



National  
Trust

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Climate Change Adaptation Guidance – Infrastructure

# Paths

Climate change vulnerability: high

# Paths – introduction

**The National Trust cares for over 18,500 miles (30,000km) of paths and trails. Climate hazards, such as storms, floods and coastal erosion, are already impacting these precious routes for accessing beauty, nature and history, and they are going to get worse.**

Paths are fundamental to visitor access. They provide the routes to open spaces, to our land and to key points across our sites. Without them, our open countryside sites would become inaccessible, inhospitable and not inclusive. Nor would we be able to open our pay for entry properties to the public.

As with any element of the built environment, lack of maintenance and ignoring the problems facing paths will make matters worse. Problems may be compounded with other backlog issues, such as lack of vegetation management, blocked drainage and surface wear and tear. Even when paths are well maintained, their deterioration has accelerated as a result of desire lines and increased awareness of access, all of which has been exacerbated by climate hazards.

When managing access around properties and countryside, proposals need to be appropriate for the setting but also sustainable, accessible, long term and fit for purpose, all of which is a lot to consider for something many of us probably take for granted.

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#### Image credits:

Peveril Castle (© English Heritage Trust)



# Paths – why do they matter?

**From choreographed picturesque walks through beautifully designed landscapes, to ancient trade routes traversing mountainous countryside, the network of paths across the UK is constantly under threat. Visitor numbers and increased visits to the outdoors have put pressure on paths, which is exacerbated by climate hazards and the increasing need to make path upkeep sustainable.**

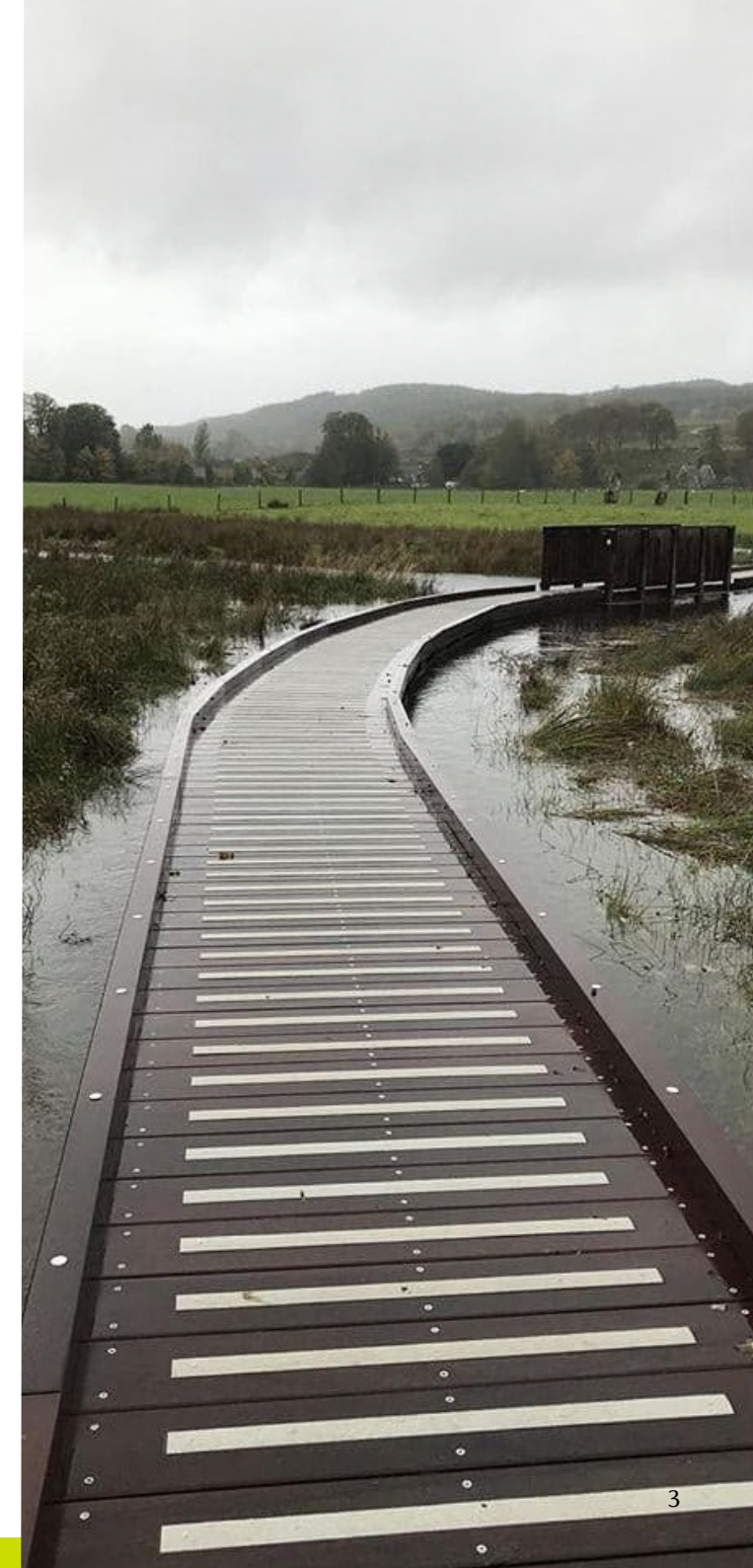
The National Trust manages a wide range of paths through from small informal routes with no defined surface, where a few people walk, to surfaced paths that are parts of national and multi-use trails used by thousands of people. The surface and function of the paths need to reflect these different user needs, but also the changing needs and priorities for access as well as climate and sustainability.

Many places that people visit contain historic designed routes that were not planned or laid out to cope with the loading of footfall and other traffic which now use these tracks and paths; for example, wheelchairs, pushchairs, electric buggies and dogs. They were also designed for a climate that existed decades, centuries and even millennia ago. Now that many paths are used all year round, historic surfaces and designs are being impacted heavily by storms, flooding and drought.

Paths generally serve a specific purpose, usually as a means to guide you from one place to another. The path may be there to limit access to the surrounding area, such as a designated nature site, or to avoid otherwise treacherous terrain, perhaps in the mountains or on the coast. The path may be part of fanciful landscape architecture linking garden episodes in a carefully thought-out story or it may simply be the route to the toilet from the café. The purpose of the path, along with its location, setting and relationship to a place are all factors that site managers need to consider to make sure that the surfacing is appropriate, fit for purpose and complementary to the place.

While design and original intent are important, our landscapes and gardens are beautiful because they are living and ever changing, which means they naturally progress over time. Given that conservation and access are our core purpose, and unless it is unavoidable, we prefer not to limit access but instead allow people to visit, circulate and walk or wheel through our sites.

We also need to consider other sustainability criteria in path choices. For example, microplastic issues, which arise from web mesh and resin-bond materials, mean we need to consider other solutions. As a result, we are reverting to options such as tar spray and chip, which are the least environmentally polluting material in relation to their long-term and cost-effective benefits. Although these methods use bitumen, the regularity of maintenance necessary for alternative materials may make them unsustainable in other ways.



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## Image credits:

Kilmartin Glen in Argyll (©Historic Environment Scotland)

# Paths – hazards, impacts and options

Hazard	Impact	Options
High winds	Dust clouds, scarring, erosion	Change surface
Storms and flooding	Material washing out, path is unusable (underwater/too wet)	Change material, change surface, change finish, change camber, maintain/improve/install drainage
Repeat freeze-thaw action	Potholes holding water which contains plant diseases	Boardwalk or above ground structure, change camber, increase shading
Heat	Distortion and material impacts, exposed lengths of paths become less appealing	Increase shading, change surface
Coastal erosion/landslide/cliff fall	Loss of route	Re-route, temporary closure, permanent closure (usually due to safety)
Prolonged rainfall	Surface recoverability time	Surface changes, structural reinforcement, drainage
Drought	Multiplier for storms and flooding; landslides, cracking, less plasticity, vegetation cover	Right surface, drainage, re-route path, create shade around vulnerable sections of path, spread the load (surface or widen)



## Image credits:

Flooding and rainfall affecting the Henry Moore Path at Kenwood  
(© English Heritage Trust)

Loose material and binder washed away after heavy rain on this historic drive at Kenwood (© English Heritage Trust)

# Paths – options and thresholds

## Climate change affects the carrying capacity of the ground, which is a key factor when determining thresholds for adaptation and making changes.

Paths can become too dry and dusty, or too wet and boggy, which will get worse with more extreme weather events. Path maintenance and changes of approach are based on the underlying geology and hydrology of a site.

### Specific options for surface improvements and changes include:

**Drainage** – should be investigated, maintained and can be installed as surface runnels or below ground drainage (for more accessible sites); either way, it is essential to carry water off the path for its sustainability.

**Timber boardwalk** – for sites perpetually flooded out and washed away, look at feasibility and ability to maintain a timber boardwalk alternative to continue access.

**Stone-pitched path** – look at options for stone surfaces where mud, water and climate impacts, compounded by visitor access, are leading to deteriorating surfaces.

**Cold patch** – cold-laid tarmac is probably not suitable for countryside sites, but has some limited application in gardens.

**Tar spray and chip** – using bituminous materials, which do not contain plastic in the mix, usually results in a lasting, stable finish (provided that loose chippings are swept away).

**Resin-bonded material (gravel fixed in resin)** – particularly where visitor access is high in frequency and loading, a resin-bonded gravel is likely to be hard wearing and can be tweaked aesthetically through gravel choice (however the material also has issues with microplastics).

**Hoggin (self-binding gravel)** – paths in many historic properties use hoggin as a historic surface material. This is easily washed out and not very accessible, but when laid correctly with drainage designed into it, can be a durable surface.

**Mountain/hill paths** – options for mountain paths tend to vary according to region (e.g. Lake District method and Snowdonia method). Although, much physical effort is needed to maintain these paths, there is no option other than to conduct site trials to see which formula works best (some sites import more hard-wearing stone such as granite to construct core routes).

**Widening the path** – sites such as Snowdonia National Park often see visitor loading compounded by drought and wet periods. Sometimes the only option to avoid degradation is to widen the path to allow more carrying capacity.

**Matrix exposed concrete** – laying concrete with a sugar-based solution, which is then power washed on the surface to help it blend into the background (alternative to tarmac for accessible paths)

**Temporary path closure** – pending permissions and considering impacts on access, paths may need to be rested or even closed where alternatives are not possible.

## Options and interventions are different for gardens and countryside

One option is to **do nothing** and another is to **maintain** the path as it is. Sometimes, the built environment is not well maintained and the most effective approach to resist climate hazards and impacts, and to improve the path's adaptive capacity is to **activate a regular maintenance regime**. Maintaining difficult to access paths is forever challenging, particularly mountainous routes where stone sources that may be locally abundant are often protected against quarrying.

All options are likely to require planning permission, and may need scheduled monument consent; advice on these should be sought at the earliest opportunity.

## Thresholds & tipping points

At what point might you diverge from your current maintenance/management strategy? What are the events/impacts that may trigger this change of approach (action/philosophy)?

- Frequency of maintenance interventions
- Quantity of material being sourced to fill washed-out areas
- Increase of health and safety incidents (slips, trips, falls, risk of landslide/cliff collapse)
- Dependence on herbicide to manage vegetation growth in failing surfaces
- Increase in standing water (affecting longevity, but also access and plant health)
- Extent of measures to maintain (resource, impacts on aesthetics, finance)
- Impact on archaeology and/or natural environment is unsustainable and negatively impacting significance
- Surface of path is no longer viable

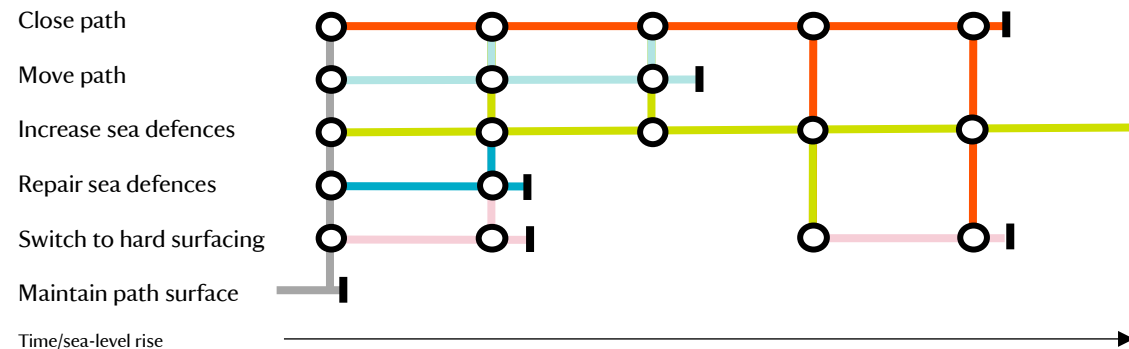
# Paths – worked pathway example

**This application of pathways and thresholds to a real site example shows how and when your adaptive response to climate hazards may change and evolve.**

Working with a multi-disciplinary group to think about options and thresholds for a typical site is key. This cannot be done in isolation as there are significant implications for impacts on more than one aspect; for example, ecology, aesthetics and access. It is better to bring together the right people to work on a mutually acceptable solution for a period of time between thresholds for change.

Paths need to be useful, beautiful and durable; however, significance should always inform the approach.

Fundamentally, all of the pattern book options use different methods for binding aggregate, but the unique characteristics, significance, vulnerabilities and use of your specific site may mean different adaptive pathways apply to each site.<sup>1</sup> The worked example below is based on the path around the Sea Plantation at Mount Stewart, Northern Ireland. This asset is vulnerable to sea-level rise, storm events and flooding.



*(Response thresholds are most likely to be based on safety, linked to the level of water ingress during storm-swell events causing flooding of the path and its access from linking infrastructure. The specific trigger points would need to be agreed by both the operations decision-maker and relevant consultants, and consultees such as visitors and path users.)*

## Image credits:

Following repeat incidents of rockfall along the path at the foot of this cliff, the path at Dunluce was moved away from the high-risk area and re-laid in concrete to address issues of mud and water drainage (© Department for Communities, NI, Crown Historic Environment Division)

Steps designed to be aesthetically sympathetic to the historic environment cannot cope with the rainfall and compounding visitor footfall and end up visually unattractive (© English Heritage Trust)

<sup>1</sup> Dynamic Adaptive Policy Pathways Approach ([Haasnoot, Kwakkel, Walker & Ter Maat](#))

# Case studies, signposting and references

## These case studies show adaptation in action and the approaches that have been tried out across properties in care in the UK.

Along the coast we see many examples where walks and access routes have been adapted because of cliff collapse, dune mobility and storm damage. At Hive Beach the National Trust moved the path inland because of coastal erosion, but also for the benefit to nature in this location. Sometimes, there is no choice but to close the path due to the lack of an alternative route, such as at Carnewas where increasing instability of cliffs posed a health and safety risk.<sup>2</sup> The path here is likely to be closed because of the considerable cost and safety issues to maintain the route. The rate of cliff collapse is now outpacing the ability to maintain the coastal access.



The gravel path in Kilmartin Glen, Argyll, was heavily prone to flooding and the impact is projected to get worse due to climate change. Although the replacement of the gravel surface with a timber walkway will need maintenance, the route is now accessible in all weathers.<sup>3</sup>



*Before*

*After*

Mountainous paths and heavily traversed, but remote, national trails such as the Pennine Way show how a substantial intervention has been effective for over half a century, even though it was controversial when installed. The path was heavily degraded by frequency of use and worsening rainfall. The stone path has held up well against the elements.<sup>4</sup>

## Signposting & other guidance of relevance/use

The National Trust has developed best-practice guidance for path maintenance, design and materials. This document is available to interested parties on request via our regional parks and gardens consultants.

When considering a change of surface, always **consult a historic environment specialist** such as a curator or an archaeologist to check the implications of any proposal. Changing the surface of a path, widening, and particularly diverting a path would be very likely to need planning permission and other consents such as those associated with the natural and historic environment (SSSI permissions, scheduled monument consent) may also apply.



### Image credits:

Collapsing cliffs at Carnewas, Bedruthan (© National Trust Images)

The timber walkway in Kilmartin Glen, Argyll (© Historic Environment Scotland)

The controversial but effective stone path on the Pennine Way (© National Trust Images)

<sup>2</sup> Carnewas at Bedruthan, Cornwall ([National Trust](#))

<sup>3</sup> Kilmartin Glen in Argyll ([Historic Environment Scotland](#))

<sup>4</sup> Pennine Way, Peak Park ([National Trust](#))