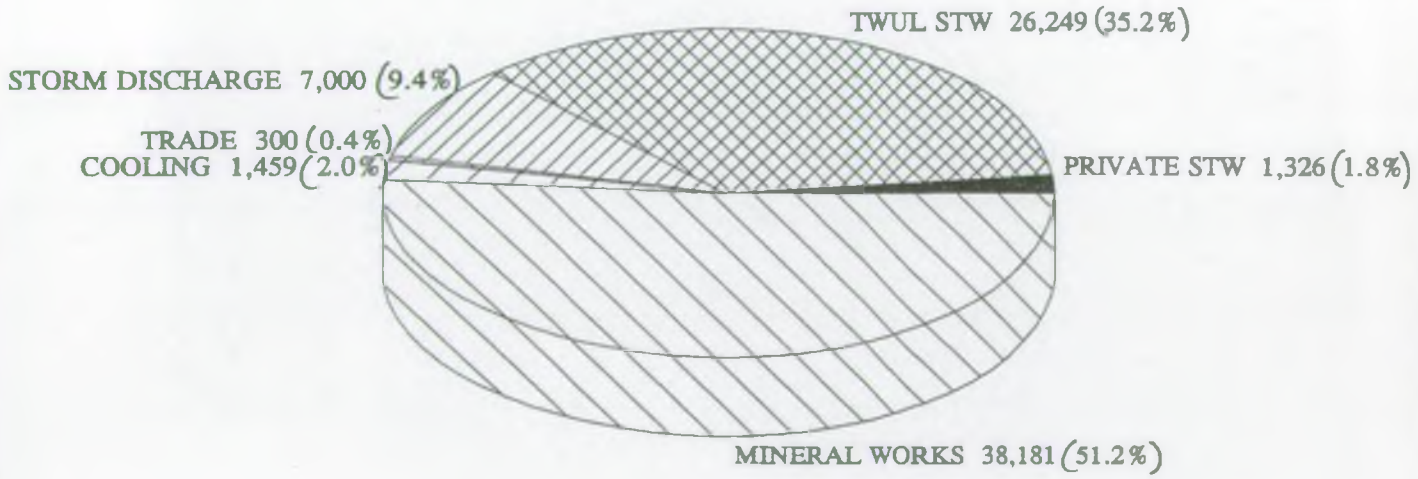


Total number of discharges over $5m^3$/day = 62

Figure 7 Maximum Permissible Volume of
Consented Discharges Over $5m^3$/day



Total vol. of discharges over $5m^3$/day= $74,515m^3$

2.30 In recent years, improvements have been carried out to a number of sewage treatment works (STWs):

- **Cholsey STW** - improvements have been ongoing for the past five years and the reach of the Cholsey Brook, from the STW to the Thames, has improved from 2B to 2A over the past three years;
- **Henley STW** - alterations to the treatment process have resulted in improved water quality over the past two years;
- **High Wycombe STW** - new tanks were fitted in 1991 and this has led to slight improvements in water quality;
- **Theale STW** has been demolished and the sewage pumped to and treated at Reading STW, resulting in the reduction of the amount of effluent discharged to the Sul Brook.

Pollution Control

2.31 Within the NRA, pollution incidents are categorised as either Major, Significant or Minor, depending on their severity. During 1993, 142 pollution incidents were reported. Of these, 79 were substantiated as being actual cases of pollution and all were categorised as minor incidents. A breakdown of the different types of reported pollution incidents from 1991 to 1993 is shown Table 2.2.

Table 2.2: Reported Pollution Incidents (1991-1993)

	1991				1992				1993			
	1	2	3	unsub	1	2	3	unsub	1	2	3	unsub
Oil	0	0	46	23	0	0	32	7	0	0	33	18
Chemical	0	1	10	8	0	0	4	8	0	0	5	7
Sewage	0	0	9	6	0	0	6	16	0	0	13	6
Natural	0	0	2	9	0	0	0	26	0	0	0	12
Agricultural	0	0	1	1	0	0	2	0	0	0	1	2
General	0	0	16	8	0	0	9	9	0	0	19	9
Urban Runoff	0	0	5	0	0	0	1	1	0	0	2	1
Unknown	0	2	11	22	0	0	7	15	0	0	6	8
Total	0	3	100	77	0	0	61	82	0	0	79	63

Pollution Prevention

2.32 Many pollution incidents occur as a result of ignorance and in the mistaken belief that any liquid which passes to a drain goes to a sewage treatment works. This is not generally the case, as most drainage systems within the catchment run directly into watercourses or soakaways. Education is therefore a vital element of pollution prevention through all sectors of the community. A programme of pollution prevention visits exists which targets areas where occasional incidents occur. Within the catchment area the following trading estates have been or will be visited and where necessary recommendations for remedial work will be made:

- Hithercroft, Wallingford;
- Cardiff Road, Reading;
- Battle Farm, Reading;
- Binders Yard, High Wycombe;
- Newtown, Henley-on-Thames;
- Cressex, High Wycombe.

Conservation

2.33 There are forty SSSIs within the catchment (Figure 8). The majority of these are located outside the river corridor, however, there are some important water-dependent SSSIs within the catchment, such as Temple Island Meadow, a species rich wetland, with several floral species of local and national importance, including the Loddon Lily (*Leucojum aestivum*). Another notable SSSI is Sulham and Tidmarsh Woods and Meadows, a mosaic of damp copses and seasonally flooded water meadows. It is of particular importance for its invertebrate species.

2.34 Other notable sites within the catchment include:

- Cholsey Marsh Nature Reserve, an example of the riverside wetland habitat, once prevalent throughout the region;
- reed beds at Child Beale Wildlife Park, one of the largest of such sites in Berkshire;
- gravel pits between Sonning and Reading which provide important habitat for wintering birds and have a population of breeding common terns (*Sterna hirundo*);

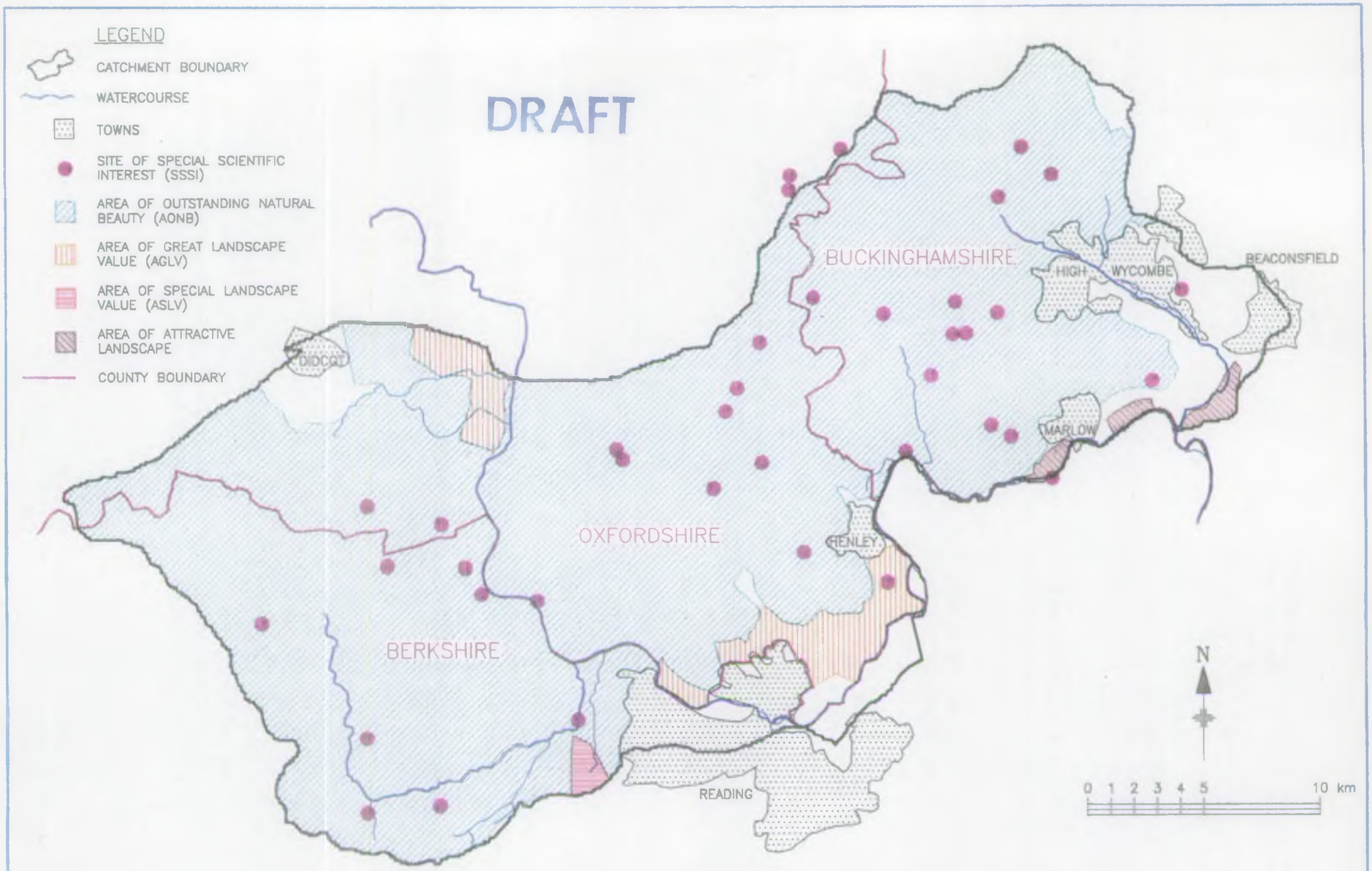


FIGURE 8 : LANDSCAPE, CONSERVATION AND PLANNING

Landscape

Landscape Character

2.35 The landscape of the Thames Valley is characterised by areas of open pasture and flood meadows with contrasting built-up frontages within urban areas, some of considerable historical and archaeological importance. This reach of the Thames features a number of lock sites of unique character and landscape importance, including Hambleden Lock, Hurley Lock and Marsh Lock.

2.36 The Pang rises in the rolling and open landscape of the Berkshire Downs. The catchment is predominantly rural in character, with a lowland agricultural landscape of fields, hedgerows, copses and small villages.

2.37 The upper reaches of the River Wye are rural in character, with open fields and hedgerows. Further downstream, the river enters High Wycombe and the character becomes more urban and confined, with the watercourse culverted along much of its length. Once through Wycombe, the valley becomes more varied, with residential and commercial areas interspersed with areas of open space. Historical mill structures exist along much of the length of the River Wye.

Landscape Designations

2.38 The study area contains two designated Areas of Outstanding Natural Beauty: the North Wessex Downs AONB and the Chilterns AONB. These are shown in Figure 8 and together they cover the majority of the catchment. The boundary of the two areas is marked by the River Thames. Although both areas are chalk upland, their character differs. The North Wessex Downs AONB includes both open uplands and lower land towards the Thames, while the Chilterns AONB is generally of a more enclosed and wooded nature.

2.39 Most of the remainder of the study area is designated as Areas of Great Landscape Value, Areas of Attractive Landscape or Areas of Special Landscape Importance. These are also shown in Figure 8. Although these designations are not of national importance, they generally have an unspoilt nature and are of high landscape quality.

Fisheries

2.40 The EC Directive 78/659/EEC, instructs member states to designate river and canal reaches capable of supporting salmonid or cyprinid fisheries. These watercourse are required to comply with stipulated water quality parameters in order to protect fish life. Designated reaches within the catchment area are shown in Figure 9.

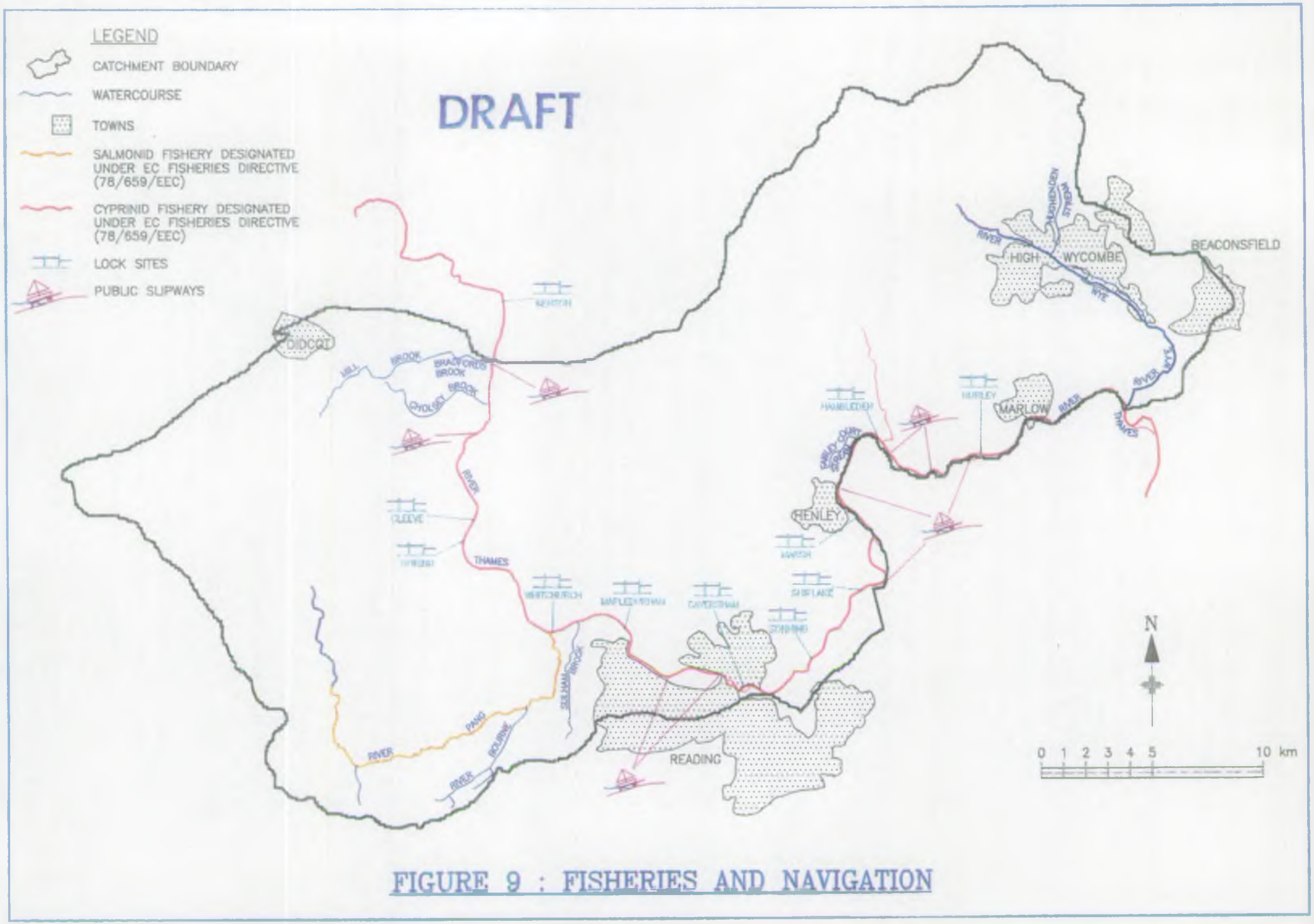


FIGURE 9 : FISHERIES AND NAVIGATION

2.41 The whole of the section of the River Thames, within the catchment review study area, is designated as an EC cyprinid fishery. At present, little is known about the fishery of the River Thames, as no comprehensive fisheries surveys have been carried out to date, due to the technical difficulties associated with surveying large rivers. However, new hydro-acoustic and electro-fishing surveying techniques have been developed, as part of the NRA's investigations of future water resources proposals and this section of the River Thames is currently due to be surveyed in 1995/96.

2.42 The Pang, from Stanford Dingley to its confluence with the Thames, is designated as an EC salmonid fishery. In addition, the River Wye (from source to its confluence with the Thames) is proposed for designation in January 1995.

2.43 None of the reaches failed the Directive for any year in the period 1990 to 1993.

2.44 Historically, the River Pang was known as a good trout fishery. However over recent years, low flows have meant the upper reaches of the Pang are unable to support a significant fish population. Downstream of Stanford Dingley, good trout populations can be found, augmented by some stocking by the various fly fishing clubs that fish the river. Grayling are also present in some numbers and other coarse fish are to be found in the lower reaches near the Thames.

2.45 The predominant fish species in the Wye are brown trout and roach, with dace and pike also common. In many places, the watercourse is rather featureless and this, along with poor water quality, is thought to limit fish populations in some areas.

Recreation

2.46 The catchment is of value for both informal countryside recreation and leisure, and for organised sports activities.

2.47 Recreation activities within the catchment are heavily concentrated around the River Thames, which is used for both formal and informal recreation. Key sites tend to be located where access is good, such as within towns and at bridging points.

2.48 Recreation on the Rivers Pang and Wye is largely informal and restricted to activities such as walking and angling.

Water-based Recreation

2.49 Water-based recreation on the Thames includes rowing, canoeing, sailing and cruising. There is a rowing club in most towns along this reach of the Thames, with several clubs located at schools and colleges. The most famous of all rowing venues, Henley, home of the Henley Royal Regatta and soon to become home to the River and Rowing Museum, is located within this catchment. Nationally,

canoeing is a growth activity and this is reflected within the Thames Region. This catchment is the home for a number of canoe clubs, all centred at towns or villages. Hambleden Lock is popular for white-water canoeing and The County Centre (water sports centre) at Pangbourne offers canoe training. There are several river-based sailing clubs within this study area. However, in comparison with other river users, there are relatively few sailors on the Thames. Cruising is one of the most visible activities on the Thames and this section of the river is one of the busiest in terms of boat traffic, with Caversham Lock having the most lock movement within the region (1993).

Land-based Recreation

2.50 Land-based recreation is heavily concentrated on publicly accessible land and lock sites adjacent to the River Thames. These include the Reading Riverside Parks, Hurley Lock, Shiplake Lock, Hambleden Lock, Marsh Lock, Mapledurham Lock and associated Estate, and Henley Riverside.

2.51 Table 2.3 shows the daily number of pedestrian visitors at Hurley and Hambleden Locks, based on the results of a Recreation Survey carried out on behalf of the NRA in 1991.

Table 2.3: Daily Total of Pedestrian Visitors to Hurley and Hambleden Locks (1991)

Day/Time	Hurley	Hambleden
July weekday	632	378
August weekday	1,254	407
August Saturday	1,496	1,227
August Sunday	2,894	2,174
August Bank Holiday	3,342	2,304

2.52 In addition to casual day visitors, the Thames is popular with more serious walkers. The long-distance Thames Path (186 miles from source to barrier) is due to be completed in 1996.

2.53 The NRA have camping facilities, open from April to October, at Shiplake and Hurley Locks.

2.54 Angling takes place throughout the catchment. On the River Thames, busy areas tend to be at weirs and other sites where river banks are publicly accessible. However at all locations, anglers have informal access arrangements with landowners. There are over twenty angling clubs within the catchment.

Navigation

2.55 Over the past fifteen years, there has been an overall decline in the volume of lock traffic on the Thames in this catchment. This reflects the trend for the Thames as a whole and is largely as a result of economic factors, the decline in the boat hire trade and restrictions on the number of moorings imposed by the implementation of the River Thames Leisure Policy in 1980. It is assumed that as the economy recovers, so boat traffic will once again increase and figures for recent years are beginning to show an upward trend.

2.56 There are no separate figures for the number of craft registered within the catchment. For the Thames as a whole, 21,000 craft were registered in 1993, 70% of which are powered. An additional 10,000 craft were granted temporary registration.

2.57 There are only a limited number of public slipways between Benson and Hurley. These are located at:

- Wallingford Cruiser Station;
- Papists Way, Cholsey;
- Scours Lane, Tilehurst;
- Reading;
- Wargrave;
- Henley;
- Aston;
- Medmenham;
- Hurley Meadow,

and are illustrated in Figure 9. A fee is charged for access to the slipways at Wallingford, Medmenham and Hurley Meadow. The access at Wargrave is only suitable for small craft, such as canoes.

2.58 There are a total of 2,099 mooring sites along the Thames, between Benson and Hurley, largely located on the main channel with a few back-stream moorings.

2.59 There are approximately 25 NRA permanent mooring sites along this reach of the Thames, located at Cleeve Lock, Shiplake Lock, Marsh Lock and Hambleden Lock.

Flood Defence

2.60 The River Wye sub-catchment is relatively steep and this, combined with urban run-off from High Wycombe, gives rise to sharp peak flows in the river. In addition, numerous in-channel mill structures are located along the river. In the past, the poor operation of the sluices following heavy rain resulted in flooding in High

Wycombe. Thus, in the 1980s, a study was carried out and a number of control structures along the River Wye were removed or replaced by fixed-crest weirs.

2.61 A number of areas within the study area are liable to flooding. These include:

- **River Wye, Station Road, Wycombe:** The River Wye is culverted beneath Station Road and the culverts are liable to blockages, which has resulted in flooding on a number of occasions. The installation of trash grids is not a viable solution as the culvert is at an awkward angle. The structures need to be regularly maintained by the NRA;

- **Portland Road, Reading:** The road and properties adjacent to the two railway bridges along Portland Road are liable to flooding from an adjacent non-main river watercourse. The Local Authority has permissive powers to carry out works to address the problem, should they wish to do so;

- **River Pang, Pangbourne:** The River Pang has flooded consistently over the past three years. Some localised works have been carried out and the NRA is undertaking studies to determine a more permanent solution.

Land Use Planning

2.62 The study area lies within the counties of Berkshire, Buckinghamshire and Oxfordshire. The relevant local planning authorities and their development plans are listed below:

Structure Plans

- Berkshire Structure Plan 1991-2006, Revised Explanatory Memorandum and Policies as Proposed to be Modified, Berkshire County Council, April 1994;

- Berkshire Structure Plan 1991-2006, Proposed Modifications, Berkshire County Council, April 1994;

- The New Buckinghamshire County Structure Plan, 1991-2011, Deposit Draft, Buckinghamshire County Council, April 1994;

- Oxfordshire Structure Plan, Oxfordshire 2001, Written Statement and Explanatory Memorandum, Oxfordshire County Council, February 1992 and December 1992;

Local Plans

Berkshire

- Newbury District Local Plan, Newbury District Council, December 1993;
- Reading Borough Local Plan, Composite Working Draft, Reading Borough Council, March 1994;
- Wokingham South East Area Local Plan, Wokingham District Council, April 1994;
- Wokingham Green Belt Local Plan, Wokingham District Council, 1985;
- Loddon Area Local Plan, Draft Incorporating Modifications, Wokingham District Council, November 1993;

Buckinghamshire

- Wycombe District Local Plan, Deposit Version, Wycombe District Council, July 1992;
- The Chiltern District Local Plan, Draft for Public Consultation, Chiltern District Council, July 1994;

Oxfordshire

- Vale of White Horse Local Plan, Draft for Consultation, Vale of White Horse District Council, November 1993;
- South Oxfordshire Draft Local Plan, South Oxfordshire District Council, December 1993.

2.63 These documents, when considered in conjunction with Regional Planning Guidance, provide the best means of establishing possible future land use trends, which may have an impact on or interact with the water environment.

2.64 NRA involvement with and representations on development plans and other planning documents has raised awareness of NRA interests and responsibilities and the need to conserve and enhance the water environment.

2.65 Development in urban areas, such as High Wycombe and Reading, has moved away from heavy industry towards light commercial, residential and retail developments. The NRA sees redevelopment as an opportunity to seek enhancements to the river

environment and liaises closely with developers and local authorities to achieve this aim.

2.66 The eastern section of the catchment lies within the Metropolitan Green Belt and any future development within the green belt would be strictly controlled by the local authority to safeguard the countryside and prevent further urban encroachment.

2.67 The local authorities within the catchment aim to divert future development and growth away from the rural areas to Reading, Didcot, High Wycombe and some of the smaller towns. Provision has been made by the Structure Plans for the construction of approximately 8,000 new dwellings within the catchment by 2001 at Reading and Didcot. These towns would be the principal locations for housing, employment and major new shopping development and this will have implications for water-based planning, including land drainage issues and water resource planning. Transport proposals, include widening works along the M4 from the M25 through Berkshire to Junction 15 and the proposed widening of the M40. These proposals could also have a potential impact on the water environment.

Minerals

2.68 Mineral extraction in the catchment is strictly controlled by Local Authorities, particularly within the Areas of Outstanding Natural Beauty, special landscape areas, river valleys and floodplains. Sharp sand and gravel reserves are found in the Chilterns, north of Reading and east of Wallingford. This plateau gravel usually occurs above the water table and the workings are generally restored to agricultural use. Sand and gravel has been worked over many years in the Caversham area and several workings have been restored as lakes for sailing, nature conservation and a marina linked to the River Thames. Oxfordshire County Council considers that there is limited scope for further working at Caversham, although modest extensions to existing pits may be permitted.

2.69 Chalk reserves are found in the Chilterns and there is an active lime works at Sonning. Extensive reserves of valley gravel and alluvium exist around Marlow and there is a band of plateau gravel in the east of the catchment at Beconsfield. There are three active sand and gravel workings and permitted reserves in this area. The area has also been identified as a preferred area for future gravel extraction within Buckinghamshire.

2.70 Berkshire also contains extensive reserves of sand and gravel, particularly within the Kennet Valley (Kennet Catchment), but there are no existing works or areas of search north of the A4 within the Chilterns AONB.

3 CATCHMENT ISSUES

3.1 This section discusses the main issues relating to the water environment within the study area. It includes current problems and issues known by the NRA and those which are anticipated to become issues or problems in the future.

Alleviation of Low Flows on the River Pang

3.2 Following a national initiative, the River Pang was one of five rivers within Thames Region identified as suffering from 'low flows'. Negotiations with TWUL resulted in them undertaking a voluntary reduction in abstraction from Compton Pumping Station from 13.5 Ml/day to 5 Ml/day.

3.3 Enhancement works, including in-channel modifications and restocking the watercourse with brown trout, have been undertaken and the recovery of the watercourse is being monitored as part of an Operational Investigation funded by Water Resources.

Rain Gauges

3.4 A need for additional rain gauges within the Thames sub-catchment has been identified.

Pang Countryside Management Project

3.5 The Pang Countryside Management Project is a joint venture funded by Berkshire County Council, Newbury District Council, English Nature, the Farming Wildlife Advisory Group and the NRA Conservation function. The aim of the project is to encourage environmentally sensitive land management through education and liaison with landowners and farmers, with the objective of de-intensifying agriculture along the Pang Valley. This three-year project is approaching the end of its second year and is proving very successful with a large number of organisations and interest groups joining together to achieve a common goal. The project has a high national profile and it is hoped that a similar scheme could be applied to other catchments.

The River Wye Through High Wycombe

3.6 The River Wye within High Wycombe is highly urbanised. Historically, a lot of heavy industry, including a number of paper mills, was located along the river and it was heavily polluted by discharged effluents. However, gradually most of the paper mills have closed down and development has moved away from heavy industry towards retail and housing. As a result, the quality of effluent is improving. Despite this improvement, water quality is still the major factor limiting faunal and floral diversity within the Wye. An additional factor is that the complex

culvert system beneath the town makes it very difficult to trace pollution events when they do occur.

3.7 High levels of polychlorinated biphenyls (PCBs) and fin and skeletal deformations have been found in pike and trout taken from the River Wye. Detailed investigations into PCB, heavy metal and pesticide concentrations in fish within this reach are needed in order to determine levels of pollution.

3.8 Some sections of the watercourse have been highly managed. In 1985, the channel of the River Wye through Kingsmead Recreation Ground was concreted, resulting in the loss of instream habitat diversity. The NRA are currently looking to carry out enhancements to this section of river, in conjunction with Wycombe District Council. Hydraulic modelling is being undertaken to determine the possible flooding implications of the proposed works. Potential for enhancement exists elsewhere.

3.9 There is a lack of up-to-date, detailed flood maps or flooding information on the Wye. This will be resolved as Section 105 surveys are undertaken, in accordance with the Memorandum of Understanding on Development and Flood Risk. The Wye is considered to be a priority catchment.

Eutrophication of the River Thames and River Wye

3.10 Under the Urban Wastewater Treatment Directive (91/271/EEC), the River Thames has been designated as sensitive (eutrophic) and is being monitored. The Directive instructs that phosphate removal at STWs discharging to designated waters be considered.

3.11 In addition, studies of aquatic macrophytes are to be instigated on the River Wye, upstream and downstream of High Wycombe STW, in relation to possible designation of the river in the future.

Inadequate Consent Conditions - TWUL Asset Management Plan

3.12 A number of STWs within the catchment have been identified by the NRA for investment under the Asset Management Planning Process (AMP 2). They are: Benson, Blewbury, South Moreton, Bradfield, Pangbourne and Little Marlow. Discussions between the NRA and TWUL are in progress to agree priorities for improvements at these works.

Groundwater Pollution

3.13 Within the Pang sub-catchment, numerous swallow holes exist, which provide a pathway for pollutants to enter groundwater. The polluted water discharges within the catchment and may at times cause surface water pollution.

3.14 Activities at UKAEA Harwell (located to the south of Didcot within the Ock Catchment) have resulted in a plume of solvent contamination in the chalk groundwater to the south of Didcot. This is being monitored by NRA groundwater staff and a scheme of remediation is in place.

Compton Sewage Treatment Works

3.15 Historically, Compton STW discharged to soakaway. The reduction of abstraction from Compton Pumping Station as part of the ALF Scheme, together with rising groundwater levels and sewer infiltration, overloaded the STW and, as a result, the works started discharging effluent to the River Pang. At present, TWUL have a temporary consent to discharge to the river and the situation is being monitored by the NRA pollution control section.

Rising Groundwater at Hambleden

3.16 Rising groundwater levels at Hambleden STW have resulted in the incursion of groundwater into the foul sewers, leading to the flooding of Mill End Pumping Station. This dilute sewage is then pumped up to Hambleden STW, which is unable to treat the dilute effluent effectively and, as a consequence, the works have been failing their discharge consent. Legal action is being taken.

Pollution of the Vastern Ditch

3.17 The Vastern Ditch, in Reading has experienced long term, sporadic oil pollution incidents. Reading Borough Council, acting as agents for TWUL, have been clearing out the ditch at regular intervals and tankering the oil away. Following further investigations by TWUL, it was discovered that the Vastern Ditch was, in fact a culverted watercourse and not a surface water sewer as originally thought and, as such, was the responsibility of the NRA. The NRA pollution control staff are currently looking into the problem.

Low Flows on the River Wye

3.18 The River Wye has been identified as a river to be targeted for further low flow studies. This will involve monitoring flows within the catchment and it is anticipated that an additional eight groundwater monitoring sites and two river flow monitoring sites will be installed within the next three years.

In-Channel Islands on the River Thames

3.19 The in-channel islands found along the River Thames provide valuable wildlife refuges and habitat diversity. These islands are gradually being eroded, largely through boat wash. Dredging of the river removes the sediments which would naturally replenish these islands or create similar features elsewhere. Unless action

is taken to protect these islands or allow others to form elsewhere, they will eventually be lost entirely.

Weir Operation on the River Thames

3.20 Complaints have been received from anglers regarding weir operation on the River Thames. The Navigation function are obliged to maintain a head of water to allow navigation. When this water is released it can result in fast clearwater flows which are not ideal for angling and may even affect fry survival. Off river storage and the retention and development of flood meadow habitats should be encouraged to alleviate this problem wherever possible.

Access for Salmon to the Upper Reaches of the River Wye

3.21 This river has traditionally been a salmon run. The provision of access for salmon to the upper Wye, through the installation of fish passes is necessary.

Swans at Caversham Bridge Reading

3.22 There are a large number of swans on the River Thames around Caversham Bridge, which use the in-channel islands as roosting sites. The islands have become de-vegetated and are eroding. Reading Borough Council, in conjunction with the NRA, are looking at closing off one of the islands and allowing the swans to use another, while the vegetation recovers and work is done to enlarge and protect the island from further erosion.

Mill Brook

3.23 The Mill Brook is a highly modified watercourse, which is little more than an agricultural drainage channel. Adjacent land use is mainly intensive agriculture. The watercourse has poor morphology, water quality and ecology. There is scope for habitat enhancement and the creation of buffer zones adjacent to the watercourse.

The Production of Management Plans for Lock and Weir Sites along the Thames

3.24 A rolling programme of maintenance and refurbishment works for lock and weir sites along the Thames exists. These sites have a unique landscape character and serve a variety of functions, including navigation, recreation, landscape and fisheries, which can result in conflicts of interest. It is suggested that multi-functional management plans are produced for each lock and weir site within the catchment, to address all these interests and resolve any conflicts.

The Recreation Strategy for the Thames

3.25 The acceptance and implementation of the strategy, both internally and outside the NRA, when it is published in 1995, is a major issue. Internally, the NRA will need to adopt the recommendations and actions identified within the strategy as part of future work programmes. This will primarily involve Navigation, Recreation, Conservation, Fisheries and Landscape functions. The incorporation of the strategy into the Catchment Management Planning process will also be beneficial. Externally, liaison with bodies such as the Sports Council and Local Authorities is essential.

Conflicts of Use on the River Thames

3.26 There is a need to manage incompatible uses of the River Thames and its immediate surroundings, eg. mountain biking along towpaths, angling and cruising/rowing, etc. The Recreation Strategy identifies potential conflicts and recommends ways to resolve them, largely through the education of river users. Continued liaison with the River User Groups will help achieve this aim.

Demand for Moorings

3.27 This section of the Thames is probably the busiest reach in the region. Within the catchment, there are relatively few permanent mooring sites and temporary mooring is often felt by river users to be expensive. The Recreation Strategy recommends that the development of additional permanent mooring sites be resisted but that the provision of low cost and free visitor moorings at river banks in towns and villages be pursued.

The Provision of Services for Boaters

3.28 In general, the provision of services is felt to be good, with the exception of petrol. Safety requirements for the sale of petrol make it prohibitively expensive to supply and, consequently, there are relatively few locations within the catchment where petrol can be purchased.

Access to Slipways

3.29 There are relatively few slipways along this section of the Thames and access to those which exist is poor. Existing slipways should be upgraded, where appropriate, and information on their locations made freely available to the general public. The location of new slipways will be encouraged only in areas where they will not cause undue disturbance to landscape and/or conservation features.

Caversham Lakes and the Third Thames Crossing

3.30 There is a proposal by Redlands Properties to develop the area known as Caversham Lakes for housing and commercial purposes. This proposal is closely linked to the Third Thames Crossing, to be located between Caversham and Sonning. Two models of the scheme have been produced to enable the effects of the development on the floodplain around Reading to be assessed: the NRA has funded the development of a physical model and the developer's consultants are undertaking a mathematical model of the proposals. There is some opposition to the construction of the bridge and the situation is currently under review.

Drainage Strategy for High Wycombe

3.31 The groundwater in the chalk aquifer around High Wycombe is sensitive to pollution. There is a need for a drainage strategy to address future development in High Wycombe, in an attempt to attenuate peak flows to the River Wye. A multi-functional working group has been set up within the NRA to investigate methods of source control.

Waste Disposal Sites

3.32 There are a number of waste disposal sites within the catchment which are giving the NRA cause for concern:

- redevelopment of a number of old waste disposal sites within the valley gravels in the Marlow area are of interest due to the potential contamination arising from construction activity;
- groundwater contamination from the High Heavens waste disposal site has occurred in the past and the NRA are currently involved in monitoring the situation.

4 CATCHMENT ACTIONS

4.1 This section sets out in table form a summary of recent NRA activity (post 1989), a summary of current NRA activity (1993/94) and a summary of planned NRA activity (1994/95 and beyond).

4.2 Many of these actions have been initiated in response to the issues outlined in the previous sections. However, to address all the issues identified fully, some further action will be required. Suggested recommended actions are put forward in Section 5 of this report.

Table 4.1: Summary of Recent NRA Activity (Post September 1989)

Project	Date Completed	Summary/Comments
Water Resources		
Installation of a flow gauging station on the River Thames at Reading	1991	The flow gauging station was installed to provide more accurate information for the flow constraint which currently exists at Gatehampton
Conservation		
Enhancement works at Cholsey Marsh Nature Reserve	1992	Construction of a wader scrape
Enhancement works at Isingale, upstream of Shiplake	1993	Pond creation
Geomorphology		
Bank Erosion Survey of the River Thames	1993	Data is contained in a map atlas and on a database, providing information on length, type and condition of bank protection
Landscape		
Thames Environment Design Handbook	1992	A reference manual for all those concerned with the heritage and infrastructure of the River Thames
Fisheries		
Fisheries survey of selective sites on the River Pang	1989	
Fisheries Survey of the River Wye	1992	
Installation of trout incubation boxes on the Hughenden Stream following the return of flows to the stream.	1992	The stream was resurveyed recently and has shown excellent survival rates with a biomass figure of 24g/m^2

Table 4.1: Summary of Recent NRA Activity (Post September 1989) (Contd.)

Project	Date Completed	Summary/Comments
Enhancements on the River Wye	1989	Construction of a spawning weir and channel narrowing at Loudwater, downstream of the M40
Recreation		
Market research has been carried out at Hurley and Hambleden Locks	1991	Lock users were counted and interviewed
Renovation of the Horse Bridge at Marsh Lock	1992	

Table 4.2: Summary of Current NRA Activity (1993/94)

Project	Action	Comments
Water Resources		
Alleviation of Low Flows on River Pang	Following negotiations TWUL have voluntarily reduced abstractions at Compton pumping station. This and the return of more typical rainfall averages has resulted in the return of flows in the upper reaches of the Pang. Enhancement works have been carried out and recovery of the river is being monitored through an Operational Investigation.	
Water Resources Strategy	A Water Resources Strategy : " Future Water Resources in Thames Region - A Strategy for Sustainable Management" was published in June 1994	The strategy acknowledges the importance of demand management and leakage control, but also addresses the development of SWORP and catchment transfers
Water Quality		
Hambleden STW	Problems with groundwater incursion have resulted in Hambleden STW failing its discharge consent. The NRA are currently taking legal action against TWUL for breach of consent.	

Table 4.2: Summary of Current NRA Activity (1993/94) (Contd.)

Project	Action	Comments
Compton STW	As a result of heavy rain and sewer infiltration during re-sewering in Compton, the STW has become overloaded and begun discharging to the River Pang (as opposed to the ground via a soakaway). The NRA have granted a temporary consent and are monitoring the situation	
Sampling sites on the Mill Brook	New water quality sampling sites have been set up on the Mill Brook to establish the cause of occasional failures to meet consent conditions downstream of South Moreton STW	
Groundwater pollution	Harwell : activities at UKAEA Harwell (Ock Catchment) have resulted in a plume of solvent contamination in the chalk groundwater to the south of Didcot. This is being monitored by the NRA and a scheme of remediation is in place. High Heavens is a major waste disposal site to the south of Marlow, which has in the past given rise to groundwater contamination. The NRA is currently monitoring the situation.	
Identification of Groundwater Protection Zones	Work is ongoing	
Conservation		
Pang Countryside Management Project	The NRA have co-funded this venture which aims to modify land management practices in the Pang Valley. The project has proved to be a success, with representatives from many organisations working together towards a common goal.	It is hoped that similar schemes could be applied to other catchments
Bat Box Project	The NRA have undertaken a scheme of constructing bat boxes on lock and weir sites along the Thames, eg. at Sonning and Shillingford locks. The boxes in this reach do not appear to have been as successful for breeding as in other areas, eg. Shifford Lock. However, there is evidence the boxes are being used for roosting.	

Table 4.2: Summary of Current NRA Activity (1993/94) (Contd.)

Project	Action	Comments
Barn Owl Box Project	The NRA commissioned the Hawk and Owl Trust to carry out a study and place owl boxes along the River Thames downstream of Sonning. These boxes are being used.	The Barn Owl Box scheme may be extended
Reed Beds at Child Beale Wildlife Park	The NRA are advising on the management of the reed beds. This is necessary to control natural succession and prevent the beds drying out.	This reed bed area is one of the largest in Berkshire
Landscape		
Landscape Assessment	A landscape assessment of the River Pang was carried out in 1993 as part of the ALF scheme	
Landscape works at Hurley Lock	A landscape scheme was undertaken and works were carried out to allow disabled access to the lock	
Fisheries		
River Pang	The River Pang was recently restocked with 3,000 4-5" brown trout, fin clipped for identification	Numbers will be monitored
Fish Pass - River Wye	The NRA recently negotiated the construction of a fish pass at Soho Mill, included within a development proposal as planning gain	
Fisheries Survey of the Mill Brook	Carried out as part of the South West Oxfordshire Reservoir proposal	
Recreation		
Recreation Strategy	The draft Recreation Strategy for the River Thames was published for consultation in October 1994. The target date for the release of the final report is 1995	This is a joint venture between the NRA, the Sports Council and the Greater London Regions
Pedestrian Counts	There is an on-going survey of people passing through Hurley Lock, by an infra-red counter	
Navigation		
Rebuilding of Hambleden Lock	Enlargement, maintenance and landscape works have been carried out to Hambleden Lock	
Lock refurbishment and repair	A rolling programme of works is in operation	
Records of boat traffic passing through locks on the Thames	Records of the types of craft passing through locks on the River Thames have been kept since the 1940s	

Table 4.2: Summary of Current NRA Activity (1993/94) (Contd.)

Project	Action	Comments
Planning and Flood Defence		
Caversham Lakes/Third Thames Crossing	The NRA are carrying out physical modelling of the floodplain through Reading to determine the impacts of the development on flooding. The developer (Redlands Properties) is financing the development of a mathematical model by Peter Brett Associates.	
Production of Thames 21	NRA (Thames Region) have recently published a consultation document entitled : "Thames 21 - A Planning Perspective and a Sustainable Strategy for Thames Region."	
Flooding study of the River Pang at Pangbourne	A study is being carried out with the aim of alleviating flooding in the village. Any solution will need to take environmental factors into account.	

Table 4.3: Summary of Planned NRA Activity (1994/95 and Beyond)

Project	Timescale	Comments
Water Resources		
Monitoring of flows on the River Wye	1994-97	Eight groundwater monitoring sites and two river flow gauging sites will be installed on the river within the next three years to enable flows to be monitored and to allow further assessment of low flows on the River Wye
Water Quality		
Eutrophication of the River Wye and River Thames	On-going	A monitoring programme has been established to provide more data by 1997. A study is also to be carried out over the next three years to determine whether phosphate removal at STWs will affect levels of eutrophication.
Vastern Ditch	On-going	The NRA have commissioned CCTV surveys of the culverted section of the Vastern Ditch to attempt to establish the source of repeated oil pollution events.
TWUL AMP 2	On-going	Liaison with TWUL to agree priorities for improvements
Conservation		
Enhancements have been proposed for the River Wye through Kingsmead Recreation Ground	1995/96	A hydraulic model of the river is currently being produced to ensure the proposed enhancements will not increase the risk of flooding in the area
Restoration of water meadows at "The Dairies" along the Pang Valley	1995/96	This will be a joint project between the landowners, the Pang Countryside Management Project and the NRA
Restoration of the island used by swans at Caversham	1995	Reading Borough Council in conjunction with the NRA are addressing the issue
Landscape		
Landscape assessment of catchment	1996/97	Scheduled to coincide with the production of the CMP
Fisheries		
Designation of River Wye under the Fisheries Directive	1995	

Table 4.3: Summary of Planned NRA Activity (1994/95 and Beyond) (Contd.)

Project	Timescale	Comments
Fisheries Survey of the River Thames	1995/96	
Recreation		
Completion of the Thames Path	1996	
Publication and Implementation of the Recreation Strategy for the River Thames	1995	The acceptance and implementation of the strategy will be a major issue
Planning		
Update information on areas liable to flooding	On-going	Surveys will be carried out under Section 105 of the Water Resources Act 1991 and as detailed in the Memorandum of Understanding on Flood Risk and Development

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 There are clearly a range of problems and issues within the study area, including the alleviation of low flows on the Pang and Wye, improvements in habitat and water quality on the Wye, the impact of sewage treatment works on the water environment, erosion of instream islands on the River Thames, the management of lock and weir sites, the implementation of the Recreation Strategy and the implications of development proposals in Reading and High Wycombe.

5.2 This section summarises, in tabular form, recommended actions to be taken to address the issues identified in Section 3. These recommendations are in addition to those actions identified in Section 4, which are either underway or planned.

Table 5.1: Summary of Recommendations

Project	Action	Priority/Timescale
Water Resources		
Rain gauges	There is a need for additional rain gauges within the Thames sub-catchment	Medium term
Water Quality		
Vastern Ditch	Reinstate existing wooden baffles in the open section of the channel. Trace and contain the source of pollution. Removal of contaminated silt and mud from the culvert.	Medium term project
River Wye	Work towards generally improving water quality	Long term
Conservation		
Mill Brook	Promote buffer zones and enhancements	Long term project
Pang Countryside Management Project	Apply the principle of the Pang Countryside Management Project to another catchment	Medium term project
River Thames - in channel islands	Establish a working group to address the problem and identify possible actions.	Medium term project

Table 5.1: Summary of Recommendations (Contd.)

Project	Action	Priority/Timescale
Habitat enhancements on the River Wye		Long term project
Geomorphology		
Geomorphological survey of the Rivers Pang and Wye		Long term project
Landscape		
Management plans for lock sites	Production of multi-functional landscape plans for lock and sites within the catchment.	High Priority - to be carried out in conjunction with the rolling programme of lock and weir works.
Safeguard the unique landscape character of the lock and weir sites	Ensure the use of appropriate materials when capital works are undertaken (see Thames Environment Handbook).	High Priority
Fisheries		
Pollution in the River Wye	Undertake detailed investigations into PCB, heavy metal and pesticide concentrations in fish in the River Wye	High Priority
Recreation		
Implementation of the Recreation Strategy	Consultation and collaboration with other functions is essential for the successful implementation of the strategy	Long term project
Managing the conflicts of interest on the River Thames		Long term project

Table 5.1: Summary of Recommendations (Contd.)

Project	Action	Priority/Timescale
Navigation		
Provision of slipways to allow access to the River Thames	Investigate opportunities to provide additional slipways and upgrade those existing.	Medium term
Provision of additional temporary moorings	Investigate opportunities to provide additional mooring facilities	Medium term
Provision of additional petrol sales points	Investigate opportunities and alternatives (possibly including financial assistance from the NRA)	Medium term
Planning		
Drainage Strategy for High Wycombe	The multi-functional working group established to look at source control, should address this issue	Medium term