Monthly Water Situation Report December 2018

Natural Resources Wales

- **The monthly rainfall total for Wales during December was 128% of the Long Term Average (LTA, 1961-90). South East, South West and North Wales received 128%, 127% and 128% of the LTA, respectively.**
- **At the end of December, the differences between soil moisture deficit (SMD) values and the LTA across Wales were from -1.8 to 1.3 mm. Soil moisture deficit values were very similar to the LTA values for all squares in December.**
- **For river flows in Wales, 8 out of 29 indicator sites (which had flow data available) were classed as *Normal.* 1 site was *Below normal* and 16 sites were *Above normal.* The remaining 4 sites were *Notably high*.**
- **The cumulative reservoir storage for 15 out of 18 indicator reservoirs was greater than 95% at the end of December. All reservoirs were within normal operating ranges.**

Rainfall*

The monthly rainfall total for Wales was 128% of the LTA for December. The percentage of rainfall recorded in catchments compared with their LTA across Wales was between 111% (Ynys Mon) and 145% (Llyn and Eryri). The rainfall total for Wales was 43.9mm more than the December LTA. For South East, South West and North Wales the rainfall totals were 128%, 127% and 128% of LTA, respectively.

Rainfall Map	National			
Rainfall Charts	National & Areas	South East Wales	North Wales	South West Wales

* using NCIC (National Climate Information Centre) data *(Source: Met Office © Crown Copyright)*

Soil Moisture Deficit/Recharge

The differences between the soil moisture deficits and the LTA for the 23 MORECS squares were from -1.8 to 1.3 mm and soil moisture deficit values were very similar to the LTA values for all the squares for December.

SMD Map	National
SMD Charts	Compare to LTA

River Flows

River flows were between *Below normal* and *Notably high* for all the indicator sites across Wales. 8 out of 29 indicator sites (which had flow data available) were classed as *Normal.* 1 site was *Below normal* and 16 sites were *Above normal*. The remaining 4 sites were *Notably high*.

***South East*:** Flows in the area ranged from 118% (River Yscir at Pont ar Yscir) to 175% (River Ely at St Fagans) of the December LTA values.

South West: The river flows within this area ranged from 126% (River Ystwyth at Pont Llolwyn and River Teifi at Glanteifi) to 169% (River Llynfi at Coytrahen) of the December LTA values.

***North*:** Flows in the area ranged from 62% (River Wheeler at Bodfari) to 135% (River Dwyfor at Garndolbenmaen) of the December LTA values.

River Flow Map	National		
River Flow Table	% of LTA and compare to previous year		
River Flow Charts	South East Wales	North Wales	South West Wales

Groundwater Levels

Groundwater levels for December at indicator sites (9 data available sites) were classed between *Exceptionally low* (Eastwick) to *Normal* (Pant-y-Lladron, Fernbank, Greenfield Garage, Dodleston and Broxton Obs). 1 site was *Notably low* (Llanfair DC) and the remaining 2 sites were *Below normal* (Pont y Cambwll and Handley).

Groundwater Map	National		
Groundwater Charts	South East Wales	North Wales	South West Wales

Reservoir Storage

At the end of December the cumulative reservoir storage for 15 out of 18 indicator reservoirs were greater than 95% full. All reservoirs were within normal operating ranges.

Reservoir Charts	South East Wales	North Wales	South West Wales

All data on Water Situation Reports are provisional, based on spot readings, and are subject to revision.

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Natural Resources Wales

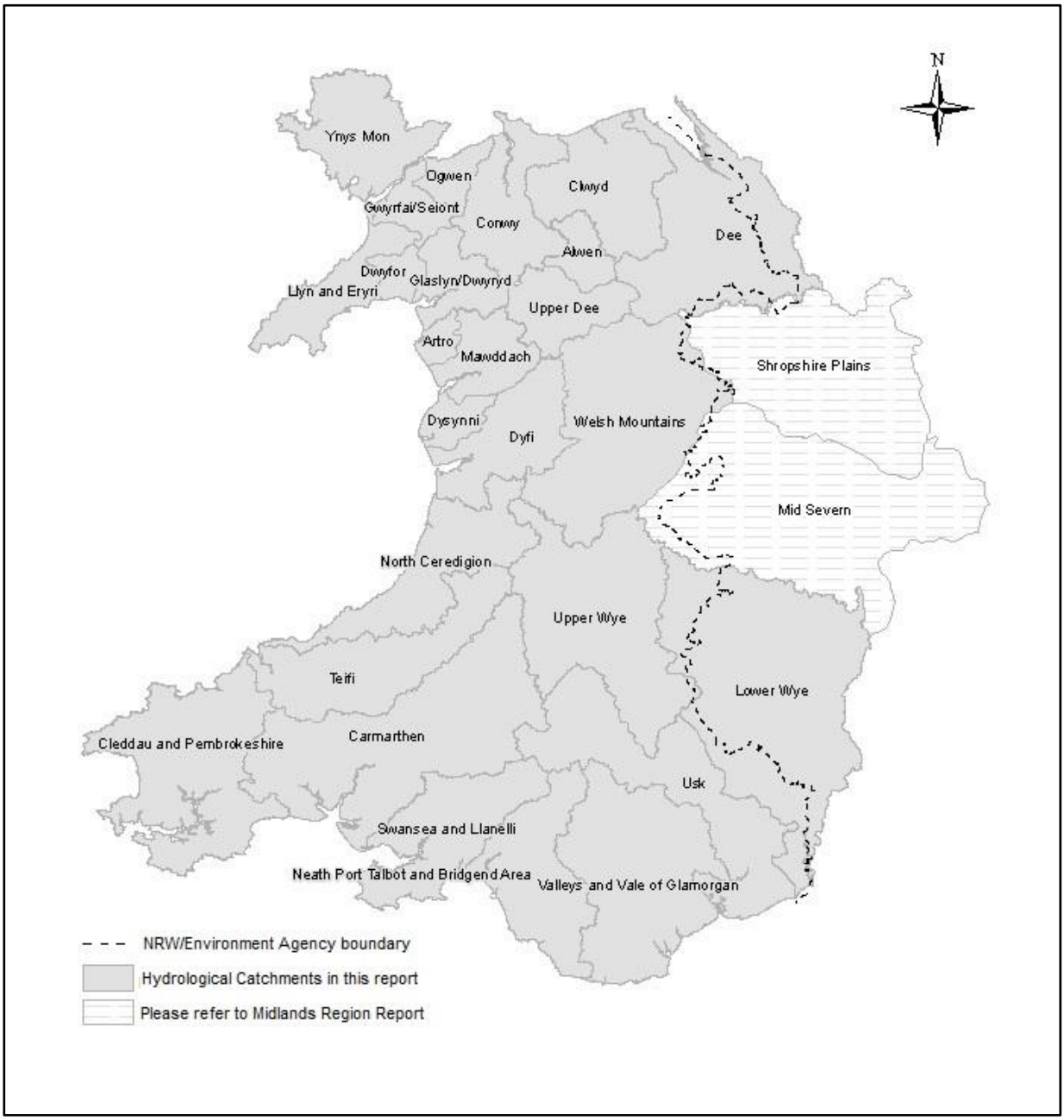

Figure 1: The Natural Resources Wales Water Situation Report features sites in the catchments shown. Parts of the Shropshire Plains and Mid Severn catchments are within Wales. For full information on these catchments, please see the Environment Agency Midlands Water Situation Report.

For areas adjoining Natural Resources Wales, please see the reports for Environment Agency Midlands and North West England:

Environment Agency - Midlands, England Water Situation Report
Environment Agency - North West, England Water Situation Report

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Rainfall

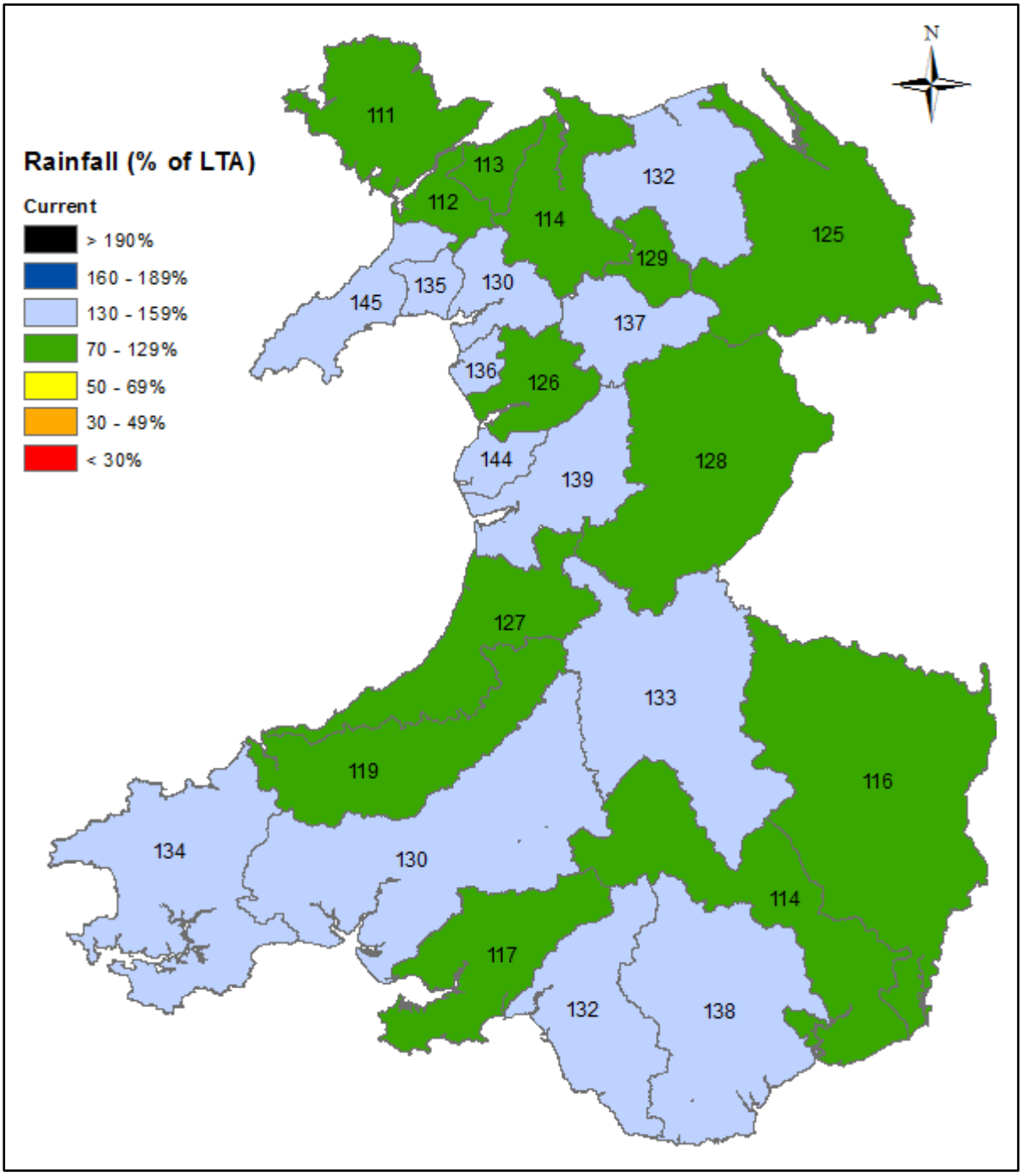

Figure 2: Calculated catchment average December rainfall totals as a percentage of the 1961-90 December long term average for Natural Resources Wales catchments, using NCIC (National Climate Information Centre) data (*Source: Met Office © Crown Copyright).*

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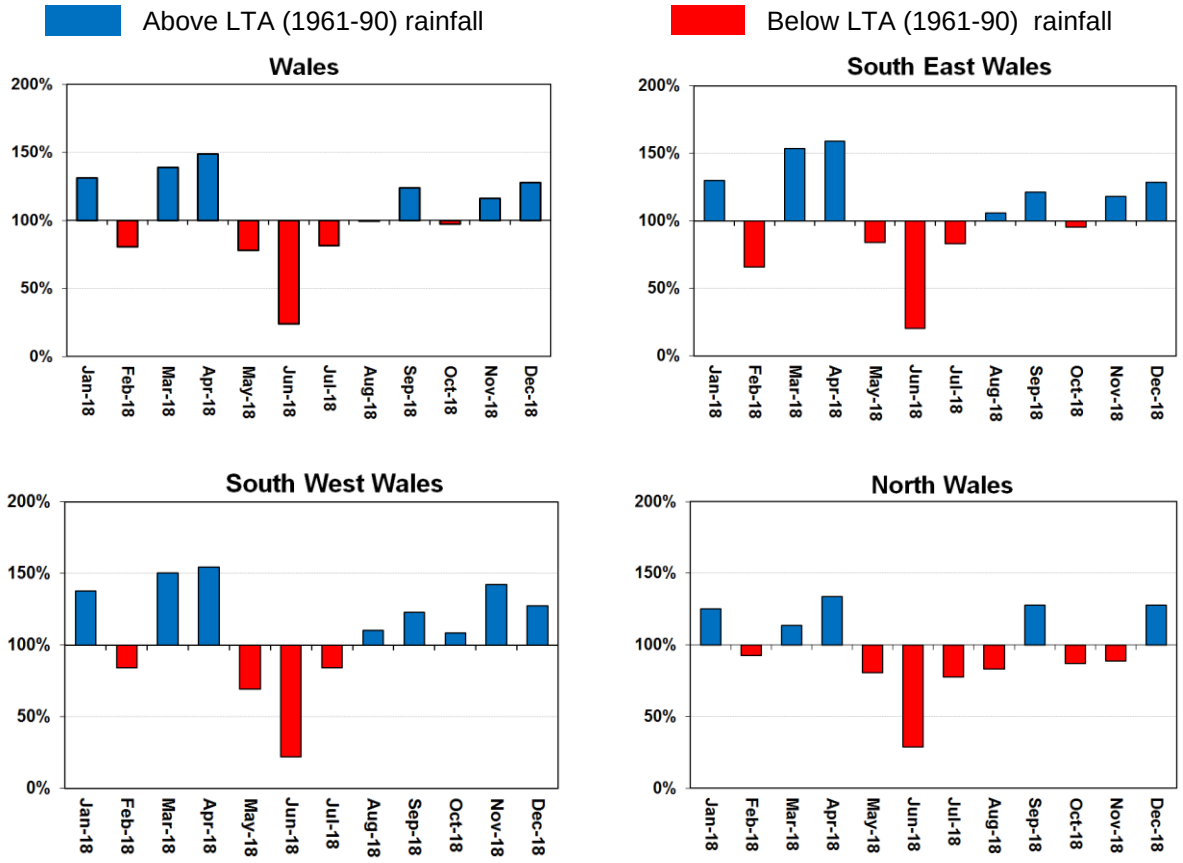
Rainfall Charts

Figure 3: Rainfall Charts: National and Areas



Comparison of monthly rainfall totals to the 1961-90 long term average expressed as percentage for Natural Resources Wales and Areas, using NCIC (National Climate Information Centre) data *(Source: Met Office © Crown Copyright).*

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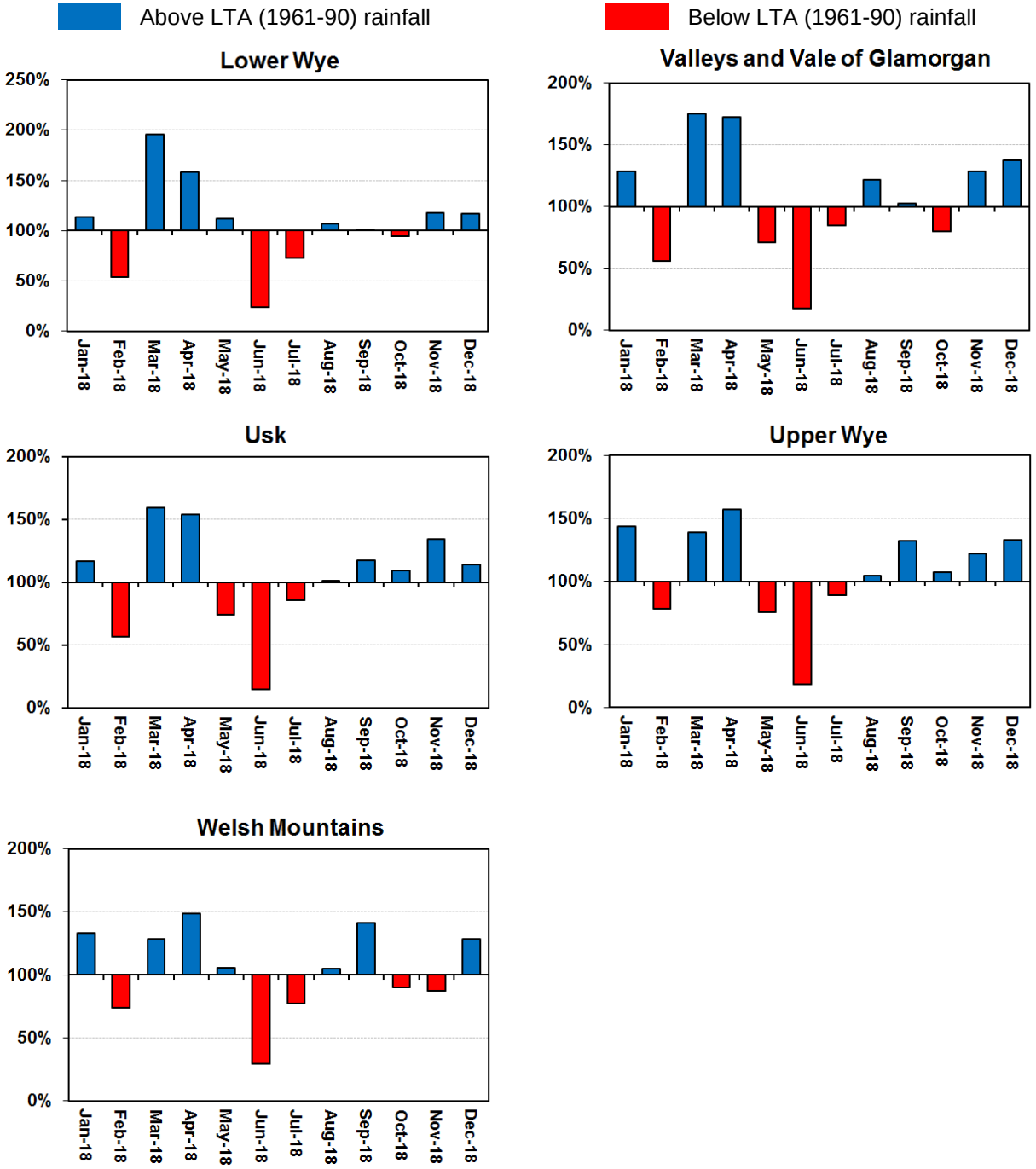
Figure 4: Rainfall Charts: South East Wales



Comparison of monthly rainfall totals to the 1961-90 long term average expressed as percentage for South East Wales, using NCIC (National Climate Information Centre) data *(Source: Met Office © Crown Copyright).*

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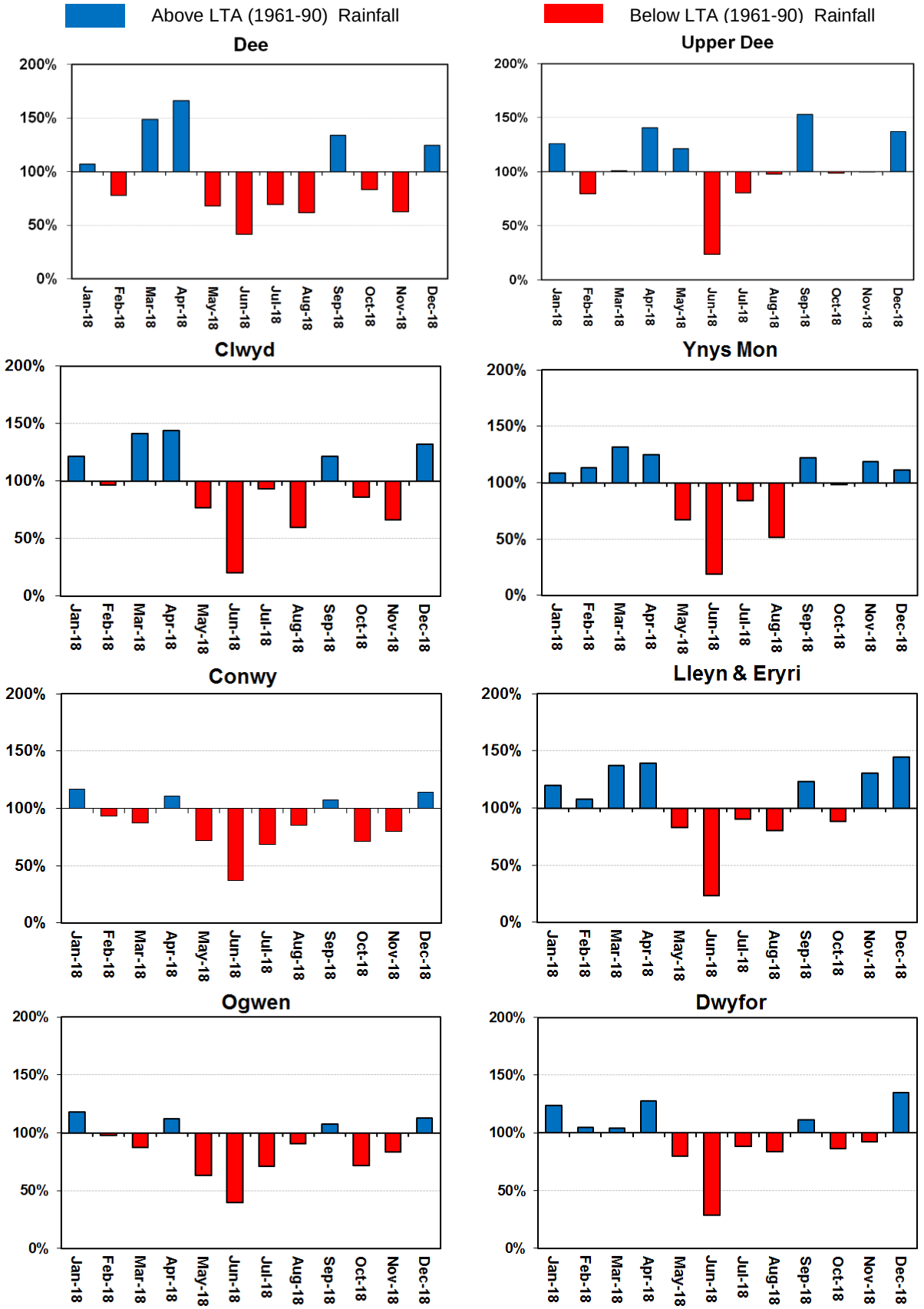
Figure 5: Rainfall Charts: North Wales



Comparison of monthly rainfall totals to the 1961-90 long term average expressed as percentage for North Wales, using NCIC (National Climate Information Centre) data *(Source: Met Office © Crown Copyright).*

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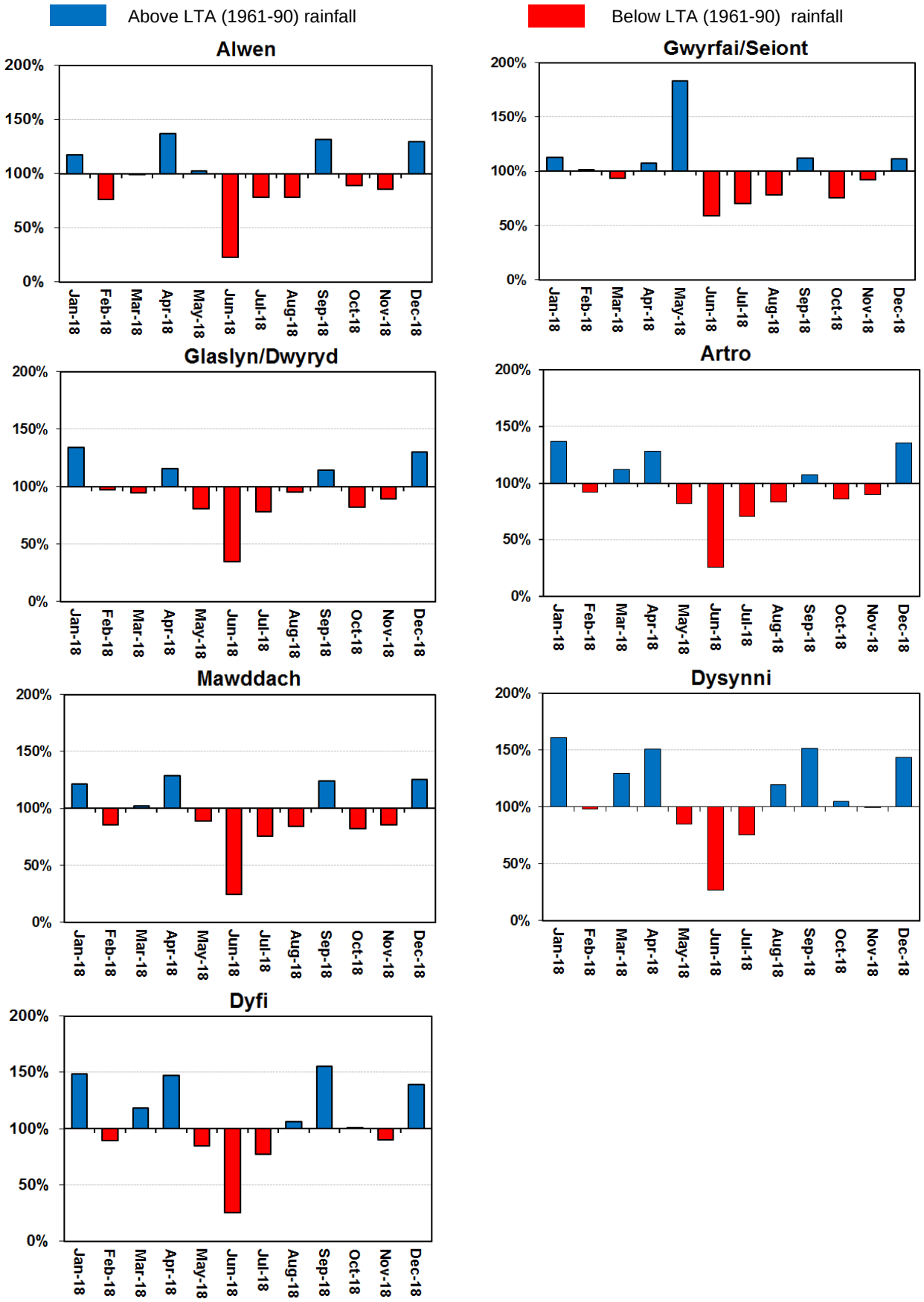

Comparison of monthly rainfall totals to the 1961-90 long term average expressed as percentage for North Wales, using NCIC (National Climate Information Centre) data *(Source: Met Office © Crown Copyright).*

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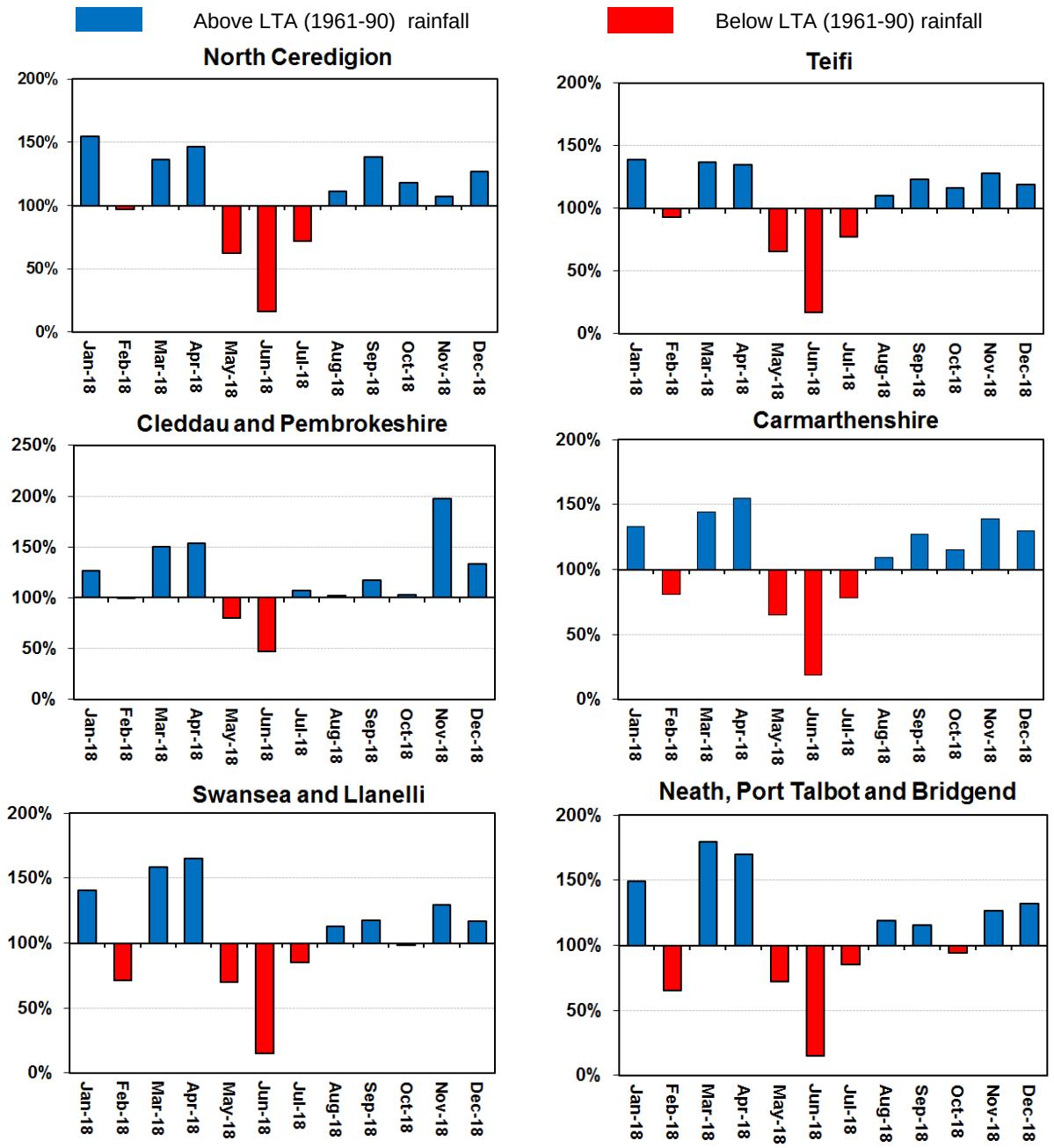
Figure 6: Rainfall Charts: South West Wales



Comparison of monthly rainfall totals to the 1961-90 long term average expressed as percentage for South West Wales, using NCIC (National Climate Information Centre) data *(Source: Met Office © Crown Copyright).*

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Soil Moisture Deficit (SMD)

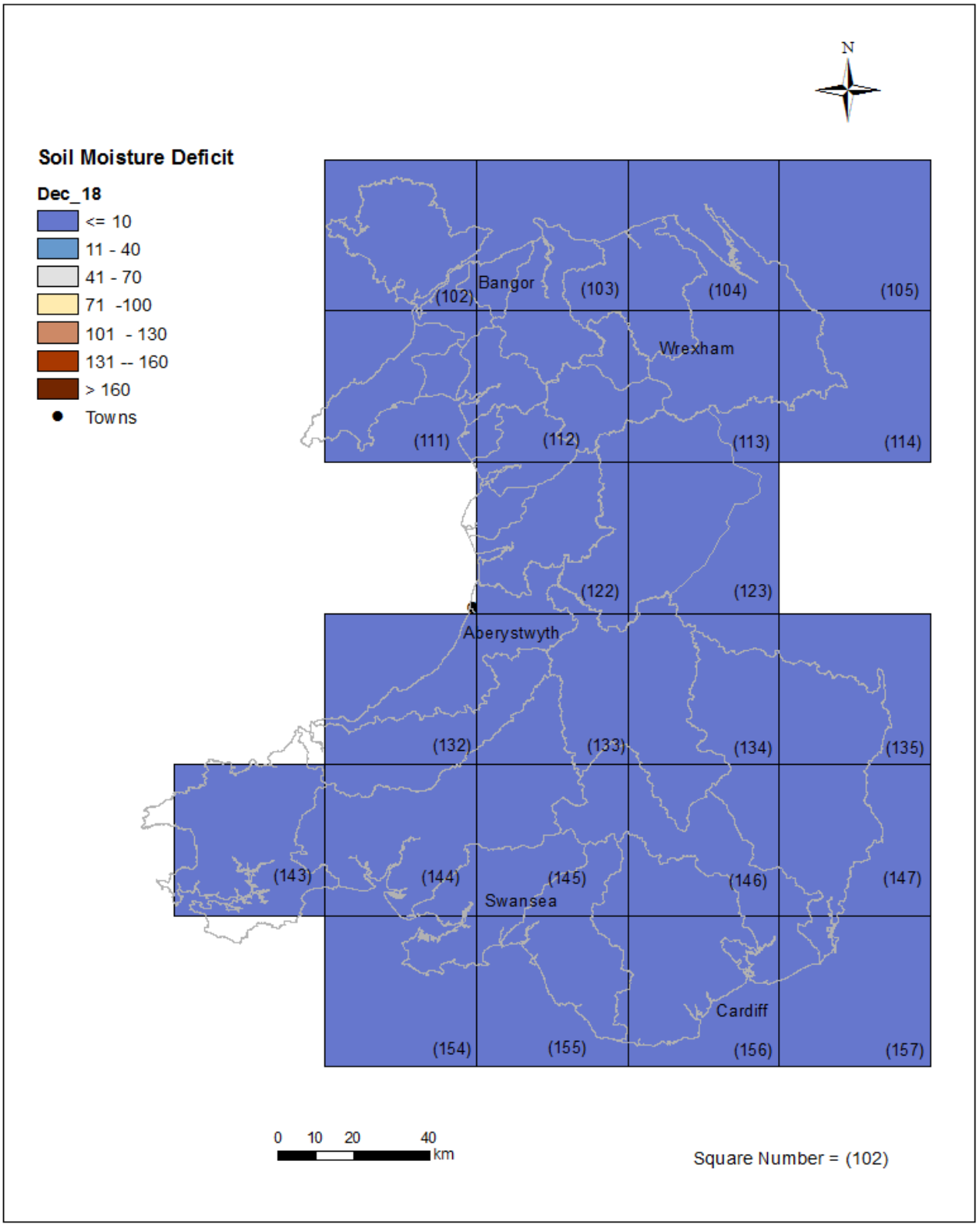

Figure 7: MORECS soil moisture deficits (mm) for December for real land use for Natural Resources Wales *(Source: Met Office © Crown Copyright).*

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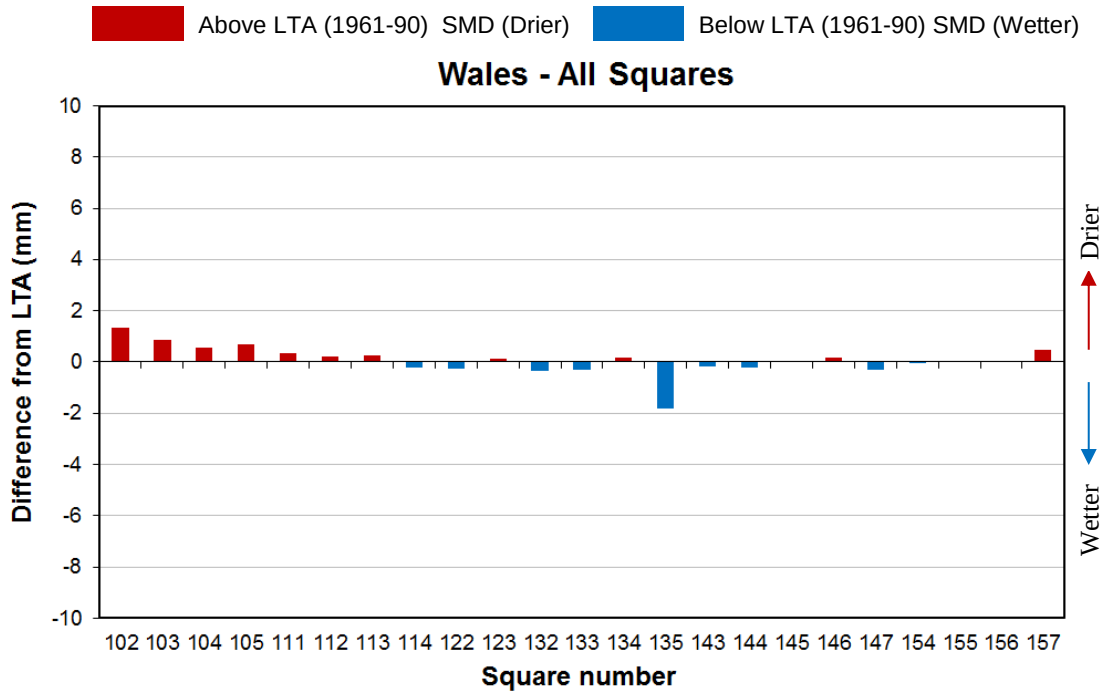

Figure 8: MORECS month end soil moisture deficits difference (mm) from the 1961-90 long term monthly average (LTA) for December for real land use for Natural Resources Wales squares (*Source: Met Office © Crown Copyright*).

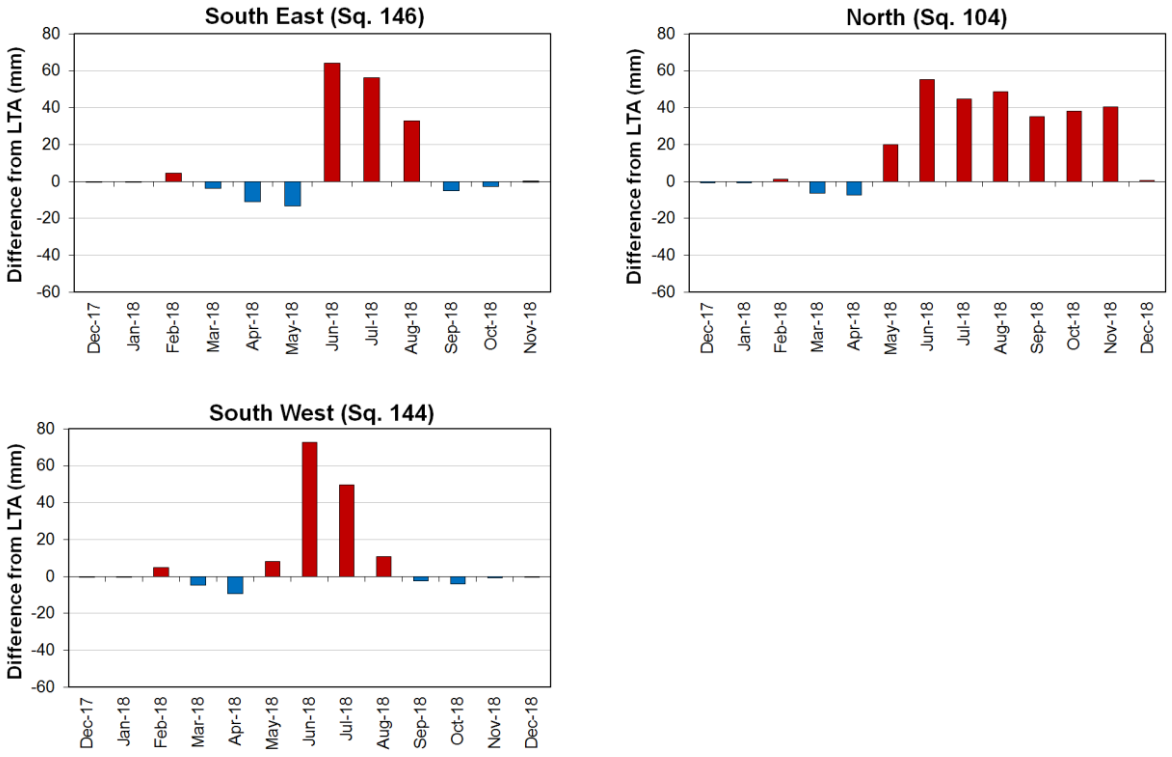

Figure 9: MORECS month end soil moisture deficit difference (mm) from the 1961-90 long term monthly average (LTA) for real land use for South East, North and South West (*Source: Met Office © Crown Copyright*). (Note: no LTA available for Natural Resources Wales.)

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River Flow

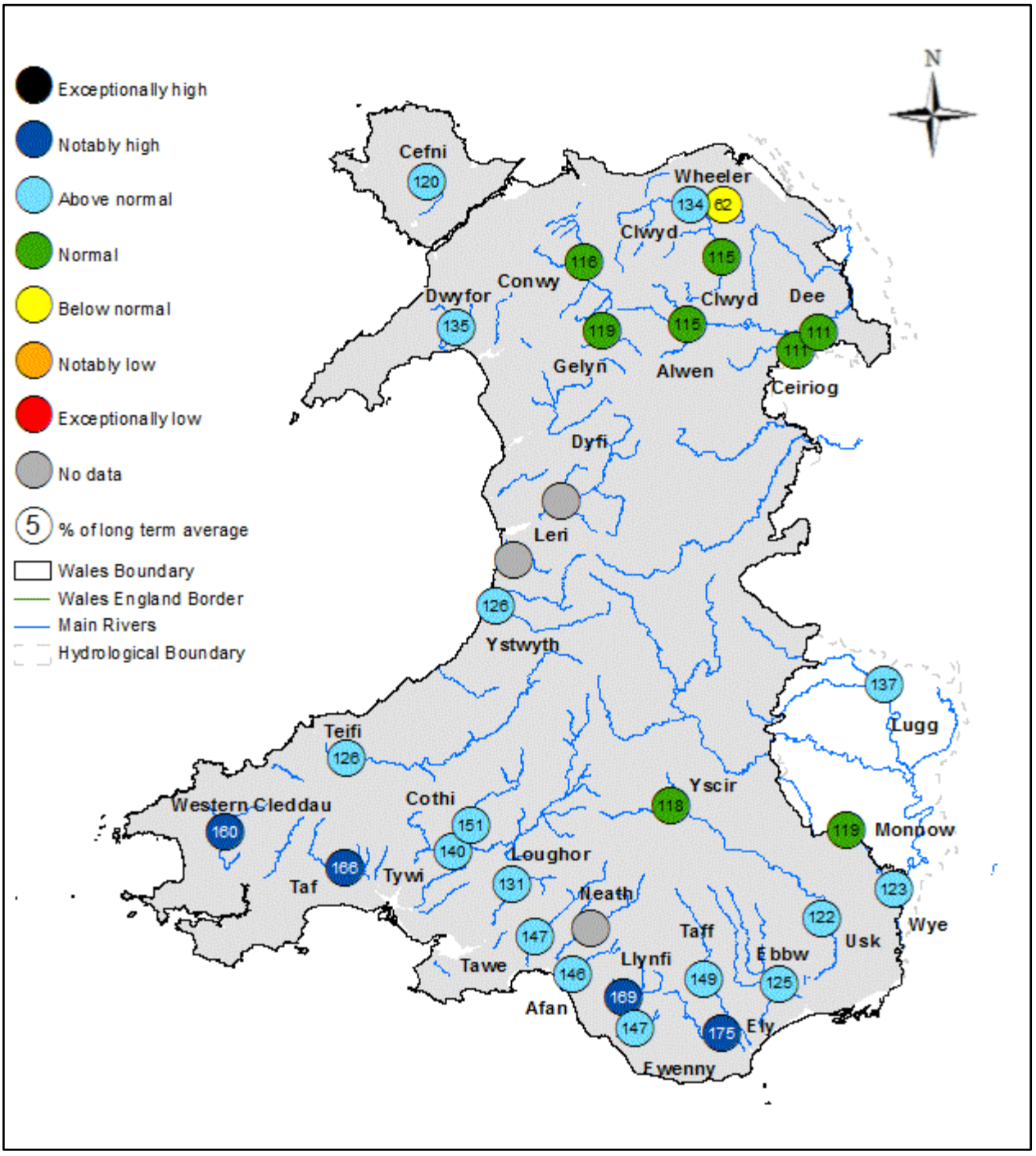

Figure 10: Monthly mean river flow for December, classed relative to analysis of historic December monthly means *(Source: Natural Resources Wales).*

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SITE NAME	RIVER	December 2018			December 2017		December LTA		
		Class	% of LTA	Flow (m3/s)	% of LTA	Flow (m3/s)	LTA	Min Monthly Mean (m3/s)	Max Monthly Mean (m3/s)
River Flow Sites : South East Area									
Butts Bridge	Lugg	Above normal	137%	14.00	57%	5.89	10.25	2.96	27.40
Grosmont	Monnow	Normal	119%	13.20	73%	8.12	11.12	1.45	31.00
Pont ar Yscir	Yscir	Normal	118%	4.310	95%	3.470	3.65	1.05	6.77
Pontypridd	Taff	Above normal	149%	53.70	92%	33.10	35.94	8.79	77.50
Redbrook	Wye	Above normal	123%	166.00	84%	113.00	134.57	36.50	305.00
Rhiwderin	Ebbw	Above normal	125%	15.80	73%	9.28	12.93	3.34	29.40
St Fagans	Ely	Notably high	175%	14.00	103%	8.24	7.98	2.76	15.70
Trostrey Weir	Usk	Above normal	122%	34.90	106%	30.50	28.68	14.11	94.50
River Flow Sites : North Area									
Bodfari	Wheeler	Below normal	62%	0.68	135%	1.47	1.09	0.34	2.25
Bodffordd	Cefni	Above normal	120%	1.06	89%	0.78	0.88	0.27	1.38
Brynkinalt Weir	Ceiriog	Normal	111%	6.20	93%	5.18	5.57	1.45	14.50
Cwmlanerch	Conwy	Normal	116%	37.40	91%	29.20	32.11	7.58	66.80
Cynefail	Gelyn	Normal	119%	1.39	86%	1.01	1.17	0.36	2.33
Dol y Bont	Leri						2.60	1.11	4.39
Druid	Alwen	Normal	115%	10.80	89%	8.38	9.37	2.93	19.40
Dyfi bridge	Dyfi						41.16	7.50	88.30
Garndolbenmaen	Dwyfor	Above normal	135%	5.48	115%	4.65	4.05	1.47	6.61
Manley Hall	Dee	Normal	111%	59.30	86%	46.10	53.66	18.30	105.00
Pont y Cambwll	Clwyd	Above normal	134%	16.40	147%	17.90	12.20	3.83	25.40
Ruthin Weir	Clwyd	Normal	115%	3.51	107%	3.25	3.05	0.73	6.15
River Flow Sites : South West Area									
Capel Dewi	Tywi	Above normal	140%	99.30	124%	88.00	70.92	18.60	137.00
Clog y Fran	Taf	Notably high	166%	23.40	110%	15.40	14.06	3.90	25.50
Coytrahen	Llynfi	Notably high	169%	6.09	108%	3.90	3.60	0.98	6.71
Felin Mynachdy	Cothi	Above normal	151%	31.30	113%	23.40	20.76	6.03	41.80
Glanteifi	Teifi	Above normal	126%	68.90	118%	64.30	54.57	16.70	105.00
Keepers Lodge	Ewenny	Above normal	147%	4.42	100%	3.01	3.01	1.15	5.99
Marcroft	Afan	Above normal	146%	11.60	107%	8.53	7.94	1.92	13.50
Pont Llolwyn	Ystwyth	Above normal	126%	14.00	107%	11.90	11.07	2.22	22.60
Treffgarne *	Western Cleddau	Notably high	160%	10.80	113%	7.62	6.73	2.25	11.51
Resolven	Neath				73%	11.80	16.20	2.90	30.40
Tir-y-Dail	Loughor	Above normal	131%	4.63	113%	3.99	3.54	1.20	6.41
Ynystanglws	Tawe	Above normal	147%	28.60	114%	22.20	19.40	3.93	43.70

Figure 11: Monthly mean river flow for December with comparison against previous year expressed as a percentage of the December long term average and classed relative to analysis of historic December monthly means. *(Source: Natural Resources Wales).* (* For Treffgarne station the LTAs were derived using scaled historical flows (1965-2003) from the downstream station at Prendergast Mill. There was no flow data for Resolven due to the maintainance work at the gauge station)

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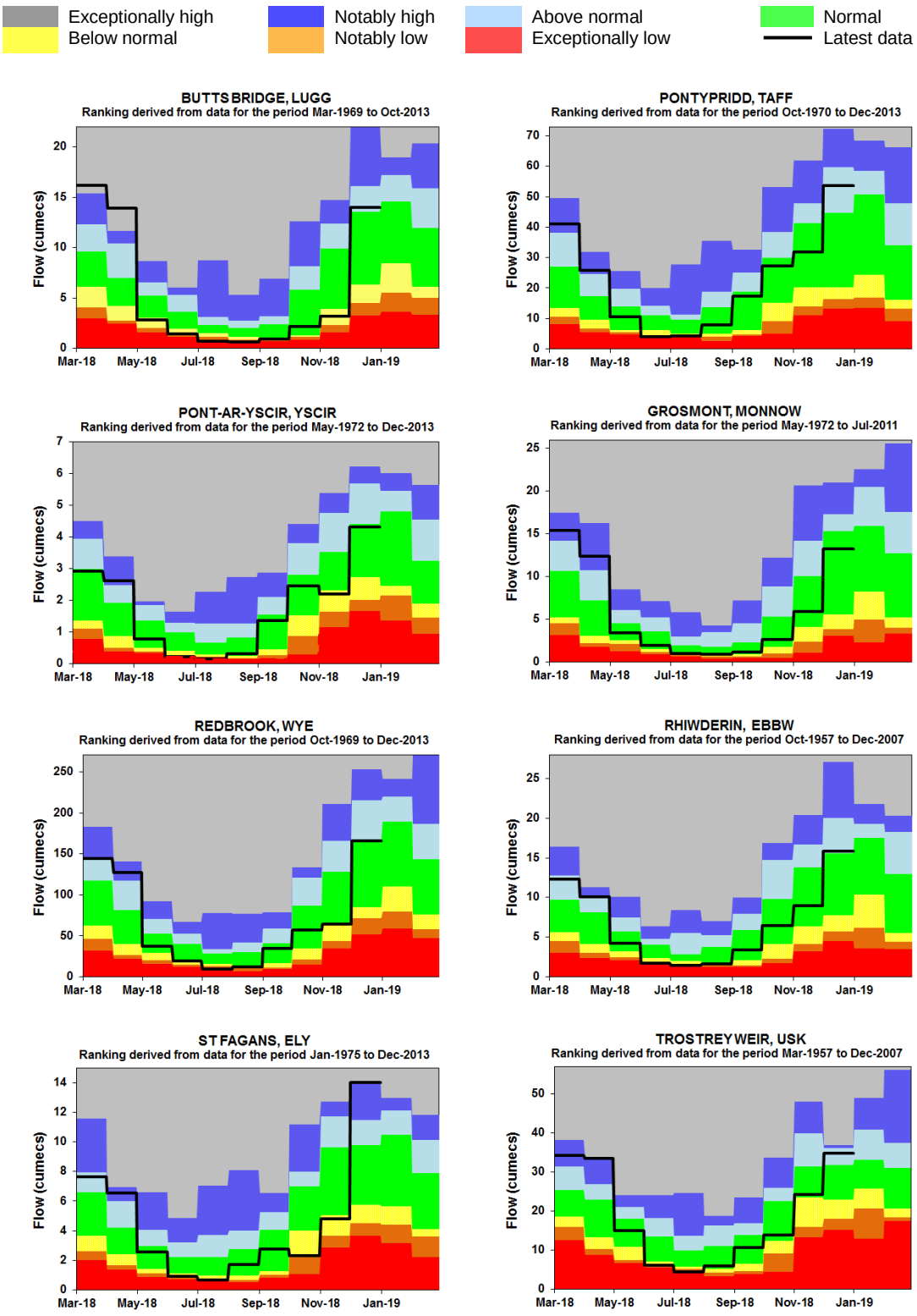
River Flow Charts

Figure 12: River Flow Charts: South East Wales



Monthly mean river flows for the last 10 months classed relative to the analysis of historic river levels (*Source: Natural Resources Wales*).

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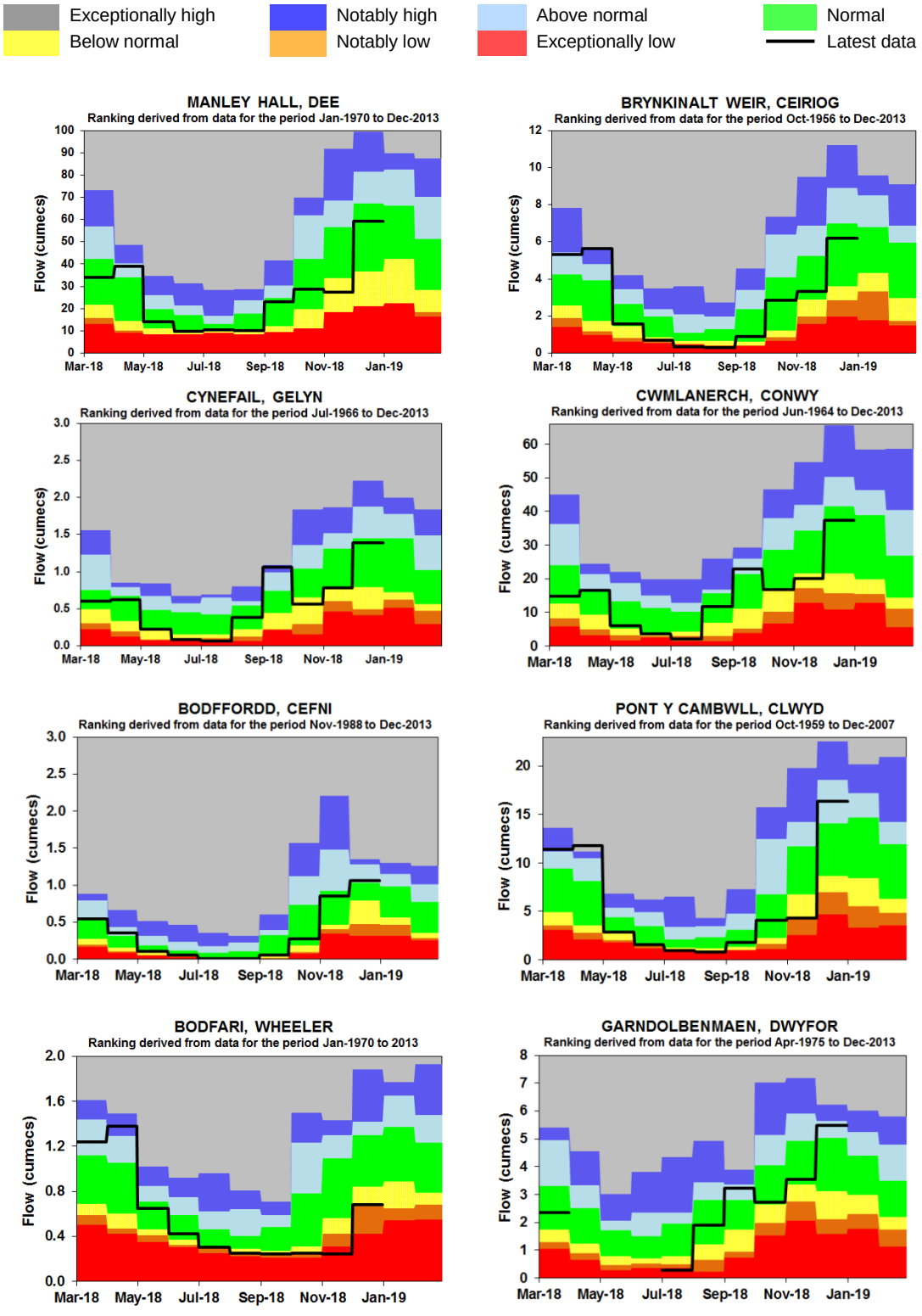
Figure 13: River Flow Charts: North Wales



Monthly mean river flows for the last 10 months classed relative to the analysis of historic river levels (*Source: Natural Resources Wales*).

(Please note that there was no data for Garndolbenmaen for April to June 2018 due to maintenance work)

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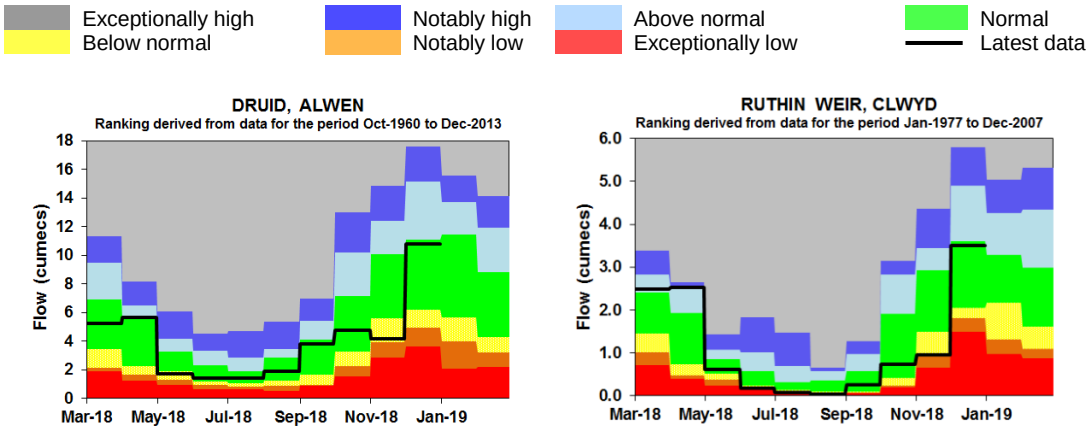
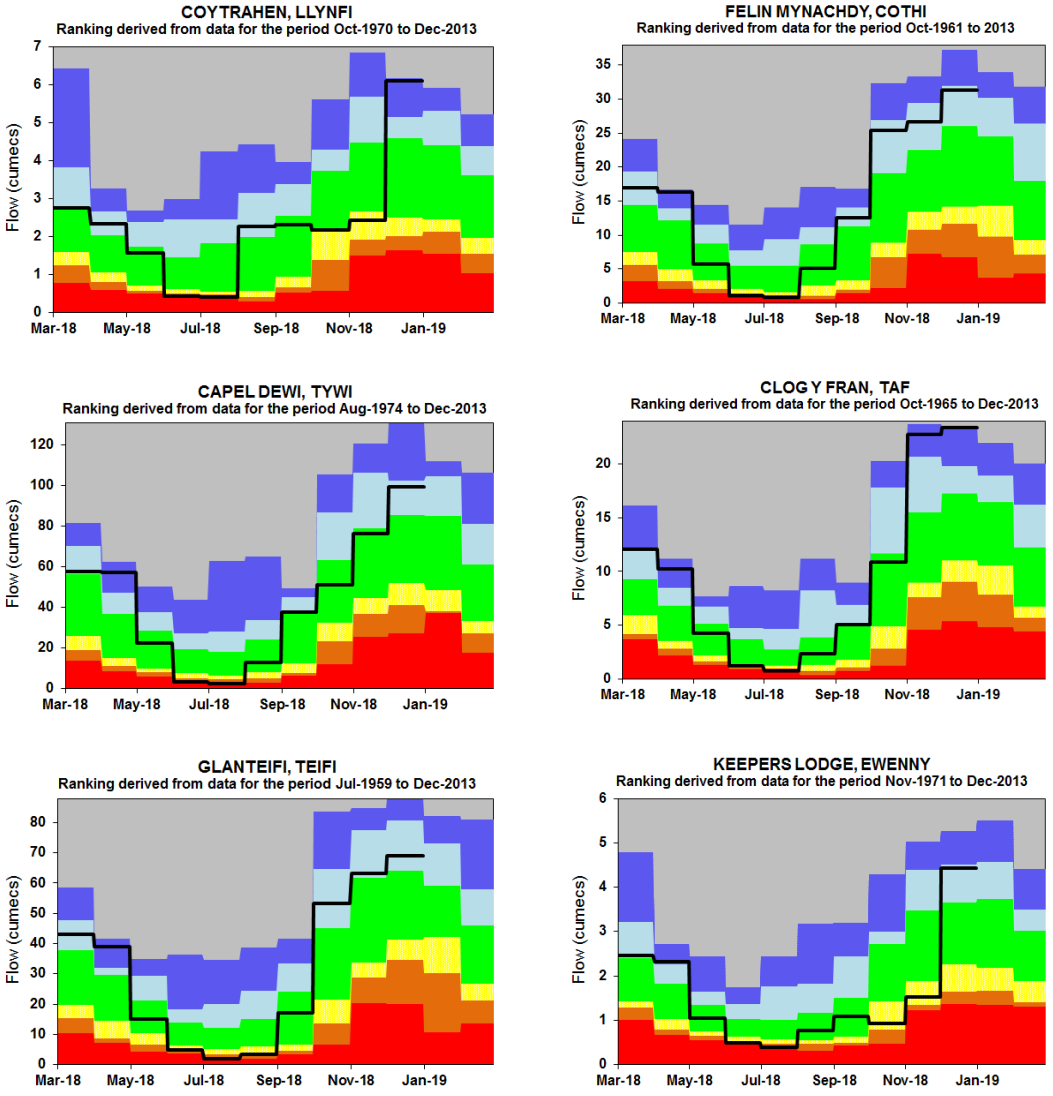


Figure 14: River Flow Charts: South West Wales



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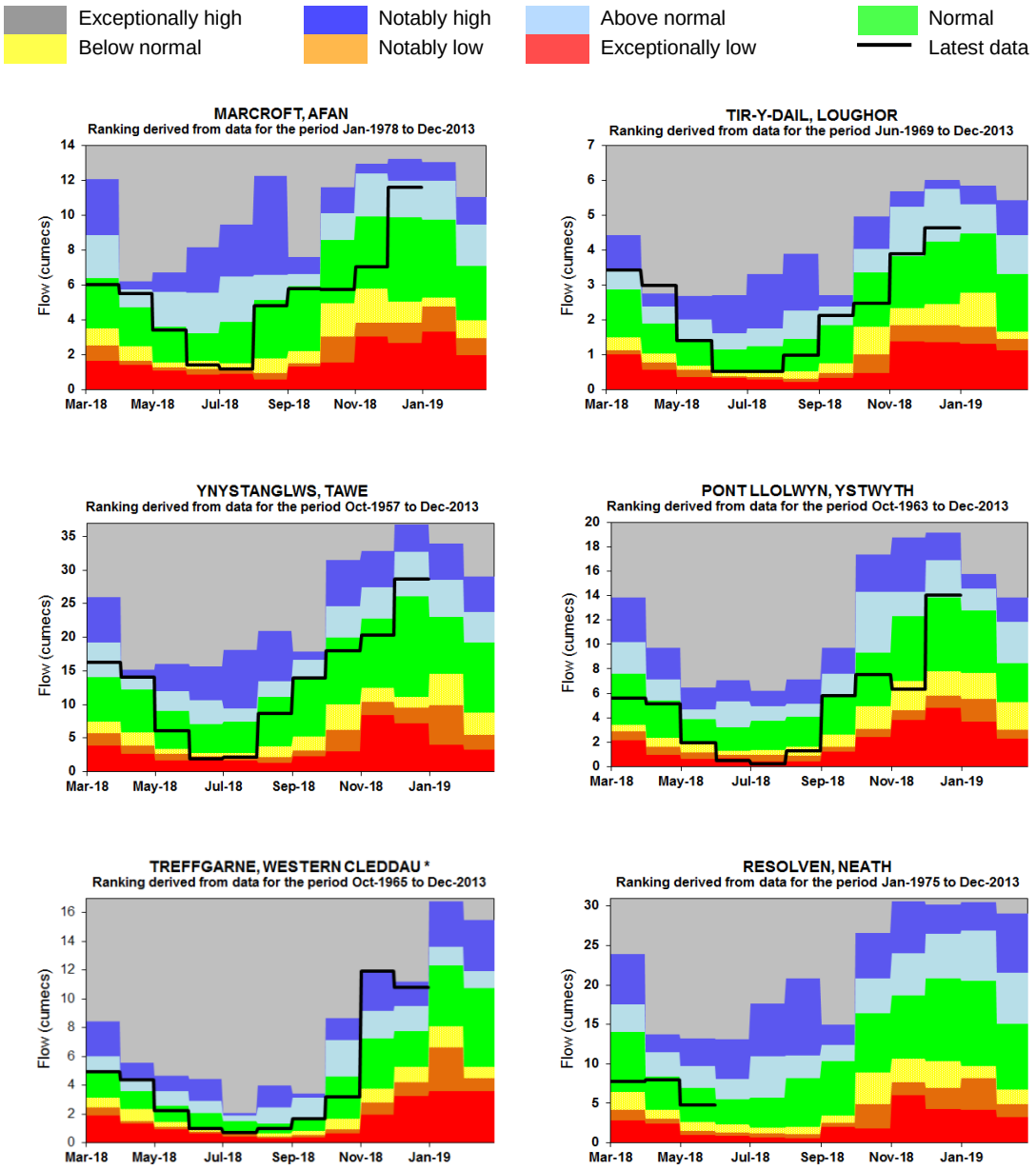

Monthly mean river flows for the last 10 months classed relative to the analysis of historic river levels. *(Source: Natural Resources Wales).*

(* Please note that for Treffgarne station the ranking bands were derived using scaled historical flows (1965-2003) from the downstream station at Prendergast Mill. There were no flow data from June to December 2018 for Resolven)

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Groundwater Levels

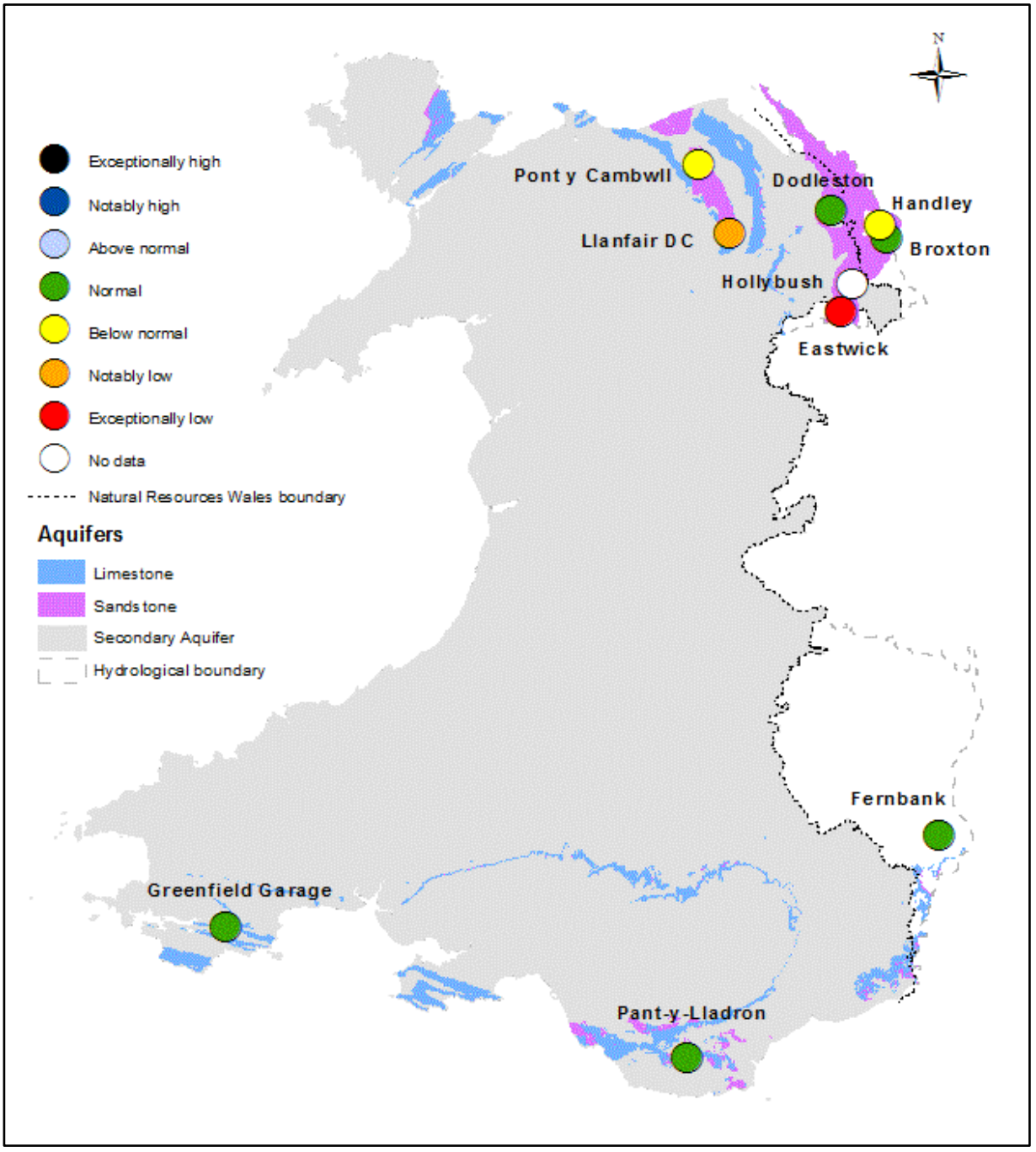

Figure 15: Groundwater levels at the end of month classed relative to an analysis of historic December groundwater levels *(Source: Natural Resources Wales and Environment Agency).*

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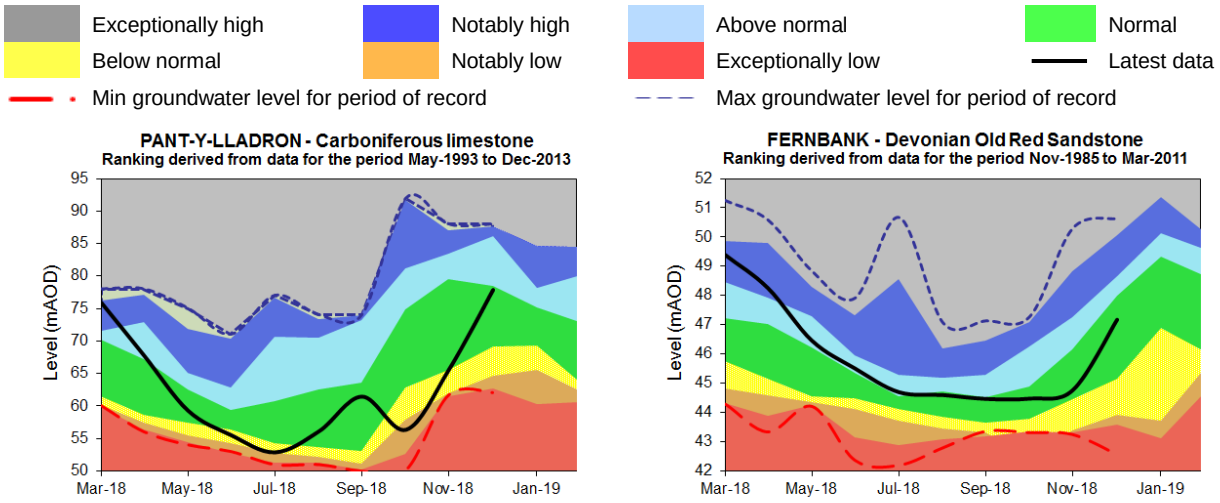
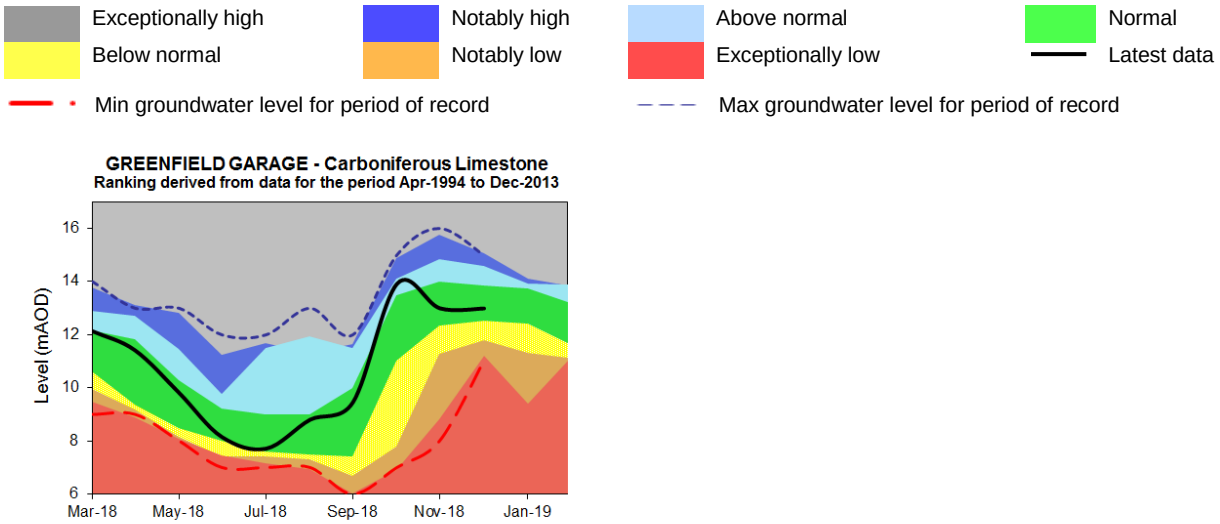
Groundwater charts

Figure 16: Groundwater level charts: South East Wales



End of month groundwater levels for the past 10 months for index sites *(Source: Natural Resources Wales).* (Please note that data is not available for May and July 2018 for Pant-y-Lladron)

Figure 17: Groundwater level charts: South West Wales



End of month groundwater levels for the past 10 months for index sites *(Source: Natural Resources Wales).*

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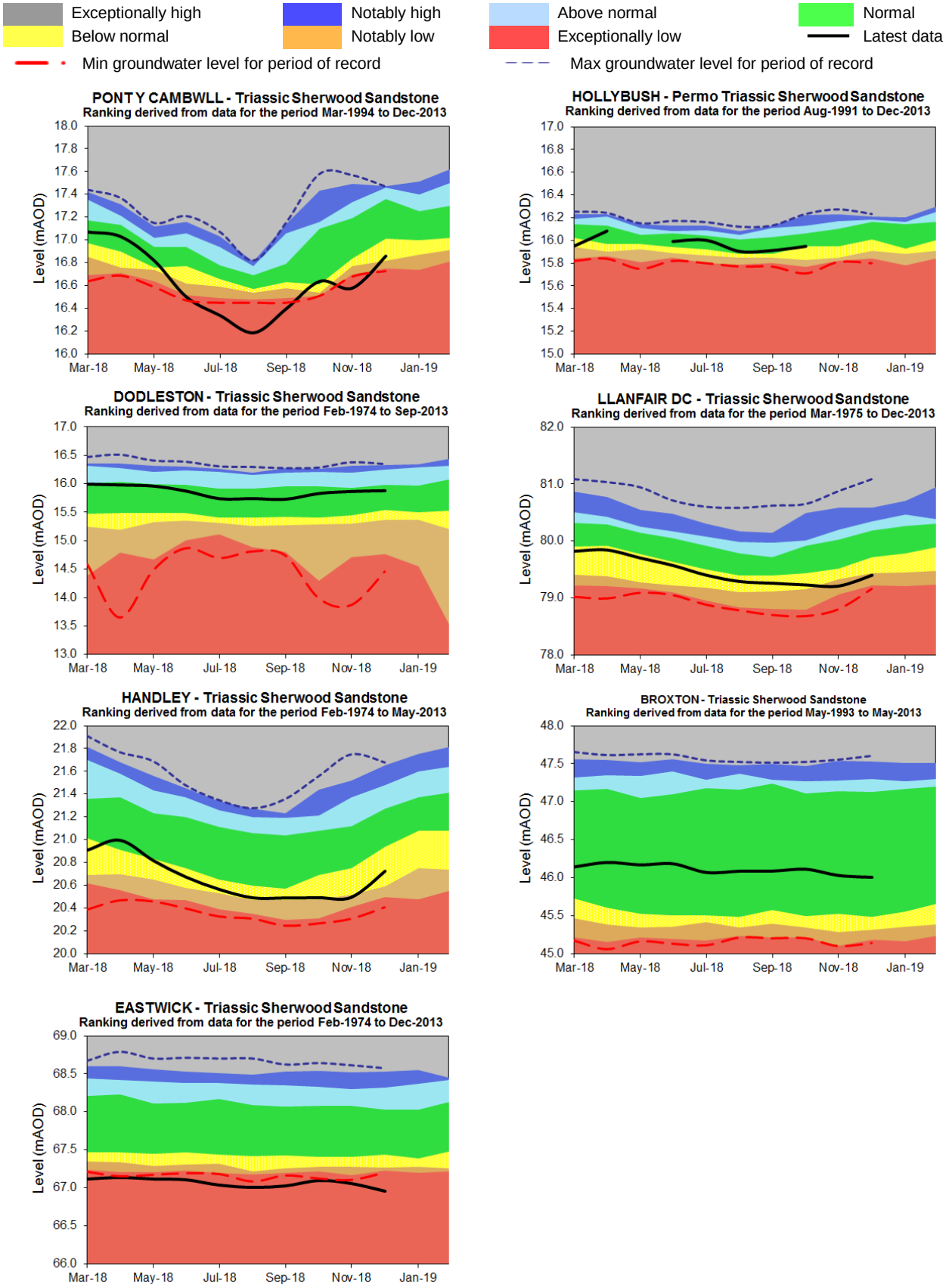
Figure 18: Groundwater level charts: North Wales



End of month groundwater levels for the past 10 months for index sites *(Source: Natural Resources Wales and Environment Agency)*. (Please note that data is not available for May and December 2018 for Hollybush and the data for October for this station is taken on 9th October 2018)

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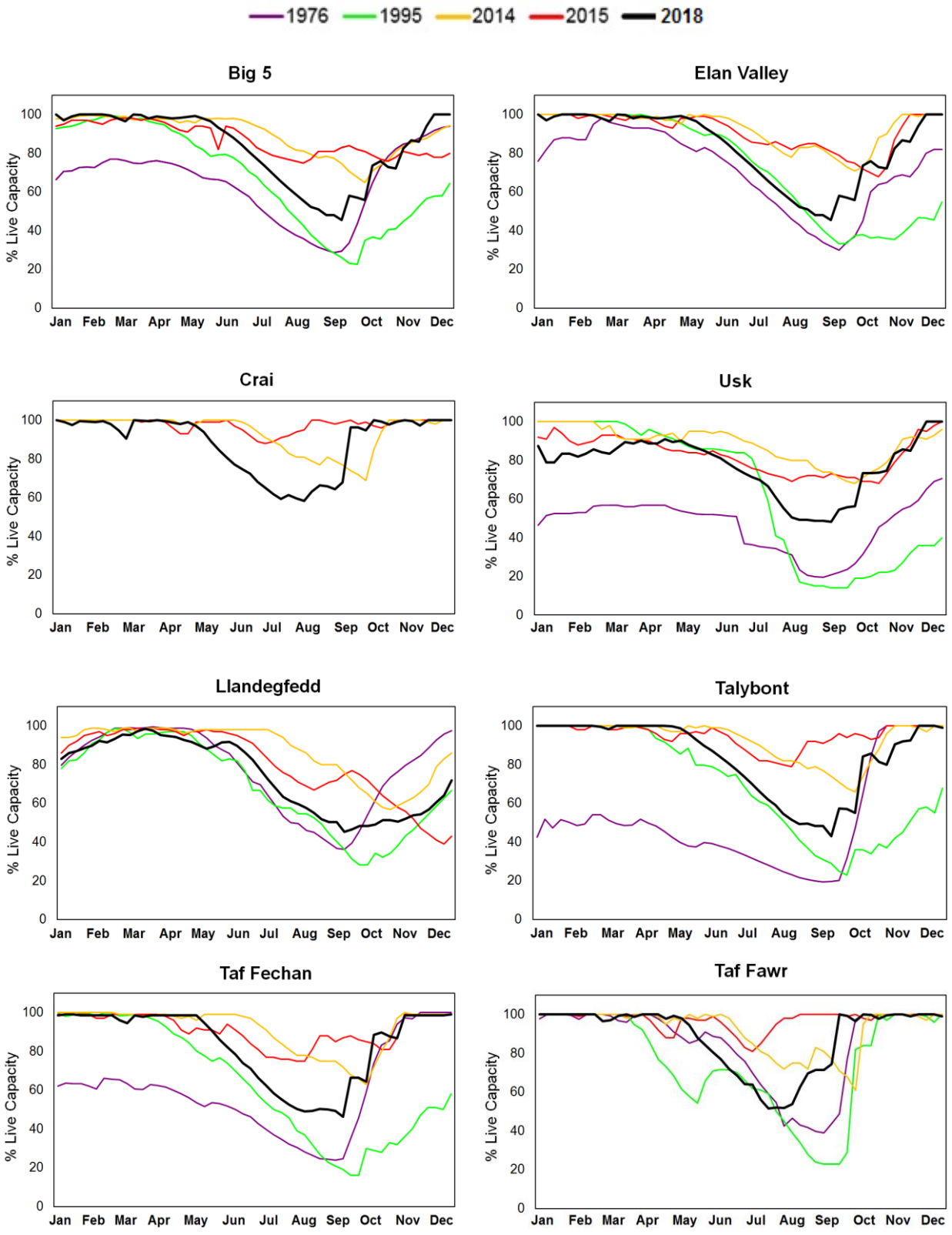
Reservoir Storage

Figure 19: Reservoir charts: South East Wales



Weekly reservoir stocks for Natural Resources Wales index sites *(Source: Welsh Water)*

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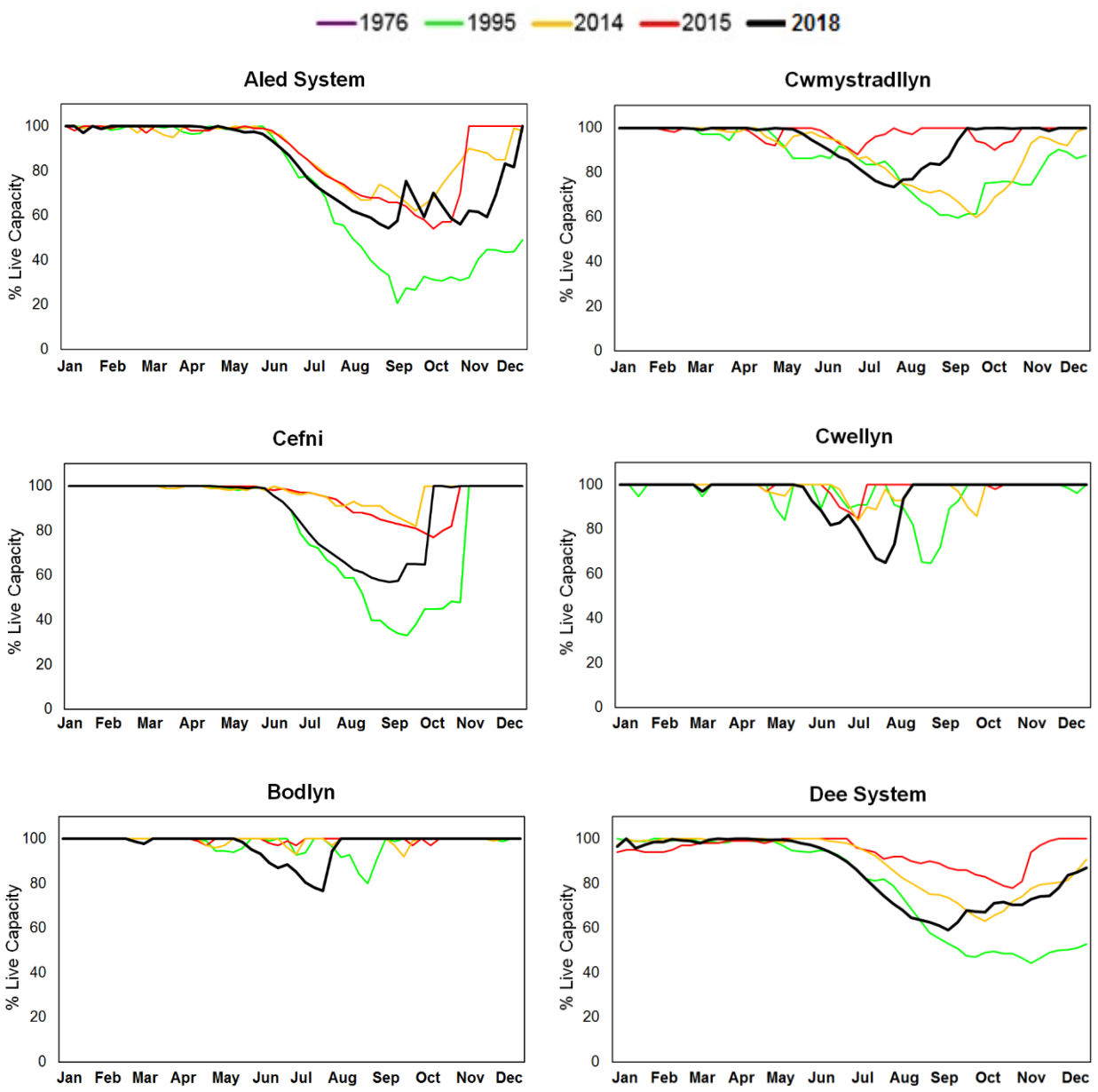
Figure 20: Reservoirs charts: North Wales



Weekly reservoir stocks for Natural Resources Wales index sites *(Source: Welsh Water).*

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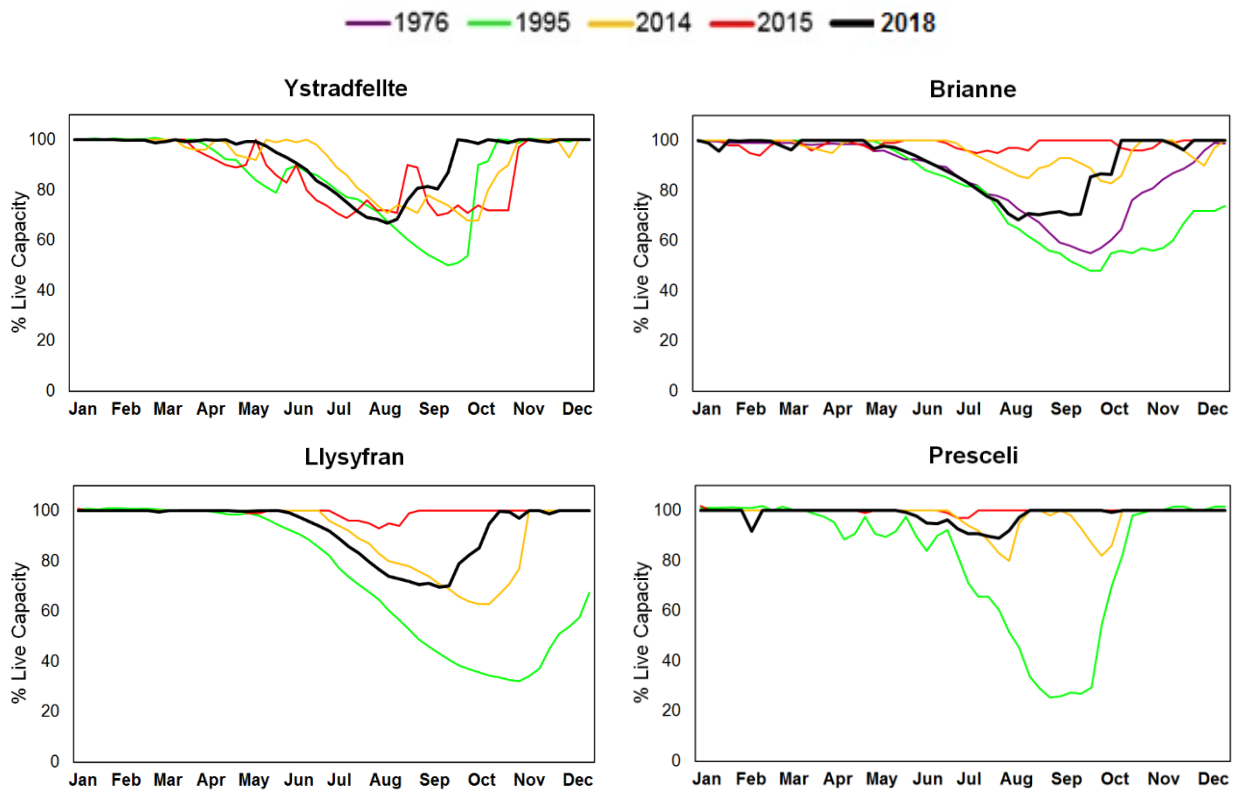
Figure 21: Reservoirs charts: South West Wales



Weekly reservoir stocks for Natural Resources Wales index sites (*Source: Welsh Water*).

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Glossary

Term	Definition
Aquifer	A geological formation able to store and transmit water.
Areal average rainfall	The estimated average depth of rainfall over a defined area. Expressed in depth of water (mm).
Effective rainfall	The rainfall available to percolate into the soil or produce river flow. Expressed in depth of water (mm).
Groundwater	The water found in an aquifer
Meteorological Office Rainfall and Evaporation Calculating System (MORECS)	The Met Office provides climate data for grid squares measuring 40km by 40km across the UK using MORECS
Recharge	The process of increasing the water stored in the saturated zone of an aquifer. Expressed in depth of water (mm).
Reservoir live capacity	The reservoir capacity normally usable for storage to meet established reservoir operating requirements. It is the total capacity less that not available because of operating agreements or physical restrictions. Only under abnormal conditions, such as a severe water shortage might this additional water be extracted.
Soil moisture deficit (SMD)	The difference between the amount of water actually in the soil and the amount of water that the soil can hold. Expressed in depth of water (mm).

Categories

Exceptionally high	Value likely to fall within this band 5% of the time
Notably high	Value likely to fall within this band 8% of the time
Above normal	Value likely to fall within this band 15% of the time
Normal	Value likely to fall within this band 44% of the time
Below normal	Value likely to fall within this band 15% of the time
Notably low	Value likely to fall within this band 8% of the time
Exceptionally low	Value likely to fall within this band 5% of the time

Units

cumecs	Cubic metres per second ($m^3 s^{-1}$)
mAOD	Metres Above Ordnance Datum (mean sea level at Newlyn Cornwall).