Natural Capital & Ecosystem Assessment Pilot Project:

Applying a Natural Capital approach to planning policy and the growth agenda in the Oxford to Cambridge Arc

Final Report

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Contents

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Executive Summary

The Natural Capital Committee (2019) defined natural capital as 'that part of nature which directly or indirectly underpins value to people, including ecosystems, species, freshwater, soils, minerals, the air and oceans, as well as natural processes and functions'. So, a natural capital approach is a way of describing, quantifying and valuing our natural resources and the benefits they bring to people, to aid decision making. By taking a natural capital approach we take nature into account when making policies and decisions that can affect all aspects of the environment. To do this a natural capital approach requires a detailed evidence base which covers a wide range of natural capital assets, and the ecosystem services that they provide (for example the Oxford to Cambridge (OxCam) Arc Local Natural Capital Plan's (LNCP) natural capital and ecosystem services (NCES) evidence base provides maps for 18 different ecosystem services) – this is a key benefit of this approach.

The Ministry of Housing, Communities & Local Government's (MHCLG) OxCam Arc Spatial Framework policy paper was published in February 2021, so the timing of this research study and report is very opportune. It is envisaged that the findings and recommendations of this study will be used by a range of organisations to help inform this Spatial Framework and support the embedding of a natural capital approach within it. This report will also be used to inform the work of the Defra group in the OxCam Arc and their wider natural capital and ecosystem assessment initiatives.

Although this project was carried out for the Defra Group OxCam Arc Local Natural Capital Plan (LNCP) team, supported by the Defra Natural Capital and Ecosystem Assessment fund, this report is written for any individual or organisation that is interested in the application of a natural capital approach or wants to use a natural capital approach or a natural capital and ecosystem services (NCES) evidence base to influence planning policy. Therefore the findings and recommendations of the report will be applicable throughout the UK and should help influence the implementation of natural capital approaches nationally, and support planning-related decision making at all scales.

The overall aim of this project was to investigate and understand how a natural capital approach, and NCES data, could be applied to local planning policy and the growth agenda within the OxCam Arc. The focus was on taking a natural capital approach and utilising any NCES data and mapping which were available, it was not specifically looking at the NCES data or any other outputs from the OxCam LNCP. To do this, desk research, interviews, workshops and 'live testing' were carried out with relevant contacts, teams and organisations at the OxCam Arc, county (Local Planning Authority (LPA)), neighbourhood plan and development masterplan levels. A review was also carried out on the proposals in the 'Planning For The Future' white paper, which was shared with experts in the field and an influencing document produced by the project team.

The main body of this report is divided into sections covering each main aspect of the research, with each section containing relevant conclusions, findings and recommendations. These are followed, in the appendices, by detailed results and case studies.

The key findings and recommendations from this study are:

Awareness and application of a natural capital approach and NCES data

This study found that there was a **general awareness** of what a natural capital approach is, except at the neighbourhood plan level, but **little knowledge** of how the approach and the use of NCES data can help with the plan making and decision taking processes, except on a strategic level. At a county level, **no OxCam Arc LPA has used a NCES evidence base to form policy yet**, but a number of the LPA teams involved in this research (though not all) are planning on using a natural capital approach for the development of upcoming Local Plans, strategic plans or supplementary planning document's (SPD's) (see sections 4.2 and 4.3.2). **NCES data is not currently being used at the development masterplan level** or for the **development of neighbourhood plans** due to the resolution of the data and licensing and resource restrictions around how it can be viewed and used.

There was a general sense that these are still **early days for the adoption of a natural capital approach**, but potential users at all levels were keen to learn more and to move towards taking this approach in the future. At a strategic level it is seen as being important in the development of Spatial Frameworks or a natural capital investment strategy. At county/LPA level it will inform the development of Local Plans, strategic plans, SPD's, site selection and policy development. It could also be used in the creation of robust neighbourhood plans to inform planning exercises, support cases for the designation of local green spaces and ensure that the environment is better protected and enhanced through the neighbourhood planning process.

This study recommends that within the OxCam Arc, **Local Nature Partnerships (LNPs) should be advocating and driving a natural capital approach** and Biodiversity Net Gain (BNG) aspirations at both OxCam Arc and county level. This is because they have the local knowledge and ambition, and have already proven that they can work collaboratively, e.g. on creating environmental opportunity mapping and green infrastructure opportunity planning at the OxCam Arc level. To enable LNPs to do this, they will require support and funding.

At an OxCam Arc and county level there is **some awareness and knowledge of the OxCam Arc LNCP team and their NCES evidence base**, but most have **not engaged with it yet**. There was a **low awareness** of both the LNCP team and their evidence base amongst developers and people working on neighbourhood plans. A general comment from respondents at most levels was that there had been some engagement with the LNCP team in its early stages (attending workshops, etc) but they had lost touch with it during the Covid-19 pandemic and were no longer aware of its current outputs and evidence base. However, the benefits of the work that the LNCP team has produced are that it has **increased the awareness amongst all OxCam LNPs**, and many other organisations, of the natural capital approach and secured their commitment to it. In effect, it has acted as a **stepping stone towards embedding a natural capital approach** within the OxCam Arc, but this work now needs to be continued to ensure that it becomes policy and is fully incorporated within planning strategies and decision making.

Benefits, drivers and barriers

Greater Manchester Combined Authority (see section 3.4) has shown that **a natural capital approach can succeed on a strategic scale** if there is the political will or other strong drivers, such as developing a Spatial Framework or a natural capital investment strategy. This can **influence decision makers and key strategies** including Local Industrial Strategies, environment plans or Local Plans.

Respondents to this report felt that a natural capital approach could assist with the Government's requirement for Local Authorities to engage in **constructive cross-boundary discussions on strategic matters (the Duty to Co-operate)** as many natural capital issues are cross-boundary and landscape-scale.

Currently, the main reason why a natural capital approach is being followed is because there is, or has been, a **practical opportunity to incorporate it in the development of a planning policy**. For example, a forthcoming Local Plan, SPD or a wider strategy (e.g. the Milton Keynes 2050 or Oxfordshire 2050 Plans). Similarly, the main reason why a natural capital approach has yet to be used within an LPA is the lack of such an opportunity. We cannot influence the Local Planning schedule of local authorities, but our research suggests that **offering opportunities for the 'live testing' of a natural capital approach** would be popular with LPA, neighbourhood plan and developer teams. Specialists would work closely with the teams on a current plan/project and offer support, advice and guidance to help them identify how to best apply a natural capital approach, identify what further support would be needed and whether there are any gaps in the current evidence base. This would increase awareness of the approach, assist with the interpretation of data and show how it can be used to make decisions. Live testing could also help with the user needs analysis and development of a practical and effective **natural capital planning user guide** (see 'Making a natural capital approach easier for practitioners').

All respondent teams stated that their **biggest problem, and a major barrier, is in interpreting and understanding the data**. Specifically, what does it mean and how can it be used in plan making and decision taking processes, especially where interpretation might be robustly challenged (see 'Making a natural capital approach easier for practitioners').

Other barriers to LPA teams taking a natural capital approach were **resourcing** and the **licensing of data**, as the licence restrictions to NCES data hampered access to, and sharing of, the data both within and between teams. It would be better for all potential users of NCEA data if **all relevant data were widely available, shared and funded.**

How we could embed the natural capital approach across the OxCam Arc

In February 2021, MHCLG published a policy paper for developing a long-term Spatial Framework for the OxCam Arc. This commits to taking a natural capital approach to inform planning and decision making and will set policy to embed the enhancement of natural capital across the OxCam Arc. This study suggests that **this**

Spatial Framework is the key to embedding natural capital at the top level, as it will lead to strategic policies and visions that are applied across the OxCam Arc.

The study team concludes that we need to ensure that a **natural capital approach is a key component of this framework and that it becomes Government policy for the OxCam Arc**. The process for developing the Spatial Framework will be consultative and this could be a **key role for the LNPs across the OxCam Arc** which should work together to promote the inclusion of a natural capital approach, shared evidence base and methodologies in the Spatial Framework.

There are number of recommendations made in this report which should be applied to the OxCam Arc Spatial Framework:

- The Spatial Framework should incorporate a natural capital approach, but this should be presented as an **evolutionary transition from current green infrastructure (GI) approaches** which are more widely used and understood. This combined approach will build upon GI policies and initiatives, but emphasise the additional benefits which a natural capital approach and its detailed evidence base can bring to assist with decision making processes (see 'Green infrastructure and the way forward')

- Further development of a **detailed, shared OxCam Arc-wide natural capital evidence base** (see 'Natural capital and ecosystem services evidence bases'). This should **work at landscape-scale** and not be constrained within administrative boundaries. It would include addressing issues and barriers such as access, licensing, cost, data sharing, scale of data, interpretation of NCES data and ease of use, as well as providing a further step towards cross-border sharing of information. This should be carried out in conjunction with the development of a natural capital planning user guide (see 'Making a natural capital approach easier for practitioners')

- The Spatial Framework will support better spatial planning, but should also incorporate funding and investment mechanisms. As part of embedding a natural capital approach within the OxCam Arc, it is recommended that a **natural capital investment approach** is incorporated within the Spatial Framework. This will build upon the detailed OxCam Arc-wide evidence base to produce strategies and plans which will attract and manage long term sustainable funding for natural capital, environmental and ecological projects within the OxCam Arc. Because it is based upon natural capital, this approach will cover the whole range of natural capital assets and the ecosystem services they provide, offering multiple benefits for the natural environment and for people. For more information on how to take a natural capital investment approach see the LNCP supported Doubling Nature Investment Plan Scoping Study

- There should be increased use of **environmental opportunity areas or mapping**, such as that carried out by the OxCam LNPs in 2019, to support strategic planning. These should be used to support the planning of environmental protection, creation and nature recovery areas, possibly through the development of Local Nature Recovery Strategies (LNRS), as well as areas for growth and development

- A natural capital approach should be integrated into **Sustainability Appraisals (SA)** for the Spatial Framework. There is an opportunity to undertake a data-led approach to SA and improve the efficiency of the process. The proposal for a 'sustainable-development test' in the 'planning for the future' White Paper also supports developing a more efficient process

Public consultation on developing a vision for the OxCam Arc's Spatial Framework will be carried out in summer 2021, with options for growth being published for consultation in spring 2022 and a draft Spatial Framework being published for consultation in autumn 2022. There is therefore a **real opportunity to implement the recommendations from this report** to support a meaningful natural capital approach within the OxCam Arc's Spatial Framework and this could also provide a practical example which can be applied nationally.

Thinking nationally, in this study we have produced an **influencing document titled 'embedding natural capital and ecosystem services into the planning system'** which presents recommendations on how a natural capital approach could influence, or be embedded within, the new planning system which will be developed from the proposals in the 'Planning for the Future' White Paper (August 2020). Although the initial consultation period has now passed, we advise that our recommendations (related to nine of the proposals) are considered in the development of the future planning system (see section 7).

How to promote a natural capital approach within the OxCam Arc

The natural environment is a really important communications and marketing tool which can be used to **promote the positive environmental principles of the OxCam Arc**. If we emphasise this it could provide strong imagery to help wider audiences engage with the OxCam Arc and it could be used to raise awareness, and communicate the benefits, of a natural capital approach.

It is important to embed a natural capital approach at all levels of the planning process, however this study has identified that there are communications problems concerning what the natural capital approach is, what it actually means in practice and how it can benefit the planning process, environment and people. Future communications planning should focus upon **socialising and normalising the concept of natural capital at all levels and within all strategic themes** of relevant organisations. To help with this we recommend that local authorities, developers and infrastructure organisations should have **natural capital champions** to promote this approach and act as advocates for the natural capital approach.

There is a need for clear information and support on how to take a natural capital approach and use a natural capital evidence base, and advice and training on how to interpret the data and use it to make decisions and identify key principles, opportunities and strategic priorities. Specifically, some form of **support structure or body should be developed** to provide these. This should be OxCam Arc-wide, link closely with other awareness raising and training developments (such as the recommended natural capital planning user guide, the promotion of natural capital champions and development of the natural capital evidence base) and include the

development of peer support mechanisms, for example through the South East Midlands Local Enterprise Partnership (SEMLEP), professional networks, between neighbouring local authorities and their teams, or between parish councils.

Making a natural capital approach easier for practitioners

The largest problem in using a NCES evidence base, and a major barrier to taking a natural capital approach, is understanding how to interpret and prioritise the data. The natural capital approach and evidence base needs to be clearly explained, including how to use it correctly and effectively in plan making and decision taking processes, especially those where interpretation might be robustly challenged. Our research showed that **NCES data needs to be much easier to use** (more efficient systems, easier access and built-in interpretation) and LPA teams need **examples of how judgements were made using the data** and guidance on what, and what not, to use the data for.

In order to assist in the use and interpretation of NCES evidence bases, the work of the proposed support body (see 'How to promote a natural capital approach within the OxCam Arc') and to further encourage the adoption of a natural capital approach, it is **recommended that a natural capital planning user guide should be developed** (see sections 4.1.5 and 4.3.4). This was requested by all respondents from LPA and neighbourhood plan teams, and all LPA teams said that they would definitely use it if it were made available to them. This user guide should be made available in different formats; LPA respondents would prefer an interactive, online user guide, whereas neighbourhood planning teams requested that the guide should be suitable for printing.

Natural capital and ecosystem services evidence bases

With regard to the scale of NCES mapping:

- **Lower scale mapping** (i.e. OxCam Arc-wide) was considered suitable for making strategic-level decisions, planning nature recovery strategies and the need to protect land for nature. Respondents considered that at a strategic level, broad data and mapping can help with regulated and cultural assets and allow comparison of high and low NCES value areas. As part of this, a natural capital approach could be used to help identify key sites, offsetting opportunities and ecological corridors to join up areas/assets.

  Many respondents stated that they like 'the OxCam Arc' as an overall approach and framework to work within, and that an OxCam **Arc-wide evidence base should have shared metrics, datasets and messaging**. This would give a consistent approach, clarity and guidance to strategy and planning teams. Such a large dataset could then be split according to Local Authority (LA) boundaries if necessary.

- The **higher scale LNCP mapping** (25 m x 25 m grid) was considered satisfactory, but **ideally data and mapping should focus down to site level** to assess and compare site allocations at a Local Plan level. Access to a higher scale of mapping would also help with analysis at a site level and project design

in neighbourhood plans because they would need to be able to use data at **field and field boundary/hedgerow level**. This would also require detailed **ground truthing and surveys to be carried out**.

Respondents to this study told us that there is a need to **develop a shared natural capital evidence base with greater detail, more accuracy and up-to-date information**. Because decisions will be challenged, especially by developers and lawyers, the information and its interpretation needs to be **evidence-based, robust, and any subjective assessments quantified**. It is recommended that this is included within the proposed natural capital planning user guide (see 'Making a natural capital approach easier for practitioners').

Through our research we found that the main gap in the existing evidence bases is that they do not normally include any measure of the **quality or condition of natural capital assets**. Also, they show the current situation but are not as effective at showing the **agreed environmental opportunity areas**, where they exist. We recommend that future NCES data and mapping should seek to measure the quality/condition of assets and include detailed environmental opportunity mapping for every county. This enhanced NCES data would be especially helpful when investigating offsetting, net gain credits and would link with work on **Environmental Land Management (ELM) policies and LNRS.**

The forthcoming Environment Act will include the requirement for BNG and to enable this a methodology and metrics have been produced. For a natural capital approach, an **environmental net gain methodology and metrics will be required**. These will allow decisions to be made considering, and valuing, the whole range of natural capital themes, assets and ecosystem services.

From our research it has become apparent that decisions need to be made about **who should host the NCES data and evidence bases**, for example Local Environmental Records Centres, LAs or a national database such as the MHCLG Data Observatory. There also needs to be a system of who can **freely access the data and who needs to pay**. Charging, or funding through a natural capital investment plan, could ensure that this high quality data is maintained, kept up to date and made fully accessible. In this study there was no consensus concerning who should host and manage this data.

Green infrastructure and the way forward

Although, to date, there has been little use of NCES data and mapping within Local Plans, **GI approaches are commonly included within Local Plans** as a specific policy as well as being identified as a core theme throughout Local Plans across the OxCam Arc. In this research, GI was highlighted as a core link to natural capital approaches through the Local Plans and is mapped in several plans (for example Local Authorities in Northamptonshire). So GI could be viewed as both a barrier (reluctance to move away from an established approach) and an opportunity (ability to build upon an existing and familiar framework) for taking a natural capital approach. It is therefore recommended that **GI should be considered as a 'stepping stone' in an evolutionary move towards embedding a natural capital**

approach within the OxCam Arc, specifically within LPA teams. The question is how we can facilitate this transition from GI to a natural capital approach.

In the Bedfordshire live testing research we found limited overlap between the GI and ecosystem services data. However, a real identified benefit of the ecosystem services data and mapping was the significantly higher level of detail and broader scope to embrace climate change, flooding and environmental pollution issues. There was general agreement, between the project team and Bedfordshire Borough Council planning policy team, that because the GI opportunity zones were an accepted and adopted element of their development plan they should be retained. However, their value and robustness should be enhanced by incorporating ecosystem services mapping and data. Using NCES data to also update underlying GI theme data and mapping, rather than just using it in the context of opportunity areas, would potentially improve the process and facilitate a transition towards a natural capital approach.

This report recommends that **environmental planning methodologies and training materials which integrate the GI and natural capital approaches**, and make use of NCES data and mapping, should be developed and shared with LPA planning teams.

Throughout this study, researchers found that there was **generally good awareness of BNG** and its inclusion in the Environment Act, and that they recognised that the direction of travel will be from BNG to environmental net gain in the future. However, there was a **lower awareness of environmental net gain** and a sense that respondents are struggling with the concept and are waiting for a Defra metric, legislation or both before considering using it (see 'Natural capital and ecosystem services evidence bases'). However, a **natural capital SPD is being prepared for North Northants LPA** which has the potential to act as an exemplar for other LPAs to follow within the OxCam Arc. It is recommended that this initiative is supported and encouraged by the LNCP team (soon to be the Environment Agency's (EA) OxCam Arc team) and the OxCam Arc LNPs.

Although there was low awareness of **LNRS**, these will soon become mandatory under the Environment Act so there is a current opportunity to incorporate natural capital thinking within these forthcoming strategies. The findings from this study and the five LNRS pilot projects should be combined to identify potential mechanisms for **integrating a natural capital approach, and the use of NCES data and mapping, within the evidence baseline for LNRSs**.

1. Introduction

Within the 25 YEP the Government committed to the creation of Local Natural Capital Plans (LNCP), with the aim of embedding natural capital thinking into growth plans. Because of the commitments to green growth, the Oxford to Cambridge (OxCam) Arc was identified as the ideal place to create the first Government endorsed LNCP and the Environment Agency (EA), on behalf of and with the Defra Group, have worked with local partners to create an LNCP for the OxCam Arc. The LNCP provides a strategic evidence base that outlines the natural capital present within the OxCam Arc, the ecosystem services that flow from this natural capital, and the economic benefits it provides to society. Alongside this, high level reports have been produced which outline the environmental opportunities within the OxCam Arc, as well as the risks and pressures faced by the OxCam Arc's natural capital. The aim of the LNCP is to help local partners provide environmental protection and enhancement within the OxCam Arc.

Following the creation of the LNCP the project team wanted to understand how a natural capital approach, and natural capital and ecosystem services (NCES) data could be applied to local planning policy and the growth agenda. This study, whose aims are set out below, was commissioned as part of Defra's Natural Capital and Ecosystem Assessment (NCEA) Programme to answer this central question. The investigation has been coordinated by the Bedfordshire Local Nature Partnership (LNP) and has worked with local partners and specialists to understand how a natural capital approach and evidence base is being used to influence planning and growth policies.

The overarching aims of this project are to:

- Investigate how a local natural capital approach and a NCES evidence base can be applied to planning policy making at different scales (from strategic to neighbourhood)

- Investigate what NCES evidence is useful at what scale and if there are any gaps both in terms of the LNCP's data and the wider availability of data. Alongside this the study will assess the adequacy of current NCES data to allow the application of a natural capital approach, and will seek to understand how strong the evidence needs to be to allow natural capital to make a difference in policy making

- Understand what differences does, or could, the application of a natural capital approach make to policy making and how you could use what we learn from this report to influence others to take forward this approach?

- Understand how a natural capital approach could be taken forward both within the OxCam Arc and more widely in light of proposed planning reforms; and what could be put in place to allow a natural capital approach to be taken forward in the future?

The focus of this research was on taking a natural capital approach and using any NCES data and mapping that was available, it was not specifically focussed upon the NCES data or any other outputs from the OxCam LNCP team although it did include these.

The Ministry of Housing, Communities & Local Government's (MHCLG) OxCam Arc Draft Spatial Framework plan was published in February 2021, it is envisaged that the findings and recommendations of this report will be used to help inform this plan and support the embedding of a natural capital approach within it. This report will also be used to inform the work of the Defra group in the OxCam Arc and their natural capital and ecosystem assessment initiatives.

Although this project was carried out for the Defra Group OxCam Arc LNCP team, this report is written for any individual or organisation that is interested in the application of a natural capital approach or wants to use a natural capital approach or NCES evidence base to influence planning policy. Therefore, the findings and recommendations of this study should help shape natural capital approaches both across, and within, the OxCam Arc and throughout the UK.

The study was focused on the OxCam Arc to ensure that it was able to make the best use of existing relationships to support its engagement work, however it has also been informed by learnings and experience gained from a limited number of other UK examples.

To fulfil the aims of this project, desk research, interviews, workshops and 'live testing' were carried out with relevant contacts, teams and organisations at the OxCam Arc, county (Local Planning Authority (LPA)), neighbourhood plan and development masterplan levels. A review was also carried out on the proposals in the 'Planning For The Future' white paper, which was shared with experts in the field and an influencing document produced by the project team. Workshops were run with relevant LPA teams from every OxCam Arc county.

In addition to experienced researchers, the project team included three planning specialists, for reference their details are given below:

Sally Chapman of Chapman Planning is a planning consultant specialising in Neighbourhood Planning. She has over 25 years of planning experience as a Member of the Royal Town Planning Institute including at local planning authorities in the OxCam Arc.

Pippa Cheetham is the founder and Planning Director of Varsity Town Planning Ltd. Pippa is a Member of the Royal Town Planning Institute and has over 20 years' experience of working in town planning roles throughout the OxCam Arc.

Ursula Stevenson is a Technical Director at WSP with 20 years' experience working with local planning authorities, central government and private developers on planning and infrastructure projects. She has an MSc in Environmental Management and Assessment, is a Registered Environmental Impact Assessor (REIA), Chartered Environmentalist (CEnv) and Member of the Institute of Environmental Management and Assessment (MIEMA).

The research stage of this project commenced on 7 January 2021 with a report deadline date of 31 March 2021. This was a tight timescale for such an ambitious project and required considerable project management in order for the team to produce its deliverables and meet deadlines. It also has to be noted that the project took place within the Covid-19 pandemic and this caused a number of additional problems for the project team related to the unavailability of staff and respondents, and people working reduced hours (due to home-schooling responsibilities).

The project team were able to carry out the required research and hold all planned meetings and workshops, but as a result of the previously mentioned issues there was little opportunity to go beyond the basic elements of the brief. With a longer timescale and better availability of respondents, the teams would have attempted to carry out more live testing with LPA teams and follow up more of the LPA team workshops with additional interviews and conversations. This project has identified a number of key issues and has produced many relevant conclusions and recommendations, it has also produced a number of recommendations for further research within the subject area, see section 9.

The main body of this report is divided into sections covering each main aspect of the research, with each section containing relevant conclusions, findings and recommendations. These are followed, in the appendices, by detailed results and case studies.

Throughout this report reference will be made to a number of technical terms, if they are not explained in the text then a brief description will be given in the glossary in Appendix L.

2. Background

The Oxford to Cambridge (OxCam) Arc is the name given to a cross Government initiative that supports planning for the future of the five ceremonial counties of Oxfordshire, Buckinghamshire, Bedfordshire, Northamptonshire and Cambridgeshire up until 2050. It aims to ensure a harmonious delivery of improved connectivity, productivity and place making, whilst ensuring pioneering environmental standards and enhancements are delivered. Because of the commitments to green growth, its governance and scale, the OxCam Arc represents a unique opportunity to put the Government's 25 Year Environment Plan (YEP) into action.

The Natural Capital Committee (2019) defined natural capital as 'that part of nature which directly or indirectly underpins value to people, including ecosystems, species, freshwater, soils, minerals, the air and oceans, as well as natural processes and functions'. Thus, natural capital approaches have a few defining characteristics:

- A focus on the environment as a set of assets (natural capital)
- These assets provide services and benefits for people (ecosystem services)
- There is an emphasis on spatial and place-based understanding of these assets and services
- They seek opportunities to maximise multiple benefits across issues and sectors and these can help manage multiple risks (integrated approaches)

Natural capital assets include geology, soil, air, water, ecological communities and all living things, and are commonly mapped according to land cover or habitat types.

Ecosystem services are divided into eighteen provisioning, regulating and cultural services which include food production, water supply, air and water quality, flood protection, the pollination of crops and cultural benefits such as aesthetic value, interaction with nature and recreational opportunities.

3. Research at the OxCam Arc/Strategic Level

To investigate how does, or could, the consideration of a natural capital approach and the use of NCES data and mapping influence the approach to planning policies, land use allocations and spatial growth at an OxCam Arc level three separate pieces of work were undertaken:

1. A workshop was run with a wide range of attendees representing organisations and roles relevant to strategic planning at the OxCam Arc level. These included the Arc Environment Group, South East Midlands Local Enterprise Partnership (SEMLEP), statutory bodies, utility and infrastructure organisations, conservation organisations and Local Authorities (LA). Section 3.2

2. A review of existing and emerging applications of natural capital in planning at the OxCam Arc level was completed to help identify the benefits for delivery organisations in embedding the natural capital approach in strategic planning and development projects. Section 3.3

3. Research on two strategic-level approaches to influencing strategies and planning policy within the UK using a natural capital approach and a NCES evidence base. Section 3.4

3.1 Conclusions

The conclusions and recommendations in this section have been derived from all of the separate pieces of work (research and workshop) described above.

3.1.1 What are the main benefits of applying a natural capital approach to planning at the OxCam Arc/strategic level?

Research indicates that a **natural capital approach can succeed on a strategic scale** if there is the political will or other strong drivers, such as developing a spatial framework or a natural capital investment strategy. This can **influence decision makers and key strategies** including Local Industrial Strategies (LIS), environment plans or Local Plans.

Our work on this study also indicates the following benefits of taking a natural capital approach:

- NCES data and mapping provides an **important evidence base for strategic planning** and the identification of environmental opportunities. This can **embed the natural environment across all strategic themes**

- Respondents commented, and case studies show, that a natural capital approach and evidence base can **highlight where investment in the natural environment should be made** at a strategic scale

- A natural capital approach can provide a mechanism for **monetary value to be assigned** to the natural environment. This allows the environment to be directly compared with other strategic themes and priorities, and therefore have an influence in plan making and decision taking. For example, in the Greater Manchester Spatial Framework and LIS

- Taking a natural capital approach and developing a NCES evidence base is **essential for the development of a natural capital investment plan**, environment fund or other mechanisms for securing the long-term, sustainable funding of the natural environment. This is because it provides a detailed study of the natural capital assets and the ecosystem services they provide, the ability to quantify the value of these assets and services, and allow these to be aligned with multiple environmental and social benefits.

- **NCES mapping can link with other areas of strategic planning**, such as for transport infrastructure

Respondents to this report considered that taking a natural capital approach will support the development of **Local Nature Recovery Strategies (LNRS's)**, **Nature Recovery Networks** (NRN's) and the implementation and adoption of **net gain**.

3.1.2 How could we embed the natural capital approach across the OxCam Arc?

MHCLG's Spatial Framework is the key to embedding natural capital at the top level, as it will lead to strategic policies and visions that are applied across the OxCam Arc and enable cross-boundary thinking. **We need to ensure that natural capital is a key component of this framework** and that it becomes Government policy for the OxCam Arc. This could be a key role for the LNPs across the OxCam Arc, and they should work together to promote the inclusion of a natural capital approach, shared evidence base and methodologies in the Spatial Framework. This will enable them to meet their ambitions to double nature and develop a green OxCam Arc.

We should also ensure that there are **relevant policies within the OxCam Arc environment pillar and the Environment Act** to embed a natural capital approach within strategic decision making processes. Similarly, there will also be a need for **strategic frameworks** and an OxCam **Arc Environment Strategy**.

3.1.3 What advice and information do we need to take natural capital into account when making strategic decisions?

Through our research and workshops at OxCam Arc level, we reviewed what support and information was needed for local and national organisations to take a greater account of natural capital in their plan making and decision taking processes. Here are the key findings from this work.

- There is a **marketing/communications problem** about what taking a natural capital approach means and inadequate understanding of what natural capital

brings to the table, so **the first step is to socialise and normalise the concept at all levels** and within all strategic themes of organisations

- There is a need for **clear information**, **support** on how you can take a natural capital approach and use a natural capital evidence base, and **advice and training** on how you can interpret the data and use it to identify key principles, opportunities and strategic priorities. Specifically, there should be a **support structure, mechanism or body** to enable this

- A **user guide should be developed** to make the whole process straightforward, efficient and easy to use. This should include information about the natural capital approach within the OxCam Arc, where to access relevant evidence, examples of best practice, demonstration projects and case studies

- **Lower scale data is helpful for strategic decision making**, but at a more local level (project or site) users can have **problems interpreting the higher scale data that is required** and in applying it in practice

- Respondents to this report told us that there is a need to develop a **stronger natural capital evidence base** with greater detail and more up-to-date information. There are **gaps in the existing datasets, particularly around opportunity mapping and the data on irreplaceable habitats**. This is important as the natural capital evidence base helps to identify where investment should be made and the opportunity mapping provides a **link between natural capital and investible opportunities** which will help to guide policy, prioritisation and investment. To potentially address this a **shared NCES database** could be established (with funding and a host secured) and LNRS's could be expanded to provide a clearer idea of the potential opportunities for the OxCam Arc

- The forthcoming Environment Act will include the requirement for biodiversity net gain (BNG) and to enable this a methodology and metrics have been produced. For a natural capital approach, an **environmental net gain (ENG) methodology and metrics will be required**. These will allow decisions to be made considering, and valuing, the whole range of natural capital themes, assets and ecosystem services

- At the OxCam Arc/strategic level we need **greater drivers and inclination** from those in the top positions of decision making bodies to help those lower down to be confident in incorporating natural capital data in their day to day work

3.1.4 How could we promote the adoption and use of a natural capital approach within OxCam Arc level planning and growth policies?

As in the previous sections, we have found through this study that the following activities could help to promote the use and adoption of a natural capital approach.

- Make the **natural environment a priority in decision making** using a top-down approach strongly linked to nature recovery networks

- Natural capital data and mapping should be a **material planning consideration** to ensure that planning applications are determined using the approach

- We **need more exemplars** and Government agencies, as operational bodies, should be the first to embed the natural capital approach within their work. If they do this then developers/house builders or minerals and waste restoration projects might follow their examples

- We need **natural capital champions within LA** to help normalise and socialise this approach

- There needs to be a group of **natural capital experts** available to give advice and guidance

- The natural capital approach should be marketed and communicated as being **simple, helpful, easy to use and reducing complexity**. The **proposed user guide, training and support** (sections 3.1.3, 4.1.5 and 4.3.4) will help with this and lead to wider, and better, use of the NCES evidence base

- There needs to be a greater emphasis on **the relevance of a natural capital approach**, its simplicity and ease of use – unless people understand this in the context of their day-to-day work and lives then it will not be used

- The **natural environment is a really important communication/marketing tool to promote the positive aspects of the OxCam Arc**. If we tap into this, it could provide strong imagery to help wider audiences engage with the OxCam Arc, for example the OxCam Arc LNP's opportunity mapping, and promote our ambitions for a Green Arc

3.2 Findings of the workshop

A workshop was run with a wide range of attendees representing organisations and roles relevant to strategic planning at the OxCam Arc level, including the OxCam Arc Environment group, SEMLEP, statutory bodies, utility and infrastructure organisations, conservation organisations and LA.

During the workshop respondents were randomly divided into four breakout groups where facilitated discussions were carried out. These focussed on two distinct sessions ('Natural capital - the strategic view' and 'Enabling, promotion and information') and three specific questions were answered in each session. Here, the feedback from these discussions and subsequent communications, is summarised. Detailed notes from the breakout groups are given in Appendix A.

Session 1: Natural Capital - The strategic view

What do you think are, or could be, the benefits of applying a natural capital-led approach and using NCES mapping to strategic planning at the OxCam Arc/strategic level?

- Natural capital provides a scientific evidence base for the environment, similar to other areas of strategic planning. This can be used to inform strategic planning alongside housing, economic and transport growth
- It enables a holistic, integrated approach to the environment based upon offering multiple benefits
- It creates links between the natural environment and development, and embeds the environment across all strategic themes
- A natural capital-led approach engages with economic discussions and provides a mechanism for monetary value to be assigned to the natural environment. This should influence decision-making by allowing them to take into account the environmental costs and benefits of the choices they make, and also create opportunities for investment from both the public and private sectors
- It will feed into MHCLG's Spatial Framework and plan making, leading to strategic policies and visions that are applied across the OxCam Arc and enable cross-boundary thinking
- Aligned to the Spatial Framework will be a MHCLG data observatory - a joint digital evidence-base to support development within the OxCam Arc. This could help improve access to natural capital data and mapping in the future
- The depth of NCES data facilitates both top-down and bottom-up approaches.
- A natural capital approach enables mapping to be carried out at the same scale to other areas of strategic planning which can be comparable, e.g. Highways England
- It provides a framework for NRN and BNG net gain approaches

How could the consideration of NCES data influence the approach to regional planning, natural resource management and spatial growth at an OxCam Arc/strategic level?

- Natural capital planning highlights where investment in the environment should be made at a strategic scale. It allows consistency of approach
- The data and mapping provide evidence for nature-based solutions and opportunity mapping, LNRS will be essential for this
- There is a need to get natural capital 'hooks' into the Spatial Framework and ensure it is meaningful and becomes Government policy for the OxCam Arc
- Barriers to achieving this include the availability of funding (which could be addressed through OxCam Arc level investment), limited policy drivers (which mapping could improve) and time required to influence Local Plans
- SEMLEP's Economic Strategy facilitates connections between the economy, natural and built environments. It requires the delivery of a Natural Capital Investment Plan to promote environmental sustainability alongside economic growth

How do we embed the natural capital approach at the top level to support our aspirations to double nature across the OxCam Arc?

Policy / legislation

- MHCLG's Spatial Framework is the key to embedding natural capital at the top level, but the existing non-statutory basis of the Spatial Framework causes

uncertainty. It is therefore important to demonstrate the benefit of considering the environment early in the process to avoid unnecessary delay later
- Relevant policies within the OxCam Arc environment pillar and potentially within the Environment Bill
- Statutory frameworks are needed, e.g. New National Design Code, and there should also be a new 'environmental code' or a code for sustainable communities
- The Environment Strategy for the OxCam Arc, the principles will soon be agreed

Marketing / Communications

- There is a marketing/communications problem about what taking a natural capital approach means and inadequate understanding of what natural capital brings to the table, so the first step is to socialise the concept at all levels
- Interested parties need clear, agreed descriptions of key terms and consistent explanations of the core messages about what a natural capital approach means.
- Ultimately, it comes down to simplicity of message – we need to condense it into something clear and simple so it is more likely to be adopted
- To effectively influence decision makers, we need a 'Natural Capital Champion'
- Those using, or applying, NCES data and mapping will need, and benefit from having, a guidance document/user guide linked to tailored training and support. It should include demonstration projects and relevant case studies

Session 2: Enabling, promotion and information

What advice, information or guidance is required to give you the tools and confidence you need to take natural capital into account in your decision making?

- At an OxCam Arc/strategic level, there needs to be the capacity and inclination to use the tools available for a natural capital approach. A strong technical knowledge is not necessary
- The (forthcoming) Environment Act requiring 10% BNG has a methodology attached to it, the same needs to be done for the natural capital approach, i.e. an ENG methodology and metrics
- There is a need for opportunities mapping linking natural capital and environmental opportunities with investible opportunities – to help guide policy and prioritisation
- We need clear information and support on how we could use natural capital information, data and mapping
- Understanding strategic opportunities would help in local decision making.
- Guidance is needed on how we can use the NCES data to identify key principles, opportunities and strategic priorities?
- There is a strong requirement for a clear user guide to make the whole process straightforward, efficient and easy to use. This should include information about the natural capital approach within the OxCam Arc, where to access relevant evidence, examples of best practice, demonstration projects and case studies
- Practitioners and interested parties will need a support structure or body that can offer advice and training

How could we promote the adoption and use of a natural capital approach, and use of NCES data, within OxCam Arc level planning and growth policies?

- Improve understanding of OxCam Arc level governance and where the natural capital approach is being applied within planning at all levels
- The environment should be a priority in decision making with a top down approach and we need to strongly link natural capital with NRNs
- Natural capital should be a material planning consideration to ensure that planning applications are determined using the approach. This could speed up the planning process by providing information upfront
- Some LA will go beyond statutory requirements and may be open to producing policy/supplementary planning guidance on the natural capital approach (for example, the Northamptonshire Joint Planning Unit) – how can we support these 'pioneers'?
- Government agencies, as operational bodies, need to embed the natural capital approach – they can then be exemplars
- Major house builders or minerals and waste restoration projects may then be persuaded to be exemplar projects (e.g. Barrett's in Aylesbury working with the RSPB on the Kingsbrook development)
- There needs to be a dedicated group of natural capital experts available to give advice and guidance to LPA's/developers in the OxCam Arc to ensure consistency
- We need to emphasise the relevance of a natural capital approach, its simplicity, ease of use and how it can reduce complexity. Unless people understand this in the context of their work and daily lives then it will not be adopted and used
- We need natural capital champions within LA to help normalise and socialise this approach
- To ensure it is easy to understand we should not only provide data, we need tangible and relevant recommendations and case studies
- We should demonstrate that you do not need to be an expert to follow a natural capital approach. A user guide, support mechanism and training will support wider adoption and better use of the evidence base
- The environment is a really important communication/marketing tool to promote the positive aspects of the OxCam Arc. It could provide strong imagery to help wider audiences engage with the OxCam Arc, for example the LNP opportunity mapping

What level and type of data is required and are there any gaps in the current evidence base at an OxCam Arc level?

- Opportunity mapping is very important as a tool. Currently a lot of information is available on the current state of play but not enough on opportunities
- There is a need for a stronger evidence base to identify where investment should be made. Is there the potential for LNRS to fill this gap?
- Gap for irreplaceable habitats and species associated with them.
- Key issue – can be hard to find all the evidence
- It would be useful to have a road map (user guide) of where the data is, how to use it and what it means .i.e. an ORVal (Outdoor Recreation Valuation Tool) for natural capital

- Need a shared NCES database across the OxCam Arc for LA to use. Developer and public body contributions to this database could be beneficial
- There needs to be a body in place that will maintain the data, drive the process to use the data/guidance/tools and measure natural capital achievements

3.3 Applications of natural capital in planning and projects at the OxCam Arc/strategic level

This section looks at existing and emerging applications of natural capital in planning at the OxCam Arc level.

An OxCam Arc/strategic level application of a natural capital approach would encompass two different levels of planning:

- Major infrastructure – for example transport or energy infrastructure, which is undertaken for planning and delivery of individual developments
- Strategic planning, for example the proposed OxCam Arc Spatial Framework[1] or Regional Transport Strategy[2] which reflects regional level growth

Desk research was carried out to produce case studies on two major infrastructure applications; Highways England A14 Cambridge to Huntingdon Improvement, and the Network Rail Biodiversity Net Positive approach. A review was also carried out on strategic planning, covering England's Economic heartland and the OxCam Arc.

Major infrastructure

Nationally Significant Infrastructure Projects (NSIPs) are more likely to be applicable at the OxCam Arc level, as they are consented at a National Planning Inspectorate level rather than through a planning application to the local authority.[3]

The majority of NSIPs within the OxCam Arc are for transport infrastructure which, due to the linear nature of their development, affect multiple LA.

The Department for Transport refers to natural capital in its guidance for environmental impact appraisals of transport schemes[4], through the qualitative assessment of landscape, townscape, historic environment, biodiversity and water environment topics. However, it acknowledges that significant further work would be

[1] HM Government (2021). Planning for sustainable growth in the Oxford-Cambridge Arc. An introduction to the Oxford-Cambridge Arc Spatial Framework. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962455/Spatial_framework_policy_paper.pdf (Accessed: 19/02/2021)
[2] England's Economic Heartland (2021). Transport Strategy. Available at: http://www.englandseconomicheartland.com/transport/our-strategy/ (Accessed: 25/02/2021)
[3] Defined by the Planning Act 2008 which sets the legal framework for applying for, examining and determining applications for Nationally Significant Infrastructure Projects. NSIPs are consented through the Planning Inspectorate. (Accessed: 19/02/2021)
[4] Department for Transport (2019). TAG UNIT A3 Environmental Impact Appraisal. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/940947/tag-unit-a3-environmental-impact-appraisal.pdf (Accessed: 19/02/2021)

required to fully convert the assessment of these topics to an ecosystem services approach.

For road-based schemes, there is separate guidance on the environmental impact assessment (EIA) of each environmental topic. Natural capital is not assessed separately, but is embedded in the individual topic-based assessment of impact on biodiversity, landscape, water environment, air quality, etc. Therefore EIA, although acknowledging the relationship with natural assets, does not provide a separate methodology for a natural capital approach.

Despite the lack of standalone guidance for natural capital for infrastructure projects, there is evidence of the application of a natural capital approach to infrastructure development. Published sources by both Network Rail and Highways England document the application of natural capital to major transport infrastructure, and these are summarised below. More detailed case studies are given in Appendix B.

- For the **A14 Cambridge to Huntingdon road improvement**, Highways England commissioned a natural capital valuation of habitat creation areas. These were being formed out of 'borrow pits' (where minerals were extracted for use in road building) that needed restoration after use. Ecosystem service benefits arising from the scheme were mapped and monetised to reveal how changing land use (from beforehand to after the scheme) could add value across a range of services, including recreation, carbon, air quality and biodiversity[5]. As part of this work small waterbodies have been created for species such as newts and replanted to support a variety of natural habitats. It is understood that this is the first ecosystem services valuation undertaken by Highways England and the use of interactive Geographic Information Systems (GIS) and monetisation was considered valuable to the sharing of benefits in an understandable way with project partners. Highways England has since used this early example to develop a natural capital approach that can be used in decision making. While examples of application are still under internal development, the 'Environmental Benefits from Nature' (Ecometric) developed with Natural England is perhaps the most notable

- Network Rail takes a 'net positive biodiversity' approach, replacing more natural habitat than is lost as part of their work. This approach has been applied to a number of major projects including **East West Rail**, where the preferred option between Bedford and Cambridge is reported as being chosen to avoid the most environmentally challenging areas and potential direct impacts on irreplaceable or sensitive environmental features with good opportunities to achieve BNG[6]. Use of a Biodiversity Action Plan and habitat mapping also helps achieve better habitat management to support species and improve connectivity

[5] http://www.wsatkins.com/~/media/Files/A/Atkins-Corporate/uk-and europe/documents/natural_capital_interactive.pdf

[6] East West Rail. Connecting Communities: The Preferred Route Option between Bedford and Cambridge. Executive Summary. Available at: https://eastwestrail-production.s3.eu-west-2.amazonaws.com/public/MediaObjectFiles/339ba6a468/Preferred-Route-Option-Announcement-Summary-Document.pdf (Accessed: 19/02/2021)

The National Infrastructure Commission recently published a report on natural capital and ENG[7]. The commission's previous work includes design principles for BNG and they are now going one step further and setting out the intention to develop natural capital principles for promoting ENG for national infrastructure projects.

Strategic Planning

England's Economic Heartland is the sub-national transport body that covers a slightly wider area than the OxCam Arc. The Transport Strategy for the region was published on 25 February 2021[2]. The strategy acknowledges transport's role in the region's green recovery and achieving net zero by 2050. The Integrated Sustainability Appraisal (SA) of the strategy takes a similar approach to natural capital to that described for the transport guidance above, in that it assesses natural capital as a summary of other related environmental topics, such as biodiversity and soils. The OxCam Arc LNP's mapping of Environmental Opportunity Areas were not published at the time of the Transport Strategy development, but this could be used in the subsequent development of transport interventions - for example a series of transport connectivity studies are planned.

In February 2021, the Government published its policy paper for developing a long-term Spatial Framework for the OxCam Arc. The plan aims to:

- Support long-run, sustainable economic growth across the area
- Help to make the area a brilliant place to live, work and travel in – for existing residents and future communities alike
- Support lasting improvements to the environment, green infrastructure (GI) and biodiversity

The paper acknowledges the need to focus on the strategic opportunities for environmental improvement as well as growth, including addressing existing environmental issues such as carbon emissions, air quality, flood risk, ecological value and public access. It identifies the need for cross border working to address these problems.

The approach to the Spatial Framework is based upon 10 core principals, those that are particularly applicable to the natural capital approach are: collaborative, integrated, evidence-based, sustainable, digital-first and add-value. The paper commits to taking a natural capital approach to inform planning and decision-making and will set policy to embed enhancement of natural capital across the OxCam Arc. The Spatial Framework will also identify Environmental Opportunity Areas, including water services infrastructure incorporating nature-based solutions, supporting nature recovery, BNG and carbon sinks (Spatial Framework section 2.7-2.8).

The Spatial Framework will also include policies to enable new developments to support habitat recovery, delivery of LNRS and provision of good-quality green space within schemes (Spatial Framework section 2.11). The Policy also commits to

[7] National Infrastructure Commission (2021). Natural Capital and Environmental Net Gain. A discussion paper. Available at: https://nic.org.uk/app/uploads/Updated-Natural-Capital-Paper-Web-Version-Feb-2021.pdf (Accessed: 24/02/2021)

making the best use of data and digital tools, in line with a reform of the wider planning system (Spatial Framework section 3.9-3.14).

Barriers and benefits

Research indicates that there are a number of strategic barriers and benefits to the application of a natural capital approach at an OxCam Arc/strategic level. Regional planning, and associated regional spatial strategies, were revoked in 2010 meaning that until recently there has been no national policy mechanism for planning at the OxCam Arc/strategic level. However, with the emergence of regional transport bodies, such as England's Economic Heartland, and the OxCam Arc Spatial Plan, this is beginning to change.

Any cross-border, or OxCam Arc-wide, planning is currently being driven by collaboration between the individual LA that make up the OxCam Arc. Such collaboration can be driven by the need to demonstrate the 'Duty to Co-operate', and the natural capital approach supports activity in this, with natural capital and ecosystem services not conforming to administrative boundaries. Additionally, the use of a 'shared' evidence base mapped consistently across the OxCam Arc, using a shared methodology, further encourages such collaboration. It is also noted that future LNRS will need to look across administrative boundaries.

There is a real role for LNPs here and this has already been demonstrated by the collaborative approach they have taken on both natural capital planning, environmental opportunity mapping and GI opportunity planning at the OxCam Arc level. The process of developing the OxCam Arc Spatial Framework will be consultative, and it will be important to ensure that it fully embraces a natural capital approach. LNP's should take this opportunity to work together to ensure that a natural capital approach, shared evidence base and methodologies are included in the Spatial Framework and that pressure is applied to ensure that we meet our ambitions for a greener, cleaner and healthier OxCam Arc.

A further benefit of using a natural capital approach at the OxCam Arc level is that it ensures that environmental attributes are considered alongside regionally planned growth, including housing, employment and transport. Ecosystem services (such as recreation, carbon sequestration or flood management) and the benefits they bring, also become an influencing part of planning processes instead of being assessed as part of a separate environmental impact assessment process.

For major infrastructure projects a natural capital approach can potentially inform decision-making, for example when comparing route options for linear projects or sites for specific developments. However there is little evidence in the current application of environmental assessment processes, that this is being driven by natural capital. More often the term 'natural capital' is used to describe existing environmental assessments of biodiversity, landscape, water etc. Although major infrastructure is part of a national planning process, case studies used demonstrates that natural capital is actually being applied at much more detailed/local level, for example at pre-construction project design or for operational maintenance. Here it can be used to maximise ecosystem service benefits through environmental design

or inform habitat management on operational sites. Another application is Highways England's use of natural capital internally to inform investment decisions.

Recommendations from planning and projects at the OxCam Arc/strategic scale

A natural capital approach has been identified for use in the emerging Spatial Framework and to some extent, transport infrastructure. Other areas where application can be further explored within the OxCam Arc are flood risk management, water resources, utilities and energy. There is a need for organisations to work together to share lessons learned, develop consistent applications and improve the quality of data.

The collection of environmental data through environmental assessment (EIA / SA / Strategic Environmental Assessment (SEA)), including the development of national infrastructure projects and any lessons learned, could contribute to an OxCam Arc-wide database in GIS format. Natural capital can contribute to environmental assessment processes through collection of baseline environmental data, assessment of alternative options for development, identification and assessment of impacts and developing mitigation and offsetting measures (see section 7.3).

The development of a natural capital approach to inform the Spatial Framework, particularly through use of digital mapping and the Natural Capital Opportunity Areas, is supported.

3.4 Examples from other strategic-level natural capital approaches within the UK

Research was carried out on two strategic-level approaches to influencing strategies and planning policy using a natural capital approach and a NCES evidence base. These were Greater Manchester Combined Authority (GMCA) and the South Downs National Park.

The GMCA wanted to take a natural capital approach to help understand what their natural capital assets are, what ecosystem services they provide and assign values to them so they can be incorporated within key strategies and policies. They collected a NCES evidence base which has been used in the development of the Greater Manchester Spatial Framework, LIS and Five Year Environment Plan. They have also used the natural capital approach and their evidence base to develop a natural capital investment strategy and plan, an environment fund and other investment, engagement and communications initiatives.

The South Downs National Park Local Plan and Policies Map 2014-2033 was adopted in July 2019 and covers the whole national park. It sets out how the national Park will manage development over the next 15 years and has a strong focus upon the natural landscape. The Local Plan covers numerous natural capital assets and the ecosystem services that these provide, and is supported by an evidence base which includes ecosystem services mapping.

The case studies are given in Appendix C.

Findings and conclusions from the case studies

General

A **natural capital approach can succeed at a strategic scale** if there is the **political will or other strong drivers**, such as developing a Spatial Framework or a natural capital investment strategy. As shown by the GMCA case study.

A natural capital approach **can influence decision makers and key strategies** including LIS, environment plans or Local Plans.

Taking a natural capital approach and developing a NCES evidence base is **essential for the development of a natural capital investment plan**, environment fund or other mechanisms for securing the long-term, sustainable funding of the natural environment. These approaches are being developed by GMCA and in a number of counties, including Surrey, Sussex and North Devon. Such strategies and investment models could be applied either to the whole of the OxCam Arc or within specific counties. The Doubling Nature Investment Plan Scoping Study (Doubling Nature Investment Plan Scoping Study) critically evaluated current UK approaches to natural capital investment planning and presented options and recommendations which could be applied in Cambridgeshire and other OxCam Arc counties.

Both case studies show that a high quality and regularly updated **NCES evidence base should underpin all policies and strategies** which are related to, or include, the natural environment. It will need to cover **all scales of data** to assist with strategic (low mapping scale) and local (high mapping scale) plan making and decision taking.

A natural capital evidence base will be needed for the development of **LNRS** and **NRN**.

The evidence base (NCES data and mapping)

Data can be presented at different scales, but a **key issue is communications** and keeping the information **user-friendly and relevant to its audiences** in their day-to-day work.

Lower scale mapping and data is helpful at a strategic scale, but **at a higher scale (project or site) users can have problems interpreting the data and applying it in practice**. As a result, GMCA are producing a text-based **user guide** which will bring all relevant tools into a single place and ensure all data is open source. This guide will be easy to use and understand and include relevant examples and case studies.

When communicating and marketing a natural capital approach, you will need to explain **what natural capital accounting and ecosystem services actually mean and how they can be used**. So, you need to talk to audiences in suitable language and communicate the ‘hidden’ benefits.

4. Research at the County/Local Planning Authority Level

To investigate how a natural capital approach and NCES evidence base is being, or could be, applied to planning policy at a county/LPA level four separate pieces of work were undertaken:

1. A review of LA plans within the OxCam Arc to identify to what extent different authorities have taken different approaches to using natural capital data for the various components of Local Plans and their supporting documents. Section 4.2.

2. Structured workshops with at least one LPA team from each OxCam Arc county to research the comparative approaches to, and experiences of using, a natural capital approach and evidence base. Section 4.3.

3. Research to identify good practice examples of UK planning policies which employed a natural capital approach and could be used inform the production of suitable planning policies. Section 4.4.

4. A 'live testing' exercise was carried out with Bedford Borough Council to help embed a natural capital approach within their Local Plan review. Section 4.5.

4.1 Conclusions

The findings and recommendations in this section have been derived from all of the separate pieces of work (research and workshops) described above.

4.1.1 Awareness and how a natural capital approach is currently being used

Within LPA teams there is a **general awareness of the natural capital approach** and a desire to learn more about it and how they can use NCES data. However, **none of the respondent teams had used NCES data to form policy yet**, which was either due to a lack of opportunity (i.e. Local Plan cycle) or a decision to take another approach. See sections 4.2 and 4.3.2 for more information on LPA approaches to natural capital and using NCES data and mapping within the OxCam Arc.

There is **some awareness and knowledge of the OxCam Local Natural Capital Plan (LNCP) team** and **many are aware of the LNCP NCES data** and mapping but most have **not engaged** with it yet. There is good awareness of the **LNP Opportunity mapping** work.

The most common current uses of a natural capital approach are for the **development of Local Plans, Strategic Plans or SPDs**. A natural capital approach is being, or planned to be, used by most of the teams included in this research, but not all at present.

To date there has been **little use of NCES data and mapping within Local Plans**. GI and BNG are however commonly included within Local Plans and there is a growing interest in taking a natural capital approach and using NCES data. See sections 4.2 and 4.3.2 for more information.

4.1.2 Drivers and barriers to taking a natural capital approach

Drivers

The main driver to taking a natural capital approach is the **necessity, requirement or opportunity** (statutory or otherwise) to use it in a real world scenario. For example, a forthcoming Local Plan, a SPD or a wider strategy (e.g. the Milton Keynes 2050 or Oxfordshire 2050 Plans) presents a practical opportunity to incorporate a natural capital approach in the development of a planning policy.

It was also felt that a natural capital approach could assist with **Duty to Co-operate discussions** as many natural capital issues are cross-boundary and landscape-scale.

It was suggested that **LNPs** should be driving a natural capital approach and BNG aspirations. However, for this to happen they will need to be adequately funded to ensure that long term support is available.

Barriers

Whereas the main driver to taking a natural capital approach was the opportunity to use it, the **lack of such a necessity or opportunity** was identified as being the largest barrier.

All respondent teams stated that their **biggest problem, and a major barrier, is in interpreting and understanding the data**. Specifically, what does it mean and how can it be used in plan making and decision taking processes, especially where interpretation might be robustly challenged. It was stated that the NCES data needs to be much easier to use (more efficient systems, easier access and built-in interpretation) and LPA teams need examples of how judgements were made using the data and guidance on what, and what not, to use the data for.

A main barrier for most of the respondent teams was **resourcing**. They have limited resources for learning new skills and applying new data, so taking a natural capital approach and using NCES data and mapping would require resourcing and funding beyond their current capacity.

This study found that the **licensing of data** is a barrier, as the licence restrictions to NCES data hampered access to and sharing of the data both within and between teams. It would be better for LPA teams if all of the data were widely available and funded. Note: LPA team members were not all aware of their county level NCES datasets or who has access to these, this should be identified as an issue and should be addressed through training and communications.

There was generally felt to be a **lack of knowledge, training and support available**. To help address this, most respondents requested **training and support** in order to take a natural capital approach and use NCES datasets. This would include accessing the data and mapping layers, interpretation of the data and how this approach can help with plan making and decision taking. In many of the workshop conversations it was stated that consultants were employed to advise, support and manage this area of work. There is the potential that this could have been a barrier to the teams learning and understanding the natural capital approach and NCES data better for themselves.

Two of the LPA teams said that they would like to take part in **'live testing'** to incorporate a natural capital approach and make better use of the available NCES evidence base. However, the researchers would suggest that all LPA teams would welcome this opportunity if it were offered to them.

4.1.3 Information, data and mapping

To take a natural capital approach and make use of NCES data and mapping, all respondent teams stated that they need the data within their evidence base to:

- Contain high quality data that is detailed and follows agreed metrics
- Be accurate
- Be kept up to date
- Be easy to use, easy to access, open and sharable

Because decisions will be challenged, especially by developers and lawyers, the **information and its interpretation need to be evidence-based, robust, and any subjective assessments quantified.**

To increase accuracy and aid interpretation, it is important to define the **assumptions** behind datasets and it was felt that **local input and ground truthing** would be needed to support this. **Exemplar projects and case studies** would also be required to add credibility to the data and help explain its uses.

From our research it has become apparent that decisions need to be made about who should **host the data and evidence bases,** for example Local Environmental Records Centres, Wildlife Trusts or even a national database such as MHCLG's Data Observatory. There also needs to be a system of who can freely access the data and who needs to pay. Charging could pay for keeping the data updated and Local Environmental Records Centres, for example, could provide this role which would also provide them with **sustainable funding** to ensure this high quality data is maintained and made fully accessible.

With regard to the scale of NCES mapping**,** this county level research found that:

- **Lower scale mapping** (i.e. Arc-wide) was considered **suitable for making strategic-level decisions**, planning LNRS and the need to protect land for nature. Respondents considered that at a **strategic level**, broad data and mapping can help with regulated and cultural assets and allow comparison of high and low NCES value areas. As part of this, a natural capital approach could

be used to help **identify key sites, offsetting opportunities and ecological corridors** to join up areas/assets.

Workshop respondents stated that they like 'the OxCam Arc' as an overall approach and framework to work within. Two of the respondent teams suggested that within the OxCam Arc our evidence base should have **shared metrics, datasets and messaging**. This would give a consistent approach, clarity and guidance to LPA teams. Such a large dataset could then be split according to LA boundaries if necessary. All LPA teams considered that **support and expertise** is required to enable a natural capital approach to be used in national, OxCam Arc-wide and local decision making processes

- The **higher scale LNCP ecosystem services mapping** (25m x 25m grid) was considered satisfactory, but more detail would be required. Data and mapping should **focus down to site level** to assess and compare site allocations. A higher scale of mapping would also help with ecological corridors and queries over village boundaries in Neighbourhood Plans because they would **need data at field and field boundary/hedgerow level.** This would require detailed, ground truthing and surveys to be carried out

There were a number of questions about **ecosystem services data**, as respondents found the 18 different layers confusing, they were not sure how to use them and questioned how they could interpret them in a meaningful way. They also had queries about **how they are measured**, especially very complex ecosystem services such as air quality regulation and aesthetic value. Most LPA team members, from strategic managers to planning officers, felt that the ecosystem services data needs to be interpreted for them, simplified and that they would need **training and guidance** on how to use and interpret it.

In the live testing research, it was found that there was very little overlap between the GI and ecosystem services data. However, a real benefit of the ecosystem services data and mapping was the significantly higher level of detail. In addition, the study also found that most of the respondents were aware of the LNCP's NCES data and mapping but had **not engaged with it yet** and so most were not sure **how to access it**.

4.1.4 What are the gaps in the evidence base?

Through our research we have found that the main gap in the evidence base is that although NCES data often indicates the presence of specific habitat types, it **does not normally include any measure of their quality or condition**. As a result, this can leave the data open to misinterpretation and does not provide as full a picture of the state of the environment as possible.

Our study has also shown that NCES data is very good at displaying the current situation but it is not as effective at showing the agreed **environmental opportunity areas** where they exist. Having detailed opportunity mapping for every county and a better source of data to support this would be especially helpful when investigating offsetting, net gain credits and links to Environmental Land Management (ELMs) policies and LNRS's. Where environmental opportunity mapping is available it needs

to be incorporated into NCES datasets and included within any training, support or user guide.

4.1.5 User guide

All respondents stated that it would be **very helpful and useful to have a user guide** for taking a natural capital approach and using NCES data, and that **they would definitely use it** if it were made available. A summary of the main requirements for this user guide (contents and format) is shown here, more information is given in section 4.3.4.

- Respondents would prefer an **interactive, online resource** to a written document. This would need to be **easy to use and find the information you need**. It also needs to be **easy to access** and **written clearly and concisely**, so a **glossary of key terms** would be helpful

- Navigation was considered to be important, so it should include **clear interactive links** to separate sections and information. This interactivity would mean that a user does not have to look in different documents for underlying evidence and interpretation. The guide should also have a **clear structure and be well organised**

- One of the main issues highlighted throughout this study concerns how the practitioner, or strategic manager, can **interpret the NCES data** and use it in plan making and decision taking. Therefore it is essential that any guidance produced should include clear and practical information that allows the user to understand what the data means and how they can easily make the right decisions using it

- Most of the LPA teams commented that any guide should incorporate some form of **interactive mapping tool** which includes explanatory text and advice on how to interpret and use the maps/data. This should include **interactive data layers** which could be 'layered up' as required. Planning officers, data managers and environmental managers/team leaders were particularly keen to have this functionality

- To help LPA teams make the best decisions and respond to any challenges, the user guide should include **proof of the data, provide links to the relevant databases and have relevant case studies**. It should also show evidence both from **within the OxCam Arc and beyond its boundaries**. **Training and support will be required** to support teams in using the guide

It is recommended that further research should be carried out to determine the specific user requirements for a natural capital planning user guide, a user centred design approach (a widely employed iterative design and development process focussed upon the user experience) should then be used to develop this interactive, online resource.

4.1.6 Links with key strategies and policies

It was recognised by respondents that the direction of travel for environmental protection and enhancement through planning is currently focussed around BNG and then, in the future, ENG. This study found that there was a lower awareness of ENG than BNG and most respondents felt that they are struggling with the concept of ENG and are waiting for a Defra metric, legislation or both before using it. However, a natural capital SPD is being prepared for North Northants which has the potential to act as an exemplar for the other LPA to follow within the OxCam Arc.

In Bedford Borough the planning team are in favour of an approach that includes a policy on NCES in the Local Plan review and are replacing an 'enhancing biodiversity' policy with one stating a requirement for net environmental gain.

Two of the respondent teams were aware of LNRS and they both see it as an important way forward in the future. Neither are closely involved with the current pilot projects at this stage, but hope to link with this work when it is completed and made available - especially the opportunity mapping aspects. The other respondent teams had low awareness and interest in LNRS at this stage.

4.1.7 Future use of NCES data and mapping

Four of the five respondent teams are planning to use NCES data and mapping as a part of their **forthcoming Local Plans** (see sections 4.2 and 4.3.2 for more information on LPA approaches to natural capital and using NCES data and mapping within the OxCam Arc). Of these four, two will also be using this approach and data in **major strategic plans** for their LA. The team which is not planning to use NCES data are instead currently focussing upon continuing to use a GI approach for their forthcoming Local Plan. This is on the advice of their consultants and because they took part in the Natural England Green Infrastructure pilot project in 2020.

From this study's discussions with LPA planning teams it was felt that, once adopted and better understood, NCES data would be helpful to other **LA departments and delivery teams**, including the land and highways teams (where mitigation data could be useful in relation to roads and drainage).

Respondents were interested in using NCES data as part of **minerals site selections and restoration plans** as it was felt that it could help select the best sites and guide restoration activities. Linkages could also be made with the RSPB's 'Nature After Minerals' programme.

Respondents expressed the view that NCES data and mapping would be very helpful in the **development of neighbourhood plans**, once it is easier to access, use and interpret the data. The evidence base will make it easier to identify key assets, environmental opportunity areas and make decisions on development and environmental protection.

4.2 Summary of the different LPA approaches to natural capital and using NCES data and mapping within the OxCam Arc.

A review of LA plans within the OxCam Arc has been undertaken. The aims of this policy review were to:

- Identify if a natural capital approach or natural capital and ecosystem services (NCES) data is present within Local Plans
- Investigate whether NCES data and mapping has been referred to or is included within Local Plans; and
- Record any associated 'green' policies

As part of this review, work was also undertaken to identify GI and BNG approaches within Local Plans.

The review was undertaken according to 'County', although it is recognised that the LA within the OxCam Arc comprise a range of different LPAs as set out below (Please note that Buckinghamshire Council became a unitary LA in April 2020, but the research was carried out using information from the previous local authorities).

Figure 1 *– OxCam Arc Local Authorities*

Here we present a summary of different LPA's current approaches to natural capital (or similar approaches) and their use of NCES data and mapping. The detailed policy review is given in Appendix D.

GI approaches are common and often included within Local Plans as a specific policy as well as being identified as a core theme throughout Local Plans across the OxCam Arc. GI specific guidance, strategies or projects to support Local Plans were also identified. GI was highlighted as a core link to natural capital approaches

through the Local Plans and is mapped in several plans (for example LA in Northamptonshire).

Biodiversity is frequently referred to within the Local Plans and often as specific policies. It is common for these policies to include BNG as mitigation or compensation where developments adversely impact on biodiversity. In some cases, Biodiversity Opportunity Areas were also mentioned (e.g. across the ex-district Buckinghamshire authorities and for Milton Keynes) and tools for BNG such as Natural Cambridgeshire's 'Developing with Nature Toolkit' in the Peterborough Local Plan were provided to interested parties. Where a Local Plan did not refer to BNG specifically, biodiversity protection and enhancement was mentioned. Publicly available data from Natural England for designated sites for nature conservation was referred to on occasion (e.g. Peterborough).

Ecosystem services are mentioned within specific environmental policies or broadly as reasoning for environmental protection and enhancement. Environmental policies are sometimes linked to specific ecosystem services such as water quality (South Oxfordshire District), flood management (Wycombe District Council), or benefits provided by biodiversity and trees (Bedford Borough Council). Specific policies for ecosystem services were not identified within any of the Local Plans reviewed.

Natural capital was included within more recent Local Plans, including Bedford, Peterborough City Council and Central Bedfordshire with the latter specifically referring to the use of analysis tools. Natural capital is not equally represented throughout the OxCam Arc, however in some cases it is recognised that this is due to age of the adopted plan and would be included in emerging plans, there is preliminary documentation to support the use of natural capital for Oxfordshire and Buckinghamshire, and within the GI evidence base for Greater Cambridgeshire, but this may also be applicable for other authorities who are yet to publish plans.

Evidence of natural capital and ecosystems services data and mapping use within Local Plans is limited. Throughout the LA in the OxCam Arc, mapping was specifically included within separate GI guidance, strategies or projects which support and provide an evidence base for the Local Plans. Local Plans tended to include a map of the strategic GI networks, corridors (Cambridgeshire, Corby, East Northamptonshire, South Northamptonshire, Wellingborough, Oxford, West Oxfordshire) with some areas also including opportunity/ target areas or sites (Luton, Aylesbury, Chiltern and South Buckinghamshire, Greater Cambridge, Peterborough, Cherwell, South Oxfordshire and Vale of White Horse). The exception is the Bedford Borough Local Plan 2030 which identified opportunity areas for GI enhancement with a broad data background from varying studies at local and county levels. It is acknowledged that other emerging plans as set out above may also take a more map-based approach.

4.3 Findings from County/LPA workshops

Structured workshops were run with LPA planning teams from each OxCam Arc county, or unitary authority, to research the comparative approaches to, and experiences of using, a natural capital approach and evidence base.

These workshops covered:

- Awareness of the natural capital approach and NCES data
- Information on this project and NCES data and mapping
- Current use of natural capital and NCES data and mapping within the teams
- Sharing and discussing examples of good practice
- Detailed questions about the information, data and mapping – including gaps in the evidence base
- How a natural capital approach might fit with key strategies and policies
- Future uses of a natural capital approach and NCES data and mapping

The teams were selected according to their current interest in natural capital, for example as part of a natural infrastructure team, and by their availability and willingness to take part in this research project. Note that this research does not cover all LPA's within the OxCam Arc. See section 4.3.2 for a summary of the approaches which are currently being taken by the LPA teams included in this research.

The numbers, and roles, of participants attending each workshop varied, but were based upon core members of LPA planning teams. Typically the workshops included strategic planners, senior/principal planners, planning officers, data managers, environmental managers/team leaders and managers from other related fields including climate change, minerals and waste or environment and heritage.

Here we present the main findings from the workshops, especially where more than one LPA team mentioned a specific point or issue. They are presented according to the main areas covered within these workshops. Detailed results from the workshops are given in Appendix E.

4.3.1 Awareness of a natural capital approach and NCES data and mapping

Most respondents were **aware of what a natural capital approach is** but lacked detailed knowledge of it. Although most organisations have someone with greater expertise in this area.

All had **some awareness and knowledge of the LNCP team** and some had attended recent workshops. They were also all aware of the **LNP Opportunity mapping** work.

Many, but not all, of the respondents were aware of the LNCP NCES data and mapping but have **not engaged** with it yet. Many respondents were unclear about the differences between the GI and natural capital approaches.
In addition most respondents want to learn more about the natural capital approach and the use of NCES data.

4.3.2 Current use of NCES data and mapping

How is it being used?

In Section 4.2, research informs us that some LPA's are starting to use a natural capital approach but that the use of NCES data and mapping is limited. We asked LPA teams how they are currently using natural capital and NCES, or similar, data and mapping – a summary of this is given below.

County/LPA	Summary of current natural capital approach and use of NCES, or similar, data
Bedfordshire (Bedford Borough Council)	• Using a natural capital approach for Local Plan review, due 2023. Draft documents due April 2021, hence 'live testing' with this project team • Working with Natural Capital Solutions who are providing the data and mapping • Do not currently have full access to the data, so have yet to fully explore and utilise it • Bedfordshire Natural Capital Project will deliver a county-wide study, with reporting and mapping provided at LA area level with the intention of supporting Local Plans (including site allocations and decision making) being a key objective
Buckinghamshire (Buckinghamshire Council & Milton Keynes Council)	• Bucks became a unitary authority in April 2020 and is now starting a new Local Plan process and using a natural capital approach • NCES data was used as part of the evidence base for the Milton Keynes 2050 Vision and this will form the starting point for the Local Plan review • The Defra LNRS pilot project in Bucks is using NCES data & mapping to support the identification of environmental priorities and a habitat map that will include opportunity areas • Whole county and Milton Keynes will prepare separate, but complementary, BNG SPD's • Working with Natural Capital Solutions which has provided NCES data & mapping and opportunity mapping for Buckinghamshire and Milton Keynes
Cambridgeshire (Greater Cambridge Planning – Cambridge City Council & South Cambridgeshire District Council)	• Current focus is on Greater Cambridge Local Plan, have produced evidence base and development strategy options to date • Took part in a Natural England GI pilot project in 2020, so are focussed on taking a GI approach • Land Use Consultants contracted to produce GI evidence base to support Local Plan, which incorporates aspects of natural capital
Northamptonshire (West and North Northamptonshire)	• North Northants Local Plan under review and they want to take a natural capital approach • Natural Capital SPD is being prepared for North Northants • Natural Capital Assessment (Dec 2017) and Natural Capital Account (May 2019) prepared to inform the development of proposals at Tresham Garden Village

	• Previous work used GI which needs to be refreshed and incorporate a natural capital approach, particularly to address climate change
Oxfordshire (Oxfordshire County Council)	• NCES data is being used as part of the evidence base for the Oxfordshire 2050 strategic spatial plan • Oxfordshire 2050 policies will influence future Local Plan policy and could include standard requirements for a county wide NCES evidence base • Districts have their Local Plans already in place, so have yet to adopt a natural capital approach

Drivers to taking a natural capital approach

Every respondent cited that the main driver was, or would be, either the **necessity or opportunity** to use a natural capital approach. This could be related to a forthcoming Local Plan, LNRS, an SPD or a wider strategy (e.g. the Milton Keynes 2050 or Oxfordshire 2050 Plans).

A natural capital approach has strong links with biodiversity, net zero carbon, climate, sustainability and public health agendas. So, it aligns well with current **political ambitions** to improve our environment, address the biodiversity and climate emergencies, and deliver a green, cleaner and healthier OxCam Arc.

Most respondents were mindful that BNG is in the Environment Bill and see this as a driver to better understand it and the natural capital approach.

Other drivers included:

- The Government's 25 Year Environment Plan
- Links with ongoing research projects, such as the Bucks LNRS pilot project
- High projected population and development growth threatening the natural environment. One team is promoting the environment as essential infrastructure
- Taking a more holistic approach

Barriers to taking a natural capital approach

None of the respondent teams have used NCES data to form policy yet, this is either due to a lack of opportunity (i.e. Local Plan cycle) or a decision to take another approach, for example one LPA is taking a GI approach.

A main barrier for most of the respondent teams was **resourcing**. They have limited resources for learning new skills and applying new data, so this work would require resourcing and funding beyond their current capacity.

Most respondents admitted that they **do not understand how to use** a natural capital approach and NCES data, especially in decision making. A key issue was the interpretation of the data.

There was generally felt to be a **lack of knowledge, training and support available**. In many cases **consultants** had carried out the detailed work, but this

might have acted as a barrier to the team developing their own understanding and expertise.

The **licensing** of data was also thought to be a barrier, it hampered access to and the sharing of data. It would be better if all of the data were widely available and funded.

Other barriers included:

- Natural capital is not a statutory requirement
- Already know the GI approach and how to apply it

What kind of support would be required to help incorporate a natural capital approach into their work?

Most respondents requested **training and support** in order to take a natural capital approach and use NCES datasets. This would include accessing the data and mapping layers, interpretation of the data and how a natural capital approach can help with decision making.

Some suggested that they would like to take part in **'live testing'**, but the researchers suggest that all would take this opportunity if it were offered to them.

Respondents said that LPA's would require **increased resources** if they were to deliver a natural capital approach.

What are the advantages and benefits?

It was felt that a natural capital approach could assist with the Government's requirement for Local Authorities to engage in constructive cross-boundary discussions on strategic matters (the **Duty to Co-operate**) as many natural capital issues are cross-boundary and landscape-scale.

At a **strategic level**, broad data and mapping can help with regulated and cultural assets and allow comparison of high and low NCES value areas.

A natural capital approach can help **identify key sites, offsetting opportunities and ecological corridors** to join up areas/assets.

Respondents liked the **combined approach of natural capital and ecosystem services**; the consideration of multiple benefits, the many layers of information it covers and the strong links with LNRS's.

Maps and illustrations are also helpful to tell the story.

What are the disadvantages and problems?

All respondents stated that **interpretation of the data was a major problem** for them. Especially how it can be used in the decision making processes and where their interpretation might be robustly challenged.

How could it be improved to meet your needs better?

Respondents like 'the OxCam Arc' as an overall approach and framework to work within. Two of the respondent teams suggested that within the OxCam Arc we should have **shared metrics, datasets and messaging**. This would give a consistent approach, clarity and guidance to LPA teams. Such a large dataset could then be split according to LA boundaries if necessary.

Support and expertise is required to enable a natural capital approach to be used in national, OxCam Arc-wide and local decision making processes.

Natural capital could be embedded within **SA or the National Planning Policy** framework (NPPF) to inform the Local Plan making process.

NCES data and its interpretation **needs to be robust** as it will be challenged by developers and their lawyers. This will be reinforced by having comprehensive, detailed data which is regularly updated and linked to research and agreed standards. There also needs to be clear guidance on the interpretation and use of data, and how this fits within current legislation and policy.

It was suggested that **LNPs** should be driving a natural capital approach and BNG. But for this to happen they will need to be adequately funded to ensure that long term support is secured.

4.3.3 Information and data

Respondents were asked about the mapping and data that they have used and also about the LNCP NCES data which they were shown in the workshop. Unless otherwise stated, comments relate to the use of NCES data and mapping in general.

How adequate is the data for your needs?

All respondents commented that the **datasets need to be accurate and kept up to date,** and have to contain **high quality and detailed data**. Some also commented that it is important to define the **assumptions** behind the evidence base.

It was felt that **local input and ground truthing** is needed to help increase accuracy, e.g. at parish or site level, and parish level contributions (linked with Neighbourhood Plans) can also include the cultural value of the data and assets.

Exemplar projects and case studies are required to add credibility to the data and help explain its uses and benefits.

Comments on the scale of the data

Lower scale mapping (i.e. OxCam Arc-wide) was considered suitable for making strategic-level decisions, planning LNRS and the need to protect land for nature.

The **higher scale LNCP mapping** (25 metre square polygons) was considered to be satisfactory, but more detail would be required. Respondents felt they would need to

focus down to site level to assess and compare site allocations. A higher scale would also help with ecological corridors and queries over village boundaries in Neighbourhood Plans. They would **need data at field and field boundary/hedgerow level.**

Is it the right type of data?

Respondents found it difficult to answer this question due to their lack of experience in using the data. However they did comment that:

They are **used to using GIS** so it is good to access data in this format but a current problem with using GIS is that it can be **very time consuming** to load all of the layers.

Future data should be interactive and web-based, so the mapping can be linked with explanatory text and additional information. This should also assist with **interpreting the data** and helping **prioritise NCES assets and services**.

It should also include **tools** which everyone will, and can, use.

Accessibility

Data needs to be **open, accessible and sharable** but at present, **licensing** can be a barrier. Currently the missing link is **how to interpret the data** – all data needs to be easy to understand and access.

There is also a question of who should host the data. Should it be Local Environmental Records Centres, Wildlife Trusts or even a national database such as the MHCLG Data Observatory.

There also needs to be a system of who can freely access the data and who needs to **pay**, the latter includes developers. One respondent team suggested that developers might be willing to pay for this data as it would cost more to collect and analyse themselves. Charging could pay for keeping the data updated and help resource some of the support required, as organisations like the Local Environmental Records Centres need **sustainable funding** to ensure high quality data which anyone can access.

Does the data give you the information that you need?

All respondents said that their main problem is in **interpreting and understanding the data**, they all said that this needs to be much easier. Specifically, how it can be used in decision making, examples of how judgements were made using the data and guidance on what to, and what not to, use the data for.

There were a number of questions about **ecosystem services** data. Respondents found the **18 different layers confusing**, they weren't sure how to use them and questioned how they could interpret them in a meaningful way. They also had queries about **how they are measured**, especially very complex ecosystem services such as air quality and aesthetic value. They also felt that the ecosystem services

data needs to be interpreted for them, simplified and that they would need **training and guidance** on how to use it.

Decisions will be challenged, so the **information and its interpretation needs to be robust.**

Respondents also highlighted that the NCES data will be used by a wide range of people including developers, planning officers, ecologists, neighbourhood plan groups and consultants (who undertake SA/SEA on behalf of local authorities).

Are there any gaps in the evidence base?

Most respondents mentioned that the data indicates the presence of specific habitat types but **does not include any measure of their quality or condition**. It was felt that this this leaves the data open to misinterpretation.

The data shows the current situation but should also show agreed **environmental opportunity areas**. These would be especially helpful when investigating offsetting, net gain credits and should link to ELMs and LNRS's.

One respondent team felt that it would be helpful if the data indicated each habitat-type's ability to **store carbon.** They were not aware of the carbon storage ecosystem service but would want this information to be comprehensive (covering every habitat-type), detailed and regularly updated according to the latest research.

How could NCES data and mapping be made easier for you to use?

Most respondents from the LPA teams said that the data needs to be **easier to use** and **easier to access**.

One of their main problems (as mentioned before) is the **interpretation of the data**, which they think should be built-in. An **interactive, web-based user guide** and maps should help with this – see section 4.3.4 User Guide.

Respondents thought that **training and support** would be required, and most would welcome **'live testing'** support.

Specific comments on the LNCP NCES data and mapping

Most of the respondents were aware of the LNCP NCES data and mapping but have **not engaged** with it yet. Most of the respondents were also not sure **how to access** the data.

Individual comments on the data were:

- It cannot be interrogated at site level, so **more detailed data** is required to enable it to be used to assess and compare site allocations
- Needs to be easier to use and navigate

Specific comments on other NCES (or similar) datasets

Habitat opportunity mapping is useful, visual and understandable. Most respondents are working at a site level and generally felt that they need detailed mapping that is accurate and up to date, as getting good quality data is difficult, particularly if it is going to be used for decision-making.

Using GI approach via a consultant, the GI themes cover aspects of a natural capital approach so it is a form of GI plus. This includes NCES themes, priority areas and broad opportunity areas.

4.3.4 User guide

From preliminary discussions, including with the Greater Manchester Combined Authority Environment Team, there appeared to be a need for some kind of user guide to assist with the use and interpretation of the NCES data and mapping. During the workshops this was explored further.

General

All respondents stated that it would be **very helpful/useful to have a user guide and that they would definitely use it**.

All respondents considered that one of the main issues is the **interpretation of the data**. There needs to be clear and practical information allowing them to easily make the right decisions based upon the data.

A user guide also needs to be **easy to use and support you finding the information you need**. It also needs to be **easy to access** and **written clearly and concisely**.

Training and support will be required to support teams in using the guide.

Format

All respondents suggested they would prefer an **interactive, online resource** to a written document.

Navigation is important, so it should include **clear interactive links** to separate sections and information. This interactivity would mean that a user does not have to look in different documents for underlying evidence and interpretation. The guide should also have a **clear structure and be well organised**.

It could include **interactive data layers** which could be ‘layered up’ as required.

It should incorporate some form of **interactive mapping tool** which includes explanatory text and advice. One respondent suggested ‘like Magic Map but with an explanatory front end’.

Different users may need to access the user guide in different ways, so it would be helpful if the user guide were available in **different formats**, e.g. online, pdf and print.

Current **data sources can be problematic** and time consuming, the user guide should help simplify and speed up this process and give wide access to the data.

Other suggestions for the format included:

- Chapters tailored to specific end-users
- Include online lessons and videos, not simply text
- A step-by-step approach or flowcharts could help increase usability

Content

All respondents wanted **interactive maps**. These should link with evidence, case studies and detailed information/guidance on how to interpret and use the data. They would be especially helpful when devising strategies, informing Local Plans and when assessing and comparing site allocations.

All respondents stated that any **data or mapping needed to be as accurate and up to date as possible**. It also needs to cover the **quality/condition of habitats types**, not just their presence.

The user guide should include **proof of the data, link to the database and evidence base and have relevant case studies**. It should also show evidence both from **within the OxCam Arc and beyond its boundaries**.

The user guide should include a detailed **glossary of key terms**.

Other users of the user guide

In addition to planning teams and other LA teams, respondents considered that the guide would be helpful for developers, planning application applicants and consultants.

4.3.5 Links with key strategies and policies

Biodiversity net gain and environmental net gain

It was recognised by respondents that the direction of travel is currently towards BNG, and then to ENG in the future.

BNG has policy drivers through the Environment Bill and NPPF, NCES mapping should help identify offsetting sites.

There was a lower awareness of ENG than BNG and most respondents are waiting for a Defra metric, legislation or both before using it.

Local Nature Recovery Strategies

Two of the respondent teams were aware of, or involved with, LNRS. They see LNRS as an important thing for the future, especially the opportunity mapping-related elements to identify priorities for biodiversity, the delivery of broader (ecosystem services) benefits and identification of the means to deliver them. The other respondent teams had low awareness and interest in LNRS at this stage.

4.3.6 Future use of NCES data and mapping

Respondents were asked if they are planning to use a natural capital approach and if so, for what.

Four of the five respondent teams are planning to use it as a part of forthcoming Local Plans. The other team are currently focussing upon using a GI approach for their forthcoming Local plan instead. It was felt that, once adopted and better understood, the data would be helpful to other LA departments and delivery teams, including the land and highways teams (where mitigation data could be useful).

Respondents were interested in using the data for minerals site selections and restoration plans. It could help select the best sites and they could link with the RSPB 'Nature After Minerals' programme.

This data would be very helpful in the development of neighbourhood plans, once it is easier to access, use and interpret the data.

Other planned, or suggested, uses include:

- MK2050, Oxfordshire Plan 2050 and other future strategic plans
- Linking it with the Bucks LNRS pilot project and future LNRS strategies
- Use in Sustainability Appraisals
- Bucks BNG SPD (consultation already concluded)
- Identifying locations for growth, comparing options, assessing site allocations and ongoing monitoring
- Identify areas for environmental protection and enhancement, and improvements in natural capital assets
- Could be used to make decisions on planning applications and appeals
- Assess the comparative benefits of onsite vs offsite BNG offsetting

4.4 Good practice examples of planning policies which take a natural capital approach

Research identified a number of examples of UK planning policies which promote a natural capital approach. These were used in the county/LPA workshops as examples of the benefits of a natural capital approach and were used to produce advice which could be used to produce suitable planning policies.

4.4.1 Development of natural capital planning policies

It is noted that while local authorities have embedded natural capital in GI policy or have used ecosystem services to support existing environmental protection policy, any stand-alone natural capital policies are yet to be developed in the OxCam Arc. When incorporating a natural capital approach within planning policies, the following aspects should be considered:

- **Policies should be developed from an evidence base**. Local Authorities who include natural capital in supporting evidence are more likely to develop robust natural capital policies and have the advantage of early consultation. For example, Northamptonshire County and composite districts are using GI mapping at different scales to support their policies, these include specific target areas for protecting and enhancing GI. This approach can be applied to natural capital. Bedfordshire and Oxfordshire are also developing natural capital in their evidence base, while Greater Cambridgeshire are currently consulting on opportunity mapping for natural capital themes and are undertaking further work to explore application to emerging policy

- **A natural capital-based policy should be linked to mapping**. To be more effective, natural capital needs to link to mapping to provide clearer protection of undesignated green/blue infrastructure networks as well as identifying areas for enhancement, for example through opportunity areas. NCES mapping should also inform spatial growth in the Local Plan

- **Application can be wider than biodiversity and environmental protection policies**. A natural capital approach can be integrated into other aspects of planning policy reflected by ecosystem services, for example recreation, climate change, flood risk management

- **Provide an emphasis on enhancement**. A natural capital approach should not just reflect environmental protection, but also enhancement, for example, through linking to opportunity areas and LNRS. It is noted that several local plans refer to ecosystem services in their environmental protection policies. Many of the local authorities in the OxCam Arc already have BNG policies, so there is already an emphasis on enhancement

4.4.2 Planning policies which take a natural capital approach

As set out above, NCES is often incorporated into GI or other environmental protection policies. Examples of policies are presented here, more detailed case studies and explanations are given in Appendix F.

Planning policy example within the OxCam Arc

Kettering Local Development Plan 2021

Policy NEH2 - The integrity of the Borough Level Green Infrastructure Network (BLGIN) as set out in Figure 8.1 of this Plan (see below) will not be compromised by

new development. It will be recognised for its important contribution to the built, historic and natural environment, to people and wildlife and to ecosystem services.

Note: North Northamptonshire District Council are currently preparing a Natural Capital Supplementary Planning Document.

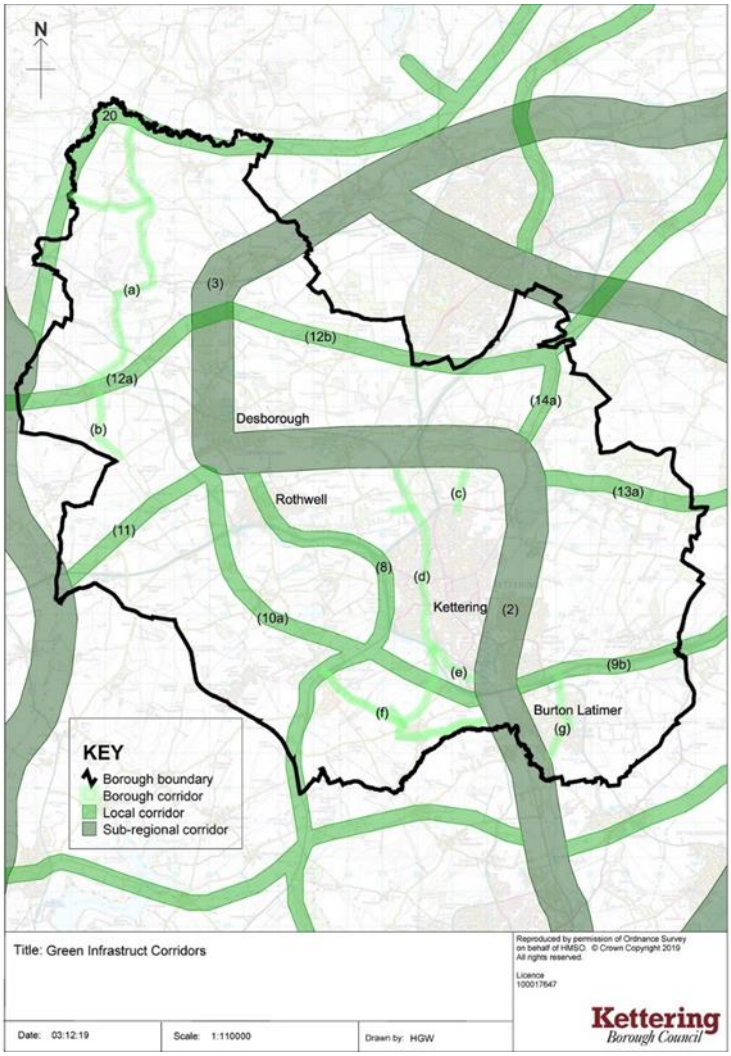

Figure 2 *– Example of Green Infrastructure Corridor Map*

Planning policy examples outside the OxCam Arc

Lake District Local Plan 2020 – 2035

Policy 04 Biodiversity and Geodiversity includes provisions for improving the function of ecosystems and supporting proposals which conserve and enhance biodiversity and ecosystems processes.

North Devon & Torridge Local Plan 2011-2031

Policy ST14: Enhancing Environmental Assets
The quality of northern Devon's natural environment will be protected and enhanced by ensuring that development contributes to: ….. (i) conserving and enhancing the

robustness of northern Devon's ecosystems and the range of ecosystem services they provide.

Policy ST03: Adapting to Climate Change and Strengthening Resilience
Development should be designed and constructed to take account of the impacts of climate change and minimise the risk to and vulnerability of people, land, infrastructure and property by: …. (k) promoting the potential contribution from ecosystem services that support adaptation to climate change.

Solihull Local Plan – Draft Submission Plan October 2020

Policy P10: Natural Environment

1. The Council recognises the importance of a healthy natural environment in its own right, and for the natural capital benefits it provides to the people, places and economy of the Borough. The Council will seek to protect, enhance, restore, increase and connect the natural environment and secure measurable net gains in biodiversity.

Policy P20 Provision for Open Space, Children's Play, Sport, Recreation and Leisure

2. The Council recognises the value of public open space for the health and wellbeing of communities, as integral to the character and visual amenity of local areas and for their contribution to the natural capital of the Borough. The Council will support proposals which will contribute towards a network of high quality provision as new and/or enhanced recreational facilities; children's play and open space.

4. Where existing provision is not being protected then the Council will require appropriate compensatory measures. The alternative provision should be at least the equivalent in terms of size, quality, accessibility, use, visual amenity, natural capital value, and supported by a management plan to ensure ongoing viability of provision.

4.5 Live testing in Bedfordshire

4.5.1 Background

Bedford Borough's adopted development plan includes the Allocations & Designations Local Plan (ADLP) (adopted 2013) and the Local Plan 2030 (adopted January 2020). The ADLP includes a section on GI and a Policy: AD24 Green Infrastructure Opportunity Zones. The policy explains that the opportunity zones reflect areas in the borough that have the greatest potential to maintain and enhance the multi-functional nature of GI across the five themes of landscape, historic environment, biodiversity, accessible green space and access routes. The supporting text sets out priorities for each of the six zones. The basis for this was taken from the Bedford Borough GI Plan (2009), which was developed to a methodology agreed and adopted across Bedfordshire through the Bedfordshire and Luton Green Infrastructure Consortium (predecessor body to the Bedfordshire LNP).

This policy and text were, and still are, considered relevant and did not need to be updated by the Local Plan 2030. The ADLP planned for the period up to 2021. Local Plan 2030 plans for the period 2015-2030 and in particular includes a policy, inserted by the Examination Inspectors, which sets a requirement for a reviewed plan to be submitted by January 2023. In order to meet that tight deadline the review started straight after the plan was adopted. The two reasons the Inspectors gave for this review policy were to provide the opportunity to reflect decisions about the OxCam Arc (still awaited) and also to provide the council with the opportunity to make site allocations in the rural parts of the borough should neighbourhood plans fail to deliver required growth within the timescales. Local Plan 2030 plans for 4,500 dwellings and around 2,200 of these are to be delivered through neighbourhood plans.

Due to the fact that the review of Local Plan2030 is an immediate review, much of it and in particular its development management policies are still relevant and up to date. The review plan will mainly focus on developing a strategy to guide housing and employment growth and identify the infrastructure needed to support it. In addition, it will look at specific policies including those around tackling climate change, protecting the natural environment, quality of development and the provision of open space.

The key timescales for the review are set out in the Local Development Scheme and in summary are:

1. Draft plan consideration by Bedford Borough Council's Executive: 9 June 2021
2. Public consultation: July-September 2021 (draft consultation documents required by the beginning of April 2021)
3. Pre-submission plan consideration by Executive: March 2022
4. Public consultation: May-June 2022. (to be drafted by the beginning of January 2022)
5. Collate and consider responses received
6. Submission of the plan to the Planning Inspectorate: January 2023

The Bedford Borough Local Plan Review had been identified as a potential 'live testing' opportunity for this project, through which a natural capital approach could be integrated into the review, because of a willingness to engage in the natural capital agenda by officers, and the timing of the review. An initial natural capital audit and ecosystem services opportunity mapping exercise, covering the whole of Bedfordshire had also been commissioned by the Bedfordshire LNP, with the draft outputs becoming available during January 2021. As noted elsewhere, the borough council's planning policy team had a limited awareness of the LNCP mapping and datasets, but had engaged directly with the Bedfordshire natural capital work, initiated in November 2019.

4.5.2 Methodology

Following initial discussions with key members of the planning policy team at Bedford Borough Council in December 2020 and February 2021, the following potential opportunities to apply a natural capital approach were identified:

- Spatial priorities – investigating how NCES opportunities could add value to the existing GI priorities identified in the Allocations & Designations Local Plan 2013
- Policy – revising existing policy to reflect a natural capital approach
- Site Assessment – incorporating NCES data and mapping into the site assessment methodology for the Local Plan Review

A further workshop session was held in early March 2021 with the planning policy team and the NCES specialist who had delivered the Bedfordshire natural capital work. This session specifically aimed to provide support, advice and guidance to help the Planning Team identify how to best apply the approach, identify what further support, information or guidance would be needed, and whether there are any gaps in the current evidence base.

The initial focus of this workshop was a comparison of the GI opportunity areas and the ecosystem services opportunity areas, with further discussion around policy development and site assessment.

4.5.3 Key Findings and Recommendations

Spatial Priority Setting

The GI opportunity zones had been developed by combining opportunities from five themes, and focusing on areas of the borough where three or more of these opportunity layers overlapped. The five GI themes used were:

- Landscape
- Biodiversity
- Historic Environment
- Accessible Greenspace
- Access Routes

This had resulted in a network of opportunity zones (largely corridors) focused on the more densely populated south and west of the borough, including the major settlements of Bedford and Kempston (the result of some bias in the GI opportunities relating to people and access, but also heavily influenced by the valley of the River Great Ouse).

The methodology for developing the five GI layers used to create the GI opportunity network differs from the natural capital approach, with landscape opportunities not being identified through current NCES mapping, historic environment assets largely being considered a constraint by the NCES approach, and biodiversity opportunities being identified at different scales. Linear access routes were also not part of the dataset used, but it is noted that the OxCam Arc-level mapping does make this available.

The ecosystem services opportunity areas identified through the county-level NCES mapping work were:

1. Enhancing biodiversity for any of the three habitat groups (broadleaved woodland, semi-natural grassland, or wet grassland and wetland)
2. Water flow regulation (reducing surface water runoff)
3. Water quality regulation (reducing soil erosion and sedimentation)
4. Air quality regulation (ameliorating air pollution)
5. Noise regulation (reducing noise pollution)
6. Local climate regulation (reducing urban heat)
7. Accessible natural greenspace provision (enhancing recreation in the natural environment)

The combined ecosystem services opportunity areas highlighted where three or more of the seven ecosystem services mapped for opportunities corresponded. These were overlain on the GI network to enable a direct comparison. Figure 3 illustrates the geographical differences between the two sets of 'opportunity areas'. Although both the GI network and the combined ecosystem services opportunities have a bias towards the more populated south and west of the borough, the degree of true overlap is only modest. The areas of greatest overlap are in and around the major population centres due to the fact that population centres have some influence on GI opportunities, and ecosystem services are quantified by the services they provide for people, and demand for ecosystem services is generally greatest close to where people live.

There was general agreement that because the GI opportunity zones were an accepted and adopted element of the development plan, that these should be retained, with an emphasis on further enhancing their value and robustness through the additional consideration of ecosystem services mapping and data. It was also agreed that 'unpicking' what was already established through the Allocations and Designations Local Plan could cause confusion and undermine processes. This may be a necessary compromise elsewhere, where there is a reluctance to fully replace a known and accepted GI approach with something entirely new, as an interim stage in the process of moving towards the NCES approach. Using NCES data to update underlying GI theme data and mapping, rather than just using in the context of opportunity areas, would potentially improve both the process and transition towards a natural capital approach.

Outcome: It was therefore agreed that the GI opportunity zones should be 'banked', and the NCES mapping and data be referenced in Local Plan 2030 and used to add to the narrative already established in the Allocations and Designations Local Plan (where the GI policy currently sits).

It was also agreed that any user guide produced should provide information on how to integrate the natural capital-led approach with existing GI-led approaches.

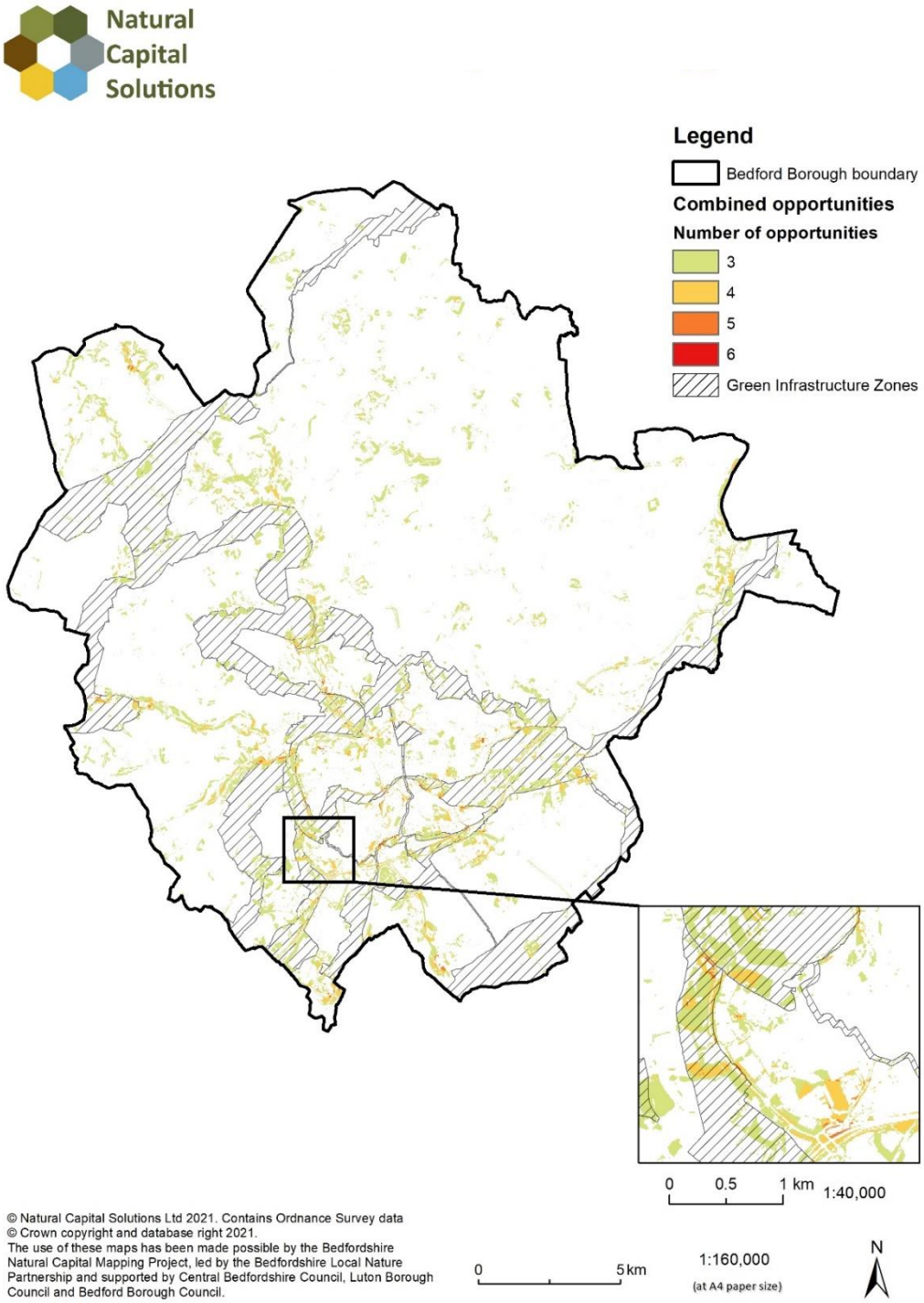

Figure 3 *– Map of GI and Ecosystem Services Opportunity Areas in Bedford Borough*

Incorporating into the Site Assessment methodology

The Call for Sites process (whereby locations for potential development are put forward) which ran during 2020 had resulted in over 430 sites being proposed for development in Bedford Borough. To help support the process of identifying which sites should be taken forward while protecting and enhancing the environment, the potential for using NCES data and mapping was considered by the LPA.

It was noted that a real benefit of the NCES data and mapping was the significant level of detail, above and beyond that of the GI planning work. The combined ecosystem services opportunities map also demonstrated the existence of environmental enhancement opportunities across the whole of the borough, not just the GI opportunity areas.

Outcome: It was agreed that the 'areas of greatest combined ecosystem services opportunities' should in the short term be used as an additional element of the site assessment process and in due course added to the policies map. Communicating both opportunities and constraints to all stakeholders was considered to be of core importance.

It was agreed that areas where four or more of the six ecosystem services opportunity area layers overlapped would be an appropriate level to consider in this context, also being consistent with the GI approach (where opportunity areas were identified from the overlap of three or more of five layers).

It was felt that having this additional information would help the planning team make better, more robust decisions when going through the Site Assessment process. It was not felt that the identification of ecosystem services opportunities would significantly reduce the amount of developable land overall, and even on a site-by-site basis it would not often result in a site being taken completely out for consideration. Rather it would highlight where natural capital could be enhanced to allow development to take place, for example by highlighting where the benefits from planting trees or hedgerows, creating accessible open space or wildlife habitats would be maximised.

Outcome: Noting the above point regarding publishing new information, it was agreed that the Site Assessment Methodology would need to be re-published as part of the review process. The ecosystem services information would be technical background information, and ecosystem services criteria would need to be incorporated into the site assessment proforma.

Incorporating into policy

The main barrier that the planning policy team identified in terms of developing a natural capital policy was the fact that there is no requirement for this from Government. The case for a BNG policy is different because it is a future requirement to be brought in by the Environment Act.

It was also agreed that any new policy would need to be evidenced and justified. The principle of a 'woolly' policy introducing the concept of a NCES-led approach, but not creating absolute requirements for development, may appear to be a potential 'stepping stone', but ultimately would prove to be completely unenforceable. For this reason the planning policy team did not feel this was an appropriate way forward.

It was agreed that a requirement for net environmental gain would exist in the future, having been included within the Government's 25 Year Environment Plan, although it

was noted that this had not been specifically included within the current Environment Bill). The planning policy team were in favour of an 'up front' approach that included a policy on NCES in the review (see Figure 4), to demonstrate an open and transparent approach and to seek feedback.

Outcome: The favoured approach was to replace Policy 43 of the Local Plan 2030 (Enhancing Biodiversity), which incorporates the principle of net biodiversity gain (and creates the conditions for it to be enforceable), with a new policy that states a requirement for net environmental gain. This suggestion was preferred to replacing the GI policy because, as described above, it was felt that the NCES approach should add value to the GI approach, and there would be risks with re-opening to challenge an accepted GI policy with something new.

The Government's 25 Year Environment Plan paves the way for net environmental gain to be developed from net biodiversity gain, expanding the approach for biodiversity to include "wider natural capital benefits". However, because net environmental gain is not yet embedded in statute, policy or regulation, it will be important to justify the new policy through reference to existing policies, the Local Plan vision and objectives. The current vision and objectives do contain reference to the role of the environment in underpinning growth, creating a robust GI network (Objective 8), creating sustainable and inclusive places equipped to respond to climate change (Objective 1) and the protection and enhancement of natural resources including air, soil and water to minimise the impacts of climate change, flooding and pollution (Objective 10). A minor amendment to Objective 10 to reference "natural capital" instead of natural resources, and incorporating the term ecosystem services, would further strengthen this.

Outcome: The justification for the replacement of Policy 43 (see Figure 4) should be strengthened through reference to the Local Plan vision, objectives and other relevant policies in any technical supporting documentation. Where possible, the vision and objectives could be further strengthened.

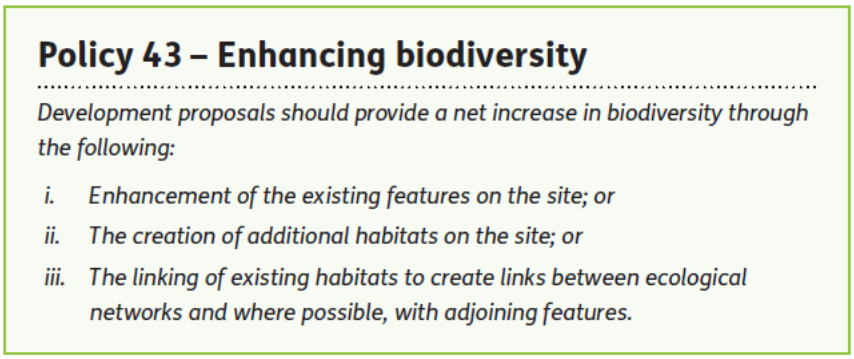

Figure 4 *- Current Bedford Borough Local Plan 2030 Policy 43 – Enhancing Biodiversity*

Policy XX – Environmental Net Gain

……..

Proposals for major development should provide a net environmental gain of 15%, consisting of a biodiversity net gain of 10% plus an additional natural capital net gain of 5%, through the following:

i. *Enhancement of the existing features of the site, particularly where these deliver significant levels of ecosystem services; or*
ii. *The creation of additional appropriate/priority habitats on the site; or*
iii. *The linking of existing habitats to create links between ecological networks and where possible, with adjoining features.*

Planning applications should demonstrate net environmental gain through the production of a supporting statement that considers the contribution that the proposal could make to the Borough's natural capital opportunity areas.

Figure 5 *- Proposed Policy XX – Environmental Net Gain (developed in conjunction with the Bedford Borough Council planning policy team)*

The proposed percentage net environmental gain of 15% is based on the mandatory 10% BNG plus a 5% natural capital net gain. It was felt that a 5% increase provided a clear target and embedded the principle, but was modest enough to be straightforward to achieve and demonstrate. The Bedfordshire natural capital report and associated mapping and data provides a baseline for existing ecosystem service value, against which increases can be measured, but would require supplementing with other information including individual site assessments and ecological surveys to ensure a high degree of accuracy.

There is a clear need to ensure that the basis for this policy is clearly set out, and is robust enough to withstand scrutiny through consultation.

Outcome: This detail will be set out in a technical supporting document (see draft in Appendix I) as this is the preferred mechanism for Bedford Borough Council. This approach is preferred to a SPD, such as that being produced in North Northamptonshire, because of the greater weight carried by policy (supported by technical guidance) than a SPD.

The key elements of the technical supporting document will be:

- The established basis for the concepts of natural capital, ecosystem services, natural capital gain and ENG, including reference to key Government publications
- Links to other key policies in the development plan documents
- Signposting of information (including NCES maps and data, including any limitations of the data and any standards applicable to its application) and a clear, understandable pathway for developers to be able to assess and demonstrate natural capital gain alongside BNG, and therefore demonstrate ENG

- Guidance on how the approach is applied within the avoid/mitigate/compensate hierarchy
- Guidance on how to apply to different scales of development (residential and non-residential)

The signposting of information and a clear pathway for developers to be able to assess and demonstrate natural capital gain is considered of key importance, and should be included within supporting text for the policy as well. This supporting text should also reflect the earlier point that highlighting ecosystem services opportunities should not be a barrier to development, but would help identify how natural capital could be enhanced as part of development proposals.

It was noted that while net environmental gain was not mandated at the current time, the direction of travel given by the 25 Year Environment Plan indicated that it would be in the future. Taking into account the timescale of the Local Plan Review, by the time the review is at the examination stage (submitted by January 2023) a new 'Environmental Improvement Plan' would be in place (due January 2023 as a 5-year review of the 25 Year Environment Plan).

Level and types of Data

As noted already, the planning policy team had a limited knowledge of the LNCP datasets and mapping. A member of the team had been to events held by the LNCP team, but had not been fully engaged with the process as it had developed. The team had fully engaged with the Bedfordshire Natural Capital project, sitting on the steering group that developed the proposal in late 2019 and had then overseen its delivery up to the current time. Using this mapping and data to support the development of planning policy to better protect and enhance the environment was a driver from the beginning.

The county-level mapping was considered more useful because it provided a greater level of detail, and included ecosystem services supply, demand and opportunity mapping.

The authority had not, at the time of writing, received the finalised report for the county-level NCES assessment work, and GIS layers of the mapping were only received at a late stage. However, a draft had been available since December 2020 and this was felt to be sufficient in terms of informing the approach and for providing materials for the technical guidance.

Issues highlighted with the draft maps and reports included the need for background information to be included on ecosystem services maps to aid their use when not being accessed via a GIS system. Being able to identify settlements, roads, railways and other features not only supports orientation but also interpretation, with many ecosystem services being directly related to human activity.

4.5.4 Conclusions of live testing work

The 'live test' exercise was limited by the timescales of this project, but nevertheless was able to make good use of the opportunity presented by the timing of the Local

Plan review. The exercise was worthwhile because of this opportune timing, but also because the planning team included officers with a genuine interest in protecting and enhancing the local environment, and in being part of a ‘leading edge’ application of new approaches.

The team were realistic and well-grounded, and were all very experienced and senior land use planners. While it was initially thought that opportunities for applying a natural capital approach could be very limited, especially given the timescales, an openness to test the approach led to the identification of three key areas within which this could happen; spatial priority setting, incorporating into the Site Assessment methodology and incorporating into policy. It also led to five key outcomes, including a proposal for a new environmental net gain policy.

The end result should enable the NCES data and mapping to be embedded into the Local Plan review to inform site selection and policy development, with a strong justification. With application across three key areas potentially being enabled, this should also help embed the approach throughout the review and plan-making process.

This is just the start of the ‘journey’, and its progress will need to be monitored. The Bedfordshire LNP is well-placed to do this, with Bedford Borough Council being a long-standing member and sitting on the Board.

5. Research at the Neighbourhood Plan Level

5.1 Conclusions

Although the **LNCP data and mapping was developed at a sufficiently detailed scale for neighbourhood planning purposes, restrictions around how it can be viewed and used mean it is not currently being used.** This is not surprising, given the stated intention of the LNCP mapping is to be "strategic". The existence of county-level (or similar) NCES mapping and reports does potentially create this opportunity, but it has yet to be used in a neighbourhood plan (NP) within the OxCam Arc.

This research has **tested the potential applicability**, and gone some way to applying it, but this has not yet been utilised within a NP and has not been tested through examination. However, the piloting of the approach has identified the **significant opportunity** it creates, either to inform GI planning exercises feeding into a NP, or as a 'stand-alone' approach to ensuring that the environment is better protected and enhanced through the neighbourhood planning process.

The **most effective policies** generally arise when a piece of **background work** has been commissioned and this is able to **feed directly into the NP**. GI planning currently provides the required robust evidence for policy-making at the NP level, but has only been consistently applied in Bedfordshire. Where the natural capital approach is combined with a GI planning approach, this is unlikely to result in a more streamlined approach (at least initially). **Further revision of existing parish-level GI planning methodologies** is required to enable an 'evolution' of this approach into something **accessible and affordable** to local communities.

It is therefore recommended that methodologies for GI planning at the parish/neighbourhood level are developed that properly integrate the natural capital approach and NCES mapping and data.

The need for a '**user guide**' to aid the **understanding** and **interpretation** of NCES data and mapping has been highlighted, along with the need for **training and support**. Where the natural capital approach is used in a **'stand-alone' manner, the need for guidance, training and support is even more acute** at the neighbourhood planning level.

People working on NP's are often **volunteers**, and do not necessarily possess the **skillsets** required to understand and interpret complex and detailed mapping and information. Their **needs are also different in terms of format**, with the Northamptonshire pilot parishes requesting that any such guide be available as a report that can be printed. Such investment would be worthwhile, to ensure better environmental outcomes generated by local communities, and to strengthen neighbourhood plans.

It is recommended that the draft user guide currently being produced by Northamptonshire (section 5.4.4) is further **refined and tested with potential users**, to ensure it meets their needs. The user guide should be applicable to any NP, or

similar exercise, anywhere within the OxCam Arc and should be developed alongside the natural capital planning user guide, see sections 4.1.5 and 4.3.4.

The user guide should also incorporate or be accompanied by:

- A **training package** for practitioners and those supporting them (recommended to be developed once the draft user guide has been tested or a wider, natural capital planning user guide has been produced)
- **Guidance on how to use the data and mapping** to support policy development, site allocations, local green space designations and project identification
- **Wider support**, including the potential establishment of 'communities of use'

The user guide should also help **make the case for using the natural capital approach**, highlighting the benefits and 'demystifying' the process, to encourage take-up.

The natural capital approach would **definitely help make NPs more robust** through the use of an **accepted and detailed evidence base**, and also through the adoption of a **systematic approach**.

Supporting parish councils and NP groups can be **costly**, and the **approach is complex and detailed**. It is therefore recommended that the proposed Northamptonshire mechanism, providing NCES data and mapping to groups at an affordable (in the context of NP funding) level, should be further explored and applied across the OxCam Arc where appropriate. This could be through the network of Local Environmental Recording Centres.

Taking all of this into account, it is **not a given** that the **natural capital approach** and the use of NCES data and mapping **will be readily adopted by NPs**. Therefore finding ways to **communicate** the approach and its benefits to as many communities as possible, building confidence and sustaining engagement, is essential.

It is also recommended that consideration should be given to **wider communication of the natural capital approach and environmental enhancement** as a key plank of wider messaging around the OxCam Arc, to raise awareness and ensure the potential environmental benefits are better known.

5.2 Background

NPs were introduced by the Localism Act (2011) and give communities direct power to develop a shared vision for their neighbourhood, and to shape development and growth of their local area. A NP forms part of the statutory development plan, and sits alongside the Local Plan prepared by the LPA. A NP has the same legal status as the Local Plan following its adoption through a referendum, and decisions on planning applications are made using both the Local Plan and the NP.

The intent is that NPs support the development of strategic policies set out in the Local Plan. NPs should set policies for the development and use of land (although they are not required to cover all elements of land use). They can be led by a town or

parish council, neighbourhood forum or community organisation. A NP usually covers a single parish, but multiple-parish NPs have also been produced.

NPs are required to justify the policies they contain. To pass the tests at examination, known as the “basic conditions”, they need to be in general conformity with national and local planning policies and have to address certain European Directives which have been enshrined within UK legislation with regard to SEA, Habitats Assessment and Human Rights. The NP must also demonstrate that it promotes sustainable development and has been produced by the local community.

Accordingly, factual evidence is required to underpin policy making. This evidence may take the form of maps, quantitative data and evidence of community involvement in the decision-making process. Where there is an absence of data, examiners have been known to remove policies from the plan.

Neighbourhood plans are able to

- Allocate sites for housing, community uses and commercial uses
- Designate Local Green Spaces and other types of green space
- Express local aspirations for community or environmental improvements

The protection and enhancement of the environment is an integral component of plan-making, and neighbourhood planning offers an opportunity for communities to do this locally, making an important contribution to sense of place and health and wellbeing. GI planning has been used to provide this input for some NPs in some areas.

5.3 Methodology

The methodology involved two broad areas of research and ‘live testing’:

1. Analysis of completed NPs to ascertain level of environmental policy content and engagement with the natural capital agenda, including identifying the route taken to developing policy, designations (Local Green Spaces) and action plans. This element was carried out at two levels:

    i. Review of all ‘made’ NPs across the OxCam Arc, identifying the number of environmental policies and existence of supporting GI plans.
    ii. Deeper analysis of a selection of NPs from across the OxCam Arc (combination of random selection and known good practice examples).

2. ‘Live testing’ with active groups/plans. This element was further sub-divided into two elements:

    i. Workshop-led approach with seven parish-level groups from Northamptonshire, to ascertain requirements of adopting a natural capital -led approach from a ‘user’ perspective.
    ii. Development of a natural capital-informed GI plan in Clophill (Beds) based on an existing draft GI plan (being developed as part of a NP) to ascertain the value of building in a NCES approach.

It should be noted that due to the timescales of this research the results of the Clophill live testing work have not been through the process of consultation and referendum required for a NP.

The Northamptonshire approach also provided significant information relating to wider aspects of this research and this has been fed in as appropriate.

5.4 Key findings and recommendations

5.4.1 Existing situation

At the time of writing there were 130 'made' NPs across the OxCam Arc. Although none of these explicitly mentioned a natural capital approach, or had specific NCES policies, all did at least have one environmental policy. 83% had three or more environmental policies, and seven had been supported through the production of a GI plan (all in Bedfordshire with one exception where a GI and biodiversity audit was carried out in Benson, South Oxfordshire). The most popular policies were those focused on green spaces, biodiversity and GI. A full spreadsheet of this data is given in Appendix G.

The NPs that were further analysed (a combination of random selection and known good practice examples) are shown below:

County	LPA	Parish
Bedfordshire	Central Bedfordshire	Silsoe
	Central Bedfordshire	Caddington & Slip End
	Bedford Borough	Stevington
Buckinghamshire	Aylesbury Vale (now part of Buckinghamshire Unitary)	Ickford
Cambridgeshire	South Cambs DC	Cottenham
Oxfordshire	West Oxford DC	Eynsham
Sussex	South Downs National Park	Lewes

No appropriate examples for further analysis were identified from Northamptonshire.

The Lewes Neighbourhood Plan was also used as a comparator as it was the only known completed NP to include a natural capital policy approach.

NPs vary widely in their scope, style and potential effectiveness. They are produced by volunteers in the community and early NPs (dating from around 2013 – 2016) were very limited in their use of specialist consultants. There is no requirement for them to cover every aspect of land use and some of the most effective plans are limited in their scope.

The key findings of this research have been based on a smaller range of communities, the largest being a fenland parish close to Cambridge (6,700 people)

and the smallest, a village in Bedfordshire of just 580 people. Analysis for each NP is summarised in Appendix H.

A NCES approach in neighbourhood planning is not prevalent anywhere in the country, only one NP, in Lewes, has been found with a specific policy and policies which hint at the approach having been used in formulating them. Lewes' NP falls within the South Downs National Park Authority where the NCES approach has been established through their Local Plan, adopted in July 2019. Interestingly, the Lewes NP pre-dated the Local Plan, which indicates that the neighbourhood plan examiner was amenable to using the emerging Local Plan prior to its adoption.

Within the OxCam Arc even GI planning as part of the neighbourhood planning process is relatively unusual, except in Bedfordshire where there has historically been LA support for the approach. Local organisations carry out GI planning with town and parish councils using Government funding for neighbourhood planning.

Where GI planning has been part of the NP process, there is a notably higher quality of policy coverage for landscape, biodiversity, historic landscape, access and recreation, in terms of both depth and breadth. Where NP's have included aspirations or action plans for BNG (in the broad sense), improvements to GI or informal recreation, there is often a GI Plan in the background documentation. However, GI plans do not incorporate the full range of ecosystem services, and themes such as climate change, renewable energy and flood risk management are only occasionally considered.

The pilot work with parishes in Northamptonshire demonstrated a high level of willingness to engage with the natural capital approach and a perception that the data and mapping provide great potential in informing land use and identifying environmental opportunities.

The best existing example of a NP with extensive, specific aspirations is in Lewes where a NCES approach has been used, but it is not clear from the documentation how the approach was translated into actions. The practical outcomes for identifying environmental improvements and actions have been well integrated into the NP itself. This will give a clear message to potential developers and the local planning authority of the actions that would be required to be taken alongside new development.

5.4.2 Potential application of the natural capital approach and use of NCES data and mapping in neighbourhood plans

There are four main elements of a neighbourhood plan which relate to taking a natural capital approach. These are:

- Develop policies relating to land use
- Allocate sites for housing, community uses and commercial uses
- Designate Local Green Spaces and other types of green space
- Express local aspirations for community or environmental improvements

The use of the natural capital approach within each of these key elements was considered.

Policy development

It should be noted that the GI plan methodology created in Bedfordshire was adapted from an existing methodology to integrate with NPs, but the GI plans do not set policy as such. The GI plan *recommends* policies and designations, it is then the decision of those writing the NP to take these recommendations forward.

The draft Clophill GI plan recommended policies under four specific and one generic theme. The table below illustrates the proportion of these policies it was felt would be supported and strengthened by NCES data and mapping.

GI Plan Theme	No. of Proposed Policies	No. supported by ecosystem services data and mapping
Landscape	9	3 policies (relating to the mitigation of impacts of roads and the protection/enhancement of hedgerows and woodland) are supported by ecosystem services evidence (of which 1 would be very strongly supported)
Biodiversity	4	4 policies are supported which includes a policy that already referenced net biodiversity gain
Historic Environment	5	0
Access, Open Space & Recreation	6	4
General	2	2

An example to illustrate the findings highlighted in the table is taken from the landscape policy:

- *Seek to mitigate the visual and audible intrusion of major roads, including the A507*

The maps illustrating noise regulation capacity and demand (see Figure 6 below) clearly show the existing low noise regulation capacity in the Clophill parish, and the impact of the A507 (running west to east) and the A6 (running north to south along the eastern boundary of the parish). This ecosystem service mapping therefore provides additional quantified evidence of the lack of existing capacity and the impacts of the audible intrusion of noise emanating from the main roads. This therefore supports the principle of the policy and also the scope of the NP – which should include natural capital enhancement measures in and around these areas to reduce the impact of noise. The value of the demand map would be enhanced by provision of background information such as the location of Clophill village itself, illustrating where people live (and are most impacted).

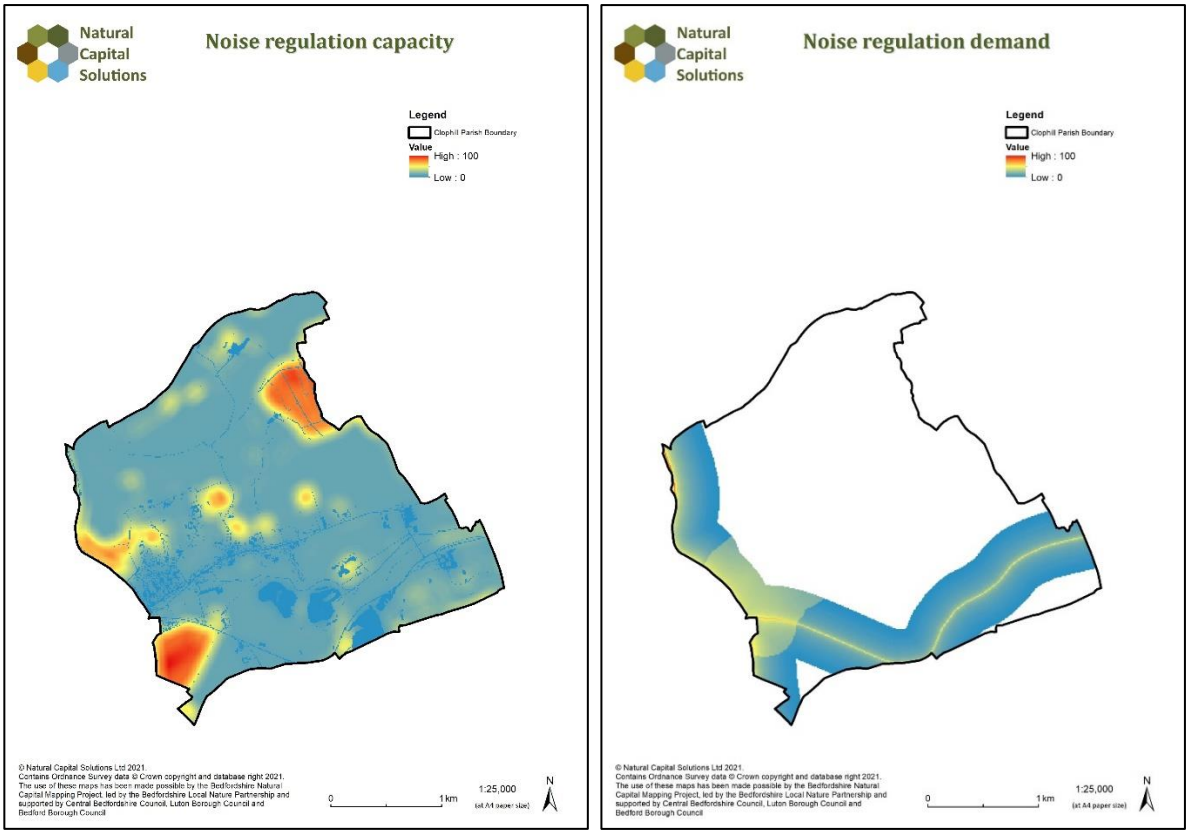

Figure 6 *– Maps of Noise regulation capacity and demand in Clophill Parish*

The approach illustrated above shows how 'existing' policies can be supported and strengthened by utilising ecosystem service mapping and data. What it did not do is look at how the mapping and data could influence policy formulation and development from the outset. The potential here is significant, with the wide range of ecosystem service mapping and data potentially available helping develop and inform a wider range of policies than just those developed from GI themes.

Site allocations

Carrying out a survey and assessment of all potential sites in a neighbourhood area provides the evidence that the sites selected for allocation are the most appropriate – that they are in the most sustainable location, they are in conformity with the strategic policies of the Local Plan and that they are available for development. Criteria must be developed to assess the sites and there is no prescribed way to do this. LPAs will have gone through this process to prepare for the Local Plan via a Housing Land Availability Assessment. A similar methodology can be used by the neighbourhood planning team, but potentially adding in more local criteria such as small sites of up to 5 houses and potential for adding value to the community.

Ultimately sites to be allocated must be suitable, available and economically viable.

Best practice guidance suggests that suitability means 'if there are no insurmountable physical or environmental factors which would restrict development. Whether or not a factor is insurmountable is a matter of judgement but often depends on if it can be mitigated. Constraints which would rule out development

include any potential negative impact on a national environmental designation such as a Site of Special Scientific Interest (SSSI) or the site falling within the functional floodplain (Flood Zone 3a or 3b)'.

The natural capital approach could be used to enhance this site allocation process in several ways:

- Constraint identification
- Proximity to features that might enhance the site's suitability
- Opportunities for biodiversity or environmental gain (either as on-site improvements, or areas adjacent to those of high biodiversity value where habitat buffering or connectivity improvements can be maximised)

When there is a large choice of sites remaining after the constraints have been applied, there is merit in considering benefits that a site could bring when compared to another site. An example of this is where a site could provide tree planting to ameliorate poor air quality or noise pollution. These benefits are best illustrated objectively through mapping.

Once preferred sites have been identified, there is often no attempt by the NP to consider how environmental or biodiversity gain can be achieved. Once BNG becomes mandated through the Environment Act it may be an opportunity for a parish or town council to target environmental improvements and focus on real benefits rather than leaving it up to the developer at planning application stage. This would need to be included in the NP, preferably as part of a site specific policy. If sufficient detail is not available as the NP is being developed, there is a lost opportunity.

Local Green Space

NPs can designate Local Green Spaces as set out in the NPPF paragraphs 99-101. They must be assessed against a set of criteria and once designated, can be protected effectively from development using the same restrictions as the Green Belt.

The criteria for designation include the need to prove a space is "of local significance" and is "locally valued". These can be demonstrated through 'beauty, historic significance, recreational value, tranquillity or richness of wildlife'.

Generally, NPs create their own methodology for assessing Local Green Spaces. Provided this is evidenced and follows the NPPF criteria, examiners are supportive. The natural capital mapping approach to identify such credentials when carrying out a local green space audit would be valuable, adding value to (rather than substitute for) existing methodologies.

The live test example in Central Bedfordshire did just this. It took a list of 19 'candidate' Local Green Space sites identified through an accepted methodology as part of a GI plan, and compared them against a series of maps illustrating individual ecosystem service supply/capacity. If a site was within an area identified as having demand for an ecosystem service this was also noted, but the primary purpose of

the exercise was to test whether what currently exists in the specific locations in terms of ecosystems services could be considered as part of the evidence base for the designation.

11 of the 19 sites were identified as providing at least one ecosystem service to a level described as 'moderate' or greater, and it was felt that this information would further strengthen the case for designation. The ecosystem services that were most relevant in this respect were:

- Local climate capacity
- Noise regulation capacity
- Carbon storage capacity
- Carbon sequestration capacity
- Air purification capacity

An example of how the ecosystem services information could be incorporated into a site assessment for a candidate Local Green Space is included in Appendix I, using one of the sites initially identified in the draft Clophill GI Plan. In this particular example the ecosystem services value, particularly with regard to noise pollution mitigation, significantly increases the ability to demonstrate the value to the local community.

The habitat base map could also have been used to identify where specific habitats have been identified to demonstrate 'wildlife value'. This was not done as part of this exercise as wildlife value had already been assessed via other mechanisms and information, but would have been very useful had this not been the case.

Expressing aspirations for environmental projects

Some NPs contain action plans or aspirational lists which can inform planning applications and developer contributions arising from development (Section 106 or Community Infrastructure Levy). Whilst these 'wish lists' are not a formal part of the NP (and therefore not formally examined during the process), they are nevertheless an extremely valuable tool to assist town and parish councils to seek community improvements. This aspect of neighbourhood planning is often overlooked but may be critical in adding value to future development.

The Lewes Neighbourhood Plan is a good example of how environmental aspirations can be captured. It has a section on riverside enhancements with detailed maps showing where improvements are required, from enhancing recreational routes and facilities to planting. However, there is no evidence to show that a NCES approach influenced the opportunities identified. The natural capital approach would be ideally placed to provide the factual evidence and justification for environmental improvements, giving a list of specific environmental improvements for consideration/prioritisation with a spatial dimension. It could also be used to help prioritise enhancements based on the number of ecosystem services they deliver.

This principle was also tested within the Clophill GI Plan. The draft 'Action Plan' contained a list of 12 projects, developed through community and stakeholder

engagement and the analysis under each GI theme. These projects fell under the following headings:

- Development of a large new accessible natural green space
- Improving facilities at existing green spaces
- Creating new access routes
- Ecological enhancements
- River restoration
- Heritage site enhancement/access
- Improving information around the local environment, wildlife and access to it

The NCES mapping provides additional evidence which could be used to support the majority of the projects, and some of the projects could be enhanced through the consideration of additional ecosystem services delivery. What cannot be tested is what the initial projects list would have contained if an approach using the ecosystem services opportunities was used to generate it in the first place, but it is possible in that scenario that additional projects to mitigate the impacts of the major roads could have been identified.

It was also noted that if the local community wished to develop a 'Climate Change Action Plan' (not currently part of a GI plan) the ecosystem services data and mapping would be extremely helpful in this process, for example by helping to better target local actions seeking to address issues at a local and global level.

5.4.3 The Green Infrastructure network and the NCES approach

GI-led approaches identify a GI network, which incorporates both existing assets and aspirations. As part of the live test, a comparison of two 'end results' was made, with the areas of multiple ecosystem services opportunities overlain on the GI network for the parish.

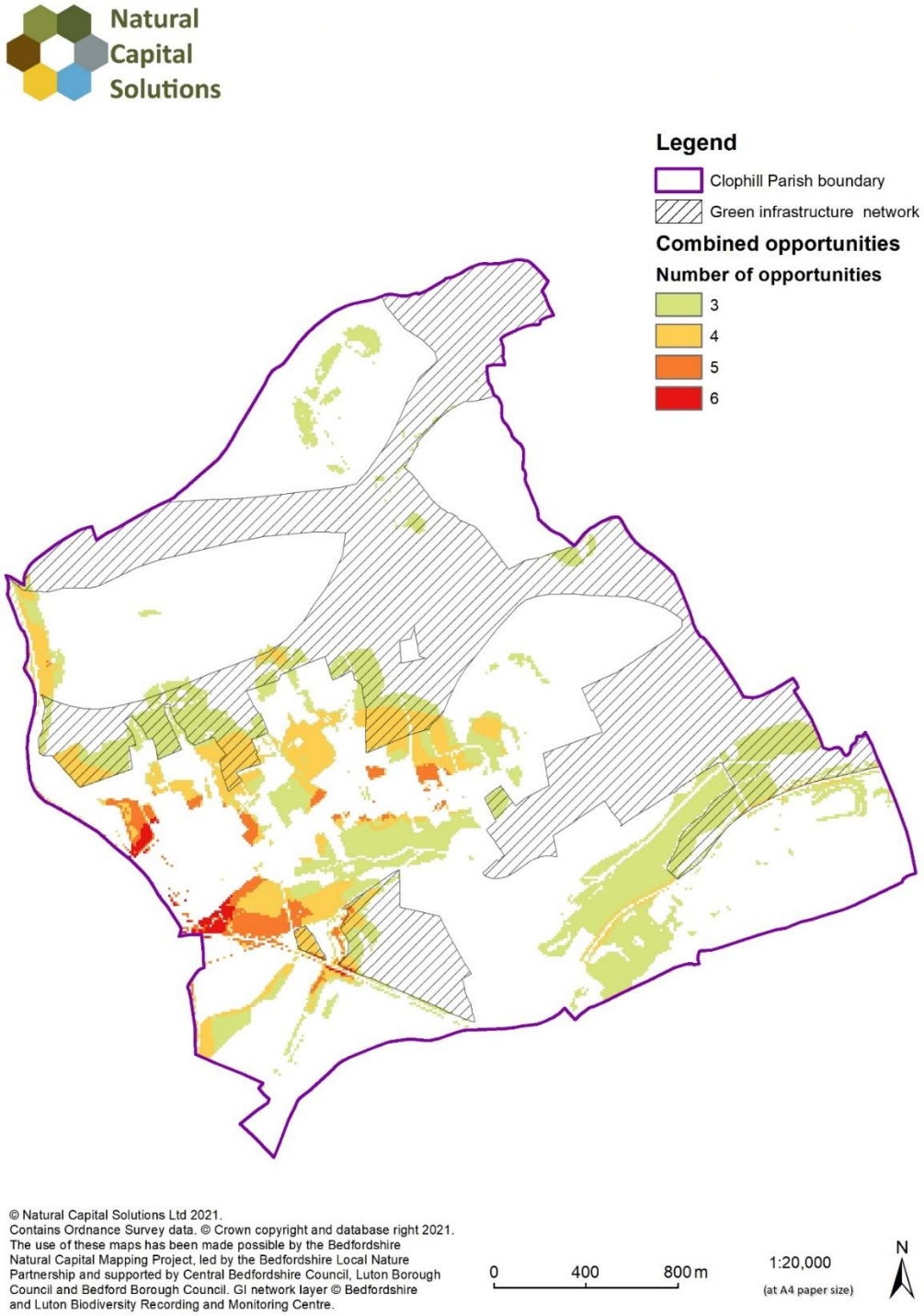

Figure 7 *– Map of GI and Ecosystem Services Opportunities for Clophill Parish*

A degree of overlap was to be expected with both approaches using the existing habitats as a key element of the baseline, and both approaches being influenced by the needs of people. The main areas of overlap were around the village of Clophill itself, where the majority of the parish's residents live. However, there were also differences, particularly across the wider rural areas of the parish, seemingly as a result of:

- The GI network is positively influenced by historic environment ‘opportunities’. These are not currently included within the natural capital approach; historic environment features are generally identified as a constraint (i.e. the existing land use and form cannot be changed)
- The GI network is also influenced by landscape opportunities. The natural capital approach used at both an OxCam Arc and county level does not yet take account of these, although the further development of ‘Sense of Place’ ecosystem service mapping carried out at the OxCam Arc level could potentially do this
- The GI network is based on a broader ‘corridor’ approach

Potential integration with GI networks was also considered in Northamptonshire, with it being felt advantageous to do this. These networks are identified at a more strategic level here, and would be considered an additional layer of data to consider integrating within a natural capital led approach. With the ‘live test’, it was felt important to use the natural capital approach to integrate with, rather than supersede or substitute for the established and accepted parish level GI approach. This may only be an interim point in the process as the natural capital approach becomes established, but is likely to better support its eventual adoption than changing of entire methodologies.

Outcome: Where a parish-level GI plan is being used in NPs, it will be important to develop existing methodologies for GI planning that properly integrate the natural capital approach and NCES mapping and data, where these are currently being used to support NPs.

5.4.4 Level and types of data required/used, and gaps in evidence base

Neighbourhood plans are required to justify the policies they contain. To pass the tests at examination, known as the “basic conditions”, they need to be in general conformity with national and local planning policies. Accordingly, factual evidence is required to underpin policy making. This evidence may take the form of maps and/or quantitative data. Where there is an absence of data, examiners have been known to remove policies from the plan.

Both the live test and the Northamptonshire pilot parishes used mapping produced for county-level natural capital studies rather than that produced by the LNCP. This was because:

- The need to ‘zoom in’ to a very local level of detail is especially important at this level
- The county-level studies provided mapping of ecosystem services opportunities, and integrated these

One of the main reasons for creating the county-level studies has been to inform the local planning process. As local authorities adopt the natural capital approach and NCES data and mapping into these processes, it will be highly advantageous if the mapping and data being used are from the same source, helping demonstrate consistency and conformity between different development plan documents.

It was noted by both the live test example and the Northamptonshire pilot parishes that the absence of background detail (roads, buildings etc) reduces usability, and also the ability to easily check the accuracy of mapping. This will be important going forward, as people working at a NP level will know their parish well, and their knowledge should be used to refine mapping and reduce errors generated through desktop analysis.

Outcome: Future ecosystem services mapping should be produced with a simple OS background layer, or similar, to allow ease of use, interpretation and interrogation.

The Northamptonshire pilot parishes also identified the need for a guidance document to enable the 'lay person' to be able to understand, interpret and use the maps and information effectively. A draft 'user guide' has been produced as part of the Northamptonshire pilot and, while not published, it was made available for consideration and initial feedback to the authors. While the parishes involved expressed a desire for guidance bespoke to their parish, this would not offer good value for money. The draft user guide is based on a specific parish, but is generic enough to have wider applicability. Also although created as a 'Northamptonshire' neighbourhood level user guide it could be applied to anywhere that the same natural capital planning methodology has been used to generate the mapping and data. The draft user guide explains how to interpret the maps by identifying what a service delivers, why it is important and what the map shows.

The Clophill 'live test' was carried out by a more experienced officer in the field, with two years' experience of working with NCES maps and data, but the concept of a user guide was also supported here.

Outcome: The draft user guide could be further refined, tested with potential users, and created as a user guide for parishes across the OxCam Arc geography. However, consideration should be given to how this relates to any other proposed user guide (see sections 4.1.5 and 4.3.4). Ideally a 'one stop shop' approach would be taken where one natural capital planning user guide can fulfil the needs of all audiences (strategic spatial level, LPA teams, neighbourhood planning teams and developers).

The Northamptonshire pilot also recommended training to accompany the user guide, for parish/community group representatives producing plans but also for officers working with such groups. It also recommended the establishment of, and support for, a 'community of practice' where people can support each other, share good practice and build confidence.

Outcome: Following any testing of and consultation on the user guide, a training package should be created to accompany the user guide. The potential establishment of a 'communities of use' should also be explored, identifying the level and type of support required, appropriate scales and mechanisms, and how they could be hosted.

The process of mapping NCES is costly and time consuming, and requires specialist skills. The information will require regular updating if it is to remain valid. In

Northamptonshire, the Local Environment Record Centre is working with a natural capital consultant to establish a mechanism that provides the data and mapping to groups at an affordable level (in the context of funds available for NPs), but also generates income to sustain the service and cover the costs of updating data and potentially providing support to groups accessing and using the data.

Outcome: The proposed Northamptonshire mechanism, providing NCES data and mapping to groups at an affordable level, should be further explored and applied across the OxCam Arc where appropriate. This could be through the network of Local Environmental Record Centres working with the local authorities.

The data and mapping were made available to the specific parishes involved in the Northamptonshire pilot and the live test at no cost to them. It is therefore essential that such approaches as recommended above are developed promptly, to ensure a lack of accessibility does not hold up the adoption of the approach.

5.4.5 Mapping requirements

In section 5.4.2 we introduce the four main elements of a NP which relate to taking a natural capital approach. Here we consider the specific mapping requirements for these based upon the 'live testing' research.

Policy development

The NCES mapping can support policy development by highlighting areas of demand for particular ecosystem services. This could be supported by making sure the potential user guide includes explanations as to why a particular ecosystem service is important.

Site Allocations

The constraints that can be identified using NCES mapping could include high quality habitats, designated sites, and areas of high ecosystem service demand (e.g. air quality). The Northamptonshire pilot work highlighted a specific appetite for using the NCES mapping in this way, and it was felt that the level and type of data presented would be ideal. However, it is important that the natural capital approach is not perceived as a barrier to development in itself. Many of the key constraints should be identified through other mechanisms, and the natural capital approach should be seen as a way of maximising environmental enhancement.

It would also be possible to demonstrate the benefits that development of a site could provide, for example through tree planting to ameliorate air or noise pollution or reduce flood risk, and these are best illustrated objectively through mapping. The NCES mapping is able to show this in detail, highlighting the areas within a parish providing these services, those areas that have the highest demand, and also where opportunities to deliver multiple benefits exist.

Outcome: Future development of the user guide and training should also incorporate site allocation scenarios.

Local Green Space designation

The ability to look at mapped data at a field level is essential as part of the assessment process. The NCES mapping provided this, although background detail is even more critical here. The ability to be able to use GIS and overlay ecosystem service layers on the site boundary is also essential, and where several sites are being proposed this could be a time consuming and costly exercise, and should be considered an add-on to existing methodologies.

It is also important to note that the range of natural capital assets and ecosystem service currently mapped (either by the LNCP or at a county level) do not cover all of the criteria for the Local Green Space designation process (for example aesthetic value). So, it is important to understand that while NCES mapping can demonstrate provision, it cannot prove that a local community 'values' these services in a manner that satisfies the Local Green Space criteria.

Outcome: Future development of the user guide and training should also incorporate potential use in Local Green Space designation.

Aspirations

Again the ability to use mapped data at a field level is beneficial, especially as many community-level projects are small-scale. The current suite of ecosystem services maps does not incorporate rights of way or other access routes, often an important component of, or focus for, local environmental projects. However this is easily rectified with information and mapping freely available from local authorities.

The draft user guide does not currently include assistance with developing projects from the information provided. This will be essential for NCES-led projects, which could be developed in addition to those that arise from more traditional routes.

Being able to interpret the mapping and data will also be essential if it is to be used successfully in funding bids.

Outcome: Future development of the user guide and training should also incorporate potential use in project identification and development.

6. Research at the Development Masterplan Level

6.1 Conclusions

At the masterplan level, respondents to this report considered natural capital an interesting, novel framework with some potential to improve the design of masterplans. Current approaches are seen as most useful to support expert opinion in the occasional review of early-stage spatial masterplans, and to address blind spots in site allocation and initial planning. These are valuable roles, but to have a wider applicability natural capital approaches and datasets would also need to become more flexible in their data requirements, more nuanced in recognising the interplay between different classes of natural capital, and wiser to the constraints of local policies and subjective preferences. All of these problems were addressed for Tresham Garden Village by involving local planners, wildlife charities, and a natural capital consultant to provide expert input.

The NCES map outputs of the OxCam LNCP could contribute to solving these problems, if they can be positioned clearly in relation to local plans and strategies, and to existing datasets and data platforms. However, the NCES datasets produced by the LNCP would not currently make a significant difference to site design and would not be commonly used for this purpose. If the LNCP project aims to influence masterplans it would need either to; improve the spatial resolution of these LNCP outputs to make them more sensitive to location and local context, and to present their scores in a way that can be relied upon for planning determination, or to convert the LNCP NCES mapping method into a format that allows developers to enter site-specific data and receive recalculated NCES outputs.

At present, existing outputs and the LNCP project were not well-known among interviewees. Further communication would appear useful, and it may be worthwhile to involve developers, LPAs and their consultants in the design of any future LNCP outputs if these outputs are expected to feed into masterplans.

6.2 Background

A masterplan is an overarching planning document that is used to structure subsequent land use and development. There is no set scale or duration for a masterplan, and no formal process for creating one. Although they are increasingly common, most developments will not have masterplans. In fact the word ‘masterplan’ only appears once in the NPPF, and only for the purpose of defining another phrase. Nonetheless masterplans, where they exist, have a great impact on the lives of the people who eventually live or work around a development. It is often in masterplans that important parameters for a development are set out, including in many cases its layout and design code, and so the structure and feel of the place that is created. As such, the masterplan stage is a critical one for the consideration of natural capital.

If the English town and country planning system becomes more spatially explicit and more dependent on design codes, as suggested by the recent ‘Planning for the

Future' White Paper, then the techniques and considerations currently applied to masterplans will have an even greater role in managing the country's natural capital. Masterplans involve extensive, site-specific investigation and design. They are usually a number of inter-linked documents and not a single one, and will be developed iteratively over several years. The documents produced will be tailored to the purpose, commonly as a detailed masterplan and site design suitable for an outline planning application. However, in many cases there is more weight given to parameter documents and design codes that guide future development applications than to explicit spatial plans. For major sites there may also be initial concept or framework masterplans designed to shape the policy of the LPA and to be adopted as a Development Plan Document (DPD) or SPD.

The NCES datasets from the OxCam LNCP have not been specifically designed to feed into the drafting of masterplans, they are presented at a higher spatial level than masterplans require and without the level of ground truthing and local detail that is needed. However, they are based on many of the same inputs as masterplans, and the LNCP is concerned with the same issues.

6.3 Approach and summarised masterplan case studies

This section investigates how a natural capital approach, and using NCES data and mapping, could be used to inform and influence the master-planning of individual developments to potentially deliver net gain.

It focuses on three case study masterplans (a summary of these is provided in the table below) in which natural capital frameworks have been used to varying extents and for different purposes. These case studies are Marston Valley (Beds), Tresham Garden Village (Northants) and Waterbeach Barracks (Cambs). These were selected to cover three different developers and masterplan approaches. The case studies are based around a review of published documents. Structured interviews discussing the application of the natural capital framework and existing LNCP outputs to these case studies were also held with; a masterplan project manager, a masterplan lead ecologist, a masterplan natural capital consultant, three LA planning team members and a LA ecologist.

The Tresham Garden Village site had explicitly applied a natural capital approach and data to improve site design. This process – with its drivers, advantages, disadvantages and impacts – is set out in detail in Appendix J. The key barriers for use of the natural capital approach elsewhere, and the natural capital knowledge and understanding of the other interviewees, is in section 6.4.

Case study	Information and natural capital approach taken
Marston Valley, Beds	Proposed development of 5,000 homes and associated infrastructure. The project is controlled by the O&H group who are taking a 'master developer' role with the potential to pass the development of land parcels on to other developers. The masterplan process began two decades ago, before the natural capital framework was created. The process has produced detailed

	environmental plans, designed to provide multiple environmental benefits, with essential concern for protected species considerations and for the policy requirement for 30% canopy cover in any development within the Forest of Marston Vale. A natural capital assessment was conducted in 2019 for Central Bedfordshire Council to review site selection using the 'Natural Capital Planning Tool' and showed strong positive results. This assessment has not influenced site design as the findings are not yet available to the masterplan team as they were commissioned for the LPA and not for the specific use of the development. The Defra BNG metric (version 2.0) has also been applied recently and provides a sufficient metric score, but the metric has not provided substantial benefits for site design.
Tresham Village, Northants	Proposed development of 1,500 homes and associated infrastructure, with planning application expected in summer 2021. The site is owned by the Deene Estate, and work is being promoted by Land Acquisition and Promotion LLP, supported with capacity funding from Homes England. The site was identified through the 2016 North Northamptonshire Joint Core Strategy. Government development funding was assigned to develop a Masterplan and Delivery Strategy for public consultation in Spring 2018. As a condition of this funding the LPA required a natural capital assessment comparing an early-stage (Spring 2017) draft masterplan to the undeveloped site, and an expert workshop to consider this assessment and recommend improvements to the masterplan. The assessment mapped eleven categories of ecosystem services before and after development. For a sub-set of these, demand for the services was also mapped to indicate the additional demand created by new residents. This used EcoServ GIS and involved similar datasets to those applied to the OxCam LNCP data (see Appendix for details), with the addition of site-specific data: the Phase 1 survey, and access point and Rights of Way maps.
Waterbeach Barracks, Cambs	Proposed development of 6,500 homes and associated infrastructure, with works commenced and first homes expected in 2023. The development process has been managed by Urban & Civic, who have taken a 'master developer' role for the Defence Infrastructure Organisation and will be creating the site's GI in advance of housing. Urban & Civic's approach is led by GI concepts and landscape design, although this uses many of the concepts later adopted for the natural capital framework. The masterplan design has been landscape-led, with a relatively early application of the Defra BNG metric (version 2.0) to ensure a 10% uplift in BNG units.

More detail on these case studies is given in Appendix J.

6.4 Findings and recommendations

A set of findings and recommendations have been collated, and a summary of these to identify critical points and recurring concerns has been outlined below.

Applying a natural capital approach to masterplans

Natural capital is a recent framework that has not yet become a standard part of masterplan development. Most respondents had an advanced understanding of natural capital as a concept and saw it as promising, but only natural capital specialists saw it as immediately influencing their work. BNG is seen as a more pressing consideration by other respondents and has become a major driver of ecological and landscape design

Current natural capital approaches are seen as having greater value at earlier stages of major developments, or in smaller developments that may not have a masterplan. There was a consensus that the natural capital approach could benefit site design by structuring decision-making in a way that ensures environmental considerations are not side-lined and that avoids 'blind spots' in environmental planning. For natural capital approaches to influence masterplans to a greater extent, they will need to:

- Be flexible enough to feed in at all stages of masterplan design, including post-development management
- Take full account of policy requirements, which often set clear priorities between categories of natural capital
- Work from fewer and less certain inputs at earlier stages of masterplan design
- Rest on up-to-date priorities, models and datasets
- Support complex decision-making on inter-related environmental concerns, and avoid presenting different aspects of natural capital as 'siloed'
- Provide locally-relevant analyses and not homogeneous solutions

At least one planning authority in the 'OxCam Arc' (Northants Council) is expected to require natural capital assessment of all developments, providing an opportunity to embed the approach in planning

The barriers to influencing masterplans through a natural capital approach

At Tresham Garden Village, a natural capital assessment was used to inform an expert workshop review of a pre-existing spatial masterplan. From respondent comments, this appears to be the most useful role and point at which to use current natural capital approaches.

There appear to be multiple barriers to using current natural capital approaches more extensively to support masterplan design throughout the process. In order of perceived importance, these are:

- **Methodological limitations**: available natural capital tools and frameworks tend to 'silo' different forms of natural capital and do not support the design of features to deliver multiple benefits, which is the issue at hand in masterplan design. They

also are seen as proposing the same things everywhere regardless of local situation
- **Policy and stakeholder barriers**: other things are prioritised by competent authorities and stakeholders than by available natural capital models
- **Data limitations**: in particular the lack of recent site-specific/location-specific datasets

Unless these barriers are addressed, the natural capital approach risks either appearing irrelevant at the masterplan stage or homogenising developments by proposing similar solutions in every location.

There was consensus that natural capital tools will only be influential at any given stage of masterplan design if they directly address and support the concerns of planning determination (i.e. have planning weight or are designed to address planning consent gateways). Existing natural capital tools need to find a way of recognising the complex interplay between environmental impacts. Where current models split natural capital assets into separate classes, they can fail to provide the holistic overview required for masterplan design.

Natural capital approaches will need to go beyond an objective or science-led view to take full account of the legal and policy drivers, and stakeholder preferences that are often the key drivers of masterplan design. Examples given included:

- Protected species and BNG requirements.
- Over-riding local policies such as the 30% canopy cover required for all development in the Forest of Marston Vale
- Residents' preference for existing features over new ones. Several respondents noted that this made the current natural capital approach more suitable for wholly-new developments than for places with existing residents
- The ability of some stakeholders to object to multi-functional features – for example of Internal Drainage Boards to prevent landscaping or vegetation on waterways

Prioritising natural capital impacts was seen as an important function. This was seen as a difficult process with both political and technical aspects and needed to be addressed directly. Several respondents noted that natural capital tools universally show massive loss of agricultural capital on development sites, but that this is implicitly accepted. The lack of explicit prioritisation makes it difficult to use NCES tools to take decisions at a masterplan stage

The natural capital approach would be seen as most useful if it addressed gaps in existing metrics and decision-making tools, and in particular those of the Defra BNG metric. Examples given included:

- Identifying areas where existing natural capital is resilient to change and/or can be improved by development
- Demonstrating the benefits of habitat connectivity and supporting decisions on how to optimise this
- Identifying demand for ecosystem services

- Optimising the placement of amenity and functional areas so as to buffer or reduce disturbance to high nature-value areas

There is demand for standardising natural capital approaches into a commonly-understood framework. Non-specialist respondents found it off-putting that there are a large number of natural capital tools and approaches. When natural capital assessments are run, it is a problem that there is no set process for following up their outputs. At Marston Valley, the results have not been communicated to the team leading the masterplan, and for Tresham Garden Village it was not clear why some recommendations were adopted and others not.

Data requirements and the adequacy of existing datasets

Data is not currently seen as adequate to take full advantage of the natural capital approach. By the time more detailed data is provided by site investigation, natural capital assessments were considered to be less useful and there was no indication that developers would run bespoke natural capital assessments at this point unless it becomes a planning requirement.

Data needs to be location, and context, specific and ground truthed to be useful at a masterplan level. Modelled outputs must be accompanied by background data and full explanation of the scores assigned to any given point or polygon, in order to be admissible as evidence in planning decisions.

Demand and opportunity modelling and data are also prized and can be particularly influential. Information on constraints was already available to respondents, and it was important that these were recognised by decision-making tools and models. Local knowledge and preferences are seen as a key determinant of natural capital benefits as knowing which sites and features are important to existing residents is seen as vital information.

The LA ecologist and Marston Valley masterplan project manager both mentioned this, in particular around the need to (i) consult pre-existing residents and (ii) establish final amenity features quickly before new residents become attached to features of the developing site that will be removed later (e.g. temporary areas of scrub)

Dataset licensing limitations are less of a problem than resolution at masterplan level, as most important datasets will be accessible. However, there are a small number of datasets that are seen as disproportionately expensive or difficult to obtain licences for (one specific Local Environment Records Centre and the Centre for Hydrology and Ecology datasets were mentioned)

Comments on the LNCP outputs

Respondents' awareness and understanding of the OxCam LNCP was limited unless they had been directly involved in producing LNCP outputs. Training and communication would be welcomed, including by senior planners who would be involved in Local Plan and OxCam Arc-wide processes.

Several respondents who had been engaged with the LNCP in its early stages (attending workshops etc.) had lost touch with it during the Covid-19 lockdowns and were not aware of any outputs. Respondents who had remained engaged with the LNCP felt they had not discussed or disseminated its outputs with colleagues in the normal way because of Covid-19 home-working requirements.

The OxCam LNCP outputs (once explained) are seen as most useful at the earliest stages of site allocation and the initial scoping of masterplan designs – although at this latter stage, the lack of resolution beyond 25m^2 and the lack of location-specific modelling will limit utility. At all later stages, data will be required at a higher resolution and with more site-specific evidence. These will be available via Phase 1 ecology surveys and bespoke GI plans (for example SuDS design), but by this point natural capital assessments are seen as less valuable.

There was consensus that it would be counter-productive to establish a separate identity or portal for OxCam LNCP outputs, alongside the already crowded field of datasets and tools. There were differing views as to whether OxCam LNCP NCES datasets should be fed into existing data management systems:

- Planning staff felt it would be most helpful to have LNCP datasets available on LPA GIS applications as additional layers
- Masterplan and ecology leads said they would be better hosted elsewhere (MAGIC was mentioned by one respondent) and reserved for specific and more expert uses, to avoid them being used only to 'sieve' sites (i.e. to steer development toward 'white space' and prioritise existing natural capital over potential)
- OxCam LNCP datasets were also seen as useful for filling 'blank spaces' at the edge of dataset licences. For example allowing LPAs to review near-boundary or cross-boundary projects as they will not have GIS datasets for neighbouring authorities

It was stated that it would be helpful to clarify how the LNCP datasets relate to other Council-level datasets, plans and strategies. Several respondents mentioned in particular LNRS and the county-level maps commissioned by LNPs and councils (via the LNP opportunity mapping exercise in 2019) and covering much of the OxCam Arc. The relationship between the LNCP and these processes was not well-understood by respondents

7. Recommendations for planning reform proposals

7.1 Introduction

In August 2020, the Government issued a White Paper, 'Planning for the Future', and consulted on a package of proposals for the reform of the planning system in England. The proposals included measures to streamline and modernise the planning process, improve outcomes on design and sustainability, and reform developer contributions. This research has looked at how the integration of a natural capital approach, and the use of NCES data, into planning reforms would support these outcomes and benefit the natural environment.

The White Paper has a number of implications for the natural environment. It proposes planning for growth, renewal and protection areas, in addition to sign-posting environmental recovery, for example through LNRS. There are also proposed changes to environmental assessment, including SA and EIA. Some proposals in the White Paper present an opportunity to better integrate the natural environment into the planning system and these are considered within this section and include, in particular, the increased use of digitised mapping.

7.2 Methodology

Planning specialists (see section 1 for details) reviewed the proposals in the White Paper in light of the concept of taking a natural capital approach within the OxCam Arc. A number of recommendations were made on how a natural capital approach could potentially integrate with and influence the new planning system. These recommendations are written as an influencing document (section 7.3) which could be used to shape the future planning system. They have not been made in response to the planning consultation (which ended in autumn 2020) or in relation to any previous response from Defra to MHCLG in respect of the White Paper. The recommendations are designed to offer a practical way forwards with regards to embedding natural capital and ecosystems services into the future planning system.

The SEMLEPSEMLEP Property Development Infrastructure Implementation & Delivery Group (PDIIDG) is attended by professional representatives from across the property and infrastructure sector including developers, infrastructure providers, planners, architects, economists, consultants and LA. The group both receives information about initiatives coming out of Government and influences policy, programmes and spending priorities. PDIIDG provide advice to SEMLEP on the built environment, including infrastructure, and sustainable economic growth.

This influencing document was circulated, by email, to the SEMLEP PDIIDG and members were invited to comment on it. Additionally, in an online PDIIDG meeting, a number of recommendations were presented for comment and discussion. Time constraints meant that we were unable to discuss all of the recommendations, but those chosen for discussion at the meeting were selected based on the background and interests of the group.

No responses were received to the full, emailed, influencing document but at the SEMLEP PDIIDG meeting our recommendations were generally agreed with and additional comments were raised. The project team felt strongly that their recommendations were supported by members of the SEMLEP PDIIDG and therefore it was decided that the recommendations would remain unaltered.

The comments and feedback from the SEMLEP PDIIDG online meeting are given in Appendix K.

7.3 Recommendations and influencing document

Below are recommendations aligned with proposals in the White Paper. Many of these are reflected by findings made elsewhere in this report, following research at different spatial scales within the OxCam Arc.

Embedding Natural Capital and Ecosystem Services into the Planning System

The points below present a high-level summary of how a natural capital approach could potentially integrate with, and influence, the new planning system flowing from the **'Proposals'** in the 'Planning for the Future' White Paper (2020).

"Proposal 1: The role of land use plans should be simplified. We propose that Local Plans should identify three types of land – *Growth* areas suitable for substantial development, *Renewal* areas suitable for development, and areas that are *Protected*."

The NPPF currently recognises the importance of natural capital and ecosystem services in establishing planning policy and decision making and recognises the need to plan for enhancement at a catchment or landscape scale across boundaries (paragraph 170-171), but to strengthen it, this would need to require a definition and enhancement of Opportunity Areas. This information would benefit protection and enhancement in all three types of land proposed by the White Paper.

Our recommendations: An output from a natural capital approach is the identification, through LNP mapping, of Natural Capital Opportunity Areas where natural capital and ecosystem services assets can be enhanced, increased or improved in other ways, e.g. improved connectivity. Our recommendation is that where these opportunity areas can be spatially defined and offer multiple benefits to ecosystem services that they are designated as one of the 'Areas that are Protected'. The definition in the NPPF would need to be expanded to capture Natural Capital Opportunity Areas with a requirement for these to be established at a local level using a natural capital approach and for these to be shown on the Local Plan maps.

“Proposal 2: Development management policies established at national scale and an altered role for Local Plans.”
and
“Proposal 11: To make design expectations more visual and predictable, we will expect design guidance and codes to be prepared locally with community involvement, and ensure that codes are more binding on decisions about development.”

Current environmental design, including green and blue spaces around buildings, could better be better linked to local opportunities and aspirations to enhance natural capital and ecosystem services. The planning system can incorporate natural capital into development management policies, design and engage with communities in the process.

Our recommendations: The idea that design guides and codes should be set at a local or neighbourhood level and that decision making flows from these local priorities is supported. The emphasis in the White Paper is on controlling the quality of the built environment. We would encourage a wider perspective on this, incorporating environmental design of the green and blue spaces around the buildings to be captured in design guidance too. The Natural Capital Opportunity Areas, and, in the future, the LNRS, should be used to steer development of the local design codes.

Where relevant to local communities, they could be engaged on the evolution of design codes at the same time as LNRS, thereby bringing the built and natural environments into the same conversation.

“Proposal 3: Local Plans should be subject to a single statutory “sustainable development” test, replacing the existing tests of soundness.”

A natural capital approach can be built into the plan making process early and can be applied at all levels from local parishes to developers and LA, including cross boundary working. Risks include whether the SA process (which offers an avenue for NCES) continues to be applied and whether a natural capital approach will be required to be incorporated into any future “sustainability test” replacing SA. If a SA process is retained, the use of a data-led, natural capital approach could make the process more efficient, which is one of Government’s aims for the planning system.

Our recommendations: We do not offer any view on the abolition of the SA system or the ‘Duty to Cooperate’ but we would encourage policy makers to review the findings of the South West Partnership for Environment and Economic Prosperity (SWEEP) recent report, *‘Applying the natural capital approach to Sustainability Appraisal’* and consider their recommendations in any policy outputs (https://sweep.ac.uk/applying-the-natural-capital-approach-to-sustainability-appraisal-report/).

The other element of Proposal 3 that we offer an observation on is the consideration given to future cross-boundary working initiatives. In this matter, one of the outputs from our county level research indicates that a natural capital approach can be a positive starting point for cross boundary discussions and, as it comes early in the

plan making process, could set a positive tone for other discussions. Consensus can usually be built around environmental priorities and opportunities to seek investment from the private sector.

"Proposal 6: Decision-making should be faster and more certain, with firm deadlines, and make greater use of digital technology."
and
"Proposal 7: Local Plans should be visual and map-based, standardised, based on the latest digital technology, and supported by a new template."

While there are substantial gains to be made in relation to efficiency, access to data and cross-border working, a number of risks in the use of data have been raised. These are covered elsewhere in this report and include incompatible data sets, licensing of data, spatial scale of application, usability and training, cost of management and updates.

Our recommendations: Proposal 6 is fully supported and we wish to offer up some insight into barriers that LA have been relaying to us in our recent research:

1. There are difficulties in sharing data between neighbouring authorities where different, sometimes incompatible software packages are used
2. Different licensing arrangements can lead to environmental datasets being unable to be shared between different tiers of local government
3. The level of detail needs to be appropriate to the particular plan or code that is being produced

What is apparent is that there is a willingness to share datasets and for these to be kept as live documents that both the public and private sectors can add to and extract data from. In order to ensure that environmental considerations are at the heart of the planning system, Defra and MHCLG should be working together to ensure cross boundary software compatibility that works at multiple tiers of the planning system.

"Proposal 15: We intend to amend the National Planning Policy Framework to ensure that it targets those areas where a reformed planning system can most effectively play a role in mitigating and adapting to climate change and maximising environmental benefits."

The White Paper wants the reform to play a role in promoting environmental recovery and recognises the role of LNRS to be introduced by the Environment Bill. The use of a BNG metric has meant a standardised approach to calculating net gain from development to aid decision-making in the planning system. A similar approach for ENG would support a standardised and quantitative approach to calculating other environmental benefits, including ecosystem services which help mitigate climate change.

Our recommendations: In amending the NPPF, consideration should be given to the 25 Year Environment Plan with a specific focus on the role that a natural capital approach can make to targeting opportunities for climate change mitigation and adaptation. Further, the application of a natural capital approach to BNG metrics

supports an ENG approach. We are anticipating further advice on this in the forthcoming Environment Bill, but would encourage all of this to be brought together in a single ENG metric that can be applied to development proposals.

"Proposal 16: We intend to design a quicker, simpler framework for assessing environmental impacts and enhancement opportunities that speeds up the process while protecting and enhancing the most valuable and important habitats and species in England."

The barriers to use of natural capital data set out above at Proposal 6 & 7, also apply to EIA. There are also opportunities to fund data management through making it chargeable for developers. From the developer perspective there are benefits in terms of savings when compared with funding their own data collection and also greater assurance by stakeholders in the quality of data. The use of digital information has the potential to deliver a much more efficient planning system, including assessment of options, improving decision-making, increased transparency and identification of environmental impacts, mitigation and enhancements.

Our recommendations: An environmental, data-driven natural capital approach could lead to a digital transformation of the planning system that would be more accessible to all stakeholders, including the public, and lead to more informed decision-making. This would involve making data accessible through a central environmental datahub at the regional level, hosted through Local Environmental Recording Centres. This could involve use of existing environmental data, including habitat mapping, and analyses of wildlife corridors for landscape-scale habitat connectivity. Data would be freely accessible to LA and chargeable for developers. This data would also underpin the LNRS.

"Proposal 19: The Community Infrastructure Levy should be reformed to be charged as a fixed proportion of the development value above a threshold, with a mandatory nationally-set rate or rates and the current system of planning obligations abolished."

Risks associated with this approach are largely associated with the adoption of a levy, its acceptability to developers and adoption of any standardised approach. If these are overcome as part of planning reforms, then integration of funding natural capital enhancement would support ENG in LA areas.

Our recommendations: We would encourage the consideration of a percentage of any infrastructure levy to be given towards 'enhancing Natural Capital Opportunity Areas' in the local area. This should be a standardised item on the infrastructure levy. Contributions could also be made by developers 'in kind' but only where they specifically relate to the Natural Capital Opportunity Areas.

7.4 Further recommendations

In Feb 2021 the Government published its policy paper for developing a long-term Spatial Framework for the OxCam Arc[8]. The Policy commits to taking a natural-capital approach to inform planning and decision-making and will set policy to embed enhancement of natural capital across the OxCam Arc. A number of recommendations made in this report, applicable at both the county level and through review of the planning reforms above, could also be applied to the OxCam Arc Spatial Framework:

- Further development of an OxCam Arc wide natural capital database. This would include addressing issues and barriers such as licensing, data sharing, spatial scale of data, and ease of use, as well as providing a further step towards cross-border sharing of information
- Use of Natural Capital Opportunity Areas to support strategic planning. These should be used to support planning of environmental protection, nature recovery as well as areas of growth
- Integrate a natural capital approach into the SA for the Spatial Framework. There is an opportunity to undertake a data-led approach to SA and improve efficiency of the process. The proposal for a 'sustainable-development test' in the White Paper also supports a more efficient process

Public consultation on the Vision for the Spatial Framework is due to be undertaken in summer 2021, with options for growth published in spring 2022 and a draft framework the following autumn. There is a real opportunity to implement the recommendations from this report to support a natural capital approach. Depending on timing, the use of natural capital in the Spatial Framework can even provide a practical example to be applied at a national level.

8 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962455/Spatial_framework_policy_paper.pdf

8. Lessons learnt

Reflecting on this study it is possible to identify a number of key lessons learnt.

Awareness of a natural capital approach

Most of the people involved in this research as interviewees, respondents or workshop participants were aware of natural capital and what a natural capital approach is, however most are still trying to increase their knowledge, collate relevant information and decide how it might be helpful and relevant to them. This was shown clearly in the OxCam Arc/strategic level workshop; with the number of participants returning from the comfort break to the participatory sessions significantly lower than that who had attended the earlier information sharing session. The feedback from the OxCam Arc level break out groups, and the workshops with LPA teams, also suggests that participants are still gathering information on a natural capital approach and implementation is still emerging. The team found that for both LPA teams and organisations such as Highways England, application is still in development and has not yet been published.

Communication about a natural capital approach and the use of NCES evidence bases is obviously very important to ensuring the adoption of the approach, but more widely communication is required to embed the general concepts and motivate people to engage with them. In this study, this has proven challenging among professional audiences but it will be significantly harder amongst the general public. Better communications about natural capital and our need to protect and enhance our natural environment, and the environmental ambitions of the OxCam Arc, will be critical in increasing the level of public support for the OxCam Arc in general – it is currently viewed as a Government mechanism for significant growth and not for significant environmental enhancement. Presenting information both graphically and digitally may go some way to help engage the public and improve understanding. While data collection and providing an evidence base was generally understood, it was less clear to organisations how this information can be then used to inform decision-making.

Currently there is no 'one-size fits all' approach to embedding a natural capital approach within the OxCam Arc

During this study it became apparent that each separate group (organisations, LPA's, neighbourhood planning teams, developers, etc) are currently taking different approaches to embedding the natural environment within their planning and decision making processes. The GI led approach remains the main mechanism currently used. So until there is legislation, or strong spatial support and guidance, there will not be a standard approach to embedding a natural capital approach to planning policy within the OxCam Arc or elsewhere. However, we should work to promote better communications between teams and facilitate shared learnings and joint training opportunities.

Overlap with Green Infrastructure planning

GI planning currently underpins a number of Local Plan environmental policies and spatial opportunity identification. Although GI planning methodologies have limitations, and the evidence base in some areas is over 10 years old, it is still considered the most robust evidence base available, with a significant degree of acceptance by planners and developers. It has become clear that LA planners are in no hurry to move away from this approach towards an 'unproven' approach not driven by statutory requirements or mandate, but that they do recognise the value the natural capital approach brings. It is felt that an 'evolution' of the GI approach is the most likely way to embed a NCES approach successfully in the short-medium term. This will require specific research into the detail of GI methodologies used, their strengths and limitations, to ensure that any evolution creates an approach that is both logical and applicable.

Lessons learnt on the research methodology

The workshops with LPA planning teams were very productive, honest and incorporated both awareness raising and information gathering for both the researchers and respondents. Aspects of the research methodology which contributed to the success of these workshops were:

- The researchers stated that the findings of the research would be anonymised as much as possible. As a result, respondents were happy to discuss issues in detail and appeared to speak freely and openly. This does, however, mean that it has not been possible to be specific in attributing certain comments or findings in the final report

- In the workshops, the main researcher was supported by a planning specialist. It was felt that this added credibility to the research team and it allowed them to answer a range of queries from the respondents covering natural capital approaches, NCES data and how these could be used as part of their planning roles, in plan making and decision taking

- In the workshops, the researcher presented background information on the project, the OxCam LNP environmental opportunity mapping and an explanation of NCES data and how it could be used. The planning specialist also presented good practice examples where a natural capital approach had been used elsewhere in the UK. This information sharing helped answer many of the questions from respondents, gave practical examples and helped increase their knowledge and awareness of natural capital approaches to planning and decision making

The LPA team meetings raised awareness, shared knowledge and started discussions on the subject of taking a natural capital approach, but the project team were unable to go any further with this work in the time available. Ideally, the workshops would have been the first stage in an iterative process (including support, training and 'live testing') leading to the production of draft planning policies.

‘Live testing’ was carried out with an LPA team and with neighbourhood planning teams, again including a planning specialist in this work proved invaluable.

It is recommended that in any future research work in this subject area the research team should have similar knowledge and skills to those who carried out this project, these are:

- Knowledge of a natural capital approach
- Knowledge of NCES evidence bases
- Specialism in NCES data and mapping (for ‘live testing’)
- Strong research skills
- Specialism in planning
- Knowledge and experience of the GI planning approach

This was a complex project which ran over a short timescale and involved a number of research staff and many separate respondent groups, so good project management was key to ensuring that the deliverables met the agreed project scope and the study report was delivered on schedule.

Lessons learnt concerning neighbourhood plans

NPs are not consistent in their approach or content. This is due to the widely ranging developmental needs and wishes of different areas, the type and size of settlement and often the expertise and interests of the volunteers. The whole purpose of NP is to provide local detail to policies in the Local Plan for the area.

In this study we saw an enthusiasm for engaging with the natural capital approach from the types of groups and individuals potentially involved in neighbourhood planning, but support and guidance is required, both to create and sustain this enthusiasm. It is possible that the extensive range of mapping available and the interpretation of the maps may be a barrier to use by neighbourhood planning groups, both in terms of cost but also in terms of processing the information. The work with the pilot parishes in Northamptonshire further illustrated this, with significant guidance and support required to enable the representatives to develop a moderate degree of understanding of the resources available, and understand some of the potential for their use. The fact that a guidance document was felt to be a necessity if any of these parishes were going to apply the NCES data in any meaningful way is not surprising given these are ‘lay’ people and not specialists in this field.

9. Recommendations for further work and research

Here are summaries of future work or research which could be carried out, based upon the findings of this research project.

Embedding the findings from this research within planning policy

The key next step will be to ensure that the findings of this research project are widely disseminated and embedded within planning and decision making at all scales and within all relevant organisations. This could be achieved by promotion of this report, followed by a series of presentations and workshops with suitable groups including OxCam Arc-wide groups (including the OxCam Arc Environment group, SEMLEP, statutory bodies, utility and infrastructure organisations, conservation organisations and LA), LNP's, LPA's, developer groups (including SEMLEP PDIIDG) and neighbourhood planning teams. The project team from this study would be well placed to deliver these activities and this work could be supported by either the LNCP/EA OxCam Arc team or OxCam Arc LNP's.

Developing the MHCLG OxCam Arc Spatial Framework policy paper

The process of developing the MHCLG OxCam Arc Spatial Framework will be consultative, and it is important to ensure that it fully embraces a natural capital approach. It is recommended that LNPs should take this opportunity to work together to ensure that a natural capital approach, shared evidence base and methodologies are included in the Spatial Framework and that pressure is applied to ensure that we meet our ambitions for a greener, cleaner and healthier OxCam Arc. This work should be supported by further research, lobbying activity and the facilitation of relevant meetings, workshops and webinars to promote the LNP's vision for a natural capital approach within the OxCam Arc and their ambitions to double nature.

Development of a natural capital planning user guide

Respondents in every aspect of this research project requested the production of a guide to help them better understand a natural capital approach and use NCES data to devise strategies and make decisions. This proposed guide should be made available to a wide audience, including strategic planners, planning officers, neighbourhood plan/community groups and developers. The production of this guide should also facilitate the development, promotion and use of standard tools, data and processes – a standard OxCam Arc natural capital package. It is felt that if carefully developed and targeted, a 'one stop shop' approach to this user guide will be possible, incorporating both general and bespoke resources relevant to different audiences and their specific needs and roles.

It is recommended that further research should be carried out to determine the specific user requirements for a natural capital planning user guide, a user centred design approach should then be used to develop this as an interactive, online resource. Such a project would incorporate user needs analysis, information collation, technical development of the tool and evaluation of prototypes with end users.

Further development of a detailed, shared OxCam Arc-wide natural capital evidence base - its availability and hosting

This would need to use standardised methodologies and metrics, and include a mechanism for keeping the data up to date. It should address issues and barriers raised in this study such as access, licensing, cost, data sharing, scale of data, interpretation of NCES data and ease of use, as well as providing a further step towards cross-border sharing of information. The evidence base should identify the risks along with the benefits, include opportunity mapping and the identification of local, regional and landscape-scale priorities. The development of this evidence base should start with a gap analysis and consideration of this reports findings, it should then be carried out in conjunction with the development of a natural capital planning user guide (see previous page).

Decisions will need to be made regarding who will host this data and how it will be funded and kept up to date.

Using Green Infrastructure planning as an 'evolutionary stepping stone' to a natural capital approach

Where GI planning methodologies exist and have been adopted/used to support a development plan, there will be a reluctance to depart from something 'tried and tested' and move towards a new approach that is not yet mandated. This has been clear from research at both the LPA and NP level. It is recommended that environmental planning methodologies and training materials which integrate and 'hybridise' the GI and natural capital approaches, and make use of NCES data and mapping, should be developed and shared with LPA planning teams. The project team from this study would be well placed to deliver this support.

Development of a natural capital support mechanism

In addition to requests for a detailed user guide, a common theme in this research was the need for some form of support structure, mechanism or body to promote a natural capital approach in the planning process and provide training and practical advice. This should work alongside the natural capital planning user guide and be developed along with the guide, because the user requirements and technical information will be similar and could be identified within the same research and development processes. Similarly, work producing practical advice on how to interpret and use NCES data in plan making and decision taking will be very relevant to both the user guide and the support mechanism. This work should also include the development of peer support mechanisms, for example it could be provided through the SEMLEP PDIIDG, professional networks, between neighbouring local authorities and LA teams or between parish councils.

Support LPAs and neighbourhood planning teams with live testing of the application of a natural capital approach and the use, and interpretation, of NCES data

Limited live testing could be offered during this research project, but those involved found it very beneficial. It is recommended that further opportunities for live testing

are made available to LPA teams working on forthcoming Local Plans and neighbourhood planning teams. For example for the pilot project parishes in Northamptonshire and the Clophill Neighbourhood Plan team – it would be really beneficial, and could act as an exemplar, if at least one of these natural capital approaches became a formal NP.

A support package, including ongoing training and information provision, should be developed and made available until the proposed natural capital planning user guide has been completed and is widely available. This should also promote better communications between teams and facilitate shared learnings and joint training opportunities.

North Northamptonshire Joint Planning Unit are currently producing a Natural Capital SPD and it is recommended that this initiative is supported and encouraged by the LNCP team (soon to be the EA OxCam Arc team) and the OxCam Arc LNP's.

Integrating NCES data within LNRS

The findings from this study and the learnings from the five LNRS pilot projects should be combined to identify potential mechanisms for integrating a natural capital approach and the use of NCES data and mapping within the evidence baseline for LNRSs.

Communications, including LNCP outputs and involvement in future projects

Many respondents had limited awareness of the LNCP team and its outputs, including the NCES data. Others were made aware of the OxCam LNCP team as a result of the workshops that were held in 2019 and 2020, however most of these had lost touch with the project in the interim period. This research suggests that this was due to a combination of a lack of promotion/advocacy and the effects of the Covid-19 pandemic which have disrupted respondents usual methods of keeping updated on new projects e.g. conferences and the informal sharing of information between nearby teams in offices.

Current mechanisms, including meetings and newsletters linked to the webpage, are not proving to be effective in engaging with wider audiences. There should therefore be a concerted effort to deliver better communications and increase knowledge and awareness of current LNCP outputs and their potential uses. This should also be linked to consultations on the next steps for the EA OxCam Arc team. For example, if future outputs will be related to strategic planning, Local Plans, NPs or masterplan design then expert and practitioner input should be included at an early stage in the design and scoping processes.

There is a need to further communicate the benefits of embracing and embedding a natural capital agenda in wider, more public communications – presenting the OxCam Arc as more than simply 'one million new homes'. Along with a wider communications strategy, the proposed natural capital planning user guide should also be used as a vehicle for communicating why the natural capital approach should be used, not just how.

All LNP’s in the OxCam Arc, and many local authorities, have adopted a doubling nature ambition. The NCES evidence base is potentially the tool to provide the baseline data from where any ‘doubling’ of land managed for nature can be measured, and a mechanism that helps ensure the benefits of the doubling are maximised for both people and wildlife. This can be facilitated at either the OxCam Arc or individual county levels, ideally working alongside LNP’s.