EKLIPSE
Knowledge & Learning Mechanism on Biodiversity & Ecosystem Services

Developing a mechanism for supporting better decisions on our environment based on the best available knowledge.

EKLIPSE Document of Work:

Restoration effectiveness request (BiodivERsA)

CONTENT

General Information
Background and context of the Call
Refined request question
Suggested Programme of Work and Methods
Logbook

Annex 1: Call for Knowledge
Annex 2: Results of the Call for Knowledge
Annex 3: Policy context of the request
Annex 4: Call for Experts

GENERAL INFORMATION

Topic of the request (see original request below):
Is missing knowledge hampering the effectiveness of approaches that aim to restore biodiversity and ecosystem function and services?
This request was initially put to EKLIPSE following our second call for requests (CfR.2/2017) by BiodivERsA, a network of national and regional funding organisations promoting pan-European research on biodiversity and ecosystem services, and offering innovative opportunities for the conservation and sustainable management of biodiversity.
In order to refine the request, the following scoping activities have been carried out:

a. Call for Knowledge in order to identify already existing work on the request and
b. Evaluation of the policy and stakeholder relevance via bilateral telephone interviews and email requests to ensure the policy relevance of the request detailed below and to refine the request.

This document of work describes the results of the scoping activities as well as the background of the request and is the basis for the call for experts.
Requesters: Xavier Leroux and Frédéric Lemaitre – BiodivERsA
Date request received: 02/10/2017
Date of first meeting with requesters, EKLIPSE KCB and methods experts: 15/12/2017
Expected deadline for deliverables: final deliverables are due Mid 2019.

This Document of Work (DoW) explores the existing knowledge in this area, who the main knowledge holders are, how the request relates to existing policy processes at the EU level, and identifies the most suitable programme of work and methodology for answering this request.

BACKGROUND AND CONTEXT OF THE CALL

A number of restoration targets and cross-sectoral actions aim to restore degraded ecosystems as their services, both as a natural heritage to safeguard and as a natural asset vital to enhanced ecosystem integrity and sustainable delivery of a range of ecosystem services in Europe. However, many of these efforts are not achieving their aims.

The aim of this request is to understand the reasons why current approaches to restoration are not as effective as they could be. These reasons are expected to be broader than lack of, or poor access to relevant knowledge - see for example a recent publication that identified research priorities for landscape restoration[1]. Such understanding can support stakeholders from a wide range of different fields, such as restoration practitioners and specialists in ecological engineering, circular economy, water-smart solutions, species and landscape management, climate resilience/mitigation, food security and restoration technologies, to better contribute to the EU's industries and economic sectors that are dependent on these natural assets (e.g. water- and fibre-related/dependent industries), as well as improve human well-being.

Current policy context
Target 2 of the EU Biodiversity Strategy to 2020 states that "*By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems*". A number of actions have already taken place to address Target 2[2] (see Annex 4). A report on priorities for the restoration of ecosystems and their services[3] provides useful clarification over the key terms used in the EU Biodiversity Strategy to 2020 and in particular Target 2 and Action 6a, specifically the definition on restoration used for the purposes of this request (other definitions can be found in Annex 4):

> Restoration objectives should be tailored to the ecosystem type, the services it provides, the recent history of the site and the location. For each ecosystem type, several states or ecological conditions can be described along a continuum from poor to excellent. Any significant improvement of ecosystem condition that moves an area of land/sea to a better state/condition should be regarded as a contribution to the 15% restoration target. An ecosystem can be assigned to one of 4 levels of condition and progress in a positive direction from one level to the next is recognized as restoration.

Policy relevance and timeliness of the request
Following discussions with DG ENV representatives working on Target 2, the request is of high policy relevance. Target 2 of the Biodiversity Strategy is the only policy document that contains a direct and

[1] Ockendon et al (2018). One hundred priority questions for landscape restoration in Europe. Biological Conservation 221: 198-208
[2] http://ec.europa.eu/environment/nature/biodiversity/strategy/target2/index_en.htm
[3] Lammerant, Johan; Peters, Richard; Snethlage, Mark; Delbaere, Ben; Dickie, Ian; Whiteley, Guy. (2013) Implementation of 2020 EU Biodiversity Strategy: Priorities for the restoration of ecosystems and their services in the EU. Report to the European Commission. ARCADIS (in cooperation with ECNC and Eftec)

quantitative target for restoration. However, many other EU level policies relate to restoration aims in indirect ways:

- There is a very strong linkage between the 15% restoration objective included in Target 2 of the EU Biodiversity Strategy and the achievement of Target 1 namely the full implementation of the Birds and Habitats Directives and associated Natura 2000 network.
- Restoration actions will impact on existing legal obligations under the Water Framework Directive, the EU Bathing Water Directive, and the Marine Strategy Framework Directive, such as achieving good ecological status in lakes and rivers or good environmental status in marine waters;
- Restoration of degraded ecosystems will contribute significantly to the deployment of Green Infrastructure (Action 6b of the biodiversity strategy);
- Restoration of disused and derelict land in urban and peri-urban areas will ease the pressure for access to new land for development and reduce soil sealing and urban sprawl;
- Restoration actions can also deliver jobs and growth and a variety of economic and social benefits. Restoration actions have been and continue to be supported through EU funding mechanisms such as ERDF, EAFRD and Horizon 2020.
- Restoration can increase greenhouse gas uptake and the resilience of natural ecosystems and human settlements to the impacts of climate change and is an integral part of EU policy on climate change adaptation.
- The greening measures introduced into the revised Common Agricultural Policy (CAP) could provide some opportunities for restoring the state of agri-ecosystems and optimizing the ecosystem services and resilience delivered by these ecosystems.

The mid-term review of the Biodiversity Strategy in 2015 highlighted that for Target 2[4], "Progress has been made on policy and knowledge improvement actions under this target, and some restoration activities have taken place in Member States. However, this has not yet halted the trend of degradation of ecosystems and services. National and regional frameworks to promote restoration and green infrastructure need to be developed and implemented".

According to the European Commission representatives, identifying the constraints or barriers to the current approaches to restoration in the EU is important, but should be understood as being broader than scientific knowledge gaps.

The outputs of the request process would be most timely before the final review of the Biodiversity Strategy (end 2019) and would be used by DG ENV to feed into the following policy processes:

- The Mapping and Assessment of Ecosystems and their Services (MAES)
- Green Infrastructure Working Group.

A suggestion from the DG ENV representatives was to avoid high level answers to the current request, resulting in generic recommendations. One suggestion to avoid this was to explore general constraints and barriers across main ecosystem types, but then focus on a few case studies around ecosystem services that span different ecosystem types, for example pollination (with links to the Pollinator Initiative), bearing in mind the issue that that efforts to enhance one service can sometimes do so at the expense of others.

[4] https://biodiversity.europa.eu/mtr/biodiversity-strategy-plan/target-2-review

Call for Knowledge

A Call for Knowledge related to this request was carried out in January and was open until 23rd February 2018. The Call for Knowledge was hosted on the KNOCK Forum and resulted in seven contributions from experts from Spain, Sweden, Czech Republic, UK and France, as well as the identification of relevant publications. For details, see Annex 2.

REFINED RESEARCH QUESTION

What are the main knowledge gaps hampering effectiveness and possible integration of existing approaches (including different governance systems and approaches) to restore ecosystem biodiversity, function and services?

The final formulation of the request after scoping:

What do we need to know to improve the effectiveness of restoration of ecosystems for biodiversity?

There are a few remaining issues with the above suggestion, namely: Who is we? What is meant be "need to know"? Does the above point to more theoretical aspects around restoration? A further suggestion might therefore be:

"**What is hampering the effectiveness of existing approaches that aim to restore biodiversity and ecosystem function and services**" (used in the Call for Knowledge). This would allow for knowledge gaps as well as other factors to be integrated.

SUGGESTED PROGRAMME OF WORK AND METHODS

This request is broader than the identification of research questions, nor is it restricted to a type of restoration[5] or ecosystem. This request focuses on constraints or barriers to effective restoration including the identification of knowledge gaps restricting restoration approaches/actions, appropriate methodologies, optimal management and effectiveness of interventions. This topic would therefore require input from the social sciences as well as ecological research needs, pointing to the fact that some of the gaps will relate to research, while others will point to impediments to the use of existing knowledge, including lack of awareness of that knowledge.

The scope of the request (and a possible typology) can therefore be summarized as addressing:

- Gaps in knowledge
- The communication of (existing) knowledge
- Linkages between researchers and relevant stakeholders, i.e. practitioners
- Capacity building (of both researchers and relevant stakeholders), including availability of appropriate tools or making use of existing knowledge.

[5] See Ockendon et al (2018). One hundred priority questions for landscape restoration in Europe. Biological Conservation 221: 198-208.

The request does not focus on priority ecosystems, however. We acknowledge that there are specific ecosystems (e.g. marine) for which there are more knowledge gaps (e.g. ecological) than others (e.g. grasslands). However, as mentioned, from a policy perspective it may be useful to use a general approach to all MAES ecosystem types followed by some case studies focusing on knowledge gaps specific to ecosystem services (e.g. pollination) or ecosystem types. The request is also relevant to restoration across Europe, including the EU's Overseas Countries and Territories, not to a specific geographic scope.

The programme of work could follow a two-pronged approach (synergistic and in parallel):

1) Identification of barriers to implementation, including the typology identified above, namely literature/research-derived knowledge gaps identified by academics, as well as the identification from scientists and people trying to implement restoration (i.e. practitioners) of other factors (e.g. governance; economics; politics, planning issues) that are hampering restoration efforts, including communication of (existing) knowledge, linkages between researchers and relevant stakeholders, i.e. practitioners, and capacity building. A synthesis of this step would differentiate between knowledge needs/gaps (here we could link to the 100-question paper and how we will build on its outputs) or implementation gaps, i.e. other constraints/barriers;
2) Assessment of available knowledge and where this needs to be improved.

The first aspect could be addressed using either a **multiple expert consultation with formal consensus method such as Delphi**; or one or more **focus group(s)**. Some key considerations were discussed with the requester regarding the pros and cons of these methods, which could be further discussed by the future Expert Working Group (EWG) in the development of their protocol. The focus group (or multiple focus groups if representativeness is a key issue to consider) could include both practitioners and researchers, and those on a continuum between these groups. Diverse focus groups offer the advantage of facilitating inter-domain information exchange. On the other hand, separating the groups (e.g. focus group with practitioners and expert elicitation/horizon scanning with scientists) may reduce the likelihood of some groups or individuals dominating the discussion. To alleviate the second risk, the Delphi approach could be very useful in terms of reducing the social dynamics, yet reaching potentially more reliable outputs. The Delphi method also allows for remote participation, and is thus likely to be less logistically challenging to apply to the desired Europe-wide range of experts/practitioners. A key issue will be for the members of the Expert Working Group to set up, analysis and distill the outputs of the Delphi process in a way that captures both the knowledge gaps identified by practitioners and scientists, and other barriers or constraints that may be hampering restoration efforts.

The second aspect could be addressed through a **scoping review**. This is a structured, step-wise methodology, following an a priori protocol (which will be expanded upon in the protocol developed by the Expert Working Group) to collate and describe existing research evidence (traditional academic and grey literature) in a broad topic area, following a systematic map methodology but with components of the process simplified or omitted to produce information in a short period of time.

While the expert/stakeholder consultation might suffice on its own, the timeline for this request allows for the use of two methods. This is anticipated to improve information coverage and can provide a further measure of confidence in key issues identified through both methods. Both a scoping review and expert elicitation can be designed to identify relevant available knowledge, knowledge gaps and barriers to implementation. It is anticipated that these aspects would be addressed simultaneously.

There is also scope to apply a conceptual modelling approach as an initial step to improve the framing of the problem. Through the use of a method such as joint fact-finding or scenario analysis, this step could clarify the precise questions of interest and expedite the identification or design of subsequent synthesis approaches. Some of these methods also allow the problem and approach to be presented visually, which can be particularly helpful for stakeholder communication.

Other methods that were considered appropriate to identifying effective measures and knowledge gaps include solution scanning and a Bayesian Belief Network. The solution scanning methodology is similar to the suggested expert elicitation with Delphi method, in that it allows for the collection of information from a range of experts, practitioners or stakeholders. However, it does not provide for group interaction and iterative consensus-building. The use of a Bayesian Belief Network requires additional specific technical expertise and does not allow for incorporating feedback between interacting factors.

For more information on each of these methods, please refer to the EKLIPSE report on knowledge synthesis methods[6].

LOGBOOK

The logbook describes the agenda of exchanges with the Requester, the Knowledge Coordination Body (KCB) and the Methods group and the contents discussed during the meetings.

Date	Participants	Topic	Platform
29th November 2017	Petr Petrik, Heidi Wittmer, Estelle Balian, Allan Watt, Juliette Young	1st scoping group meeting	Online (Gotomeeting)
15th December 2017	Xavier Le Roux, Frederic Lemaître, Petr Petrik (chair), Heidi Wittmer, Estelle Balian, Hilde Eggermont, Allan Watt.	Scaling and scoping the request, Discussion and dissemination of the call for knowledge	Online (Gotomeeting)
7th February 2018	Juliette Young (EKLIPSE Secretariat), Allan Watt (EKLIPSE Secretariat), Frédéric Lemaitre (BiodivERsA), Petr Petrik (Institute of Botany of the CAS), and Jorge Ventocilla (EKLIPSE Secretariat)	Assess input to the Call for Knowledge request on the KNOCK Forum and define: methods to be used and EU policy relevance	Online (Gotomeeting)

[6] Dicks LV, Haddaway N, Hernández-Morcillo M, Mattsson B, Randall N, Failler P,Ferretti J, Livoreil B, Saarikoski H, Santamaria L, Rodela R, Velizarova E,and Wittmer H. (2017). Knowledge synthesis for environmental decisions:an evaluation of existing methods, and guidance for their selection, use anddevelopment – a report from the EKLIPSE project

	Apologies: Hilde Eggermont (EKLIPSE) and Heidi Wittmer (EKLIPSE KCB).		
7th March 2018		Petr Petrik steps down as KCB Focal Point and is replaced by Juliette Young (interim)	Email
16th March 2018	Heidi Wittmer (EKLIPSE KCB), Val Kapos (UNEP-WCMC), Lynn Dicks (EKLIPSE Methods Group), Juliette Young (EKLIPSE Secretariat), Flore Jeanmart (EKLIPSE KCB), Allan Watt (EKLIPSE Secretariat), Frederic Lemaitre (BiodivERsA), Jorge Ventocilla (EKLIPSE Secretariat)	Method Selection, Update on organizational matters, Policy relevance of the request, share relevant bibliography.	Online (Gotomeeting)
11th April 2018	Laure Ledoux (DG ENV), Jakub Wejchert (DG ENV), Juliette Young (EKLIPSE), Jorge Ventocilla (EKLIPSE)	Establishing the EU policy relevance of the request	Phone
20th April 2018	Allan Watt (EKLIPSE KCB), Miriam Grace (EKLIPSE Methods Group), Juliette Young (EKLIPSE Secretariat), Frederic Lemaitre (BiodivERsA), Xavier Leroux (BiodivERsA)	Update on input from DG ENV, methods selection, and update on next steps: KCB agreement on Document of Work (mid May) and upcoming Call for Experts (end May).	Online (Gotomeeting)

Annex 1: Call for Knowledge

EKLIPSE is developing a European Mechanism to answer requests from policy makers and other societal actors on biodiversity related issues

More information on the processes and the EKLIPSE project funded by the EU in H2020 is available at *www.EKLIPSE-mechanism.eu*

CALL FOR KNOWLEDGE FOR INITIAL SCOPING – CfK 01/2018, EKLIPSE – JANUARY 2018 Responses most useful before: February 5th 2018

TOPIC: Is missing knowledge hampering the effectiveness of approaches that aim to restore biodiversity and ecosystem function and services?

1 Invitation to share knowledge for informed decision-making

This request was submitted by BiodivERsA.

Context: A number of restoration targets and cross-sectoral actions aim to restore degraded biodiversity and ecosystems, both as a natural heritage to safeguard and as a natural asset vital to enhanced ecosystem integrity and sustainable delivery of a range of ecosystem services in Europe. However, many of these efforts are not achieving their aims.

The aim of this request is to understand the reasons why current approaches to restoration are not as effective as they could be. Such understanding can support stakeholders from a wide range of different fields, such as ecological engineering, circular economy, water-smart solutions, species and landscape management, and restoration technologies, to better contribute to the EU's industries and economic sectors that are dependent on these natural assets (e.g. water- and fibre-related/dependent industries), as well as improve human well-being.

EKLIPSE is inviting scientists, policy makers, practitioners and other societal actors to share their knowledge on this specific selected request to explore available resources and evaluate if the request requires a structured knowledge gap analysis and consultation on research priorities.

To scope current knowledge on what is hampering the effectiveness of existing approaches that aim to restore biodiversity and ecosystem function and services, we invite you to answer the following questions:

A. Do you know of any projects, papers, reports, grey literature that have or are exploring the reasons why existing approaches that aim to restore biodiversity and ecosystem function and services are not as effective as they could be?
B. Could you share your experiences of on-the-ground actions aiming at restoration in the EU, including ORs and OCTs at various scales? These can be successful or unsuccessful processes – we can learn from both!
C. Do you have any suggestions on what knowledge is needed to increase the effectiveness of existing approaches that aim to restore biodiversity and ecosystem function and services or how existing knowledge could be better mobilized to this end? The final framing of the request is being developed through an interactive dialogue between the EKLIPSE scientists and the requester (BiodivERsA), and will be further discussed with stakeholders to ensure relevance for policy making regarding biodiversity and ecosystem services. We want to explore the amount of knowledge that exists in this area, who the main knowledge holders are and, if after scoping we decide to answer this request, we want to identify the most suitable methodology for answering it. *Please contribute your comments and knowledge/references in the online KNOCK forum.*

1 How to contribute to the Call for Knowledge

All knowledge collected through this call for knowledge will be collected and discussed on the KNOCK Forum. To upload documents and participate in the discussion, please register at our quick and easy 'Keep me Posted' page. Then, please click on the relevant thread to upload your information. Each thread already contains documents that are potentially relevant to the request. We invite you to add any information that you think is relevant for this request, and justify its inclusion (e.g. additional information from countries, scales or disciplinary perspectives not covered sufficiently etc...). Relevant information should be grouped under the following headings: **1) literature reviews, 2) empirical studies/practical experiences, 3) modelling studies and 4) conceptual papers** and can include:

- Links to open access papers.

- Links to published and unpublished grey literature or case studies.

- Description of on-going research projects, or knowledge compilations, expected to deliver results within the next year.

- Your on-the-ground experiences in this field.

2 Objective of the call and request to be addressed by this call

EKLIPSE coordinates innovative and transparent approaches for science, policy and societal actors to jointly provide the best available evidence leading to better informed decision-making and to identify current and future research priorities. A request on whether missing knowledge is hampering the effectiveness of approaches that aim to restore biodiversity and ecosystem function and services was proposed by BiodivERsA to the EKLIPSE Call for Requests (CfR.2/2017). The objective of this call for knowledge is to launch an initial scoping process on the request meant to identify available assessments, existing studies and other resources.

3 Background on EKLIPSE

EKLIPSE is an EU-funded project that started in February 2016. With support from the European Commission and a high level Strategic Advisory Board (SAB), the project aims to establish a robust and flexible long-term mechanism for policy support on biodiversity and ecosystem services, communicating and engaging a wide set of knowledge holders and ensuring tailor-made outreach of results to knowledge requesters and society more broadly.

The success of EKLIPSE and its resulting mechanism is in everyone's hands:

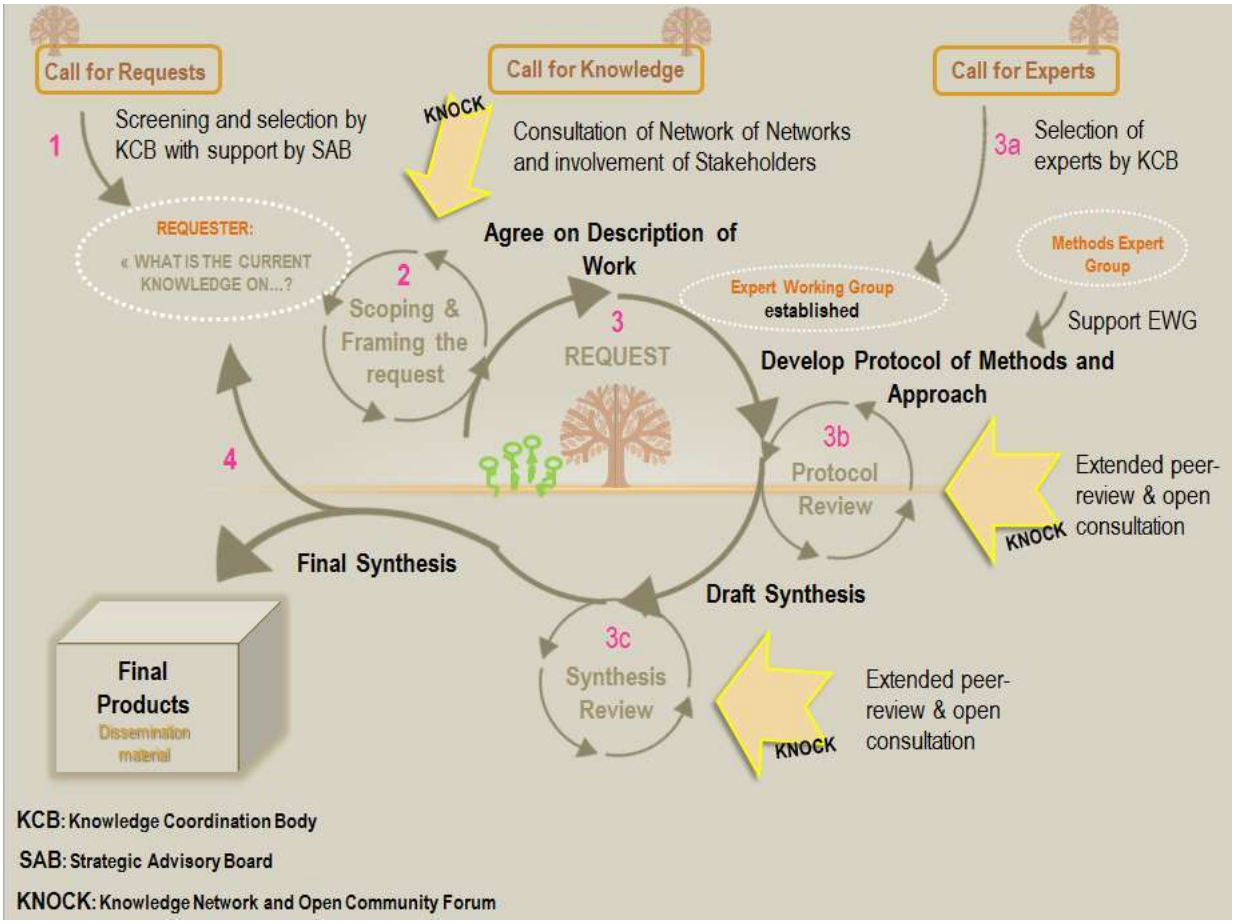
- The 'requesters' from policy and society who need to know what knowledge is out there to answer their policy or societal needs;

- The knowledge holders (be they scientists or other citizens) who want their knowledge to mean something; and
- The extensive networks working on biodiversity and ecosystem services who have the enthusiasm and knowledge to make the mechanism work in the long term.

4 The process: how EKLIPSE answers requests

The EKLIPSE process consists of several steps (see figure below): After the Call for request (step 1), the second step is the Call for Knowledge that supports further Scoping and Framing the request (step2). Based on the findings of the Call for Knowledge, EKLIPSE and the requester discuss how to proceed with the request (step 3). If already sufficient knowledge on the request is available or other reasons exist for not continuing with the request, the request will not be taken further, and the outcome is the collection of knowledge identified in second step. If EKLIPSE and the requester agree on continuing, the request will be framed and finalised jointly with relevant science, policy and societal actors. EKLIPSE then organizes a Call for Experts inviting experts to form an expert working group on the request (step 3a).

The selected expert group will, together with the Knowledge Coordination Body (KCB) and the requester, agree on the methodological approach to be taken for the knowledge synthesis. This will be compiled in a protocol, made publicly available and peer reviewed (step 3b). During the process of gathering, integrating and synthesizing the best available evidence, communication between all relevant actors will be key. Finally, the results of the co-generated evidence will be peer reviewed before being communicated in targeted ways to the requester (e.g., as a report or brief or other output to be discussed with the requester), as well as relevant decision-makers, the knowledge community and the general public (steps 3 c and step 4).



5 Next steps: How EKLIPSE will continue with this request

If EKLIPSE decides to carry out a new knowledge synthesis based on the responses to this call for knowledge, it will invite experts on the topic to express their interest in joining the Expert Working Group. The expert working group will cover diverse and complementary skills (including multidisciplinary skills and a broad geographical coverage) and will interact with relevant stakeholders to ensure appropriate methodological choices and uptake of outputs.

The Call for Experts will be widely publicized on the EKLIPSE website, on the Forum and other dissemination channels to ensure a broad coverage of disciplines and geography. The selected group will be supported financially by the EKLIPSE project for travel expenses and in certain cases through honorary contracts.

Annex 2: Results of the Call for Knowledge

Comments from the Forum

Institutional mechanisms established within management settings do not effectively promote the compilation and application of scientific knowledge for conservation practice. (M.D. Lopez-Rodriguez, University of Almeria (Spain)).

Existing **restoration aims at site-level are unclear** (given that aims actually exists) **and not quantitatively measurable**. This makes evaluation from a scientific point of view difficult and from a stakeholder perspective subjective (Emelie Waldén, Sweden)

Two challenges: The first one lead in **perception of public and most relevant regulation** which is based on concept of recultivation of disturbed land as and approach returning those to productive agriculture and forestry. Although those do not represent knowledge gap per se it create large complexity of existing legal regulations, which make in many cases difficult to apply or restore natural processes. **Lack of mechanistic understanding about ecosystem functioning in oligothrophic systems** how these mechanisms work and how they are affected by technical measures and how this is modified by environmental factors such as soil or climatic properties. (Jan Frouz, Charles University (Czech Republic))

We should **specify the stakeholders important for success** of restoration projects. (Petr Petrik, Institute of Botany - The Czech Academy of Sciences (Czech Republic))

We **don't have accurate figures of past and current restoration efforts in Europe**. This would really help people planning a new project to see if it can connect with on-going or achieved ones, learn from them or from projects with similar reference ecosystems or degradation, etc. **This ideal tool would be an online database linked to a map**. The database would include basic information on each project as well as of restoration success. (Elise Buisson, University of Avignon / IMBE (France))

To provide both technical and 'non-technical' people involved with **a practical understanding of the general concepts of ecosystem functioning and how this specifically applies to their local situation and restoration objectives**. Otherwise the biophysical causes of degradation are poorly understood and the design of restoration options is inadequate. (Philip BUBB, UNEP-WCMC (UK))

Publications referred to in the Call for Knowledge:
Exploring Institutional Mechanisms for Scientific Input into the Management Cycle of the National Protected Area Network of Peru: Gaps and Opportunities

(1) the institutional mechanisms did not effectively promote the compilation and application of scientific knowledge for conservation practice; (2) six important barriers hindered scientific input in management decisions; and (3) stakeholders showed positive perceptions about the involvement of scientists in protected areas and expressed their willingness to collaborate in conservation practice. This collaborative research helped to (1) identify gaps and opportunities that should be addressed for increasing the effectiveness of the institutional mechanisms and (2) support institutional changes integrating science-based strategies for strengthening scientific input in decision-making. These insights

provide a useful contextual orientation for scholars and decision makers interested in conducting empirical research to connect scientific inputs with operational aspects of the management cycle in other institutional settings.

Long Term Positive Effect of Grassland Restoration on Plant Diversity - Success or Not?

Restoration of semi-natural grasslands can contribute to conservation of semi-natural habitats and their associated biodiversity. Yet, due to the vague restoration goals for these sites, it is difficult to evaluate the restoration success, which emphasize the general need for clear and measurable goals.

Are we restoring enough? Simulating impacts of restoration efforts on the suitability of forest landscapes for a locally critically endangered umbrella species

Based on the goals of the protection plan for the species, which reflect its habitat requirements, we evaluated which of several restoration scenarios could fulfill goals with respect to (1) the amount of deciduous forest; (2) the amount of dead wood; and (3) the age of the forest. We found that whereas it may be relatively easy and quick to acquire high levels of dead wood, increasing the proportions of deciduous forest and of old forests require considerably more time and effort. Also, current management actions would not be sufficient to create the required amount of habitat to conserve the White-backed Woodpecker in our study region. Simulations like ours can provide valuable information about the levels of restoration needed through time to fulfill project goals and may prevent wasting valuable resources, time, effort, and money.

Near-natural restoration vs. technical reclamation of mining sites in the Czech Republic

Policy Language in Restoration Ecology

Restoration ecologists are failing to include themselves in policy formation and implementation of issues such as climate change within journals focused on restoration ecology. Using language in scientific publications that resonates with overarching policy questions may facilitate linkages between researcher investigations and decision-makers' concerns on all levels. Climate change is the most important environmental problem of our time and to provide policymakers with new relevant knowledge on this problem is of outmost importance.

Planning Management for Ecosystem Services (manual)

The manual aims to contribute to existing site and landscape natural resource planning and restoration, by developing a practical understanding of the environment as an ecosystem. The approach of the Manual is people-centred, to strengthen the supply of ecosystem services as benefits for people, as well as helping to make the ‘ecosystem approach’ practical. The Manual includes key knowledge and possible indicators of ecosystem functioning and how these relate to ecosystem services. And there is a step to consider ecosystem resilience to drivers of change, by examining potential impacts on ecosystem functioning.

ANNEX 3: POLICY CONTEXT OF THE REQUEST

Based on discussions with DG ENV (see logbook), a number of actions have already taken place to address Target 2[7], including:

- In October 2017 the European Commission launched preparations for developing an EU Pollinators Initiative[8] to address the decline of pollinators. Its adoption is foreseen in 2018, with a public consultation in progress.
- Two initiatives launched in 2017, in the framework of the Action plan for nature, people and the economy[9], contributed to Target 2:
    - Guidelines to support the deployment of strategic EU green infrastructure projects
    - Integrating ecosystems and their services into planning and policy decisions, including EU guidance to be published in 2018
- A coherent framework and methodology have been developed for the Mapping and Assessment of Ecosystems and their Services (MAES)[10]. The Commission, supported by a contractor, worked with Member States and stakeholders regarding the development of the strategic framework referred to in Action 6a[11] ("By 2014, Member States, with the assistance of the Commission, will develop a strategic framework to set priorities for ecosystem restoration at sub-national, national and EU level"). This included a model for ecosystem restoration, guidance regarding the steps to be taken for priority setting at national and sub-national level and information concerning support mechanisms and innovative financial mechanisms.
- A study was carried out by JRC in 2015 examining the costs of restoration measures in the EU based on LIFE projects[12].
- In 2013, the European Commission adopted an EU-wide strategy on Green infrastructure[13] promoting investments to ensure that natural areas remain connected together, to restore the health of ecosystems and allow species to thrive across their entire natural habitat so that nature keeps on delivering its many benefits to us.

The 2013 report on priorities for the restoration of ecosystems and their services[14] provides useful clarification over the key terms used in the EU Biodiversity Strategy to 2020 and in particular Target 2 and Action 6a. The definitions that are relevant to and that are used in this request are as follows:

Degradation and Restoration: Restoration objectives should be tailored to the ecosystem type, the services it provides, the recent history of the site and the location. For each ecosystem type, several states or ecological conditions can be described along a continuum from poor to excellent. Any significant improvement of ecosystem condition that moves an area of land/sea to a better state/condition should be regarded as a contribution to the 15% restoration target. Within the framework of the contract supporting the work on the restoration prioritization framework, a 4-level

[7] http://ec.europa.eu/environment/nature/biodiversity/strategy/target2/index_en.htm
[8] http://ec.europa.eu/environment/nature/conservation/species/pollinators/index_en.htm
[9] http://ec.europa.eu/environment/nature/legislation/fitness_check/action_plan/index_en.htm
[10] http://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/index_en.htm
[11] http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/RPF.pdf
[12] http://publications.jrc.ec.europa.eu/repository/bitstream/JRC97635/lb-na-27494-en-n.pdf
[13] http://ec.europa.eu/environment/nature/ecosystems/index_en.htm
[14] Lammerant, Johan; Peters, Richard; Snethlage, Mark; Delbaere, Ben; Dickie, Ian; Whiteley, Guy. (2013) Implementation of 2020 EU Biodiversity Strategy: Priorities for the restoration of ecosystems and their services in the EU. Report to the European Commission. ARCADIS (in cooperation with ECNC and Eftec)

model of ecosystem condition was elaborated. An ecosystem can be assigned to one of 4 levels of condition and progress in a positive direction from one level to the next is recognized as restoration. The 4 -level model can be applied to all ecosystem types.

The reference point (in comparison to which the restoration target should be evaluated): At EU level, the most suitable reference point and the foundation upon which the EU biodiversity Strategy was developed, is the EU 2010 Biodiversity Baseline as improved and refined within the framework of the MAES process. In addition, if Member States have more detailed information concerning the condition of their ecosystems in 2010 this can also be used to improve and refine the 2010 baseline.

The scope of the 15% restoration target: In principle, the target applies to all of the EU territory. This means there are no locations that can be considered as "un-restorable": urban areas can be made greener and the ecological function of intensively farmed land can always be improved. This does not imply that all urban areas, or intensively farmed land, need to be restored; it is simply an acknowledgement that restoration can, in principle, be carried out in any location no matter how degraded.

Quantitative and Qualitative components of restoration: Restoration will have both quantitative (how much) and qualitative (intensity of change) components. In addition, actions which contribute to a reduction of the overall negative burden on an ecosystem (e.g. reducing the amount of atmospheric pollution and atmospheric deposition) should also be counted as contributions to the restoration target e.g. reducing the number of grid squares where critical loads are exceeded by 15%.

The 15% restoration target at the level of the Member States: Each Member State should restore at least 15% of the degraded ecosystems within its territory. If each Member State achieves this objective then collectively the EU will also achieve the 15% target. Such an approach leaves considerable flexibility to the Member States to decide their own priorities but in order to ensure an equitable approach the Commission considers that national actions for restoration should be part of a common framework and respect certain common principles.

In order to be in a position to assess the net gains and whether the target has been achieved, as part of the final evaluation of the EU 2020 Biodiversity Strategy, it will be necessary to monitor and record restoration actions as well as further degradation of ecosystems.

Annex 4: Draft Call for Experts

CALL FOR EXPERTS No.5/2018 EKLIPSE – May 2018

What is hampering the effectiveness of existing approaches that aim to restore biodiversity and ecosystem function and services?

Deadline for Call: 30th of June, 2018

EKLIPSE is inviting experts to join an expert working group to understand what is hampering the effectiveness of existing approaches that aim to restore biodiversity and ecosystem function and services – this is a direct policy request from BiodivERsA

- Are you an expert in restoration?
- Would you like to contribute directly to a policy-relevant process in your field of expertise?
- Would you like to expand your network and learn about methods of knowledge synthesis?
- Are you interested in collaborating in a trans-disciplinary and multi-cultural setting?

Then please apply at www.eklipse-mechanism.eu

Important dates and information:

- Interested experts should apply before midnight on the **30th June, 2018** by following the rules and procedures detailed below.
- The Experts of the working group will be selected by **13th July, 2018** and should start its work immediately thereafter.
- We will aim to have a first expert group meeting on **week starting 23rd July, 2018.**
- The deadline for reporting is **30th June 2019**.

- Participation in this expert working group will require approximately 10% of your time – please find more information on expectations of and support to EKLIPSE Expert Working Groups **here**.

EKLIPSE is developing a European Mechanism to answer requests from policy makers and other societal actors on issues related to biodiversity and ecosystem services. EKLIPSE organizes and facilitates knowledge synthesis processes, horizon scanning and societal dialogue on topics that relate to or impact on biodiversity and ecosystem services by making the best knowledge available. It invites experts to contribute their knowledge.
More information on the processes and the EKLIPSE project funded by the EU in H2020 is available at
www.eklipse-mechanism.eu

1 Invitation to join an expert working group

EKLIPSE is inviting **experts to join an expert working group** to develop recommendations on how to improve the effectiveness of restoration efforts, including knowledge gaps and other barriers or constraints**.** Suggestions for improvements should take into account governance structures, feasibility, social implications, politics, planning issues and economics.

The expert working group will cover diverse and complementary skills (including multidisciplinary skills and a broad geographical coverage) and will interact with relevant stakeholders to ensure appropriate methodological choices and uptake of outputs.

2 Request to be addressed by this call

Background to this request

A number of restoration targets and cross-sectoral actions aim to restore degraded ecosystems as their services, both as a natural heritage to safeguard and as a natural asset vital to enhanced ecosystem integrity and sustainable delivery of a range of ecosystem services in Europe. However, many of these efforts are not achieving their aims.

The aim of this request is to understand the reasons why current approaches to restoration are not as effective as they could be. These reasons are expected to be broader than lack of, or poor access to relevant knowledge - see for example a recent publication that identified research priorities for landscape restoration[15]. Such understanding can support stakeholders from a wide range of different fields, such as restoration practitioners and specialists in ecological engineering, circular economy,

[15] Ockendon et al (2018). One hundred priority questions for landscape restoration in Europe. Biological Conservation 221: 198-208

water-smart solutions, species and landscape management, climate resilience/mitigation, food security and restoration technologies, to better contribute to the EU's industries and economic sectors that are dependent on these natural assets (e.g. water- and fibre-related/dependent industries), as well as improve human well-being.

Current policy context

Target 2 of the EU Biodiversity Strategy to 2020 states that "*By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems*". A number of actions have already taken place to address Target 2[16] (see Annex 4). A report on priorities for the restoration of ecosystems and their services[17] provides useful clarification over the key terms used in the EU Biodiversity Strategy to 2020 and in particular Target 2 and Action 6a, specifically the definition on restoration used for the purposes of this request (other definitions can be found in Annex 4):

> Restoration objectives should be tailored to the ecosystem type, the services it provides, the recent history of the site and the location. For each ecosystem type, several states or ecological conditions can be described along a continuum from poor to excellent. Any significant improvement of ecosystem condition that moves an area of land/sea to a better state/condition should be regarded as a contribution to the 15% restoration target. An ecosystem can be assigned to one of 4 levels of condition and progress in a positive direction from one level to the next is recognized as restoration.

Policy relevance and timeliness of the request

Following discussions with DG ENV representatives working on Target 2, the request is of high policy relevance. Target 2 of the Biodiversity Strategy is the only policy document that contains a direct and quantitative target for restoration. However, many other EU level policies relate to restoration aims in indirect ways:

- There is a very strong linkage between the 15% restoration objective included in Target 2 of the EU Biodiversity Strategy and the achievement of Target 1 namely the full implementation of the Birds and Habitats Directives and associated Natura 2000 network.
- Restoration actions will impact on existing legal obligations under the Water Framework Directive, the EU Bathing Water Directive, and the Marine Strategy Framework Directive, such as achieving good ecological status in lakes and rivers or good environmental status in marine waters;
- Restoration of degraded ecosystems will contribute significantly to the deployment of Green Infrastructure (Action 6b of the biodiversity strategy);
- Restoration of disused and derelict land in urban and peri-urban areas will ease the pressure for access to new land for development and reduce soil sealing and urban sprawl;
- Restoration actions can also deliver jobs and growth and a variety of economic and social benefits. Restoration actions have been and continue to be supported through EU funding mechanisms such as ERDF, EAFRD and Horizon 2020.

---

[16] http://ec.europa.eu/environment/nature/biodiversity/strategy/target2/index_en.htm

[17] Lammerant, Johan; Peters, Richard; Snethlage, Mark; Delbaere, Ben; Dickie, Ian; Whiteley, Guy. (2013) Implementation of 2020 EU Biodiversity Strategy: Priorities for the restoration of ecosystems and their services in the EU. Report to the European Commission. ARCADIS (in cooperation with ECNC and Eftec)

- Restoration can increase greenhouse gas uptake and the resilience of natural ecosystems and human settlements to the impacts of climate change and is an integral part of EU policy on climate change adaptation.
- The greening measures introduced into the revised Common Agricultural Policy (CAP) could provide some opportunities for restoring the state of agri-ecosystems and optimizing the ecosystem services and resilience delivered by these ecosystems.

The mid-term review of the Biodiversity Strategy in 2015 highlighted that for Target 2[18], "Progress has been made on policy and knowledge improvement actions under this target, and some restoration activities have taken place in Member States. However, this has not yet halted the trend of degradation of ecosystems and services. National and regional frameworks to promote restoration and green infrastructure need to be developed and implemented".

According to the European Commission representatives, identifying the constraints or barriers to the current approaches to restoration in the EU is important, but should be understood as being broader than scientific knowledge gaps.

The outputs of the request process would be most timely before the final review of the Biodiversity Strategy (end 2019) and would be used by DG ENV to feed into the following policy processes:
- The Mapping and Assessment of Ecosystems and their Services (MAES)
- Green Infrastructure Working Group.

A suggestion from the DG ENV representatives was to avoid high level answers to the current request, resulting in generic recommendations. One suggestion to avoid this was to explore general constraints and barriers across main ecosystem types, but then focus on a few case studies around ecosystem services that span different ecosystem types, for example pollination (with links to the Pollinator Initiative), bearing in mind the issue that that efforts to enhance one service can sometimes do so at the expense of others.

Call for Knowledge

A Call for Knowledge related to this request was carried out in January and was open until 23rd February 2018. The Call for Knowledge was hosted on the KNOCK Forum and resulted in seven contributions from experts from Spain, Sweden, Czech Republic, UK and France, as well as the identification of relevant publications. For details, see Annex 2.

SUGGESTED PROGRAMME OF WORK AND METHODS

This request is broader than the identification of research questions, nor is it restricted to a type of restoration[19] or ecosystem. This request focuses on constraints or barriers to effective restoration including the identification of knowledge gaps restricting restoration approaches/actions, appropriate methodologies, optimal management and effectiveness of interventions. This topic would therefore require input from the social sciences as well as ecological research needs, pointing to the fact that

[18] https://biodiversity.europa.eu/mtr/biodiversity-strategy-plan/target-2-review

[19] See Ockendon et al (2018). One hundred priority questions for landscape restoration in Europe. Biological Conservation 221: 198-208.

some of the gaps will relate to research, while others will point to impediments to the use of existing knowledge, including lack of awareness of that knowledge.

The scope of the request (and a possible typology) can therefore be summarized as addressing:

- Gaps in knowledge
- The communication of (existing) knowledge
- Linkages between researchers and relevant stakeholders, i.e. practitioners
- Capacity building (of both researchers and relevant stakeholders), including availability of appropriate tools or making use of existing knowledge.

The request does not focus on priority ecosystems, however. We acknowledge that there are specific ecosystems (e.g. marine) for which there are more knowledge gaps (e.g. ecological) than others (e.g. grasslands). However, as mentioned, from a policy perspective it may be useful to use a general approach to all MAES ecosystem types followed by some case studies focusing on knowledge gaps specific to ecosystem services (e.g. pollination) or ecosystem types. The request is also relevant to restoration across Europe, including the EU's Overseas Countries and Territories, not to a specific geographic scope.

The programme of work could follow a two-pronged approach (synergistic and in parallel):

3) Identification of barriers to implementation, including the typology identified above, namely literature/research-derived knowledge gaps identified by academics, as well as the identification from scientists and people trying to implement restoration (i.e. practitioners) of other factors (e.g. governance; economics; politics, planning issues) that are hampering restoration efforts, including communication of (existing) knowledge, linkages between researchers and relevant stakeholders, i.e. practitioners, and capacity building. A synthesis of this step would differentiate between knowledge needs/gaps (here we could link to the 100-question paper and how we will build on its outputs) or implementation gaps, i.e. other constraints/barriers;
4) Assessment of available knowledge and where this needs to be improved.

The first aspect could be addressed using either a **multiple expert consultation with formal consensus method such as Delphi**; or one or more **focus group(s)**. Some key considerations were discussed with the requester regarding the pros and cons of these methods, which could be further discussed by the future Expert Working Group (EWG) in the development of their protocol. The focus group (or multiple focus groups if representativeness is a key issue to consider) could include both practitioners and researchers, and those on a continuum between these groups. Diverse focus groups offer the advantage of facilitating inter-domain information exchange. On the other hand, separating the groups (e.g. focus group with practitioners and expert elicitation/horizon scanning with scientists) may reduce the likelihood of some groups or individuals dominating the discussion. To alleviate the second risk, the Delphi approach could be very useful in terms of reducing the social dynamics, yet reaching potentially more reliable outputs. The Delphi method also allows for remote participation, and is thus likely to be less logistically challenging to apply to the desired Europe-wide range of experts/practitioners. A key issue will be for the members of the Expert Working Group to set up, analysis and distill the outputs of the Delphi process in a way that captures both the knowledge gaps identified by practitioners and scientists, and other barriers or constraints that may be hampering restoration efforts.

The second aspect could be addressed through a **scoping review**. This is a structured, step-wise methodology, following an a priori protocol (which will be expanded upon in the protocol developed by the Expert Working Group) to collate and describe existing research evidence (traditional academic and grey literature) in a broad topic area, following a systematic map methodology but with components of the process simplified or omitted to produce information in a short period of time.

While the expert/stakeholder consultation might suffice on its own, the timeline for this request allows for the use of two methods. This is anticipated to improve information coverage and can provide a further measure of confidence in key issues identified through both methods. Both a scoping review and expert elicitation can be designed to identify relevant available knowledge, knowledge gaps and barriers to implementation. It is anticipated that these aspects would be addressed simultaneously.

There is also scope to apply a conceptual modelling approach as an initial step to improve the framing of the problem. Through the use of a method such as joint fact-finding or scenario analysis, this step could clarify the precise questions of interest and expedite the identification or design of subsequent synthesis approaches. Some of these methods also allow the problem and approach to be presented visually, which can be particularly helpful for stakeholder communication.

Other methods that were considered appropriate to identifying effective measures and knowledge gaps include solution scanning and a Bayesian Belief Network. The solution scanning methodology is similar to the suggested expert elicitation with Delphi method, in that it allows for the collection of information from a range of experts, practitioners or stakeholders. However, it does not provide for group interaction and iterative consensus-building. The use of a Bayesian Belief Network requires additional specific technical expertise and does not allow for incorporating feedback between interacting factors.

For more information on each of these methods, please refer to the EKLIPSE report on knowledge synthesis methods[20].

The expert working group is expected to:

- Develop a methodological protocol based on the above suggestions;
- Write a comprehensive report answering the above questions under the quality standards of the methodologies proposed;
- Respond to and integrate the results of extended peer review on the methodological protocol and the final report;
- Integrate the outcomes of the two tasks in a manner understandable and useful to policy makers;
- Present the results at a dissemination event organized by EKLIPSE and/or the requesters.

4 Implementation steps and timeline

[20] Dicks LV, Haddaway N, Hernández-Morcillo M, Mattsson B, Randall N, Failler P,Ferretti J, Livoreil B, Saarikoski H, Santamaria L, Rodela R, Velizarova E,and Wittmer H. (2017). Knowledge synthesis for environmental decisions:an evaluation of existing methods, and guidance for their selection, use anddevelopment – a report from the EKLIPSE project

The work is expected to follow the EKLIPSE knowledge synthesis process, i.e. it will include the following steps:

- **Kick-off dialogue meeting with EKLIPSE** Knowledge Coordination Body (KCB) to ensure common understanding of the request among experts (within 3 weeks of nomination of expert group).
- **Preparation of the work** (to be concluded within 12 weeks of nomination)
    - Scanning of literature and other sources
    - Development of methodological protocol (with support of the EKLIPSE expert group for knowledge synthesis methods)
    - Agreement of methodological protocol with KCB and requesters
    - Review of protocol through open consultation (organized by EKLIPSE)
- **Programme of work**
    - Analysis of determinants of uptake
    - Recommendations for measures with potential to be effective across Europe
    - Early draft (to be discussed with KCB and possibly requesters)
    - Full draft completed for review.
- **Finalisation including review***
    - Extended peer review (via open consultation, organised by EKLIPSE)
    - Presentation of process and results to requesters and stakeholders: May 2019
    - Revision
    - Final product for requester by 30th June 2019.

*Exact order e.g. first revision then presentation or vice versa tbd

5 Support provided by EKLIPSE

EKLIPSE team: The expert working group will be supported in all steps by the EKLIPSE Secretariat in communication, documentation (via the EKLIPSE website), and dissemination of products as required for this request. The working group will be supported thematically and strategically by the KCB.

Financial support: EKLIPSE activities rely on in-kind contributions as in similar science-policy processes. The benefits for experts and institutions arise from the networking in the group and the visibility of expertise to policy and society via the products. EKLIPSE will actively support this visibility of experts and their institution's contributions. In addition:

- kick-off meeting, focus group meeting and final meeting will be hosted by and travel costs covered via EKLIPSE funds as needed
- upon specific request, individual experts from Eastern and Southern European countries might be supported via a honorary contract by an EKLIPSE partner institution.
- a maximum budget of € 8.000 can be granted for tasks such as the literature review and synthesis (for this a separate contract is required see section 6).

Technical support: Access to literature databases will be facilitated if needed. EKLIPSE will cover the layout, printing, and dissemination of interim and final products, i.e. using the OPPLA Platform[21].

6 Eligibility and applicant information

6.1 Selection criteria for the composition of the Expert Group

Selection of the expert working group will be done by the KCB according to selection process and criteria outlined below (6.2) and on the EKLIPSE website.

The expert working group should cover all relevant disciplines including natural, social, economic and planning sciences.

Gender balance and geographical diversity of EU countries will be considered in the selection. If teams are applying, this will also apply, and the KCB may decide to complement a team selected with additional individual experts.

The working group is expected to have up to 10 experts.

6.2 Selection criteria for individual experts

- Demonstrated expertise or experience in relation to the call covering one or more of the following: restoration practitioners and specialists in ecological engineering, circular economy, water-smart solutions, species and landscape management, climate resilience/mitigation, food security and restoration technologies.
- Experience with biodiversity and ecosystem services and/or sustainable development as well as with European policy processes.
- Experiences in inter- and transdisciplinary work on topics related to the Biodiversity Strategy and in science-policy interface processes
- Experts will have to comply with the principles and rules of EKLIPSE (e.g. conflicts of interest policy (see http://www.eklipse-mechanism.eu/our_ethical_framework for more detail).
- Project partners of EKLIPSE and KCB members are excluded.

See Guidance note on Preparing and managing calls for experts for more information.

6.3 Process and eligibility criteria for supporting contracts

Based on the needs identified by the expert working group in its kick-off meeting, EKLIPSE can support the work of the group by sub-contracting some tasks to individual experts (or institutions, from and beyond the Expert working Group) via working contracts up to a total amount of 25,000€.

[21] See www.oppla.eu

The aim of these would be to carry out dedicated work supporting the Group, e.g., a literature search and/or review based on the protocols decided by the Group. An EKLIPSE partner would prepare and issue a (restricted) call for tender for this purpose.
Honorary contracts will be given upon request to experts chosen for the expert groups on an individual basis, if they could not contribute otherwise. We expect this to apply to experts especially from eastern, central and southern European countries that might not able to join the activities otherwise. In case you require such support please contact the EKLIPSE secretariat (secretariat@eklipse-mechanism.eu).

6.4 Data and information policy

All results will be made publicly available through the EKLIPSE website and transparent procedures will apply, following Creative Commons Agreement 4.0[22], which includes the reference of authorship and involvement[9].

6.5 Information to provide

The EKLIPSE form should be completed, including a list of relevant publications and outlining relevant experience on the topic and details of experience in previous assessments or knowledge synthesis processes.

7 Application and notification of results

7.1 How to apply

The EKLIPSE expert form can be found on the EKLIPSE website under '**Open calls**'. The completed form should be handed in **by midnight on June 30th, 2018**.
Should you require any further information do not hesitate to contact us: secretariat@eklipsemechanism.eu.

7.2 Announcement of the results

Successful applicants will be notified directly by EKLIPSE KCB by **July 13th 2018**. As soon as they accept the nomination, names of selected experts will be made public on the EKLIPSE website.

EKLIPSE has received funding from the European Union's Horizon 2020 program under grant agreement 690474

[22] See http://creativecommons.org/licenses/by/4.0/. It permits unrestricted use, distribution, and reproduction in any medium, provided appropriate credit is given to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.