EAST HAMPSHIRE CATCHMENT MANAGEMENT PLAN CONSULTATION REPORT

NRA

National Rivers Authority
Southern Region

MISSION STATEMENT

The NRA's mission is :

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

Our Aims are to :

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

Published May 1995

East Hampshire Rivers Catchment Management Plan
Consultation Report

CONTENTS

WHAT IS CATCHMENT MANAGEMENT PLANNING?

The Water Act 1989 established the National Rivers Authority (NRA) as the "Guardian of the Water Environment", a non-departmental government organisation with responsibility for regulating and managing water quality in coastal and inland waters, flood defence, salmon and freshwater fisheries, water recreation and, in some areas, navigation. An additional duty laid on the NRA was to further conservation of the natural environment, seeking opportunities for enhancement wherever possible.

NRA Regions are defined by river basins catchments - singly, as in the Thames Region (which is divided into sub-catchments), or in geographical groups of individual rivers. With the exception of sea defence and coastal water pollution control, all the NRA's functions are managed within this catchment framework, the need to resolve conflicts arising from differing functional objectives makes it essential to integrate the NRA's planning in the same way.

Catchment Management Plans relate firstly to the Authority's own operations, including that of a statutory regulator controlling the actions of others. However, the Plans also offer an opportunity for input from the public to the development of NRA policy, and for the Authority itself to draw attention to its aspirations for the improvement of the water environment.

The Plans concentrate on topics where the Authority has a direct interest and are focused mainly on the river corridor, although some functions such as water resource management and pollution control inevitably extend over the whole catchment area. Whilst they lack the status of statutory planning documents, it is hoped that Catchment Plans will make a positive input to the Town and Country planning process.

The NRA consults widely with interested organisations and the general public before definitive Catchment Management Plans are published. This Consultation Report is the first stage of the process and will be followed by a Final Report and Action Plan. The NRA will review Catchment Management Plans annually and they will normally be revised at five year intervals.

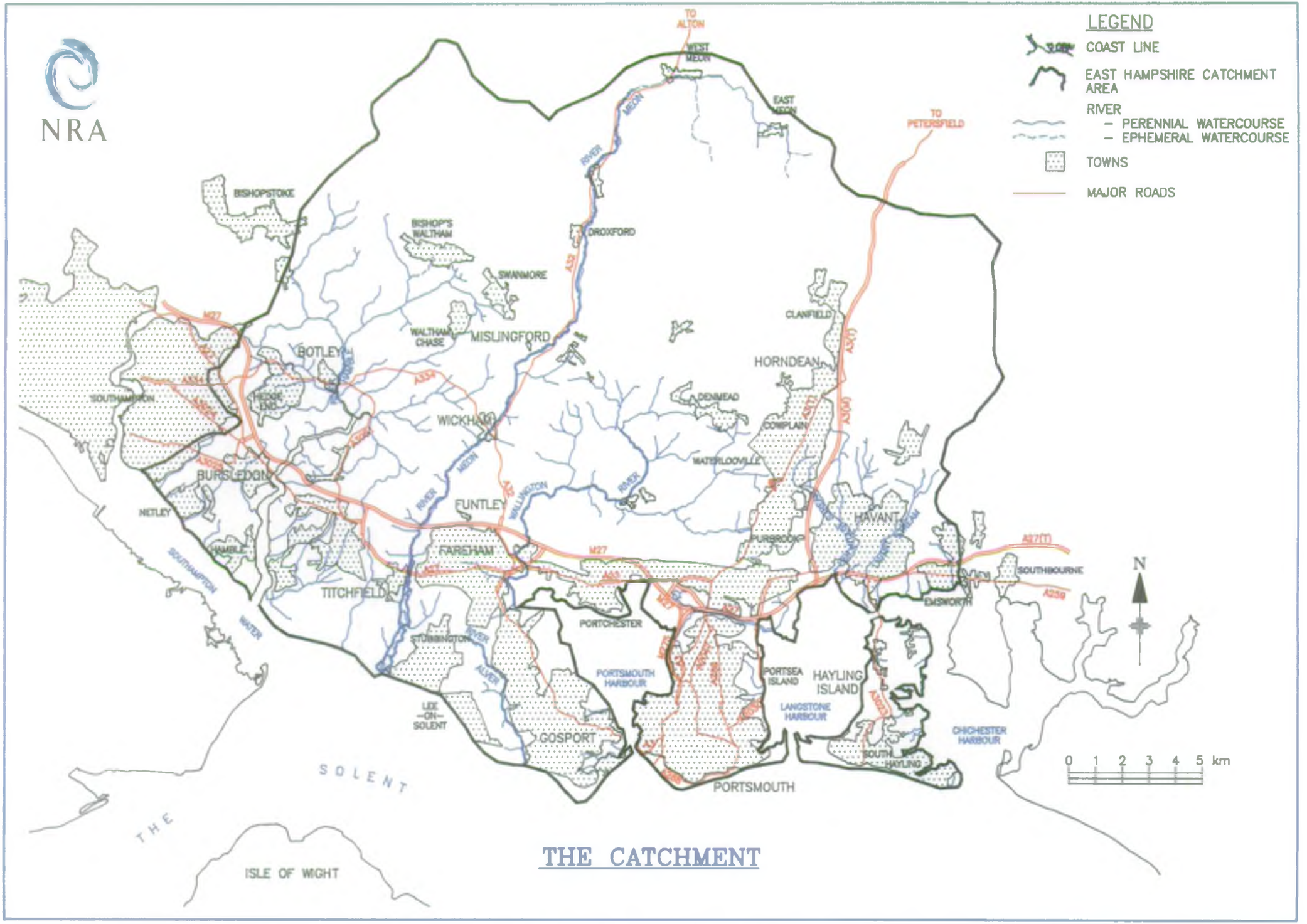
If you have any comments on this Consultation Report, please write to

The Catchment Planning Co-ordinator
Guildbourne House
Chatsworth Rd
Worthing
West Sussex
BN11 1LD

THE CONSULTATION PERIOD CLOSES ON 30th September 1995

SECTION A :

GENERAL INFORMATION



THE CATCHMENT

SECTION A : GENERAL INFORMATION

A1. THE EAST HAMPSHIRE RIVERS CATCHMENT

The catchment lies in the Hampshire Basin which covers the southern part of Hampshire and extends into the coastal plain of West Sussex. During the last Ice Age, when sea levels were considerably lower, the East Hampshire streams were tributaries of the Solent River which flowed eastwards from the Dorset Frome to join the sea near Littlehampton. This system was inundated by rising sea levels during the Pleistocene Period, forming the broad straits of The Solent and Southampton Water and the coastal lagoons of Portsmouth, Langstone and Chichester Harbours.

The resident population of the catchment is approximately 600,000, the main towns being Portsmouth, Havant, Fareham, South Hayling, Gosport and Horndean. The City of Portsmouth stands on Portsea Island, much of which is below high tide level; to the east lies Hayling Island which is similar, but with less urban development. Industry is concentrated in the urban coastal strip, especially around Portsmouth Harbour and its naval base. Away from the coast the area is predominantly rural with arable and mixed farming. Watercress is grown in the Chalk valley of the R Meon.

The catchment is dominated by two watercourses in the west, the Rivers Hamble and Meon. The River Hamble, with a total catchment area of 160km^2 rises from springs at the Chalk/Tertiary boundary, flowing to the head of tide at Botley and hence, via the long Hamble Estuary, to Southampton Water. The upper catchment, around 40km^2 in area comprises dry valleys and winterbournes, perennial streams are not supported until the ground level falls to intercept the water table. Most of the catchment is rural with extensive horticulture in the coastal belt, but some 16km^2 is occupied by the urban agglomeration of Warsash, Swanwick, Bursledon, Hamble, Hedge End and Botley. The principal tributaries of the River Hamble are the Ford Lake, Pudbrook Lake, Curbridge Stream and Hungerford Stream.

The River Meon, with a catchment area of approximately 100km^2 rises from springs 2km south of East Meon. After flowing north-west through the village of West Meon the river turns south towards the sea, passing through Droxford, Soberton, Wickham and Titchfield. The Meon is one of the noted Hampshire Chalk streams, its upper reaches have no significant tributaries but south of Mislingford the river passes from the Chalk to the less-permeable Tertiary sands, silts and clays where the surface drainage pattern is better developed. The outfall to the sea at Hillhead is controlled by a tidal flap creating Titchfield Haven as a shallow, slightly brackish lagoon with extensive reedbeds, managed as a nature reserve.

The River Wallington rises on the Tertiary beds north of Portsdown before flowing across the Chalk and into Fareham Creek. The headwaters drain the expanding towns of Waterlooville, Denmead and Purbrook, but the greater part of the catchment of 122km^2 is rural.

The Hermitage Stream has a small, mainly urban, catchment on Tertiary clays and silts. It is prone to flash flows following heavy rainfall and receives water from the neighbouring Havant catchment at times of flood.

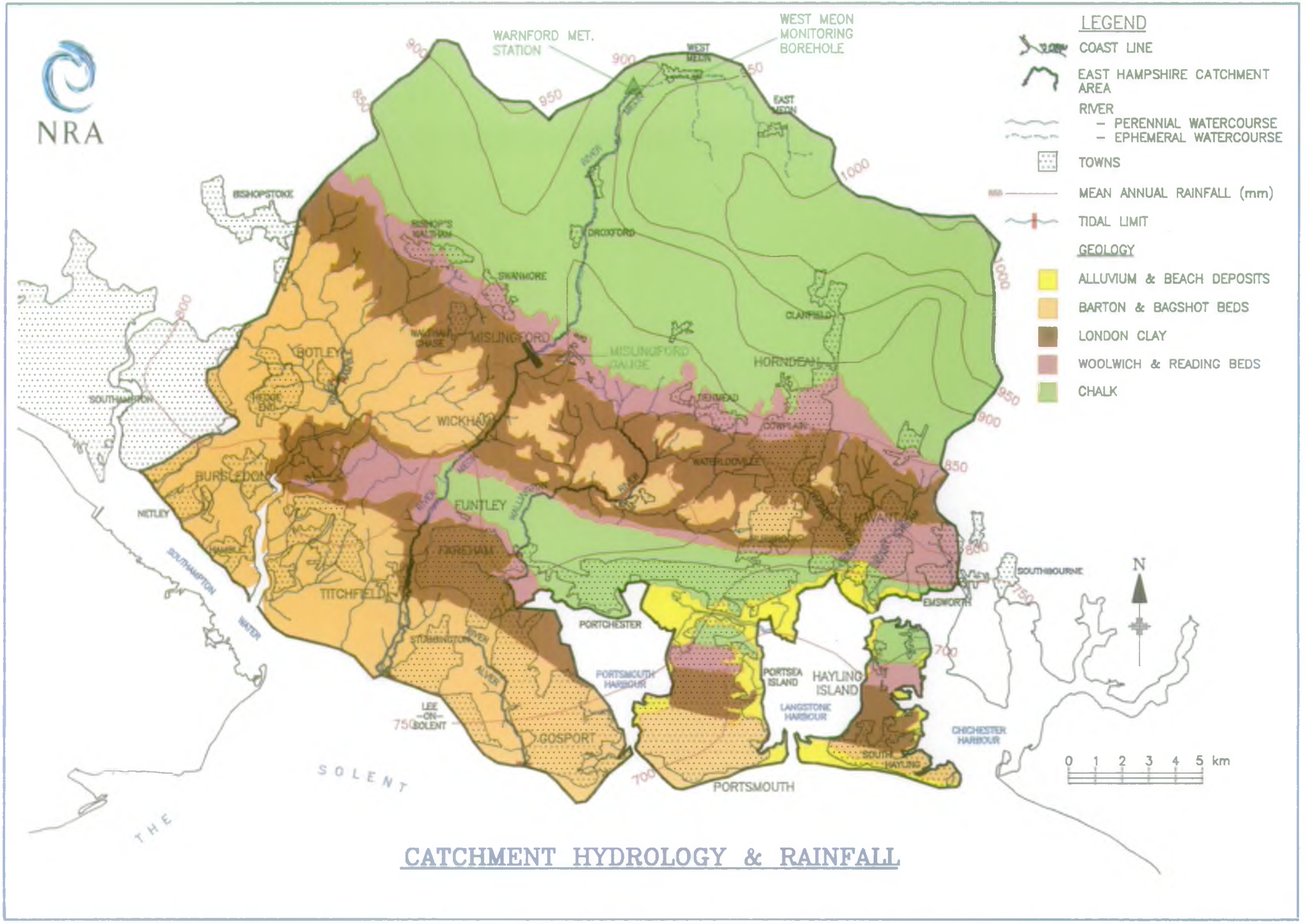
Other smaller watercourses include the River Alver on the Gosport peninsula, the Warblington streams draining into the north-west corner of Chichester Harbour, the Black Brook in the Borough of Fareham and the small Hook Lake stream.

The main water resource of the catchment is Chalk groundwater, with the aquifer being divided into discrete "Blocks" by the river valleys. The Hamble, Meon and Wallington provide a small surface water resource, mainly for agricultural uses, but abstraction from the Chalk reduces the availability of surface water in the summer months. The NRA operates a presumption against licensing new consumptive abstractions from the Chalk or increasing overall abstraction and is currently reviewing the situation.

The catchment has significant nature conservation interest; Portsmouth and Langstone Harbours and their associated grazing marshes are designated under the RAMSAR Convention as internationally important sites for wildfowl and there are nature reserves at Titchfield Haven, Farlington Marshes and at Hook Park adjacent to the mouth of the Hamble. The area has many scheduled ancient monuments including the Roman Porchester Castle (with Norman additions), Southsea Castle, the fortifications of Portsmouth, Gosport and Portsdown and much of the Royal Dockyard. Substantial use is made of coastal waters, Portsmouth and Langstone Harbours for recreational watersports. There are seven European Union Designated bathing waters within the catchment; dinghy sailing, canoeing and sailboarding are highly popular.

The River Meon supports a flourishing trout fishery and attracts a run of sea trout which also enter the Hamble estuary, but their passage into the freshwater reaches of this river is impeded by obstructions at the tidal limit. The NRA has built fish passes on the River Meon at Funtley, Wickham and Titchfield Mill. Ponds, ornamental lakes and defensive moats provide popular coarse fisheries. There are important shellfisheries in the Harbours and offshore.

A2. HYDROLOGY AND RAINFALL



CATCHMENT HYDROLOGY & RAINFALL

A2. HYDROLOGY AND RAINFALL

A2.1 General

This section considers the natural water resources of the catchment, the use of these resources for water supply is reviewed in Sections B1, B2 and B3.

A proportion of rainfall is lost through direct evaporation and transpiration from trees and other plants. The remainder, the effective rainfall, represents the total water resource available to the catchment and may appear as surface run-off to streams or as groundwater recharge.

The allocation of rainfall between surface and groundwater is largely dependent on geology and soils - low permeability clay and silt results in high run-off to a strongly developed surface drainage system whereas porous Chalk and sandstone allow a higher proportion of recharge to groundwater. In the latter case the surface drainage system is less well developed and a large part of river flow may be derived from groundwater as springs or as upflow through the river bed.

Surface flows in clay catchments respond rapidly to rainfall and drought, leading to considerable seasonal variations. The low-flow yield of such "flashy" catchments can be enhanced by reservoir storage of water abstracted during periods of high flow.

Aquifers provide natural water storage for a catchment, groundwater systems react to rainfall much more slowly than surface waters and generally provide a more reliable resource during drought periods although recovery from drought may also take longer.

A2.2 Local Perspective

The geology in this area is folded along east-west trending axes, with the Chalk dipping below Tertiary strata and emerging to the south as the Portsdown Anticline. The Chalk is extremely permeable, most rainfall either evaporates or percolates into the groundwater system and aquifer storage gives rivers a stable flow regime which peaks in Spring, when groundwater levels are high, and recedes to a minimum in late Autumn. Spring fed rivers respond slowly to rainfall and the maximum flow in any year is only four or five times the minimum. These features are illustrated in the hydrograph presented for Mislingford on the River Meon.

The main hydrological feature of the catchment is the Hampshire Chalk block, which outcrops across its northern half. Many streams rise as springs at the southern margin of the Chalk where it is overlain by Tertiary sands and clays. The springs at Bedhampton, at the eastern end of the anticline, are among the largest in Europe and are heavily used for public water supply, representing a valuable public asset. Swallow-holes in the Chalk in the East Horndean area are in direct connection with the springs and need to be protected against contamination.

The River Meon rises from springs on the northern side of the Downs and cuts through the Chalk block, but when the groundwater level falls below the river bed there is a danger that flows will be lost to the underlying Chalk, as happens upstream of Warnford where the river dries completely in some years. Both the Meon and, to a more severe extent the Hamble, are vulnerable to low flows associated with groundwater abstraction for public supply and are the subject of continuing remedial work by NRA.

Groundwater levels vary widely from year to year, as is illustrated by the record from West Meon in the upper Meon Catchment. This shows a long-term minimum level in late 1989 (following a dry winter in 1988) and the rapid response to near maximum early in 1990, resulting from high rainfall in the winter of 1989/90. In contrast, the less permeable Tertiary strata respond rapidly to rainfall and support a surface drainage pattern which is relatively well developed.

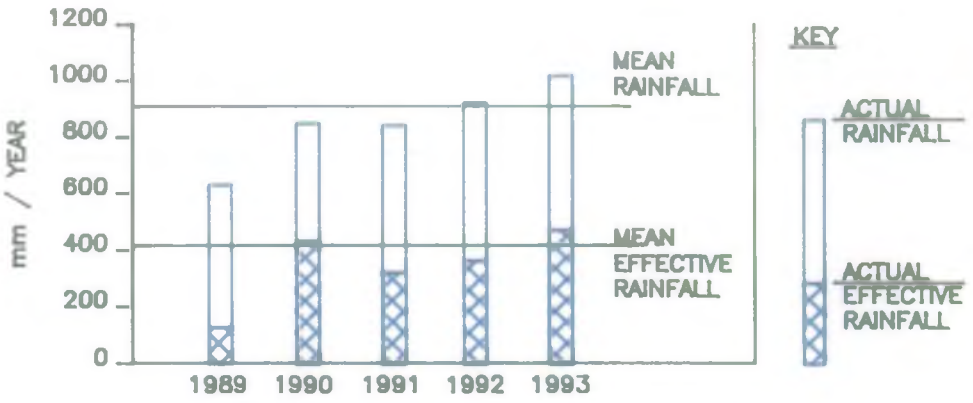
The southern part of the catchment shows many features of a drowned coastline caused by sea water ingression and local subsidence which formed the Hamble Estuary, the Solent and the distinctive Portsmouth, Langstone and Chichester Harbours.

A2.3 Meteorological Considerations

The mean annual rainfall of the catchment is approximately 900 mm, varying from over 1000 mm on the Hampshire Downs to less than 700 mm at the coast.

When evaporation losses and the needs of plants are taken into account the mean effective rainfall is around 400 mm.

For each year from 1989 to 1992 the actual effective rainfall was at or below the mean and this was reflected in lower than average groundwater levels and stream flows. The winter of 1991/92 was particularly dry and the groundwater recession continued for two to three months longer than usual leading to very low summer stream flows. Following the winter of 1992-93 groundwater levels had fully recovered and the stream flow recorded at Mislingford in 1993 was near average for the period of record.

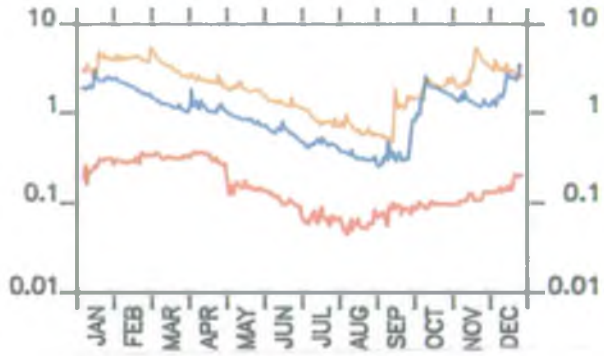


NRA

Annual Rainfall Record from Warnford Rainfall Station at SU627235
Actual Evapotranspiration Data from MORECS Database (Sq 182)

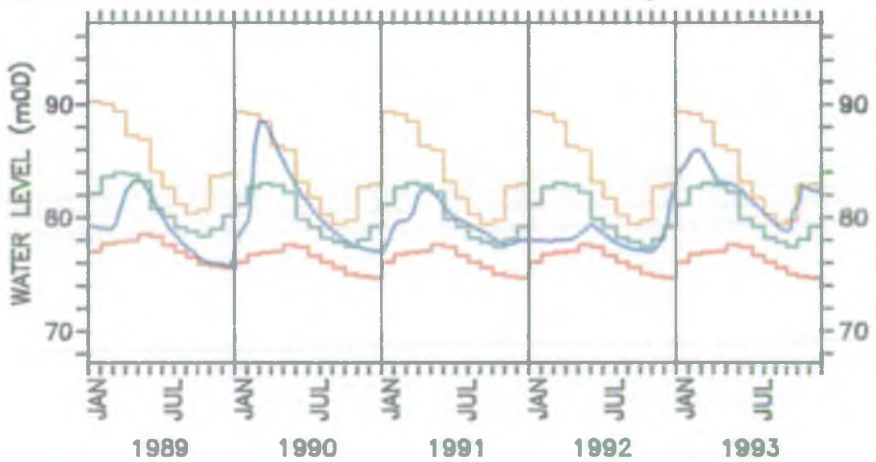
DAILY FLOW HYDROGRAPH (m^3s^{-1})

Max. and min. daily mean flows from 1964 to 1992 with an example yearly hydrograph (1993)



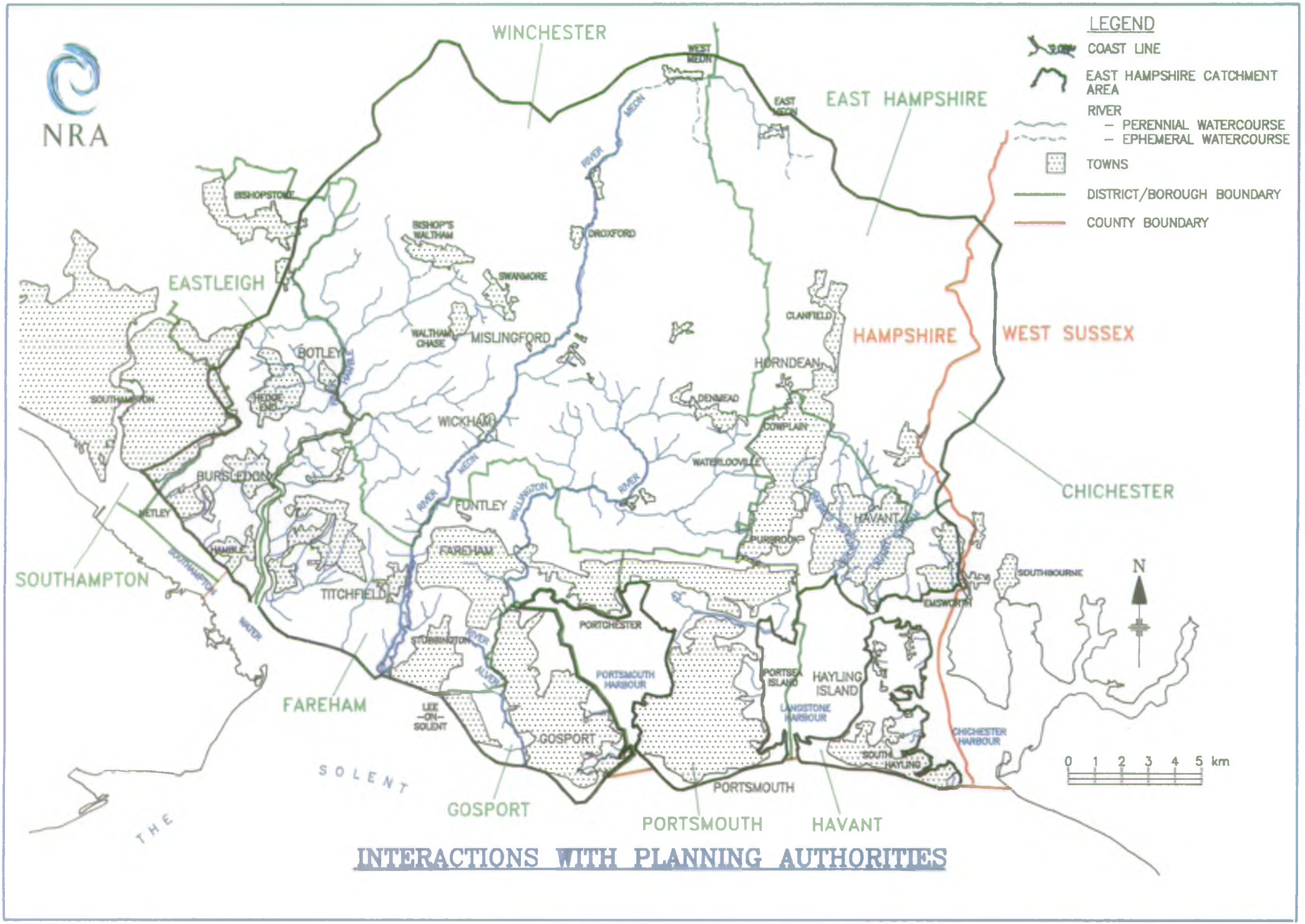
MEON AT MISLINGFORD

Site name : WEST MEON A32
National grid reference : SU 6510 2650
Aquifer : CHALK
Well number : 142201739
Measuring level : 119.19mAOD



Actual groundwater levels 1989–1993. This can be compared to long term Max, Min and Mean values calculated from years 1958 to 1992.

HYDROMETRIC DATA



INTERACTIONS WITH PLANNING AUTHORITIES

A3 FUTURE DEVELOPMENT

A3.1.1 General

The NRA is consulted regularly on planning matters falling within its terms of reference, both by Local Authorities preparing statutory plans and in connection with individual applications for planning consent. Recent guidance from the Department of the Environment has strengthened links with the NRA, but ultimate planning control remains with the Planning Authorities. Catchment Management Plans are complementary to the statutory Plans, by stating clearly the NRA's vision it is hoped that they will make a positive input to the formal planning process.

In taking decisions on development proposals, planning authorities are required to have regard to relevant Development Plans, the legislation specifically states that "...decisions are to be in accordance with the Plan, unless material considerations indicate otherwise". The framework required to meet this obligation in non-metropolitan areas entails the preparation of the following Plans:-

1. County Structure Plan.
This provides the broad strategic planning framework and should ensure that the provision for development is realistic and consistent with national and regional policy.

2. District or Local Plan.
This plan sets out detailed policies and specific proposals for the development and use of land, it should be in general conformity with the Structure Plan.

3. Minerals Local Plan.
The exploitation of minerals can impact upon a catchment in a number of ways, having significant effects on the river corridor and flood plain. Finished mineral workings can provide important conservation or amenity sites, but can also be a further cause of concern if they are used for solid waste disposal. The Minerals Locals Plan should cover these points in some detail, indicating areas where provision is made for mineral workings and the disposal of mineral wastes, as well as those where mineral resources are to be safeguarded for future working. The Plan should set out development control criteria and requirements for the restoration and aftercare of such sites.

4. Waste Local Plan.
Waste Regulation Authorities are required to licence disposal sites and ensure that they do not endanger public health, cause water pollution or seriously detract from local amenity. Operators must restore filled sites in accordance with the licence conditions and acquire a Certificate of Completion from the Waste Regulation Authority before being exonerated from legal responsibility for a site.

A Waste Disposal Authority may include its policies in the Minerals Local Plan, or prepare a separate Waste Local Plan which identifies suitable locations for the provision of further facilities and examines the land use implications of waste disposal.

Within the development plans outlined above provision should be made for the needs of the National Rivers Authority and of the utility companies responsible for water supply, sewerage, electricity, gas and telecommunications. Local Authorities are required to consult a number of bodies, including the NRA, to resolve non-contentious points and minimise objections before a Plan is put on deposit.

Government policy for the future is to transfer the waste regulation duties of County Councils in England and Wales to an Environment Agency, which will also be responsible for the functions of the present National Rivers Authority and Her Majesty's Inspectorate of Pollution.

A3.1.2 The NRA Groundwater Protection Policy

One of the main concerns of the NRA is the protection of groundwater, as explained in the document "Policy and Practice for the Protection of Groundwater" (NRA, 1992), which reviews all potential impacts (eg. contaminated land, diffuse pollution and the physical disturbance of aquifers and groundwater flow). Application of the policy depends on the circumstances of each case, but the document gives guidance based on the following key points:-

1) The measures needed to protect groundwater depend on the following factors:

- Nature of the soil cover: high, intermediate or low leaching potential (high leaching potential soils are further sub-divided according to the physical processes controlling water movement through them).
- Presence and nature of any drift cover.
- Properties of the bed-rock as a major, minor or non-aquifer.
- Depth to the water table

2) The policy defines three zones of protection around each groundwater supply source:-

Zone One	Within the 50 day groundwater travel-time horizon to the supply source.
Zone Two	Between 50 and 400 days groundwater travel-time to the supply source.
Zone Three	Within the source catchment area but more than 400 days groundwater travel-time to the supply source.

A3.2 Local Perspective

A3.2.1 Housing and Employment

Over 95% of the catchment lies in the jurisdiction of Hampshire County Council with the remainder in West Sussex. Within Hampshire, strategic Planning is provided by the Hampshire Structure Plan which lays down guidelines for development to the year 2001. This was approved by the Secretary of State for the Environment in December 1993, replacing the North East, Mid, South and South West Hampshire Structure Plans which were repealed with effect from 31 January 1994.

Hampshire has experienced net inward migration throughout the 1970s and 1980s, primarily from south east England. During this time planning policies have sought to protect mid and south west Hampshire from major development, while north east Hampshire and southern Hampshire were the focus for sustained high growth. The most recent Plan provides for slower growth in Hampshire with a net total of 66,700 additional dwellings for the period 1991 to 2001, a figure consistent with the Government's Regional Planning Guidance. As the Plan refers to net growth, the County Council monitors demolitions

as part of its housing land supply studies.

Development in Hampshire between 1991 and 2001. There are no Districts where stock will meet need and projections indicate a need for additional dwellings beyond 2001. Table A3.1 shows the distribution between Districts.

Industrial development and economic expansion is monitored both through development control at District level and as a guide to the strategic allocation of new employment. Additional development land may be made available when monitoring identifies particular needs.

Table A3.1 Projected Requirements for Additional Dwellings in Hampshire

District	1991-2001	2001-2011
Basingstoke and Deane	8,700	7,013
East Hampshire	4,600	3,089
Eastleigh	5,000	4,471
Fareham	5,000	2,308
Gosport	3,000	2,390
Hart	4,100	3,085
Havant	2,600	3,161
New Forest	7,000	1,996
Portsmouth	6,200	5,324
Rushmoor	3,000	3,697
Southampton	6,500	6,902
Test Valley	6,500	3,818
Winchester	4,500	1,390
Total	66,700	48,644

NB These figures cover the whole of the county of Hampshire and for many of the Districts (eg Basingstoke and Deane) the entire housing allocation will be developed outside the catchment area.

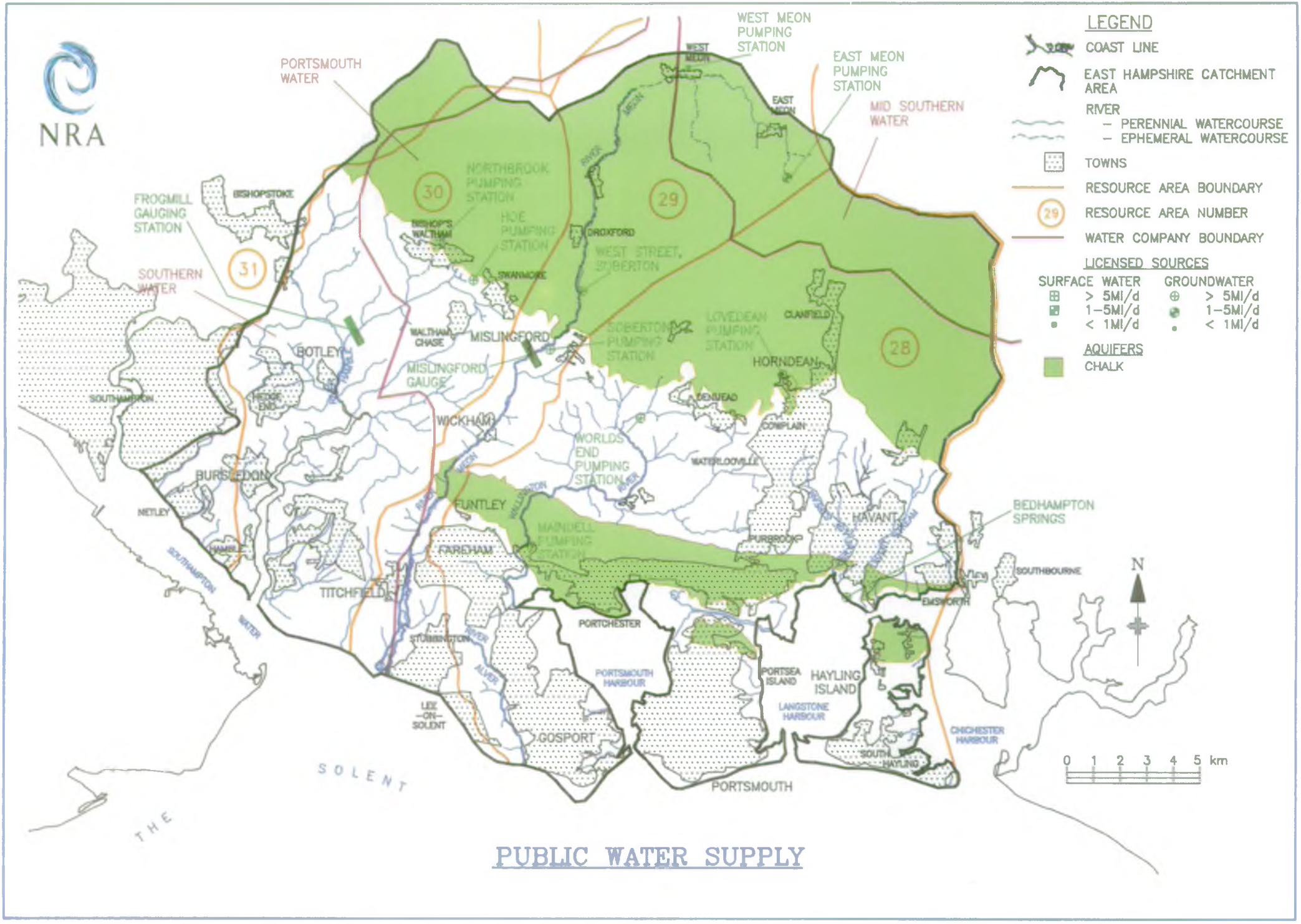
A3.2.2 Minerals and Waste Disposal

The Hampshire Minerals and Waste Local Plan currently exists as the deposit version of November 1993 which is scheduled for formal public enquiry procedures which commenced in January 1995, and will replace the Hampshire Minerals Local Plan (1987). The county has extensive deposits of valuable minerals, although many are in sensitive areas with high conservation, landscape and amenity value. Sand and gravel aggregates have been extracted at the rate of 3.0 million tonnes a year in recent years, Chalk is worked for agricultural lime, for use by industry and as an aggregate, and clay is used for brick making and to line landfill sites.

Hampshire currently produces about 2.6 million tonnes of waste a year, 1.5 million tonnes of which is from demolition and road construction. At present only about 5% of this is recycled, although the proportion could be much higher, and 90% is dumped as landfill or incinerated. The best sites for waste handling, treatment and disposal are often in sensitive locations, so it is essential to provide a clear planning framework for decisions and to identify suitable sites for these activities.

The County Council's general planning policy for minerals and wastes is set out in the Structure Plan submitted in 1991, particularly the General Policy statements, "Future planing in Hampshire will be committed to development which conserves and sustains resources of land and energy" and, "...waste disposal by land raising and gravel extraction which results in large areas of water in the County's important river valleys should be prevented".

SECTION B : USES



PUBLIC WATER SUPPLY

SECTION B: USES

B1. PUBLIC WATER SUPPLY

B1.1 General

This section considers the provision of public water supplies (PWS) from both surface and groundwaters. Abstractions are controlled by licences from the NRA, which stipulate maximum allowable annual and daily volumes. The mean licensed abstraction is the average daily abstraction allowable under the annual licence. Private groundwater supplies for domestic use are also included here, although these are generally very small and not significant from the resources standpoint.

Water supply sources in use before 1963 were granted Licences of Right under the Water Resources Act (1963). Since then, new sources have been licensed on the basis that abstraction neither adversely affects existing sources nor impairs the natural environment. Licences issued after 1963 may carry conditions such as Prescribed Flows or water levels, requiring abstraction to cease once the river falls below the prescribed value. In practice, the NRA increases the Prescribed Flows (PFs) controlling new abstractions in steps as more licences are granted, so as to protect both the Minimal Residual Flow (MRF) of the river and the rights of existing licence holders (MRFs are set to protect flows for other uses). PFs are set to control abstractions but do not control river flows.

Compensation flows may also be included in licence conditions, requiring the release of water from groundwater or reservoir sources to augment low river flows.

At times of extreme water shortage Water Companies may apply to the DoE for a Drought Order to relax abstraction licence conditions or the level of service they provide to their customers. This may allow, for example, the temporary reduction of Prescribed Flows, an increased abstraction rate, reduction in mains pressure or even periodic closure of the supply. The terms of a Drought Order usually require the Water Company to introduce demand reduction measures, such as hose-pipe bans, at the same time.

B1.2 Local Perspective

The East Hampshire catchment comprises Resource Areas 30 (Hamble), 29 (Meon) and 28 (Wallington). There are no surface water abstractions or supply reservoirs operated for public water supply and all the public water resource development within the catchment is from the chalk aquifer. However, this is supplemented by the import of surface water abstracted from the lower reaches of the River Itchen at Gaters Mill.

Much of the area is supplied by Portsmouth Water Plc which operates most of the PWS boreholes within the catchment. Some such as Soberton and Worlds End are located adjacent to a river from which they indirectly draw a substantial part of their yield, with the aquifer acting as a natural filtration system. Many such abstractions operate under licences of right with no restrictions, although use of the Soberton borehole is subject to a minimum residual flow setting on the River Meon at Mislingford.

The total licensed abstraction from the catchment is 78690 Ml/yr (an average of 279 Ml/d) although the actual abstraction in 1993 was less than half of this, a reflection of the wet season and of over-licensing of some sources. A summary of public water supply licences is given in Table B1.1

In recent years there has been public concern over flows in the Meon and Hamble, both these rivers are included in the NRA's priority list of forty rivers in need of action to alleviate low flows. The Authority has completed a hydrological study of these catchments and is currently investigating groundwater resources in the lower Hamble valley with a long-term plan of relocating the more sensitive public water supply sources. In the meantime, the regional policy of presumption against granting new licences for consumptive abstraction from the Chalk will continue.

B1.2.1 Surface Water Sources

There are no public water supply reservoirs or major surface water abstractions in catchment.

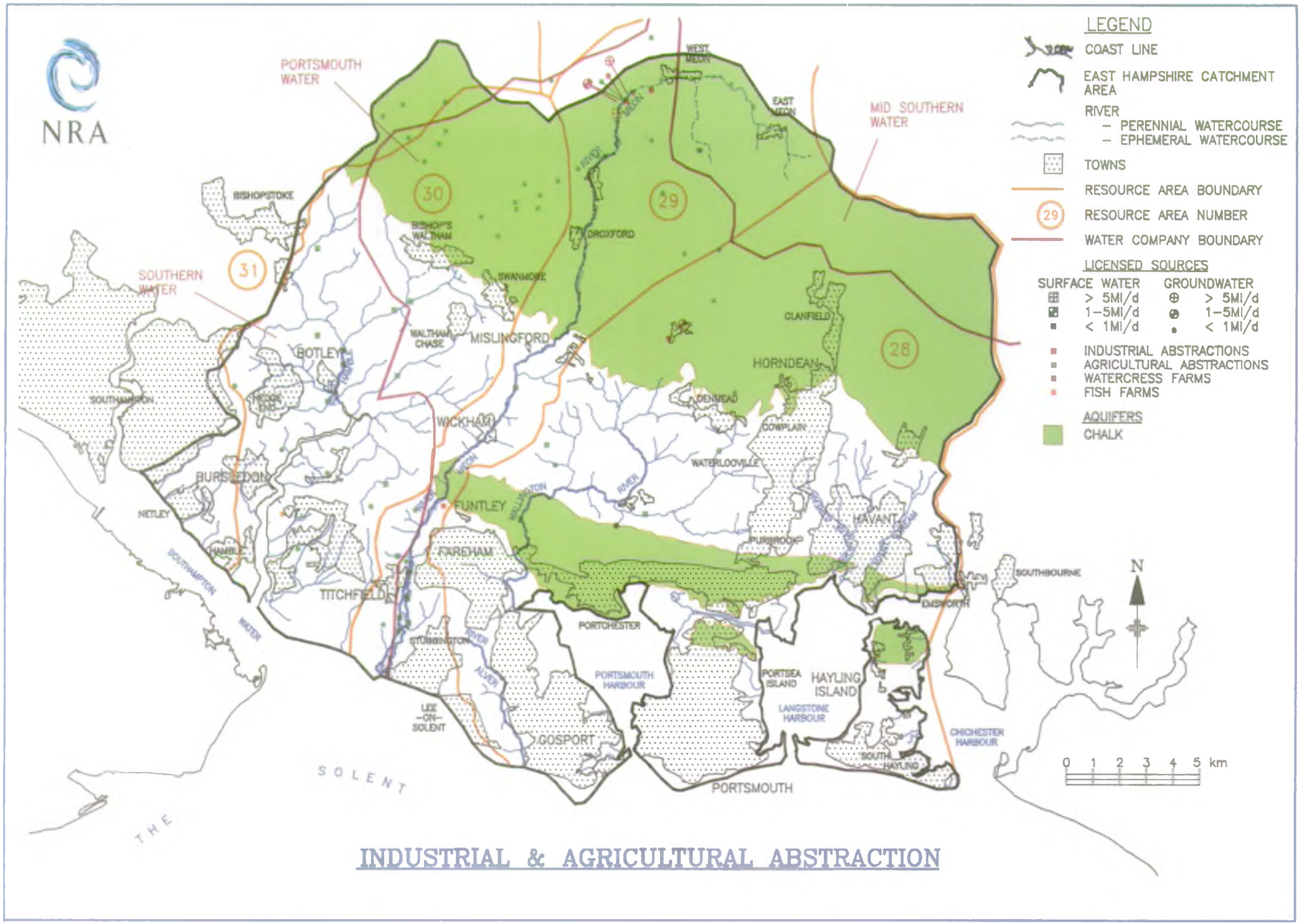
B1.2.2 Groundwater Sources

Groundwater abstraction accounts for over 95% of water supplied to the public in the catchment, the remainder being imported from elsewhere (notably the Itchen catchment). Sources are predominantly from the Chalk with some smaller abstractions from the Tertiary beds and Bedhampton Springs in the Hermitage Stream catchment.

Table B1.1 Mean Licensed and Actual Abstraction for Public Water Supply

Location	Type	Conditions (if any)	Abstraction (Ml/day)
Meon Catchment:			
East Meon	Groundwater		1.13
West Meon	Groundwater		0.45
West Street	Groundwater		9.12
Soberton	Groundwater	Minimum Residual Flow of 0.34 cu.m/s at Mislingford, whereby daily abstraction rate can be increased to 13636 cu.m/d for 15 consecutive days. If any protected right within 1.5km is adversely effected, the company will compensate those effected accordingly.	15.9
Hamble Catchment:			
Hoe	Groundwater		10.91
Northbrook	Groundwater		20.51
Wallington Catchment:			
Lovedean	Groundwater		11.36
Maindell	Groundwater		6.83
World's End	Groundwater		22.73
Total Licensed Annual Abstraction (Groundwater)			98.94
Actual Annual Abstraction 1993 (Groundwater)			39.47

B2. WATER SUPPLY FOR INDUSTRY AND AGRICULTURE



INDUSTRIAL & AGRICULTURAL ABSTRACTION

B2. WATER SUPPLY FOR INDUSTRY AND AGRICULTURE

B2.1 General

This section considers the availability of water for industry and agriculture. Industrial uses include power generation, milling, process water, cooling water and water for gravel washing. Agricultural uses include spray irrigation and general agricultural use.

B2.2 Local Perspective

Historically, the upper and middle reaches of the River Meon provided water power for iron working, wool processing, paper making, tanning, flour and grist milling, and for the generation of electricity. The Iron Mill, north of Titchfield, was an early pig-iron manufacturer supplying Portsmouth Dockyard, and used water power to drive a drop hammer. Currently there are only three industrial abstractions in the catchment, all of which are for less than 0.1 Ml/d. The most significant industry is associated with the naval base at Portsmouth and is centred around the naval dockyards.

Sluices built to harness water power or to improve navigation were also used for the irrigation of water meadows, and although these are defunct many of the structures remain. Agriculture in the catchment is mixed dairying and arable, with some market gardening around the coastal urban centres. Over fifty small agricultural abstractions take water for spray irrigation and other more general uses. Four watercress farms and five fish farms are licensed to abstract significant volumes of water, most of which is returned directly rivers.

B2.3 General Requirements for the Supply of Water to Industry etc

- Abstraction should not cause environmental damage. New agricultural licences may specify prescribed MRFs, winter abstraction and storage of water for summer use.

- Water quality guidelines for agricultural irrigation have been published by ADAS, the agricultural advisory service of MAFF.

- ADAS Central Veterinary Laboratory has published guidelines for the quality of water to be used by livestock.

- The Food and Agricultural Organisation of the United Nations (FAO) classifies water with moderate salinity (0.7 - 3.0ds/m) or chloride concentrations (140 - 350mg/l Cl-) as having restricted use for irrigation. NRA guidelines recommend that irrigation water should contain no more than 100mg/l to 500mg/l Cl- depending on the tolerance of the crop.

Table B2.1 Mean Licensed and Actual Abstractions for Water Supply for Industry and Agriculture

Use	Mean Licensed Abstraction (Ml/day)		Mean Actual Abstraction 1993 (Ml/day)	
	Surface	Groundwater	Surface	Groundwater
Agriculture	11.7	19.4	9.74	15.1
Industrial	0.0	0.5	0.0	0.4
Total	11.7	19.9	9.74	15.5

B.3 USE OF THE WATER RESOURCE

B3.1 General

This section compares the overall use of water within the catchment with the available resource. The catchment is divided into resource areas defined on the basis of size and common characteristics and used for water resources assessment purposes. The available water resource for each area is defined as its annual effective rainfall and any inflow from an upstream resource area, and may be available as surface water or groundwater. Mean-year and 1:10 year drought annual resource figures have been assessed for the catchment. These are compared with the total annual licensed abstraction and the estimated actual abstraction for a typical year (1993).

In some cases abstracted water is returned directly to the river with minimal losses (eg cooling waters, fish farms and gravel washing). Some of the water abstracted to supply customers within a catchment may be returned to the river via effluent discharges, and this can make a significant contribution to the maintenance of river flows.

The difference in volume between the water abstracted from a catchment and that returned constitutes the "consumptive use". The theoretical figure has been assessed for each resource area by subtracting the total consented discharge from the total licensed abstraction. Actual consumptive use has been assessed using actual abstraction and discharge data for a typical year, in this case 1993.

B3.2 Local Perspective

The East Hampshire catchment comprises three resource areas; Wallington, which incorporates Bedhampton Springs: Meon, and Hamble. It should be noted that resource areas include groundwater catchments whose boundaries may differ from those of surface catchments.

The Meon and Hamble resource areas correspond reasonably closely with the surface catchment of these rivers. However, the Wallington resource area includes a large segment of the Chalk block which lacks a surface drainage system. Some of the recharge to this area provides spring flows at the southern margin of the Chalk outcrop, but much of it travels beneath the Tertiary sands and clays overlying the Chalk to emerge as springs at Bedhampton. It is unclear whether or not the defined Resource Area provides a true picture of the hydrology of the system.

The total mean resource available to the East Hampshire catchment area has been assessed at 582 Ml/day, around half of which is in the Wallington resource area. In a 1 in 10 year drought the total resource reduces by 40% to 355 Ml/day. The Wallington is the most heavily committed in terms of the demand for water. In years of average rainfall the recharge is totally taken up by licensed abstraction. In the drought conditions of 1975-76 168% of the available recharge was committed to licensed abstractions.

In common with other resource areas in the catchment there is a very low return of effluent to rivers or groundwater, by far the greater part of abstracted water being used consumptively or discharged to tidal waters.

Around 25% of the mean resource (40% of the drought resource) of the Hamble area is licensed for abstraction, nearly all for public water supply. In 1993 the actual abstraction was only around half of this licensed total.

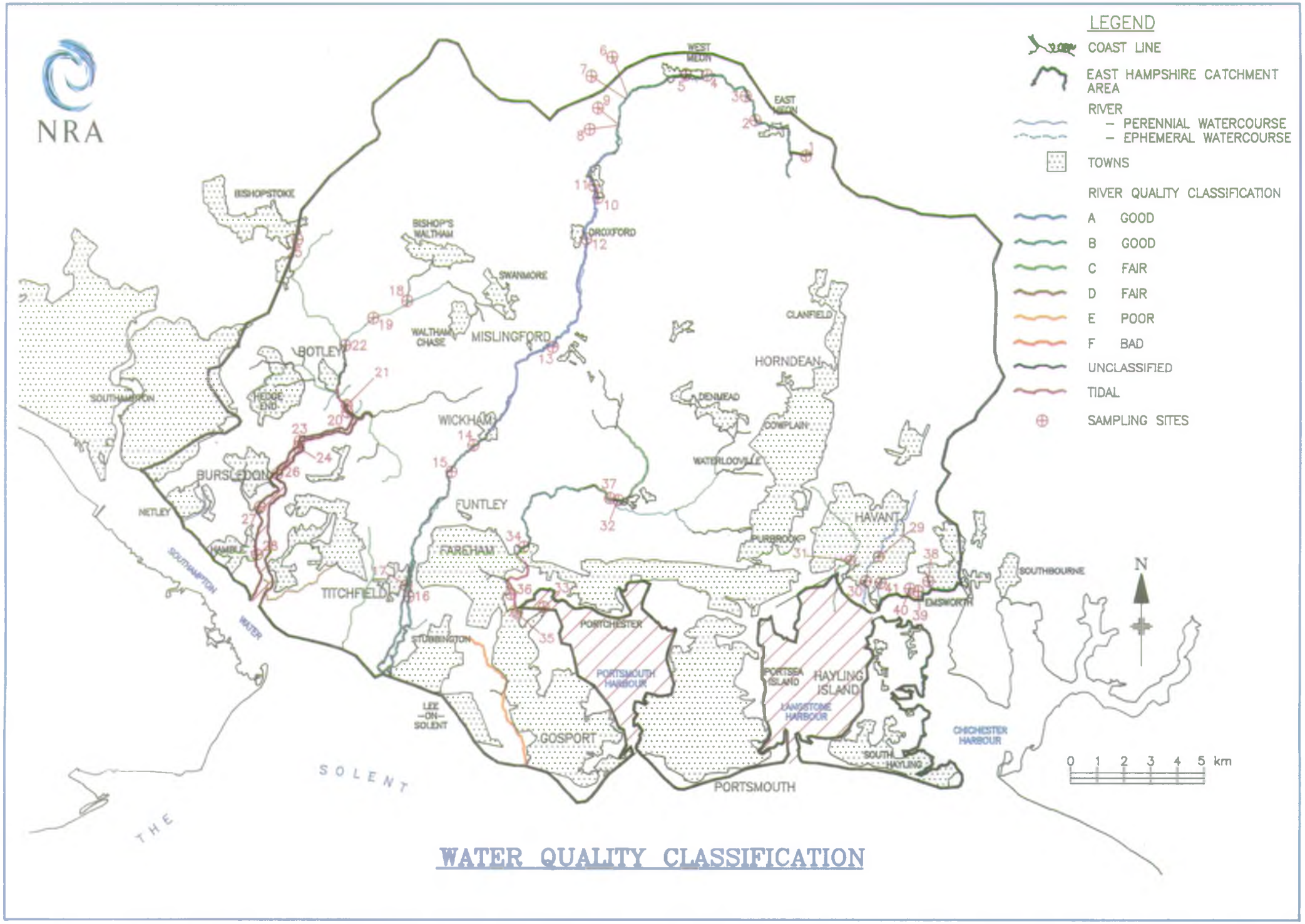
Licensed abstraction in the Meon catchment amounts to around 35% of the mean resource (55% of the drought resource). The licensed demand is equally divided between public water supply and abstractions for industry and agriculture. Actual abstraction in 1993 was only 40% of the licensed total for public supply, whereas industrial and agricultural abstractions were close to the licensed maximum.

In summary, the entire water resource of the Wallington catchment, around one quarter of the mean resource of the Hamble and one third of the Meon are committed for public water supply, with only minimal return of effluent to the catchment. In both cases the actual abstraction for public supply in 1993 was only around half the licensed total, which may be in part due to sources being licensed (under licences of right) for greater volumes than the aquifer can provide, and to the return of normal weather conditions to Southern England. Private abstractions for industry and agriculture constitute a significant demand on the resources of the Meon catchment.

B3.3 General Objectives for Water Resource Management

- To maintain and develop the hydrometric monitoring network.
- To ensure that future resource developments do not damage the river flow regime or ecology of the catchment.
- Where possible, to secure measures for the benefit of the catchment within new licence agreements.
- To encourage water consumers to adopt water saving measures.
- To encourage water companies to meet leakage targets and to manage demand.
- To encourage the use of winter abstraction and storage for spray irrigation.
- To encourage the linking of resources to optimise resource usage.
- Where possible, to return suitably treated effluent to the catchment for reuse.
- To consider the effects of possible climate change in long term water resource planning.

B4. WATER QUALITY



WATER QUALITY CLASSIFICATION

B4 WATER QUALITY

B4.1 General

The NRA uses two schemes for reporting river water quality and setting targets, General Quality Assessment (GQA) and Water Quality Objectives (WQO), which have replaced the National Water Council (NWC) classification.

The GQA scheme objectively classifies river water quality and is used to assess geographic and temporal trends. It comprises four components, each of which looks at a different aspect of river water quality:-

* General Chemistry
* Nutrients
* Aesthetics
* Biology

Currently, only the General Chemistry criteria have been defined.

The WQO scheme sets statutory water quality targets for controlled waters, designated by Notice by the Secretary of State for the Environment after consultation with the NRA and other interested parties. Until this procedure is invoked the NRA will set informal River Quality Objectives (RQOs) by translating existing NWC targets to their WQO equivalents. The scheme is based on the requirements of recognised river uses which include:-

* River Ecosystem
* Special Ecosystem
* Abstraction for Potable Supply
* Abstraction for Industry or Agriculture
* Water sports

The first phase of implementation of the WQO/RQO scheme will be restricted to the River Ecosystem assessment described in The Surface Waters (River Ecosystem) (Classification) Regulations 1994 (DoE). Five Classes are proposed, based on water chemistry, with an additional "Unclassified" designation for waters where insufficient data are available to apply the scheme. For each river reach a target River Ecosystem (RE) Class will be set, which will include the date by which it should be achieved (eg RE2 1997). Standards for uses other than River Ecosystem are still being developed.

The targets set as WQOs will be confined to what is practical and achievable within their time limits, bearing in mind committed investment for water quality improvement. Progressively higher WQOs may be set as existing WQOs expire, or the NRA may propose "visionary" non-statutory objectives where water quality improvements cannot be achieved in the shorter term.

B4.2 Local Perspective

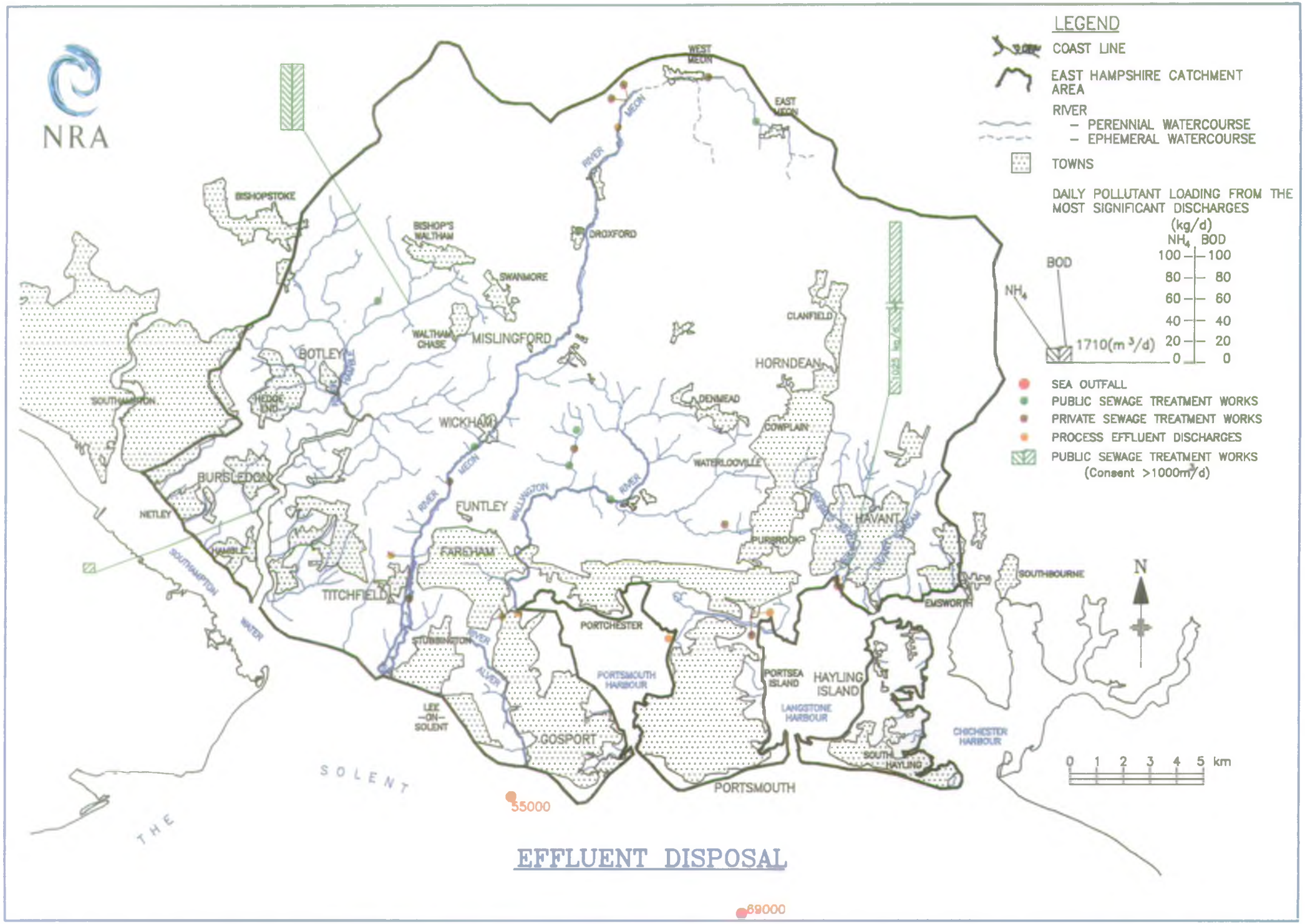
The map shows GQA water quality results calculated for 1992 from data derived from the NRA routine water sampling programme. Sample points are listed in Table B4.1. Seven bathing waters within the catchment have been designated under the EC Bathing Waters Directive (76/160/EEC).

B4.1 - Routine Surface Water Sampling Points

Map Ref No.	River/Stream	Sampling Point	Grid Ref.
1	Meon	Giant's Cottage STW	SU 6918 2113
2		East Meon STW	SU 6727 2240
3		Drayton	SU 6691 2325
4		Westbury House STW	SU 6546 2397
5		April Cottage STW	SU 6465 2400
6		Highbarn Cottages STW	SU 6244 2326
7		George Hotel STW	SU 6240 2315
8		Warnford Fish Farm	SU 6205 2222
9		U/S Warnford Fish Farm	SU 6204 2230
10		Meonstoke School STW	SU 6135 1965
11		Bucks Head STW	SU 6119 2008
12		Droxford	SU 6091 1819
13		Soberton (PWC) STW	SU 5966 1434
14		Wickham STW	SU 5667 1075
15		Knowle Hospital STW	SU 5582 0978
16		Hollam House STW	SU 5422 0510
17		Titchfield	SU 5413 0551
18	Hamble	Bishops Waltham STW - New Works	SU 5414 1598
19		Durley	SU 5286 1537
20		Recreational Waters - Fairthorne Manor	SU 5189 1196
21		Fairthorne Manor STW	SU 5187 1220
22		Wangfield Farm (Maddoxford)	SU 5181 1440
23		Upper Hamble Country Park STW	SU 5010 1090
24		Recreational Waters - Upper Hamble Country Park	SU 5006 1065
25		East Horton Farm Golf Course STW	SU 5000 1815
26		Bursledon Bridge	SU 4926 0970
27		Bursledon STW	SU 4861 0850
28		Ferry Slip - Tidal River Hamble	SU 4851 0676
29	Lavant	Eastern Road SWO	SU 7195 0667
30		Lavant - IBM Havant	SU 7147 0567
31	Hermitage Stream	New Road	SU 7088 0653
32	Wallington	Newman's Bridge	SU 6213 0875
33		Foxbury Point	SU 5933 0472
34		Riversdale	SU 5858 0705
35		Cyanamid C/W @ SWO	SU 5832 0452
36		Fareham - Salters Lane STW	SU 5809 0520
37		Southwick STW	SU 1682 0882
38	Warblington Streams	Warblington Stream No 1	SU 7281 0567
39		Warblington Stream No 2	SU 7343 0530
40		Warblington Stream No 3	SU 7312 0539
41		Warblington Stream No 4	SU 7202 0560

Water quality in the River Hamble and its tributaries has improved markedly in recent years, mainly as a result of investment in a new sewage works at Bishops Waltham, but also because of a drive by the NRA to improve the agricultural housekeeping of farms and smallholdings in the catchment.

B5. EFFLUENT DISPOSAL



EFFLUENT DISPOSAL

B5. EFFLUENT DISPOSAL

B5.1 General

This section considers the disposal of domestic, industrial and agricultural effluent to rivers and groundwaters. The NRA specifies volumetric and quality conditions to be met by discharges, calculated in relation to the use made of the receiving water.

B5.2 Local Perspective

The East Hampshire catchment area has a resident population of over half a million, the main population centres being in the coastal strip and including Portsmouth, Havant and Gosport. Some twenty sewage treatment works within the catchment, of which four are private, are consented to discharge in excess of 5 m^3/d. Two long sea outfalls, Eastney serving Portsmouth and Peel Common at Lee on Solent, are each consented to discharge nearly 50,000 m^3/d to the Solent. Eastney (5.7km) is the longest sea outfall in the UK.

Disposal of sewage through short outfalls causes problems of water quality at bathing beaches. Recent coastal disposal schemes using long outfalls have improved the situation, but some local problems remain to be resolved. Continuing improvement is expected as Southern Water Services' Seaclean investment programme progresses, and all designated bathing beaches are expected to comply with the EC Directive by 1996.

The six consented industrial discharges in the catchment include two pharmaceutical plants, a shellfish processing plant, an electronics manufacturing site and an aggregate washing facility.

There are no major discharges to the Meon, but several water cress farms operate in the middle reaches. Cress farm discharges will be consented by April 1995, and agreement has been reached with MAFF that they should contain no detectable pesticides. Most of the cress farms in the catchment have already taken measures to ensure they will meet their likely consents.

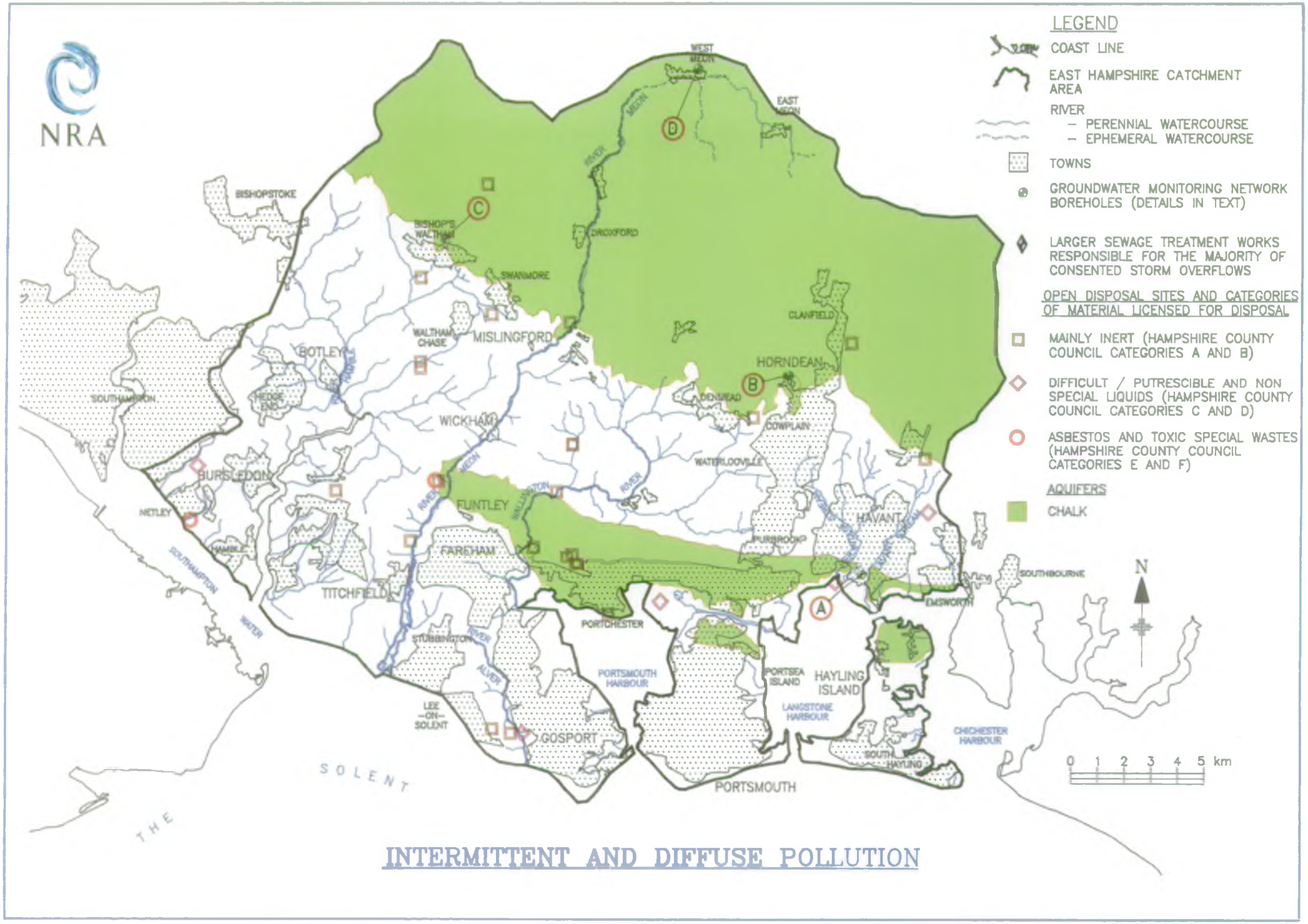
B5.3 General Requirements for the Management of Water Quality

- River water quality objectives to be use-related.
- Monitoring of surface waters and effluent discharges to ensure compliance with consents.
- Outfalls to be sited so as to achieve good effluent mixing with the receiving water.
- No deterioration in upstream flow or water quality beyond the values used in setting the consent.

Table B5.1 List of Major ($\geq 1000m^3$/day) Consented Discharges

Name	Type	Consented Flow (m^3/day)	Consent Conditions (kg/day)		Receiving Water
			BOD	NH_3	
Bishops Waltham	Public STW	3100	15 Summer 20 Winter	5 Summer 20 Winter	River Hamble
Budds Farm	Public STW	41000	25	-	Langstone Harbour
Bursledon	Public STW	1000	30	-	River Hamble Estuary
Eastney Outfall	Long Sea Outfall	69000	-	-	Solent
Peel Common Outfall	Public STW	55000	-	-	Solent
Warnford FF	Fish Farm	9090	2	10	River Meon

B6. INTERMITTENT AND DIFFUSE POLLUTION



INTERMITTENT AND DIFFUSE POLLUTION

B6 INTERMITTENT AND DIFFUSE POLLUTION

B6.1 General

This section considers the wide range of pollution inputs to the catchment which are irregular or are not covered by formal discharge consents. These fall into three main categories:

1) Occasional unconsented discharges from point sources.

The main source of intermittent pollution in rural catchments is accidental discharges of strong agricultural wastes, such as silage liquor or cattle slurry. Elsewhere, accidental pollution may result from traffic accidents, industrial spillages, or from plant failure at effluent treatment works. Problems are most acute in the summer months when river flows are low, and small streams are particularly at risk as they offer only limited dilution.

2) Intermittent consented point source discharges.

This category includes combined sewer overflows (CSOs) from public sewerage systems, which are required to prevent the network being overwhelmed at times of heavy rainfall. The aggregated discharge of CSOs can represent a significant pollutant load to a river, so care must be taken that control levels are correctly set to maximise the hydraulic capacity of the system, and to limit overflows to times of storm. Most CSO discharges are untreated and unconsented at present, particularly in rural areas, but they are increasingly coming within the control of the NRA. The initial pulse of storm sewage arriving at a STW is usually retained for treatment when the flow subsides, whereas the more dilute overflow from prolonged storms is discharged to the river.

The NRA is closely involved with Her Majesty's Inspectorate of Pollution (HMIP) and the Waste Regulation Authorities the control of pollution from landfill sites and mining activities. However, many such sites pre-date the legislation and are subject to little control, and discharges from abandoned mines are exempt. Modern landfill engineering techniques will improve matters for the future, but problems from older sites may persist for many years after operations cease.

3) Diffuse inputs.

Agricultural activities frequently result in diffuse inputs to the water environment. The application of fertiliser, or ploughing fallow land, may cause groundwater nitrate levels to exceed the limit set by EC Directive (80/778/EC) for the protection of drinking water. In their general operations, farmers are encouraged to follow the MAFF Code of Good Agricultural Practice for the Protection of Water, and free advice on pollution control is available from the NRA or the MAFF Agricultural Development Advisory Service (ADAS).

Pesticides (fungicides, herbicides, insecticides etc) are of concern, as their concentration in drinking water is also constrained by Directive 80/778/EEC. The MAC (Maximum Admissible Concentration) is 0.5 micrograms/litre for individual pesticides and 0.5 micrograms per litre for total pesticides. Non- agricultural uses (such as weed control on roadsides or railway lines) have been a significant source of herbicide contamination, but are increasingly coming under control.

The NRA Groundwater Protection Policy, which was issued in 1992, is discussed in Section A3.1.2

B6.2 Local Perspective

With the East Hampshire Rivers catchment having both intensively farmed rural areas and large urban agglomerations such as those adjacent to the Solent, the catchment is impacted by both urban and agricultural run off. The NRA is now responsible for the 1989 Farm Waste Regulations covering the management of slurry and silage, and the storage of fuel. Enforcement includes monitoring agricultural installations and the provision of advice on best practice for the control of farm based pollution risks. On the lower Hamble diffuse pollution has been reduced by work from farm campaigns and improvements from work that has been grant-aided.

Some of the smaller catchments are heavily influenced by the urban areas through which they flow. The river Hermitage and the river Wallington both rise in urban areas and their headwaters are quite heavily impacted by urban run-off and sewer and stormwater overflows. This is a particular problem in the Rowlands Castle - Horndean area, where solution features occur at the southern boundary of the Chalk outcrop. There has been shown to be a short transit time in the aquifer between swallow holes and the springs at Bedhampton, which are an important source of water for public supply. This area is especially sensitive in terms of groundwater protection and known swallow holes are included as special features in NRA Groundwater Protection policy documents.

There are many landfill sites in the catchment including Paulsgrove Tip. The local waste incinerator near Portsmouth may fail to meet the new gaseous emissions standard in 1997 and therefore must be replaced, or a new disposal route found, which may impact on the aquatic environment. The preferred hierarchy for waste disposal is set out in the County's Waste Management Plan.

The map shows average groundwater nitrate concentrations for the period 1990-1994, which are all below the MAC required by EC Directive (71/354/EEC) on the quality of water for human consumption of 11.3mg/l (as N).

Pesticide concentrations are monitored at four locations within the catchment and results for the period 1990-1994 are given in Table B6.1. The MAC for Triazines (herbicide) and 'Drins (insecticide) is 0.1 micrograms per litre (one part in ten billion).

The naval dockyard in Royal Portsmouth Harbour, except for Whale Island and Fleetlands, enjoys Crown exemption from NRA jurisdiction. The impact of the activities of the Navy is unclear, but some concern has been raised about possible pollution from the mobilisation of heavy metals in the Harbour sediments. Potential risks to water quality are being addressed by the NRA in conjunction with the Royal Navy and Local Authorities.

B6.3 General Requirements for the Control of Pollution

- Monitoring of surface and groundwater quality.
- Monitoring of high risk sites (eg. waste disposal sites and farms) to assess their impact on surface and groundwater quality.
- Implementation of the NRA National Groundwater Protection Policy.

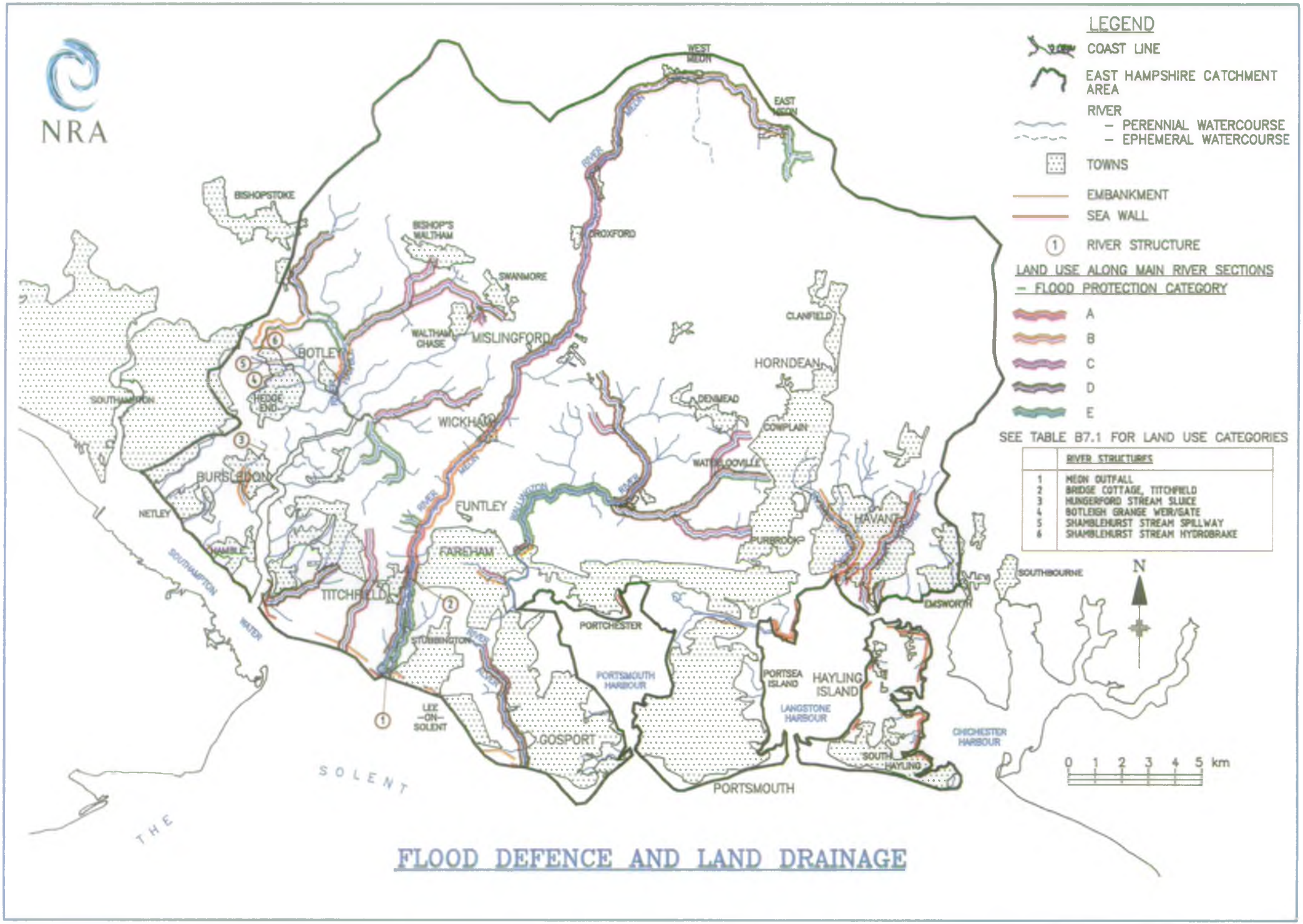
- Public education to encourage the early reporting of pollution incidents to the NRA.
- The maintenance of emergency procedures to eliminate or mitigate the impact of accidental discharges.
- Compliance with EC Directives on the Discharge of Dangerous Substances, Abstraction for Water Supply and the protection of Fisheries or Shellfish.
- Maintenance of a basic flow regime to reduce the impact of pollution.
- Provision of an uncultivated bankside buffer strip to attenuate diffuse pollution from overland run-off.

Table B6.1 Representative Groundwater Pesticide Concentrations

Map Ref	Source	'Drins	Triazines
A	Brockhampton	ND	65
B	Lovdean	ND	10
C	Northbrook	ND	10
D	West Meon	ND	10

Note : ND = Not Detected

B7. FLOOD DEFENCE AND LAND DRAINAGE



FLOOD DEFENCE AND LAND DRAINAGE

B7. FLOOD DEFENCE AND LAND DRAINAGE

B7.1 General

Flood defence relates to the provision of effective defence for the undeveloped and built environment against flooding from rivers and the sea, and to land drainage for agricultural purposes within river valleys.

Flooding is a natural hazard resulting from extreme climatic conditions such as high winds or very heavy rainfall, and the severity of a flood is described in terms of its statistical frequency over a long period of time. This is expressed as a return period such as 1 in 50 years, and the effectiveness of flood defences is measured in the same terms, indicating the frequency with which they can be expected to be overtopped. Different land uses (housing, industry, agriculture etc) vary in their sensitivity to flooding and MAFF indicative targets for their defence are shown on Table B7.1.

Table B7.1 Indicative Standards of Protection (MAFF)

Current Land Use		Target Standard of Protection Return Period (Yrs)	
		Freshwater	Saline
A.	High density Urban Areas	50-100	100-200
B.	Medium density Urban (may include some agricultural)	25-100	50-200
C.	Low population density; few properties at risk; highly productive agricultural land	5-50	10-100
D.	General arable farming, medium productivity, isolated properties	1.25-10	2.5-20
E.	Low population density; low productivity agriculture; grassland	<1.25	<1.5

(These MAFF standards are indicative and do not represent an entitlement or minimum level to be aimed at).

For the purposes of management, certain reaches of the river are formally designated as Statutory Main River. Here, the NRA has special powers under the Water Resources Act (1991) to carry out flood defence and land drainage works, and to control the actions of others to protect these interests. Any proposal that could interfere with the bed or banks, or obstruct the flow in the river, requires formal consent from the NRA. Under the Land Drainage Act 1991 the NRA also has a general duty to oversee, and powers to control, significantly obstructive works on any watercourse. The criteria for designation of Main River are currently under review.

The nature of flood defence works carries the risk of conflict with other river uses - notably fisheries and conservation. This is resolved by consultation and, where feasible, flood protection targets are met using methods with the least environmental impact. Where a designated nature conservation site is sensitive

to water levels the NRA is required to prepare a Water Management Plan in accordance with guidance issued by MAFF.

The National Rivers Authority is concerned that urbanisation and development should not increase the risk of flooding. Acting as a statutory consultee the NRA advises Planning Authorities on the implications of their strategic plans and comments on individual planing application proposals. In general, building development increases the volume and rate of surface water run-off into the river system, with the potential to raise flood levels and peak flood flows.

Development in the flood plain is a particular problem, increasing the number and value of properties at hazard. There is a risk that river flows may be obstructed, reducing the capacity of the system and increasing the severity of floods. Effective flood defence has to be planned on a wide scale, local remedial works may solve local problems but there is a danger that flood risks may be increased elsewhere.

The NRA's flood defence function includes the protection of land from flooding from the sea. This should not be confused with the power of Local Authorities to protect coastal land against erosion, but as the two processes are intimately related there is close cooperation between all the agencies concerned. A recent Government initiative is a proposal for the development of integrated Shoreline Management Plans for flood defence, based on eleven natural "shoreline cells" in England and Wales. The coastline of East Hampshire falls within Cell 5, which lies between Portland Bill in Dorset and Selsey Bill in Sussex.

B7.2 Local Perspective

Roads and houses were seriously affected when severe flooding occurred at East Meon (and to a lesser extent at West Meon) in 1951 and 1953. Following this extensive flood relief works were carried out from 1954 to 1956, six small arch bridges were replaced by clear span structures and the stream was widened and deepened to improve its flood capacity.

Flooding such as this is uncommon on Chalk streams, although the upper reaches of the Meon are more vulnerable as they flow over the Lower Chalk, which is much less permeable than the Upper and Middle Chalk, allowing heavy rain to run off rather than soak into the ground. As a consequence the Meon has a greater range of flows than other Hampshire Chalk streams. High groundwater levels in the Chalk cause seasonal flooding at Hambledon, Finchdean and Rowlands Castle. Many streams in this area have insufficient high-flow capacity and flood occasionally, a flood warning system was installed for Hambledon in 1994.

The area covered by this report includes a great deal of land at or below sea level; if flood protection embankments were not maintained there would be considerable damage to property and loss of agricultural land. The NRA makes an overall allowance of 6mm per year for rising sea levels which affect coastal defences - this is increased to 10mm per year in the Portsmouth area to take account of land subsidence. Farlington Marshes are protected by a long sea wall, parts of the eastern seaboard of Hayling Island are particularly vulnerable and some embankments are in a poor state of repair. The NRA has engaged consultants to investigate management options, from the "do-nothing" approach to works requiring capital investment.

A management plan for Langstone Harbour is in preparation, funded by Hampshire County Council, English Nature and MAFF. Portsmouth Harbour is currently dredged twice a year, giving rise to concern over the release of heavy metals from the sediments, which are monitored by MAFF. Land is

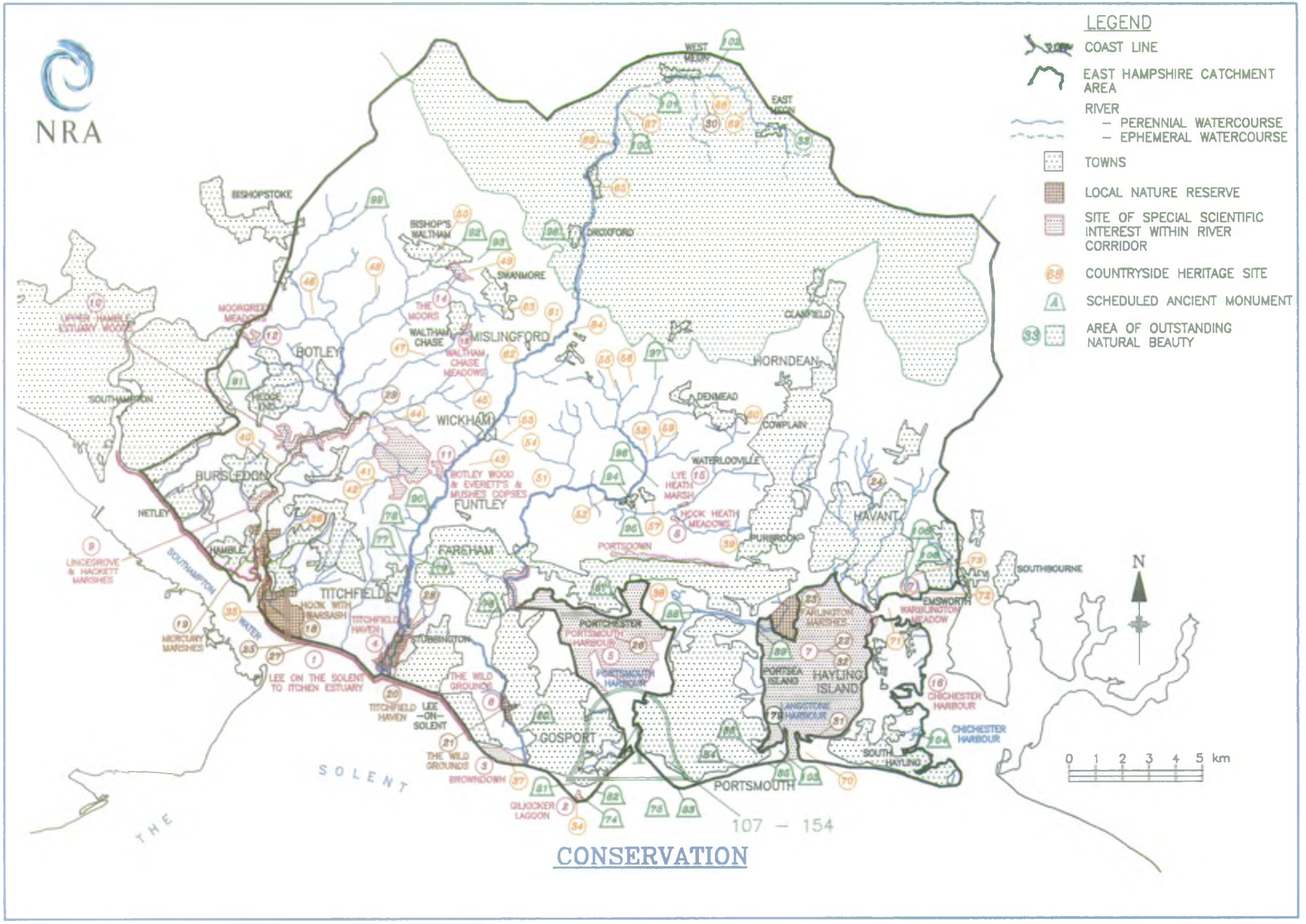
being reclaimed around the marinas and ferry terminal in Langstone Harbour, which is also dredged for shellfish. Concern has been expressed that these activities may cause foreshore erosion following disturbance of the natural sediment and tidal flow patterns, with implications for flood risk management.

Urban developments in the Meon sub-catchment require source-controls such as balancing ponds or soakaways to prevent higher volumes and more rapid run-off from paved areas increasing the risk of flooding. Balancing ponds are being constructed as a flood risk measure for a town development at Whiteley.

B7.3 General Requirements for Flood Protection and Land Drainage

- Carry out flood defence works with sensitivity and in accordance with the NRA's environmental responsibilities.
- Design river channels to need the minimum of maintenance.
- Maintain control structures and embankments to ensure their continued effectiveness.
- Maintain the capacity of river channels to control flooding to an appropriate level of service.
- Manage aquatic weed to maintain the appropriate flood defence standard.
- Manage bankside trees to prevent obstruction of the river channel whilst contributing to the landscape, conservation and amenity of the catchment.
- Maintain channel water levels and the water table in adjacent land at a level appropriate to land use.
- Resist development in the flood plain unless measures are taken to ensure that flood risk is not significantly increased.
- Maintain tidal defences to provide the design level of protection

B8. LANDSCAPE AND CONSERVATION



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CONSERVATION

B8. LANDSCAPE AND CONSERVATION

B8.1 General

This use relates to the protection of the flora, fauna and ecology of the river corridor and includes both organisms which depend on the river itself and those which exploit the river banks. A healthy river and adjacent corridor is characterised by diverse and abundant wildlife communities which enhance the overall quality of the landscape.

Rivers have been managed and used by man for thousands of years, shaping their character in relation to his use of the land. However, the pace of change is accelerating and recent measures such as realignment, the removal of bankside trees and wetland drainage have significantly altered this environment. The NRA's conservation duties are set in Sections 16 and 17 of the Water Resources Act 1991, and require the Authority, whilst carrying out its own functions or exercising its regulatory powers, to further the conservation of flora, fauna, geological and physical features of special interest, and the enhancement of natural beauty. Consideration must also be given to impacts on the man-made environment including buildings, sites and objects of architectural or historic interest.

Many statutory and voluntary bodies have conservation roles and responsibilities; these include English Nature, the Countryside Commission, English Heritage, County Councils, Local planning authorities, the National Trust, County Wildlife Trusts and the Royal Society for the Protection of Birds (RSPB).

B8.2 Local Perspective

A significant part of the East Hampshire Rivers Catchment lies on Chalk geology, giving rise to water courses with water of high quality that is hard, alkaline and of relatively constant temperature. Water courses of this nature include the Meon, Hamble and Warblington Streams. All these rivers support good biological communities of a diverse nature and also have significant conservation interest along the river corridor.

Hampshire's coast has a special character, with broad enclosed tidal harbours, extensive saltmarsh, reedbeds and wet meadows. Portsmouth and Langstone Harbours are included in the nominated Solent RAMSAR site, proposed for its international importance for wildfowl. Specific sites within this complex include Farlington Marshes Nature Reserve to the north of Langstone Harbour, Titchfield Haven at the mouth of the Meon, Wild Grounds Nature Reserve in the Alver valley near Gosport, and the Hook-with-Warsash Nature Reserve near the mouth of the Hamble.

Both Portsmouth and Langstone Harbours suffer from heavy growths of green algae as a result of nutrient enrichment which, it is thought, has been exacerbated by the increased wildfowl population of recent years. The two Harbours are the subject of Estuary Management Plans, promoted by English Nature, which will complement the conservation aspects of this Catchment Management Plan, being focused on the estuarine environment and wildlife conservation issues.

Some watercourses which experience flooding problems have been managed in the past with little thought for their landscape or conservation value. An example is the Hermitage Stream at Havant, where the flood capacity was improved in two phases during the 1950's and 1970's. A restoration scheme is under consideration, to be jointly funded by the NRA, Havant Borough Council and English Nature.

B8.3 General Requirements for Wetland Conservation and Landscape Management

- Determine the conservation value and requirements of river reaches.
- Waters should comply with the minimum quality standards for amenity protection and aesthetic criteria, and with EC Directive 76/464/EEC on the control of Dangerous Substances.
- A variable flow regime is required to conserve the natural characteristics of the river, with monthly averages reflecting the natural flow pattern.
- Seasonal spate flows are desirable to remove accumulated silt from the river channel and to provide a high water table in bankside wetlands.
- An uncultivated margin is desirable to act as a buffer strip between the river and farmland and as a "green corridor" in the landscape. Encourage the application of land-use grant schemes to this end and to enhance wetlands.
- Encourage biodiversity by maintaining natural river features such as meanders, pools, rapids, river cliffs, marginal wetlands, trees and bankside vegetation. Channels should be of a size appropriate to the flow regime.
- Operate control structures to maintain channel water levels and protect adjacent wetland habitats from excessive drying.
- Especially in Chalk streams, encourage autumn weedcutting to maintain channel capacity for winter flows whilst minimising loss of vegetation by scouring.
- Manage access to the river by livestock to control excessive trampling of the banks. Control access by the public to avoid excessive disturbance or ecological damage.
- Protect sites of archaeological or historic interest from damage. The importance of Local Authority Sites and Monuments Records should be recognised.
- Co-operate with local authorities and riparian landowners to ensure that banks and surrounding areas are free from rubbish and litter.

Table B8.1 Schedule of Designated Sites

Map Ref No	Name	Designation
1	Lee on the Solent to Itchen Estuary	SSSI
2	Gilkicker Lagoon	SSSI
3	Browndown	SSSI
4	Titchfield Haven	SSSI
5	Portsmouth Harbout	SSSI
6	The Wild Grounds	SSSI
7	Langstone Harbour	SSSI
8	Hook Heath Meadows	SSSI
9	Lincegrove and Hacklett's Marshes	SSSI
10	Upper Hamble Estuary and Woods	SSSI
11	Botley Wood and Everetts and Mushes Copses	SSSI
12	Moorgreen Meadows	SSSI
13	Waltham Chase Meadows	SSSI
14	The Moors, Bishop Waltham	SSSI
15	Lye Heath Marsh	SSSI
16	Chichester Harbour	SSSI
17	Warblington Meadow	SSSI
18	Hook with Warsash	LNR
19	Mercury Marshes	LNR
20	Titchfield Haven	LNR
21	The Wild Grounds	LNR
22	Langston Harbour	LNR
23	Farlington Marshes	LNR
24	Sir George Staunton Country Park	
25	Southampton Water and Solent Marshes Spa	SPA
26	Portsmouth Harhour Spa	SPA
27	Southampton Water and Solent Marshes	RAMSAR
28	Upper Titchfield Haven	RSNC
29	Curbridge Hiowwt	RSNC
30	Chappets Copse Hiowwt	RSNC
31	Hayling Island Gold Course Hiowwt	RSPB
32	Langstone Harbour	AONB
33	East Hampshire	CHS
34	Gilkicker Point	CHS
35	Hook Saltworks	CHS
36	Winnard's Copse	CHS
37	Browndown Common	CHS
38	Horsea Island	CHS
39	Sandy and Alderrmoor Copses	CHS
40	Brixedone Saltmarsh	CHS
41	Bound Coppice and Meadow	CHS
42	Round Coppice and Meadow	CHS
43	Ravens Wood	CHS
44	Suttons Copse	CHS
45	Shedfield Common	CHS

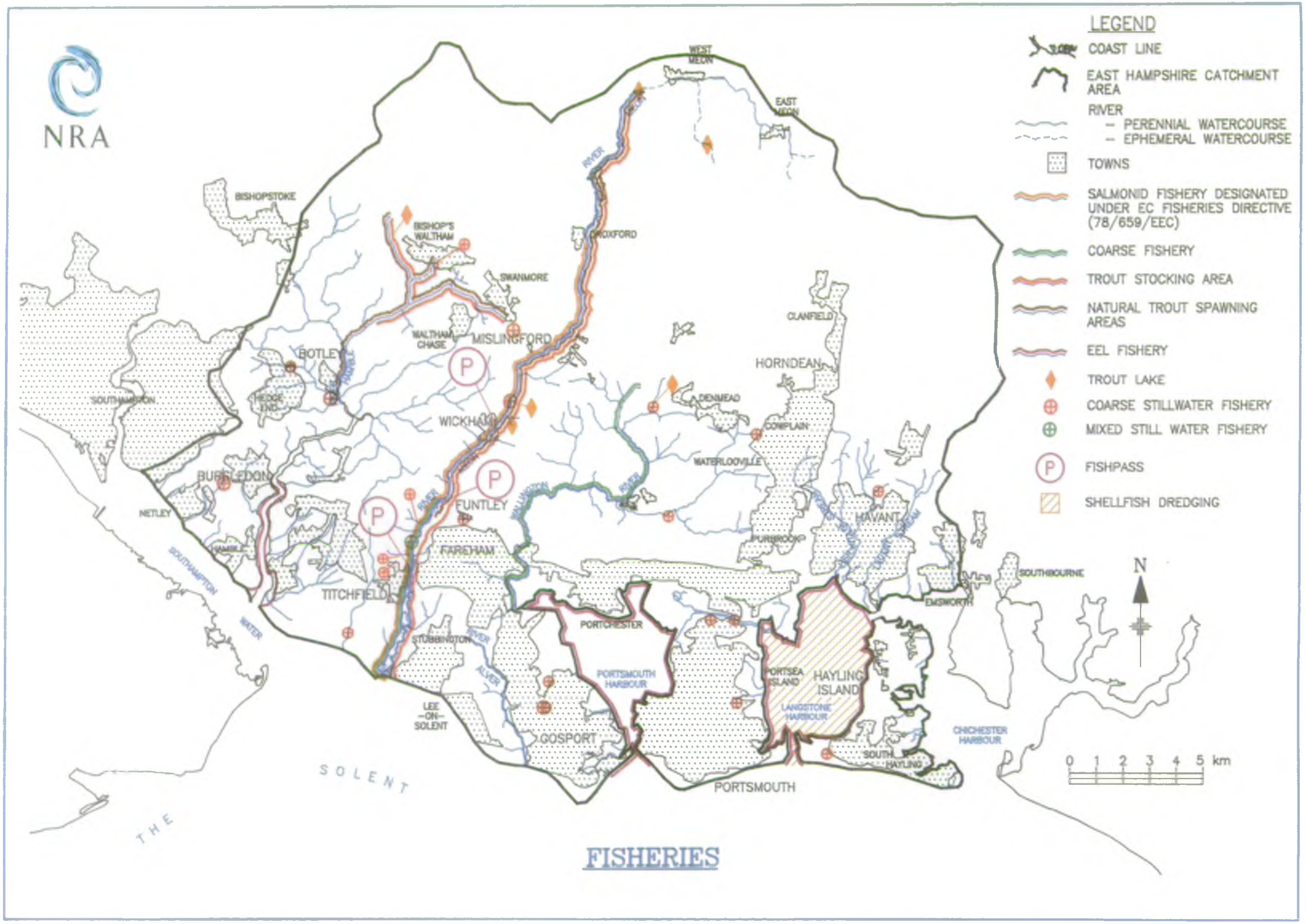
Map Ref No	Name	Designation
46	Ford Lake Meadows	CHS
47	Lyons Copse and Meadow	CHS
48	Deoryle Wood, Calcot Coppice and Meadows	CHS
49	The Moors Meadows	CHS
50	North Pond	CHS
51	Pigeonhouse and Homerhill Copses	CHS
52	Ham Copse	CHS
53	Wickham Meadow	CHS
54	Wickham Common	CHS
55	Huntbourn Wood	CHS
56	Hoegate Common	CHS
57	Southwick Park	CHS
58	Lovelocks Park	CHS
59	Beckford Meadows	CHS
60	Anmore Dell Meadow	CHS
61	Holywell Limewoods	CHS
62	Bishop's Inclosure	CHS
63	Hillpound Meadow	CHS
64	Bere Copse	CHS
65	Meonstoke Meadows	CHS
66	Exton Meadow	CHS
67	Warnford Park	CHS
68	Westbury Park	CHS
69	Drayton Down	CHS
70	Gunner Point	CHS
71	The Wade Way	CHS
72	Warblington Meadow	CHS
73	Warblington Roman Villa	CHS
74	Gilkicker Fort	SAM
75	Spitbank Fort	SAM
76	Fort Fareham	SAM
77	Barn at Fern Hill Farm, Titchfield	SAM
78	Titchfield Abbey	SAM
79	Stony Bridge, Titchfield	SAM
80	Castle Mound near Apple Dumpling Bridge	SAM
81	Fortification S of Crescent Road	SAM
82	Fort Monckton	SAM
83	Southsea Castle	SAM
84	Eastney Fort and Perimeter Defences of Barracks	SAM
85	World War 2 Beach Defences, Eastney	SAM
86	Eastney Sewage Pumping Station	SAM
87	Portchester Castle	SAM
88	Hilsea Lines	SAM
89	Pickett Hamilton Fort, Hillsea	SAM
90	Hickley Wood Hillfort	SAM
92	Bishop's Waltham Palace	SAM

Map Ref No	Name	Designation
93	Two Bowl Barrows N of Hoe Farm	SAM
94	Southwick Brewhouse	SAM
95	Southwick Priory	SAM
96	Place Wood, Motte and Bailey	SAM
97	Group of Round Barrows E of Bent Farm	SAM
98	Long Burrows in the ground of Long Barrow Hse	SAM
99	Roman Site 400yds S of Fairthorn	SAM
100	King John's house in Warnford Park	SAM
101	Boundary works and Barrow at Sheepbridge	SAM
102	St Nicolas Chapel and deserted Medieval village	SAM
103	Form Cumberland	SAM
104	Tourner Bury, Hayling Island, South Hayling .	SAM
105	Black Burn, Warblington	SAM
106	Warblington Castle	SAM
107	Haslar gunboat yard; transverse slipway & Gunbo	SAM
108	Haslar gunboat yard; misc buildings	SAM
109	Fortification N of Mumby Road	SAM
110	Fort Blockhouse	SAM
111	Fortifications S of Trinity Road	SAM
112	Royal Clarence victualling yard, main gate	SAM
113	Royal Clarence victualling yard, the residences	SAM
114	Royal Clarence victualling yard, the Cooperage	SAM
115	Royal Clarence victualling yard, mill and granary	SAM
116	Royal Clarence victualling yard, slaughter house	SAM
117	Portsmouth Dockyard, the Royal Railway Stn	SAM
118	Portmouth Dockyard, the Lion Gate	SAM
119	Earthworks Defences at Priddy's Hard	SAM
120	Earthworks Defences at Priddy's Hard	SAM
121	Point Battery incl, King Edwards Tower and S	SAM
122	Long Curtain, King Bastion and Spur Redoubt	SAM
123	Portsmouth Garrison Church	SAM
124	Landport Gate	SAM
125	Former board of ordnance gunwharf, HMS Vernon	SAM
126	King James Gate	SAM
127	Portsmouth Dockyward, No 5 and 7 Boathouses	SAM
128	Portsmouth Dockyard, the Porter Lodge	SAM
129	Portsmouth Dockyard, main gate and dockyard wall	SAM
130	Portsmouth Dockyard, Ship maintenance authority	SAM
131	Portsmouth Dockyard, No 6 boathouse	SAM
132	Portsmouth Dockyard, No 9, 10 and 111 stores	SAM
133	Portsmouth Dockyard, No 15 , 16 and 17 stores	SAM
134	Portsmouth Dockyard, the boild shop west	SAM
135	Portsmouth Dockyard, the south block	SAM
136	Portsmouth Dockyard, no 18 store	SAM
137	Portsmouth Dockyard, navigation school	SAM
138	Portsmouth Dockyard, former pay office	SAM

Map Ref No	Name	Designation
139	Portsmouth Dockyard, admiralty house	SAM
140	Portsmouth Dockyard, the docks	SAM
141	Portsmouth Dockyard, No 24 store	SAM
142	Portsmouth Dockyard, No 25 store	SAM
143	Portsmouth Dockyard, the Block mills and stores 35	SAM
144	Portsmouth Dockyard, the north block office	SAM
145	Portsmouth Dockyard, no 33 store and electrics	SAM
146	Portsmouth Dockyard, no 2 ship shop	SAM
147	Portsmouth Dockyard, covered bridge	SAM
148	Portsmouth Dockyard, fire station	SAM
149	Portsmouth Dockyard, no 19 store	SAM
150	Portsmouth Dockyard, short row no 10-14	SAM
151	Portsmouth Dockyard, long rows or the parade	SAM
152	Portsmouth Dockyard, the iron and brass foundry	SAM
153	Portsmouth Dockyard, the extended dockyard wall	SAM
154	Portsmouth Dockyard, the unicorn gate	SAM

SSSI	Sites of Special Scientific Interest
CHS	Countryside Heritage Site
LNR/NNR	Local/National Nature Reserve
SPA	Special Protection Area
RAMSAR	International Bird Protection Site (Wetland of International Importance)
RSNC	Royal Society of Nature Conservation
RSPB	Royal Society of Protection of Birds
SNCI	Site of Nature Conservation Interest
AONB	Area of Outstanding Natural Beauty
SAM	Scheduled Ancient Monument

B9. FISHERIES


NRA
LEGEND
COAST LINE
EAST HAMPSHIRE CATCHMENT AREA
RIVER
PERENNIAL WATERCOURSE
EPHEMERAL WATERCOURSE
TOWNS
SALMONID FISHERY DESIGNATED UNDER EC FISHERIES DIRECTIVE (78/659/EEC)
COARSE FISHERY
TROUT STOCKING AREA
NATURAL TROUT SPAWNING AREAS
EEL FISHERY
TROUT LAKE
COARSE STILLWATER FISHERY
MIXED STILL WATER FISHERY
FISHPASS
SHELLFISH DREDGING
WEST MEON
EAST MEON
BISHOPSTOKE
BISHOP'S WALTHAM
DROXFORD
SWANMORE
WALTHAM CHASE
MISLINGFORD
BOTLEY
HEDGE END
SOUTHAMPTON
WICKHAM
CLANFIELD
HORNDEAN
DENMEAD
COWPLAIN
WATERLOOVILLE
BURSLEDON
NETLEY
HAMBLE
FUNTLEY
FAREHAM
TITCHFIELD
STUBBINGTON
PURBROOK
HAVANT
SOUTHBOURNE
EMSWORTH
PORTCHESTER
PORTSMOUTH HARBOUR
PORTSEA ISLAND
HAYLING ISLAND
LANGSTONE HARBOUR
CHICHESTER HARBOUR
LEE -ON- SOLENT
GOSPORT
SOUTH HAYLING
PORTSMOUTH
SOLENT
THE
SOUTHAMPTON WATER
N
0 1 2 3 4 5 km

FISHERIES

B9. FISHERIES

B9.1 General

This use relates to the maintenance of sustainable populations of indigenous freshwater and migratory fish. Game fish (also referred to as Salmonids) and coarse fish (under the general heading of Cyprinids) are protected under the EC Fisheries Directive (78/659/EEC) which sets water quality criteria in designated freshwaters to protect fish life. Additional reaches may be designated periodically, or existing reaches upgraded.

The distribution of fish is influenced by habitat diversity, geographical parameters (principally altitude, bed gradient and river flow) and the quality of the water. As a result, fisheries status is an important indicator of the overall health of a river.

All freshwater anglers in England and Wales are required to be licensed under the Salmon and Freshwater Fisheries Act 1975. This system is administered and enforced by the NRA.

B9.2 Local Perspective

B9.2.1 Coarse Fisheries

The Meon, Hamble and Wallington all support good populations of coarse fish. No other rivers in the catchment support good fisheries. There are also a variety of fishing lakes in the catchment, most of which are artificially constructed and including clay/gravel pits, old ornamental lakes, fort moats and recently dug fishing lakes.

The Hamble is a small non-tidal river which supports a good coarse fishery including populations of roach and perch. The fishery has improved in recent years as a result of better water quality following the completion of a new sewage treatment works at Bishop's Waltham, and the better control of agricultural pollution. No fish kills have been reported on the river in the last ten years.

The lower reaches of the River Meon also support good coarse fish populations, notably dace and roach. The River Wallington is populated with dace, roach, carp and gudgeon. Some chub fry/fingerlings were introduced in 1991/1992. Mullet enter the first mile or so of the estuary.

Coastal waters and the tidal reaches of rivers in the catchment are fished commercially for eels, many tonnes are taken each year and most are exported to Holland. The present NRA licensing system for eel fishing is being revised to allow closer control of this activity from 1995.

B9.2.2 Game Fisheries

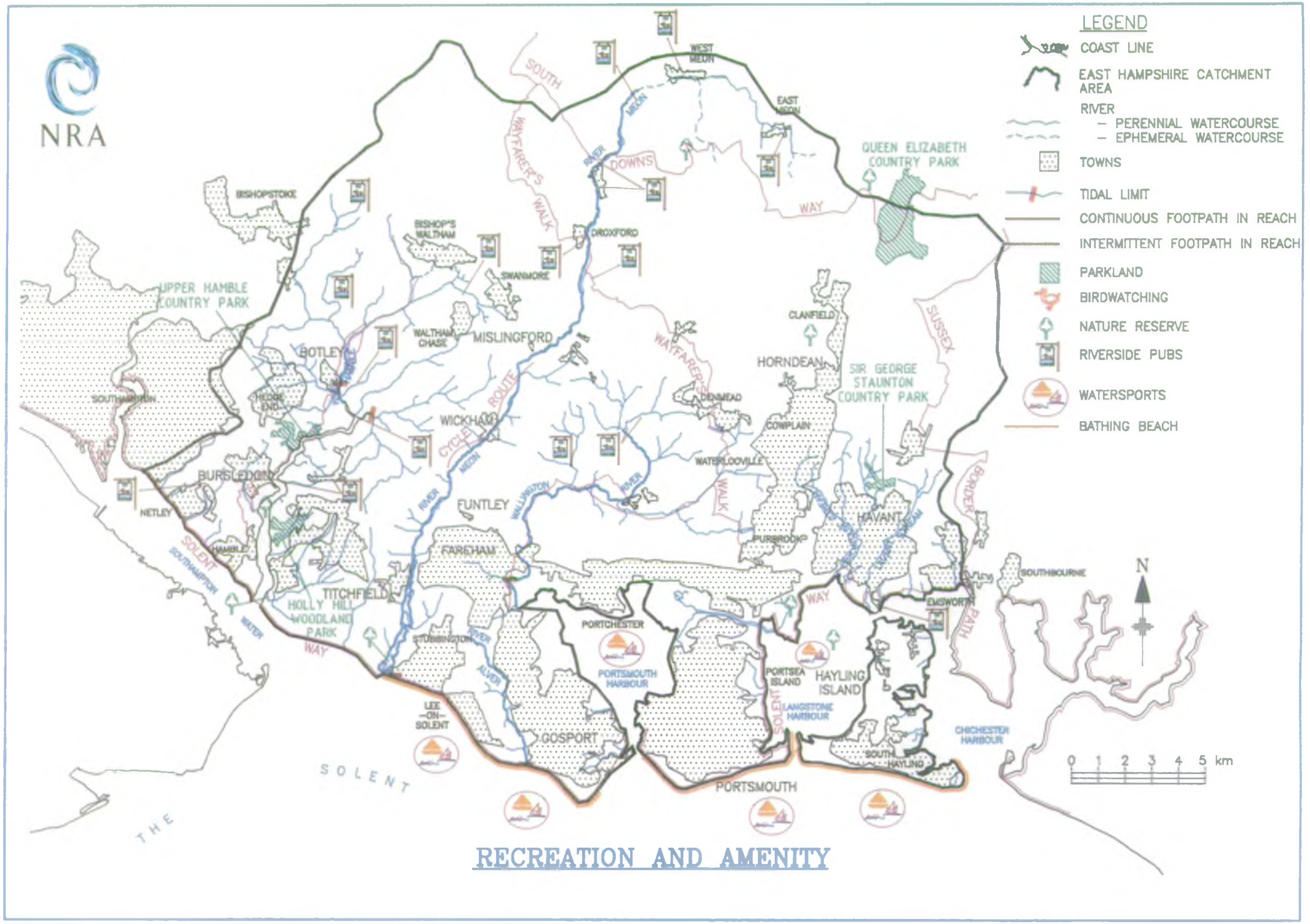
The hard Chalk water of the Meon and abundance of weed have made the river ideal for trout and fishing takes place throughout its length. Sea trout are particularly important in the lower river with brown trout in the middle and upper reaches. The river above Funtley is designated area as a Salmonid Fishery under the EC Freshwater Fisheries Directive which requires the water to be maintained at a high standard. There is a limited amount of brown trout stocking on the river. The NRA has built fish passes at Titchfield, Funtley and Wickham to ease the upstream passage of sea trout to their spawning grounds. Salmon occasionally enter the river.

The Hamble should also be able to support sea trout, but their passage upstream is restricted by a flour mill at Botley. However, the recent improvement in river water quality justifies investment in a fish pass, which the NRA plans to build. Sea trout are known to spawn in tributaries of the Hamble but their numbers seem to have declined in recent years. There are small populations of wild brown trout (which may be augmented by stocking) in the upper reaches of rivers in the area under review.

B9.3 General Requirements for Fisheries Management

- Water quality in designated reaches to comply with EC Fisheries Directive (78/659/EEC).
- Maintain sufficient flow to conserve fish populations and allow fish movements within the catchment.
- Provide and maintain fish passes at obstructions to ensure the free passage of fish. All barriers should be passable at low river flows.
- Maintain and develop diverse natural river features to ensure a variety of spawning and feeding areas.
- Maintain a variety of vegetation on the stream bank and in the channel to provide shade and cover.
- Where fish stocking is required, use appropriate species and numbers of fish.
- Maintain high quality spawning gravels in reaches where fish breed.
- Avoid rapid fluctuations in water levels where this may endanger fish.
- Ensure that fisheries management operations are consistent with conservation objectives.

B10. RECREATION AND AMENITY



RECREATION AND AMENITY

B10. RECREATION AND AMENITY

B10.1 General

This section considers activities such as walking, canoeing, swimming, boating, fishing and bird watching, which attract people to the river corridor. The principal areas of concern are access, aesthetic acceptability and, in the case of immersion sports, the possible health risk.

The Recreation and Amenity functions of the NRA are set out in Section 8 of the Water Act 1989, which empowers the NRA to conserve and enhance the natural beauty and amenity of inland and coastal waters and associated land, as well as the use of such waters and land for recreational purposes. The NRA is required to have regard to the desirability of preserving public freedom of access, and may actively promote the development of recreation and amenity where it is considered desirable.

Also included here are commercial and recreational navigation. In tidal waters there is usually a public right of navigation, but such rights do not exist in non-tidal stretches of water unless they have been established through historical usage, by dedication from the riparian owners or by statute. The extent of freshwater navigation rights is limited, there may be restrictions on the parts of rivers which can be used and the type of craft, and there is usually no right to land as the banks above tidal limits are privately owned.

B10.2 Local Perspective

Public access throughout the catchment is generally good and there are extensive networks of footpaths to the north of Portsmouth and around the Meon valley.

Angling opportunities in the Rivers Meon, Hamble and Wallington are limited, with most suitable reaches being controlled by private owners or angling clubs. Stillwater fisheries throughout the catchment are popular, providing a variety of angling for trout and coarse fish.

There are seven EC Designated bathing beaches within the catchment, popular for water sports and swimming. During the summer most of the accessible coastline is used intensively for recreation, with watersports including windsurfing, dinghy sailing, waterskiing and jet-skiing, being popular in Langstone and Portsmouth Harbours, Stokes Bay, Lee-on-Solent, and around Hayling Island. The Hamble estuary is a centre for all types of recreational sailing and is probably the most important single site for mooring and marina development on the English south coast. The NRA has no direct responsibility for these activities.

There is no inland navigation anywhere within the catchment. The NRA is not responsible for any coastal or estuarine navigation, but the River Hamble, Chichester, Portsmouth and Langstone Harbours all have their own Harbour Authorities. Navigation in the Solent area is controlled by the Queen's Harbour Master.

B10.3 General Requirements for Recreation and Amenity

- Waters to be aesthetically acceptable, free from surface films, floating litter, discolouration or unpleasant odours.

- The flow regime should be compatible with the requirements of recreation and amenity.

Abstraction should be controlled to avoid artificially low summer flows, seasonal spate flows are required to inundate wetlands and to flush river channels.

- A network of footpaths and access points should be available to the public.
- Clearly signposted footpaths, access rights and recreational features.
- The availability of countryside interpretation information.
- Recreation promoted and managed to conform with the objectives of wildlife conservation.

SECTION C : TARGETS

C1 RIVER FLOW TARGETS

Critical river flow requirements are identified from the needs of river USES and summarised in this section.

- The flow regime should reflect the natural pattern of seasonal flow variation to conserve the characteristics of the river.
- The natural flow regime should not be altered in a way which significantly inhibits fish migration or is detrimental to the interests of recreation, conservation or amenity.
- There should be no diminution of flows below those assumed in setting effluent discharge consents.
- Additional minimum residual flows should be set for reaches of the river as the basis for Prescribed Flows and to control future abstraction licences. In particular cases consideration may be given to varying existing licences by including a new prescribed flow control.

C2 WATER QUALITY TARGETS

The following general water quality targets are considered to be appropriate for the catchment :-

- Individual reaches to meet their target River Quality Objective class.
- The conservation and amenity value of the river corridor to be maintained.
- The NRA Groundwater Protection Policy to be implemented
- The NRA water quality monitoring programme for the catchment to be maintained.
- Designation to be sought under the EC Freshwater Fisheries Directive for reaches where significant game or coarse fisheries occur.

C3 RIVER TOPOGRAPHY TARGETS

Overall River Topography Targets for the catchment are derived from those for individual catchment uses, but vary widely in scale. The intention here is to identify broad objectives rather than points of detail.

- Maintain river structures to ensure their continued effectiveness in relation to the Flood Defence Target Levels of Protection shown in Table B7.1
- Ensure that river structures are passable to migratory fish at Q95 flows.
- Maintain the width and depth of river channels at a size appropriate to the flow regime, the requirements of fisheries and wildlife conservation, and the needs of flood defence.

- Where consistent with the requirements of effective flood defence, conserve natural river features such as bankside trees, emergent vegetation, meanders and pool:riffle sequences.

- Promote the development of a buffer strip of uncultivated bankside vegetation to enhance the conservation and landscape value of the river corridor, and to attenuate the effects of siltation, nutrient enrichment and pollution resulting from run-off from adjacent land.

- Prevent excessive trampling of the river bank by livestock.

- Resist new development, especially within the flood plain, to prevent significantly increased flood risk.

- Ensure that river maintenance work and new developments are compatible with the conservation duties of the NRA.

- Maintain the integrity of river banks and channels adjacent to mineral extraction sites.

- Restore waste disposal and mineral extraction sites to an acceptable environmental standard when operations are complete.

- Encourage access to the river for recreational users, consistent with the objectives of conservation.

C4 RIVER MANAGEMENT TARGETS

River management targets are derived from those of individual uses and summarised in this section. The intention is not to provide a maintenance schedule but to indicate the major river management issues.

- Determine the ecological value of river reaches, and the management prescription needed for this to be conserved and enhanced.

- Ensure that environmental objectives are taken into account in river management programmes.

- Maintain channels and river banks to meet flood defence objectives in a way which encourages ecological diversity.

- Manage water levels to reduce flood risks, whilst maintaining fisheries and conserving wetland habitats.

- Maintain in-channel features to benefit wildlife conservation and fish stocks.

- Encourage Local Authorities, riparian owners and other interests to keep river banks and surrounding areas free from litter.

- Manage in-stream vegetation to control water levels, having regard to the needs of fisheries and nature conservation.

- Manage bankside trees to prevent the obstruction of river flow.

- Operate sluices in a way which balances the needs of river users.

SECTION D : CATCHMENT ISSUES

1. Large areas of coastal land, including much of Portsmouth and Hayling Island, are at or below High Tide level and rely on sea walls and embankments for flood protection. The problem is exacerbated by natural subsidence of the coastal plain and the threat of rising sea levels.

2. High groundwater levels in the Hambledon, Finchdean and Rowlands Castle areas cause flooding, and the capacity of local streams is too small for peak flows.

3. Land reclamation and development in Portsmouth Harbour needs to be controlled to minimise its impact in the future on intertidal ecology, water quality and flood defences.

4. Dredging in Portsmouth Harbour is thought to release heavy metals from the sediment into the water. Royal Navy establishments have Crown exemption from NRA jurisdiction, their impact on water quality is under discussion.

5. It is feared that Shellfish dredging in Langstone Harbour and the development of marinas in areas with tidal mudflats might interfere with the dynamics of sediment transport, and that structural changes to the saltings may expose sea defence embankments to risk.

6. Past management of rivers for flood defence and land drainage has resulted in reduced environmental variety. River restoration schemes are needed to improve their conservation and landscape value.

7. In recent years there have been excessive growths of green seaweeds in Langstone Harbour, damaging the sediment ecology. Sewage effluent and other sources contribute to the enrichment problem. The eutrophic status of the Harbour is currently being assessed in connection with the requirements of the EU Urban Wastewater Directive.

8. The River Hamble suffers from low flows at times of reduced rainfall as a result of public water supply abstractions. The upper reaches of the River Meon suffer from leakage through the bed when groundwater levels are low, and there is concern that abstraction reduces river flows. The NRA has concluded studies of these problems and is considering the scope for relocating the abstractions.

9. Swallow holes in the Rowlands Castle area have a direct connection with the prolific Bedhampton springs several kilometres to the south. Low level turbidity problems in the spring water occur during winter rainfall and the vulnerability of the system to catastrophic pollution requires constant vigilance by the Water Company, NRA and the Local Authority.

10. Sea trout migration into the freshwater River Hamble is restricted by structures at Botley Mill.

11. Water quality in urban streams is at risk from pollution by contaminated run-off and accidents.

12. There is a lack of riverside land and wetlands to provide refuges and a corridor for wildlife, and to act as a buffer between rivers and agricultural land.

13. The control of diffuse agricultural pollution is a continuing problem in this catchment.

14. The projected closure of the refuse incinerator at Havant may increase pressure for landfill as a disposal option.

15. Some designated bathing beaches are prone to fail the standards required by the EC Bathing Water Directive. Investment in long sea outfalls has brought dramatic improvements in recent years, but other factors are thought to contribute to the problem. In particular, recent failures at Southsea Beach have not been fully explained.

16. Development has increased flood risks by reducing the flood capacity of river systems and by increasing short-term peak flows.

17. Climate change and rising sea levels could cause problems in the future.

SECTION E : MANAGEMENT OPTIONS

The management options in this section represent the ideas of the of the NRA at the time this Consultation Report was prepared, but do not constitute NRA policy as this will not be finalised until the public consultation process is complete.

Comments on these options and suggestions for new ideas are invited.

Management Options identify the agencies with an interest in the issue concerned, recognising that some functions are outside the specific responsibility of the NRA. The final choice of management action will involve many interests working together to fulfil the common strategy represented by the River Catchment Management Plan.

Table of Management Options

Issue Ref. No. 1	Coastal Land at risk from tidal flooding		
Management Options	Responsible Bodies	Pros	Cons
Establish appropriate coastal flood defences for areas at risk.	NRA, LAs, MAFF, Landowners	Increased security development potential	Cost
Restrict development increase at risk.	LAs, NRA	Addresses the Problem Cheap to Apply	Restricts future options for economic growth
Consider managed retreat policy where appropriate.	NRA, LAs, MAFF, Landowners	Offers opportunity for low cost solution	Impacts on land use, Social effects
In the long term, relocate sensitive industries etc. to other areas.	LAs, Industry, Owners	Solves Problem	Very high cost, Dislocation of local economy. Social effects

Issue Ref. No. 2	High Seasonal Groundwater Levels may cause flooding		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Enhance existing water level monitoring and warning system.	NRA		
Improve the capacity of surface drainage systems and water courses.	LAs, NRA	Wide area solution to problem. Lower unit cost than individual solutions	High cost of disruption, environmental and landscape implications
Maintain close liaison with planning authorities to control development in unsuitable areas.	NRA, LAs	Solves Problem	
Relocate sensitive activities to other areas.	Owners, LAs		Cost, Dislocation of local economy, social effects
Issue Ref. No. 3,4 and 5	**Land reclamation, dredging and shellfishing in Portsmouth and Langstone Harbours may impact on water quality, flood defence and wildlife conservation**		
Incorporate NRA concerns and objectives for intertidal ecology in Strategic and Local Plans.	LAs, NRA		
Improve understanding of the impacts of these activities on the Harbours and secure agreement for appropriate control measures.	Harbour Authorities, LAs, NRA, Royal Navy		
Contribute to the detailed management plans for local Harbours.	EN, Harbour Authority, LAs, NRA, Developers, Fishermen	Integrated Solution	

Issue Ref. No. 6	Past flood defence and land drainage works have reduced the ecological diversity of rivers		
Management Options	Responsible Bodies	Pros	Cons
Progress the restoration scheme for Hermitage Stream in conjunction with Havant Borough Council.	NRA, LA		
Develop habitat improvement proposals for the Lavant, Alver, Wallington and Blackbrook catchments using data from river corridor surveys.	NRA, LAs, EN		
Implement a restoration programme as funds permit.	NRA LAs, EN	Integrated solution	
Issue Ref. No 7	Excessive growths of green seaweed in Langstone Harbour damage the sediment ecology		
Complete the study of the trophic status of the harbour and recommend appropriate action to DoE.	NRA		
ensure that Budds Farm STW complies fully with its consent conditions and resist any increased input of nutrients from this source pending completion of the harbour studies.	NRA, SWS		
Contribute to a detailed management plan for the Harbour.	EN, Harbour Authority, LAs, NRA	Integrated Solution	

Issue Ref. No. 8	The Rivers Meon and Hamble are prone to seasonal low flows resulting from PWS groundwater abstractions		
Management Options	Responsible Bodies	Pros	Cons
Investigate alternative sources of water for public supply, and the possibility of relocating key abstractions.	NRA, Water Cos	Environmental improvement	Cost
Review abstraction licence conditions and, where necessary, introduce more realistic controls. Revoke disused licences and unused portions of licences of right.	NRA	Brings licenses of right within NRA resource strategy	Cost
Develop habitat improvement proposals (see Issue 6 above)			
Issue Ref. No 9	Bedhampton Springs are vulnerable to contamination from surface water entering shallow holes in the Rowlands Castle area		
Apply NRA Groundwater Protection Policy in sensitive areas.	NRA, LAs, Water Cos		
Improve flood capacity of Lavant stream to accommodate direct input of surface water from Rowlands Castle	NRA, SWS, LA		
Issue Ref. No. 10	Sea trout migration into the River Hamble is restricted		
Build fish passes at sensitive locations, starting with Botley Mill.	NRA, Owners, Anglers	Lasting solution to problem	High Capital Cost

Issue Ref. No. 11	Urban streams are at risk from accidental pollution		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Educate the public to be more aware of pollution risks.	NRA		
Ensure that industry follows "good housekeeping" practice in the storage and disposal of polluting substances.	NRA, Industry		
Ensure that waste disposal systems and surface water drainage are segregated as far as possible.	LAs, Owners, SWS	Difficult to apply existing systems	
Ensure that emergency and combined sewer overflows operate correctly.	SWS, NRA, LAs, Owners		
Subject to the Asset Management Plan for the water industry agreed by OFWAT, provide more effective treatment for CSO discharges.	OFWAT, SWS, NRA		
Fit and maintain oil traps on all new surface water and highway drainage systems, and at sensitive points on existing systems.	LAs, Highway Authority		
Issue Ref. No 12.	**Lack of riverside land providing a wildlife corridor and a buffer between the river and agriculture**		
Promote the application of land-use grant schemes to provide a buffer of uncultivated land bordering rivers, and to enhance the conservation value of wetlands.	MAFF, CC, EN, NRA, CLA, Landowners		
Encourage the provision of buffer schemes via the planning process.	NRA, LAs, Landowners		

Issue Ref. No. 13	Diffuse inputs from agriculture affect water quality		
Management Options	Responsible Bodies	Pros	Cons
Establish pollution inventories in affected catchments to identify risks.	NRA, LAs		
Work with farmers to minimise pollution problems.	NRA, Farmers		
Continue monitoring to ensure that improvements are maintained.	NRA		
Issue Ref. No. 14	**There is an increasing demand for landfill to dispose of wastes**		
Consider all applications for landfill or land raising on the basis of risk to the water environment, in accordance with the NRA's Groundwater Protection Policy and Landfill Position Statement. (There is a presumption that waste disposal would be less acceptable on the Chalk than on areas with impermeable geology)	LAs		
Issue Ref. No. 15	**Some designated beaches fail the EC Bathing Water Directive**		
Ensure that the infrastructure, treatment and disposal requirements of the Bathing Water and Urban Wastewater Directives are met effectively and provided within agreed timescales.	SWS, OFWAT, NRA	Compliance with EU law, improves environment	High Cost, for what may be an intermittent problem
Investigate the causes of persistent failures and apply corrective measures.	NRA, Dischargers		

Issue Ref. No. 16	Uncontrolled development may lead to increased flood risks		
Management Options	Responsible Bodies	Pros	Cons
Control development and proposed changes of land use to ensure that flood risks are not increased. Maintain and improve hydrometric monitoring systems.	LAs, NRA NRA		
Issue Ref. No. 17	**Climate change and rising sea levels pose a threat for the future**		
Take account of the possibility of climate change when planning for the future.	All		

Abbreviations

The following are used in the Management Proposals and refer to those bodies that are relevant to the particular proposals.

CC	Countryside Commission
CLA	Country Landowners Association
EN	English Nature
IDB	Internal Drainage Board
LA	Local Authority
NRA	National Rivers Authority
MAFF	Ministry of Agriculture, Fisheries and Food
NFU	National Farmers Union
OFWAT	Office of Water Services
SWS	Southern Water Services Plc

APPENDIX 1 : STATISTICS FOR THE EAST HAMPSHIRE RIVERS CATCHMENT

1. GENERAL INFORMATION

Catchment area 571km²

Topography

Maximum Level	248 m AOD
Minimum Level	0 m AOD

Geology

North - predominantly Chalk, South - Tertiary sands and clays.

Estimated Catchment Population

Year	Population	Change per decade
1991	589,000	
2001	605,000	+2.7%

Districts and Estimated Population (1991)

Hampshire County Council
557.5km² within catchment
97.6% of total catchment area

District	Persons per Ha	Ha in catchment	% area of catchment	Population in catchment
E Hampshire	2.0	83	14.5	16600
Eastleigh	13.3	34	6.0	45200
Fareham	13.4	79	13.9	105900
Gosport	34.1	27	4.8	92100
Havant	21.7	55	9.7	119400
Portsmouth	41.6	39	6.9	162200
Southampton	39.5	1	0.2	4000
Winchester	1.5	239	41.8	35900

West Sussex County Council
13.5km² within catchment
2.4% of total catchment area

District	Persons per Ha	Ha in catchment	% area of catchment	Population in catchment
Chichester	1.3	14	2.4	1,800

Note: The population figures are approximate and portray overall trends rather than precise values.

2. WATER RESOURCES

Resource Areas

	Number	Ha in catchment	% area of catchment
Wallington	28	301	52.7
Meon (part)	29	102.5	18.0
Hamble	30	147.7	25.8
Lower Itchen (part)	31	19.8	3.5
Total		571,000	100.0

Rainfall (mm)

	Mean Year	1:10 yr Drought
Mean Annual Total	850	662
Effective Rainfall	369	205

Abstraction (av. daily vol)

	Meon	Hamble	Portsmouth Area
Licensed Abstraction	54.5Ml/d	33.5Ml/d	164.6Ml/d
Actual Abstraction (1989)	25.1Ml/d	14.4Ml/d	77.2Ml/d
Actual as % of Licensed	46%	43%	47%
Percentage from groundwater	82%	95%	99%
Percentage in High/Med Loss category	53%	99%	97%

River Flow (cumecs):

		R.Meon	R.Hamble
Mean Flow	(Q50)	0.70	0.27
95 percentile Flow	(Q95)	0.19	0.09

Water Supply Companies serving the catchment

	Area (Ha)	% Catchment
Portsmouth	42500	74.4
SWS Hants	11400	20.0
Mid Southern Water	3200	5.6

3. WATER QUALITY

Length of River in each Quality Class (Km)

Meon

Class	Description	Achieved 1992
1	Good	12.0
2	Good	38.1
3	Fair	33.7
4	Fair	6.5
5	Poor	9.1
6	Unclassified	0.0
	Meon Total	99.4

Length Designated under the EC Freshwater Fisheries Directive (Km)

	Freshwater	Tidal
Cyprinid Designation	0	0
Salmonid Designation	24.42	0

Sewage Discharges

	Number	Consented Vol.(Ml/d)
To rivers	19	6386
To estuary	7	136237
To sea	0	0

4. FLOOD DEFENCE

Length of Main River (Km) 160.0 (includes tidal lengths)

Length of Coastline (Km) 165.3

Schedule 4	1424
Main Tidal Waters	1653 (included in Schedule 4)
Sea Defences (NRA)	295
Sea Defences (LA)	861
Tidal Banks (NRA)	238

Internal Drainage Districts (Ha)

None

5. CONSERVATION

Number of Designated Sites in the Catchment

Type	Total	Water Dependent	
Ramsar Sites	2	-	(designated and proposed)
NNRs	2	-	
SSSIs	25	16	

6. NAVIGATION

Length of non tidal navigation : None

APPENDIX 2. GLOSSARY OF TERMS AND UNITS

1:10 YEAR DROUGHT/FLOOD

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

ABSTRACTION LICENCE

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

ABSTRACTION - ACTUAL

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

AONB

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

BOD

Biochemical Oxygen Demand. A measure of the polluting potential.

COARSE FISH

See FRESHWATER FISH, CYPRINIDS, SALMONIDS

CONSUMPTIVE USE

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

COUNTY STRUCTURE PLANS

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

CYPRINIDS

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

DISTRICT LOCAL PLANS

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

DROUGHT ORDER

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

EFFECTIVE RAINFALL

Total rainfall minus direct evaporation and the water used by plants for transpiration. This is equivalent to the total resource of a catchment.

EIFAC

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

EMERGENT VEGETATION

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

EPHEMERAL FLOW

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

FLOW MEASUREMENT UNITS

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

FLOW CONVERSION TABLE

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

FRESHWATER FISH

For the purposes of the Salmon and Freshwater Fisheries Act 1975, fish other than Salmon, Brown Trout, Sea-Trout, Rainbow Trout and Char (see also COARSE FISH, FRESHWATER FISH, SALMONIDS).

HECTARE

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

HIGH SEAS RIGHTS

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

IDB

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

IMPOUNDMENT RESERVOIR

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

ISOHYETALS

Contours of equal mean annual rainfall.

LOCAL NATURE RESERVE

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

mAOD

A measure of altitude. Metres above ordnance datum.

MARSH FEEDING

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

MEAN LICENSED ABSTRACTION

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

MHWS

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

MINIMUM RESIDUAL FLOW (MRF)

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

APPENDIX 3 : FURTHER READING

EC Directives

Quality of Surface Water for Abstraction as Drinking Water:	(75/440/EEC)
Pollution Caused by the Discharge of Dangerous Substances:	(76/464/EEC)
Quality of Fresh Waters for the Support of Fish Life:	(78/659/EEC)
Protection of Groundwater Against Pollution:	(80/68/EEC)
Urban Waste Water Treatment:	(91/271/EEC)
Protection Against Pollution by Nitrates from Agriculture:	(91/676/EEC)

Acts of Parliament

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

NRA Publications

NRA Corporate Plan (Annually)
Water Resources Development Strategy: A Discussion Document. 1992
Sustaining our Resources. Southern Region Water Resources Development Strategy: NRA Southern Region 1992

Other Publications

Conservation and Land Drainage Guidelines: Water Space Amenity Commission 1980
Nature Conservation and River Engineering: Nature Conservancy Council 1983
Rivers and Wildlife Handbook: RSPB 1984
Changing River Landscapes: Countryside Commission CCP238 1987
Code of Practice on Conservation, Access and Recreation: MAFF, DoE & Welsh Office. HMSO 1989
Nature Conservation and the Management of Drainage Channels: Nature Conservancy Council & Association of Drainage Authorities 1989
Conservation Guidelines for Drainage Authorities: MAFF, DoE & Welsh Office. 1991
Solving the Nitrate Problem: MAFF 1993