Sleaford Nature Improvement Projects: Broad scope natural capital assessment

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Contents

1. Summary of ecosystem services

Site	Existing potential Ecosystem Service	Potential increase Ecosystem Service
S1 Cogglesford Mill section	Air quality Climate regulation Cultural services (various) Flood protection Noise regulation Nursery populations Water supply	Cultural services (various) Flood protection Nursery populations Water quality
S2 Lollycocks Field	Air quality Climate regulation Cultural services (various) Materials from plants, animals & algae Noise regulation Nursery populations Plant based energy Pollination/seed dispersal Reared animals and outputs Water quality	Air quality Climate regulation Cultural services (various) Materials from plants Noise regulation Nursery populations
S3 Castle Causeway	Climate regulation Cultural services (various) Nursery populations Water supply	Cultural services (various) Flood prevention Nursery populations Water quality
S4 River Slea footpath improvement	Air quality Climate regulation Cultural services (various) Mass stabilisation of soils Materials from plants, animals & algae Noise regulation Nursery populations Plant based energy Water quality Water supply	Cultural services (various) Nursery populations Pollination & seed dispersal

2. Introduction

This natural capital assessment is a brief review of the potential ecosystem services provided by four project sites within Sleaford, North Kesteven, Lincolnshire. It has been compiled to add to North Kesteven District Council's natural capital evidence base. The project sites are:

- **Cogglesford Mill section**

- **Lollycocks Field**

- **Castle Causeway**

- **River Slea footpath improvement**

The document includes potential existing ecosystem services and the potential for change to ecosystem services resulting from intended project work, identified through a desk study of the four sites.

2.1 What is natural capital?

Natural capital is defined, by the Natural Capital Committee, as "…our 'stock' of waters, land, air, species, minerals and oceans. This stock underpins our economy by producing value for people, both directly and indirectly"[1].

Natural capital has four basic categories (habitats, air, land and water) and consists of the environmental assets, such as minerals, soils and flora and fauna. These assets enable the ecosystem to function and, in turn, provide services (also known as ecosystem services) which hold benefits for people and society. A focus on protecting the assets, over the services they result in, is considered to be a more sustainable approach for protecting nature as it considers the habitat as a whole rather than focusing on the parts that provide the services. As such, using assets has the potential to maximise the broad societal benefits of the natural environment while promoting the conservation of a functioning habitat.

The process of valuing natural capital is briefly explained in chapter 5.

3. Method

The methods utilise and are adapted from Natural England's **Natural Capital Indicators: Method[2].**

Potential **existing ecosystem services** were identified by cross referencing habitats and features at each project site with indicators of natural capital as described by Natural

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[1] http://www.naturalcapitalcommittee.org/natural-capital/
[2] http://publications.naturalengland.org.uk/publication/6742480364240896

England in their suite of Natural Capital Indicators Evidence notes. The ecosystem services relating to these indicators were then highlighted. Due to the lack of data for the sites surveyed some indicators could not be included. The indicators excluded are categorised in the Natural Capital Indicators Evidence notes as 'Asset attribute Ecosystem Service Flow'. It should be noted that absence of data does not necessarily mean absence of service.

Potential **changes to ecosystem services** were identified by cross referencing the intended works and outcomes of each project in the same manner as described above. The ecosystem services relating to these indicators were then highlighted. Unlike **existing ecosystem services**, as the results are predictive, indicators categorised under the 'Asset attribute of Ecosystem Service Flow' were included where described in project outcomes.

3.1 Caveats and limitations

Please note this study is a pilot and the method should be revised in the future. While the method is replicable for use on other sites it does include an element of judgement based on the interpretation of the data and of the indicators as defined by Natural England.

As a desk study the evidence used is limited, therefore the ecosystem services described are not an exhaustive list; equally those identified by the study are done so on the assumption of the existence of features and habitats described in sources of data used.

This study did not aim to quantify the natural capital or ecosystem services identified. It should be recognised that the physical value of each will depend upon the quantity, quality, condition and accessibility of each natural capital indicator. It must also be recognised that the value of natural capital can be reliant on its location and proximity to potential beneficiaries of services.

4. Natural capital potential

Pease note that the findings of this report are correct to the best of our knowledge, based on the data available at time the survey was undertaken and are a matter of judgement. The findings of this report are not exhaustive and are intended to be used as part of a wider evidence base.

It should also be noted that for tables referring to **existing natural capital** potential ecosystem services are only included once for each habitat or feature- this is because while the presence of an indicator potentially signifies the presence of a service, repeated indicators cannot definitively suggest a greater level of service provision without more detailed analysis. In contrast, for tables showing **natural capital improvement**, potential ecosystem services for each habitat or feature have been included wherever they have been

identified. The aim is to highlight the number of opportunities for improving or creating service flow; it does not serve to quantify any changes in flow.

Ecosystem service categories

Provisioning	Goods which can be extracted, such as crops, timber and fuel.
Regulating	Processes which regulate the natural environment, including maintaining air and water quality.
Cultural	Elements of natural capital which provide aesthetic, recreational or other cultural value, such as education sites or places to visit.

4.1 Cogglesford Mill section (S1)

Potential services from existing natural capital

Habitat/Feature	Indicator	Potential Ecosystem Service
River	River	Water supply
		Nursery populations
		Cultural services (various)
	Urban blue space	Climate regulation
Grassland and Marsh	Floodplain grazing marsh	Flood protection
Overhanging trees	Veteran/individual tree	Nursery populations Climate regulation
		Cultural services (various)
	Urban/street trees, canopy cover	Air quality Noise regulation

Potential for natural capital improvement

Habitat/feature improvement	Indicator	Affected Ecosystem Service
Bank Softening	Vegetation next to water bodies	Water quality Flood prevention Nursery populations
	Naturalness of watercourses	Cultural services (various)
Varying Depths	Naturalness of watercourses	Cultural services (various)
Sinuous outer edge of marginal shelf	Naturalness of watercourses	Cultural services (various)

4.2 Lollycocks Field (S2)

Potential services from existing natural capital

Habitat/Feature	Indicator	Potential Ecosystem Service
Wet Woodland	Woodland, scrub and hedge	Air quality Nursery populations Noise regulation Climate regulation Cultural services (various)
	Broadleaved, mixed & yew woodland	Materials from plants, animals & algae Plant based energy
	Woodland	Water quality
Lowland mixed deciduous	Broadleaved, mixed & yew woodland	Materials from plants, animals & algae Plant based energy
	Woodland, scrub and hedge	Air quality Nursery populations Noise regulation Climate regulation Cultural services (various)
	Woodland	Water quality
Semi improved Neutral Grass	Other semi-natural grasslands	Reared animals and outputs Pollination/seed dispersal Nursery populations Climate regulation Cultural services (various)
	Semi-natural habitats	Air quality Noise regulation
Standing water	Lakes and standing waters	Water supply Nursery populations Cultural services (various)
	Blue Space	Climate regulation
Dense scrub	Woodland, scrub and hedge	Air quality Noise regulation Nursery populations Climate regulation Cultural services (various)

Potential for natural capital improvement

Habitat/feature improvement	Indicator	Affected Ecosystem Service
Hedgerow added	Woodland, scrub and hedge	Air quality Noise regulation Nursery populations Climate regulation Cultural services (various)
Improved and additional Scrapes	Urban blue space	Nursery populations Climate regulation Cultural services (various)
Coppicing	Production of timber other wood products	Materials from plants
	Vegetation structure/structural diversity	Nursery populations
Owl Box	N/A	Nursery populations
Bird Boxes	N/A	Nursery populations
Bat Boxes	N/A	Nursery populations
Footpath Improvement	Public Rights of Way / permissive paths; footpaths, bridleways, byway – length, density (km/ha)	Cultural services (various)
	Presence of paths accessible to all – e.g. wheelchairs, pushchairs – length, density (km/ha)	Cultural services (various)
Fishing Platforms	Range of activities undertaken (number of people carrying out each activity, frequency, time spent)	Cultural services (various)
School Groups	Number of school visits	Cultural services (various)
Community group engagement	Number of visits	Cultural services (various)
	Duration of visits	Cultural services (various)
Kingfisher nest bank	N/A	Nursery populations

4.3 Castle Causeway (S3)

Potential services from existing natural capital

Habitat/Feature	Indicator	Potential Ecosystem Service
Running Water	River	Water supply
		Nursery populations
	Urban Blue Space	Climate regulation
		Cultural services (various)

Potential for improvement of natural capital services

Habitat/feature improvement	Indicator	Affected Ecosystem Service
Planting of marginal species	Vegetation next to water bodies	Water quality Flood prevention Nursery populations
	Naturalness of watercourses	Cultural services (various)
Varied depth	Naturalness of watercourses	Cultural services (various)

4.4 River Slea footpath improvement (S4)

Potential services from existing natural capital

Habitat/Feature	Indicator	Potential Ecosystem Service
Lowland mixed deciduous	Broadleaved, mixed & yew woodland	Materials from plants, animals & algae Plant based energy
	Woodland, scrub and hedge	Air quality Nursery populations Noise regulation Climate regulation Cultural services (various)
	Woodland	Water quality
Running Water	River	Water supply Nursery populations Cultural services (various)
	Urban Blue Space	Climate regulation
Trees	Veteran/individual Tree	Nursery populations Climate regulation Cultural services (various)
Wet Woodland	Woodland, scrub and hedge	Air quality Nursery populations Noise regulation Climate regulation Cultural services (various)
	Broadleaved, mixed & yew woodland	Materials from plants, animals & algae Plant based energy
	Woodland	Water quality
Cultivated/ Disturbed	Improved Grassland	Mass stabilisation of soils Climate regulation Cultural services (various)
Scattered scrub	Woodland, scrub and hedge	Air quality Nursery populations Noise regulation Climate regulation Cultural services (various)

Potential for improvement of natural capital services

Habitat/feature improvement	Indicator	Affected Ecosystem Service
Improved footpath	Public Rights of Way / permissive paths; footpaths, bridleways, byway – length, density (km/ha)	Cultural Services (various)
	Presence of paths accessible to all – e.g. wheelchairs, pushchairs – length, density (km/ha)	Cultural Services (various)
Bird Boxes	N/A	Nursery populations
Bat Boxes	N/A	Nursery populations
Species rich seeding	Plant species diversity	Pollination & seed dispersal Nursery populations
	Species diversity	Cultural Services (various)
	Visibility of wildlife (birds, mammals; flowers, butterflies)	Cultural Services (various)

5. Measuring the value of natural capital

Once there has been an assessment of natural capital one of the logical next steps is to develop an account of its value. Methods to do this are continuously evolving, but put simply, the value of natural capital is the accumulated value of each ecosystem service it provides over a defined period of time. For example:

Annual timber production x Market value of timber per m^2 = Annual monetary flow

Annual monetary flow over 50yrs = Asset value of that timber

Value of timber as an asset + asset values of all other of ecosystem services of accounting area = Natural Capital value of accounting area

Services such as timber are easy to value as they have a marketable value. Services which do not provide marketable goods are generally valued using one of the following methods:

- Revealed preference methods

- Cost based methods

- Stated preference methods

Further details on the valuation of natural capital can be found in the **GLNP natural capital report (2018)[3]**.

There are a number of useful tools which can help with the valuation of natural capital, though none are all encompassing and most focus on the change to, not the accounting of, existing natural capital. Some of these have been detailed in the table below.

Tool	Description
ORVal	A tool detailing the recreational value of open space, from **Exeter University.**
NCPtool	A tool for evaluating increase or degradation of natural capital by development.
B£ST	Ciria tool for valuing natural capital benefits.
CostingNature	Web bases natural capital evaluation tool from **Kings College London**.
GI Value Calculator	A tool for evaluating the benefits of implementing green infrastructure.

Simplified estimates of natural capital value can also be calculated by extrapolating national values for desired services. An example of this utilising broad habitat types can be found in the **GLNP natural capital report (2018)**.

6. Additional value in the context of the SUE

With the prospect of a growth in population, the development of sustainable urban extensions in Sleaford have the potential to increase the value of natural capital, without increasing physical outputs. This would be achieved through an increased number in beneficiaries of cultural ecosystem services, such as recreation and education, and regulating ecosystem services, such as those that benefit population health. However a larger population also holds potential for a rise in the need for services, for example more traffic will increase the need for pollution removal and carbon sequestration by vegetation. This is something that must be acknowledged in any post development valuation.

Increased population also holds the potential for increased degradation of natural capital through usage, which could reduce its value. Appropriate management would be required to mitigate against this.

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[3] https://glnp.org.uk/admin/resources/natural-capital-report-final-1.pdf

7. Next steps

Following the brief assessment of natural capital there are a number of steps that might be taken:

- Site visits may be conducted to gain a more accurate idea of the indicators currently on site for a more detailed understanding of the state of natural capital.

- A set of natural capital accounts could be produced calculating the value of natural capital.

- The success of nature improvement projects could be assessed to get an accurate understanding of the effect they have had on natural capital.

- The change to natural capital and its value in the context of population changes could be monitored.

- A natural capital management plan could be developed.

- A natural capital investment plan could be developed.

This method has been designed to be replicable, allowing assessments of natural capital present on other sites to feed into a baseline understanding of assets across Greater Lincolnshire.

8. Glossary

Asset	At its most basic level this can refer to mineral, soil or flora and fauna, it is often used to refer to a collection of these things which work together to provide ecosystem services.
Ecosystem service	Also referred to simply as service. Services are derived from the habitat and benefit society and the economy.
Natural capital accounts	A valuation of natural capital
Natural capital investment plan	A plan identifying opportunities to invest in preserving and growing natural capital. The content of these plans often vary and are sometimes simple statements of intent.
Natural capital management plan	A plan for the management of natural capital. The content of these plans often vary and are sometimes simple statements of intent.

9. Definitions of ecosystem services

Descriptions of the ecosystem services included can be found in CICES Version 5.1[4] which was developed to work towards a common classification of ecosystem service.

10. Further reading

GLNP (2018) GLNP natural capital report.

Lusardi, J., Rice, P., Waters. R. and Craven, P. (2018) Natural Capital Indicators: for defining and measuring change in natural capital. Natural *England Research Report NERR076*. Natural England.

Natural Capital Committee (2017) *How to do it: a natural capital workbook*.

Natural England (2019) *Natural Capital Indicators: Annex 3 Short and long list indicators for key ecosystem services*. Natural England Evidence Information Note EIN049.

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Office for National Statistics (2017) *Natural Capital accounting principles*.

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UK National Ecosystem Assessment (2014) *The UK National Ecosystem Assessment: Synthesis of the Key Findings.* UNEP-WCMC, LWEC: UK.

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[4] https://cices.eu/cices-structure/

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