Hydrological Summary for Great Britain

JANUARY 1995

Rainfall

January was a relatively mild and exceptionally wet month in most regions, with boisterous conditions characterising the latter half as an unremitting sequence of active frontal systems - mostly on a south-westerly airflow - brought gales and flooding to many areas. After a relatively dry start to the month significant rainfall was registered on most days, although the high winds and speedy passage of the low pressure systems restricted individual storm totals until month-end when a near stationary front straddling the Pennines produced notable 24-hour precipitation totals, including > 120 mm at Shap (Cumbria). Regional rainfall totals were all substantially above average, with much of the English lowlands reporting around twice the 1961-90 mean. The provisional nationwide rainfall total for January equals that for December 1993; both rank amongst the dozen wettest months in a series from 1869. Five of the wettest eleven Januarys since 1869 have now clustered in the post-1987 period. For most of southern Britain a very unsettled spell can be traced back to the early autumn. The provisional England and Wales rainfall total for Sept. '94 - Jan. '95 is the highest since 1977 - but only a little greater than the corresponding period ending in January last year. Accumulated rainfall totals in the 20 to 30-month timeframes are considerably above average in southern Britain and outstanding in parts of southern England where below average rainfall has been restricted to three or four months since March 1993.

River Flow

Though nothing like on the scale experienced in parts of western Europe, flooding was widespread and protracted throughout large parts of Britain in late January. The episodic nature of the rainfall - the brief respites being generally associated with ridges of high pressure - allowed many river levels to fall just sufficiently to accommodate the next pulse of rainfall. The same overall rainfall less evenly distributed through the month would have produced very damaging flooding. Many rivers registered peak flows in the 5-10 year return period range but, in the North-East particularly, a number of more extreme events were reported. Notable 2-day rainfall totals augmented by significant snowmelt contributions produced exceptional flow rates in rivers draining from the northern Pennines. The River Ure (Yorkshire) exceeded its previous maximum level in a 29-year record and the peak flow at Haydon Bridge on the South Tyne also eclipsed previous maxima and produced significant flooding at the confluence with the North Tyne. In the English lowlands Flood Alerts were common (including 'Red' on the Thames and Severn) but generally the persistence of spate conditions was more significant than the instantaneous peaks. Nonetheless the inundation of floodplains and other low-lying land (e.g. the Somerset Levels) was extensive and prolonged, though generally less widespread than in February 1990. Notwithstanding moderate flows early in the month, many new January runoff records were established - from the Lune to the Hampshire Avon and the overall runoff total for England and Wales is likely to have been exceeded in the recent past only by February 1990. Accumulated runoff totals over a range of timeframes, from 3 to 20 months, are at, or near, record levels over wide areas.

Groundwater

With catchments saturated and rainfall well distributed through the month, infiltration through January was abundant; in much of the English lowlands it will have exceeded the entire winter totals for 1988/89 and 1990/91. Because of the delay between infiltration and water-table response much of the recovery consequent upon the recent heavy recharge will not be evident until the early spring. January levels in the Chalk confirm that brisk recoveries are underway in all but the deepest eastern boreholes. In many boreholes, the recent level rises have been dramatic but not quite matching those which produced artesian conditions in the South Downs early in 1994. High-level springs are flowing strongly and for the third successive winter the pre-1991 peak at Ashton Farm has been exceeded. Generally throughout the Chalk levels are well above average and likely to soon approach the seasonal maxima. Following a 40-metre rise since last summer, levels in the Carboniferous Limestone (Alstonfield) are also unprecedented and the protracted post-drought recovery in the confined Permo-Triassic sandstones is gathering momentum. Very healthy groundwater levels are in prospect but the date of the onset of the spring recession will be influential in determining the outlook for the late summer.

General

The hydrological volatility, which has been a feature of much of the last seven years, continues. More settled conditions in early February have reduced the immediate flood risk but most catchments remain vulnerable to further rainfall. Most reservoirs are at or near capacity and the water resources outlook is very healthy.

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

Tel: 01344 856858 Fax: 01344 854024

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

13 February 1995

TABLE 1 1994/95 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.

		Jan 1994	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 1995
England and	mm	123	82	96	74	62	36	46	70	105	95	84	123	154
Wales	%	140	130	133	123	97	55	74	92	136	112	93	131	175
NRA REGIONS														
North West	mm	159	71	165	107	35	70	67	104	108	113	124	197	196
	%	131	91	174	151	47	86	79	97	94	88	101	159	162
Northumbrian	mm	107	71	84	63	26	39	39	81	76	71	95	110	127
	%	127	120	120	113	42	65	60	100	104	93	110	135	151
Severn Trent	mm	95	71	75	57	54	24	43	53	127	66	74	112	124
	%	136	131	123	104	92	41	81	79	198	103	104	145	177
Yorkshire	mm	116	68	71	61	46	28	52	58	100	72	89	120	128
	%	147	117	104	103	77	47	88	78	147	99	111	144	162
Anglian	mm	73	45	53	51	51	25	41	56	90	69	32	58	98
	%	146	122	113	111	106	49	84	102	184	135	55	105	195
Thames	mm	97	59	51	57	79	25	21	50	75	84	53	85	133
	%	152	131	91	114	141	45	43	86	127	135	82	122	207
Southern	mm	124	64	57	77	91	39	29	69	91	119	68	114	154
	%	155	119	90	145	169	72	60	121	132	149	80	139	193
Wessex	mm	126	100	80	62	92	24	34	68	99	113	98	131	162
	%	145	154	114	117	151	42	65	103	138	143	118	141	186
South West	mm	186	174	125	94	99	32	48	101	132	140	127	183	202
	%	135	172	126	136	138	46	70	120	142	121	102	131	146
Welsh	mm	182	131	184	116	69	57	64	88	132	137	133	241	226
	%	127	135	172	145	84	72	83	87	115	100	94	158	158
Scotland	mm	215	96	250	133	29	110	66	101	103	109	150	236	259
	%	142	94	200	175	34	128	70	86	73	70	99	156	172
RIVER PURIFICATION BOARDS														
Highland	mm	248	74	341	185	36	148	62	112	153	117	162	285	329
	%	132	58	210	203	39	151	58	88	89	59	80	145	175
North East	mm	131	110	106	77	16	55	39	48	92	82	85	76	145
	%	132	169	136	128	23	83	53	55	106	85	86	82	146
Tay	mm	206	117	219	96	22	89	47	81	56	113	151	187	206
	%	143	123	201	155	27	122	61	86	49	87	125	147	143
Forth	mm	161	88	210	84	21	75	55	78	57	90	127	191	177
	%	136	111	223	142	28	109	73	83	52	78	113	174	150
Tweed	mm	141	86	124	72	19	52	42	70	58	74	120	165	130
	%	141	128	157	126	27	80	58	80	65	78	129	177	130
Solway	mm	204	116	195	124	29	79	102	121	77	116	177	246	267
	%	131	115	167	161	34	94	113	102	54	74	123	166	171
Clyde	mm	268	110	301	149	38	143	99	143	98	129	186	342	328
	%	142	93	205	177	42	154	91	107	55	67	103	191	174

Note: The monthly rainfall figures for the NRA regions for December and January 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 December 1994 and January 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

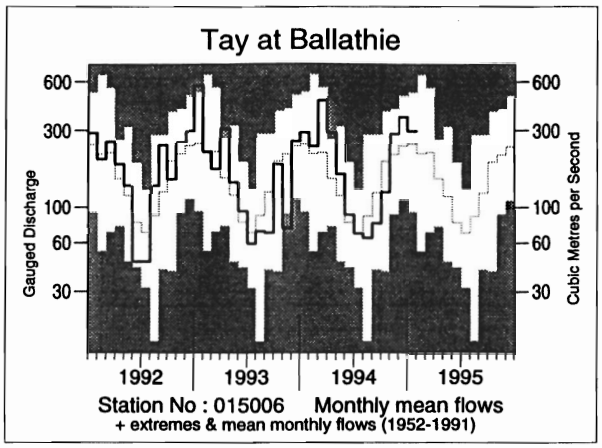
		Sep 94-Jan 95		May 94-Jan 95		Feb 94-Jan 95		Apr 93-Jan 95	
			Est Return Period, years		Est Return Period, years		Est Return Period, years		Est Return Period, years
England and Wales	mm	561		775		1027		1978	
	% LTA	129	10-20	111	2-5	115	5-10	119	30-50
NRA REGIONS									
North West	mm	738		1014		1357		2463	
	% LTA	121	5-10	106	2-5	113	5-10	110	5-10
Northumbria	mm	478		663		881		1804	
	% LTA	120	5-10	99	2-5	103	2-5	114	10-15
Severn Trent	mm	503		677		880		1704	
	% LTA	145	30-50	116	5-10	117	5-10	122	35-50
Yorkshire	mm	508		692		892		1778	
	% LTA	133	10-20	109	2-5	109	2-5	117	15-25
Anglian	mm	347		520		669		1379	
	% LTA	132	10-15	111	2-5	112	5-10	124	60-90
Thames	mm	430		605		772		1524	
	% LTA	134	10-15	112	2-5	112	2-5	119	15-25
Southern	mm	546		774		972		1869	
	% LTA	138	10-20	127	10-20	125	10-20	130	120-170
Wessex	mm	603		821		1063		1985	
	% LTA	146	25-40	126	10-20	127	15-25	129	100-150
South West	mm	784		1064		1457		2803	
	% LTA	128	5-10	118	5-10	124	10-20	130	>200
Welsh	mm	869		1147		1578		2877	
	% LTA	126	5-10	111	2-5	120	10-15	119	20-35
Scotland	mm	857		1163		1642		2850	
	% LTA	114	5-10	103	2-5	114	5-15	108	5-10
RIVER PURIFICATION BOARDS									
Highland	mm	1046		1404		2004		3275	
	% LTA	109	2-5	102	2-5	114	5-10	101	2-5
North East	mm	480		638		931		1866	
	% LTA	101	2-5	83	5-10	96	2-5	103	2-5
Tay	mm	713		952		1384		2540	
	% LTA	112	2-5	99	2-5	113	5-10	113	5-10
Forth	mm	642		871		1253		2297	
	% LTA	114	2-5	99	2-5	113	5-10	112	5-15
Tweed	mm	547		730		1012		2039	
	% LTA	116	2-5	95	2-5	104	2-5	114	10-15
Solway	mm	883		1214		1649		2925	
	% LTA	118	5-10	108	2-5	116	5-10	111	5-10
Clyde	mm	1083		1506		2066		3477	
	% LTA	118	5-10	112	5-10	122	20-35	111	5-10

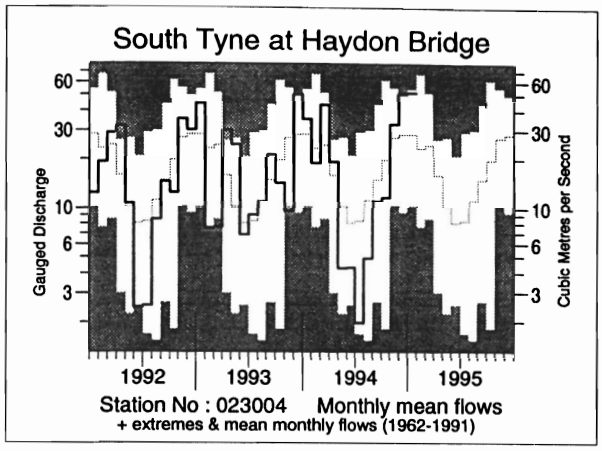
LTA refers to the period 1961-90.

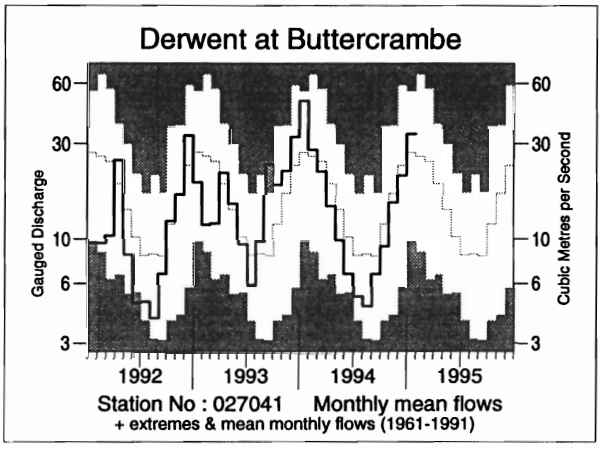
Return period assessments are based on tables provided by the Meteorological Office*. The tables reflect rainfall totals over the period 1911-70 only and the estimate assumes a sensibly stable climate. They assume a start in a specified month; return periods for a start in any month may be expected to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

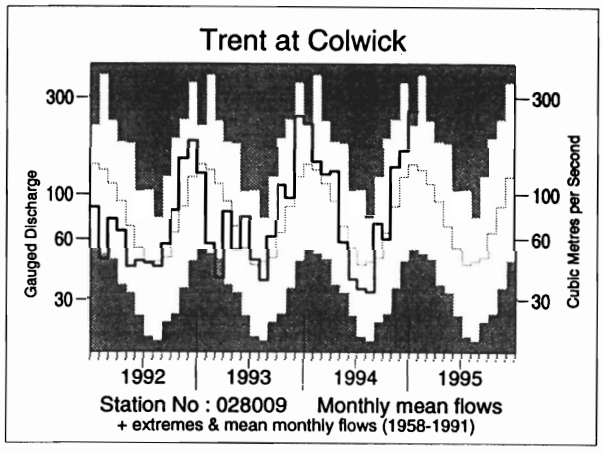
* Tabony, R.C., 1977, The Variability of long duration rainfall over Great Britain, Scientific Paper No. 37, Meteorological Office.

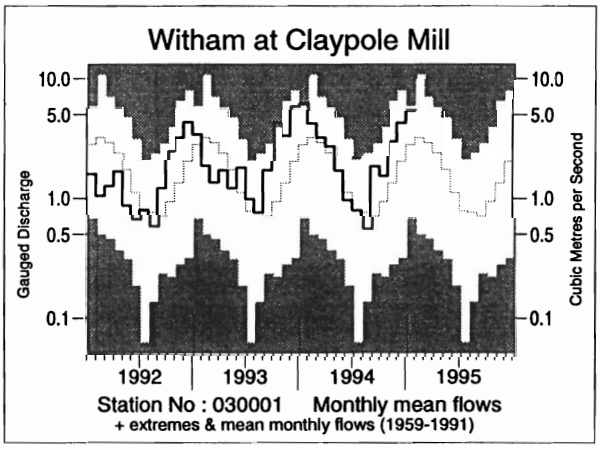
FIGURE 1 MONTHLY RIVER FLOW HYDROGRAPHS

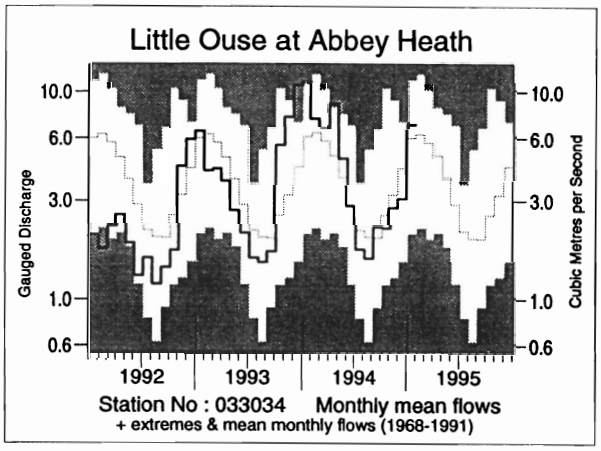


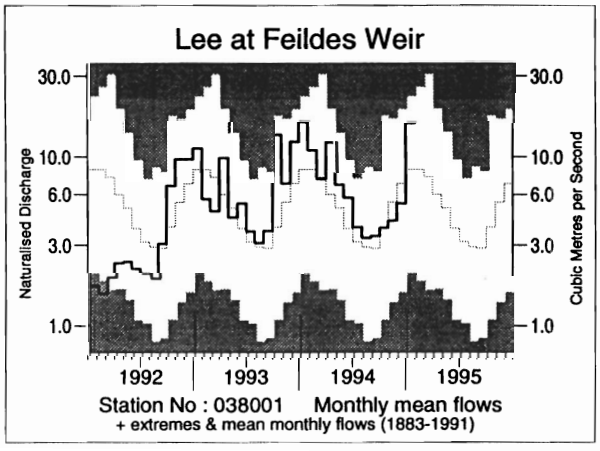


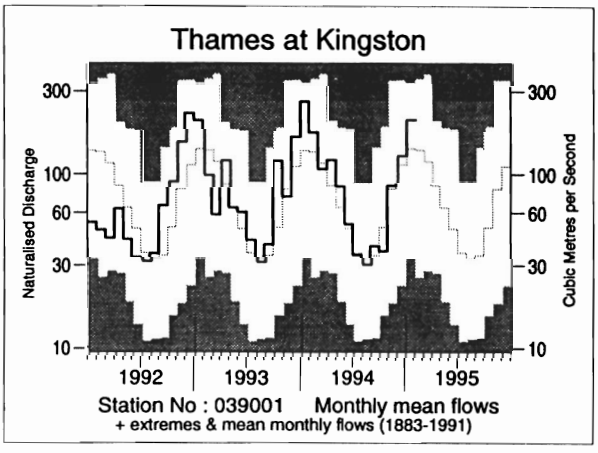


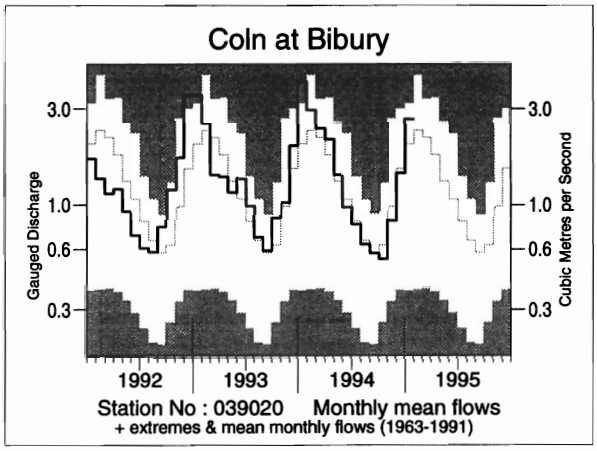


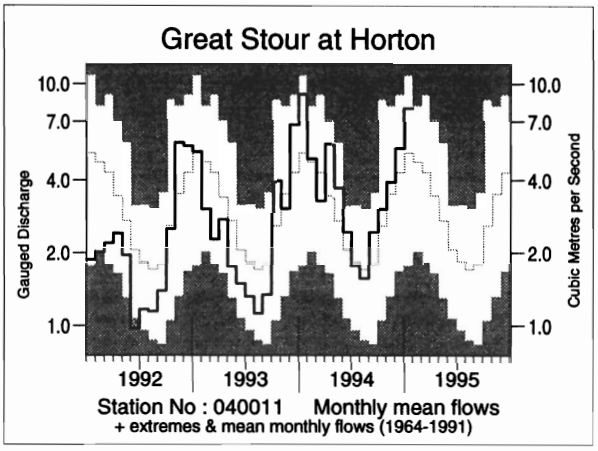


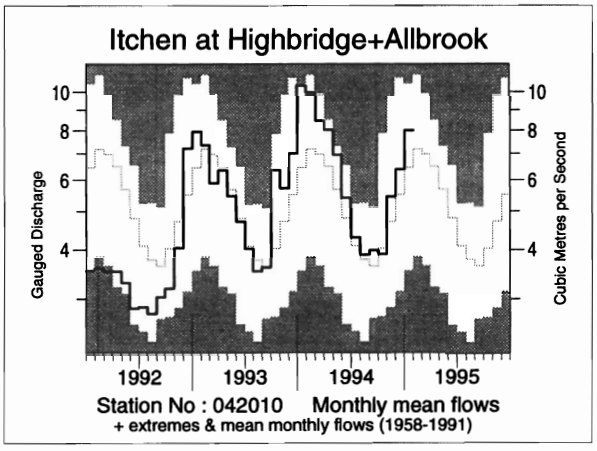


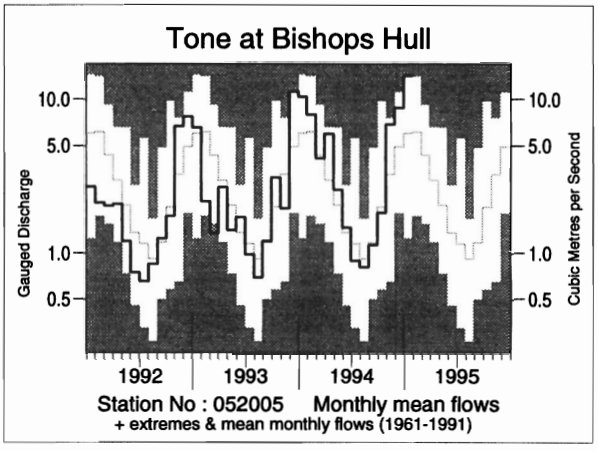


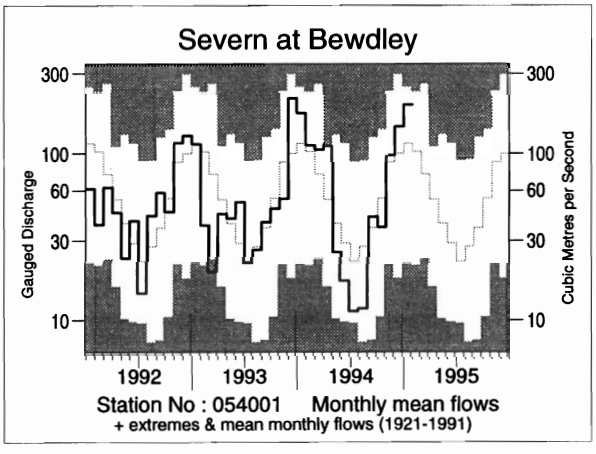


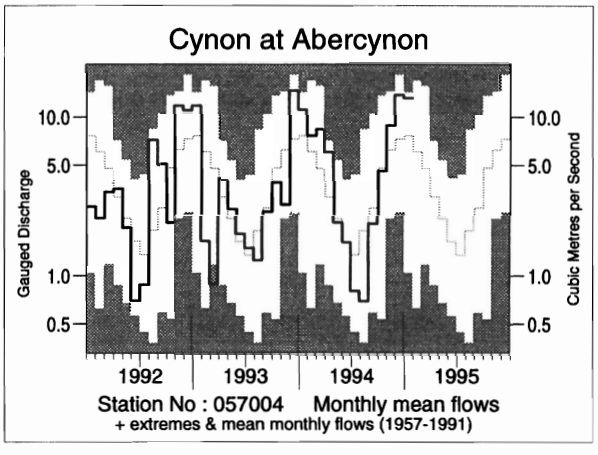

Coln at Bibury
Gauged Discharge
Cubic Metres per Second
3.0
1.0
0.6
0.3
1992
1993
1994
1995
Station No : 039020 Monthly mean flows
+ extremes & mean monthly flows (1963-1991)

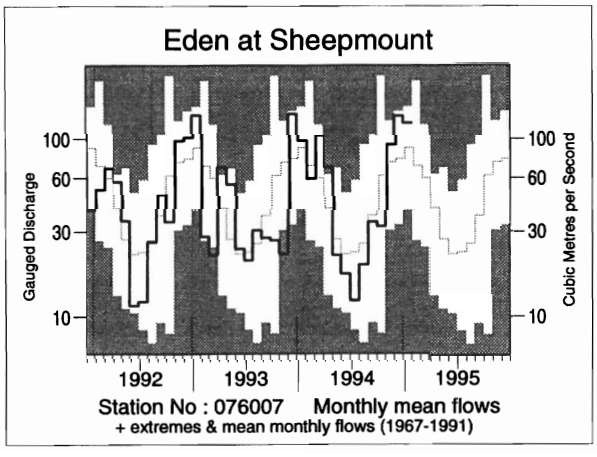

Great Stour at Horton
Gauged Discharge
Cubic Metres per Second
10.0
7.0
4.0
2.0
1.0
1992
1993
1994
1995
Station No : 040011 Monthly mean flows
+ extremes & mean monthly flows (1964-1991)


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)

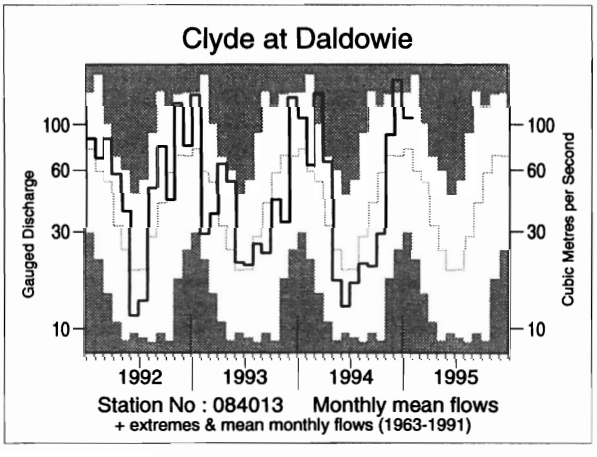

Clyde at Daldowie
Gauged Discharge
Cubic Metres per Second
100
60
30
10
1992
1993
1994
1995
Station No : 084013 Monthly mean flows
+ extremes & mean monthly flows (1963-1991)

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	Sep 1994	Oct	Nov	Dec	Jan 1995		11/94 to 1/95		8/94 to 1/95		2/94 to 1/95		9/92 to 1/95	
	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	29	41	86	71	81	11	238	11	320	4	734	8	2034	12
Park	70	52	112	83	91	/23	94	/23	78	/22	94	/22	104	/20
Tay at	45	72	163	212	174	31	550	38	704	32	1447	40	3419	39
Ballathie	63	65	135	151	121	/43	133	/43	108	/42	127	/42	119	/40
Tweed at	25	33	114	214	162	29	490	34	569	31	960	31	2358	32
Boleside	49	46	130	223	157	/35	165	/34	125	/34	126	/34	122	/32
Whiteadder Water at	6	8	29	39	43	9	111	8	131	6	292	5	995	12
Hutton Castle	41	28	78	86	73	/26	77	/26	65	/25	75	/25	102	/24
South Tyne at	38	41	114	179	181	32	474	33	570	27	890	25	2170	21
Haydon Bridge	74	59	120	176	182	/33	156	/33	121	/31	114	/31	108	/27
Wharfe at	44	48	113	136	163	40	412	39	524	34	819	30	1962	26
Flint Mill Weir	99	76	141	140	167	/40	147	/40	122	/39	113	/39	107	/37
Derwent at	11	15	25	35	57	25	117	20	151	14	290	13	820	18
Buttercrambe	82	77	90	88	126	/34	102	/34	93	/33	90	/33	103	/31
Trent at	25	22	47	59	91	37	197	35	255	33	437	33	1044	32
Colwick	148	92	155	132	183	/37	153	/37	139	/36	123	/36	120	/34
Lud at	13	12	14	18	37	19	69	17	107	18	307	18	697	18
Louth	122	105	101	94	130	/27	106	/27	106	/27	121	/26	119	/25
Witham at	16	14	26	38	49	33	113	33	148	32	265	31	669	34
Claypole Mill	257	157	212	202	195	/36	188	/36	177	/36	141	/35	151	/34
Little Ouse at	8	8	10	12	27	17	49	13	71	11	189	19	478	21
Abbey Heath	114	87	85	70	119	/27	91	/27	91	/27	112	/26	119	/25
Mimram at	11	10	10	11	15	34	36	30	69	35	187	42	406	40
Panshanger Park	135	128	119	114	129	/43	118	/42	124	/42	148	/42	137	/40
Lee at	8	10	10	14	41	100	65	77	92	75	208	89	537	97
Feildes Weir (natr.)	117	99	77	76	189	/110	121	/110	117	/109	128	/108	136	/105
Thames at	10	10	23	34	54	89	110	76	138	75	286	81	782	100
Kingston (natr.)	113	73	104	112	147	/113	124	/112	115	/112	116	/112	130	/110
Coln at	14	13	20	36	67	24	124	16	167	15	426	19	1136	27
Bibury	98	82	83	91	133	/32	105	/32	101	/31	108	/31	121	/29
Great Stour at	18	24	30	42	62	27	134	25	188	25	352	23	801	16
Horton	136	118	109	125	157	/31	129	/30	124	/30	120	/28	112	/25
Itchen at	29	29	39	47	60	32	146	31	233	29	543	33	1244	30
Highbridge+Allbrook	110	97	116	115	126	/37	117	/37	112	/36	118	/36	114	/34
Piddle at	16	19	48	61	80	26	190	26	240	26	543	30	1277	25
Baggs Mill	104	94	168	146	158	/31	150	/31	135	/30	133	/30	131	/26
Exe at	43	81	165	200	238	38	603	39	737	38	1205	37	2688	36
Thorverton	111	110	167	152	185	/39	163	/39	144	/39	144	/38	126	/37
Taw at	32	65	143	181	208	37	531	37	633	34	1023	35	2376	34
Umberleigh	133	106	153	156	182	/37	159	/37	144	/36	146	/36	132	/34
Tone at	15	24	89	118	189	33	396	34	445	34	738	34	1564	31
Bishops Hull	96	92	205	177	241	/34	199	/34	176	/34	154	/34	132	/32
Severn at	25	22	58	89	121	70	269	68	324	59	552	63	1302	58
Bewdley	116	68	108	143	171	/74	142	/74	124	/74	122	/73	114	/72
Teme at	17	11	47	88	118	25	254	25	283	24	447	22	1056	21
Knightsford Bridge	195	57	143	164	182	/25	160	/25	145	/25	122	/24	116	/23
Cynon at	52	116	218	351	334	34	904	37	1090	31	1743	35	4023	29
Abercynon	78	97	139	187	176	/37	163	/37	135	/35	137	/35	123	/31
Dee at	126	158	219	447	390	23	1055	24	1391	22	2211	22	4927	17
New Inn	96	81	89	183	166	/26	142	/26	120	/26	122	/25	106	/24
Eden at	39	38	105	157	143	21	405	22	504	17	828	19	1959	15
Sheepmount	91	52	123	171	141	/25	142	/24	120	/23	119	/23	111	/19
Clyde at	27	41	122	233	152	26	506	32	604	25	1040	29	2519	29
Daldowie	47	51	123	234	141	/32	159	/32	122	/31	132	/31	124	/29
Carron at	186	129	229	420	383	12	1033	10	1428	5	2538	8	6345	4
New Kelso	68	49	76	122	125	/17	107	/16	88	/16	99	/16	95	/14
Ewe at	132	217	214	336	379	19	929	18	1337	11	2395	20	5970	17
Poolewe	67	98	79	120	144	/25	114	/25	100	/24	112	/24	107	/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.

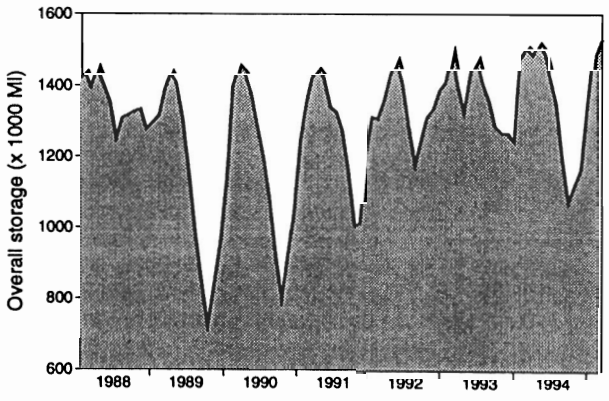
TABLE 4 START-MONTH RESERVOIR STORAGES UP TO FEBRUARY 1995

Area	Reservoir (R)/ Group (G)		Capacity● (Ml)	1994 Sept	Oct	Nov	Dec	1995 Jan	Feb	1994 Feb
North West	N.Command Zone[1]	(G)	133375	52	55	50	67	91	100	97
	Vyrnwy	(R)	55146	61	69	65	83	100	99	100
Northumbria	Teesdale[2]	(G)	87936	46	51	53	80	97	100	98
	Kielder	(R)	199175*	92*	89*	90*	91*	100*	100*	97*
Severn-Trent	Clywedog	(R)	44922	61	70	82	83	100	100	100
	Derwent Valley[3]	(G)	39525	43	53	64	89	100	100	100
Yorkshire	Washburn[4]	(G)	22035	40	42	52	73	92	100	100
	Bradford supply[5]	(G)	41407	38	48	57	74	88	99	99
Anglian	Grafham	(R)	58707	83	88	89	95	93	92	93
	Rutland	(R)	130061	86	87	86	93	95	96	96
Thames	London[6]	(G)	207569	77	83	85	89	92	94	87
	Farmoor [7]	(G)	13843	96	97	99	96	95	95	98
Southern	Bewl	(R)	28170	88	86	83	85	89	96	100
	Ardingly	(R)	4685	85	82	80	90	93	100	100
Wessex	Clatworthy	(R)	5364	54	48	53	100	100	100	100
	Bristol W [8]	(G)	38666*	61*	55*	52*	71*	88*	99*	88*
South West	Colliford	(R)	28540	68	69	70	75	81	90	100
	Roadford[9]	(R)	34500	67	65	66	69	79	91	98
	Wimbleball[10]	(R)	21320	60	57	64	80	100	100	100
	Stithians	(R)	5205	57	50	50	66	77	100	100
Welsh	Celyn + Brenig	(G)	131155	66	71	75	86	100	100	100
	Brianne	(R)	62140	72	71	83	99	100	100	100
	Big Five[11]	(G)	69762	58	62	66	83	92	97	99
	Elan Valley[12]	(G)	99106	62	67	83	99	100	100	100
Lothian	Edin./Mid Lothian	(G)	97639	73	71	69	85	95	99	97
	East Lothian	(G)	10206	66	56	57	70	91	98	97
Strathclyde	Loch Katrine	(G)	111363	86	83	90	95	98	97	98
	Daer	(R)	22412	59	58	99	99	100	100	100
	Loch Thom	(G)	11840	76	80	83	94	99	100	99

● 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.

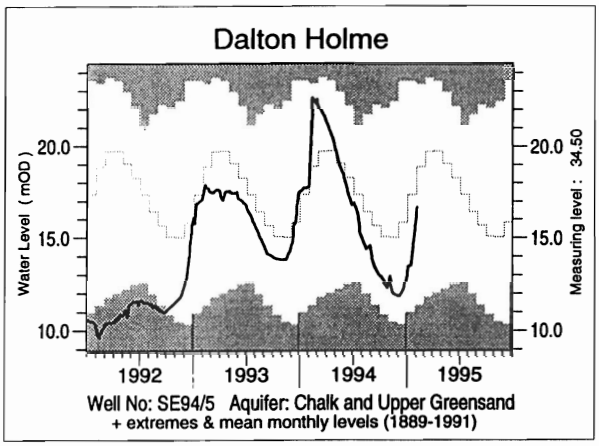
A GUIDE TO THE VARIATION IN OVERALL RESERVOIR STOCKS FOR ENGLAND AND WALES

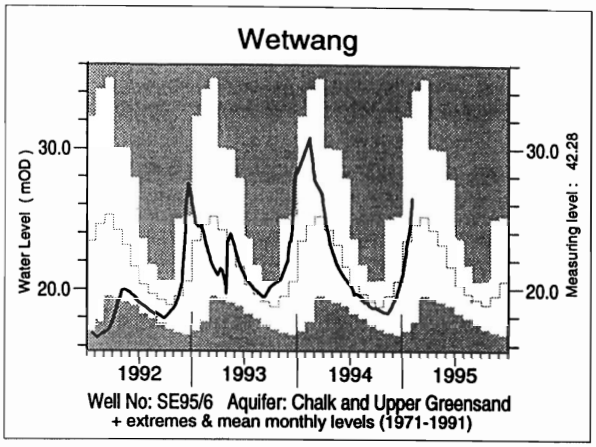


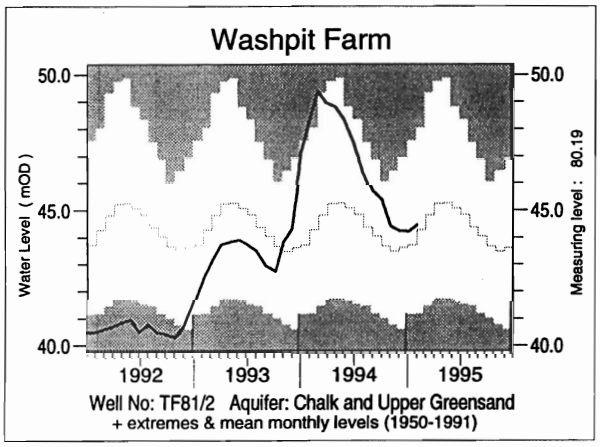
This plot is based on the reservoirs featured in Table 4 only.

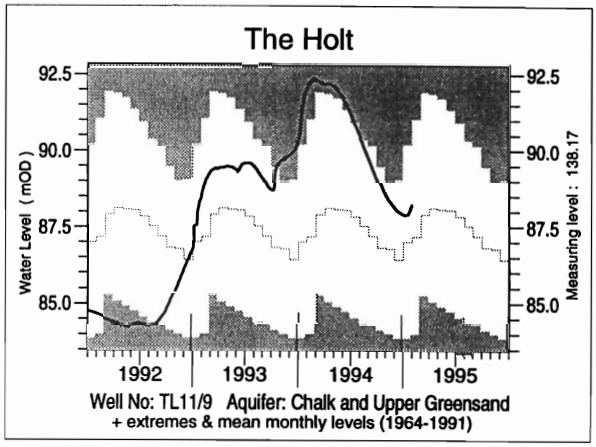
Note: Variations in storage depend on the balance between inputs (from catchment rainfall and any pumping) and outputs (to supply, compensation flow, HEP, amenity). There will be additional losses due to evaporation, especially in the summer months. Operational strategies for making the most efficient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

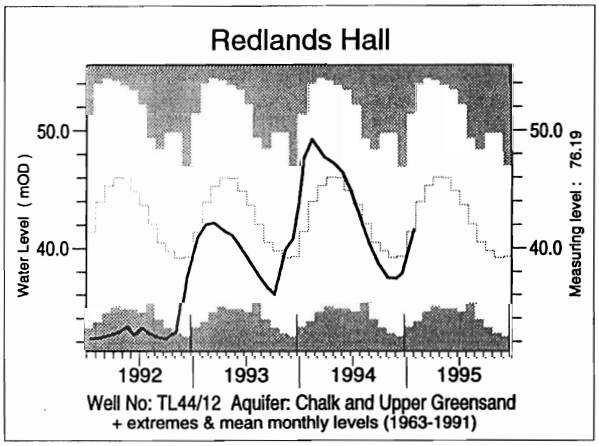
FIGURE 2 GROUNDWATER LEVEL HYDROGRAPHS

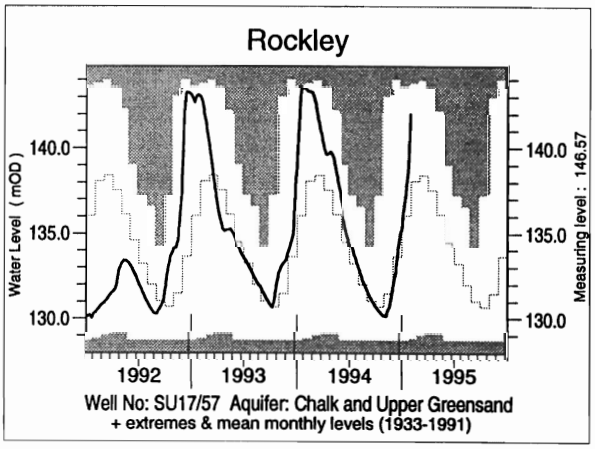


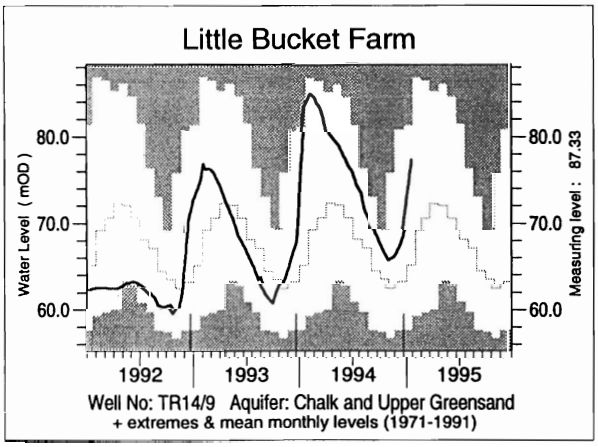


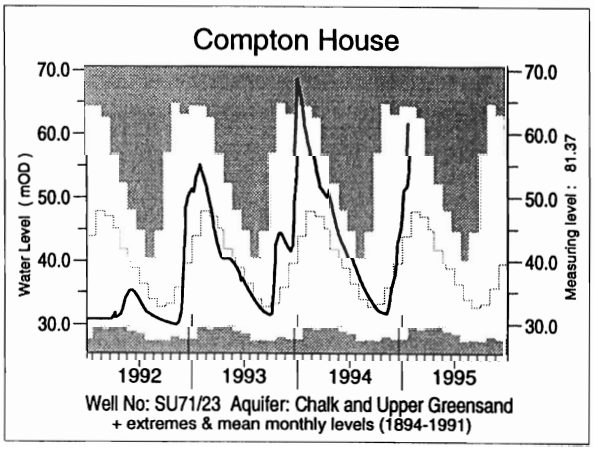


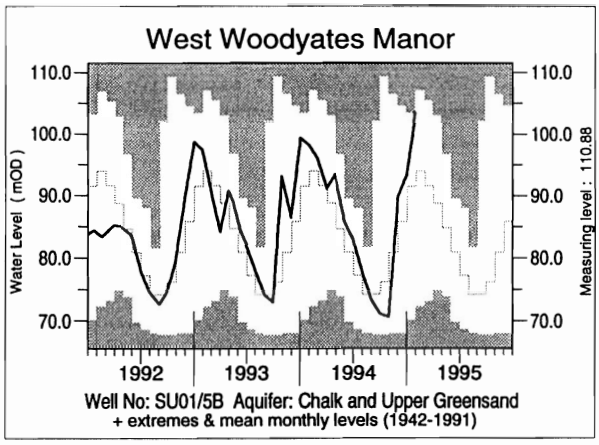


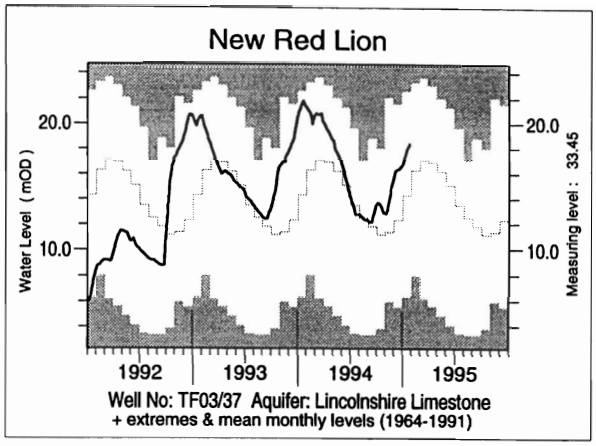


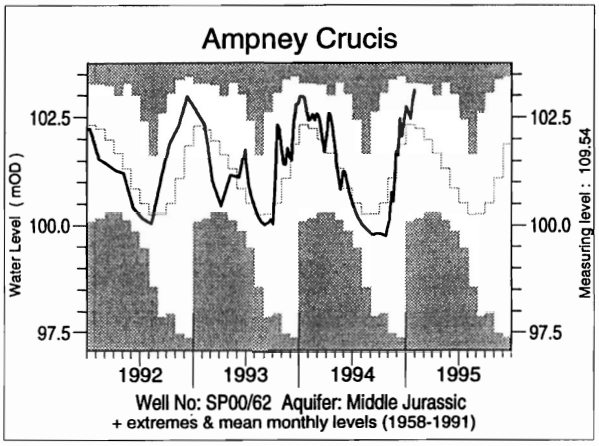


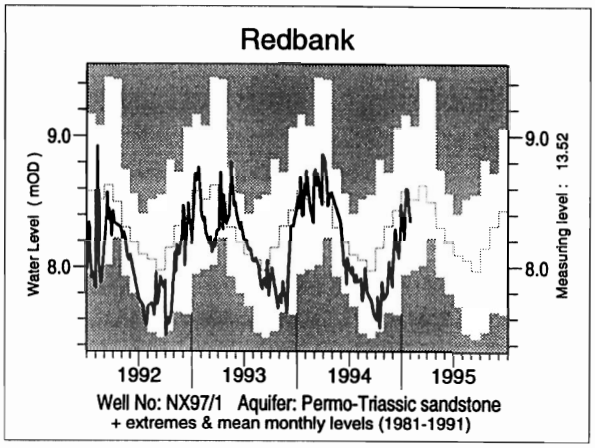


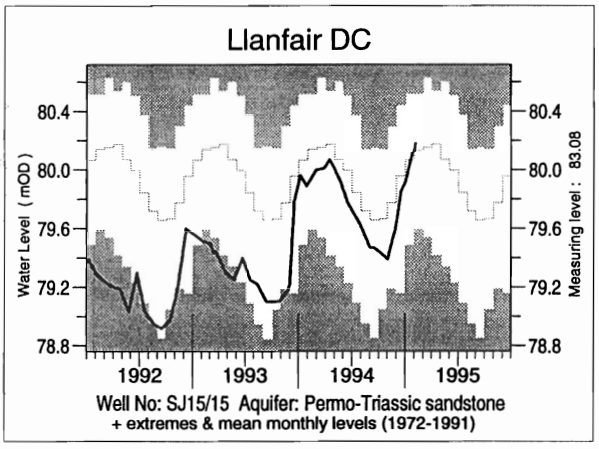


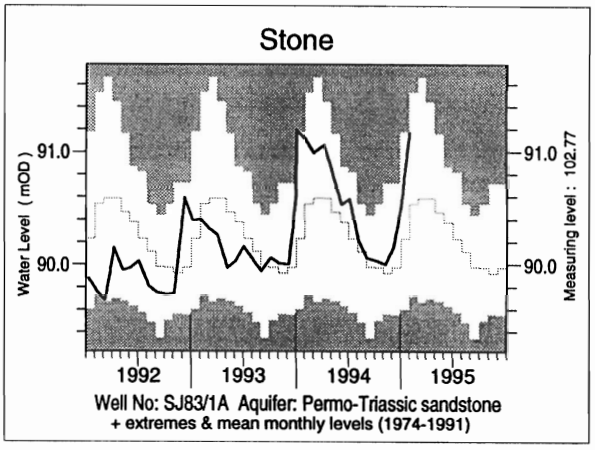

West Woodyates Manor
Water Level (mOD)
110.0
100.0
90.0
80.0
70.0
Measuring level : 110.88
1992
1993
1994
1995
Well No: SU01/5B Aquifer: Chalk and Upper Greensand
+ extremes & mean monthly levels (1942-1991)

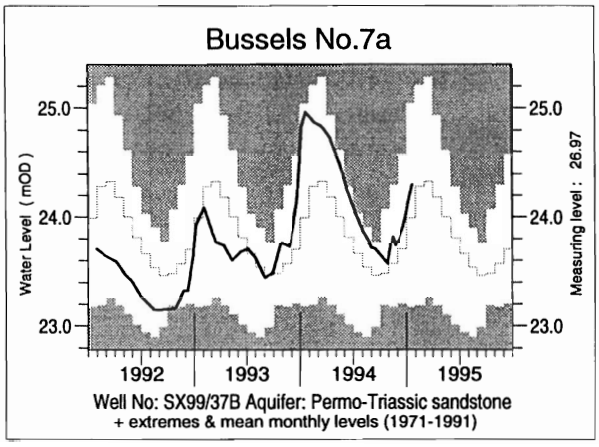

New Red Lion
Water Level (mOD)
20.0
10.0
Measuring level : 33.45
1992
1993
1994
1995
Well No: TF03/37 Aquifer: Lincolnshire Limestone
+ extremes & mean monthly levels (1964-1991)


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


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


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


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


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

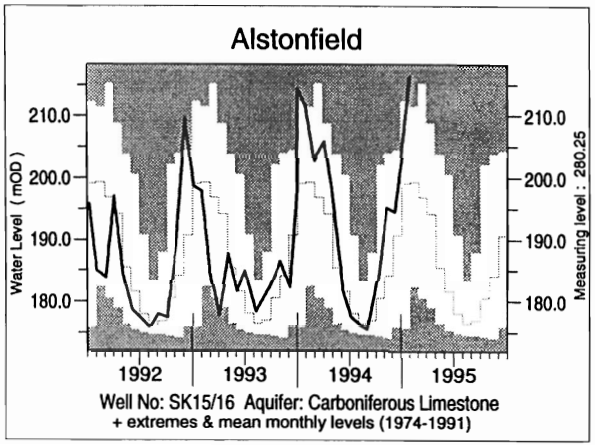

Alstonfield
Water Level (mOD)
210.0
200.0
190.0
180.0
Measuring level : 280.25
1992
1993
1994
1995
Well No: SK15/16 Aquifer: Carboniferous Limestone
+ extremes & mean monthly levels (1974-1991)

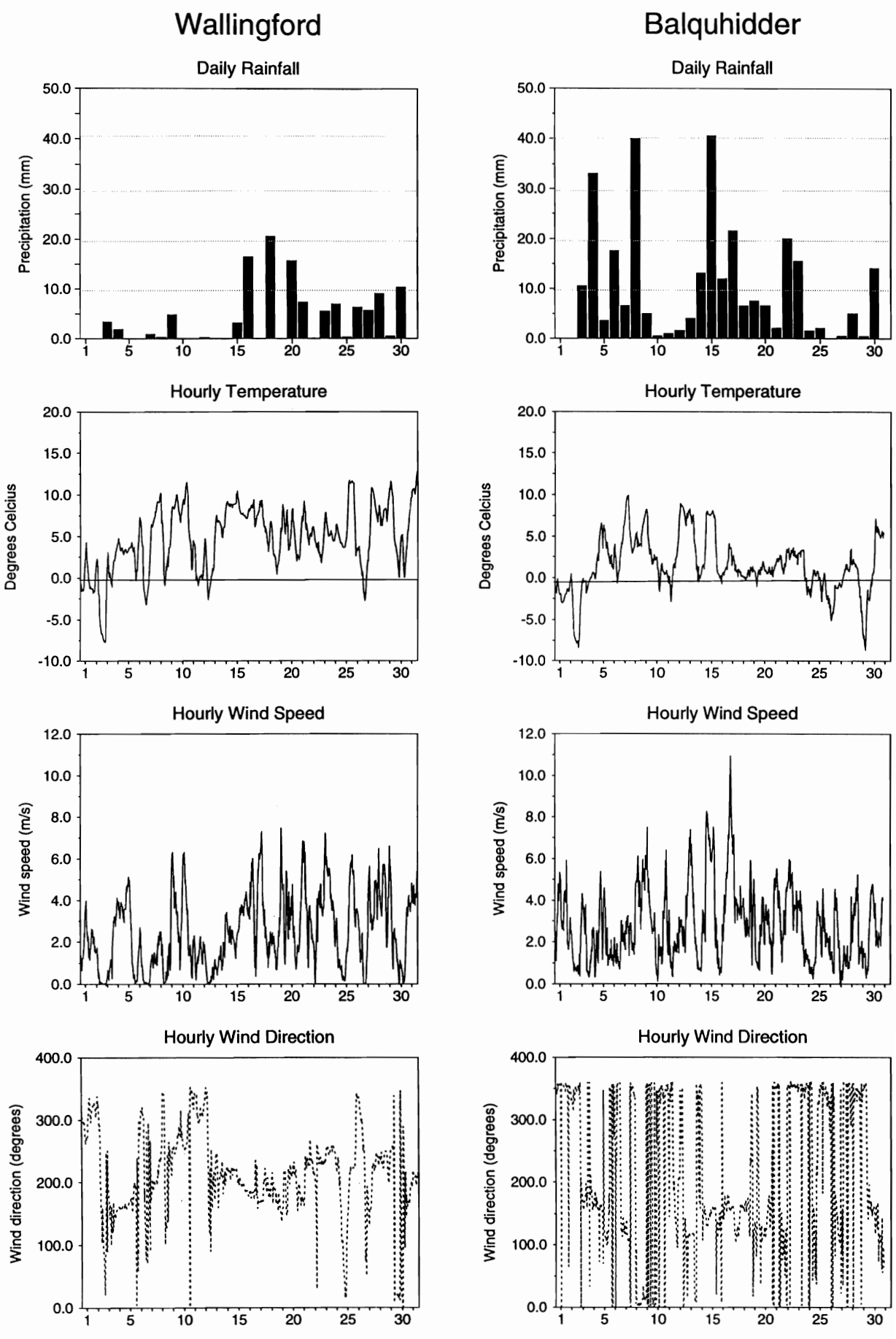
TABLE 5 A COMPARISON OF JANUARY GROUNDWATER LEVELS: 1994 AND 1995

Site	Aquifer	Records commence	Minimum Jan <1995	Average Jan <1995	Maximum Jan <1995	January 1994 day	January 1994 level	Jan/Feb 1995 day	Jan/Feb 1995 level
Dalton Holme	C & UGS	1889	10.47	17.36	23.64	30/01	17.80	02/02	16.66
Wetwang	C & UGS	1971	17.00	23.70	32.36	no	level	02/02	26.56
Washpit Farm	C & UGS	1950	40.51	43.66	47.60	04/01	47.11	02/02	44.46
The Holt	C & UGS	1964	83.90	87.08	92.02	31/01	92.02	29/01	88.21
Therfield Rectory	C & UGS	1883	dry <71.6	77.69	96.05	31/01	82.18	29/01	77.37
Redlands Hall	C & UGS	1964	32.38	40.78	51.48	14/01	47.63	25/01	41.57
Rockley	C & UGS	1933	dry <128.44	136.14	143.75	24/01	143.54	29/01	141.97
Little Bucket Farm	C & UGS	1971	57.64	67.09	84.05	31/01	84.05	27/01	77.41
Compton House	C & UGS	1984	27.84	45.96	68.75	27/01	65.32	30/01	61.85
Chilgrove House	C & UGS	1836	33.46	55.94	77.19	27/01	74.68	30/01	73.83
Westdean No.3	C & UGS	1940	1.14	2.16	4.29	28/01	3.69	28/01	3.83
Lime Kiln Way	C & UGS	1969	124.16	125.02	125.89	27/01	125.40	25/01	125.80
Ashton Farm	C & UGS	1974	63.80	68.72	71.43	31/01	70.93	30/01	71.35
West Woodyates Manor	C & UGS	1942	70.08	90.72	103.40	31/01	98.04	30/01	103.45
Killyglen (NI)	C & UGS	1985	114.67	116.31	119.02	27/01	115.62	11/01	116.31
New Red Lion	LLst	1964	6.06	14.45	22.58	26/01	21.44	27/01	18.37
Ampney Crucis	Mid Jur	1958	100.09	102.33	103.28	31/01	102.43	29/01	103.12
Yew Tree Farm	PTS	1973	12.43	13.56	13.92	11/01	13.74	31/01	13.88
Llanfair D.C	PTS	1972	79.39	79.93	80.52	26/01	79.89	02/02	80.19
Morris Dancers	PTS	1969	31.78	32.51	33.56	11/01	32.09	13/01	32.46
Weeford Flats	PTS	1966	dry <88.61	89.73	91.27	07/01	89.17	01/02	89.91
Stone	PTS	1974	89.60	90.32	91.19	05/01	91.19	02/02	91.17
Skirwith	PTS	1978	129.80	130.38	130.84	27/01	130.60	31/01	130.97
Redbank	PTS	1981	7.91	8.53	9.16	31/01	8.55	01/02	8.62
Bussels No.7A	PTS	1972	23.18	24.04	25.04	19/01	24.96	19/01	24.30
Rushyford NE	MgLst	1967	64.79	72.23	76.84	31/01	76.70	16/01	76.31
Peggy Ellerton	MgLst	1968	31.78	34.16	36.18	13/01	33.40	17/01	34.08
Alstonfield	CLst	1974	175.81	200.11	214.39	05/01	214.39	01/02	216.18

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 - JANUARY 1995



Altitude of sites : Wallingford 48m; Balquhidder (Kirkton Glen) 300m.

FIGURE 4 LOCATION MAP OF GAUGING STATIONS AND GROUNDWATER INDEX WELLS