National Trust approach to Climate Change planning and action

Climate Action: our urgent race

RACE – reduce, adapt, capture, and engage

We will **reduce** our carbon emissions from all of our activities, to be carbon net zero by 2030

We will take account of the need to be resilient and **adaptable** to a changing climate in every choice we make .

We will **capture** more carbon from our land, to be carbon net zero by 2030

We will **engage** others – telling our story widely to inspire action from supporters and policymakers

Climate Action: how we are set up

Harry Bowell
Director of Land & Nature

Climate and Environment Advisors

Chris Mitchell, Programme Manager
Katie Winney
Programme Co-Ordinator (tbc)

Programme contacts

Patrick Begg, Programme Sponsor
Lizzy Carlyle, Technical Lead
Colette Dorward
Nigel Stevens
And workstream sponsors *see below

Climate Action Programme Board

The board oversees the mechanism by which progress against our climate objectives are measured and reported to the Exec Team, and monitors and reports on risks to success. It supports the Trust in delivering our objectives, understanding climate change impacts across our places and the choices we will have to make.

Paul Forecast, Sponsor*
Zach Lewis, Technical Lead

Decarbonising our business

We will **Reduce** carbon emissions across our business, using science-based methodologies informed by best practice standards, and approaches from trusted climate authorities

Ingrid Samuel, Sponsor*
Keith Jones, Technical Lead

Adapting to climate change

We'll **Adapt** by developing frameworks and action plans to help our natural and cultural assets and elements of our business/operations become more resilient to climate shocks

Rosie Hails, Sponsor*
Matt Heard, Technical Lead

Managing our land for carbon

We will protect, renovate and create habitats that support nature, **Capture** and store carbon, and are adaptable to future environmental change

Mark Funnell, Sponsor*
Katie Ramsay, Technical Lead
Emma Pearson, Integration Lead

Engaging our people, supporters, etc

We'll **Engage** our people, volunteers, members and the public in the work we're doing and share our stories in an accessible way to create maximum impact. We'll work with partners, as a collaborator and expert advisor; and advocate for better policies

Huw Davies, Sponsor*
Ali Mitchell, Technical Lead

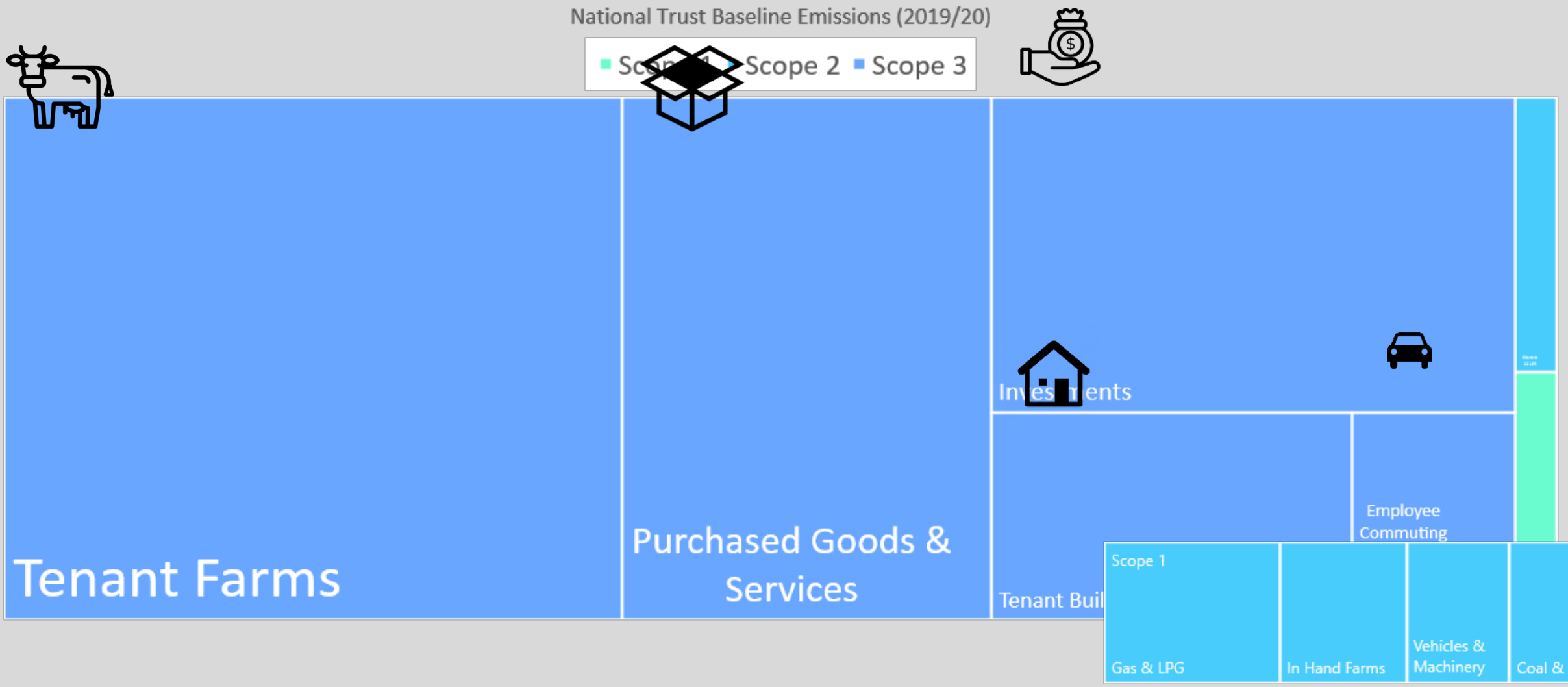
Data and Insight

We support the programme and four key work areas by providing data and insight to support decision making and capture the IT elements of the programme.

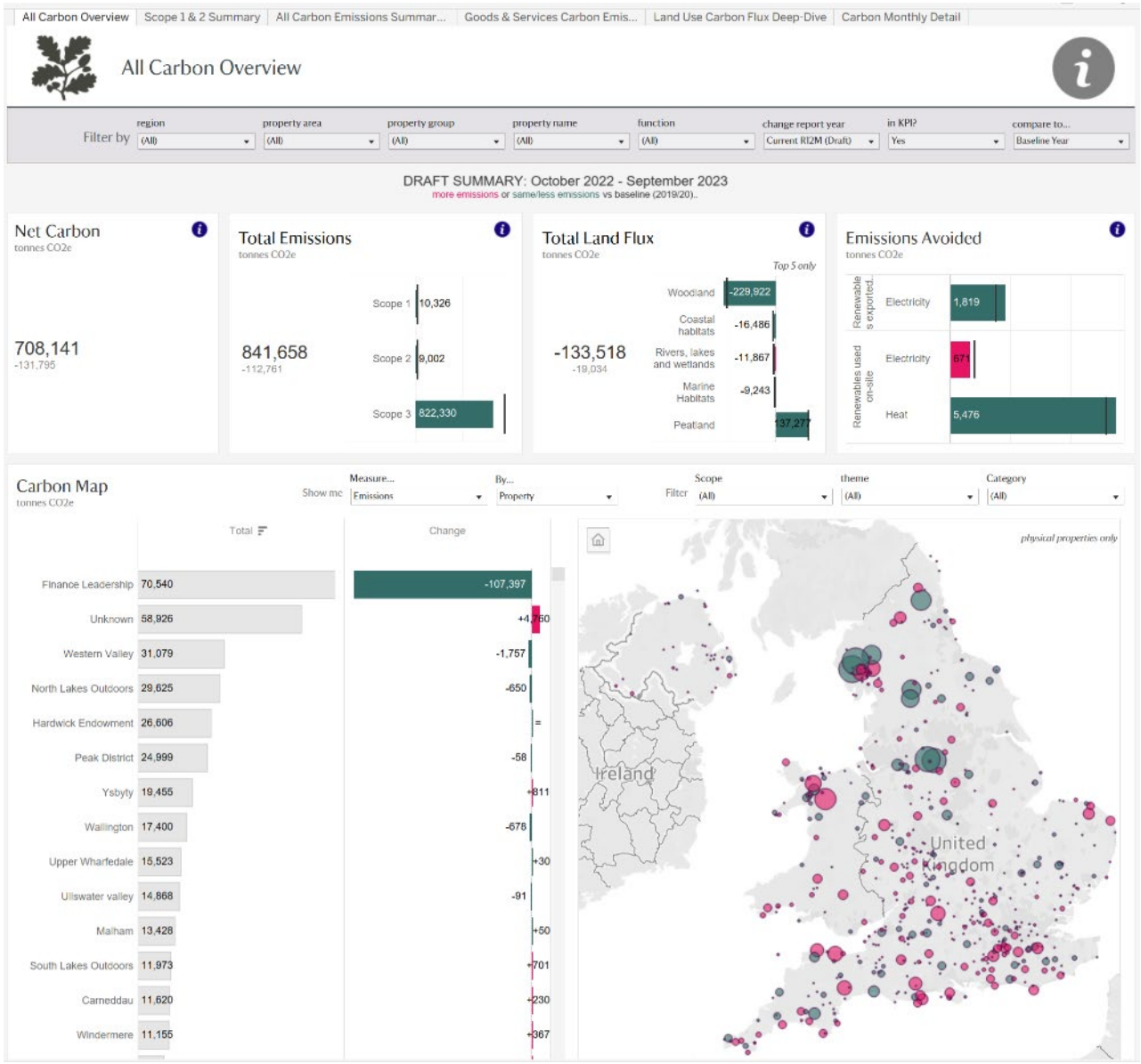
Anita Weatherby & Charlotte Croft

Research opportunities

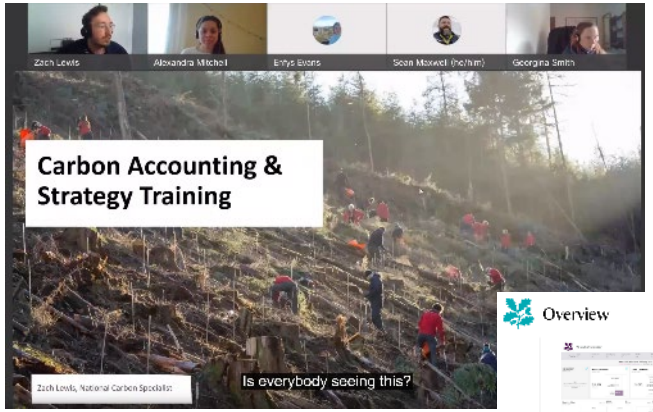
Our starting point: Carbon Baseline



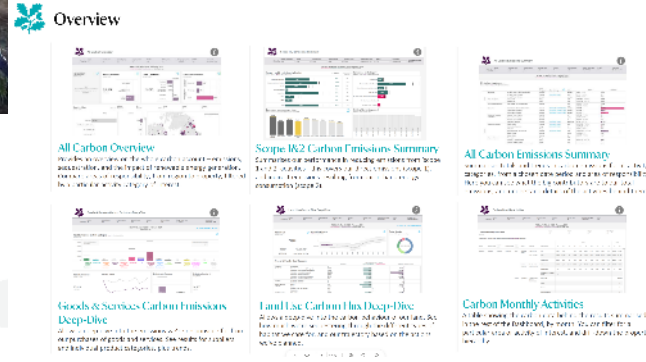
The Carbon Dashboard



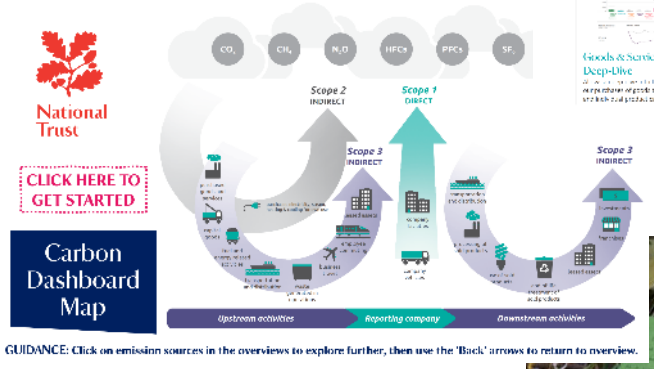
User Training Videos



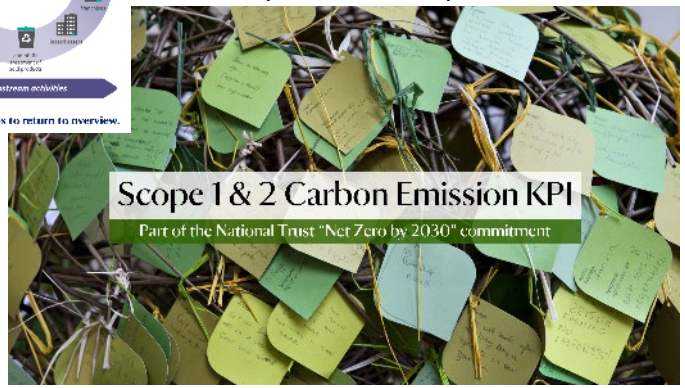
User Guides



Methodology Summary Map

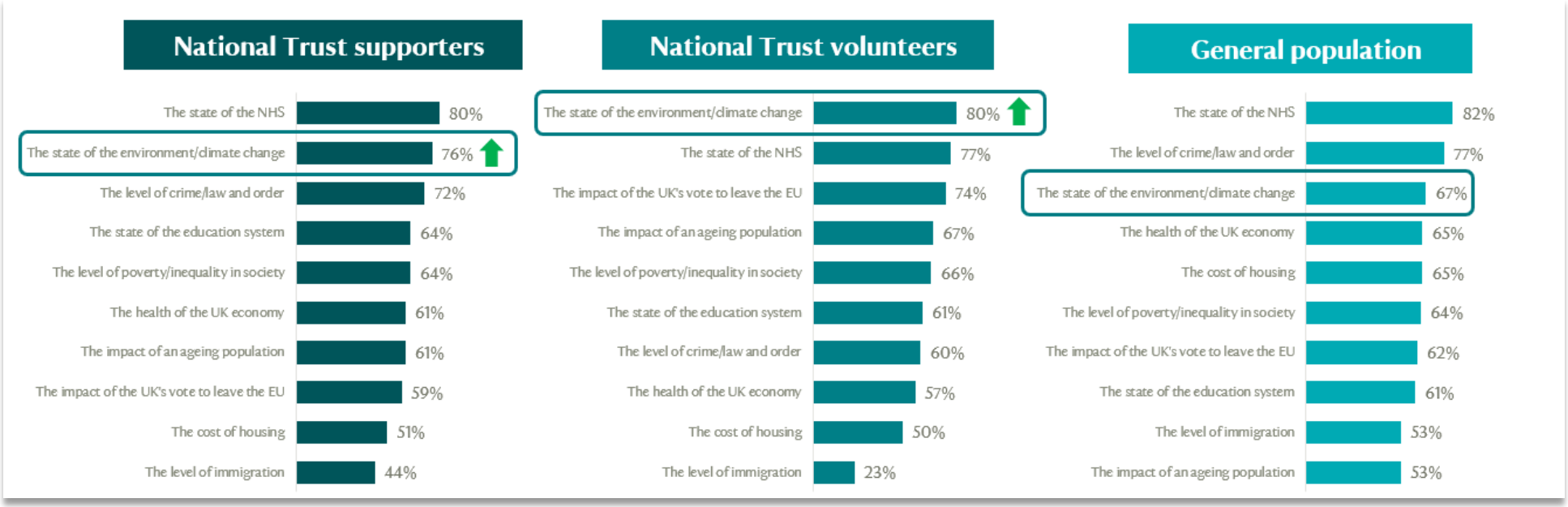


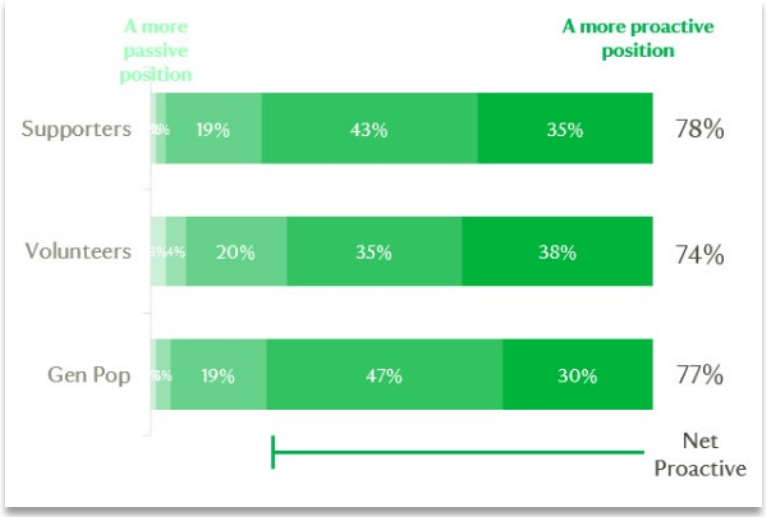
Scope 1&2 KPI Explainer

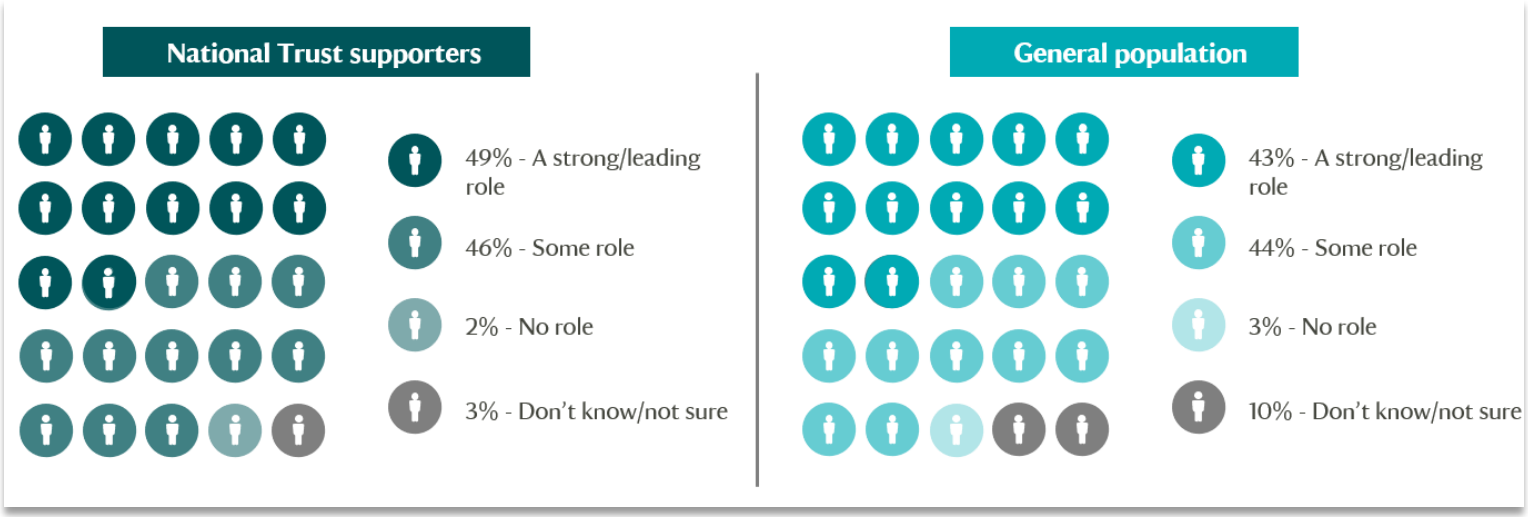


Climate Action: engagement

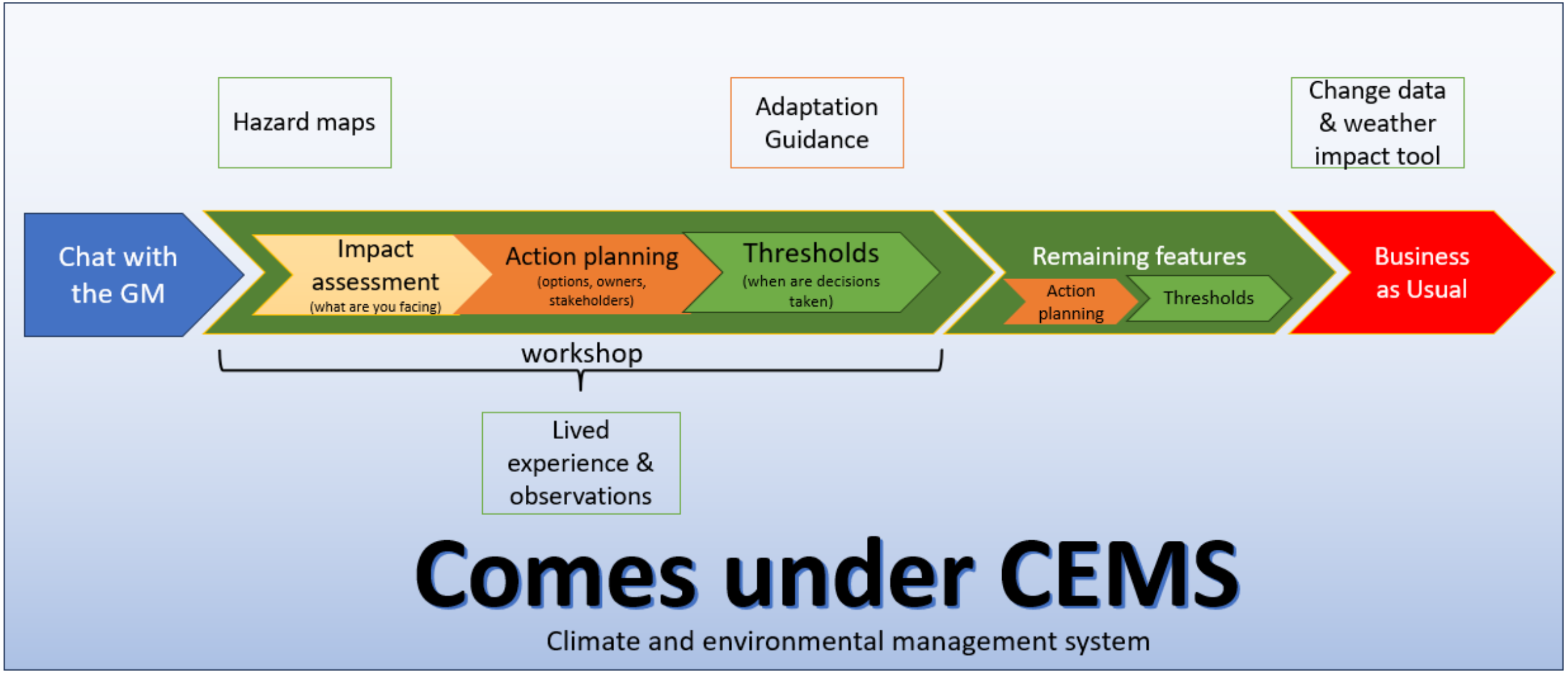
- Supporters and volunteers are more concerned than the public
- They want us to be more proactive and play a more leading tole







National Trust climate adaptation handrail components



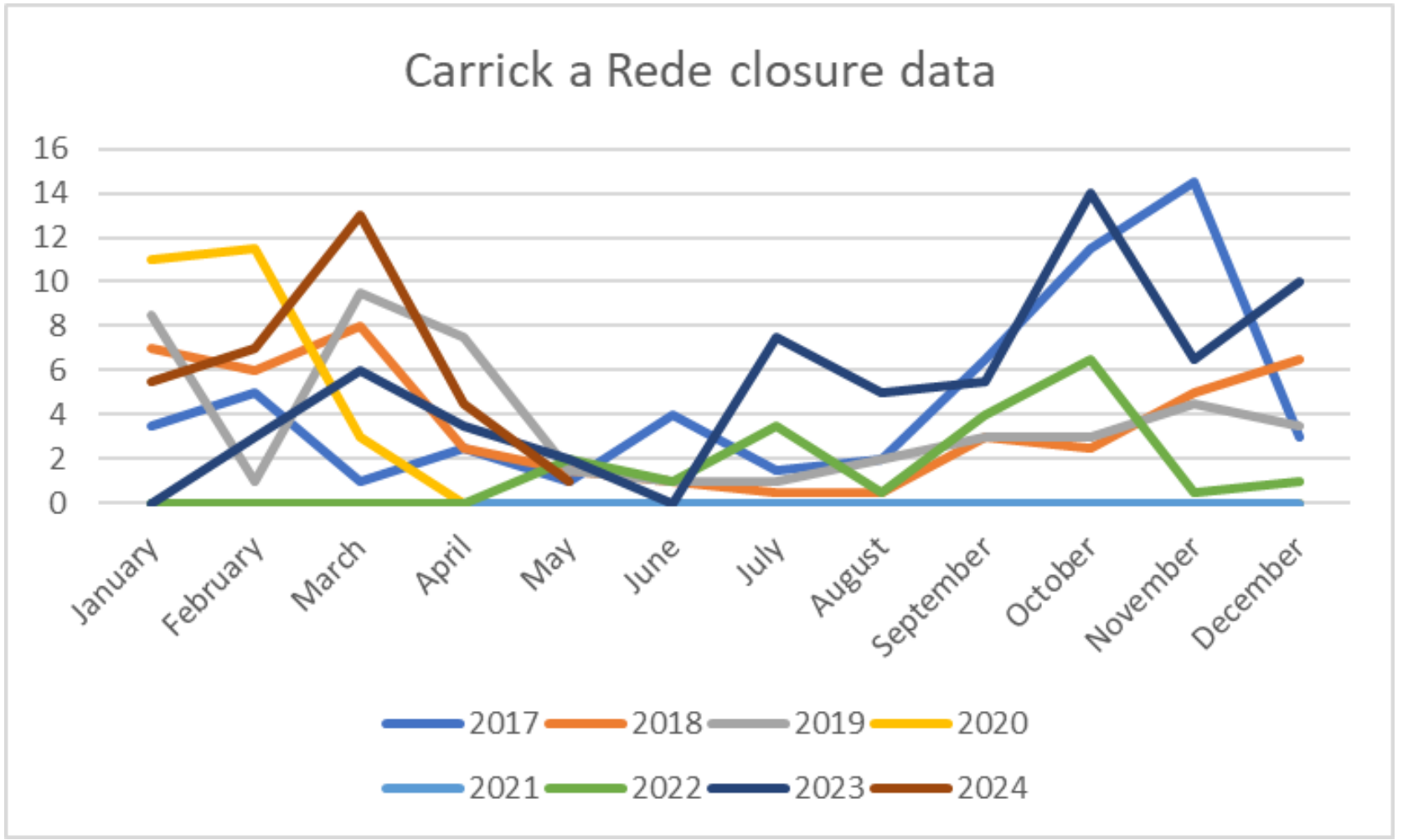
Supporting the professionals

Rosie Fyles, Ham House

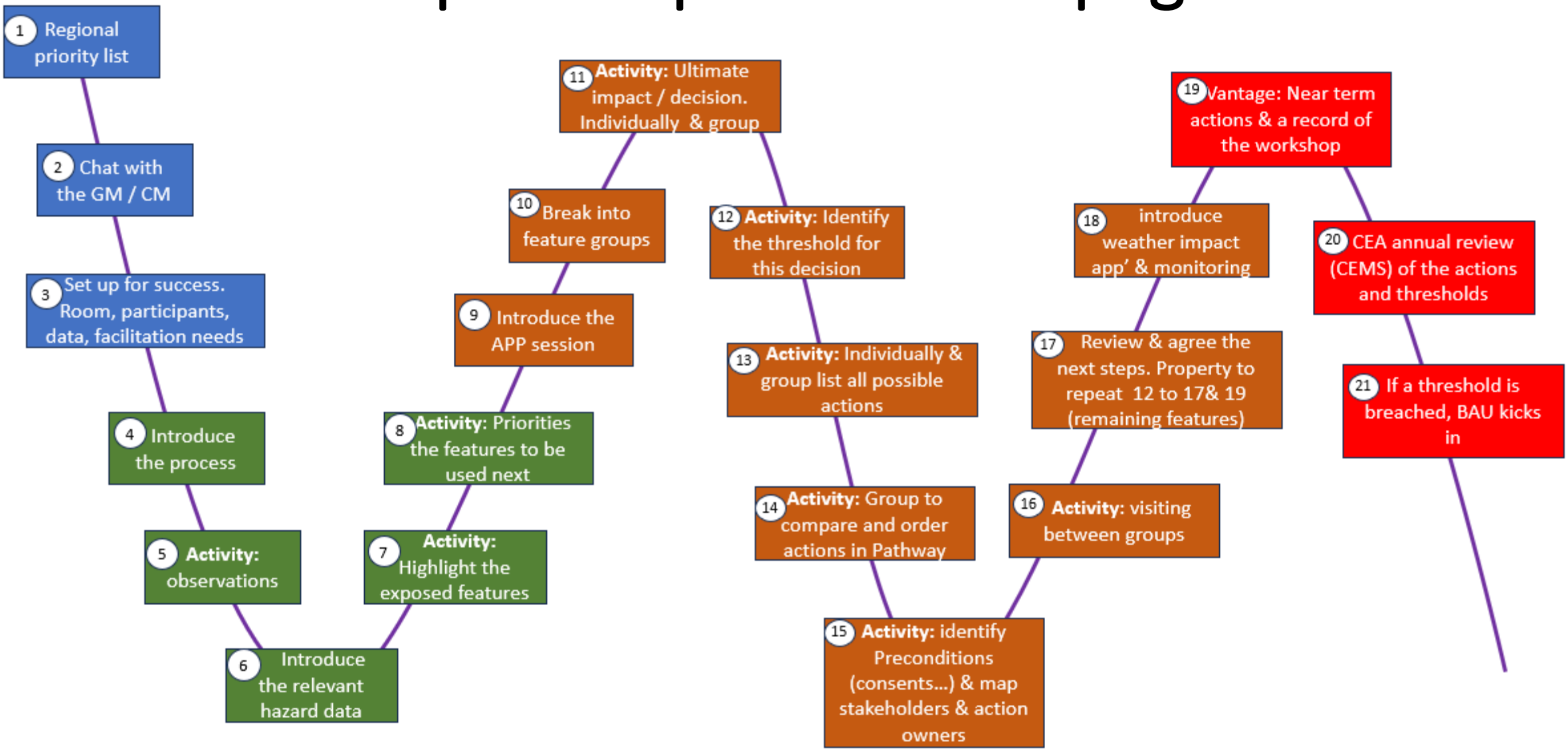
Acceptable and unacceptable futures.
Providing a structure for climate informed decision making

“I want to know where the red line is? When do I adapt and who has my back” Rosie Fyles

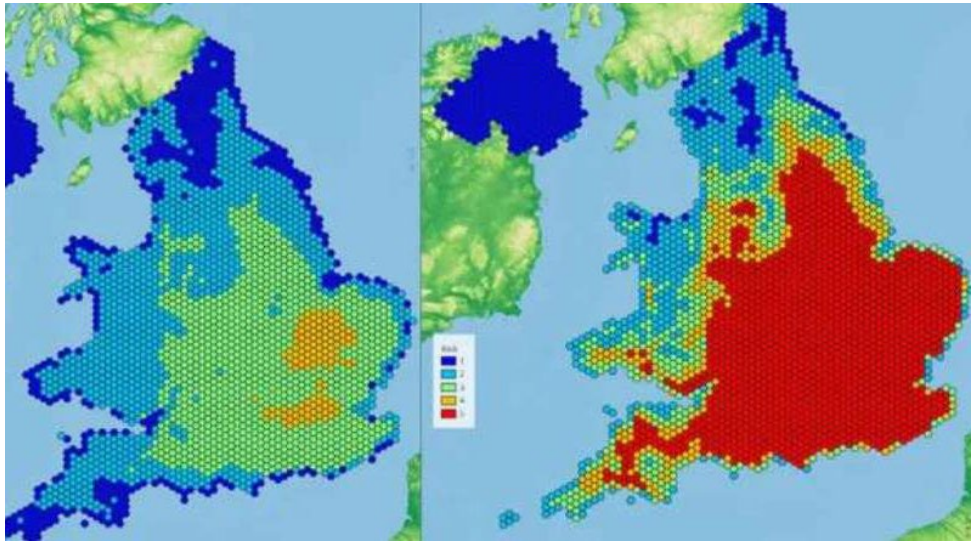
How do we manage?



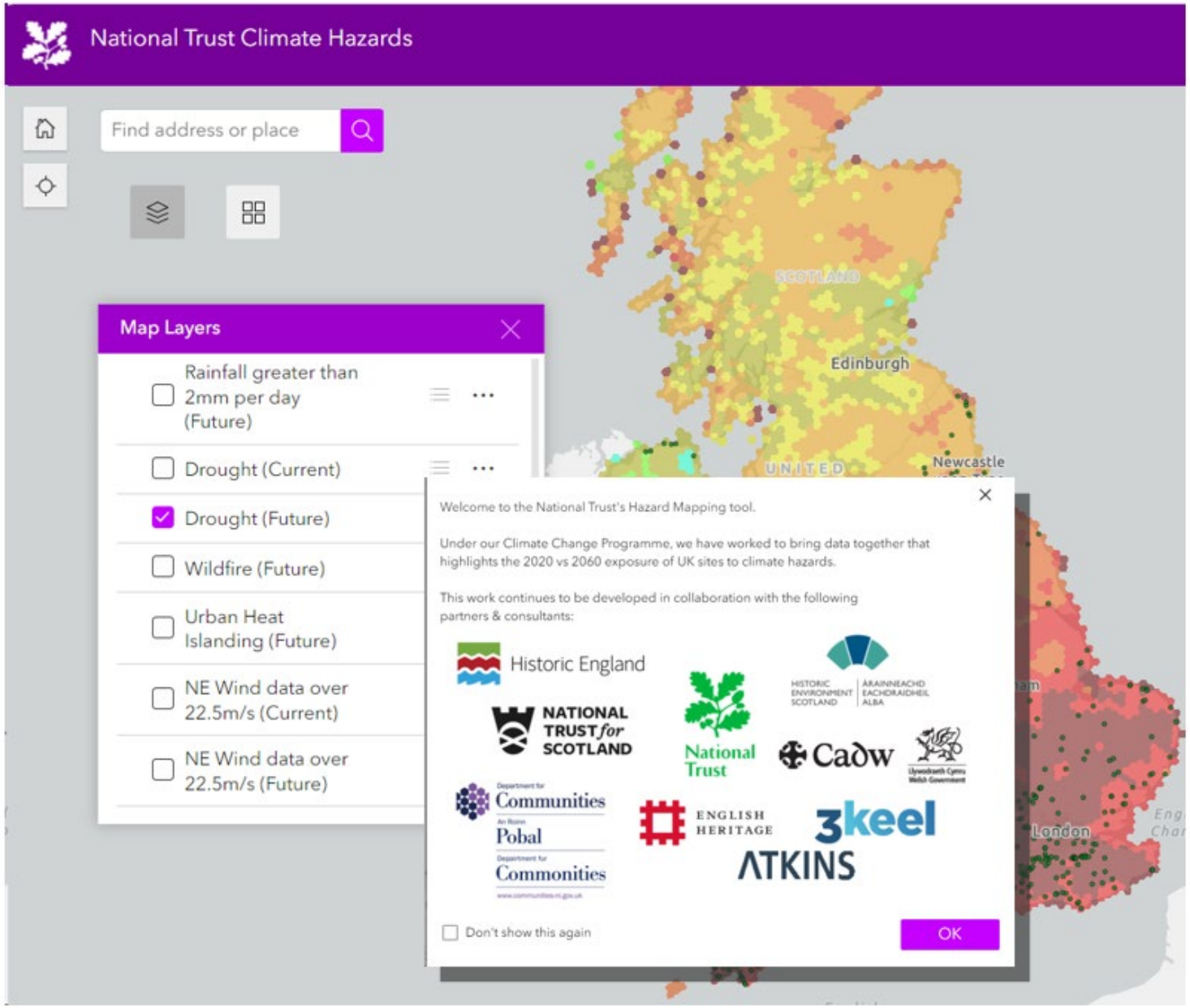
The adaptation process on a page



Climate Hazard Maps and resources

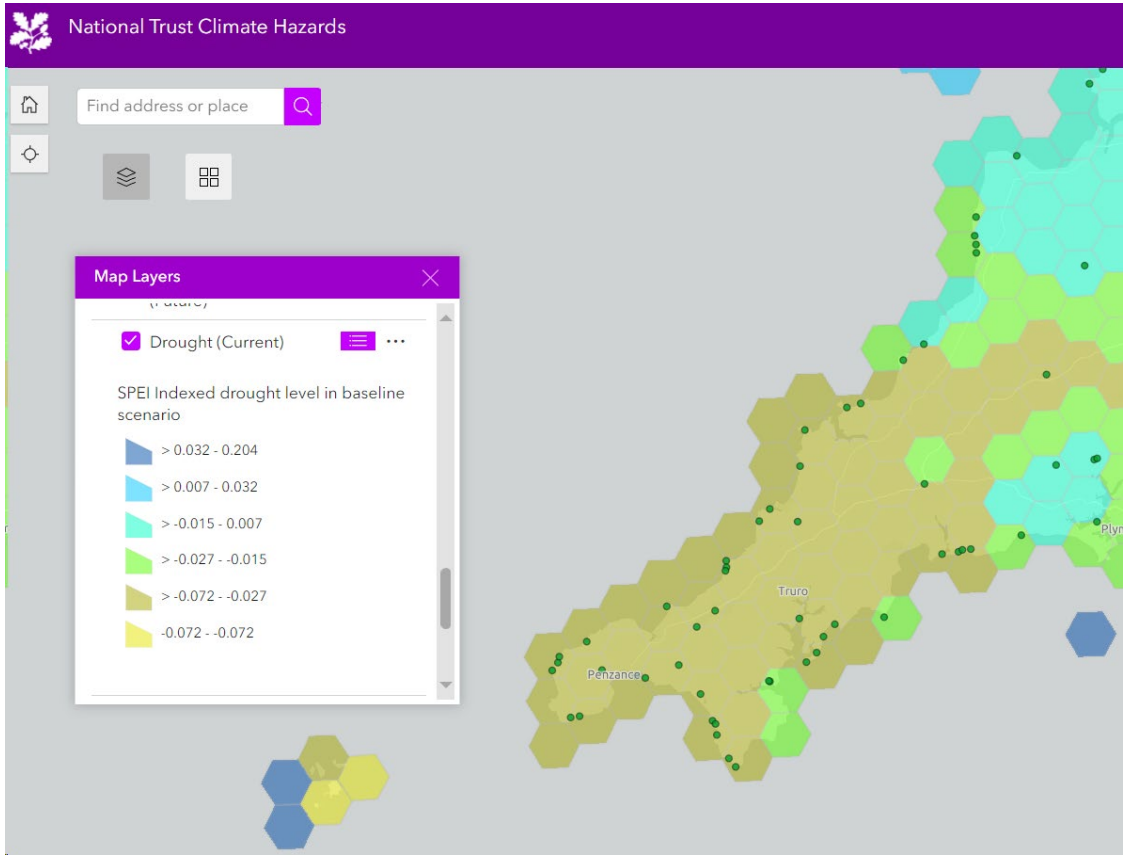


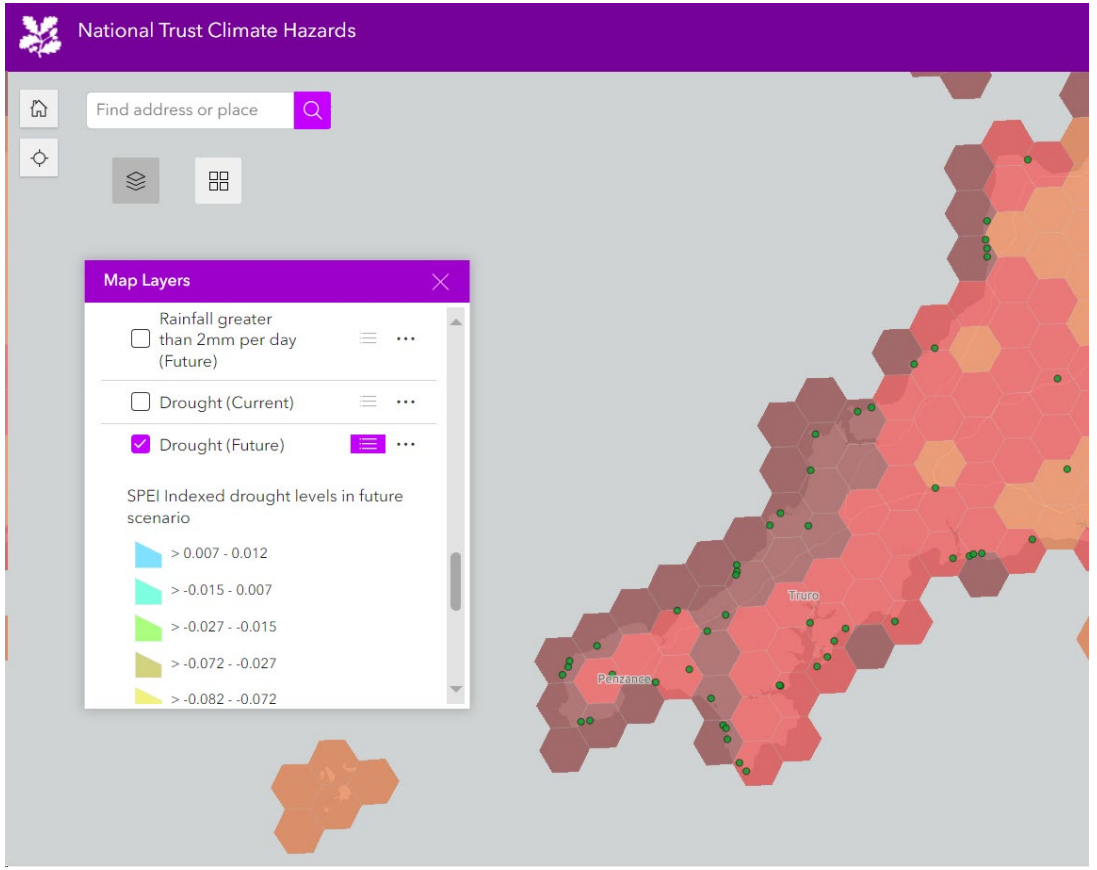
[Climate Hazards 23 (arcgis.com)]



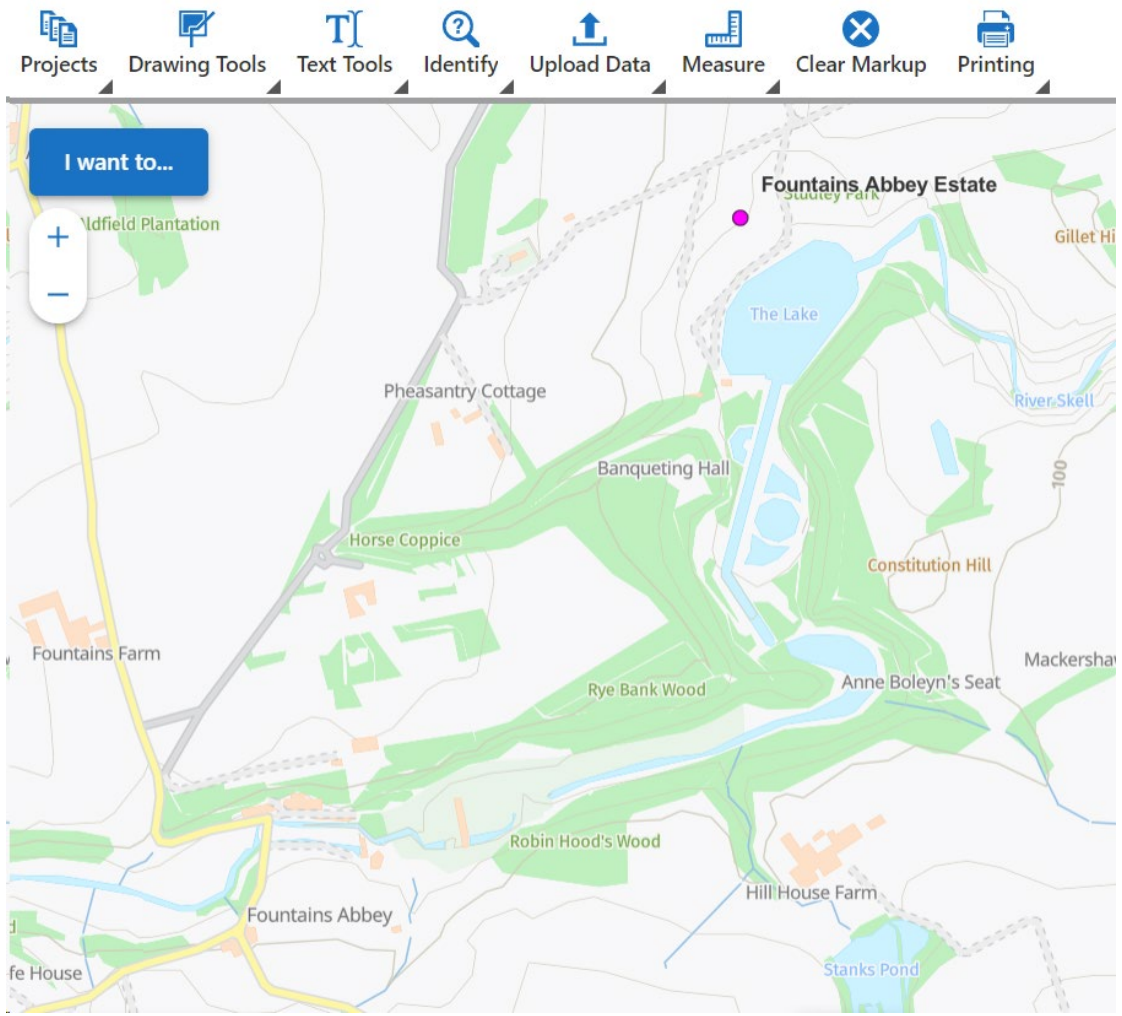
It’s going to get dryer and wetter. Paradox?

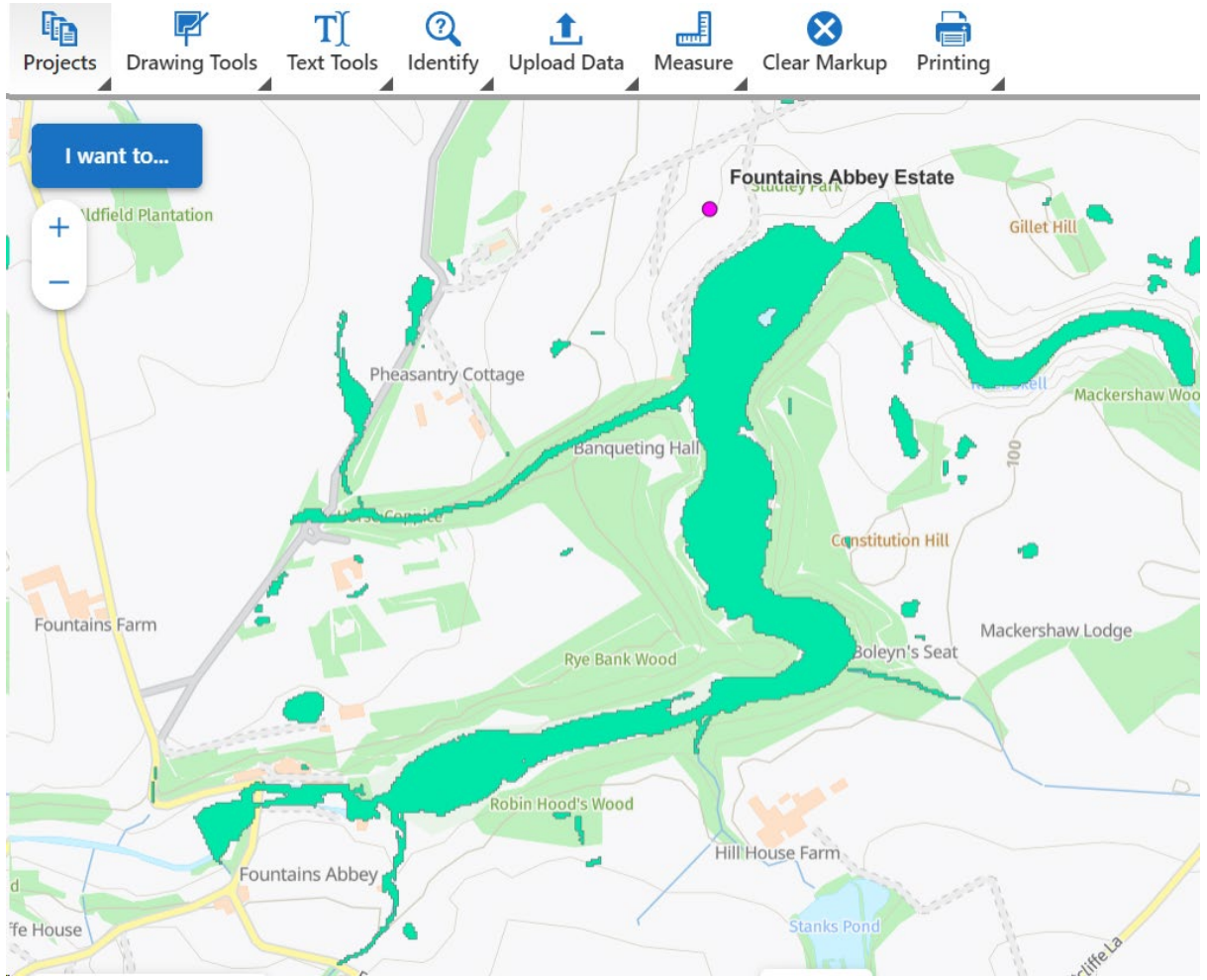
Drought 2020 vs 2060 using the Centre for Ecology and Hydrology data (SPEI)



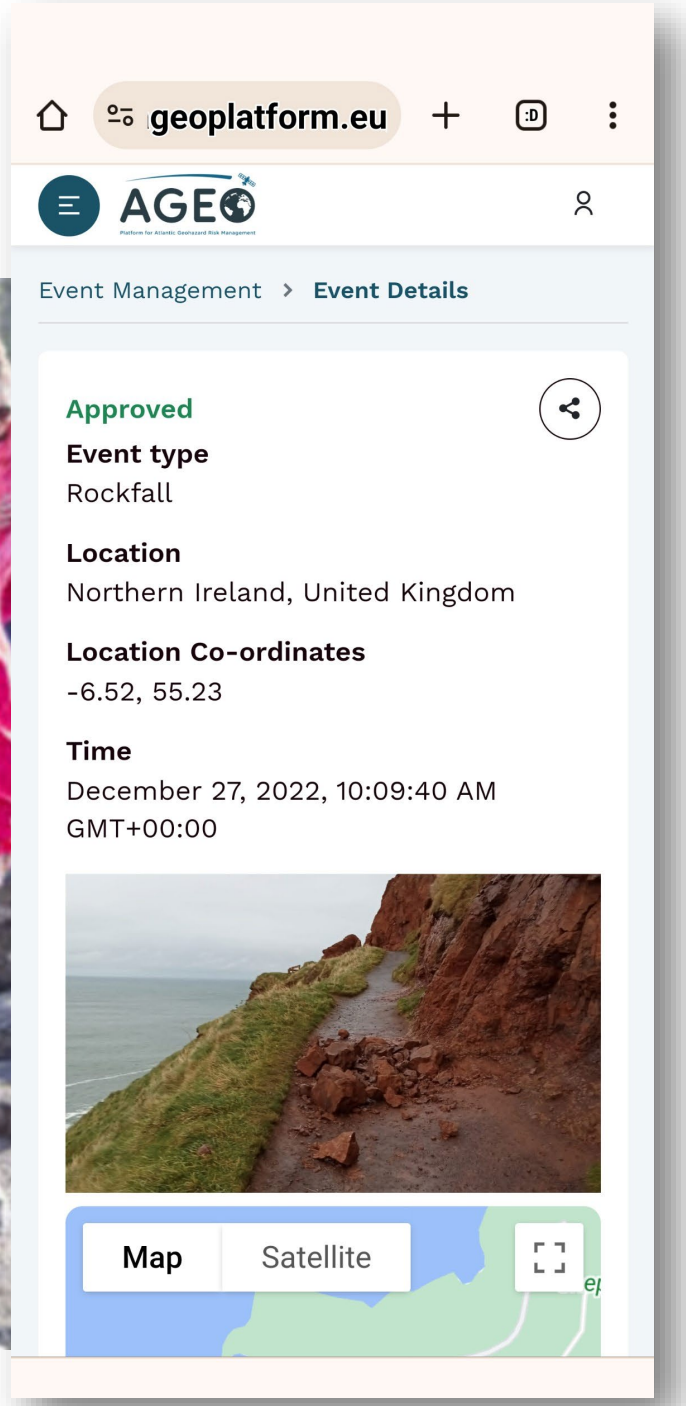


Modelling / probability. Fountains estate.

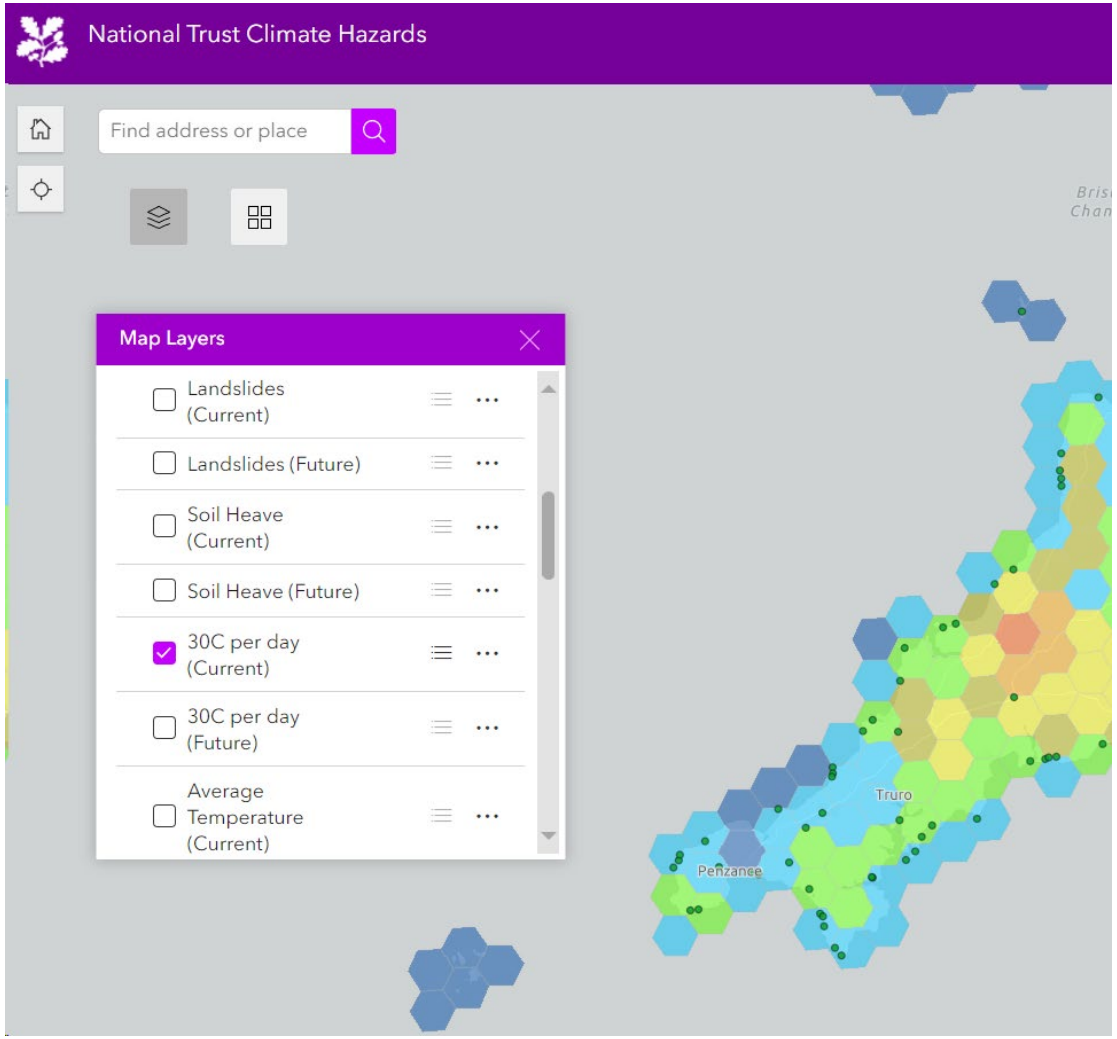


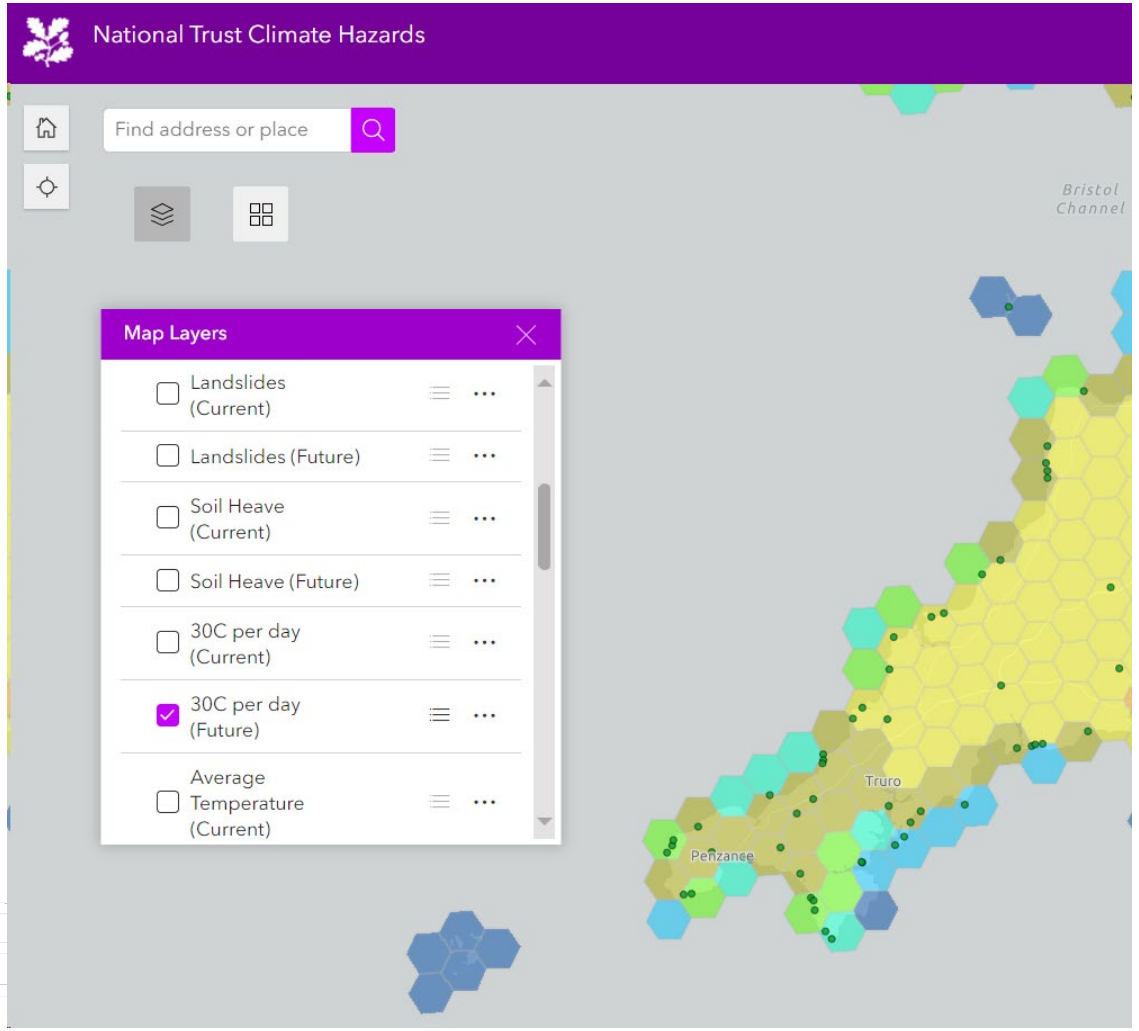


Observations and data

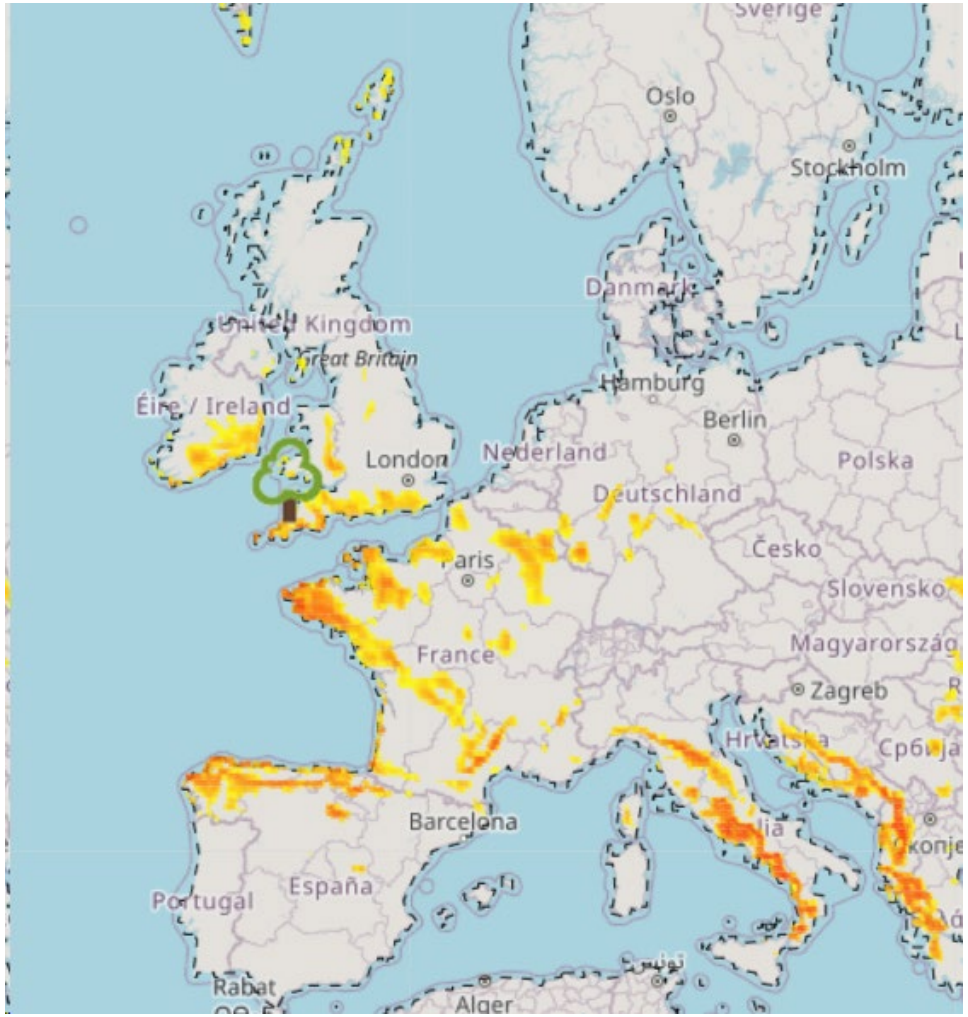


Number of days above >30c





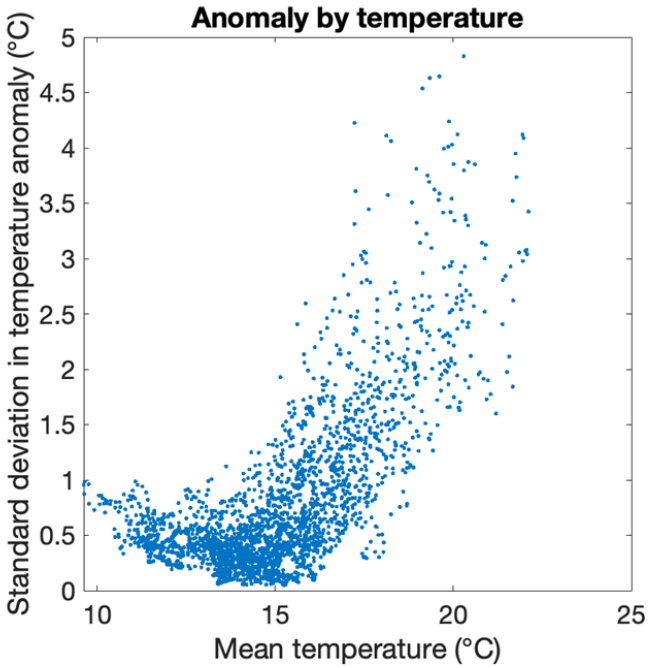
Future Climate

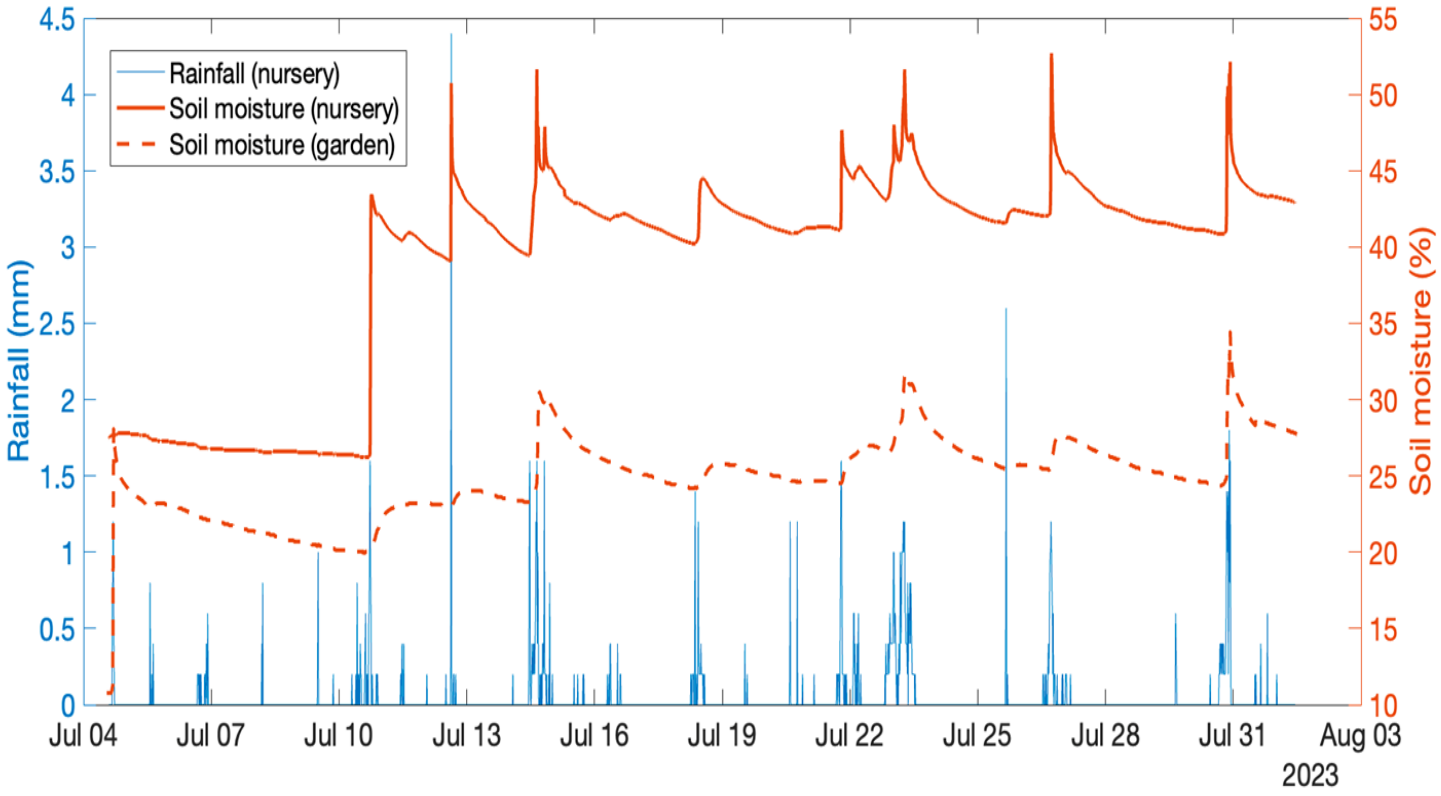


In 2060 you will experience rainfall patterns like Italy and the Adriatic coast has today. But they don't have the same soils, aspect, exposure…

[Climate Matching Tool]

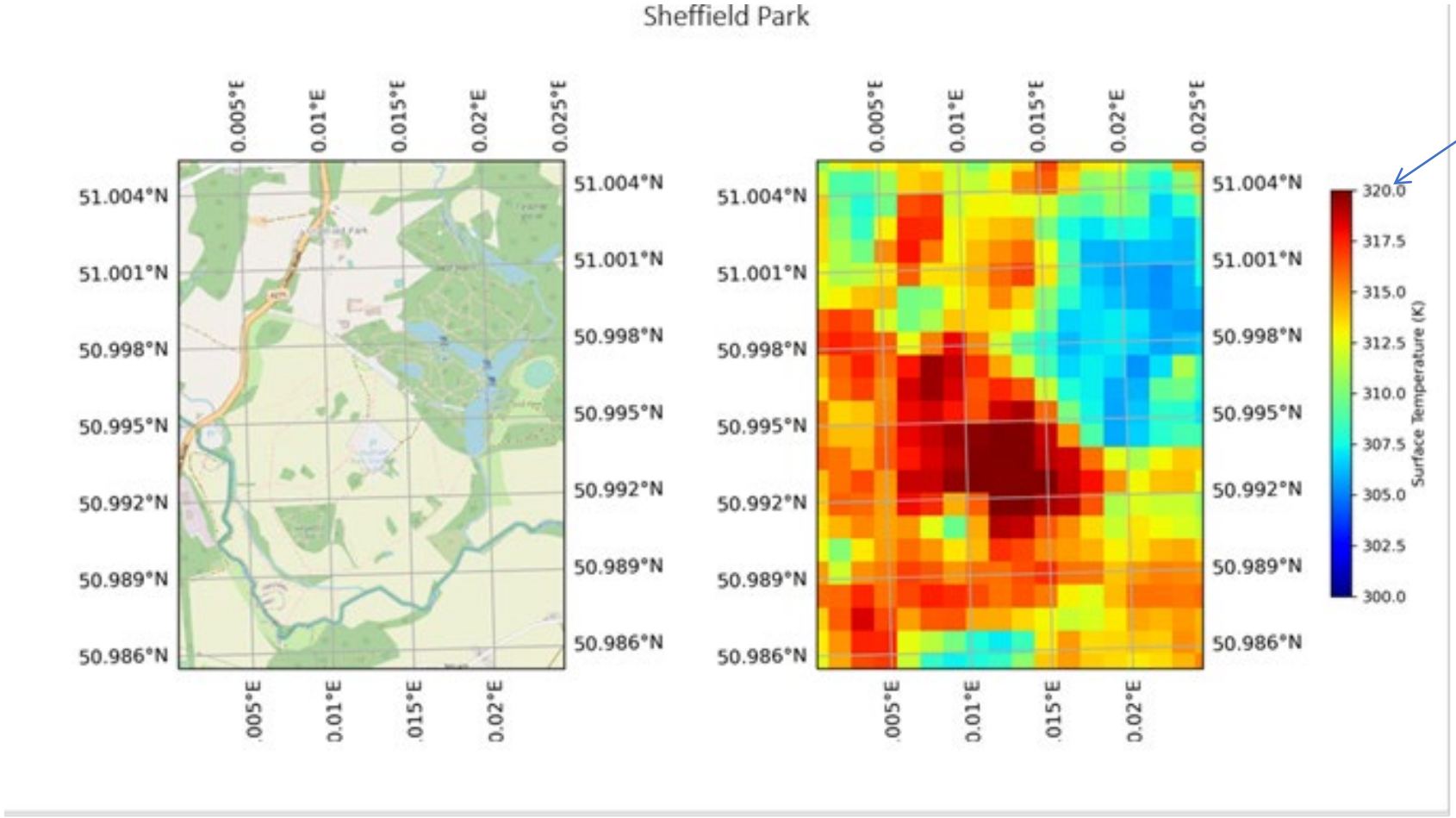
Variations even within gardens (you know this)





Mt Stewart testing mini tag monitors (Alan Kennedy, Bristol University)

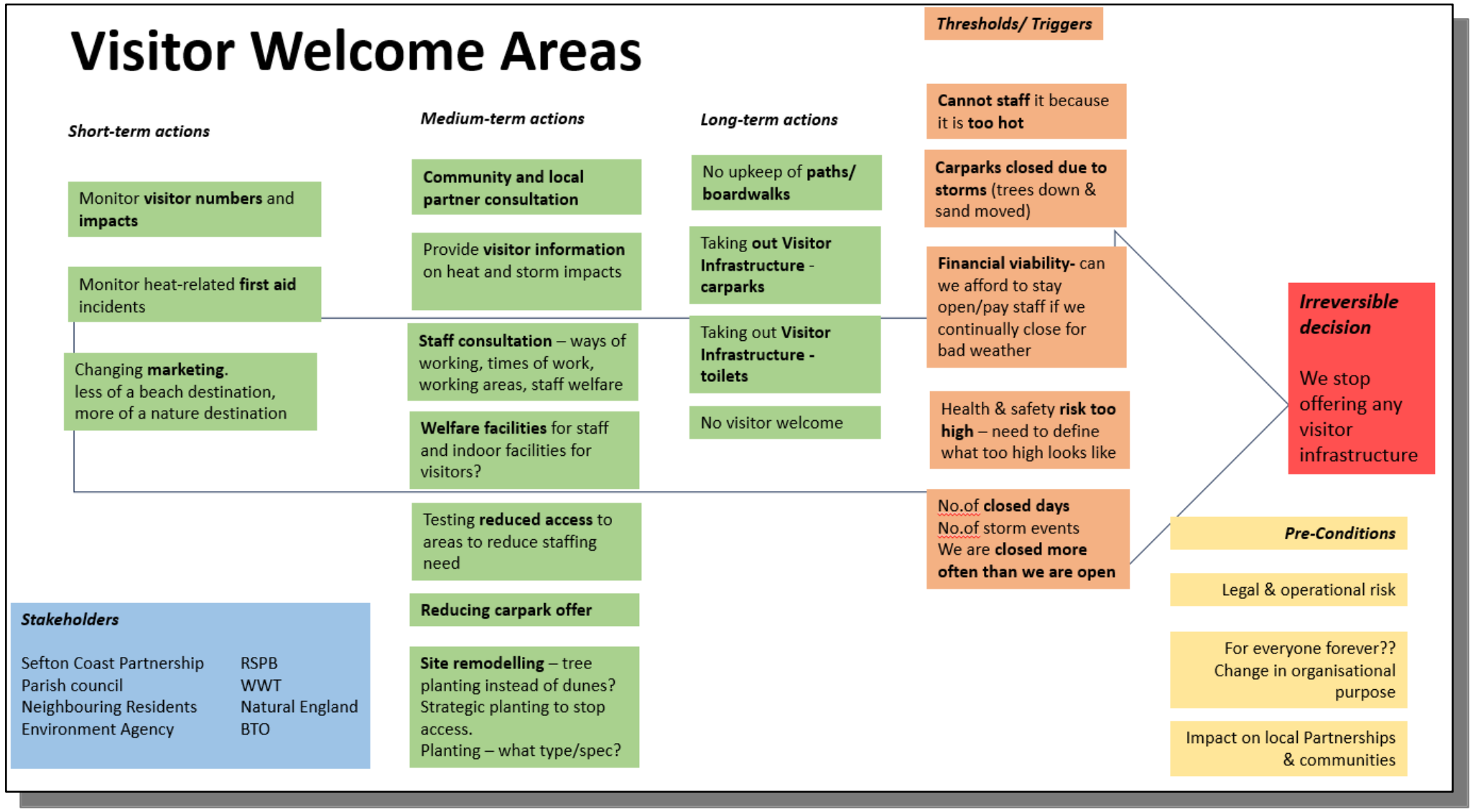
…and local variation from space



47c (July 22 2022)

Sheffield Park
10meter x 10meter resolution

Pathway examples



Property Observations tool: weather impact

We need to capture impacts for a few different reasons

1) To aid adaptation decision making and evidence change (our memories are very short term)
2) To report to government on what we are seeing day to day (Defra and devolved Gov's)
3) To aid the comms streams and avoid the usual scrabble for stories every time a drought, storm, wildfire, landslide… hits

But there is so much more. Feedback has been positive as it highlights what NT people are dealing with. We have been blind to the incremental shifts. Footpath wash outs, cracking due to drought, smaller wildfires… we usually did not even capture the big stuff

Impact observation

collection

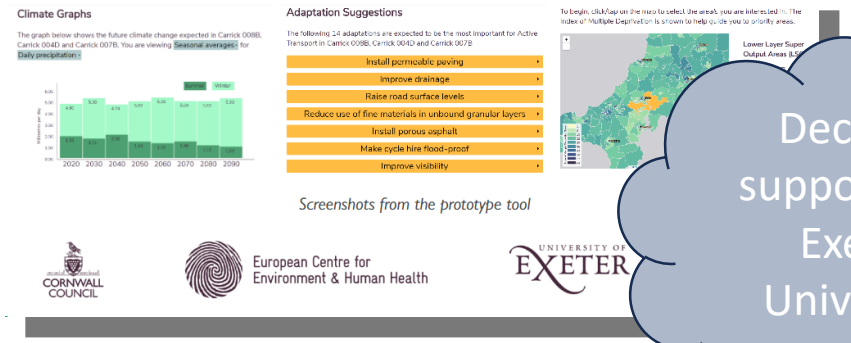
Synchronise

Research areas

In situ mini tag monitoring Bristol Uni (Sheffield Park and Mt Stewart)

Weather Station data. (NT data)

Visitors and Climate change Exeter University



Evidence based decision making analytics Bangor Uni

Test, evidence-based decision making UCL

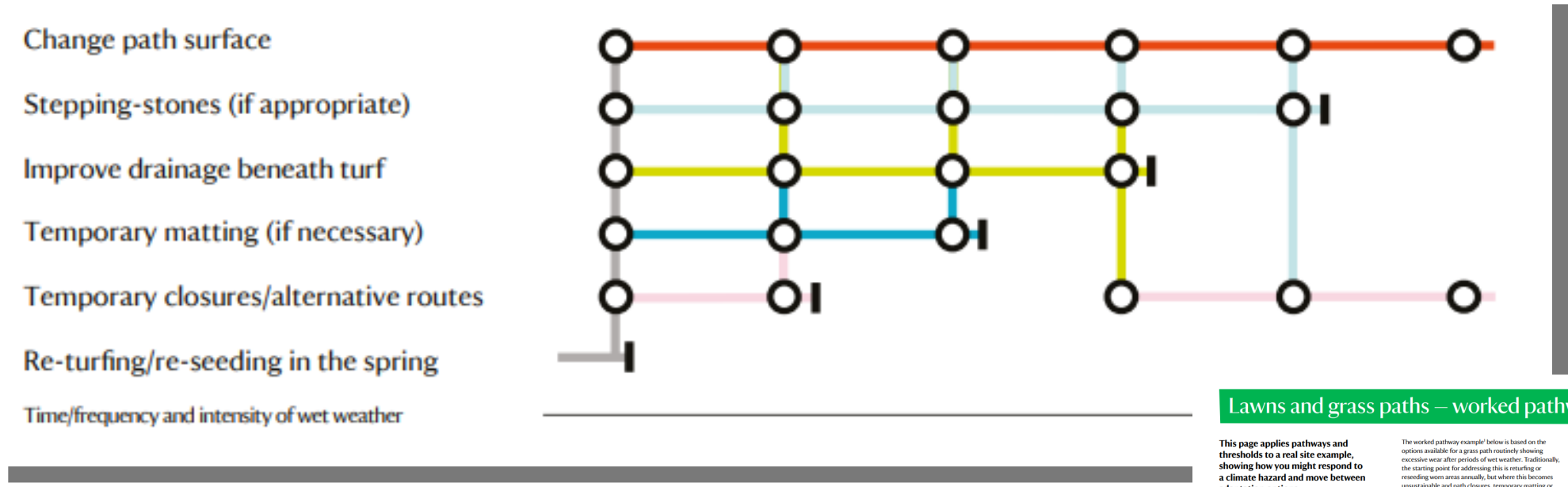
Earth Observation Reading University

Property twining tool Exeter

Next gen of Climate hazard data. Testing

Decision support Tool Exeter University

Dynamic Adaptation Policy Pathways



Lawns and grass paths – worked pathway example

This page applies pathways and thresholds to a real site example, showing how you might respond to a climate hazard and move between adaptation options.

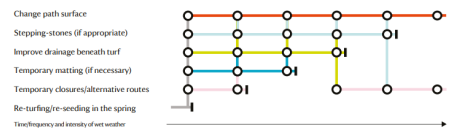
A multi-disciplinary group will be needed to decide which course of action to take and when to change approach. This should include horticulturalists, curators, visitor facilities experts and site managers. Where options involve changes to hard surfaces, buildings surveyors and planners may need to be consulted. For registered sites it may be best to involve the Gardens Trust. Where options include installing drainage or management of flood water in the wider catchment, experts in these areas will be needed.

It may not be possible to find a perfect solution and certain compromises may be needed, balancing aesthetics with access. Pathway options will vary depending on the significance of the site and the public benefits of all-weather access. It may also be necessary to consider the nature conservation value of the existing turf, especially if protected species such as orchids or wax cap fungi are present (though these species are unlikely in areas with heavy footfall).

The worked pathway example[1] below is based on the options available for a grass path routinely showing excessive wear after periods of wet weather. Traditionally, the starting point for addressing this is returfing or reseeding worn areas annually, but where this becomes unsustainable and path closures, temporary matting or improved drainage are insufficient, then changes of surface are likely to be the best option. As the frequency and intensity of wet weather continues to increase, temporary path closures or changes of route around the site may still be required following changes to the path surfaces.

Drought-tolerant species

A number of grass seed suppliers are now marketing grass seed for very dry conditions. Sites are advised to trial these species in a limited area before making the switch, to ensure they find a selection best suited to their local conditions and with an appropriate appearance for the site.



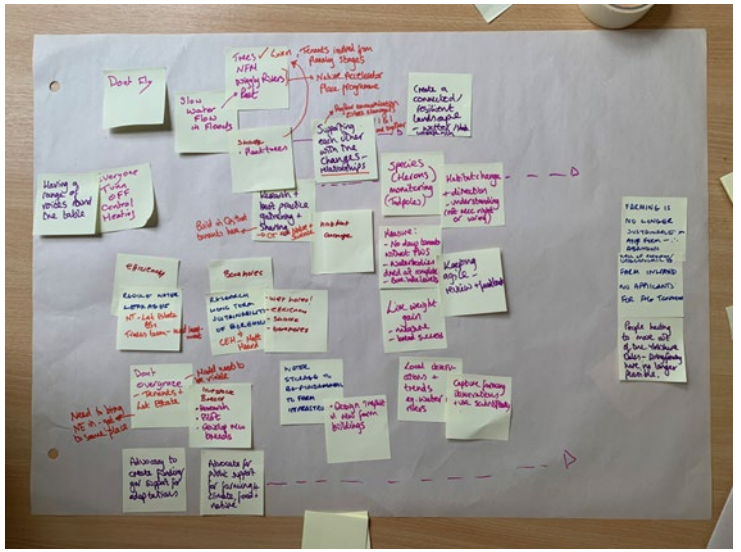
(Response thresholds are most likely to be based on visitor complaints and inaccessibility of paths because of damage to turf from saturated conditions throughout the winter and shoulder months. These factors are balanced by site operational behaviours and requirements. The specific trigger points would need to be agreed by the operations decision-maker and relevant consultants and consultees such as the gardeners and rangers working at a site. Design and significance of the asset might impact your thresholds and options within the Dynamic Adaptive Policy Pathway.)

[1] Dynamic Adaptive Pathways Approach (Haasnoot, Kwakkel, Walker & Ter Maat, 2013).

Pathway Planning… the options & when

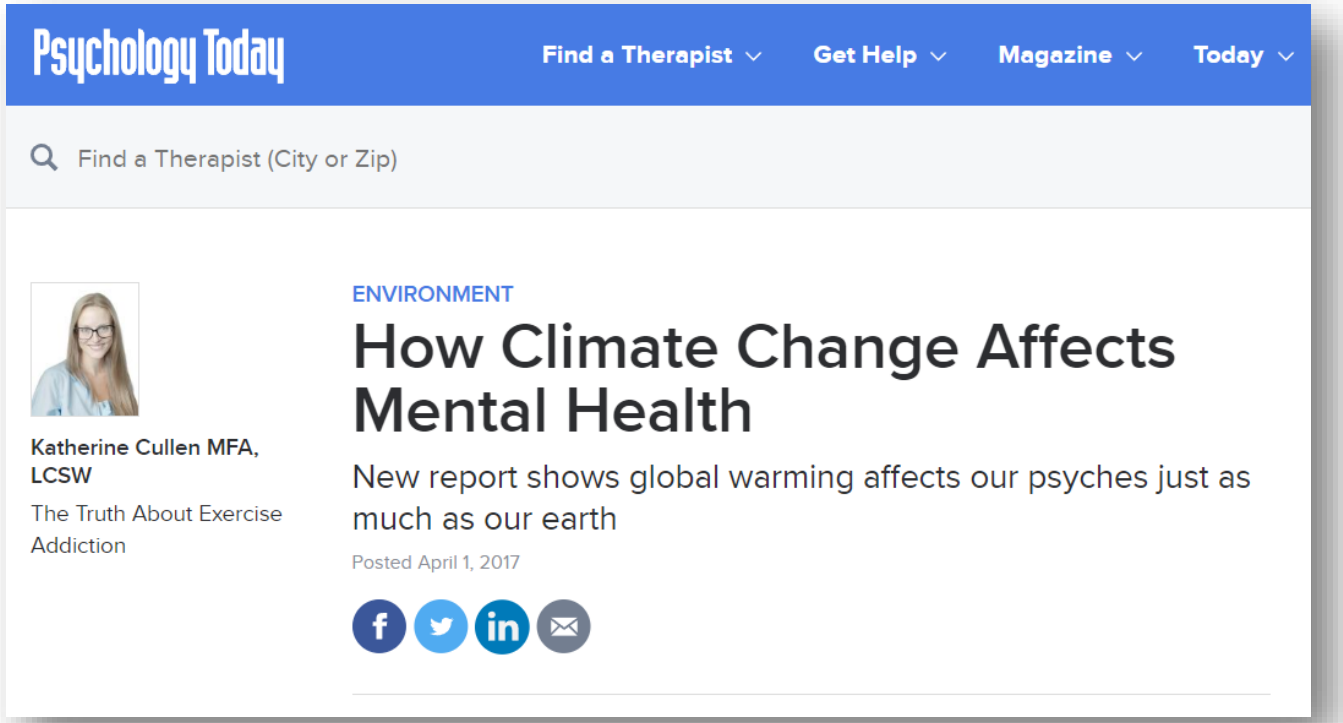
Again, group workshop. (people led)

Agree a point of an ‘irreversible decision’ on the feature, not time bound
We work back through a series of actions to the near terms, actions. To delay, change or accept the eventual irreversible decision
Lastly, we set a threshold. When the conditions are ‘intolerable’ resources, safety, opportunity…



Once a threshold is triggered. Because we are a conservation organisation this actually triggers a meeting to assess.
Yorkshire Dales example. Irreversible decision could be the NT stops farming completely due to the lack of water. Near term action stop all leaks, be more frugal, change species…

Its more than features



Adaptation Guidance

https://www.into.org/new-national-trust-climate-change-adaptation-guidance/

Chapter 2: People and Visitor Activity

Chapter 3: Countryside

Chapter 4: Gardens and Parks

Chapter 5: Farming

Chapter 6: Coast

Chapter 7: Water

Chapter 8: Archaeology and landscape

Chapter 9: Collections and interiors

Chapter 10: Buildings

Chapter 11: Infrastructure

Chapter 12: Utilities and services

Chapter 13: Finance, risk and insurance

Chapter 14: Procurement and commercial

Test and learn

- Moving an entire designed garden (Mt Stewart)
- Moving a plant collection (Rhododendrons)
- Adapting to overheating (Ham House)
- Adapting a feature (Blickling Parterre)
- Tree selection to a new climate (Sheffield Park)

Lawns and grass paths – hazards, impacts and options

Hazard	Impact	Options
Drought and heat	Prolonged periods of dry, dormant grass. Worn patches that are hard to reseed/returf and do not recover naturally. Compacted ground is less able to absorb water when rain does fall. Permanent death of lawn or some grass species.	Mow less frequently and raise height of mower blades. Allow grass to brown and provide signage plus blankets/chairs for visitors. Collect rainwater in large volumes and irrigate areas critical for setting or visitor experience. Change to more drought-tolerant grass species and/or include clovers. Redesign area (e.g. meadow, trees for shade, borders with hard path). Care for turf in autumn to reduce compaction and increase the lawn's ability to absorb moisture.
Waterlogging and flooding	Worn areas created which persist all year. Visitors trampling mud through site (poor experience, increased workload for staff plus potential spread of plant diseases). Paths or lawns closed. More staff resources and budget spent on repairs and maintenance. Only the most hardwearing species survive, which changes the look of a historic lawn. Lawns unusable for hosting events.	More turf care (e.g. scarification and spiking) to reduce compaction and increase the lawn's ability to drain. Use ground protection matting for vehicles or events. Avoid hosting events on fragile lawns. Close paths in wet weather, provide signage and alternative routes. Install drainage. Address flood management issues in wider catchment. Accept flooding and create planted areas to absorb run off (rain gardens). Change to hard surface (with appropriate drainage).
Milder winters	Grass continues to grow all year and requires cutting when soil conditions are not suitable. Increased visitor use in winter when ground is wet, leading to wear of lawns and grass paths (as above).	Account for additional staff time. Invest in robotic mowers. Create alternative routes in winter. Change style of planting (e.g. meadow).

Image credit:
The parterre at Cliveden in Berkshire, with parched grass (© National Trust Images/Hugh Mothersole. All rights reserved).

Image credit:
Increasingly frequent flooding of the lawned terrace at Shugborough in Staffordshire is being addressed holistically, by understanding where flood water can be slowed and absorbed in the wider landscape (Jen Holsey).

Chapter 4: Gardens and Parks

New for 2023: we've published three chapters on Gardens and Parks, taking in the measures that may be considered to safeguard and adapt cultivated plants, lawns and grass paths, and trees in designed landscapes to the impacts of climate change.

Cultivated Plants

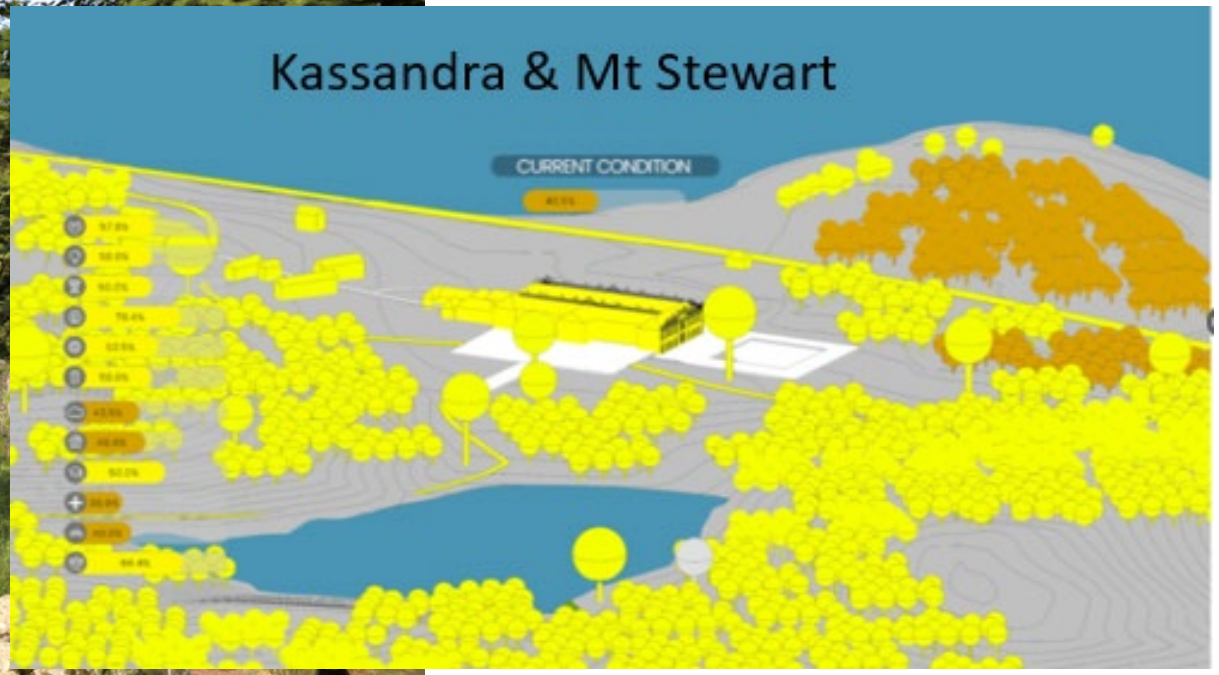
Lawns and Grass Paths

Trees in the Designed Landscape

Property/ Climate Matching tool

LCAT appraoch

Visualisation & digital twins



UK visitor sector

University of Exeter

Climate Change and the Tourism Sector: Impacts and Adaptations at Visitor Attractions

Prof Tim Coles

University of Exeter Business School

The past as a key to the future

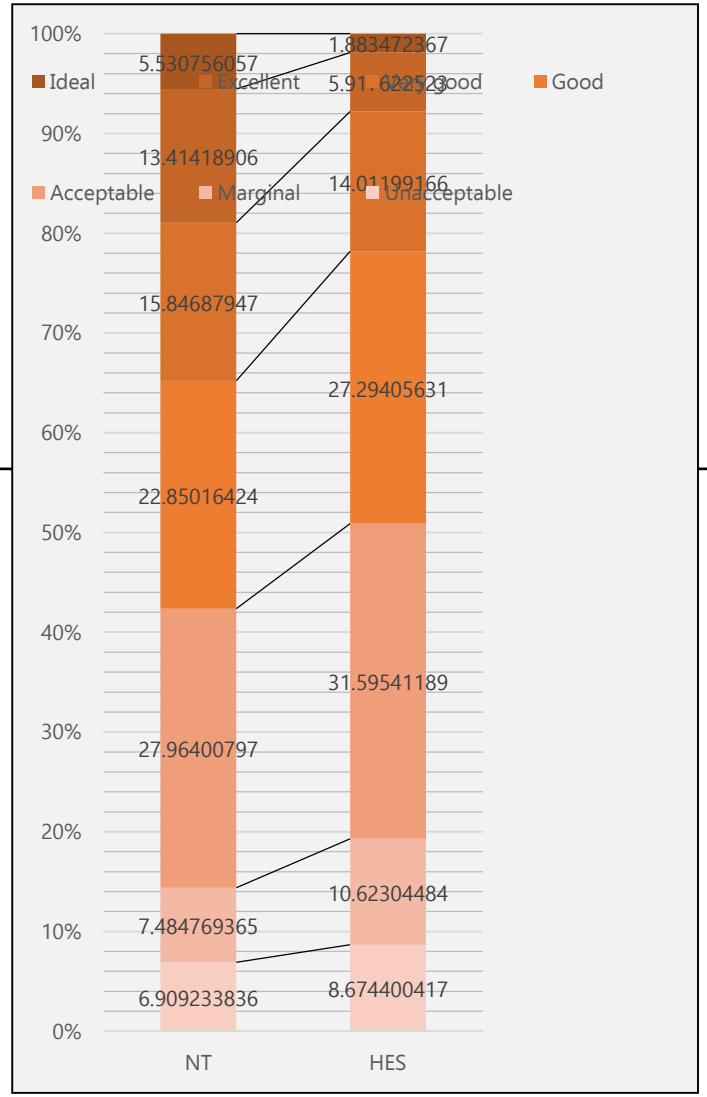
Visitation data
- Visitors (+type)
- Sales (+type)

2017/18-2019/20
Daily (n=1096 NT, n=1066 HES)
Property-level (n=65+14)

Day type (HCI: Urban), z-scores

Historical weather
- Max temp (tasmax)*
- Precipitation*
- Relative humidity (HURS)+
- *Sunshine hours*+
- Windspeed+

2017-2020, daily (n=1096), from:
* HadUK
+ MIDAS (where available)



Future visit and spend by property, region, organisation, year, decade

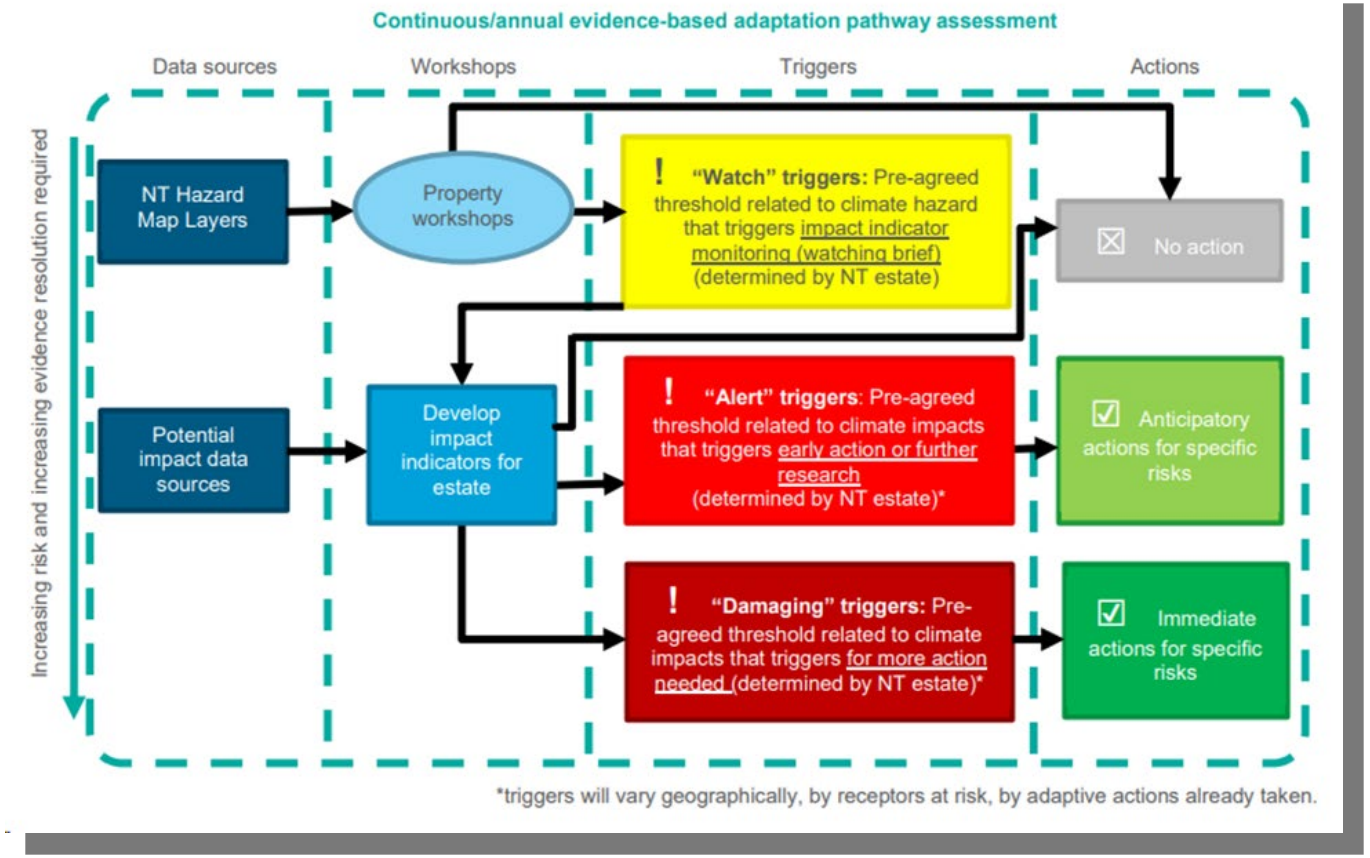
Project on historic visit and spend onto future days by type

Future days by type (HCI: Urban)

Future weather
- Max temp (tasmax)
- Precipitation
- Relative humidity (HURS)
- *Cloud cover*
- Windspeed

2020-2080, 'daily' (n=21,960)
- RCP8.5 (UKCP18)
- Ensemble Members 6,12,**9***

Evidence based decision data. Too complicated!



Data set	Source	Link	Description	Data Licence	Ease of incorporation
				asets/licences/general/	
Flood warnings (river and sea)	Environment Agency	https://environment.data.gov.uk/flood-monitoring/doc/reference#flood-warnings	Water levels and flows are regularly monitored, usually every 15 minutes. However, data is transferred back to the Environment Agency at various frequencies, usually depending on the site and level of flood risk. Transfer of data is typically once or twice per day, but usually increases during times of heightened flood risk.	Open Government Licence	15 minute data available via API
Flood warnings (river and sea)	Northern Ireland Department for Infrastructure	https://www.infrastructure-ni.gov.uk/articles/dfi-rivers-water-level-network	Water levels for stations across Northern Ireland that can be viewed and downloaded from online platform for the past month. No historic data available.	Open Government Licence v3.0.	Dataset updated continuously. Data easily downloadable from web portal.
HADUK	Met Office	https://www.metoffice.gov.uk/research/climate/maps-and-data/data/haduk-grid/haduk-grid	HADUK-Grid is a dataset created by the Met Office that provides daily UK surface land observations at a 1km x 1km resolution including precipitation. HADUK is only available 18 months late, so this can only be part of an annual review process when the Met Office State of the Climate is published every July.	Open Government Licence	Dataset updated annually for 18 months. Data easily downloadable from web portal
Incidence report	National Trust	N/A	Incident reporting is split into modules with the Environment and Flooding modules most relevant for this assessment. The reports are completed when there's an incident. They are downloadable from	N/A	Individual reports can be downloaded from

Data set	Source	Link	Description	Data Licence	Ease of incorporation
			rate, total cloud cover and mean sea level Free services available for limited number of API calls, which could be used for evaluation purposes.		programme
Weather stations at properties	National Trust / Department of Communities	N/A	Any information collected by local weather stations or anemometers	N/A	Dependent on sophistication of weather station
WOW	Met Office	https://wow.metoffice.gov.uk/	The 'Weather Observations Website' (WOW) is a crowd-sourced weather monitoring platform including data from the following sources: • WOW Observations - Public automatic and manual observations for the time specified • Official Observations - Met Office and partner met agency sites Registered Sites - Any sites that have not sent in data for the time specified	Non-Commercial Government Licence and Open Government Licence	API
Yearly condition reports	Department of Communities	N/A	Annual report summarising site condition forms.	N/A	Annual PDF report

Green - Data easily accessible through API or other server that allow real-time integration | **Yellow** - Data available annually/sub-annually but will require manual data extraction | **Amber** - Data not available annually | **Red** - Data is a paid service | **White** – information not currently available

The power of data blended with lived experience example (Penrhyn Castle)

Steps

- Hazard map view of the site. What will the near future be like ‘here’
- Impact workshop to reality check the data and gain the lived experience view
- National specialist input into what it could look like
- Planning for real excise with the gardens team. ‘what if we don’t adapt’
- Laser scan the garden to get the building blocks in place
- Planting schedule from the national specialist in terms what could the garden look like
- Completion of the model (which we can tweak any time in the future

- It is an illustration only of the need to start planning..


Bog Garden. Today


Un adapted Bog Garden


Well adapted Bog Garden

All of these processes are there to support people to take climate informed decisions