Hydrological Summary for Great Britain

FEBRUARY 1995

Rainfall

Another notably wet and, northern Scotland aside, exceptionally mild month with weather patterns dominated by a succession of active low pressure systems, mostly borne on a westerly or south-westerly airstream. After a dry interlude in England during the first week, most regions registered only three or four dry days; individual daily totals were generally unremarkable though the 12th and 22nd were particularly wet. Snow accumulations in the uplands of northern Britain were substantial by late February. Monthly precipitation totals were in the 150% to 200% range over wide areas and exceeded twice the average in parts of north-west Britain; Scotland may have recorded its 4th wettest February, in a 125-year series (but 1989 and 1990 were both wetter). Once again a few sheltered low-lying districts in the east recorded below average rainfall. Although rainfall deficiencies have been protracted in such areas, regional winter (Dec-Feb) precipitation totals were very high. Provisional figures suggest that Britain recorded its 3rd wettest winter in a record from 1869; significantly 1989/90 was wetter and 1993/94 only a little drier. For Scotland six of the eleven highest winter precipitation totals now cluster in the post-1983 period during which Dec-Feb rainfall has been around 20% greater than the preceding average. In the English lowlands large areas recorded their second wettest winter (after 1989/90) since 1937 and in central and southern England a very wet phase can be traced back to the late summer of 1994; for a few districts the subsequent rainfall is approaching 90% of the annual average. Notwithstanding the limited precision of the return period estimates given in Table 2 (see footnote) they confirm the outstanding nature of the recent rainfall in much of Britain and the long term accumulations in southern England.

River Flow

Though flooding was much less extensive than earlier in the winter, spate conditions were maintained throughout most of February; near-bankfull levels characterising many rivers over the greater part of the month. Generally peak flows were less notable than runoff accumulations over several weeks (and, in most areas, months). A few sheltered catchments draining to the east coast reported average flows but generally February runoff totals are eclipsed only by the outstanding runoff in February 1990 (and, in Scotland, 1989 also). In the majority of index catchments abundant runoff has been a feature of each of the winter months and Dec-Feb totals are the highest, or close to the highest, on record. A number of record long term runoff accumulations have also been established. For the Kennet, runoff in each of the post-1991/92 winters ranks amongst the three highest in a 35-year record and the post-1981 winter runoff is some 15% above the preceding average - notwithstanding the fact that this period also includes three of the five lowest totals! The Kennet provides a dramatic illustration of a common tendency - enhanced winter runoff variability over the recent past associated with a higher frequency of spates. This is particularly marked in Scotland which has registered a notable cluster of major flood events and significantly enhanced runoff totals over the last decade (winter runoff on the Ewe for example being 20% greater than the pre-1986 mean).

Groundwater

With soils remaining close to saturation and rainfall totals more than 50% above average for the winter period, infiltration in most aquifer outcrop areas has been heavy and sustained. The late-winter/early-spring peaks in groundwater levels are - or in the deeper eastern wells, where the onset of recharge was delayed, soon will be - close to the seasonal maxima. Most Chalk hydrographs exhibit notably high levels for the second (or third) successive winter. At Compton the February 1995 level is exceeded only by last year's January peak in a 102-year series. Particularly steep recoveries have occurred in the Yorkshire Chalk and most western Permo-Triassic sandstone outcrops - levels at Yew Tree Farm and Skirwith are appreciably above previous maxima. In the South-West and Wales levels in index boreholes are also greatly above the seasonal mean. The early 1995 maxima have further extended the recorded range of groundwater level variation in some areas.

General

Overall reservoir stocks are the highest since the beginning of the national monitoring programme and the water resources prospects for the summer are excellent. Perhaps of more interest in relation to the longer term outlook is the impact of the recent, protracted departures from the hydrological norm on the reliable yield of water resources systems and the expected frequency of damaging floods. There are very few modern parallels for the recent rainfall patterns, none if account is taken of the record temperatures. The unprecedented hydrological conditions raise questions regarding the resilience of index hydrological statistics.

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. Figure 3 is based on weather data collected by the Institute of Hydrology at Wallingford and Balquhidder (Central Region, Scotland). Reservoir contents information has been supplied by the Water Services Companies, the NRA or, in Scotland, the Lothian and Strathclyde Regional Councils. 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 4) 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.

Note: A summary of significant hydrological events in the UK during 1994 is currently being compiled. Copies - free on application - are available through the National Water Archive Office.

* 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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13 March 1995

TABLE 1 1994/95 RAINFALL AS A PERCENTAGE OF THE 1961-90 AVERAGE

		Feb 1994	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 1995	Feb
England and Wales	mm	82	96	74	62	36	47	70	105	95	84	139	154	101
	%	130	133	123	97	55	76	92	136	112	93	148	175	160
NRA REGIONS														
North West	mm	71	165	107	35	70	70	104	108	113	124	204	196	141
	%	91	174	151	47	86	82	97	94	88	101	165	162	181
Northumbrian	mm	71	84	63	26	39	41	81	76	71	95	124	127	80
	%	120	120	113	42	65	63	100	104	93	110	153	151	136
Severn Trent	mm	71	75	57	54	24	44	53	127	66	74	115	124	89
	%	131	123	104	92	41	83	79	198	103	104	149	177	164
Yorkshire	mm	68	71	61	46	28	53	58	100	72	89	121	128	95
	%	117	104	103	77	47	90	78	147	99	111	146	162	163
Anglian	mm	45	53	51	51	25	41	56	90	69	32	58	98	61
	%	122	113	111	106	49	84	102	184	135	55	105	195	166
Thames	mm	59	51	57	79	25	21	50	75	84	53	90	133	78
	%	131	91	114	141	45	43	86	127	135	82	129	207	174
Southern	mm	64	57	77	91	39	29	69	91	119	68	123	154	104
	%	119	90	145	169	72	60	121	132	149	80	150	193	192
Wessex	mm	100	80	62	92	24	34	68	99	113	98	139	162	101
	%	154	114	117	151	42	65	103	138	143	118	149	186	156
South West	mm	174	125	94	99	32	49	101	132	140	127	213	202	142
	%	172	126	136	138	46	71	120	142	121	102	153	146	140
Welsh	mm	131	184	116	69	57	68	88	132	137	133	240	226	161
	%	135	172	145	84	72	88	87	115	100	94	157	158	165
Scotland	mm	96	250	133	29	110	67	101	103	109	150	240	248	203
	%	94	200	175	34	128	71	86	73	70	99	159	164	199
RIVER PURIFICATION BOARDS														
Highland	mm	74	341	185	36	148	62	112	153	117	162	297	329	258
	%	58	210	203	39	151	58	88	89	59	80	151	175	203
North East	mm	110	106	77	16	55	40	48	92	82	85	90	145	82
	%	169	136	128	23	83	55	55	106	85	86	97	146	126
Tay	mm	117	219	96	22	89	47	81	56	113	151	197	206	183
	%	123	201	155	27	122	61	86	49	87	125	155	143	193
Forth	mm	88	210	84	21	75	59	78	57	90	127	203	177	160
	%	111	223	142	28	109	79	83	52	78	113	185	150	203
Tweed	mm	86	124	72	19	52	46	70	58	74	120	171	130	99
	%	128	157	126	27	80	63	80	65	78	129	184	130	148
Solway	mm	116	195	124	29	79	106	121	77	116	177	243	267	215
	%	115	167	161	34	94	118	102	54	74	123	164	171	213
Clyde	mm	110	301	149	38	143	97	143	98	129	186	312	269	260
	%	93	205	177	42	154	89	107	55	67	103	174	142	220

Note: The monthly rainfall figures for the NRA regions for January and February 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 January and February 1995 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

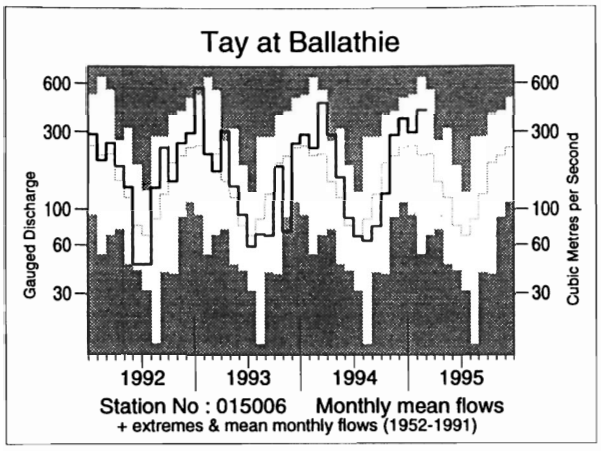
		Dec 94-Feb 95		Sep 94-Feb 95		Mar 94-Feb 95		Apr 93-Feb 95	
			Est Return Period, years		Est Return Period, years		Est Return Period, years		Est Return Period, years
England and Wales	mm	394		678		1063		2096	
	% LTA	161	70-100	136	30-50	119	10-15	122	60-90
NRA REGIONS									
North West	mm	542		887		1438		2615	
	% LTA	168	80-120	129	10-20	120	10-15	113	5-15
Northumbria	mm	331		573		907		1901	
	% LTA	148	15-25	125	5-10	106	2-5	116	10-20
Severn Trent	mm	328		595		902		1797	
	% LTA	163	40-60	149	70-100	120	5-15	124	60-90
Yorkshire	mm	343		604		921		1875	
	% LTA	156	30-45	137	25-40	112	5-10	119	20-35
Anglian	mm	217		408		685		1440	
	% LTA	153	20-35	136	20-30	115	5-10	126	80-120
Thames	mm	301		513		796		1607	
	% LTA	168	40-60	141	20-35	116	5-10	122	30-40
Southern	mm	381		659		1021		1982	
	% LTA	176	80-120	146	40-60	131	30-50	133	>200
Wessex	mm	402		712		1072		2094	
	% LTA	164	35-50	149	50-80	128	20-30	130	140-200
South West	mm	557		956		1456		2976	
	% LTA	147	10-20	134	15-25	124	10-20	132	>200
Welsh	mm	627		1029		1611		3041	
	% LTA	159	40-60	131	10-20	123	10-20	121	35-50
Scotland	mm	691		1053		1743		3047	
	% LTA	171	>200	123	10-20	121	35-50	111	10-15
RIVER PURIFICATION BOARDS									
Highland	mm	884		1316		2200		3545	
	% LTA	173	>200	121	5-15	125	50-80	106	2-5
North East	mm	317		576		918		1963	
	% LTA	123	5-10	107	2-5	94	2-5	105	2-5
Tay	mm	586		906		1460		2733	
	% LTA	160	50-80	124	5-10	119	10-15	116	15-25
Forth	mm	540		814		1341		2473	
	% LTA	176	>200	126	10-20	121	15-25	116	20-35
Tweed	mm	400		652		1035		2148	
	% LTA	154	35-50	121	5-10	107	2-5	115	10-20
Solway	mm	725		1095		1749		3141	
	% LTA	179	>200	129	10-20	123	20-35	115	15-25
Clyde	mm	841		1254		2125		3646	
	% LTA	173	>200	121	5-10	125	40-60	112	10-15

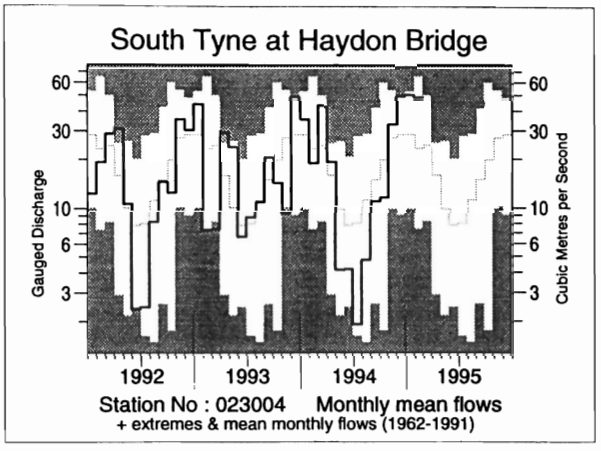
LTA refers to the period 1961-90.

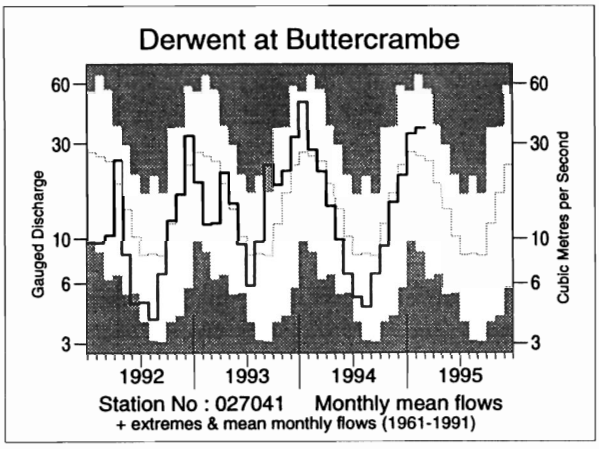
Return period assessments are based on tables provided by the Meteorological Office*. The tables reflect rainfall totals over the period 1911-70 only and the estimate assumes a sensibly stable climate. They assume a start in a specified month; return periods for a start in any month may be expected to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

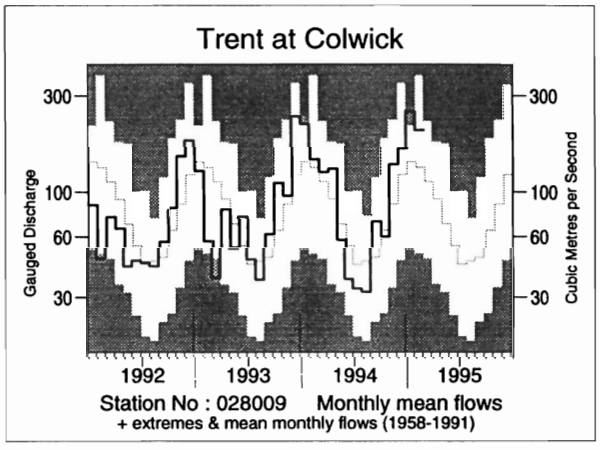
* Tabony, R.C., 1977, The Variability of long duration rainfall over Great Britain, Scientific Paper No. 37, Meteorological Office.

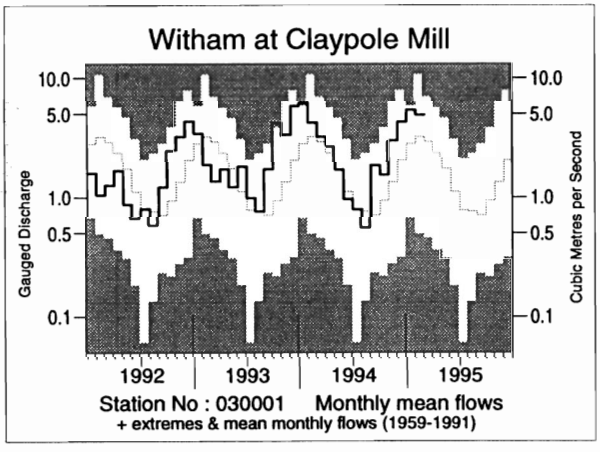
FIGURE 1 MONTHLY RIVER FLOW HYDROGRAPHS

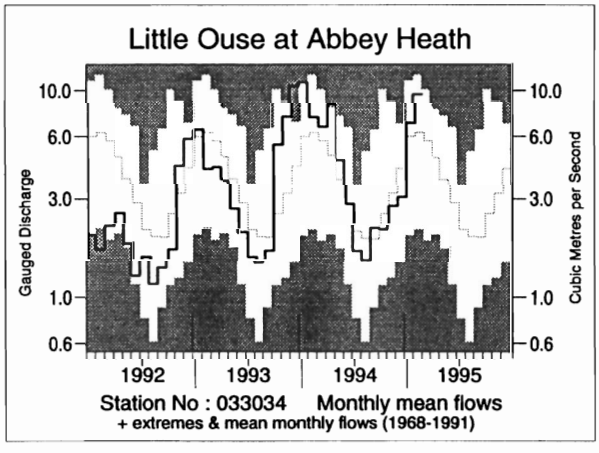


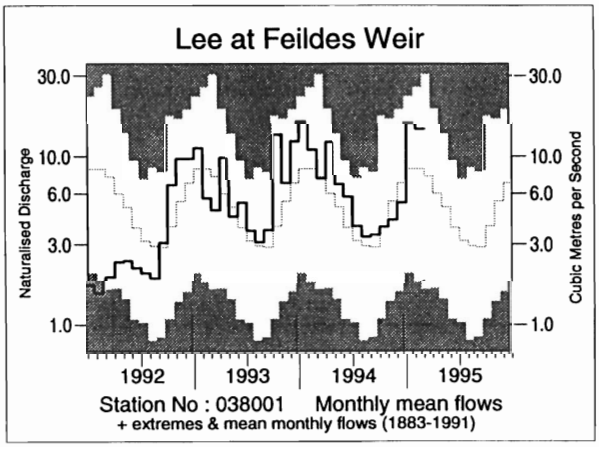


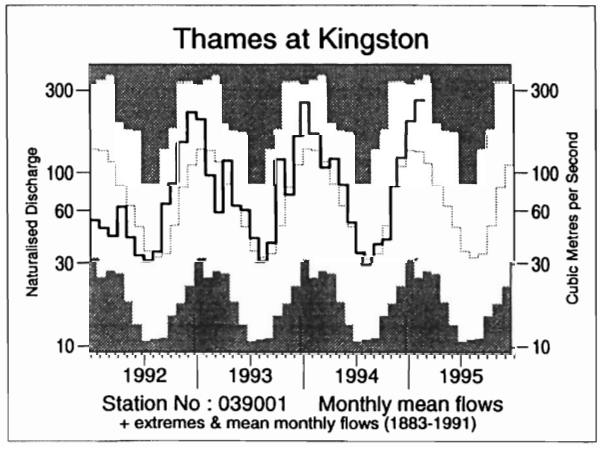


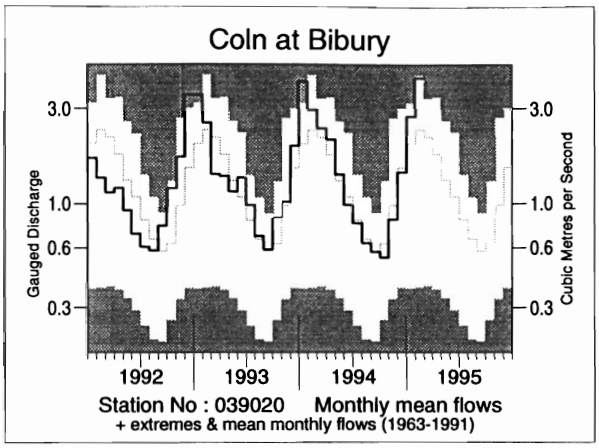


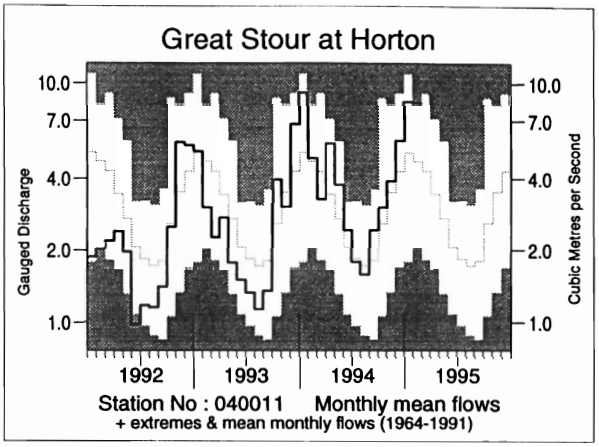


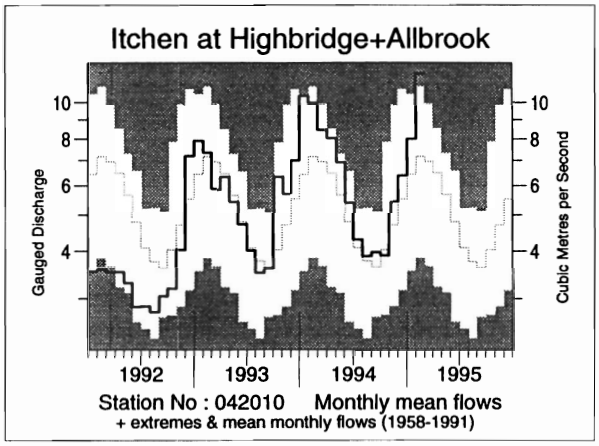


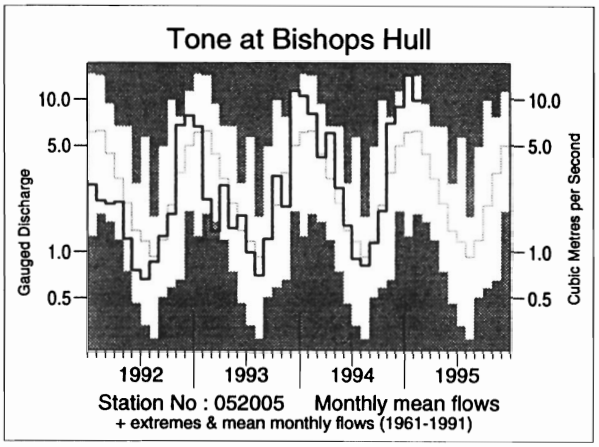


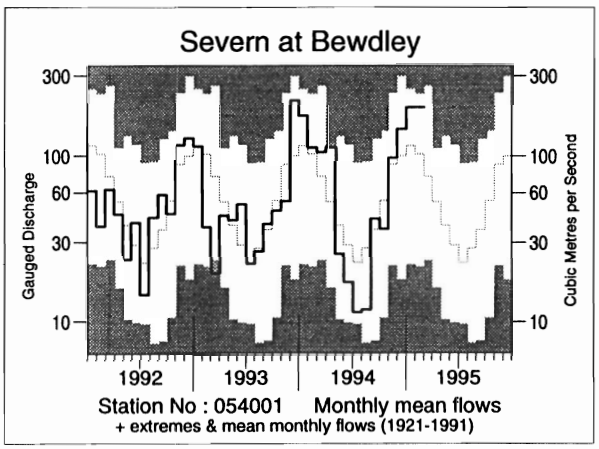


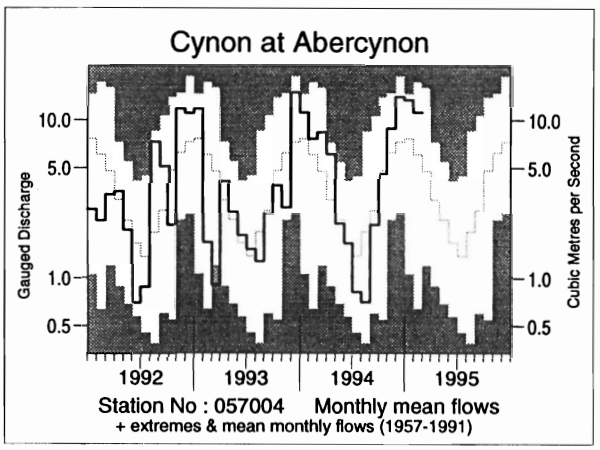

Coln at Bibury
Gauged Discharge
Cubic Metres per Second
3.0
1.0
0.6
0.3
1992
1993
1994
1995
Station No : 039020 Monthly mean flows
+ extremes & mean monthly flows (1963-1991)

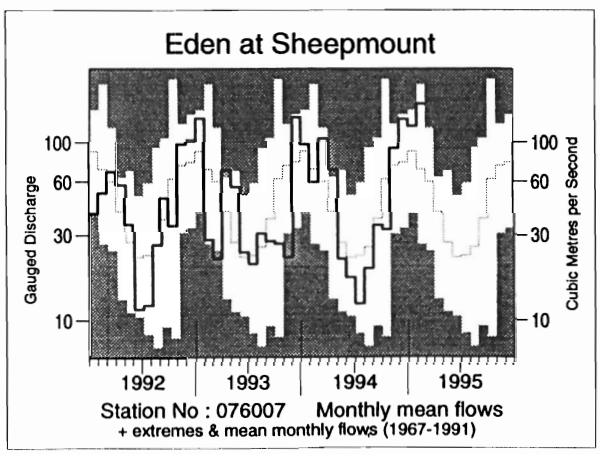

Great Stour at Horton
Gauged Discharge
Cubic Metres per Second
10.0
7.0
4.0
2.0
1.0
1992
1993
1994
1995
Station No : 040011 Monthly mean flows
+ extremes & mean monthly flows (1964-1991)


Itchen at Highbridge+Allbrook
Gauged Discharge
Cubic Metres per Second
10
8
6
4
1992
1993
1994
1995
Station No : 042010 Monthly mean flows
+ extremes & mean monthly flows (1958-1991)


Tone at Bishops Hull
Gauged Discharge
Cubic Metres per Second
10.0
5.0
1.0
0.5
1992
1993
1994
1995
Station No : 052005 Monthly mean flows
+ extremes & mean monthly flows (1961-1991)


Severn at Bewdley
Gauged Discharge
Cubic Metres per Second
300
100
60
30
10
1992
1993
1994
1995
Station No : 054001 Monthly mean flows
+ extremes & mean monthly flows (1921-1991)


Cynon at Abercynon
Gauged Discharge
Cubic Metres per Second
10.0
5.0
1.0
0.5
1992
1993
1994
1995
Station No : 057004 Monthly mean flows
+ extremes & mean monthly flows (1957-1991)


Eden at Sheepmount
Gauged Discharge
Cubic Metres per Second
100
60
30
10
1992
1993
1994
1995
Station No : 076007 Monthly mean flows
+ extremes & mean monthly flows (1967-1991)

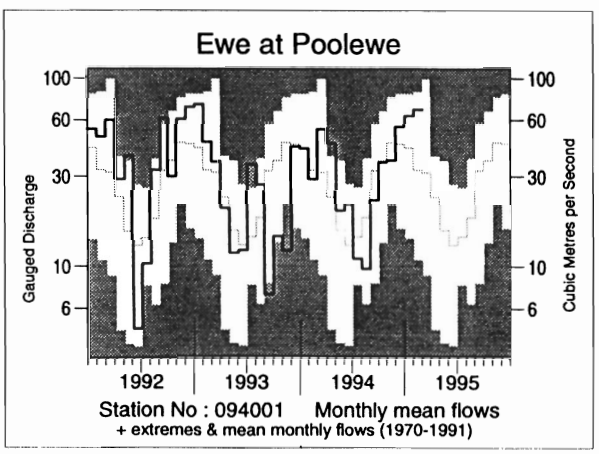

Ewe at Poolewe
Gauged Discharge
Cubic Metres per Second
100
60
30
10
6
1992
1993
1994
1995
Station No : 094001 Monthly mean flows
+ extremes & mean monthly flows (1970-1991)

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	Oct 1994	Nov	Dec	Jan 1995	Feb 1995		12/94 to 2/95		9/94 to 2/95		3/94 to 2/95		9/92 to 2/95	
	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	41 49	86 115	71 83	81 88	98 136	20 /23	250 100	9 /23	405 89	8 /22	768 98	10 /22	2132 105	12 /20
Tay at Ballathie	72 65	163 137	212 150	174 117	217 190	42 /43	603 147	41 /43	883 123	36 /42	1538 135	42 /42	3636 122	40 /40
Tweed at Boleside	33 46	114 133	214 218	162 154	160 209	34 /35	536 186	34 /34	708 143	34 /34	1043 136	34 /34	2518 125	32 /32
Whiteadder Water at Hutton Castle	8 26	29 79	39 82	43 73	47 101	17 /26	129 84	9 /26	172 74	6 /26	284 73	6 /25	1043 102	11 /24
South Tyne at Haydon Bridge	41 59	114 123	179 172	181 179	158 215	32 /33	518 181	33 /33	711 139	31 /31	987 125	30 /31	2328 111	23 /27
Wharfe at Flint Mill Weir	48 77	113 143	136 137	163 166	152 203	39 /40	451 163	39 /40	655 140	38 /39	907 125	35 /39	2113 111	28 /37
Derwent at Buttercrambe	15 76	25 89	35 87	57 127	55 142	28 /34	146 117	25 /34	198 106	19 /33	302 93	15 /33	875 104	20 /31
Trent at Colwick	22 91	47 154	59 129	91 184	66 158	32 /37	215 154	35 /37	309 147	34 /36	456 128	33 /36	1110 121	33 /34
Lud at Louth	12 98	14 96	18 89	37 130	48 150	19 /27	103 123	17 /27	142 117	19 /27	307 121	17 /26	745 121	18 /25
Witham at Claypole Mill	14 144	26 204	38 192	49 194	40 156	32 /36	127 173	31 /36	182 177	32 /36	270 143	31 /35	709 152	34 /34
Little Ouse at Abbey Heath	8 83	10 81	12 67	27 119	34 160	25 /27	72 115	18 /27	99 107	16 /27	197 117	21 /26	511 121	22 /25
Mimram at Panshanger Park	10 124	10 117	11 112	15 128	19 165	40 /43	45 133	37 /43	76 130	36 /42	183 145	41 /42	425 138	40 /40
Lee at Feildes Weir (natr.)	10 96	10 77	14 75	41 189	34 174	95 /110	89 148	91 /100	117 129	84 /109	217 133	91 /108	571 138	98 /105
Thames at Kingston (natr.)	11 82	22 102	34 111	55 149	65 199	109 /113	154 154	100 /112	198 137	89 /112	312 127	89 /112	850 134	103 /110
Coln at Bibury	13 81	20 83	36 90	69 133	97 182	31 /32	202 136	29 /32	249 122	24 /31	457 115	23 /31	1235 124	28 /29
Great Stour at Horton	24 115	30 110	45 131	65 165	58 178	30 /31	168 153	28 /30	240 139	26 /30	382 130	26 /28	865 115	18 /25
Itchen at Highbridge+Allbrook	29 96	39 116	47 114	60 125	80 167	37 /37	187 134	32 /37	284 124	30 /36	556 121	33 /36	1324 116	31 /34
Stour at Throop Mill	16 68	73 232	73 127	120 202	122 216	22 /23	315 169	22 /22	414 163	21 /22	588 148	22 /22	1455 141	20 /20
Exe at Thorverton	81 110	165 170	200 148	238 184	174 171	35 /39	612 163	38 /39	901 153	38 /39	1242 148	37 /38	2862 128	37 /37
Taw at Umberleigh	65 104	143 156	181 152	208 180	148 177	33 /37	537 164	36 /37	776 152	35 /36	1047 149	35 /36	2523 134	34 /34
Tone at Bishops Hull	24 90	89 207	118 170	189 240	117 164	31 /35	424 187	34 /34	551 176	33 /34	759 158	34 /34	1681 134	31 /32
Severn at Bewdley	22 68	58 109	89 141	121 171	109 192	69 /74	320 166	72 /74	425 141	69 /74	599 132	69 /73	1411 117	66 /72
Teme at Knightsford Bridge	11 56	47 143	88 158	118 183	83 165	22 /25	289 163	23 /25	364 152	24 /25	465 127	21 /24	1139 119	22 /23
Cynon at Abercynon	116 97	218 142	351 182	334 173	257 192	34 /37	942 176	36 /37	1329 148	35 /35	1825 143	35 /35	4280 125	31 /31
Dee at New Inn	158 83	219 92	447 175	390 165	292 181	24 /26	1129 167	26 /26	1632 133	25 /26	2326 128	24 /25	5219 108	19 /24
Eden at Sheepmount	38 54	105 127	157 166	143 138	172 238	24 /25	472 168	24 /24	653 139	23 /23	937 133	23 /23	2131 116	16 /19
Clyde at Daldowie	41 51	122 125	233 227	152 137	152 203	31 /32	537 180	32 /32	727 136	31 /31	1112 141	31 /31	2671 127	29 /29
Carron at New Kelso	129 51	229 81	420 122	383 120	445 205	16 /17	1248 136	15 /16	1792 106	10 /16	2899 112	13 /16	6789 99	6 /14
Ewe at Poolewe	217 101	214 81	336 121	379 140	369 197	23 /25	1084 145	22 /25	1647 116	18 /24	2605 121	23 /24	6339 109	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 1995.

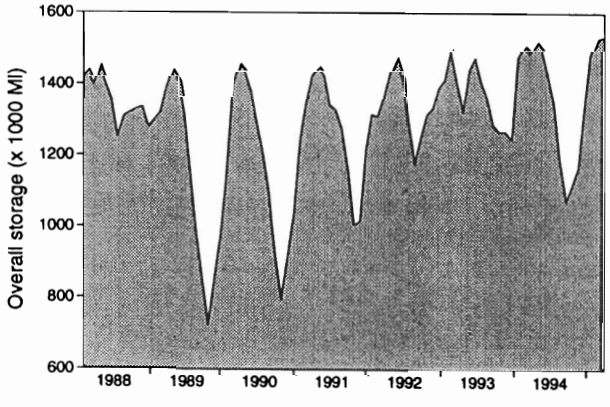
TABLE 4 START-MONTH RESERVOIR STORAGES UP TO MARCH 1995

Area	Reservoir (R)/ Group (G)		Capacity● (Ml)	1994 Oct	Nov	Dec	1995 Jan	Feb	Mar	1994 Mar
North West	N.Command Zone[1]	(G)	133375	55	50	67	91	100	100	93
	Vyrnwy	(R)	55146	69	65	83	100	99	100	100
Northumbria	Teesdale[2]	(G)	87936	51	53	80	97	100	100	97
	Kielder	(R)	199175*	89*	90*	91*	100*	100*	100*	91*
Severn-Trent	Clywedog	(R)	44922	70	82	83	100	100	94	98
	Derwent Valley[3]	(G)	39525	53	64	89	100	100	100	99
Yorkshire	Washburn[4]	(G)	22035	42	52	73	92	100	100	98
	Bradford supply[5]	(G)	41407	48	57	74	88	99	99	98
Anglian	Grafham	(R)	58707	88	89	95	93	92	93	98
	Rutland	(R)	130061	87	86	93	95	96	95	97
Thames	London[6]	(G)	207569	83	85	89	92	94	95	87
	Farmoor [7]	(G)	13843	97	99	96	95	95	96	99
Southern	Bewl	(R)	28170	86	83	85	89	96	99	92
	Ardingly	(R)	4685	82	80	90	93	100	100	100
Wessex	Clatworthy	(R)	5364	48	53	100	100	100	100	100
	Bristol W [8]	(G)	38666*	55*	52*	71*	88*	99*	99*	99*
South West	Colliford	(R)	28540	69	70	75	81	90	96	100
	Roadford[9]	(R)	34500	65	66	69	79	91	97	97
	Wimbleball[10]	(R)	21320	57	64	80	100	100	100	100
	Stithians	(R)	5205	50	50	66	77	100	100	100
Welsh	Celyn + Brenig	(G)	131155	71	75	86	100	100	100	100
	Brianne	(R)	62140	71	83	99	100	100	100	100
	Big Five[11]	(G)	69762	62	66	83	92	97	100	99
	Elan Valley[12]	(G)	99106	67	83	99	100	100	100	100
Lothian	Edin./Mid Lothian	(G)	97639	71	69	85	95	99	100	94
	East Lothian	(G)	10206	56	57	70	91	98	100	99
Strathclyde	Loch Katrine	(G)	111363	83	90	95	98	97	99	100
	Daer	(R)	22412	58	99	99	100	100	100	100
	Loch Thom	(G)	11840	80	83	94	99	100	100	98

● 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.

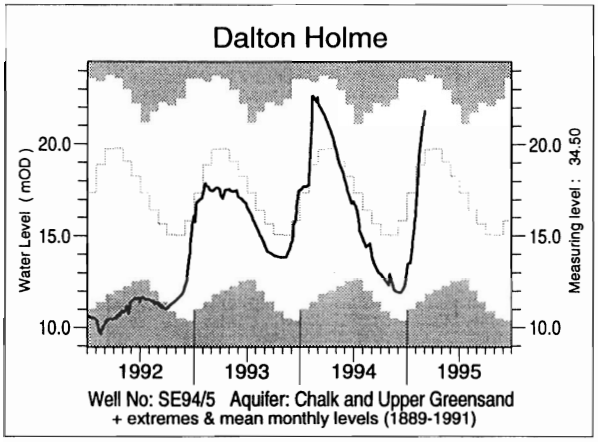
A GUIDE TO THE VARIATION IN OVERALL RESERVOIR STOCKS FOR ENGLAND AND WALES

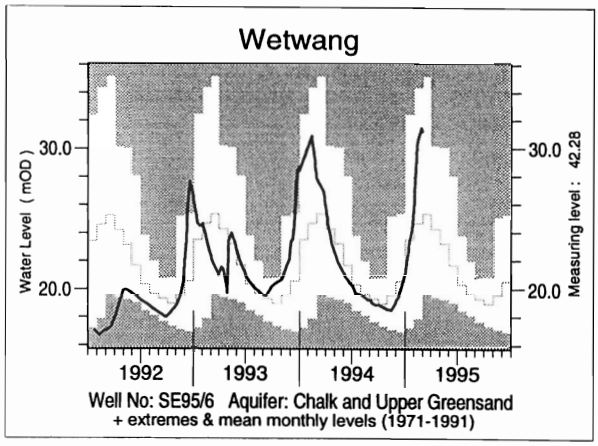


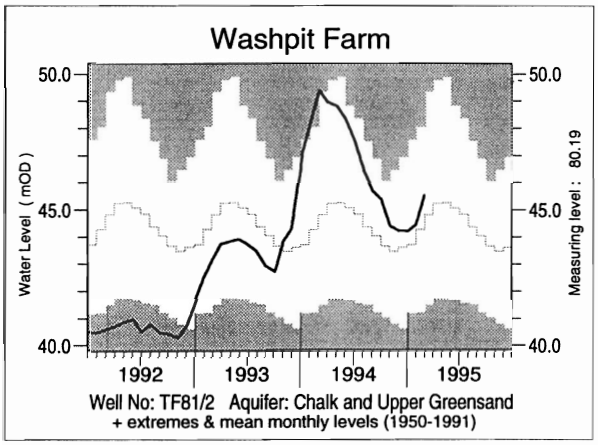
This plot is based on the reservoirs featured in Table 4 only.

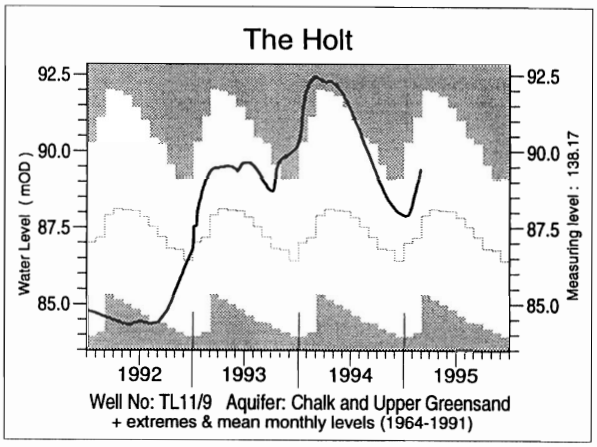
Note: Variations in storage depend on the balance between inputs (from catchment rainfall and any pumping) and outputs (to supply, compensation flow, HEP, amenity). There will be additional losses due to evaporation, especially in the summer months. Operational strategies for making the most efficient 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.

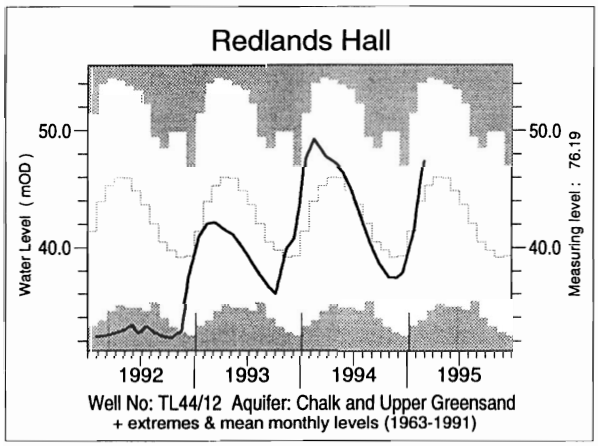
FIGURE 2 GROUNDWATER LEVEL HYDROGRAPHS

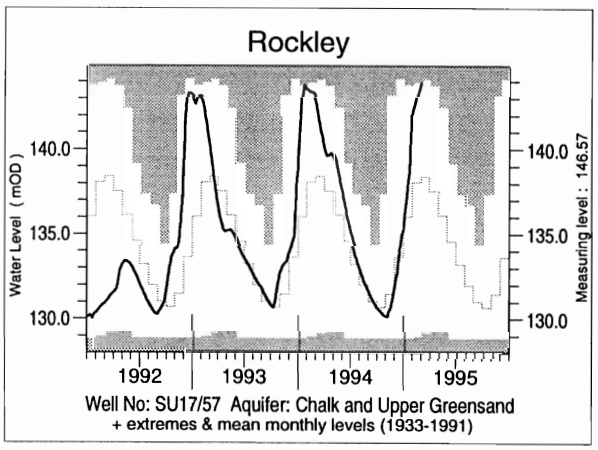


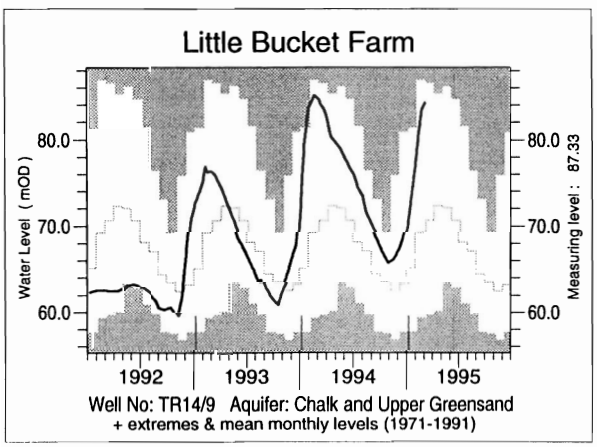


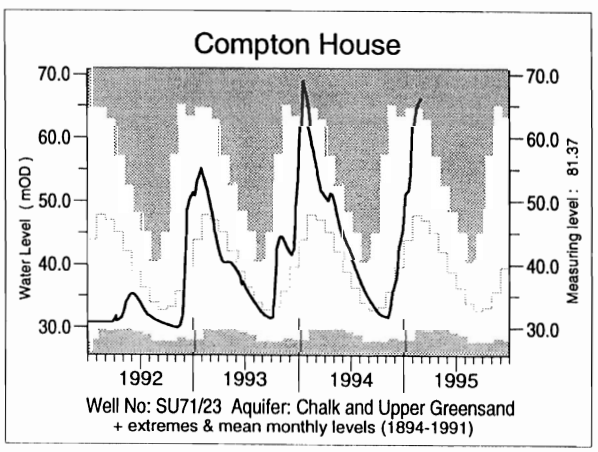


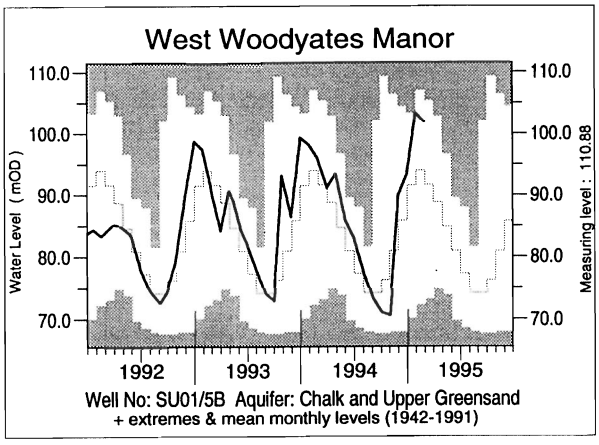


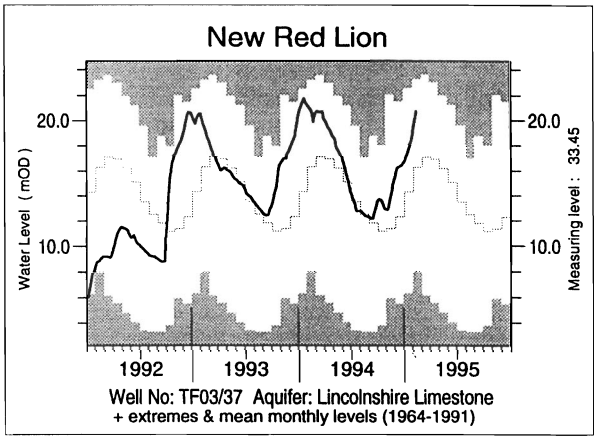


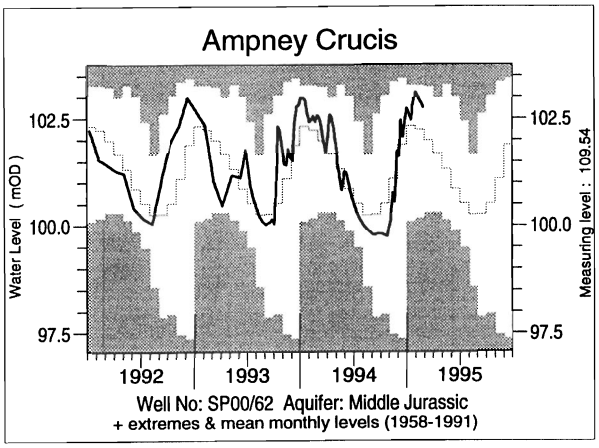


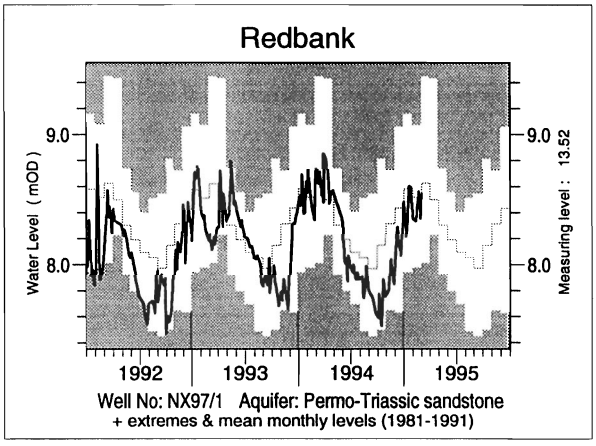


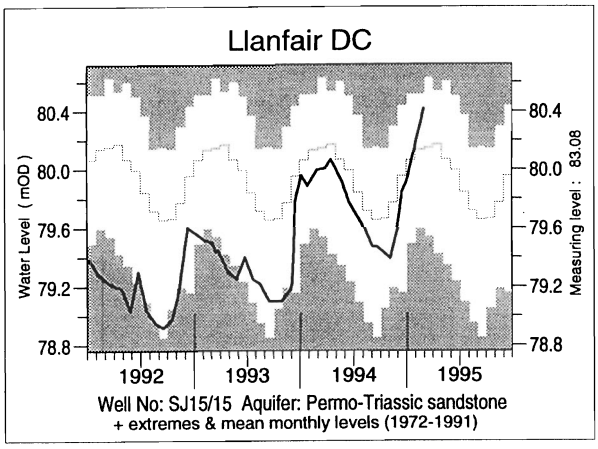


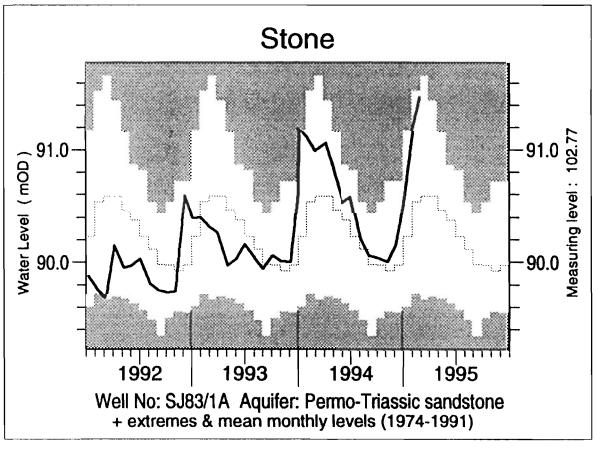

West Woodyates Manor
Water Level (mOD)
Measuring level : 110.88
110.0
100.0
90.0
80.0
70.0
1992
1993
1994
1995
Well No: SU01/5B Aquifer: Chalk and Upper Greensand
+ extremes & mean monthly levels (1942-1991)

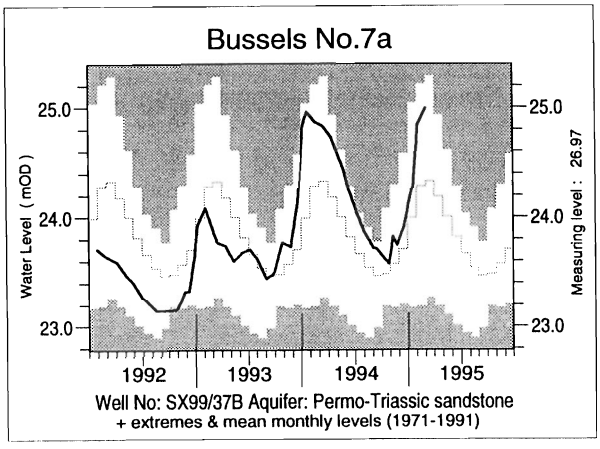

New Red Lion
Water Level (mOD)
Measuring level : 33.45
20.0
10.0
1992
1993
1994
1995
Well No: TF03/37 Aquifer: Lincolnshire Limestone
+ extremes & mean monthly levels (1964-1991)


Ampney Crucis
Water Level (mOD)
Measuring level : 109.54
102.5
100.0
97.5
1992
1993
1994
1995
Well No: SP00/62 Aquifer: Middle Jurassic
+ extremes & mean monthly levels (1958-1991)


Redbank
Water Level (mOD)
Measuring level : 13.52
9.0
8.0
1992
1993
1994
1995
Well No: NX97/1 Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1981-1991)


Llanfair DC
Water Level (mOD)
Measuring level : 83.08
80.4
80.0
79.6
79.2
78.8
1992
1993
1994
1995
Well No: SJ15/15 Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1972-1991)


Stone
Water Level (mOD)
Measuring level : 102.77
91.0
90.0
1992
1993
1994
1995
Well No: SJ83/1A Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1974-1991)


Bussels No.7a
Water Level (mOD)
Measuring level : 26.97
25.0
24.0
23.0
1992
1993
1994
1995
Well No: SX99/37B Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1971-1991)

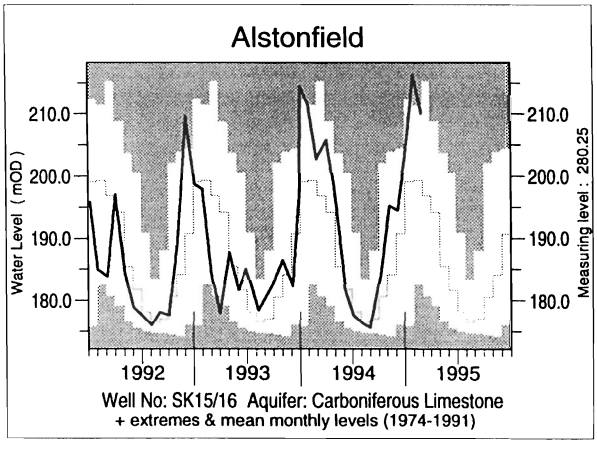

Alstonfield
Water Level (mOD)
Measuring level : 280.25
210.0
200.0
190.0
180.0
1992
1993
1994
1995
Well No: SK15/16 Aquifer: Carboniferous Limestone
+ extremes & mean monthly levels (1974-1991)

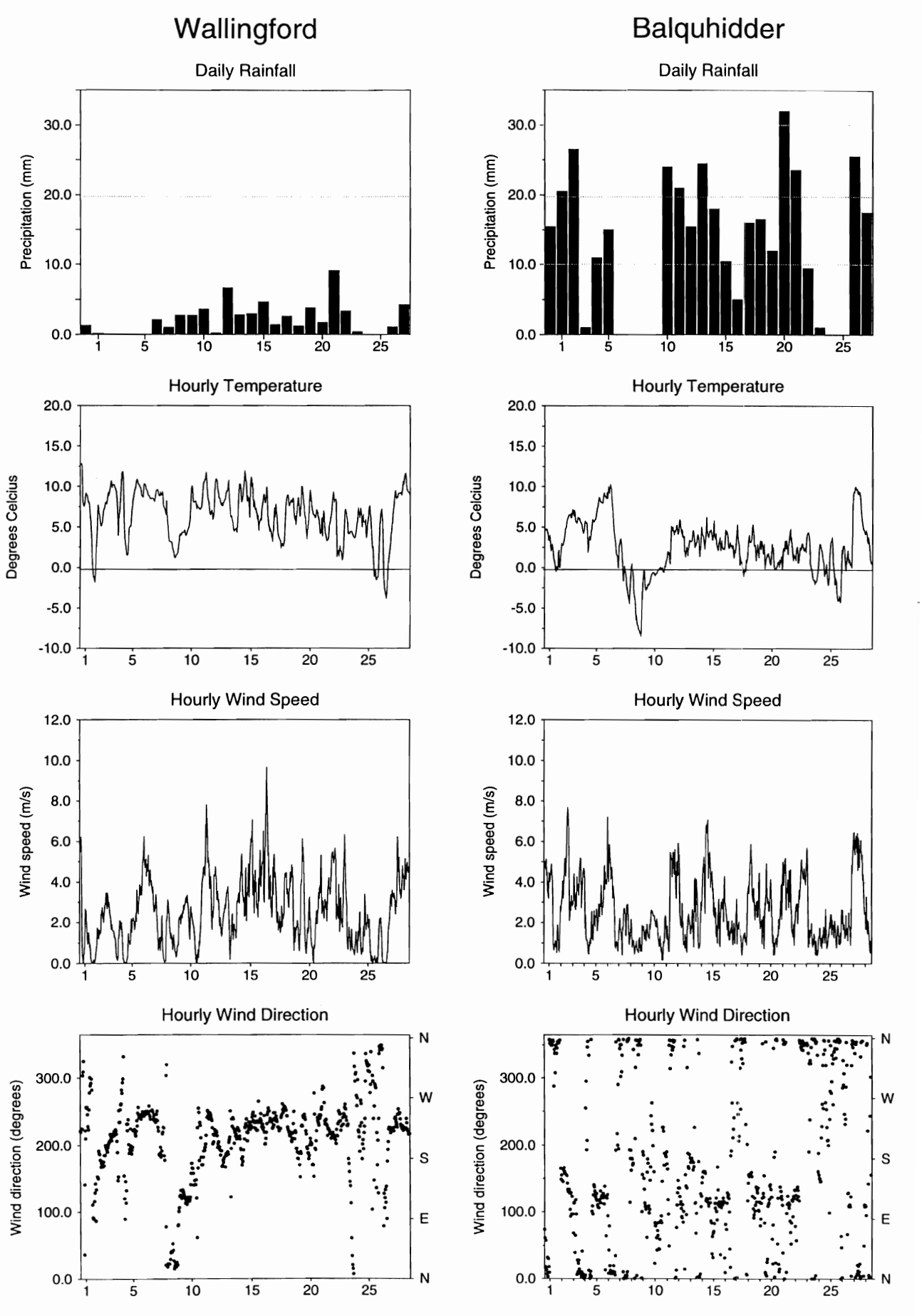
TABLE 5 A COMPARISON OF FEBRUARY GROUNDWATER LEVELS: 1994 AND 1995

Site	Aquifer	Records commence	Minimum Feb	Average Feb	Maximum Feb	February 1994		Feb/March 1995	
			<1995	<1995	<1995	day	level	day	level
Dalton Holme	C & UGS	1889	9.64	18.92	23.44	28/02	22.58	01/03	21.85
Wetwang	C & UGS	1971	16.66	25.13	34.31	28/02	27.93	01/03	31.18
Washpit Farm	C & UGS	1950	40.51	44.27	48.20	01/02	48.20	01/03	45.53
The Holt	C & UGS	1964	84.03	87.35	92.41	27/02	92.41	27/02	89.38
Therfield Rectory	C & UGS	1883	dry <71.6	78.12	96.17	27/02	86.55	27/02	78.25
Redlands Hall	C & UGS	1964	32.47	43.32	54.01	11/02	49.24	24/02	47.33
Rockley	C & UGS	1933	128.92	138.17	143.88	27/02	143.03	27/02	143.90
Little Bucket Farm	C & UGS	1971	59.34	69.16	86.87	14/02	85.12	01/03	84.26
Compton House	C & UGS	1984	29.60	48.25	64.50	22/02	57.52	24/02	66.15
Chilgrove House	C & UGS	1836	35.36	57.62	76.20	22/02	67.33	15/02	76.18
Westdean No.3	C & UGS	1940	1.19	2.29	5.03	25/02	2.68	24/02	4.23
Lime Kiln Way	C & UGS	1969	124.12	125.24	126.05	23/02	125.72	28/02	126.34
Ashton Farm	C & UGS	1974	64.83	69.63	71.18	28/02	71.18	28/02	71.14
West Woodyates Manor	C & UGS	1942	72.22	93.11	107.10	28/02	95.86	28/02	101.95
Killyglen (NI)	C & UGS	1985	114.32	115.94	119.50	22/02	115.54	09/02	115.51
New Red Lion	LLst	1964	7.97	16.13	23.29	28/02	20.61	13/02	20.75
Ampney Crucis	Mid Jur	1958	100.17	102.25	103.27	27/02	102.57	27/02	102.76
Yew Tree Farm	PTS	1973	12.69	13.57	13.86	02/02	13.71	01/03	14.01
Llanfair D.C	PTS	1972	79.29	80.01	80.52	28/02	80.00	28/02	80.42
Morris Dancers	PTS	1969	31.75	32.49	33.52	08/02	32.10	02/02	32.41
Weeford Flats	PTS	1966	dry <88.61	89.73	91.25	01/02	89.36	01/03	90.31
Stone	PTS	1974	89.72	90.57	91.53	01/02	91.11	01/03	91.47
Skirwith	PTS	1978	129.88	130.51	130.94	14/02	130.66	01/03	131.49
Redbank	PTS	1981	7.84	8.53	9.08	25/02	8.34	02/03	8.54
Bussels No.7A	PTS	1972	23.19	24.28	25.21	17/02	24.87	02/03	24.99
Rushyford NE	MgLst	1967	65.32	72.39	76.84	25/02	76.72	28/02	76.64
Peggy Ellerton	MgLst	1968	31.73	34.46	36.84	17/02	33.65	14/02	34.78
Alstonfield	CLst	1974	182.47	199.04	211.50	01/02	211.33	01/03	210.09

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 METEOROLOGICAL SUMMARY - FEBRUARY 1995



Altitude of sites : Wallingford 48m; Balquhidder (Kirkton Glen) 270m.

FIGURE 4 LOCATION MAP OF GAUGING STATIONS AND GROUNDWATER INDEX WELLS