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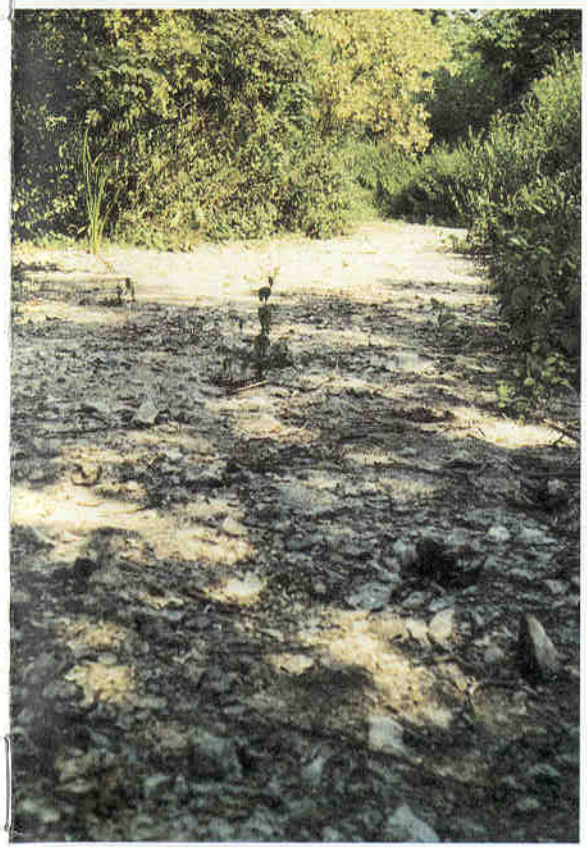
THE RIVER DARENT ACTION PLAN



ENVIRONMENT AGENCY

INTRODUCTION

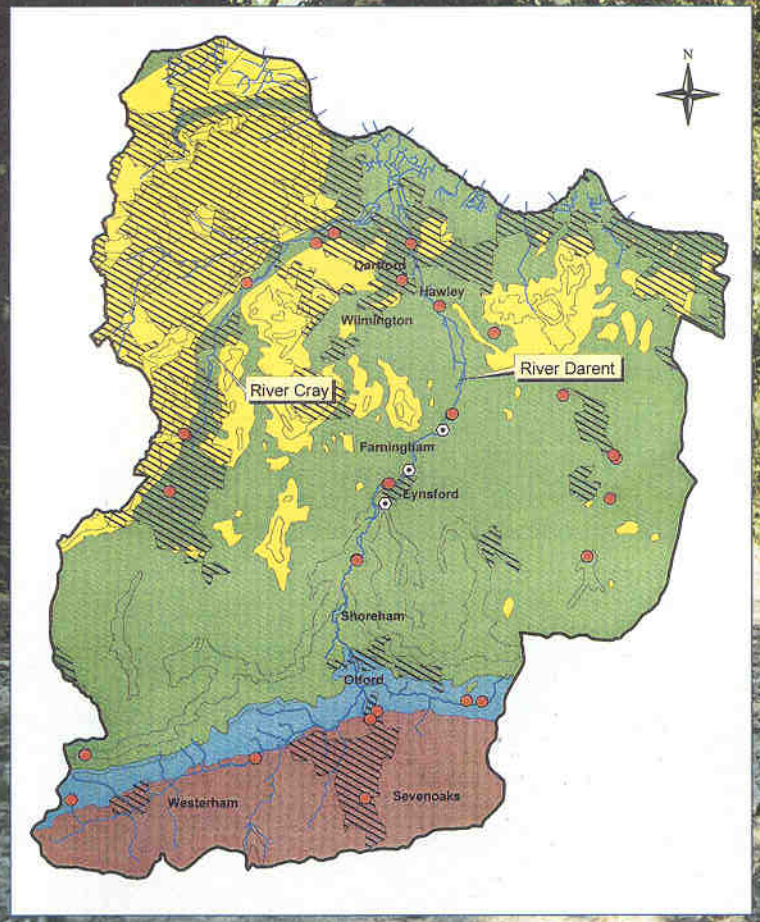
For much of the year, flow in the Darent is sustained by springs and seepages issuing from the Chalk and Greensand aquifers underlying the catchment (See Map) but for many years now, abstraction from boreholes tapping these natural reservoirs has resulted in falling water table levels with a consequent loss of level and flow for long sections of the river between Sevenoaks and Dartford. Until recently, the total volume of groundwater pumped for public supply was only slightly less than the average rate of aquifer replenishment by rainfall and records show, furthermore, that for drier-than-average years, there is a substantial deficit. At such times, summer flows have been severely depleted and under the more extreme drought conditions such as those experienced during 1989-92 and 1995-97, springs have failed and the lower courses of the river have dried out completely.

It has been estimated that prior to the implementation of low flow alleviation measures the average daily flow at Hawley, near Dartford, was only 40% of what would normally be expected of the river at this point in its natural state if no abstractions were taking place anywhere within the catchment.

The loss of flow is reflected in a widespread reduction in wildlife including some important invertebrate species. In recent years, watercress beds have been abandoned and silt deposition has resulted in the loss of native brown trout from the middle and lower reaches. The silting has also caused reeds to encroach, narrowing the river channels.

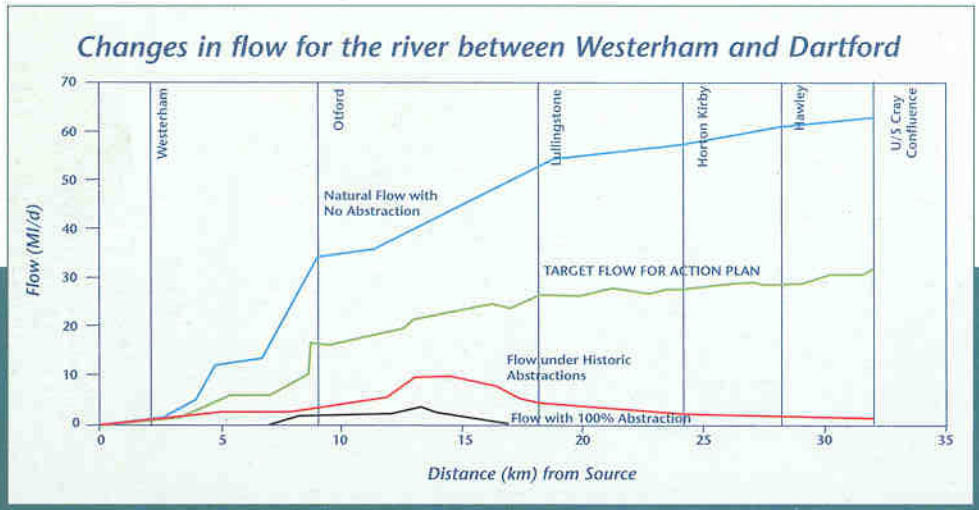
Water Balance Summary for Darent and Cray Resource Area.

Conditions	Average	Drought (1989-92)
Catchment area (km^2)	399	399
Annual rainfall (ave. 1961-90) (mm)	700	649
Actual evapotransporation loss (mm)	422	407
Effective rainfall (mm)	278	242
Annual Total available resource (Mm^3)	110,936	96,761
Authorised abstraction (Mm^3)	103,065	103,065
% commitment	93	107



THE **ACTION PLAN**

In recognition of the problem, the River Darent was given high priority on a list of 40 over-abstracted catchments compiled by the National Rivers Authority (NRA) following the 1990 national survey. A subsequent assessment by specialist consultants led to the adoption of a plan for joint action by the NRA and Thames Water Utilities Limited (TWUL) aimed at the restoration of a stable and sustainable chalk stream habitat. This meant that the year-round flows of the river would have to be increased in order to create what is termed an Environmentally Acceptable Flow Regime which has been defined by a sequence of monthly target flows prescribed for key locations along the course of the river.



The graph illustrates the principle using a comparison of the conditions likely to occur during the late summer/early autumn when the river would normally be at or around its lowest flow. The target flows achieved by the Action Plan will be about half of those experienced under natural conditions. It was understood from an early stage that significant improvements in flow could only be achieved by substantially reducing the rate of abstraction from public supply boreholes in the Chalk and Lower Greensand aquifers feeding the river.

OUTLINE OF **ACTION PLAN**

The plan adopted by the Environment Agency, as successor to the NRA, was formulated and implemented in partnership with TWUL and in close consultation with the Darent River Preservation Society and other special interest groups. It comprises two principle phases:-

Phase I (completed mid 1999)

- Reductions in the authorised and actual quantities of groundwater abstracted by TWUL from boreholes in the Chalk and Lower Greensand.
- River flow augmentation or "topping up" from specially constructed bankside boreholes at Lullingstone, Eynsford and Farningham.
- Construction of low flow weirs designed to increase the depth of flow at important amenity sites (e.g. Eynsford).
- A programme of in-river and bankside works by the Darent Valley Enhancement Programme (DVEP) team (part funded by the Agency) to enhance the conservation value of the scheme.

Phase II (2000-2005)

This will take the next four to five years and lead to further reductions in the total quantity of water pumped from public supply boreholes in the Chalk and Lower Greensand aquifers.

PROGRESS SO FAR

Phase I has delivered a number of important improvements, notably:-

- A 30% reduction in the total quantity of water licensed for abstraction within the catchment, (the total now stands at 52 M1/d).
- A 60% reduction in actual winter period abstraction to approximately 32 M1/d.
- A 30% reduction in the actual all-year abstraction from the boreholes sited close to the river and considered to have the greatest impact on summer flow.
- Commissioning of 3 bank side flow augmentation wells ("artificial springs") with a total output of 15M1/d.

In recent winters, TWUL have also endeavoured to reduce pumping from their Chalk boreholes at times when the Thames reservoirs are up to capacity.

Taken together, these improvements have been sufficient to bring the flow of the river up to about half target level.

THE FUTURE

Phase II has been approved in outline by the Department of Environment, Transport and the Regions (DETR) and will mean further cut-backs in public supply abstraction from boreholes operated by TWUL and South East Water. Losses in public supply capacity incurred by the companies will need to be made up from new sources outside the catchment. One possibility under investigation would involve the construction of new Chalk boreholes in the vicinity of Swanscombe quarry where large volumes are currently being pumped to waste to prevent flooding of the excavation works. This proposal has the support of DETR, being a wholly sustainable option with the additional benefit of materially reducing wastage of the area's water resources.

The general rise in the level of underground water, resulting from the cut-backs in pumping, is calculated to produce an increase in spring flows sufficient to sustain the river at or close-to target flows under all but the most severe droughts.

The Agency's role is to manage the augmentation or topping up of the river to ensure that target flows are maintained.
Successful management of the conjunctive use of River Thames and Darent water and the reduction in underground abstraction will mean that the times when augmentation will be needed will be relatively few and, in wetter years, may not be needed at all.