



Making the most of communities' natural assets: green infrastructure

An information note for Community Planning Partnerships on applying an ecosystems approach



This information note is for community planning partnerships, their members and local partnerships involved in economic regeneration. Community planning partnerships include local authorities, health boards, enterprise agency and transport partnerships and often involve other public, voluntary and private sector partners. They work to provide better public services and to engage people in the public service decisions which affect them. The note explains how communities and those who serve them can use land and water in a way which works with nature to sustain the benefits nature provides. It suggests some practical steps to make the most of green infrastructure and provides links to further information and examples. This note supplements the information note on applying an ecosystems approach to land use published in 2011 alongside the Scottish Government's Land Use Strategy, as well as the National Planning Framework, Scotland's Climate Change Adaptation Framework, the Scottish Biodiversity Strategy, and the Regeneration Strategy. It has been prepared by Scottish Government and its agencies, with input from a range of stakeholders, as a source of information but is not statutory guidance.

Nature is our life-support system: it is essential for the air we breathe, the water we drink, and the food we eat. Nature enhances the quality of the places where we live, work and visit, and provides the landscapes and wildlife that help make these areas special. Scotland's nature underpins our tourism industry, with nature-based tourism worth £1.4 billion a year¹. 11% of Scotland's total economic output depends on sustainable use of the environment. This is worth £17.2 billion a year, and supports 1 in 7 of all full time jobs². Nature can also help make us more resilient to events such as flooding, land slides or sea level rise which are likely to increase with climate change. We need to look after nature, rather than taking it for granted, to ensure it continues to provide benefits for future generations. An environment that is healthy and enables nature to thrive is also healthier for people and for the economy.

¹ Bryden, D.M., Westbrook, S.R., Burns, B., Taylor, W.A., and Anderson, S. 2010. Assessing the economic impacts of nature based tourism in Scotland, Scottish Natural Heritage Commissioned Report No. 398.

² RPA and Cambridge Econometrics. 2008. The Economic Impact of Scotland's Natural Environment. Scottish Natural Heritage Commissioned Report No.304.

This is essential to sustainable development. What do we mean by nature? We mean natural assets like healthy soils and clean rivers, wild species and landscapes, peatbogs and woods, tidal mudflats and underwater reefs, urban parks and greenspace. Together these make up the green network of 'green infrastructure' as essential to Scotland's future as roads and railways, pipes and cables. Productive farmland is an essential part of Scotland's natural assets, but green infrastructure usually refers to features in the landscape that provide benefits other than, or alongside, food production. This includes allotments which provide opportunities for communities to grow food as well as contributing to urban greenspace.

Green infrastructure provides multiple benefits

Place-making – by improving the image of a place, giving it a distinctive identity and sense of place, boosting property values and attracting economic investment³.

Flooding and water management – by protecting against flooding and improving resilience to climate change. Living roofs, large trees and soft landscape areas absorb water.

Energy and carbon management – by saving energy costs. Living roofs insulate buildings, and trees shade offices which reduces the need for air conditioning. Trees provide fuel and many natural habitats, store carbon, helping to reduce greenhouse gas emissions.

Clean air and tranquillity – by helping to improve air quality and reduce noise.

Health and wellbeing – by improving opportunities for access to nature and outdoor space for exercise, recreation, and reflection.

Education – by providing a resource for outdoor learning.

³ In an online survey across all regions and sectors in Scotland between December 2007 and January 2008, two-thirds of businesses surveyed believe that Scotland's natural environment benefits their company.

Solving problems and reducing costs

Working with nature can provide effective and often lower cost solutions to complex problems. For example, working with nature's natural functions to remove pollutants from water or air, or to reduce flooding impacts, can often be cheaper than using more conventional hard engineered approaches that may require more expensive materials and construction methods. Including appropriately designed and sited greenspace in towns and cities as part of a wider approach to sustainable urban drainage systems can reduce the need for additional drainage capacity in more conventional underground pipes. This approach can offset increases in built-up land and impermeable surfaces such as car parks which put more pressure on the drainage system. [See example: Metropolitan Glasgow Strategic Drainage Partnership surface water management schemes⁴].

Looking after our natural assets like rivers or wildlife is cheaper in the long term than trying to restore them after they have been damaged or degraded. For example, controlling an invasive non-native species such as Japanese knotweed before it spreads with associated cost implications for built development. A report suggests that invasive species cost £1.7 billion every year, such as through loss of crops, damaged buildings, additional production costs and loss of benefits from nature. This includes £251 million in Scotland, and more than £6m to the Scottish construction and development sector⁵.

The costs of high-maintenance, low biodiversity "green deserts" of much urban greenspace is another example of a problem where "nature assisted management" adopted from ecosystem thinking could be an answer⁶ (see Edinburgh Parks example). A recent evaluation for Forestry Commission Scotland of the installation of a natural play facility in the grounds of Merrylee Primary School in Glasgow found that it costs only about £3,000 more than using hard surfaces - and the knock-on benefits for children's health, behaviour and achievement are significant⁷.

⁴ The Metropolitan Glasgow Strategic Drainage Partnership (MGSDP) is undertaking work to evaluate Glasgow's complex drainage infrastructure issues. More details at <http://www.mgsdp.org/>

⁵ The Economic Cost of Invasive Non-Native Species to the British Economy Williams et al 2010. CABI.

⁶ [Protecting, planting and restoring native woodland - the Woodland Trust](#)

⁷ More details at:

[http://www.forestry.gov.uk/pdf/NaturalPlaySummary.pdf/\\$FILE/NaturalPlaySummary.pdf](http://www.forestry.gov.uk/pdf/NaturalPlaySummary.pdf/$FILE/NaturalPlaySummary.pdf)

Improving Edinburgh's Parks – Living Landscapes

Edinburgh City Council aims to improve its parks through the Living Landscapes project. Current trials in a number of parks are transforming the intensively maintained landscape features (e.g. amenity grassland and municipal flower/shrub beds) to less intensive but more biologically rich landscape features. These include Pictorial Meadows, a mix of native and non-native wildflower communities. The trials have been extremely popular as they create a vibrant and visually appealing environment for park users and local residents. Further trials are planned with Edinburgh University as part of their "Urban Pollinator" research, (see http://www.edinburgh.gov.uk/info/94/wildlife_conservation/550/wildlife_conservation_and_biodiversity/5).



Research increasingly highlights the health benefits from physical activity and contact with nature⁸.

- Regular participation in informal recreation, volunteering and learning in the outdoors can all improve physical and mental health.
- Contact with nature can help recovery from physical and mental problems and guard against future illness, as well as increase mental concentration⁹.
- Enjoyment of nature and involvement in its care brings increased social contact and contributes to stronger communities.
- Stimulating a positive interest in the natural world and promoting outdoor activity at a young age has the potential to encourage healthier lifestyles.

⁸ For example Good Places Better Health for Scotland's Children: Childhood Mental Health and Wellbeing Evidence Assessment December 2011. Scottish Government. [Good Places Better Health, Findings and Recommendations](#)

⁹ An Essex University study that showed five minutes of green exercise had the biggest impact on young people and those with mental health problems in terms of boosting mood and self esteem.



Evidence suggests that investing in nature and landscapes can be cost effective. For example, an analysis of an 8 week wildlife and nature activity programme in Perth and Kinross, for patients with a variety of mental health problems as an alternative form of rehabilitation support, produced an estimated 'profit' of £12.43 for each £1 spent i.e. a social return on investment of £1: £12.43¹⁰.

An important aspect of creating health-nurturing environments is ensuring that everyone has access to high quality greenspace for health and recreation. The Central Scotland Green Network aims to transform the environment of the central belt, in particular our most deprived communities, and to ensure that everyone has access to attractive, well-maintained greenspace within walking distance of their home.

Working with nature – sustaining nature's community service

To sustain nature's benefits for people, it is important that we reflect these benefits in making decisions about how we use and manage land for communities. Applying an ecosystems approach allows decision-makers to do this. An ecosystems approach is a holistic approach for integrating management of land, water and living resources that promotes conservation and sustainable use in an equitable way. The Scottish Government has identified three principles or steps which together enable decision-makers to apply an ecosystems approach to land use:

1. Understand how nature works and how decisions affect nature and the benefits it provides. This means working with nature rather than against it, and often thinking in the long term and at a wider scale. It involves identifying the natural assets, or green infrastructure, that underpin nature's benefits, how they are inter-connected and how best to manage them. It also means

¹⁰ Greenspace Scotland (2011) Wood for Health Pilot. Social Return on Investment (SROI) Analysis. <http://www.greenspacescotland.org.uk/default.asp?page=574>

understanding how proposals could impact on natural systems and avoiding exceeding environmental limits such as for pollution or habitat loss which could lead to knock-on effects on other natural assets. It is an iterative rather than one-off approach, involving adaptive management which responds to lessons learnt and to new information such as the effects of climate change.

2. Take account of all the multiple benefits that nature provides.

An integrated, holistic and cross-sectoral approach is likely to be most successful. The values of some of these benefits can be accounted for by using economic and other measures to inform policies. Understanding all of the benefits nature provides can inform priorities for investing in improving natural assets to enhance these benefits.

3. Involve local people and communities and value their special knowledge and perspectives on why greenspace is important to them. Help communities and land managers to develop a vision that sustains their natural assets.

Making better land use choices

There is growing Scottish experience of innovative ways to apply these principles to make better use of land to sustain nature's benefits. They can be reflected in land-use decisions from development plans to design plans and delivery of services from drainage to health to park management. Local authorities and developers play a critical role in this process, but improving green infrastructure requires a collaborative approach involving other organisations in the public and private sector and communities. The Scottish Government's National Performance Framework and Single Outcome Agreements provide the framework to work together in this way. Community Planning Partnerships are important in setting an overall vision for an integrated and holistic approach that recognises the value of green infrastructure. They can also work to ensure synergy with neighbouring partnerships.

The following steps apply to any decisions which make use of or affect the natural environment and the benefits from it. Examples for particular types of decision-making are given in the next section.

- **Identify your natural assets or green infrastructure.** Natural assets cannot be considered separately as they are often linked through natural processes such as water or wildlife movements, or through the way people use them such as path networks, so they are best considered as part of a network. Integrated Habitats Networks are one way of identifying natural assets and opportunities to enhance them.
- **Be aware of the effects of different choices** for planning and land use on nature and the benefits it provides, such as using Strategic Environmental Assessment (SEA). For example, built development that limits soil sealing reduces run-off rates and flood risk. SEA can also help to identify opportunities to enhance green infrastructure.

- **Where appropriate, support transfer of responsibilities for management and decision-making to communities** through community ownership, co-operatives or partnerships, for example community development trusts, community land buy-outs or community woodland.
- **Use indicators of the health of the environment** against which to measure whether the benefits from nature are being sustained into the future, and to help decide where action is needed to restore a healthy environment. The [Environmental Indicators Framework](#), published to support measures in the [Menu of Local Outcome Indicators](#), shows how indicators can be used to describe the state of the environment, and to describe progress towards outcomes and the activities required to support that progress. Indicators can improve understanding of environmental limits. Where possible indicators should be meaningful for the public who can get involved in improving local environmental knowledge through citizen science and nature recording networks, such as Local Record Centres or internet-based recording like [i-Spot](#).

Building on good practice – practical examples

The following are some examples where decision-makers have used some of these steps to enhance local benefits from working with nature and building green infrastructure. In some cases, decision-makers have come together to integrate their activities towards common goals through Community Planning Partnerships.

Development planning and place-making

Techniques such as [Charrettes](#) (Scottish Sustainable Communities Initiative) and [Enquiry by Design](#) (e.g. in Aberdeenshire, Caithness, East Ayrshire) have been used in different parts of Scotland to engage communities in new development proposals. Similar processes can be applied to existing settlements to help shape the many activities undertaken by the public sector. Existing assets, whether natural or built, can form the basis for new, green infrastructure that is relevant to the community.

The guide [Green Infrastructure: Design and Place-making](#) includes examples of incorporating green infrastructure into building and urban design at different scales – from a building to a neighbourhood to a region.

[Seven Lochs Wetland Park Masterplan](#) is a key green network element of the Gartloch-Gartcosh community growth area which will see 4500 new homes created in the area over the next 15 years. The Masterplan sets out a vision, costed proposals for the site split over 3 phases, recommends how it should be developed and identifies possible funding sources. The Gartloch Gartcosh Strategic Delivery Partnership is consulting widely on the draft plan to secure community and political support for the project.



Shrubhill Works

The 2011 winner of the Integrated Habitats Design Competition was a design for adapting a brownfield site for housing at Shrubhill, Leith. The judges commented “This project integrates community, energy, materials, water, food and biodiversity, transforming a run-down inner city site into a water sensitive urban village with permaculture at its heart. Integration comes in the form of waste and wastewater treatment and rooftop gardens. The site includes plenty of wildlife habitat which links to the wider ecological network and species, including bats, birds and bees.”

Funding and investment

Clackmannanshire Council, with support from the [Central Scotland Green Network Development Fund](#), has developed a strategy and framework for decision-making on future investment in a range of green network projects across the Council area. Working in partnership with the Clackmannanshire Alliance (the Community Planning Partnership for Clackmannanshire), Forestry Commission Scotland and Action for Change, the project brought together information from a variety of sources to produce a vision and action plan for the future management of, and investment in, the green network in Clackmannanshire. This will target resources at projects which will have the biggest impact on the health and well-being of Clackmannanshire’s residents. The study is also helping to develop the Local Development Plan and related Open Space Strategy.

Water and drainage infrastructure

The [Metropolitan Glasgow Strategic Drainage Scheme Partnership](#) aims to provide a holistic approach to managing surface water which will reduce flood risk and unlock development potential while improving water quality and allowing residential areas to co-exist with the natural landscape.

Economic regeneration and use of vacant/derelict land

Central Scotland Forest Trust, with support from the Central Scotland Green Network Development Fund, identified vacant and derelict land sites in North Lanarkshire suitable for woodland planting for the International Children's Games 2011 Legacy Project, to help the organising committee realise their ambition to deliver a carbon neutral Games. The methodology devised identified a number of sites which are suitable for planting and the funding and implementation of these are being explored by the Trust and the Forestry Commission Scotland. In addition, links with Beautiful North Lanarkshire have been established which should also lead to implementation of some schemes by volunteer groups.

[Irvine Bay Green Network Strategy](#) focuses on the greening of derelict industrial sites and contaminated land to create and restore accessible greenspace and wildlife habitats. The strategy explores both permanent and temporary solutions for sites awaiting development and the action plan contains costed proposals for five key sites. Projects are now being taken forward including at Riverside Business Park.

Health

[Tayside Woods for Health](#) is an initiative led by three neighbouring Ranger Services working in partnership with NHS Tayside Health Board, other participant mental health services and local Community Planning Partnerships. It has established programmes of outdoor nature-focused activity; structured around the John Muir Award scheme to supplement traditional forms of care provided for mental health support service users. Social Return on Investment (SRoI) evaluation of the 2010 pilot demonstrated the scope for outdoor 'green prescription' activities, with an estimated social return of £9.30 for every £1 invested. Programmes have been developed in Perth and Kinross, Angus and Dundee.

[Royal Edinburgh Community Gardens](#) is a 3-acre community garden within the Royal Edinburgh Hospital grounds in Morningside. It involves a diverse range of volunteers of all ages, abilities and social backgrounds. It was established to pilot a community-based approach to maintaining and improving health and well being, promoting healthy eating, outdoor exercise and volunteering opportunities. The gardens are now open three days a week and encourage members of the public, community associations, local charities, users of mental health services and hospital in-patients to get involved. Initially part-funded by Central Scotland Green Network and Scottish Natural Heritage, NHS Lothian has recently contributed to the project's core costs of approximately £26,000k per annum.

Finding out more

Advice and Guidance

[Applying an ecosystems approach to land use](#) Information Note. Scottish Government 2011 Provides general background on applying an ecosystems approach to land use.

[Green Infrastructure: Design and Place-making](#). Scottish Government 2011 Builds on *Designing Places* and *Designing Streets* to give practical tips on incorporating green infrastructure in masterplans.

[National Standards for Community Engagement, Scottish Community Development Centre](#) Sets out best practice guidance for engagement between communities and public agencies.

[Environmental Indicators Framework](#). Improvement Services. Published to support measures in the Menu of Local Outcome Indicators. The Framework is still in development.

[The Prince's Foundation's Enquiry by Design](#) Planning tool which brings together stakeholders to collaborate on a vision for a new or revived community.

[Resilient Places – character and community in everyday heritage](#). Demos 2010.

[Green Networks in Development Planning](#) Guidance explaining the background to green networks, their multi-functionality and providing development planning advice in respect of green networks. Scottish Natural Heritage, March 2012.

[Health Impact Assessment of Greenspace: A Guide 2008](#) A valuable tool in enabling practitioners and partnerships to develop an understanding of the potential health impacts of greenspace projects, including policies and plans, and to increase the emphasis on health greenspace in proposals. Includes a review of relevant literature. Published in 2008 by Greenspace Scotland in partnership with NHS Health Scotland, Scottish Natural Heritage and the Institute of Occupational Medicine.

[Green Health](#) A programme of research on the contribution of green and open space in public health and well-being, funded by Scottish Government and led by James Hutton Institute. Outputs will include guidelines on measures to target the provision of green and open spaces to support public health and well-being in rural and urban areas and an indicator of health and well-being with respect to environmental characteristics.

[Green Infrastructure Valuation Toolkit](#)

A valuation framework for assessing the potential economic and wider returns from investment in green infrastructure and environmental improvements. A prototype developed under the Green Infrastructure North West partnership is available for use: Policy Futures series no 1- Living landscapes towards ecosystem-based conservation in Scotland [Ecosystem-scale conservation - Scottish Wildlife Trust](#)

[Talking about our place - Scottish Natural Heritage](#)

This is community dialogue toolkit provides guidance, resources and ideas to help communities to think about and discuss their landscape, the issues their place is facing and how they can get involved. It is based on the Climate Conversations project which used information on effects of climate change on landscapes and quality of life to help communities in the Machars and Nairnshire discuss the implications of climate change for their place and the path they wanted their communities to follow.

Examples

[Metropolitan Glasgow Strategic Drainage Partnership](#)

An ecosystems approach to surface water management schemes.

[Lothians and Fife Green Network Partnership](#)

Showcases best practice for green network development.

[Glasgow Clyde Valley Green Network Partnership](#)

[Central Scotland Green Network](#)

A National Development in the second National Planning Framework. Scottish Natural Heritage and Forestry Commission Scotland are working with 19 local authorities and other partners to establish the network. The initiative will include:

- A significant increase in woodland expansion to further 'green up' the area, boost recreation opportunities and contribute to climate change reduction;
- restoring vacant and derelict land with the aim of regenerating and restoring it to attractive landscapes for a range of uses, including new business;
- improved networks for cycling and walking, encouraging more 'active travel' to work and school which will also reduce carbon footprints; and
- building a strategic network of priority habitats which will improve biodiversity and, protect many species.

[Cairngorms National Park Authority – draft Plan and Strategic Environmental Assessment](#)

[Integrated Habitats Design Competition Winners 2011](#)

[Scottish Sustainable Communities Initiative](#)

Provides an overview of 11 SSCI exemplar projects and the approaches taken by their project teams, describing their achievements and also the challenges faced over the two years 2009-2011.

[Simple Pleasures Easily Found. Scottish Natural Heritage](#)

Encouraging more people to get outdoors, targeted to places where current participation is lower than the national average.

[Scottish Environment LINK: *Delivering for the environment in our communities: An audit of Single Outcome Agreements.*](#)

Report for Scottish Environment LINK by CAG Consultants. February 2011.
Contains examples of cross-outcome working.

Wales

A range of case studies which demonstrate an [ecosystems approach in Wales](#).

England

[East of England Pilots](#)

Looked at methods for valuing ecosystems services and identifying implications for a range of policy areas within five regional or local case study areas including: Marston Vale, Blackwater Estuary, Cambridgeshire Fens, Great Yarmouth and Greater Norwich.

[Natural Economy Northwest](#)

Subject of a recent study which concluded that the green infrastructure concept has been successful in integrating greenspace policy with economic development policies in North-west England, by emphasising the links between the economic benefits of green spaces and growth policies.

Programme website includes examples of the contribution of green infrastructure to economic regeneration:

<http://www.naturaleconomynorthwest.co.uk/green+infrastructure.php>

Images

Images supplied by Scottish Natural Heritage except images of Figgate Park Meadow, Living Landscapes provided by Karen Reeves, Edinburgh City Council and Shrubhill Works, Michael Bryan, Reset Development.



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