CLIMATE CHANGE ENGAGEMENT WITH THE HAVENS COMMUNITY

December 2020 – March 2021

Report prepared by	
Pembrokeshire Coastal Forum (PCF)	
Project Manager	Tim Brew and Alex Cameron-Smith
Report Contributions	Jetske Germing
PCF, 2nd Floor, Pier House, Pier Road, Pembroke Dock, Pembrokeshire, SA72 6TR	

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Contents

1. What we intended to do

This work set out to discuss adapting to climate change with The Havens community, covering the geographical area surrounding Broad Haven, Little Haven, Talbenny, Hasguard, Haroldston, Walton West and Broadway. The project was a collaboration between the Natural Resources Wales (NRW) Marine Area Statement team[1] and Pembrokeshire Coastal Forum (PCF)[2]. It enabled new engagement tools developed in the Coastal Communities Adapting Together[3] project to be trialled with a community. The work was also aligned with the Marine Area Statement's community engagement actions.

Information was sought from participants on Changes, Impacts and Actions related to climate change in their community. Suggestions from the community for **Actions** were recorded. Suggestions from Welsh Government and Fingal County Council's Climate Adaptation Plans were included for participants to consider during the focus groups, but PCF did not set out to influence participants on the choice of Actions. A consultant provided information to help the community plan to take these forwards.

Resource was built into the project so we could learn from with the climate change community engagement work being undertaken in Fishguard and Goodwick, on behalf of the NRW South West Area Statement team[3]. Before commencing we met with Pembrokeshire Coast National Park Authority (PCNPA) planning team and Pembrokeshire County Council (PCC) to discuss any information we needed before selecting the community to work with.

As a result of national lockdown measures, the CCAT engagement tools were adapted to be used online, but restrictions on meeting or travel to the community had significant impact on reaching people, and/or their interest in engaging.

Note: A national lockdown due to COVID-19 was declared shortly after the start of this project and was in place for the full duration of the community engagement phase.

2. Where we worked

PCNPA and PCC both have lists of coastal communities that are considered a priority for engagement around climate change. PCF cross-referenced these and added in our knowledge of the coastal communities' likely level of engagement. We took the NRW Shoreline Management Plans[4] (SMPs) for the areas into account and also considered the size of the community in our final choice. From this process The Havens community seemed a suitable pilot community for this project, as agreed with PCC, PCNP and NRW representatives of the Pembrokeshire Service Board (PSB) Climate Change working group.

PCF then spoke to the Community Council Clerk and the County Councillor for the area and both were supportive of the project. They were also able to confirm that broadband connection is usually

[1] https://naturalresources.wales/about-us/area-statements/marine-area-statement/?lang=en
[2] www.pembrokeshirecoastalforum.org.uk
[3] www.ccatproject.eu

good in the community, which was important as online engagement was the only type possible at this time.

After this positive response and encouragement, we settled on The Havens and confirmed this selection with the lead officer for this project in NRW.

3. How we set about engaging with the community

3.1 Community Council

Information about the project was passed on to the Community Council members by their Clerk, and we had hoped to be able to speak to the Community Council at their monthly meeting in February. Agenda items and external speakers at Council meetings need to be approved by the Councillors at the previous meeting. The Clerk was able to raise a discussion point on the project and pass on information about it during the AOB section of the January Council meeting on our behalf. PCF also offered to call any members who were interested in discussing the project further or had concerns. The Clerk was asked by Councillors to promote the project via their Facebook page and community notice boards.

3.2 Digital promotion by PCF

Lockdown extended over the whole community engagement period. As the tools for engagement were digital, we also reached out to the community digitally.

PCF collated an extensive list of public emails for community groups and businesses in The Havens - these were taken from public websites and public Facebook groups. Invites to use the map tool and to take part in the workshops were sent to all of these, with a follow up email when further workshops were announced. In total we emailed nine community groups, 37 local businesses, 15 other key contacts and 18 members of the Public Services Board, as well as Broad Haven Community School. The invitation to participate was passed onto partners and it was circulated by the Biodiversity partnership and internally by PCNPA.

PCF contacted the local newsletter “The Havens Community Diary” to include invites to the workshops and information about the mapping tool in their printed and online issues for February and/or March.

PCF promoted the project via our newsletter and social media. Occasionally the URL to the map tool was blocked by Facebook and the PCC IT system, so we created a page on the PCF website to link to which eliminated this problem. Social media posts were shared by PCF partners and supporters.

3.3 Lessons learned

Despite this considerable effort to reach community members, participation was lower than we had hoped. Only six community members took part in the focus groups with 34 data entries on the map tool. The depth of data was useful, but we understand that this is likely to only represent the views of a small sample of The Havens community. However, despite low participation numbers, enough information was collected to enable the consultant to consider the proposals for climate **Actions** by participants and suggest steps to take these forwards.

	What worked	Challenges	Recommendation
Community based	Approaching the Community Council first ensured permission for the Clerk to assist.	Community Councillors did not participate in any of the workshops themselves.	Allow enough lead in time for the Community Council to follow their process. Offer follow up with individual councillors.
Digital promotion	Invitation to take part was seen by a significant number of people. Focussed messaging meant data was collected from people in the community.	Digital promotion did not reach key groups* in the community.	Use a range of non-digital methods to promote digital. Signage, press articles, flyers, radio, events are all worth considering. Consider offering a prize or payment for submitting data.

** these groups may not have found the digital tools accessible.*

In addition to scheduling and publicising fixed workshops dates and times, we also invited the community to get in touch if they wanted to schedule a meeting at a time suitable for them, however we did not receive any requests, most likely due to the problems already outlined.

4. Introduction to the digital tools used

4.1 Climate changes, Impacts and Actions (CIA) structured conversation tool

Figure 1 Screen shot of a focus group board with Changes, Impact, and Actions cards. This is the board near the end of the workshop.

PCF developed the CIA structured conversation tool for use in the focus groups. Originally developed as a physical resource and now moved online this tool had been tested with a number of groups towards the end of 2020. Small groups of between six and eight people join a video-conference call, usually via Zoom, to discuss climate related **Changes**, **Impacts** and **Actions**, guided by facilitators. Mural is a web-based platform which allows several users to work together on a virtual canvas. The activity results in a finished board (an example in the screenshot above) with what the participants agree are the most relevant cards in the three categories for the community. The conversation finishes with participants considering who is needed to make the **Actions** happen.

The resulting board itself is a qualitative representation of the data, with participants sorting their priority "cards" into themes. The facilitator assisted with this process during the session, inviting clarification from participants.

Working in this way meant transcribing the discussions and coding into themes was built into the process. This greatly reduces time spent by facilitators post workshop sorting participants information. In addition, participants were able to discuss their ideas freely and their privacy was protected.

Once all the workshops were complete the boards were reviewed and a final sort into themes was conducted. This process was supported by referring to notes from the session. When participants identified a particular location during the workshop this was added to the map tool.

4.2 Map tool

Feedback from another programme of NRW funded engagement, commissioned through the Public Services Board Climate Change sub group, in the Fishguard and Goodwick communities advised the use of a participatory mapping approach to collecting information on community concerns related to climate change.

CCAT partners University College Dublin were able to develop this additional tool and will evaluate it as part of CCAT. The tool[4] is based on Survey 123 which is an ESRI application linked to ArcGIS[5]. The tool underwent testing by CCAT partners and a Welsh language version was created.

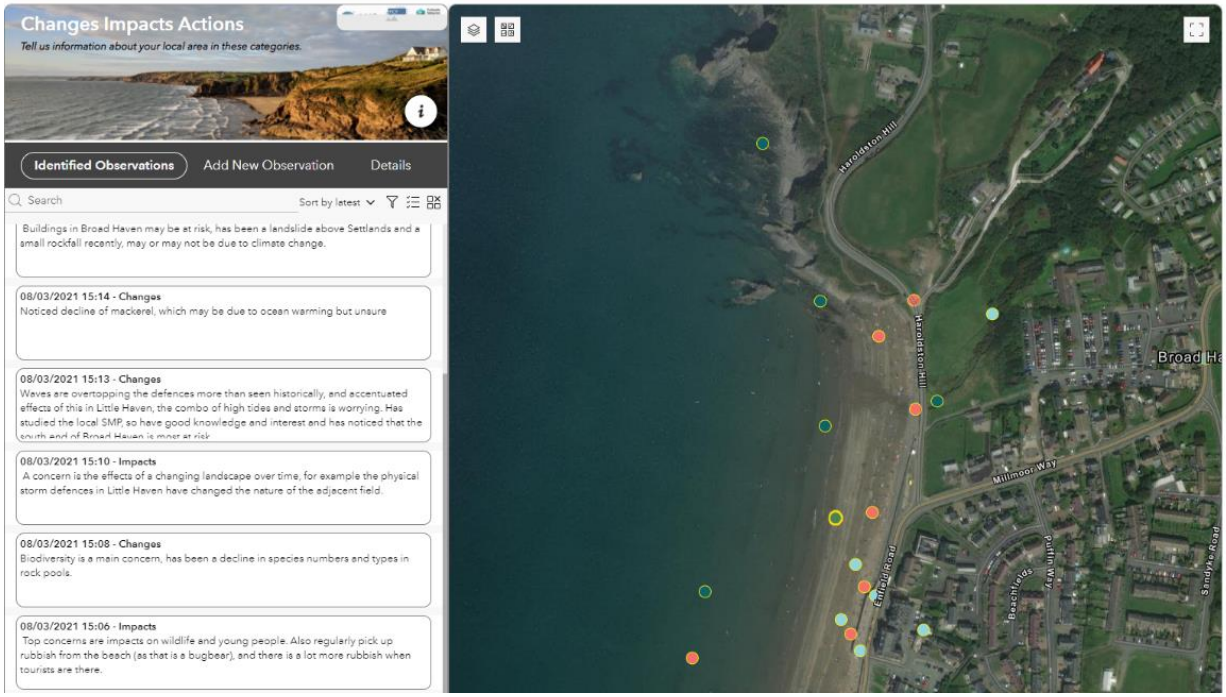


Figure 2 Screen shot of the mapping tool. Each circle represents data supplied by the community.

[4] Map tool

[5] ArcGIS Survey 123

4.3 Lessons learned

	What worked	Challenges	Recommendation
CIA structured conversation tool	Structured conversations. Participants grasped how to use the tool quickly. Educational value, both from the resource and peer to peer.	Harder for users without a laptop. Access is possible on phone or tablet, but harder for users to move around the board. Participants took a while to get to grips with Mural at the start of the workshops. Technical problems with video-conferencing at times.	Outside of COVID-19 restrictions offer remote digital, blended* and conventional ways to participate.
Map tool	Detailed user supplied data for the specific area. Hyperlocal information captured. Facilitated browsing of peer – peer information by users even if they didn't submit an entry.	The URL was blocked for some users. Lockdown restricted use of the mobile version, where users could use their smartphone camera to log an issue. Some users expressed that it was too complex for them to use.	Test links work, especially from social media and local government systems in advance. Embed tools in a page on an existing organisation's website. Use practical sessions to orientate users to any new digital tool.

**blended here is used to describe an approach where participants and facilitator are in the same physical space but using the digital tool on their own devices.*

5. How we processed the information

Data from the focus groups was qualitative. The focus group process was designed with processing the information in mind. The cards were discussed, prioritised into groups and some were discarded in this process. Cards were then grouped into themes either by participants during the workshop or afterwards by PCF.

The map tool was designed to complement the focus groups using the same categories: **Changes, Impacts** and **Actions**. We cross referenced the information with the focus group themes. In the Havens community, the information from the map matched the themes from the focus groups, but this may not always be the case.

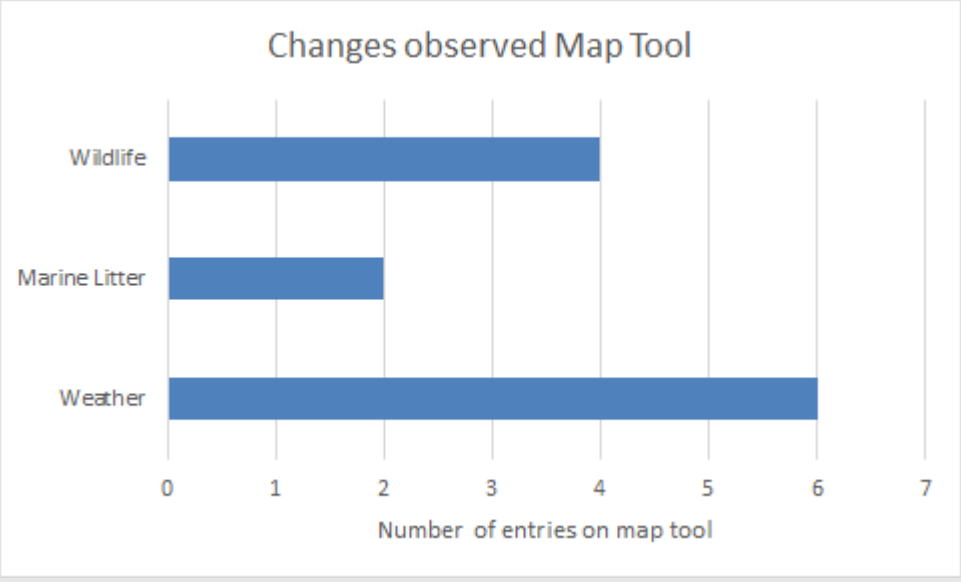
The map tool provided more detailed information about particular concerns and this was be passed on to the consultant to consider when advising on the **Actions.**

6. Community observed Changes

For the purpose of this project, we defined **Changes** as observations of changes in climate, weather, land or sea.

6.1 Map tool

Users add data to the map tool through an online survey. Users can select a location, then pick a category from Changes/Impacts/Actions. They can provide additional information about the issue they are logging. The graph below is based on the information logged under the **Changes** category.



The theme of "Wildlife" covers observations around changes in plants and animals. Not all comments were negative: a community member reported seeing trout in the stream at the north end of Broad Haven beach for the first time in many years. "Weather" was used to collate information covering increased frequency of bad weather. These comments mentioned flooding and damage to property. "Marine Litter" was reported twice, possibly because more litter is washed ashore or down the streams during bad weather.

6.2 Focus groups

As the first task in the focus group discussion, participants were presented with 21 cards with information related to **Changes** and were asked to consider the question "Which are the most important climate **Changes** in The Havens?" The cards were discussed, prioritised into groups and some deemed not important were discarded in this process. Cards were then either grouped into themes which are recorded below.

In the workshops participants identified three clear common themes related to the **Changes** they had observed locally related to climate change.

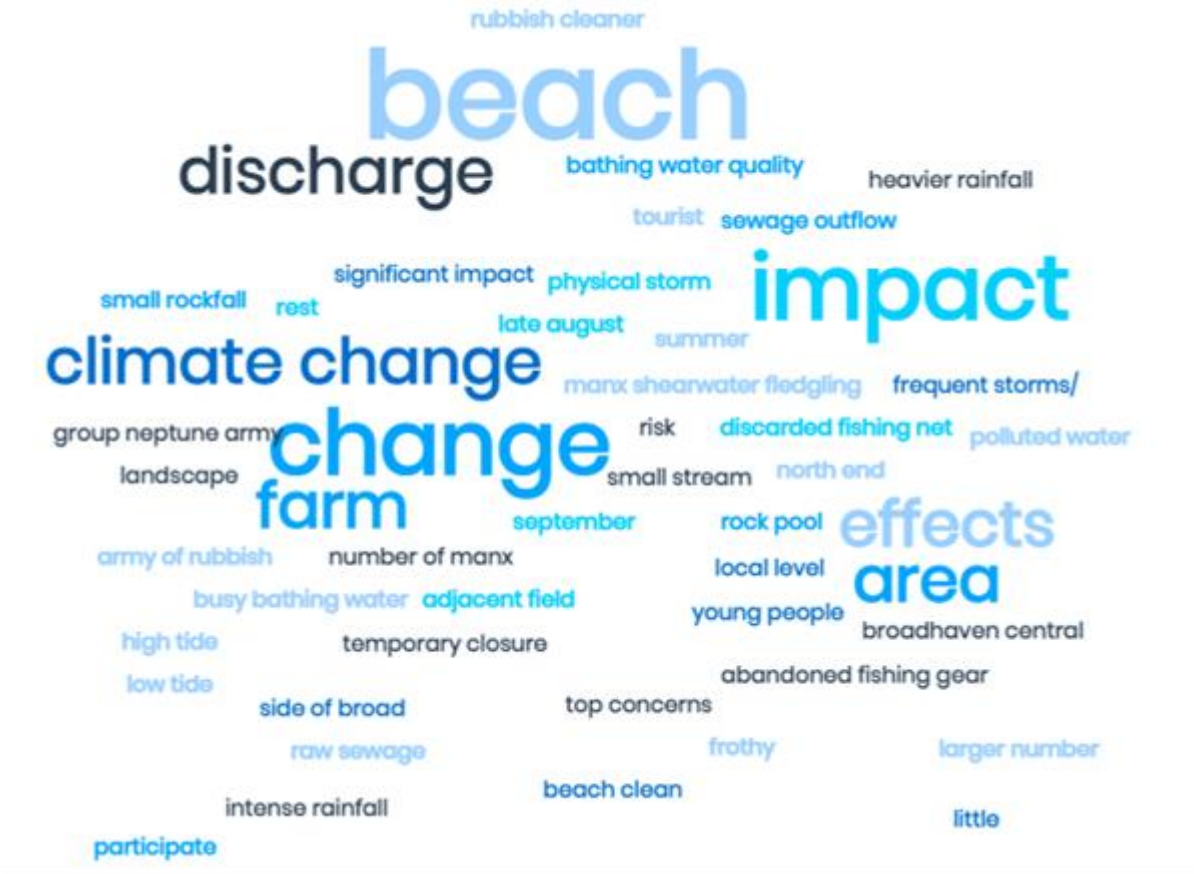
- “Storms” - extreme weather with the associated flooding and damage
- “Bad weather” - discussions around depressing grey weather, generally more rain and the occasional drought
- “Changes in wildlife” - including the timing of natural events such as flowering times and different species had been observed in the local area

7. Community observed Impacts

For the purpose of this project, we defined **Impacts** as impacts that are caused because of **Changes** in climate, weather, land or sea.

7.1 Map tool

The map tool was used by participants to provide further detailed information about **Impacts** within The Havens. Flooding and degradation of the natural environment and water quality, especially after heavy rainfall, were all reported using the tool.



The word cloud above represents the extended comments logged on the map tool. Larger text represents phrases that are repeated and provides a visual representation of the concerns of community members.

7.2 Focus groups

In the second part of the focus group, participants considered a set of cards describing the most important Impacts of climate change for The Havens. There are 18 cards for participants to discuss, select or discard. Again, the focus is on local **Impacts** within The Havens community, though participants did describe national and global **Impacts** too.

Three key themes emerged representing the most significant **Impacts** in the community:

- "Drainage and Pollution". Concerns here were related to the strain put on natural and planned drainage systems. This grouping included flooding, but also pollution being washed into the streams, soil erosion and litter ending up in water courses.
- "Damage". This theme covered damage to property both private and public from storms. Economy was also discussed here, as expected cost of repairs and insurance emerged but also the impact poor weather had on incomes from tourism.
- "Environment". This theme of concerns covered biodiversity and damage to the natural environment.

8. Community observed and proposed Actions

For the purpose of this project, we defined **Actions** as actions being taken or should be taken locally.

8.1 Map tool

Actions were collected in a similar survey on the mapping tool. There were **Actions** identified that were already being taken by the local community, which included:

- Beach cleans
- Plastic Free Broad Haven community group
- Support the Board Walk community group

The word cloud above represents the extended comments logged on the map tool. Larger text

represents phrases that are repeated and provides a visual representation of the **Actions** that the community provided information on.

8.2. Focus groups

In the last part of the focus group discussions, participants were asked to consider a range of **Actions** to tackle climate change. All these **Actions** were taken from the Welsh Government Climate Adaptation plan or Fingal County Council Climate Adaption Plan. Participants were asked to discuss and select **Actions** they thought should be happening in their community, and discard ones which were less relevant or not appropriate. They could also suggest **Actions** of their own.

Impacts cards selected	**Actions cards selected**	**Who is responsible for these Actions?**
Workshop 1		
Drainage Systems/Waste	Clean-ups, Plant trees*	Communities and Individuals
Renewable Energy	Community Renewable Energy/Insulate homes/	Welsh Government and Communities
None	Transport/Community Economy	Welsh Government
Health	Support vulnerable people	Communities
Biodiversity/Environment/ Farmers	Biodiversity/Farmers/ Observing the environment	Local Government
Workshop 2		
Biodiversity/Fisheries	Biodiversity	Local Government
Telecomms/Economy/ Environment/Transport/Roads, Paths &Tracks	Observing the environment/Community Forum/Support Vulnerable People/Emergency Procedures	Local Government, Communities and Individuals
Drainage Systems/Waste	Farmers/Fishers & Fisheries/Clean ups/Reduce Consumption & Waste/Recycling/Plant Trees	Businesses and Public Services & Utilities
Buildings	Insulated homes	None specified but policy issue
None linked specifically	Flood Protection	Welsh Government*
Workshop 3		
Waste/Environment/Farms	Water Use/Recycle/Reduce Consumption & Waste/ Clean Ups	Individuals and Communities
Buildings/Human Populations/Roads, Paths & Tracks/Economy	Insulated Homes/Flood Protection/Transport	Welsh Government, Local Government and Businesses
Biodiversity/Fisheries	Observing the Environment/Biodiversity	Individuals and Local Government
None specified	Emergency Procedures/Community Forum	Communities and Local Government
Renewable Energy	Community Renewable Energy/Community Economy/Farmers	Public Services and Utilities and Communities

*Table 1: A summary of the Impacts and Actions cards participants selected across the three workshops. *Participants in workshop 2 stated that Welsh and UK Governments are fundamentally responsible for funding all Actions and making sure these are effective.*

Priority themes for **Actions** put forward are:

1. **Preventing and minimising flooding risk**
2. **Maintaining and increasing biodiversity**
3. **Beach clean-ups**
4. **Plant trees**
5. **Adjusting farming practices**
6. **Observing and recording environmental change**
7. **Addressing community-led renewable energy potential**

There is an overlap between the **Actions** put forward as a priority and **Actions** being taken by existing community groups, so there is a sense coming from the community that many **Actions** already taking place should be continued.

Practical **Actions** such as tree planting are a great way of bringing people together from a wide range of backgrounds. Supporting practical community environmental activity is a stepping stone to establishing more ambitious projects to adapt to climate change.

9. Taking actions forward

Proposed Community Council **Actions** to follow-up this report:

- Find out if the concerns and proposed **Actions** raised in this report resonate with the wider community.
- Community Council to share concerns raised about water quality from the community and request an update from Natural Resources Wales and Welsh Water about how this is being tackled. Wider community to be updated on what **Action** is being taken.
- Community Council to maintain communication with environmental groups. This report, in particular the comments from the consultant provided in this section, will provide points for discussion.

An environmental consultant familiar with the area was engaged to give advice on how each of the proposed **Actions** could be taken forward. Consideration was given to the potential locations these **Actions** could take place. However, without the opportunity to discuss further with the community and land owners we have chosen not to map potential locations. Identifying potential locations and willingness of landowners to consider nature-based solutions is an important next step.

The consultant's advice on each **Action** suggested is outlined below. Links to sources of information, support and funding are included in the Appendix.

9.1 Action 1: Preventing and minimising flood risk

Coastal communities often face threats from fluvial (river) flooding as well as from coastal flooding and it is more likely to be possible to take meaningful local action to alleviate the effects of fluvial flooding. Climate change has led to increases in the frequency of intense rainfall events that cause significant run-off from built-up and agricultural areas, exceeding the capacity of natural

watercourses and artificial drainage systems. These extreme rainfall events are further exacerbated by actions such as the drainage of wetlands, changes to river channels and by increased run-off from agricultural land.

Natural flood management
Many flood issues can be addressed through “nature-based solutions”. Nature-based solutions is an approach that uses natural systems to provide critical services, such as wetlands for flood mitigation or “soft” (natural) defences to reduce the impact of waves, storm surges, and erosion. These solutions can also be used in conjunction with traditional “hard” infrastructure, forming "hybrid" solutions. A range of natural flood management (NFM) techniques are available to slow the flow of rainwater and provide habitats for wildlife. Works can include wetland creation, hedge and tree planting, leaky dam installation, soil and land management and fencing off odd, awkward areas of fields from grazing so that more vegetation can grow which helps to store and slow the flow of water across the land. Natural flood management schemes work best when a ‘whole catchment approach’ is taken, where a plan is developed to manage the flow of water along the whole length of a river catchment from its source to sea. The small scale and short length of the streams affecting the villages in The Havens makes catchment-scale projects manageable and achievable. The “Land Use Planning Tool” commissioned by the Pembrokeshire Nature Partnership and hosted by West Wales Biodiversity Information Centre (WWBIC) could be utilised (in conjunction with local knowledge) to help identify suitable locations for a variety of different intervention options in each catchment.

9.2 Action 2: Maintaining and increasing biodiversity

Protected areas
Although much of the area is within the Pembrokeshire Coast National Park, there are just two officially designated sites for nature conservation. These include The Afordir Niwgwl – Aber Bach / Newgale to Little Haven Coast SSSI and the West Wales Marine / Gorllewin Cymru Forol SAC. The creation of further “official” protected sites is unlikely and therefore, the community may need to consider how it might take steps to create its own “protected areas” for biodiversity through novel approaches. For example, it might be possible to develop a "community nature reserve" composed of many pieces of private land, but between which insects, birds and other wildlife can move and develop sustainable populations. Community Woodlands, Orchards and Forest Gardens can also be set up to provide multiple community benefits such as communal green spaces, food production and education opportunities alongside biodiversity gains.

Habitat creation
Before undertaking any habitat management, creation or similar project, it is critical to consider the following principles:

- Do no harm. Ensure that your management decisions are well informed and that you do not inadvertently change or destroy existing valuable habitats (e.g., by planting trees in areas of flower-rich grassland).
- Make use of existing expertise. There is a wealth of knowledge and experience that you can draw upon that will help and support you.
- Give preference to native species of local provenance. Using native plants, shrubs and trees will contribute to the maintenance of UK species that will be adapted to local soils and climates. They will also, generally, provide better habitat and food sources for our native animal species.
- Link habitats. As far as possible, link habitats by developing corridors to help some species move between them. For example, plant a hedge between two wooded areas or a flowery verge between two grassy areas.

Habitat creation projects can involve the creation or restoration of a wide range of habitats in a variety of situations. This can encompass everything from tree planting and hedgerow creation, restoring or creating flower-rich meadows or even creating artificial rockpools in man-made structures in the sea. Habitats can also be created for a specific species that might be locally important. Generally, the bigger the better but lots of small, linked habitats are also useful. For example, if it isn't possible to find a suitable site for a large-scale tree-planting project, it may be possible for many individuals to plant a tree or two in their gardens.

Invasive non-native species (INNS)
These are plants, animals, fungi and microorganisms which have been introduced to parts of the world where they would not naturally be found. They can spread causing damage to the environment, the economy, our health and the way we live. INNS are the second greatest threat to biodiversity after habitat loss and fragmentation. INNS have been estimated to cost the UK economy at least £1.8 billion pounds annually. In The Havens, INNS threaten the integrity of, for example, the wood at Borough Head where non-native rhododendron shades out the communities of extremely rare "Old Forest" lichens and is taking over parts of the wood. A project to map and control some of the INNS in The Havens community area would be beneficial.

Creating artificial rockpools
Coastal squeeze caused by sea-level rise threatens intertidal habitats. On coastlines protected by hard defences, there is a risk that natural rocky shore habitats will be lost. Engineering solutions can help mitigate the impact of sea-level rise by creating habitats that retain water on existing sea defence structures. Artificial rock pools ("Vertipools") can be fitted on seawalls and other structures. Studies have shown that, after five years, the artificial pools increased the species richness and attracted fish and crabs.

The "Land Use Planning Tool" commissioned by the Pembrokeshire Nature Partnership and hosted by West Wales Biodiversity Information Centre (WWBIC) could be used (in conjunction with local knowledge) to help identify suitable locations for a variety of different habitat creation, restoration or management interventions such as those outlined above. Contact WWBIC for a list of local experts and biodiversity groups that can provide advice. The Wildlife Trust of South and West Wales, the Pembrokeshire Nature Partnership, Natural Resources Wales and the Pembrokeshire Coast National Park Authority may also be able to provide advice. Any projects affecting the designated sites would need prior consultation with Natural Resources Wales.

9.3 Action 3: Marine litter and beach cleans

There are local **Actions** that can be taken or continued:

1. **Flood debris**

Flooding and storm discharges play a role in transporting waste into the seas and therefore, reducing the incidence of flooding through measures set out under section 9.1 "Flooding" has additional benefits with regard to littering.

2. **Beach cleans**

Ensuring a regular programme of beach cleans is maintained along with providing information and education on marine litter issues to visitors. Reinstating the #2minutebeachcleanstation boards which make it easier for beach goers to pick up marine litter every time they visit the beach would be beneficial. These boards are provided by The2Minute Foundation. The boards were introduced in the summer of 2018 being paid for by the County Council's community enhancement fund.

3. Plastic Free Havens
Maintain and build on the Plastic Free Broadhaven or similar groups in The Havens.

9.4 Action 4: Plant trees

When considering tree planting, the Woodland Trust is the most important organisation that can provide help, no matter what the scale of the planting project. The Woodland Trust provides free trees as well as a wide range of resources and advice to get communities and schools planting trees and creating woodlands and hedgerows. For Farmers and other Landowners, the Glastir Woodland Creation (GWC) scheme is another option. For GWC you will need to plant at least 0.25 hectares (0.62 acres), although within this, individual woodlands can be as small as 0.1 hectares (0.25 acres). GWC grants can be used to plant areas ranging from shelterbelts, woodland strips and field corners to substantial areas of woodland. Funding covers the trees, fencing and there is also a 12-year maintenance grant available. To capture significant carbon, tree planting schemes need to be of a reasonably large scale. However, even small-scale planting of patches of trees, shelterbelts and hedges can increase the infiltration rates of rainwater and decrease run-off, helping to reduce flood risks and can create opportunities for wildlife and people.

9.5 Action 5: Adjusting farming practices

Habitat management in the farmed landscape
There are many opportunities to change and improve management regimes on farmland for the benefit of wildlife without negatively impacting on-farm productivity or income. This can include all manner of things from Changes to hedgerow management to the creation of small arable plots and retention of stubbles for farmland birds. The Farming and Wildlife Advisory Group (FWAG Cymru) have, for more than five decades, provided trusted, independent environmental advice to the farming community that can help farmers make meaningful Changes to benefit biodiversity.

Herbal leys
A herbal ley is a complex mixture of grasses, legumes and herbs, which bring a range of benefits to livestock health and soil fertility. Just as vital is their ability to withstand drought and promote biodiversity across whole fields. Herbal Leys bring significant benefits not only to the soil health but also to the health of livestock and the wider environment and the diverse mix of species ensures a long growing season. The deep rooting species in the mixtures add drought resistance and mine the soil for important nutrients and minerals, making them available to the grazing livestock and lowering the need for bought-in concentrates. The high legume content of these leys reduces the need for expensive artificial nitrogen, since they fix their own N, feeding the other grasses and herbs in the mixture, and again helping to reduce costs.

No-till farming
No-till farming (also known as zero tillage or direct drilling) is an agricultural technique for growing crops or pasture without disturbing the soil through tillage. No-till farming increases soil fertility by building and retaining organic matter in soils and increases the amount and variety of life in and on the soil. Soils naturally store carbon and no-till farming minimizes soil disturbance, helping keep carbon locked up in the soil. No-till farming decreases the amount of soil erosion and compaction associated with traditional methods. It also increases the amount of water that infiltrates into the soil and slows evaporation rates all of which helps to reduce flooding.

Precision farming
Precision farming (PF) is all about the integration of modern technologies and targeted approaches. PF encompasses technology such as GPS guided tractors, variable rate applications for fertilizers, smart irrigation, yield monitoring, and aerial data mapping. This improves productivity and reduces

inputs over an entire farm system. Essentially PF is all about doing the right thing, in the right place and at the right time.

Agricultural pollution
Many farms in The Havens are corporately owned and must accept their responsibilities as local businesses. On 27 January 2021 the Minister for Environment, Energy and Rural Affairs announced the introduction of regulatory measures to address agricultural pollution in Wales, the Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021. These Regulations will apply from 1 April 2021 for an initial set of measures. The remaining measures will be phased in over a period of 3 years. The Regulations focus on those farms where the environmental risk from poor manure management is greatest. They are based on current good practice recommendations, so some farmers will see minimal impact, particularly those already following good practice and those not producing slurry, such as sheep farmers, whilst others will need time and support to become compliant.

In summary, the regulations include the following requirements:
- Nutrient management planning
- Sustainable fertiliser applications linked to the requirement of the crop (see precision farming above)
- Protection of water from pollution-related to when, where and how fertilisers are spread
- Manure and silage storage standards.

Compliance with these regulations will be key to avoiding agricultural pollution incidents. The adoption of some of the climate-resilient farming methods outlines above will also help reduce background “diffuse” pollution.

The “Land Use Planning Tool” commissioned by the Pembrokeshire Nature Partnership and hosted by West Wales Biodiversity Information Centre (WWBIC) could be used (in conjunction with local knowledge) to help identify suitable locations for a variety of different “climate-friendly farming” interventions such as those outlined above. These could help address issues relating to climate change such as flooding, soil erosion and biodiversity loss.

9.6 Action 6: Observing and recording environmental change

Biodiversity recording
West Wales Biodiversity Information Centre is one of four Local Records Centres which together serve as a biodiversity data storage and management facility for the whole of Wales. WWBIC is a not-for-profit service run in partnership for the public benefit, which collects, collates, manages and disseminates information of known quality relating to the wildlife, wildlife sites and habitats for West Wales. WWBIC has a recording app for Smartphones that allows rapid data entry and transfer. The records collected by WWBIC are used for many purposes, not least to ensure that biodiversity interests are considered in planning applications. The recording app is available on Google Play and at https://www.wwbic.org.uk/wildlife-recording/lerc-wales-app/

Landscape change
Help record landscape **Changes** which can often be related to climatic **Changes** by taking a photo from one of the PCNPA fixed-point photography posts and emailing it to: photos@pembrokeshirecoast.org.uk. PCNPA will add it to all the other shared images and create a time-lapse film to show the Changes. As well as contributing to “official” monitoring projects, with the use of simple technology (such as GPS apps on mobile phones) it would be possible to establish a network of fixed-point photo locations in parts of The Havens that are particularly sensitive to

climate induced **Changes**. A record of such **Changes** can be useful in understanding how best to manage and mitigate them.

Citizen science
In order to accumulate the largest datasets possible, many groups and organisations need members of the public to submit sightings. These large datasets provide results that can then be analysed for emerging trends. Taking part in any of these surveys will give useful experience and also help to extend scientific knowledge. Very comprehensive lists of these citizen science projects are available online (see links below). There some long-running projects such as the British Trust for Ornithology's Garden BirdWatch and The Woodland Trust's Nature's Calendar, which tracks the seasons. Others cover a specific time period – like the Big Butterfly Count in July and August or the Garden BioBlitz which is for 24 hours in June. The Natural History Museum have a range of their own citizen science projects for you to take part in but also provide downloadable resources to enable individuals and groups to set up their own citizen science projects that could be adapted to investigate locally important issues. The museum also provides great resources for species identification at https://www.nhm.ac.uk/take-part/identify-nature.html

9.7 Action 7: Addressing community-led renewable energy potential

Charging for Electric Vehicles (EV)
Little Haven properties have limited off road parking. The benefit to residents of having charging points for electric vehicles in the PCNPA carpark in Little Haven was suggested by a participant. PCC/PCNPA are progressing plans to do this and will consult with the Community Council.

Energy efficiency (insulation)
Coastal properties and older solid wall properties require particular care when insulation is upgraded. Careful design is needed prevent moisture damage to buildings. Some common interventions such as cavity wall insulation may not be possible or appropriate. The Energy Saving Trust can assist with advice: www.est.org.uk.

Community energy
Several participants were keen on the idea of community owned renewable energy, the Welsh Government Energy Service provides advice and feasibility studies on a range of technology and ownership models. Ben Ferguson is the local point of contact: Ben.Ferguson@energyservice.wales

Appendix

Action 1: Preventing and minimising flooding risk

Sources of information and advice:

1. The Pontbren Project is an innovative approach to using woodland management and strategically located belts of trees are to reduce the amount of water running off improved upland grasslands in mid-Wales. https://climate-adapt.eea.europa.eu/metadata/publications/the-pontbren-project-a-farmer-led-approach-to-sustainable-land-management-in-the-uplands
2. A film exploring the principles and methods of natural flood management in small streams and their catchments Stroud RSuDS Technical film - Principles and methods of natural flood management in small streams and their catchments | Stroud District Council
3. The evidence-base for working with natural processes to reduce flood risk https://www.gov.uk/government/publications/working-with-natural-processes-to-reduce-flood-risk
4. West Wales Biodiversity Information Centre https://www.wwbic.org.uk/
5. Pembrokeshire Nature Partnership - Pembrokeshire County Council https://www.pembrokeshire.gov.uk/biodiversity
6. Wildlife Trust of South and West Wales https://www.welshwildlife.org/
7. Commenting on planning applications https://www.pembrokeshire.gov.uk/planning-applications/commenting-on-applications

Action 2: Maintaining and increasing biodiversity

Sources of information and advice:

1. A Community Nature Reserve that encourages gardeners and allotment owners to allocate at least three-square yards of their land for wildlife http://littlegreenspace.org.uk/features/Felixstowe-nature-reserve.html
2. Enhance biodiversity with artificial "rockpools" on man-made structures in the sea https://www.artecology.space/vertipools and Eco-sensitive Design (ecostructureproject.eu)
3. West Wales Biodiversity Information Centre https://www.wwbic.org.uk/
4. Pembrokeshire Nature Partnership - Pembrokeshire County Council https://www.pembrokeshire.gov.uk/biodiversity
5. Invasive non-native species (INNS) in Pembrokeshire https://www.pembrokeshirecoast.wales/conservation/invasive-non-native-species/#:~:text=INNS%20in%20the%20Pembrokeshire%20Coast,three%20in%20the%20Gwaun%20Valley and a catchment based approach to INNS control https://www.pembrokeshirecoast.wales/conservation/invasive-non-native-species/stitch-in-time/
6. Wildlife Trust of South and West Wales https://www.welshwildlife.org/
7. FWAH Cymru FWAG Cymru - Home | Facebook

Action 3: Marine litter and beach cleans

Sources of information and advice:

1. #2MinuteBeachClean boards. https://beachclean.net/boards and Individuals or businesses wishing to learn more about hosting a board can do so by calling Pembrokeshire County Council on 01437 764551. https://www.pembrokeshire.gov.uk/newsroom/more-boards-for-beaches
2. Organise a beach clean https://www.sas.org.uk/our-work/beach-cleans/organise-beach-clean/

3. Mini Beach Clean https://www.sas.org.uk/our-work/beach-cleans/mini-beach-cleans/
4. Beaches and Littering fines https://www.sunderlandecho.com/news/crime/extra-police-patrols-sunderland-beaches-and-litter-fines-ps2500-new-crackdown-2872554
5. Marine Litter art and education - skeleton vomiting washed-up plastic "shocked and amazed" people on Aberystwyth's seafront https://www.bbc.co.uk/news/uk-wales-48193779 and 32ft recovered-plastic whale https://www.bbc.co.uk/news/uk-wales-south-east-wales-40975997

Action 4: Plant trees

Sources of information and advice:
1. Setting up a community Orchard in Wales https://www.theorchardproject.org.uk/what-we-do/
2. Setting up a community Forest Garden in Wales https://naturewise.org.uk/about/
3. Create a community wood https://www.woodlandtrust.org.uk/plant-trees/community-woods/
4. Free trees for communities https://www.woodlandtrust.org.uk/plant-trees/schools-and-communities/
5. Trees, grants and funding for large scale planting schemes https://www.woodlandtrust.org.uk/plant-trees/large-scale-planting/
6. Forest Schools https://www.forestschoolwales.org.uk/

Action 5: Adjusting farming practices

Sources of information and advice:
1. Agriculture (Wales) White Paper https://gov.wales/written-statement-publication-agriculture-wales-white-paper
2. The Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021 (https://gov.wales/sites/default/files/publications/2021-01/the-water-resources-control-of-agricultural-pollution-wales-regulations-2021.pdf).
3. Herbal leys https://farmwildlife.info/2017/08/01/case-study-herb-rich-leys/ and https://www.cotswoldseeds.com/knowledgehub-search.asp?articletypeid=1
4. No-till farming. A central hub for farmers currently undertaking or interested in changing to no tillage farming l http://www.no-till.uk/index.html and general no-till information http://www.cpm-magazine.co.uk/2018/02/27/no-till-farming-public-good-no-till-farming/
5. Precision Farming and climate change https://businesswales.gov.wales/farmingconnect/news-and-events/technical-articles/can-precision-farming-help-mitigate-climate-change

Action 6: Observing and recording environmental change

Sources of information and advice:
1. West Wales Biodiversity Information Centre https://www.wwbic.org.uk/
2. Pembrokeshire Coast National Park Changing Coasts project https://www.pembrokeshirecoast.wales/get-involved/changing-coasts/
3. Comprehensive lists of citizen science projects https://www.countryside-jobs.com/volunteers/citizen-science and https://www.imperial.ac.uk/opal/.

Action 7: Addressing community led renewable energy potential

Sources of information and advice:
1. The NEST grant scheme https://nest.gov.wales/en/
2. The Energy Saving Trust https://energysavingtrust.org.uk/
3. The Society for Protection of Ancient buildings https://www.spab.org.uk/advice

4. Welsh Government Energy Advice Service https://gov.wales/energy-service-public-sector-and-community-groups

References

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