

Hydrological Summary for Great Britain

OCTOBER 1993

Rainfall

October was very much a month of two halves in much of Britain. The first fortnight saw a continuation of the notably unsettled conditions which characterised much of September. Thereafter, high pressure dominated the synoptic pattern and, despite a damp complexion to the weather, precipitation in many areas was largely restricted to light drizzle and fog-drip. The normal west-to-east rainfall gradient across Britain was barely discernible in October and monthly totals showed an unusual degree of spatial coherence. Some exceptional daily rainfalls occurred (e.g. > 100 mm on the 6th near Inverness) but accumulated totals were more noteworthy. In the English lowlands many districts had recorded around twice the October average rainfall by the 14th. Even more notably, rainfall over the five weeks from the second week of September was commonly the equivalent of the full autumn (Sept.-Nov.) quota in a normal year; this was the wettest interlude since the winter of 1989/90 in many eastern areas. By contrast, parts of western Scotland registered below half of the 1961-90 average in October and three-monthly accumulations are the lowest, for any three month sequence, for over four years in some western coastal areas. Remarkably in the context of the recent past, some evidence of drought stress could be detected by late October. Regional long term rainfall deficiencies are now very modest in England and Wales - reflecting the abundant rainfall since March. For England and Wales, the April-October period was the wettest since 1968 but in parts of the lowlands the seven-month rainfall totals were the highest for 70 years. In the 12-month timeframe, regional rainfall totals are mostly well above average.

River Flow

Runoff rates in October displayed large variability, both spatially and temporally. Early in the month spate conditions were widespread and persistent in eastern and southern Britain. Most catchments were saturated by the end of the first week; thereafter localised flooding occurred in many catchments. In some areas, overgrown drainage ditches and partially blocked culverts combined with effects of the autumn leaf fall to reduce channel capacities; flooding was often more widespread on minor tributaries than on trunk rivers in England. In eastern Scotland, peak river flows testified

to a more severe event in hydrological terms. In the Highland RPB area, recorded peak flows were equalled or exceeded on the rivers Alness, Helmsdale, Thurso, Halladale, Naver and Nairn (flow records are generally of the order of 15-20 years) and, in the Forth RPB area, the Water of Leith and Braid Burn were the main rivers affected. Localised flooding was reported in Edinburgh. Runoff rates decreased steeply to the west and, by month-end, depressed inflows to reservoirs used for hydro-power generation in the Western Highlands were a matter of concern. Blackwater Reservoir was reportedly at its lowest level for 50 years and a new minimum October runoff total was registered on the Luss Water. In eastern and southern Britain, rivers recording new maximum October runoff totals showed a wide distribution - from the Tyne (Forth) to the Kenwyn (Cornwall). Elsewhere, October mean flows were mostly below average and runoff totals in the four-month timeframe show great geographical variation. Echoes of the lowland drought may still be recognised in the two-year accumulations.

Groundwater

As is often the case in October, the trend in groundwater levels was clearly in a transitional phase and water-table responses to the autumn rainfall displayed a considerable degree of spatial heterogeneity. In the Chalk, recessions continued in some of the deeper wells whereas at other monitoring sites the benefit of the early autumn infiltration can now be recognised. Water-tables are rising in almost all areas and, for a few sites including the Holt, new October maxima were established. The recent brisk rise at Washpit Farm brought levels to above average for the first time in over five years drawing more than a symbolic veil over the recent drought at a site close to the zone of maximum severity. Particularly steep October recoveries were recorded in the fissured Lincolnshire Limestone and Oolitic limestone aquifers. Generally, in eastern and southern England, late-autumn levels throughout the other major aquifers are close to or above average. However below average levels characterise the Permo-Triassic sandstones of southern Scotland and the North-West (North Wales also) and full recoveries are still awaited in some areas where the aquifer is confined (e.g. East Midlands).



Institute of
Hydrology

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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 (particularly in Scotland) 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, the original ten regional divisions of the NRA have been retained for use in the Hydrological Summaries.

MORECS

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 1992/93 RAINFALL AS A PERCENTAGE OF THE 1961-90 AVERAGE

Note: The monthly rainfall figures are the copyright of The Meteorological Office. These data may not be published or passed on to any unauthorised person or organisation.

		Oct 1992	Nov	Dec	Jan 1993	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
England and Wales	mm %	84 99	138 153	83 88	113 128	16 25	26 36	96 160	86 134	68 105	80 129	54 71	111 144	102 120
NRA REGIONS														
North West	mm %	121 95	172 140	118 95	162 134	18 23	38 40	116 163	131 175	69 85	99 116	75 70	105 91	64 50
Northumbria	mm %	81 107	100 116	71 88	107 127	16 27	25 36	120 214	118 190	38 63	57 88	76 94	85 116	84 110
Severn-Trent	mm %	71 111	113 159	61 79	82 117	9 17	16 26	78 142	84 142	75 127	77 145	44 66	96 150	74 116
Yorkshire	mm %	77 105	102 128	71 86	91 115	19 33	15 22	102 173	82 137	49 82	67 114	78 105	127 186	74 101
Anglian	mm %	73 143	83 143	41 75	57 114	17 46	17 36	71 154	52 108	49 96	69 141	46 84	105 214	88 172
Thames	mm %	73 118	117 180	58 83	86 134	7 16	25 45	83 166	61 109	57 104	56 114	33 57	102 172	114 183
Southern	mm %	86 108	141 166	76 93	95 119	9 17	31 49	91 172	58 107	53 98	62 129	37 65	119 173	137 172
Wessex	mm %	52 66	152 183	86 92	119 137	9 14	40 57	82 155	62 102	69 121	67 129	37 56	119 165	122 154
South West	mm %	96 83	216 173	122 88	172 125	23 23	33 33	98 142	131 182	109 158	128 186	39 46	168 181	119 102
Welsh	mm %	102 74	214 151	145 95	193 135	24 25	35 33	107 134	124 151	97 123	101 131	74 73	119 103	81 59
Scotland	mm %	123 79	212 140	159 105	306 203	67 66	120 96	128 168	111 129	75 87	112 119	74 63	81 57	162 104
RIVER PURIFICATION BOARDS														
Highland	mm %	155 78	280 138	239 121	397 211	120 94	156 96	86 95	93 101	85 87	141 133	86 68	76 45	236 119
North-East	mm %	110 113	93 94	78 84	159 161	33 51	55 71	68 113	109 158	59 89	80 110	72 83	63 73	166 171
Tay	mm %	70 54	163 135	113 89	343 238	25 26	114 105	135 218	132 159	59 81	87 113	60 64	83 73	177 136
Forth	mm %	66 57	153 137	84 76	261 221	20 25	90 96	108 183	119 161	73 106	74 99	50 53	84 76	144 125
Tweed	mm %	77 81	135 145	82 88	161 161	16 24	43 54	124 218	130 183	62 95	54 74	52 59	84 94	110 116
Solway	mm %	116 74	203 141	133 90	216 138	29 29	101 86	163 212	139 164	70 83	101 112	67 56	104 73	73 47
Clyde	mm %	133 69	255 142	165 92	350 185	69 58	158 107	158 188	119 131	77 83	135 124	84 63	105 59	100 52

Note: The monthly rainfall figures for September and October correspond to the MORECS areal assessments derived by The Meteorological Office. In northern Britain these initial assessments may have a wide error band associated with them. 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

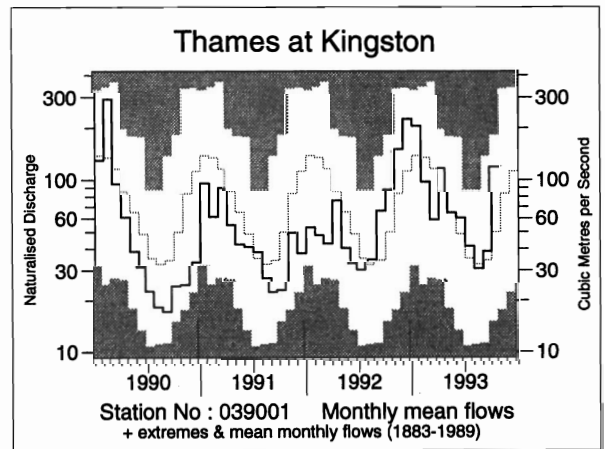
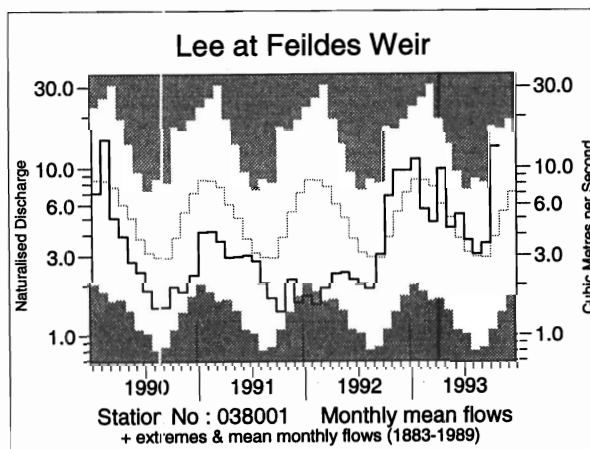
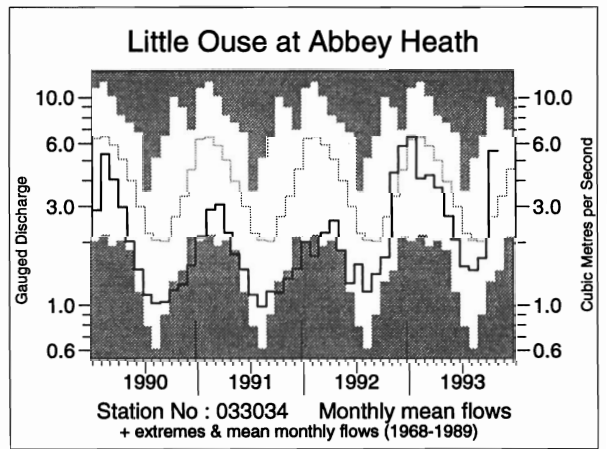
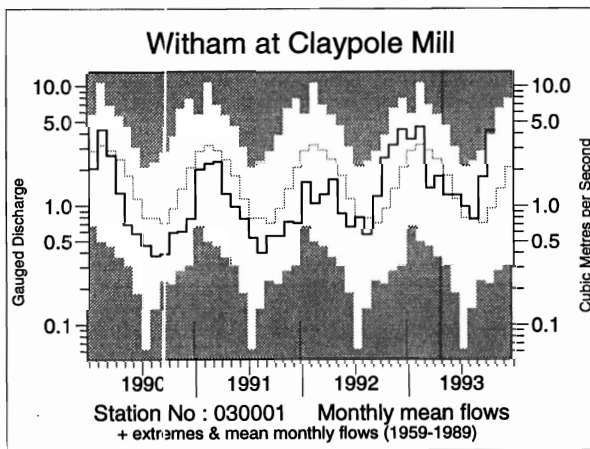
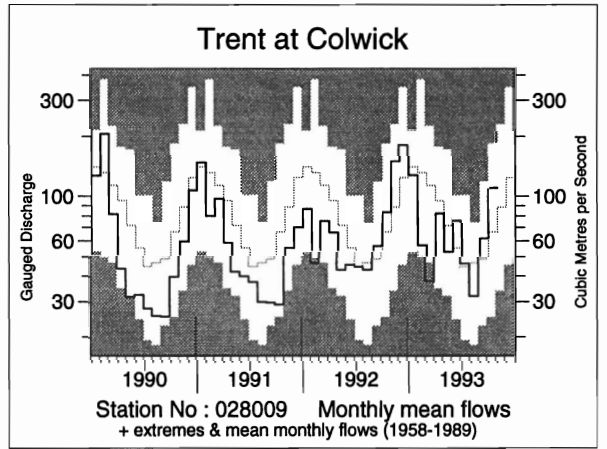
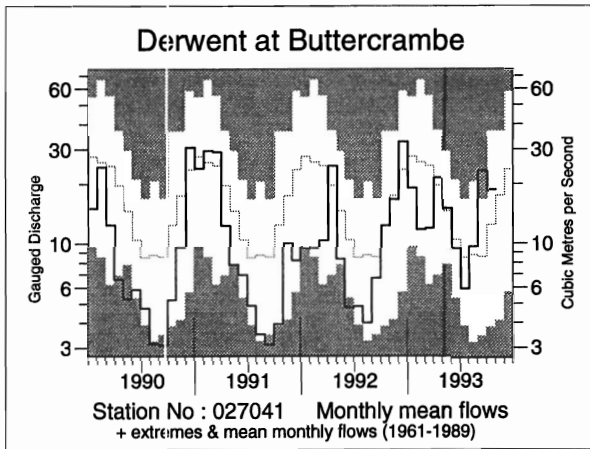
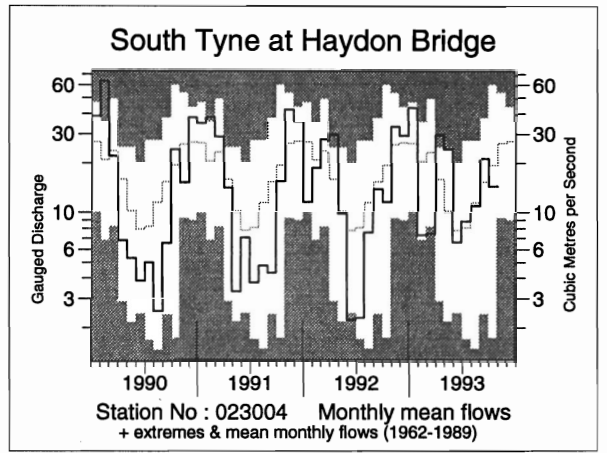
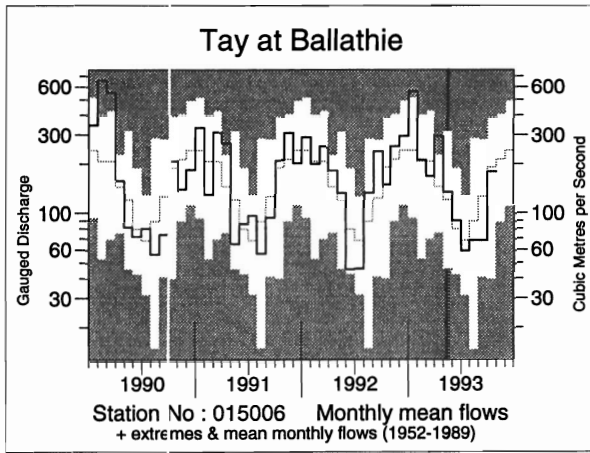
		Aug-Oct93		Apr93-Oct93		Nov92-Oct93		Mar90-Oct93	
		Est Return Period, years		Est Return Period, years		Est Return Period, years		Est Return Period, years	
England and Wales	mm	266		596		972		3053	
	% LTA	112	<u>2-5</u>	122	<u>5-15</u>	108	<u>2-5</u>	94	2-5
NRA REGIONS									
North West	mm	243		658		1166		4091	
	% LTA	70	5-10	99	2-5	97	2-5	94	2-5
Northumbria	mm	245		578		897		2997	
	% LTA	106	<u>2-5</u>	122	<u>5-10</u>	105	<u>2-5</u>	97	2-5
Severn-Trent	mm	214		528		809		2600	
	% LTA	110	<u>2-5</u>	125	<u>5-15</u>	107	<u>2-5</u>	95	2-5
Yorkshire	mm	278		578		876		2761	
	% LTA	129	<u>5-10</u>	128	<u>10-20</u>	107	<u>2-5</u>	93	5-10
Anglian	mm	239		480		695		2091	
	% LTA	154	<u>20-40</u>	137	<u>30-50</u>	117	<u>5-10</u>	96	2-5
Thames	mm	248		505		798		2367	
	% LTA	139	<u>5-10</u>	130	<u>10-20</u>	116	<u>5-10</u>	94	2-5
Southern	mm	293		557		909		2638	
	% LTA	142	<u>10-20</u>	134	<u>15-25</u>	117	<u>5-10</u>	94	2-5
Wessex	mm	278		558		964		2801	
	% LTA	128	<u>5-10</u>	127	<u>5-15</u>	115	<u>5-10</u>	93	5
South West	mm	326		792		1358		3980	
	% LTA	111	<u>2-5</u>	138	<u>30-50</u>	116	<u>5-10</u>	95	2-5
Welsh	mm	274		703		1314		4410	
	% LTA	78	2-5	105	<u>2-5</u>	100	<u>2-5</u>	93	5
Scotland	mm	317		743		1607		5814	
	% LTA	76	5-10	98	2-5	112	<u>5-10</u>	112	<u>30-60</u>
RIVER PURIFICATION BOARDS									
Highland	mm	398		803		1995		7266	
	% LTA	80	5-10	91	2-5	113	<u>5-10</u>	115	<u>80-120</u>
North-East	mm	301		617		1035		3574	
	% LTA	111	<u>2-5</u>	115	<u>5-10</u>	106	<u>2-5</u>	101	<u>2-5</u>
Tay	mm	320		733		1491		4843	
	% LTA	95	2-5	116	<u>5-10</u>	121	<u>10-25</u>	109	<u>5-15</u>
Forth	mm	278		652		1260		4356	
	% LTA	87	2-5	109	<u>2-5</u>	114	<u>5-10</u>	108	<u>5-10</u>
Tweed	mm	246		616		1053		3659	
	% LTA	90	2-5	114	<u>5-10</u>	109	<u>2-5</u>	104	<u>2-5</u>
Solway	mm	244		717		1399		5237	
	% LTA	58	20-30	95	2-5	98	2-5	102	<u>2-5</u>
Clyde	mm	289		778		1775		6923	
	% LTA	57	30-50	88	2-5	105	<u>2-5</u>	113	<u>30-60</u>

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



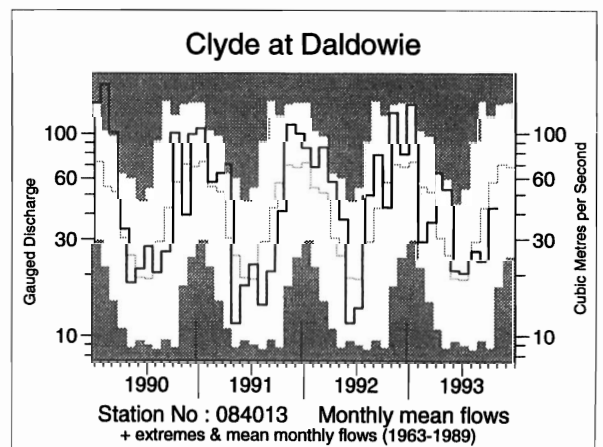
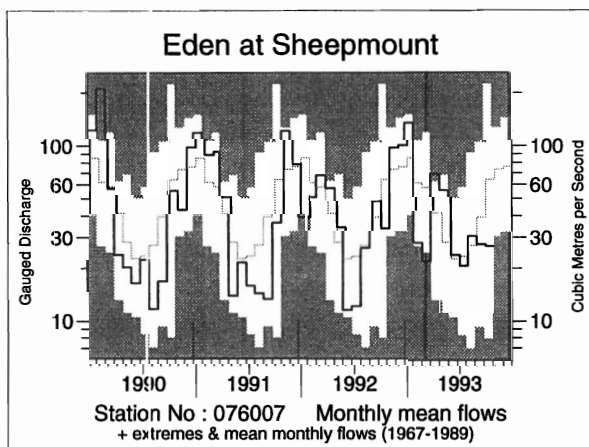
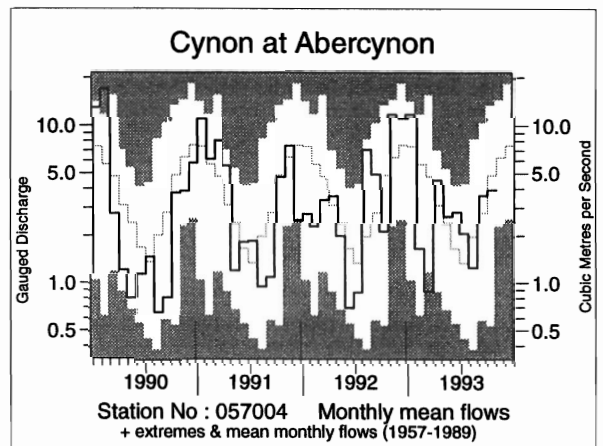
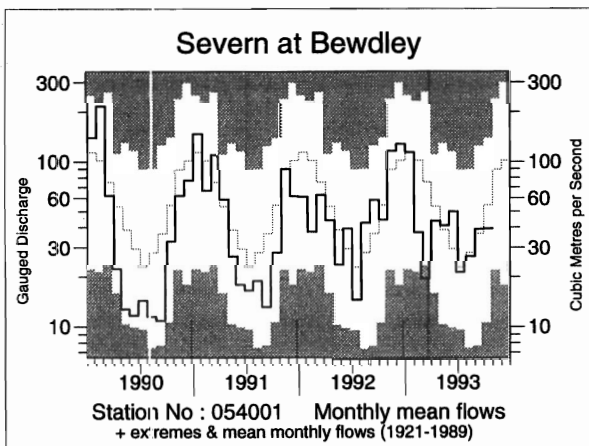
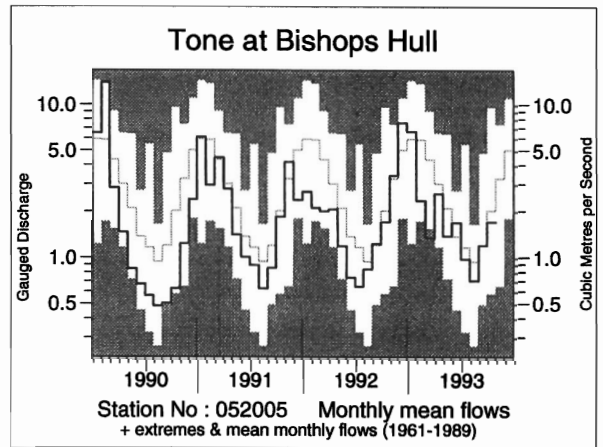
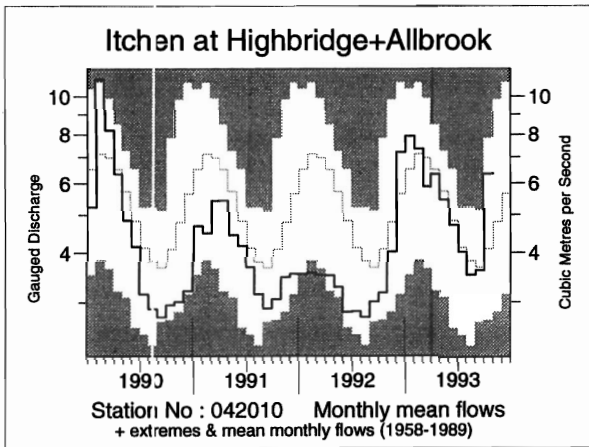
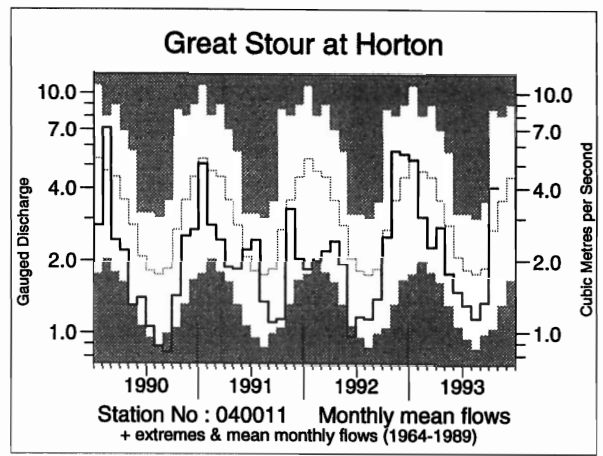
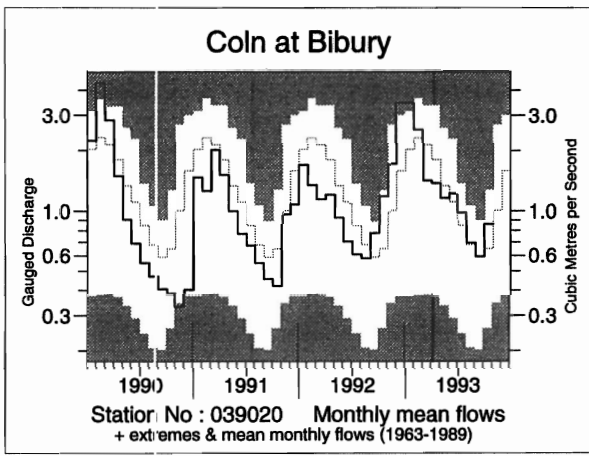


TABLE 3 RUNOFF AS MM. AND AS A PERCENTAGE OF THE PERIOD OF RECORD AVERAGE WITH SELECTED PERIODS RANKED IN THE RECORD

River/ Station name	Jun	Jul	Aug	Sep	Oct		7/93	1/93	5/90	11/88				
	1993	1993	1993	1993	1993	rank	to	to	to	to				
	mm	mm	mm	mm	mm	rank	10/93	10/93	10/93	9/93				
	%LT	%LT	%LT	%LT	%LT	/yrs								
Dee at Park	33 90	23 82	24 75	50 122	172 218	19 /21	269 146	18 /21	781 126	20 /21	2565 96	8 /18	3599 90	3 /17
Tay at Ballathie	50 112	34 85	40 77	38 53	104 93	20 /42	216 79	12 /41	1049 121	35 /41	4088 108	28 /38	6494 115	33 /37
Whiteadder Water at Hutton Castle	22 132	11 88	8 53	13 83	73 267	24 /25	105 143	19 /24	327 106	15 /24	1260 97	9 /21	1605 80	5 /20
South Tyne at Haydon Bridge	23 88	32 116	39 101	73 145	51 75	12 /32	195 104	19 /30	619 110	22 /30	2498 97	11 /24	3609 94	6 /22
Wharfe at Flint Mill Weir	27 110	27 103	42 106	79 180	46 73	13 /39	194 111	25 /38	521 97	20 /38	2126 89	9 /35	3160 87	3 /34
Derwent at Buttercrambe	15 91	10 72	16 115	38 285	32 159	27 /33	96 155	30 /32	243 95	16 /32	833 77	3 /29	1136 69	1 /28
Trent at Colwick	27 144	17 107	12 73	21 126	40 172	31 /36	89 124	28 /35	241 87	11 /35	945 80	3 /32	1439 81	2 /31
Lud at Louth	16 83	11 71	9 69	11 102	33 285	25 /26	64 129	19 /25	181 83	9 /25	457 55	2 /22	692 55	1 /21
Witham at Claypole Mill	11 115	9 129	7 103	15 239	38 432	35 /35	69 230	34 /35	188 123	24 /34	519 86	10 /32	747 81	7 /30
Little Ouse at Abbey Heath	8 77	6 74	6 81	6 84	21 218	24 /26	39 120	21 /26	127 92	11 /25	351 63	2 /23	563 68	1 /21
Colne at Lexden	6 113	3 72	3 75	5 117	19 223	33 /35	30 141	29 /34	98 93	12 /34	312 72	4 /31	509 76	1 /30
Lee at Feildes Weir (natr.)	13 138	10 124	8 106	9 125	34 342	107 /109	60 184	103 /108	164 125	83 /107	402 74	17 /102	634 78	13 /99
Thames at Kingston (natr.)	16 127	11 116	8 91	10 112	32 239	104 /111	62 152	97 /111	220 114	71 /111	667 83	25 /108	1030 84	18 /106
Coln at Bibury	30 115	25 121	17 102	14 99	22 135	25 /31	78 115	22 /30	352 108	18 /30	1135 87	8 /27	1706 87	4 /26
Great Ouse at Horton	11 72	10 71	9 68	10 74	32 159	26 /30	61 100	20 /29	187 82	8 /27	712 73	3 /22	1022 70	1 /18
Itchen at Highbridge + Allbrook	34 100	30 100	26 94	26 100	47 158	34 /36	129 114	28 /35	402 105	22 /35	1271 82	2 /32	1872 82	1 /31
Piddle at Baggs Mill	23 100	18 101	15 97	19 126	48 237	31 /31	100 143	29 /30	366 111	20 /29	1142 86	6 /24	1707 84	3 /21
Exe at Thorverton	36 154	26 125	22 78	40 104	87 118	28 /38	176 108	24 /38	495 84	8 /37	2315 86	6 /35	3499 85	2 /33
Taw at Umberleigh	73 471	32 211	19 102	39 163	103 168	29 /36	193 160	30 /35	502 106	23 /35	2006 91	7 /32	3073 90	4 /31
Tone at Bishops Hull	22 128	13 86	9 74	16 106	23 87	20 /33	61 89	19 /33	272 76	6 /32	1107 73	1 /30	1853 78	1 /28
Severn at Bewdley	30 172	13 93	16 93	23 106	24 72	31 /73	77 90	35 /73	262 79	14 /72	1212 82	9 /70	1911 85	4 /68
Cynon at Abercynon	69 173	53 155	32 61	88 128	98 82	18 /36	271 98	19 /34	881 98	17 /34	3956 96	13 /28	6156 99	14 /27
Dee at New Inn	88 153	72 110	105 113	83 63	55 28	2 /25	315 66	4 /25	1020 78	3 /24	5180 86	1 /21	7947 87	1 /20
Eden at Sheepmount	27 109	24 91	36 120	31 73	31 43	4 /24	122 77	7 /23	508 99	13 /23	2269 100	9 /17	3448 102	7 /14
Clyde at Daldowie	29 111	29 107	37 91	32 55	60 74	11 /31	158 77	10 /30	637 111	24 /30	3031 117	26 /27	4496 117	26 /26
Carron at New Kelso	85 117	229 198	131 76	36 13	128 49	2 /15	524 65	1 /15	1766 92	8 /15	9043 103	7 /12	14214 111	10 /10

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 as 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 NOVEMBER 1993

Area	Reservoir (R)/ Group (G)	Capacity● (MI)	1993							1992
			June	July	Aug	Sep	Oct	Nov	Nov	
North West	Northern Command Zone ¹	(G) 133375	92	77	66	58	51	42	64	
	Vyrnwy	(R) 55146	94	89	81	79	73	60	81	
Northumbria	Teesdale ²	(G) 87936	96	80	72	66	73	71	79	
	Kielder	(R) 199175*	96*	91*	90*	87*	84*	87*	87*	
Severn-Trent	Clywedog	(R) 44922	100	96	94	92	87	82	86	
	Derwent Valley ³	(G) 39525	72	76	77	76	84	83	79	
Yorkshire	Washburn ⁴	(G) 22035	94	81	72	63	67	68	70	
	Bradford supply ⁵	(G) 41407	91	80	74	74	90	86	65	
Anglian	Grafham	(R) 58707	95	95	96	95	95	96	95	
	Rutland	(R) 130061	93	96	93	90	86	88	95	
Thames	London ⁶	(G) 206232	96	94	96	87	86	92	96	
	Farmoor ⁷	(G) 13843	98	98	98	98	93	98	99	
Southern	Bowl	(R) 28170	96	91	85	78	74	81	69	
	Ardingly	(R) 4685	100	99	90	80	77	100	81	
Wessex	Clatworthy	(R) 5364*	86	91	82	72	61	76	49*	
	Bristol W ⁸	(G) 38666*	84*	76*	67*	60*	48*	59*	61*	
South West	Colliford	(R) 28540	84	87	86	81	84	86	67	
	Roadford	(R) 34500	78	82	81	74	76	81	76	
	Wimbleball ⁹	(R) 21320	89	89	83	76	74	80	55	
	Stithians	(R) 5205	91	99	91	85	93	99	69	
Welsh	Celyn + Brenig	(G) 131155	99	100	98	94	92	92	96	
	Brienne	(R) 62140	100	98	97	92	91	91	100	
	Big Five ¹⁰	(G) 69762	92	89	86	78	80	80	87	
	Elan Valley ¹¹	(G) 99106	100	97	96	97	97	95	100	
Lothian	Edinburgh/Mid Lothian	(G) 97639	99	96	89	83	81	82	90	
	West Lothian	(G) 5613	99	99	89	81	87	98	84	
	East Lothian	(G) 10206	100	99	92	81	85	98	82	

● Live or usable capacity (unless indicated otherwise)

* Gross storage/percentage of gross storage

1. Includes Haweswater, Thirlmere, Stocks and Barnacre.
2. Cow Green, Selsat, 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.

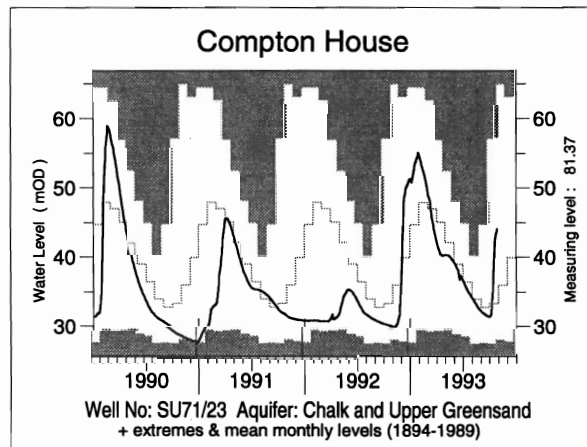
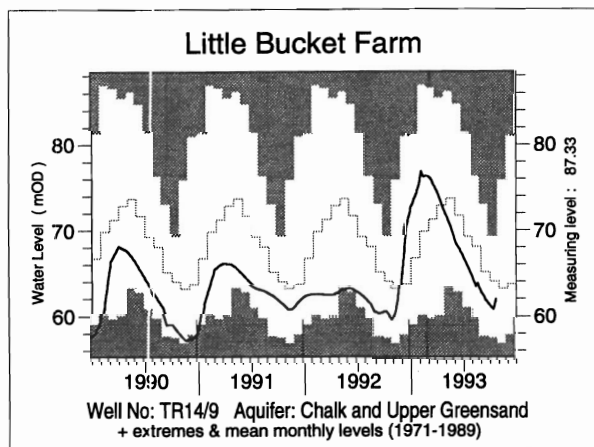
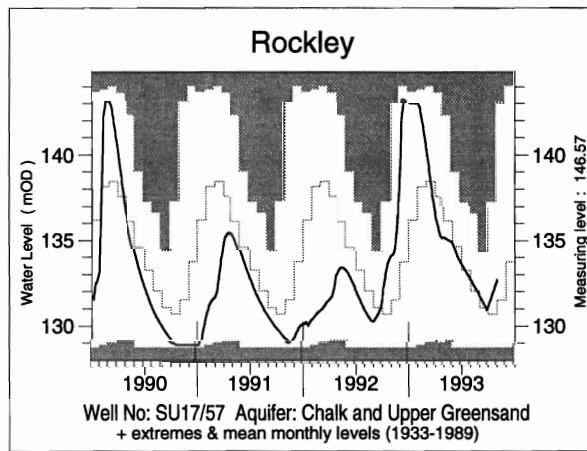
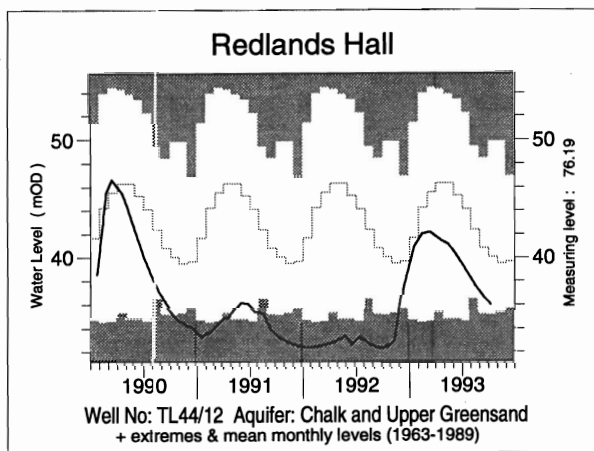
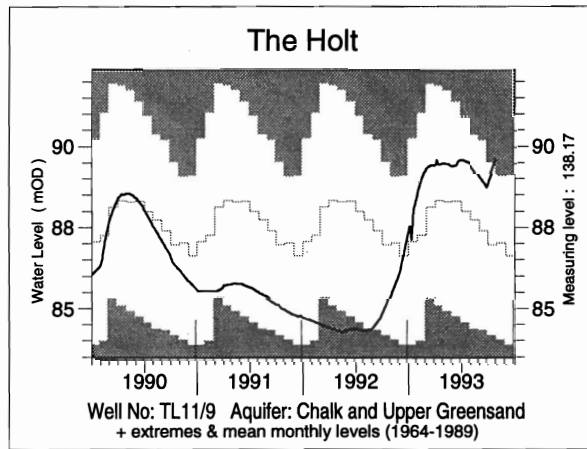
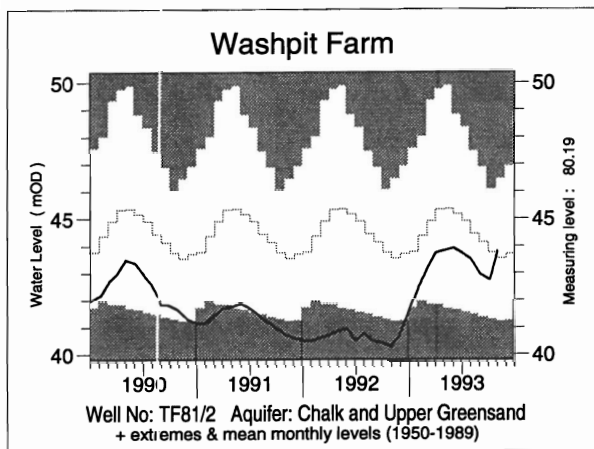
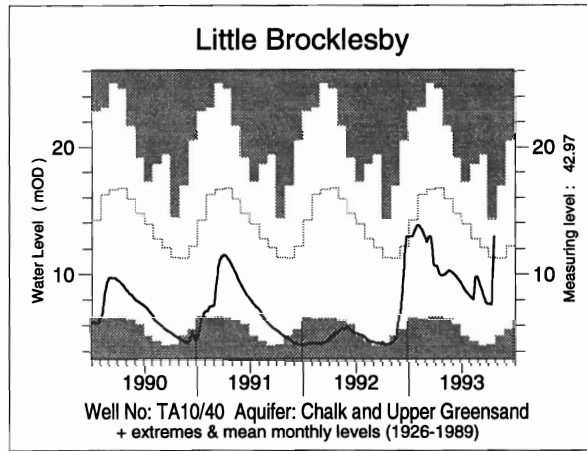
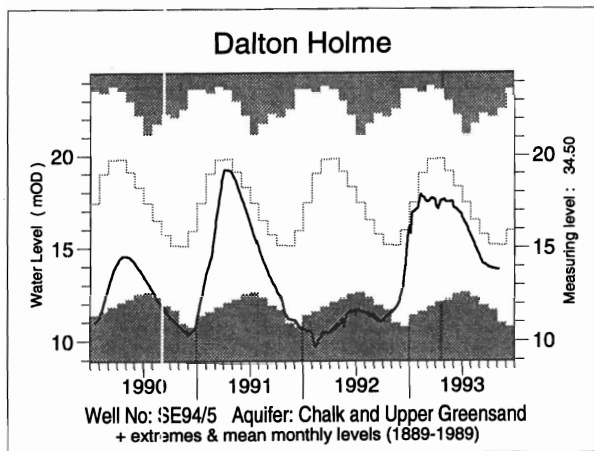
9. Shared between South West (river regulation for abstraction) and Wessex (direct supply).

10. Usk, Talybont, Llandegfedd (pumped storage), Taf Fechan, Taf Fawr.

11. Claerwen, Caban Coch, Pen y Garreg and Craig Goch.

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



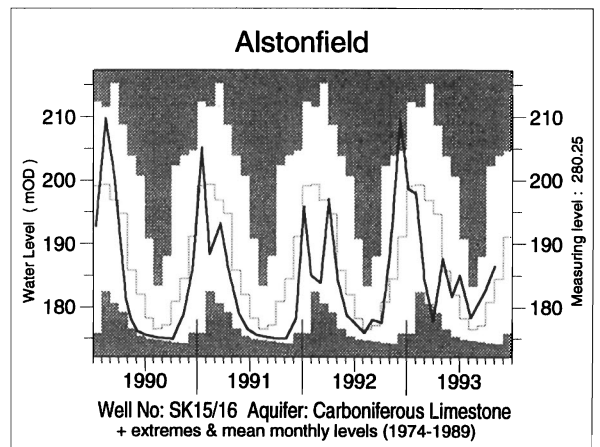
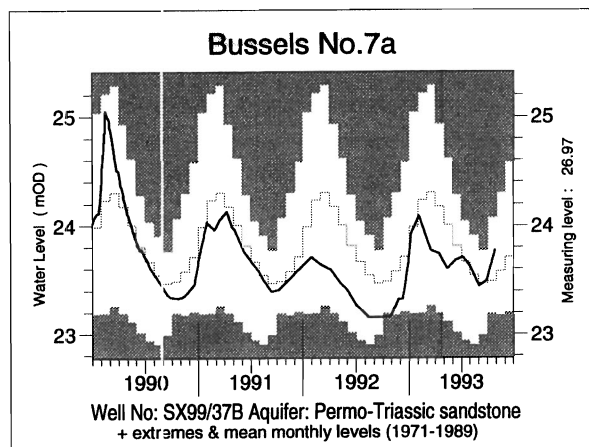
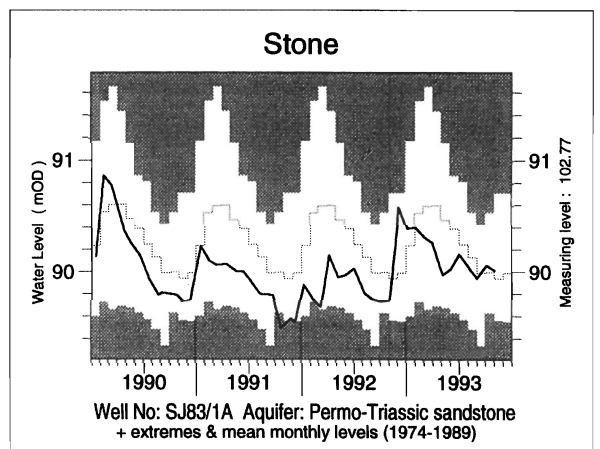
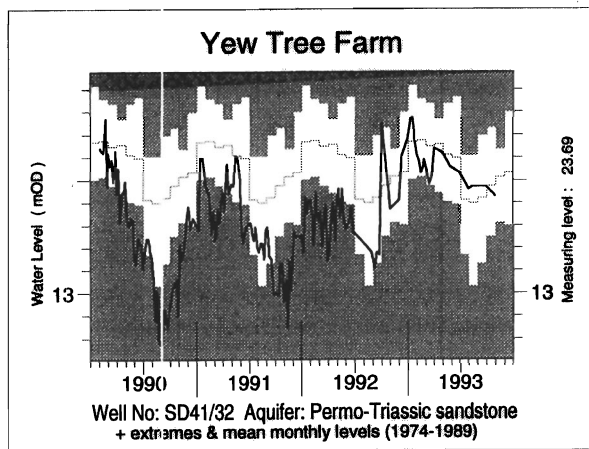
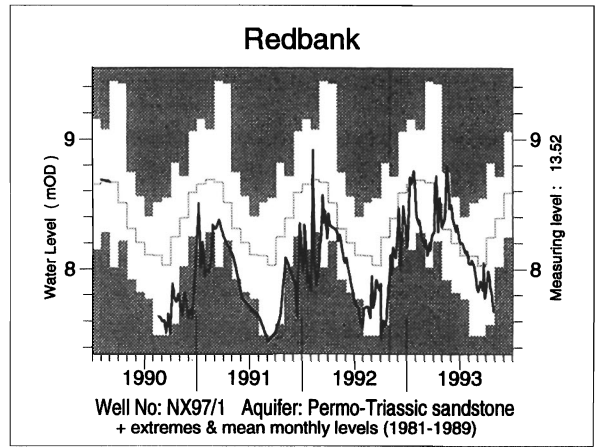
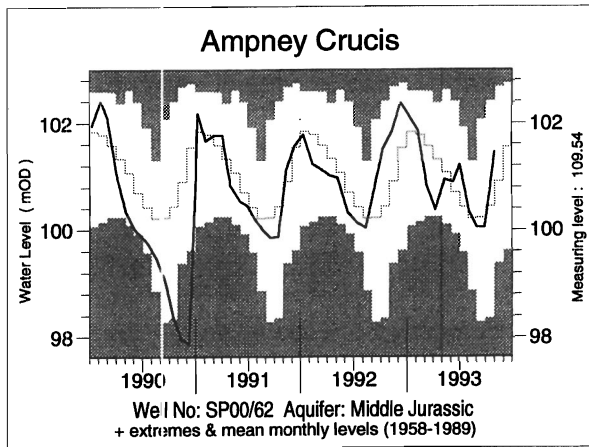
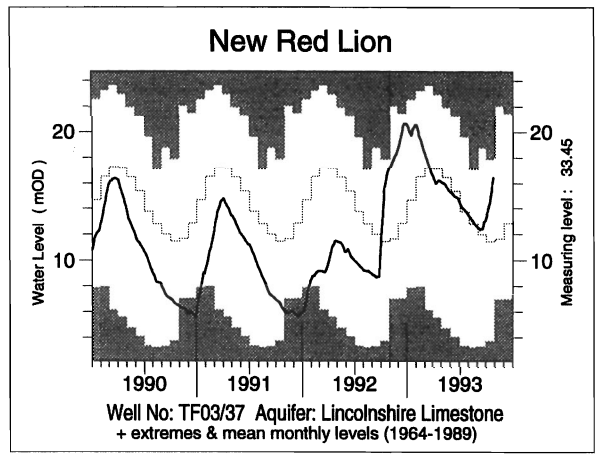
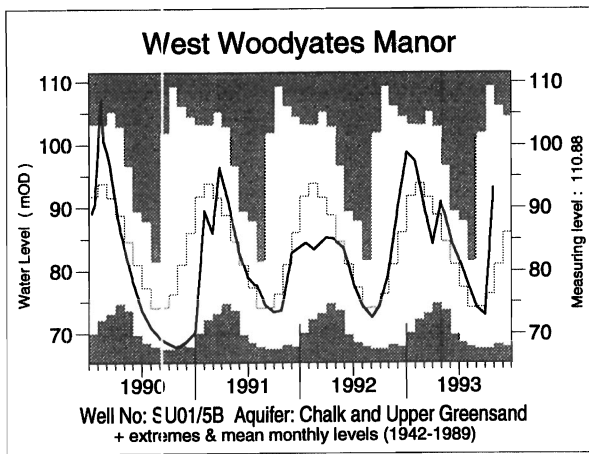


TABLE 5 A COMPARISON OF OCTOBER GROUNDWATER LEVELS: 1992 AND 1993

Site	Aquifer	Records commence	Average October Level	October 1992		Oct/Nov 1993		No of years Oct level <1993	Least pre-1993 level any month
				day	level	day	level		
Wetwang	C & UGS	1971	19.57	13/10	18.29	31/10	20.62	>10	16.66
Dalton Holme	C & UGS	1889	15.12	30/10	11.48	31/10	13.82	>10	9.64
Little Brocklesby	C & UGS	1926	11.04	28/10	4.64	25/10	16.44	>10	4.53
Washpit Farm	C & UGS	1950	43.54	01/10	40.43	01/11	43.80	>10	40.30
The Holt	C & UGS	1964	86.95	01/10	84.75	31/10	89.65	>10	83.90
Therfield Rectory	C & UGS	1883	81.91	01/10	dry	31/10	77.24	>10	dry <71.6
Redlands Hall	C & UGS	1964	39.28	09/10	32.29	07/10	36.01	5	32.29
Rockley	C & UGS	1933	130.72	31/10	134.12	31/10	132.69	>10	dry <128.9
Little Bucket Farm	C & UGS	1971	63.24	14/10	60.59	21/10	61.98	8	56.77
Compton House	C & UGS	1894	33.38	28/10	30.01	27/10	44.08	>10	27.64
Chilgrove House	C & UGS	1836	41.91	28/10	37.92	27/10	55.16	>10	33.46
West Dean No.3	C & UGS	1940	1.58	30/10	1.63	28/10	1.64	>10	1.01
Lime Kiln Way	C & UGS	1969	124.87	08/10	123.75	03/11	124.39	4	123.70
Ashton Farm	C & UGS	1974	65.10	28/10	64.66	28/10	69.12	>10	63.10
West Woodyates Manor	C & UGS	1942	75.63	28/10	79.37	28/10	93.12	>10	67.62
New Red Lion	LLst	1964	11.37	29/10	17.25	25/10	16.44	>10	3.29
Ampney Crucis	Mid Jur	1958	100.59	09/10	101.90	31/10	101.81	>10	97.38
Yew Tree Farm	PTS	1973	13.45	30/10	13.37	29/10	13.43	9	8.43
Llanfair D.C	PTS	1972	79.64	16/10	78.98	26/10	79.11	2	78.85
Morris Dancers	PTS	1969	32.50	12/10	31.88	04/10	31.96	2	30.87
Stone	PTS	1974	90.04	05/10	89.73	01/11	90.01	>10	89.34
Skirwith	PTS	1978	129.93	30/10	129.70	28/10	129.94	6	129.44
Redbank	PTS	1981	8.30	31/10	7.90	27/10	7.68	4	7.45
Bussels No.7A	PTS	1972	23.48	27/10	23.16	26/10	23.77	>10	22.90
Rushyford NE	MgLst	1967	71.75	31/10	74.53	22/10	75.93	>10	64.77
Peggy Ellerton	MgLst	1968	34.18	08/10	31.46	06/10	31.88	1	31.10
Alstonfield	CLst	1974	181.72	05/10	177.56	01/11	186.46	>10	174.22

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

