

THE FROME & PIDDLE CATCHMENT MANAGEMENT PLAN CONSULTATION REPORT

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ENVIRONMENT AGENCY

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South Western Region
March 1995*

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Published March 1995

ENVIRONMENT AGENCY



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FROME & PIDDLÉ

CATCHMENT MANAGEMENT PLAN

CONSULTATION REPORT

YOUR VIEWS

The Frome & Piddle is the second Catchment Management Plan (CMP) produced by the South Wessex Area of the National Rivers Authority (NRA). CMPs will be produced for all catchments in England and Wales by 1998.

Public consultation is an important part of preparing the CMP, and allows people who live in or use the catchment to have a say in the development of NRA plans and work programmes.

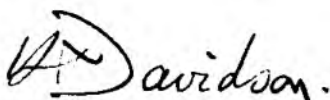
This Consultation Report is our initial view of the issues facing the catchment. We would welcome your ideas on the future management of this catchment :

- *Have we identified all the issues ?*
- *Have we identified all the options for solutions ?*
- *Have you any comments on the issues and options listed ?*
- *Do you have any other information or ideas which you would like to bring to our attention?*

This document includes relevant information about the catchment and lists the issues we have identified and which need to be addressed. Following the public consultation period, we will produce an Action Plan that will set out targets for action by the NRA and others over the coming years.

This is your opportunity to influence our future plans

We look forward to hearing from you



Howard Davidson

Area Manager, South Wessex Area

Please send your comments by 1st July 1995, preferably by writing to :

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THE NATIONAL RIVERS AUTHORITY

The National Rivers Authority (NRA) is responsible for protecting and improving the water environment within England and Wales. It has a wide range of responsibilities which include:

- *improving water quality and controlling pollution*
- *managing water resources and controlling water abstraction*
- *protecting and improving fisheries and recreation facilities*
- *providing flood defences and flood warning systems*
- *conserving and enhancing the nature, landscape, archaeology, geology and amenity interest in inland and coastal waters*

To achieve its aims, the NRA must work with or seek to influence central government, local government, industry, commerce, farming, environmental organisations, riparian owners and the general public.

Our 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 interest of all who benefit from and use rivers, groundwaters, estuaries, and coastal waters. We will be businesslike, efficient and caring towards our employees.

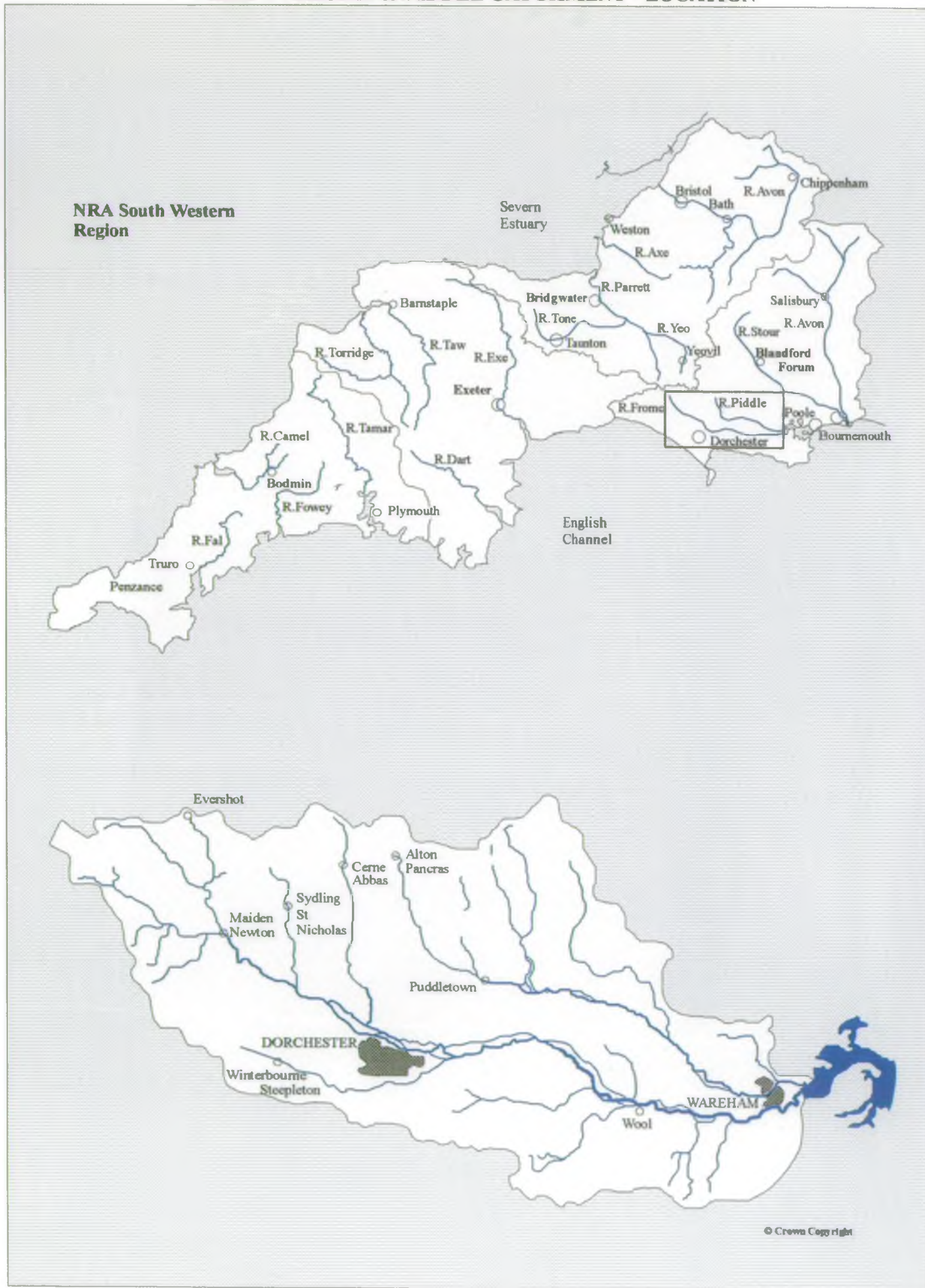
Our aims are to :

- *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 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 recreational 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 water 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*

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MAP 1 : FROME & PIDDLE CATCHMENT - LOCATION



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1. CATCHMENT VISION

The Frome & Piddle is essentially a rural catchment of high amenity and ecological value. The upper part of the catchment lies within the Dorset Area of Outstanding Natural Beauty and is characterised by steep-sided valleys. The rivers change in character as they flow through lowland towards Poole Harbour where they drain into the English Channel. The rivers make an important contribution to the rural economy through tourism, agriculture and recreation.

The high quality water in the aquifer provides a source both for public water supply and for the rivers which support high quality salmonid fisheries. The protection of public health and the natural water environment therefore demands that our management of the catchment will ensure that :

- *the quality of water in aquifers is not compromised*
- *abstractions of water are in balance with the ecological needs of rivers and where flows are not environmentally acceptable then, where justifiable, sustainable solutions must be sought*

The rivers also allow us to dispose of treated sewage effluents and we must ensure that using the cleansing capacity of the Frome & Piddle to purify effluents does not damage their considerable ecological, amenity and fishery potential.

In our management of flood defences and land drainage, we will seek to balance the needs of the environment by :

- *protecting people and property from flooding*
- *developing a strategy for agreed flood plain land use management, recognising the need to conserve and enhance the wetland wildlife interest of the catchment*

The realisation of this vision will involve the commitment of all who have an interest in the water environment, and the NRA recognises the importance of establishing links with local communities and their representatives. It is important that local planning authorities include policies in their local plans which protect and enhance the water environment. The NRA has a commitment to work with all relevant parties to implement the principles of sustainable development.

2. INTRODUCTION

2.1 Catchment Management Plans

Sustainable development can be defined as *development that meets the needs of the present without compromising the ability of future generations to meet their own needs*, and it is at the heart of UK policy on the environment. A recent government publication, Sustainable Development - The UK Strategy (HMSO 1994), recognises the inland freshwaters of the UK as *a vital and highly valued component of the UK environment and ecology*, along with the conflicts that may arise between different purposes and uses of the water and water environment.

An holistic approach to river management is required to plan for environmental sustainability and improvement. To this end, the NRA has developed the concept of catchment management plans (CMPs). These allow the full range of water management issues to be identified and considered within a geographical area which is both relevant and meaningful. CMPs are strategic in nature, since individual catchments cover large areas of land often straddling local authority boundaries.

2.2 The Consultation Report

This Consultation Report includes the following sections :

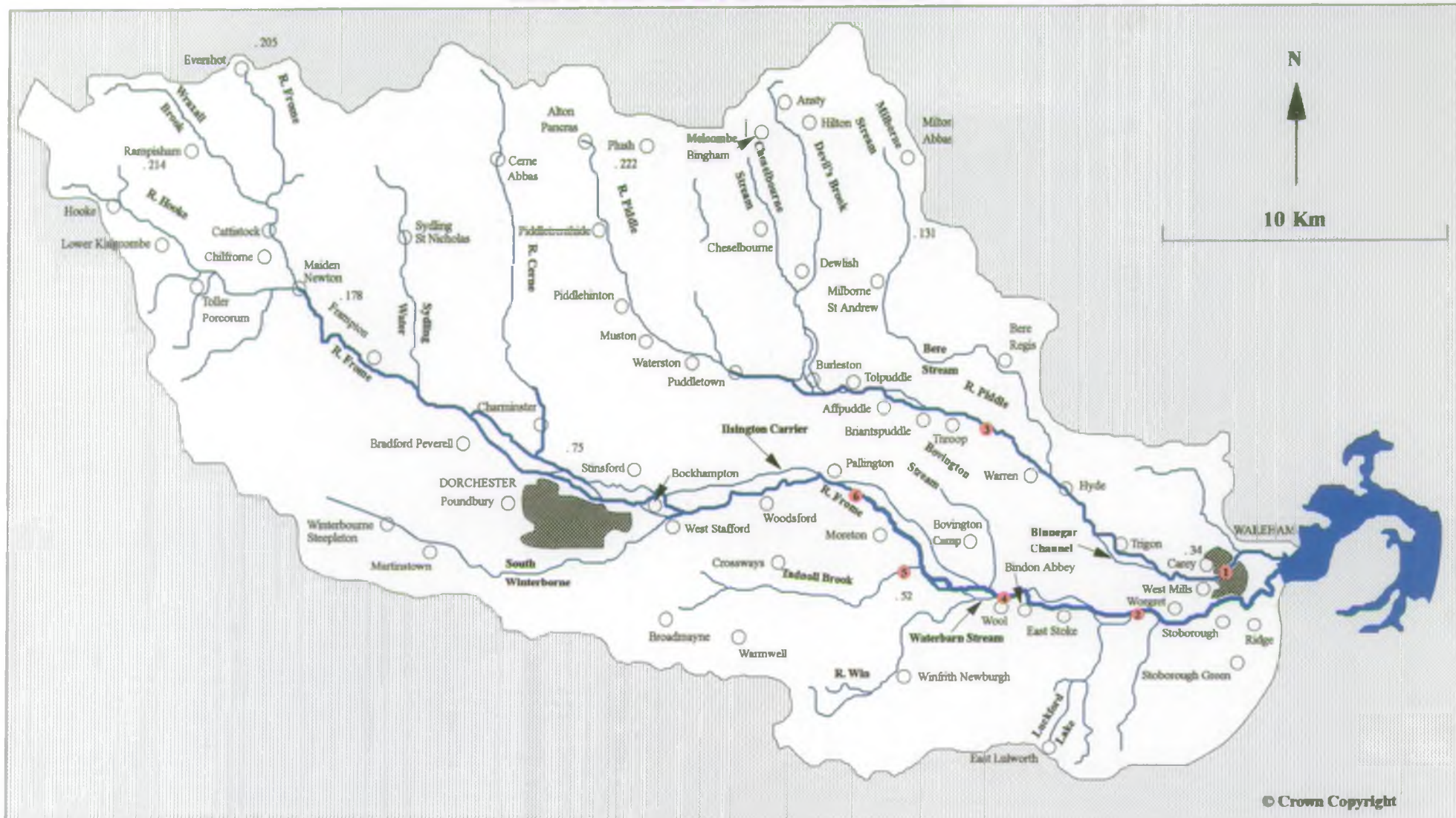
- *Catchment Characteristics, which provides a brief and general introduction to the catchment describing its key characteristics*
- *Catchment Uses, which describes the activities that take place in the catchment which may influence the water environment or have requirements of it. We include notes about our role in managing or promoting these issues*
- *Catchment Status, where we assess the state of the catchment in relation to the water environment, and identify environmental quality targets where we can*
- *Issues and Options, where we identify situations where targets are not being met or we are failing to meet our objectives. Where possible we identify options and invite comment on the possible course of action to resolve the issues*

2.3 The Action Plan

We will collate the responses to this report and publish an Action Plan in November 1995. The Action Plan will be reviewed annually and a progress report published. The Plan will normally be subject to a major review every 5 years.

We have also set up a Steering Group comprising representatives of organisations and individuals representing interest groups in the catchment. They have helped us produce this Report, and will monitor our progress with the Actions.

MAP 2 : FROME & PIDDLE CATCHMENT



LEGEND



River

. 34

Spot Heights (mAOD)



Poole Harbour (Part Of)



Settlements



1. North Bridge

4. Wool Bridge

2. Holme Bridges

5. Broomhill Bridge

3. Cecily Bridge

6. Hurst Bridge

3. CATCHMENT CHARACTERISTICS

3.1 Catchment Description

The Frome rises on the North Dorset Downs near Evershot, and flows south to be joined near Cattistock by the Wraxall Brook, and at Maiden Newton by the River Hooke. Two small streams, the Sydling Water and the Cerne, also join the Frome upstream of Dorchester. Below Dorchester, the Win, South Winterborne and Tadnoll Brook enter from the south, while the Frome itself meanders in an easterly direction to Poole Harbour.

The Piddle rises at four major springs near Alton Pancras, initially flowing south before turning east at Puddletown towards Poole Harbour. The Devil's Brook and Cheselbourne flow from the north and join the Piddle east of Puddletown. The Bere Stream flows south through Milborne St Andrew and Bere Regis to join the Piddle at Warren.

In the upper reaches, the rivers are dependant on springs and groundwater levels for their flows. Many are winterbournes, where the stream ceases to flow during the summer, or perched, where the flow goes underground for part of its length.

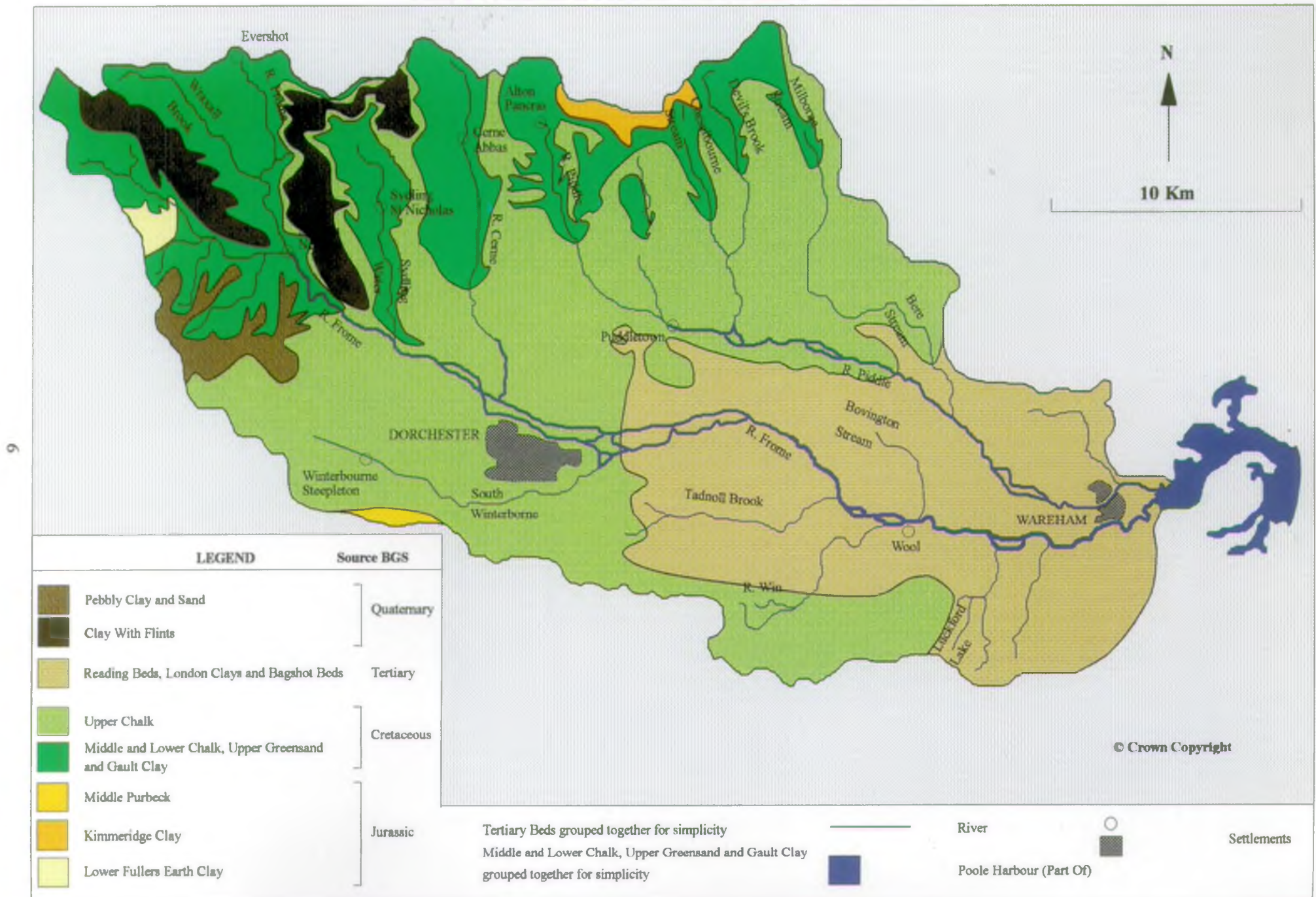
The middle reaches of both rivers have a braided network of channels; some are flood relief channels, and others natural, but many are relics of historic water meadow systems. Most of these water meadow systems are now abandoned, but their locations are easily seen; there have been some partial restorations on the Frome at Maiden Newton and on the Devil's Brook. There are no other significant waterways such as canals within the catchment.

The rivers drain an area of some 660km² and flow into Poole Harbour; the Harbour will be the subject of a separate CMP, to be published later in 1995.

The catchment lies entirely within the county of Dorset. It has a population of 50,460 (mid 1992 estimate), with an annual growth rate (1984-1990) of almost 3%, mainly by migration into the area. It is predominantly rural, with only two major settlements, Dorchester (population 15,104) and Wareham (8,092). Other centres include Puddletown, Maiden Newton, Cerne Abbas, Bere Regis and Wool, and the military establishment at Bovington.

Several main roads cross the area including the A35 Bridport-Bournemouth road. Dorchester is also linked to Wareham, Weymouth and Yeovil by rail. Industrial development is light, with most activity being related to agriculture.

MAP 3 : FROME & PIDDLE CATCHMENT - GEOLOGY



3.2 Geology, Soil and Land Use

The upper part of the catchment is dominated geologically by Chalk, from which most of the rivers flow. The top of the Frome catchment is more complex because of its geological faults, and a variety of clay outcrops are present.

The soils are characteristically shallow, well-drained and chalky, although there are substantial areas of heavier, clay-influenced soils. In the middle ages, land use was dominated by sheep, but with the recent widespread use of fertilizers, arable crops predominate with dairying and stock rearing.

The upper tributaries flow through typical chalk valleys, with their landscape of pasture on the flat valley floors, patches of woodland, and tree-lined channels. Much of this area falls in the Dorset Area of Outstanding Natural Beauty (AONB), and is a valued and protected landscape.

In the lower part of the catchment, there is a more recent geology dominated by sands, gravels and clays. Soils are acid and sandy, and since prehistoric clearance the area has been typically lowland heath. The landscape is characterised by valley pastures, usually improved, with some arable crops adjacent to the river. Fields are generally large, but there are also areas of small fields and copses along some channels.

Downstream, the floodplain widens out into extensive tracts of pasture and marsh, with some acid heathland. In the main river valleys, the soils are often waterlogged either from groundwater or by winter flooding. Land use for both would typically be permanent grassland, dairying or stock rearing, with some cereals and natural wetland habitats.

3.3 Hydrology

3.3.1 Hydrogeology

The Chalk is the major aquifer, or reservoir of underground water, in the catchment. This layer passes beneath the lower catchment and Poole Harbour, rising again on the coast near Swanage and on the Isle of Wight.

Chalk is a porous rock, though it is mainly the cracks and fissures which allow it to transmit large quantities of water. The Upper and Middle Chalk are generally more permeable than the less well fissured and more marly Lower Chalk.

There is probably hydraulic continuity between the Chalk and Upper Greensand, but it is likely that the Lower Chalk is sufficiently impermeable to reduce groundwater movements. Supporting evidence comes from the Upper Piddle where spring flows are found at the Upper-Middle Chalk boundary, resulting from water being unable to percolate down into the Upper Greensand. Beneath the Greensand is a layer of relatively impermeable Gault Clay.

The sands and gravels of the lower catchment are relatively impermeable, which limits recharge to the aquifer and also give rise to springs.

3.3.2 Rainfall

Rainfall is measured daily at 12 Meteorological Office approved gauges within the catchment (Fig 1), and it is these sites that have been used to produce the long term annual average rainfall (1961 - 1990). There is also a telemetry raingauge at Evershot which is able to record rainfall intensity.

Map 4 shows how the average annual rainfall varies across the catchment. The highest rainfall, up to 1,100mm, occurs in the north of the catchment and the south-west, reflecting the higher altitudes in these areas. Rainfall decreases to the south and east, with the lower part of the catchment experiencing rainfall of between 850 and 950mm.

3.3.3 River Flow

The natural river flows are mainly influenced by the geology of the catchment, and the upper tributaries are predominantly spring-fed.

In the summer, the water level in the chalk will fall, and some of the uppermost springs will progressively dry up. This may lead to sections of the river ceasing to flow. Such flow as remains tends to be relatively stable because it originates from these springs; rainfall is largely absorbed by the soil.

During winter the increased rainfall will eventually saturate the chalk, restoring the water level and the spring flows. Only when the aquifer is recharged will further rainfall run off directly into the river, giving rise to more variable flows.

River flows are measured at 12 permanent gauging stations within the catchment. There is also a level-only measuring station, primarily for flood warning purposes, at Maiden Newton.

FIGURE 1 : FROME & PIDDLE CATCHMENT - RAINFALL FROM TWO SITES

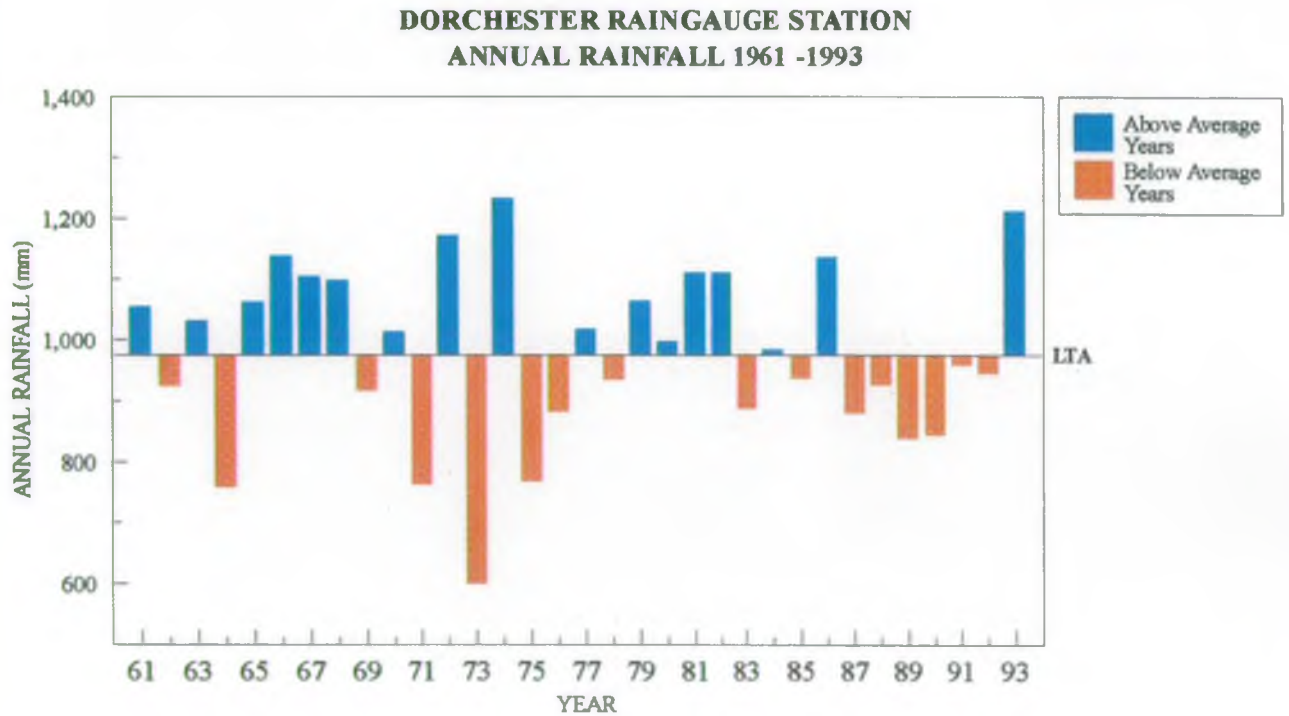
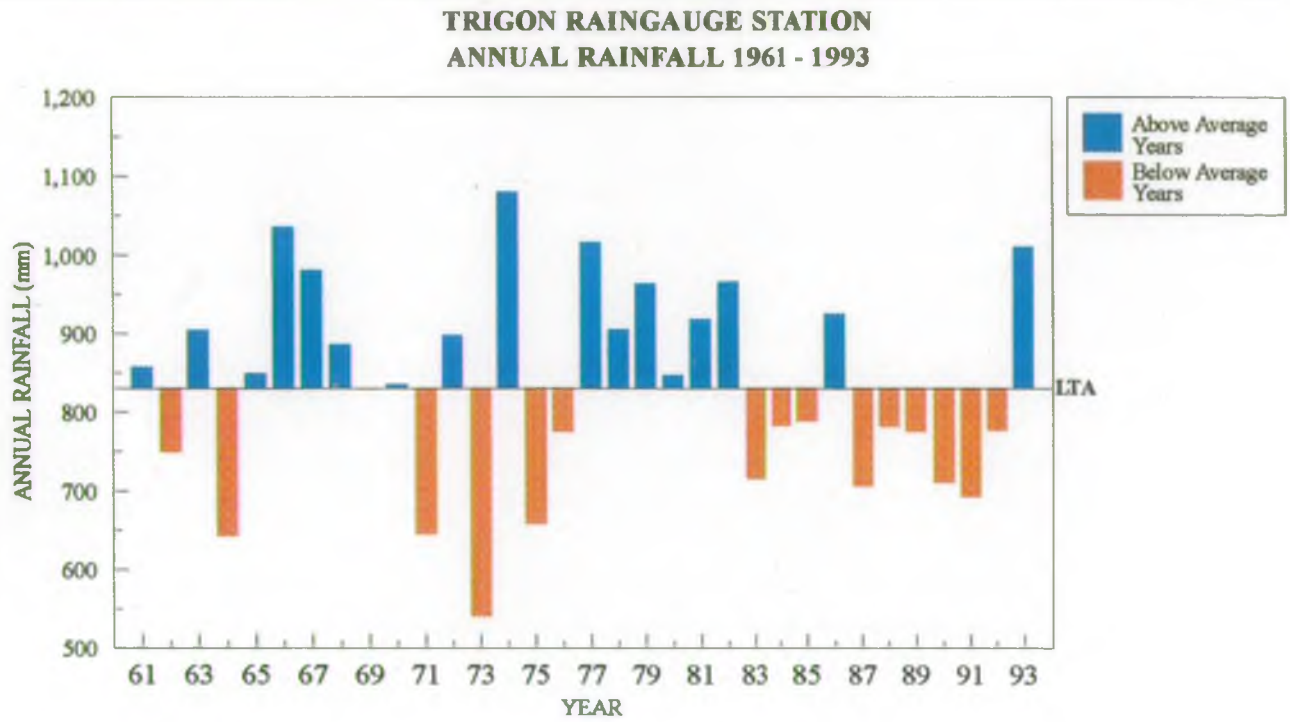
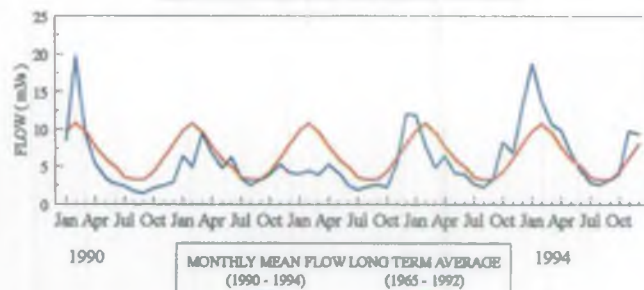


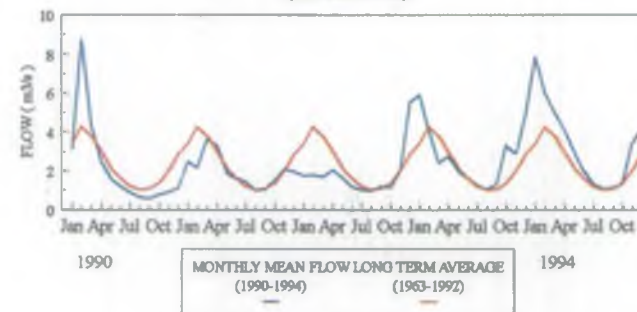
FIGURE 2 : FROME & PIDDLE CATCHMENT - SAMPLE HYDROMETRIC DATA

HYDROGRAPH FOR EAST STOKES

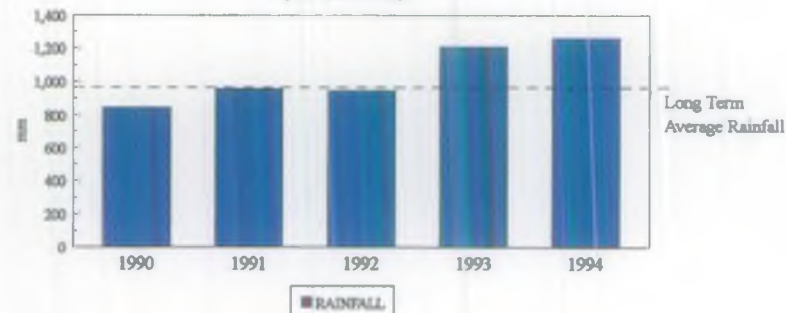


COMBINED FLUME (SY 866 868) AND
WEIR (SY 873 867)

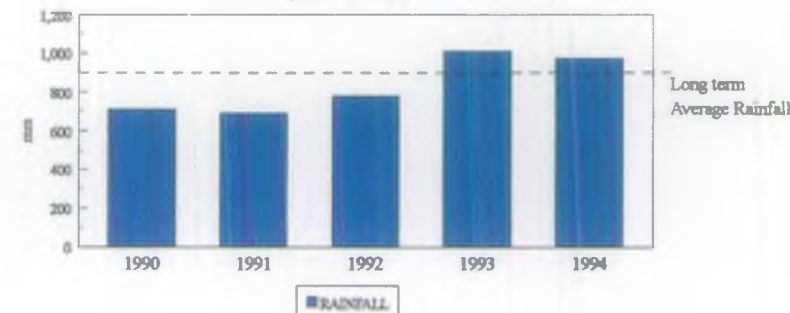
**HYDROGRAPH FOR BAGGS MILL
(SY 914 876)**



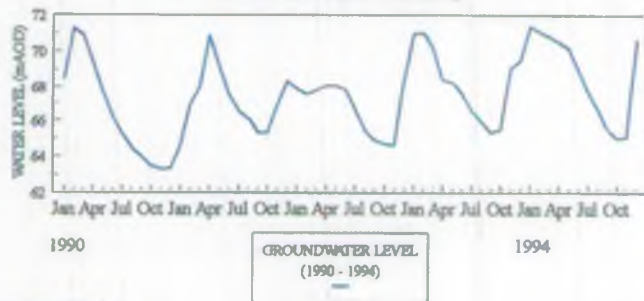
**RAINFALL RECORD FROM DORCHESTER STATION
(SY 684 906)**



**RAINFALL RECORD FROM TRIGON STATION
(SY 887 889)**

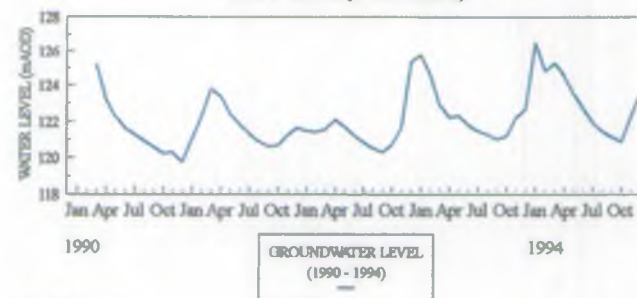


**GROUNDWATER LEVEL FROM ASHTON FARM
1990 - 1994 (SY 662 880)**



DATUM 72.18m

**GROUNDWATER LEVEL FROM BARCOMBE FARM
1990 - 1994 (ST 699 032)**



DATUM 127.58m

CATCHMENT CHARACTERISTICS

Flows at the two lowest gauging stations in the catchment, East Stoke on the Frome, and Baggs Mill on the Piddle, are analysed below. They effectively measure the flow out of the catchment.

The flow that is exceeded for 95% of the time (Q95) for East Stoke is 34% of its mean annual flow, and for Baggs Mill is 32%. These percentages reflect how much of the flow depends on groundwater, and how slowly the rivers respond to rainfall.

	LTA Daily Mean Flow	Q95 Flow	Max Daily Mean Flow	Min Daily Mean Flow
East Stoke	6.552	2.146	24.1 (26 Feb 66)	0.955 (27 Aug 76)
Baggs Mill	2.358	0.760	9.8 (9 Jan 68)	0.363 (23 Aug 76)

East Stoke data 1965 - February 1995, Baggs Mill data 1963 - February 1995

Max and Min flows from LH data sheets, all flows in m³/s

In an average year, the flow would only be at or below Q95 levels for 18 days. The table clearly indicates the drought years of 1976, 1989 and 1990 with more low flow days than average, and recent wetter years with fewer.

	Q95	1976	1989	1990	1991	1992	1993	1994
East Stoke	2.146m ³ /s	115	105	115	0	64	19	0
Baggs Mill	0.760m ³ /s	130	82	83	0	0	0	0

The hydrology reviewed above is based on the recorded flow rather than the natural flow; it is inevitable that abstractions and discharges within the catchment have altered the flow regime, and natural flows would probably be higher than those recorded.

3.3.4 Groundwater

The manual monitoring of groundwater levels takes place at 24 boreholes in the Piddle catchment and 11 in the Frome catchment. In addition the borehole at Ashton Farm is continuously monitored (Fig 2).

4. CATCHMENT USES

4.1 Water Abstraction

We consider here all surface and groundwater abstractions including public water supplies, industrial, domestic and amenity supplies.

4.1.1 Objective

The NRA seeks to manage water resources in the catchment for the benefit of all, by seeking to :

- *achieve a best use of water resources within a planned and sustainable framework, through effective licensing control, in such a way to achieve and maintain the right balance between protected rights, lawful water users and the natural environment*
- *promote the efficient use of water by all types of abstractor*

4.1.2 The Role of the NRA

Our management of water resources is guided by EU and UK legislation. We have duties and powers to:

- *take action to conserve, redistribute, augment and secure proper use of water resources, recovering costs through abstraction licences*
- *obtain and publish information about the demand for water and the available resources, and to maintain a public register of licence applications*
- *set minimum acceptable flows, levels or volumes for inland waters*
- *administer the system of licensing abstractions and impoundments. We have powers to grant or refuse licence applications and may impose restrictive conditions on new licences to protect existing interests. We can apply to revoke or vary existing abstraction licences, but only if the licence holder agrees or is compensated*
- *seek emergency or ordinary drought orders from the Secretary of State and restrict spray irrigation to cope with water shortages*
- *enforce licence conditions, prosecuting offenders if appropriate*

4.1.3 Local Perspective

All licensed abstractions in the catchment are summarised in the table below. The high percentage of groundwater abstractions reflects the importance of the chalk aquifer as a source of supply.

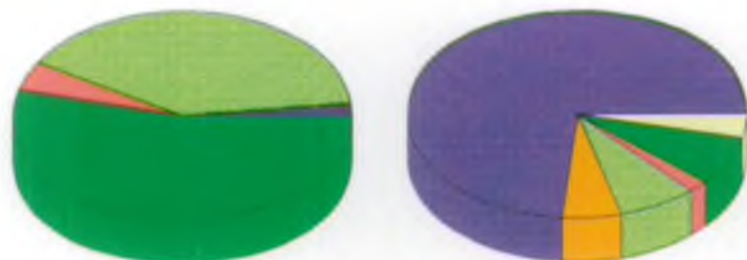
	Number of Licences	Licensed Daily Quantity (ML/d)	Licensed Annual Quantity (ML/y)	% from Groundwater	% from Surface Water
Frome	206	288.16	76,140.57	54.2	45.8
Piddle	79	196.74	52,754.25	43.5	56.5
Total	285	484.90	128,894.82	49.8	50.2

Daily licensed quantity represents how much could legally be abstracted per day but is not necessarily a straight multiplication to annual quantity ie maximum daily quantities cannot be taken every day of the year. Where no specific daily quantity is available, the average of the weekly licensed value is used.

Fig 3 shows the breakdown of abstraction licensing for both groundwater and surface water in the catchment. The largest licensed groundwater uses (by licensed volume) are public water supply (PWS) and cress growing, although general farming has the largest number of licences. The largest licensed surface water use is fish farming, although the actual numbers of licences are evenly spread among many uses.

FIGURE 3 : FROME & PIDDLE CATCHMENT - LICENSED ABSTRACTIONS

Piddle - Groundwater

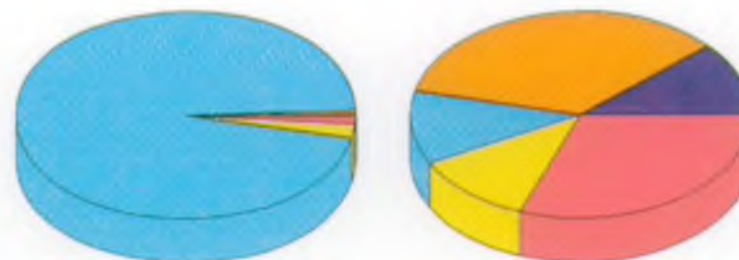


% Of Licensed Abstractions

Number Of Licences



Piddle - Surface Water

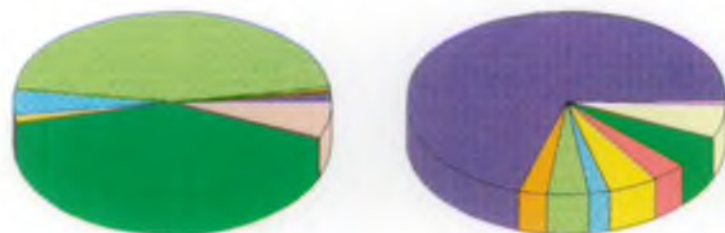


% Of Licensed Abstractions

Number Of Licences



Frome - Groundwater

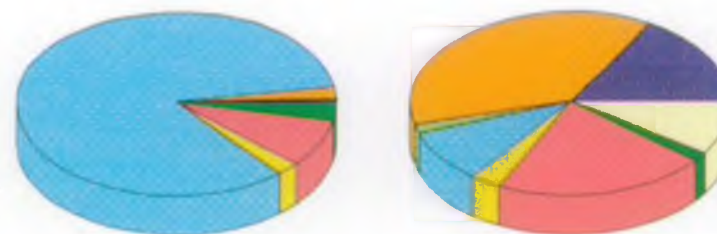


% Of Licensed Abstractions

Number Of Licences



Frome - Surface Water



% Of Licensed Abstractions

Number Of Licences

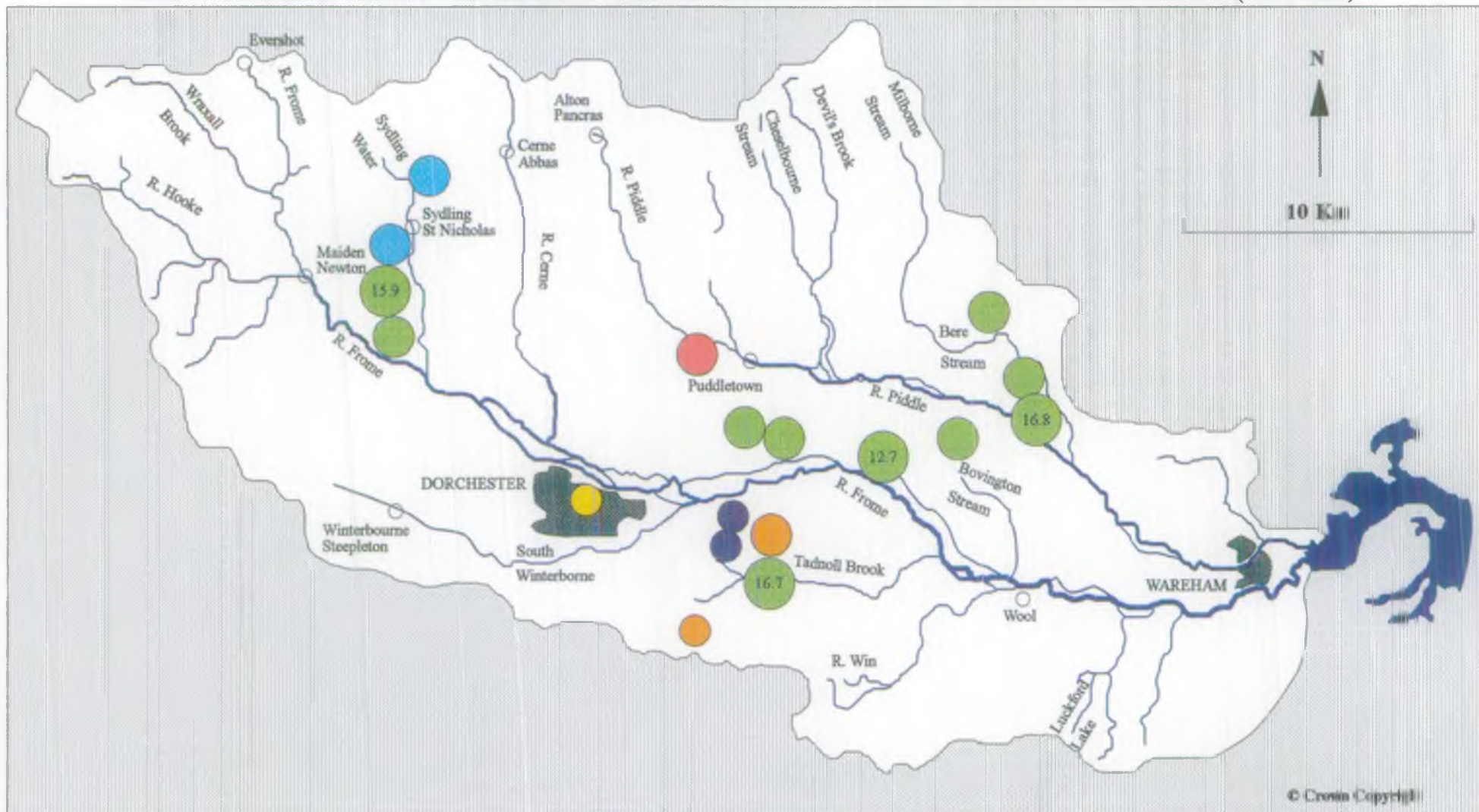


NOTE

%'s based on annual licensed quantities
 Spray Irrigation - Agriculture and Leisure
 Other - Commercial and Public Service

MAP 5 : FROME & PIDDLE CATCHMENT - PRIVATE LICENSED GROUNDWATER ABSTRACTIONS (>0.45 Mld)

15

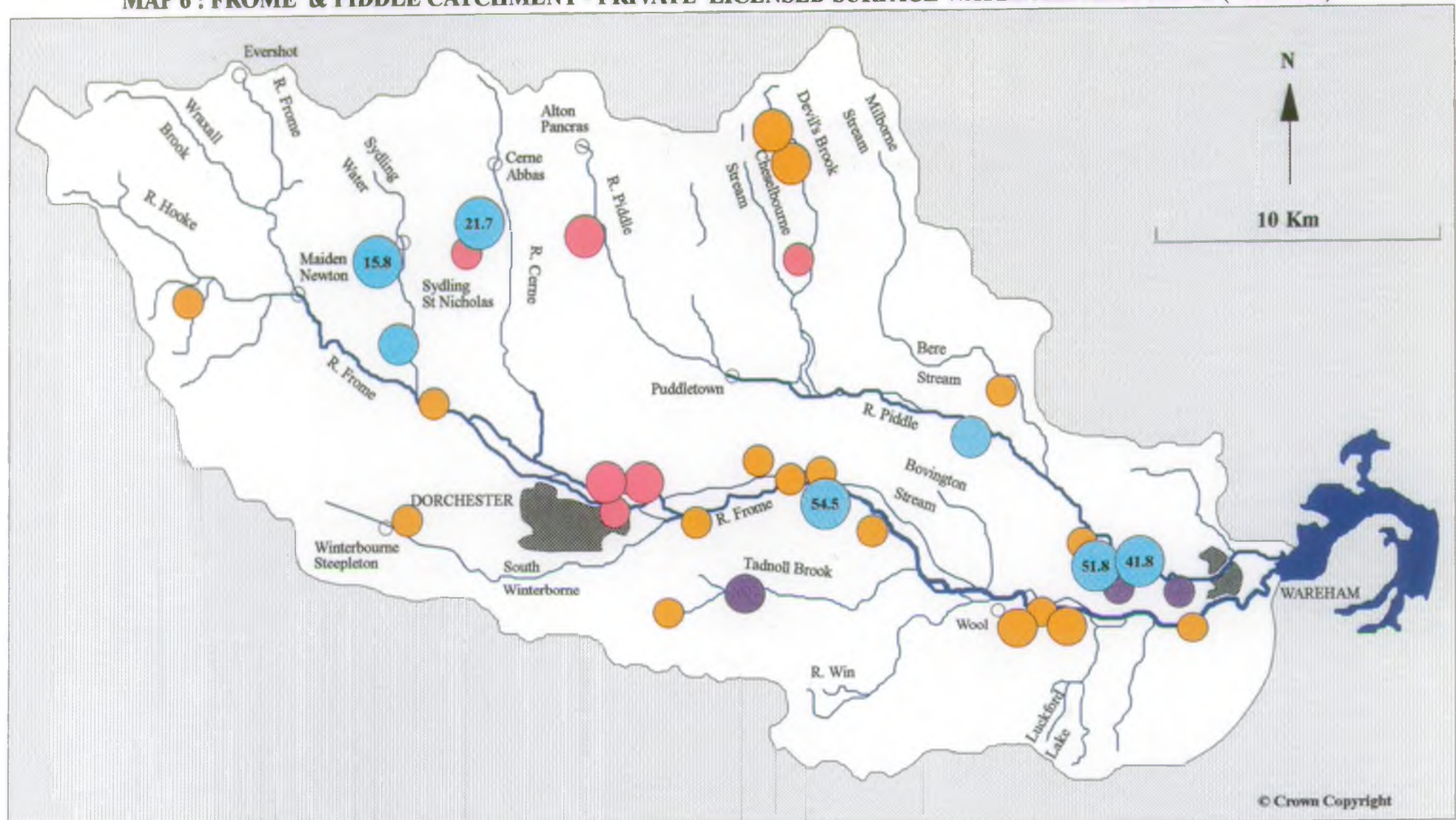


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LEGEND

	River		> 0.45 Mld but < 1 Mld	Primary Purpose Of Licence		Spray Irrigation		Commercial
	Poole Harbour (Part Of)		1 - 10 Mld inclusive			Cress		Industrial
	Settlements		> 10 Mld (Actual licensed Quantity In Circle)			Fish Farms		Gravel Washing

MAP 6 : FROME & PIDDLE CATCHMENT - PRIVATE LICENSED SURFACE WATER ABSTRACTIONS (>0.45Mld)



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LEGEND

	River		> 0.45 Mld but < 1 Mld	Primary Purpose Of Licence		Spray Irrigation
	Poole Harbour (Part Of)		1 - 10 Mld inclusive			Fish Farms
	Settlements		> 10 Mld (Actual licensed Quantity In Circle)			Gravel Washing
						Leisure

Licensed abstractions fall into two basic categories of consumptive and non-consumptive use. Consumptive use generally involves the loss of a proportion of the water abstracted eg spray irrigation; non-consumptive use returns virtually all the abstracted water back into the catchment close to the point of abstraction eg fish farms. Consumptive uses have more impact on rivers than non-consumptive, though these can still have localised impacts depending on the rates of abstraction and local conditions.

The annual licensed total for the Frome represents 37% of the long term average (LTA) flow at East Stoke, and for the Piddle represents 72% of the LTA flow at Baggs Mill. The much higher percentage for the Piddle than the Frome is a crude indication of the pressure on its resources.

If the uses of the licences are considered, about 72% of the total annual licensed abstraction from the Frome is non-consumptive, and 74% for the Piddle. A large proportion of the water is returned to the catchment and can be reused.

The data above are based on the worst-case where all abstractions are used to a maximum. The table below gives an indication of actual use of water compared with total licensed quantities for the period 1993-1994. This is based on returns made to the NRA, a condition on most abstraction licences, which represents most of the total quantity.

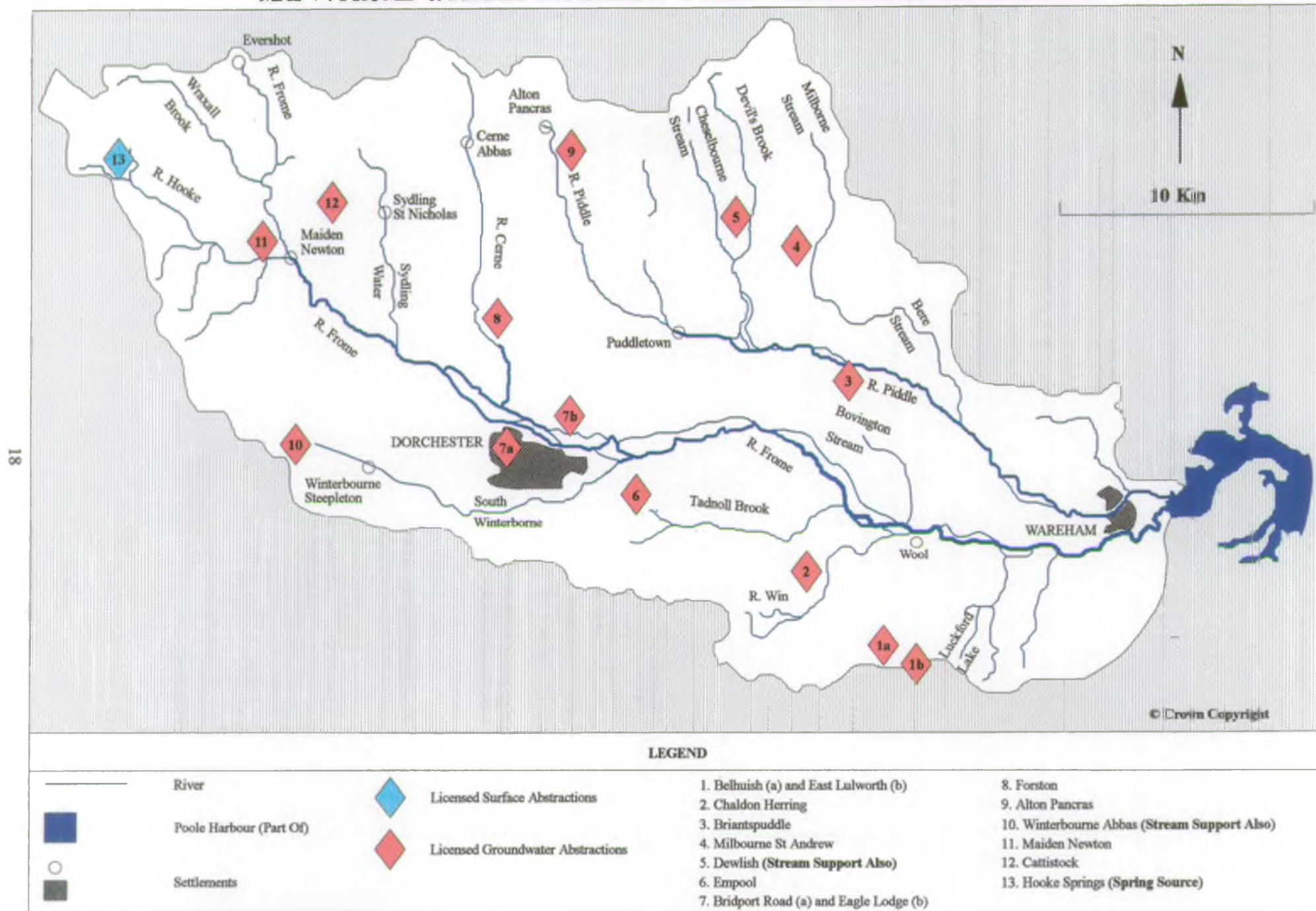
Catchment	Source	No of Licences Data Based On	Licensed Quantity (MI)	Actual Quantity (MI)	% Use
Frome	Groundwater	53	28,056.4	12,411.1	44.2
	Surface Water	37	34,756.3	31,206.7	89.8
Piddle	Groundwater	24	21,135.2	15,167.3	71.8
	Surface Water	16	29,732.0	25,793.8	86.8
Total		130	113,679.9	84,578.9	74.4

4.1.4 Public Water Supply

Wessex Water Services (WWS) are the sole providers of mains PWS within the catchment. They have 13 licences to abstract. The locations are shown on Map 7 and the quantities, sources and conditions in the table below.

Source	Yearly Licensed Quantity (MI)	Daily Licensed Quantity (MI)	Comments
Alton Pancras	1,363.80	4.55	
Dewlish	2,363.92	9.09	Up to 1.135MI/d can be provided to maintain flows in the Devil's Brook when flows fall below prescribed levels at Woodsdown Cross gauging station.
Briantspuddle	6,619.12	18.18	
Milborne St Andrew	2,045	10.50	
Cattistock	540	2.73	
Maiden Newton	232.30	0.64	
Forston	1,250.00	4.55	
Eagle Lodge	2,550.00	8.20	Additional 4.8MI/d can be abstracted in any 30 days, subject to licence conditions
Winterbourne Abbas	1,250.00	4.50	Up to 1.7MI/d can be provided to maintain flows in the South Winterborne when flows fall below prescribed levels at Winterbourne Steepleton gauging station.
Empool	4,550.00	19.10	Stream support from Watergates.
Chaldon Herring	136.84	0.37	
Belhuish/East Lulworth	6,000.00	20.00	Subject to a maximum of 15MI/d and 4,000MI/y at Belhuish
Hooke Springs	1,063.79	2.92	

MAP 7 : FROME & PIDDLE CATCHMENT - PUBLIC WATER SUPPLY ABSTRACTIONS



The PWS abstraction represents 1.65% of the total annual licensed quantity for surface water (3% for the Frome, none for the Piddle) and 45% for groundwater (40% for the Frome, 54% for the Piddle). The importance of groundwater to PWS is evident from these figures.

Out of Catchment Supply

All the sources currently operate to meet local demands, but not always within this catchment. Supply out of the catchment represents a total loss to the catchment. There is little conjunctive use of the 13 sources within the catchment.

Water from Empool can be diverted either northwards to Dorchester (within the catchment) or south to Weymouth (out of catchment). Alton Pancras was developed to supply water to Somerset, and some 70% of the abstraction leaves the catchment.

4.1.5 Private Water Supply Resources

Fish farming accounts for 89% of the annual licensed quantity for surface water and 3% for groundwater. Cress growing accounts for less than 0.5% of the annual licensed quantity for surface water and 43% of the groundwater. It is not anticipated that any growth will occur in these uses. Most of this water is returned to the rivers close to the point of abstraction.

Use	% of Total Annual Licensed Quantity		Predicted Annual Growth Rate	Comments
	Ground	Surface		
Non mains domestic supply (1)	< 0.5	< 0.5		In areas with low population density there maybe difficulties in supplying mains water at reasonable cost, in these circumstances private ground/surface water supplies provide a useful alternative, yields permitting.
Agriculture (2)	1.8	< 0.5		The NRA's Wessex Areas Water Resources Strategy predicts little growth in this use.
Spray irrigation (agriculture, horticulture & leisure, such as golf courses)	< 0.5	1.6	1.7% 1991 - 2001 inc 1% 2002 - 2021 inc (3)	Demand generally occurs at times of year when rivers are naturally low and impacts can be high. The NRA will generally expect any such schemes to include the provision of storage to protect the water environment.
Industrial	0.8	2.2	0.8% to 2021 (4)	Limited use, although water is used in extractive industries and for brewing.
Fish farms	3.0	89.0		
Cress farms	43.0	<0.5		
Other (commercial, public services & leisure)	< 1.7	5.2		This use includes off stream amenity ponds.

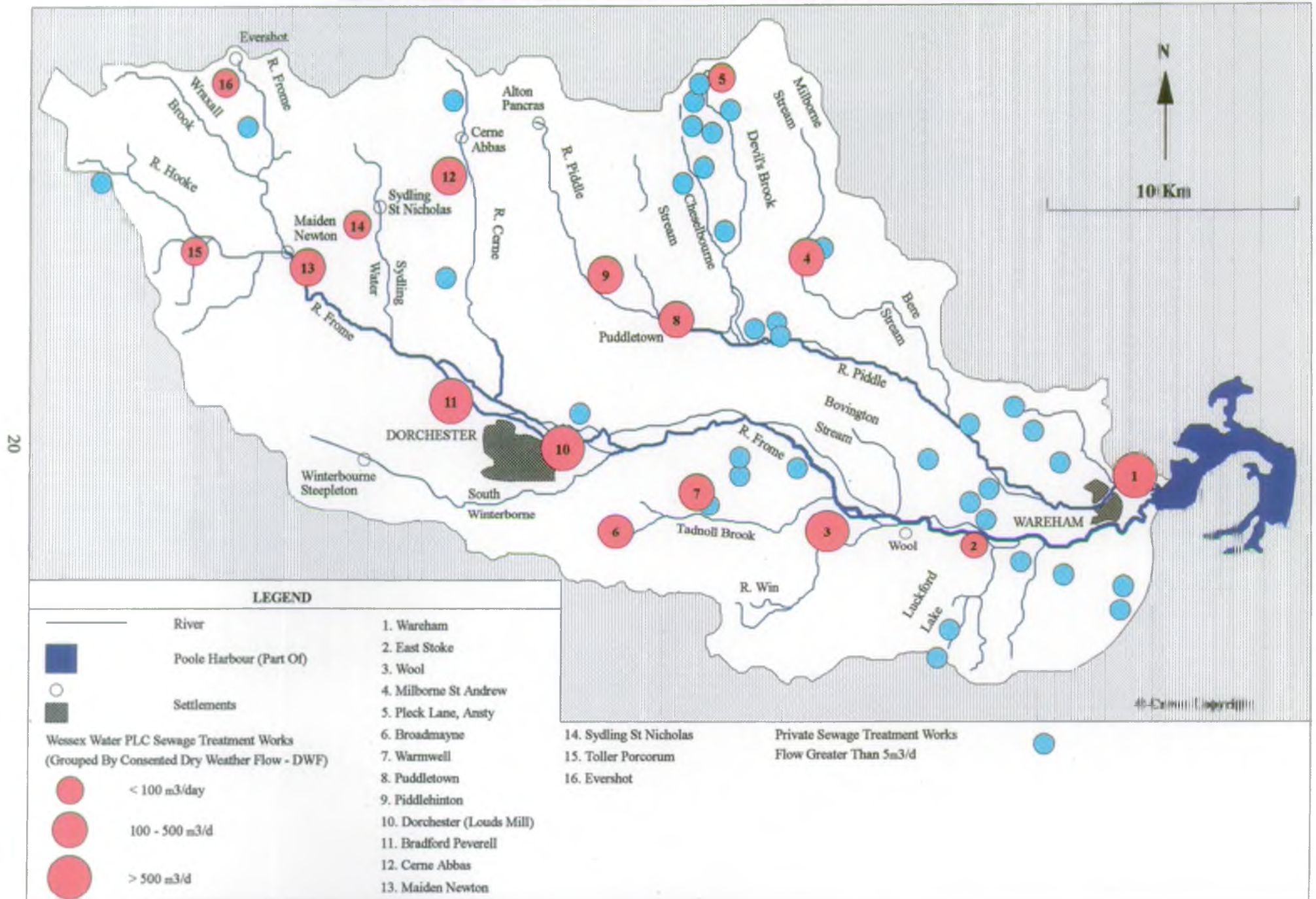
(1) Many abstractions for this use are exempt from licensing by being less than 20m³/d for private domestic household use.

(2) Some of these are exempt from licensing control being from surface water and less than 20m³/d

(3) Growth rates taken from NRA National Water Resources Strategy. These figures are theoretical and it may not be practical to meet them

(4) Growth rate taken from NRA Wessex Area Water Resources Strategy

MAP 8 : FROME & PIDDLE CATCHMENT - EFFLUENT DISCHARGES



4.2 Effluent Discharges

This use refers to the discharge of sewage, industrial and agricultural effluent directly to controlled waters. This includes continuous and intermittent discharges requiring NRA consent, and accidental spillages where no consent applies.

The discharge of treated effluents when legally consented is a legitimate use of the water environment, as dilution and biological processes will allow watercourses to self-cleanse at sustainable levels. Furthermore the return of the water itself is often essential to the maintenance of flows.

There are also significant discharges of treated effluents from fish farms and these are dealt with in Section 4.3 on Aquaculture.

4.2.1 Objective

To control effluent disposal so as to ensure environmental water quality and relevant EC Directive standards are achieved and maintained, and that other uses are not compromised by effluent disposal.

4.2.2 The Role of the NRA

The NRA has duties and powers to :

- *license discharges through a system of consents. We must issue a consent to discharge unless there is a good reason to refuse it. We look at the circumstances in each case. If a river is already polluted or if an effluent is of a poor quality then we can refuse a consent*
- *check discharges to see if they comply with standards. We may prosecute dischargers if they break consent conditions*
- *monitor the impact of discharges on the receiving waters*
- *prevent illegal discharges*
- *work with OFWAT to direct investment in sewage treatment by the water companies*

4.2.3 Continuous Discharges

Sewage effluent from 50 sewage treatment works (STWs) with dry weather flows (DWFs) greater than 5m³/d are discharged to the catchment (see Map 8).

There are 16 Wessex Water Services (WWS) works in the Frome & Piddle catchment. The majority of these works receive domestic effluent with only a small component of trade effluent, and therefore the consent conditions are primarily aimed at controlling the loads of biochemical oxygen demand (BOD), suspended solids and ammonia which are discharged.

Three works in the catchment receive a significant trade effluent component. Two of these discharge to the Frome; Dorchester STW receives effluents from a brewery, anodising works, and a small amount of effluent from meat and vegetable processing. Wool STW receives trade effluent from the Army Base Repair Organisation workshops at Bovington. Wareham STW, which discharges to the Piddle, receives plating effluent from one consented site, and other discharges of a minor nature.

Other STWs which cause local problems because of the limited dilution available include Evershot and Broadmayne. A £686,000 improvement scheme was completed at Evershot STW in 1993.

CATCHMENT USES

There are 19 private STWs with DWFs greater than 5m³/d discharging to rivers or groundwater in the catchment. There is also a treated surface water discharge from the oil/gas transfer station at Furzebrook, operated by BP, which is controlled by Her Majesty's Inspectorate of Pollution (HMIP) under an Integrated Pollution Control (IPC) authorisation. The treated effluent from the milk transfer station at Milborne St Andrew is the only significant trade effluent discharged to ground in the catchment.

There are discharges from minerals sites operated by ECC International in the Frome catchment, at Squirrels Cottage, Povington Heath and Furzebrook. The Squirrels Cottage and Povington Heath discharges are unconsented, but will be consented in 1995. The discharge at Furzebrook is from an oil interceptor at a vehicle washing facility.

In the Piddle catchment there are gravel washing facilities at the Wareham Ball Clays site and the ARC site at Stokeford Heath.

The HQ Royal Armoured Corps at Bovington is the main Crown Exempt property in the catchment. Other Crown Exempt properties include Piddlehinton Camp and Chantmarle. All Crown Exempt properties in the catchment will be consented during 1995.

The UKAEA Site at Winfrith includes an experimental nuclear power station which is currently being decommissioned. Domestic effluents from the site are treated at Wool STW, and there is also a discharge of effluent to a sea outfall at Arish Mell, near Lulworth which is not controlled by the NRA.

A number of villages within the area are not served by main sewers; these include Hooke, Rampisham and East Lulworth within the Frome catchment and Cheselbourne, Ansty, Godmanstone, Melcombe Bingham, Dewlish, Hilton, Plush and Tolpuddle. Many of these villages are served by small STWs and septic tanks.

4.2.4 Sewerage

A number of sewerage systems suffer problems which result in intermittent discharges to the catchment. This is discussed in Section 5.2.2.

4.2.5 Surface Water Discharges

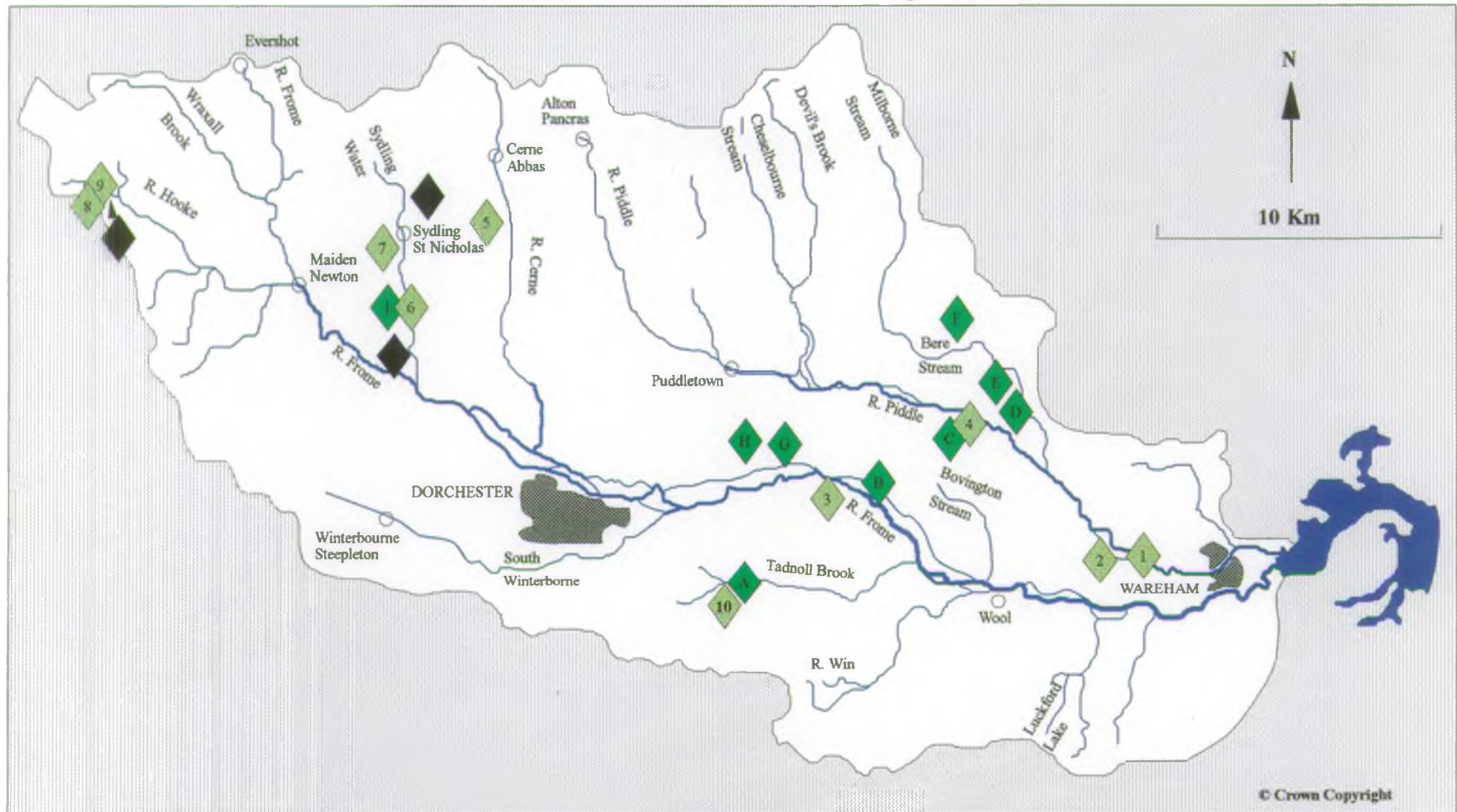
Tank training on Wool Heath, and the subsequent run off of rainfall results in the discharge of silty water to the Bovington Stream (see Section 8.5).

There are numerous discharges of surface water from settlements within the catchment. The most noteworthy of these are the Poundbury Industrial Estate, Dorchester which discharges to the Frome, and the Westminster Road Industrial Estate, which discharges to a tributary of the Piddle.

4.2.6 Pollution Incidents

During 1993 there were 70 substantiated pollution incidents in the Frome and Piddle catchment. All incidents are investigated and where appropriate the necessary evidence was collected to support prosecution. Follow up visits are also undertaken to ensure that the necessary remedial actions are taken to mitigate the effect of any pollution and that necessary pollution prevention measures are taken.

MAP 9 : FROME & PIDDLE CATCHMENT - AQUACULTURE



LEGEND

	River		Fish Farms	1. Eight Hatch	6. Lower Magiston		Cress Beds	A. Warmwell*	F. Roke*
	Poole Harbour (Part Of)			2. Trigon	7. Huish			B. Waddock Cross	G. Tincton*
	Settlements			3. Golden Springs	8. St Francis Farm			C. Brockhill*	H. Ilsington
				4. Brockhill	9. Hooke Springs		Disused	D. Doddings*	I. Lower Magiston*
				5. Pound Farm	10. Watergates			E. Bere Regis*	

* denotes sites where abstraction licences allow for other uses, but fish farming or cress growing is the major one.

4.3 Aquaculture

This use involves the operation of riverside beds or ponds on a commercial basis for the production of watercress or the rearing of fish and crayfish. An important feature of both is that their water use, though large, is non-consumptive ie all water used is returned to the catchment close to the point of abstraction.

4.3.1 Objective

To ensure there is no impact from this use on groundwater or surface water quality or resources, and the associated fauna, flora and wild fish stocks.

4.3.2 The Role of the NRA

The NRA has duties and powers to:

- *protect the existing water resource by a licensing system for water abstraction. On new licences a residual flow requirement can be imposed to protect the watercourse. This protection does not exist for historic abstraction licences*
- *a discharge consent is required from the NRA in order to protect the watercourse from adverse affects of feeding, chemicals and pharmaceuticals*
- *to control the movement and introduction of fish into waters other than MAFF registered fish farms.*
- *to control fish diseases by limiting fish movements and introductions. This duty is discharged in association with MAFF, who deal with fish farms*

4.3.3 Local Perspective

There are nine cress farms and ten fish farms operating within the catchment (Map 9). Cress farms are typically located on chalk streams, raising plants from seedlings on gravel beds. Sources of water include springs, artesian boreholes and pumped boreholes. If cress is grown in compliance with the industry's own Code of Practice, it must be supplied solely with groundwater to ensure that it is pest free.

Activities such as bed cleaning, disinfection, fertilizer application and pest control can cause pollution problems. Changes in the biology of the watercourse have been detected immediately downstream of cress farm discharges. All discharges are currently unconsented, but we intend to consent all cress farms in the catchment during 1995/96. The cress farm at Lower Magiston has recently installed a settlement tank to treat the water used during bed cleaning. Discharges from cress farms can help to maintain river flow at times of low flows.

The fish farms in the catchment mainly use surface water, and all abstractions are licensed; these may reduce flows in bypassed reaches.

The effluent discharges from fish farms can be contaminated by organic wastes, ammonia and therapeutics from the large concentrations of fish, and produce an impact on the quality of the receiving water. As a result of the large volumes of effluent, considerable loads of these substances can be discharged into the river, and cause pollution if insufficiently diluted. All effluents are controlled by consents to discharge.

In addition, escapes of farmed fish are known to disrupt wild fish populations in the vicinity (see Section 4.7).

4.4 Farming

With more than 80% of the land in England and Wales used for agriculture there is significant scope for impact on the water environment. It is to the credit of our farmers that our rivers remain of such high quality, as pollution of surface and groundwaters, soil erosion, land drainage and stock damage to river banks can cause both acute and chronic environmental problems. A sustainable and affordable farming system that conserves the soil, minimises and recycles wastes will reduce the impact on the water environment.

The types of agriculture that are appropriate on particular areas of land can often be closely related to the prevailing land drainage practices.

4.4.1 Objective

To prevent and control the pollution of surface and groundwaters from agricultural activities, and to encourage agricultural practices that improve the river environment.

4.4.2 The Role of the NRA

The NRA recognises the importance of agriculture in promoting environmental sustainability in the catchment. The extent to which we can take direct action is limited by statute and so we must seek to inform and influence other regulatory agencies.

The NRA has duties and powers to:

- *prevent pollution from agriculture through the enforcement of the Water Resources Act 1991 and specifically the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991*
- *deal with pollution incidents, restoring waters to their previous condition*
- *issue consents to discharge from agricultural premises. However the NRA encourages the disposal of farm wastes to land in preference to consenting discharges from treatment systems*
- *regulate the abstraction of water for agricultural use*
- *perform land drainage and flood alleviation to current Standards of Service agreements*

Additionally through liaison and R&D initiatives the NRA is committed to:

- *promoting the Code of Good Agricultural Practice for the Protection of Water and further developing best practices to prevent pollution from the storage and disposal of agricultural wastes, and from the management of agricultural land. This may include development of managed buffer zones and agri-environmental schemes to prevent pollution*
- *promoting the Code of Good Agricultural Practice for the Protection of Soil. The NRA encourages farmers to use this code to minimise soil erosion problems*
- *promoting to farmers the free pollution advisory visits that are available from the Agricultural Development & Advisory Service (ADAS) of MAFF*
- *promoting appropriate livestock management to protect the river corridor*
- *developing a public relations plan to educate farmers and improve public awareness of pollution associated with agriculture*

4.4.3 Local Perspective

In both catchments, the upland areas are extensively used for arable farming, with winter cereals an increasing feature. Sheep farming and pig ranching are becoming more common, especially in the Frome catchment.

The lower areas in the catchment tend to support more dairy farming, though some cereals are grown. Maize in particular is increasingly common, being grown on 1,016ha in the Frome catchment and 494ha in the Piddle catchment.

The tables show current land uses and changes since 1979. Common Agricultural Policy (CAP) schemes such as the Arable Area Payments Scheme may influence changing crop patterns, and the land use for set aside. The NRA encourages the siting of long-term set aside near water courses where it can act as a buffer to reduce soil erosion and pesticide and fertilizer run off.

1993 Land Uses	Frome Catchment		Piddle Catchment	
	hectares	%	hectares	%
Total agricultural land (% catchment area)	34,100	75	17,233	84
Grassland (%total agricultural land)	16,774	49	8,378	49
Arable (crops & fallow)	11,089	32	6,614	38
Set Aside	2,032	6	1,114	7
Farm Woodland	884	<1	623	<1

These tables are taken from census statistics provided by MAFF Land Planning Unit. The data are derived from parishes and do not correspond exactly to the catchment boundaries.

Changes in Use 1979 - 1993	Frome Catchment		Piddle Catchment	
	hectares or units	%	hectares or units	%
Change in cattle/calves	-1,618	-5	-1981	-12
Change in dairy units	-15	-13	-11	-18
Change in sheep	30,300	169	4,051	45
Change in pigs	42,943	406	6,663	38
Change in fowl	-34,725	-20	76,766	42
Change in cereal (ha)	1,531	23	933	21

4.4.4 Pollution Risk

Agricultural pollution in the catchment should not be a serious problem if farms are well managed. The geology of the catchment generally allows wastes to be spread on the land at all times of the year. The Code of Good Agricultural Practice for the Protection of Water should always be complied with.

In some parts of the upper Frome catchment, clay soils can create the potential for run off problems, though the permeable nature of other parts of the catchment means that groundwater contamination is a risk.

Siltation of watercourses due to soil and bank erosion in the upper catchment can be a problem because of its topography and land management (see Section 8.5).

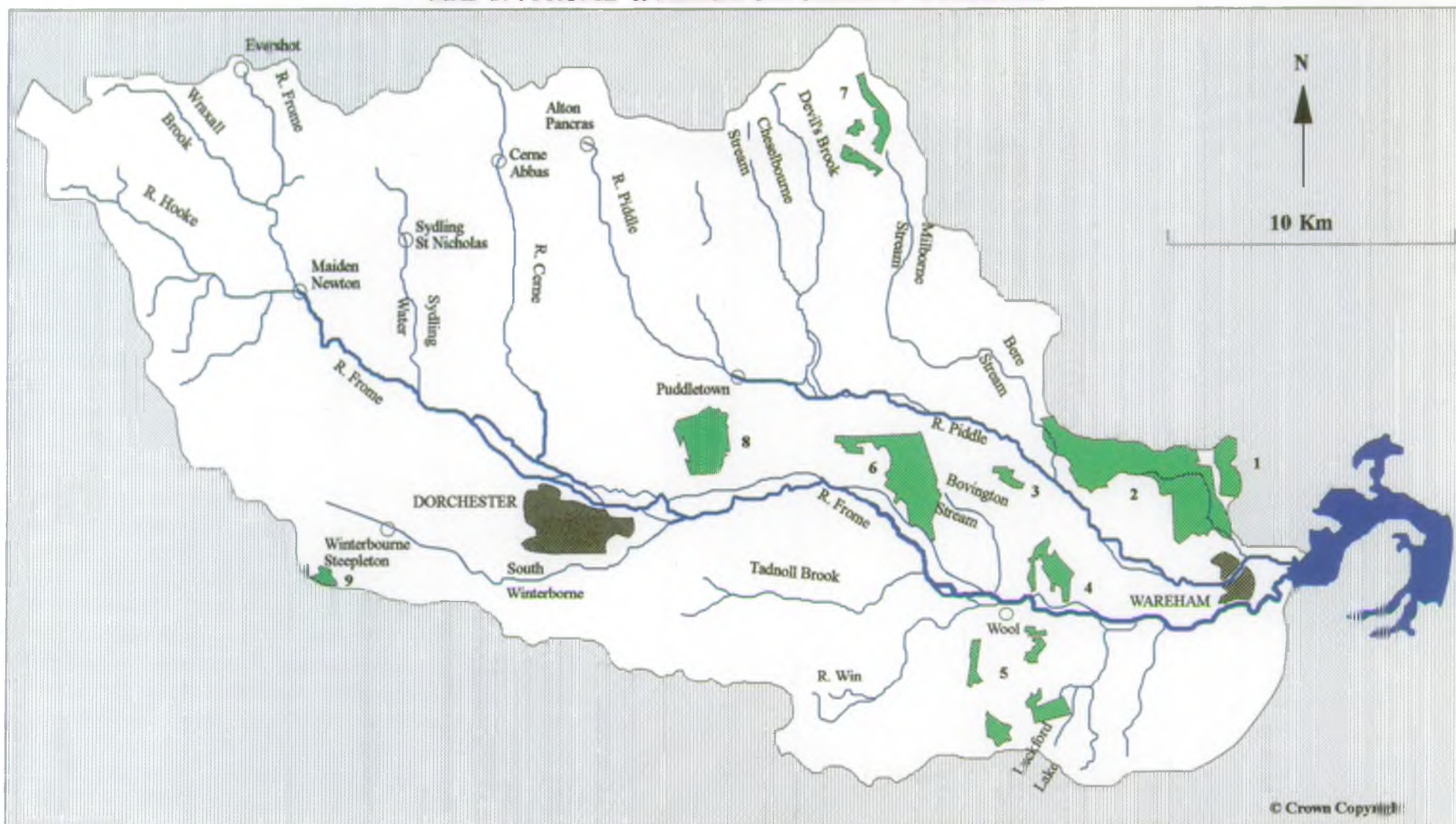
4.4.5 Agrochemicals

The intensive use of chalk downland for arable crops means that the application and storage of herbicides and pesticides poses a risk to groundwaters.

There are a number of approved agrochemicals stores in the catchment which comply with the British Agrochemical Standards Inspection Scheme (BASIS) regulations; this means that pollution prevention measures are incorporated into their design.

The Code of Good Agricultural Practice for the Protection of Water contains advice for farmers on the safe application and disposal of pesticides, herbicides and sheep dips.

MAP 10 : FROME & PIDDLE CATCHMENT - FORESTRY



LEGEND

	River		Forest Enterprise Plantations	1. Gore Heath	approx 100ha	5. Lulworth	268ha
	Poole Harbour (Part Of)			2. Wareham Forest	approx 620ha	6. Moreton, Affpuddle, Pallington	409ha
				Bere Heath	approx 440ha	7. Delcombe (Milton Abbas)	122ha
	Settlements			3. Gallows Hill	29ha	8. Puddletown	317ha
				4. Hethfelton	182ha	9. Blackdown	approx 55ha

Approximate areas of forestry given when part of plantation falls outside the catchment

4.5 Forestry

Well managed forestry in the right places does not harm the water environment, and may bring benefits. However, in some circumstances, forestry development and management can cause problems. Areas of concern to the NRA nationally include acidification, soil erosion, pollution, water yield and damage to wildlife habitats.

To minimise these adverse effects, the Forestry Commission has published a series of Guidelines regarding Water, Nature Conservation, Landscape Design and Recreation, against which all forest operations are assessed.

4.5.1 Objective

- *To protect the water environment from adverse effects of forestry activities*
- *To encourage forestry practices that improve the water environment*

4.5.2 The Role of the NRA

The NRA has duties and powers to :

- *regulate some forestry works using land drainage legislation*
- *deal with pollution incidents*

4.5.3 Local Perspective

During 1992, the Forestry Commission was reorganised into two bodies, the Forestry Authority which has a regulatory role over the whole industry, and Forest Enterprise which manages the Commission's forest estate.

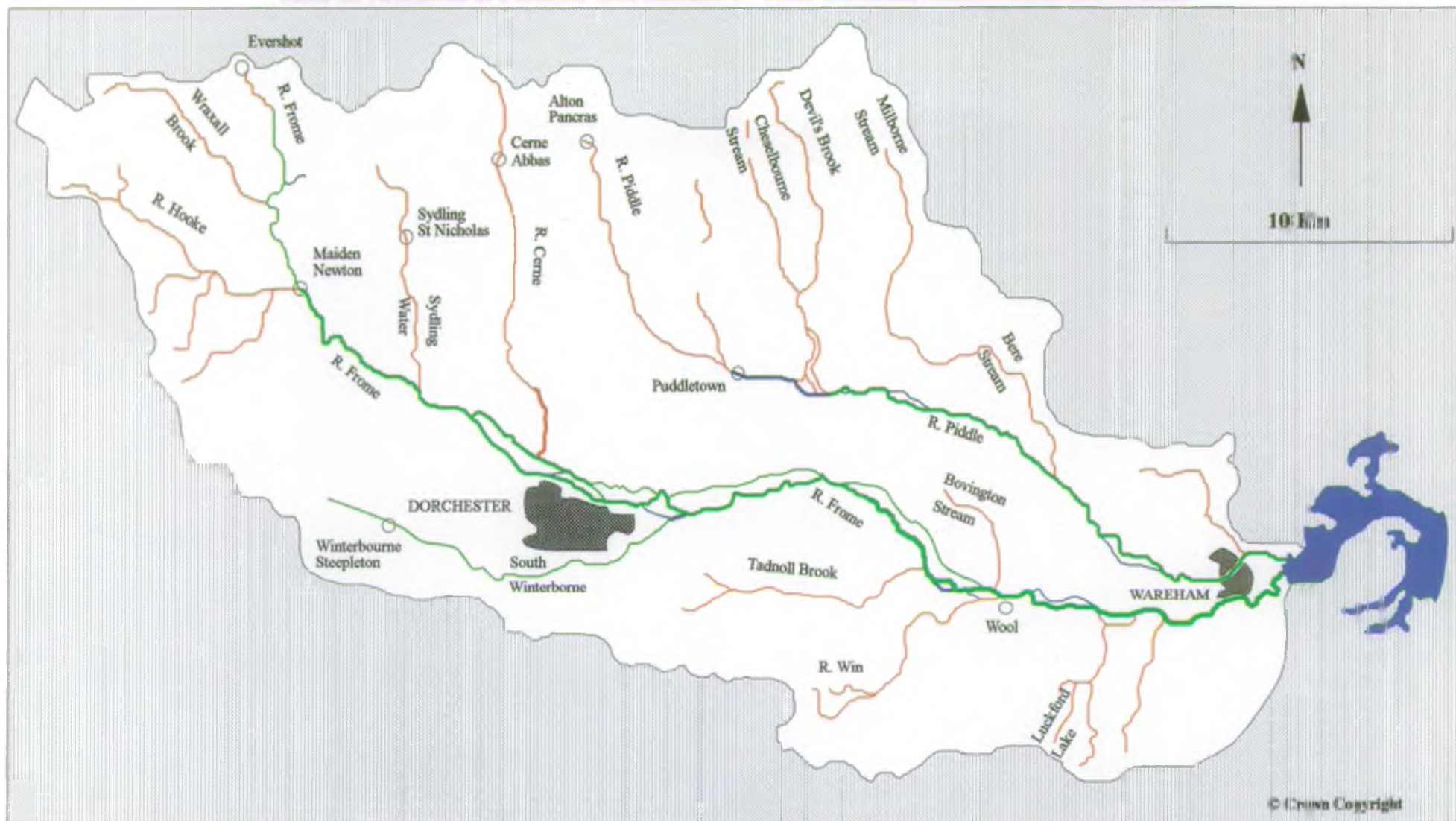
There is approximately 2,542ha of forest managed by Forest Enterprise within the catchment, and in excess of 900ha managed by the Forestry Authority. MAFF statistics indicate 1,507ha of farm woodland in the catchment in 1993.

The majority of this forest is pine, with fir at Puddletown, spruce and fir at Coombe Wood, Highwood, Lodge Wood, Shaggs, Burngate and Home Farm. At Milton Abbas and Monmouth Hill there is mixed broadleaved woodland.

There are no designated acid sensitive areas in the catchment, but there is some uptake of the Forestry Authority's Woodland Grant Scheme to plant broadleaved species near watercourses to act as a buffer between conifer plantations and the watercourses. Some tributaries of the lower Piddle drain Wareham Forest, but this is not known to adversely impact the Piddle.

The NRA would wish to be consulted about any future development of forestry within the catchment which might impact on the water environment.

MAP 11 : FROME & PIDDLE CATCHMENT - NRA CONSERVATION SURVEY WORK



LEGEND

	River		River Corridor Survey
	Poole Harbour (Part Of)		Aerial Photograph Interpretation
	Settlements		

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4.6 Landscape, Wildlife and Archaeology

We consider here how we protect and manage the natural environment and the historic built environment associated with rivers and wetlands.

4.6.1 Objective

To ensure that these features are not degraded through neglect, mismanagement, or insensitive development, and where we can to take measures to enhance them.

4.6.2 The Role of the NRA

Legislation tells us what we can and can not do to regulate work in rivers and floodplains. An important part of our work is to influence land use planners and land managers to look after rivers and wetlands sensitively.

We have duties to :

- *conserve and enhance landscape, wildlife and natural features, especially in rivers and wetlands*
- *protect and conserve buildings, sites and objects of archaeological, architectural or historic interest*

4.6.3 Local Perspective

The Frome is classified as *a large calcareous river, with clay influence and with some tributaries flowing over acid Tertiary sands* (NCC 1983). The Piddle is classified as *a fast flowing calcareous small river over mixed substrates, with clay influence* (NCC 1983). Rich and characteristic plant communities have developed.

The significance of the Frome as one of the best examples of a chalk river in England has led to the English Nature (EN) proposal to notify part of it as a Site of Special Scientific Interest (SSSI) by 1997.

4.6.4 NRA Survey and Monitoring Work

Map 11 indicates the extent of conservation surveys, and the results are summarised below. River Corridor Surveys (RCS) are available for all main rivers, mostly carried out between 1992-94; non-main rivers have been assessed using 1993 aerial photos.

The South Winterborne was surveyed using RCS and historical data for a low flow study; the Piddle and Devil's Brook had an ecological assessment based on historical data and interviews in relation to low flow.

Land drainage consents, abstraction licences, discharge consents and planning applications are screened for their implications for conservation and recreation. With the exception of public water supply licences, the impact of the above has been minimal, and the catchment remains essentially rural.

Hooke, Wraxall Brook and Upper Frome

These small rivers flow through steeply undulating terrain, are very rural in character, and have a few small settlements on them. Land use is predominantly grassland and arable, with significant blocks of woodland, rough grazing, scrub and hedges in many cases strongly associated with the river courses and steep valley sides.

CATCHMENT USES

Natural physical features, including springs, seasonal minor watercourses and lightly managed land adjacent to the rivers, contribute to ensuring these sub-catchments form rich and diverse habitats in which the river is centre stage.

Seven SSSIs and five Sites of Nature Conservation Interest (SNCIs) have significant wetland interest within this sub-catchment. Dorset County Council (DCC) are restoring a water meadow system at Maiden Newton, one of only two in the catchment area.

Pressures affecting these watercourses are predominantly agricultural, the most significant being the fragmentation and intensification of the river corridor and a reduction in buffer zone width. On-stream ponds, fish farms and urban flood defence works have had local impact.

Cerne and Sydling Water

Both rivers play a relatively minor role in the wider landscape and are constrained by intensive agriculture. The corridor is narrow and clearly defined, for example by narrow bands of trees, or isolated blocks of woodland.

There are significant exceptions to this, where locally the river is very important ecologically and visually. Old water meadows, cress beds, ponds and scrub are vital elements in the river corridors. One SSSI and two SNCIs with wetland importance lie within this sub-catchment.

There has been some modification of these watercourses within areas of built development. Further fragmentation of the habitat and straightening should be resisted. Protection of existing pockets of valuable habitat and the promotion of schemes which reinstate wet meadows and buffer zone habitat would be a positive step in enhancing the river corridor.

South Winterborne

This river exhibits partly perennial and partly winterbourne characteristics. The contribution the river makes visually and ecologically is thus seasonally determined. In urban sections, the river course is modified but is an important feature, giving its name to the villages along its route. In rural sections, the river is ill-defined within intensive grassland agriculture.

There are few associated wetland habitats, for example ponds and springs, wet woodland and relic water meadows, and the river is generally quite open and treeless. The channel communities vary from terrestrial to aquatic; the fauna is a typical winterbourne community.

There are few opportunities for enhancement, apart from tree management at certain locations.

Middle and Lower Frome

The main river is a medium sized, slow to moderately fast flowing lowland river. It has been modified in the past through its use for feeding water meadows and for powering mills, and also through land drainage schemes. Little of historic interest remains, although the river runs in several channels along much of the middle section.

Most of the floodplain is agriculturally improved grassland, though remnants of wet, marshy grassland, ditches, bank channels, reed, scrub, lake and woodland occur throughout. Tree and shrub cover is frequent upstream of Dorchester but scarce downstream.

The channel itself is morphologically diverse, exhibiting a good range of features (shoals, riffles, bars, pools, etc), except in those lengths of past engineering works. Here, nature has softened the uniform profile though many meanders have been lost.

There are two SSSIs (reed bed/wet grassland), two Dorset Wildlife Trust (DWT) reserves and several wetland SNCIs (mostly ditch systems) along the Frome. Sporting interests have maintained or created pools and wetland in the lower section.

There are several Countryside Stewardship agreements, aiming to conserve the traditional grazing meadows in the Wool area. Here, the NRA grant-aided the repair of sluices as part of a scheme to encourage a higher water table on the grassland. The NRA has also created new features and cover as enhancements related to the maintenance work, with the co-operation of landowners.

The safeguarding of existing areas of wildlife habitat is important; the promotion of schemes which partially reinstate water meadow and wet grassland and increase areas of non-intensively managed land, would contribute towards ensuring the Frome retains its reputation as a rich and diverse river system.

Tadnoll Brook and Win

The Tadnoll Brook, though modified in places, is essentially following its semi-natural, tree-lined course through a rich and extended corridor of wildlife habitat, improved pasture and woodland. Two heathland SSSIs, four SNCIs, wet woodland, fen, wet heath and bog and water meadows are important habitats adjacent to the brook. Other features include deciduous and mixed woodland, ponds and cress beds, and significant drains and ditches where farmland has been drained. Further intensification of the catchment and reduction of the river corridor would be regrettable.

In contrast, the Win river corridor lacks diversity with very limited natural habitat remaining. The channel has been modified through development or land drainage and wetland habitat is scarce. Small sections of heath/bog, wet woodland and water meadow occur at the downstream end, part of which is SSSI. Elsewhere, arable and intensive agriculture, or small settlements where the river serves some visual amenity, predominate. The river would benefit from habitat enhancement, both of the river and the adjacent land.

Bovington Stream

Whilst the river course has been substantially modified, the terrain through which it flows is mostly semi-natural with a high proportion of wetland interest. Wet heath, bog, valley mire, bog pools, wet acid grassland and deciduous woodland occur. The whole length of the stream is either SSSI or SNCI.

Tank training inputs significant silt into the watercourse; the removal of this input would benefit the impoverished aquatic communities. The maintenance of the water regime on adjacent land is important.

Luckford Lake and Povington Stream

These tributaries are characterised by flowing through extensive heathland SSSIs. Tree cover conceals much of the river course; the corridor grades through woodland, bracken and scrub out onto open heath. Elsewhere the valleys are mainly open, improved grassland, remnant water meadows, hedges and scattered scrub, with small settlements - more diverse, but increasingly modified. Luckford Lake itself is an SSSI. The East Lulworth tributary would benefit from improvements to the surrounding corridor.

CATCHMENT USES

Upper Piddle

This small river rises in a steep chalk downland valley. Arable fields, intensive grassland and several settlements dominate the land use. Tree cover is scarce, and bank vegetation diversity depends on the intensity of grazing.

Upstream, off-stream ponds are a feature; further downstream, drains, springs and watercress beds exist. Amenity interests are important throughout. Measures to manage bank vegetation less intensively would be welcome.

Devil's Brook, Cheselbourne

The Cheselbourne flows through an intensively farmed landscape, with few trees and cultivation to the banktop throughout. The channel has been significantly modified by man, and lacks diversity. It is believed to be a winterbourne along part of its length. The river corridor has a limited conservation value, and would require significant effort to improve it.

In contrast, the Devil's Brook exhibits considerable diversity in scenery and habitat. Semi-natural habitats are limited, though several lakes occur alongside or on the river.

A form of working water meadow system at the downstream end is a unique feature in this catchment, of value to wintering wetland birds in particular. An increase in the channel network and associated hedges, copses and trees, adds further interest where the streams flow into the Piddle valley. The water meadow system demonstrates the opportunities that schemes like Countryside Stewardship can provide in the river corridor in the hands of sympathetic land ownership.

Milborne Stream and Bere Stream

The Milborne Stream appears to have been substantially modified, and flows through an open, featureless landscape of arable and improved grassland fields. Some sections are tree-lined, but the channel is otherwise uniform and dull. Substantial habitat enhancement would improve the wildlife interest.

The Bere Stream, in contrast, is a river corridor with notable semi-natural habitat including wet grassland and wet woodland, watercress beds, ponds and ditches. There are two SNCIs and an SSSI which includes a length of river. The interest of the SSSI results in the mixing of base-rich and acid waters. There have been limited modifications to the channel, especially in connection with the cress beds, but otherwise the bank and channel habitats appear diverse.

The Bere Stream is an important wildlife corridor, probably representing a habitat type that was once much more common throughout the Piddle. The conservation and extension of these habitats is a priority.

Middle and Lower Piddle

The Piddle flows through a wide flat valley of largely improved grassland. Originally, water meadows were widespread; none are presently functional, though the ground form and remaining structures record the past use. Arable land is limited. Some meadows remain damp or wet and retain some floristic interest. Reed/sedge swamp, bog, fen and wet woodland are notable habitats in the Piddle valley, relying on the maintenance of the water regime for their survival. Bank communities are diverse and, in places, quite wide; trees and shrubs are frequent along the banks. The channel is morphologically diverse, and the aquatic flora is both mixed and abundant.

There is a wet grassland/ditch SSSI within the floodplain at Wareham, and four wetland SNCIs further upstream. The channel, being predominantly semi-natural, requires little enhancement. Conservation of the remaining area of wildlife interest and the wetland regime of the valley as a whole is of prime importance.

Weed cutting lowers water levels considerably, and therefore the annual weed cutting, which ceased when abstraction reduced water levels, needs careful evaluation now that flows have been enhanced.

Wareham tributary

This un-named tributary, although much modified as a drainage channel in the past, is an important watercourse draining out of Hyde Heath SSSI and running the length of Morden Bog SSSI and NNR into Wareham Meadows SSSI. It flows principally through open wet heath and bog, coniferous and deciduous woodland. The maintenance of the water and drainage regime is of prime importance.

4.6.5 Designated areas

There are 44 SSSIs in the catchment (Appendix 11.1) of which 23 have a wetland interest, two National Nature Reserves (NNRs), 165 SNCIs of which 26 have a wetland interest, and ten DWT reserves of which five are adjacent to or contain rivers. In addition, the lower Frome is a proposed SSSI, and there is a small wetland community nature reserve in Dorchester (Map 12).

The high number of sites of national and county importance with wetland interest, indicates the significance of this catchment for wildlife, and the need for active conservation.

4.6.6 Rare Species

Many of the habitats described are of national or county rarity, so it is not surprising that populations of nationally rare and uncommon species occur.

In the Frome, river water-dropwort (*Oenanthe fluviatilis*) is widespread; the rare pondweed *Potamogeton praelongus* occurs at Stinsford, and the scarce chaser dragonfly (*Libellula fulva*) is established on the lower river.

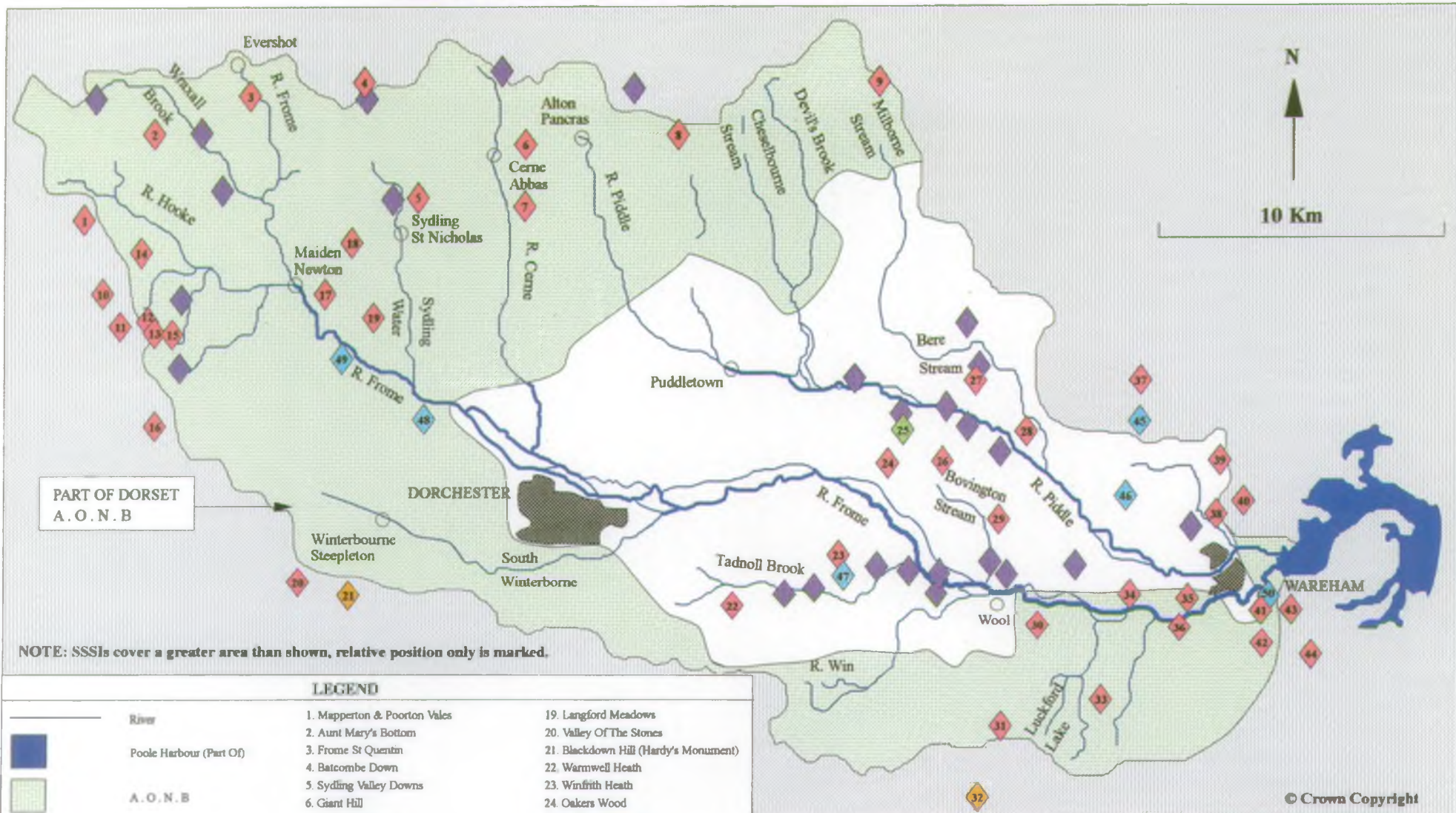
The South Winterborne supports some nationally uncommon invertebrates characteristic of winterbournes such as the shrimp *Niphargus aquilex*, the mayfly *Paraleptophlebia werneri* and the blackfly *Metacnephia amphora*. Other relative rarities include the water beetle *Agabus biguttatus* and the sedge *Limnophilus bipunctatus*.

Eight nationally uncommon plants occur in the Piddle. These are the wood clubrush (*Equisetum sylvaticum*), the blunt-fruited starwort (*Callitriche obtusangula*), the river water-dropwort, the pink water-speedwell (*Veronica catenata*), the greater panicle-sedge (*Carex paniculata*), the greater pond-sedge (*Carex riparia*), the whorl grass (*Catabrosa aquatica*), and the perfoliate pondweed (*Potamogeton perfoliatus*).

The native white-clawed crayfish (*Austropotamobius pallipes*) occurs locally in the Piddle, and the nationally rare summer snowflake (*Leucojum aestivum*) grows in meadows and willow thickets adjacent to the river.

Wetland birds listed on Schedule 1 of the Wildlife and Countryside Act 1981 and known to breed in the catchment include bearded tit (*Panurus biarmicus*) and Cetti's warbler (*Cettia cetti*) mostly near Wareham, and the kingfisher (*Alcedo atthis*) throughout.

MAP 12 : FROME & PIDDLER CATCHMENT - CONSERVATION



LEGEND

- | | | | |
|--|--|--|---------------------------------------|
| | River | 1. Mapperton & Poorton Vales | 19. Langford Meadows |
| | Poole Harbour (Part Of) | 2. Aunt Mary's Bottom | 20. Valley Of The Stones |
| | A.O.N.B. | 3. Frome St Quentin | 21. Blackdown Hill (Hardy's Monument) |
| | SSSI | 4. Batcombe Down | 22. Warmwell Heath |
| | SSSI Geology | 5. Sydling Valley Downs | 23. Winfrith Heath |
| | SSSI (Combined SSSI With Some Geological Interest) | 6. Giant Hill | 24. Oakers Wood |
| | County Nature Reserves (DWT) | 7. Black Hill Down | 25. Cull Peppers Dish |
| | SNCIs With Wetland Interest Not Numbered | 8. Lyscombe & Highdon | 26. Turners Puddle Heath |
| | | 9. Higher Houghton | 27. Black Hill Heath |
| | | 10. Drakenorth | 28. Bere Stream |
| | | 11. Whetley Meadows | 29. Hyde Heath |
| | | 12. Powerstock Common - Also DWT Reserve | 30. East Stoke Fen - Also DWT Reserve |
| | | 13. Eggardon Hill & Luucas Farm | 31. Lulworth Park & Lake |
| | | 14. Toller Porocum | 32. South Dorset Coast |
| | | 15. Woolcombe | 33. Povington & Grange Heaths |
| | | 16. Hayden & Askewell Downs | 34. Wongret Heath |
| | | 17. Hog Cliff | 35. Wareham Common |
| | | 18. Court Farm Sydling | 36. East Holme Meadows |

- | |
|---|
| 37. East Coppice |
| 38. Morden Bog |
| 39. Gore Heath |
| 40. Sandford Heath |
| 41. Wareham Meadows - Also Part Of Proposed Poole Harbour SPA And Ramsar Site |
| 42. Stoborough & Creech Meadows |
| 43. The Moors - Also Part Of Proposed Poole Harbour Ramsar Site |
| 44. Hartland Moor - Also A National Nature Reserve |
| 45. Woolsbarrow |
| 46. Trigon |
| 47. Tadnoll |

- | |
|------------------|
| 48. Muckdeford |
| 49. Nunbury Mead |
| 50. Ridge |

Settlements

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Flocks of wintering Bewick's Swan (*Cygnus bewickii*) in the Frome valley and widgeon (*Anas penelope*) in the Piddle valley reach numbers of national importance. Within the county context, the Frome upstream of Frampton holds an important breeding population of dippers (*Cinclus cinclus*).

The Frome and Piddle were past strongholds for the otter (*Lutra lutra*) but the population appears to be at very low levels; neither habitat quality nor food appear to be limiting. Under the NRA otter strategy, this catchment is considered within the category for monitoring and encouraging recolonisation.

4.6.7 Biodiversity

The EC Habitats Directive will be implemented through The Conservation (Natural Habitats etc) 1994 UK legislation, by designating key sites protecting the best examples of European habitat.

Precise site and species details are not yet known. Some species listed in the Directive occur within the catchment, including the white-clawed crayfish, salmon, otter and *Ranunculus* in flowing water; any implications for this area will not be known before June 1995.

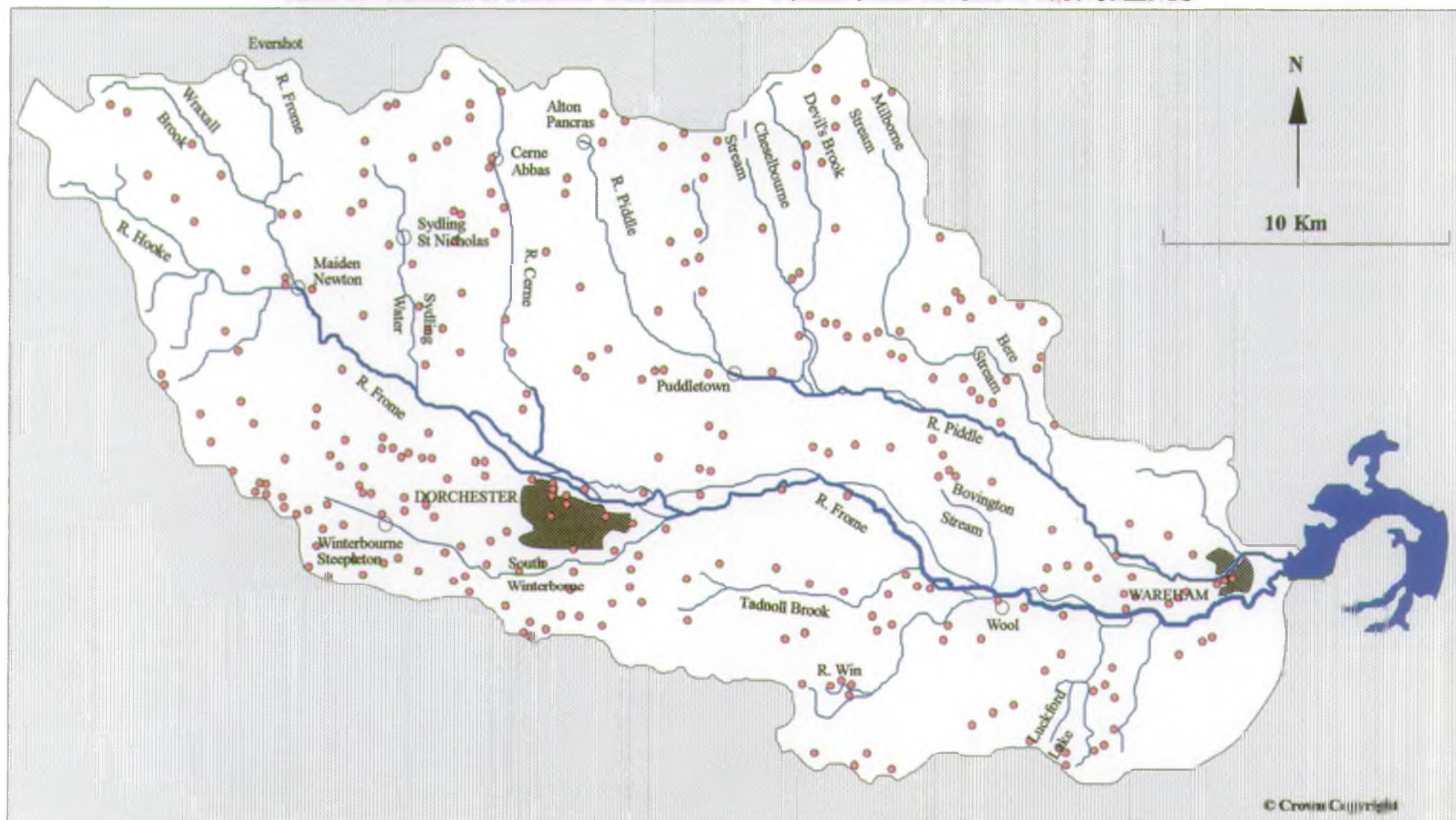
4.6.8 Invasive Plants

Japanese knotweed (*Fallopia japonica*) is widespread on the Frome, and Himalayan balsam (*Impatiens glandulifera*) on the Piddle. Hemlock water-dropwort (*Oenanthe crocata*) is common on both; the tuber is poisonous to stock when eaten in quantity and can be a problem after bankside weed cutting. Similar concerns arise from the nationally uncommon river water-dropwort.

Other invasive water plants recorded in the catchment include the Australian swamp stonecrop (*Crassula helmsii*), the water fern (*Azolla filiculoides*) and the duckweed *Lemna miniuscula*.

The NRA take steps to control these plants where other work is taking place, and advise others on methods of control by a free leaflet.

MAP 13 : FROME & PIDDLE CATCHMENT - SCHEDULED ANCIENT MONUMENTS



LEGEND

- | | | | |
|---|-------------------------|---|-----------------------------|
|  | River |  | Scheduled Ancient Monuments |
|  | Poole Harbour (Part Of) | | |
|  | Settlements | | |

4.6.9 Archaeology

There is a rich and varied archaeological heritage within the catchment associated with populations dating back to prehistoric times. Some of this is recognised in the 404 Scheduled Ancient Monuments (SAMs), but much is still to be discovered.

Many of the most conspicuous prehistoric features are to be seen on the chalk uplands around Dorchester. These include extensive field systems, Neolithic pits and henges, Bronze Age barrows and the Iron Age hill forts of Maiden Castle and Eggardon.

Dorchester appears to have developed predominantly as a Roman fort and town, though there is evidence of earlier habitation. The Roman aqueduct which runs into the town from the direction of Bradford Peverell is exceptional. Extensive Roman pottery and ironworking sites have also been found adjacent to the Frome at Worgret, and there is evidence of Roman habitation at Bestwall.

Wareham is primarily a Saxon burgh, when it was an important administrative and trading centre, and a significant port. The most visible Saxon remains to be seen in the town today are the vast earthen banks of the Town Walls.

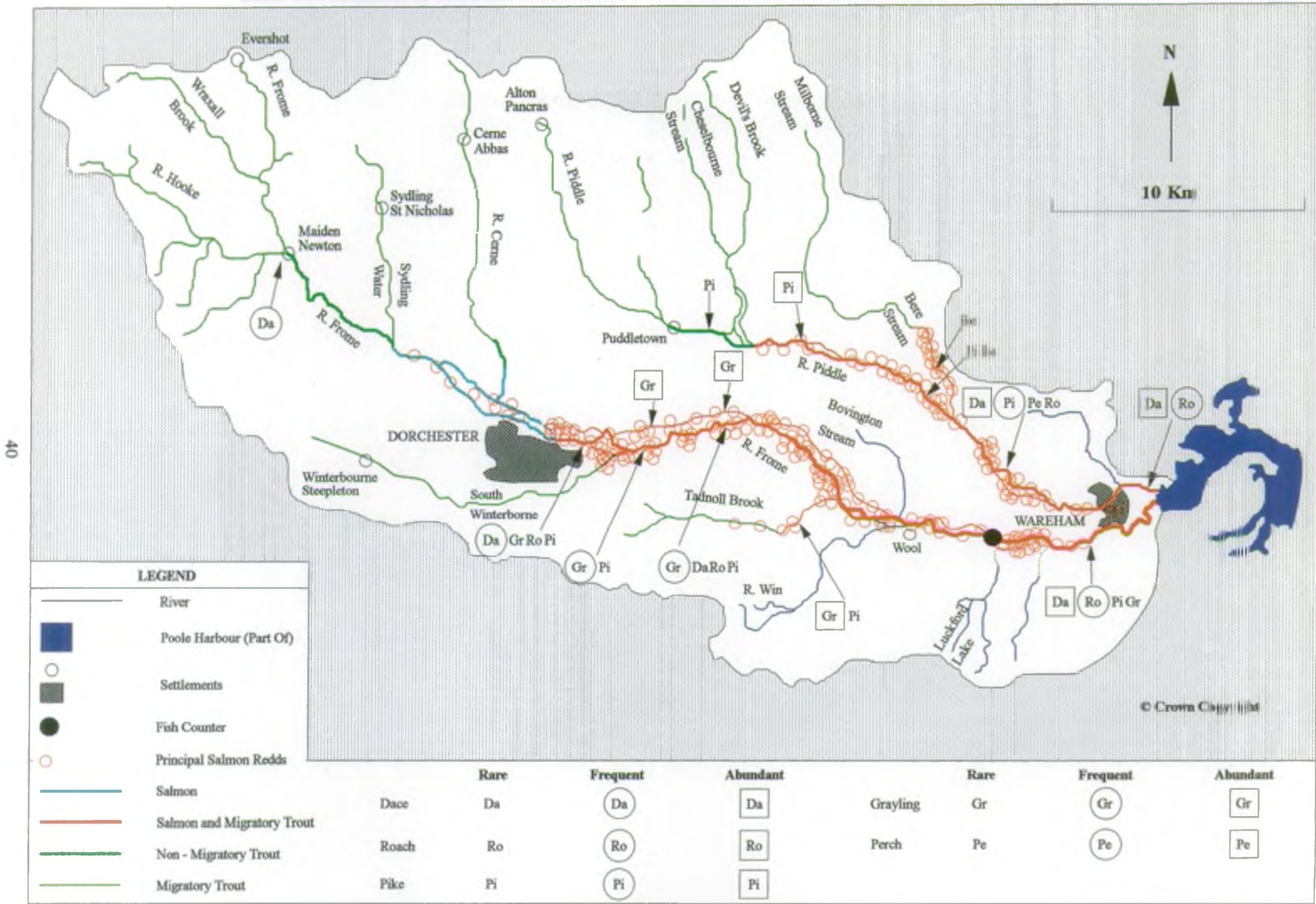
Most of the modern towns and villages in the catchment date back before the medieval period. The Domesday Book provides documentary evidence of these, and of many others abandoned in later years, especially when the land was enclosed for sheep farming. In the medieval period, much of the land ownership was in the hands of powerful ecclesiastical establishments such as Cerne, Milton and Bindon Abbeys.

Holme Bridge, Broomhill Bridge, North Bridge (Wareham) and Wool Bridge were all in existence by the medieval period, and there is evidence of a Saxon-Norman fish trap at Wareham; traps were operated here until the 1860s.

There were at least ten water mills on the Frome and its tributaries between Cattistock and East Stoke, and 23 on the Piddle between Alton Pancras and Wareham. Uses included milling of flour, fulling and tucking of cloth, silk throwing, papermaking, powering of grinding tools, and more recently driving turbines for electricity generation.

Organic remains may be better preserved in the lower catchment, and finds include a Viking sword found in the gravel below the present river bed of the Frome at Wareham; a possible Bronze Age wooden 'laundry' beater preserved under peat and revealed when the bed of the Piddle was cleared to make a water channel, and a log platform nearby; Neolithic timbers from the Wareham area of the Frome, and post-Roman hurdles possibly used as early bank revetment nearby.

MAP 14 : FROME & PIDDLER CATCHMENT - SALMON AND COARSE FISH DISTRIBUTION



4.7 Fisheries

We consider here the conservation of wild populations of fish and their habitats.

We also deal with the recreational activity of angling with rod and line. This is considered separately from other recreational uses as the NRA has particular responsibilities in relation to angling.

Finally we consider the use of nets and other types of gear to catch migrating salmon, trout and eels for commercial purposes. The NRA has only limited responsibility for fishing in the tidal waters, and collaborates with MAFF and the Southern Sea Fisheries Committee.

4.7.1 Objectives

Our primary objective is to protect stocks of fish, by maintaining water quality, water resources and other physical habitat features appropriate to the catchment, and protecting the passage of migratory fish.

We maintain rivers so that they can sustain angling at an appropriate level, in balance with the needs of other catchment uses. We also ensure that neither angling nor commercial fishing takes place in a manner that could over-exploit fish stocks.

4.7.2 The Role of the NRA

The NRA has duties and powers to:

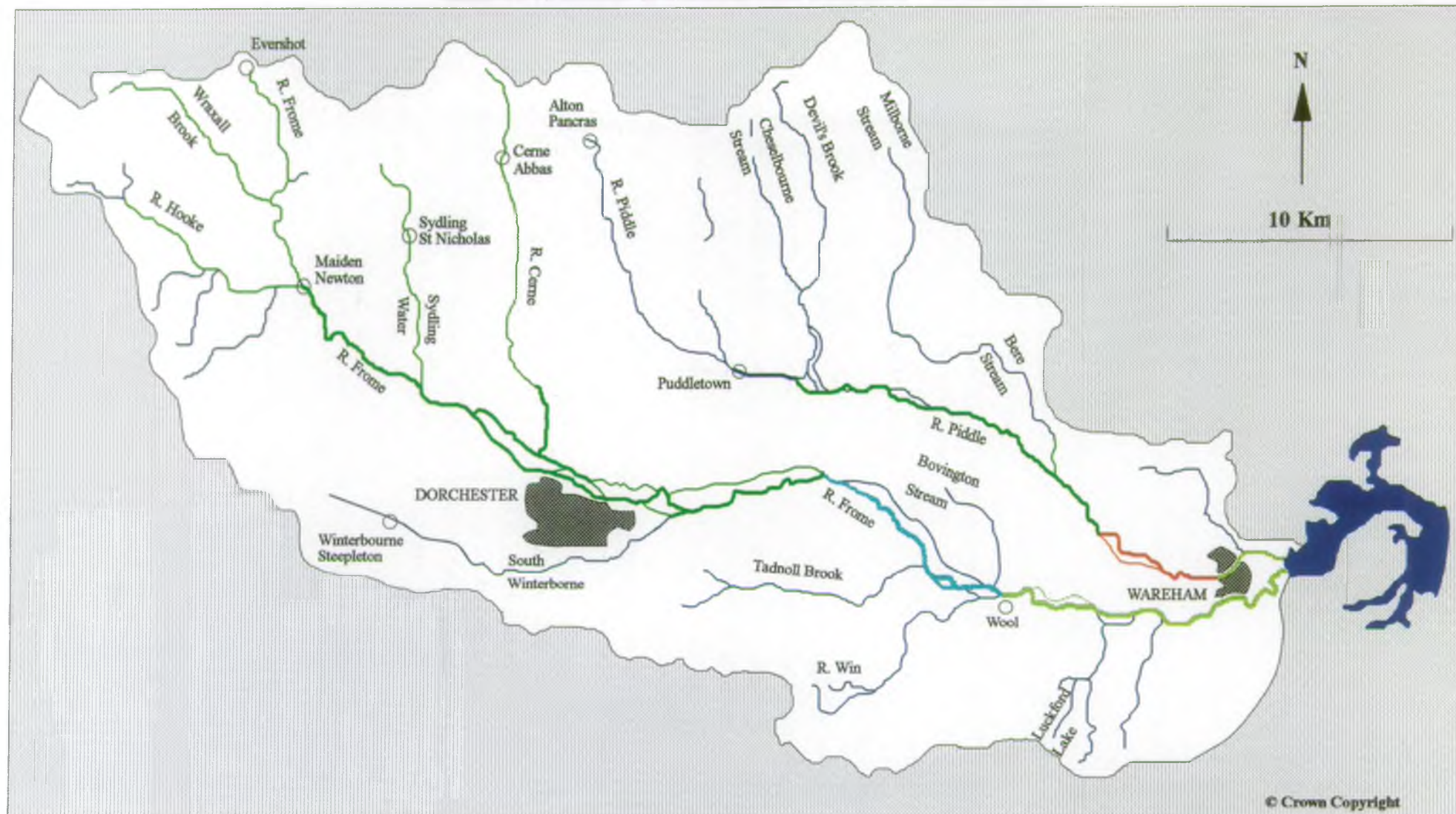
- *maintain, improve and develop the wild fish resource of the catchment*
- *ensure that chemical water quality in those stretches designated under the EC Freshwater Fish Directive complies with those standards*
- *control the movement and introduction of fish into waters to protect the health and genetic integrity of local indigenous stocks*
- *maintain, improve and develop fisheries, allowing for a sustainable harvest of fish by anglers and commercial fishermen where appropriate*
- *regulate angling and raise money for fisheries management by issuing rod licences for freshwater angling, restricting fishing methods and seasons*
- *regulate commercial fishing by a system of licensing. This includes control by limiting the number of licences issued, and, with the approval of the Minister, the NRA may also make byelaws to regulate commercial fishing by restricting fishing methods and seasons*
- *enforce regulations and byelaws to prevent illegal angling and fishing*

4.7.3 Fish Populations

Fish populations are important indicators of the overall health of the rivers as they are affected by changes in flow, water quality and the availability of suitable physical habitats.

We monitor changes in fish populations by carrying out electric fishing surveys, spawning surveys, and studies on smolt migration. Information is also collected from records of rod and net catches and the electronic fish counter at East Stoke.

MAP 15 : FROME & PIDDLE CATCHMENT - ANGLING



LEGEND

	River		Principal Salmonid Fishing
	Poole Harbour (Part Of)		Principal Salmon and Migratory Trout Fishing
	Settlements		Principal Non-Migratory Trout Fishing
			Principal Salmon, Migratory Trout and Coarse Fishing

Salmon and Migratory Trout

Salmon are found in the whole of the Frome catchment downstream of Frampton, although they rarely enter the Cerne or South Winterborne.

Salmon do not normally ascend the Piddle beyond Burleston; their distribution is heavily dependent on adequate flow during critical migration periods. They do not enter the Devil's Brook and only use the Bere Stream downstream of Bere Regis.

Migratory trout may sometimes spawn as far upstream as Dorchester on the Frome, but do not usually ascend the Piddle beyond Burleston.

Non-Migratory Trout

Brown trout are present throughout the upper Frome catchment, but are less common downstream of Bockhampton and virtually absent below Wool. The tributaries and flood relief channels are important areas for trout spawning and nursery. Some trout stocking takes place upstream of Dorchester and here the river is managed for trout fishing over much of its length.

Brown trout are present throughout the Piddle catchment, although they are less abundant upstream of Puddletown. Compared with other chalk streams, relatively little stocking of trout occurs on the Piddle. The populations are therefore considered to be largely naturally spawned and merit a high level of protection.

There are currently no approved introductions of rainbow trout to the catchment. In the past there has been approved stocking in the Frome near Wool, and some unauthorised stocking of the Piddle may have occurred. Some rainbow trout may also have escaped from fish farms, and these fish have been recorded in the Piddle around Cecily Bridge and Trigon, the Cerne and the Sydling. Rainbow trout have been known to breed on the Compton Valence stream and may do so elsewhere in the catchment.

Grayling and Coarse Fish

The Frome does not have a particularly diverse coarse fish population. Grayling are widespread below Dorchester, and are often the dominant species in terms of weight. Pike and dace are also widespread but are less common upstream where some coarse fish are removed to enhance the trout fishery.

Eels, minnow, stone loach, bullhead, three-spined stickleback and brook lamprey are found widely in the Frome system. Roach are less abundant and very localised, but they may reach specimen size. Perch, carp, tench, sea lamprey, river lamprey and ten-spined stickleback are also present.

Fewer species of coarse fish are found in the Piddle. Dace are common downstream of Trigon but rare elsewhere; they may have been more affected by abstraction than trout. Pike are present downstream of Tolpuddle and roach occur in the tidal river. Perhaps surprisingly, grayling are absent.

Eels, minnow, stone loach, bullhead, three-spined stickleback and brook lamprey are found throughout the Piddle system. Carp, rudd, and perch have been recorded during electric fishing surveys, probably having escaped from nearby ponds and lakes.

CATCHMENT USES

Other Species

Marine species including thick-lipped and thin lipped mullet, bass and flounder are frequent in the tidal reaches of both rivers. Thin-lipped mullet and flounder penetrate the Frome right up to Bindon Mill, but do not appear to ascend the Piddle above Baggs Mill.

Anadromous twaite shad and smelt have been recorded, from Poole Harbour and the Frome respectively.

4.7.4 Angling

Most angling for salmon and migratory trout angling takes place from Pallington downstream on the Frome, and from Trigon downstream on the Piddle; the majority of fish are taken from the lower river (Map 15).

Most trout angling takes place on the Frome upstream of Woodsford, and on the Piddle downstream of Puddletown, including most tributaries and some flood relief channels. Grayling angling is popular around Dorchester.

Coarse angling is largely restricted to the Frome downstream of Wool, and usually only in the winter because the river is mainly controlled for salmon angling.

All fishing in the catchment is in private ownership, controlled by local estates, syndicates and clubs. Some trout angling on the rivers is available by day-ticket. There are several trout and coarse stillwater fisheries within the catchment. Most of the trout fisheries are available to the public by day-ticket.

The NRA owns a fishery in the tidal reaches of the Frome, and allows National Rod Licence holders to fish for coarse fish free of charge.

The NRA owns a fishery in the tidal reaches of the Piddle and lets rods for salmon and sea trout angling on an annual basis. Coarse angling is allowed from November to March.

On both the Frome & Piddle, NRA byelaws apply and there are no statutory bag limits, although some private fisheries may set their own. Catch and return is becoming more widely accepted in the management of brown trout fisheries in the upper catchment.

4.7.5 Commercial Fishing

Salmon and Migratory Trout

There is one licensed seine netsman operating in the joint estuary of the Frome & Piddle, catching the salmon and migratory trout from both rivers. This is outside the present catchment, but exploits their stocks.

Eels

There is relatively little eel fishing on the Frome & Piddle. There are a small number of licensed fyke nets on the Frome in the Wool area, and there is an eel rack at East Burton; on the Piddle the only licensed instruments are the eel racks at Trigon.

Sea Fish

As riparian owners of the tidal river fishery, the NRA does not allow any exploitation of sea fish in these waters.

4.8 Recreation & Amenity

Many people spend their spare time enjoying our rivers and coasts. Where we can, we try to improve facilities for these people but we must always safeguard the environment from any damage they might cause.

4.8.1 Objective

To encourage the development of the amenity and recreational potential of inland and coastal waters and associated land.

4.8.2 The Role of the NRA

We have duties and powers to:

- *protect and maintain access to beautiful areas and sites of interest, where access currently exists*
- *make sure that land and water under our control is made available for recreation and at all times provide for the needs of the chronically sick or disabled*
- *charge for facilities that we provide for recreation*
- *make byelaws to regulate recreation*
- *make byelaws covering navigational matters where there is a public right of navigation and in the absence of a navigation authority*

4.8.3 Local Perspective

The Frome, Piddle and their tributaries are very highly regarded, good quality rivers that, together with their associated habitats, are well used by people in search of recreation in the countryside.

Land-Based Recreation

While there are many footpaths, bridleways and roads that cross the rivers affording some excellent views, there are very few places where they run alongside the rivers for any distance. In most places there is no public right of access to the river itself.

Rivers and riverside habitats are important for birds, and watching them is a popular pastime. Horse riding and mountain-bike riding also take place where there is public access; both have grown in popularity in recent years.

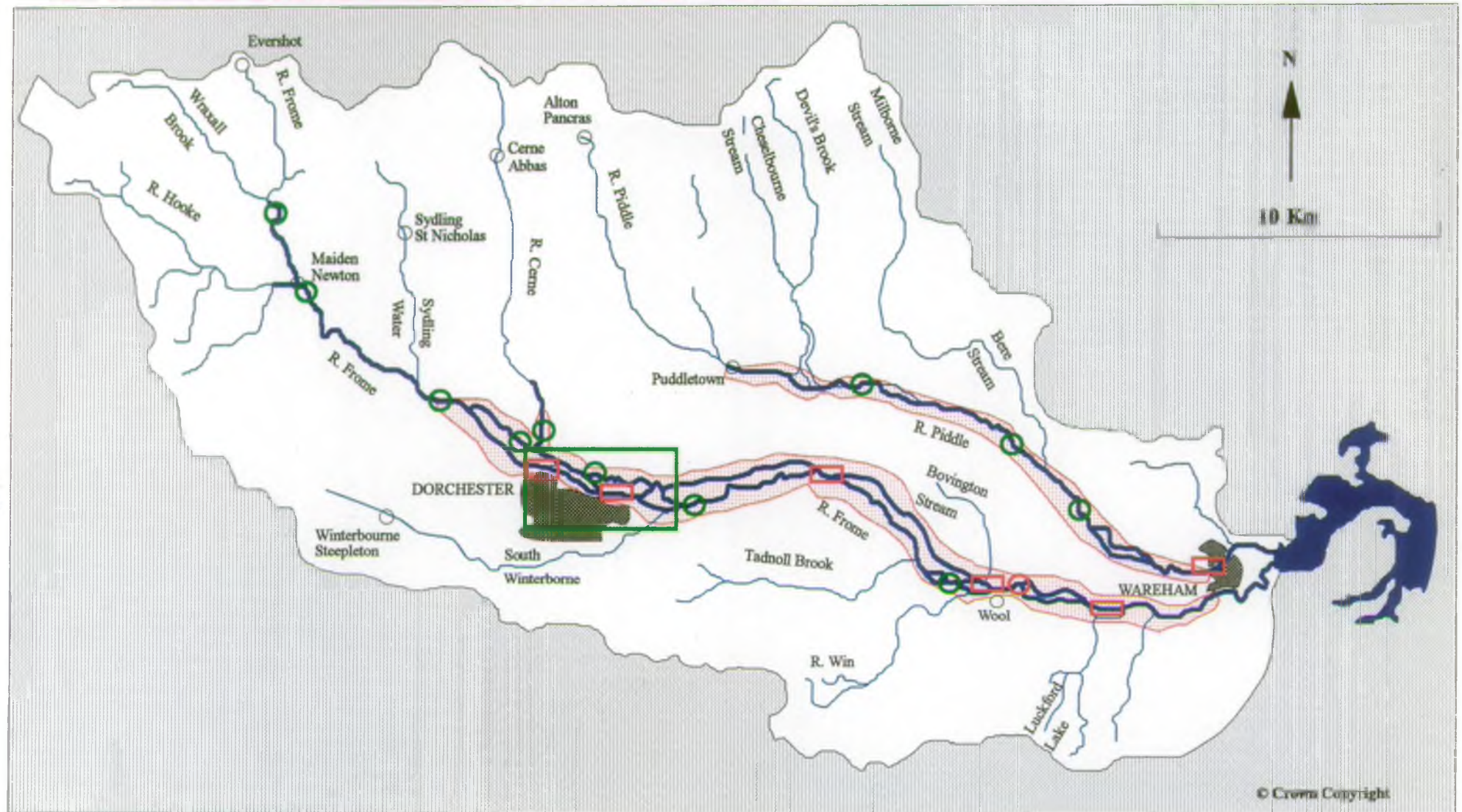
Water-Based Recreation

Water-based recreation is very limited on the majority of watercourses within the catchment because the rivers are generally small and access agreements have not been made with the owners.

Boating is a major activity on the tidal Frome. The NRA owns and administers 127 non-residential moorings, and issues mooring licences to a number of private operators. These firms also provide a range of boating-related services.

A number of land drainage byelaws cover moorings, speed limits, and boats abandoned, sunk or moored so as to cause erosion, navigation or access problems.

MAP 16 : FROME & PIDDLE CATCHMENT - FLOODPLAIN AREAS, CONTROL STRUCTURES AND STATUTORY MAIN RIVER



LEGEND



Statutory Main River



Ordinary Watercourses



Poole Harbour (Part Of)



Flood Plain



FAS Schemes



NRA Weirs



Other NRA Controls



Private Weirs



Other Private Controls



Settlements

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4.9 Flood Defence & Land Drainage

In simple terms, the river system within a catchment drains surface water from the land to the sea. The interaction of weather, geology and land use means that there is a wide range of river flows.

Flood risk and land drainage have always affected the way we use land. By improving our control of water, we have been better able to make use of river and coastal floodplains for farming and building towns. This control can take many forms, from simple channel alterations to the construction of floodbanks and the creation of artificial washlands. Works constructed for other purposes, such as weirs, mills and bridges, have also altered the natural river system (Map 16).

Greater protection from floods has improved the quality of life for those affected and better land drainage has improved agricultural productivity. However, unless properly managed, these benefits may result in other problems, such as increased downstream flows and a legacy of expensive works for future generations to maintain. Changes in land use, made possible by drainage and flood defence, may also cause significant environmental change, particularly to wetland habitats.

Today we manage flood defences and land drainage to balance the needs of all river users with the needs of the environment.

4.9.1 Objective

To provide effective defence for people and property against flooding from rivers and the sea, and to provide adequate arrangements for flood forecasting and warning.

4.9.2 The Role of the NRA

Legislation tells us what we can and cannot do, and our statutory Flood Defence Committees make decisions on flood defence matters. All watercourses are defined as either main rivers or ordinary watercourses. We supervise all flood defence matters, but have special powers to carry out control work on main rivers. We also have powers to protect properties flooding from the sea. Local authorities are responsible for flood defence on ordinary watercourses, and for protecting the coast from erosion by the sea.

We have duties and powers to:

- *control certain works and advise planning authorities on flood defence*
- *maintain and improve the flood defence system which is under our control*
- *provide flood forecasts and warnings so that risk to life and damage to property is reduced during floods*

4.9.3 Local Perspective

There are 109km defined as main river Frome, and 24km of main river Piddle (Map 16); adjacent land use is predominantly agricultural, with relatively few properties or major roads.

Although the upper Frome catchment is subject to intense rain storms, the river downstream of Maiden Newton responds only relatively slowly to rainfall owing to the highly permeable nature of its chalk catchment. The Piddle catchment displays similar characteristics.

CATCHMENT USES

Historically, agricultural land drainage schemes have been carried out on the Frome in the 1960s and 70s from Dorchester to Wareham. One of the last of these was the Wool to Pallington Scheme completed in 1973. Some isolated agricultural schemes have also been carried out on the Piddle, including dredging and lowering of the river bed in the late 1970s between Tolpuddle and Briantspuddle.

From the mid 1960s to 1972 a programme of works was implemented to construct tidal defences at Wareham Marshes, Bestwall and Keysworth.

4.9.4 Maintenance

This work consists mainly of weed cutting between Dorchester and Wareham (Section 8.6), desilting (Section 8.5), maintenance of NRA control structures and the defences along the tidal reaches of the Frome & Piddle (Section 7.3.2 and 8.7).

4.9.5 Emergency Response

The NRA's workforce responds to remove blockages and to operate flood hatches during high flows to ensure that flood water can pass safely downstream.

Our priorities are firstly to ensure that Flood Alleviation Schemes (FASs) operate to their design standard. Secondly we manage high flows in other main river situations, and finally we respond to flood situations on ordinary watercourses, where resources allow, in support of local authorities.

4.10 The Built Environment and Development Plans

We consider the built environment and the process of planning and regulating new developments, including roads, housing and industry.

4.10.1 Objective

To protect the water environment from the adverse impacts of development and to minimise flood risk.

4.10.2 The Role of the NRA

The County and District Planning Authorities plan and control development within the catchment, but they must consult the NRA even if they choose not to follow our advice. The policies in statutory development plans set out the framework for land use change. As a statutory consultee, we offer comments which aim to protect and enhance the water environment and minimise the risk of flooding.

We have published guidance for local planning authorities on these matters (Guidance Notes for Local Planning Authorities on Methods of Protecting the Water Environment Through Development Plans) to help improve the protection that statutory development plans provide for the water environment.

4.10.3 Development Plans

Dorset County Structure Plans

The Frome & Piddle catchment is wholly situated within the county of Dorset. The approved plans for the area are the South East Dorset Structure Plan: First and Second Alterations, and the Dorset (excluding South East) Structure Plan: First and Second Alterations.

Both plans recognise that environmental constraints mean that development is likely to be limited in certain areas. The AONB, the rural nature of the catchment, and groundwater Source Protection Areas are all recognised as constraints to development.

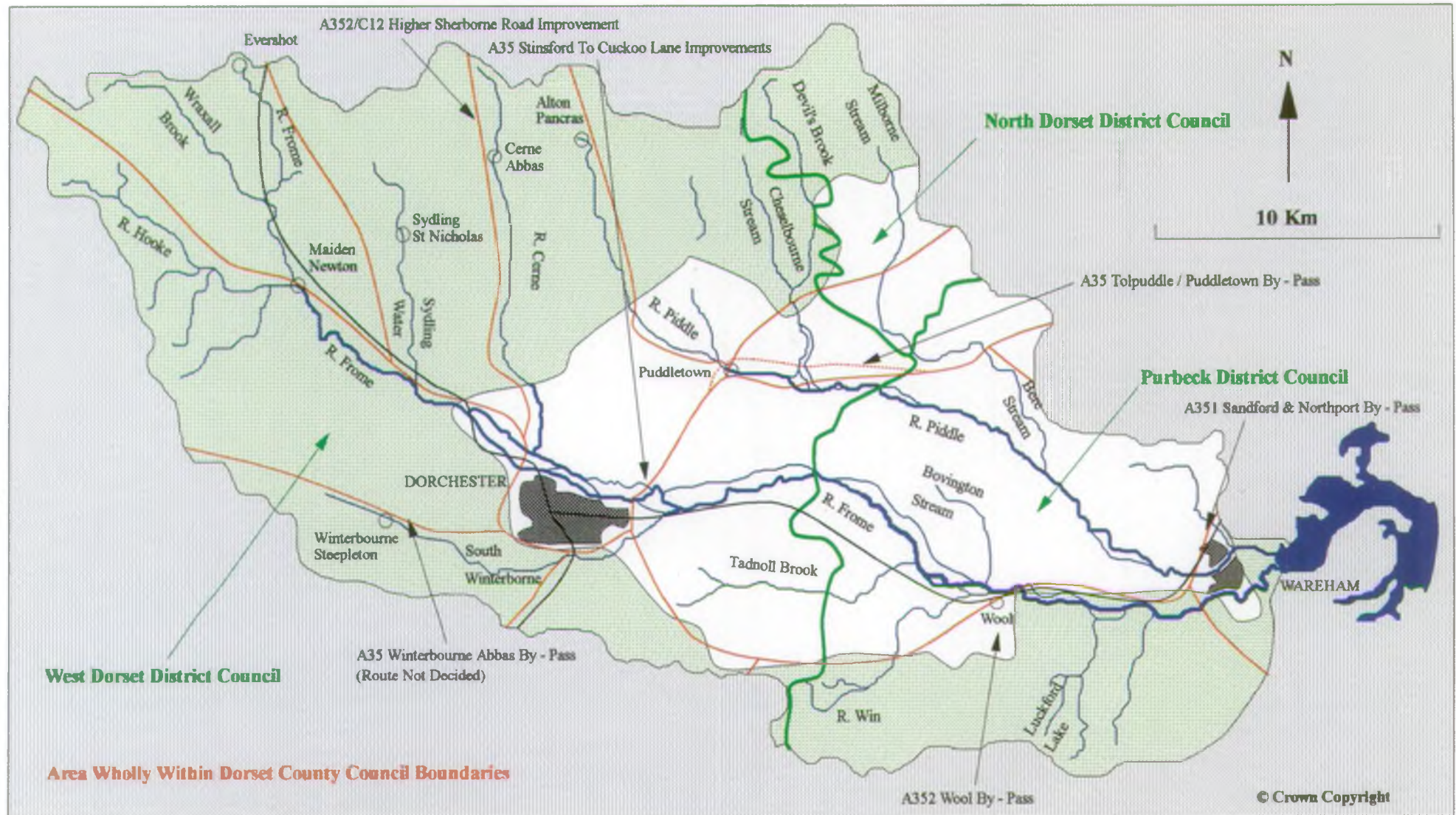
The Dorset County Structure Plan Consultation Draft (November 1994) outlines the draft policy framework for development up to 2011. Although this plan has no commitment, the NRA supports the principle that development will only be permitted if the necessary service infrastructure, including drainage, sewerage, sewage treatment and water supply is available or will be provided in order to protect or improve the water environment.

District Wide Local Plans

Local Plans are available for most of the catchment but these are being superseded by District Wide Local Plans (DWLPs) which reflect the Structure Plan guidance for the period to 2001.

All local planning authorities include policies which state that development is unlikely to be permitted if it will be detrimental to the water environment in terms of water quality, flow regime, flood risk, amenity and the historical and wildlife value of streams and rivers, their valleys, associated wetlands and water meadows.

MAP 17 : FROME & PIDDLE CATCHMENT - DEVELOPMENT



LEGEND

	River		Roads		District Council Boundaries
	Poole Harbour (Part Of)		Railway		Part of Dorset AONB
	Settlements		Proposed New Road Routes		

West Dorset District Council

The West Dorset District Local Plan (Deposit Plan) allocates significant development within the catchment in the Dorchester area. Residential and employment land is allocated at Poundbury, Herrison Hospital at Charminster and Crossways. Within Dorchester, the Hardy's School site and St George's Road are earmarked for residential development.

All other villages have defined boundaries which outline the areas in which development will normally be permitted. Development in the rural catchment will be extremely limited.

The Plan contains policies which seek to protect and enhance the water environment, and recognises the need to ensure that new development can be supplied with water without adversely impacting on the flows of Dorset rivers and streams.

Purbeck District Council

The Purbeck DWLP Deposit Plan will not be available until spring 1995; the North East Purbeck Deposit Plan and Adopted Isle of Purbeck Local Plan are used for guidance.

The Isle of Purbeck Local Plan area, a small part of which falls within the Frome & Piddle catchment, is known to be of high landscape value and development will therefore be concentrated in and around principal settlements; the main source of new housing is likely to come from infill development. Stoborough, including Stoborough Village, Ridge and Stoborough Green, is a priority village and land has been allocated for a fairly sizeable residential development including several small industrial workshop dwellings.

In the rest of Purbeck, Wareham is the only sizeable settlement where development would be permitted. Constraints such as river floodplains of the Frome & Piddle and the Green Belt boundary, combined with Local Plan objectives to maintain the town's character, mean development potential is limited. Small scale industrial development can occur at the Sandford Lane Industrial Estate, to the north of Wareham.

North Dorset District Council

A small part of the Frome & Piddle catchment falls in the area covered by the North Dorset DWLP Consultative Draft. Small allocations for residential development are included for Milborne St Andrew and Milton Abbas.

4.10.4 Development in Flood Risk Areas

Settlements have historically been located near rivers, and the flood plain, which offers flat land, is often thought of as being attractive for further development.

Some coastal strips are at risk from sea or tidal flooding. Global warming and expected sea level rise are likely to exacerbate existing problems and may generate new ones.

The Government and the NRA believe that new development should be guided away from flood risk areas and that the effects of global warming should be taken into account in planning the pattern of future development. The NRA will continue to liaise with planning authorities to assist them in achieving this objective. In this way future flooding problems and wasteful expenditure of public resources on remedial works should be avoided. Prevention is better than cure.

CATCHMENT USES

The NRA is a statutory advisor to planning authorities on flood defence matters. It also issues consents and byelaw approvals for certain works including planting and landscaping which are likely to affect the flow level or distribution of water, or impede any drainage work, or affect the current or future operation and maintenance of a watercourse.

There are existing water uses and associated land uses which depend upon the proper regulation of water levels and flows, and we have a responsibility to protect such uses.

It is important that developers and scheme promoters are fully aware of these controls and that full consideration is given to them at a very early stage in the gestation of any proposal which may affect water levels or flows, and thereby require NRA consent or approval.

4.10.5 Surface Water Run Off

Run off is proportional to the amount of urban area within a catchment. Information about the size of existing developed areas, the increases proposed in County Structure and Local Plans, and the number and location of known flooding problems will be used to identify the need and priorities for Catchment Drainage Plans (CDPs).

CDPs may be produced by the NRA to provide a strategic and local framework to assist in the control of surface water run off from new developments. They examine how normal flow and flood flow regimes may change with time and respond to activities and land use changes within a catchment.

Measures to mitigate any potential increase in flood risk or damage to the aquatic environment can then be investigated and passed to the local authority. Such measures might involve local or strategic surface water attenuation, more widespread use of soakaways, increasing river capacity or flood protection works. To be approved, a measure must be environmentally acceptable.

4.11 Mineral Extraction

The NRA recognises the economic importance of quarrying and extraction of sand, gravel, ball clay, oil and gas to the region. However, exploration and extraction can pollute and reduce flows in surface and groundwaters locally and across catchments.

Areas of concern to the NRA include :

- *the loss of aquifer material and groundwater resources as a result of extraction*
- *extraction often involves dewatering, sometimes for substantial periods of time. This can lead to the loss of water supply from nearby wells and boreholes, the removal of natural groundwater supplies to ponds and rivers, and can also affect wetlands*
- *removal of material from above the water table reduces natural filtration and increases pollution risk to groundwaters*
- *the increased risk of pollution from plant or operations close to or below the water table*
- *the impact of suspended solids inputs to streams on salmonid spawning gravels and nursery areas*

4.11.1 Objective

To control the impact of mineral winning and quarrying activities on the water environment and to promote suitable after-use activities.

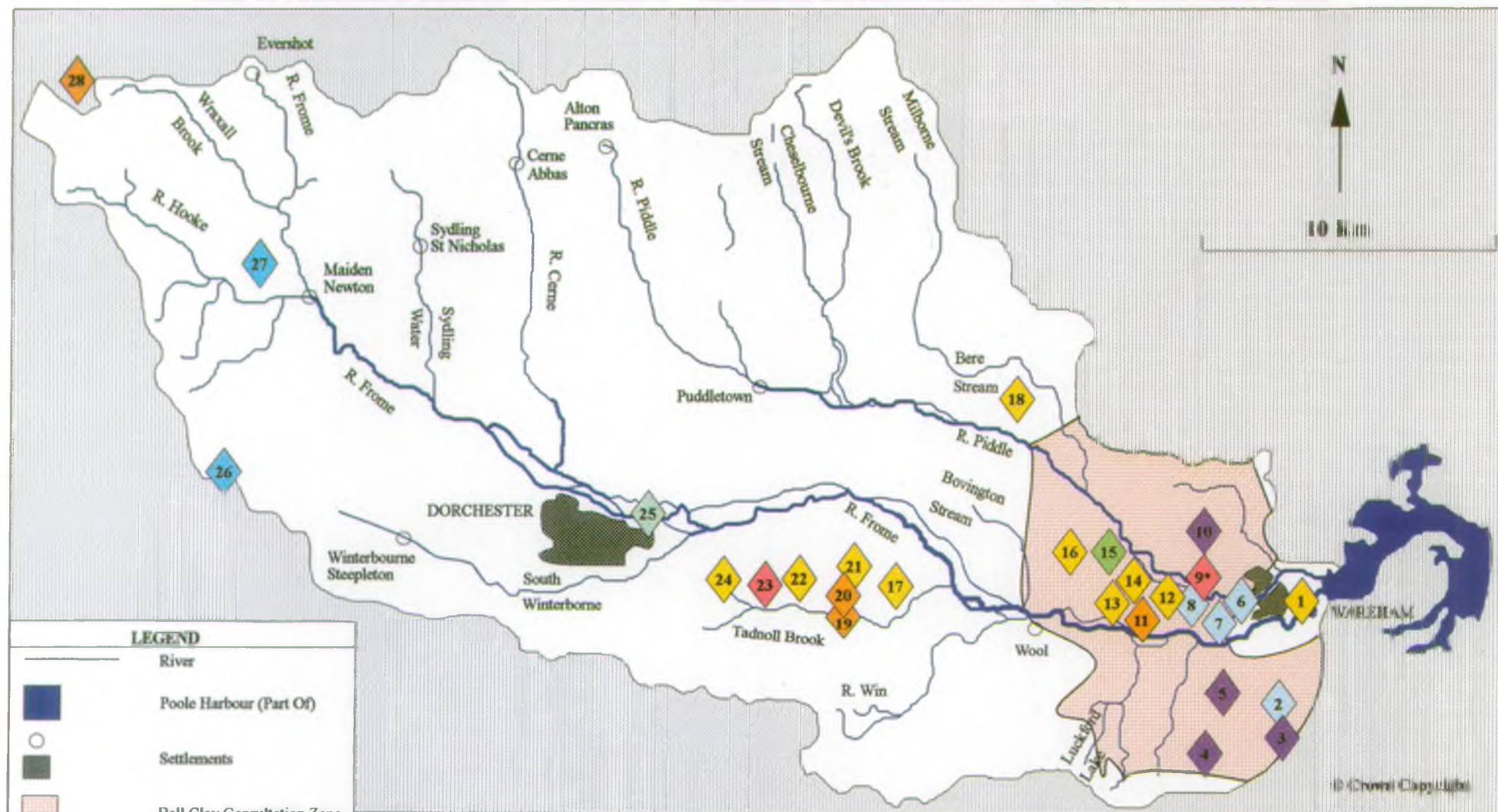
4.11.2 The Role of the NRA

The NRA's role is to :

- *license abstraction for dewatering purposes*
- *consent discharges from quarries and operational mines*
- *respond to Mineral Plans as a statutory consultee of the planning authority*

In considering proposals, the NRA will have regard to its Policy and Practice for the Protection of Groundwater (PPPG). We will object to a new proposal for mineral extraction where there will be demonstrable harm to water resources or the water environment, unless measures to mitigate any effects can be agreed in the planning controls.

MAP 18 : FROME & PIDDLE CATCHMENT - MINERAL EXTRACTION AND WASTE DISPOSAL SITES



LEGEND

- River
- Poole Harbour (Part Of)
- Settlements
- Ball Clay Consultation Zone

- | | | | | | | |
|-------------------------------|-------------------|------------------------|-----------------|-------------------------|------------------------------|-------------------------------|
| Sand & Gravel, Waste Disposal | Chalk Working | 1. Bestwall/Swineham | 7. Wareham 'C' | 13. Masters South | 19. Redbridge Lane | 25. Loud's Mill |
| Sand & Waste Disposal | Ball Clay Working | 2. Furzebrook Terminal | 8. Wareham 'D' | 14. Masters North | 20. Old Heath Farm | 26. North Barn |
| Waste Disposal | Sand and Gravel | 3. Furzeyground | 9. Tatchells | 15. South Heath | 21. Redbridge Road (Disused) | 27. Whitesheet Hill (Disused) |
| Bulky Household Waste | Oil/Gas Wellsite | 4. Povington | 10. Trigon Hill | 16. Hyde | 22. Hanger Field | 28. Corscombe |
| | | 5. Squirrel Cottage | 11. Hines | 17. Sheepwalk (Disused) | 23. Warmwell | |
| | | 6. Wareham 'A' | 12. Binnegar | 18. Blackhills | 24. West Knighton | |

Sites taken from Dorset
Minerals and Waste Local Plan
(Deposit Plan) July 1994
* Includes bulky household waste

4.11.3 Local Perspective

Minerals

The lower reaches of the catchment are worked extensively for sand, gravel and ball clays. Historic and current sand and gravel extraction has been largely from plateau deposits. The Dorset Minerals and Waste Local Plan Deposit Plan identifies that the only new site proposed in the area is to extract from river valley gravels. There are concerns that development of this proposed site, at Philliols/Hyde Farm, may have an adverse impact on the Bere Stream SSSI.

Existing planning permissions for current sand and gravel extractions to the north of Puddletown Road have had a severe impact on the landscape of the Piddle valley, by effectively removing part of the southern valley side. There is an existing planning permission at Worgret Heath Farm which, if implemented, would have a similar impact on the Piddle valley landscape. DCC are seeking the revocation of this consent.

Effluent discharges have been dealt with in Section 4.2.3.

A new area of sand and gravel working has recently been established by CAMAS Aggregates between the Frome and the Piddle at Bestwall, downstream of Wareham. This will create a large area of open water between the Frome and Piddle and it is proposed to use this as a nature reserve. However, the creation of a nature reserve and its long term tenure and management are issues that have yet to be resolved

Gravel extraction also takes place in the Tadnoll Brook area.

Many sand and gravel pits are developed in minor aquifers and reduce the amount of groundwater held in temporary storage. This loss can be partly replaced by creating a compensation pond, which is designed to contain a similar volume of water to that which was originally stored. It fills naturally in winter, and gradually releases the water to the system in summer.

Oil

There are oil production wells in the Wareham area, part of the Wytch Farm oilfield, but the operation of these sites does not impact on the water environment.

The potential for pollution is obviously a concern; however extensive pollution prevention measures are incorporated into site design and operation. Additionally, all sites have contingency plans for dealing with spillages of oil. All discharges from oil production sites are controlled by HMIP under IPC authorisations, but intermittent discharges of surface water are consented by the NRA.

At the end of production, all facilities will be removed and the land reinstated to an acceptable and beneficial after-use.

4.12 Solid Waste Disposal

Here we consider the disposal of solid waste to land. Some wastes can form very polluting liquids, known as leachate, as they break down; this can pollute water both above and below ground.

Waste disposal sites are licensed by the County Waste Regulation Authority (WRA) who make sure that sites do not endanger public health, cause pollution or cause serious detriment to the local community. WRAs consult us on all applications for waste management licences and we recommend ways of avoiding water pollution to them.

Some wastes can be spread on farmland to improve the soil. We advise the WRA on ways of protecting the water environment from this activity. The NRA has its own powers to deal with pollution arising from this activity.

4.12.1 Objectives

To prevent the pollution of ground and surface water or damage to wetlands resulting from the disposal of waste to land.

4.12.2 The Role of the NRA

We have duties and powers to:

- *monitor the quality of water in the vicinity of, but not within, waste disposal sites*

4.12.3 Local Perspective

There are six operational licensed waste disposal sites within the catchment, and a number of disused sites (Map 18). Tatchells Quarry (Carey Heath) is licensed to receive solid domestic, commercial and industrial waste of a non-hazardous nature. Special wastes which by definition may be regarded as toxic are not permitted at any site within the catchment with the exception of Hines Pit (Worgret Heath) which is licensed to receive a small percentage of asbestos waste. Operations at Hines and Tatchells are within containment structures with appropriate measures in place for the management of leachate.

Stokeford Heath is licensed to accept only inert wastes, and Masters Pit (Worgret Heath) and Old Heath Farm (Crossways) are limited to inert waste with a minimum of 1% of paper, plastics, wood, metal or fabric per load.

The completed area of Warmwell Quarry no longer accepts waste and is undergoing restoration.

There is a disused landfill site at Duck Hill which has caused local pollution problems in ditches draining to the Piddle. The site has now been properly sealed and capped, with both leachate collection and methane control systems installed.

Pits at Gallows Hill have historically been used for the disposal of septic tank wastes, but this practice has now ceased.

5. WATER QUALITY - CATCHMENT STATUS

The NRA aims to maintain and improve, where appropriate, the quality of water for all those who use it. This is achieved by setting targets for water quality based on :

- *ensuring compliance with the standards laid down in EC directives*
- *Water Quality Objectives (WQOs) to protect recognised uses*

5.1 EC Directives

The current status of water quality is compared with targets set by EC Directives appropriate to the catchment. Issues are identified where standards are not being met.

5.1.1 EC Freshwater Fish Directive

The Freshwater Fish Directive *relates to the quality of waters needing protection or improvement in order to support fish life*. It is concerned with ensuring that water quality in the designated stretches of water is suitable for supporting fisheries.

The Directive contains two sets of quality standards, one at levels to support a cyprinid fish population and another set at stricter levels to support a salmonid fish population. There are also two sets of standards, imperative standards which must be achieved and guideline standards which member states should aim to achieve.

State of the catchment

All sites monitored under this Directive between 1991 and 1993 comply with the imperative standards for salmonid fisheries. The designations are outlined in Map 19.

5.1.2 EC Dangerous Substances Directive

The EC Dangerous Substances Directive *relates to pollution caused by certain substances discharged in the aquatic environment of the community*. It is concerned with controlling certain substances considered harmful which are discharged to the aquatic environment.

The Directive established two lists of compounds. List I contains substances regarded as particularly dangerous because of their toxicity, persistence and bioaccumulation. Discharges of List I substances must be controlled by Environmental Quality Standards (EQSs) issued through Daughter Directives.

List II contains substances which are considered to be less dangerous but which still can have a deleterious effect on the aquatic environment. Discharges of List II substances are controlled by EQSs set by the individual Member States.

State of the catchment

Both water and sediments in the tidal reach of the Piddle are monitored downstream of Wareham (Keysworth) STW for the List I substance cadmium. In 1993 an increase in cadmium levels was recorded in the sediment; this is likely to be due to inputs from industrial discharges to Poole Harbour rather than the STW, as the annual average cadmium concentration of the effluent from Wareham STW has not exceeded the limit of detection over the last 3 years. Consequently cadmium is not consented in the effluent.

Nine sites are monitored in the catchment for List II purposes relating primarily to aquaculture practices. None of the reported List II sites exceeded their EQS.

MAP 19 : FROME & PIDDLE CATCHMENT - EC FRESHWATER FISH DIRECTIVE



LEGEND



River



Poole Harbour (Part Of)



Settlements



Designated Salmonid Stretches



Monitoring Site

1991, 1992 and 1993 all imperative standards for salmonid fisheries were met

No designated cyprinid fisheries in the catchment

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5.1.3 EC Nitrates Directive

The Directive *concerning the protection of waters against pollution caused by nitrates from agricultural sources* requires Member States to identify waters affected by pollution from nitrates or which could be affected if protective measures are not taken.

The land draining to these areas is designated as Nitrate Vulnerable Zones (NVZ) and action plans must be established to reduce existing nitrate pollution and preventing further pollution. The identification of vulnerable zones has been limited to catchments around strategic PWS sources where existing data shows that standards for nitrate in drinking water have been or will be exceeded by 2010.

State of the catchment

There are no designated zones in the catchment.

5.1.4 EC Urban Waste Water Treatment Directive

The EC Directive *concerning urban wastewater treatment* lays down minimum standards for the provision of sewage collection systems and sewage treatment. The Directive specifies secondary treatment for all discharges serving population equivalents greater than 2,000 to inland waters and estuaries, and greater than 10,000 to coastal waters, but provides for higher standards of treatment for discharges to *sensitive* areas and lower standards of treatment to *less sensitive* areas.

Sensitive areas are those surface waters which receive discharges serving population equivalents of greater than 10,000, and are or may become eutrophic in the near future. Less Sensitive areas or *High Natural Dispersion Areas* (HNDAs) are those coastal or estuarial waters with high, natural dispersion where a lower level of treatment is required, subject to comprehensive studies being carried out by the discharger, to establish that a lower level of treatment will be sufficient to protect the environment from adverse effects.

Discharges below the specified population equivalents for inland and coastal waters must also receive appropriate treatment as defined in the AMP2 Guidelines (1993).

State of the Catchment

The combination of nutrient inputs from point source discharges (STWs and fish farms) and diffuse inputs means that the Frome & Piddle catchment may be undergoing eutrophication. This can result in increased production of algae and a deterioration in water quality. In recent years there have been complaints about the lack of clarity of the water in the lower Frome in the spring and early summer; these are usually caused by algal blooms.

The Frome between Dorchester STW and the tidal limit is to be studied between January 1995 and January 1997 to ascertain whether it is eutrophic. This study will also identify the relative contribution of different sources of nutrients in the catchment. If the river is found to be eutrophic, it may be designated as a sensitive water; this may result in the requirement for nutrient removal at Dorchester STW if it is found to be a significant contributor of nutrients.

Issue 1. Trophic status of the Frome is uncertain

CATCHMENT STATUS

5.1.5 EC Groundwater Directive

The Directive *on the protection of groundwater against pollution caused by certain dangerous substances* is concerned with protecting groundwaters from pollution from certain substances considered dangerous on the basis of their toxicity, persistence, bioaccumulation and carcinogenic, mutagenic or teratogenic properties in the aquatic environment. The Directive identifies two lists of compounds similar to those listed in the Dangerous Substances Directive. List I contains substances which are not allowed to enter groundwaters. This Directive applies to all discharges to groundwaters for example discharges from waste disposal sites.

State of the Catchment

The NRA carries out its duties under this Directive as a statutory consultee to the WRA, providing advice during the issue of waste disposal licences, and auditing monitoring data collected by waste disposal site operators. The NRA has its own duties and powers for protecting groundwaters.

5.1.6 Annex 1a Reduction Programme

At the second and third North Sea Conferences, the UK Government made a commitment to reduce the loadings of certain Annex 1a substances entering tidal waters from rivers and direct discharges by 50% (70% for mercury, cadmium and lead) by 1995 compared to a 1985 baseline (or a 1991/92 baseline where data for 1985 is unavailable). In England and Wales the NRA is responsible for identifying inputs where reductions must be made in order to meet this commitment.

State of the Catchment

Significant loads of zinc and nickel have been reported under Annex 1a for the site on the Frome at Holme Bridge since 1991. The NRA is currently examining sites nationally where reductions of Annex 1a loads may have to be achieved; the Frome at Holme Bridge may or may not be targeted for load reductions.

Zinc accumulates in river sediments downstream of cress farms where it is used to control crook root. The salmonid EQS is 75µg/l annual average total zinc, and observations from current farming operations indicate that loadings from solution and sediment combined do not exceed this value. Consent conditions at cress farms will be set at 75µg/l as a maximum value for the period October to April, and thereafter no zinc may be added.

Issue 2. Control of cress farm discharges.

5.2 Water Quality Targets

The NRA aims to maintain and improve, where appropriate, the quality of water for all those who use it. This is achieved by setting targets for the catchment based on Water Quality Objectives (WQOs) to protect recognised uses.

5.2.1 Water Quality Objectives

The Water Resources Act 1991 contains legislation which allows the Secretary of State to prescribe classification schemes for water quality and to use them for the setting of WQOs.

Previous references to water quality have been based on the National Water Council (NWC) classification system. Because of its limited range of chemical parameters and subjective interpretation it has been replaced with a dual system of use-related classifications, statutory WQOs and a General Quality Assessment (GQA) system.

These reporting facilities will operate in parallel and will represent a neutral translation in standards from the NWC scheme (Appendix 11.2). Whilst the WQO system will examine compliance with EC Directives and specific use-related standards, the purpose of the GQA is to provide a means of accurately assessing and reporting on the general state of controlled waters in a nationally consistent manner.

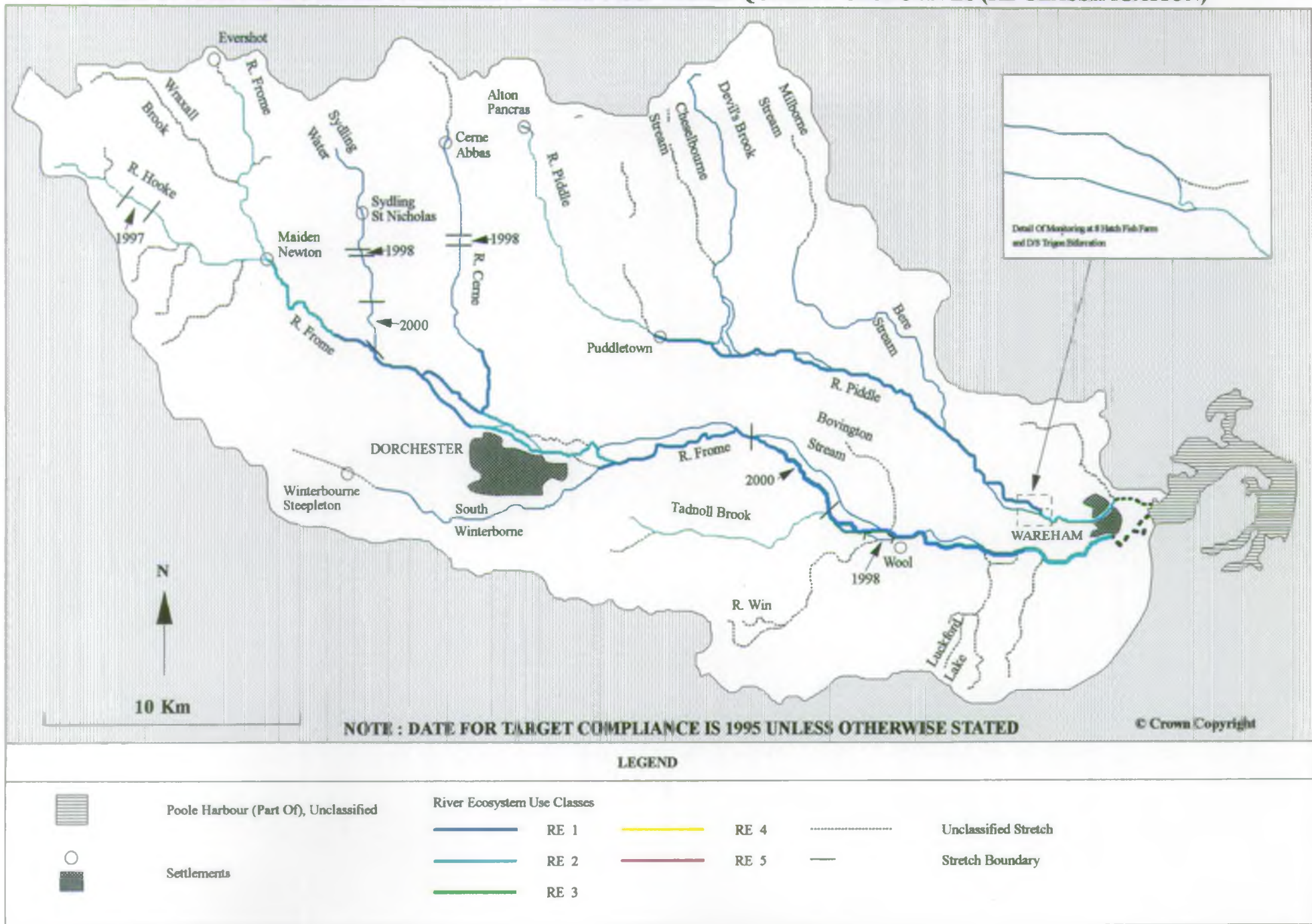
Water Quality Objectives

A Use-Related Scheme: The classification scheme proposed for establishing statutory WQOs is based upon the recognised uses to which a river stretch may be put. These uses include River Ecosystem, Abstraction for Drinking Water Supply, Agricultural Abstraction, Industrial Abstraction, Special Ecosystem, and Watersports.

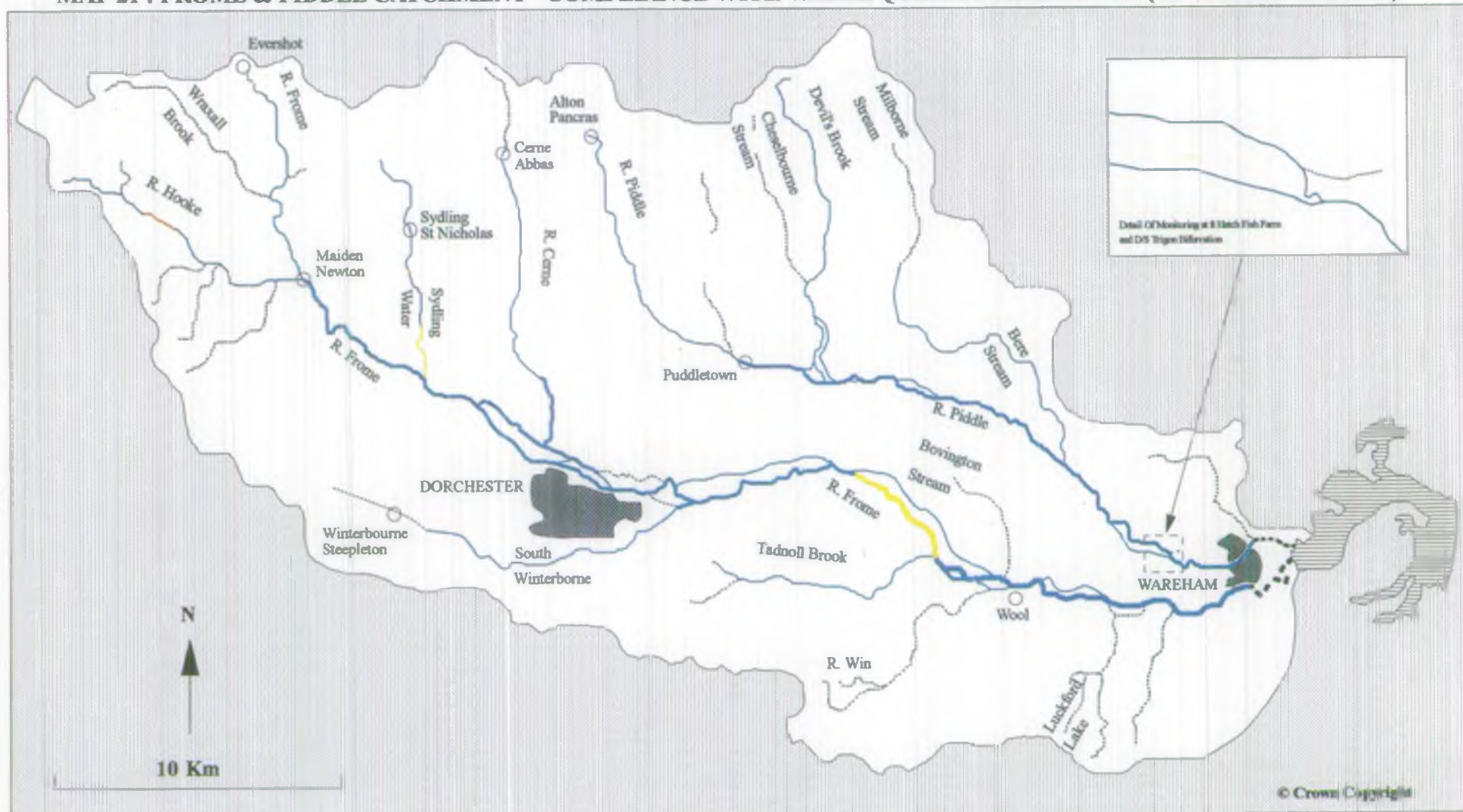
The first phase of WQO implementation will be restricted to the River Ecosystem (RE) Use Class only; the standards for further uses are still under development. For each stretch, a target WQO will be proposed, including a date by which this level of water quality should be achieved. Until WQOs are formally established by the Secretary of State, they will be applied on a non-statutory basis.

RE Use Class: There are five Classes within the RE scheme, one of which will be applicable to every stretch of classified river. The term *Ecosystem* is used in recognition of the need to protect the ecosystem that is sustained in a healthy river. The proposed standards for the five RE Classes are based on the chemical water quality requirements of different types of ecosystem (Appendix 11.3), and consequently the types of fisheries they are capable of supporting. Until the WQOs are formally established by catchment, they will equate to the former NWC-based River Quality Objectives (RQOs).

MAP 20 : FROME & PIDDLE CATCHMENT - PROPOSED WATER QUALITY OBJECTIVES (RE CLASSIFICATION)



MAP 21 : FROME & PIDDLE CATCHMENT - COMPLIANCE WITH WATER QUALITY OBJECTIVES (RE CLASSIFICATION)



LEGEND



Poole Harbour (Part Of), Unclassified



Settlements



Compliant With Proposed WQO



Non Compliant With Proposed WQO
(marginal failure)



Non Compliant With Proposed WQO
(significant failure)



Unclassified Stretch

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CATCHMENT STATUS

Proposed Water Quality Objectives

The proposed target WQOs (RE Use Class) are shown in Map 20, and will apply from January 1995 apart from the following stretches.

River	Stretch	Target Class	Date
Hooke	Hooke - Higher Kingcombe	RE2	1997
Hooke	Higher Kingcombe - Kingcombe	RE2	1997
Sydling Water	d/s Huish Fish Farm - d/s Sydling STW	RE1	1998
Sydling Water	Lower Magiston - d/s Lower Magiston Fish Farm	RE1	2000
Sydling Water	d/s Lower Magiston Fish Farm - confluence with Frome	RE1	2000
Cerne	u/s Nether Cerne Fish Farm - d/s Nether Cerne Fish Farm	RE1	1998
Frome	d/s Pallington - d/s Golden Springs Fish Farm	RE1	2000
Frome	d/s Golden Springs Fish Farm - Moreton	RE1	2000
Frome	Moreton - confluence with Tadnoll Brook	RE1	2000
Frome	u/s Waterbarn bifurcation - d/s Waterbarn bifurcation	RE1	1998

The target WQOs are predominantly RE1 and RE2, reflecting the need to protect high quality river ecosystems. Stretches of the upper Frome have a proposed target of RE2. This reflects the geology of the upper catchment and the low flows in many of these streams, but recognises their importance as trout spawning and nursery areas.

State of the Catchment

An assessment of current water quality based on the RE Use Classes has been made using data from the routine water quality sampling programme taken over the three year period 1991-1993 inclusive.

A comparison of current water quality with the targets shows that there are several stretches where current water quality does not comply with the objectives (Map 21).

Compliance with target WQOs is expressed in terms of significant and marginal failures. Significant failures are those where there is a 95% confidence that the river stretch has failed its WQO; marginal failures are those where there is at least a 50% confidence, but less than 95% confidence that the stretch has failed.

Of the 82 classified river stretches in the catchment, only three significantly fail to meet their objectives and six marginally fail to comply with their target WQO.

Hooke

Two river stretches of the Hooke, from Hooke-Higher Kingcombe, and Higher Kingcombe-Kingcombe significantly fail to comply with their WQO of RE2 due to elevated levels of BOD and ammonia; the target date for compliance is not until 1997.

There are no known discharges in the stretch Hooke-Higher Kingcombe. The reason for the non-compliance is unknown and will be the focus of an investigation survey.

The non-compliance for the stretch Higher Kingcombe-Kingcombe is thought to have been the discharge from Kingcombe Fish Farm. This is now no longer in operation and the consent was revoked in August 1993.

Sydling Water

One stretch of Sydling Water, d/s Huish Fish Farm-d/s Sydling STW significantly fails to comply with its WQO of RE1 due to elevated BOD, ammonia and un-ionised ammonia levels.

The poor water quality may be due to effluent from Sydling St Nicholas STW which discharge into this stretch. Samples have been collected too close to the STW discharge; they will now be taken at a more representative site beyond the mixing zone.

Two further stretches on the Sydling Water achieve a marginal compliance with their WQO of RE1; these are Lower Magiston-d/s Lower Magiston Fish Farm, and Lower Magiston Fish Farm-confluence with the Frome. The cause of this downgrading is unknown. More recent data (1994) suggests that this stretch will now be able to comply with its target WQO.

Cerne

The middle stretch of the Cerne, u/s Nether Cerne Fish Farm-d/s Nether Cerne Fish Farm, is currently non-compliant with its WQO of RE1. This may be due to the monitoring site being located in the mixing zone of the fish farm discharge. Monitoring will now take place further downstream of the discharge at a site which is more representative of river water quality.

Frome

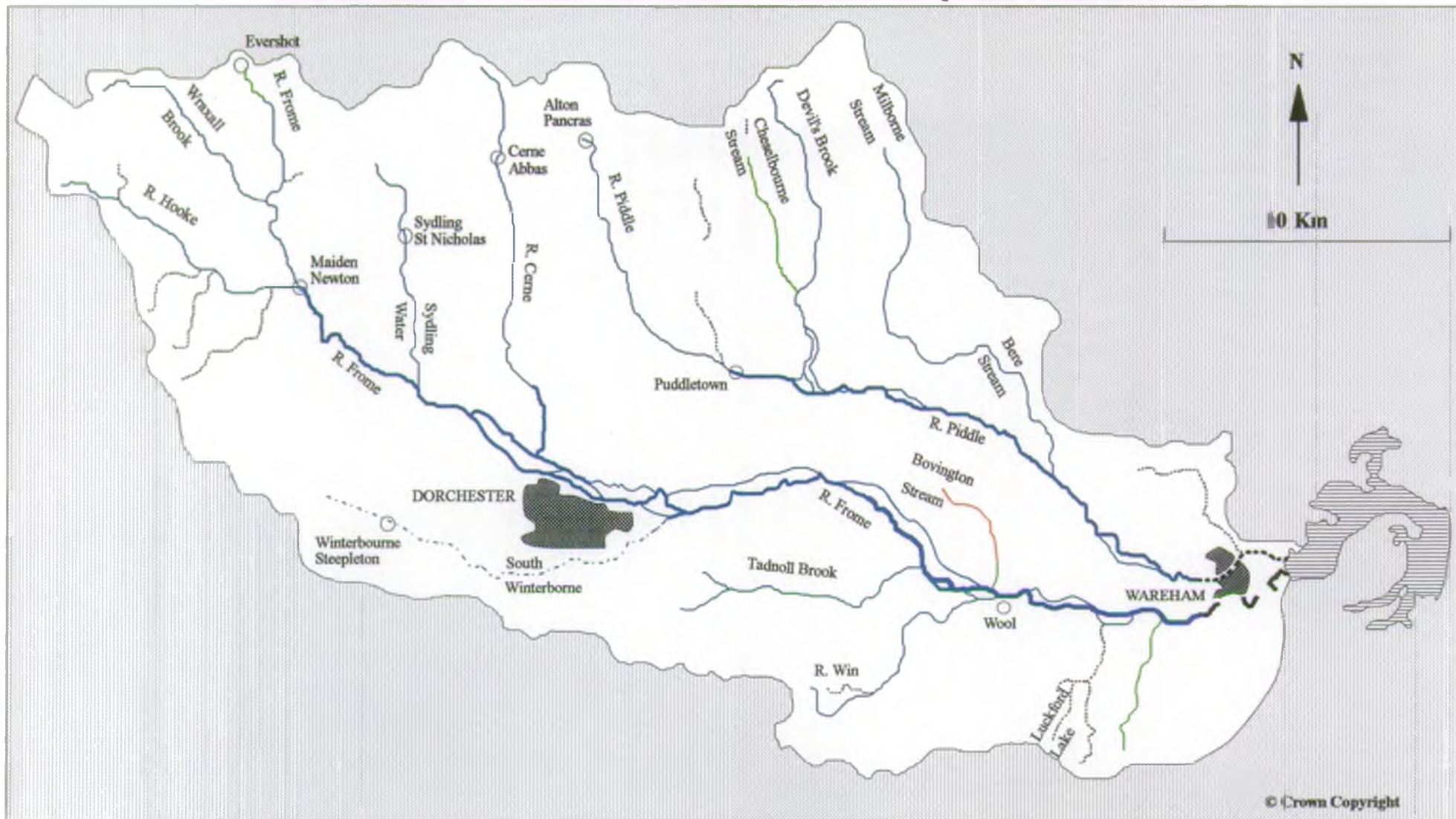
Three consecutive stretches of the Frome marginally fail to comply with their target WQOs of RE1 by 2000. These are d/s Pallington-d/s Golden Springs Fish Farm, d/s Golden Springs Fish Farm-Moreton and Moreton-confluence with Tadnoll Brook.

The above stretches form one arm of a bifurcation which starts upstream of Golden Springs Fish Farm. The failure of the WQO for these stretches is due to BOD and ammonia. Failure is unlikely to be caused by the effluent from Golden Springs Fish Farm as the major part of the discharge goes into the other arm of the bifurcation. Although there is a minor discharge from Golden Springs Fish Farm into the arm of the bifurcation from d/s Pallington-confluence with Tadnoll Brook, the monitoring point is approximately 2.5km downstream of the discharge.

Issue 3. Significant non-compliance with RE targets

Issue 4. Marginal non-compliance with RE targets

MAP 22 : FROME & PIDDLE CATCHMENT - BIOLOGICAL QUALITY SURVEY 1994



LEGEND

	River		Class B : Moderate		No Information
	Poole Harbour (Part Of), No Information		Class C : Poor		Awaiting Results
	Settlements				

5.2.2 Sewerage

A number of sewerage systems within the catchment become infiltrated with groundwater during the winter months when the water table is high. This results in intermittent discharges of dilute raw sewage from pressure points within the system. The Piddlehinton sewerage system is affected and there are intermittent discharges from manholes on the system in Piddletrenthide, Piddlehinton and Muston. Similar problems occur at Milborne St Andrew and Sydling St Nicholas.

There are also intermittent discharges to the South Winterborne from the terminal pumping station at Martinstown, and there is a consented storm overflow at Abbots Quay, Wareham which commonly discharges during times of high rainfall; a scheme is in hand to eliminate this.

Issue: 5. Sewerage in the Piddle Valley and elsewhere

5.2.3 Sewage Treatment Funding Plans

Improvements to WWS STWs over the next 10 to 15 years can only be carried out if money is available. OFWAT (the government water company regulator) decides where and when this money is spent. We help OFWAT to set these priorities and agree spending plans - known as AMP2 Plans - with the water service companies. In priority sequence, AMP2 includes :

- *schemes required to meet current legal obligations*
- *schemes to meet future legal obligations*
- *schemes which have been separately justified to maintain river quality relative to the 1990 survey or to achieve improvements*

AMP2 Strategic Business Plans were submitted in early 1994 and OFWAT declared the associated charging base in July 1994. It should be emphasised that improvements identified for the catchment under AMP2 are provisional until a financial commitment is established. The timing of any improvement works will depend on a priority rating system agreed between WWS and the NRA.

Dorchester and Puddletown STWs are the only sites in the catchment where the need for improvements has been identified under AMP2. At Dorchester improvements are necessary to ensure that 1990 river quality is maintained and at Puddletown improvements are necessary to maintain consented load.

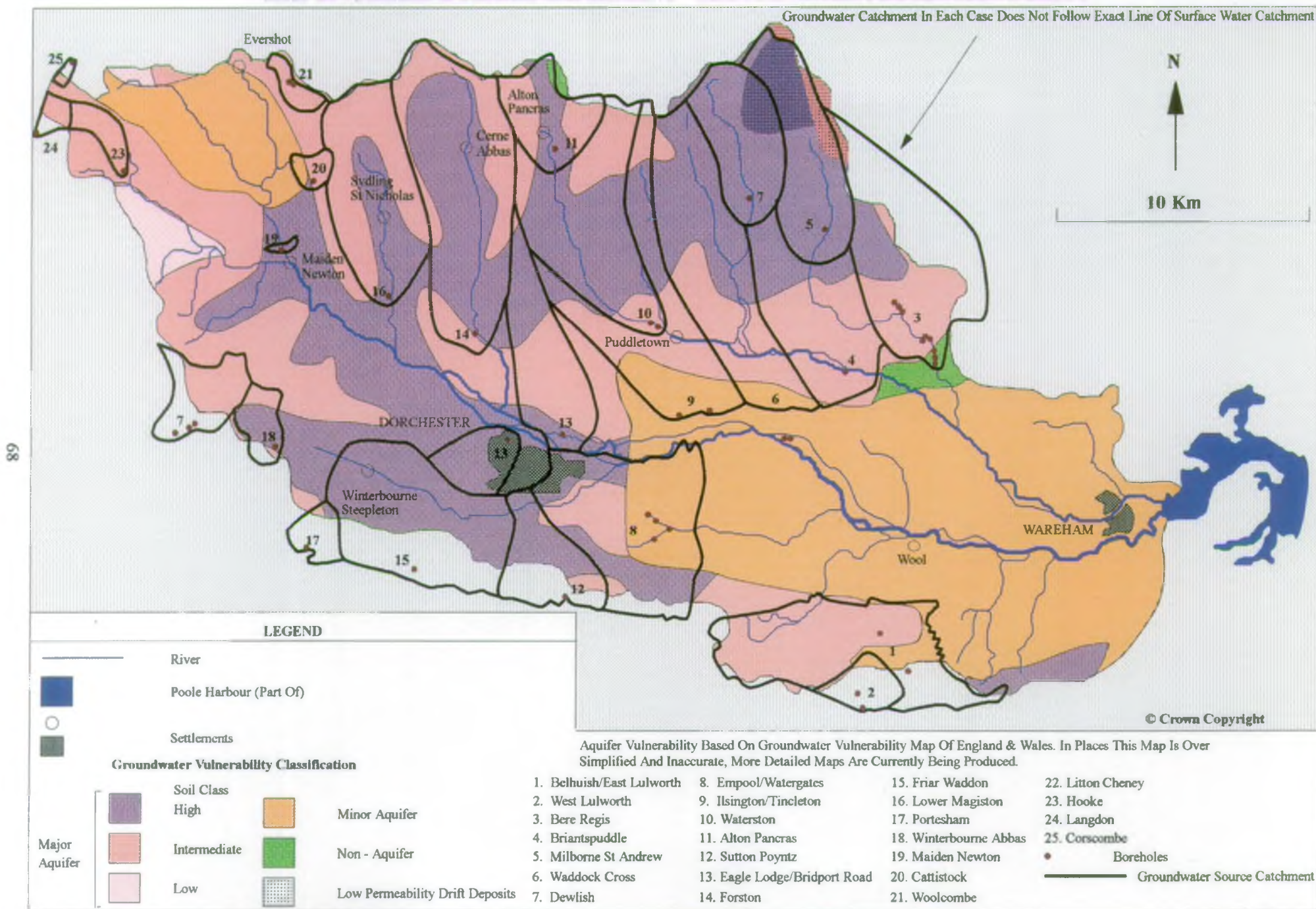
The need for improvement to the Piddle Valley sewerage system has also been identified under AMP2.

5.2.4 Biological Monitoring.

The ecological quality of the freshwater catchment is monitored using benthic macroinvertebrates, the small animals which live in the river. They are unable to move far and respond to long-term conditions within the watercourse. This provides an overall indication of the ecological condition of the river.

The Biological Component of the GQA Classification is calculated by comparing the observed richness of the fauna with that predicted by RIVPACS using standard methods (NRA 1994).

MAP 23 : FROME & PIDDLE CATCHMENT - GROUNDWATER PROTECTION POLICY



State of the catchment

The Biological Classification is shown in Map 22, and indicates a good water quality for most of the catchment. In such a rich environment, the biology is quite resilient to small changes in water quality. Problems were identified on the Bovington and Povington Streams which probably relate to suspended solids (Section 8.5), and on the Cheselbourne and upper Frome at Evershot which may relate to low flows.

5.2.5 Groundwater Quality

The protection of aquifers from pollution is of great importance, as the contamination of groundwater may put public water supplies at risk. Contamination of groundwater may impact on river water quality where the baseflow is entirely dependant on groundwater.

The Policy and Practice for the Protection of Groundwater (PPPG) (NRA 1992) contains policy statements on the following aspects of groundwater protection:

- *physical disturbance of aquifers affecting quality and quantity*
- *waste disposal to land*
- *contaminated land*
- *disposal of sludges and slurries to land*
- *discharges to underground strata*
- *diffuse pollution*
- *other activities affecting groundwater quality*

The PPPG statements cover the risks posed by various activities to groundwater based on the type of aquifer, its vulnerability and in the case of drinking water sources the proximity to that source.

State of the Catchment

The NRA applies its PPPG through its own authorisations (discharge consents and abstraction licences), and seeks to protect groundwater quality in its role as a statutory consultee to the planning authorities.

The extensive use of groundwater for drinking water and its contribution to the good river quality suggests that the major aquifer is not subject to contamination affecting its use. However the continued application of the PPPG to the catchment is critical to protecting uses for the future.

CATCHMENT STATUS

6. WATER QUANTITY - CATCHMENT STATUS

6.1 General Targets

The Wessex Area Water Resources Strategy will be published shortly and seeks to balance the environmental needs and the consumer needs, which often conflict, and to ensure that water resources are sustainable in the long term.

The NRA has adopted a range of key policies to help achieve an environmentally sustainable water strategy. Foremost amongst these are :

- *sustainable development, ensuring that there will be no long-term systematic deterioration in the water environment due to water resource development and use*
- *the precautionary principle, making sure that decisions made and measures implemented err on the side of caution if significant environmental damage could occur, or if knowledge on the matter is incomplete*
- *demand management and better use, ensuring due attention has been given to the management and conservation of water resources by measures to control waste and manage demand, and to make the best use of existing resources before licensing and developing additional resources*

6.2 Specific Targets

The NRA will seek to achieve the above targets through the following measures:

- *determining new abstraction and impoundment applications in accordance with Regional and National policy*
- *including appropriately worded conditions on any new licence that is issued to :*
 - » *prevent over-exploitation of groundwater resources*
 - » *prevent deleterious effects on migratory salmonid movements and spawning, nursery and wetland habitats*
 - » *ensure sufficient dilution for consented discharges*
 - » *ensure adequate water is available for existing licensed abstractions, other protected rights, legal water uses and in-river use*
 - » *ensure proper records are maintained of actual abstraction to permit a proper understanding of water resource use within the catchment*
- *enforcement of abstraction licence conditions by the NRA*
- *reviewing existing Regional licensing policy in the light of any results from National R&D projects*
- *implementing the PPPG in order to protect groundwater yields and flows*

Where the above general target has not been met, the NRA will undertake the following:

- *investigate low flow sites within the context of National policy and available manpower and financial resources*
- *seek opportunities to transfer licensed resources downstream*
- *seek an element of environmental gain from any future water resources scheme*

6.3 Low Flows in the River Piddle

Since the mid 1980s, public concern has been expressed about the effects that abstractions for public water supply are having on the Piddle. It was felt that spring flows had been significantly reduced over a considerable period of time and that flows and levels in the river were lower and stayed lower for longer now than historically.

A five years investigation, initiated by the former Wessex Water Authority and extended by the NRA, ended in 1990. Analysis of the results of these investigations showed that the abstractions at Alton Pancras, Dewlish and Briantspuddle were significantly reducing the flow in the river.

Issue 6. Public water supply abstraction on the Piddle catchment

The River Piddle Action Plan recommended a series of actions and investigations designed to lead to a short-term improvement, and ultimately to a long-term improvement in the river flows. This identified a number of options, detailed below.

Sir William Halcrow & Partners were appointed as consultants in 1992 to investigate in detail the influence of the Alton Pancras and Dewlish abstractions on river flows. Once these have been quantified, the consultants brief is to consider remedies and alternative management regimes to improve river flows.

6.3.1 Setting an Environmentally Acceptable Flow

The setting of an environmentally acceptable flow will allow us to achieve a balance between conflicting demands on the Piddle.

The Institute of Hydrology has been employed by the NRA to develop IFIM and PHABSIM, American techniques which attempt to quantify an ecologically acceptable flow for various species, and to apply the method on the Piddle.

6.3.2 Local Licensing Policy

As a result of investigations into the current impact of abstractions in the Piddle catchment, the NRA has resolved that a catchment specific licensing policy for future licences is essential. This policy ensures that no new licences are issued which would have significant effects on the river.

The policy splits surface and groundwater into three volumetric groups :

- *abstractions of less than 20m³/d would normally be permitted*
- *abstractions between 20-100m³/d might only be approved after thorough environmental investigation, and would normally be subject to prescribed flow conditions.*
- *abstractions greater than 100m³/d would normally be refused*

6.3.3 Abstraction at Briantspuddle

The Briantspuddle source was considered to be the most damaging on river flows and, as an immediate action pending the outcome of further studies, the NRA negotiated a 50% reduction in the Briantspuddle abstraction for 3 months each summer. This was agreed for a period of four years, partly on the basis of the water no longer being required to supply the UKAEA Winfrith facility.

The benefit of this action will be substantial in a dry year. Since this agreement, the river has not experienced seriously low flows, and although improvements are reported, the full benefits have not been witnessed. The current agreement expires in October 1995.

6.3.4 Briantspuddle Recirculation Proposal

Consultants, Howard Humphreys, have been appointed to investigate the potential of river recirculation as a possible way to remedy low flows in the middle Piddle.

The study has two equally important objectives :

- *would recirculation solve the identified low flow problem in the middle section of the river*
- *is recirculation ecologically and aesthetically acceptable*

If adopted, water would be abstracted from the river below Cecily Bridge and piped to above Affpuddle. The consultant's report is due in April 1995.

6.3.5 Low Flow in Devil's Brook

The absence of water in the Devil's Brook at Dewlish is an issue locally. WWS add compensation water to the Brook upstream of their abstraction during the summer. The full benefit of this water is not enjoyed in the village of Dewlish as much of it is lost through the river bed before it reaches the village. The situation is further aggravated by a series of diversions and a naturally perched river section. WWS have recently agreed to consider adding additional compensation water, strictly on an experimental basis, to the Devil's Brook at a point nearer to Dewlish. Some bed sealing may also be required to ensure that the water reaches Dewlish.

6.3.6 Waterston Stream Support

Pumping water into the river from boreholes can be used to support stream flows at critical times. Waterston is a potential source for such stream support, and investigations indicate that it could help to maintain flows from there to Puddletown.

6.3.7 Funding of Solutions

Since the Action Plan was conceived there has been much discussion with OFWAT and the DoE about the cost of changes and the value of the benefit of low flow alleviation. So far, approvals for major expenditure have not been received for any potential works despite strong support in these discussions from WWS.

For this reason, the NRA intends to introduce as an additional item to the Action Plan in 1995 a cost-benefit study to support continued arguments for change.

Issue 7. Funding of low flow alleviation

6.4 Future PWS Use

The WWS Dorset Supply Zone, in which this catchment falls, currently has a surplus in available yield. NRA predictions estimate the resource-demand balance will remain in surplus for high and low forecasts until 2002, with deficits only occurring thereafter under the high forecasts.

This deficit could be met by the planned implementation of the groundwater abstraction at Lulworth, for which a licence is already in place, but this would require extensive extra works.

WWS are currently yield testing three alternative groundwater sources in the Wareham area with the aim of establishing their feasibility as alternative sources to Briantspuddle.

Issue 8. Future use of water resources

The NRA has a clear commitment to both resource and demand management before any new resources are developed

6.5 Interaction between Ground and Surface Water in the South Winterborne

Natural flow conditions before 1973 were such that given adequate winter recharge the South Winterborne rose in winter upstream of Winterbourne Abbas and flowed continuously to the confluence with the River Frome east of Dorchester.

In the summer, the first 2km of the stream normally dried up. Even in a dry summer, the stream flowed from Winterbourne Abbas to just downstream of Martinstown, where it disappeared down two discrete sink holes in the river bed. From here to just upstream of West Stafford, the river completely dried up in most summers. Reliable springs around West Stafford ensured continuous flow in the last kilometre of the stream.

Nowadays, the summer flow starts in Winterbourne Abbas where some groundwater is pumped from the Winterbourne Abbas PWS borehole to augment the stream. The compensation water is added to simulate the natural flow conditions experienced before the Winterbourne Abbas boreholes were drilled in 1973.

We have been unable to trace the eventual destination of the water that enters the river bed by introducing small quantities of dye down one of the holes at Martinstown. It may travel south into the catchment of the Wey, at the spring at Upwey or the supply boreholes at Friar Waddon, or travel underground along the South Winterborne valley to the springs upstream of West Stafford. This work continues, but the drying up of the middle reaches of the South Winterborne is regarded as largely a natural phenomena.

6.6 Diurnal Fluctuation of Flow in River Hooke

A daily cycle of changes in flow has been observed on the Hooke, which may damage the river environment. Their pattern would appear to implicate an abstraction operation.

Issue 9. Impact of diurnal flow fluctuations on the Hooke

7. FLOOD DEFENCE

7.1 Flood Defence Management Framework

The NRA will base its future provision of flood defence around the Flood Defence Management Framework (FDMF).

The Framework considers the main river system and any control structures or flood defences as *assets* to be managed in a consistent, cost-effective manner, based on the use and consequent value of the land they protect.

Current land uses are surveyed, and appropriate Standards of Service (SoS) required from the protecting assets are established. Where there is a difference between standards currently provided and those required now or in the future, the action required will be established through consultation with interested parties.

The development of the FDMF is dependant upon collecting the necessary data to allow its implementation. This includes the Section 105 Surveys and Asset Surveys.

7.1.1 Section 105 Surveys

Surveys of flood risks will be carried out under S105 of the Water Resources Act 1991 to include both flood plain mapping and a survey of flooding problems. These will update national surveys of flooding problems carried out under S24 of the Water Act 1973.

The NRA has signed a memorandum of understanding with the Association of Metropolitan Authorities and the Association of County Councils to complete the S105 surveys, and we are currently looking at the best way to implement this important work.

The S105 surveys will be used both in flood defence management and in advising planning authorities on development and flood risk issues.

Issue 10. Improved identification of flood risk areas

7.1.2 Asset Surveys

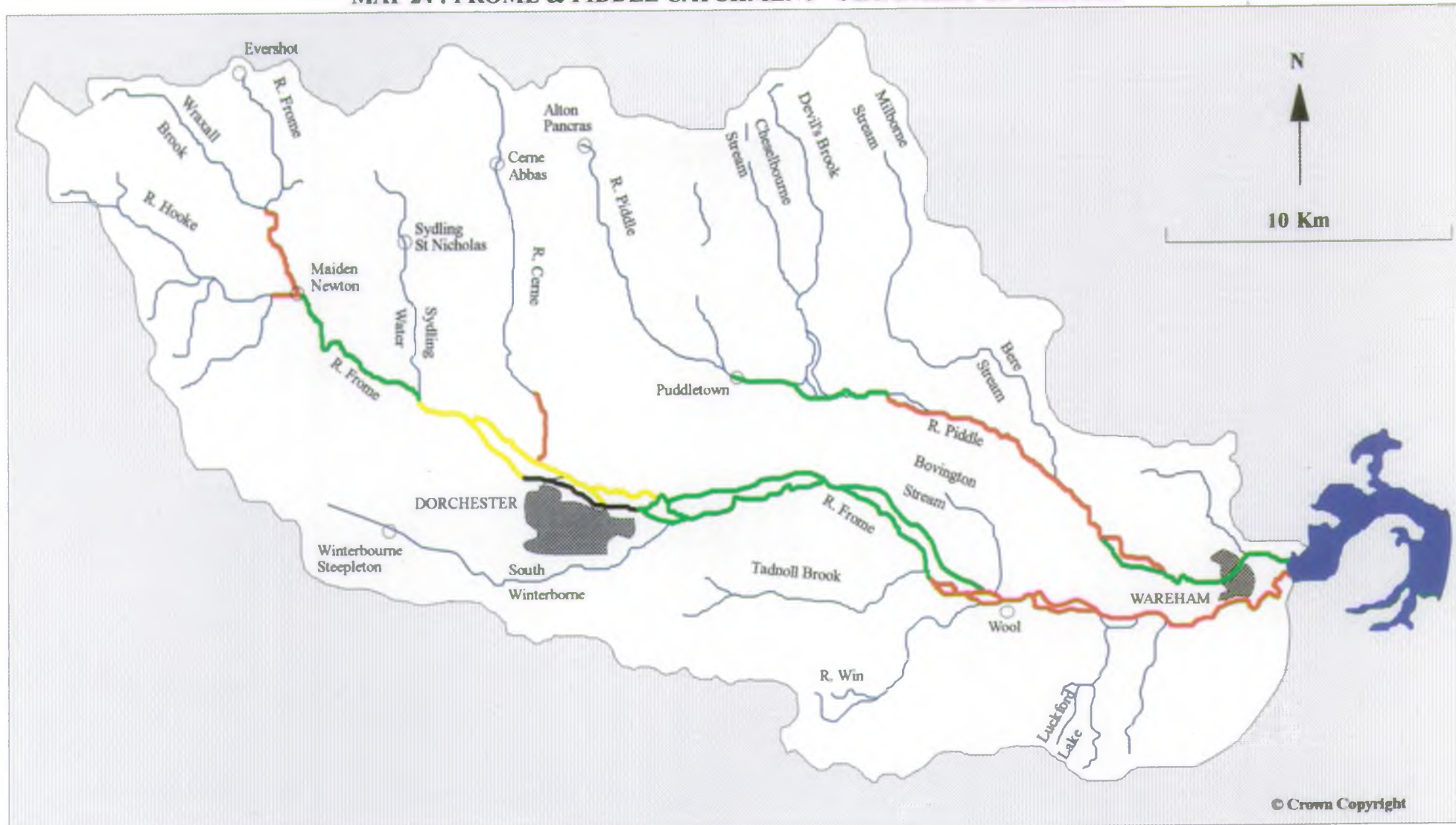
The NRA is undertaking a programme of asset surveys to assess the condition and maintenance requirements of control structures and flood defences, which will be completed by 1996. The surveys are expected to confirm that only 10% of all existing river control structures are owned by the NRA.

Issue 11. The management of assets and the future control of water levels

7.1.3 Flood Events










Flood events are usually described in terms of the frequency with which they can be expected to occur. Hence a 1 in 10 year flood can be expected to be equalled or exceeded once every ten years on average. This is also described as the *return period*, although the interval before another similar event returns is subject to chance and only averages over a long period.

MAP 24 : FROME & PIDDLE CATCHMENT - STANDARDS OF SERVICE



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LEGEND

	Poole Harbour (Part Of)	House Equivalent Description - On Statutory Main River			
	Settlements		Band A - 50 or more		Band D - 1.25 to 4.99
	Ordinary Watercourses		Band B - 25 to 49.99		Band E - 0.01 to 1.24
			Band C - 5 to 24.99		Band X - No data

7.1.4 Standards of Service

The standard of protection at a location is expressed as the worst flood event which can be withstood without significant flooding. Map 24 is an indication of property at risk when described as House Equivalents (HEs). For ease of understanding, land use is converted into HEs per kilometre; by this we mean the number of houses susceptible to flooding at a given level.

For maintenance revenue work, the minimum target standard is generally between 0.5 and 1.0 HEs per kilometre per year. The present standard being offered is calculated from historical flood records. For capital (new works), the scheme standards are indicated below.

Current Land Use	Tidal	Non Tidal
High density urban, containing significant residential property	200	100
Medium density urban	150	75
Low density or rural communities	50	25
Generally arable farming with isolated properties	20	10
Low productivity land with few properties	5	1

Indicative standards do not indicate an entitlement or minimum level to be aimed at. It is also important to note that flood defence schemes alleviate flooding up to a design period, but a worse event may still occur.

In order to assess whether the maintenance effort exceeds that which is appropriate to the adjacent land use, we will consider the benefits that accrue from the work and compare them with the costs.

7.2 Maintenance

Maintenance work is undertaken to ensure the efficient working of the natural drainage system, and to ensure that flood alleviation schemes provide protection up to their design standard.

The SoS methodology underpins much of this work by assessing land use in the flood plain and monitoring the achievement or otherwise of the target SoS. For areas not achieving the target SoS, where justified, remedial work is considered. Since 1990, a broad assessment of the Frome & Piddle catchment has been made using the SoS system. The first indication is that annual maintenance work may only be necessary on some small stretches of the River Piddle to comply with the SoS and that the current level of maintenance far exceeds the target SoS.

On the Frome, some 6.6km of river does not meet the adequate SoS; this is generally around the Dorchester urban area. Elsewhere the SoS is adequate or exceeds the target SoS. The 2.5km of statutory main river on the Cerne is presently meeting an adequate SoS, whereas the Hooke exceeds the target SoS.

Issue 12. Review the efficiency and effectiveness of FD maintenance operations

Weed cutting is a major component of the maintenance work, and its impact goes beyond flood defence into issues of land drainage, farming, conservation and fisheries. It is discussed in Section 8.6.

7.3 Special Risk Sites

Flood defence improvement works may be carried out where the SoS is below the indicative standard. All schemes must satisfy technical, economic and environmental criteria and the NRA maintains a Programme of Capital Works for the future which takes account of the priority of each.

Although inclusion on the Programme indicates a budget provision, each scheme must satisfy the appraisal criteria before it can proceed. It should also be noted that all schemes are subject to approval by the Flood Defence Committee and are usually dependent upon grant aid from MAFF.

Issue 13. Investigate, justify and, if appropriate, implement FD Schemes

7.3.1 Maiden Newton

The current programme of improvement includes possible works at Maiden Newton where 15 properties were flooded in 1979.

7.3.2 The Tidal Rivers

An operational maintenance plan exists for the tidal defences around Wareham Marshes. The tidal defences are deteriorating rapidly.

Along the tidal reaches, the recently produced Tidal Defence Survey identified that the present standard of protection was variable with an average level at 1 in 25 years, and some 2,575ha of agricultural land were protected to this standard.

A scheme to improve tidal floodbanks downstream of Wareham is included in the Capital Programme for 1997/98. Options to be considered include strengthening the existing peat banks and managed retreat (see Section 8.7). Proposals will be prepared following detailed investigation and consultation with those affected. Consideration would have to be given to the potential problems associated with possible sea level rise due to global warming.

7.4 Emergency Response

Absolute flood protection is not possible and it is therefore necessary to provide flood warning for those affected by actual flooding.

Where possible, the NRA issue a warning at least two hours in advance of flooding in accordance with a nationally agreed and consistent procedure, identifying the river reach or coastal zone at risk, together with an indication of public safety aspects, property and land at risk and an assessment of certainty.

Flood warning for the Frome is dependent upon the river gauge at Maiden Newton and to a lesser extent the gauging station at Louds Mill, Dorchester. In Dorchester flood warnings of at least two hours can be provided. Further downstream, most of the land is agricultural and general flood warnings are given in this area although it is not yet possible to determine the timing of a flood event. However at Maiden Newton, because of the run off in the upper catchment, it is not possible to provide flood warnings of at least two hours.

Issue 14. Ensure the adequate provision of flood warning in the catchment

7.5 Siltation

Siltation is a problem in terms of channel capacity within the Frome and from its tributaries. It is discussed in Section 8.5.

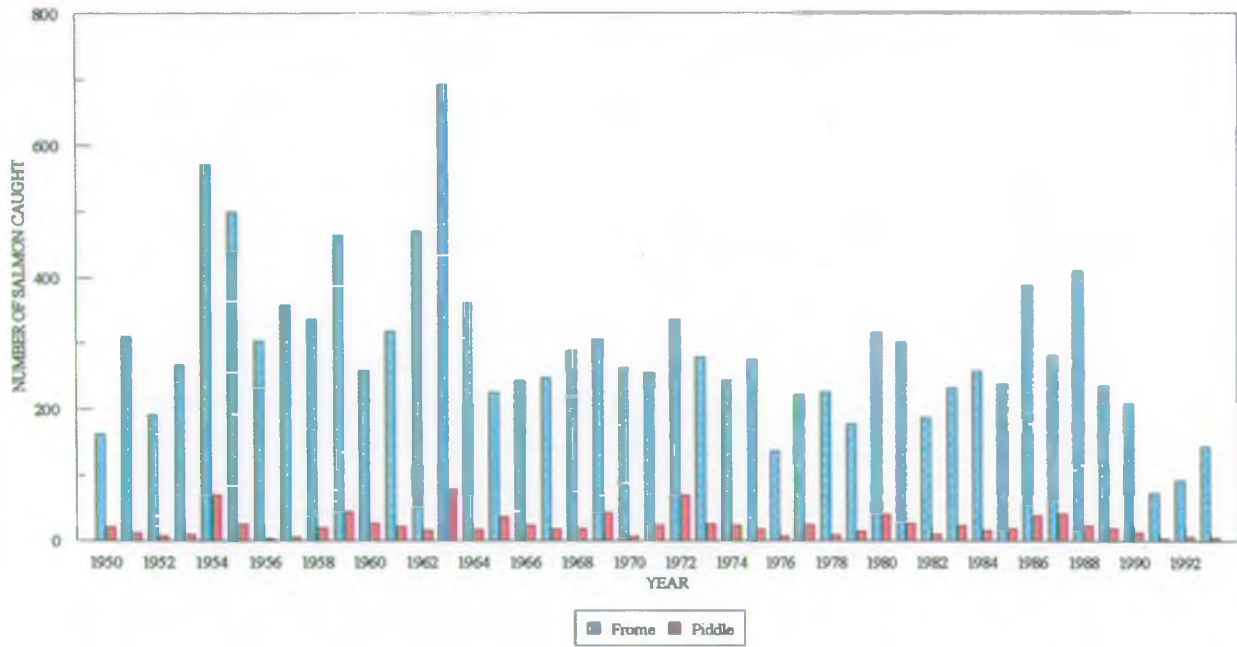
7.6 Implications of the SSSI Proposal

If the Frome catchment, either channel or flood plain, are considered by English Nature to be worthy of SSSI status then the NRA would wish to enter into an agreement with EN and to compile an operational maintenance plan for the channel between Dorchester and Wareham.

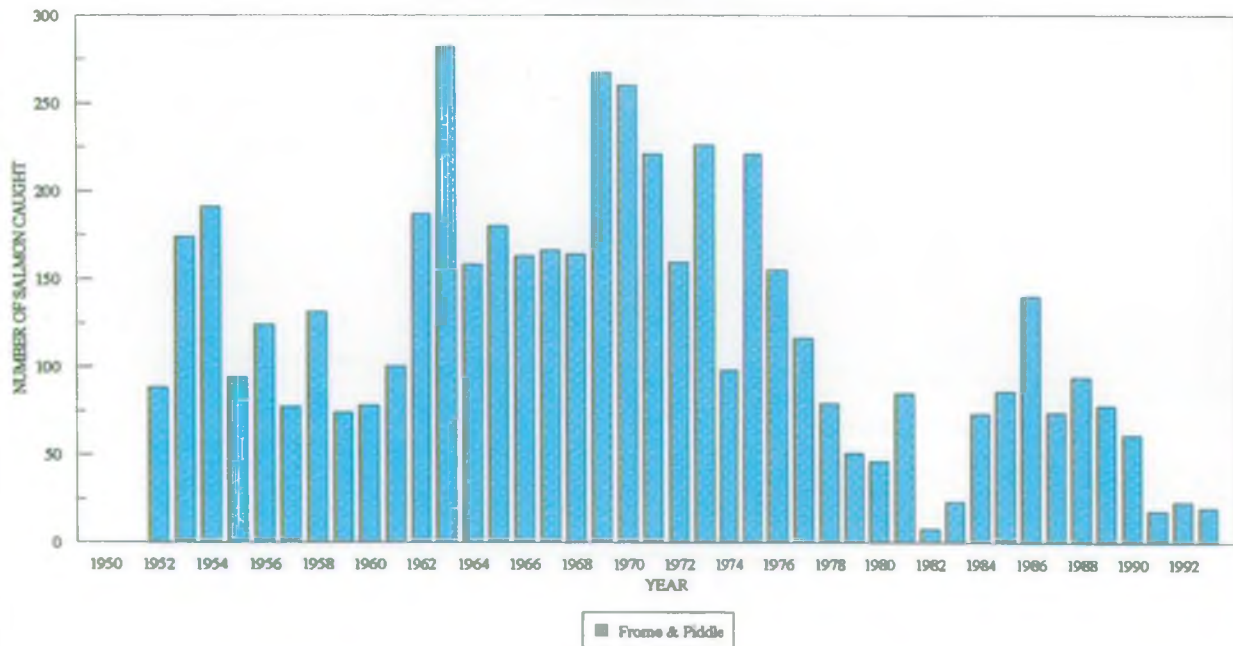
Issue 15. The impact of an SSSI designation on NRA river operations

FIGURE 4 : FROME & PIDDLE CATCHMENT - ROD AND NET CATCHES

TOTAL ANNUAL SALMON ROD CATCHES
1950 - 1993



TOTAL ANNUAL SALMON NET CATCHES
1950 - 1993



8. RIVER ECOSYSTEM - CATCHMENT STATUS

8.1 Fisheries

There are no NRA hatcheries within the Frome & Piddle catchment and no mitigation or rehabilitation stocking takes place. Our policy is directed at the provision of high quality habitat and the control of exploitation to allow naturally breeding stocks to maintain themselves.

8.1.1 Salmon and Migratory Trout

The Frome & Piddle catchment supports good populations of salmon and migratory trout. Figure 4 shows historical rod catches for salmon.

Issue 16. Management of salmon stocks

The 50 year average rod catch on the Frome is 276 salmon; in recent years (since 1988) catches have been below average. On the Piddle, rod catches, anecdotal evidence and electric fishing surveys suggest that salmon are relatively late running with few fish ascending beyond the tidal limit during the rod fishing season. Catches therefore are low, the 50 year mean being only 25 fish.

The catch has declined in recent years, in line with the trend on other local rivers, but there is no corresponding measure of angling effort. This is thought to have been caused by two years of particularly high mortality at sea in combination with an extended period of reduced river flows between 1988 - 91.

There has been a long-term decline in stocks of large spring-running fish which can be traced back for about 40 years. It may be associated with patterns of exploitation by anglers, changes in sea temperature and other environmental changes (Solomon, 1992).

Salmon angling was restricted by byelaw to fly only before May 15, and closed entirely for the month of September, to give greater protection to the stocks. This byelaw is due for review in 1996/97.

Important areas for salmon spawning and nursery on the Frome include the main river between Lewell Mill and Pallington plus most of the tributaries and flood relief channels within their range.

Densities of juvenile salmon, which have been monitored on the Piddle since 1988, are on average the highest recorded in the South Wessex Area. Areas of particular importance for juveniles include Throop to the Bere Stream confluence, Hyde House Weir to (and including) the Binnegar Stream, and Carey on the main river, and the lower Bere Stream.

The impacts of low flows on the salmon populations of the Piddle are currently being assessed (see Section 6.3.1).

The value of the salmon spawning and nursery habitat provided by mill streams and flood relief channels must be recognised and given a high degree of protection. Restoration schemes may also be appropriate, and must balance all the interests involved. Sediment accumulation can be a major factor in reducing the breeding success of salmon, and is discussed in Section 8.5.

CATCHMENT STATUS

A national NRA research project is currently investigating methods for setting spawning targets for salmon. Another project will assess the run of smolts on the Frome. This will provide information that can be used with data from the IFE counter to derive a stock-recruitment relationship for salmon on the Frome.

No serious obstructions to migration are known to exist on the Frome. Bindon Mill Hatches can cause minor temporary obstructions despite the availability of a fish pass, as can the tilting gates on the Waterbarn Stream and at Hangman's Hatch.

There are several structures throughout the Piddle catchment which, while posing no problems under the normal flow regime, can be significant obstructions to migration under low flow conditions. There are two flow diversions on the Piddle associated with cress or fish farming; in both cases water is diverted immediately upstream of an impounding structure.

The accumulation of adult fish in the tidal rivers during summer and autumn is thought to be a natural phenomenon. Whilst there, however, experience has shown that they are vulnerable to poaching and are occasionally exposed to naturally poor water quality conditions. Low flows may exacerbate these problems.

The NRA routinely carries out enforcement and anti-poaching work to ensure that fish are not being taken illegally. This includes patrols throughout the freshwater system and by boat in the estuary and out to sea, and several successful prosecutions have been made in recent years.

Weed cutting creates both problems and opportunities for anglers. It is discussed in Section 8.6

8.1.2 Brown Trout

The headwaters of the Frome and the middle reaches of the Piddle support good populations of essentially wild trout.

Issue 17. Management of the brown trout fishery

Trout are less abundant in the Piddle upstream of Puddletown. It is considered that production here is constrained by low flows (due to abstraction) and siltation. Abstraction is also believed to reduce the production of trout in the main river between Tolpuddle and Briantspuddle (see Section 6.3). It may also be affecting trout populations in the Dewlish area of the Devil's Brook, although here impacts are relatively small and localised.

Important areas for brown trout spawning and nursery on the Piddle include the main river between Throop and the Bere Stream confluence, and the Devil's Brook and Bere Stream. The mill streams and flood relief channels in particular are often the focus of spawning and nursery activity. Sediment accumulation can be a major factor in reducing the breeding success of trout, and is discussed in Section 8.5.

Weed cutting creates both problems and opportunities for anglers. It is discussed in Section 8.6.

Pike are perceived as a problem by owners of many brown trout fisheries in the catchment, and some angling interests may carry out private culling of populations with the consent of the NRA. Predation on fish stocks by cormorants is seen as a local problem by some fishery owners.

8.1.3 Coarse Fish

Issue 18. The management of the coarse fish stocks

Restoration of water meadows and other channels which could improve recruitment, and a reduction in weed cutting during the spawning season around May could improve spawning success

8.1.4 Sea Fish

Southern Sea Fisheries are the Sea Fisheries Authority for the tidal rivers, which are part of a statutory Bass Nursery Area. The NRA, however, are riparian owners of the fishery in tidal waters, and as such do not allow any fishing for sea fish.

8.2 Recreation

8.2.1 Public Access

DCC has created a number of Designated Conservation Areas around watercourses in the catchment; these include sites at Bere Regis, East Holme, Moreton, Affpuddle-Turnerspuddle, Wareham-Stoborough, Winfrith Newburgh and Wool (Duck Street-Spring Street).

The Cerne has footpaths which loosely follow the river for most of its length, and the Frome below Wareham has a riverside footpath. Wareham Common, downstream of Baggs Mill on the Piddle, is a popular area for walking and picnicking, and the river is used by locals for swimming.

Purbeck Tourism Group, in conjunction with Purbeck District Council, have produced a series of guides to countryside walks. One of these, Bere Regis to Moreton, describes an 11 mile walk that takes in three river valleys, the Frome, Piddle and Bere Stream, and was sponsored by the NRA.

The NRA will encourage landowners to consider improvements to existing public access agreements and the creation of new agreements through, for example, the Countryside Stewardship Scheme, where such use would not adversely affect other interests.

Issue 19. Assess the scope for improved public access to rivers and associated land for informal recreation

The NRA is unaware of any facilities specially provided for water-related recreation by disabled people within the catchment.

The catchment as a whole, and the rivers in particular, constitute a valuable educational resource. There is plenty of scope for educational establishments to exploit this. At the upper end of the catchment, the Hooke Educational Trust is planning to launch an environmental education programme centred on the water environment, and the Kingcombe Centre is also within the catchment.

8.2.2 Boating

A public right of navigation of the Frome exists between Poole Harbour and the Wareham Bypass. Many boat owners favour the Frome as a mooring site over others in Poole Harbour because of its quiet character. It is generally seen as a refuge from the busier parts of Poole Harbour, where a wide range of sports takes place.

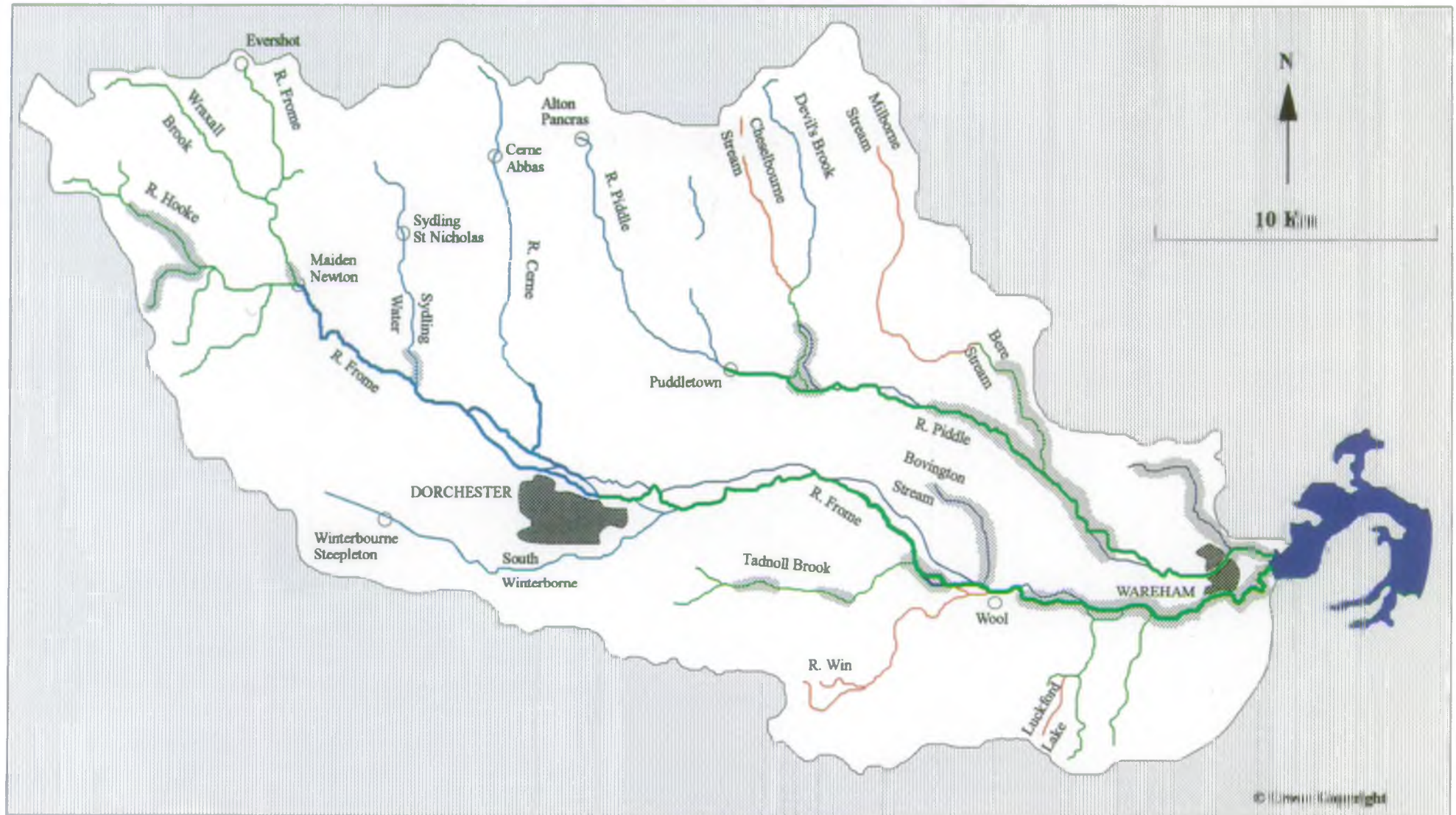
Speeding boats can cause disturbance and hazard to people and wildlife, and long-term damage to banks by erosion. Steps to enforce speed limits are taken by the use of prominent signs and speed traps.

Issue 20. The impact of recreational boat use on the tidal Frome.

Noise and disturbance are causing concern to users of the lower Frome. Pleasure cruises, small boat hire and the general activity associated with large numbers of visitors all contribute to the disturbance, which has increased significantly in recent years.

There are no facilities in the catchment for the disposal of waste from boats.

MAP 25 : FROME & PIDDLE CATCHMENT - HABITAT



LEGEND

	River		High Quality Habitat		Water Regime Critical To Ecology Of Adjacent Land
	Poole Harbour (Part Of)		Fragmented Good Quality Habitat - Minor Enhancements Required	NOT ALL MINOR CHANNELS HAVE BEEN ASSESSED	
	Settlements		Significant Enhancement Required		

8.3 Conservation

Issue 21. Improve the conservation status of the catchment

8.3.1 Landscape Assessment

River valleys form an important component of the valued landscapes of the catchment. The NRA has an established River Landscape Assessment method (NRA 1993) whereby landscapes can be assessed and key elements recognised for protection or enhancement.

The definition of these areas requires detailed survey. Although many land use decisions are beyond the control of NRA, by promoting strategic landscape assessment the NRA hopes to influence planning and development control decisions, and protect valued river landscape features.

8.3.2 River Restoration

Agricultural improvement, land drainage work, water abstraction and channel modifications for a variety of purposes have reduced the ecological and amenity value of rivers and wetlands within the catchment area.

A systematic appraisal of all watercourses using the River Habitat Survey system should clearly identify those watercourses failing to meet their ecological potential based on physical structure, allow the development of targets for the physical river environment and associated habitats, and lead to a clearer definition of NRA's role by fixing objective targets.

The NRA has considered the potential for river restoration, and a number of schemes are currently underway in various parts of England and Wales. The Cheselbourne, Milborne, Win and East Lulworth tributary are rivers where significant habitat rehabilitation would improve the ecological interest.

All our rivers could benefit from relatively minor improvements to the river corridor which would increase its ecological value. Some of these measures can be carried out by the NRA in association with maintenance work, with the agreement of the landowner. The NRA will continue to support initiatives like Countryside Stewardship and work with organisations like English Nature to safeguard SSSIs.

In its day-to-day regulatory activities the NRA follows principles which constantly seek to safeguard the intrinsic natural qualities of the river, maintaining and enhancing the total river environment wherever possible.

8.3.3 Water Level Management and Water Meadows

Raising the water table and partial restoration of water meadows may be appropriate in some locations. This is discussed in Section 8.7.

8.3.4 Siltation

The increased silt loading has an adverse effect on plant and animal species. This is discussed in Section 8.5.

CATCHMENT STATUS

8.3.5 Nutrients

English Nature perceive the input of phosphates from Dorchester STW and from diffuse agricultural sources throughout the catchment as possibly effecting changes in the river plant communities.

Less intensive agriculture, better practices and increased buffering could reduce any proven impact.

8.3.6 Weed Cutting

Weed cutting on the Frome and Piddle has the potential to significantly alter the structural diversity, plant community, water levels and general ecology of the rivers. This is discussed in Section 8.6.

8.3.7 Rare Species

Issue 22. Conservation of important species

Many of the headwater streams, whether winterbournes or not, have distinctive plant and animal communities which may be damaged by changes in their annual flow regime. There is also a need to establish whether the rare winterbourne fauna on the South Winterborne is also present on other sections of natural winterbourne eg the Cheselbourne.

The NRA has proposed a project in 1995/96 to investigate pesticide levels in eels, the major food source of otters,.

The native white-clawed crayfish has declined in the catchment. The NRA might support the establishment of a no-go area for the introduction of non-native crayfish farms, in order to protect the existing native crayfish populations. The NRA will undertake a project in 1995/96 to refine our existing knowledge of native crayfish populations, and possible measures to protect them.

The Game Conservancy Trust are investigating the possibility of a project to assess the relationship between fishery management practices and the residual populations of native crayfish in the Piddle. The IFE are also carrying out a survey of native crayfish in the Frome catchment.

8.4 Archaeology

The rich and extensive known archaeology, coupled with the relative paucity of information in some areas, highlights archaeology as a key interest in the catchment.

Archaeological features are at risk from direct damage by NRA work eg river maintenance and dredging, and indirectly through the drying out of organic remains with lowered water tables and the deposition of spoil on sites of historic interest.

Work is already screened for the presence of scheduled archaeological sites. There is also a need to identify those sites with as yet unknown interest in the catchment, and an appraisal of existing water meadows and sluice structures.

Issue 23. The protection of features of archaeological interest

8.5 Siltation

Sediments occur naturally in rivers and form part of the natural cycle of erosion. Elevated quantities can cause serious damage to the flora and fauna of the rivers. In particular they may encourage the growth of less desirable plants in the river channel, reduce the recruitment of salmonids both by rendering the river bed less desirable to the adults and by smothering the eggs, and in addition the erosion of soil from agricultural land could be a route for the entry of nutrients and pesticides into the watercourse.

There are several known inputs of sediments to the Frome & Piddle catchment:

- *soil erosion from agricultural land in the upper catchment*
- *bank erosion exacerbated by cattle poaching of the river banks*
- *inputs from cress and fish farms*
- *soil erosion from heathland in the lower catchment*
- *erosion from MoD ranges in the lower Frome catchment*
- *silt washing from gravel working in the lower catchment*

The NRA study (Walling & Amos 1994) identified and quantified sediment inputs into the upper Piddle, examined evidence for changes in inputs and sources in recent years, and assessed differences between the Piddle and other chalk streams.

The results identified 15 major sources of sediment input (11 from ploughed land, 4 from yards and highways). In particular, soil eroded by heavy rain from winter-ploughed fields was channelled along roads and into the river.

The amount of silt washing from agricultural land depends on the current farming practices; the cultivation of winter cereals and maize means that increasing areas of land are under the plough during the wet autumn months, and the increase in pig ranching can produce similar effects.

Changes in agricultural practices could minimise the effect, by the introduction of erosion-reducing practices such as ploughing along contour lines and fencing to reduce cattle poaching the river banks, creation of buffer zones along river corridors, and reducing agricultural intensification.

Elsewhere in the catchment silt problems can arise below cress farms unless a settlement tank has been installed to treat the water used during bed cleaning.

The use of Wool Heath as a tank training facility and the subsequent run off of rain results in the discharge of silty water to the Bovington Stream. The colloidal nature of the contaminated water can make it difficult to resolve these problems. The MoD have worked with the NRA to reduce this problem by the construction of hard standings and settlement lagoons, a wash-down recycling plant, reseeding and restricting access to certain areas to allow the recolonisation of heather, and completion of an all-weather driving circuit.

Engineering works on the Frome and Piddle that might release suspended solids to the river are not normally undertaken between 1 November and 1 May to protect salmonid eggs and alevins.

Issue 24. The increased silt load in the rivers

The NRA aims to establish a sediment control strategy. This will be a complex matter and will involve cooperation from the local community. The NRA is committed to improving this element of the river and feel that real benefits can be achieved in a relatively short time.

CATCHMENT STATUS

Gravel rehabilitation to improve salmonid spawning conditions was piloted on the Piddle in 1993, and further work will be done here in the future if the results of current investigations indicate that the process is beneficial.

Until recently, the Tadnoll Brook was heavily utilised by salmon for spawning and nursery. Over the last five years, use by salmon and sea trout has fallen dramatically. This tributary is suffering from considerable sedimentation and is now less suitable for spawning and as juvenile habitat.

Siltation can also be a problem in terms of channel capacity. Should it reach the stage where it becomes a flood defence hazard, it may have to be addressed by dredging, with consequent cost implications and environmental damage.

It may be appropriate for the NRA to consider the construction of sediment lagoons at various strategic locations, but this has considerable construction and long-term maintenance cost implications which the NRA would have to consider very carefully. The use of buffer zones and best management practices may be more practical.

8.6 Weed Cutting

The primary purpose of weed cutting is to lower the level of water in the river, to reduce the risk of flooding and especially to improve drainage in the adjacent land, lowering the water table for agricultural purposes.

NRA weed cutting takes place annually in May on most of the Frome between Dorchester and Wareham. No routine weed cutting takes place on the Piddle, but weed is occasionally cut for agricultural purposes depending on flows. A single weed cut on the River Frome costs £42,000.

Weed cutting is also carried out by owners or fishery interests with prior approval from NRA Flood Defences. The removal and disposal of cut weed is their own responsibility. Disposal of cut weed can become a water quality issue, and drifting weed creates problems for other river users downstream.

Salmon anglers on the lower Frome feel that early summer is the most beneficial time for the weed cut for the benefit of their sport. Trout anglers in the Frome find that weed cutting in May is detrimental to their sport, and would much prefer an autumn weed cut.

There is evidence that weed cutting in early summer on the Frome can have a detrimental effect on the spawning success of coarse fish.

Early summer weed cutting can often stimulate growth of weed by preventing it from flowering. This can lead to more weed being present in the river for the following winter, increasing the risk of flooding and the washing out of weed which can cause problems on weirs and moorings downstream.

A study by the Freshwater Biological Association (Dawson & Westlake 1985) showed that autumn weed cutting reduced the amount of overwintering weed, and where this was put into practice it proved to be a cost-effective solution in the deeper reaches, and cost-neutral in the shallower reaches.

The Code of Practice for Weed cutting put to one side the method of autumn weed cutting to be reviewed at a later date. On pure economic terms, autumn weed cutting of the lower reaches of the Frome would appear to be sufficient to meet the required national SoS for flood defence.

Weed cutting on the Frome and Piddle has the potential to significantly alter the structural diversity, plant community, water levels and general ecology of the rivers and wetlands. The history, purpose and present need for weed cutting on both rivers needs to be reviewed periodically.

Issue 25. Review the objectives, efficiency and effectiveness of weed cutting operations.

If thunderstorm activity is noted on the NRA radar system during the weed cutting season, an alert should be issued to operational staff to monitor cut-weed build-up at structures and boom sites in case they release weed to drift downstream and get caught up against the moored boats around Wareham.

8.7 Water Level Management and Water Meadows

The maintenance of the natural flow is clearly critical to conserve the geomorphological characteristics and associated communities of the rivers. In addition, some stretches have associated wetlands which are dependent on the water regime being maintained. There are scattered examples on every river, but significant lengths of the Piddle, Bere Stream, Bovington Stream and Frome support valuable wetlands.

The raising of water levels is often seen as a direct way of improving the wetland interest of a catchment. In particular, higher water levels in spring and early summer are of value to wetland birds and plants.

The meadows below Wareham attract nationally scarce birds when wet. This interest could be improved by a system of managed raising of water levels behind the tidal defences, or the managed retreat of the flood banks (see Section 7.3.2).

The benefits to be gained from such habitat creation would need to be carefully evaluated against the possible loss of recreational, agricultural and other facilities on the Frome.

Partial restoration of water meadows, such as at Maiden Newton, may be appropriate in some locations where the wildlife interest could be enhanced by the reopening of carefully selected disused carriers to allow winter irrigation and higher water levels in spring and early summer.

Full restoration of water meadows in their traditional operational form is unlikely to be viable on cost grounds. Some management strategies on water meadows can be poor for wildlife and trap migratory fish. Full restoration might be justified on a limited number of sites for historic and educational reasons.

Issue 26. The management of water levels in the catchment.

8.8. Road Schemes

The NRA is a statutory consultee in the process of developing new trunk roads and inputs into the road development schemes proposed by County and District Councils. We are involved in route selection, design and construction. Through consultation and negotiation we seek to protect all potentially impacted aspects of the water environment, and where appropriate to secure enhancements for the water environment.

There are a number of schemes outlined in the County Structure Plan which may or may not proceed during the plan period. These include:

- *A35 Tolpuddle - Puddletown Bypass*
- *A35 Winterbourne Abbas Bypass*
- *A35 Stinsford - Cuckoo Lane*
- *A352/C12 Higher Sherborne Road Improvement*
- *A351 Sandford and Northport Bypass*
- *A352 Wool Bypass*

Many of these proposed schemes are likely to impact on the river flood plains and the river corridor. Additionally the risk of pollution of ground and surface waters during and after construction is likely to be a concern.

Issue 27. Impact of road schemes on the aquatic environment.

9. ISSUES AND OPTIONS

Issue	Options	Responsibility	Advantages	Disadvantages
1. Trophic status of the Frome is uncertain	<p>1.1. Collect and analyse chemical and biological data to investigate the potential nomination of the Frome d/s Dorchester STW as a Sensitive Water under the UWWTD</p> <p>1.2. Promote land use practices which reduce run off of nutrients eg buffer zones</p>	<p>NRA</p> <p>See 24.5</p>	Improved knowledge for planning	Acceptance
2. Control of cress farm discharges	<p>2.1. Protect water quality in receiving water by issuing discharge consents which allow control of discharges</p> <p>2.2. Install settlement facilities at cress farms</p> <p>2.3. Joint R&D project to produce watercress strains with improved resistance to crook root fungus and water cress yellow spot virus in order to reduce the need to treat with zinc</p> <p>2.4. Monitor the effect of off label use of pesticides in receiving water</p>	<p>NRA</p> <p>Growers</p> <p>NRA Growers</p> <p>NRA</p>	<p>Improved control of discharges</p> <p>Environmental improvements</p> <p>Improved water quality</p> <p>Improved water quality</p>	<p>Cost</p> <p>Cost</p>
<p>3. Significant non-compliance with RE targets</p> <p>Hooke - Higher Kingcombe</p> <p>Higher Kingcombe - Kingcombe</p> <p>d/s Huish Fish Farm - d/s Sydling Stream</p>	<p>3.1. Investigate cause of non-compliance</p> <p>3.2. Monitor stretch in absence of fish farm discharge</p> <p>3.3. If still non-compliant investigate cause</p> <p>3.4. Review WQ at relocated sampling site</p> <p>3.5. If still non-compliant investigate cause</p>	<p>NRA</p> <p>NRA</p> <p>NRA</p> <p>NRA</p> <p>NRA</p>	<p>Compliance with targets</p> <p>Improved water quality</p> <p>Improved water quality</p> <p>Improved water quality</p>	
4. Marginal non-compliance with RE targets	4.1. Investigate cause of non-compliance	NRA	Improved water quality	

ISSUES AND OPTIONS

Issue	Options	Responsibility	Advantages	Disadvantages
5. Sewerage in the Piddle Valley and elsewhere	5.1. Negotiate timing of improvements to Piddle valley sewerage system	NRA WWS	Improved water quality	Cost
	5.2. Monitor and assess impact of other surcharging sewers	NRA	Environmental improvements	Cost
6. Public water supply abstraction on the Piddle				
Assessing the impacts	6.1. Assess results of current modelling studies	NRA		
	6.2. Define environmental flow needs	NRA	Provide a scientific basis for identifying detrimental impacts and determining flow needs	Cost
Short-term options	6.3. Negotiate additional stream support for Devil's Brook	NRA WWS	Water flow in Dewlish	Cost Benefits may be limited
	6.4. Negotiate extension to Briantspuddle agreement	NRA WWS	Alleviate low flow problems	
Long term options	6.5. Implement local licensing policy	NRA	Provide a basis to ensure a consistent evaluation of licence applications	
	6.6. Assess viability of Briantspuddle recirculation proposal	NRA Public	May provide additional flows	Cost Potential impact on river regime Benefits may be limited
	6.7. Assess viability of the Waterston stream support proposal	NRA	May provide additional flow	Cost Benefits may be limited
	6.8. Develop environmentally acceptable alternative sources	See 8.2		
	6.9. Altered abstraction regimes	NRA WWS		Cost
7. Funding of low flow alleviation	7.1. Cost-benefit study	NRA	Information to support the case for low flow alleviation	Acceptance

ISSUES AND OPTIONS

Issue	Options	Responsibility	Advantages	Disadvantages
8. Manage future use of water resources by implementing South Western Region Water Resources Strategy	8.1. Ensure effective use of existing sources	NRA WWS		Cost
	8.2. Development of environmentally acceptable future sources	NRA WWS	Relieve pressure on resources Help meet future needs	Cost
	8.3. The promotion of demand management and leakage control measures	WWS	More efficient use of current resources	Cost
9. Impact of diurnal flow fluctuations on the Hooke	9.1. Investigate the cause of diurnal flows	NRA	Identify cause of problem	
	9.2. Assess results of investigations and decide course of action	NRA		
10. Improved identification of flood risk areas	10.1. Undertake S105 flood risk surveys of the Frome & Piddle catchment	NRA Local authorities	Improved knowledge Improved advice to planning authorities	Cost
11. The management of assets and the future control of water levels	11.1 Undertake asset survey	NRA	Improved knowledge	
12. Review the efficiency and effectiveness of FD maintenance operations	12.1. Adopt Standards of Service for defining maintenance needs on main river	NRA	Better planning potential for environmental gain Cost savings	
13. Investigate, justify and, if appropriate, implement FD schemes	13.1. Liaise with planning authorities	NRA Local authorities MAFF	Prevention of flooding	Cost
	13.2. Ensure all options evaluated	NRA		
	13.3. Investigate, justify and implement the appropriate option for Maiden Newton	NRA MAFF	Prevention of flooding	Cost
	13.4. Investigate, justify and implement the appropriate option for Wareham Marshes	NRA MAFF	Prevention of flooding	Cost

ISSUES AND OPTIONS

Issue	Options	Responsibility	Advantages	Disadvantages
14. Ensure the adequate provision of flood warning in the catchment	14.1. Review flood risk areas	NRA	Better planning and protection	Cost
	14.2. Review flood warning with emergency response levels of service			
	14.3. Cost and produce plan for future improvements			
15. The impact of an SSSI designation on NRA river operations	15.1. Negotiate management agreement	NRA EN	Environmental improvement	
16. Management of salmon stocks	16.1. National studies on the decline in salmon stocks and catches	NRA		
	16.2. National studies on the decline in large spring-running fish	NRA		
	16.3. Review of revised salmon angling byelaws in 1996/97	NRA Anglers		
	16.4. Flow management policies should attempt to meet the proven requirements of salmon populations	See 6.3		
	16.5. Restoration and protection of spawning and nursery areas	See 24.2		
	16.6. Relationships between spawning and recruitment of salmon should be resolved	NRA	Scientific basis for management of spawning stocks	

ISSUES AND OPTIONS

Issue	Options	Responsibility	Advantages	Disadvantages
17. Management of the brown trout fishery	<p>17.1. Flow management policies should attempt to meet the proven requirements of wild trout populations</p> <p>17.2. Assess the potential for minimising the impact of low flows on brown trout populations by simple management practices, including fencing to keep cattle out, and small in-channel structures such as groynes and weirs</p> <p>17.3. Restoration and protection of spawning and nursery areas</p> <p>17.4. Where restocking of brown trout is carried out by users, the use of marked fish and selective cropping, or better still sterile triploid stock, would reduce the risk of genetic dilution</p> <p>17.5. Catch and return is being encouraged by Frome, Piddle and West Dorset Fisheries Association</p> <p>17.6. Assess benefit of pike removal on brown trout populations</p> <p>17.7. Assess impact of cormorants on brown trout populations</p>	<p>See 6.3</p> <p>GCT WWS NRA Owners</p> <p>See 24.2</p> <p>Owners NRA</p> <p>Owners</p> <p>GCT</p> <p>Owners NRA</p>		
18. The management of the coarse fish stocks	<p>18.1 Restoration of water meadows and other side streams to improve recruitment</p> <p>18.2. Reduction in weed cutting during the spawning season around May and June to improve spawning success</p>	<p>Owners</p> <p>NRA</p>	<p>Improve recruitment</p> <p>Improve spawning success</p>	<p>Land use issues</p> <p>Could conflict with flood defence objectives</p>
19. Assess the scope for improved public access to rivers and associated land for informal recreation	<p>19.1. Are there places within the catchment that are suitable for use by the disabled ?</p> <p>19.2. Are there places within the catchment that are suitable for educational use ?</p> <p>19.3. Restoration of water meadows at Maiden Newton.</p>	<p>Owners</p> <p>Owners</p> <p>See 26.2</p>		

ISSUES AND OPTIONS

Issue	Options	Responsibility	Advantages	Disadvantages
20. The impact of recreational boat use on the tidal Frome	20.1. Should alternative riverside recreation sites be encouraged within the catchment, and if so, where ?	Owners	/	
	20.2. Provision of facilities for the disposal of waste from boats	Owners NRA		
21. Improve the conservation status of the catchment	21.1. Strategic landscape assessment	NRA	Objective evaluation of the catchment	
	21.2. River Habitat Survey	NRA	Objective evaluation of degraded river reaches	
	21.3. What improvements could and should be made to the river corridor, who is best placed to provide them, and what incentives are available ?	NRA Others		
	21.4. Are phosphate levels in the Frome effecting changes in the plant community ?	EN NRA		
22. Conservation of important species	22.1. Identify the distribution of rare species in winterbournes	NRA	Protection of rare species	
	22.2. Assess the vulnerability of these rare winterbourne species		Protection of rare species	
	22.3. A project in 1995/96 to investigate pesticide levels in eels, the major food source of otters		Improve potential for otters	
	22.4. The decline in native white-clawed crayfish in the catchment		Assess possible environmental impacts	
23. The protection of features of archaeological interest	23.1. Protect known archaeological features by screening all NRA works for the presence of these sites	NRA	Protect archaeological interest	Cost
	23.2. Identify opportunities for increasing its knowledge of archaeological interest within river valleys.	NRA	Assist in the screening process for works and consents	

ISSUES AND OPTIONS

Issue	Options	Responsibility	Advantages	Disadvantages
24. The increased silt load in the rivers	24.1. Establish a sediment control strategy.	NRA Others	Improve river habitat	Environmental damage from dredging Long term maintenance
	24.2. The benefit of gravel reconditioning should be assessed further	NRA GCT	Improved salmonid spawning	
	24.3. The deterioration of the Tadnoll Brook as a salmon spawning area should be assessed and the potential for remedial works evaluated	NRA	Improved salmonid spawning Conservation benefit	
	24.4. Siltation could reduce channel capacity and become a flood defence hazard requiring dredging,	NRA	Avoid flood risk	
	24.5. Encourage the establishment of buffer zones and other best-management practices	NRA Farmers	Reduce silt and nutrient inputs	
	24.6. Assess the viability of sediment lagoons at various strategic locations	NRA	Reduce silt	
25. Review the objectives, efficiency and effectiveness of weed cutting operations	25.1. Review weed cutting strategy	NRA Owners	Avoid blocking control structures Avoid fouling boat moorings	
	25.2 Disposal of cut weed is a water quality issue	NRA Owners		
	25.3. In heavy rainfall, weed collection booms can overturn releasing large amounts of cut weed.	NRA		
	25.4. Drifting weed creates problems for other river users downstream			
26. The management of water levels in the catchment	26.1. A Water Level Management Plan for East Holme Meadows, Wareham Common & Wareham Meadows to be discussed with MAFF during 1995/96	NRA MAFF	Educational and conservation benefits	
	26.2. Cooperation with DCC in the restoration of the water meadow system at Maiden Newton	NRA DCC		
	26.3. Cooperation with EN regarding SSSI & other designations (eg SPA) on tidal rivers	NRA EN		

ISSUES AND OPTIONS

Issue	Options	Responsibility	Advantages	Disadvantages
27. Impact of road schemes on the aquatic environment	27.1. Incorporate flood protection measures in all new road schemes	NRA DoT DCC	Avoid increased flood risk	Cost
	27.2. Incorporate pollution control measures in all new road schemes	NRA DoT DCC	Avoid pollution risk	Cost
	27.3. Ensure nature conservation and landscape aspects of river corridors are protected in all new road schemes	NRA DoT DCC	Protect nature conservation and landscape	Cost

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11. APPENDICES

Appendix 11.1 Sites Of Special Scientific Interest In The Frome & Piddle Catchment

Site	Summary of Interest	Area (ha)
Mapperton and Poorton Vales*	Wet meadow grassland	85.64
Aunt Mary's Bottom	Valley Fen, meadow and woodland	8.62
Frome St Quentin	Fen, meadow, reed bed and woodland	29.19
Batcombe Down*	No details available	18.6
Sydling Valley Downs	Chalk grassland	72.6
Giant Hill	Chalk Grassland	-103.7
Black Hill Down	Calcareous grassland and scrub	71.84
Lyscombe and Highdon	Chalkland, grassland, woodland and scrub	81.0
Higher Houghton	Chalk grass, scrub and wood	139.0
Drakenorth*	Grassland and wet woodland	67.2
Whetley Meadows*	Grassland and woodland	8.5
Powerstock Common	Woodland and grassland	159.1
Eggardon Hill and Luccas Farm	Grassland, flushes and woodland	144.1
Toller Porcorum	Grassland, flushes and woodland	176.7
Woolcombe	Fen and wet woodland	18.8
Hayden and Askewell Downs*	Chalk grassland	108.0
Hog Cliff	Chalk grassland and scrub	-
Court Farm, Sydling	Chalk Grassland	83.8
Langford Meadows	Wet water meadow	7.6
Valley of the Stones*	Grassland and lichens	66.2
Blackdown Hill (Hardy's Monument)*	Geological, heathland	21.4
Warmwell Heath	Heath, bog, carr and Tadnoll Brook	56.2
Winfrith Heath	Heath and wet meadows	268.45
Oakers Wood	Woodland	46.6
Cull Peppers Dish	Geological	0.9
Turners Puddle Heath	Extensive lowland heath	390.1
Black Hill Heath	Dry, wet heath with bog and woodland	69.67
Bere Stream	Chalkstream, marsh and woodland	11.2
Hyde Heath	Heath and bog	294.1
East Stoke Fen	Reed bed fen	6.1
Lulworth Park and lake	Parkland and lake	49.5
South Dorset Coast*	Coastal habitats and grassland, geological	1760.9
Povington and Grange Heaths	Large heathland	1226.7
Worgret Heath	Dry heath	8.4
Wareham Common	Grazing meadows	17.38
East Holme Meadows	Winter floods and wet meadows	17.4
East Coppice*	Woodland	4.8
Morden Bog	Valley, mine and heath	212.7
Gore Heath	Wet heath	87.6
Sandford Heath*	Heath, bog and carr	49.9
Wareham Meadows	Grazing meadows	204.3
Stoborough and Creech Heaths	Heath, bog and woodland	339.9
The Moors	Wet meadow and bog	156.8
Hartland Moor*	Heathland	299.9

SSSI not wholly within catchment area. Area of SSSIs partly or wholly within catchment 7051.09 ha (excluding Hog Hill).

Appendix 11.2 Neutral Translation Of NWC RQOs To River Ecosystem Use Classes †

NWC Class	Rivers Ecosystem Use Class
1A	RE1
1B	RE2
2	RE3 or RE4
3	RE5
4	RE6 ‡

† The translation from NWC-based RQOs to River Ecosystem Use Class should be cost neutral, ie standards should not be made stricter by change to the new format. However, if current data indicates that water quality is already better than RQO, the RE class may be set to protect current water quality.

‡ The latest issue of the Regulations have removed the RE6 class contain no reference to the RE6 class originally proposed. Clarification is being sought from Head Office as to how to deal with stretches which do not meet RE5.

Appendix 11.3 Standards For The Five River Ecosystem Use Classes

Use Class	DO % sat 10%ile	BOD (ATU) mg/l 90%ile	Total Ammonia mgN/l 95%ile	Un-ionised Ammonia mgN/l 95%ile	pH 5%ile & 95%ile	Hardness mg/l CaCO ₃	Dissolved Copper µg/l 95%ile	Total Zinc µg/l 95%ile	Class Description
1	80	2.5	0.25	0.021	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	30 200 300 500	Water of very good quality suitable for all fish species
2	70	4.0	0.6	0.021	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	30 200 300 500	Water of good quality suitable for all fish species
3	60	6.0	1.3	0.021	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	300 700 1000 2000	Water of fair quality suitable for high class coarse fish populations
4	50	8.0	2.5		6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	300 700 1000 2000	Water of fair quality suitable for coarse fish populations
5	20	15.0	9.0						Water of poor quality which is likely to limit coarse fish populations

Appendix 11.4 Glossary of Terms

ADAS	Agricultural Development Advisory Service of MAFF
AMP	Asset Management Plan
Anadromous	Fish which live in the sea but enter rivers to breed
AONB	Area of Outstanding Natural Beauty, designated by the Countryside Commission to conserve and enhance the natural beauty of the landscape, mainly through planning controls
Aquifer	A layer of water-bearing rock
ARC	Amey Roadstone Corporation
BASIS	British Agrochemical Standards Inspection Scheme
BOD	Biochemical Oxygen Demand
BOD (ATU)	Biochemical Oxygen Demand with nitrification suppressed by allylthiourea
BP	British Petroleum
CAMAS	Construction, Aggregates, Materials and Sales
CAP	Common Agricultural Policy
CDP	Catchment Drainage Plan
CMP	Catchment Management Plan
Cyprinids	All non-salmonid freshwater fish
DCC	Dorset County Council
DO	Dissolved Oxygen
DoE	Department of the Environment
DoT	Department of Transport
DWF	Dry Weather Flow
DWLP	District Wide Local Plan
DWT	Dorset Wildlife Trust
EC	European Community
ECC	English China Clays
EN	English Nature
EQO	Environmental Quality Objective
EQS	Environmental Quality Standard
ERLOS	Emergency Response Levels of Service
ESA	Environmentally Sensitive Area
EU	European Union
FAS	Flood Alleviation Scheme
FBA	Freshwater Biological Association, now Institute of Freshwater Ecology, at East Stoke
FD	Flood Defence
FDMF	Flood Defence Management Framework
GCT	Game Conservancy Trust
GQA	General Quality Assessment
HE	House Equivalents per kilometre
HMIP	Her Majesty's Inspectorate of Pollution, the regulatory authority for IPC
HNDA	High Natural Dispersion Area
HQ	Headquarters
IFE	Institute Of Freshwater Ecology
IFIM	Instream Flow Incremental Methodology
IH	Institute of Hydrology
IPC	Integrated Pollution Control, a system introduced to control pollution from industrial processes which could cause significant pollution to air, land and water
LNR	Local Nature Reserve established, and usually managed, by district or borough councils.
LTA	Long Term Average
m AOD	metres Above Ordnance Datum
MAFF	Ministry of Agricultural Food and Fisheries
MoD	Ministry of Defence
NCC	Nature Conservancy Council, now English Nature
NNR	National Nature Reserve, a site owned or leased and managed by English Nature and established as a reserve
NRA	National Rivers Authority
NVZ	Nitrate Vulnerable Zone
NWC	National Water Council
OFWAT	Office of Water Services, the government regulatory agency for the water industry
PARCOM	Paris Commission
Perched	A term describing a stream which disappears underground for part of its length
PHABSIM	Physical Habitat Simulation
PPPG	Policy and Practice for the Protection of Groundwater
PWS	Public Water Supply

Q95	Flow which is equalled or exceeded for 95% of the time
R&D	Research and development
RAMSAR Sites	Sites identified by UK Government under the Convention on Wetlands of International Importance which was ratified by the UK Government in 1976.
RCS	River Corridor Survey
RE	River Ecosystem
RIVPACS	River Invertebrate Prediction And Classification System, a computer program developed by IFE which predicts the most likely invertebrate fauna of a river from a selection of simple physical and chemical measurements
RQO	River Quality Objective
Salmonids	Salmon, Brown and Sea Trout and Rainbow Trout
SAM	Scheduled Ancient Monument of national importance designated under the Ancient Monuments and Archaeological Areas Act 1979.
SLA	Special Landscape Area of special landscape quality, designated by the County justifying the adoption of particular development control policies and other safeguarding measures.
SNCI	Site of Nature Conservation Interest selected (usually by County Trusts) as sites of County ecological importance.
SoS	Standards of Service
SPA	Special Protection Areas identified by UK Government under the EC Directive on the Conservation of Wild Birds (79/409/EC).
SSSI	Site of Special Scientific Interest of national importance designated under the Wildlife and Countryside Act 1981. Habitats, sites for individual species, geology and land forms may be designated.
STW	Sewage Treatment Works
SWQO	Statutory Water Quality Objectives
UKAEA	United Kingdom Atomic Energy Authority
UWWTD	Urban Waste Water Treatment Directive, an EC Directive
WQO	Water Quality Objectives
WRA	Waste Regulation Authority
WRC	Water Research Centre
WWS	Wessex Water Services Ltd

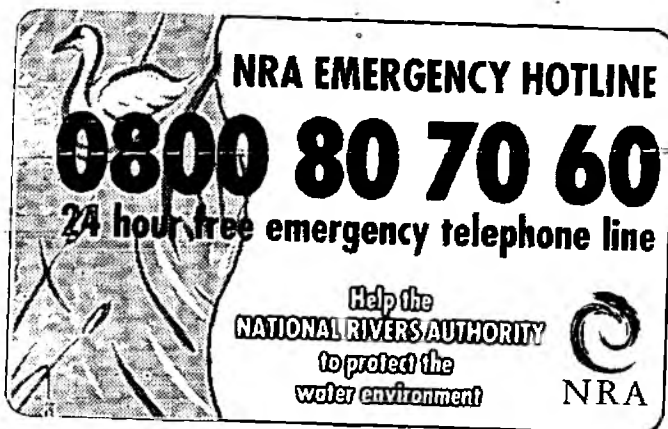
Appendix 11.5 Units

m ³ /s	cubic metres per second (cumecs)
m ³ /d	cubic metres per day
l/s	litres per second
Ml/d	megalitres per day
Ml/y	megalitres per year
Mgd	millions of gallons per day
mg/l	milligrams per litre
mg/l	micrograms per litre
ng/l	nanograms per litre
%ile	Percentile
%sat	% saturation (of oxygen)
mm	millimetre
m	metre
km	kilometre
km ²	square kilometre
ha	hectare
1 cubic metre	1,000 litres
1 cubic metre	220 gallons
1 gallon	4.54 litres
1 megalitre	1,000,000 litres
1 hectare	2.471 acres

Telephone the emergency hotline to report all environmental incidents, such as pollution, poaching and flooding, or any signs of damage or danger to our rivers, lakes and coastal waters. Your prompt action will help the NRA to protect water, wildlife, people and property.

NRA Emergency Hotline

0800 80 70 60



*50% post consumer waste
chlorine free*

