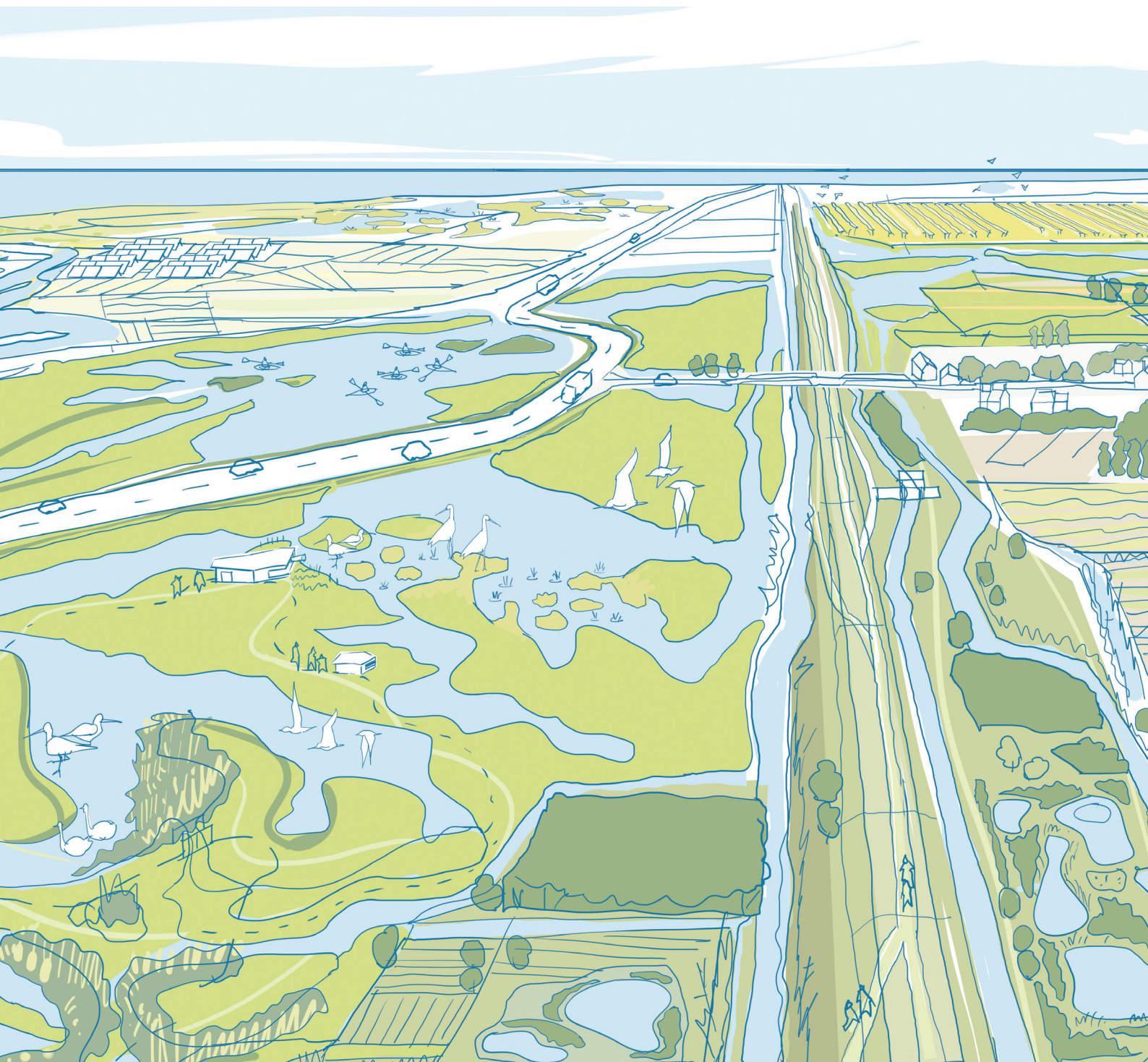


Our Fens Futures: Exploring the case for change

Version 1



Our Fens Futures

Our Fens Futures build on insights and perspective from workshops in March and April 2024 with key partners and stakeholders.

Since the start of the Fens 2100+ Programme we have heard the growing appetite for change in the way we manage water and flood risk in this distinctive, historic and human-influenced landscape. This desire for change reflects increasing recognition that our current investment practices are not delivering for people, place and public value.

To explore and develop the case for change, we have created four narratives - The futures we choose - that illustrate plausible but ambitious future directions for the Fens.

These future narratives reflect back from 2100 on change and progress. Flood risk management and collective investment in the landscape sit at the heart of each of these futures.

For each of the futures, an indication of outcomes for 2033 and 2050 is presented to prompt consideration of the changes that would be necessary to current investment practices.

The investment benefits of each of the futures have been illustrated using 5-Capitals (see footnote) to indicate the Natural, Manufacturing (including Agricultural), Human, Social and Financial Capital potential.

It is the intention to use these futures alongside other evidence such as system analysis and understanding, the policy review and the Climate Change Risk Assessment, to shape and substantiate the case for change with partners.

In doing so, core questions we need to explore include:

- How do the futures we choose align with your organisation’s ambitions for 2050 and any emerging plans/choices/ambitions. When are they due? When are you consulting?
- For the emerging Fens 2100+ ambitions, choices, investment goals to have a lasting impact, who are the key change makers, advocates, and champions?
- What further evidence do you have to inform the case for change and investments?
- What methods do you use to quantify and communicate investment benefits?
- Are there any synergies with other planned initiatives or existing investments?
- How would you like to be involved in further exploration and development of the Fens 2100+ case for change?

The insights emerging from this dialogue will shape the Partnership Investment Plan, due to be published in 2025, informing the strategic case for change, the associated landscape-wide economic case for investment and the management case for partnership.

Five Capitals is a model for understanding sustainability in economic and investment terms.

The document is structured as follows:

Introduction, context and use

Our inheritance and our legacy

The Fens today – the state of the current flood risk management system

An unadapted future: A case for change - what might happen if we continue with business as usual

Drivers for future investment

Securing future investment, funding and finance - unlocking investment through a shift to deliver asset and climate resilience and multiple benefits

Exploring our choices

The futures we choose: landscape-led adaptation

Four future ambition themes, covering community resilience, food and farming, nature, and carbon

A vibrant and climate resilient future Fens

Exploring the futures we choose: a vibrant and climate resilient Fens

Choices, Investment and Impact - creating a shared future

The contents of this document should be treated as building blocks for open dialogue to spark and generate ideas.

The Fens today

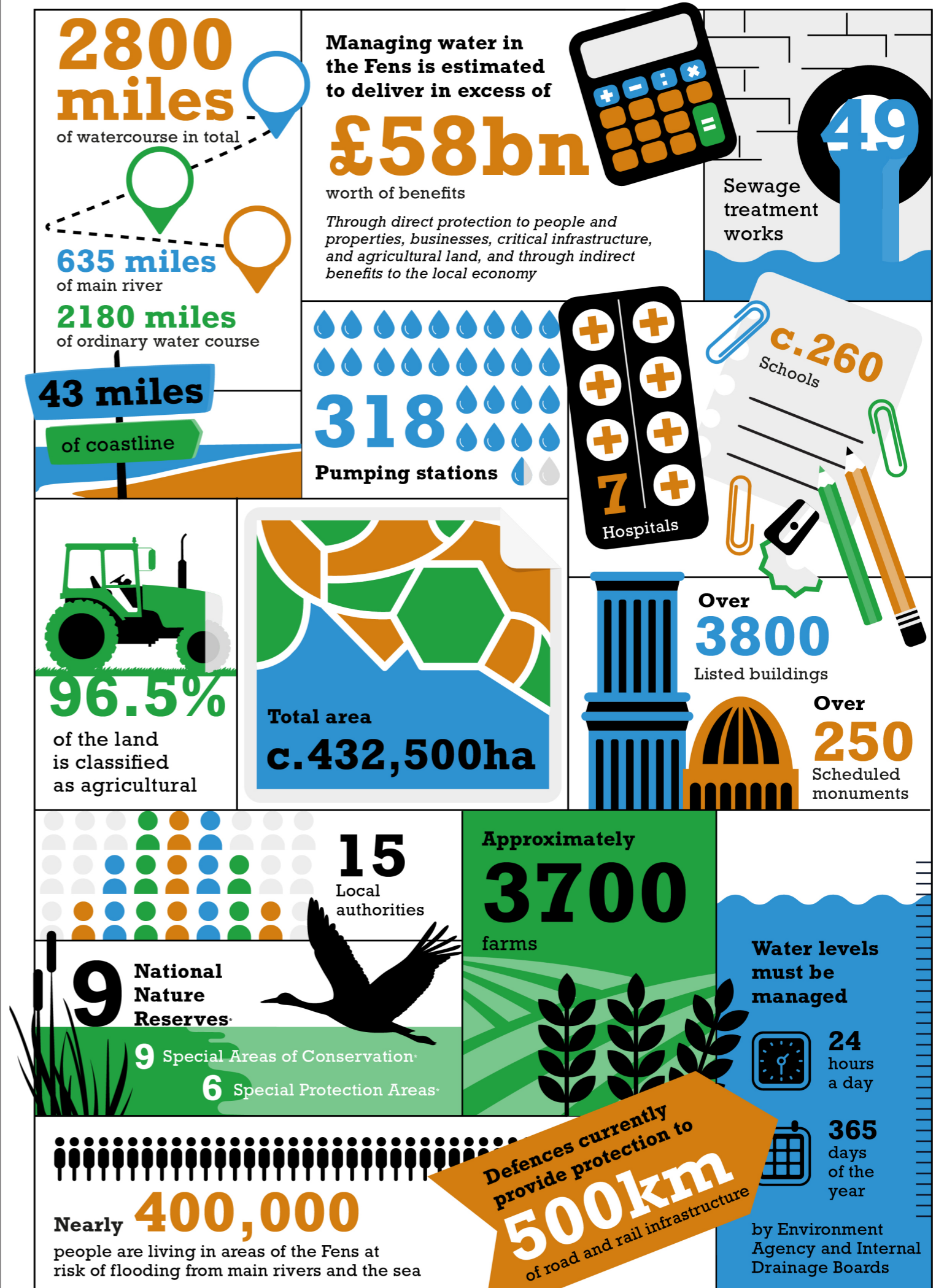
The Fens today reflects the legacy of investment choices made over hundreds of years. Initially, investments were made to drain the land over 400 years ago due to the opportunities it presented for agriculture. In the 1950s and 60s there were high levels of investment in the land drainage infrastructure, aimed at supporting the modern, intensive agricultural system we see today.

The existence of the Fens was hard won, and we now can't take that for granted. Water levels are constantly managed by the Environment Agency and 60 Internal Drainage Boards, to support water levels required for growing and irrigation. The Fens system is made up of 2800 miles of watercourse, fed by a complex network of field and boundary drains.

Water is controlled using a network of 318 pumping stations supported by sluices, locks and gravity discharges.

Over 95% of land in the Fens is agricultural, the majority being classified as excellent or very good, with the Grade 1 land representing over 50% of England's stock. The use of land for growing underpins the wider economy, and is worth over £1.23bn.

The landscape is home to approximately 750,000 people who live and work in the Fens, with approximately 400,000 of those at risk from flooding.



Note, there is considerable geographic overlap between sites for nature conservation, for example, many sites are designated as SAC, SPA and NNR. Almost all Ramsar sites are underpinned by the SSSI designation, and most Ramsar sites are also SPAs.

An unadapted Fens: A case for change

Reflections from the future

"We have reached the year 2100 without changing our flood risk investment trajectory, and the Fens are afflicted by regular, widespread flooding. Many areas are permanently inundated. Extreme weather events now occur regularly, as predicted.

Fens 2100+ was unable to unpick the complexities of delivering climate ready flood risk management across the landscape and lost its momentum for working collectively towards shared goals. Without a shared ambition of delivering against the strategy, early large scale land-use changes made by others locked us into a restricted set of options, that were more expensive, less effective and did not realise wider benefits. Nature was pushed to the sidelines as we didn't prioritise identifying other ways to deliver flood protection and were forced into hard engineering choices by default.

In the 2030s and 2040s, investments continued to be made on an asset-by-asset basis. We delayed making important decisions to monitor how drivers changed. As a result, many assets came to the end of their life at the same time, and there was not enough money to renew them all. As one asset failed, it became clearer that the complexity of the Fens system was not fully understood.

After each flood, we race to repair infrastructure ahead of the next storm, with increasingly stretched resources. Assets deteriorate faster from more frequent high-pressure periods. Maintenance and repair costs continue to rise and the funding gap grew.

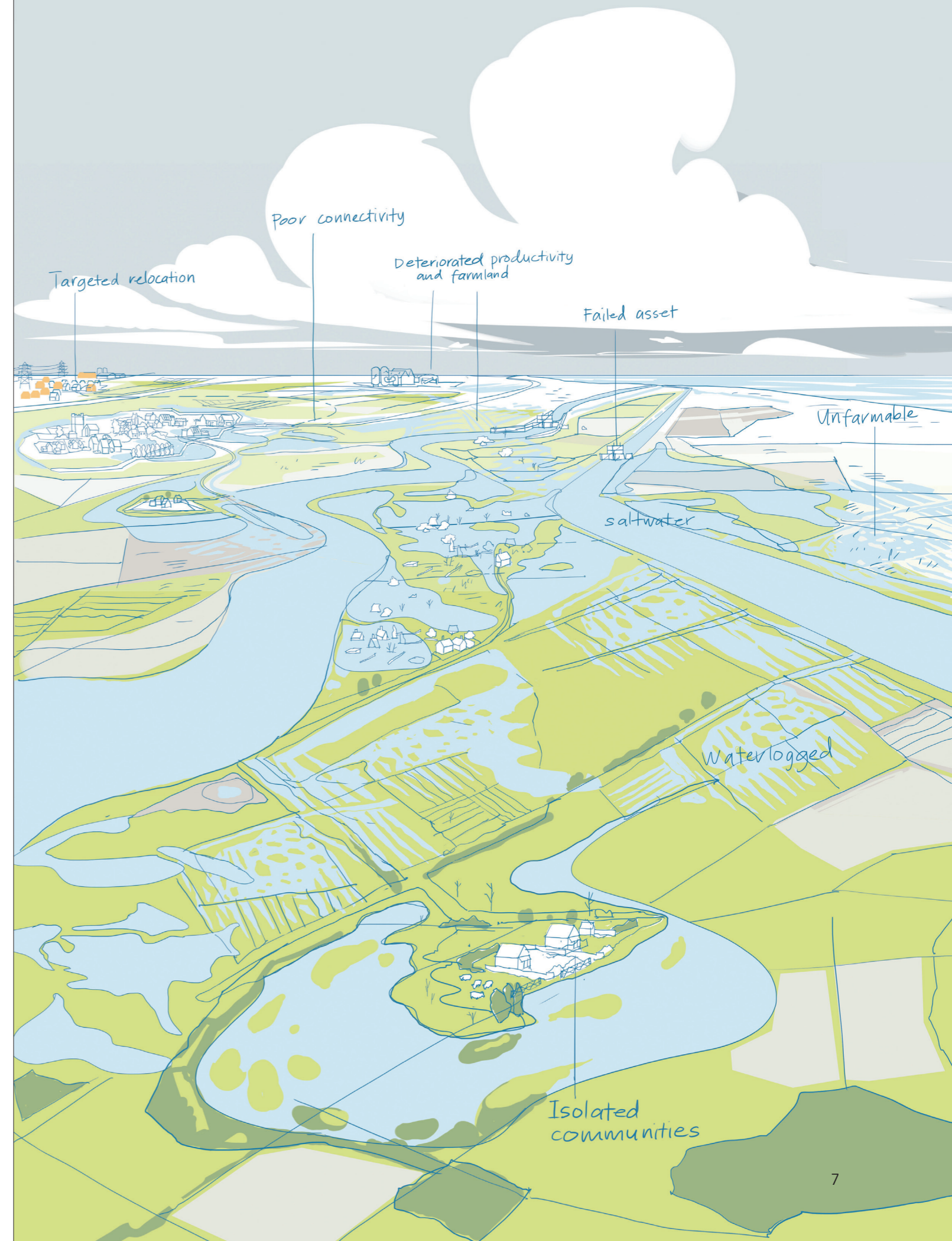
Costs exceed the budgets of infrastructure operators, landowners, and local businesses.

Only assets that directly protect large settlements from risk to life are prioritised, but even here, some flooding is not unusual. We rely on individuals to prepare themselves to respond to flood events, and we struggle to fully fund recovery projects. People are less prepared for subsequent flood events and have no means to respond and recover.

Water resources and flooding continue to be managed separately, and we regularly experience crises of too much and too little water in the same year. The collapse of the agricultural economy means that the Fens no longer provides the significant contribution to national food security it once did. Large areas were inundated by salt water, making them unfarmable. Other areas are unpredictably waterlogged, undermining the ability to sow or harvest crops. The productivity of farmland in the Fens rapidly deteriorated and the associated economy in processing and transporting these products followed.

Due to the high flood risk and daily threat to livelihoods, isolated rural residents and businesses have experienced targeted relocation and communities have been lost. This has not only further stretched public finances but has displaced communities and support networks. The Fens are viewed as a drain on the UK.

We still evaluate the impacts of individual projects, but our understanding of the system interdependencies remains limited. Without a cohesive framework to measure impact across the region, it remains difficult to build strategic cases for flood risk measures that can secure the future of the Fens."



Securing future investment, funding and finance

Unlocking and delivering the outcomes and futures described herein requires a shift in our approach to the management of water and our critical (flood, drainage and coastal defence) infrastructure. This shift will need to deliver asset and climate resilience, multiple benefits, sustainable decisions (including whole life planning and carbon reduction), and greater focus on investment in the system and network - not just individual assets. This more integrated approach to asset management delivery in the Fens will necessitate greater collaboration and enhanced governance, innovation in funding and finance, and longer-term planning department collaboration.

A five capitals approach to benefits

To support greater integration of asset management delivery and investment, the futures will be explored through a 5-Capitals lens. This will facilitate the consideration of investment synergies and alignment with the Future Fens Integrated Taskforce (FFIA), Water Resources East strategic plans and other regional strategic plans.

The five capitals are:



Natural capital: the natural environment, natural resources and the ecological services provided.



Human capital: people's knowledge, skills, motivation, well-being and the data and information they generate, relating to the skills and support for individuals to work productively across the integrated assets of the Fens system.



Social capital: the relationships with people, society and other organisations, relating to societal factors outside of the flood and coastal risk management system, but impacted by it.



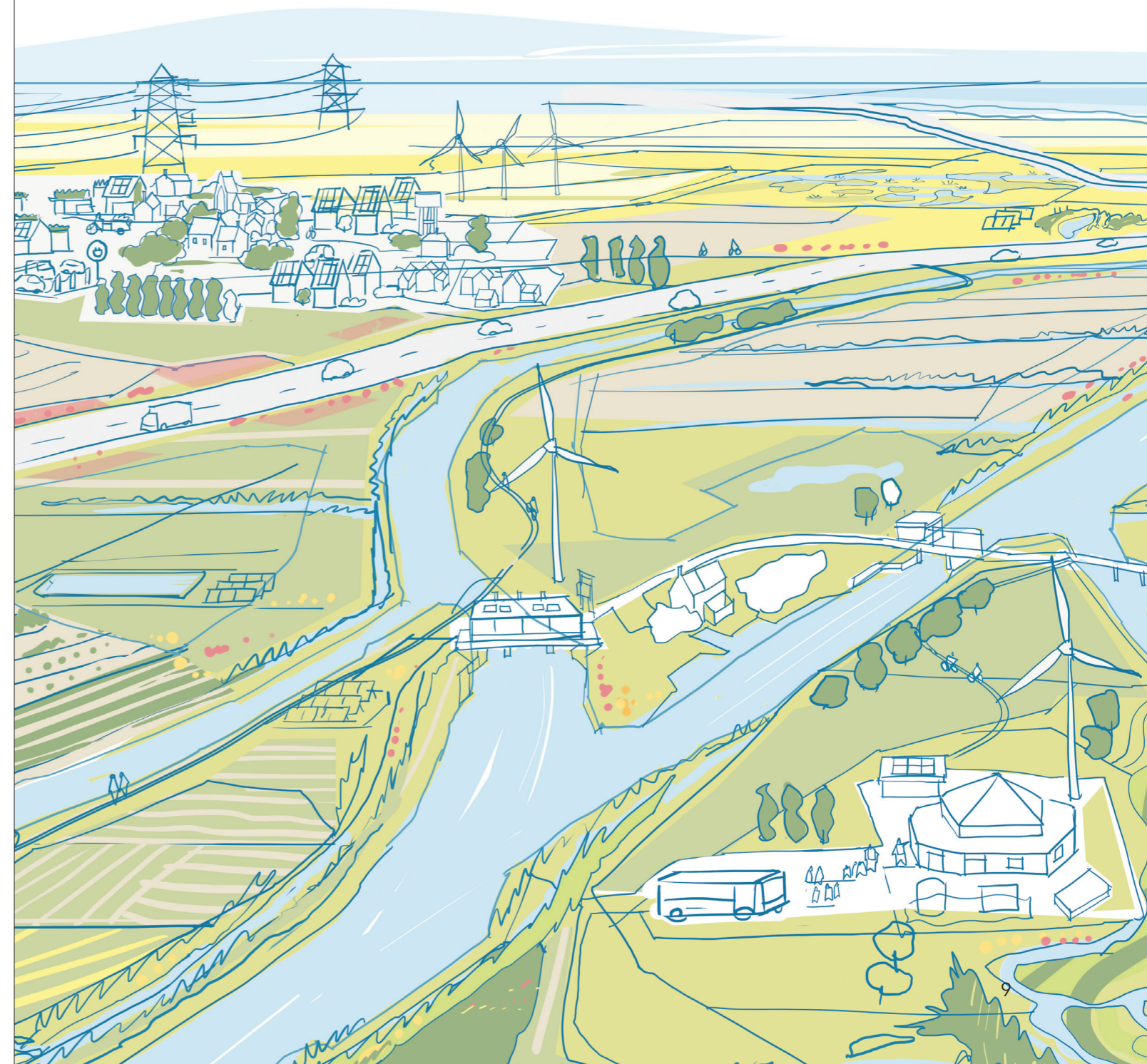
Manufactured capital: all goods or assets (including agriculture) created by the system functioning effectively.



Financial capital: illustrates the ability to own or trade other types of capital. This is the traditional economic measure of value, which is intrinsically linked to natural, social and manufactured capital.

Exploring our choices

Four 'futures we choose' are set out on the following pages exploring plausible narratives. These are written reflecting back from 2100 on change and progress.



Communities are connected in the face of a changing climate

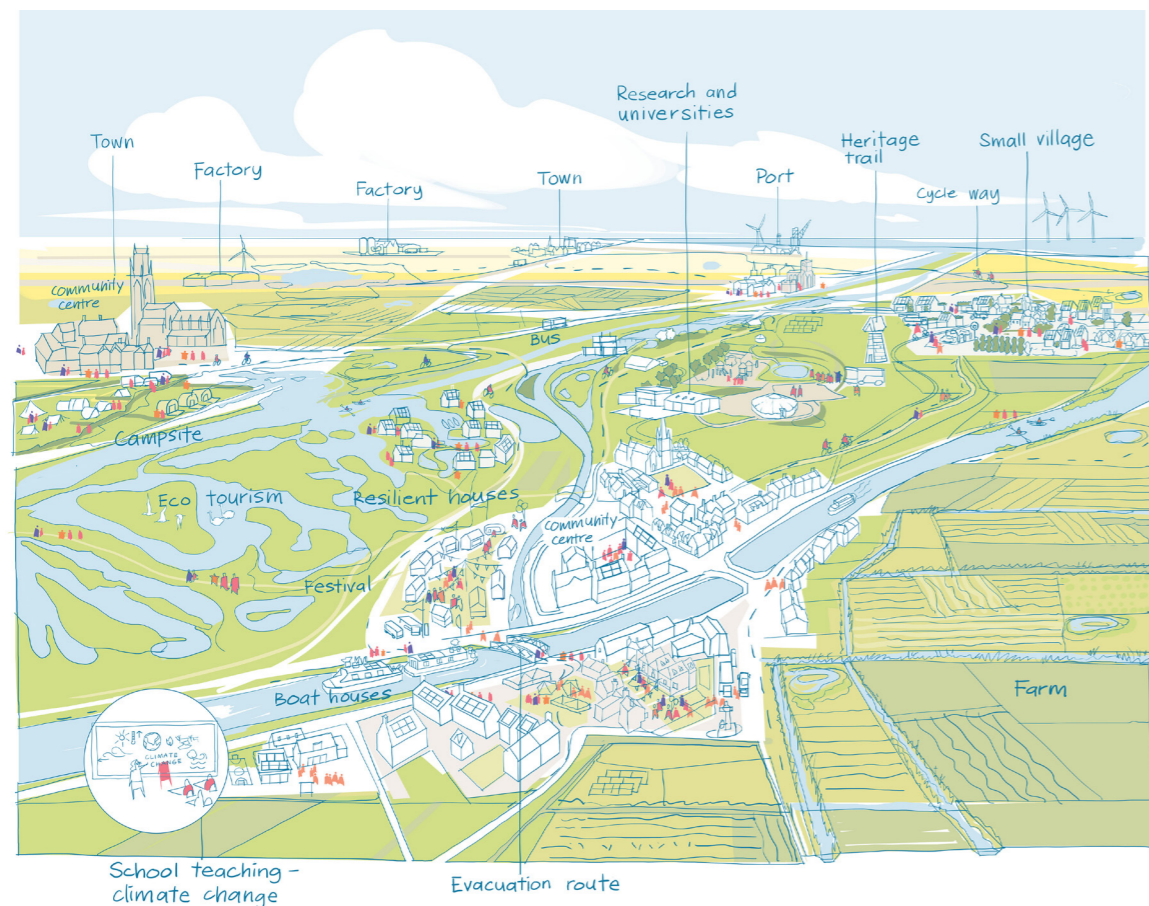
Reflections from the future

"The way we manage water in the Fens is a matter of civic pride, and there is a deep connection to the history of how the landscape was developed, leading to a strong regional and national identity. Communities are informed of risk management choices. They are core participants in shaping the future with water, engaging strongly with flood preparedness and incident recovery.

All homes and businesses in the Fens are prepared for the risk of flooding, including recommendations for property level resilience measures and the type of flood or drought event they would provide protection for.

All new homes and businesses are resilient to all sources of flooding with flood warning systems embedded. Properties are water sensitive in both flood and drought, resulting in a significant reduction of consumption per household.

There has been a renaissance in key towns and villages of the Fens, supported by innovation and investment in a thriving high-tech food processing and logistics sector. Eco-tourism has become a new core industry, capitalising on an expanded network of navigable waterways, improved active travel routes, and access to nature.



Important heritage and natural assets are protected, conserved, and enhanced. Quality of life is significantly improved.

Learning institutions in the area focus on working with water and developing home-grown skills. Fens expertise is globally recognised in this space, with knowledge shared on the international stage. Schools teach awareness of climate change and flood risk, alongside skills for core Fens industries.

No one has died from flooding in the Fens since 1953; despite an increase in extreme weather events and rising tides. This is in part due to climate information and warning systems, safe havens and safe access and egress."

Key features of this future

- Communities have agency to ask for what they need for flood resilience, understanding the portfolio of interventions available, and that they have a role to play, alongside civic institutions.
- Local development plans and flood risk management investment plans are aligned and integrated, focused on supporting a few specified locations for resilient growth that can be effectively protected.
- Strong roles for knowledge institutions in strengthening economic sectors in high-tech food production and processing to be resilient to changes and support growth and opportunities.
- Jobs and skills plans support growing industries in high-tech agriculture and processing, eco-tourism, and the growing water sector, focused on supporting local people's involvement.

Why is this important for the Fens now?

The area is sparsely populated, with less than 3% of the land in the Fens being 'urban', compared to 8.7% of England. Currently, just over 750,000 people live in the Fens. A large proportion work across the food supply and associated industries, including manufacturing, wholesale, transportation and storage, and agriculture, forestry and fishing.

Overall, qualification attainment in the Fens is below the average in England. Those who do gain a degree level education are likely to seek employment opportunities elsewhere, creating a brain drain for the region.

Most people in the region do not realise they are at risk of flooding, and there is limited take up of property and community resilience measures.

Policy context

- National FCERM Strategy
- National Planning Policy Framework and Local Development Plans

How is this influenced by flood and coastal risk management?

The Fens are a man-made landscape and are only liveable in the way we know today because of the continuous flood risk management undertaken which ensures the safety of communities and individuals living and working in the Fens. This includes carefully managing and operating numerous sluices, gates, pumps, walls and embankments to manage water levels.

The topography of the Fens is a low lying bowl. Without a sustained level of operation, the Fens would return back to marshland and the way in which we live and work in this area would fundamentally change.

Outcomes

2033

To create the first steps towards delivering this, we need:

- Improved general population understanding of the history of how the Fens developed, flood risk in the Fens and how climate will change this risk.
- Stronger understanding of flood risk management in local development plan making.
- Clear messaging on flood risk, and how this is expected to impact different communities and resources such as homes, transport networks, essential services and space for recreation and enjoyment.
- Stronger and more open institutions for flood risk management and links to learning institutions.

2050

Goals for what change will be created by 2050:

Resilience gain

- Clear links between development planning and flood risk management investment, to support key resilient communities.
- Increased investment and adoption of community resilience measures and reduced expectation that RMAs will protect all land and people from all risk.
- Engagement with flood risk management is deeply enmeshed with civic expectations of being from the Fens, supported by clear education and training objectives for a locally grown, water aware workforce.

Wider benefits

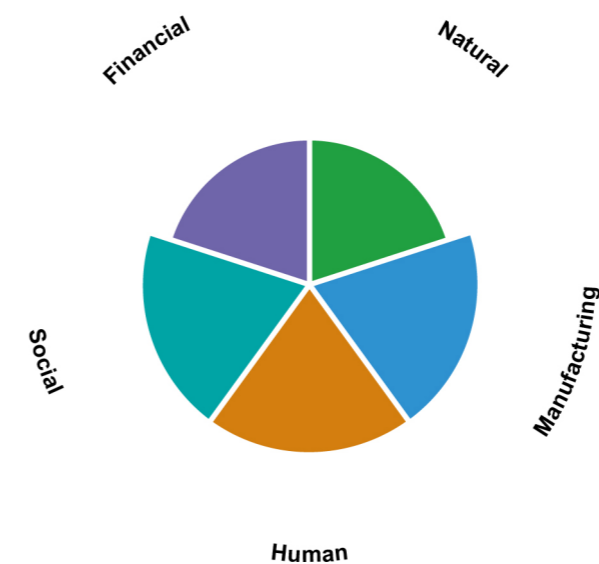
- Fens friendly SUDS requirements in new developments, that work with the pumping regimes of the IDBs.
- The Fens Waterways and other active travel projects have been realised, providing access to the rich ecological network based on the waterways across the Fens.
- Changes to skills and employment to support changes to agriculture, food processing and eco-tourism. This, alongside improved educational attainment, will help to provide residents with access to higher skilled, better paid jobs close to where they live.
- Places beginning to adopt 'living with water' principles.
- Through targeted growth, health inequalities and community deprivation have been reduced.
- There is a strong consideration of legacy in all investment decisions. The Fens becomes a place where people want to move to and bring up their family.

What do we need to unlock this?

- Community messaging and education on flood risk management and climate change risks in the Fens.
- Stronger engagement with plan making and infrastructures investments across the Fens.
- Clearer evidence and understanding of different types of adaptation measures within new developments in Fens specific circumstance, including implications for pumping.
- Skills development plans to help local people access new skills and employment areas.
- Information for communities on climate and flood risk, which are easy to access and used often. Open forums for communities to connect with risk management authorities.

Investment case

By 2050, investment in delivering these goals could unlock the following types of benefits:



These visuals have been used throughout the document to illustrate the benefits that each narrative could create for the Fens. The centre of the visual indicates low benefits achieved, increasing to high as the segments span outwards.

Adaptation measures

Investments in the following portfolio of measures could create and enhance this future:



Protection measures include water control structures including pumps, sluices, embankments and weirs.



Protection measures include land management practices like soil management, hedgerow planting, cover crops, buffer strips and floodplain reconnection. More **transformational** measures including saltmarsh development, paludiculture and Fenland habitat creation.



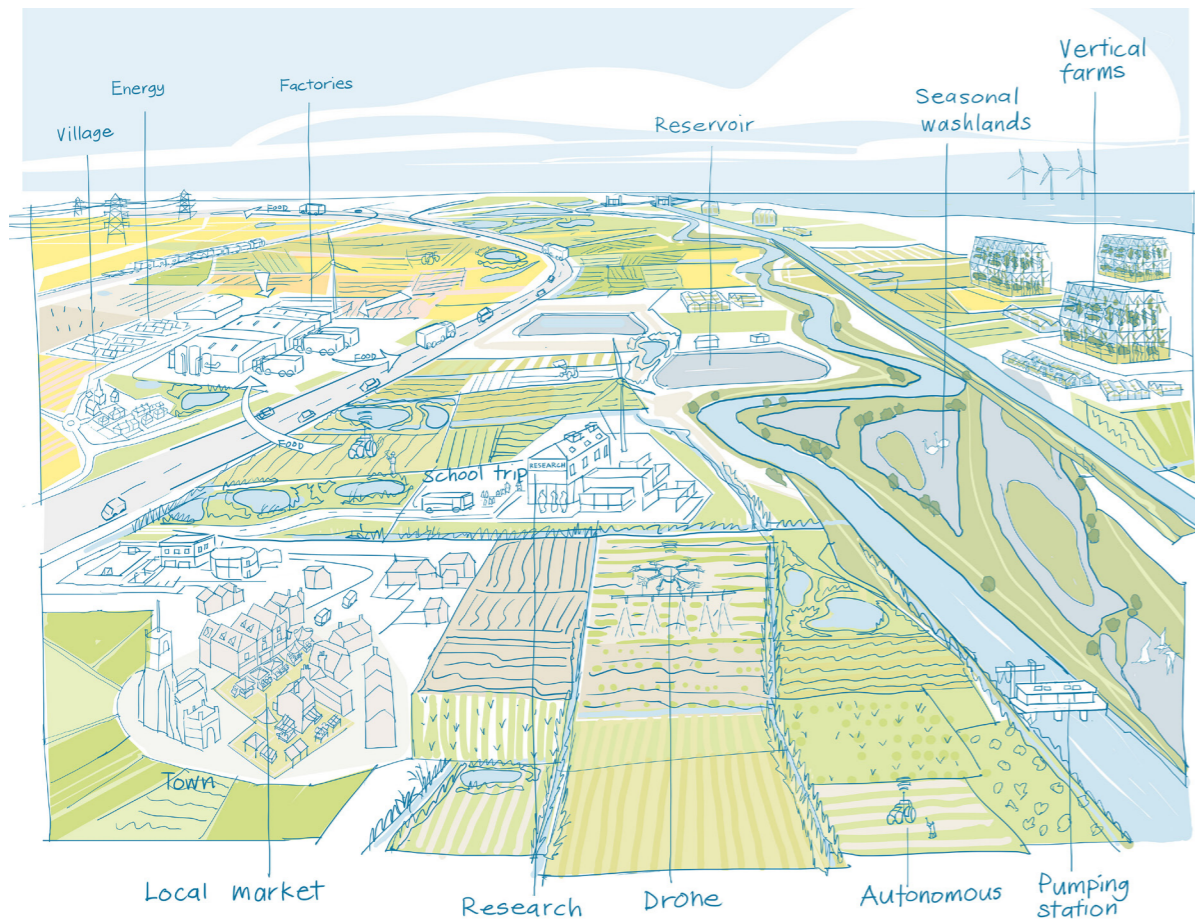
A number of **anticipate, adapt and recover** soft measures are relevant for this future from local emergency response and planning strategies, flood insurance, safe havens, safe access and egress, and supporting local recovery plans.

The Fens are key to UK food production

Reflections from the future

"The Fens has a thriving high-tech food processing and logistics supply chain, which has kick-started the wider economy in the region, supporting thousands of quality processing, manufacturing, distribution and retail jobs. Early in the 2030s, the government designated the Fens as a protected area for food production in the UK, with Fens specific policies put in place alongside the whole UK Food Security Plan. This was supported by incentives and subsidies for adopting innovative agricultural technologies and food production methods, leading to a reduction in input costs, boosted yields and increased profitability.

Water underpins the new ways of working. Farmers are incentivised to support water management and river maintenance. There is a long-term commitment to investments which support secure and reliable year-round water availability, giving farmers and growers certainty to invest in new equipment and methods to boost productivity. Planting higher value crops is de-risked, taking advantage of the fertile land available. Vertical farming has become common-place, high-value paludiculture is located around washlands and there is a growing interest in saline crops. "Grown in the Fens" branding is a marker of quality.



Stronger profitability and higher yields helped farmers switch areas to regenerative farming practices and soil health has improved, creating a virtuous cycle for agriculture. This means there is more space for nature, supporting pollinators and reducing disease threats from mono-cropping and highly stressed farm environments as the climate changes.

Those employed in the food supply chain are more highly educated and command higher wages, boosting the economy across the Fens. The Fens are an exemplar for modern agriculture and this knowledge is traded and sought out globally."

Key features of this future

- Focus on using the best quality land for high value food crops, protecting it from other land uses.
- A high uptake of 'climate-smart farming' and agri-tech innovations, supported by the strong food and farming research institutions in the area.
- Clear and strong regional government policy, including strategic rural land use planning.
- Water availability is not a constraint. The best land is highly productive and predictable.
- Across the landscape there is a combination of intensification, land sharing and land sparing, which means space can be made for other land uses.

Why is this important for the Fens now?

There are approximately 3,700 farms in the Fens, which cover 96.5% of the total land area. There are currently almost half a million hectares of best and most versatile agricultural land in the Fens, much of which is at flood risk now and in the future. The Fens produces over 7% of England's total agricultural production, worth £1.23bn despite covering less than 4% of England's farmed areas¹. The agriculture and food production sector supports 80,000 jobs in the Fens.

Policy context

- Government Food Strategy
- Lowland Agricultural Peat Task Force

How is this influenced by flood and coastal risk management?

Water availability – in terms of how much and when its needed - for planting, growing and harvesting crops is key to high yield cropping in the Fens. The winter storms of 2023/24 highlighted how flooding and long-term waterlogging of land significantly impact agricultural productivity and yields, with estimates of key crop harvests being down by up to a fifth². The unpredictability of water availability coupled with uncertainties in the future composition of subsidies, means that farmers are less likely to take the financial risk to invest in higher value crops, even though their soil would support them.

The primary use for most of land in the Fens is agriculture. There is a clear opportunity for stronger partnership working to support the case for continued active flood risk management in the landscape to support its agricultural value and productivity.

The wider food production sector in the Fens is also dependent on water availability for the processing and manufacturing of food products.

Many of the food products produced in the Fens have limited shelf lives. To ensure the economy of this area, the reliability of transport infrastructure is crucial.

¹ NFU, Delivering for Britain: Food and Farming in the Fens, 2019

² Analysis by the Energy and Climate Intelligence Unit reported in the Guardian on 29/04/2024 (Washout winter spells price rises for UK shoppers with key crops down by a fifth)

Outcomes

2033

To create the first steps towards delivering this, we need:

- Clear agreement that the best use of land in the Fens is for growing food, and that this is valued.
- Regulations and licensing for on-farm water storage simplified, with clear guidance on how landowners can use this to manage both water resources and flood risk.
- Farmers have taken up a variety of ELMS funding and equivalents, where water is a clear outcome of investment. Farmers are more informed about how they can support good water management on their land and feel supported to act on it.
- Clear messaging on flood risk, and how this is expected to impact different methods of production and crop types, processing capabilities and logistics.
- Research institutions have supported a stronger understanding of soil hydraulics across the Fens, aligned to different types of flood risk management.
- Clearer understanding of funding and compensation for farmers for allowing their lands to flood in the interests of downstream communities, that can support more upland, nature flood management measures.

2050

Goals for what change will be created by 2050:

Resilience gain

- The way that water moves through farms is well understood by Farmers and growers, and they play an active role in shaping flood risk management decisions that impact them.
- Flood risk management considerations are a normal part of farm business planning in the Fens.

Wider benefits

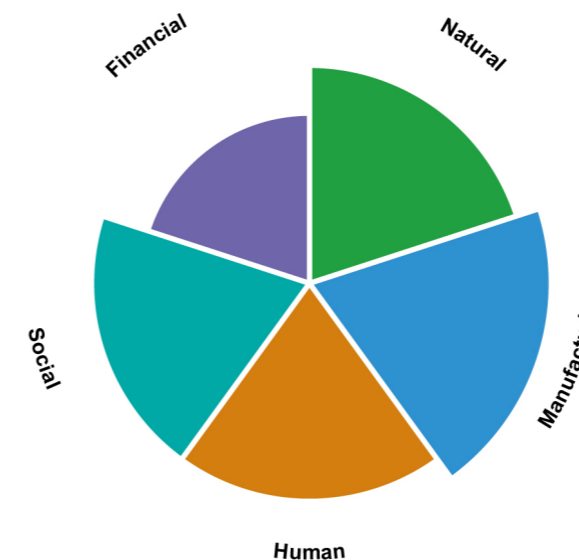
- There is clarity that agriculture and food production will be supported in the long term in the Fens, with a clear plan for food security nationally.
- There is certainty that long term investments in changes to production methods are viable, and farmers and producers will get a good return on investment. The farming system is less reliant on public subsidy, providing wider public value.
- New methods of farming that work alongside carbon sequestration and nature gain are more prevalent in the landscape, including paludiculture.

What do we need to unlock this?

- Central policy on rural land use, agricultural incentives and subsidies, and trade are all aligned to support growing and processing food in the Fens.
- Widespread access to innovation and learning, including from the research institutions in the Fens.
- Uptake of water based environmental stewardship schemes.
- Considerations of water trading as a mechanism to drive change.
- New and more widespread skills in modern methods of food production, distribution etc.
- Better valuation methods to take into account wider benefits of agriculture.
- Financial support for capital costs of on-farm water storage.

Investment case

By 2050, investment in delivering these goals could unlock the following types of benefits:



Adaptation measures

Investments in the following portfolio of measures could create and enhance this future:



Grey **protection** measures include water control structures including pumps, sluices, embankments and weirs.



Protection measures include land management practices like soil management, hedgerow planting, cover crops, buffer strips and floodplain reconnection. More **transformational** measures including saltmarsh development, paludiculture and Fenland habitat creation.

The Fens are a haven for wildlife

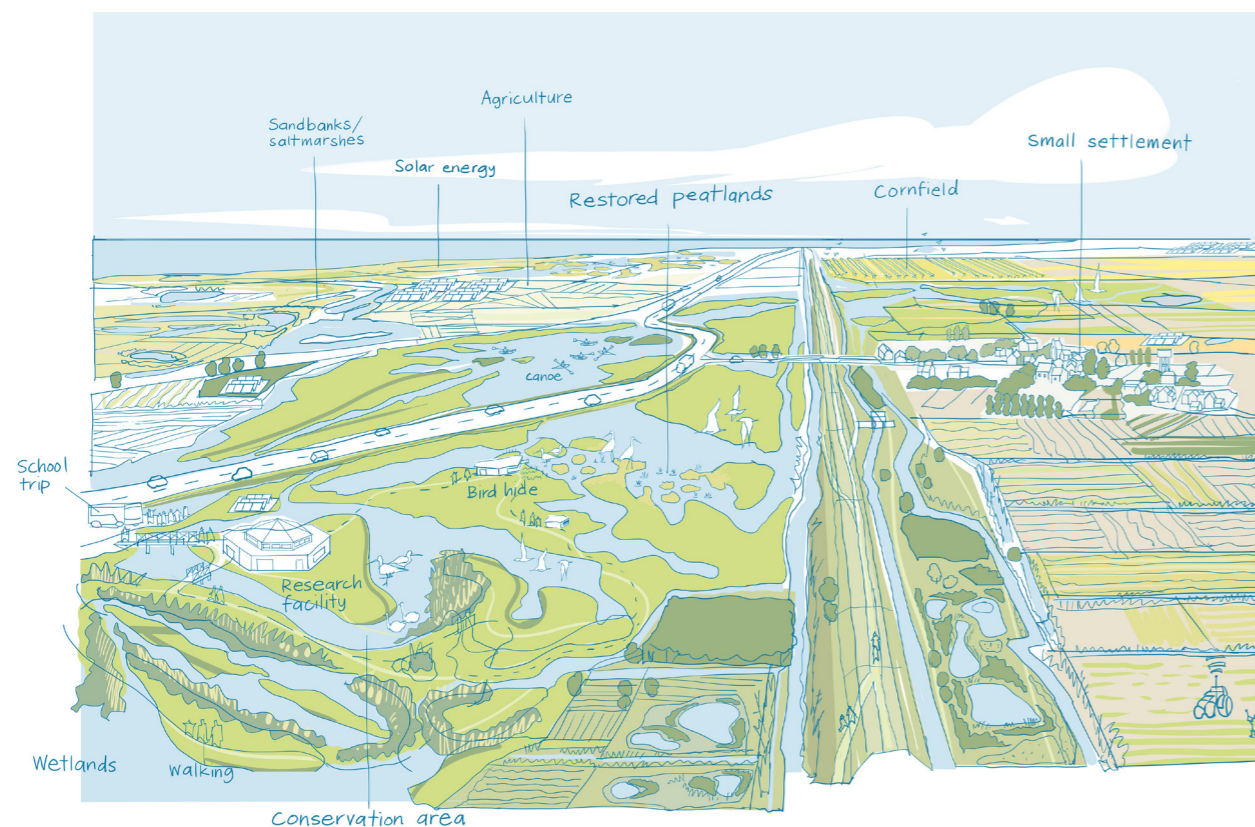
Reflections from the future

"The first local nature recovery strategies in the Fens resulted in coordinated action from new partnerships which created a healthy, connected, and resilient ecosystem, which is rich in wildlife. They brought together environmental groups, local people and farming communities to prioritise nature-based solutions and peatland restoration.

Supporting farmers to maximise the productivity and quality of produce on their best land opened up less productive land for nature, including natural flood management through wetland and washland areas. These sites, connected by the network of waterways and supported by adoption of more nature friendly farming techniques, have led to improved biodiversity, soil health and water quality.

Wildlife decline was reversed in the early 2030's and populations of species such as the Black-tailed godwit, Cranes, and European Eels are thriving, alongside new wetland species seeking refuge from climate pressures elsewhere. This has created a thriving, biodiverse environment for those living and working in the Fens.

New investment from public and private partnerships, drawing from new carbon and nature markets led to the establishment of the Fens Centre of Excellence for Green Finance and Land Restoration. Working with key institutions, this knowledge has been shared to help tackle the impacts of the climate crisis."



Key features of this future

- More space for nature, in a connected network underpinned by water.
- Conservation NGOs are well respected partners for delivering change and new investments.
- Nature strategies are woven into all Fens policy making and funding mechanisms. Ecosystems services are a key valuation tool in building any viable business case in the Fens.
- Data on natural features including species, habitats, water quality, air quality, soil health and carbon stores underpins decisions across the landscape.
- Natural flood management features can adapt to increased winter peaks and summer dry spells without causing a detriment to the ecosystems which establish around these sites.
- Greater access to nature, and new job opportunities associated with increased tourism, research organizations.
- Nature friendly food supply chain models.

Why is this important for the Fens now?

The Fens are home to nationally and internationally important sites for nature, including The Nene and Ouse Washes SSSIs and The Wash Ramsar site. The importance and uniqueness of these sites are underpinned by water. Ditches are some of the most species rich areas in the region. Over 13,000 species are supported by this landscape.

There are many initiatives focused on conservation of Fen history, such as those in the Great Fen area, which contribute positively to preserving and enhancing wildlife habitats. The enabling environments exist in the Fens to become an exemplar for research, and development of new water-compatible crops, and testing new investment vehicles such as carbon and water credits.

Many Water Framework Directive objectives are outstanding, emphasising the need for mitigation measures and opportunities to align with broader environmental objectives. In some places trying to use the same limited space for nature and water creates conflicts between conveyance requirements and nature needs. For example, cutting vegetation in ditches as regular maintenance to increase conveyance rates reduces biodiversity.

Policy context

- Environment Act 2021
- The 25 Year Environment Plan

How is this influenced by flood and coastal risk management?

The movement of water through the landscape supports the habitats that make the Fens unique. Newly created and restored wetland and washland areas around the Nene and Ouse Washes are used to store water in periods of high-water levels, reducing flood risk to local communities.

Rewetting strategies can impact nature differently, with different species benefiting from different hydrological regimes. Salination can have vastly different impacts on different habitats. A one size fits all approach will not support the greatest biodiversity possible in the Fens.

Outcomes

2033

To create the first steps towards delivering this, we need:

- Natural Capital assessment and local ecosystems services are well understood and widely adopted for making investment cases.
- Species decline in the Fens has halted and we are starting to move towards a reversal of decline trends in line with the biodiversity targets in The Environment Act 2021.
- There has been an uptake in Environmental Land Management schemes linked to landscape recovery, support new land management practices.
- Local Nature Recovery Strategies are well embedded into strategic planning and flood risk management investment decision making. Biodiversity net gain is standard across all developments and are starting to be considered in maintenance activities.
- Alignment in the regulatory requirements (such as planning consent, licenses for abstraction or species) for nature recovery projects.
- Risk management authorities are seen as open, joined up, and easy to navigate for nature organisations. They collaborate to secure additional investment to support retrofit measures for existing homes and businesses and the development of community response networks.
- Better understanding of water quality and nutrient loading of water and of sediments deposited during flood storage.

2050

Goals for what will be created by 2050:

Resilience gain

- Natural Flood Management is a core component of the portfolio of measure for managing flood risk across the Fens, and schemes are designed to support biodiversity thriving even in extreme events.
- Ecosystems services is a well adopted tool in building strong business cases for investment.
- Flood risk management is a core component of nature markets, accessing new streams of funding and finance.

Wider benefits

- There is a growing network of habitats across the Fens which are more resilient, and richer in plants and wildlife which underpins a more sustainable agricultural system.
- There is connection between the communities in the Fens and nature, with access to nature supported by our waterways nature gain are more prevalent in the landscape, including paludiculture (see Footnote).

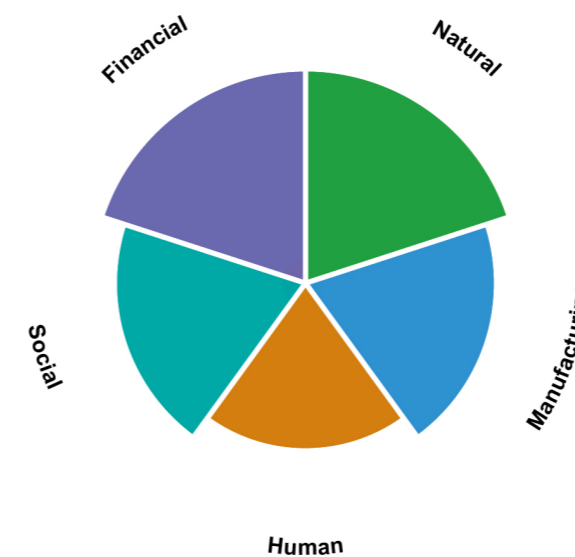
Paludiculture is wet agriculture on peatlands

What do we need to unlock this?

- Coordination between organisations for defined nature recovery outcomes.
- Application of ecosystem services valuation.
- Reconciliation between the role of agriculture in the landscape and methods used, and their impacts on nature.
- Language of natural capital to become widespread.

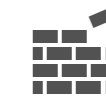
Investment case

By 2050, investment in delivering these goals could unlock the following types of benefits:



Adaptation measures

The portfolio of measures that could apply to this future include:



Grey measures: **Transformational** measures include asset rationalization and removal, relocation of community infrastructure and property, managed retreat and realignment.



Green measures: All **protect** and **transform** measures.



Soft measures: A range of measures across **anticipate, adapt recover and transform** include Local Resilience Forums, emergency response and recovery, design standards and guidance, forecasting and flood warning, community participation in incident recovery and funding and finance.

The Fens are a carbon sink

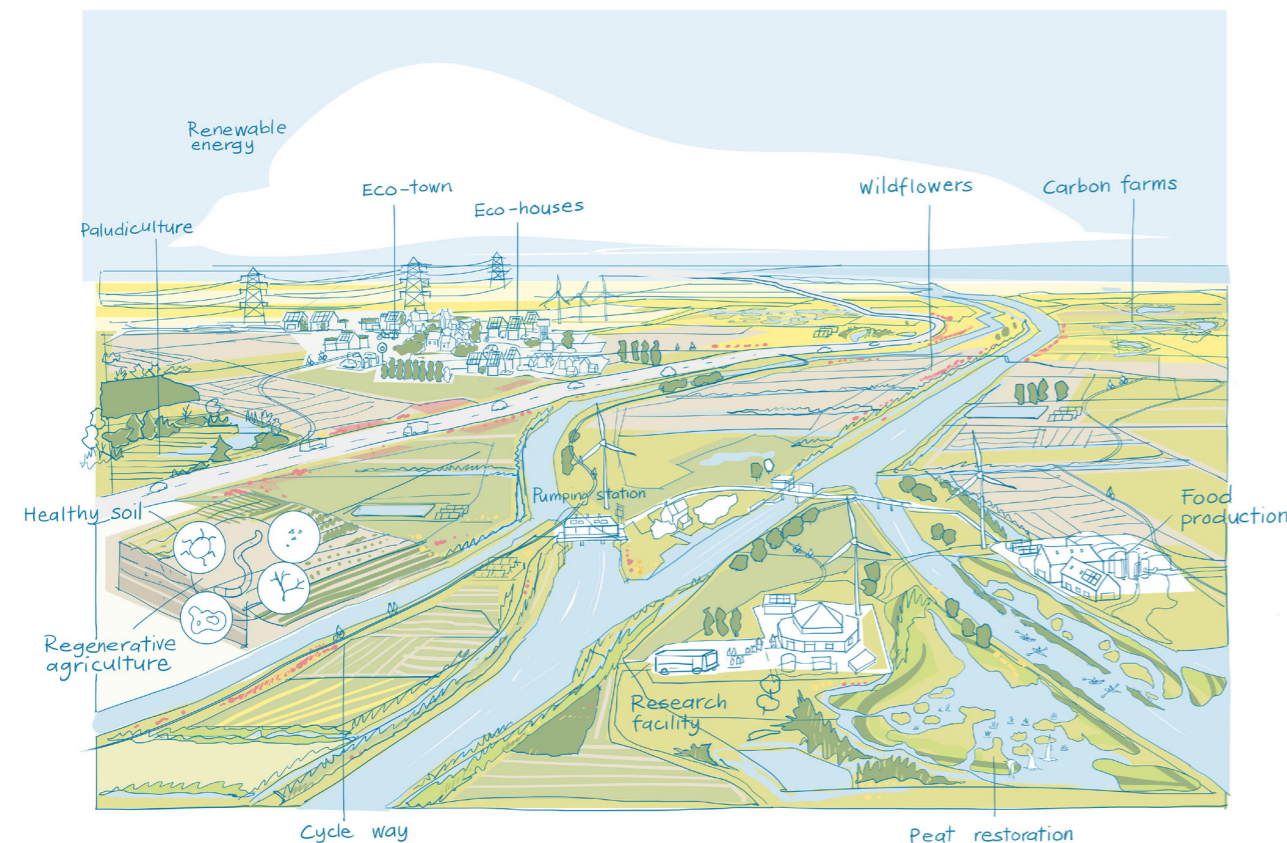
Reflections from the future

"Agricultural investments helped to give more space for nature and peat restoration, and supported low-carbon future ready communities. Land use changes significantly contributed to the UK meeting its net zero by 2050 commitment. The Fens pushed beyond net zero and is an asset in the UK's ability to sequester significant amounts of carbon. The sustainable management of water plays a vital role in its ability to do so.

Integrated flood risk management and water resources planning uses a catchment-wide lens, underpinned by an optimised system of assets, including new reservoirs, flood

storage areas and nature-based solutions. Maintenance and renewal of assets is informed by whole lifecycle carbon and circular economy assessment. Where energy intensive flood risk management, such as pumping, continues to be needed, opportunities to use renewable energy and sustainable fuels have been maximised.

Cambridge and Peterborough are now world-leading tech-hubs for carbon-led agri-environmental land-use research. Public and private investors in the Fens required innovative cost measurement methods to measure and verify emission reductions, which have been widely adopted.



Local authorities, land managers, investors and communities across the Fens pushed for interconnected water-compatible eco-settlements, informed by comprehensive carbon assessments. New developments are built to the highest standards for energy and water use, and existing homes and businesses are supported to retrofit for carbon and climate impacts.

Carbon, water and nature credit schemes have created local climate funds to support decarbonisation and adaptation including property flood protection, energy efficiency measures, and renewable energy."

Key features of this future

- All assets are managed in line with PAS2080 and the carbon hierarchy.
- Water is used as an enabler for land use change to sequester carbon across the landscape.
- Protection of lowland peat is now a key consideration in regional water resource planning, abstraction licensing and Local Nature Recovery Strategies across the Fens.
- The Fens ability to act as a carbon sink is valued nationally and internationally.
- Carbon strategies are woven into all Fens policy making and funding mechanisms. Ecosystems services are a key valuation tool in building any viable business case in the Fens.
- The Fens are at the forefront in disseminating knowledge on monitoring, reporting and verification of lowland peat management techniques for different crop and water management systems.

Policy context

- Climate Change Act 2008
- The Strategy for Net Zero
- National Adaptation Plan
- 25 Year Environment Plan

Why is this important for the Fens now?

The Fens has some of the most extensive areas of lowland peat. Across the UK, 3% of the UK's GHG emissions are from drained agricultural peat. In the Fens, there is potentially an opportunity to reverse this, and turn these peatlands into carbon sinks. There may however be trade offs with agricultural production, as peatlands and food production need different water levels.

How is this influenced by flood and coastal risk management?

For the Fens to remain a liveable landscape like we know today, the area is actively managed through a variety of measures including physical structures, pumps and sluices. To carry out this active management there is a carbon cost for operation and maintenance. – It is estimated that pumping represents the majority of operational emissions.

The Fens are a peat rich area which stores significant carbon. Keeping peat soils in good, wetted condition ensures that this historic carbon, which has been locked in over centuries, isn't released into the atmosphere.

Managing the landscape and allowing nature to thrive alongside water management and agricultural activities gives further carbon sequestration opportunities.

Outcomes

2033

To create the first steps towards delivering this, we need:

- Clear understanding of PAS2080 principles across all flood risk management investments in the Fens, with strong evidence of adherence to the climate hierarchy in decision-making. This should take a whole life carbon approach.
- This should be applied at a catchment and portfolio wide approach, seeking to identify carbon sequestering interventions and offsetting opportunities, where possible to balance out carbon creating ones.
- To measure carbon intensity of our capital and operational spending, and have clear monitoring and reporting mechanisms up to the portfolio level at the RFCC.
- Land use changes that require water level management to enable sequestration are understood and supported.
- Ecosystems services valuation is normalised.
- Research and policy is in place to effectively manage lowland peat.
- More open data availability on features such as peat depths and associated hydrology.
- Clear requirements, potentially through legislation, for responsible authorities to raise water levels in the interests of preserving peat soil carbon is in place.

2050

Goals for what will be created by 2050:

Resilience gain

- All individual investments in new capital projects are net zero.
- Across the portfolio of projects, investments sequester more carbon than they create overall.
- Operational activities including maintenance activities are matched by carbon sequestration investments which mean that the full flood risk management system is net zero.

Wider benefits

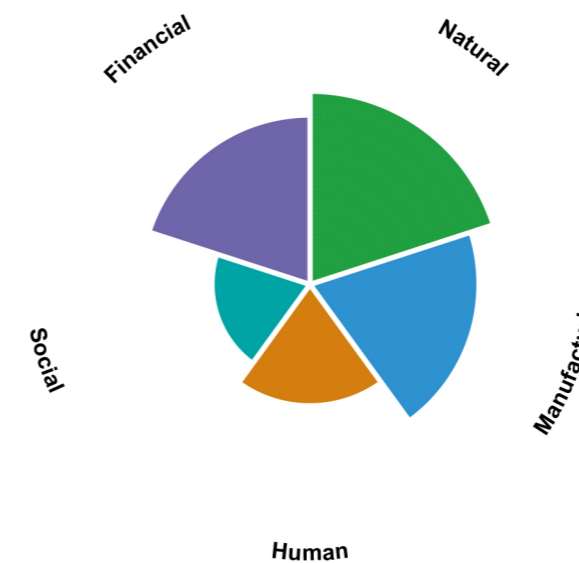
- The landscape is managed to be net zero, and is moving towards being a carbon sink for the UK.
- Water is made available for land use changes that can sequester carbon across the landscape, including regenerative agriculture or paludiculture, where appropriate.
- The majority of lowland peat areas are restored.

What do we need to unlock this?

- Knowledge sharing for the academic institutions in the area.
- Widely held skills in carbon measurement and accounting across sectors, including Carbon centered design for flood risk management.
- Whole life carbon considerations monitored at the portfolio level.
- RMAs have a clear understanding of carbon sequestration potential from land use supported through their investment decisions.
- Successful roll-out and expansion of schemes such as ELMS SFI, CS and landscape recovery.
- Peatland code updated to attract carbon-related finance from investors, and clear requirements and incentives for water companies to keep lowland peat wetter.
- IDBs remit is expanded to include water level management, including for peat preservation purposes supported by government funding changes.

Investment case

By 2050, investment in delivering these goals could unlock the following types of benefits:



Adaptation measures

The portfolio of measures that could apply to this future include:

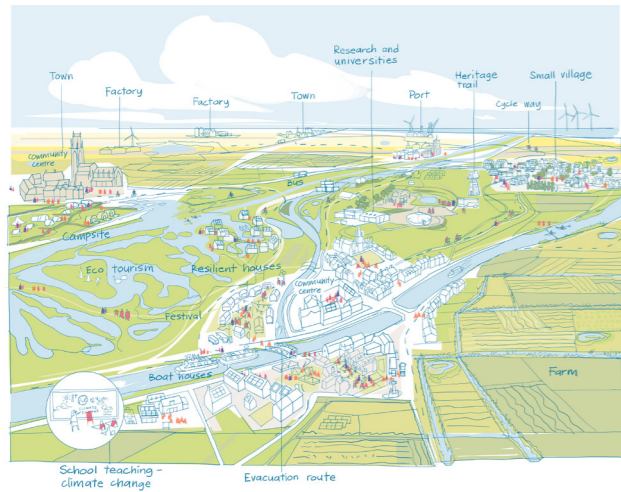


Grey **transformation** measures including managed realignment and retreat could contribute to this future.

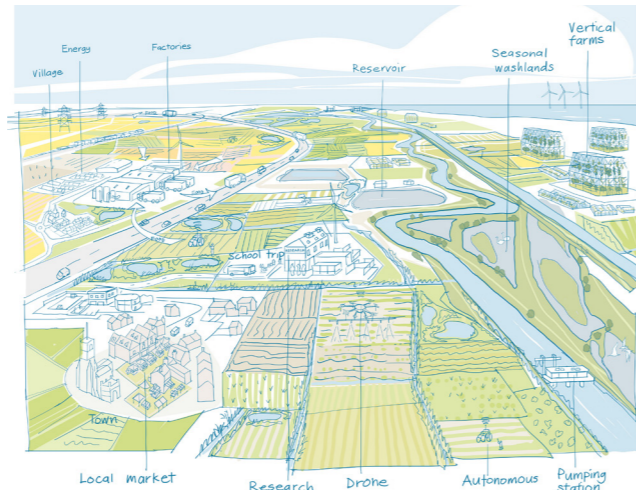


Most of the **protect** and **transform** green measures including saltmarsh, habitat creation, sustainable drainage, paludiculture, lowland peat restoration, woodland creation, soil management and tree planting contribute to this future.

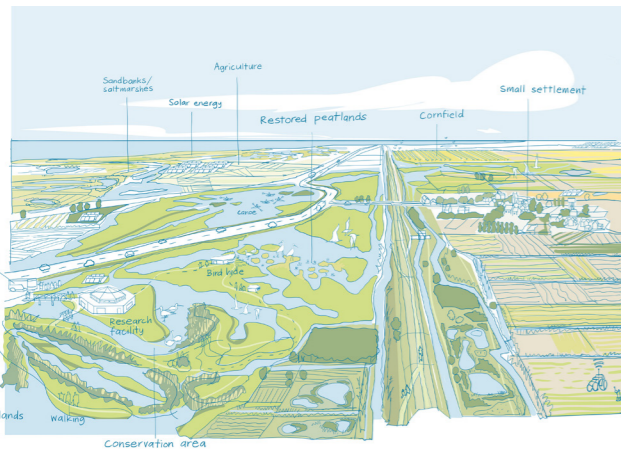
Exploring the futures we choose: a vibrant and climate resilient Fens



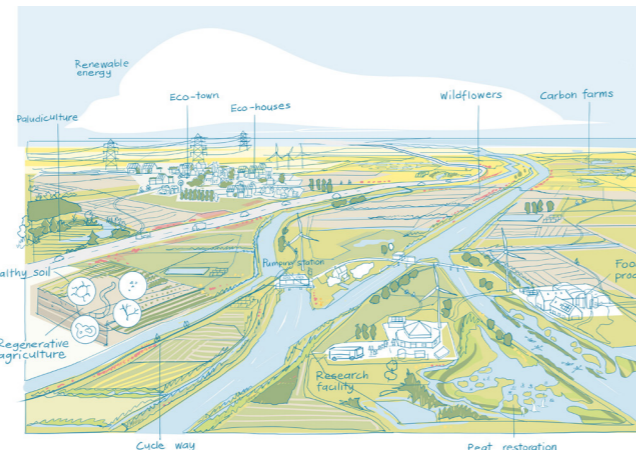
Communities are connected in the face of a changing climate



The Fens are key to UK food production



The Fens are a haven for wildlife



The Fens are a carbon sink

Choices, Investment and Impact

Creating and delivering a shared future for the Fens

The Fens are a unique, man-made and evolving landscape, shaped and influenced by the choices we make. We have illustrated a range of different futures, which can each contribute to a vibrant and climate resilient landscape and a path for living with water. No future is intended to represent an isolated story, rather a rich tapestry of plausible ambitions for the landscape, underpinned by investment in flood risk management.

These futures are open for us to co-create and influence as a partnership, advocating for the landscape and communities. Elements of all the futures can co-exist across the landscape, opening up a wide range of benefits and funding and finance opportunities. This is an opportunity to collectively shape the mission and objectives to drive towards a better future.

This is a first step in the journey towards a more collaborative and integrated future for flood risk management in the Fens. Together we can embrace bold new approaches to help us leave a positive inheritance for future generations, and provide the tools, skills and resources for people and the environment to thrive in this special place.



ARUP

RIVELIN
BRIDGE
water | people | places



Share your thoughts

If you are interested in exploring Our Fens Futures, or any other aspect of the programme, please contact: Fens2100@environment-agency.gov.uk

Fens 2100+ Our Fens Futures: Exploring the Case for Change.
October 2024

Fens 2100+ is an Environment Agency led partnership programme.

This document has been developed to facilitate discussion and explore a range of futures. It is based upon engagement undertaken over 2024.