

# PEMBROKESHIRE CLIMATE ADAPTATION STRATEGY

## Workshop#3:

## PRIORITIES FOR CLIMATE ADAPTATION

APRIL 2022



**Pembrokeshire Public Services Board**  
**Bwrdd Gwasanaethau Cyhoeddus Sir Benfro**



**UK Government**  
**Llywodraeth y DU**

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Front cover image taken from  
<https://www.pembrokeshire.gov.uk/definitive-map>

## 1. Introduction

1.1 This brief report summarises an online workshop run on 22<sup>nd</sup> March 2022. This workshop was the third of five being run between January and June 2022 for partners to develop a county-wide Pembrokeshire Climate Adaptation Strategy. The process is being coordinated by Pembrokeshire Coastal Forum and Netherwood Sustainable Futures, with the support of the Pembrokeshire Public Services Board and Pembrokeshire County Council. The project 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** actions that minimise risks from changes we are already locked into from past emissions, 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 the local economy; natural environment; infrastructure; communities; people’s well-being both now and in the future.

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

1.4 It should be 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 CO<sub>2</sub> 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 This third workshop aimed to:

- reflect on the **outputs of four ‘Surgeries’** in March attended by local experts under the themes of Infrastructure; Communities; Natural Environment and Agriculture; and Business & Economy which focused on the **61 climate risks** identified at a Wales level in the UK’s Climate Change Risk Assessment 3; utilising expert local knowledge to explore where and how these risks might manifest themselves in the County.
- reflect on **39 Adaptation Priorities** identified in these Surgeries where those engaged felt that work is needed to adapt to climate change in Pembrokeshire.
- undertake an exercise to **categorise** these 39 Adaptation Priorities into the following:

**Urgent** – for Immediate additional action in Pembrokeshire over the next year

**High importance** – for additional action in Pembrokeshire over next 18 months

**Important** – for additional action in Pembrokeshire between now and 2027

**Unsure** – Unclear as yet on whether Pembrokeshire based activity is needed

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 9 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. Reflections on the Climate Risk Surgeries

2.1 NSF provided an overview of the four Climate Change Risk Surgeries run during March 2022: Infrastructure CCRA3 Surgery March 10<sup>th</sup>; Business & Industry CCRA3 Surgery March 16<sup>th</sup>; Community CCRA3 Surgery March 14<sup>th</sup>; Natural Environment and Agriculture CCRA3 Surgery March 17<sup>th</sup>.

2.2 These surgeries involved focusing on the 61 risks in CCRA3 (See Appendix A). PCF liaised with the PSB Sub-Group to identify key experts to invite to each surgery. In total 28 people were involved – representing a range of organisations, who were able to provide detailed, specific insight into the Pembrokeshire ‘picture’.<sup>1</sup>

2.3 Each of the surgeries lasted 3 hours (12 hours in total). In each, a precis was given by NSF for each of the 61 risks and local experts discussed which areas, specific locations, groups, assets species and habitats and features in Pembrokeshire maybe most significantly affected by each risk and how they might categorise each risk – whether more action or evidence was as needed. Views were recorded on the Xleap Platform. Follow up emails after each surgery enabled further information to be gathered.

2.4 In total **39 adaptation priorities** for Pembrokeshire emerged from the above discussions and correspondence. These are detailed in Sections 3, 4, 5 and 6 of this report. The expert consultation during and after the surgeries also highlighted the following issues:

- the importance of distinguishing between **managing a risk now** and **managing the issue in a different climate** in the future.
- in many cases, the ‘**systems**’ to manage an issue (a problem, a development; a place, an investment, an asset) are not focusing on climate risk enough.
- a repeated theme or question was ‘**how much evidence do you need to flag up risks**’ as part of a decision-making process? Many felt that a better balance was needed to raise climate risks earlier in plans for Pembrokeshire. The risks to be given more profile, even though more evidence might be needed.
- partners needed to **use evidence better together** to focus on where multiple risks are in Pembrokeshire – to all sit around a ‘virtual table’.
- it is not enough to flag up and signpost information to each other but there is a need to **interpret evidence** between partners to understand climate risks better.
- for many of the risks, there is not enough focus on climate risks by partners as part of, or in addition to the ‘day job’ and a major **adaptation gap** needs to be addressed.
- partners need better **outreach and engagement with stakeholders** and **time/resources to explore the risks** more fully, to plan forward together.

2.5 **Additional discussions** are also needed on the 39 adaptation priorities with, amongst others: Pembrokeshire Marine SAC; Pembrokeshire Coast National Park Authority; Welsh Water; partners in Milford Haven Energy Kingdom; CADW; Dyfed Archaeological Trust and National Trust. These will be pursued by NSF in April 2022.

2.6 The following sections provide an overview of the 39 Climate Adaptation Priorities emerging from the Surgeries under four themes. Infrastructure; Communities; Business & Industry; and Natural Environment & Agriculture, and the discussions at Workshop#3 on March 22<sup>nd</sup>

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<sup>1</sup> Representatives of Natural Resources Wales, Pembrokeshire Council; Hywel Dda Health Board; FUW, NFU, Pembrokeshire Nature Partnership; Port of Milford Haven; Keep Wales Tidy; Royal Haskoning DHV; RNLI; Pembrokeshire College.

### 3. Infrastructure Climate Adaptation Priorities



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NETHERWOOD  
SUSTAINABLE FUTURE'S  
Sustainability Governance Policy Process



P.F.  
Pembrokeshire Futures

**PEMBROKESHIRE CLIMATE CHANGE ADAPTATION STRATEGY:**  
**WORKSHOP#3 PRIORITISING ACTIONS**  
**INFRASTRUCTURE: ISSUES FLAGGED**

<p><b>INF1 Cascading Infrastructural Risks</b>                  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><b>INF2 Infrastructural Investment</b>                  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 &amp; Lock; Pembroke Port Redevelopment)</p> <p><b>INF3 Land Stability</b>                  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><b>INF4 Highways Infrastructure</b>                  planning for risks to roads, embankments, trees (slopes, windfall) bridges - erosion, scour), including slope stability on transport network e.g Haverfordwest and Pembroke; Newgale, Aberiedi. – Resilient Roads Study?</p> <p><b>INF5 Rail infrastructure</b>                  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><b>INF6 Waste infrastructure and Contaminated Land</b>                  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><b>INF7 Pipelines and Cable Networks</b> planning forward for risks to networks of pipelines and cables across Pembrokeshire; both subterranean and underwater e.g ports pipelines; landfill for offshore pipelines; underwater cabling; gas.</p> <p><b>INF8 Water infrastructure</b>                  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><b>INF9 Energy Infrastructure</b>                  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><b>INF10 Port Infrastructure</b> - 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><b>INF11 ICT Infrastructure</b> - addressing vulnerabilities in ICT networks both on and off site which may affect critical infrastructure, systems across the County.</p> <p><b>INF12 Minerals</b> – managing climate risks related to mining legacy; supply and demand for crushed limestone; shales; sand and gravel</p>
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### 3.1 Workshop #3 Infrastructure Discussion

The ranking exercise with attendees produced the following results based on the following criteria.

<b>Urgent</b> – for Immediate additional action in Pembrokeshire over the next year	<b>High importance</b> – for additional action in Pembrokeshire over next 18 months	<b>Important</b> – for additional action in Pembrokeshire between now and 2027	<b>Unsure</b> – Unclear as yet on whether Pembrokeshire based activity is needed
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INFRASTRUCTURE	URGENT	HIGH	IMP	UNSR
INF1 Cascading Infrastructural Risks	5	4		
INF2 Infrastructural Investment	2	5		
INF3 Land Stability		3	6	
INF4 Highways Infrastructure	3	2	5	
INF5 Rail infrastructure		3	7	
INF6 Waste infrastructure & Contaminated Land	1	4	3	1
INF7 Pipelines and Cable Networks		4	5	
INF8 Water infrastructure	6	2		
INF9 Energy Infrastructure	4	5		
INF10 Port Infrastructure		4	5	
INF11 ICT Infrastructure		5	3	
INF12 Minerals	1	3		4

The wider group involved in the Adaptation Strategy production process will also be given an opportunity to rank the urgency of the adaptation priorities via PCF.

Note: each issue may need work to fill the adaptation gap, but this exercise will help with sorting the most important to work on soon, and other work items which may come later.

## 4. Business and Industry Climate Adaptation Priorities



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### PEMBROKESHIRE CLIMATE CHANGE ADAPTATION STRATEGY: WORKSHOP#3 PRIORITISING ACTIONS BUSINESS & INDUSTRY – ISSUES FLAGGED

**B1 Business communities:** engagement with business communities at risk from coastal erosion; fluvial, surface and tidal flooding; evidence; options; business case; finance; adaptation schemes; smaller scale projects and nature based solutions to alleviate risk.

**B2 Business and Industrial Assets** factoring in climate risks (flood, heat severe weather) and cascading risks into existing and new: buildings; land and investment in new infrastructure; industrial estates. (Milford Haven Quay & Lock; Pembroke Port Redevelopment)

**B3 Business water-use** planning forward *with businesses* for a changed climate; industrial processes; farm storage; private abstraction; agricultural use; energy transition (hydrogen); increased tourism use at times of low supply.

**B4 Tourism Economy**– planning forward for climate risks to tourism infrastructure (coastal path); heritage assets; heritage landscape; beaches; slopes; woodland; cliffs (Wisemans); outdoor recreation; caravan sites.

**B5 Agricultural businesses:** planning for future business in a changed climate; water use; soil health; crop productivity; livestock productivity; seasonal access; nutrient trading payments for ecosystems services; focus on profit margin not productivity

**B6 Cascading risks for businesses:** planning for multiple risks to businesses and locations where risks interact and cascade;

- *off site* transport networks, supply chains) energy infrastructure; grid resilience and capacity, IT infrastructure as well as *on site* risks to assets and business continuity
- and *strategic* risks for businesses (markets).
  - Pembrokeshire at the end of the logistics chain
  - onward links to ROI

**B7 Finance** financial implications of climate risk to local and regional economy and businesses; insurance; repeated clean up; investment in infrastructure; relocation; land value; housing market; supply and distribution costs.

## 4.1 Workshop#3 Business and Industry Discussion

The ranking exercise with attendees produced the following results based on the following criteria.

<b>Urgent</b> – for Immediate additional action in Pembrokeshire over the next year	<b>High importance</b> – for additional action in Pembrokeshire over next 18 months	<b>Important</b> – for additional action in Pembrokeshire between now and 2027	<b>Unsure</b> – Unclear as yet on whether Pembrokeshire based activity is needed
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BUSINESS & INDUSTRY	URGENT	HIGH	IMP	UNSR
B1 Business communities	9			
B2 Business and Industrial Assets	1	8		
B3 Business water-use	3	3	3	
B4 Tourism Economy	2	5	2	
B5 Agricultural businesses	1	7	1	
B6 Cascading risks for businesses	1	5	1	2
B7 Finance		4	5	

The wider group involved in the Adaptation Strategy production process will also be given the opportunity to rank the urgency of the adaptation priorities via PCF.

Note: each issue may need work to fill the adaptation gap, but this exercise will help with sorting the most important to work on soon, and other work items which may come later.

## 4.2 Communities Climate Adaptation Priorities

### PEMBROKESHIRE CLIMATE CHANGE ADAPTATION STRATEGY: WORKSHOP#3 PRIORITISING ACTIONS COMMUNITIES - ISSUES FLAGGED



**C1 Coastal communities:** engagement with communities at risk (HTL, MR, NAI); evidence; options; business case; finance; adaptation schemes.

**C2 Flooding communities:** engagement with communities at risk; evidence; options; business case; finance; adaptation schemes.

**C3 Public Asset Management:** factoring in climate risks (flood, heat severe weather) and cascading risks into **existing buildings; land and investment and in new infrastructure.** (public, private, health, agriculture, education) through asset management planning

**C4 Mental Health** planning forward for mental health risks from more frequent severe weather impacts; flood; heat; 'overwhelm'

**C5 Wildfire** planning forward for increased frequency of moor, grass, woodland fires and impact on air quality e.g. Preseli Hills project (future focus)

**C6 Water Quality** – addressing *social consequences* of climate change on deteriorating water quality: nutrient loading ; blue pharmaceuticals; sewerage; food production; soil health.

**C7 Public services** – planning forward for individual public services and how they will need to adapt – e.g. social model of care; schools services; regeneration in PCC and Hywel Dda Health Board

**C8 Heritage and Culture** – planning forward for changes in historic landscapes that communities live in and assets valued by communities and visitors e.g. and historic built assets

**C9 Disease and health risks** addressing changes in vector borne, zoonotic disease, bioaccumulation through health services

**C10 Community: cascading risks** –understanding levels of risks to communities where risks interact in specific places due to landscape, network, infrastructural or social or economic vulnerabilities

## 4.2 Workshop #3 Communities Discussion

NSF prepared a slide using NRW data to focus on individual communities across Pembrokeshire related to surface water flooding; river flooding; coastal flooding a coastal erosion (see opposite). This provided a useful tool during the workshop to focus discussions about identifying locations of risks, and particularly cascading risks (where multiple climate impacts combine). Further background is provided in Appendix C on the origins and background to this data:<sup>2</sup>

The ranking exercise with attendees produced the following results based on the following criteria.

<b>Urgent</b> – for Immediate additional action in Pembrokeshire over the next year	<b>High importance</b> – for additional action in Pembrokeshire over next 18 months	<b>Important</b> – for additional action in Pembrokeshire between now and 2027	<b>Unsure</b> – Unclear as yet on whether Pembrokeshire based activity is needed
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COMMUNITIES	URGENT	HIGH	IMP	UNSR
C1 Coastal communities	9			
C2 Flooding communities	9			
C3 Public Asset Management	2	7		
C4 Mental Health	1	3	4	1
C5 Wildfire		2	7	
C6 Water Quality	5	4		
C7 Public services		6	2	1
C8 Heritage and Culture		3	6	
C9 Disease and health risks	1	4	3	1
C10 Community: cascading risks	3	4	2	

The wider group involved in the Adaptation Strategy production process will also be given the opportunity to rank the urgency of the adaptation priorities via PCF.

Note: each issue may need work to fill the adaptation gap, but this exercise will help with sorting the most important to work on soon, and other work items which may come later

<sup>2</sup> PCC are working with Royal Haskoning DHV on factsheets to engage with communities on hold the line and managed retreat – to start engagement with them

Please refer to Appendix C when reading this table



Pembrokeshire Pŷllig, Serwisïer Iocaf  
Dorodol Gwarchodwraig Cylchreiddus Strydau



**PEMBROKESHIRE CLIMATE CHANGE ADAPTATION STRATEGY: WORKSHOP#3 PRIORITISING ACTIONS**

**EVIDENCE : planning for change in communities**

Taken from NRW data supplied as part of Pembrokeshire Wellbeing Assessment 2021/22?

Community	Surface	Tidal	Fluvial	At Risk	Shoreline post 2025 - 2055
Amroth					No active intervention post 2055
Angle		6			
Broadhaven S & C					Managed retreat post 2055
Broadhaven North					Managed retreat 2025-55 then no active intervention
Cilgerran			9		
Crymych			1		
Cym yr Eglwys					Hold the Line and Nature Based Solutions
Dale					
Felindre Farchog			7		
Fishguard			5	4	
Fishguard Harbour	9	7			Hold the Line and Nature Based Solutions
Fishguard Lower					Hold the Line and Nature Based Solutions
Gelliswick Bay					
Goodwick	6	2			Managed retreat (Parrog) post 2025.
Goodwick Lower					Managed retreat post 2055
Haroldston Hill					Managed retreat post 2055
Haverfordwest	5	5	3	1	
Kilgetty			4		
Little Haven					Managed retreat post 2055
Lawhaden			10		
Lower Solva					Managed retreat post 2055
Lydstep	7				No active intervention post 2025
Martello, Llanrath					
Cleddau Bridge					Hold the Line and Nature Based Solutions
Merlin's Bridge	10				
Milford Haven		10	6		Hold the Line and Nature Based Solutions
Narbeth	8				
Neyland					Hold the Line and Nature Based Solutions
Nolton Haven					Managed retreat post 2025
Newgale					Managed retreat post 2025
Newport	4	8			Managed retreat 2025 - 2055 then no active intervention
Newport Sands					Parrog managed retreat post 2055
Pembroke					Managed retreat 2025 - 2055 then no active intervention
Pembroke Dock	2	3		2	
Porth Clais Inner		4			
Porth Clais Outer					Hold the Line and Nature Based Solutions
Porth Gain					Hold the Line and Nature Based Solutions
Pwllgwaelod Bay					No active intervention post 2025
Saundersfoot			8		
Solva Harbour					Managed retreat post 2055
St. Dogmaels	3		2	5	Hold the Line and Nature Based Solutions
Tenby	1	1		3	(North) Hold the Line and Nature Based Solutions North and South Beach Hold the Line and Nature
Wisemans Bridge					No active intervention post 2025
Whitesands Bay					Managed retreat post 2025

## 6. Natural Environment Climate Adaptation Priorities

### PEMBROKESHIRE CLIMATE CHANGE ADAPTATION STRATEGY: WORKSHOP#3 PRIORITISING ACTIONS NATURAL ENVIRONMENT & AGRICULTURE – ISSUES FLAGGED



**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.

**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?

**N3 Soil health** planning forward through climate change to maintain organic matter, minimise mineralisation; runoff; loss to the sea; nutrient loading; maximising biodiversity to support agricultural production.

**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

**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

**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)

**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)

**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.

**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.

**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.

## 6.1 Workshop#3 Natural Environment & Agriculture Discussion

The ranking exercise with attendees produced the following results based on the following criteria.

**Urgent** – for Immediate additional action in Pembrokeshire over the next year

**High importance** – for additional action in Pembrokeshire over next 18 months

**Important** – for additional action in Pembrokeshire between now and 2027

**Unsure** – Unclear as yet on whether Pembrokeshire based activity is needed

<b>NATURAL ENVIRONMENT &amp; AGRICULTURE</b>	<b>URGENT</b>	<b>HIGH</b>	<b>IMP</b>	<b>UNSR</b>
N1 Transitional change across habitats:		9		
N2 Designated Sites	7	2		
N3 Soil health	7	2		
N4 Land use management	6	3		
N5 Marine	6	3		
N6 Coastal	8	1		
N7 Freshwater	7	2		
N8 Forest and woodlands		6	2	
N9 Grasslands	2	6	1	
N10 Landscape		3	5	1

The wider group involved in the Adaptation Strategy production process will also be given the opportunity to rank the urgency of the adaptation priorities via PCF.

Note: each issue may need work to fill the adaptation gap, but this exercise will help with sorting the most important to work on soon, and other work items which may come later.

## 7. Plenary and next steps

**Workshop #3: Prioritising Actions:** reflected on the surgeries; explored adaptation priorities under each theme; started to rank a set of priorities based on immediate, short, and medium-term timescales. The plenary session and discussions during the session also focused on:

- **methods to involve the unengaged partners** – with NSF and PCF committing to contact them regarding this exercise during early April; Attention will also need to be given to engage with senior staff and local authority members in Workshop # 5 and strategy production.
- undertaking the **prioritisation exercise for non-attendees** – with PCF committing to facilitate a prioritisation exercise with the wider group of stakeholders via email in early April.
- building on the data that NRW were able to provide on individual communities – the need to establish a method to **share and map information about localities** so that cascading risks could be explored around a 'virtual table'.
- the need to prioritise by **identifying locations particularly vulnerable to multiple risks**.
- ensuring that any **low carbon development or infrastructure also enhances adaptation** and does not displace opportunities for adaptation – for example in Pembrokeshire Local Area Energy Plan.

**Workshop #4 Specifying Actions on April 12<sup>th</sup>** will; build on the prioritisation work to determine a final list of adaptation priorities, for immediate action, short- and medium-term implementation and begin to identify specific actions based on a theory of change:

**action** - what specific activity is proposed to address the climate risk

**inputs** - what elements are required to implement it including resources?

**outputs** - what will be produced as a result of the action?

**Outcomes**- how will the action manage climate risk?

## Appendix A UK Climate Change Risk Assessment 3: Wales Risks

NATURAL ENVIRONMENT & ASSETS	INFRASTRUCTURE
N1. Terrestrial species and habitats	I1. Infrastructure networks (water, energy, transport, ICT)
N2. Terrestrial species and habitats (INNS)	I2. Infrastructure services (riverine)
N4. Soils	I3. Infrastructure services (coastal)
N7. Agriculture	I4. Bridges and pipelines
N8. Forestry	I5. Transport networks
N10. Aquifers and agricultural land	I6. Hydroelectric generation
N11. Freshwater species and habitats	I7. Subterranean and surface infrastructure
N12. Freshwater species and habitats (INNS)	I8. Public water supplies
N14. Marine species, habitats and fisheries	I9. Energy generation
N16. Marine species and habitats	I10. Energy
N5. Natural carbon stores, carbon sequestration	I11. Offshore infrastructure
N6. Agricultural and forestry productivity	I12. Transport
N17. Coastal species and habitats	I13. Digital
N18. Landscape character	
N3. New species	BUSINESS & INDUSTRY
N9. Agricultural and forestry productivity	B1. Flooding of business sites
N13. Freshwater species and habitats	B2. Coastal business locations and infrastructure
N15. Marine species, habitats and fisheries	B3. Business production processes
	B4. Business access to finance, investment and insurance
HEALTH COMMUNITIES AND THE BUILT ENVIRONMENT	B5. Reduced employee productivity in businesses
H1. Health and wellbeing (temperatures)	B6. Supply chains and distribution networks
H3. People, communities and buildings (flooding)	B7. Changes in demand for goods and services
H4. Viability of coastal communities (sea level)	
H5. Building fabric	INTERNATIONAL DIMENSIONS
H7. Health and wellbeing (air quality)	ID1. Food availability, safety, and quality
H8. Health	ID3. Migration and effects on the UK's interests overseas
	ID4. The UK's international interests and responsibilities
H9. Food safety and food security	ID5. Changes to international governance affecting the UK
H10. Health (house water supply)	
H11. Cultural heritage	ID7. International trade routes
H12. Health and social care delivery	ID8. Risk to the UK Financial Sector
H13. Education and prison services	ID9. Risks to Public Health from Overseas
H6. Household energy demand	ID10. Risk multiplication to the UK
H2. Health and wellbeing (high temperatures)	
	ID2. UK food availability and exports
	ID6. Increased trade for the UK
From Climate Change Risk Assessment 3: Summary for Wales UKCCC & Netherwood Sustainable Futures (2021)	

## Appendix B Participants in Workshop 3 – Priorities

<b>Attendees</b>	
Emma Thornton	Visit Pembrokeshire
Angharad Llewelyn	Pembrokeshire Council
Bob Smith	Pembrokeshire Council
Tom Trapman	Welsh Government
William Mansfield	Natural Resources Wales
Emma Taylor	Natural Resources Wales
Yvette Eley	Natural Resources Wales
Chris Lawrence	Natural Resources Wales
Nicola Gandy	Pembrokeshire Coast National Park
Steve Keating	Pembrokeshire Council
Alex Cameron Smith	Pembrokeshire Coastal Forum
Dr. Alan Netherwood	Netherwood Sustainable Futures
<b>Apologies</b>	
Emma James	Pembrokeshire College
Jess McQuade	WWF Cymru
Peter Howells	NFU
Anna Frizzell	RNLI
Sarah Thorne	Hywel Dda Health Board
Emma Palmer	National Trust
Sue Barker	Pembrokeshire Marine SAC
<b>Registered</b>	
Jess McQuade	WWF Cymru
Amy Nicholas	

## Appendix C Notes on Table (pg. 10) Evidence: Planning For Change in Communities

### **Communities at Risk Register (CaRR)**

NRW has developed the Communities at Risk Register (CaRR) to identify the locations of greatest risk of flooding from all sources.

CaRR uses outputs from flood models to consider the number of people at risk, the hazard they are exposed to over a range of probabilities, the speed of onset of flooding and their ability to respond to flooding due to their social vulnerability. It also uses factors such as the availability and standard of flood warnings and flood defences. The CaRR score (and ranking) is the sum of scores within the community area. It is important to note that the 'community' scale level of risk will not be applicable to all properties within the 'community' area.

Please note: The numbers of properties at risk may vary over time; they will reduce with new flood alleviation schemes and other improvements to standards of protection; and with improved modelling techniques and local modelling (generally the responsibility of NRW), numbers may increase or decrease.

### **Shoreline Management Plans (SMPs)**

Shoreline Management Plans (SMPs) set out a shared strategic approach for managing the coastline from coastal flooding and erosion risks. Their aim is to reduce the risks to people, the developed, historic and natural environments over the next century.

SMPs have been developed by Coastal Groups, whose members include Natural Resources Wales, Maritime local authorities, government bodies, and other stakeholders with a responsibility or interest in managing the coast.

SMPs are living documents and will be reviewed and updated where more new information, such as climate change projections, becomes available.

The coastline is split into sections known as 'policy units' that will be assigned one of three management policies (below) for each of the time periods or epochs.

- Hold the line by maintaining or changing the existing standard of protection
- Managed realignment which allows the shoreline to move backwards and forwards, with management to control or limit the movement
- No active intervention where there is no investment in coastal defences and natural processes are allowed

It is important to note that where a SMP policy has determined a policy which requires intervention, such as investment in existing or enhanced defences when 'hold the line' has been determined, or movement of the defences in a 'managed realignment' situation, this does not mean that funding has been secured for this investment.

### **Provided by NRW**