Hydrological Summary
for the United Kingdom

May 2008

General

May rainfall totals – and the associated hydrological response – exhibited a remarkable north-south contrast: notably high rainfall characterised large parts of southern Britain but exceptionally dry conditions prevailed across much of Scotland and, especially, Northern Ireland. The consequential very low runoff is reflected in well below average reservoir stocks in some northern impoundments. With a few exceptions (e.g. Bewl Water), stocks also declined in southern Britain but in England & Wales almost all reservoir stocks remain well within the normal early summer range and overall stocks are modestly above the long term average (for early June). Spate conditions occurred early in the month and, more widely, across central and southern England during the final week of May when localised flooding was common in the South. In most of northern Britain and Northern Ireland, however, sustained recessions resulted in seasonally very depressed river flows by late May. Groundwater levels are now generally in recession but May levels remain mostly within, or above, the normal seasonal range. Correspondingly, flows in many southern spring-fed streams and rivers are particularly healthy. Conversely, significant June rainfall will be needed to avoid exceptionally low flows in rivers draining impermeable northern catchments.

Rainfall

Anticylonic conditions dominated weather patterns in northern areas throughout May when most frontal systems followed tracks south of a line from Cardigan Bay to the Wash. As a consequence, monthly rainfall totals in parts of the South East greatly exceeded those across much of the Scottish Highlands; a very uncommon circumstance. Most of southern Britain was relatively dry until the final, very unsettled, week when convective storms contributed to rainfall totals which exceeded the May average in many localities; Marston (Kent) reported 121mm from the 24-28th. Correspondingly, May rainfall totals exceeded twice the monthly mean in much of Kent, and parts of South Devon also. By contrast, May totals fell below 25% in large parts of northern England, Scotland and Northern Ireland. Scotland, which experienced its warmest May on record, registered its 4th driest May in a series from 1914 whilst, in the same timeframe, Northern Ireland reported its 2nd lowest May rainfall (after 1991) and 6-week rainfall deficiencies were very notable by early June. In most northern regions of the UK, spring (March-May) rainfall totals were below average but well within the normal range whilst, to the south, some notably high regional totals were registered; Southern Region reported its 4th wettest spring on record. Most longer-term accumulations are above average but the Oct-May rainfall for Northern Ireland ranks 3rd lowest since 1976.

River flows

Early in the month, river flows were healthy across most of the country but, generalising broadly, the lowest May rainfall coincided with the more responsive UK catchments. With little baseflow support and soil moisture deficits increasing, sustained recessions characterised most northern rivers. Entering June, estimated daily outflows from Scotland and Northern Ireland were close to the lowest on record for the early summer. However, many southern, central and eastern rivers in England & Wales registered notable, if short-lived, flow recoveries in late May and flood alerts were common over the 26-29th. The Warwickshire Avon and the Wallington (Hants) reported their highest May daily flows for 25 and 30 years respectively, and some localised flash flooding was severe (e.g. at Crewkerne, Somerset). The mostly moderate May spates, together with seasonally healthy baseflows, helped ensure that monthly runoff totals approached, or exceeded, the May average across much of the English Lowlands. In Somerset, the Tone registered its 2nd highest May runoff since 1986. By contrast, depressed runoff totals typified many western and northern catchments; for the Nevis and Annacloy (Northern Ireland), the May runoff was the lowest since the 1984 drought. For the year thus far, runoff accumulations for index rivers are, with the exception of the South-West, mostly above average – notably so in much of Scotland.

Groundwater

As in 2007, the development of soil moisture deficits through the spring of 2008, has been very atypical; late-May soils were substantially drier in much of the Scottish Highlands (the driest on record in some areas) than in south east England. Rainfall patterns during May favoured the outcrop areas of the major aquifers, the southern Chalk especially, but the intensity of some of the storms exceeded the infiltration capacity of the soils and groundwater recharge was generally local and modest (e.g in parts of Kent). Evidence of late spring recharge is provided by the increase in levels in the Jurassic Limestone of the Cotswolds (Ampney Crucis) but, more commonly, only an inflection in the seasonal recession can be identified (e.g. at Chilgrove). In the Chalk, early summer groundwater levels in most mainland outcrops are near, or above, average (notably so in parts of Norfolk and Lincolnshire). In Northern Ireland however, levels at Killyglen fell below the previous May minimum in a 23-yr series. Index boreholes in the main limestone aquifers mostly reported May levels close to the monthly average; this is true of most Permo-Triassic sandstones outcrops also, but levels in southern Scotland (see the Newbridge hydrograph) were notably low at month end.

Centre for Ecology & Hydrology
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Rainfall . . . Rainfall . . .

Rainfall accumulations and return period estimates

Area	Rainfall	May 2008	Mar 08- May 08	RP	Jan 08- May 08	RP	Oct 07- May 08	RP	Jun 07- May 08	RP
England & Wales	**mm**	**67**	**239**		**430**		**651**		**1044**	
	%	**105**	**121**	**5-10**	**122**	**10-20**	**104**	**2-5**	**115**	**5-10**
North West	mm	**33**	227		538		867		1372	
	%	**44**	93	2-5	122	10-20	106	2-5	113	5-10
Northumbrian	mm	**25**	209		407		603		972	
	%	**39**	109	2-5	121	5-15	104	2-5	112	5-10
Severn Trent	mm	**57**	210		368		543		949	
	%	**94**	118	5-10	121	5-15	105	2-5	124	10-20
Yorkshire	mm	**32**	200		418		605		1029	
	%	**52**	106	5-10	128	10-20	107	2-5	123	10-20
Anglian	mm	**59**	186		286		422		718	
	%	**122**	131	5-15	124	5-10	107	2-5	119	5-10
Thames	mm	**84**	229		348		535		833	
	%	**149**	139	10-20	126	5-15	112	2-5	119	5-10
Southern	mm	**97**	260		395		581		885	
	%	**179**	153	40-60	129	10-20	105	2-5	113	2-5
Wessex	mm	**96**	262		423		660		997	
	%	**156**	141	10-20	124	5-15	110	2-5	117	5-10
South West	mm	**122**	314		509		793		1224	
	%	**165**	129	5-15	105	2-5	91	2-5	103	2-5
Welsh	mm	**84**	328		649		985		1513	
	%	**100**	119	5-10	125	5-15	103	2-5	112	2-5
Scotland	**mm**	**27**	**295**		**748**		**1150**		**1631**	
	%	**31**	**100**	**<2**	**135**	**25-40**	**112**	**5-15**	**111**	**5-15**
Highland	mm	**23**	365		958		1491		2033	
	%	**24**	106	2-5	147	30-40	121	10-20	117	10-20
North East	mm	**28**	234		483		761		1187	
	%	**38**	104	2-5	122	20-30	109	5-10	115	10-20
Tay	mm	**33**	248		695		985		1415	
	%	**38**	93	2-5	135	20-30	108	2-5	110	5-10
Forth	mm	**27**	218		596		869		1290	
	%	**35**	92	2-5	137	20-30	111	5-10	113	5-10
Tweed	mm	**27**	228		494		727		1150	
	%	**37**	106	2-5	128	15-25	107	2-5	115	5-15
Solway	mm	**27**	267		668		1028		1521	
	%	**30**	94	2-5	124	5-10	103	2-5	106	2-5
Clyde	mm	**36**	341		879		1344		1856	
	%	**38**	101	2-5	135	15-25	111	5-10	106	2-5
Northern Ireland	**mm**	**18**	**200**		**454**		**715**		**1156**	
	%	**25**	**87**	**2-5**	**106**	**2-5**	**94**	**2-5**	**105**	**2-5**

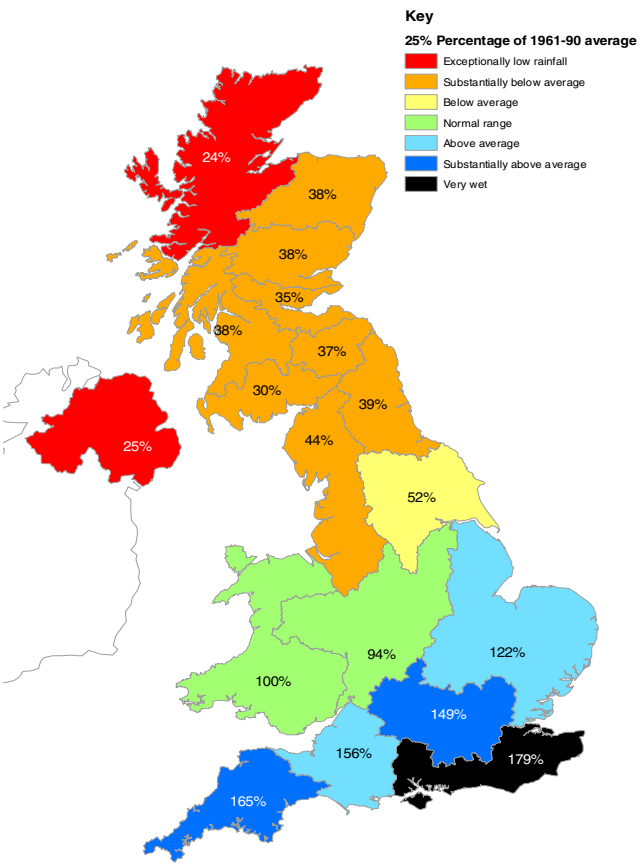
% = percentage of 1961-90 average

RP = Return period

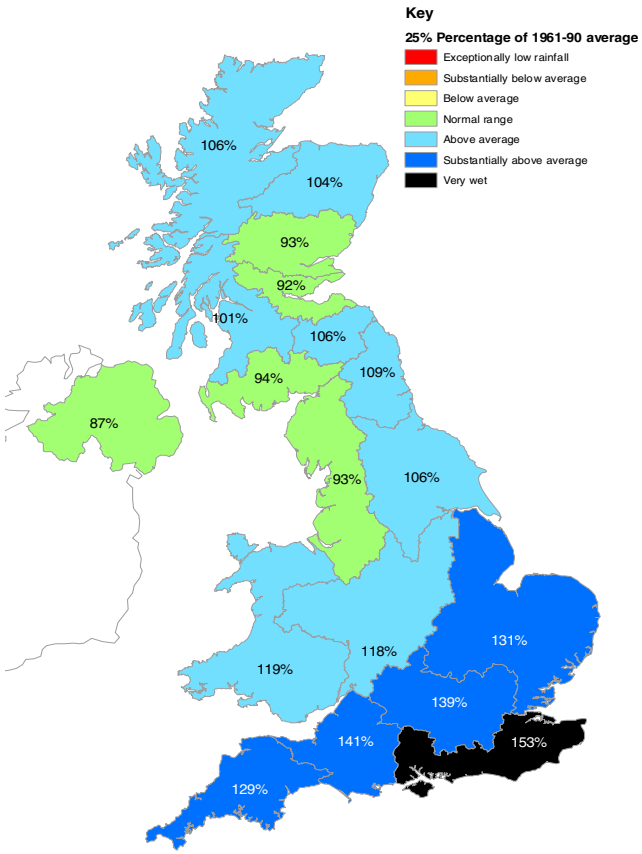
Important note: Figures in the above table may be quoted provided their source is acknowledged (see page 12). Where appropriate, specific mention must be made of the uncertainties associated with the return period estimates. The RP estimates are based on data provided by the Met Office and derived following the method described in: Tabony, R. C. 1977, *The variability of long duration rainfall over Great Britain*. Met Office Scientific Paper no. 37. The estimates reflect climatic variability since 1913 and assume a stable climate. The timespans featured do not purport to represent the critical periods for any particular water resource management zone. For hydrological or water resources assessments of drought severity, river flows and/or groundwater levels normally provide a better guide than return periods based on regional rainfall totals.
All monthly rainfall totals since November 2007 are provisional.

Rainfall . . . Rainfall . . .

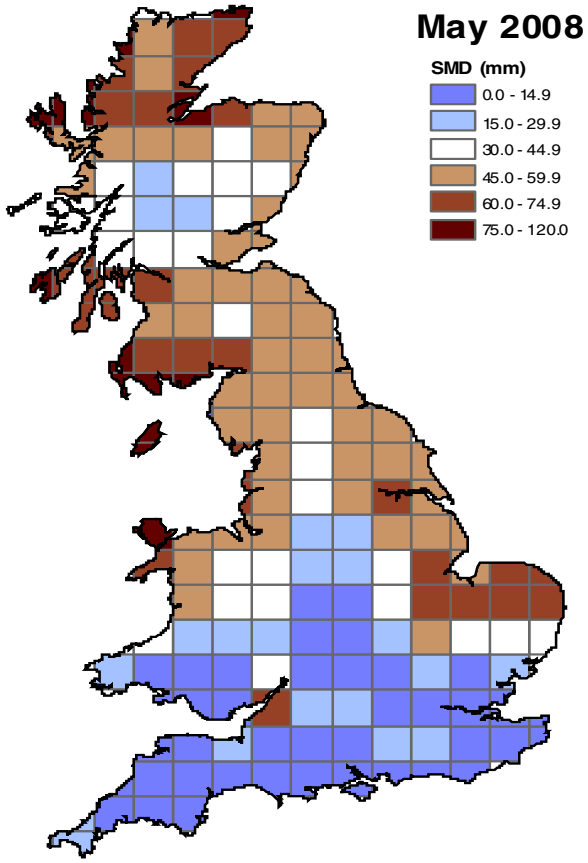
May 2008



March - May 2008



MORECS Soil Moisture Deficit



Met Office Summer 2008 forecast

Forecast for Summer 2008 updated 29 May 2008

European forecast: Temperature and rainfall

For north-west Europe there is a slightly enhanced risk of more unsettled spells than usual with average or above-average rainfall. In contrast, rainfall is more likely to be below average over much of southern and eastern Europe. Mean summer temperatures are more likely to be above 1971-2000 averages over much of Europe, with the highest probabilities of warmer than average over Mediterranean regions.

UK forecast:

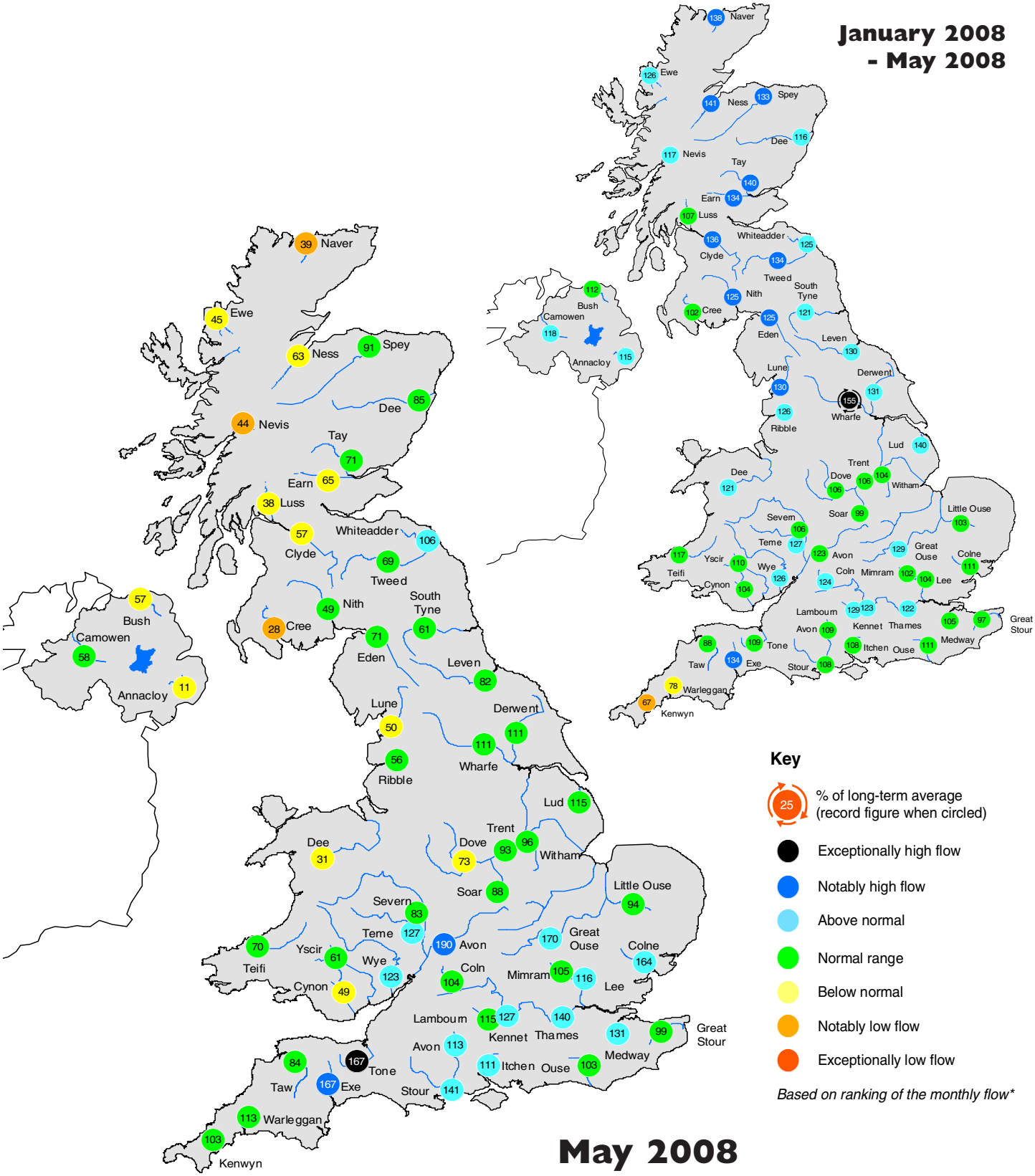
Temperature: There is a slightly enhanced chance of more frequent cloudy and cool spells compared to recent summers prior to 2007. Nevertheless, mean temperatures are more likely to be above the 1971-2000 average.

Precipitation: Forecasting methods continue to suggest that rainfall for the summer as a whole is more likely to be either near, or above average.

The summer forecast will be next updated on 25 June 2008. For further details please visit:

http://www.metoffice.gov.uk/weather/seasonal/summer2008/uk.index.html

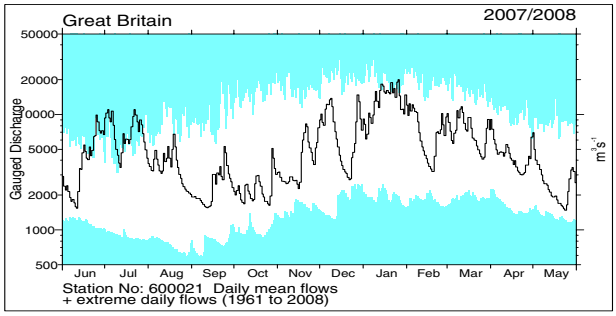
River flow . . . River flow . . .

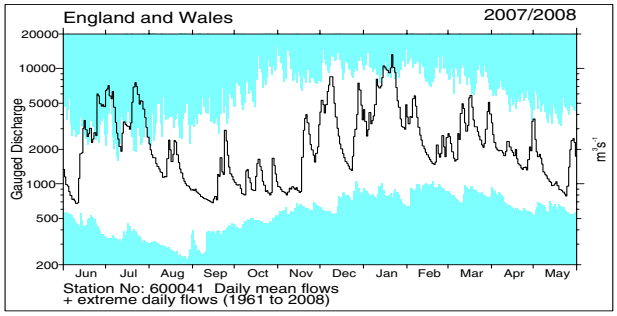


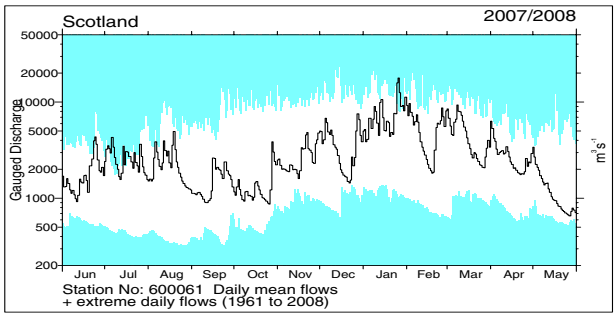
River flows

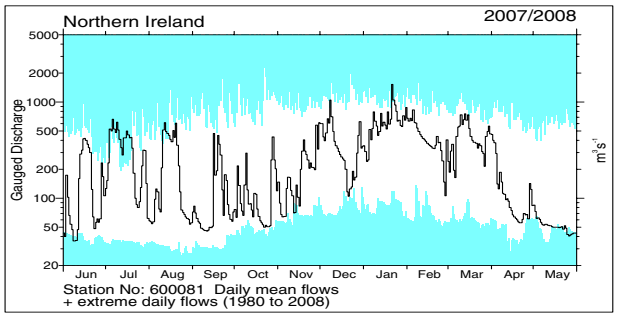
*Comparisons based on percentage flows alone can be misleading. A given percentage flow can represent extreme drought conditions in permeable catchments where flow patterns are relatively stable but be well within the normal range in impermeable catchments where the natural variation in flows is much greater. Note: the period of record on which these percentages are based varies from station to station. Percentages may be omitted where flows are under review.

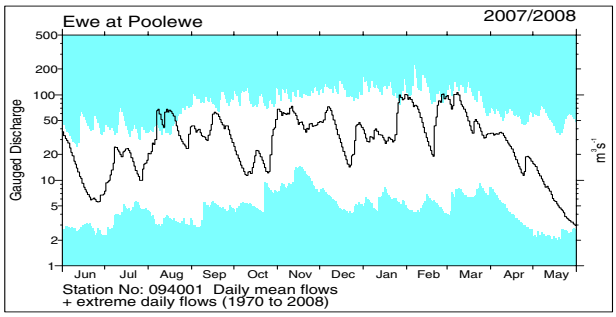
River flow . . . River flow . . .

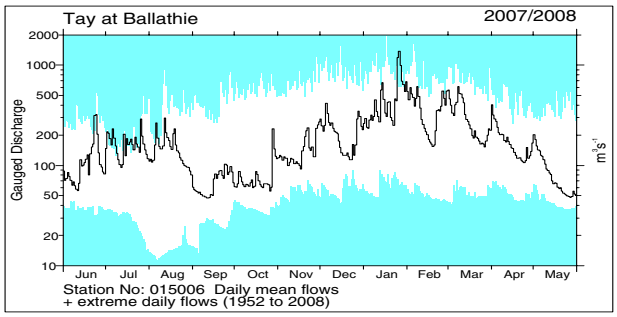


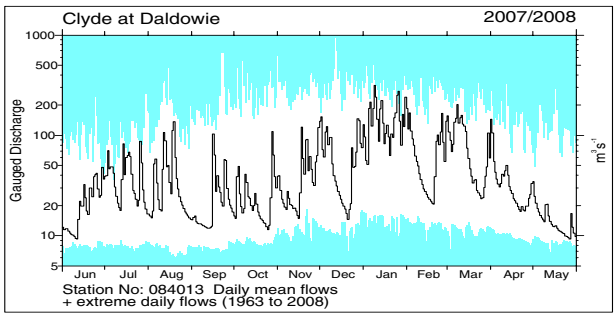


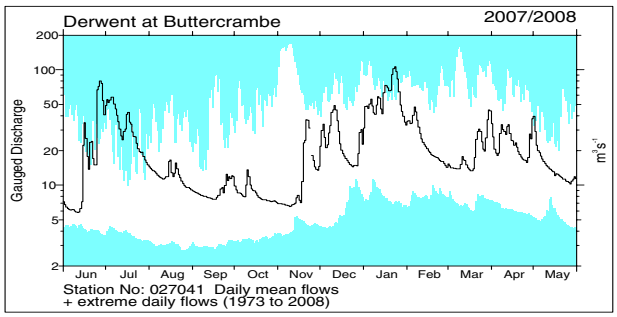


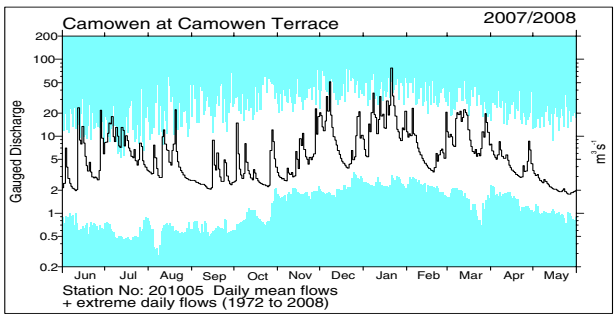


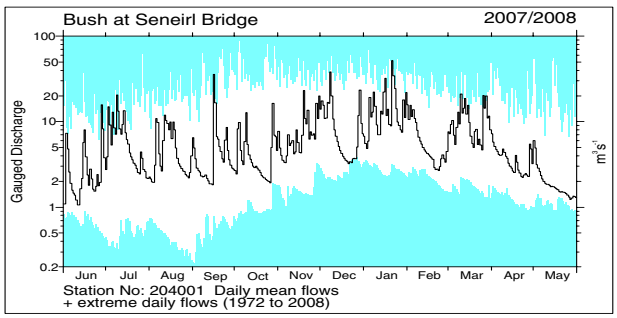








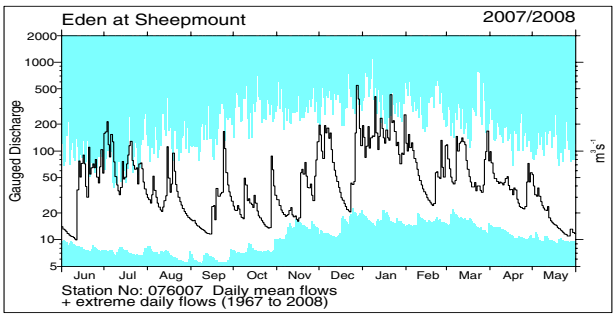


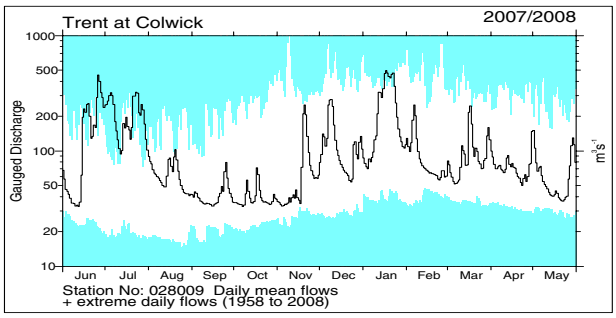


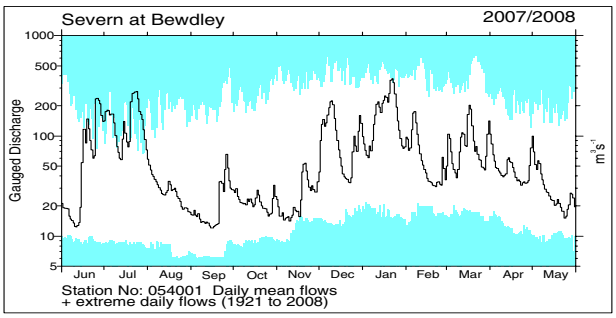
River flow hydrographs

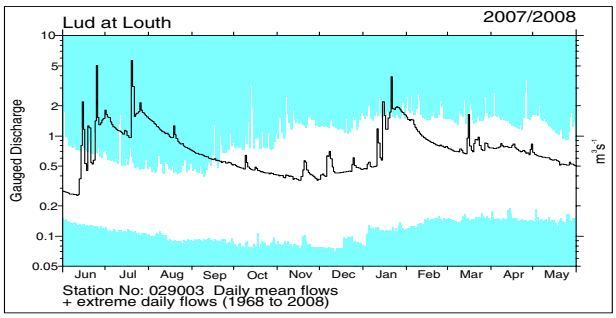
The river flow hydrographs show the daily mean flows together with the maximum and minimum daily flows prior to June 2007 (shown by the shaded areas). Daily flows falling outside the maximum/minimum range are indicated where the bold trace enters the shaded areas.

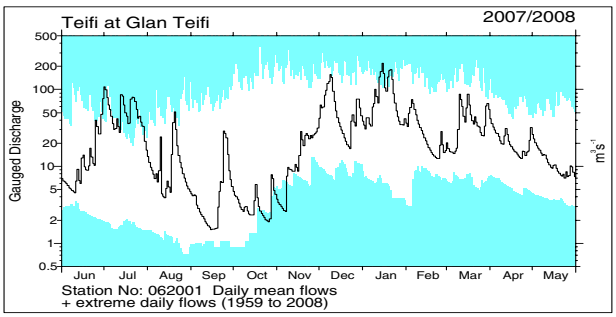
River flow . . . River flow . . .

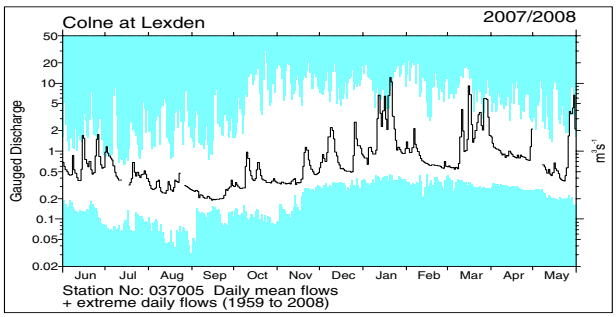


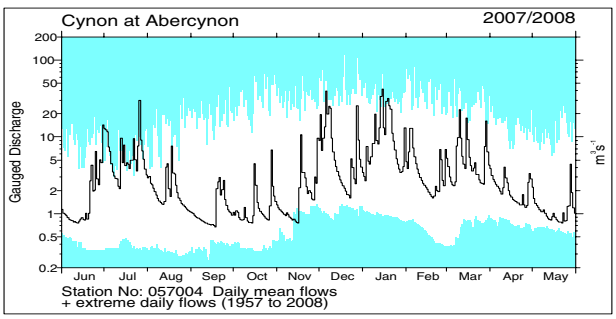


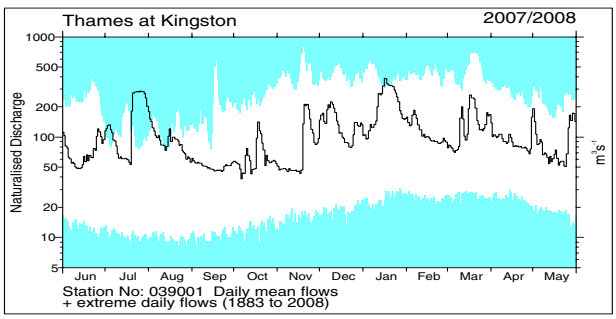


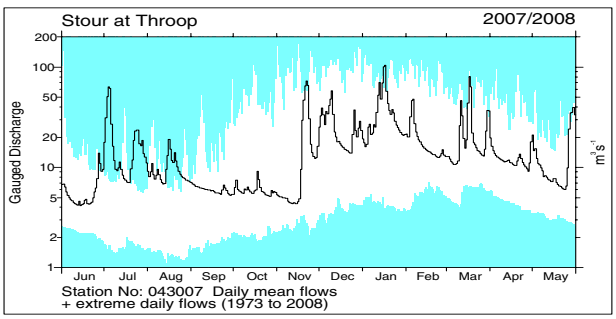


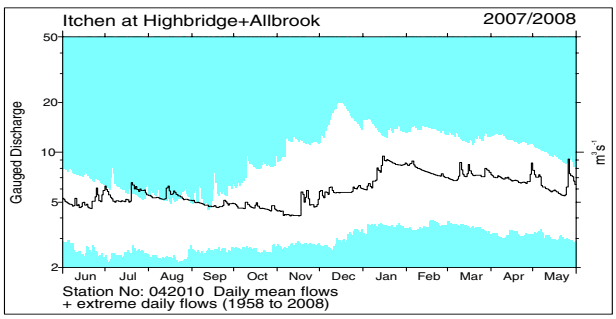












Notable runoff accumulations (a) March-May 2008, (b) January - May 2008, (c) June 2007- May 2008

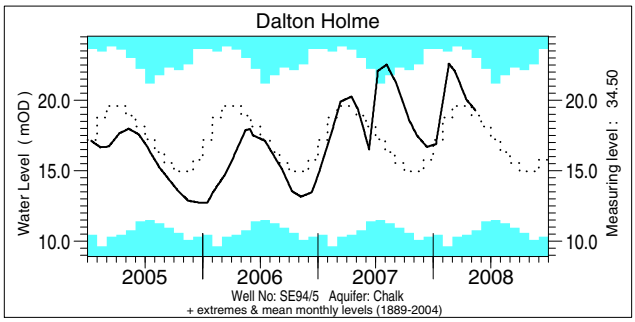
	River	%lta	Rank
a)	Mole	157	32/34
	Luss	83	7/32
	Nevis	87	9/26
	L Bann	67	3/28
	Annacloy	70	7/29

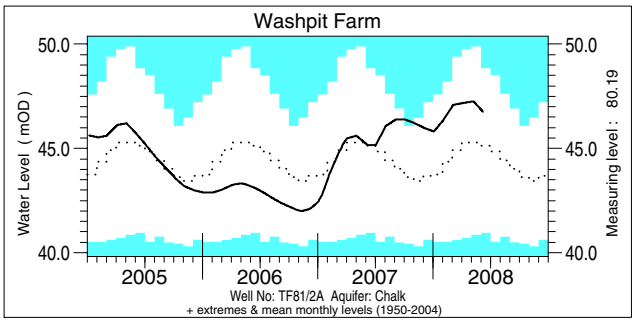
	River	%lta	Rank
b)	Tay	140	54/56
	Tyne (Spilmersford)	154	44/44
	Tweed (Norham)	137	49/49
	Wharfe	155	53/53
	Exe	134	50/52
	Kenwyn	67	4/40
	Clyde (Blairston)	152	47/48
	Naver	138	30/31

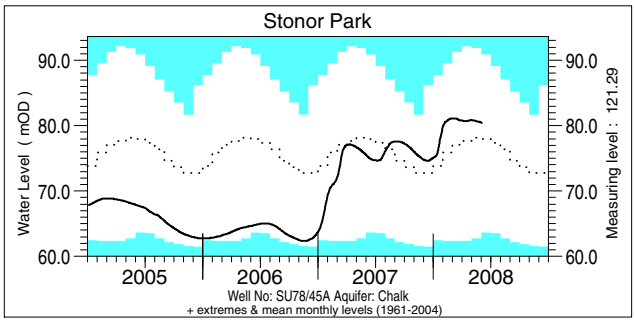
	River	%lta	Rank
c)	S Tyne	122	42/44
	Dover Beck	187	32/32
	Lud	186	39/39
	Bedford Ouse	164	72/75
	Lambourn	145	44/45
	Coln	160	43/44
	Avon (Evesham)	158	68/71
	Teme	154	37/38

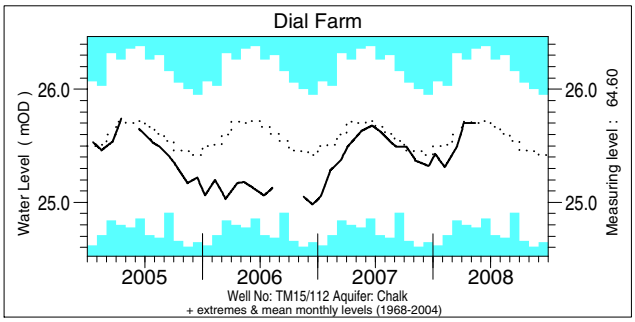
lta = long term average
Rank 1 = lowest on record

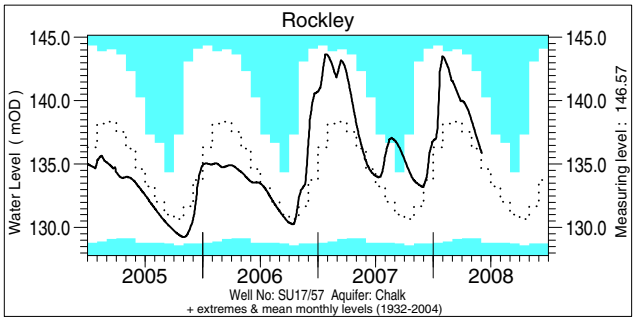
Groundwater . . . Groundwater

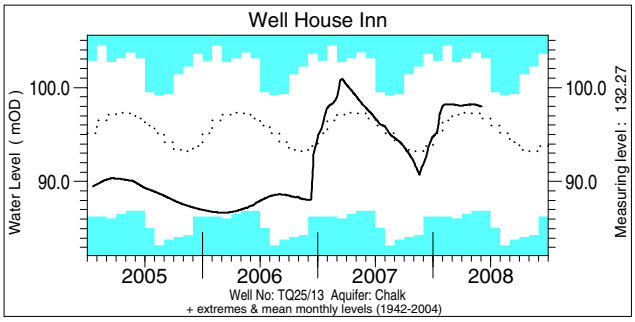


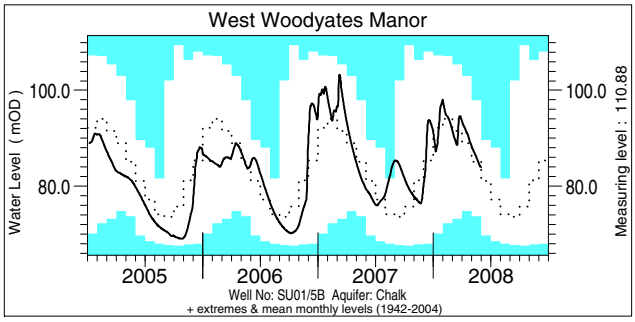


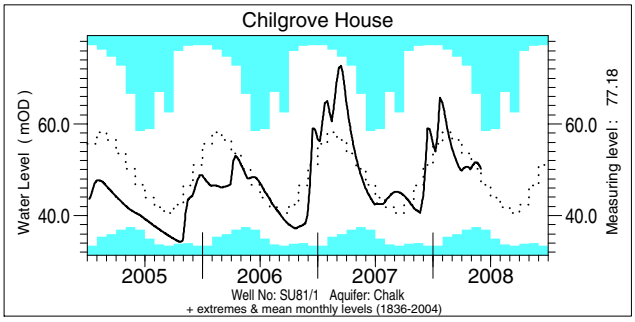


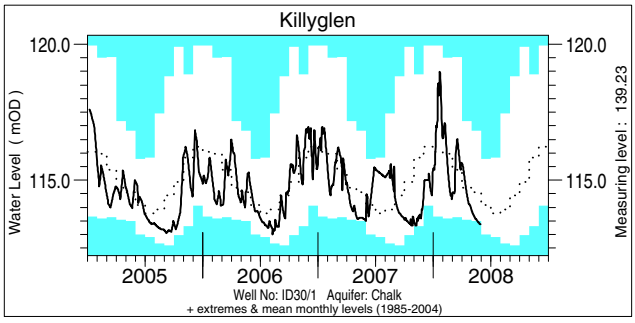


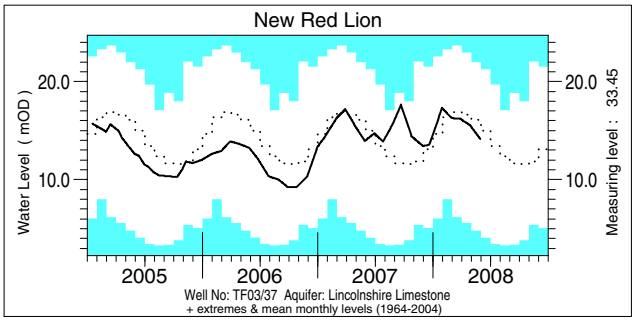






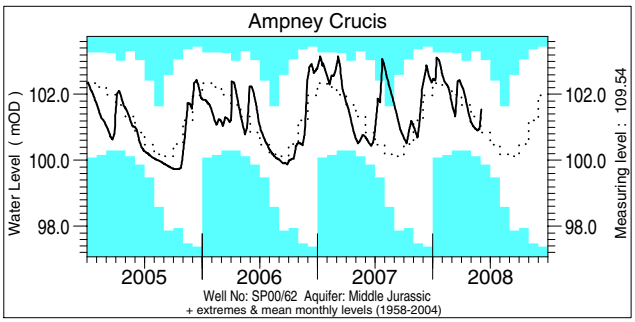


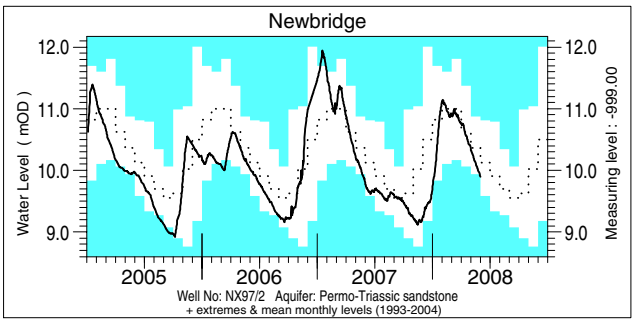


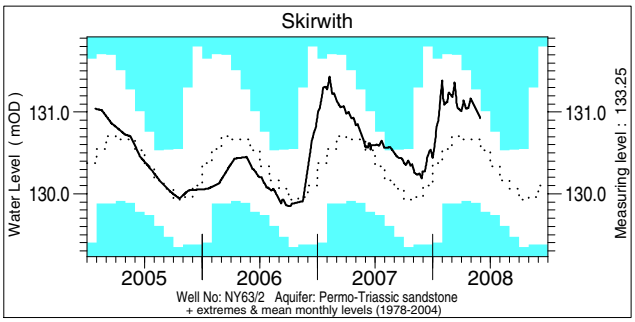


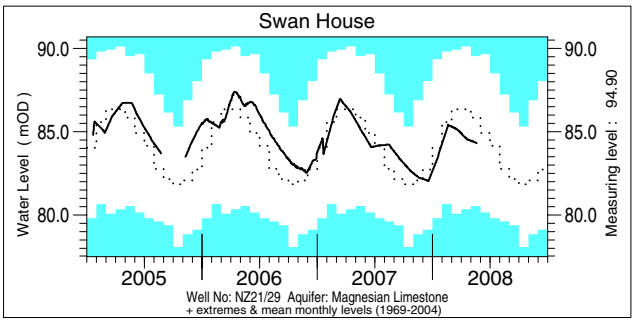
Groundwater levels normally rise and fall with the seasons, reaching a peak in the spring following replenishment through the winter (when evaporation losses are low and soil moist). They decline through the summer and early autumn. This seasonal variation is much reduced when the aquifer is confined below overlying impermeable strata. The monthly mean and the highest and lowest levels recorded for each month are displayed in a similar style to the river flow hydrographs. Note that most groundwater levels are not measured continuously – the latest recorded levels are listed overleaf.

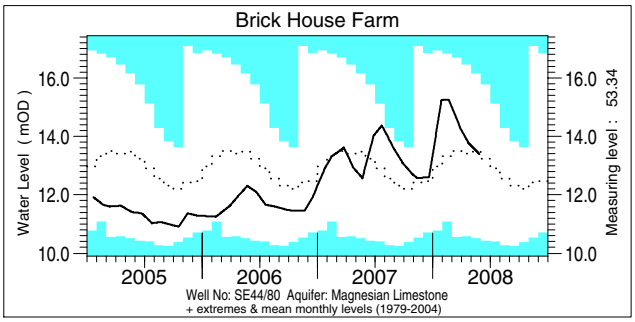
Groundwater . . . Groundwater

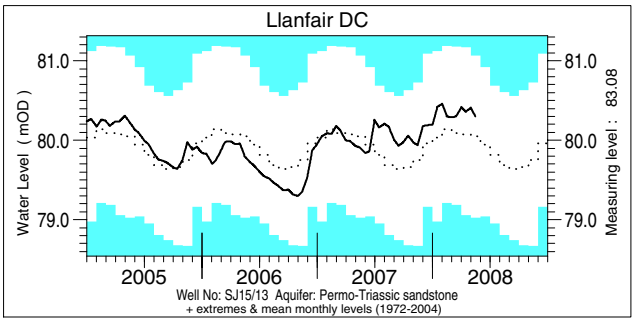


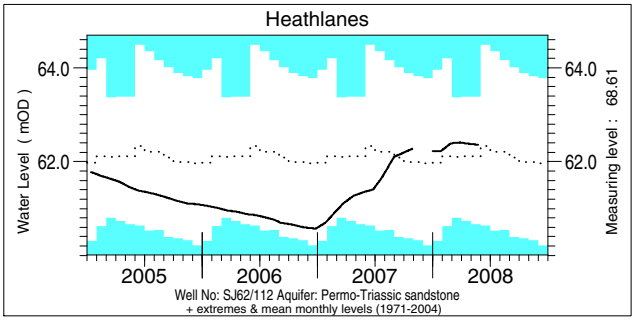


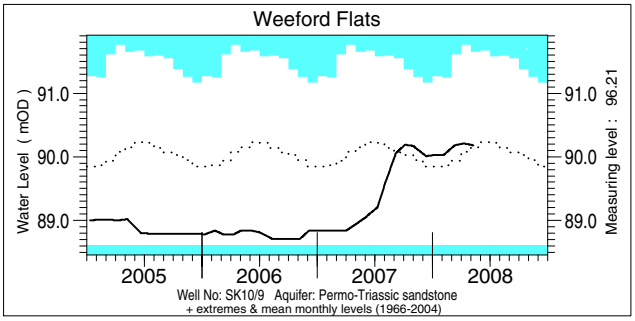


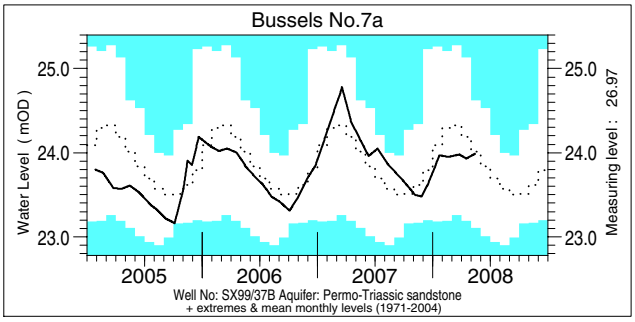


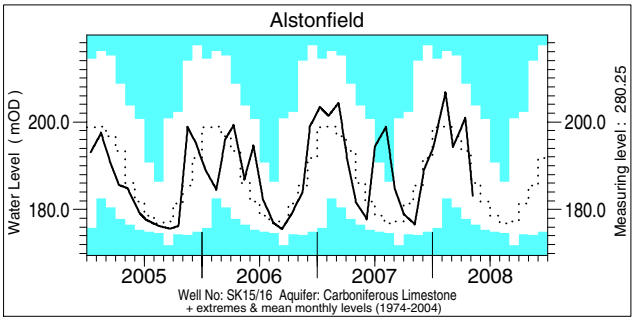










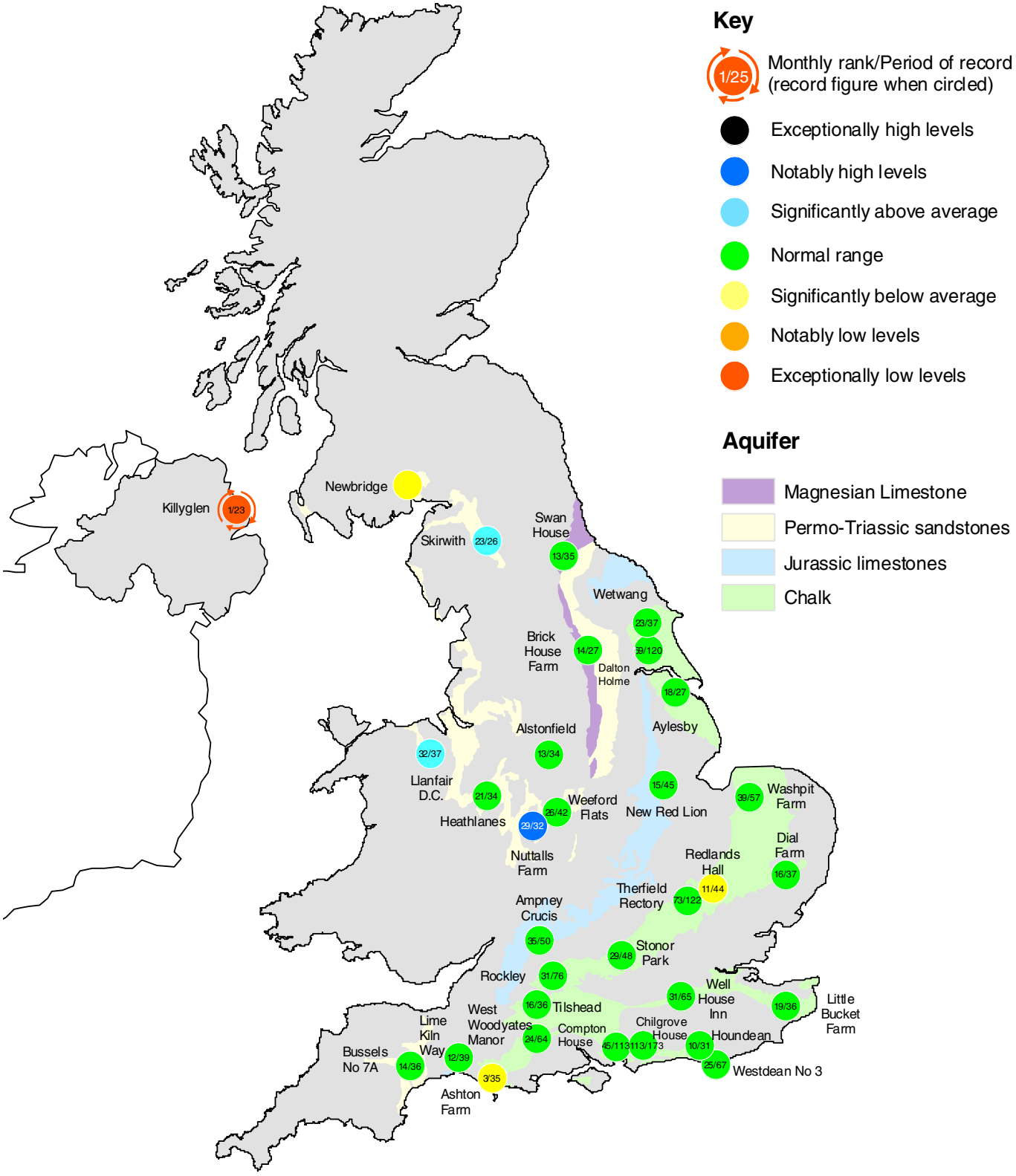


Groundwater levels May / June 2008

Borehole	Level	Date	May av.	Borehole	Level	Date	May av.	Borehole	Level	Date	May av.
Dalton Holme	19.27	13/05	18.95	Chilgrove House	50.26	31/05	48.95	Brick House Farm	13.39	27/05	13.29
Washpit Farm	46.76	06/06	45.46	Killyglen (NI)	113.37	30/05	114.47	Llanfair DC	80.30	15/05	79.97
Stonor Park	80.43	02/06	77.95	New Red Lion	14.11	29/05	15.78	Heathlanes	62.36	23/05	62.03
Dial Farm	25.70	13/05	25.69	Ampney Crucis	101.55	02/06	101.27	Weeford Flats	90.18	09/05	89.92
Rockley	135.90	02/06	136.18	Newbridge	9.90	31/05	10.29	Bussels No.7a	23.99	14/05	24.00
Well House Inn	97.96	02/06	97.01	Skirwith	130.92	30/05	130.59	Alstonfield	183.12	07/05	186.62
West Woodyates	84.03	31/05	84.58	Swan House	84.31	19/05	85.25				

Levels in metres above Ordnance Datum

Groundwater . . .Groundwater



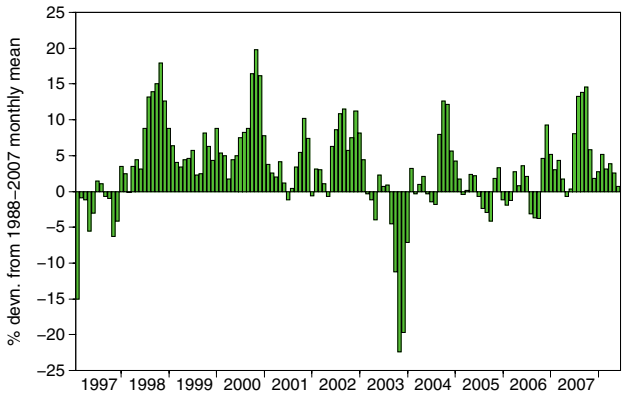
Groundwater levels - May 2008

The rankings are based on a comparison between the average level in the featured month (but often only single readings are available) and the average level in each corresponding month on record. They need to be interpreted with caution especially when groundwater levels are changing rapidly or when comparing wells with very different periods of record. Rankings may be omitted where they are considered misleading.

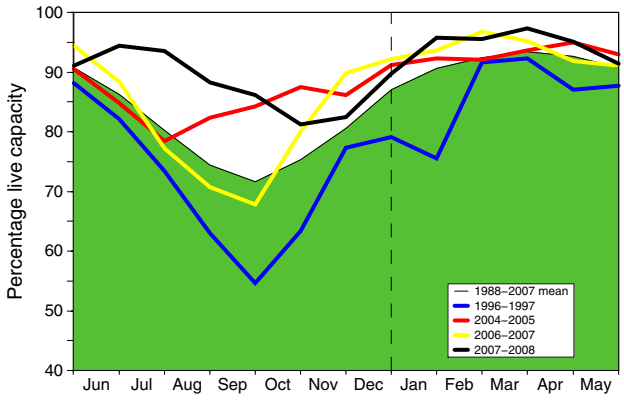
Notes: i. The outcrop areas are coloured according to British Geological Survey conventions.
ii. Recent levels for Houndean Bottom are under review.
iii. Llanfair DC levels are under review.

Reservoirs . . . Reservoirs . . .

Guide to the variation in overall reservoir stocks for England and Wales



Comparison between overall reservoir stocks for England and Wales in recent years



These plots are based on the England and Wales figures listed below.

Percentage live capacity of selected reservoirs at start of month

Area	Reservoir	Capacity (Ml)	2008 Apr	2008 May	2008 Jun	Jun Anom.	Min. Jun	Year* of min.	2007 Jun	Diff 08-07
North West	N Command Zone	• 124929	98	91	**79**	-4	72	1991	83	-4
	Vyrnwy	55146	100	99	**90**	1	72	1990	85	5
Northumbrian	Teesdale	• 87936	100	97	**87**	1	64	1991	84	3
	Kielder	(199175)	(92)	(93)	**(92)**	0	(85)	1989	(93)	-1
Severn Trent	Clywedog	44922	100	100	**100**	4	83	1989	98	2
	Derwent Valley	• 39525	100	99	**92**	4	56	1996	86	6
Yorkshire	Washburn	• 22035	99	96	**88**	1	72	1990	82	6
	Bradford supply	• 41407	100	96	**89**	3	70	1996	81	8
Anglian	Grafham	(55490)	(90)	(96)	**(96)**	2	(72)	1997	(98)	-2
	Rutland	(116580)	((96)	(93)	**(93)**	2	(75)	1997	(96)	-3
Thames	London	• 202828	97	90	**98**	5	83	1990	94	4
	Farmoor	• 13822	98	96	**93**	-5	90	2002	98	-5
Southern	Bewl	28170	100	98	**99**	12	57	1990	88	11
	Ardingly	4685	94	100	**100**	1	96	1990	99	1
Wessex	Clatworthy	5364	100	94	**90**	4	67	1990	80	10
	Bristol WW	• (38666)	(98)	(96)	**(89)**	0	(70)	1990	(92)	-3
South West	Colliford	28540	91	91	**93**	9	52	1997	78	15
	Roadford	34500	95	93	**90**	7	48	1996	91	-1
	Wimbleball	21320	100	99	**100**	9	76	1992	92	8
	Stithians	5205	93	88	**80**	-6	66	1990	87	-7
Welsh	Celyn and Brenig	• 131155	100	100	**99**	2	82	1996	96	3
	Brianne	62140	100	100	**96**	0	85	1995	94	2
	Big Five	• 69762	99	96	**90**	0	70	1990	91	-1
	Elan Valley	• 99106	100	99	**94**	-1	85	1990	92	2
Scotland(E)	Edinburgh/Mid Lothian	• 97639	100	99	**93**	4	52	1998	89	4
	East Lothian	• 10206	100	100	**100**	4	84	1990	95	5
Scotland(W)	Loch Katrine	• 111363	93	90	**74**	-14	66	2001	78	-4
	Daer	22412	99	97	**85**	-6	70	1994	88	-3
	Loch Thom	• 11840	96	91	**88**	-3	74	2001	86	2
Northern Ireland	Total+	• 67270	90	83	**69**	-16	69	2008	71	-2
	Silent Valley	• 20634	93	82	**66**	-14	56	2000	68	-2

() figures in parentheses relate to gross storage • denotes reservoir groups +excludes Lough Neagh *last occurrence

Details of the individual reservoirs in each of the groupings listed above are available on request. The percentages given in the Average and Minimum storage columns relate to the 1988-2006 period except for West of Scotland and Northern Ireland where data commence in the mid-1990's. In some gravity-fed reservoirs (e.g. Clywedog) stocks are kept below capacity during the winter to provide scope for flood attenuation purposes.

Location map . . . Location map

National Hydrological Monitoring Programme

The National Hydrological Monitoring Programme (NHMP) was instigated in 1988 and is undertaken jointly by the Centre for Ecology and Hydrology Wallingford (formerly the Institute of Hydrology - IH) and the British Geological Survey (BGS). Financial support for the production of the monthly Hydrological Summaries is provided by the Department for Environment, Food and Rural Affairs (Defra), the Environment Agency (EA), the Scottish Environment Protection Agency (SEPA), the Rivers Agency (RA) in Northern Ireland, and the Office of Water Services (OFWAT).

Data Sources

River flow and groundwater level data are provided by the Environment Agency, the Environment Agency Wales, the Scottish Environment Protection Agency and, for Northern Ireland, the Rivers Agency and the Department of the Environment (NI). In all cases the data are subject to revision following validation (flood and drought data in particular may be subject to significant revision).
Reservoir level information is provided by the Water Service Companies, the EA, Scottish Water and the Northern Ireland Water Service.

The National River Flow Archive (maintained by CEH Wallingford) and the National Groundwater Level Archive (maintained by BGS) provide the historical perspective within which to examine contemporary hydrological conditions.

Rainfall

Most rainfall data are provided by the Met Office (see opposite). To allow better spatial differentiation the rainfall data for Britain are presented for the regional divisions of the precursor organisations of the EA and SEPA. Following the discontinuation of the Met Office's CARP system in July 1998, the areal rainfall figures have been derived using several procedures, including initial estimates based on MORECS*. Recent figures have been produced by the Met Office, National Climate Information Centre (NCIC), using a technique similar to CARP. A significant number of additional monthly raingauge totals are provided by the EA and SEPA to help derive the contemporary regional rainfalls. Revised monthly national and regional rainfall totals for the post-1960 period (together with revised 1961-90 averages) were made available by the Met Office in 2004; these have been adopted by the NHMP. As with all regional figures based on limited raingauge networks the monthly tables and accumulations (and the return periods associated with them) should be regarded as a guide only.

NATURAL ENVIRONMENT RESEARCH COUNCIL

The monthly rainfall figures are provided by the Met Office (National Climate Information Centre) and are Crown Copyright and may not be passed on to, or published by, any unauthorised person or organisation.

*MORECS is the generic name for the Met Office services involving the routine calculation of evaporation and soil moisture throughout Great Britain.

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The National Hydrological Monitoring Programme depends on the active cooperation of many data suppliers. This cooperation is gratefully acknowledged.

Subscription

Subscription to the Hydrological Summaries costs £48 per year. Orders should be addressed to:

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Selected text and maps are available on the WWW at
http://www.nerc-wallingford.ac.uk/ih/nrfa/index.htm
Navigate via Water Watch

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06/08