RIVER MEDWAY CATCHMENT MANAGEMENT PLAN FINAL REPORT

NRA

National Rivers Authority

Southern Region

July 1993

MISSION STATEMENT

The NRA's mission is :

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

Published July 1993

ENVIRONMENT AGENCY

NATIONAL LIBRARY &
INFORMATION SERVICE

HEAD OFFICE

Rio House, Waterside Drive,
Aztec West, Almondsbury,
Bristol BS32 4UD

RIVER MEDWAY CATCHMENT MANAGEMENT PLAN

FINAL PLAN

CONTENTS

INTRODUCTION

The function of Catchment Management Plans is to promote the overall vision of The National Rivers Authority for the catchment in question. They are central to the development of NRA policy, assigning priorities for its own activities, providing a framework for decisions where the Authority has powers of control and guiding others towards the sustainable use of the resources of the catchment.

This Final Plan represents the second phase of planning for the Medway Catchment, drawing together information and comment from the earlier consultation stage. Sufficient descriptive text is included to support the Key Issues and Management Proposals, but the reader is referred to the earlier Medway Catchment Consultation Report for more detailed information.

Recommendations have been framed in the context of a ten year planning horizon but will be reviewed at intervals in the light of changing circumstances.

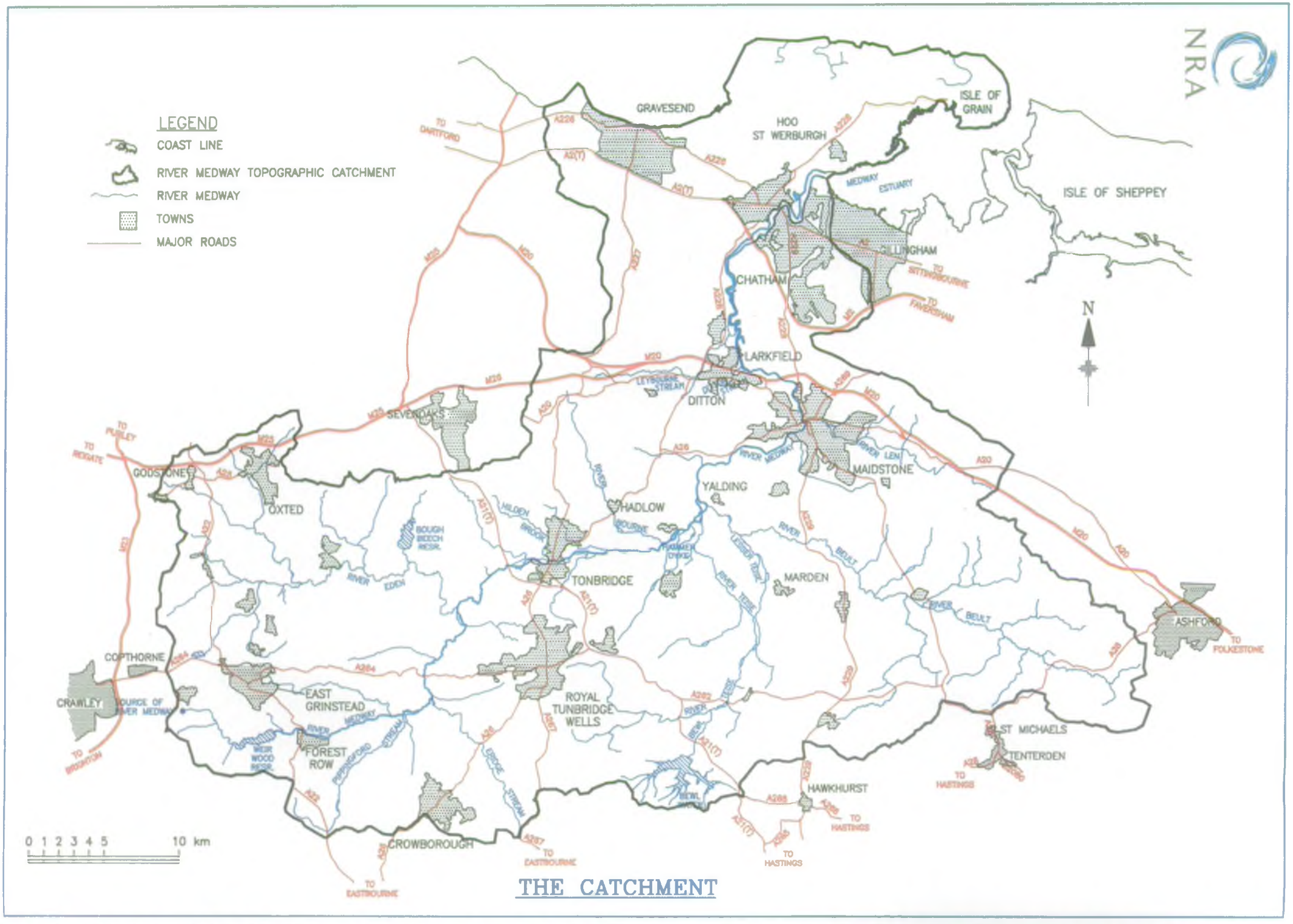
The NRA is consulted regularly on planning matters falling within its terms of reference, both in the preparation of statutory Plans and in connection with individual applications for planning consent. Recent guidance from the Department of the Environment has strengthened the links between the NRA and the Planning Authorities, but ultimate planning control remains with them.

Catchment Management Plans are complementary to the statutory Plans of Local Authorities; by stating clearly the NRA vision it is hoped they will make a positive input to the formal planning process, which is the responsibility of the District and County Councils.

IT IS IMPORTANT THAT THIS CATCHMENT PLAN IS READ IN THE CONTEXT OF COUNTY AND DISTRICT PLANNING POLICIES, ESPECIALLY THOSE CONCERNED WITH RECREATION, CONSERVATION, WASTE DISPOSAL, MINERAL EXTRACTION AND COUNTRYSIDE MANAGEMENT.

RIVER MEDWAY FINAL PLAN

SECTION A : STATE OF THE CATCHMENT



THE CATCHMENT

A.1 SUMMARY

The Medway is the largest river in the Southern Region of the NRA, rising to the north of Turners Hill near East Grinstead. In the High Weald the upper reaches and their tributaries run through deeply incised valleys, in contrast to the River Eden, a tributary which rises from the Chalk at the foot of the North Downs and drains the Wealden Clay, joining the Medway at Penshurst. The Wealden tributaries are very flashy with extremes of flow which may vary five-hundredfold between summer and winter, but downstream of the Eden confluence the gradient of the River Medway reduces, although it still collects flashy tributaries from the Greensand ridge to the north and the High Weald to the south.

The River Beult which rises near Ashford is the longest Medway tributary, joining the River Teise and the Medway at Yalding. From here the river cuts northwards through the Greensand Ridge collecting two more tributaries in the vicinity of Maidstone, the Loose Stream and the River Len.

Allington Lock to the north of Maidstone is at the head of a long estuary which runs northwards through the Chalk of the North Downs, following an over-large alluvial valley cut by an ice-age river.

Three reservoirs have been built in the Medway catchment since 1950. Much of the water from Weir Wood and Bough Beech reservoirs is exported from the catchment, but Bewl Water at the head of the River Teise is the regulating reservoir for the Medway Scheme, supporting a major river abstraction at the tidal limit in addition to its use as a source for a local water supply in the upper catchment.

Bewl Water, the largest reservoir in the NRA Southern Region, is filled mainly by pumping water abstracted from the river downstream. Bough Beech reservoir is similar, being filled largely by pumping from the River Eden, but Weir Wood relies entirely on its natural catchment. River abstraction to fill reservoirs normally takes place in autumn and winter when flows are at their highest.

The major groundwater abstractions in the catchment are from the Chalk, which drains to the Medway estuary. Smaller sources are found in the Lower Greensand and Hastings Beds in the central and upper catchment.

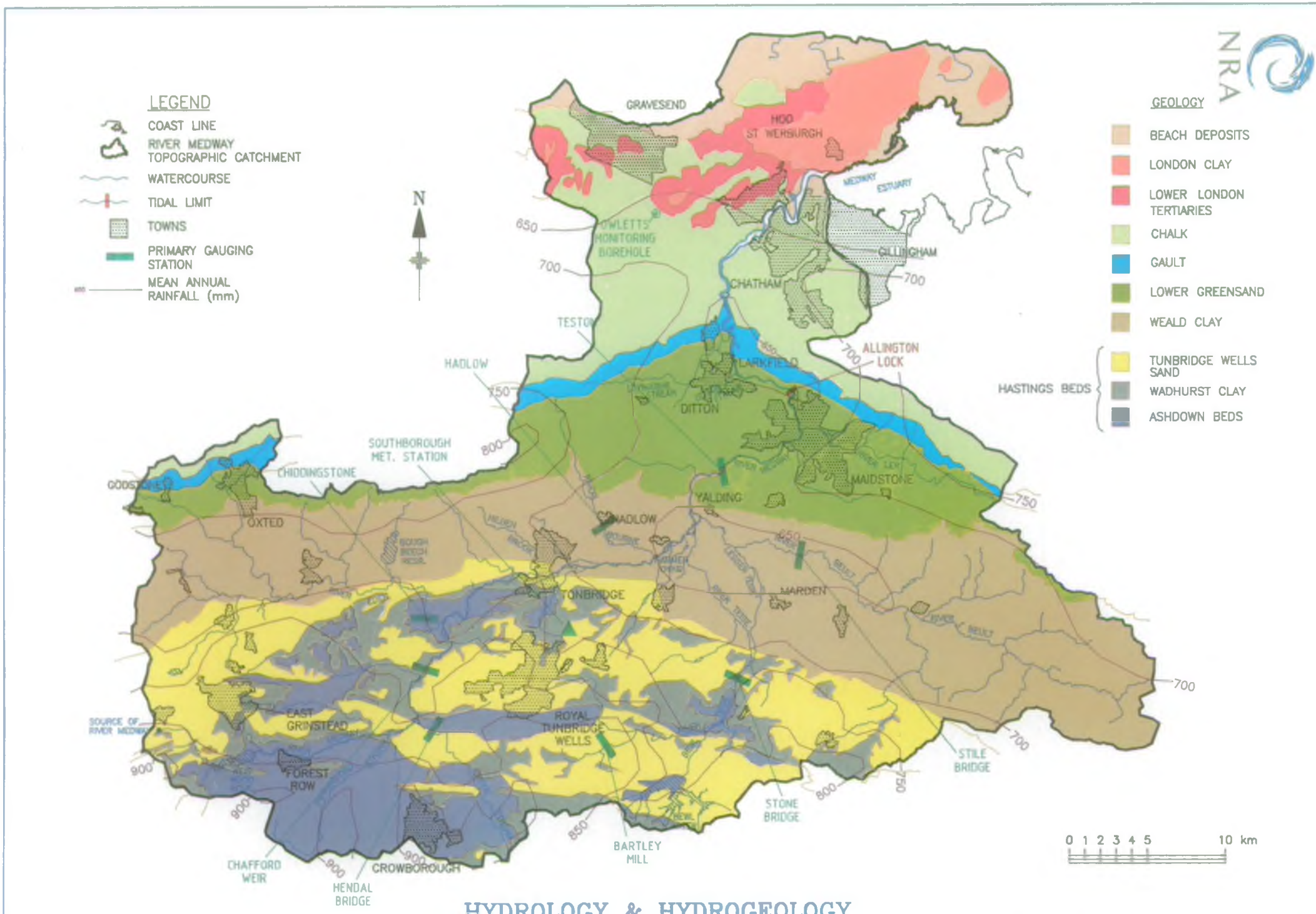
Low summer flows and high temperatures make Wealden rivers vulnerable to pollution, particularly from agricultural wastes whose disposal is made difficult by the topography and impermeable clay soils. Whilst urban development and industrialisation have taxed the river's ability to absorb waste in the past, improvements in effluent treatment have led to better river quality in recent years.

Population growth in commuter centres has resulted in treated effluent forming a high proportion of the base flow of rivers in the catchment, particularly below Crowborough, East Grinstead, Edenbridge, Tunbridge Wells and Tonbridge. Urban and industrial development have also been significant in relation to the upper estuary, the principal discharges being treated effluents from the paper and chemical industries, and sewage effluent from Aylesford and Snodland.

Flooding has been an historic problem throughout the Medway catchment where many towns have developed in the flood plain. The worst flood in living memory occurred in September 1968, causing massive damage to Tonbridge, which straddles the river. The town is now protected by a barrier and sluice gates at Leigh, 3 kilometres upstream. At times of heavy rainfall the flow through the gates is restricted to prevent flooding downstream, at the expense of agricultural land above the barrier. Once river flows have fallen below the capacity of the natural channel the stored water is drained at a controlled rate.

The headwaters of the Medway and its tributaries support small populations of native brown trout, although most game fisheries in the area rely on stocked fish. In the middle and lower reaches the deeper water supports prolific coarse fisheries which attract considerable angling interest. In wet years the occasional sea trout or salmon is reported, but poor water quality in the estuary prevents the establishment of a self-sustaining population at present.

The public right of navigation in tidal waters is administered by the Medway Ports Authority; the non-tidal river between Allington and Tonbridge is a public navigation which dates from 1664 and is now operated by the NRA. Since 1988 the management of the middle reaches for wildlife, landscape conservation and public recreation has been vested in the Medway River Project, a partnership between the NRA, Kent County Council, Maidstone Borough Council, Tonbridge & Malling Borough Council and the Countryside Commission.



HYDROLOGY & HYDROGEOLOGY

A.2 HYDROLOGY AND RAINFALL

With 1400sq.km above the tidal limit and a further 400sq.km to Rochester Bridge, the Medway catchment is the largest in the Southern region of the NRA.

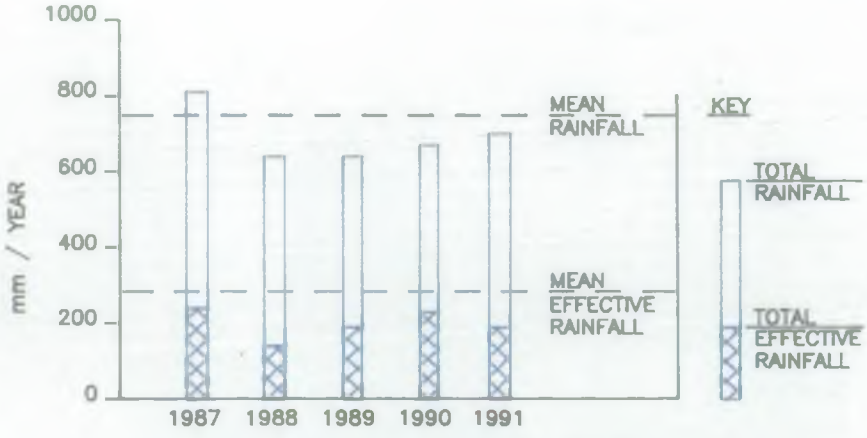
Mean annual rainfall across the catchment varies from 650mm in the lower Medway to more than 900mm in the upper reaches. From 1987 to 1991 rainfall was below the long-term mean, a situation which is reflected in the groundwater record.

The components of the catchment consist of the Medway itself and three main sub-catchments; the Teise, Beult and Eden. The River Medway rises on the Tunbridge Wells Sandstone north of Turners Hill, flowing east and north across the silts, sands and clays of the Hastings Beds to its confluence with the River Eden at Penshurst. The Eden catchment is predominantly on the Weald Clay, receiving some spring flow from the Lower Greensand and a small input from the Chalk on its north western margin.

The Rivers Teise and Beult drain the south eastern third of the catchment and meet the Medway at Yalding. The Teise receives run-off and some baseflow from the Hastings Beds and is supported by releases from Bewl Water, whereas the Beult is fed predominantly by surface water from the Weald Clay.

Downstream from Yalding the Medway flows across the Lower Greensand to the tidal limit at Allington Lock. The estuary above Rochester Bridge is approximately 20km in length, running through alluvial deposits overlying the Chalk.

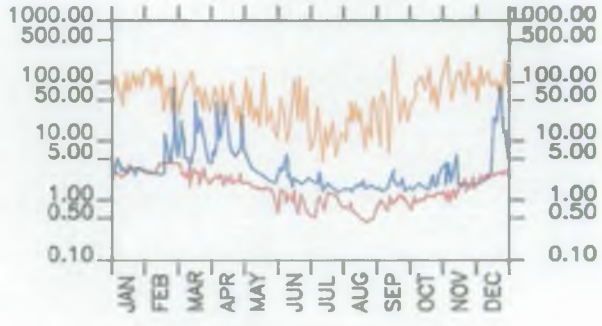
The main gauging station on the Medway is at Teston, downstream of Yalding. Records show that the catchment responds rapidly to rainfall and has a wide range of flows, with the maximum daily mean up to 100 times the minimum in any one year (this compares with a factor of 500 for some tributaries on the High Weald). The record from Teston gauge shows how the natural flow was reduced during the prolonged drought of 1987-1989, and the beneficial effect to the river which resulted from releases from Bewl Water for abstraction at Springfield, near the tidal limit.



Annual Rainfall Record from Southborough Station
Long Term/Mean and Actual Evapotransport Data from MORECS Database
Annual Mean Rainfall Data 1941–1970

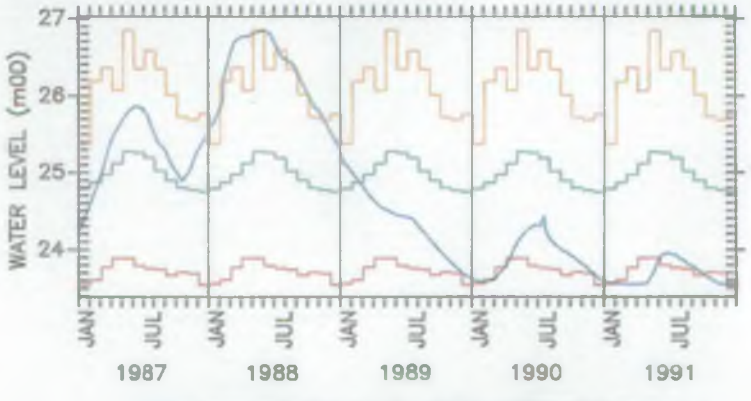
DAILY FLOW HYDROGRAPH (m^3s^{-1})

Max. and min. daily mean flows from 1962 to 1991 with an example yearly hydrograph (1989)



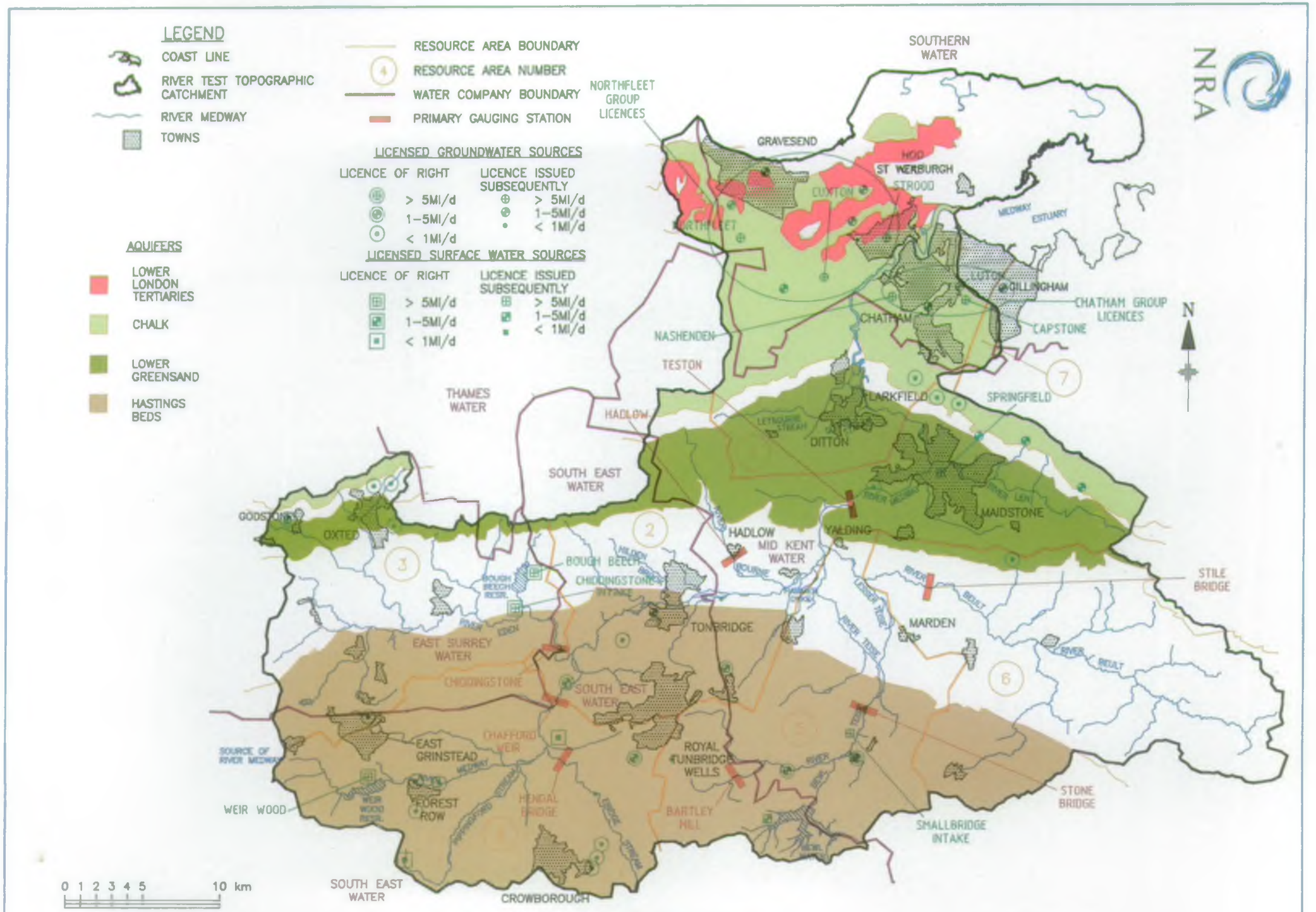
MEDWAY AT TESTON

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



Actual groundwater levels 1987–1991. This can be compared to long term Max, Min and Mean values calculated from years 1968 to 1991

HYDROMETRIC DATA



PUBLIC WATER SUPPLY

A.3 WATER SUPPLY

Public Water Supply from Surface Sources

The Water Resources Act 1963 entitled sources in operation before 1st July 1965 to continue under a Licence of Right. Since then new licences have been issued subject to conditions to protect the environment, existing lawful interests and the balance of aquifer resources.

Abstraction from the river and its tributaries is normally regulated by reference to Minimum Residual Flows (MRF, see Appendix 2 for definitions) set at control points, but at times when the security of the public water supply is at risk the MRF may be modified by Drought Orders to allow increased abstraction. The terms of a Drought Order usually include conditions limiting non-essential uses of water whilst the Order is in force.

The three major surface water supply schemes in the Medway catchment are:-

Weir Wood Reservoir

Weir Wood is the oldest reservoir in the catchment, completed in 1954 and located in the headwaters of the Medway above Forest Row. It is a simple impoundment reservoir operated by Southern Water Services for direct abstraction to supply, serving Crawley (in the Thames catchment) and providing a bulk supply to South East Water Ltd for use in the Haywards Heath area (Sussex Ouse catchment).

Bough Beech

Bough Beech is a pumped storage reservoir to the north of Chiddingstone operated by East Surrey Water Plc. In addition to a small component from the Bough Beech stream, water is abstracted from the River Eden and stored in the reservoir for direct supply to the Reigate area in the Thames catchment.

Bewl Water

Bewl Water is a pumped storage reservoir on the Bewl Stream south east of Tunbridge Wells and is the regulating reservoir for the River Medway Scheme. The main abstraction for supply is operated by Southern Water Services at Springfield, near the tidal limit, and is subject to an MRF of 352 Ml/d at Teston. This will be revised to 275 Ml/d on completion of the new Yalding intake (expected by 1995), being the flow needed to protect water quality in the estuary below Allington.

At times of natural low flow the Springfield abstraction is supported by releases from Bewl Water, benefiting other uses in the intervening reaches of the river. The reservoir is currently filled by abstraction from the River Teise at Smallbridge, but the new intake will allow much higher rates of filling in the winter, increasing the yield of the Medway Scheme to 136 Ml/d. Mid Kent Water Plc has a 25% share in the scheme, including a direct abstraction from Bewl Water to supply local demand in the Lamberhurst area.

Mean monthly flows at Teston fell below the MRF of 352 Ml/d for an average of four months a year during the 1980s, but in 1989 and 1990 they were below 352Ml/d for eight and six months respectively. Drought Orders were granted in both these years allowing the MRF at Teston to be reduced to 100 Ml/d, although this lower freshwater flow had a significant impact on the quality of the upper Medway Estuary.

Public Water Supply from Groundwater

A National Groundwater Protection Policy (GPP) was implemented by the NRA in December 1992 to continue the control over potentially polluting activities formerly exercised in this Region under a local Aquifer Protection Policy.

GPP Zones are defined in terms of the travel time for water contributing to the abstracted resource, and are applied to sources used for potable supply or for commercial food or drink production. A graduated scale of restrictions on potentially polluting activities will be applied to designated GPP Zones.

Zone 1. Inner Source Protection

The zone around a water source encompassing the 50 day saturated flow travel time area (minimum 50m), other than where the aquifer is confined below a layer of very low permeability.

Zone 2. Outer Source Protection

The zone surrounding Zone 1, encompassing the 400 day saturated flow travel time area, or the recharge catchment area calculated using 25% of the long term abstraction rate, whichever is the larger. This zone is not generally defined for confined aquifers.

Zone 3. Source Catchment Zone

The area from which groundwater will eventually reach the source. This may be very large and in the case of confined aquifers may be some distance from the actual abstraction.

Groundwater abstraction from the Chalk accounts for over 70% of the total for public supply, with almost all these licences located in the North Kent chalk block in the catchment of the Medway estuary. This resource is considered to be fully developed and there is a presumption against granting licences for new abstractions. Observation boreholes have been installed near the coast to monitor the fresh/saline groundwater interface and to provide an early warning of problems.

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 on the northern margin of the Lower Greensand outcrop. A further two sources in the upper reaches of the River Eden sub-catchment are operated by East Surrey Water Company.

Groundwater abstraction from the seventeen sources in the Hastings Beds accounts for less than 20% of the licensed total, the majority being from the Ashdown Sands. The yield of individual boreholes is generally low and the characteristically high concentration of iron adds to the cost of treatment. There is concern that groundwater abstraction from these sources may result in the loss of minor spring flows, drying of the soil and local detriment to the natural ecology of the area.

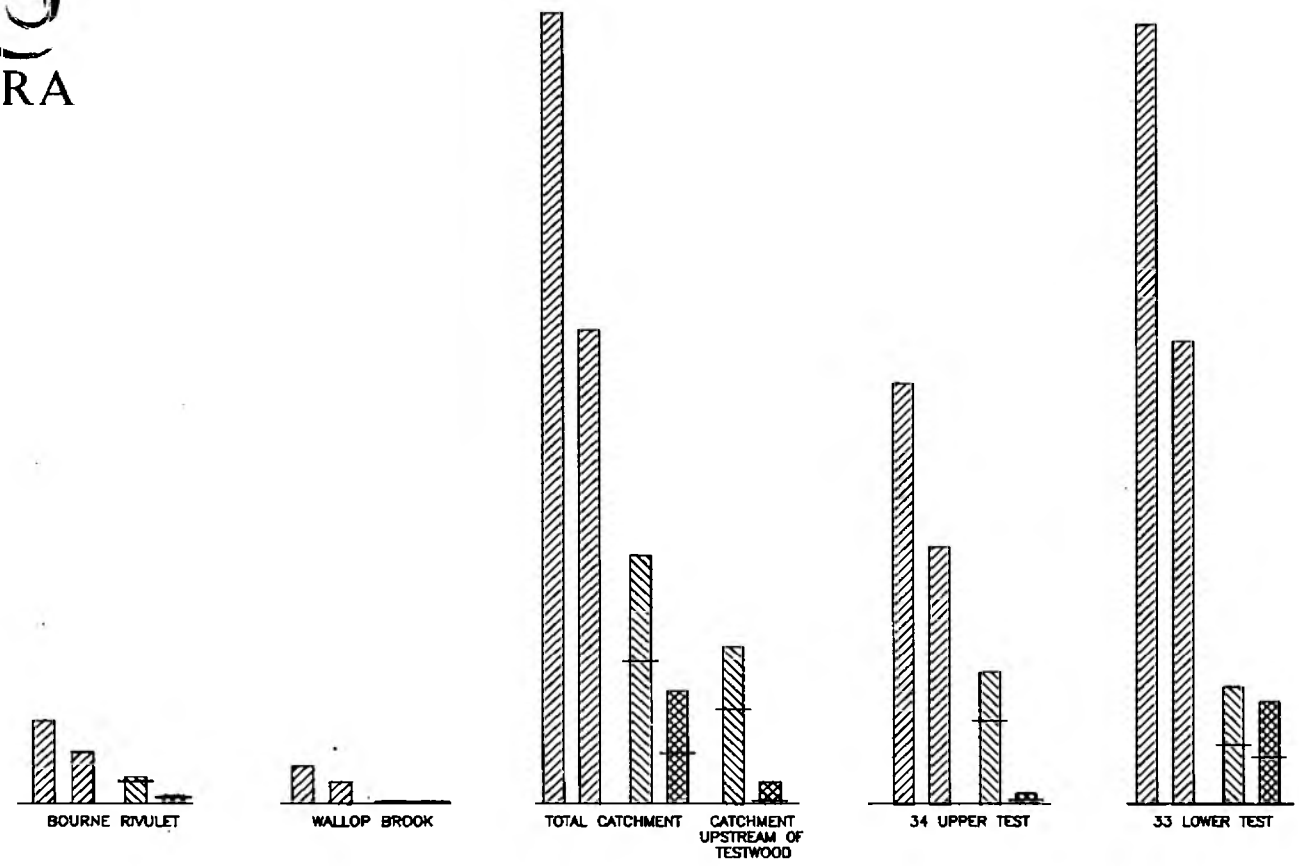
Water for Industry and Agriculture

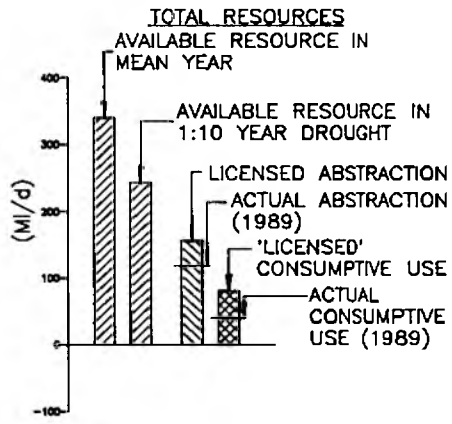
Within the catchment there are two hundred and eighty one licences for industrial/agricultural abstraction 85% of which are 'agricultural', including licences for spray irrigation, private borehole supplies to farms and one groundwater supply for a fish farm. The volumes licensed for agriculture are generally very low and amount to less than 5% of the total in this category.

The controlling MRF at Teston is increased progressively for new licences as the total licensed abstraction increases, with the result that recently issued licences are more restrictive and may limit abstraction to the winter and require on-site storage if the water is for a consumptive use in the summer months.

By far the largest industrial water users are the two paper mills near New Hythe to the north-west of Maidstone which account for over 80% of the total licensed abstraction in this category, the majority from surface water. Other large licensed abstractions are for cement production and gravel washing, most of these being non-consumptive. In the six years preceding 1990 the actual volume abstracted by industry was considerably lower than the maximum allowed.

NRA





Resource Area	'Licensed' Consumptive Use (% of Resource)	
	Mean Year	1:10 Year Drought
34 UPPER TEST	3	4
33 LOWER TEST	13	24
TOTAL CATCHMENT	14	26
UPSTREAM OF TESTWOOD	3	5
Sub-catchment Area		
BOURNE RIVULET	11	18
WALLOP BROOK	8	15

USE OF THE WATER RESOURCE

A.4 USE OF THE WATER RESOURCE

The total resource (see Appendix 2 for definitions) is available either as stream flow or as a contribution to groundwater and has been assessed for both the "mean year" and the 1:10 year drought. Table 1 compares these figures with the total annual licensed abstraction and the consumptive use, allowance having been made for the volume of water returned as effluents. Where data are not available for gravel washing operations the volume returned is assumed to equal the licensed abstraction.

A large flow is required to flush the river and to maintain water quality in the estuary, once this has been allowed for the catchment is seen to be heavily developed for water supply. In an average year over half the annual resource is allocated for abstraction under licence, and consumptive use is approximately a quarter of the total resource. During a 1:10 year drought the available resource is halved and consumptive use rises to more than 50%.

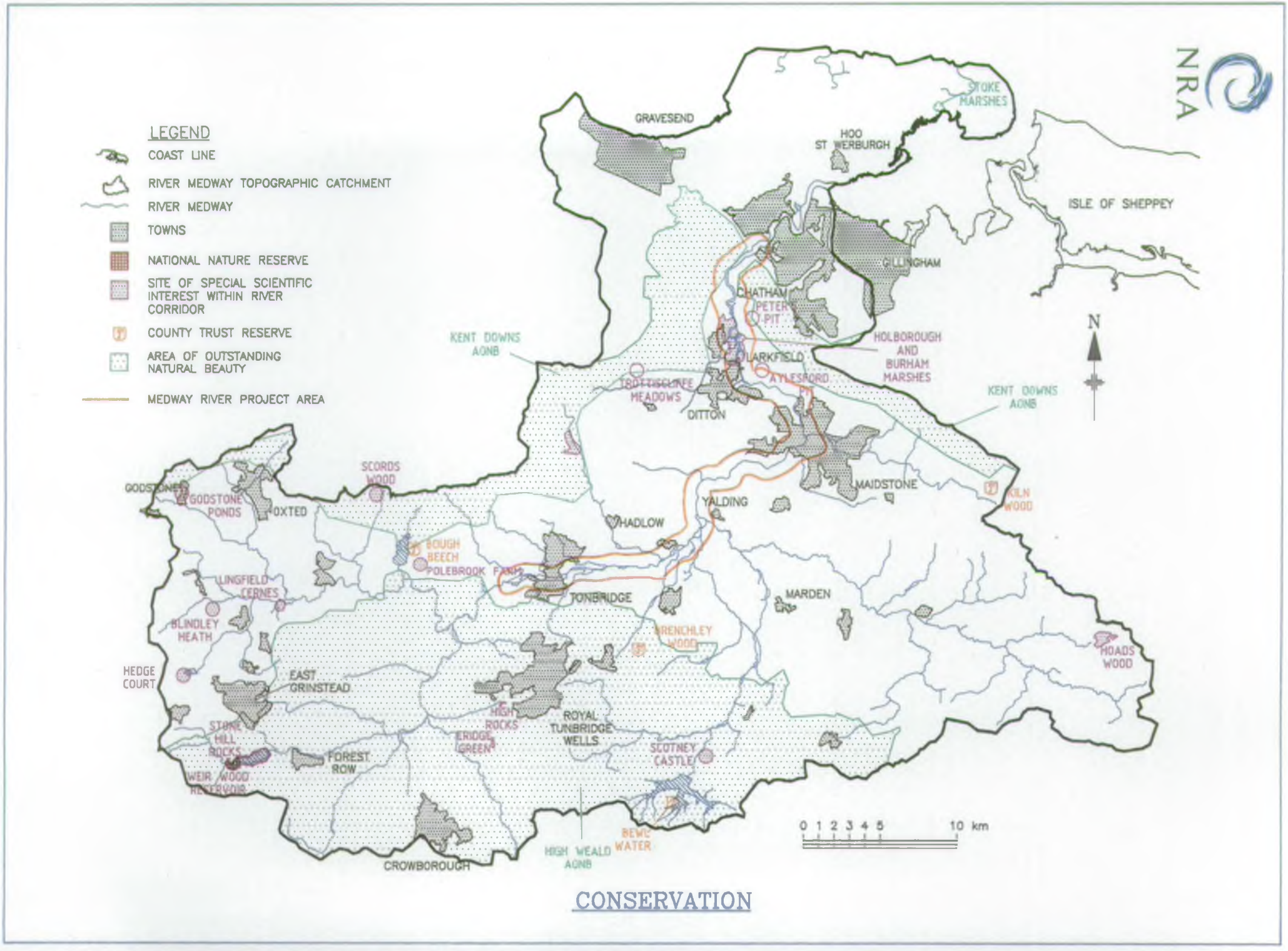
Table 1. Use of the Water Resource

Resource Statistics (indicative data)		Average Year	1:10 Year Drought
Rainfall	(mm/yr)	730	570
Effective Rainfall (ER)	(mm/yr)	240	150
Licensed Abstraction	1) Ml/d	580	580
	2) mm/yr	140	170
	3) % of ER	58	113
Consumptive Abstraction	1) Ml/d	320	320
	2) mm/yr	70	90
	3) % of ER	29	60

The resources of the Chalk and Lower Greensand aquifers are considered to be fully committed to existing licences and leave little scope for further development. Limited additional resources are available from the Hastings Beds, although the environmental impact of abstraction from these minor aquifers needs to be investigated before licences are issued.

The Bough Beech Reservoir scheme uses the resources of the Eden sub-catchment very effectively, but exports most of the water to the Thames catchment. In contrast, the Upper Medway and Beult resource areas are only lightly developed, indeed effluent discharges to the Beult catchment result in a small net resource gain.

The resources of the River Bewl sub-catchment are discussed above in Section A.3 in relation to the River Medway Scheme.



CONSERVATION

A.5 LANDSCAPE AND CONSERVATION

The place names and small-scale field pattern over much of the Medway catchment reflect a history of agricultural land having been reclaimed from the ancient Wealden Forest. Remnants of this are found on the Greensand and in the steeper valleys of the Hastings Beds, where hedges sometimes represent the boundaries of forest clearings rather than having been planted to divide areas of open land. Woodlands within the river corridors are small and fragmented. Unimproved pastures are scarce outside the scheduled conservation sites (eg Nature Reserves, SSSIs, Sites of Nature Conservation Interest).

The area supports mixed agriculture with beef and dairy farming in the High Weald and a concentration of orchards between Tunbridge Wells and Maidstone. More extensive areas of arable farming are situated on the flat land of the flood plains with smaller expanses along the upper reaches of the Teise, Medway and Eden. The cultivated land produces cereals, horticultural crops, soft fruit and hops, the main areas for orchards being on the valley slopes south and west of Maidstone. Dairying, as a component of mixed farming, becomes predominant west of Tonbridge; the more extensive pastures along the upper reaches of the Eden are also grazed by sheep.

Open water is a common habitat in the catchment, often in the form of ornamental lakes, reservoirs or flooded gravel pits. Flooded iron workings dating from the Tudor/Stuart period are a common feature of the upper catchment and the Wealden clay is dotted with small ponds which were originally dug as marl pits or for cattle watering. These still waters cover the complete range of productivity, supporting an interesting aquatic flora and fauna and are important for wintering wildfowl and breeding birds.

Conservation objectives require a variable river flow which reflects the natural conditions of the river, allowing the development of river bed gravels, meanders and pool-riffle sequences and a channel size appropriate to the flow regime. The mean monthly flow equivalent to a 1:10 year drought is an acceptable minimum in most river reaches, but occasional spate flows are required to inundate wetlands and scour the river channel. Existing fringes of trees or marshland vegetation should be maintained and water weeds managed to ensure the continued survival of healthy aquatic vegetation. River banks are fragile, needing protection by managing recreational activity, limiting access for farm stock, and controlling the speed of river craft. Sluices, locks and weirs require sympathetic management to prevent bank erosion and to control water levels whilst protecting wetland habitats. Ditches should be maintained in a way which encourages rather than destroys ecological diversity.

The Countryside Commission operates a Stewardship Scheme which provides grants to landowners for the restoration or protection of natural wildlife habitats, including "Waterside Landscapes". Under this scheme, which is generally welcomed by the NRA, soil water levels must be raised during the first winter and the regeneration of natural grassland and herbs encouraged. Ditches and dykes should be maintained in rotation without the use of herbicides.

Special Conservation Areas

Between Rochester and Maidstone the Holborough and Burham Marshes SSSI includes some of the extensive unimproved grassland of the tidal floodplain with reedbed, fen, carr and open water communities. These marshes are vulnerable to changing water levels, a point which may conflict with other catchment uses which require a lower water table.

In the Eden catchment wet alder woods and open water form the principal habitats of Godstone Ponds SSSI, further downstream, Lingfield Cernes (a wet meadow beside the River) has been notified for its unusual grassland community which includes some nationally scarce plants. Valley alder woods alongside the River Bourne have been scheduled and two further SSSIs at Cowden Meadow and Sissinghurst Park Wood lie adjacent to tributaries. Other scheduled sites in the catchment are situated on higher ground beyond the influence of river management operations, but many are sensitive to local changes in groundwater levels.

Only a few of the County Trust Reserves lie within the river corridor, but Kiln and Brenchley Woods are situated on higher ground beside two of the smaller tributaries and are within 1km of the watercourse. The NRA takes account of the Trust's Sites of Nature Conservation Interest (SNCI) when considering flood defence works or discharge, abstraction and planning proposals.

RECREATION AND AMENITY

A.6 RECREATION AND AMENITY

The Medway catchment is used extensively for recreation and amenity. The towpath between Tonbridge and Allington forms part of the long distance Weald Way and there is public access to the water at Weir Wood, Bough Beech and Bewl Water reservoirs. A number of tributaries are also accessible via the public footpath network. Several long distance footpaths cross the catchment, including the North Downs Way, the Greensand Way, Weald Way (see above), Sussex Border Path, Eden Valley Walk, Vanguard Way (from London to the South Downs), and the Forest Way which runs along the Medway from Hartfield to Weir Wood Reservoir.

The Medway River Project, which has been in existence since 1988, is a partnership between the NRA, the Countryside Commission, Kent County Council and the District Councils serving the area between Leigh Barrier and the Rochester- Chatham conurbation. Its purpose is to coordinate action and harness community support for the benefit of wildlife, conservation, landscape management and public access along the river corridor. The Weald Way has been developed by the Project team in connection with the local footpath network and there are plans to extend it down the estuary. Volunteers and Project staff have also built angling facilities for the disabled, cleared litter, managed bankside vegetation, planted reedbeds and trees and worked with the community to improve awareness of the river environment.

Below Tonbridge the Medway Navigation is extensively used for recreation. This activity is controlled by NRA byelaws to minimise conflicts and environmental damage.

The river corridor is popular for informal recreation:-

* Bird watching is encouraged on all the reservoirs and at the gravel-pit lakes at Snodland.

* There are nature walks at the reservoirs and at Barden Park, between Leigh and Tonbridge.

* Areas of parkland adjoin watercourses at Leeds Castle and Mote Park on the River Len; Loose Valley Park on the Loose Stream; Barden Park, Tonbridge Castle and Penshurst Place on the Medway; Hever Castle on the River Eden and Scotney Castle on the River Bewl.

* There are picnic areas at Bewl Water and at Teston Lock upstream of Maidstone.

Watersports

Bewl Water, with 312 ha of open water, is the main centre for outdoor recreation. The number of day-visits for each purpose in 1989/90 was as follows:-

Birdwatching/Picnics	150,000
Angling	30,000
Educational Watersports	12,230
Windsurfing	1,200
Canoeing	900
SCUBA Diving	250
Sailing	24,820
TOTAL	219,400

These numbers are likely to increase as the recreational potential of Bewl Water is developed. Conflicts are rare in spite of the high level of use for a variety of purposes, but with the reservoir having the primary operational functions of water supply and river regulation it must be accepted that water levels will fluctuate and may at times be significantly reduced.

Canoeing is permitted (on application) by riparian owners on the River Medway between Forest Row and Leigh Barrier. There is a potential conflict of interests between canoeists and anglers, particularly on the upper reaches of the river, which can be avoided if canoeists respect the need to seek permission before using private waters.

Navigation

There is a public right of navigation on tidal waters, which is administered by the Medway Ports Authority below Allington Lock. From here to the Leigh Flood Barrier the NRA is the statutory navigation authority for the freshwater Medway Navigation, which includes ten locks capable of accommodating craft up to 24.5 metres long and 5.6m beam. NRA sluice keepers trim water levels and operate Allington Lock and the lifting bridge at Yalding, other locks are operated by boat owners themselves.

Navigation Licences issued in 1990

Recreational vessels, short term	1,109
Powered craft, long term	895
Canoes, rowing and sailing boats	640

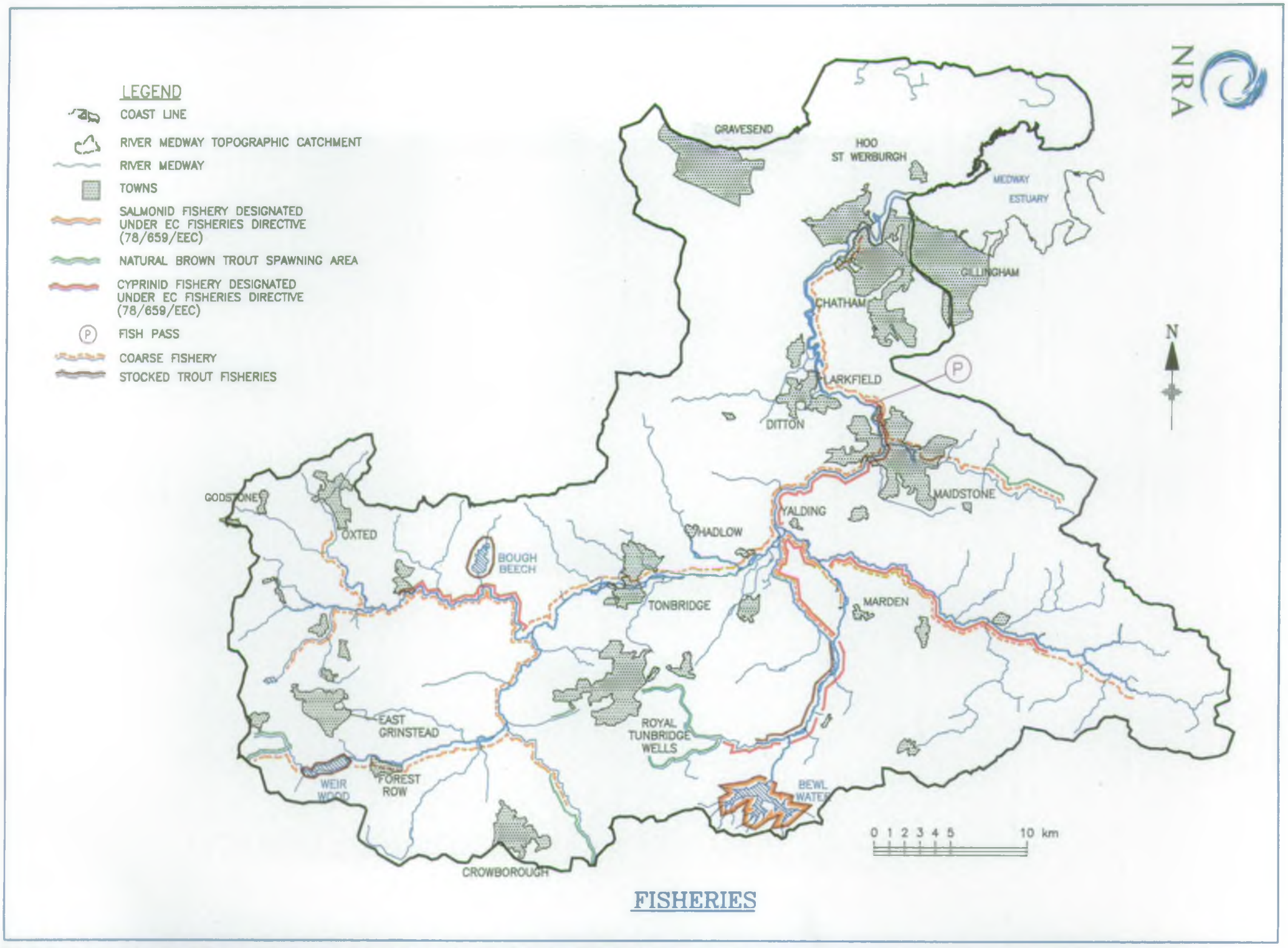
Maximum draught available for vessels using the Medway navigation

Tidal estuary	2.13 m *
Allington Lock to Maidstone	2.00 m
Maidstone to Yalding	1.70 m
Yalding to Leigh	1.20 m

* Navigation is restricted at low tide

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

Excessive speed by powered river craft damages the river banks and a speed limit of 5 knots is maintained throughout the freshwater Navigation.


LEGEND
COAST LINE
RIVER MEDWAY TOPOGRAPHIC CATCHMENT
RIVER MEDWAY
TOWNS
SALMONID FISHERY DESIGNATED UNDER EC FISHERIES DIRECTIVE (78/659/EEC)
NATURAL BROWN TROUT SPAWNING AREA
CYPRINID FISHERY DESIGNATED UNDER EC FISHERIES DIRECTIVE (78/659/EEC)
FISH PASS
COARSE FISHERY
STOCKED TROUT FISHERIES
NRA
GRAVESEND
HOO ST WERBURGH
MEDWAY ESTUARY
GILLINGHAM
CHATHAM
LARKFIELD
DITTON
MAIDSTONE
YALDING
HADLOW
GODSTONE
OXTED
BOUGH BEECH
TONBRIDGE
MARDEN
EAST GRINSTEAD
ROYAL TUNBRIDGE WELLS
WEIR WOOD
FOREST ROW
BEWL WATER
CROWBOROUGH
N
0 1 2 3 4 5 10 km

FISHERIES

A.7 FISHERIES & ANGLING

Salmon and migratory trout are found only rarely in the rivers of the Medway catchment because of poor estuarine water quality, inadequate attractant flows in dry years and a difficult passage at Allington Lock. The encouragement of a healthy population of migratory salmonids is an objective of the NRA, all new locks and structures within the river channel are designed to be passable to these fish and the Authority is working towards a steady improvement in estuary water quality.

Native Brown Trout are well distributed in suitable tributaries, particularly the Teise, Bourne, Eridge Stream, Pippingford Brook and the Medway above Fordcombe. Farmed trout are stocked to some of these streams to improve sport and all three reservoirs in the catchment are managed as trout fisheries, relying mainly on Rainbow Trout. Bewl Water is designated as a salmonid fishery under the EC Freshwater Fisheries Directive (78/659/EEC). Grayling have been introduced to the Teise, but do not seem capable of sustaining a resident population.

There are extensive healthy coarse fisheries throughout the catchment, both in the rivers and still waters. Selected reaches of the Medway (Yalding to Allington), Beult (Hadmans Bridge to Yalding), Teise (Bartley Mill to Yalding) and Eden (Edenbridge to the Medway confluence) have been designated cyprinid fisheries under the EC Freshwater Fisheries Directive (78/659/EEC) and more will be added as water quality improves.

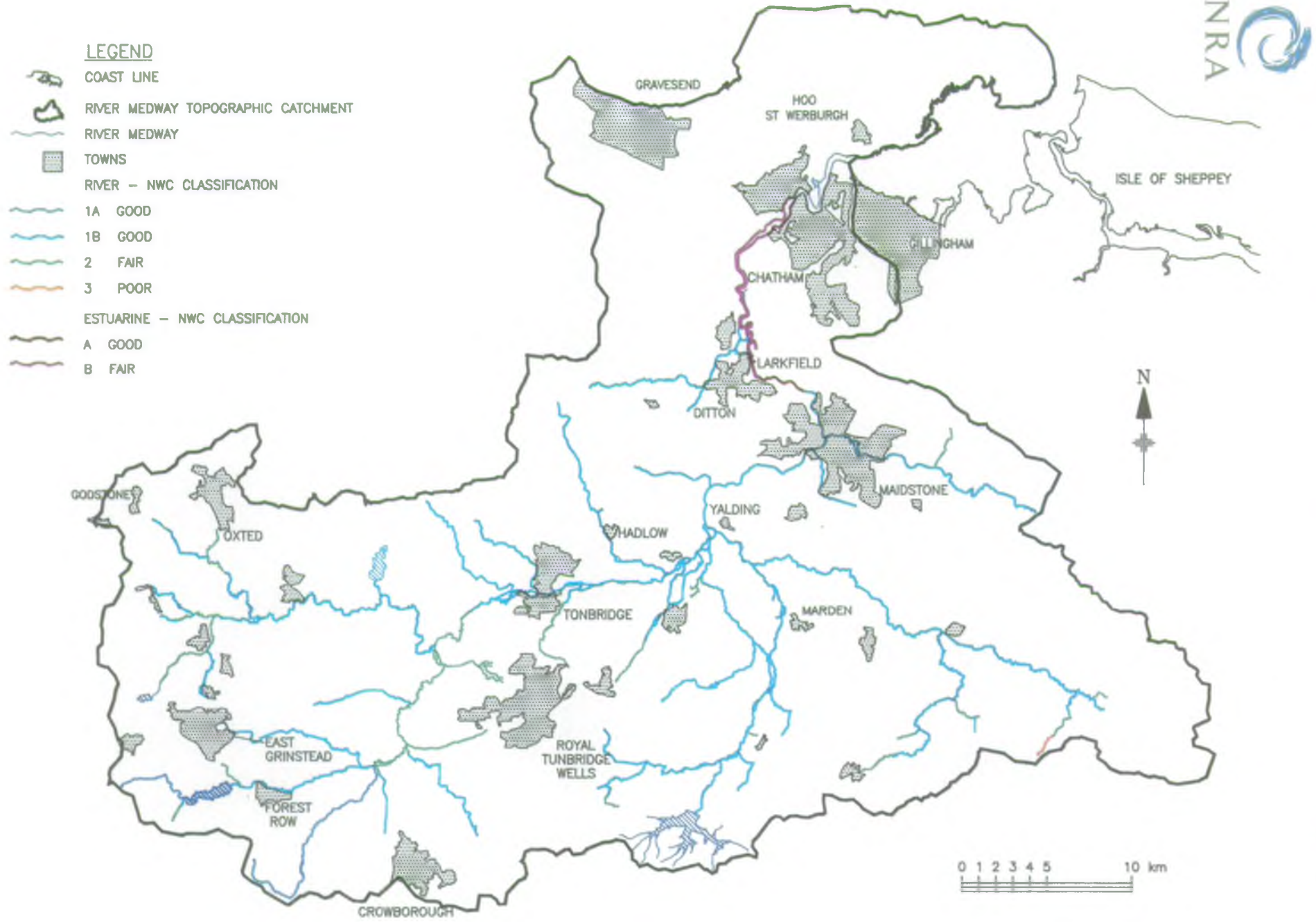
The distribution of fish species is strongly influenced by the activities of anglers and most species of Britain's coarse fish fauna are found in the catchment. This includes eel, gudgeon, stone loach, bull head, stickleback, minnow, perch, ruffe, pike, chub, barbel, bleak, roach, rudd, dace, bronze bream, tench, carp, crucian carp and goldfish. Smelt, mullet and flounders are found in the estuary but are excluded from fresh water by Allington Lock; brook lamprey (not strictly classified as fish) are common in the tributaries. European catfish have been reported from the Eden and grass carp (which do not breed in Britain) have been introduced to a number of still waters to control excessive weed growths.

Angling

The majority of angling waters in the Medway are private or syndicated to clubs, although many offer day tickets to visiting anglers. Trout fishing is available to the public at Weir Wood, Bewl Water and at a number of smaller privately managed fisheries, coarse angling abounds elsewhere with high quality fishing in the middle reaches of the Medway.

Water levels are kept high in summer on reaches of the Eden, Teise and Beult to maintain adjacent ditches as "wet fencing" for cattle. The resulting deep water enhances the angling value of the river (and is important for wetland conservation), but reduces its flood capacity. River levels are lowered in autumn in anticipation of high winter flows, but this makes the fisheries less attractive and the timing of the change can be a source of conflict between angling, conservation and farming interests.

Similar problems occur on the navigable reaches of the Medway where water levels are maintained by locks and sluices. Inconsiderate use of these control structures at times of low river flow can result in rapid fluctuations in water level, or even the draining of intervening pens.



NWC RIVER CLASSIFICATION

A.8 WATER QUALITY

River Quality Objectives

Rivers are the natural recipients of all drainage in a catchment and the discharge of effluents to them is a legitimate use, conserving and recycling the water resource; they have a natural ability to stabilise and degrade organic matter, but become stressed or polluted if this is exceeded. Conventional sewage treatment works operate by concentrating these natural processes within an optimised environment.

It is the duty of the NRA to set Water Quality Objectives for rivers and to control the nature, volume and composition of effluents to ensure that these objectives are met. They are currently set for inland waters in accordance with the National Water Council (NWC) which recognises four broad Classes (with a subdivision of NWC Class I, see table 2) based mainly on chemical criteria. The limitations of the NWC system are recognised and the NRA is developing a new scheme based on use-related standards, including the criteria of EC Directives in force on each reach.

Table 2. NWC Water Quality Classes

NWC Class	Remarks
IA Good	Exceptional water quality typical of upland rivers or chalk streams.
IB Good	Good water quality typical of clean lowland stream.
II Fair	Water quality typical of a lowland stream containing well treated effluent.
III Poor	Water quality in need of improvement.
IV Polluted	

With the exception of some NWC Class IA headwaters the nature of the catchment dictates that the objective of most reaches is NWC Class IB, and where streams provide low dilution for treated effluents NWC Class II may be appropriate.

Most reaches meet their objectives, but there are occasional local failures and problems may be encountered in summer when algal blooms or excessive weed growths are stimulated by low river velocities, high temperatures and the high nutrient content of the water. Table 3 summarises water quality objectives for non-tidal rivers in the catchment.

Table 3 Water Quality Objectives and Performance

NWC Class	Objective (km.)	Achieved 1991 (km)
IA	23.7	37.2
IB	312.2	219.6
2	60.1	124.5
3	0.2	11.6
4	-	3.3

Estuary quality is assessed using slightly different criteria. Under average freshwater flow conditions the upper estuary is generally "Good", declining to "Fair" below the industrial discharges in the Larkfield area. However, the quality of the estuary deteriorates to "Poor" when the diluting flow of fresh water is low (see "Effluent Disposal" below).

Effluent Disposal

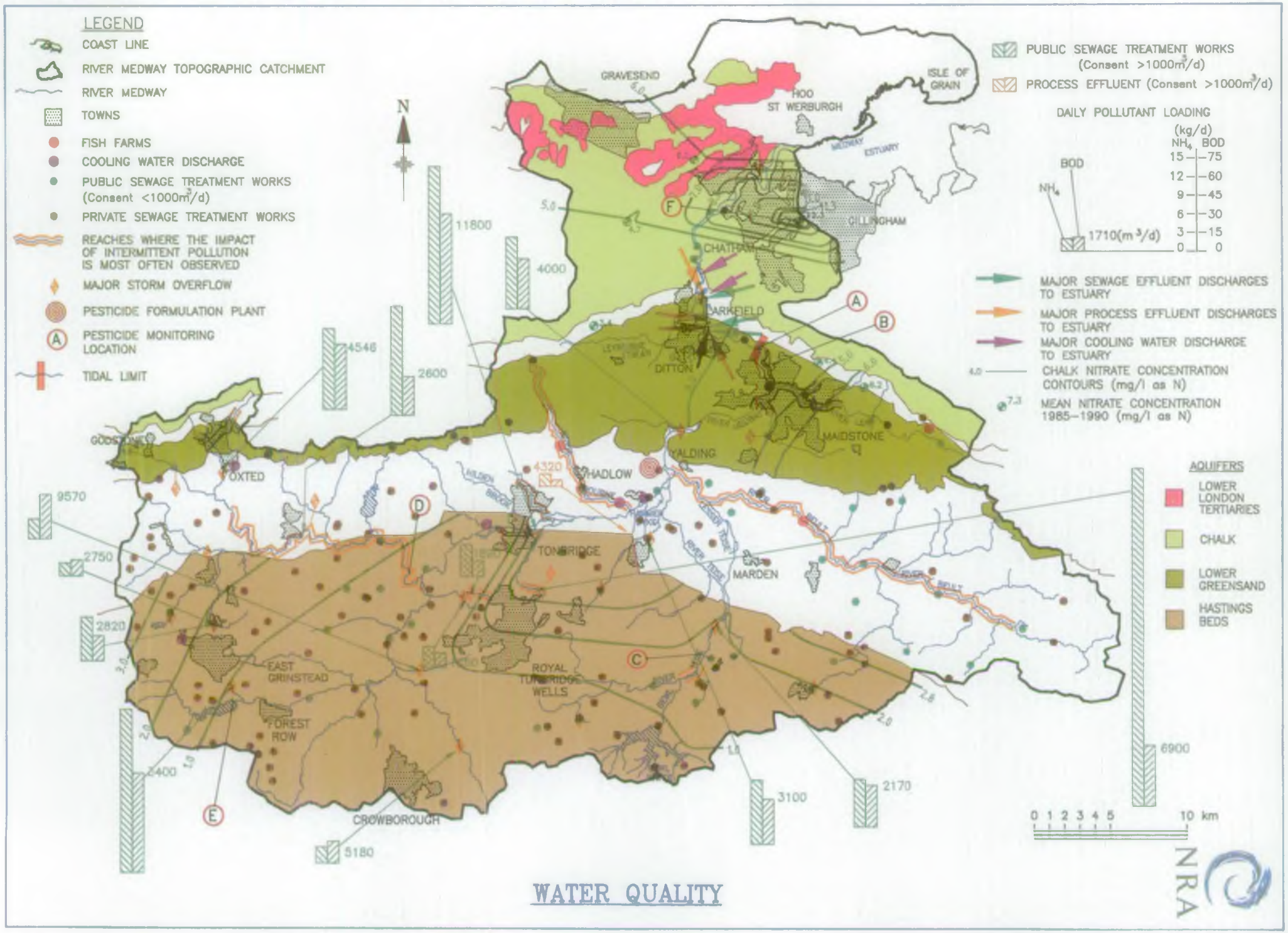
There are more than one hundred and eighty sewage treatment works in the Medway catchment, of which fifty four discharge more than 70 cu.m/day. Some significant discharges are to the upper catchment where dilution flows are naturally lower, requiring strict consent standards and high quality effluents.

Five of the ten consented industrial discharges in the catchment are to the tidal Medway between Allington and Rochester. The impact of these discharges is significant, high BOD loadings and a long residence time in the upper estuary lead to serious water quality problems and at times of low freshwater flow there may be a complete lack of dissolved oxygen in parts of the estuary.

Intermittent and Diffuse Pollution

The Medway catchment as a whole encompasses rural, urban and heavy industrial areas, giving rise to pollution events which vary in their frequency and impact. Sources include stormwater discharges, storm sewage overflows, accidental industrial, agricultural or road traffic spillages, and discharges derived from more diffuse sources such as runoff from highways or land.

At Yalding the catchment contains one of the largest agrochemical formulation plants in the country. Its location upstream of the major public water supply abstraction at Springfield (Maidstone) gives cause for concern about the potential for water pollution which might arise from a fire, accident or spillage on site, or from road transport accidents involving concentrated raw materials or finished products. Whilst the risk of serious pollution has been minimised by the implementation of strict safety measures, any further development of the site must be subject to close scrutiny.



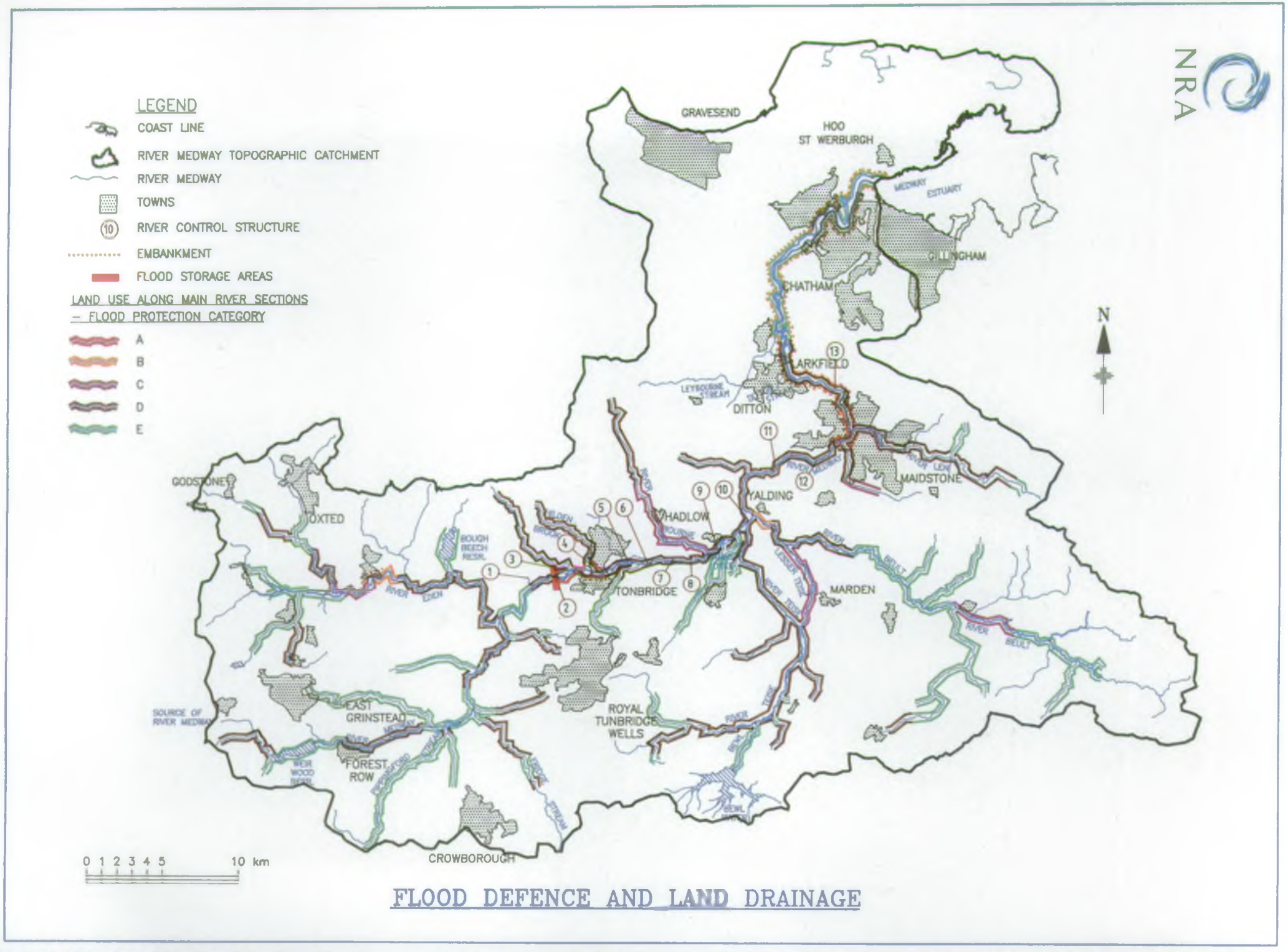
WATER QUALITY

Other potential hazards within the catchment include timber treatment plants, especially those sited near watercourses, and pollution from agricultural point sources. The NRA administers the 1991 Farm Regulations which cover the storage of slurry, silage and fuel. Farms are monitored and farmers advised on pollution prevention for both new and existing facilities.

Diffuse pollution in the form of run-off from land is also of concern, stimulating eutrophication of rivers and ponds. Following the first rains of autumn nitrate concentration in the River Medway at the Springfield intake sometimes exceeds the Maximum Admissible Concentration (MAC) permitted by the EC Drinking Water Directive. The nitrates are derived from land run-off and may result in the abstraction being shut down for periods of several days until the problem passes.

Management of the Medway Navigation has implications for water quality. The river is penned between locks creating pond-like conditions at times of low flow, allowing the growth of floating weeds and algal blooms which result in reduced levels of dissolved oxygen.

Groundwater nitrate concentrations in the North Downs chalk block occasionally exceed the EC Drinking Water Directive MAC, but are significantly below this level for the rest of the catchment. Surface and groundwater concentrations of the Triazine group of pesticides occasionally exceed the MAC, however the limited data from most monitoring sites puts the significance of these results in question. Additional monitoring is required to determine the true range of background levels.



FLOOD DEFENCE AND LAND DRAINAGE

A.9 FLOOD DEFENCE

In general the objective of flood defence is to protect people and property from flooding from rivers or the sea. Such protection cannot be absolute as the climatic conditions which cause flooding vary in their frequency of occurrence. Flood events are described in terms of their statistical frequency expressed as a return period, eg. 1 in 50 years. This does not imply that similar events will be separated by fifty years, but rather that in such a period one event of that severity can be expected. The effectiveness of flood defences is expressed in similar terms. Different types of land use (eg. housing, arable land, pasture etc.) require different levels of protection which are usually determined on a benefit/cost basis.

The NRA has a general duty of care which includes powers to control significant obstructions on any watercourse, but has special responsibility for the management of strategic reaches which have been designated "Statutory Main River". These are the rivers where the Authority promotes flood defence works and conducts routine maintenance operations. The criteria for designation of Main River are currently under review.

Flooding has been an historic problem throughout the Medway, Beult and Eden valleys, where many towns have developed in the flood plain adjacent to the river. The worst flood in living memory occurred in September 1968 causing massive damage to the town of Tonbridge and other areas.

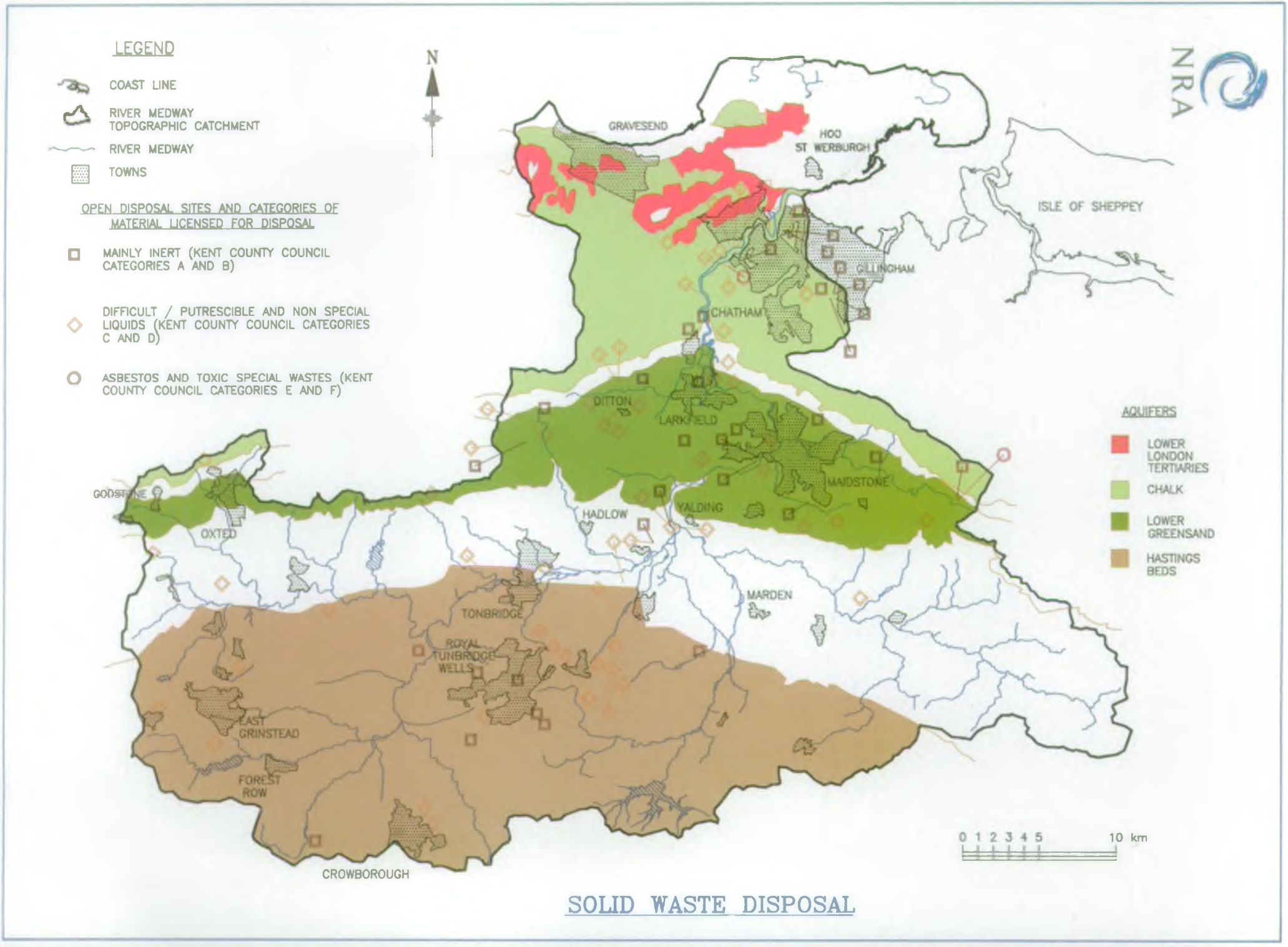
Floods in the middle reaches of the River Medway are now controlled by a barrier and sluice gates at Leigh. At times of heavy rainfall the flow through the gates is restricted to prevent flooding urban areas downstream, at the expense of agricultural land above the barrier. Once flows have fallen below the capacity of the river channel the stored water is drained at a controlled rate. The barrier is called into operation approximately twice a year.

In recent years flood defences have been improved at Maidstone and Edenbridge, towns which had suffered considerable flooding in the past. Areas of concern still exist on the Medway at Yalding, and at Headcorn and Smarden on the River Beult, but the work required to alleviate flooding is disproportionately expensive compared with the value of the property at risk.

Development in a catchment increases the amount and rate of run-off into rivers and may increase the risk of flooding. Development in the flood plain including loss of flood plain storage is an even greater problem, placing additional properties at risk and reducing the flow attenuation effects of the natural flood plain. The NRA is a statutory consultee for planning applications and advises the planning authorities on flood defence matters.

Agricultural Drainage

The objective of agricultural drainage is to control the water level in the soil to enable the cultivation of crops. Such drainage in low-lying areas is often the responsibility of Internal Drainage Boards (IDBs), which control drainage ditches within their areas up to the point where they discharge to a statutory Main River. There are two IDBs within the Medway catchment, the Upper and Lower Medway Internal Drainage Boards, whose boundaries are defined with reference to known flood levels.



SOLID WASTE DISPOSAL

2.10 SOLID WASTE DISPOSAL

There are some two hundred and ten known landfill sites within the Medway catchment, 60% of which have now been closed. The waste concerned ranges from mainly inert materials to potentially more difficult industrial waste or domestic refuse. Kent County Council, the waste disposal authority for the greater part of the catchment, has specific policies to control the location and operation of new sites and prefers redundant mineral workings to be used wherever possible. NRA comment on proposals for solid waste disposal is formulated with reference to the Groundwater Protection Policy.

The NRA operates a surface and groundwater monitoring network throughout the catchment, but it is not specifically related to disposal sites. However, no water quality problems associated with waste disposal have been reported from the Medway catchment.

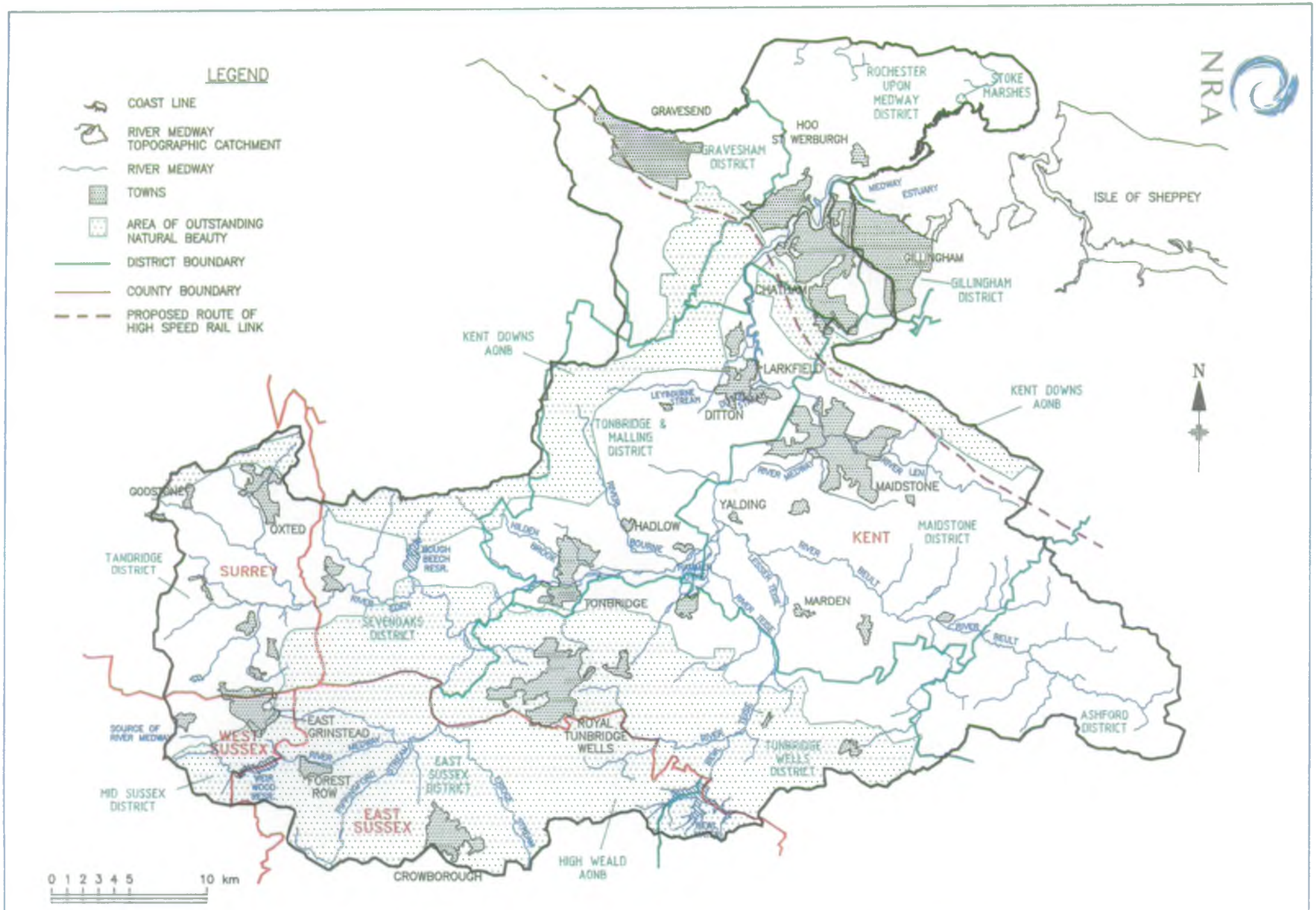
A.11 MINERAL EXTRACTION

For most of the catchment Kent County Council is the local authority licensing mineral workings. Construction aggregates form the principal mineral resource with alluvial deposits in the river corridor providing virtually all the coarser sands and gravels.

The extensive areas of open water downstream of Maidstone are flooded gravel pits, and gravel extraction continues in this area. There are similar flooded pits west of Tonbridge and major new reserves have been identified in the river valley downstream of the town. Many of the older abandoned workings have wildlife or recreational interest, especially where open water complements the conservation value of adjacent land. The Holborough-Burham Marshes SSSI is an example of such a designated site.

The Lower Greensand provides building sands, particularly in the Borough Green area where there are several active pits. Three other sites lie in the Oxted/Godstone area on the Kent/Surrey border where pure silica sands from the lower layers of the Folkestone Beds are worked 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 three sites, Allington quarry in north-west Maidstone, lying on the edge of the Medway corridor. Chalk and clay are also quarried from sites within the catchment, but being distant from the main river and its tributaries these operations have little impact on the river system.



INTERACTIONS WITH PLANNING AUTHORITIES

A.12 FUTURE DEVELOPMENT

Most of the catchment is within the County of Kent, comprising all or part of the Districts of Maidstone, Ashford, Tunbridge Wells, Sevenoaks, Tonbridge & Malling, and Rochester. Wealden District (plus a very small part of Rother) is in East Sussex; Mid-Sussex District lies in West Sussex, and Tandridge in Surrey.

The Structure Plans for these Counties identify areas of growth, the number of new houses and the area of land to be developed in each District for industry and commerce up to the year 2000. For the most significant districts in the catchment these are as follows:-

County	District	Housing No.	Industry ha.
Kent	Medway Towns	7500	120
	Maidstone & Malling	9000	80
	Tunbridge Wells	2800	20
	Tonbridge	700	5
E Sussex	Wealden	400	-
Surrey	Tandridge	3320	-
	TOTAL	23720	225

Development of the Medway Towns (mostly outside the area considered by the Plan) is likely to be substantial, but housing provision is expected to cater only for local needs. A large increase in demand for employment and tourism is expected.

Substantial growth is expected in the Maidstone area (including the Medway Gap), although mainly in response to locally generated demand. 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. High-technology industries, office development and services are expected on the site of West Malling Airfield.

Tonbridge has been an attractive area for investment in recent years although the pressure on development is now expected to reduce. Housing will be restrained, but local needs should be satisfied by infill and redevelopment. Tunbridge Wells is expected to generate development of new-technology, office and research organisations whereas Paddock Wood has been identified as having potential as a distribution centre. Development will continue in the East Grinstead area with 1,000 new houses projected up to 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.

RIVER MEDWAY FINAL PLAN

SECTION B : KEY ISSUES AND MANAGEMENT PROPOSALS

Our Aims are to :

- Achieve a continuing overall improvement in the quality of rivers, estuaries and coastal waters, through the control of pollution.
- Manage water resources to achieve the right balance between the needs of the environment and those of the abstractors.
- Provide effective defence for people and property against flooding from rivers and the sea.
- Provide adequate arrangements for flood forecasting and warning.
- Maintain, improve and develop fisheries.
- Develop the amenity and recreation potential of inland and coastal waters and associated lands.
- Conserve and enhance wildlife, landscape and archaeological features associated with inland and coastal waters of England and Wales.
- Improve and maintain inland waters and their facilities for use by the public where the NRA is the navigation authority.
- Ensure that dischargers pay the costs of the consequences of their discharges, and, as far as possible, to recover the costs of environment improvements from those who benefit.
- Improve public understanding of the water environment and the NRA's work.
- Improve efficiency in the exercise of the NRA's functions and to provide challenge and opportunity for employees and show concern for their welfare.

B. KEY ISSUES AND MANAGEMENT PROPOSALS

The Consultation Report and public consultation which preceded this Catchment Management Plan identified a number of issues in the Medway catchment. Many of these are being addressed by the NRA in the normal course of business, although the timing of solutions is dependent on the availability of funds and manpower. For information, the general Aims of the NRA are listed opposite.

In addition to these general management activites, a number of key issues have been identified which apply specifically to the Medway Catchment. These are discussed in this Section along with the specific management action which the NRA considers is needed to address these Key Issues. Most of the Management Proposals lie within the competence of the NRA, but many solutions require collaboration or independent action by others with an interest in the catchment. Some are mutually contradictory (eg. reducing channel capacity to improve low flow velocities : maintaining the flood capacity of the river) and priorities will have to be tailored to local circumstances.

The Key Issues are listed below and are elaborated upon, along with the Management Proposals, in the following tables. An Action Plan with suggested timings is included in Section C.

Issue 1	Poor Water Quality in the Upper Estuary
Issue 2	Conflict Between Abstraction and Other Catchment Uses
Issue 3	Conflict arising from intensive Recreational use of the Medway
Issue 4	Elevated Nitrate Concentration and Contamination of Groundwater
Issue 5	Elevated Nitrate Concentrations at Surface Water Intakes
Issue 6	Taste and Odour Problems in Potable Water taken from Surface Sources
Issue 7	Localised Failures of River Water Quality Targets
Issue 8	Flooding at Yalding, Headcorn and Smarden
Issue 9	Locks subject to shoaling and bank erosion
Issue 10	Locks and control structures in need of replacement
Issue 11	Litter
Issue 12	Development control
Issue 13	Climate change

ISSUE 1 Poor water quality in the Upper Estuary	
KEY ISSUES	**MANAGEMENT PROPOSALS**
* The concentration of industry alongside the estuary, its high pollutant load, the long estuary residence time, especially during drought periods, and the lack of freshwater flushing all have a serious effect on water quality. * The Drought Orders granted in 1989 and 1990 to reduce prescribed flows and allow continued abstraction for public supply had a significant adverse effect on water quality in the estuary. * Poor estuary water quality prevents access to the river by salmon and sea trout.	* Monitor effluent discharges to the estuary to ensure compliance with existing standards. **(NRA)** * Working in collaboration with Industry, set progressively higher effluent standards to improve estuary water quality within an agreed period of time. **(NRA)** * Set the MRF at Allington to improve estuary water quality whilst optimising the water resource of the catchment. **(NRA)**

ADAS Agricultural Development Advisory Service
BR British Rail
CC Countryside commission
DoE Department of the Environment
EN English Nature
IDB Internal Drainage Board
LA Local Authority
NRA National Rivers Authority
MAFF Ministry of Agriculture, Fisheries and Food
SWS Southern Water Services

ISSUE 2
Conflict Between Abstraction and other Catchment Uses

KEY ISSUES	MANAGEMENT PROPOSALS
* In the case of pumped storage water supply schemes there is a conflict between economic operation (using small abstraction pumps for prolonged periods over a range of river flows) and the need to protect other river uses by setting a high MRF and using large pumps to exploit peak flows.	* Review operating rules for abstractions to ensure that the optimum balance of interests is achieved. **(NRA, abstractors)** * Construct new intake at Yalding to enable Bewl Water to draw on a wider catchment, taking full advantage of high river flows to fill the reservoir. **(SWS)** * Once the Yalding intake is in operation, review the operating rules for releasing water from Bewl to improve support for low river flows. **(NRA, SWS)** * Set the MRF at Allington to optimise the water resource whilst ensuring sufficient fresh water flow to improve estuary water quality. **(NRA, abstractors)** * Restrict new consumptive abstractions from the Medway catchment to the winter period, backed by sufficient storage to support summer demand. **(NRA)**

ISSUE 3
Conflist arising from intensive Recreational use of the Medway

KEY ISSUES	MANAGEMENT PROPOSALS
* The River Medway is a major regional attraction, particularly downstream of Tonbridge, and is used intensively for boating, canoeing, informal recreation and angling. Conflict may arise between these uses, or between the requirements of recreation and the need to conserve the river corridor. The further development of navigation moorings in the Maidstone/Wateringbury reaches may have to be strictly controlled.	* Continue to support the Medway River Project to ensure dialogue and cooperation between recreational users. **(NRA, CC, LAs)**
* The management of water levels in the Teise, Beult, Eden and Eden Brook can be a source of conflict between angling, conservation and agricultural interests.	* Control riverside development and the provision of new moorings in congested areas. **(LAs, NRA)**
* The public health implications of developing intensive water-based recreation on rivers should be carefully considered by the appropriate authorities.	* Educate users about health risks of water-contact recreation. **(LAs, User Groups, NRA)**
* The conservation value of the river corridor can be enhanced by the preservation of an uncultivated buffer strip alongside the river bank. This feature is missing in much of the catchment, but could be reinstated through the sensitive application of government funded agricultural grant schemes.	* Review the management of water levels where navigation or flood defence requirements conflict with those of other river users. **(NRA)**
* Fisheries management may be in conflict with conservation objectives.	* Encourage Government agencies to structure agricultural grant schemes to favour the development of buffer zones alongside river banks and the maintenance of the river as a "green corridor" through the landscape. **(NRA, EN, CC, MAFF, owners)**
	* Encourage good fisheries management practice which is compatible with nature conservation. **(NRA, fisheries interests, owners)**

ISSUE 4
Elevated Nitrate Concentrations and Contamination of Groundwater

KEY ISSUES	MANAGEMENT PROPOSALS
* Groundwater nitrate concentrations in parts of the North Downs chalk aquifer exceed the MAC for the EC Drinking Water Directive.	* Apply the NRA Groundwater Protection Policy to minimise the possibility of sources becoming contaminated. **(NRA, LAs)**
* Groundwater is at risk from chemicals spilt by industry or from transport accidents. Continuing firm control is needed over development in sensitive areas, and to minimise the risks from road drainage.	* Investigate the need for the designation of Nitrate Sensitive Areas. **(NRA,DoE)**
	* Where appropriate, support moves to take land out of arable cultivation or to use less nitrogenous fertiliser in sensitive areas. **(NRA, MAFF, ADAS, farmers)**
	* Investigate blending water from different sources to ensure that the potable supply meets the nitrate criteria. **(Water Companies)**

ISSUE 5
Elevated Nitrate Concentrations at Surface Water Intakes

KEY ISSUES	MANAGEMENT PROPOSALS
* High nitrate concentrations are recorded in river water following the first significant rains in Autumn and can lead to the suspension of abstraction from the Springfield public water supply intake.	* Apply the NRA Groundwater Protection Policy to minimise the possibility of sources becoming contaminated. **(NRA, LAs)** * Investigate the need for the designation of Nitrate Sensitive Areas. **(NRA,DoE)** * Where appropriate, support moves to take land out of arable cultivation or to use less nitrogenous fertiliser in sensitive areas. **(NRA, MAFF, ADAS, farmers)** * Investigate blending water from different sources to ensure that the potable supply meets the nitrate criteria. **(Water Companies)**

ISSUE 6
Taste and odour problems in potable water taken from surface sources

KEY ISSUES	MANAGEMENT PROPOSALS
* Isolated pollution incidents are a constant threat to water quality. Hazardous operations have been identified at a number of sites where accidents could cause serious water pollution. Firm control measures are needed and the future development of such operations needs to be considered carefully by the planning authorities.	* Encourage the proper care and storage of petroleum products and industrial chemicals to reduce the risk of pollution. **(NRA, LAs)** * Construct advanced water treatment works to remove taints from drinking water (such as those produced by algae). **(Water Companies)**

ISSUE 7
Localised Failures of River Water Quality Targets

KEY ISSUES	MANAGEMENT PROPOSALS
* The underlying geology of the catchment and the concentration of population in the headwaters contribute to water quality problems caused by lack of dilution for effluents at times of low flow.	* Adopt Statutory River Water Quality objectives to protect the uses made of individual river reaches. (This process will resolve anomalies in the existing classification system). **(NRA, DoE)**
* The prevalence of agriculture and the high proportion of sewage effluent in the catchment's rivers result in elevated nutrient concentrations which promote algal blooms. This may lead to seasonal failure to achieve water quality targets.	* Extend the designation of appropriate river reaches in accordance with EC Directives. **(NRA, DoE)**
* The opportunity exists to designate further river reaches under the EC Freshwater Fisheries Directive.	* Implement the NRA quality improvement plan to ensure that effluents are treated to a high standard and river water quality objectives are achieved. **(NRA, dischargers)**
	* Advise Local Authorities, Industry and Agriculture on the best practice for preventing water pollution. **(NRA)**
	* Encourage a reduction in the use of pesticides, especially on highways, railway land and close to watercourses. **(NRA, LAs, BR, farmers)**
	* Investigate pollution incidents and take appropriate action to mitigate their effects, including the prosecution of offenders. **(NRA)**

ISSUE 8
Flooding at Yalding, Headcorn and Smarden

KEY ISSUES	MANAGEMENT PROPOSALS
* Flooding occurs at Yalding, Headcorn and Smarden, but the protection standard required to solve this problem exceeds the target for the land use and the benefits of improvement are unlikely to justify the costs.	* Review flood defence priorities and produce a Flood Defence strategy for the Medway. **(NRA)**

ISSUE 9
Locks subject to shoaling and bank erosion

KEY ISSUES	MANAGEMENT PROPOSALS
* The inland Medway Navigation is subject to shoaling, but dredging and the draining of navigation pens for channel maintenance can disrupt fisheries and conflict with conservation objectives. * Erosion of river banks leads to the destruction of footpaths, siltation of the river channel and increasing maintenance costs. The problem may be aggravated by:- - the pressure of public use - by allowing cattle to have unrestricted access to the water - by the insensitive operation of locks or sluices on the Medway Navigation - by powered craft exceeding speed limits.	* Continue the maintenance dredging programme to remove silt. **(NRA)** * Restrict access to the river bank by cattle. **(Farmers)** * Enforce speed limit for powered boats. **(NRA, boat owners)** * Where new flood defence works are undertaken, design channel profiles to minimise erosion. **(NRA)** * Protect and stabilise river banks where there is a high risk of erosion. **(NRA, Medway River Project, owners)**

ISSUE 10 Locks and control structures in need of replacement	
KEY ISSUES	**MANAGEMENT PROPOSALS**
* Eldridges Sluice and Lock on the Medway Navigation is in a dilapidated state, is difficult to operate and in urgent need of replacement. The NRA has no compulsory power of access for navigation purposes. * Many river structures are impassable to migratory fish.	* Reconstruct Eldridges Sluice. (Subject to gaining access over private land), **(NRA)** * Implement the NRA asset management plan. **(NRA)** * Ensure that new or substantially modified structures within the river channel are passable to migratory fish. **(NRA, owners)**

ISSUE 11 Litter	
KEY ISSUES	**MANAGEMENT PROPOSALS**
* Litter is a cause of concern in many parts of the catchment.	* By supporting the Medway River Project, increase local awareness of the problem and encourage participation by the public in preventative management. **(NRA, CC, LAs)**

ISSUE 12
Development Control

KEY ISSUES	MANAGEMENT PROPOSALS
* Water undertakers have a statutory duty to provide services to new developments, even if this can be done only at high financial cost or at the expense of damaging environmental interests. Planners need to give attention at the earliest stage of the planning process to the availability of water resources and the capacity of rivers to accept effluents. It is hoped that recent planning guidance from the Department of the Environment will achieve this aim.	* Seek to ensure that the policies of other bodies (notably the Planning Authorities) accord with those of the NRA. This will be achieved by regular liaison, by making an input to statutory Plans and by commenting on individual planning applications. **(NRA, LAs, all interests)** * Continue to advise Planning Authorities to prevent increased risks of flooding resulting from development in flood risk areas **(NRA, IDBs)**
* There is a need for close control of development in flood risk areas such as river flood plains.	
* Because of its high population density and the proximity of the area to the London conurbation there is pressure to develop all potential landfill waste disposal sites. Such proposals must be controlled to avoid the risks of water pollution, groundwater contamination or increased flooding in the catchment.	
* Development within the strategic East Thames Corridor may have a knock-on impact on the management of the Medway and its estuary.	
* Careful design of new development (especially the Channel Tunnel Rail Link) is needed to avoid damaging the river landscape.	
* Preservation of the river as a "Green Corridor" through urban areas has great landscape value.	

ISSUE 13 Climate Change	
KEY ISSUES	**MANAGEMENT PROPOSALS**
* The possible effects of climate change need to be taken into account when planning future management of the catchment.	* The NRA will take the implications of possible climate change into account in its long term planning. **(NRA)**

RIVER MEDWAY FINAL PLAN

SECTION C : ACTION PLAN SUMMARY

RIVER MEDWAY CATCHMENT PLAN
ACTION PLAN SUMMARY

Management Task	93 94 95 96 97 Future	Action by	Estimated Cost £'000
Issue 1, Poor Water Quality in Upper Estuary			
Monitor compliance with existing effluent consent conditions.	Continuing	NRA	
Agree progressively higher effluent consent conditions.	Continuing	NRA, Dischargers	
Review MRF at Allington to protect estuary quality.	▬	NRA, Abstractors	
Issue 2, Conflict between Abstraction and other uses			
Review operating rules for existing abstractions.	▬	NRA, Abstractors	
Construct Yalding intake for Bewl Water.	▬ Operating 1995.	SWS	20,000
Review rules for Bewl releases to support low river flows.	▬	NRA, SWS	
Review MRF at Allington to optimise resource yield (see above).	▬	NRA, Abstractors	
Restrict consumptive abstractions to winter, with storage.	Continuing	NRA	
Issue 3, Conflict between Recreation and other users			
Encourage co-operation via Medway River Project.	Continuing	NRA, LAs	
Control development of new moorings.	Continuing	LAs, NRA	
Educate public about health risks of water based recreation.	Continuing	LAs, User Groups NRA	
Review Management of water levels in sensitive areas.	▬	NRA	
Promote buffer zones and 'Green Corridor'.	Continuing	NRA,EN,CC,MAFF,Owners	

RIVER MEDWAY CATCHMENT PLAN
ACTION PLAN SUMMARY

Management Task	93 94 95 96 97 Future	Action by	Estimated Cost £'000
Issue 3, (Continued)			
Encourage good fisheries management.	Continuing	NRA, Owners, Anglers	
Issue 4 and 5, Contamination and Nitrate in groundwater			
Apply NRA Groundwater Protection Policy (introduced 12/92).	Continuing	NRA, LAs	
Investigate need for Nitrate Sensitive Areas.	[redacted]	NRA, DoE	
Encourage farmers to use less fertiliser in sensitive areas.	Continuing	NRA, EN, CC, MAFF	
Blend potable water from different sources.	Continuing	Water Companies	
Issue 6, Taste and Odour Problems in Potable Water			
Encourage care of industrial chemicals to prevent spillage.	Continuing	NRA, Industry	
Adopt advanced potable water treatment processes.	Continuing	Water Companies	
Issue 7, Failures to meet river water quality targets			
Propose Statutory WQOs for adoption by DoE.	[redacted]	NRA, DoE	
Review Designations under EC Directives.	[redacted]	NRA, DoE	
Monitor effluent and river water quality.	Continuing	NRA, Dischargers	
Advise others on best practice for prevention of pollution.	Continuing	NRA	

RIVER MEDWAY CATCHMENT PLAN
ACTION PLAN SUMMARY

Management Task	93 94 95 96 97 Future	Action by	Estimated Cost £'000
Issue 7, (continued)			
Reduce non-essential use of pesticides.	Continuing	NRA, LAs, BR, Farmers	
Take action on pollution incidents.	Continuing	NRA	
Issue 8, Flooding at Yalding, Smarden and Headcorn			
Produce FD strategy for the catchment.	▬▬	NRA, MAFF	120
Issue 9, Shoaling and Bank Erosion			
Continue maintenance dredging.	Continuing	NRA	
Restrict access by cattle to river bank.	As necessary	Farmers	
Enforce power boat speed limit in navigation reaches.	Continuing	NRA	
Ensure new navigation and FD works designed to minimise erosion.	As required	NRA	
Protect bank in vulnerable areas.	As required	Owners, NRA	
Issue 10, Locks and Sluices in poor repair			
Reconstruct Eldridges Sluices.	▬▬	NRA, MAFF, DoE	532
Refurbish other structures, to plan.	▬▬	NRA	1,240
Provide fish passess at obstructions.	As necessary	NRA, Owners	

RIVER MEDWAY CATCHMENT PLAN
ACTION PLAN SUMMARY

Management Task	93 94 95 96 97 Future	Action by	Estimated Cost £'000
Issue 11, Litter			
Educate and involve Public through Medway River Project.	Continuing	NRA, LAs	
Issue 12, Development Control			
Seek improved liaison with planning authorities etc.	Continuing	NRA, LAs	
Control development of landfill waste disposal.	Continuing	LAs, NRA	
Apply FD byelaws to prevent increased flooding risk.	Continuing	NRA, IDBs	
Issue 13, Climate change			
Take climate change into account in long-term planning.	▬	All	

RIVER MEDWAY FINAL PLAN

APPENDIX 1 - FURTHER READING

Acts of Parliament

Salmon and Freshwater Fisheries Act 1975
Wildlife and Countryside Act 1981
Water Act 1989
Environment Protection Act 1990
Land Drainage Act 1990
Water Resources Act 1991

NRA Publications

NRA Corporate Plan (Annually)

Water Resources Development Strategy A Discussion Document. NRA 1992

Sustaining our Resources. Southern Region water resources development strategy.
NRA Southern Region 1992

River Medway Catchment Management Plan, Phase I
NRA Southern Region 1991

Other Publications

Changing River Landscapes
Countryside Commission CCP238 1987

Code of Practice on Conservation, Access and Recreation
MAFF, DoE & Welsh Office. HMSO 1989

Conservation and Land Drainage Guidelines
Water Space Amenity Commission 1980

Conservation Guidelines for Drainage Authorities
MAFF, DoE & Welsh Office. 1991

Development and Flood Risk. Circular 30/92
MAFF, DoE & Welsh Office. 1992

Nature Conservation and the Management of Drainage Channels
Nature Conservancy Council & Assn of drainage Authorities 1989

Nature Conservation and River Engineering
Nature Conservancy Council 1983

Rivers and Wildlife Handbook
RSPB 1984

Development and Flood Risk Circular 30/92.
DoE, MAFF/WO December 1992

RIVER MEDWAY FINAL PLAN

APPENDIX 2 - GLOSSARY OF TERMS AND UNITS

GLOSSARY OF TERMS AND UNITS

1:10 YEAR DROUGHT/FLOOD

A drought/flood event with a statistical probability of occurring once in a ten year period (other periods may be specified in a similar way).

ABSTRACTION LICENCE

Licence to abstract water from a surface or underground source. The maximum annual, daily and hourly abstraction rates are set by the licence.

ABSTRACTION - ACTUAL

Individual abstraction records are reported to the NRA each year but under the Water Resources Act 1991 these data are confidential. Actual abstraction figures reported in the Plan are area annual totals expressed in Ml/d.

AONB

Area of Outstanding Natural Beauty, notified by the Countryside Commission.

BOD

Biochemical Oxygen Demand. A measure of the polluting potential.

COARSE FISH

See FRESHWATER FISH, CYPRINIDS, SALMONIDS

CONSUMPTIVE USE

Water which is abstracted but not returned to the catchment, either because it evaporates (as in spray irrigation) or is exported for use in another catchment.

COUNTY STRUCTURE PLANS

Statutory documents produced by County Councils outlining their strategy for development over a 10-15 year timescale.

CYPRINIDS

Fish of the carp family. (See also FRESHWATER FISH, SALMONIDS)

DISTRICT LOCAL PLANS

Statutory documents produced by District or Borough Councils to implement the development strategy set out in County Structure Plans. Specific land use allocations are identified.

DROUGHT ORDER

Order issued by the Secretary of State for the Environment allowing the terms of abstraction licences to be varied and/or the levels of service to water company customers to be reduced at times when the resource is under stress.

EFFECTIVE RAINFALL

Total rainfall minus direct evaporation and the water used by plants for transpiration. This is equivalent to the total resource of a catchment. (See also TOTAL RAINFALL)

EIFAC

The European Inland Fisheries Advisory Commission. An agency of the United Nations Food & agriculture Organisation (FAO).

EMERGENT VEGETATION

Plants with roots in the river bed but which emerge from the water. Examples include reeds, iris and bullrush.

EPHEMERAL FLOW

River flow which dries at some times of the year (eg winterbournes).

FLOW MEASUREMENT UNITS

m^3/s Cubic metres per second
l/s Litres per second
Ml/d Megalitres per day.A megalitre is equivalent to a ten metre cube (approximates to a 4-bedroom detached house).
mgd Millions of gallons per day

FLOW CONVERSION TABLE

m^3/s	Ml/d	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

FRESHWATER FISH (COARSE FISH)

For the purposes of the Salmon and Freshwater Fisheries Act 1975, fish other than Salmon, Brown Trout, Sea-Trout, Rainbow Trout and Char.

HECTARE

Unit of area 100m x 100m, equal to 2.471 acres.

HIGH SEAS RIGHTS

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

IDB

Internal Drainage Board. A local land drainage authority with powers to raise finance and do works.

IMPOUNDMENT RESERVOIR

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

ISOHYETALS

Contours of equal mean annual rainfall.

LOCAL NATURE RESERVE

A nature reserve designated by a Local Authority, frequently owned or managed by a voluntary conservation organisation.

mAOD

A measure of altitude. Metres above ordnance datum.

MARSH FEEDING

Supply of water from the river to marsh areas during the summer for wet fencing and abstraction (usually for spray irrigation).

MEAN LICENSED ABSTRACTION

In this Plan the mean licensed abstraction is the total annual abstraction permitted within the terms of a licence, expressed as an average daily volume in terms of megalitres per day (Ml/d).

MHWS

Mean High Water Spring Tides. A datum level used in mapping.

MINIMUM RESIDUAL FLOW (MRF)

The flow set at a river gauging station to protect downstream uses and below which controlled abstractions are required to cease. (see also PRESCRIBED FLOW)

NATIONAL NATURE RESERVE

A nature reserve of national importance, designated and managed by English Nature.

NATURAL FLOW REGIME

The river flow pattern experienced prior to the influence of man, with no abstraction from or discharges to the catchment.

PERENNIAL FLOW

River flow present through the entire year. (See also EPHEMERAL FLOW)

POTABLE WATER SUPPLY

Water supplied for domestic use, including human consumption.

PRESCRIBED FLOW (PF)

A river flow incorporated as a condition in an abstraction licence, such that abstraction must cease once the flow falls below this value. Prescribed flows are set at or above the MRF (qv) which applies to the river where the abstraction takes place.

In many instances the PF applying to new licences is increased incrementally in step with the total licensed abstraction to protect the interest of existing abstractors: ie. newer abstractions have to cease at higher river flows. (see also MINIMUM RESIDUAL FLOW)

PRIMARY GAUGING STATION

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

PUMPED STORAGE RESERVOIR

Surface water storage area where the natural inflow is supplemented by water pumped from a separate source, typically a nearby river.

POOL:RIFFLE

A stretch of river with alternate sections of shallow fast-flowing water and deeper slow-moving pools.

Q95

River flow that is exceeded for 95 percent of the flow record (a low flow, the Q5 flow would be a high flow).

RAMSAR SITE

A wetland site of international significance for conservation, notified under international treaty.

SALMONIDS

Fish classified by the Salmon and Freshwater Fisheries Act 1975 as belonging to the salmon family - Salmon, Brown Trout, Sea-Trout, Rainbow Trout and Char. (Summer-spawning salmonid species such as Grayling are classified by the Act as Freshwater Fish).

SPATE FLOWS

Episodic fresh water flood flows.

SSSI

Site of Special Scientific Interest. A site designated by English Nature as being in need of protection to conserve its outstanding ecological or geological features. Land use and management operations within SSSIs are subject to control.

SNCI

Site of Nature Conservation Interest. A site of local importance for wildlife or geology, identified by the County Wildlife Trust or the County Council.

STW

Seawage Treatment Works.

TOTAL RAINFALL

Rainfall as measured by a rain gauge.

TOTAL RESOURCE

See EFFECTIVE RAINFALL

WET FENCING

Water-filled ditches used as field boundaries or to control the movement of livestock.