

## MEMORANDUM

TO: D.E.S. DATE: 14 November 2000  
Hydrometric Section

FROM:

**SUBJECT: Preliminary Report on Flooding of November, 2000**

Please find below estimates of the relative severity of the recent flood event (6<sup>th</sup>-7<sup>th</sup> November, 2000) that affected many parts of the South and East of Ireland.

It should be noted that the estimates are based solely on reported flood levels from OPW hydrometric stations as 'phoned in' by our Technicians, and as such have not been verified by this office. Approved levels (given in mOD – Poolbeg) should not however vary significantly from those provided.

### **Shannon (Athlone)**

The river level at Athlone was still rising slightly on 9<sup>th</sup> November, but was still some 450mm below peak levels experienced last winter. The recorded level (38.15m OD) would represent an average high winter level.

### **Mulkear (Annacotty)**

The peak level recorded at this station was 13.74m OD, which would be in the order of a mean annual flood. This level was recently exceeded in February 1990, February 1995 and August 1997.

### **Maigue (Croom and Castleroberts)**

At both recorder stations on the Maigue, the recent event ranks 6<sup>th</sup> out of 25 years of records in terms of water level (and 5<sup>th</sup> and 6<sup>th</sup> out of the 16 years since the completion of the Maigue drainage scheme at Castleroberts and Croom respectively). Without assessing flow records, this would indicate a return period in the order of 3-5 years.

### **Bandon (Upper and Lower Catchment)**

The event of 6<sup>th</sup> November was less significant than that which caused flooding in the Dunmanway in October (levels appx. 300mm lower at the station at Long Bridge adjacent to the town). The event was less significant than all of the recorded annual maxima in the upper catchment. Peak levels were lower than a mean annual event in the lower catchment (Bandon Town and Curranure).

### **Munster Blackwater (Killavullen, Ballyduff)**

Analysis of peak levels and estimated flows (comparison of  $Q/Q_{MAF}$  vs. FSR growth curve for Ireland) show that the return period of this event is in the order of 5 years. Note that the levels recorded were recently exceeded at Killavullen (appx. 10km downstream of Mallow) in March 1995 and December 1998.

**Suir (Clonmel)**

The peak water level at Gashouse Bridge in Clonmel was the highest recorded in over 50 years. The event peaked at a level approximately 200mm higher than the events of March 1995 and January 1996. It is believed however that the flows experienced during the 1995 event might in fact have been greater than those experienced this month. It should be noted however that the date of the shift in the rating is not certain, and should it in fact precede the 1995 event, then the peak flow this month would indeed be the greatest since the events of 1946 and '47. The estimated return period of the event, as derived from analysis of flows (as described above), would be in the order of 25-30 years.

The levels recorded at the station on the River Anner are the highest recorded since records began in 1954.

Although the flood peak on the Suir itself passed through Clonmel during the night of the 6<sup>th</sup>-7<sup>th</sup> November, flood damage is also reported to have been experienced on the 5<sup>th</sup> in other areas of the town due to flash flooding in minor tributaries that drain down through the town. No details are available in this office as yet as to the extent of this damage.

**Suir (Carrick-on-Suir)**

Although some flooding was reported upstream of the town of Carrick-on-Suir, the water levels recorded at the hydrometric station (which is in the fully tidal reach) were by no means exceptional. The fluvial event occurred during a neap tide.

**Nore (Kilkenny)**

The flood peak recorded at John's Bridge in Kilkenny was the 9<sup>th</sup> highest since autographic records began in 1953, and was lower than those recorded in 1995 and 1997. This evidence, which is supported by an analysis of the estimated flow, would indicate that this event has a return period in the order of 5-10 years. This estimate concurs with the analysis of the peak level downstream at Brownsbarn.

The peak levels recorded on the Breaghagh and Dinin tributaries were not exceptional.

**Barrow (Carlow, Royal Oak)**

The flood peak recorded in Carlow was the 4<sup>th</sup> highest in 25 years of record (lower than the events of January 1995 and February 1990, and of a similar order to those of June 1993 and March 1995). The peak at Royal Oak was the 7<sup>th</sup> highest in 61 years of record. This data would indicate that this event has a return period in the order of 5-10 years (note the similarity to the Nore catchment).

**Slaney (Enniscorthy)**

The flood was the largest on record (22 years) in Enniscorthy town, exceeding the level of the previous maximum (March 1995) by appx. 1.4m.

A longer record is available a short distance upstream at the station at Scarawalsh, where this event was the 2<sup>nd</sup> largest on record (46 years), a higher level having only been recorded in 1965.

An analysis of estimated flows at this site indicate that this event might have a return period in excess of 100 years. This analysis does however require a significant extrapolation of the rating and relies on the assumption that the FSR growth curve applies to this station, and the estimate may well therefore be excessive.

The 1965 event occurred before construction of the new road bridge (appx. 1976) downstream of the station at Scarawalsh, during which time localised channel widening or improvements might have been undertaken. It is therefore possible that although the level for the 1965 event was higher, the flow might have been less than that which occurred recently (no flood flow measurements were taken pre-76).

Further analysis of this record is required, but the event is likely to have a return period in excess of 25 years, and possibly in the order of 50 years or more.

#### **Owenavorrhagh (Boleany)**

The event at this station (upstream of Courtown, near Gorey) was second only to the Hurricane Charlie event in 1986 during 29 years of record. The recorded peak level was however 600mm higher than the third ranked event (1997). An analysis of flows indicates a return period of approximately 100 years, but again relies on significant extrapolation of the rating. Given the degree of exceedence of this recent event above all others recorded except that of 1986, it is possible that this event has a return period significantly in excess of 20 years.

#### **Ryewater (Liffey Tributary, Leixlip)**

The recent event recorded the highest levels at this station in 45 years of record, with a peak level appx. 300mm higher than the second highest recorded (June 1993) since the construction of the weir in 1980. An analysis of flows indicates that this event has a return period in excess of 100 years, but again, relies on significant extrapolation of the rating. It is likely that this event has a return period in the order of 50 years or more.

#### **Boyne (Slane Castle, Navan, Trim)**

The recent event was the 2<sup>nd</sup> highest in 60 years of record at Slane Castle behind that of 1954. It was also the highest on record at Navan Weir (25 years) and Blackcastle in Navan (19 years). Note that drainage works on the Boyne catchment were only completed in the mid-80's.

An analysis of flow at Slane Castle indicates that this event has a return period in the order of 30 years, which would be supported by its ranking in terms of level.

The peak level of the recent event is only ranked 4<sup>th</sup> in the post-drainage annual maxima series from the station at Trim (15 years), although this might be due to the recent channel clearance work undertaken by the OPW immediately adjacent to the hydrometric station.

#### **Dee (Charleville, Burley Bridge)**

The event is ranked first equal and tenth in 25 years of record at Burley Bridge (appx. 4km upstream of Ardee) and Charleville (appx. 8km downstream of Ardee) respectively. This difference is unexpected and requires further investigation.

### Nanny (Duleek)

The recent event was the highest recorded at all of the recorders in the Duleek area since the flood relief scheme was completed in 1998.

### SUMMARY

Summarised in the table below are the estimated return period of the event of 6<sup>th</sup>-7<sup>th</sup> November this year at key points in Southern and Eastern Ireland. The estimates given in the table take account of all available data, i.e., peak level rankings, flow estimates as compared to the mean annual flood, degree of exceedence above other events, etc. It will be noted that many of the return periods given incorporate a substantial range which reflects the degree of uncertainty in flood frequency estimation.

It should be stressed that estimates of return period are indicative only, and should be treated with some caution. Confidence in the estimates could be improved with further investigation or analysis.

Station	River	Estimated Return Period (Years)	Degree of Rating Extrapolation <sup>(1)</sup>
Athlone	Shannon	2	N/A
Annacotty	Mulkear	2-3	N/A
Croom	Maigue	3-5	N/A
Bandon, Dunmanway	Bandon	1	N/A
Killavullen, Ballyduff	Blackwater	5	1.4, 1.6
Clonmel	Suir	25-50	1.3
Kilkenny	Nore	5-10	1.2
Carlow	Barrow	5-10	N/A
Enniscorthy	Slaney	25-100	1.6
Boleany (Courtown)	Owenavorrhagh	>>20(?)	(2.0)
Leixlip	Ryewater	>50	2.0
Navan, Slane (Trim)	Boyne	30	1.2
Charleville, Burley	Dee	?	N/A

**Note (1)**

'Degree of Rating Extrapolation' indicates the factor of the estimated flow over the highest relevant flow gauging taken at that station. In general terms, the higher the factor, the less reliable the flow estimate.

Please call if you have any queries.

Regards

## SUMMARY

Table 1 ranks the November 2000 event relative to other flooding events at those locations where the peak level was either the highest or second highest level on record (each station has over 45 years of records). The table also indicates clearly the number of high levels that have occurred in the last decade.

Peak Level Rankings	Slane Castle	Leixlip	Scarawalsh (near Enniscorthy)	Clonmel
1	Dec. 1954	Nov. 2000	Nov. 1965	Nov. 2000
2	Nov. 2000	June 1993	Nov. 2000	Mar. 1995
3	Feb. 1990	Dec. 1968	Oct. 1960	Jan. 1996
4	June 1993	Aug. 1986	Nov. 1997	Nov. 1997
5	Feb. 1995	Jan. 1995	June 1958	Feb. 1990
Year auto records began	1940	1956	1955	1953

**Table 1**

This fact (the number of high levels occurring in recent years) is evidenced also at those locations with long records where the November 2000 level was not as great; refer to Table 2.

Peak Level Rankings	Killavullen (near Mallow)	Kilkenny	Royal Oak (near Bagenalstown)
1	Nov. 1980	Dec. 1968	Feb. 1990
2	Oct. 1988	Feb. 1990	Jan. 1995
3	Mar. 1995	Jan. 1995	Dec. 1960
4	Dec. 1998	Dec. 1979	June 1993
5	Aug. 1986	Dec. 1960	Nov. 1965
Year auto records began	1955	1953	1954

**Table 2**

Summarised in Table 3 are the estimated return periods of the event of 5<sup>th</sup>-7<sup>th</sup> November 2000 at specific gauged locations referred to in this report. The estimates given in the table take account of all available data, i.e., peak level rankings, flow estimates as compared to the mean annual flood, degree of exceedence above other events, etc. It will be noted that many of the return periods given incorporate a substantial range which reflects the degree of uncertainty in flood frequency estimation.

River	Location	Estimated Return Period (Years)	Degree of Rating Extrapolation <sup>(1)</sup>
Boyne	Slane, Navan	30	1.2
Ryewater	Leixlip	>50	2.0
Owenavorrhagh	Boleany	>20	2.0
Slaney	Scarawalsh	25-100	1.6
Suir	Clonmel	25-50	1.3
Munster Blackwater	Killavullen	5	1.4
Nore	Kilkenny	5-10	1.2
Barrow	Royal Oak	5-10	1.0

Note (1)

'Degree of Rating Extrapolation' indicates the factor of the estimated flow over the highest relevant flow gauging taken at that station. In general terms, the higher the factor, the less reliable the flow estimate.

**Table 3**

**AREAS FLOODED IN NOVEMBER 2000**

Clonmel	Co. Tipperary	
Carrick-on-Suir	Co. Tipperary	
Templemore	Co. Tipperary	
Enniscorthy	Co. Wexford	
Dublin side of Gorey Town	Co. Wexford	
Arklow	Co. Wexford	
Drumcondra (Tolka)	Dublin	Homes evacuated
Chapelizod/Islandbridge	Dublin	
N1 – Blakes Cross	Dublin	
Lucan Village	Dublin	
Milltown (River Dodder)	Dublin	
Clonee	Dublin	
Mallow	Cork	
Bandon	Cork	Road near the viaduct
Blarney	Cork	
Cork City (Donnybrook & Churchfield areas)	Cork	Houses evacuated
Fermoy	Cork	
Aughrim	Co. Wicklow	
Avoca	Co. Wicklow	
Shillelagh	Co. Wicklow	
Ashford	Co Wicklow	
Kilkenny	Kilkenny	
Thomastown	Kilkenny	
Ballyhale	Kilkenny	
Graiguenamanagh	Kilkenny	
Freshford	Kilkenny	
Mullinavat	Kilkenny	
Castlecomer	Kilkenny	
Waterford	Waterford	
Dunboyne	Meath	
Trim	Meath	
Julienstown	Meath	
Ashbourne	Meath	Roads
Coast from Drogheda to Termonfeekin	Louth	Homes evacuated
Drogheds – Slane Road	Louth/Meath	
Mornington	Louth/Meath	
Hazelhatch	Kildare	
Athy	Kildare	Canal flooding
Maynooth	Kildare	

