

**Laois County Council**  
**Climate Change Adaptation Strategy**



**Environment Department**  
**2019-2024**

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# 1 CLIMATE CHANGE, POLICY & ADAPTATION

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## 1.1 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 Laois County Council Climate Change Adaptation Strategy is the start of the process of adaptation planning in Laois 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.

## 1.2 Purpose of this strategy:

This Laois County Council Adaptation Strategy forms part of the National Adaptation Framework (NAF) which was published in response to 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, Laois County Council are uniquely placed to effect real positive change with respect to delivery of the national transition objective to a low carbon and a climate resilience future.

The local authority 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 the local authority

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

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

In accordance with the provisions of the Climate Action and Low Carbon Development Act 2015 and the National Adaptation Framework this adaptation strategy is required to be adopted by members of Laois County Council before the 30<sup>th</sup> September 2019.

### **1.3 The Challenge of Climate Change**

*Climate* is described as the average weather prevailing in an area over a period of time. *Climate Change* is a significant change in weather patterns such as rainfall, temperature, and / or wind, which continue over an extended period of time (i.e. over 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<sup>1</sup>. 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)<sup>2</sup> warming of the climate system is attributable to human activities as a consequence of greenhouse gas emissions<sup>3</sup> 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,

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<sup>1</sup>El Nino is a climate cycle in the Pacific Ocean with a global impact on weather patterns.

<sup>2</sup> 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.

<sup>3</sup> Greenhouse Gases include: water vapour, carbon dioxide (CO<sub>2</sub>), methane CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and industrial gasses: Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur Hexafluoride (SF<sub>6</sub>), and Nitrogen Trifluoride (NF<sub>3</sub>). Carbon Dioxide emissions in the atmosphere are the main greenhouse gas caused by human activity

- Emissions from changes in land use such as urbanization, deforestation, reforestation and desertification.

Emissions from these activities are proven to impact the atmosphere by trapping the sun's 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 i.e. 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.

#### **1.4 The challenge for Ireland**

There is evidence that Ireland's 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<sup>4</sup>

The impacts of climate change are felt more acutely at the local level.

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<sup>4</sup> EPA Research, A summary of the state of knowledge on Climate Change Impacts for Ireland, Report No. 223, 2014.

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 i.e.:

- 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 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 Laois 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 through various implementation tools available as a local authority<sup>5</sup>.

### **1.5 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

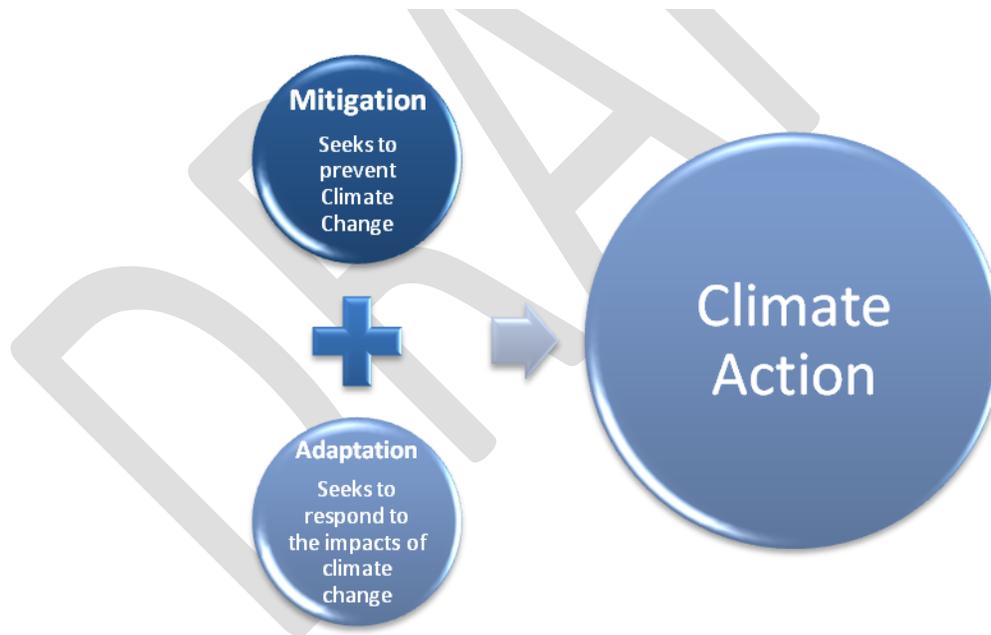
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<sup>5</sup> Including: Spatial Planning, development consent, asset management and natural resource protection.

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 a local authority 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.

## 1.6 Adaptation and Mitigation



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*Adaptation* refers to efforts to manage the risks and impacts associated with existing or anticipated impacts of climate change.

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

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This 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 produced under the provisions of the Climate Action and Low Carbon Development Act 2015.

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

While there is strong emphasis on local authorities through the NAF to develop and implement adaptation measures and actions, mitigation measures and actions that seek to combat, reduce or eliminate the emissions of greenhouse gases are also hugely important. Local authorities have a significant role to play in actively implementing mitigation actions through measures including the design and construction of flood defenses, retrofitting of building stock, energy efficient projects, promoting sustainable energy communities and encouraging sustainable transport and land use.

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 Laois.

## **1.7 Adaptation Policy Context**

This local authority adaptation strategy is set within a policy framework at International, European and National level.

### **1.7.1 International Context**

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty adopted in May 1992. The framework's 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 UNFCCC (ratified by Ireland on 4th November 2016) and it is aimed at:

- limiting global warming to less than 2°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.

### 1.7.2 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. Laois County Council is working towards becoming a party to the Covenant of Mayors.

### 1.7.3 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.

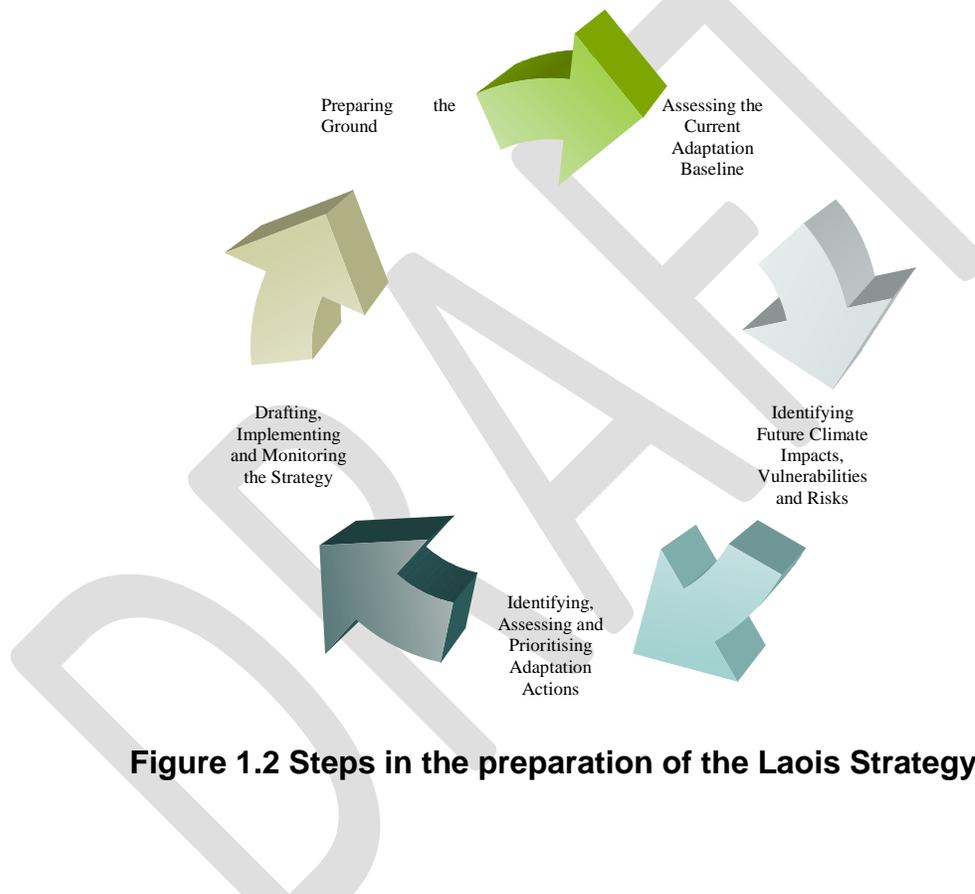
**The Climate Action and Low Carbon Development Act 2015** was a landmark national milestone in the evolution of climate change policy in Ireland. It provides the statutory basis for the national transition objective laid out in the National Policy Position (as per above). Further to this, it made provision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

**The Local Authority Adaptation Strategy Development Guidelines 2018** provides guidance to Local Authorities to develop their own Climate Action Adaptation Strategy. In developing this adaptation strategy Laois County Council has been consistent with these guidelines.

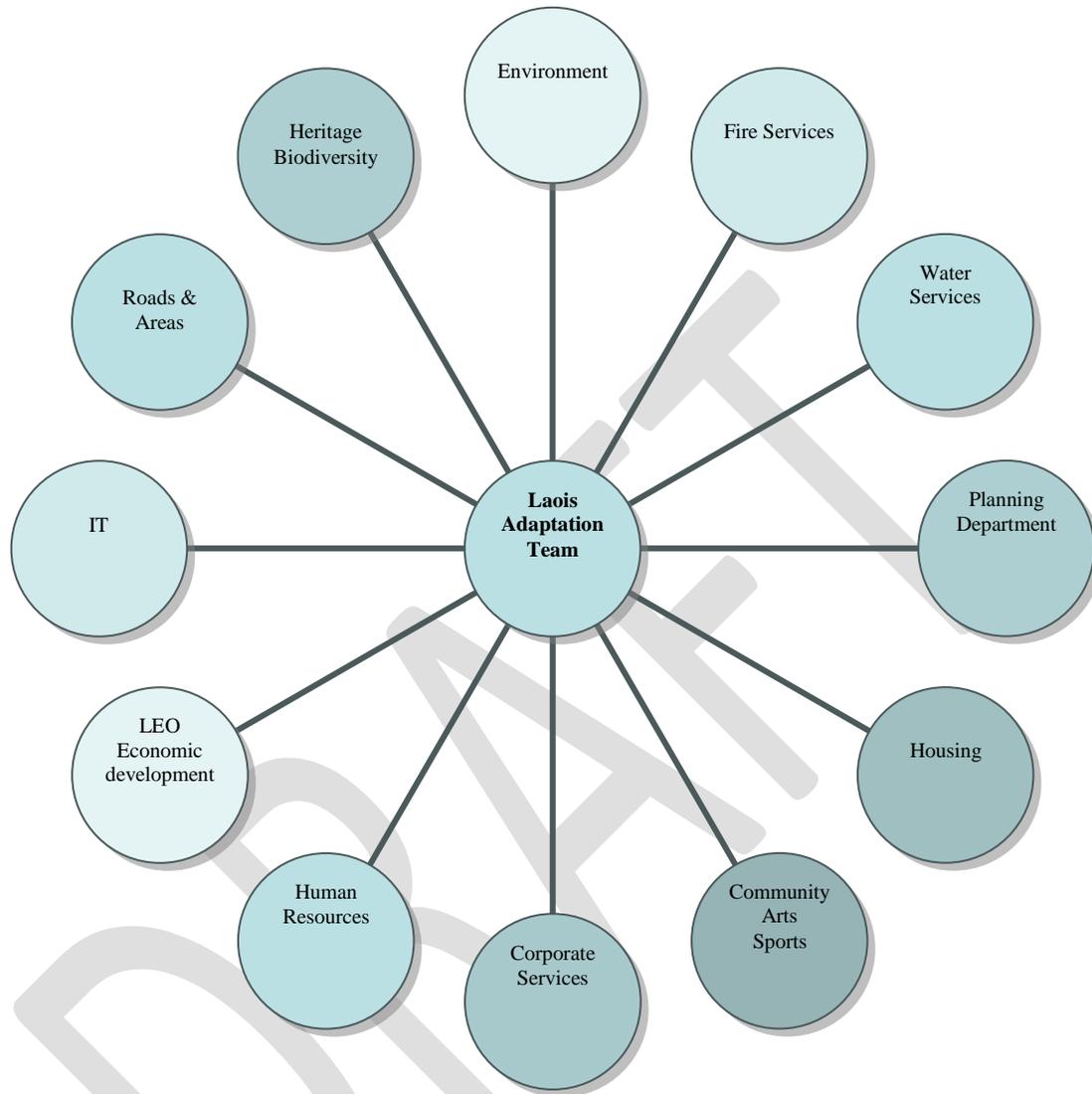
## 1.8 Methodology

The methodology used in the preparation of the Laois Climate Adaptation Strategy is set out in the Local Authority Adaptation Strategy Development Guidelines 2018. These guidelines are structured around a 5 step planning cycle, which include:

1. Preparing the Ground;
2. Assessing the Adaptation Baseline;
3. Identifying Future Climate Impacts, Vulnerabilities and Risks;
4. Identifying, Assessing and Prioritising Adaptation Actions;
5. Drafting, Implementing and Monitoring the Strategy.



In December 2018, a Climate Adaptation Team was established made up of personnel at a senior level drawn from a wide range of disciplines across the Council, refer to Figure 1.3. The Climate adaptation team was introduced to Climate Change at a workshop in January 2019; existing and anticipated changes to climate were presented to the team for impact identification by the team. The team's feedback on impacts and department specific actions, including discussion on existing policies, programmes, plans and bye-laws were compiled to identify existing adaptation actions and opportunities for consideration in the strategy.



**Figure 1.3 Laois County Council Departments represented on the Internal Adaptation Team**

Additional resources utilised in the development of this plan include the

- County Development Plan,
- The Local Economic and Community Plan (LECP) 2016-2021.
- Laois County Council Corporate Plan 2014-2019
- Laois County Council Major Emergency Plan 2018
- EPA Research Programme 2014–2020 Ensemble of regional climate model projections for Ireland (2008-FS-CC-m) Prepared for the Environmental Protection Agency by Irish Centre for High-End Computing and Meteorology and Climate Centre, School of Mathematical Sciences, University College Dublin Author: Paul Nolan. As well as web based tools like Climateireland.ie and met.ie.

The draft plan will be placed on public display in line with provisions of public consultation and stakeholder communication plan. Consultation with prescribed environmental authorities for the purposes of Strategic Environmental Assessment will be undertaken in accordance with the provisions of the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. 435 of 2004 as amended by S.I. 200 of 2011).

## **1.9 Environmental Assessment:**

### **SEA/AA**

#### ***Screening Overview for SEA***

Under the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. 435 of 2004 as amended by S.I. 200 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 overview for AA:***

Screening of this strategy will be 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. An AA Screening Report is being prepared and will be finalized post consultation and will accompany the final strategy.

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## **2 REGIONAL AND LOCAL CONTEXT**

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### **2.1 Laois County Council in Context**

Laois County Council is located within the Eastern and Midlands Climate Action Region (CARO) and is one of 17 Local Authorities in the region. Laois County Council is located centrally within the Eastern and Midlands Climate Action Region. The Eastern and Midland CARO has assisted and supported Laois County Council in the development of this climate change adaptation strategy.

### **2.2 Background to the Eastern and Midland Climate Regional Office**

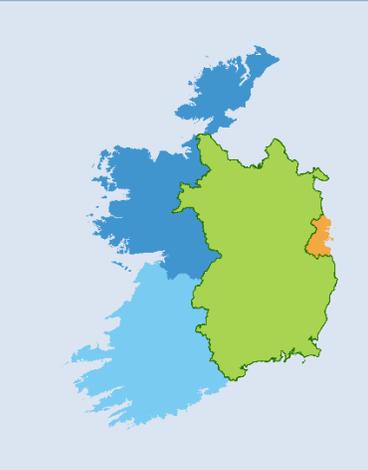
The Eastern & Midland CARO is one of four regional climate action offices set up in 2018 in response to Action 8 of the 2018 National Adaptation Framework (NAF) – *Planning for a Climate Resilient Ireland*.

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 local authority areas. The climatic risks associated with the Eastern and Midlands Climate Action Region includes Fluvial Flooding, Pluvial Flooding, Groundwater Flooding and Coastal Flooding.

The four CARO regions and constituent local authorities are illustrated on table 2.1.

**Table 2.1 Four Caro Regions**

	CLIMATE ACTION REGION	LOCAL AUTHORITY FUNCTION AREA	LEAD AUTHORITY
	<b>MIDLANDS AND EASTERN</b>	CARLOW, CAVAN, KILDARE, KILKENNY, LAOIS, LEITRIM, LONGFORD, LOUTH, MEATH, MONOGHAN, OFFALY, ROSCOMMON, TIPPERARY, WATERFORD, WESTMEATH, WEXFORD, WICKLOW	<b>KILDARE COUNTY COUNCIL</b>
	<b>ATLANTIC SEABOARD NORTH</b>	DONEGAL, SLIGO, MAYO, GALWAY CITY & COUNTY	<b>MAYO COUNTY COUNCIL</b>
	<b>ATLANTIC SEABOARD SOUTH</b>	CLARE, LIMERICK, KERRY, CORK CITY & COUNTY.	<b>CORK COUNTY COUNCIL</b>
	<b>DUBLIN METROPOLITAN</b>	SOUTH DUBLIN, FINGAL, DUNLAOGHAIRE-RATHDOWN, DUBLIN CITY	<b>DUBLIN CITY COUNCIL</b>

**2.3 Profile of Eastern and Midland Climate Action Region**

With 17 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<sup>6</sup> and at 32,542 sq.km occupies 46.3% of the area of the state<sup>7</sup>. 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 land use in the region.

<sup>6</sup> Total population of E&M Region is 1,796, 923 persons. The state population is 4,761,865 persons (CSO, 2016).

<sup>7</sup> Total area of state is 70,282 sq.km

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.

Twenty-one 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.

## **2.1 Profile of County Laois**

Laois is an inland county in the south midlands of Ireland covering an area of 171,990 hectares which equates to 2.4% of the national landmass. Occupying a strategic position near the centre of the country, County Laois is land locked and shares borders with five adjoining counties; Carlow, Kildare, Kilkenny, Offaly and Tipperary, as shown in Figure 2.1.

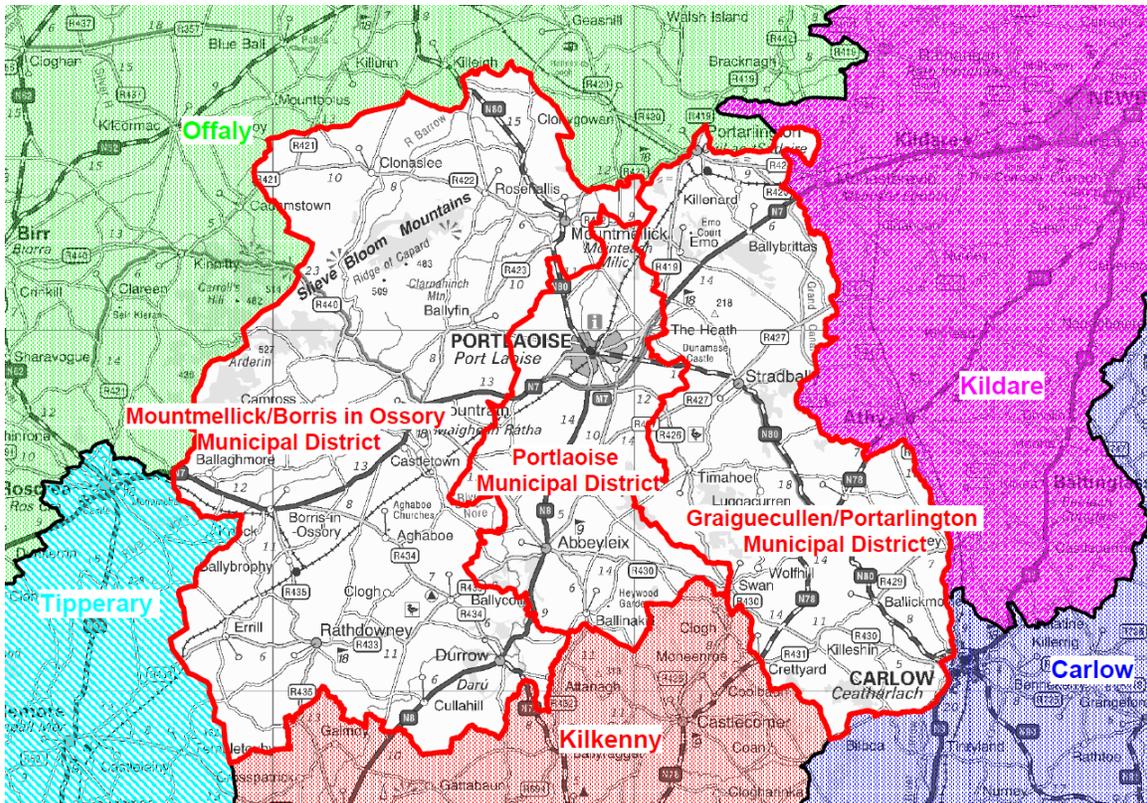


Figure 2.1 County Laois in context (Laois GIS)

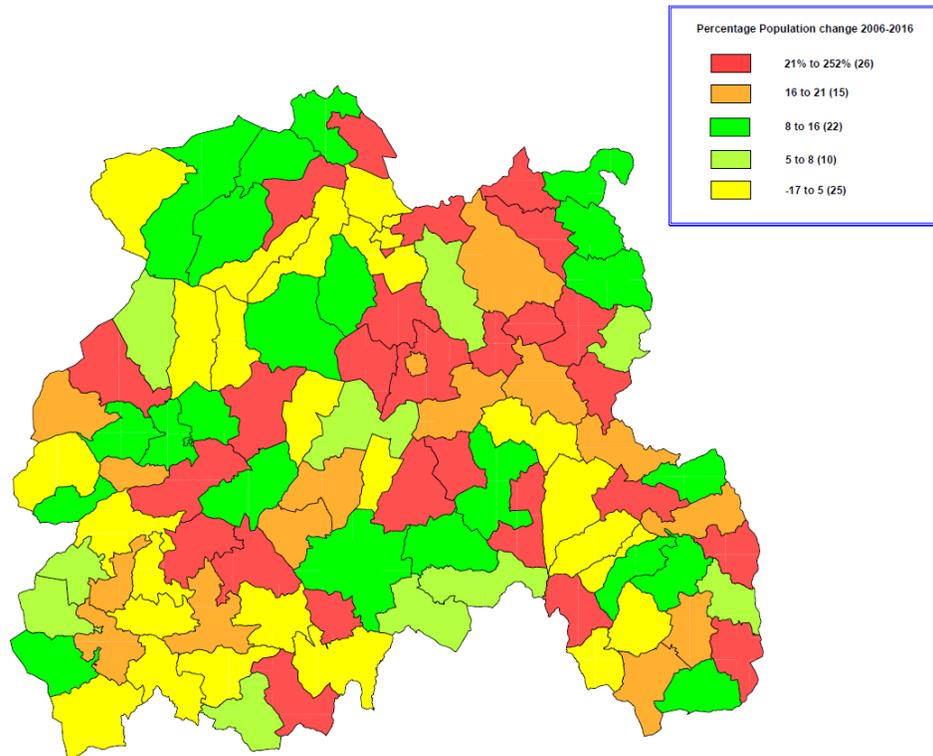
## 2.2 Population

The population of the county in 2016 according to the Central Statistics Offices, CSO was 84,732. The population in Laois continues to be one of the fastest growing county populations in Ireland, having seen a 5.2% increase in population from 2011 to 2016. Table 2.2 shows the population changes in County Laois from 2002- 2016. Figure 2.2 shows the population change from 2006-2016 geographically in the County.

Table 2.2 Population increase in County Laois 2002 to 2016, CSO.

Year	2002	2006	2011	2016
Population	58,774	67,059	80,559	84,732

County Laois has a balanced rural/urban population. It is becoming more urbanised but rural life and the rural economy remain important. The urban population increased slightly in census 2016 from 47% to 48%, with the rural population down 1% to 52%. Average farm sizes and farm incomes in County Laois are higher than the Midlands or State average.



**Figure 2.2 Population change from 2006-2016 geographically. (Laois GIS).**

Figure 2.3 shows a snap shot of Laois, provided by the CSO, showing information on population numbers, the average age, the number of students/pupils and persons with a disability and the number of careers in the County.



**Figure 2.3 A snap shot of Laois, Source: Central Statistics Office, 2018, based on CSO information from Census 2016.**

### 2.2.1 Education

The 2016 Census showed that, of those aged 15 years and over whose full-time education had ceased, 14.1% were educated to at most primary level only, while 35.3% were educated to third level. Among those who had completed their full-time education in April 2016, younger people were significantly better educated than their older counterparts, illustrating the on-going gains in educational attainment.

The educational attainment of Laois residents is likely influenced by the profile of available job opportunities. For employment reasons, many Laois-born residents may choose to live elsewhere after completing their higher education. Educational attainment is greater in the eastern part of Laois that experiences a high level of out-of-county commuting and lower in western areas that are associated with in-county working.

A high number of people living in the eastern half of the county have third-level qualifications compared to the western half. A higher number of people, living in the eastern half of the county, commute out-of-county to work in adjoining counties and the greater Dublin Area..

The following table represents the number of national and secondary schools within the county.

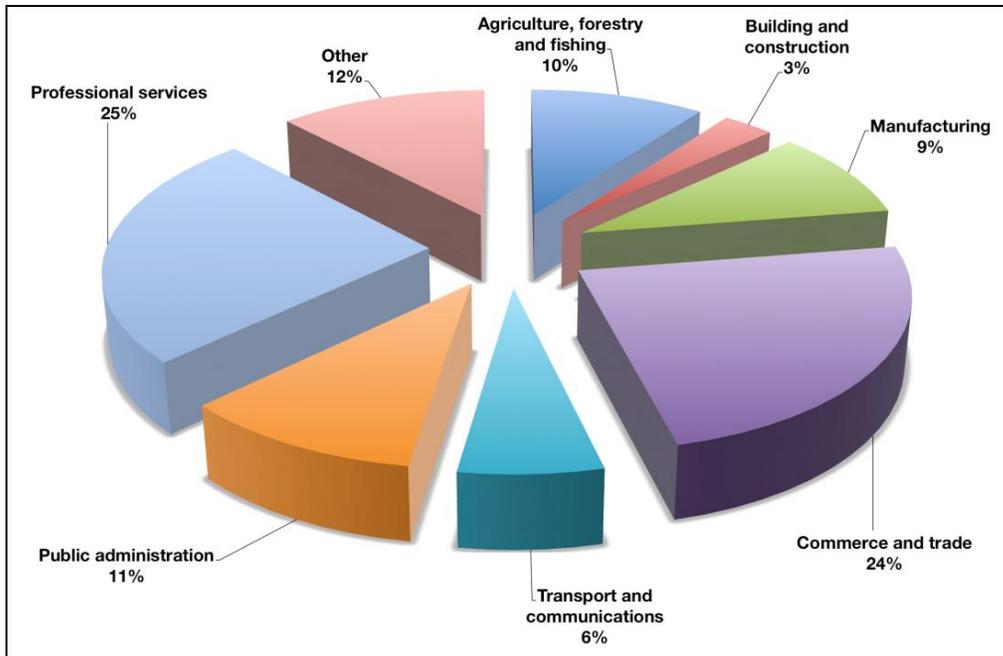
**Table 2.3: Number of National and Secondary Level Schools**

	National Schools	Secondary Schools	Total number
County Laois 2019	79	9	88

Source: Based on most recent statistics from Department of Education.

### 2.2.2 Employment, Workers by Industry

Unemployment in 2016 in County Laois was 15.3% down from 21.4% in 2011. County Laois has a growing services sector, especially in the retail and wholesale area. The public sector is an important employer in Laois. Employment levels related to manufacturing are low in Laois relative to the Midlands or the State. Manufacturing employment is falling in Laois in line with wider employment trends in this sector, while agriculture still remains an important sector in the county. The designation of Portlaoise as a national transport hub in national and regional policy remains crucial from the point of view of attracting significant inward investment and job opportunities to the county. IT activities (computer programming, consultancy and related services) showed the largest increase nationally but only 1% of workers in Laois work in computer and information services (CSO, 2016). This was followed by residential care and social work activities which showed a 24 per cent rise nationally, 5.6% of Laois workers are employed in this sector.



**Figure 2. 4 Employment by sector in County Laois, CSO.**

### 2.2.3 Commuting

County Laois has the highest rate of outbound commuters in the Midlands, with Dublin and Kildare being the most popular destination. The average travel time to work in Laois is 31.9 minutes, CSO 2016.

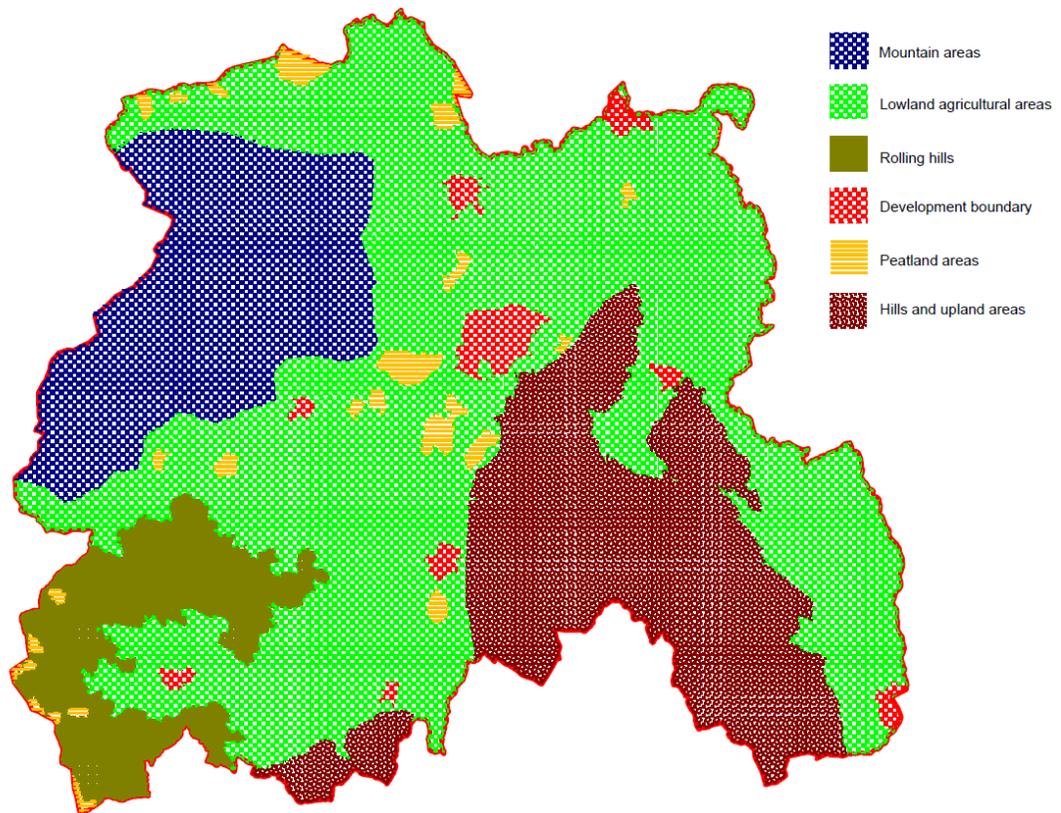
**Table 2.3 Time Spent travelling to work in Laois, (Source CSO 2016)**

Time Spent Travelling	% of Workforce
Less than 30 minutes	51
31-60 minutes	22
61-90 minutes	11
90+minutes	6.7

Note: 9.2% was not stated

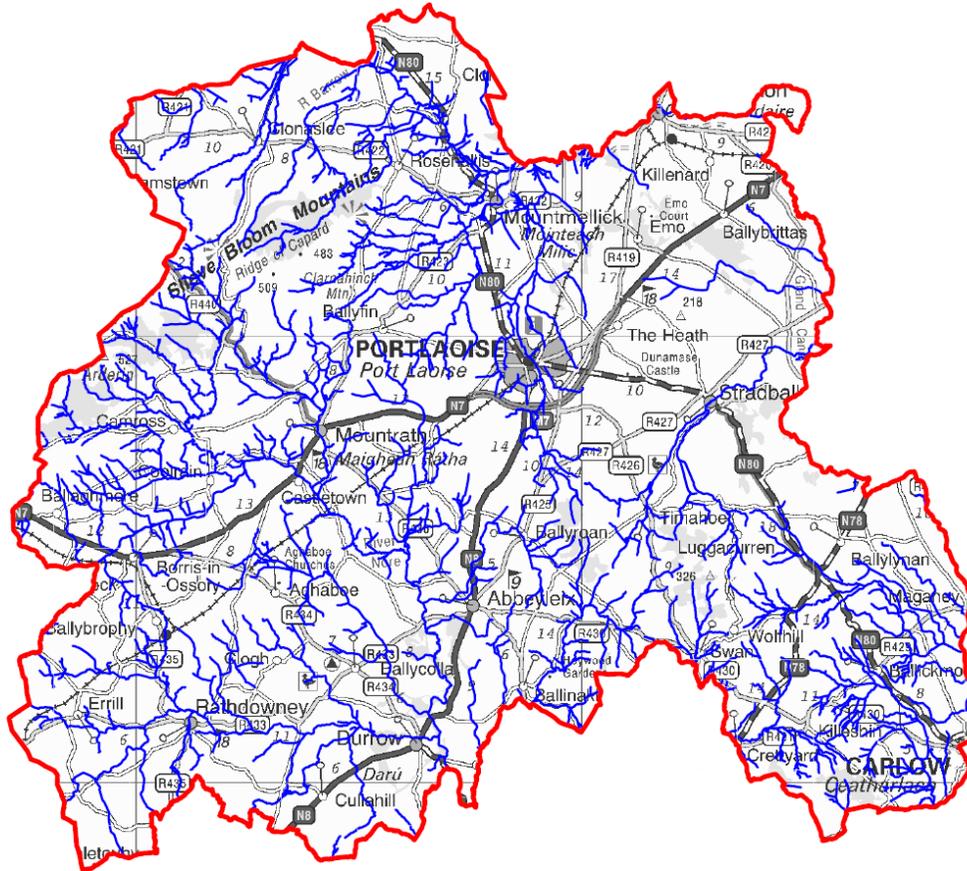
### 2.3 Topography & Hydrology

In physical terms, the landmass of County Laois consists of a central plain containing most of the productive agricultural land, surrounded by a number of upland areas including the Slieve Bloom Mountains in the northwest, Killeslin Plateau in the south east and Cullahill Mountain in the south. Though not as extensive as in counties Offaly and Kildare, there are significant cutaway peatlands in the county mainly situated between Portlaoise, Mountrath and Abbeyleix. Figure 2.4 shows the topography of Laois.



**Figure 2.5 Topography of County Laois, (Laois GIS)**

Approximately 0.01% of County Laois is covered by water. The principal rivers are the Barrow, Nore and Erkina which flow in a northwest-southeast trajectory and there are minor man-made lakes at Ballyfin, Grantstown and Heywood. The Grand Canal passes through the north east of the county and links to the wider River Barrow navigation system. All of these watercourses offer much potential by way of natural and cultural heritage, tourism, leisure and recreational pursuits.

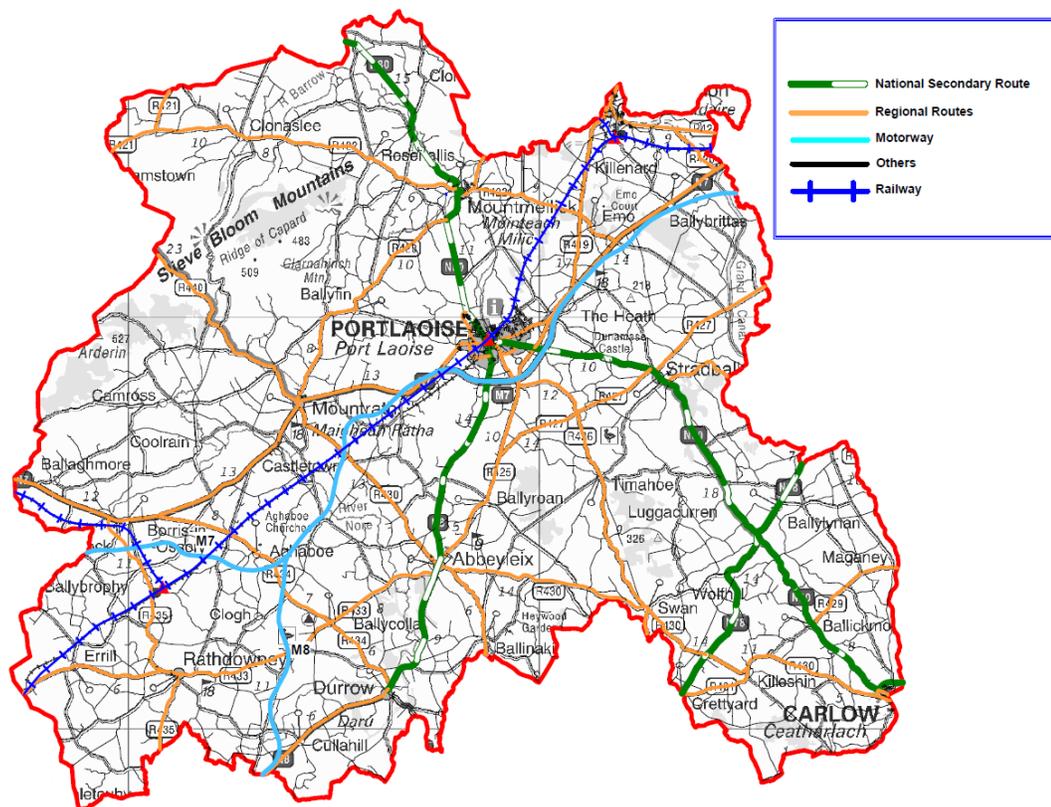


**Figure 2.6 Rivers of County Laois, (Laois GIS)**

## **2.4 Transportation**

County Laois is only c. 70 kms from the Dublin metropolitan area. This relative proximity to the capital has had a major effect on both the nature and extent of development and the associated traffic movements, particularly in the northern and eastern parts of the county. The travel time between Laois and Dublin continues to decrease as a consequence of improved road and rail infrastructure between the two places. Figure 2.7 shows the main transport network in the County. The total length of public road network in Laois is 2,361km, consisting of:

- Motorway: 67km
- National Secondary: 100km
- Regional: 348km
- Local Roads: 1,846km



**Figure 2.7 Main Transport Network in County Laois. (Laois GIS)**

## **2.5 Built Heritage**

The monuments, buildings, streets and spaces in the towns, villages and rural areas of Laois together make up the rich built heritage of County Laois. The built heritage of County Laois has a very considerable contribution to make to the identity of the county itself and also to the wider region. There are some outstanding and very exceptional structures within County Laois, including the Monastic Settlement in Aghaboe, Fort Protector in Portlaoise, Donaghmore Workhouse, Heywood Gardens, Coolbanagher Church, Emo Court and Gardens, Ballyfin House and Demene, Castledurrow Demesne, Abbeyleix Demesne, Stradbally Hall and Roundwood Demesne. In addition, there are many fine groups of buildings including historic and village town centres for which Architectural Conservation Areas have been designated in Abbeyleix, Ballinakill, Castletown, Clonaslee, Durrow, Portlaoise and Timahoe. Other townscapes of significant and special architectural interest include O’Connell Square Mountmellick, Market Square Mountrath, Portarlinton Market Square and French Church Street and Stradbally Main Street.

## 2.6 Archaeology of County Laois

The archaeology of County Laois varies greatly in form, date and condition and includes structures, constructions, groups of buildings, developed sites, all recorded monuments as well as their contexts, and moveable objects, situated both on land and underwater. Tables 2.3 and 2.4 detail the National Monuments in State Care in Laois and the Monuments protected by Preservation Orders in County Laois.

**Table 2.3 National Monuments in State Care in Laois**

Name	Description	Townland	COUNTY	Legal Status	RMP Number	National Monument Number
<b>Aghnahilly</b>	Ringfort	Aghnahilly	Laois	Ownership	LA013-063	540
<b>Coorlaghan</b>	Ringfort	Coorlaghan	Laois	Ownership	LA037-002	567
<b>Dunamase Castle</b>	Castle	Dunamase	Laois	Ownership	LA013-052	615
<b>Errill</b>	Church & Cross	Errill, Ballagharahin	Laois	Ownership	LA027-024---, LA027-025	113
<b>Fossy</b>	Church	Fossy Lower	Laois	Ownership	LA019-016	114
<b>Killeshin</b>	Church	Killeshin	Laois	Ownership	LA032-020002	115
<b>Sleaty</b>	Church & Crosses	Sleaty	Laois	Ownership	LA032-018001-, LA032-018003-, LA032-018007-	116
<b>Timahoe</b>	Church & Round Tower	Timahoe	Laois	Ownership	LA018-031002-, LA018-031005	114

**Table 2.4 Monuments protected by Preservation Orders in County Laois**

<i>Preservation Order No</i>	<i>Monument Name</i>	<i>RMP Number</i>	<i>Townland</i>	<i>Effective Date</i>
3/95	Clogrennan	LA034-008---	Clogrennan	1995
197	Lamberton Fort	LA018-012---	Lamberton Demesne	1957
190	Motte	LA024-006001-	Ballyroan	1952
4/81	Motte & Bailey	LA024-015001 LA024-015002-	Ballinclogh	1981
9/77	Ringfort	LA028-011---	Garryduff	1977

## **2.7 Natural Heritage**

A wide diversity of flora, fauna and wildlife habitats make up the biodiversity of County Laois. Some sites have been designated by the National Parks and Wildlife Service of the DOAHRRGA as Special Areas of Conservation (SACs), Special Protection Areas [SPAs] and Natural Heritage Areas (NHAs) as a result of their international and national wildlife importance. Laois County Council also recognises the integral value of the locally important sites and the wildlife and biodiversity of the wider countryside and acknowledges the importance of implementing policies to protect our natural heritage.

### **2.7.1 Designated Sites**

The National Parks and Wildlife Service of the Department of Environment, Heritage & Local Government is responsible for designating areas of special biodiversity interest in the context of national and European legislation. These areas include Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Natural Heritage Areas (NHAs) and Statutory Nature Reserves.

The county contains:

- 8 Special Areas of Conservation, SACs (See Figure 2.8)
- 2 Special Protection Areas, SPAs (See Figure 2.9.)
- 2 Natural Heritage Areas, NHAs and 28 proposed Natural Heritage Areas
- 3 Statutory Nature Reserves

“Natura 2000 sites” is the collective name given to Special Areas of Conservation (SACs) and Special Areas of Protection (SPA). These sites contain habitats or species of special European importance.

### **2.7.2 Special Areas of Conservation (SACs)**

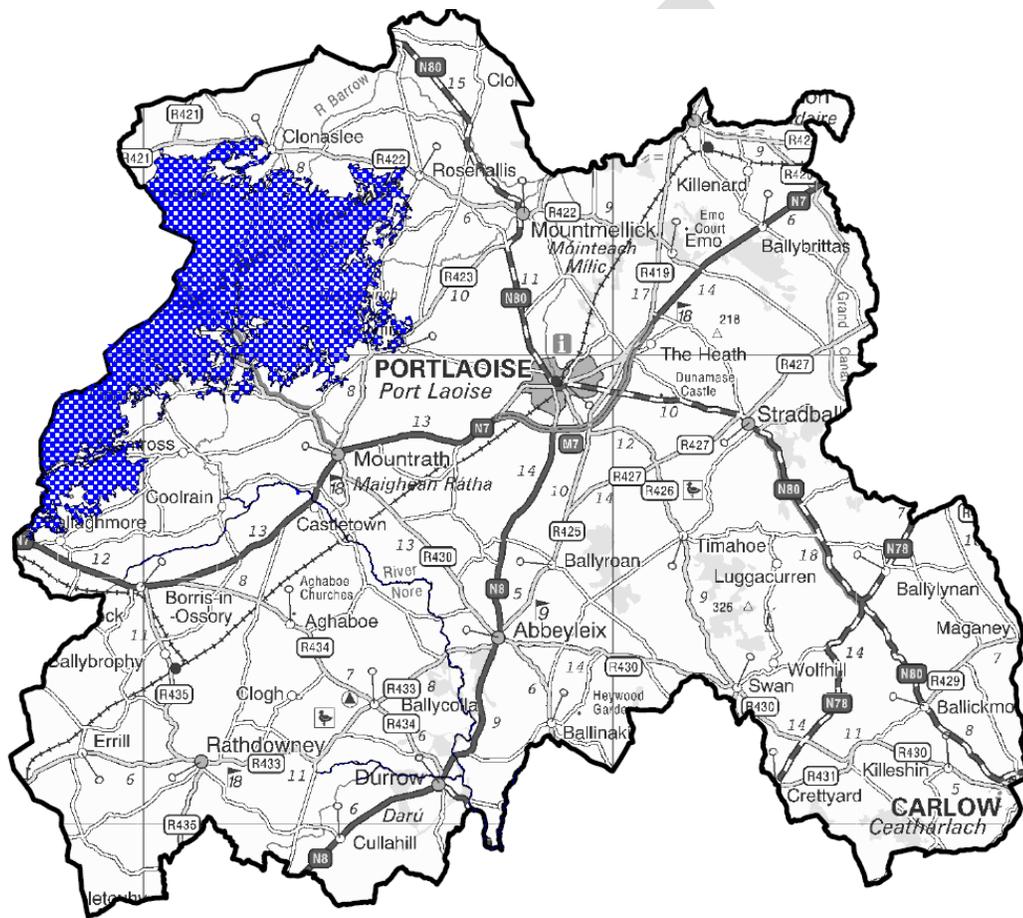
Special Areas of Conservation are prime wildlife areas, considered to be important on a European as well as Irish level. The legal basis on which SACs are selected and designated is the EU Habitats Directive (92/43/EEC), transposed into Irish law in the European Communities (Birds and Natural Habitats) Regulations 2011-2015. The Directive lists certain habitats and species that must be protected within SACs. Irish habitats include raised bogs, blanket bogs, turloughs, sand dunes, machair, heaths, lakes, rivers, woodlands, estuaries and sea inlets. The species which must be afforded protection under the Habitats Directive include inter alia all our bat species, Salmon, Pearl Mussel, Common Frog, Pine Marten, Mountain Hare and Otter.

There are eight SACs to date in County Laois as listed in Table 2.5, shown in Figure 2.8.



**Table 2.6 Special Areas of Protection in County Laois**

Site Name	Site Code
Slieve Bloom Mountains	004160
River Nore	004233



**Figure 2.9 Special Protection Areas, (Laois GIS)**

**2.7.4 Natural Heritage Area (NHAs)**

To date, only a selection of raised and blanket bog NHAs have been given formal legal protection. In County Laois, these sites are: 000652-Monaincha Bog / Ballaghmore Bog NHA and 002357-Clonreher Bog NHA.

The remaining 28 proposed NHA (pNHA) sites in County Laois are given limited legal protection through; inter alia, recognition in the County Development Plan, See Table 2.7.

**Table 2.7 Proposed Natural Heritage Areas (pNHAs) in Co Laois**

Site Name	Site Code	Main habitat or species
Annaghmore Lough Fen	000413	Calcareous fen with willow and birch scrub
Ballylynan	000857	Grassland, wet meadows
Barrow Valley At Tankardstown Bridge	000858	River, canal, grassland, marsh
Clonaslee Eskers And Derry Bog	000859	Esker, raised bog
Cloppook Wood	000860	Ash/hazel woodland, limestone hill
Coolacurragh Wood	000862	Birch/alder woodland, fen peat
Coolrain Bog	000415	Midland raised bog (with Knockacoller Bog, these two bogs are the most southerly intact examples of true Midland Raised Bogs in the country)
Cuffsborough	000418	Grassland used by Greenland White-fronted geese
The Curragh And Goul River Marsh	000420	Wet meadow, river, winter feeding site for Greenland White-fronted Geese
Delour River Nr Lacca Manor	000864	Oak/birch woodland, river, wet grassland
Derries Wood	000416	Disturbed raised bog, disused gravel pit, conifer Plantation, lake, reedbed, important insect populations
Dunamais Woods	001494	Limestone hills, oak/ash woodland
Emo Court	000865	Semi-natural mixed (oak/ash with beech) woodland, lake, parkland, amenity grassland
Forest House Wood	000874	
Grand Canal	002104	Canal, wetland, grassland
Granstown Wood and Lough	000417	State-owned nature reserve. Lake in transition through fen to alder/willow. Important invertebrate fauna
Kilteale Hill	000867	Limestone hill, hazel/ash woodland
Knockacoller Bog	000419	Midland raised bog, Birch and alder woodland. One of the few intact bogs south of the Slieve Blooms
Lisbigney Bog	000869	Raised bog
Mannin Wetland	00868	Species-rich fen
Ridge Of Portlaoise	000876	Esker ridge, ash/hazel woodland, species-rich grassland, disused gravel pits
River Barrow And River Nore	002162	River, wetland, woodland
River Nore/Abbeyleix Woods Complex	002076	River, site for Freshwater Pearl Mussel (international importance), Twaite Shad (Vulnerable), wet grassland, mixed deciduous woodland of great antiquity and species diversity, with specimen oak
Rock of Dunamais	000878	
Shanahoe Marsh	001923	
Slieve Bloom Mountains	000412	Old Red Sandstone mountains, mountain blanket bog, Peregrine Falcon, Hen harrier, red grouse
Stradbally Hill	001800	
Timahoe Esker	000421	Esker ridge, Hazel/Ash woodland

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## **3 ADAPTATION BASELINE ASSESSMENT**

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### **3.1 Past Climate Events**

In understanding how well adapted to current climate hazards Laois County Council is we must first examine how well the local authority has adapted to current weather extremes. Weather extremes include both extreme weather events and periods of climate variability. Events that result from the interaction or combination of climate hazards (compound events) will also be examined, e.g. extreme temperatures in summer 2018 together with prolonged dry spell.

**Extreme Weather Event:** An extreme weather event or climate extreme is defined as ‘the occurrence of a value of a weather or climate variable above (or below) a threshold value near the upper (or lower) ends of the range of observed values of variable’ (IPCC 2012)

**Climate Variability:** Climate variability denotes deviations from average climate conditions over a given period of time when compared to a long term averages for the same calendar period such as a month, season or a year, e.g. periods of above or below average temperature.

### **3.2 Major Climate Event Timeline**

The major climate event timeline for Laois County Council has focused on the full range of hazard events to have affected the local area and Laois County Council and has not been limited to a particular time period. The timeline detailed spans from 1982 to 2018. The timeline looks at events that occurred over a long period of time, or in combination, which led to a notable level of disruption and drew on significant front line and emergency services. The Laois major climate events/variability timeline is tabled in Table 3.1.

Timeline	Climate Event/ Trend	Issues Experienced
18 <sup>th</sup> /19 <sup>th</sup> September 2018	Storm Ali	High winds and strong gusts led to power outages in Ballinakill and Portlaoise. Fire services and roads crews dealt with a number of fallen trees blocking roads in Mountmellick and Portarlinton. The National Ploughing Championships were cancelled on the 19 <sup>th</sup> September for the day.
Summer 2018	Rising Temperatures & Drier Summer	Highest average daily temperatures recorded in 23 years (since 1995). Hottest warmest driest summer in several decades. Mean seasonal temperatures above long term averages. Water restrictions in Portlaoise, Portarlinton, The Swan, Mayo, Doonane & Portarlinton. Agriculture affected.
March 2018	Beast from the East	Heavy snowfall event. Led to disruption to travel and business. Laois Severe Weather Management Team met ahead of event to ensure adequate resources were in place to manage the event to ensure continued access on main routes and minimum disruption to services and business.
22 November 2017	Major Flood Event Mountmellick	The Council, including its engineering and outdoor crews along with Laois County Council Fire Services supported by Laois County Council Civil Defence and the Defence Forces aided with the substantial clean-up, provision of Skips, provision of De-humidifiers and emergency repairs to damaged infrastructure as well as the provision of emergency accommodation by the Housing Section of Laois County Council. Laois County Council also established a Humanitarian Aid Office in Mountmellick for a period after the event to support the locals affected by the extreme flood event. Laois County Council committed funds of over €208,000 to these efforts.
16 <sup>th</sup> October 2017	Storm Ophelia	High winds: Over 93 incidents reported in Laois, including 34 roads blocked due to fallen trees. Power Outages have been reported at Abbeyleix, Mountmellick, Clonaslee, Cullohill, Kilcavan, Killenard. The Laois Crisis Management Team – which comprises the County Council, An Garda Síochána and the HSE was convened to manage event.
13 <sup>th</sup> /14 <sup>th</sup> November 2014	Localised Flood Event	Severe damage to roads and bridges in a localized area of south-east Laois following flash flooding in River Fuishoge from heavy localized downpours. Road closures and immediate repairs cost 92K with damage to a number of roads and bridges resulting in their closure costing 1.2 million. Rural community faced long diversions for school, work & businesses.
12 <sup>th</sup> February 2014	Storm Darwin	Storm Darwin affected Co. Laois on the afternoon of the 12 <sup>th</sup> February 2014. Very high wind speeds and severe gusts destroyed areas of forestry and blew trees and structures down onto roads and buildings and toppled power lines, leading to many road closures and power outages which lasted several days in some cases. Laois Co Council mobilised over 140 people, including outdoor staff, civil defence and Laois Fire and Rescue Services to assist in combating storm damage. The south of the county was the worst affected – 46 ‘999’ calls were logged in Laois in less than 12 hours, while an additional 30 incidents were reported locally. Two trucks overturned near junction 21 on the M7. All eight of the county’s fire stations and 68 fire fighters were mobilised. A 20-tonne evergreen tree fell on a car on the Block Road. A car was also badly smashed after a tree fell on it in Errill. A fire tender even fell victim to the weather when it was struck by a large bough as emergency services responded to a call near Belady cemetery, Rathdowney.
December 2013 to February 2014	Winter Storms	Winter storms, comprising high winds and heavy rain over prolonged period (12 days with storm force winds, 200% of normal rainfall), hit Co. Laois between December 2013 and February 2014, leading to widespread and prolonged flooding. Road closures due to wind damage and flooding were experienced. Vulnerable water supplies and wastewater infrastructure were impacted by floodwater.
July 2013	Drought	Laois one of 6 counties to introduce a hose pipe ban due to drought conditions in July 2013.
November/December 2010	Severe Cold Spell	A cold spell in November and December 2010 saw temperatures in Co. Laois plummet to below -10°C for a prolonged period. Soil froze to 30cm depths. There was widespread disruption to transport due to snow and ice blocking roads, water disruption due to freezing and burst pipes and higher water usage to prevent freezing, creating excessive demands on water supplies.
December 2009 January 2010	Severe Cold Spell	A cold spell between December 2009 and January 2010 saw temperatures in Co. Laois plummet to below -10°C for a prolonged period. Laois experiences three times as many frost days as normal. A resulting shortage of salt led to widespread traffic disruption. Footpaths became treacherous in towns. Water disruptions occurred due to freezing and burst pipes.
November 2009	High Rainfall	High rainfall in November 2009 led to widespread flooding, leading to road closures and damage to property.
June to August 2008	High Rainfall	June to August 2008 was the wettest summer on record in Co. Laois. Over 200% of average rainfall fell within the period, saturating land and leading to flooding. Council road works programme and surfacing contracts were severely impacted. Flash floods in August cause road closures, hazardous driving conditions and the cancellation of the Tullamore Show. Laois a river burst its banks along the Ballyroan to Portlaoise Road at Cashel Cross.
Summer 2006	Drought conditions	Summer 2006 was the warmest driest summer since 1995. It was 65% drier and 1.5°C warmer than average, leading to drought conditions and difficulties for the agricultural community in particular.
5 <sup>th</sup> /6 <sup>th</sup> November 2000	Heavy Rain	Severe rain fall led to flood event. Roads closed, disruption to traffic.
Summer 1995	Hottest Summer	Hottest summer on record. Mean air temperatures 2 degrees higher than normal. Very dry summer also having less than half normal rainfall. June and August were particularly dry while there were a number of downpours in July. Water restrictions and fatted up roads caused issues for the Council.
August 1986	Hurricane Charley	High winds and extreme rainfall events. Disruption to traffic, flooding and property damage.
January 1982	Heavy Snowfall	There was a prolonged snowfall on 8th and early 9th January. Strong easterly winds, caused extensive and deep snowdrifts. Due to the severe cold spell which followed, snow remained on the ground until about the 15th. There were scattered light snow showers in the period 5th-7th, 10th-12th and on the 17th, 22nd and 26th. Snow fall of 16cm was experienced across Laois. Major disruption to travel, business and agriculture.

These extreme weather events have affected the operation of and the services provided by Laois County Council, as well as impacting on local businesses and communities. Whilst some services have only experienced minor disturbances, others such as water services and transport infrastructure have been frequently affected by various extreme weather events. These weather related incidents have resulted in threats to people’s health, risk to buildings and transport infrastructure, the natural environment and the economy.

### 3.3 Common Climate Events/Climate Trends.

The common types of Major Weather Events experienced by Laois County Council in the timeline are reflected across the Eastern and Midlands Climate Action Region and depicted in Table 3.2. The main climate trends in the county and region as highlighted in recent EPA Reports on ClimateIreland.ie are also depicted. With the exception of the impacts of sea level rise, Laois County Council experiences similar events and trends to its fellow local authorities in the Eastern and Midlands Climate Action Region.

Common Major Weather Events	Climate Trends
Heavy Rainfall / Prolonged Rainfall	Increased Heavy Rainfall
Strong Winds / Windstorms	Storm intensity increase
Dry periods / periods of drought	Rising Temperatures (decrease in cold days & nights) (increase in warm days and nights)
Cold periods	Drier Summers / Wetter Winters
Heavy snowfall	Sea level Rise
	Longer Growing Season (Phenology)

**Table 3.2 Common Climate Events and Trends in the Eastern & Midlands Climate Action Region.**

### 3.4 Assessment of Current Adaptation Baseline

The baseline assessment involves conducting an assessment of local level vulnerability to the impacts of climate hazards and identifying the consequences (impact and level) on both the proper functioning of the area and on the functions/services provided by Laois County Council. The Local Authority Adaptation Strategy Development Guidelines, December 2018, describe the term vulnerability as the susceptibility of a system to be adversely affected by climate and weather related impacts. Vulnerability can be broken down into three components, 1) exposure, 2) sensitivity, and 3) adaptive capacity see Table 3.3.

**Table 3.3 Vulnerability to Climate Change**

Exposure	Sensitivity	Adaptative Capacity
Exposure refers to the people, livelihoods, species of ecosystems, environmental functions, services and resources, infrastructure or economic, social or cultural assets subject to current and future climate variability and extremes.	Sensitivity refers to the susceptibility to harm of exposed receptors (people, livelihoods, species of ecosystems, environmental functions, services and resources, infrastructure or economic, social or cultural assets.	Adaptive capacity refers to the ability of a system, institutions, humans and other organisms to adjust to potential damages, to take advantage of opportunities, or to respond to consequences.

The baseline assessment involves assessing each of the extreme weather events and periods of climate variability identified in Table 3.1 for Laois County Council in relation to the exposure, sensitivity and adaptive capacity for core operation areas. In addition to a description of consequences under these headings a level of disruption associated with the hazard for the delivery of the service by the local authority is required.

The Local Authority Adaptation Strategy Development Guidelines, December 2018, recommends using the Edinburgh Sustainable Development Partnership, 2016 broad categories of service disruption to evaluate impacts on level of disruption to services and is presented in Table 3.4.

**Table 3.4 Broad categories of service disruption that may assist in determining how to characterise the consequences of climate risk for your local authority (Edinburgh Sustainable Development Partnership, 2016)**

<b>Consequence</b>	<b>Level</b>	<b>Description</b>
<b>Catastrophic</b>	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
<b>Major</b>	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
<b>Moderate</b>	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.
<b>Minor</b>	2	Isolated but noticeable examples of service decline. Minor environmental damage
<b>Negligible</b>	1	Appearance of threat but no actual impact on service provision

The baseline assessment required an evaluation of all functions of the local authority within its responsibility for the provision of an extensive range of services. A workshop facilitated by the Eastern & Midlands CARO was held in January 2019 with the Climate Adaptation Team. The Team examined their core functions with regard to impact, exposure, sensitivity and existing adaptive response for each of the climate events/trends in the Laois timeline.

### 3.5 Baseline Assessment for County Laois

The following table summarises how the services of the Laois County Council can be impacted by weather events which are linked to Climate change. This information was identified in the Laois Climate Adaptation Team workshop and at regional level at a Team leaders workshop facilitated by the Eastern & Midlands CARO. The baseline assessment was then used in the preparation of the Risk Register.

**Table 3.5 Baseline Assessment of Impacts for the delivery of services/functions of Laois County Council (non exhaustive)**

<b>Services/Functions</b>	<b>Climate Hazard Impacts</b>	<b>Consequences</b>
<b>Business operations/continuity</b>		
<b>Business efficiency, effectiveness and emergency response</b>	<p>Building Closures – <i>storm, snow, extreme rainfall, drought conditions</i></p> <p>Building damage, impacts on servers – <i>storm events.</i></p> <p>Electricity supply affected – <i>storm events</i></p> <p>Risks to staff welfare, public safety, local business and tourism assets – <i>storm, snow, rainfall, extreme heat events.</i></p>	<p>Service disruption to customers: motor tax, housing applications, scheduled meetings, arts/cultural events etc.</p> <p>Inability to meet statutory deadlines e.g. planning applications – financial/reputational consequences, IT Services.</p> <p>Resources stretched to deal with various impacts from extreme weather events above and beyond the performance of daily duties.</p> <p>Increased pressure on emergency response and recovery operations.</p> <p>Consequence to local/regional economies</p> <p>Financial implications to local authority in clean up operations, staff overtime, unable to perform normal duties.</p> <p>Economic impacts – longer term consequence to local economy and local authority in terms of rate collection.</p>
<b>Business operations</b>	Capitalising on opportunities arising from addressing the impacts of climate hazards.	Positive
<b>Infrastructure &amp; Built Environment</b>		
<b>Roads/footpaths, bridges, project construction and maintenance</b>	<p>Changes in rates of deterioration - faster rate of deterioration in areas subject to <i>flooding, storm, rainfall, snow and heatwave events (combination events)</i></p> <p>Infrastructure collapse, significant damage – <i>sustained duration and frequency of extreme events.</i></p> <p>Blocked roads – <i>storm, snow, rainfall events</i></p> <p>Impact on construction projects – <i>all extreme weather events.</i></p>	<p>Nuisance</p> <p>Risk to public safety</p> <p>Financial implications for unscheduled maintenance, repair, upgrade, new construction, staff overtime costs.</p> <p>Reduced economic efficiency of road network for commuting traffic and emergency transport routes disrupted.</p> <p>Time delays and cost implications in delivery of infrastructure.</p>
<b>Building Stock - LA Buildings and social housing stock</b>	<p>Damage and deterioration of housing stock – <i>Storm, rainfall, snow and heatwave events (combination events)</i></p> <p>Increased need for heat – <i>extreme cold events</i></p> <p>Closure of Local Authority buildings – <i>storm, snow, rainfall events</i></p> <p>Need for mechanical ventilation systems and cooling systems – <i>Heatwave events</i></p>	<p>Cost of maintenance, safety implications to public, possible rehousing of tenants</p> <p>Cost of fuel (negative or positive)</p> <p>Service disruption</p> <p>Pressure on housing staff to rectify reports issues.</p>
<b>Community Infrastructure</b>	Deterioration of community infrastructure e.g., playgrounds, public parks, swimming pools, public realm spaces - <i>sustained weather</i>	<p>Cost of maintenance/upgrade.</p> <p>Loss of revenue locally/regionally – tourism.</p>

	<p><i>extreme events.</i>  <i>Impacts on recreation amenities and tourism activities – storm, rainfall, snow events.</i>  <i>Reduced water for swimming pools, irrigation of open spaces, parks etc - drought conditions.</i>  <i>Risk to public safety in times of high temperatures for unsecured lakes, water spots (quarries).</i></p>	<p><i>Closure of community infrastructure – short term.</i>  <i>Injury, illness or potential loss of life.</i>  <i>Loss of Reputation</i></p>
<b>Cultural/Heritage</b>	<p><i>Damage to cultural and heritage assets and cultural landscapes – storm, rainfall, extreme cold and heat events</i></p>	<p><i>Negative impact on tourism – economic consequence locally/regionally.</i>  <i>Loss of assets of intrinsic historical importance.</i>  <i>Cost of maintenance/upgrade. Safety Implications</i></p>

## **Water and Sewerage Services**

<b>Stormwater /sewerage</b>	<p><i>Inundation of stormwater and sewerage infrastructure – storm surge, rainfall events.</i>  <i>Increased peak flows – rainfall events</i>  <i>Changes in groundwater levels – drought conditions</i>  <i>Changes in floodplains – rainfall events</i>  <i>Reduced dry weather sewerage flow performance - drought conditions</i>  <i>Reduced/unreliable power supply for pumping and treatment – storm events</i>  <i>Changes in mean and peak stream and river flows – rainfall and drought events.</i>  <i>Uncertain water availability – drought conditions.</i></p>	<p><i>Disruption to communities</i>  <i>Negative Environmental consequences - draw on staff resources to investigate/rectify.</i>  <i>Additional demand on LA staff working under the SLA with Irish Water</i>  <i>Local surface water flooding events.</i>  <i>Loss of reputation</i>  <i>Financial Implications</i>  <i>Negative impact on tourism / business – economic consequence locally/regionally.</i></p>
<b>Water Supply</b>	<p><i>Increase in water demand and reduction in receiving water assimilative capacities during drought conditions – drought events</i>  <i>Flooding and inundation of wastewater treatment and water abstraction plants – rainfall events</i>  <i>Reduced availability of water supply sources during low rainfall and drought events</i>  <i>Loss of power supply during intense storm events</i>  <i>Increased potential for water contamination – rainfall and drought events</i>  <i>Changes in availability of groundwater – drought events</i>  <i>Quality of water diminished – rainfall, drought, heatwave events.</i></p>	<p><i>Nuisance to householders.</i>  <i>Impact on economic development i.e. businesses and tourism.</i>  <i>Health consequences with inadequate water quality.</i>  <i>Additional demand on LA staff working under the SLA with Irish Water</i>  <i>Additional demand on LA staff working on an emergency response</i>  <i>Requirement for hose pipe bans and impacts on local communities including Local Authority parks and sports facilities</i>  <i>Water pollution issues relating to reduction in surface water flows</i>  <i>Network disruptions due to loss of power supplies.</i>  <i>Loss of Reputation</i></p>
<b>Wastewater</b>	<p><i>Inflow and infiltration to wastewater network – rainfall events.</i>  <i>Interruption to anaerobic process – heatwave events</i>  <i>Interruption to process – freezing events.</i></p>	
<b>Water Quality</b>	<p><i>Ground movement, in high temps, resulting in cracking of old wastewater pipe networks</i>  <i>Increased flooding mobilising runoff from land, including contaminants into surface waters</i>  <i>Changes in species distribution and phenology of river systems – heatwaves, rainfall and cold events.</i></p>	<p><i>Increased discharges from drainage systems to ground-waters</i>  <i>Increased pollution of surface water systems</i>  <i>Changes to surface water habitats</i>  <i>Spread of pathogens and other contaminants</i>  <i>Impact on economic development i.e. businesses and tourism.</i>  <i>Inability to meet WFD requirements.</i></p>

	<i>Low flows resulting in deterioration of water quality – low rainfall/drought events</i>	<i>Inability to meet objectives to protect and conserve important habitats.</i>
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## **Natural Resources and Flood Management**

<b>Biodiversity</b>	<p><i>Shift in distribution of plant and animal species from heat and cold stress- <b>heatwaves and cold events</b>.</i></p> <p><i>Loss of bio-diversity - <b>all sustained extreme weather events</b>.</i></p> <p><i>Increased risk of disturbance to population and species leading to extinction – <b>heatwave events</b></i></p> <p><i>Reduced ecosystem resilience to stress – <b>all extreme weather events</b></i></p> <p><i>Increased ecosystem and species heat stress – <b>heatwave events</b>.</i></p> <p><i>Increased pressure on dune systems – <b>storm and heatwave events</b>.</i></p> <p><i>Increased bog fires – <b>heatwave and drought events</b>.</i></p> <p><i>Invasive Species Management -Changes in rate of coverage and spatial distribution of invasive species – <b>change in average mean temperatures</b></i></p>	<p><i>Inability to meet objectives to protect and conserve important habitats.</i></p> <p><i>Negative consequence on health and wellbeing of communities.</i></p> <p><i>Stretched emergency services in dealing with bog fires.</i></p> <p><i>Economic impact – reduced tourism.</i></p> <p><i>Cost and staff resources required to manage and deal with invasive species</i></p> <p><i>Increase risk of flooding due to loss of natural attenuation</i></p>
<b>Weed/pest Management – Area Offices</b>	<p>Changes in rate of coverage and spatial distribution of invasive species – <b>change in average mean temperatures</b></p>	<p>Cost and staff resources required to manage and deal with invasive species.</p>

## **Landuse and development policy**

<b>Spatial Planning and landuse</b>	<p>Inappropriate location of urban expansion areas</p> <p>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.</p> <p>Loss of private property and community assets – <b>extreme rainfall events</b>.</p> <p>Early retirement of capital infrastructure - <b>all extreme weather events</b></p>	<p>Increased insurance costs</p> <p>Increased pressure on disaster management and response resources</p> <p>Long term economic cost to area and to general public.</p> <p>Impact on quality of life</p>
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## **Community Health and Wellbeing**

<b>Community Development</b>	<p>Increase isolation and disconnect of communities through inaccessibility – <b>rainfall, snow, heatwaves i.e.</b> bog, gorse, commonage fires)</p> <p>Damage to properties, streetscapes and community assets – <b>storm and rainfall events</b></p> <p>Contaminants to waterways and drinking water supplies – <b>rainfall (flooding)</b></p> <p>Pressure on drinking water supplies – <b>heatwave and extreme cold events</b></p>	<p>Abandonment of vulnerable rural areas</p> <p>Impact on local economies, reduced interest in settlement</p> <p>Cost of repair, replacement of street surfaces, public realm</p> <p>Disadvantaged communities.</p>
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## 4 CLIMATE RISK IDENTIFICATION

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### 4.1 Climate Projections

To identify projects and trends relevant to Ireland there are three main national resources namely Climate Ireland ([www.climateireland.ie](http://www.climateireland.ie)), Met Éireann ([www.met.ie](http://www.met.ie)) and the EPA ([www.epa.ie](http://www.epa.ie)). Ireland has engaged in global modeling by contributing to the scientific development of the EC-Earth global climate model, performing simulations with the model using supercomputers and contributing the data for assessment by the Intergovernmental Panel on Climate Change, IPCC.

The global modeling work was carried out by Met Éireann and the Irish Centre for High-End Computing (ICHEC) as partners in the international EC-Earth consortium. The EC-Earth and other global models are then downscaled to provide information at a regional level for Ireland. The impacts of climate change for Ireland were assessed for the mid-century period 2041-2060 using an ensemble of down-scaled climate simulations, based on medium-to-low (RCP 4.5) and high emission scenarios (RCP 8.5). Met Éireann

#### 4.1.1 Temperature Projections for Ireland

According to Met Éireann, projections indicate an increase of 1–1.6°C in mean annual temperatures, with the largest increases seen in the east of the country. Warming is enhanced for the extremes (i.e. hot or cold days), with highest daytime temperatures projected to rise by 0.7–2.6°C in summer and lowest night-time temperatures to rise by 1.1–3°C in winter. Averaged over the whole country, the number of frost days (days when the minimum temperature is less than 0°C) is projected to decrease by 50% for the medium-low emission scenario and 62% for the high-emission scenario. The projections indicate an average increase in the length of the growing season by mid-century of 35 and 40 days per year for the medium-low emission and high-emission scenarios.

#### 4.1.2 Rainfall Projections for Ireland

The down-scaled simulations show significant projected decreases in mean annual, spring and summer precipitation amounts by mid-century according to Met Éireann. The projected decreases are largest for summer, with reductions ranging from 0% to 13% and from 3% to 20% for the medium-to-low and high emission scenarios, respectively. The frequencies of heavy precipitation events show notable increases of approximately 20% during the winter and autumn months. The number of extended dry periods is projected to increase substantially by mid-century during autumn and summer. The projected

increases in dry periods are largest for summer, with values ranging from 12% to 40% for both emission scenarios.

### **4.1.3 Wind Energy and Storms**

Met Éireann have studies showing significant projected decreases in the energy content of the wind for the spring, summer and autumn seasons, with the projected decreases largest for summer and no significant trend in winter. The overall number of North Atlantic cyclones is projected to decrease by approximately 10 %. Results also indicate that the paths of extreme storms will extend further south, bringing an increase in extreme storm activity over Ireland, although the number of individual storms is projected to be quite small.

### **4.1.4 Changes in Nature**

Changes in the climate will bring changes in the behaviour of species. Recent years has seen an advance in the timing of key phenological phases of a wide range of organisms, including trees, birds and insects following spring warming. For example, higher temperatures in late winter or early spring results in butterflies appearing earlier in the year and birds shifting their migration patterns. The pace of future change will cause stress to ecosystems which are unable to adapt quickly.

## **4.2 Future Risk based Projections**

Our climate is moving towards overall higher temperatures, drier summers, milder winters, and changes in the frequency of weather extremes such as heat waves, cold snaps, and storms. The impacts of climate change for Ireland, that will impact on Laois County Council's functional area 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 flooding
- Adverse impacts on water quality
- Changes in the distribution and ecological lifecycle events of plant and animal species on land

### **4.3 Climate Risk Register**

Having developed a profile of current and potential future locally-relevant climate hazards, impacts and vulnerabilities and assessed the consequences for the delivery of services by Laois County Council a summary of this information has been provided through the development of a climate risk register. A Register of climate risks is detailed in Tables 4.1 to 4.4 for climate hazards to include:

1. Heat Wave & drought conditions
2. Extreme Wind Events
3. Extreme Rainfall
4. Extreme Cold & Snow Events

Table 4.5 further details these risks and presents a detailed Risk Register for Laois detailing the relevant climate hazard, the impacted area and the risk statement for the particular climatic hazard.

**Table 4.1 Risk Register: Laois Increase in summer heat wave events and drought conditions.**

<b>Climate Hazard (Event): Heat Wave &amp; Drought Conditions</b>						
<b>Operational Area</b>	<b>Impact</b>	<b>Exposure &amp; Sensitivity</b>	<b>Existing Adaptive Response</b>	<b>Consequence</b>		<b>Other Relevant Actors</b>
				<b>Level</b>	<b>Description</b>	
Road Section	Deterioration of road surfaces (rutting) due to prolonged exposure to high temperatures.	Local roads situated across the county, comprising of tarred and chipped surfaces.	Chipping and emergency works.	2	Increased maintenance costs and staff overtime.	Deterioration of road surfaces due to prolonged exposure to high temps.
	Increased deterioration of roads as a result of ground movement/shrinkage	Roads situated across the county.	Engineered solutions to reduce effect of ground shrinkage/movement	2	Increased repair costs	Department of Transport, Tourism and Sport, TII
Fire and Emergency services	Increase frequency and intensity of fires	Forestry area, upland areas, gorse and bog areas and amenity/ recreational areas.	Emergency response by fire services.	3	Increased callout of fire services.	Adjacent Fire services.
	Reduced availability of water sources to combat fires.	Areas with limited water supplies particularly in rural areas where water bodies may go dry.	Securing water from alternative water bodies.	2	Increased costs	Inland Fisheries Ireland, EPA, Adjoining local authorities.
Health and Wellbeing	Increased levels of sunburn and heat stress (heat stroke/dehydration) as a result of prolonged exposure to high temperatures.	Outdoor (particularly in urban areas due to UHI), Council Staff	Provision of Water and sunscreen stations.	2	Increased costs for protection of staff from heat stress and/or Staff fatigue; Staff on subsequent sick leave.	HSE Unions
	Increased levels of heat stress in staff working inside council buildings due to inadequate ventilation or heat controls	Indoor staff with respiratory issues.	Provisional of fans / cooling equipment	3	Staff fatigue; Staff on subsequent sick leave. Increased energy costs for cooling	HSE Unions
Environment Services	Increased demand for bathing waters	Popular bathing areas in the County.	Continuation of the non-designated bathing waters sampling program.	2	Reduction in the quality of bathing waters due to increased usage and reduced water levels.	EPA Sampling and analysis contractor.
	Reduced flow in rivers and streams.	Water bodies sensitive to reduced flow conditions.	Monitoring and sampling of designated rivers	2	Reduced assimilative capacity in rivers and lakes to handle polluting matter.	EPA, Irish Water, Inland Fisheries Ireland, EPA, LAWPRO
Biodiversity	Wild fires in areas of high biodiversity and habitat value.	Upland areas, comprising of gorse, forest and bog .	Emergency response by fire services. Fire breaks.	3	Loss of priority habitats and species. Increased callouts of emergency services.	NPWS, Department of Cultural, Heritage and the Gaeltacht, Coillte.
	Increase in Invasive species suited to higher temps and drier conditions.	Sensitive flora and fauna	Liaison with National Parks and Wildlife	3	Loss of native species and priority habitats.	National Parks and Wildlife.

**Table 4.2: Risk Register Laois Increase in precipitation during the winter months resulting in milder and significantly wetter winters.**

Climate Hazard (Event): Extreme Precipitation Events						
Operational Area	Impact	Exposure & Sensitivity	Existing Adaptive Response	Consequence		Other Relevant Actors
				Level	Description	
Operations Section	Increase in damage to transport infrastructure including flooding of roads and damage to bridge structures and potential landslides. Increase in river levels bursting banks and causing flooding of roads & footpaths, or rivers so high so as to prevent surface water drainage freely flowing away from road surfaces	Roads and bridges in low lying vulnerable areas throughout Laois.	Maintenance of road river and stream drainage systems. Provision of warning signage and sandbags as needed by outdoor staff. Implementation of severe weather Plan. Engage contractors to carry out minor works on site to open channels to alleviate flooding and remove debris.	3	Increased costs and staff overtime. Isolation of families/communities. Reputational damage of transport disruption. Increased maintenance and repair costs	Dept of Transport, Tourism and Sport, TII Civil Defence Army
Fire and Emergency services	Increased attendance and response to flooding events.	Dwellings, business, and community and public facilities located in vulnerable areas in Laois.	As per existing Emergency response	2	Increased staff overtime costs. Increased H&S considerations	Roads staff Neighbouring fire services
	Increased need for additional equipment (e.g. additional pumps, booms)	Dwellings, business, and community and public facilities located in vulnerable areas.	Having well stocked and maintained equipment in place	2	Increased equipment costs	MD Staff. Civil Defence. Neighbouring Fire Authorities
Housing	Requirement to Re-house families impacted by flooding.	Families living in areas prone to flooding.	Provision of suitable short-term alternative accommodation for affected families.	2	Increased costs for provision of alternative accommodation	
Environmental Services	Increased surface run-off resulting in nutrients being washed into rivers, streams, and lakes.	At risk water bodies in the Laois.	Enforcement of the Water Pollution Act and the Good Agricultural Practice Regulations.	2	Pollution of our water bodies and failing to achieve good status as per requirements of the Water Framework Directive. Reputation.	Dept of Comms, Climate action & environment. EPA, LAWPRO, Dept of Agriculture. IFI, Public & Group water Schemes
	Changes to River morphology (e.g. Bank erosion) caused by increased flow rates.	At risk water bodies in the Laois.	None in place	2	Pollution of our water bodies and increase in risk of water bodies failing to achieve good status as per requirements of the Water Framework Directive. Reputation.	Department of Communications Climate action and environment. EPA, LAWPRO Dept of Agriculture.
Biodiversity	Loss of biodiversity and habitats in flooded areas.	Wetlands and low-lying lands	None in Place	2	Loss of locally important habitat and biodiversity.	

**Table 4.3: Risk Register Laois Increase in extreme wind events particularly during the winter months.**

Climate Hazard (Event): Extreme Wind Events						
Operational Area	Impact	Exposure & Sensitivity	Existing Adaptive Response	Consequence		Other Relevant Actors
				Level	Description	
Infrastructure Section	Increased frequency of road and bridge infrastructure due to fallen trees and fallen power and communication overhead lines. Blocking of roads by fallen trees and debris.	Roads situated across the county. Exposed Bridges. Roads adjacent to power lines	Implement severe weather plan. Emergency response by appropriately trained and competent outdoor staff. Engagement of local contractors. ESB and communication service providers contacted.	3	Increased staff costs/overtime. Additional repair costs incurred through engaging specialist contractors. Reputational damage of transport disruption Increased potential for serious injury and also loss of life.	Department of Transport, Tourism and Sport, TII ESB networks Eircom. Fire Services
	Increased frequency of wind damage to road signage, street furniture and public lighting.	Exposed locations throughout the county.	Response by outdoor MD staff Response by specialist contractors	2	Increased staff costs/overtime. Additional repair costs incurred through engaging specialist contractors. Reputational damage of transport disruption & public lighting outages.	Department of Transport, Tourism and Sport, TII Fire Services.
Fire and Emergency services	Increased frequency of responding to accidents caused by debris and falling trees and overhead lines.	Whilst exposed locations likely to be most affected all of the county may potentially be impacted. Likely to have a county wide effect	Emergency response by Fire Services Staff.	3	Increased staff costs/overtime. Increased potential for serious injury and also loss of life.	ESB networks Eircom networks Roads staff Neighbouring fire services
Housing	Increased frequency of damage to council housing stock	Housing stock particularly in exposed parts of the county.	Response by housing tradesmen and specialist contractors.	2	Increased staff costs/overtime. Additional repair costs incurred through engaging specialist contractors.	Dept of Housing.
Environment	Increased risk of being unable to carry out sampling of rivers.	EPA Water Framework Directive Program.	Unable to take samples in the main river channel due to flooding of river banks.	1	Unable to complete the WFD sampling program on behalf of the EPA.	EPA LAWPRO

**Table 4.4: Risk Register Laois Extreme cold and/or snow events.**

Climate Hazard (Event): Extreme Cold and/or snow events						
Operational Area	Impact	Exposure & Sensitivity	Existing Adaptive Response	Consequence		Other Relevant Actors
				Level	Description	
Operations Section	Increased frequency of roads closed by snow.	Roads situated across the county particularly in elevated locations.	Snowplough and salt treatments. Severe Weather Response Plan	2	Increased costs and staff overtime.	Department of Transport, Tourism and Sport, TII, Fire Services & Civil Defence, Army
	Increased road and bridge infrastructure deterioration due to freeze/thaw conditions	All road infrastructure in the county.	Road repair	2	Reputational damage of transport disruption. Increased repair costs	Department of Transport, Tourism and Sport, TII, Fire Services and Civil Defence. Irish Water
	Damage to underground utility services located under or adjacent to roads	All road infrastructure in the county.	Road reinstatement works via road opening licenses.	1	Reputational damage of transport disruption. Increased repair costs	Utility service providers (e.g. ESB, Eircom, Irish Water, Bord Gais.
Fire and Emergency services	Increased vehicular accidents. Increased time to reach call out destinations or destinations may be inaccessible. Water hydrants and/or equipment frozen making it impossible to tackle fires.	county wide effect	Emergency response. Snow socks, snow chains. Water checks on pumps. Hydrant maintenance. Ensuring water supply to stations.	4	Increased costs and staff overtime. Increased repair and maintenance costs	HSE Roads staff Neighbouring fire services
Housing	Damage to housing stock such as burst pipes	Housing stock particularly in exposed locations.	Repairs by council tradesmen and specialist contractors	2	Increased costs and staff overtime. Increased repair and maintenance costs.	Contractors. Dept of
Environment	Low temperatures will result in an increase in polluting carbon sources being burned which will have a consequence for air quality and public health.	Particularly urban conurbations throughout the county	Enforce smoky coal regulations	2	Increased costs and staff overtime.	HSE. Northern Ireland authorities. EPA

**Table 4.5 Impacts of Climate Change: Risk Register Laois**

Climatic Hazard	Impact area	Risk Statement
	LA Assets	More <b>frequent and intense extreme events</b> i.e. rainfall, wind and snow events will <b>damage local authority buildings, housing stock, equipment and facilities</b> (machinery yards, storage facilities etc) giving rise to <b>increased costs for maintenance, repair and replacement and increased demand on staff resources.</b>
	Business Operations & Continuity	More <b>frequent and intense extreme events</b> will see more <b>closures impacting the local authority in performing normal daily tasks, exercising statutory duties and organising events.</b> This will <b>interrupt work flows and efficiencies, disrupt scheduled events and increase staff costs</b> in dealing with extreme events.
	Business Operations & Continuity	Increased frequency of <b>flooding, storm and extreme cold events (snow)</b> will give rise to general <b>service disruption</b> presenting difficulties for business continuity and the delivery of projects locally, as a consequence of staff being unable to travel to work.
	Business Operations & Continuity	Projected increases in <b>storm intensity</b> will see a higher risk of <b>service disruption</b> due to closure of local authority buildings, damage to LA communications infrastructure, impact on road networks from debris and impact on utility networks e.g. Electricity supply, directly impacting Local Authority's ability to operate.
	Critical Infrastructure Flood/ Water Management	<b>Extreme rainfall events</b> could affect <b>critical infrastructure</b> such as roads, water, sewerage, storm water, housing and communications through flooding. Damage to critical infrastructure will <b>impact the economic function of transport routes, will give rise to flooding impacts to properties and communities</b> resulting in <b>increased costs of clean up and maintenance, repair and insurance costs and a wider economic impact.</b>
	Environment, Bio-diversity	<b>Extreme rainfall events</b> will give rise to flooding of habitats and wash nutrients and sediment into watercourses. This will result in <b>changes to geomorphology</b> and cause <b>contamination of watercourses.</b> Landscape may become more vulnerable, ecologically sensitive and may result in habitat loss.
	Environment, Bio-diversity	Heatwaves and/or sustained drought conditions will result in significant and serious <b>degradation of the natural environment and biodiversity</b> with loss to/of important species/habitats, impact on important landscapes and reduction in water quality.
	Community	<b>Higher temperatures</b> and more hot days could result in heat exhaustion and <b>increased heat-related stress with vulnerable people within communities increasing the need for emergency response.</b> Remote communities are particularly vulnerable.

Climatic Hazard	Impact area	Risk Statement
	<b>Infrastructure</b> <b>Structural, cultural</b> <b>community,</b>	More <b>frequent and intense weather events</b> and combination events will undermine the integrity of <b>critical infrastructure, community infrastructure and cultural assets</b> giving rise to increased costs to repair, reinforce, or replace with potential for loss of these assets.
 	<b>Emergency services</b> <b>Environment</b> <b>Infrastructure</b>	<b>Higher temperatures</b> and longer dry seasons will increase <b>risk of bog, gorse or forest fires</b> in some areas, will impact on the integrity of road composition in these areas and water supply in such areas. This will impact on resources of the fire services, result in road closures, threat to public safety and potential local economic impact through loss of tourism potential.
	<b>Infrastructure</b> <b>Structural, Heritage</b> <b>community,</b>	More <b>frequent and intense weather events</b> and combination events will undermine the <b>integrity of Community, Heritage and Cultural Infrastructure</b> , giving rise to increased and significant costs of repair, reinforcement or replacement and possibly rendering assets unviable (note: some assets of heritage or cultural significance, by their nature and historical importance, cannot be replaced).
 	<b>Bio-diversity</b> <b>Environment</b>	More climate extremes - <b>changes in rainfall variability and increased frequency of heatwaves</b> will impact on native species, encourage diseases, weeds, pests and invasive species which will need to be managed appropriately.
 	<b>Environment</b> <b>Bio-diversity</b> <b>Water Services</b>	Extreme <b>rainfall events and heatwave/drought events</b> will increase the risk of impacting <b>water quality</b> and the ability of the local authority to meet the requirements of the <b>WFD</b> .
	<b>All Services</b>	<b>Failure</b> by the local authority <b>to plan for, respond effectively and appropriately adapt</b> to the impacts of Climate Change will encourage a <b>negative perception of ability and will impact the reputational status</b> of the area (damage/loss of critical assets, degradation of the natural and historical environment, local economic impact, community abrasion).

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## 5 ADAPTATION GOALS, OBJECTIVES AND ACTIONS

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### 5.1 Laois County Council's Climate Adaptation Vision & Mission Statement

#### Vision Statement:

That Laois County Council will fulfill a leadership role in seeking knowledge about and responding to the impacts of climate change.

#### Mission Statement:

To be fully engaged with the risks and opportunities of a changing climate and build a resilient future for and together with, the communities of County Laois,

### 5.2 Adaptation Goals and Objectives

The risk register and priority risks developed and identified in Section 4 have provided a better understanding of the potential climate change impacts and their consequences for Laois County Council and helped to identify goals and objectives for adaptation.

Goals have been determined as general guidelines which are presented as high level long term statements, while objectives outline the steps necessary to achieve these goals.

This adaptation strategy is based around six thematic areas that are developed further as High Levels Goals, see Figure 5.1. These goals identify the desired outcomes anticipated through the effective implementation of the climate change adaptation strategy.

They are supported by specific objectives and adaptation actions to achieve their desired outcomes.

**Theme 1: Local Adaptation Governance and Business Operations**

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

**Theme 2: 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**

**Theme 3: Land use 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.**

**Theme 4: Drainage and Flood Management**

**Goal: Great understanding of risks and consequences of flooding and successful management of a co-ordinated approach to drainage and flooding**

**Theme 5: 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.**

**Theme 6: 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**

**Figure 5.1 Thematic Areas and High Level Goals**

**5.3 Aims of High Level Goals**

Through its six thematic areas and high level goals, the local authority Climate Change Adaptation Strategy is designed to guide a planned and coherent response to the effects of climate change. However, four principle aims (guiding principles) thread through and underpin these goals:

1. **Mainstream Adaptation:** That climate change adaptation is a core consideration and is mainstreamed in all functions and activities across the local authority. In addition, ensure that 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.

2. **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.
3. **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 sustainable and robust action response.
4. **Capitalising on Opportunities:** Projected changes in climate may result in additional benefits and opportunities for the local area and these should be explored and capitalised upon to maximise the use of resources and influence positive behavioural changes.



**Figure 5.2 Four guiding principles of climate adaptation goals**

#### **5.4 Adaptation Actions**

Adaptation actions will help Laois County Council to achieve its adaptation goals and associated objectives under the six thematic areas. No single adaptation action will help achieve an objective but rather a portfolio of adaptation actions delivered over a range of timeframes will be required. Adaptation actions may be classified as either those that build adaptive capacity or those that deliver progress in responding to climate change risks.

Adaptive capacity refers to the local authority's ability or potential to respond successfully to climate change. Building adaptive capacity refers to actions that develop Laois County Council's capacity to adapt to climate change for example raising

awareness and understanding, identifying, monitoring and assessing climate hazards, impacts and consequences.

Delivering progress adaptation actions involves taking practical actions to reduce vulnerability to the negative impacts of a changing climate and enhance opportunities or benefits. These actions are generally classified as soft, green or grey and may range from simple solutions possible in the immediate term to large scale longer term transformational projects.

- Soft adaptation actions involve alterations in behaviour, regulation or systems of management, example land-use planning policy.
- Green adaptation actions are those that seek to use ecological properties to enhance the resilience of human and natural systems to climate change, examples include green spaces and parks used to counteract urban heat island effects.
- Grey adaptation typically involves technical or engineering responses to climatic impacts, examples include construction of flood relief walls.

In planning climate actions to support and achieve the thematic goals and objectives three different timeframes were considered. Short term (1-5 years), Medium Term, (>5 and less than 10 years), Long Term (>10 years). Lead and partner roles were considered, the identification of 'partner' roles as considered appropriate and necessary by the local authority to fulfill implementation of action.

**G1 Local adaptation Governance and Business Operations**

**Objective: To ensure that Climate Change adaptation considerations are mainstreamed and integrated successfully into all functions and activities of the local authority ensuring operational protocols, procedures and policies implement an appropriate response in addressing the diversity of impacts associated with climate change**

No	Action	Lead & Partner(s)	Timeframe S/M/L
1	<p>(a) Establish an adaptation Steering Group with representatives from across key functions of local authority to ensure the successful implementation of the actions of this Climate Change Adaptation Plan and to report on progress.</p> <p>(b) Establish a 'Climate Champion'/Steering Group Leader to lead the adaptation Steering Group and to serve as a catalyst to others involved in preparing operational protocols, procedures and policies ensuring the implementation of appropriate response in addressing the diversity of climate change impacts; and to report on progress.</p> <p>(c) The adaptation Steering Group will manage and oversee the effective mainstreaming of climate change into plans, strategies and policies of Laois County Council.</p>	Senior Management Team, Climate Adaptation Steering Group, Heads of Section	Short-Long
2	Ensure that Climate Action is listed as a standing item on the agenda of the Senior Management Team Meetings	Senior Management Team	Short
3	Mainstream Climate Action policy as an integral consideration in the Corporate Plan objectives providing for the all local authority activities and the delivery of functions and services across the administrative area.	Corporate Services, Senior Management Team, Heads of Section.	Short
4	Mainstream Climate Action policy as an integral consideration in the Service Delivery Plan objectives and provide for its translation into team development plans and personal development plans.	Senior Management Team, Climate Adaptation Team, Heads of Section, Line Managers	Short
5	Encourage inter-agency, sectoral and local authority collaboration.	Senior Management Team, Government Depts, CARO	Short-Long

**Objective: To build capacity and resilience within Laois County Council to respond to climate change and climate change/severe weather events**

6	Build expertise, capacity and increase knowledge base through relevant training programmes for staff & elected members on Climate Change and its implications on the operations/functions of Laois Co. Council.	HR, Environment, H&S, Libraries.	Short
7	To build evidence base and increase knowledge of impacts of severe weather events by completing an evaluation of resources deployed for the management of extreme weather events, including maintenance, repairs and clean up operations following the event. Evaluation & debrief to include: <ul style="list-style-type: none"> <li>• Increased operation costs</li> <li>• Increased maintenance costs</li> <li>• Increased staff resources deployed including contractors</li> <li>• Funding sought and received.</li> </ul>	Roads, Emergency Services, HR	Ongoing
8	Undertake and implement a Business Continuity Plan to identify and address specifically, the impacts associated with extreme weather events on all functions/services of the local authority including: <ul style="list-style-type: none"> <li>• Preparing for critical services disruptions,</li> <li>• Mitigating/Minimising the impact of service disruption and,</li> <li>• Improving the capacity/ability to recover.</li> </ul>	Building facilities	Short
9	Incorporate considerations of the impact of climate change into the Laois Severe Weather Plan	Roads Section, Emergency Services	Short
<b>Objective: 3 To identify and support opportunities that may arise from pursuing adaptation efforts through the functions of Laois County Council.</b>			
10	Identify and source funding streams for the active implementation of adaptation and mitigation actions	Director of Services, Heads of Section, LEO	Short
11	To support and encourage opportunities that may arise associated with environmental and technological advances that support low carbon transition through the work of the Laois Local Enterprise Office	LEO, SEAI, CARO	Short-Long

**Objective: To ensure and increase the resilience of infrastructural assets and the built environment, informing investment decisions**

No.	Action	Lead & Partner(s)	Timeframe S/M/L
1	Apply a robust risk assessment and management framework to Local Authority owned public buildings and public properties to identify and protect against the key vulnerabilities to the impacts of climate change and mitigate against service disruption.	Building facilities	Short
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.	Road Design, Area Offices, NTA	S/M/L
3	Undertake a Risk Assessment of road 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.	Road section, NTA, local communities.	M
<b>Objective: To work towards the objective for a low carbon society</b>			
4	Develop a Local Authority Energy Strategy to manage and reduce their energy consumption in accordance with national targets.	Building facilities, Roads Section, Energy Agency	S
5	Become leaders in and champions of energy efficiency, ensuring that all council owned buildings are assessed for possible retrofitting to improve energy efficiency.	Roads Section, Building facilities	S/M/L
6	Assess potential for council led renewable energy projects on public buildings & properties.	Environ, Housing, Building facilities, Energy Agency	M/L
7	Move to near-zero energy buildings for new council buildings/development	Building facilities, Housing Section	M
8	To support the development of Portlaoise as a Low Carbon Town	Infrastructure, Facilities	Short

**Objective: To Integrate climate action considerations into land use planning policy and influence positive behaviour**

No.	Action	Lead & Partner(s)	Timeframe S/M/L Short
1	Identify and integrate climate change as a critical consideration and guiding principle informing core strategy, strategic objectives, policies and development standards of the County Development Plan.	Planning section	Short
2	Integrate and promote climate-smart building and urban design performance outcomes in development standards through the development management process.	Planning Section, Housing section, Project Office	Short
3	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, Community Development, Tourism, Economic Development, Project Office, Area offices, Heritage, Parks, Housing.	Short - Long
4	<p>Research and incorporate, in the content of the County Development Plan, measures in accordance with section 10 (n) of the Planning and Development Acts 2000 (as amended) for:</p> <p>(n) the promotion of sustainable settlement and transportation strategies in urban and rural areas including the promotion of measures to—</p> <ul style="list-style-type: none"> <li>(i) reduce energy demand in response to the likelihood of increases in energy and other costs due to long-term decline in non-renewable resources,</li> <li>(ii) reduce anthropogenic greenhouse gas emissions, and</li> <li>(iii) address the necessity of adaptation to climate change;</li> </ul> <p>in particular, having regard to location, layout and design of new development;</p>	Planning Section in consultation with external agencies and key stakeholders including E&M CARO.	Short

**Objective: To manage the risk of flooding through a variety of responses**

No.	Action	Lead & Partner(s)	Timeframe S/M/L
1	Undertake and implement a surface water management plan for the assessment and management of flood risks with the aim of reducing the adverse consequences of flooding, to prioritise projects to reduce surface water flood risk and provide for detailed mapping of areas prone to surface water and groundwater flood risk.	Water Services, Area Offices	Short
2	Develop a guidance document on the requirement for the design and specification of urban stormwater drainage systems for new development to take account of the potential future impact of climate change.	Planning section	
3	Incorporate the requirement for Sustainable Urban Drainage Systems where appropriate in local authority projects and private development sites.	Roads Section, Housing Section, Planning Section	Short
4	Incorporate considerations of the impact of climate change into the Laois Flood Management Plan	Roads Section	Short
<b>Objective: To mitigate the risk and impact of flooding</b>			
5	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.	Project Office, OPW	Short-Long
6	Ensure that potential future flood information is obtained/generated by way of a Flood Risk Assessment (FRA) and used to inform suitable adaptation requirements within the Development Management process in line with the Guidelines for Planning Authorities on Flood Risk Management (DoECLG & OPW, 2009).	Planning Section	Short-long

**Objective: To provide for enhancement of natural environment to work positively towards climate action.**

No.	Action	Lead & Partner(s)	Timeframe S/M/L
1	Develop a strategy to undertake and implement an active Tree Planting programme in the context of climate adaptation in conjunction with an awareness campaign that informs of the benefits to communities in improving air quality, offsetting carbon emissions, promoting biodiversity, limiting flood risk, reducing urban heat, as well as aesthetic value.	Environment, Community Development, Housing, Planning, Roads, Parks	Short
2	Develop guidelines for the provision of natural borders/buffers and include as an integral component of the design of greenways/blueways, tracks and trails and amenity areas to promote natural enhancement.	Design Office, Roads Section, Bio-diversity, Heritage	
<b>Objective: To promote effective bio-diversity management and enhance protection of natural habitats and landscapes</b>			
3	Review Bio-diversity Plans / habitat conservation strategies, plans and projects to ensure that: <ul style="list-style-type: none"> <li>• all risks from adverse climate change have been identified;</li> <li>• future changes are assessed and measures employed to address issues identified</li> <li>• carbon capture within habitats is considered.</li> </ul>	Heritage Officer, Bio-diversity, NPWS, Heritage Council	Short-Long
4	Research and map areas considered beneficial for use as local carbon offset through carbon sequestration and include in Green Infrastructure strategy.	Bio-diversity, Planning Section, stakeholders	Short-long
5	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 Officer, Heritage Council, Dept.	Medium
6	Promote protection of natural habitats and biodiversity within the organisation and with communities	NPWS, Teagasc, LAWCO, Environment, Heritage, Parks, Roads	Short-Long

**Objective: To build capacity and resilience within communities**

No.	Action	Lead & Partner(s)	Timeframe S/M/L
1	Through public participation network, Environmental awareness campaigns and libraries raise awareness of the impacts of climate change and ways for communities to increase response and resilience to these impacts.	PPN, Community Development, Libraries, Environment	Short
2	Assess communities across the county in the context of their vulnerability to the impacts of climate change. Identify vulnerable communities and the risks to the community.	Area Offices, Community Development	Short
3.	For identified vulnerable communities, develop and implement a programme to enhance their capacity to respond to and recover from extreme weather events with specific aims to: <ul style="list-style-type: none"> <li>• help the vulnerable community to develop a stronger facilitating role for mitigating risks</li> <li>• provide advice on the risk of extreme events affecting their locality</li> <li>• Devise mitigating actions to enhance preparedness</li> <li>• Provide support to develop appropriate resilience arrangements to enable response and recovery</li> </ul>	Area Offices, Community Development, Community.	Medium
4	Promote clean local environments by continuing to invest in Tidy Towns, Tree planting and other environmental initiatives throughout the county.	Environment, Parks, Roads, PPN, Community Development	<b>Short</b>

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## 6 IMPLEMENTATION, MONITORING AND EVALUATION

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### 6.1 Introduction

Goal one, *Local Adaptation Governance and business operations* endeavors 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 Laois 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 strategy. The Management Team will nominate representation to the Climate Action Steering Group and assign its Chair/Champion. 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 and,
- Report on Progress to the Climate Change and Environment 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. Laois 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.

### 6.2 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.

### **6.3 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.

### **6.4 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.

### **6.5 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.

## **6.6 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, Transportation, Environment and Emergency Services Strategic Policy Committee and the Elected Members / full council as considered appropriate.

Reporting on progress i.e. Climate Change Adaptation Progress Report should be prepared annually, (based on the initial date of the adoption of the strategy), 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 (including key indicators as established)
- 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 used
- 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 DCCAIE.*

- *The National Adaptation Steering Committee, chaired by the DCCAIE 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.*