Sustrans Design Manual

Greenway management handbook

June 2016

Esmée Fairbairn FOUNDATION

Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

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About Sustrans

Sustrans makes smarter travel choices possible, desirable and inevitable. We're a leading UK charity enabling people to travel by foot, bike or public transport for more of the journeys we make every day. We work with families, communities, policy-makers and partner organisations so that people are able to choose healthier, cleaner and cheaper journeys, with better places and spaces to move through and live in.

It's time we all began making smarter travel choices. Make your move and support Sustrans today.
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Foreword

Green space is good for people. Spending time outdoors and taking part in outdoor activities, from birdwatching to dog walking, makes us feel better and improves our health. The physical and emotional benefits of spending time out of doors are well understood. Ensuring we have great places for children to spend time outdoors, safe from traffic and close to wildlife, is also recognised as an important part of childhood.

Green space is also good for nature. Wildlife will readily colonise new areas and creating the right mixture of habitats to attract the greatest diversity of wildlife, including in parks and alongside roads, is entirely achievable with appropriate management.

Connectivity is as crucial for wildlife as it is for people. Forming 'wildlife networks' that allow both to move and adapt can be achieved by creating green corridors. Rivers, bridleways, disused railways, walking and cycling paths are all examples of potential greenways that connect people to each other and to nature whilst also supporting a wildlife network.

What makes a greenway attractive? High maintenance, overly manicured green spaces are becoming a thing of the past. Balancing the needs of wildlife, people and the environment requires a different approach.

This document aims to provide an introduction to achieving this balance based on Sustrans and our partners' extensive experience of managing the greenways of the National Cycle Network.

So whether you manage walking and cycling paths, bridleways, towpaths, old railways, forest roads or any other green, linear space, this handbook offers practical advice and examples of best practice. Further information, including more detailed case studies, templates and examples are available at **sustrans.org.uk/greenways**.

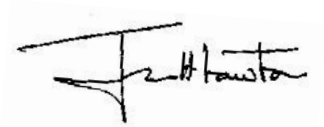
We fully support Sustrans in their ambition to ensure that all of us involved in managing land do all that we can to encourage and connect people and wildlife by making our greenways as rich, interesting and accessible as possible.

Ian Jardine

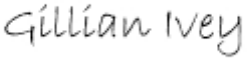
Chief Executive
Scottish Natural Heritage

Sally Holland

Children's Commissioner for Wales



Professor Sir John Lawton CBE FRS



Gillian Ivey

Chairman
Trans Pennine Trail Steering Group

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1. INTRODUCTION

1.1 Definition of greenway

> Traffic-free routes which are attractive, generally well separated from traffic and continuous over obstacles and through road junctions. Quite typically greenways may run along old railways, canal towpaths, riverbanks, forest roads and tongues of open space leading into urban areas. Although greenways are often rural, many of the most popular and important ones thread their way through the urban fabric.
>
> (Sustrans Design Manual)

Open path

Environment quality

Biodiversity

Geodiversity

Architecture

Place

1.2 Where to start

There will always be multiple demands on greenways. In order to make sure you consider all the possible benefits and pitfalls it is useful to write a greenway management plan. This will help when formulating ideas and allow a starting point for conversations with other interested parties.

The first stage of designing a greenway management plan is to decide what the aims and priorities are for your greenway. This is likely to include aims for maintaining an open path for route users such as pedestrians and cyclists, improving environmental quality and promoting local biodiversity (native plants and animals), protecting and showcasing local features such as geodiversity (interesting rocks and strata), local architecture, and in some cases sites of historic significance, or promoting the character of the greenway – giving it a sense of place. Desirable activities on the greenway may include:

- social activities (creating a place to meet / run events which is used by a wide range of people / groups and contributes to their physical and mental health and well-being)
- educational activities (providing opportunities for a memorable experience, running an outdoor classroom or taking part in citizen science projects)
- economic activities (i.e. delivering benefits such as the regulation of floods, soil erosion and disease outbreaks, making a space to hold fundraising events or producing products such as food).

No two greenways are the same. Their development is always a result of collaboration between diverse organisations, local communities and landowners over many years. Each greenway has distinctive characteristics reflecting the landscape it passes through and the people it connects and will therefore have different goals that the management sets out to achieve.

The opportunities presented by a greenway are endless. There is never likely to be a ‘perfect’ management plan for a greenway. There will always be multiple demands on the ‘resource’ the greenway provides. This guide is intended to be a simple reference tool which summarises best practice on different aspects of greenway management, provides examples where competing demands have been addressed and holistic solutions found and highlights links to more detailed information and examples.

Further guidance on writing habitat management plans can be found at the Scottish Natural Heritage (www.snh.gov.uk) and Forestry Commission (www.forestry.gov.uk) websites.

1.3 Using this document

In preparing and implementing your management plan you should follow three key processes; Understand, Manage and Monitor. This will also enable you to see if the changes you have made to the management plan are being successful.

Remember management plans are not set in stone. As you go through this process you can change them to incorporate what you have learnt and include more of the things that work well and less of the things that do not. Plans will also change as a result of management, especially if rare or protected species start to appear, so make sure monitoring results get reported to the maintenance team and fed back into the management plan.

UNDERSTAND

You need to assess the current state of your greenway to identify what constraints and opportunities exist that could hinder or help you achieve your aims. It may be that you modify your aims based on this assessment

Seek out existing surveys such as habitat assessments, tree inspections, land inspections and structural reports. Gather information on the needs of current users and explore any links to local communities. Liaise with maintenance staff, local councils, biological record centres, wildlife trusts and conservation / local history groups who may have information vital to your greenway. Finally you may need to conduct or commission investigations of your own

MANAGE

Greenways do not manage themselves. Chapter 3 of this document takes you through common themes of management, from how to manage antisocial behaviour and path surfacing problems to the best ways to manage habitats such as hedgerows and grasslands

Remember to speak to other landowners adjoining your land to discuss your management, particularly if making any changes, and consider any impacts on the wider landscape. As you make changes to your management remember to keep a record of what you have done so you and other people can learn from your experiences. Important things to record are:

- what you did: Cut the grass, coppice trees, clear brambles, etc
- when you did it: A date will help make future timetables
- where you did it: A grid reference is best but a note on a map will do
- how much you did: A simple count of trees, an estimate of length/area or percentage
- what did it cost: Recording time spent and expenses makes future budgeting easier

Photographic records can provide useful detail without the need for long written descriptions

MONITOR

The final test of a management plan is looking to see what is there after management and compare it to what was there before. This can be a fun way to explore a local greenway and is great for volunteers and community groups. It also helps people to feel ownership, such as taking some photos after six months to show how that hedge is getting on - so re-involve volunteers, partners and the local community

Important things to look for are:

- what has changed? Compare the situation now to information collected at the start
- how have the things changed? More flowers, more insects, community ownership, etc
- have any new interesting features appeared? Friends of… groups, unusual wildlife, etc

Wildlife appears at different times of year so doing surveys regularly through the summer months is best. Some species will take years to move in so use monitoring as an ongoing process to help guide future management

An example of how adaptive management may work in practice

Objective	Agreed management Year 1	Monitor method	Actions complete	Review /evaluation of actions
Stop bank erosion at the desire line at the entrance from Lumsden Road	Reseed bank with grass wildflower mix Dead hedge created from brash to deter access Communicate actions to local people	Fixed point photography once per month at points ABC illustrated on map	Yes	Ground flora increased and desire line almost covered. Holes in dead hedge suggest that a few people are still trying to use the desire line
Enhance grassland to better condition	Cut vegetation twice a year [Mar/ Apr and Aug/Sep] and rake off Recruit volunteers for raking Publicise Big Rake Off event and reduce cutting regime Species and density survey by a local botanical group for identified areas as per map [June]	Species and density survey by a local botanical group [June] Path and web based survey of users about new regime	Yes	First vegetation cut and rake off a success however there were not enough 'rakers' for second cut due to holidays Feedback from users was positive apart from a 200m stretch between Yardley Beck and Warren Farm Lane where vegetation began to encroach on the path The botanical group reported user interest in what they were doing and what they might find

Objective	Agreed management Year 2	Monitor method	Actions complete	Review/ evaluation of actions
Stop bank erosion at the desire line at the entrance from Lumsden Road	Repair and reinforce deadwood hedge	Fixed point photography twice per month at points ABC illustrated on map	Yes	Bank stable and good ground cover. Objective achieved Agreed to monitor the situation as part of ongoing land inspections
Enhance grassland to better condition	Cut vegetation twice a year [Mar/ Apr and September to avoid peak holiday period] remove arisings. Trial mowing of one verge at a time Recruit volunteers for raking (including local businesses) especially for Sept cut between Yardley Beck and Warren Farm Lane. Species and density survey by local botanical group for identified areas as per map Hold 'event' on a day the surveys are happening to highlight work User survey and fixed point photography [once per month March to Sept]	Surveys by local botanical group Fixed point photography Number of people attending Big Rake Off event	Yes	Survey complete and results sent to local records office Two yearly cut and rake off worked well with two local businesses getting involved Feedback from the event is that people would appreciate future similar events on site Yardley Beck and Warren Farm stretch is still providing problems for users with vegetation encroaching on the path - 70% of respondents thought it was an improvement from last year

1.4 Top 10 principles for managing greenways

1.	**Find out what's there now**	Each greenway is unique and may have very important features or characteristics that need to be considered. Find out about any legal issues and constraints before you start any management*. Check existing surveys and talk to site staff and local contacts
2.	**Know what your goals are**	Whether it be for the entire management plan or a day's work have a clear idea of what you want to achieve and write it down (including maps and drawings). Communicating this effectively will avoid misunderstandings
3.	**Take your time**	You don't need to manage everything immediately. Some things are best carried out in winter, others in summer. Taking your time allows you to communicate your plans to stakeholders in good time and avoid nasty surprises. A phased approach in habitat management will help you create a variety of different ages and more varied habitat structure. It will also enable you to monitor how successful new ideas have been on a smaller area before you manage the whole greenway
4.	**Take a long term view**	Areas that look messy at one time of year may burst with life at another and can be valuable for wildlife. Think about what habitats will be like in different seasons and try to make it valuable for as long or as often as possible. Unless it is your goal avoid creating manicured parks in favour of more natural (low maintenance) settings. It may take you a while to develop a volunteer group or to attract funding, so start small whilst thinking big!
5.	**Develop your volunteers**	Volunteers are the eyes and ears for land managers who cannot frequently visit their greenway. With the right skills they can multiply habitat management efforts. Make sure you look after volunteer safety and wellbeing. Build the capacity of your volunteers by creating good feedback mechanisms and teaching them specialist skills such as hedgelaying
6.	**Join up your efforts**	You will get the best results (and fewest complaints) if you join up with other groups and organisations at the beginning of a project. The more people who feel involved and listened to the more support your project will receive
7.	**Be creative with your materials**	Use every opportunity to be creative. Felled trees could become a natural play area, a seating area, a chainsaw sculpture or a habitat for lichens and fungi (or all of the above). Cut bramble scrub can become a sculptural dead hedge and even grass cutting can be artistic
8.	**Advertise**	Let people know what you are doing and celebrate your successes. Talk to people on site, make signs, run events, contact local papers or start a blog/social media page to tell the world about your progress
9.	**Monitor your effects**	Every habitat is different the only way to know whether what you are doing is working is to find out what you have now and measure changes as you manage. Record what you see and use that information to change how you manage in the future. Consider training volunteers to help with monitoring. Count the number of people using the route to see if it goes up
10.	**Use the right tool for the job**	Make the best use of your resources and use the right tool for the job. Don't be afraid to use machinery or employ specialists if the job requires it. When using volunteers make sure they have the right tools, properly maintained and sharpened, know how to use them and have a proper risk assessment, it's a lot safer that way

** Sustrans Legal Team cannot act as legal advisor to outside bodies, due to Solicitors Regulation Authority rules and professional indemnity insurance limits on in-house solicitor roles. Please consult your own lawyer, as necessary*

2. UNDERSTAND

To define your aims and determine your management prescriptions you need to understand your greenway; identify constraints and opportunities and consider the needs of all users. This chapter discusses what you need to consider and how to gather this information.

2.1 Land ownership

If you don't own the land it may be possible to lease it or undertake management under a licence agreement or in partnership. Determine ownership and establish what permissions are required, there may be obligations such as easements, land agreements or contractual issues. Land Registry and your property team will be able to advise you.

2.2 Third party interests

Local community, historical, wildlife or recreational groups may have an interest in the land. If you have budget you could undertake a community consultation to find interested third parties, alternatively a laminated sign with your phone number may enable users to contact you. They may be able to tell you about particular groups, organisations or events that would be impacted by management. The local volunteer bureau may have useful contacts.

2.3 Local government duties

Public sector bodies have a biodiversity duty and local authorities may have rights of way, countryside improvement, nature conservation, landscape or biodiversity plans which you can contribute to. Local authorities often have specialist staff who can help when planning or carrying out management activities that help meet these duties or tie into these plans.

2.4 Route users

Surveys to show how people use a greenway and what they think of it will help when determining what you want to achieve and where local opposition may occur. Regular monitoring of use and opinions will allow you to show how local support and appreciation change as a result of the management of the greenway and will help guide future activities.

2.5 Organisational and Biodiversity Action Plans

Within Areas of Outstanding Natural Beauty or National Parks greenways may be able to contribute to management plans or visions for that area. Some geographic areas also have Green Infrastructure plans (e.g. the All London Green Grid). Contact the lead organisation to find out more and get involved. You or your partners may also have corporate Biodiversity Action Plans or Biodiversity Strategies which you may need to take into account.

2.6 Ecological interest

Knowing what habitats are present along a route, what condition they are in and what species they support is critical to management planning. The more detail you gather at the start the easier it will be to demonstrate what changes result from your efforts.

Find out what nature is present locally too, your greenway does not exist in isolation. Some wildlife does not easily cross inhospitable habitat. Habitat creation and management should aim to 'join up' similar habitats at a landscape scale either via a continuous feature (e.g. a hedgerow between woodlands) or via stepping stones (e.g. patches of bare ground).

Consider how you will record and share ecological information you gather within your organisation and externally. iRecord (www.brc.org.uk/irecord) is a simple online tool for capturing ecological records from anyone (including the public) although many others exist. Your local environmental record centre will be able to help match your proposals to local or national objectives and projects that could benefit from your data.

Sources of ecological information

- land and tree inspections
- Local Environmental Records Centres (LERCs) and online resources such as the National Biodiversity Network (NBN) database or the Ancient Tree Inventory
- local Wildlife Trusts - www.wildlifetrusts.org
- baseline ecological surveys: such as a Preliminary Ecology Appraisals will use a data search and site visit to identify important habitats and species that may be present on your route and make management recommendations
- citizen science: research conducted, in whole or in part, by amateur or nonprofessional scientists: You could run events that link in with existing projects or organise a bioblitz (an intense period of surveying in an attempt to record all species on the greenway). Useful Citizen Science websites:
  - list of projects that can be contributed to via the internet - https://www.zooniverse.org/projects
  - Springwatch site listing some UK projects - http://www.bbc.co.uk/programmes/b007qgm3
  - Butterfly Conservation's Big Butterfly Count - http://www.bigbutterflycount.org/about
  - Bat Conservation Trust's Sunrise Sunset Survey - http://www.bats.org.uk/pages/sunset_sunrise_survey.html
  - British Trust for Ornithology volunteer surveys - http://www.bto.org/volunteer
  - National Amphibian and Reptile Recording Scheme - http://www.narrs.org.uk/
  - RSPB Big Garden Birdwatch -https://ww2.rspb.org.uk/discoverandenjoynature/discoverandlearn/birdwatch
  - Peoples Trust for Endangered Species - various including hedgehogs http://ptes.org/get-involved/surveys/
  - Woodland Trust's Nature's Calendar - http:/www.naturescalendar.org.uk/survey/
- targeted surveys: Targeted surveys can identify whether something is present, where and in what abundance. This will advise your management and help establish a baseline for monitoring your impacts

2.7 Nature conservation sites

The presence of designated sites may influence what management you propose. Many are not currently managed to a favourable condition and your management can make significant positive contribution to the site and its wildlife. Conversely, inappropriate management can have a significant negative impact and constitute a breach in legislation. Even if your greenway does not cross a designation positive management can provide a buffer to notable habitats or support rare or notable species found nearby.

Contact your Statutory Nature Conservation Organisation (see box for details) for advice on habitat management in or near Natura Sites or SSSI/ASSIs. They may have management recommendations and a list of prohibited activities. You will need permission for any changes in management regime.

Local Nature Reserves (LNR) are locally designated sites with statutory protection. Check byelaws for restrictions on what can/ cannot be undertaken in the LNR and contact your Local Authority for management advice.

Changes that affect sites with non-statutory designations should be discussed with the council ecologist or other relevant nature conservation organisations. The Local Authority may know of funding available to help manage locally designated sites.

Sources of information

The location of statutory designated sites can be found on the MAGIC website for England and Wales, Scottish National Heritage website for Scotland and Northern Ireland Environment Agency website in Northern Ireland. Statutory designations are;

- Natura 2000 Sites: Special Protection Areas and Special Areas for Conservation
- Sites of Special Scientific Interest (SSSI) or Areas of Special Scientific Interest (ASSI) in Northern Ireland
- Local Nature Reserves (LNR)
- Limestone Pavement Orders (LPO)

Locally designated sites go by a large range of names including Local Wildlife Sites, Sites of Importance for Nature Conservation, Biodiversity Alert Sites etc. Nature conservation groups also have privately owned nature reserves. The location of these non-statutory sites can be determined by contacting the Local Biological Record Centre and interest groups.

Statutory Nature Conservation Bodies:

- Natural England: www.naturalengland.gov.uk (0300 060 3900)
- Natural Resources Wales: www.naturalresources.wales (0300 065 3000)
- Scottish Natural Heritage: www.snh.gov.uk (01463 725 364)
- Department of Environment Northern Ireland: www.doeni.gov.uk (028 9054 0540)

Bird nest

Badger sett

Sources of information

- Non Native Species Secretariat: www.nonnativespecies.org
- The Great Britain Invasive Non-native Species Strategy (DEFRA 2015)

Useful guides:

- European Protected Species in Woodlands: A Field Guide (Forestry Commission, 2014)
- Bats and trees (Bat Conservation Trust, 2015)
- Woodland management for bats (Bat Conservation Trust, 2005)
- Forest Operations and Badger Setts (Forestry Commission, 1995)
- Pond Management Work and Great Crested Newts (Natural England, 2009)
- Guidance on managing woodlands with great crested newts in England (Natural England, 2013)

2.8 Presence of legally protected species and habitats

Although in the long-term you may be seeking to maximise the value of the land for wildlife, take care not to fall foul of wildlife legislation in the short-term. The presence of protected species can affect timing of works and the methodology used. In some situations licences may be required from your statutory body before work can be undertaken. Badger setts, nesting birds and bat roosts in trees or bridges are three commonly occurring protected species issues for greenway management, whilst Great Crested Newts can present issues for construction or excavation works. As best practice, vegetation clearance should be undertaken outside the nesting season (which is generally considered to extend between March and September inclusive but is weather dependent). Any major habitat management works (e.g. major tree works, structural repairs or works to watercourses) should be assessed for potential impacts on protected species by a suitably experienced ecologist.

In some cases, habitats can also be legally protected, for example through Tree Protection Orders (See 3.7 Trees/woodlands) or inclusion in Built Conservation Area. Your Local Authority will be able to advise if this is the case.

2.9 Problem species

Invasive species and those that are detrimental to agriculture may be present on the greenway and will need to be taken into consideration in the management plan. Some species also pose legal or safety issues. This is particularly relevant to giant hogweed, which has health and safety implications for path users. See Section 3.13 for more information on managing common problem plants.

Problem species (giant hogweed)

2.10 Buried or overhead services

Ensure you know where buried or overhead services are to avoid major health and safety incidents. Be sure to do a search and survey before excavating the ground. Keep emergency contact details for water, gas and electrics at hand during work days.

Overhead services

Sources of information

- property maps
- utilities company records
- HSE's "Avoiding danger from underground services" guidance for work that breaks the ground's surface (e.g. driving-in fence posts or digging ponds)
- HSE's "Overhead power lines" guidance for work by above-ground services

2.11 Asbestos and contaminated ground

You may find asbestos and other contaminants on the greenway in fly-tipping and in both recent and historic waste which may have become buried or scrubbed over. It may also be in buildings e.g. roofs and pipes. If you suspect there is asbestos on the greenway get specialist help to test for it and if it is present, to remove it safely. Asbestos should only be removed by a licenced contractor. Any structural repairs and site preparation work (stripping soil etc.) should consider the risk of asbestos or contamination being present.

Sources of information

- for general information and FAQs visit the HSE asbestos web pages
- local authorities' survey information for Part 2A of the Environmental Protection Act 1990; regeneration teams, highways and engineering, building control and Environmental Statements submitted to the planning department
- Environment Agency River Basin Management Plans and 'What's in your backyard?' website for former landfill sites and industry profiles
- National Land Use Database, in commercial databases, land condition records or in records held by the Environment Agency or the British Geological Survey (for the location of 'made ground', the results of broad scale geochemical surveys or radon potential maps)
- information on the most common industrial activities and the risk of contamination is in Volume 2, Annex 3 of 'Guidance for the Safe Development of Housing on Land Affected by Contamination', published by the Environment Agency, NHBC and CIEH
- Coal Authority's website for sites of former mining

Rubbish pile containing asbestos

Case Study: Asbestos and meadow creation on NCN1, Saltburn-by-the-Sea

Over a number of years Sustrans Redcar Rangers have created a wildflower meadow alongside the route in Saltburn-by-the-Sea. This process entailed clearing the land of scrub and sowing native wildflower seed. In February 2014 the volunteers organised a number of workdays to clear the corner of the land to improve the sight lines on the track. During this work they uncovered a large pile of rubbish which contained material that looked like building rubbish and bricks. The pile could not be picked apart as it was interwoven with many years of briar growth. It was decided that a digger would be used to remove the material and level out the ground.

The local authority was contacted and greed to visit the site. When the mound of fly tipping was inspected it was found to contain broken asbestos roofing sheets. The Council subsequently cordoned off the area and works were postponed. Local council employees using specialist equipment removed the fly tipping. All staff and volunteers working on the land have been informed that there may be contamination below the surface and not to dig in this area. The management plan and risk assessments for the site have been updated and surface management is continuing using a no-dig methodology.

This case study illustrates that caution should be used when clearing land of industrial waste and fly tipping. In this case the problem was identified and dealt with immediately and costs were minimised due to the strong working relationship between Sustrans and the local authority.

2.12 Proximity to water

In the long term positive management can help improve water quality, reduce runoff and help reduce downstream flood risk. However, care should be taken not to adversely affect watercourses during management works.

Current Pollution Prevention Guidelines (including the Water Environment (Controlled Activities) Regulations (CAR) in Scotland) should be adhered to for all work around watercourses to prevent pollution (including muddy run-off) from maintenance work. The use of herbicides near water requires Environment Agency, Scottish Environment Protection Agency (SEPA), Natural Resource Wales (NRW) or Department of Environment (DOE), Northern Ireland consent.

You should submit your plans to your statutory body and apply for consent or a licence (if applicable) if you want to:

- do work on, over, under or near a Main River, flood or sea defence
- make changes to any structure that helps control floods

The relevant statutory body can advise as to whether a watercourse is a "Main River" as it is impossible to tell from looking at it. They can also advise whether proposed works might be within the functional floodplain. Certain activities like dredging no longer require Flood Defence Consent but the activity will need to be registered.

For some work within 9m of watercourses that aren't main rivers you may need permission from either your lead local flood authority or the Internal Drainage Board in your area (Ordinary Watercourse Consent). Contact the Environment Agency/SEPA, NRW, DOE or your local council to find your lead local flood authority.

Always make sure to consider any health and safety issues when working near water. Make sure all current and future maintenance work can be carried out safely and always use appropriately trained and competent personnel.

A watercourse

Sources of information

- Environment Agency: enquiries@environment-agency.gov.uk / 03708 506 506
- SEPA: www.sepa.org.uk (03000 99 66 99)
- NRW: www.naturalresources.wales (0300 065 3000)
- DOE, Northern Ireland: www.doeni.gov.uk (028 9054 0540)
- further information: Gaining permission for works that might be affected by coastal or river flooding (Sustrans, Sept 2011)

2.13 Personnel

A management plan that is drawn-up without proper consideration of who might be undertaking the work is likely to miss its aims. Ideally, each task should be agreed on site with the person who would be responsible for seeing it implemented. Risk assessments should be brief and understood prior to any works taking place. Ensure you have up-to-date copies of certificates of qualification and records of competency for all personnel (staff, contractor and volunteers) who use power tools, machinery or herbicides. If contractors or third parties are undertaking the works copies of insurance and method statements will also be required.

Route construction underway

2.14 **Safe planning**

Your organisation is responsible for ensuring any work on the greenway does not adversely affect the health and safety of other people, which includes the users of the greenway. You should therefore ensure you understand:

- how the regulations apply for each activity you undertake or instruct a third party (volunteers, contractors or partners) to undertake
- how to assess and control the risks

All aspects (site, personnel, activity and legal) of land management work should be carefully considered. Ensure you employ your organisational Health and Safety system. Useful guidance can be found in the HSE's "Machinery – use it safely". If the people are able to access your greenway then you may need appropriate public liability insurance.

Across all aspects of management the following health and safety principles apply:

- ensure that work is planned and carried out by competent people with relevant training and experience
- use appropriate tools and equipment which have been properly maintained
- ensure relevant information from hazard sheets and risk assessments are understood and shared appropriately
- plan for lone working in remote areas (ensure mobile signal in the work area/set up a buddy system etc.)
- consider the accessibility of working areas for emergency services.
- review and monitor your training, certificates, procedures and risk assessments as necessary

2.15 **CDM regulations**

The Construction (Design and Management) Regulations (CDM 2015) place legal duties on all parties involved in construction and maintenance activities including clients, designers, contractors and workers. This usually does not apply to small scale maintenance, however if CDM 2015 applies to the activities that you are planning on carrying out, the manager of the greenway is likely to be the client, as defined by CDM 2015. They will therefore have a number of legal duties relating to the management of the health and safety of those activities. Meeting the obligations of CDM 2015 should be addressed as part of your organisations health and safety management system. Further guidance on CDM 2015 can be found on the Health and Safety Executive web site (www.hse.gov.uk).

3. MANAGE

3.1 Managing access

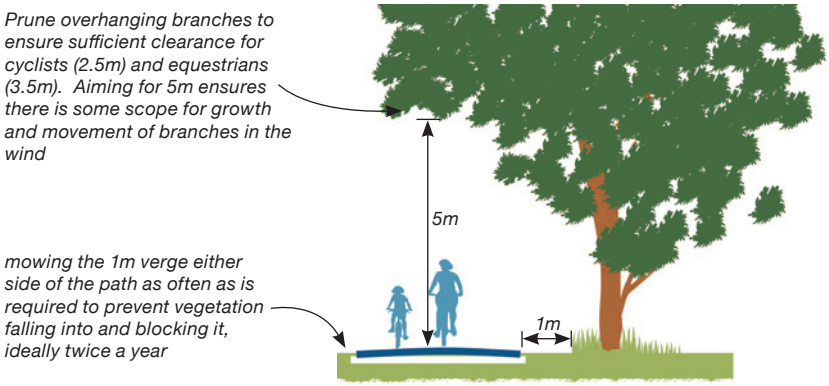
Maintaining open access to greenways for all members of the local community and visitors is fundamental to the success of a route. However, when people with different interests share a space conflicts are inevitable. People who care enough about the greenway to get in touch give you an opportunity to connect with the local community. This person could become a volunteer, could contact you when problems arise or simply tell their neighbours what you're doing. Nobody will agree on everything, but everybody wants the greenway cared for; so here are four tips on reducing conflict, engaging people and some actions to tackle common problems.

- don't surprise people - use social media, local media and signage to explain what you are doing, when and why
- listen to people, be honest and manage expectations
- don't expect everyone to be 'on-side' all the time but use conflict as an opportunity to involve people further
- train and inform site staff and volunteers so they can explain work to the public

Speeding cyclists

'Speeding cyclists' are often really an issue of insufficient space or separation where the speed difference between pedestrians and cyclists results in an intimidating environment.

Make sure that vegetation is kept cut back to create the best possible width and head clearance and allow maximum visibility along the path. This will enable a path to support the volume and types of traffic it was designed to take. Management could include;



manage vegetation along the greenway to preserve sightlines, especially around corners. Even relatively low vegetation (1m) can conceal small children or adapted bikes

Vegetation cleared to preserve sightlines

Where paths are narrow natural features can be used to help control cyclists speed, although care must be taken that they do not constitute a hazard to users. For guidance on this issue see Technical Information Note 40: Speed Control for Cyclists (Sustrans, 2016). In some situations solutions such as creating separate 'lanes' with two colours of paint or stencils can help alleviate conflicts.

Unwanted access

Unwanted access

People may use your greenway to access neighbouring private land or could cause damage to adjacent habitats (e.g. causing erosion or disturbing ground nesting birds). Fencing can be used but can also be unsightly and subject to vandalism. Alternatively;

- allow thick vegetation and brambles to develop to restrict access;
- use cuttings/brash to create dead hedges

If formerly open areas are closed to people signs should be erected to let people know why this is and for how long.

Fencing

There is no general obligation in law to fence the boundaries of one's land, however there are a number of circumstances where the law requires that fences are erected. These are usually related to safety and include:

- alongside railways (including those that are no longer 'live' in some circumstances)
- around disused mines
- around building sites adjacent to highways, both road and path
- to prevent livestock from straying from their fields onto highways or common land

The type of fencing required will depend on the circumstances but consideration should be given to sustainable alternatives such as planting hedgerows or willow screens alongside or instead of wooden or metal fencing. Fencing materials including wire should never be attached to trees. Planning and legal restrictions exist in certain areas and in relation to certain materials (such as barbed wire) so seek advice before installing or altering a fence.

Historic fences can be maintained as a feature

Access barriers and chicanes

A greenway is only as secure as its weakest point so anti-motorbike barriers are seldom effective against motorbikes and can severely inconvenience legitimate users of the greenway. Any consequent reduction in use can then cause anti-social behaviour to rise. Targeted police campaigns (e.g. in school holidays) can be effective in reducing this problem and Section 59 (police seizure) notices can be issued to repeat offenders. Signage and speed reduction measures can also be useful tools.

Fears of speeding cyclists can also create pressure to install access barriers or chicanes on routes. Physical barriers at access points should be avoided as under the Equality Act 2010 service providers must make reasonable adjustments to ensure that disabled people can use services as far as is reasonable to the same standard as non-disabled people.

In general, well maintained and actively used routes are less likely to be subject to the problems barriers are intended to solve. Larger numbers of users will dissuade anti-social activities and will change the behaviour of everyone who uses the route, slowing cyclists and making pedestrians more aware of other users.

If as a last resort access barriers are to be installed to overcome anti-social behaviour problems only adjustable versions should be used that can be locked when required and re-opened when the problem has abated. For more information read A Guide to Controlling Access on Paths (Sustrans, Jan 2012) and guidance By All Reasonable Means (Sensory Trust, 2005).

Use adjustable access barriers

3.2 Anti-social behaviour

Managing anti-social behaviour can occupy a significant proportion of greenway manager's time. Fostering a sense of ownership through the creation of local groups, running of events, activities and workdays will reduce levels of anti-social behaviour in all its forms. Where sections of greenways are overlooked by properties and businesses, the passive or natural surveillance should also reduce anti-social behaviour provided views are not obstructed.

Common problems

Litter

Depending on the scale of the problem and resources available litter and broken glass can be managed through 'tidy-up' days, regular litter picking or the provision and management of litter bins. Bins should be monitored to ensure they are being emptied frequently enough and the contents are being dealt with safely (e.g. if dog mess or needles are deposited).

Dog fouling

Dog fouling can be managed through signage and/or the provision of bins depending on the scale of the problem and resources. The Environmental Protection team at your local authority may be able to assist with erecting signs and spraying warnings on the path.

Dogs 'off the lead' can create a hazard in some situations and it may be appropriate to install warning signs in busier areas.

Domestic & fly tipping

Even garden waste over a fence may be an eye-sore or damage ecologically sensitive habitats. If it is clear that rubbish is from neighbouring landowners it may be wise to visit them and politely explain that their behaviour is unwelcome and could result in legal action. Access controls can end greater fly tipping problems but should be considerate of legitimate access. To report fly tipping use the www.gov.uk website (England and Wales), the dumb dumpers website (Scotland) and the NI Direct website for advice in Northern Ireland.

Graffiti

The constant repainting of surfaces is not ideal and you should avoid painting surfaces white. Proprietary anti-graffiti treatments make it easier to remove graffiti but do not prevent graffiti from occurring. Prevention is better than cure and local engagement, particularly with school children, can help create a feeling of ownership and can significantly reduce uninvited spray-painting. Vegetation can help reduce graffiti but should be properly planned and maintained to prevent damaging the structure.

Arson

Where arson is a problem limit opportunities for fire lighting by removing all arisings from vegetation clearance and consider permeable access controls to prevent wheelie bins or dumped vehicles being brought onto the Greenway (but should not impede legitimate users). Evidence of previous fires can 'invite' further incidents of arson. Remove, repair or replace fire damaged trees, structures or path surface as soon as possible.

Loitering

To reduce loitering or the fear of loiterers;

- allow scrub and tall vegetation to establish around neighbouring properties
- locate open spaces and benches that might attract gatherings of people at locations with higher usage, by access points or where the greenway is overlooked
- where required use constant low level lighting that delineates the path but allows users to see into shadows rather than bright lighting that creates darker areas off the path where loiterers may hide

Throwing missiles

Debris thrown from bridges can be a particularly difficult problem. Firstly reduce the amount of 'ammunition' easily available; remove loose stones or brickwork, remove arisings from vegetation management, cover ballast in soil and remove weak low level boughs on trees. Regular police patrols and CCTV can reduce the problem but the latter is costly. Security fencing can mitigate the problem but is unsightly and can itself be vandalised.

Land-grab

Be clear on where your boundaries are ahead of issues arising. Use photographs and reconcile land boundary plans with what is present on the ground and check this as part of a general land inspection regime. GIS systems can help with comparing different maps and photographs. If it looks like a neighbour has tried to take land, your property or estate management team will determine if it is worth pursuing.

Case Study:
Anti-social behaviour, Walsall to Pelsall Greenway

Over the years a stretch of urban greenway in Walsall has suffered from antisocial behaviour. This has seen cars and motorbikes abandoned on the greenway and burnt-out, broken glass and litter strewn across the greenway and, most egregiously, bricks and stones dropped from a bridge onto a road that passes underneath the greenway.

The problem has not gone away, but incremental steps have been taken to reduce the extent and depth of it.

To address the problem of objects being thrown from the bridge, the first measure was to remove all obvious loose material from the site that could have been used as a 'missile'. Loose stones were either removed or covered in topsoil, all loose brickwork was repointed and any loose or damaged tree branches were removed. This reduced the problem but it didn't end it, so undergrowth was cut back to make those on the bridge feel more visible. It wasn't clear that this made much difference, so a CCTV camera was installed. This reduced the problem but there were some recurrences, so safety fences will be installed. This will make it incredibly difficult to drop things onto the road – similar fences on a bridge in Liverpool have ended the problem there. It is unfortunate that the earlier measures didn't end the problem, but it is also highly unlikely that planning permission could have been granted for the safety fences had those measures not been attempted first. The cost of the response has been considerable. For example, the safety fences designed to stop people dropping material from the bridge will cost approximately £27,000.

Some measures to combat anti-social behaviour have been achieved without significant additional cost. For example, when an older rail bridge's parapet copping-stones needed to be replaced, the replacements were installed onto metal dowel bars (which were grouted into the supporting parapet walls). The additional cost was small, but it ensures that the copping stones can't be easily moved or levered off the parapet walls.

Other measures that have mitigated the problem have included 'beefing-up' anti-motorcycle barriers (combined with a continued Police campaign to catch those riding motorbikes on the greenway) and targeting litter and fly-tipping.

The timescale is, of course, continuous.

A 'mock up' of the proposed safety fences

Litter and loose material collected and removed

Problems still exist but incremental improvements are being made

Do not pull weeds growing through the path surface, use herbicides if necessary

Leaves accumulating and creating a slippery surface in autumn: Sweeping or leaf blowing can tackle this

3.3 Path surface maintenance

Unsealed path surfaces can degrade quickly due to erosion and vegetation encroachment. Follow the manufacturer's maintenance recommendations and the following top tips;

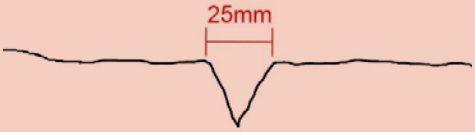
- undertake edging before grass spreads out over the surface and takes root
- cut drainage channels filled with stone (known as grips) in side vegetation or on slopes to direct run-off and prevent unwanted puddle formation
- scrape or sweep the surface regularly in locations where vehicles use or cross the path to avoid the build-up of mud that 'lifts' off the surface
- do not pull weeds growing through the path surface, use herbicides if necessary
- ensure saplings within 1-2m of the path are not allowed to become trees
- cut back trees overhanging the path surface to avoid rain water dropping in a pool and developing a low spot in the path surface leading to accidental erosion and ponding

Sealed paths can experience problems in maintaining good surface conditions, including:

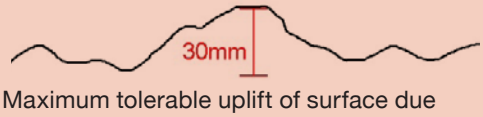
- leaves accumulating and creating a slippery surface in autumn: Sweeping or leaf blowing can tackle this. Priority should be given to heavily used paths, schools and key transport corridors
- moss can create a slippery surface in shaded locations: Prevent damp, dark conditions from forming through managing overhanging vegetation and remove moss by seasonal scraping or brushing in badly affected areas
- using grit to combat ice will rarely be feasible or appropriate. Consider signage to warn users and encourage them to use alternative routes in icy conditions
- subsidence caused by poor drainage or ground movements leading to cracking: You can press cold lay tarmac into these cracks, however this is not a long-term solution. To resolve the problem you must resolve the underlying cause of the crack and resurface the path

Guidelines to determine when path repairs are required

Maximum tolerable depth of a pothole: 30mm



Maximum tolerable gap width in a crack: 25mm



Maximum tolerable uplift of surface due to tree roots: 30mm

Maximum tolerable level difference across a crack: 30mm

Where path repairs are required;

- unsealed surfaces: To top up the worn surface, brush off loose material and scarify the surface with a rake. Roll and then water-roll in 20mm or 25mm depth of new material
- sealed surfaces: Cut out a square around potholes, refill the hole with new material then roll in
- consider installing concrete pads where vehicles cross to protect the path surface (for example where a landowner requires access across the greenway into adjacent fields using an agricultural vehicle)
- where mature trees are near the path set out root protection areas to avoid harming trees during any construction works (in line with BS5837 and NJUG Vol.4)

Suggested actions based on resources and income:	
Minimal resources / low cost	• **use volunteers** to remove leaf litter, sweep mud, cut grips, edge the path and remove saplings • **warnings can be sprayed on the path** to indicate poor condition of the surface as well as signs. Spray is often more desirable in areas of high anti-social behaviour
Basic resources and budget	• **temporary surface repairs** to prevent potholes, tree roots or cracks worsening or causing a hazard to path users
Extra resources and budget	• **more extensive resurfacing** and engineering to rectify slumps, pooling or root damage

Recommendations:	
Do	• **ensure that path surface problems are noted** during routine land inspections • **highlight damaged areas** so they are visible at night • **read Chapter 5 and 6** of the Sustrans Handbook for cycle-friendly design
Don't	• **wait until the problem becomes a significant hazard** to path users. Take action, even if it is just installing warning signs

Path repairs close to trees

Trees roots can damage paths and create trip hazards. Depending upon the value and protection of the tree and on the extent of the damage there are four main ways to deal with this:

- careful root pruning (in line with British Standard BS 5837 - Trees in relation to design, demolition and construction and the National Joint Utilities Group Guidelines vol. 4)
- planing the path surface
- reconstruction of the section of path affected by the roots; or
- tree removal

The extent of reconstruction depends on the extent of the root damage. It might only be necessary to locally excavate the surface asphalt layer of the path, scrape out excess path base material and resurface the path. Where root damage is more extensive, the whole depth of the path will need reconstructing. Structural geotextiles or structural reinforcement can be used to reduce the risk of future damage.

Path prior to restoration

Path after 'scraping back' edges

Path after tree removal

Case Study:
Path width restoration, The Lias Line in Warwickshire

The route along this disused railway line was developed 10-15 years ago and surfaced with limestone dust as a low cost solution. Over the years vegetation has crept in from the edges reducing the effective width of the path from 3 metres to 1 metre.

In order to keep the path in useable condition the edges of the surface were sprayed with glyphosate based herbicide and the surface was scraped back every 2-3 years, most recently in 2013.

In addition to this management sympathetic tree clearance works was carried out over a 300m section to allow light in, reduce leaf litter and let path dry out. When it is scraped back and dried the limestone dust reconsolidates to provide a useable path surface.

Path verges have been subject to limited management in the intervening years although some mowing and path clearance by volunteers had been carried out.

2km of path verge vegetation clearance was completed within one day.

Costs:

– mowing £1500,

– spraying £500,

– scraping back path edges £300

– tree clearance works £2,500

3.4 Structures

Structures such as bridges, former platforms, lineman's huts etc. should be subject to a regular inspection regime to ensure they are safe and maintenance is planned appropriately to keep them in suitable condition. Regular land inspections should also note any major defects or safety concerns with structures.

Ivy on a bridge

Trees and vegetation growing on, or very close to, structures can obscure cracks and other defects that need to be monitored. Trees can also damage the structure directly as a result of root action or branches pushing against parts of the structure. Some activities such as pulling roots from brickwork or removing rust from metal structures can cause damage to structures so should only be carried out as part of more extensive repair work. Clearance of obscuring vegetation should cover an area 3m-5m from all elements of the structure, however it is not necessary to remove all vegetation in every case and a situational approach should be adopted depending on local conditions and ecological considerations.

Hedgehog ramp

Vegetation growing on bridge decks and platforms can provide a valuable habitat corridor for wildlife, allowing species to move across barriers. Taller vegetation such as scrub and trees will require management to prevent potential damage to the structure from roots but low growing flowers and grasses should be retained wherever possible.

Some structures provide habitats for wildlife such as roosts for bats or nesting habitat for birds and may support rare plants such as ferns. These ecological issues should be taken into account when planning repair works. This may be as straight forward as altering the timing or methods of work or may require a licence. Surveys may be needed to determine the presence of protected species and appropriate protection measures. Ideally repair works to structures should incorporate features for wildlife, such as bat bricks and nesting ledges.

When planning maintenance works on structures make sure to produce a method statement that considers the timing of the work, access requirements, the working method (including how to handle the weight of removed vegetation at height) and any potential ecological or historic conservation issues. This document should be agreed with all interested parties before works begin.

Other structures include access controls, seats, portrait benches, mile posts and art work, all of which will need checking and testing during land inspections. Whilst inspecting cattle grids check to see if there is an escape ramp for wildlife such as hedgehog that can become trapped. A cheap and easy solution is to place bricks inside near the edge to form steps out.

Suggested actions based on resources and income:	
Minimal resources / low cost	• **install bricks in cattle grids** to allow hedgehogs to escape • **keep trees** and scrub clear from bridges
Basic resources and budget	• **deal with all priority repairs** to structures
Extra resources and budget	• **deal with the non-urgent repairs** to structures before they become critical

Recommendations:

Do

- **undertake regular inspections** of structures and boundaries
- **report safety problems** with bridges and other structures to route managers
- **consider ecological issues** and the risk of asbestos before undertaking repairs
- **agree a method statement** before carrying out work on a structure (including vegetation removal)

Don't

- **let vegetation obscure possible faults** in structures
- **entomb any bats** during any repair work – make sure you've done some bat surveys first

Barn owl nest site

Barn owl chick inside the girder

Replacement nest box

Case Study: **Grit blasting and barn owls, Torksey Viaduct**

Torksey viaduct, a former railway viaduct over the River Trent comprises longitudinal wrought iron box girders. As part of a project to rehabilitate the viaduct as a walking route part of the structure was repainted. This involved grit blasting the metalwork to remove dirt and old paint prior to applying a new paint system.

A preliminary ecological assessment was carried out to ensure no protected species were present before works were commissioned. These surveys identified the possibility that there were nesting barn owls within the upper part of one of the longitudinal girders.

Further survey work by an ecologist confirmed that there was an active barn owl nest in one of the longitudinal box girders. This necessitated a delay to the start of the works while the barn owl chicks fledged and left the nest. This delay was exacerbated by the fact that the barn owls had a second brood.

We were advised that despite being a well-established nesting site the box girder was not an ideal nesting site due to the potential for the void in the girders to become too hot during the summer. Therefore, it was decided to close the girders off, once the barn owl chicks had left the nest, to prevent future nesting.

To compensate for the loss of this nesting site two barn owl nest boxes were put up in trees close to the viaduct. In addition, the ends of the box girder were sealed under the supervision of the ecologist. This entailed closing one end and then confirming that the girder was empty before sealing the second end. An agreement was reached with the local barn owl conservation project along this section of the River Trent so that the ongoing management and monitoring of the new nest boxes will be carried out by local experts.

This case study illustrates that birds may nest in places other than trees and scrub and that consideration should always be given to other possible nesting sites.

3.5 Signs and interpretation

Interpretation boards and signs can enhance the experience of greenways but too many makes an area looking cluttered and untidy. They should also be regularly monitored and inspected to ensure they are intact and secure.

Interpretation board

Users should be able to follow the route and get to important features beyond the greenway without needing a map. For guidance on the recommended standard of signs, where they should be located and their maintenance, see Technical Information Note 5: Cycle Network Signing (Sustrans, July 2013).

Short term signage can let people know about proposed work on the route and could be a simple laminated sign removed when no longer relevant. Short term interpretation can also inform users of recent wildlife sightings or seasonal events e.g. ice or toad crossings.

In the longer-term booklets, boards, webpages or podcasts can interpret natural and manmade heritage. Good interpretation in valuable but takes time and resources; some key things to think about are:

- is interpretation really needed?
- who is the main audience?
- how might different user groups physically experience the site (consider audio interpretation, language or pictures rather than words)?
- consider the location, local community groups, ethnic diversity and language
- how will physical features such as interpretation boards be maintained?
- keep it relevant and entertaining
- make sure any interpretation materials include generic contact information that will be accessible in the long term

Scottish Natural Heritage provide a useful detailed guide on effective interpretation: *http://www.snh.gov.uk/policy-and-guidance/heritage-interpretation/*

Recommendations:

Do	• **check signs** and interpretation during routine land inspections • **use laminated sheets** to provide temporary interpretation
Don't	• **clutter a greenway**, particularly in rural locations or areas subject to high levels of vandalism and graffiti

3.6 Seating

Seating improves the accessibility of our greenways for people with restricted mobility and provides a useful facility for all route users. Seats should be located in areas that can easily be kept clear of vegetation where people can enjoy nature or a view, but should be set back from the path edges to be clear of people walking and cycling.

Seating

Seating can be a mixture of formal seats with arms and backs and informal benches e.g. logs or boulders. Think about how people may reach seating areas with wheelchairs, mobility scooters, pushchairs and cycles as well as how the seat will be delivered and installed in the first place. Consideration also needs to be given to the distance between seating areas; to some people 100m can be nothing but to others it can be a marathon. Place benches at regular distances in the vicinity of access points (from housing areas or car parks) and communicate the number of benches and distance to the next bench. This gives people confidence in being able to use our greenways who may find other outdoor areas more difficult to access. Working with a local disability organisations can help form decisions as to what might be suitable.

Seats can present maintenance issues or provide a focus for antisocial behaviour, so ensure they are kept in good condition and any associated litter is removed quickly. The location, level of use and the risk of damage will help determine what materials to use when constructing or repairing a seat.

For further info see Technical Information Note 25: Informal seating (Sustrans, March 2011)

Suggested actions based on resources and income:	
Minimal resources / low cost	• **make use of natural features** (such as felled trees and boulders) to provide informal seating
Basic resources and budget	• **commercial seating** (construction material dependent on local circumstances)
Extra resources and budget	• **bespoke seating** utilising local tradesman

Informal seating using local materials

Case Study: **Natural seating, Airdrie to Bathgate cycle route (part of NCN 75)**

The original railway track bed between Airdrie and Bathgate, which has served as a cycle route once the line was closed a number of decades ago, includes several picturesque views across the countryside of North Lanarkshire and West Lothian.

Proposals for route and habitat enhancement developed by Sustrans and Central Scotland Green Network Trust (CSGNT) in partnership with North Lanarkshire and West Lothian Council included installation of seating at strategic points along the route. This created stopping and resting, as well as feature points on an otherwise featureless route situated within the exposed plateaux of the central belt of Scotland.

Options including plastic and wooden benches were considered but were rejected in favour of natural stone seats more in keeping with the surrounding landscape.

This choice also reduces future maintenance requirements for the seating areas.

Cost: Awaiting confirmation from CSGNT

Partners Involved: Sustrans, North Lanarkshire Council, West Lothian Council, CSGNT, Mark Hamilton Landscape Services, Contractor

3.7 Trees and woodland

Working around trees can be contentious. They create privacy, support wildlife and can be a dominant feature of a path; users value them highly but trees can also block light or TV reception and can be seen as dangerous by neighbours. They can also impede users on bike or horse and therefore a minimum height of 2.5-3.5m over the path should be kept free of vegetation. Tree effects on structures are discussed in more detail in section 3.4.

Tree tunnel

Tree shape is determined by space and light; by managing an open strip where the path is, the uppermost branches (outside of the head clearance area) will slowly spread over the path. Where trees are abundant this can create a tunnel effect making a path dark, damp and raise personal security concerns for some path users. Dense stands of trees should therefore be managed to prevent tunnels developing and to allow trees to develop into mature standards whilst limiting the damage and disease often associated with overcrowding.

Tree safety

The risk of harm to people from trees is extremely low, however land owners have a duty of care to make sure their land is reasonably safe and a formal tree inspection process is needed for land with public access. Inspections should be undertaken by staff with training to recognise obviously hazardous trees. Where hazards are identified, action should be taken to reduce the risk to users. The risk posed can be alleviated by reducing usage levels around the tree. Where this is not possible you will need to seek specialist advice or commission tree works depending on the risk, cost and value of the tree. Remedial work to reduce the size of the tree or remove hazardous branches may be preferable to removing a valuable tree. Deadwood and damaged branches are often the most ecologically valuable part of a tree so these should only be removed where it poses a hazard to path users. Leaving dead trees as large immobile trunks reduces cost and limits opportunities for anti-social behaviour.

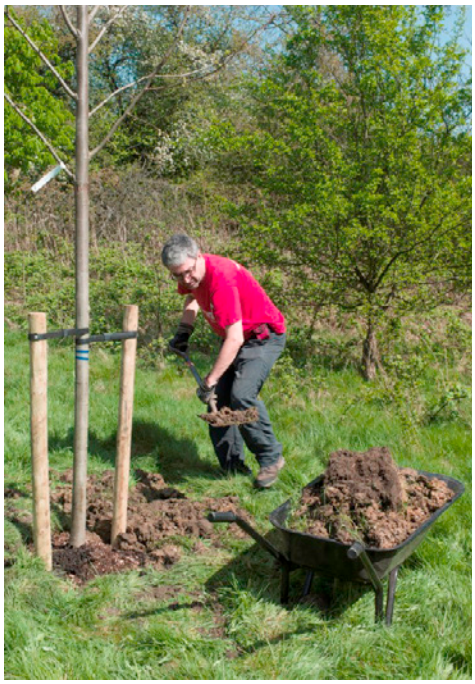
Immobile trunks

For more information on tree safety see the National Tree Safety Groups: Common Sense Risk Management of Trees (Forestry Commission, 2011).

Suggested actions based on resources and income:	
Minimal resources / low cost	• **allow scrub and tall vegetation to develop** around ‘risky’ tree to reduce likelihood of people lingering • **thin groups of young saplings** to give trees space to develop to maturity
Basic resources and budget	• **move benches and interpretation away** from ‘risky’ tree • **install signage and fencing** to reduce access around ‘risky’ trees • **felling or basic tree surgery** to remove hazardous branches
Extra resources and budget	• **commission expert arboricultural surveys** of valuable trees to inform retention possibilities • **more complex tree surgery** in order to retain valuable trees safely • **construct supports** to retain valuable trees safely

Before tree works are authorised the following should be determined:

- the presence of Tree Preservation Orders
- whether the tree is in a Conservation Area or SSSI/ASSI
- presence of protected species (bats, nesting birds and nearby badger setts)
- the need for felling licences
- what will happen to the cut timber and brash? Deadwood and brash can be used to form wood piles and dead hedges that provide habitats for wildlife



Tree planting

Tree works

Tree work can be complex and dangerous and should always be carried out by a trained and competent professional. Machinery can be helpful when accessing trees or transporting cut material however flails should not be used on mature trees as they cause damage and can cause infections. The use of a finger bar cutter or shaping saw to manage dense vegetation is preferable. Larger branches should be removed with a chainsaw. Chippers should be avoided unless no suitable alternative exists and any chipped material should be removed from site to allow a diverse ground flora to develop.

Non-emergency tree works should be carried out from october to february to avoid the nesting bird season

Tree planting

Tree planting should be treated with caution. Improving the variety of native species in the right location can have wildlife and community benefits, however well-meaning tree planting in the wrong location can destroy valuable habitats such as wildflower-rich meadows. Trees can also cause on-going maintenance problems if located too close to paths or structures.

Carefully consider where you can plant trees and what you wish to achieve. Always bear in mind that trees could be in place for hundreds of years and reach a significant size. Where vegetation has been removed natural regeneration may be preferable to artificial planting as it creates more variety and attracts a greater abundance of wildlife. If you are considering planting trees, contact an ecologist or tree specialist for advice.

Trees and neighbours

Trees on greenways, in particular those bordering private gardens, can be a source of conflict. Concerns over safety, shading and leaves in the autumn can put pressure on landowners to manage otherwise healthy and valuable trees. Clear communication and compromise are important in making sure reasonable concerns are addressed.

Under common law a landowner can cut the branches from a neighbour's trees if they overhang his or her property. The same rule applies to encroaching roots, although should harm occur as a result of this pruning, liability may follow. The cut branches remain the property of the tree owner although they cannot be forced to deal with them. If a tree grows exactly on a boundary, then it is shared property and both parties have equal rights and responsibilities.

Managing woodland for wildlife

All woodlands require some management, however mature woodlands will often need minimal intervention to maintain their value. More recently established woodlands can be improved for wildlife by creating some of the features of a mature woodland;

- use clear felling and selective thinning of trees to create glades and woodland rides
- create a range of tree ages and species through selective thinning and coppicing
- retain fallen deadwood and arisings from tree works as habitat piles or benches
- use selective tree work away from the path to create standing deadwood
- promote a diverse ground flora in created glades by scrub clearance or planting

Planned and forward thinking management can allow the retention of trees that would otherwise be unsafe, reduce management costs, generate an income or engage the local community. Any management of trees or woodlands should take place during the winter to avoid the nesting bird season.

Recommendations:

Do

- **undertake regular tree safety inspections**
- **plan management in August/September** and carry out tree works from October to February

Don't

- **disturb any protected species** or nesting birds during any tree work – make sure you've done some ecological surveys first
- **manage trees with a flail**
- **use a wood chipper** unless no suitable alternative exists

Case Study: **Tree planting, Airdre to Bathgate (NCN 75)**

Airdrie to Bathgate cycle route was redeveloped in 2010 as part of the railway line reinstatement between the towns of Airdrie and Bathgate on the original railway track bed. Proposals for route and habitat enhancement developed by Sustrans and Central Scotland Green Network Trust (CSGNT) in partnership with North Lanarkshire and West Lothian Council included planting of trees in several locations along the route, to serve a number of purposes, including:

- diversifying a range of habitats along the route,
- enhancing biodiversity along the route and opportunities for a range of species
- providing public amenity
- providing focal points along the route
- providing windbreak areas along the exposed route

An ecological survey was completed to find the best loation for the trees to ensure they would not adversely affect other habitats along the greenway. A suitable site was located and agreed with all the project partners. Tree planting was carried out in 2015 by a contractor (and on a smaller scale by Sustrans volunteers) and the follow up maintenance is to be carried out by Sustrans volunteers as part of and legacy of the Greener Greenways project along the route.

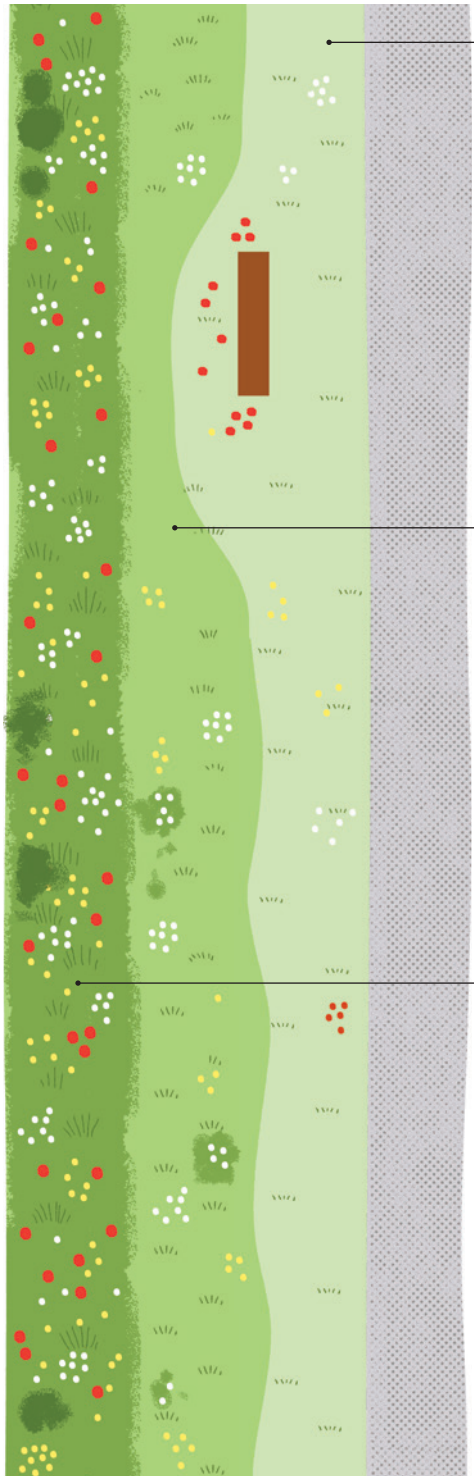
Cost: Awaiting confirmation from CSGNT

Partners Involved: Sustrans, North Lanarkshire Council, West Lothian Council, CSGNT, Mark Hamilton Landscape Services, Contractor, Sustrans volunteers

The route before the work

Trees protected within plastic guards

Wider grass verge



3.8 Verges/grassland

Actively managing grassland can make a greenway more interesting to people using it as well as promoting wildlife and adding interest that changes throughout the year.

Grassland along the verges of greenways can fall into three rough management categories. That which is regularly mown for amenity reasons, grassland in the wider verge that is less intensively managed and areas that are managed specifically for wildflowers. All grassland usually requires some management to prevent it being gradually invaded by scrub and woodland.

Regularly mown grassland

To prevent vegetation falling into and obstructing the path, the first metre from the edge of a path should be regularly mown, ideally 1-2 times per year. For equestrian use, one mown verge should be 2.5m in width. Areas around seating and signage should also be regularly mown to allow access and visibility. These mown areas can support a variety of wildflowers and best practice includes:

- mow only when it is required to preserve the path width
- alternate which sides are cut to retain some longer grass and wildflowers
- where rare species are present leave some patches uncut and allow seeds to set (these patches can be in different places every year)
- remove arisings where possible

Wider grass verges

A wider verge cut is recommended once per year in late summer or autumn to prevent the gradual encroachment of woody vegetation and encourage wildlife. This maintains grass habitat in the wider verge and prevents the route from become too enclosed. To maximise the value of this wider verge to wildlife management should;

- favour wavy rather than straight edges
- retain small patches of scrub, taller vegetation and uncut grassland
- avoid cutting right up to the base of a hedgerow or scrub, leave a buffer of taller grass and wildflowers
- remove arisings where possible or create hay bales / habitat piles

Wildflower grassland management

Managing grassland for wildflowers can be labour intensive. As such it is a good idea to select patches where the wildflower interest is greatest along the greenway to focus habitat management. An ecologist would be able to offer site specific advice for your grassland based on a site visit. Without bespoke advice some important principals of grassland management are;

- cut grass once per year in autumn where wildflower rich patches occur. Consider a second cut in spring in patches where grasses dominate
- remove grass cuttings – these smother wildflowers and favour grass growth (these can be piled off your target patch to create habitat for other wildlife)
- create a varied structure: leave uncut areas, consider using a strimmer/ scythe rather than a mower and create wavy rather than straight edges
- keep bramble and shrubs in check so they form small patches within the grassland only

If the patch is not already rich in wildflowers you could also consider;

- adding yellow rattle seed in autumn: this reduces the vigour of grasses and so favours wildflower growth
- rake up dead grass and matted vegetation before adding wildflower seed to the existing sward; use seed from a reputable supplier, ideally of local provenance
- import green hay from a nearby species-rich donor site which will contain a mix of local wildflower seeds and invertebrates
- avoid planting non-native or garden varieties of species such as daffodils or Spanish bluebells

Changes in grassland management can be unpopular as locals may think it looks unkempt and temporary interpretation is recommended. In some places user safety would override aesthetics or wildlife conservation and consequently a different approach can be adopted.

Mowing should be carried out in autumn to avoid the peak flowering season. A second cut in spring may be necessary if growth is vigorous

Regularly mown grass

Yellow rattle

Wildflower grass

Case Study: **Grassland management, Clackmannanshire**

NCN route 767 runs between Alloa and Dollar in Clackmannanshire (Scotland) and is known as the Devon Way. The grasslands along this route were managed for access including two cuts per year of the immediate verges only. As a result, these habitats had become invaded by coarse grasses and scrub and were losing their wildflower interest.

As part of the Habitat Management Plan for the route, developed by Sustrans in partnership with Clackmannanshire Council as part of the Sustrans Greener Greenways project, locations were identified where the introduction of wider management could be used to enhance the existing grasslands and increase their aesthetic value and encourage pollinators and other fauna.

Due to small scale of selected grassland patches a traditional method of grassland management carried out by volunteers was selected, using Austrian scythes and hay rakes to cut the sward and remove the arisings. Sustrans teamed up with The Conservation Volunteers (TCV) who delivered the scything training to local volunteers who created wider swales at regular intervals along the route.

Scythes bought for the project were left with volunteer groups to allow them to continue management in the future as part of the legacy of the Greener Greenways project.

Timescale: 2015 onwards

Cost: Volunteer time, equipment (£500), TCV fee (£350)

Partners Involved: Sustrans, Clackmannanshire Council, TCV, Sustrans volunteers

Proper scythe training is essential

Areas can seem daunting at first...

... but you'll be amazed what you can achieve

3.9 Hedgerows

Hedgerows require management to remain a stock-proof boundary feature and to maintain their value to wildlife. An overgrown hedge also blocks views, makes routes feel enclosed and can add to problems with leaves and moss on the path surface. Over management and under management will both reduce the wildlife value of a hedgerow. Sustrans Ecological Technical Note 01: Hedgerows provides more information on hedgerow planting and management. Management of hedgerows for conservation is dependent on the lifecycle stage of the hedgerow.

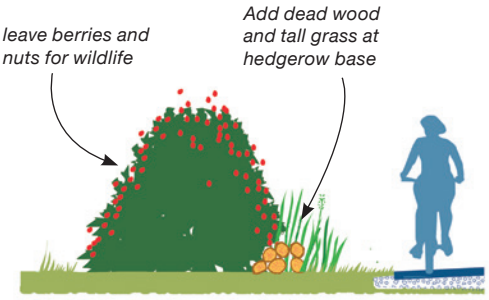
Newly created hedgerow

Planting a new hedge

New hedgerows should only be planted if there is a commitment to managing them in the long-term. If existing hedgerows are unmanaged consider whether it would be an appropriate use of resources to plant more hedgerow. Hedgerow planting would be most desirable where it fills gaps between woodlands and sections of existing hedgerow. Natural England have produced some advice on how to plant a high quality hedgerow. Avoid using thorny species, particularly blackthorn, on greenways used by cyclists as the cuttings from regular maintenance may cause punctures.

Newly created hedge should be cut back immediately (or in the first autumn) after planting and pruned back by a third in the late winter for the first 3-4 years. This will encourage bushy growth. Leave a small number of specimen trees uncut to develop into hedgerow trees to increase the wildlife value of the hedge.

Hedgerow maintenance



Hedgerow maintenance

Mature hedgerows have the greatest potential to support wildlife. The recommended management for mature hedgerows is:

- cut in an A-frame shape so hedges are widest at the base
- cut during winter ideally in January or February on a 2-3 year cycle
- cut rotationally so that not all hedgerows are cut at the same time
- cut about 10-15cm above the level of the previous cut

Maintaining hedgerows in rotation (i.e. different sections in different years) is important not only from a wildlife point of view but also to allow path users to see across the wider landscape and make their journey more interesting. When considering management of the route as whole ensure there are sufficient vistas and avoid long continuous sections of overgrown hedgerow.

Machinery including flails can be helpful when managing large sections of scrub or hedgerow, however care should be taken around hedgerow standards and in woodlands to avoid damaging mature trees.

Deadwood and brash created during management can be used to form wood piles and dead hedges that can fill gaps and provide habitats for wildlife. Chippers should be avoided unless no suitable alternative exists and any chipped material should be removed from site to allow a diverse ground flora to develop.

Hedgerow restoration

As the hedgerow matures, it start to thin and decline. Hedgerows are rejuvenated by hedge laying, normally between a height of 2.4 – 3.6m. Woody stems (pleachers) are partially cut and laid horizontally across the hedgerow. New shoots grow upright from the pleachers, once again forming stock-proof boundary and starting the hedge life cycle again.

Where large gaps occur planting native species or taking cuttings from the existing hedgerow (whips) can be used to fill gaps and create a continuous line of vegetation.

Hedge restoration

Hedgerow removal

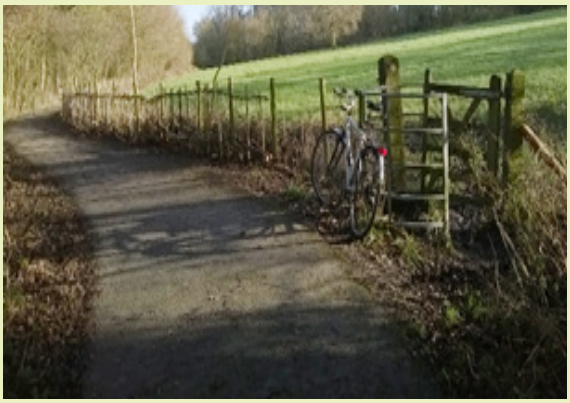
If you are removing sections of hedgerows for access or other reasons be aware that some species-rich hedgerows are protected under the Hedgerows Regulations 1997 in England and Wales. The regulations prohibit the removal of 'important hedgerows' without permission from the local planning authority.

Hedgerow works should ideally be carried out in january or february to allow birds to make use of nuts and berries over the winter

Suggested actions based on resources and income	
Minimal resources/ low cost	• **manage hedgerows on rotation** to maintain access and open sightlines
Basic resources and budget	• **volunteers** may be able to assist with hedgerow maintenance in target areas if adequate training is provided • **if you have 'leggy' overgrown hedgerows**, volunteers and staff could be trained in hedge laying techniques so that they can be restored
Extra resources and budget	• **fill larger gaps** with new planting • **remove and replant hedgerows** that have become lines of tall woody bushes

Recommendations:	
Do	**cut at the right time of year** **leave a 1m buffer of grass**/ ruderal vegetation right up to the base of the hedgerow wherever possible **lay hedges** to rejuvenate hedgerows
Don't	**cut all of your hedgerows in one sitting** – try to split them into sections and manage on rotation over several years

An enclosed overgrown tunnel



The route is opened up and easier to manage

Case Study: **Hedge laying, Chiseldon to Marlborough (NCN 428)**

A 175m stretch of this greenway along NCN 428 runs between two fenced boundaries. The fence on the north side has mature trees while on the south side there is a hedge, planted about 15 years ago. This hedgerow was about 4m tall and created a dark, overgrown tunnel. Brambles growing through the hedge were encountered at head height, leaves fell thickly on the path and there was no view over surrounding fields.

Over 7 workdays between February 2013 and Jan 2016 the local Friends of Chiselden Greenway group laid this stretch of hedgerow.

An experience hedge layer provided training in the first year and supplied stakes and binders for the first two winters. The group soon developed a fruitful partnership with the support of the Woodland Trust who generously agreed to donate materials from one of their nearby sites at Stratton Wood.

The volunteer group leader said, “We have discovered that laying hedges is fun to do, and is a team-oriented thing. There are several different jobs that need doing, and although some of them can be hard work there is something to suit all tastes and abilities. And you can see immediately the impact of your work, which is motivating. This stretch of well used path is now much more pleasant for walkers, runners and cyclists. Many of them have commented as they have passed us while we’ve been working. It’s less dangerous without the brambles and hawthorn at head height. The reduced leaf fall makes it easier to keep the path clear in the autumn. And the dense sprouting in the laid hedge provides a better habitat for a variety of invertebrates and small mammals.”

This project was undertaken entirely by volunteers (totalling approximately 330 hours over three years).

Costs:

2013: £180 for training,

£120 for materials (stakes and binders)

2014: £120 for materials (stakes and binders)

2015: No expenses

2016: No expenses

3.10 Drains, ditches, ponds, watercourses and wetlands

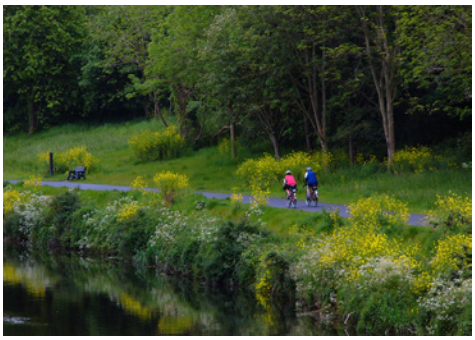
Drains, ditches, ponds and soakaways keep your path free of standing water and protect them from run-off. They also provide an opportunity to create a wildlife habitat. The principles of Sustainable Drainage Systems (SuDS) can be applied to existing and new drainage to help reduce possible negative impacts such as runoff or downstream flooding.

A wildlife pond

Keeping drainage in good working order is one of the most important parts of greenway management. For example drain clearance should be planned as part of the annual cycle of maintenance activities and catch pits should be checked and cleared of any silt and debris that builds up regularly, otherwise they can lead to blocked pipes and flooding. Always be aware of the potential hazards of working near water including water-borne diseases such as leptospirosis.

French drains

French drains comprise a perforated pipe laid in a shingle-filled trench, often lined with a geotextile filter membrane which conveys water to a soakaway, watercourse or mains drainage system. Good installations incorporate frequent rodding points, these should be checked during regular land inspections and cleared of any blockages. French drains topped with turf should be managed to limit the growth of vegetation with potentially damaging root systems such as trees.



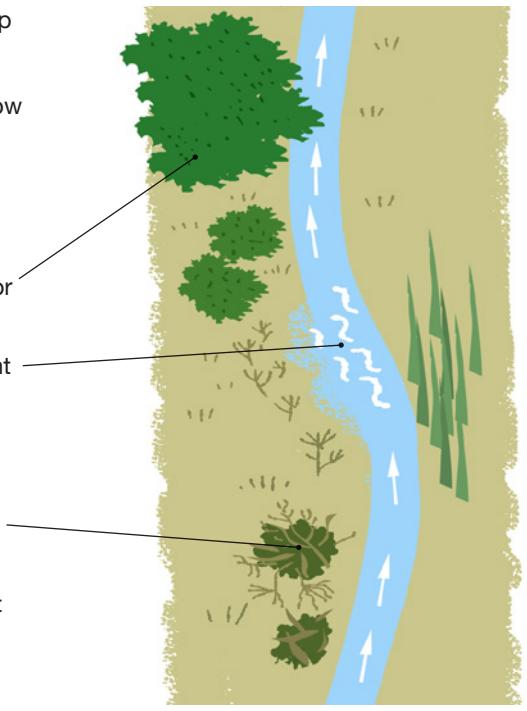
A river bank

Open ditches

Areas of standing water can become stagnant and polluted, attract biting insects or pose a potential hazard to path users. Appropriate management to encourage beneficial water plants and wildlife will help keep a waterbody clean and make it an attractive feature.

In order to keep open ditches clear whilst also protecting wildlife, follow these principals;

- work only from one bank
- maintain the existing water level wherever possible
- leave parts of the ditch undisturbed each time you clear vegetation or de-silt the ditch; Only do what is needed (not the entire feature)
- try to create bends or rough areas to reduce flow rates, avoid straight clear channels with smooth bottoms
- manage the ditch in an upstream direction to enable wildlife to recolonize disturbed areas more easily
- leave aquatic vegetation taken from the ditch on the bankside for a couple of hours to allow wildlife to escape back to the ditch
- do not leave vegetation on the bankside in the long-term as it will rot and pollute the water



Treatment of open ditches

Recommendations:

Do

- **get appropriate permissions** for working near main watercourses and flood defences
- **remember safe working practices** for working near water and the presence of leptospirosis
- **check for protected species** before undertaking major habitat works
- **undertake drainage inspections** during your land inspection regime and tackle problems before they cause damage
- **consider the effects of deep mud** or soft ground on access, the use of machinery and on path users.
- **create new ponds**, ditches, soakaways and marshes along drainage features as part of a SuDS

Don't

- **undertake work that could affect flow rates** or restrict access (such as fencing) within 9m of a watercourse without permission from the local drainage board
- **clear out whole ditches** in one go
- **move dredgings** once they are on the bank
- **automatically clear out obstructions or silted ponds,** consider different times of year and geographic scales

Dredging

Non-hazardous dredgings that are deposited alongside the waterway from where they are dredged are excluded from the Landfill Directive (European Community (EC) Directive 1999/31/EC). To be exempt the waste must be deposited as close as possible to where it was dredged from but care should be taken not to allow dredged material to wash back into the ditch, especially during wet weather. The dredgings must be removed from the waterway and deposited mechanically in one operation, (this means that you can't deposit dredgings onto a bank and then move it further away later on).

Ponds

People tend to think that ponds need to be managed if they are drying out or being 'choked' by vegetation, but different wildlife species like different kinds of ponds. Ponds can also support legally protected species such as great crested newts and this restricts what management can take place. Where non-native invasive species occur management can easily spread seeds or eggs exacerbating the problem and potentially posing legal issues. It may be simpler and more beneficial to create new ponds and scrapes and increase the diversity of water bodies in an area, rather than clearing out existing ponds. These new ponds can be sited to take flood water or act as part of a SuDS system. Seek advice from an ecologist or pond expert before carrying out intensive management.

The Freshwater Habitats Trust have excellent guidance on how to create high quality wildlife ponds. Given the high levels of public access, in particular with dogs, it can be a good idea to have 'sacrificial' ponds beside the path for dogs and people to paddle in, and less accessible ponds that are less disturbed. Boardwalks and dipping platforms can attract people to wildlife ponds but also be a hazard to users, particularly in unsupervised areas, and should be carefully planned and managed.

Water courses

Current Pollution Prevention Guidelines should be adhered to for all work around watercourses to prevent pollution (including muddy run-off) from maintenance work. Refer to Chapter 2 for information on permissions required to work in or near a watercourse or flood defence (including herbicide applications).

Vegetation clearance can sometimes be beneficial around water courses to allow sunlight to reach the water and facilitate the growth of aquatic vegetation. However, this should only be undertaken on the advice of an ecologist who has been to site and assessed the habitat, as existing vegetation along watercourses can also be valuable and support protected and notable wildlife.

Fallen deadwood and other permeable obstructions in the channel create a more varied habitat for wildlife with more micro-habitats that can be exploited. However, obstructions can also increase the risk of local flooding but reduce effects downstream by slowing flow rates. It may therefore be beneficial to monitor the effects of an obstruction on the wider watercourse before taking action.

Where flooding from watercourses is inevitable, alternate route options should be put in place.

Marshes and other waterlogged habitats

Waterlogged areas often support notable species and are valuable and sensitive habitats. As such any work that might affect the drainage of these habitats, such as clearing out ditches, should be carefully considered. Wetlands can become overgrown with scrub and so some small scale clearance can be beneficial, but wet woodland (or carr), is also an important habitat and should be protected.

Before undertaking any significant work at wetland sites a method statement should be agreed that considers access, the potential for damage by vehicles or machinery, hazards (such as deep mud) during the works and effects on route users in the longer term. Where appropriate advice should be sought from an ecologist regarding habitats and protected species before works begin.

Wetlands should ideally be managed in autumn to Minimise the damage to habitats and wildlife

Marsh often occurs in low lying areas

Case Study: **Drain clearance, Snowford Hall Farm in Warwickshire**

Minor flooding was reported along the bottom of an embankment by a neighbouring landowner during the winter of 2014.

Further inspections discovered that a culvert located under the former railway line had become blocked with soil. The flooding was associated with a shallow drainage ditch situated on either side of the raised embankment. Badger holes were identified in four locations; one to the south of the embankment (3 meters from the southern portal of the culvert) and three groups of holes on the northern embankment.

Soil clearance was required at both portals of the culvert to restore the drainage ditches. A method statement was agreed with the landowner and Natural England (the statutory body) to allow works to proceed without the need to obtain a protected species licence or close any of the setts. This was achieved by conducting the works by hand using an experienced contractor supervised by an Ecological Clerk of Works (EcCoW).

The method statement detailed that the works take place in October/ November 2015 following updated surveys, works would be carried out under supervision and all staff would receive a badger tool box talk from the EcCoW.

The soil was dug out using hand tools, working from the opposing side of the spoil heap to the sett entrance whenever possible. Personnel minimised the amount of time stood in close proximity to the entrance and soil was only deposited in areas agreed with the EcCoW.

In this way the drainage channels were cleared with minimal ecological impact and the flooding was alleviated.

The western entrance filled with soil

The eastern entrance after clearance

3.11 Unmanaged areas (& potential veteran trees)

In our highly fragmented and human influenced landscape, most habitats require some level of management to maintain their wildlife value. Most habitats on greenways, particularly grasslands and hedges, need to be managed to remain rich and diverse. However, small patches of unmanaged and undisturbed habitats provide important refuges for wildlife to rest, nest and hibernate away from human disturbance. These areas can be rare, especially in urban areas, but provide a benefit to all neighbouring habitat areas.

The absence of management can be an important tool to limit pedestrian access and so protect valuable features. Before managing areas outside the path verge it can be helpful to consider what would happen if an area was 'left to nature'. For example veteran trees with standing deadwood that would otherwise pose a potential hazard can be retained and ponds can be protected from damage by humans and dogs.

A clear and well managed path leading away from an unmanaged area is often the best distraction/deterrent. Where necessary limiting public access to areas can be achieved by the promotion or retention of spikey or unpleasant plants, the creation of physical barriers such as dead hedges or narrow trenches and / or hiding sites from view behind willow screens, hedges or tall vegetation. In areas with a history of anti-social behaviour it may be necessary to provide more secure separation using fencing to prevent unwanted access.

Recommendations:	
Do	• **allow scrub to develop** between the path and features such as mature trees • **communicate with the general public** about the wildlife benefits of more visible 'unloved' areas
Don't	• **manage all habitats** in order to 'tidy up' • **remove deadwood** from trees and woodlands unless it is a threat to the public

3.12 Steep banks and rock faces/exposures

Steep banks can pose obvious hazards to management staff and the public. Vegetation management should be carefully planned to avoid exposing hazardous slopes.

Exposed rock faces can be of geological and ecological importance and can be great promotional tools to encourage new greenway users and inspire educational visits. However, exposed formations can pose a potential hazard if rocks become loose and should be included in regular land inspections. Changes in rock faces can be subtle so taking photographs for comparison is advisable. Where a significant hazard is identified action should be taken to mitigate the risk.

Avoid damaging or removing the roots of mature trees or climbing vegetation as these may be buttressing or supporting the rock face. Cutting and treating of stumps is acceptable as this allows support to remain in situ. Management (often called 'de-veg & descaling') is usually undertaken as a combined task and is a skilled job with a lot of judgement in it – the use of a skilled contractor is highly recommended.

An exposed rock face

Suggested actions based on resources and income:	
Minimal resources / low cost	• **put up signs** warning of potential rock fall • **maintain standoff areas**
Basic resources and budget	• **consider whether the path can be moved** further away from the rock face • **partially in-fill rock cuttings** to reduce height of rock faces • **maximise width of stand-off** between rocks sources & public routes • **remove sloping screes** from lower parts of rock faces • **de-scale** to remove loose rocks • **manage small trees** and climbing vegetation where it becomes a problem and to allow a clearer view for safety assessments
Extra resources and budget	• **provide interpretation** re: geological interest (if any) • **form ditches and/or bunds** as rock traps within stand-offs, to halt rocks • **use rock traps/ fixed mesh & rock bolts** to minimise the impact of any future rock fall • **consolidate & retain cliff faces** using retaining walls, mesh or shotcrete

Recommendations:	
Do	• **use safe working methods** when working around gradients and uneven ground • **make more of interesting geological features** (if budget allows) • **keep an eye on these features** in the same way you would undertake structure inspections
Don't	• **remove the roots** of substantial/mature vegetation

3.13 Problem plant species

Problem plant species on greenways include invasive non-native species, injurious weeds and ornamental plants.

Giant hogweed

Japanese knotweed

Himalayan balsam

Invasive non-native species

Species listed as invasive non-native species under schedule 9 of the Wildlife and Countryside Act 1981 often grow on greenways, including giant hogweed, Japanese knotweed and Himalayan balsam. There is no obligation to control these species if they occur on your land but it is an offence to cause these species to spread. Under public nuisance laws there is an obligation not to let these species spread onto your neighbours land.

Giant hogweed poses a serious hazard and can cause chemical burns if people come into direct contact with it, children are particularly vulnerable. It is therefore essential that it is eliminated from accessible areas as quickly as possible and not allowed to regrow. Maintenance staff are also vulnerable and only trained and competent personnel following and approved method statement should attempt to control this species.

Japanese knotweed can damage structures, path surfaces and other features. It is highly persistent and will readily regrow from small fragments of material. For this reason all soils within 7m of a knotweed plant should be considered contaminated land. Regular treatment with herbicide will control knotweed but full eradication can take several years.

Himalayan balsam dies in the winter and regrows from seeds every year. This species can readily be tackled by staff and volunteers through clearance or hand pulling. Once flowers develop management should stop to avoid spreading seeds and exacerbating the problem.

There are many invasive aquatic plants that you might find in your ditches and watercourses. If you do discover an invasive species, don't panic – take care not to cause it to spread (via, tools, boots or machinery) and seek advice from an ecologist or invasive species expert.

Further advice and identification information is available:

- **The Non Native Species Secretariat** website
- **Himalayan Balsam, Ecology Technical Information Note E03** (Sustrans 2015)
- **Japanese Knotweed, Ecology Technical Information Note E04** (Sustrans 2015)

Injurious weeds

These are species detrimental to agriculture listed on the Weeds Act 1959. It is not an offense to have these species on your land but they should not be allowed to spread onto neighbouring agricultural (especially grazing) land. The species of most concern is ragwort Senecio jacobaea which can harm livestock. Control is only recommended in medium or high risk situations although once ragwort is established it is difficult to eradicate and an early response may be appropriate.

- **medium risk:** Ragwort is 50 m to 100 m from land used for grazing or feed production: Consider establishing a control programme to prevent it spreading closer. Control may not be necessary if prevailing winds, topography, natural barriers, soil type or other vegetation cover make it unlikely that ragwort would spread
- **high risk:** Ragwort is within 50 m from land used for grazing or feed production - action should be taken to prevent its spread onto the adjacent agricultural land

Young ragwort plants can easily be pulled by hand and more established plants removed using a spade or fork. It is important to wear gloves and also to remove the material from site if the greenway is used by horses as it is when it has been pulled that livestock are more likely to ingest it. Ragwort is biennial so it usually takes a few years to remove it from an area. More Information on controlling ragwort can be found in **Ragwort, Ecology Technical Information Not**e E05 (Sustrans 2011).

Ornamental plants

Ornamental species often escape onto greenways from adjacent land. Ideally management should favour native plants and non-natives should not be planted. This benefits wildlife and enables people to 'escape' into the natural world. In a more urban context a more relaxed view can be taken if the ornamental species are in keeping with the character of the area and are beneficial to wildlife. Any ornamental species that becomes dominant to the detriment of native species should be controlled.

Suggested actions based on resources and income:	
Immediate action irrespective of cost	• treat giant hogweed where it is a hazard to path users
Minimal resources / low cost	• treat giant hogweed in all potentially accessible areas • volunteer workdays to control Himalayan balsam
Basic resources and budget	• volunteer workdays to eliminate Himalayan balsam • treat Japanese knotweed near neighbouring properties
Extra resources and budget	• treat all stands of Japanese knotweed

Ragwort

Recommendations:

Do

- **keep an eye out** and record the location of any invasive species, in particular giant hogweed and Japanese knotweed
- **use a contractor**/trained and competent operative to undertake treatment involving herbicides
- **utilise volunteers** to remove Himalayan balsam as early as possible, before it flowers and sets seed

Don't

- **allow staff**, volunteers or the public to come into contact with giant hogweed
- **undertake any vegetation clearance** or use machinery within 7m of Japanese knotweed, in case you inadvertently cause it to spread

Case Study: **Himalayan balsam treatment in Renfrewshire**

Volunteers hand pulling Himalayan balsam

Himalayan balsam has been recorded in a number of locations along National Cycle Network Route 7 in Renfrewshire (Scotland), including along a section of the route in Lochwinnoch, where it has spread from the adjacent corridor of the river Calder. The land is owned and managed by Sustrans.

As part of the Habitat Management Plan for the route Himalayan balsam eradication was proposed to address the spread of the invasive species within the route corridor and to provide opportunities for re-colonisation by native flora.

In collaboration with Sustrans Scotland's Land and Estate Manager plans were developed to tackle the Himalayan balsam in two different and complementary ways:

- a specialist contractor was commissioned to treat the balsam with a glyphosate based herbicide in May before plants begin to flower. Direct application with a backpack sprayer was used on steeper slopes and in difficult reach locations.
- at the same time hand-pulling was carried out by volunteers in easy to reach locations and where the concentration of Himalayan balsam growth was sufficient to create a rewarding volunteer task.

Further workdays are planned on an annual basis to reduce and control balsam along the route. Eradication will not be possible due to off-site populations upstream along the river Calder continuing to produce seed that is carried to the site. Partnership working with upstream landowners has been proposed to help alleviate this problem although a whole catchment plan will be required to completely eradicate the species.

Cost: £200 (Contractor), Volunteer time

Case Study: **Japanese knotweed treatment in the West Midlands**

Japanese knotweed growing through a spruce tree

Dead stalks of Japanese knotweed in the winter

A section of greenway passing through Biddulph was being managed in partnership with the local council. Several small Japanese knotweed plants were reported to Sustrans by council staff in 2013.

The plants were small and did not pose a risk to the path or nearby structures, however the section of route was close to several residential gardens.

A more detailed inspection revealed knotweed plants along a short section of ditch that could carry infected soil and plant materials downstream during heavy railfall. It is possible that this is how the plant came to be in the ditch in the first place.

A specialist contractor was commissioned to treat the knotweed with a glyphosate based herbicide during the drier summer months to reduce the risk of herbicides entering the watercourse. Direct application with a backpack sprayer was used once per year for three years and has resulted in no knotweed plants being found on site in 2015.

Costs:

2013: £300 for a contractor to carry out 3 treatments over 3 years

2014: No expenses

2015: No expenses

3.14 Herbicides and pesticides

Herbicides are sometimes needed to control problem plants but can harm people's health and the environment. Their use on greenways should be minimised and strictly controlled. Pesticides are unlikely to be required, but may be necessary, for example if wasp nests pose a significant hazard to path users.

Using the minimum amount of chemical necessary is a legal requirement in areas frequented by the public and is only appropriate when there are no cost effective non-chemical alternatives available. The Control of Substances Hazardous to Health Regulations 2002 (COSHH) will need to be adhered to if herbicides are to be used. The Health and Safety Executive recommend that in amenity spaces users of herbicides and pesticides not only comply with the authorised conditions of use but also use them in a responsible and sustainable fashion and follow these 10 rules;

1. **Training.** Users must be competent to apply products safely and should hold a relevant and up to date certificate.

2. **Planning.** Assess whether non-chemical methods or an integrated approach may deliver an acceptable degree of control.

3. **Sourcing herbicides:** Buy chemicals from reputable distributors.

4. **Storing herbicides**. Storekeepers should be trained and qualified to ensure compliance with legal requirements, best practice and keep up to date with changes in guidelines.

5. **Maintain application equipment.** All equipment must be regularly calibrated and there is a legal requirement to test certain types of application equipment on a regular basis.

6. **Minimising use.** Using the minimum amount of product necessary to control weeds is a legal requirement in areas frequented by the public and on certain transport infrastructure and sealed surfaces. Application on hard surfaces should be targeted.

7. **Protecting people.** The legislation requires that all reasonable precautions must be taken to protect human health including employees, neighbours and users of the path.

8. **Protecting the environment.** The legislation requires that all reasonable precautions must be taken to protect the environment, and particularly water, when storing, handling or using chemicals.

9. **Checking the guidance.** Users should keep up to date with changes in guidance and government codes of practice.

10. **Keeping records.** Current legislation demands that records of chemical use must be kept.

This may mean that it is preferable to use a well-chosen or 'approved' contractor if the above is too onerous for the scale of the issue. There are different methods of applying herbicides, listed below. A suitably qualified operative will be able to advise on the most suitable method depending on the proximity of ecologically sensitive habitats;

Glyphosate herbicides are most effective from july to september (or before leaves discolour and fall)

Recommendations:

Do

- **use ground protection** such as bog mats to spread the weight of vehicles in sensitive areas such as wetlands or near mature trees
- **avoid exposing soil** on slopes or next to watercourses
- **consider how you will re-vegetate** this area and whether soft engineering will be required

Don't

- **bring top soil on site** – it will encourage more vigorous plants that harm wildflowers and lead to increased maintenance burdens
- **move any soil** within 7m of known stands of Japanese knotweed

- **foliar spray:** coat plant leaves with a fine spray. Main disadvantage is the risk of drift spray, so don't use it near water or desirable plants
- **stem injection:** inject herbicide into plant stems. This method is particularly useful where spray drift has to be avoided
- **weed wipe:** this is the slowest and most costly method of applying herbicide but is the most appropriate if the problem plant is growing close to desirable plants to be retained
- **ecoplugs:** plugs of herbicide hammered into cut-stumps: a 100% selective method which ensures no spillage of chemicals, no risk of damage to the surrounding vegetation and reduced risk of contact with the active substance for people

Use of herbicides near water

You will need permission from the Environment Agency to use herbicides to control weeds in water or on the banks next to a water body or watercourse and will need to follow rules set out in The Food and Environment Protection Act 1985 (Control of Pesticides Regulations 1986, as amended).

3.15 Soil protection

Soil characteristics such as pH, nutrient levels and drainage can determine the ecological value of habitats along greenways. Irrespective of soil type some bare soil is also a valuable habitat and occasional disturbance can create new opportunities for wildlife. Maintenance work on greenways can therefore create new features or detrimentally affect valuable habitats through soil compaction, nutrient enrichment and by allowing soil erosion to occur.

Sources of information

- Good Practice Guide for Bank Protection: Rivers and Lochs (SEPA, 2008)
- Waterway Bank Protection: A guide to erosion assessment and management (EA, 1999)
- Environmentally sensitive channel and Bank Protection Measures (NCHRP, 2005)
- Estuary Edges: Ecological Design Guidance (Environment Agency, 2008)
- River Restoration Manual (River Restoration Centre, 2013)

Nutrient enrichment

To avoid nutrient enrichment (which detrimentally affects wildflowers);

- no fertiliser or topsoil should be added to soft landscaping along the greenway
- grass cuttings should be removed from areas of grassland to prevent them from rotting down in situ and adding nutrients to the soil

Compaction

Soil compaction from frequent or heavy vehicle movements can affect drainage and damage the root system of trees. This can be remedied through techniques such as air spading, although this can be expensive. If vehicles are accessing the greenway protect important habitats such as mature trees, marshy grassland and other wetland habitats. Keep vehicles on the surfaced path or use ground protection such as bog mats to spread the weight of the vehicle.

Where no sensitive habitats are present vehicle movements can create bare ground, minor topographical variations and ephemeral puddles that increase the variety of microhabitats present on the route for invertebrates and can be beneficial for nature conservation.

Movement of soil

If soil is to be moved on a temporary basis for work on the greenway follow recommendations in Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009) relating to soil movement and storage.

When re-landscaping or moving soil on a temporary basis be aware of potential contaminants such as asbestos or invasive species such as Japanese knotweed and potential impacts on protected species. Advice from a suitably experienced ecologist should be sought before any significant earthworks.

Soil erosion

Where scrub and invasive plants have been removed the ground can be vulnerable to soil erosion, particularly on the banks of watercourses or if heavy rainfall is forecast. In ordinary circumstances natural regeneration is preferred, however where soil erosion is a risk planting or soft engineering techniques may need to be used to stabilise banks. Soft engineering techniques can be applied to three different types of design categories:

- bioengineered - using plants to provide stability and protection from erosion (e.g. pre-planted coir mats, coir rolls or wooden reinforcement)
- biotechnical - hard techniques to provide structural support for plants or live bioengineered products (e.g. stone supports or reinforced vegetated geotextiles)
- biostructural - hard structures with a soft face (e.g. vegetated gabion cages)

Recommendations:

Do

- **use ground protection** such as bog mats to spread the weight of vehicles in sensitive areas such as wetlands or near mature trees
- **avoid exposing soil** on slopes or next to watercourses
- **consider how you will re-vegetate** this area and whether soft engineering will be required

Don't

- **bring top soil on site** – it will encourage more vigorous plants that harm wildflowers and lead to increased maintenance burdens
- **move any soil** within 7m of known stands of Japanese knotweed

3.16 Delivery

Landowners

Greenways may have a variety of landowners along their entire length. It is important to understand each other's objectives and requirements so that collectively more is achieved with the resources available.

Partnerships

Partnerships can help you to reach your management objectives, particularly if you lack technical expertise or have limited resources. Whether the arrangement is formal or informal, agree in writing what work will be carried out, when and how both parties will benefit and support each other. The inclusion of the three sectors below is likely to create a strong and holistic partnership:

- **public bodies:** Parks and opens spaces teams may have capacity to assist tasks like path sweeping, collection of fly tipping and emptying of bins.
- **businesses:** As part of their corporate social responsibility businesses may contribute through providing skills, advice, materials (e.g. B&Q community re-use scheme or through corporate workdays. Some businesses offer funding for example Tesco Local Community Scheme, Aviva Community Fund and banks often have similar schemes.

- **third sector groups:** may be more experienced at involving the local community, supporting volunteers or working with different target audiences e.g. mental health groups, the elderly or deprived communities. They may also be able to provide specialist advice on wildlife or history or to secure funding that you can't

Contractors

You and your contractor have responsibilities under health and safety law to take precautions to manage and reduce the risks of workplace dangers to employees and the public. You will need to select a competent contractor, make sure all aspects of the job are clear and ensure health and safety implications have been fully assessed and agreed. See the Using contractors: A brief guide (HSE, 2013) for information and examples.

Your organisation may use an approved list of contractors or those registered with a procurement and supply chain management service, such as Constructionline, or the Contractors Health and Safety Assessment Scheme (CHAS). Personal recommendations are often a good way to find reliable contractors. Alternatively ask contractors for references to contact and recent examples of similar work.

Where utility companies or other third parties conduct work on or adjacent to the greenway they will use their own contractors. In such instances your main consideration will be to ensure that works proceed in such a way to avoid and minimise disturbance or damage, offset unavoidable damage and restore and enhance the greenway once work is complete. Temporary path diversions and signage may be required. Enhancement could include improvements to the path surface, access points, signage or biodiversity.

Communities and volunteers

Volunteers helping to resurface a path

Engaging local people and volunteers can enable you to tackle management tasks beyond your current resources, fosters a sense of community ownership and create advocates for the greenway and your organisation. Volunteers are often highly engaged individuals who are proactive in joining partnerships, attending or running events, carrying out route inspections or engaging in practical maintenance work. They can also do things that you perhaps can't, such as petitioning local MPs. Volunteers may benefit personally by increasing their confidence, improving their physical and mental health, learning new skills and meeting new people.

There will still be resource implications when engaging with local community groups and volunteers. Anyone using volunteers should undergo volunteer management training to ensure they understand the legal and regulatory issues involved. You should consider their health and wellbeing, communicate effectively with them and support and train them to undertake the tasks in hand. If your organisation is not set up for managing volunteers, consider partnering an organisation with its own volunteers or local 'Friends of' groups.

4. MONITOR

Monitoring and evaluation are an important part of any land management plan or project. They enable you to know what effect your interventions are having so you can adapt your plans accordingly. With limited resources you will need to prioritise what is most important and practical to measure. Monitoring also needs to be a repeatable activity to evaluate change over a period of time. You need to determine;

- what will be monitored and how?
- who will undertake the monitoring work?
- how will you tackle inconsistences between different surveyors?
- do they have sufficient skill or do they need training?
- how frequently will they undertake the monitoring?
- what is the likelihood of this resource being available in 10 years' time?

Monitoring, evaluation and planning is a cyclical procedure. Remember to allow time to review your actions. Although your objective will remain the same your management may change to reflect what you have learnt from monitoring.

Volunteers monitoring wildlife

4.1 Condition assessments

Condition assessments monitor change over time. This may determine whether a tree is declining, a crack in a bridge is worsening or a habitat is becoming more or less diverse. In order for these to have any meaning the surveyor will need to;

- choose measurable and reliable indicators at the outset
- follow the same methodology as employed in the initial assessment

Some guidelines have been published, for example the Farm Environmental Plan Manual (Natural England 2010), although this methodology requires specialist skills and can be lengthy. Local authorities often have a duty to report on the condition of habitats and notable features within their areas of influence and where specialist staff exist they can provide specific guidance and support.

Example

To measure the condition of habitats you may choose a mixture of positive indicators (number of desirable plant species, extent of habitat or diversity of plants within the habitat type) and negative indicators (% cover of undesirable species).

4.2 Monitoring people

Route user surveys can help you justify your work. By asking the right questions you can ascertain if your greenway has encouraged more people to take regular exercise, and whether they are using the route rather than take a journey in a car. These are all things that can support developing the walking and cycling network.

In addition to this you can ask qualitative questions to find out people's experience of the greenway and the value it brings to them and the community.

For further information see Sustrans Design Manual Chapter 16 – Monitoring and evaluation of walking and cycling (draft) (Sustrans, November 2014).

Recording local peoples experiences

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