

RIVER TEST CATCHMENT MANAGEMENT PLAN PHASE 1



NRA

*National Rivers Authority
Southern Region*

**Guardians of the
Water Environment**

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**River Test Catchment Management Plan
 Phase 1**

December 1991

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ORD

ed in 1989 to preserve and improve the
 and property from flooding. In its role
 the NRA is committed to establishing
 management and development of river

Due for return

~~9 AUG 96~~

ans will be a catalyst for achieving
 As a vehicle for consultation they will
 on the way ahead and as a planning
 ing commitment from all parties to

in the country as a whole. I look forward
 people and organisations most closely
 gs. As a shared vision of the future, the
 otecting the nation's water heritage and
 e river environment.

Grainger Davies

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ENVIRONMENT AGENCY



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River Test Catchment Management Plan
Phase I



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I CATCHMENT MANAGEMENT PLANS : INTRODUCTION TO CONCEPT



- I.1 The Water Act 1989 established the National Rivers Authority (NRA) to have responsibility for those operational and regulatory functions relating to the water environment which were formerly exercised by the now defunct regional water authorities. These are water resources, water pollution control, flood defence, fisheries, water recreation and in some areas navigation. In addition, the Act laid on the NRA more demanding duties towards the conservation of the natural environment, include that of seeking opportunities for enhancement where possible. The NRA's Mission Statement and Aims relating to these functions are appended.

With the separation of these functions from the customer-orientated ones of water supply and sewerage, it became clear that a new basis for planning was called for. With the exception of its coastal responsibilities for sea defence and coastal water pollution control, all the functions of the NRA fit into the geographical framework of the river catchment. There is a close interaction between these functions in any catchment, as well as the potential for conflict. It has accordingly been decided to plan for services, standards and activities on this basis.

The NRA (Southern Region) has initiated an exercise to prepare integrated River Catchment Management Plans on a pilot basis for six of its significant catchments. It is intended that there should be full consultation with interested outside organisations, as well as with the general public, before these are published in definitive form. This document, which results from extensive internal study and consultation, is now offered for comment.

- I.2 These Plans are produced using the same general procedure:-
- Identify **USES**, both actual and potential.
 - Identify **ENVIRONMENTAL REQUIREMENTS** for each use, in relation to Water Quality, River Flow, River Topography and River Management.
 - Integrate the environmental requirements for all uses to give **OVERALL TARGETS** for the catchment.
 - Assess the **PRESENT STATE** of the catchment against these targets.
 - Identify **PROBLEMS** and **CONFLICTS**.
 - Set out **MANAGEMENT OPTIONS** for the future strategy for the catchment.
- I.3 The uses described in the plans are arranged loosely according to the following general themes;
- Geographical Context
 - Ecology
 - Recreation
 - Water Resources
 - Flood Defence and Land Drainage
 - Water Quality
 - Other Catchment Activities

For each of the **USES**, there is a diagram of the catchment, accompanied by no more than two pages of text. The diagram shows broadly where the **USE** takes place in the catchment and some additional data where this is appropriate.

I CATCHMENT MANAGEMENT PLANS : INTRODUCTION TO CONCEPT



The text is divided usually into 4 sections:

General. This describes some of the general characteristics of the USE and any relation it may have to other USES in the plan.

Local Perspective. This describes how the USE manifests itself within the particular river catchment.

Environmental Objectives. This identifies the overall objective for the USE and relates to the aims in the Mission Statement of the NRA.

Environmental Requirements. This details the specific requirements to enable the USE to take place in the catchment.

1.4 The Environmental Requirements relate to the following characteristics of the river:

Water Quality. The chemical and biochemical conditions in the river itself or in the groundwater of the catchment.

River Flow. The flow of water in the river including its variation throughout the year.

River Topography. The physical characteristics of the river such as its width and depth; weirs; locks; natural features like pools and riffles; footpaths.

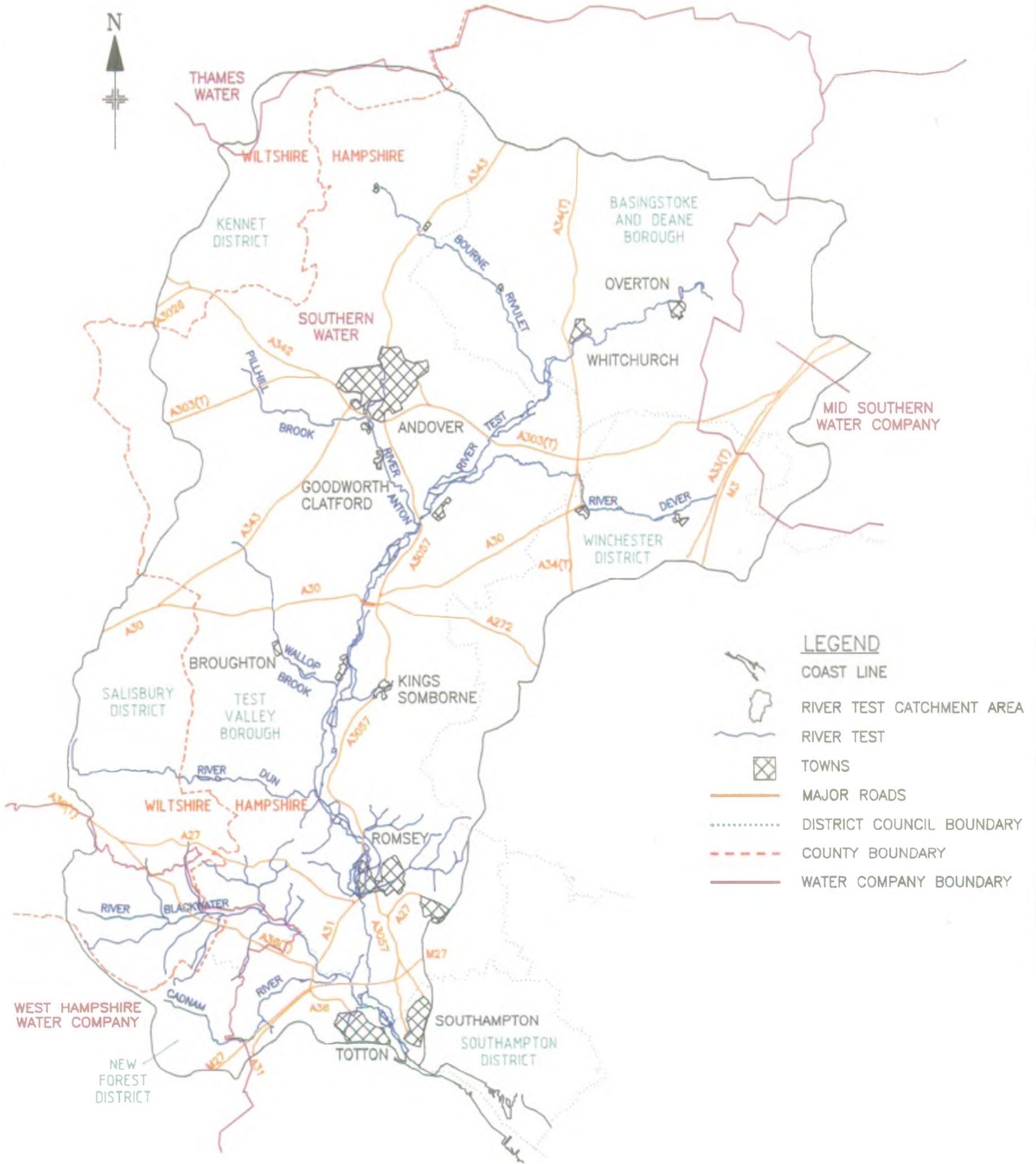
River Management. The regular activities carried out on the river such as weedcutting; control of water levels; fish stocking.

The requirements for each USE are collated to create the OVERALL TARGETS for the catchment.

1.5 The PRESENT STATE of the catchment is assessed by comparing data with the OVERALL TARGETS. This identifies PROBLEMS due to failures to meet targets and CONFLICTS where different USES have opposing requirements. MANAGEMENT OPTIONS are then suggested to resolve these PROBLEMS and CONFLICTS.

1.6 The results of studies to this stage are released for PUBLIC CONSULTATION in draft form as the PHASE I PLAN, and this is such a document for the TEST catchment. Whilst every care has been taken to ensure that information in this Plan is correct, the NRA accepts no responsibility for any omissions or errors.

1.7 Following the PUBLIC CONSULTATION and discussion with relevant organisations, an optimum strategy will be presented in a formal PHASE II PLAN. This will represent NRA policy for the catchment and can be considered as a Plan of Action. It is envisaged that the PHASE II PLAN for the Test will be produced within twelve months of the release of this PHASE I PLAN.



- LEGEND**
-  COAST LINE
 -  RIVER TEST CATCHMENT AREA
 -  RIVER TEST
 -  TOWNS
 -  MAJOR ROADS
 -  DISTRICT COUNCIL BOUNDARY
 -  COUNTY BOUNDARY
 -  WATER COMPANY BOUNDARY

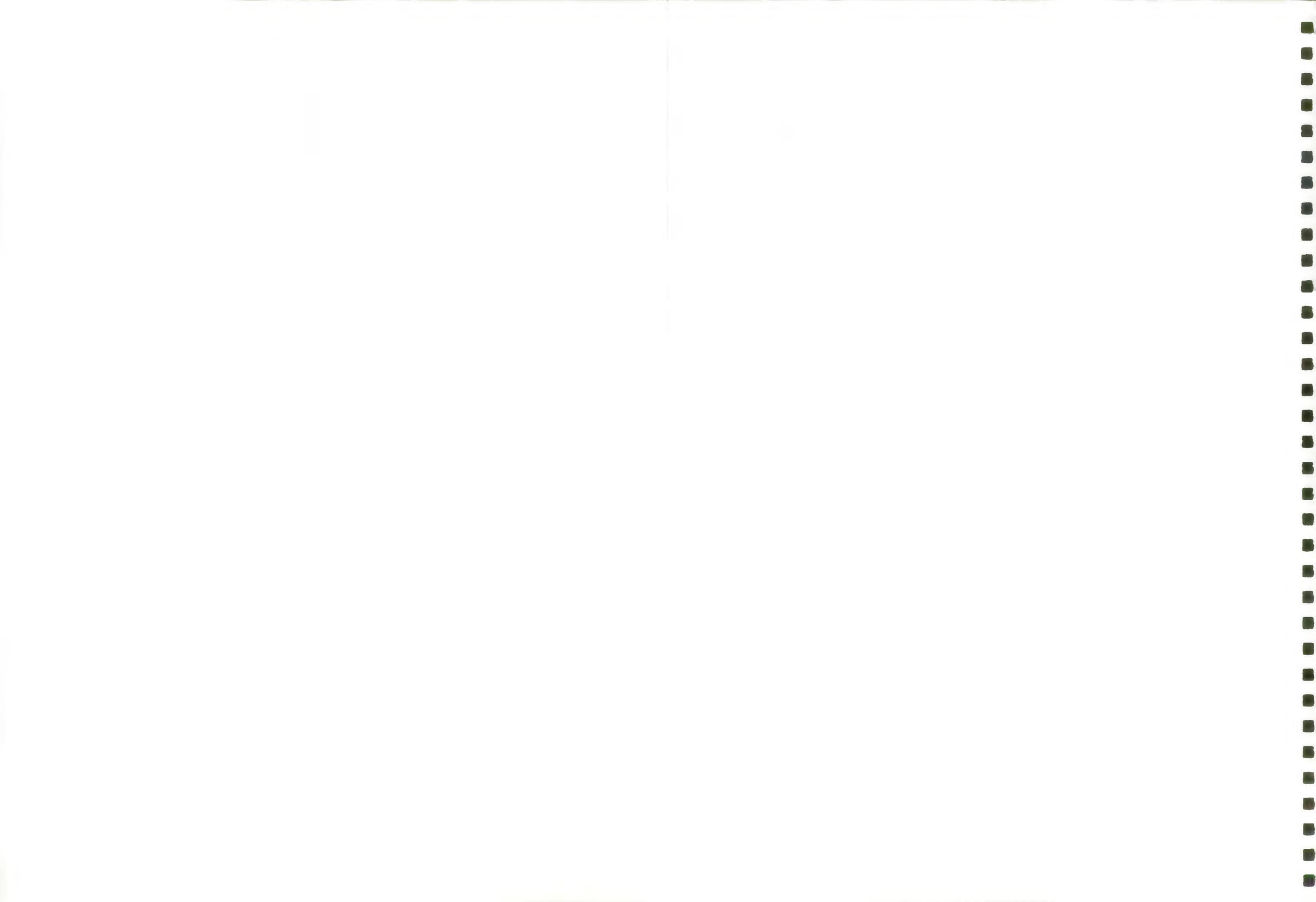


FOREWORD



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1. TEST CATCHMENT : FOREWORD



The River Test is considered by many people to be the finest chalk stream in the world. At a recent public meeting, Lord Crickhowell, the Chairman of the National Rivers Authority, said that the Test should be treated as "a great work of art or music". Rising in the village of Ashe near Overton it flows across the chalk downlands collecting spring fed tributaries on its way to the sea at Southampton Water. The river is famous for its seclusion, crystal clear waters and excellent game fishing.

Although the river and its valley is of great natural interest, it is, and always has been, a very man-managed environment. Centuries ago the water meadow system was developed to provide farmers with a lush, early crop of spring grass to feed to their livestock. The river water was diverted across the meadows through a network of channels and hatchways. This skilled operation was carried out by "drowners" and gave the meadows a supply of mineral-rich silt and sediment from the river. This process not only provided benefits for the farmers but helped the river by filtering-out much of the silt and sediment washed off the upland fields. The labour-intensive nature of the water meadows system, however, led to it becoming unprofitable and eventually being abandoned. The legacy is a network of streams and carriers which were part of the system.

The river, with its strong year-round flow, once powered many mills for wool processing, tanning and flour milling. None of these traditional mills have survived in working condition, but the mill heads and leats remain a feature of the river.

It is the high quality game fisheries, however, that have made the River Test justifiably famous. Game fishing has been a regular activity on the river for at least 200 years and it is really considered the home of dry fly fishing. Before the advent of dry flies, blowlines and natural flies tended to be used. To improve conditions for this type of fishing, many of the trees alongside the river in the lower and middle sections of the valley were cut down. Whilst the change to dry fly fishing has led to the replanting and re-establishment of many of these trees, it does demonstrate the extent to which the valley has been managed to provide the ideal environment for game fishing. This environment is maintained by the river keepers of the various estates and clubs which own the fishing rights along the river.

The NRA and riparian owners have committed substantial resources to researching the status of salmon stocks and to their protection. Anti-poaching patrols are carried out on tidal waters and along all reaches of the river. As part of a fisheries management programme, hatchery reared salmon are restocked to the river. Fish passes have been installed at weirs and river structures to assist the passage of migratory fish to their spawning grounds.

A problem faced by salmon and the native brown trout is that the gravel areas in which they spawn have tended to silt. Chalk streams have a natural silt load and river keepers traditionally raked gravels to prepare for the spawning season. This practice has slipped into abeyance in recent years because of manpower and resource limitations on some estates. The NRA is investigating mechanical raking as an alternative to traditional methods.

The post-war drive to improve agriculture also affected the river. In the late 1940's a scheme was carried out in much of the lower and middle sections of the Test to reduce water table levels in the adjacent fields. The dredging that the scheme involved changed the characteristics of the river by making the river deeper and therefore slower moving. The damaging effects of this work are still apparent in the river today.

The Upper Chalk, which outcrops over the whole of the valley to the north of Mottisfont, provides the river with its supply of crystal clear water. In addition to the Test itself, a number of small spring-fed tributaries join the river on its passage southwards; the Bourne Rivulet, the Dever, the Anton, the Wallop Brook and the Somborne Stream. Downstream from Mottisfont there are younger rocks of tertiary origin, such as silts, clays and sands which are much less permeable than the chalk.

1. TEST CATCHMENT : FOREWORD



Apart from evaporation, almost all of the annual rainfall that falls on the Chalk catchment soaks into its deeper layers which are fully saturated with water. The water moves through the Chalk under the influence of gravity until it issues from springs in the valley bottoms, feeding the river system with high quality water.

Generally rain takes several months to find its way through the Chalk to the springs, so the winter rainfall which swells the underground reserves gives peak river flows in late spring and into the summer. The water is clear, hard and alkaline and its temperature varies little between seasons.

The development of South Hampshire, based historically on rail and sea links, but more recently on the improved road network, generates a demand for water for domestic and industrial use. The chalk streams provide much of the water used in Hampshire, particularly from their lower reaches. Some water is also pumped from boreholes penetrating the chalk aquifer.

The NRA is now the licensing Authority for all abstractions and considers the environmental aspects of a proposed abstraction and its effect on other lawful water users. In order to protect river flows, restrictions are attached to licences to ensure that water is only taken from specified locations and at times when it can be spared.

The NRA sets objectives for water quality to protect the natural environment of the river and the uses to which it is put. The highest objective in the classification is Class 1A. Altogether, 135 km of the 139 km of the River Test have this objective. To achieve these standards, the NRA sets limits known as 'consent conditions' on all permitted discharges, restricting their strength and quantity.

There is little manufacturing industry on the River Test, the only significant discharge in this category being from a paper mill at Overton.

The catchment is predominantly rural with a population spread across small towns and villages in the North, or concentrated in the conurbations alongside Southampton Water. There are two substantial discharges of treated sewage effluent made directly to the river; at Andover and Romsey.

The largest volume of returned water is from the ten fish farms in the catchment and watercress farms on the Bourne Rivulet and River Anton. The high quality, the temperature profile of the river water, and proximity to markets make the valley ideal for these activities which bring economic benefit to the area.



LEGEND



- COAST LINE
- RIVER TEST CATCHMENT AREA
- RIVER TEST
- TOWNS
- MAJOR ROADS
- DISTRICT BOUNDARIES
- COUNTY BOUNDARIES

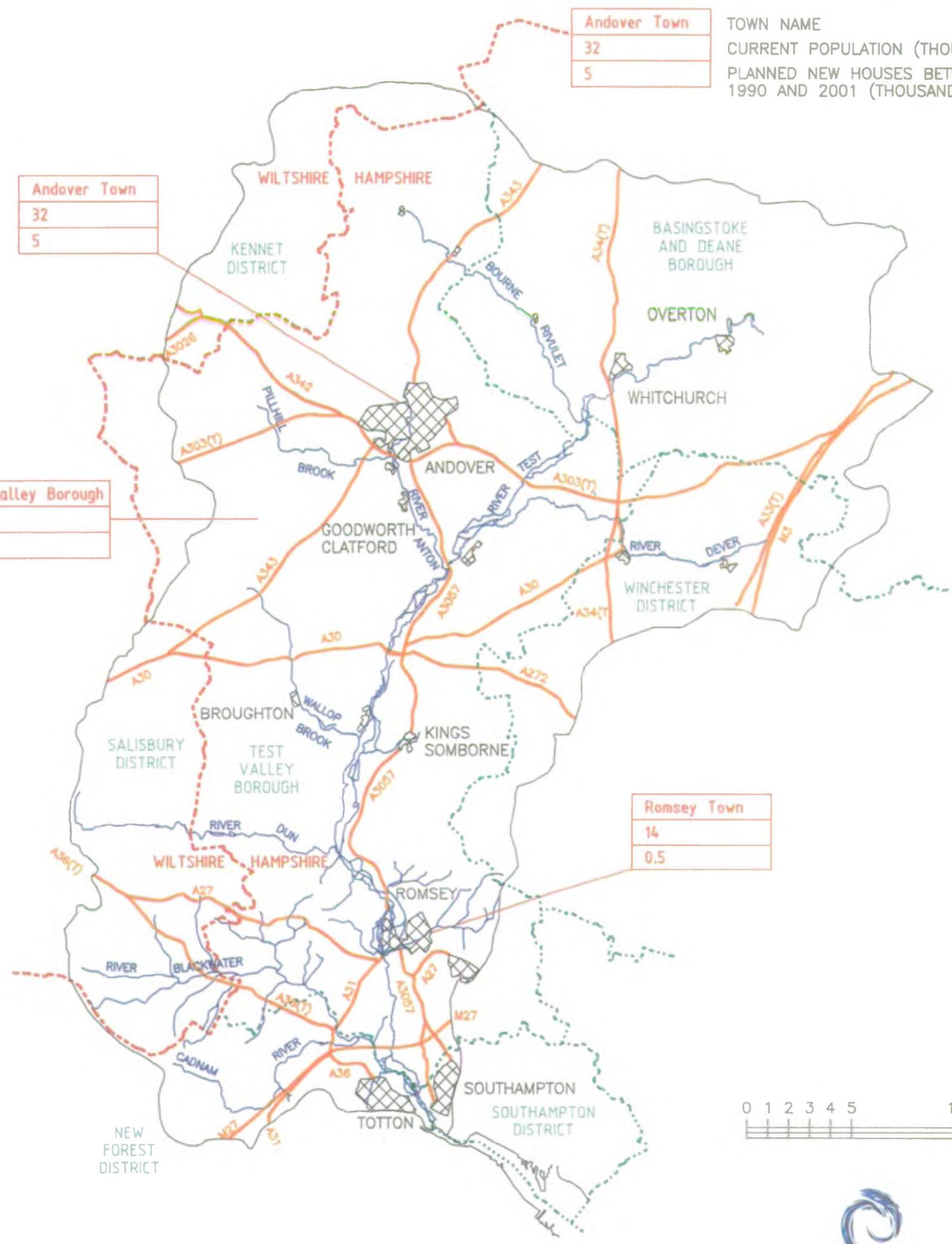
Andover Town
32
5

- TOWN NAME
- CURRENT POPULATION (THOUSANDS)
- PLANNED NEW HOUSES BETWEEN 1990 AND 2001 (THOUSANDS)

Andover Town
32
5

Test Valley Borough
101
5.4

Romsey Town
14
0.5

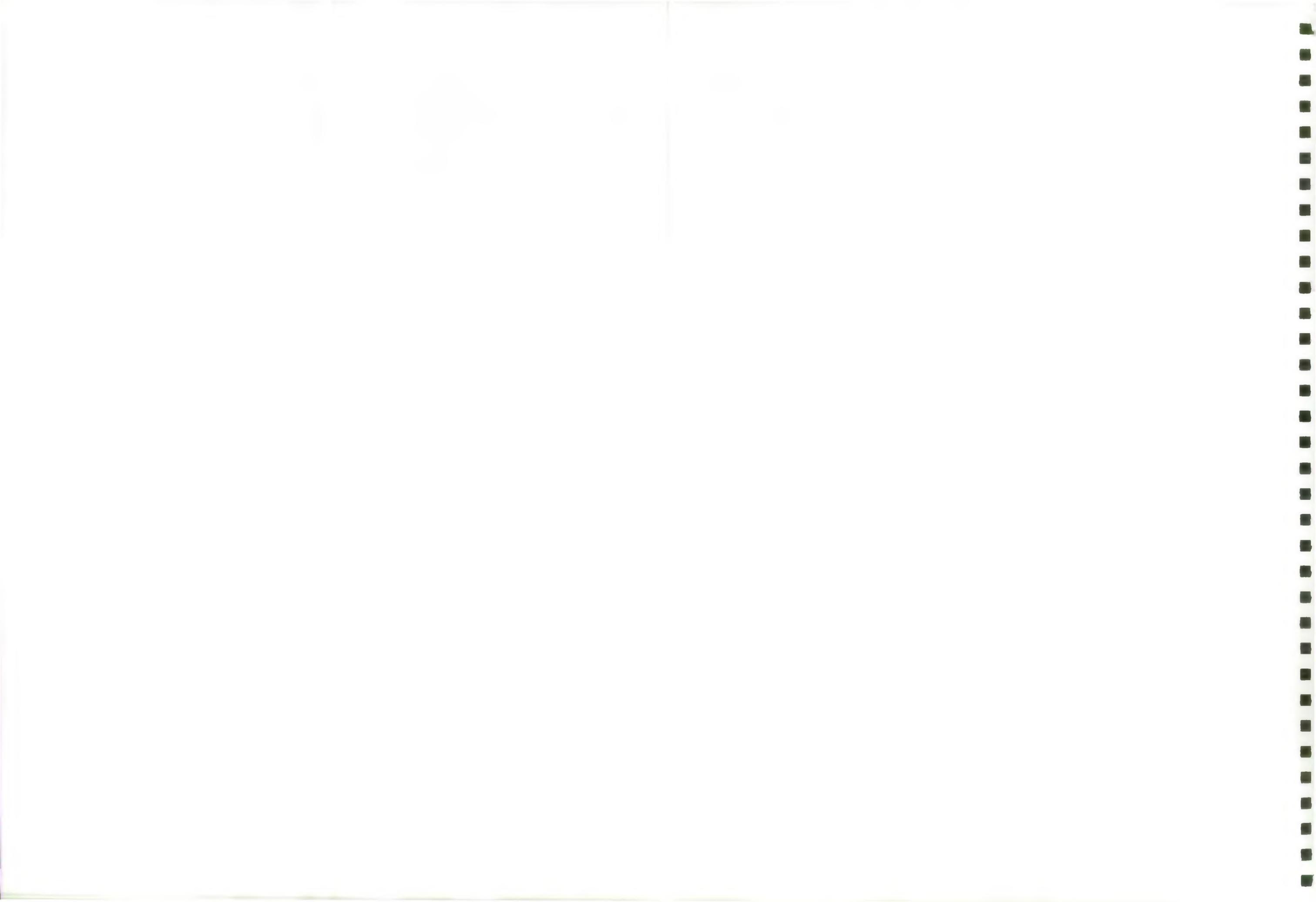


**FUTURE DEVELOPMENT OF HOUSING,
INDUSTRY & COMMERCE**



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2. FUTURE DEVELOPMENT OF HOUSING, INDUSTRY AND COMMERCE



2.1 General

The planning of uses within a river catchment must be related to development planning on a wider basis, particularly on a District and County level. The use identified here relates to the predicted future commercial and residential development within the catchment as outlined in the respective published District Local Plans and County Structure Plans. The policies of the planning authorities towards Recreation, Countryside, Conservation, Waste Disposal and Mineral Extraction are covered in relevant sections within this Plan.

The NRA is consulted routinely by local planning authorities for development which may have an impact on NRA functions, although the final decision on planning matters is made by the local authority. However, if the development entails an abstraction or impoundment, a discharge or necessitates work on or near a watercourse then a consent or licence is required from the NRA.

It should be noted that any development within the County and Districts will be permitted normally only where it complies with the objectives and policies of the planning authority as it relates to environmental protection.

2.2 Local Perspective

The Test Catchment is situated mainly in the county of Hampshire, with its extreme western boundary in the county of Wiltshire. The catchment covers the districts of Basingstoke and Dean, Test Valley, Southampton, New Forest, and at the extreme eastern boundary, the district of Winchester. The Hampshire Draft County Structure Plan 1990 recognises that growth in the county has been rapid and extensive in the past decade. Indeed, the major population centres of Basingstoke, in the north of the county and Southampton/Portsmouth, in the south have been among the most rapidly expanding areas in south east England. Approximately 90,000 new homes were built in Hampshire in the 1980's at an average rate of 9,000 houses per year. The Draft Structure Plan seeks to reduce the previous rate of growth whilst consolidating the increased prosperity in Hampshire. Although a modest increase in population is expected, the rate of growth will be somewhat below that of the recent past. It is anticipated that 66,000 new homes will need to be built in Hampshire between 1990 and 2001, dropping to an annual rate of 3,500 new homes per annum by the end of this period.

In the districts forming the Test Catchment, the share of this total is as shown in the following table:

Basingstoke and Dean	8350
New Forest	8250
Southampton	7100
Test Valley	5350

Much of this growth is likely to be accommodated by infill and renovation in urban areas and small developments in the fringes of villages and rural towns, with emphasis being away from any large-scale developments in greenfield sites. Most of the above allocation will be provided outside the Test Catchment although up to 5000 new houses are expected at Andover.

It should be noted that any development within the County and Districts will normally be permitted only where it complies with the objectives and policies of the planning authority as it relates to environmental protection. In particular, the catchment plan should be read within the context of both County and District policies regarding recreation, countryside, conservation, waste disposal and mineral extraction.

2. FUTURE DEVELOPMENT OF HOUSING, INDUSTRY AND COMMERCE



2.2 Local Perspective (continued)

The allocation of water resources in Hampshire as a whole, and the Test Catchment in particular, is of considerable concern. This constraint on development is not dealt with explicitly in the County or District Plans.

One proposal of note is the possibility of a 5000 home development at Micheldever. This does not feature in the Test Valley or Hampshire County Structure Plans and, indeed, runs contrary to the policies established for the County. The provision of water supply for this development will be a major issue.

2.3 Environmental Objectives

- To control the future development of housing, industry and commerce within the catchment in such a way that other uses are not compromised.

2.4 Environmental Requirements

Water Quality

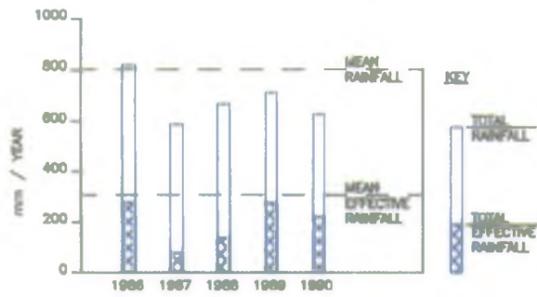
- New development must have regard to the existing effluent disposal strategy.

River Flow

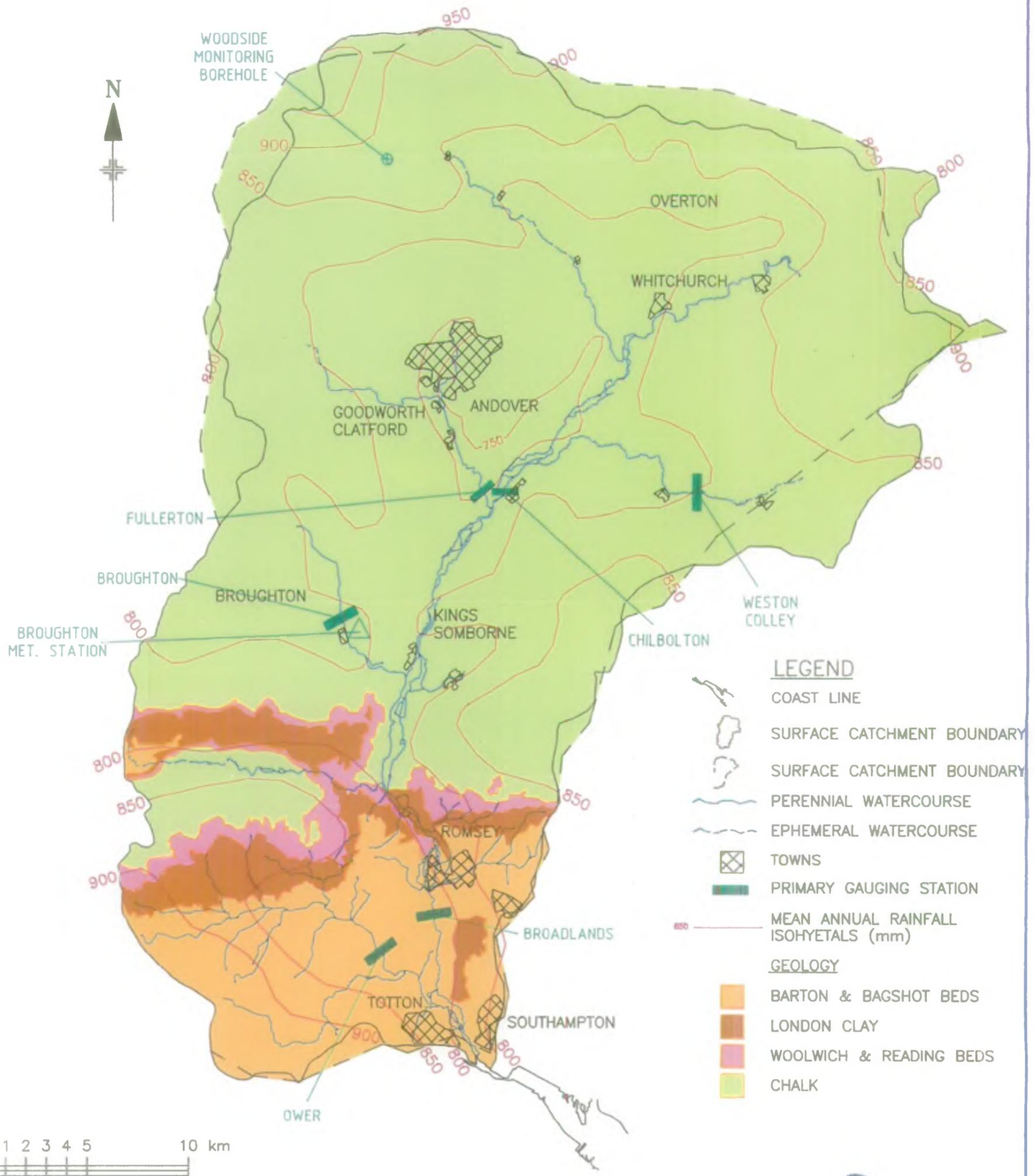
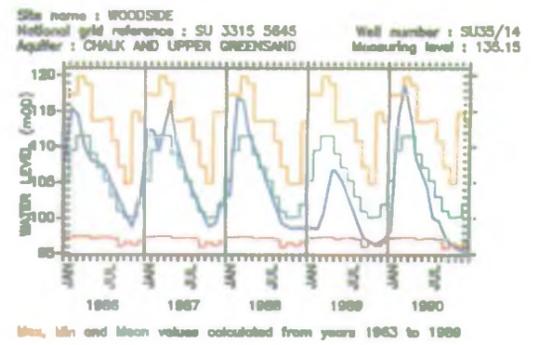
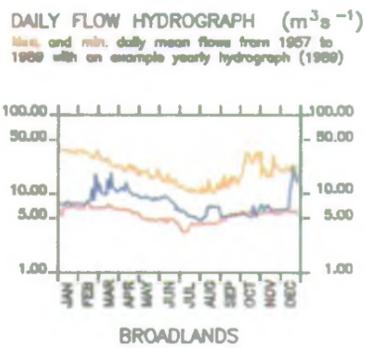
- Development must have regard to the availability of water resources.

River Topography

- No new development to be in the flood plain unless adequate measures are taken to ensure no increase in flood risk.
- No significant increase in flood risk as a result of surface water discharges from new development.
- New development not to reduce the conservation value of the river corridor.



Rainfall Record from Broughton Station
Actual Evapotranspiration Data from MCRECS Database

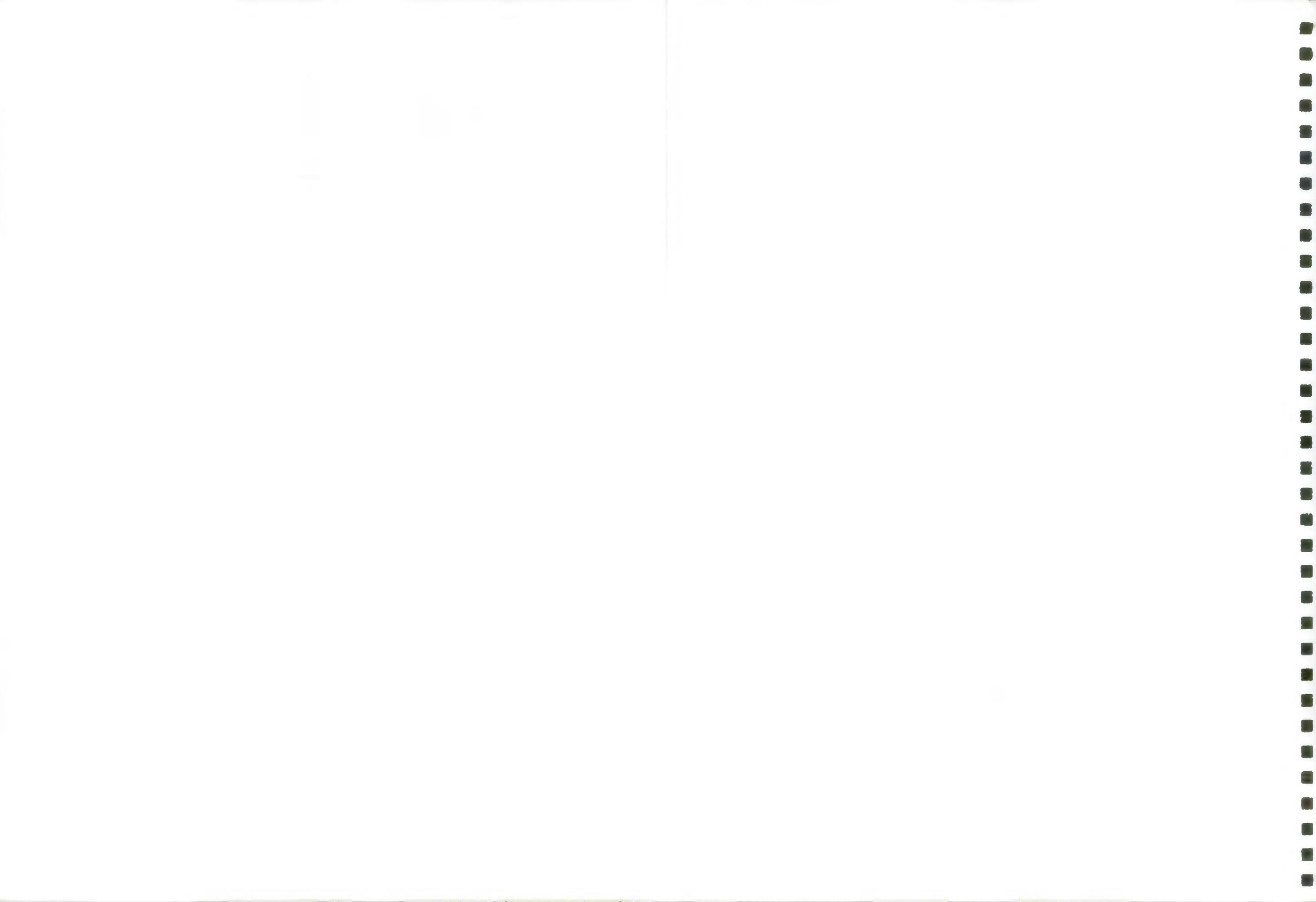


CATCHMENT HYDROLOGY & HYDROGEOLOGY



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3. CATCHMENT HYDROLOGY AND HYDROGEOLOGY



3.1 General

This section considers the main features of the natural water resources within the catchment. A proportion of the rainfall falling on the catchment is subsequently lost as evaporation and transpiration. The remainder, termed the effective rainfall, is the total available water resource to the catchment as either surface run-off or groundwater recharge.

The allocation of effective rainfall between surface and groundwater is largely dependent on the nature of the surface geology. Low permeability clay and silt areas result in a high run off component to a well developed surface drainage system. Chalk and some sand catchment areas allow a higher proportion of recharge to groundwater. The surface drainage system is less well developed therefore, and a large part of the river flow is derived by upward outflow from the groundwater aquifer. This outfall can occur from springs or through the bed of the river and is known as baseflow.

Surface flows in clay catchments respond rapidly to both high rainfall and drought periods. The water resource available to the supply company at a river intake shows considerable seasonal variation. These catchments are referred to as 'flashy' in character. The water supply can be enhanced by the construction of reservoirs to store water during the periods of high flow for use during the low flow periods.

Groundwater aquifers provide a natural storage volume for the catchment. Groundwater systems react much more slowly to high rainfall and generally provide a more reliable resource during drought periods. Recovery from drought periods may also take longer however. These catchments are considered to be 'baseflow controlled'.

3.2 Local Perspective

The River Test rises near Overton and flows southwestwards across the Upper chalk outcrop on the southern flank of the North Downs ridge. The river is joined at Hurstbourne Priors by the Bourne Rivulet and further downstream by the Rivers Dever, Anton and Wallop Brook.

The river system upstream of Kimbridge is fed almost entirely by chalk groundwater baseflow and consequently the catchment is unresponsive to rainfall and the maximum flow in any one year is only 4 to 5 times the minimum.

One of the flow characteristics of the upper reaches of the chalk catchment is the ephemeral nature of surface flows in response to the large seasonal variations in groundwater levels. The groundwater hydrograph at Woodside in the upper reaches of Bourne Rivulet, for example, illustrates an annual range in groundwater levels of approximately 15 metres. Artificially reduced flows have been identified along short reaches within both the Wallop Brook and Bourne Rivulet sub-catchments due to abstractions from large individual sources and these catchments are being considered by the NRA in two separate studies.

Downstream of Kimbridge the Test flows off the chalk and on to a varied clay, silt and sand catchment comprising London Clay and the overlying Bagshot Beds. The River Dun which joins the Test at Kimbridge flows across both the London Clay and Upper Chalk and receives both chalk baseflow and run-off from the clay part of the catchment.

3. CATCHMENT HYDROLOGY AND HYDROGEOLOGY



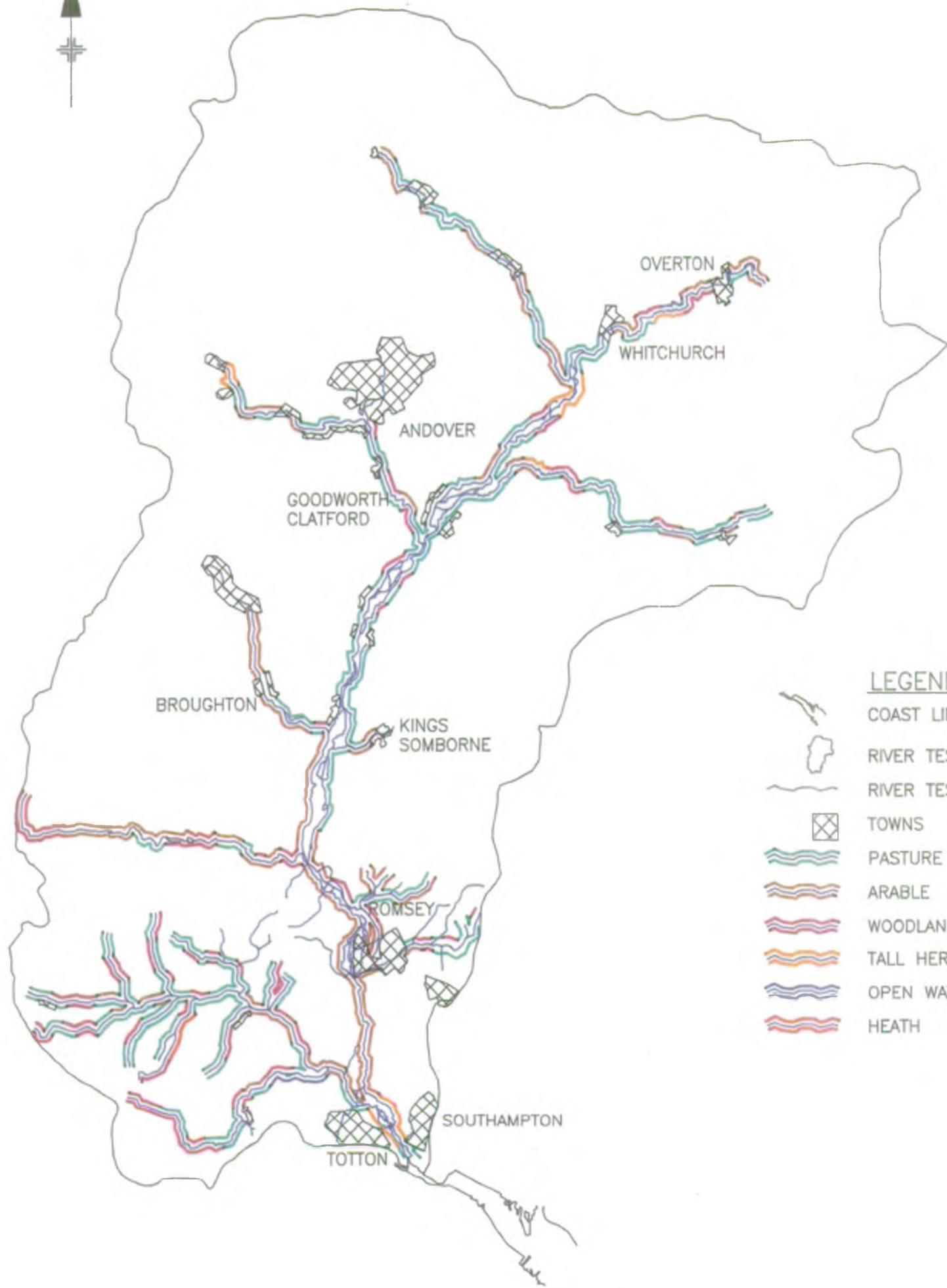
3.2 Local Perspective (continued)

The main gauging station for the Test is at Broadlands and has operated since 1957. The flow records are primarily chalk baseflow with a small component of rapid runoff from the lower reaches of the catchment.

The flashy clay and sand catchments of the Blackwater and Cadnam Rivers join the Test downstream of Broadlands.

3.3 Recent Meteorological Conditions

The mean rainfall across the catchment is fairly constant, varying from over 900mm in the upper parts of the Hampshire Downs to 750mm in the Test Valley. Both the actual and effective rainfall over the last 4 years were consistently below the mean. The groundwater levels, as monitored at Woodside, held up between 1986 and 1988. The main reason for the reduction in both surface and groundwater flows in 1989 was the significantly reduced rainfall during the previous winter. High rainfall in December 1989 significantly increased the annual total and also resulted in a recovery in groundwater levels in the following January. Groundwater levels fell subsequently to below the previous minimum for November and December, an occurrence which is not yet fully understood.



LEGEND

-  COAST LINE
-  RIVER TEST CATCHMENT AREA
-  RIVER TEST
-  TOWNS
-  PASTURE
-  ARABLE
-  WOODLAND
-  TALL HERB / REEDBED
-  OPEN WATER
-  HEATH

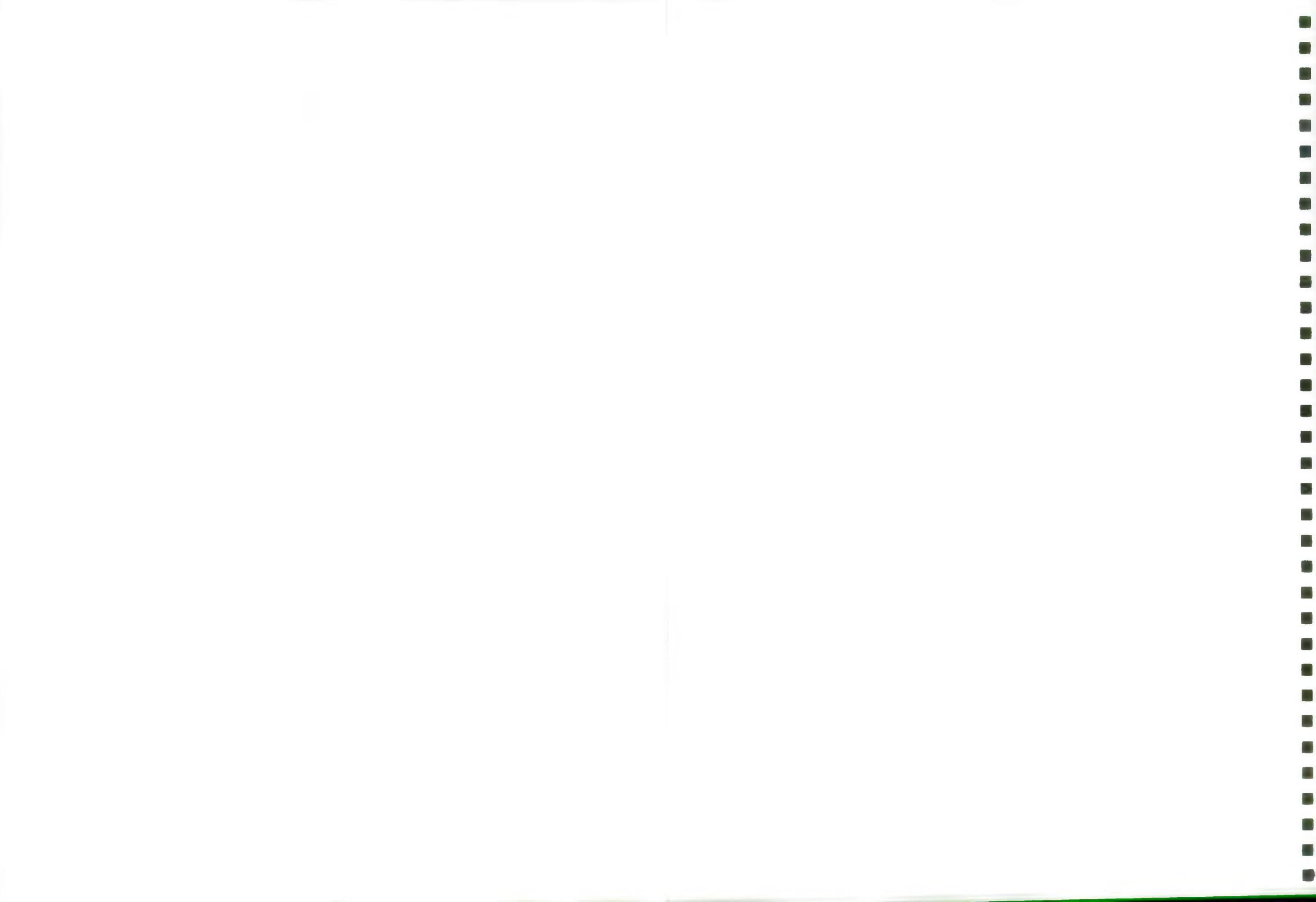


RIVER CORRIDOR CONSERVATION



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4. RIVER CORRIDOR CONSERVATION



4.1 General

This use relates to the protection of all aquatic flora and fauna along with dependent organisms in the river corridor. These dependent organisms range from animals such as watervoles, kingfishers and wagtails, which are dependent upon the river itself, to plants and animals able to exploit the river banks. A healthy river and adjacent corridor environment are characterised by ecologically diverse and abundant plant and animal communities which enhance the overall quality of the landscape.

The character of the river and its corridor is highly dependent upon the adjacent land use and the type and frequency of river works undertaken. Rivers have been managed and used by man for thousands of years. The creation of water meadows and wet pasture, pollarded willows and mills, all added to the diversity and quality of the environment, both ecologically and visually. However, more recent measures like realignment, removal of bankside trees and draining of wetlands have significantly altered parts of this environment. These measures are often carried out to improve the drainage of land in the river corridor to allow for more intensive agricultural use. This adjacent land use can also influence the ecological character of the river.

Modern farming has often led to the removal of corridor vegetation and utilisation of the land up to the banks of the water course. This practice effectively removes beneficial shading and cover from the river and can often result in increased soil erosion and runoff from the surrounding land.

The map opposite identifies in broad terms the land use adjacent to the river. This provides an indicator of the ecological and landscape value of the river corridor with, for instance, woodlands and tall herbs encouraging a greater diversity than permanent pasture. Similarly, pasture usually provides better quality habitats and landscapes than intensively cultivated land.

The NRA's conservation duties are set in sections 8 and 9 of the Water Act 1989. It requires the NRA, whilst carrying out its own functions or dealing with proposals by others, to further the conservation of flora, fauna, geological and physiographical features of special interest, and the enhancement of natural beauty.

Consideration of the impact of all proposals is also required to encompass the impacts on the man made environment including buildings, and sites and objects of architectural or historic interest. In addition the NRA must also comply with national and international agreements or legislation, as discussed in Section 5.

The Countryside Stewardship Scheme is operated by the Countryside Commission and offers grants to landowners for the preservation and re-creation of natural landscapes and wildlife habitats including waterside areas.

4.2 Local Perspective

With the source of the Test and five of the six principal tributaries arising from chalk springs, flow rates tend to be relatively constant and the waters are rich in base nutrients. In contrast, the River Blackwater in the south west of the catchment is formed by streams which drain the Eocene sands and clays of the New Forest. With few urban reaches and a high diversity of habitats, the environmental quality of the river is high.

Land use in the catchment is mixed arable and permanent grassland. Often a narrow but valuable strip of rough grassland remains along the river or stream banks with arable land adjacent on higher ground. To the south and east of Andover there are long reaches with permanent grassland (much formerly managed as water meadow) with associated pockets of fen and carr. The artificially braided river in these areas is a relic of the water meadow management system, by which water was diverted onto the meadows via a network of channels and hatchways in a process known as drowning. Now no longer used for this type of pasture feeding the major carriers are maintained for fishing.

4. RIVER CORRIDOR CONSERVATION



4.2 Local Perspective (continued)

Further south around Romsey, where the chalk gives way to the Eocene beds, arable farming predominates. The Blackwater and its tributaries, close to the New Forest, have adjacent or covering woodland with damp acid pastures and occasional heath.

The numerous "traditional" villages along the river add another land-use type of garden and parkland. Rarely do these significantly constrict the green riparian corridor, however, and for most of the main river and its tributaries there is continuity of open land from source to sea. The landscape value of the river valley and the wider catchment is generally of a very high standard. The Wiltshire Downs Area of Outstanding Natural Beauty includes a portion of the top of the catchment.

The presence of traditional aquatic weeds like water crowfoot (*Ranunculus*) is a very important feature of the river. Weedcutting is necessary to provide ideal conditions for game fishing but an Autumn weedcut is particularly important for the continued growth of the weed. Uncut weed is more susceptible to being ripped out by high flows and once removed is more difficult to re-establish.

Recent concern has been voiced regarding the increase of the algal blanket weed 'cladophora' throughout the catchment, often at the expense of traditional water plants. The algae generally prefer warm, slow moving waters and strong sunlight.

Erosion of the banks and in some cases dredging has led to a widening and deepening of the river and carriers. This is particularly prevalent in the middle and lower sections of the river where a substantial dredging scheme was carried out in the late 1940's to reduce the water table on adjacent agricultural land. As a result of these effects the cross sectional area of the River Test has increased. This inevitable leads to slower flows and in many areas lower water depths in the river.

4.3 Environmental Objectives

- ° To conserve and enhance the river corridor and landscape.

4. RIVER CORRIDOR CONSERVATION



4.4 Environmental Requirements

Water Quality

- Waters should comply with the minimum standards for amenity protection and aesthetic criteria (listed in Section 9: RECREATION AND AMENITY) and with the levels of List I and II substances in the EEC directive 76/464/EEC for the general protection of the aquatic environment. Biological standards will also be applied in future as outlined in Section 17: STATUTORY WATER QUALITY OBJECTIVES.

River Flow

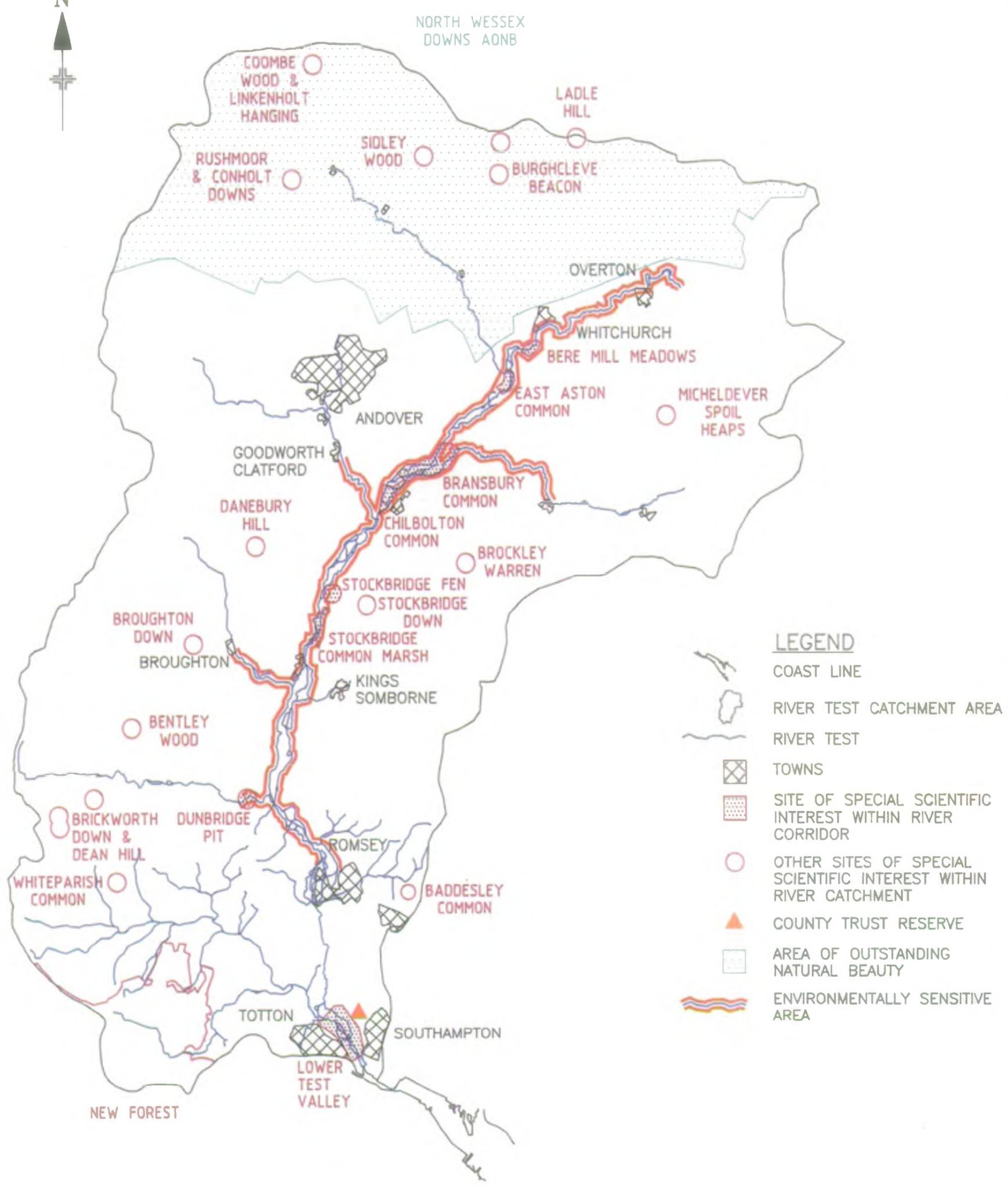
- A variable flow regime where the monthly average reflects the natural flow conditions in the river. A variable flow regime is required to conserve the natural characteristics of the river such as emergent vegetation, river bed gravels, river margins and any associated wetland habitats. The natural mean monthly flow regime during a 1 in 5 or 1 in 10 year drought is likely to be acceptable for non drought years in most river reaches. Monthly flows could be expected to fall below this critical threshold only during an actual drought period.
- Spate flows to inundate wetlands and to achieve natural cleansing of the river channel.

River Topography

- Maintenance of existing fringes of tree or marshland vegetation, and the encouragement of such vegetation in areas where they are presently of poorer quality.
- Maintenance and enhancement of natural river features such as emergent vegetation, meanders and pool:riffle sequences.
- Channels to be of appropriate cross-section for the flow regime.
- Limited access for livestock to the river corridor to minimise damage caused by trampling.

River Management

- Protection and maintenance of natural instream plant communities.
- Operation of sluices and weirs to control channel water levels so as to protect adjacent wetland habitats.
- Maintenance and clearance of ditches in a way which encourages rather than destroys ecological diversity.
- Weeds should be cut back in the autumn to enable minimum interference with winter spates and ensure the vegetation survives to grow again in the following spring.
- Carry out river corridor surveys to determine the real value and requirements of river reaches.
- Co-operation with local authorities and riparian landowners to ensure the watercourse, its banks and surrounding areas are free of litter and waste material.
- Encourage the take-up of the Countryside Stewardship Scheme for the preservation and re-creation of natural landscapes and wildlife habitats.

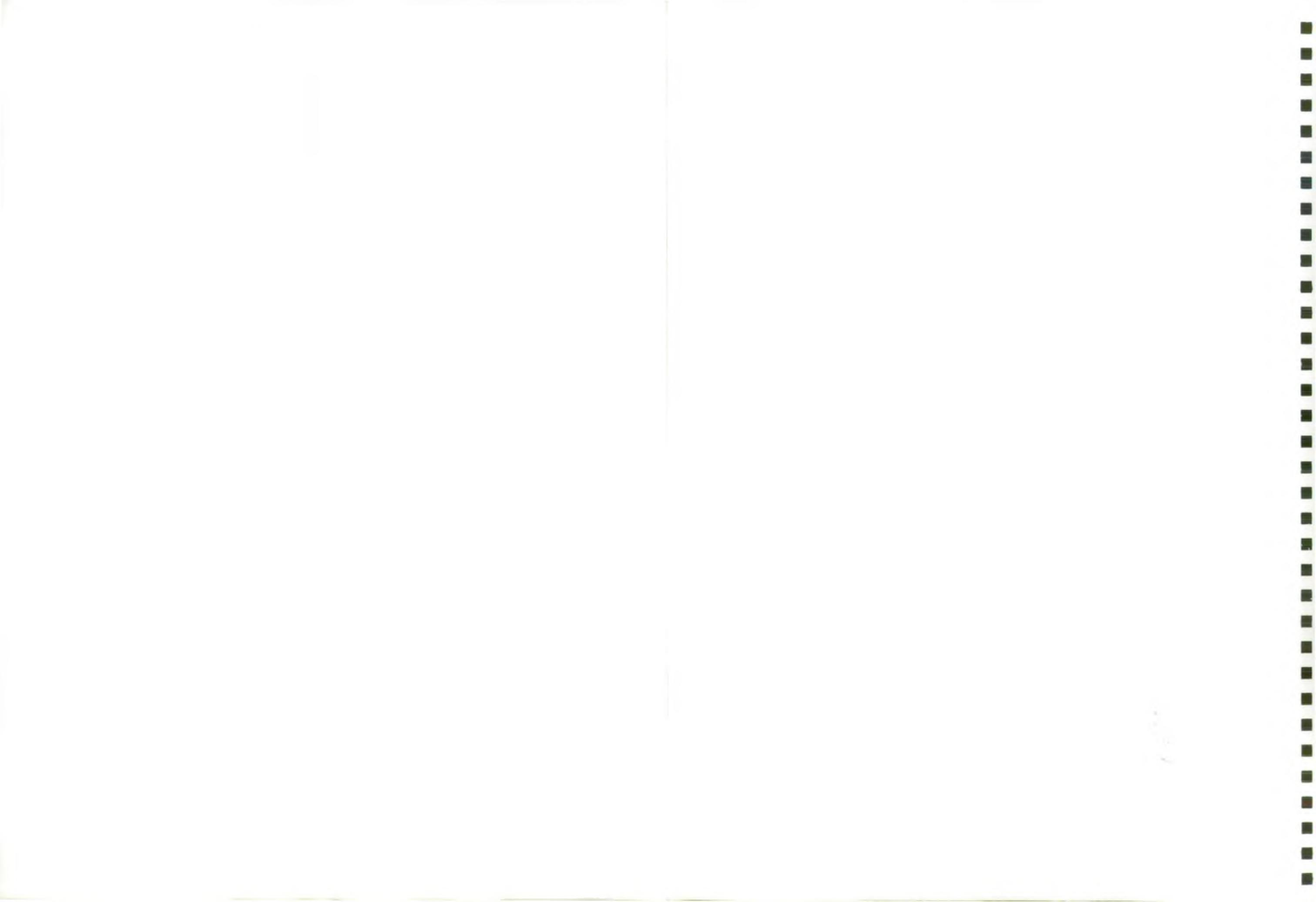


SPECIAL CONSERVATION AREAS



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5. SPECIAL CONSERVATION AREAS



5.1 General

This use relates to the protection of those areas that have been formally designated as being of particularly high conservation value. Such areas include National Parks, National Nature Reserves (NNR), Special Protection Areas (SPA's), Ramsar Sites, Areas of Outstanding Natural Beauty (AONB's), Sites of Special Scientific Interest (SSSI's), Environmentally Sensitive Areas (ESA's) and County Trust Reserves (CTR). However, not all eligible areas will have been formally designated. Some sites do not achieve SSSI status but are nevertheless of high wildlife conservation value. In particular there are many Sites of Nature Conservation Interest (SNCI) which are monitored by the County Trusts for Nature Conservation (or Wildlife Trusts). The sites identified opposite should not be regarded therefore as the only areas of high conservation value in the catchment.

5.2 Local Perspective

Most of the SSSIs occur upstream in the reaches to the south and east of Andover where the river flows through old, permanent grasslands, many of them former water meadows. These riparian habitats along with other types of unimproved grassland, fen, carr and wet woodland constitute the main interest of the sites. Their botanical interest remains high and, along with the high quality aquatic habitats, are the main reason for notification. The structure of some of these damp alluvial habitats is also important for some specialised bird species such as reed and sedge warblers, snipe and redshank.

To the south by Southampton Water the Lower Test Valley SSSI preserves a broad wedge of old pasture, brackish grassland and salt marsh, between the urban areas of Southampton and Totton. A section of the very extensive New Forest SSSI impinges on the south west of the catchment. Noted for its heath, bog and woodlands, some of the wooded valleys that drain into the River Blackwater are also of geological interest.

Most of the River Test Valley, including many of its tributaries, has been designated an Environmentally Sensitive Area (ESA). This Ministry of Agriculture designation seeks voluntarily to promote a more environmentally sympathetic approach to agricultural practices in sensitive areas. This is achieved through a series of grants and other incentives. To date, however, few farmers have entered into any formal agreements.

5.3 Environmental Objectives

- To safeguard the special conservation interest for which the sites have been designated.

5.4 Environmental Requirements

Water Quality

- The protection and maintenance of the aquatic environment as outlined in Section 4: RIVER CORRIDOR CONSERVATION.

River Flow

- Basic flow regime to minimise detriment to the special conservation areas is met by the requirements detailed in Section 4: RIVER CORRIDOR CONSERVATION.
- Spate flows to inundate the designated wetlands at a reasonable frequency.

5. SPECIAL CONSERVATION AREAS

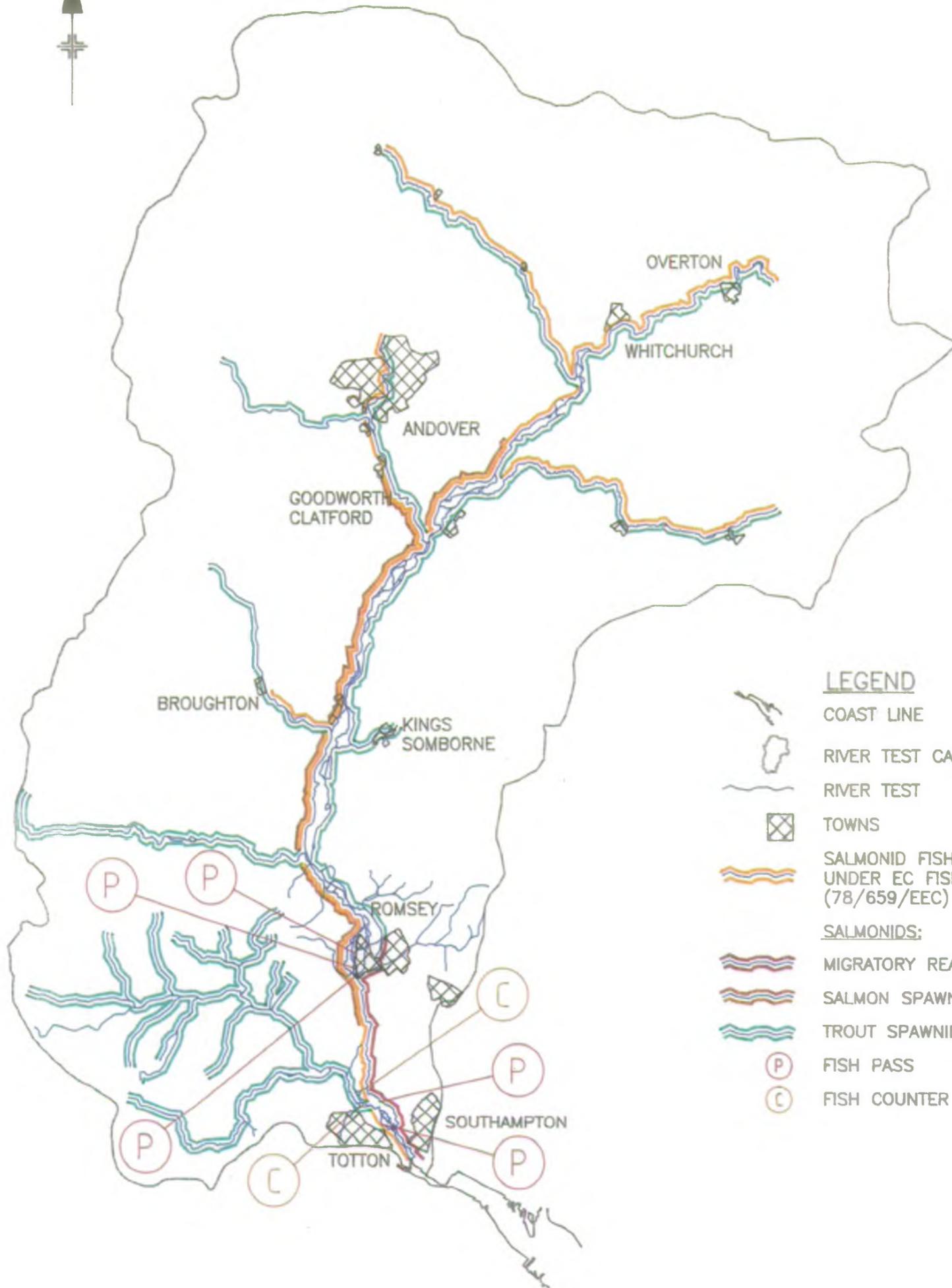


River Topography

- Maintenance, enhancement and preservation of the natural river features which contribute towards or give rise to the specific features of the designated conservation areas.
- Avoid damage to habitats due to too much unrestricted public access.

River Management

- In areas of wetland habitats to operate structures and drainage channels in such a way which maintains an appropriate water table level.
- Maintain ditches in a way which encourages habitat diversity in the Special Conservation Areas.



LEGEND

-  COAST LINE
-  RIVER TEST CATCHMENT AREA
-  RIVER TEST
-  TOWNS
-  SALMONID FISHERY DESIGNATED UNDER EC FISHERIES DIRECTIVE (78/659/EEC)
- SALMONIDS:**
-  MIGRATORY REACH
-  SALMON SPAWNING AREA
-  TROUT SPAWNING AREA
-  FISH PASS
-  FISH COUNTER



GAME FISHERIES



NRA

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Southern Region*



6. GAME FISHERIES



6.1 General

This use relates specifically to the maintenance of breeding populations of game fish and, where appropriate, to the conditions necessary for their successful migration between the river and the sea in both directions. The fish discussed in this section are referred to as Salmonids and include Salmon (*Salmo Salar*), Brown and Sea Trout (*Salmo trutta*) and Rainbow Trout (*Salmo gairdneri*). These fish are protected under the EC Fisheries Directive (78/659/EEC). This directive sets water quality criteria to protect fish life in designated freshwater reaches. Additional freshwater reaches may be designated periodically or existing reaches redesignated. Fish are sensitive to general conditions in the river since they are near the top of the aquatic food chain. They are therefore important not just for their own presence but also as a good indicator of the overall health of the river.

6.2 Local Perspective

The Test catchment is world-renowned as one of the finest game fisheries in Britain. Salmon spawn from close to the tidal limit up to Longparish. Brown trout spawn ubiquitously in the catchment whilst sea trout spawn in the lower reaches and in the River Blackwater and the New Forest streams. Many lengths of rivers in the catchment have been designated as salmonid fisheries under the EC Freshwater Fisheries Directive (78/659/EEC). The Test itself is designated from its source to Testwood. The Anton, Bourne Rivulet and Dever are designated from their sources to their confluences with the Test. The Wallop Brook is designated from Broughton to the confluence with the Test.

The spawning success of salmonids in the middle and lower reaches of the River Test is, and has always been, quite poor. These reaches are mainly populated by stocked Brown and Rainbow Trout. In the tributaries and headwaters of the river spawning success is much better and wild brown trout occur in these reaches.

The recent droughts have exacerbated problems of shallow depths in the rivers. Dried-up streams have occurred on the Bourne Rivulet and Wallop Brook. Low flows and velocities downstream of Testwood have interfered with the natural ascent of migratory fish in the river.

6.3 Environmental Objectives

Breeding Reaches

- To sustain a natural salmonid population appropriate to the catchment.

Migratory Reaches

- To protect and improve the passage of salmonids to and from fresh water.

6. GAME FISHERIES



6.4 Environmental Requirements

Water Quality

- For designated reaches water quality not to deteriorate below the mandatory limits for pollutants as specified in the EEC Fisheries Directive (78/659/EEC) for salmonid fisheries.
- Water quality should meet the guideline limits for pollutants as specified in the EC Fisheries Directive (78/659/EEC).

River Flow

- To maintain the base flow and level in watercourses in order to maximise the production of fish, other fauna and aquatic and bankside flora as per Section 4: RIVER CORRIDOR CONSERVATION.
- The natural flow regime should not be altered in a way which significantly inhibits the migration of salmonids.

River Topography

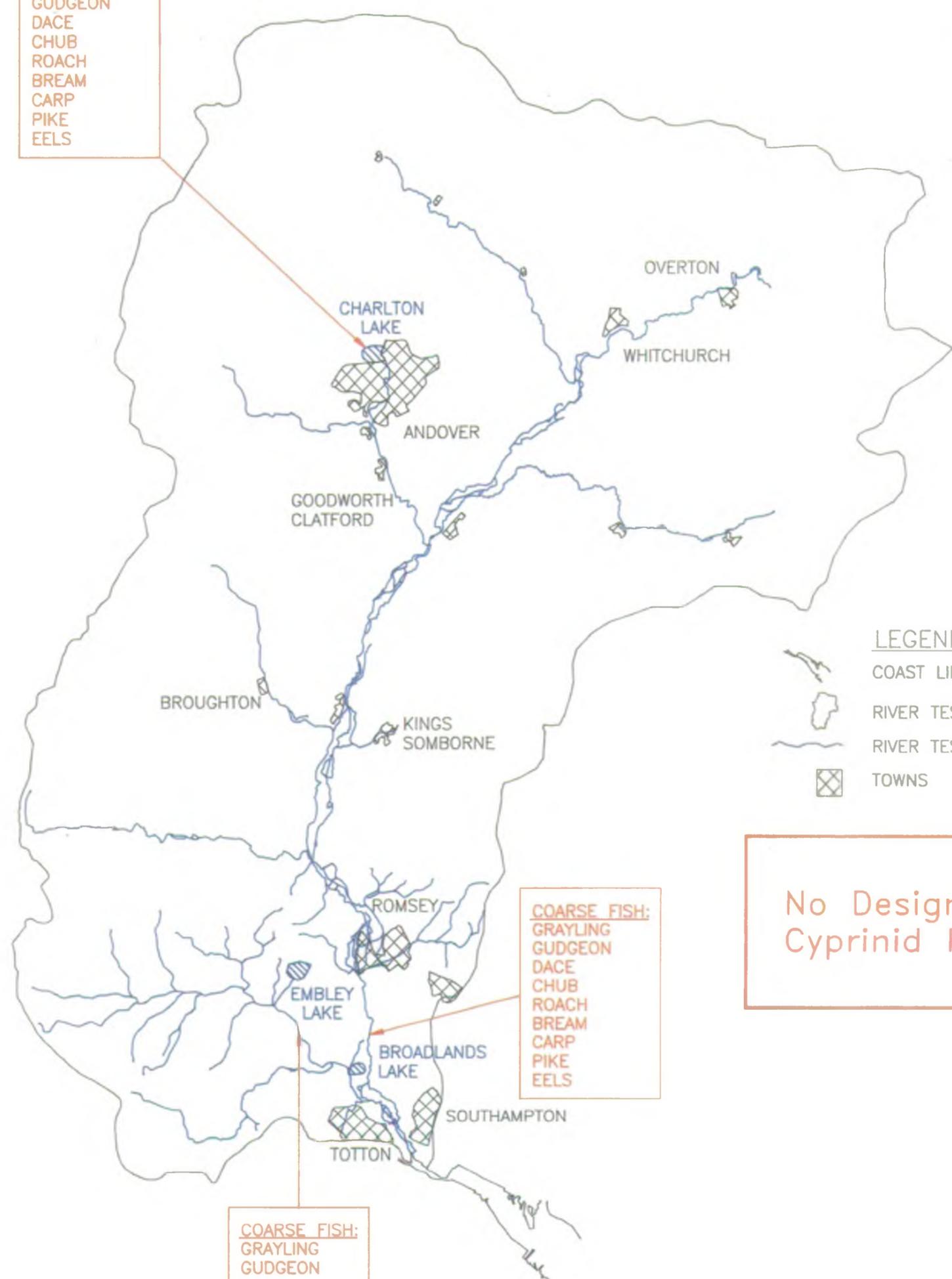
- Barriers should be passable at Q95 flows.
- Diverse and natural river features to ensure a variety of spawning and feeding areas.
- Bankside vegetation to provide adequate shade and cover.

River Management

- Fish stocking should be appropriate to the river reaches where it takes place.
- High quality gravels for spawning in breeding reaches.
- Ensure fish farms prevent mass escapes of fish which can disrupt the game fisheries within the river.



COARSE FISH:
 GRAYLING
 GUDGEON
 DACE
 CHUB
 ROACH
 BREAM
 CARP
 PIKE
 EELS



LEGEND
 COAST LINE
 RIVER TEST CATCHMENT AREA
 RIVER TEST
 TOWNS

No Designated
 Cyprinid Fisheries

COARSE FISH:
 GRAYLING
 GUDGEON
 DACE
 CHUB
 ROACH
 BREAM
 CARP
 PIKE
 EELS

COARSE FISH:
 GRAYLING
 GUDGEON
 DACE
 CHUB
 ROACH
 BREAM
 CARP
 PIKE
 EELS



COARSE FISHERIES



NRA

National Rivers Authority
 Southern Region



7. COARSE FISHERIES



7.1 General

This use relates specifically to the maintenance of breeding populations of coarse fish (mainly for angling and not a food source). Coarse fish are also known as cyprinids and are protected under the EC Freshwater Fisheries Directive (78/659/EEC). This directive sets water quality criteria to protect fish life in designated freshwater reaches of inland watercourses. Additional freshwater reaches may be designated or existing reaches redesignated periodically. Fish are sensitive to general conditions in a river since they are near the top of the aquatic food chain. They are therefore important not just for their own presence but also as a good indicator of the overall health of the river.

7.2 Local Perspective

There are no coarse fisheries in the Test catchment designated under the EC Freshwater Fisheries Directive. However, certain species of coarse fish are found in the rivers, some of which are considered less desirable by the game fishermen. Those found include grayling, gudgeon, eels, and, to a lesser extent, pike, dace, chub, roach and bream. There is a good mixed fishery in the lower reaches of the River Blackwater and coarse fish are found in a number of still waters including Broadlands Lake, Charlton Lakes and Embley Lake.

7.3 Environmental Objectives

- To sustain a natural cyprinid population appropriate to the catchment.

7.4 Environmental Requirements

Water Quality

- Water Quality not to deteriorate below the mandatory limits for pollutants as specified in the EEC Fisheries Directive (78/659/EEC) for cyprinid fisheries.
- Water quality should meet the guideline limits for pollutants as specified in the EEC Fisheries Directive (78/659/EEC) for cyprinid fisheries.

River Flow

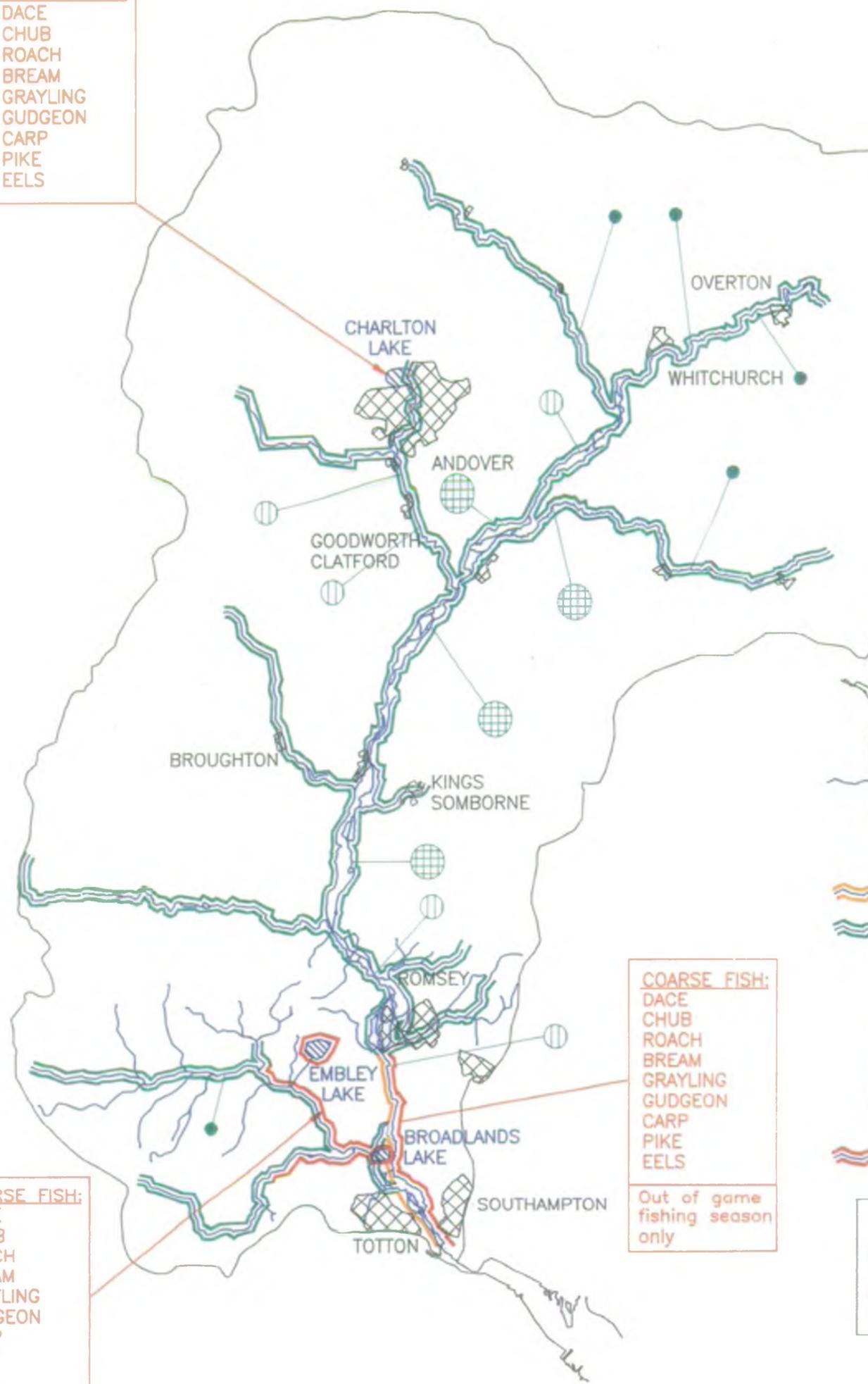
- To maintain the base flow and level in watercourses in order to maximise the production of fish, other fauna and aquatic and bankside flora as per Section 4: RIVER CORRIDOR CONSERVATION.

River Topography

- Provision and maintenance of adequate shade and cover.
- Diverse and natural river features to ensure a variety of spawning and feeding areas.



COARSE FISH:
 DACE
 CHUB
 ROACH
 BREAM
 GRAYLING
 GUDGEON
 CARP
 PIKE
 EELS



COARSE FISH:
 DACE
 CHUB
 ROACH
 BREAM
 GRAYLING
 GUDGEON
 CARP
 PIKE
 EELS

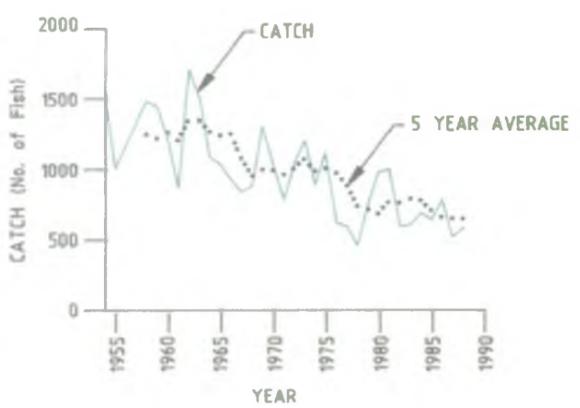
Out of game fishing season only

COARSE FISH:
 DACE
 CHUB
 ROACH
 BREAM
 GRAYLING
 GUDGEON
 CARP
 PIKE
 EELS

LEGEND

- COAST LINE
- RIVER TEST CATCHMENT AREA
- RIVER TEST
- TOWNS
- GAME FISHING
- SALMON
- TROUT
- DENSITY OF TROUT RODS ON RIVER (RODS/km)
- <2
- 2-4
- >4
- COARSE FISHING

TROUT STOCKING UBIQUITOUS THROUGHOUT CATCHMENT



RIVER TEST ROD CATCHES OF SALMON

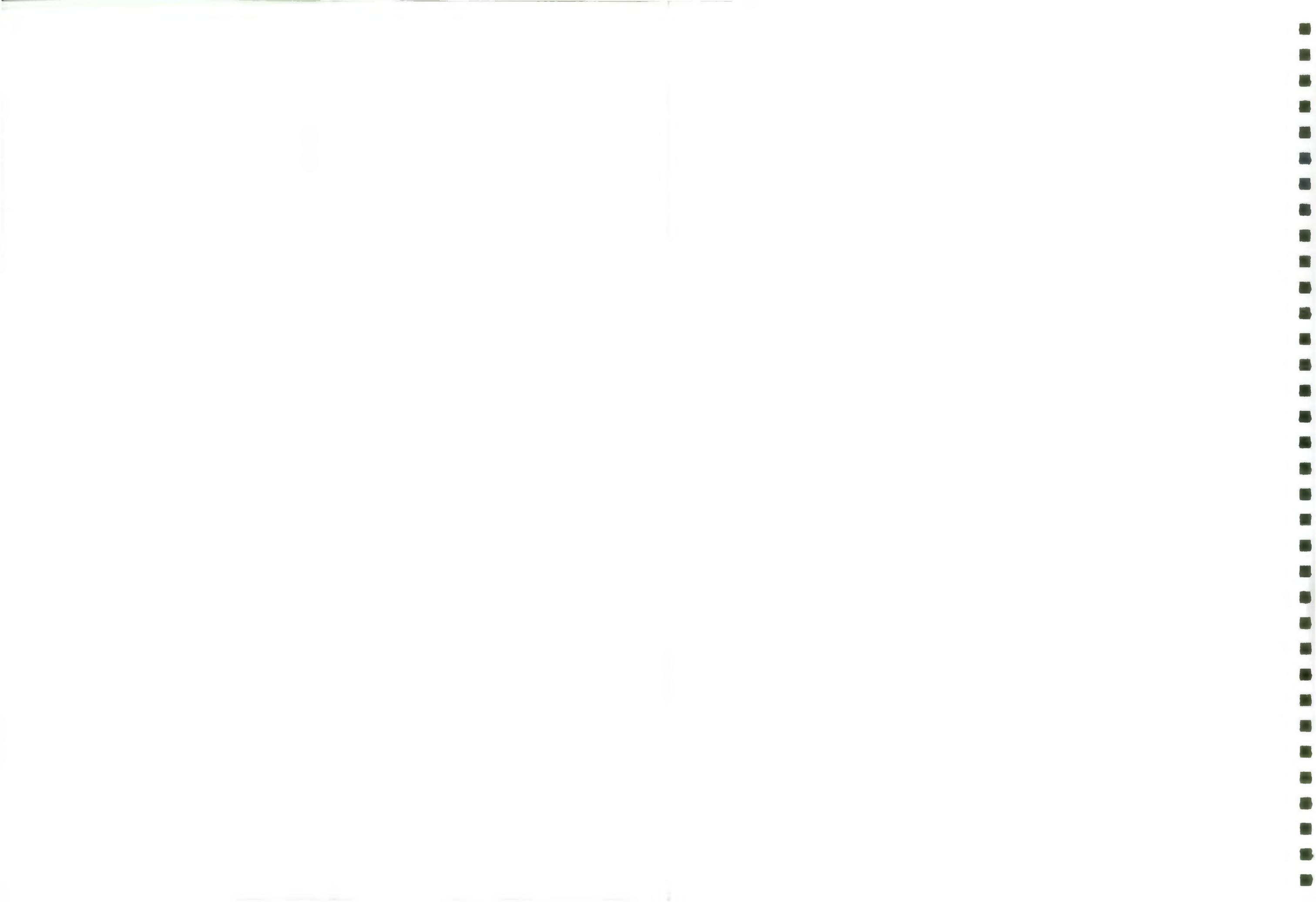


ANGLING



NRA

National Rivers Authority
 Southern Region



8. ANGLING



8.1 General

This use relates specifically to the use of the river by anglers and to the manipulation of river channel and bank conditions so as to enhance the sport. The fish are considered under Section 7; GAME FISHERIES and Section 8; COARSE FISHERIES.

Game and coarse fish are distributed in a catchment according to the river's geomorphology, principally bed gradient and river flow, but modified by the quality of the water, which relates to the inputs of pollutant and nutrient. Anglers pursue their quarry, whether game or coarse fish, wherever they are found. They have a strong preference for catching fish but also for enjoying outdoor activity in a harmonious environment. Both types of angling require a mixture of open and dense instream and bankside vegetation to provide variety for both the fish and the anglers.

8.2 Local Perspective

The angling interest in the Test catchment is intense. All rivers in the catchment are fished; with salmon traditionally caught below Romsey and trout above, with several put and take trout lakes also available. Some coarse fishing occurs on the River Test below Romsey outside of the game fishing season. Coarse fishing is also available during the appropriate season at several locations including Broadlands, Embley and Charlton Lakes, as well as in the River Blackwater below West Wellow.

A review of reports of trout catches at Middleton, Wherwell, Leckford and Houghton from 1968 to 1988 shows that there has been no significant increase in the average weight of fish caught at these locations. However, with regard to the numbers of fish caught, the three year averages from 1970 to 1972 and 1983 to 1985 at Wherwell and Leckford have increased significantly (53% to 140% of long term average at Wherwell and 74 to 112% of long-term average at Leckford). No trend has been identified for Middleton and Houghton. Rod catches of salmon on the River Test have declined significantly since 1958. The rolling five year average for the period from 1958 to 1966 was over 1200 fish, whereas the rolling average was below 800 between 1978 and 1983 and below 700 between 1986 and 1988 (a decrease of over 40%).

Current pressures on the river result from a high demand for quality angling. An examination of the general licences issued by the National Rivers Authority for the permitted number of salmon and trout rods indicates that the middle and lower reaches of the Test (from Wherwell to Timsbury) are the most heavily fished, with a density of over 4 rods per kilometre. Above Wherwell and below Timsbury, the density is lower, between 2 and 4 rods/km. Above Laverstoke, the density is below 2 rods/km. All other tributaries have rod densities below 2 rods/km. It should be noted that these data refer only to general licences and not to all rods on the river. As such these figures could be conservative and represent an underestimate of fishing density on the river.

In recent seasons turbidity has extended into the fishing season. This has been linked to poor weed growth in spring, often associated with the lack of an autumn weedcut in the previous year.



8. ANGLING

8.3 Environmental Objectives

- To provide suitable and safe conditions for successful angling.

8.4 Environmental Requirements

Water Quality

- Guidelines on public health implications awaited.
- Angling waters to be aesthetically acceptable (see Section 9; RECREATION AND AMENITY) in order to enhance the sport of fishing.

River Flow

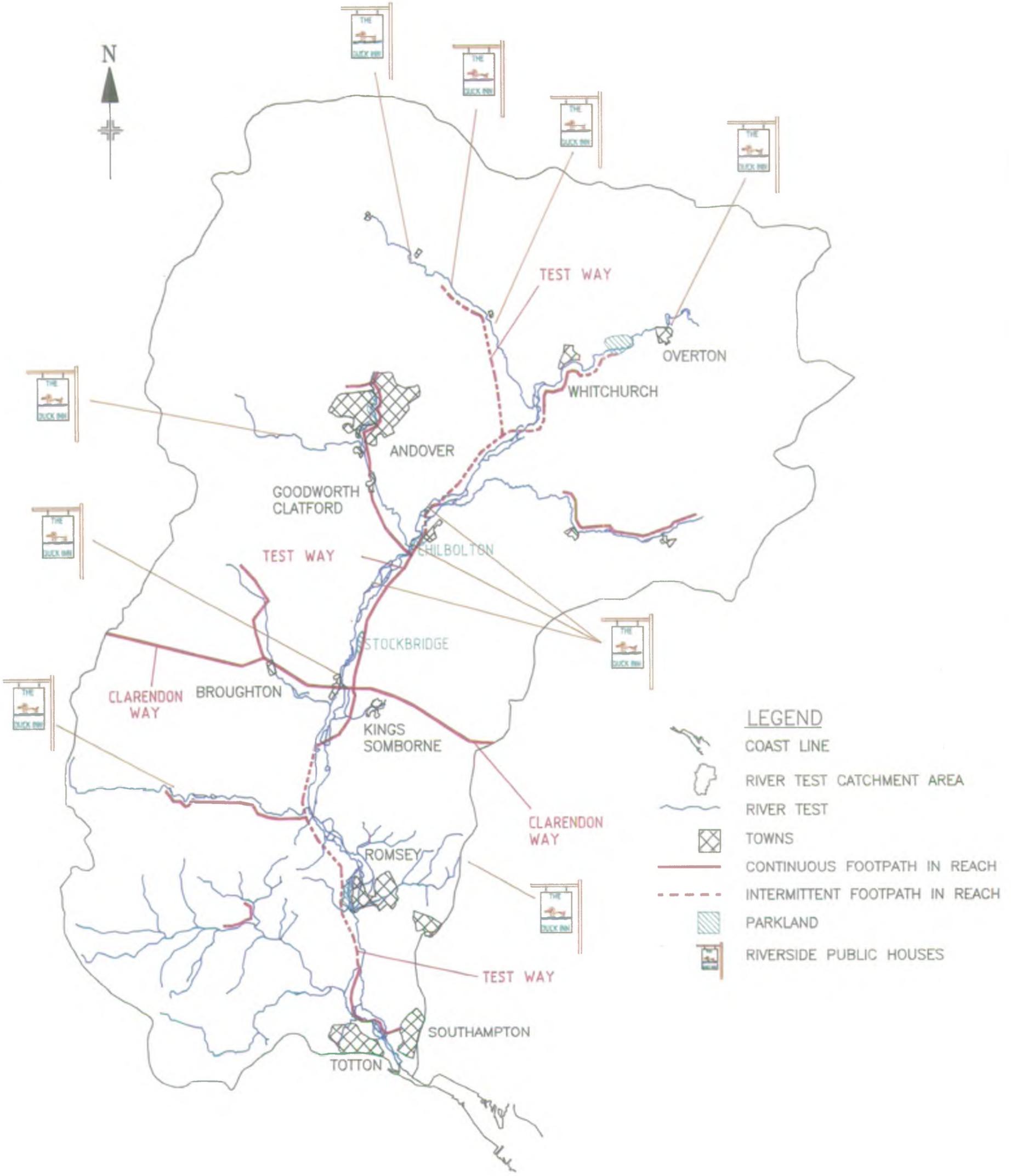
- To maintain the base flow and level in watercourses in order to maximise the production of fish, other fauna and aquatic and bankside flora as per Section 4: RIVER CORRIDOR CONSERVATION.

River Topography

- Maintenance of sufficient access points for angling.
- Maintenance of a mixture of open and dense instream and bankside vegetation.

River Management

- Control of weirs and stop boards to maintain water levels appropriate to angling.
- Weedcutting at appropriate intervals to maintain conditions for angling.
- Minimise the number of occasions when angling cannot take place due to river maintenance activities.



LEGEND

- COAST LINE
- RIVER TEST CATCHMENT AREA
- RIVER TEST
- TOWNS
- CONTINUOUS FOOTPATH IN REACH
- INTERMITTENT FOOTPATH IN REACH
- PARKLAND
- RIVERSIDE PUBLIC HOUSES



RECREATION AND AMENITY



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9. RECREATION AND AMENITY



9.1 General

This use relates to those activities which attract people to the river corridor and may, therefore, bring them into close proximity with the water, but without intimate contact. Examples include walking and bird watching. As such, the principal areas of concern are general aesthetic acceptability and access to the water course.

The Recreation and Amenity duties of the NRA are set out in section 8 of the Water Act 1989. The act generally empowers the NRA to conserve and enhance the natural beauty and amenity of inland and coastal waters and associated land, as well as the use of such waters and land for recreational purposes. The NRA is also required to have regard to the desirability of preserving public freedom of access and to take into account, either as a matter of its own activities or those of others, the likely effect specific action would have on any such freedom of access. The NRA may also actively promote proposals for recreational and amenity development where it is considered desirable.

9.2 Local Perspective

The facilities for public access along the Test are rather limited compared to some other rivers in the region. This reflects the historic uses of the catchment and the lack of any prolonged navigation of the river, which can provide old towpaths for use as public access, as on the neighbouring Itchen catchment. However, there are in total over forty footpaths which either cross or run alongside the Test and its tributaries.

There are also areas of parkland and common adjacent to the rivers at Romsey, Laverstoke, Andover, Chilbolton and Stockbridge and a number of riverside public houses on the Test, Bourne Rivulet, Pillhill Brook and Dun. Public access to the river is also available at the National Trust's Mottisfont Abbey near Kimbridge. Footpaths cover significant lengths of the Rivers Test, Anton, Wallop Brook and Bourne Rivulet, generally following the valleys and affording views of the river. The Test Way covers most of the Test Valley following the line of a disused railway and the Clarendon Way crosses the Test just downstream of Houghton passing eastwards into the Itchen catchment. The New Forest touches the upper reaches of the River Blackwater and Cadnam River.

The Test Valley Local Plan proposes the creation of The Valley of the River Test Heritage Area. This will run from Longparish to Romsey and seeks to provide a number of foci for countryside recreation in the Test Valley. This is furthered by a policy to provide walkways and public access where new development or redevelopment takes place on land adjoining watercourses.

9.3 Environmental Objectives

- To preserve the river as one of the most famous chalk streams in the world.
- To conserve and enhance the landscape and archaeological features associated with the river.



9. RECREATION AND AMENITY

9.4 Environmental Requirements

Water Quality

- Minimum requirement being the protection of the amenity value of the water body.
- Water to be free from surface films and extraneous floating material, discolouration and unpleasant odour.

River Flow

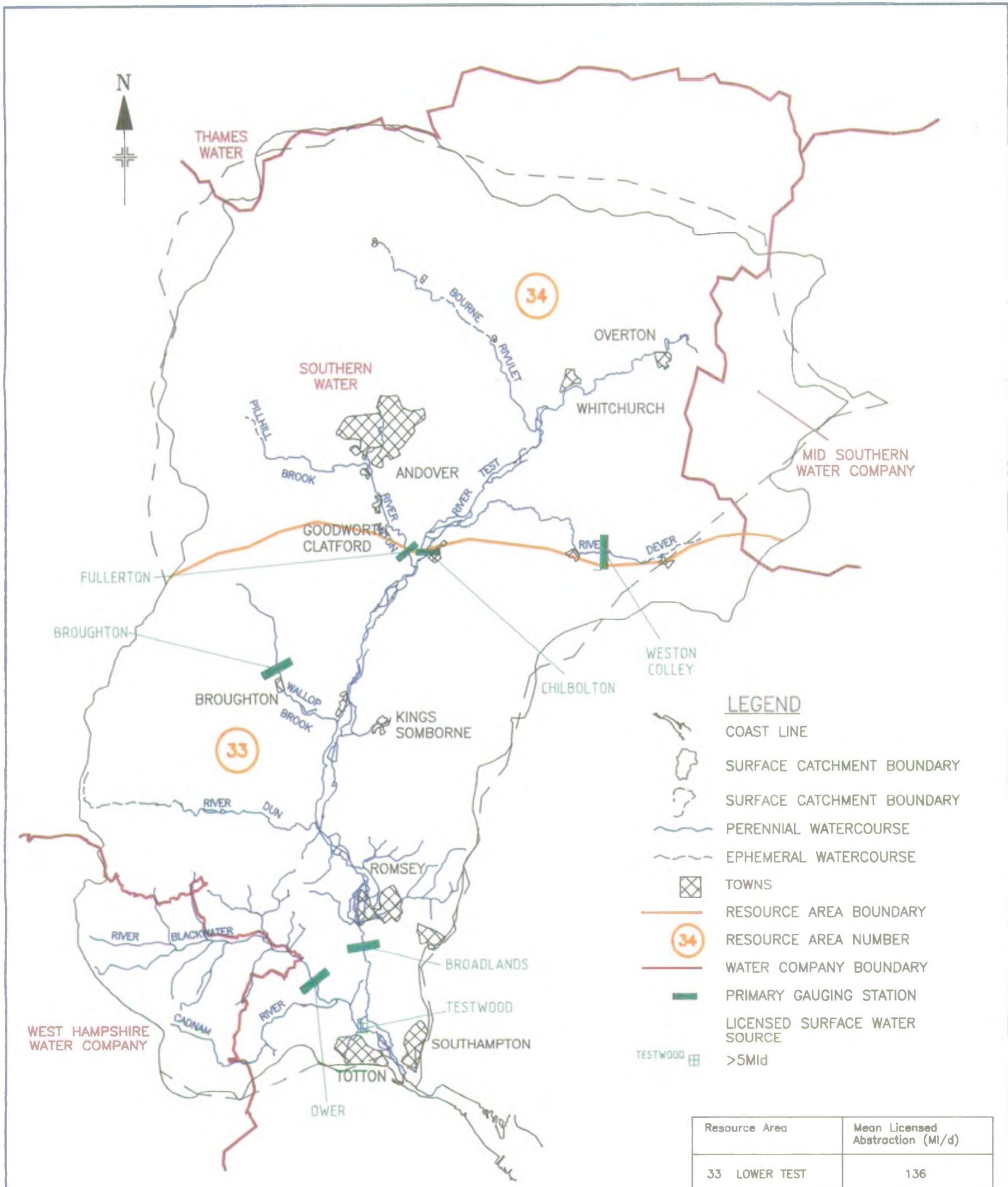
- Basic flow regime to minimise detriment to recreation and basic amenity is met by requirements detailed in Section 4: RIVER CORRIDOR CONSERVATION

River Topography

- Maintenance of existing footpaths.
- Maintenance of existing access points.
- Sympathetic management and renovation of historical riverside artifacts (eg. Mills, weirs and bridges)

River Management

- Co-operation with local authorities and riparian landowners to ensure banks and surrounding areas are free of litter.
- To encourage the clear communication and understanding of access rights and locations.



Resource Area	Mean Licensed Abstraction (Ml/d)
33 LOWER TEST	136

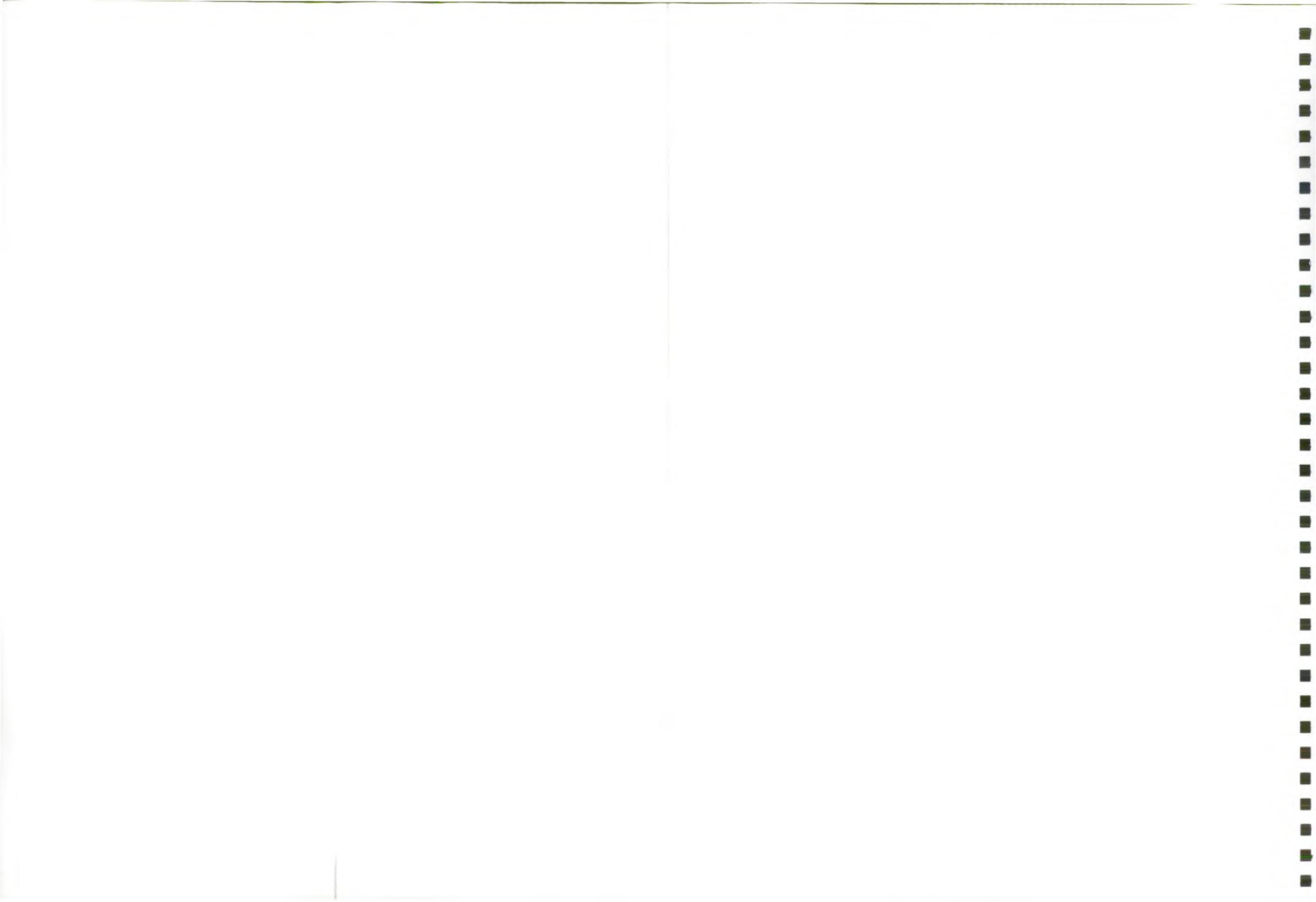


**PUBLIC WATER SUPPLY
SURFACE WATER SOURCES**



NRA

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Southern Region*



10. PUBLIC WATER SUPPLY - SURFACE WATER SOURCES



10.1 General

This use relates to the provision of public water supplies from surface waters. Abstractions are operated by the Water Companies, controlled by a licence which stipulates the maximum allowable annual and daily abstraction. The mean licensed abstraction is the average daily abstraction allowable under the annual licence.

Minimum Residual Flows (MRF's) are set at various points on the river and abstraction licences may be related to these such that abstraction must cease once the river flow is reduced to the MRF setting. The water companies may apply for a Drought Order to vary the licence conditions during periods of exceptional shortage in resources. This may include the reduction of the MRF setting controlling abstraction and/or temporary increase to the maximum licensed abstraction. The terms of the Drought Order may also require the Water Company to introduce demand reduction measures, such as hose-pipe bans, at the same time.

10.2 Local Perspective

The only surface public water supply abstraction on the River Test is at Testwood, just upstream of the tidal limit. This is the preferred location for surface water abstraction from a catchment, being close to the point at which flows are lost from the fresh water system.

The river bifurcates upstream of Testwood and the intake is located on the Main Test, the larger of the two branches. The division of flows between the Main Test and Little Test is controlled by gates and gauging stations operated by the NRA following a judgement known as Coleridge Award. Under this award two-thirds of the flow is guaranteed to the Main Test and one-third can be diverted to the Little Test.

The abstraction at Testwood is linked to an MRF setting at the tidal limit of 91Mld intended to protect migratory fisheries. Actual residual flows exceeded the MRF throughout both 1989 and 1990. Further MRF settings are in place upstream of Testwood on the Main Test and at Longbridge above the division to protect downstream flows for the public supply.

The MRF setting at Longbridge is 409Mld for those abstraction licences granted before 1991. This has been increased this year to 510Mld to correspond to the Q95 flow recorded at Broadlands gauging station just upstream, and all future licences will be linked with this higher setting. Surface flows at Broadlands were below Q95 for over 70 days between July and October 1989, but, due to the high storage characteristics of the Chalk Aquifer, flows fell below the previous MRF at Longbridge for only 5 days. For most of the average year the available resource at Testwood is above the licensed quantity.

Abstraction from Testwood supplies parts of Southampton, Fawley Refinery and, via a pipeline across the Solent, part of the Isle of Wight. Actual abstractions from Testwood have been significantly below the licensed maximum ever since the licence was granted in 1982 and the resource is considered to be under utilised. Development options for the resource have included the construction of an on-site storage reservoir and increasing the licensed abstraction to 180Mld with transfer of supplies to a larger supply area in Southampton and further north.

The MRF settings controlling abstraction would need to be reviewed prior to this scheme development and the river augmentation scheme proposed for the upper reaches of the Test would also be incorporated to increase security of supply.

10. POTABLE WATER ABSTRACTION - SURFACE SOURCES



10.3 Supply Objectives

- To safeguard the public water supply.
- To conform with the existing Minimum Residual Flow settings the catchment.
- To review the MRF settings controlling abstraction from Testwood.
- To encourage the development of surface resources close to the downstream freshwater limit.
- To ensure that any future resource developments do not derogate the flow regime within the catchment.
- To secure, where possible, measures for the benefits of the catchment within new licence agreements.
- To meet increased demand in the catchment by northward transfer of resources from close to downstream freshwater limit.

10.4 Supply Requirements

Water Resources

- Maximum availability of resources within the terms specified in the licence.

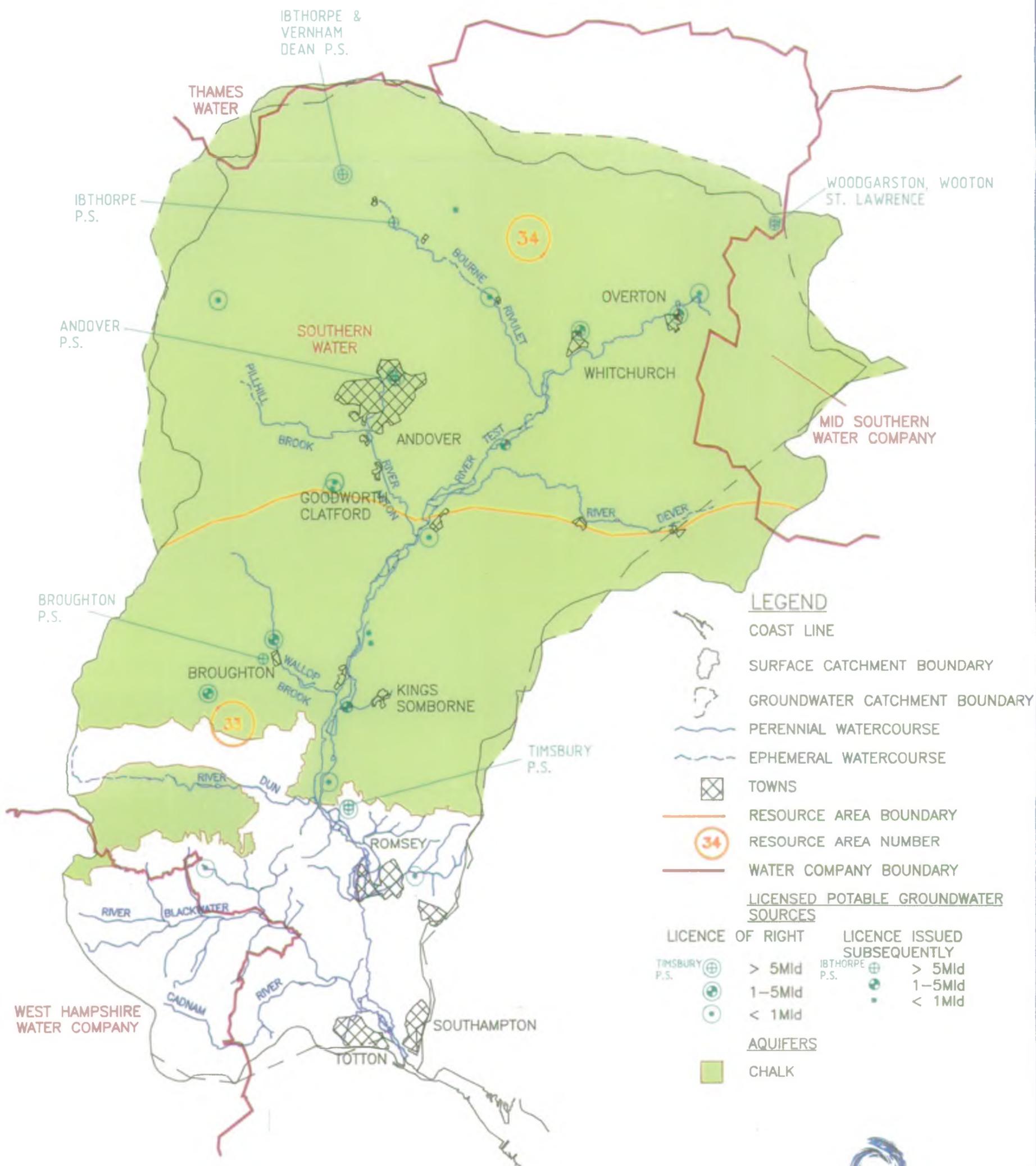
Water Quality

- Within the limiting values defined for A2 Category Treatment (EEC Council Directive 75/440/EEC)

River Management

- Control weed growth local to gauging stations to ensure an accurate flow record.

Resource Area	Mean Licensed Abstraction (Ml/d) Total	Mean Actual Abstraction (%Licensed) Total
34 UPPER TEST	38	73
33 LOWER TEST	24	43
Total	62	61



LEGEND

- COAST LINE
 - SURFACE CATCHMENT BOUNDARY
 - GROUNDWATER CATCHMENT BOUNDARY
 - PERENNIAL WATERCOURSE
 - EPHEMERAL WATERCOURSE
 - TOWNS
 - RESOURCE AREA BOUNDARY
 - RESOURCE AREA NUMBER
 - WATER COMPANY BOUNDARY
- LICENSED POTABLE GROUNDWATER SOURCES**
- | | | | |
|-------------------------|--------|------------------------------------|--------|
| LICENCE OF RIGHT | | LICENCE ISSUED SUBSEQUENTLY | |
| | > 5Mld | | > 5Mld |
| | 1-5Mld | | 1-5Mld |
| | < 1Mld | | < 1Mld |
- AQUIFERS**
- CHALK



**PUBLIC WATER SUPPLY
GROUNDWATER SOURCES**



NRA

National Rivers Authority
Southern Region



11. PUBLIC WATER SUPPLY - GROUNDWATER SOURCES



11.1 General

This use deals with groundwater abstracted for public water supply. Private groundwater supplies for potable use are also included, although these are generally very small and not significant from the resources standpoint. The catchment is divided into a number of resource areas and the total licensed abstraction from each is listed in terms of the mean daily licensed abstraction. The total actual abstraction in 1989 is listed as a percentage of licensed abstraction. Abstraction details for individual sources are confidential so the totals per resource area only are included.

Those sources installed before 1963 were granted Licences of Right under the Water Resources Act (1963). Since 1963, sources have been licensed on the basis that abstraction does not derogate either existing sources or the natural environment, including surface water flows. Licences issued after 1963 are linked to Minimum Residual Flows (as discussed in Section 10) where appropriate.

Southern Water Authority produced an Aquifer Protection Policy (APP) in 1985. The purpose of this policy is to define appropriate protection zones around supply sources and for each groundwater aquifer to control land use activities which may pollute the resource. Among the types of land use for which controls are set are; solid and liquid landfill, quarrying, reclamation and development of contaminated land, soakaways, septic tanks and sludge spreading to land. Five levels of protection are set, of which the strictest, Zone 1, is defined as the area within 50 days groundwater travel time of a significant groundwater supply source. The division of the catchment into the 5 Zones is illustrated in Section 18: SOLID WASTE DISPOSAL. A National Groundwater Protection Policy is currently being developed by the NRA. This policy is likely to develop upon the principles within the existing APP.

11.2 Local Perspective

There are 13 chalk groundwater licences operated for public supply in the Test catchment, covering 15 sources. Twelve of the licences are operated by Southern Water Services with the remaining source operated by Mid Southern Water Company. In addition, there are 6 small private potable groundwater supplies within the catchment. Licensed abstraction from the sources totals 62Mld which is less than one third of the total potable supply under licence within the catchment with all the remaining two thirds provided by the surface source at Testwood. Actual abstraction in 1989 from the groundwater sources was approximately 61 per cent of the licensed total.

The groundwater sources are located throughout the catchment and not concentrated in any one area. They are however, generally located within the valleys and close to the stream or river as this location has been considered historically to provide the highest yielding sources. In these cases groundwater abstraction may result in a comparable reduction in surface flows as baseflow is reduced or leakage induced through the stream bed.

The only source where groundwater abstraction for public supply has been identified as possibly having a significant effect on surface flows is Broughton pumping station in the Wallop Brook sub-catchment. The licensed abstraction for the resource is relatively low at 4.4Mld. However, Broughton gauging station a kilometre downstream records surface flows, particularly during low flow periods, of the same magnitude and zero flow was recorded for a 5 month period in 1976.

11. POTABLE WATER ABSTRACTION - GROUNDWATER SOURCES



11.2 Local Perspective (continued)

A detailed study is now reporting on options for flow improvement within the stream. The Brook is thought to have dried up in both 1921 and 1936, before installation of the Pumping Station and the reduced flow problem is now considered largely natural, due to an outcrop of high transmissivity chalk across the stream. Nevertheless, the abstraction at Broughton is considered likely to exacerbate the problem during natural low flow periods.

The chalk aquifer beneath Andover is contaminated with chlorinated hydrocarbons. Southern Water have installed an air stripper for removal of contamination from the four boreholes operated at their Andover pumping station. The water company are planning to replace sources with boreholes installed outside the town in order to improve the security of supply.

11.3 Supply Objectives

- To safeguard the public and private water supply abstractions.
- To manage abstraction to maintain Minimum Residual Flow requirements within the catchment.
- To ensure that any new groundwater licences are of no detriment to either surface flows or the natural ecology the catchment.
- To define Nitrate Sensitive Areas for the protection of groundwater sources.
- To encourage the operation of seasonal resource management schemes to improve surface flows during the summer.

11.4 Supply Requirements

Water Resources

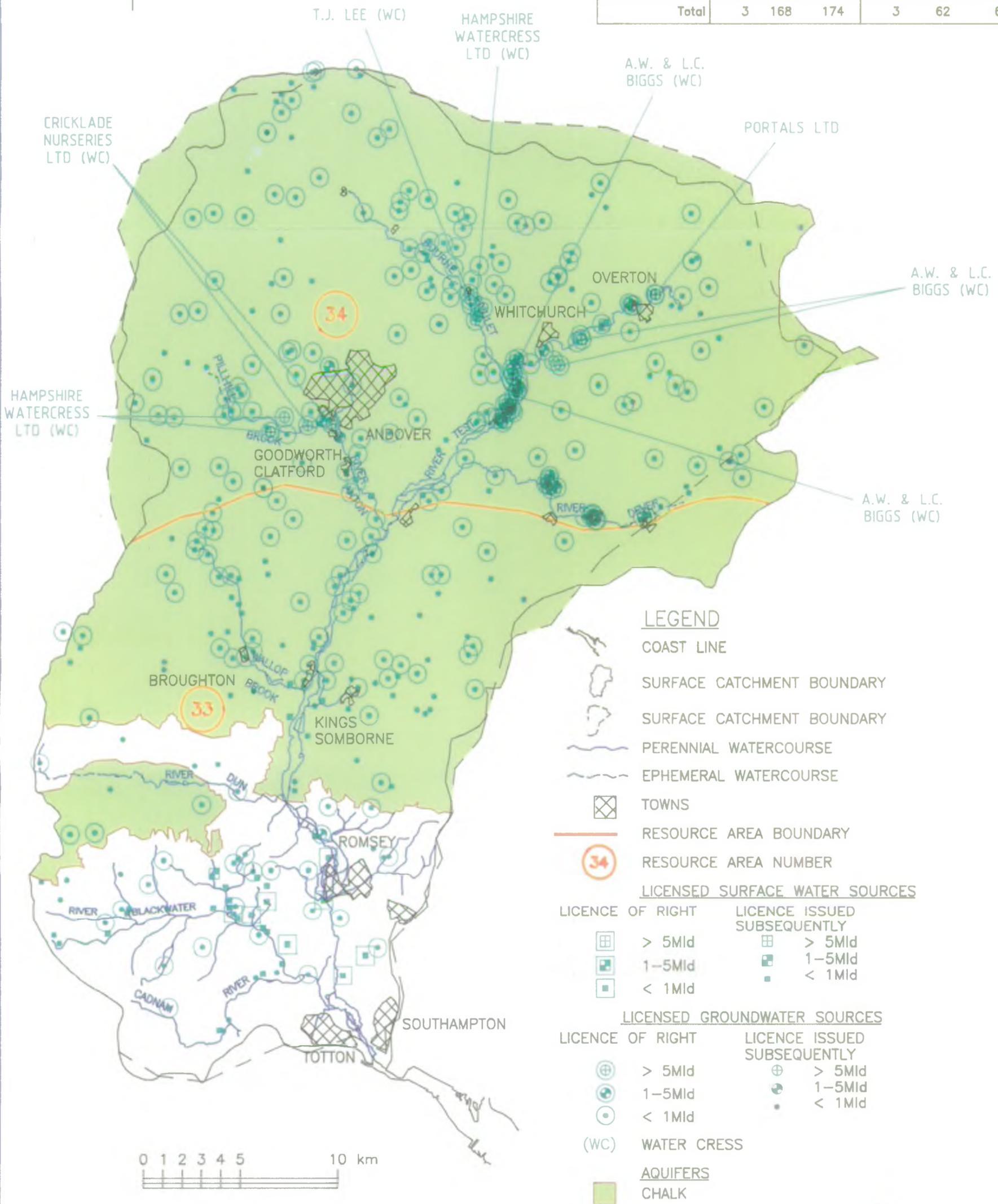
- Availability of resources within the terms specified in the licence.

Water Quality

- Not Specified. Chalk sources generally within the limiting values for A1 Category treatment, (Council Directive 75/440/EEC).



Resource Area	Mean Licensed Abstraction (Ml/d)			Actual Abstraction in 1989 (%Licensed)		
	Surface	Ground Water	Total	Surface	Ground Water	Total
34 UPPER TEST	3	156	159	3	62	61
33 LOWER TEST	3	12	15	3	62	50
Total	3	168	174	3	62	60

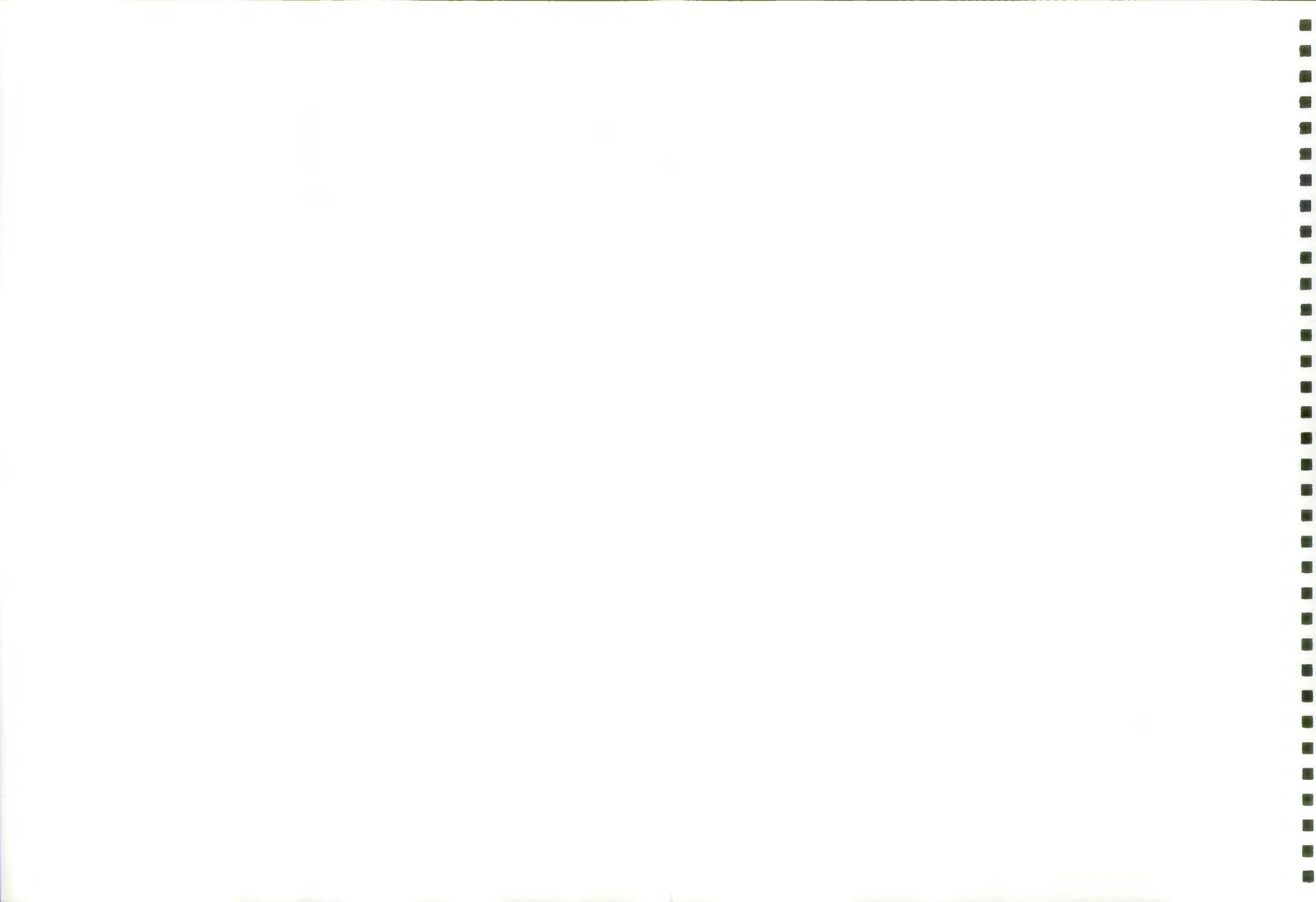


INDUSTRIAL & AGRICULTURAL ABSTRACTION



NRA

National Rivers Authority
Southern Region



12. INDUSTRIAL AND AGRICULTURAL ABSTRACTIONS



12.1 General

This use deals with surface and groundwater supplies abstracted for industrial and agricultural purposes. Industrial abstractions include all licensed supplies for industrial process uses, cooling water and gravel washing. Agricultural abstractions include all supplies for spray irrigation and general agricultural use.

12.2 Local Perspective

There are over 350 licences in this category, of which 280 are small groundwater abstractions for agricultural and domestic use amounting to only 3 per cent of the total licensed abstraction. The large number of licences in this category is due to the rural nature of the catchment, (farms have traditionally operated their own boreholes), and the continued good quality of the chalk groundwater. A further 29 surface water licences are operated largely for spray irrigation, accounting for just 1 per cent of the licensed total.

By far the largest licensed use in this category is for water cress farming, the 23 groundwater licences amounting to almost 80 per cent of the total use. All cress growers operate under the Cress Growers Code of Conduct which stipulates, for reasons of water quality, that the cress beds are fed by either spring or groundwater.

Cress growing is essentially a non-consumptive use of the resource as the outflow is fed into the adjacent river or stream. However, the effect of large scale groundwater abstraction may reduce groundwater levels upstream of the borehole sites and this may induce surface flow losses through the stream bed.

Cress beds are often located close to the upstream perennial limit for stream flows, where small changes in groundwater flow rates can have a large effect on spring locations. Three large cress farms on the Bourne Rivulet have a combined licensed abstraction of 34.6 Mld. Abstractions are believed to have moved the natural summer spring line one kilometre or more down the valley. The flow regime within the Bourne Rivulet has been investigated in detail as part of a separate study. As a part of this study the NRA are proposing to undertake field trials this year (1991) for improving flows by pumping a proportion of the outflow from the cress farms to discharge upstream of the abstraction.

Portals (Holdings) Ltd operate the only large industrial abstraction within the catchment at Overton, and this accounts for 77 per cent of total licensed industrial use of 20 Mld. A further 3 Mld is licensed for gravel washing. Both the Portals site and the gravel washing operations are largely non-consumptive users of water resources.

12.3 Supply Objectives

- To safeguard the water supply.
- To continue to link new surface water licences to Minimum Residual Flow settings.
- To encourage the use of reservoirs to store winter flows for agricultural use in the summer..

12. INDUSTRIAL AND AGRICULTURAL ABSTRACTIONS



12.4 Supply Requirements

Water Resources

- Availability of resources within the terms specified in the licence.
- New agricultural licences to specify winter abstraction and storage.
- Embargo on new licences for consumptive use of chalk groundwater.

Water Quality

- There are no mandatory water quality guidelines for agricultural irrigation purposes.
- The Food and Agricultural Organisation of the United Nations (FAO) categorises water with salinity and chloride concentrations between 0.7 - 3.0 ds/m (140-350mg/l) respectively as having slight to moderate restrictions for irrigation use. NRA working guidelines categorise the types of crops grown under irrigation from very sensitive to least sensitive in terms of chloride toxicity. The maximum chloride concentrations recommended in the irrigation water range from 100mg/l (C1) upto 500mg/l (C1) dependent on the tolerance of the crop.

Resource Area	'Licensed' Consumptive Use (% of Resource)	
	Mean Year	1:10 Year Drought
34 UPPER TEST	3	4
33 LOWER TEST	13	22
TOTAL CATCHMENT	14	24
UPSTREAM OF TESTWOOD	3	5

Sub-catchment Area	Mean Year	1:10 Year Drought
BOURNE RIVULET	11	17
WALLOP BROOK	8	14

LEGEND

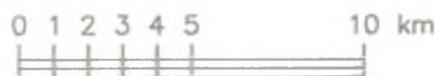
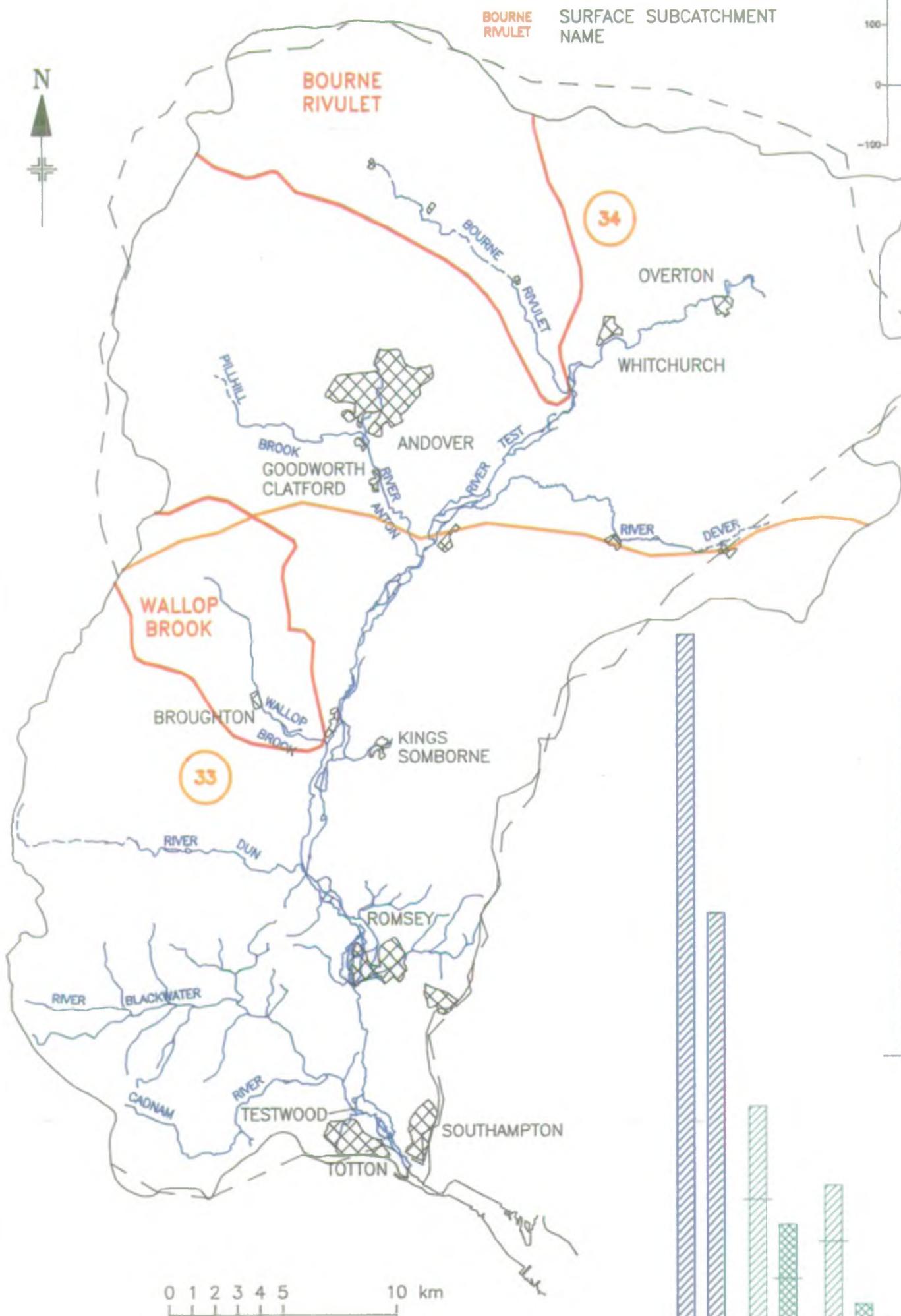
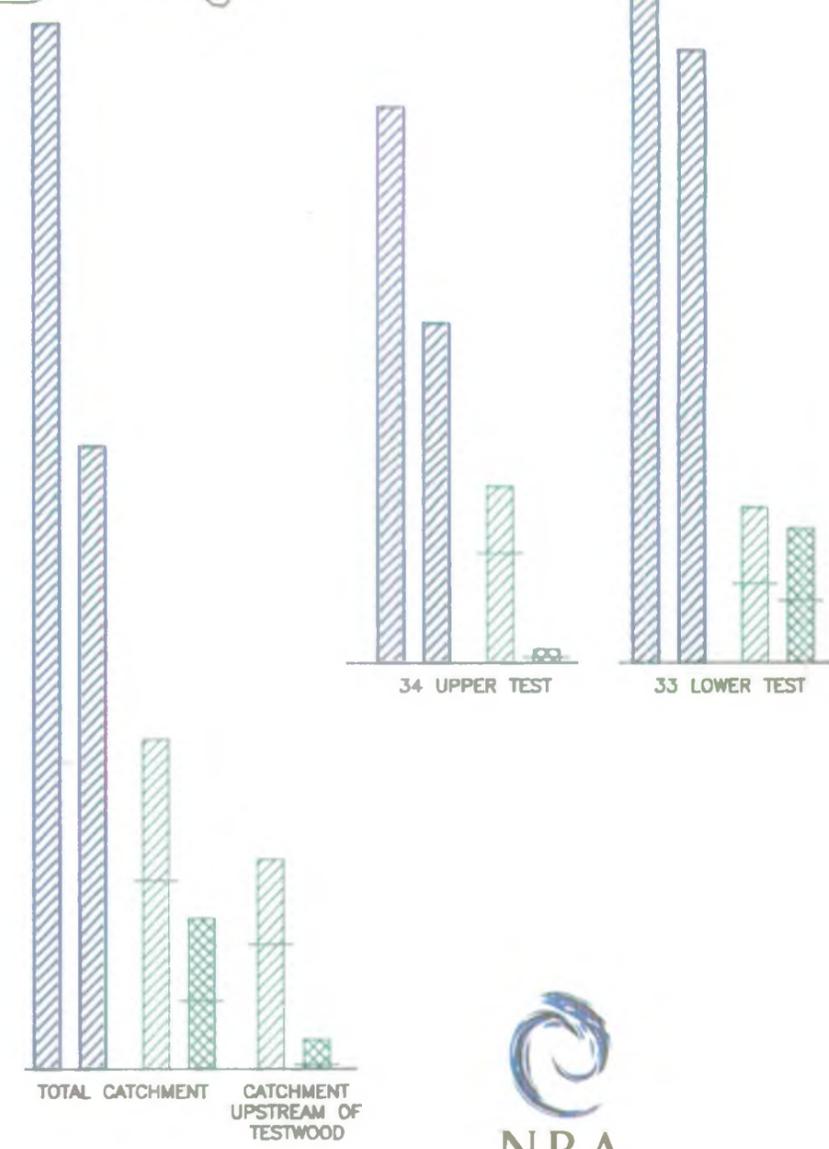
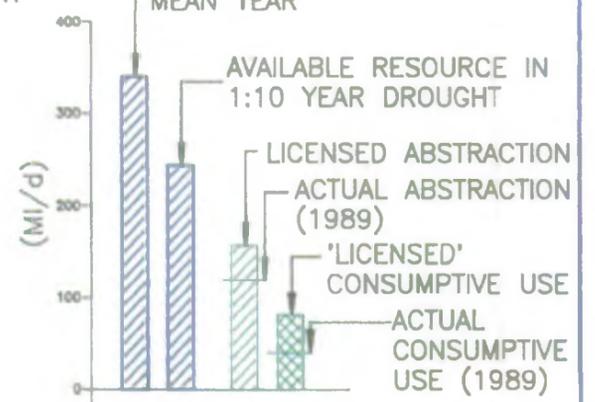
- COAST LINE
- SURFACE CATCHMENT BOUNDARY
- SURFACE CATCHMENT BOUNDARY
- PERENNIAL WATERCOURSE
- EPHEMERAL WATERCOURSE
- TOWNS
- SURFACE SUBCATCHMENT BOUNDARY
- SURFACE SUBCATCHMENT BOUNDARY

RESOURCE AREA BOUNDARY

34 RESOURCE AREA NUMBER

TOTAL RESOURCES

AVAILABLE RESOURCE IN MEAN YEAR

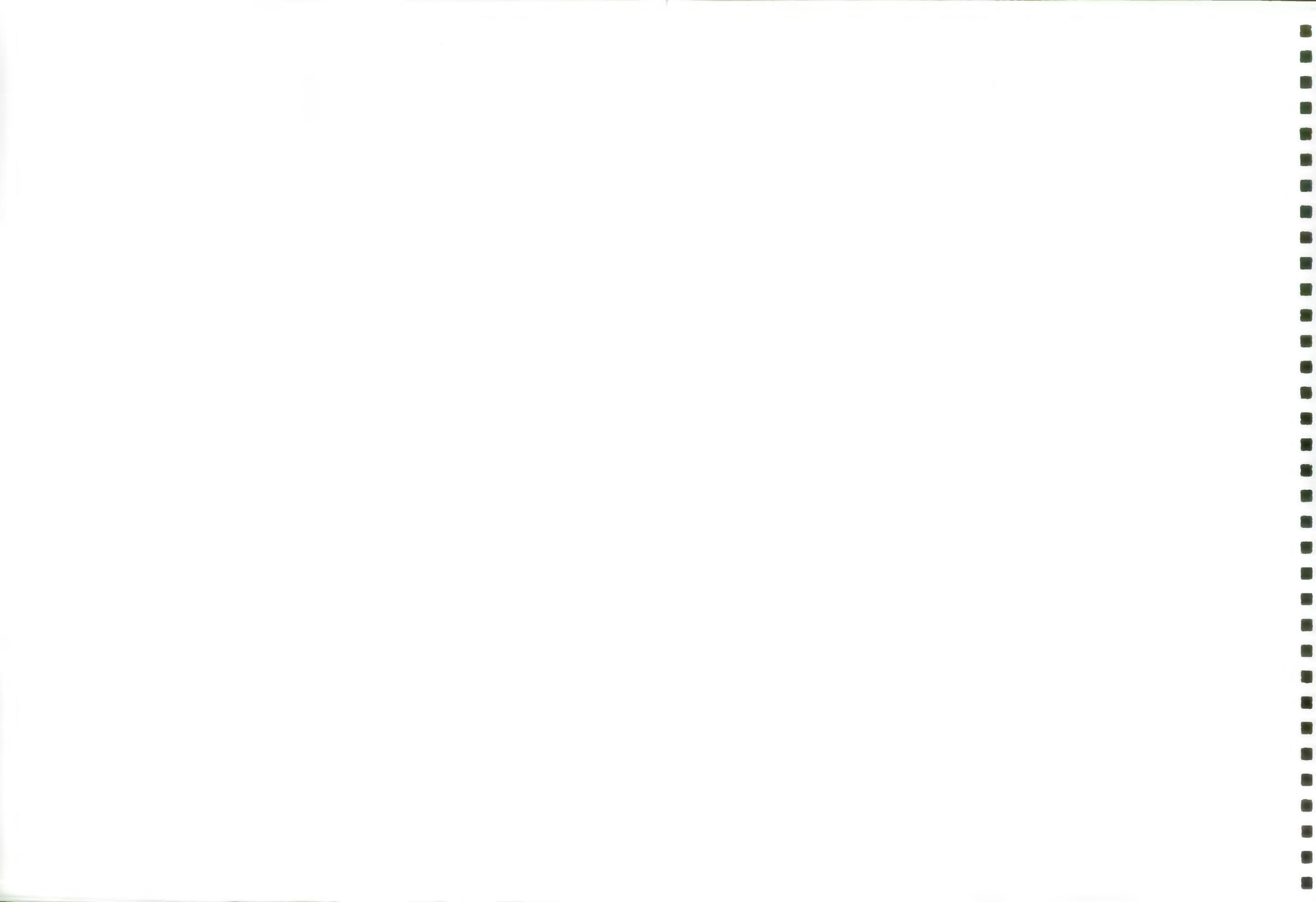


RESOURCE USAGE



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Southern Region



13. RESOURCE USAGE



13.1 General

This section is intended to portray the overall usage for water supply within the catchment, compared with the available resource. Resource usage has been assessed for each resource area and for the overall catchment.

The available resource is defined as the annual effective rainfall to the resource area and is available as either surface run-off or groundwater recharge. Both mean and 1:10 year drought annual available resource totals have been assessed. These totals are compared with the total annual licensed abstraction and the 'licensed' consumptive use.

The 'licensed' consumptive use is defined as the licensed abstraction minus the consented effluent return and is a measure of the potential nett loss from the resource area as allocated under licence. Discharge consents are set for each sewage treatment works and all private industrial process and cooling uses.

The purpose of this comparison is to illustrate the scale of water resources development within the total catchment and each resource area.

13.2 Local Perspective

The total catchment balance indicates that over half of the mean annual effective rainfall to the catchment is allocated for licensed abstraction. Effluent returns to the catchment amount to just over a half of licensed abstraction and consumptive use is therefore approximately 15 per cent of the resource. The effective rainfall in a 1:10 year drought is just over half of the mean and consumptive use under licence is then approximately 26 per cent of resource.

The surface source at Testwood, near the tidal limit, accounts for approximately 35 per cent of the licensed abstraction from the catchment. Upstream of Testwood a large proportion of abstracted supplies are returned to the catchment and consumptive use is only 4 per cent of the mean available resource.

Surface flows, as measured at Broadlands upstream of Testwood, fell below Q95 for over 70 days in the late Summer/Autumn of 1989. The assessment of resource usage indicates that this was largely due to a natural reduction in resources during this year. Flows typically reduce to an annual minimum over the Autumn and there are no further resources available for development over this period. The NRA are proposing surface augmentation schemes from boreholes in the upper reaches of the Test in order to improve the seasonal low flows in the catchment. Surface flows in the Great Test downstream of Testwood were also reduced in 1989 and 1990 and this had an adverse effect on the migration of salmonid fish from the Test Estuary.

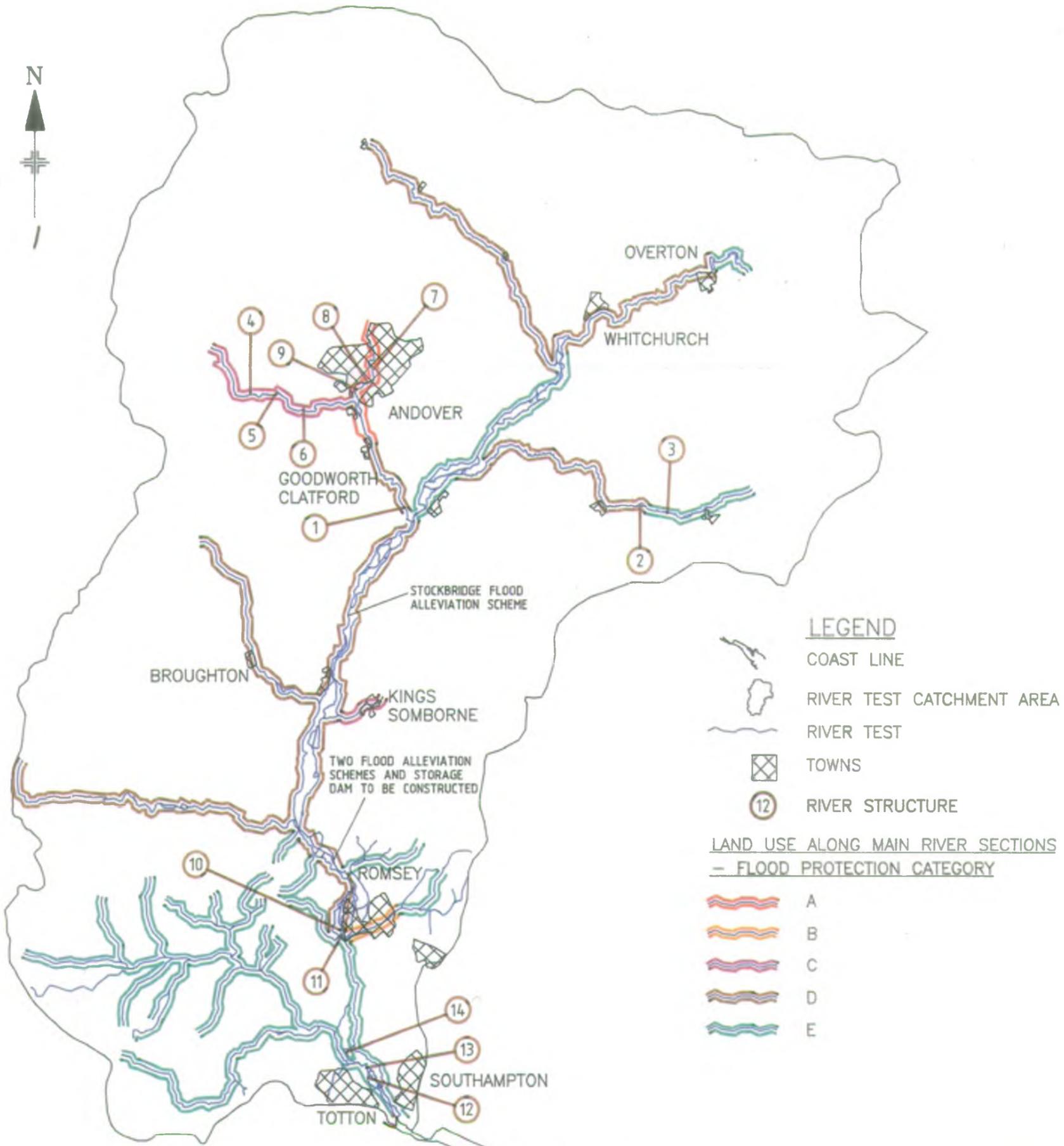
For a significant part of a typical year, and allowing for residual flows to the estuary, there is a large additional resource available for abstraction at Testwood. In a mean year the additional resource is of the same order as the total existing licensed potable abstraction from the catchment. A large storage reservoir would be required, however, to benefit from the resource during low flow periods. Future increases in water demand within the

13. RESOURCE USAGE



13.3 Overall Supply Objectives

- To restrict water resource development for public supply within the chalk catchment.
- To incorporate controlling flows in new abstraction licences as required.
- To encourage water companies and consumers to adopt water saving measures.
- To encourage water companies to adopt water metering with an acceptable tariff structure.
- To consider the adoption of licensing charges based on the environmental impact of abstraction.
- To consider the development of additional resources, with appropriate storage facilities and a controlling flow and quality regime, by abstraction from the Test close to the downstream freshwater limit.
- To meet increased demand in the catchment by transfer northwards from the tidal limit.
- To promote the return of suitably treated effluent to the catchment.
- To improve low flow conditions on the Wallop Brook and Bourne Rivulet.
- To develop surface augmentation from groundwater in the upstream reaches of the catchment.
- To maintain and develop the hydrometric monitoring network.
- To consider the effects of possible climate change in long term water resources planning.



LEGEND

- COAST LINE
- RIVER TEST CATCHMENT AREA
- RIVER TEST
- TOWNS
- RIVER STRUCTURE

LAND USE ALONG MAIN RIVER SECTIONS - FLOOD PROTECTION CATEGORY

- A
- B
- C
- D
- E

RIVER STRUCTURE	
1	BRANSBURY MILL SLUICE
2	WONSTON SLUICE
3	WESTON COLLEY GAUGE
4	PILLHILL BROOK MILL
5	PILLHILL BROOK MILL
6	PILLHILL BROOK MILL
7	ANTON WEIR
8	ANTON MILL
9	ANTON MILL
10	ABBAY MILLS SLUICE
11	SADDLERS MILL SLUICE
12	TESTWOOD MILL SLUICE
13	WIREHOUSE SLUICE
14	NURSING MILL SLUICE

LAND USE BAND	DESCRIPTION OF TYPICAL LAND USE	TYPICAL STANDARD OF PROTECTION RETURN PERIOD
A	DENSE URBAN AREAS	AT LEAST 1 IN 50 YEARS
B	SUBURBAN / URBAN AREAS (LESS DENSE THAN BAND A)	1 IN 20 TO 1 IN 50 YEARS
C	LIMITED NUMBERS OF COMMUNITIES AND / OR VERY INTENSIVE AGRICULTURE	1 IN 10 TO 1 IN 50 YEARS
D	ISOLATED AND LIMITED NUMBERS OF PROPERTIES AND / OR ARABLE FARMING	1 IN 2 TO 1 IN 5 YEARS
E	VERY FEW PROPERTIES AND / OR EXTENSIVE GRASSLAND	ANNUAL FLOODING
F	ANY AREA TO WHICH A LOWER STANDARD OF SERVICE IS OFFERED FOR ENVIRONMENTAL OR ECONOMIC REASONS	

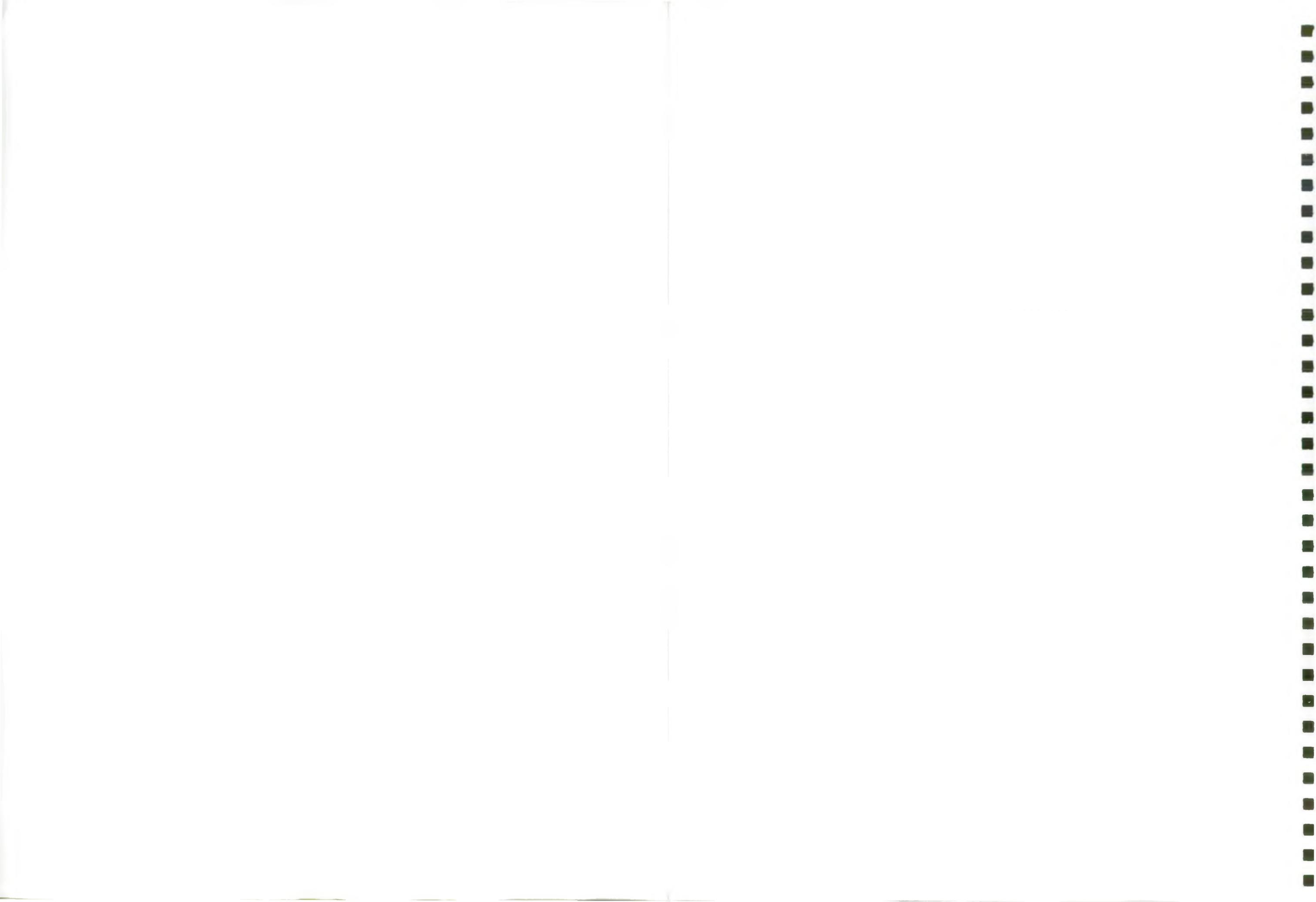


FLOOD DEFENCE



NRA

National Rivers Authority
Southern Region



14. FLOOD DEFENCE



14.1 General

This use deals with the provision of effective defence for people and property against flooding from rivers and the sea. Normally flooding is a result of extreme climatic conditions, such as high winds or very heavy rainfall. Flood events are described in terms of the frequency at which, on average, a certain severity of flood is exceeded. This frequency is usually expressed as a return period in years e.g. 1 in 50 years.

The effectiveness of flood defences can be measured in terms of the return period up to which they prevent flooding. It is clear that different types of land use, for example, urban areas and pasture land, require different levels of effectiveness for the defences. The different land uses and the proposed targets for their protection are shown on the plan opposite.

Under the Land Drainage Act the NRA have a general duty to oversee and have powers to control significantly obstructive works on any watercourse.

For the purposes of management, certain reaches of the river are formally designated as the "Statutory Main River". On the Main River, the NRA have special powers to carry out works or control the actions of others. Any proposal that could interfere with the bed or banks or obstruct the flow in the river requires formal consent from the NRA. The nature of the works carried out for flood defence means that this use can come into conflict with other river uses - notably fisheries and conservation. Consultations are carried out and, where feasible, methods are devised whereby the river can achieve its flood protection target but without significant habitat degradation.

The criteria for designation of Main River are currently under review.

Residential and commercial development in a river catchment is a cause for concern. The urbanisation of an area increases the amount of run-off into the river which can increase the risk of flooding. Development in the flood plain is an even greater problem. Firstly, it places additional properties at some risk of flooding and secondly it reduces the natural flow attenuation effects of the flood plain. This can lead to higher flows downstream of the development and therefore an increased risk of flooding. The effects of development in a catchment therefore have to be considered very carefully, particularly if they are in the flood plain.

14.2 Local Perspective

Flood defence is not considered an important issue along the River Test and there are few flood defence schemes. The worst floods occurred in 1947, 1961, 1974 and 1990 with the latter event causing flooding in a limited number of properties in Goodworth Clatford, Upper Clatford and between Timsbury and Middlebridge. However it is extremely rare for properties to flood although low lying water meadows are subject to regular inundation. The sluices at Romsey, known as the Fish Lake Hatches, need to be operated by the NRA during a flood emergency. There are also numerous private sluices, many of which need to be operated to avoid flooding. A number of these can be seen on the map opposite.

14.3 Objectives

- To provide effective defence for people and property against flooding from rivers and the sea. The Standard of Protection to be appropriate to the Land Use, where this is economically viable.
- To provide adequate arrangements for flood forecasting and warning.

14. FLOOD DEFENCE



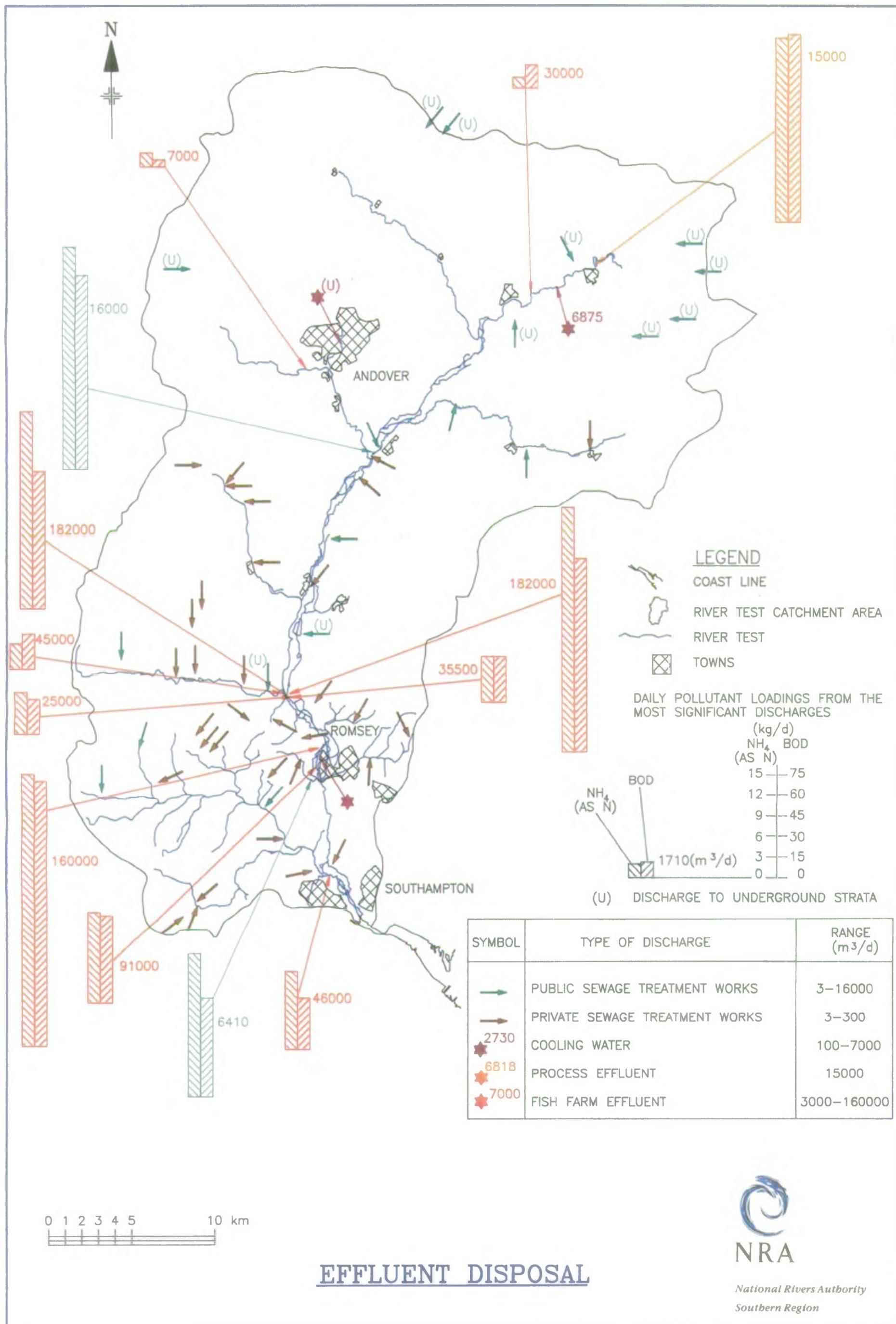
14.4 Requirements

River Topography

- Ensure that there is no unnecessary increase in flood risk as a result of new development.
- Resist development in the flood plain unless all measures are taken to ensure no increase in flood risk.

River Management

- Carry out weedcutting in the channels before the winter flood season where necessary to protect people and property to the appropriate standard.
- Ensure correct operation of relevant sluice gates.
- Carry out flood defence works with reference to environmental needs and requirements.

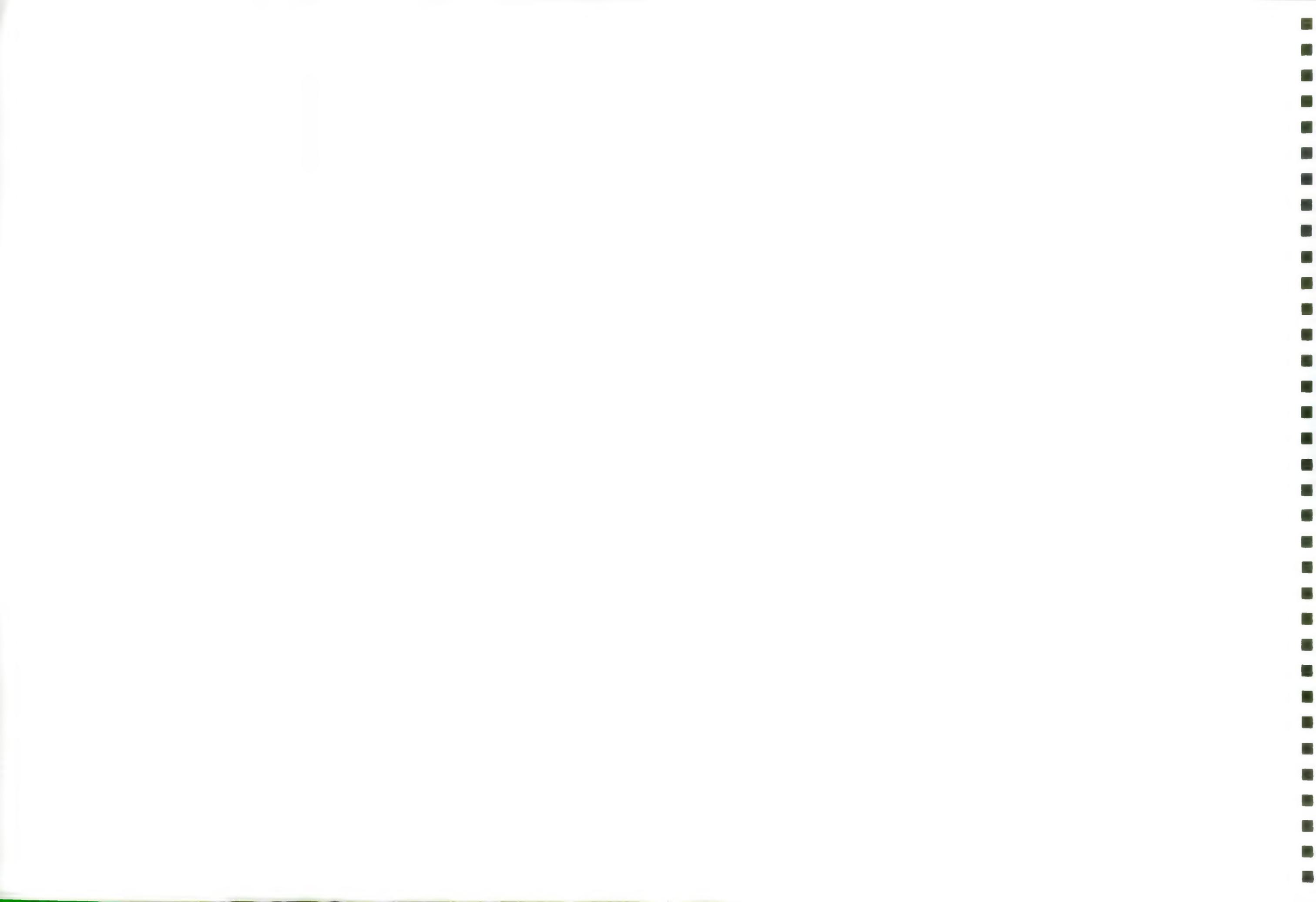


EFFLUENT DISPOSAL



NRA

National Rivers Authority
Southern Region





15. EFFLUENT DISPOSAL

15.1 General

This use relates to the disposal of domestic, industrial and agricultural effluents to the river system. The conditions to be met by a particular discharge are set out in a specific discharge consent. They are calculated based upon the upstream water quality and flow in the receiving watercourse. It follows that if there is any subsequent deterioration in upstream water quality, or diminution of river flow beyond the values used in calculating the consent, then downstream uses could be put at risk.

15.2 Local Perspective

There are over 50 sewage treatment plants discharging throughout the catchment. These discharge volumes range from over 14,000 m³/day for Fullerton public treatment plant at Andover to less than 3m³/day for many of the smaller private plants. In addition, a number of treatment works discharge their effluent directly to ground, the largest of which is Overton with a discharge of some 1600 m³/day.

The Test catchment receives only one process effluent, this being from Portals Paper manufacturing plant at Overton which discharges some 15000m³/day of treated effluent.

The catchment receives 3 cooling water discharges which are generally regarded as having minimal impact on the receiving waters, and discharges from 10 fish farms and a number of cress farms.

The relative quantity of pollutant loading to the river from the more significant discharges is shown on the map with reference to comparative average Biochemical Oxygen Demand and Total Ammonia daily loadings.

This comparison shows that the pollutant loading discharged from Portals at the top of the catchment is comparable to that from Andover sewage treatment works. Similarly, the relative pollutant loading from the largest fish farm in the catchment, is nearly double that discharged from either Portals or Andover sewage treatment works.

15.3 Environmental Objectives

- To control the discharge of domestic, industrial and agricultural effluent to the watercourse in such a way that water quality objectives are met and other uses are not compromised.

15. EFFLUENT DISPOSAL



15.4 Environmental Requirements

Water Quality

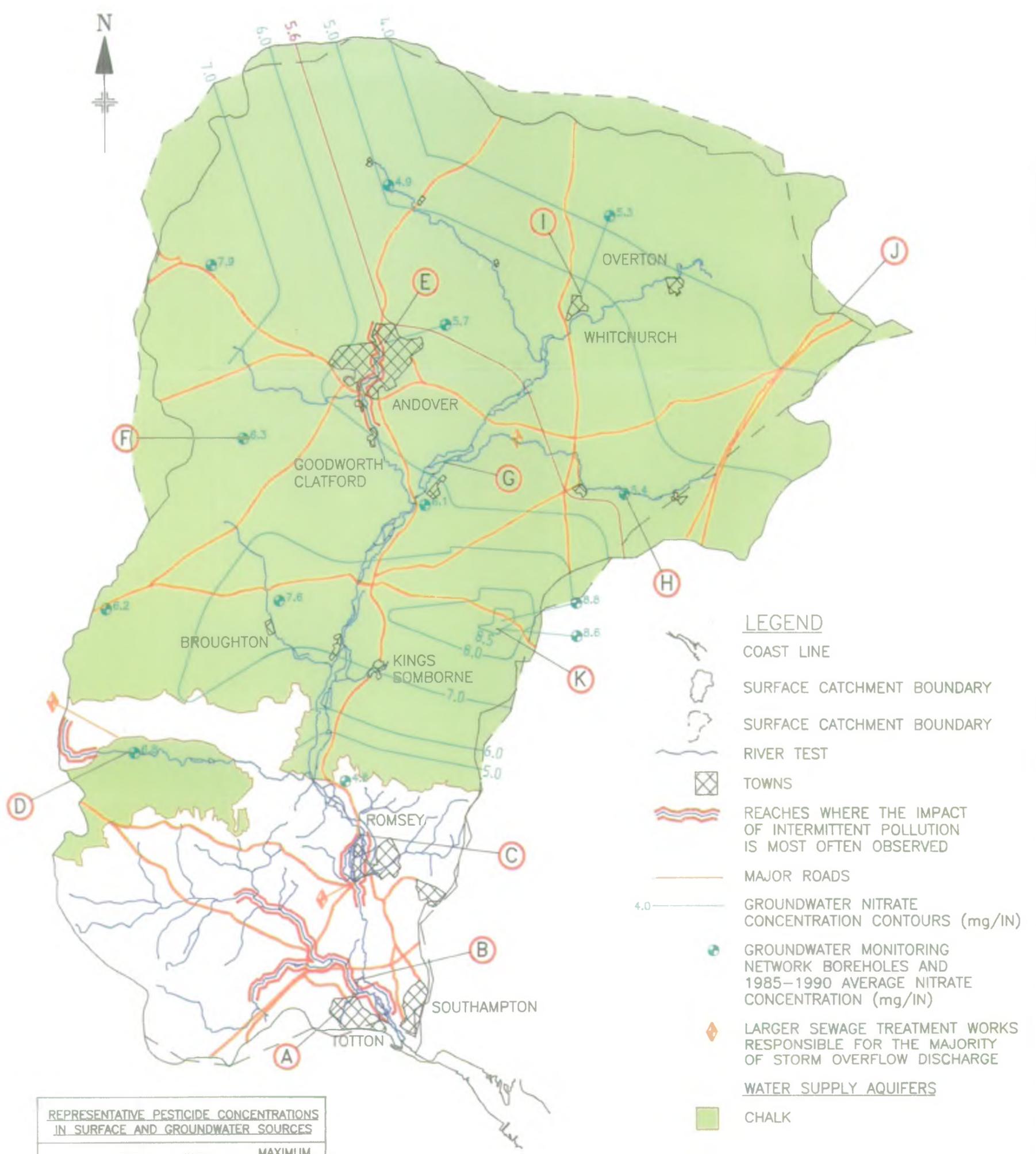
- No deterioration in upstream water quality, beyond that used in setting the consent.
- Continued monitoring of surface waters and the effluent discharges to ensure compliance.

River Flow

- No diminution of the flow regime below that used in setting the consents. Consents are normally set using 10 day Q95 river flows.

River Topography

- Outfalls should be sited so as to achieve a specified degree of effluent mixing with the river contents, within a specified distance.



LEGEND

- COAST LINE
- SURFACE CATCHMENT BOUNDARY
- SURFACE CATCHMENT BOUNDARY
- RIVER TEST
- ▨ TOWNS
- ~ REACHES WHERE THE IMPACT OF INTERMITTENT POLLUTION IS MOST OFTEN OBSERVED
- MAJOR ROADS
- 4.0 — GROUNDWATER NITRATE CONCENTRATION CONTOURS (mg/lN)
- GROUNDWATER MONITORING NETWORK BOREHOLES AND 1985-1990 AVERAGE NITRATE CONCENTRATION (mg/lN)
- ◆ LARGER SEWAGE TREATMENT WORKS RESPONSIBLE FOR THE MAJORITY OF STORM OVERFLOW DISCHARGE
- WATER SUPPLY AQUIFERS
- CHALK

REPRESENTATIVE PESTICIDE CONCENTRATIONS IN SURFACE AND GROUNDWATER SOURCES

SITE	TOTAL TRIAZINES Ng/l	TOTAL DRINS Ng/l	MAXIMUM ADMISSIBLE LIMITS Ng/l
A	161.66	2.57	500
B	111.0	2.58	500
C	1708.7	2.33	500
D	66.6	1.30	500
E	53.0	3.80	500
F	121.0	1.30	500
G	40.6	3.30	500
H	20.4	1.30	500
I	53.3	2.66	500
J	66.6	1.30	500
K	66.6	1.30	500



INTERMITTENT AND DIFFUSE POLLUTION



NRA

National Rivers Authority
Southern Region



16. INTERMITTENT AND DIFFUSE POLLUTION



16.1 General

This use relates to both consented and non-consented intermittent discharges received by the catchment. The intermittent discharges are varied in terms of both frequency and impact. They include consented surface water discharges and storm sewage overflows, as well as accidental industrial, agricultural or road traffic spillages, and discharges derived from more diffuse sources such as runoff from land.

This use also highlights the potential risks to the catchment from such sources as chemical stores, given the potentially severe impacts which could occur as a result of accidents. Pollution of groundwater aquifers also occurs and this can be a very significant problem due to the difficulty of removing contamination once it has occurred.

16.2 Local Perspective

Intermittent pollution incidents in the Test catchment are predominantly centred around the River Blackwater and the top of the River Dun and the urban areas of Romsey and Andover. The River Blackwater and River Dun incidents tend to be more agriculturally derived organic wastes rather than the oil runoff which characterise the incidents in the urban areas.

There are a number of consented stormwater discharges throughout the catchment as well as consented stormwater overflows on the sewerage systems and at the treatment works. The map shows the larger treatment works responsible for the majority of the storm sewage overflow volumes throughout the catchment.

The contours shown on the map represent the average groundwater nitrate concentrations for the last 8 years determined using the NRA groundwater monitoring network. The EC Directive 71/354/EEC lays down guideline levels and Maximum Admissible Concentrations of 5.6 and 11.3mg/lN for water to be used for human consumption. These levels are highlighted separately.

The map also displays average total pesticide concentrations for 1985-1990 from representative sites for both surface and groundwater throughout the catchment. Triazines and Drins represent the two major groups of compounds which give rise to the most concern throughout the Southern Region of the NRA.

The groundwater nitrate concentrations show that there is no exceedence of maximum admissible concentrations anywhere in the catchment. However exceedence of the guideline limit occurs throughout much of the catchment.

Surface and groundwater pesticide concentrations for the two indicator groups show generally low levels significantly below the Maximum Admissible Concentrations of 500ng/l for each group of compounds. The only exceedence of this level occurred in the surface waters of the River Test at Greatbridge with respect to the Triazines group. The average at this site is, however, heavily influenced by a single large result. Given the average upstream and downstream concentrations, the Greatbridge result is therefore not necessarily representative of the existing ambient concentrations.



16. INTERMITTENT AND DIFFUSE POLLUTION

16.2 Local Perspective (continued)

In recent years there has been an increase in phosphate concentrations in the River Test. It is not known why this has occurred but may have something to do with changing land use and agricultural practices. The NRA is proposing to investigate the issue with a view to formulating solutions.

There is concern that accidental spills from the Walworth Industrial Estate, Andover, situated in a Zone 1 area of the Authorities Aquifer Protection Policy, have found their way into the aquifer below.

16.3 Environmental Objectives

- To control intermittent and diffuse pollution in such a way that no other uses are compromised.

16.4 Environmental Requirements

Water Quality

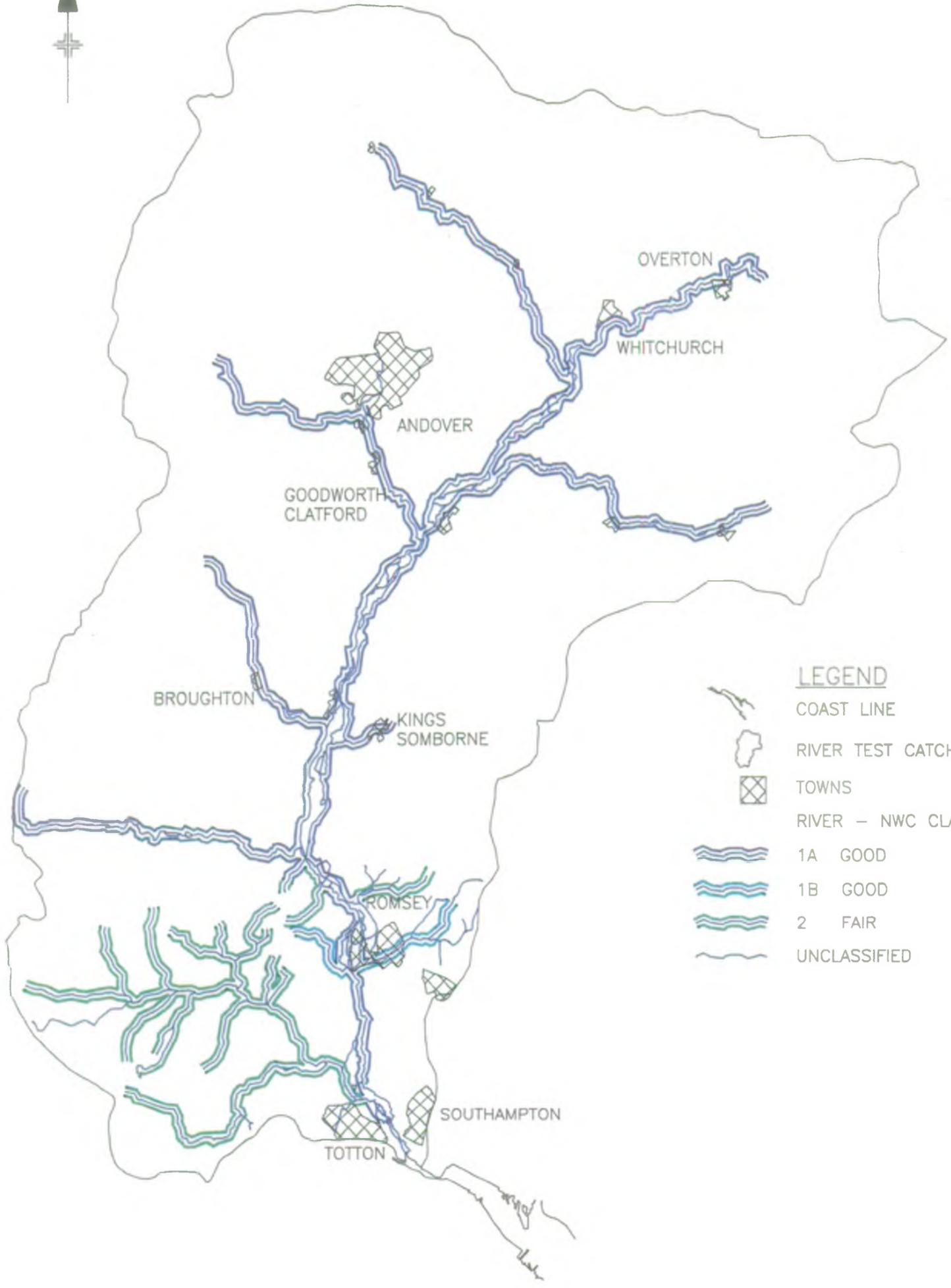
- To have emergency procedures to deal with, or mitigate, the impact of accidental discharges.
- Prevention of pollution of controlled waters.
- Continued monitoring of surface and groundwaters.
- To encourage the early reporting of all pollution incidents to the NRA.

River Flow

- Basic flow regime to reduce the impact of intermittent and diffuse pollution is met by the requirements detailed in Section 4: RIVER CORRIDOR CONSERVATION.

River Topography

- Provision of terrestrial bankside vegetation to act as a buffer for diffuse pollution from overland run-off, particularly in areas of intensive agriculture.



LEGEND

-  COAST LINE
-  RIVER TEST CATCHMENT AREA
-  TOWNS
- RIVER - NWC CLASSIFICATION**
-  1A GOOD
-  1B GOOD
-  2 FAIR
-  UNCLASSIFIED



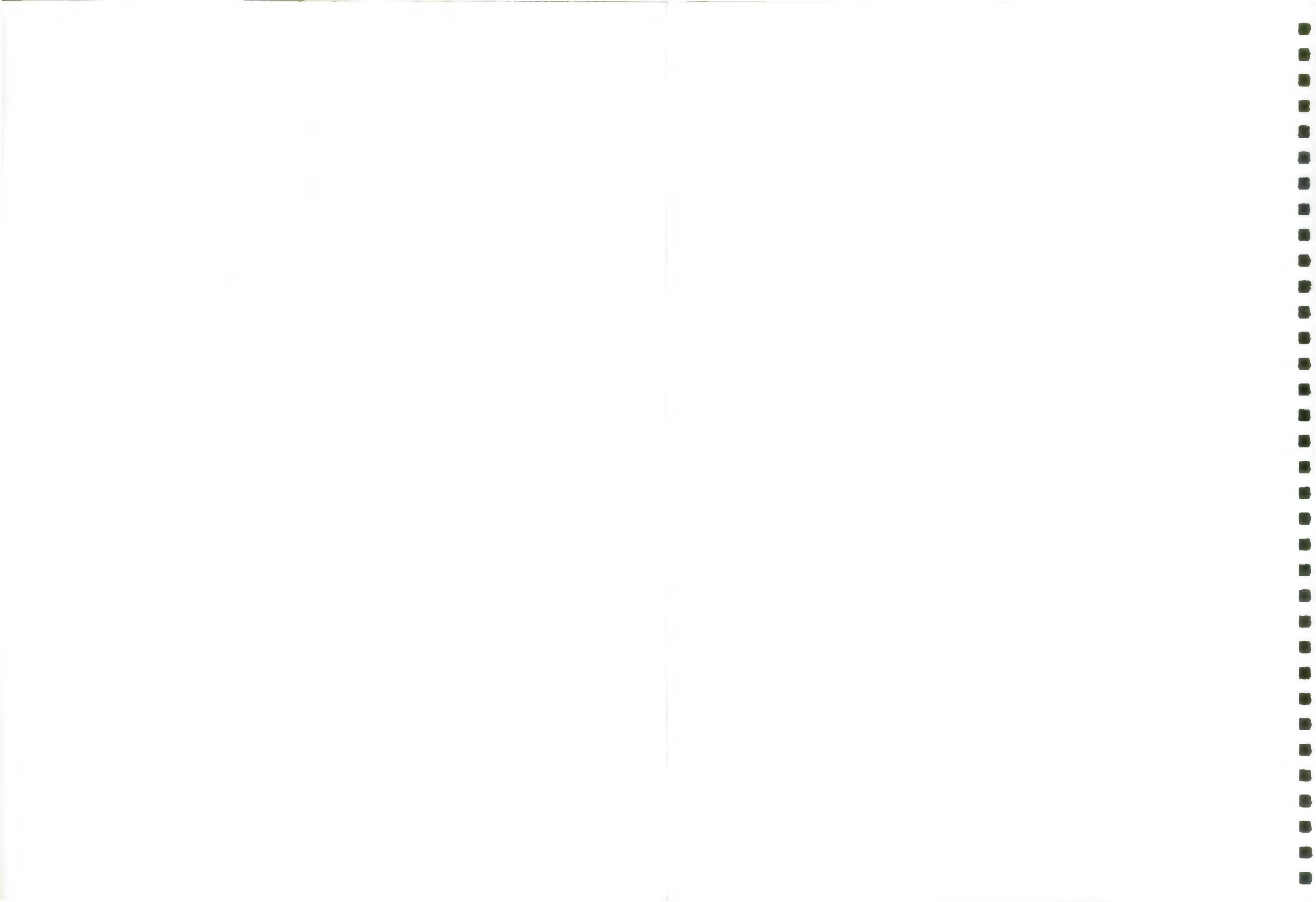
NWC RIVER CLASSIFICATION



NRA

*National Rivers Authority
Southern Region*





17. STATUTORY WATER QUALITY OBJECTIVES



17.1 General

Sections 104 and 105 of the Water Act 1989 state respectively that all controlled waters will be subject to a system of classification, and that Statutory Water Quality Objectives will be set in relation to such waters by the Secretary of State.

UK aquatic pollution control has been traditionally based upon the application of Environmental Quality Objectives (EQOs) and their associated Environmental Quality Standards (EQSs) in the waters which receive pollution. The EQO based approach permits the control of particular discharges whilst having regard to the assimilative capacity of the receiving water and the fate and behaviour of particular pollutants. Given the various water quality requirements for different uses it is possible to construct a use based classification system for individual river reaches based on the various uses undertaken.

However, this approach to classification does not provide a means for absolute comparison of water quality between different water courses and regions. A broad system of river classification able to provide the basis of such comparisons throughout the country was introduced in 1979. It was based on the National Water Council recommendations for a limited number of specific (NWC) target classes and a limited range of criteria (BOD, Ammonia, Dissolved Oxygen). This system was used in both the 1980 and 1985 National Comparative Survey. A biological component was introduced as part of the 1990 National survey in order to give a biological 'over ride' to the chemical data. A biological 'over ride' seeks to limit the distortions caused by a limited chemical sampling programme in determining the compliance or otherwise of a given target class. By being a continuous indicator of water quality, biological data such as insect species present will then be used in association with chemical water quality data to determine compliance.

However, statutory Water Quality Objectives based solely on this classification scheme and associated target classes would be unsatisfactory, since for example a water body might achieve its target class while simultaneously failing its use-related EQO. Similarly, achievement of a target class could occur where there has been a failure to comply with relevant EC Directives, compliance with which is mandatory in the UK.

Therefore, given these difficulties and in order to achieve a satisfactory Water Quality Objective system throughout the country, the NRA's Water Quality Working group has proposed an overall water quality classifications scheme which includes the following components:

- 1) Achievement of relevant use-related Environmental Quality Objectives and compliance with their relevant Environmental Quality Standards.
- 2) Achievement of the relevant NRA target class
- 3) Compliance with relevant EC directives
- 4) Requirement not to deteriorate the water quality of any controlled waters.

The working group proposes a series of 14 general use-related EQO's to which a water-body may be put. Associated with each of these uses will be a set of water quality standards (EQSs) which must be met in order to ensure that the water body is able to support the continuation of that use.

17. STATUTORY WATER QUALITY OBJECTIVES

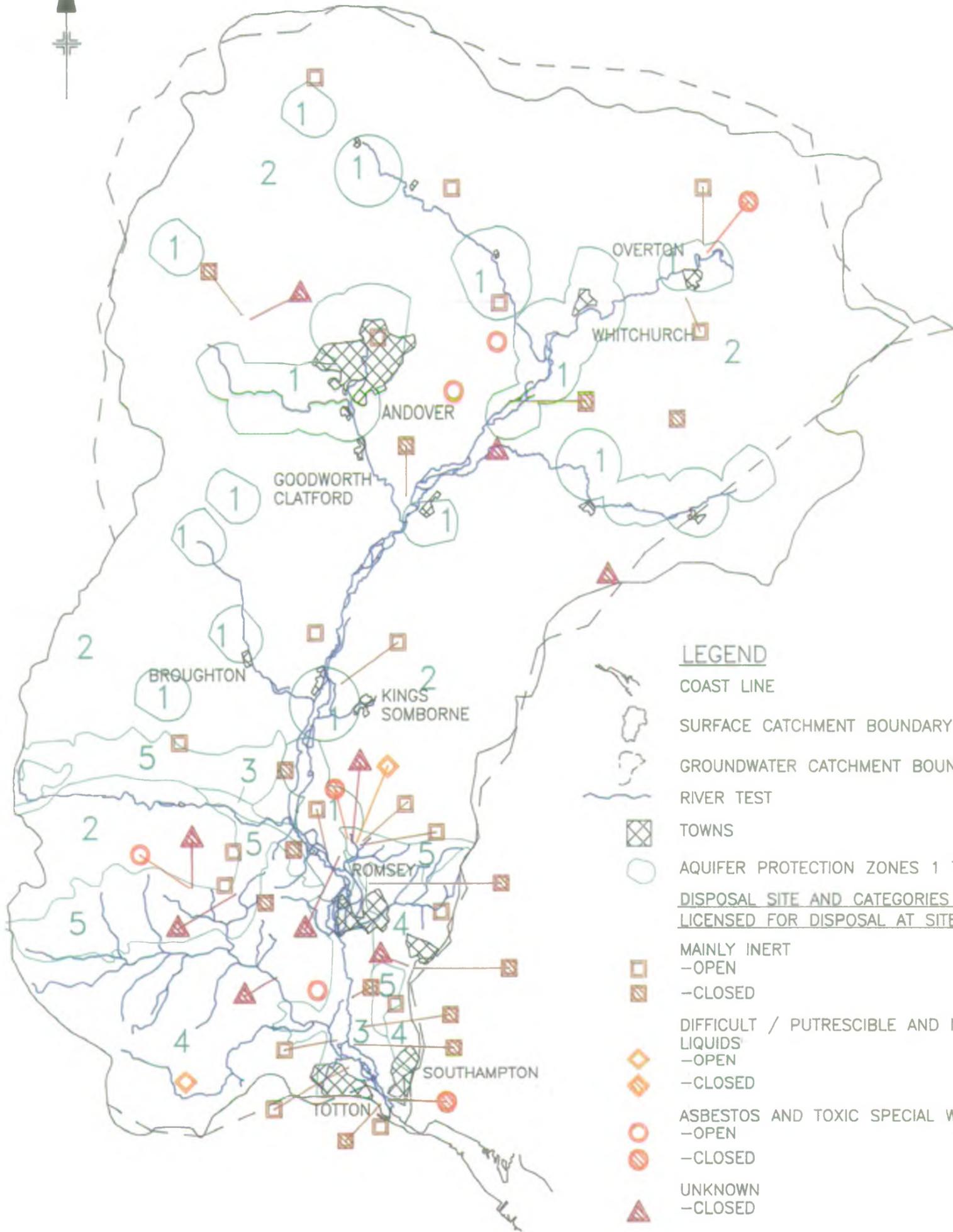


17.1 General (continued)

The uses have been largely identified throughout this Plan. However, the process of preparing River Catchment Management Plan is progressing at the same time as the NRA's Water Quality Working Group. Many of the EQS's relevant to each use have not yet been determined and the water quality requirements quoted in the plans are either the new standards where known or existing national or EC Directives. They will be revised when the new water quality classification system comes into operation.

The map shows the existing NWC target designations for the River Test.

As the new water quality classification system outlined above is still being devised this plan uses compliance with existing NWC target classes using the 1990 chemical survey data, and specific EC use related water quality directive in order to, as closely as possible, mimic the future water quality classification system. This will enable the plan to be readily updated when required.



SOLID WASTE DISPOSAL



NRA

National Rivers Authority
Southern Region



18. SOLID WASTE DISPOSAL



18.1 General

This use relates to the disposal of domestic, industrial and trade waste throughout the catchment. This use has the potential to impact significantly upon the water quality of the catchment through the contamination of ground or surface water.

The 1974 Control of Pollution Act places a duty on the Waste Disposal Authority to licence disposal sites, subject to conditions specifying the materials to be deposited. The licensing authority is also responsible for ensuring that the sites do not endanger public health, cause water pollution or cause serious detriment to the local amenity.

The 1990 Environmental Protection Act also introduced stricter controls on the closure and after care of waste disposal sites. A waste disposal operator will have to acquire a certificate of completion from the Waste Disposal Authority before they are able to hand back their license and exonerate themselves of any further legal responsibility. The Waste Disposal Authority must therefore be certain that the restored land will not result in pollution of the environment or harm to public health before a certificate of completion is granted.

Pollution resulting from landfill sites is most often observed in either surface or groundwaters. Comprehensive water quality monitoring is therefore essential to ensure that contamination does not result in harm to public health or damage to the environment. The obvious areas of concern with respect to contamination from landfill sites revolve around those sites disposing of difficult and/or special wastes in areas of overlying water supply aquifers. Many of these sites were constructed prior to the introduction of the licensing procedures.

18.2 Local Perspective

There are approximately 50 known landfill sites within the Test catchment, many of which have now been closed. The types of waste range from mainly inert materials, to potentially more difficult industrial waste and/or domestic refuse.

Hampshire County Council is the primary Waste Disposal Authority responsible for the Test Catchment. The Council faces 3 main problems with respect to waste disposal:

1. It is becoming increasingly difficult to find environmentally acceptable new landfill sites, particularly in South Hampshire.
2. Existing household waste incinerators are ageing and there are concerns over atmospheric emissions.
3. The quantity of waste being produced is likely to increase.

In response to these pressures the County Council has specific policies with respect to increasing recycling and the siting and operation of new sites.

The County Council further favours the infilling of existing mineral extraction sites or derelict land, rather than land raising waste disposal activities.

18. SOLID WASTE DISPOSAL



18.2 Local Perspective (continued)

The proposed NRA National Groundwater Protection Policy and the existing Aquifer Protection Policy (APP), as discussed in Section 14.1 are very relevant to this use. The map opposite shows the current APP Zones along with the location of the waste disposal sites. The Policy states that in Zone 1, which surrounds public water supply sources, the disposal of all but inert and non-toxic waste is prohibited. The remaining aquifer protection Zones 2-5 represent progressively lower levels of prohibited waste disposal. Protection Zone 2, which covers the remaining Chalk and Upper Greensand aquifers not immediately adjacent to existing public water supplies, prohibits the deposition of incineration residues, medical, surgical or veterinary wastes, pulverised fuel ash, or most forms of difficult or special wastes. Protection Zone 3, which extends over the more important remaining granular water-bearing aquifers, has similar disposal restrictions to those imposed on Zone 2. Protection Zone 4, the remaining less important aquifers, and Zone 5 representing the impermeable clay substrate have few restriction on the types of waste which can be deposited.

The NRA operates a comprehensive surface water monitoring programme and a groundwater monitoring network throughout the catchment neither of which are specifically related to any particular disposal sites. Although information is limited there are few reported problems associated with waste disposal sites in the Test Catchment. However, given the obvious concern expressed above of high risk sites, increased monitoring, particularly of groundwater, may be required in the future.

18.3 Environmental Objectives

- To control domestic, industrial and trade waste disposal within the catchment in such a way that other uses are not compromised.

18.4 Environmental Requirements

Water Quality

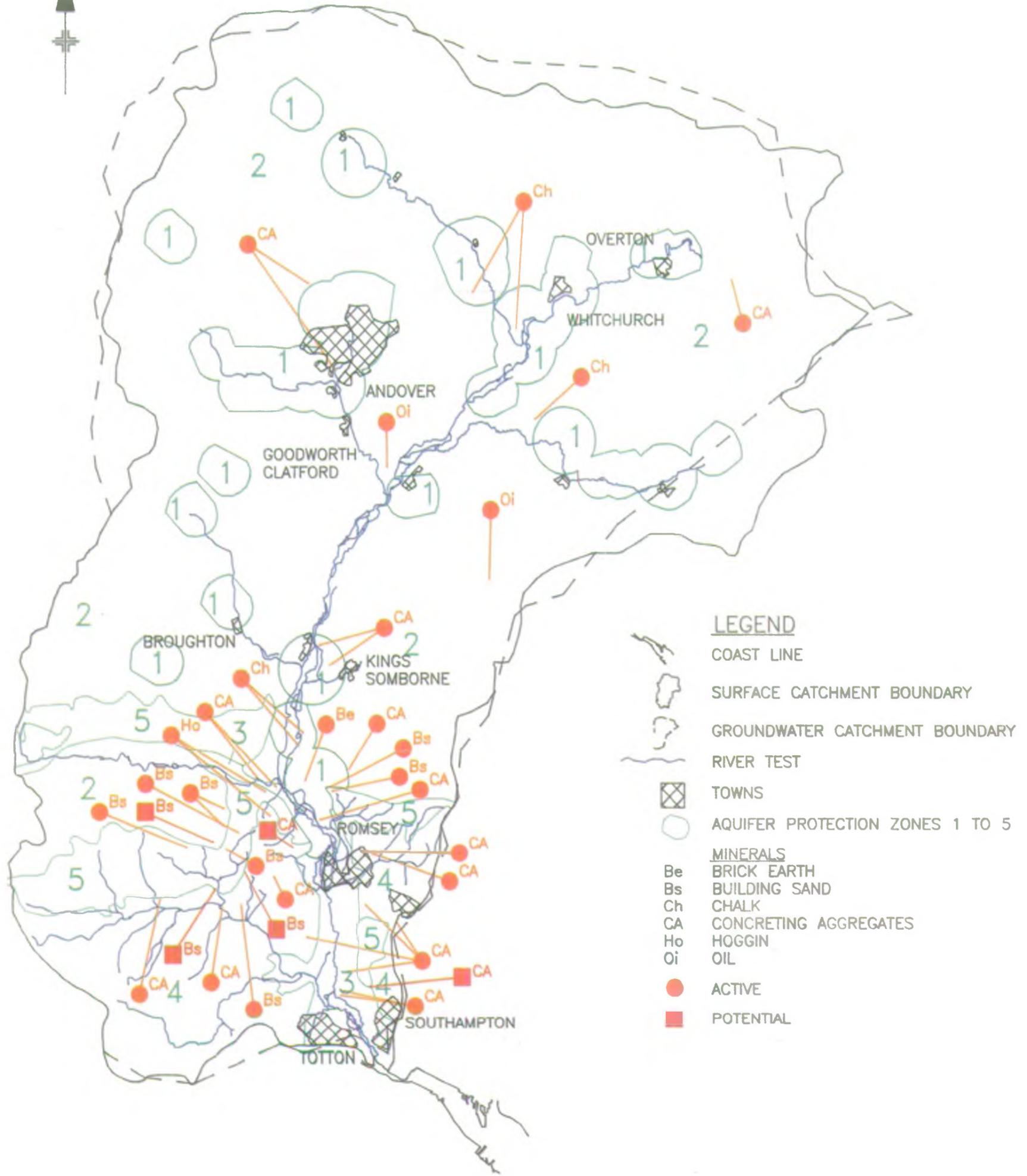
- Compliance with EC Directives on dangerous substances discharged to groundwaters.
- Implementation of the NRA National Groundwater Protection Policy.
- Prevention of pollution of controlled waters.
- Appropriate monitoring of effects of disposal sites on surface and groundwater.
- Ensuring that licensing of disposal sites is in accordance with either the present Southern Region aquifer Protection Policy or the future NRA National Groundwater Protection Policy.

River Topography

- Restoration of all sites to an acceptable environmental standard.

River Management

- Prevention of litter problems in the river corridor due to wind blown debris.



LEGEND

- COAST LINE
- SURFACE CATCHMENT BOUNDARY
- GROUNDWATER CATCHMENT BOUNDARY
- RIVER TEST
- ⊠ TOWNS
- AQUIFER PROTECTION ZONES 1 TO 5
- MINERALS**
- Be BRICK EARTH
- Bs BUILDING SAND
- Ch CHALK
- CA CONCRETING AGGREGATES
- Ho HOGGIN
- Oi OIL
- ACTIVE
- POTENTIAL



MINERAL EXTRACTION



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19. MINERAL EXTRACTION



19.1 General

This use relates to the exploitation of mineral resources throughout the catchment. This use has the potential to impact upon the catchment through subsidence or effluent discharges. It may also lead to further impact in the future should the finished workings be used as solid waste disposal sites.

The County Councils are the local planning and licensing authority with respect to the exploitation of natural resources throughout the catchment. The County Councils through their minerals plans seek to reconcile the potentially conflicting aims of securing adequate minerals supply with the need to safeguard the physical and human environment.

19.2 Local Perspective

The Test Catchment contains a large number of active mineral sites with over one third of these lying within the river corridor. Twenty sites provide coarse aggregates, many of these abstracting river gravels from the lower Test valley and others operating along the Blackwater. Other large deposits are worked away from the river corridor in the Rownhams and Nursling area, north west of Southampton.

Finer building sand (8 active sites) is derived from around Romsey and by the smaller tributaries of the Blackwater, particularly the Sherfield English area.

Further upstream, reflecting the change of solid geology from Eocene sandstones to the chalk, quarrying at five sites in the valleys of the Bourne Rivulet, Dever and Test south of Kings Somborne provides chalk for agricultural use.

Other minerals from the catchment include hoggin from two sites in the area of the confluence of the rivers Dun and Test and, on the opposite side of the Test valley, a brickearth pit is situated between the river and Michelmersh. Higher up on the chalk numerous exploration boreholes have resulted in two active oilfields at Wherwell and South Wanston.

Hampshire County Council anticipates expansion of mineral workings in a number of preferred areas. The sites in the Shootash, East Wellow and Sherfield English areas could have some impact on the Blackwater and its tributaries and one of the smaller Test tributaries flowing through Squabb Wood, west of Romsey. Some westward expansion of the Nursling pits may occur as far as the Southampton to Romsey railway line. This site and others which are intended for expansion are unlikely to impinge upon other uses in the catchment.

19.3 Environmental Objectives

- To control the extraction of minerals from the catchment in such a way that other uses are not compromised.



19. MINERAL EXTRACTION

19.4 Environmental Requirements

Water Quality

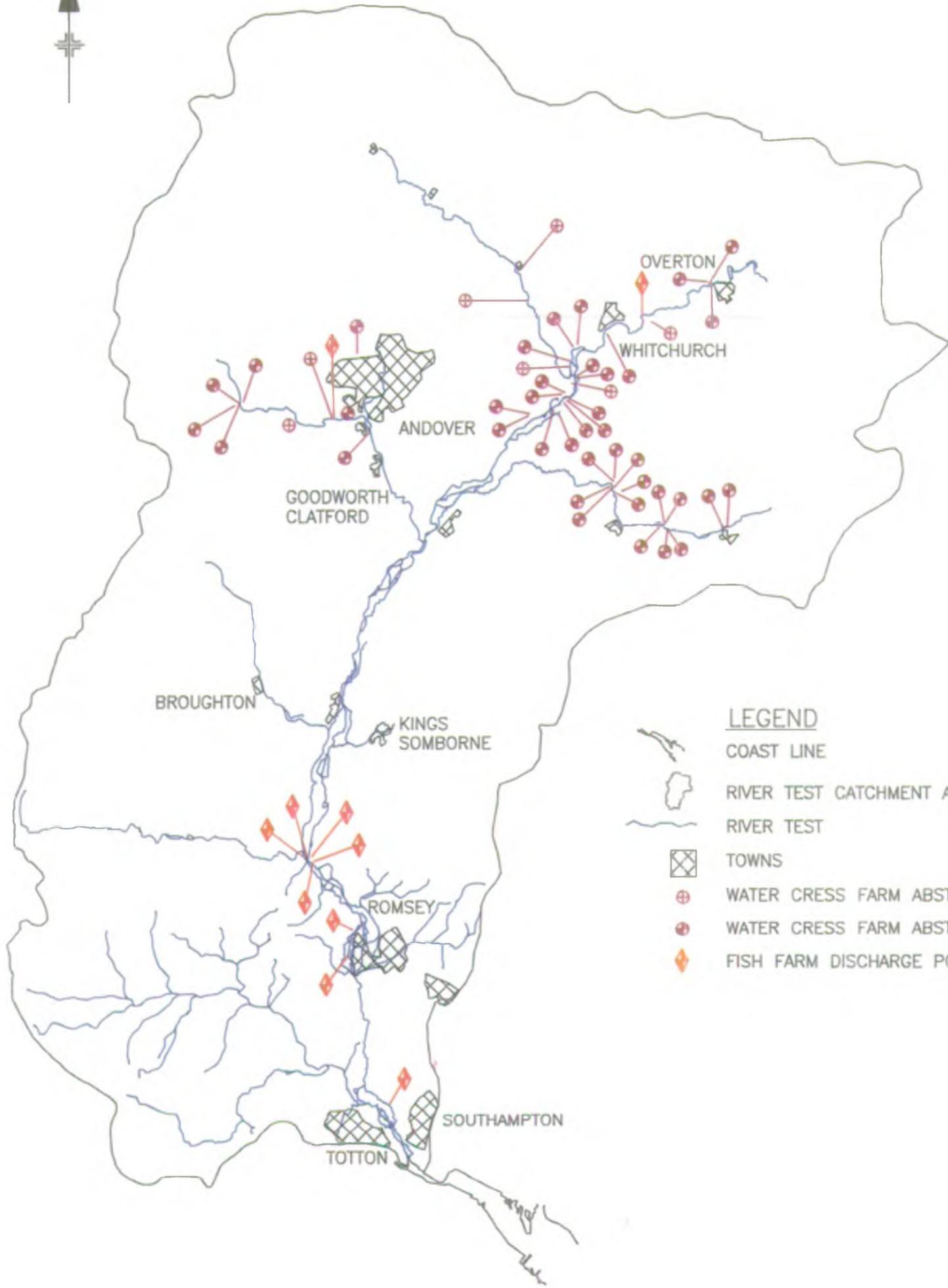
- No deterioration in groundwater or surface water quality.

River Flow

- No detriment to the availability of water resources.
- Minimise loss of unsaturated zone cover to aquifers.

River Topography

- Minimise the occurrence of slipping.
- Maintenance of the integrity of the river channel adjacent to extraction sites.



- LEGEND**
-  COAST LINE
 -  RIVER TEST CATCHMENT AREA
 -  RIVER TEST
 -  TOWNS
 -  WATER CRESS FARM ABSTRACTION >5Mld
 -  WATER CRESS FARM ABSTRACTION <5Mld
 -  FISH FARM DISCHARGE POINT



AQUATIC AGRICULTURE



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20. AQUATIC AGRICULTURE



20.1 General

This use refers to the operation of ponds and artificial beds adjacent to the river for the commercial rearing of fish and watercress.

All cress grown in compliance with the industry's Code of Practice requires the use of groundwater to feed the cress beds in order to eliminate the risk of liver fluke and similar pests.

The Test and Itchen catchments account for over 80% of the total watercress grown in the UK. There are over 128 cress farms in the two catchments, although the size of the individual farming operation varies from small single bed operations to extensive cress farms.

The majority of fish farms simply divert a consented proportion of river flows through the fish ponds. Concerns arise from fish farming due to the possible pollution from chemicals and organic matter. In addition, escapes of fish can disrupt fisheries.

A particular feature of both uses is that they are essentially non consumptive in that all water either diverted or abstracted is returned to the river close to the point of abstraction.

The discharges from fish farms are also covered in Section 15: EFFLUENT DISPOSAL and abstraction in Section 12 : INDUSTRIAL AND AGRICULTURAL ABSTRACTIONS.

20.2 Local Perspective

The Test catchment has 7 large watercress farms abstracting and therefore discharging over 5 MI/d. There are also 10 consented fish farms within the catchment.

The fish farms vary in size with the largest producing several hundred tons of fish per year. All farms producing fish for the table have been consented by the NRA and their effluent is monitored. The farms divert a portion of the river flows through either concrete or earth ponds and then discharge the flow back to the river.

Cress farms utilize ground water abstracted through either springs or boreholes, which is continuously passed over the growing cress in large beds, before being discharged directly to the river. Cress farming represents annually a multi-million pound industry throughout the catchment.

20.3 Environmental Objectives

- ° To permit the operation of fish and cress farms without detriment to other uses.

20. AQUATIC AGRICULTURE



20.4 Environmental Requirements

Water Quality

- To maintain water quality by enforcing consent conditions such that other uses are not compromised.

River Management

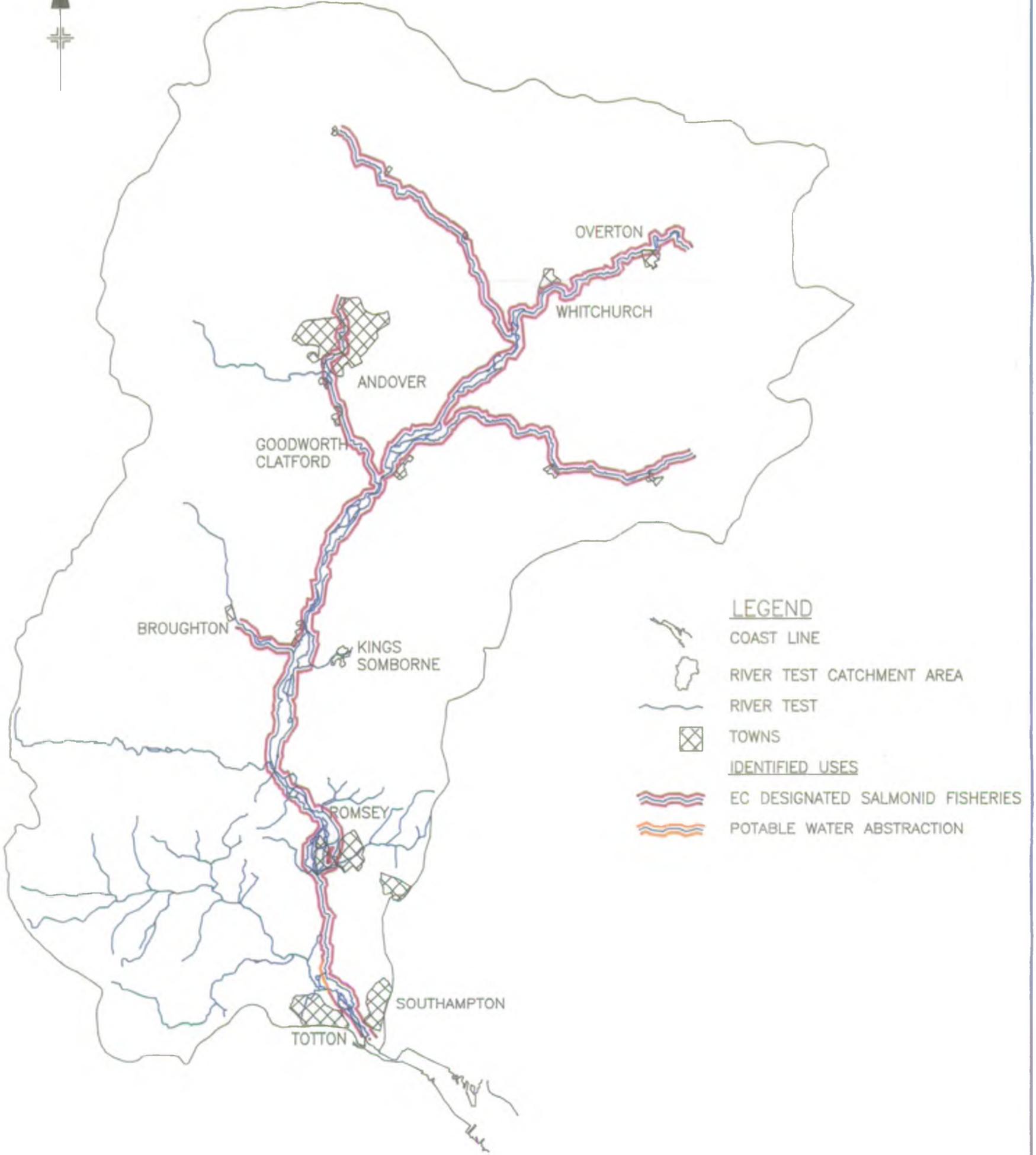
- Ensure fish farms prevent mass escapes of fish which can disrupt the game fisheries within the river.

River Flow

- To maintain river flows such that other uses are not compromised.

River Topography

- To ensure fish farms are located at sites such that other uses are not compromised.



LEGEND

-  COAST LINE
-  RIVER TEST CATCHMENT AREA
-  RIVER TEST
-  TOWNS
- IDENTIFIED USES**
-  EC DESIGNATED SALMONID FISHERIES
-  POTABLE WATER ABSTRACTION



WATER QUALITY TARGETS



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B1. WATER QUALITY TARGETS



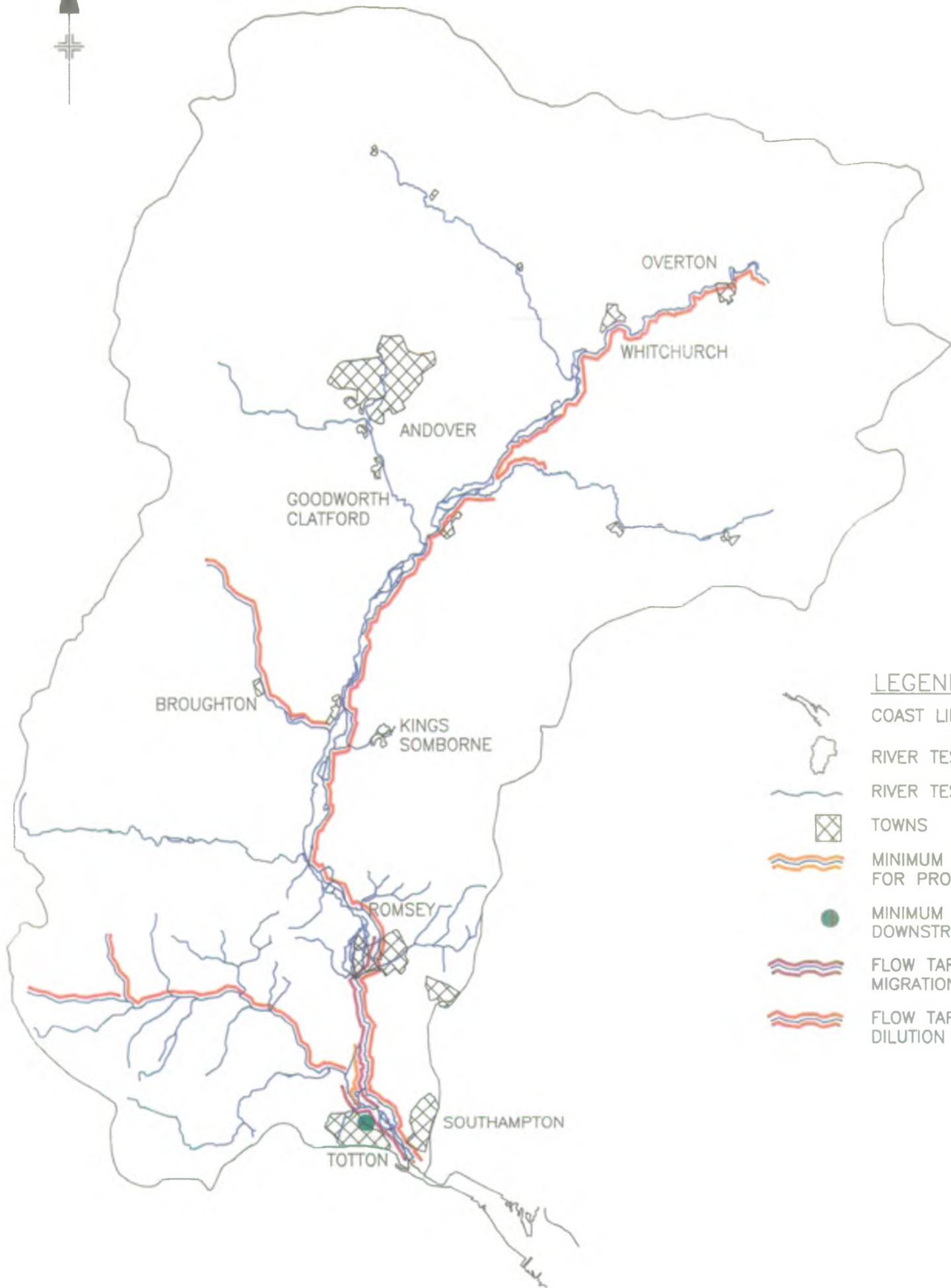
B1.1 General

The water quality requirements for the identified uses can now be combined to give a single "synoptic map" summarising the targets for the entire catchment. Clearly the quality requirements that apply to a particular reach of river are equal to the strictest requirements from the uses identified in this Plan.

B1.2 Local Perspective

There are a great number of uses of the Test with their own requirements for Water Quality. For clarity, the map opposite shows those areas where a specific requirement for a particular use exists. The water quality standards for the major parameters for these uses are shown on the attached table. In addition to those shown on the map, the following more general requirements are considered to be targets for the catchment:

- To meet the NWC objective class for individual reaches as detailed in Section 17.
- To meet the general requirement to maintain amenity value and river corridor conservation as detailed in Sections 4 and 9.
- Implementation of the Aquifer Protection Policy with respect to the licensing and operation of solid waste disposal sites.
- Implementation, on completion, of the NRA National Groundwater Protection Policy.
- To undertake routine water quality monitoring throughout the catchment in line with the NRA's stated aim of 'protecting and enhancing the quality of rivers, estuaries and coastal waters through the control of pollution'.
- To seek designation under the EC Freshwater Fisheries Directive for reaches where significant game or coarse fisheries occur.



LEGEND

-  COAST LINE
-  RIVER TEST CATCHMENT AREA
-  RIVER TEST
-  TOWNS
-  MINIMUM RESIDUAL FLOW SET FOR PROTECTION OF SUPPLY
-  MINIMUM RESIDUAL FLOW SET DOWNSTREAM OF TESTWOOD
-  FLOW TARGET FOR SALMONID MIGRATION
-  FLOW TARGET FOR EFFLUENT DILUTION

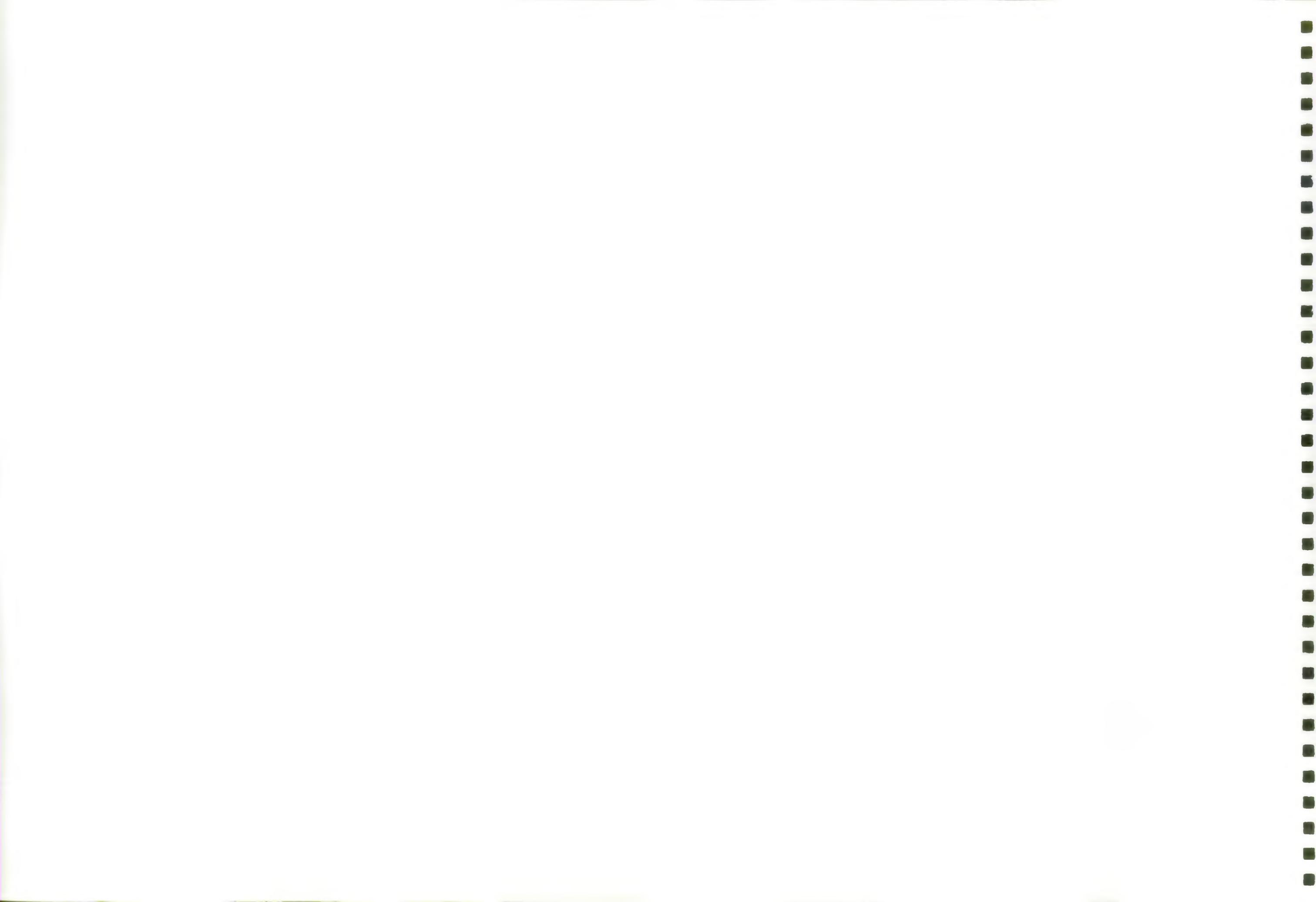


RIVER FLOW TARGETS



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B2. RIVER FLOW TARGETS



B2.1 General

This section considers the requirements for river flows to sustain the various river uses. Flow targets are set related to specific river uses. Minimum Residual Flow (MRF) settings are already in place in some cases, set at gauging stations and intended to protect flows for other uses.

Abstraction licences issued subsequently to setting the MRF upstream are linked to a prescribed flow, increased in stages so as to preserve both the MRF and existing licence holders. MRF control abstractions under the licences issued subsequently but do not control the river flows. Compensation flows may be set into licence conditions such that abstractions from groundwater or releases from a reservoir are used to augment low flows.

B2.2 Local Perspective

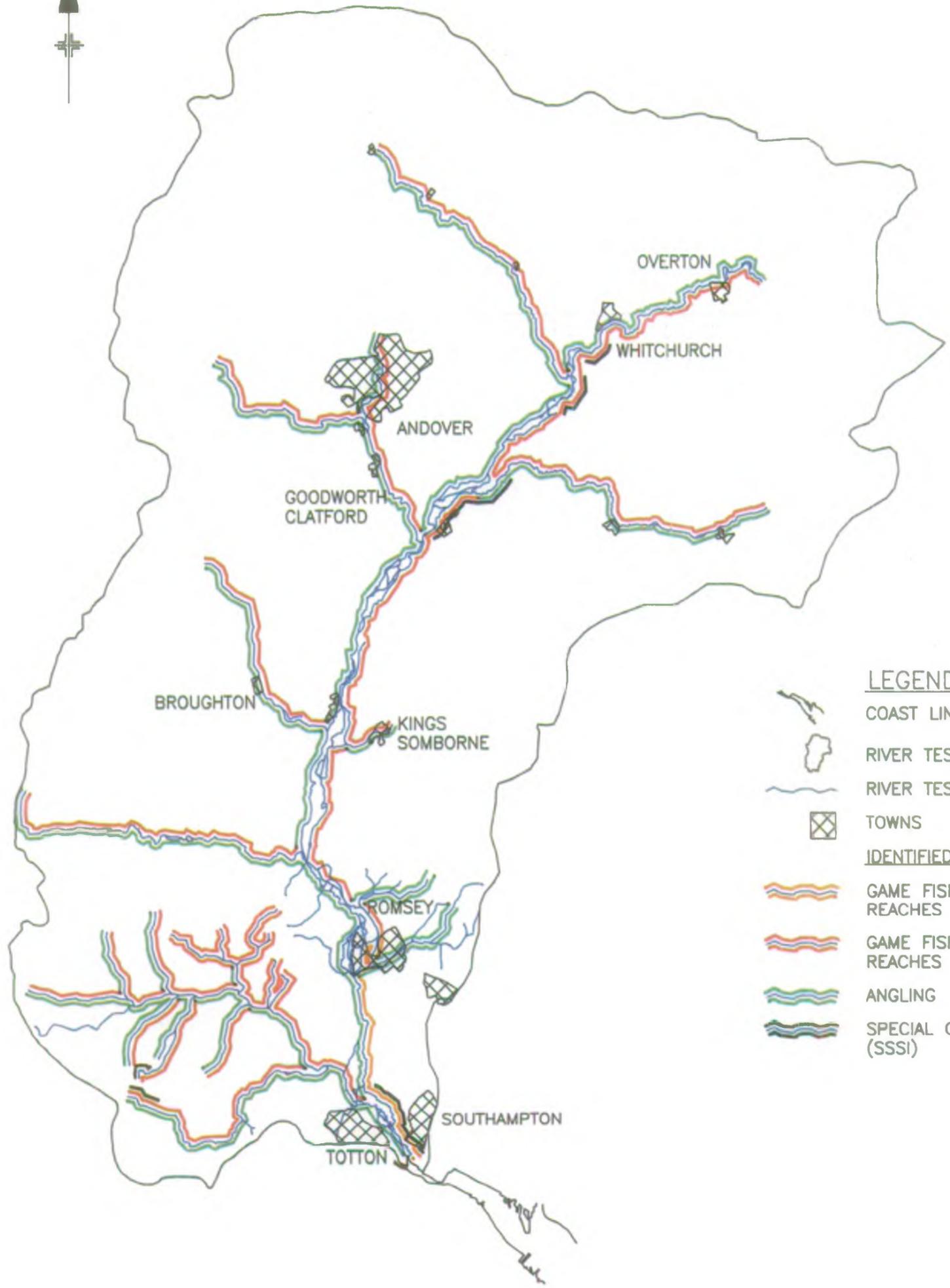
The river flow targets for each use are stated below and targets referred to specific reaches are illustrated on the plan:

- A seasonal variation in flow is required to conserve the natural characteristics of the river for River Corridor Conservation. The natural mean monthly flow regime during a 1 in 5 or 1 in 10 year drought is likely to be acceptable for non drought years in most river reaches. Monthly flows could be expected to fall below this critical threshold only during a pre-determined drought period. This flow target is set for all reaches where freshwater flow is a significant influence on the river corridor. This target also meets the requirement for a basic flow regime to minimise detriment to:
 - Recreation and Amenity
 - Game Fisheries
 - Coarse Fisheries
 - Angling

and to reduce the impact of:

 - Intermittent and Diffuse Pollution.

- A Minimum Residual Flow is set at Testwood gauge to protect resources for the Testwood surface water source
- A Minimum Residual Flow is set downstream of Testwood to protect fresh water resources for the estuary.
- In migratory reaches the natural flow regime should not be altered in a way which significantly inhibits the migration of salmonids.
- No diminution of the flow regime below that assumed in setting the effluent discharge consents. Consents are normally set using Annual Q95 flows.



LEGEND

-  COAST LINE
-  RIVER TEST CATCHMENT AREA
-  RIVER TEST
-  TOWNS
- IDENTIFIED USES**
-  GAME FISHERIES, MIGRATORY REACHES
-  GAME FISHERIES, BREEDING REACHES
-  ANGLING
-  SPECIAL CONSERVATION AREAS (SSSI)

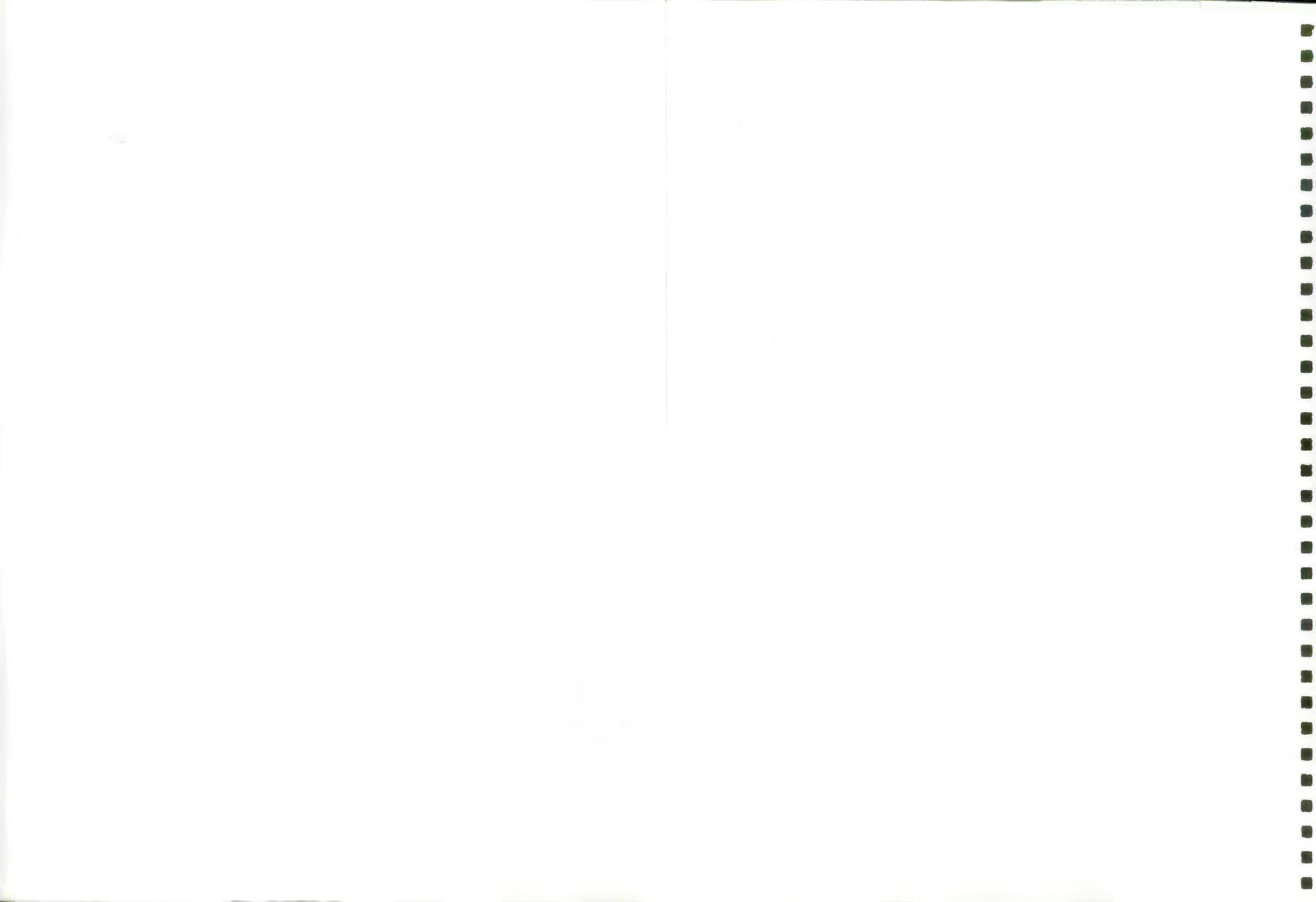


RIVER TOPOGRAPHY TARGETS



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B3. RIVER TOPOGRAPHY TARGETS



B3.1 General

This section considers the general requirements for the topography of the river and its corridor as well as the provision and maintenance of permanent facilities and access. The overall River Topography Targets for the catchment are collated from the individual uses and summarised in this Section. The nature of the features that are included under the term "River Topography" means that the targets involved can vary widely in scale. The intention here is not to identify, for example, points of access to the river wherever they are required, but rather to indicate the major topographical requirements of various reaches in relation to the uses concerned.

The targets for flood defence in the catchment are detailed in Section 14 and for convenience are not repeated here.

B3.2 Local Perspective

There are a great number of uses of the Test with their own requirements for River Topography. For clarity, the map opposite shows those areas where a specific requirement for a particular use exists. In addition to those shown on the map, the following more general requirements are considered to be targets for the catchment:

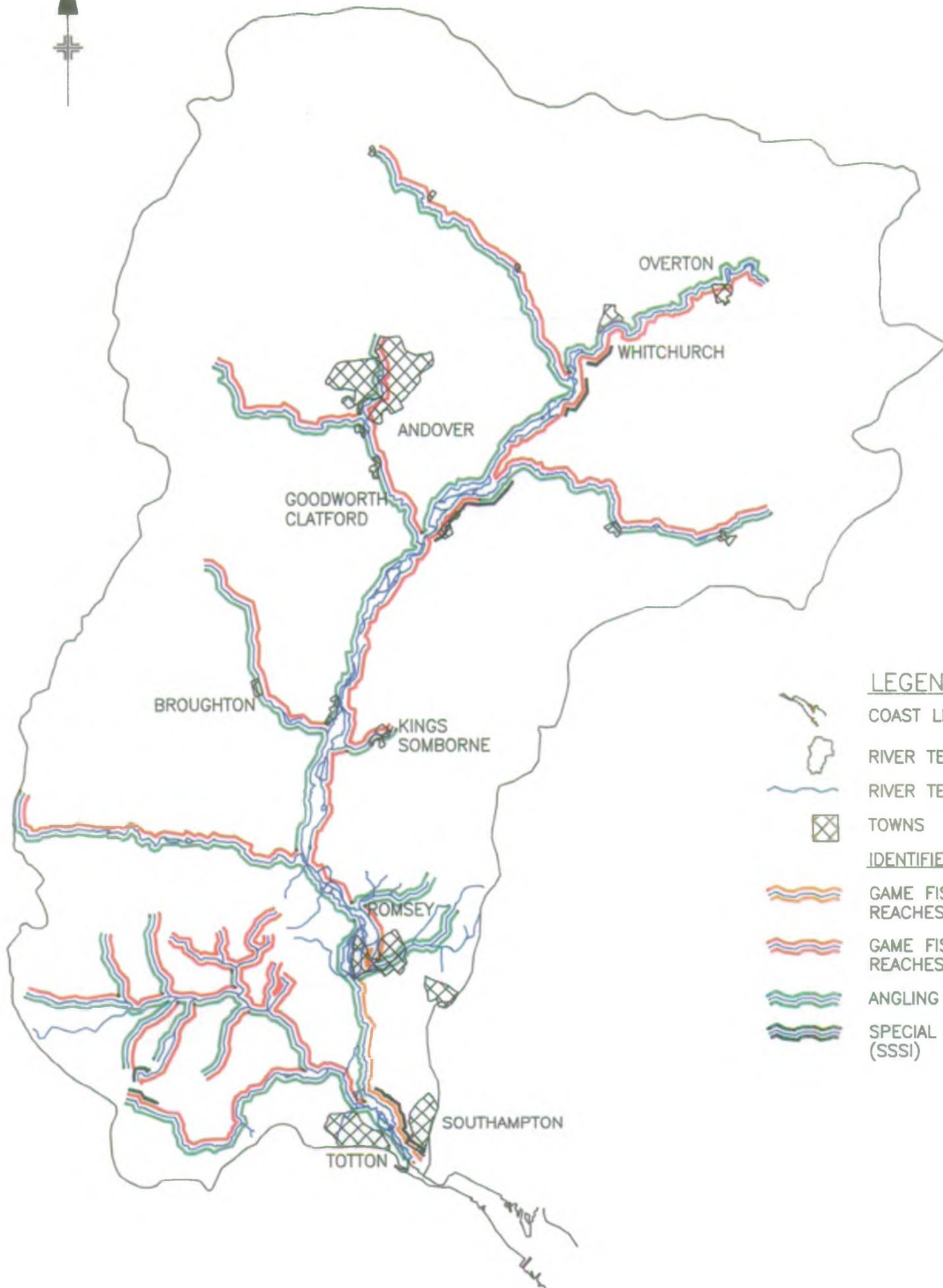
- The Flood Defence Target Levels of Protection shown in Section 14.
- Presence of uncultivated bankside vegetation alongside the river to provide; habitats; shade and cover for fish; a buffer against diffuse pollution; and to enhance the quality of the landscape.
- The river should be of a width and depth appropriate to the flow regime.
- Presence of natural river features such as emergent vegetation, meanders and pool: riffle sequences for conservation of the river corridor and to enhance the quality of the landscape.
- Restrict access of livestock to the river to minimise damage caused by trampling.
- To ensure the restoration of all waste disposal and mineral extraction sites to an acceptable environmental standard.
- No increase in flood risk as a result of new development.
- No new development to be in the flood plain unless all measures are taken to ensure no increase in flood risk.
- New development not to reduce the conservation value of the river corridor.
- Minimise the occurrence of slipping due to mineral extraction.
- Maintenance of the integrity of the river channel adjacent to mineral extraction sites.

The requirements for the specific uses shown on the map are detailed in the table overleaf.

B3. RIVER TOPOGRAPHY TARGETS



USE	REQUIREMENTS
Special Conservation Areas:	Maintenance of special features.
Game Fisheries:	Barriers to be passable at Q95 flows Natural River Features Shade and cover
Coarse Fisheries:	Natural and diverse River Features Shade and cover
Angling:	Sufficient access Maintenance of a mixture of open and dense instream and bankside vegetation Means to control water levels



LEGEND

-  COAST LINE
-  RIVER TEST CATCHMENT AREA
-  RIVER TEST
-  TOWNS
- IDENTIFIED USES**
-  GAME FISHERIES, MIGRATORY REACHES
-  GAME FISHERIES, BREEDING REACHES
-  ANGLING
-  SPECIAL CONSERVATION AREAS (SSSI)

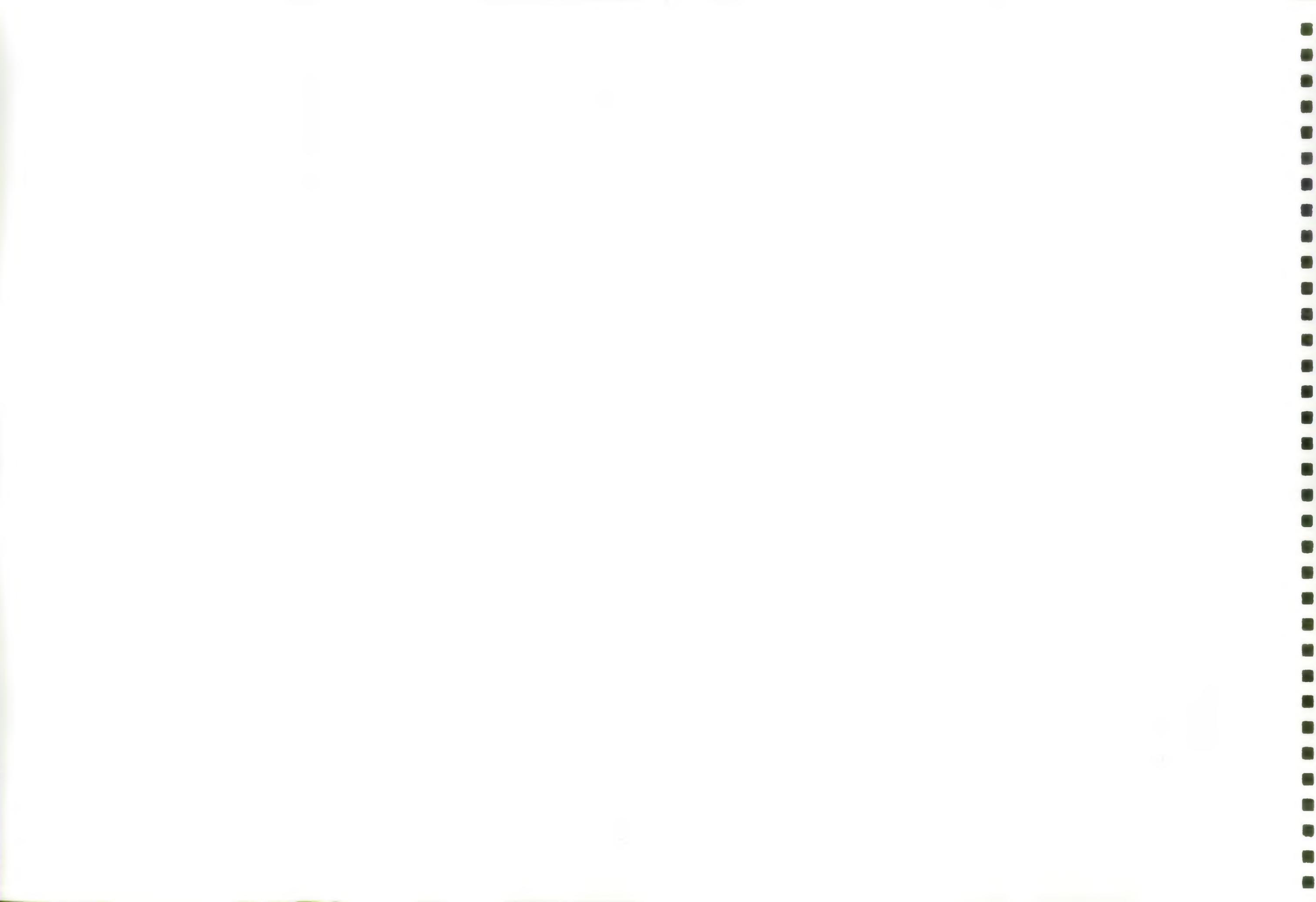


RIVER MANAGEMENT TARGETS



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B4. RIVER MANAGEMENT TARGETS



B4.1 General

This section considers the regular activities for the management of the river and its bankside features which are necessary to enhance and maintain the various uses of the river. The overall River Management Targets are collated from the individual uses and summarised in this section.

The intention here is not to provide a maintenance schedule (for example the location, methods and frequency of weed cutting required for land drainage or fisheries management) but rather to indicate the major river management requirements in relation to the uses concerned.

B4.2 Local Perspective

There are a great number of uses of the Test with their own requirements for River Management. For clarity, the map opposite shows only those areas where specific requirements for a particular use exists.

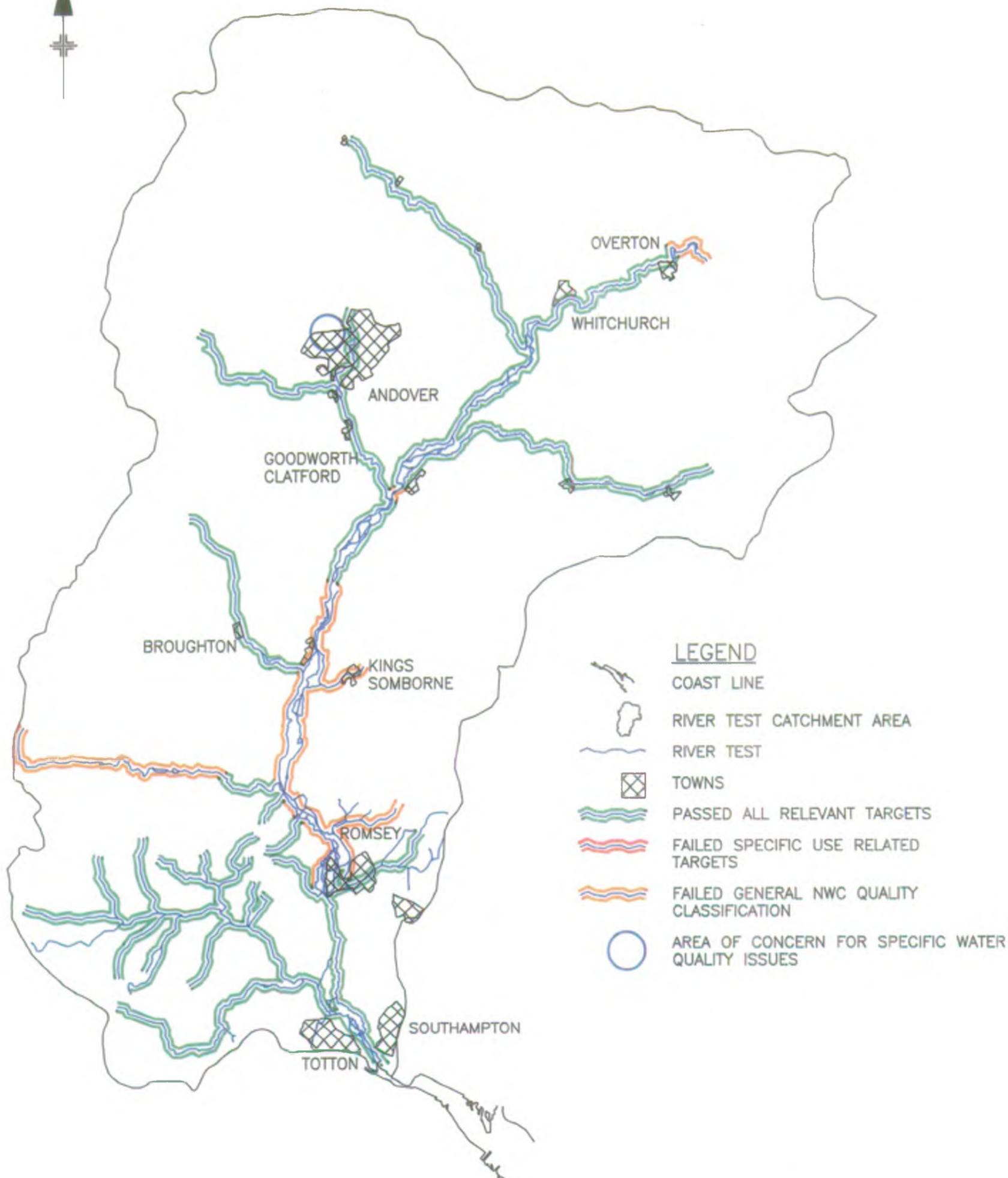
In addition to those shown on the map, the following more general requirements are considered to be targets for the catchment:-

- Co-operation with local authorities and riparian landowners to ensure banks and surrounding areas are free from litter.
- Carry out river corridor surveys to determine the real value and requirements of river reaches.
- Weedcutting to be carried out in a way that provides adequate flood protection but that ensures the continued survival of healthy aquatic vegetation.
- Maintenance and clearance of ditches in a way which encourages rather than destroys ecological diversity.
- Maintenance of emergent instream plant communities.
- Weedcutting adjacent to gauging stations.

The requirements for the specific uses shown on the map are detailed in the table overleaf.

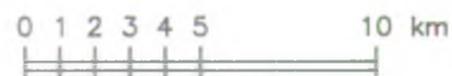
B4. RIVER MANAGEMENT TARGETS

USE	REQUIREMENT
River Corridor Conservation:	Operation of sluices and weirs to protect wetland habitats.
Special Conservation Areas:	Maintenance of special features.
Game Fisheries:	Appropriate fish stocking. High quality gravels to be identified and maintained.
Coarse Fisheries:	Appropriate fish stocking.
Angling:	Control structures to maintain water levels. Weedcutting at appropriate intervals.
Flood Defence:	Ensure correct operation of sluice gates.



LEGEND

-  COAST LINE
-  RIVER TEST CATCHMENT AREA
-  RIVER TEST
-  TOWNS
-  PASSED ALL RELEVANT TARGETS
-  FAILED SPECIFIC USE RELATED TARGETS
-  FAILED GENERAL NWC QUALITY CLASSIFICATION
-  AREA OF CONCERN FOR SPECIFIC WATER QUALITY ISSUES



STATE OF THE CATCHMENT WATER QUALITY



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C1. STATE OF THE CATCHMENT : WATER QUALITY



C1.1 General

Having set water quality targets it is now possible to assess the state of the catchment against these targets. The present conditions in the catchment have been evaluated by considering the results of various routine water quality sampling programmes over the period 1985 to 1990. The state of the catchment is then obtained by comparing the present conditions with the targets. The NWC compliance is derived from the 1990 national comparative survey conducted by the NRA.

The map opposite identifies two specific types of failure, either failure to meet the combined use related target or failure to meet the more subjective NWC river or estuarine target classification.

C1.2 Issues Identified:-

Several issues have been identified with respect to water quality and are shown on the map opposite.

1. The River Test from Romsey to Stockbridge failed to comply with its NWC target class for 1990. The failures are extremely marginal and result from minor decreases in dissolved oxygen and minor increases in BOD. The target class for this stretch of river is 1A (the highest possible) and the reach actually achieved 1B quality status.

The reach receives few discharges and given the artificially braided nature of the river channel in this stretch its failure is likely to be due to the impact of the naturally reduced drought flows observed in 1990.

2. A small reach of the main River Test above the confluence of the River Anton failed to achieve its NWC target class. The reach receives two sewage effluent discharges including that from Andover. The failure is extremely marginal in terms of slightly elevated BOD. The sewage works comply with their discharge consents and the water quality failure is likely to result from the impact of the lower 1990 drought flows on the environment.
3. The main body of the Test above Overton to its source marginally failed to achieve its NWC target class. The reach receives no direct works discharges and is fed by groundwater which is usually lower in dissolved oxygen than surface water. Any reduction in flows from groundwater could potentially impact on water quality.
4. The majority of the River Dun marginally fails to achieve its NWC target class. There are a total of 8 discharges to the Dun, being 6 private sewage discharges and 2 public sewage works, one of which discharges to ground.

The largest sewage effluent discharge is some 690m³/day from the East Grinstead sewage treatment works, which complies with its discharge consents, and firm proposals exist for a sewerage scheme which will remove the 6 private water discharges from the watercourses.

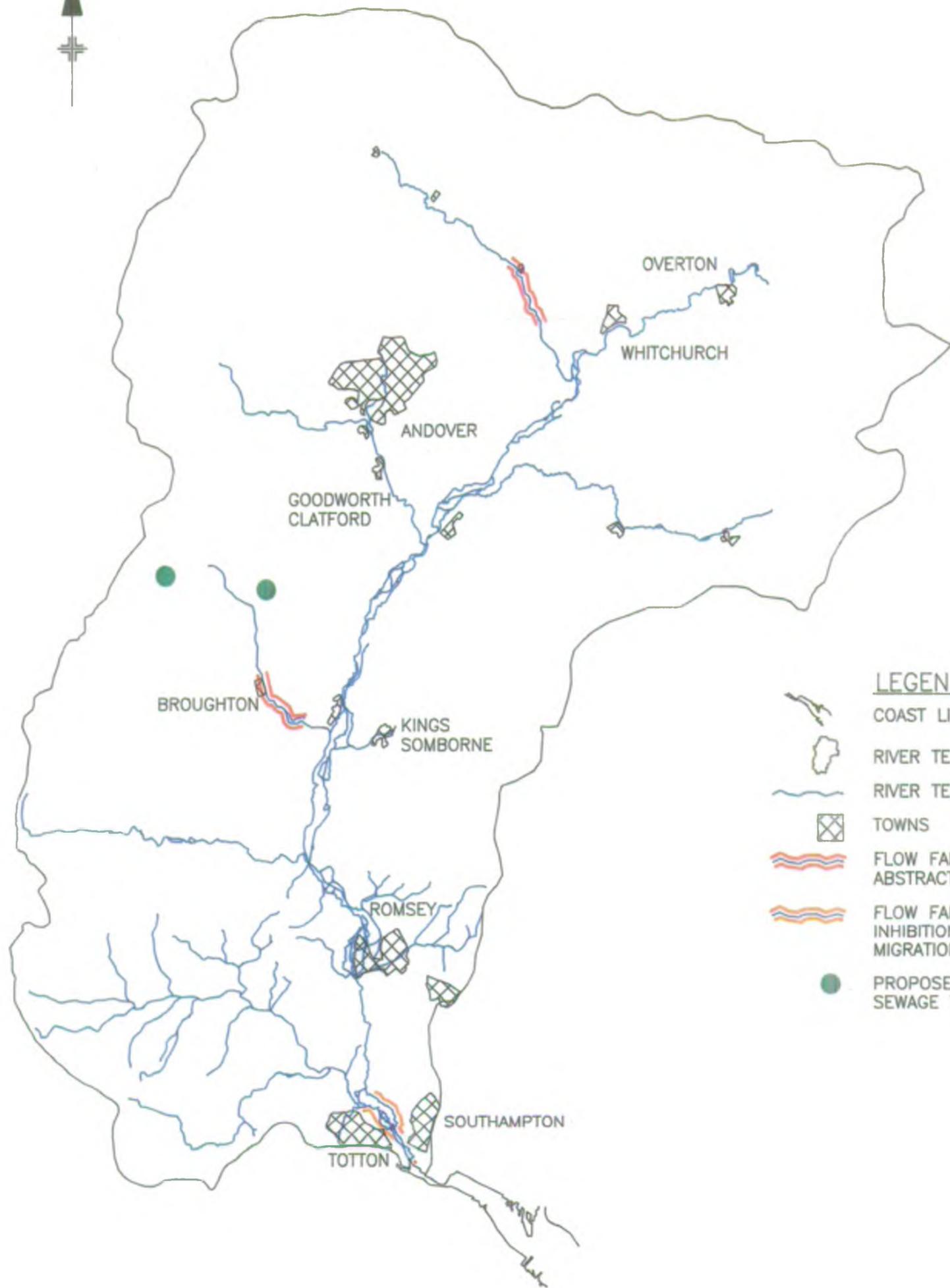
However it appears to be the flashy nature of the upper clay catchment coupled with its susceptibility to intermittent pollution events and insufficient dilution flows which result in the observed water quality failure.

5. The Casebrook Common stream and the Kings Somborne stream marginally fail their NWC target class. The streams received only minor private sewage discharges.

C1. STATE OF THE CATCHMENT : WATER QUALITY



6. Average pesticide concentrations for the Total Triazines group of compounds were found to be significantly in excess of the Maximum Admissible Concentrations at Greatbridge on the River Test between 1985 and 1990. This average result is seriously distorted by 1 exceptionally high sample and is probably the result of an intermittent pollution incident, given the low average levels both upstream and downstream of Greatbridge.
7. The chalk aquifer is vulnerable to pollution in industrial areas. Contamination with chlorinated hydrocarbons has been identified at the River Wey boreholes in Andover.
8. Phosphate concentrations have been increasing in the River Test in recent years.



LEGEND

-  COAST LINE
-  RIVER TEST CATCHMENT AREA
-  RIVER TEST
-  TOWNS
-  FLOW FAILURE DUE TO ABSTRACTION
-  FLOW FAILURE DUE TO INHIBITION OF SALMONID MIGRATION
-  PROPOSED CLOSURE OF SEWAGE TREATMENT WORKS



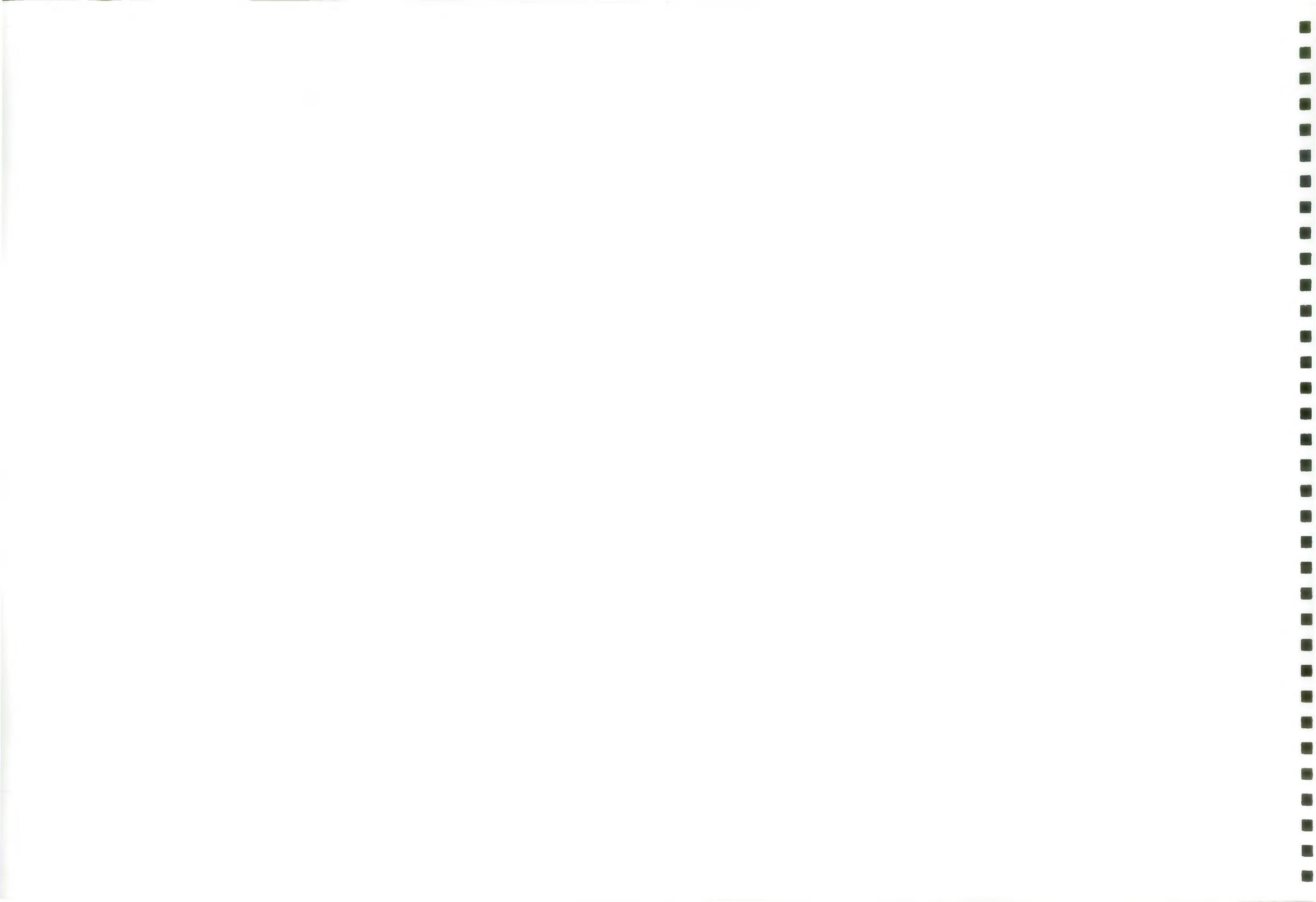
STATE OF THE CATCHMENT
RIVER FLOW



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C2. STATE OF THE CATCHMENT: RIVER FLOW



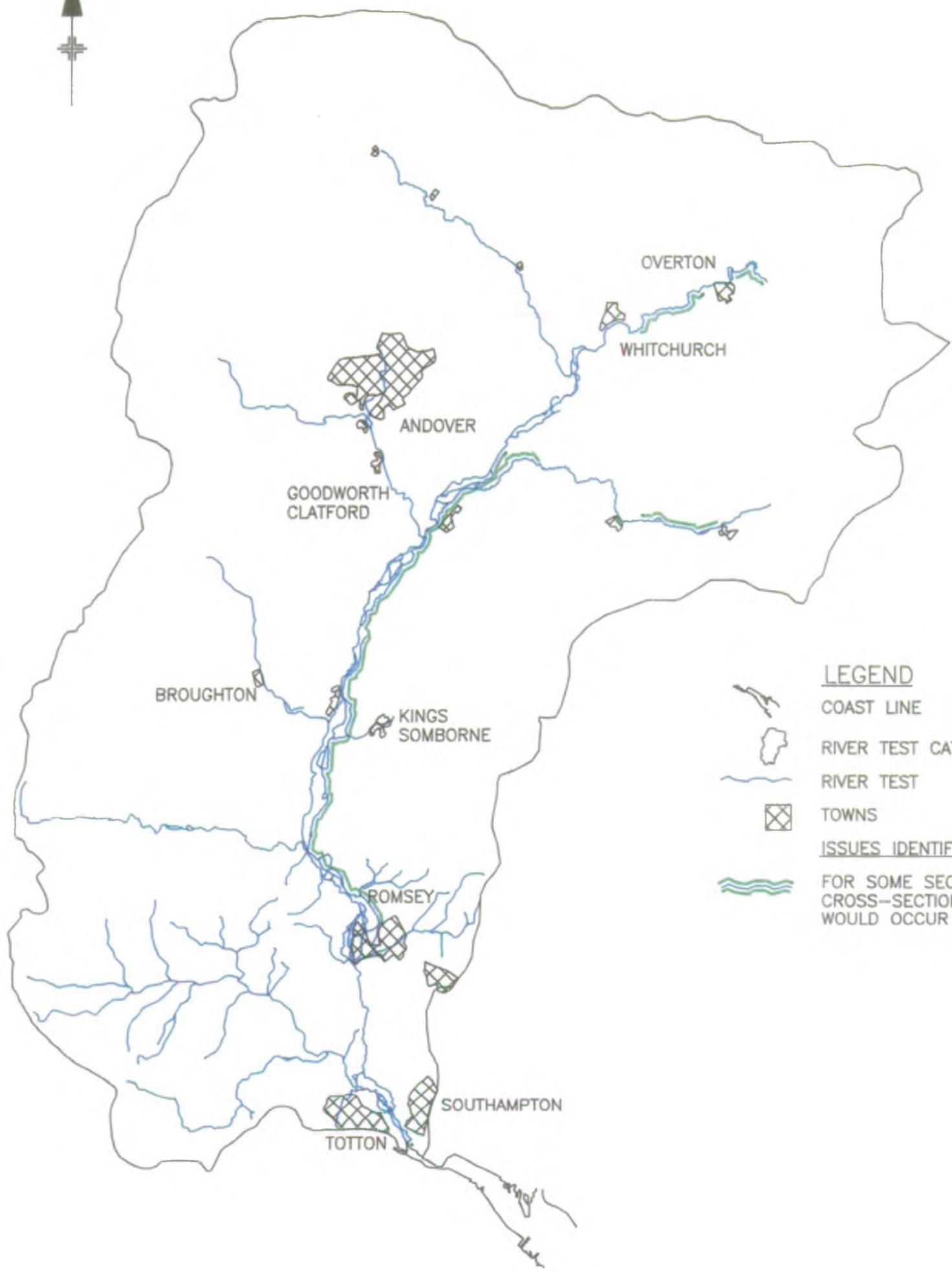
C2.1 General

Having set river flow targets, it is now possible to assess the state of the catchment against these targets. The present conditions in the catchment are evaluated by considering the flow records, resource usage and abstraction licence conditions discussed elsewhere in this Plan. The state of the catchment is then obtained by comparing the present conditions with the use-related targets.

C2.2 Issues Identified:-

Several issues have been identified with respect to river flow and water resources, and are summarised below and shown on the map opposite.

1. Reduced flows in Wallop Brook, which may be related to abstraction from Broughton pumping station. Reduced flows in Bourne Rivulet related to abstractions for water cress farms. Both issues are being considered in separate detailed studies.
2. There is no flow gauge on Bourne Rivulet.
3. Low flows at Broadlands during drought periods.
4. Seasonal low flows in the Main Test, downstream of Testwood and particularly between Testwood and the return from Nursling Fish Farm.
5. The discharge from Nursling Fish Farm has, during low flow periods, been of the same order as flows in the Main Test. This has led to the disorientation of migratory fish.
6. The policy of rationalising Sewage Treatment Works may lead to the closure of small STW's in the upstream reaches of the catchment and a consequent reduction of inflow. The proposed closure of 2 small STW's which discharge to the Wallop Brook is of concern in this context.



LEGEND

-  COAST LINE
-  RIVER TEST CATCHMENT AREA
-  RIVER TEST
-  TOWNS
- ISSUES IDENTIFIED**
-  FOR SOME SECTIONS THE RIVER CROSS-SECTION IS GREATER THAN WOULD OCCUR NATURALLY



STATE OF THE CATCHMENT
RIVER TOPOGRAPHY



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C3. STATE OF THE CATCHMENT : RIVER TOPOGRAPHY

C3.1 General

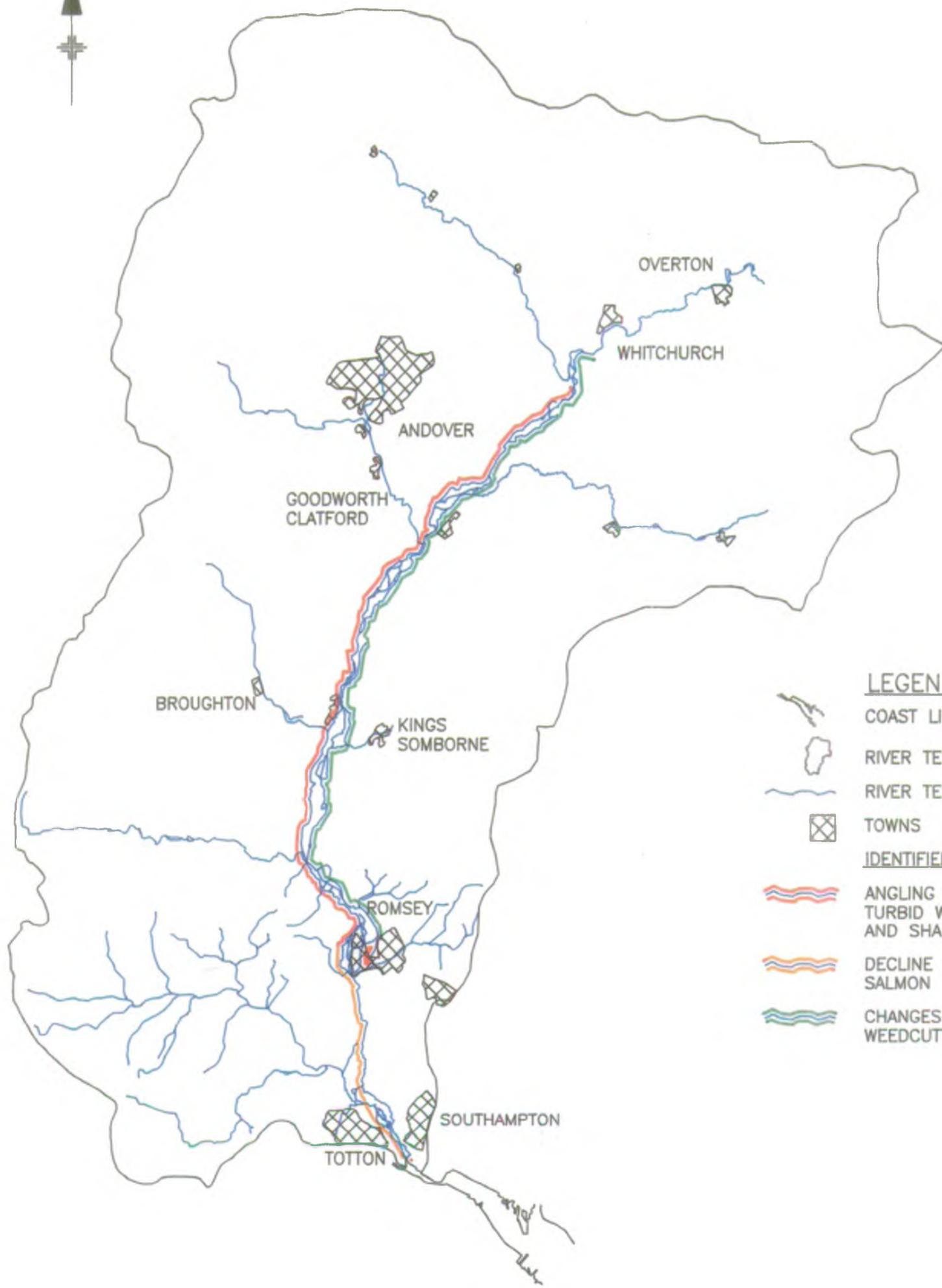
Having set river topography targets it is now possible to assess the state of the catchment against these targets. This assessment involves identifying problems due both to failures to meet targets and also conflicts between different uses on the same river reach.

The present levels of flood protection in the catchment are evaluated by considering past records of flooding, and taking account of flood defence schemes that have been carried out. The state of the catchment is then obtained by comparing the present standards with the targets.

C3.2 Issues Identified:-

A few issues have been identified with respect to river topography and are shown on the map opposite.

1. The quality of the river corridor is generally very high with uncultivated bankside vegetation and natural river features. These provide shade, cover and variety to meet the requirements of the game fisheries. The quality of the corridor has been recognised by the designation of a large part of the valley as an Environmentally Sensitive Area.
2. For most of the main River Test between Wherwell and Romsey the cross-sectional area of the river channels is greater than would occur naturally. This is due to the permanent diversion of flows into the carrier channels as well as the main river, the widening of the channels due to erosion and bank management; and, in some areas, the dredging of the river. The extra width of the river inevitably leads to lower flow velocities, particularly in the dredged areas.
3. There are a large number of sluices and other control structures along the river which are privately owned and therefore not under the direct control of the NRA. The timely operation of these sluices during a flood event can have an impact on the extent of flooding.
4. Provided sluice gates and other structures are operated correctly, the river meets its targets for Flood Protection.



- LEGEND**
-  COAST LINE
 -  RIVER TEST CATCHMENT AREA
 -  RIVER TEST
 -  TOWNS
 - IDENTIFIED ISSUES**
 -  ANGLING PROBLEMS DUE TO TURBID WATER, LACK OF WEED AND SHALLOW DEPTHS
 -  DECLINE IN ROD CATCHES OF SALMON
 -  CHANGES TO TRADITIONAL WEEDCUTTING PRACTICES



STATE OF THE CATCHMENT RIVER MANAGEMENT



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C4. STATE OF THE CATCHMENT : RIVER MANAGEMENT



C4.1 General

Having set river channel management targets, it is now possible to assess the state of the catchment against these targets. This assessment involves identifying problems due both to failures to meet targets and also conflicts between different uses on the same river reach.

C4.2 Issues Identified:-

A few issues have been identified with respect to river management and are shown on the map opposite.

1. In recent game fishing seasons there have been problems with turbid water, lack of aquatic weed (primarily *Ranunculus*) and shallow water depths. This has inhibited the enjoyment of the sport.
2. Rod catches of salmon in the river have been declining steadily since the 1950's. There has been excessive silting of river gravels in the breeding reaches which has inhibited the recruitment of migratory fish.
3. The cutting of aquatic weeds is necessary to meet the requirements of angling during the game fishing season. This is carried out by the landowners and river keepers in co-operation with the NRA, who operate a fixed boom across the river above Romsey to remove the cut weeds. However, in order to maintain a healthy river, the weeds also need to be cut back before the onset of winter. Weed beds accumulate silt throughout the year and an autumn weed cut exposes this silt to the increased winter flows, which transport it out of the river system. Delayed, or no, cutting until the following spring causes late silt transport and high turbidity problems which may extend into the game fishing season. Uncut weeds are also more likely to be ripped out of the river bed, complete with their root system, during the higher flow conditions in late winter and spring. Once the complete plant has been removed from the river it is more difficult for the weed to re-establish itself than if the root system had been left in the river bed, as would result from weed cutting.

There is concern that this important autumn weed cut is not being carried out consistently along all reaches of the river.

4. Floating cut weed and litter can cause problems, particularly in the lower reaches of the river.
5. The river has suffered from periodic growth of nuisance algae, especially during periods of low flow.

C5 STATE OF THE CATCHMENT : CONCLUSIONS



C5.1 General

In the preceding sections on the State of the Catchment a number of issues were highlighted relating to water quality, river flow, river topography and river management. The purpose of this concluding section is to draw together these issues into a number of clearly defined problems which are outlined in the following paragraphs. The possible effects of future changes to the catchment are also considered in very broad terms.

C5.2 Issues Identified

It is important to note that some issues which relate to fisheries are concerned with the overall well being of the river. As discussed in Section 6.1 and 7.1, fish are near the top of the aquatic food chain and are therefore a good indicator of the health of the river.

1. The River Test has suffered from a number of problems in recent years including shallow depths, turbid water and lack of weed. These problems have been compounded by the natural drought conditions which have occurred during this period. A contributory cause of these problems is the over-large cross-sectional area of the river and recent trends in river management such as weedcutting.
2. Reduced flows in the Wallop Brook and Bourne Rivulet.
3. There have been seasonal low flows in the Test downstream of the potable abstraction at Testwood. The abstraction for Nursling Fish Farm had aggravated this problem since it significantly reduces the flow in the Great Test between the potable abstraction and the fish farm discharge points.
4. Rod catches of salmon have been declining steadily since the 1950's, which is allied to problems of siltation of gravels in breeding reaches.
5. There is localised NWC water quality failures in the catchment. The failures are all marginal in extent and largely reflect the impact of the reduced drought flows that the catchment suffered in 1990.
6. Phosphate concentrations have been increasing in the river and there is periodic growth of nuisance algae.
7. The policy of rationalising Sewage Treatment Works may lead to the closure of small STW's in the upstream reaches of the river and a consequent reduction of inflow. The proposed closure of 2 small STW's which discharge to the Wallop Brook is of concern in this context.
8. There is some concern regarding pesticide concentrations in the River Test.
9. The chalk aquifer is vulnerable to pollution in industrial areas.
10. There are no flow gauges on Bourne Rivulet.
11. Floating cut weed and litter can cause problems particularly in the lower reaches of the river.
12. The NRA are consulted with regard to development in the catchment, but do not have direct influence on the planning process. Since new development can have a significant impact on a catchment through requirements for water resources, effluent and surface water disposal or flood defence, this lack of influence can reduce the ability of the NRA to manage the catchment.

C5. STATE OF THE CATCHMENT : CONCLUSIONS



13. **Climate Change.** The issue of global warming and its impact on the climate has received a lot of attention in recent years. The effects of global warming are by no means certain but current best opinion is that over the next 50 years:

- i. mean temperature is likely to rise by 1 to 2°C.
- ii. winter rainfall is to increase
- iii. summer potential evaporation is to increase
- iv. sea level is to rise.

The consequences perceived for the catchment are that:

- i. Surface flows will become more seasonal
- ii. Coastal flooding risk will increase.

D. MANAGEMENT OPTIONS



D1.1 General

This section of the Plan considers options to address the issues identified in Section C5 : STATE OF THE CATCHMENT: CONCLUSIONS. These options represent the ideas of the Southern Region of the NRA at the time of production of this Phase I Plan. They do not represent policy statements as this will only be developed following this public consultation process.

Comments on these options and suggestions for new ideas are therefore positively encouraged.

The Management Options listed in this section identify the body who will probably be responsible for carrying them out. It is recognised that several of the options are outside the specific responsibility of the NRA. However the options are intended to be a blue print for the improvement of the river catchment to meet the requirements of all its users. Inevitably this will involve many bodies and individuals working together to fulfill the common strategy represented by this River Catchment Management Plan.

D1.2 Management Options

The Management Options are addressed towards alleviating and resolving the problems and conflicts identified in Section C5 : STATEMENT OF THE CATCHMENT: CONCLUSIONS. The tables following list the issue reference number from Section C5, a brief resume of the problem or conflict, the Management Options, the bodies likely to be responsible and, where appropriate, some of the 'pros' and 'cons' for each option.

Table for Management Options

Issue Ref. No. 1	Poorer conditions in the river due to shallow depths, turbid waters and lack of weed		
Management Option	Responsible Bodies	Pros.	Cons.
Reduce cross-sectional area of river, through for example:			
◦ Infilling over-deep or dredged sections.	Landowners; Test and Itchen Fishing Association with NRA advice	Improves flow velocities.	
◦ Closing off the flow of some of the carrier channels.	Ditto	Ditto	Loss of reaches for fishing.
◦ Reducing the width of the river channel by infilling from the banks; particularly in the old disused mill heads.	Ditto		Potential loss of bankside habitat.
Return to traditional river management practice of autumn weed cutting in areas where this is not consistently carried out at present.	Landowners; Test and Itchen Fishing Association; NRA	Improved management.	Labour cost.
Provide a surface water augmentation scheme to supplement low flows during periods of natural drought.	NRA	Improves low flow conditions.	Cost; Does not reinstate 'natural' conditions.
Ensure that there are no further consumptive abstractions from the upstream chalk aquifer.	NRA	Increases the securing of surface flows.	Loss of potential for resource development.
Ensure that future water supply is from the bottom of the catchment (both for the Test and Itchen) and fed to any new development in the upper part of the catchment. The effluent from the development can then be treated and returned to the river to help augment flows/groundwater.	NRA; Southern Water Plc	Ditto	Cost; Possible reduction in water quality due to increase in effluent discharge.

Table for Management Options

Issue Ref. No. 1 (contd)	Poorer conditions in the river due to shallow depths, turbid waters and lack of weed		
Encourage sewage disposal by ground infiltration.	NRA; Southern Water Plc	Improves utilisation of resource. Some reduction of nitrate concentrations.	Possible contravention of National Groundwater Protection Policy; local opposition to developments.
Issue Ref No. 2	Reduced flows in Wallop Brook and Bourne Rivulet		
<p align="center">Management Options</p> <p>Detailed Study already carried out and final reports being prepared.</p> <p>Possible solutions could include:</p> <p>For the Bourne Rivulet, to transfer a proportion of the effluent discharge from the cress farms upstream of the reach with low flow problems.</p> <p>For the Wallop Brook,</p> <ul style="list-style-type: none"> ◦ Relocation of supply source ◦ Development of satellite source to operate during the summer/ autumn ◦ Lining of high infiltration reaches 	<p align="center">Responsible Bodies</p> <p>NRA</p> <p>NRA; Cress Farm Owners</p> <p>NRA; Southern Water Plc</p> <p>NRA; Southern Water Plc</p> <p>NRA; Landowners</p>	<p align="center">Pros.</p> <p>Flow improvement.</p> <p>Ditto</p> <p>Ditto</p> <p>Ditto</p>	<p align="center">Cons.</p> <p>Cost.</p> <p>Cost.</p> <p>Ditto</p> <p>Loss of natural characteristics; Environmental disruption.</p>

Table for Management Options

Issue Ref No. 3	Flow Problems in the Lower Test		
Management Options	Responsible Bodies	Pros.	Cons.
<p>Reduce the abstraction to Nursling Fish Farm to maintain volume limit on effluent consent (Temporary injunction presently limits abstraction while the case is before the High Court).</p> <p>Provide bankside storage at Testwood to safeguard water supply abstraction.</p>	<p>NRA; Fish Farm Owner</p> <p>Southern Water Plc.</p>	<p>Removal of potential migration barrier.</p> <p>Improves security of supply.</p>	
Issue Ref. No. 4	Reduced presence of salmon in the river		
Management Options	Responsible Bodies	Pros.	Cons.
<p>Remove low flow problems in the Lower Test which inhibit upstream migration (as Issue 3).</p> <p>Investigate migration of salmon into the river. (Research already in hand).</p> <p>Carry out research into the source and nature of sediments input to the river. Make recommendations to improve quality of river gravels.</p> <p>Carry out pilot works on gravel rehabilitation.</p> <p>Establish and maintain adequate restocking programme for 4 years.</p>	<p>NRA</p> <p>NRA</p> <p>NRA</p> <p>NRA; Fishery owners</p>	<p>Identify critical factor governing migration.</p> <p>Improve river gravels and hence breeding sites.</p>	

Table for Management Options

Issue Ref. No. 5	Localised marginal water quality failures		
Management Options	Responsible Bodies	Pros.	Cons.
Provide augmentation during summer low flows e.g. reservoir at top of the Dun catchment or groundwater augmentation to the top of the Test.	NRA; Southern Water Plc.	Flow improvement and hence increased dilution.	Cost; Possible loss of natural characteristics.
Control Cress Farm inputs by consent.	NRA		
Reconsent and improve discharges where appropriate.	NRA; Southern Water Plc; Owners of private discharges; Industries	Reduction in pollutant input.	Cost.
Issue Ref. No. 6	Increasing phosphate and growth of nuisance algae		
Management Options	Responsible Bodies	Pros.	Cons.
Carry out research to establish the trophic state of the river.	NRA		
Establish the sensitivity of the river water. (Sensitivity is the extent to which achievable nutrient removal from sewage effluent may alter the trophic state so as to reduce algal growth and is related to EC Waste Water Directive).	NRA		
Issue Ref. No. 7	Rationalising Sewage Treatment Works		
Management Options	Responsible Bodies	Pros.	Cons.
Avoid rationalising sewage treatment where there is likely to be a significant detrimental impact due to reduced river flow.	NRA; Southern Water Plc	Protection of flows to upstream reaches.	Lack of dilution for effluent. Uneconomic.
For the Wallop Brook catchment consider rationalising treatment facilities so that they are centred at the Middle Wallop Camp Works.	Southern Water Plc.	Ditto	Ditto

Table for Management Options

Issue Ref. No. 8	Concerns over pesticide concentrations		
Management Options	Responsible Bodies	Pros.	Cons.
Encourage the reduction in the agricultural and local authority use of pesticides and herbicides in the catchment, especially close to the river valley.	Farmers; Landowners; Ministry of Agriculture; NRA; Local Authorities	Improve water quality.	Reduced control over weed growth and pests.
Ensure that full and proper care is taken in the storage and handling of pesticides.	Ditto.	Reduction in spillages.	Ditto.
Ensure farmers and local council workers are aware of the risks and effects of poor practice.	Ditto.	Improved knowledge.	Ditto.
Issue Ref. No. 9	Chalk aquifer is vulnerable to pollution		
Management Options	Responsible Bodies	Pros.	Cons.
Relocate the public supply boreholes from the Walworth Industrial Estate in Andover.	Southern Water Plc	Improve security of supply.	Cost.
Ensure that full and proper care is taken in the storage and handling of oils, solvents and toxic substances.	Factory Owners; Local Authorities; NRA		
Ensure that factory owners and operators are aware of the risks and effects of poor practice.	NRA; Southern Water Plc; Local Authorities		
Issue Ref. No. 10	No gauging station on the Bourne Rivulet		
Management Options	Responsible Bodies	Pros.	Cons.
Install gauging station.	NRA	Improved information for resource management.	Cost; other priorities.

Table for Management Options

Issue Ref. No. 11		Floating weed and litter	
Management Options	Responsible Bodies	Pros.	Cons.
Ensure all river keepers comply with the selected weed-cutting periods.	Riparian Owners; Test and Itchen Fishing Association.	Keep disruption to defined periods.	
Increase local awareness of the value of rivers and the problems caused by litter.	Ditto; NRA; Local Authorities.		
Issue Ref. No. 12		Development Control and the planning process	
Management Options	Responsible Bodies	Pros.	Cons.
NRA to seek to gain a more direct influence in the planning process with respect to constraints on development through water resources, effluent and surface water disposal of flood defence.	NRA; Local Authorities	Increases the potential for overall catchment planning.	
Issue Ref. No. 13		Climate Change	
Management Options	Responsible Bodies	Pros.	Cons.
Continue to investigate the likely impact of climate change on all aspects of catchment management.	NRA		

Appendix 1 :
Glossary of Terms and Units

River Test Catchment Management Plan

Phase 1

GLOSSARY OF TERMS AND UNITS

1. COUNTRY STRUCTURE PLANS

Statutory document produced by County Council outlining strategy for development for a 10-15 year timescale.

2. DISTRICT LOCAL PLANS

Statutory document produced by District or Borough Council to implement strategy for development set out in County Structure Plan. Specific land use allocations are identified.

3. mAOD

Metres above ordnance datum.

4. TOTAL RAINFALL

Rainfall as measured by rain gauge.

5. EFFECTIVE RAINFALL

Total rainfall minus actual evapotranspiration. (direct evaporation plus transpiration).

6. DIFFERENT UNITS FOR FLOW MEASUREMENT

m³/s Cubic metres per second

l/s Litres per second

Mld Megalitres per day

mgd Millions of gallons per day

Conversion Table

m ³ /s	Mld	mgd
0.012	1	0.224
0.06	5	1.12
0.12	10	2.24
0.24	20	4.48
0.6	50	11.2
1.2	100	22.4

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Phase 1

7. ISOHYETALS

Contours of equal mean annual rainfall

8. HECTARE

Unit of area equal to 2.471 acres.

9. WET FENCING

Water filled ditches used for control of livestock.

10. MARSH FEEDING

Supply of water to marsh areas during the summer period for both wet fencing and spray irrigation abstractions.

11. EMERGENT VEGETATION

Plants with roots in the river bed but which emerge from the water, often at the banks. Examples include reeds, irises and bullrushes.

12. POOL : RIFFLE

A stretch of river with alternate sections of shallow faster flowing water and deeper slower moving pools.

13. SPATE FLOWS

Periodic fresh water flood flows.

14. NATURAL FLOW REGIME

The natural flow record prior to the influence of man, i.e. with no abstraction from or discharge to the catchment.

15. Q95

Flow that is exceeded for 95 percent of the flow record.

16. SALMONIDS

Salmon (*Salmo salar*), Brown and Sea Trout (*Salmo trutta*) and Rainbow trout (*Salmo gairdneri*).

River Test Catchment Management Plan
Phase 1

17. CYPRINIDS

All non-salmonid freshwater fish.

18. HIGH SEAS RIGHTS

Common law rights of navigation on tidal waters where no specific authority exists.

19. ABSTRACTION LICENCE

Licence to abstract water. The maximum annual, daily, and hourly abstraction rates are set within the terms of the licence.

20. MEAN LICENSED ABSTRACTION

In this Plan, the mean licensed abstraction is the maximum annual abstraction within the terms of the licence, expressed in terms of megalitres per day (Mld).

21. ACTUAL ABSTRACTION

Annual actual abstraction totals are shown in the plan, expressed in terms of megalitres per day. Individual actual abstractions are returned to the NRA each year. These data are confidential.

22. POTABLE WATER SUPPLY

Water supplied for domestic use including human consumption.

23. PRIMARY GAUGING STATION

A permanent flow gauging installation included in the National Surface Water Archive.

24. MINIMUM RESIDUAL FLOW (MRF)

A minimum flow setting at a gauging station, related to the flow requirements for downstream river reaches.

25. PRESCRIBED FLOW

A flow setting at a gauging station, incorporated into an abstraction licence, such that abstraction must cease once the flow recorded at the gauging station reduces below this flow. Prescribed flows are set at or above the Minimum Residual Flow setting at the gauging station. The prescribed flow is increased periodically for new licences.

26. IMPOUNDMENT RESERVOIR

Surface water storage area formed by construction of a dam across a river or stream and supplied only by natural inflow from the upstream catchment.

River Test Catchment Management Plan
Phase 1

27. PUMPED STORAGE RESERVOIR

Surface water storage area, as above, with natural inflow supplemented by a pumped inflow from a separate source, typically a nearby river.

28. DROUGHT ORDER

Order, issued by the Secretary of State under which

- (i) variations to the terms of abstraction licences and/or
- (ii) reductions in the levels of service to consumers are sanctioned.

29. PERENNIAL FLOW

River flow present through the entire year.

30. EPHEMERAL FLOW

River flow not present through the entire year.

31. MHWS

Mean High Water Spring Tides.

Appendix 2 :
Mission Statement

River Test Catchment Management Plan

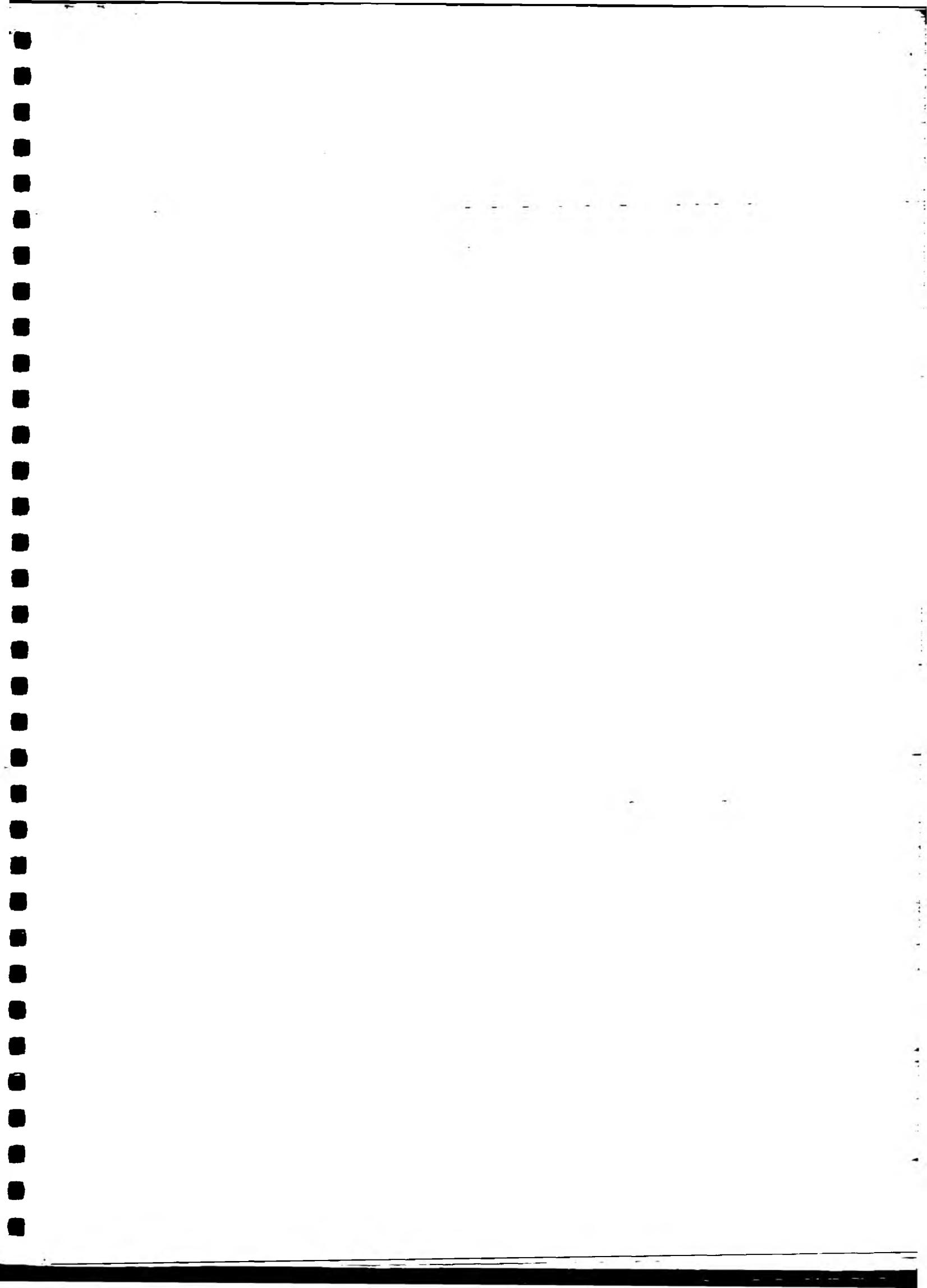
Phase 1

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, ground waters, estuaries and coastal waters. The Authority will be businesslike, efficient and caring towards its employees.

AIMS

- to achieve a continuing improvement in the quality of rivers, estuaries and coastal waters, through the control of water pollution;
- to assess, manage, plan and conserve water resources and to maintain and improve the quality of water for all those who use it;
- to provide effective defence for people and property against flooding from rivers and the sea;
- to provide adequate arrangements for flood forecasting and warning;
- to maintain, improve and develop fisheries;
- to develop the amenity and recreation potential of waters and lands under NRA control;
- to conserve and enhance wildlife, landscape and archaeological features associated with water under NRA control;
- to improve and maintain inland waterways and their facilities for use by the public where the NRA is the navigation authority;
- to ensure that dischargers pay the cost of the consequences of their discharges and, as far as possible, to recover the cost of water environment improvements from those who benefit;
- to improve public understanding of the water environment and the NRA's work;
- to improve efficiency in the exercise of the NRA's functions and to provide challenge and opportunity for employees and show concern for their welfare.





NRA

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Southern Region

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