

# Ecosystem Assessment Guidance

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It is intended that this support document should be used at the earliest possible stage of the policy decision making process set out on the [NEAT tree](#). It is also designed so that it is relevant across all the stages and iterations:

**Ideas ---- Survey ----- Assess ----- Plan ----- Act ----- Evaluate**

*Users of this document may also wish to refer to the ‘Shared, plural and cultural values of ecosystems handbook’, which is available at <http://www.lwec.org.uk/sharedvalues>*

## What is an Ecosystem Assessment?

An Ecosystem Assessment (EA) is a tool that provides information about the state, trend and value of ecosystems and ecosystem services at a specific spatial scale (e.g. at the local authority or county level) and how such services benefit human wellbeing. Ecosystem services are *“the benefits people obtain from ecosystems”* (Millennium Ecosystem Assessment 2005). This guidance aims to help practitioners and decision-makers to understand how an Ecosystem Assessment can support them; but also specialists on how to undertake an Ecosystem Assessment in the UK.

An Ecosystem Assessment underpins good policy and decision making. It provides an up-to-date understanding of the world about us and how it contributes to our wellbeing. This helps us to develop tools and techniques to monitor and manage our environment as efficiently and effectively as possible. It also helps us to understand how the environment is changing and to identify what the future pressures may be. The HM Government 2011 White Paper *The Natural Choice* highlights that *“Nature is sometimes taken for granted and undervalued”* and that *“This is why we must properly value the economic and social benefits of a healthy natural environment...”* (HM Government 2011).

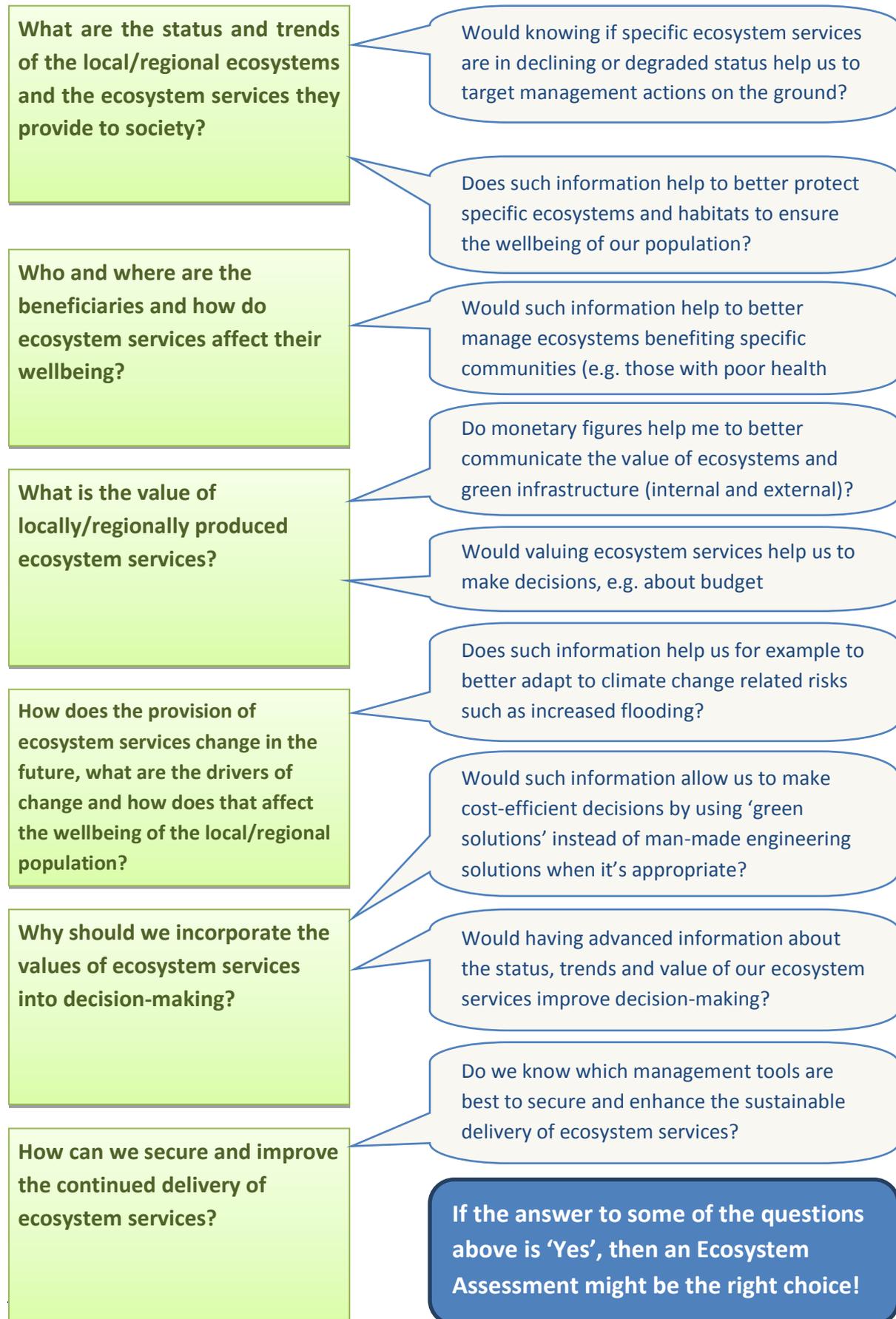
The probably best known example for an Ecosystem Assessment is the Millennium Ecosystem Assessment (2005), addressing broad habitat types at the global scale. The UK National Ecosystem Assessment (UK NEA 2011) is another significant study which remains at present the only example of a national-scale Ecosystem Assessment. Acknowledging that Ecosystem Assessments are already available at the global and national scale, this guidance focuses on undertaking an Ecosystem Assessments at the local, (sub)regional, or city scale, where it’s often most useful to support decision-making ‘on the ground’.

## Why should I use the tool?

Undertaking an Ecosystem Assessment can for example be useful to answer the questions as outlined in Figure 1 below. It evaluates for example the space for recreation greenspaces at a city scale, or the flood risk regulation services of wetlands. The information an Ecosystem Assessment

provides can for example inform a Green Infrastructure Strategy, planning guidance as well as Local Nature Partnerships (LNPs) and Local Enterprise Partnerships (LEPs).

Figure 1: Main questions an Ecosystem Assessment can answer and how this can improve decision-making



An Ecosystem Assessment provides information at the more strategic level. The main aim of the tool is to **make the value of ecosystem services visible and tangible for decision-makers**. Local/regional practitioners and decision-makers often demand evidence about state, value and trends of ecosystem services to be able to reveal and judge trade-offs and to make well-founded decisions when ecosystems are affected or when they can be used to improve the wellbeing of the local population.

An Ecosystem Assessment can provide the information that is most relevant to inform decision-makers at the relevant scale. It can also ensure that the findings are presented in a format and terminology that can easily be taken up by the target audience. Otherwise, ecosystem services may remain taken for granted and undervalued, which often leads to poor decisions and declining ecosystem services. This, in turn, can significantly impact on the wellbeing of inhabitants of a city, local authority or county; especially in the long term.

Carrying out an EA can provide the demanded information in a 'fit-for-purpose' format. An EA also draws the awareness of the relevant decision-makers to the distinctive features, vulnerabilities and dependencies of the geographical area for which they have responsibility. It should be acknowledged that raising awareness about the value of ecosystem services and potential changes is a first step towards integrating these diverse values into everyday decision-making.

Ecosystem services are relevant to all policies, not merely for those considered as 'environmental'. Therefore City Councils, Local Authorities, County Councils, Nature Improvement Area (NIA) Partnerships, Local Nature Partnerships (LNPs), Local Enterprise Partnerships (LEPs), but also other local and (sub)regional authorities and organisations such as the National Health Service (NHS) may benefit from carrying out an EA as part of their strategic work. Undertaking an EA can also be useful for businesses, for example those with large land-holdings or those depending on ecosystem services provided by a specific geographical area (see also [Corporate Ecosystem Valuation](#)).

## How does one work with the tool in practical steps?

The publication [Ecosystems and Human Well-being: A Manual for Assessment Practitioners](#) offers a framework for carrying out an Ecosystem Assessment (Ash et al. 2010). The guidance to hand is based on that framework, but expands upon it by explicitly acknowledging the circumstances of local/regional Ecosystem Assessments carried out in the UK.



Figure 2: The four stages of an Ecosystem Assessment

The single steps and elements of an Ecosystem Assessment are outlined in more detail below. Please note that this is an idealised framework which may be adjusted, acknowledging the specific scope and aims of your Ecosystem Assessment.

## 1. Exploratory stage

The first step towards carrying out an Ecosystem Assessment is to decide if such an assessment would be beneficial to inform decision-making (directly or indirectly, e.g. by educating and knowledge exchange). One question to consider is if higher- (or lower-) level Ecosystem Assessments already provide the information demanded by the target audience. The questions raised in Figure 1 above may help you to decide if it's worth undertaking an Ecosystem Assessment.

Scope and boundaries of the assessment should also be defined at the initial exploration stage. Emphasis should be given to the main target audiences when defining the geographical boundaries. If the target audiences are for example local decision-makers, then the local authority or city boundary may be used to define the spatial scope of the assessment. However, different target audiences may have different geographical areas of responsibility. Therefore the target audiences should be involved when defining the geographical scope.

The Ecosystem Assessment may also need to address cross-boundary issues. This includes ecosystem services 'produced' in the study area from which others outside the study area benefit, and *vice versa*. This may for example be the case where a population downstream (outside the study area) benefits from flood regulating services upstream (within the study area). Another example is when the ecosystem service 'food production' is assessed for a city. Most of the food is commonly produced on the countryside and then imported. It is important to clearly define the geographical scope and how cross-boundary issues are to be assessed.

## 2. Design stage

Once the need for an EA and its geographical boundaries has been determined, one has to work out the governance, content and implementation of the EA. It is essential for the success of an EA that stakeholders are involved throughout the whole process, ideally incorporated within the development of a steering group. According to (Ash et al. 2010, p.12) the steering group has the following functions:

- Promote coordination among the institutions and individuals carrying out the assessment;
- Develop the detailed assessment design (what information will be produced by which individuals and institutions);
- Increase the legitimacy of the assessment, and guard against bias from particular interest groups;
- Assure quality of assessment outputs;
- Design the outreach and communication activities; and
- Help to raise funds for the assessment.

We recommend to involve representatives of the main audience(s) to ensure that outcomes match the actual information demands. Involving stakeholders providing local information and data is also recommended. It can also be beneficial to involve universities or an experienced researcher as 'critical friend' to ensure the quality of the assessment.

One of the first tasks of the steering group is to agree on a conceptual framework for the Ecosystem Assessment. This determines which elements will be carried out within scope of the EA, acknowledging budget restrictions. An EA may include the following elements:

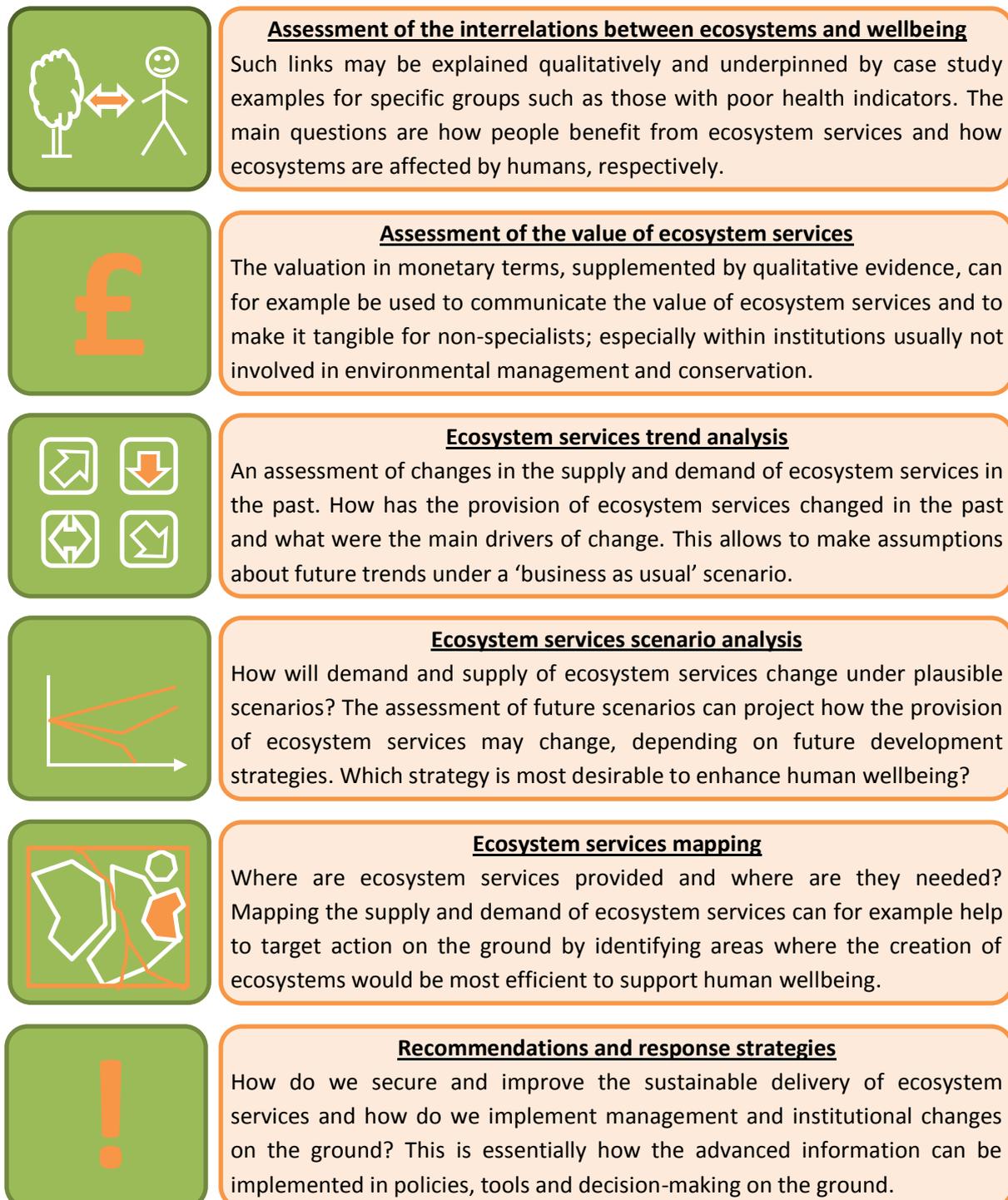


Figure 3: Potential elements of an Ecosystem Assessment

The list above is not exhaustive. The selection of elements carried out within scope of an EA should best match the actual information demands of the target-audience. However, the elements included in an Ecosystem Assessment also strongly depend on the intended timescale of the project, the available funding as well as the available expertise.

The [Ecosystem Services Evaluation for Birmingham's Green Infrastructure](#) (Hölzinger et al. 2013) may give you a first impression of how a local EA in the UK can look like. The main aim of the Ecosystem Assessment for Birmingham was to provide local decision-makers, practitioners, but also other relevant stakeholders, with the magnitude of the value of ecosystem services provided by the green infrastructure in Birmingham.

For this purpose, the economic value of as many ecosystem services provided by as many broad habitat types as possible has been investigated. Such values have been supplemented by qualitative evidence about the links between human wellbeing and ecosystems as well as policy advice. The assessment followed these subsequent steps:

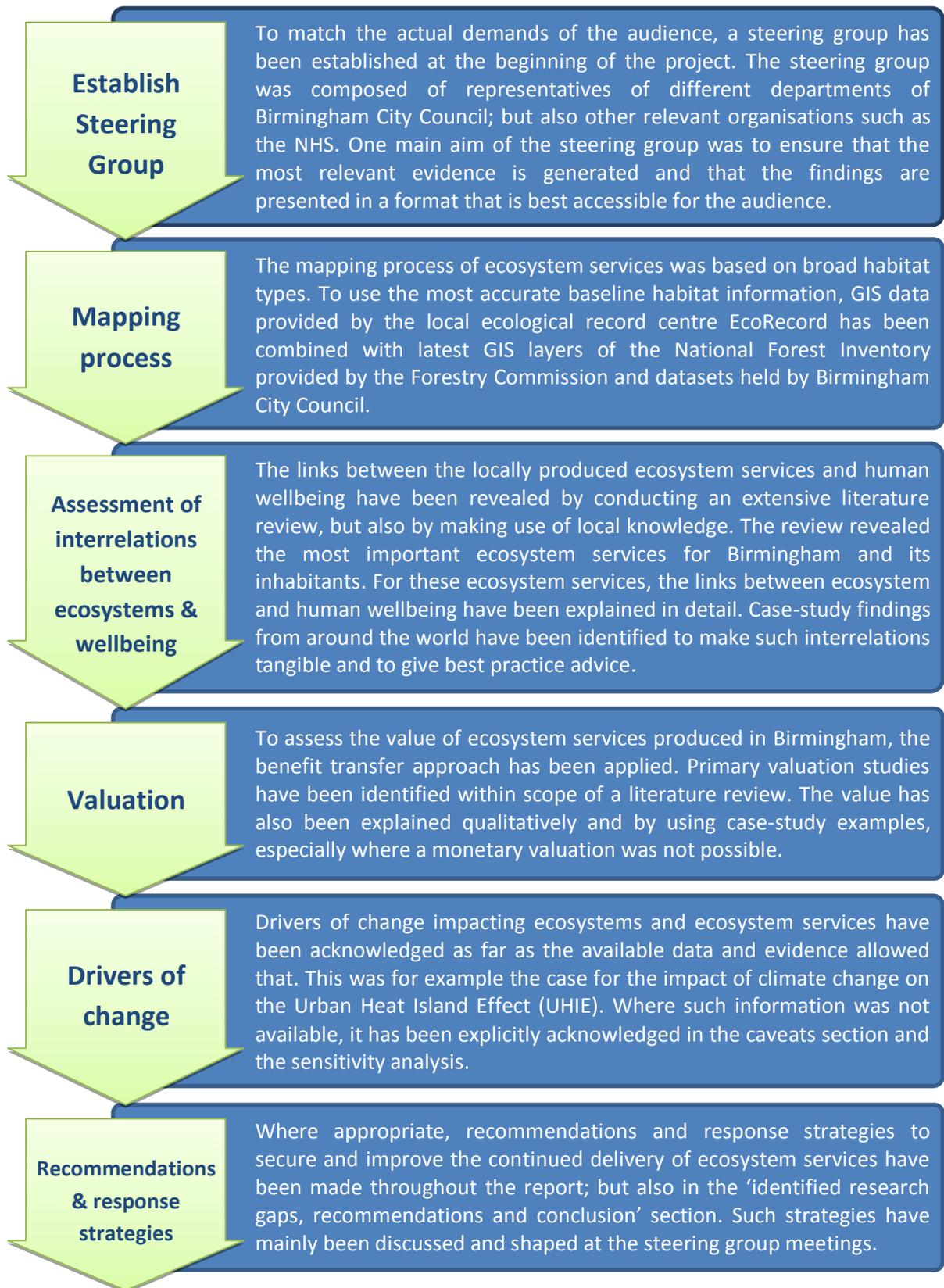


Figure 4: Steps and elements of the Ecosystem Assessment for Birmingham

Please note that this is just an example for a local/regional EA and that scope, elements and methods are flexible and depend on the specific information-demands of the target audience of your EA.

### 3. Implementing work program

After design and framework have been defined the technical work can begin. Within scope of this review it is not possible to provide detailed guidance about carrying out each element of an EA. As a starting point it would be beneficial to review how the different elements have been applied within scope of other Ecosystem Assessments such as the [Millennium Ecosystem Assessment](#) or the [National Ecosystem Assessment \(UK NEA\)](#). The [Ecosystem Services Evaluation for Birmingham's Green Infrastructure](#) is an example for an Ecosystem Assessment at the city scale in the UK. The [Manual for Assessment Practitioners](#) (Ash et al. 2010) also provides more detailed information about the single elements.

This guidance can only provide more general advice when carrying out an EA in the UK. Because carrying out an EA can be very challenging and may require a wide range of expertise, it is strongly recommended to seek professional advice or to commission a specialised consultancy or university with the work. A peer-review process may also be carried out for an EA to ensure the quality of the assessment.

To take uncertainties applying for the different elements of the EA into account it is recommended to apply a sensitivity analysis. This is important to acknowledge for example data gaps, scientific uncertainties and the general uncertainty about the future.

Economic valuation may not always be essential. For some elements and purposes of the Ecosystem Assessment it may be prohibitively time-consuming and expensive. However, it is important in all cases to assess impacts across the whole of the system of services, and not make potentially erroneous prejudgements about which services are the 'most important'.

We recommend that whenever monetary valuation of ecosystem services is applied, such values should be calculated as annual values as well as capitalised values over a time period of 200 years. For monetary valuation it is common to apply a discount rate for future costs and benefits because environmental impacts often affect a long time horizon including future generations.

HM Treasury recommends applying a discount rate of 3.5% for periods of up to 30 years. Afterwards the discount rate declines stepwise to 2.5% (HM Treasury 2003). This *standard discount rate* in the UK reduces benefits and costs fifty years into the future to less than two per cent of the undiscounted value. As will be becoming obvious, the results of monetary valuation are very sensitive to the discount rate, which is concerning because it is the hardest input to justify objectively (Weitzman 2001). There, we recommend developing values based on both, the *standard discount rate* recommended by HM Treasury and a *sustainability discount rate* of zero for a timeframe of 200 years. This should alert you to any significant sustainable development issues. A technical justification for the *sustainability discount rate* is contained in the appendix, because our recommendation differs from central government guidance.

It might be useful implementing the sensitivity to the discount rate within the sensitivity analysis of an EA. In that case, the discount rate recommended by HM Treasury (3.5%-2.5%) might be applied for the lower threshold of the sensitivity analysis whilst the discount rate of zero might be applied for the upper threshold. As a compromise, a discount rate of 1.5% might be applied for the 'best guess' estimate of the sensitivity analysis (This rate is also recommended by the German Federal Environment Agency 2008). In any case it is very important to explicitly state which discount rates have been applied when undertaking an EA.

#### **4. Developing outputs and communicating findings**

The success of an Ecosystem Assessment does not only depend on the quality of the work, but also on the presentation and communication of the findings. Each EA should be written up as a technical report (or a series of technical reports). The technical report should match high scientific standards and contain the whole process of the EA; not just the methods and findings. It is essential that all methods, caveats, uncertainties and limitations of the assessment are communicated transparently.

We also recommend to include a more general introduction to the ecosystem services framework and ecosystem valuation. This should also include an assessment of relevant policies at the international and national level and which implications that has for environmental decision-making at the regional or local scale. This element should be mandatory for all Ecosystem Assessments to 'set the scene' for the target audience and to stress why it is important to incorporate the (economic) values of ecosystem services into decision making.

Because the findings of an Ecosystem Assessment are most relevant to practitioners and decision-makers, an executive summary should be produced to make the findings better accessible, considering the time-constraints of the target audience. Here it is important to acknowledge that the target audience may not be familiar with the ecosystem services terminology and that different target audiences use different terminologies. Therefore the executive summary should match the 'language demands' and knowledge level of the target audience. It could be beneficial to publish more than one executive summary specifically shaped for different target audiences to provide the most relevant information and to best match their information demands. One could for example prepare an executive summary for planners as well as one for the Local Enterprise Partnership (LEP). Other communication strategies such as conferences or workshops should also be considered.

It might be very beneficial to keep the steering group operating after the formal Ecosystem Assessment has been completed. This can help to implement the recommendations and response strategies into institutions and decision-making. The steering group members can act as 'champion' or 'multiplier' within their own organisations to promote the EA and to enforce the implementation of the recommendations and response strategies developed within scope of the Ecosystem Assessment.

It should be stressed again that carrying out an EA requires specific expertise. The Millennium Ecosystem Assessment as well as the UK National Ecosystem Assessment have for example been carried out by a consortium of numerous academic institutions and involved many researchers from several disciplines. Considering budget restrictions, it is clear that this may not be possible for EAs at

the (sub)regional, local, or city scale. However, it is important that an EA is carried out by experienced experts.

## Useful links

[Ecosystem Assessments in Europe](#) is an information platform of BISE, to facilitate the planning and development of ecosystem assessments in Europe.

[Ecosystems and Human Well-being: A Manual for Assessment Practitioners](#)

[Ecosystem Services Evaluation for Birmingham's Green Infrastructure](#)

[National Ecosystem Assessment \(UK NEA\)](#)

[Millennium Ecosystem Assessment](#)

[Shared, plural and cultural values of ecosystems – A handbook for decision-makers](#)

[TEEB – The Economics of Ecosystems and Biodiversity](#)

[The Natural Choice: securing the value of nature](#)

## Technical appendix: Justification for a *sustainable development discount rate of zero*

Discount rates and time horizons for their implementation are necessarily political. They relate to how much we care about the future and those who will inhabit it. Given that the trajectory of market evolution has generally almost wholly externalised the natural environment, and particularly its finite carrying capacity and the potential for ‘tipping points’ beyond which system stability and the production of ecosystem services might change radically and potentially irreversibly, it is necessary to pay particular attention to discount rates when undertaking an Ecosystem Assessment.

There is provision within the Green Book for producing a sensitivity discount rate. That is to ask ‘how would these results look different with a different discount rate?’ The guidance calls for a sensitivity discount rate to be used in project which ‘involve very substantial and, for practical purposes, irreversible wealth transfers between generations’ (Lowe 2008). This seems unduly restrictive, as a wide variety of projects, when the cumulative impact is considered, may have significant impacts on future generations. Therefore a sensitivity discount rate should be applied for all projects to show the sensitivity of the conclusions to our assumptions about the future.

The official guidance recommends removing the pure time preference (impatience) element of the standard discount rate, which lowers it to 3 per cent (Lowe 2008). This approach however retains two assumptions which we might wish to question. It assumes that the long-term growth rate of the economy over 30 years will be 2 per cent per year. It also assumes that all forms of capital are substitutable with each other – that is to say that increased material consumption will compensate for reduced environmental quality or health. These assumptions seem insecure enough to test the

sensitivity of our recommendations to them. Therefore a sensitivity analysis should be conducted which uses a sensitivity discount rate of zero. Using a rate of zero creates a problem in that costs and benefits therefore stretch forever into the future, and so an arbitrary time horizon will need to be selected, and we recommend 200 years. For results calculated under this sensitivity discount rate it is the orders of magnitude of the values that are significant. Clearly, there may also be costs and benefits which are significant and unquantifiable, and these should be clearly reported.

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