

RIVER MEDWAY CATCHMENT MANAGEMENT PLAN PHASE 1



NRA

National Rivers Authority

Southern Region

**Guardians of the
Water Environment**

TD/cmt/01

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Regional General Manager
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National Rivers Authority
Southern Region

***River Medway Catchment Management Plan
Phase 1***

December 1991

FOREWORD

The National Rivers Authority was created in 1989 to preserve and improve the water environment and to protect people and property from flooding. In its role as "Guardian of the Water Environment", the NRA is committed to establishing a sound planning base for the future management and development of river catchments.

These first catchment management plans will be a catalyst for achieving improvements in the water environment. As a vehicle for consultation they will provide a means of seeking a consensus on the way ahead and as a planning document they will be a means of seeking commitment from all parties to achieving improvements.

This plan is one of the first to be prepared in the country as a whole. I look forward to receiving the contributions of those people and organisations most closely involved with the river and its surroundings. As a shared vision of the future, the completed plans will play a vital role in protecting the nation's water heritage and in reconciling competing pressures on the river environment.

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ENVIRONMENT AGENCY



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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 all 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.

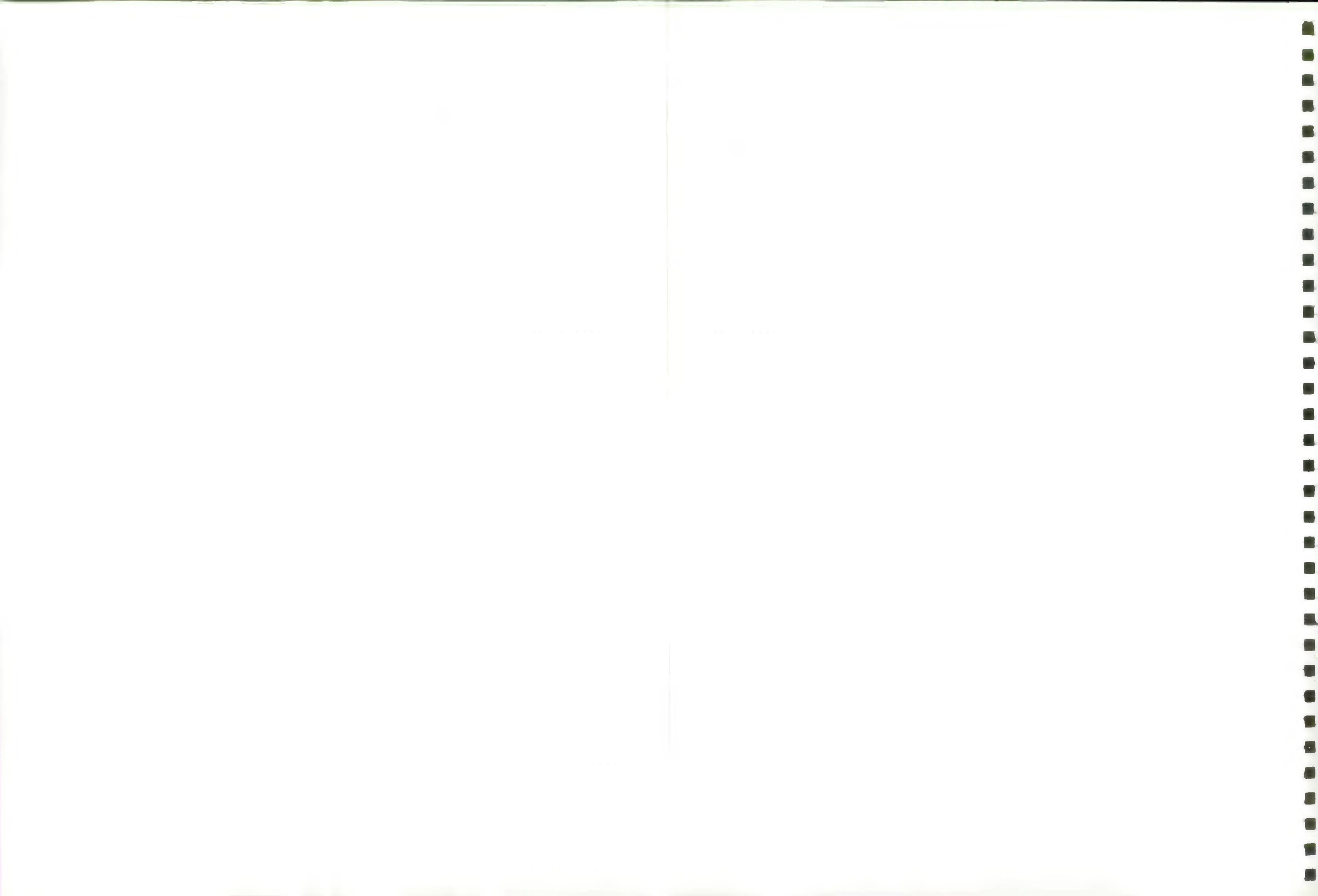
I.4 The Environmental Requirements relate to the following characteristics of the river:

- **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 pool 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.

- I.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.
- I.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 MEDWAY 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.
- I.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 PHASE II PLAN for the Medway will be produced within twelve months of the release of this PHASE I PLAN.





1. MEDWAY CATCHMENT : FOREWORD



The River Medway is the largest river in the Southern Region of the NRA. The river rises as a spring just above Turners Hill near East Grinstead. The sands and clays of the High Weald dictate the character of the river, which with its many deeply incised tributaries, contrasts sharply with the chalk streams found in other parts of the region. The Wealden Clays are relatively impermeable to rainfall and water finds its way across the surface of the steeply sloping land, creating a multitude of small streams. These meet to form a typical Wealden vale as the Medway flows north-eastwards towards Penshurst, where it is joined by the River Eden. As the Medway flows across the Vale of Kent the gradient reduces, though the river still collects tributaries which rise in other parts of the High Weald, including the Rivers' Bourne, Teise and Beult. The River Beult, which rises in the Hythe sandstone ridge, is the longest tributary of the river.

The Medway cuts its way through the Greensand Ridge beyond Yalding and collects two more tributaries, the Loose Stream and the River Len before reaching the County Town of Maidstone. Allington Lock forms the tidal limit of the Medway in Maidstone from whence the river flows North, cutting through the North Kent Chalk Block. For the purposes of this Plan, the downstream limit of the catchment is defined as Rochester Bridge and the greater part of the estuary is not included in the plan.

The history of the Medway Navigation extends back to the mid sixteenth century when Sewer Commissioners were established to prevent flooding. However, it was not until 1664 that the first specific Navigation Act gave powers for certain works to be carried out such as the construction of locks and weirs. This was followed in 1739 by a second Act to improve the extent of the navigable reaches by the construction of additional locks and weirs between Maidstone and Tonbridge. By the early twentieth century the advent of the railway brought increased competition to river transport and the prospect of the river's decline led to the creation of the Medway Conservancy Board in 1911. In 1934 powers were taken over by the River Medway Catchment Board under the 1930 Land Drainage Act. The 1989 Water Act invested responsibility for the navigation in the National Rivers Authority.

The Wealden rivers respond rapidly to rainfall and extremes of flow may vary five-hundredfold between summer and winter. There are three water supply reservoirs in the Medway catchment viz. Bough Beech, Weir Wood and Bewl Water. Bewl Water near Lamberhurst is the largest reservoir in the Southern Region of the NRA and is filled partly by inflow from its natural catchment and partly by water pumped from the River Teise at Goudhurst. Pumping normally takes place in autumn and winter to fill the reservoir for use during the summer. Releases of water from the reservoir are used to support Southern Water's abstraction on the River Medway at Springfield near Maidstone when natural flow in the river is insufficient. Mid Kent Water Company also uses Bewl Water to supply its treatment works at the reservoir site. Whilst the largest single abstraction on the river is Southern Water's intake at Maidstone, there are numerous other abstractions for agriculture and industry licensed by the NRA. Spray irrigation is the major agricultural use, particularly on the River Teise and the River Beult.

The major groundwater abstractions for public water supply are from the North Kent chalk block within the downstream tidal catchment, which account for over 70% of the total of groundwater abstraction in the catchment. Further sources are located in the Lower Greensand and the Hastings Beds within the central and upper catchment.

The iron rich streams of the Weald support resident populations of small but highly coloured brown trout. The River Teise is managed as a game fishery down to Marden whereas the lower stretches of both the Teise and Beult are managed as coarse fisheries with chub, dace, roach and pike. In the middle and lower reaches of streams where the water is deeper, there are bream and tench. Minnows, gudgeon, stone loaches, bullheads, brook lampreys and perch are also found in riffles. The main river has considerable angling interests over its

1. MEDWAY CATCHMENT : FOREWORD



entire length and attracts large numbers of fishermen. The upper reaches support chub, roach and pike along with several other species. In wet years the occasional sea trout or salmon is reported but existing conditions in the estuary prevent a self-sustaining population from being re-established at present.

Low summer flows and high temperatures make Wealden rivers less easy to protect than the chalk streams in other parts of the Southern Region. The NRA sets objectives for river quality to protect the river's natural ecology and the uses to which the river is put. To achieve these objectives, the Authority sets limits on all permitted discharges to the river, restricting their strength and quantity. These are known as consent conditions. Historically urban development and industrialisation have taxed the river's ability to absorb waste. However, the NRA and its predecessors have been able to bring about improvements by imposing increasingly stringent consent conditions.

Population growth in Tonbridge, Tunbridge Wells and other commuter areas has resulted in greater quantities of treated domestic effluent being discharged to the river. In particular there are relatively large sewage treatment works in the River Eden, the River Grom, the Somerhill Stream and the Botany Stream. Historically, the naval base at Chatham gave great economic impetus to the lower reaches of the river and its estuary. Urban and industrial development have been significant factors affecting the water quality. The principal discharges comprise effluents from the paper and chemical industries, cooling waters from power stations and sewage effluents from several large treatment plants, particularly at Aylesford and Snodland. Apart from the cooling waters, all effluents are treated before discharge to the river or estuary.

The risk of pollution from agricultural activity is a significant factor, especially in the High Weald where there are many small dairy farms. The steeply sloping land and the relatively impermeable clay aggravate the effects of slurry and silage pollution, particularly during periods of heavy rainfall.

The clay soil and the large areas of urban development give the river its 'flashy' character. Historically the Medway Valley and Eden Valley have suffered flooding of both agricultural land and property. In September 1968 the worst flood in living memory occurred causing massive damage both in the town of Tonbridge and in other areas. In order to alleviate flooding, a flood storage area was created above Tonbridge at Leigh and is now operated by the NRA. This is the largest on-river flood storage area in the UK. In times of heavy rainfall three gates in an earthen embankment across the river regulate the amount of flood water passing downstream to Tonbridge. Some of the run-off is held back, forming a temporary lake whenever the flows exceed the channel capacities through the town. The "lake" can be drained at a controlled rate once flood flows have abated.

In March 1988 the Medway River Project was established for the benefit of wildlife, landscape conservation and public access along the Medway Navigation. It is funded by a partnership of the NRA, Countryside Commission, Kent County Council, Maidstone Borough Council and Tonbridge & Malling Borough Council.

LEGEND

-  COAST LINE
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  MAJOR ROADS
-  DISTRICT BOUNDARY
-  COUNTY BOUNDARY
-  POSSIBLE ROUTE OF HIGH SPEED LINK

Medway Towns
129.1
7.5

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

Medway Towns
129.1
9.7

Maidstone Borough
89.1
10 (includes Malling)

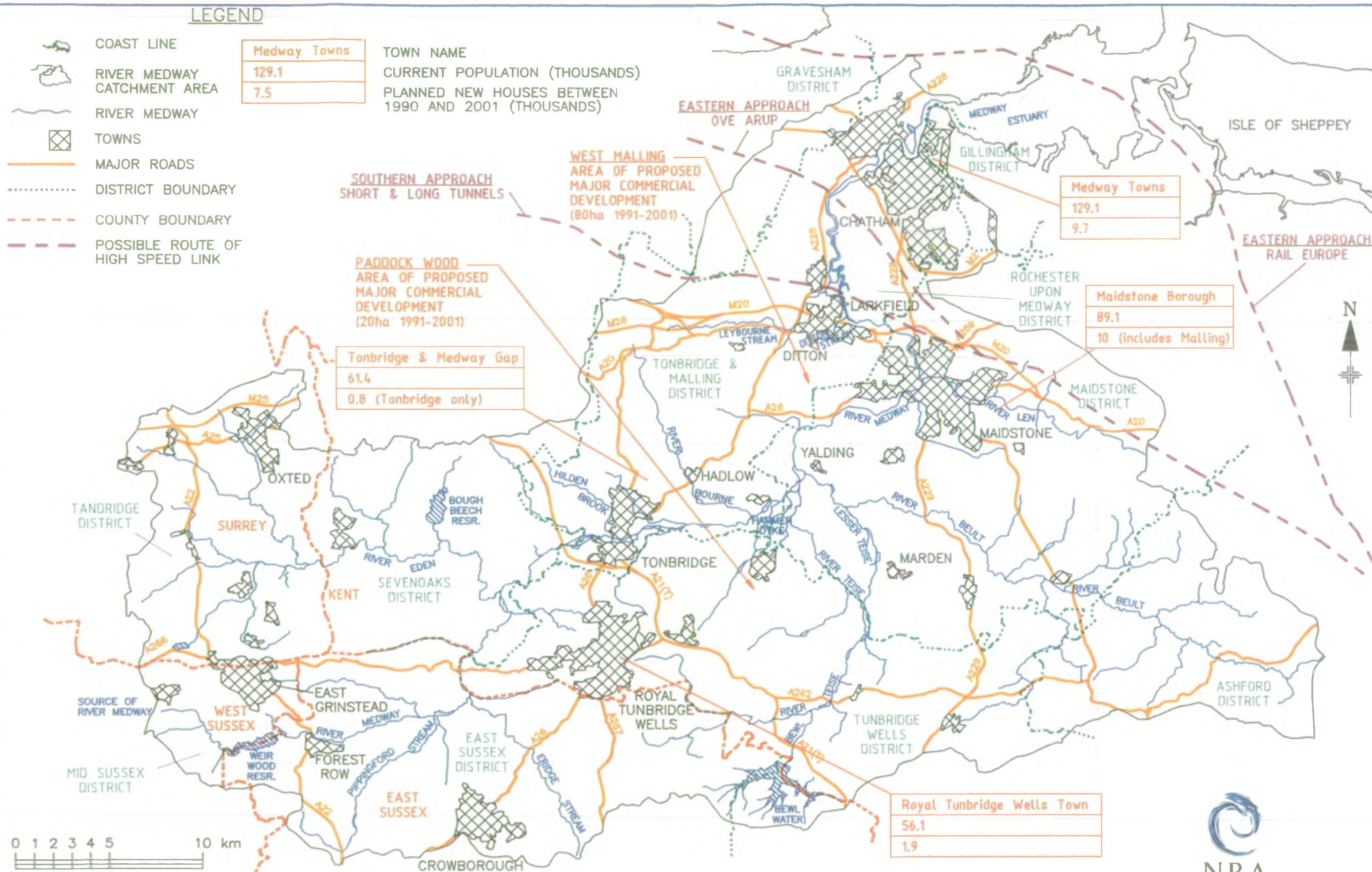
SOUTHERN APPROACH
SHORT & LONG TUNNELS

WEST MALLING
AREA OF PROPOSED
MAJOR COMMERCIAL
DEVELOPMENT
(80ha 1991-2001)

PADDOCK WOOD
AREA OF PROPOSED
MAJOR COMMERCIAL
DEVELOPMENT
(20ha 1991-2001)

Tonbridge & Medway Gap
61.4
0.8 (Tonbridge only)

Royal Tunbridge Wells Town
56.1
1.9



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, discharge or works 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 Medway catchment is situated mainly in the County of Kent. The southern boundary reaches into East Sussex and the western boundary into Surrey and West Sussex. The districts covered include Maidstone, Ashford, Tunbridge Wells, Sevenoaks, Tonbridge and Malling and Rochester-upon-Medway in Kent; Wealden (plus a very small area of Rother) in East Sussex; Mid-Sussex in West Sussex and Tandridge in Surrey.

The County Structure Plans for these counties have identified areas of growth and the number of new houses and land area for industrial and commercial development to be provided in each district to the year 2000. For the most significant boroughs in the catchment these are as follows:-

County	District	Housing	Industrial Land (ha)
Kent	Medway Towns	7500	120
	Maidstone & Malling	9000	80
	Tunbridge Wells	2800	20
	Tonbridge	700	5
East Sussex	Wealden	400	-
Surrey	Tandridge	3320	-

Development of the Medway Towns is likely to be substantial. A large increase in demand is expected for employment and tourism. However, housing provision is expected to cater only for local needs.

2. FUTURE DEVELOPMENT OF HOUSING, INDUSTRY AND COMMERCE

2.2 Local Perspective (Continued)

The Maidstone area (including the Medway Gap) is expected to grow substantially, although mainly in response to demands generated locally. High technology industries, office development and services are expected to develop on the site of the West Malling Airfield. The possibility of a new stand-alone development on the east bank of the Medway north of Maidstone is being considered by Kent County Council.

Tonbridge has been an attractive area for investment in recent years although the pressure on development is now expected to reduce. Housing is to be restrained, and should satisfy local needs by infill and redevelopment. Tunbridge Wells is expected to generate development of new technology, office and research organisations. Paddock Wood has been identified as having some potential for distribution uses. There is continued development in the East Grinstead area with 1000 new houses projected up until the year 2006. The future development of the Channel Tunnel Rail Link and improvements to the A20 and M20 are likely to provide the infrastructure necessary for these developments.

2.3 Environmental Objectives

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

2.4 Environmental Requirements

Water Quality

- New development to be catered for within the existing effluent disposal strategy.

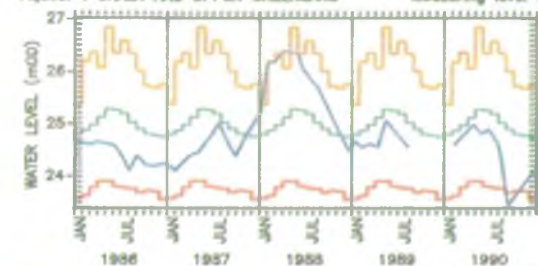
River Flow

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

River Topography

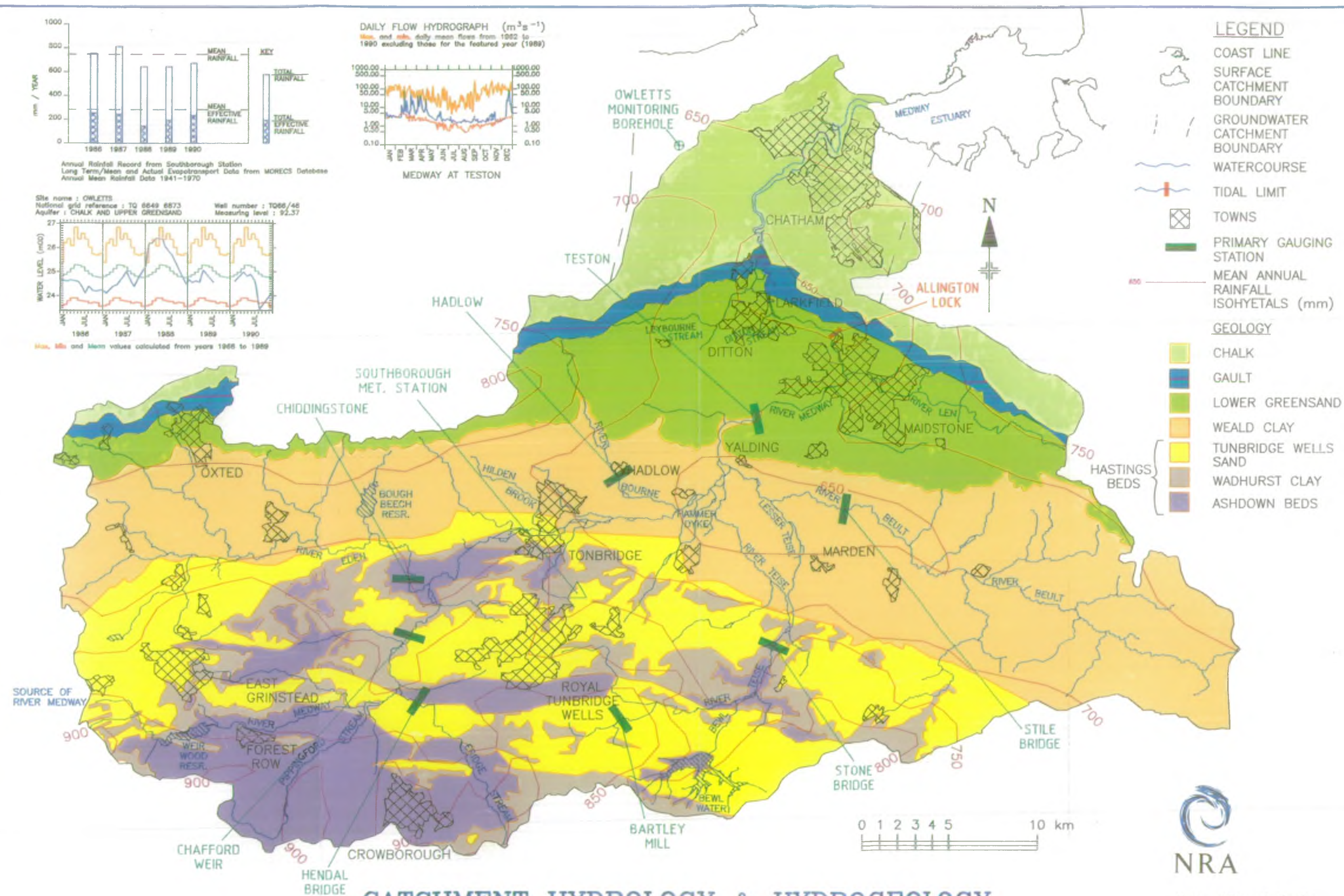
- No new development to be in the flood plain unless adequate measures are taken to ensure no increase in flood risk.
- No significant increase in flood risk as a result of surface water discharges from new development.
- New development not to reduce the conservation value of the river corridor.

Site name : OWLETT
National grid reference : TQ 6649 6873
Aquifer : CHALK AND UPPER GREENSAND
Well number : TQ66/48
Measuring level : 92.37



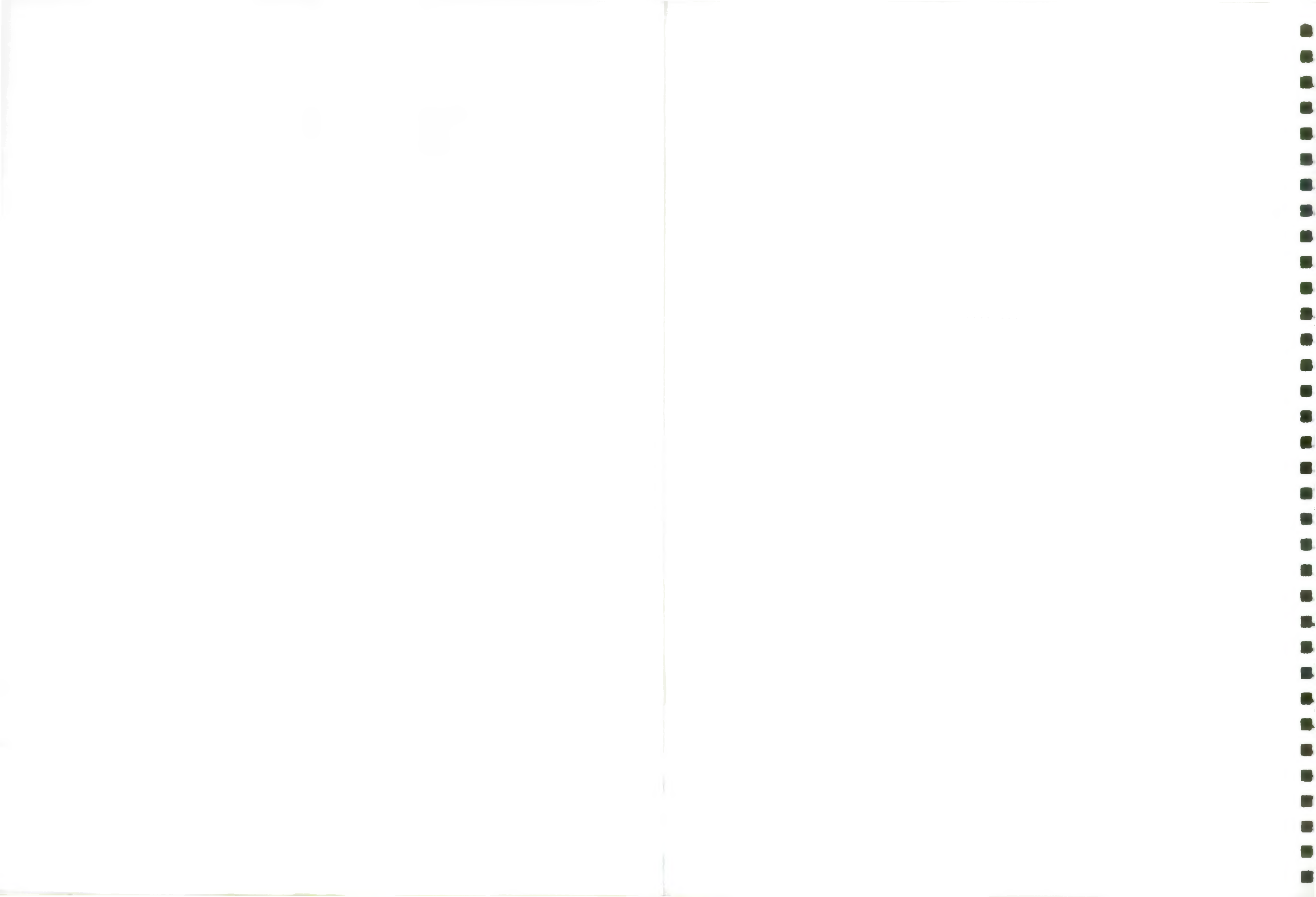
Max, Min and Mean values calculated from years 1968 to 1989

MEDWAY AT TESTON



CATCHMENT HYDROLOGY & HYDROGEOLOGY

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Southern Region



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 Medway is the largest in the Southern Region of NRA. The catchment area of 1800km² comprises 1400km² above and 400km² below the tidal limit.

The upstream tributaries of the river consist of the Medway itself and 3 main subcatchments, the Teise, Beult and Eden. The River Medway rises on the Tunbridge Wells Sand, just above Turners Hill, and flows east and north across the varied silts, sands and clays of the Hastings Beds to join with the River Eden at Penshurst. The River Eden drains the Weald Clay catchment to the North and is fed by both surface run-off from the clay and spring flow from the Lower Greensand outcrop on the northern margin of the catchment.

The Rivers' Teise and Beult drain the eastern part of the upstream catchment and meet the Medway at Yalding. The Teise receives run-off and some baseflow from the Hastings Beds and the Beult is fed predominantly by surface run-off from the Weald Clay.

Bowl Water, Bough Beech and Weir Wood are three public supply reservoirs in the upper reaches of the Medway catchment, the operation of which are discussed in Section 13 : PUBLIC WATER SUPPLY - SURFACE WATER SOURCES.

The main gauging station on the Medway is at Teston, downstream of Yalding. The catchment characteristics, as monitored at Teston, are a rapid response to rainfall and a high range in flows with maximum mean daily flow up to 100 times the minimum in any one year.

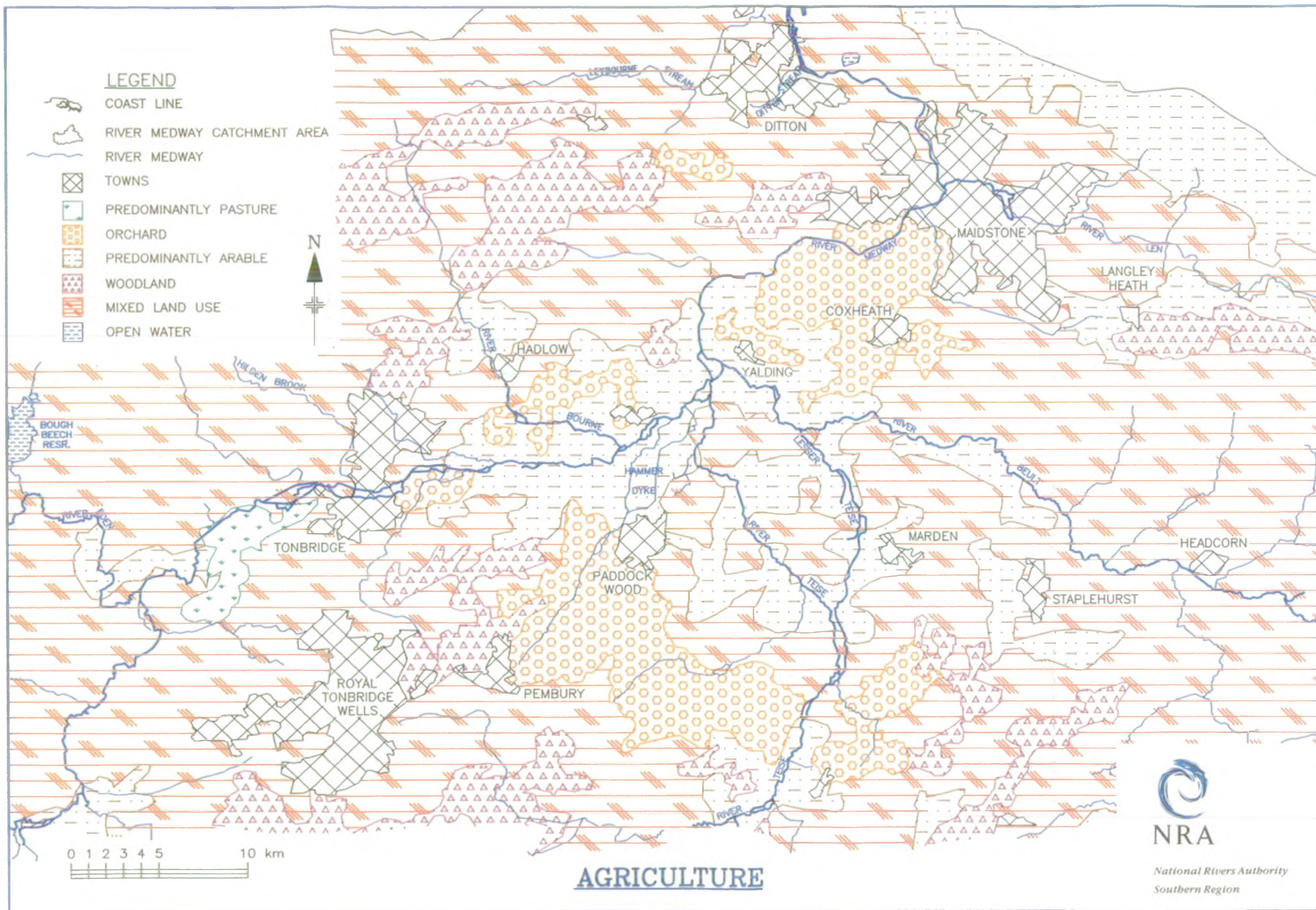
The Medway downstream of Yalding flows across the Lower Greensand aquifer to the tidal limit at Allington Lock. The tidal reach of the river is approximately 20 kilometres in length and is largely within the North Kent coastal chalk aquifer.

3. CATCHMENT HYDROLOGY AND HYDROGEOLOGY



3.3 Recent Meteorological Conditions

The mean annual rainfall across the catchment varies from 650mm in the lower Medway to above 900mm in the upper reaches of the catchment. The annual rainfall record for Southborough gauge indicates that at this location rainfall has been below mean in each of the last 5 years. These data are reflected in the groundwater hydrograph for the Chalk at Owletts, just outside the surface catchment, which shows groundwater levels below mean for each year except 1987 when there was heavy rainfall during the previous winter. The surface hydrograph for Teston Gauge illustrates the effects of reduced run-off in 1989. Flows during the summer period are improved by artificially controlled outflows from Bewl Water for abstraction at Springfield downstream near the tidal limit.





4. AGRICULTURE

4.1 General

This use relates to the types of agriculture present in the catchment, particularly where they depend on the river either for drainage or irrigation. The level of the water table is a key element governing the type and productivity of agricultural use. During the summer the availability of water of an appropriate quality for irrigation can be of great importance. The requirements for soil water tables and water levels in ditches vary with the type of agriculture and this can lead to conflict between neighbouring farms. In addition the operation of land drainage for agriculture can exert significant control on associated flora and fauna.

The drainage of the land is covered in more detail in Section 18 : AGRICULTURAL DRAINAGE and irrigation in Section 15: INDUSTRIAL AND AGRICULTURAL ABSTRACTION.

4.2 Local Perspective

In general, agricultural use of the Medway catchment, particularly higher up in the river system, is mixed with the retention of a relatively small scale of field pattern that includes arable, semi-improved and improved pasture, orchards and woods. The map opposite illustrates agricultural use in the central Medway Catchment which is subject to the most intensive agricultural development.

There is a tendency for the more extensive areas of arable farming to be situated on the flat land of the flood plains, and hence the Medway east of Tonbridge and the lower reaches of the Beult are bordered largely by arable land. Other areas of arable land on a less extensive scale occur along the upper reaches of the Teise, Medway and Eden.

The cultivated land produces mainly cereal, horticultural crops, hops and fruit. The main areas for hops and horticulture are on the Medway, Teise and Beult catchments though the area under hops is declining and horticulture is taking precedence. The demand for irrigation water may be expected to increase as a consequence. There are also extensive orchards in this area as well as on the river valley slopes south and west of Maidstone.

Dairy farming, as a component of mixed farming, becomes predominant west of Tonbridge and the more extensive pastureland along the upper reaches of the Eden are also grazed by sheep.

Much of the Ightham to Pluckley Area of Special Significance for Agriculture, as defined in the Kent Countryside Local Plan, falls within the Medway catchment. The needs of agriculture within this area receive priority over other planning considerations.

4.3 Environmental Objectives

- ° To monitor the agricultural use of the catchment such that other uses are not unduly compromised.

4. AGRICULTURE

4.4 Environmental Requirements

Water Quality

- ° Water quality requirements for agriculture are described in Section 15: INDUSTRIAL AND AGRICULTURAL ABSTRACTION.

River Flow

- ° River Flow requirements for agriculture are described in Section 15 : INDUSTRIAL AND AGRICULTURAL ABSTRACTION.

River Topography

- ° Provision of appropriate protection from flooding (See Section 17 : FLOOD DEFENCE)
- ° Provision of appropriate drainage for agricultural land (See Section 18 : AGRICULTURAL DRAINAGE)

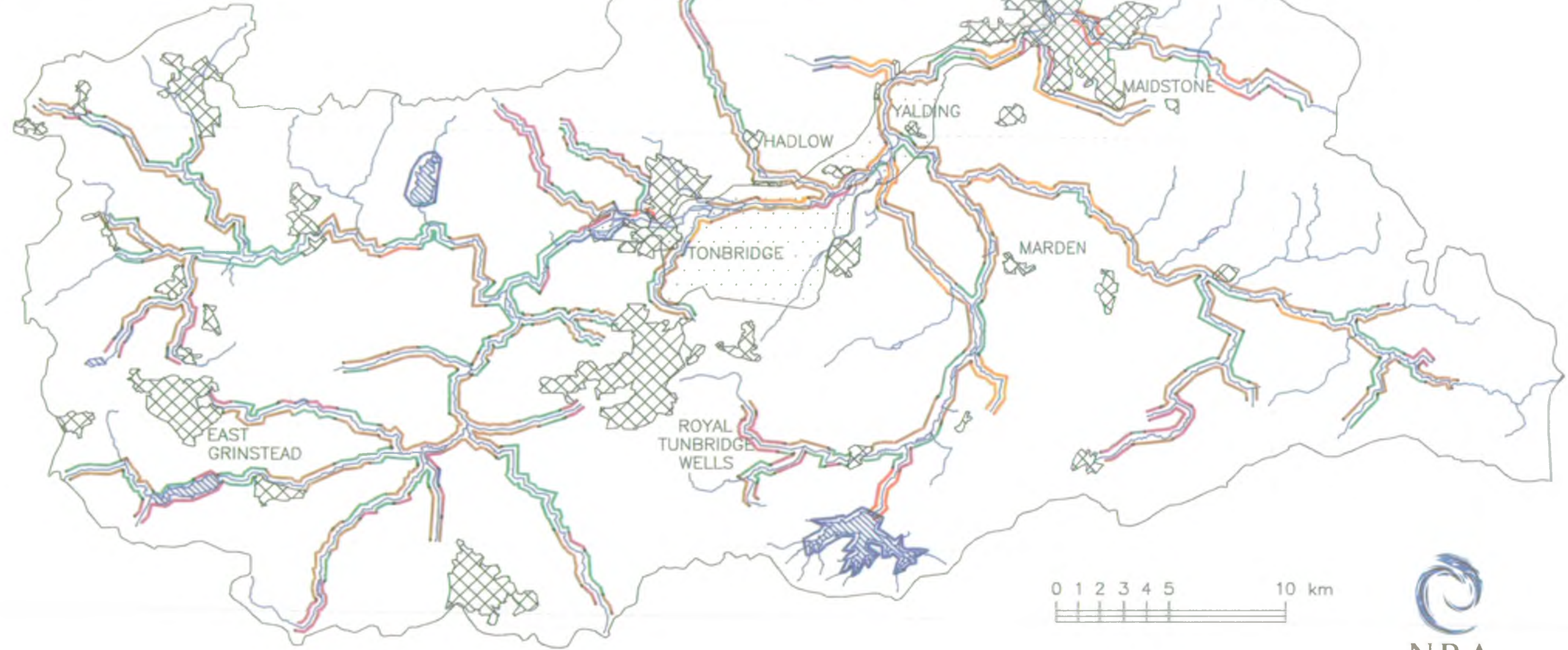
River Management

- ° Maintenance of channel water levels as appropriate to provide wet fencing for grazing pasturage.
- ° Maintenance of drainage channels (see Section 17 : FLOOD DEFENCE and Section 18 : AGRICULTURAL DRAINAGE)

03-05

LEGEND

- COAST LINE
- RIVER MEDWAY CATCHMENT AREA
- RIVER MEDWAY
- TOWNS
- PASTURE
- ARABLE
- MIXED FARMING
- WOODLAND
- PARKLAND
- ORCHARD
- OPEN WATER
- OUTLINE OF MEDWAY PROJECT



ISLE OF SHEPPEY

CHATHAM

MAIDSTONE

YALDING

HADLOW

TONBRIDGE

MARDEN

ROYAL
TUNBRIDGE
WELLS

EAST
GRINSTEAD

0 1 2 3 4 5 10 km



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RIVER CORRIDOR CONSERVATION

5. RIVER CORRIDOR CONSERVATION

5.1 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 water voles, 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 NRA has a duty to further the conservation of wildlife, landscape and historic features along the river corridor.

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 many thousands of years. The creation of water meadows and wet pasture, pollard willows and small 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 devastated 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 section 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 comply with national and international agreements or legislation, as discussed in Section 6.

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

5.2 Local Perspective

Overall, the catchment is fairly intensively developed for mixed farming with large areas of land down to arable and orchard, particularly in the middle reaches between Tonbridge and Maidstone. Whilst some of the smaller tributaries in the steeper valleys of the Hastings Beds and the Lower Greensand are wooded, the woodland habitat within the river corridors is small and fragmented. Unimproved pastures are scarce outside the scheduled sites (see Section 6 : SPECIAL CONSERVATION AREAS). The more extensive pastures, most semi-improved, are found mainly along the Eden around Penshurst, upstream of Edenbridge and along the Medway upstream of the flood barrier at Leigh near Tonbridge.

5. RIVER CORRIDOR CONSERVATION



5.2 Local Perspective (continued)

Open water forms the other common habitat in the catchment, often in a parkland setting or resulting from the construction of reservoirs or extraction of gravel. The larger ponds and lakes are of interest for their waterfowl populations.

The Medway River Project is sponsored by NRA, the Countryside Commission, Kent County Council and the local Borough Councils and has been running since 1988. The purpose of the project is to harness community support for the benefit of wildlife, landscape conservation and public access along the river corridor. The project has helped to develop towpath walks, planted reedbeds and trees and worked with the community to improve awareness and enhance protection of the river environment. The lower reaches of the Medway are extensively used for boating. The wash from boat movements, particularly when at excessive speeds, contributes to the erosional damage of the river banks.

5.3 Environmental Objectives

- To conserve and enhance the river corridor and landscape.

5.4 Environmental Requirements

Water Quality

- Waters to comply with the minimum standards for amenity protection and aesthetic criteria are listed in Section 10: RECREATION AND AMENITY and comply 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 21: STATUTORY WATER QUALITY OBJECTIVES.
- All toilet facilities to be sealed for river craft.

River Flow

- A variable flow regime where the monthly averages reflect 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.

5. RIVER CORRIDOR CONSERVATION



5.4 Environmental Requirements (continued)

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.
- Strict control of speed limits for river craft.

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.
- Weedcutting to be carried out in a way that ensures the continued survival of healthy aquatic vegetation and provides adequate flood protection where necessary. Primarily weeds should be cut back at the end of the summer to enable minimum interference with winter spates and ensure the vegetation survives to grow again in the 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 recreation of natural landscapes and wildlife habitats.

6. SPECIAL CONSERVATION AREAS

6.1 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 (CTRs). 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's) 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.

6.2 Local Perspective

Intensive farming is the prevailing land use throughout the catchment and there are relatively few sites of special conservation interest along the river corridors. Between Rochester and Maidstone, the Holborough and Burham Marshes SSSI includes some of the extensive unimproved grassland on the tidal floodplain with reedbed, fen, carr and open water communities. These marshes are vulnerable to changes in water table level caused by agricultural drainage. In the far north-west of the catchment, ponds and wet alder woods form the principal habitats of Godstone Ponds SSSI and valley alder woods have been notified in a Greensand valley along the Bourne tributary. Lingfield Cernes, a wet meadow by the Eden has been notified for its unusual grassland community including some nationally scarce plants.

Two other SSSIs lie adjacent to main river tributaries, Cowden Meadow (unimproved hay meadow) and Sissinghurst Park Wood, notified, in part, for the rich and unusual flora of the woodland rides. Other scheduled sites in the catchment are all situated higher up in the watersheds at some distance from the designated reaches. Although these sites are unlikely to be affected by operations within the river corridor many are influenced by changes in water table level and soil moisture deficit.

Only a few of the County Trust Reserves lie within the river corridor. The only reserve impinging directly onto the river system is Bough Beech Reservoir, part of which is leased for educational use. Two woodland reserves, Kiln and Brenchley Woods are situated on higher ground by two of the smaller tributaries and are within 1 km of the watercourse.

6.3 Environmental Objectives

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

6. SPECIAL CONSERVATION AREAS

6.4 Environmental Requirements

Water Quality

- The protection and maintenance of the aquatic environment as outlined in Section 5: RIVER CORRIDOR CONSERVATION.

River Flow

- Basic flow regime to minimise detriment to the special conservation areas is met by the requirements detailed in Section 5: RIVER CORRIDOR CONSERVATION.
- Spate flows to inundate the designated wetlands at a reasonable frequency.

River Topography

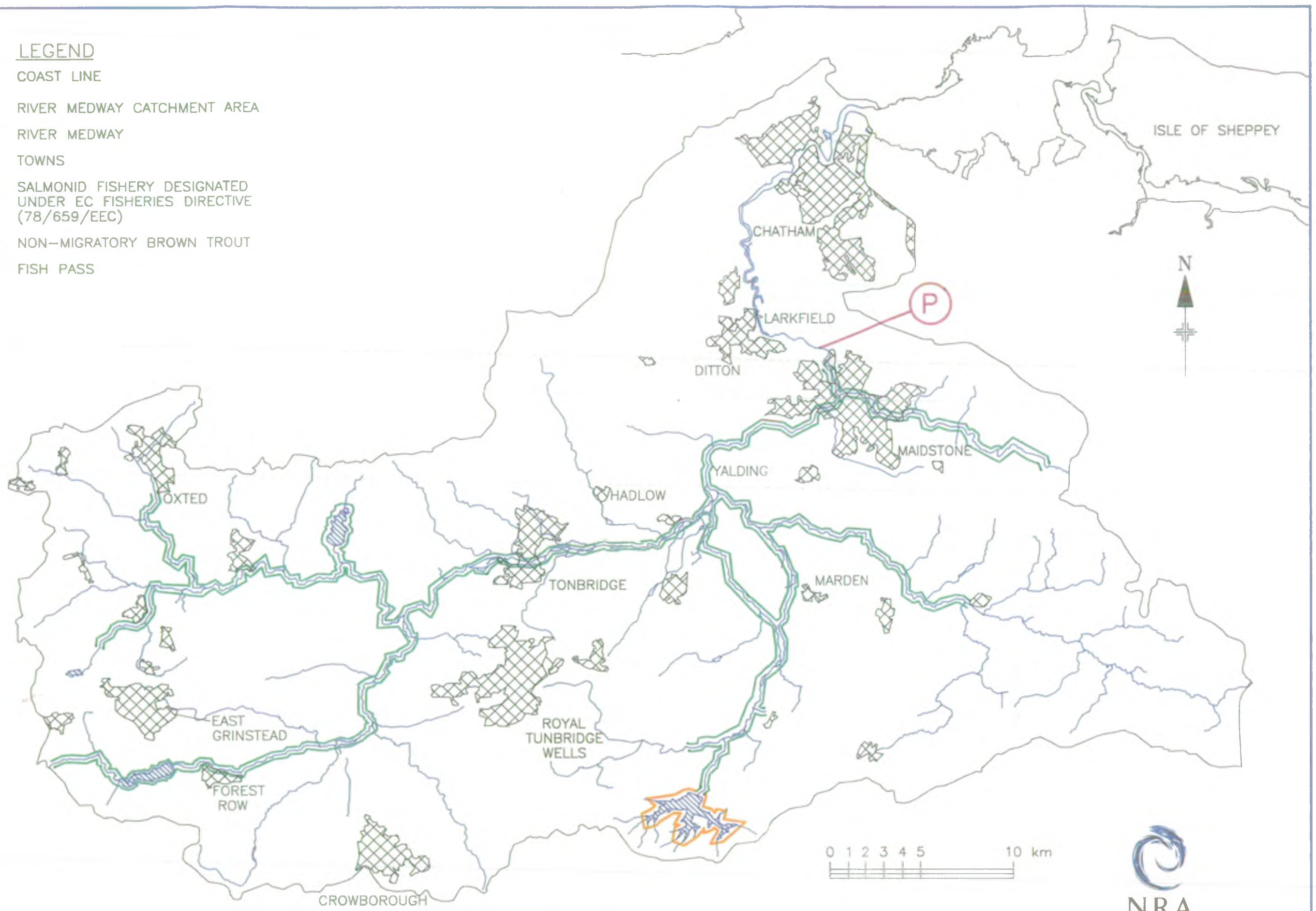
- Maintenance, enhancement and preservation of the natural river features which contribute towards or give rise to the specific features of the designated conservation areas.
- Avoid damage to habitats due to too much unrestricted public access.

River Management

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

LEGEND

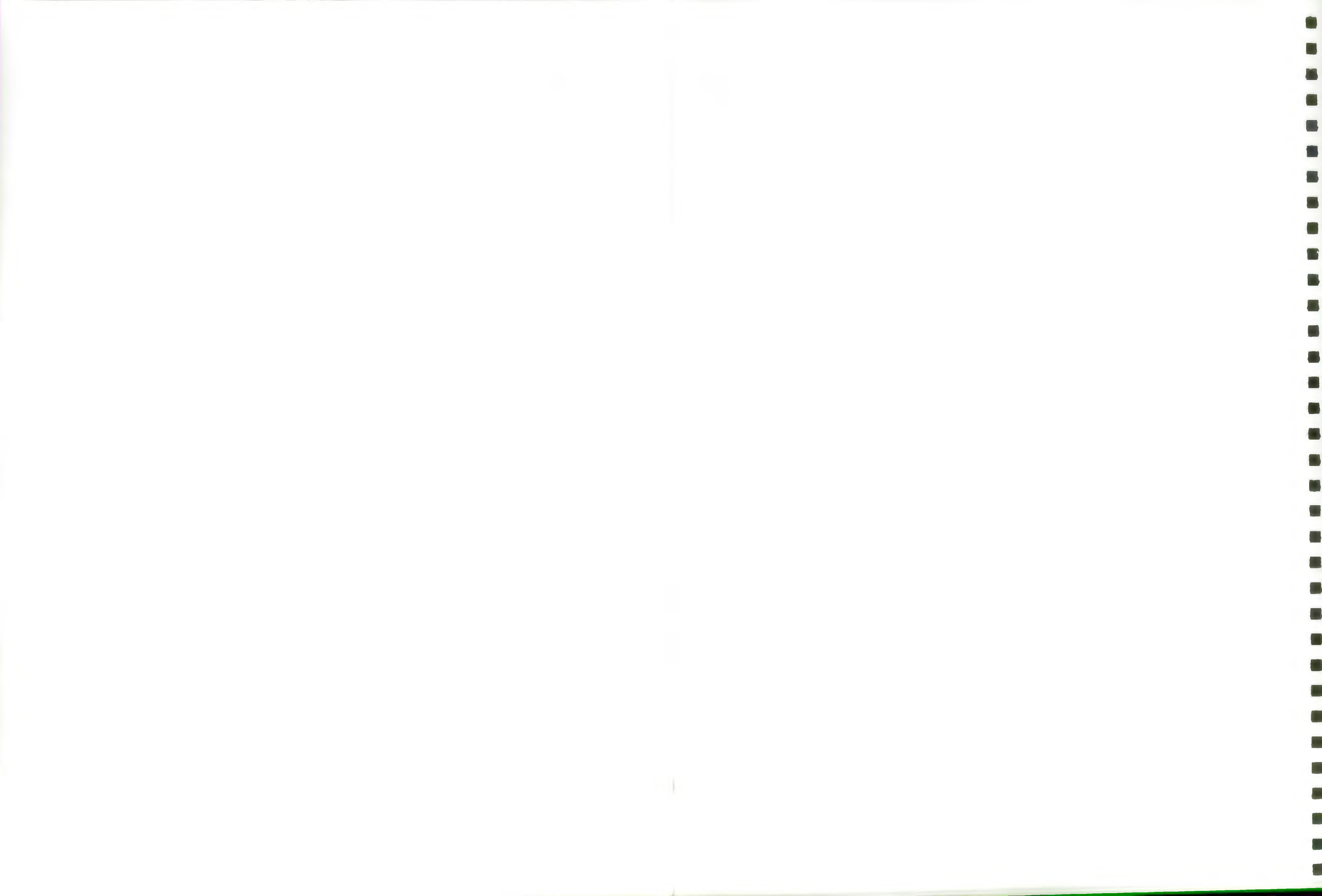
-  COAST LINE
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  SALMONID FISHERY DESIGNATED UNDER EC FISHERIES DIRECTIVE (78/659/EEC)
-  NON-MIGRATORY BROWN TROUT
-  FISH PASS



GAME FISHERIES



National Rivers Authority
Southern Region



7. GAME FISHERIES

7.1 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 (78/695/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 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

Salmon and migratory trout do not occur regularly in the Medway catchment because of poor estuarine water quality, inadequate attractant flows in dry years and a difficult passage at Allington Lock. Occasionally, sea trout have been found as far upstream as the River Teise.

Bowl Water is designated as a salmonid fishery under the EC Freshwater Fisheries Directive (78/659/EEC). The sport fishery is supported by rainbow trout which are farmed in cages in the reservoir. Raceways below the dam are used to propagate rainbow trout, salmon and sea trout.

Brown trout are well distributed in the catchment with particularly high class fisheries in the River Teise. Trout are also stocked at the three reservoirs in the catchment.

The NRA Southern Region would, in the long term, like to see the Medway support a healthy population of migratory salmonids.

7.3 Environmental Objectives

Breeding Reaches

- To sustain a natural salmonid population appropriate to a river in such a geographical situation.

Migratory Reaches

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

7. GAME FISHERIES



7.4 Environmental Requirements

Water Quality

- For designated reaches water quality not to deteriorate below the mandatory limits for pollutants as specified in the EC 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).
- For reaches not specifically designated for the protection and enhancement of salmonid fisheries, but where significant game fisheries occur, designation under the EC Freshwater Fisheries Directive should be sought.

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 5: RIVER CORRIDOR CONSERVATION.
- The natural flow regime should not be altered in a way which significantly inhibits the migration of salmonids.

River Topography

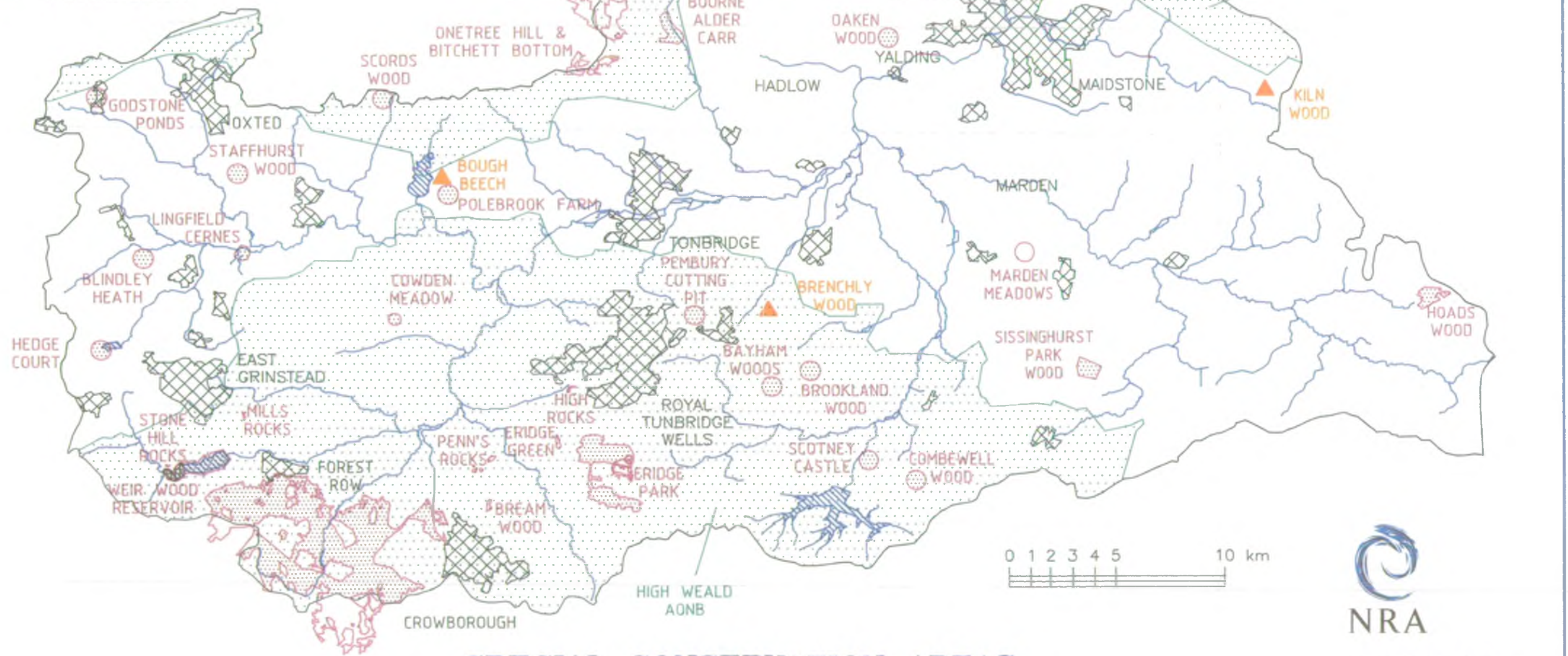
- Barriers should be passable at Q95 flows as far upstream as Tonbridge.
- Diverse and natural river features to ensure a variety of spawning and feeding areas.
- Bankside vegetation to provide adequate shade and cover.

River Management

- Fish stocking should be appropriate to the river reaches where it takes place.
- High quality gravels for spawning in breeding reaches.
- River management practices to minimise effects on river ecology.

LEGEND

-  COAST LINE
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  NATIONAL NATURE RESERVE
-  SITE OF SPECIAL SCIENTIFIC INTEREST WITHIN RIVER CORRIDOR
-  OTHER SITES OF SPECIAL SCIENTIFIC INTEREST WITHIN RIVER CATCHMENT
-  COUNTY TRUST RESERVE
-  AREA OF OUTSTANDING NATURAL BEAUTY



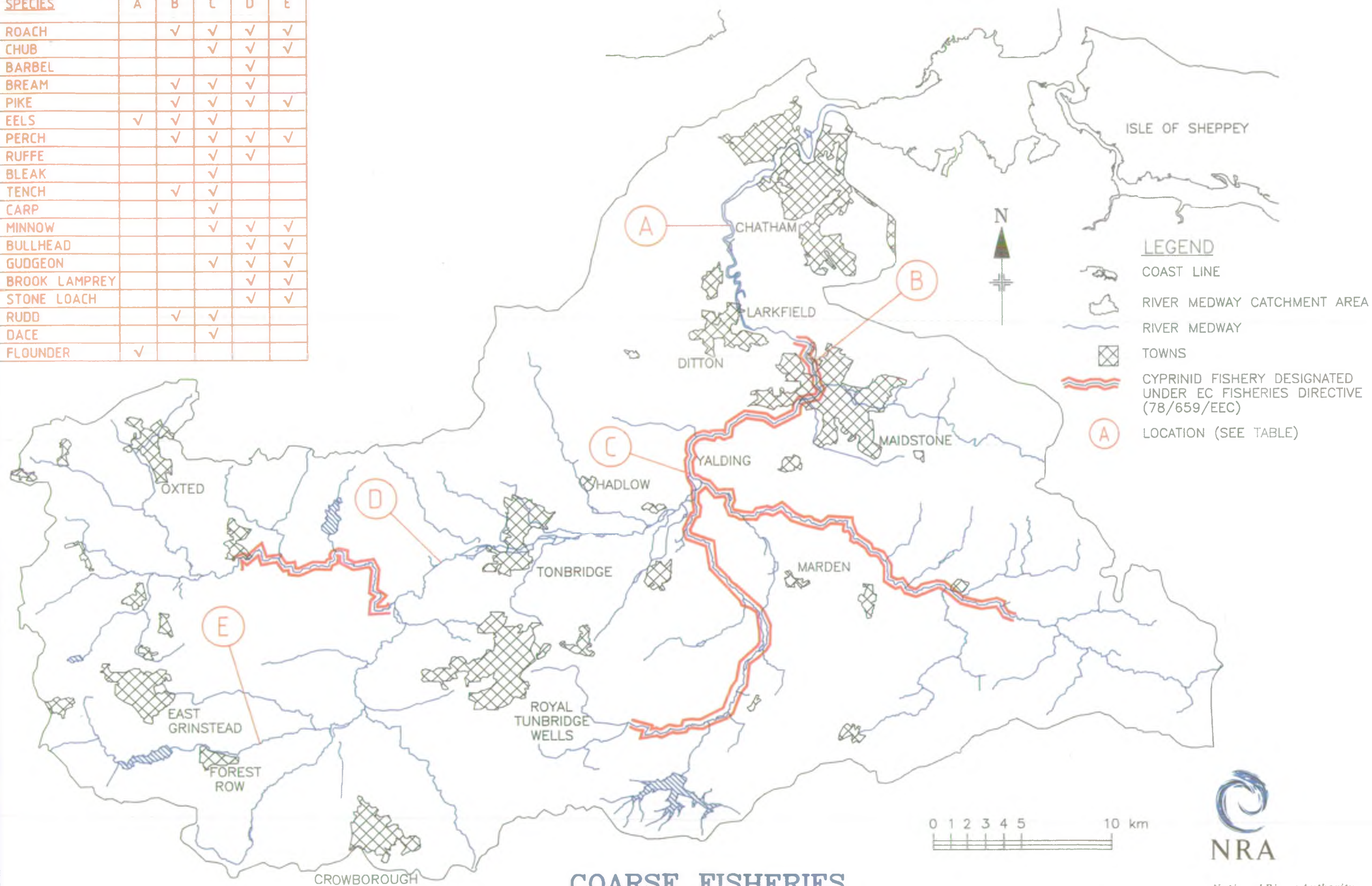
SPECIAL CONSERVATION AREAS



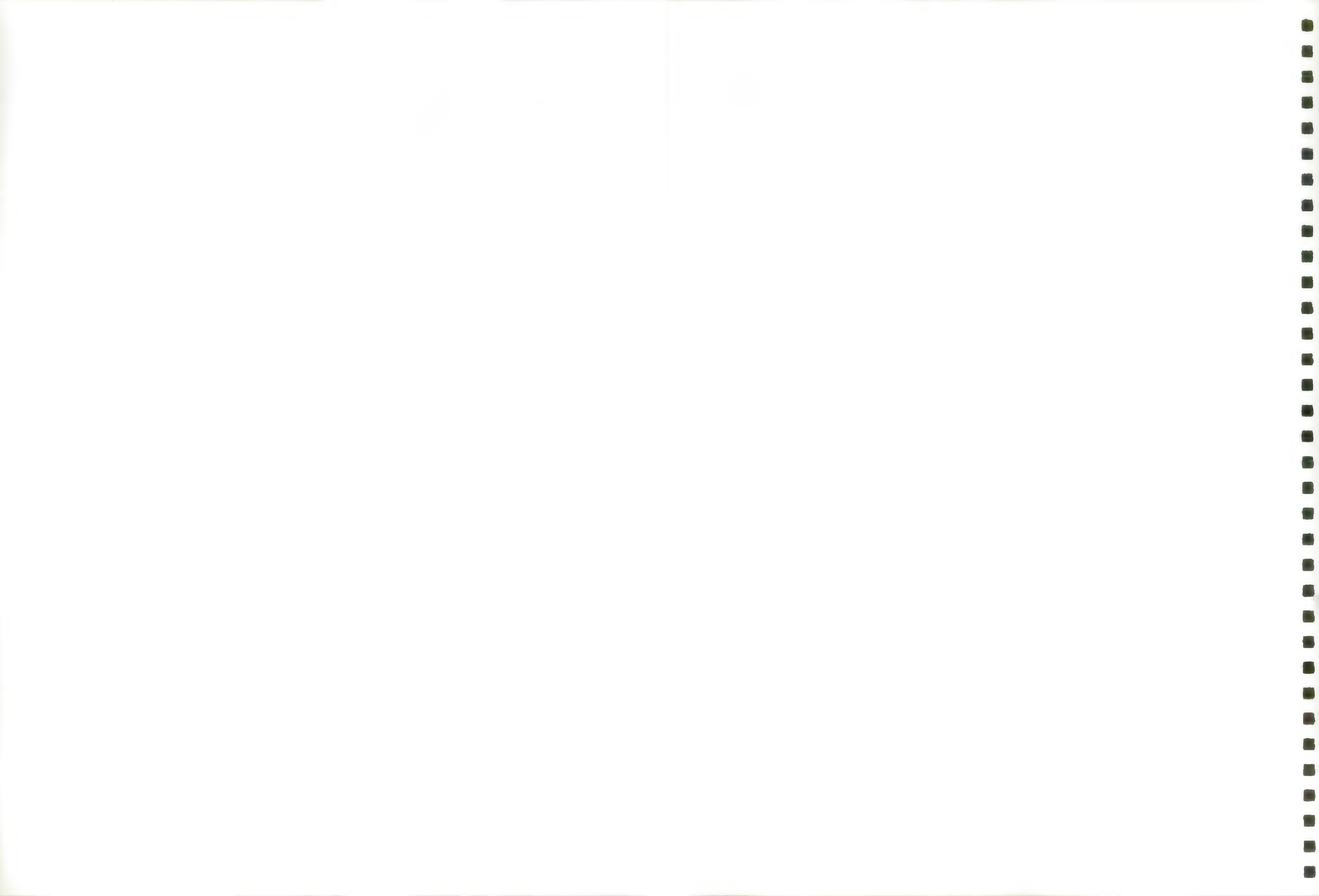
NRA

National Rivers Authority
Southern Region

SPECIES	A	B	C	D	E
ROACH		✓	✓	✓	✓
CHUB			✓	✓	✓
BARBEL				✓	
BREAM		✓	✓	✓	
PIKE		✓	✓	✓	✓
EELS	✓	✓	✓		
PERCH		✓	✓	✓	✓
RUFFE			✓	✓	
BLEAK			✓		
TENCH		✓	✓		
CARP			✓		
MINNOW			✓	✓	✓
BULLHEAD				✓	✓
GUDGEON			✓	✓	✓
BROOK LAMPREY				✓	✓
STONE LOACH				✓	✓
RUDD		✓	✓		
DACE			✓		
FLOUNDER	✓				



National Rivers Authority
Southern Region



8. COARSE FISHERIES

8.1 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.

8.2 Local Perspective

Cyprinid fisheries in the Medway catchment are extensive and healthy. The reaches designated as cyprinid fisheries under the EC Freshwater Fisheries Directive (78/659/EEC) are the Medway (Yalding to Allington), Beult (Hadmans Bridge to Yalding), Teise (Bartley Mill to Yalding) and Eden (Edenbridge to the confluence with the Medway at Penshurst).

A wide variety of species are found in the catchment. These include stone loach, brook lamprey, gudgeon, bull head, minnow, perch, pike, rudd, dace, tench, chub and roach in the upper and middle reaches; carp, tench and bream in the lower reaches. The stretch below Ashurst Weir has a breeding population of barbel and is an important spawning ground. Grayling have been stocked to the upper reaches over recent years and some also find their way down the River Teise into the River Medway. Rarer species such as ruffe and bleak also occur.

8.3 Environmental Objectives

- ° To sustain a natural cyprinid population appropriate to a river in such a geographical situation.

8. COARSE FISHERIES



8.4 Environmental Requirements

Water Quality

- Water Quality not to deteriorate below the mandatory limits for pollutants as specified in the EC Fisheries Directive (78/659/EEC) for cyprinid fisheries.
- Water quality should meet the guideline limits for pollutants as specified in the EC 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 5: RIVER CORRIDOR CONSERVATION.

River Topography

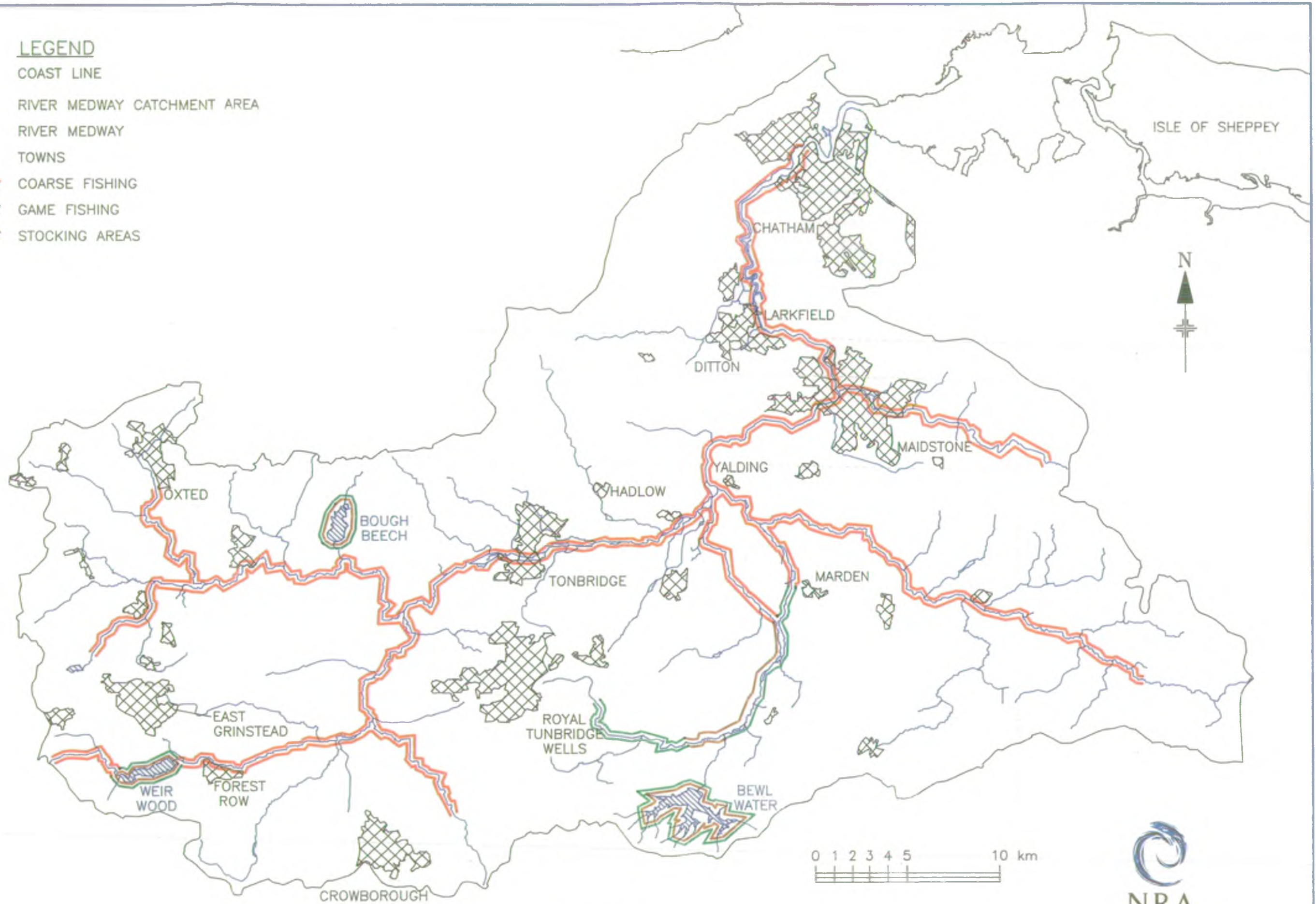
- Provision and maintenance of adequate shade and cover.
- Diverse and natural river features to ensure a variety of spawning and feeding areas.

River Management

- Fish stocking to be appropriate to the river reaches where it takes place.
- River management practices to minimise effects on river ecology.

LEGEND

- COAST LINE
- RIVER MEDWAY CATCHMENT AREA
- RIVER MEDWAY
- TOWNS
- COARSE FISHING
- GAME FISHING
- STOCKING AREAS



ANGLING



National Rivers Authority
Southern Region

9. ANGLING

9.1 General

This use relates specifically to the use of the river by anglers and to the availability of preferred 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. However, coarse fish venues close to urban areas are more difficult to maintain because of the impact of large numbers of participants with consequent bank erosion and trampled bankside vegetation.

9.2 Local Perspective

The majority of angling waters in the Medway are private or syndicated to clubs. Trout fishing takes place at Weir Wood, Bewl Water and Bough Beech reservoirs and at Bayham on the River Teise. Coarse angling abounds elsewhere with high quality bream fishing in the middle reaches of the Medway. The NRA operate a large fish farm at Dunk's Green for a wide range of coarse species. These include mirror carp, chub, barbel, tench and trout.

Sluices are operated on small streams in wet meadows on the Eden, Teise and Beult. These sluices are used to hold up water levels for wet fencing and to aid angling (also helping conservation in the process). However, to avoid flooding, the sluices are removed prior to the winter rains. The exact timing of their removal can be a cause for concern and can raise conflicts between anglers, conservationists and farmers.

The lowering of pens between locks within the Medway Navigation for maintenance purposes can have a marked detrimental impact on fish populations, particularly during the spawning season.

9.3 Environmental Objectives

- To provide suitable and safe conditions for successful angling.

9. ANGLING



9.4 Environmental Requirements

Water Quality

- Guidelines on public health implications awaited.
- Angling waters to be aesthetically acceptable (see Section 10; 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 5: RIVER CORRIDOR CONSERVATION.
- To operate the locks along the navigation such that the detrimental effects on the fisheries and fish spawning are minimised.

River Topography

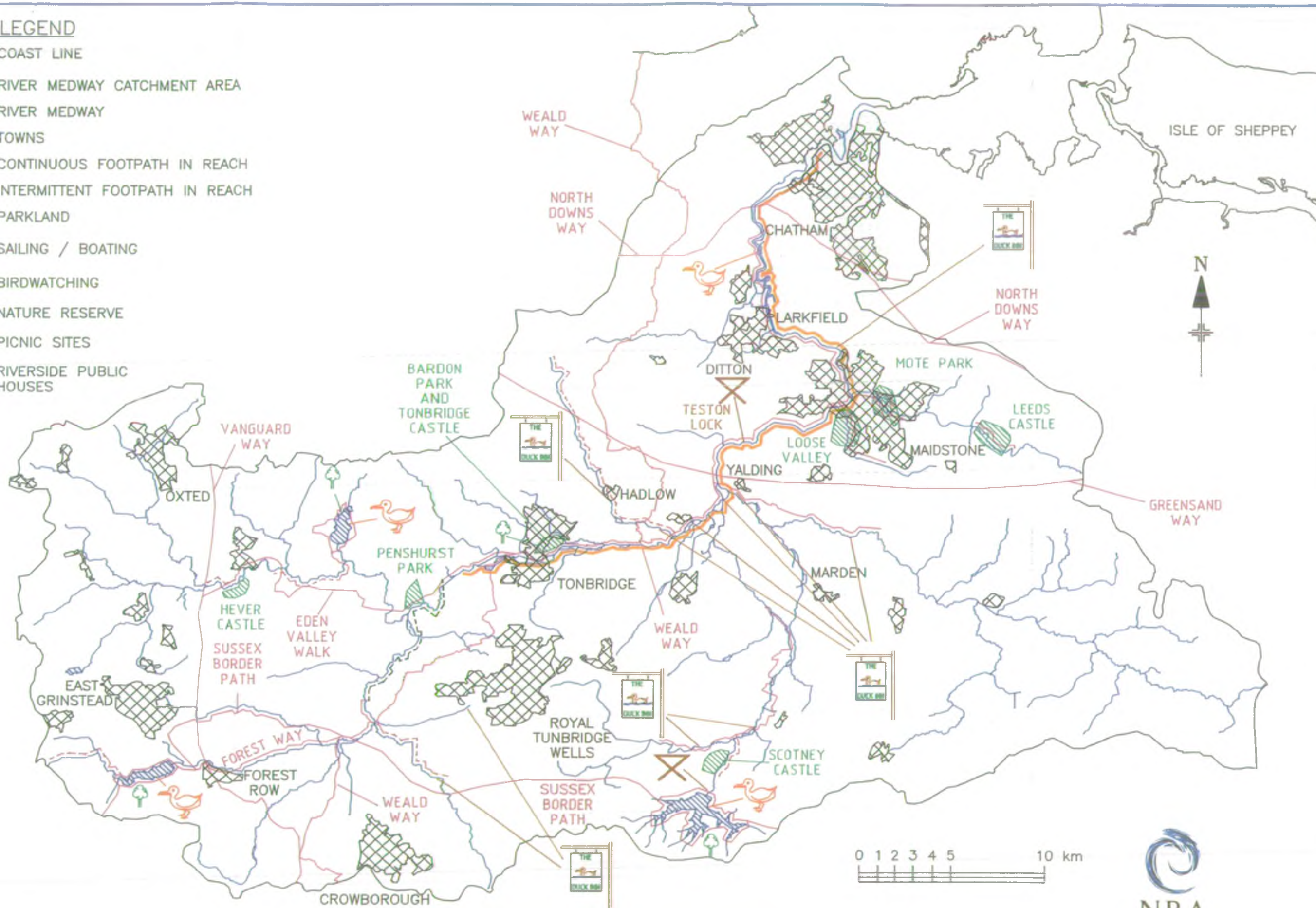
- Maintenance of sufficient access points for angling.
- Maintenance of a mixture of open and dense instream and bankside vegetation.

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 channel maintenance activities.

LEGEND

-  COAST LINE
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  CONTINUOUS FOOTPATH IN REACH
-  INTERMITTENT FOOTPATH IN REACH
-  PARKLAND
-  SAILING / BOATING
-  BIRDWATCHING
-  NATURE RESERVE
-  PICNIC SITES
-  RIVERSIDE PUBLIC HOUSES

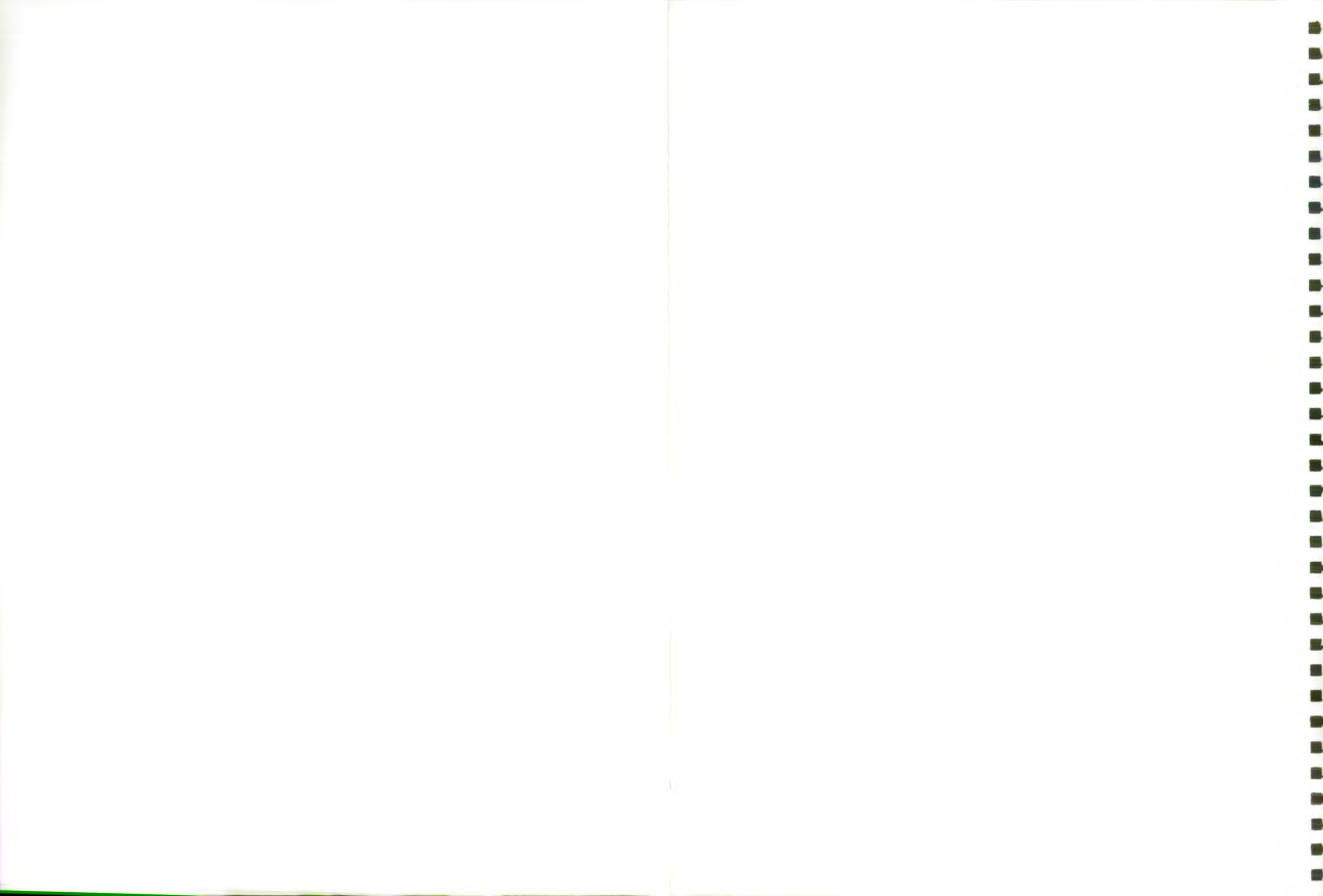


0 1 2 3 4 5 10 km



National Rivers Authority
Southern Region

RECREATION AND AMENITY



10. RECREATION AND AMENITY



10.1 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, bird watching, boating, sailing and rowing. As such, the principal areas of concern are general aesthetic acceptability and access to the water course. Water sports such as canoeing, windsurfing and swimming are covered in more detail in Section 11 : WATERSPORTS and angling is covered in Section 9 : ANGLING. The specific details of navigation rights and authorities are dealt with in Section 12 : NAVIGATION.

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.

10.2 Local Perspective

The Medway catchment is used extensively for public recreation and amenity, providing enjoyment for many thousands of people. Access to the watercourses is available along the River Medway corridor and at the reservoirs at Weir Wood, Bough Beech and Bewl Water. A number of tributaries also have reaches with limited access.

A number of long distance footpaths cross the catchment and the watercourses along their routes. These include the North Downs Way, the Greensand Way, the Sussex Polder Path, Eden Valley Walk, Vanguard Way and Forest Way which runs along the Medway from Hartfield to Weir Wood Reservoir. Perhaps the most important footpath as far as the river is concerned is the Weald Way which follows the Medway from Tonbridge to Maidstone, and may be extended further down the estuary. This has been developed by Kent County Council and the Countryside Commission in partnership with the NRA and local authorities.

Bird watching takes place on the three reservoirs and the lakes of Snodland. Nature walks are located at the reservoirs and at Barden Park between Leigh and Tonbridge. There are areas of parkland adjacent to watercourses at Leeds Castle and Mote Park on the Len, Loose Valley Park on the Loose, Barden Park, Tonbridge Castle and Penshurst Place on the Medway, Hever Castle on the Eden and Scotney Castle on the Bewl. Picnic areas are located at Bewl Water and Teston Lock.

Boating forms a major recreational use of the Medway. The Medway Navigation from Allington to Leigh consists of 10 locks and associated sluices operated by the National Rivers Authority and is used by both powered and sail boats. The Medway Ports Authority controls the navigation downstream of Allington used by commercial and all types of pleasure craft. Boating also takes place on Bewl Water although boats are restricted to the area outside the nature reserve.

Bewl Water, the largest reservoir in Southern England at 312 hectares of open water, is a major recreational centre. In 1989/90, there were over 220,000 visitors who took part in a wide range of activities, approximately 150,000 walkers, birdwatchers and picnickers; 30,000 anglers; and 40,000 participants in water sports (Section 11). The number of visitors is likely to continue to increase as the recreational potential is realised by more people.

10. RECREATION AND AMENITY



10.2 Local Perspective (continued)

The Medway Project, operated jointly by Tonbridge and Malling Borough Council, Maidstone Borough Council, Kent County Council, Countryside Commission and the NRA aims to carry out improvement work in the Medway corridor in the interests of amenity, recreation and conservation. The project is discussed in more detail in Section 5 : RIVER CORRIDOR CONSERVATION.

10.3 Environmental Objectives

- To encourage and monitor the sympathetic development of the amenity and recreation potential of the river.
- To conserve and enhance the landscape and archaeological features associated with the river.

10.4 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 5: RIVER CORRIDOR CONSERVATION.

River Topography

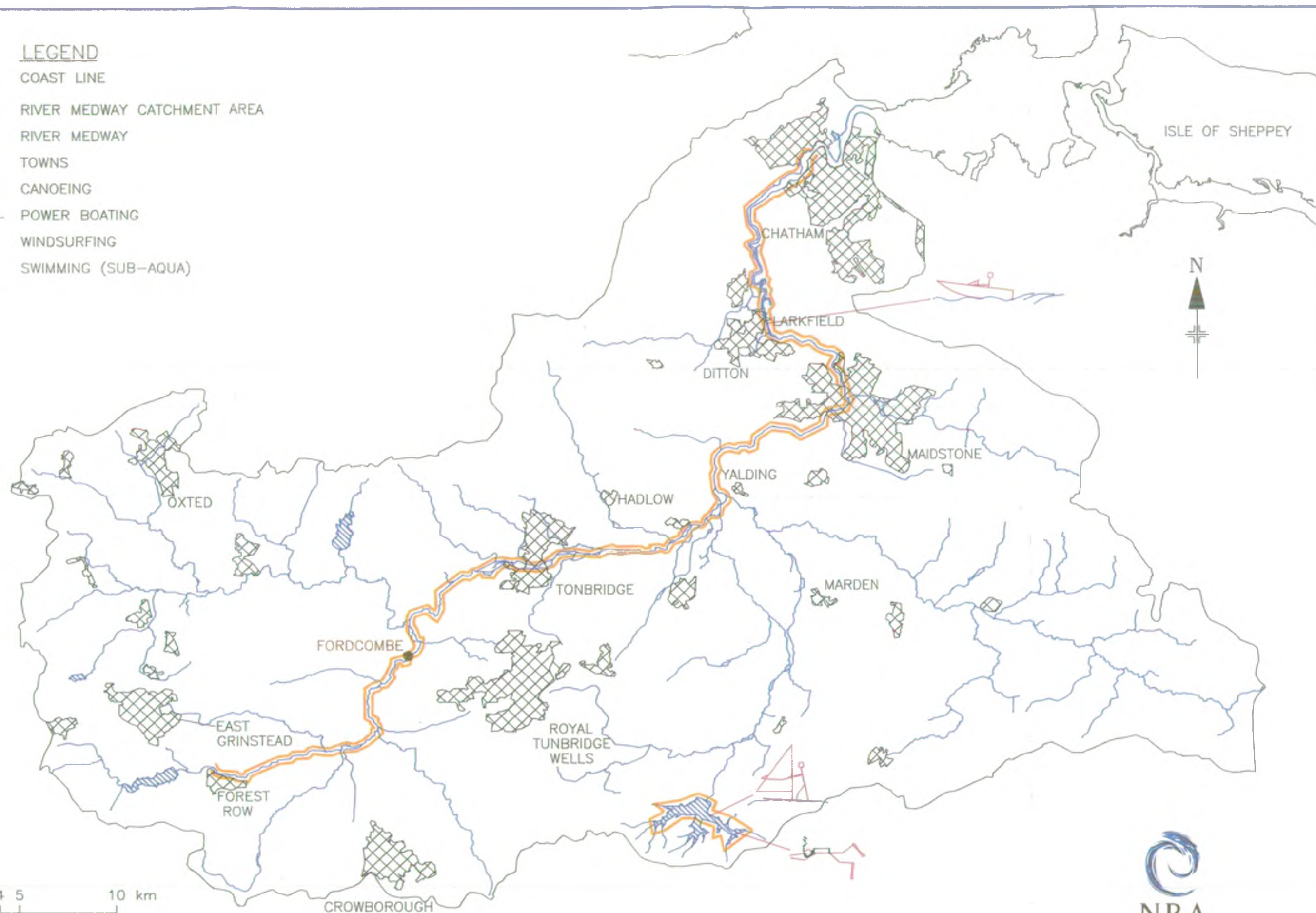
- Maintenance of existing footpaths.
- Maintenance of existing access points and moorings.
- Sympathetic management and renovation of historical riverside artifacts (eg. Mills, weirs and bridges) which does not significantly compromise other uses, particularly flood defence.
- Encourage the extension of footpaths and other facilities where there is sufficient demand.

River Management

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

LEGEND

-  COAST LINE
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  CANOEING
-  POWER BOATING
-  WINDSURFING
-  SWIMMING (SUB-AQUA)

**WATER SPORTS****NRA**

National Rivers Authority
Southern Region

11. WATERSPORTS



11.1 General

This use deals only with those sports, such as canoeing, water-skiing, windsurfing and swimming, where there is a risk of immersion and hence intimate contact with water. Principal areas of concern are the health of participants and the river conditions required for the successful pursuit of the activity in question.

Public health guidelines for undertaking immersion sports within fresh water are presently being formulated. Designated coastal bathing beaches are subject to the EC Bathing Waters Directive, with specific water and microbiological standards. However a simple transfer of standards from the marine environment to the freshwater environment would be inappropriate.

11.2 Local Perspective

The main centre for immersion sports in the catchment is Bewl Water. At this reservoir clubs exist for canoeing, windsurfing and diving. The numbers of participants in 1989/90 are shown in the following table:

Educational Watersports	12229
Windsurfing	1202
Canoeing	900
Diving	248
Sailing	24820
TOTAL WATERSPORTS	39339

Watersports take place on most of Bewl Water apart from the nature reserve. As such, these sports require significant areas of the water body that may be under demand from other interests. Water levels may be reduced significantly during the later summer due to water releases for public supply.

Canoeing takes place on the Medway from Forest Row downstream to Rochester. There is a potential conflict of interest between canoeists and anglers particularly on the upper reaches of the river and permission should be sought to use the section upstream of Fordcombe.

11.3 Environmental Objectives

- To provide suitable and safe conditions for those involved in immersion sports.

11. WATERSPORTS



11.4 Environmental Requirements

Water Quality

- Guidelines on public health implications awaited.
- Waters to be aesthetically acceptable for participants.

River Flow

- Basic flow regime to minimise detriment to watersports is met by the requirements in Section 5: RIVER CORRIDOR CONSERVATION.

River Topography

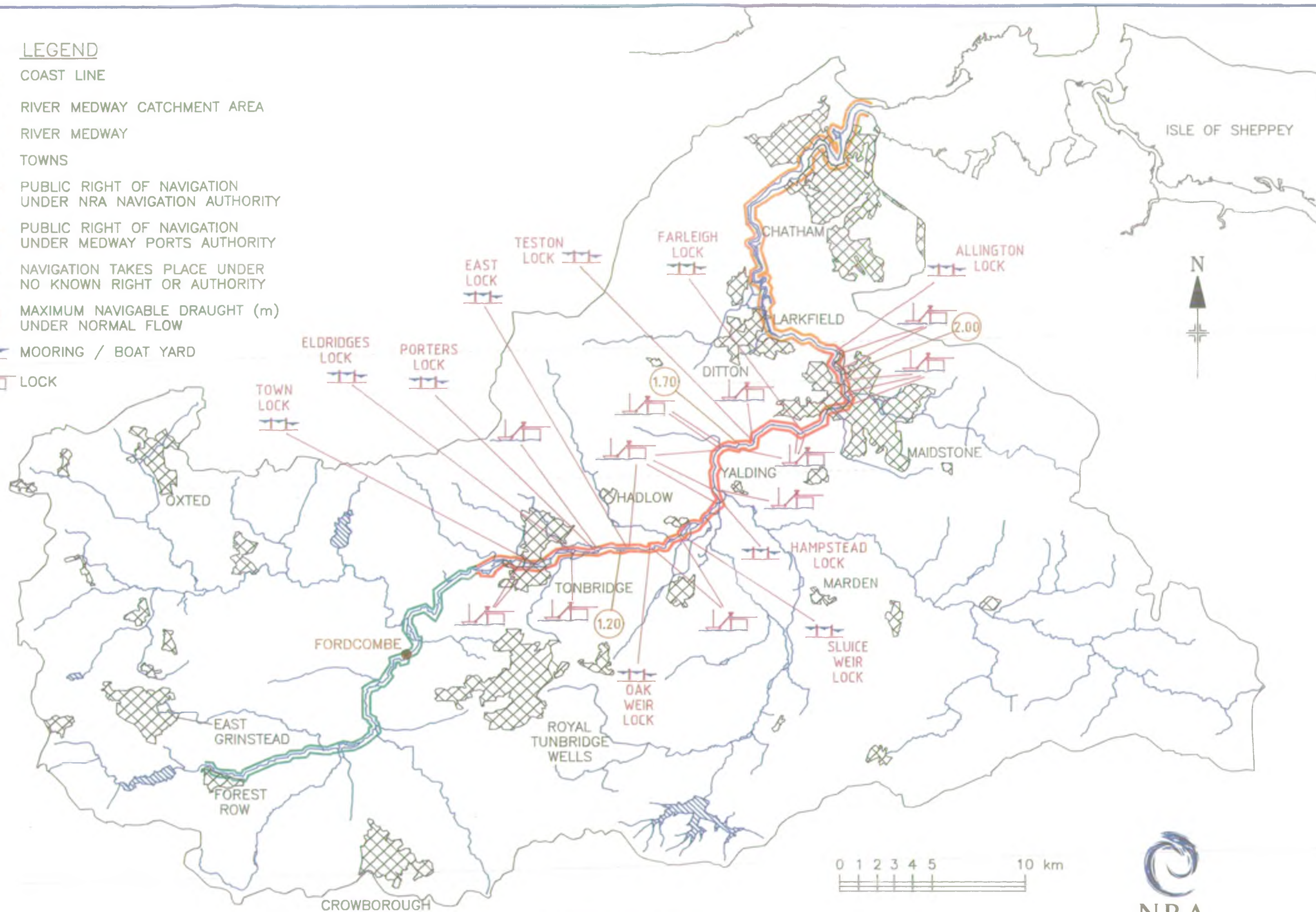
- Provision and maintenance of landing and launching points and storage areas for equipment.

River Management

- To encourage the clear communication and understanding of access rights and locations.

LEGEND

-  COAST LINE
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  PUBLIC RIGHT OF NAVIGATION UNDER NRA NAVIGATION AUTHORITY
-  PUBLIC RIGHT OF NAVIGATION UNDER MEDWAY PORTS AUTHORITY
-  NAVIGATION TAKES PLACE UNDER NO KNOWN RIGHT OR AUTHORITY
-  MAXIMUM NAVIGABLE DRAUGHT (m) UNDER NORMAL FLOW
-  MOORING / BOAT YARD
-  LOCK



NAVIGATION



NRA

National Rivers Authority
Southern Region

12. NAVIGATION

12.1 General

This use relates to the passage of vessels through watercourses in the catchment. Vessels may be of commercial or recreational use, and the right of navigation and the appropriate navigation authorities are identified where they are known.

The right of navigation must be divided between tidal and non-tidal rivers. In tidal rivers which are realistically broad and deep enough to serve for commerce then there is a right of way for all the public for all purposes of navigation, trade and intercourse. There may also be the right to moor for unloading and loading and in case of stress of weather or for changes in the tide.

Generally there is no right of navigation over the non-tidal stretches of water unless one has been established through immemorial usage, by dedication of the riparian owners or by statute. Furthermore the extent of the rights are not as substantial as those prevailing on the tidal lengths of the same river. For instance there may be restrictions on the lengths of parts of rivers over which navigation can be exercised or on the type of craft. Certainly there would be no right of landing except by custom or grant since the banks above tidal limits are owned by individuals rather than the Crown.

This section should be considered in conjunction with Section 10: RECREATION AND AMENITY and Section 11 : WATERSPORTS.

12.2 Local Perspective

Navigation on the Medway is a major use of the river upstream of Rochester. Between Rochester Bridge and Allington Lock there is a public right of navigation under the authority of the Medway Ports Authority. This reach is utilised by both commercial and recreational vessels.

Between Allington Lock and the Leigh Flood Barrier, there is a public right of navigation under the authority of the National Rivers Authority. The NRA sluice and lock keepers trim levels and operate Allington Lock and the lifting bridge at Yalding. A hydraulic dredger is operated by the NRA to clear blockages and shoals. In 1990, 2644 licences were issued for the passage of recreational vessels. Of these, 1100 licences were short-term and the remainder long-term. Of the long-term licences, 895 were issued for powered craft and 640 were issued for manual craft. Above Leigh, canoeing occurs under no known right or authority up to Forest Row, downstream of Weir Wood Reservoir. Upstream of Fordcombe permission should be sought for access.

The Medway Navigation between Allington and Leigh is used by recreational vessels and permits craft of the following maximum draughts under normal flow conditions:

Allington Lock to Maidstone	2.0 metres
Maidstone to Yalding	1.7 metres
Yalding to Leigh	1.2 metres

Below Allington Lock a draught of 2.13 metres is possible on high tides. Navigation is severely restricted at low tides.

A minimum headroom of 2.55 metres exists on all bridges at normal flow levels except the Great Bridge at Tonbridge (1.98 metres). At Aylesford Bridge below Allington, the head room is 2.8 metres at MHWS. There are ten locks on the Medway Navigation each capable of accommodating craft up to 24.5 metres in length and 5.6m in beam.

12. NAVIGATION



12.2 Local Perspective (continued)

Public moorings are available at Allington Lock, Maidstone Bridges and Tonbridge Great Bridge. Slipways are provided at Maidstone High Level Bridge, Watlington Bow Bridge, Hampstead Lock and upstream of Tonbridge Castle. Boat yards are located between Allington and Maidstone, Tovil Bridge, East Farleigh Bridge, Watlington Bow Bridge, Yalding and upstream of Tonbridge Castle.

There is concern as to the erosion damage caused by river craft, particularly when navigated at excessive speed. A separate environmental concern relates to the disposal of effluent from both pleasure boats and house boats.

12.3 Environmental Objectives

- ° To facilitate navigation in appropriate reaches.

12.4 Environmental Requirements

Water Quality

- ° To maintain the aesthetic quality of water (as for Section 10: RECREATION AND AMENITY).

River Flow

- ° In the navigable reaches between Allington and Leigh, the basic flow regime to minimise detriment to navigation is met by the requirements detailed in Section 5: RIVER CORRIDOR CONSERVATION.
- ° In navigable reaches the natural flow regime should preferably not be altered in a way which changes the sedimentation characteristics of the channel.

River Topography









- ° To maintain mooring facilities and locks to an appropriate standard.

River Management







- ° To maintain bed levels and water levels sufficient to provide appropriate draught for vessels.
- ° To encourage the clear communication and understanding of access rights and locations.

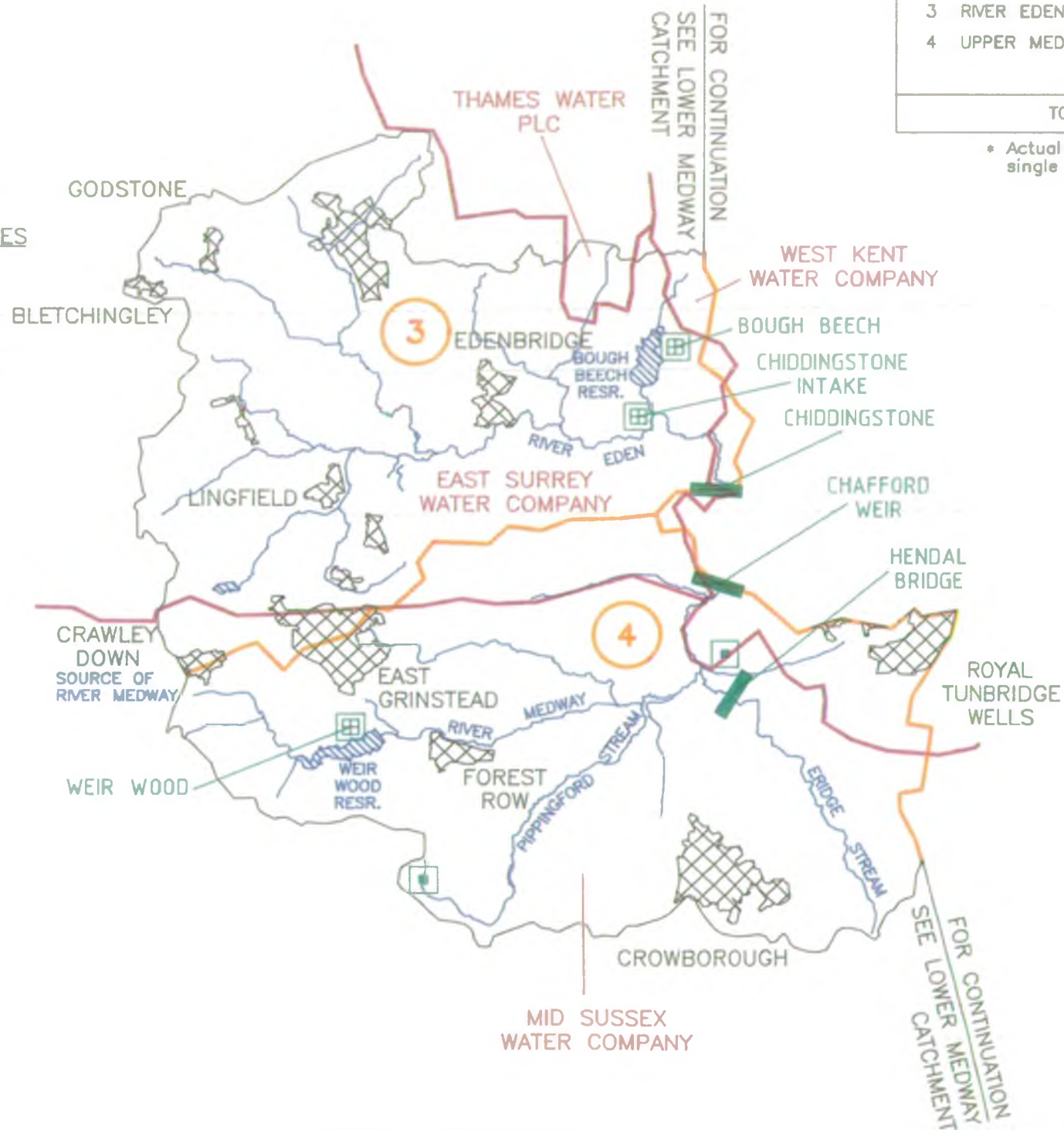
UPPER MEDWAY CATCHMENT

LEGEND

-  COAST LINE
-  SURFACE CATCHMENT BOUNDARY
-  ESTIMATED GROUNDWATER CATCHMENT BOUNDARY
-  TOWNS
-  RESOURCE AREA BOUNDARY
-  RESOURCE AREA NUMBER
-  WATER COMPANY BOUNDARY
-  PRIMARY GAUGING STATION

LICENSED SURFACE WATER SOURCES

LICENCE OF RIGHT	LICENCE ISSUED SUBSEQUENTLY
 > 5MI/d	 > 5MI/d
 1-5MI/d	 1-5MI/d
 < 1MI/d	 < 1MI/d



Resource Area	Mean Licensed Abstraction (MI/d)	Actual Abstraction in 1990 (% licensed)
3 RIVER EDEN	46	*
4 UPPER MEDWAY	22	*
TOTAL	68	*

* Actual abstractions not revealed as identifiable to a single source but included in the total.



PUBLIC WATER SUPPLY – SURFACE WATER SOURCES



NRA



National Rivers Authority
Southern Region

LOWER MEDWAY CATCHMENT







Resource Area	Mean Licensed Abstraction (MI/d)	Actual Abstraction in 1989 (%Licensed)
1 MEDWAY ESTUARY	0	—
2 MIDDLE MEDWAY	65	*
5 RIVER TEISE	5	*
6 RIVER BEULT	0	—
TOTAL	70	*
GRAND TOTAL	138	79

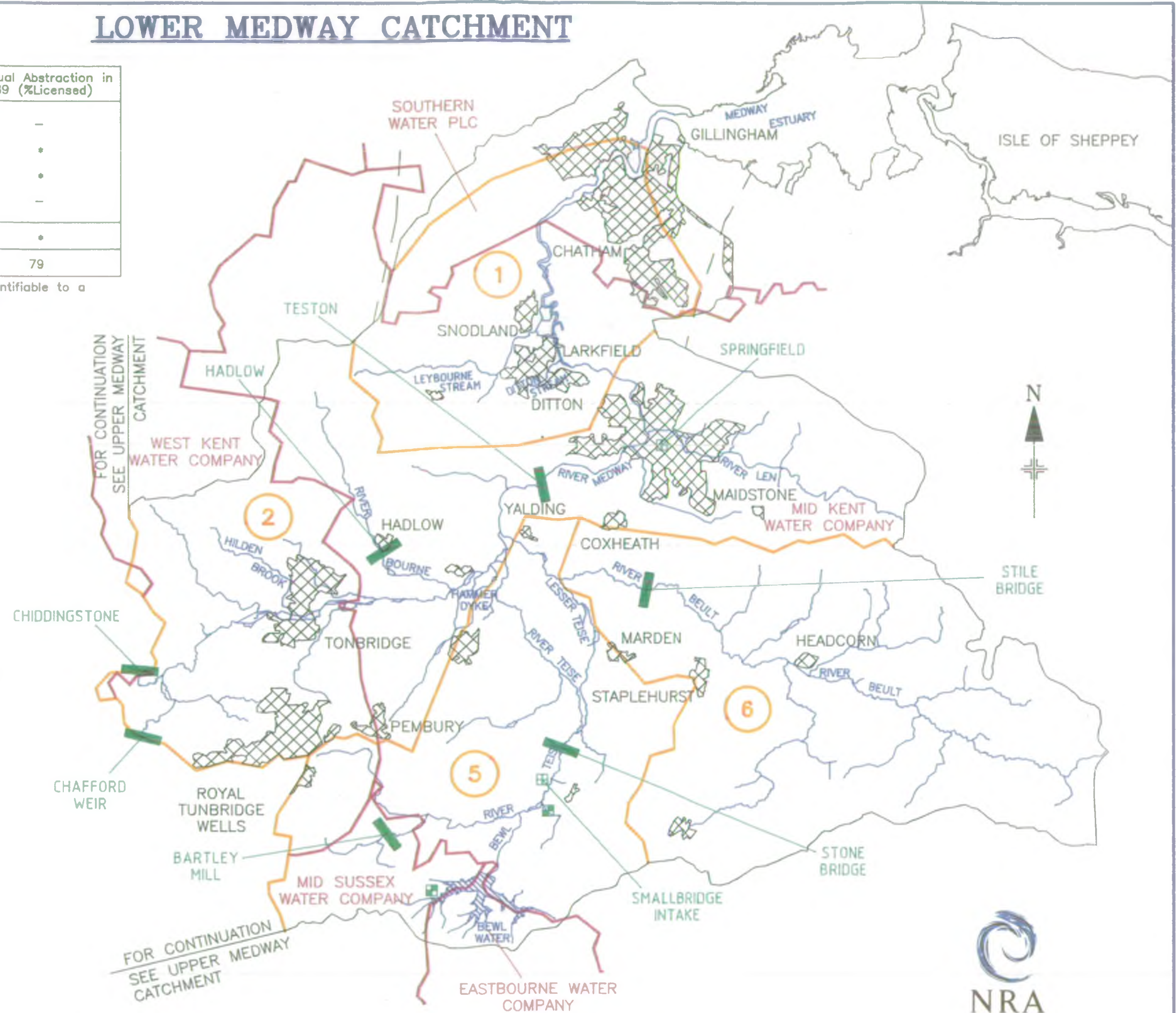
* Actual abstractions not revealed as identifiable to a single source but included in the total.

LEGEND

-  COAST LINE
-  SURFACE CATCHMENT BOUNDARY
-  ESTIMATED GROUNDWATER CATCHMENT BOUNDARY
-  TOWNS
-  RESOURCE AREA BOUNDARY
-  RESOURCE AREA NUMBER
-  WATER COMPANY BOUNDARY
-  PRIMARY GAUGING STATION

LICENSED SURFACE WATER SOURCES

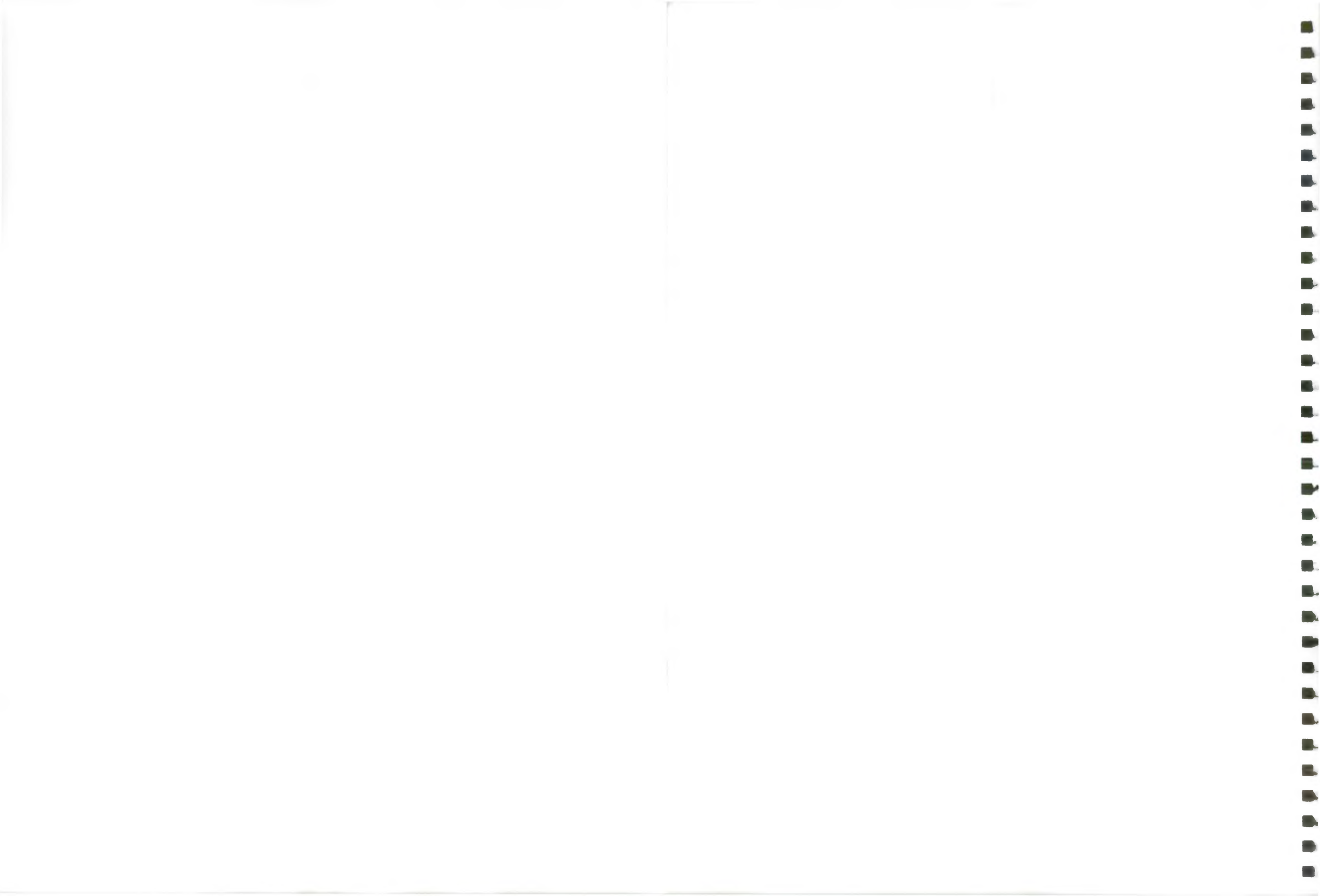
LICENCE OF RIGHT	LICENCE ISSUED SUBSEQUENTLY
 > 5MI/d	 > 5MI/d
 1-5MI/d	 1-5MI/d
 < 1MI/d	 < 1MI/d



PUBLIC WATER SUPPLY – SURFACE WATER SOURCES



National Rivers Authority
Southern Region



13. PUBLIC WATER SUPPLY - SURFACE WATER SOURCES



13.1 General

This use relates to the provision of public water supplies from surface waters. Abstractions are operated by the Water Supply 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 in 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.

13.2 Local Perspective

There are three major surface water supply schemes on the River Medway and these are introduced in turn below:

- Weir Wood is the oldest reservoir in the catchment, completed in 1954 and located in the headwaters of the Medway. It is a simple impoundment reservoir operated by Southern Water Plc for direct abstraction to supply.
- Bough Beech is a pumped storage reservoir on the Bough Beech stream operated by East Surrey Water Company. Abstraction is from the River Eden at Chiddingstone to the reservoir and direct from the reservoir for supply.
- Bewl Water is a pumped storage reservoir on the Bewl Stream with abstraction from the River Teise at Smallbridge to the reservoir. The outflows from the reservoir augment river flow along the Teise and Medway downstream to the major public supply abstraction at Springfield. Southern Water operate the Springfield intake and Mid Kent Water Company operate a small licence abstracting direct from the reservoir.

Minimum residual flow requirements (MRF's) at Stone Bridge and Chiddingstone control abstraction for the Bewl Water and Bough Beech reservoirs respectively and a further MRF at Teston controls abstraction from Springfield.

The MRF at Teston controlling abstraction from Springfield is complex and is set under the conditions of the Medway Water (Bewl Bridge Reservoir) Act 1968. The MRF below which abstraction must cease is 352 Mld, approximately Q60 flow. Between 353 and 568 Mld compensation flows released from Bewl Bridge can be abstracted the following day at Springfield. The principal reason the MRF is set to provide adequate flows for the Medway Estuary.

Mean monthly flows at Teston have fallen below the MRF for an average of over 4 months per year during the last 10 years. In 1989 and 1990 mean monthly flows were below MRF for 8 and 6 months respectively. Drought Orders were granted in both 1989 and 1990 which reduced the MRF setting to 100 Mld at Teston. The operation of the Drought Orders caused a significant deterioration in water quality within the Medway Estuary.

13. PUBLIC WATER SUPPLY - SURFACE WATER SOURCES



13.2 Local Perspective (continued)

The catchment area to the Smallbridge intake for Bewl Water is approximately 140km². A proposal in Southern Water's Capital Programme is to site a new intake for supply to the reservoir at Yalding on the River Medway. This would increase the catchment area to over 1200km² and would improve considerably the reliability and flexibility of the Bewl Water scheme.

The operation of Bewl Water is currently the subject of a separate study being undertaken on behalf of Southern Water.

13.3 Supply Objectives

- To safeguard the public water supply.
- To conform with the existing Minimum Residual Flow settings within the catchment.
- To ensure that any future resource developments do not derogate the flow regime.
- To secure, where possible, measures for the benefit of the catchment within new licence agreements.

13.4 Supply Requirements

Water Resources

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

Water Quality

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

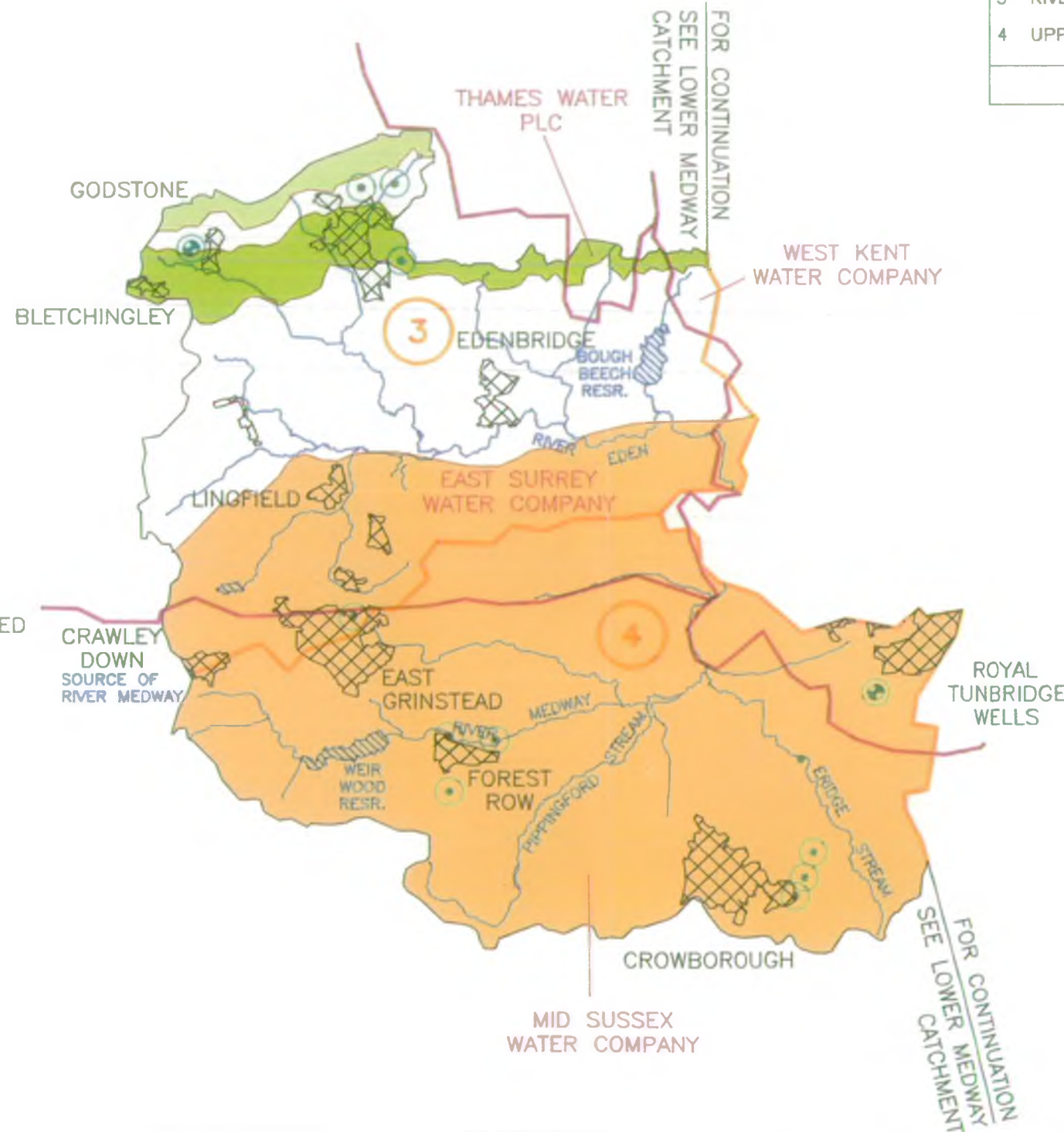
River Management

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

UPPER MEDWAY CATCHMENT

LEGEND

- COAST LINE
- SURFACE CATCHMENT BOUNDARY
- GROUNDWATER CATCHMENT BOUNDARY
- WATERCOURSE
- TOWNS
- RESOURCE AREA BOUNDARY
- RESOURCE AREA NUMBER
- WATER COMPANY BOUNDARY
- LICENSED GROUNDWATER SOURCES
 - LICENCE OF RIGHT
 - > 5MI/d
 - 1-5MI/d
 - < 1MI/d
 - LICENCE ISSUED SUBSEQUENTLY
 - > 5MI/d
 - 1-5MI/d
 - < 1MI/d
- AQUIFERS
 - CHALK
 - LOWER GREENSAND
 - HASTINGS BEDS
- POSSIBLE ROUTE OF HIGH SPEED LINK



Resource Area	Mean Licensed Abstraction (MI/d)	Actual Abstraction in 1989 (%Licensed)
3 RIVER EDEN	14	53
4 UPPER MEDWAY	9	52
TOTAL	23	53



PUBLIC WATER SUPPLY – GROUNDWATER SOURCES



National Rivers Authority
Southern Region



LEGEND

-  COAST LINE
 -  SURFACE CATCHMENT BOUNDARY
 -  ESTIMATED GROUNDWATER CATCHMENT BOUNDARY
 -  WATERCOURSE
 -  TOWNS
 -  RESOURCE AREA BOUNDARY
 -  RESOURCE AREA NUMBER
 -  WATER COMPANY BOUNDARY
- LICENSED GROUNDWATER SOURCES**
- | LICENCE OF RIGHT | LICENCE ISSUED SUBSEQUENTLY |
|---|---|
|  > 5MI/d |  > 5MI/d |
|  1-5MI/d |  1-5MI/d |
|  < 1MI/d |  < 1MI/d |
- AQUIFERS**
-  CHALK
 -  LOWER GREENSAND
 -  HASTINGS BEDS
-  POSSIBLE ROUTE OF HIGH SPEED LINK

LOWER MEDWAY CATCHMENT



Resource Area	Mean Licensed Abstraction (MI/d)	Actual Abstraction in 1989 (%Licensed)
1 MEDWAY ESTUARY	110	53
2 MIDDLE MEDWAY	44	48
5 RIVER TEISE	12	32
6 RIVER BEULT	<1	*
TOTAL	166	50
GRAND TOTAL	189	50

* Actual abstractions not revealed as identifiable to a single source but included in the total.

PUBLIC WATER SUPPLY – GROUNDWATER SOURCES



NRA

National Rivers Authority
Southern Region

14. PUBLIC WATER SUPPLY - GROUNDWATER SOURCES

14.1 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 13) 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 22, 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.

14.2 Local Perspective

Groundwater abstraction from the chalk aquifer accounts for over 70% of the total abstraction in this category with almost all the chalk licences located in the North Kent Chalk Block downstream of the tidal limit.

A detailed study of the North Kent Chalk Block, which extends along the Thames Estuary to the east and west of the Medway catchment, was undertaken by Southern Water Plc and Mid Kent Water Company in 1989. As a result of the study, many of the supply companies' licensed sources were combined under Group Licences controlling annual licensed abstraction, retaining the total annual maximum but allowing greater flexibility of supply. The two Group Licences affecting the Medway are the Northfleet and Chatham Group operated by Southern Water. All the individual sources are identified on the map although not all are within the surface catchment.

The main conclusion of the study as regards the Medway catchment was that the Chalk Block was fully developed and no further licences should be considered above the present total. Observation boreholes have been installed near the coast to monitor the fresh/saline water interface and to provide an early warning of saline intrusion problems.

The proposed route options for the high speed rail link between London and the Channel Tunnel Terminal take the line across the North Kent Chalk Aquifer of the Medway catchment. A study has been undertaken to assess the impact of the line, for which tunnel and cut and cover sections are proposed, on the chalk groundwater resources. Relocation of groundwater sources may be required as part of the project. The route options are shown in Section 2: FUTURE DEVELOPMENT OF HOUSING, INDUSTRY AND COMMERCE.

14. PUBLIC WATER SUPPLY - GROUNDWATER SOURCES



14.2 Local Perspective (continued)

Licensed abstraction from the Lower Greensand accounts for just below 10% of the licensed total. Most of these sources are operated by Mid Kent Water Company and are located on the northern margin of the Lower Greensand outcrop to the east and west of the Medway. The remaining two sources are located in the upper reaches of the River Eden sub-catchment and are operated by East Surrey Water Company.

Licensed groundwater abstraction from the 17 sources in the Hastings Beds sequence accounts for below 20% of the licensed total, the majority of which is from the Ashdown Sands. Historically, this resource has been considered as marginal. The yield of individual boreholes is generally low and the characteristically high concentration of iron in the groundwater adds to the cost of treatment. The impact of groundwater abstraction from these sources on the surrounding environment is not well understood. There is concern, however, that the loss of minor spring flows and increased soil moisture deficit may have a significant detrimental effect on the natural ecology.

14.3 Supply Objectives

- To safeguard the public and private water supply abstractions.
- To develop and optimise abstraction with reference to 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 of 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.

14.4 Supply Requirements

Water Quality

- Not Specified : Chalk sources generally within the limiting values for A1 Category treatment, Lower Greensand and Hastings Beds sources generally within the limiting values for A2 Category treatment (Council Directive 75/440/EEC).

14. PUBLIC WATER SUPPLY - GROUNDWATER SOURCES



14.1 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.

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14.2 Local Perspective

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14. PUBLIC WATER SUPPLY - GROUNDWATER SOURCES



14.2 Local Perspective (continued)

Licensed abstraction from the Lower Greensand accounts for just below 10% of the licensed total. Most of these sources are operated by Mid Kent Water Company and are located on the northern margin of the Lower Greensand outcrop to the east and west of the Medway. The remaining two sources are located in the upper reaches of the River Eden sub-catchment and are operated by East Surrey Water Company.

Licensed groundwater abstraction from the 17 sources in the Hastings Beds sequence accounts for below 20% of the licensed total, the majority of which is from the Ashdown Sands. Historically, this resource has been considered as marginal. The yield of individual boreholes is generally low and the characteristically high concentration of iron in the groundwater adds to the cost of treatment. The impact of groundwater abstraction from these sources on the surrounding environment is not well understood. There is concern, however, that the loss of minor spring flows and increased soil moisture deficit may have a significant detrimental effect on the natural ecology.

14.3 Supply Objectives

- To safeguard the public and private water supply abstractions.
- To develop and optimise abstraction with reference to 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 of 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.


14.4 Supply Requirements

Water Quality

- Not Specified : Chalk sources generally within the limiting values for A1 Category treatment, Lower Greensand and Hastings Beds sources generally within the limiting values for A2 Category treatment (Council Directive 75/440/EEC).

UPPER MEDWAY CATCHMENT

LEGEND

-  COAST LINE
-  SURFACE CATCHMENT BOUNDARY
-  GROUNDWATER CATCHMENT BOUNDARY
-  WATERCOURSE
-  TOWNS


RESOURCE AREA BOUNDARY

3 RESOURCE AREA NUMBER

LICENSED SURFACE WATER SOURCES

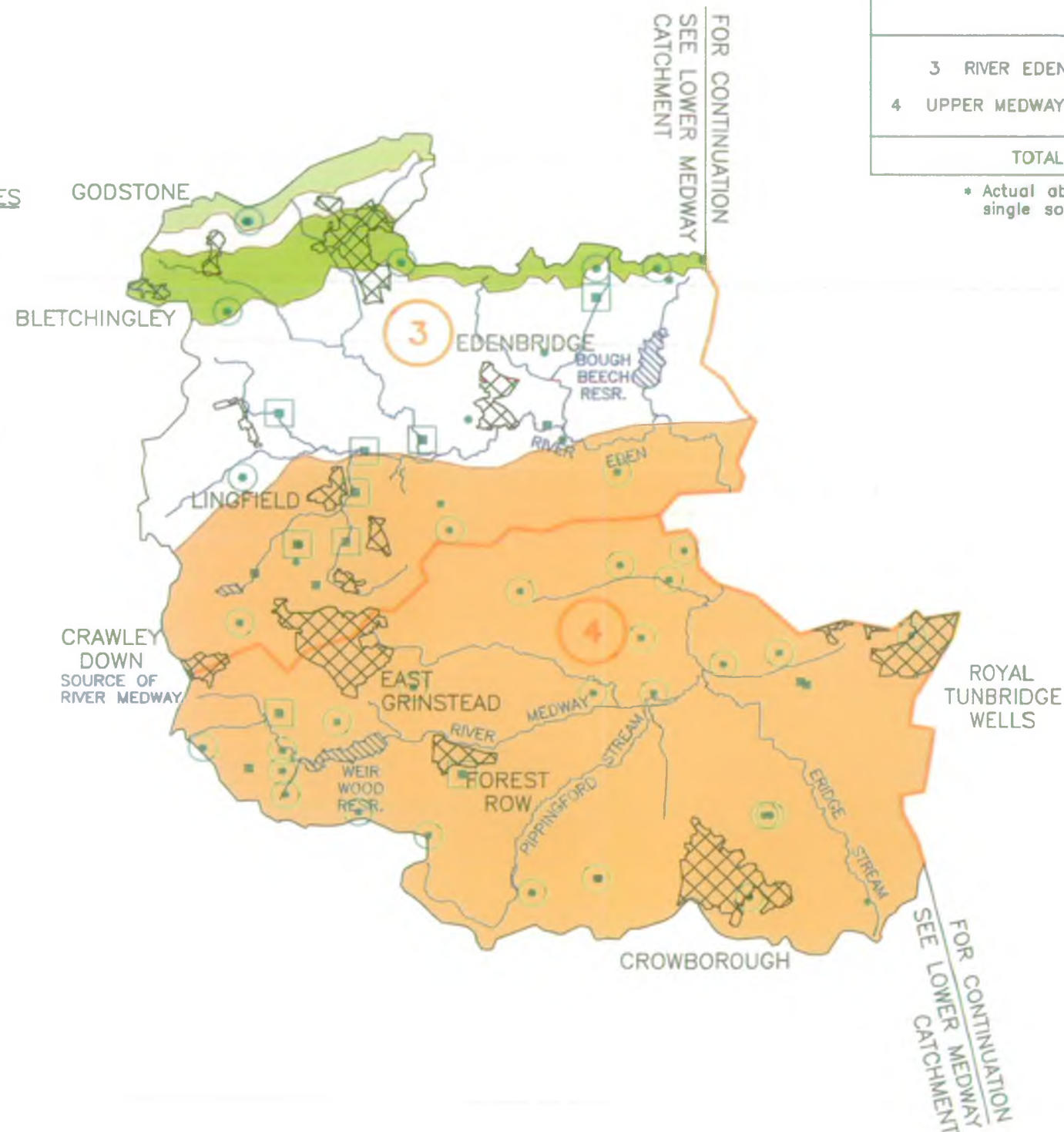
LICENCE OF RIGHT	LICENCE ISSUED SUBSEQUENTLY
REED PAPER & BOARD LTD.  > 5Mld	HALL AGGREGATES LTD.  > 5Mld
 1-5Mld	 1-5Mld
 < 1Mld	 < 1Mld

LICENSED GROUNDWATER SOURCES

LICENCE OF RIGHT	LICENCE ISSUED SUBSEQUENTLY
REED PAPER & BOARD LTD.  > 5MI/d	 > 5MI/d
 1-5MI/d	 1-5MI/d
 < 1MI/d	 < 1MI/d

AQUIFERS

-  CHALK
-  LOWER GREENSAND
-  HASTINGS BEDS



Resource Area	Mean Licensed Abstraction (Ml/d)			Actual Abstraction in 1989 (%Licensed)		
	Surface	Ground Water	Total	Surface	Ground Water	Total
3 RIVER EDEN	1	<1	1	*	*	*
4 UPPER MEDWAY	<1	1	1	*	*	*
TOTAL	1	1	2	*	*	*

* Actual abstractions not revealed as identifiable to a single source but included in the total.



INDUSTRIAL & AGRICULTURAL ABSTRACTION



NRA

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Southern Region

























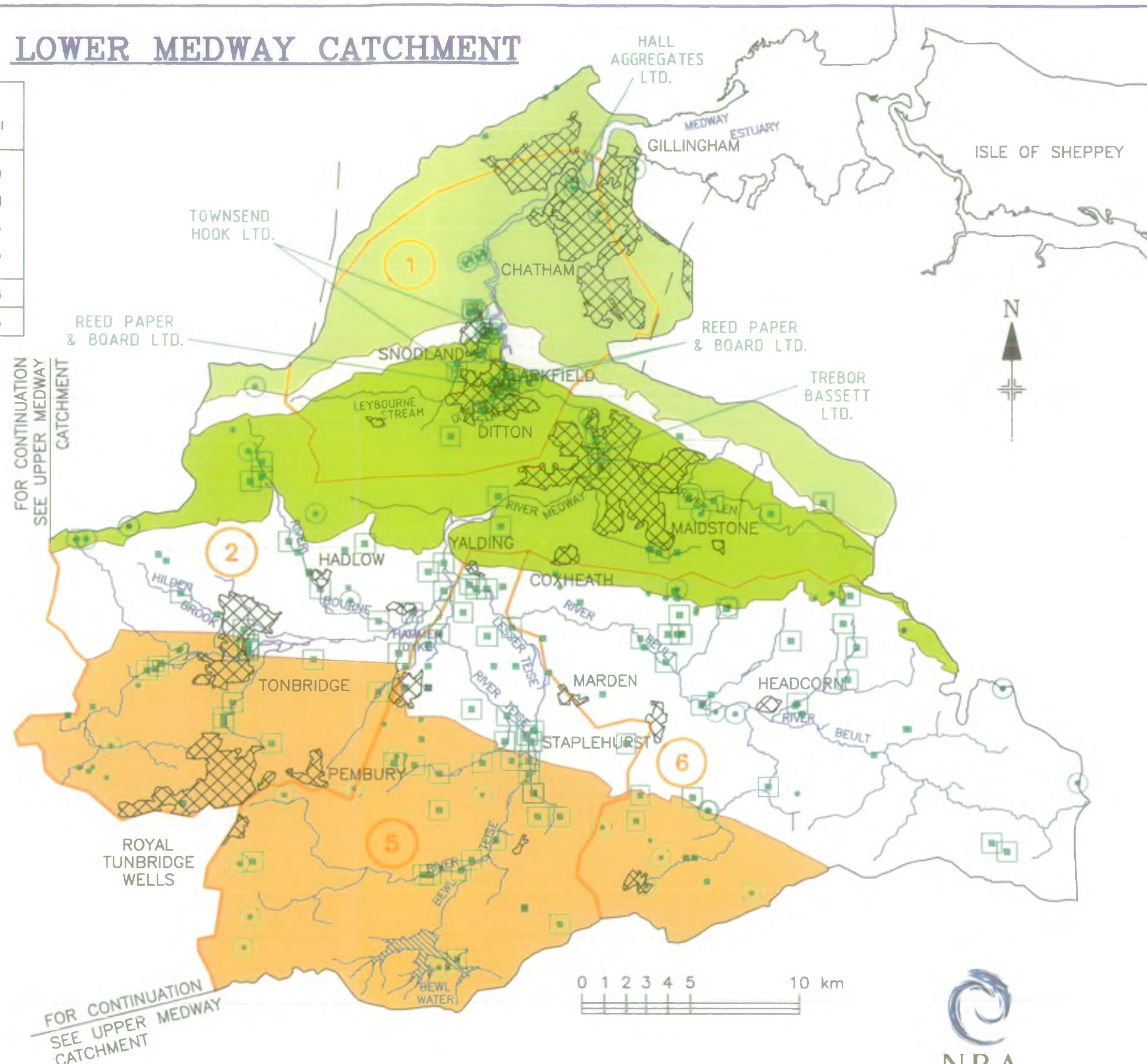
LOWER MEDWAY CATCHMENT

Resource Area	Mean Licensed Abstraction (Ml/d)			Actual Abstraction in 1989 (%Licensed)		
	Surface	Ground Water	Total	Surface	Ground Water	Total
1 MEDWAY ESTUARY	188	41	229	15	40	19
2 MIDDLE MEDWAY	11	10	21	55	67	61
5 RIVER TEISE	2	1	3	*	*	*
6 RIVER BEULT	2	<1	2	*	*	*
TOTAL	203	52	255	17	45	23
GRAND TOTAL	204	53	257	17	45	23

* Actual abstractions not revealed as identifiable to a single source but included in the total.

LEGEND

-  COAST LINE
 -  SURFACE CATCHMENT BOUNDARY
 -  GROUNDWATER CATCHMENT BOUNDARY
 -  WATERCOURSE
 -  TOWNS
 -  RESOURCE AREA BOUNDARY
 -  RESOURCE AREA NUMBER
- LICENSED SURFACE WATER SOURCES**
- | LICENCE OF RIGHT | LICENCE ISSUED SUBSEQUENTLY |
|---|--|
|  REED PAPER & BOARD LTD. > 5Ml/d |  HALL AGGREGATES LTD. > 5Ml/d |
|  1-5Ml/d |  1-5Ml/d |
|  < 1Ml/d |  < 1Ml/d |
- LICENSED GROUNDWATER SOURCES**
- | LICENCE OF RIGHT | LICENCE ISSUED SUBSEQUENTLY |
|---|---|
|  REED PAPER & BOARD LTD. > 5Ml/d |  > 5Ml/d |
|  1-5Ml/d |  1-5Ml/d |
|  < 1Ml/d |  < 1Ml/d |
- AQUIFERS**
-  CHALK
 -  LOWER GREENSAND
 -  HASTINGS BEDS



INDUSTRIAL & AGRICULTURAL ABSTRACTION



NRA

National Rivers Authority
Southern Region

15. INDUSTRIAL AND AGRICULTURAL ABSTRACTION



15.1 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. Surface abstractions for fish farms are not included in this category.

15.2 Local Perspective

There are a total of 281 licences in this category within the catchment, 85% of which are broadly categorised as agricultural, including all licences for spray irrigation, private borehole supplies to farms for general use and one groundwater licence for a fish farm. The licensed abstractions for agricultural use are generally very low and in total amount to less than 5% of the licensed total in this category.

Many of the surface water abstractions for spray irrigation are linked to the Minimum Residual Flow (MRF) setting at Teston which restricts abstraction during the summer. The MRF is increased periodically for new licences as the total licensed abstraction from the river increases. As a result licences issued at the present day largely restrict abstraction to the high flow winter period and on-site storage is required to ensure supplies for spray irrigation during the summer.

Almost 90% of the licensed abstraction in this category is for industrial use from the tidal Medway and the chalk aquifer. The actual abstraction in 1989 and over the last 5 years has been considerably lower than the maximum allowed, at approximately 20% of the licensed total. By far the largest users are the two paper mills near New Hythe, to the north-west of Maidstone. Together these account for over 80% of the total licensed abstraction in the category, the majority from surface water. Other large licensed abstractions are for cement production and gravel washing. Most of these abstractions are largely non-consumptive and, in the case of the paper mills, the effluent is returned to the estuary. The MRF on the Medway at Teston is set partly to ensure supply for the downstream licences but largely to provide dilution for the effluent discharges. Reduction in the MRF by drought orders set during the summers of 1989 and 1990 had a significant adverse effect on the water quality in the estuary.

Upstream of the tidal limit there are less than 20 industrial licensed abstractions and none are considered to have a significant effect on catchment resources.

15.3 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 winter flow storage for summer agricultural use.
- To provide adequate resources for marsh feeding.

15. INDUSTRIAL AND AGRICULTURAL ABSTRACTION



15.4 Supply Requirements

Water Resources

- Optimise use of water resources.
- New agricultural licences to specify winter abstraction and storage.
- Embargo on new licences for consumptive use of chalk groundwater.

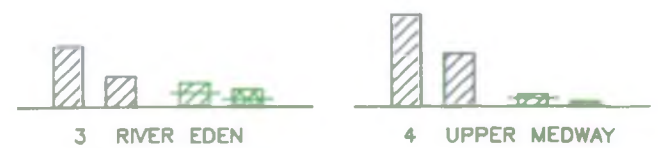
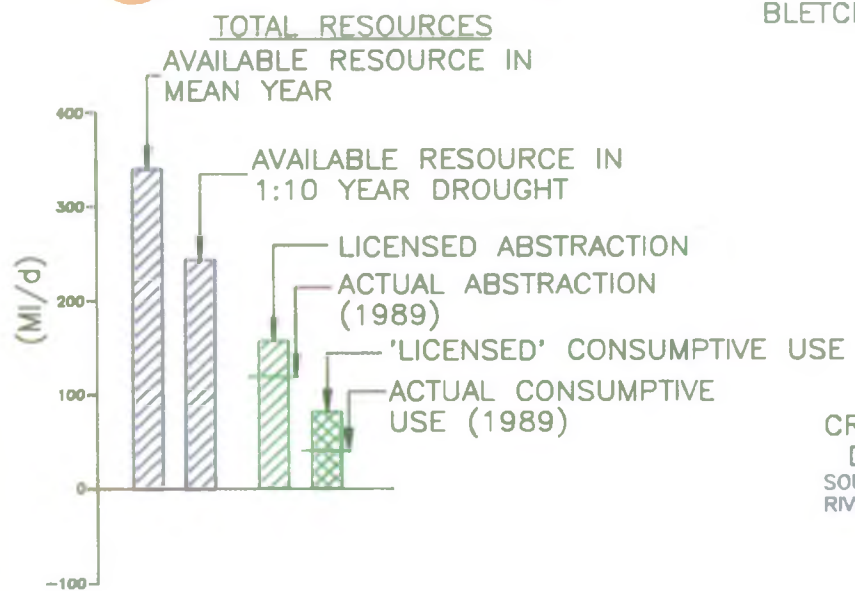
Water Quality

- 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 (Cl) upto 500mg/l (Cl) dependent on the tolerance of the crop.
- The FAO recommend faecal coliform concentrations of less than 1000/100ml in water used for unrestricted irrigation on edible crops, sports fields and public parks.

UPPER MEDWAY CATCHMENT

LEGEND

- COAST LINE
- SURFACE CATCHMENT BOUNDARY
- ESTIMATED GROUNDWATER CATCHMENT BOUNDARY
- WATERCOURSE
- TOWNS
- SURFACE SUBCATCHMENT BOUNDARY
- 323 SURFACE SUBCATCHMENT NUMBER
- 3 RESOURCE AREA BOUNDARY
- 3 RESOURCE AREA NUMBER



Resource Area	'Licensed' Consumptive Use (% of Resource)	
	Mean Year	1:10 Year Drought
3 RIVER EDEN	28	55
4 UPPER MEDWAY	5	8



RESOURCE USAGE



NRA

National Rivers Authority
Southern Region

LEGEND

-  COAST LINE
-  SURFACE CATCHMENT BOUNDARY
-  ESTIMATED GROUNDWATER CATCHMENT BOUNDARY
-  WATERCOURSE
-  TOWNS
-  SURFACE SUBCATCHMENT BOUNDARY
-  SURFACE SUBCATCHMENT NUMBER
-  RESOURCE AREA BOUNDARY
-  RESOURCE AREA NUMBER

TOTAL RESOURCES

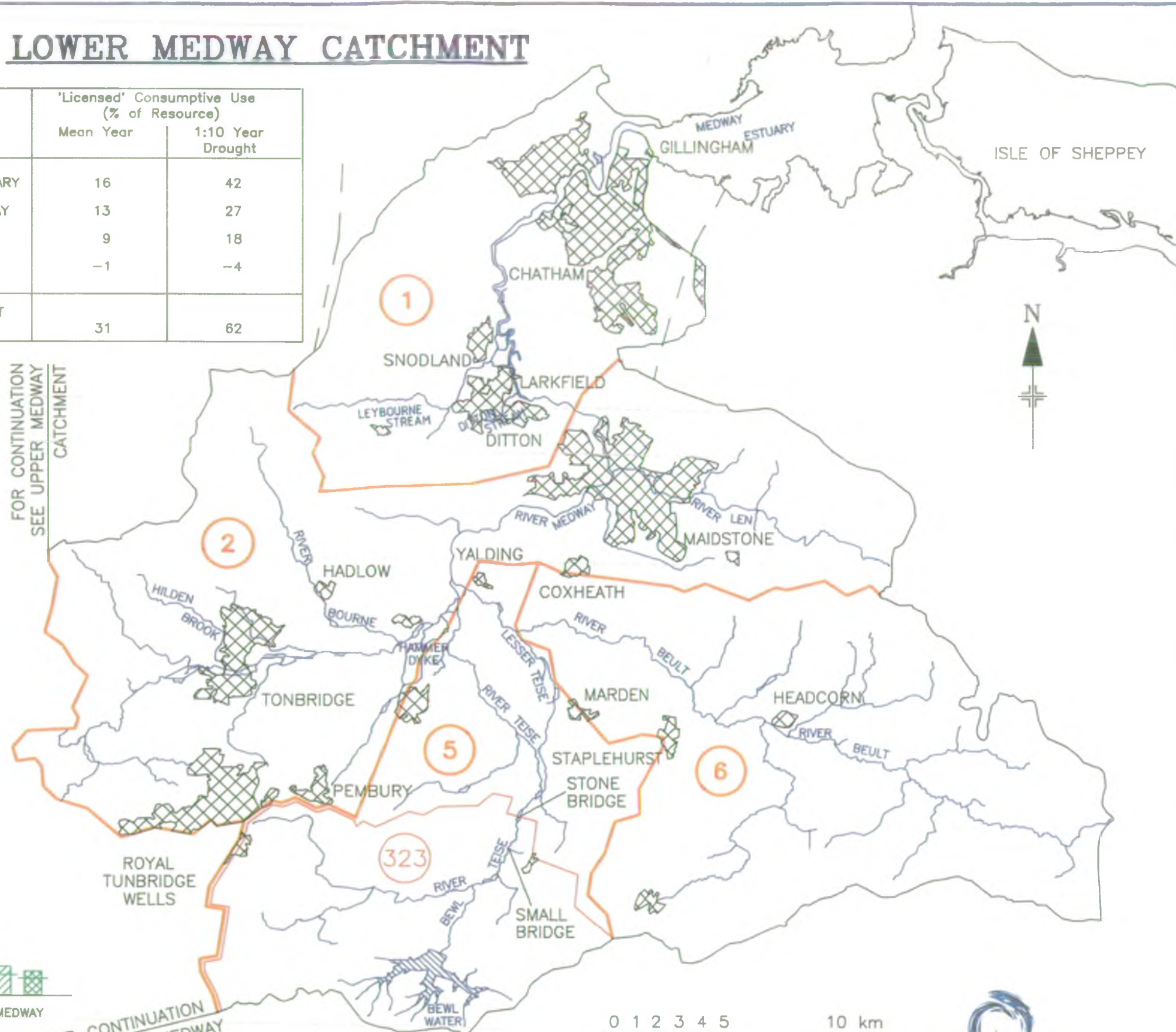


LOWER MEDWAY CATCHMENT

Resource Area	'Licensed' Consumptive Use (% of Resource)	
	Mean Year	1:10 Year Drought
1 MEDWAY ESTUARY	16	42
2 MIDDLE MEDWAY	13	27
5 RIVER TEISE	9	18
6 RIVER BEULT	-1	-4
OVERALL CATCHMENT BALANCE	31	62

FOR CONTINUATION
SEE UPPER MEDWAY
CATCHMENT

FOR CONTINUATION
SEE UPPER MEDWAY
CATCHMENT



RESOURCE USAGE



NRA

National Rivers Authority
Southern Region

16. RESOURCE USAGE



16.1 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 consumptive use.

The 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 most private industrial process and cooling uses. Discharge data are not available for all gravel washing operations and, as a non-consumptive water use, discharges are assumed to equal the licensed abstraction. Actual abstraction and consumptive use data for a recent year (1989) are also shown on the map.

16.2 Local Perspective

The catchment as a whole is quite heavily developed for water supply, particularly as a large residual flow is required to the estuary for dilution of the major effluent inputs to the tidal reaches and provide a flushing flow. Over half of the mean annual resource is allocated for abstraction under licence, and consumptive use is approximately a quarter of the resource. During a 1:10 year drought the available resource is halved and consumptive use rises to above 50%.

The chalk aquifer adjoining the Medway Estuary (Resource Area 1) is considered to be fully committed for supply and a seasonal resource management scheme has been developed to optimise resource usage. The bulk of the surface abstractions from the Estuary are non-consumptive for industry.

The upstream resource areas (3, 4, 5 and 6) are largely on the silts, clays and sands of the Hastings Beds. Consequently they exhibit a flashy response to rainfall events and surface storage reservoirs are often the best solution for reliable long term public water supply. The Bough Beech Reservoir scheme uses the available resources of the River Eden (Resource Area 3) very effectively and the sub-catchment resources can be considered to be largely committed for supply.

The Upper Medway and the River Beult (Resource Areas 4 and 6) are lightly utilised for supply and the Beult catchment shows a small nett gain in resources.

The Bewl Water sub-catchment (Sub catchment 323) is the area contributing to the intake at Smallbridge for supply to the reservoir. Abstraction at the intake is controlled by a Minimum Residual Flow setting at the Stone Bridge gauge. The available resource at Smallbridge reduces by a factor of 4 during the 1:10 year drought and the mean flow no longer provides the licensed yield.

A new intake has been proposed for the Bewl Water scheme at Yalding on the River Medway, downstream of its confluence with the Beult. The catchment area is a factor of 10 larger than the catchment at Smallbridge and would take advantage of the low usage in the Upper Medway and Beult sub-catchments.

16. RESOURCE USAGE



16.2 Local Perspective (continued)

Overall the non-tidal catchment, as measured at Teston gauge, is responsive with a wide flow range, although low flows are augmented by releases from Bewl Water. During the summer, surface flows normally reduce below the MRF setting and in the drought summers of 1989 and 1990 Drought Orders were issued to enable abstraction to continue with a much reduced MRF. The issuing of these Drought Orders had a significant adverse effect on water quality in the Estuary.

The Lower Greensand is considered to be fully committed for abstraction. Limited additional resources are considered to be available from the Hastings Beds although the environmental impact of abstraction from these minor aquifers needs to be investigated.






16.3 Overall Supply Objectives

- To control any further development of resources such that they are not of significant detriment to the flow regime within the catchment.
- To incorporate controlling flows in new abstraction licences as required.
- To encourage seasonal resource management to improve low flows in the summer periods.
- 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 encourage the water companies to meet leakage targets.
- To consider the adoption of licensing charges based on the environmental impact of abstraction.

LEGEND

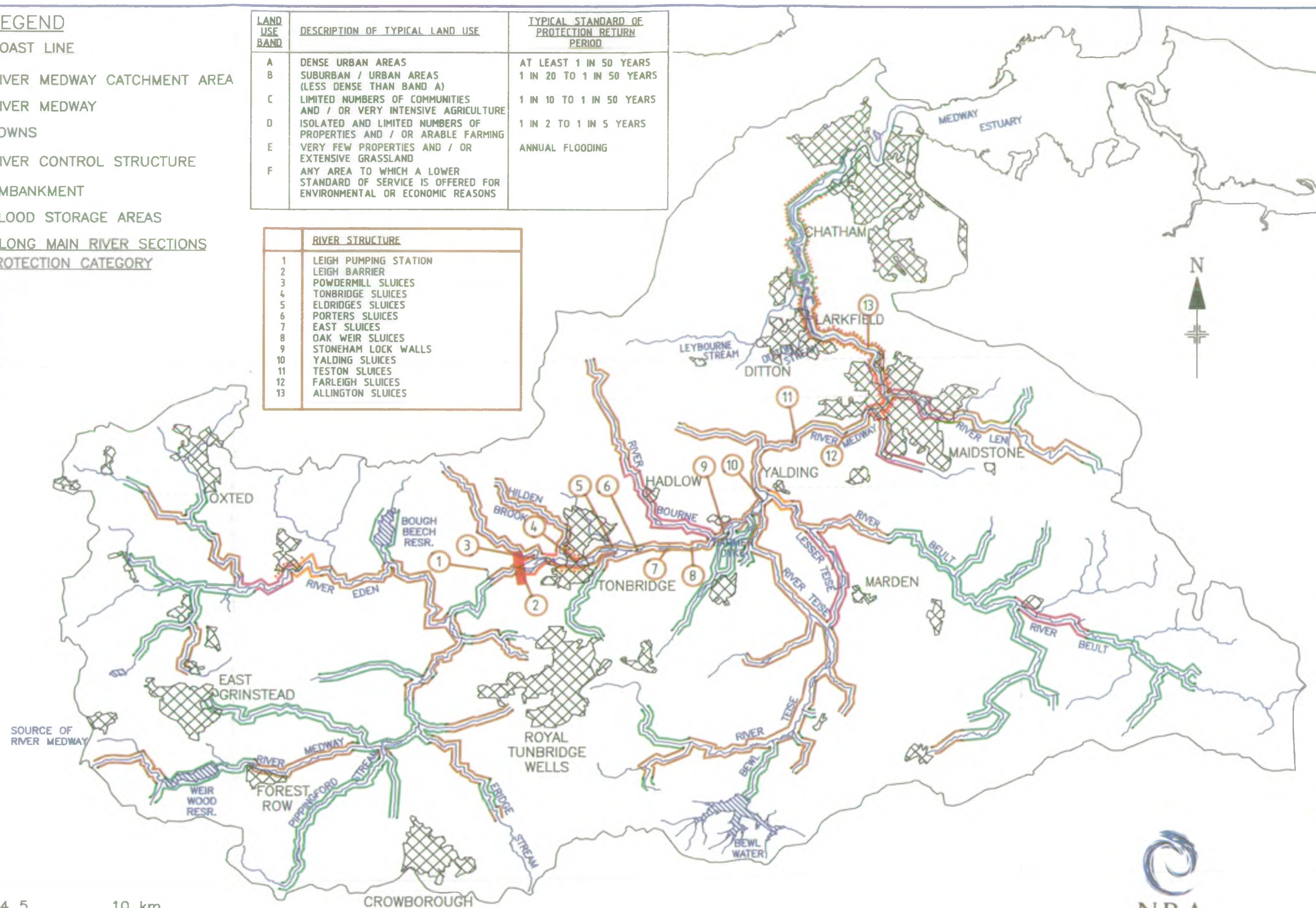
-  COAST LINE
 RIVER MEDWAY CATCHMENT AREA
 RIVER MEDWAY
 TOWNS
 RIVER CONTROL STRUCTURE
 EMBANKMENT
 FLOOD STORAGE AREAS

LAND USE ALONG MAIN RIVER SECTIONS
— FLOOD PROTECTION CATEGORY

-  A
 B
 C
 D
 E

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	

	RIVER STRUCTURE
1	LEIGH PUMPING STATION
2	LEIGH BARRIER
3	POWDERMILL SLUICES
4	TONBRIDGE SLUICES
5	ELDRIDGES SLUICES
6	PORTERS SLUICES
7	EAST SLUICES
8	OAK WEIR SLUICES
9	STONEHAM LOCK WALLS
10	YALDING SLUICES
11	TESTON SLUICES
12	FARLEIGH SLUICES
13	ALLINGTON SLUICES



0 1 2 3 4 5 10 km

FLOOD DEFENCE



NRA

National Rivers Authority
Southern Region



17. FLOOD DEFENCE

17.1 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.

17.2 Local Perspective

Historically the Medway and Eden valleys suffered flooding of both agricultural land and property. The worst flood in living memory occurred in September 1968 and caused extensive damage in Tonbridge and several other areas. This event is estimated to have had a return period in excess of 100 years. In more recent years notable floods occurred in 1979, 1985, 1988 and 1990.

Schemes to alleviate flooding had been considered for some time and these plans were accelerated following the event of September 1968. This led to the construction of the Leigh Flood Barrier and Flood Storage Area which was completed in 1982. During heavy rain three gates in an earthen embankment across the river regulate the amount of flood water passing downstream to Tonbridge. Some of the flood waters are held back, forming a temporary lake and preventing flow exceeding the channel capacity through the town. The lake can then be drained at a controlled rate once flood flows have abated. This scheme is called into operation approximately twice a year and has proved highly successful. Flood defence works have also been carried out at Maidstone and Edenbridge, which has suffered considerable flooding in the past. Areas of concern still exist at Yalding and at Headcorn and Smarden on the River Beult.

17. FLOOD DEFENCE



17.3 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.

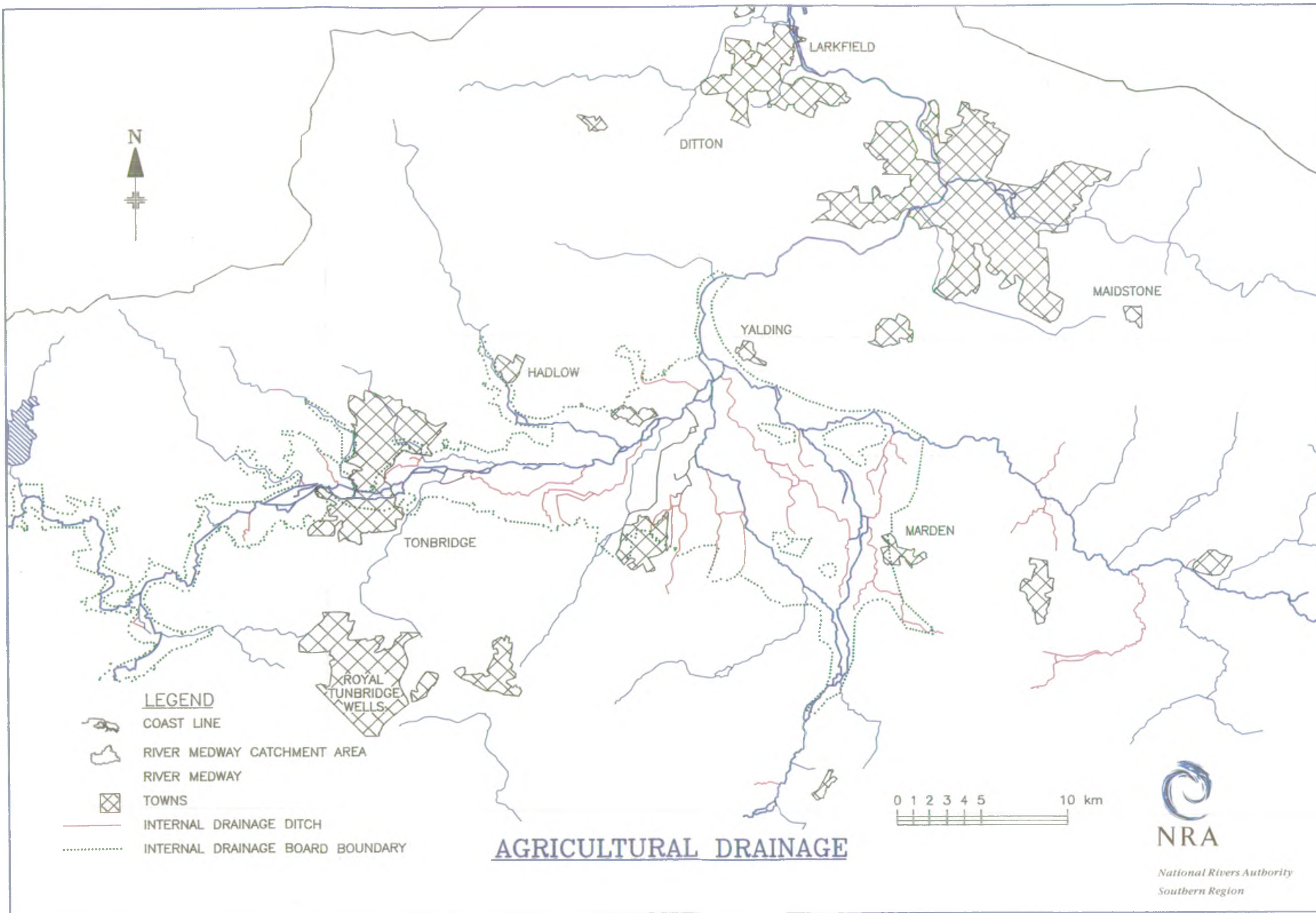
17.4 Requirements

River Topography

- Inspect and maintain fluvial and tidal flood defences such as embankments to ensure their continued effectiveness.
- 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 grass cutting on river banks and flood embankment to enable inspection to identify any problems such as animal burrows.
- Carry out necessary dredging.
- Carry out tree management to prevent obstructions caused by fallen trees.
- Carry out flood defence works with reference to environmental needs and requirements.
- To meet the statutory requirements of the Medway Act under which the Leigh Barrier was constructed.



LEGEND

- COAST LINE
- RIVER MEDWAY CATCHMENT AREA
- RIVER MEDWAY
- TOWNS
- INTERNAL DRAINAGE DITCH
- INTERNAL DRAINAGE BOARD BOUNDARY

AGRICULTURAL DRAINAGE



National Rivers Authority
Southern Region

18. AGRICULTURAL DRAINAGE

18.1 General

This use relates primarily to providing land drainage for agricultural areas within the river valley for which the level of the water table is of vital importance. However, due to the marshy origins of this land, they can often be areas of local or national ecological interest. This can lead to conflict between agricultural drainage and nature conservation.

The drainage of low-lying areas is often the legal responsibility of Internal Drainage Boards. These IDB's are usually responsible for the drainage ditches within their area, up to the point where they discharge into the Main River, which is the responsibility of the National Rivers Authority. The types of Agricultural land use in the areas can be seen in Section 4 : AGRICULTURE.

18.2 Local Perspective

The drainage of low-lying land in the catchment is largely the responsibility of the Upper and Lower Medway Internal Drainage Boards. The boundary of the UMIDB area in rural locations is 8 feet above the highest known flood level whereas in urban areas it is taken to be the flood level itself. The boundary of the LMIDB area is 5 feet above ordinary spring tide level. The plan opposite shows the central part of the catchment where agricultural drainage is most intensive.

The Countryside Commission operates the Countryside Stewardship Scheme which provides grants for the restoration or protection of natural wildlife habitats. One of the categories for protection is 'Waterside Landscapes'. Under the scheme water levels must be raised during the first winter and the natural regeneration of grassland and herbs encouraged. Ditches and dykes should be maintained in rotation without the use of herbicides.

18.3 Objectives

- To provide effective drainage for agricultural use in a way which does not impinge unreasonably upon other uses, most notably conservation.

18.4 Requirements

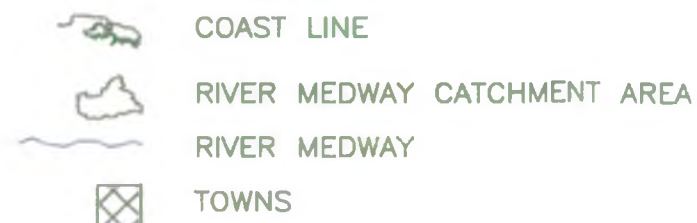
River Topography

- Maintenance of drainage structures such as weirs and stops.
- Maintenance of long term channel capacity by dredging/desilting at appropriate intervals.
- Maintenance of Main River to carry discharges for IDB watercourses.

River Management

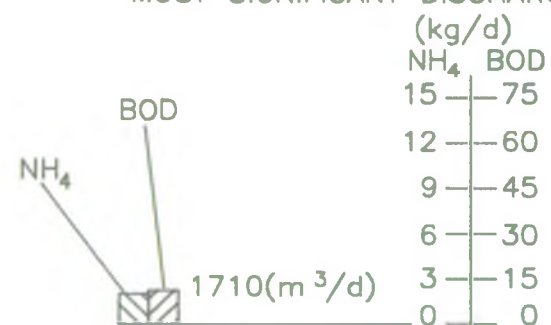
- Maintenance of channel water levels and hence water table levels appropriate to land use through
 - control and operation of drainage structures.
 - weedcutting in the drainage channels.
- Encourage the take-up of the Countryside Stewardship Scheme.

LEGEND

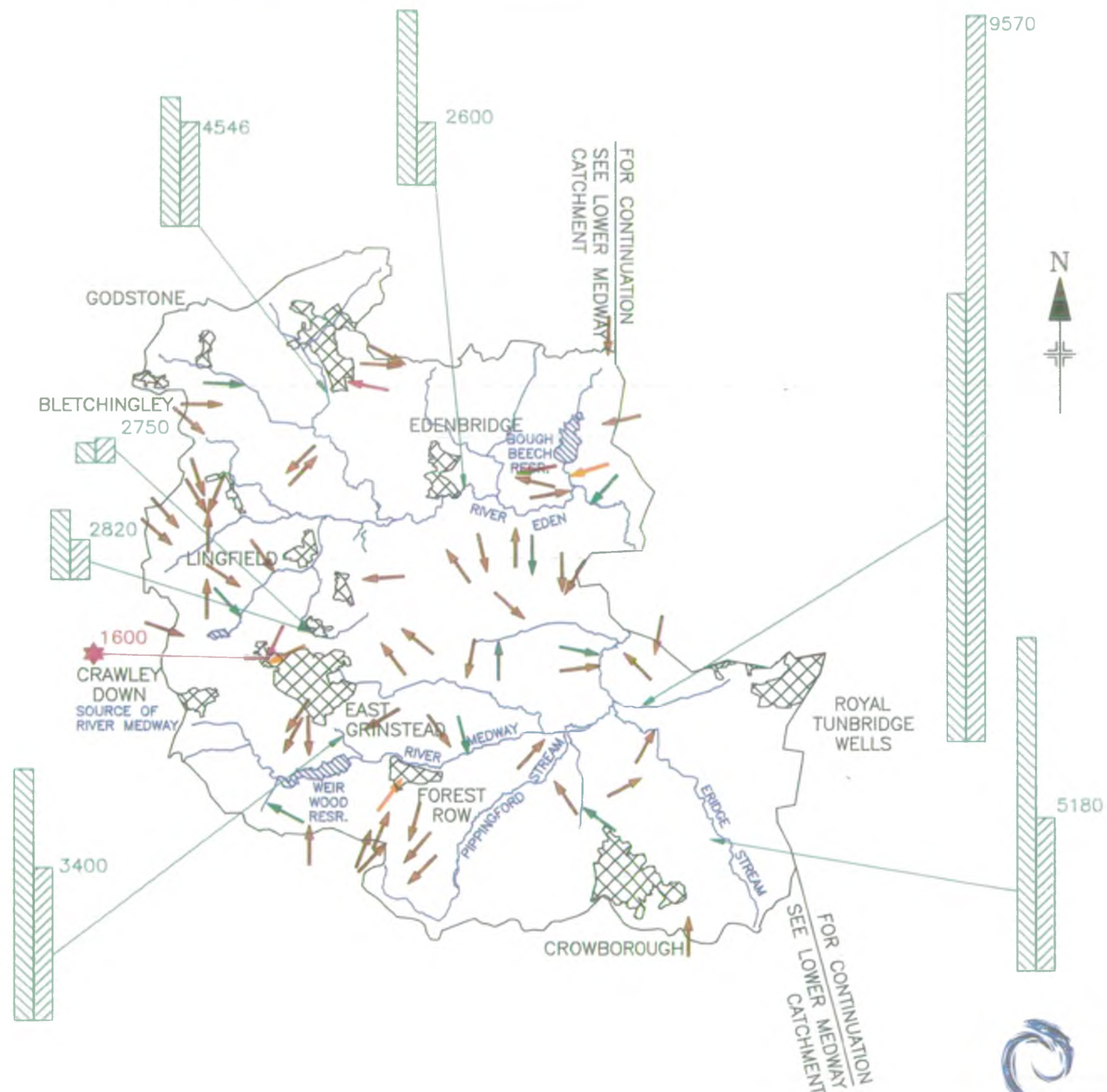


SYMBOL	TYPE OF DISCHARGE	RANGE (m ³ /d)
	PUBLIC SEWAGE TREATMENT WORKS	3-22000
	PRIVATE SEWAGE TREATMENT WORKS	11-1100
	COOLING WATER	100-68500
	PROCESS EFFLUENT	3-35000
	FISH FARMS	1000-10000

DAILY POLLUTANT LOADING FROM THE MOST SIGNIFICANT DISCHARGES (kg/d)



UPPER MEDWAY CATCHMENT



EFFLUENT DISPOSAL



National Rivers Authority
Southern Region



LOWER MEDWAY CATCHMENT

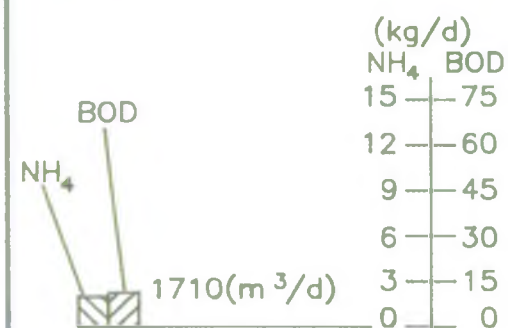
THIS IS A MAJOR DISCHARGE IN TERMS OF DAILY POLLUTANT LOADING AND IS SHOWN AT 1/20th SCALE COMPARED TO THE OTHER DISCHARGES

THIS IS A MAJOR DISCHARGE IN TERMS OF DAILY POLLUTANT LOADING AND IS SHOWN AT 1/20th SCALE COMPARED TO THE OTHER DISCHARGES

LEGEND

- COAST LINE
- RIVER MEDWAY CATCHMENT AREA
- RIVER MEDWAY
- TOWNS

DAILY POLLUTANT LOADING FROM THE MOST SIGNIFICANT DISCHARGES



SYMBOL	TYPE OF DISCHARGE	RANGE (m ³ /d)
	PUBLIC SEWAGE TREATMENT WORKS	3-22000
	PRIVATE SEWAGE TREATMENT WORKS	11-1100
	COOLING WATER	100-68500
	PROCESS EFFLUENT	3-35000
	FISH FARMS	1000-10000

FOR CONTINUATION SEE UPPER MEDWAY CATCHMENT

EFFLUENT DISPOSAL



NRA

National Rivers Authority
Southern Region

19. EFFLUENT DISPOSAL



19.1 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 rate in the receiving watercourse, and the degree of downstream water quality degradation that can be tolerated before other uses are adversely affected. It follows that if there is any subsequent deterioration in upstream water quality, or river flow degradation beyond the values assumed in calculating the consent, then downstream uses could be put at risk.

19.2 Local Perspective

The character and quality of the non-tidal reaches of the Medway catchment are largely determined by the underlying geology, hydrology and the quantity of sewage and industrial effluent discharged to them.

There are in excess of 180 public and private sewage treatment works discharging to the Medway catchment. Of these there are 54 sewage works which discharge more than 70m³/day of treated effluent. The distribution of these discharges shows that there are a number of significant discharges to the upper parts of the catchment, where dilution flows are naturally lower. There are also 6 public sewage works within the catchment operating under time limited derogated consents. These relaxed consents were introduced in 1989 with a definite time limit within which the works are to be upgraded in order to comply with new tighter discharge standards. The derogated consents expire at the end of 1991. Southern Water Plc operate each of these plants and are making substantial investments in improvement works in order to meet consent standards at five of the Works by the start of 1992. The improvements at Leeds STW are being delayed by difficulties in gaining planning approval.

The Medway estuary receives significant industrial process effluent and cooling water discharges. Of the ten process effluent discharges licensed in the catchment five are to the tidal Medway between Allington and Rochester. Similarly the majority of the catchment cooling water discharges occur within the tidal stretch below Allington. The impact of these discharges is significant. The high BOD loadings and the long residence time of water in the upper estuary leads to serious water quality deterioration. Under Drought Orders during the summer of 1989 and 1990 there was little freshwater input to the estuary and it became anoxic over the summer period.

The relative quantities of pollutant loading to the river from the larger public sewage treatment works and industrial effluent discharges are shown on the map with reference to comparative Biochemical Oxygen Demand and Total Ammonia Loads.

The BOD loadings derived from the process effluent discharges in the tidal reaches, are considerably higher than those resulting from the sewage works. For comparison the highest industrial BOD loading is some 24 times greater than the highest sewage effluent BOD loading.

19.3 Environmental Objectives

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

19. EFFLUENT DISPOSAL

19.4 Environmental Requirements

Water Quality

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














River Flow

- No diminution of the flow regime below that assumed in setting the consents. Consents are normally set using Annual Q95 river flows.
- Sufficient dilution flows to achieve flushing of the upper estuary.

River Topography

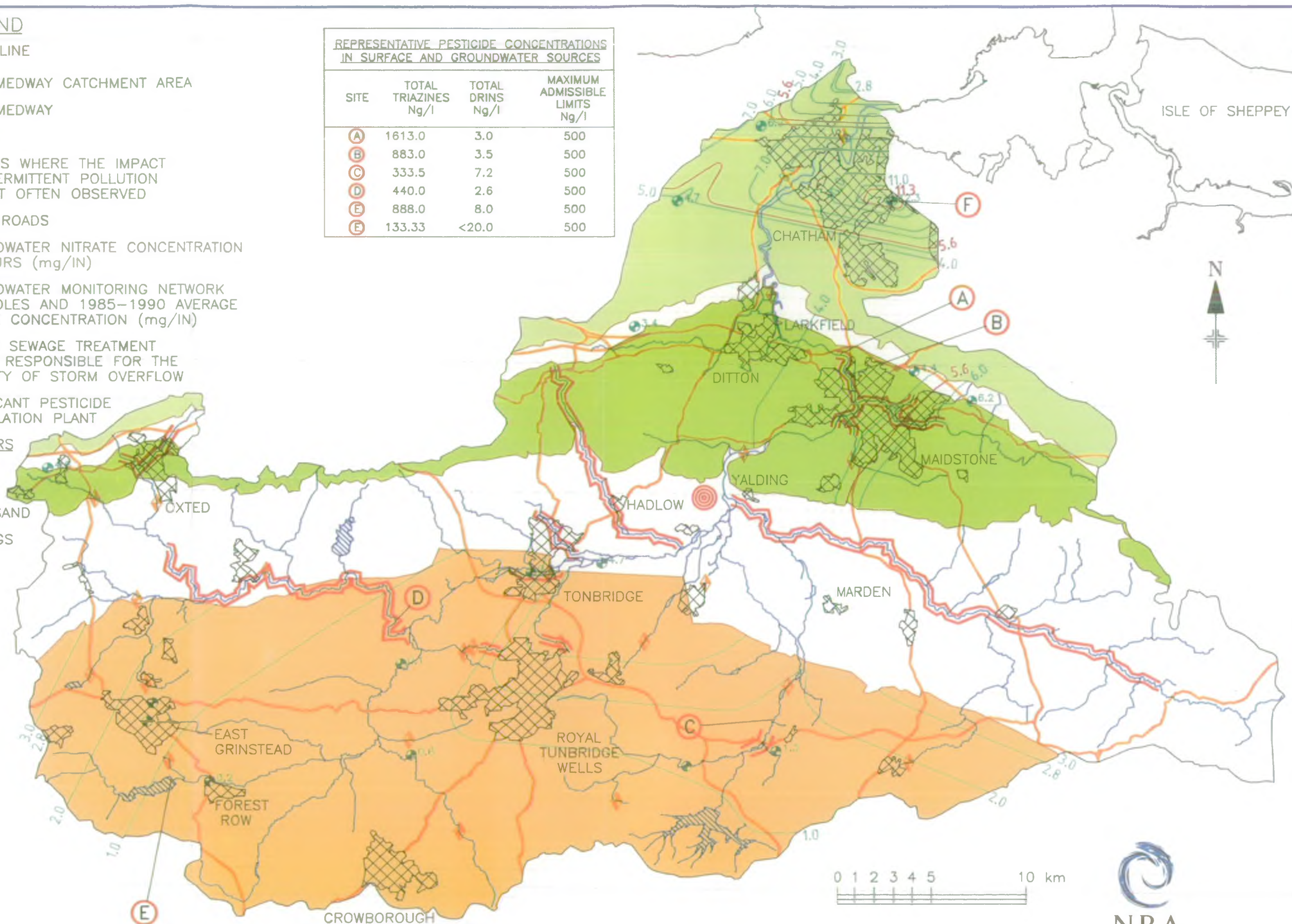
- Outfalls must be sited so as to achieve a specified degree of effluent mixing with the river contents, within a specified distance; the precise terms to vary for different consents.

LEGEND

-  COAST LINE
 RIVER MEDWAY CATCHMENT AREA
 RIVER MEDWAY
 TOWNS
 REACHES WHERE THE IMPACT OF INTERMITTENT POLLUTION IS MOST OFTEN OBSERVED
 MAJOR ROADS
 4.0
 7.3


AQUIFERS
 CHALK
 LOWER GREENSAND
 HASTINGS BEDS

REPRESENTATIVE PESTICIDE CONCENTRATIONS IN SURFACE AND GROUNDWATER SOURCES

SITE	TOTAL TRIAZINES Ng/l	TOTAL DRINS Ng/l	MAXIMUM ADMISSIBLE LIMITS Ng/l
(A)	1613.0	3.0	500
(B)	883.0	3.5	500
(C)	333.5	7.2	500
(D)	440.0	2.6	500
(E)	888.0	8.0	500
(F)	133.33	<20.0	500

**INTERMITTENT AND DIFFUSE POLLUTION****NRA**

National Rivers Authority
Southern Region

20. INTERMITTENT AND DIFFUSE POLLUTION

20.1 General

This use relates to both consented and non-consented intermittent pollution discharges received by the catchment. The sources of these intermittent discharges are varied in terms of both frequency and impact, and include consented stormwater discharges and overflows, accidental industrial, agricultural or road traffic spillages, and the discharges derived from the 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 the contamination once it has occurred.

The particular feature of this overall use, as with that of effluent disposal, is that it has no intrinsic requirement for any particular environmental condition to be met; rather it is constrained by the need to protect other uses from the effects of its discharges.

20.2 Local Perspective

The Medway catchment encompasses rural, urban and heavy industrial areas, all of which influence the type and intensity of intermittent pollution events which occur.

The River Beult with its predominantly rural catchment is prone to agricultural effluent pollution.

Diffuse source pollution, primarily in the form of nutrient run-off from land, is also a concern within the catchment, especially given the potential in conjunction with sewage effluent discharges to increase nutrient availability and therefore stimulate the eutrophication of the catchment surface waters. Surface water nitrate concentrations sometimes exceed maximum admissible concentrations at the Springfield water treatment plant at Maidstone, following the first significant rains of autumn. The nitrates are derived from land run-off, and have resulted in the works not abstracting for several days. The high concentrations are however only temporary.

The maintenance of sufficient depth for navigation results in a very sluggish, slow moving waterbody below Tonbridge. During dry periods, flows in this section often occur primarily through the operation of the lock gates and a significant proportion of these flows are derived from the many sewage effluent discharges upstream. The slow moving nutrient rich waters often give rise to algal blooms, particularly during warmer sunny periods, and wide daily fluctuations in dissolved oxygen have been observed.

Road traffic and rural accidents are also a significant source of spillages which find their way to the surface waters.

The map shows the ICI pesticide formulation plant near Yalding in the lower catchment. This plant is one of the largest of its kind in the country and represents a significant potential source of chemicals capable of great impact upon the downstream river. Road transportation of raw materials and products to and from the plant is also a potential hazard to the water courses. In awareness of the potential hazards, strict safety measures are employed at this plant. There are many other potential hazards within the catchment, including timber treatment plants; especially where they are sited near to watercourses.

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 and the subsequent Water Supply (Water Quality) Regulations 1989 set a Maximum Concentration of 11.3 mg/(as N) for water to be used for human consumption on the plan. The EC Directive also specifies a guideline level

20. INTERMITTENT AND DIFFUSE POLLUTION



20.2 Local Perspective (continued)

of 5.6mg/L (as N) and these levels are highlighted separately on the plan. The map also displays average total pesticide concentrations for 1990 from representative sites for both surface and groundwater throughout the catchment. Triazines and Drins are shown as representative groups of pesticide compounds. The Water Supply (Water Quality) Regulations specify maximum concentrations of 500ng/l for total pesticides and 100 ng/l for individual substances.

Groundwater nitrate concentrations show limited exceedence of the maximum admissible concentrations within the North Downs chalk block adjacent to the estuary. Concentrations are significantly lower for the remaining catchment.

Surface and groundwater pesticide concentrations show exceedence of the Maximum Admissible Concentrations for the Triazine group of pesticides. It is not possible, however, to determine whether these levels reflect the 'natural' background levels because for most sites there is limited data which shows a wide range of values. Further monitoring will be required to satisfactorily determine background levels.

The NRA are presently assuming control of the farm waste regulations covering slurry, silage and fuel under the 1989 Water Act. The activities will include monitoring and advice on farm based pollution prevention for both new and existing facilities.

20.3 Environmental Objectives

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

20.4 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 groundwater sources.
- To encourage the early reporting of all pollution incidents to the NRA.
- To control the application of pesticides to minimise their occurrence and accumulation in the aquatic environment.















River Flow

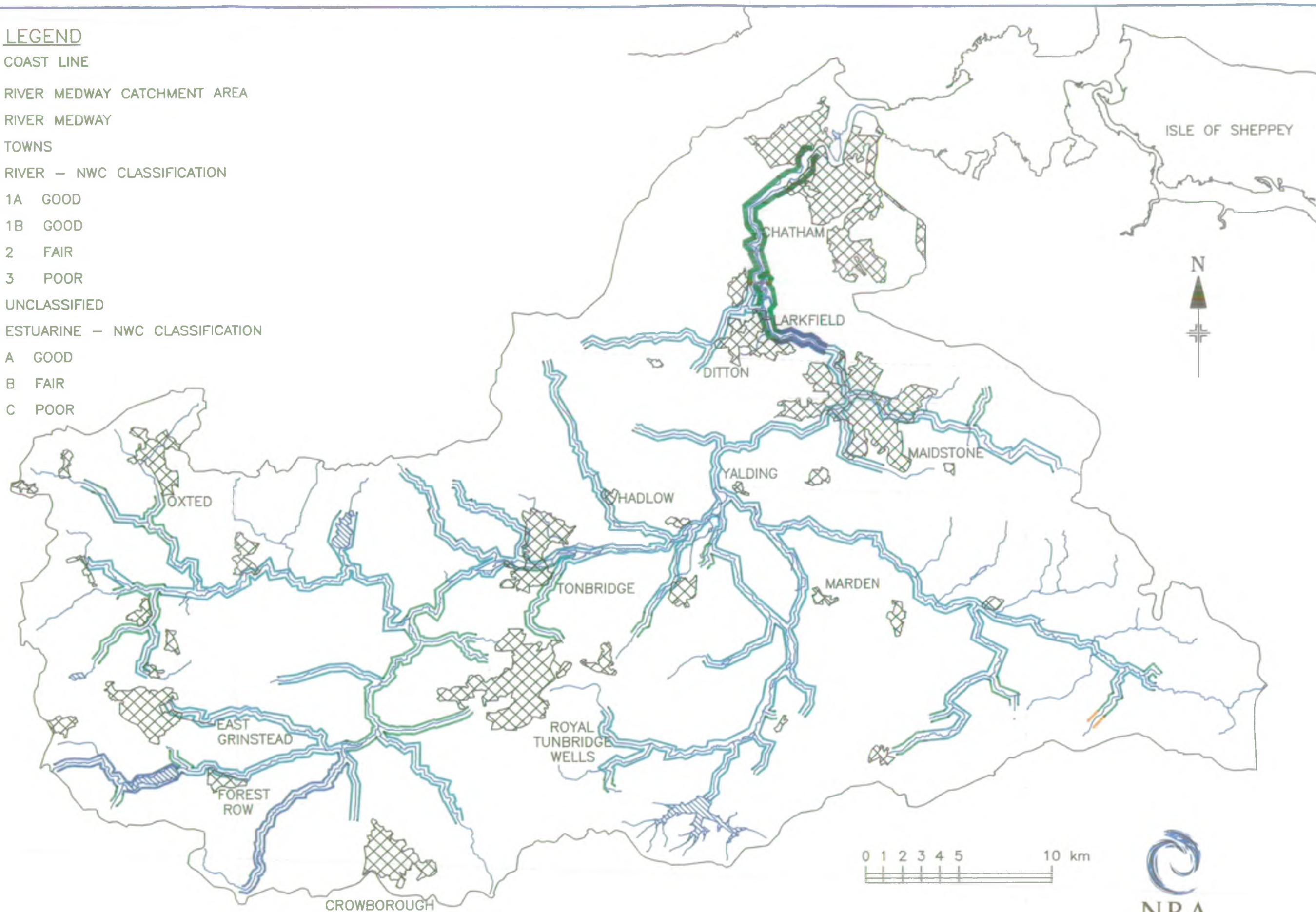
- Basic flow regime to reduce the impact of intermittent and diffuse pollution is met by the requirements detailed in Section 5: RIVER CORRIDOR CONSERVATION.

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 MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  RIVER - NWC CLASSIFICATION
-  1A GOOD
-  1B GOOD
-  2 FAIR
-  3 POOR
-  UNCLASSIFIED
-  ESTUARINE - NWC CLASSIFICATION
-  A GOOD
-  B FAIR
-  C POOR



NWC RIVER CLASSIFICATION



NRA

National Rivers Authority
Southern Region

21. STATUTORY WATER QUALITY OBJECTIVES



21.1 General

Sections 104 and 105 of the Water Act state respectively that all controlled waters may be subject to a system of classification, and that Water Quality Objectives may 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 environment 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 into the survey prior to the 1990 National survey in order to give a biological 'over ride' to the chemical data collected. 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 better indicator of the ambient water quality biological data such as insect species will then be used in association with chemical water quality data to determine compliance.

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 directives. In order to, as closely as possible, mimic the future water quality classification system. This will enable the plans to be readily updated when required.

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 classification 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.

21. STATUTORY WATER QUALITY OBJECTIVES



21.1 General (continued)

The uses have been largely identified throughout this Plan. However, the process of preparing River Catchment Management Plans 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.

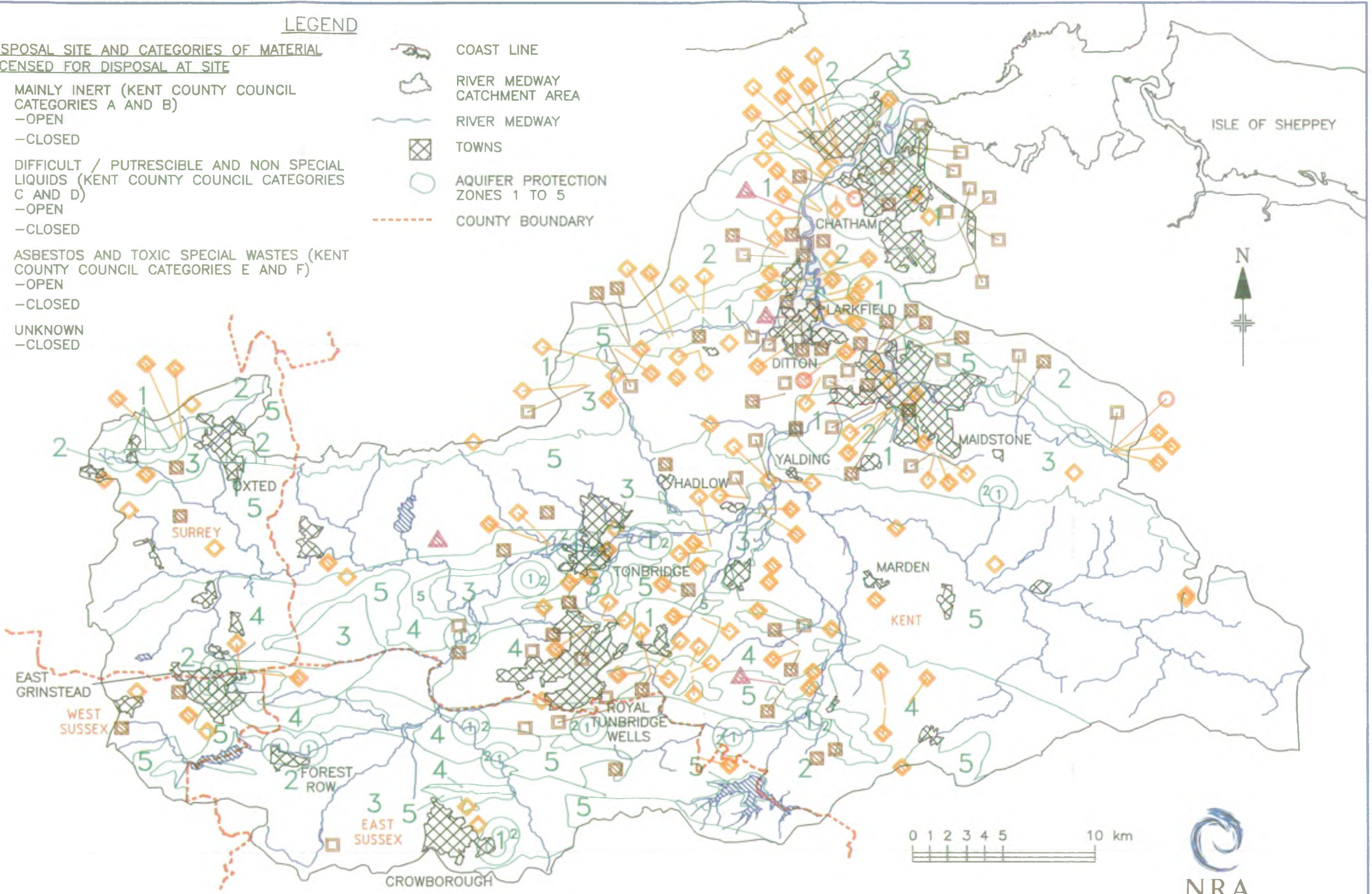
The map shows the existing NWC target designations for the River Medway as part 2 of the overall proposed water quality classification. These designations may be revised in light of the 1990 National Survey which, as previously mentioned, was undertaken in conjunction with a National Biological Survey.

LEGEND

DISPOSAL SITE AND CATEGORIES OF MATERIAL LICENSED FOR DISPOSAL AT SITE

- MAINLY INERT (KENT COUNTY COUNCIL CATEGORIES A AND B)
 - OPEN
 - CLOSED
- DIFFICULT / PUTRESCIBLE AND NON SPECIAL LIQUIDS (KENT COUNTY COUNCIL CATEGORIES C AND D)
 - OPEN
 - CLOSED
- ASBESTOS AND TOXIC SPECIAL WASTES (KENT COUNTY COUNCIL CATEGORIES E AND F)
 - OPEN
 - CLOSED
- UNKNOWN
 - CLOSED

- COAST LINE
- RIVER MEDWAY CATCHMENT AREA
- RIVER MEDWAY
- TOWNS
- AQUIFER PROTECTION ZONES 1 TO 5
- COUNTY BOUNDARY



NRA

National Rivers Authority
Southern Region

SOLID WASTE DISPOSAL



22. SOLID WASTE DISPOSAL



22.1 General

This use relates to the disposal of domestic, industrial and agricultural 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. A particular feature of this use is that it has no intrinsic requirement of itself for any given environmental conditions to be met; rather it is constrained by the need to protect other uses from the effect of this activity.

The 1974 Control of Pollution Act places a duty on the waste disposal authority to oversee all licensed disposal sites to ensure that they are appropriate for that site. 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 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 licence 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.

The effects of 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 overlying water supply aquifers. Many of these sites were constructed prior to the introduction of the licensing regime.

22.2 Local Perspective

There are approximately 210 known landfill sites within the Medway catchment, 60% 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 and are categorised broadly using Kent County Council's key for waste material type.

Kent County Council is the waste disposal authority responsible for the Medway catchment. The Council is known to have limited landfill volume remaining within the County. There is, therefore, considerable pressure to develop alternative disposal sites, which could potentially impact upon the catchment given its proximity to large population centres.

In response to these pressures the County has specific policies with respect to the siting and operation of new sites. This includes in particular a preference for utilising existing mineral workings for solid waste disposal wherever possible. They are finding it increasingly difficult to find new environmentally acceptable landfill sites.

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 most

22. SOLID WASTE DISPOSAL



22.2 Local Perspective (continued)

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 restrictions on the types of waste which can be deposited.

The NRA operates a comprehensive surface water monitoring system and a less thorough groundwater monitoring network throughout the catchment, neither of which are specifically related to any particular disposal sites. Although the information is limited there are not reported problems associated with waste disposal sites in the Medway catchment. However, given the obvious concern expressed above of high risk sites, increased monitoring particularly for groundwater may be required in the future.

22.3 Environmental Objectives

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

22.4 Environmental Requirements

Water Quality

- Compliance with EC Directives on dangerous substances discharge to the ground.
- 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.
- Licensing of disposal sites 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
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  AQUIFER PROTECTION ZONES 1 TO 5

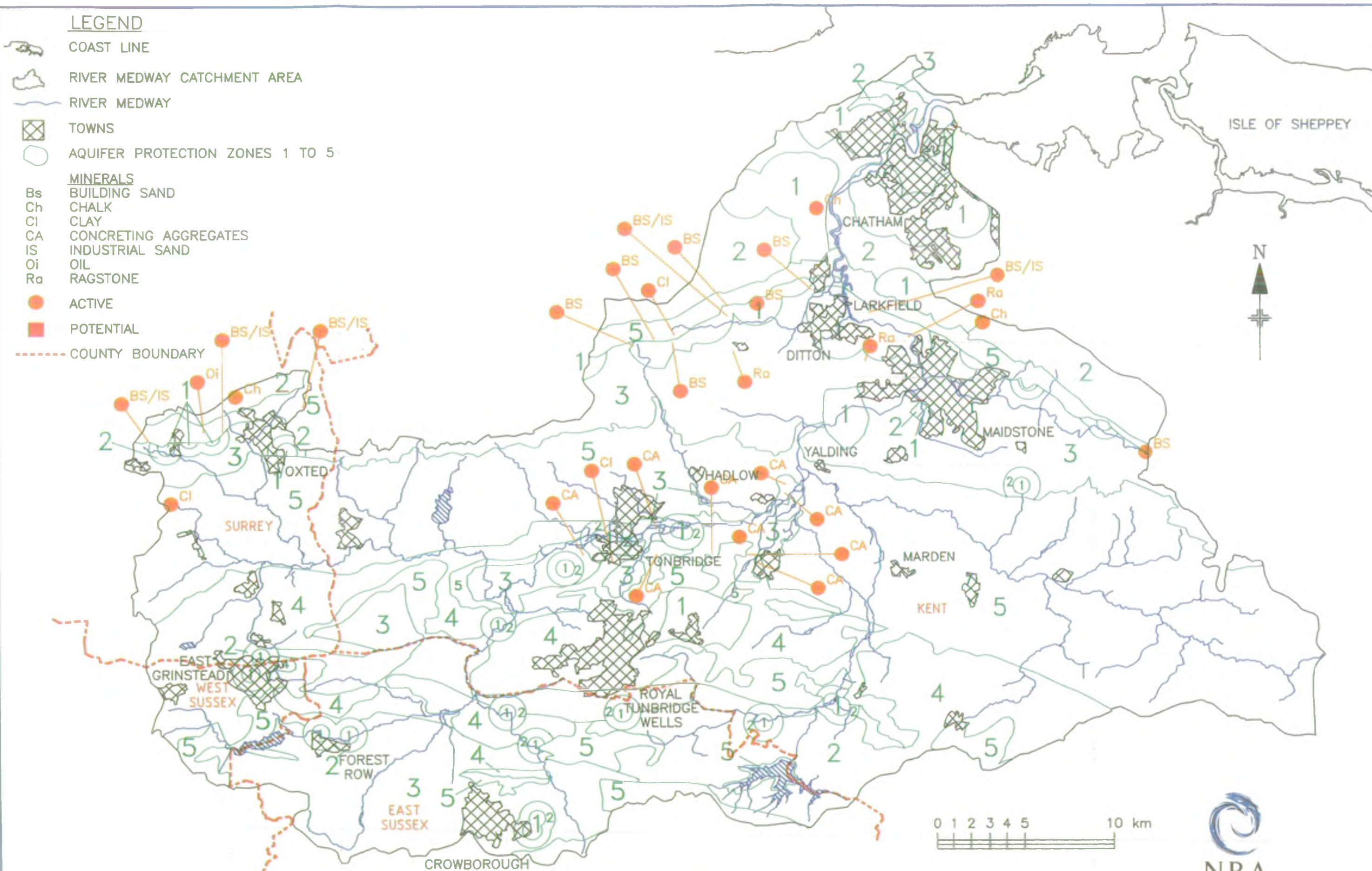
MINERALS

- Bs BUILDING SAND
- Ch CHALK
- Cl CLAY
- CA CONCRETING AGGREGATES
- IS INDUSTRIAL SAND
- Oi OIL
- Ra RAGSTONE

 ACTIVE

 POTENTIAL

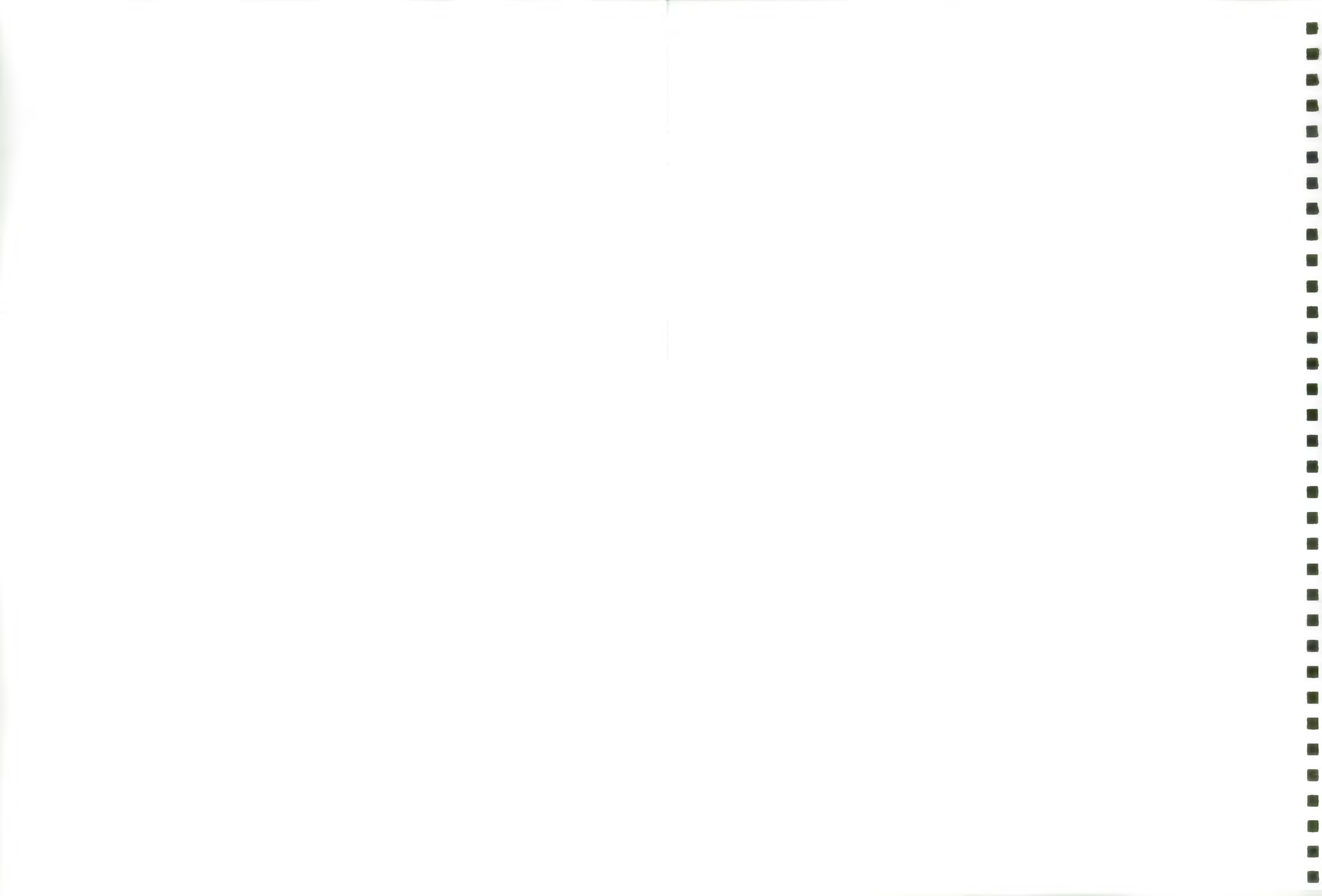
 COUNTY BOUNDARY



MINERAL EXTRACTION



National Rivers Authority
Southern Region



23. MINERAL EXTRACTION

23.1 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.

23.2 Local Perspective

Construction aggregates form the principal mineral resource in the catchment with the alluvial deposits in the river corridor providing virtually all the coarser sands and gravels. The extensive areas of open water downstream from Maidstone are flooded pits from the previous winning of sand and gravel, and extraction continues in this area. Old gravel workings remain as flooded pits west of Tonbridge and major reserves have been identified in the river valley downstream from the town.

The Lower Greensand strata provide finer building sands, particularly in the Borough Green area where there are a number of active sites. Three other sites lie in the far north-west of the catchment, in the Oxted/Godstone area. Here, pure silica sands from the lower layers of the Folkestone Beds are also used for glass making. These sites lie some distance from the river corridor.

Kentish ragstone is quarried from the Lower Greensand ridge between Sevenoaks and Maidstone with one of the three native sites, the Allington quarry in north-west Maidstone, lying on the edge of the Medway corridor. Chalk and clay are also quarried from higher sites within the catchment, distant from the main river and its tributaries. Thus their operation has little impact on the river system.

With an increasing need for waste disposal sites, many exhausted mineral workings are now infilled with a defined category of waste and for most there is now a planning presumption for restoration of the site to agricultural use. Some of the older, flooded gravel pits have an actual or potential wildlife or recreational interest. The former use is enhanced where adjacent habitats are of ecological interest and the Holborough to Burnham Marshes SSSI is an example of a designated site that includes a flooded gravel pit within its boundary.

23.3 Environmental Objectives

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

23. MINERAL EXTRACTION



23.4 Environmental Requirements

Water Quality

- No deterioration in groundwater or surface water quality.









River Flow

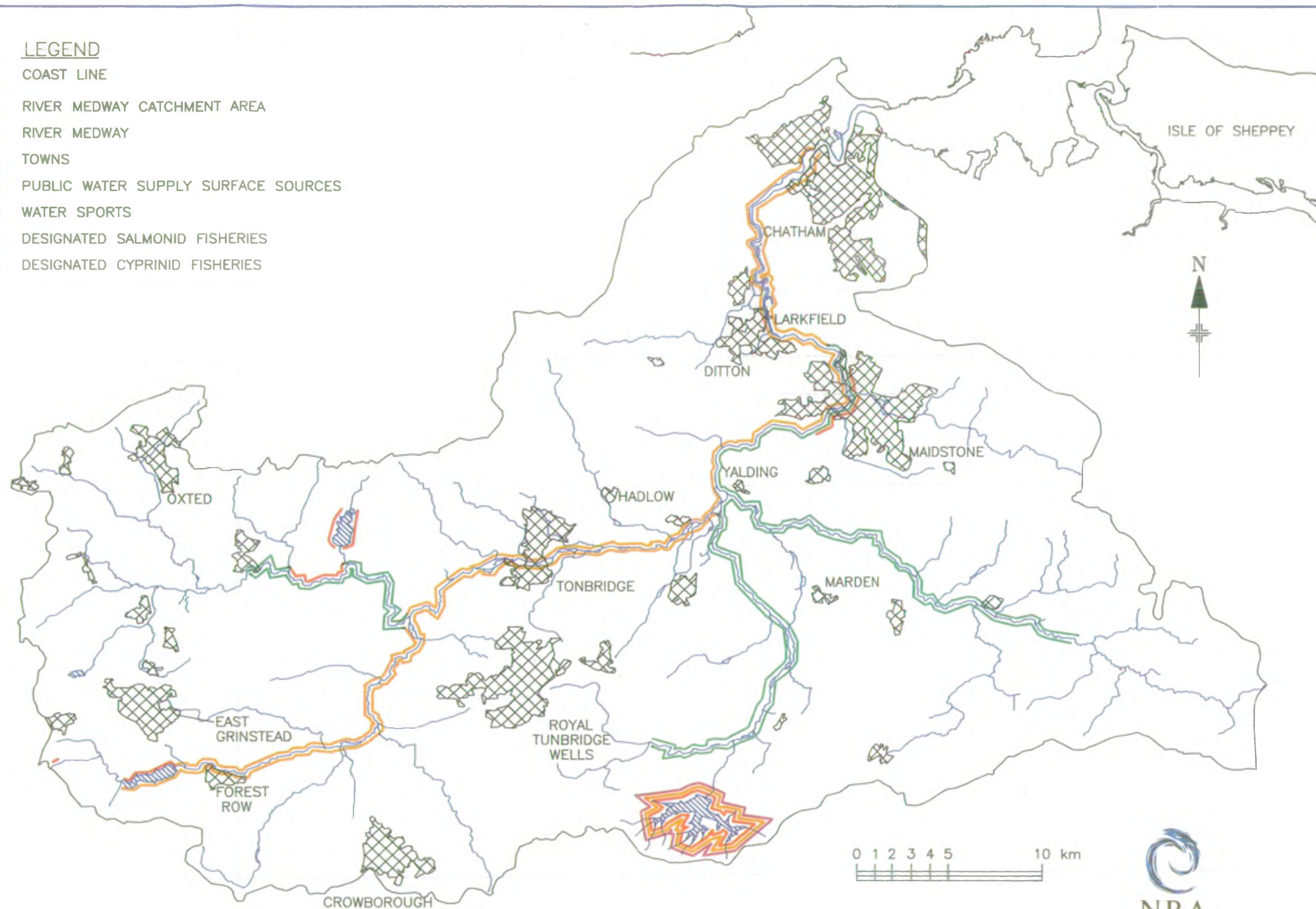
- No detriment to the availability of water resources.
- Minimise loss of unsaturated zone cover to aquifers.

River Topography

- Minimise the occurrence of subsidence and slipping.
- Maintenance of the integrity of the river channel adjacent to extraction sites.
- Restoration of all sites to an acceptable environmental standard, taking into account the opportunities for conservation, recreation and amenity.

LEGEND

-  COAST LINE
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  PUBLIC WATER SUPPLY SURFACE SOURCES
-  WATER SPORTS
-  DESIGNATED SALMONID FISHERIES
-  DESIGNATED CYPRINID FISHERIES



WATER QUALITY TARGETS



NRA

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Southern Region*

B1. WATER QUALITY TARGETS



B1.1 General










The water quality requirements for the identified uses can now be combined on a single 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.

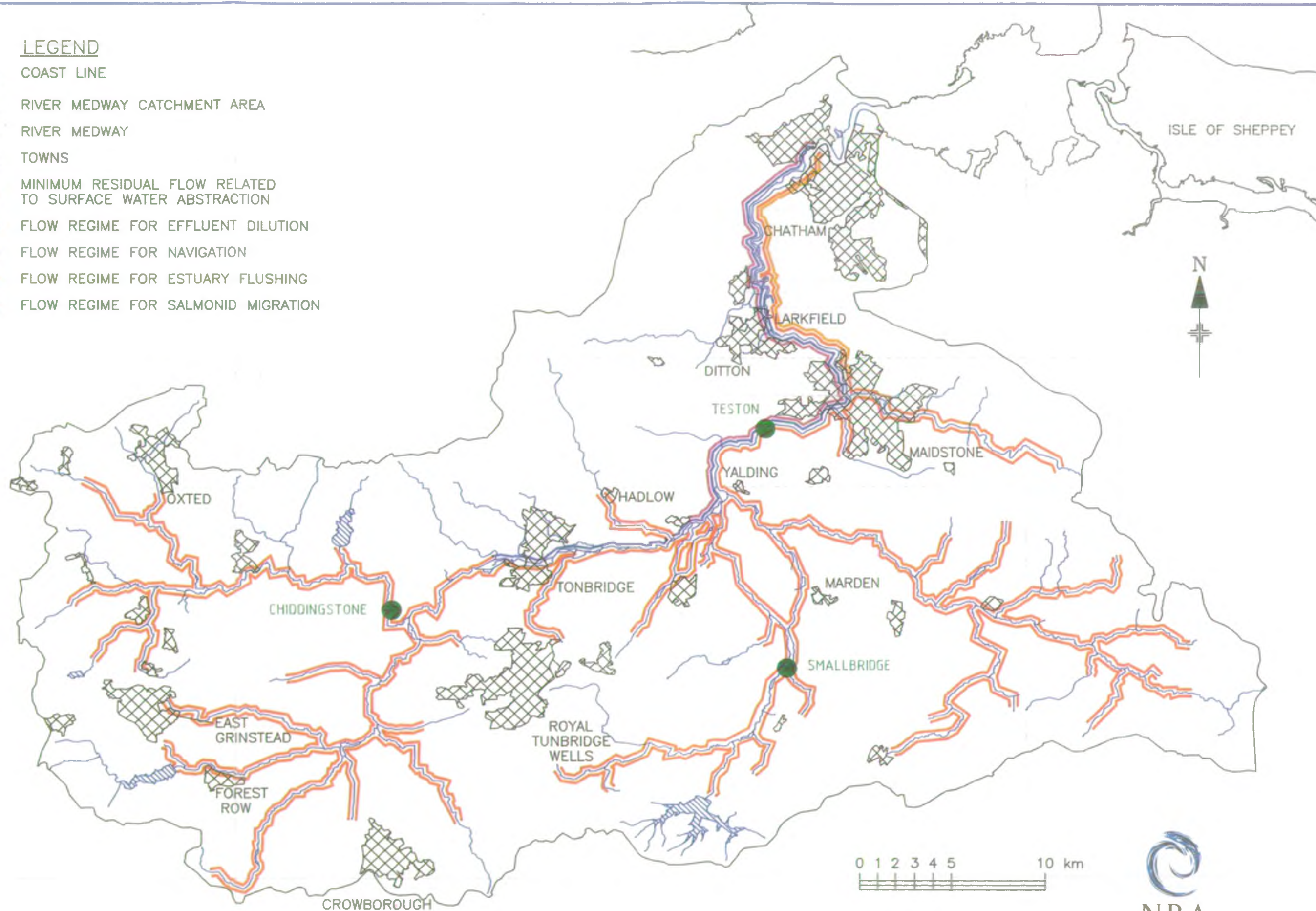
B1.2 Local Perspective

There are a great number of uses of the Medway 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 target class as detailed in Section 21.
- To meet the general requirement to maintain amenity value and river corridor conservation as detailed in Section 5 and 10.
- Implementation of the Aquifer Protection Policy, particularly 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 MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  MINIMUM RESIDUAL FLOW RELATED TO SURFACE WATER ABSTRACTION
-  FLOW REGIME FOR EFFLUENT DILUTION
-  FLOW REGIME FOR NAVIGATION
-  FLOW REGIME FOR ESTUARY FLUSHING
-  FLOW REGIME FOR SALMONID MIGRATION

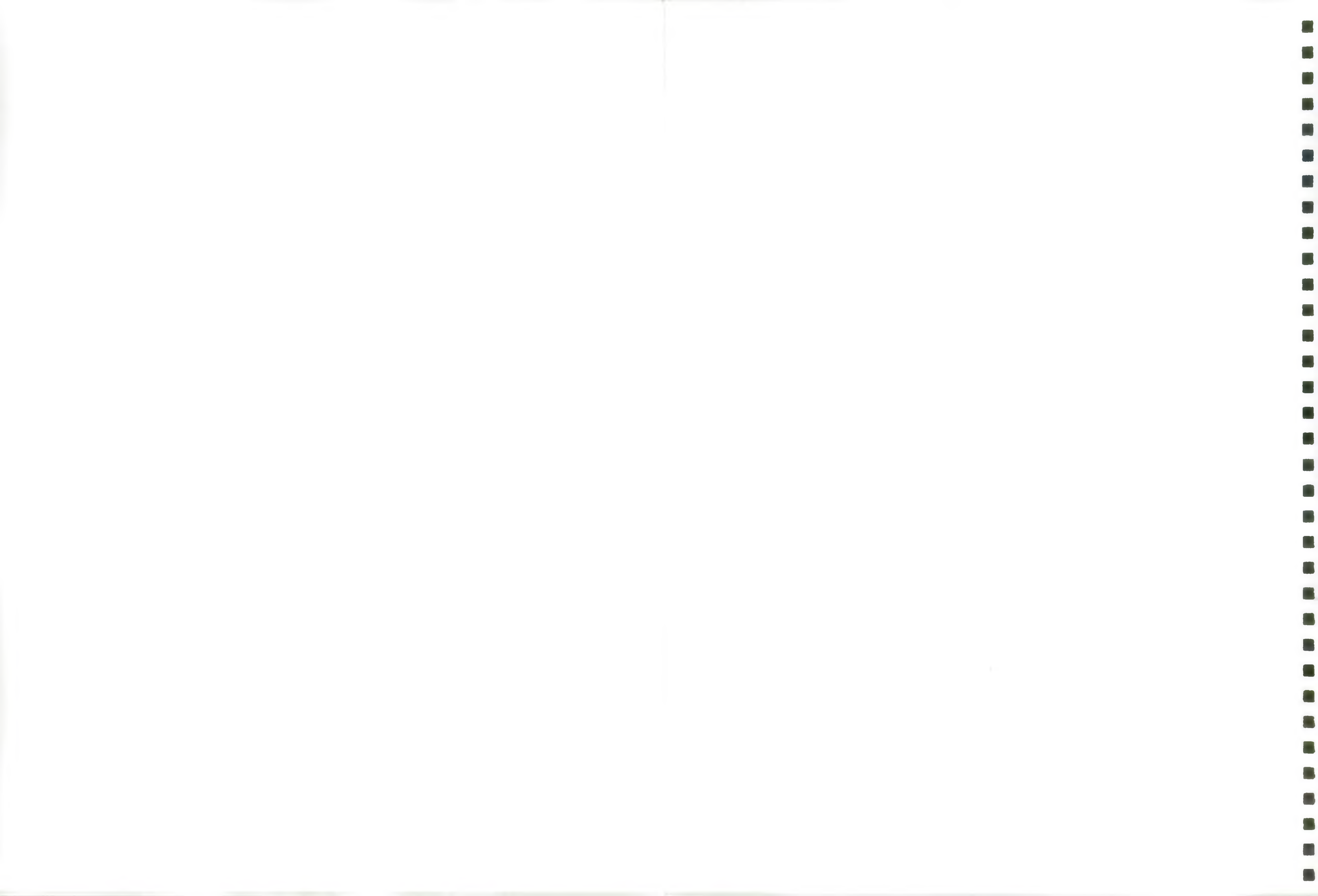


RIVER FLOW TARGETS



NRA

National Rivers Authority
Southern Region



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.

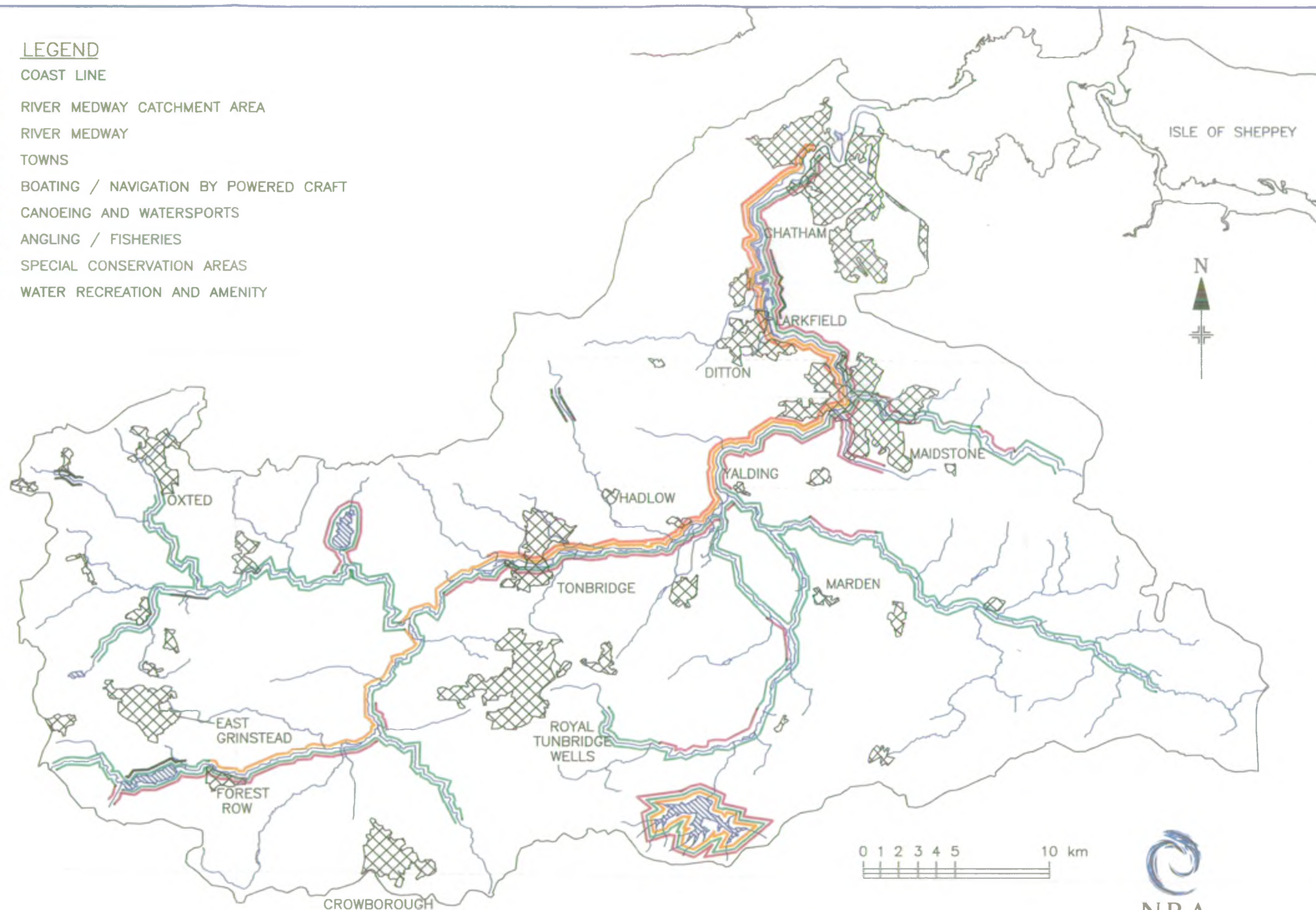
B2.2 Local Perspective

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
 - Watersports
 - Game Fisheries
 - Coarse Fisheries
 - AnglingAnd to reduce the impact of
 - Intermittent and Diffuse Pollution.
- A Minimum Residual Flow is set at Stonebridge to control abstraction from Smallbridge to Bewl Bridge Reservoir in order to conserve flows for River Corridor Conservation and downstream abstraction.
- A Minimum Residual Flow is set at Chiddingstone to control abstraction to Bough Beech Reservoir. In addition, abstraction is not permitted between May and August and from 1 September, a flow of 4500 ML is allowed to pass before abstraction is permitted. These restrictions are set in order to conserve flows for River Corridor Conservation and downstream abstraction.
- A Minimum Residual Flow has been set at Teston gauge to control abstraction at Springfield intake in order to conserve flows to the Estuary.
- In migratory reaches the natural flow regime should not be altered in a way which significantly inhibits the migration of salmonids.
- The natural flow regime below Allington should not be altered in a way which significantly inhibits the passage of vessels over a range of tidal conditions.
- The natural flow regime below Allington should not be altered in a way which significantly reduces the flushing effects for the estuary.
- 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 MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  BOATING / NAVIGATION BY POWERED CRAFT
-  CANOEING AND WATERSPORTS
-  ANGLING / FISHERIES
-  SPECIAL CONSERVATION AREAS
-  WATER RECREATION AND AMENITY



RIVER TOPOGRAPHY TARGETS



NRA

National Rivers Authority
Southern Region

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 17 and for convenience are not repeated here.

B3.2 Local Perspective

There are a great number of uses of the Medway 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 17.
- 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.
- Limited access for livestock to the river corridor to minimise damage caused by trampling.
- The maintenance of flood defence structures to ensure their continued effectiveness.
- To ensure the restoration of all solid waste disposal and mineral extraction sites to an acceptable environmental standard.
- No significant increase in flood risk as a result of surface water discharges from new development.
- No new development to be in the flood plain unless all measures are taken to ensure no increase in flood risk.
- Encourage the extension or provision of facilities or footpaths where there is sufficient demand for recreational and amenity use.
- New development not to reduce the conservation value of the river corridor.
- 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.

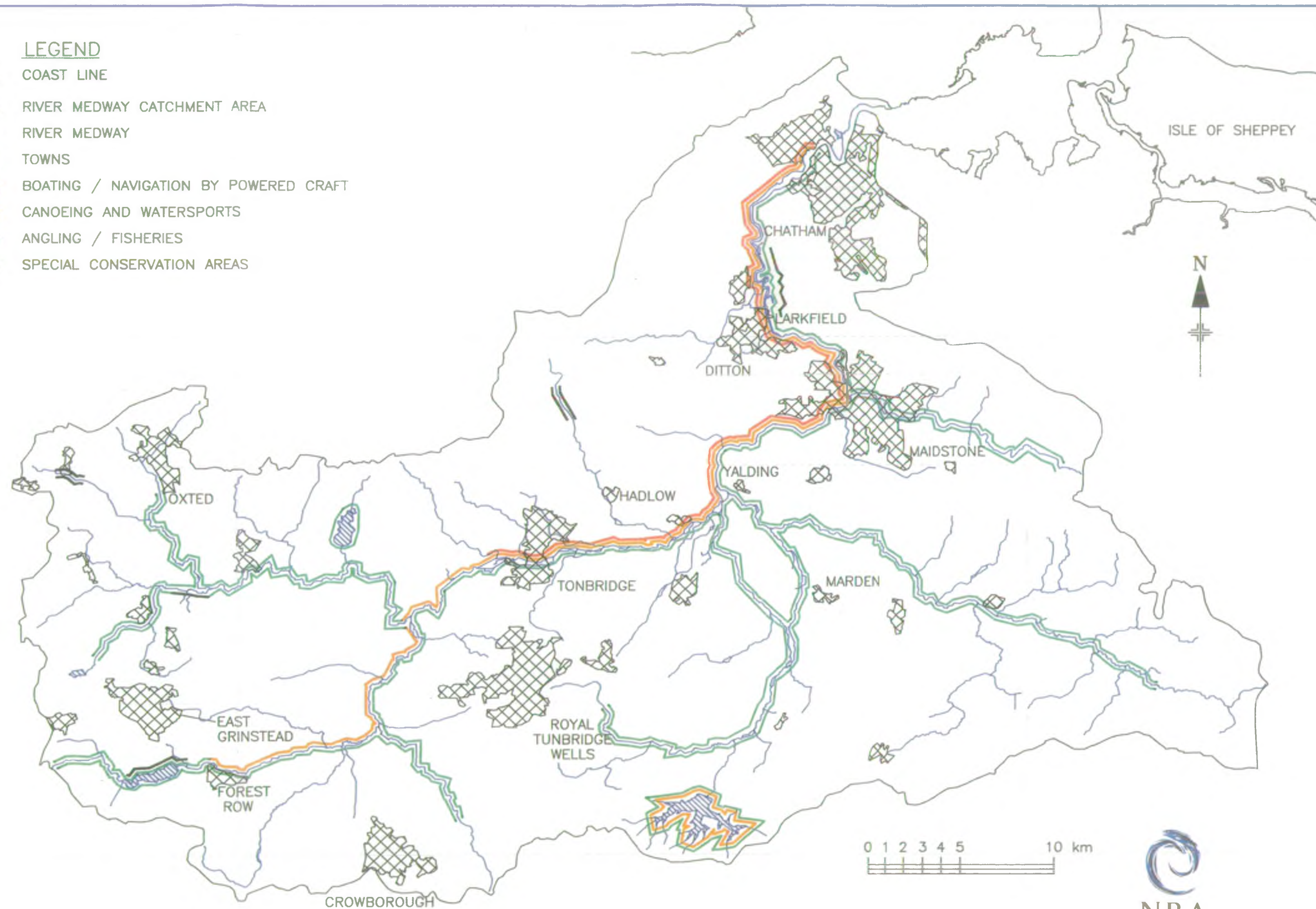
B3. RIVER TOPOGRAPHY TARGETS



USE	REQUIREMENTS
Special Conservation Areas:	Maintenance of special features.
Game Fisheries:	Barriers to be passable at Q95 flows. Natural and diverse 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.
Recreation and Amenity:	Maintenance of existing footpaths, access points and moorings.
Navigation:	Maintenance of mooring facilities. Maintenance of Locks
Industrial and Agricultural Abstraction:	Provision, maintenance and operation of facilities for marsh feeding.
Agricultural Drainage:	Maintain drainage structures.

LEGEND

-  COAST LINE
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  BOATING / NAVIGATION BY POWERED CRAFT
-  CANOEING AND WATERSPORTS
-  ANGLING / FISHERIES
-  SPECIAL CONSERVATION AREAS

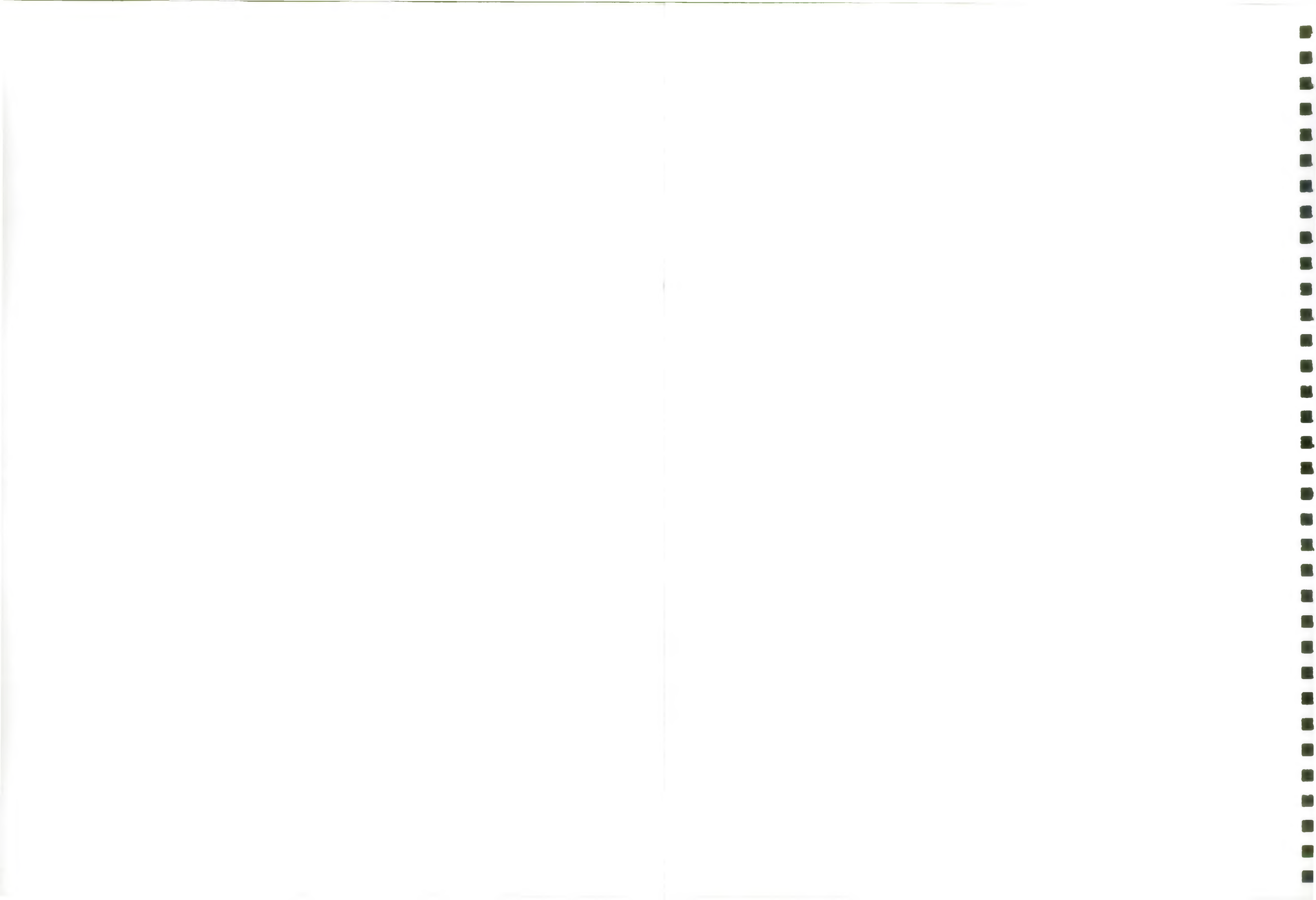


RIVER MANAGEMENT TARGETS



NRA

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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 Medway 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.
- Ensure that where fish stocking takes place that a balanced natural fish population is maintained.
- 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.
- Carry out tree management to prevent obstructions caused by fallen trees.

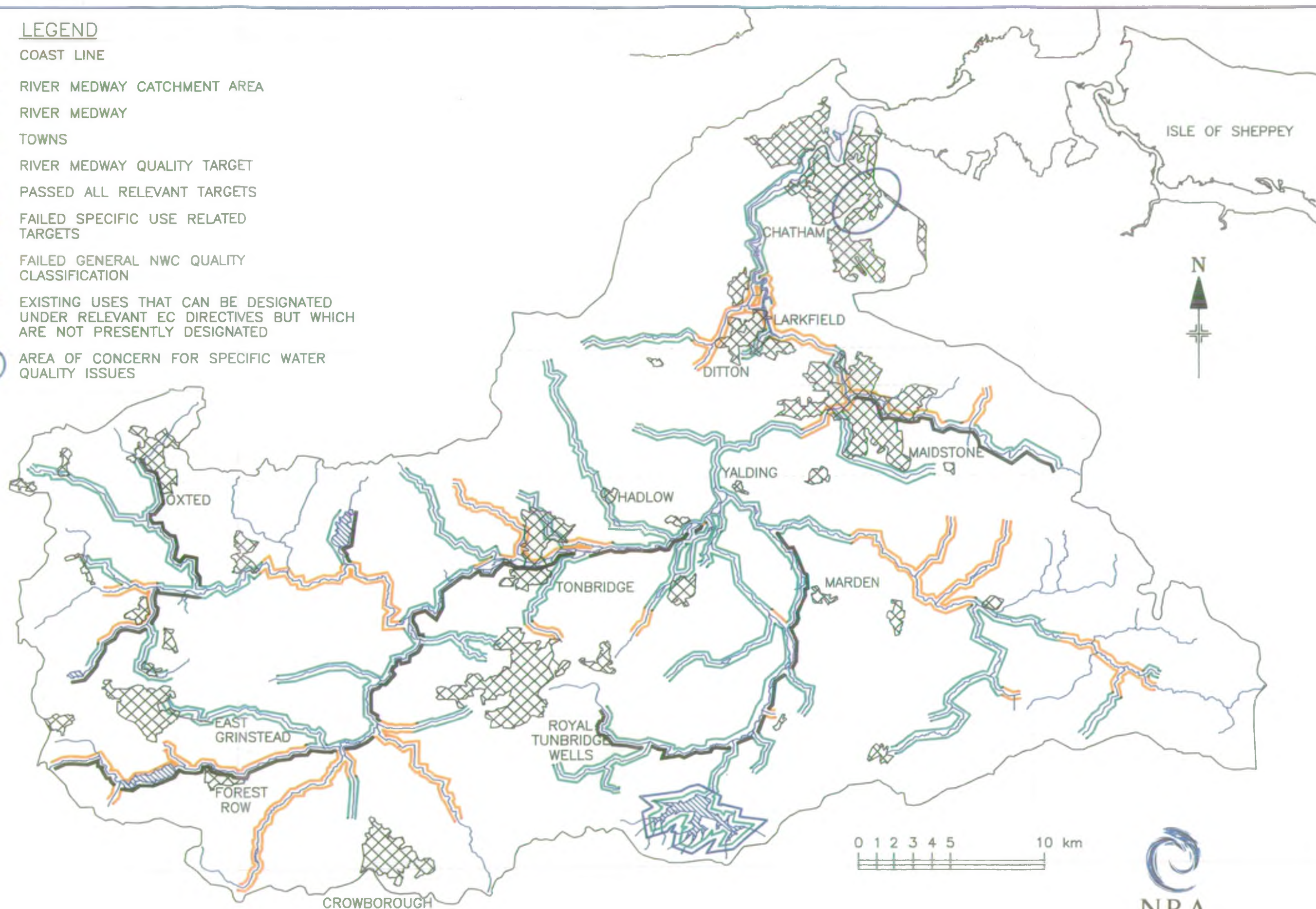
The requirements for the specific uses shown on the map are detailed in the table overleaf.

B4. RIVER MANAGEMENT TARGETS

USE	REQUIREMENTS
Agricultural Drainage: i) Arable ii) Livestock	Maintenance of lower water tables contrary to environmental needs. Where required, maintenance of higher water levels in ditches to provide wet fencing.
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.
Coarse Fisheries:	Appropriate fish stocking.
Angling:	Control structures to maintain water levels. Weedcutting at appropriate levels.
Navigation:	Sufficient draught
Flood Defence:	Ensure correct operation of sluice gates.
Agricultural Drainage:	Maintenance of channel capacity through weedcutting and dredging.

LEGEND

-  COAST LINE
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  RIVER MEDWAY QUALITY TARGET
-  PASSED ALL RELEVANT TARGETS
-  FAILED SPECIFIC USE RELATED TARGETS
-  FAILED GENERAL NWC QUALITY CLASSIFICATION
-  EXISTING USES THAT CAN BE DESIGNATED UNDER RELEVANT EC DIRECTIVES BUT WHICH ARE NOT PRESENTLY DESIGNATED
-  AREA OF CONCERN FOR SPECIFIC WATER QUALITY ISSUES



STATE OF THE CATCHMENT : WATER QUALITY



National Rivers Authority
Southern Region

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 are evaluated by considering the results of 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 in the map opposite.

1. The concentration of industrial effluents within the estuary, particularly those with high BOD loadings, has a serious impact on water quality. The high pollutant loadings from these discharges coupled with the long residence times within the upper estuary and, during drought periods, the lack of freshwater flushing all have a serious effect on the water quality. For much of the summer of 1990 the upper estuary was anoxic with no dissolved oxygen.
2. Groundwater nitrate concentrations exceed the maximum admissible concentrations in boreholes within the North Downs chalk aquifer.
3. There is localised NWC target class water quality failure in several areas in the catchment. The nature of the population distribution and industrial activity throughout the catchment and the underlying geology all contribute to the observed failures of water quality in the catchment.
4. There are 6 sewage treatment works operating with time limited derogated consents. The river reaches downstream of 4 of these plants fail to comply with their respective NWC target classes, including the River Grom below Tunbridge Wells South, the Sunnyside Stream below Luxford Lane, the River Eden below Edenbridge and the River Len below the Leeds Sewage Treatment Works. Tighter discharge consents for these works will operate from the beginning of 1992. Southern Water Services have improvement works in hand for each of these treatment works with a view to complying with consent conditions from the beginning of 1992. Difficulties with obtaining planning permission at Leeds STW mean that improvements may be delayed at this works.
5. The top of the River Medway above and below the Weir Wood impoundment reservoir fails its NWC target classification. The river above the reservoir receives treated sewage effluent from West Hoathly treatment works, and is also an extremely difficult site to sample. The actual sampling point is at the head of the reservoir with extremely difficult access to the inflowing stream. Standing water is often sampled which may be unrepresentative of the true quality of the river upstream. West Hoathly works is currently subject to improvements with a view to ensuring it meets its discharge consent.

Water quality in the river immediately below the dam is affected by algal activity in the reservoir while the river further downstream receives a sizable discharge from Luxford Lane sewage treatment works, one of the six works operating under derogated time consents, see item 4 above. The compensation flow from the reservoir affords very little dilution to this effluent.






6. The River Medway between Penshurst and Yalding is used for coarse fishing but is not a designated cyprinid water.

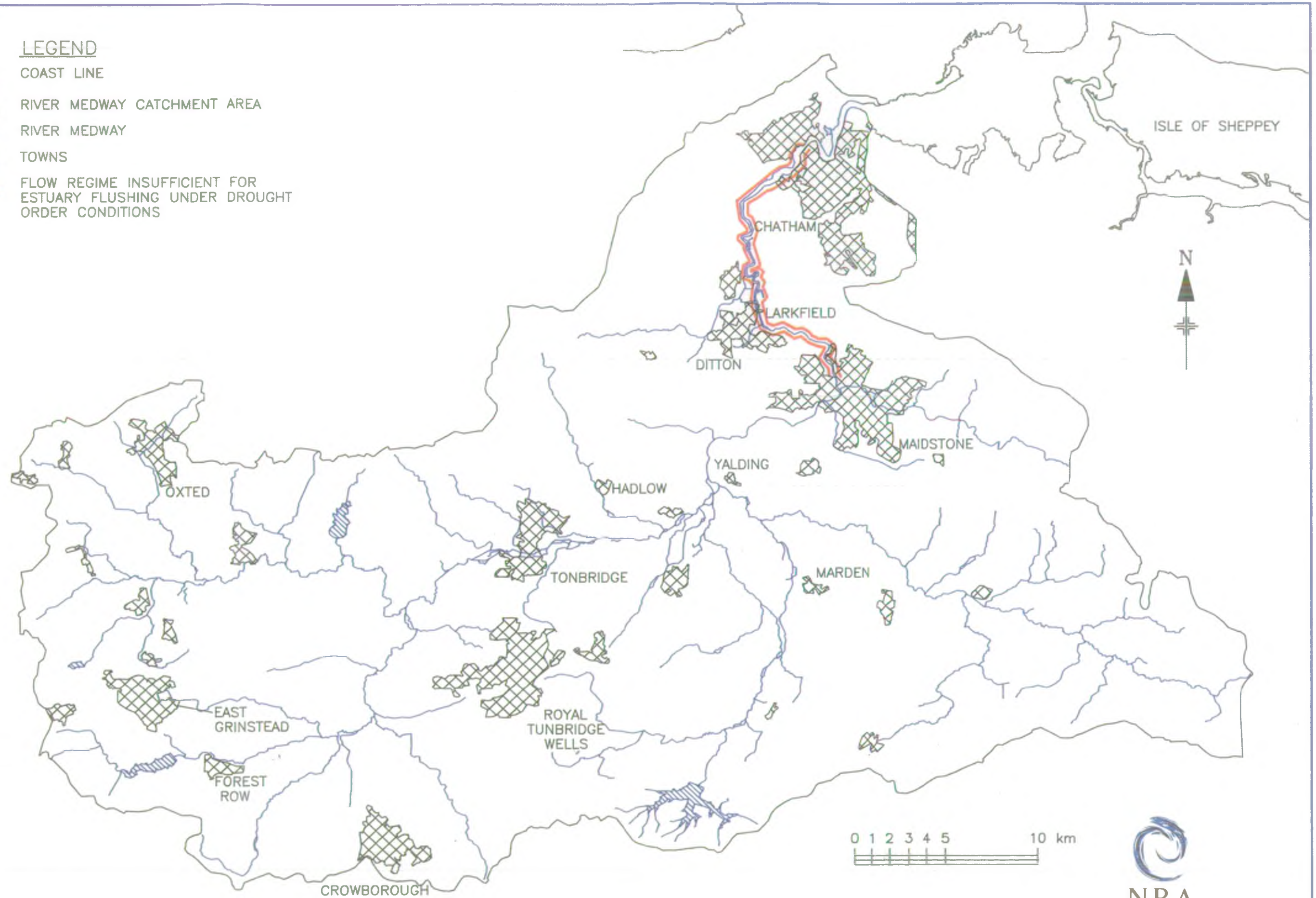
C1. STATE OF THE CATCHMENT : WATER QUALITY



7. The entire classified length of the Eridge Stream fails its NWC target class. The stream receives a significant effluent discharge from Redgate Mill-Crowborough treatment works. The River Medway through Tonbridge also fails its NWC target class. This stretch of the river is locked for navigation which results in a sluggish slow moving waterbody. The reach also receives significant effluent discharges from Tonbridge and ultimately all treatment plants discharging to the catchment above. The combination of sluggish nutrient rich water, with a long residence time often gives rise to algal blooms in the penned river
8. The Pippingford Brook receives only very minor effluent discharges but fails to comply with its NWC target class. The actual target for most of the stream is 1A, the highest attainable, yet the stream rises in the Ashdown Forest area, a natural iron bog. The water quality is therefore likely to be naturally influenced, thus highlighting the difficulty of some streams in meeting what may have been optimistic and/or inappropriate targets. This may also be the case in the River Beult and River Eden sub-catchments where the clay substrata of many tributaries provides a very low natural baseflow component during dry periods. Indeed some of the upper reaches on these rivers may dry up naturally providing no dilution flows whatsoever.
9. Surface water nitrate concentrations following the first significant rains of autumn have led to temporary closures of the water abstraction at Springfield water treatment plant near Maidstone. The high nitrate concentrations result from land run-off, but do not generally last for more than a few days.
10. Mid Kent Water Company are presently installing further treatment facilities at their Bewl Water water treatment plant. The water abstracted directly from Bewl Water has taste and odour problems.
11. The agricultural nature of the catchment and the large quantity of sewage effluent discharged to the river means that the surface waters can be rich in nutrients. The maintenance of water levels for navigation and angling results in slow moving water which can lead to algal blooms and associated water quality problems due to the high levels of nutrients.

LEGEND

-  COAST LINE
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  FLOW REGIME INSUFFICIENT FOR ESTUARY FLUSHING UNDER DROUGHT ORDER CONDITIONS



STATE OF THE CATCHMENT : RIVER FLOW



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Southern Region

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.

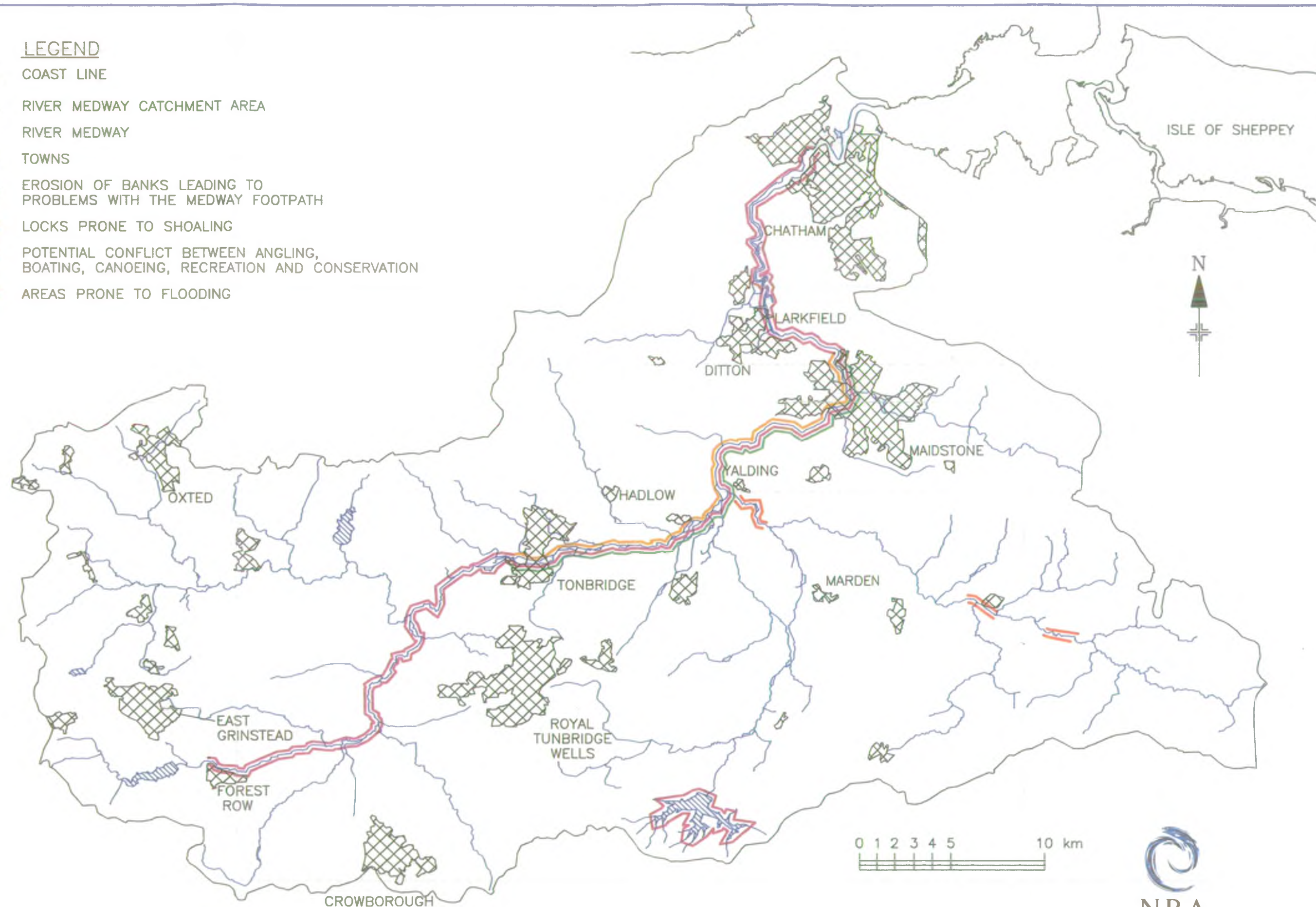
C2.2 Issues Identified:-

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

1. The operation of 'pumped storage' type reservoirs which also impound a natural catchment (such as Bough Beech and Bewl Water) involves a trade-off between increased pumping costs and the risk of running out of water at the end of the summer period. There is a conflict of interest between the economic provision of water supplies and flows in the river.
2. Sewage treatment works in the upstream catchments can provide a valuable water resource during the summer provided the effluent is treated to a suitable quality. The rationalisation of sewage treatment works into fewer and larger works, normally downstream of the existing sites, can cause flow problems, particularly for small upland streams.
3. The Drought Orders granted in 1989 and 1990 to reduce the prescribed flows controlling abstraction for public supply had a significant adverse effect on water quality in the estuary.

LEGEND

-  COAST LINE
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  EROSION OF BANKS LEADING TO PROBLEMS WITH THE MEDWAY FOOTPATH
-  LOCKS PRONE TO SHOALING
-  POTENTIAL CONFLICT BETWEEN ANGLING, BOATING, CANOEING, RECREATION AND CONSERVATION
-  AREAS PRONE TO FLOODING

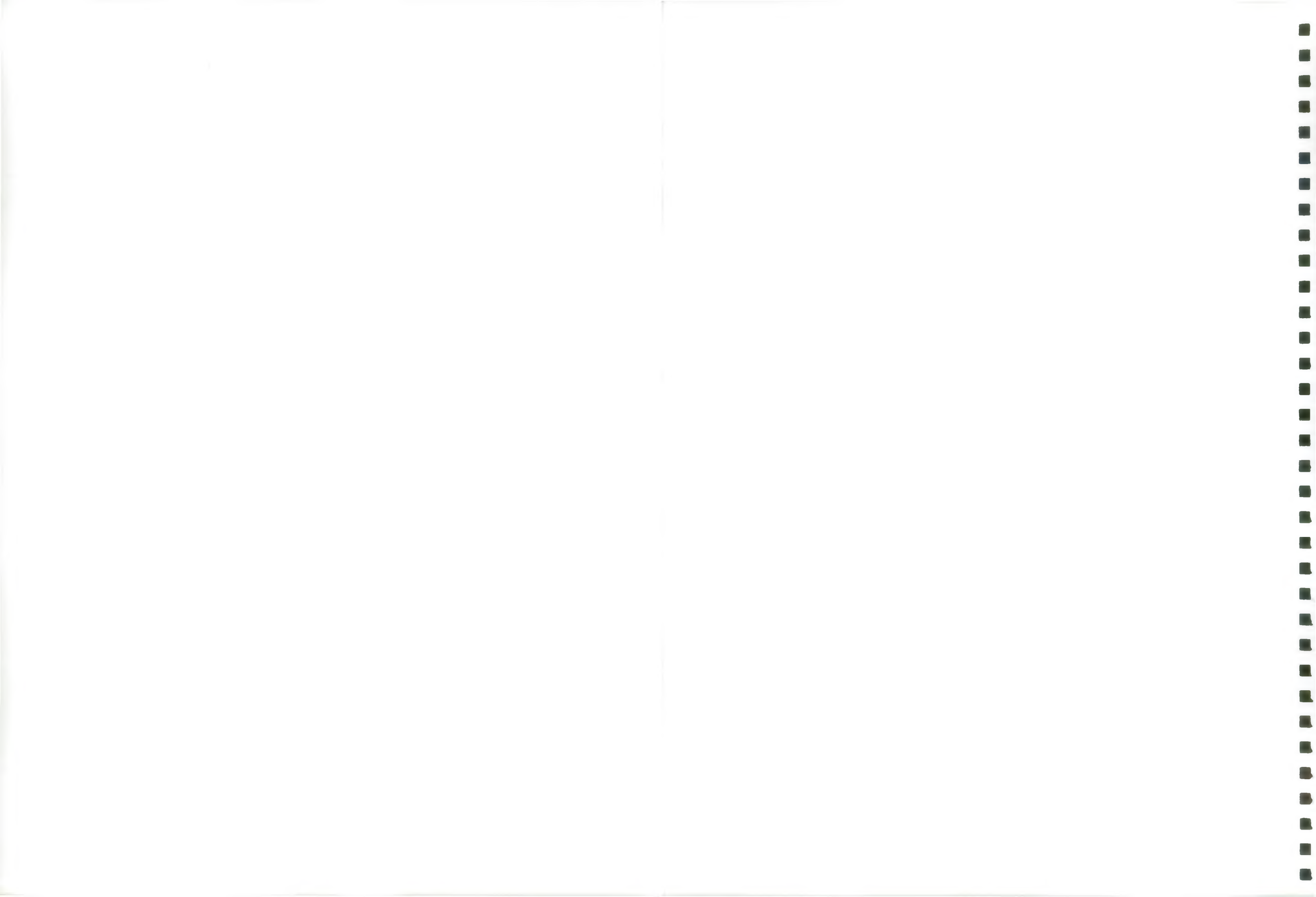


STATE OF THE CATCHMENT : RIVER TOPOGRAPHY



NRA

National Rivers Authority
Southern Region



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.

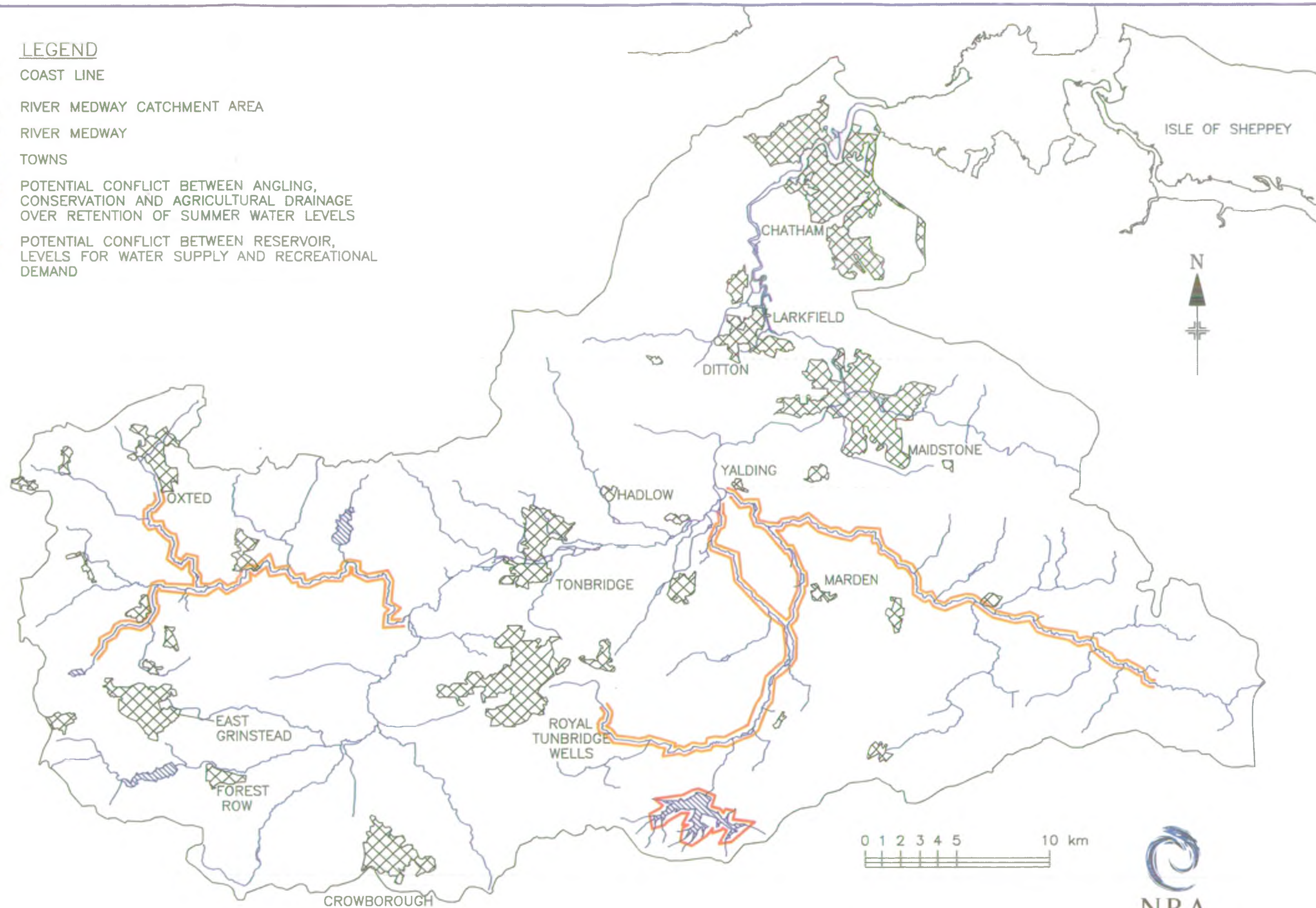
C3.2 Issues Identified:-

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

1. The Medway downstream, and to a lesser extent upstream, of Tonbridge is a major regional attraction and is used intensively for boating, canoeing, recreation and angling. This can lead to conflict between these uses themselves and also with the conservation of the habitats in the river corridor.
2. Flooding occurs in the town of Yalding which is located at the confluence of the Medway, Teise and the Beult, and at Headcorn and Smarden on the River Beult. The protection standard offered exceeds the target for the land use category at Yalding.
3. The locks along the Medway Navigation are subject to shoaling whereby fine particulate matter is deposited immediately downstream of locks after periods of heavy rain. The draining of pens and dredging of this material can disrupt the fisheries in the river by removing or disturbing fish spawn.
4. The erosion of the banks alongside the Medway leads to problems maintaining the riverside footpaths. This erosion is aggravated by wash from boats using the Medway Navigation.

LEGEND

-  COAST LINE
-  RIVER MEDWAY CATCHMENT AREA
-  RIVER MEDWAY
-  TOWNS
-  POTENTIAL CONFLICT BETWEEN ANGLING, CONSERVATION AND AGRICULTURAL DRAINAGE OVER RETENTION OF SUMMER WATER LEVELS
-  POTENTIAL CONFLICT BETWEEN RESERVOIR, LEVELS FOR WATER SUPPLY AND RECREATIONAL DEMAND



STATE OF THE CATCHMENT : RIVER MANAGEMENT



National Rivers Authority
Southern Region

C4. STATE OF THE CATCHMENT : RIVER MANAGEMENT



C4.1 General

Having set river 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. The high amenity value of Bewl Water causes a conflict between the high recreational usage and the need to reduce water levels in the reservoir for the purpose of flow regulation during the dry periods. Peak recreational usage of the reservoir often coincides with the peak requirement for river flow augmentation.
2. There is a potential conflict between angling, conservation and agricultural drainage over the retention of summer water levels in the Beult, Teise, Eden and Eden Brook. Water levels are maintained to provide wet fencing, improved angling conditions and to maintain water tables for wetland habitats. However, the water levels have to be lowered before winter floods and the precise timing of this can lead to problems for some uses and hence is a potential source of conflict.

In addition, the following more general issues have been identified:-

3. Meetings are held between conservation groups and the NRA prior to undertaking river maintenance work. These are arranged to minimise the impact of essential maintenance work required for flood protection or navigation.
4. The Medway River Project plays a very important role in the catchment. Throughout the project area, now covering approximately 200 km² downstream of Tonbridge, the aims are:
 - (1) To manage and enhance the landscape and wildlife of the Medway.
 - (2) To manage and enhance the access and recreation of the Medway.
 - (3) To promote local community awareness of, and active involvement in, the enhancement of the Medway's environment.
 - (4) To encourage landowners to take a positive role in enhancing the Medway and its surrounding countryside.

Since its launch in March 1988 the Project has been establishing close working relationships within the local community. In the 1990/91 year, the Project organised a total of 1234 days of environmental enhancement work, of which 834 days were from voluntary local community groups.

5. Litter is a topic of concern in many parts of the catchment, and is an area in which the Medway River Project has been very active.

In partnership with the Clean Kent Campaign the Project launched the "Keeping the Medway Clean'n'Green" programme. Over 10,000 leaflets, promoting an awareness of the litter problem and the need for individuals participation, were distributed to angling shops, boat yards and other organisations. Support for the campaign from angling shops, clubs and marinas was so good that a further 10,000 copies of the Clean'n'Green leaflet were printed.

C5 STATE OF THE CATCHMENT : CONCLUSIONS



C5.1 General

In the preceeding 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:-

1. The water quality within the upper estuary is very poor. This reach receives a large volume of paper manufacturing effluent. The upper estuary has a very long natural residence time and, during drought periods when very little freshwater flushing flow is released to the estuary, the dissolved oxygen reduces to zero.
2. The operation of the two pumped storage reservoirs (Bough Beech and Bewl Water) can lead to conflicts between the economic provision of water supplies and river flows. Bewl Water's new intake at Yalding is programmed for construction in 1994/95 under Southern Water's existing programme for capital works.
3. The Medway, both upstream and downstream of Tonbridge, is used intensively for many types of recreation. This can cause conflict between the different types and also with conservation interests.
4. There is a potential conflict between the high recreational usage at Bewl Water and the need to reduce water levels in the reservoir for the purpose of water supply during dry periods.
5. Nitrate concentrations in the North Downs chalk block are close to, or in excess of, EC Maximum Admissible limits.
6. High nitrate concentrations can lead to a suspension of abstraction of surface flows at Springfield water treatment plant following the first significant rains in autumn, as a result of nutrient run-off from land.
7. There are taste and odour problems associated with water directly abstracted from Bewl Water for public water supply.
8. There is localised NWC target water quality class failure in several areas in the catchment. There are a variety of reasons for this including the operation of derogated time limited consents at several sewage treatment works; the concentration of population centres and effluent discharges in certain areas; the underlying geology resulting in low baseflows for dilution during dry periods; the failure of some sewage treatment works to comply with their respective discharge consents; and the setting of naturally unachievable target classes.
9. Sewage treatment works in the upper reaches are able to supplement flows in the river especially during low flow periods, provided the effluent is of sufficient quality. The rationalisation of these works into fewer and larger works downstream can result in flow problems. However, many of these works at present do not produce high quality effluents and their impact on the receiving water is magnified by lack of dilution. The options of closure, continued operation or upgrading of small sewage treatment works should be considered in terms of both river flows and water quality.
10. The maintenance of water levels for navigation can result in algal blooms and associated water quality problems in the slow moving nutrient rich waters.

CS. STATE OF THE CATCHMENT : CONCLUSIONS



11. The River Medway between Penshurst and Yalding is used for coarse fishing but is not a designated cyprinid water.
12. Flooding is an issue at Yalding where the Medway is joined by the Teise and the Beult. A similar problem exists for Headcorn and Smarden on the River Beult. However, the protection standard offered exceeds the target for the land use category at Yalding (B) and the benefits of improvement are unlikely to justify the costs.
13. The locks along the Medway Navigation are subject to shoaling and erosion of the banks and causes problems for the maintenance of the riverside footpaths. The draining of navigation pens and dredging can disrupt fisheries.
14. The maintenance of summer water levels in the Teise, Beult, Eden and Eden Brook can be a source of conflict between angling, conservation and winter flood drainage.
15. Litter is a topic of concern in many areas of the catchment.
16. 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.
17. 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.
18. The upper part of the Beult catchment is within Ashford District where considerable development is planned. This could lead to pressure to discharge effluent from this new development to the Beult or its tributaries. This would increase the strain on a river which already fails to meet its classification in some reaches and suffers from insufficient diluting flows, especially during dry summers.

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 these 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 table below lists the issue reference number from Section C5, a brief resume of the problem or conflict, the Management Options and 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	Water Quality within upper estuary		
Management Options	Responsible Bodies	Pros.	Cons.
Ensure compliance with present consent standards, investigate discharges and reconsult where appropriate.	Factory owners; NRA	Reduce pollutant inputs.	Cost of improvements to discharges.
Ensure sufficient freshwater flushing flows enter the estuary at all times through the existing prescribed flow regime.	Southern Water Plc; NRA	Maintains freshwater flows.	Possible shortfall in water supply during drought periods.
Carry out a detailed study of water quality within the estuary	NRA	Ensures that improvement schemes will be effective.	
Issue Ref. No. 2	Operation of Bough Beech and Bewl Water pumped storage reservoirs		
Management Options	Responsible Bodies	Pros.	Cons.
Encourage an early start to winter abstraction so as to reduce risk of reservoirs not being full at the end of winter.	NRA; Southern Water Plc; East Surrey Water Company	Increases security of supply.	Increases the possibility of uneconomic pumping.
Construct Yalding intake. This will operate under a reduced winter MAF to enhance yield and improve reservoir filling capability. The new scheme will also have sufficient capacity to improve summer flow in the river by releases from storage in accordance with a minimum maintained flow set by the NRA.	NRA; Southern Water Plc	<p>Ensure sufficient water for supply and river regulation in the following summer.</p> <p>Increases security of supply.</p> <p>Improves use of resources.</p>	<p>Cost of construction and pump operation.</p>

Table for Management Options

Issue Ref. No. 3	Potential conflict due to intensive recreational use of the Medway		
<p>Management Options</p> <p>Ensure continued dialogue and co-operation through the Medway Project.</p> <p>Ensure all users of the river are aware of the impact they can have on other uses and that they take all reasonable measures to minimise the impact.</p>	<p>Responsible Bodies</p> <p>NRA; Kent County Council; Countryside Commission; Tonbridge & Malling BC; Maidstone BC</p> <p>As above plus Users & Representative Bodies</p>	<p>Pros.</p> <p>Improved appreciation of the requirements for all users.</p>	<p>Cons.</p>
Issue Ref. No. 4	Conflict between recreational and environmental uses of Bewl Water and its function as a river regulation reservoir		
<p>Management Option</p> <p>(As for Issue 2)</p> <p>Ensure close liaison between all interested parties.</p>	<p>Responsible Bodies</p> <p>NRA; Southern Water Plc;</p> <p>Fishing, Sailing, Windsurfing, Sub-aqua clubs; Southern Water Plc; NRA; Sussex Wildlife Trust</p>	<p>Pros.</p> <p>Decreased risk of low levels in late summer.</p>	<p>Cons.</p> <p>As for Issue 2.</p>
Issue Ref. No. 5	Nitrate concentration in North Downs chalk block		
<p>Management Options</p> <p>Designate Nitrate Sensitive Areas.</p> <p>Reduce application of nitrate fertilisers</p> <p>Investigate means of blending water from the boreholes.</p>	<p>Responsible Bodies</p> <p>NRA; Department of the Environment; European Commission</p> <p>Landowners/Farmers</p> <p>Southern Water Plc</p>	<p>Pros.</p> <p>Decreases nitrate input to the chalk.</p> <p>Reduces nitrate inputs.</p> <p>Continued use of resource.</p>	<p>Cons.</p> <p>Imposes controls on farmers. Requires supervision.</p> <p>Cost to agriculture.</p> <p>Cost.</p>

Table for Management Options

Issue Ref. No. 6	High nitrate concentrations at Springfield intake		
Management Options	Responsible Bodies	Pros.	Cons.
Designate Nitrate Sensitive Areas.	NRA; Department of the Environment; European Commission		
Reduce application of nitrate fertilisers	Landowners/Farmers		
Issue Ref. No. 7	Taste and odour problems from Bewl Water supply.		
Management Options	Responsible Bodies	Pros.	Cons.
Construct a more advanced water treatment works (already in hand).	Mid-Kent Water Company		
Issue Ref. No. 8	Localised failures of NWC Target Class in several areas of the catchment		
Management Options	Responsible Bodies	Pros.	Cons.
Ensure compliance with consent standards.	Southern Water Plc; private treatment work owners; NRA		
Investigate water quality in the catchment with a view to reconsenting discharges where appropriate.	NRA	Identification of potential quality improvements.	Cost of improvement.
Reduce NWC target class for some reaches of river.	NRA; Department of the Environment	No costs.	No environmental improvement.
Issue Ref. No. 9	Sewage treatment works rationalisation/upgrading		
Management Options	Responsible Bodies	Pros.	Cons.
Investigate the water quality and flow implications of each new upgrading or rationalisation proposal.	Southern Water Plc; NRA	Protection of flows in upstream reaches.	Possible water quality deterioration particularly during low flows.

Table for Management Options

Issue Ref. No. 10	Maintenance of water levels for navigation can encourage algal blooms		
Management Option	Responsible Bodies	Pros.	Cons.
Monitor the input of nutrients to the river to minimise the occurrence of conditions for the promotion of algal growth.	NRA		
Consider means of reducing the input of nutrients (primarily phosphates and nitrates).	NRA		
Issue Ref. No. 11	Reaches used for fisheries but not designated under EC Directive.		
Management Options	Responsible Bodies	Pros.	Cons.
Designate reach from Penshurst to Yalding as a coarse fishery.	NRA		
Issue Ref. No. 12	Flooding at Yalding, Headcorn and Smarden		
Management Options	Responsible Bodies	Pros.	Cons.
Under Ministry of Agriculture Fisheries and Food (MAFF) rules, flood defence schemes are only carried out if the cost of the work can be justified by the value of the benefits it provides. Previous studies have concluded that the benefits of flood alleviation in Yalding, Headcorn and Smarden are not sufficient to justify the cost of the flood defence schemes that would be required.	NRA		
The conclusions of these studies should be reviewed to ensure that they are up-to-date and that all possible options for flood alleviation are investigated.	NRA; MAFF		

Table for Management Options

Issue Ref No. 13		Locks subject to shoaling and erosion of banks	
Management Options	Responsible Bodies	Pros.	Cons.
Continue to dredge the river to remove accumulations of silt.	NRA	Enable continued operation of navigation.	Dredging can disrupt fisheries and remove spawn.
Investigate means of stabilising the banks to protect the footpaths and reduce the supply of sediment for shoaling of the locks.	NRA		
Relocate the footpath further away from the river.	The Medway Project; Landowners		Loss of amenity.
Issue Ref. No. 14		Maintenance of summer water levels in Teise, Beult, Eden and Eden Brook	
Management Options	Responsible Bodies	Pros.	Cons.
Maintain water levels for as long as possible without unduly compromising flood defence.	NRA		
Ensure all users are consulted and informed before the water levels are reduced.	NRA; Farmers; Fishing Clubs		
Issue Ref. No. 15		Litter	
Management Options	Responsible Bodies	Pros.	Cons.
Continue to support the efforts made by the Medway River Project	NRA; Local Authorities; Countryside Commission		
Increase local awareness of the value of rivers and the problems caused by litter.	Ditto; Medway River Project		

Table for Management Options

Issue Ref. No. 16		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. 17		Climate Change	
Management Options	Responsible Bodies	Pros.	Cons.
Continue to investigate the likely impact of climate change on all aspects of catchment management.	NRA		
Issue Ref. No. 18		Development in the Ashford area	
Management Options	Responsible Bodies	Pros.	Cons.
Do not consent increased discharge of effluent to the upper part of the Beult catchment.	NRA	No reduction in water quality.	Does not help low flows in the river.
Ensure that any new discharges are treated to an extremely high standard.	NRA	Increases flows in the river.	Possible reduction in water quality. High cost of treatment works.

Appendix 1 :

Glossary of Terms and Units

River Medway 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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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 Medway 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 Medway 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 Medway 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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