Hydrological Summary for Great Britain

MAY 1997

General

May was generally a mild and sunny month especially in southern Britain. It was also a relatively wet month in most regions, providing a timely respite from the drought (especially for farmers) and extending the reservoir refill season in the west and north. Overall stocks having varied erratically in 1997 are, again, very close to the average but are low for early summer in parts of eastern and southern England. The May rainfall was insufficient - and lowland soils too dry - for appreciable aquifer recharge to recommence in eastern and southern England. Hydrologically, May served to emphasise the current focus of the drought in the English lowlands - the South-East particularly - where the water resources and environmental outlooks are most fragile; most river flows and groundwater levels remain above those of the benchmark 1976 drought but an extension of the current drought into the autumn would produce extremely depressed runoff rates and groundwater levels.

Rainfall

1997 rainfall continued in its episodic vein with the unsettled conditions which became established in late April continuing until around May 20th. Thereafter, high pressure dominated and many central areas of England had virtually no rainfall over the remainder of the month. Despite this dry interlude rainfall totals for May were above average in most regions - notably so in parts of Scotland where the rainfall in a few eastern districts exceeded twice the 1961-90 average. Despite a very unsettled start to the month, rainfall totals for the English lowlands were typically in the 90-110% range although local variability was considerable and below average rainfall characterised some eastern and a few southern areas. A dampish spring following a notably wet February produced very high four-month rainfall totals in Scotland - the provisional February-May total is the third highest in a series from 1869 (1989, 1990 and 1992 all rank in the wettest four). By contrast, the spring in the English lowlands, though substantially wetter than 1990, was the third driest in the last 40 years; less than 50% of average being reported for parts of the South-East. Rainfall deficiencies are also notable in the six-month timeframe especially in the Anglian, Thames and Southern regions; in the latter two regions the December-May rainfall was below 60% of average. The drought remains exceptional over its full compass; notwithstanding the May rainfall, the provisional England and Wales rainfall total for the period beginning in April 1995 is the lowest for any 26-month accumulation in the 231-year England and Wales series. Accumulated rainfall deficiencies continue to be the equivalent of around six months average rainfall throughout most of England away from the South-West.

River Flow

The early May rainfall satisfied the modest (but seasonally notable) soil moisture deficits in northern and western catchments. This allowed river flows to pick-up mostly from an exceptionally low base - and a few minor spates were reported in the first three weeks before recessions became re-established. Monthly runoff totals showed wide regional variations. In large parts of Scotland, northern England and Wales, May runoff totals were several times the April figure and above average in most catchments. By contrast, the parched soils in the east and south robbed the rainfall of much of its effectiveness and flow recoveries were short-lived and modest, especially in permeable catchments. Lowland runoff totals for May were very depressed in those, mostly Chalk, catchments which showed a continuing decline from April. Many lowland rivers reported May flows as the lowest on record with the exception of 1976; in Kent the Gt Stour which has a 30-year record, eclipsed the May minimum established last year. 24-month (ending in May) runoff totals are unprecedented throughout much of England and Wales, and the general contraction in the stream network is continuing. Many headwater reaches are now dry and the dilution available for sewage effluent is limited in many streams.

Groundwater

The wetting up of soils allowed some infiltration in northern and western areas - producing moderate but useful upturns in some limestone and Permo-Triassic sandstones index wells. Spatial variability in levels in the latter are significant but remain close to the lowest on record in the Midlands and the North. Some isolated instances of modest recharge to the Chalk (typically well fissured outcrops below desiccated soils) following heavy rainfall were reported but there was no appreciable recharge in the eastern Chalk where groundwater levels are depressed over wide areas - in the eastern Chilterns and the Lee catchment especially; levels in the deep Therfield Rectory well went dry for only the second time since the drought of 1921/22 (it was dry in 1992 also). In the rest of the Chalk conditions are less extreme with recessions remaining above those of 1976 and, in most areas, 1992 also. Nonetheless, the overall decline in ground water resources since early 1995 has few modern parallels although it appears less unusual in the context of the very wide departures from the seasonal average which has been a feature of the last decade.

Institute of Hydrology

British Geological Survey

This report was compiled jointly by the Institute of Hydrology (a component of the Centre for Ecology and Hydrology) and the British Geological Survey - both organisations form part of the Natural Environment Research Council (NERC).

Data for this report have been provided principally by the regional divisions of the newly formed Environment Agency (England and Wales) and the Scottish Environment Protection Agency. For reasons of consistency and to provide greater spatial discrimination, the original regional divisions of the precursor organisations have been retained for use in the Hydrological Summaries. The majority of the areal rainfall figures have been provided by the Meteorological Office. 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. Figure 3 is based on weather data collected by the Institute of Hydrology at Wallingford, Balquhidder (Central Region, Scotland) and Plynlimon. Reservoir contents information has been supplied by the Water Services Companies, the Environment Agency and, in Scotland, West of Scotland Water and East of Scotland Water. 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, the Environment Agency, the Scottish Environment Protection Agency and the Office of Water Services (OFWAT).

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. The text of the monthly report, together with details of other National Water Archive facilities, is available on the World Wide Web: http://www.nwl.ac.uk:80/~nrfadata/nwa.html

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 raingauge sites.

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

Tel: 01344 856858 Fax: 01344 854024

Institute of Hydrology/British Geological Survey
Maclean Building
Crowmarsh Gifford
Wallingford
Oxfordshire
OX10 8BB

12 June 1997

TABLE 1 1996/97 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.

		May 1996	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 1997	Feb	Mar	Apr	May
England and Wales	mm	57	30	41	80	34	91	126	52	15	119	31	25	73
	%	89	46	66	105	44	107	140	55	17	189	43	42	113
North West	mm	62	49	65	88	61	149	133	64	14	213	73	39	107
	%	83	60	76	82	53	116	108	52	12	273	77	55	142
Northumbrian	mm	53	22	53	67	31	69	108	84	19	127	36	20	72
	%	85	37	82	83	42	91	126	104	23	215	51	36	116
Severn Trent	mm	48	30	33	68	20	72	95	53	13	85	22	29	77
	%	81	51	62	101	31	113	134	69	19	157	36	53	130
Yorkshire	mm	52	35	41	74	31	57	112	93	13	105	28	22	69
	%	87	58	69	100	46	78	140	112	16	181	41	37	115
Anglian	mm	23	18	40	76	16	46	91	42	14	44	12	18	49
	%	48	35	82	138	33	90	157	76	28	119	26	39	103
Thames	mm	35	16	39	61	20	47	106	24	13	77	12	15	57
	%	63	29	80	105	34	76	163	34	20	171	21	30	102
Southern	mm	51	16	34	80	33	57	147	31	19	94	18	11	48
	%	94	30	71	140	48	71	173	38	24	174	29	21	89
Wessex	mm	60	29	27	86	33	84	145	31	14	116	29	23	68
	%	98	51	52	130	46	106	175	33	16	178	41	43	112
South West	mm	100	34	31	98	50	135	201	52	25	162	40	32	81
	%	139	49	45	117	54	116	161	37	18	160	40	46	112
Welsh	mm	106	47	47	103	58	180	171	52	12	211	50	42	117
	%	129	59	61	102	50	131	120	34	8	218	47	52	142
Scotland	mm	78	65	78	67	64	227	188	95	58	267	136	60	102
	%	91	76	83	57	45	146	125	63	38	262	109	78	118
Highland	mm	84	79	91	73	85	263	250	106	93	339	202	93	101
	%	91	81	86	57	50	133	123	54	49	267	125	102	110
North East	mm	67	33	66	64	32	136	110	86	27	126	70	35	115
	%	97	50	90	74	37	140	111	92	27	194	90	58	167
Tay	mm	67	44	53	64	52	194	142	70	39	247	103	27	106
	%	81	60	69	68	46	149	117	55	27	260	94	44	128
Forth	mm	68	44	55	61	47	174	139	81	40	227	82	33	114
	%	92	64	73	65	43	151	124	74	34	287	87	56	154
Tweed	mm	63	30	53	63	29	133	139	118	24	189	53	21	99
	%	89	46	73	72	33	140	149	127	24	282	67	37	139
Solway	mm	80	78	69	66	58	261	155	99	32	252	87	44	109
	%	94	93	77	55	41	166	108	67	21	250	74	57	128
Clyde	mm	90	88	99	66	78	284	215	93	64	308	161	72	84
	%	99	95	91	49	44	147	119	52	34	261	110	86	92

Note: The monthly regional rainfall figures for England and Wales for April & May 1997 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, especially when snow is a significant component in the precipitation total. The figures for the Scottish regions (and also for Scotland) for April & May 1997 were derived by IH in collaboration with the SEPA regions.
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 ACCUMULATIONS AND RETURN PERIOD ESTIMATES

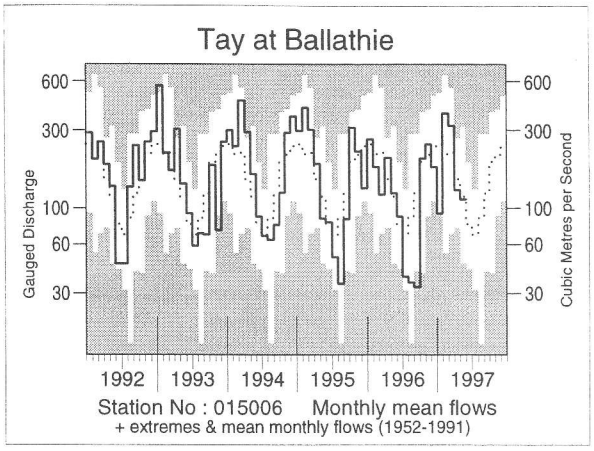
		Mar 97-May 97		Dec 96-May 97		Jun 96-May 97		Apr 95-May 97	
			Est Return Period, years		Est Return Period, years		Est Return Period, years		Est Return Period, years
England and Wales	mm	129		315		717		1501	
	% LTA	66	10-15	71	15-25	80	10-20	78	110-150
North West	mm	219		510		1055		1923	
	% LTA	91	2-5	90	2-5	88	5-10	75	>200
Northumbria	mm	128		358		708		1517	
	% LTA	68	5-15	87	2-5	83	5-15	83	25-40
Severn Trent	mm	128		279		597		1252	
	% LTA	73	5-10	74	5-15	79	10-20	77	70-100
Yorkshire	mm	119		330		680		1320	
	% LTA	64	10-15	81	5-10	83	5-15	75	>200
Anglian	mm	79		179		466		938	
	% LTA	56	15-25	63	30-50	78	10-20	73	>200
Thames	mm	84		198		487		1124	
	% LTA	52	15-25	58	35-50	71	30-50	76	70-100
Southern	mm	77		221		588		1267	
	% LTA	45	30-45	57	35-50	76	15-25	76	70-100
Wessex	mm	120		281		685		1610	
	% LTA	65	5-10	66	15-25	82	5-10	90	5-10
South West	mm	153		392		941		2154	
	% LTA	64	5-15	63	30-40	80	10-15	87	5-15
Welsh	mm	208		483		1089		2284	
	% LTA	77	2-5	73	10-20	83	5-10	82	30-45
Scotland	mm	297		717		1406		2803	
	% LTA	104	2-5	104	2-5	98	2-5	92	5-10
Highland	mm	396		934		1775		3319	
	% LTA	115	2-5	109	2-5	101	2-5	90	5-15
North East	mm	220		459		900		2115	
	% LTA	106	2-5	99	2-5	92	2-5	102	2-5
Tay	mm	236		592		1141		2479	
	% LTA	93	2-5	95	2-5	93	2-5	95	2-5
Forth	mm	229		577		1097		2169	
	% LTA	101	2-5	108	2-5	99	2-5	92	5-10
Tweed	mm	173		504		951		1914	
	% LTA	84	2-5	108	2-5	98	2-5	93	2-5
Solway	mm	240		623		1310		2678	
	% LTA	86	2-5	91	2-5	92	2-5	89	5-10
Clyde	mm	317		782		1612		3191	
	% LTA	98	2-5	97	2-5	95	2-5	89	5-15

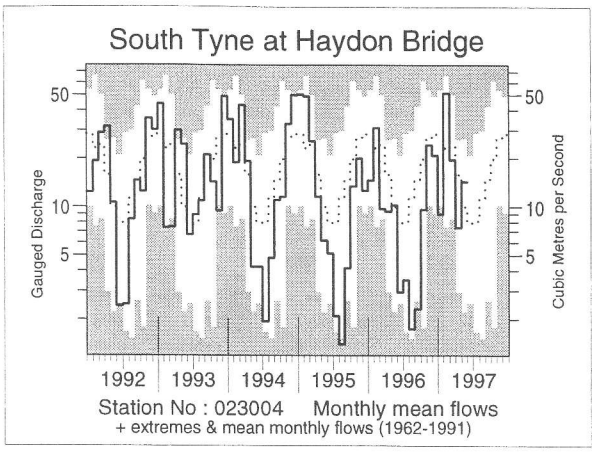
LTA refers to the period 1961-90.

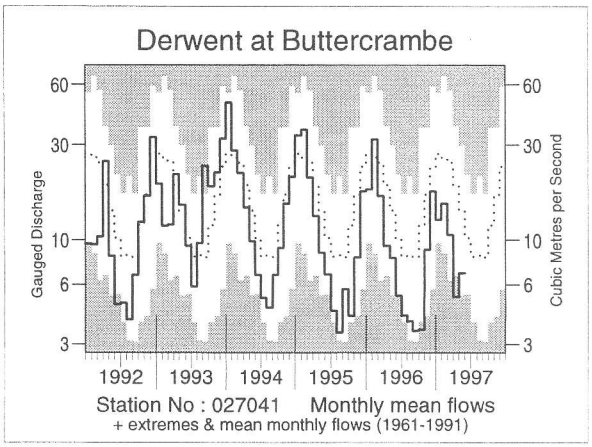
Return period assessments are based on tables provided by the Meteorological Office*. The tables reflect rainfall totals over the period 1911-70 only and the estimate assumes a sensibly stable climate. They assume a start in a specified month; return periods for a start in any month may be expected to be an order of magnitude less - for the longest durations the return period estimates converge. "Wet" return periods underlined. The ranking of accumulated rainfall totals for England & Wales and for Scotland can be affected by artifacts in the historical series - on balance these tend to exaggerate the relative wetness of the recent past.

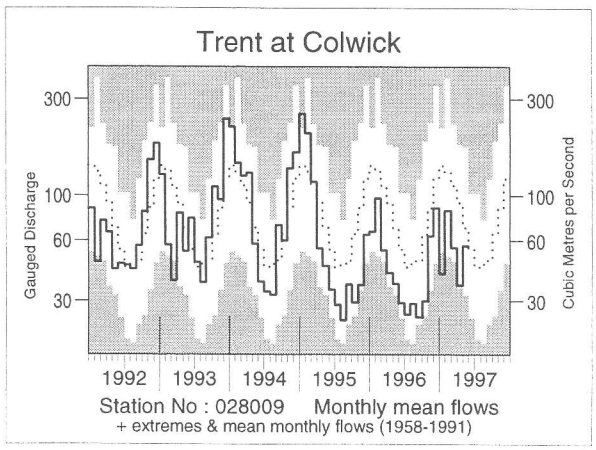
* Tabony, R.C., 1977, The Variability of long duration rainfall over Great Britain, Scientific Paper No. 37, Meteorological Office.

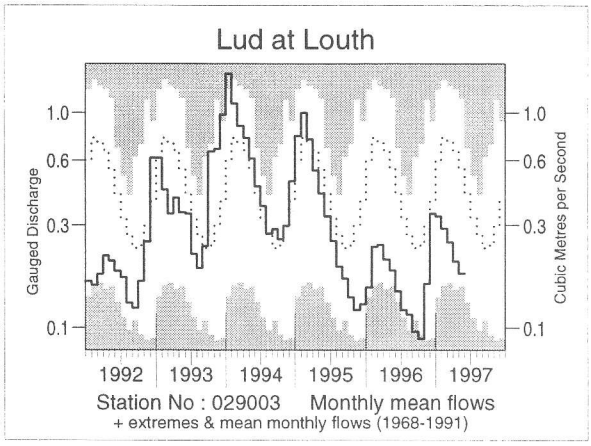
FIGURE 1 MONTHLY RIVER FLOW HYDROGRAPHS

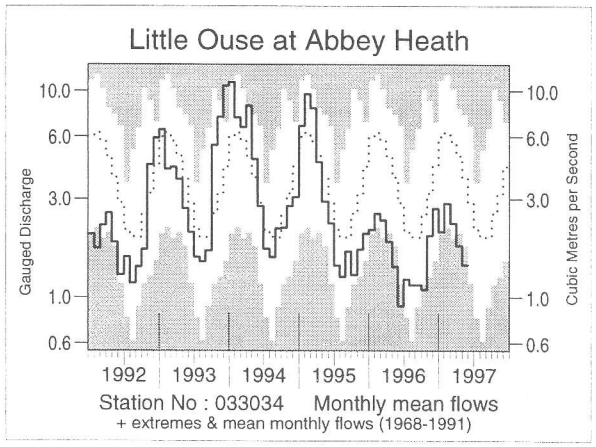


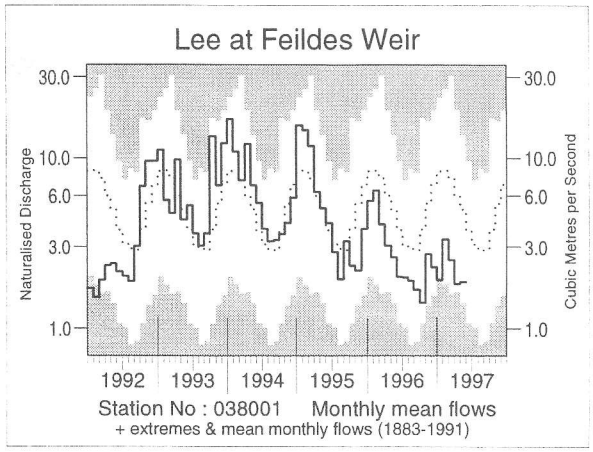


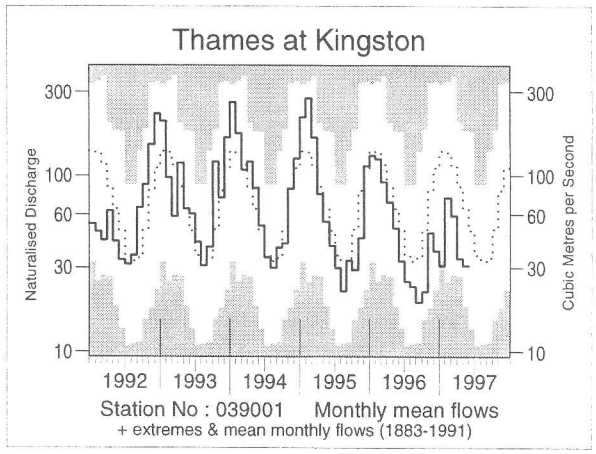


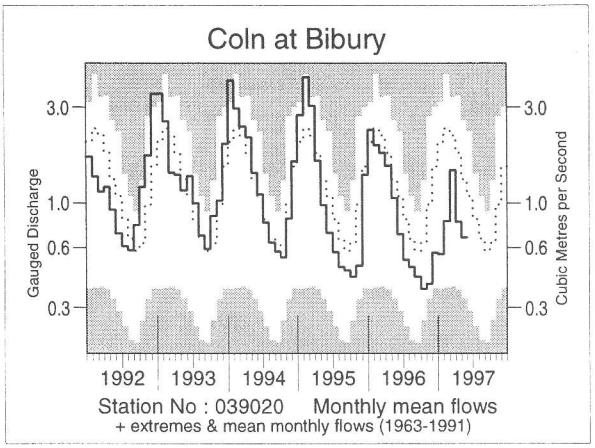


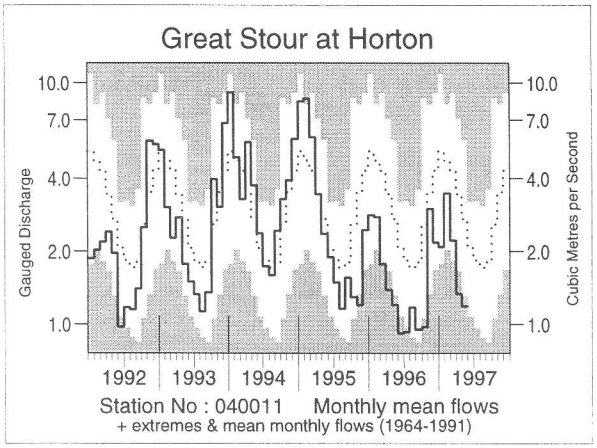


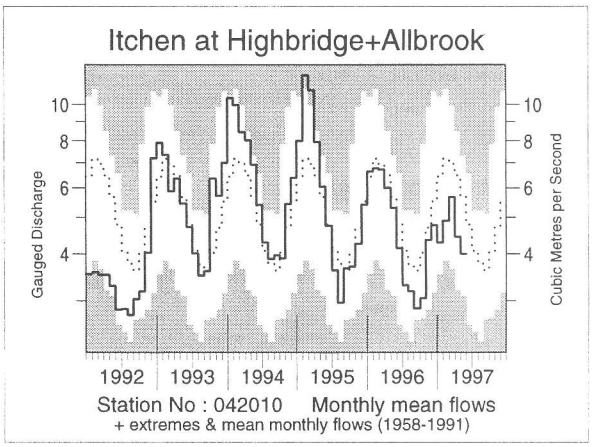


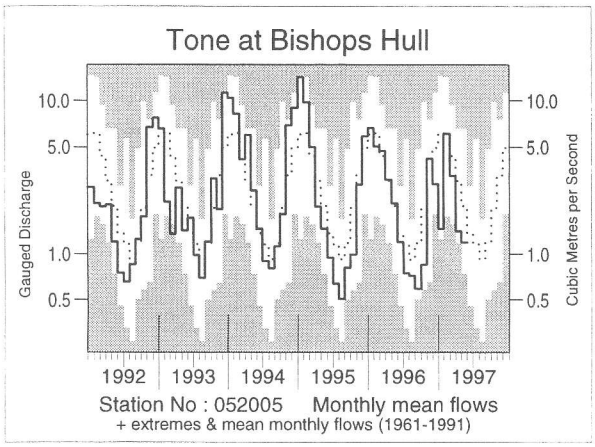


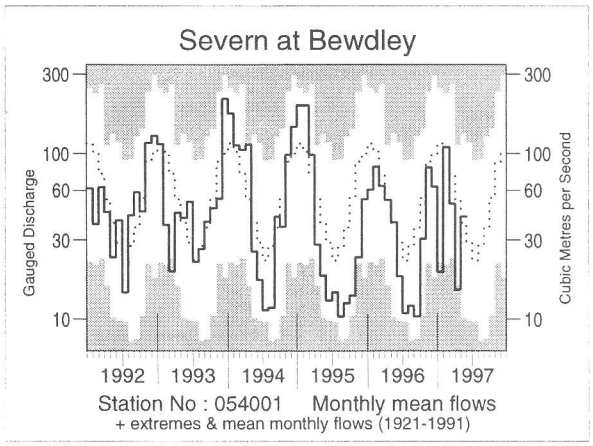


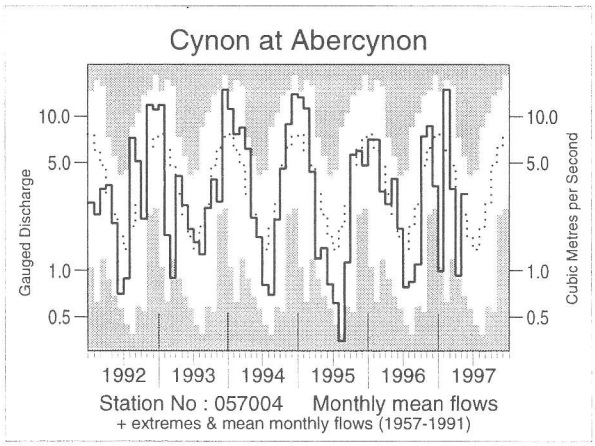

Coln at Bibury
Gauged Discharge
Cubic Metres per Second
3.0
1.0
0.6
0.3
1992 1993 1994 1995 1996 1997
Station No : 039020 Monthly mean flows
+ extremes & mean monthly flows (1963-1991)

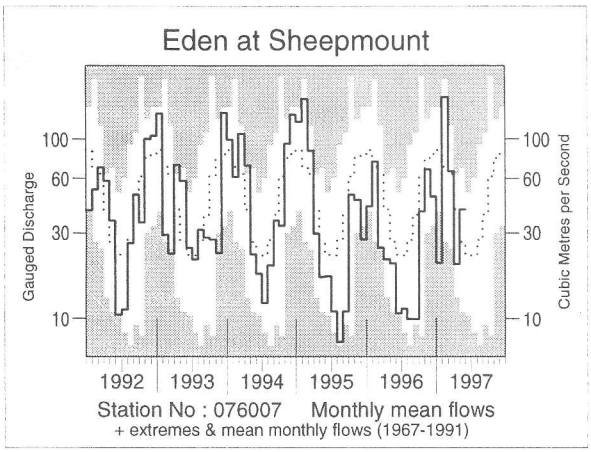

Great Stour at Horton
Gauged Discharge
Cubic Metres per Second
10.0
7.0
4.0
2.0
1.0
1992 1993 1994 1995 1996 1997
Station No : 040011 Monthly mean flows
+ extremes & mean monthly flows (1964-1991)


Itchen at Highbridge+Allbrook
Gauged Discharge
Cubic Metres per Second
10
8
6
4
1992 1993 1994 1995 1996 1997
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 1996 1997
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 1996 1997
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 1996 1997
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 1996 1997
Station No : 076007 Monthly mean flows
+ extremes & mean monthly flows (1967-1991)

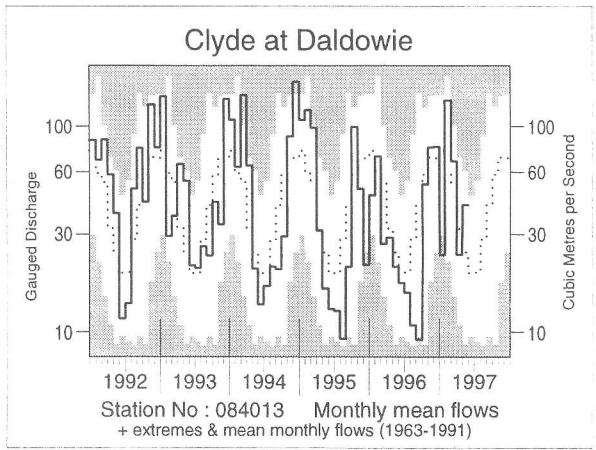

Clyde at Daldowie
Gauged Discharge
Cubic Metres per Second
100
60
30
10
1992 1993 1994 1995 1996 1997
Station No : 084013 Monthly mean flows
+ extremes & mean monthly flows (1963-1991)

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	Jan 1997	Feb	Mar	Apr	May 1997		3/97 to 5/97		12/96 to 5/97		6/96 to 5/97		6/95 to 5/97	
	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	39 41	97 130	90 95	32 40	73 118	19 /25	195 83	8 /25	408 83	5 /25	602 76	3 /24	1574 99	10 /23
Tay at Ballathie	54 36	202 173	187 143	73 80	66 95	24 /45	326 112	30 /45	686 98	23 /45	1054 92	15 /44	2094 92	13 /43
Tweed at Boleside	42 39	183 230	88 108	24 45	60 140	30 /37	172 96	21 /37	523 112	28 /36	758 99	15 /36	1375 90	10 /35
Whiteadder Water at Hutton Castle	47 79	48 100	27 58	11 30	17 64	15 /28	56 51	4 /28	252 95	12 /28	319 83	8 /27	654 85	8 /26
South Tyne at Haydon Bridge	32 31	166 216	70 81	26 45	51 141	28 /35	147 82	12 /35	420 91	11 /35	575 75	4 /33	1042 67	1 /31
Wharfe at Flint Mill Weir	28 28	138 182	54 72	21 40	41 114	29 /42	117 71	12 /42	360 82	11 /42	542 76	4 /41	812 57	1 /40
Derwent at Buttercrambe	21 47	23 59	18 46	8 28	12 51	2 /36	38 42	1 /36	112 52	3 /36	161 51	2 /35	383 60	1 /34
Trent at Colwick	15 29	27 65	20 51	12 40	20 85	18 /39	53 57	3 /39	126 55	3 /39	197 57	3 /38	390 55	1 /37
Lud at Louth	16 54	13 39	12 37	10 32	9 35	2 /29	30 35	3 /29	76 45	6 /29	110 46	3 /28	223 46	2 /27
Witham at Claypole Mill	9 35	11 41	11 43	6 29	7 49	6 /39	24 40	3 /38	52 40	3 /38	75 41	3 /38	175 48	1 /37
Little Ouse at Abbey Heath	8 35	10 46	9 41	7 37	6 40	2 /30	21 40	1 /29	49 44	4 /29	77 47	2 /29	160 49	2 /28
Colne at Lexden	5 23	5 28	6 34	3 27	3 42	4 /38	13 34	2 /38	30 32	2 /37	50 38	2 /36	125 47	3 /34
Mimram at Panshanger Park	5 42	5 46	6 44	5 37	4 36	2 /45	15 40	2 /45	31 43	2 /45	64 51	3 /44	176 70	4 /43
Lee at Feildes Weir (natr.)	5 23	8 40	7 34	5 30	5 38	4 /112	16 34	4 /111	35 33	4 /111	65 40	4 /110	172 53	9 /108
Thames at Kingston (natr.)	8 22	18 55	16 51	9 39	8 48	10 /115	33 47	9 /115	69 41	5 /114	114 47	6 /114	320 65	11 /113
Coln at Bibury	14 26	18 34	36 68	20 46	17 53	2 /34	73 58	3 /34	119 44	2 /34	191 49	2 /33	515 65	2 /32
Great Stour at Horton	16 40	24 74	17 54	10 39	9 45	1 /33	36 48	2 /32	94 51	1 /31	155 54	1 /31	315 55	1 /29
Itchen at Highbridge+Allbrook	32 66	33 67	42 81	32 69	30 71	5 /39	104 75	5 /39	204 73	6 /39	357 78	4 /38	794 86	6 /37
Stour at Throop Mill	18 27	49 80	40 79	16 46	12 53	2 /25	68 64	4 /25	164 56	3 /24	240 61	3 /24	608 76	2 /23
Exe at Thorverton	18 13	135 130	46 55	15 26	28 76	19 /42	89 51	3 /41	313 57	3 /41	550 67	2 /41	1180 71	1 /40
Taw at Umberleigh	14 12	118 138	40 59	9 21	16 57	14 /39	65 47	3 /39	261 57	4 /39	449 65	3 /38	913 66	1 /37
Tone at Bishops Hull	19 23	73 100	43 76	18 46	16 59	4 /37	76 63	6 /37	207 60	4 /36	314 66	4 /36	759 80	6 /35
Severn at Bewdley	12 17	61 107	31 67	9 28	26 111	54 /77	66 65	15 /76 *	178 61	6 /76	277 62	5 /76	544 61	1 /75
Teme at Knightsford Bridge	11 16	48 91	29 62	10 29	15 79	16 /28	54 55	5 /27	141 52	3 /27	188 52	3 /27	483 67	3 /26
Cynon at Abercynon	25 13	340 244	85 72	23 29	79 134	29 /39	187 74	11 /39	641 82	10 /39	1154 91	11 /37	2229 88	8 /35
Dee at New Inn	25 10	364 216	141 80	38 35	110 159	21 /28	288 82	9 /28	771 76	4 /28	1488 84	4 /27	2506 70	1 /26
Eden at Sheepmount	24 23	181 238	77 104	23 48	47 148	24 /30	147 96	13 /30	408 95	13 /30	579 83	6 /29	982 70	1 /28
Clyde at Daldowie	33 30	171 218	95 118	32 68	58 164	30 /34	186 114	22 /34	502 109	21 /34	756 96	14 /33	1337 85	8 /32
Carron at New Kelso	164 53	373 170	286 101	182 122	122 132	15 /19	590 112	14 /19	1288 93	8 /18	2404 96	7 /18	3787 75	1 /17
Ewe at Poolewe	127 48	335 177	325 159	178 124	143 147	21 /27	647 143	24 /27	1276 108	17 /27	2218 104	15 /26	3580 84	3 /25

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 1995. For the long periods (at the right of this table), the end date for the long term is 1997.

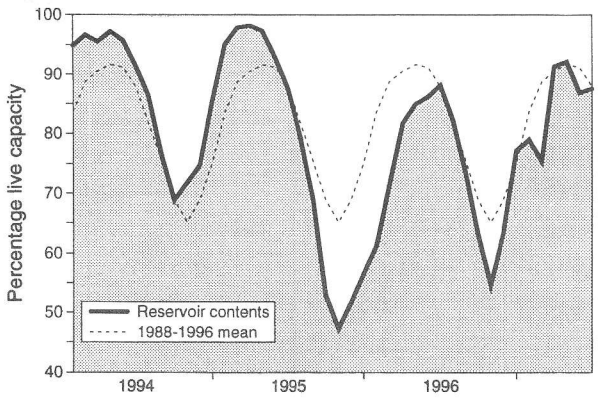
TABLE 4 START-MONTH RESERVOIR STORAGES UP TO JUNE 1997

Area	Reservoir (R)/ Group (G)		Capacity● (Ml)	1997 Jan	Feb	Mar	Apr	May	Jun	*1996 Jun*
North West	N.Command Zone[1]	(G)	133375	77	66	100	97	87	88	*80*
	Vyrnwy	(R)	55146	81	71	100	95	86	87	*74*
Northumbria	Teesdale[2]	(G)	87936	78	80	95	97	89	85	*81*
	Kielder	(R)	199175*	88	89	100	93	90	92	*96*
Severn-Trent	Clywedog	(R)	44922	81	76	93	97	98	98	*100*
	Derwent Valley[3]	(G)	39525	98	94	100	100	95	98	*56*
Yorkshire	Washburn[4]	(G)	22035	97	86	98	93	86	89	*87*
	Bradford supply[5]	(G)	41407	90	88	100	98	90	95	*70*
Anglian	Grafham	(R)	58707	69	68	72	77	73	72	*95*
	Rutland	(R)	130061	71	68	73	76	72	75	*93*
Thames	London[6]	(G)	206399	70	70	85	94	93	88	*95*
	Farmoor [7]	(G)	13843	99	93	96	98	98	98	*99*
Southern	Bewl	(R)	28170	60	65	85	98	91	84	*88*
	Ardingly	(R)	4685	64	68	100	100	100	98	*100*
Wessex	Clatworthy	(R)	5364	96	81	100	99	89	79	*97*
	Bristol W [8]	(G)	38666*	80	74	96	95	92	88	*95*
South West	Colliford	(R)	28540	53	52	57	58	56	52	*69*
	Roadford[9]	(R)	34500	54	52	61	62	60	59	*48*
	Wimbleball[10]	(R)	21320	64	59	81	91	84	79	*86*
	Stithians	(R)	5205	88	90	96	97	89	79	*98*
Welsh	Celyn + Brenig	(G)	131155	82	78	97	98	94	97	*82*
	Brianne	(R)	62140	93	84	99	97	86	96	*100*
	Big Five[11]	(G)	69762	75	67	96	95	85	88	*97*
	Elan Valley[12]	(G)	99106	92	85	100	99	91	97	*97*
East of Scotland	Edin./Mid Lothian[13]	(G)	97639	93	91	100	100	94	94	*98*
	East Lothian[14]	(G)	10206	100	100	100	99	98	100	*99*
West of Scotland	Loch Katrine	(G)	111363	89	85	100	100	96	90	*99*
	Daer	(R)	22412	98	91	100	98	94	94	*96*
	Loch Thom	(G)	11840	99	96	100	100	94	95	*94*

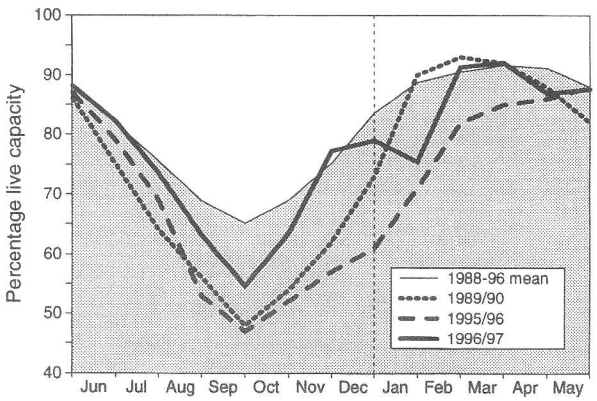
● Live or usable capacity (unless indicated otherwise) * Gross storage/percentage of gross storage

1. Includes Haweswater, Thirlmere, Stocks and Barnacre.
2. Cow Green, Selset, Grassholme, Balderhead, Blackton and Hury.
3. Howden, Derwent and Ladybower.
4. Swinsty, Fewston, Thruscross and Eccup.
5. The Nidd/Barden group (Scar House, Angram, Upper Barden, Lower Barden and Chelker) plus Grimwith.
6. Lower Thames (includes Queen Mother, Wraysbury, Queen Mary, King George VI and Queen Elizabeth II) and Lee Valley (includes King George and William Girling) groups -pumped storages.
7. Farmoor 1 and 2 - pumped storages.
8. Blagdon, Chew Valley and others.
9. 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.
13. Megget, Talla, Fruid, Gladhouse, Torduff, Clubbiedean, Glencorse, Loganlea and Morton (upper and lower).
14. Thorters, Donolly, Stobshiel, Lammerloch, Hopes and Whiteadder

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



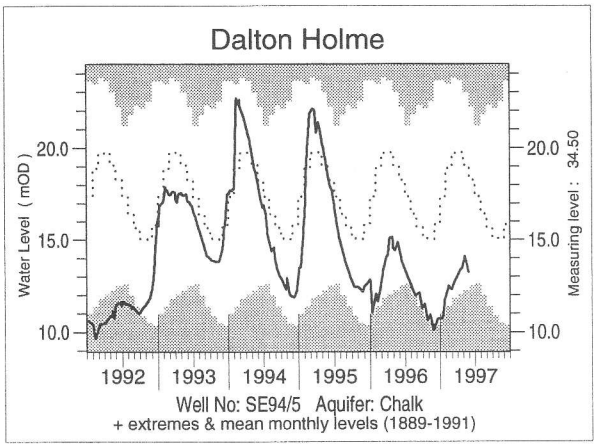
A COMPARISON BETWEEN OVERALL RESERVOIR STOCKS FOR ENGLAND AND WALES IN RECENT YEARS

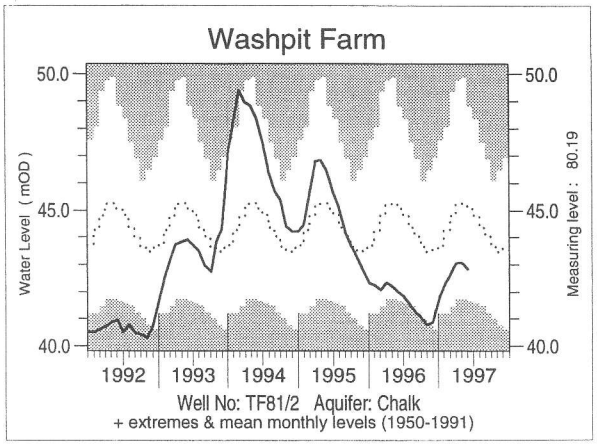


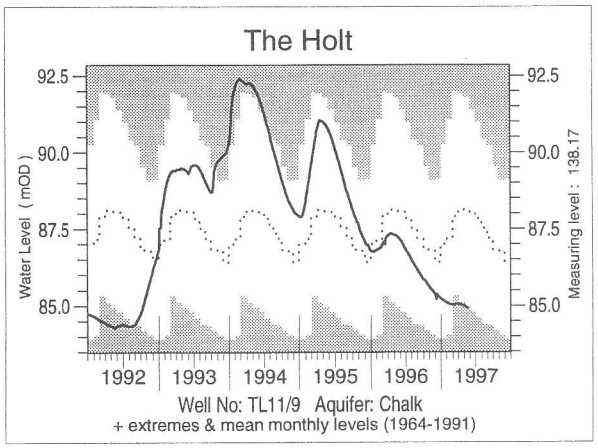
These plots are based on the reservoirs featured in Table 4 only

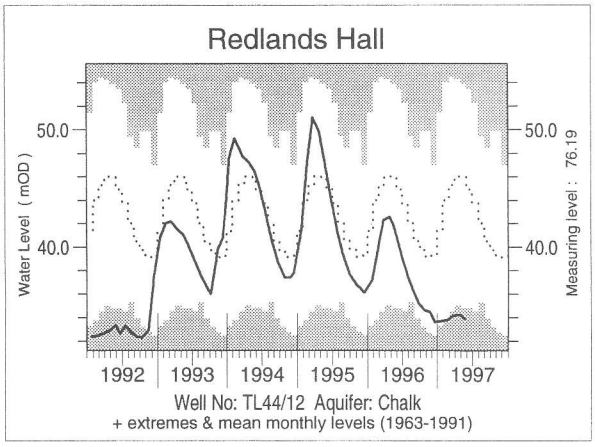
Note: Variations in storage depend on the balance between inputs (from catchment rainfall and any pumping) and outputs (to supply, compensation flow, HEP, amenity). There will be additional losses due to evaporation, especially in the summer months. Operational strategies for making the most efficient use of water stocks will further affect reservoir storages. Table 4 is intended to provide a link between the hydrological conditions described elsewhere in the report and the water resources situation. The reservoirs featured may not be representative of storage conditions across the individual regions; this can be particularly important during drought conditions (eg, in the Severn-Trent region during 1995/96).

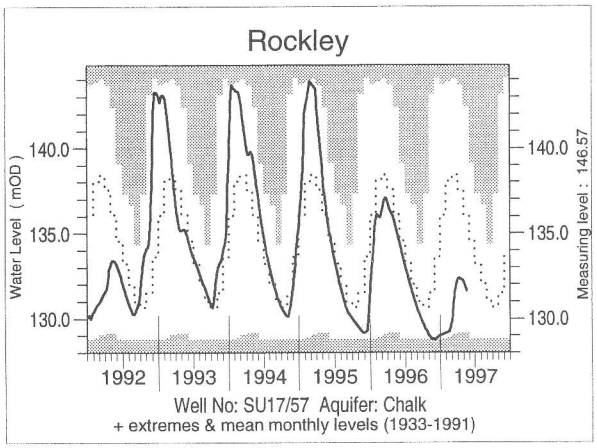
FIGURE 2 GROUNDWATER LEVEL HYDROGRAPHS

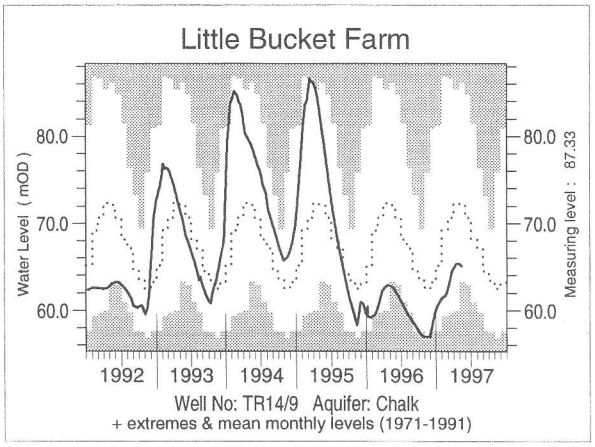


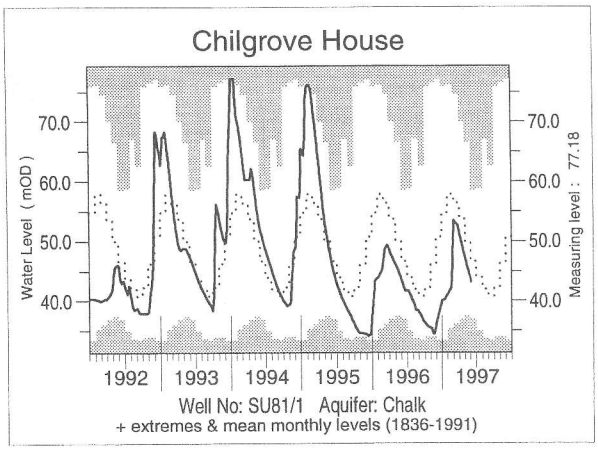


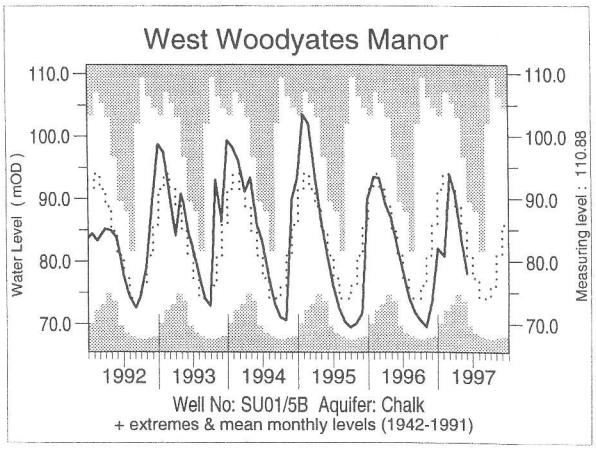


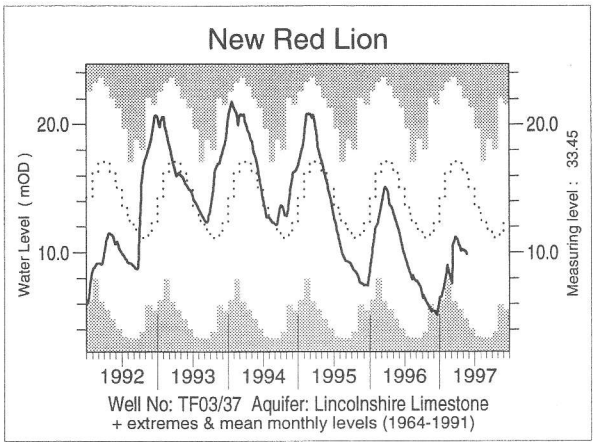




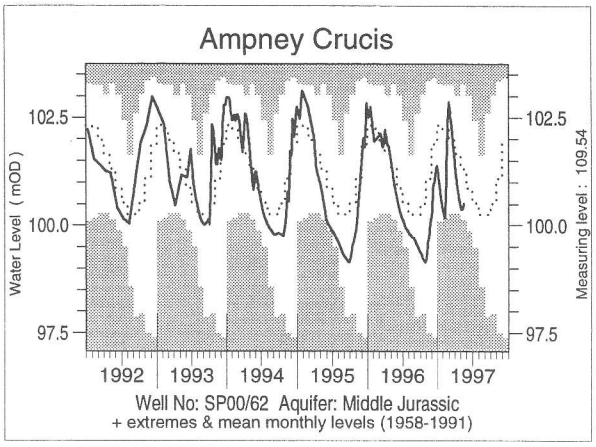




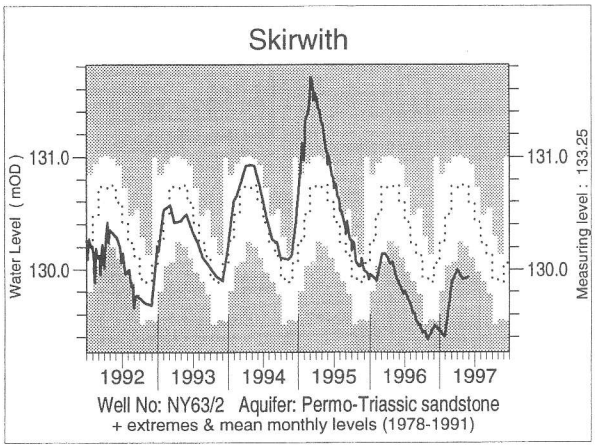




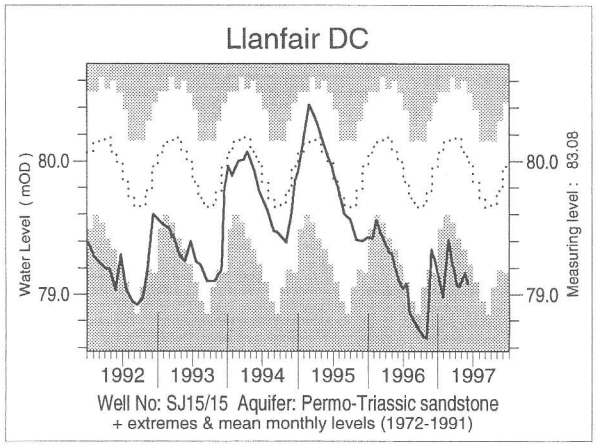
Well No: TF03/37 Aquifer: Lincolnshire Limestone
+ extremes & mean monthly levels (1964-1991)



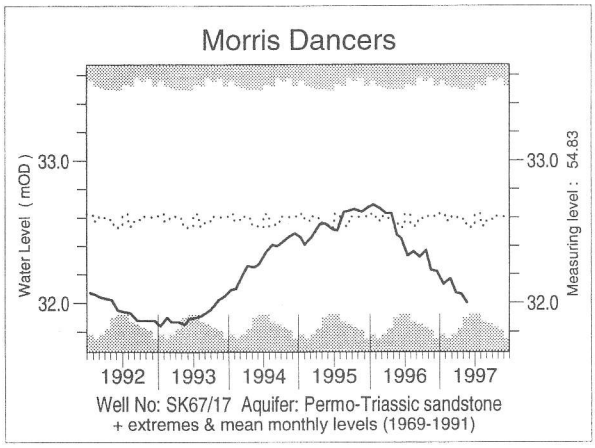
Well No: SP00/62 Aquifer: Middle Jurassic
+ extremes & mean monthly levels (1958-1991)



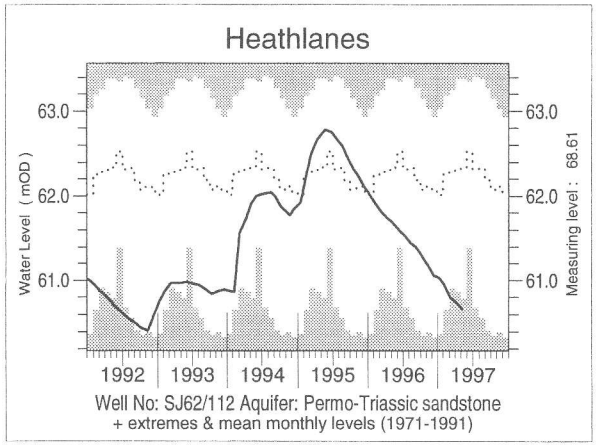
Well No: NY63/2 Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1978-1991)



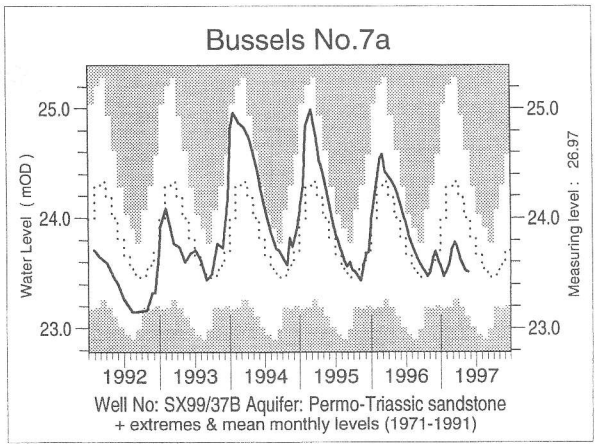
Well No: SJ15/15 Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1972-1991)



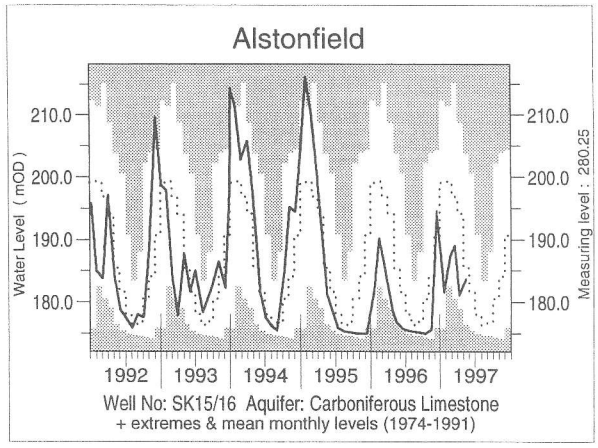
Well No: SK67/17 Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1969-1991)



Well No: SJ62/112 Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1971-1991)



Well No: SX99/37B Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1971-1991)



Well No: SK15/16 Aquifer: Carboniferous Limestone
+ extremes & mean monthly levels (1974-1991)

TABLE 5 MAY GROUNDWATER LEVELS 1997

Site	Aquifer	Records Commence	Minimum May <1997	Average May <1997	Maximum May <1997	No of years May/Jun level < 1997	May/Jun 1997 day	level
Dalton Holme	Ck	1889	10.77	18.92	22.99	3	27/05	13.24
Wetwang	Ck	1971	19.14	23.27	30.02	2	27/05	19.79
Keelby Grange	Ck	1980	3.88	12.51	19.19	1	27/05	5.67
Washpit Farm	Ck	1950	40.87	45.27	49.90	5	02/06	42.83
The Holt	Ck	1964	84.26	88.24	92.18	1	19/05	84.92
Therfield Rectory	Ck	1883	70.69	81.56	97.72	4 (dry)	19/05	71.51
Redlands Hall	Ck	1963	33.34	44.65	53.89	1	20/05	33.91
Rockley	Ck	1933	129.16	136.03	142.36	3	19/05	131.59
Little Bucket Farm	Ck	1971	62.35	72.04	86.15	5	12/05	65.03
Compton House	Ck	1894	29.71	41.19	52.55	7	05/06	34.89
Chilgrove House	Ck	1836	37.49	48.88	66.54	>10	05/06	43.11
Westdean No.3	Ck	1940	1.24	1.87	2.84	1	30/05	1.34
Lime Kiln Way	Ck	1969	124.02	125.46	126.18	8	15/05	125.31
Ashton Farm	Ck	1974	65.29	68.52	70.33	1	31/05	66.77
West Woodyates	Ck	1942	73.74	84.35	96.74	6	31/05	78.07
Killyglen (NI)	Ck	1985	113.53	114.55	116.30	10	28/05	115.18
New Red Lion	LLst	1964	4.80	15.80	22.00	1	21/05	9.89
Ampney Crucis	MidJ	1958	100.12	101.22	103.30	6	19/05	100.51
Redbank	PTS	1981	7.14	8.17	8.80	1	01/06	7.46
Yew Tree Farm	PTS	1972	13.07	13.56	13.84	5	02/06	13.46
Skirwith	PTS	1978	129.89	130.59	131.28	1	27/05	129.93
Llanfair D.C	PTS	1972	79.03	79.89	80.60	1	03/06	79.08
Morris Dancers	PTS	1969	31.85	32.46	33.50	3	21/05	32.00
Heathlanes	PTS	1971	60.67	62.12	63.38	0	08/05	60.67
Bussels No.7A	PTS	1971	23.11	23.98	24.62	3	20/05	23.51
Rusheyford NE	MgLst	1967	65.31	73.08	76.75	>10	20/05	76.03
Peggy Ellerton	MgLst	1968	31.45	34.45	37.24	3	19/05	32.06
Alstonfield	CLst	1974	176.53	185.86	203.79	10	15/05	183.72

groundwater levels are in metres above Ordnance Datum

Ck	Chalk	MidJ	Middle Jurassic Limestones
LLst	Linconshire Limestone	MgLst	Magnesian Limestone
PTS	Permo-Triassic sandstones	Clst	Carboniferous Limestones

FIGURE 3 LOCATION MAP OF GAUGING STATIONS AND GROUNDWATER INDEX WELLS