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*An Comhchoiste um Chomhshaol, Oidhreacht agus
Rialtas Áitiúil*

**An Ceathrú Tuarascáil ón gComhchoiste
Tréimhsí Aimsire Anróití in Éirinn a Bhainistiú & Nithe Gaolmhara**

Iúil 2010

*Joint Committee on the Environment, Heritage and Local
Government*

**Fourth Report of the Joint Committee
The Management of Severe Weather Events in Ireland & Related
Matters**

July 2010

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CHAIRMAN'S PREFACE

On behalf of the Joint Committee on the Environment, Heritage and Local Government, I am pleased to present this report on Severe Weather Events.

The devastation caused by the flooding late last autumn and early last winter will live long in the memory of the population of the country but it will never be forgotten by those whose lives were directly affected. The flooding impacted on both urban and rural households, leaving houses and farms inundated. A period of severe cold weather began in mid-December and continued up to late January 2010 with record low temperatures and widespread snow and ice. In preparing this report the Joint Committee met with a diverse range of stake-holders from the Minister for the Environment, Heritage and Local Government, Mr. John Gormley T.D. to Met Éireann, ESB, County and City Councils, residents groups etc.

Furthermore, the Joint Committee was conscious that, in order to fully familiarise itself with the devastating impact of the floods, it would be necessary to visit some of the worst affected areas. To that end the Committee went to Cork from 4 to 6 February 2010 during which it visited the city, the Inniscarra Dam, Fermoy, Bandon, Clonakilty and Skibbereen.

The Committee has agreed to make a number of recommendations to Government Departments including the Office of Public Works and the Local Authorities which, if implemented, should ensure that future severe weather events will be managed appropriately.

I am delighted that the Joint Committee agreed to publish this Report.



Seán Fleming TD
Chairman
20 July 2010

**MEMBERS OF THE JOINT COMMITTEE ON THE ENVIRONMENT,
HERITAGE AND LOCAL GOVERNMENT**

Chairman: Sean Fleming (FF)

Deputies: Pádraic McCormack (FG) (Vice Chairman)
Christy O'Sullivan (FF)
James Bannon (FG)
John O'Donoghue (FF)
Phil Hogan (FG)
Joanna Tuffy (LAB)
Eamon Scanlon (FF)
Johnny Brady (FF)
Michael Fitzpatrick (FF)
Ciaran Lynch (LAB)

Senators: Camillus Glynn (FF)
Ciaran Cannon (FG)
Dominic Hannigan (LAB)
Paudie Coffey (FG)

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- The Minister for the Environment, Heritage and Local Government, John Gormley, T.D.;
- The Minister of State at the Department of Finance with special responsibility for the Office of Public Works, Martin Mansergh T.D.;
- MET Éireann;
- The Department of the Environment, Heritage and Local Government;
- The Department of Social Protection;
- The Office of Public Works;
- The Electricity Supply Board;
- Bord na Móna;
- Waterways Ireland;
- The Central Fisheries Board;
- The Heritage Council;
- The National Parks and Wildlife Service;
- The Irish Farmers Association;
- Cork City Council;
- Cork County Council;
- Galway County Council;
- Longford County Council;
- Roscommon County Council;
- Limerick County Council;
- Westmeath County Council;
- Clare County Council;
- Leitrim County Council;
- Offaly County Council;
- Fermoy Urban District Council;
- Bandon Urban District Council;
- Clonakilty Town Council;
- University College Cork;
- Mr Paudie Barry;
- The residents of Middle Parish;
- Members of Skibbereen Flood Committee.

The Joint Committee also wishes to thank the many Members of the Oireachtas who do not serve on the Committee but who attended, and contributed to the various debates held during the course of its deliberations on the management of severe weather events.

The Joint Committee also wishes to thank the Committee Secretariat of the Office of the Houses of the Oireachtas for its support throughout this process.

Introduction

Unprecedented rainfall in late October and early November 2009 resulted in severe and prolonged flooding across many parts of Ireland, and lands, homes, businesses and other premises were flooded, people evacuated and enormous costs incurred. In December 2009 a period of severe cold weather began in the second half of the month and remained until well into January, during which there were record low temperatures, recurring frosts and widespread snow and ice.

The Joint Committee on the Environment, Heritage and Local Government began considering the flooding events in December, but as their magnitude and severity increased, and then a period of severe cold began, it widened its deliberations to consider the severe cold weather, and later agreed to prepare a report on the management of severe weather events more generally, based on the experiences between November 2009 and January 2010. This is the Report of the Joint Committee.

The Report is broadly structured in accordance with the main parties involved with responsibilities regarding the preparation for and management of severe weather and flooding, and which were invited to come before the Joint Committee. As such the subsequent sections of the Report are as follows

- Section 1 – MET Éireann;
- Section 2 – The Major Emergency Response Committee;
- Section 3 – The Department of the Environment, Heritage and Local Government;
- Section 4 – The Office of Public Works;
- Section 5 – The Local Authorities;
- Section 6 – Communications;
- Section 7 – Case Studies of the flooding events in Cork city on November 19th and 20th and the management of the River Shannon; and
- Section 8 – Conclusions and Recommendations.

1. MET Éireann

A delegation from MET Éireann presented to the Joint Committee its analyses of both the November 2009 rainfall and the January 2010 severe cold spell.

The November 2009 severe rainfall that preceded the flooding in various parts of the country came on foot of three consecutive very wet summers. In 2009 the Valentia Observatory, which has records going back 150 years, recorded a summer rainfall of close to 600mm, shattering the previous record of some 400mm. Following the severities of the 2009 summer rainfall, October and more particularly November 2009 recorded extraordinary levels of rainfall by any comparison.

The severity of the rainfall in November 2009 was with regard to both its volumes and spatial distribution. Recorded levels for the month were more than twice the normal amount at almost all MET Éireann stations and over three times the amount at many. Between 17 and 30 wet days were recorded compared with a normal range of between 13 and 20 days. Of 440 rainfall stations, 79% recorded their highest ever total November rainfall in 2009. Maps presented to the Joint Committee indicated that the western counties of the country experienced the highest levels of rainfall, particularly mountainous regions of west Cork, Kerry, Galway and Donegal.

In terms of the rarity of the rain levels experienced during November 2009, the delegation presented maps of Ireland showing the return periods (or probabilities) associated with the rainfall for 1, 2, 4, 8, 16 and 25 day periods in November 2009. The maps suggested that while the very specific period around November 18-20th had substantial volumes of rain, the levels were not highly unusual within typical 2 day periods during the month of November. However when the number of cumulative November days examined increases, the rarity of the rainfall levels increase substantially. Taken as an entire period, the 25 days ending on 26th November saw rainfall levels with probabilities of less than one in 250 across vast areas of the western seaboard from Donegal down through Sligo, Mayo, Longford, Roscommon, Westmeath, Galway, Clare, Tipperary, Limerick, Kerry and Cork, and across much of these affected areas the volumes of rain had probabilities of up to one in 500 (or put another way, such events have a probability of occurring once in every 500 years).

While the rainfall of November 18th and 19th in the general area of the River Lee catchment was substantial, it was not an extremely rare event. What was unique however was the level of precipitation in the month before the 18th and 19th, and indeed the 2009 summer.

Following a relatively mild start, the second half of December 2009 became severely cold throughout the country. The shift brought with it widespread severe frosts and falls of snow in places. Despite the relatively mild start, the month went on to become the coldest December for 28 years over most of the country and the coldest of any month since February 1986 at some measurement stations.

Following a small number of days in early January when average temperatures were positive (above 0°C), the severe cold returned and much of the first half of January experienced daily average temperatures below zero degrees, and significantly below

normal for the time of year. While the second half of January experienced a rise in temperatures, the month as a whole was the coldest since 1985 generally and the coldest since 1963 in the Dublin area. There were a total of between 22 and 28 ground frosts in most places, compared with a normal range for January of between 12 and 18.

While there is no single measure of the severity of a period of cold weather (duration, temperatures and precipitation are all factors), the MET Éireann delegation characterised the 2009/10 cold spell as the most extreme since 1963, although there were comparable spells in 1981/2, 1978/9, 1962/3 and 1946/7. While the 2009/10 cold spell was extreme, similar spells in both 1962/3 and 1947 were more so. As such comparable cold spells typically recur over a time scale of decades.

Several concerns of Members were addressed by the delegation. Firstly, Committee Members sought greater clarity with regard to when, if at all, rainfall events of such magnitude had happened in the past. Supplementary statistical information provided by MET Éireann showed that since 1940, 2009 provisionally appeared to have had the highest average annual volumes of rain across Ireland, with in excess of 1500mm recorded. However 2009 was not entirely unique. Other years where levels were above 1400mm include 2008, 2002, 1998, 1994 and 1960, and many other years recorded more than 1300mm. The unique features of the 2009 rainfall were its severity over a duration of several months prior to the flooding events, and its widespread geographical coverage.

The delegation described recent developments in weather forecasting and the inherent difficulties involved with providing medium and long-term forecasts. While Ireland's location and climatic status has traditionally confined reliable forecasting to just 3-4 days, the accuracy of 5-10 day forecasting has increased in recent times as data sources and scientific methods have evolved. As the time horizons for reliable forecasting have lengthened, the accuracy of very localised forecasting has also improved. The unpredictable behaviour of the Atlantic ocean means however that MET Éireann does not have the ability to forecast months or seasons ahead.

The warnings and notifications issued by MET Éireann in advance of the severe flooding events were a significant concern of Members. The delegation confirmed that MET Éireann has an established public service severe weather warning system in place and that it issued a range of warnings and notifications over the November period in advance of the severe flooding events in accordance with those systems. As well as through national radio, television, website and other media, it issues a graduated series of warnings to specific organisations and bodies, as well as in specific locations. Reliable forecasts of heavy rain are typically confined to a two-day horizon, although general warnings are routinely issued 3 or 4 days in advance. Warnings and forecasts under various categories are provided to preselected parties, usually taking a fax or email format, and organisations may seek forecasts and notifications under any range of categories of most importance to them. While MET Éireann does not consider how weather patterns or combinations of weather patterns may specifically affect different parties in distinct localities, it provides weather recordings, forecasts and warnings both according to its own public service obligations and also specific to any variables required by third parties.

MET Éireann confirmed that it had issued weather warnings and notifications to various organisations in advance and over the course of the November 18th – 20th period,

including the ESB and Cork and Kerry County Councils. A record of the weather warnings issued by MET Éireann in the week leading up to November 19th was provided to the Joint Committee, and included the following:

- a weather warning issued 18.30 on Thursday November 12th (for website, AA etc) – between 25 and 35mm rainfall expected on Friday evening and Friday night, with 40mm possible in east Munster and Leinster;
- a weather warning issued 18.30 on Thursday November 12th (for ESB Lee Catchment) – between 30mm and 40mm rainfall expected on Friday evening and early on Saturday;
- a weather warning issued 09.00 Friday November 13th (for website, AA etc) – very heavy rain countrywide this evening and tonight. Most places could have 25mm, but locally totals could be between 30mm and 40mm. Some flooding is likely. Risk of coastal flooding also in the south and east;
- a weather warning issued 10.30 Sunday November 15th (for website, AA etc) – 25mm to 40mm of rainfall expected with western and south western areas most at risk;
- a weather warning issued 10.30 Sunday November 15th (for ESB Shannon and Lee Catchments etc) – 25mm to 40mm of rainfall expected;
- a weather warning issued 14.00 on Tuesday November 17th (for website, AA etc) – rain to spread eastwards across many parts of the country tonight, giving falls of 15-30mm in places and bringing a renewed risk of localised flooding;
- a weather warning issued 10.00 on Wednesday November 18th (for website, AA etc) – further very wet and windy weather expected Wednesday night and through Thursday with widespread rain and strong southerly winds. Rainfall totals of 20-40mm in many areas with falls of 50-60mm likely in parts of the southwest and west with some severe flooding likely;
- a weather warning issued 10.00 on Wednesday November 18th (for Kerry County Council, Cork County Council, ESB Lee Catchment) – further very wet and windy weather expected this evening, tonight and tomorrow. Falls of 50-60mm possible with further flooding;
- a weekend weather advisory issued 11.00 on Friday November 20th (for website, AA etc) – a spell of heavy rain will move northwards across the country late Friday night and Saturday morning, with clearer weather following. Although it will be short-lived – typically 3 or 4 hours – it will be intense enough to produce around 15-25 mm of rain in places, with south Munster and south Leinster most at risk. Another area of rain and showers will affect many areas on Saturday night or Sunday, and could give as much as 15-25mm, with the western half of the country most at risk at that stage. These amounts are not exceptional in themselves, but in the current context they are of some concern, as they are likely to hinder or delay recovery from recent flooding and might even worsen conditions again at times. It will be windy too for much or all of the weekend, and on Saturday night or Sunday there is a danger of severe winds (gusts 90-120 km/h in exposed places);
- weather warnings for ESB issued 13.30 on Friday 20th:
 - ESB Lower Shannon Catchment – heavy rain for a time late Friday night or Saturday morning. Totals of 10-20mm possible – less than the usual threshold but could be of concern in current situation;
 - ESB Lee Catchment - heavy rain for a time late Friday night or Saturday morning. Totals of 15-25mm possible – less than the usual threshold but could be of concern in current situation.

In addition to these warnings, MET Éireann issued many other warnings over the period in question – primarily for strong wind, the occurrence of thunderstorms, and also for rainfall in other parts of the country.

The delegation also provided the Joint Committee with very localised and detailed rainfall statistics from its stations within the general area of the River Lee catchment over the period November 18th and 19th, and the entire month. The statistics confirmed that while quantities of rain over the two specific days were at most places high but not exceptionally so, the quantities for the entire month of November were quite exceptional across most stations and in many but not all cases unprecedented in the history of recording at the station.

The Joint Committee requested a comparison from MET Éireann of weather patterns in the lead up to November 18th and 19th 2009 with those prior to August 1986, the last time there was a severe fluvial flooding event in Cork city. Statistics for the return periods for rainfall levels experienced between August 5th and 6th, 1986 were provided for many stations in the Lee catchment. The data suggests that the 24hr rainfall prior to the 1986 event was extreme at most stations, but did not follow a month of such extreme rain as was the case in 2009.

The MET Éireann delegation confirmed their comfort with the organisation's forecasting and weather warning performance over the period leading to and covering November 18th and 19th 2009.

2. The Emergency Response Co-ordination Committee

A “Framework for Major Emergency Management” was approved by Government in 2006, the purpose of which is to “enable An Garda Síochána, the Health Service Executive and Local Authorities to prepare for and make a co-ordinated response to major emergencies resulting from events such as fires, transport accidents, hazardous substance incidents and severe weather”¹.

The Framework defines a Major Emergency as follows:

A Major Emergency is any event which, usually with little or no warning, causes or threatens death or injury, serious disruption of essential services or damage to property, the environment or infrastructure beyond the normal capabilities of the principal emergency services in the area in which the event occurs, and requires the activation of specific additional procedures and the mobilisation of additional resources to ensure an effective, co-ordinated response.

Both the Framework and the Major Emergency Management Development process that has taken place on foot of it were described to the Joint Committee by a delegation from the Department of the Environment, Heritage and Local Government comprising Mr Des Dowling, Assistant Secretary, and Mr John Hogan, National Director for Fire and Emergency Management, and Chairperson of the National Emergency Response Co-ordination Committee (NERCC).

The Framework considers underlying principles, approaches to risk assessment and risk management, planning and preparedness, co-ordinating responses and the recovery phase. It forms a central element in a Major Emergency Management Development process that involved:

- the commissioning of a review of major emergency management in November 2004;
- the review process and drafting of the new Framework in 2005;
- Government approval, in May 2006, of the Framework Document, the proposed Major Emergency Development Programme that would bring the Framework into effect, and a proposed National Steering Group to oversee the process;
- commencement of the Major Emergency Development Programme in September 2006;
- the coming into effect of the new arrangements in 2008.

The delegation described how the Framework enshrines a “systems” approach to major emergency management which involves a continuous cycle of activities comprising hazard analysis and risk assessment; mitigation and risk management; planning and preparedness; co-ordinated response; and recovery. As such the State endeavours to have a dynamic emergency response process in place that reflects international best practice rather than the existence of a once-off, single “plan”.

Implementation of the Framework’s provisions has taken place at three levels:

- the Local/Agency Level, where An Garda Síochána, the Health Service Executive and the Local Authorities (the “Principal Response Agencies” under the

¹ “A Framework for Major Emergency Management” September 2006.

Framework) are responsible for implementing several elements including having a Major Emergency Plan for their functional areas in place, and for supporting plans and procedures;

- the Regional Level, where these principal response agencies form Steering Groups to co-ordinate inter-agency aspects of emergency preparedness and planning; and
- the National Level, where a National Steering Group is responsible for promulgating and promoting the Framework and ensuring its effective implementation.

Garda Divisions, principal Local Authorities and regional structures within the HSE were required under the Framework to carry out risk assessments in association with their partner principal response agencies. The primary purpose of these assessments was to identify and assess the range of risks to members of the community, the environment, or physical, economic or social infrastructure, and to align such known hazards with respect to their potential impact and their likelihood of occurring.

As mentioned, the Framework identifies three principal emergency response agencies, namely the Garda Síochána, the Health Service Executive and the local authorities. Each principal response agency was tasked through its regional structures with preparing an individual Major Emergency Plan, setting out its arrangements to respond to events occurring in, or impacting on, its functional area and which require the declaration of a major emergency.

The Framework set out the required contents and section headings of Major Emergency Plans, as shown below.

Figure 1. Content of a Major Emergency Plan	
1.	Introduction to the Plan
2.	The Principal Response Agency and its Functional Area
3.	The Risk Assessment for the Area
4.	Resources for Emergency Response
5.	Preparedness for Major Emergency Response
6.	The Command, Control and Co-ordination System
7.	The Common Elements of Response
	<ul style="list-style-type: none"> • Declaring a Major Emergency • Initial Mobilisation • Command, Control and Communications Centres • Co-ordination Centres • Communications Facilities • Exercising the Lead Agency's Co-ordination Roles • Public Information • The Media • Site Management Arrangements • Mobilising Additional Resources • Casualty and Survivor Arrangements • Emergencies Involving Hazardous Materials • Protecting Threatened Populations • Early and Public Warning Systems • Emergencies Arising on Inland Waterways • Safety, Health and Welfare Considerations • Logistical Issues/Protracted Incidents

Figure 1. Content of a Major Emergency Plan (cont)

- Investigations
 - Community/VIPs/Observers
 - Standing Down the Major Emergency
8. Agency Specific Elements and Sub-Plans
 9. Plan for Regional-Level Co-ordination
 10. Links with National Emergency Plans
 11. Severe Weather Events
 12. Site- and Event-Specific Arrangements and Plans
 13. The Recovery Phase
 14. Review of the Major Emergency Plan

Source: A Framework for Major Emergency Management, p.33

The Major Emergency Plans of each Garda Division, HSE area and Local Authority were completed and adopted by September 2008.

The Framework designates “lead agency” roles to one of the principal response agencies, depending on the category of emergency. It also sets out the detailed functions of the principal response agencies in response to a major emergency, and assigns the co-ordination function to the lead agency. In the case of weather-related emergencies, the designated lead agency role is assigned to local authorities.

The Framework establishes the concept of a Generic Co-ordination Centre at which the lead and other principal response agencies are to adopt a shared co-ordination approach. Individual buildings in each city and county are designated to act as the local co-ordination centre for the purpose of inter-agency co-ordination during an emergency event. Typically, local authority headquarter buildings have been assigned this role. In addition, an information management system generic to all of the agencies was established to manage the flow of information in an emergency situation. The establishment of this information system has been accompanied by the training of 360 information managers, and the system has been used, including in respect to the Cork flooding events of November 2009.

Mr Hogan described and recounted the role played by the NERCC during and after the November flooding events in Cork as follows:

- on Thursday November 19th, Mr Hogan’s staff at the Department of the Environment, Heritage and Local Government were monitoring potential flooding situations that were being reported during the day;
- on Friday November 20th, following briefings given the Minister for the Environment, Heritage and Local Government and senior management within the Department, Mr Hogan as Chairperson decided to convene a meeting of the NERCC, which was held at 3pm that day at the national emergency co-ordination response centre, following which the Taoiseach was briefed by the Minister for the Environment, Heritage and Local Government and Mr Hogan, and during which the Taoiseach confirmed and supported the national co-ordination arrangements;
- on Saturday November 21st, the NERCC Chairman and the Minister for the Environment, Heritage and Local Government visited Cork, Clare and Galway. The NERCC met at 3pm that day, following which the Taoiseach was briefed and a press briefing held;

- on Sunday November 22nd, the NERCC met once again following which a briefing was given to the full cabinet;
- the NERCC met daily between November 23rd and December 1st;
- the NERCC met every second day between December 2nd and December 7th; and
- the NERCC met for the final time with respect to the flooding emergency on December 8th.

Members of the Joint Committee sought clarification and further elaboration from the delegation in several respects. Firstly, details of the meetings of the NERCC during and after the severe cold weather of late December and early January was requested. In this respect, Mr Hogan described the following sequence of events:

- following the outbreak of the severe cold weather in December, local authorities began gritting and salting roads following the procedures of the National Roads Authority's (NRA's) ice alert system;
- in the face of weather forecasts predicting the continuation of the freezing conditions, the Department of the Environment, Heritage and Local Government contacted the local authorities and the NRA on Wednesday 30th December;
- on Thursday 31st December a situation assessment report was sent to the Minister for the Environment, Heritage and Local Government and senior departmental staff;
- an interdepartmental meeting was convened in the Department of the Environment, Heritage and Local Government Headquarters at the Custom House on Tuesday 5th January;
- a further meeting was held on Wednesday 6th January at the Department of Transport, following which the Taoiseach was briefed by the Minister for the Environment, Heritage and Local Government, the Minister for Community, Rural and Gaeltacht Affairs, and senior officials. On the same day, the Taoiseach requested the Minister for the Environment, Heritage and Local Government to activate the co-ordination mechanisms as had been done during the November flooding; and
- the NERCC was convened and met on Thursday 7th January, and met daily between then and the time of the Joint Committee meeting at which Mr Hogan appeared.

Given Mr Hogan's key responsibilities in deciding when and if circumstances necessitate the convening of the NERCC, the Joint Committee inquired about his formal grade within the civil service system. Mr Hogan confirmed his position was that of Principal Officer. Members expressed their dissatisfaction with a situation where such responsibility and leadership functions were placed on somebody at that grade and level of authority, although it was emphasised that in doing so no judgement was being passed on Mr Hogan's performance, abilities or qualifications.

Clarification was also sought as to whether a major emergency was formally declared in relation to the flooding events of November 2009. Mr Hogan was unable to confirm this. He recounted how communications from the local response agencies in Cork suggested that the situation was evolving and that a major emergency may subsequently be declared, but that he had no recollection of a formal major emergency declaration on the part of the principal response agencies involved with the Cork flooding events.

Mr Hogan also confirmed that there had also been no formal declaration of a major emergency in the case of the severe cold weather during December and January, although he stated that inter-agency co-operation and co-ordination was taking place effectively and to the same extent as would have been the case had a formal declaration been made, and this de-facto co-ordination was of greater concern to him than whether a declaration was made to bring it into effect.

Joint Committee Members sought clarification from the delegation regarding the risk assessment which preceded and formed part of the preparation of local Major Emergency Plans in Cork, and specifically whether assessments of the flood risks relating to substantial discharges from the Inniscarra Dam had been specifically considered. While Mr Hogan expressed his expectation that flooding risks were most likely considered in the Cork risk assessments, he had no knowledge of whether fluvial flooding in the western parts of the City, and the effects of discharge levels from the Inniscarra Dam, had been considered specifically.

Mr Hogan informed the Members that on the request of the Minister for the Environment, Heritage and Local Government, a review of the emergency response to the flooding events had been initiated, but that no such review of the severe cold weather had been requested by any Minister up to the time of his appearance before the Joint Committee.

3. The Department of the Environment, Heritage and Local Government

The role and responsibilities of the Department of the Environment, Heritage and Local Government that relate to the management and response to severe weather similar to that experienced between November 2009 and January 2010 are multiple:

- it oversees the local government system, and implements policy with respect to local authority structures, functions and resources;
- it is responsible for the legislative framework and national policy determination in regard to the physical planning system;
- it oversees and funds national investment in water and sanitation infrastructure;
- it is the nominated lead Department for national-level co-ordination in a severe weather major emergency under the Framework for Major Emergency Management; and
- it chairs the National Steering Group for the implementation of the Framework, and the National Directorate for Fire and Emergency Management operates under its aegis.

The Minister for Environment, Heritage and Local Government attended the Joint Committee meeting of 2nd March 2010, and was accompanied by officials that had also come before the Joint Committee on 12th January.

While acknowledging the costs, damage and trauma caused by both the flooding events and severe cold weather, and their hugely negative impact on the lives and businesses of many people, the Minister pointed to their unprecedented nature, particularly the flooding events of November 2009. He commended the local response agencies and all those who worked to remedy and minimise the impacts on people and communities and to restore and maintain essential services.

The Minister expressed strong support for the Framework for Major Emergency Management and for the structures created and processes completed under it in the areas of emergency preparedness and planning. In his view, the principal response agencies had adopted and utilised the co-ordination and emergency management procedures set out under the Framework, and the primacy of the local response ethos had been very evident during both the flooding and severe cold weather emergencies. He argued that the co-ordination and inter-agency arrangements were utilised to various degrees that had been determined locally, and reports and media coverage indicated the mechanisms had worked satisfactorily.

The Minister commended the work of local authorities, which covered a range of urgent roles including the rescue and evacuation of people from buildings and vehicles, care arrangements for such persons, the protection of threatened infrastructure, traffic management and diversions, road treatment, temporary water supply and clean up and recovery. He noted that during the severe cold weather, key strategic roads and public transport routes had generally been kept open, food and fuel supplies were maintained, emergency services continued to operate, and community and public health services continued to be provided.

The Minister confirmed to the Joint Committee that notwithstanding the effective and co-ordinated response made, lessons from the severe weather events would need to be learned. He reminded the Members that a review of the emergency responses and inter-agency arrangements was being carried out by officials of the Department of the Environment, Heritage and Local Government, although no indication of when the review would be completed was given.

In terms of avoiding similar crises in the future, the Minister noted that as the lead agency for national flood policy, the Office of Public Works (OPW) was working with local authorities to reduce future flood risks through the provision of physical defences, the installation of appropriate warning systems and other measures. Flood risk assessment and management plans were in preparation in various parts of the country which would identify and map areas of risk and set out prioritised measures to manage such risks. In the case of Cork city, the River Lee Catchment Flood Risk Assessment and Management Plan had recently been launched for consultation by the OPW.

The Department of the Environment, Heritage and Local Government had also been increasingly aware of the need to integrate flood risk management principles into the physical planning system, and the role that effective planning has in avoiding and reducing future flood risks. In this regard, the Department, jointly with the OPW, published Guidelines for Planning Authorities on the Planning System and Flood Risk Management in November 2009. These guidelines, the Minister confirmed, are aimed at ensuring development which is vulnerable to flooding will only be permitted by planning authorities in exceptional circumstances for areas at high or even moderate risk of flooding.

Water supplies had been affected in many areas during the severe weather due to damage to treatment and distribution infrastructure, frozen pipes and leakages. Demand for water increased sharply during the severe cold spell. The Department was, according to the Minister, placing considerable emphasis on water conservation measures within the Water Services Investment Programme in order to reduce water loss due to leakages in the distribution system. The Minister also pointed to guidance documents issued by the Department of the Environment, Heritage and Local Government in relation to standards regarding diameters and layouts for water pipes, and in building regulations concerning the protection of household water systems from the effects of cold and frost.

Joint Committee Members sought clarification of whether the review being undertaken would examine the effectiveness of the emergency response to the severe weather events only, or whether its remit would go further in respect to risk assessment and management and specific areas of risk that may have existed. The Minister suggested the emergency response would be the focus of the review, but expressed his wish that all important lessons would be learned and acted upon.

Members also expressed their concern at the number and range of bodies that have responsibilities with regard to, or strategic interests in, the river Shannon and its management, and whether creating a single River Shannon authority was likely to improve the management of the river. The Minister expressed his concern at creating what he referred to as another quango, and argued that the appropriate management of the river was by way of the River Basin Management Plans and River Basin Management Districts established under the Water Framework Directive.

The failure to appropriately dredge and maintain the capacity of river channels to drain land areas over recent decades was also raised by Members. While there were legitimate concerns regarding the environmental effects of river dredging, it was unclear whether decisions or the lack of decisions regarding the undertaking of such works were being informed by the very realistic flood risks that could be mitigated by doing so. The Minister expressed his openness to the advice of experts in relation to the dredging of river channels, but noted that it may not provide any panacea for efforts to avoid future flooding.

Funding constraints concerned many Joint Committee Members. Funds to provide flood defences, to allow local authorities to maintain and clear drains, to allow for the effective implementation of flood risk management measures and to allow for the modernisation and maintenance of water distribution and drainage systems were all necessary to reduce the risk and effects of future flooding events. In this regard the Minister pointed to record levels of investment in flood defences and risk management in recent years following the report of the Flood Policy Review Group, record levels of investment under the Water Services Investment Programme and new sources of funding for local authorities such as the second home tax.

Several Members expressed their view that a public inquiry should be held with regard to the specific events up to and during the severe flooding in Cork city. In this regard the Minister expressed a desire not to pre-empt the findings of both the Departmental review and the Joint Committee's deliberations.

4. The Office of Public Works

A delegation from the Office of Public Works (OPW), led by Minister for State, Martin Mansergh, came before the Joint Committee on 1st December 2009, while a further delegation of OPW officials appeared before it at a subsequent meeting on 9th March 2010.

Following Government approval in 2004 of the report of the Flood Policy Review Group, the OPW was given the lead role in flood risk management on a national basis. As such it has primary responsibility for co-ordinating activities of Government Departments, local authorities and other bodies and managing the implementation of the national flood risk management policy. Its activities in this area include:

- provision of information to people and businesses at risk of flooding;
- provision of information on historic floods;
- recording and monitoring water level flow data;
- maintenance of arterial drainage schemes and flood relief schemes carried out;
- delivery of new schemes under the Arterial Drainage (Amendment) Act 1995; and
- assistance to Local Authorities in their response to areas at risk of flooding.

A major element of its work is in delivering a programme of river catchment flood risk assessment and management studies (CFRAMS) the objectives of which include:

- assessing flood risk, through the identification of flood hazard areas and the associated impacts of flooding;
- identifying viable structural and non-structural measures and options for managing the flood risks for localised high-risk areas and within the catchment as a whole;
- preparing a strategic catchment flood risk management plan (CFRMP), and associated strategic environmental assessment (SEA), that sets out the measures and policies that should be pursued by local authorities and the OPW to achieve the most cost effective and sustainable management of flood risk within the catchment.

The implementation and completion of the programme is being planned so as to ensure Ireland's compliance with the requirements of the EU Floods Directive, and their preparation involves widespread consultation with the public and all stakeholders.

The River Lee catchment was one of several pilot areas selected for the initial tranche of CFRAM studies, and a draft Strategy was put out for public consultation in February 2010. The CFRAM study for the River Shannon catchment is due to be initiated in 2010, and, according to the OPW, will take several years to complete. Pending its completion the OPW will fund local authorities to undertake minor works in specific areas that meet certain criteria.

The OPW stresses that the CFRAMS does not provide solutions to all of the flooding problems or risks that may exist in a catchment under all eventualities, as to do so would neither be feasible nor sustainable. However it identifies where flood risks are most significant and sets out a range of structural and non-structural options for managing those risks.

In addition to conducting and overseeing the production of CFRAM studies, the OPW maintains drainage and flood relief schemes it has carried out, provides hydrological and flood mapping information to the public and, jointly with the Department of the Environment, Heritage and Local Government, prepared Guidelines for Planning Authorities on the Planning System and Flood Risk Management in November 2009.

The 2010 budgetary allocation to the OPW in relation to flood relief activities, capital works, drainage maintenance and hydrometric activities is approximately €68m. In the six years to 2009, it invested €130m in capital flood relief projects and €112m on drainage maintenance and hydrometric programmes, with annual spending increasing over the period.

While the OPW places emphasis on the maintenance of river channels, it informed the Joint Committee that it was of the view that given the magnitude of the severe flooding of November 2009, additional channel maintenance would not have contributed significantly to mitigation of the damage that arose, and that such maintenance is effective in reducing the duration and frequency of much less severe flooding events only.

The OPW is not, according to its officials, a front-line response agency in the face of a major flooding event or emergency. Its role during such events is to ensure that all of its flood defence measures are operational and to collect hydrological data. Notwithstanding this, its resources are made available to emergency services, and its staff were active in a range of areas supporting the emergency effort, including providing advice, assisting in sandbag distribution, providing plant and pumps, and undertaking aerial photography. It also offered its services and equipment to local authorities to assist with clean up tasks.

The draft Lee CFRAMS has been considered by Committee Members. The detailed report sets out:

- a catchment overview;
- a flood hazard assessment;
- a flood risk assessment;
- a number of flood risk management options;
- a strategic environmental assessment and habitats directive assessment; and
- a flood risk management strategy, including a proposed implementation approach.

Its flood risk management strategy encompasses a range of structural and non-structural components including fluvial (river) and tidal flood forecasting and warning systems, public awareness programmes, permanent flood walls and embankments in catchment towns, major permanent flood walls and/or embankments in Cork city, permanent sea walls in specific areas and optimisation of the downstream flood risk management potential of the operation of the Carrigadrohid and Inniscarra reservoirs.

The various components set out in the strategy have a combined cost of almost €200m, and a prioritised phased implementation programme is set out with high priority measures undertaken up to 2015, medium priority measures undertaken between 2016 and 2022, and low priority measures taken after 2023.

Joint Committee Members are concerned that despite its central role in delivering flooding policies and programmes of Government and in detailed flood risk assessment

and management, the OPW did not consider itself a front line response agency in a flood emergency. While acknowledging the major emergency framework which places An Garda Síochána, the Health Service Executive and the local authorities as front line response agencies, the position now exists that a host of agencies point to the OPW as the “lead agency” with respect to flooding, while the OPW points to others as lead agencies with respect to flooding emergencies. The subtle distinction between flood risk management and flood emergency response is of little consolation to those affected by or at risk of a flood who seek leadership and accountability. More importantly perhaps, this position arguably divests those charged with avoiding and militating against floods from the responsibility to respond to one, and those charged with reacting to one from the primary responsibility to understand and manage the prior risk.

As the agency centrally responsible for flood risk management, the OPW carries the equally important responsibility that flood risk information is disseminated appropriately. The Joint Committee welcomes the OPW’s acknowledgement that its prior awareness raising and communication of flood risk to those at risk was unsatisfactory.

The Lee CFRAMS process has obviously been a detailed, rigorous, and scientific one which gathered and utilised an enormous quantity of hydrological information and data concerning water levels and flows in the entire catchment. Its preparation has taken place over a four year period, yet it is not obvious to the Joint Committee how exactly, and to what extent, its research, findings and outcomes informed major emergency planning in Cork city and county.

Advance flood warning systems are proposed in the Lee CFRAMS, have been proposed elsewhere and have been successfully installed in places. The case for providing such warning systems on all major river channels that pose significant flood risks prior to such events, seems inarguable, and their provision should not, it would seem, need to await the comprehensive completion of CFRAMS processes before being installed.

Members also expressed their deep concerns that the River Shannon CFRAMS process is only due to begin in 2010 and is unlikely to be complete until 2014. Why the largest river and river catchment in the country, and one with a history of flooding events, was not amongst the first CFRAMS to be undertaken is not clear to the Joint Committee. This is particularly frustrating when recent capital spending by the OPW has consistently fallen behind levels planned or budgeted for. The entire OPW budget for flood risk management in 2010 was reported to be €68m, and over the period 2004-2009 the total spend was approximately €242m. The costs of implementing the flood risk plan for the Lee catchment alone are therefore equivalent to approximately two thirds of the total spend nationally over a 7 year period. Given the number and size of other river catchments still to have studies carried out, there is clearly a hugely inadequate level of funding being provided to the OPW for flood risk management, and a record of annual allocations not being spent in full.

Several Members challenged the contention that additional river drainage works carried out in advance would not have significantly alleviated the damaging effects of the recent flooding crises. While the environmental and biodiversity effects of channel drainage and maintenance measures need to be carefully considered, it seems illogical to suggest such works would not serve to increase the volumes of water channelled to the sea and thereby help reduce the extent of the flooding. That an appropriate degree of such channel

maintenance takes place albeit within the constraints of environmental and habitat protection policies was not clear to the Joint Committee, and Members expressed the view that the balance to be struck between increasing the conveyance capacity of rivers and avoiding negative impacts on biodiversity needs to be fully informed of the human costs and damage which significant floods cause and the recent flooding events illustrated so clearly.

Finally, the concern persists that there is a disconnect between flood risk management responsibilities and urban sanitation and drainage investment and planning. Linkages between engineering aspects of urban surface water drainage and flooding risk management measures are shown to exist in the Lee CFRAMS report and were acknowledged by the Minister of State when before the Committee, yet the OPW is responsible for flood risk management works, the Department of the Environment, Heritage and Local Government is responsible for prioritising and financing major urban wastewater investments and local authorities are responsible for maintaining drains and outfalls. This can only reduce one's confidence that effective, co-ordinated and synchronised planning, investment and maintenance is the result.

5. The Local Authorities

The Joint Committee met representatives of several local authorities during the course of its investigation into the severe weather events between November 2009 and January 2010, including from Cork City and County Councils, Limerick County Council, Clare County Council, Offaly County Council, Galway County Council, Roscommon County Council, Westmeath County Council, Leitrim County Council and Longford County Council.

During these meetings the various local authority officials described the nature and extent of the severe weather events in their respective counties and cities, the issues that required to be addressed, the responses made, the lessons learned and the legacy issues that remain.

The rainfall and floods of November 2009 affected wide areas of counties with water levels at record levels in many areas of river channel and in lakes and other water courses. Rural and urban areas were affected, and individuals, homes, farms, businesses and public infrastructure including roads and water and sanitation facilities were all impacted. While there had been persistent rainfall during early November, the period around November 18th was a tipping point in many areas, following which flooding events became widespread and substantially more severe than normal, and while in some areas water levels peaked around that time, continued rain in many areas resulted in further exacerbation with water levels not peaking until several days or in some cases weeks later.

The immediate reaction of the local authorities to the flooding appears to have been swift and pre-determined. No local authority declared a major emergency although the protocols and procedures of the emergency plan were followed. Key partner agencies were contacted, crises management teams were quickly convened and met, and local co-ordination centres were made operational. Key agencies and support bodies that were involved or supportive of the overall response included An Garda Síochána, the HSE, the Army, the Civil Defence, the OPW, the NRA, Met Éireann, the ESB, Eircom, the Irish Coast Guard and a range of charitable and voluntary bodies.

Amongst the immediate issues to be dealt when the flooding crisis hit were:

- the distribution of sandbags;
- the operation and distribution of water pumps;
- the evacuation of houses and buildings;
- provision of emergency accommodation;
- gathering and disseminating information;
- ensuring the distribution and availability of clean water supplies;
- the monitoring of water quality and the putting in place of boil water notices;
- the closure of roads and establishment of diversions;
- the protection of critical water treatment plants; and
- the distribution of food and supplies to households cut off.

Assisting households in flooded areas was an immediate priority. Farms, individual houses and entire housing estates were inundated with water in many localities across

many counties. Councils and supporting agencies provided pump and sandbag protection where possible, however many families needed immediate evacuation and the provision of temporary accommodation. The Joint Committee heard accounts of very proactive work on the part of local authority staff in seeking out vulnerable people to see if they required assistance, who worked with An Post, the HSE, community Gardaí and others in this regard. Substantial numbers of households needed to be evacuated, and hotel, B&B and other emergency accommodation was provided by local authorities. While for some temporary accommodation requirements were short-term, many others required transitional housing arrangements while their damaged premises were refurbished. The Joint Committee welcomed the fact that few, if any, permanent housing relocations were required. After the emergency, local authorities also provided assistance to many families and households in the disposal of flood-damaged items such as furniture and equipment.

Road networks were severely impacted in many counties. Numerous roads became impassable in very localised floods, while in some counties all national primary roads, several national secondary roads and many regional and county roads were affected in places. Bridges needed to be assessed, flooding pumped from roads where possible, roads closed where necessary, and diversions established and maintained. Local authorities also gathered and disseminated information regarding the status and condition of roads to the public and the media.

Some water treatment plants and pumping stations flooded, which resulted in areas being without piped water for extended periods. Tanked and bottled water needed to be distributed to large numbers of households, in cases for several weeks. Drinking water quality needed to be monitored and boil water notices issued. Numerous waste water treatment plants were also flooded and services disrupted. Where plants were not flooded, often this was due to proactive protective work on the part of local authority staff.

As well as dealing with the effects of the flooding, local authorities put considerable effort into recording and understanding its extent for the benefit of future planning. Water levels were recorded and monitored and many local authorities had the foresight to ensure detailed aerial photography of affected areas was undertaken, in which they were assisted by the Garda Síochána and the Air Corps.

The severe cold period of weather throughout the country that began in December presented a different set of challenges to the local authorities. The primary task was ensuring transport mobility to allow products and goods to be distributed, persons to get to work, children to get to schools and services to operate in as normal a manner as possible.

In considering the issue of road treatment during the severe cold period, many local authorities considered that their level of preparedness was high. Stockpiles of salt and grit were at appropriate levels for the time of year, and additional orders had been made. The “icecast” road treatment alert and information system for the primary and strategic routes (developed in tandem with the National Roads Authority) had been in place for many years, had been proven effective, and been used by staff on many occasions previously. Equipment was also in place including large and small gritting trucks, snow ploughs and other vehicles.

The pre-treatment of roads with salt (prior to the initial freeze) can be effective in minimising subsequent ice build-up on the roads, and the Joint Committee heard examples of local authorities having been able to pre-treat many roads using the ice alert system and based on weather forecasts and their own knowledge of specific roads in their areas.

The severity and duration of the freeze however placed tremendous pressures on salt stocks for many authorities. The period from mid-December to mid-January required levels of road treatment substantially greater than normal. Some reported that within that four week period the number of gritting/salting events required and delivered was more than twice the typical number required over an entire winter, and with daytime temperatures remaining below zero on many days, cases of having to treat important stretches of roads up to three times within a 24 hour period were recounted. Salt has a limited storage life given its perishable nature, and shipments of pre-ordered salt to the local authorities became sporadic.

Approaches to managing supplies had to be adopted, and different local authorities faced different challenges. The treatment of national primary, secondary and strategic routes was prioritised over the treatment of local and county roads, initially with the former generally salted and the latter gritted where possible. However as supplies dwindled in the face of the prolonged freeze, the emphasis of local authority efforts was generally on primary roads, and with mixes of salt and grit applied to try to make provisions last but at the same time ensure accessibility, the flow of fuels and supplies, and the operation of routes that accounted for up to 80% of normal traffic flows. Keeping all or the majority of primary roads open over such a prolonged and intense freeze was considered a substantial achievement in the circumstances that prevailed.

Water supplies were also a major challenge for the local authorities during the freezing conditions. As raw water temperatures plunged, treatment became difficult in places. In addition many supply pipes froze cutting off supplies in many areas. At the same time, demand for clean water increased substantially (25-50% above normal in some places), and in many areas this was due to people letting taps run to ensure pipes didn't freeze. This seriously compounded water supply problems, and its widespread practice was confirmed by extraordinary waste water treatment flows at night time. Reservoirs reached dangerously low levels in places, and some areas were without piped water for extended periods. When the thaw came, many frozen pipes burst, further affecting supplies.

To deal with these challenges local authorities were required to adopt active water supply management policies including pressure reduction, night-time rationing and entire supply cuts at night time. The water services staff, the Army and the Civil Defence were deployed with water tankers to serve areas without a piped supply, and leak identification and repair crews were very active over the extended cold period, the Christmas period and on Christmas day. Neighbours also assisted households where pipes had frozen or supplies had been cut. Leak detection and repair work resulting from the freeze was ongoing by the local authorities for an extended period after the severe cold ended.

The provision and dissemination of information played a central role in the response of local authorities to both the flooding and severe cold weather spell. Information regarding flooded areas, flooded roads, water supplies, road diversions and closures, imminent

threats, road treatment, pumps, sandbag distribution, clean water quality, boil water notices, and other aspects of the response required to be collected and regularly updated, monitored and acted upon, and effectively communicated to a range of important stakeholders from local authority staff and sections, to wider response agencies and emergency services, home owners, business owners and institutions under threat, and to members of public more generally.

This presented local authorities with an enormous challenge but one to which they responded well. Website-based information, including GIS-enabled road network information updated on an ongoing basis, was the most central method of information dissemination, however local authorities also issued press releases, used local radio extensively, and text messaging and public meetings were also widely used to spread accurate information to the public. In addition, 24hr emergency help lines were provided, and important roads, water and other engineering and technical staff made themselves available to take calls from the public.

The floods and cold weather events put a large financial burden on local authorities dealing with them. The costs associated with the immediate response were substantial in terms of additional labour and supplies, remedial works, accommodation, tankers and water distribution, leak detection, clean up costs and others. The provision of supplementary funding from the Department of the Environment, Heritage and Local Government for such response costs was welcomed. However the long-term financial implications are of concern. There was substantial damage to regional and county roads as a result of frost and ice, for which no supplementary funding has been provided. Road treatment costs were in practice a multiple of the budgets available, and water collection and distribution systems affected will cost money to remedy. The costs of adequately protecting water treatment and distribution infrastructure from future events are unknown, and the costs of preparing and implementing effective flood prediction, defence and risk management measures are likely to be very substantial in some counties and regions.

Local authority managers pointed to a range of lessons learned from the severe weather events:

- the general and very localised causes of the flooding require detailed examination, the development of comprehensive and up to date flood mapping, risk assessment and management planning, co-ordinated across all relevant agencies and based on the events that took place in November 2009, needs to be accelerated and implemented. Such examinations need to consider the major river catchments, tributary systems, dams, weirs and reservoirs and their influence on drainage;
- there needs to be greater investment in arterial drainage;
- minor localised flood protection measures and schemes identified by local authorities need to be financially supported and implemented pending the completion of major studies and works;
- the major emergency framework ensured reactions were effective and co-ordinated. The further refinement of the framework learning from these experiences should take place, and ongoing support for inter-agency planning, training and co-ordination should be supported on an ongoing basis;
- road salt procurement, storage and distribution should be managed at a central, national level, and storage capacities should be optimised;

- confusion was evident as regards the responsibility for major rivers, their control and management and their water levels and flow rates, with a host of agencies with responsibilities but little clarity as to the predominant one;
- there needs to be advance clarity on cost recoupment from central Government, the costs of what aspects of the local emergency response activities will be recouped from central funds, and the precise circumstances in which local authorities have to financially resource emergency responses from existing budgets;
- local authorities generally adopted or based their responses on the major emergency framework and their own major emergency plan. The latter are however generic. Sub-plans tailored to emergency flooding and cold weather crises should be developed by all local authorities identified as primary response agencies under the emergency framework;
- information regarding vulnerable persons living in specific areas does not appear to have been readily available to local authorities and would have assisted in facilitating a co-ordinated and rapid response to those most in need of assistance. Databases of such persons should be developed and maintained under the emergency planning framework;
- the assistance of members of the public by way of clearing roads and pathways of snow and ice, and gritting of local and county roads came up against what may have been legitimate concerns regarding health, safety and public liability implications. Clarity needs to emerge at a national level on these issues to allow agencies to react appropriately at local level.

Members raised numerous issues of concern with the local authority delegations. The lack or insufficiency of river drainage and maintenance works was a significant concern. In this regard, the local authority representatives confirmed that while some funding was set aside for such works on an annual basis, the level is entirely inadequate in the face of what has now been shown to be required. Furthermore local authorities are typically responsible for the drainage and maintenance of a proportion of the river channel in their areas. The OPW is responsible for other channels, but much channel length flows over private property where responsibilities for maintenance are more unclear.

The issue of the protection from floods of critical water and waste water treatment infrastructure was also raised, and the need for steps to be taken was acknowledged by local authority officials that met the Joint Committee, although the source of funds for such works would need to be identified.

Many Members also expressed serious concerns about development having taken place or having been permitted to do so on floodplains. Local authority officials pointed to the recently published guidelines issued jointly by the Department of the Environment and Local Government and the OPW as the appropriate framework for addressing such concerns in future, and several pointed to what they considered effective planning policies having been in place in recent years within their own authorities. However nobody denied that buildings are located and development has taken place on what have historically been known to be (or have now been proven to be) lands at genuine risk of flooding.

Members questioned the financial capacity of local authorities to fully respond to the severe weather events, and to address their long-term implications. While the officials noted and acknowledged the supplementary central government funding provided to cover costs associated with the immediate emergency responses, the costs of repair and remedial works to damaged infrastructure was of great concern to some, and the costs of researching and implementing future flood management and risk mitigation strategies were also a substantial concern in the present financial climate.

Information management and communication issues were also raised, with concerns expressed regarding a lack of clear information at the very early stages of the crises, during which rumours and misinformation were prevalent. The local authority officials felt that huge resources and time had gone into information management and communication and that new procedures and protocols were followed, although they agreed that lessons would also need to be learned in this area. The need to get clear and unequivocal information out immediately as a crisis is developing is one such lesson, even though time is needed to gather and verify facts at the outset. Another lesson may be to put more emphasis on local radio as an effective information conduit, in tandem with detailed web-based information and news. The point was also made however that the national rather than just local media have a critical role to play in informing the public, but that this needs a national approach to information and media management rather than one any individual local authority can deliver.

The incidence of pipes freezing and cutting off water supplies during the severe cold spell was also a significant concern, and Members questioned building standards and their enforcement in this area. The local authority officials maintained however that compliance with building regulations remains the responsibility of developers in estates that have not been taken into the charge of local authorities, and that while they do put resources into the enforcement of building regulations, such resources are finite.

Even at the level of the effective use of sandbags, lessons should be learned from international approaches, such as the UK practice of utilising plastic sheeting in tandem with sandbags to provide a non-permeable barrier.

Finally, many Joint Committee Members paid tribute to the local authorities, their staff, volunteers and charitable organisations, and supporting agencies in managing the crises in the manner they did, and avoiding further damage, serious injuries or loss of life as a result of the severe weather events.

6. Communications

Communication in an emergency or crisis situation is vital, a fact generally understood to be the case by those who had responsibilities to react to the severe weather events of November 2009 to January 2010. The overriding need is for members of the public to understand the nature of the emergency, any threat to them it may present, and appropriate action they should take.

However while it is of course critical that there be effective communication in the face of an emergency, the successful management of that emergency will depend on how effective communication between agencies and with the public will have been prior to the emergency event itself, and in the co-ordinated preparation for such an event.

Information also needs to flow effectively in many different directions in a crisis, and between many parties. While informing members of the public about threats to their safety and welfare is obviously critical, equally important will be the communication within response agencies, between such agencies and others active in the response effort, between information sources and those making decisions based on it, and between those responsible for monitoring and managing risks and those responsible for reacting when such risks materialise and become reality.

The communications challenge is a formidable one in a widely-affected weather emergency. It needs professional management and pre-planned approaches that consider what information is needed, by whom, where and how it is to be gathered, sourced and verified, how it is to be disseminated, when it needs to be received and how regularly it needs to be updated. The communications challenge in a crisis can also be as much about the management of the public's perceptions, whether factually accurate or not (a point recognised in the Framework for Major Emergency Management).

As the primary local response agencies, the local authorities understood the importance of communication, and most appear to have adopted the communication protocols and principles set out under the major emergency framework. Sustained and concerted efforts were made to inform members of the public regarding the conditions, their severity, location, their likely and actual effects and the action being taken. A wide range of methods were used, including the use of 24 hr emergency telephone services, council websites, extensive use of local radio bulletins and interviews, text messaging, press releases and press conferences, public meetings and the making available of key personnel to answer telephone inquiries.

A range of warnings and forecasts were made by MET Éireann regarding rainfall, snow and ice, directed both at the public in general and to particular agencies and organisations with responsibilities requiring preparation and reaction.

Nevertheless lessons must be learned from the experiences of the severe weather emergencies to ensure any communications strategy relating to a future similar crisis is most effective and beneficial.

Prior to the flooding events, the risk of serious flooding which people living and working in specific areas within major river catchments, were at, was not adequately

communicated to them. For example, residents of relatively new developments proximate to, but not directly beside rivers, should have been specifically informed of the flood risks of their residences. This applies to the period immediately prior to the November 2009 floods (when three consecutive wet summers were being followed by an autumn of extreme rainfall), and over the previous number of years. This is highly regrettable. Irrespective of the role of the State and its agencies to respond, the first line of defence against and reaction to a flooding threat are the people threatened by it. For them not to have been made fully aware of the threat is a substantial failing. Informing such people when the flood has arrived or is both imminent and unavoidable is too late. The challenge to which this gives rise is two-fold: firstly the nature of the threat in very specific localities must be understood by the authorities responsible; and secondly the message has to be effectively delivered and understood, and the failures appear to have arisen in relation to both.

That no major emergency was officially declared in Cork on foot of the floods of November 18th to 20th is now understood by the Joint Committee, to have been due to the wider implications of such a declaration. There is concern that irrespective of its effect, the lack of a declaration must by definition have influenced the responses of those trained in how to react to such a declaration.

Some Members of the Joint Committee questioned the speed with which official information began being issued to members of the public and people living in areas affected by flooding, and recalled how there was substantial rumour and misinformation being promulgated in the absence of clarity in this immediate period following the outbreak of the emergency. While it is acknowledged that authorities required some time to establish and verify facts and discern appropriate local action to be taken, a future lesson is that every effort must be made to minimise the period in which people remain “in the dark” regarding the conditions in their own areas and the official response being made.

Communication between the response agencies was not as effective at the height of the crises, for instance, some agencies reported that key contact numbers for other agencies which they held were general office numbers with recorded call diversion systems. This is unacceptable in an emergency situation, and cross-agency contact numbers need to be direct lines (mobile numbers if necessary) for key identifiable people, at which they ought to be available within or outside normal office hours.

Finally, while some local authorities felt that web-based information dissemination had been effective and widely utilised by members of the public, a balance needs to be struck between such approaches and more traditional methods such as telephone calls and local radio, especially for older people or those who may not use the internet regularly or as a primary source of information.

7. Case Studies

7.1 Shannon

The Shannon is Ireland's largest river system. It stretches some 250 km from source to estuary and covers a catchment area of more than 10,000 sq.km. Exceptionally high rainfall during late October and November 2009 led to severe and in many places unprecedented flooding along substantial portions of the river catchment that lasted from approximately 19th November until early December. Homes, businesses and other premises were flooded, people were evacuated from their residences, and many large towns suffered extensive damage. Local authorities led the local response, and took a broad range of measures to deal with the events including assisting people affected, the distribution of pumps, sandbags and food parcels, providing temporary accommodation, the closure and diversion of roads, the protection of critical infrastructure, the distribution of clean water, and communication of details and developments to the public and other parties.

The Shannon is prone to flooding. Its length, the size of the land area it drains, its system of lakes, channels and tributaries, and its relatively low gradient (falling by less than 20m between Lough Allen and Lough Derg), result in recurring conditions of localised or widespread flooding after periods of heavy rainfall.

To discuss the management of the Shannon, the Joint Committee invited representatives of a range of agencies with interests or responsibilities concerning the river to come before it. These included the National Parks and Wildlife Service, the ESB, the Central Fisheries Board, Waterways Ireland, Bord na Móna and the Heritage Council.

The National Parks and Wildlife Service

The National Parks and Wildlife Service (NPWS) is part of the Department of the Environment, Heritage and Local Government, which is the lead Department in relation to the protection of the State's ecological assets, such as habitats, species and ecosystems. It operates under the legal framework of the Wildlife Acts and the EU Birds and Habitats Directives. The Shannon River is designated as both a Special Area of Conservation (SAC) and a Special Protection Area (SPA), and the Shannon Callows (stretching from Athlone to Portumna) are recognised as a nationally and internationally important habitat for many bird species.

Article 6 of the Habitats Directive, which applies to both SACs and SPAs, requires that any public authority, before consenting to any project or plan that could have a significant impact on a designated site, should undertake an ecological impact assessment of it. This applies to a range of activities including land-use plans and planning consents, a local authority's own development, forestry consents, aquaculture licensing and river drainage works including maintenance programmes. The delegation noted that when considering flood alleviation on a site as complex and significant as the Shannon Callows, a detailed ecological investigation is a legal pre-requisite under the relevant EU Directives.

The Electricity Supply Board

The ESB is responsible under statute for the operation of the Ardnacrusha hydroelectric station located upstream of Limerick City. It is one of several hydroelectric stations under the ESB's portfolio, and can generate 85MW of electricity using a renewable and sustainable source.

Below Lough Derg, the river is diverted at Parteen Weir to the Ardnacrusha station for electricity generation, with a minimal release down the original river channel. During flooding however surplus water can also be discharged down the original river channel from Parteen Weir, as was the case in November 2009.

According to the ESB delegation, the company's statutory role in relation to the Shannon is in the generation of electricity at Ardnacrusha. It no longer has a strategic interest in storing water in Lough Allen or Lough Ree for electricity generation, and operates minimal control of their water levels in non-flood conditions. The outlet sluice gates at Lough Allen are mainly used to maintain navigation levels in the lake, to discharge floods and to maintain the downstream channel. On Lough Ree, minimum safe navigation levels are maintained in the Summer months in non-flood conditions, and the Athlone sluice gates are used to augment downstream flows in circumstances where doing so would not result in waterlogging or flooding in the Callows.

During flooding, the maximum amount of water possible is channelled through Ardnacrusha, thereby minimising the additional discharge required to flow down the original river channel and providing a degree of flood alleviation. During floods, the delegation maintained that the only significant control on the river is at Parteen Weir, the effects of which do not extend upstream of the Meelick Weir.

The Central Fisheries Board

The Central Fisheries Board is statutorily responsible for the management, conservation, protection, development and improvement of inland fisheries and sea angling, and it operates under the aegis of the Department of Communications, Energy and Natural Resources. Any proposal to drain a river must be assessed by the Board with respect to its potential to cause damage to the fishery environment. The Board will discuss any such proposals with developers and put forward suggestions if required, and has done so in relation to many proposals concerning river channel maintenance.

Irish Farmers Association

A delegation from the Irish Farmers Association (IFA) presented a number of their concerns to the Joint Committee. These included:

- the neglect of the maintenance of the River Shannon over many years and the effects of localised flooding on farmland along its banks;
- the plethora of agencies involved in river management;
- the conflicting role of the ESB in managing water levels to support electricity generation rather than other public policy objectives;
- the need for a single rivers agency.

Waterways Ireland

Waterways Ireland was established on foot of the Northern Ireland Good Friday Agreement as one of six cross-border bodies. It operates under the British/Irish

Agreement Act 1999, the Shannon Navigation Act of 1990 and the Marine Safety Act of 2005, and its remit is to manage, maintain, develop and restore the inland navigable waterway system throughout the island, principally for recreational purposes, and it has the legislative responsibility to manage, control, extend or develop the Shannon navigation. According to its delegation, Waterways Ireland manages the water levels under its control in order to achieve the minimum level required for navigation at times of low flow and to afford the maximum flood relief at all other times.

Over the last decade, Waterways Ireland has increased the number of mooring berths on the Shannon system alone by over 50%, and made new destinations accessible such as Ballinasloe and Boyle. It expressed the view that any changes to the existing navigation regime that would lower water levels could render much of the infrastructure inaccessible.

Bord na Móna

Bord na Móna controls 37,000 hectares of bog in the Shannon catchment, equivalent to 2.1% of the total land area. Of the total land area, 12,500 hectares, or 0.7% of the land area, is actively worked by Bord na Móna. The delegation stated that the company operates under Integrated Pollution Control Licenses issued by the Environmental Protection Agency (EPA), which applies conditions relating to water discharges. All discharges go through appropriately designed silt ponds, designed to rid water from peat silt and dust before its discharge, and of which it has approximately 500 in its area of operations within the Shannon catchment. The company's compliance with the requirements is monitored by the EPA, and its record in this regard is excellent according to the delegation.

In terms of the future, the delegation from Bord na Móna stated the view that cutaway bog can offer a significant opportunity for flood attenuation, and that an increasing proportion of Bord na Móna's peatlands will become cutaway bog in the coming years. The company has already publicly declared that it will not be opening any new bogs for working. It is open to co-operating fully with all relevant agencies to explore this potential use.

The Heritage Council

The Heritage Council is tasked with protecting and enhancing the richness, quality and diversity of Ireland's national heritage. It works with its partners, particularly at local level, to increase awareness of Ireland's national heritage and to highlight its importance to public policy and everyday life. It is a statutory body operating under the Heritage Act 1995, and amongst its responsibilities is to propose policies and priorities for Ireland's inland waterways, on which it has published numerous policy papers, conducted waterway corridor studies and held seminars and awareness raising events.

Recognising that a river is a single entity, and the absence of a coherent national policy, the Heritage Council called for an overall waterways strategic plan in 1999. In its 2005 paper "Integrating Policies for Ireland's Inland Waterways", it recognised the need for an overall co-ordinating function for inland rivers and waterways. The delegation expressed the view that the continued absence of such a co-ordinating and leadership function became apparent once again during the floods of late 2009, where no agency or Department took a leadership role, and where responsibilities remain fragmented and

unclear. It notes that as well as the various roles and responsibilities of the OPW, the ESB, Waterways Ireland, National Parks and Wildlife Service, the Fisheries Boards and other national agencies, both regional and local authorities have significant roles and responsibilities concerning the Shannon. However only in one county is the same local authority even in place on both banks of the river.

The Heritage Council has developed significant skills and experience in bringing together multiple stakeholders to enhance and co-ordinate policies and planning. Under its statutory remit, it is obliged to promote co-ordination, and has done so in many arenas with multiple stakeholders, including in relation to waterways and the Shannon specifically. In its experience, effective co-ordination requires resources – time and money, as well as proactive work, good working relationships, clear channels of communication and trust. It will not take place if an ad-hoc working structure is expected to evolve of its own accord.

The Council would like to see resources allocated to co-ordinate the role of the various agencies in the effective management of the waterways, including the Shannon. It does not hold to the view however that the establishment of a single “super agency” can simply bring this about, as there is a wide range of interests that are entirely legitimate and need to be considered. Greater clarity is however needed about roles and responsibilities, and proper accountability and leadership must be brought to the fore. For its part, the Heritage Council is committed to working with all parties to bring this about.

7.2 Cork City Floods

An enormous quantity of water descended the River Lee on the evening and night of November 19th and during November 20th 2009, resulting in severe flooding in western parts of Cork City. Households had to be evacuated, and roads closed and diverted. The Lee Waterworks had to be shut down due to flooding, and clean water supplies were cut to thousands of residents. The quay walls collapsed at Grenville Place as a result of flooding in the city, causing them to fall into the river and power lines came down. Huge quantities of rock had to be deposited to provide temporarily repairs to walls. The Mercy Hospital flooded and the A&E Department had to be evacuated. At University College Cork a total of 29 buildings were flooded, 30 acres was submerged, a third of the building stock was affected and 13% was directly damaged at basement and ground floor levels. Over 500 staff were impacted and 2,000 students were required to evacuate student residences. There was substantial damage to households and businesses, major disruption to water supplies and transport, and severe hardship suffered by many residents over a period of days and in cases weeks.

A massive effort to deal with the flooding ensued, led by the City Council, but with the assistance of a range of organisations including Cork County Council, An Garda Síochána, the HSE, the Defence Forces, the Fire Service, the Civil Defence, the ESB, private businesses, adjoining local authorities, a host of voluntary and charitable bodies and many private individuals. Despite the scale and severity of the floods and the speed with which they developed, there were no known fatalities or significant injuries.

The Cork City Manager set out his account of the sequence of contacts from the ESB at Inniscarra Dam on November 19th and 20th, for the benefit of the Joint Committee:

- at 11.30 a.m. on Thursday November 19th, the City Council was contacted by the ESB at Inniscarra Dam and informed that the discharge level would be 150 cubic meters per second, increasing to 200 cubic meters over the subsequent few hours with the possibility that it would reach 250 to 300 cubic meters per second later in the day;
- this information was assessed by the Council, and when considered against the weather forecast at that stage and the expected timing of the high tide, the indication was that some flooding could be expected at Carrigrohane Road and Western Suburbs;
- at 15.00 the ESB at Inniscarra Dam informed the Council that the discharge levels had risen to 225 cubic meters per second, were expected to reach 250 cubic meters per second by 17.00 hours and could reach 275 cubic meters per second by 19.00 hours;
- at 17.00 the ESB at Inniscarra Dam informed the Council that the discharge level would now reach 300 cubic meters per second;
- at 17.30 the ESB at Inniscarra Dam informed the Council that discharge levels would be higher than previously anticipated;
- at 22.10 the waterworks contacted the ESB at Inniscarra as there was increasing concern about the rising water level near the water treatment plant. The ESB advised that the discharge levels would now go to 450 cubic meters per second; and
- at 16.00 on Friday November 20th, at the second Crisis Management Team meeting held on that day, the ESB informed the meeting that it had found it necessary to increase the discharge levels at the Inniscarra Dam to 535 cubic meters per second during the previous night.

The City Manager also described the response of the Council and support agencies, noting that at 12 noon on November 19th, the City Council contacted key businesses on the Carrigrohane Road advising them of the flooding possibility, and mobilised the traffic section to deal with road closures. At 14.30 it issued a flood warning by email to all relevant internal staff and to a standard list of external parties including local broadcast and press media and city centre businesses. At 18.50 the tide level was gauged by the Council, which indicated sufficient capacity to accommodate the flow of water from upstream without floods resulting.

At 21.00 the water level at Grenville Place had fallen somewhat, reflecting the passing of the high tide. However at 23.00 the Carrigrohane Road was under heavy flood, and the Army was mobilised to gain access to a halting site there. At 23.28 the Civil Defence was mobilised, and at 12 midnight the shutdown of the Lee Waterworks commenced as the pumping station was being flooded.

By 02.10 on Friday 20th November there was no immediate threat to the Mercy Hospital, and the Army assisted in giving access to the Lee Waterworks for an electrician, and at 03.00 the Council initiated its Drinking Water Incident Response Plan. At 03.56 the Council was informed that the quay wall at Grenville Place had collapsed, and at 04.07 the Council staff and the Army were on site, and protection for the generator and other ground flood equipment at the Mercy Hospital was put into place. Between 04.00 and 06.30 the Gardaí, Army, Council Building Control Staff, Council Housing Staff, Fire

Brigade, Civil Defence, Water Engineers and Roads Staff were on the streets, and by 07.00 the Council commenced arrangements for providing water supplies by way of tankers.

During the course of Friday 20th November two meetings of the Council's Crisis Management Team were held, the evolving situation assessed, wider resources mobilised, responses prioritised and the evacuation of residents at Grenville Place initiated. During the night 2,000 tons of rock were delivered to the breached quay wall.

Other steps taken in the immediate aftermath of the flood's arrival included:

- the bringing into use of a defunct watermain at Tivoli to ensure the maintenance of water supplies to the Central Island;
- the distribution of an estimated 300,000 litres of bottled water to households;
- the establishment of 40 water stations supplying drinking water and water for sanitation purposes;
- the delivery of water to hospitals;
- the provision of temporary accommodation for evacuated persons;
- the delivery of water tankers to schools to ensure their re-opening on the 30th November;
- preliminary examinations of all bridges and the quay walls was arranged, and urgent repairs were carried out.

Dedicated telephone numbers were established for members of the public, and over the period November 19th to December 3rd a total of 42 press releases were issued and regular briefings for the local, regional and national media held. Web-based information was continually updated, advertisements and notices put in the press and interviews given on an ongoing basis.

A delegation from the ESB attended a meeting of the Joint Committee on February 23rd 2010, and gave its summary of the events that took place around November 19th and 20th at Cork, and particularly with respect to its management of the Carrigadrohid and Inniscarra reservoirs and dams on the River Lee upstream of Cork city.

The ESB has a statutory role in the hydroelectric generation of electricity, and operates several hydroelectric power stations on the Shannon, Lee, Liffey, Erne and Clady river systems. The River Lee scheme dates from the late 1950s and can generate 27 MW of electricity from a sustainable and renewable source.

It noted that flood risks in Cork city arise for both fluvial and tidal reasons, and that the fluvial effect is influenced by the discharge from the Inniscarra dam, as well as the Shournagh, Bride and Curragheen rivers which are downstream from it. Discharges from the Inniscarra dam take approximately 4 hours to reach the weir at the Lee Waterworks on the western fringes of the city, and the topography of the catchment results in a very flashy river system, with water levels rising and falling very quickly in response to heavy rainfall. As well as an electricity source, the scheme provides flood alleviation downstream of Inniscarra, by reducing the flow of water downriver during peak flood periods.

The ESB operates the scheme according to Regulations and Guidelines for the Control of the River Lee, the current version of which dates from December 2003. These set out procedures and protocols for the management of flood events and of routine water management, and set out specific rates at which water should be spilled in order to manage reservoir levels and protect dam structures, which is a key objective of the ESB's regulations, which also include the principle of not causing a flood – i.e. peak discharges are not allowed to exceed peak inflows during a rising flood.

According to the ESB, heavy rainfall during November 19th raised the reservoir level behind the Inniscarra dam by over 2.5m in 16 hours. Catchment inflows peaked at 809 cubic meters per second, and discharge levels from Inniscarra were increased during the day, in accordance with the Regulations, and peaked at 546 cubic meters per second at 21.50 hrs, and remaining at that level until 03.40 hours on Friday November 20th, at which stage the reservoir level began to drop and the discharge rates were reduced.

The ESB confirmed that it issued warnings, including to the City Council, between 10.45 and 11.00 on Thursday November 19th, with further warnings that the situation was escalating between 16.50 and 17.30 hours. RTE was contacted at 17.40 hours and asked to issue a flood warning. The ESB indicated that it was satisfied that timely and appropriate warnings were issued to all the relevant local authorities, other bodies and local residents, and that it fully discharged its responsibilities in relation to flood warnings. The ESB made the point that they issued two warnings on Thursday, 19th November, which was unique. However, the significance of the two notifications wasn't appreciated by the general public.

The ESB delegation referred to the Framework for Major Emergency Management and the development of major emergency plans by local authorities. The ESB had not been aware of this framework in advance of the November flooding, according to its delegation.

The delegation noted that the ESB is not a delegated lead agency in either flood risk management or emergency response. It is aware of the draft Lee CFRAMS study which it welcomes, and has met with the OPW to discuss the next steps in that process.

8. Conclusions and Recommendations

8.1 Conclusions

Severe weather events are a natural phenomenon and are both inevitable and unavoidable. What a State can and must do in the face of this knowledge is firstly to prepare well, and secondly to react well. In both preparation and reaction, the management of the severe weather spells between November 2009 and January 2010 involved aspects which were strong and aspects that were weak. As an overall outcome, that is unacceptable.

Nobody controls the weather or its extremities, nor can it be predicted perfectly or substantially in advance of its occurrence. Similarly, the preparation for and response to severe weather can never reach perfection, and probably can't categorically ensure that when it arises it will have no detrimental effect on any citizens. Lessons will always need to be learned, and preparation and response improved. What is possible is that the prior preparation is comprehensive, informed, resourced and co-ordinated, and that the response is immediate, wide-ranging, thorough and effective. Managing severe weather events is not simply about reaction. It means planning for them, understanding and effectively managing and mitigating the risks prior to them occurring, putting the resources of the State into dealing with their effects swiftly and effectively when they do occur, and taking the further steps necessary to mitigate the effects of similar future events.

The management of the severe flooding in Ireland during November 2009 and the subsequent severe cold weather of December and January had several very positive dimensions in relation to both prior preparation and response. It is undoubtedly the case that the lack of known fatalities and the minimal severe injuries attributable to the weather, and the minimal disruption to large numbers of people's lives and welfare, were in huge part reflective of the readiness of citizens and official agencies to respond and their effectiveness in doing so. Tremendous credit is due to the individuals, communities, businesses, charitable groups and State organisations that worked tirelessly over the periods in question to bring about these outcomes, and the Joint Committee pays enormous tribute to them.

At the same time, that the State was properly informed of the risks, was properly managing them, responded comprehensively and meticulously, and was adequately prepared and resourced to do so, is at best unproven and more likely simply untrue. Many people's lives were negatively affected by the weather events and to extents that could and should have been avoided. There is a duty therefore to avoid the same result in future, and this must be the singular focus of the State and its agencies, irrespective of the specific role of different structures and parties. Throughout our deliberations we repeatedly encountered a tendency on the part of various relevant State bodies to define their responsibilities more in terms of what they do not include rather than what they do.

The Members of the Joint Committee were acutely aware of the hardship and devastation visited on innumerable communities throughout the country as a result of the severe weather, and were informed by many who suffered at the coal-face. Although dealing

with events of nature, it focused its deliberations not on apportioning blame, but on identifying where things should have been managed better. In doing so, it seeks only to ensure appropriate action is taken so that future events have a less severe impact on the country and citizens.

The Framework for Major Emergency Management played an important role in ensuring the preparedness for and response to the severe weather events were as effective as they were in practice. It ensured responses were delivered and managed locally and that a common understanding of the steps to be taken was shared amongst local agencies and authorities. Important principles of emergency reaction were familiar to those tasked with local management, and appropriate working mechanisms were adopted. The existence of the Framework and the processes that have accompanied its adoption unquestionably left the State much more prepared than would have been the case in its absence. However several of its aspects, and how it was applied to and supportive of the management of the severe weather, are of significant concern to the Joint Committee.

A fundamental concern is that it is complex and confusing to those unfamiliar with it. While it has many merits, the fact that it cannot provide a clear, unambiguous and consistent answer to the question of “who is in charge?” in an emergency situation is most unsatisfactory. While leadership roles are set out, the answer to the question becomes dependent on a range of issues such as what type of emergency is at hand, where it is occurring, whether it conforms to the definition of a major emergency, who decides that and who declares it. It is the first question many will ask when confronted with a public crisis or emergency situation, and there is a reasonable expectation that a prominent, recognisable, authoritative and accountable body and figure is understood to be leading and directing an effective response from the outset.

The Joint Committee is satisfied, based on the enquiry it has undertaken and the information gathered to date, that there is an urgent necessity for an independent investigation into the circumstances surrounding the flooding of the Lee valley and Cork City downstream of the Inniscarra Dam on November 19th / 20th 2009. Such an investigation should be resourced so as to retain appropriate technical expertise at its discretion.

The Joint Committee regards such an investigation as essential in order to understand the causes leading to the November 19th / 20th flood and to identify the appropriate immediate steps that can be taken in order to eliminate or minimise the prospect of similar circumstances arising in future, and if and when they occur, to ensure as far as possible that they do not result in such catastrophic consequences for people in Cork, their homes and businesses.

Much work has gone into local emergency planning as a result of the roll-out of the Framework, but the extent to which this has involved planning for severe weather emergencies specifically, including the detailed assessment and management of weather risks, is unclear and appears unsatisfactory. The Joint Committee welcomes the proposals of some local authorities to prepare emergency plans specific to flooding and severe cold weather based on the experience gained between November 2009 and January 2010, but it is also concerned about how such plans should integrate with the numerous other agencies that have a role in identifying and managing the risks severe weather pose. The OPW is the lead agency for flood risk management, but the local authorities are

responsible for preparing emergency plans for dealing with a flood emergency, including, it would appear, the assessment and management of risk. The Joint Committee was also greatly concerned to learn from its own delegation that the ESB had been unaware of the Cork city Emergency Plan prior to the flooding events of November 2009. The ESB was not aware of, and therefore not involved in, the development of the Department of the Environment, Heritage and Local Government Major Emergency Management (MEM) Framework

The Joint Committee is aware that a number of State bodies are reviewing the severe weather emergency and that the Department of the Environment, Heritage and Local Government is carrying out a review of the management of the severe weather emergencies, which the Joint Committee welcomes. As well as the concerns described above, the Joint Committee considers it critical that the review examine both the emergency response itself, as well as the suitability and adequacy of the prior emergency planning processes undertaken by principal response agencies into weather-related emergencies specifically. The depth, scope, processes and outcomes of severe weather risk anticipation, assessment and management that took place alongside generic emergency planning need to be fully understood and their adequacy assessed. Equally the reasons for, and effects of, major emergencies not having been officially declared in the cases of both the flooding and severe cold need to be identified, and the speed and effectiveness with which national structures of the Framework, including the NERCC, came into operation require consideration.

The number and range of State bodies that have powers or responsibilities regarding inland waterways is truly breathtaking. The fragmented organisational distribution of responsibilities, as well as their fragmented regional structures within individual river catchments, would almost leave one at a loss as to where to begin in any modernisation of the arrangements. Yet the Joint Committee is aware that the frustrations to which this gives rise often relate to the complex set of legitimate interests more than the complex set of agencies. A single, over-arching river authority (or individual authorities for major rivers) has been proposed in the past and may offer the promise of more co-ordinated and effective management, but it cannot reduce the number of interests, often competing ones, that such management must address. The case for such an authority rests more in relation to improved co-ordination of the management of river systems. The Joint Committee is aware of the River Basin Management process that has been developed in accordance with the Water Framework Directive, and its new approaches to co-ordinated management involving all stakeholders, but would like to see its ongoing effectiveness rigorously evaluated.

Flood and severe weather preparation costs money. Any amount of policies, programmes, or reports can exist to set out what is or should be done, but without effective resourcing of each step of the implementation process, the system fails. In too many instances the reaction to suggestions of under-resourcing is reference to increasing or record levels of spending. While spending may indeed be increasing or at record levels, this has nothing to do with what levels are actually needed. Improving the prior management of severe weather risks, and improving the effectiveness of emergency responses, will cost money in terms of research, structural and non-structural risk management measures, response resources, equipment and supplies, and ongoing preventative maintenance of assets, and preparedness and responses will not improve if those resources are not put in place.

There has been much physical development on floodplains in Ireland. There has also been considerable development in other areas without proper advance consideration as to how this might affect local drainage and river systems. That it shouldn't have occurred is quite apparent. Guidelines for addressing this in the future are only as effective as the people implementing them. Even then they only affect future planning and do not remedy past planning practice. While the Joint Committee welcomes the publication of the planning guidelines issued in relation to flood risk management, it is concerned that their existence deflects attention from the fact that it is past more than future planning that flood risk management must urgently address. Many citizens who felt they lived in an area safe from flooding were proven wrong in November 2009, and where engineering and hydrology could have shown their prior assumptions to have been incorrect, the onus is on the State to inform them appropriately prior to a catastrophe.

Finally, serious lessons in regard to communications must be learned, and the Joint Committee would expect the review being undertaken in the Department of the Environment to consider communication effectiveness at every level, both during the emergency responses and in their prior planning and preparation.

8.2 Recommendations

Department of the Environment, Heritage and Local Government and Other Government Departments

1. The Department of the Environment, Heritage and Local Government should complete and publish its review of the management of the severe weather events, and should specifically consider the following as part of the review, such a review to be completed by 1st November 2010:
 - a. Whether or not a major emergency should have been declared at local or national level and whether or not a system of graded emergencies should be established according to the level of severity;
 - b. The speed and effectiveness with which the local and national authorities under the Major Emergency Framework responded to both severe weather events;
 - c. The reasons the ESB was not aware of nor involved in the development of the Department of Environment, Heritage and Local Government Major Emergency Management (MEM) Framework and also not aware of a Cork City Emergency Plan prior to the November flooding events;
 - d. The extent and adequacy of detailed, co-ordinated flood risk assessment between Cork City Council, the OPW and the ESB in the development of local emergency planning in Cork under the Major Emergency Framework;
2. In major emergencies, leadership must be provided by the Minister or, alternatively, by the Secretary General;
3. The Government should oversee and sponsor an independent technical and engineering review of the role and the management of the ESB's Hydro Electric Schemes in view of the conflicting requirements of electricity generation, flood management and the provision of public water supplies;

4. The Department should ensure that local authorities are adequately resourced and continually effective in the enforcement of building regulations as they apply to piping and water distribution networks and their susceptibility to extreme cold;
5. The Department should take steps to ensure recent guidelines on the planning system and flood risk management are effective and enforced;
6. The Department should, in conjunction with the OPW, ensure urban water, waste water and draining schemes supported under the Water Services Investment Programme are planned and prioritised with flood risk management considerations fully assessed;
7. The Department should investigate the health, safety and public liability issues surrounding members of the public assisting in treating roads, paths and other property in conditions of ice and snow, and give clear guidance to local authorities in this regard;
8. The Department of Transport and the National Roads Authority should oversee and manage a national programme of road salt procurement, distribution and storage and ensure stocks are sufficient, maintained, and available to local authorities in the event of a spell of cold weather as severe and prolonged as in December 2009 to January 2010;
9. The Department, in conjunction with the local authorities, should research and identify water and waste water treatment and distribution infrastructure located in areas of significant or high flood risk, and should provide resources for appropriate protection works to be carried out;
10. The Department should prepare and circulate clear guidance to local authorities regarding the recoupment of emergency response costs to them by the Department in the event of severe weather emergencies;

The Office of Public Works

11. The OPW's funding for flood risk management should be substantially and strategically increased to reflect levels of flood risk now known to exist in several major river catchments. The OPW should commence and if possible accelerate the implementation of the Lee CFRAMS, commence the Shannon CFRAMS and those of other major river systems;
12. The OPW should approve and fund all urgent minor flood relief measures identified by local authorities pending the completion of detailed flood risk assessment and management strategies except where there may be legal or other unavoidable reasons for not doing so;
13. The OPW should determine and prepare a national strategy for river drainage and maintenance measures to manage flood risk, and allocate sufficient resources to, and begin, its implementation in conjunction with the local authorities;
14. The OPW should actively engage with and support local authorities in the preparation of detailed flood risk assessment under the major emergency planning framework;
15. Appropriate flood early warning systems should be put in place by the OPW on all major river systems or parts thereof where a substantial ongoing flood risk is known to exist. Providing some degree of early warning system in such places should not need to await the detailed studies planned under the CFRAMS process;
16. The OPW should update its flood mapping work to reflect localised risks and flooding events that took place in November 2009, and ensure such information is disseminated to and understood by relevant agencies;

The Local Authorities

17. Each local authority nominated as a principal response agency under the Framework for Major Emergency Management should prepare specific flood and severe cold weather major emergency plans, including detailed risk assessments;
18. Such plans should seek to provide for the treatment of main, strategic and primary roads as well as regional and county roads that provide important accessibility during a severe cold weather period;
19. Each local authority should prepare an inventory of water and waste water treatment and distribution infrastructure in their jurisdiction and set out measures that need to be taken to protect them from the risk of flooding;
20. Each local authority should review their effectiveness in the treatment of roads during the severe cold spell of December 2009 to January 2010;
21. Each local authority should develop and maintain a database of people vulnerable to the effects of floods and severe weather in their jurisdiction, subject to data protection and privacy considerations;
22. Each local authority should include a separate budget figure for the drainage and maintenance of rivers in its annual budgets.

Cork City Floods

23. An in-depth investigation should be conducted by the Department of the Environment, Heritage and Local Government into the events surrounding the flooding of Cork City on the 19th & 20th November 2009, and that:
 - a. an Independent Expert Investigation Team be established to carry out this task;
 - b. the Independent Expert Investigation Team would comprise of independent experts whose skill-sets reflect the relevant areas to be investigated such as hydrology, metrology, surveying and engineering;
 - c. a specific time frame be set for the Independent Expert Investigation Team to complete its task and that this would be no longer than four months following the establishment of the expert team;
 - d. the brief of the Independent Expert Investigation Team would provide for a period in which relevant submissions can be made by both the public and other bodies;
 - e. the Independent Expert Investigation Team would, along with other matters it deems appropriate in order to complete its investigation, examine matters such as:
 - The extent to which risk assessment was carried out in relation to fluvial flooding caused by the various discharge rates from both dams. The extent to which the relevant individual agencies had access to this data. The manner in which this data was shared and communicated between the relevant agencies. And ultimately how data with regard to various risk assessment levels arising from increasing discharge rates were reflected in the Cork City Emergency Plan;

- The manner, sequence and adequacy by which communications and warnings were issued between agencies, along with those issued by each agency to both individual members of the public and to the wider general public, in the period both leading up to and at time of the flood;
- A determination as to what should be regarded as appropriate water levels held at both dams in the in the period both leading up to and at time of the flood;
- The implementation of all recommendations arising from the ESB 1986 flood report and the implications arising from same in the context of the 2010 flood;
- The implications regarding water retention and discharge levels arising from the putting in place of a spill-way at the Carrigadrohid Dam in 1991 and how this was reflected in the ESB's regulations governing both dams.

Other Recommendations:

24. The Department of Finance should substantially increase the resourcing of the OPW for flood risk assessment and management measures, allowing it to progress the preparation and implementation of flood risk assessment reports and strategies for the major river systems simultaneously and without delay;
25. The Government should consider and assess the effectiveness with which rivers and inland waterways are managed, controlled and regulated, and consider the options for enhancing the co-ordination of responsibilities currently carried out by a multitude of agencies, including but not limited to the option of appointing a single rivers agency or a single agency for the River Shannon;
26. The ESB should be brought into, included and involved with the ongoing implementation of the Major Emergency Management Framework, with immediate effect.

