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Challenges and opportunities

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Over the last century, changes in land use across Cambridgeshire and Peterborough have led to significant habitat loss, with remaining habitats becoming smaller and more fragmented.

The area is one of the driest in the country with the lowest rainfall, whilst also being at greatest risk of flooding. Both issues are likely to worsen with the impacts of climate change.



The following are key challenges specific to Cambridgeshire and Peterborough:

- rising sea levels due to the changing climate and how this is being managed.
- the importance of the remaining lowland peat soils and limiting CO₂ and methane emissions from agriculture.
- providing space for nature within our farming and food production system.
- how water is managed and the current impacts of over-abstraction on wetlands and chalk streams.
- water quality and excess nutrients, adversely impacting aquatic ecosystems and wetland habitats.
- the impact of major infrastructure such as new housing, employment sites and major transport schemes.
- the rising population and lack of large areas of downland, forest, or commons to provide natural green space for local communities.
- the fragmentation and low percentage land cover of natural habitats

There are however also new opportunities to better integrate nature into how we build settlements and infrastructure and practice farming and food production. There are also the wider benefits of nature recovery, not just for habitats and species, but for our economy and quality of life.

Did you know?

Fenland SOIL is a not-for-profit organisation that aims to develop farm policies to help achieve climate change mitigation and improved biodiversity within the Fenland region.

Each of these challenges and associated opportunities are considered by the following sectors.

Arable farming and lowland peat

The extent and condition of peat in Cambridgeshire is currently unknown, although there are projects looking to establish this being conducted by the Fens East Peat Partnership and Fenland SOIL. As set out in the England Peat Action Plan (2021), Natural England is working on a new peatland map. Future iterations of the LNRS should take account of this peat data once it is available.

There are growing efforts to monitor farming on peat soils to ensure soils are protected alongside healthy sustainable farm businesses. Fenland SOIL projects engage with farmers to encourage **regenerative** farming practices that reduce soil disturbance and carbon release, while maintaining the primary purpose of food production.





Soils on the fens are at risk of wind erosion, which can be a major problem during prolonged dry spells. Re-wetting will require large quantities of water, and major water abstraction pressures from agricultural use, public water supply demand and drought from climate change present significant challenges. Holding back water that currently flows out to the sea by encouraging farmers to provide reservoirs on their land or change their flood management strategies and seek to farm in alternative ways, could be two potential solutions. However, interventions need careful consideration on a case-by-case basis.

Projects are underway trialling wet farming techniques to test innovative new viable crops for food, healthcare and industry, and to lock in carbon whilst not increasing methane emissions. **Paludiculture** is the productive use of wet peatlands; a land management technique to cultivate commercially valuable crops on wet or re-wetted peatlands under sustainable conditions. **Paludiculture** is a developing science and trials such as Water Works project led by the Wildlife Trust are seeking to understand whether this will be a viable option for farmers¹⁹. The outcomes of these trials could present opportunities for nature recovery within Cambridgeshire and Peterborough.

Consultation as part of the production of the LNRS has found that Government **stewardship** incentives are often not appropriate for the type of agriculture practised in the fens. Encouraging and assisting farmers and landowners to change farming practices, where practical and viable, in areas of known peat deposits will be important for climate change mitigation and nature recovery in

Cambridgeshire and Peterborough but will require more targeted environmental schemes..



Opportunities for nature recovery in arable farming on lowland peat

- encourage and assist farmers and landowners to change farming practices where practical and viable in areas of known peat deposits.
- look at opportunities to hold water back on farmland through on farm reservoirs or changes in drainage management strategies.
- keep up-to-date with the outcome of wet farming technique trials and work with farmers and landowners to understand and overcome any barriers to implementation.

Nature-friendly Farming

Farmland birds, diverse flora, pollinators and Brown Hare are species typical to Cambridgeshire and Peterborough farmland but have suffered dramatic national declines due to land use intensification. Run-off of excess agricultural chemicals and soil are polluting many watercourses. Many agricultural soils are in a poor condition from decades of ploughing and artificial chemical inputs, with reduced levels of organic matter and a poor structure due to compaction.

Across Cambridgeshire and Peterborough there are farmers demonstrating wildlife-friendly practices such as sensitive hedgerow management,

providing uncultivated margins and headlands, buffering natural habitats, and creating small-scale farm habitats. These help wildlife populations to recover and move through the landscape.

Other farmers are adopting regenerative agricultural techniques to prevent the loss of soil and improve soil quality, and integrated pest management to minimise chemical inputs, whether pesticides or herbicides.

Farm clusters (groups of farmers / land managers working together at a landscape or local scale) are providing valuable support and opportunities for knowledge-sharing and training to increase understanding of the habitats and wildlife present on farms, and how best to protect or enhance wildlife alongside productive farm businesses.



Opportunities for nature recovery in arable farming

- encourage and assist farmers and landowners to adopt nature-friendly farming practices.
- support the adoption of regenerative farming and integrated pest management approaches across the whole farming sector.
- encourage and support farmers to work with their neighbours through farmer clusters to learn together and share knowledge.

Water resource management and aquifer depletion

The drying out of our chalk streams in 2019 and 2022, following previous droughts in the 1990s, is putting significant pressure on the species reliant on these habitats. Many of the spring-fed fens are in a poor condition and several rare species dependent on high ground-water levels and clean spring water have not been recently



recorded. Over-abstraction of water from the chalk aquifer for public water supply means that our rivers and wetlands are less resilient to natural drought periods and climate change is likely to exacerbate these threats, with more frequent drought periods in the future.

The current reliance on the chalk aquifer for water supplies across the southern half of Cambridgeshire is unsustainable and already damaging the natural environment. While there are plans for a new fens reservoir to supply drinking water, this will not come on-line until the late 2030s and plans to transfer water from an adjacent region with excess water will not be in place until the early 2030s. In the meantime, our chalk streams and spring-fed wetlands are in a poor condition and continue to decline.

Paradoxically, the internationally important bird populations of the fen washlands are threatened by excess flooding, particularly during their late spring and early summer breeding season. Increased intensity of rainfall events, coupled with improved drainage of agricultural land in the upstream catchment causes larger peak flood flows with increased risk of flooding to communities and habitats downstream.

The Fens' drainage system removes water in winter to protect people, property and land against flooding and maintains water levels in summer for the environment, irrigation and, in places, navigation. Much of the existing infrastructure was put in place to support agriculture but will need upgrades to handle climate change impacts like rising sea levels and heavier rainfall events. The Fens 2100+ partnership and program are developing a long-term plan for managing flood risk in the fens. A 20 – 25year flood and coastal resilience plan will identify more immediate investment needs.

For more information and latest project updates, visit the Fens 2100+ website.



The solutions to drought and over-abstraction on the one hand, and flooding on the other are inter-related. It is not necessarily that there is too little or too much water, it is how we manage the water that is important.

While Cambridgeshire is the driest part of the country, it sits at the lower end of major rivers catchments, and there could be sufficient water if it was stored, rather than the current approach of getting water to the North Sea as quickly as possible. Storing excess winter water in reservoirs or wetlands could support irrigation, public water supply, and groundwater recharge whilst providing environmental benefits. This new approach could benefit people, the economy, and the environment.

There are some short-term solutions. Collection and storage of excess water in winter, through new farm reservoirs or wetlands could provide water for irrigation and even public water supply.

For the Ouse Washes and their internationally important bird populations, there is also a need to store more water in the upper catchment for longer to reduce the volume of flood flows and their peaks particularly during the breeding season. This needs to take place on both farmland and in urban areas. This catchment wide approach could also support the restoration of wetlands on floodplains.

Finally, there is also a need for wider public recognition of the value of water and the need to reduce personal consumption.



Opportunities for nature recovery in water management and aquifer depletion

- promote catchment-scale, nature-based solutions to store more water upstream for longer, including use of farm reservoirs and wetlands.
- work with water companies to ensure new water supply infrastructure considers the impact and opportunities for nature recovery.
- work with the Fens 2100+ project to consider how nature-based solutions can be used to aid management of flood risk.
- promote water saving among the public and support retrofitting of water-saving devices in existing buildings to reduce demand on water supply.
- strongly discourage adding non-porous cover to gardens.

Water quality and excess nutrients

Pollution from agriculture and pollution from agriculture and waste water treatment works contribute to excess nutrients within our rivers and streams. This in turn affects floodplain habitats as nutrient laden flood waters cause changes to the soil conditions and vegetation. This is contributing to a deterioration in the quality of floodplain meadows habitats such as at Portholme and the floodplain wet grasslands of the Ouse Washes.

Nutrient-rich waters also change the composition of the in-stream aquatic plants and adversely affect sensitive aquatic invertebrate species and some fish species.

Point source pollution needs to be addressed at source with upgrades to sewage treatment works. However, there is also a role for wetland treatment systems creating wetland habitats that take up nutrients, whether downstream of sewage plants or inefficient septic tanks.

Farming practices can significantly reduce diffuse pollution through a mixture of wide habitat buffers such as woodlands or grasslands along rivers and ditches, or across sloping fields. Wetland basins and other natural flood management actions such as leaky dams can also slow the flow and prevent nutrient laden silt entering watercourses.



Opportunities for nature recovery associated with water quality improvements

- upgrade sewage treatment works and install downstream wetland treatment systems at waste-water plants or in catchments with a high number of septic tanks.
- promote catchment-scale nature-based solutions including habitat buffer strips to reduce nutrient and soil run-off from fields.

Major infrastructure

Major transport infrastructure such as the A1(M), A14, A428, the national rail network and guided bus routes create barriers to the movement of wildlife across the landscape. There are however options for reducing habitat fragmentation such as the use of green bridges and tunnels for transport infrastructure.

Major energy infrastructure also takes away space for food production and nature recovery, while wind turbines sited in the wrong location can kill birds and bats. However, designed well, solar parks and other energy infrastructure can support nature recovery by using landscaping and new habitats to buffer and connect existing habitats and ensuring that these are well managed.



Proposals within the LNRS will need to consider how existing physical barriers from major infrastructure can be overcome to allow wildlife to move unimpeded across the landscape within the design, construction and operation of major infrastructure.



Opportunities for nature recovery in major infrastructure

- Consider opportunities for overcoming physical barriers of major transport infrastructure to improve landscape permeability for wildlife and people.
- Adopt best practice in the design and management of energy infrastructure such as solar parks and the siting of wind farms.

Urban expansion and population growth

The rapid and continuing increase in developed land area and associated infrastructure is taking land from food production and reducing space for nature recovery. There are however good practice standards for the provision of Green Infrastructure and the sustainable design of new communities. Well-designed new settlements can contribute to nature recovery and an enhanced sense of place and quality of life. Natural England has published the Green Infrastructure Standards²⁰. These have and

are being applied to many of the strategic developments taking place. However, strategic developments only account for about half of new development.

Locally, the 2011 Cambridgeshire Green Infrastructure Strategy set out a coherent set of proposals to enhance the quality and increase the provision of strategic Green Infrastructure to meet the needs of all development across the county. Unfortunately, this has not been comprehensively implemented, and the deficiencies in Green Infrastructure provision have continued to grow.



With the increasing population there has been an increase in demand for access to nature and to the countryside.

This was further heightened during the Covid pandemic. Many local nature sites are small and suffering adverse impacts from human recreational pressures and declining in quality, due to the lack of large-scale open access downland, forests or commons for people to visit.

The Cambridge Nature Network identified a vision and locations for the provision of large-scale strategic natural areas of downland, forest and fen to support the future sustainable growth of Cambridge. In the John Clare Countryside, west of Peterborough, partners are exploring how best to meet the demand for increased access to the countryside in a way that respects the natural environment.

In recognition of this local councils in Greater Cambridge and Peterborough are reviewing their approach to Green Infrastructure needs and provision through their Local Plans. The more rural

districts also need to review green infrastructure provision associated with the growth of their market towns.



Opportunities for nature recovery in and around urban areas

- ensure the LNRS and local Green Infrastructure strategies inform one another and Local Plans to deliver large-scale nature recovery and accessible countryside where possible around our towns and cities.
- implement best practice Green Infrastructure design and provision through all new developments.
- identify opportunities to create, expand and connect natural and other green spaces within urban areas to address the shortage of greenspaces.
- identify improvements to the Rights of Way network to encourage active travel, and enhance wildlife corridors through, between, and around urban areas.
- to encourage people to adopt nature friendly gardening and contribute towards the nature recovery.

Public survey feedback

'I am concerned that our urban gardens are not wildlife friendly' *East Cambridgeshire Resident*





Habitat fragmentation and low percentage habitat cover

Cambridgeshire and Peterborough is a rural area with around 80% of the land farmed, most of which is arable. Urban areas cover another 11% of the county. The remaining natural habitats cover less than 8% of the area and are highly fragmented.

Applying the Lawton Principles to this situation is challenging and could potentially result in a scattergun approach. To effectively deliver nature recovery these principles must be applied in a way that responds to this landscape fragmentation.

Public survey feedback

'Urban restoration is the best chance for people to see nature in their daily lives'
Public survey respondent

Ecological principles suggest that within a particular geographical area, nature recovery and the re-building of species richness and abundance has a greater chance of success where at least 30% of the land area comprises high value habitats²¹.

However, it is neither possible nor desirable to achieve 30% land cover of high-value habitats over the whole of Cambridgeshire and Peterborough because of the importance of farming the continued growth in urban areas and other constraints.

However, there are parts of the LNRS area with higher concentrations of habitats.

Several studies (see list opposite) have mapped habitat networks across the LNRS area and identified those local landscape areas which

provide the best opportunities for re-building a resilient nature network:

- Natural Cambridgeshire's six priority landscapes²²
- John Clare Countryside habitat network mapping
- Great Ouse Valley habitat network mapping
- West Cambridgeshire Hundreds habitat network mapping
- Cambridge Nature Network²³
- East Cambridgeshire Interim Nature Network²⁴
- Fenland Interim Nature Network²⁵
- Huntingdonshire Interim Nature Network²⁶

The local landscape areas identified as priorities for nature recovery have been termed **priority natural landscapes**.

These local landscape areas provide a realistic opportunity for achieving at least 30% habitat cover and are the best areas for applying the Lawton Principles across Cambridgeshire and Peterborough and to focus nature recovery in the short and medium-term.



Opportunities for nature recovery to address habitat fragmentation

- focus nature recovery opportunities within the priority natural landscapes identified through nature network mapping to achieve approximately 30% land cover of high value habitats within these localised areas.

The impacts of climate change

Climate change is the greatest threat to terrestrial and freshwater habitats. Our warming climate is already having dramatic impacts on nature.

Species distribution patterns are being altered and food webs and life cycles disrupted. The impacts of climate change on food production and crop choices could place additional stresses on the natural environment. We are currently headed for nearer 3oC than 2oC warming by the end of the century.

With these changes there is likely to be increased risk of prolonged droughts, increased flooding and a growing threat of wildfires. Pests, diseases and invasive non-native species might spread in unpredicted ways. The impact of sustained severe weather events, multiple extreme events, and

record-breaking seasons poses significant risks to our natural environment.

The UK Climate Change Risk Assessment²⁸ has identified threats to terrestrial and freshwater habitats and species as one of eight priority risks facing the country. Other priority risks included soil health, natural carbon stores and sequestration, and crops, livestock and commercial trees. This means half the country's priority risks are linked in some ways to the wellbeing of our natural environment.

Species adapted to current climate conditions are likely to see their geographical range change. For some species this will increase, while for others such as bluebell, it will decrease, but with a general northwards movement in suitable conditions for many.

The UK national climate projections²⁷ suggest the following headline figures:

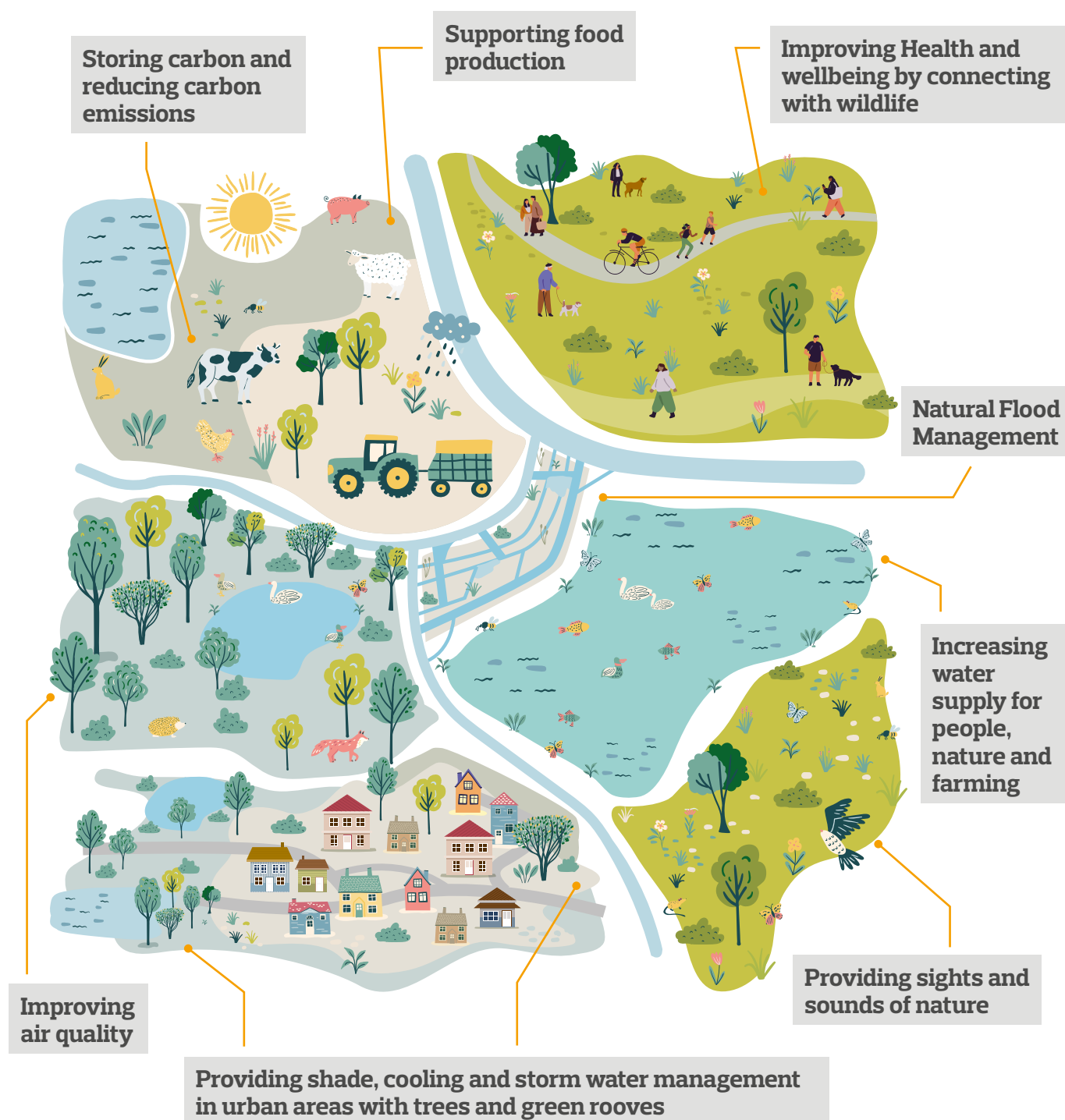
Warming trend	→	all areas of the UK will be warmer by the end of 21st century
Seasonal change	→	increased chance of warmer, wetter winters and hotter, drier summer
Extreme weather	→	increased frequency and intensity of extreme weather events
High temperatures	→	hot summers become more common, with increased hot summer days and more frequent hot spells
Rainfall changes	→	overall trend is for drier summers, alongside future increases in the intensity of heavy summer rainfall events. Changing seasonality of heavy rainfall, more intense rainfall extremes, and increased winter rainfall
Coastal inundation	→	increase to extreme coastal water levels, largely driven by sea level rise. Additional chances of storm surges possible
Soil moisture	→	decreased soil moisture during summers, consistent with lower rainfall
Snow decline	→	almost 100% decrease in lying snow by end of 21st century

Adapting to climate change

Working with nature and supporting nature recovery is one of our best options for mitigating climate risk. There are two ways that action for nature recovery can support mitigation and adaptation to climate change.

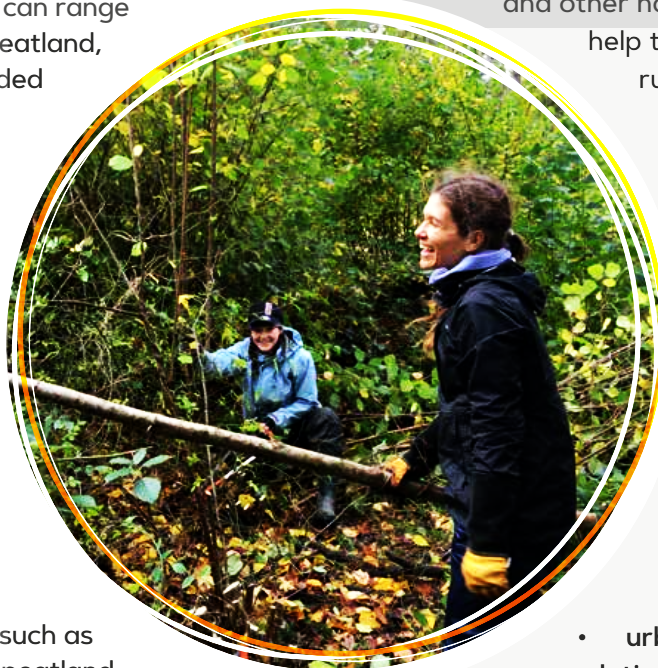
- 1 nature-based solutions:** to support climate and nature goals: Using ecosystem and habitat restoration to reduce impacts such as drought, flooding and extreme heat through the natural processes and ecosystem services that nature provides..
- 2 support nature to adapt to climate change:** Reducing the impact of climate change on biodiversity and increasing resilience through building a resilient nature network to allow species to move in response to the changing climate.

Nature-based solutions (NbS)



Nature-based solutions are solutions to problems faced by society that are provided by the natural environment. These can range from the carbon stored in peatland, to flood management provided by wetlands, to the cooling and shading from urban trees. Critically they must provide both benefits to human well-being and biodiversity. They are a way of supporting nature's recovery in a way that creates other benefits to society and the economy.

There is an increasing demand from public and private sectors for nature-based solutions. Standards such as the woodland carbon code, peatland carbon code, and biodiversity net gain metric are delivering nature-based solutions in a verifiable and measurable way. Further market-led developments are expected to bring private finance to support nature-based solutions over the next few years.



- **water supply & aquifer recharge:** Wetlands and other habitats on the chalk can help to retain rainwater and runoff from fields and allow it to percolate back into the soil to recharge the aquifer.
- **food production:** Nature can support food production by providing habitats to support larger populations of pollinators and predators of crop pests.
- **urban nature-based solutions:** These can help to improve the liveability of our towns and cities as well as improve health and wellbeing. Street trees and vegetation can improve air quality, provide shade, reduce heating, and support wildlife to bring the sights and sounds of nature closer to people. These can encourage physical exercise and improve mental health.



Opportunities for nature-based solutions locally include:

- **carbon emission reductions and sequestration:** Most habitat creation will offer carbon sequestration – the absorbing and storing of carbon – whether in the vegetation or soils. Protecting the lowland peat soils in the Fens from further erosion is the biggest opportunity locally to reduce carbon emissions.
- **natural flood management:** Holding more water back in upper catchments, particularly on clay soils, through the use of new wetland areas, leaky dams and woodland planting helps to reduce flooding downstream. The naturalisation or “re-wiggling” of rivers, improving channel structure and reconnecting rivers to floodplains provides more wetland habitats as well as reducing flood risk.
- **improved water quality:** Many of our water bodies are in a poor state due to pollution. Wetlands can help clean water as can buffer strips and woodland along watercourses.

Restoring natural processes to our land and water management can be more cost effective by requiring less human intervention in the longer-term. The use of more extensive or natural grazing regimes, allowing natural regeneration of woodland and the re-naturalisation of rivers are all examples of working with nature. However, doing this requires more space for nature to allow species to adapt. It is also messier, creating more varied habitats and mosaics of habitats that change in space and time.



Opportunities for promoting more natural processes locally include:

- restoring lowland peatlands so they are better able to absorb carbon.
- using a mix of free-roaming grazing animals at a low density to create dynamic mosaics of flower-rich grassland and scrub or wood pasture and provide high quality meat and lower emissions from the animals..



Continued from previous page

- managing woodlands so they have a greater diversity of habitats including open spaces, a dense shrub layer and lots of deadwood. Introducing grazing animals into larger woods and keeping deer populations at levels where they do not prevent regeneration of trees.
- creating new woodlands and areas of scrub through natural regeneration and promoting natural regeneration in existing woodlands.
- restore rivers to a more natural state by 're-wiggling', reconnecting rivers to floodplains, creating more varied river channels and restoring floodplain and river edge habitats..

In many areas the existing farming or other land uses will restrict what can be achieved in terms of re-instating natural processes. However, there are still opportunities to undertake more traditional small-scale conservation on all productive farmland and within our urban areas.

Supporting nature to adapt to climate change: the most important



response to climate change for mobile species, such as birds and mammals, is to ensure an ecologically connected landscape, that enables them to move in response to a changing climate.

However, for less mobile species, particularly some invertebrates and plants, specific habitat management actions and larger sites with more varied habitats may be needed to increase their chances for survival.

The application of the Lawton Principles is critical to providing space for nature to adapt to climate change.

Restoring nature: a way forward

There are multiple competing demands for how we use land, especially here in Cambridgeshire and Peterborough. This LNRS has been written so that other competing demands can be accommodated alongside gains for nature, including:

- maintaining our status as the 'breadbasket' of England.
- enabling much needed new homes, businesses and infrastructure to be provided where they are needed most.
- reducing our carbon emissions, as we contribute to minimising global climate change.
- preserving and enhancing clean and adequate flows in our water courses.





There are two key approaches underpinning nature recovery:

- 1** the Lawton Principles: Better, bigger, more, and joined
- 2** natural capital and ecosystem services

Source: Lawton (2010) Making Space for Nature

The Lawton Principles highlight the need for a more coherent and resilient ecological network by improving habitat quality, expanding nature sites, increasing connectivity, and promoting nature-friendly land use.

These principles have formed the basis for identifying the opportunities for nature recovery in this LNRS.

Natural capital and ecosystem services

Ecosystem services are the services that nature provides when it is functioning as it should. Damage to nature means our natural environment is less able to provide the many services upon which we depend.

Natural capital is the 'stock' of natural resources (for example, plants, animals, air, water, soils, minerals). From this stock, we receive ecosystem services such as healthy soils, crops, pollination, timber, clean air, clean water, and so on. **Ecosystem services** is shown diagrammatically below.



Source: <https://www.southdowns.gov.uk/wp-content/uploads/2018/04/Core-05-Ecosystem-Services-Background-Paper-April-2018.pdf>

A Natural capital assessment was undertaken for Cambridgeshire and Peterborough in 2022. This study found:

- woodlands and some of the fenland nature reserves had the highest capacity to provide ecosystem services.
- river corridors were highlighted as particularly effective at bringing habitats delivering high levels of ecosystem services right into the heart of urban areas, especially in Peterborough, Huntingdon and St Ives.
- most land (81.7%) in Cambridgeshire is in poor condition, primarily due to the predominance of arable and improved grassland habitat, and the extent of domestic gardens and amenity grassland.
- most of the Ouse Washes is also considered to be in poor condition.

- the total monetary value of public benefits provided by greenspaces each year was estimated to be a minimum of £377 million.
- the vast majority of opportunities to improve water quality by reducing soil erosion are located adjacent to watercourses and are found predominantly in the fens and claylands.

Understanding the ecosystem services provided by habitats in Cambridgeshire and Peterborough has helped in the prioritisation of nature recovery opportunities.

Did you know?

Natural Capital Assessment – a method for quantifying the total value of natural capital (resources such as water, air and soil quality) within a region.

The information provided in Part 1 of the Local Nature Recovery Strategy provides the context and background to the priorities and actions set out in the following Part 2.

