

catchment management plan

EA Anglian LEAPS Box 5



SOUTH ESSEX action plan June 1996



**ENVIRONMENT
AGENCY**

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INTRODUCTION

.....The Environment Agency is one of the most powerful environmental regulators in the world. It provides a comprehensive approach to the protection and management of the environment by combining the regulation of waste to land, water, and industrial releases to air. It's creation on 1 April 1996 was a major and positive step, merging the expertise of the National Rivers Authority, Her Majesty's Inspectorate of Pollution, the Waste Regulation Authorities and several smaller units from the Department of the Environment.

The Consultation Draft for the South Essex Catchment Management Plan was prepared by the National Rivers Authority (NRA) in November 1995. The Environment Agency is to continue to use the former NRA's integrated environmental management mechanism for forward planning. Catchment Management Plans instigated by the National Rivers Authority will continue to be called Catchment Management Plans, although new Plans initiated by the Agency will be known as Local Environment Agency Plans. This Action Plan and future Annual Reviews will take account of the wider responsibilities of the Environment Agency and will incorporate issues relating to waste regulation and Integrated Pollution Control. The Action Plan was prepared after full consultation with those bodies listed in Appendix III who have an interest in the water environment and in industry. The Agency will also encourage relevant organisations and industries regulated by the former Her Majesty's Inspectorate of Pollution and Waste Regulation Authorities to shape this integrated planning process in the future.

This Action Plan sets out the characteristics of the South Essex catchment which includes the Crouch, Roach, and Mardyke river systems. The Plan refers to the management of Integrated Pollution Control prescribed processes, and also to the regulation of radioactive and domestic wastes. It gives a broadly based vision of what the Agency seeks to achieve, and is followed by an overview and a detailed Activity Plan.

We hope that you will find the document useful whether you are involved in a Local Authority, an environmental organisation, in industry, or a recreational or other relevant body. It is intended to inform you of our Plans and to be a basis for further ideas and initiatives to ensure that the work of the Environment Agency progresses towards more integrated environmental management and regulation.

The consultation process will continue by Annual Review which allows for the development of new objectives as progress is made. This process will involve the Essex Area Environment Group (AEG) which has inherited this role from the former Essex Catchment Panel set up by the National Rivers Authority in 1994. AEGs will assist in the process of consultation and in the development of partnerships across the whole array of Environment Agency responsibilities. Readers opinions and suggestions are welcomed, and they should be addressed to the Area Planning & Customer Services Manager at the address given on page 19.

Paul Foster
Area Manager (Eastern)

Jeffrey Jenkinson
Chairman, Area
Environment Group



Battlesbridge Mill on the River Crouch

CHARACTERISTICS OF THE CATCHMENT

The catchment lies within the county of Essex, apart from a small area within the London Borough of Havering. Significant industrial and urban areas are associated with the coastal fringe of Southend-on-Sea and Purfleet, and the major towns of Basildon, Wickford, Billericay and Burnham-on-Crouch. Port facilities are generally concentrated along the Thames estuary frontage. The plan area contains the Rivers Crouch, Roach, and Mardyke, the drainage network within Canvey Island, and numerous small rivers, many of which drain directly to the sea or the Thames estuary.

Industry and agriculture play important roles, with heavy industry concentrated in the southern part of the catchment. Consequently it is important that measures to prevent pollution are enforced to minimise the impact on the wider environment. The majority of sewage effluent and surface water generated by the large urban population is discharged to tidal waters, principally the Thames estuary but also, to some extent, the Crouch and Roach estuaries. However, all discharges direct to the Thames estuary are monitored and regulated by the Environment Agency's Thames Region.

Within the catchment, there are a significant number of Integrated Pollution Control (IPC) processes authorised by the Agency under Part 1 of *The Environmental Protection Act (EPA) 1990* (as amended by *The Environment Act 1995*). These are located on the north bank of the Thames estuary and mainly in the Borough of Thurrock. The releases to air from these processes are predominantly the products of combustion of fossil fuels and to a lesser extent of volatile organic compounds. Releases to controlled waters are dominated by cooling water systems which discharge to the Thames estuary. The main release to land arises from the generation of ash from coal burning. Industrial air releases originating from outside the catchment also impact upon the area under certain weather conditions and these originate primarily from the area to the west and south of the catchment which together form the "Thames Corridor". IPC processes include power generation and waste incineration. Within the catchment there are other smaller but more numerous, less polluting processes which are controlled, for releases to air only, by Local Authorities under *EPA90*.

Essex & Suffolk Water are responsible for providing public water supplies within the plan area. As there are only limited water resource availability within the catchment itself, demands are met from a combination of sources. Groundwater abstractions at Linford and Stifford are used to meet local demands whilst the remainder of the area is supplied from outside the catchment. This includes bulk imports of raw water from the neighbouring Thames area and from water stored in the Essex reservoirs at Hanningfield and Abberton, located to the north. These reservoirs are themselves supported by the Agency's Ely Ouse to Essex Transfer Scheme which imports surplus water from Norfolk for subsequent treatment and distribution in this catchment and other parts of Essex. Other users of

water such as industry and agriculture obtain their supplies locally from within the catchment either from surface or groundwater sources. Groundwater resources in the catchment are fully committed to existing uses. However, some surface water may be available during the winter.

The catchment's coastal strip is mainly below the mean high tide level. The land is protected by tidal defences which are generally made of clay in rural areas, but of concrete and steel construction with lockable flood dams in urban areas. The Thameside Tidal Defence is one of the most important frontages in the country, and designed to the highest standards. There are four major tidal barriers protecting some of the most valuable infrastructure lying below surge tide level.

The watercourses within this catchment are all relatively small and have very low summer flows. Most of the watercourses are also affected by heavy urbanisation which can give rise to problems with the surface water drainage both in terms of quantity and quality. On Canvey Island all the surface water drainage is managed through a system of pumps and gravity sluices.

Estuarial waters within the catchment are widely used for recreation. Some of these areas are also designated shellfisheries within the terms of the *EC Shellfish Waters Directive 79/923/EEC* and the *EC Shellfish Hygiene Directive 91/492/EEC*. These uses demand a high standard of water quality.

The conservation value of this catchment is highlighted in the designation of nearly all the coastline as Sites of Special Scientific Interest, Special Protection Areas and Ramsar Sites. The coast comprises an extensive complex of estuaries and intertidal sand and mudflats, saltmarsh, grazing marsh and beaches. These habitats support both internationally and nationally important numbers of wintering wildfowl and waders. Much of the coast, specifically Dengie Flat, River Crouch Marshes and Foulness has also been identified as candidate Special Areas of Conservation under the *EC Habitats Directive 94/43/EEC*.

Many of the traditional grazing areas are included in MAFF's Essex Coast Environmentally Sensitive Area. This scheme encourages farmers to manage land as permanent grassland, often with prescriptions for raising water levels, to preserve or create this habitat to balance the needs of traditional grazing with the environment.

Major recreational and amenity uses are further characteristics of the area. The estuaries provide sheltered waters allowing a variety of boating activities which are accessible from large population areas. It is the landscape value and the range and diversity of flora and fauna that are important for the enjoyment of recreation and these uses need to be balanced carefully with the natural resource to ensure an integrated approach to management.

CHARACTERISTICS OF THE CATCHMENT



Boats off Southend-on-Sea

Fish populations in rivers, reservoirs, lakes and ponds throughout the plan area are dominated by coarse fish species, including roach, carp, tench, pike and eels. The small size and low flows of the local watercourses generally preclude the occurrence of any substantial stocks of the larger species, and consequently the vast majority of freshwater angling activity is concentrated on lakes and reservoirs. A small number of these contain rainbow trout which are stocked regularly.

Commercial fisheries for eels, marine fin fish and both crustacean and molluscan shellfish are present all around the coast. These fisheries make a traditional and culturally important contribution to the local economy. Fish farming does not occur to any significant extent.

The most challenging development in railway transportation is the forthcoming high speed channel tunnel rail link between the Continent and London St Pancras. This will emerge from a Thames tunnel just upstream of Grays, pass beneath the northern approaches of the Thurrock Bridge, before passing Purfleet and heading westwards over the River Mardyke to its London Terminal. The Agency has been heavily involved with consultations on this project and will aim to ensure that damaging environmental impacts are

minimised and that mitigating compensatory measures are incorporated within the works.

Over many years chalk, clay, sand and gravels have been excavated widely in South Essex. The resultant excavations have in some cases been refilled with waste including domestic refuse, industrial and toxic chemicals. Other excavations have been redeveloped for urban commercial and industrial purpose, for example, Lakeside Retail Park and Chafford Hundred residential development at Grays. Use of such quarries and other areas of exposed chalk for major oil storage, have caused groundwater pollution in the past and remain a threat for the future.



Queen Elizabeth II Bridge, Thurrock

VISION

The Environment Agency intends to develop its strategic objectives in partnership with all concerned in the environment. Management initiatives will be undertaken by the Agency in the areas of their responsibility over the life of the plan. Where action is in the hands of others the Agency's powers and evolving partnerships will be used to facilitate sustainable development.

To protect public health and the natural environment the Agency aims to:

- ensure that the quality of ground and surface water is not compromised, and is improved where possible.
- manage water resources in an environmentally sustainable way, by balancing the needs of the water environment and those of the abstractors and dischargers whilst maintaining a healthy and diverse water environment.
- establish and make progress towards meeting long term water quality targets for freshwater rivers, estuaries, and the coast, which reflect environmental need and appropriate water use.
- develop and act on the National Waste Strategy and encourage movement up the waste hierarchy. The aim is to REDUCE, to RE-USE, to RECOVER, and finally to DISPOSE.
- protect the catchment against flooding from the rivers and the sea. One of the Environment Agency's key functions is to protect the coastal zone and inland rivers that are vulnerable to flooding.
- further the conservation and enhancement of wildlife, landscape and archaeological features
- develop the amenity and recreational potential of inland and coastal waters and their associated lands.
- maintain, improve and develop fisheries.



KEY OBJECTIVES OF THE SOUTH ESSEX CMP

Key objectives over the next ten years are to:

- To meet long term water quality targets, the Agency is aiming for:
 - compliance of the designated shellfisheries with the *EC Shellfish Waters Directive 79/923/EEC* specifically with regard to the dissolved copper limits which are currently non-compliant.
 - a reduction in pollution from agricultural sources and a reduction in the number of pollution incidents arising from industrial estates, particularly in the Basildon, Southend and Thurrock areas.
 - no significant adverse impact on water quality from past and existing waste disposal sites, including the use of refuse in seawalls.
 - improvements in the regime of the lower Mardyke by eliminating or controlling the worst effects of eutrophication, low flows, saline infiltration and pollution.
 - improvements in the microbiological standards in estuarine recreational waters by enhanced treatment of sewage discharges when circumstances permit, and in the meantime to ensure that users are properly informed.
- support Local Authorities in establishing action target standards for air pollutants as required by the Environment Act 1995. The Agency will participate in the setting and achievement of such local standards.
- ensure, by liaison with the Planning Authorities, that advice is given on future developments which may impact on water resources.
- ensure compliance with the *EC Protection of the Quality of Groundwater Directive 80/68/EEC*.
- implement the Agency's National Groundwater Policy.
- prevent the pollution of surface and groundwater.
- ensure adequate monitoring of landfill and other disposal facilities, in order to assess the effects on groundwater quality.
- manage water resources to meet the demands for water taking account of both human needs and those of the environment. In short to secure water supplies and a better water environment. The Agency sees

demand for public water supply being met, in the immediate future, by a combination of measures including:

- demand management and the redevelopment of minor groundwater sources in the nearby Romford area by Essex and Suffolk Water, and
- more efficient use of water by industry and agriculture.

Work will continue to identify in-river flow needs and where appropriate define river flow objectives. Continued monitoring and investigation into the hydrology and ecology of wetlands will also be undertaken. In the longer term, and outside the horizon of this plan, the Agency sees demands being met through enhancements to the Ely Ouse to Essex Transfer Scheme including the possibility of a new surface reservoir strategically located outside this catchment after the turn of the century.

- protect the catchment from tidal flooding by taking into account sea level rise, economic factors, and the care and enhancements of the environment. Much work has already been completed, such as Thames tidal defences. On-going priority work includes the Essex Seawall Strategy, taking account of the changing coastline and loss of saltmarsh habitat and the Agency's scheme to improve the tidal defences at Wallasea Island as part of on-going urban protection (this scheme is currently being appraised). Schemes identified in the Seawall Strategy will be included in the Essex Local Flood Defence Committee Long Term Capital Programme (10 years). Annual maintenance works will be managed to support the overall aim of creating a sustainable coastline.
- achieve positive environmental enhancement and river restoration schemes. The Agency will extensively consult and cooperate with other interested parties, to work together to achieve a range of environmental improvements to freshwater rivers, especially to the lower Mardyke.
- encourage recreation and amenity, for example, by extension and improvement of the footpath network beside watercourses and in particular the Mardyke.
- attempt to meet the target classes applied to freshwater rivers, by the promotion of sound fisheries management practices on all stillwaters, and by the effective use of regulatory powers for the protection of fish stocks wherever they may occur.

REVIEW OF THE CONSULTATION PROCESS

Catchment Management Planning is a process through which the former NRA, and since 1 April the Environment Agency, sets out to identify all the environmental problems and issues in a catchment. This is achieved through public and internal consultation, to identify possible courses of action for solving these issues and to produce an "Activity Plan" to resolve them.

TIMETABLE:

| | |
|---------------------|-----------------------------|
| Preconsultation | February, 1995 |
| Public Consultation | November, 1995 |
| Action Plan | June, 1996 |
| Annual Review | June 1997, 1998, 1999, 2000 |
| Five Year Review | June 2001 |

The co-operation required from other environmental organisations and the public cannot be overstated. The Agency aims to work in partnership to balance interests and seek to improve the wider environment in an integrated manner.

The South Essex Catchment Management Plan Consultation Report was published in November 1995. There was a successful presentation launch to an invited audience representing a wide range of organisations with an interest in the water environment. Further publicity for the plan was attained by television and press coverage as well as displays in prominent public sites within the catchment.

The volume and quality of response to the consultation document was good. By the end of the consultation process, approximately 350 of the full and 670 copies of the summary documents had been issued.

A summary of the written comments received throughout the consultation period is included as Appendix I.

As a consequence of the consultation process, the Environment Agency has gained a fuller appreciation of the different viewpoints of the water related issues identified. Where appropriate, this plan will reflect those views, along with the incorporation of land and air environmental issues.

There were forty-one issues set out in the Consultation Report and all are listed in this Action Plan. Of the original options suggested the most appropriate have been adopted

and become actions in the Activity Plan. In some cases new actions have been incorporated into an issue (for example; Issues 1, 2 and 4), these are highlighted in the Activity Plan. A number of issues have been deleted from the Activity Plan as they were too general and do not follow the "SMART" principal; of Specific, Measurable, Agreed, Realistic, and Time based (for example; Issues 13, 17 and 19). Most of these involve work that is part of the Agency's routine business and therefore should not have constituted an issue within the CMP.

Six new issues have also been identified and added to the Activity Plan (Issue Nos. 42 - 47). Issue 12 has been expanded to form two new issues, Nos. 42 and 43, as the actions to resolve the migration of leachates issue is different for closed and active landfill sites. Some issues have been combined (for example Issues 1 and 40) because the actions are inextricably linked and should be jointly implemented.

The consultation process also revealed some errors in the Consultation Report; the Agency would like to thank the relevant organisations for bringing these to our attention. The corrections are listed as Appendix II.

The former Essex Catchment Panel have overseen the production of this plan. There were 21 independent members on this panel, each has particular interests in the local water environment but none was an employee of the National Rivers Authority or the Environment Agency. Currently Panel members are:-

| | | |
|--------------------|----------------|-------------------|
| Mr J Jenkinson MVO | Mr K Pettican | Mr A Overall |
| Mr C Durdin | Ms C Reid | Mr E Strachan |
| Dr C Mansfield | Mr K Green MBE | Dr D Simpson |
| Mr C Stephenson | Mr J Joyce | Mr C Lofts |
| Mr P Bradford | Mr R Smith | Mr W Squier |
| Dr C Mason | Mr P Holloway | Ms C Richardson |
| Mr B Isaacs | Mr R Goodwin | Cdr W A Twist OBE |

The Environment Agency formed Area Environment Groups to oversee the production of Catchment Management Plans and new Local Environment Agency Plans. The new Groups have a similar role to the former Catchment Panels, but the members particular interests will span all aspects of the work of the new Agency.

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WATER QUALITY

There are no public water supply abstractions from surface waters within the plan area. However groundwater is abstracted for public supply at two sites in the Thurrock area, namely, Linford and Stifford and it is essential that the quality of these sources be protected. Strategies are being developed to ensure that the pollution risks involved in waste disposal and industrial activities in the vicinity of these sources are fully understood and adequately controlled.

The Environment Agency's water quality aim is to ensure that the water quality requirements of the various river, estuary and coastal uses are maintained or selectively improved, as appropriate. The Agency has strategic targets known as River Quality Objectives. These objectives provide a basis for water quality management decisions, and are based on a classification system known as River Ecosystem. The River Ecosystem comprises five quality classes which reflect the chemical quality requirements of different types of river ecosystems.

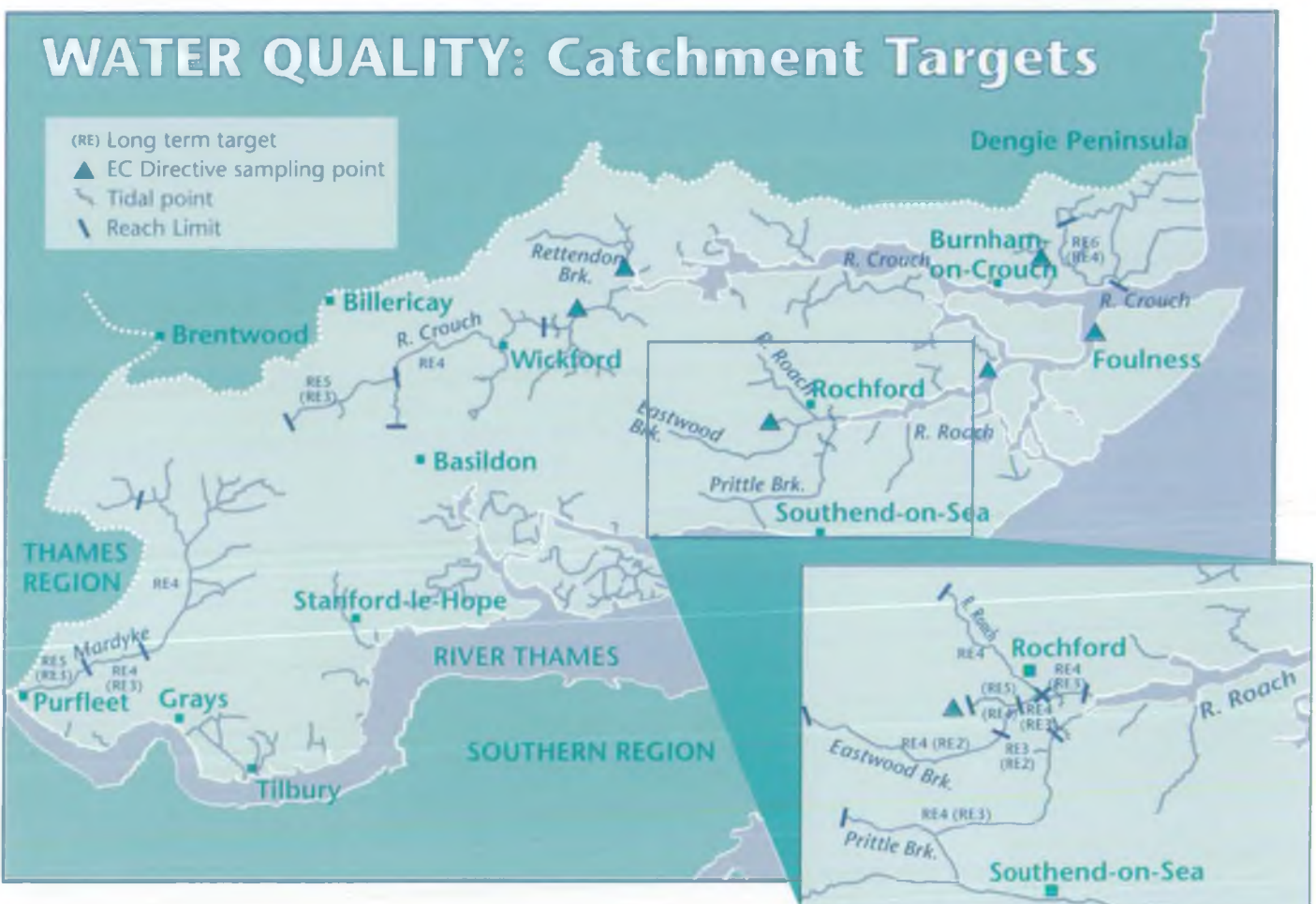
There are formally adopted water quality requirements in the major stretches of the rivers Crouch, Mardyke, Roach and Goldsands Bridges, Eastwood, Noblesgreen and Pitsea Hall Fleet Brooks. Other watercourses have no formal objectives except for the absence of nuisance.

The long term formal objectives are to achieve the water quality River Ecosystem Class essential to the river uses or

such better class as existed in 1984. The quality actually occurring in the period 1992 to 1994 forms a minimum standard which the Agency is committed to sustain until any higher objective can be achieved.

Long term targets may be achieved, or progressed towards, by various means such as preventing accidental spillage, improving effluent treatment, eliminating polluting discharges or enhancing dilution. Improvements in public sewerage and sewage treatment are subject to agreed programmes between the Agency and the Water Companies. This is controlled by the Office of Water Services and is detailed within Asset Management Plan 2 (AMP2). Improvement to Water Company discharges that have been agreed within AMP2 are to be pursued. However, capital investment is unlikely for discharges that have not been agreed within the AMP2 programme. In other cases it may be practicable to make progress on improvements in farm effluents, industrial / urban drainage, and pollution prevention, as well as waste disposal and highway drainage. This may enable many targets to be achieved or at least approached. Outside of AMP2 programme, the Agency is actively seeking opportunities for enhancement of water quality within other projects such as the replacement or renovation of treatment works.

Estuarine quality is still subject to the former classification criteria (CEWP) which is somewhat subjective. It will be replaced by a more quantitative system in the near future.



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However, specific EC Directives enable us to control discharges of dangerous substances to estuaries which will ensure compliance with criteria for bathing beaches and shellfisheries.

INDUSTRIAL POLLUTION PREVENTION

The introduction to the regulatory framework and environmental responsibilities of the Integrated Pollution Control (IPC) function, formerly Her Majesty's Inspectorate of Pollution, is contained in Appendix I. The Agency will incorporate IPC issues into this Action Plan and future Annual Reviews of Catchment Management Plans.

WASTE MANAGEMENT

A detailed description of the duties and responsibilities of the new Waste Regulation section, formerly Essex County Council, who were the Waste Regulation Authority in the area, is enclosed as Appendix II. As with Integrated Pollution Control issues, the Agency aims to incorporate all relevant issues into the CMP process.

Pitsea landfill is an historic site and has not been engineered to current standards. The site is underlain by alluvial gravels which are known to be contaminated by leachate. However, contamination has not been detected beyond the boundary of the site. The site receives annually about 2.2 million tonnes of controlled waste including 220,000 tonnes of hazardous wastes. A leachate treatment plant discharges a consented 200,000 m³ per annum into the Thames.

Mucking landfill is a ballast quarry, currently operated in cells sealed with London clay. Waste inputs are around one million tonnes of controlled wastes including 115,000 tonnes of hazardous wastes annually. The site geology is complex with historic deposits on unsealed marshland along the Thames. Groundwater monitoring has not yet shown any migration of leachate contaminations from the site. Part of the site is capped and produces sufficient landfill gas to generate electricity which is sold to the National Grid.

The clay pit at South Ockendon is ideally suited for waste disposal. Over 600,000 tonnes of Category A, B and C wastes are disposed annually. Barling landfill is much smaller taking 65,000 tonnes of Category A, B and C wastes per annum. This site is a ballast quarry worked in cells lined with London Clay.

In addition Regulation 15 of the Waste Management Licensing Regulation, 1994, requires WRA's (and the Agency) to review all licences which permit the disposal of wastes which have the potential to generate List I and II substances. This review has not been undertaken for any of these sites.

WATER RESOURCES

The Agency's Water Resources aim is to manage water resources in an environmentally sustainable manner, balancing the needs of the environment and those of the abstractors. In doing so it will take all such action as it



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considers necessary or expedient to conserve, redistribute and augment water resources, and secure their proper use for the benefit of all users, both human and environmental.

Water resource development will not be allowed where this will be detrimental to the environment. However, knowledge of environmental requirements is often limited. Research will therefore continue to establish and quantify the hydrological requirements of our rivers, wetlands and springs so that these can be taken into full account when allocating resources. Meanwhile, where significant environmental damage may occur as a result of a proposed abstraction, but where knowledge on the matter is incomplete, decisions made and measures implemented will err on the side of caution adopting a precautionary approach to development.

With the exception of winter surface water, resources in the catchment are fully committed to existing demands. Indeed, existing demands for public water supply are heavily dependant on water imported into the catchment from the neighbouring Thames Region and the Essex reservoirs of Hanningfield and Abberton. These reservoirs are located outside the catchment to the north and are themselves augmented by the Agency's Ely Ouse to Essex Transfer Scheme. Demands for water in the area are varied and often competing and whilst these are predicted to rise, they have to some extent been suppressed by increased public awareness of the wise and more efficient use of

water. Increased demand management, through the use of domestic water meters, tighter leakage control and improved irrigation and industrial practices have also reduced demand. Whilst these factors delay the timing of the need for major resource development, lead-in times can be lengthy and planning needs to be progressed well in advance. The former National Rivers Authority document Water Resources in Anglia outlines the Region's water resources strategy over the next 30 years for providing secure water supplies and a better water environment. For this area it identifies future increases in demand for public water supply being met in the short term by redevelopment of minor groundwater sources in the nearby Romford area and in the longer term by enhancements to the Agency's Ely Ouse to Essex Transfer Scheme including the possibility of a new strategically located storage reservoir after the turn of the century. It is envisaged that agricultural demand will be met by increased winter storage.

Uses for water in the catchment vary considerably and include human needs, such as drinking water for homes, water for agriculture to support farming interests such as crop irrigation as well as industrial needs. In contrast, but equally important, are the needs of the water environment itself, our rivers and wetland sites, which are numerous, provide a high degree of ecological and environmental interest. The hydrological needs of wetlands is a Region wide concern for the Agency. As such, the Agency have recently installed observation boreholes at a number of sites



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across the Region for long term monitoring as part of the on-going Hydrological Monitoring of Wetlands project. Monitoring in this plan area routinely takes place at Hadleigh Castle Country Park. The Agency will continue to monitor wetland sites as part of its routine business and carry out investigations into the hydrology and ecology of wetlands as well as other natural water features such as lakes, ponds and springs at sites of particular concern.

Other developments in the Area such as mineral extraction can also have a detrimental effect on water resources. This may occur through the removal of a water storage material such as sand and gravels and backfilling with silts and clays or as a result of de-watering activities during a quarry's operation.

The Environment Agency uses its powers under the Water Resources Act 1991, and as a consultee to the Local Planning Authorities, to ensure that water resource implications of gravel extractions are assessed and mitigation measures implemented where appropriate.

Management of water resources, requires careful planning to balance the needs of all uses and a sound understanding of individual requirements. Currently resource availability assessments are based on a limited understanding of some of the component parts. An improved knowledge of environmental needs such as river and wetland requirements is essential, not only for this catchment, but

for the Anglian region as a whole. Studies and research are already on-going and will continue in an effort to gain a better understanding and to quantify these requirements. These will also be used to refine resource assessments. In the longer term, consideration will be given to developing a computer simulation model of the catchment to provide a better understanding of how the system works. The benefits of developing a model at the present time are likely to be outweighed by the costs. However, in the fullness of time such a model could also be extended to help develop a strategy for dealing with rising groundwater levels in the area and the management of saline contamination.

Salinity levels in the aquifer will continue to be monitored as part of the Agency's routine business. It is considered that the Agency's licensing policy of no additional groundwater abstraction in the area will contain the situation.

Whilst groundwater resources are classified as fully committed it is recognised that in places groundwater levels are rising providing the potential for local re-use. However, in the majority of cases, levels are still well below previous natural levels and are unlikely to cause problems or require managing for some time. Meanwhile, the Agency propose to investigate the extent and local impact of rising groundwater and consider the potential for local re-use and a longer term management strategy.



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Meanwhile, the current policy with respect to water availability for licensed abstraction is:

- Chalk groundwater resources are fully committed to existing demands and the area is classified as having "no additional water available".
- Some additional surface water is available during winter periods when flows are naturally higher and abstractors are encouraged to store this in reservoirs for summer use.

FLOOD DEFENCE

The Agency's flood defences aim is to provide cost effective protection for people and property against risk of flooding from rivers and sea and provide adequate arrangements for flood forecasting and warning. Shoreline Management Plans, a regional initiative, are currently being drawn up by the Agency covering this frontage and the adjacent Anglian Coastline. This Catchment Management Plan addresses three areas from a flood defence view point.

1. Sea and tidal defences.
2. Fluvial Rivers
3. Flood Warning

In carrying out works, the Agency is obliged to provide economically justified, technically sound and environmentally acceptable solutions.

The Environment Agency consults extensively to ensure that operations are undertaken within its statutory powers and meet MAFF project appraisal criteria.

Sea and Tidal Defences

Much of the land bordering the tidal waters of South Essex is low lying and protected by sea defences. These seaward faces need to be paved to prevent damage caused by high water levels and accompanying large waves, particularly in open sea areas like South Dengie. The problem of wave damage is increasing as saltmarshes and foreshore levels erode allowing the large waves to be sustained close inshore. This problem is being addressed by the Shoreline Management Plan (SMP), with a view to creating a sustainable coastline. The Plan will be completed by September 1996. It also identifies the protection of refuse filled seawalls as a primary objective. Environmental concern about this technique is reflected in the Agency decision not to promote this method of construction at any further sites.

The Thameside frontages of South Essex benefit from some of the best tidal defences in the country, following major capital investment over the period 1972 to 1983. This was achieved as part of the tidal defence improvements for the Thames estuary including the City of London, and was a major scheme completed in 1983.

All these works were constructed in order to prevent a similar disaster to that experienced on 31st January / 1st



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February 1953, when 59 people drowned on Thameside and 25,000 had to be rescued by boat and evacuated to high ground.

Defence standards along the rest of the South Essex frontage are generally good in urban areas. However, some schemes are still being completed under the 10 year needs programme, for example; Paglesham, Great Wakering, and Little Wakering. The rural frontage has varying standards and these will be addressed under the Essex Seawall Strategy. This is the implementation strategy arising from the SMP and will feed into the 10 year needs programme and annual maintenance programme.



Dutch cottage, Canvey Island

Maintenance activities on the sea defences are generally concentrated on the seaward face, repairing the paved seaward face and lowering the seawall toes as the foreshore erodes.

Responsibility for the coastline and tidal defences falls to various organisations and owners. This situation is common all around the coast of the British Isles. The Environment Agency cannot unilaterally take over responsibility for all tidal defences, which is generally prescribed by Act of Parliament. The Agency monitors and advises other statutory organisations and riparian owners on the appropriate standards of sea defences, as a matter of routine business, such as Ministry of Defence on Foulness, and Southend Borough Council.

Fluvial Rivers

The main fluvial rivers are the Mardyke, Crouch, and Roach. Other significant systems are the Eastwood Brook and Prittle Brook. Several large urban areas lie on these rivers; Southend, Wickford, and Rayleigh have had schemes completed to provide flood protection. The rural lengths of channel generally pass through agricultural land, predominantly arable. The natural river flood plain is a vital part of the flood protection regime. If it is lost then water levels will rise, usually damaging property and infrastructure.

Flood Warning

The Agency provides a 24 hour flood warning service for coastal and inland flooding. It receives tidal alerts from the East Coast Storm Tide Warning Service, which is part of the Met Office at Bracknell. This information of tidal surges together with warnings of inland flooding, is disseminated to the Essex Police, Essex County Council, other Local Authorities, and the public. The Agency also provides

on-site flood patrols and arranges emergency repair to defences if damage is suffered. The continued enhancement of this service ensures changing flood risks due to sea level rise and third party responsibility for sea defences do not reduce the standard of flood warning to vulnerable areas in South Essex.

FISHERIES, RECREATION, CONSERVATION & NAVIGATION

The aim of the Fisheries, Recreation, Conservation and Navigation function is to further the conservation and enhancement of the flora, fauna, landscape and archaeology of the aquatic environments, and to develop the amenity, fishery and recreational potential of both inland and coastal waters, together with associated lands.

Fisheries Maintenance and Development

The Agency has statutory responsibilities for the maintenance, development and improvement of freshwater fisheries. This role is of critical importance to the conservation of river environments, to the sport of angling, and to the protection of inland stocks from excessive or damaging exploitation. The Agency's responsibilities include the regulation of coastal eel and salmonid fisheries. This ensures that it also has a role to play in the protection of coastal and marine fish stocks, by acting as necessary in cooperation with the responsible sea fisheries authorities.

Within the plan area, the Mardyke is the only river physically large enough to support a substantial population of the larger species of freshwater fish. Unfortunately, problems of low flow, eutrophication, pollution, saline intrusion and physical habitat characteristics are all limiting factors which currently prevent the Mardyke fish stocks from achieving their target class. A rolling programme of fisheries surveys has been adopted to monitor the status of the stocks, and

OVERVIEW

to show if any changes are taking place.

Future improvement of these stocks will depend on the development of sustained and suitable water quality conditions, good pollution control, and improved habitat characteristics. Enhancement of flows would also be desirable, but is rarely practicable in any catchment area. If rivers are satisfactory in both physical and chemical respects, there is reason to believe that good quality fish stocks will persist naturally, obviating or minimising any need for management intervention. This represents the ultimate goal of any environmental improvement programme.



Burnham Marina

Fisheries habitat improvements are incorporated into flood defence maintenance works whenever possible, and increasingly as a matter of routine. Many of these improvements will be of benefit to all components of the river ecosystem, and not just to the fish stocks themselves. Projects have already been undertaken on the Mardyke to manage riverside trees (pollarding and planting), and to improve certain physical in-stream features.

It is neither practical nor appropriate for the Agency to become directly involved in the day to day management of the lake, reservoir and pond fisheries which occur throughout the area. However, the promotion of sound fisheries management practices, the provision of free advisory services to angling clubs, owners, tenants, and the general public, and the maintenance of specialist services such as fish rescues and fish mortality investigations, all contribute in a major way to the success of South Essex fisheries.

Historically, the predecessor Authorities of the Agency have not had any substantial involvement in the regulation of commercial eel or salmonid stocks in coastal waters. This is primarily due to the lack of viable stocks of salmon or migratory trout. These circumstances obviated the need for any enforcement measures, whilst regulation of the eel fishery for either its own protection, or for the protection of other species, did not appear to be required.

In recent years, fish stocks throughout the Thames estuary and Tideway have shown a considerable improvement in fortune, and it is now becoming evident that more attention may need to be paid to the proper regulation of all of its fisheries, so that valuable stocks can be conserved, and potential conflicts of interest avoided.

Fisheries responsibilities in the estuary are shared by the Kent and Essex Sea Fisheries Committee, and the Ministry of Agriculture, Fisheries and Food and three Environment Agency Regions. No one of these bodies alone could succeed in establishing a coherent management regime throughout the area, particularly in the absence of formal and well defined arrangements for liaison between them. The Agency must therefore be prepared to support fully any emerging initiatives designed to establish improved fisheries management arrangements for stocks of all types.

Conservation Interests within the Catchment

A large proportion of the catchment has exceptional environmental importance in both a national and international context. The Essex coast rates amongst the top five maritime wetlands in Britain, due mainly to its extensive saltmarshes and intertidal mud and sand flats. In recognition of this value, wide areas have been designated as Sites of Special Scientific Interest. Added to this are the designations as Special Protection Areas (SPAs) and Ramsar sites that indicate a European and worldwide importance as wetland sites. SPAs are classified under the *EC Birds Directive 79/409/EEC* and requires special measures to be taken in these areas to conserve the habitats of rare and migratory birds.

Foulness is designated a SPA for the fact it supports, in winter, internationally important populations of six species of migratory waterfowl, these include dark-bellied brent geese, oystercatchers, grey plovers and bar-tailed godwits. The Essex coast can assume even greater importance in severe winters due to wildfowl and waders from the continent arriving attracted by the relatively mild climate and the abundant food resources available on the mudflats and grazing marshes.



Parts of Foulness and the River Crouch Marshes along with Dengie have also been identified as candidate Special Areas of Conservation (SACs). This status recognises the international importance of the sites for their habitat and species value. It enables the ecological requirements of the areas to be further protected.

Grazing of these historic marshes was the predominant land use around the coast, but many of them have now been turned over to arable production. The coastal marshes have been designated as Environmentally Sensitive Areas, both to encourage their traditional use, encourage conversion from arable to grass and to protect and enhance their valuable habitats and characteristic landscape.

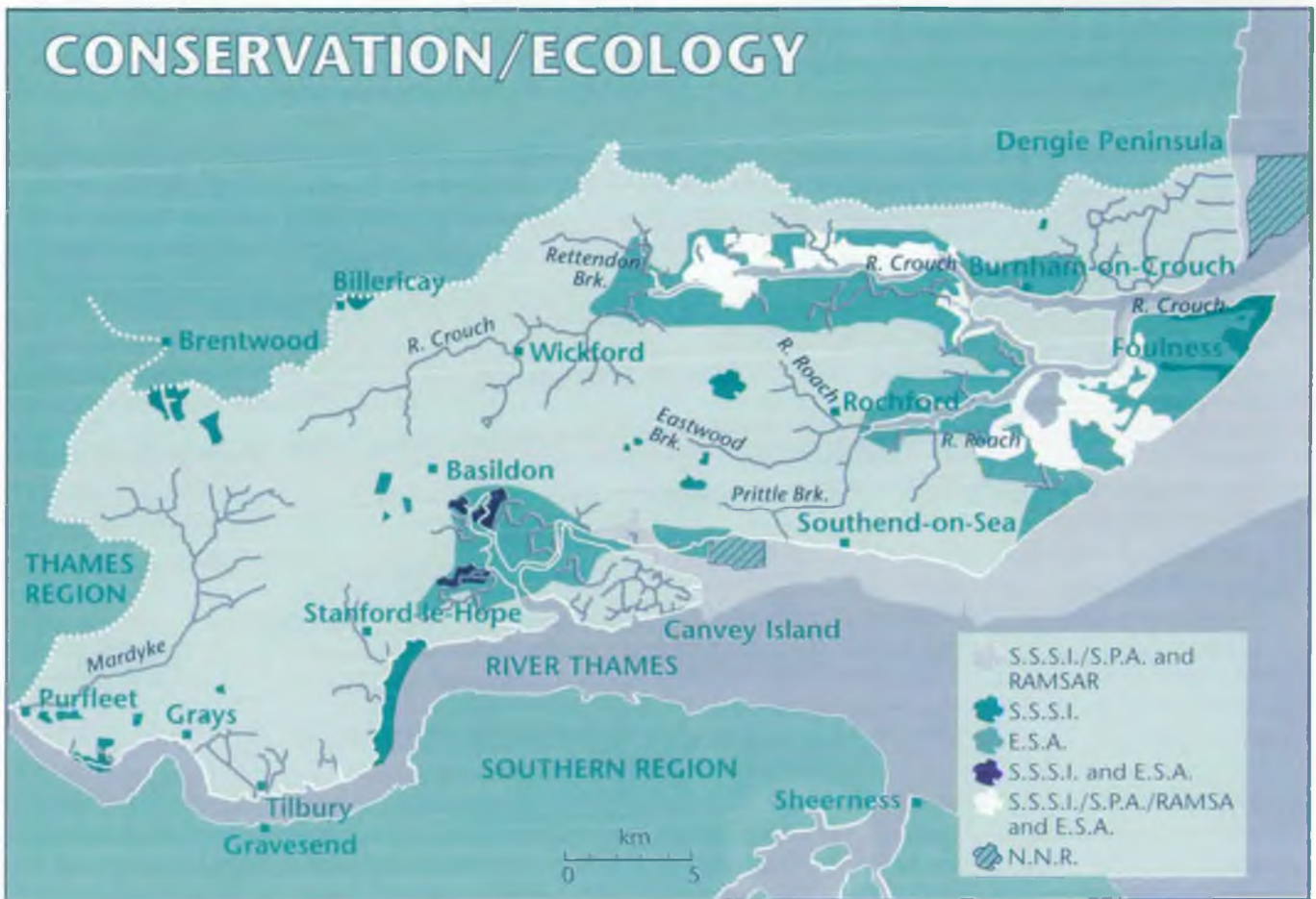
Extensive areas of saltmarsh have been lost to erosion in recent years. This is a matter of great concern not only to conservation interests, but also to flood defence. Saltmarshes perform the valuable role of absorbing wave energy, and consequently protecting the defences from the full force of the sea. Retention of the remaining marshes, together with the establishment of new ones in vulnerable areas, represents one of the greatest current challenges facing the Agency.

The requirement to produce Water Level Management Plans for sites of high conservation value will lead to a more strategic approach to the management of wetlands with water level control structures. Water Level Management

Plans provide a means by which the water level requirements for a range of activities in a particular area, including agriculture, flood defence and conservation, can be balanced and integrated. Initially, where the Agency is the Operating Authority only those designated sites with control structures will be included, such as Foulness SSSI. It will be necessary for the Agency to liaise closely with other concerned parties during the production of the Water Level Management Plans for these highly sensitive areas.

The catchment has a wealth of archaeological remains. The light soils, easily worked for agriculture, coupled with the rivers and estuaries as obvious sources of food and communication, have led to continuous occupation of the area since Neolithic times. Given that many of these important sites are not yet identified, it is necessary for the Agency to establish very effective liaison procedures with the County Archaeologists, before carrying out any works which could cause damage. Along the coast, for example, are red hills (Iron Age and Roman salt production sites), seawalls (some of which are medieval in origin), shipwrecks, oyster pits and intertidal wooden structures (such as fish traps).

The Thames estuary gravels are extremely important for palaeolithic finds and provide information on the earliest human occupation, many flint implements have been discovered. There is a causewayed enclosure at Orsett dated as Neolithic and many Bronze Age finds are located along



the river corridors in this area. Iron Age, Roman, Saxon and artifacts from all other periods of time are located in Essex, right up to World War II remains, that are today classified as archaeological. The wealth of major sites, numerous smaller investigations and abundant crop mark complexes testify to the extensive nature of prehistoric and later settlements.

Recreation Opportunities

The characteristics of the area and its proximity to large population centres attracts many people, and as a consequence the catchment is used intensively for a wide variety of water and land based recreational activities. Continuation of a rich tradition of recreational use of the coast and river systems, by both visitors and residents, helps the local economy. Recognising this, the Agency’s work will focus on ensuring that the rivers and wetlands can be enjoyed by the public, whilst maintaining their inherent environmental quality. The overall emphasis will be on widening awareness of what is valuable and needs protection, and on carrying out improvement works where needs and solutions have been identified.

Chances to extend and improve the availability of recreational opportunities, such as angling or walking, will be actively taken up throughout the catchment. Encouragement will be given for the more effective recreational and conservation use of all water environments. Where potential conflicts exist, for example between canoeists and anglers, the Agency will promote

reconciliation through the adoption of balanced and even handed solutions. To achieve this the Agency will continue to work closely with other organisations. On the coast, the integration of conservation, flood defence and local interests within Shoreline Management Plans will become an increasingly important aspect of coastal zone planning.

A number of recreation initiatives to promote public access to rivers have already been completed through the Thames Chase project and Hullbridge Parish Council and this support to schemes will be continued. Disabled access and public information have been provided along the Mardyke. Both consultation and environmental interpretation will be important to ensure a wide understanding of management actions, and to encourage the participation of the public in decision making. A strategic approach to the provision and management of access will be needed in order to reduce conflicts between the many recreational groups, and minimise their impact on the environment. The Agency will approve and support appropriate enhancement of river banks, for example by the provision of footpaths and the protection of valuable natural features.

Navigation

The Agency is not the Navigation Authority for any waterway within this catchment. The responsibility for coastal navigation falls to the Port of London Authority and the Crouch Harbour Authority.

RELATIONSHIP BETWEEN LAND USE AND THE ENVIRONMENT

The policies in Local Authority statutory development plans are very important, given they provide the framework for land use change and provide the key reference in determining development applications (*Planning and Compensation Act 1991*). The Environment Agency therefore welcomes the inclusion of policies which reflect its concerns and responsibilities in development plans. To facilitate this the former NRA provided all Local Authorities with *Guidance Notes for Local Planning Authorities on the Methods of Protecting the Water Environment Through Development Plans 1994*, and seek their inclusion wherever applicable.

Though the Agency has wider interests than the former NRA, the statements in those guidance notes remain an important guide to environmentally friendly, sustainable land planning.

The nature of land use has profound influence on the water, air and land environment. Development requires land, minerals, energy, and water, together with other appropriate infrastructure. It produces gaseous, liquid and solid wastes, and can alter or destroy the natural balance of the environment.

This South Essex Catchment Management Plan is targeted at all influential groups whose actions or remits cover and influence the wide ranging environmental duties of the Environment Agency in this area.

In Autumn 1996 an English Nature initiative will result in the publication of the *Thames Estuary Management Plan - Action Plan*. This document is targeted at the area of the Thames estuary from Tower Bridge down to a line drawn between Shoeburyness and the Isle of Grain. That plan focuses on the estuary, its marshes, mudflats, and the coastal strips and margins. Overlap and compatibility was necessary with this South Essex Action Plan. The Environment Agency is one of many influential bodies who have contributed to this plan. Land use along the length of the Thames estuary has profound effects on the waters quality and therefore the water uses within the Thames estuary.

Along the Thames estuary frontage between the Mardyke sluice in the west and Shoeburyness in the east, is a five kilometre wide strip of heavily urbanised and industrialised land, much of it having been so for considerable time. At Brentwood (partly within the plan area) and at Basildon are further significant urban and industrial areas, generally of a more modern nature.

This major development has created widespread changes to the local environment, rivers and streams have been culverted or filled and vast impermeable areas cause significant "flashy" surface water run-offs. These can create localised flooding if the Thames estuary sluices are unable to operate due to high tides, yet most of the time, channels and ditches are dry. Poor local environments thus result from much of the past development.

In controlling new development, the Agency seeks urbanised surface water to be attenuated to flow rates that existed prior to development. Rivers and ditches, together with green margins are encouraged to be retained for new developments. Conservation areas should be retained and enhanced, and re-establishment of wetlands is advocated.

Development should be refused in low lying land adjacent to watercourses and in the flood or coastal plain if it would place itself or existing development at greater risk of flooding. The Agency advises the Local Planning Authorities where any proposed development is at risk from flooding, in accordance with DoE *Government Circular 30/92*.

The northern part of this catchment is dominated by agricultural land use, but its associated activities can, if not properly managed, result in deterioration of ground and surface waters, and adversely affect river flows. *The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991* have introduced standards of construction within the agricultural industry which serve to reduce the incidence of pollution.

South Essex contains some large mineral workings, mostly disused chalk and sand and gravel pits; the majority of these are in the Thurrock area. The control of these operations and particularly the effect of de-watering during operations is of concern to the Agency. It is essential that reclamation and after-use of these excavations continues to be adequately prescribed and monitored by the Agency. Some of these disused workings are promoted for refuse disposal, though significant waste management projects currently run on other sites. Without significant controls being exercised by the Agency, significant ground contamination and air smell nuisance can be caused, together with public health risks.

The Environment Agency generally controls waste disposal activities by means of Waste Management Licences. These can stipulate the standards required for the site operation to control environmental pollution by leachate and landfill gas, as well as aesthetic matters such as litter.

Most landfill sites, particularly those taking degradable wastes are usually restored to pre-determined contours and have a low-intensity use such as country park, golf course, or agricultural land. It will take several decades for these sites to completely degrade and settle to allow other uses, unless special techniques are used.

One activity which is exempt from licensing, subject to certain provisions, is landspreading of wastes. Such wastes must result in 'benefit to agriculture or ecological improvement'.

There is a concern that the catchment is experiencing elevated levels of silt deposition in the rivers, resulting in an increase in the need for silt removal, especially in mill pools and in the deeper and wider sections of the rivers. Increased

RELATIONSHIP BETWEEN LAND USE AND THE ENVIRONMENT

siltation influences the quality of the riverine environment in many ways for instance by degrading river habitats (i.e. silting gravel bed and riffles) and causing a deterioration in water quality through the elevation of chemicals adsorbed onto silt particles (for example, phosphates and pesticides). Siltation also reduces the carrying capacity of river channels, increasing flood risks and the costs and environmental damage of maintenance work through increasing the frequency of de-silting operations.

Instead of simply tackling the problems of siltation by increasing the de-silting programme, there is a need to address the causes of the problem. Land use management has a significant impact on the severity of soil erosion (for instance autumn sown cereals as opposed to grassland increase erosion), as does soil type and soil organic matter. Much of the catchment is vulnerable to erosion, especially from water. The susceptibility of soils to erosion is particularly exacerbated by low soil organic matter and

agricultural practices. Ways in which farmers can reduce soil erosion have been set out in the Code of Good Agricultural Practice for the Protection of Soils. National research by the Agency has identified the value of buffer strips adjacent to watercourses and in other strategic locations, not only to reduce sediment loads to rivers (and hence nutrients) but also to reduce pesticides contaminating watercourses.

Drainage from new developments, increased paved areas and improved highway drainage may also provide significant mechanisms for transporting silt into the catchments rivers.

Land use, and the air and water environment are closely inter-related. The Environment Agency will actively promote with the Local Planning Authorities the need for the protection of the environment, and where possible enhancement, to be clearly evident in policies within their statutory development plans

FUTURE REVIEW AND MONITORING

The Environment Agency will be jointly responsible, with other identified organisations and individuals, for implementing this Action Plan. Progress will be monitored and reported annually; these reviews will examine the need to update the Catchment Management Plans in the light of changes within the catchment. The Annual Review will take the form of a short progress report, to include work achieved compared with that planned, and to highlight any changes to the Plan. Major revisions will normally be carried out after a five year period.

Land use planning will be an important feature of future

reviews. Efforts will continue to be made by the Agency to include policies which reflect its responsibilities in the statutory development plans produced by Local Authorities. This is considered to be a vital mechanism for controlling land use change on a large scale.

Comments about this Action Plan should be addressed to:

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ACTIVITY PLAN

* Actions in *Italics* are new, and have been introduced since the publication of the Consultation Report.

| Issue | Preferred Action(s) | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | Future | Responsibility | Est Cost £ |
|---|---|-------|-------|-------|-------|-------|--------|---|---|
| 1. Poor dissolved oxygen levels in lower Mardyke giving rise to RE3 failure for dissolved oxygen. Fish stocks below target class. | 1. Integrated project to assess the causative factors which may include: inadequate flows (see Issue 15/16); a need for proactive weed control; pollution reduction measures on significant highway drainage outfalls; high effluent volumes; and (for fish stocks) restricted physical habitat quality. 2. <i>Scoping study</i> * | | | ■ | ■ | ■ | ■ | Environment Agency Environment Agency | 25K Capital 5K Capital |
| The majority of the options from the Consultation Report have been amalgamated to form an all-encompassing Action 1. There is a link between this Issue and the combined Issue 15/16. Issue 40 has also been amalgamated with Issue 1 to deal with the total environmental quality of the lower River Mardyke. | | | | | | | | | |
| 2. Failure to meet biological LQI target and achieve RIVPACS Class A or B Mardyke; Stifford Bridge - Mardyke Sluice Outwood Common Brook; Billericay - Crouch River Crouch Memorial Park - Wickford Prittle Brook - Priory Park Rayleigh Brook - Eastwood Brook Eastwood Brook - Rayleigh Brook River Roach - Rochford Station | 1. Pollution prevention investigation followed by remedial actions as appropriate. 2. <i>Review biological targets when national guidelines are available</i> 3. <i>Enhanced biological survey to evaluate extent of failures.</i> | ■ | ■ | ■ | ■ | ■ | | Environment Agency/ AWS/ Industrial Estate Owners/ Site Occupiers Environment Agency Environment Agency | 2-5K Revenue 10K Revenue 0.5K Revenue |
| Actions 2 and 3 are new. Present biological targets may not make adequate allowance for physical features of the river. This needs to be reviewed in the light of new national protocols for setting biological targets. | | | | | | | | | |
| 3. Occasional polluted conditions in the lower stretches of the River Crouch. | This Issue was thought to be closely linked with Issue 14 and has therefore been combined with it. | | | | | | | | |
| 4. Failure to meet River Ecosystem Class 3. Rochford Reservoir. | 1. Pollution prevention investigations and remedial measures as identified. 2. <i>Improve Rayleigh Eastern STW to River Needs Consent standard.</i> | | | ■ | ■ | | | Environment Agency/AWS Estate owners and Site Occupiers AWS | 10K Revenue Known only to AWS |
| In addition to Action 1 a further Action 2 has been included. Through the AMP3 programme the Agency will seek to improve this STW via discussions with AWS. * Timing dependant on cost benefit analysis and budget constraints | | | | | | | | | |

| Issue | Preferred Action(s) | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | Future | Responsibility | Est Cost £ |
|---|---|-------|-------|-------|-------|-------|--------|---|--|
| 5. River fails to meet River Ecosystem Class 4 for Dissolved Oxygen. Goldsands Bridges Brook. | 1. Agree river flow objective and review river needs consent for Southminster STW and river quality objectives for Goldsands Bridges Brook. | | ■ | | | | | Environment Agency/AWS | 1K Revenue |
| | 2. Survey catchment. | ■ | ■ | | | | | Environment Agency | 1-3K Revenue |
| 6. Concern over contamination of ditches by leachate from seawalls. | 1. <i>Ensure adequate monitoring undertaken at all three sites in catchment.</i> | ■ | | | | | | Environment Agency | Routine Revenue |
| | 2. <i>Develop a strategy for dealing with leachate discharges.</i> | | ■ | | | | | Environment Agency | 1K Revenue |
| Both actions are new to ensure that if leachate problems are to be produced by the three sites in the future, a strategy is in place to mitigate the problem. Issue 27 has been merged with this issue. | | | | | | | | | |
| 7. Failure to meet biological LQI target and achieve RIVPACS Class A or B. Pitsea Hall Fleet. | 1. Carry out biological survey to assess potential sources of pollution | | ■ | | | | | Environment Agency | 5K approx. Revenue |
| | 2. <i>Review biological targets when national guidelines are available (as for issue 2)</i> | | ■ | | | | | Environment Agency | 0.5-1K Revenue |
| Action 2 is a new option. | | | | | | | | | |
| 8. Concern over microbial contamination of Roach and Crouch Estuaries, which impact on shellfisheries and recreational waters | 1. Review and implement sampling programme to ensure adequate microbiological information is available to support potential improvements in future capital expenditure. | ■ | ■ | ■ | ■ | | | Environment Agency/ Local Authorities/ Navigation Authority | 5K Revenue |
| | 2. Improve liaison with Local Authorities, Navigation Authority and agree plan to disseminate microbiological quality data for recreational areas | ■ | ■ | ■ | | | | Environment Agency | Minimal Revenue |
| | 3. Identify sources of contamination of shellfish in upper estuary. | ■ | ■ | | | | | Environment Agency | 5K Revenue |
| | 4. Following (3) consider options for improvement, including urban drainage study. | | | ■ | ■ | | | Environment Agency | To be assessed. |
| Issues 8 and 11 have been combined as both dealt with bacteriological contamination within the catchment. The actions have been changed accordingly to address this combined issue. | | | | | | | | | |
| 9. Coastal and Estuarine Working Party Class B is inadequate for amenity and shellfishery requirements in Roach and Upper Crouch Estuaries. | 1. Improve STW's quality by use of water quality model (timing beyond the Plan period) | | | ■ | ■ | ■ | ■ | Environment Agency/AWS | Large costs depending on which works involved. |
| | 2. Assess trophic state (this may involve Sensitive Area status and drive nutrient removal) | ■ | ■ | ■ | | | | Environment Agency/AWS | 5K Revenue. Large if nutrient removal becomes necessary. |

| Issue | Preferred Action(s) | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | Future | Responsibility | Est Cost £ |
|--|---|-------|-------|-------|-------|-------|--------|---|--|
| | 5. Urban drainage study and improved pollution input control. | ■ | ■ | ■ | ■ | | | Environment Agency/AWS Site Occupier | Moderately large. |
| Pollution prevention investigation within industrial areas is now addressed in Issue 4. | | | | | | | | | |
| 10. Contamination of groundwater may be jeopardising Linford Public Water Supply. | 1. Discussion with site operators leading to remedial measures if necessary. | | ■ | ■ | ■ | | | Environment Agency and WD Site Operators | Not quantifiable |
| | 2. Investigation to clarify issues and assess the risk. | | ■ | | | | | Environment Agency | 5K for desk study Revenue |
| | 3. <i>Expansion of the monitoring regime.</i> | | ■ | ■ | ■ | | | Environment Agency | 15K Revenue |
| New Action 3 to fill gaps in the existing monitoring regime which is inadequate. | | | | | | | | | |
| 11. Microbial contamination of recreational waters. | This issue has been incorporated with Issue 8 - both deal with microbial contamination within the catchment. | | | | | | | | |
| 12. Migration of leachates in gravels. | Issue 12 has been expanded into two issues. The resultant issues deal with active landfill sites (Issue 42) and closed landfill sites (Issue 43) | | | | | | | | |
| 13. Oil contamination in chalk groundwater at West Thurrock and Purfleet. | Not an issue. The aquifer is not utilized in this area and the threat to other users is considered minimal. | | | | | | | | |
| 14. Concern over the quality of discharges from surface water sewers on Industrial Estates including: Southfields, Courtauld Road and Laindon. | 1. Agree strategy with AWS to control pollution. | ■ | | | | | | Environment Agency/AWS | 0.5K Revenue |
| | 2. Pollution prevention campaign including education and increased PR, negotiation and where necessary enforcement with Notices and/or prosecutions. | ■ | ■ | ■ | ■ | ■ | | Environment Agency/AWS, Owners and Occupiers | 5K Revenue |
| | 3. Identify practical pollution reduction measures. | | ■ | | | | | Environment Agency/AWS | 0.5K Revenue |
| Action 2 has been re-written. Expanded to incorporate action from Issue 9. The objective is to achieve a long-term improvement in water quality. | | | | | | | | | |
| 15. In-river needs and Minimum Acceptable Flows are not defined for the catchments rivers. Also, low flows in the Mardyke are perceived to be inadequate to meet river needs. | 1. Await outcome of Regional studies aimed at developing a methodology for defining River Flow Objectives (RFOs) | ■ | | | | | | Environment Agency | Combination of several Regional and National initiatives (Revenue) |
| | 2. Carry out ecological and in-river needs studies to implementing RFO methodology. The Mardyke is assumed to be the highest priority river for investigation in this catchment although costs and timing depend on methodology requirements and overall priority for implementation within the Anglian Region. | | | | | | | * ■ Environment Agency | To be assessed (Capital) |
| Issue 15 has changed to allow Issue 16 to be merged with it. * The timing of ecological and in-river needs studies is dependant on Regional priority given to rivers in this catchment. | | | | | | | | | |

| Issue | Preferred Action(s) | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | Future | Responsibility | Est Cost £ |
|---|--|-------|-------|-------|-------|-------|--------|--|--------------------|
| 16. Low flows in the Mardyke are perceived to be inadequate to meet river needs. | Issue 16 has been combined with Issue 15 as both are inextricably linked. | | | | | | | | |
| 17. There is a lack of detailed understanding of the working of the Essex Chalk and superficial aquifers. | Benefits of developing a model at the present time is likely to be outweighed by the costs. In the fullness of time a model could also be extended to develop a strategy for dealing with rising groundwater levels. Aquifer modelling in the long-term is considered as a new action in Issue 22. | | | | | | | | |
| 18. Available water resources within the catchment are inadequate to meet present and future demands compared against current resource assessments. | 1. Combination of measures identified in the Regional Water Resources Strategy including: | ■ | ■ | ■ | ■ | ■ | | Environment Agency/Abs/MAFF/CoCo/NFU | To be assessed |
| | 2. Encourage on-farm winter fill storage reservoirs and more efficient agricultural practices. | ■ | ■ | ■ | ■ | ■ | | Environment Agency | Not quantifiable |
| | 3. Enhance the existing Ely Ouse to Essex Transfer Scheme increasing the reliability of water for import into the catchment. | | | | | | ■ | Environment Agency/WCos/Ind/Consortium | To be assessed |
| | 4. Demand management. | ■ | ■ | ■ | ■ | ■ | | Environment Agency/ESW | Not quantifiable |
| | 5. Revocation of unused licences. | ■ | ■ | ■ | ■ | ■ | | Environment Agency | Not quantifiable |
| | 6. <i>Continue to investigate the potential for Aquifer Storage Recovery at Langford.</i> | ■ | ■ | ■ | ■ | ■ | | Environment Agency/ESW | 96K Capital |
| Action 6 is new - the Water Company is investigating the possibility of aquifer storage with the Agency contributing to funding. | | | | | | | | | |
| 19. Catchment areas for wetland sites of conservation value need to be identified. | This issue is part of the Agency's routine business and therefore has been deleted as an issue. | | | | | | | | |
| 20. Impact of gravel abstraction | This issue is part of the Agency's routine business and therefore has been deleted as an issue. | | | | | | | | |
| 21. Potential threat of increased saline intrusion contaminating groundwater resources. | This issue is part of the Agency's routine business and therefore has been deleted as an issue. | | | | | | | | |
| 22. Requirement for a management strategy for dealing with rising groundwater levels. | 1. Study to assess the extent of the impact and identify management options including re-use locally. | | | | | | ■ | Environment Agency | 25K Capital |
| | 2. <i>Longer term, possibly consider management options in association with aquifer modelling.</i> | | | | | | | ■ | Environment Agency |
| New Action 2 as opportunity may arise in conjunction with future monitoring. This action has arisen from the former Issue 17. | | | | | | | | | |

| Issue | Preferred Action(s) | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | Future | Responsibility | Est Cost £ |
|--|--|-------|-------|-------|-------|-------|--------|---|--|
| 23. Unknown impact of saltwater through sluices. | 1. Carry out study into extent of problem and establish advantages/disadvantages for wildlife. | | ■ | | | | | Environment Agency/ English Nature/ Wildlife Trusts/ ESA Project Officer | 5K Capital Use expertise and local knowledge |
| 24. Concern that Flood Defences may not meet Agency target standards. | This issue has been merged with issue 25 as the two are inextricably linked. | | | | | | | | |
| 25. Concern over the effects of sea level rise on tidal defences. | 1. Develop and implement Shoreline Management Plan. | ■ | ■ | ■ | ■ | ■ | ■ | Environment Agency/ Coastal Local Authorities | 100K p.a. Capital Development |
| The future maintenance and improvement standards are inextricably linked with Issue 25, and are being addressed by the SMP and Essex Seawalls Strategy. These jointly feed into the 10 year needs programme. | | | | | | | | | |
| 26. Suitability of refuse fill as a future sea defence material. | The Agency and the Essex Local Flood Defence Committee have decided that use of refuse fill in seawalls is not an acceptable material for future works. Therefore this issue has been deleted. | | | | | | | | |
| 27. Concern over pollution potential of existing refuse fill seawalls. | Merged with issue 6 which addresses the same problem. | | | | | | | | |
| 28. Concern over lack of continuity of tidal defence responsibility. | This is not an issue because the Land Drainage Act (1991) sets out provisions for the Environment Agency to oversee and advise on flood defences operated by third parties. | | | | | | | | |
| 29. Development control and the water environment. | This issue is part of the Agency's routine business and so has been deleted as an issue. | | | | | | | | |
| 30. Concern over the effects of past management practices on the river, floodplain and marshland environments | 1. Develop and implement effective methods to describe, classify and monitor the conservation resource | ■ | ■ | | | | | Environment Agency | 5K Revenue |
| | 2. Identify areas with potential for restoration and enhancement of both habitats and landscape and determine costs e.g Mardyke and Vange and Fobbing SSSI | | ■ | ■ | | | | Environment Agency | 5-10K Capital |
| | 3. Undertake restoration and enhancement schemes | | | | | | ■ | Environment Agency | To be assessed Capital |
| The title of this issue has changed as Issue 32 has been merged with it. | | | | | | | | | |
| 31. Concern about the adverse effects of bait digging on the foreshore. | This issue is now deleted because it is considered to be better addressed by the lead partners in Estuary Management Plans. | | | | | | | | |
| 32. Concern about degradation of the traditional lowland landscape. | This issue is now merged with Issue 30. | | | | | | | | |

| Issue | Preferred Action(s) | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | Future | Responsibility | Est Cost £ |
|---|---|-------|-------|-------|-------|-------|--------|--|----------------|
| 33. Requirement to identify a rolling programme of conservation and recreation opportunities at an early stage within the river maintenance programme. | This issue is part of the Agency's routine business and so has been deleted as an issue. | | | | | | | | |
| 34. Requirement to investigate opportunities to develop riparian buffer strips | 1. Promote possibilities of riparian buffer strips through land use schemes. Liaise with landowners, MAFF and ADAS | | | | | ■ | ■ | Landowners/ MAFF/ ADAS/ Environment Agency | 6K Capital |
| 35. Need to improve liaison with Essex County Council over protection of sensitive archaeological sites adjacent to Environment Agency maintenance and capital works. | 1. Improve procedures for contacting appropriate organisations when precise details of Environment Agency works have been finalised. | ■ | ■ | ■ | ■ | ■ | ■ | Environment Agency | 1K Revenue |
| | 2. Evaluate results of National R&D study on current liaison practice. | ■ | | | | | | Environment Agency | 1K Revenue |
| 36. Requirement to promote appropriate public access to rivers and seawalls in conjunction with other organisations. | This issue is part of the Agency's routine business and so has been deleted as an issue. | | | | | | | | |
| 37. There is a lack of public information boards detailing Agency activities. | This issue is part of the Agency's routine business and so has been deleted as an issue. | | | | | | | | |
| 38. Some flood defences require construction/reconstruction to comply with the Agency target standards. | This issue is part of the Agency's routine business. On-going work involves close liaison with English Nature and the Environment Agency Thames Region, who are jointly preparing the Thames Estuary Management Plan. | | | | | | | | |
| 39. Requirement to draw up Water Level Management Plans, where the Agency is the operating authority. | 1. Draw up Water Level Management Plans for wetlands according to English Nature where the Agency is the operating authority | ■ | ■ | ■ | ■ | ■ | ■ | Environment Agency | 15k Revenue |
| | The Plans are being drawn up for Hadleigh Marshes (Benfleet & Southend Marshes SSSI), Rushley Island, Fleet Head, Oxenham Farm (all Foulness SSSI), Hogwell Marshes, Hyde Marshes, Lion Creek, Marsh Farm Country Park, Lower Raypits, Stokes Hall Farm (all River Crouch SSSI), Pitsea Marsh SSSI, and Vange & Fobbing Marshes SSSI. | | | | | | | | |
| 40. Fish stocks in the Mardyke do not reach their target class. | This issue has been merged with Issue 1. | | | | | | | | |

| Issue | Preferred Action(s) | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | Future | Responsibility | Est Cost £ |
|---|--|-------|-------|-------|-------|-------|--------|---|------------|
| 41. Optimum fisheries management policies for the Thames estuary as a whole do not exist, and cannot be developed for isolated parts, such as that covered by this plan. | 1. Responsible Authorities to coordinate coherent fisheries management policies for the Thames estuary as a whole. | ■ | ■ | ■ | ■ | ■ | ■ | Environment Agency (Anglian, Southern & Thames regions)/ Kent & Essex Sea Fisheries Committee/ MAFF | 5K Revenue |
| The Agency's Anglian Region does not have as large a fisheries interest in the Thames estuary as do the other responsible Authorities, or its own Thames Region. Anglian Region will therefore stand ready to cooperate with any initiatives to realise a new management regime, but will not actively promote any initiatives of its own under the current prevailing circumstances. | | | | | | | | | |

NEW ISSUES

| Issue | Preferred Action(s) | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | Future | Responsibility | Est Cost £ |
|--|--|-------|-------|-------|-------|-------|--------|-----------------------------------|---|
| 42. Threat to controlled waters from active waste disposal sites (landfill). | 1. Ensure active sites which do not have engineered containment comply with Regulation 15 of EPA 1990: Part II Waste Management Licensing. | ■ | | | | | | Environment Agency | 2-3K Revenue |
| | 2. Evaluate pollution risk and ensure appropriate monitoring programme is in place. | ■ | ■ | | | | | Environment Agency/ Site Operator | 2-3K Revenue |
| | 3. Agree trigger levels for leachate contamination and contingency plans for remedial action with site operators. | ■ | ■ | | | | | Environment Agency/ Site Operator | 1K Revenue |
| New Issues 42 and 43 have been expanded from Issue 12. | | | | | | | | | |
| 43. Threat to controlled waters from closed waste disposal sites (landfill). | 1. Establish a priority list based on existing information and knowledge of risk. | ■ | | | | | | Environment Agency | 0.5K Revenue |
| | 2. Review suitability of current monitoring programme and assess risk to environment. | ■ | ■ | | | | | Environment Agency | 0.5K Revenue |
| | 3. Identify owners and agree plans for future monitoring, including trigger levels. | | ■ | ■ | | | | Environment Agency | 1-2K Revenue |
| | 4. Establish contingency plans to be used if trigger levels are exceeded. | | ■ | ■ | | | | Environment Agency | 0.5K Revenue |
| New Issues 42 and 43 have been expanded from Issue 12. | | | | | | | | | |
| 44. Identification of flood plains and flood risk assessment. | 1. Undertake mathematical models of river valleys and coastal zones to determine "Flood Risk Areas". | ■ | ■ | ■ | ■ | ■ | ■ | Environment Agency | Currently being assessed (Regional Capital) |
| There is a requirement to provide this data under Section 105 of the Water Resources Act 1991, and Local Authorities are requesting the information. | | | | | | | | | |

| Issue | Preferred Action(s) | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | Future | Responsibility | Est Cost £ |
|--|--|-------|-------|-------|-------|-------|--------|---------------------------------------|--------------------|
| 45. Ensure that Environment Agency activities comply with new and existing EU Directives concerning nature conservation. | 1. Investigate, with partners, the possible development of compensatory habitat where habitats may be lost due to the implementation of the SMPs preferred options and subsequent sea defence works. | | ■ | | | | | Environment Agency/ English Nature | 5K Capital |
| | 2. Develop a programme to review all discharge consents and abstraction licences that may potentially impact on SACs and SPAs. | | | ■ | ■ | ■ | ■ | Environment Agency | Minimal Revenue |
| There is a requirement under EU Directives within SAC's and SPA's for certain activities not to affect these conservation areas. The Agency will seek to ensure that their activities comply with the Directives. | | | | | | | | | |
| 46. Identify the role of the Agency in the implementation of agreed local and national Biodiversity Action Plan targets for relevant water dependant habitats and species. | 1. Identify and agree targets and action plans with local biodiversity group. | | ■ | | | | | Environment Agency/ English Nature | 2.5K Capital |
| | 2. Identify necessary activities or procedures to implement targets. | | ■ | | | | | Environment Agency | 2.5K Capital |
| Biodiversity Action Plan only recently published and this issue has been incorporated into the CMP process to show the Environment Agency's contribution. Local biodiversity groups are currently being set up to compile County based Action Plans. | | | | | | | | | |
| 47. Concern over copper exceeding EC Dangerous Substances Directive (76/464/EEC) limits in upper River Crouch and tributary. | 1. Develop metals budget for estuary to identify principle sources. | | ■ | | | | | Environment Agency | 1-2K Revenue |
| | 2. Control all non-diffuse inputs of metals by appropriate consent limits. | | ■ | ■ | | | | Environment Agency | 0.5K Revenue |
| | 3. Undertake surveys of estuary to determine trends for water column and sediments. | | ■ | ■ | ■ | ■ | | Environment Agency | 1-2K Revenue |
| This new issue was required to address the EC Directive copper failure in the upper River Crouch. | | | | | | | | | |

INTEGRATED POLLUTION CONTROL AND RADIOACTIVE SUBSTANCES

A. INTEGRATED POLLUTION CONTROL

Regulatory Framework

The Environmental Protection Act 1990 assigned responsibilities for regulation and control of releases to the environment, and introduced a regulatory approach to Integrated Pollution Control. The regulation of releases from the 2500 (nationally) most potentially polluting processes is assigned to the Agency (formerly HMIP); these are known as Part A prescribed processes. The Agency is required to establish that such processes meet the objective of ensuring that the best available techniques not entailing excessive cost (BATNEEC) are used to prevent, minimise and render harmless releases of prescribed substances to any environmental media whilst having regard to the best practicable environmental option (BPEO) available in respect of those substances which may be released. In this context, consideration of BATNEEC and BPEO are, primarily, site specific.

Releases to controlled waters are limited to ensure that it is unlikely for there to be a breach of any statutory Environmental Quality Standard (EQS). Releases to public sewers are assessed after consulting the sewage undertaker.

Under *The Water Industries Act 1991*, referrals from sewage undertakers for trade effluent discharges to sewer, involving prescribed substances, from processes which are not subject to IPC, are managed on behalf of the Secretary of State for the Environment. This involves the application of Best Technical Means Available (BTMA) to protect the sewage treatment works and controlled waters receiving the final discharge.

In authorising IPC processes, the Agency is required to establish that the generation of wastes is minimised subject to site BPEO.

The Agency is required to ensure that statutory Environmental Quality Standards (EQS) are not exceeded. Although standards have been established for releases to air and water, there are no standards for depositions to land. EQS for air are set for four substance, Nitrogen Dioxide, Sulphur Dioxide, Suspended Particles, and Lead. Further EQS will shortly be established for Benzene, 1,3 Butadiene, Carbon Monoxide, Ozone, and Polycyclic Aromatic Hydrocarbons (PAH). EQS for water are set for fifteen substances or groups of substances, mainly persistent pesticides and similar chlorinated hydrocarbons, but also including the metals cadmium and mercury.

A further 8000 (nationally) processes were assigned to Local Authorities for control of releases to air only (these are known as Part B processes) using the same concepts of BATNEEC.

The Environment Act 1995 extends responsibilities of Local Authorities to establish action target standards for certain air

pollutants so as to improve air quality. This may involve more extensive measures involving parties other than those regulated as operators of Part B processes. The Agency in its regulation of Part A processes, will be required to participate in the setting and achievement of such local standards.

Eventually it is intended that these targets will be set at two main levels of air quality. One will be a guideline figure to represent the level at which the pollution has been rendered harmless to health or the environment, or at which it is unlikely that any significant further benefit could be obtained by expending further reasonable cost on abatement, because of background sources or other factors. The other will be a trigger level which distinguishes when air quality is so poor that an immediate response would be justified to prevent serious damage.

There are complex interactions between weather conditions, chemical processes, distances that air pollution can travel, and the number of possible sources that make understanding causes and effects and attributing responsibility difficult in cases of air pollution. Local Authorities will be expected to have regard to these targets in preparing land-use development plans and in carrying out other duties such as transport planning.

Local Authorities will introduce assessments for local air quality in due course and, where it is shown to be necessary according to nationally agreed criteria, prepare local air quality management plans for operation in defined areas where targets are unlikely to be met. The "alert" threshold for any pollutant or combination of pollutants would define the level at which there is a potential risk of immediate serious harm. If the level were reached or approached in a particular area, it should therefore trigger a mandatory obligation on the relevant pollution control authorities, including the Agency, to take remedial action.

B. AIR QUALITY MANAGEMENT

Overview

Air quality has been improving in recent years and these improvements are set to continue. The new systems for dealing with industrial pollution, introduced by *The Environmental Protection Act 1990*, new vehicle standards, and other measures aimed at mitigating the environmental effects of traffic are addressing the reduction of emissions. The UK confidently expects to meet its existing international commitments for reductions in emissions of NO₂, SO₂ and volatile organic compounds.

There remain, however, important challenges and uncertainties. For example, the recurrence of ozone episodes, particularly in summertime, and recent research publications have raised public concern about air quality.

The Government have concluded that it should consolidate and build on the present strong position by developing a

APPENDIX I

general strategy for air quality, based on clear standards and targets. Such clear standards and targets are essential, but must be supported by effective machinery for achieving them. They will be supported by a new framework for local air quality management which will:

1. require periodic review of air quality by Local Authorities;
2. provide for the establishment of Air Quality Management Areas in those places where air quality targets are unlikely to be met;
3. place powers and obligations on Local Authorities and other relevant bodies to prepare plans for remedying air quality problems ;
4. secure the effective co-ordination of all activities which can influence air quality improvement in the most cost-effective manner in those areas where it is most needed.

Air Quality Targets

To establish a new framework of national air quality standards and targets.

To establish new systems for local air quality management based on Air Quality Management Areas.

To establish effective control of emissions, particularly from vehicles.

C. RADIOACTIVE SUBSTANCES

The Radioactive Substances Act 1960 established controls over the holding, use and disposal of radioactive substances. The Agency is the body currently charged with regulating such uses under the subsequent *Radioactive Substances Act 1993*.

Various exemption orders made under the Acts permit the holding and disposal of radioactivity where the usage is

widespread but the quantities involved are of such low magnitude as not to present any risk to the public or the environment. All usages and disposals above these levels are subject to regulation by the Agency.

In summary the usage/disposal of radioactivity is grouped by the Act into three categories:

Section 7 covers the registration of premises where radioactive sources may be held and used. The Agency ensures that the holding is properly recorded and supervised, and that correct procedures are in place for ensuring the safe replacement/disposal at the end of the useful life of the sources.

Section 10 covers the registration of mobile sources, where the Operator is permitted to take radioactive sources around in the course of his work. The Agency ensures that the holding, transportation, and storage when not in use, is properly recorded and controlled, and that correct procedures are in place for ensuring the safe replacement/disposal at the end of the useful life of the sources.

Section 13 covers the disposal of radioactive sources, whether to air, the aquatic environment, landfill, or specified depositories. The Agency ensures that proper assessments of the impact on the environment are carried out to ensure that the disposal may be carried out in such a way as to prevent harm to humans or to the environment, and that the disposals conform to the approved methods.

In the context of radioactivity, consideration such as BATNEEC/BPEO and BTMA are not appropriate. The guiding principle is "as low as reasonably achievable (ALARA)" and, because radioactivity can be measured accurately in very low concentrations, the standards to be achieved can be appropriately specified.

WASTE MANAGEMENT

REGULATORY FRAMEWORK

Up to the investiture of the Environment Agency, the NRA was a statutory consultee of the Waste Regulation Authorities (WRAs) under *The Environmental Protection Act, 1990*. It was also a statutory consultee of Planning Authorities under the *Town and Country Planning Acts. The Environment Act, 1995* which brought about the amalgamation of the NRA, WRAs and Her Majesty's Inspectorate of Pollution (HMIP) to form the Environment Agency, changed these consultation roles. The Agency continues to be a statutory consultee of Planning Authorities but other consultations are internal. Previously WRAs consulted internally with their planning colleagues responsible for determining waste disposal facility planning applications. Under *The Environment Act, 1995* this arrangement has been formalised by making these Planning Authorities statutory consultees for waste management licences along with the Health and Safety Executive.

In the past waste management (disposal) licences could only relate to the operational phases of any site and the planning permission was the only means by which control could be exercised over closed sites. The introduction of *The Waste Management Licensing Regulations, 1994* under *The Environmental Protection Act, 1990* has changed this situation. Licences can now control the monitoring and aftercare of closed sites. Licences cannot be surrendered until the Agency is satisfied that the site does not represent a risk to the environment. This is particularly important in relation to landfill sites, which pose the greatest potential risk to surface and groundwater quality.

In addition to landfill sites a wide range of other waste disposal operations require a waste management licence, these include scrap yards, transfer stations, incinerators and waste storage facilities. All of these can impact on surface and groundwater, to a greater or lesser extent.

The Environment Act, 1995 also changes the responsibilities for waste planning. Under *The Environmental Protection Act, 1990* the WRAs were required to prepare a Waste Management Plan which considered the quantities of waste arising in each Local Authority area and the methods by which this waste was to be disposed. The Waste Planning Authorities are now required to produce Waste Local Plans which consider the land use requirement of the disposal strategy set out in the Waste Management Plan.

In the 1994 Budget the Government announced that it was to introduce a tax on waste going to landfill. The purpose of this tax is to increase the costs of landfill thereby making it more competitive to dispose of waste by other methods

including incineration and recycling. In November 1995 the Chancellor stated that this tax will be levied at a rate of £7 per tonne for active waste and £2 for inactive waste (these terms have yet to be defined), starting in October 1996. The tax will be collected by the landfill site operators with the system administered by Customs and Excise. There will be the opportunity for the operators to pay a percentage of the sums collected into Environmental Trusts which can be used to pay for environmentally beneficial projects.

The main concern for the Agency is whether the increases in costs of landfill will result in an increase in fly-tipping and other unauthorised activities. These could have resource implications in terms of manpower and the costs of removal and disposal of illegally deposited waste.

CATEGORIES OF WASTE

Landfill sites are licensed to accept various categories of waste. Category A waste consists of dry inert material, whereas Categories B and C wastes contain the more putrescible material which will decompose to form polluting leachate.

With the recent closure of a major hazardous waste treatment plant, landfill is the only form of waste disposal in South Essex which could significantly affect the environment. There are four landfill sites in the catchment which are licensed to accept degradable wastes and are currently operational. Of these, two are also licensed to accept hazardous wastes.

Landfill gas, which is a mixture of methane and carbon dioxide is generated by the anaerobic breakdown of putrescible wastes in a landfill site. Because of the explosive nature of methane and the asphyxiant properties of carbon dioxide there is a need to control this gas. The greatest potential risk comes from its ability to migrate through permeable strata into adjoining property where it can threaten life or the property. It can also cause damage to crops and trees by depleting the oxygen levels in the soils.

At sites which are known to generate landfill gas, or are expected to do so, control can be exerted by positive extraction and flaring of the gas. It is possible to use the gas as a source of energy either directly, or by generating electricity.

The remainder of the operational sites in the Catchment accept only Category A or Category B waste and are not generally perceived as posing a major risk to the environment.

APPENDIX III

CORRESPONDENCE RECEIVED ON THE CONSULTATION REPORT

| CONSULTEE | COMMENTS | REMARKS ON ISSUES (as numbered in the Consultation Report) |
|---|--|---|
| Anglian Water Services | General comments on text | |
| Borough of Southend-on-Sea | | Preference: 2 14 27 29 30 32 33 36 37 38 Comment: 11 20 28 35 |
| BPB Paper & Packaging | Site specific comments | |
| British Canoe Union | General comments specifically relating to canoeing | Comment: 11 33 36 38 |
| Castle Point Borough Council | General support for flood defence issues | |
| Chelmsford Borough Council | Specific comments regarding Water Quantity text and issues | Preference: 3 11 14 15 32 38 Comment: 2 4 5 8 9 18 24 25 |
| Cleanaway Ltd | Comments relating to Pitsea and Pitsea Hall Fleet | Comment: 7 12 |
| Coal Authority | No comment | |
| Cory Environmental | General comments | Comment: 10 |
| Council for the Protection of Rural Essex | Comments on the protection of the water environment | Comment: 1 12 13 16 17 18 21 40 41 Preference: 2 3 4 5 6 7 8 9 10 11 14 15 19 20 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 |
| Country Landowners Association | Specific comments on flood defence, pollution control and water supply and abstraction | Comment: 24 25 31 Additional/alternative option(s): 25 |
| Cranfield University | General comments on the text | |
| Crouch Harbour Authority | Concerned with bacterial problems | Support: Majority of issues |
| English Heritage | Archaeology comments | Preference: 35 |
| English Nature | Comments/preferences on issues | Comment: 26 31 38 Additional/ alternative option(s): 25 Preference: 3 6 8 9 19 23 24 27 29 30 33 34 39 41 Support: 32 |
| Essex Canoeing Association | Comments on related issues and text | Preference: 11 33 36 38 |
| Essex County Council | General comments on the text | Comment: 30 |
| Essex Lepidoptera Panel | Comments on sea wall habitats | |
| Essex Joint Council of Wildfowling Clubs | Concern over disappearance of saltmarsh | |
| Essex and Suffolk Water | Highlights the possible use of aquifer storage and recovery | |
| Inland Waterways Association | General comments on a wide range of water related issues and text modifications | |
| Kent and Essex Sea Fisheries Committee | Specific comments relating to sea fisheries | Comment: 1 2 3 4 5 6 7 8 9 10 11 14 23 26 27 28 29 31 41 Additional/alternative option(s): 11 |
| London Borough of Havering | Comments on access/recreation and conservation | Additional/alternative option(s): 29 |

APPENDIX III

| CONSULTEE | COMMENTS | REMARKS ON ISSUES (as numbered in the Consultation Report) |
|---|---|---|
| MAFF | General comments on the text | |
| Ministry of Defence | Comments on related text and issues | Comment: 23 24 25 26 27 28 31 |
| Mobil Oil Company | Comments on related issues | Additional/ alternative option(s): 12 Comment: 13 36 |
| Moor Hall and Belhus Angling Society | Comments on related text | |
| National Farmers Union | Comments on agriculture | Comment: 1 2 3 4 5 6 8 15 18 19 22 23 24 25 26 27 28 30 31 32 33 34 36 Additional/ alternative option(s): 28 |
| National Trust | Comments concerning Rayleigh Brook and surrounding area | Preference: 2 |
| Ramblers' Association | Specific concerns regarding footpaths in the area | |
| Rochford District Council | General comments on all issues | Preference: 2 3 4 8 9 11 15 18 19 20 24 25 26 27 28 29 30 32 33 34 36 37 38 39 Support: 14 Additional/alternative option(s): 6 |
| Royal Society for the Protection of Birds | General comments on issues | Comment: 18 24 25 Preference: 19 31 32 33 34 37 38 39 |
| Shellfish Association of Great Britain | Specific comments relating to shellfisheries | |
| Sports Council | Recreation, navigation and fishery issues | Preference: 1 2 3 4 5 6 7 8 9 11 15 18 24 25 26 27 29 30 31 33 34 36 37 38 40 41 |
| Thames Chase | General comments regarding the River Mardyke | Support: 32 38 Preference: 36 |
| Van Ommeren | Comments on related issues | Comment: 13 17 |
| West Thurrock Estate | Comments on issues | Comment: 13 20 |

APPENDIX IV

ERRORS IN THE CONSULTATION REPORT

| SECTION (as numbered in the Consultation Report) | ERROR | RAISED BY |
|--|--|--------------------------------------|
| 2.2 | The finalised Thames Estuary Management Plan will be published by the Thames Estuary Project not English Nature. | Essex County Council |
| 3.1.1 | The Structure Plan Second Alteration is not being considered by the Secretary of State, but is now Adopted. | Essex County Council |
| 3.16.2 | Reference is made to Appendix II but it should read Appendix III. | Essex County Council |
| 3.18.1.3 | Country Parks; Grangewaters is one word; Thorndon is known as Thorndon Park. Essex County Wildlife Sites are now known as Sites of Importance for Nature Conservation. | Thames Chase Essex County Council |
| Map 25 | The gap in the Forest designation area around South Ockendon does not exist any more. | Thames Chase |
| Map 27 | The marina to the east of Burnham-on-Crouch should be to the west, opposite Essex marina at Wallasea Island. | Crouch Harbour Authority |
| 3.21.2.2 | London Underground's District Line Station in Upminster and Depot in Cranham both drain to the Mardyke catchment. | London Borough of Havering |
| Map 28 | The Upminster - Basildon - Pitsea railway line is missing and has implications on the Mardyke. | London Borough of Havering |
| Appendix XVI | In the comments box for Category A the words "if end product standard met" should be deleted. | MAFF |
| Appendix XVII | No mention of the Crouch Harbour Authority's Plan, although parts of the plan were used in the report. | Crouch Harbour Authority |

APPENDIX V

ABBREVIATIONS

| | | | |
|----------------|--|----------------|---|
| ADAS | Agricultural Development Advisory Service | LEAP | Local Environment Agency Plan |
| AWS | Anglian Water Services | LQI | Lincoln Quality Index |
| BATNEEC | Best Available Technology Not Entailing Excessive Cost | MAFF | Ministry of Agriculture, Fisheries and Food |
| BPEO | Best Practical Environmental Option | NFU | National Farmers Union |
| BTMA | Best Technical Means Available | NRA | (former) National Rivers Authority |
| CC | County Councils | PR | Public Relations |
| CEWP | Coastal and Estuarine Working Party | R&D | Research and Development |
| CMP | Catchment Management Plan | RE | River Ecosystem |
| DoE | Department of the Environment | RIVPACS | River Invertebrate Prediction and Classification System |
| EC | European Commission | SAC | Special Area of Conservation |
| EPA | Environmental Protection Act | SMP | Shoreline Management Plan |
| ESA | Environmentally Sensitive Area | SPA | Special Protection Area |
| ESW | Essex & Suffolk Water | SSSI | Site of Special Scientific Interest |
| EU | European Union | STW | Sewage Treatment Works |
| HMIP | (former) Her Majesty's Inspectorate of Pollution | WCos | Water Companies |
| IPC | Integrated Pollution Control | WRA | (former) Waste Regulation Authorities |

APPENDIX VI

REPORTS AND LEGISLATION CITED IN THE DOCUMENT

| REPORTS | SOURCE |
|--|---|
| Catchment Management Plans | |
| a) Consultation Report (South Essex) | Environment Agency, Ipswich |
| b) Action Plan (South Essex) | Environment Agency, Ipswich |
| Government Circular 30/92 | Department of the Environment |
| Guidance Notes for Local Planning Authorities on the Methods of Protecting the Water Environment Through Development Plans | Environment Agency, Ipswich |
| Local Plans | Relevant Borough / District Council |
| Shoreline Management Plan (Essex) | Environment Agency, Ipswich / L G Mouchel |
| Structure Plans | Essex County Council |
| Thames Estuary Management Plan | Environment Agency, Reading |
| Water Level Management Plans | Environment Agency, Ipswich / English Nature |
| Water Resources in Anglia | Environment Agency, Ipswich |
| LEGISLATION | |
| EC Birds Directive 79/409/EEC | HMSO |
| EC Dangerous Substances Directive 76/464/EEC | HMSO |
| EC Habitats Directive 94/43/EEC | HMSO |
| EC Protection of the Quality of Groundwater Directive 80/68/EEC. | HMSO |
| EC Shellfish Hygiene Directive 91/492/EEC | HMSO |
| EC Shellfish Waters Directive 79/923/EEC | HMSO |
| Environment Act 1995 | HMSO |
| Environmental Protection Act (EPA) 1990 | HMSO |
| Planning and Compensation Act 1991 | HMSO |
| The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991 | HMSO |
| Town and Country Planning Act (1990) | HMSO |

THE CATCHMENT MANAGEMENT PLANNING PROCESS

The Environment Agency was established in 1996 and exists to provide high quality environmental protection and improvement. The Agency's overall aim of protecting and enhancing the whole environment contributes to the world-wide environmental goal of Sustainable Development, which has been defined as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

The Agency works towards Sustainable Development through seven objectives, set by Ministers;

- An integrated approach to environmental protection and enhancement, taking into consideration the impact of all activities and natural resources;
- Delivery of environmental goals without imposing disproportionate costs on industry or society as a whole;
- Clear and effective procedures for serving its customers, including the development of single points of contact with the Agency;
- High professional standards, using the best possible information and analytical methods;
- Organisation of its own activities to reflect good environmental and management practice, and provision of value for money for those who pay its charges, as well as for taxpayers as a whole;
- Provision of clear and readily available advice and information on its work;
- Development of a close and responsive relationship with the public, including Local Authorities, other representatives of local communities and regulated organisations.

This forward planning process was developed by the former NRA and Catchment Management Plans (CMPs) will continue under the Agency, to look at river catchments. CMPs initiated by the NRA, prior to 1st April 1996 will continue to be called CMPs, but all new Plans, where the Consultation Report is prepared by the Agency, will be known as Local Environment Agency Plans (LEAPs).

The principal aim of integrated environmental planning (CMPs/ LEAPs) involves the Environment Agency working with interested organisations and individuals in order to harmonise the many functional issues within a catchment.

The Agency will regulate the disposal of domestic and radioactive waste, industrial releases to air, and ensure that the water environment is protected and where possible improved, for the benefit of present and future generations.

Catchment Management Plans / Local Environment Agency Plans are leading Agency documents. They incorporate all other relevant planning initiatives within the geographical boundaries of each catchment, for instance other relevant Agency plans such as the Water Level Management Plans, Shoreline Management Plans and Estuary Management Plans, as well as plans external to the Agency such as the Structure and Local Plans.

The CMP Consultation Report for South Essex was published by the NRA in November 1995. This involved a pre-consultation meeting with an invited audience of representatives from key organisations within the catchment. The report was prepared in close consultation with internal functions and liaison with the Essex Catchment Panel. Future reviews to this Plan will be carried out annually.

In the context of Catchment Management Plans the long term is ten years, the medium term five years and the short term one or two years. The life of this plan is five years after which it will be reviewed. The identified actions will be subject to on-going monitoring.

The broad objective of catchment management planning is to conserve and enhance the environment through effective land and resource management. However, while the Agency is well placed to influence some of the factors affecting the environment, particularly in relation to the river corridor itself, it has very little control over the mechanisms which determine land use change over the catchment as a whole. This is largely the responsibility of Local Planning Authorities through the implementation of the *Town and Country Planning Acts*.

The policies in statutory development plans are important in this regard in that they set out the framework for land use change and provide the key reference in determining development applications. The Agency encourages the inclusion of policies which reflect its concerns and responsibilities.

As guidance for Local Authorities, the former NRA prepared a set of statements, summarised in *Guidance Notes for Local Planning Authorities on the Methods of Protecting the Water Environment through Development Plans*. This Action Plan sets out issues and actions which have been agreed within the framework of these Guidance Notes.

MANAGEMENT AND CONTACTS:

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.

Head Office is responsible for overall policy and relationships with national bodies including government.

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AGENCY**