

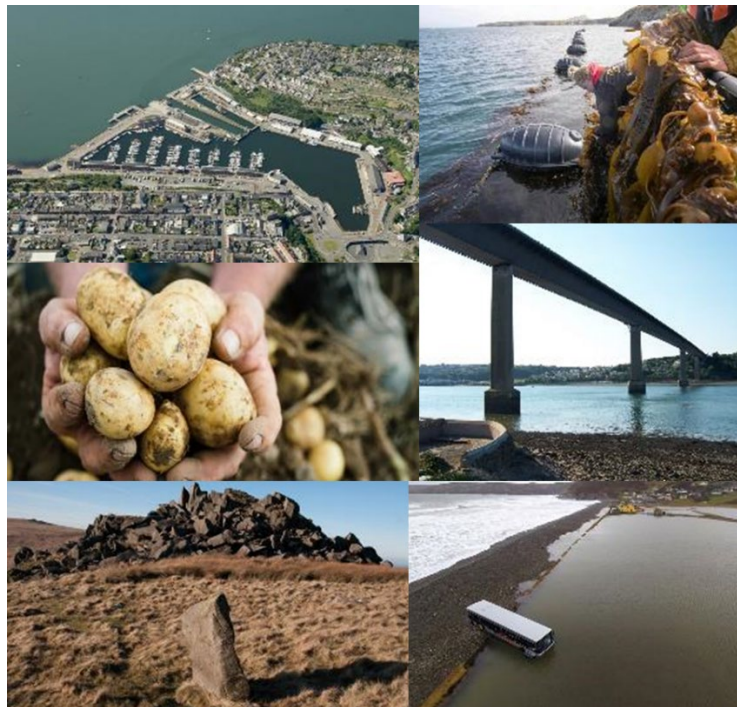
PEMBROKESHIRE CLIMATE ADAPTATION STRATEGY

Workshop#4:

SPECIFYING CLIMATE ADAPTATION:

Infrastructure; Natural Environment & Agriculture; Communities; Business & Industry

MAY 2022



Pembrokeshire Public Services Board
Bwrdd Gwasanaethau Cyhoeddus Sir Benfro 



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1. Introduction

1.1 This brief report summarises an online workshop run on 19th May 2022. This workshop was the fourth of five being run between January and June 2022 for partners to develop a county-wide Pembrokeshire Climate Adaptation Strategy. The process is being co-ordinated by Pembrokeshire Coastal Forum and Netherwood Sustainable Futures, with the support of Pembrokeshire Public Services Board and Pembrokeshire County Council. The support is funded by UK Community Renewal Fund.

1.2 This activity is seeking to involve key agencies, all parts of the Council, the National Park, businesses and local community organisations, to develop a 5-year strategy to increase the resilience of Pembrokeshire to future climate risks.

1.3 It is important to note that this work is about coping with future changes to the climate in Pembrokeshire. It is focused on the following:

Climate Adaptation which helps to minimise risks from changes we are already bought into from past emission, including unpredictable severe weather; sea level rise; changes in natural systems that we rely on.

Climate Risks: multiple risks likely to arise from changes to our climate: which may impact on the local economy; natural environment; infrastructure; communities; people's well-being both now and in the future.

Climate Resilience ensuring that the county can deal with the risks from climate change and be prepared for the future.

1.4 It should clear that this work is not about **Climate Mitigation** which aims to reduce, prevent and limit the rate of emissions which contribute to climate change from Pembrokeshire.; or **Decarbonisation** which removes or extracts carbon from energy sources used in Pembrokeshire, reducing CO₂ emissions. Other work is underway in Pembrokeshire by public bodies, business and industry and third sector and community groups to address these issues.

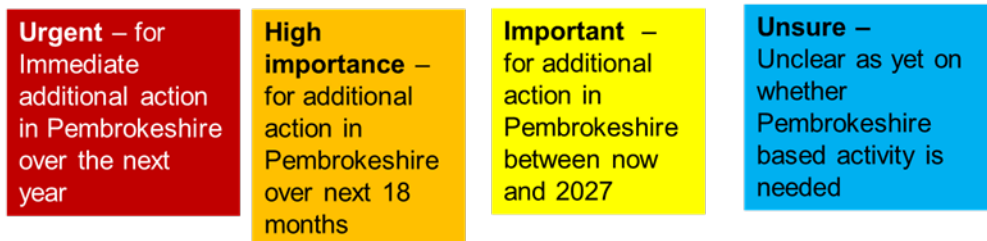
1.5 The aim of this fourth workshop was to bring partners together to explore:

- how partners had categorised the **urgency of the thirty-nine climate risks** identified by local experts
- the **outreach** work with key organisations for example Grwp Resilience; Bluestone; National Trust and others
- understanding the difference between actions, outputs and outcomes for climate adaptation using **theory of change**
- identifying **specific actions** that are needed to address these risks over and above what is already being planned: for infrastructure; nature and agriculture; communities and business and industry
- what needs to be done in June to produce a **draft strategy**, and the process for ratification post June

1.6 PCF and NSF, with support from Pembrokeshire Public Services Board invited attendees from the public, business, utility, academic and community sectors to this workshop. A total of 15 people attended contributing to a series of exercises on the day. Attendees are shown in Appendix B. The following sections describe and provide some analysis of the information gathered in the workshop.

2. Which climate change risks need to be tackled most urgently?

2.1 Since April, partners had been asked to categorise the thirty-nine climate risks in relation to urgency using the following:



2.2 Partners had provided input on this at a previous workshop, had been contacted by email, and this had been discussed at 1-1 ‘outreach’ sessions with partners by NSF.¹ The picture that emerged from the response is shown below.

2.3 It is important to remember when looking at this table that **all of the issues still need to be tackled at a Pembrokeshire wide level over the next five years**– however some are seen to be more urgent than others. These are denoted in red and orange in the tables below.

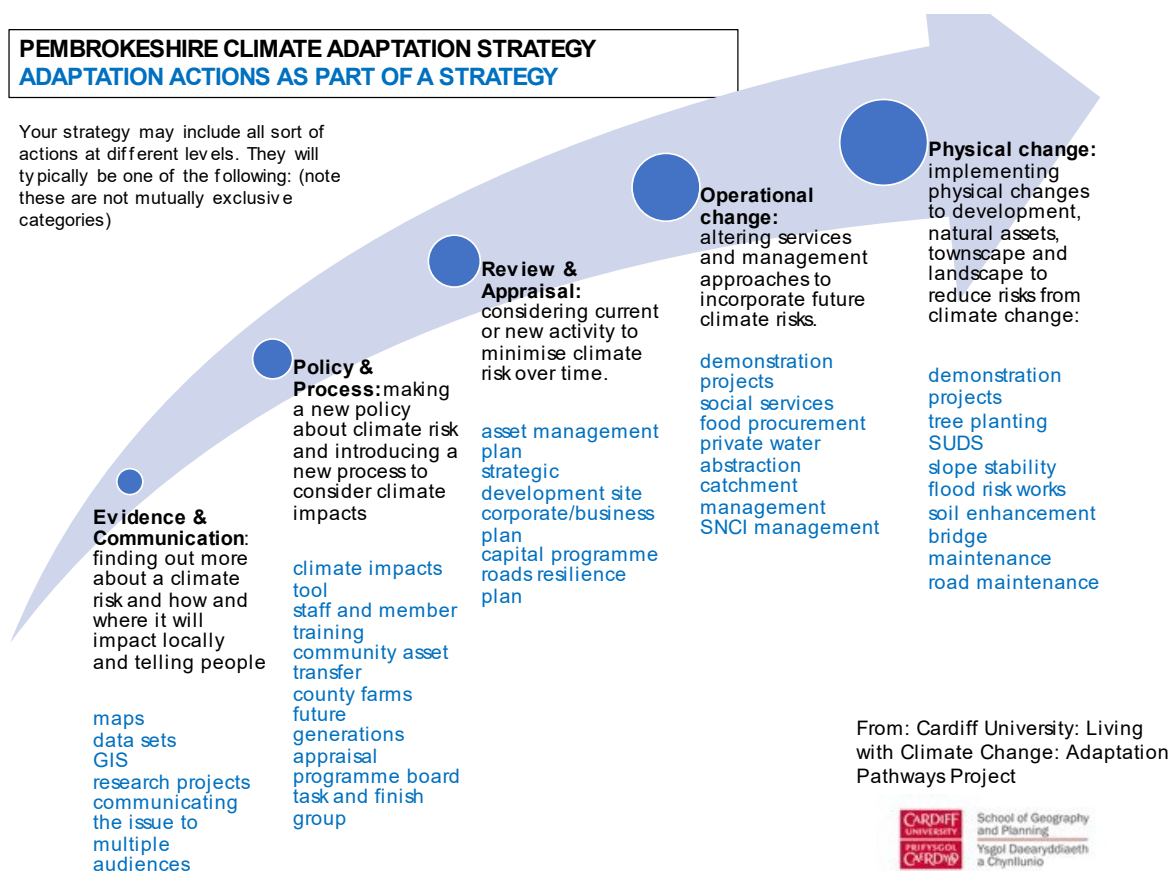
INFRASTRUCTURE	BUSINESS & INDUSTRY
INF1 Cascading Infrastructural Risks	B1 Business communities
INF2 Infrastructural Investment	B2 Business and Industrial Assets
INF3 Land Stability	B3 Business water-use
INF4 Highways Infrastructure	B4 Tourism Economy
INF5 Rail infrastructure	B5 Agricultural businesses
INF6 Waste infrastructure & Contaminated Land	B6 Cascading risks for businesses
INF7 Pipelines and Cable Networks	B7 Finance
INF8 Water infrastructure	
INF9 Energy Infrastructure	
INF10 Port Infrastructure	
INF11 ICT Infrastructure	
INF12 Minerals	
COMMUNITIES	NATURAL ENVIRONMENT & AGRICULTURE
C1 Coastal communities	N1 Transitional change across habitats:
C2 Flooding communities	N2 Designated Sites
C3 Public Asset Management	N3 Soil health
C4 Mental Health	N4 Land use management
C5 Wildfire	N5 Marine
C6 Water Quality	N6 Coastal
C7 Public services	N7 Freshwater
C8 Heritage and Culture	N8 Forest and woodlands
C9 Disease and health risks	N9 Grasslands
C10 Community: cascading risks	N10 Landscape

¹ NSF ran one to one sessions to discuss the risks with: Pembrokeshire Coast National Park, Grwp Resilience; National Trust; Welsh Government and Bluestone; meetings still to be arranged at the end of May were: Dwr Cymru; Dyfed Wales & West Utilities; Milford Haven Energy Kingdom; others had been contacted directly but not responded including Dyfed Powys Police; Mid and West Wales Fire Authority; Wildlife Trusts Wales.

2.4 This indicates that Pembrokeshire -wide need to work urgently on climate risks to key infrastructure that communities rely on and with communities that will be affected adversely by climate impacts. There is also a clear message that public assets and services and businesses need to be supported to factor in climate risks and plan forward for a changed climate. This exercise provides us with a broad but clear indication of who/what needs to be targeted by actions in the Strategy.

3. Getting specific: ‘Theory of Change’ and Climate Adaptation

3.1 NSF provided attendees with an idea of what types of actions are typically included in climate adaptation plans and strategies. These were shared to enable participants to understand that there are several different types of action, based on evidence; policy and process; review and appraisal; operational change and physical change as shown in the diagram below.



Attendees were encouraged to think about these different types of actions when ‘getting specific’ about actions to include in the Strategy.

3.2 Participants were also provided with information on ‘theory of change; to understand the difference between an:

- **action** the specific activity that is proposed to address the climate risk
- **output:** what will be produced because of the action
- **outcome:** how the output will reduce climate risk
- **input:** what is required to deliver the above

Three examples were given to illustrate this and are included in Appendix A:

- the production of a climate risk map for heritage sites
- the introduction of an appraisal tool for managing assets

- introducing climate risk as part for designated nature site management

3.3 Attendees were encouraged to think about theory of change when ‘getting specific’ about actions to include in the Strategy. During four half hour sessions participants made suggestions for actions to address the climate risks under each theme. The following sections describe what was produced in these sessions. **It is important to note that these are not necessarily the specific actions which will appear in the strategy but are indicative of the types of actions that attendees felt were needed under each theme.**

4. Infrastructure: Specific Actions

4.1 The twelve most important climate risks for Infrastructure identified by local experts are shown in the diagram below. Attendees were able to spend time thinking about specific *actions* and *outcomes* to address these issues in addition to activity already planned. It is important to note that these are just some of the ideas which were generated in the workshop and further work will be done during June to distil specific actions on climate adaptation for these issues.

PEMBROKESHIRE CLIMATE ADAPTATION STRATEGY INFRASTRUCTURE: SPECIFIC ACTIONS AND OUTCOMES	
<p>INF1 Cascading Infrastructural Risks understanding levels of risks where infrastructural risks interact e.g. combined infrastructure failure: oil infrastructure; gas infrastructure; landfill and contaminated land; ICT, transport network; energy and water supply; sewerage. e.g. Haverfordwest or Milford Haven Port</p> <p>INF2 Infrastructural Investment factoring in climate risks (flood, heat severe weather) and cascading risks into maintaining existing infrastructural assets and investment in new infrastructure. e.g Milford Haven Quay & Lock; Pembroke Port Redevelopment)</p> <p>INF3 Land Stability planning for increased subsidence from old coal field mine working, limestone sink holes on roads and buildings; slope stability on embankments of transport routes and rivers and beach cliffs e.g Amroth, Wiseman's Cuff</p> <p>INF4 Highways Infrastructure planning for risks to roads, embankments, trees (slopes, windfall) bridges -erosion, scour), including slope stability on transport network e.g. Haverfordwest and Pembroke; Newgale, Aberfeldi. –Resilient Roads Study</p> <p>INF5 Rail infrastructure planning for risks to rail embankments, trees (slopes, windfall) , bridges - erosion, scour; track maintenance e.g.access to Tenby and Goodwick Port; (also dependent on Carms routes)</p> <p>INF6 Waste infrastructure & Contaminated Land planning for future risks to current and historical landfill (erosion and leaching) and contaminated land from rainfall, flooding, heat; e.g. Pembroke Dock WW2 Fuel Depot</p>	<p>INF7 Pipelines and Cable Networks planning forward for risks to networks of pipelines and cables across Pembrokeshire; both subterranean and underwater e.g. ports pipelines; landfall for offshore pipelines; underwater cabling; gas.</p> <p>INF8 Water infrastructure climate risks to waste water treatment works, sewage systems; sewage outlets; e.g.Fishguard Lower Town; planning forward for increased water demand from agriculture and business around supply ring.</p> <p>INF9 Energy Infrastructure planning forward: for resilient existing and future energy infrastructure :offshore, land based renewables, grid enhancement; power lines and subterranean; ensuring new energy generation does not lock in climate risks (e.g water and hydrogen)</p> <p>INF10 Port Infrastructure planning for multiple risks to Milford Haven and Fishguard and smaller ports/harbours around the coast given sea level rise; coastal erosion; frequent severe weather impacts.</p> <p>INF11 ICT Infrastructure addressing vulnerabilities in ICT networks both on and off site which may affect critical infrastructure, systems across the County.</p> <p>INF12 Minerals managing climate risks related to mining legacy; supply and demand for crushed limestone; shales; sand and gravel</p>

4.2 Examples of specific actions for infrastructure are shown below. These focus predominantly on gathering more information on risks, developing the evidence base on the spatial impact of climate risks across the County and developing an understanding of how combined risks will affect particular assets.

4.3 HIGHWAYS INFRASTRUCTURE

- Map and identify risks and the most vulnerable assets in the highways network including:
 - capacity of existing drainage to cope with future extreme weather events.
 - scour-vulnerable structures (bridges, retaining walls) on the highway network
 - mapping the vulnerability of strategic diversion routes to flooding.
 - detailed research into highways stability
- Update specifications for road surfaces to ensure adequate temperature capacity, particularly surface dressing materials

4.5 ENERGY INFRASTRUCTURE

- Map and identify risks and the most vulnerable assets in energy infrastructure including substations on flood plains, overhead cables prone to wind damage); impact of increasing temperatures on thermal resilience of electricity network and potential need for re-conducting; measures to ensure all new infrastructure considers climate risk from the outset.

4.6 INFORMATION TECHNOLOGY INFRASTRUCTURE

- Map and identify risks and the most vulnerable information technology assets – in relation to cascading risks to communities, including UPS/back-up generator energy supply.

4.7 WATER & SEWERAGE INFRASTRUCTURE

- Map and identify risks and the most vulnerable water and sewage infrastructure assets (e.g., STW/pumping stations on flood plains) and foul and surface water drainage systems
- Assess future water needs in and around Milford Haven especially related to large scale hydrogen production
- assessing impacts of more frequent and severe weather events on water supply networks is critical - and this should include groundwater aquifers as well as rivers, streams, reservoirs and lakes.

4.8 LAND STABILITY & INFRASTRUCTURE

- Map and identify risks related to land stability on particular assets including:
 - tourism assets
 - roads
 - residential areas
 - business sites
 - waste and contaminated land site
- a study of the future resilience of the Pembrokeshire coastal path to climate change

4.9 PIPELINE & CABLE INFRASTRUCTURE

- Map and identify risks climate vulnerability of pipes and cables across Pembrokeshire Including:
 - land based and subterranean networks.
 - underwater and shoreline networks around Milford Haven

4.10 PORT & HARBOUR INFRASTRUCTURE

- Map and identify climate impacts to key ports and harbours at risk including:
 - cascading risks to leisure amenity, fishing industry/food, flooding of local properties and businesses.
 - how port upgrades need to take account of climate impacts and plan accordingly.

4.11 RAIL INFRASTRUCTURE

- Map and identify risks and the most vulnerable assets in the rail network including:
 - capacity of existing drainage to cope with future extreme weather events.
 - scour-vulnerable structures (bridges, retaining walls) on rail network.
- Update specifications for rail infrastructure to ensure adequate temperature capacity and flood resilience

4.12 All of the above potential actions have common **outcomes** which are set out below. It will be important for partners to think about what they will do with all of this evidence once it is produced. How will it be used to inform decision-making?

- stakeholder organisations and communities can understand the nature, location and scale of risk provides understanding of relocation, re-alignment, protection, maintenance and long-term management

- information can be used to guide relevant bodies where to invest/seek funding as a priority
- the data can be used target direct investment to locations most in need of adaptation, including upgrades, updated specifications
- information can be used to budget and resource measures which will address risks at locations
- the data would provide evidence to ensure new assets are future proofed through early consideration of climate risk
- information on all infrastructural risks can be used for both strategic and emergency planning for cascading risks in particular locations

4.13 CLIMATE RISK MAPPING 'HUB' Discussion of these actions identified another potential action, the development of a shared information resource: to centralise all climate risk data, maps on energy, water, flooding, IT, ports, highways, rail, land use etc into one accessible platform so that specific risks in all can be considered on a location-by-location basis.

In terms of outcomes, attendees felt that this would be an efficient way of identifying individual risks and potential cascading risks between partner organisations and to provide communities with information.

It was thought that although some information would already exist to populate this tool, more data collection, mapping and research would be needed. It was seen as a major project which would need to build into partners business planning and need ongoing support.

5. Natural Environment & Agriculture: Specific Actions

5.1 The ten most important climate risks for Natural Environment and Agriculture, identified by local experts are shown in the diagram below. Attendees were able to spend time thinking about specific *actions* and *outcomes* to address these issues in addition to activity already planned. It is important to note that these are just some of the ideas which were generated in the workshop and further work will be done during June to distil specific actions on climate adaptation for these issues.

PEMBROKESHIRE CLIMATE ADAPTATION STRATEGY NATURE & AGRICULTURE : SPECIFIC ACTIONS AND OUTCOMES	
<p>N1 Transitional change across habitats planning forward to manage risks that transition across terrestrial, coastal and marine habitats as a result of climate change e.g. soil loss, sedimentation, effects of nutrient loading, INNS.</p> <p>N2 Designated Sites establishing approaches that enable change; connectivity; species mobility in management planning at landscape, SAC and individual site scales. 77 SSSIs, 4 SPAs etc. Managing condition through climate change?</p> <p>N3 Soil health planning forward through climate change to maintain organic matter, minimise mineralisation; run-off; loss to the sea; nutrient loading; maximising biodiversity to support agricultural production.</p> <p>N4 Land use management establish approaches to land use which combine carbon sequestration and storage, soil health, water quality, biodiversity, flood risk management with landowners and farm businesses</p> <p>N5 Marine work needed with marine stakeholders to understand and monitor change underway, risks e.g. INNS, siltation) and opportunities (fisheries and blue carbon) ; integrate into forward planning for sustainable approaches to managing Marine SAC</p>	<p>N6 Coastal planning forward for sea level rise and coastal erosion and its impact on the management of saltmarsh, sand dunes and inter-tidal habitats species given SMPs recommended approaches (HLT, MR or NAI)</p> <p>N7 Freshwater managing multiple impacts of increased temperatures, lower flows, bank erosion and associated decreases in water quality exacerbated by climate change. e.g. Eastern and Western Cleddau. Potential loss of lagoons (Pickleridge)</p> <p>N8 Forest and woodlands planning forward to manage forest, woodlands and hedgerows through change to water, soils, temperature; diseases; INNS severe weather (drought and storms –for connectivity; biodiversity; landscape and forestry needs.</p> <p>N9 Grasslands planning forward to manage upland and lowland grasslands to combine carbon sequestration and storage, water quality, biodiversity, flood risk management alongside agricultural use and to maintain landscapes.</p> <p>N10 Landscape addressing climate risk management in 28 landscape character areas and 7 landscapes of outstanding/ special historic interest –establishing approaches that enable change/ or maintaining features that led to designation.</p>

5.2 Examples of specific actions for natural environment and agriculture are shown below. These focus on a wide variety of issues . Again, the outcomes for many of these actions will be common to those listed in 4.12 above.

5.3 DESIGNATED SITES

- to appraise designated sites for climate vulnerability including SSSIs, LNRs, SACs and SNCI and MPA; an additional outcome to those listed in 4.12 would be to guide stakeholders in their work on encouraging connectivity for biodiversity and nature recovery in a changed climate.

5.4 SOILS

- to map an identify climate risks to soils across the county and particular locations where adaptation is necessary. An additional outcome to those listed in 4.12 would be to help agronomists to target practical advice on managing soils to particular landowners, farmers and public bodies.

5.5 SEA GRASS & SALTMARSH

- to identify options for establishing seagrass and saltmarsh restoration to make most of carbon sequestration opportunities as well increasing the resilience of coastal communities to coastal erosion and flood risk, using natural systems,

5.8 COASTAL MANAGEMENT PLANS

- to identify and encourage stakeholders and partners review management plans related to coastal land, properties and amenities to ensure that climate risks are being considered in maintenance, refurbishment, new investment, forward planning and management practices.

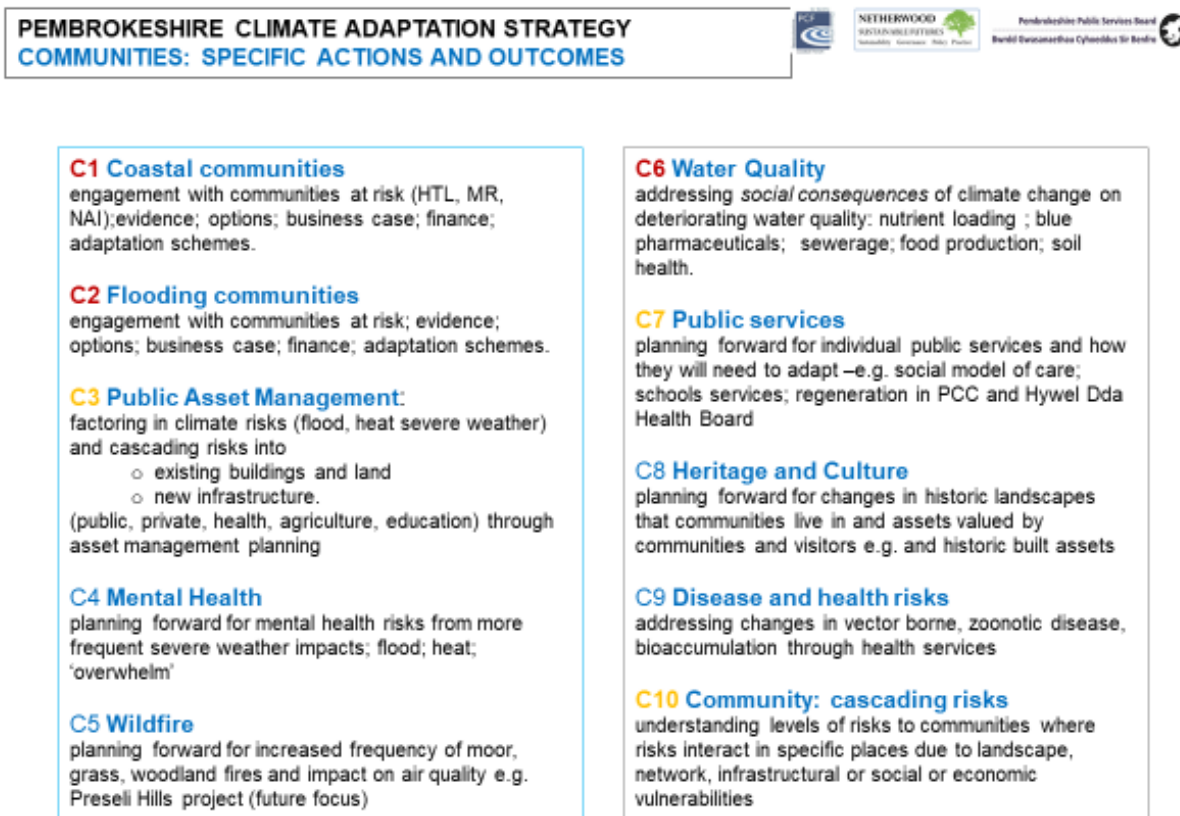
5.9 LANDSCAPES

- to map and identify climate risks to landscapes across the county including impacts to identify key areas/habitats which are under particular pressure and are essential to invest in for connectivity in a changed climate This would allow land managers to focus investment in these areas

5.10 Although this workshop provided relatively few specific actions on natural environment and agriculture, NSF and PCF will also be reviewing outputs and ideas Workshops 1-3 and continuing discussions with organisations in June to further inform the actions for the draft strategy under this theme.

6. Communities: Specific Actions

6.1 The ten most important climate risks for Communities identified by local experts, are shown in the diagram below. Attendees were able to spend time thinking about specific *actions* and *outcomes* to address these issues in addition to activity already planned. It is important to note that these are just some of the ideas which were generated in the workshop and further work will be done during June to distil specific actions on climate adaptation for these issues.



6.2 Examples of specific actions for Communities are shown below. Again, the outcomes for many of these actions will be common to those listed in 4.12 above

6.3 VULNERABLE COMMUNITIES

A major point of discussions was how to meaningfully engage with communities on climate risk, especially those communities that are likely to be directly impacted through coastal erosion, combined flood risks and likely cascading risks resulting from increase frequency and intensity of severe weather. The following suggestions were made of actions to support better communication and engagement on forward 'place' planning for these communities.

- develop a best practice guidance for engaging with vulnerable communities through different management regimes (no active intervention; managed retreat; hold the lines)using examples of other coastal adaptation schemes; using the experience of Newgale; with information targeted at multiple audiences communities; institutions; local members
- elected member forum on coastal adaptation to support local members to inform and engage their communities in forward planning for climate change

- formation of community coastal adaptation groups so that people embedded within the community with an understanding of the policy and practical options before "crisis" point is reached - with aiming to co-produce adaptation plans specific to them
- identify those assets that are more vulnerable and with the largest impact on the community to allow asset owners to prioritise investment according and prepare for changes; and allow public bodies/charities to plan forward to support the community through change
- focus on supporting locations where climate risks may be compounded by socio-economic factors and where several risks interact to improve understanding/ awareness within those communities.

6.4 HEALTH

- undertake research into potential health planning for Pembrokeshire as part of the 'One health agenda to build an understanding of: spatial and demographic distribution of health risks ; access i to health services under a changed climate; mental health impacts of climate change; health assets under a changed climate: new health risks from climate change; all to inform forward planning for social and health services.

6.5 WILDFIRES

- assess future spatial distribution of wildfires under a changed climate; to consider impacts on air quality and health; biodiversity; soils and vegetation and land management; to identify appropriate management measures in the landscape and plan forward for increased frequency and severity as the climate changes.

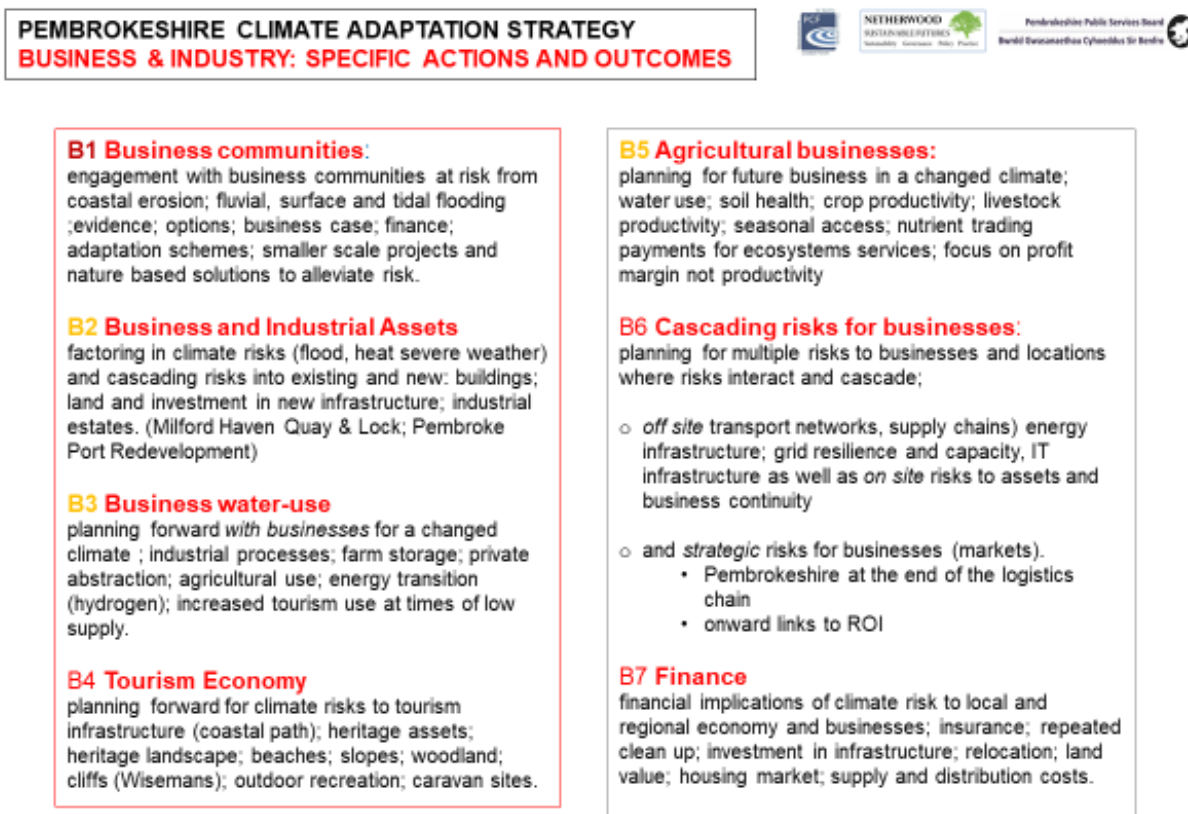
6.6 HERITAGE ASSETS

- risk assessment of the potential impacts of climate change on historic buildings and structures; archaeological sites . In addition to the outcomes listed in 4.12 this would enable stakeholders to review assets with a view to cost benefit analysis of protection and adaptation or allowing loss as appropriate.

6.7 NSF and PCF will be reviewing outputs and ideas Workshops 1-3 and continuing discussions with organisations in June to further inform the actions for the draft strategy under this theme.

7. Business & Industry: Specific Actions

The seven most important climate risks for Business & Industry identified by local experts are shown in the diagram below. Attendees were able to spend time thinking about specific *actions* and *outcomes* to address these issues in addition to activity already planned. It is important to note that these are just some of the ideas which were generated in the workshop and further work will be done during June to distil specific actions on climate adaptation for these issues.



6.2 Examples of specific actions for Business & industry are shown below. Where relevant additional outcomes to those listed in 4.12 are suggested.

6.3 BUSINESS AWARENESS

- develop support services to enable businesses across all sectors of the economy to understand place-based climate risks, in order to assess likely impact on their business interests and to build in contingencies and resilience in forward planning, including
 - built and land assets.
 - supply chains and markets
 - insurance availability

6.3. FISHING BUSINESS & INDUSTRY

- research into climate impacts on the fishing community, (lost days at sea, changes to target species etc) and consideration of how adaptation may impact on planning (aquaculture,

quayside improvements) to for stakeholders to assess likely impact on their fisheries business interests and to build in contingencies and resilience in forward planning

6.4 BUSINESS AND INDUSTRIAL ASSETS

- map nature and location of business and industrial assets in Pembrokeshire to assess climate risks to particular locations and business interests and support the private sector in managing risks moving forward.
 - smaller industrial estates
 - industrial activities in rural locations.
 - built and land assets
 - offshore assets including new marine technology and infrastructure
 - landfall sites for pipelines and cables
 - abstraction of water
 - discharge consents
 - rainwater harvesting
 - the role of green infrastructure in climate adaptation

6.5 WATER RESOURCES AND BUSINESS & INDUSTRY

- estimate and communicate future projections of water supply and demand to business and industry, under a changed climate in relation to:
 - establishing new technologies with intense water use e.g., desalination, hydrogen production.
 - abstraction for rural businesses and farm businesses
 - agriculture use and storage of water
 - anticipatory investment required to support economic growth
 - impacts of business and industrial use on water quality and phosphate and nitrate pollution

6.6 TOURISM ECONOMY

- support tourism businesses to consider and respond to risks (as 6.3) with additional focus on: tourism assets at risk; including:
 - access for visitors
 - caravan parks and campsites.
 - tourism businesses outside mains settlements in rural locations.
 - Pembrokeshire Coastal Path (see 4.5)
 - Impacts of climate change on the Pembrokeshire 'offer'
 - contingency planning for visitors in severe weather (heatwaves, storms)

6.7 AGRI-BUSINESS

- support agricultural businesses to consider and respond to risks (as 6.3) with additional focus on:
 - crop viability
 - water resource management
 - soil health

6.8 As with the other themes, NSF and PCF will be reviewing outputs and ideas Workshops 1-3 and continuing discussions with organisations in June to further inform the actions for the draft strategy

8. Next steps - producing the Strategy in June 2022 and post June ratification

Attendees were invited to comment on the following proposed approach to delivering the Strategy and post June ratification. The following steps were suggested:

1. NSF to produce the Workshop Report by 27th May
2. PCF to distribute this to their contact group to
3. Invite partners to provide further examples of specific actions to address the thirty-nine risks by 10th June
4. NSF to contact outstanding organisations for further limited 1-1 discussions
5. NSF and PCF to develop a draft set of actions for the strategy by 15th June; based on outputs of workshops 1-4 and outreach work
6. Partners to review draft set of actions and explore leadership and resourcing in Workshop~5 on June 15th
7. Draft Strategy produced by NSF and PCF completed by June 30th to include Monitoring & Evaluation recommendations
8. Verbal report by NSF and PCF to PSB sub-group and PSB in July,
9. Ratification/amendment through PSB
10. Strategy informs business planning of key partners Q2 and Q3 and actions start to be implemented.

Participants, including those engaged with the PSB and as part of the sub-group were content with this process and schedule. NSF and PCF will work toward these actions and timetable.

Appendix A Climate Adaptation: theory of change examples:

Step in theory of change		Detail
Action	what is the specific activity that is proposed to address the climate risk?	<ul style="list-style-type: none"> • produce a map of historic landfill sites at risk from climate change
Outputs	what will be produced as a result of the action?	<ul style="list-style-type: none"> • a GIS layer; • a pdf map; • interpretation for users
Outcomes	how will the action manage climate risk?	<ul style="list-style-type: none"> • helps site managers, agencies and the public to understand climate risk to shape forward planning, address liabilities, maintenance and investment decisions.
Inputs	what resources are required to implement the action ?	<ul style="list-style-type: none"> • staff time to manage and coordinate • technical support costs • data analysis costs • design costs • licensing advice • officer time

Step in theory of change		Detail
Action	what is the specific activity that is proposed to address the climate risk?	<ul style="list-style-type: none"> • produce a tool to establish climate risk as a key part of asset management
Outputs	what will be produced as a result of the action?	<ul style="list-style-type: none"> • an appraisal tool interpretation for the • user workshops for asset managers
Outcomes	how will the action address climate risk?	<ul style="list-style-type: none"> • helps asset managers consider climate risks as part of rationale for retention, disposal, purchase, transfer management and maintenance of land
Inputs	what resources are required to implement the action ?	<ul style="list-style-type: none"> • staff time for tool development • design costs; • staff time for trainers; • staff time for asset managers

Step in theory of change		Detail
Action	what is the specific activity that is proposed to address the climate risk?	<ul style="list-style-type: none"> • incorporate climate risk management into forward plans for site management for SSSI's and Local Nature Reserves
Outputs	what will be produced as a result of the action?	<ul style="list-style-type: none"> • guidance and training on new approach to assess future condition of sites under a changed climate; • climate assessment report for SNCIs across Pembrokeshire; • list and map of priority sites for revised management • management plans incorporating climate risks
Outcomes	how will the action manage climate risk?	<ul style="list-style-type: none"> • supports forward planning and management of SSSIs, SINCs and LNRs by incorporating climate risks
Inputs	what resources are required to implement the action ?	<ul style="list-style-type: none"> • staff time to produce guidance • staff time to assess current sites and climate risks • staff time to produce report with list of priorities • staff time to incorporate

Appendix B

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