Comhairle Chontae Uíbh Fhailí
Offaly County Council

# OFFALY COUNTY COUNCIL
# OFFALY CLIMATE CHANGE ADAPTATION STRATEGY 2019 - 2024

OffalyAdapts

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## DOCUMENT CONTROL

| Revision | Status | Report By | Reviewed | Approved | Date |
|---|---|---|---|---|---|
| 1 | Draft for Consultation with Environmental Authorities | Jean Ryan A/SE | Eoin O' Ceilleachair A/DOS | Anna Marie Delaney CE | 28th May 2019 |
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| 3 | Draft accompanying the Chief Executive's Report on Public Consultation | Jean Ryan A/SE | Eoin O' Ceilleachair A/DOS | Anna Marie Delaney CE | 9th August 2019 |
| 4 | Adopted by Offaly County Council | Jean Ryan A/SE | Eoin O' Ceilleachair A/DOS | Anna Marie Delaney CE | 16th September 2019 |

## INTRODUCTION

The Earth's Climate is changing. While natural fluctuations in climate are considered normal, emerging research and observational records from across the world show rates of change that are far greater than those experienced in recent history. Global temperatures have risen and are projected to rise further bringing changes in weather patterns, rising sea levels and increased frequency and intensity of extreme weather. Ireland's climate is changing in line with global patterns and these changes are bringing significant and wide ranging economic, environmental and social impacts.

Climate change is now recognised as a global challenge with policy responses required in terms of both mitigating the causes of climate change and in adapting to the now inevitable consequences of our changing climate. Action at local level is vitally important to help reduce the risks and impacts of climate change across communities.

This Offaly Climate Change Adaptation Strategy is the start of the process of adaptation planning in Offaly County Council and is the first step in increasing knowledge and understanding of our changing climate, growing resilience, and enabling effective responses to the threats posed by climate change.

Climate change mitigation, to restrict new emissions of Green House Gases and enhance plants, soils and oceans to remove carbon from the atmosphere, is a critical priority if a rise in global mean surface temperature is to be avoided. With change a certainty over the coming century, climate change adaptation is also becoming an urgent policy priority. Adaptation involves taking steps to adjust human and natural systems in response to existing or anticipated climatic change, in order both to avoid unwanted impacts and to take advantage of new opportunities that may arise. Scientific research into the impacts of climate change for Ireland has been under way for some time, and a broad understanding of the probable temporal and spatial distribution of changes in temperature, precipitation, sea levels and flood risk is now beginning to coalesce.

Adaptation, along with mitigation, is an essential part of addressing the challenges and opportunities associated with climate change.

**Mitigation** refers to our efforts to limit the man-made causes of climate change.

**Adaptation** involves taking action so that we can be more resilient to our current climate, less susceptible to the impacts of future climate change and in a position to take advantage of opportunities.

Action at local and regional levels is vitally important to help reduce the risks and impacts of climate change across our communities.

The development of Climate Change Adaptation Strategies by Local Authorities is a step in increasing knowledge and understanding of our changing climate and to enable effective responses to the threats posed by climate change.

This Offaly Climate Change Adaptation Strategy forms part of the National Adaptation Framework (NAF) which was given statutory authority by the provisions of the Climate Action and Low Carbon Development Act 2015.

As the level of government closest to local communities and enterprise and as first responders in many emergencies, we here in Offaly County Council are uniquely placed to effect real positive change with respect to delivery of the national transition objective to low carbon and a climate resilience future.

The Offaly Climate Change Adaptation Strategy takes on the role as the primary instrument at local level to:

- ensure a proper comprehension of the key risks and vulnerabilities of climate change;
- bring forward the implementation of climate resilient actions in a planned and proactive manner;
- ensure that climate adaptation considerations are mainstreamed into all plans and policies and integrated into all operations and functions of Offaly Local Authority

This adaptation strategy serves Offaly County Council in its two capacities namely:

- As a business organisation or entity with an obligation towards customer service, a focus on effectiveness in business, improving efficiencies and maintaining staff welfare;
- In the delivery of services and functions across the administrative and geographical area of County Offaly

In accordance with the provisions of the Climate Action and Low Carbon Development Act 2015 this adaptation strategy is required to be adopted by members of Offaly County Council before the 30th September 2019.

## CHAPTER 1 CLIMATE CHANGE, POLICY AND ADAPTATION

### The Challenge of Climate Change

Climate is described as the average weather over a period of time. Climate Change is a significant change in weather patterns such as rainfall, temperature, wind, which continue over an extended period of time, decades or longer. The Earth's climate is constantly changing. Climatic fluctuations are known to occur from natural causes including the Earth's orbit and tilt, volcanic eruptions, variations in solar energy and other phenomena such as the El Nino effect[1]. However, in more recent times, there are growing concerns that natural fluctuations in climate are being overtaken by rapid human-related activities which are negatively influencing climate variability and giving rise to serious implications for the rate of global warming.

Scientific evidence for warming of the climate system is unequivocal. According to the Intergovernmental Panel on Climate Change (IPCC)[2] warming of the climate system is attributable to human activities as a consequence of greenhouse gas emissions[3] from:

- Burning of fossil fuels such as oil, gas, peat, and coal resulting in carbon dioxide emissions;
- Agricultural activities that lead to methane and nitrous oxide emissions;
- Emissions from changes in land use such as urbanization, deforestation, reforestation and desertification;
- Emission from these activities are proven to impact the atmosphere by trapping the suns radiation and reflecting back to the earth giving rise to global warming. The term greenhouse effect has been coined to describe this occurrence.

The effects of global warming are observed through reductions in snow and ice in polar regions, increase in global mean surface temperatures, rise in sea levels and changes in some climate extremes, weather events. Scientists state these changes are occurring rapidly, are considerable, and will have consequences for this and future generations. Some impacts of global warming such as sea level rise and coastal flooding are already locked in and unavoidable. The full impacts of current warming have not yet been seen, since ice sheets and oceans take many decades to fully react to higher temperatures.

Climate change is one of the most pressing global policy challenges facing governments needing immediate commitment to action.

[1] El Nino is a climate cycle in the Pacific Ocean with a global impact on weather patterns.
[2] The IPCC was created in 1988. One of its key objectives is to provide governments at all levels with scientific information that they can use to develop climate policies. IPCC reports are a key input into international climate change negotiations.
[3] Greenhouse Gases include: water vapour, carbon dioxide (CO2), methane CH4), nitrous oxide (N20) and industrial gasses: Hydrofuorocarbons HFCs), Perfluorocarbons (PFCs), Sulphur Hexaflouride (SF6), and Nitrogen Triflourise (NF3). Carbon Dioxide emissions in the atmosphere are the main greenhouse gas caused by human activity

## The challenge for Ireland

There is evidence that Irelands climate is changing in line with global trends of climate change. Over the last few decades our climate has warmed, sea-levels have risen, rainfall patterns have changed and we have been impacted by frequent, intense and more extreme weather events. Temperatures have increased by 0.8°C since 1900 and sea level rises of about 3.5cm per decade have been observed since 1990. Climate change has diverse and wide ranging impacts on Ireland's economic and natural resources including:

- More intense storms and rainfall events giving rise to disruption to society;
- Increased river and coastal flooding;
- Water shortages in summer;
- Increased risk of new pests and diseases;
- Adverse impacts on water quality;
- Changes in the distribution and phenology of plant and animal species on land and in the oceans;
- Increase in Forest Fires;
- Biodiversity and Natural Heritage loss / pattern disruption.

The impacts of climate change are felt more acutely at the local level. Nationally, climate projections for the next century indicate that the climate trends observed over the last century will continue and intensify over the coming decades.

- Increase in average temperatures across all seasons;
- Heat waves are expected to occur more frequently;
- Significant reductions are expected in average levels of spring and summer rainfall with a substantial increase in the frequency of heavy precipitation events in Winter and Autumn;
- Decrease in wind speed and an increase in extreme wind speeds;
- The number of very intense storms is projected to increase over the North Atlantic region;
- Sea levels will continue to rise for all coastal areas. The south of Ireland will likely feel the impacts of these rises first;
- Sea surface temperatures are projected to continue warming for the coming decade.

This Offaly Local Authority Adaptation Strategy is set against the background of increasing risks associated with climate change and seeks to reduce and manage these risks at local level through a combination of mitigation and adaptation responses.

All Local Authorities including Offaly County Council provide a wide range of services, many of which are already and will increasingly be affected by climate change. It is most likely that we will continue to play a critical role in responding to the impacts of extreme weather events and other impacts that are likely to emerge over the coming decades.

### What is Climate Adaptation?

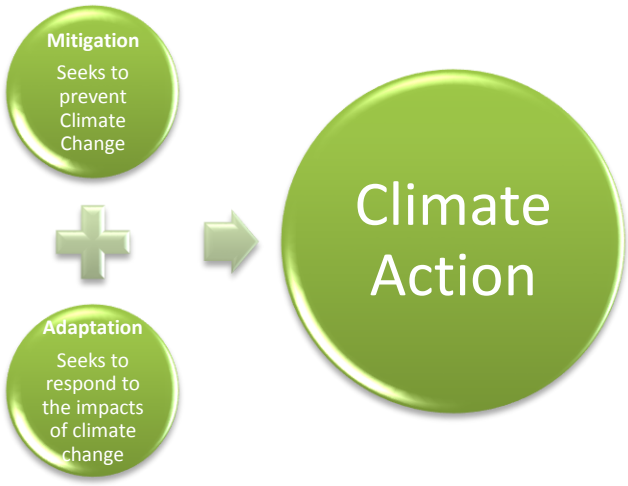
Climate Adaptation can be best described as planning proactively to take action and make adjustments to minimise or avoid the existing and anticipated impacts from climate change. The Intergovernmental Panel on Climate Change (IPCC), in 2014, defined climate adaptation as:

**The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects.**

Climate adaptation aims to build climate resilient communities, to protect people, ecosystems, businesses, infrastructure and buildings from the negative impacts of climate change. As a Local Authority we play a pivotal role in planning for, and responding to, emergency situations. We are best placed to react faster and more effectively to local climate events given our close relationship with communities and extensive knowledge of the local natural and built environment. This is demonstrated by our prompt and unrelenting emergency responses to varying and more frequent extreme weather events.

Our climate is changing and we as Offaly County Council need to ensure that we adapt to climate change. It is crucial that climate change adaptation is mainstreamed into our decision making processes and implemented proactively in the performance of our duties. In addition, the benefits and opportunities that may arise as a result of climate change must be capitalised upon in respect of cost savings and new ways to foster environmental sustainability.

## Adaptation and Mitigation




This Offaly Local Authority climate change adaptation strategy forms part of Ireland's national strategy for climate adaptation as set out in the National Adaptation Framework (NAF) which was given legislative backing from the Climate Act.

It is tasked with mainstreaming climate change adaptation over time into all functions, operations and services of Offaly Local Authority. It seeks to inform or *climate proof* existing plans and policies produced and implemented by Offaly Local Authority. This ensures a considered, consistent and coherent approach for facing head on the challenges of a changing climate and for building resilience within Offaly Local Authority organisation itself as well as across all communities.

**Adaptation** refers to efforts to manage the risks and impacts associated with existing or anticipated change. While there is strong emphasis on Local Authorities to develop and implement adaptation measures and actions, mitigation measures are also crucial considerations.

**Mitigation** refers to the efforts to reduce the emission of greenhouse gases and reduce the severity of future climate change impacts.

There are positive interactions between adaptation and mitigation measures. Employing both adaptation and mitigation measures represents a robust climate action response in addressing the challenges associated with climate change at local level. The actions set out in Chapter 5 of this strategy reflect both adaptation and mitigation measures as a considered, relevant and integrated approach to combating the effects of climate change in County Offaly.

## Adaptation Policy Context

This Offaly Local Authority Adaptation Strategy is set within a policy framework at International, European and National level.

## International Context

**The United Nations Framework Convention on Climate Change (UNFCCC)** is an international environmental treaty adopted in May 1992. The frameworks objective is "to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." The framework set non-binding limits on greenhouse gas emissions and contained no enforcement mechanisms. However, the framework outlined how specific international treaties may negotiate further action towards its key objective. The Paris Agreement 2015 is a protocol set within the context of the UNFCC (ratified by Ireland on 4th November 2016) and it is aimed at:

- limiting global warming to less than $20^{C}$ above pre-industrial level and pursue efforts to limit the temperature increase to $1.5^{C}$;
- Increasing the ability to impact of climate change and foster climate resilience

The agreement states the need for Parties to formulate and implement National Adaption Plans.

**In 2015, Countries adopted the 2030 Agenda for Sustainable Development** and 17 Sustainable Development Goals (SDGs). The SDGs are a blueprint to achieve a better and more sustainable future. They address global challenges related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. The Goals interconnect and are interdependent. Goal No. 13 addresses Climate Action with an objective to: Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy. This Goal recognizes Climate Change as a global challenge that does not respect national borders and requires solutions that need to be coordinated at the international level to help developing countries move toward a low-carbon economy.

## EU Context

**The 2013 EU Strategy on Adaptation to Climate Change** encouraged all Member states to adopt comprehensive adaptation strategies. It sought for better informed decision making through the identification and addressing of gaps in knowledge about adaptation. The European Climate Adaptation Platform, Climate-ADAPT, was developed as a resource mechanism to help users access and share information on adaptation.

The Global Covenant of Mayors for Climate and Energy is a voluntary, bottom up, approach for cities and local governments to combat Climate Change and move towards a low emission, resilient society. The Global Covenant of Mayors for Climate and Energy brought the Compact of Mayors and the EU Covenant of Mayors under one international body in January 2017 incorporating over 9,000 cities and local governments.

### National Context

**The 2012 National Climate Change Adaptation Framework (NCCAF)** was Ireland's first step in developing a national policy on adaptation actions to combat the impacts of climate change. The National Policy Position on Climate Action and Low Carbon Development 2014 restated the policy position of the NCCAF, 2012. Greenhouse gas mitigation and adaption to the impacts of climate change were to be addressed in parallel national plans under an evolving climate policy to 2050.

**The Climate Action and Low Carbon Development Act 2015** was a landmark national milestone in the evolution of climate change policy in Ireland. It provides the statutory basis for the national transition objective laid out in the National Policy Position (as per above). It also gave statutory authority to the National Mitigation Plan (2017) (NMP) and the National Adaptation Framework (2018) (NAF). This Local Adaptation Strategy forms part of the National Adaptation Framework.

**The Local Authority Adaptation Strategy Development Guidelines 2018, DCCAE, provides the framework for Local** Authorities to develop their own Climate Action Adaptation Strategy. In developing this adaptation strategy Offaly County Council has been consistent with these guidelines.

**The Government Climate Action Plan 2019 - To Tackle Climate Breakdown** was published on Monday 17th June 2019. The plan sets out 183 individual actions over 12 sectors and charts an ambitious course towards decarbonisation. It acknowledges the failure to meet emissions targets to 2020, failure to address efforts to decarbonise particularly during the period of the economic downturn and failure in breaking the link between emissions and economic growth. In light of this, the ambition is clearly set out to deliver a step-change in emission performance over the coming decade to meet 2030 targets and to set a trajectory to meet 2050 objectives. There is strong commitment under new governance arrangements to update the plan annually, to track performance of targets and revise or update the actions as necessary. To drive the successful and practical implementation of Climate Action towards achieving 2030 and 2050 targets, the Minister for Communications, Climate Action and Environment will bring forward a legislative framework through a new Climate Action Act.

Within the 12 Sectors described in the Plan, the Public Sector is identified as having a significant role in Leading by Example to not only just reduce their own emissions but to inspire climate action across communities and society. Local Government in particular is recognized for its pivotal role in stimulating climate action at community level. The Plan speaks also to the role of the Climate Action Regional Offices (CARO) in assisting local authorities in building capacity to engage effectively with climate change. There are a range of actions that are specific to and/or relate to local authorities as well as the CAROs.

Local authorities will be required to undertake an annual programme with measurable impact particularly with actions to focus on, inter alia;


13.2 Targets

To meet the required level of emissions, by 2030 we will:

- Reduce $CO_2$ eq. from the sector by 30%
- Improve the energy efficiency of public sector buildings by 50%
- Set a target to demonstrate leadership in the adoption of low emission transport options
- In 2019, have a Climate Mandate adopted by every Public Body, making the sector a catalyst for climate action
- In 2019, agree a Climate Action Charter with Local Authorities
- All Public Buildings to reach BER 'B' Rating

- Reducing emissions by 30% and Improve energy efficiency of local authority buildings by 50% under the guidance of a new Public Sector Decarbonisation Strategy;
- Setting a target to demonstrate leadership in the adoption of low emission transport options;
- Developing and implementing a Climate Action charter;
- Public buildings (all) to reach BER 'B' Rating;
- Building capacity through upskilling and knowledge dissemination;
- Supporting and delivering projects that include strong ambition on climate action through funding resources from Project Ireland 2040;
- Developing robust community engagement on climate action by linking to existing and new networks and clustering initiatives using the National Dialogue on Climate Action and local authority structures;
- Working with communities to expand Sustainable Energy Communities;
- Continue to implement Adaptation Planning with emphasis on building Climate Resilience and delivering the objectives of the National Adaptation Framework.

On Climate Change Adaptation, the Plan is very strong on the need *to address the current and future risks posed by a changing climate…*Adaptation is *both urgent and essential to successfully transition to a climate resilient economy*

*and society by 205 (chapter 16).* It cites examples of extreme weather events to explain that the cost of inaction to the effects of climate change are simply too significant to discount.

It is acknowledged that much of the focus for the local authority sector to date, has been on Adaptation Planning. Local authorities are now prescribed to widen their scope and act as a catalyst for much wider change. Since 2018 Climate Action Regional Offices (CAROs) have been co-ordinating the Local Authority response to Climate Change. The structures deployed have proved highly effective and can be utilised to direct local authority actions within the Climate Action Plan. The CAROs will lead a step up in climate action within local authorities to pursue mitigation measures to reduce emissions, activate meaningful citizen engagement, encourage community leadership and capacity building using the National Dialogue on Climate Action linking in with existing and new local authority structures.

The Climate Action Plan is notably focused on mitigation measures to achieve emission targets to 2030. However, there is full commitment to provide clear leadership in promoting Adaptation. Recognising that Climate Change is a hugely complex issue that requires a range of responses from every sector in society all measures collectively represent a coherent approach to dealing with the challenges ahead.

Local Authorities, through the process of Adaptation Planning are gaining a clear understanding of the risks presented by climate change and the current levels of vulnerability to such risks. Actions identified in the adaptation strategies are aimed at building climate resilience and integrating adaptation into effective local level decision making. Building on this work, local authorities will undoubtedly need to expand their role to take on actions and measures from the Climate Action Plan to respond to and meet obligations set out. It is important that the Offaly Climate Change Adaptation Strategy recognizes the purpose of the Climate Action Plan and the role intended for Local Authorities to meet targets and contribute to the national climate ambition.

**The Eastern & Midland CARO** is one of four Regional Climate Action Offices set up in 2018 in response to Action 8 of the 2018 National Adaptation Framework (NAF) – Planning for a Climate Resilient Ireland.

The four CAROs have been established to drive climate action at both regional and local levels. In recognition of the significant obligation to develop and implement climate action measures, the four regional offices are mandated to co-ordinate engagement across the varying levels of government and help build on experience and expertise that exists in the area of climate change and climate action.

The composition of the four Climate Action Regions has been determined by the geographical and topographical characteristics, vulnerabilities and shared climate risks experienced across Offaly Local Authority areas. The climatic

risks associated with the Eastern and Midlands Climate Action Region include Fluvial Flooding, Pluvial Flooding, Groundwater Flooding and Coastal Flooding.

### Environmental Assessment

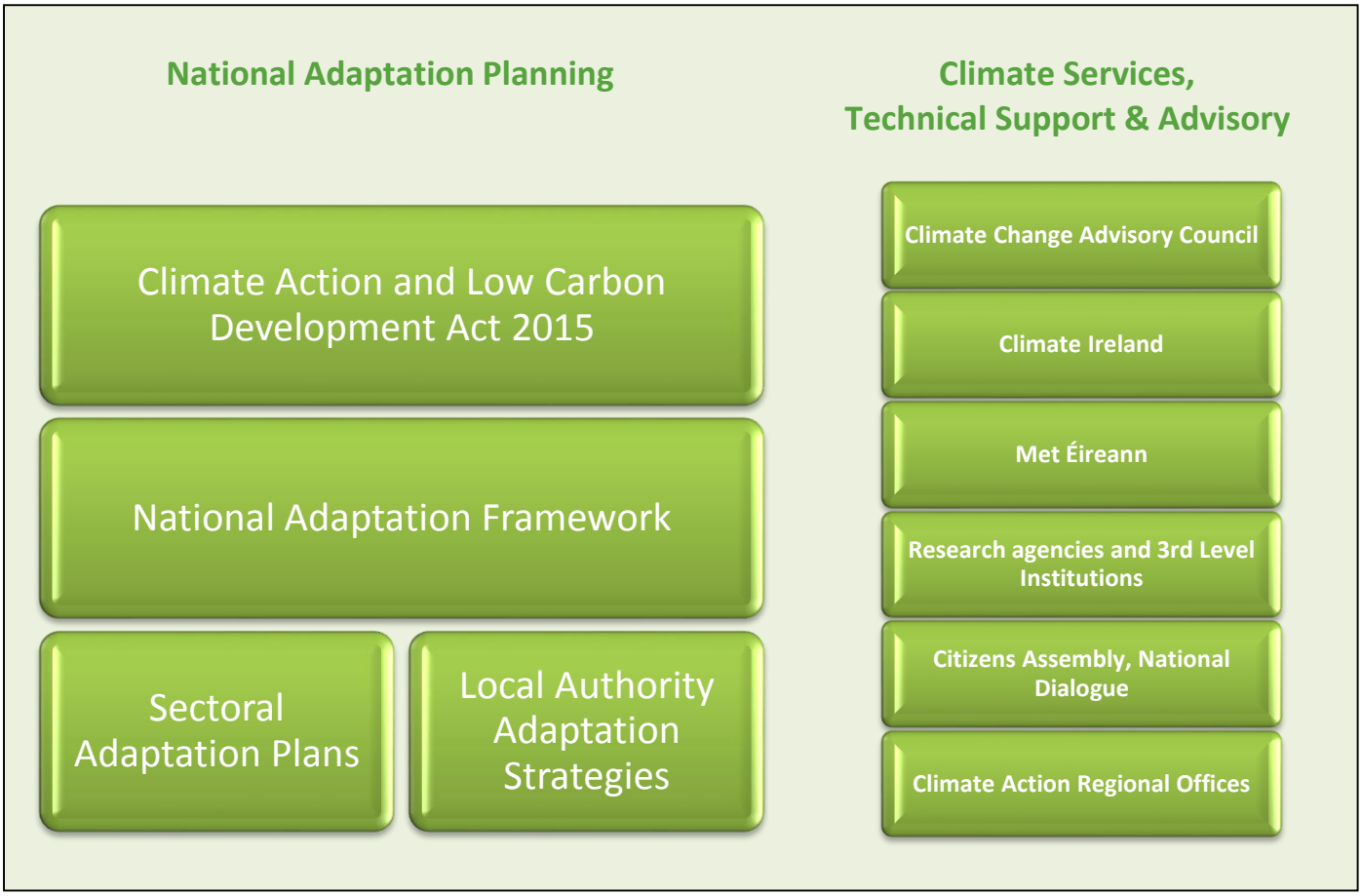
Consultation process of draft strategy and environmental screening reports to be undertaken with Environmental Authorities SEA process to be undertaken in accordance with the provisions of the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (SI 435 of 2004 as amended by SI 435 of 2011).

Under the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (SI 435 of 2004 as amended by SI 435 of 2011), all plans which are likely to have a significant effect on

the environment must undergo screening to determine whether a Strategic Environmental Assessment (SEA) is required. “Screening” is the process for making a determination as to whether a particular plan, would be likely to have significant environmental effects, and would thus warrant SEA. This strategy has been screened for SEA and it is determined that full SEA is not required. The screening report accompanies this strategy.

Screening of this draft strategy has been undertaken in accordance with the requirements of Article 6(3) of the EU Habitats Directive (directive 92/43/EEC) to determine if the Climate Change Adaptation Strategy is likely to significantly affect Natura 2000 sites (i.e. Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) within or surrounding the Strategy area. It is determined that stage 2 Natura Impact Report is not required. The draft screening report accompanies this Strategy.

This adaptation strategy is set within the context of a national framework for adaptation planning which is prescribed in the Climate Action and Low Carbon Development Act 2015 and elaborated upon in the National Adaptation Framework.

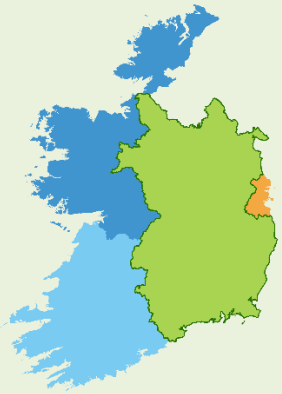



This adaptation strategy commits to aligning with national commitments on climate change adaptation. It must be noted that the process of making 12 sectoral adaptation strategies (identified in the NAF) is running concurrently with the making of Local Authority strategies. Once published, however, any relevant recommendations or actions will be incorporated into this strategy. For both the preparation of this strategy and the implementation of actions, opportunities will be advanced to align with and collaborate with adjoining Local Authorities.

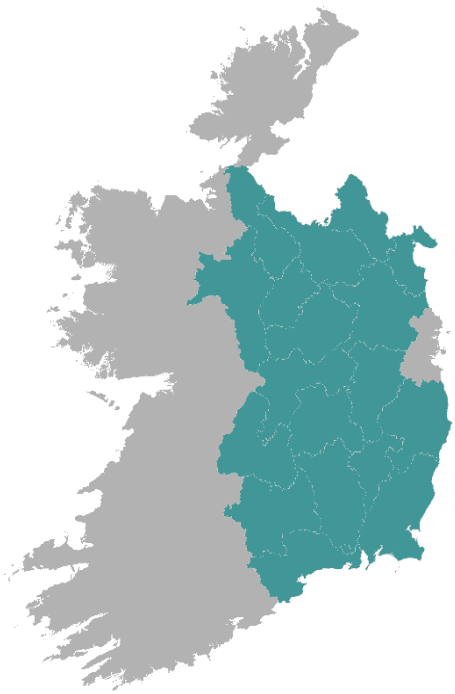
## CHAPTER 2 REGIONAL AND LOCAL CONTEXT

### Offaly County Council in Context

Offaly County Council is located within the Eastern and Midlands Climate Action Region (CARO) and is one of 17 Local Authorities in the region. The four CARO regions and constituent Local Authorities are illustrated on the map below:

| | Climate Action Region | Local Authority function area | Lead Authority |
|---|---|---|---|
|  | **Midlands and Eastern** | Carlow, Cavan, Kildare, Kilkenny, Laois, Leitrim, Longford, Louth, Meath, Monaghan, **Offaly**, Roscommon, Tipperary, Waterford, Westmeath, Wexford, Wicklow | **Kildare County Council** |
| | **Atlantic Seaboard North** | Donegal, Sligo, Mayo, Galway City & County | **Mayo County Council** |
| | **Atlantic Seaboard South** | Clare, Limerick, Kerry, Cork City & County. | **Cork County Council** |
| | **Dublin Metropolitan** | South Dublin, Fingal, Dun-Laoghaire-Rathdown, Dublin City | **Dublin City Council** |

### Profile of Eastern and Midland Climate Action Region



With 17 Offaly Local Authority areas, the Eastern and Midland region is the largest of the four Climate Action Regions in Ireland. The region, exclusive of the Dublin Metropolitan Area, occupies the eastern and central aspects of the country. The Region borders Northern Ireland to the north with counties Louth, Cavan, Monaghan and Leitrim. The River Shannon flanks the western aspect bounding along its course, counties Leitrim, Roscommon, Longford, Westmeath, Offaly and Tipperary. The Irish Sea bounds the region to the east. Counties Louth, Wicklow, Wexford and Waterford are located to the east and south east of the region all with extensive coastlines along the Irish Sea.

The region with its extensive pattern of settlement areas and rural areas and has a population of almost 1.8 million people

accounting for 37.7% of the total population of the state[4] and at 32,542 sq.km occupies 46.3% of the area of the state[5]. The region plays a significant role economically to the country hosting a range of sectors inclusive of multinationals, public service, private and small-medium enterprises. Agriculture remains the prevailing sectoral landuse in the region.

There is a rich variety of landscapes and topographies across the region. A mostly flat low lying landscape sweeps through the midland counties. Significant areas of raised bogs occupy this central location in the country as well as the Curragh Plains extending towards the Curragh Plains in County Kildare. The Drumlin Belt across the northern aspect of the region, the Wicklow Mountains, Galtee Mountains and Slieve Bloom Mountains offer variation and punctuation in the landscape of the region.

21 prominent Rivers rise and flow (with tributaries) through the Region. The most prominent of these include the River Shannon, River Barrow, River Suir, River Nore, River Liffey and River Boyne. Counties Louth, Wicklow, Wexford and Waterford occupy coastal locations to the east and south east of this region while County Leitrim extends to occupy a distance of 4.6km along the western coast of the country.

The region offers an extensive and crucially important network of critical infrastructure. The road network in the region typically radiates from the metropolitan Dublin Region. The Rail Network is significant with the Dublin-Cork, Dublin-Limerick, Dublin-Waterford and Dublin-Galway/Mayo lines. Rosslare Europort in Wexford is a gateway to Wales and greater Europe through France. Electricity and communications infrastructure is widespread throughout the region.

The Ireland's Ancient East proposition best represents the vast array of tourism products on offer in the region as a cultural and tourist destination.

### Profile of Offaly Climate Action Region

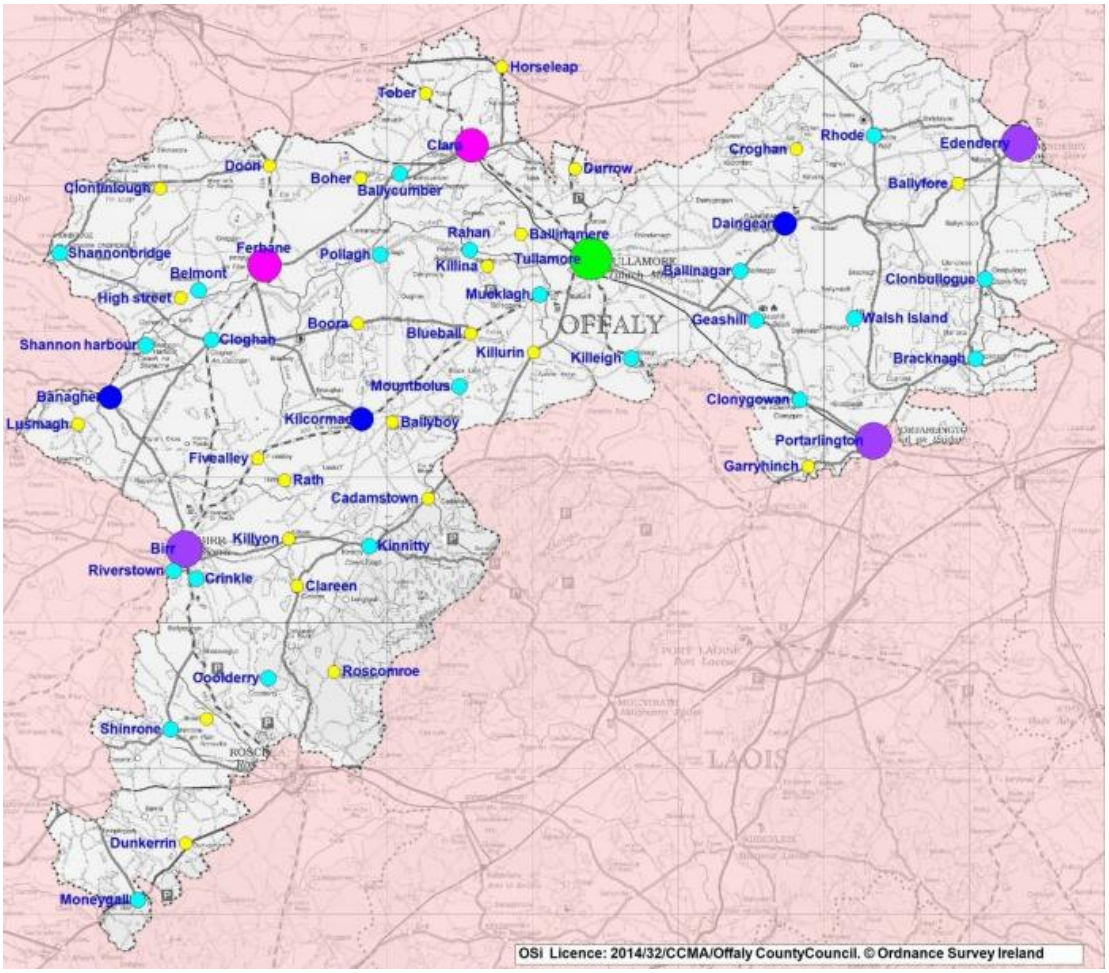
County Offaly occupies a prominent position in the Midlands of Ireland. It is situated approximately half-way between Dublin and Galway and between Belfast and Cork. In ancient times, the Eiscir Riada passing through the county formed an important route for east-west traffic to Clonmacnoise and westwards. In Victorian times, the River Shannon and the Grand Canal connected Dublin with the West and South-West. Modern traffic is facilitated by the Dublin-Galway railway line and national roads such as the M6, M7, N52, N62 and N80.

[4] Total population of E&M Region is 1,796, 923 persons. The state population is 4,761,865 persons (CSO, 2016).
[5] Total area of state is 70,282 sq.km

Offaly is a land-locked county which is bounded by Counties Westmeath, Meath, Kildare, Laois, Tipperary, Galway and Roscommon. The Rivers Shannon and Little Brosna form the boundary in the West while the Rivers Boyne and Barrow do so in stretches of the East. The area of the county comprises 199,981 ha and it extends approximately 70km in width and 60km in depth. The topography of the county is generally flat and undulating except for the Slieve Bloom Mountains in the South-West. Peatlands are found extensively around the county and these extend to approximately 32,400ha in area.

The population of County Offaly was recorded as 77,961 persons in the 2016 Census. This was an increase of 1.7% on the 2011 Census figure. The population residing in urban areas amounts to 47% of the total population and that in villages and rural areas to 53%.

Twelve prominent rivers rise and flow (with tributaries) through County Offaly. The largest of these include the River Shannon, River Barrow, River Boyne, River Brosna, River Little Brosna and River Camcor. There are three small lakes in the county, namely, Lough Boora, Pallas Lake and Fin Lough. The Grand Canal extends from Edenderry in the East to Shannon Harbour in the West, a distance of approximately 65 km.



## Offaly Core Adaptation Team

In July 2016 the DECLG requested each Local Authority to establish an Adaption Team and notify the DECLG of the Team Leader. The core team met regularly to progress the Local Authority Adaptation Strategy. The guidelines specifically state that a representative from each section across the organization should be involved. Interested staff representing all sections contributed to the development of the strategy through a series of workshops.

## Key Dates

28th March 2017 Offaly Climate Change Adaptation Stagey Process commenced

15th May 2017 Core Team Meeting

8th June 2017 Core Team Meeting

26th September 2017 Presentation to OCC Management Team

27th September 2017 Core Team Workshop

23rd October 2017 Presentation to Elected Members at Council Meeting

8th November 2017 Core Team Workshop

21st November 2017 Interdepartmental Workshop

26th June 2018 Core Team Workshop

12th September 2018 CARO Workshop Athlone

26th September 2019 CARO Regional Steering Group Meeting

10th December 2018 Core Team Workshop Developing Strategies

17th December 2018 Offaly, Westmeath, Laois & Longford Working Group

4th February 2019 CARO Workshop Athlone

14th February 2019 CARO Regional Steering Group Meeting

19th March 2019 CARO SEA/AA Consultants Meeting

9th April 2019 Draft Strategy issued to CARO SEA/AA Consultants

25th April 2019 CARO Regional Steering Group Meeting

14th May 2019 Draft Environmental Assessment Screening Report

31st May 2019 Draft Appropriate Assessment Screening Report

28th May 2019 Consultation with SEA Environmental Authorities (4 weeks)

26th June 2019 Public Consultation and circulation to Elected Members (4 weeks)

26th July 2019 End of Public Consultation

9th August 2019 CE Report on submissions & Final SEA/AA Screening

16th September 2019 Present to Elected Members for Adoption

### Stakeholder Engagement and Communication Plan

Offaly County Council developed a Stakeholder Engagement and Communication Plan in September 2017. Stakeholder participation in the development of Local Authority Adaptation Strategies is stipulated in the National Climate Change Adaptation Framework (NCCAF 2013) in order to:

- Promote the integration of a range of knowledge and values in adaptation;
- Build a constituency of support behind the adaptation process via embedding it in local interests and concerns;
- Ensure adaptation processes at the local scale are aligned with similar processes underway in neighbouring authorities and relevant sectors

The Local Authority Adaptation Strategy Development Guidelines (DCCAE, 2018) endorse the need for stakeholder engagement. The guidelines suggest in particular that Local Authorities develop a Stakeholder Engagement and Communication Plan to identify the audience and the most appropriate means of communication.

Offaly's Stakeholder Engagement and Communication Plan was actively implemented by way of a formal pre-draft consultation stage that was formally opened by members of Offaly County Council at their October meeting (23rd October 2017). A six-week process of pre-draft consultation took place from Monday 23rd October 2017 to Friday 8th December 2017.

The public consultation on the Draft Offaly Climate Change Adaptation Strategy will commence on 26th June for four weeks.

The Public Consultation, Stakeholder Engagement and Communication Plan is available in Appendix 1.

## CHAPTER 3 ADAPTATION BASELINE ASSESSMENT

A workshop was held in September 2017 for the team to work through step 2 of the Local Authority Adaptation Strategy Development Guideline. The aim of the workshop was to:

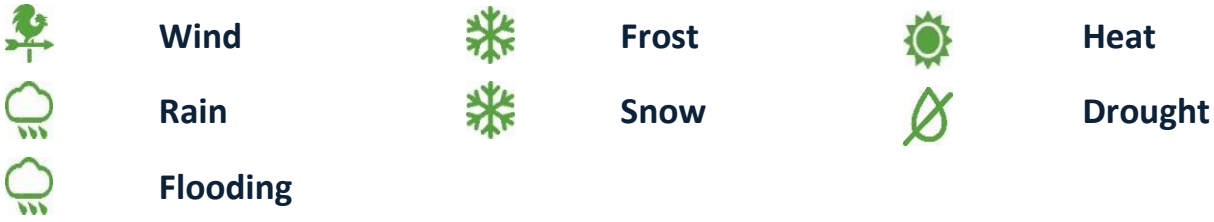
- **Identify the impacts of current weather extremes and recent climatic trends**
- **Estimate costs of current weather extremes and climatic trends**
- **Map roles, responsibilities and affected stakeholders in relation to identified impacts**
- **Identify existing policies and measures linked to the management of identified impacts**
- **Assess lifetime and efficacy (including threshold values) of current policies and measures**

### Climate Events (Data from Met Éireann Website)

The Offaly Climate Change Adaptation team identified the impacts of current weather extremes and recent climatic trends in Offaly and identified the 10 most important Major Weather Events in last 30 years using data from Met Éireann Website. The table in Appendix 2 has been compiled from the Met Éireann website with a 45-year time span. A timeline visually highlighting all major weather events between 1974 to present day in Ireland is provided.

| **Extreme Events Identified in Offaly** | | **Climatic Trends Identified in Offaly** |
|---|---|---|
| Low-flow events | High winds | Increased Heavy Rainfall |
| Heavy precipitation days (> 10 mm of rainfall) | Cold snap/freezing | Storm intensity increase |
| Fluvial flood (1/10 year event) | Snow events | Rising Temperatures (decrease in cold days & nights) (increase in warm days and nights) |
| Fluvial flood (1/1000 year event) | Absolute drought (> 15 days of < 0.2 mm of rainfall) | Drier Summers / Wetter Winters |
| Pluvial flooding | Heat wave (> 5 days at > 25°C) | Sea level Rise |
| | | Longer Growing Season (Phenology) |

The Major Weather Events Impacting Offaly in last 30 years can be categorised into 7 events:



| Most important Major Weather Events Impacting Offaly in last 30 years (Ref Met Eireann | | |
|---|---|---|
| 2018 | November | Storm Diana |
| 2018 | September | Storm Ali |
| 2018 | June - July | Heat wave & Drought Risk |
| 2018 | February | Storm Emma |
| 2018 | January | Storm Eleanor |
| 2017 | October | Storm Ophelia |
| 2017 | Q1 – Q2 | Drought Risk |
| 2016 | January | Storm Desmond / Ava / Frank Flooding |
| 2015 | December | Storm Desmond / Ava / Frank Flooding |
| 2014 | February | Storm Darwin |
| 2013 | July | Heatwave |
| 2010 | Nov/Dec | Severe Cold Spell |
| 2009/10 | Winter | Coldest winter for almost 50 years |
| 2009 | November | Severe flooding in many parts of the country; |
| 2008 | Summer | Heavy rain and flooding |
| 2006 | Summer | Warmest summer since record breaking year of 1995 |
| 1998 | December | Hurricane force winds over north and northwest |
| 1997 | December | Windstorm |
| 1995 | Summer | Warmest Summer on record |
| 1991 | January | Windstorm |
| 1990 | February | Storms and heavy rain |
| 1988 | February | Storm Force winds over Ireland |
| 1987 | January | Heavy Snowfall |
| 1986 | August | Storm - Hurricane Charley |
| 1985 | July | Widespread thunderstorms |
| 1982 | January | Heavy snowfall in eastern areas |

**Esimated Costs:** Extreme event result in unexpected costs to the Local Authority both directly in responding to the event and the cleanup and aftermath and indirectly in impacts to services and infrastructure. The direct costs to Offaly County Council during Storm Emma in February 2018 and Storm Ophelia October 2017 were captured throughout the event and in the aftermath and amounted to €282,912 and €226,160 respectively.

Working across the various departments the Offaly Climate Adaptation Team characterised to what extent each event or trend resulted in service disruption and additional costs that were incurred as a result. Further analysis is included in Appendix 3.

| Service Areas | | | |
|---|---|---|---|
| Major Emergency | Birr Municipal District | Environment | Management Team |
| Fire Service | Tullamore Municipal District | Roads | Corporate Services |
| Health & Safety | Edenderry Municipal District | Housing | Human Resources |
| Library Services | Local Community Development | Heritage | Information Systems |
| Planning | Water Services | Arts | Finance |

### Impact Assessment

| Consequence | Level | Description |
|---|---|---|
| Catastrophic | 5 | Widespread service failure with services unable to cope with wide-scale impacts. Irrecoverable environmental damage. Large numbers of serious injuries or loss of life |
| Major | 4 | Services seen to be in danger of failing completely with severe/widespread decline in service provision and quality of life. Severe loss of environmental amenity. Isolated instances of serious injuries |
| Moderate | 3 | Service provision under severe pressure. Appreciable decline in service provision at community level. Isolated but significant instances of environmental damage that could be reversed. Small number of injuries. |
| Minor | 2 | Isolated but noticeable examples of service decline. Minor environmental damage |
| Negligible | 1 | Appearance of threat but no actual impact on service provision |

## Extreme Event: Wind

| Major Events | |
|---|---|
| 16th October 2017 Storm Ophelia | 5th January 1991 Windstorm |
| 12th February 2014 Storm Darwin | 9th February 1988 Storm Force winds over Ireland |
| December 1997 Windstorm | August 1986 Hurricane Charley |
| 26th December 1998 Hurricane force winds over north and northwest24th | |

### Services Impacted

| **Major**<br>**Services seen to be in danger of failing completely with severe/widespread decline in service provision and quality of life. Severe loss of environmental amenity. Isolated instances of serious injuries** | |
|---|---|
| Roads | Fallen trees resulting in road closures and dangerous conditions |
| Water Services | Damage to electricity supply resulting in disruption to water supplies |
| Information Systems | Damage to electricity supply resulting in disruption IT functions; Staff engaged in communication with public throughout the event and in the aftermath |
| Fire Service | Fallen trees resulting in road closures and dangerous conditions |
| Tullamore / Birr / Edenderry MD | Mobilising and managing staff and dealing with issues as above |

| **Moderate**<br>**Service provision under severe pressure. Appreciable decline in service provision at community level. Isolated but significant instances of environmental damage that could be reversed. Small number of injuries** | |
|---|---|
| Environment | Damage to electricity supply resulting in disruption to wastewater treatment and imapct on receiving waters |
| Finance | Managing and recoupment of costs incurred for cleanup and repair after the event |
| Housing | Damage and deterioration of housing stock; Review and assessment of OCC houses in the aftermath of the event |
| Heritage | Review and assessment of protected structures in the aftermath of the event; Damage to cultural and heritage assets |
| Human Resources | Risk to staff welfare; Management of staff time and attendence during the event |
| Health & Safety | Staff engaged in the emergency response during and in the aftermath of the event; Review of proceedures after the event. |

| **Minor**<br>**Isolated but noticeable examples of service decline. Minor environmental damage** | |
|---|---|
| Corporate Services | Electricity supply affcted; Services closed during event and distrupted in immediate aftermath |
| Library Services | |
| Local Community Development | |
| Planning | |
| Arts | |

| **Beneficial**<br>**Services or functions within the policy area improved during the event or in its immediate aftermath** | |
|---|---|
| Major Emergency / Health & Safety | During extreme events in particular Storm Opheilia the major emergency team is engaged and the major emergency plan activated; It is an opportunity to see the major emergency plan in operation and learn from the event, identify issues and improve the plan; Following the event there was an oppurtunity to review health and safety preceedures in the plant and equipment used, staff training required and contractors available. |

## Extreme Event: Flooding

| Major Events | |
|---|---|
| January 2016 Storm Desmond / Ava / Frank Flooding | Summer 2008 Heavy rain and flooding |
| December 2015 Storm Desmond / Ava / Frank Flooding | February 1990 Storms and heavy rain |
| November 2009 Severe flooding in many parts of the Country | 25th – 26th July 1985 Widespread thunderstorms |

### Services Impacted

| **Major**<br>**Services seen to be in danger of failing completely with severe/widespread decline in service provision and quality of life. Severe loss of environmental amenity. Isolated instances of serious injuries** | |
|---|---|
| Roads | Flooding of Roads, traffic management and safety during event, repair to damaged roads during event; Increased levels of flooding resulting in road surface degradation; faster rate of deterioration |
| Water Services | Flooding of water and wastewater plants and pumping stations resulting in disruption to supply; Capacity impacts on combined sewer networks; Increased frequency of combined sewer overflows |
| Fire Service | Emergency response during the event; increased pressure on emergency response and recovery operations |
| Environment | Pollution incidents due to flooded sewers and pumping stations and un treated effulent to watercourses; exceedance of existing flood defences |
| Tullamore / Birr / Edenderry MD | Mobilising and managing staff and dealing with issues as above |
| Local Community Development | Negative impacts on local communities; insurance impacts; consequence to local & regional economics; deterioration of community infrastructure |

| **Moderate**<br>**Service provision under severe pressure. Appreciable decline in service provision at community level. Isolated but significant instances of environmental damage that could be reversed. Small number of injuries.** | |
|---|---|
| Finance | Managing and recoupment of costs incurred for cleanup and repair after the event |
| Health & Safety | Staff engaged in the emergency response during and in the aftermath of the event; review of proceedures and after the event. |
| Housing | Review and assessment of OCC houses in the aftermath of the event; damage and loos of property |
| Heritage | Review and assessment of protected structures in the aftermath of the event; damage to cultural and heritage assets |
| Information Systems | Staff engaged in communication with public throughout the event and in the aftermath |
| Tourism | Impacts on recreation amenities and tourism activities |

| **Minor**<br>**Isolated but noticeable examples of service decline. Minor environmental damage** | |
|---|---|
| Corporate Services | Disruption to normal services |
| Human Resources | Management of staff time and attendence during the event |
| Local Community Development | Negative impacts on local communities; insurance impacts; consequence to local & regional economics |
| Arts | Potential for damage to assets |
| Planning | Changes in floodplains |

| **Beneficial**<br>**Services or functions within the policy area improved during the event or in its immediate aftermath** | |
|---|---|
| Major Emergency | During extreme events the major emergency team is engaged and the major emergency plan activated; Each event provides training and expereince in major emergency planning and action; |
| Planning | Information available to direct flood maps, planning and future County Development Plans |

## Extreme Event: Frost & Snow

| Major Events | |
|---|---|
| February 2018 Extreme Snow | |
| November & December 2010 Severe Cold Spell | January 1987 Heavy Snowfall |
| December 2009 & January 2010 Coldest winter for 50 years | January 1982 Heavy snowfall in eastern areas |

### Services Impacted

| **Major**<br>**Services seen to be in danger of failing completely with severe/widespread decline in service provision and quality of life. Severe loss of environmental amenity. Isolated instances of serious injuries** | |
|---|---|
| Roads | Road safety; requirement to grit / salt roads; damage to roads |
| Water Services | Frozen water services during extreme events distruption to supply |
| Fire Service | Emergency response during the event; increased pressure on emergency response and recovery operations |
| Environment | Impact on wastewater treatment and watercourses |
| Housing | Increased need for heat; |
| Tullamore / Birr / Edenderry MD | Mobilising and managing staff and dealing with issues as above |
| Corporate Services | Disruption to services; buildings closed; management of the prolonged event |
| Health & Safety | Risk to staff welfare during response; |

| **Moderate**<br>**Service provision under severe pressure. Appreciable decline in service provision at community level. Isolated but significant instances of environmental damage that could be reversed. Small number of injuries.** | |
|---|---|
| Finance | Managing and recoupment of costs incurred for cleanup and repair after the event |
| Human Resources | Risk to staff welfare; Management of staff time and attendence during the event |
| Library Services | Serices closed for the duration of the event |
| Local Community Development | Negative impacts on local communities; insurance impacts; consequence to local & regional economics; |
| Planning | Distrubtion ot service; inability to meet statutory deadlines |

| **Beneficial**<br>**Services or functions within the policy area IMPROVED during the event or in its immediate aftermath** | |
|---|---|
| Major Emergency | During extreme events the major emergency team is engaged and the major emergency plan activated; Each event provides training and expereince in major emergency planning and action; |
| Planning | Significance and impact of such events leads to focus and direction for next planning cycle |

## Extreme Event: Heat & Drought

| Major Events | |
|---|---|
| June – July 2018 Heatwave & Drought Risk | July 2013 Heatwave |
| Q1 – Q2 2017 Drought Risk | Summer 1995 Warmest Summer on record |
| Summer 2006 Warmest summer since record breaking year of 1995 | |

### Services Impacted

| **Major**<br>**CORE services or functions within the policy area were SUBSTANTIALLY disrupted during the event or in its immediate aftermath** | |
|---|---|
| Roads | Changes in rates of deterioration; following harsh winter the sustained period of drought resulted in deterioration of roads in peat areas; Impact on construction projects |
| Water Services | Reduced availability of water supply sources during low rainfall and drought events; uncertainty of water availability; increase in water demand and hose pipe ban<br><br>Interruption to wastewater treatment anaerobic process; reduction in receiving water assimilative capacities |
| Fire Services | Increase risk and severity of fires |

| **Moderate**<br>**CORE services or functions within the policy area were PARTIALLY or INTERMITTENTLY disrupted during the event or in its immediate aftermath** | |
|---|---|
| Housing | Need for mechanical ventilation systems and cooling systems – Heatwave events |
| Environment | Increased potential for water contamination; changes in availability of groundwater; quality of water diminished; changes in species distribution and phenology of river systems |

| **Minor**<br>**Core services or functions within the policy area were largely unaffected, but NON-ESSENTIAL or ANCILLARY services or functions were SEVERELY disrupted during the event or in its immediate aftermath** | |
|---|---|
| Local Community Development | Reduced water for swimming pools, irrigation of open spaces, parks etc - drought conditions. |

| **Beneficial**<br>**Services or functions within the policy area IMPROVED during the event or in its immediate aftermath** | |
|---|---|
| Tourism | Short to medium term benefit to Tourism with warmer weather |

## CHAPTER 4 CLIMATE RISK IDENTIFICATION

A workshop was held in November 2017 for the team to work through Step 3 of the Local Authority Adaptation Strategy Development Guideline; The aim of the workshop was to:

- **Identify future climate risks**
- **Set objectives in relation to managing future climate risks**

### Task: Future Climate Risk Assessment

1. The climatic variables posing a sufficiently significant risk in Offaly to warrant further assessment were identified.

   The Major Weather Events Impacting Offaly in last 30 years can be categorised into 7 events:


2. Identification of the climate risks that are likely to be of significance in the future begin with those risks that are significant in the present

3. Standard risk assessments use a relatively simple equation: Consequence × Probability = Future Risk

   **Consequence:** the estimated future level of service disruption caused by the climatic variable in question, giving an impact consequence

   **Probability:** the level of confidence attributable to projections of change in the climatic variable

4. The climate risk matrix can be used to guide decision-making with respect to which climatic risks should be identified as being of particular significance for adaptation planning;

## Climate Risk Matrix

| Consequence | | | Probability | | | | |
|---|---|---|---|---|---|---|---|
| | | | Low | Low / Med | Medium | Med / High | High |
| | | | 1 | 2 | 3 | 4 | 5 |
| | Negligible | 1 | 1 | 1 | 1 | 1 | 2 |
| | Minor | 2 | 1 | 1 | 2 | 2 | 3 |
| | Moderate | 3 | 2 | 2 | 3 | 3 | 4 |
| | Major | 4 | 3 | 3 | 4 | 4 | 5 |
| | Critical | 5 | 4 | 4 | 5 | 5 | 5 |

## Future Risk Prioritiese

| | |
|---|---|
| 5 Critical | Must not be accepted as part of routine (unadapted) operational procedures; urgent attention at the most senior level required; adaptation measures that function to diminish risk must be proposed and acted on immediately |
| 4 Major | May be accepted as a part of routine operations only where adaptation measures have been identified and are immediately feasible, monitoring/early warning of the risk is routine and the nature of risk is well understood; senior management must be informed of the status and evolution of the risk over time |
| 3 Moderate | May remain part of routine operations, but a schedule for future adaptation should be in place, with a thorough investigation of any lead time and/or required precedent steps prior to adaptation measures becoming feasible having been conducted |
| 2 Minor | Likely to remain part of routine operations; should be assigned a monitoring and observation protocol; existing controls are sufficient and no further action will be required unless significant change occurs |
| 1 Negligible | No further action will be required in the short term unless significant change occurs in the climate variable or receiving environment in question |

The impacts of climate change for Ireland which are expected to increase over the coming decades will include:

- Rising temperatures for all seasons – particularly in the summer and winter;
- Water shortages in the summer;
- Changes in the timing and spatial distributions of precipitation – for example, winters will be wetter and the summers will be drier;
- More intense rainfall and storm events;
- Increased likelihood and magnitude of river and coastal flooding;
- Adverse impacts on water quality;
- Sea level rise;
- Changes in the distribution and ecological lifecycle events of plant and animal species on land and in the oceans.

## Climate Impact Projections: 30 Year Overview Dervided from Published Projection Data
## Ref: LA Adaptation Stragety Development Guidline

| Event | | Summary | | Confidence |
|---|---|---|---|---|
| | Wind | Minor Increase | Models predict a slight increase in wind energy in winter of between 0 and 8%, with a minor decrease in summer of 4–14%; | Observed wind speed over Ireland has not changed significantly in recent times, but it is anticipated that the distribution of wind will alter slightly in future, with winters marginally windier and summers marginally less so; Though the average windspeed is anticipated to change in only a minor way over the coming decades, the frequency of extreme wind storms is expected to increase due to alterations in the origin and track of tropical cyclones; |
| | Flooding | Moderate Increase | Projected increases in winter rainfall will likely increase the risk of fluvial flooding | An Irish Reference Network of hydrometric stations has been established to assess signals of climate change in Irish hydrology; This network has detected an increasing trend in high river flows since 2000; Projections of future flows are beset by uncertainties at the catchment scale, but a broad signal of wetter winters and drier summers is evident across a number of independent studies; |
| | Rain | Strong Increase | Increasing seasonality in rainfall distribution is likely to result in an a >20% increase in the number of very Extreme Rainfall wet days; | Heavy precipitation days (in which more than 20mm of rain falls) are likely to increase in frequency in winter; By the 2050s an increase in the number of heavy precipitation days of around 20% above the level of 1981–2000 is projected under both low–medium and high emissions scenarios; This may have serious consequences for flood risk in sensitive catchments; |
| | Frost / Snow | Moderate Decrease | Increasing average air temperatures may act to decrease the duration and intensity of cold snaps | By mid-century, minimum temperatures during winter are projected to increase by ~2ºC in the south-east and ~2;9ºC in the north; This change will result in fewer frost days and milder night-time temperatures; |
| | Drought | Strong Increase | Increased seasonality in precipitation is very likely to result in more severe dry spells in summer | There have been seven periods of insignificant rainfall in Ireland in the past 40 years; Of these, the events of 1976 and 1995 were the most severe, averaging 52 and 40 days in duration respectively across Irish rainfall stations; An approximate 20% decrease in summer precipitation receipts in many areas is strongly indicated under a high emissions scenario; This decrease is likely to result in progressively longer periods without significant rainfall, posing potentially severe challenges to water-sensitive sectors and regions; |
| | Heat | Strong Increase | Increasing average air temperatures are likely to increase the duration and intensity of heatwaves | Seven significant heatwaves (defined as 5+ days @ >25ºC) have been recorded in Ireland over the past 30 years, resulting in approximately 300 excess deaths; By mid-century, a projected increase in summer maximum daily temperature of approximately 2ºC will likely intensify heatwaves, with maximum temperatures increasing and heatwave duration lengthening; |

The climatic variables posing a sufficiently significant risk in Offaly to warrant further assessment were identified. The climate risk matrix guided the Climate Change Adaptation Team on which climatic risks should be identified as being of particular significance for adaptation planning;

### Future Climate Risk Assessment in Offaly

| | Current Consequence | Future Consequence | Projection Confidence | Potential Future Risks |
|---|---|---|---|---|
| **Snow** | Critical (5) | Critical (5) | Medium (5) | 5 |
| **Flooding** | Critical (5) | Critical (5) | High (5) | 5 |
| **Wind** | Major (4) | Major (4) | High (5) | 5 |
| **Drought** | Major (5) | Major (5) | High (5) | 5 |
| **Rain** | Moderate (3) | Moderate (3) | High (5) | 4 |
| **Heat** | Moderate (3) | Moderate (3) | Medium (3) | 3 |
| **Frost** | Moderate (3) | Moderate (3) | Medium (3) | 3 |

## CHAPTER 5 ADAPTATION GOALS, OBJECTIVES AND ACTIONS

Workshops were held on 26th June 2018 and 10th November 2018 for the Offaly adaptation team to work through Step 4 of the Local Authority Adaptation Strategy Development Guideline. Adaptation options were presented and discussed at each workshop and developed further in between workshops. The aim of the workshops were to:

- **Identify adaptation options**
- **Assess each option across a number of criteria**
- **Prioritise options for implementation**

Adaptation goals and objectives were identified to support Offaly County Council in achieving climate resilience. A range of adaptation actions must be identified to enhance the capacity of Offaly Local Authority and communities to adapt to climate change impacts and to address priority climate risks.

Adaptaion action should be prioritised and implementation and monitoring plans developed. Goals are general guidelines which are presented as high level long term statements, while objectives outline the steps neecessary to achieve these.

The Offaly Strategy commits to aligning with national commitments on climate change adaptation. Relevant recommendations or actions identified in the 12 sectoral adaptation strategies (identified in the NAF) will be incorporated into the Offaly Strategy and opportunities will be advanced to align with and collaborate with adjoining Local Authorities.

In implementing the actions of the Offaly Strategy, Offaly County Council will seek to ensure that any potential environmental impacts are minimized. Consideration of potential adverse cumulative and in-combination environmental effects must be accounted for in selecting and implementing specific actions. Actions will be examined in the context of potential co-benefits including measures such as human health, biodiversity enhancement and protection, improvement in water quality, management of areas at risk of flooding and sustainable landuse zoning and development practices. It would be important that.

### Identify Adaptation Options

Adapting to climate change need be no more novel or complex than any other task of local governance. Aadaptation options have typically been categorised to date, with modes of adaptation delivery termed **Grey, Green and Soft** largely originating in existing measures and practices.

**Grey Adaptation** typically involves technical or engineering-oriented responses to climatic impacts. Adaptive measures lies in their level of quantification in terms of both cost and anticipated efficacy.

**Green Adaptation** options are those that seek to use ecological properties to enhance the resilience of human and natural systems in the face of climate Change. Green options perform particularly strongly in providing ancillary benefits beyond pure climate impact amelioration, often serving to offset or diminish carbon emissions, while providing desired social or ecological services such as enhanced recreation or biodiversity preservation. Green options also typically perform equally strongly across a number of climate scenarios.

**Soft Adaptations** involve alterations in behaviour, regulation or systems of management, such as land-use planning policy. Soft measures have the potential to be relatively flexible and inexpensive to progress. They are therefore often considered the most tractable first steps in taking action on climate adaptation.

### Strategic Vision for Climate Adaptation

Offaly County Council will fulfil a leadership role in learning about and responding to the impacts of climate change, be fully engaged with the risks and oppurtunities of  a changing climate and build a resilient future for and together with the communities of County Offaly.

This adaptaion stragety is based around six thematic areas that are developed further as High Level Goals. These goals identify the desired outcomes anticipated through the effective implmentation of the climate adaption stragety. They are supported by specific objectives and adaptaion actions to achieve their desired outcomes.

Through the six thematic areas and high level goals Offaly Local Authority Climate Change Adaptaion Stagety is designed to guide a planned and coherent response to the effects of climate change.

- **Local Adaptation Governance and Business Operations Goal:** Climate Change adaptation considerations are mainstreamed and integrated successfully into all functions and activities of Offaly Local Authority ensuring operational protocols, procedures and policies implement an appropriate response in addressing the diversity of impacts associated with climate change.

- **Infrastructure and Built Environment Goal:** Increased capacity for climate resilient structural infrastructure is centred around the effective management of climate risk, informed investment decisions and positive contribution towards a low carbon society.

- **Landuse and development Goal:** Sustainable policies and measures are devised influencing positive behavioural changes, supporting climate adaptation actions and endorsing approaches for successful transition to low carbon and climate resilient society.

- **Drainage and Flood Management Goal:** Great understanding of risks and consequences of flooding and successful management of a coordinated approach to drainage and flooding.

- **Natural Resources and Cultural Infrastructure Goal:** Fostering meaningful approaches to protecting natural and key cultural assets through an appreciation for the adaptive capacity of the natural environment to absorb the impacts of climate change.

- **Community Health and Wellbeing Goal:** Empowered and cohesive communities with strong understanding of climate risks, increased resilience to impacts of climate change with capacity to champion climate action at local level.

### Aims of High Level Goals

Through the six thematic areas and high level goals Offaly Local Authority Climate Change Adaptaion Stagety is designed to guide a planned and coherent response to the effects of climate change.

- **Mainstream Adaptation:** That climate change adaptation is a core consideration and is mainstreamed in all functions and activities across Offaly Local Authority. In addition, ensure that the Local Authority is well placed to benefit from economic development opportunities that may emerge due to a commitment to proactive climate change adaptation and community resilience.

- **Informed Decision Making**: That effective and informed decision making is based on reliable and robust evidence base of the key impacts, risks and vulnerabilities of the area. This will support long term financial planning, effective management of risks and help to prioritise actions.

- **Building Resilience:** That the needs of vulnerable communities are prioritised and addressed encourage awareness to reduce and adapt to anticipated impacts of climate change and promote a sust,alnabf e and robust action response.

- **Capitalising on Opportunities:** Projected changes in climate may result in additional benefits andopportunities for the local area and these should be explored and capitalised upon to maximise the use of resources and influence positive behavioural changes.

| Timeframe Defined |
| --- |
| **Short term 1 – 3 years** |
| **Medium Term 4 – 5 years** |
| **Long Term 5+ years** |

## LOCAL ADAPTATION GOVERNANCE AND BUSINESS OPERATIONS

**Goal 1: Climate Change adaptation considerations are mainstreamed and integrated successfully into all functions and activities of Offaly County Council ensuring operational protocols, procedures and policies implement an appropriate response in addressing the diversity of impacts associated with climate change**

| | Action | Lead / Partners | Timeframe |
|---|---|---|---|
| **Objective 1.1: To support the successful and practical implementation of climate change adaptation actions** | | | |
| **1.1.1** | Establish a Climate Change Adaptation Steering Group with representatives from across key functions of Offaly County Council to ensure the successful implementation of the actions of the Offaly Climate Change Adaptation Strategy and to report on progress. The Group will be tasked with managing and overseeing the effective mainstreaming of adaptation measures into all plans, programmes, strategies and policies of Offaly County Council. | Management Team<br>Senior Management Team | Short |
| **1.1.2** | Include climate change adaptation policy in the Corporate Plan objectives providing for all Offaly County Council activities and the delivery of functions and services across the administrative area. | Management Team<br>Corporate Services | Short |
| **1.1.3** | Include climate change adaptation policy into the Service Delivery Plan and provide for its translation to team development plans and personal development plans to enable actions to be directly pursued per operational area. | Each Section | Short |
| **1.1.4** | Include climate change adaptation policy into the next County Development Plan and ensure it is fully informed in relation to climate change mitigation and adaptation measures. | Planning | Short |
| **1.1.5** | Liaise, collaborate and work in partnership with the sectors identified in the National Adaptation Framework, subject to funding, in the delivery of the Government approved sectoral | Management Team<br>Planning | Short |

| | | | |
|---|---|---|---|
| | adaptation actions, where they relate and are relevant to the functions and activities of the Council at local level and /in local communities. | | |
| **Objective 1.2: To ensure that climate change adaptation is mainstreamed into all activities and operations** | | | |
| **1.2.1** | Appraise the appointment of a Climate Change Adaptation Officer with responsibility for climate related activity within Offaly County Council to inform communities on local climate change issues and climate action measures, run awareness campaigns and manage funding for climate action projects. | Management Team<br>Human Resources | Short |
| **1.2.2** | Appraise the appointment of an Energy Efficiency Officer with responsibility for the preventative and reactive maintenance for all buildings in Offaly County Council, implementing energy efficiency & renewable energy measures and driving initiatives to meet the 2020, 2030 and 2050 targets and promote Offaly County Council as a leader and exemplar in energy efficiency through workshops and events. | Management Team<br>Human Resources | Short |
| **1.2.3** | Promote green procurement, in order for goods, services and works to support environmental and wider sustainable development objectives, to assist in balancing cost effectiveness and sustainable development and to represent both short-term and long-term value for money. | Procurement<br>Each Section | Medium |
| **Objective 1.3: To build capacity within Offaly County Council to respond effectively to extreme weather events** | | | |
| **1.3.1** | Review the Major Emergency Plan to identify and address specifically, the impacts associated with extreme weather events on all functions/services of Offaly County Council including preparing for critical services disruptions, mitigating against the impact of service disruption and improving the capacity to recover. | Emergency Services<br>All Sectons | Short |

| | | | |
|---|---|---|---|
| **1.3.2** | Review Offaly County Council's Health and Safety Statement to reflect climate related risks and ensure standard operating procedures are completed for job roles in each operational area taking into consideration the potential risks to workers from extreme weather events. | Health & Safety<br>Municipal Districts | Short |
| **1.3.3** | Review operational plans for outdoor and indoor workers around times of extreme events. | Health & Safety<br>Municipal Districts | Short |
| **1.3.4** | Review Blue Light Policy with the aim of increasing resilience to extreme weather events. | Emergency Services | Short |
| **Objective 1.4: To build resilience within Offaly County Council to support service delivery** | | | |
| **1.4.1** | Identify gaps in data or information from an assessment of previous experiences of dealing with severe weather events and explore ways to maintain a high level of understanding of the risks and vulnerabilities of Offaly County Council in dealing with the future impacts of climate change. | Emergency Services<br>Municipal Districts<br>Roads | Short |
| **1.4.2** | Develop and manage a centralised repository for all information relating to climate hazards and extreme climatic events including reports of incidents, estimates of costs incurred in remediation works, no. of resources deployed during and post event, description of impacts on service delivery and funding recouped for remediation works, rapid response aerial survey / drone availability during or immediately after extreme events, GIS mapping of extent & severity of extreme events. | Emergency Services<br>Municipal Districts<br>Roads<br>Finance | Short |
| **1.4.3** | Evaluate and document resources deployed for the management, maintenance, repairs and clean up operations after extreme weather events taking full account of hours and costs involved and impact on service delivery and including increased operational, | Emergency Services<br>Municipal Districts<br>Roads | Short |

| | | | |
|---|---|---|---|
| | maintenance and contractor and out-of hours costs and additional funding sought and received. | Finance | |
| **1.4.4** | Encourage and develop further inter agency and departmental collaboration to increase climate change resilience in County Offaly providing for emergency planning and coordination, sharing expertise and experience around adaptation actions, coordination around implementing adaptation actions and liaison with the relevant Departments and Agencies regarding the implementation of actions set out in sectoral climate change adaptation strategies. | Emergency Services | Short |
| **1.4.5** | Make provision for a contingency in the budget of each service / operational area to ensure continued or improved capacity of service in face of the projected increase in climate event intensity. | Management Team<br>Finance | Short |
| **Objective 1.5: To identify and support opportunities that may arise from pursuing adaptation efforts through the functions of Offaly County Council** | | | |
| **1.5.1** | Provide climate change awareness training to staff, elected members and communities. | Environment | Medium |
| **1.5.2** | Review the mobilisation policy and staff transfers to benefit staff in the organisation and reduce travel time; Expand and encourage the use of Citrix and remote working subject to business case and operational effectiveness. | Management Team<br>Human Resources<br>IT | Medium |
| **1.5.3** | Quantity Offaly's CO2 emission and establish a target for first and subsequent cycles of the programme. Opportunity to link with tourism strategy and strategic projects in the County such as wind farms, loving bogs, constructed wetlands, public lighting LED retrofits. Promote carbon foot print savings within the County and potential future savings. Opportunity to promote Offaly as a Sustainabe Energy County. | Environment<br>Planning<br>Tourism<br>Green Offaly | Medium |

| Objective 1.6: To support the development of green energy jobs and efficiencies | | | |
|---|---|---|---|
| **1.6.1** | Support the National Conference on Green Energy Jobs - Economic & Business Opportunities of Climate Change (Tullamore, 9th October) | Local Enterprise Office<br><br>Regional Transition Team | Medium |
| **1.6.2** | Support the North Offaly Development Fund to promote Rhode Business Park – 13 serviced sites with access to National Grid, and encourage energy companies and companies testing new technologies to avail of the facilities. | Local Enterprise Office | Medium |
| **1.6.3** | Support the Junction Business Innovation Centre, Tullamore – Co-working hub for businesses developing Green Energy Technologies, Software and Design businesses. | Local Enterprise Office | Medium |
| **1.6.4** | Support Micro-LEAN Programmes, assisting micro-enterprises improve efficiencies and reduce waste in their businesses. | Local Enterprise Office | Medium |
| **1.6.5** | Support the vision of Offaly as an alternative to Dublin, encourage green enterprise in Offaly, promote Offaly as a place offering a work life balance. | Local Enterprise Office<br><br>Green Offaly | Medium |

## INFRASTRUCTURE AND BUILT ENVIRONMENT

**Goal 2: Increased capacity for climate resilient structural infrastructure is centred around the effective management of climate risk, informed investment decisions and positive contribution towards a low carbon society.**

| | Action | Lead / Partners | Timeframe |
|---|---|---|---|
| **Objective 2.1: To increase the resilience of roads and transport infrastructure** | | | |
| **2.1.1** | Undertake a risk assessment of road infrastructure and vulnerable transport infrastructure in the area to identify the severity of climate change risks on their function and condition. The risk assessment should provide for an understanding and quantification of risks posed. The findings should be integrated into decision making processes, road infrastructure programmes and investment strategies. | Roads | Medium |
| **2.1.2** | Integrate climate considerations into the design, planning and construction of all roads, footpaths, bridges, public realm and other construction projects. Make provision to incorporate green infrastructure as a mechanism for carbon offset. | Roads | Medium |
| **2.1.3** | Support the implementation of the winter maintenance services programme annually and keep up to date with developments in best practice | Roads | Short |
| **2.1.4** | Carry out the pilot scheme, funded by the Department of Transport in 2019, following the drought period in 2018 which resulted in significant defects and cracking of the bog rampart roads in Offaly, to survey the extent of peat in Offaly which will inform Road Design of the extent and depth of peat in the Regional Roads in Offaly and will provide information for proposals and cost estimates for solutions. | Roads<br>Municipal Districts | Short |

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| **2.1.5** | Support the ongoing programme of upgrading public lighting to LEDs in Offaly in the interest of energy efficiency and ongoing maintenance of 7,000 public lights. | Roads | Short |
| **2.1.6** | Carry out an inventory of pedestrian crossings for maintenance and programme of upgrading lights to LEDS. | Roads<br>Municipal Districts | Medium |
| **2.1.7** | Develop and implement a tree policy in Offaly and inform landowners of statutory duty to maintain trees and hedgerows along public roads incorporating sustainable practices into essential maintanance. | Roads<br>Municipal Districts | Short |
| **Objective 2.2: To increase the resilience of county council buildings and housing stock** | | | |
| **2.2.1** | Increase the resilience of Offaly County Council owned building stock to climate change impacts. Assess the vulnerability of building stock to climate risks and identify, prioritise and implement alleviation measures. | Building Facilities Housing | Medium |
| **2.2.2** | Promote renewable heating in Offaly County Council housing stock & office buildings. | Building Facilities Housing | Short |
| **2.2.3** | Ensure all housing development in Offaly County Council projects and private development achieve required energy ratings. | Planning | Short |
| **2.2.4** | Assess back-up communication systems to ensure communication for emergency responders is maintained in the event of disruption to main communication system. | Building Facilities | Short |
| **Objective 2.3: To support the transition to a climate resilient low carbon society** | | | |
| **2.3.1** | Work with Stakeholders to develop and promote increased public transport in Offaly, upgrading the public transport infrastructure, exapanding the services across the County, ensuring accessibilty for all and informing the public of availablilty. | Roads | Medium |

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| **2.3.2** | Promote transport schemes in Offaly such as the Go Car scheme and a pickup / drop off bike scheme. | Environment<br>Planning | Short |
| **2.3.3** | Encourage policy to support and develop energy efficient vehicles usage and charging infrastructure on sites owned and occupied by Offaly County Council and private sites through supportive policies and development control standards of the County Development Plan. | Roads<br>Planning | Short |
| **2.3.4** | Review OCC fleet to incorporate energy efficient vehicles including a review of carbon reducing measures available such as electric vehicles and CNG. | Roads | Medium |
| **2.3.5** | Promote and inform public on renewables and grants available to encourage the move away from coal and turf heating in homes to solar and more green methods. | Environment<br>Planning | Short |

## LAND USE AND DEVELOPMENT

**Goal 3: Sustainable policies and measures are devised influencing positive behavioural changes, supporting climate adaptation actions and endorsing approaches for successful transition to low carbon and climate resilient society.**

| | Action | Lead / Partner | Timeframe |
|---|---|---|---|
| **Objective 3.1: To integrate climate change adaptation considerations into landuse planning policy** | | | |
| **3.1.1** | Identify and integrate climate change as a critical consideration and guiding principle informing all chapters of the County Development Plan 2021 - 2027 | Planning | Short |
| **3.1.2** | Engage with the Department of Housing Planning and Local Government and the Eastern and Midland Regional Assembly during the review process of the Offaly County Development Plan to develop a sustainable approach to landuse, consistent with the National Strategic Outcomes of the National Planning Framework and the Regional Strategic Outcomes of the Eastern and Midland Regional Spatial and Economic Strategy. | Planning | Short |
| **Objective 3.2: To explore policies to help the transition to a climate resilient low carbon society** | | | |
| **3.2.1** | Integrate and promote climate-smart building and urban design performance outcomes in development standards through the development management process. | Planning<br>Housing | Medium |
| **3.2.2** | Promote the integrated planning, design and delivery of green infrastructure including urban greening through appropriate provisions in planning policies, development standards, infrastructural, public realm and community projects. | Planning<br>Community & Development<br>Tourism<br>Heritage<br>Housing | Short - Long |

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| **3.2.3** | Incorporate sustainable settlement and transportation strategies in urban and rural areas including the promotion of measures to reduce energy demand in response to the likelihood of increases in energy and other costs due to long-term decline in non-renewable resources. | Planning<br>Stakeholders | Short |
| **Objective 3. 3: To promote and maximize the most efficient and sustainable use of land** | | | |
| **3.3.1** | Engage with key landowners in agricultural, peat, fostery, to protecting natural and key cultural assets, empowering communities, developing a more sustainable green economy and resource management. Offaly County Council will engage with DAFM and farming organisations on a number of actions in the Offaly Strategy. | LEO<br>Environment<br>Planning<br>DAFM | Medium |
| **3.3.2** | Explore the identification and protection of areas that are subject to flooding across County Offaly to allow for natural uninhibited floodplain areas. | Environment<br>Planning<br>OPW | Short |
| **3.3.3** | Ensure that climate change considerations are integrated to inform the location of burial grounds and are zoned appropriately thereafter. | Planning<br>Environment | Short |
| **3.3.4** | Explore and make provision for the need to plan and provide more indoor sporting facilities and outdoor all weather facilities for recreation and sporting use on appropriately zoned land. | Sports<br>Planning | Short |
| **3.3.5** | Support the Water Framework Directive in its key objectives and core principles and the Local Authority Waters Programme to develop and implement River Basin Management Plans in Ireland and achieve common water quality goals. | Environment | Short |
| **3.3.6** | Promote conservation, regenerating and planting of natural woodland and hedgerows through interagency collaboration and planning policy. | Environment | Medium |

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| **3.3.7** | Support the ongoing programme to develop the Grand Canal Greenway cycling route to promote Offaly as a major cycling destination in the midlands of Ireland. | Planning<br>Roads | Short |
| **3.3.8** | Support Bord na Mona by co-funding a feasibility study to explore the expansion of Lough Boora Discovery Park, winner of best environmental tourism innovation award at the biennial Irish tourism industry awards. | Local Enterprise Office | Short |
| **3.3.9** | Support the work of Green Offaly in their Geothermal Mapping project to see what geothermal energy potential lies beneath and explore the opportunity to work with them to develop ideals and future actions. | Environment<br>Green Offaly | Short |

## DRAINAGE AND FLOOD MANAGEMENT

**Goal 4: Understanding of risks and consequences of flooding and successful management of a coordinated approach to drainage and flooding**

| | Action | Lead / Partners | Timeframe |
|---|---|---|---|
| **Objective 4.1: To mitigate the risk and impact of flooding** | | | |
| **4.1.1** | Develop drainage and flood management policy in the next County Development Plan and ensure it is fully informed in relation to development in floodplains. | Planning<br>Environment | Short |
| **4.1.2** | Ensure that existing and future flood information in the Flood Risk Assessments (FRA) are used to inform suitable adaptation requirements and planning in line with the Guidelines for Planning Authorities on Flood Risk Management (DECLG & OPW, 2009). | Planning<br>Environment<br>OPW | Short |
| **Objective 4.2: To liaise and work with other bodies and agencies responsible for flood management** | | | |
| **4.2.1** | Support the OPW in delivering the measures identified in the CFRAM study, tranche 1 flood protection scheme in Rahan and tranche 2 scheme in Birr, considering the impact of climate change into proposals to ensure that measures proposed are adaptable to future changes. | Environment<br>Planning<br>OPW | Medium |
| **4.2.2** | Incorporate considerations of the impact of climate change into proposals submitted under the Minor Works Programme to ensure that measures proposed are adaptable to future changes. | Environment<br>Planning<br>Municipal Districts | Short |
| **4.2.3** | Support the OPW in further Flood Risk Assessment Studies and pilot projects such as Natural Water Retention Measures to managing flood risk. | Environment<br>OPW | Medium |

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| **Objective 4.3: To provide and plan for effective drainage systems** | | | |
| **4.3.1** | Develop a surface water management plan for Offaly identifying the requirement for future management of the surface water network. Prioritise projects to reduce surface water flood risk and provide for detailed mapping of areas prone to surface water and groundwater flood risk. | Environment<br>Roads<br>Municipal Districts | Medium |
| **4.3.2** | Assess the need for upgrades of drainage systems including separation of sewer and surface water required to reduce risk of capacity pressure on drainage systems. | Environment<br>Roads<br>Municipal Districts<br>IW | Medium |
| **4.3.3** | Review current operations around drainage channel maintenance to take into account increased siltation and continued plant growth. | Environment<br>Roads<br>Municipal Districts | Short |
| **4.3.4** | Develop a policy for the design, specification and management of sustainable urban drainage systems, incorporating the requirement for SUDS in Local Authority projects and private development site taking account of the potential future impact of climate change. | Planning<br>Environment<br>Roads<br>Municipal Districts | Medium |
| **Objective 4.4: To provide for adequate and quality water supply in times of extreme drought conditions** | | | |
| **4.4.1** | Encourage rainwater harvesting learning from experience in other Countries. Explore best practice in harvesting and storing water during the winter months to be used during the summer when less rain is projected. | Planning<br>Environment | Medium |

## NATURAL RESOURCES AND CULTURAL INFRASTRUCTURE

**Goal 5: Fostering meaningful approaches to protecting natural and key cultural assets through an appreciation for the adaptive capacity of the natural environment to absorb the impacts of climate change.**

| | Action | Lead / Partners | Timeframe |
|---|---|---|---|
| **Objective 5.1: To protect and enhance the natural environment to work positively towards climate action** | | | |
| **5.1.1** | Promote an awareness campaign that encourages and informs communities of the benefits of an active tree planting programme in improving air quality, offsetting carbon emissions, promoting biodiversity, limiting flood risk, reducing urban heat and aesthetic value. | Heritage<br>Environment<br>Community & Development | Long |
| **5.1.2** | Integrate natural borders/buffers to be included as an integral component of the design of greenways/blueways, tracks and trails and amenity areas to promote natural enhancement. | Heritage<br>Roads | Medium |
| **5.1.3** | Support the management and control of invasive species in Offaly to reduce the spread of invasive species by managing the movement of soil and promote public awareness and education. | Heritage<br>Municipal Districts | Short |
| **5.1.4** | Research and identify areas considered beneficial for use as local carbon offset through carbon sequestration and support green infrastructure. | Heritage<br>Planning | Medium |
| **5.1.5** | Research and identify suitable areas to support biomass growth. | Planning<br>Environment | Medium |
| **5.1.6** | Review the rivers in Offaly and work with and support agencies responsible for their management. | Environment | Short |

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|---|---|---|---|
| **5.1.7** | Continue to work with all Stakeholders in managing waste in a sustainable manner working towards new initiatives and developments in this area. | Environment | Short |
| **5.1.8** | Consider the impact of climate change on food and food systems. | Environment<br>Green Offaly<br>DAFM | Medium |
| **5.1.9** | Engage with key landowners agricultural, peat, forestery to protecting natural and key cultural assets, empowering communities, developing a more sustainable green economy and resource management. Offaly County Council will engage with DAFM and farming organisations on a number of actions in the Offaly Strategy. | Environment<br>DAFM | Medium |
| **5.1.10** | Support the Department of Agriculture, Food and Marine in their Strategy. Recognise impacts as being of cross-sectoral concern for both DAFM and Offaly County Council such as wildfires, slurry storage and land spreading issues, soil quality, non-native invasive species. | DAFM<br>Environment<br>Fire Services | Medium |
| **Objective 5.2: To support bio-diversity for its intrinsic value within the natural environment** | | | |
| **5.2.1** | Review Offaly County Council's biodiversity policy to ensure that risks from adverse climate change have been identified and future changes are assessed and measures employed to address issues identified and carbon capture within habitats is considered. | Heritage | Medium |
| **5.2.2** | Support biodiversity in plans for the maintenance of grass areas and develop a grass cutting policy with training and guidance provided to interested staff across all areas including a pair back approach to grass cutting, with many areas allowed to grow naturally, with appropriate signage to inform people. | Heritage<br>Municipal Districts<br>Tidy Towns<br>Green Offaly | Short |

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|---|---|---|---|
| **5.2.3** | Support the implementation of a pollinator policy in Offaly, including the maintenance of grass areas and grass cutting policy. | Heritage<br>Municipal Districts<br>Tidy Towns<br>Green Offaly | Short |
| **5.2.4** | Support an Offaly Swift project identifying where they are nesting and threats to their environment. | Heritage<br>Environment | Medium |
| **Objective 5.3: To protect heritage and cultural infrastructure** | | | |
| **5.3.1** | Undertake a risk assessment of the heritage and cultural assets in the County to assess the vulnerability and the risk to the historical environment from the impacts of climate change and to help build resilience to these important assets. | Heritage | Medium |
| **5.3.2** | Support the Heritage Council and Fáilte Ireland in their aims to identify and address the effects of climate on heritage and implications for Ireland's tourism industry. | Heritage | Medium |
| **5.3.3** | Consider the impact of proposed adaptation and mitigation measures on the impact on tourism and tourism amenities and any unintended consequences for heritage and tourism that might arise. | Heritage | Medium |

## COMMUNITY HEALTH AND WELLBEING

**Goal 6: Empowered and cohesive communities with strong understanding of climate risks, increased resilience to impacts of climate change with capacity to champion climate action at local level.**

| | Action | Lead / Partners | Timeframe |
|---|---|---|---|
| **Objective 6.1: To build capacity and resilience within communities** | | | |
| **6.1.1** | Identify vulnerable communities across the County in the context of their vulnerability to the impacts of climate change and assess the risks to the community. | Community & Development<br>Municipal Districts | Medium |
| **6.1.2** | Develop and implement a programme to enhance vulnerable Communities' capacity to respond to and recover from extreme weather events, provide advice on the risk of extreme events affecting their locality, devise mitigating actions to enhance preparedness and provide support to develop appropriate resilience arrangements to enable response and recovery. | Community & Development | Medium |
| **Objective 6.2: To collaborate with other agencies and groups working with communities to enhance the effectiveness of community programmes related to climate change** | | | |
| **6.2.1** | Raise awareness of the impacts of climate change through the Public Participation Network and ways for communities to increase response and resilience to these impacts through adaptation & mitigation. | Community & Development<br>PPN | Medium |
| **Objective 6.3: To protect and encourage climate resilient community infrastructure** | | | |
| **6.3.1** | Facilitate education about climate change to community groups, schools, secondary schools, tidy towns | Community & Development<br>Environment | Medium |
| **6.3.2** | Incorporate the consideration of climate change in the design and development of community schemes such as town and village renewal and rural regeneration. | Community & Development<br>Planning | Medium |
| **6.3.3** | Promote and inform public on renewables and grants available to encourage the move away from coal and turf heating in homes to solar and more green methods. Support initiatives to avail of the advantages to be gained by economics of scale in retro fitting schemes. | Community & Development<br>Planning | Medium |

## CHAPTER 6: IMPLEMENTATION MONITORING AND EVALUATION

Goal 1, Local Adaptation Governance and Business Operations, endeavours through its first objective to establish a framework within the organisation to support the successful and practical implementation of adaptation actions. Given that this strategy represents all functions and operations of Offaly County Council, it is important that the Climate Action Steering Group brings together representatives from all key functional areas with various technical, operational and management expertise who can successfully carry out the necessary tasks and implement the actions contained within the Strategy. The Management Team will nominate representation to the Climate Action Steering Group and assign a Chair. The Climate Action Steering Group will meet quarterly.

The tasks of the group, are as follows:

- Prioritise actions within the short, medium and long term delivery timeframes;
- Develop an approach and initiate implementation of the actions;
- Liaise with other stakeholders and sectors, both locally and regionally, where required for the implementation of actions;
- Monitor and evaluate implementation of the actions;
- Report on Progress to the Environment including Climate Change SPC and subsequently to full Council.

The Eastern and Midland Climate Action Region Offices (E&M CARO) will continue to assist and provide guidance where possible in the practical implementation of the actions of this Strategy. Offaly County Council will continue the positive relationship, collaborate and engage with the E&M CARO as is necessary throughout the lifetime of this strategy. This will include submitting the annual progress report to the CARO if required.

### Prioritise Actions

The purpose of this task is to prioritise adaptation actions for delivery within the short, medium and long term timelines as defined in the Strategy document. Actions are to be assigned timeframes for implementation and furthermore assigned owners for delivery. Progress reporting will be aligned to this prioritisation.

### Develop an approach and initiate implementation

The purpose of this task is to break down the adaptation framework into what actions will be taken and when, and who will carry out the actions by way of an Implementation Plan.

The steering group will devise a methodology for implementation that includes:

- Who is responsible for implementing the adaptation actions;
- Identify funding required for the adaptation measures,
- Identify/establish key indicators or targets as mechanisms for measuring outcomes;
- Collaboration required with other stakeholders;
- Identification of where adaptation measures could be incorporated into existing plans, policies and budgets;
- Timeframe that measures will be implemented;
- Identify risks to the implementation of actions.

It is recommended to expand out the actions into the implementation plan. Once complete, key personnel can assume responsibility and begin implementing the adaptation actions.

In implementing the actions of this strategy Offaly County Council will seek to ensure that any potential environmental impacts are minimized. Actions will be examined in the context of potential co-benefits including measures such as human health, biodiversity enhancement and protection, improvement in water quality, management of areas at risk of flooding and sustainable landuse zoning and development practices. It would be important that actions yielding multiple environmental and societal benefits are prioritised.

Likewise, consideration of potential adverse cumulative and in-combination environmental effects must be accounted for in selecting and implementing specific actions. Consideration of environmental sensitivities under the Habitats Directive and Water Framework Directive for example are important in the context of potential adverse cumulative or in-combination effects.

For the purposes of monitoring and reporting on progress, maladaptation will be identified and approaches to counter this will be explored thoroughly and put in place.

### Liaise with other Stakeholders/Sectors

At times, the Local Authority will be required, as considered necessary, to liaise with other key stakeholders to provide for the delivery of actions. Conversely, the sectors, as identified in the National Adaptation Framework, will engage and liaise with Local Authorities in the delivery of sectoral adaptation actions stemming from their respective adaptation plans.

### Monitor and evaluate implementation

Monitoring and evaluating the implementation of actions is critical to ensure the long-term success of climate adaptation actions. It is essential in tracking the performance of activities within the lifetime of this strategy, in determining whether planned outcomes from adaptation actions have been achieved and in determining whether new adaptation actions should be undertaken.

The climate action steering group is encouraged to use results from the monitoring and evaluating program to:

- Revisit vulnerability and risk assessments conducted as part of adaptation actions,
- Make changes where appropriate based on monitoring results,
- Update observed changes,
- Include new climate science and recent extreme climatic hazards/events,
- Factor in changes to exposure and/or adaptive capacity, and
- Evaluate the success or outcome of completed actions.

This ensures an iterative process and allows actions to be informed by latest climate change data and projections. In this way monitoring, and evaluation can help improve the efficiency and effectiveness of adaptation efforts in the council.

### Report on progress

The Climate Action Steering Group should develop and agree appropriate and continuous timeframes and mechanisms to report on the progress of the practical implementation of actions of this strategy to the Management Team, Environment SPC and the Elected Members / Council as considered appropriate.

Climate Change Adaptation Progress Report should be prepared annually for input by the Management Team and SPC and review by the Elected Members.

The progress report should provide for, inter alia:

- Progress achieved on actions to that point;
- Extent to which actions have achieved and built new relationships with key stakeholders, agencies, communities and identified new or emerging opportunities;
- Identification of funding streams;
- Inspired or encouraged positive community engagement;
- Reports on the outcomes of efforts to change behaviour.

The requirement to report on progress on an annual basis is also informed by the following:

Under section 15 of the Climate Action and Low Carbon Development Act 2015, Local Authorities may be required to report on progress in meeting the terms of the National Adaptation Framework and Sectoral Adaptation Plans.

Local Authorities have been identified by many national sectors under the National Adaptation Framework as a key stakeholder responsible for implementing adaptation actions in their local area and ensuring coordination and coherence with the sectors identified in the NAF. Cooperation and collaboration between Local Authorities and the sectors is encouraged strongly. Under Section 14 of the Climate Action and Low Carbon Development Act 2015, Sectors may be required report on progress made with adaptation actions and present annual sectoral adaptation statements to each House of the Oireachtas by the relevant Minister or by the Minister for DCCAE.

The National Adaptation Steering Committee, chaired by the DCCAE maintains a role to ensure a coordinated and coherent approach to implementing actions under the NAF. This steering committee with representation from Local Authorities and the CAROs has a role in promoting cross sectoral coordination.

The High Level Climate Action Steering Committee, chaired by the Minister for Communications, Climate Action and Environment has a role in monitoring progress by sectors and Local Authorities in delivering on climate change adaptation actions.

Under Section 13 of the Climate Action and Low Carbon Development Act 2015, the Advisory Council has a role, at the request of the Minister, in conducting periodic reviews of the implementation of the National Adaptation Framework and sectoral adaptation plans and to report on its findings and recommendations.

## Appendix 1

# PUBLIC CONSULTATION, STAKEHOLDER ENGAGEMENT & COMMUNICATION PLAN

## INTRODUCTION

The Climate Change Adaptation Strategy development process must include a structured and substantive programme for engagement of stakeholders from within Local Community, relevant non-governmental organisations and state sector bodies.

## LEGISLATIVE/POLICY DIRECTION FOR CONSULTATION

**Local Authority Adaptation Strategy Development Guidelines (December 2018), DCCAE:** Adaptation strategy development process must include a structured and substantive programme for engagement of stakeholders from within Local Community, relevant non-governmental organisations and state sector bodies.

Collaboration with other Local Authorities and key sectors.

Develop a stakeholder engagement and communication plan.

NCCAF: S5.5 The involvement of key stakeholders at local a level in the preparation of local adaptation plans is essential. Engagement process - must be open, transparent and inclusive. Ensure opportunities are provided for all interested individuals and organisations at local, regional and national levels to comment or make submissions for consideration before the policies, objectives and measures to be included in the plan are decided upon.

## KEY CONSIDERATIONS FOR EFFECTIVE CONSULTATION

- Timeframe for the development and completion of adaptation strategy in line with legislative requirements;
- Resources required to undertake consultation;
- Adherence to requirements for consultation with environmental authorities as per the provisions of Strategic Environmental Assessment Regulations SI No. 435/2004 as amended by SI No. 200/2011;
- Gathering statistics, data, information – widening the pool of knowledge;
- Getting information out there – fill in gaps in public understanding, climate change science, clarifying uncertainty, education, raising the profile;
- Active participation in the plan making process – individuals, communities, business, agencies;
- Involving key stakeholders that are influenced by policy decisions of Local Authority;
- Geographical Interdependencies – adjoining LAs, river basin districts, Climate Action Region, Regional assembly area;
- Alignment - between LAs, regionally, sectors and national framework;
- Infrastructure provision in administrative area as part of overall infrastructural network;
- Transparency in respect of the degree on influence that contributors have in the process.

## AREAS OF INTEREST FOR STRATEGY IN OFFALY - DRAWING STAKEHOLDERS FROM ALL AREAS

- Economic development
- Water/Air Quality
- Infrastructure
- Cultural and Built Heritage
- Landscape
- Transport
- Planning/sustainable development
- Energy
- Bio-diversity
- Waste
- Flooding
- Housing
- People/communities
- Climate
- Communication

## STAKEHOLDERS INVOLVED

| | | | |
|---|---|---|---|
| | | | |
| Offaly County Council | Councilors<br>Interdepartmental representatives<br>Municipal Districts<br>SPC<br>LCDC | | |
| Adjoining Local Authorities | | | |
| River Basin Districts | Geographical interdependencies Eastern, Shannon, South | | |
| External and Local | Community groups –<br>PPN<br>Sports Clubs<br>Business Interests<br>Chambers of commerce | Housing associations<br>Tidy Towns<br>Heritage Groups | Groups & agencies working with OCC<br>General public |
| External agencies (sectoral & vested interest in Offaly) | Irish Water<br>Bord Gais<br>ESB<br>Eir<br>TII<br>Irish Rail<br>IFA/Teagasc<br>LAWCO | Coillte<br>Waterways Ireland<br>Bord na Mona<br>OPW<br>NPWS<br>Failte Ireland<br>IDA<br>Enterprise Ireland | Heritage Council<br>Midland Energy Agency<br>An Taisce<br>SEAI<br>AIT<br>EPA |
| Government Departments | Communications, Climate Action and Environment<br>Housing, Planning and Local Government<br>Culture, Heritage and the Gaeltacht<br>Agriculture, Food and Marine<br>Transport, Tourism and Sport<br>Rural and Community Development | | |

## FUNCTION OF STAKEHOLDER ENGAGEMENT


**Key Issues Relevant to Offaly County**

## ENGAGEMENT AND CONSULTATION APPROACH PER STAGE OF PLAN

Public engagement and consultation is important in the context of spreading awareness of the issues around climate change and climate action and particularly the role of the local authority at local level in building the adaptive capacity of communities. The methods of communication employed should reflect this.

| Stage | Stakeholder | | Method |
|---|---|---|---|
| **Stage 1**<br>**Data Collation**<br>**Information Dissemination**<br>**Background Research** | OCC | Councilors<br>Municipal Districts<br>Interdepartmental representatives<br>SPC<br>LCDC | Presentation<br>Feedback<br>Workshop<br>Presentation & FB |
| | LA | Adjoining local authorities | Work collaboratively through variety of means for purposes of information sharing |
| | CARO | Eastern and Midlands Climate Action Regional Office | Continuous liaison/collaboration with CARO in development of strategy - various communicative means |
| | RBD | LAWCO, LAWPRO<br>River Basin Districts | Engage one to one through existing established LA working groups |
| | External and Local | General public<br>Community groups<br>Sports Clubs<br>Business Interests<br>Chambers of commerce<br>Housing associations<br>Tidy Towns<br>Heritage Groups<br>Groups & agencies working with LA<br>Youth clubs<br>Schools | Newspaper notice<br>Targeted approach through PPN<br>Information on Website<br>Focus groups<br>Open display period inviting submissions or commentary (display in library network and OCC buildings.<br>Social media notices |
| **Stage 2**<br>**Data Collation**<br>**Information Dissemination**<br>**Background Research** | External Agencies<br><br>(sectoral & vested interest in Offaly) | Irish Water<br>Bord Gais<br>ESB<br>Eir<br>TII<br>Irish Rail<br>IFA / Teagasc<br>Coillte<br>Waterways Ireland<br>Bord na Mona<br>OPW<br>NPWS<br>Failte Ireland<br>IDA<br>Enterprise Ireland<br>Heritage Council<br>Midland Energy Agency<br>An Taisce<br>SEAI<br>AIT<br>EPA<br>CIF | Letter<br>Email<br>Meeting |

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| | Government Departments | Communications, Climate Action and Environment<br>Housing Planning and Local Government<br>Culture, Heritage and the Gaeltacht<br>Agriculture, Food and Marine<br>Transport, Tourism and Sport<br>Rural and Community Development | Letter |
| **Stage 3 Draft Plan** | All stakeholders | | Newspaper notice<br>Social media<br>Website info<br>Open Submission period |
| **Stage 4 Final Plan** | All stakeholders | | Newspaper Notice<br>Social Media<br>Website<br>Final publication |

# Appendix 2

## Climate Events 1976 - 2018

## Climate Events (Data from Met Éireann Website)

The table below has been compiled from the Met Éireann website with a 45 year time span. A timeline visually highlighting all major weather events between 1974 to present day in Ireland is provided below. On the timeline all events that involved rainfall, snowfall, and flooding are above the middle line. All Events that involved rising temperatures, dry periods and wind storms (without rainfall) are below the middle line. The timeline aims to show the events that had the most impact further from the middle line with the events having less impact closer to the middle line.

| Date of Event | Type of Event | Description of Event |
|---|---|---|
| 02/01/1976 | Storm | Highest gust speed - 68mph (Dublin airport); Mean Speed 43 kts<br>Duration: 6 hours |
| 01/10/1974 - 01/08/1976 | Dry Period | More than 50 % less than average rainfall in east / south east Oct 1974, Jan May, June, December 1975, April, June August 1976 |
| 13/08/1976 - 14/08/1976 | Fastnet Storm | Winds of between Storm Force 5 to 10; Wave height of between 4 to 14.5 metres |
| 01/11/1980 - 02/11/1980 | Prolonged Heavy Rainfall | 157.1 mm of rain recorded over 36 hours (Valentia) severe flooding in W/SW |
| 15/01/1982 | Heavy Snowfall | 16 - 25 cm of snow depth in eastern region |
| 25/07/1985 - 26/07/1985 | Thunderstorms | Widespread thunderstorms - farm animals killed (100s), crops damaged, flooding - over 50 mm rainfall in 24 hr period Leinster / Munster |
| 25/08/1986 | Hurricane Charley | heavy rainfall, flooding (worst flooding in Dublin in over 100 years) |
| 12/01/1987 - 13/01/1987 | Heavy Snowfall | 6 - 19 cm nationally (12-19cm Kildare / Dublin) |
| 21/10/1987 | Flooding | Flooding in northern areas - between 34.9 - 52 mm in Dublin area in 24 hr period |
| 09/02/1988 | Storm Force Winds | Storm force winds over Ireland - gusts up to 93 kts (mean wind speed of 50 kts) - above average rainfall for that month as a result of storm, 80,000 homes without power |
| 27/10/1989 - 28/10/1989 | Heavy Rainfall | Heavy Rainfall in the West and Northwest - 61 - 130 mm of rainfall in West - Northwest (over 36 hours) (20 - 30 mm in East - Southeast). Flooding in West and Northwest, maximum gusts of 60-70 kts |
| 01/02/1990 - 28/02/1990 | Storms / Heavy Rain | Widespread flooding, gales and gale gusts throughout the month. Wettest February on record in parts - up to 251mm of rainfall in Claremorris (also 38.7mm of rainfall over 24-hour period in Mullingar - highest ever recorded at the time) |
| 05/01/1991 | Windstorm | Maximum gusts of 63-83 kts - Mean wind speeds (over 24 hr period) 28-54 kts |

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|---|---|---|
| 11/06/1993 | Flooding | Flooding in Dublin / Kildare area - record rainfall for region - in excess of 100mm of rain in 24 hr period |
| 17/03/1995 | Tornado | A tornado in the Summerhill area of Co. Meath - path of approximately 18 miles long, wind speed approximately in excess of 100mph - accompanied by lightning and hailstones (up to 5cm diameter) - roof tiles lifted, trees uprooted, windows shattered, animals killed, farm buildings severely damaged |
| 01/06/1995 - 30/08/1995 | Warmest Summer on Record | Mean air temperature over two degrees above normal in most places. Temperature rose to above 30 degrees on a number of days. Driest summer on record at Malin Head, Casement Aerodrome and Cork Airport. At Dublin (Phoenix Park) 65.2 mm of rainfall over summer months - lowest since 1887 |
| 03/08/1997 - 06/08/1997 | Extensive Flooding | Extensive flooding in Southeast and South - 200mm of rainfall between 3rd and 7th in places. Flooding of farmland seriously damaged crops. Pollutants also washed into waterways. Rivers in south overflowed / burst their banks) |
| 24/12/1997 | Windstorm | Munster / South Leinster - highest gusts of 88kts (101mph) (Valentia Observatory). Maximum ten-minute mean wind speeds reached violent storm force 11 (Beaufort Scale). 85-95 mph winds in Dublin area |
| 26/12/1998 | Hurricane force winds | Hurricane force winds over North and Northwest - storm force 10 - gusts of up to approximately 96 kts (110 mph) (max 10 min mean wind of 45-67 kts) - Ulster and Connaught had the more severe winds |
| 29/12/1998 - 31/12/1998 | Flooding along Munster Blackwater | Heavy rain in the period of 29th - 30th December - Soil moisture levels already close to saturation before rain arrived. Approximately 56 mm of rainfall on 29th (in 24 hr period) |
| 05/11/2000 | Severe Flooding | Severe flooding in East and Southeast - between 77 - 142mm of rainfall in Wicklow / Dublin region, between 70-98 mm of rainfall in Tipperary / Waterford region - flooding caused widespread disruption of transport. Flood damage to property estimated at 40 million Pounds |
| 01/02/2002 | Coastal Flooding | Coastal Flooding along Eastern and Southern Coasts - Rain and tidal flooding - wettest February at many stations for 12 - 25 years. Wettest February at Casemont Aerodrome since records began in 1964. Severe coastal flooding from heavy rain, gales, higher than normal tide - highest tide in over 80 years caused see defenses to fail and led to rivers and canals overflowing in parts of the city. |
| 14/11/2002 | Severe Flooding | Severe flooding in Eastern areas - Second highest monthly accumulation on record (October at Dublin Airport), wettest month on record at Casemont Aerodrome (October) - Total rainfall in first half of November 2002 well above normal total for whole month. Ground was well saturated as a result. Average of 80mm rainfall in Dublin on 14th. Caused significant disruption and damage especially in the lower Tolka catchment. |
| 19/09/2003 | Flooding / Landslide | Flooding / Landslide at Pollatomish - an almost stationary intensity peak in the area with instantiated value greater than 23mm/hour. An estimated runoff in excess of 50mm in the Ballinaboy river during the almost 10 hours ending 08:00 hours on the 20th |

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|---|---|---|
| 01/06/2006 - 30/08/2006 | Warmest Summer on Record | Warmest Summer generally since the record-breaking year of 1995 - at Malin Head - warmest summer on record since records began in 1885. Summer rainfall totals below normal everywhere and well below normal over most of the southern half of the Country. Third highest records on Poulter Index (extends back almost 100 years) |
| 01/06/2008 - 30/08/2008 | Heavy Rain and Flooding | Rainfall totals were above normal everywhere and were more than twice the average in the east and southeast of the country. Severe flooding in west Limerick (31st July) and North Kildare / Dublin Regions 9th August) and in other areas (12th-16th August). 49-78 rain days (normal range 38-55) led to soil near to saturation unable to soak up large amounts of rainfall. |
| 01/11/2009 - 30/11/2009 | Severe Flooding | Severe flooding in many parts of the country. Rainfall totals for November were the highest on record at most stations. Valentia's total of 360mm was its highest of any month since observations began in 1866. Between 17 &30 wet days observed (normal range 13-20). |
| 01/12/2009 - 28/02/2010 | Coldest Winter for almost 50 years | A total of 70 - 80 ground frosts at inland stations. Between 20 - 30 days with snow in many places - snow accumulation slight except on higher ground. Total number of rain days during winter period was 44-62 (10% lower than normal) |
| 27/11/2010 - 31/12/2010 | Severe Cold Spell | Both Dublin Airport (-8.4 degrees C) and Casement Aerodrome -9.1 degrees C) had their lowest November temperatures on record (on 28th). Significant snow accumulation (20 - 27cm at Dublin Airport and Casemont Aerodrome) and record low December temperatures. Freezing condition penetrated into the ground |
| 24/10/2011 | Heavy Rainfall | Heavy rainfall in the greater Dublin region - this heavy rainfall combined with rainfall totals the previous day, lead to saturation of soils and flooding occurred in some eastern areas. 82.2 mm rainfall at Casemont Aerodrome (greatest October daily rainfall since records began in 1954). Maximum 9-hour rainfall at Dublin Airport (68mm) (annual probability of 1 in 100). Flooding in many parts of Dublin and East Coast - flooding roads and causing lengthy traffic delays - many home & businesses under water - two death attributed to rainfall event - millions of Euro worth of damage to homes, businesses, and infrastructure. |
| 14/12/2013 - 12/02/2014 | Winter Storms | A run of winter storms, culminating in serious coastal damage and widespread, persistent flooding. Storm force winds occurred on 12 different days. Rainfall amounts of 1 1/2 - 2 times above normal and to saturated or waterlogged ground throughout the country. Wind speeds above average for winter. |
| 12/02/2014 | Storm Darwin | Maximum sustained wind and gust speeds were 120 and 160 km/h respectively. Most severe winds were experienced in Galway, Clare, Limerick, Kerry and Cork but also strong winds were noticeable around the N7 motorway corridor from Limerick to Dublin. Considerable damage to housing and other buildings. Approximately 8000 ha of forestry were damaged. 1 in 20-year event. |
| 01/01/2016 - 31/01/2016 | Wettest January in 20 years | Rainfall in Ireland during January was 126% of the monthly Long-Term Average (1981-2010) Dublin reported 200% of their LTA rainfall. |

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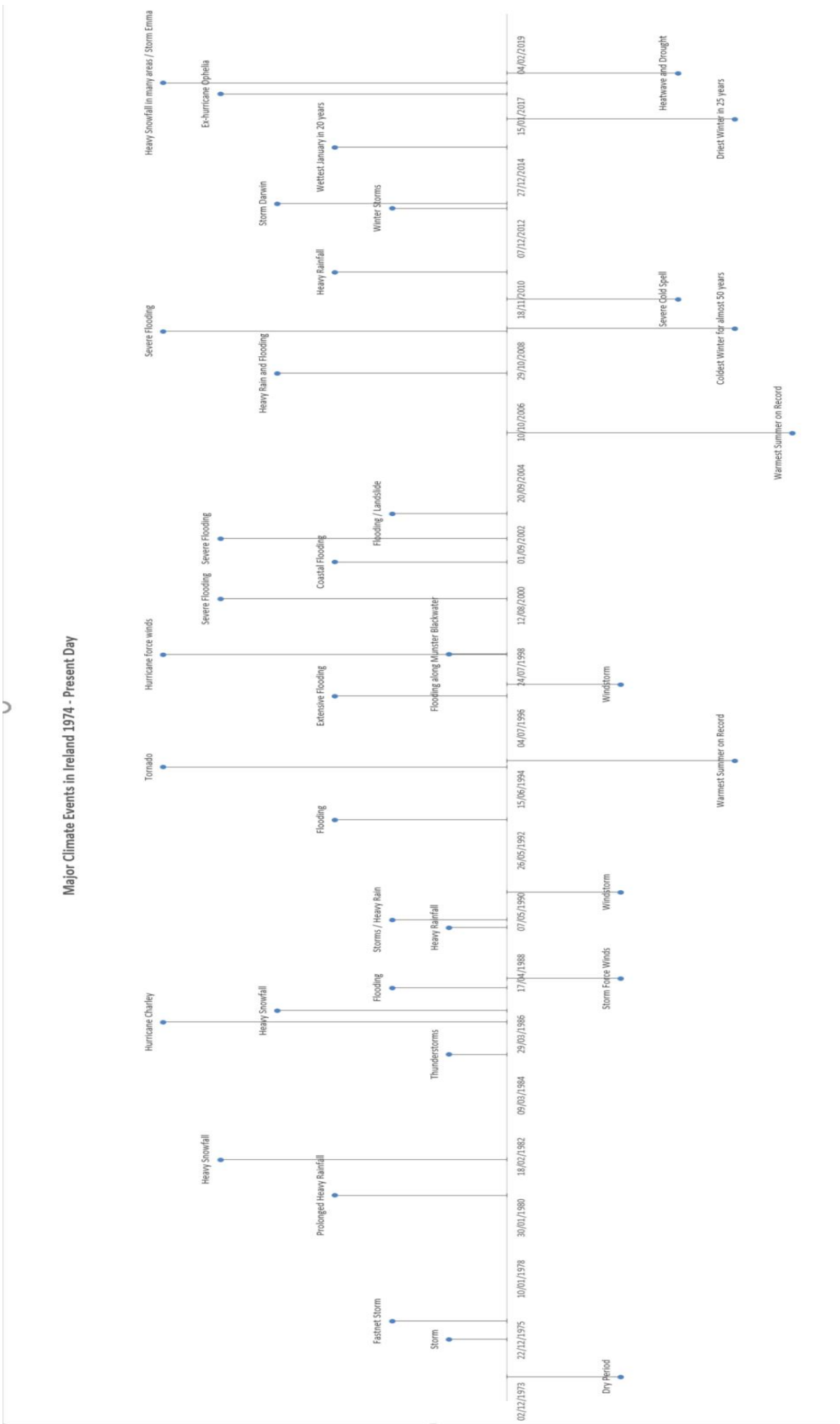
| 12/12/2016 - 28/02/2017 | Driest Winter in 25 years | All places had below Long-Term Average (LTA) winter rainfall, with the majority of stations reporting between half and three-quarters of their normal seasonal total. Percentage of monthly LTA values were variable in December February, with January reporting below monthly LTAs, with dry spells reported in the East and east Midlands. All seasonal mean temperatures were above their LTA, with over half of stations reporting at least 1°C or more above normal with some of these reporting it as their mildest winter in 10 years. Monthly mean temperatures were above Average for all three months of the season. |
| 16/10/2017 | Ex-hurricane Ophelia | Windstorm - Gales and strong gales were reported at many stations on the 16th. Violent storm force winds reported in Cork on 16th. Highest gusts were 84 kts (155km/hr (highest on record at this station) also highest 10-minute mean wind spend was 62 knots. |
| 01/03/2018 - 03/03/2018 | Heavy Snowfall in many areas / Storm Emma | Widespread heavy falls of drifting snow occurred on 1st, 2nd, and 3rd, heaviest in the East and Southeast with accumulations of up to 69 cm in the Wicklow mountains. Fairly widespread snow occurred also on the 18th. |
| 10/06/2018 – 28/07/2018 | Heat wave & Drought | All rainfall totals were below their long term average for the season. All 3 summer months had below average rainfall with June and July being the driest months. It was the driest summer at Cork Airport since 1962. The number of wet days ranged from 1 day at a number of stations to 10 days in Co. Mayo. Absolute drought conditions prevailed from late June until mid July at stations in the East, Midlands, West and South, whilst partial drought conditions in the South from early June until late July. All mean seasonal air temperatures across the country were above their long term average. Many stations reported heat waves by the end of June. Heat waves continued into July in some places. August was the coolest month of the summer. The season's highest temperature was recorded at Shannon Airport at the end of June at 32$^{O}$C. Apart from Malin Head all stations had above average sunshine (June and July). |

## Major Weather Event Information from Met Éireann



# Appendix 3

# Consequences of Climate Hazards

| Services/Functions | Climate Hazard Impacts | Consequences |
|---|---|---|
| **Business Operations / Continuity** | | |
| **Business efficiency, effectiveness and emergency response** | Building Closures – storm, snow, extreme rainfall<br><br>Building damage, impacts on servers – storm events.<br><br>Electricity supply affected – storm events<br><br>Risks to staff welfare, public safety, local business and tourism assets - storm, snow, rainfall events. | Service disruption to customers: motor tax, housing applications, scheduled meetings, arts/cultural events etc.<br><br>Inability to meet statutory deadlines eg. planning applications – financial/reputational consequences.<br><br>Resources stretched to deal with various impacts from extreme weather events above and beyond the performance of daily duties.<br><br>Increased pressure on emergency response and recovery operations.<br><br>Consequence to local/regional economies<br><br>Financial implications to Local Authority in cleanup operations, staff overtime, unable to perform normal duties.<br><br>Economic impacts – longer term consequence to local economy and Local Authority in terms of rate collection. |
| **Business operations** | Capitalising on opportunities arising from addressing the impacts of climate hazards. | Positive |
| **Infrastructure & Built Environment** | | |
| **Roads/footpaths, bridges, project construction and maintenance** | Changes in rates of deterioration - faster rate of deterioration in areas subject to flooding, sustained high temperatures, combination events.<br><br>Infrastructure collapse, significant damage – sustained duration and frequency of extreme events.<br><br>Blocked roads – storm, snow, rainfall events<br><br>Impact on construction projects – all extreme weather events. | Nuisance<br><br>Risk to public safety<br><br>Financial implications for unscheduled maintenance, repair, upgrade, new construction, staff overtime costs.<br><br>Reduced economic efficiency of road network for commuting traffic and emergency transport routes disrupted.<br><br>Time delays and cost implications in delivery of infrastructure. |
| **Surface Water Drainage** | Exceedance of drainage capacity – localised and larger scale flooding - rainfall, combination events. | Blocked roads, flooding/damage to roads properties/business – impact on insurance costs. |

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| | Inflow/infiltration into wastewater networks – extreme rainfall event<br><br>Reduced pressure on surface water drainage systems - drought conditions | Operating challenges of waste water infrastructure – knock on effects for wider community.<br><br>Stretch on staff resources.<br><br>Financial implications for increased maintenance, repair |
| **Building Stock – LA Buildings and social housing stock** | Damage and deterioration of housing stock – Storm, rainfall, snow and heatwave events<br><br>Increased need for heat – extreme cold events<br><br>Closure of Local Authority buildings – storm, snow, rainfall events<br><br>Need for mechanical ventilation systems and cooling systems – Heatwave events | Cost of maintenance, safety implications to public, possible rehousing of tenants<br><br>Cost of fuel (negative or positive)<br><br>Service disruption<br><br>Pressure on housing staff to rectify reports issues. |
| **Flood Defenses** | Exceedance of existing flood defenses – rainfall events<br><br>Increased frequency or permanent inundation of infrastructure & utilities i.e. water, sewerage, gas, communications, electricity, transportation routes – rainfall events<br><br>Destruction, damage, disturbance to council managed marinas and boat ramps - flood, wind events | Loss of capital infrastructure – cost of replacement.<br><br>Damage/loss of properties/lands take – displacement or isolation of communities<br><br>Disruption to commuting traffic, and utilities – economic impact.<br><br>Increased cost to Local Authority – repair, replacement. |
| **Community Infrastructure** | Deterioration of community infrastructure eg, playgrounds, public parks, swimming pools, public realm spaces - sustained weather extreme events.<br><br>Impacts on recreation amenities and tourism activities – storm, rainfall, snow events.<br><br>Reduced water for swimming pools, irrigation of open spaces, parks etc - drought conditions. | Cost of maintenance/upgrade.<br><br>Loss of revenue locally/regionally – tourism.<br><br>Closure of community infrastructure – short term.<br><br>Injury, illness or potential loss of life. |

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| | Risk to public safety in times of high temperatures for unsecured water spots | |
| **Cultural/Heritage** | Damage to cultural and heritage assets and cultural landscapes – storm and rainfall events. | Negative impact on tourism – economic consequence locally/regionally.<br>Loss of assets of intrinsic historical importance. |
| **Water and Sewerage Services** | | |
| **Stormwater /sewerage** | Inundation of stormwater and sewerage infrastructure – rainfall events<br>Increased peak flows – rainfall events<br>Changes in groundwater levels – drought conditions<br>Changes in floodplains – rainfall events<br>Reduced dry weather sewerage flows<br>Reduced/unreliable power supply for pumping and treatment – storm events<br>Changes in mean and peak stream and river flows – rainfall and drought events.<br>Uncertain water availability – drought conditions. | Disruption to communities<br>Negative Environmental consequences - draw on staff resources to investigate/rectify.<br>Local surface water flooding events. |
| **Wastewater** | Inflow and infiltration to wastewater network – rainfall events<br>Interruption to anaerobic process – heatwave events<br>Interruption to process – freezing events | |
| **Water Supply** | Increase in water demand and reduction in receiving water assimilative capacities during drought conditions – drought events<br>Flooding and inundation of wastewater treatment and water abstraction plants – rainfall events | Nuisance to householders.<br>Impact on economic development ie businesses and tourism.<br>Health consequences with inadequate water quality.<br>Additional demand on LA staff working under the SLA with Irish Water |

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| | Reduced availability of water supply sources during low rainfall and drought events<br><br>Loss of power supply during intense storm events<br><br>Increased potential for water contamination – rainfall and drought events<br><br>Changes in availability of groundwater – drought events<br><br>Quality of water diminished – rainfall, drought, heatwave events. | Requirement for hose pipe bans and impacts on local communities incl Local Authority parks and sports facilities<br><br>Water pollution issues relating to reduction in surface water flows<br><br>Network disruptions due to loss of power supplies. |
| **Water Quality** | Ground movement, in high temps, resulting in cracking of old wastewater pipe networks<br><br>Increased flooding mobilising runoff from land, incl contaminants into surface waters<br><br>Changes in species distribution and phenology of river systems – heatwaves, rainfall and cold events.<br><br>Low flows resulting in deterioration of water quality – low rainfall/drought events | Increased discharges from drainage systems to ground-waters<br><br>Increased pollution of surface water systems<br><br>Changes to surface water habitats<br><br>Spread of pathogens and other contaminants |
| **Natural Resources and Flood Management** | | |
| **Biodiversity** | Shift in distribution of plant and animal species from heat and cold stress- heatwaves and cold events.<br><br>Loss of bio-diversity - all sustained extreme weather events.<br><br>Increased risk of disturbance to population and species leading to extinction – heatwave events<br><br>Reduced ecosystem resilience to stress – all extreme weather events<br><br>Increased ecosystem and species heat stress – heatwave events. | Inability to meet objectives to protect and conserve important habitats.<br><br>Negative consequence on health and wellbeing of communities.<br><br>Stretched emergency services in dealing with bog fires, fires on sand dune areas.<br><br>Economic impact – reduced tourism. |

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|---|---|---|
| | Increased pressure on dune systems – storm and heatwave events.<br><br>Increased bog and sand dune fires – heatwave and drought events. | |
| **Weed/pest Management – Area Offices** | Changes in rate of coverage and spatial distribution of invasive species – change in average mean temperatures | Cost and staff resources required to manage and deal with invasive species. |
| **Landuse and Development Policy** | | |
| **Spatial Planning and Landuse** | Inappropriate location of urban expansion areas<br><br>Increased uncertainty in long term landuse planning and infrastructure design i.e. location of future developments, suitability of infrastructure designs to cope with impacts of weather events.<br><br>Loss of private property and community assets – extreme rainfall events, sea level rise, storm surge.<br><br>Early retirement of capital infrastructure - all extreme weather events | Increased insurance costs<br><br>Increased pressure on disaster management and response resources<br><br>Long term economic cost to area and to general public.<br><br>Impact on quality of life |
| **Community Health and Wellbeing** | | |
| **Community Development** | Increase isolation and disconnect of communities through inaccessibility – rainfall, snow, heatwaves i.e. bog, gorse, sandune, commonage fires)<br><br>Damage to properties, streetscapes and community assets – storm and rainfall events<br><br>Contaminants to waterways and drinking water supplies – rainfall (flooding), sea level rise and storm surge<br><br>Pressure on drinking water supplies – heatwave and extreme cold events | Abandonment of vulnerable rural areas<br><br>Impact on local economies, reduced interest in settlement<br><br>Cost of repair, replacement of street surfaces, public realm<br><br>Disadvantaged communities. |