Hydrological Summary for Great Britain

NOVEMBER 1994

Rainfall

November was dull and remarkably mild; the provisional 'Central England' temperature estimate for the month suggests that the previous warmest November (1881) in a series from 1659 has been eclipsed by a significant margin. Many parts of Great Britain registered their warmest November on record with night-time temperatures being exceptionally high. This was one consequence of a dominant south-westerly airflow and the heavily overcast conditions; total sunshine hours were the second lowest, for November, in the last 25 years over large parts of England. Rainfall continued in the episodic vein which has characterised much of the last four months. The very wet late-October weather continued into November culminating in notable frontal rainfall on the 9th and 13th. Thereafter, the succession of frontal systems generally became less vigorous and, over the final fortnight, precipitation was restricted mostly to light drizzle and fog drip in the English lowlands; 14-day rainfall totals of <3 mm were common. Notwithstanding the marked temporal contrast the monthly rainfall total for Great Britain was close to the 1961-90 average and regional totals were well within the normal range; western areas were mostly a little wetter than normal with below average rainfall typifying many low-lying eastern districts - some localities in East Anglia recorded only around half of the November mean. Nonetheless autumn rainfall totals exceed the average throughout most of England and Wales but are appreciably below average in most of Scotland. For a few pockets, mostly in north-eastern Britain, relatively dry conditions stretch back to early May but regional rainfall deficiencies in this timeframe moderated during November. Rainfall totals for 1994 thus far are close to, or above, average - notably so in the South-West. Accumulated rainfall totals are also well above average - for most regions - over the period from the beginning of autumn 1992.

River Flow

Generally the brisk recovery in river flows during the third week of October continued into November and minor spates were common over the initial fortnight. With catchments saturated from around the 8th, minor flooding was reported from North Wales and northern England over the following five days and bankfull flows were widespread on the 13/14th. Subsequently recessions became established in most areas, some were sustained into December but, boosted by the impact of the late-October rainfall, November runoff totals were generally above average, notably so in south-western Britain. Exceptions could be found in north-western Scotland and in impervious catchments close to the east coast. The Leven (Northumbria) and Whiteadder for example, recorded less than 80% of their November mean - more significantly they registered, respectively, their ninth and eighth successive month below average but accumulated totals are greatly above those registered in 1989 and 1990. From the late spring below average rainfall characterises many permeable English lowland catchments but healthy baseflow contributions has maintained late summer and autumn flows near to the seasonal average. A few such catchments have established record runoff accumulations in the two-year timeframes and, generally long term runoff totals are well above average.

Groundwater

In groundwater terms, November is often a transitional month with recoveries gathering momentum in western aquifers and the seasonal recessions close to termination in the deeper Chalk wells in eastern England. November 1994 conformed to this pattern although the monthly recording cycle in some areas undoubtedly masked significant within-month variability. In the Chalk, levels increased steeply at West Woodyates Manor and are rising at, for example, Rockley and Compton but in Norfolk and the eastern Chilterns, where levels have been exceptionally high over the last year, the water-table continued a gentle decline in November. In the more responsive Great Oolite a brisk recovery has taken place and appreciable upturns characterise most of the Permo-Triassic outcrops also. Levels in the great majority of index wells are reasonably close to the late autumn average and soils in the majority of outcrop areas are at, or close to, saturation. Given rainfall within the normal range, a full winter's recharge season may therefore be anticipated.

General

November was a remarkable month climatologically but unexceptional in hydrological terms. Water resources are generally healthy and the outlook for 1995 is encouraging.

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

		Nov 1993	Dec	Jan 1994	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
England and Wales	mm	74	167	123	82	96	74	61	35	46	70	105	104	93
	%	82	178	140	130	133	123	95	54	74	92	136	122	103
NRA REGIONS														
North West	mm	65	247	159	71	165	107	31	73	67	104	108	124	126
	%	53	199	131	91	174	151	41	90	79	97	94	97	102
Northumbrian	mm	63	136	107	71	84	63	27	39	39	81	76	71	98
	%	73	168	127	120	120	113	44	65	60	100	104	93	114
Severn Trent	mm	67	139	95	71	75	57	55	23	43	53	127	67	73
	%	94	181	136	131	123	104	93	39	81	79	198	105	102
Yorkshire	mm	63	136	116	68	71	61	45	28	52	58	100	74	89
	%	79	164	147	117	104	103	75	47	88	78	147	102	111
Anglian	mm	70	85	73	45	53	51	51	25	41	56	90	67	34
	%	121	155	146	122	113	111	106	49	84	102	184	131	59
Thames	mm	47	105	97	59	51	57	80	25	21	50	75	87	51
	%	72	150	152	131	91	114	143	45	43	86	127	140	78
Southern	mm	63	154	124	64	57	77	91	39	29	69	91	113	58
	%	74	188	155	119	90	145	169	72	60	121	132	142	68
Wessex	mm	63	167	126	100	80	62	90	24	34	68	99	107	94
	%	76	180	145	154	114	117	148	42	65	103	138	135	114
South West	mm	107	263	186	174	125	94	100	32	48	101	132	132	130
	%	86	189	135	172	126	136	139	46	70	120	142	113	104
Welsh	mm	113	275	182	131	184	116	68	57	64	88	132	140	134
	%	80	180	127	135	172	145	83	72	83	87	115	102	94
Scotland	mm	76	234	215	96	250	133	30	110	66	101	103	115	165
	%	50	155	142	94	200	175	35	128	70	86	73	74	109
RIVER PURIFICATION BOARDS														
Highland	mm	67	275	248	74	341	185	39	148	62	112	153	119	186
	%	33	140	132	58	210	203	42	151	58	88	89	60	92
North East	mm	44	115	131	110	106	77	16	56	39	48	92	81	96
	%	44	124	132	169	136	128	23	85	53	55	106	84	97
Tay	mm	77	175	206	117	219	96	22	89	47	81	56	127	151
	%	64	138	143	123	201	155	27	122	61	86	49	98	125
Forth	mm	73	189	161	88	210	84	21	75	55	78	57	99	122
	%	65	172	136	111	223	142	28	109	73	83	52	86	109
Tweed	mm	55	176	141	86	124	72	20	52	42	70	58	74	106
	%	59	189	141	128	157	126	28	80	58	80	65	78	114
Solway	mm	97	269	204	116	195	124	28	79	102	121	77	132	178
	%	67	182	131	115	167	161	33	94	113	102	54	84	124
Clyde	mm	114	306	268	110	301	149	38	141	99	143	98	138	220
	%	63	171	142	93	205	177	42	152	91	107	55	72	122

Note: The monthly rainfall figures for the NRA regions for October and November 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 October and November 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

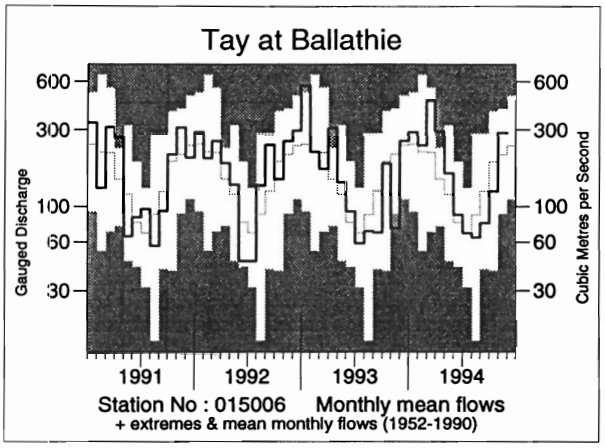
		Sep94-Nov94		May94-Nov94		Dec93-Nov94		Sep92-Nov94	
		Est Return Period, years		Est Return Period, years		Est Return Period, years		Est Return Period, years	
England and Wales	mm	301		513		1055		2268	
	% LTA	119	2-5	99	2-5	118	10-15	111	5-10
NRA REGIONS									
North West	mm	357		632		1381		2820	
	% LTA	98	2-5	89	2-5	115	5-10	102	2-5
Northumbria	mm	245		431		892		2068	
	% LTA	104	2-5	86	2-5	105	2-5	107	2-5
Severn Trent	mm	267		441		878		1894	
	% LTA	134	5-10	101	2-5	116	5-10	111	5-10
Yorkshire	mm	263		446		898		2002	
	% LTA	119	2-5	94	2-5	109	2-5	107	2-5
Anglian	mm	191		364		671		1597	
	% LTA	121	2-5	101	2-5	113	5-10	118	25-40
Thames	mm	213		389		758		1766	
	% LTA	114	2-5	96	2-5	110	2-5	113	5-10
Southern	mm	262		490		966		2092	
	% LTA	112	2-5	110	2-5	124	10-20	117	10-20
Wessex	mm	300		516		1051		2223	
	% LTA	128	5-10	110	2-5	125	15-25	116	10-20
South West	mm	393		674		1516		3166	
	% LTA	118	2-5	107	2-5	129	30-45	118	20-35
Welsh	mm	406		683		1571		3241	
	% LTA	103	2-5	93	2-5	120	10-15	107	2-5
Scotland	mm	383		690		1618		3543	
	% LTA	85	2-5	83	5-10	113	5-10	107	5-10
RIVER PURIFICATION BOARDS									
Highland	mm	458		819		1942		4247	
	% LTA	80	5-10	82	5-10	110	5-10	104	2-5
North East	mm	269		428		967		2290	
	% LTA	95	2-5	74	20-30	99	2-5	103	2-5
Tay	mm	334		573		1386		3153	
	% LTA	92	2-5	83	5-10	113	5-10	112	5-15
Forth	mm	278		507		1239		2774	
	% LTA	82	2-5	78	2-5	112	5-10	109	5-10
Tweed	mm	238		422		1021		2363	
	% LTA	86	2-5	74	15-25	105	2-5	107	2-5
Solway	mm	387		717		1625		3387	
	% LTA	87	2-5	87	2-5	114	5-10	103	2-5
Clyde	mm	456		877		2011		4190	
	% LTA	83	2-5	90	2-5	119	10-20	106	2-5

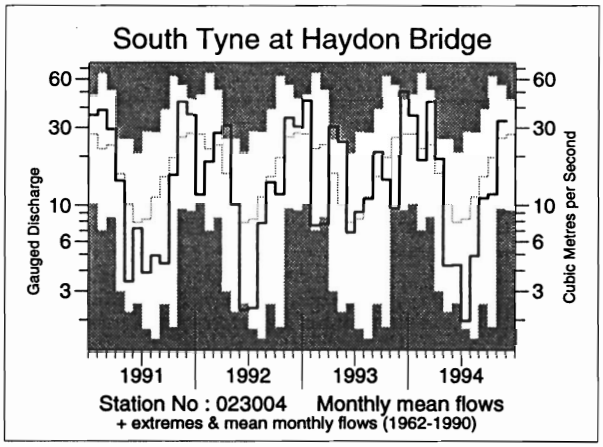
LTA refers to the period 1961-90.

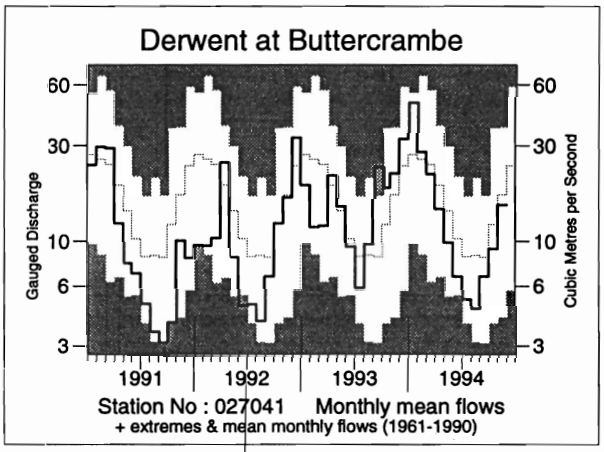
Return period assessments are based on tables provided by the Meteorological Office*. The tables reflect rainfall totals over the period 1911-70 only and the estimate assumes a sensibly stable climate. They assume a start in a specified month; return periods for a start in any month may be expected to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

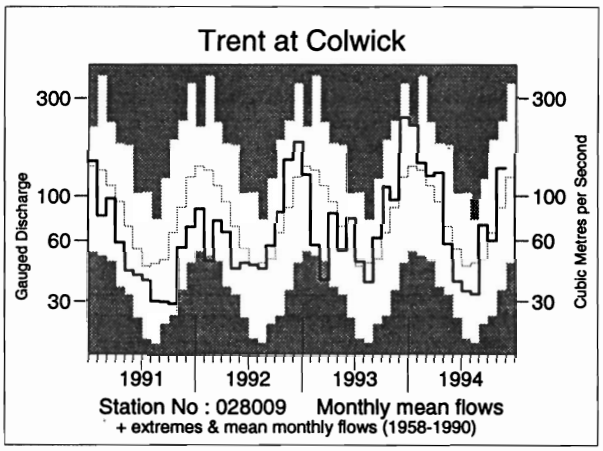
* Tabony, R.C., 1977, The Variability of long duration rainfall over Great Britain, Scientific Paper No. 37, Meteorological Office.

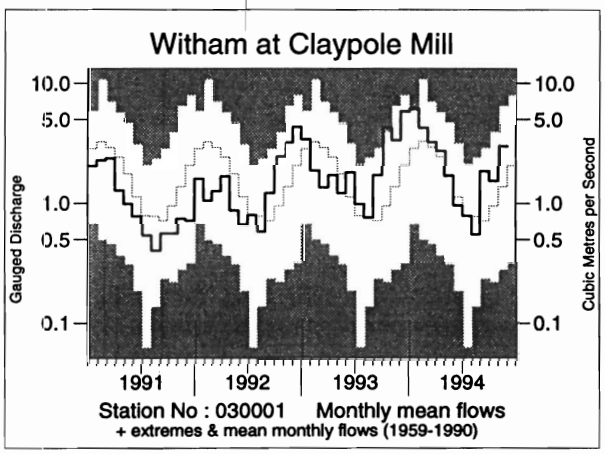
FIGURE 1 MONTHLY RIVER FLOW HYDROGRAPHS

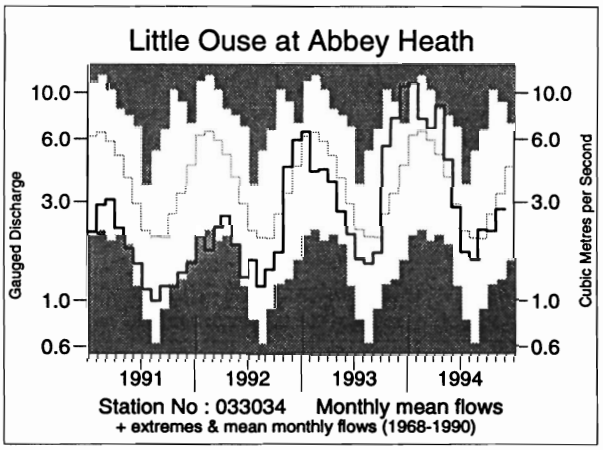


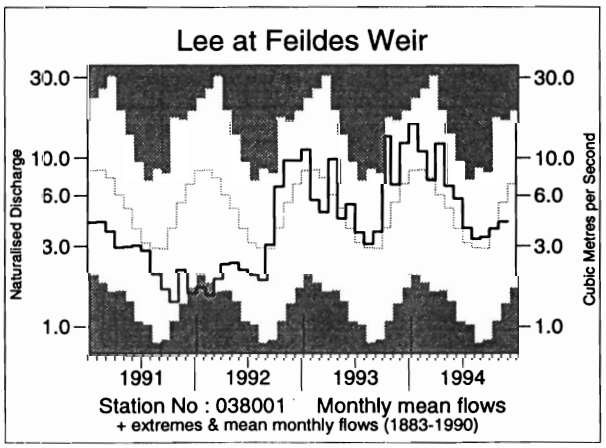


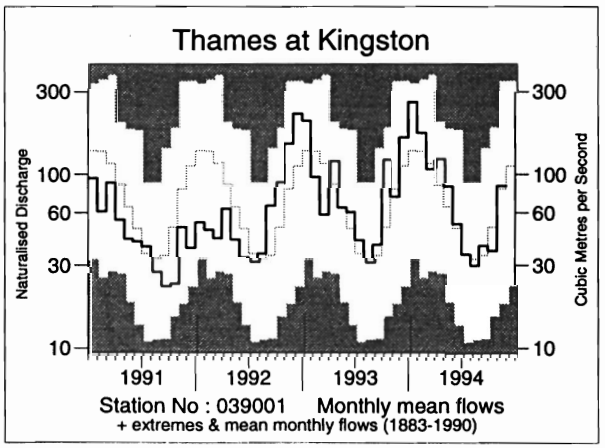


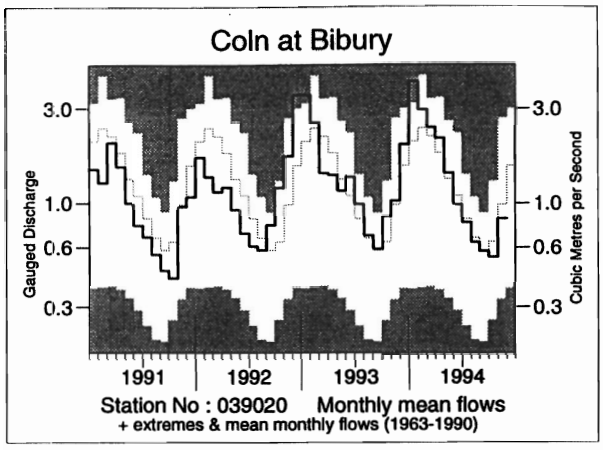


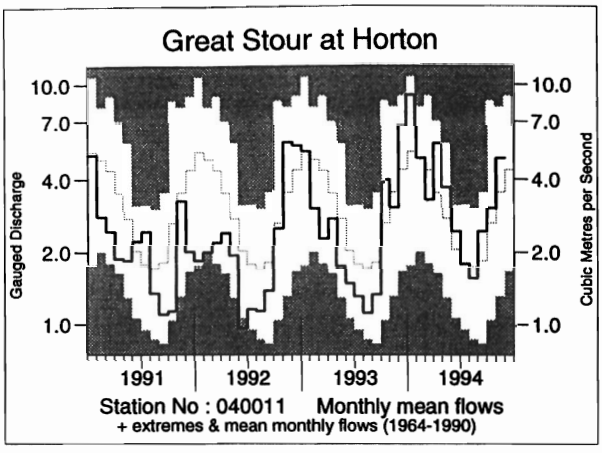


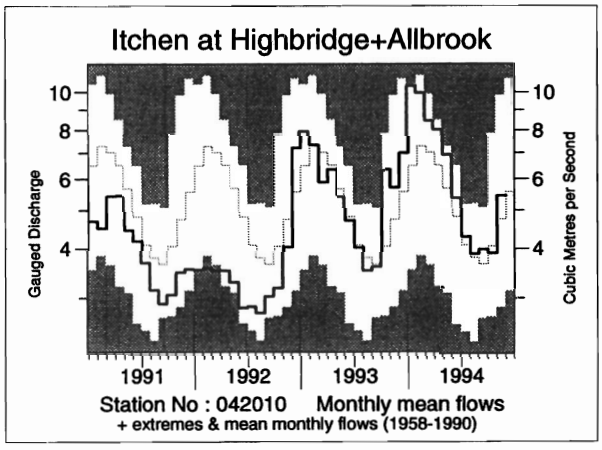


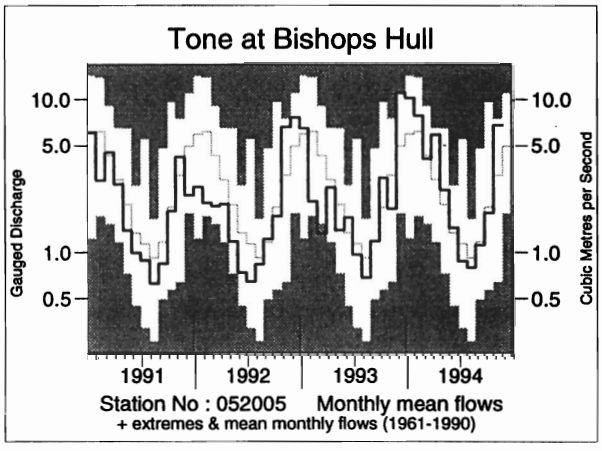


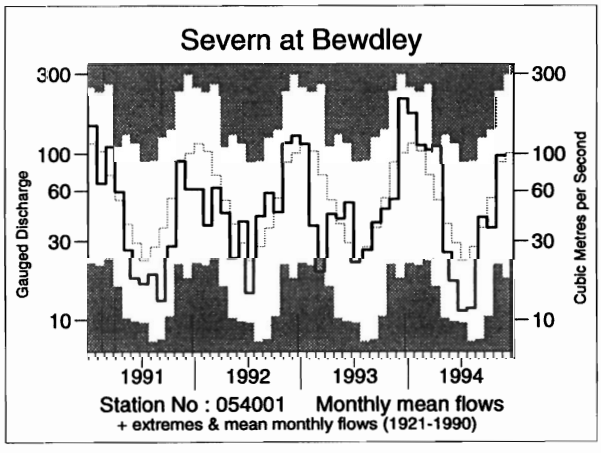


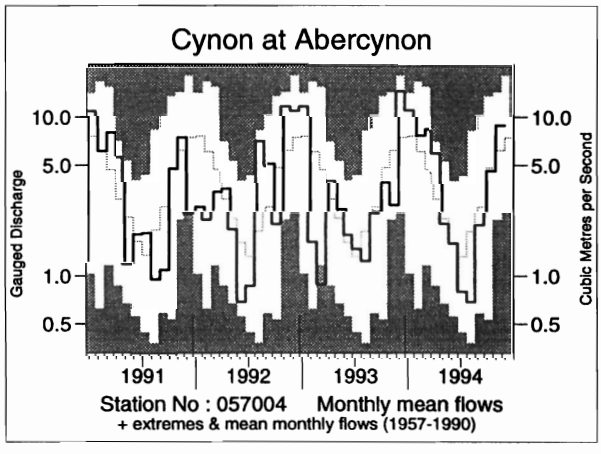

Coln at Bibury
Gauged Discharge
Cubic Metres per Second
3.0
1.0
0.6
0.3
1991
1992
1993
1994
Station No : 039020 Monthly mean flows
+ extremes & mean monthly flows (1963-1990)

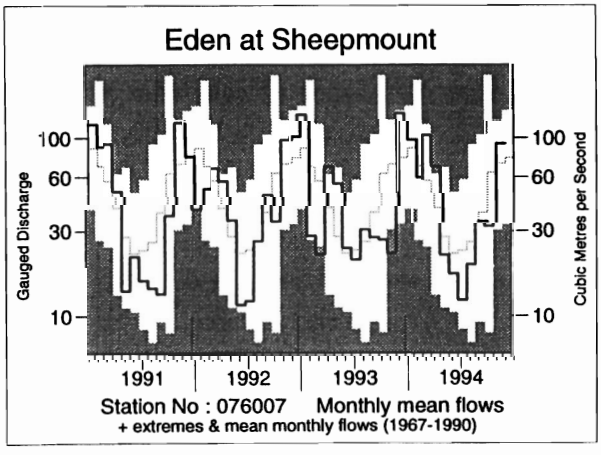

Great Stour at Horton
Gauged Discharge
Cubic Metres per Second
10.0
7.0
4.0
2.0
1.0
1991
1992
1993
1994
Station No : 040011 Monthly mean flows
+ extremes & mean monthly flows (1964-1990)


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)

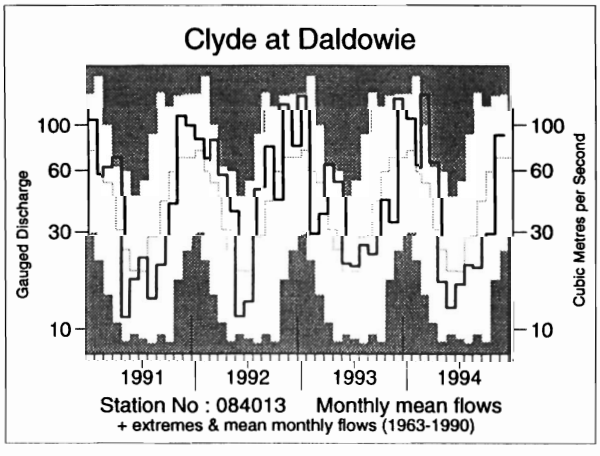

Clyde at Daldowie
Gauged Discharge
Cubic Metres per Second
100
60
30
10
1991
1992
1993
1994
Station No : 084013 Monthly mean flows
+ extremes & mean monthly flows (1963-1990)

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	Jul	Aug	Sept	Oct	Nov 1994		9/94 to 11/94		5/94 to 11/94		1/94 to 11/94		9/92 to 11/94	
	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	16 57	12 38	29 70	41 52	86 112	17 /23	155 78	7 /22	256 72	4 /22	705 101	11 /22	1882 105	12 /20
Tay at Ballathie	40 99	37 72	45 63	72 65	163 135	34 /43	280 93	17 /42	501 99	21 /42	1230 124	39 /42	3033 118	37 /40
Tweed at Boleside	16 61	21 55	25 49	33 46	114 130	25 /34	172 83	10 /34	261 77	7 /34	736 111	25 /34	1982 115	29 /32
Whiteadder Water at Hutton Castle	7 54	6 43	6 41	8 28	29 78	11 /26	43 54	5 /26	79 52	4 /25	323 94	11 /25	914 106	14 /24
South Tyne at Haydon Bridge	7 25	17 45	38 76	41 60	114 123	22 /33	194 91	11 /31	247 73	5 /31	656 100	14 /31	1797 103	17 /27
Wharfe at Flint Mill Weir	9 34	20 51	44 99	48 76	113 141	31 /40	204 108	27 /39	266 85	10 /39	674 109	26 /39	1662 102	21 /37
Derwent at Buttercrambe	9 63	8 56	11 82	15 77	25 90	17 /34	51 83	13 /33	95 74	6 /33	281 99	17 /33	729 102	18 /31
Trent at Colwick	12 75	12 71	25 148	22 92	47 155	33 /37	94 132	27 /36	151 103	21 /36	366 118	29 /36	894 115	28 /34
Lud at Louth	17 113	13 101	13 122	12 105	14 101	20 /27	39 104	21 /27	125 116	16 /26	327 139	22 /26	642 120	18 /25
Witham at Claypole Mill	7 102	5 73	16 257	14 157	26 212	32 /36	56 189	30 /36	91 134	30 /36	234 140	33 /35	583 147	33 /34
Little Ouse at Abbey Heath	7 81	6 80	8 114	8 87	10 85	15 /27	27 90	17 /27	68 97	12 /27	194 127	22 /26	439 121	22 /25
Colne at Lexden	3 68	3 70	4 101	7 77	8 63	20 /36	19 72	18 /35	39 81	13 /35	129 109	25 /35	366 125	30 /33
Lee at Feildes Weir (natr.)	10 123	9 114	8 117	10 99	10 77	56 /110	29 93	63 /109	79 115	76 /109	195 135	93 /108	483 136	97 /105
Thames at Kingston (natr.)	9 98	8 92	10 113	10 73	23 104	71 /112	42 96	68 /112	96 104	64 /112	269 125	89 /112	694 130	100 /110
Coln at Bibury	20 97	16 96	14 98	13 82	20 83	15 /32	48 88	14 /31	143 95	14 /31	425 120	27 /31	1033 122	26 /29
Great Stour at Horton	14 98	12 92	18 136	24 118	37 136	23 /31	79 127	24 /30	153 122	24 /29	326 127	24 /28	704 110	16 /25
Itchen at Highbridge+Allbrook	32 106	29 104	29 110	29 97	39 116	28 /37	97 108	27 /36	248 111	29 /36	513 123	35 /36	1137 113	29 /34
Piddle at Baggs Mill	19 108	16 102	16 104	19 94	48 168	27 /32	83 127	25 /31	190 124	25 /31	516 142	30 /30	1135 130	26 /27
Exe at Thorverton	12 58	11 37	43 111	81 110	165 167	34 /39	289 136	31 /39	366 114	29 /39	982 141	38 /38	2250 121	35 /37
Taw at Umberleigh	6 37	5 26	32 133	65 106	143 153	30 /37	239 133	27 /36	286 110	24 /36	827 144	35 /36	1987 127	34 /34
Tone at Bishops Hull	12 78	11 88	15 96	24 92	89 205	33 /34	127 148	30 /34	203 129	28 /34	569 141	32 /33	1257 122	29 /32
Severn at Bewdley	7 50	7 42	25 116	22 68	58 108	47 /74	106 98	38 /74	146 81	25 /74	449 116	57 /73	1091 108	45 /72
Teme at Knightsford Bridge	2 29	2 22	17 195	11 57	47 143	19 /25	75 121	17 /25	96 86	8 /25	332 108	15 /24	849 108	14 /23
Cynon at Abercynon	20 60	18 34	52 78	116 97	218 139	28 /37	386 112	20 /35	520 98	19 /35	1341 126	31 /35	3337 117	26 /31
Dee at New Inn	24 37	51 55	126 96	158 81	219 89	12 /26	503 90	12 /26	683 80	7 /25	1675 108	16 /25	4090 99	11 /24
Eden at Sheepmount	14 55	23 76	39 91	38 52	105 123	15 /25	181 97	12 /24	264 88	9 /24	642 108	16 /24	1659 108	14 /20
Clyde at Daldowie	24 87	29 72	27 47	41 51	122 123	21 /32	190 82	11 /31	285 79	7 /31	808 120	29 /31	2134 118	28 /29
Carron at New Kelso	35 30	80 47	186 68	129 49	229 76	9 /16	544 70	2 /16	899 73	2 /16	2099 95	9 /16	5541 93	5 /14
Ewe at Poolewe	66 78	58 52	132 67	217 98	214 79	11 /25	563 85	5 /24	931 90	9 /24	1939 105	19 /24	5255 105	15 /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.

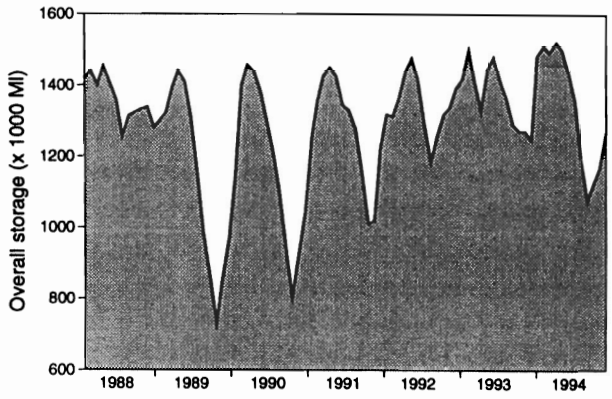
TABLE 4 START-MONTH RESERVOIR STORAGES UP TO DECEMBER 1994

Area	Reservoir (R)/ Group (G)		Capacity• (Ml)	1994 July	Aug	Sept	Oct	Nov	Dec	1993 Dec
North West	N.Command Zone[1]	(G)	133375	73	59	52	55	50	67	44
	Vyrnwy	(R)	55146	79	66	61	69	65	83	64
Northumbria	Teesdale[2]	(G)	87936	72	54	46	51	53	N/A	69
	Kielder	(R)	199175*	93*	89*	92*	89*	90*	91*	80*
Severn-Trent	Clywedog	(R)	44922	93	77	61	70	82	83	83
	Derwent Valley[3]	(G)	39525	78	60	43	53	64	89	79
Yorkshire	Washburn[4]	(G)	22035	68	53	40	42	52	73	59
	Bradford supply[5]	(G)	41407	66	49	38	48	57	74	76
Anglian	Grafham	(R)	58707	94	88	83	88	89	95	93
	Rutland	(R)	130061	93	89	86	87	86	93	88
Thames	London[6]	(G)	207569	86	83	77	83	85	89	88
	Farmoor [7]	(G)	13843	95	98	96	97	99	96	99
Southern	Bewl	(R)	28170	98	92	88	86	83	85	82
	Ardingly	(R)	4685	100	93	85	82	80	90	100
Wessex	Clatworthy	(R)	5364	85	68	54	48	53	100	68
	Bristol W [8]	(G)	38666*	85*	71*	61*	55*	52*	71*	60*
South West	Colliford	(R)	28540	87	78	68	69	70	75	88
	Roadford[9]	(R)	34500	87	79	67	65	66	69	78
	Wimbleball[10]	(R)	21320	92	77	60	57	64	80	82
	Stithians	(R)	5205	82	69	57	50	50	66	100
Welsh	Celyn + Brenig	(G)	131155	94	78	66	71	75	86	84
	Brianne	(R)	62140	90	81	72	71	83	99	95
	Big Five[11]	(G)	69762	89	70	58	62	66	83	84
	Elan Valley[12]	(G)	99106	91	77	62	67	83	99	99
Lothian	Edin./Mid Lothian	(G)	97639	84	79	73	71	69	85	78
	West Lothian	(G)	5613	77	64	52	45	38	66	100
	East Lothian	(G)	10206	86	76	66	56	57	70	87

• 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 Hurynn.
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. Roadford began filling in November 1989.
10. Shared between South West (river regulation for abstraction) and Wessex (direct supply).
11. Usk, Talybont, Llandegfedd (pumped stroage), Taf Fechan, Taf Fawr.
12. Claerwen, Caban Coch, Pen y Garreg and Craig Goch.

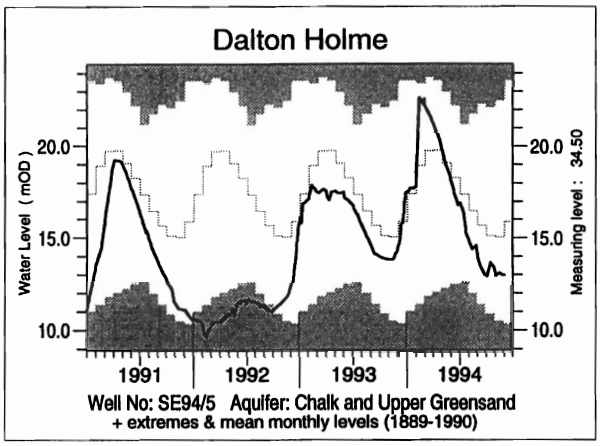
A GUIDE TO THE VARIATION IN OVERALL RESERVOIR STOCKS FOR ENGLAND AND WALES

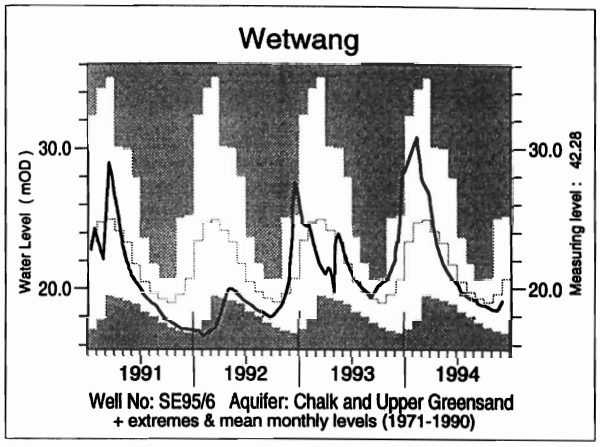


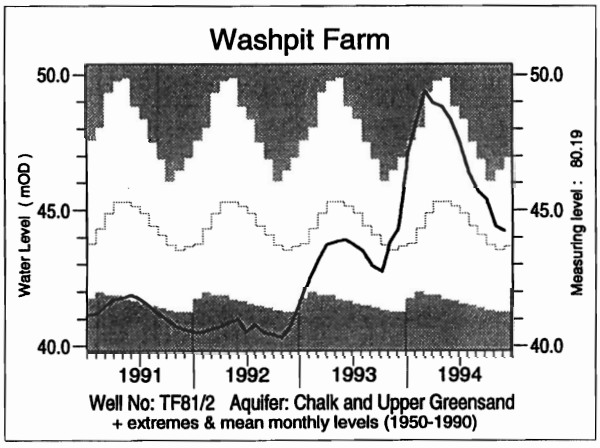
This plot is based on the reservoirs featured in Table 4 only.

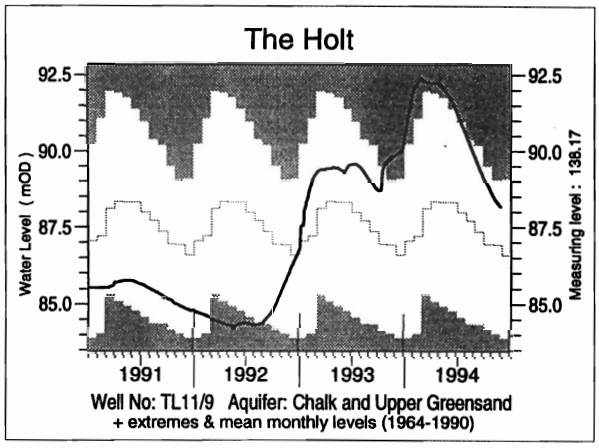
Note: Variations in storage depend on the balance between inputs (from catchment rainfall and any pumping) and outputs (to supply, compensation flow, HEP, amenity). There will be additional losses due to evaporation, especially in the summer months. Operational strategies for making the most efficient 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.
Teesdale capacities were unavailable at the beginning of this month. The reservoir plot reflects the incomplete figures.

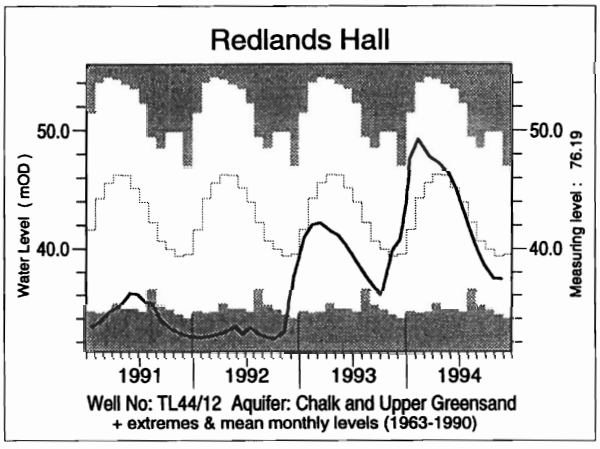
FIGURE 2 GROUNDWATER LEVEL HYDROGRAPHS

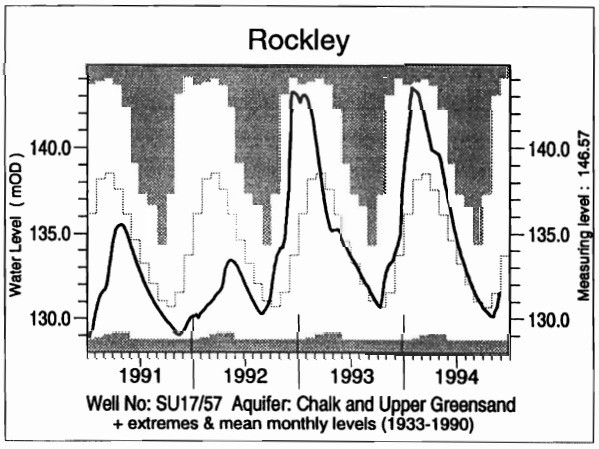


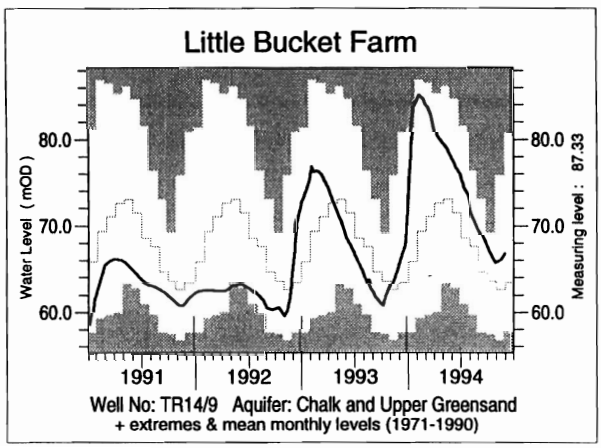


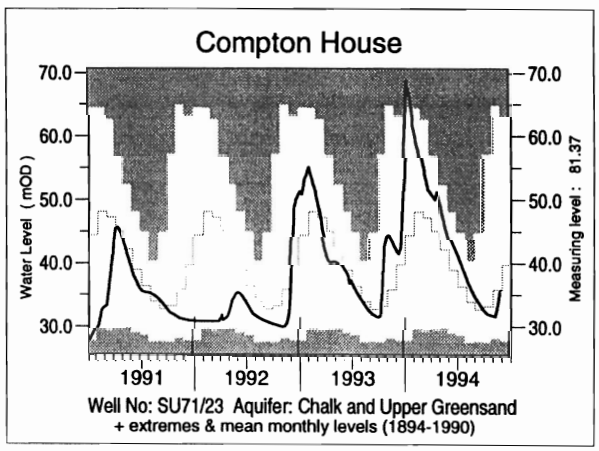


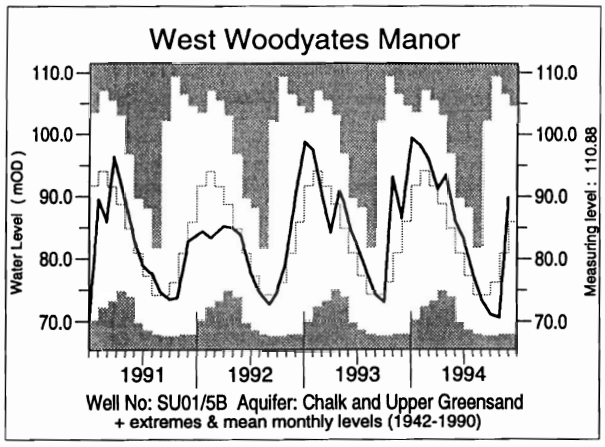


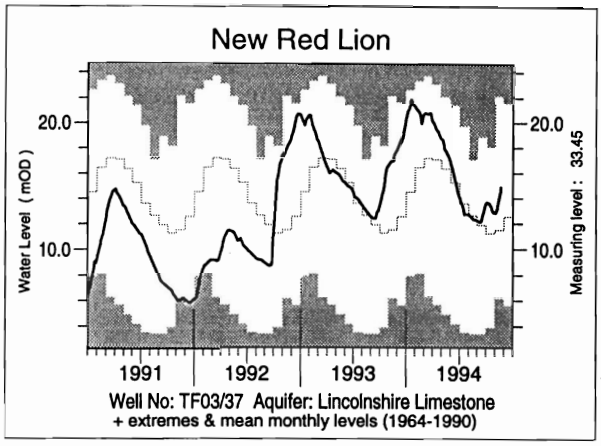


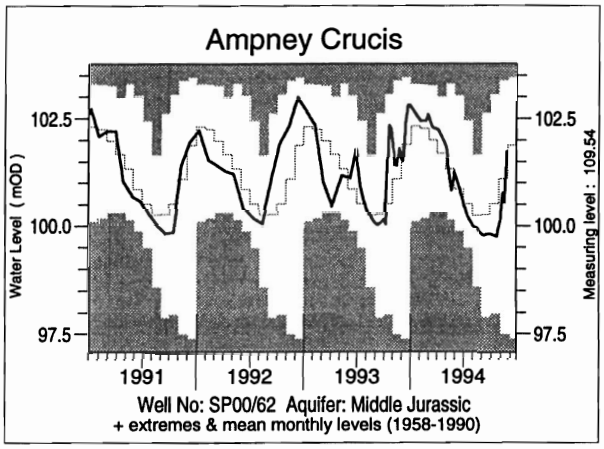


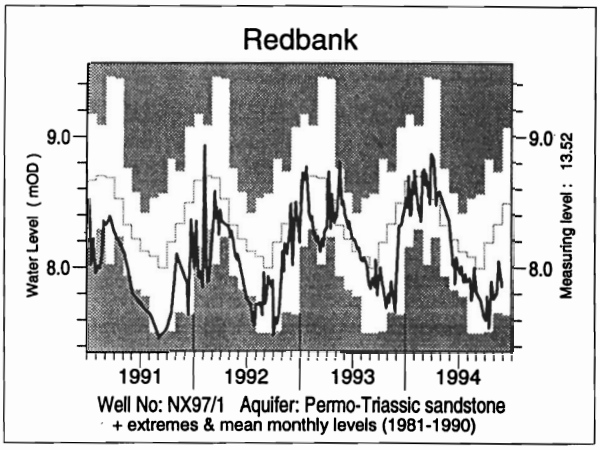


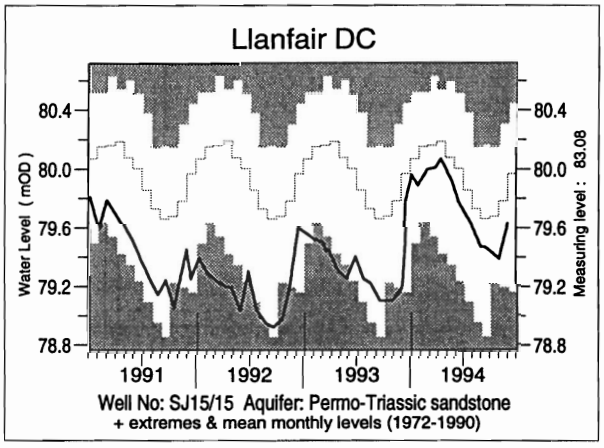


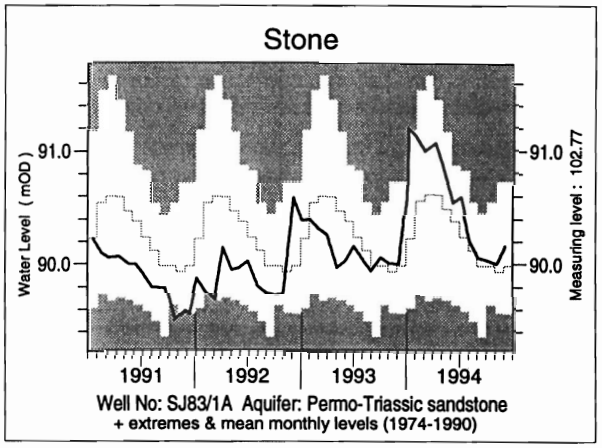

West Woodyates Manor
Water Level (mOD)
110.0
100.0
90.0
80.0
70.0
Measuring level : 110.88
1991
1992
1993
1994
Well No: SU01/5B Aquifer: Chalk and Upper Greensand
+ extremes & mean monthly levels (1942-1990)

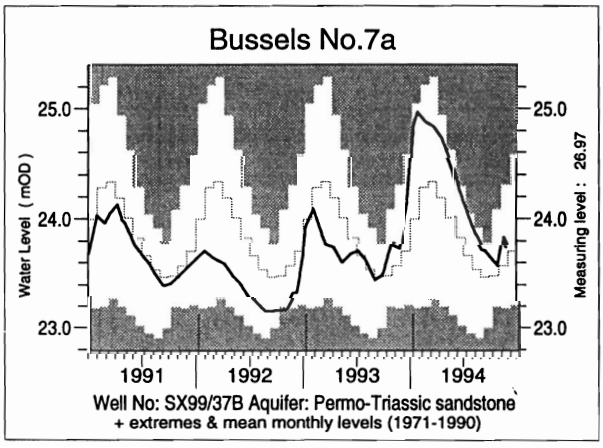

New Red Lion
Water Level (mOD)
20.0
10.0
Measuring level : 33.45
1991
1992
1993
1994
Well No: TF03/37 Aquifer: Lincolnshire Limestone
+ extremes & mean monthly levels (1964-1990)


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


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


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


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


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

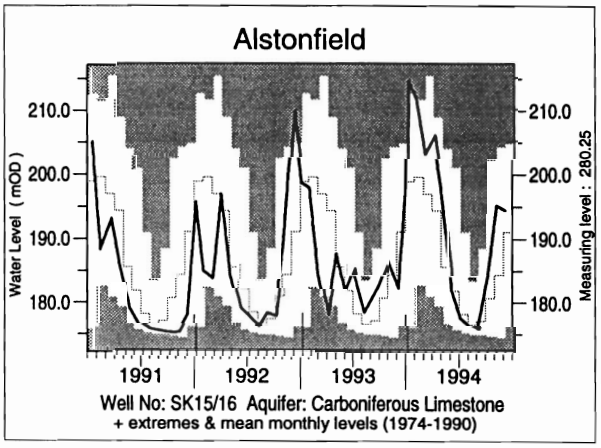

Alstonfield
Water Level (mOD)
210.0
200.0
190.0
180.0
Measuring level : 280.25
1991
1992
1993
1994
Well No: SK15/16 Aquifer: Carboniferous Limestone
+ extremes & mean monthly levels (1974-1990)

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

Site	Aquifer	Records commence	Minimum Nov	Average Nov	Maximum Nov	November 1993		Nov/Dec 1994	
			<1994	<1994	<1994	day	level	day	level
Dalton Holme	C & UGS	1889	10.49	14.96	22.53	30/11	14.51	01/12	12.6
Wetwang	C & UGS	1971	17.01	19.84	25.11	30/11	20.62	01/12	19.11
Washpit Farm	C & UGS	1950	40.30	43.24	46.47	01/11	43.80	01/12	44.23
The Holt	C & UGS	1964	84.04	86.97	89.87	29/11	89.87	27/11	88.16
Therfield Rectory	C & UGS	1883	dry <71.6	78.38	96.42	29/11	77.77	01/12	78.65
Redlands Hall	C & UGS	1964	32.71	38.62	49.90	12/11	39.81	25/11	37.40
Rockley	C & UGS	1933	dry <128.44	131.58	143.12	28/11	133.72	27/11	131.50
Little Bucket Farm	C & UGS	1971	56.77	62.76	75.89	26/11	65.19	29/11	66.79
Farm									
Compton House	C & UGS	1984	28.22	36.64	64.98	25/11	42.42	24/11	35.77
Chilgrove House	C & UGS	1836	33.97	46.07	76.51	25/11	50.36	24/11	48.11
Westdean No.3	C & UGS	1940	1.17	1.71	4.26	26/11	1.60	25/11	2.06
Lime Kiln Way	C & UGS	1969	123.70	124.77	125.39	30/11	124.57	29/11	125.40
Ashton Farm	C & UGS	1974	63.10	65.98	69.85	29/11	68.99	30/11	70.26
West Woodyates Manor	C & UGS	1942	67.90	80.66	106.35	29/11	86.40	30/11	89.82
Killyglen (NI)	C & UGS	1985	113.68	115.84	118.84	30/11	114.35	13/11	117.20
New Red Lion	LLst	1964	5.90	11.87	22.06	22/11	17.37	21/11	14.88
Ampney Crucis	Mid Jur	1958	97.48	101.18	103.37	28/11	101.58	27/11	101.73
Yew Tree Farm	PTS	1973	11.69	13.33	13.64	30/11	13.57	05/12	13.68
Llanfair D.C	PTS	1972	79.18	79.62	80.30	26/11	79.18	01/12	79.63
Morris Dancers	PTS	1969	31.81	32.51	33.57	09/11	32.02	07/11	32.46
Weeford Flats	PTS	1966	dry <88.61	89.84	91.26	01/11	88.91	06/12	89.99
Stone	PTS	1974	89.56	89.97	90.72	01/11	90.01	06/12	90.16
Skirwith	PTS	1978	129.55	129.89	130.13	30/11	129.90	28/11	130.13
Redbank	PTS	1981	7.65	8.24	8.72	27/11	7.66	29/11	7.85
Bussels No.7A	PTS	1972	23.17	23.56	24.30	25/11	23.73	24/11	23.74
Rushyford NE	MgLst	1967	64.83	71.97	76.52	30/11	76.30	22/11	76.11
Peggy Ellerton	MgLst	1968	31.26	33.77	35.65	04/11	31.98	16/11	33.44
Alstonfield	CLst	1974	174.22	184.89	203.93	01/11	186.46	07/12	194.03

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

FIGURE 3 LOCATION MAP OF GAUGING STATIONS AND GROUNDWATER INDEX WELLS