National River Flow Archive

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National River Flow Archive

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WINFAP-FEH DATA FILES VERSION 6

Note on changes from v5

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1.0	FEBRUARY 2018	KATIE MUCHAN, CATH SEFTON, STEVE TURNER, OLIVER SWAIN	

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1 INTRODUCTION

Version 6 of the WINFAP-FEH Data Files is the third major update released since stewardship of the national peak flows database was passed to the National River Flow Archive (NRFA).

Version 6 of the WINFAP-FEH files contain AMAX and POT data for 939 gauging stations, of which 638 are in England, 154 are in Scotland, 103 are in Wales and 44 are in Northern Ireland. A total of 553 stations are recommended for use in pooling groups ('Suitable for Pooling'), 298 stations are 'Suitable for QMED' and 88 stations are 'Suitable for Neither'.

Version 6 contains:

- Network changes (see Section 2)
- Additional water years of data (see Section 3)
    - One water year for all active peak flow stations in England and Northern Ireland
    - One water year for a subset of stations in Scotland (those that undertook period of record review in the version 5 release)
    - Two water years in Wales
- Modifications to existing time series (see Section 3)
- Changes to metadata (see Section 4)

2 NETWORK CHANGES

A number of changes have been made to the gauging stations for which peak flow data are held on the NRFA since the release of version 5 of the WINFAP-FEH files. Key changes are noted in this section.

2.1 Removal of Gauging Stations

12 stations have been removed from the dataset due to concerns regarding data quality. Details of these stations are provided in Table 1. Users should note that all except 67020 remain on the NRFA website as they also provide daily flow data.

Table 1: Stations removed from the dataset in version 6

Station Number	Station Name	Measuring Authority	NRFA daily flow station	Comment
27056	Pickering Beck at Ings Bridge	EA-Y	YES	Station is poor at high flows, will be replaced by Pickering (EA F2517) in the next data release.
33002	Bedford Ouse at Bedford	EA-EA	YES	Significant variation from rating, a complex site and concerns about third party data reliability.
39058	Pool River at Winsford Road	EA-KSL	YES	Highest gauging well below QMED, therefore low confidence in higher flows.
39069	Mole at Kinnersley Manor	EA-KSL	YES	Modular limit of structure is significantly below QMED and gaugings in non-modular conditions limbs match rating poorly with deviations of more than 30%.
39095	Quaggy at Manor House Gardens	EA-KSL	YES	No gaugings above half-QMED and very difficult to capture gaugings due to flashy flow regime.
40006	Bourne at Hadlow	EA-KSL	YES	No gaugings about 0.5 QMED, therefore low confidence in high flows. No neighbouring sites to confirm accuracy of peaks.
40020	Eridge Stream at Hendal Bridge	EA-KSL	YES	Highest gauging well below QMED and reference flow is not contained within structure.
50005	West Okement at Vellake	EA-DC	YES	Upper limit of rating is ~10% of QMED so large uncertainty in high flows. Very inaccessible site, so unlikely to extend the rating in the future.
50010	Torridge at Rockhay Bridge	EA-DC	YES	Bypassing starts below QMED across a large floodplain, very hard to measure bypassing flow.
50012	Yeo at Veraby	EA-DC	YES	No gaugings above 1.1m since 2007 as inaccessible at high flows.
67020	Dee at Chester Weir	NRW	NO	Quality of high flow ratings is poor and data are of limited use - heavily regulated river and significant tidal influence.
84009	Nethan at Kirkmuirhill	SEPA-S	YES	Some inconsistency between the rating/flows pre- and post-gap. No account of non-modular flows in the rating.

2.2 Addition of Gauging Stations

No stations have been added to the dataset in version 6.

2.3 Closure of Gauging Stations

4 stations have been closed, listed in Table 2. Previously recorded flow data for these stations are still contained in the WINFAP-FEH files and shown on the NRFA website, but there will be no further updates in future.

Table 2: Gauging stations closed in version 6

Station Number	Station Name	Measuring Authority	NRFA daily flow station	Comment
26010	Driffield Canal at Snakeholme Lock	EA-Y	NO	Due for replacement.
31026	Egleton Brook at Egleton	EA-LN	YES	
35011	Belstead Brook at Belstead	EA-EA	NO	
54041	Tern at Eaton upon Tern	EA-WM	YES	Significant vegetation growth makes the station unsuitable for continued flow measurement.
72016	Wyre at Scorton Weir	EA-CL	YES	Weir structure damaged in December 2015 flood.

2.4 Combined Peak Flow Time Series from Multiple Stations

No changes have been made to these in version 6 of the WINFAP-FEH files. See the release note for v3.3.2 for the most recent changes.

2.5 Component Stations

No changes have been made to the stations that the NRFA treats as combined sites since v4.1.

At a number of gauging stations, flows are derived from measurements taken at more than one location (for example low flows may be measured at a weir and high flows measured at a gauged section a short distance up/downstream). There are a number of such stations around the UK that the NRFA and/or Measuring Authority treat as a combined station.

In some cases, the peak flow data may be derived from only one component of the combined dataset and as such the source for the POT and AMAX data may not be the same as that presented for the daily flow record.

2.6 Stations Where No POT Data are Presented

No POT data are presented on the NRFA website or given in the WINFAP-FEH files for stations listed in Annex 1. No stations were added to the list in version 6.

Stations are usually listed as ‘POT excluded’ because the gauged catchment response does not lend itself to POT analysis. Such catchments are usually, but not exclusively, those dominated by baseflow and are therefore concentrated on the large chalk aquifers of southern and eastern England.

3 CHANGES TO TIME SERIES DATA

3.1 Extension of AMAX and POT Records

The version 6 files contain AMAX and POT time-series data updated to 30 September 2016 for all active peak flow gauging stations in Wales, England and Northern Ireland, with the exception of five stations (Table 3). An annual update was also carried out for the subset stations Scotland that were released in version 5 (except 8004).

Table 3: Stations not updated in version 6 due to issues in the hydrometric archive

Station Number	Station Name	Measuring Authority
38020	Cobbins Brook at Sewardstone Road	EA-HNL
39016	Kennet at Theale	EA-T
39022	Loddon at Sheepbridge	EA-T
40007	Medway at Chafford / Colliersland Bridge	EA-KSL
40016	Cray at Crayford	EA-KSL

3.2 Impact of Annual Update

Version 6 contains the annual update for water year 2015/2016, an extreme year in hydrological terms with high flows and significant flooding across much of northern England, eastern Scotland and Northern Ireland. A new period of record AMAX (AMAX 1) was recorded at 70 peak flow stations and the addition of the 2015/2016 AMAX has had significant impacts on the calculation of QMED, 50- and 100-year return periods, changes greater than 10% are shown in Figure 2.

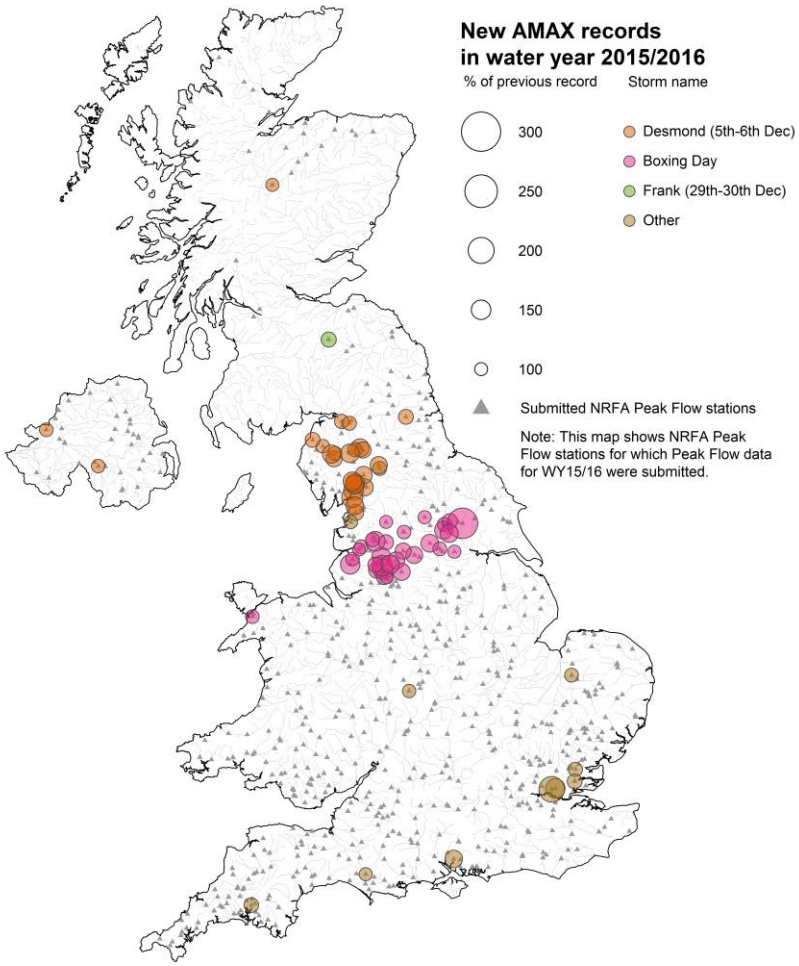

Figure 1 Stations with new AMAX 1 records in water year 2015/2016

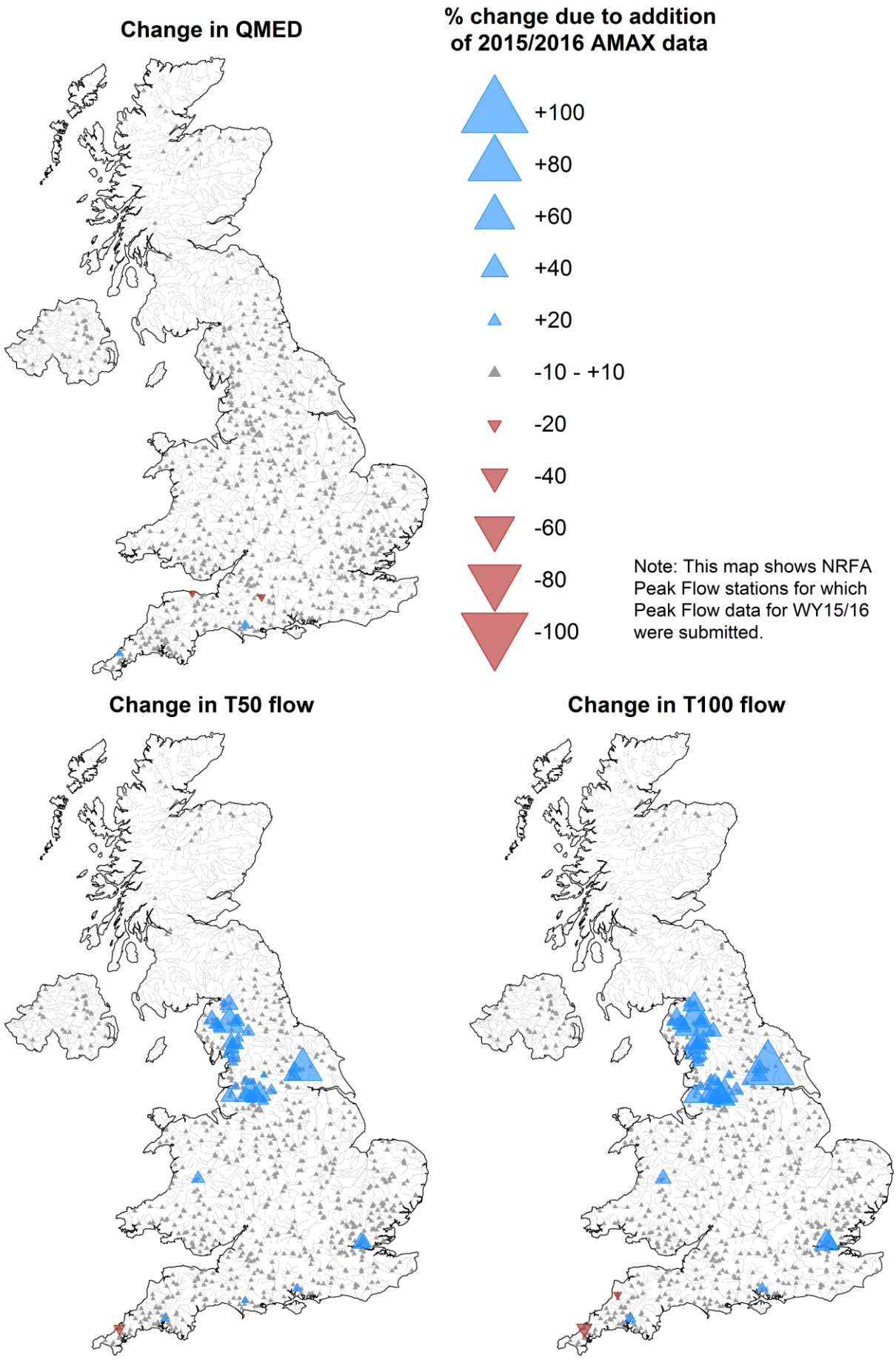

Figure 2 Changes in QMED, 50- and 100-year return periods due to the addition of 2015/2016 AMAX data

3.3 POT Independence

For stations in England operated by the Environment Agency and in Wales operated by Natural Resources Wales, the rules for independence between POT events have been clarified such that the minimum discharge in the trough between the two peaks must be less than two-thirds of the discharge of **both peaks** (FEH guidelines states the first peak, but this requires subsequent manual re-processing to remove spurious peaks). Previous Environment Agency data updates last year and under the HiFlows-UK initiative may also have utilised the 'both peaks rule'.

These rules apply at all Environment Agency and Natural Resources Wales operated stations to POT events for water years 2014/2015 and 2015/2016. Additionally, for the stations listed in Table 4, due to changes to stage-discharge relationships or other re-processing, the new independence rules apply from the date shown to the end of the period of record. Users should therefore be aware that at these stations the independence criteria used to generate the POT series updates may therefore vary throughout the flow record.

No changes have been made to the independence extraction criteria for POT data in Scotland or Northern Ireland.

Table 4: Stations and time periods with additional POT independence changes

Station Number	Station Name	Measuring Authority	Start date of POT independence change	Released in
25006	Greta at Rutherford Bridge	EA-NE	01/10/2008	V5
27003	Aire at Beal Weir	EA-Y	14/09/1993	V5
27023	Dearne at Barnsley Weir	EA-Y	24/03/1965	V5
27035	Aire at Kildwick Bridge	EA-Y	09/07/1971	V5
27086	Skell at Alma Weir	EA-Y	22/11/2012	V5
28008	Dove at Rocester Weir	EA-WM	25/11/2011	V5
28012	Trent at Yoxall	EA-WM	01/10/2010	V5
28018	Dove at Marston on Dove	EA-WM	07/11/2000	V5
28024	Wreake at Syston Mill	EA-WM	30/11/2009	V5
28033	Dove at Hollinsclough	EA-WM	05/12/1972	V5
28053	Penk at Penkridge	EA-WM	01/01/2012	V5
28061	Churnet at Basford Bridge	EA-WM	06/11/2000	V5
28095	Tame at Hopwas Bridge	EA-WM	01/01/1998	V5
33030	Clipstone Brook at Clipstone	EA-EA	01/10/2012	V5
39035	Churn at Cerney Wick	EA-T	01/01/2013	V5
43806	Wylye at Brixton Deverill	EA-WX	Full period of record	V5
45004	Axe at Whitford	EA-DC	Full period of record	V5
47024	Tavy at Tavistock Abbey Bridge	EA-DC	Full period of record	V5
48006	Cober at Helston Country Bridge	EA-DC	01/10/2012	V5
50005	West Okement at Vellake	EA-DC	01/10/2012	V5
50010	Torridge at Rockhay Bridge	EA-DC	01/10/2012	V5
52004	Isle at Ashford Mill	EA-WX	07/03/1972	V5
70004	Yarrow at Croston Mill	EA-CL	01/10/2013	V5
75005	Derwent at Portinscale	EA-CL	01/10/2011	V5
23001	Tyne at Bywell	EA-NE	01/12/1992	V6
25004	Skerne at South Park	EA-NE	12/10/2012	V6
27028	Aire at Armley	EA-Y	28/12/1978	V6
27030	Dearne at Adwick	EA-Y	11/02/1977	V6
27080	Aire at Lemonroyd	EA-Y	20/12/1996	V6
27086	Skell at Alma Weir	EA-Y	Full period of record	V6

Station Number	Station Name	Measuring Authority	Start date of POT independence change	Released in
27088	Calder at Mytholmroyd	EA-Y	Full period of record	V6
28018	Dove at Marston on Dove	EA-WM	31/10/2000	V6
28081	Tame at Bescot	EA-WM	Full period of record	V6
28083	Trent at Darlaston	EA-WM	Full period of record	V6
28061	Churnet at Basford Bridge	EA-WM	Full period of record	V6
30014	Pointon Lode at Pointon	EA-LN	21/11/2012	V6
33029	Stringside at Whitebridge	EA-EA	26/11/2012	V6
37014	Roding at High Ongar	EA-HNL	21/10/2012	V6
39001	Thames at Kingston	EA-T	05/11/2012	V6
40012	Darent at Hawley	EA-KSL	26/11/1992	V6
40018	Darent at Lullingstone	EA-KSL	30/03/2010	V6
45003	Culm at Woodmill	EA-DC	Full period of record	V6
45004	Axe at Whitford	EA-DC	Full period of record	V6
46007	West Dart at Dunnabridge	EA-DC	Full period of record	V6
47024	Tavy at Tavistock Abbey Bridge	EA-DC	Full period of record	V6
51003	Washford at Beggearn Huish	EA-WX	01/11/1982	V6
53013	Marden at Stanley	EA-WX	Full period of record	V6
53023	Sherston Avon at Fosseway	EA-WX	Full period of record	V6
54028	Vyrnwy at Llanymynech	NRW	13/12/2011	V6
54080	Severn at Dolwen	NRW	22/11/2011	V6
55029	Monnow at Grosmont	NRW	29/04/2012	V6
60001	Twyi at Ty Castell	NRW	03/01/1982	V6
60009	Sawdde at Felin-y-cwm	NRW	29/12/2012	V6
61003	Gwaun at Cilrhedyn Bridge	NRW	24/10/2011	V6
64001	Dyfi at Dyfi Bridge	NRW	18/11/2009	V6
64002	Dysynni at Pont-y-Garth	NRW	03/03/1998	V6
65004	Gwyrfai at Bontnewydd	NRW	20/07/2010	V6
68003	Dane at Rudheath	EA-GMMC	03/02/1977	V6
68018	Dane at Congleton Park	EA-GMMC	01/10/2012	V6
68044	Dane at Hug Bridge	EA-GMMC	18/01/2007	V6
69017	Goyt at Marple Bridge	EA-GMMC	01/01/1976	V6
69022	Irwell at Irwell Vale	EA-GMMC	Full period of record	V6
69024	Croal at Farnworth Weir	EA-GMMC	15/03/1978	V6
69041	Tame at Broomstairs	EA-GMMC	03/09/1974	V6
69047	Roch at Littleborough	EA-GMMC	Full period of record	V6
70004	Yarrow at Croston Mill	EA-CL	Full period of record	V6
72003	Hindburn at Wray	EA-CL	23/11/1977	V6
72014	Conder at Galgate	EA-CL	06/04/1978	V6
73014	Brathay at Jeffy Knots	EA-CL	Full period of record	V6
73015	Keer at High Keer Weir	EA-CL	01/01/1991	V6

3.4 POT Thresholds

The POT Threshold has changed at 13 stations in Northern Ireland, 11 stations in England and 2 stations in Wales, listed in Table 5.

Table 5: Stations with changes to POT Thresholds in version 6

NRFA Station	Station Name	Measuring Authority	V5 POT Threshold	V6 POT Threshold
28061	Churnet at Basford Bridge	EA-WM	13.959	13.462
28081	Tame at Bescot	EA-WM	19.81	19.633
28083	Trent at Darlaston	EA-WM	18.98	19.85
39005	Beverley Brook at Wimbledon Common	EA-KSL	5.865	5.866
47024	Tavy at Tavistock Abbey Bridge	EA-DC	43	45
54004	Sowe at Stoneleigh	EA-WM	20.18	20.161
55032	Elan at Caban Dam	NRW	47	53.78
57014	Rhymney at Bargoed	NRW	29.3	30.76
68003	Dane at Rudheath	EA-GMMC	51.038	31.038
69022	Irwell at Irwell Vale	EA-GMMC	50	42.6
69047	Roch at Littleborough	EA-GMMC	5	3.61
70004	Yarrow at Croston Mill	EA-CL	22.85	18
72003	Hindburn at Wray	EA-CL	88.652	62
73015	Keer at High Keer Weir	EA-CL	10.743	7
201005	Camowen at Camowen Terrace	RA	60.752	55.9
203010	Blackwater at Maydown Bridge	RA	75.02	95.651
203011	Main at Dromona	RA	29.608	36.514
203024	Cusher at Gamble's Bridge	RA	32.796	30.193
203025	Callan at Martin's Bridge	RA	22.813	27.627
203042	Crumlin at Cidercourt Bridge	RA	20.335	17.826
203043	Oonawater at Shanmoy	RA	14	17.149
203046	Rathmore Burn at Rathmore Bridge	RA	5.125	5.138
205005	Ravernet at Ravernet	RA	6.491	8.102
205011	Annacloy at Kilmore Bridge	RA	17.966	22.044
205020	Enler at Comber	RA	10.567	11.283
206004	Bessbrook at Carnbane	RA	4.823	8.09

3.5 Changes to Stage-Discharge Ratings and Reprocessed Data

Stage-discharge ratings have been changed for 29 stations since the last version of files were published, with the time period of re-processed flow data listed in Table 6. All stations have been re-processed to the end of the record (water year 2015/2016).

Table 6: Stations with rating changes and re-processed data in version 5. Stations with an * have not had a rating change, but significant re-processing / record extension

Station Number	Station Name	Measuring Authority	Start date of re-processed data
23001	Tyne at Bywell	EA-NE	01/12/1992
27028	Aire at Armley	EA-NE	Full period of record
27030	Dearne at Adwick	EA-NE	Full period of record
27080	Aire at Oulton Lemonroyd	EA-NE	20/12/1996

Station Number	Station Name	Measuring Authority	Start date of re-processed data
27086	Skell at Ripon Alma Weir	EA-NE	Full period of record
27088	Calder at Mytholmroyd	EA-NE	Full period of record
28018	Dove at Marston on Dove	EA-WM	31/10/2000
28081*	Tame at Bescot	EA-WM	Full period of record, POT record extended back to 1991 (from 2003)
28083	Trent at Darlaston	EA-WM	Full period of record
37013	Sandon Brook at Sandon Bridge	EA-EA	Full period of record
37017	Blackwater at Stisted	EA-EA	Full period of record
40012	Darent at Hawley	EA-KSL	01/04/1990
40018	Darent at Lullingstone	EA-KSL	12/03/2010
42010*	Itchen at Highbridge & Allbrook Total	EA-SSE	01/10/1980 - clarification of flows from the combined series
45003	Culm at Woodmill	EA-DC	Full period of record
45004	Axe at Whitford	EA-DC	Full period of record
46007	West Dart at Dunnabridge	EA-DC	Full period of record
47024*	Tavy at Tavistock Abbey Bridge	EA-DC	Full period of record, POT and AMAX record extended back to 1994 (from 2011)
51003	Washford at Beggearn Huish	EA-WX	01/11/1982
53013	Marden at Stanley	EA-WX	Full period of record
53023	Sherston Avon at Fosseway	EA-WX	Full period of record
55029	Monnow at Grosmont	NRW	03/11/2012
60001	Tywi at Ty Castell	NRW	Full period of record
64001	Dyfi at Dyfi Bridge	NRW	18/11/2009
64002	Dysynni at Pont-y-Garth	NRW	03/03/1998
65004*	Gwyrfai at Bontnewydd	NRW	Station ‘re-opened’ for peak flows with data for 2009/2010 to 2015/2016
68044	Dane at Hug Bridge	EA-GMMC	15/08/2006
69017	Goyt at Marple Bridge	EA-GMMC	01/01/1976
69024	Croal at Farnworth Weir	EA-GMMC	Full period of record
69041	Tame at Broomstairs	EA-GMMC	Full period of record
70004	Yarrow at Croston Mill	EA-CL	Full period of record
72014	Conder at Galgate	EA-CL	04/09/1975
73014	Brathay at Jeffy Knotts	EA-CL	Full period of record

3.6 Missing Data Periods

A missing data table is provided for each station, listing the dates of known periods of missing data in the underlying 15-minute data. These are shown on the NRFA website by yellow shading on the AMAX and POT graphs. There were 26 missing data periods added to the missing data table for stations in England and Wales in version 6, shown in Table 7. Users should always consult the missing data table when using the data for flood estimation in WINFAP-FEH.

Table 7: Additions to the list of missing periods in version 6

NRFA Station	Station Name	Measuring Authority	Start Date	End Date
23003	North Tyne at Reaverhill	EA-NE	01/06/2016	07/06/2016
23008	Rede at Rede Bridge	EA-NE	02/10/2015	05/10/2015
23018	Ouse Burn at Woolsington	EA-NE	20/12/2015	24/02/2015
24005	Browney at Burnhall	EA-NE	28/10/2015	03/11/2015
27031	Colne at Colne Bridge	EA-Y	14/07/2016	18/07/2016
27083	Foss at Huntington	EA-Y	26/02/2016	07/03/2016
38002	Ash at Mardock	EA-HNL	20/07/2015	26/07/2015
38020	Cobbins Brook at Sewardstone Road	EA-HNL	08/03/2014	09/07/2014
39003	Wandle at South Wimbledon	EA-KSL	22/06/2016	18/08/2016
39086	Gatwick Stream at Gatwick Link	EA-KSL	25/02/2016	31/03/2016
40007	Medway at Chafford / Colliersland Bridge	EA-KSL	10/03/2016 30/03/2016	16/03/2016 08/04/2016
40010	Eden at Penshurst / Vexour Bridge	EA-KSL	04/06/2013 19/06/2013 05/12/2013 25/06/2014 10/01/2016	08/06/2013 07/07/2013 08/12/2013 27/06/2014 13/01/2016
40016	Cray at Crayford	EA-KSL	29/06/2015	06/11/2015
41006	Uck at Isfield	EA-SSD	26/05/2015	02/06/2015
41016	Cuckmere at Cowbeech	EA-SSD	20/07/2015	10/07/2015
41028	Chess Stream at Chess Bridge	EA-SSD	10/02/2015 03/03/2015	14/02/2015 06/03/2015
43014	East Avon at Upavon	EA-WX	23/09/2015	30/09/2015
43017	West Avon at Upavon	EA-WX	16/09/2015	23/09/2015
55032	Elan at Caban Dam	NRW	05/06/2015	08/06/2015
64002	Dysynni at Pont-y-Garth	NRW	01/08/2014	30/09/2016

3.7 Unrepresentative Data Periods

Some periods of data are unsuitable for use in WINFAP-FEH because they are unrepresentative of the hydrological behaviour of the catchment. These are shown on the NRFA website by pink shading on the AMAX and POT graphs. The unrepresentative periods occur in two main situations:

1. Where there is a clear change in the catchment during the period of record. The most common example is where a large reservoir has been built and therefore caused a change in the FARL (Flood Attenuation by Reservoirs and Lakes) value.
2. Where data quality has changed significantly during the period of record, the indicative suitability has been based on the better data, providing the length of record is reasonable. In these cases, the years of poorer quality have been rejected.

New unrepresentative periods have been added at four stations in Wales, and one in Scotland (Table 8). The end dates for ongoing unrepresentative periods at a further eight stations were extended to 30 September 2016.

Table 8: Additions to the list of unrepresentative periods in version 6

NRFA Station	Station Name	Measuring Authority	Start Date	End Date	Comments
57010	Ely at Lanelay	NRW	01-OCT-1974 09.00.00	30-SEP-1999 08.45.00	There is uncertainty in rating curves due to lack of gaugings in upper limb.
60003	Taf at Clog-y-Fran	NRW	01-OCT-2012 09.00.00	30-SEP-2016 08.45.00	Issues with bed movement and bank stability mean rating has been greatly over-estimating flows since 2012.
60009	Sawdde at Felin-y-cwm	NRW	19-FEB-2010 09.00.00	30-SEP-2016 08.45.00	The rating for post-weir-rebuild is not yet confirmed at QMED.
64002	Dysynni at Pont-y-Garth	NRW	01-OCT-1966 09.00.00	30-SEP-1997 08.45.00	Pre-1997 data is from an old station at a slightly different location and requires a full review before it is fit for use.
83013	Irvine at Glenfield	SEPA-S	01-OCT-1913 09.00.00	30-SEP-1982 08.45.00	There is a very active and significant sluice/lade influence through most of the record up to around 1982.

There were 29 stations at which an unrepresentative period during the historical record began on 1 October at midnight, and one station which had two such periods. These 30 periods have been corrected to begin at 1 October at 09:00, so that each starts with the first water day of the water year, and not nine hours earlier, during the last water day of the previous water year. This has not changed the datafiles or the AMAX or POT plots on the website, which already took this anomaly into account, but has removed the implication that the previous water year may have been incorrectly rejected.

3.8 Rejected Data

AMAX and POT data that are unsuitable for use in flood estimation are marked as rejected in WINFAP-FEH files and not included in flood estimation calculations. These are shown by red bars (for AMAX) and red crosses (for POTs) on the AMAX and POT graphs respectively. All data falling within unrepresentative periods (see section 3.7 Unrepresentative Data Periods) are rejected.

In addition, where periods of missing data (see section 3.6 Missing Data Periods) are likely to have included the true AMAX, any AMAX recorded during that water year is likely to be rejected. Where the true AMAX is recorded, the event is not rejected. There were no additional rejected AMAX values added to the list of rejected water years, and none removed**.**

4 CHANGES TO METADATA

4.1 Changes to FEH Indicative Suitabilities

Indicative suitabilities have changed at 5 stations, listed in Table 9.

Table 9: Stations with changes to indicative suitability in version 6

NRFA Station	Station Name	Measuring Authority	V5 Suitability		V6 Suitability	
			QMED	POOLING	QMED	POOLING
55016	Ithon at Disserth	NRW	YES	YES	YES	NO
56011	Sirhowy at Wattsville	NRW	YES	YES	YES	NO
57015	Taff at Merthyr Tydfil	NRW	YES	NO	YES	YES
79003	Nith at Hall Bridge	SEPA-S	YES	YES	YES	NO
89004	Strae at Glen Strae	SEPA-S	YES	YES	YES	NO

4.2 Datum Changes

A table is provided on the NRFA website for each station which details the datum history over the period of record, with dates of applicability. The datum history has been updated at 133 stations listed in Annex 2.

ANNEX 1 POT EXCLUDED STATIONS

NRFA Station	Station Name	Measuring Authority
26003	Foston Beck at Foston Mill	EA-NE
26009	West Beck at Snakeholme Lock	EA-NE
26010	Driffield Canal at Snakeholme Lock	EA-NE
26802	Gypsey Race at Kirby Grindalythe	EA-NE
26803	Water Forlornes at Driffield	EA-NE
27038	Costa Beck at Gatehouses	EA-NE
27073	Brompton Beck at Snainton Ings	EA-NE
29005	Rase at Bishopbridge	EA-LN
30005	Witham at Saltersford Total	EA-LN
30006	Slea at Leasingham Mill	EA-LN
30013	Heighington Beck at Heighington	EA-LN
30015	Cringle Brook at Stoke Rochford	EA-LN
31004	Welland at Tallington Total	EA-LN
33005	Bedford Ouse at Thornborough Mill	EA-EA
33007	Nar at Marham	EA-EA
33012	Kym at Meagre Farm	EA-EA
33032	Heacham at Heacham	EA-EA
33049	Stanford Water at Buckenham Tofts	EA-EA
33052	Swaffham Lode at Swaffham Bulbeck	EA-EA
33054	Babingley at Castle Rising	EA-EA
34007	Dove at Oakley Park	EA-EA
34018	Stiffkey at Warham	EA-EA
35003	Alde at Farnham	EA-EA
35004	Ore at Beversham Bridge	EA-EA
36002	Glem at Glemsford	EA-EA
36003	Box at Polstead	EA-EA
36005	Brett at Hadleigh	EA-EA
36006	Stour at Langham	EA-EA
36007	Belchamp Brook at Bardfield Bridge	EA-EA
36008	Stour at Westmill	EA-EA
36009	Brett at Cockfield	EA-EA
36010	Bumpstead Brook at Broad Green	EA-EA
36011	Stour Brook at Sturmer	EA-EA
36015	Stour at Lamarsh	EA-EA
37003	Ter at Crabbs Bridge	EA-EA
37005	Colne at Lexden	EA-EA
37009	Brain at Guithavon Valley	EA-EA
37010	Blackwater at Appleford Bridge	EA-EA
37012	Colne at Poolstreet	EA-EA
37013	Sandon Brook at Sandon Bridge	EA-EA
37016	Pant at Copford Hall	EA-EA
37017	Blackwater at Stisted	EA-EA
38011	Mimram at Fulling Mill	EA-HNL
39010	Colne at Denham	EA-HNL
39021	Cherwell at Enslow Mill	EA-T
39033	Winterbourne Stream at Bagnor	EA-T

NRFA Station	Station Name	Measuring Authority
39034	Evenlode at Cassington Mill	EA-T
39037	Kennet at Marlborough	EA-T
39089	Gade at Bury Mill	EA-HNL
39095	Quaggy at Manor House Gardens	EA-KSL
41015	Ems at Westbourne	EA-SSD
41023	Lavant at Graylingwell	EA-SSD
42005	Wallop Brook at Broughton	EA-SSD
42006	Meon at Mislingford	EA-SSD
42007	Alre at Drove Lane Alresford	EA-SSD
42008	Cheriton Stream at Sewards Bridge	EA-SSD
42009	Candover Stream at Borough Bridge	EA-SSD
42010	Itchen at Highbridge & Allbrook Total	EA-SSD
42012	Anton at Fullerton	EA-SSD
42017	Hermitage Stream at Havant	EA-SSD
43003	Avon at East Mills Total	EA-WX
43004	Bourne at Laverstock	EA-WX
43005	Avon at Amesbury	EA-WX
43008	Wylye at South Newton	EA-WX
43010	Allen at Loverley Farm	EA-WX
43012	Wylye at Norton Bavant	EA-WX
43018	Allen at Walford Mill	EA-WX
44002	Piddle at Baggs Mill	EA-WX
44004	Frome at Dorchester Total	EA-WX
44006	Sydling Water at Sydling St Nicholas	EA-WX
44008	South Winterbourne at Winterbourne Steepleton	EA-WX
44009	Wey at Broadwey	EA-WX
44013	Piddle at Little Puddle	EA-WX
44014	Piddle at Briantspuddle	EA-WX
54027	Frome at Ebley Mill	EA-WM
55035	Iago at Iago flume	CEH
67020	Dee at Chester Weir	NRW
68007	Wincham Brook at Lostock Gralam	EA-GMMC
69002	Irwell at Adelphi Weir	EA-GMMC
71003	Croasdale Beck at Croasdale Flume	EA-CL
85001	Leven at Linnbrane	SEPA-W
205034	Woodburn at Control	RA
206006	Annalong at Recorder	BCDWC

ANNEX 2 STATIONS WITH CHANGES TO DATUM HISTORY

NRFA Station	Station Name	Measuring Authority
21806	Till at Heaton Mill	EA-NE
22007	Wansbeck at Mitford	EA-NE
23001	Tyne at Bywell	EA-NE
23003	North Tyne at Reaverhill	EA-NE
23006	South Tyne at Featherstone	EA-NE
23008	Rede at Rede Bridge	EA-NE
23009	South Tyne at Alston	EA-NE
23011	Kielder Burn at Kielder	EA-NE
23017	Team at Team Valley	EA-NE
23018	Ouse Burn at Woolsington	EA-NE
23033	Rede at Otterburn	EA-NE
24005	Browney at Burnhall	EA-NE
24008	Wear at Witton Park	EA-NE
24009	Wear at Chester le Street	EA-NE
25009	Tees at Low Moor	EA-NE
26003	Foston Beck at Foston Mill	EA-Y
27029	Calder at Elland	EA-Y
27034	Ure at Kilgram Bridge	EA-Y
27055	Rye at Broadway Foot	EA-Y
27056	Pickering Beck at Ings Bridge	EA-Y
27087	Derwent at Low Marishes	EA-Y
27088	Calder at Mytholmroyd	EA-Y
28003	Tame at Water Orton	EA-WM
33013	Sapiston at Rectory Bridge	EA-EA
33023	Lea Brook at Beck Bridge	EA-EA
33034	Little Ouse at Abbey Heath	EA-EA
34001	Yare at Colney	EA-EA
34004	Wensum at Costessey Mill	EA-EA
34006	Waveney at Needham Mill	EA-EA
34007	Dove at Oakley Park	EA-EA
34008	Ant at Honing Lock	EA-EA
34011	Wensum at Fakenham	EA-EA
34012	Burn at Burnham Overy	EA-EA
35003	Alde at Farnham	EA-EA
35004	Ore at Beversham Bridge	EA-EA
35011	Belstead Brook at Belstead	EA-EA
36002	Glem at Glemsford	EA-EA
36004	Chad Brook at Long Melford	EA-EA
36005	Brett at Hadleigh	EA-EA
36006	Stour at Langham	EA-EA
36007	Belchamp Brook at Bardfield Bridge	EA-EA
36009	Brett at Cockfield	EA-EA
36011	Stour Brook at Sturmer	EA-EA
36015	Stour at Lamarsh	EA-EA
37003	Ter at Crabbs Bridge	EA-EA
37005	Colne at Lexden	EA-EA

NRFA Station	Station Name	Measuring Authority
37006	Can at Beach's Mill	EA-EA
37008	Chelmer at Springfield	EA-EA
37011	Chelmer at Churchend	EA-EA
37016	Pant at Copford Hall	EA-EA
37017	Blackwater at Stisted	EA-EA
37020	Chelmer at Felsted	EA-EA
37031	Crouch at Wickford	EA-EA
37033	Eastwood Brook at Eastwood	EA-EA
39003	Wandle at South Wimbledon	EA-KSL
39004	Wandle at Beddington Park	EA-KSL
39005	Beverley Brook at Wimbledon Common	EA-KSL
39012	Hogsmill at Kingston upon Thames	EA-KSL
39053	Mole at Horley	EA-KSL
39056	Ravensbourne at Catford Hill	EA-KSL
39058	Pool River at Winsford Road	EA-KSL
39086	Gatwick Stream at Gatwick Link	EA-KSL
39134	Ravensbourne East at Bromley South	EA-KSL
40003	Medway at Teston / East Farleigh	EA-KSL
40004	Rother at Udiam	EA-KSL
40009	Teise at Stonebridge	EA-KSL
40013	Darent at Otford	EA-KSL
40017	Dudwell at Burwash	EA-KSL
40018	Darent at Lullingstone	EA-KSL
40033	Dour at Crabble Mill	EA-KSL
43004	Bourne at Laverstock	EA-WX
43005	Avon at Amesbury	EA-WX
43007	Stour at Throop	EA-WX
43014	East Avon at Upavon	EA-WX
43017	West Avon at Upavon	EA-WX
43018	Allen at Walford Mill	EA-WX
43019	Shreen Water at Colesbrook	EA-WX
43801	Chitterne Brook at Codford	EA-WX
43806	Wylye at Brixton Deverill	EA-WX
44006	Sydling Water at Sydling St Nicholas	EA-WX
44008	South Winterbourne at Winterbourne Steepleton	EA-WX
44009	Wey at Broadwey	EA-WX
44011	Asker at East Bridge Bridport	EA-WX
44801	Hooke at Hooke	EA-WX
45001	Exe at Thorverton	EA-DC
45002	Exe at Stoodleigh	EA-DC
45003	Culm at Wood Mill	EA-DC
45004	Axe at Whitford	EA-DC
45005	Otter at Dotton	EA-DC
45008	Otter at Fenny Bridges	EA-DC
45009	Exe at Pixton	EA-DC
45013	Tale at Fairmile	EA-DC
46006	Erme at Ermington	EA-DC

NRFA Station	Station Name	Measuring Authority
46007	West Dart at Dunnabridge	EA-DC
47024	Tavy at Tavistock Abbey Bridge	EA-DC
50001	Taw at Umberleigh	EA-DC
50002	Torridge at Torrington	EA-DC
50006	Mole at Woodleigh	EA-DC
50008	Lew at Gribbleford Bridge	EA-DC
50011	Okement at Jacobstowe	EA-DC
51002	Horner Water at West Luccombe	EA-WX
51003	Washford at Beggearn Huish	EA-WX
52004	Isle at Ashford Mill	EA-WX
52014	Tone at Greenham	EA-WX
52016	Currypool Stream at Currypool Farm	EA-WX
52017	Congresbury Yeo at Iwood	EA-WX
53002	Semington Brook at Semington	EA-WX
53004	Chew at Compton Dando	EA-WX
53006	Frome (Bristol) at Frenchay	EA-WX
53007	Frome (Somerset) at Tellisford	EA-WX
53008	Avon at Great Somerford	EA-WX
53009	Wellow Brook at Wellow	EA-WX
53013	Marden at Stanley	EA-WX
53017	Boyd at Bitton	EA-WX
53018	Avon at Bathford	EA-WX
54001	Severn at Bewdley	EA-WM
54011	Salwarpe at Harford Hill	EA-WM
54029	Teme at Knightsford Bridge	EA-WM
68001	Weaver at Ashbrook	EA-GMMC
68003	Dane at Rudheath	EA-GMMC
68018	Dane at Congleton Park	EA-GMMC
68020	Gowy at Bridge Trafford	EA-GMMC
69008	Dean at Stanneylands	EA-GMMC
69012	Bollin at Wilmslow	EA-GMMC
69015	Etherow at Compstall	EA-GMMC
69020	Medlock at London Road	EA-GMMC
69022	Irwell at Irwell Vale	EA-GMMC
69028	Mersey at Brinksway	EA-GMMC
69030	Sankey Brook at Causey Bridges	EA-GMMC
69041	Tame at Broomstairs	EA-GMMC
69043	Irk at Collyhurst Weir	EA-GMMC
69046	Bradshaw Brook at Bradshaw Tennis Club	EA-GMMC
69047	Roch at Littleborough	EA-GMMC
69803	Roch at Rochdale	EA-GMMC