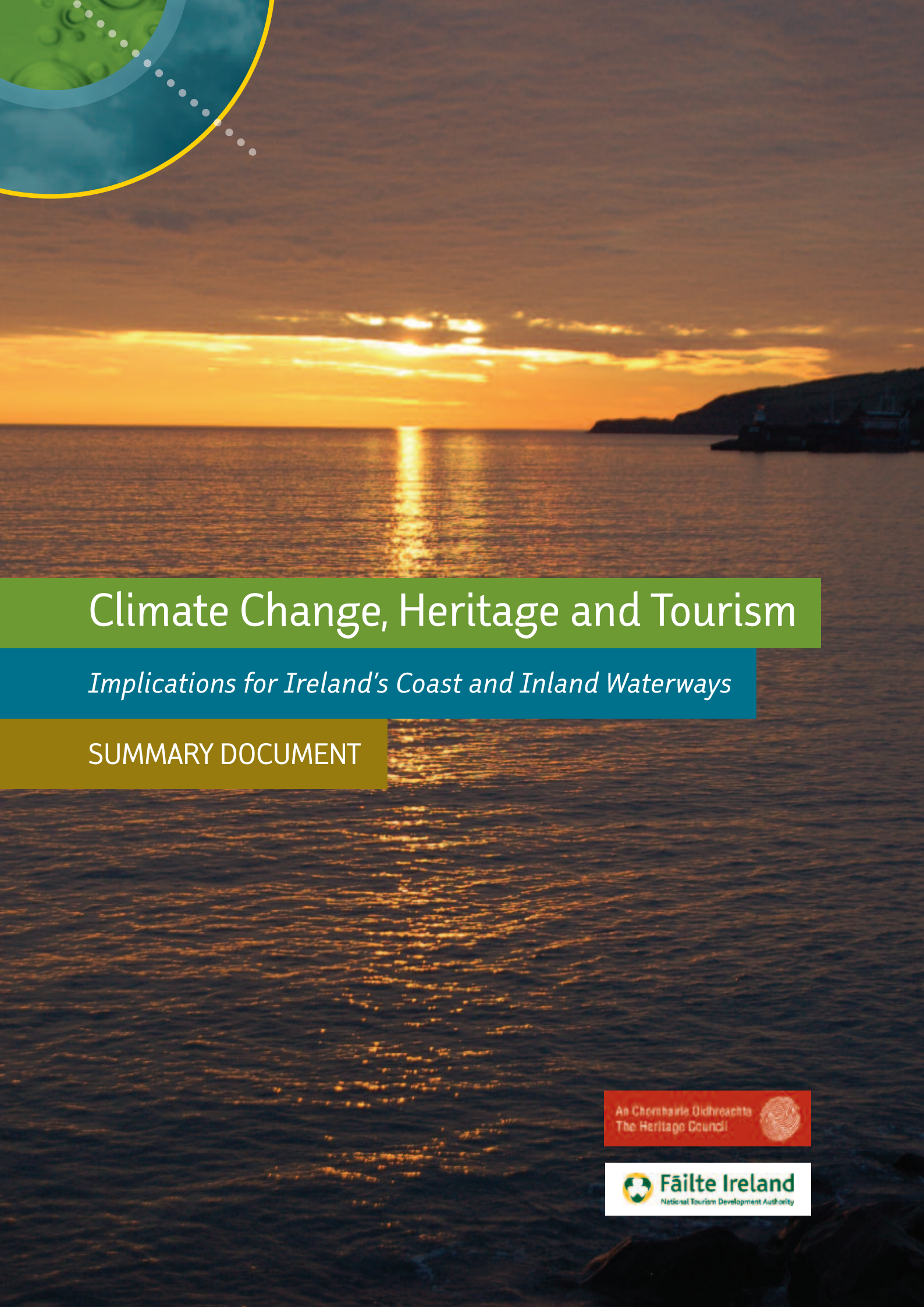

Climate Change, Heritage and Tourism

Implications for Ireland's Coast and Inland Waterways

SUMMARY DOCUMENT

An Chomhairle Oidhreachta
The Heritage Council

Fáilte Ireland
National Tourism Development Authority

Defences along the promenade at Youghal, Co. Cork. Defences such as these can only be put in place sparingly, due to the likely knock-on negative impacts elsewhere along the coastline and the costs of installation and maintenance.
Photo: Beatrice Kelly

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PART I

Introduction

Some of Ireland's much visited beaches may disappear as sea levels rise.
Photo: Fáilte Ireland

Climate change presents an immediate and significant threat to our natural and built environments and to the ways of life which co-exist with these environments.

Overseas visitors choose to holiday in Ireland for many reasons, chief among them being the richness of our cultural and natural heritage. As changes to the climate affect our heritage, then they will also have implications for Ireland's tourism industry.

In response to this the Heritage Council and Fáilte Ireland commissioned a report, ***Climate change, Heritage and Tourism, Implications for Ireland's coast and inland waterways***, to investigate what climate change will mean for Irish tourism and the heritage of our coastline and inland waterways with an aim to help plan for the likely eventualities of climate change and to provide recommendations to Government on prioritising action.

The report is the culmination of two years' study by a multi-disciplinary team and includes extensive consultation with experts on Ireland's cultural and natural heritage as well as operators within the Irish tourism industry. The findings in this report are built on the predictions published by the Environmental Protection Agency in May 2008 (Fealy, R., Sweeney, J., 2008. Climate Change: Refining the Impacts). The main report takes these predictions and assesses what they could mean for the heritage and tourism of Ireland's coast and inland waterways.

In the main report you will find predictions on how heritage and tourism may be affected by climate change and how we need to adapt to these changes. It also addresses areas that we are not so sure about, for example, how little we know about our coastal archaeology. It includes recommendations for further study, the integration of heritage and tourism policy, raising awareness of the issues, providing training for those responsible for adaptation, and examines the question of resourcing everything that needs to be done.

The main report should be consulted for further details on all the issues covered in this summary document.

Coastal flooding is predicted to increase over the next 50 years.
Photo: Richard Nairn, natura.ie

PART II

Climate Change Predictions for Ireland

Ireland is already experiencing a number of changes in its climate. Over the next 100 years, sea levels are likely to rise by at least 18 to 59cm by the 2080's, and possibly by as much as one metre. This is being made worse by more frequent storm events, storm surges and increased wave energy. Coastal flooding, caused by a combination of these elements, and the resultant coastal erosion will be more widespread, placing low-lying areas and coastlines, made up from "soft" material like sand and gravel at particular risk.

Our rain patterns are also changing, with more extreme rain, or precipitation, events occurring. This will change the current rainfall pattern of 'low duration, low intensity' to 'long duration, high intensity'. The likelihood of inland flooding will increase as a result, in particular in the West and the Midlands. The whole country will experience scarcity of water during the late summer and autumn periods.

Ireland is also likely to experience a potential rise in average temperatures relative to the 1961-1990 period of up to 2.1 to 2.7 degrees Centigrade by the 2080s, with autumn months warming the most.

SUMMARY

- Sea levels will rise, and storms will become more frequent resulting in more widespread coastal erosion.
- Rain patterns will move to "long duration, high intensity" increasing the risk of inland flooding and water scarcity during late summer and autumn.
- The average temperature could rise by more than 2°C by 2080's.

What does this mean for our natural heritage?

Ireland's wildlife, including all the plants and animals living in water or on land, thrive in Ireland precisely because our climate suits them. They have adapted to our current patterns of temperature and rainfall. As these patterns change, which they will, some of these plants and animals will not be able to adapt or move, or will be so stressed that they become extinct. Some species are already disappearing from Ireland due to recent climate change.

Additionally these new climatic conditions may be more favourable to species of plants or animals that currently do not live here, but which may in time become invasive at the expense of existing species. This is happening already for example on our inland waterways with the spread of Zebra Mussels and African Curly Waterweed causing expensive problems.

Rising air and water temperatures in many Irish waters will greatly magnify the existing problem of nutrient enrichment, thus putting greater pressure on existing species of invertebrate, fish and plants. Studies have also shown that the Atlantic salmon is likely to be greatly affected by a rise in water temperature.

Salmon have long been closely associated with Ireland, appearing regularly in our ancient mythology, and are a very important heritage and tourism resource. Indeed the changes caused by water pollution in our inland waterways and the rising sea water temperatures are making it much more difficult for the Salmon to spawn, and are therefore reducing the numbers of young salmon. According to the National Parks and Wildlife Service - the future prospects for the salmon are poor (NPWS, 2008. Atlantic Salmon *(Salmo Salar)*, Conservation Status Assessment Report).

The frequency and severity of storms is predicted to increase greatly over the next 50 years.
Photo: Richard Nairn, natura.ie

Indirect changes from climate change on our natural heritage will also become evident. For example, climate change impacts at the lower end of the food chain will produce significant effects higher up. Changes to insects and plankton will affect the food webs that support fish and bird life in our rivers, lakes and seas.

Marine mammals like whales, dolphins and seals are likely to be affected by these changes. Seals may also be affected by rising sea levels as their traditional haul out and breeding sites become flooded.

On the other hand, more whales and dolphins are being sighted off the Irish coast than ever before. This could be due in part to both greater numbers of people participating in whale and dolphin watching activities leading to greater numbers of sightings, but could also be due to a greater productivity of plankton which attracts greater numbers of fish. Leatherback turtles are also predicted to become more frequent visitors to our waters in the future.

SUMMARY

- Predicted climate change will make Ireland unsuitable for some species of plants and animals currently living here, causing them to become stressed and possibly extinct in Ireland. At the same time it will also attract new invasive species to our shores and inland waters.
- Rising air and water temperature will magnify existing pollution problems, putting greater pressure on species of invertebrates, fish and plants such as Salmon.
- Existing food webs which support fish and birdlife in our rivers, lakes and seas will be affected by climate change.

Late medieval fishtrap on the Shannon Estuary.
Sites such as these will be very vulnerable to rises in sea level and the change in sediment movement.
Photo: Aidan O'Sullivan

What does this mean for our cultural heritage?

Our cultural heritage is very diverse and includes all physical traces of human activity in Ireland since pre-historic times. Along the coast, this includes castles, Martello Towers, harbours, promontory forts, historic houses and a whole variety of archaeological remains, including ship wrecks on the sea bed.

While many of these have been designed to be immersed in water, such as harbours and jetties, the predicted increase in storm frequency and storm surges, together with increased erosion, will inevitably weaken them. More frequent and violent storms may also speed up stone decay of historic buildings along the coast and inland waterways.

Our navigable inland waterways themselves are also being affected by climate change. The principal effects will be as a result of changes in river flow and water supply, intense rainfall and flooding, the build-up of flotsam and bank erosion. Important archaeological sites along our inland waterways may dry out due to changes in the water table caused by drought, or may suffer from flooding due to extreme weather events.

Ireland's most prominent cultural asset is its landscape, which has been continually shaped by human activity and settlement since the introduction of farming six thousand years ago. The greenness and lushness of Ireland's landscape, is a result of having grass and arable crops as the main land cover and this creates the main characteristics of Ireland's distinctive landscape.

Grassland is likely to remain an important part of our landscape over the next 80 years or so, but it will be affected by more droughts. Summers like that of 1995, during which the grass turned brown in places, are likely to occur more frequently. Inevitably, the character of Ireland's landscape will change in response to climate change, although like all landscape change, this is likely to be gradual and subtle, as perceived by each generation.

It is our coastal landscapes, however, that are at most risk from transformation by climate change. Rocky or "hard" coast lines will be more resilient to the rising sea levels and coastal erosion, but coasts made up of sands, clays and gravels are particularly vulnerable. Recent work carried out for the EPA has found that retreat of the coast line is happening fastest in Counties Down, Louth, Dublin, Wicklow and Wexford where much of the coast is made of soft boulder clay. In some places more that 3 metres a year are being lost.

Low-lying bays and estuaries in the west and south - such as Tralee Bay, Cork Harbour, Clew Bay and especially the Shannon Estuary - are vulnerable to increased flooding as sea level rises. The study finds that in the worst-case scenarios of a storm surge occurring in conjunction with a spring tide there is the potential that up to 680km^2 of coastal land may be flooded.

Towns on inland waterways will experience more flooding over the next 50 years. Flood defence schemes must be designed sensitively in regard to their historic urban centres.
Photo: Fáilte Ireland

SUMMARY

- Ireland's coastal landscape, and its cultural heritage features such as Martello Towers, castles, historic houses and promontory forts, along with our coastline will be affected by increased coastal erosion, more frequent storms and rising sea levels.
- Archaeological and industrial heritage sites along Ireland's inland waterways will suffer from changes in river flow and water supply, resulting in both intense rainfall and flooding at times, but also a drying out due to drought and a reduction in the water table during summer months.
- Predicted droughts will also affect the character of Ireland's green landscape, although this change is predicted to be gradual and subtle, as perceived by each generation.

How will climate change affect tourism in Ireland?

Ireland's natural and cultural heritage feature strongly among the main reasons why visitors choose Ireland for their holiday. In 2008, our scenery received a satisfaction rating of **89%** among all overseas visitors, with our unspoilt environment scoring **79%** and nature and wildlife registering a satisfaction rating of **77%**. As climate change is affecting our heritage, we must be clear about how this is likely to affect tourism and what, if anything, we can do about it.

Sites like Joyce's Tower, Co Dublin, will be affected by rising sea levels and more frequent storms. The materials they are constructed from may decay more rapidly too.
Photo: Richard Nairn, natura.ie

While there are many issues related to tourism and climate change that are difficult to predict in an Irish context, we can be certain that we will not be as adversely affected as many other destinations around the world.

For example, within Europe certain Alpine ski resorts may become unuseable in the future due to rises in temperature and the consequent loss of snow, and parts of the Mediterranean coast could become uncomfortably hot during the peak summer months. Tourists are better able to adapt to changing climate conditions than the tourism industry, meaning that they will quickly switch their choice of destination as the results of climate change begin to impact negatively on the enjoyment of their usual holiday destinations.

Ireland's temperate climate, however, should be capable of absorbing the predicted changes in climate over the next one hundred years without resulting in unacceptable comfort levels for visitors, or taking away

from the main reasons that people choose to come here, which is our people, our culture and our landscape. It is also likely that some of the predicted outcomes of climate change will have positive impacts on tourism in Ireland.

For example, warmer, drier summer weather will increase the appeal of many Irish coastal resorts as well as the appeal of water-based and other outdoor activities. However, there will be adverse impacts associated with climate change and it is now necessary to prepare for these.

While warmer weather will make golf more attractive as an activity, erosion of links courses due to rising sea levels and stormier conditions is already a significant problem for golf course management. Water shortages will also pose additional management problems. Coastal paths are already vulnerable to erosion, and their maintenance costs are subsequently very high. The problems of erosion will increase so any future coastal walkways must be planned to avoid vulnerable areas.

Erosion of the cliffs north of Greystones. The location of coastal paths must be considered carefully in the light of increasing rates of coastal erosion.
Photo: Richard Nairn, natura.ie

Over the coming decades, many popular beaches may be eroded, submerged or remain wet all day due to rising sea levels and increased storms. This may be worse at places where coastal defensive measures have already been taken. This will have a significant effect on the vitality of a number of popular seaside resorts. Also with fewer beaches to visit, remaining beaches may become more crowded and less attractive.

Water-based activities on our inland waterways and coasts will be affected by unpredictable and stormy weather, as has already been seen in the wet summers of 2007 and 2008. Charter boat trips for angling, whale and bird watching, kayaking, sailing and cruising are all affected by poor weather conditions. On our inland waterways, the increase in water flow during periods of flood can make navigation dangerous. More stormy weather could also affect the viability of access to Ireland's offshore islands.

Tourism activities on inland waterways will be affected by higher freshwater temperatures combined with pollution. Traditional angling may change as some fish species find it harder to spawn, or to live with higher water temperatures e.g., salmon and trout. Poor water quality in lakes and rivers will have a negative effect on fish populations, as well as rendering activities such as swimming, kayaking, and sailing less attractive.

Invasive species of plants or fish could have a dramatic effect on related tourism assets, by altering radically the ecology of our inland waterways e.g. the African curly-leafed waterweed, Lagarosiphon, in Lough Corrib is threatening the aquatic life, on which the trout and salmon feed, by cutting off the supply of sunlight into the water.

However, it's not all bad news for tourism. For example, climate change can bring with it a number of opportunities which operators can capitalise upon, and others which we may not even be able to foresee at this time. A case in point is nature-based tourism, which is likely to see both positive and negative impacts from climate change.

With warmer temperatures possibly bringing a greater variety of whale and dolphin species, together with other marine animals such as the leatherback turtle to the seas off our coast, opportunities for wildlife watching will increase. Bird watching however, may be adversely affected as cliff breeding sea birds like puffins, razorbills and guillemots may decrease in number as their food sources decline.

Overall, while there may be gains to tourism from climate change, there are also a number of significant risks. It is vital, therefore, in order to ensure the sustainable development of the tourism sector in Ireland and its successful adaptation to climate change, that tourism offerings are of a consistently high quality and sustainable management policies and practices are put in place.

SUMMARY

- Tourists are better able to adapt to changing climate conditions than the tourism industry, meaning that they will quickly switch their choice of destination when the results of climate change begin to impact on the enjoyment of their holiday destination.
- Water-based activities on the coast and inland waterways such as cruising, angling, bird and whale watching will be affected by more unpredictable stormy weather
- Ireland's links courses, coastal paths and beaches will suffer from increased coastal erosion.
- Higher water temperatures, combined with pollution and a potential increase in invasive species of plants and fish will affect inland waterways by making them less attractive for angling and other water-based activities.
- Warmer temperatures may bring with it higher numbers of dolphins and whales off the coasts increasing tourism opportunities for mammal watching. Bird watching however may suffer due to a decline in their food sources.
- Relative to Mediterranean regions, which may become too hot for tourists during the summer, Ireland as a tourism destination may benefit from increased visitor numbers as a result of climate change. However, there will be adverse impacts associated with this and it will be necessary to prepare for these.

Coastal defences for North West Golf Course. Many golf courses currently experiencing coastal erosion problems which will be further exacerbated by climate change.
Photo: Richard Nairn, natura.ie

PART III

What Can We Do About It?

In this report we have focussed on how we can cope with the impacts of climate change on the heritage and tourism of our coast and inland waterways. The Government has already published the National Climate Change Strategy (revised 2007) which sets out how Ireland can reduce its Greenhouse Gas Emissions (GHG), emissions which contribute to climate change, and how it can adapt to the impacts of climate change.

The Government also plans to publish its national adaptation strategy in 2009 which will provide a framework for the integration of adaptation issues into decision making at national and local level.

The purpose of the Heritage Council and Fáilte Ireland report is to build on these important initiatives and complement the national adaptation strategy by providing detailed information relating to the impacts of climate change on the heritage and tourism of our coasts and inland waterways.

In proposing measures to deal with the effects of climate changes, it is important to consider any unintended consequences for heritage and tourism that might arise. For example, the construction of coastal defences and inland flood relief works can have negative impacts on aspects of our natural and cultural heritage such as beaches, sand dunes and historic town centres.

Likewise, where the coastline is allowed to erode or, in some cases, is opened to coastal flooding and inundation by the sea, this can be beneficial to natural heritage by creating new wetlands or allowing coastal habitats space to advance inland, but it may also result in the destruction of archaeological sites along the coast.

Incompatibilities between the needs of heritage and tourism over adaptation strategies may also arise. For example, hard engineering works to protect coastal tourism assets or infrastructure must be considered in light of natural coastal processes and the potential long-term impacts on the heritage value, and indeed the tourism value of the area. It is vital that protection works do not exacerbate the problem, which may lead to the eventual undermining and possible complete loss of the tourism asset. These situations need to be assessed on a case by case basis and more detailed information will be required on the scenarios that are likely to arise.

While higher temperatures will make sea bathing more attractive, the increase in storminess will affect access to traditional bathing places like the 40 Foot, Sandycove, Co Dublin.
Photo: Heritage Council

What are the conditions for success?

In addition to providing the heritage and tourism sectors with information on how they need to adapt to the impacts of climate change as outlined in this report, there are a number of other actions that need to be taken at national level to ensure the success of any adaptation measures.

A number of detailed recommendations are included in the full report relating to these measures, and include:

Doon West ringfort in Co Kerry offers a very spectacular example of coastal erosion.
Photo: Markus Casey.

1 Further integration of climate change policies with heritage and tourism policies

The various national and local heritage plans, as well as national, regional and local tourism strategies, should include policies and actions relating to climate change. Objectives relating to heritage and tourism should also be included in climate change adaptation strategies at national and local levels.

This need for integration reflects the necessity for a more cohesive management approach at an institutional level. In particular, the development of a national policy on Integrated Coastal Zone Management is critical in devising a coherent, appropriate response to rising sea levels and coastal erosion. The Water Framework Directive and the OPW flooding guidance are steps towards a more joined-up approach which should be used to inform other areas of national policy.

2 The need for heritage and tourism sectors to plan adequate adaptation measures

Even if concentrations of greenhouse gases were maintained at the levels recorded in 2000, global warming would continue at a rate of 0.1°C to 0.2°C per decade for the next twenty years. The need for the heritage and tourism sectors to adapt to the predicted impacts of climate change is, therefore, critical.

To respond to these predictions, a significant adjustment of current practices will be needed to help our coast and inland waterways adapt to the likely changes. Among the adaptation measures identified for natural heritage is the need to reduce existing stresses on our habitats and wildlife which are likely to become worse by the effects of climate change. For example, a significant number of Ireland's waterways already contain excessive nutrients. Much more determined actions will be needed to reduce this problem given the expectation of warmer, drier conditions and hence the lower dilution of pollutants in the future.

Effective conservation of the built heritage requires greater levels of inspection,

monitoring and maintenance of structures, and the installation of flood warning systems.

Emergency planning is also needed to cope with damage caused by extreme events such as storms or flooding.

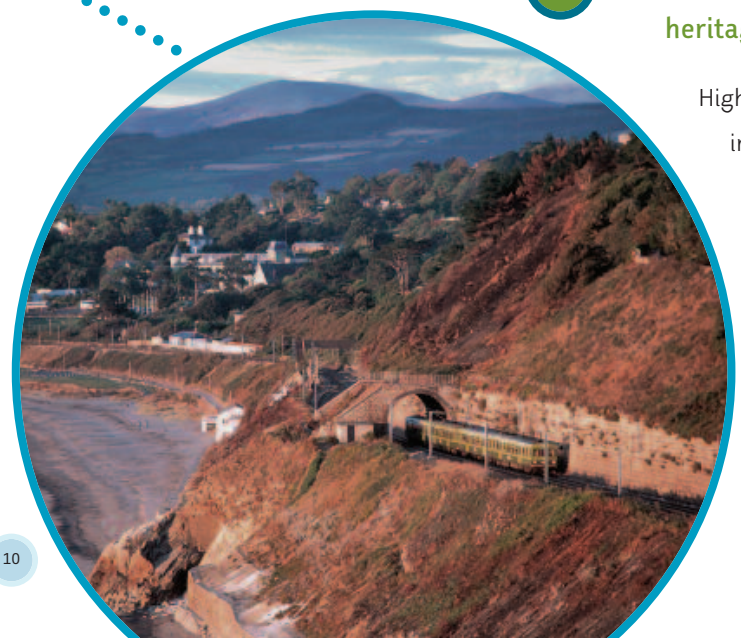
The tourism sector (both industry and promoters) must adapt to the predicted impacts of climate change. This will involve a number of measures such as climate-proofing of tourism / recreation related infrastructure, in particular in relation to the extension or development of any coastal works, such as coastal walkways or golf links. In addition, the diversification and innovation of our tourism offerings should be promoted and developed within the industry. Climate change offers a range of opportunities for the development of new tourism offerings such as nature tourism.

3 More Research & Analysis

One of the main findings of this study is the need to improve our baseline knowledge of many aspects of our heritage. With more precise baseline knowledge it will be possible to start monitoring for the potential impacts of climate change on heritage.

It will also be possible to prioritise those sites and species of particular vulnerability which may require special attention. Improved knowledge about the state of our heritage will also inform the tourism industry of opportunities for the development of new offerings in the future.

Vulnerability mapping is also required which would identify geographic areas of Ireland at greatest risk of coastal erosion, the types of heritage that can be found there, and the tourism activities relating to that heritage. Such mapping would also assist with any climate-proofing of tourism products or infrastructure.



Train line, Killiney, Co Dublin. Infrastructure on vulnerable coasts may need to be relocated inland in the future.
Photo: Fáilte Ireland.

4 Raising awareness of the impacts of climate change on the heritage and tourism of our coast and inland waterways

Higher levels of awareness and understanding of the potential impacts of climate change are required among the public, politicians, policy makers at national, regional and local levels, and the business sector. In particular, better understanding of coastal processes may prevent the need for unsustainable coastal defences.

The potential impacts of climate change on heritage need to be communicated to heritage professionals to inform their activities and future plans as well as encouraging

them to join the general debate. Tourism providers and policy makers also need to be aware of the potential implications of climate change for both individual businesses and the potential future travel patterns of both domestic and overseas tourists.

Grand Canal, Dublin.
With a greater frequency of extreme rain events, and prolonged drought periods, the management of water levels on the canals and inland waterways will become more complex and important.
Photo: Fáilte Ireland

5 Training for anyone planning adaptation measures for heritage and tourism

Training is required for those involved in heritage (policy and site specific) to manage the changes that will inevitably arise from climate change. Training should include the identification of appropriate adaptation measures, ensuring that national adaptation policy does not impact negatively on heritage, and should identify means for providing alternative habitats and space for nature.

Tourism providers and promoters may also require training in how to climate-proof infrastructural projects, and to ensure that the impacts of their activities are compatible with heritage conservation needs. Training is also required for both the heritage and tourism sectors on emergency preparedness, i.e. how to cope with extreme weather events and their impacts on heritage sites and related tourism facilities.

6 Resources should be made available to ensure effective mitigation and adaptation by the heritage and tourism sectors

There will inevitably be a cost associated with any mitigation or adaptation measures put in place to tackle climate change. The Economics of Climate Change, more commonly known as the Stern Review, found that the cost of action to combat climate change now would cost far less (approximately 1% of global Gross Domestic Product) than the cost of inaction or repair (approximately 5% of global Gross Domestic Product) at a later stage. Therefore costs associated with climate change adaptation and mitigation should be part of all future Government investment strategies and considered as part of any future development plans for the country at national, regional, county and local area levels.

The costs, financial and otherwise, of protecting our heritage and tourism resources need to be placed against the feasibility of undertaking this work. Priorities will have to be identified and trade-offs made on what to protect and conserve, and what to let go, based on high quality information on the significance of the heritage resource, alongside the values that each holds for the community.

PART IV

The Next Steps

Step One: Creating Awareness

Following the publication of this report, it is important to ensure that the heritage and tourism sectors are aware of the implications of climate change for them.

This could be done through numerous initiatives including information campaigns, which would link to the Government's existing CHANGE campaign. Awareness of the implications of climate change should be incorporated into existing environmental training and Continued Professional Development seminars offered to heritage professionals and tourism managers and businesses.

Step Two: Identifying Vulnerabilities

The Heritage Council and Fáilte Ireland, together with other partners and stakeholders, will have to work closely with the various sectors to identify what our most vulnerable heritage and tourism assets are.

It is important that a methodology is agreed to identify a comprehensive list of these assets so that heritage and tourism managers and agencies are informed of the future possible impacts and measures can be taken to adapt to these.

Step Three: Planning for Change

Finally it is vital that we work in partnership with heritage and tourism sectors to prepare detailed adaptation plans. These plans will identify what areas we can control and how. Equally as important they will help us identify what areas are beyond our reach.

However is it important, despite this uncertainty that we react in some way. Strong political leadership backed up by well-informed policies and resources are needed to ensure that appropriate mitigation and adaptation strategies are put in place to reduce impacts and to manage our heritage and tourism assets for future generations.

The full report is available on the Heritage Council and Fáilte Ireland websites.

www.heritagecouncil.ie and www.failteireland.ie

AUTHORSHIP

Research was carried out for the report by the following:

- **Likely Climate Projections for Ireland** - Rowan Fealy, (ICARUS) with contribution from Ray Bates (UCD)
- **Likely physical impacts of future climate change on inland waterways and coastal environment** - Rowan Fealy and Conor Murphy, (ICARUS)
- **Likely implications for natural heritage of Ireland's coast and inland waterways** - Marcin Penk, John Brophy, and Roisin Nash, (Ecoserve)
- **Likely Implications for cultural heritage of Ireland's coast and inland waterways** - Beatrice Kelly, (Heritage Council)
- **Likely implications on tourism and amenity in Ireland** - Craig Bullock, (Optimize), Mary Stack and Paddy Mathews, (Fáilte Ireland)