

**ADAPTING TO CLIMATE CHANGE  
FINDINGS FROM THE CARSE OF GOWRIE  
CLIMATE CHANGE PANEL**

for the

**Scottish Climate Change Impacts Partnership (SCCIP)**

and

**Perth and Kinross Council**

from STAR Development Group and LUC



April 2011

## 1. INTRODUCTION

This report sums up the findings of the 3 Climate Change Panel meetings that were convened in the Carse of Gowrie during the course of February and March 2011.

Around 30 local people attended each of the meetings which were held in the Inchtute Hotel. The meetings were hosted by Perth and Kinross Council and the Scottish Climate Change Impacts Partnership (SCCIP) and were aimed at providing an opportunity for the Carse of Gowrie community to consider the likely impacts and effects of climate change - and the potential to proactively adapt to address the challenges and issues that this might bring.

The report is primarily designed to provide feedback to the participants on the findings of the meetings and to enable them to access the information and presentations made at these meetings.

It was agreed at the end of the meetings that there was enough interest to hold a follow up meeting in 3 months time - sometime in June. Notification of this meeting will be sent out to all participants.

This report and updates can be accessed via the Perth and Kinross Website:

<http://www.pkc.gov.uk> or

<http://www.pkc.gov.uk/Planning+and+the+environment/Greener+living/Climate+change/>

## 2. INFORMATION AND PRESENTATIONS ON CLIMATE CHANGE

Prior to the meetings all participants were provided with an Information Pack on Climate Change. This can now be accessed on line at <http://www.landuse.co.uk/Portal/>

Once at this site log in using the following details (Username: 5110 Password: 1213)

At each meeting there were also a series of power point presentations made and these can also now be accessed on line at the address above.

### **3. FINDINGS FROM THE MEETINGS**

#### **First Meeting: Our place**

In the first session, the Climate Change Panel was asked to identify the strengths and weaknesses of the Carse of Gowrie under the headings of:

- Natural Environment
- Built Environment
- Local Economy
- Culture and Heritage
- Community and Social Facilities and Services

By rotating between themed tables, all participants were able to record their views on the positive and negative aspects of the area. In addition, each table was asked to mark key positives and negatives on a blank map of the area. Interestingly, with the exception of a few negative features (e.g. transport infrastructure, specific examples of flooding etc) these maps concentrate on positive aspects of the area.

The results are set out in Appendix 1 by theme. These were summarised and carried forward to the second session which focused on ways in which climate change could affect positive and negative aspects of the area.

#### **Meeting 2: Impacts and Effects of Climate Change**

The second session focused on the impacts of climate change on some of the positive and negative aspects of the Carse of Gowrie that had been identified by the Panel during the first session. Members of the Panel worked in pairs to identify positive and negative effects of climate change. This was followed by group discussions focusing on each of the key topic areas that emerged. These provided a launch pad for the third session which would focus on adaptation responses. The key findings from the working in pairs are summarized in Appendix 2.

#### **Meeting 3: Strategies for Adaptation**

During the third session thematic group discussions explored responses to the impacts that had been identified in the second meeting. Groups were formed on the basis of people's interest, background and expertise. As it transpired, this resulted in no-one taking part in the 'agriculture' group discussion, though a number of key issues were picked up under other themes. Each group was asked to consider the priority actions in relation to relevant stakeholders (residents, community organisation, farmers, historic property owners, Perth and Kinross Council, SEPA, Scottish Government etc).

The findings are shown in Appendix 3.

#### **4. OVERVIEW OF THE FINDINGS**

A number of overarching themes emerge from these discussions and are summarised in the following paragraphs:

##### **Information and research**

There was a common view that much could be done to improve the information and research base. Suggestions included:

- making more use of the local knowledge and expertise, as revealed during the Panel meetings;
- developing and providing more detailed flood and sea level rise data and working with local stakeholders to develop adaptation responses - whether that was identifying archaeological or historic sites that need to be protected or surveyed, or steering development to areas that will not compound the risk of flooding in the future;
- providing more information and advice to land managers to help them adapt to climate change and, for example, develop habitat networks linking across the area;
- developing and carrying out Carse-specific research relating to climate change.

##### **Coordinated responses**

There was also agreement that there is a need for coordinated, joined up responses across the Carse of Gowrie. Specific examples included getting individual communities to work together on the provision and management of community facilities, and the coordination of tourism businesses, together with local access interests, in developing the area's tourism 'offer'. Other suggestions related to working with Perth and Kinross Council, research organisations such as SCRI, and common approaches on the part of heritage groups.

##### **Dealing with flooding**

Flooding is already a key issue on the Carse of Gowrie, though there is some disagreement about the causes and most appropriate solutions. Climate change is likely to make these issues worse, increasing the frequency and severity of flooding affecting properties, transport infrastructure and farmland. Some of the issues relate to 'ownership' and maintenance of the system of pows. Others relate to the way that land management has compacted clay soils, increasing surface flooding and run-off. Others relate to concerns that development will compound flood risk, either by selecting locations which are at risk of flooding, or by increasing run-off and increasing flood risk elsewhere. There was less discussion about the effects of rising sea levels on ground water levels and the effectiveness of existing drainage channels.

**Development**

The key concerns about new development focus on the relationship with existing and potential flood risk. There was reference to the historic focus of development on the former ‘inchs’ or islands on the Carse of Gowrie, and the suggestion that new development should be focused on higher ground to the north of the A90 and on the Braes of the Carse.

**Tourism and recreation**

There was common agreement that the Carse could currently do much more to realise its potential as a tourism destination given the wealth of historic sites and landscapes, the presence of habitats such as the Firth of Tay and the area’s distinctive landscape character and sense of identity. Climate change, particularly the prospect of better summer weather, further underlined this view.

**Identity and cultural heritage**

There was a strong view, possibly reflecting the range of interests represented on the Panel that the Carse of Gowrie has a very distinct and special sense of place which could be lost as a consequence of development, flooding and agricultural change. It was considered important that responses described under previous headings all aimed to maintain this sense of place, whilst recognising that climate change means that some change is inevitable.

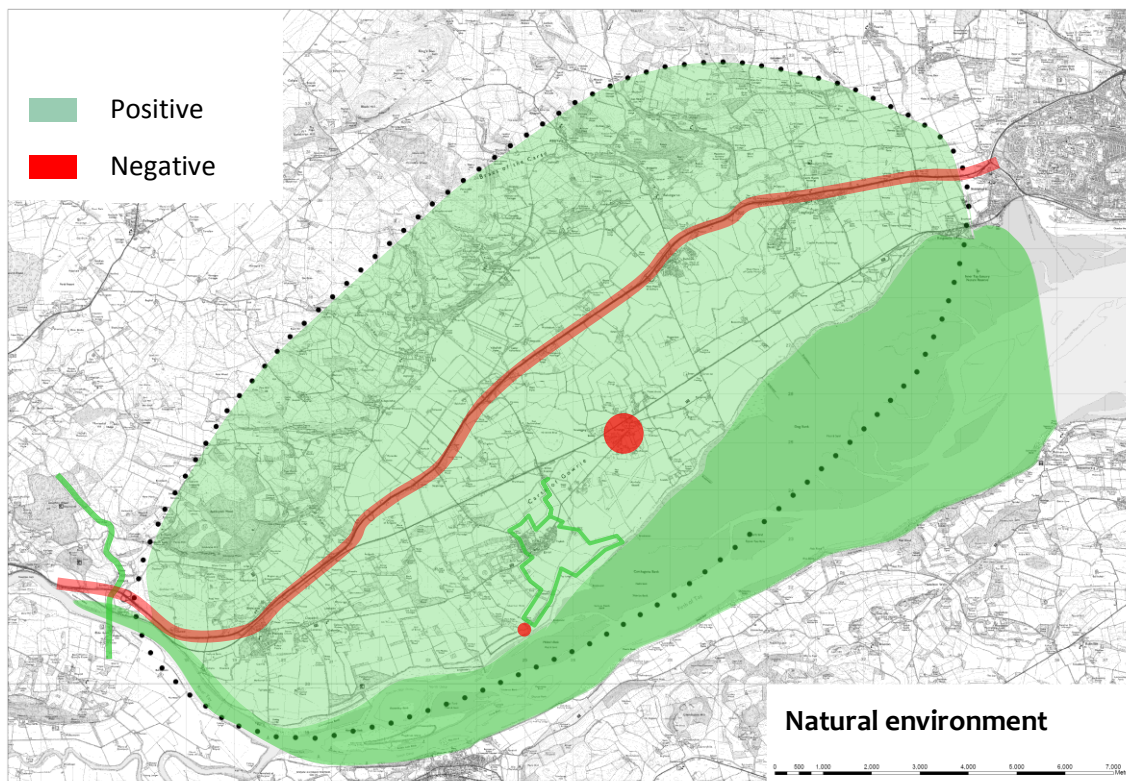
**Coastal change**

Interestingly, there was relatively little comment on sea level rise and possible changes in coastal erosion and deposition, despite this being noted in presentations for all three meetings. This may be a reflection of the uncertainty about the effects on the area since sea level rise itself is likely to have a limited impact and it is the potential changes in erosion that could be more damaging. It may also reflect the limited prominence of the river in the area and the concentration of development on slightly higher ground, inland.

**APPENDIX 1: OUR PLACE - FINDINGS**

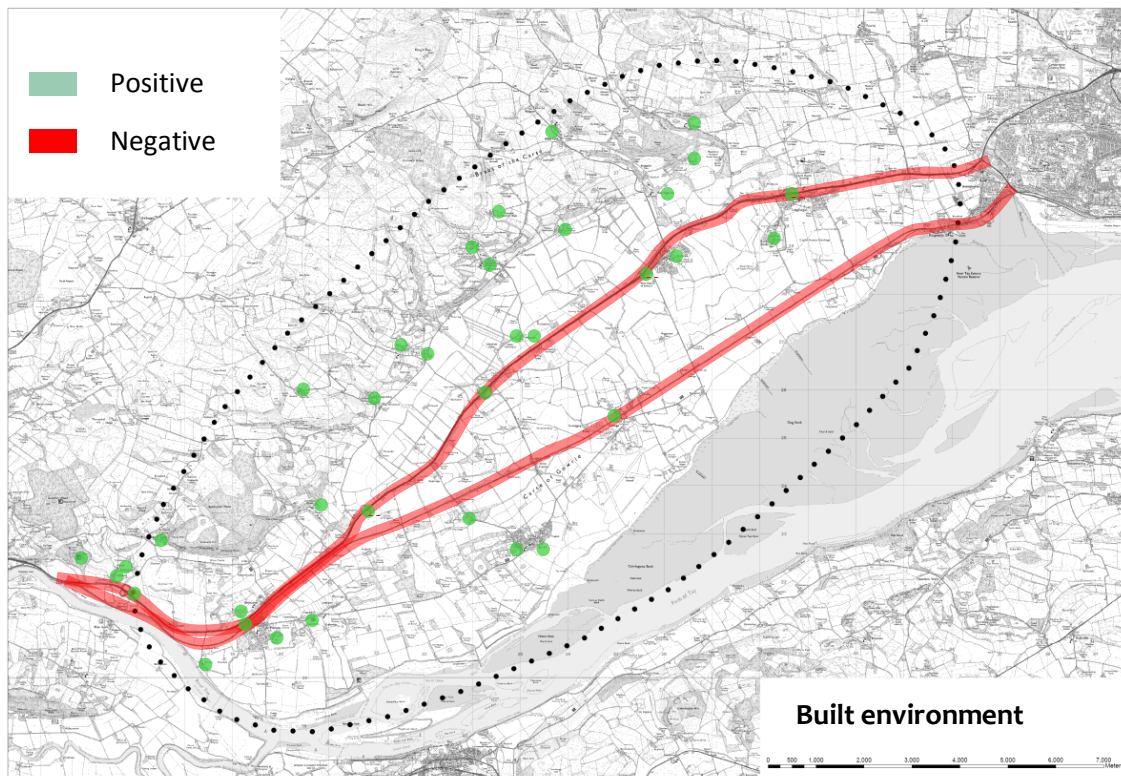
**NATURAL ENVIRONMENT**

Positive features	Negative
<p>The whole of the Carse</p> <p>Orchards, new and old</p> <p>Paths and trails</p> <p>River Tay - reedbeds - designated</p> <p>Birds - some rare and secret</p> <p>Diverse wildlife and habitats</p> <p>Ancient trees and hedges</p> <p>Historic gardens and designed landscapes</p> <p>Pows</p> <p>Scenic quality - landscape and views over the Carse and Braes</p> <p>Farming and fruit growing</p>	<p>Lack of woodland</p> <p>Poor access to the river &amp; trails blocked elsewhere</p> <p>Flooding, poor drainage, clay soils, maintenance of Pows</p> <p>Lack of protection for orchards</p> <p>Vermin</p> <p>Noise from the A90</p>



**BUILT ENVIRONMENT**

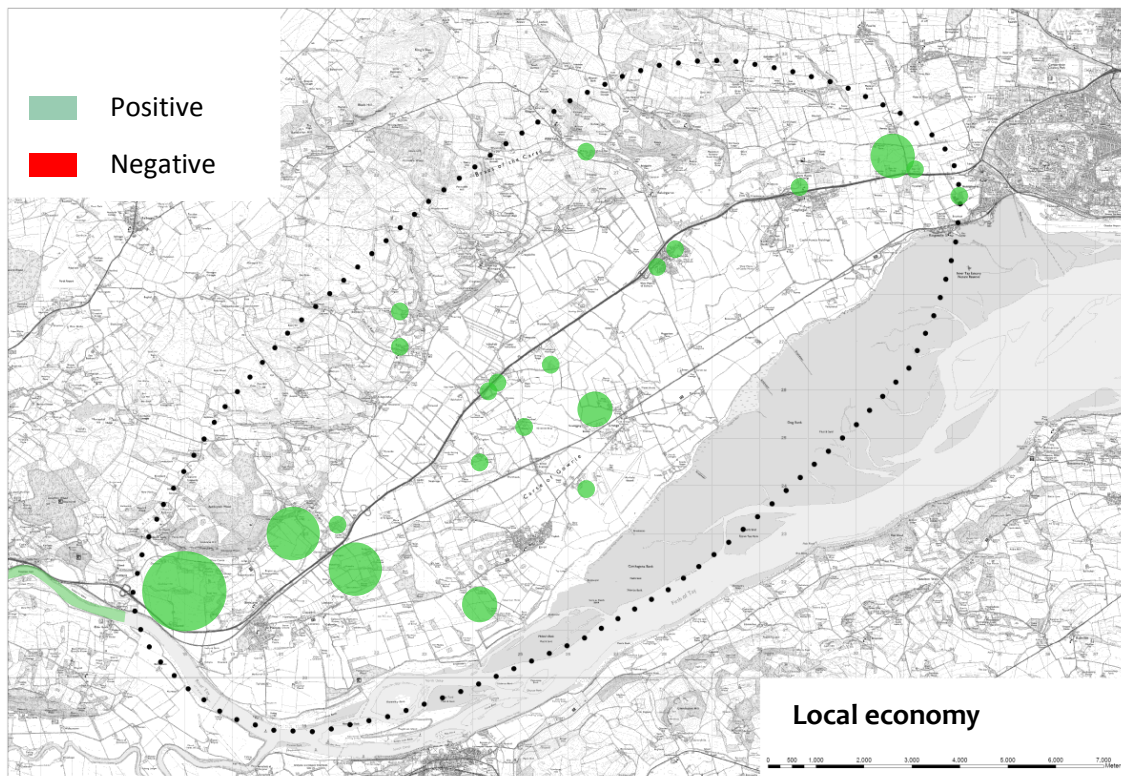
Positive features	Negative
<p>Small villages</p> <p>Historic buildings - steadings, churches, listed buildings, historic gardens - all fitting the landscape</p> <p>Community use of public buildings</p> <p>A90 flyovers</p> <p>Good links via A90</p>	<p>Flooding, including housing being built in flood risk areas, and reliance on electricity for pumping</p> <p>Design and character of new housing</p> <p>Poor public transport</p> <p>Poor opportunities for cycling</p> <p>Poor roads off the A90</p> <p>Severance by A90 and railwayline</p>





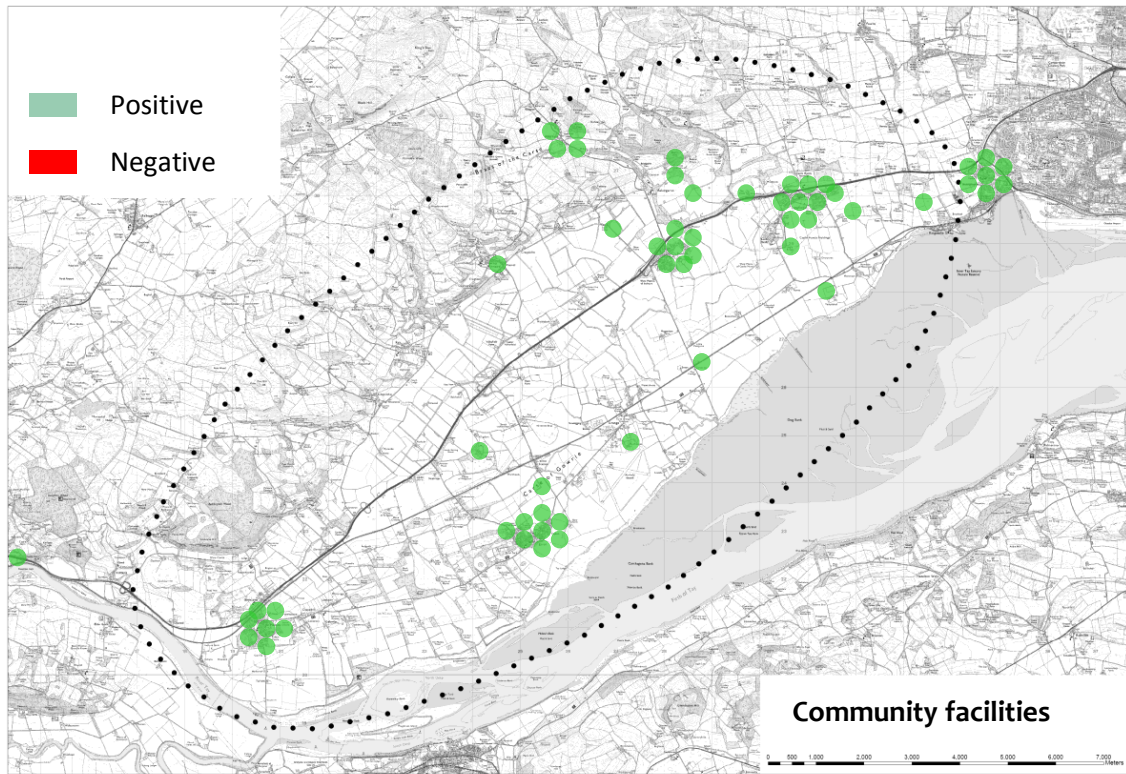
**LOCAL ECONOMY**

Positive features	Negative
Agriculture, soft fruit production, polytunnels	Intensive agriculture - polytunnels, loss of dairy, no rotation
Specialist producers - herbs, winery	Poor public transport, no P+R
Fisheries	Poor visitor infrastructure
Local foods	Lack of support and sites for business development
SCRI	Commuting out of the area
Good transport access	Poor IT and telecoms
Local businesses e.g. garden centre, caravan centre, markets and car auction	Inappropriate development - loss of local identity
'Visitor' attractions - castles, hotels	



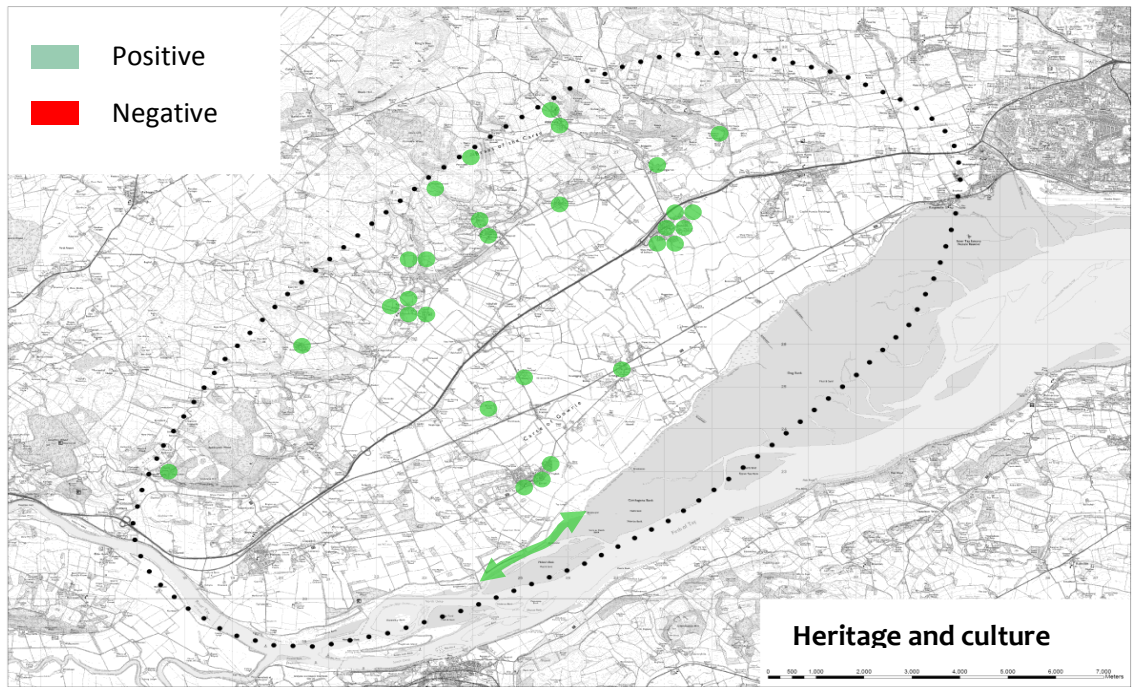
**SOCIAL AND COMMUNITY**

Positive features	Negative
<p>Long list of:</p> <ul style="list-style-type: none"> <li>- Community facilities</li> <li>- Recreation opportunities</li> <li>- Shops and mobile shops</li> <li>- Community organisations</li> <li>- Community initiatives</li> </ul>	<p>Poor schools facilities and lack of secondary school</p> <p>Poor road maintenance</p> <p>Lack of policing</p> <p>Poor public transport</p> <p>Loss of shops and POs</p> <p>Need for sustainable communities (new housing at Abernyte)</p> <p>Car boot sale</p>

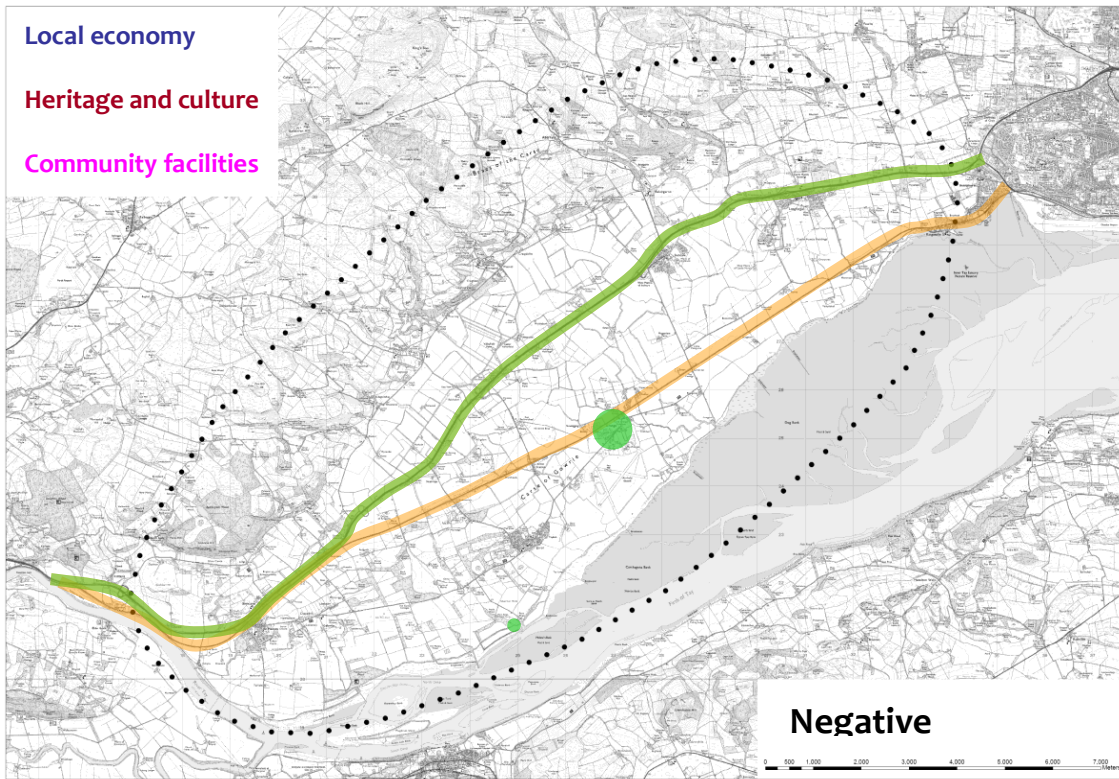
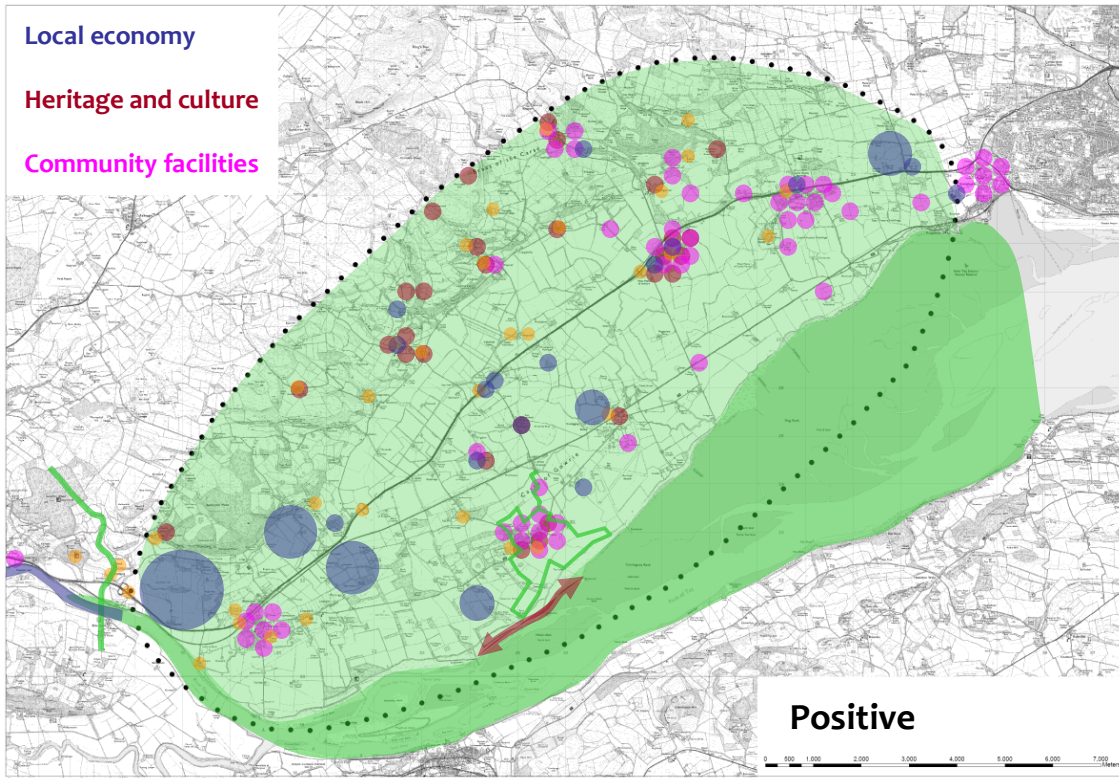


**CULTURE AND HERITAGE**

Positive features	Negative
Long list of historic buildings - churches, forts, castles, houses, archaeological sites	Risk of losing community identity - speed and type of development
Designed landscapes, historic orchards, Redwood trees	Lack of cultural activities, lack of focal point in some areas
Local arts and crafts businesses	Lack of information and interpretation of culture and heritage
Local heritage and conservation groups	Apathy and lack of communication
Community events - village fetes, fun runs	Some historic buildings in poor condition
Conservation areas	
Distinct Carse of Gowrie identity and culture	
River Tay - heritage and history	



SUMMARY MAPS



## APPENDIX 2: IMPACTS AND EFFECTS OF CLIMATE CHANGE - FINDINGS

### Pair discussion summary of the points made about the likely impacts and effects of climate change to the Carse of Gowrie

An increase in the risk of **flooding**, already identified as a key issue in the area

- surface water, along rivers and burns and as a result of sea level rise
- closely linked to maintenance of the Pows, patterns of land management, location and design of development
- concern that future climate change could make the situation worse

#### Changes affecting **farming**

- Some opportunities, new crops, expansion into more marginal areas, increase in productivity
- Apparent longer growing season affected by risk of frost damage and practical issues of getting machinery onto wetter fields
- Increased risk of pests and diseases
- Impacts of flooding - surface, river and coastal

#### Changes affecting **historic environment and biodiversity**

- Impacts of rainfall, flooding, erosion and sea level rise on historic buildings and archaeological sites
- Stress, pests and diseases affecting historic orchards and local fruit species
- Historic designed landscapes being affected by tree loss
- Further impacts on habitats including along the Firth of Tay
- Combined impact on the special identity and character of the area

#### Changes affecting **communities**

- Flooding of homes
- Flood risk, insurance implications
- Impact on community facilities
- Disruption of transport
- Isolation, especially for more vulnerable people
- Gradual shift north, from the Carse onto the Braes

#### Changes affecting **recreation and tourism**

- Opportunities for outdoor recreation in summer - paths, historic sites, bird watching etc
- Poorer conditions in winter
- Increase in seasonality of tourism sector

- Loss of paths to flooding and sea level rise

### APPENDIX 3: STRATEGIES FOR ADAPTATION - FINDINGS

Five themes were identified and worked on by small groups. Each group considered the action needed to address a range of impacts and challenges that had been identified in session 2.

#### Housing and flooding

*Impact/Challenge: Responding to the increased risk of flooding of existing houses as a result of increases in winter rainfall and more intense rainfall events*

##### Action/ Proposals:

- Flood defences to protect houses at risk of flooding, to be financed with subsidies (suggested householders pay 30%, council etc pay 70%)
- Developer contributions to pay for new flood defences and for maintenance of drainage infrastructure (pows)
- Land owners to maintain drainage infrastructure
- Encourage land management practices which break up the clay pan to improve natural drainage.
- Tree planting including as part of habitat networks and shelter belts to improve natural drainage
- Perth and Kinross Council should play a more active role in drainage of the Carse
- There is a need to draw on existing local knowledge of the area, including where drains are located and where flooding occurs on a frequent basis

*Impact/challenge: Summer drought and water restrictions*

##### Action/Proposals

- Irrigation for food production

## Community and Transport

*Impact/Challenge: Disruption of transport infrastructure due to flooding and storm damage*

### Action/Proposals

- Plan for alternative routes where parts of the road network likely to be affected by flooding
- Consider alternative design of public transport vehicles so they are better able to cope with flooding and standing water
- Consider alternative public transport systems (e.g. monorail or light rail) to serve local communities and provide an alternative to car use
- Encourage car sharing with multi-occupancy lanes
- Encourage electric car use by providing charging sockets

*Impact/Challenge: Increases in flood risk affecting community facilities, buildings and other assets.*

### Action/Proposals

- Increased community involvement and responsibility for managing community assets
- Carse-wide co-operation, for example in the sharing of improved community facilities. Possible changes in use of existing community buildings to provide new facilities serving the wider area, not just the local community. e.g. Errol cinema converted to provide gallery space.
- Opportunities for communities and individuals to implement small scale renewables with the policy and funding support of government
- Perth and Kinross development plan policies should provide protection for pows and mechanisms for their management and maintenance

*Impact/Challenge: Opportunities for outdoor community events in summer, few opportunities in winter*

### Action/Proposals

- Opportunities for communities to increase and build on the existing programme of events across the Carse
- Perth and Kinross Council to provide support for community events e.g. outdoor music festival

*Impact/Challenge: Fear of flooding*

### Action/Proposals

- Raise awareness of the extent of potential flood risk among local residents - better information
- Perth and Kinross Council to provide better flood information for residents



- Perth and Kinross Council to revise planning policies to ensure new development does not increase flood risk
- Housing developers to avoid areas at risk of flooding, or locations where development could increase the risk of flooding elsewhere

*Impact/Challenge: Movement north of the A90 to avoid flood risk - impact on existing communities*

Action/Proposals

- Retreat of settlement back to historic locations on higher ground 'back to the hills' - would require very careful planning to limit impacts on the area's cultural heritage
- Perth and Kinross Council to develop a strategy for future development based on sensitive accommodation of development on higher ground
- Existing conservation groups including Braes of Carse Conservation Group and the Historic Orchards Forum to be fully involved in the process

*Impact/Challenge: Impact on schools e.g. sports, access etc*

Action/Proposals

- Improvements to school playing fields and play grounds - improved drainage to overcome compaction (boggy in winter, solid in summer)
- Consider schools as locations for wind turbines - perhaps linked to drainage proposals

*Impact/Challenge: Climate change leading to changes in agriculture, landscape etc that result in loss of community identity*

Action/Proposals

- Development of flood storage reservoirs on farmland - serving three purposes - reducing flood flows in winter, providing irrigation for farmland in summer and potentially supplying communities with potable water where this is currently a problem (e.g. Kinnaird and other settlements in the upper Braes) or could become a problem in the future. Linked to development of wind turbines to pump water. Land managers to take the lead.

*Impact/Challenge: Other*

Action/Proposals

- Need for co-ordinated research programme to examine impacts and possible responses for the Carse of Gowrie.

## Tourism and recreation

*Impact/Challenge: Improved summer weather leading to an increase in tourism activity*

### Action/Proposals

- Connect Perth and Dundee with access routes on quiet roads
- Form a local cycle group
- Residents to lobby and volunteer to improve walking and cycling provisions
- Businesses to work in partnership and connect with cycling groups (e.g Sustrans) to offer a full tourism package
- Improved accommodation to keep tourists in the area overnight

*Impact/Challenge: Flooding and waterlogging of paths and path networks etc*

### Action/Proposals

- Need a joined up approach to the management of pows and other drainage across the whole of the Carse - should involve land managers, Pow Commission, Perth and Kinross Council, SEPA, Transport Scotland and developers
- More hedges to improve ground conditions

*Impact/Challenge: Better summers encouraging more people to use paths and path networks*

### Action/Proposals

- Residents to lobby and secure funding to improve paths
- Residents to carry out maintenance (e.g. pruning) to keep paths open
- Creation of 'Friends of' groups and volunteering for maintenance etc
- Businesses working together to create package of visitor facilities including tearooms etc, linked to promotion and maintenance
- Land managers and land owners to manage access provision more consistently and create range of income generating visitor 'attractions' including tea rooms, plant nurseries, wine tasting, fruit picking etc.
- Perth and Kinross Council and Scottish Government to support development of access and tourism facilities - reducing red tape and providing advice and help.
- Provide links from railway stations to paths etc

*Impact/Challenge: Other*

### Action/Proposals

- Priority and challenge to secure coordination and integration across the Carse of Gowrie.

## Cultural and Natural Heritage

*Impact/Challenge: Impacts on historic buildings and archaeological sites as a result of higher rainfall and flooding*

### Action/Proposals

- Owners of historic properties to receive grants to help them adapt to the changing climate
- Charitable status may help some historic building owners
- Owners to design to adapt to change
- Historic Scotland to provide advice to property owners
- Involvement, with grant assistance, of heritage groups including the Historic Orchards Forum, Abernyte Community Council, Inchtute Community Council, Carse of Gowrie Group, Carse of Gowrie Paths Group, Carse of Gowrie Climate Change Panel, Braes of the Carse Conservation Group

*Impact/Challenge: Impacts on historic orchards and other trees across the Carse of Gowrie as a result of drought, waterlogging and pests and disease*

### Action/Proposals

- Owners of historic properties should start planting trees now before historic trees are lost.
- Tree preservation orders should be used to protect historic trees
- Owners should maintain and upgrade drainage to avoid waterlogging impacts wherever possible
- Community organizations (listed above) also need to plant trees and maintain drainage infrastructure
- There is a need to consolidate the findings of the Carse Historic Orchards Forum Surveys, speeding up the collection and propagation of old cultivars of apples and pears
- Council and Scottish Government and agencies to maintain and upgrade drainage to limit impacts.

*Impact/Challenge: Further loss or deterioration of natural habitats due to flooding, erosion, drought, invasive species*

### Action/Proposals

- Perth and Kinross Council policies to ensure that drainage, floodplains, hard surfaces are properly addressed at planning stage. Require green roofs, freshwater reservoirs for new build
- SCRI should prioritise work to monitor local biodiversity

*Impact/Challenge: Impacts on the River Tay due to sea level rise and human responses to flood risk*

Action/Proposals

- Plant water loving trees including alders, limes, willows
- Perth and Kinross Council and SNH to identify and designate areas which could revert to semi-natural wetland

*Impact/Challenge: Increase in woodland to connect habitats, slow run-off and store carbon*

Action/Proposals

- Owners, community organizations, Perth and Kinross Council, Government and Government Agencies to prioritise the development of habitat corridors linking the north and south of the Carse
- Relocate riverside habitats

*Impact/Challenge: Other*

Action/Proposals

- Agencies to produce and make available a detailed map of the Carse showing height levels and the potential implications of flooding and sea level rise - this will help identify historic sites at risk where survey and recording is needed before they are lost
- Tourism is not currently related to the area's natural and cultural heritage - opportunities for tourism businesses to develop green tourism based on activities such as bird watching
- Perth and Kinross Council to create a database of farmers to provide information to land managers on changing habitats

**Agriculture** (completed by one Panel member - not a group discussion)

*Impact/Challenge: Flooding / waterlogging of farmland due to wetter winters*

Action/Proposals

- Promote sustainable food production to fund drainage
- Local community to contribute to water issues
- All community to contribute to funding of the Pow Commission
- Perth and Kinross Council to play larger role in drainage issues
- Scottish Government and agencies to provide the funding necessary for the drainage necessary to sustain the local economy

*Impact/Challenge: Loss and damage to soils, due to erosion and compaction*

Action/Proposals

- Change cropping rotations and grow alternative crops to help overcome compaction

*Impact/Challenge: Warmer and drier summers leading to drought*

Action/Proposals

- Not seen as a problem, possible need for irrigation
- Pows never run dry since they are dug to the water table

*Impact/Challenge: Reduction in frost, wetter winters, drier summers impacting on fruit crops*

Action/Proposals

- Farmers will always produce crops that are profitable and dictated by the supermarkets

*Impact/Challenge: Warmer and longer growing season (subject to workable soils in spring and autumn)*

Action/Proposals

- Not regarded as a problem

*Impact/Challenge: Impact of changing farming patterns on landscape of the Carse*

Action/Proposals

- Farming has already undergone almost complete transformation with the switch from dairy to arable and fruit growing. This is reflected in removal of fences etc.