



OSPAR CONVENTION

COMPREHENSIVE STUDY

OF

RIVERINE INPUTS

HYDROMETRIC DATA FOR 2009

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1.1 INTRODUCTION

In 1988, it was agreed that Ireland would participate in the Comprehensive Study of Riverine Inputs undertaken for purposes of the Convention for the Prevention of Marine Pollution from Land Based Sources (Paris Convention).

In discussions between staff of the then Department of the Environment and An Foras Forbartha, the catchments to be included in the study were agreed.

Consequent on the amalgamation of the Paris and Oslo Conventions, the name of the Convention (and the name used in this report) was changed to the OSPAR Convention.

This report deals with the flow data from which estimates are made of the annual loads of various pollutants carried by rivers discharging to the seas around Ireland. Flow data are derived from water level records and the stage (water level) discharge relationship i.e. the station's rating curve developed for the staff gauge at the station. The methodology to be used in the project is to obtain the flow (and loading) at time of water quality sampling and, based on the continuous water level records, to estimate the flow (and estimate the loading) to the seas throughout the year.

1.2 TIMETABLE

In March 1988 it was decided by the Convention Technical Working Group that the first year of the study would cover 1990 with the results being reported to the Secretariat by 30 June 1991.

This report deals with the year 2009, the twentieth year of the study.

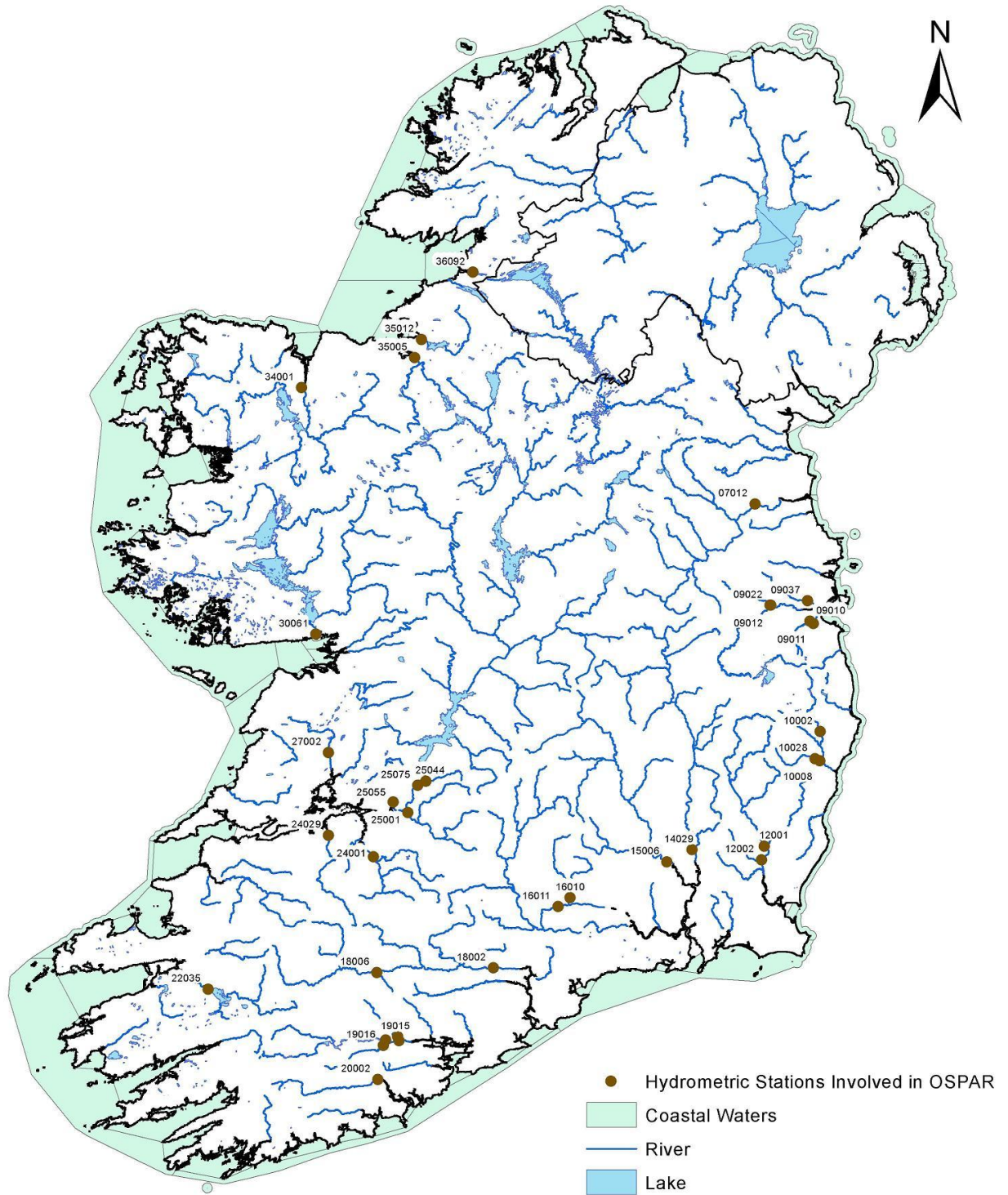
1.3 HYDROMETRIC AREAS

For the purposes of hydrological activities, and by agreement between the various hydrological agencies in Northern Ireland and the Republic of Ireland, the country has been divided into 40 hydrometric areas. Each hydrometric area comprises a single large river basin or a group of smaller ones with the exception of the Shannon Catchment, which comprises two hydrometric areas i.e. 25 (Lower Shannon) and 26 (Upper Shannon).

1.4 STUDY AREA

The catchments included in the field study are listed along with the relevant hydrometric stations in Table 1. The study was planned to include detailed monitoring of the following catchments (shown with the hydrometric area number in brackets): Liffey (09), Avoca (10), Barrow (14), Nore (15), Suir (16), Blackwater (Munster) (18) and Shannon (24, 25 + 26). Less frequent monitoring of the Rivers Boyne (07), Slaney (12), Lee (19), Bandon (20), Laune (sampled from October 2000), (22), Feale (23, sampled from October 2000), Corrib (30), Moy (34), Ballysadare (35, sampled from

Figure 1. Hydrometric Stations Involved in OSPAR Comprehensive Study of Riverine Inputs in Ireland 2006



OSPAR CONVENTION: COMPREHENSIVE STUDY OF RIVERINE INPUTS

TABLE 1: LIST OF HYDROMETRIC STATIONS

RIVER CATCHMENT	HYDROMETRIC STATION	Catchment Area km ²	BODY RESPONSIBLE	FACILITY
Boyne	07012 Slane Castle	2460	OPW	DL
Tolka	09037 Botanic Gardens	138	DUB	DL
Liffey	09022 Leixlip P.S.	1055	ESB	Power Station Records
	09001 Leixlip	210	OPW	DL
	09012 Leixlip	1055	KID	SG
Dodder	09010 Waldron's Br.	94	DUB	DL
Avoca	10002 Rathdrum	231	WIC	DL
	10008 Woodenbridge	390	WIC	SG
	10028 Knocknamohill	203	WIC	DL
Slaney	12001 Scarrawalsh	1031	OPW	DL
	12002 Enniscorthy	1320	OPW	DL
Barrow	14029 Graiguenamanagh u/s	2778	OPW	DL
	14023 Graiguenamanagh	2808	OPW	DL
Nore	15006 Brownsbarn	2418	OPW	DL
Suir	16010 Anner	437	OPW	DL
	16011 Clonmel	2144	OPW	DL
Blackwater (Mun.)	18002 Ballyduff	2334	OPW	DL
Lee (Cork)	19013 Inniscarra P.S.	790	ESB	Power Station Records
	19016 Ovens Bridge	118	ESB	DL
	19011 Leemount u/s	924	ESB	DL
	19015 Healys Bridge	212	ESB	DL
Bandon	20002 Curranure	424	OPW	DL
Laune	22035 Laune Br.	560	OPW	DL
Feale	23002 Listowel	647	OPW	DL
Deel	24012 Rathkeale	439	OPW	DL
	24029 Inchirourke More	486	LIM	DL
Maigue	24008 Castleroberts	806	OPW	DL
	24001 Croom	770	OPW	DL
Shannon (to Limerick)	25055 Ardnacrusha P.S.	}10427	ESB	Power Station Records
	25075 Parteen Weir	}10427	ESB	Power Station Records
	25044 Coole	93	TIN	DL
	25001 Annacotty	648	OPW	DL
Fergus	27002 Ballycorey	564	OPW	DL
Corrib	30061 Wolfe Tone Br.	3136	OPW	DL
Moy	34001 Rahans	1975	OPW	DL
Ballysadare	35005 Ballysadare	640	OPW	DL
Garravogue	35012 New Br.	369	SLI	DL
Erne	36092 Cataleen Falls P.S.	4353	ESB	Power Station Records

LEGEND

SG	Staff Gauge		
DL	Data logger		
CSE	Greencore plc	OPW	Office of Public Works
DUB	Dublin City Council	SLI	Sligo County Council
ESB	Electricity Supply Board	TIN	North Tipperary County Council
KID	Kildare County Council	WIC	Wicklow County Council
LIM	Limerick County Council		

January 2000), Garravogue (35, sampled from January 2000) and Erne (36) was envisaged. The catchment areas to the hydrometric stations, sampling stations and the full catchments are given in Table 2.

The border with Northern Ireland does not coincide with hydrometric area boundaries. The Erne catchment, for instance, comprises Hydrometric Area 36 and straddles the State border. The catchment of the Erne to Station 36092 Cathaleen Falls is about 4,353 km² of which about 1,800 km² or 40% lies in Northern Ireland. There are also a number of small catchments, totalling some 240 km² in area (mainly the Castletown, Fane and Ballymasganlan Catchments) in which the rivers rise in Northern Ireland and discharge in the Republic. Likewise, there is an area of some 1,110 km² (mainly in the Blackwater (Monaghan) and Foyle Catchments) where the rivers rise in the Republic and discharge in Northern Ireland.

The Ordnance Survey of Ireland has estimated the area of Ireland¹ (including islands) to be approx. 84,000 km² of which about 14,000 km² are in Northern Ireland.

1.5 POPULATION

The total population of Ireland, as sampled in the 2006 Census, was 4,239,848 persons. The number of persons living within the catchments sampled as part of the OSPAR Sampling Programme was 3,062,174 or 72 percent of the population.

In 2002, the population for the same OSPAR sampling program was 2,846,102 persons and the total population of the state was 3,917,203 persons. The population of the same OSPAR catchments in 1996 was 2,635,358 persons out of a total population of 3,626,087, while in 1991 the number of persons within the sampled catchments was 2,569,256 persons and the population of the State was 3,525,719 persons.

1.6 FLOW DATA

Early in 2009, authorities responsible for relevant hydrometric stations were advised of the continuation of this study and the flow data requirements.

The Office of Public Works has provided flow data, based on the processing of the water level records from their stations.

The ESB International Ltd. provided water level records from ESB hydrometric stations and also details of the discharges at the hydroelectric power stations.

The EPA's Regional Hydrometric Teams, carried out calibration flow measurements and spot checks at individual stations in their respective areas.

The Environmental Protection Agency processed water level records from the ESB and from Local Authority water level hydrometric stations.

¹Ireland: Rivers and their Catchment Basins. Ordnance Survey of Ireland. 1958.

1.7 RAINFALL IN 2009

The Monthly Weather Bulletins, published by Met Éireann, were used to provide the following commentary on the rainfall in Ireland in the calendar year 2009.

1.7.1 Annual Rainfall in 2009

Annual rainfall totals were well above normal for the second successive year. They ranged from 918mm at Dublin Airport to 2175mm at Valentia Observatory, between 12% and 55% higher than the 30-year annual average amounts. Like the previous two years, the summer period of June to August was extremely wet, while November 2009 was the wettest November since records began at most stations and the wettest of any month on record in several places. Annual totals were the highest in over 50 years of record at both Mullingar and Johnstown Castle, while Valentia Observatory's total was its highest since observations began in the area in 1866, considerably higher than its previous highest total of 1923mm in 2002. The exceptionally heavy rainfall brought extensive flooding during the late summer and again during November, especially in the west and south. The driest months relative to normal were March and September, but the annual number of raindays (days with 0.2mm or more rainfall) was above normal everywhere, by between 10% and 20% generally; there were between 202 raindays at Casement Aerodrome and 272 at Valentia Observatory. Most stations measured their highest daily fall of the year during November, but there were also very heavy falls locally over short periods during the summer months, usually associated with thunderstorms.

1.7.2 Monthly Rainfall in 2009

January 2009 rainfall totals were a little below normal in parts of the north and east, but it was a wet month generally, with almost twice the normal rainfall recorded at some stations in the south. There was a wide variation in monthly totals, ranging from 57mm at Dublin (Phoenix Park) to 306mm at Maam Valley, Co. Galway, with percentage of normal values between 79% at Phoenix Park and 182% at Fermoy (Moorepark), Co. Cork. At both this latter station and at Valentia Observatory it was the wettest January since 1974.

Very little rain was recorded during the first nine days of the month, but rain fell on each day thereafter and was heavy at times, especially in the south and west. The wettest days were the 10th/11th, 14th, 17th, 21st and 29th/30th. By the end of the month, significant flooding developed in the south of the country after 2-day falls of over 50mm in places. The month's highest daily fall, 41.0mm, was measured at Dungarvan (Carriglea), Co. Waterford, on the 29th, the highest January daily fall at the station since 1988. There were between 11 and 15 wetdays (days with 1mm or more of rainfall) during the month at most eastern stations, but more than 20 wetdays were measured in many southern, western and northwestern areas.

February 2009 rainfall totals were below normal except in the Dublin area, with less than half of the monthly normal over much of the country and less than a quarter of the average in many parts of the southwest. Totals ranged from 13mm at Roche's Point to 70mm at Dublin (Phoenix Park), with percentage of normal values between 15% at Cork Airport and 133% at Dublin (Merrion Square). At many stations it was the driest February for between 11 and 23 years.

The wettest part of the month was during the first week, especially in the east. Wintry showers during this period were heavy in places, while a longer spell of rain, sleet or snow became slow-moving over Leinster between the 2nd and 4th. The highest daily fall, 35.3mm, was measured at Dublin (Merrion Square) on the 3rd; this was the highest daily fall for February at the station since 1967. The number of wetdays recorded during the month (days with 1mm or more of rainfall) was below normal almost everywhere, varying between 5 and 9 generally, but up to 15 or more wetdays were measured in parts of the west.

March rainfall totals were below normal in all areas except for a few parts of the northwest. Less than half of the monthly normal was measured in coastal counties of the east, southeast and south, and it was the driest March for between six and nine years in places. Monthly totals ranged from 18mm at Dublin (Merrion Square) to 162mm at Maam Valley, Co. Galway, with percentage of normal values between 32% of normal at Waterford (Tycor) and 107% at Ballyshannon (Cathleen's Fall), Co. Donegal.

Most of the month's rainfall was recorded during the first half of the month, with little or no rain falling between the 15th and 22nd at the majority of stations. The heaviest daily falls of the month were recorded in the periods 2nd/3rd and 7th to 9th. Maam Valley measured the highest daily value, 27.4mm on the 9th. There was a wide variation in the number of wetdays recorded (days with 1mm or more of rainfall), with between 5 and 9 wetdays over most of the east and south of the country, but between 15 and 20 wetdays were measured in many western and northern areas.

April rainfall totals were above normal everywhere and were more than twice the monthly normal in parts of the midlands, northwest and south. Totals ranged from 64mm at Dublin (Merrion Square) to 183mm at Maam Valley, Co. Galway, with percentage of normal values between 131% at Merrion Square and 236% at Ballyshannon (Cathleen's Fall), Co. Donegal. It was the wettest April for over 40 years at a number of stations, including Cork Airport.

There were short dry spells over the country in the periods 1st/2nd and 18th to 20th, but the remainder of the month was wet, with spells of heavy rain at times. The heaviest daily falls were in the periods 7th to 9th and 23rd to 25th, while the 16th was the wettest day of the month in the Dublin area. The highest daily fall, 33.5mm, was measured at John F. Kennedy Park, Co. Wexford, on the 24th; this was the highest daily fall for April at the station since 1984. Belmullet's fall of 26mm on the 7th was its highest on record for April. There were between 14 and 20 wetdays recorded during the month at the majority of stations (9 days with 1mm or more of rainfall), well above the normal range for April of between 10 and 14 wetdays.

May rainfall totals were above normal almost everywhere and were well above normal in parts of the west and northwest. Given the showery nature of much of the month's rainfall, there was a wide variation in totals across the country. Totals ranged from 40mm, or 60% of normal, at Roche's Point to 203mm, or 225% of normal, at Carron, Co. Clare, where it was the wettest May since records began there in 1974.

Some parts of the country recorded heavy daily falls during the first week, particularly the north and northwest, but at the majority of the stations the wettest weather of the month was in the period 14th to 19th. Carron also recorded the highest daily fall of the month, 32.6mm on the 17th, the highest May fall at the station since 1993. There were between 12 and 17

wetdays recorded during the month (days with 1mm or more of rainfall) at most eastern and southern stations, but between 18 and 22 wetdays were measured in parts of the west and north, well above the normal range for May in these areas of between 14 and 17 wetdays.

June 2009 rainfall totals were very variable over the country, with showery rain bringing heavy falls to some areas on a number of days. While it was a relatively dry month over the northern half of the country, these falls brought totals well above normal in parts of the south and east. Totals ranged from 39mm at Ballyhaise to 133mm at Delphi Lodge, Co. Mayo, with percentage of normal values between 58% at Ballyhaise and 148% at both Casement Aerodrome and Sherkin Island, Co. Cork. Malin Head had its driest June since 2000.

While many days during June were relatively dry, very heavy falls were recorded in places on a number of days. Heavy rain fell over the east of the country on the 6th, when the highest June falls for between six and 16 years were recorded in the Dublin area, while localised thunderstorms brought flooding in the extreme northwest on the 23rd. At the majority of stations, the wettest days were the 16th and 17th, with Valentia Observatory measuring the highest daily fall of the month, 51.8mm on the 16th. The number of wetdays recorded during the month (days with 1mm or more of rainfall) was below normal almost everywhere, varying between seven and 11 generally, compared with the normal range for June of between nine and 13.

July rainfall totals were exceptionally high in many parts of the country, but were close to normal in the extreme north. Much of the rain that fell during the month was in the form of heavy showers or thunderstorms, resulting in very uneven distribution across the country. Totals ranged from 71mm at Malin Head to 284mm at Carron, Co. Clare, with percentage of normal values between 98% at Malin Head and 404% at John F. Kennedy Park, Co. Wexford. It was the wettest July on record at several stations, including Valentia Observatory, where records commenced in the area in 1866.

Heavy falls were recorded in places on a number of days throughout July, with very few dry days. The heaviest falls generally were on the 1st/2nd, 6th and 11th, but isolated heavy falls were recorded on several other days. Flooding was reported in many parts of the country following these events. Both Dublin Airport and Valentia Observatory recorded their highest daily falls for July, with values of 42mm up to midnight on the 2nd and 43mm up to midnight on the 31st respectively. The number of wetdays recorded during the month (days with 1mm or more of rainfall) was also well above normal almost everywhere, varying between 20 and 28 generally, compared with the normal range for July of between nine and 15.

August rainfall totals were above normal except at some Dublin stations and they were well above normal in parts of the west and southwest. Totals ranged from 49mm at Dublin (Merrion Square) to 424mm at Maam Valley, Co. Galway, with percentage of normal values between 77% at Merrion Square and 247% at Valentia Observatory. At a number of stations in the west and southwest it was the wettest August since 1985.

Rain was recorded on every day of the month, with a number of stations near the Atlantic coast measuring 31 raindays (days with 0.2mm or more of rainfall). Most other stations recorded a total of between 22 and 26 raindays, compared with the normal number for August of between 14 and 20 raindays. There was very heavy rain on a number of days,

particularly in the period between the 19th and 25th. The highest daily fall of the month, 57.6mm, was measured at Mountrussel, Co. Tipperary, on the 23rd, the highest August fall at the station since 1997. Other stations recorded their highest daily falls for August for between 11 and 23 years.

Rainfall totals for September were below normal everywhere, with less than half of the normal monthly totals in many places. Only around a quarter of the normal amount was measured in parts of the east and northeast. Monthly totals ranged from 17mm at Dublin (Merrion Square) to 147mm at Maam Valley, Co. Galway, with percentage of normal values between 27% of normal at Merrion Square and 72% at Valentia Observatory. It was the driest September since 2002 in many places and the driest since 1990 at Claremorris.

Almost all of September's rainfall was recorded during the first eight days of the month, when some heavy daily falls were recorded. These caused flooding in some parts of the country, as soil conditions were near saturation following the very wet summer. The month's highest daily fall of 36.4mm was recorded at Delphi Lodge, Co. Mayo, on the 7th. Many other stations recorded their highest daily falls on the 2nd, which amounted to over half of their monthly totals in some cases. Fewer than 10 wetdays were recorded during the month at the majority of stations (9 days with 1mm or more of rainfall), but between 11 and 16 wetdays were measured near Atlantic coasts.

Rainfall totals for October were below normal in some parts of Ulster, but it was a wet month in many southern and southeastern areas. Monthly totals ranged from 84mm at Dublin (Merrion Square) to 269mm at Delphi Lodge, Co. Mayo, with percentage of normal values between 81% of normal at Glenties Hatchery, Co. Donegal and 188% at Carlow (Oak Park). Johnstown Castle's total of 179mm was its highest for October since 1982.

There was a spell of relatively dry weather around mid-month in all areas, but some heavy falls were recorded during the first week and particularly in the second half of the month. These caused flooding in some parts of the country, as soil conditions reached saturation in most areas by the end of the month. The 6th, 24th and 30th/31st were the wettest days generally, but the highest daily fall of the month, 40.1mm, was recorded at Mountrussel, Co. Limerick, on the 21st. Between 13 and 18 wetdays were recorded during the month at the majority of stations (days with 1mm or more of rainfall), but 20 or more wetdays were measured in some western areas.

November rainfall totals were more than twice the normal almost everywhere and were over three times normal in parts of the west and southwest. Totals ranged from 141mm at Dublin (Merrion Square) to 465mm at Delphi Lodge, Co. Mayo, with percentage of normal values between 164% at Belmullet and 292% at Sherkin Island, Co. Cork, where it was the wettest of any month since records began in 1972. At a number of other stations in the west and southwest it was also the wettest of any month on record, including Valentia Observatory, where observations began almost 150 years ago. At some Dublin stations, totals were just below those of another exceptionally wet November, that of 2002.

Rain was recorded on every day of the month, with stations near the Atlantic coast measuring between 26 and 29 raindays (days with 0.2mm or more of rainfall). Most other

stations recorded a total of at least 24 raindays, compared with the normal number for November of between 16 and 22 raindays. There was heavy rain on many days, particularly in the period between the 16th and 19th, bringing unprecedented floods in many areas. Over 100mm of rain fell in a 2-day period between the 18th and 20th in some southwestern areas, while Galway (University College) measured 60.8mm on the 17th, the highest November fall on record at the station. Many other stations recorded with highest daily falls for November for between 10 and 30 years.

December rainfall totals were near or below normal over most of the country, but they were higher than normal at many Leinster stations. Totals ranged from 49mm at Gurteen to 232mm at Delphi Lodge, Co. Mayo, with percentage of normal values between 55% at Malin Head and 149% at Johnstown Castle, where it was the wettest December since 1989. At a number of stations in the west and northwest it was the driest December for between 6 and 8 years, while it was the driest since 1996 at Knock Airport.

Heavy rain was recorded near the beginning and end of the month, but the period around mid-month was relatively dry. The wettest days were in the periods 4th to 7th and 29th to 30th, with the highest daily fall of 41.9mm at Cork Airport on the 30th. Two-day totals of over 50mm in many parts of the east and south between the 29th and 30th resulted in localised flooding; Casement Aerodrome's daily fall of 40.3mm up to midnight on the 30th was its highest for December since 1984. Most stations recorded a total of between 11 and 17 wetdays (days with 1mm or more of rainfall), slightly below the normal number for December of between 13 and 19 wetdays.

1.8 COMMENTARY ON RIVER FLOWS IN 2009

The runoff reflected the rainfall pattern, with an increase in runoff with increased rainfall and a reduction in runoff after rainfall ceased.

The occurrence of the low flow in 2009 at several of the hydrometric stations listed in Table 1 was similar while the occurrence of the peak flood varied from catchment to catchment.

In the period mid March – mid October, there was very little difference in the low flow in the River Dodder at Station 09010 Waldron's Br. while the highest flood (60.8 m³/s) in the calendar year occurred on 6 June 2009.

At Station 09037 Botanic Gardens, there was very little variation in the low flow from mid March to mid September while the highest flood of the year occurred on 30 December 2009.

In the Avonmore Catchment, the highest flood for the year (150.7 m³/s) occurred at Station 10002 Rathdrum on 19 November 2009, while low flows, of the order of 2.4 m³/s, occurred in the period of April to October 2009. At Station 10028 Knocknamohill on the Aughrim River, a major flood occurred on 1 November 2009 (92.7 m³) and in the period April to October 2009, the low flows did not vary much outside the range 2.7 -2.3m³/s.

The latest data received by the Environmental Protection Agency for Station 19016 Ovens on the River Bride is for w/e 1 August 2008 and Station 19015 Healy's Br. is for w/e 17 August 2008. Consequently, in the absence of an indicator of the Lee Catchment runoff, it was not possible to make an accurate assessment of the natural runoff from the Lee Catchment from the Shournagh and Bride Sub-Catchments of the Lee Catchment in 2009.

At Station 24029 Inchirourke More, similar low flows occurred from 1 April-6 October 2009 and floods of similar magnitude occurred in quick succession: on: 1 November, 14 November, 16 November, 20 November and 21 November 2009.

At Station 25044 Coole on the Kilmastulla River, there were a series of 5 floods in the range 15- 26 m³s from 1 November -19 November 2009 while low flows in the range 1.0 -0.7 m³/s occurred in the period 1 March-4 October 2009.

In the Garravogue River, the peak flood at Station 35012 New Br. for the year occurred on 20 November 2009 (67.9 m³) while similar low flows occurred a number of times in the year: early February, in April, June and late September, respectively.

1.9 CATCHMENT FLOWS

Flow rates* at the water quality sampling stations and at the catchment mouths have been determined by extrapolation, on an area basis, of flow data as determined for the hydrometric stations. Details of flows are given as follows:-

- Long average flow (Table 2);
- Flow at the time of water quality sampling (Tables 3A-3W);
- Average monthly flows and
- Average annual flows (Tables 4A-4W).

1.9.1 Long Average Flow

The long average flows at the stations used in the study are presented in Table 2. The data quoted are based either on processing of water level records at those stations or on calculations using catchment areas, long average rainfall and evapotranspiration losses.

1.9.2 Flow at the Time of Water Quality Sampling

Flow rates at times of sampling have been estimated for the various sampling stations based on staff gauge readings taken and/or records from automatic water level recorders. Where the daily mean flow is used, the abbreviation "dmf" is entered in the W.L. column. The flow rates at times of water quality sampling are presented in Table 3A-3W.

1.9.3 Average Monthly Flow at Hydrometric Stations in 2009

Average monthly flows in the year 2008, based on available processed data from the relevant gauging stations, are presented in Tables 4A-4W.

Station 14029 Graiguenamanagh u/s on the River Barrow was commissioned by the OPW in September 1996 and data is now available for the period 1996-2009. In 1993 the OPW relocated Station 30061 Wolfe Tone Bridge on the River Corrib to a new location upstream of Wolfe Tone Bridge and data for 1993-2009 are now available.

The following rivers were **not** sampled as part of the 2009 sampling programme:

- (1) the Laune River at Station 22035 Laune Br.,
- (2) the Feale River at Station 23002 Listowel,
- (3) the Ballysodare River at Station 35005 Ballysadare and

A new station on the River Tolka was commissioned by Dublin City Council, Station 09037 Botanic Gardens in September 1999, and data for the calendar year 2009 are available.

In a number of cases, there were gaps in the available information:

There were gaps in the record at the following stations:

Station 09001 Leixlip from 15/12/2009-31/12/2009

Station 19015 Healy's Br. and 19016 Ovens as noted above

Difficulties arose with the rating at Station 24029 Inchirourke More. It is being investigated at present. The OPW made data available for 24013 Rathkeale in lieu.

1.9.4 Annual Average Flows at Hydrometric Stations in 2009

Annual average flows in the year 2009, based on available processed data from the relevant gauging stations, are also presented in Tables 4A-4W.

NOTE

- * Flow results quoted in this report are based on processing using, in some cases, incomplete records. The values given are considered adequate for the purposes of this report, *but their use in other circumstances should be treated with caution.*

OSPAR CONVENTION: COMPREHENSIVE STUDY OF RIVERINE INPUTS

TABLE 2: DETAILS OF HYDROMETRIC STATIONS, SAMPLING STATIONS
The flow data in this table represents the flow in the period of record (to December 2009)

RIVER	HYDROMETRIC STATION		SAMPLING STATION		CATCHMENT		
CATCHMENT	No. & NAME	AREA	Location	AREA	AREA	LONG AVG. FLOW	
		km ²		km ²	km ²	m ³ /s	
Boyne	07012 Slane Castle	2460	Oldbridge	2566	2695	38.67	
Tolka	09037 Botanic Gardens	138	Drumcondra	141.3	146	1.96	
Liffey	09022 Leixlip P.S.	827					
	09001 Leixlip	215					
	09012 Leixlip	1042	Chapelizod	1119	1256	17.10	
Dodder	09010 Waldron's Br.	94	Donnybrook	109	113	2.73	
Avoca	10002 Rathdrum	231					
	10008 Woodenbridge	390					
	10028 Knocknamohill	203					
			u/s Arklow	639	652	22.03	
Slaney	12001 Scarrowalsh	1031	Scarrowalsh	1036	1762	38.80	
	12002 Enniscorthy	1320					
Barrow	14029 Graiguenamanagh u/s	2778					
	14023 Graiguenamanagh	2808	Graiguenamanagh	2762	3067	46.53	
Nore	15006 Brownsbarn	2418	Brownsbarn	2388	2530	42.24	
Suir	16010 Anner	437					
	16009 Cahir Park	1582					
	16011 Clonmel	2144					
			Kilsheelan	2637	3610	76.29	
Blackwater (Mun.)	18002 Ballyduff	2334	Lismore	2431	3324	87.37	
Lee (Cork)	19013 Inniscarra P.S.	790					
	19016 Ovens Bridge	118					
	19011 Leemount u/s	924					
	19015 Healys Bridge	212	M12 Leemount u/s	1137	1253	NA	
Bandon	20002 Curranure	424	Inishannon	495	608	21.57	
Laune	22035 Laune Br.	560	Beaufort Br.	592	837	43.10	
Feale	23002 Listowel	647	Finuge Br.	656	1149	37.50	
Deel	24013 Rathkeale	439					
	24029 Inchirourke More	486	Askeaton		486	7.36	
Maigue	24008 Castleroberts	806					
	24001 Croom	770	Croom	774	1052	17.35	
Shannon (to Limerick)	25055 Ardnacrusha P.S.	} 10427	Head Race				
	25075 Parteen Weir						
	25044 Coole			93			
	25001 Annacotty			648	Athlunkard		11628
Fergus	27002 Ballycorey	564	Doora		1042	19.00	
Corrib	30061 Wolfe Tone Br.	3136	New Bridge	3110	3138	105.53	
Moy	34001 Rahans	1975			2086	63.01	
Ballysadare	35005 Ballysadare`	640		642	678	16.28	
Bonet	35012 New Br.	369		360	395	13.60	
Erne	36092 Cataleen Falls P.S.	4353	u/s Lower Dam		4372	84.87	

TABLE 3A
River: Boyne

Hydrometric Station			Sampling Station	Total Catchment
07012				
Slane Castle			Oldbridge	
Date	Time Sampled	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s
05/01/2009	15.40	27.03	28.82	30.26
16/02/2009	15.35	43.44	46.30	48.62
09/03/2009	14.30	30.64	32.66	34.29
14/04/2009	18.50	18.88	20.13	21.14
11/05/2009	15.44	22.80	24.31	25.52
15/06/2009	11.35	14.91	15.90	16.69
20/07/2009	13.45	18.73	19.96	20.96
10/08/2009	14.00	16.80	17.90	18.80
07/09/2009	14.50	56.79	60.54	63.57
05/10/2009	12.55	14.01	14.93	15.68
02/11/2009	12.45	198.52	211.62	222.20
07/12/2009	14.50	105.77	112.75	118.39

TABLE 3B
River: Tolka

Hydrometric Station			Sampling Station	Total Catchment
09037				
Botanic Gardens			Drumcondra	
Date	Time Sampled	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s
08/01/2009	10.29	0.83	0.85	0.88
17/02/2009	15.43	1.66	1.70	1.75
09/03/2009	16.02	1.66	1.70	1.75
15/04/2009	19.50	1.39	1.42	1.47
11/05/2009	16.57	0.66	0.68	0.70
15/06/2009	13.00	0.74	0.76	0.79
20/07/2009	15.00	1.09	1.11	1.15
11/08/2009	13.10	0.63	0.65	0.67
07/09/2009	16.32	1.59	1.63	1.68
05/10/2009	14.20	0.45	0.46	0.48
02/11/2009	14.25	10.48	10.74	11.10
07/12/2009	16.00	3.73	3.82	3.94

TABLE 3C
River: Liffey

Date	Hydrometric Station		Sampling Station		Total Catchment
	09022 Leixlip P.S.	09001 Leixlip	Chapelizod		
	Flow m ³ /s DMF	Time Sampled	Flow m ³ /s DMF	Flow m ³ /s	
08/01/2009	8.350	9.30	1.65	10.60	11.87
17/02/2009	22.150	14.45	2.50	26.13	29.26
09/03/2009	11.050	16.48	3.17	15.07	16.88
15/04/2009	6.050	19.20	1.05	7.53	8.43
11/05/2009	4.050	18.00	1.19	5.55	6.22
15/06/2009	6.950	13.50	1.07	8.50	9.52
20/07/2009	5.450	15.35	1.75	7.63	8.55
11/08/2009	10.950	12.25	1.07	12.74	14.27
07/09/2009	14.950	17.29	3.08	19.11	21.41
07/10/2009	5.650	16.20	2.13	8.25	9.24
02/11/2009	35.550	14.55	15.60	54.22	60.73
10/12/2009	45.650	9.50	4.99	53.68	60.12

TABLE 3D
River: Dodder

Date	Hydrometric Station		Sampling Station		Total Catchment
	09010 Waldron's Br.		Donnybrook		
	Time Sampled	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s	
08/01/2009	11.30	1.255	1.44	1.49	
18/02/2009	15.20	4.103	4.71	4.88	
12/03/2009	10.30	1.792	2.06	2.13	
16/04/2009	16.20	4.151	4.76	4.93	
12/05/2009	15.09	1.684	1.93	2.00	
17/06/2009	13.53	4.469	5.13	5.31	
23/07/2009	10.30	2.563	2.94	3.05	
13/08/2009	10.50	1.192	1.37	1.42	
10/09/2009	12.41	1.152	1.32	1.37	
08/10/2009	15.52	1.056	1.21	1.25	
03/11/2009	16.12	4.545	5.21	5.40	
10/12/2009	10.50	3.247	3.72	3.86	

TABLE 3E
River: Avoca
Hydrometric Stations

Date	10028 Knocknamohill		10002 Rathdrum	Sampling Station u/s Arklow	Total Catchment
	Time Sampled	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s
06/01/2009	11.00	3.662	3.16	9.33	9.52
17/02/2009	10.00	10.487	19.42	44.84	45.74
10/03/2009	16.25	8.389	10.95	27.85	28.41
15/04/2009	10.48	4.782	8.03	19.01	19.39
12/05/2009	9.33	4.515	4.24	12.11	12.35
16/06/2009	10.20	4.292	5.84	14.67	14.96
21/07/2009	11.25	19.876	24.50	63.48	64.75
12/08/2009	10.55	5.831	4.43	13.81	14.09
08/09/2009	13.25	9.348	9.38	26.11	26.64
06/10/2009	11.10	5.364	2.54	10.01	10.21
03/11/2009	11.10	28.915	26.69	76.71	78.24
09/12/2009	12.00	13.64	17.03	43.94	44.82

TABLE 3F
River: Slaney

Date	Hydrometric Station 12001 Scarrawalsh		Sampling Station Enniscorthy Lower Bridge	Total Catchment
	Time Sampled	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s
06/01/2009	12:25	18.93	24.23	31.50
04/02/2009	13:05	87.49	111.98	145.58
11/03/2009	14:30	28.65	36.67	47.68
15/04/2009	13:00	21.67	27.73	36.05
11/05/2009	13:10	21.00	26.88	34.94
08/06/2009	12:40	28.82	36.89	47.96
14/07/2009	12:55	47.508	60.81	79.05
21/07/2009	12:00	31.656	40.52	52.68
10/08/2009	12:25	22.493	28.79	37.43
03/09/2009	12:35	105.135	134.57	174.94
06/10/2009	14:10	20.273	25.95	33.73
03/11/2009	13:10	69.007	88.33	114.83
03/12/2009	13:25	58.41	74.76	97.19

TABLE 3G
River: Barrow

Hydrometric Station			Sampling Station	Total Catchment
14029 Graiguenamanagh u/s			Graiguenamanagh Br	
Date	Time Sampled	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s
		DMF		
06/01/2009	Not Recorded	27.31	27.31	30.32
04/02/2009	11:40	108.12	108.12	120.02
12/03/2009	Not Recorded	52.94	52.94	58.76
15/04/2009	11:00	31.93	31.93	35.44
11/05/2009	Not Recorded	26.14	26.14	29.01
08/06/2009	Not Recorded	24.57	24.57	27.28
15/07/2009	Not Recorded	61.911	61.91	68.72
05/08/2009	11:00	28.17	28.17	31.27
03/09/2009	Not Recorded	102.70	102.70	114.00
06/10/2009	Not Recorded	24.18	24.18	26.83
10/11/2009	Not Recorded	111.55	111.55	123.82
03/12/2009	Not Recorded	129.06	129.06	143.26

TABLE 3H
River: Nore

Hydrometric Station			Sampling Station	Total Catchment
15006 Brownsbarn			Brownsbarn Br	
Date	Time Sampled	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s
06/01/2009	10:05	22.39	22.39	23.71
04/02/2009	11:00	135.903	46.71	143.92
12/03/2009	11:05	46.71	35.30	49.46
15/04/2009	15:25	35.30	23.47	37.38
11/05/2009	10:55	23.47	24.62	24.85
08/06/2009	11:00	24.62	24.62	26.07
14/07/2009	11:05	61.95	61.95	65.60
05/08/2009	10:05	40.67	40.67	43.07
03/09/2009	10:35	143.42	143.42	151.88
06/10/2009	11:40	15.99	15.99	16.93
03/11/2009	Not Recorded	132.42	DMF used	140.23
03/12/2009	11:25	102.04	102.04	108.06

TABLE 3I
River: Suir
Hydrometric Stations

Date	16010 Anner		16011 Clonmel		Sampling Station	Total Catchment
	Time Sampled	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s	Kilsheelan Br Flow m ³ /s	Flow m ³ /s
07/01/2009	15:15	3.65	33.47	37.93		51.93
05/02/2009	11:20	16.00	146.09	165.67		226.80
10/03/2009	11:00	9.80	73.39	85.00		116.37
16/04/2009	11:20	4.45	44.96	50.51		69.15
07/05/2009	10:55	5.35	43.64	50.06		68.53
03/06/2009	12:20	3.96	36.57	41.42		56.70
15/07/2009	16:10	5.94	60.141	67.55		92.48
11/08/2009	11:00	4.12	40.38	45.49		62.27
08/09/2009	10:50	7.00	75.67	84.51		115.70
07/10/2009	10:30	6.14	74.15	82.10		112.39
09/11/2009	11:00	13.32	147.91	164.84		225.67
02/12/2009	11:10	13.32	130.00	146.50		200.56

TABLE 3J
River: Blackwater(Munster)

Date	Hydrometric Station		Sampling Station	Total Catchment
	Time Sampled	Flow m ³ /s	Lismore Br Flow m ³ /s	Flow m ³ /s
12/01/2009	Not Recorded	98.85	102.81	140.85
10/02/2009	Not Recorded	64.94	67.54	92.53
09/03/2009	Not Recorded	86.54	90.00	123.30
06/04/2009	Not Recorded	26.69	27.75	38.02
06/05/2009	Not Recorded	45.70	47.52	65.11
17/06/2009	Not Recorded	69.78	72.57	99.42
07/07/2009	Not Recorded	44.08	45.84	62.80
17/08/2009	Not Recorded	35.73	37.16	50.91
09/09/2009	Not Recorded	90.76	94.39	129.32
05/10/2009	Not Recorded	21.40	22.26	30.49
12/11/2009	Not Recorded	193.33	201.06	275.46
02/12/2009	Not Recorded	120.18	124.99	171.23

TABLE 3K
River: Lee (Cork)

Date	Hydrometric Stations		Sampling Station	Total Catchment	
	19013	19016	Leemount u/s	19015	Flow m ³ /s
	Inniscarra P.S.	Oven's Br.		Healy's Br.	
	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s	
	DMF			DMF	
12/01/2009	55.27	No Data	No Data	No Data	No Data
09/02/2009	27.89	No Data	No Data	No Data	No Data
10/03/2009	46.97	No Data	No Data	No Data	No Data
08/04/2009	26.02	No Data	No Data	No Data	No Data
12/05/2009	1.89	No Data	No Data	No Data	No Data
23/06/2009	15.64	No Data	No Data	No Data	No Data
08/07/2009	41.73	No Data	No Data	No Data	No Data
18/08/2009	21.770	No Data	No Data	No Data	No Data
03/09/2009	73.770	No Data	No Data	No Data	No Data
05/10/2009	5.520	No Data	No Data	No Data	No Data
10/11/2009	83.640	No Data	No Data	No Data	No Data
10/12/2009	87.600	No Data	No Data	No Data	No Data

TABLE 3L
River: Bandon

Date	Hydrometric Station	Flow m ³ /s	Sampling Station	Total Catchment
	20002		Inishannon Br	Flow m ³ /s
	Curranure			
	Time Sampled	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s
		DMF		
13/01/2009	Not Recorded	25.73	29.54	36.33
11/02/2009	Not Recorded	11.96	13.73	16.89
11/03/2009	Not Recorded	12.04	13.82	17.00
08/04/2009	Not Recorded	17.75	20.37	25.06
12/05/2009	Not Recorded	6.20	7.11	8.75
23/06/2009	Not Recorded	5.92	6.79	8.36
09/07/2009	Not Recorded	5.11	5.86	7.21
18/08/2009	Not Recorded	8.79	10.10	12.42
09/09/2009	Not Recorded	37.00	42.48	52.25
07/10/2009	Not Recorded	36.04	41.37	50.88
11/11/2009	Not Recorded	31.22	35.85	44.09
03/12/2009	Not Recorded	33.61	38.58	47.46

TABLE 30
River: Deel

Hydrometric Station			Sampling Station	Total Catchment
24013 Rathkeale			Askeaton BR.	
Date	Time Sampled	Flow m³/s DMF	Flow m³/s	Flow m³/s
15/01/2009	Not Recorded	15.41	17.06	17.10
12/02/2009	Not Recorded	5.68	6.29	6.30
11/03/2009	Not Recorded	10.73	11.88	11.90
09/04/2009	Not Recorded	5.97	6.61	6.62
05/05/2009	Not Recorded	4.54	5.03	5.04
15/06/2009	Not Recorded	2.26	2.50	2.50
09/07/2009	Not Recorded	1.36	1.50	1.51
21/08/2009	Not Recorded	9.12	10.10	10.12
10/09/2009	Not Recorded	5.39	5.96	5.97
06/10/2009	Not Recorded	7.71	8.54	8.55
17/11/2009	Not Recorded	26.47	29.30	29.36
10/12/2009	Not Recorded	14.64	16.21	16.24

TABLE 3P
River: Maigne

Hydrometric Station			Sampling Station	Total Catchment
24008 Castleroberts			Castleroberts Bridge	
Date	Time Sampled	Flow m³/s DMF	Flow m³/s	Flow m³/s
14/01/2009	Not Recorded	13.836	13.84	18.86
12/02/2009	Not Recorded	13.95	13.95	19.01
11/03/2009	Not Recorded	20.96	20.96	28.57
07/05/2009	Not Recorded	8.78	8.78	11.97
15/06/2009	Not Recorded	5.76	5.76	7.86
09/07/2009	Not Recorded	4.43	4.43	6.04
21/08/2009	Not Recorded	13.88	13.88	18.92
10/09/2009	Not Recorded	10.77	10.77	14.68
06/10/2009	Not Recorded	9.32	9.32	12.70
17/11/2009	Not Recorded	62.38	62.38	85.02

TABLE 3Q
River: Shannon

Date	Hydrometric Stations			Sampling Station	25055 Ardnacrusha P.S.	Total Catchment
	25075 Parteen	25001 Annacotty	25044 Coole	Athlunkard		Flow m ³ /s
	Flow m ³ /s DMF	Flow m ³ /s DMF	Flow m ³ /s DMF	Flow m ³ /s DMF		Flow m ³ /s DMF
15/01/2009	10.000	25.53	4.103	57.11	248.75	305.86
09/02/2009	56.710	18.42	2.806	90.46	384.31	474.77
11/03/2009	10.000	23.33	3.41	52.52	206.94	259.46
09/04/2009	10.000	11.31	1.427	30.25	83.38	113.63
08/05/2009	10.000	14.41	2.67	37.15	139.44	176.59
22/06/2009	10.000	22.88	0.85	47.74	93.50	141.24
29/06/2009	10.00	5.93	0.76	20.63	62.56	83.19
09/07/2009	10.00	10.56	0.76	27.99	111.31	139.30
21/08/2009	10.00	22.43	2.78	50.09	176.38	226.47
10/09/2009	10.00	17.51	2.17	41.29	256.63	297.92
02/10/2009	10.00	5.51	0.67	19.83	77.56	97.39
17/11/2009	212.93	54.78	7.46	311.90	353.19	665.09
15/12/2009	179.41	15.81	2.27	208.16	357.50	565.66

TABLE 3R
River: Fergus

Hydrometric Station			Sampling Station	Total Catchment
27002 Ballycorey			Doora	
Date	Time Sampled	Flow m³/s	Flow m³/s	Flow m³/s
		DMF		
13/01/2009	Not Recorded	7.46	8.63	13.84
15/01/2009	Not Recorded	12.11	14.02	22.47
03/02/2009	Not Recorded	29.68	34.34	55.04
27/02/2009	Not Recorded	5.52	6.39	10.24
03/03/2009	Not Recorded	4.95	5.72	9.18
13/03/2009	Not Recorded	16.53	19.13	30.66
31/03/2009	Not Recorded	5.08	5.87	9.41
10/04/2009	Not Recorded	9.27	10.73	17.20
11/05/2009	Not Recorded	10.93	12.65	20.28
15/06/2009	Not Recorded	3.75	4.34	6.96
22/06/2009	Not Recorded	4.97	5.75	9.21
06/07/2009	Not Recorded	2.64	3.05	4.89
14/07/2009	Not Recorded	9.00	10.42	16.70
21/08/2009	Not Recorded	16.42	18.99	30.45
24/08/2009	Not Recorded	32.20	37.26	59.72
11/09/2009	Not Recorded	32.00	37.02	59.35
29/09/2009	Not Recorded	5.18	6.00	9.61
09/10/2009	Not Recorded	3.52	4.07	6.53
27/10/2009	Not Recorded	8.94	10.34	16.58
12/11/2009	Not Recorded	40.07	46.36	74.32
14/12/2009	Not Recorded	32.41	37.49	60.10
16/12/2009	Not Recorded	28.27	32.70	52.43

TABLE 3S
River: Corrib

Date	Hydrometric Station		Sampling Station	Total Catchment
	30061		Quincentennial Br	Flow m ³ /s
	Time Sampled	Flow m ³ /s DMF		
06/01/2009	12.35	95.80	95.80	96.66
10/02/2009	16.15	163.00	163.00	164.47
12/02/2009	12.35	122.00	122.00	123.10
04/03/2009	15.10	95.60	95.60	96.46
01/04/2009	9.20	51.20	51.20	51.66
11/05/2009	7.00	88.40	88.40	89.20
02/06/2009	8.30	52.90	52.90	53.38
01/07/2009	8.10	31.70	31.70	31.99
04/08/2009	7.30	92.50	92.50	93.33
01/09/2009	7.30	195.00	195.00	196.76
06/10/2009	8.00	71.20	71.20	71.84
02/11/2009	8.00	125.00	125.00	126.13
16/12/2009	9.30	204.00	204.00	205.84

TABLE 3T
River: Moy

Date	Hydrometric Station		Sampling Station	Total Catchment
	34001		Rahans	Flow m ³ /s
	Time Sampled	Flow m ³ /s		
06/01/2009	11.15	44.45	44.45	48.54
18/02/2009	10.50	52.34	52.34	57.16
03/03/2009	14.23	36.39	36.39	39.74
22/04/2009	13.50	30.24	30.24	33.02
07/05/2009	15.41	55.56	55.56	60.67
04/06/2009	10.30	23.24	23.24	25.37
13/07/2009	11.50	19.59	19.59	21.39
27/08/2009	13.42	88.12	88.12	96.23
22/10/2009	12.35	26.90	26.90	29.37
15/12/2009	11.00	109.62	109.62	119.71

TABLE 3U
River: Ballysadare

Hydrometric Station			Sampling Station	Total Catchment
35005				
Ballysadare			Ballysadare	
Date	Time Sampled	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s
Not Sampled	Not Sampled		0.00	0.00
Not Sampled	Not Sampled		0.00	0.00
Not Sampled	Not Sampled		0.00	0.00
Not Sampled	Not Sampled		0.00	0.00
Not Sampled	Not Sampled		0.00	0.00
Not Sampled	Not Sampled		0.00	0.00

TABLE 3V
River: Garravogue

Hydrometric Station			Sampling Station	Total Catchment
35012				
New Br.			Bridge at Toff's	
Date	Time Sampled	Flow m ³ /s	Flow m ³ /s	Flow m ³ /s
06/01/2009	12.20	4.416	4.42	4.51
07/01/2009	10.50	4.17	4.17	4.26
12/02/2009	12.55	8.45	8.45	8.64
02/03/2009	11.15	9.30	9.30	9.50
02/04/2009	16.18	8.81	8.81	9.00
07/05/2009	11.02	40.31	40.32	41.20
04/06/2009	8.00	5.64	5.64	5.76
15/07/2009	9.35	10.50	10.50	10.73
05/08/2009	9.30	13.77	13.78	14.08
02/09/2009	17.35	30.29	30.30	30.96
19/10/2009	14.20	5.05	5.06	5.17
16/11/2009	12.05	37.35	37.36	38.17
02/12/2009	Unknown	17.01 DMF	17.02	17.39

TABLE 3W
River: Erne

Hydrometric Station		Sampling Station		Total Catchment
36092 Cathaleen Falls P.S.		u/s Lower Dam		
Date	Time Sampled	Flow m ³ /s DMF	Flow m ³ /s	Flow m ³ /s
06/01/2009	13.35	64.54	64.54	70.86
02/02/2009	14.00	268.10	268.10	294.37
12/02/2009	12.50	194.08	194.08	213.10
02/03/2009	9.00	52.08	52.08	57.18
22/04/2009	14.00	22.25	22.25	24.43
18/05/2009	9.00	91.63	91.63	100.61
08/06/2009	12.30	28.13	28.13	30.89
06/07/2009	10.00	16.04	16.04	17.61
10/08/2009	12.50	21.63	21.63	23.75
15/09/2009	11.35	75.58	75.58	82.99
12/10/2009	13.10	26.83	26.83	29.46
09/11/2009	10.30	317.50	317.50	348.62
07/12/2009	10.10	342.40	342.40	375.96

**TABLE 4A BOYNE
RIVER : BOYNE**

2009 Month	Hydrometric Station 07012 Slane Castle Avg. Monthly Flow m³/s	Sampling Station Oldbridge	Total Catchment Flow
January	55.30	58.95	61.90
February	57.60	61.40	64.47
March	23.89	25.46	26.74
April	19.23	20.50	21.52
May	32.78	34.94	36.69
June	17.75	18.92	19.87
July	22.41	23.89	25.09
August	34.47	36.75	38.58
September	41.40	44.14	46.34
October	29.67	31.63	33.21
November	157.60	168.00	176.40
December	67.21	71.65	75.23
Avg.Flow 2009 m ³ /s	46.61	49.69	52.17

**TABLE 4B
RIVER : TOLKA**

2009 Month	Hydrometric Station 09037 Botanic Gardens Avg. Monthly Flow m³/s	Sampling Station Drumcondra m³/s	Total Catchment Flow m³/s
January	2.60	2.66	2.75
February	3.85	3.95	4.08
March	1.08	1.10	1.14
April	0.99	1.02	1.05
May	1.85	1.89	1.96
June	1.21	1.23	1.27
July	1.94	1.99	2.06
August	1.29	1.32	1.36
September	1.29	1.32	1.36
October	1.55	1.59	1.64
November	7.54	7.72	7.97
December	4.12	4.22	4.36
Avg.Flow 2009 m ³ /s	2.44	2.50	2.58

**TABLE 4C
RIVER : LIFFEY**

2009 Month	Hydrometric Station		Sampling Station Chapelizod	Total Catchment Flow
	09022 Leixlip P.S. Avg. Monthly Flow m ³ /s	09001 Leixlip Avg. Monthly Flow m ³ /s		
January	13.48	4.11	18.64	20.87
February	21.91	3.95	27.41	30.70
March	7.85	1.88	10.31	11.55
April	5.10	1.23	6.72	7.52
May	7.25	2.50	10.34	11.58
June	8.73	1.48	10.83	12.12
July	8.58	2.21	11.44	12.81
August	10.63	2.06	13.45	15.07
September	8.46	2.37	11.48	12.86
October	10.41	3.05	14.27	15.98
November	39.69	11.83	54.60	61.16
December	39.77	6.43	48.97	54.85
Avg.Flow 2009 m ³ /s	15.15	3.59	19.87	22.26

**TABLE 4D
RIVER : DODDER**

2009 Month	Hydrometric Station		Sampling Station Donnybrook	Total Catchment Flow
	09010 Waldron's Bridge Avg. Monthly Flow m ³ /s			
January	3.01		3.45	3.58
February	4.57		5.24	5.43
March	1.63		1.87	1.94
April	2.00		2.29	2.37
May	2.17		2.49	2.58
June	2.05		2.35	2.43
July	1.64		1.88	1.95
August	1.15		1.32	1.36
September	1.14		1.31	1.36
October	2.14		2.45	2.54
November	6.34		7.27	7.53
December	3.41		3.91	4.06
Avg.Flow 2009 m ³ /s	2.60		2.99	3.09

TABLE 4E
RIVER : AVOCA

2009 Month	Hydrometric Station 10002.00	Hydrometric Station 10028	Sampling Station	Total Catchment
	Rathdrum	Knocknamohill	u/s Arklow	
	Avg. Monthly Flow m ³ /s	Avg. Monthly Flow m ³ /s	Flow m ³ /s	Flow m ³ /s
January	15.68	10.85	38.67	39.44
February	14.20	11.76	37.03	37.77
March	4.80	4.77	13.34	13.61
April	8.79	6.45	22.06	22.50
May	7.93	6.07	20.17	20.58
June	6.90	5.30	17.56	17.91
July	10.96	7.76	27.22	27.77
August	7.59	7.17	20.71	21.12
September	6.79	6.45	18.57	18.94
October	10.25	7.57	25.78	26.29
November	33.46	24.242	83.68	85.35
December	13.45	11.929	35.91	36.63
Avg.Flow 2009 m ³ /s	9.19	11.73	30.06	30.66

TABLE 4F
RIVER : SLANEY

2009 Month	Hydrometric Station 12001.00	Sampling Station	Total Catchment
	Scarrawalsh	Enniscorthy Br	Flow
	Avg. Monthly Flow m ³ /s	m ³ /s	m ³ /s
January	42.42	54.30	70.59
February	49.34	63.16	82.10
March	22.86	29.26	38.04
April	24.25	31.04	40.35
May	24.74	31.67	41.17
June	16.96	21.71	28.22
July	27.61	35.34	45.94
August	27.57	35.28	45.87
September	32.78	41.96	54.54
October	32.08	41.06	53.38
November	84.48	108.14	140.58
December	49.78	63.72	82.84
Avg.Flow 2009 m ³ /s	36.24	46.39	60.30

**TABLE 4G
RIVER : BARROW**

2009 Month	Hydrometric Station 14029.00 Graiguenamanagh u/s Avg. Monthly Flow m³/s	Sampling Station Graiguenamanagh Br m³/s	Total Catchment Flow m³/s
January	71.42	71.42	79.28
February	68.22	68.22	75.73
March	35.91	35.91	39.86
April	35.43	35.43	39.32
May	36.02	36.02	39.98
June	22.17	22.17	24.61
July	35.84	35.84	39.78
August	33.91	33.91	37.64
September	38.64	38.64	42.89
October	40.06	40.06	44.46
November	167.34	167.34	185.75
December	86.88	86.88	96.43
Avg.Flow 2009 m ³ /s	55.99	55.99	62.14

**TABLE 4H
RIVER : NORE**

2009 Month	Hydrometric Station 15006.00 Brownsbarn Avg. Monthly Flow m³/s	Sampling Station Brownsbarn Br m³/s	Total Catchment Flow m³/s
January	78.45	78.45	83.08
February	69.36	69.36	73.46
March	29.68	29.68	31.43
April	40.07	40.07	42.44
May	35.54	35.54	37.64
June	20.84	20.84	22.07
July	40.72	40.72	43.12
August	37.58	37.58	39.80
September	36.01	36.01	38.13
October	40.19	40.19	42.56
November	177.12	177.12	187.57
December	73.22	73.22	77.54
Avg.Flow 2009 m ³ /s	56.57	56.57	59.90

**TABLE 4I
RIVER : SUIR**

2009 Month	Hydrometric Stations		Sampling Station Kilsheelan Br m ³ /s	Total Catchment Flow m ³ /s
	16010.00 Anner Avg. Monthly Flow m ³ /s	16011 Clonmel Avg. Monthly Flow m ³ /s		
January	12.70	96.87	111.95	153.26
February	10.15	85.18	97.41	133.36
March	5.28	42.40	48.72	66.70
April	6.23	57.71	65.35	89.46
May	6.45	52.27	60.01	82.15
June	3.88	38.02	42.83	58.64
July	5.62	49.70	56.54	77.40
August	5.40	54.69	61.43	84.09
September	5.68	55.08	62.11	85.02
October	6.22	54.80	62.36	85.37
November	23.24	186.34	214.16	293.18
December	12.03	86.76	100.93	138.17
Avg.Flow 2009 m ³ /s	8.57	71.65	81.98	112.23

**TABLE 4J
RIVER : BLACKWATER (MUNSTER)**

2009 Month	Hydrometric Station	Sampling Station Lismore Br m ³ /s	Total Catchment Flow m ³ /s
	18002.00 Ballyduff Avg. Monthly Flow m ³ /s		
January	106.88	111.16	152.29
February	66.83	69.50	95.22
March	46.05	47.89	65.61
April	55.17	57.38	78.61
May	52.85	54.96	75.30
June	33.58	34.92	47.84
July	43.66	45.41	62.21
August	59.24	61.61	84.41
September	54.24	56.41	77.28
October	58.70	61.04	83.63
November	222.93	231.84	317.62
December	97.81	101.72	139.36
Avg.Flow 2009 m ³ /s	74.83	77.82	106.62

Table 4K
RIVER : LEE (CORK)
Hydrometric Stations

2009 Month	19013	19016	Sampling Station	Total Catchment
	Inniscarra P.S.	Oven's Br.	Leemount u/s	Flow
	Avg. Monthly Flow m³/s	Avg. Monthly Flow m³/s	m³/s	m³/s
January	61.83	No data	NA	NA
February	27.92	No data	NA	NA
March	16.04	No data	NA	NA
April	22.40	No data	NA	NA
May	17.54	No data	NA	NA
June	11.34	No data	NA	NA
July	31.41	No data	NA	NA
August	44.55	No data	NA	NA
September	31.84	No data	NA	NA
October	23.89	No data	NA	NA
November	122.66	No data	NA	NA
December	57.77	No data	NA	NA
Avg.Flow 2009 m ³ /s	39.10	No data	NA	NA

TABLE 4L
RIVER : BANDON

2009 Month	Hydrometric Station	Sampling Station	Total Catchment
	20002.00 Curranure	Inishshannon	Flow
	Avg. Monthly Flow m³/s	m³/s	m³/s
January	32.08	36.89	45.38
February	13.07	15.03	18.49
March	8.06	9.27	11.40
April	11.98	13.78	16.95
May	10.64	12.23	15.05
June	7.21	8.29	10.19
July	13.51	15.53	19.10
August	24.03	27.64	33.99
September	17.05	19.61	24.12
October	20.04	23.05	28.35
November	62.89	72.32	88.96
December	30.33	34.88	42.90
Avg.Flow 2009 m ³ /s	20.91	24.04	29.57

**TABLE 4M
RIVER : LAUNE**

2009 Month	Hydrometric Station 22035.00 Laune Br. Avg. Monthly Flow m³/s	Sampling Station Beaufort Br. m³/s	Total Catchment Flow m³/s
January	51.22	54.14	76.60
February	23.81	25.17	35.61
March	19.23	20.32	28.75
April	23.49	24.83	35.14
May	22.52	23.81	33.69
June	12.52	13.24	18.73
July	21.68	22.92	32.43
August	36.21	38.28	54.16
September	34.27	36.22	51.26
October	20.41	21.57	30.52
November	86.16	91.07	128.87
December	---	---	---
Avg.Flow 2009 m ³ /s	31.96	33.78	47.80

**TABLE 4N
RIVER : FEALE**

2009 Month	Hydrometric Station 23002.00 Listowel Avg. Monthly Flow m³/s	Sampling Station Finoge Bridge m³/s	Total Catchment Flow m³/s
January	43.86	44.47	77.83
February	8.28	8.39	14.69
March	14.07	14.27	24.97
April	17.67	17.92	31.35
May	20.48	20.77	36.35
June	4.90	4.97	8.70
July	6.86	6.95	12.16
August	21.60	21.90	38.33
September	19.25	19.51	34.15
October	14.39	14.60	25.54
November	96.04	97.39	170.43
December	33.79	34.26	59.96
Avg.Flow 2009 m ³ /s	25.10	25.45	44.54

TABLE 4O
RIVER : DEEL

2009 Month	Hydrometric Station 24013.00 Rathkeale Avg. Monthly Flow m³/s	Sampling Station Askeaton m³/s	Total Catchment Flow m³/s
January	17.88	19.79	19.83
February	5.74	6.35	6.37
March	6.73	7.45	7.46
April	7.29	8.06	8.08
May	8.09	8.96	8.98
June	2.51	2.78	2.78
July	2.21	2.45	2.45
August	3.94	4.36	4.37
September	6.41	7.10	7.11
October	6.45	7.13	7.15
November	42.88	47.47	47.57
December	15.28	16.91	16.95
Avg.Flow 2009 m ³ /s	10.45	11.57	11.59

TABLE 4P
RIVER : MAIGUE

2009 Month	Hydrometric Station 24008.00 Castleroberts Avg. Monthly Flow m³/s	Sampling Station Castleroberts Br m³/s	Total Catchment Flow m³/s
January	29.17	29.17	39.75
February	16.21	16.21	22.09
March	12.71	12.71	17.32
April	13.62	13.62	18.57
May	13.22	13.22	18.02
June	6.06	6.06	8.26
July	5.16	5.16	7.04
August	7.07	7.07	9.64
September	9.69	9.69	13.21
October	14.80	14.80	20.17
November	63.67	63.67	86.79
December	21.15	21.15	28.83
Avg.Flow 2009 m ³ /s	17.71	17.71	24.14

TABLE 4Q.1
RIVER : SHANNON
Hydrometric Stations

2009 Month	25075	25044	25001	Sampling Station Athlunkard
	Parteen Weir Avg. Monthly Flow m ³ /s	Coole Avg. Monthly Flow m ³ /s	Annacotty Avg. Monthly Flow m ³ /s	m ³ /s
January	10.71	4.499	28.11	62.6
February	35.18	2.601	17.98	67.9
March	10.00	1.923	13.97	35.3
April	10.00	1.701	13.84	34.7
May	10.00	2.357	17.76	42.0
June	10.00	1.030	8.96	25.9
July	10.00	0.932	12.19	30.9
August	10.00	1.609	15.47	37.2
September	10.00	1.850	15.21	37.1
October	10.00	1.324	14.92	35.8
November	220.02	10.014	73.97	353.6
December	157.93	2.937	26.32	204.4
Avg.Flow 2009 m ³ /s	41.99	2.73	21.56	80.6

TABLE 4Q.2
RIVER : SHANNON

2009 Month	Hydrometric Station			Sampling Station Athlunkard	Total Catchment Flow
	25055.00 Ardnacrusha P.S. Avg. Monthly Flow m ³ /s	25075 Parteen Weir Avg. Monthly Flow m ³ /s	25044 Coole Avg. Monthly Flow m ³ /s	Avg. Monthly Flow m ³ /s	m ³ /s
January	271.34	10.712	4.499	62.56	333.89
February	316.63	35.184	2.601	67.91	384.54
March	137.87	10.000	1.923	35.26	173.14
April	138.10	10.000	1.701	34.72	172.82
May	214.11	10.000	2.357	41.99	256.10
June	72.60	10.000	1.030	25.88	98.49
July	93.80	10.000	0.932	30.86	124.66
August	153.25	10.000	1.609	37.16	190.40
September	214.41	10.000	1.850	37.13	251.54
October	77.25	10.000	1.324	35.82	113.07
November	355.38	220.020	10.014	353.55	708.94
December	336.87	157.933	2.937	204.44	541.31
Avg.Flow 2009 m ³ /s	198.47	41.987	2.731	80.61	279.074

**TABLE 4R
RIVER : FERGUS**

2009 Month	Hydrometric Station 27002.00 Ballycorey Avg. Monthly Flow m³/s	Sampling Station Doora m³/s	Total Catchment Flow m³/s
January	19.57	22.65	36.30
February	14.41	16.67	26.73
March	9.19	10.63	17.04
April	8.61	9.96	15.97
May	15.32	17.73	28.42
June	5.38	6.23	9.98
July	8.70	10.06	16.13
August	19.12	22.12	35.46
September	21.90	25.34	40.62
October	5.40	6.25	10.02
November	50.32	58.22	93.33
December	29.64	34.29	54.96
Avg.Flow 2009 m ³ /s	17.30	20.01	32.08

**TABLE 4S
RIVER : CORRIB**

2009 Month	Hydrometric Station 30061 Wolfe Tone Bridge Avg. Monthly Flow m³/s	Sampling Station Quincentennial Br m³/s	Total Catchment Flow m³/s
January	148.04	148.04	149.37
February	127.88	127.88	129.03
March	72.42	72.42	
April	73.25	73.25	73.91
May	100.79	100.79	101.70
June	36.11	36.11	36.44
July	47.26	47.26	47.68
August	113.77	113.77	114.79
September	148.48	148.48	149.82
October	53.44	53.44	53.92
November	231.47	231.47	233.55
December	241.48	241.48	243.66
Avg.Flow 2009 m ³ /s	116.20	116.20	121.26

**TABLE 4T
RIVER : MOY**

2009 Month	Hydrometric Station 34001.00 Rahans Avg. Monthly Flow m³/s	Sampling Station Rahans m³/s	Total Catchment Flow m³/s
	January	86.60	86.60
February	69.42	69.42	75.81
March	45.60	45.60	49.79
April	40.29	40.29	43.99
May	43.73	43.73	47.75
June	16.46	16.46	17.97
July	25.86	25.86	28.24
August	53.89	53.89	58.84
September	59.75	59.75	65.25
October	28.47	28.47	31.09
November	158.55	158.55	173.14
December	113.36	113.36	123.79
Avg.Flow 2009 m ³ /s	61.83	61.83	67.52

**TABLE 4U
RIVER : BALLYADARE**

2009 Month	Hydrometric Station 35005.00 Ballysadare Avg. Monthly Flow m³/s	Sampling Station Ballysadare m³/s	Total Catchment Flow m³/s
	January	29.00	28.998
February	19.23	19.226	20.30
March	13.89	13.891	14.67
April	16.94	16.936	17.88
May	16.84	16.839	17.78
June	5.32	5.323	5.62
July	11.32	11.318	11.95
August	18.51	18.512	19.55
September	17.23	17.227	18.19
October	10.32	10.316	10.89
November	75.45	75.450	79.68
December	23.86	23.863	25.20
Avg.Flow 2009 m ³ /s	21.49	21.49	22.70

TABLE 4V
RIVER : Garravogue

2009 Month	Hydrometric Station 35012.00 New Bridge Avg. Monthly Flow m³/s	Sampling Station Bridge at Toff's m³/s	Total Catchment Flow m³/s
January	17.13	17.13	18.81
February	12.24	12.24	13.44
March	12.74	12.74	13.99
April	12.29	12.29	13.49
May	16.92	16.92	18.58
June	5.48	5.48	6.02
July	11.07	11.07	12.15
August	16.54	16.55	18.17
September	13.68	13.68	15.02
October	9.29	9.29	10.20
November	46.40	46.41	50.96
December	11.73	11.74	12.89
Avg.Flow 2009 m ³ /s	15.46	15.46	16.98

TABLE 4W
RIVER : ERNE

2009 Month	Hydrometric Station 36092.00 Cataleen Falls P.S. Avg. Monthly Flow m³/s	Sampling Station u/s Lower Dam m³/s	Total Catchment Flow m³/s
January	115.28	115.28	126.58
February	135.38	135.38	148.65
March	82.29	82.29	90.35
April	89.28	89.28	98.03
May	140.96	140.96	154.78
June	30.38	30.38	33.36
July	54.55	54.55	59.89
August	102.74	102.74	112.81
September	111.81	111.81	122.76
October	73.01	73.01	80.16
November	300.49	300.49	329.94
December	246.69	246.69	270.86
Avg.Flow 2009 m ³ /s	123.57	123.57	135.68