Hydrological Summary for Great Britain

JULY 1994

Rainfall

On the basis of the provisional 'Central England Temperature' series July ranks as the second warmest month (after July 1983) in a record from 1659; countrywide assessments make the month rather less outstanding. Throughout most of July anticyclonic conditions held the Atlantic frontal systems at bay and hot, dry conditions produced exceptional evaporative demands. However, thunderstorms became increasingly prevalent over the later half of the month producing some very intense local downpours. North of London (at Chipping), 22.6 mm was recorded in 30 minutes on the 24th and further notable falls occurred on the 27th; in northern England and southern Scotland several exceptional falls were reported early in August. These, and other very spatially restricted events, produced heavy runoff and/or localised flooding. Some districts, mostly in southern England, which benefitted little from the convectional rainfall, reported very low rainfall totals - e.g. less than 5 mm in parts of the North Downs - and sequences of 20 dry days, or more, were not unusual. The lack of spatial coherence in the rainfall makes for imprecise areal estimates but July rainfall totals were significantly below average in almost all regions - extending a dry phase stretching back, in some areas, for over three months. The May-July period was especially dry in north-eastern Britain; for the North East RPB area comparable three-month rainfalls over the last fifty years are restricted to the 1955 and 1976 droughts. The June/July rainfall for the Thames Valley was also very meagre. Nonetheless, accumulated rainfall totals for 1994 thus far, and over the last 12 months, remain close to or above average and notably wet over longer timespans.

River Flow

Soil moisture deficits (SMDs) increased rapidly through July and were generally above average by month end, notably so in parts of north-eastern Britain and central England. Consequently, thunderstorms apart, little surface runoff was generated in July. The summer recessions have been prolonged and generally steep. This is most evident in impervious catchments where runoff rates were depressed by mid-July but mostly well above the minima recorded in the recent drought. July runoff totals were well below average throughout Britain and, in a few catchments, unprecedented (examples include the Rivers Teme and Carron). Exceptions were found in the English Lowlands where contrasting baseflow contributions resulted in large variations in flow rates. Rivers draining predominantly clay catchments registered very low flows whereas some chalk rivers remain close to the long term average. For a few, including the Lee, Mimram and Kennet, July continued a lengthy sequence of months with above average runoff; with spring flows declining this sequence is drawing to a close. A dry August may be expected to produce widespread low flows but generally still well above historical minima.

Groundwater

As is usual in July, groundwater recessions continued in all major aquifers. The rate of water-table decline has slackened but the overall fall since the notable peak levels registered early in 1994 is impressive, e.g. over 30 metres in parts of the South Downs and in the Carb. Limestone of Staffordshire. Despite the steep recessions, groundwater levels remain relatively close to the seasonal average over wide areas and well above corresponding levels in the summer of 1992. Some significant regional differences can be identified: levels in the eastern Chilterns are still close to the period-of-record maxima whereas in parts of southern Scotland and the English Midlands (e.g. the Lower Trent) levels in the Permo-Triassic sandstones are substantially below average. Late July SMDs were the equivalent of more than two months average rainfall over much of eastern England - this implies a significantly later recovery in recharge rates than in either 1992 or 1993.

General

High temperatures, abundant sunshine and parched soils have once again conjured up the spectre of drought. However, most of the essential hydrological ingredients are missing - a consequence largely of the exceptionally wet winter and spring. The hot summer has certainly produced some water supply stress. As often happens, peak demands (often associated with heavy garden watering) expose weak links in the distribution system and consumers at the end of supply lines are vulnerable. However, despite substantial recent reductions in some gravity-fed reservoirs (in Yorkshire, for example), stocks remain very adequate. The autumn rainfall will strongly influence the longer term resources outlook.

Institute of Hydrology

British Geological Survey

Data for this report have been provided principally by the regional divisions of the National Rivers Authority* in England and Wales, the River Purification Boards in Scotland and by the Meteorological Office. Reservoir contents information has been supplied by the Water Services Companies, the NRA or, in Scotland, the Lothians Regional Council. The most recent areal rainfall figures are derived from a restricted network of raingauges and a proportion of the river flow data is of a provisional nature.

A map (Figure 3) is provided to assist in the location of the principal monitoring sites.

Financial support towards the production of the Hydrological Summaries is given by the Department of the Environment and the National Rivers Authority.

The Hydrological Summaries are available on annual subscription at a current cost of £48 per year - enquiries should be directed to the National Water Archive Office at the address below. No charge is made to those organisations providing data for the Summaries.

* For reasons of consistency and to provide greater spatial discrimination, the original ten regional divisions of the NRA have been retained for use in the Hydrological Summaries.

MORECS

Most of the recent monthly regional rainfall data featured in the Hydrological Summaries are MORECS assessments. MORECS is the generic name for The Meteorological Office services involving the calculation of evaporation and soil moisture routinely for Great Britain. Products include a weekly issue of maps and tables of potential and actual evaporation, soil moisture deficits, effective rainfall and the hydrometeorological variables used to calculate them. The data are used to provide values for 40 km squares - or larger areas - and various sets of maps and tables are available according to user requirements. Options include a day-by-day retrospective calculation of soil moisture at any of 4000 rain-gauge sites.

Further information about MORECS services may be obtained from: The Meteorological Office, Sutton House, London Road, Bracknell, RG12 2SY

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TABLE 1 1993/94 RAINFALL AS A PERCENTAGE OF THE 1961-90 AVERAGE

		Jul 1993	Aug	Sep	Oct	Nov	Dec	Jan 1994	Feb	Mar	Apr	May	Jun	Jul
England and	mm	83	55	113	89	74	167	123	82	93	75	61	34	52
Wales	%	134	72	147	105	82	178	140	130	129	125	95	52	84
NRA REGIONS														
North West	mm	109	80	87	51	65	247	145	70	151	151	31	67	84
	%	128	75	76	40	53	199	120	90	159	213	41	82	99
Northumbria	mm	59	77	109	91	63	135	108	70	82	65	27	45	44
	%	91	95	149	120	73	167	129	119	117	116	44	75	67
Severn-Trent	mm	79	43	95	75	67	139	94	71	74	59	55	25	43
	%	149	64	148	117	94	181	134	131	121	107	93	43	82
Yorkshire	mm	67	78	132	62	63	136	117	68	69	61	45	31	58
	%	114	105	194	85	79	164	148	117	101	103	75	52	99
Anglian	mm	69	45	105	90	70	86	73	44	52	52	51	23	43
	%	141	82	214	176	121	156	146	119	111	113	106	45	87
Thames	mm	55	33	103	111	57	105	97	59	49	59	80	25	24
	%	112	57	175	179	88	150	152	131	88	118	143	45	49
Southern	mm	62	37	123	133	62	154	124	63	57	78	91	39	31
	%	129	65	178	166	73	188	155	117	90	147	169	71	64
Wessex	mm	76	36	120	122	63	167	126	99	79	63	90	25	39
	%	146	55	167	154	76	180	145	152	113	119	148	44	75
South West	mm	128	39	168	119	107	263	186	174	124	87	100	32	50
	%	186	46	181	103	86	189	135	172	125	126	139	47	73
Welsh	mm	111	75	118	81	113	275	183	130	177	115	68	56	64
	%	144	74	103	59	80	180	128	134	165	144	83	71	84
Scotland	mm	113	74	76	118	76	234	215	99	249	134	30	100	58
	%	120	63	54	76	50	155	142	97	199	176	35	116	62
RIVER PURIFICATION BOARDS														
Highland	mm	143	85	52	139	68	275	257	84	338	188	39	134	49
	%	135	67	30	70	33	140	137	66	209	207	42	137	46
North-East	mm	82	69	84	170	44	115	132	105	105	77	16	47	29
	%	112	79	97	175	44	124	133	162	135	128	23	71	40
Tay	mm	90	58	103	126	77	176	200	114	229	103	22	78	38
	%	117	62	90	97	64	139	139	120	210	166	27	107	49
Forth	mm	76	51	78	109	73	189	160	88	204	83	21	61	42
	%	101	54	71	95	65	172	136	111	217	141	28	88	56
Tweed	mm	55	53	92	135	55	177	140	86	122	71	20	48	36
	%	75	60	103	142	59	190	140	128	154	125	28	74	49
Solway	mm	101	65	102	54	97	269	197	117	191	120	28	81	108
	%	112	55	71	34	67	182	126	116	163	156	33	96	120
Clyde	mm	138	89	74	67	113	306	269	114	301	148	38	138	95
	%	127	66	41	35	63	171	142	97	205	176	42	148	87

Note: The monthly rainfall figures for the NRA regions for June and July correspond to the MORECS areal assessments derived by The Meteorological Office. In northern England these initial assessments may have a particularly wide error band associated with them. The figures for the RPB regions for June and July 1994 were derived by IH in collaboration with the RPBs. The provisional figures for England and Wales and for Scotland are derived using a different raingauge network. Regional areal rainfall figures are regularly updated (normally one or two months in arrears) using figures derived from a far denser raingauge network.

TABLE 2 RAINFALL RETURN PERIOD ESTIMATES

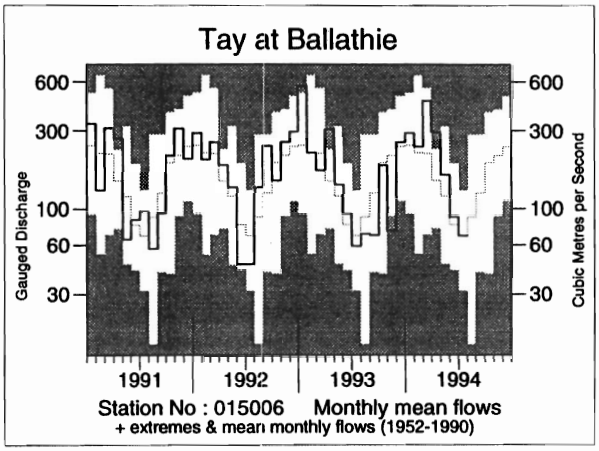
		May94-Jul94	Est Return Period, years	Jan94-Jul94	Est Return Period, years	Aug93-Jul94	Est Return Period, years	Sep92-Jul94	Est Return Period, years
England and Wales	mm	147		520		1018		1902	
	% LTA	77	5-10	110	2-5	114	5-10	111	5-10
NRA REGIONS									
North West	mm	182		699		1229		2384	
	% LTA	75	5-10	115	5-10	102	2-5	104	2-5
Northumbria	mm	116		441		916		1751	
	% LTA	62	10-20	97	2-5	107	2-5	108	2-5
Severn-Trent	mm	124		422		841		1577	
	% LTA	72	5-10	103	2-5	112	2-5	109	5-10
Yorkshire	mm	135		450		921		1691	
	% LTA	75	5-10	102	2-5	112	5-10	108	2-5
Anglian	mm	117		338		734		1350	
	% LTA	79	2-5	103	2-5	123	15-25	119	20-30
Thames	mm	129		393		802		1517	
	% LTA	81	2-5	105	2-5	116	5-10	115	5-15
Southern	mm	160		482		991		1762	
	% LTA	103	2-5	119	5-10	127	20-30	117	10-20
Wessex	mm	154		521		1029		1862	
	% LTA	91	2-5	117	5-10	123	10-20	116	10-15
South West	mm	183		754		1450		2668	
	% LTA	87	2-5	122	5-10	124	10-20	118	15-25
Welsh	mm	188		793		1455		2737	
	% LTA	79	2-5	119	5-10	111	2-5	108	5-10
Scotland	mm	188	10-20	885	15-25	1463	2-5	3039	5-15
	% LTA	71		123		102		110	
RIVER PURIFICATION BOARDS									
Highland	mm	222	5-10	1089	20-30	1708	2-5	3674	5-10
	% LTA	75		126		97		108	
North-East	mm	92		511		993		1947	
	% LTA	44	>200	100	<2	102	2-5	105	2-5
Tay	mm	138		784		1324		2727	
	% LTA	59	15-25	123	5-10	108	2-5	115	10-20
Forth	mm	124		659		1159		2384	
	% LTA	57	30-40	116	5-10	105	2-5	112	10-20
Tweed	mm	104		523		1035		2042	
	% LTA	50	50-80	102	2-5	107	2-5	110	2-5
Solway	mm	217		842		1429		2873	
	% LTA	84	2-5	119	5-10	101	2-5	106	2-5
Clyde	mm	271		1103		1752		3587	
	% LTA	92	2-5	133	40-60	103	2-5	110	5-10

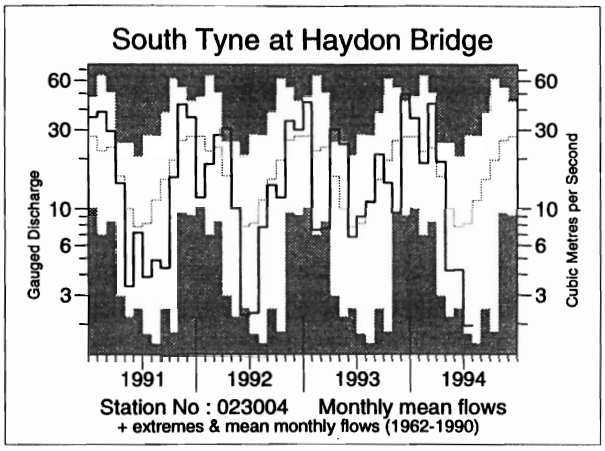
LTA refers to the period 1961-90.

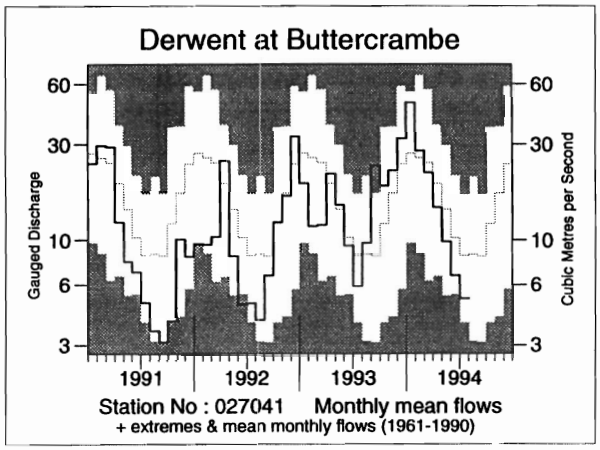
Return period assessments are based on tables provided by the Meteorological Office*. The tables reflect rainfall totals over the period 1911-70 only and the estimate assumes a sensibly stable climate. They assume a start in a specified month; return periods for a start in any month may be expected to be an order of magnitude less - for the longest durations the return period estimates converge. "Wet" return periods underlined.

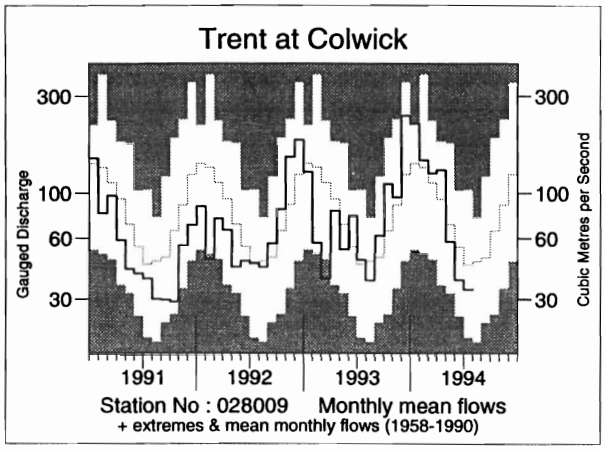
* Tabony, R.C., 1977, The Variability of long duration rainfall over Great Britain, Scientific Paper No. 37, Meteorological Office.

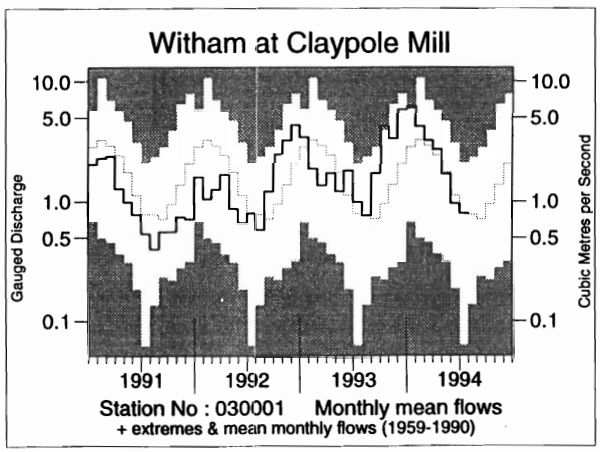
FIGURE 1 MONTHLY RIVER FLOW HYDROGRAPHS

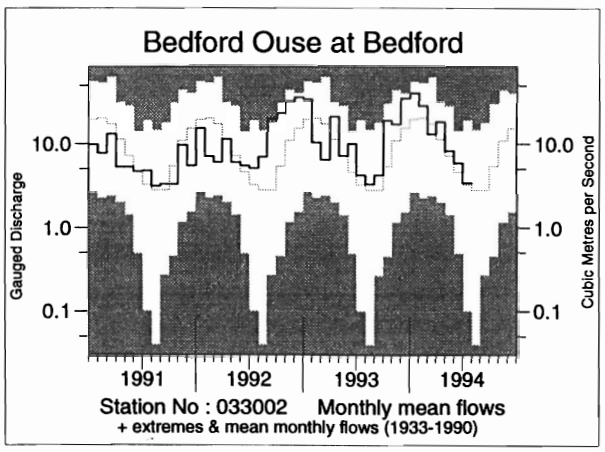


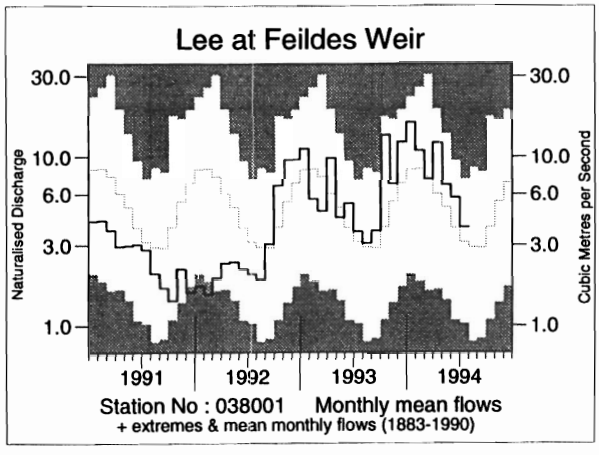


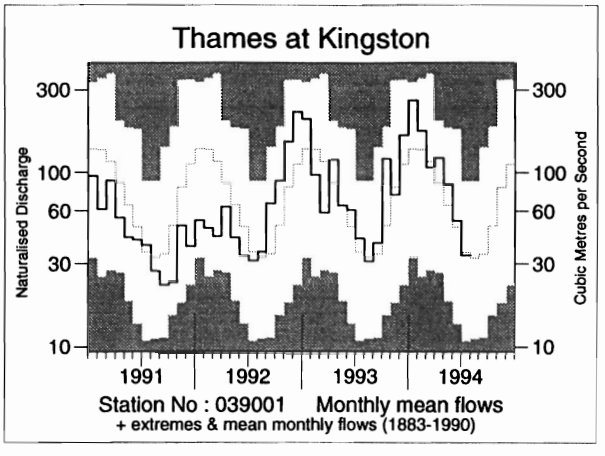


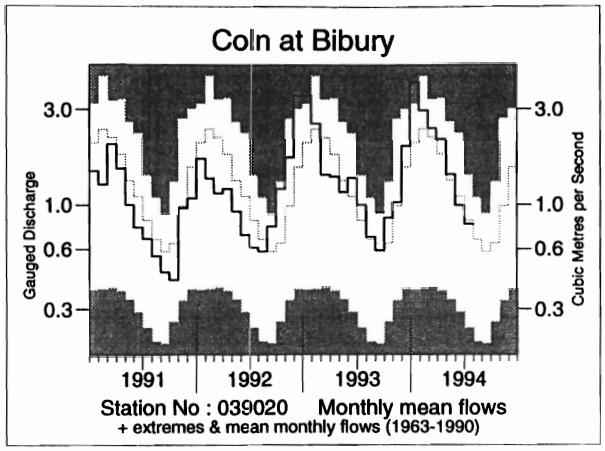


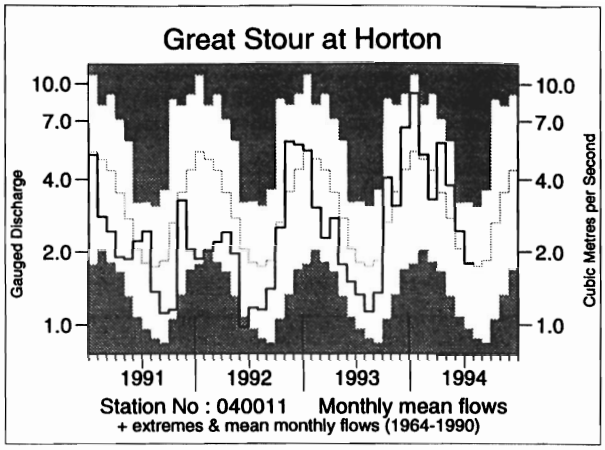


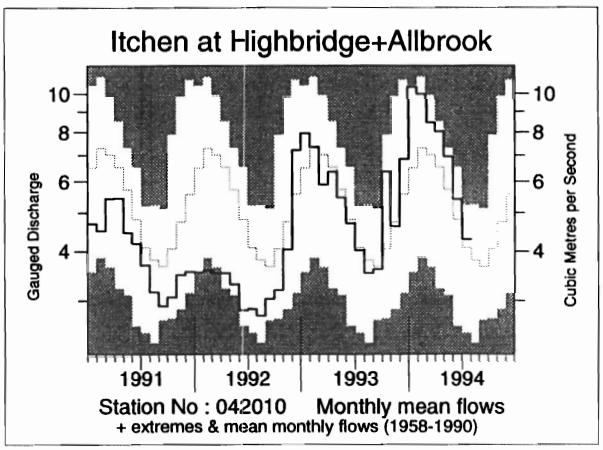


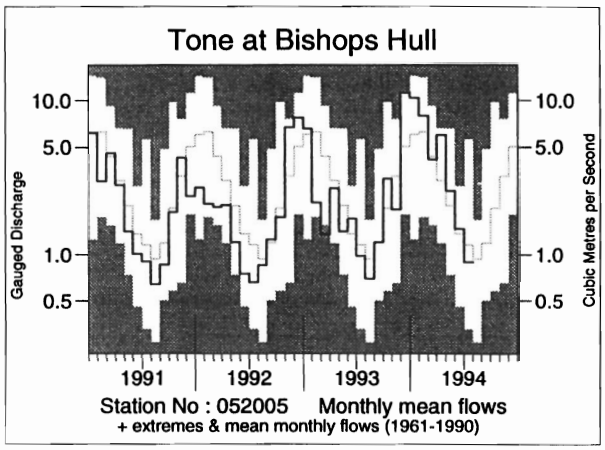


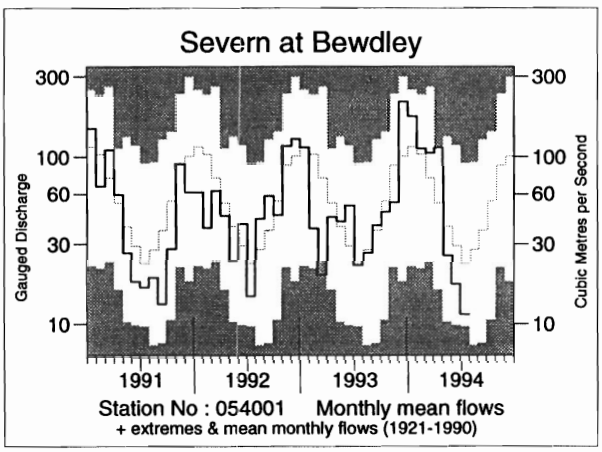


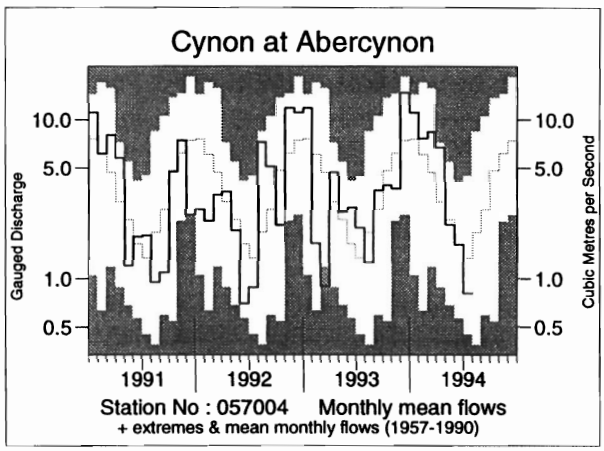

Coln at Bibury
Gauged Discharge
Cubic Metres per Second
3.0
1.0
0.6
0.3
1991
1992
1993
1994
Station No : 039020 Monthly mean flows
+ extremes & mean monthly flows (1963-1990)

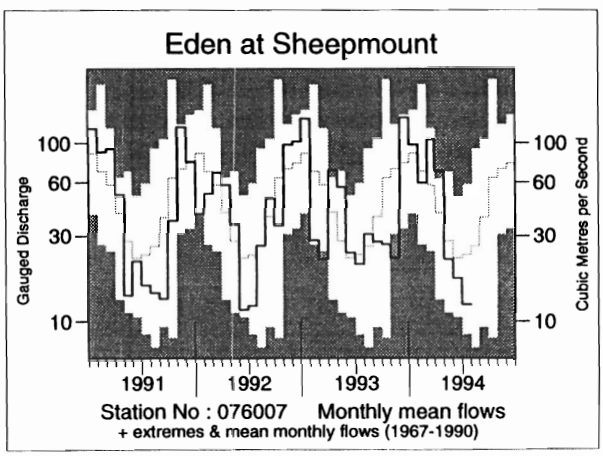

Great Stour at Horton
Gauged Discharge
Cubic Metres per Second
10.0
7.0
4.0
2.0
1.0
1991
1992
1993
1994
Station No : 040011 Monthly mean flows
+ extremes & mean monthly flows (1964-1990)


Itchen at Highbridge+Allbrook
Gauged Discharge
Cubic Metres per Second
10
8
6
4
1991
1992
1993
1994
Station No : 042010 Monthly mean flows
+ extremes & mean monthly flows (1958-1990)


Tone at Bishops Hull
Gauged Discharge
Cubic Metres per Second
10.0
5.0
1.0
0.5
1991
1992
1993
1994
Station No : 052005 Monthly mean flows
+ extremes & mean monthly flows (1961-1990)


Severn at Bewdley
Gauged Discharge
Cubic Metres per Second
300
100
60
30
10
1991
1992
1993
1994
Station No : 054001 Monthly mean flows
+ extremes & mean monthly flows (1921-1990)


Cynon at Abercynon
Gauged Discharge
Cubic Metres per Second
10.0
5.0
1.0
0.5
1991
1992
1993
1994
Station No : 057004 Monthly mean flows
+ extremes & mean monthly flows (1957-1990)


Eden at Sheepmount
Gauged Discharge
Cubic Metres per Second
100
60
30
10
1991
1992
1993
1994
Station No : 076007 Monthly mean flows
+ extremes & mean monthly flows (1967-1990)

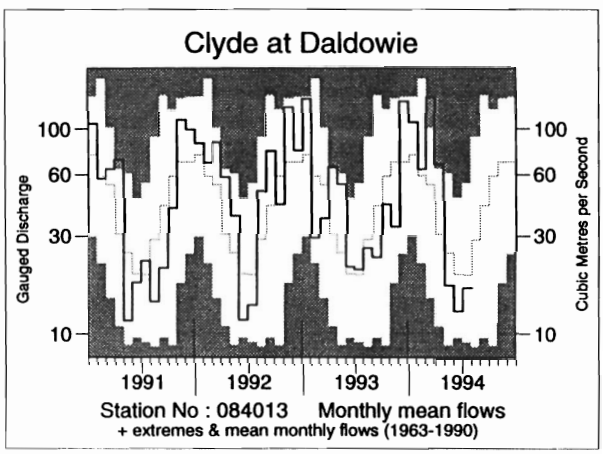

Clyde at Daldowie
Gauged Discharge
Cubic Metres per Second
100
60
30
10
1991
1992
1993
1994
Station No : 084013 Monthly mean flows
+ extremes & mean monthly flows (1963-1990)

TABLE 3 RUNOFF AS MM. AND AS A PERCENTAGE OF THE PERIOD OF RECORD AVERAGE WITH SELECTED PERIODS RANKED IN THE RECORD

River/ Station name	Mar 1994	Apr	May	Jun	Jul 1994		5/94 to 7/94		1/94 to 7/94		8/93 to 7/94		9/92 to 7/94	
	mm %LT	mm %LT	mm %LT	mm %LT	mm %LT	rank /yrs	mm %LT	rank /yrs	mm %LT	rank /yrs	mm %LT	rank /yrs	mm %LT	rank /yrs
Dee at Park	167 178	96 123	48 78	24 67	16 57	6 /22	88 71	7 /22	537 115	19 /22	899 113	17 /21	1714 110	16 /20
Tay at Ballathie	268 209	166 194	94 136	50 113	40 99	25 /42	184 119	33 /42	913 143	41 /42	1290 113	36 /41	2716 122	38 /40
Tweed at Boleside	165 205	81 151	33 79	19 71	17 64	10 /34	69 72	9 /34	544 131	33 /34	898 118	29 /33	1790 121	32 /32
Whiteadder Water at Hutton Castle	51 101	26 67	14 53	9 52	7 54	2 /25	29 52	3 /25	273 109	17 /25	486 123	19 /24	864 112	15 /24
South Tyne at Haydon Bridge	155 182	67 120	15 43	15 56	7 25	3 /31	37 42	2 /31	445 111	20 /31	818 107	20 /29	1586 106	20 /27
Wharfe at Flint Mill Weir	117 152	73 134	19 50	15 59	9 34	5 /39	42 48	4 /39	450 115	28 /39	797 110	27 /38	1441 103	21 /37
Derwent at Buttercrambe	37 90	24 76	17 71	11 67	9 63	7 /33	36 69	7 /33	222 106	20 /33	398 122	26 /32	669 105	18 /31
Trent at Colwick	45 113	45 141	21 84	13 69	12 75	7 /36	46 77	11 /36	260 117	29 /36	453 128	32 /35	789 114	24 /34
Lud at Louth	42 123	38 123	33 128	22 112	18 116	18 /26	73 120	18 /26	275 146	23 /26	407 157	24 /26	590 121	18 /25
Witham at Claypole Mill	29 112	23 114	15 99	8 87	7 103	22 /36	31 96	21 /36	173 133	29 /35	314 169	33 /35	522 144	33 /34
Bedford Ouse at Bedford	24 77	32 160	15 117	10 127	6 103	44 /62	32 116	41 /62	208 140	52 /62	350 159	55 /61	717 165	59 /60
Colne at Lexden	13 71	22 167	10 112	5 87	3 68	7 /35	17 95	20 /35	108 121	28 35	195 142	30 /34	344 130	29 /33
Lee at Feildes Weir (natr.)	19 98	30 203	18 138	14 152	10 123	84 /109	42 138	90 /109	158 149	95 /108	259 159	98 /107	446 141	98 /105
Thames at Kingston (natr.)	29 94	31 140	23 132	14 109	9 95	51 /112	46 116	79 /112	219 134	96 /112	333 136	97 /111	644 134	101 /110
Coln at Bibury	61 114	51 121	35 109	24 93	20 97	18 /31	80 100	18 /31	361 128	28 /31	489 124	27 /30	969 125	27 /29
Great Stour at Horton	26 78	43 166	29 140	18 120	14 98	16 /30	62 122	23 /29	236 130	25 /28	361 124	23 /27	613 108	15 /25
Itchen at Highbridge+Allbrook	63 123	58 126	52 124	39 114	32 106	26 /36	122 115	31 /36	388 129	35 /36	571 124	33 /35	1002 113	29 /34
Piddle at Baggs Mill	73 132	59 140	43 139	28 122	19 108	20 /31	91 125	26 /31	417 148	30 /30	612 151	29 /29	1036 131	25 /27
Exe at Thorverton	125 148	133 238	34 90	21 89	12 58	12 /39	67 82	17 /39	671 146	38 /38	1138 137	37 /38	1924 118	33 /37
Taw at Umberleigh	112 165	112 256	25 85	12 75	6 37	10 /36	42 68	12 /36	583 155	36 /36	1017 146	34 /35	1743 127	33 /34
Tone at Bishops Hull	55 97	77 201	34 128	19 110	12 78	14 /34	65 110	24 /34	431 141	32 /33	671 142	32 /33	1119 120	29 /32
Severn at Bewdley	65 141	67 213	16 68	10 59	7 50	7 /74	33 61	10 /74	336 128	68 /73	568 126	62 /73	979 111	52 /72
Teme at Knightsford Bridge	33 68	47 142	11 53	6 42	2 29	1 /25	19 46	3 /25	255 107	16 /24	436 120	22 /24	772 108	14 /23
Cynon at Abercynon	213 178	164 214	56 95	40 101	20 60	8 /36	116 87	18 /36	949 143	35 /36	1634 129	34 /34	3046 123	31 /32
Dee at New Inn	319 175	195 183	41 62	65 113	24 37	6 /26	130 67	5 /25	1121 126	24 /25	1945 108	19 /25	3536 101	14 /24
Eden at Sheepmount	122 173	79 168	26 80	20 79	14 55	5 /24	60 72	7 /24	438 115	19 /24	722 105	13 /22	1455 109	15 /20
Clyde at Daldowie	199 259	91 203	24 70	18 67	24 87	14 /31	65 74	7 /31	588 146	30 /31	954 121	27 /30	1915 125	29 /29
Carron at New Kelso	451 158	300 213	56 56	183 250	35 30	1 /16	275 93	9 /16	1475 117	13 /16	2151 84	3 /15	4913 97	6 /14
Ewe at Poolewe	326 163	264 190	119 120	124 170	66 78	8 /24	309 117	19 /24	1317 123	19 /24	1944 90	8 /23	4633 110	18 /22

Notes:
(i) Values based on gauged flow data unless flagged (natr.), when naturalised data have been used.
(ii) Values are ranked so that lowest runoff is rank 1.
(iii) %LT means percentage of long term average from the start of the record to 1992. For the long periods (at the right of this table), the end date for the long term is 1993.

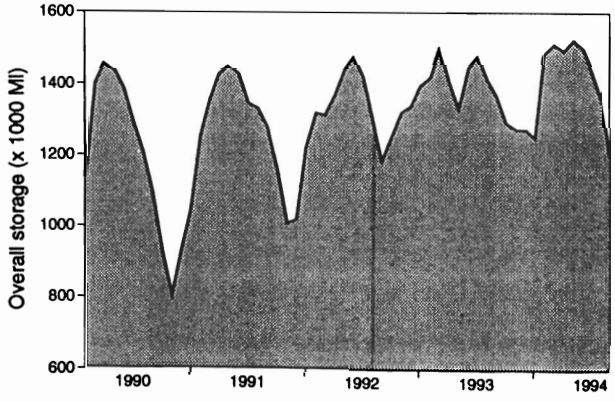
TABLE 4 START-MONTH RESERVOIR STORAGES UP TO AUGUST 1994

Area	Reservoir (R)/ Group (G)		Capacity• (Ml)	1994 Mar	Apr	May	June	July	Aug	1993 Aug
North West	N.Command Zone[1]	(G)	133375	93	100	97	85	73	59	66
	Vyrnwy	(R)	55146	100	100	94	87	79	66	81
Northumbria	Teesdale[2]	(G)	87936	96	100	99	83	72	54	72
	Kielder	(R)	199175*	91*	96*	93*	92*	93*	89*	90*
Severn-Trent	Clywedog	(R)	44922	98	99	96	93	93	77	94
	Derwent Valley[3]	(G)	39525	99	100	97	90	78	60	77
Yorkshire	Washburn[4]	(G)	22035	98	100	94	89	68	53	72
	Bradford supply[5]	(G)	41407	98	98	96	83	66	49	74
Anglian	Grafham	(R)	58707	98	91	96	96	94	88	96
	Rutland	(R)	130061	97	96	96	95	93	89	93
Thames	London[6]	(G)	207569	87	89	89	88	86	83	96
	Farmoor [7]	(G)	13843	99	98	98	98	95	98	98
Southern	Bewl	(R)	28170	92	100	100	100	98	92	85
	Ardingly	(R)	4685	100	100	100	100	100	100	90
Wessex	Clatworthy	(R)	5364	100	100	99	84	85	68	82
	Bristol W [8]	(G)	38666*	99*	99*	98*	94*	85*	71*	67*
South West	Colliford	(R)	28540	100	100	100	96	87	78	86
	Roadford	(R)	34500	97	100	97	92	87	79	81
	Wimbleball[9]	(R)	21320	100	100	99	99	92	77	83
	Stithians	(R)	5205	100	100	96	93	82	69	91
Welsh	Celyn + Brenig	(G)	131155	100	100	99	97	94	78	98
	Brianne	(R)	62140	100	100	100	96	90	81	97
	Big Five[10]	(G)	69762	99	100	97	93	89	70	86
	Elan Valley[11]	(G)	99106	100	100	99	95	91	77	96
Lothian	Edin./Mid Lothian	(G)	97639	94	99	98	93	84	79	89
	West Lothian	(G)	5613	96	99	100	91	77	64	89
	East Lothian	(G)	10206	99	98	99	95	86	76	92

• Live or usable capacity (unless indicated otherwise) * Gross storage/percentage of gross storage

1. Includes Haweswater, Thirlmere, Stocks and Barnacre.
2. Cow Green, Selset, Grassholme, Balderhead, Blackton and Hury.
3. Howden, Derwent and Ladybower.
4. Swinsty, Fewston, Thruscross and Eccup.
5. The Nidd/Barden group (Scar House, Angram, Upper Barden,Lower Barden and Chelker) plus Grimwith.
6. Lower Thames (includes Queen Mother, Wraysbury, Queen Mary, King George VI and Queen Elizabeth II) and Lee Valley (includes King George and William Girling) groups -pumped storages.
7. Farmoor 1 and 2 - pumped storages.
8. Blagdon, Chew Valley and others.
9. Shared between South West (river regulation for abstraction) and Wessex (direct supply).
10. Usk, Talybont, Llandegfedd (pumped stroage), Taf Fechan, Taf Fawr.
11. Claerwen, Caban Coch, Pen y Garreg and Craig Goch.

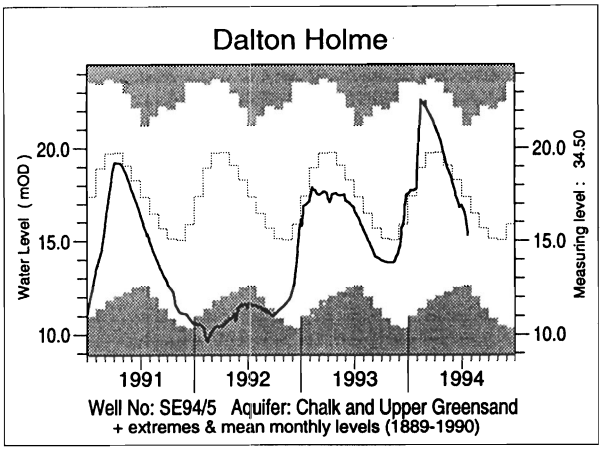
A GUIDE TO THE VARIATION IN OVERALL RESERVOIR STOCKS FOR ENGLAND AND WALES

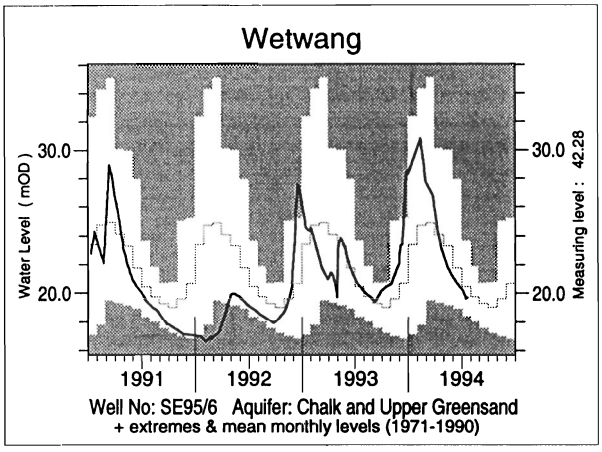


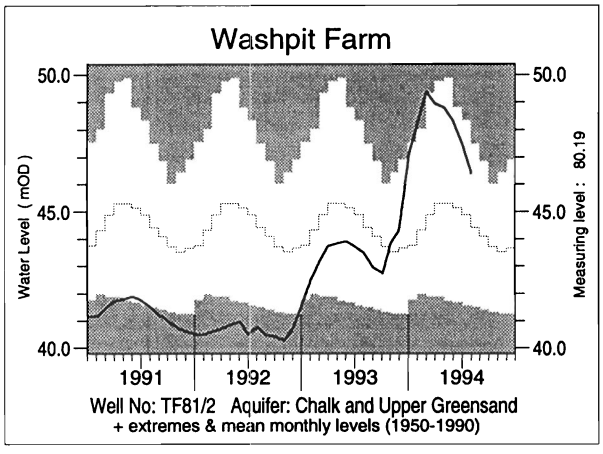
This plot is based on the reservoirs featured in Table 4 only.

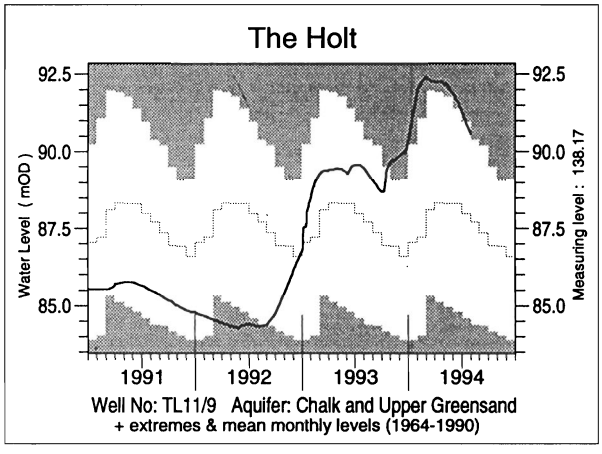
Note: Variations in storage depend on the balance between inputs (from catchment rainfall and any pumping) and outputs (to supply, compensation flow, HEP, amenity). There will be additional losses due to evaporation, especially in the summer months. Operational strategies for making the most efficient use of water stocks will further affect reservoir storages. Table 4 provides a link between the hydrological conditions described elsewhere in the report and the water resources situation.

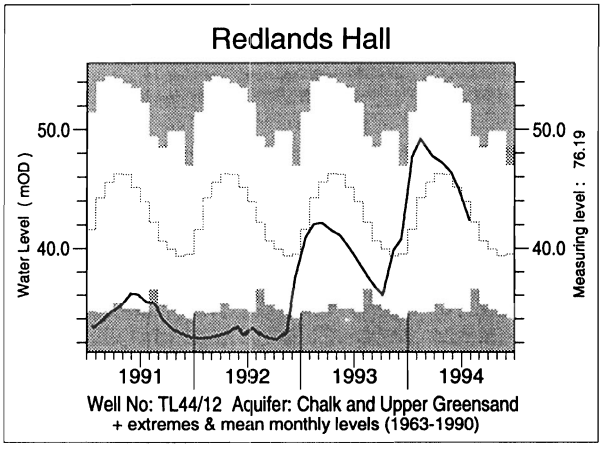
FIGURE 2 GROUNDWATER LEVEL HYDROGRAPHS

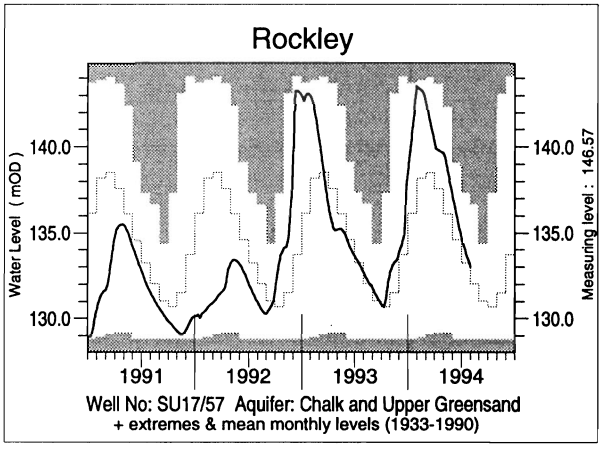


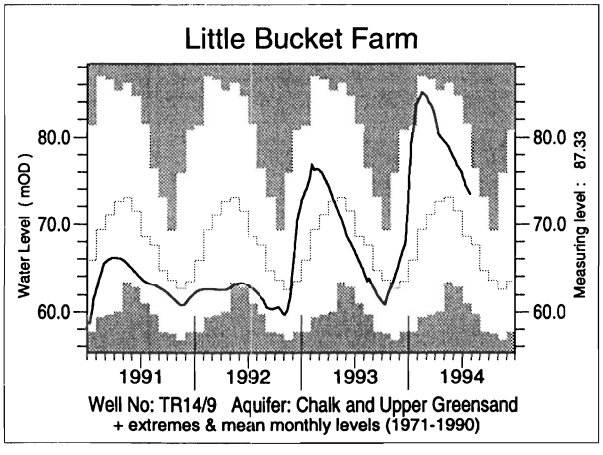


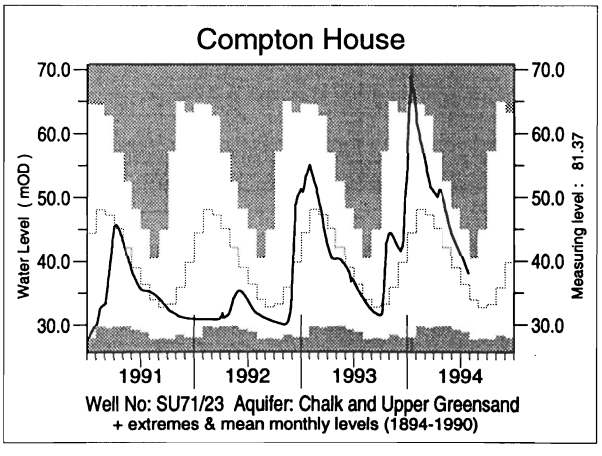


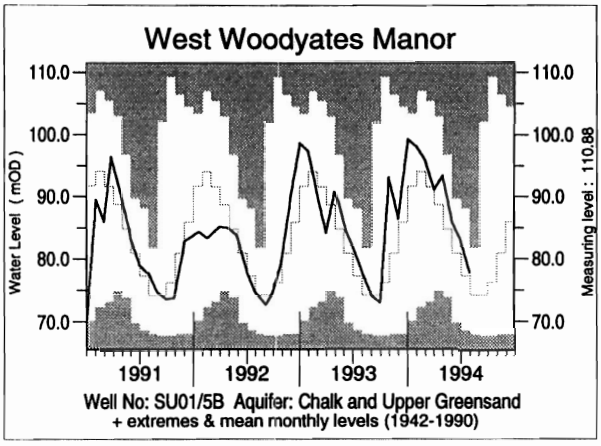


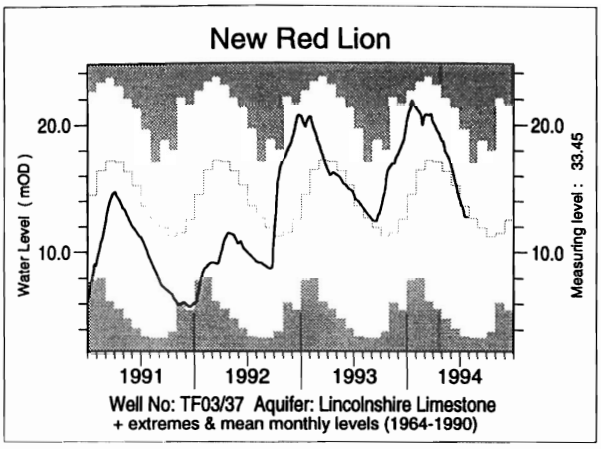


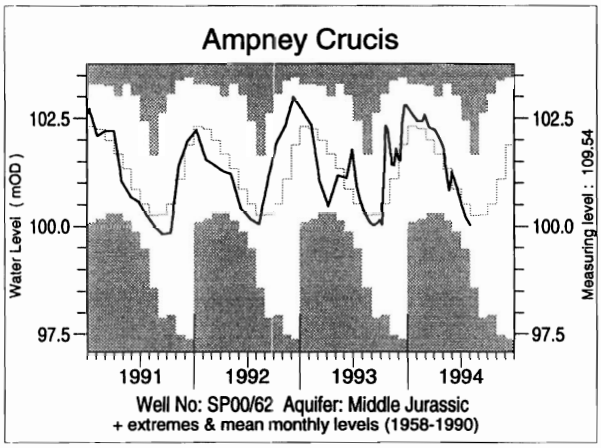


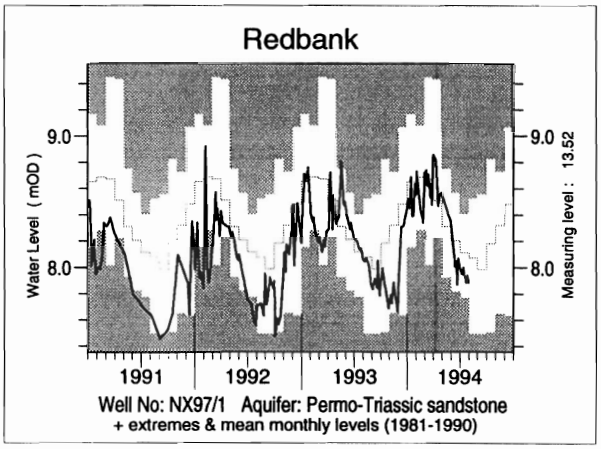


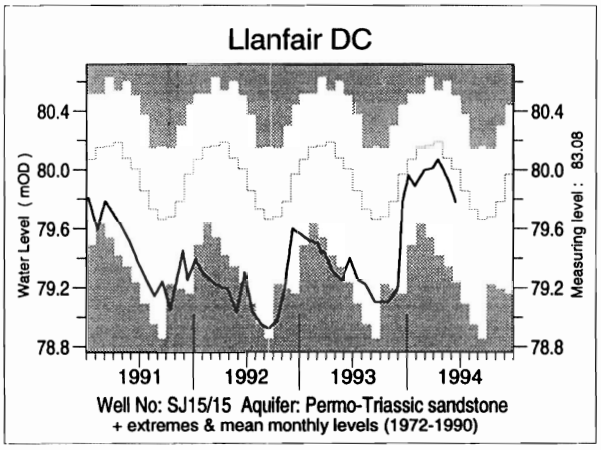


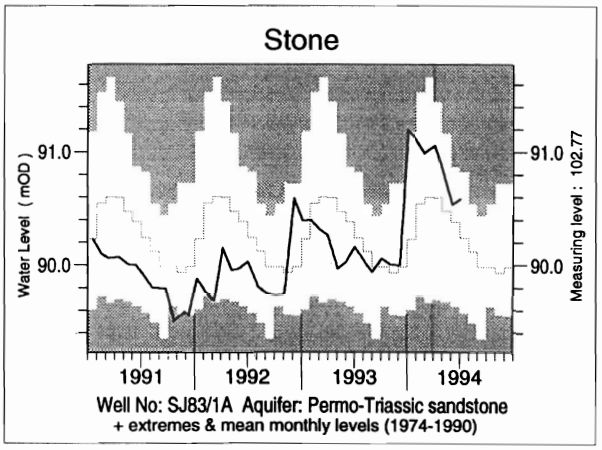

West Woodyates Manor
Water Level (mOD)
Measuring level : 110.88
110.0
100.0
90.0
80.0
70.0
1991
1992
1993
1994
Well No: SU01/5B Aquifer: Chalk and Upper Greensand
+ extremes & mean monthly levels (1942-1990)

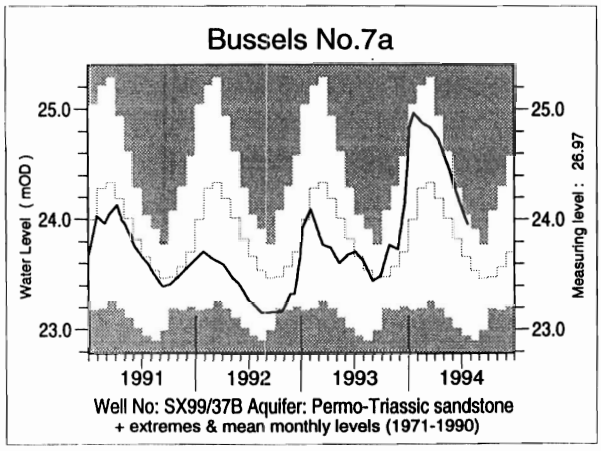

New Red Lion
Water Level (mOD)
Measuring level : 33.45
20.0
10.0
1991
1992
1993
1994
Well No: TF03/37 Aquifer: Lincolnshire Limestone
+ extremes & mean monthly levels (1964-1990)


Ampney Crucis
Water Level (mOD)
Measuring level : 109.54
102.5
100.0
97.5
1991
1992
1993
1994
Well No: SP00/62 Aquifer: Middle Jurassic
+ extremes & mean monthly levels (1958-1990)


Redbank
Water Level (mOD)
Measuring level : 13.52
9.0
8.0
1991
1992
1993
1994
Well No: NX97/1 Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1981-1990)


Llanfair DC
Water Level (mOD)
Measuring level : 83.08
80.4
80.0
79.6
79.2
78.8
1991
1992
1993
1994
Well No: SJ15/15 Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1972-1990)


Stone
Water Level (mOD)
Measuring level : 102.77
91.0
90.0
1991
1992
1993
1994
Well No: SJ83/1A Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1974-1990)


Bussels No.7a
Water Level (mOD)
Measuring level : 26.97
25.0
24.0
23.0
1991
1992
1993
1994
Well No: SX99/37B Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1971-1990)

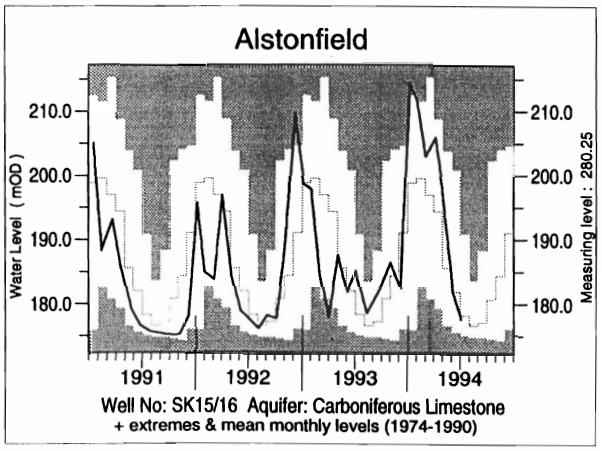

Alstonfield
Water Level (mOD)
Measuring level : 280.25
210.0
200.0
190.0
180.0
1991
1992
1993
1994
Well No: SK15/16 Aquifer: Carboniferous Limestone
+ extremes & mean monthly levels (1974-1990)

TABLE 5 A COMPARISON OF JULY GROUNDWATER LEVELS: 1993 AND 1994

Site	Aquifer	Records commence	Minimum July <1994	Average July <1994	Maximum July <1994	July 1993 day	July 1993 level	July/Aug 1994 day	July/Aug 1994 level
Dalton Holme	C & UGS	1889	11.51	17.36	21.17	30/07	15.65	22/07	15.29
Wetwang	C & UGS	1971	18.39	20.66	23.71	30/07	20.14	22/07	19.69
Washpit Farm	C & UGS	1950	40.51	44.76	48.37	05/07	43.70	02/08	46.43
The Holt	C & UGS	1964	84.40	88.04	90.99	25/07	89.54	01/08	90.59
Therfield Rectory	C & UGS	1883	dry <71.6	81.67	99.05	01/07	79.91	01/08	84.14
Redlands Hall	C & UGS	1964	33.28	42.99	52.30	09/07	39.08	28/07	42.39
Rockley	C & UGS	1933	dry <128.94	133.20	137.34	25/07	132.90	01/08	133.01
Little Bucket Farm	C & UGS	1971	60.97	68.46	81.50	29/07	64.73	29/07	73.40
Compton House	C & UGS	1984	28.75	35.69	45.10	28/07	34.46	28/07	38.00
Chilgrove House	C & UGS	1836	34.95	43.64	58.83	28/07	42.53	28/07	45.78
West Dean No.3	C & UGS	1940	1.06	1.50	2.02	29/07	1.53	29/07	1.72
Lime Kiln Way	C & UGS	1969	123.91	125.19	125.90	15/07	124.24	13/07	125.68
Ashton Farm	C & UGS	1974	64.21	66.81	69.77	28/07	66.02	31/07	66.87
West Woodyates Manor	C & UGS	1942	68.56	77.08	88.07	28/07	78.38	31/07	77.70
New Red Lion	LLst	1964	3.42	13.48	19.69	29/07	13.52	25/07	12.74
Ampney Crucis	Mid Jur	1958	99.48	100.53	102.42	25/07	100.59	01/08	100.03
Dunmurry (NI)	PTS	1985	27.18	27.86	28.36	31/07	27.24	20/07	27.48
Yew Tree Farm	PTS	1973	8.43	13.00	13.61	28/07	13.46	06/07	13.43
Llanfair D.C	PTS	1972	79.04	79.71	80.38	19/07	79.25	31/07	79.62
Morris Dancers	PTS	1969	31.90	32.50	33.62	16/07	31.90	11/07	32.35
Weeford Flats	PTS	1966	dry <88.61	90.07	91.58	02/07	89.01	04/08	89.86
Stone	PTS	1974	89.57	90.20	90.82	02/07	90.16	03/08	90.22
Skirwith	PTS	1978	129.96	130.30	130.73	28/07	130.23	04/08	129.96
Redbank	PTS	1981	7.55	8.04	8.41	31/07	8.05	31/07	7.88
Bussels No.7A	PTS	1972	22.94	23.67	24.04	06/07	23.71	21/07	23.95
Rushyford NE	MgLst	1967	65.19	72.56	76.55	31/07	75.64	21/07	76.38
Peggy Ellerton	MgLst	1968	31.30	34.20	36.96	07/07	31.63	25/07	33.45
Alstonfield	CLst	1974	174.90	178.94	190.77	02/07	185.06	04/08	176.31

groundwater levels are in metres above Ordnance Datum

C & UGS	Chalk and Upper Greensand	Mid Jur	Middle Jurassic limestones
LLst	Lincolnshire Limestone	MgLst	Magnesian Limestone
PTS	Permo-Triassic sandstones	CLst	Carboniferous Limestone

Note: Table 5 has been redesigned to include both monthly minimum and monthly maximum levels.

FIGURE 3 LOCATION MAP OF GAUGING STATIONS AND GROUNDWATER INDEX WELLS