

Box 2



# local environment agency plan

## **EASTERN ROTHER LEAP** **ENVIRONMENTAL OVERVIEW** **DECEMBER 1999**



# Eastern Rother Area Key Details

## General

Area 971 km<sup>2</sup>

## Administrative Details

Councils and the % of the Eastern Rother Catchment they administer

Kent CC	49.6%
Ashford BC	19.6%
Shepway DC	23.0%
Tunbridge Wells BC	7.0%
East Sussex CC	50.4%
Hastings BC	0.5%
Rother DC	41.8%
Wealden DC	8.0%

## Population

Year	Population
1991	170,000
2001 (Estimate)	188,000

## Water Resources

Rainfall (mm/yr)

	Actual	Effective
Average	757	303
Drought (1989-1992)	648	248

Number of licensed abstractions

Surface Water	116
Groundwater	97
Combined / Impoundments	31

## Flood Defence

Length (km)

Coastline including main tidal waters	324.0
Main River including tidal lengths	55.2
Sea Defences (Agency responsibility)	40.0
Tidal banks (Agency responsibility)	10.8

## Conservation

Water dependent SSSIs	10
NNRs	2
Ramsar sites	1
SPAs	1
SACs	2

## Fisheries

Length of EC Designated Fisheries (km):

	Freshwater	Tidal
Cyprinid	27.9	10.0
Salmonid	3.5	0

## Water Quality

Chemical GQA of lengths in each class for the Eastern Rother catchment (1995 - 1997)

Class	%
A	1
B	12
C	17
D	9
E	3
F	42

Number of EC Designated Bathing Waters (1998)

Meeting guideline standards	1
Meeting mandatory standards	5
Failing to comply	0

## Pollution Prevention & Control

Number of sites holding licences

Licensed Waste Sites	22
Process Industry Regulations	1
Radioactive Substance Regulations (Nuclear Power Stations)	2

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## 1. INTRODUCTION

### 1.1. PURPOSE AND SCOPE OF THE EASTERN ROTHER ENVIRONMENTAL OVERVIEW

This Environmental Overview has been prepared to provide supporting information to the Eastern Rother Area Local Environment Agency Plan (LEAP) for the next five years. It is a factual description and analysis of the Eastern Rother environment and the stresses and strains that are acting upon it. A series of issues has been developed from this analysis and these issues have been carried forward into the separate LEAP Consultation Draft. This allows consideration by the Agency, its partners and those individuals and organisations generally interested in the local environment so that the relative importance of local concerns can be identified. After this consultation the final Action Plan is prepared to provide a five year programme for addressing these issues.

The Overview has been prepared in the context of the Agency's overall aim to protect and enhance the whole environment, thus contributing to sustainable development. The term sustainable development is most commonly taken to mean *development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*

A Kent Area LEAP has been issued as an overarching plan to address major environmental issues of strategic importance to the Kent Area as a whole. This document is a catchment based LEAP focussing on more specific issues local to the Eastern Rother area.

### 1.2. STRUCTURE OF THE ENVIRONMENTAL OVERVIEW

The Agency has adopted a framework for determining the state of the environment in the area under six classifications or viewpoints. Section 2 provides an introduction to the Eastern Rother area and addresses each of the viewpoints and the stresses and strains affecting them. The six frameworks are:

- Land use and environmental resources;
- Key biological populations, communities and biodiversity;
- Compliance with environmental standards and targets;
- The health of the environment;
- Long term reference sites;
- Aesthetic quality.

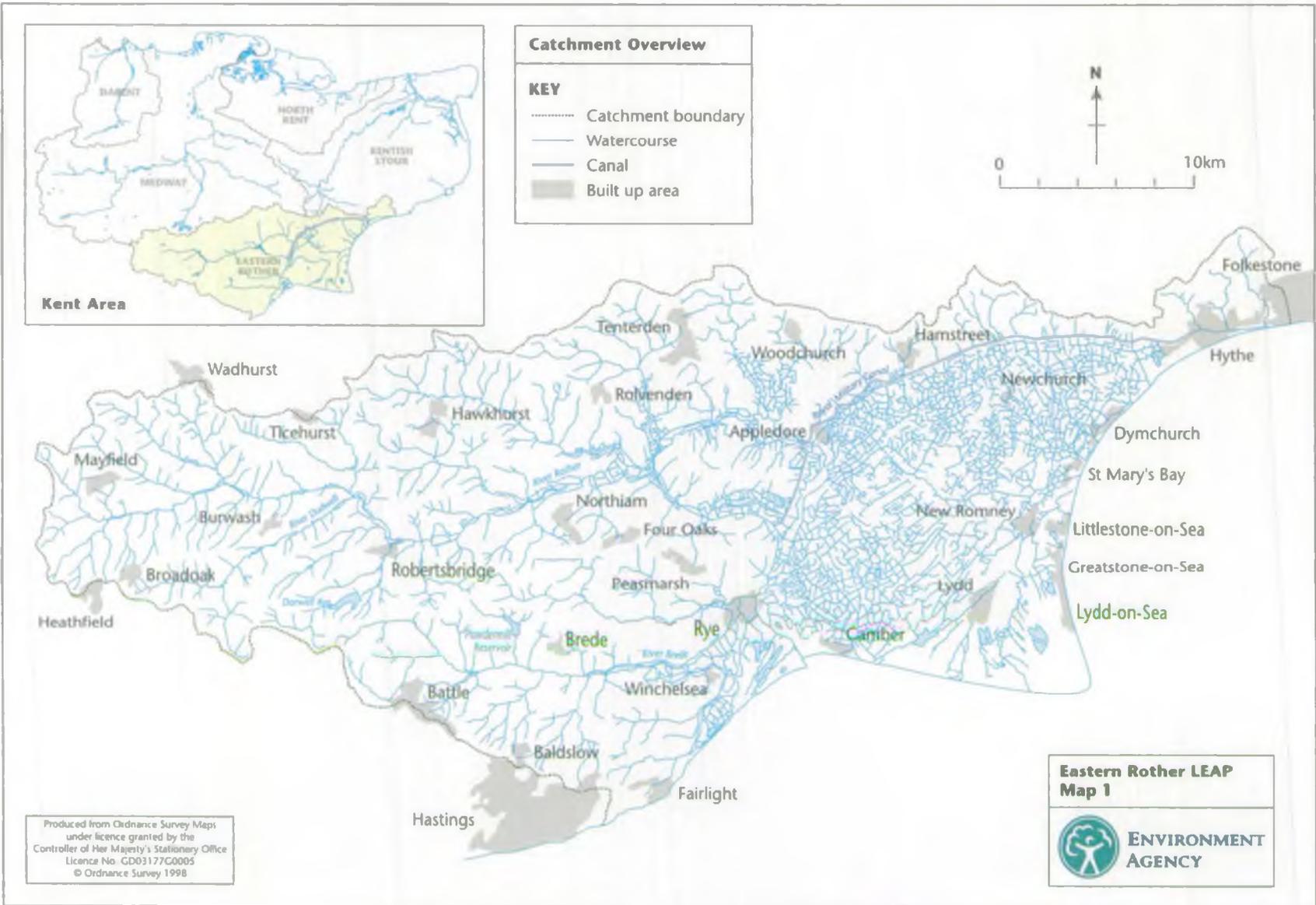
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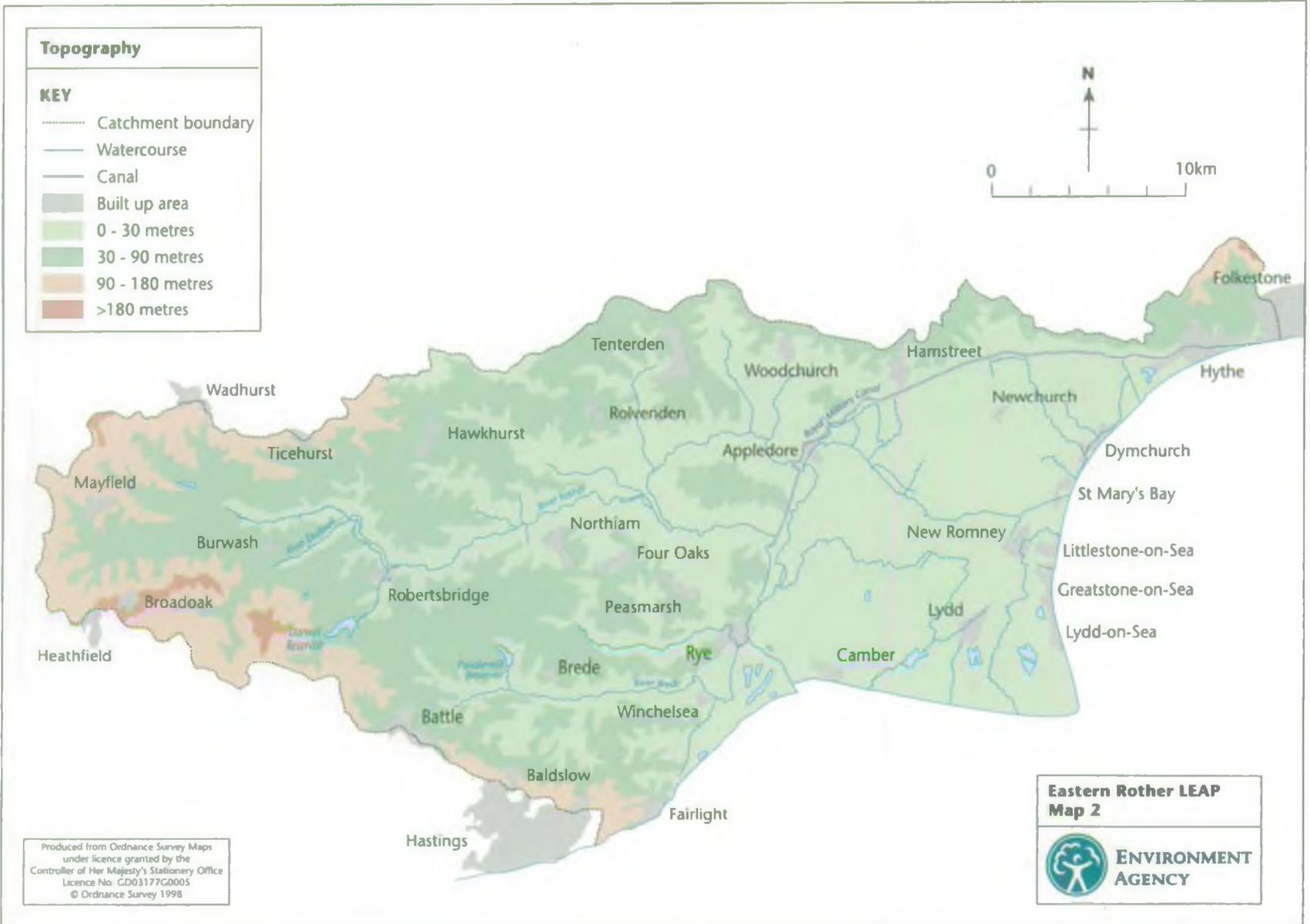
The stresses and strains acting on these environmental resources have been classified under the following headings:

- Natural forces;
- Societal influences;
- Abstractions and removals;
- Uses, releases and discharges;
- Waste arisings and disposals;
- Illegal practices including accidents and non-compliance with regulations.

The issues identified in the Consultation are summarised in Section 3. They have been grouped according to the Agency's environmental concerns presented in its overall strategy document *An Environmental Strategy for the Millennium and Beyond (1997)* as:

- Addressing climate change;
- Improving air quality;
- Managing our water resources;
- Enhancing biodiversity;
- Managing our freshwater fisheries;
- Delivering integrated river-basin management;
- Conserving the land;
- Managing waste;
- Regulating major industries.





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## 2. EASTERN ROTHER AREA ENVIRONMENT

### 2.1. LAND USE AND ENVIRONMENTAL RESOURCES

#### 2.1.1. Introduction

This section of the Environmental Overview describes the environmental resources of the Eastern Rother LEAP area that fall within the realm of the Environment Agency's interests. Such resources include landscape and cultural heritage associated with the water environment, air quality, the quantity of water resources available and water quality. Nature conservation resources are considered separately in Section 2.2.

Also considered in this section are three other additional important concerns of the Environment Agency: the protection of people and property against flooding, recreation and the management of waste

#### 2.1.2. Location, geology and topography

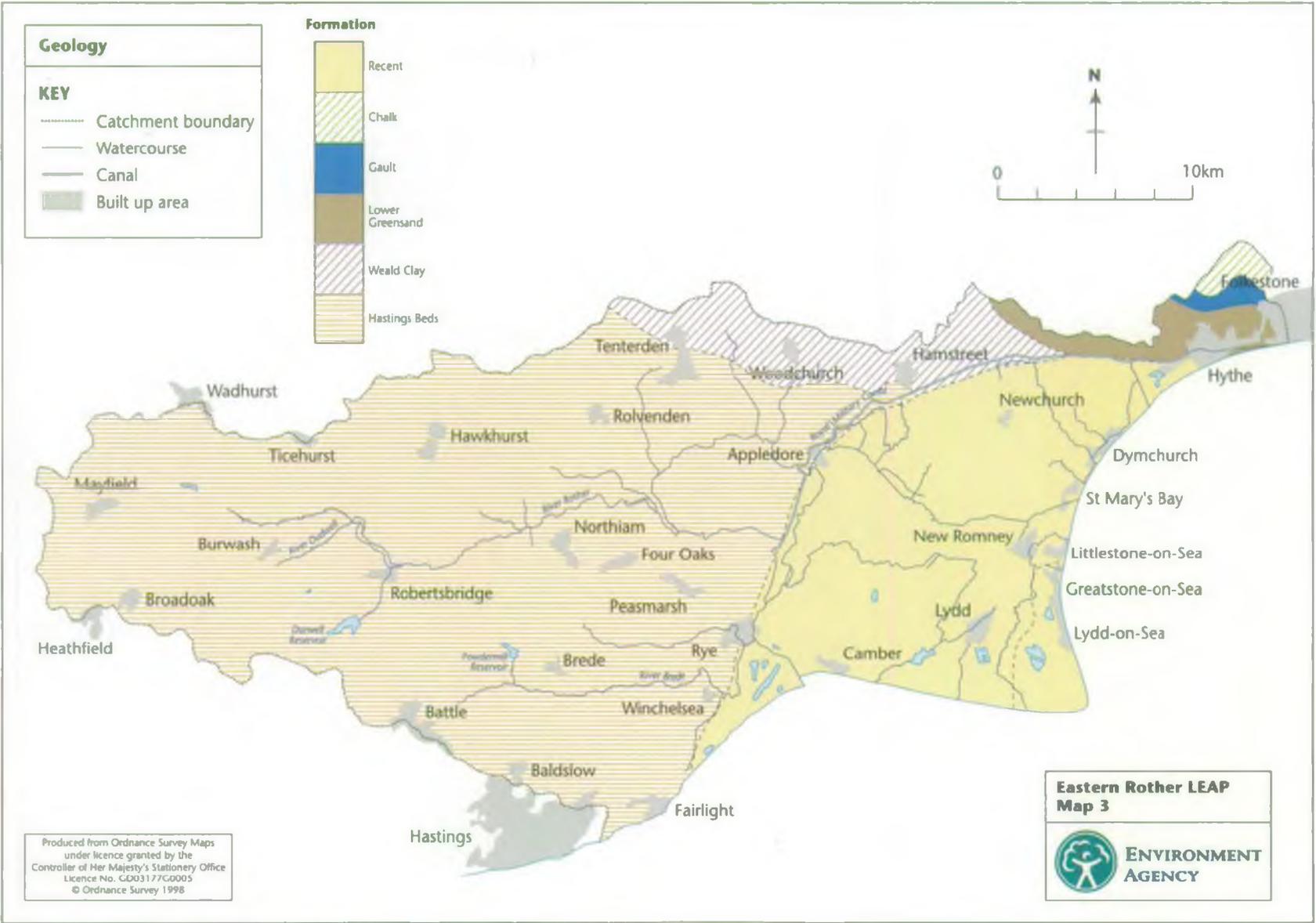
The Eastern Rother Catchment is situated in the south of the Agency's Kent Area covering the surface catchment of the Rivers Rother, Brede and Tillingham together with the marshes (Romney, Walland and Denge Marshes but referred to collectively as Romney Marsh) bounded by the Royal Military Canal (Map 1). It has a land area of 970 km<sup>2</sup>, making it the third largest catchment in the Kent Area, but a much lower population density than the rest of the area (approximately 180/km<sup>2</sup>). The catchment is almost equally divided between Kent and East Sussex.

The Eastern Rother LEAP Area extends from Mayfield in the west to the outskirts of Folkestone in the east and from Tenterden in the north to the outskirts of Hastings in the south. The land rises from the largely flat area of Romney Marsh, in the east of the area, lying below the high tide sea level to a maximum of 197m Above Ordnance Datum (AOD) to the west on the edge of the High Weald (Map 2).

The Area's geology is mainly split between the sandstones, siltstones and clays of the Hastings Beds on the southern side of the High Weald and the recent alluvial deposits, including the important shingle bed at Dungeness, on Romney Marsh. The catchment also includes a small part of the downland chalk to the NW of Folkestone with the associated greensand and clay at its foot (Map 3).

There are two distinct topographical divisions in the area:

- the High Weald;
- Romney Marsh.



This present topography of the High Weald has been shaped by the fluvial processes acting on the underlying geology whilst that of Romney Marsh has been formed from naturally developing sand and shingle spits together with human land drainage activity. The main river flowing through the area is the Rother, which rises near Rotherfield in East Sussex, flows eastwards through the High Weald and then skirts Romney Marsh. About halfway along its course, the river changes its character from an upland stream to an embanked channel, much being below the high tide level. The tidal limit of the Rother reaches as far as Scots Float, at Playden, which is a tidal locked sluice. Further up stream, the river is embanked to provide storage for floodwater. The Rivers Tillingham and Brede join the Rother estuary at Rye to form a drying harbour, which extends 4 kilometres out to the sea.

### 2.1.3. Land use and management

The area remains largely rural with no large towns in the Eastern Rother catchment, only market towns such as Tenterden, Rye, Lydd and New Romney. Overall, urban development covers approximately 5% of the area. The main concentration of industry is found alongside the Rother Estuary between Rye and Rye Harbour.

Table 1 shows the different types of land use found in the Eastern Rother catchment. Agricultural land accounts for approximately 70% of the LEAP area comprising a mixture of arable and grazing while woodland, which is predominantly deciduous, makes up 12% of land use.

**Table 1: Landcover in 1990**

Land Cover Type	%
Sea / Estuary and associated land	2.5
Inland Water	0.3
Grass Heath	1.3
Mown / Grazed Turf	19.5
Meadow / Verge / Semi-natural	26.3
Rough / Marsh Grass	2.2
Scrub / Orchard	0.6
Deciduous Woodland	10.7
Coniferous Woodland	1.4
Tilled Land	28.2
Ruderal Weed	1.1
Suburban / Rural Development	4.6
Continuous Urban	0.4
Inland Bare Ground	0.3
Open Shrub Heath	0.7

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*Stresses: Abstractions and removals – minerals*

The main sources of minerals in the Eastern Rother catchment have been from marine derived aggregates on Romney Marsh and gypsum at Brightling and Mountfield near Robertsbridge. There has also been small scale extraction of clay for brick and tile manufacture in the catchment north of Hastings. Existing operations include:

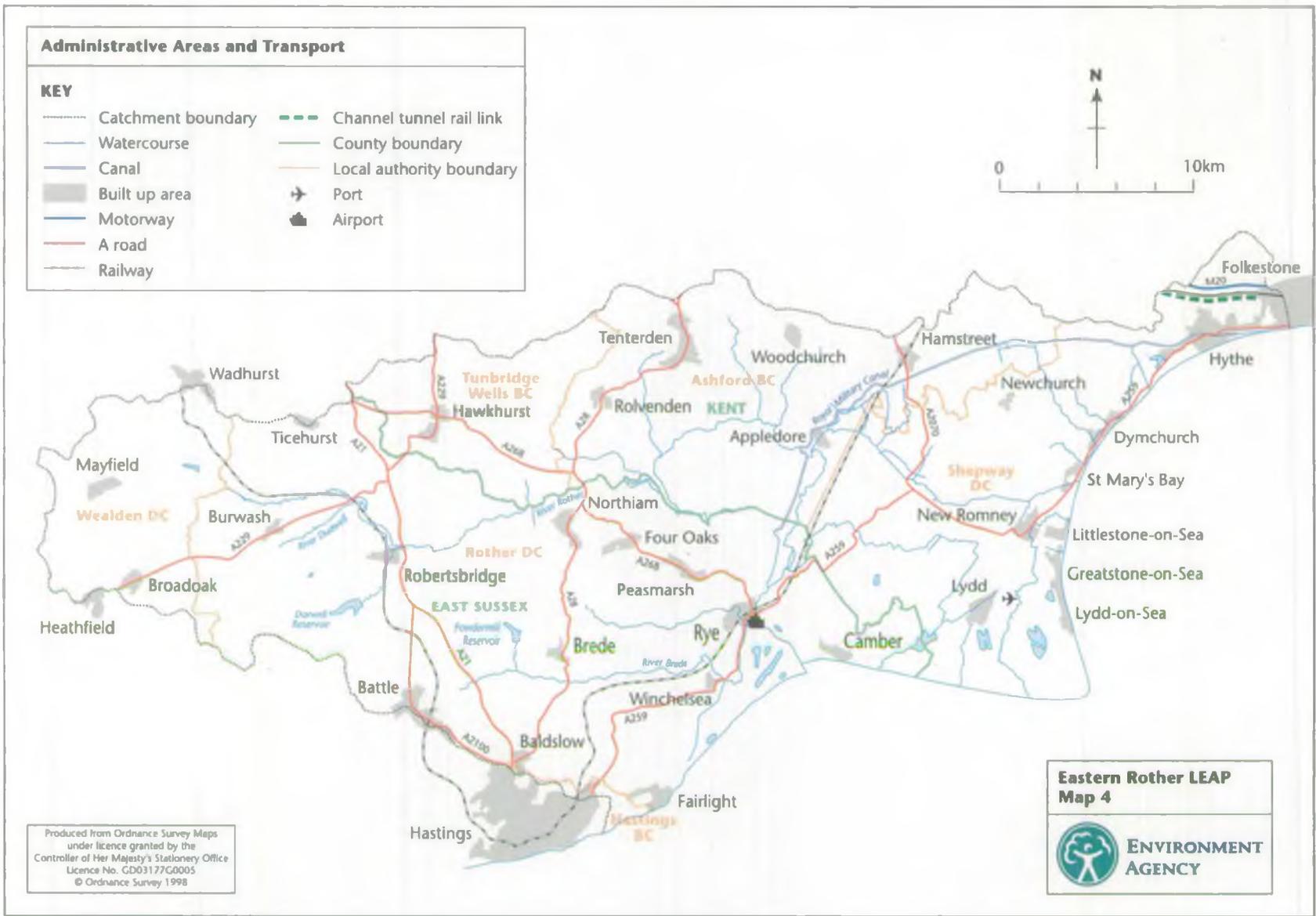
- flint based gravel quarried at Dungeness;
- sand and gravel quarried at Lydd;
- gypsum mined at Brightling.

Outside the existing sites, there is a general planning policy that proposals for the working of minerals will not normally be permitted on land subject to one or more of a series of constraints. These include water resource or nature conservation constraints or location in areas of outstanding natural beauty (AONB) which cover much of the LEAP area.

#### **2.1.4. Administrative areas and land use planning**

The Eastern Rother LEAP area falls within the Counties of Kent and East Sussex. The catchment includes parts of the areas administered by Ashford, Rother, Shepway, Tunbridge Wells and Wealden councils with a very small part in Hastings Borough (Map 4). The development plans covering the area are:

- Kent Structure Plan (1996)
- East Sussex County Council-Deposit Draft (November 1996)
- Ashford Borough Local Plan-Deposit Draft (November 1996)
- Shepway District Local Plan-Adopted October 1997
- Tunbridge Wells Borough Local Plan-Adopted March 1996
- Hastings Borough Local Plan-Consultation Draft-November 1996 (Deposit Draft due October 1999)
- Rother District Local Plan-Consultation Draft (February 1995)
- Wealden District Local Plan-Deposit Draft (January 1995)



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**Eastern Rother LEAP  
Map 4**

**ENVIRONMENT  
AGENCY**

### 2.1.5. Landscape and cultural heritage

The Environment Agency is required when formulating or considering any proposal relating to any of its activities other than pollution control to further the conservation and enhancement of natural beauty, geological or physiographical features of special interest.

In addition, all functions are required to take into account any effect that proposals would have on the beauty or amenity of an area and have regard to the desirability of protecting and conserving buildings, sites and objects of archaeological, architectural, engineering or historic interest.

The Agency also has a duty to promote - to such extent as it considers desirable and resources allow - the conservation and enhancement of the natural beauty of inland and coastal waters and land associated with these waters.

By understanding the character of the landscape of the LEAP area, the Agency can evaluate the alterations to the character that will take place from the decisions it has to make.

#### *Current situation in the Eastern Rother area*

The area comprises sections of the following landscape areas defined by the Countryside Agency as Countryside Character Areas and by English Nature as Natural Areas:

- *High Weald* – well wooded landscape deeply incised in many places to give a complex pattern of ridges and heavily wooded steep stream valleys or ghylls. Main roads and settlements such as Battle or Burwash are sited along the prominent ridgelines with a dense network of small, narrow, and winding lanes linking scattered villages, hamlets and farms. There are many examples of high quality vernacular architectural features such as weatherboarding or tile hanging and timber framed barns. Heavy clay soils have reduced the impact of agricultural change in the area, the majority of which remains as a quiet pastoral landscape with mixed farming predominating.
- *Romney Marshes* – an open, flat, agricultural landscape, with distinctive drainage dykes, marshes, and open skies bounded by the degraded former sea cliffs running in an arc from Hythe to Pett. Human impact on the landscape is seen in the drainage ditches, the Royal Military Canal largely following the foot of the old cliffs and recent developments in the towns along the coast and at Dungeness.

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*Stresses on the landscape*

The stresses on the landscape zones are as follows:

- *High Weald* – pressures on the landscape are still relatively slight in this area but include loss of characteristic landscape features such as hedgerows, meadows, wooded ghylls, hammer ponds and parklands due to inappropriate management and a decline in the use of vernacular building materials coupled with the introduction of urban features such as lighting and alarms.
- *Romney Marshes* – pressures include the change to widespread arable cultivation replacing traditional wet grazing marsh, vulnerability of the open landscape from large agricultural buildings or military use, increasing tourism developments and proposals for new roads, which would be particularly intrusive if built on embankments.

#### 2.1.6. Air quality

The Environment Act 1995 (EA95) Part IV places responsibility for local air quality management on the local authorities. They are required to carry out a three stage review and assessment of air quality within their boundaries, taking into account factors from neighbouring areas. An inherent component of this review and assessment is ambient monitoring of airborne pollutants to assist with the identification of locations where exceedances may occur. The review must assess whether it is likely that air quality objectives laid down in the Air Quality Regulations (SI 1997 No 3043) will be complied with by 31 December 2005. If it is likely that one or more of the objectives will be breached, the local authority is required to designate that area where the breach is likely to occur as an Air Quality Management Area. An Action Plan must be prepared which sets out the measures required to achieve the objectives. The Agency is a consultee to the overall process of review and assessment, designation of Air Quality Management Areas and the development of Air Quality Action Plans.

The Agency's role in local air quality management is one of liaison, support, technical consultation and provision of data relating to Part A IPC processes. The Agency's contribution to the achievement of air quality objectives is limited to its regulation of Part A IPC processes. Part B processes (those with lower potential to pollute) are already regulated by local authorities under the Local Authority Air Pollution Control provisions of the Environmental Protection Act 1990 Part I.

The Kent Air Quality Partnership is an existing forum, which promotes co-operation and co-ordinated action on air quality issues. It is the custodian of an emissions inventory and air quality model, which is now being used to facilitate member Local Authorities' Air Quality Review and Assessments. The Agency is a full member of the Partnership and KCC provides secretariat facilities.

The air quality model is also used by KCC to assist with strategic planning decisions by evaluating the impact of proposed developments.

In Sussex, the Sussex Air Quality Steering Group was formed in 1995 to provide a means of pooling the resources and expertise of the various agencies in the area. The Group aims to improve air quality in Sussex by supporting local authorities with their air quality management duties under Part IV of the Environment Act 1995 and to assist in implementing the UK National Air Quality Strategy. These aims are to be achieved through:

- promotion of collaboration and co-ordination of effort amongst those with responsibility for, influence on or active interest in air quality in Sussex;
- collecting, interpreting and disseminating information relevant to understanding and managing air quality in Sussex.

The Group has been involved in undertaking and supporting the Statutory Air Quality Review and Assessment process, which aims to identify those areas within each local authority where air quality may be in breach of government objectives for 2005. Results of Stages I and II of this process will link in with information on strategies to reduce concentrations of air pollutants and how these may be effectively delivered to the general public.

#### *Stresses on air quality*

##### *Industrial activity*

There is one Part A process regulated by the Agency in the Eastern Rother LEAP area (Map 11).

There are at least 25 Part B processes, regulated by local authorities, as well as one regulated by the Agency at Dungeness Power Station, within the LEAP area. The most numerous of those that have been identified are vehicle spraying and cement processes (Table 2).

**Table 2: Part B Processes**

Processes	Number of Licensed Processes
Cement	3
Coating	9
Combustion	2
Mineral	4
Timber	3
Other	4

IPC regulations are being met within the catchment and no issues have been identified in the area.

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*Emissions from landfill sites*

A known cause of climate change is landfill gas, which is the product of the decomposition of organic waste within landfill sites. Whilst it contains many trace elements which give it odour, the most significant component of landfill gas is methane. Methane is a flammable, asphyxiate and powerful greenhouse gas. There are no sites in the Eastern Rother area currently being monitored for landfill gas by the Environment Agency.

This issue is addressed in more detail in the Kent Area LEAP.

### 2.1.7. Water resources

A principal concern of the Agency is to ensure that water resources are properly managed to provide water for all reasonable needs and to meet the Agency's commitment to progressive enhancement of the environment. Water is abstracted from the area's rivers and groundwater for a range of uses including public supply, agriculture and industry.

*Current situation in the Eastern Rother area**Rainfall*

The average annual rainfall across the area is approximately 757mm, which fell to 687mm for the 1989-92 drought. As such the Eastern Rother catchment is one of the drier areas in the UK. The average annual effective rainfall (i.e. after allowance for losses by evaporation) is only 303mm, declining to 248mm in the 1989-92 drought.

*Groundwater*

A very small part of the Lower Greensand (Hythe Beds) and Chalk Aquifers are within the LEAP area. There are no major abstractions from these sections of the aquifers in this area. It does, however, support strong spring flows in the area of West Hythe.

There are two minor aquifers in the area:

- *The Hastings Beds* include some very permeable sandstones but a complex system of folds and faults has reduced them to relatively small isolated blocks yielding, for the most part, quantities that are insufficient for economic development.

The aquifer is used for small domestic, agricultural and public water supply abstractions. In order to protect spring flow from the Hastings Beds all new licences are issued with a condition where authorised abstraction is dependent on the previous winter's rainfall (*Kent Groundwater Management Policy, 1993*).

- *The Denge Gravels* – which are a major source of supply for Folkestone and Dover Water Services. This aquifer is at risk from tidal incursions and abstraction is managed in a sensitive manner to maintain the balance between saline and freshwater.

#### *Surface water*

The principal surface water resources in the Eastern Rother area are provided by pumped storage reservoirs. The largest is Darwell, which receives its water from the Rother via Robertsbridge and is augmented with a transfer from Bewl reservoir, which is within the Medway catchment. The Brede supplies the smaller Powdermill reservoir.

Surface water is intensively used for agricultural purposes within the lower Rother and Romney Marshes area. The Agency feeds the marsh system via Iden Lock and West Hythe Dam and attempts to maintain high levels in the ditches throughout the summer. The Agency restricts summer abstraction by Minimum Residual Flow (MRF) conditions at Udiam Gauging Station and other local levels and also encourages the use of winter storage reservoirs.

#### *Water resource balance*

The Romney Marsh, Upper Rother and Lower Rother resource areas closely approximate to the LEAP area. Table 3 summarises the results of the water balance estimates carried out for these resource areas. The results show that two of the areas have a 0 – 25% commitment of effective rainfall and the remaining area has a commitment of 25 – 50% of effective rainfall.

**Table 3: Water resources summary for an average year.**

<b>Resource Area</b>	<b>Romney Marsh</b>	<b>Lower Rother</b>	<b>Upper Rother</b>
Rainfall (1961-90) Ann. Ave (mm)	720	740	810
Effective rainfall (mm)	266	291	353
Net gain to resource(Ml)	54,966	161,609	71,918
Natural inflow (Surface only) (Ml)	0	70,000	0
Total available resource (Ml)	54,966	231,609	71,918
<b>Authorised Abstraction (Ml)</b>	8,559	11,836	13,538
<b>Commitment (%)</b>	<b>16</b>	<b>5</b>	<b>19</b>

Table 4 below, summarises the licensed and actual abstractions of surface and groundwater for different purposes during the period 1995 to 1998. The largest abstractions are shown on Map 5.

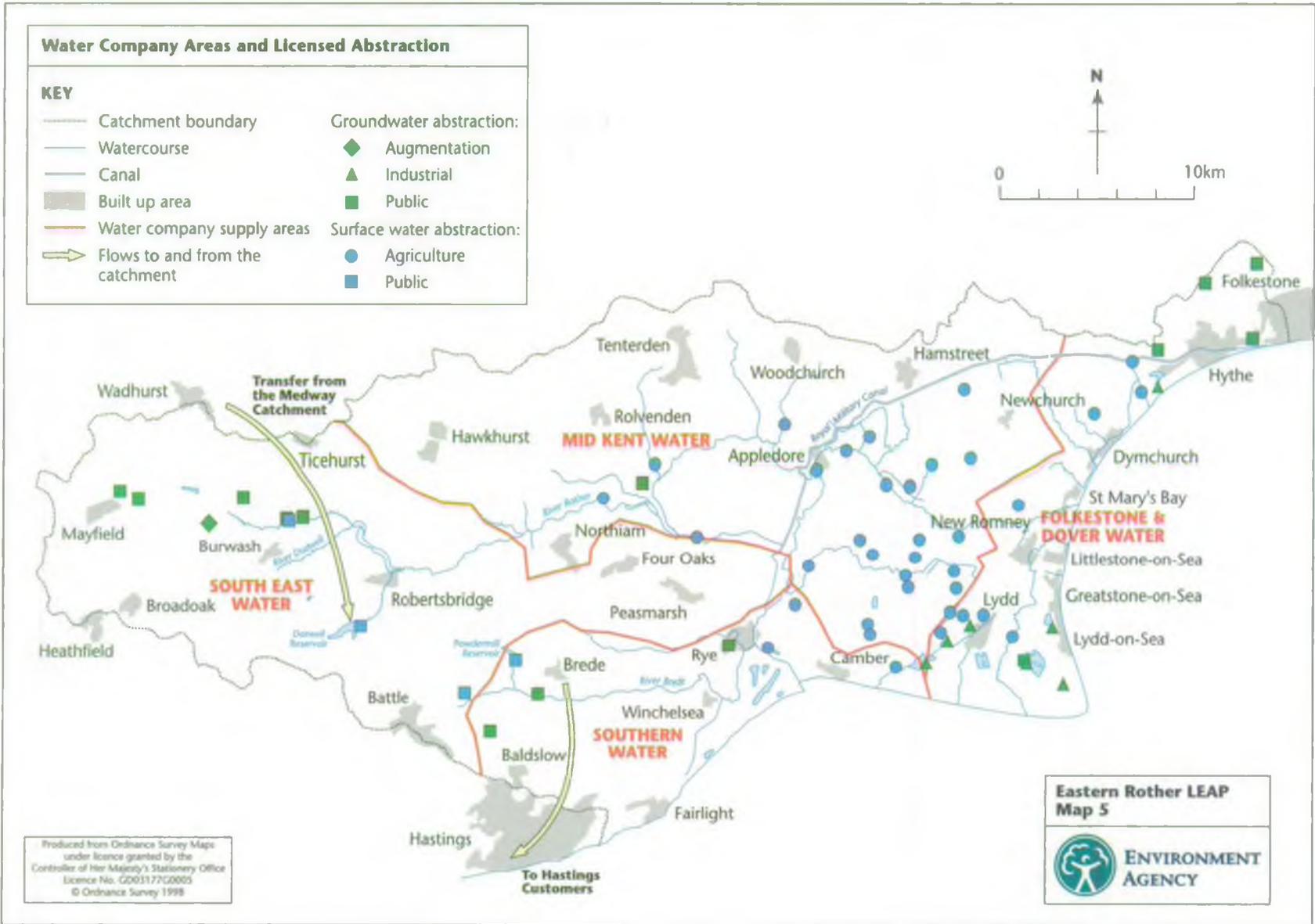
**Table 4: Licensed and actual abstractions of surface and groundwater**

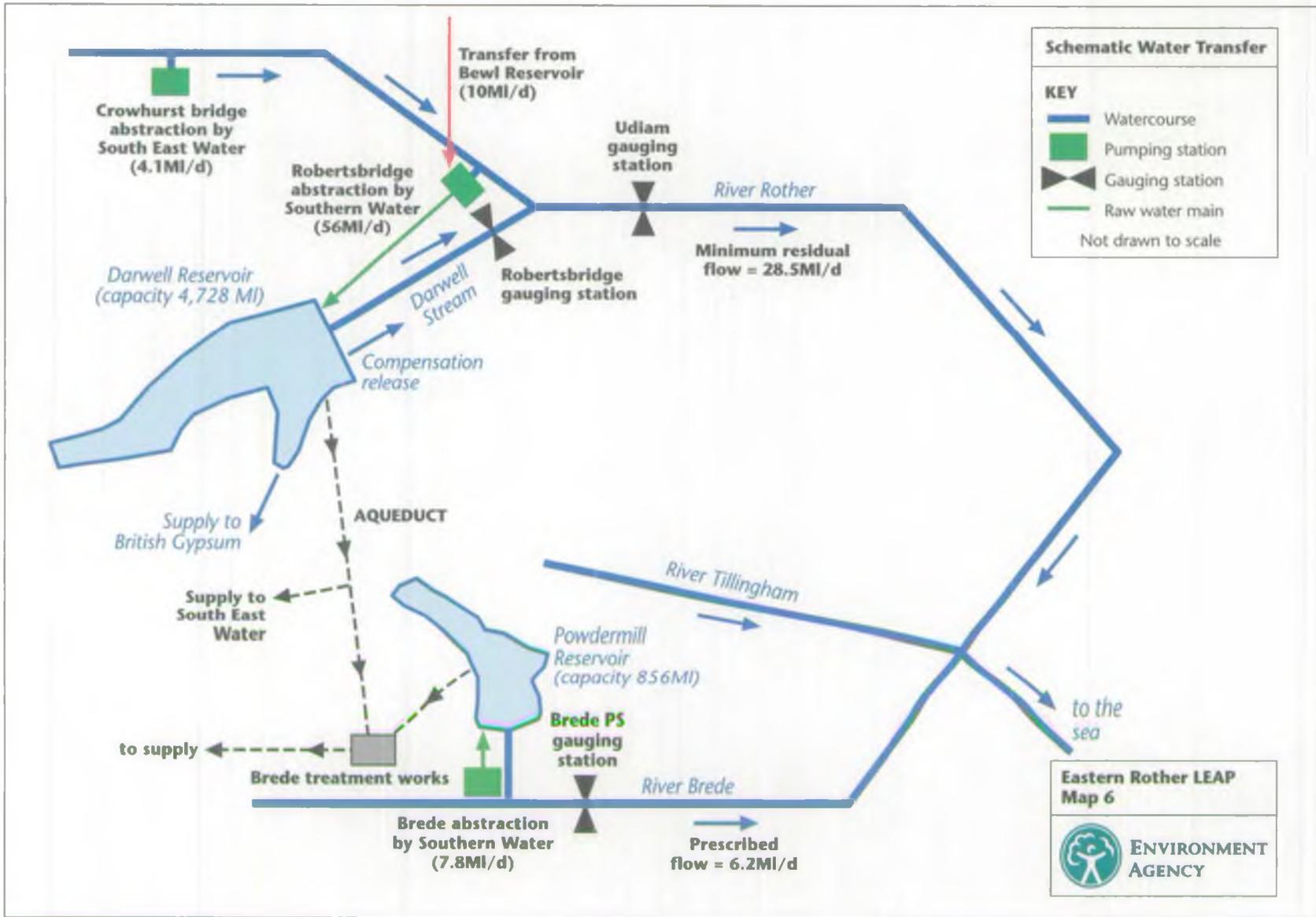
	Licensed Abstraction (ML/year)	Actual Abstraction (ML/year)		
		1995/96	1996/97	1997/98
<b>Surface water</b>				
Public Water Supply	13,345	12,194	9,286	4,390
Industry (non-saline)	112	4	3	3
Irrigation	1,443	476	509	373
Other	183	72	74	40
<b>Total</b>	<b>15,083</b>	<b>12,746</b>	<b>9,872</b>	<b>4,805</b>
<b>Ground water</b>				
Public Water Supply	11,590	6,313	6,234	2,668
Industry	6,975	2,386	2,235	2,613
Irrigation	106	7	14	12
Agriculture	142	42	33	27
Other	37	2	12	15
<b>Total</b>	<b>18,850</b>	<b>9,087</b>	<b>8,740</b>	<b>5,580</b>
<b>Grand total (ML/year)</b>	<b>33,933</b>	<b>21,833</b>	<b>18,612</b>	<b>10,385</b>

#### *Stresses on water resources*

##### *Public water supply*

Four Public Water Companies, namely Folkestone and Dover Water, Mid Kent Water, South East Water and Southern Water supply water to the LEAP area (Map 5). As a result of the historic development of water resources within the LEAP area, the sources of water are not necessarily within the supply zone. For example Mid Kent Water only has one small groundwater source at Maytham Farm (1.6ML/year) and yet supplies water to over a third of the LEAP area. An additional anomaly is that although Southern Water is the largest abstractor, the majority of its water is used outside the catchment to supply Hastings and Bexhill (Map 6).





**Table 5: Summary of Public Water Supply in the Eastern Rother Catchment**

Water Company	Authorised Output (MI/d)		Deployable Output (MI/d)	
	Surface	Groundwater	Surface	Groundwater
Southern Water	38.02	3.90	21.20	2.27
South East Water	10.73		10.2	
Folkestone & Dover Water	0	9.04	0	5.00
Mid Kent Water	0	4.55	0	1.90

*Water supply for industry and agriculture*

The majority of the licensed agricultural abstractions (Table 6) are for irrigation of crops. There is a large demand for water in the lower parts of the catchment for spray irrigation. This is especially so in Romney Marsh and Shirley Moor. In future the more intensive use of irrigation may mean that total abstraction remains at current levels or increases. Also climate change could result in more demand for water from agriculture as the conditions become hotter and drier (see section below).

Supplies are drawn predominantly from surface water either from marsh feeding systems or the storage of surplus winter water in small agricultural reservoirs.

**Table 6: Licensed abstractions for agriculture**

Resource Area	Mean Licensed Abstraction (MI/year)		
	Surface	Groundwater	Total
Romney Marsh	242	16	258
Lower Rother	1,011	93	1,104
Upper Rother	68	117	185
<b>LEAP Area Total</b>	<b>1,321</b>	<b>226</b>	<b>1,547</b>

Gravel washing at Dungeness is the only industrial demand for water in the LEAP area (Table 7).

**Table 7: Licensed abstractions for industry**

Resource Area	Mean Licensed Abstraction (Ml/year)		
	Surface	Groundwater	Total
Romney Marsh	0	4,219	4,219
Lower Rother	107	2,674	2,781
Upper Rother	5	27	32
<b>LEAP Area Total</b>	<b>112</b>	<b>6,920</b>	<b>7,032</b>

#### *Forecast demand growth*

Although there are no plans for extensive growth in population or industrial activity within the area, it is expected that there will be a marginal increase in per capita consumption. This will place greater stress on public water supply.

The Habitats Regulations impose a specific duty on the Agency, as a competent authority, to review the effects of abstraction licences on designated conservation sites.

#### *Climate Change*

Central to any assessment of future supply/demand balances is the issue of climate change. Recent hydrological data seems to suggest that there is no record of a long term trend but that climate variability is becoming more extreme. The response of aquifers to extreme variations in recharge is hard to predict so the precautionary principle will be applied to any new or varied licence applications. Continued monitoring of all aspects of the hydrological cycle should ensure that any trends are detected.

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### 2.1.8. Water Quality

A principal concern of the Agency is to achieve a continuing and overall improvement in the quality of controlled waters through the prevention and control of pollution.

#### *Current situation in the Eastern Rother area*

The current state of water quality is described below with reference to General Quality Assessment, the River Ecosystem Classification, assessment of estuary quality, groundwater protection, consented discharges to water, sewage treatment works and industrial discharges.

#### *General Quality Assessment (GQA) of surface watercourses*

The Agency routinely obtains chemical and biological data through its monitoring programmes. Periodic assessment is now made by applying the GQA Scheme, which provides a general measure of water quality and allows national comparisons. The assessment is based on water chemistry and the biological diversity of the watercourse. The Chemical GQA comprises six water quality grades which reflect different levels of pollution (A = Very Good to F = Bad).

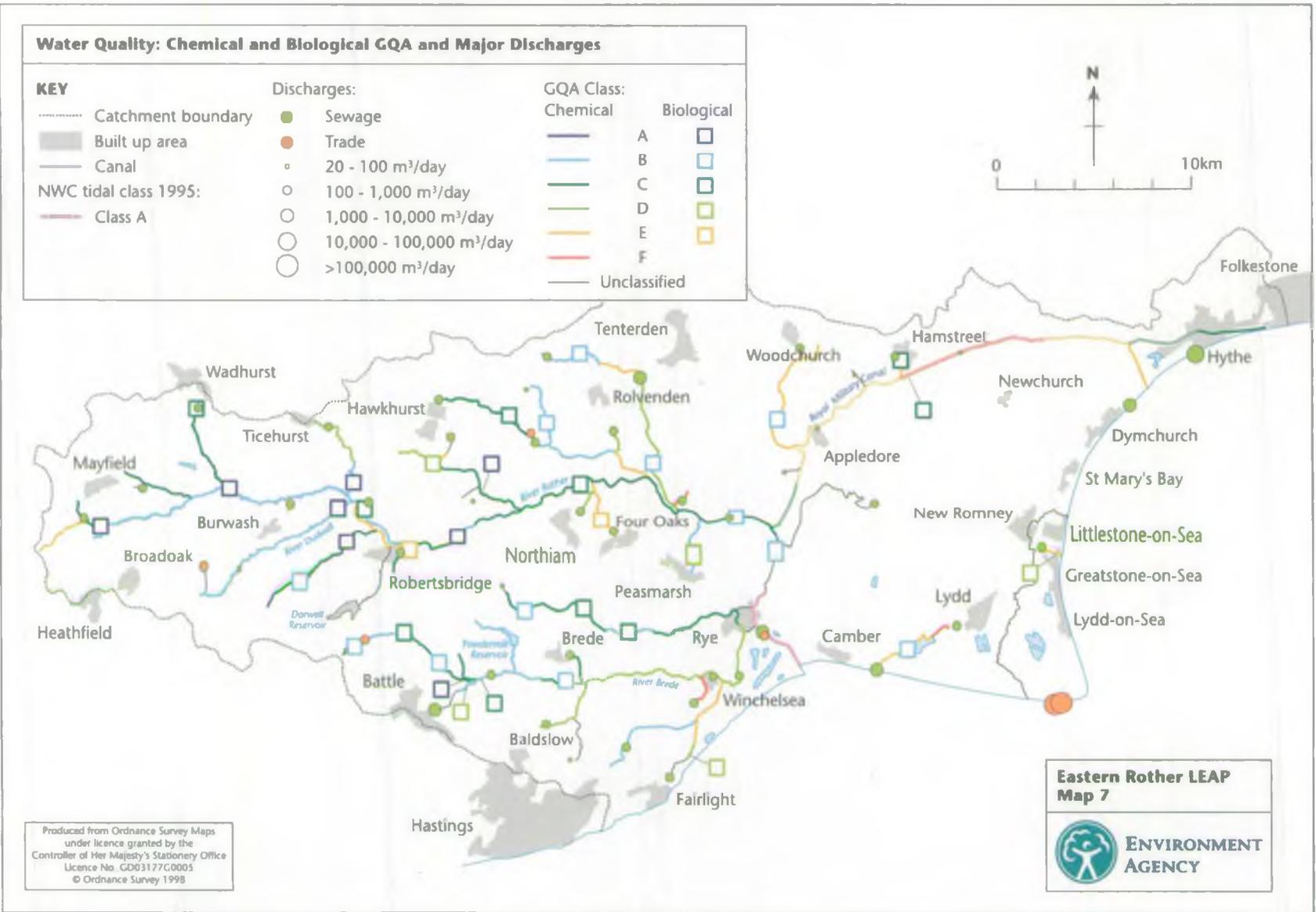
Whereas the Chemical GQA grades reflect degrees of pollution at the time of sampling, the Biology GQA assesses the health of river stretches through the diversity of tiny animals (macro-invertebrates) that live on the bed of the river. This provides a longer term picture and the best overall guide to the health of the river ecosystem. The biological water quality is based on the diversity and abundance of particular species of macro-invertebrates. Biological grades are assigned to rivers based on values of Ecological Quality Index (EQI). EQI is a ratio, which is calculated by expressing biological quality as a fraction of the predicted biological quality that would be found in a clean river. The Biology GQA applies a water quality grading scheme comprising six grades (a = very good to f=bad).

The 77 stretches sampled in the Eastern Rother Catchment are shown on Map 7 and the GQA Chemical Grades from 1995 to 1997 are given in Appendix 4.

The GQA Biological Grade from 1990 to 1998 for these stretches of watercourses in the Eastern Rother Catchment are given in Appendix 5.

#### *River Ecosystem classification*

The River Ecosystem Classification is used to establish long term targets for water quality. Five classes are defined containing chemical water quality standards required to protect certain water uses (RE1 = water of very good





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quality suitable for all fish species to RE5 = water of poor quality which is likely to limit coarse fish populations).

The target RE classes and achievements from 1995 to 1997 are also given in Appendix 4 and shown on Map 8.

#### *Assessment of estuary quality*

One stretch in the Eastern Rother catchment from Rye Harbour East Pier to Scots Float is sampled 4 times a year to establish its NWC tidal quality classification. Points for tidal classifications are awarded under each of the headings of biological, aesthetic and water quality which are combined into four classes from A (good quality) to D (bad quality). As shown on Map 7 the stretch in the catchment scored grade A for 1995. This shows the excellent quality of the tidal waters.

#### *Groundwater protection*

The Agency considers the protection of groundwater to be of great importance. Once a groundwater source is contaminated it can take many years before it can be used again. The Agency framework document, *The Policy and Practice for the Protection of Groundwater (1998)*, advises on activities which may affect groundwater quality, including physical disturbance to aquifers, point source and diffuse pollution and contaminated land and identifies constraints. Groundwater Vulnerability Maps that are being produced nationally for England and Wales support these policies. These show the location of aquifers and classify their vulnerability according to the properties of the soil and underlying strata.

The Environment Agency is at present setting up a strategy for monitoring groundwater quality in the Eastern Rother LEAP area. Chalk and lower Greensand form aquifers in the far east of the area.

There are 6 protection zones associated with Lower Greensand abstractions and one associated with the Lower Chalk. The Denge gravel aquifer contains an agglomeration of protection zones covering a large proportion of its area. 6 protection zones are associated with abstractions from minor aquifers in the Hastings Beds.

#### *Consented discharges to water*

The Environment Agency issues consents for discharges from sewage treatment works and industrial sites to watercourses. The most significant consented discharges are shown on Map 7. It is the responsibility of the sewage undertaker, Southern Water, to issue consents to industrial organisations that discharge their trade effluent to sewer.

*Sewage Treatment Works (STWs)*

A large proportion of the catchment is not served by main drainage. However there are a number of significant public STWs such as Tenterden, Battle and Robertsbridge. The private works in the catchment are generally very small but their cumulative effect on water quality should not be underestimated.

*Industrial discharges*

As shown on Map 7 industrial discharges in the Eastern Rother Catchment include:

- Dungeness Power Stations (cooling water to the sea);
- Mountfield mine (to the River Line).

*Stresses on water quality*

Additional stresses on water quality are primarily from non-consented discharges, the operation of combined sewage overflows in dry weather, discharges from septic tanks to watercourses, potential contamination from landfill sites and from agricultural run-off and pollution incidents.

Reported pollution incidents are categorised in terms of their environmental impact from 1 – major to 4 – no impact. Table 8 summarises the number of Category 1 and 2 incidents in recent years. The largest cause of pollution involved in 35% of these incidents was various types of oil.

**Table 8: Number of Category 1 and 2 water pollution incidents in the Eastern Rother Catchment.**

Year	Category 1	Category 2
1995	1	4
1996	0	4
1997	2	4
1998	1	7

### 2.1.9. Protection against flooding

A key aim of the Agency is to provide appropriate protection for people and property against flooding from rivers and the sea and to provide adequate arrangements for flood forecasting and warning.

#### *Current situation in the Eastern Rother area*

Due to the low-lying nature of much of the LEAP area, it is prone to flooding. In the post-war period there has been a significant amount of land drainage.

Romney Marsh occupies that part of Kent and Sussex that is bounded to the north and west by the Royal Military Canal and to the east and south by the sea. The Royal Military Canal, although in fact it now forms part of the *main river* system of the Environment Agency, is an artificial waterway constructed as a defence measure during the Napoleonic Wars. It extends from Hythe to Pett Level along the foot of the Wealden Hills, which rise steeply from its northern bank.

Romney Marsh includes not only Romney Marsh Level proper situated to the north-east of the Rhee Wall along, which now runs the road from Appledore to New Romney, but also the Walland Marsh, Denge Marsh and the Pett Levels. The total area is approximately 27,000ha in extent. The whole of the area is flat – a characteristic accentuated by the Wealden Hills skirting it to the north and west. Practically all of it lies below high spring tides, the lowest portion, namely the Dowels area in the neighbourhood of Appledore, being approximately 3.2 meters below a spring tide.

Between Bodiam and the sea, the valley of the River Rother lies below mean high tide level. The Wet Level, south of the Isle of Oxney, was reclaimed several centuries ago and is the lowest land in the valley. Land reclaimed subsequently is higher, having received further marine silt deposits. Today the river is only tidal up to Scots Float Sluice and the banks of the Rother have been raised to reduce flooding and maximise flood storage.

The uplands of the River Rother catchment are steep and relatively impermeable giving a high rate of run-off during wet weather. The lowland part of the valley below Bodiam, the Wet Level, consequently becomes a flood storage lake, which can only discharge intermittently between each high tide.

There have been changes to the land use within the area for several thousand years, with particularly significant change over the last 200 years. The major human influences on natural processes fall into three main categories:

- built defences, such as sea walls and groynes, to protect areas of coastline from flooding and erosion;
- enclosure of saltmarsh behind sea wall and drainage of the saltmarsh areas for agricultural purposes more than 100 years ago.

- Rother drainage improvement scheme during the late 1960s when the Rother banks were raised, Archimedian screw pumps installed and flood storage area created.

Due to the scale of human influence in the area it is not possible to predict exactly how natural processes work. For instance there is insufficient knowledge about coastal processes to inform decisions about sediment budgets such as shingle movement and recycling between Rye and Dungeness. The Agency has commissioned two strategies covering the coast from Dogs Hill to Folkestone to study the coastal processes and recommend options for coastal management.

Map 9 shows the extent of sea defences along the coast and watercourses within the Eastern Rother LEAP area and the locations of Environment Agency control structures and pumping stations. A variety of defences protect the banks from flooding and erosion. These include concrete sea walls, clay embankments, rock revetments and groynes.

There are 37 pumping stations which are used for flood defence purposes as well as land drainage to pump water over sea defences and flood embankments when outfalls are tide locked and water levels in the Rother are too high.

#### *Flood risk areas*

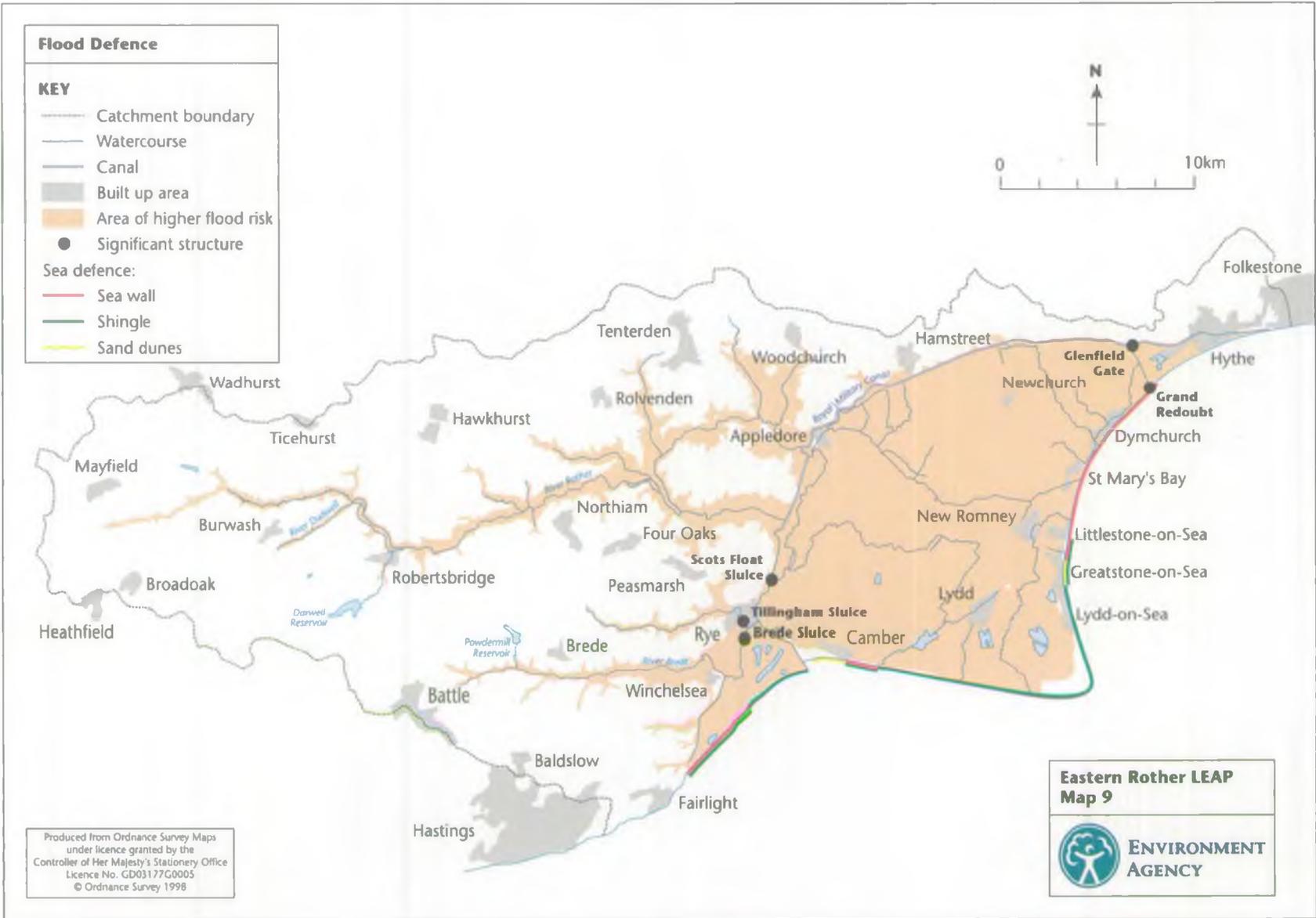
The risk of flooding is a problem in the Eastern Rother LEAP area due to the potential combination of both fluvial and coastal flooding events. In 1983, the tide reached a level 5.3m above ordnance datum (AOD). Prior to this in 1977 defences were overtopped by extreme tidal flood events and in 1953 the worst tidal flooding in recorded history resulted in extensive property damage.

Much of the Eastern Rother coast, which is unprotected by cliffs or higher ground, is at risk from coastal flooding. In some areas there is the risk of both coastal and fluvial flooding.

The main areas currently at risk of fluvial flooding are the lowland reaches of the Rivers Rother, Brede and Tillingham and the Romney, Walland and Pett marshes.

#### *Capital works: river*

The current capital programme in Kent indicates an annual expenditure of approximately £5m by the Environment Agency. In Eastern Rother the 5 year programme includes improvements to the Pett and Dymchurch frontage and the tidal banks in Rye.



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### *Maintenance works: coastal*

The coastal defences present around the Eastern Rother are generally in a reasonable state of repair and are maintained primarily by the Environment Agency, through a programme of annual maintenance work. The flood defences protecting the built up areas, for example around Rye, comprise of concrete walls and clay embankments that must be inspected regularly.

The Agency is not obliged to maintain sea defences as public amenities but does require access for maintenance, so there are generally a number of points of access. However, stretches of the Saxon Shore Way and parts of the defences in Romney Marsh are historic public rights of way and as such it is the Agency's responsibility to provide public access to these defences whilst carrying out its defence maintenance programme.

The grass on many of the embankments is flail mown at least once a year. This is necessary to maintain the structural integrity of the flood defences in times of over topping. The defences are in some locations botanically interesting due in part to the mowing regime and the programme is designed to promote this where practical. In view of the length of defence and resources available it is not possible to always undertake the most ideal mowing regime from a conservation viewpoint.

### *Dredging*

Maintenance dredging by 360° Hydraulic Excavators on approximately 10 km of watercourse every year is carried out between December and March as and when necessary. Dredgings are disposed of on adjacent riverbanks.

### *Managed retreat*

Managed retreat, involving setting back the line of actively maintained defence to a new line inland of the original and promoting the development of intertidal habitat on the land between the old and new defences, has not been considered to be an option for the Rother Area. This is due to the extent of low-lying land behind the sea walls, which could be flooded. There are two main factors which suggest that it is timely for the Agency to review its position with respect to managed retreat:

- (i) the high monetary cost of maintaining the sea defences (which may outweigh the benefits in terms of protecting people and property from flooding);
- (ii) the potential conservation benefits of retreating the line of sea defences, in terms of the creation of saltmarsh and other diminishing habitats.

A number of areas in Eastern Rother where managed retreat would bring operational and environmental benefits are therefore being investigated in consultation with the landowners, users and conservation bodies. Examples are Rye Harbour Nature Reserve and Lydd Ranges (MOD).

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### *Internal Drainage Boards*

Land drainage and sea defences have had an essential part to play in the development of Romney Marshes. Historically these functions were exercised by the Corporation of Romney Marsh, the oldest drainage authority in England. Currently drainage and sea defence works are undertaken by Internal Drainage Boards (IDBs) and the Environment Agency, which acts as agent for the IDBs carrying out the works on behalf of the five Boards:

- Romney Internal Drainage Board;
- Walland Internal Drainage Board;
- Denge & Southbrooks Internal Drainage Board;
- Rother Internal Drainage Board;
- Pett Internal Drainage Board.

Proposals have now been approved to merge these Boards into a single one.

### *Stresses on flood defence*

There are four stresses on flood defence:

- the natural force of rising sea levels relative to land level may increase the area of land liable to flood;
- pressures for development have resulted in building in river floodplains and below maximum tide levels in areas protected by sea defences, for example at Dymchurch;
- blocked combined storm overflows (CSOs) results in the backing up of storm waters and flooding;
- the recreational use of flood defences may compromise their effectiveness. The sea defence walls provide useful access routes and many form part of the public rights of way system. There may be opportunities to enhance recreation provision on the sea walls, although there are potential conflicts between different uses on the narrow tops of the walls and significant health and safety concerns (e.g. due to people falling off the walls)

Climate change could have serious long-term consequences for the Eastern Rother area as a result of, amongst other factors, rising sea levels. The UK Climate Change Impacts Review Group completed a review of the potential effects of climate change in July 1996 for the Department of the Environment. This document stated that "the balance of evidence suggests that there is a discernible human influence on the global climate". It is predicted that sea level will rise at the rate of about 5mm per year for the UK as a whole and this is likely to be exacerbated in the southern and eastern England by sinking land.

The future planning of sea defences needs to take account of possible sea level rise due to climate change. Raising the level of defences above that necessary today can only be justified where evidence of actual sea level rise supports the need. Where reconstruction or improvement of flood defences is carried out, the designed defence level usually takes account of the predicted sea level rise over a 50 year period. Changes to mean sea level are much smaller than the short term changes due to tides, surges and waves. However, only a slight rise in mean sea level will amplify the frequency of extreme water levels caused by storm surges. MAFF allows for an increase of 6 mm/year when appraising its coastal defences in the Agency's Southern Region. Overall, any improvement works would be subject to cost benefit analysis.

### 2.1.10. Recreation

The Environment Agency seeks to protect, improve and promote recreation on or near to water where appropriate or desirable. It is also concerned about the appearance (aesthetic quality) of the water environment.

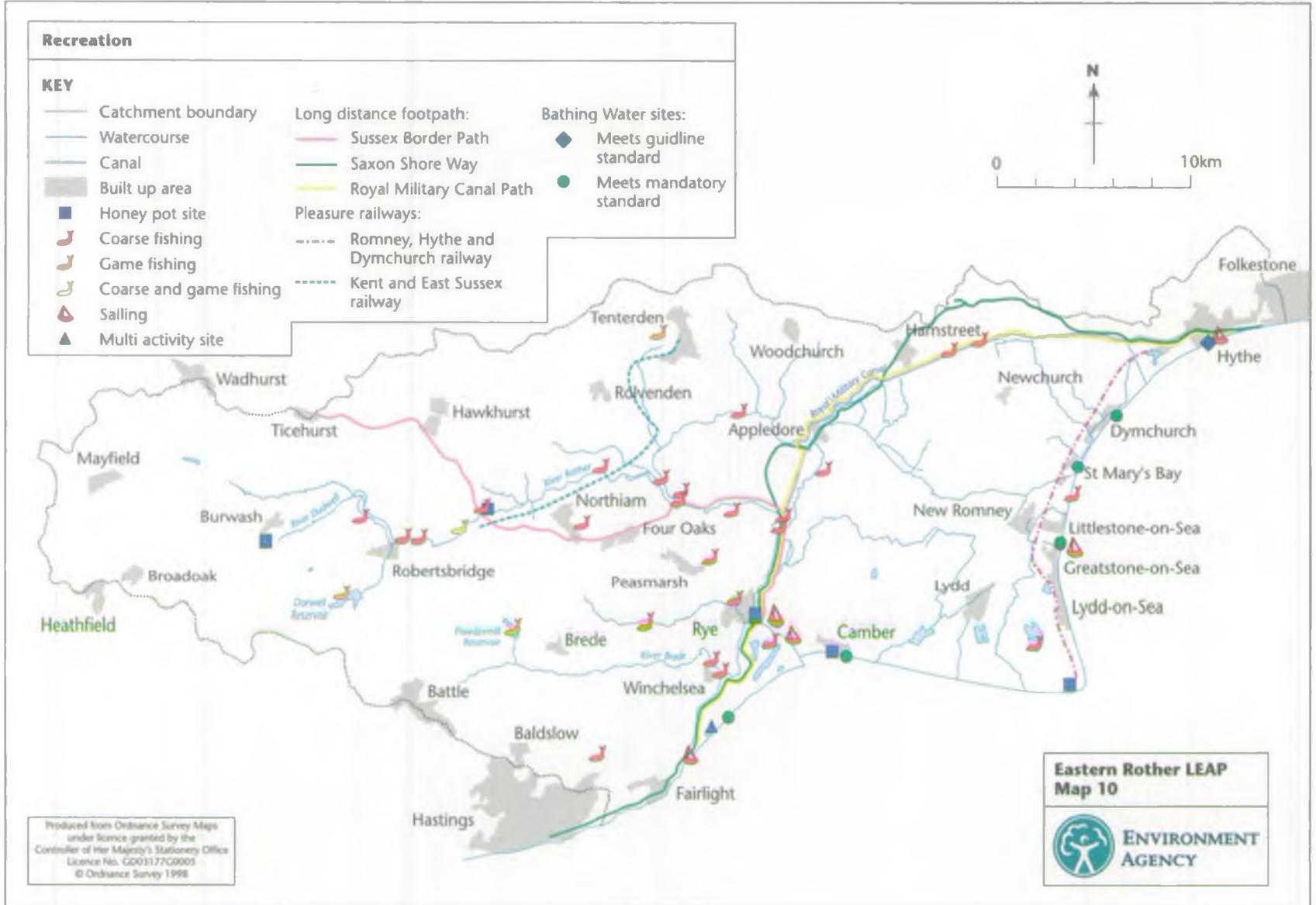
Recreation covers all aspects of water-related leisure activities ranging from informal types such as walking, picnicking and visiting the waterside to more organised sports such as canoeing, sailing, fishing and water-skiing. Water forms an important part of the landscape and people enjoy being on or near water appreciating it aesthetically or observing other people or wildlife using it.

The key objectives of the Agency are to:

- increase the quality, quantity and diversity of access;
- improve access to, and facilities available, at Agency sites;
- promote water and associated land for appropriate recreational use;
- increase the number of recreational opportunities through all Agency operations;
- influence environmental improvements which provide recreational benefits;
- resolve any perceived or actual conflicts.

#### *Current situation in the Eastern Rother area*

A key element for recreation in the Eastern Rother catchment is the long stretch of coastline running from Hythe, southwards past Dungeness to Fairlight close to the outskirts of Hastings providing opportunities for a range of water based activities. As a result the area draws in many visitors and holidaymakers to attractions such as the historic towns of Rye and Hythe, beaches including Camber and Dymchurch or the Romney, Hythe and Dymchurch Railway which travels to the environmentally fragile, shingle promontory at Dungeness (Map 10).



Inland the area retains many of the characteristics that are considered to make up the traditional English landscape, which is increasingly under threat in the more heavily populated parts of the South East. Here tourist attractions include the town of Tenterden, a number of historic buildings such as Bodiam Castle and the Royal Military Canal skirting Romney Marsh. Water based recreation in the area includes fishing on the rivers and reservoirs as well as the use by small boats of the River Rother, including boat trips from Newenden to Bodiam.

#### *Water based recreational activities*

Rye Harbour is a key location for water based activity, particularly sailing and powerboats, some of which continue on to the River Rother passing through the lock at Scots Float Sluice. A stretch of the River Rother between Rye and Scots Float is used for water-skiing, which also takes place on a lake at Lydd and in the sea at Hythe.

#### *Angling*

Rye Bay is popular for sea angling from boats as well along the whole stretch of coast in the Eastern Rother catchment.

Inland, the following angling clubs operate in the area:

- Ashford Angling Society
- Bodiam Angling Club
- Brede Angling Club
- Burwash Angling Club
- C.A.L.P.A.C.
- Cinque Ports Angling Society
- Clive Vale Angling Club
- Cranbrook & District Angling Society
- Folkestone & Shepway Angling Club
- Hastings Flyfishers Club
- Hastings, Bexhill & District Angling Club
- Lydd Water Sport Angling Club
- Mid Kent Fisheries
- Northiam Angling Club
- Rother Fisheries Association
- Royal Tunbridge Wells Angling Society
- Rye & District Angling Society
- South Kent Angling Association
- Tenterden Angling Club

#### *Land based recreational activities*

Public access to the water environment in the LEAP area is particularly concentrated on the Royal Military Canal, Rye Harbour and the coastline. There are popular beaches along the whole stretch of coast including six designated as Bathing Water sites at Hythe, Dymchurch, St Mary's Bay, Littlestone, Camber and Winchelsea. Camber Sands is also used regularly during the winter for exercising horses.

It is believed recreational cycling is increasing within the LEAP area, although

there are, as yet, few designated cycle routes. The proposed route for the South Coast section (No 201) of the Sustrans National Cycle Network would pass through the LEAP area, including following the Royal Military Canal.

The LEAP area is enormously rich in nature conservation interest, particularly at Rye Harbour and Dungeness. These areas provide opportunities for people to enjoy wildlife and appreciate the open landscape along the coast.

#### *Stresses on recreation*

There is pressure on space for mooring in Rye Harbour, especially during the summer.

There is also a large number of visitors during the summer to the popular resorts in the area with a demand for facilities including parking and the potential to damage fragile habitats. This demand is particularly high in Rye and Camber but also occurs to a lesser extent at other places such as Battle and Dungeness.

Extensive weed growth, limited access to the water and its use for angling limits the use of the Royal Military Canal for navigation, which is restricted to unpowered craft.

### **2.1.11. Waste management**

#### *The Agency's role*

The Agency has a key role in implementing the Government's proposed national statutory waste strategy, which is required under the EA95. Currently the strategy is based on three key objectives:

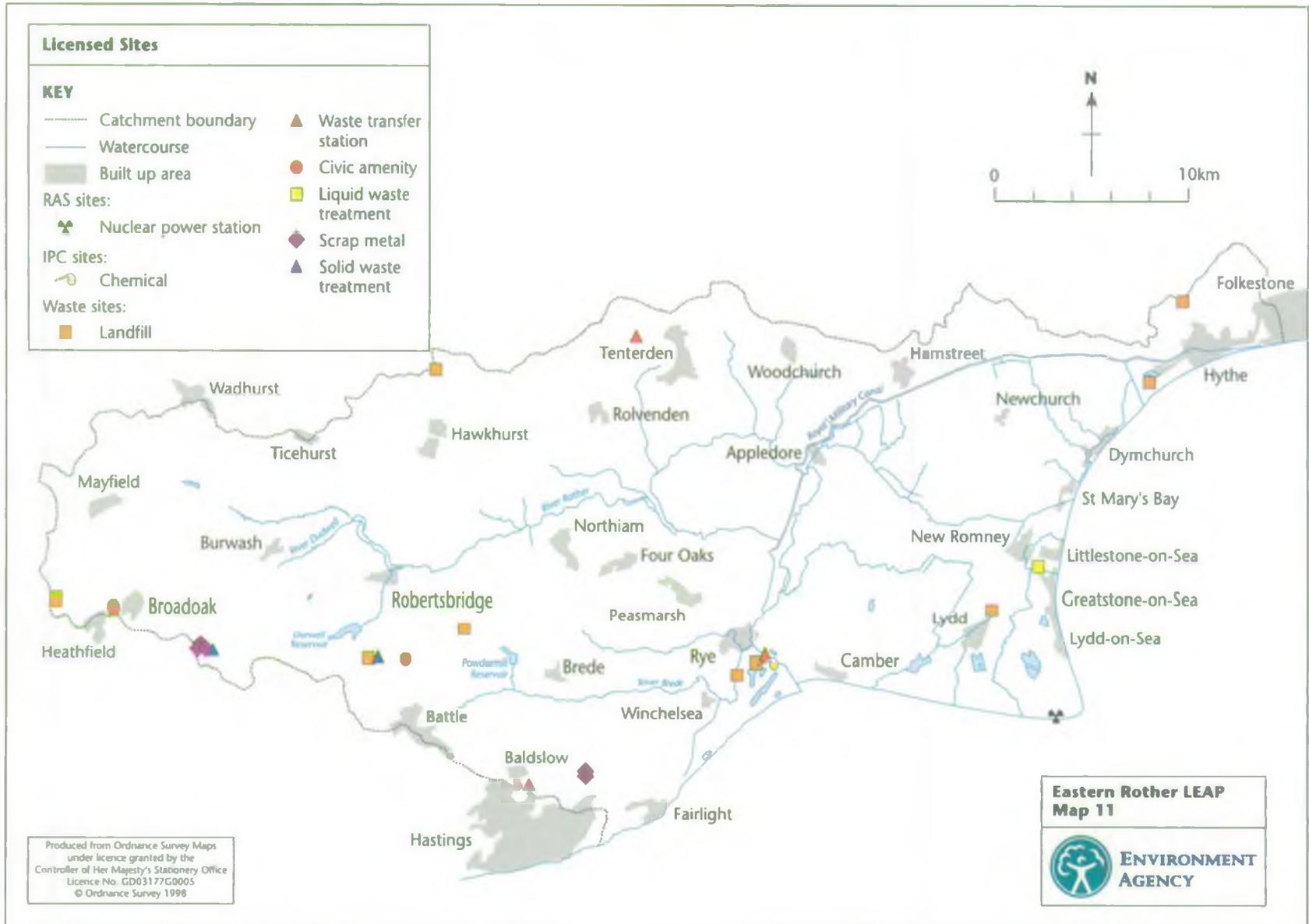
- to reduce the amount of waste society produces;
- to make the best use of the waste produced;
- to minimise risks of harm to human health and environmental pollution.

#### *Current situation*

The Waste Local Plans prepared by Kent County Council (1998) and East Sussex County Council and Brighton & Hove Council (Consultation Draft, 1998) indicate that the Eastern Rother has a growing shortage of facilities with planning permission to deal with the waste that the community will generate. The Agency, in line with the proximity principle and the principle of regional self-sufficiency, would prefer local facilities in Kent or Sussex to be used.

#### *Licensed facilities*

There are 22 licensed sites located within the LEAP area identified on Map 11.



**Licensed Sites**

**KEY**

- Catchment boundary
- Watercourse
- Built up area
- RAS sites:
  - ☢ Nuclear power station
  - ☪ Liquid waste treatment
  - ◆ Scrap metal
- IPC sites:
  - ☪ Chemical
  - ▲ Solid waste treatment
- Waste sites:
  - Landfill
- ▲ Waste transfer station
- Civic amenity

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**Eastern Rother LEAP  
Map 11**

**ENVIRONMENT  
AGENCY**

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*Exempt sites*

Since 1994 the Agency has registered a total of 854 activities in the Kent Area that are exempt from waste management licensing. The main activity covered by these exemptions is packaging waste recovery.

*Proposed facilities*

East Sussex County Council is currently undertaking a review of waste handling facilities within the county with a view to accommodating future demands.

*Stresses on waste management**Waste arisings*

The Agency has completed work on the national survey of waste arisings as part of a process aimed at reducing the amount produced. This is based on questionnaires, a telephone survey and some follow-up visits to waste generating activities. The amount of waste arising in the Eastern Rother LEAP area will be assessed as part of the survey.

*Storage and spreading of sewage sludge*

The UK agreed under international conventions to cease the disposal of untreated sewage sludge at sea by the end of 1998. This has necessitated the treatment of sewage sludge at licensed sites and increased spreading on land. Guidelines for the control of the storage and spreading of sewage sludge on agricultural land are provided by MAFF.

Under the Sludge Use in Agriculture Regulations 1989, the Sludge Producer (generally the water company) is required to keep registers of all spreading sites, waste streams, quantities and the acreage spread. The Environment Agency can inspect these registers at any time and is in the process of doing so under a National Sludge Pilot Survey.

Under the Waste Management Licensing Regulations 1994 (Paragraph 8, Schedule 3), the Sludge Producer is only required to register sites with the Environment Agency where the waste is to be stockpiled prior to spreading on agricultural land. They also have to register sites with the Agency where they are spreading sludge on non-agricultural land.

Sewage sludge is not generally stockpiled prior to spreading, however there are 4 sites registered to stockpile sewage sludge in the Eastern Rother area. There are a far greater number of areas where sewage sludge is spread and registered only with MAFF. Hence, the Agency does not have representative data on the amount of sewage sludge that is being spread and potentially impacting on the quality of land.

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*Storing and spreading of paper sludge*

The spreading of paper sludge on land (under registered exemptions from waste regulations licensing) is an issue in Eastern Rother area. Kemsley Mill at Sittingbourne is the main producer in Kent of paper sludge that is spread on agricultural land. Data from 1998 indicate that some 20,000 tonnes of paper sludge was spread on land in the Eastern Rother area.

Paper sludge may be stockpiled prior to spreading or it may be spread immediately. While the management of land spreading has undoubtedly improved over recent years, the activity still gives rise to odours and complaints. The Agency liaises with the mills and spreading contractors to ensure that there is no stockpiling or spreading on groundwater protection Zone 1 Areas and also to protect surface water. There is planning permission and IPC authorisation in place for a waste to energy plant at Kemsley, although building has not yet started. This should significantly reduce the amount of sludge spreading when the plant is completed.

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## **2.2. THE STATUS OF KEY BIOLOGICAL POPULATIONS, COMMUNITIES AND BIODIVERSITY**

### **2.2.1. Introduction**

Biodiversity encompasses the whole variety of life on earth. This includes all species of plants and animals, together with the complex ecosystem of which they are a part.

A principal concern of the Environment Agency is to help conserve and enhance biodiversity for the benefit of present and future generations.

In order to meet overall objectives for biodiversity, whilst recognising its obligation to consider costs and benefits, the Agency seeks to:

- play a full and active part in delivering the UK's Biodiversity Action Plan;
- play a full part in implementing the EC Habitats Directive;
- implement a series of projects, in partnership with local conservation groups, to deliver biodiversity targets at specific sites;
- allocate specific resources to conservation projects aimed at increasing biodiversity;
- improve the management of wetlands for conservation purposes;
- use and promote best environmental practice for the protection and restoration of river habitats;
- implement specific projects to restore habitats in rivers and lakes, increase the area of reedbeds and abundance of other water plants, and improve the ecological potential of river banks;
- ensure that there is no deterioration in the quality of the aquatic environment in particular, and deliver significant improvements in river and still water quality by tackling diffuse pollution of them.

### **2.2.2. Key Habitats**

The Environment Agency has particular responsibilities in relation to water dependent habitats. The majority of water dependent habitats in the LEAP area are associated with Rye Harbour, Dungeness, and Romney Marsh. These are:

- intertidal mud and sand flats
- saltmarsh
- grazing marsh
- reedbeds
- estuarine open water
- saline lagoons
- shellbanks
- drainage ditches associated with agricultural land
- freshwater lakes

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### *Intertidal mud and sand flats*

The Rother catchment has significant amounts of intertidal mud and sand flats. These are mainly to be found in the Rye Harbour and Camber Sands area. The area of intertidal mudflats has suffered extensive historical losses due to sea level rise and coastal squeeze.

Mudflats are an important habitat for:

- feeding waders and wildfowl, particularly in winter and on migration (e.g. dunlin, plover, knot, godwits and curlew);
- specialised invertebrates;
- beds of eel grass.

### *Saltmarsh*

Saltmarshes are vegetated marshes within the intertidal area, which occur where low lying land is periodically inundated by the tide. As part of natural coastal processes, saltmarsh is constantly building and eroding. Historically, the rate of erosion in Kent has exceeded that of formation, mainly due to sea level rise, therefore it is a habitat in decline.

Saltmarshes are important for:

- rich plant communities including species such as golden samphire;
- invertebrates including species such as the ground lackey moth;
- high tide roost sites for wintering and migrating waterfowl;
- breeding sites for waders such as redshanks, little tern and Mediterranean gull;
- providing a natural sea defence by breaking up the energy of the waves as they reach the shore.

### *Grazing marsh*

Grazing marsh is a complex habitat of pasture, sea walls and numerous dykes and fleets. There may be a salinity gradient across the marsh so some areas may be brackish while other parts retain fresh water.

The exact extent of grazing marsh in the UK is not known but it is estimated that there may be a total of 300,000 ha (with 200,000 ha in England). Only a small proportion of this area is semi-natural (10,000 ha in the UK and 5,000 ha in England) (Biodiversity: The UK Steering Group Report, 1995).

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The County of Kent contains 5,255 ha of grazing marsh (approximately 2% of the UK total), of which the majority is unimproved or semi-improved. Significant losses of this habitat have occurred in the UK over the last 60 years. The extent of loss in the Eastern Rother area is currently unknown.

Grazing marsh is important for:

- plants such as divided sedge, sea barley and saltmarsh goosefoot;
- invertebrates, in particular associated with the ditches;
- breeding and wintering waders and wildfowl;
- birds of prey such as hen harriers;
- water voles.

Grazing marsh is the subject of a National Habitat Action Plan, and opportunities for restoration and re-creation of the habitat should be sought within the catchment.

#### *Reedbeds*

Reedbeds are fens or swamps dominated by stands of the common reed *Phragmites australis*. There are about 5000 ha of reedbeds in the UK, most of which are less than 20 ha (Biodiversity: The UK Steering Group Report, 1995).

The area of reedbed has been declining steadily since the end of the Second World War due to drainage and lack of management (estimated as a net loss of 5-10% of reedbed in England between 1979 and 1993).

A limited amount of reedbed habitat is present in the Eastern Rother area, for example reedbeds in the River Brede valley and numerous small areas of reedbed in ditches associated with grazing marsh. The total area of reedbed in the LEAP area is currently unknown.

Reedbeds are the subject of a National Habitat Action Plan, and partnership opportunities for their restoration and re-creation of the habitat should be sought within the catchment.

#### *Estuarine open water*

The catchment provides an area of open water, which is important for:

- feeding area for breeding little and common terns;
- predator free roosting sites for wildfowl;
- small numbers of wandering common seals;
- fish nursery and spawning grounds

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### *Saline lagoons*

There are at present approximately 1,300 ha of saline lagoon habitat in the UK (Biodiversity: The UK Steering Group Report, 1995). The loss of lagoons is believed to be greater than the formation of new lagoons. The lagoons provide safe roosting and feeding areas for birds during the winter and breeding habitat during the spring and summer.

The exact status of saline lagoons within the Eastern Rother catchment is unknown and further survey work is recommended.

### *Shellbanks*

Shellbanks, which are formed from the accumulation of the remains of estuarine shellfish, are present at Dungeness. The habitat is important for:

- providing roosting sites for waders at high tide;
- providing nesting sites for little terns and ringed plovers;
- a distinctive flora including sand couch, sea holly, sea sandwort, sea rocket and prickly sandwort.

### *Drainage ditches*

Drainage ditches associated with agricultural land occur throughout the LEAP area, and form important habitats for a number of species such as a vast range of invertebrates and the protected water vole. The network of ditches is thought to play a key role in the distribution flora and fauna across the catchment. Sympathetic management whilst conducting routine land drainage works greatly enhances the potential of the ditches for a wide range of flora and fauna.

### *Freshwater lakes*

Significant areas of freshwater lakes have resulted due to the past and on-going process of gravel extraction mainly centred around Lydd and Dungeness. The lakes support an interesting diversity of wildlife, such as the protected medicinal leech.

### *Areas of land owned by the Environment Agency*

The Environment Agency has a responsibility for managing its land to sustain, enhance or create conservation interest where the opportunity arises. The grass cutting regime of Agency owned flood banks adjacent to the River Rother is one such example. Here the frequency of the cut is such that it favours small rodents which in turn provides ideal hunting ground for the barn owl. The introduction of artificial nest boxes to the Eastern Rother catchment

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has proved to be one of the most successful programmes of its kind in the country. The Agency also owns significant areas of Rye Harbour presenting an interesting opportunity to enhance a site that is visited by a wide range of people.

### 2.2.3. Key Species

#### *Wildfowl and wading birds*

The Romney and Walland Marshes together with the range of habitats associated with Dungeness support numerous species of breeding, migrating and over-wintering birds. These species are important in a local, national and international context and consequently significant areas of land have specific nature conservation designations applied to them to maintain a favourable conservation status (see Section 2.3.5).

#### *Biodiversity Action Plan (BAP) Species*

Under the UK BAP and Kent BAP, the Environment Agency is the lead agency for twelve species. However, only the water vole. has been recorded in the Eastern Rother area. It is possible that transient otters have passed through the area but to date there is little evidence to support this claim.

The water vole. was formerly common in Britain but has undergone a considerable decline in numbers, distribution and density throughout this century. A national survey in 1989-90 recorded losses from 67% of former sites and it is estimated that this may rise to 94% by 2000 (Kent Biodiversity Action Plan, 1997).

Within the County of Kent, water vole. populations have become increasingly rare and isolated. However, the Romney Marsh area would appear to be a stronghold where the network of ditches allows animals to distribute widely across the area.

### 2.2.4. Fisheries

The responsibility of the Agency to fisheries in the Eastern Rother LEAP area relates to salmon, trout, freshwater fish and eels. Responsibility for coastal fisheries lies with the Kent and Essex Sea Fisheries Committee and the Sussex Sea Fisheries Committee. The River Rother Fisheries Strategy was published by the Agency in March 1998. This fully examines the status of the fisheries in the catchment related to its hydrology, chemical and biological water quality and discharge consents. The following description focuses on the fish species.

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### *Salmon and sea trout*

The Rivers Rother, Brede and Tillingham support runs of sea trout from the English Channel and Rye Bay usually from May to September. Spawning occurs around Christmas on gravel fords in the rivers and their tributaries. Juvenile sea trout spend between 1 and 3 years in freshwater before the return journey to the sea to complete the migratory cycle. Salmon have not been found in this catchment.

The principal barrier to migration is Scots Float Sluice, which includes a submerged orifice fish pass. This is designed to operate automatically according to the state of the tide to prevent the ingress of saline water but recent summer low flows have resulted in extended periods of non-operation. There are also a number of other obstructions to migration on the rivers although there is a fish pass at Stonegate on the River Rother and the operation of the lock gates allows access at Brede Sluice.

### *Freshwater fish*

In the rivers and streams, the principal species are bullheads, brook lampreys and stone loach in the fast flowing headwaters, chub and dace in the middle sections and roach and bream in the slow flowing lower sections. The marsh drainage system is dominated by tench and other bottom living species including eels.

Waterweed growths proliferate in the low lying watercourses during the summer and, in some very hot years, excessive growth has depleted the oxygen causing major fish mortalities.

### *Elvers and eels:*

Elvers (glass eels) migrate from the sea through the estuary into the rivers and dykes from February to May each year. Adult eels pass back through the estuary during October for their return oceanic migration back to the spawning grounds of the Sargasso Sea. Recent surveys indicate the spread of the parasite *Anguillicola crassus* throughout the eel population.

*Fisheries and fish farms.*

The principal fisheries and fish farms in the LEAP area are listed in Table 9.

**Table 9: Fisheries locations and fish farms**

Type	Name of Water	Club / Owner
Coarse Fisheries	Lakes at Lydd	Lydd Watersport
	Marsh drains	Hastings, Bexhill & District AC
	Pett Pools / River Rother	Clive Vale AS
	Radnor Park Lake	Folkestone & Shepway AC
	Reading Sewer	Tenterden & District APS
	River Brede	Brede AC
	River Rother	Northiam AC
	River Rother / River Brede	Rye & District AC
	Royal Military Canal	Cinque Ports AS
	Royal Military Canal	South Kent AA
	River Rother / Royal Military Canal	Rother Fisheries Association
Trout Fisheries	Darwell / Powdermill	Hastings Flyfishers
	River Dudwell	Burwash AC
Fish Farms	Hawkhurst	Hawkhurst FF
	Iden Green	Waters End Farm
	Tenterden	Morghew Farms Ltd

*Stresses from usage, releases and discharges**The Health Status of Fish Stocks*

30 riverine sites within the catchment are surveyed within the five-year rolling programme. During the past two years one tenth of these sites have been selected for a health check of the fish stocks. Rarely are any diseases or parasites of importance found in native riverine stocks. However, in 1998 the ergasilid crustacean ectoparasites *Neoergasilus japonicus* and *Paraergasilus* spp were found in fish at Blackwall Bridge on the Rother. These are commonly associated with reservoir/still water fisheries and it is suspected that illegal stocking may have taken place at this site.

The catchment has also experienced the introduction of *Ergasilus sieboldii* via the Bawl to Darwell transfer, which is being monitored by consultants for Southern Water. There has been a progressive increase in the incidence of this parasite from zero to 28% on coarse fish stocks in Darwell Reservoir and in 1998 nearly 100% of trout stocked to Darwell were infected within weeks of introduction. The percentage infection has been less in 1999 perhaps because of modifications in the restocking regime.

In 1998 *E sieboldii* was found on a pike below Darwell Reservoir in the Rother at Robertsbridge and on a few tench at Blackwall Bridge. It is likely that the former came from Darwell but the latter may be related to the previously mentioned illegal activity.

Low river flows, eutrophication and excessive waterweed growths in the lower levels of the Eastern Rother Catchment will favour colonisation by these parasites with a chronic long term impact upon the health of the fish stock.

### 2.2.5. Designated Nature Conservation Areas

English Nature is responsible for proposing sites for designation under international or national legislation such as the EU Habitats Directive or the Wildlife and Countryside Act. At a local level Sites of Nature Conservation Interest (SNCIs) are designated by County Wildlife Trusts and Local Nature Reserves are identified by local authorities. Both are recognised and protected in local authority plans (Map 12).

#### *European Directive on Wild Birds: Special Protection Areas (SPAs)*

An SPA is a site designated by member states under the EC Birds Directive, 1979, as the most suitable territories in number and size for the conservation of bird species protected by the Directive.

There is one proposed SPA site within the LEAP area from Dungeness to Pett Level. Birds of particular interest or significant numbers include wintering Bewick's swans, breeding little and common terns. Birds of prey include marsh and hen harriers, peregrine falcons and short-eared owls.

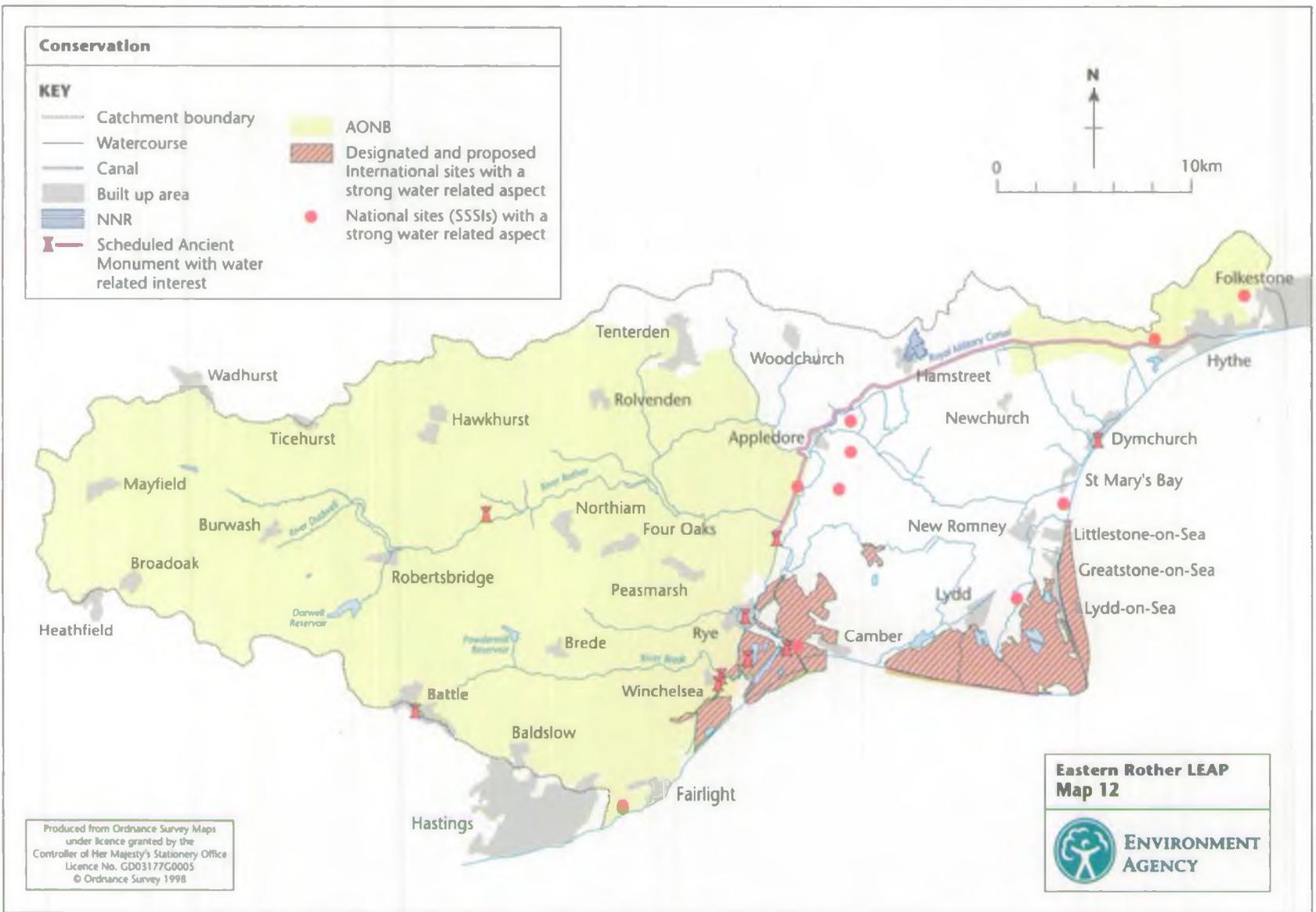
#### *European Directive on the conservation of natural habitats and of wild fauna and flora: Special Areas of Conservation (SACs)*

An SAC is a site designated by member states under the EC Habitats Directive, as the best representative sites of the habitats and species particular to that region. The aim is to create a network of sites throughout Europe, known as Natura 2000, which together will offer the entire range of habitats and species that occur naturally within the continent.

There are two candidate SACs within the LEAP area, which are Rye Harbour and Dungeness. Both have fine examples of annual vegetation of drift lines and coastal shingle outside the reach of wave action.

#### *Ramsar sites*

Ramsar sites are wetlands of international importance which qualify as designated sites by supporting a number of species of rare plants, invertebrates and birds and by virtue of regularly supporting over 20,000 waterfowl.



There is one Ramsar site within the LEAP area, the Dungeness to Pett Level site, containing many specialist and rare plants including least lettuce, marsh mallow and brackish water crowfoot. More than 15 Red Data Book species of invertebrates are associated with the site. Various ground beetles, hoverflies, weevils, water beetles and leeches all contribute to the site's biodiversity.

#### *Sites of Special Scientific Interest (SSSIs)*

There are 10 SSSIs in the LEAP area that have a strong water related aspect. These are listed below and shown on Map 12.

- Dungeness
- Ham Street Woods
- North Lade
- Pett Level
- River Line
- Romney Warren
- Rye Harbour
- Seabrook Stream
- Walland Marsh
- Winchelsea Cutting

#### *Nature reserves*

There are two National Nature Reserves (NNRs) within the LEAP area at Ham Street Woods and Dungeness. There is also a number of other nature reserves in the LEAP area, including RSPB reserves, Kent Wildlife Trust reserves, Local Authority reserves and private reserves.

#### *Sites of Nature Conservation Interest (SNCI)*

There are over 30 SNCIs in the Eastern Rother area many of which have some degree of water related nature conservation interest.

#### *Water Level Management Plans*

MAFF has required that Water Level Management Plans should be produced by the operating authority in areas where water levels are managed with the aim of enhancing operations and reconciling the demands from the different uses involved. Water Level Management Plans have been completed for the Eastern Rother catchment, by the Environment Agency as the main operating authority, to outline recommended water levels for the following 5 water related SSSIs:

- Dungeness
- Pett Level
- Romney Warren
- Rye Harbour
- Walland Marsh

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### 2.2.6. Stresses on the Biodiversity of the Eastern Rother LEAP area

As indicated above, many factors influence the abundance and diversity of flora and fauna in the Eastern Rother area. These include:

#### *Natural stresses – climate change*

With rising sea level, saltmarshes would naturally migrate inland. Where the “hard” sea defences prevent this process, saltmarsh is squeezed and disappears. The same process will also result in the loss of intertidal mudflats.

#### *Natural stresses – predation*

Natural stresses on the fisheries of the area include the perceived impact of cormorant activity on fish populations in inland still waters and dykes and the impact of the parasite *Anguillicola crassus* on the eel population.

Water vole. (a legally protected and BAP target species) is present in the LEAP area and has a stronghold in the marsh areas although full surveys have not been carried out in other areas. The main threats to the water vole population are likely to include habitat loss and disturbance and predation especially as a result of increasing numbers of mink

#### *Natural stresses – long term effects*

Fisheries are surveyed on a better than 5 year rolling programme but there is concern that there is insufficient baseline information on fisheries against which stresses on the fish population can be assessed. This will improve when a national classification scheme is introduced to give better objectivity.

#### *Societal stresses – abstractions*

In the upper Rother catchment societal stresses from abstractions are limited to the influence of the Darwell and Powdermill Reservoirs and their associated abstractions at Robertsbridge and Brede respectively. Other licences in this area are very small in comparison.

In the lower catchment and especially in the marsh areas there are many small agricultural abstractions. Particularly during the summer months there is competition between water use for irrigation, which reduces ditch water levels, and the needs of stock farms to retain high levels as a means of “wet-fencing”. This area also contains an area of gravels at Denge, which provides public water supply sources.

Pursuant to Section 14 of the Salmon and Freshwater Fisheries Act 1975, intakes from and discharges to waters frequented by salmon and sea trout will require gratings to prevent destruction of the fish. Assessments of the sites have been undertaken and the installation of appropriate gratings and site monitoring is underway.

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### *Societal stresses - discharges*

The Environment Agency, as the harbour authority for the Harbour of Rye, has submitted to the Marine Coastguard Agency an oil spill strategy plan as required by the *Merchant Shipping Act (full details to be confirmed)*. This plan is allied with an oil spill response plan. The strategy plan defines the reasons for having to provide protection from an oil spill occurring either within the harbour limits or from a spillage at sea, which in this area could affect the Rye Harbour Nature Reserve SSSI.

Pollution from farming practices may adversely affect the nature conservation value within the catchment.

Nutrient rich discharges in the catchment are causing eutrophication and excessive weed growth in still water and dykes.

### *Societal stresses - agriculture*

Drainage ditches in grazing land agricultural land and orchards provide habitats for important flora and fauna. Insensitive management of the ditches is resulting in adverse impacts on the flora and fauna. In particular, it is important that routine maintenance work undertaken by the Environment Agency, IDBs and landowners is sympathetic to wildlife.

Maintenance of grazing marsh habitat requires the maintenance of water levels within the marsh. Drainage of land for agricultural development has led to a lowering of water levels, in conflict with the requirements for grazing marsh. This is a particular problem in areas of mixed arable and grazing land. Other agricultural practices that are resulting in adverse impacts are the use of fertiliser and pesticides.

It is necessary to manage the grassy habitats of flood defence walls to maintain the integrity of the wall and to prevent invasion by shrubs. Due to the importance of the flora and fauna of the dry grassland, it is important that management is undertaken in a sympathetic manner.

### *Societal stresses - infrastructure*

New roads may prevent animals such as the otter from re-colonising former habitats. Terrestrial walkways combined with guidance fencing can make roads safer for wildlife.

### *Societal stresses - recreation*

Water based recreation within the catchment has the potential to result in disturbance of wildlife (particularly birds). This is of particular concern for noisy activities such as jet-skis, which are frequently used outside the restricted areas.

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Land based recreation also has the potential to impact on nature conservation including the use of off road vehicles which has placed stress on fragile habitats such as vegetated shingle beaches.

Fishing activities undertaken in the LEAP area have the potential to impact on key fish species, specifically sea trout, eels and elvers, allis shad and twaite shad. The use of gill nets and specifically keddle nets, a fixed net-trap used on the beaches of Rye Bay between Fairlight and the Rother estuary, take the principal quarry, sea fish, and a by-catch of sea trout and shad. The run of sea trout into the Eastern Rother in most years is nominal and the by-catch can therefore be significant in relation to the number of adult fish available to spawn and replicate the species.

Both species of shad are listed within the EC Habitats Directive although greater protection is afforded to the rarer allis shad. Whilst it is not illegal for these species to be caught and taken, the destruction of them, sometimes in quantity, may not be supportive of the potential spawning population. This is particularly apparent in view of their low commercial and culinary value.

Exploitation of elvers and eels by licensed and, in some cases, un-licensed netmen may have a bearing upon the apparent decline of the species. Disruption of the passage of eels through the estuary and into the creeks and rivers is also of concern.

There are conflicts between water based recreation and commercial fishery activities, in particular operation of jet-skis within shellfish nursery grounds and pleasure craft failing to give way to operating trawlers.

Theft of specimen fish especially carp from still water and their unregulated transfer can cause overstocking and disease problems.

#### *Societal stresses - development*

Development of artificial sea defences has the potential to result in alteration of the natural coastal processes, and reduced deposition of material on saltmarshes, thus contributing to the loss of saltmarsh habitat.

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## **2.3. COMPLIANCE WITH ENVIRONMENTAL QUALITY STANDARDS, TARGETS AND POLICIES/STRATEGIES**

### **2.3.1. Waste management and regulation**

The draft waste strategy for England and Wales *A way with waste* (DETR June 1999) identifies specific goals for waste management:

- to reduce industrial and commercial waste sent to landfill to 85% of 1998 levels by the year 2005;
- 45% of municipal waste recovered (recycling, composting, or energy recovery) by 2010;
- 30 % of household waste recycled or composted by 2010;
- reduce household waste arisings possibly to a target weight (still to be determined) per household per year.

No accurate data are available about compliance with these targets in the Eastern Rother area.

### **2.3.2. Radioactive Substances Regulation (RSR)**

The Environment Agency is responsible for regulating the storage, use and disposal of radioactive materials through the Radioactive Substances Act, 1993 (RSA93) as amended by EA95.

There are two nuclear power stations in the area at Dungeness operating under RSA93 authorisations.

### **2.3.3. Flood defence**

#### *Flood warning responsibilities*

Colour coded warnings are given when water levels are likely to exceed existing flood defences and when combinations of climatic conditions are exceptionally adverse. Colour coded warnings are given according to the amount of flooding likely, as described in Table 10.

**Table 10: Colour coded flood warnings**

Yellow Warning	A warning of flooding to some low lying farmland and roads near rivers or the sea
Amber Warning	A warning of flooding to isolated properties, roads and large areas of farmland near rivers or the sea
Red Warning	A warning of serious flooding affecting many properties, roads and large areas of farmland

Flood warnings can be issued to households at risk by the use of the Automatic Voice Message (AVM) system over the telephone. Warnings are also distributed via the media such as AA Roadwatch, local radio and teletext. More information can be found on Floodline (08459 88 1 188).

#### *Flood defence standards of service (SOS)*

Specific reaches of sea defences along tidally influenced watercourses, are classified as providing "below", "above" or "acceptable" standards of service. Other reaches of sea defence are classified according to their condition i.e. good, fair or poor.

The provision and maintenance of defences, to improve the standards of services, requires a large amount of capital and revenue expenditure. The survey which provides the basis for the current SOS figures for Eastern Rother was conducted in November 1992, and since then work has been undertaken to improve the defences. However, there still remains a need to optimise standards of service through the ongoing programme of defence maintenance and improvement.

Current large works planned for the area include:

- Pett Level Frontage
- Tidal wall on the River Rother

#### **2.3.4. European Water Quality Directives**

The following EC Directives contain standards that are relevant to water quality in the area:

- Bathing Waters Directive
- Dangerous Substances Directive
- Freshwater Fisheries Directive
- Groundwater Directive
- Surface Water Abstraction Directive
- Urban Waste Water Treatment Directive

The Agency is required to ensure compliance with certain elements of the Directives cited above.

*Bathing Waters Directive*

The Bathing Waters Directive (76/160/EEC) protects the environment and the health of bathers by reducing pollution entering identified bathing areas. The Directive contains standards for 19 microbiological, physical and chemical parameters to assess bathing water quality. Compliance is assessed by DETR.

The Agency is required to sample and analyse bathing waters in accordance with the requirements of the Directive and report the results annually to the DETR. 6 sites within the LEAP area from Hythe to Winchelsea are designated as bathing waters. Table 11 gives results for compliance with guideline coliform and faecal streptococci standards or mandatory coliform standards from 1990 to 1997 at these bathing waters.

There have been no failures to comply with these standards since 1992 and since 1996 some of the beaches have reached the higher guideline standard.

**Table 11: Compliance with standards at bathing waters**

Year	Hythe	Dymchurch	St Mary's Bay	Littlestone	Camber	Winchelsea
1990	F	F	M	M	M	M
1991	M	F	F	F	F	M
1992	M	M	M	M	M	M
1993	M	M	M	M	M	M
1994	M	M	M	M	M	M
1995	M	M	M	M	M	M
1996	G	M	M	M	M	M
1997	G	M	M	M	M	G
1998	G	M	M	M	M	M

Key: G Meets guideline coliform and faecal streptococci standards  
 M Meets mandatory coliform standards  
 F Non-compliant

*Dangerous Substances Directive*

The Dangerous Substances Directive (EC Directive 76/464/EC) covers the control of substances based on their toxicity, persistence, and potential to accumulate in biological organisms. They include specific organic compounds such as pesticides and solvents, and specific metals that are discharged into the environment.

This Directive describes two lists of compounds. List I contains substances regarded as particularly dangerous because they are toxic, they persist in the environment and they bioaccumulate. Discharges containing List I substances must be controlled by Environmental Quality Standards (EQSs) issued through Daughter Directives. List II contains substances that are considered to be less dangerous but which still can have a harmful effect on the water environment.

There were no List I or II failures in the Eastern Rother area in 1997 or 1998.

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### *Freshwater Fisheries Directive*

This Directive on the quality of fresh waters needing protection or improvement in order to support fish life (78/659/EEC) lists appropriate water quality standards for salmonid and cyprinid freshwater fish communities. In the Eastern Rother Catchment the lengths designated under this directive are:

- salmonid - River Rother between Crowhurst Bridge and Stonegate (3.5km);
- cyprinid - River Brede between Sedlescombe and Winchelsea (10km);
  - River Rother between Robertsbridge and Iden Lock (23km);
  - Royal Military Canal north from Iden Lock (5km).

There was one failure for low pH in the Eastern Rother in 1997 and none in 1998.

### *Groundwater Directive*

The Groundwater Directive seeks to prevent pollution of groundwater from certain dangerous substances. The substances are split into two lists. List I contains the most dangerous substances and these must be prevented from entering groundwater. List II are less dangerous but their entry into groundwater must be limited such that it does not cause pollution of the groundwater.

The Government has developed the Groundwater Regulations, which transpose the Directive into British Law. This will be enacted on the 1 April 1999 and requires the Agency to authorise any disposal of materials containing List I or II substances that could impact or reach groundwater. People wishing to carry out an activity which includes the discharge of List I or II substances to the ground or groundwater after 1 April must apply for an Authorisation prior to undertaking the activity. Failure to do so is a criminal offence.

The Agency can also serve notices on individuals or companies that use or store List I or II substances where it believes that due to a lack of proper facilities or procedures there could be an accidental release of such substances to groundwater. The notice would detail works required by the person or company to prevent such a release and a date by which the work must be done.

The Agency expects to authorise a number of previously exempt activities especially in the farming industry such as the instances of the disposal of used sheep dip. A number of properties and industries within the area have oil storage tanks. The Agency will seek to identify those that are below standard and serve notices to prevent pollution occurring.

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### *Surface Water Abstraction Directive*

The Surface Water for Abstraction as Drinking Water Directive (75/40/EEC) ensures that water abstracted for public supply meets certain quality standards and is given adequate treatment before entering public water supplies. There are 5 surface water abstraction sites in the Eastern Rother area. There was 1 failure in 1998 due to sulphate.

### *Urban Waste Water Treatment Directive*

Under the terms of the Urban Waste Water Treatment Directive (91/271/EEC), current arrangements for the treatment and disposal of sewage have become subject to requirements for treatment to standards specified within the Directive. The objective of the Directive is to protect the environment from being adversely affected by the disposal of insufficiently treated urban waste water.

Southern Water Services provides all public waste water treatment facilities in the area. The only requirement under this directive in the Eastern Rother Catchment is the provision of secondary treatment at Hythe by 2005.

## **2.3.5. Fisheries**

Although the Agency has a statutory duty to maintain, improve and develop fisheries, there are few targets or criteria against which fishery performance is assessed. At present there are no targets for the assessment of stocks of freshwater fisheries, eels, smelt, salmon and trout. With regard to cyprinids, a National Monitoring Review is underway and it is probable that targets will be a recommendation. Salmon targets have been set in Salmon Action Plans for the most important rivers in England and Wales but none of the rivers in the Eastern Rother catchment fall in that category.

In addition, the level of current information on fish stocks is insufficient to provide an adequate baseline for assessment.

## **2.3.6. Recreation**

The Environment Act 1995 requires the Agency to promote, where desirable, the recreational use of all inland waters and associated land. The Agency also has a duty to preserve public access to places of natural beauty through its own functional work and to also make best recreational use of land and water under its control.

In 1997 the Environment Agency and English Sports Council published a consultation draft of their *Water Related Recreational Strategy for the Southern Region*. The main purpose of the document is to promote good practice in the planning and management of water related recreation and to

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promote provision for recreation as an integral part of the Agency functions. The strategy does not contain any targets for recreational provision but sets out a series of principles; for example visitor facilities should be promoted, as they are an integral part of many recreational activities. There are many opportunities for the implementation of the objectives of the regional strategy within the Eastern Rother area.

### **2.3.7. Biological Populations, Communities and Biodiversity**

The Agency has a number of duties with regard to conservation of biodiversity under the Environment Act 1995. In addition, the Agency has responsibility under the following:

#### *1992 Habitats Directive and 1994 Habitats Regulations*

The 1994 Habitats Regulations require the Agency to carry out its activities in a manner that assists in maintaining the 'favourable conservation status' of sites afforded statutory protection under the Habitat Directive. This includes the review of current authorisations and assessment of new works to evaluate impacts on European sites (Special Protection Areas and Special Areas for Conservation) afforded protection under the Directive. There are a number of designated European sites in the LEAP area (see Section 2.2.5). The first phase of identifying authorisations that may affect sites is complete. National guidance on how to proceed was published in January 1999.

#### *Biodiversity Action Plans (BAPs)*

The Agency has responsibilities under the National BAP) and is a stakeholder in the Kent BAP) and East Sussex BAP). The Environment Agency is identified as the lead agency for a number of habitats and species, of which only the water vole. is confirmed as present within the Eastern Rother area.

### **2.3.8. Radiation Doses to Public**

The Environment Agency, MAFF and the operators of the Dungeness nuclear power stations carry out sampling and analysis of environmental samples collected in the vicinity of the power stations. The published annual reports state that levels of radioactivity in the samples are very low and less than background in most cases.

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## **2.4. HEALTH OF THE ENVIRONMENT**

### **2.4.1. Introduction**

Traditional methods of assessing environmental quality have relied heavily on the taking of measurements with respect to established physico-chemical standards and criteria. As a consequence, data have accumulated over the years on the levels of certain substances in the environment. Assessments of the state of the environment have frequently been made on the basis of whether the levels of substances are considered to be acceptable or not, rather than by direct measurement of the state of the environment itself. There are good reasons why this has been so. Methods for sampling and analysis for many substances are well developed and convenient, quantitative standards exist, and there is a direct link to the control of emissions to the environment.

Developments in the science of ecotoxicology are opening new avenues for more direct assessment of environmental health. New ecotoxicological techniques show considerable potential not only in providing direct measures of ecological condition but also in making the important link between the observed effects and their causes. Ecotoxicological databases are continually expanding, covering an increasing number of different species and different chemicals, providing a valuable source of interpretative information. A challenge for the future is the development of techniques that allow direct measurement of ecological health "symptoms" that are sufficiently robust and reliable for incorporation into national monitoring programmes. However, there is still much to be done to improve overall understanding of the health of the environment and how it is changing in response to the pressures placed upon it.

### **2.4.2. Water**

There has been a recent decline in water quality for which low flows and drought conditions have been contributory factors.

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## **2.5. LONG TERM REFERENCE SITES**

### **2.5.1. Introduction**

Many environmental processes act over long periods and the influence of human activities often only has a slow impact. A number of long term monitoring schemes are in place to identify these environmental changes.

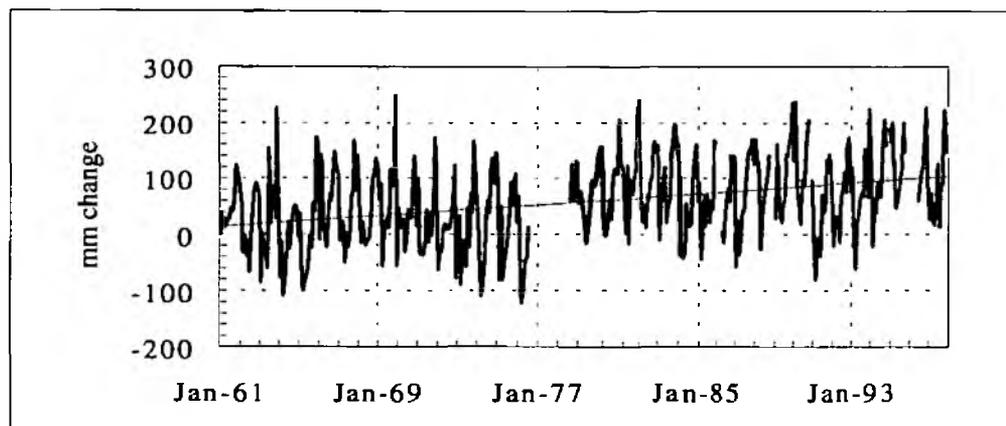
### **2.5.2. Air quality monitoring**

South East Institute of Public Health manages the Kent Air Quality Monitoring Network on behalf of the Kent Air Quality Partnership (KAQP) and Kent County Council. The monitoring network is supplemented by an emissions inventory, which incorporates industrial, traffic and domestic emissions. The inventory is used as the database for the Kent Air Quality Model. KAQP recently carried out a validation exercise on the model, funded by the Environment Agency as a member of the Partnership, to compare predicted pollutant concentrations with actual monitoring data. The results of this process will be available shortly.

A similar partnership, the Sussex Air Quality Steering Group (SAQSG), fulfils an equivalent role in both the Sussex counties. This Group comprises the local authorities, East and West Sussex County Councils and the Environment Agency together with other co-opted parties (e.g. representatives from Gatwick Airport) and acts as custodian for an emissions inventory that is used to facilitate modelling work. Whilst most of the partners conduct ambient air quality monitoring there is no co-ordinated monitoring network across Sussex similar to the one in Kent. The SAQSG is currently considering the benefits and implications of establishing such a network.

### **2.5.3. Sea level rise**

Average sea level relative to land is measured at fixed monitoring points around the coast. Regular readings are available since 1961 from Dover, which although not in the area gives a good representation for the stretch of coast through the Eastern Rother catchment.

**Figure 1: Sea level change at Dover**

Source: Proudman Oceanographic Laboratory

#### 2.5.4. Assessment of Estuary Quality

One site in the Eastern Rother area at Rye Harbour is included in the national long term monitoring survey for estuary quality according to the National Water Council classification scheme. In 1995 this site was classed as A or "good".

#### 2.5.5. Environmental Change Network

The Environmental Change Network was launched in 1992 to collect data on a range of variables of major environmental importance and identify long term changes. There are currently no monitoring sites in this network in the Eastern Rother catchment.

#### 2.5.6. Harmonised Monitoring

River quality is monitored in a consistent manner, under the Harmonised Monitoring Scheme, at a series of sites, which are mainly just above the tidal limit or confluence of major tributaries of rivers. In the Eastern Rother catchment there is one point sampled under this scheme at Blackwall Bridge on the River Rother.

Trends for data collected from 1976 to 1995 have been analysed in an Environment Agency report *The State of the Environment of England and Wales: Fresh Waters (1998)*. This shows a decrease in biochemical oxygen demand (BOD) but no trends or insufficient data for dissolved oxygen, ammoniacal nitrogen, orthophosphate, nitrate and nitrite concentrations.

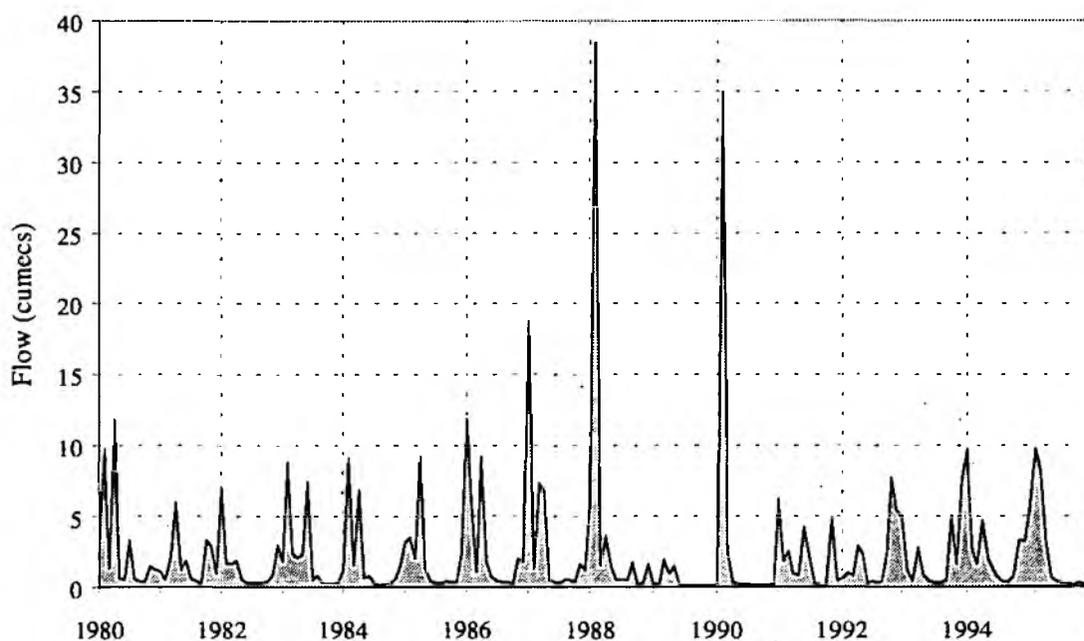
### 2.5.7. Reference Groundwater Borehole Series

Due to the complexity of the geology in the area, the long term data available from each one of the network of groundwater monitoring boreholes only represents a small localised section of the catchment. As a result there is no set of data that can be used to demonstrate typical wide spread groundwater level trends in the aquifers across the whole catchment.

### 2.5.8. Long term river flows

There are 7 gauging stations in the Eastern Rother Catchment where long term flow data is collected. The site at Udiam on the River Rother, shown in Figure 2, is the main gauging station for the catchment and demonstrates the typical flashy flows throughout the area.

**Figure 2: Actual river flow at Udiam, River Rother**



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## **2.6. AESTHETIC QUALITY OF THE ENVIRONMENT**

### **2.6.1. Introduction**

The preceding sections of this Environmental Overview have assessed the state of the environment of Eastern Rother using generally quantitative viewpoints. The same viewpoints are used nationally by the Agency to ensure consistency between Regions and Areas. They also help to identify issues for the Agency to address through the LEAP. Qualitative or aesthetic aspects of the environment are also important. Most people view the environment in these terms taking account of what it looks like and how it feels.

The links between the Agency's responsibilities and the aesthetic quality of the environment are often indirect. However, an understanding of people's perceptions of an area, described in the following paragraphs, is an important aspect of the LEAP process.

### **2.6.2. Landscape Quality**

Landscape assessment is principally a tool for identifying the character of the landscape rather than assessing landscape quality. Section 2.1.5 describes the landscape character of the LEAP in relation to the Countryside Agency's Character Areas and English Nature's Natural Areas.

Most of the western part of the catchment lies within the High Weald AONB and a small part in the east is within the Kent Downs AONB, areas which have been designated at national level for their landscape quality.

There is a general perception that the Eastern Rother still retains the characteristics considered to make up the traditional English landscape but which are increasingly threatened in much of the South East from new development.

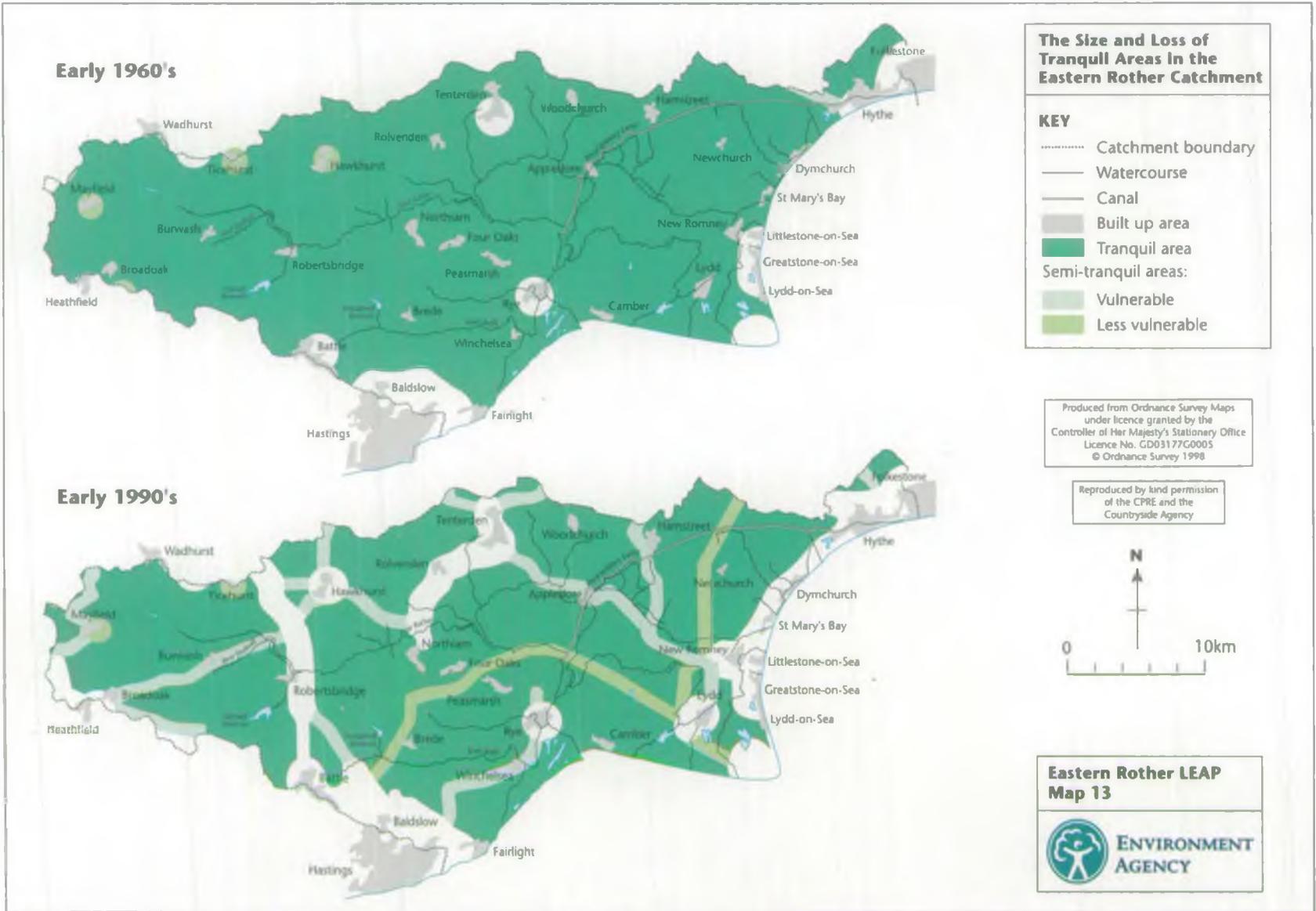
### **2.6.3. Tranquil areas**

The Countryside Agency and Council for the Protection of Rural England (CPRE) have prepared maps showing the effect on the tranquillity of the countryside from the visual or noise intrusion of development and traffic. Areas that are far enough away from these sources, determined by a number of criteria, are deemed to be tranquil areas.

There has been a significant reduction in these tranquil areas in South East England overall from the 1960s to the 1990s but the Eastern Rother catchment still retains relatively large undisturbed areas throughout (Map 13).

### **2.6.4. Aesthetic GQA of Rivers**

Trials were carried out in 1995 in some areas of the Agency to assess the aesthetic river quality based on the quantities and types of litter, oil, sewage-derived litter and other debris present. No formal assessment has been undertaken in this catchment.



### 3. SUMMARY OF ISSUES FOR THE LEAP

#### 3.1. INTRODUCTION

This section provides a summary of the issues emerging from the Environmental Overview of the Eastern Rother LEAP area. The issues are grouped around the nine Principal Concerns of the Environment Agency (see Section 1, above).

#### 3.2. SUMMARY OF ISSUES

Environment Agency Concern*	Issue
Addressing Climate Change	1 Risk of loss of aquifer capacity at Denge from saline intrusion (tidal surges).
	The issue of the risk to flood defences from climate change has been covered in issue 1 in the Kent Area LEAP.
Improving Air Quality	No issues identified which are exclusive to the Rother catchment. For more information, see Kent Area LEAP.
Managing Water Resources	2 Future climate changes could give rise to a need for additional winter storage to improve water availability for agriculture.
	3 Need to address water company demands whilst protecting the needs of the environment.
Enhancing Biodiversity	4 Riverine biological decline in the River Line.
	5 Pressures on natural habitats on Romney Marsh and how to achieve the Agency's biodiversity objectives.
	The issue of implementing the EC Habitats Directive has been covered in Issue 8 of the Kent Area LEAP.
Managing Freshwater Fisheries	6 Impact of structures on the passage of migratory fish.

Environment Agency Concern*	Issue
Delivering Integrated River-Basin Management	7 Nutrient rich discharges causing weed growth on Romney Marsh plus weed growth and fish deaths in extreme summers in the Royal Military Canal.
	8 The impact of the Bewl to Darwell Transfer and its effects, such as on water quality and fish health.
	9 Pressure from the tourist industry in the area.
	The issue of the loss of dilution capacity has been covered in Issue 10 of the Kent Area LEAP.
Conserving the Land	10 Maintaining the sea defences on coastal areas.
	11 Impacts from land contamination along Rye Harbour Road.
	Floodplain development has been covered in Issue 21 of the Kent Area LEAP
Managing Waste	12 Future waste disposal methods at British Gypsum from the manufacturing process.
Regulating Major Industries	13 British Gypsum Mountfield mine abandonment - regulation/environment study.

\* From: An Environmental Strategy for the Millennium and Beyond (Environment Agency 1997)

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**APPENDIX 1: GLOSSARY**

Abstraction	Removal of water from surface water or groundwater, usually by pumping.
Abstraction Licence	Licence issued by the Environment Agency under Section 38 of the Water Resources Act 1991 to permit water to be abstracted.
Aquifer	A layer of underground porous rock which contains water and allows water to flow through it.
Biochemical Oxygen Demand	A measure of the amount of oxygen in water during the breakdown of organic matter.
Catchment	The total area of land which contributes surface water to a specified watercourse or water body.
Combined Sewer Overflow	An overflow structure that allows discharge from the sewerage system to a watercourse during wet weather conditions.
Controlled Water	Defined by the Water Resources Act 1991 Section 104. They included groundwater, inland waters and estuaries.
Cyprinid	Coarse fish of the carp family i.e. roach, dace, bream etc.
Discharge Consent	A statutory consent issued by the Environment Agency under Schedule 10 of the Water Resources Act 1991 to indicate any limits and conditions on the discharge of an effluent to a controlled water.
Dissolved Oxygen	The amount of oxygen dissolved in water. Oxygen is vital for life so this measurement is an important, but highly variable, indicator of the "health" of a water. It is used to classify waters.
Effective rainfall	The rain remaining as runoff after all losses by evaporation, interception and infiltration have been allowed for.
Eutrophication	Presence of nutrients e.g. fertilisers in aquatic systems leading to excessive growth of algae and other aquatic plants.

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Floodplain	This includes all land adjacent to a watercourse over which water flows or would flow, but for flood defences, in times of flood.
Greenhouse gas	Natural and man-made gases, which influence the greenhouse effect. Including carbon dioxide, methane, ozone and chlorofluorocarbons.
Groundwater	Water that is contained in underground rocks (aquifers).
Internal Drainage Boards	Autonomous public bodies under the control of board members (including those elected by agricultural ratepayers and those nominated by local authorities), with responsibilities and powers for flood defence on ordinary watercourses (non-Main Rivers) under the Land Drainage Acts.
Main River	All watercourses are designated as either 'Main River' (defined in maps held by the Environment Agency and MAFF) or 'ordinary watercourses' ('non-Main River'). Main Rivers include most watercourses that contribute significantly to a catchment's drainage, although ordinary watercourses may be significant locally. The Agency has powers to carry out works to protect land and property from flooding by improving drainage of Main Rivers only, under the Water Resources Act 1991. Local authorities (and in some areas Internal Drainage Boards) have powers for flood defences on ordinary watercourses, and the Agency has a supervisory role.
National Nature Reserve	An area of land designated by English Nature under Section 35 of the Wildlife and Countryside Act 1981. They are managed by, or on behalf of, English Nature specifically for nature conservation purposes.
Ramsar Sites	Internationally important wetland sites adopted from the Ramsar Convention on Wetlands of International Importance especially as waterfowl habitats (1971) and ratified by the UK government in 1976.
River Quality Objective	The level of water quality that a river should achieve in order to be suitable for its agreed uses.

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Salmonid	Game fish of the salmon family, e.g. Salmon, trout and sea trout.
Sea defences	Natural or man-made features that protect land and property from flooding by the sea.
Sites of Special Scientific Interest	An SSSI is an area of land notified under the Wildlife and Countryside Act 1981 as being of special nature conservation interest. SACs, SPAs and Ramsar sites are also classified as SSSI.
Special Protection Areas	Internationally important nature conservation sites designated under the EEC Wild Birds Directive. All SPAs are also SSSIs.
Strata	Layers of rock, including unconsolidated materials such as sands and gravel.
Sustainable development	'Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs' (definition from World Commission on Environment and Development, 1987. Our Common Future - The Brundtland Report).

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**APPENDIX 2: ABBREVIATIONS**

AOD	Above Ordnance Datum
AONB	Area of outstanding natural beauty
BOD	Biochemical oxygen demand
CSO	Combined sewer overflow
DETR	Department of the Environment, Transport and the Regions
EA95	The Environment Act 1995
EQI	Ecological Quality Index
EQS	Environmental Quality Standard
GQA	General Quality Assessment
IPC	Integrated Pollution Control
KAQP	Kent Air Quality Partnership
KCC	Kent County Council
LEAP	Local Environment Agency Plan
MAFF	Ministry of Agriculture, Fisheries and Food
MI	Megalitre
MOD	Ministry of Defence
MRF	Minimum Residual Flows
NNR	National Nature Reserve
OFWAT	Office of Water Services
RE	River ecosystem
RMC	Royal Military Canal
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SAQSG	Sussex Air Quality Steering Group
SNCI	Site of Nature Conservation Interest
SOS	Standard of Service
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STW	Sewage treatment works

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**APPENDIX 3: CONSULTATIONS**

In addition to extensive consultation with members of the Environment Agency, consultation was also undertaken with external consultees. These included the local authorities whose jurisdiction falls within the LEAP area and various interest groups as follows:

Ashford Borough Council\*  
British Gypsum Limited  
CPRE Kent\*  
Country Landowners Association\*  
Countryside Agency  
East Sussex County Council  
English Heritage  
English Sports Council (SE Region)\*  
Farming and Rural Conservation Agency  
Folkestone & Dover Water Services\*  
Harbour of Rye Advisory Committee  
Hastings Borough Council  
Internal Drainage Boards  
Kent County Council  
Kent & Essex Sea Fisheries Committee  
Kent Fisheries Consultative Association (Rother Catchment Consultative)\*  
Kent Wildlife Trust  
Mid Kent Water\*  
National Farmers Union (SE Region)  
Romney Marsh Countryside Project  
Rother District Council  
Rother Fisheries Association  
RSPB  
Rye Harbour Nature Reserve\*  
Shepway District Council\*  
Salmon & Trout Association  
South East Water\*  
Southern Water\*  
Sussex Sea Fisheries Committee\*  
Sussex Wildlife Trust\*  
Tunbridge Wells Borough Council  
Wealden District Council

\* = Response received

A meeting was held with the following organisation:

English Nature

## APPENDIX 4: CHEMICAL GQA

Watercourse	Location and Grid Reference	GQA			RE Objective	RE Achieved 1995-97
		95	96	97		
Royal Military Canal	Hythe TR 1526 3473	C	C	C	2	3
	Bilsington TR 0400 3360	E	E	F	4	-
	Hamstreet TR 0040 3241	E	E	E	4	5
	Iden Lock TQ 9372 2456	C	C	C	4	5
	Appledore TQ 9574 2910	E	E	E	4	5
RMC Tributary	D/S Appledore STW TQ 9588 2983	E	D	E	4	5
Springbrook Sewer	At RMC TR 0003 3229	E	E	E	4	5
	D/S confluence Viaduct and Hamstreet arm TR 0810 2372	E	E	E	4	5
	D/S Hamstreet STW TR 0007 3316	E	E	E	4	5
Littlestone Sewer	Greatstone PS TQ 9372 2456	E	E	E	5	5
Jury's Gut Sewer	Rosedale TR 0038 1911	D	E	E	2	5
	D/S Lydd STW TR 0256 2013	F	F	F	4	-
River Rother	Boonshill TQ 9359 2370	C	C	C	3	5
	Iden New Bridge TQ 9150 2538	C	C	C	3	5
	Blackwall Bridge TQ 8850 2581	C	C	C	2	3
	Newenden TQ 8350 2704	D	C	C	2	3
	Bodiam TQ 7833 2530	B	B	B	2	2
	Udiam TQ 7713 2433	B	B	C	2	3
	Robertsbridge PS TQ 7417 2395	B	B	B	2	2
	Etchingham TQ 7180 2620	B	B	B	2	2
	Crowhurst Bridge TQ 6842 2638	B	B	B	1	2
	Witherenden Bridge TQ 6540 2677	B	B	B	1	2
	Old Mill Farm TQ 5880 2497	C	D	C	3	3
Rother Tributary	Meres Farm tributary TQ 5759 2509	E	E	E	3	5

Watercourse	Location and Grid Reference	GQA			RE Objective	RE Achieved 1995-97
		95	96	97		
Kent Ditch	U/S conf Hawkhurst Sth trib. TQ 7596 2811	D	C	D	2	4
	Kitchenham TQ 7837 2666	C	C	C	2	3
Hawkhurst Sth Stream	U/S A229 Bridge TQ 7590 2810	E	E	E	4	5
Abbey Petty Sewer	Russet Farm TQ 7460 2371	C	C	C	3	3
Socknersh Stream	Clapsons Bridge TQ 7145 2408	C	C	C	2	3
	Brown Oak Farm TQ 6898 2226	C	C	C	2	1
Hurst Green Stream	Bugsell Mill Farm TQ 7237 2581	E	E	E	2	5
River Limden	Etchingam TQ 7181 2707	B	B	B	2	2
River Dudwell	Etchingam TQ 7098 2584	B	C	C	1	3
Limden Tributary	Little Boarzell TQ 7167 2841	C	D	D	2	4
Rother Tributary	D/S Burwash Lane STW TQ 6858 2617	E	E	E	4	5
Coggins Mill Stream	Bivelham Farm TQ 6330 2642	C	C	C	2	3
Tidebrook	Stonegate TQ 6505 2703	C	C	C	2	3
	D/S Washwell Lane STW TQ 6374 3082	C	C	C	2	3
Corkwood Stream	Old House Farm TQ 89337 2355	B	B	B	2	2
Blackbrook Petty Sewer	D/S Wittersham STW TQ 8845 2592	F	F	F	5	-
Newmill Channel	Potmans Heath TQ 8727 2810	C	D	D	2	4
	U/S Tenterden STW TQ 8636 3272	D	E	E	2	5
	D/S Benenden STW TQ 8349 3360	C	C	B	2	2
Reading Sewer	Stone Ferry TQ 9420 2888	D	E	E	2	5
Cradlebridge Sewer	Redhill Bridge TQ 9374 3022	D	E	E	3	5
	D/S Woodchurch STW TQ 9498 3356	E	E	E	2	5
Newmill Channel Trib	Little Halden TQ 8549 3245	D	E	D	4	4
Hexden Channel	Maytham Wharf TQ 8678 2762	E	E	E	2	5
	Hexden Bridge TQ 8300 2839	B	B	B	2	3
	U/S Sandhurst STW TQ 7980 3047	B	C	C	2	3
	D/S Hawkhurst North STW TQ 7754 3134	C	C	C	2	3

Watercourse	Location and Grid Reference	GQA			RE Objective	RE Achieved 1995-97
		95	96	97		
Hexden Channel Tributaries	Lambsland Farm TQ 8554 2877	D	D	D	4	4
	Cattsford TQ 8177 3009	B	B	B	2	2
Knell Petty Sewer and Tributary	Rogers Wood TQ 8460 2520	D	E	E	2	5
	A268 Bridge TQ 8368 2589	D	D	D	4	4
River Brede	Rye Harbour Road TQ 9180 1930	D	D	D	3	5
	Ferry Bridge TQ 9036 1797	C	D	D	3	4
	Brede Bridge TQ 8269 1748	B	B	C	2	3
	Brede Waterworks TQ 8123 1770	B	B	B	2	2
	Sedlescombe St Roadbridge TQ 7760 1744	B	B	B	3	2
	Sedlescombe Street TQ 7833 1769	B	B	B	2	2
River Line	A21 Sedlescombe TQ 7758 1763	C	C	C	2	4
	Whatlington TQ 7617 1841	B	C	C	2	3
	Riverhall TQ 7431 1987	B	B	B	2	2
	D/S Netherfield STW TQ 7180 1920	C	C	C	2	3
River Tillingham	Udimore Road TQ 8900 2014	C	C	C	2	3
	House Lane TQ 8588 1992	B	B	B	2	2
	Beckley Furnace TQ 8363 2106	B	B	C	2	3
	Chitcombe TQ 8057 2093	C	C	C	2	3
Marsham Sewer	Winchelsea Beach Road TQ 9091 1750	E	E	E	4	5
	Cliff End TQ 8900 1369	D	D	D	4	4
Pannel Sewer	Pannel Bridge TQ 8811 1520	B	B	B	3	2
Pewis Petty Sewer	A 259 Bridge TQ 9000 1705	F	F	F	4	-
Doleham Ditch	Doleham Farm TQ 8340 1869	D	D	D	2	4
River Brede Tributaries	Stubb Lane TQ 8340 1869	C	C	C	3	3
	D/S Powdermill Reservoir TQ 8000 1855	A	B	B	2	2
Vinehall Stream	U/S EWWC Abstraction TQ 7748 1770	B	B	C	2	3

## APPENDIX 5: BIOLOGICAL GQA

Watercourse	Location and Grid Reference	90	91	92	93	94	95	96	97	98
Royal Military Canal	Hythe TR 1526 3473	b	b	b	b		a	b		b
	Bilsington TR 0400 3360						c		b	
	Hamstreet TR 0040 3241	b	b	c	a		b	b		c
	Iden Lock TQ 9372 2456						b	c		
	Appledore TQ 9574 2910						b		b	
RMC Tributary	D/S Appledore STW TQ 9588 2983	c	c	c	c	c	c		c	
Springbrook Sewer	At Royal Military Canal TR 0003 3229						c		c	
	D/S confluence Viaduct and Hamstreet arm TR 0013 3307						d		c	
	D/S Hamstreet STW TQ 0007 3316	d	c	d	e		c	c		c
Littlestone Sewer	Greatstone PS TQ 9372 2456	c	c	c	c		c	c		d
Jury's Gut Sewer	Rosedale TR 0038 1911	a	b	a	a		c	b		b
	D/S Lydd STW TR 0256 2013	c	c	c	c		c		c	
River Rother	Boonshill TQ 9359 2370	b	b	b	b	b	b		c	b
	Iden New Bridge TQ 9150 2538						b	b		b
	Blackwall Bridge TQ 8850 2581	b	b	b	b	b	b		b	
	Newenden TQ 8350 2704	b	a	b	a	a	a	a		c
	Bodiam TQ 7833 2530						a		a	
	Udiam TQ 7713 2433	a	a	a	a	a	a	a		a
	Robertsbridge PS TQ 7417 2395	a	a	a	a	a	a		a	
	Etchingham TQ 7180 2620						a	a	a	
	Crowhurst Bridge TQ 6842 2638						a	a		a
	Witherenden Bridge TQ 6540 2677	a	a	b	a	a	a	a		a
	Old Mill Farm TQ 5880 2497	a	b	a	a	a	a		a	a
	Rother Tributary	Meres Farm tributary TQ 5759 2509						a		a
Kent Ditch	U/S conf Hawkhurst S trib TQ 7596 2811						a		b	
	Kitchenham TQ 7837 2666	b	c	b	b		a	a		a

Watercourse	Location and Grid Reference	90	91	92	93	94	95	96	97	98
Hawkhurst Sth Stream	U/S A229 Bridge TQ 7590 2810	c	c	d	c		d	d		d
Abbey Petty Sewer	Russet Farm TQ 7460 2371	d	e	d	c		c	d		e
Socknersh Stream	Clapsons Bridge TQ 7145 2408	a	a	a	a		a	b	b	a
	Brown Oak Farm TQ 6898 2226						b		b	b
Hurst Green Stream	Bugsell Mill Farm TQ 7237 2581	d	d	c	c		d	b		c
River Limden	Etchingham TQ 7181 2707	b	a	a	a		a	b		a
River Dudwell	Etchingham TQ 7098 2584	a	a	a	a	a	a	a		a
	Burwash Weald TQ 6562 2257	a	a	a	a	a	a		a	
Limden Tributary	Little Boarzell TQ 7167 2841	c	c	c	c		c	d	c	
Rother Tributary	D/S Burwash Lane STW TQ 6858 2617	d	c	e	d	c	e	f	c	
Coggins Mill Stream	Bivelham Farm TQ 6330 2642	a	a	a	a		a	a		a
Tidebrook	Stonegate TQ 6505 2703						a		a	
	D/S Washwell Lane STW TQ 6374 3082						b	b		c
Corkwood Stream	Old House Farm TQ 89337 2355						d	d		d
Blackbrook Petty Sewer	D/S Wittersham STW TQ 8845 2592	b	b	b	a		b		b	
Newmill Channel	Potmans Heath TQ 8727 2810	c	c	b	b		a	b		b
	U/S Tenterden STW TQ 8636 3272						a		c	
	D/S Benenden STW TQ 8349 3360						b	b		b
Reading Sewer	Stone Ferry TQ 9420 2888	c	b	b	b		b	b		b
Cradlebridge Sewer	Redhill Bridge TQ 9374 3022	b	a	b	b		b	b		b
	D/S Woodchurch STW TQ 9498 3356						c		c	
Newmill Channel Tributary	Little Halden TQ 8549 3245	e	e	d	d		dry	dry	d	
Hexden Channel	Maytham Wharf TQ 8678 2762						a	b	b	
	Hexden Bridge TQ 8300 2839	c	c	c	c		b		c	
	U/S Sandhurst STW TQ 7980 3047						b	b		c
	D/S Hawkhurst North STW TQ 7754 3134						b		c	

Watercourse	Location and Grid Reference	90	91	92	93	94	95	96	97	98
Hexden Channel Tributaries	Lambsland Farm TQ 8554 2877	b	c	a	b		a		b	
	Cattsford TQ 8177 3009	b	b	b	b		b	b		b
Knell Petty Sewer and Tributary	Rogers Wood TQ 8460 2520	d	d	d	d	c	c	d		e
	A268 Bridge TQ 8368 2589	d	f	d		e	e		d	
River Brede	Rye Harbour Road TQ 9180 1930						c		d	
	Ferry Bridge TQ 9036 1797	c	c	c	b		b		c	
	Brede Bridge TQ 8269 1748	c	b	b	b		a	b	b	b
	Brede Waterworks TQ 8123 1770						a	a	a	
	Saddlescombe Street Roadbridge A21 TQ 7760 1744						d	d	e	d
	Saddlescombe Street TQ 7833 1769						c	b	d	c
River Line	A21 Sedlescombe TQ 7758 1763						a	a	c	a
	Whatlington TQ 7617 1841	b	c	c	c		a	c	b	b
	Riverhall TQ 7431 1987						c	c	e	c
	D/S Netherfield STW TQ 7180 1920						c	b	b	b
River Tillingham	Udimore Road TQ 8900 2014	c	b	b	b		a		b	
	100 House Lane TQ 8588 1992						b	c		c
	Beckley Furnace TQ 8363 2106						c	c		c
	Chitcombe TQ 8057 2093	b	b	a	b	b	b		b	b
Marsham Sewer	Winchelsea Beach Road TQ 9091 1750	c	b	c	b		b		b	
	Cliff End TQ 8900 1369						c	c		d
Pannel Sewer	Pannel Bridge TQ 8811 1520	c	c	c	b		b		c	
Pewis Petty Sewer	A 259 Bridge TQ 9000 1705	c	c	c	c		c		c	
Doleham Ditch	Doleham Farm TQ 8340 1869	b	b	a	c		a		c	b
River Brede Tributaries	Stubb Lane TQ 8340 1869	e	e	d	e		c	d		d
	D/S Powdermill Res TQ 8000 1855	b	c	b	b		b		c	
Vinehall Stream	U/S EWWC Abstraction TQ 7748 1770	c	c	c	b		b	b	c	

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The Environment Agency delivers a service to its customers, with the emphasis on authority and accountability at the most local level possible. It aims to be cost-effective and efficient and to offer the best service and value for money.

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