

As a result of the Water Act, 1973, river management, water supply and sewage disposal in Britain have now been integrated under the control of new regional water authorities. This is clearly a desirable move which will make planning and coordination easier within the regions. But of course there are still larger issues which must be settled on a national basis, at government level or by cooperation between regional authorities. To assist with these, a Central Water Planning Unit remains as a rump of the old Water Resources Board, under the auspices of the Department of the Environment (DoE), and a new Water Research Centre has been established by amalgamating the Water Research Association laboratories, the Water Pollution Research Laboratory, most of the Technology Division of the Water Resources Board and part of the Development Division of the Directorate General Water Engineering of the DoE.

As far as the study of long term trends is concerned, the CWPU is concerned directly with forecasting demand, and not with predicting how the supply of water (as rainfall) might vary. But the experience of the past three years, which have been very dry by established standards in Britain, has encouraged an awareness of the question of climatic change, and some steps are being taken to look into this problem.

This new weather pattern is seen by climatologists as part of a global trend which is causing droughts in parts of Africa and has also been responsible for bad harvests in Canada and the USSR. For Britain, the implications are that longer dry spells will be broken by occasional very heavy storms. This has serious repercussions for the farmer, but from the point of view of the CWPU reservoirs can be filled up just as conveniently in one or two great cloudbursts as by weeks of standard British drizzle.

The CWPU itself is situated on the banks of the River Thames at Reading, and members of the Unit (then part of the Water Resources Board) were treated to the sight of the river flooding its banks as recently as January 1974; the same high rainfall which produced that rise in the river helped to stock up the surface reservoirs. But the problems of replenishment of underground aquifers cannot be overcome so easily. Some 25 to 30% of the public water supply is derived from underground sources, and in periods of drought what precipitation there is tends to be absorbed in the surface layers of the ground, or runs off as floodwater, without having much effect on the aquifers; 10% less rainfall over a year can result in as much as a 50% drop in aquifer recharge.

Whither water?

Water services in Britain have recently been reorganised, with the Water Resources Board ceasing to exist on April 1, 1974. John Gribbin discusses future plans for water resources in the light of the last annual report of the Board and the growing awareness of the possible importance of climatic change.

This is where the possibility of longer term changes in rainfall becomes important.

The average rainfall of England and Wales has declined over the past five years; but is this a continuing trend, or is it likely to reverse in the immediate future? It is too early yet for panic measures on the strength of such evidence alone, although it is perhaps worth noting that Professor Hubert Lamb has commented that the first 50 years of this century, which are accepted as the climatic normal, were in

sources Board could, if it so wished, use any part of its research funds in support of climatic research. But now any proposal for extending the present investigation (or, indeed, starting any new project) must first go to the DoE before filtering back down through the CWPU or the Water Research Centre. A spokesman for the DoE confirmed recently that proposals for future research along these lines have been discussed with Professor Lamb, who heads the Climatic Research Unit, and that "the proposals are now under consideration by the Department". Meanwhile, the planners have plenty on their plate in working out how to distribute the rainfall we do get, without worrying too much about what might happen to that rainfall in future.

The way the CWPU would like to see things develop is towards what might loosely be termed a 'national water grid'. This would involve transfers from region to region—such as from the Severn to the Thames—and extending the present system of river regulation. Again, however, this depends on how things develop as the new regional authorities feel their way. There is nothing to stop a region opting for

Table 1 Rainfall over England and Wales, for year ended September 30, 1973

Month	Monthly rainfall (mm)	1916-50 Standard average (mm)	Percentage of average
1972			
October	32	92	35
November	99	95	104
December	104	88	118
1973			
January	44	92	48
February	40	66	61
March	24	57	42
Winter	343	490	70
April	67	60	112
May	84	63	133
June	63	55	115
July	91	79	115
August	63	81	78
September	86	76	113
Summer	454	414	110
Year	797	904	88

fact "perhaps the most abnormal period for the past thousand years" in terms of the British climate. What is important is that the CWPU, at least, takes the possibility of climatic change seriously. A spokesman said that they "would be very interested in seeing more work [of this kind] done, and are open to suggestions for programmes of research". The old Board has provided funds for research into the variability of rainfall in the English lowlands at the Climatic Research Unit of the University of East Anglia, but the present situation with regard to the continued funding of such work is not yet clear.

Under the situation which prevailed until April this year, the Water Re-

independence in water supply, and dotting the local countryside with reservoirs rather than 'importing' water from neighbours.

Indeed, the most nationalistic of the Welsh might press the case that England should be made to pay for 'Welsh' water—although the CWPU has a stock answer to that: build a dam across the border and see what happens if the Welsh do try to keep all their water!

In fact, of course, water from Wales is so important because of a coincidence of geography and climate. The water brought in from the Atlantic is dumped conveniently on the Welsh mountains, providing the possibility of storing it near the source of rivers and using it to regulate their flow. This makes schemes

to develop that potential still further more attractive than alternatives, such as barrages at the Wash or in Morecombe bay; indeed, one plan now being studied would involve expansion of the Craig Goch reservoir to produce 500 million gallons a day—more than twice the capacity of the Wash scheme in its latest form.

The Craig Goch scheme is representative of the change in philosophy of the water planners from the days when direct supply from reservoirs to consumers was fashionable. Now, the aim is to use rivers wherever possible, meeting the demand for abstraction by regulating the flow using reservoirs at the head of the river. This also improves the health of the river, as well as making it possible to take out more water than from a comparable 'wild' river.

Because of this philosophy of river regulation, the planners must now take increasing account of weather forecasting on a day-to-day basis. If water is released from a reservoir during a dry spell to maintain the flow of a river, it could be embarrassing if heavy rainfall a couple of days later were to occur lower down the river just as the surge from the reservoir arrived. This has provided one of the closest direct links between the old Board and the Meteorological Office in recent years, when both have collaborated with Plessey Radar Ltd and the Dee and Clwyd River Authority on a radar weather forecasting project which has formed part of the River Dee Regulation Research Programme.

Apart from the new outlook on surface water management—which depends very much on the cooperation of the new regional authorities—there are also plans to develop groundwater abstraction. In the tenth (and last) Annual Report of the Water Resources Board (HMSO, 79p) it is suggested that resources will be available to maintain the proportion of water derived from aquifer storage until the end of this century, even though total demand is expected to double by then. In the long term, there is the possibility of artificial recharge of aquifers from wells or by



Craig Goch reservoir

“infiltration” through lagoons or basins; pilot projects carried out in the London Basin, in Nottinghamshire, Sussex and other parts of England and Wales have shown the feasibility of refilling some strata with water and abstracting the water when required, and research into and development of such techniques must clearly have very high priority in the plans of the Water Research Centre and the CWPU.

But one superficially attractive proposal for the future seems to have been ruled out for some time to come. Desalination has been widely mooted as a practical system of obtaining pure water in Britain, because of the extensive coastline. But studies suggest that it will be simply too expensive in the fore-

seeable future (the next 25 years), especially when the rising costs of fuel are taken into account. In addition, the environment lobby, which by and large seems to favour the idea of desalination, has not, perhaps, taken full account of the impact on the coastal environment of unsightly desalination plants. Just about the only economically viable use of these plants in Britain at present would be to top up the supply of coastal resorts in the summer, when their population rockets and demand is highest (indeed, desalination is used in just this way in the Channel Islands). But on the other hand, the authorities of areas which depend on the income obtained from visitors attracted by the natural beauties of the coast are the least likely to authorise construction of new industry.

However the investigation of climatic change develops, the question of water supply is bound to occupy an increasingly important place in the thoughts of planners around the world as population increases. Desalination will obviously be important in some areas, if not in Britain. But the problems with desalination as a commercial proposition highlight the truth that although “two thirds of our planet is covered by water” we must think very carefully indeed about where we are going to get a drop to drink in the year 2001 □

Table 2 Water Resources Board expenditure on research

Financial Year	Research £	Section 90* £	Total £
1966-67	31,265	17,948	49,213
1967-68	41,260	41,553	82,813
1968-69	63,866	121,604	185,470
1969-70	120,878	107,998	228,876
1970-71	259,967	167,254	427,221
1971-72	226,679	194,027	420,706
1972-73	237,111	293,686	530,797
1973-74 (estimated)	436,300	347,700	784,000

* “Section 90” is the section of the 1963 Act which empowered the Water Resources Board to provide financial support for work and research carried out by the then river authorities.