Contents

BACKGROUND INFORMATION FOR REVIEWERS

Thank you for taking part in the peer-review of the methodological protocol developed by the selected expert working group to answer the Eklipse request on "How can we improve adherence to the mitigation hierarchy using ecosystem services with particular focus on the avoid stage."

The form has two main parts: a "general comments" part, and a "comments by section" part where you can provide more specific comments to each section of the protocol. Where possible, please provide page and line numbers so that we can ensure we match your comments to the text.

Eklipse is a science-policy mechanism in the public interest. The lawful basis for processing your personal data under the EU's General Data Protection Regulation (GDPR) will be a public task. Our privacy policy (http://eklipse.eu/privacy-policy/) contains further information on the purpose and lawful basis for processing your personal data.

Please note the deadline for submitting comments is Tuesday 9th November 2021.

ANSWERS FROM REVIEWERS
(ON THE FORM)

1. **IS THE TEXT SELF-EXPLANATORY, FREE OF JARGON AND EASY TO FOLLOW? IF NOT, WHERE DO YOU SEE A NEED FOR LANGUAGE REVISION, OR MORE CLARITY? PLEASE SPECIFY PAGE AND LINE NUMBERS IF POSSIBLE.**

Reviewer 1: Given the nature of the research topic, it's inevitable that some jargon remains. This includes terms like "ecosystem services" or "natural capital". This is relevant to the broader issue, given the requirement to carry out public consultations etc. where such terms would need to be explained to the lay public.

RESPONSE: These terms have been added to the glossary

Reviewer 2: Page ii, first definition needs some clearance, due to the use of semicolons, kommas, and a missing fullstop at the end. Sentences are chopped. Line 58: Delphi does not fit delphi on page.

RESPONSE: The first definition has been clarified. Delphi description modified.

Reviewer 3: I think it is relatively easy to follow. One exception is the section on the 'Applied Policy Delphi', which I found a little hard to follow. It is not necessarily because of the language, it is just a little complicated, perhaps showing a section of figure 1 alongside the text might help provide an overview? Also that might provide the opportunity to align the figure and the text better as I think they have slightly different wordings now which can be a bit confusing.

RESPONSE: Section of figure 1 added and text clarified

Reviewer 4: Upon reading, I found it relatively easy to understand.

RESPONSE: Thank you

Reviewer 5: *no comment*

Reviewer 6: Yes, the protocol reads well, and the argumentation of the authors is easy to follow. For all important terms a glossary entry is available that specifies the meaning.

RESPONSE: Thank you

2. **REGARDING THE INITIAL REQUEST MADE TO EKLIPSE, "HOW CAN WE IMPROVE ADHERENCE TO THE MITIGATION HIERARCHY USING ECOSYSTEM SERVICES WITH PARTICULAR FOCUS ON THE AVOID STAGE?", DO YOU AGREE WITH THE INTERPRETATION OF AND REFINEMENTS TO THE REQUEST AND THE KNOWLEDGE SYNTHESIS FRAMEWORK?**

Reviewer 1: Research objective #1 is much too broad and goes much beyond the initial request by OFB. Objective #2 is more aligned, but could be narrowed to investigate if and how impacts were actually avoided by including ecosystem service or natural capital considerations into decisions at the strategic (plans & programmes) or project stages for infrastructure, energy, or other (harmful) sectors.

RESPONSE: The research objectives have been reformulated to make it clear that the focus of the research is on the avoidance and mitigation of the impacts and the enhancement of

biodiversity conservation. This is also reflected in the reformulated search string for the systematic mapping

Reviewer 2: Yes

RESPONSE: Thank you

Reviewer 3: Yes. I think however, that it could be more clear on what basis the choices of sectors/planing types are made. E.g. looking at infrastructure development, land use change and resource management.

RESPONSE: Clarified in the objectives that focus is on sectors that are likely to have direct impact on biodiversity"

Reviewer 4: I feel that the output matches the specific request, and is thoroughly outlined.

RESPONSE: Thank you

Reviewer 5: no comment

Reviewer 6: I think the working group did well in interpreting the request made by Eklipse and all three main objectives are target-oriented and pertinent. Especially, research objective number three seems timely in this context as it aims at developing potential guidance for the operationalization of ecosystem services into natural capital assessments, impact assessments, and policy making processes.

RESPONSE: Thank you

3.   IS THE GLOBAL METHODOLOGICAL APPROACH LOGICAL, WELL-FORMULATED AND APPROPRIATE? PLEASE CONSIDER THAT THE BUDGET AND TIMETABLE OF THIS KNOWLEDGE SYNTHESIS IS LIMITED (TO SEE THE TIMELINE, PLEASE GO TO PAGE 12).

Reviewer 1: It seems fine, but the composition of the Delphi panel matters greatly. How will the differences in language and legal terminology across european countries be managed? A connection to the BISON project could be very useful: https://bison-transport.eu/

RESPONSE: The EWG will create a glossary of terms to reduce the potential for misunderstanding. Also, a native speaker will be available to conduct an interview or clarify any terminology to ensure the differences stemming from language or legal terminology are managed properly.

Reviewer 2: line 125: Even using private mode, different browsers deliver information. Apple Safari seems to be more strict than e.g. Microsoft IE.

RESPONSE: Thank you for the response. That will be taken into consideration

Reviewer 3: Yes I think so. Regarding the time schedule I am not sure i understood it correctly, but it looks like you expect to task 4 . expert consultation which I am assuming is the delphi

proces in 2.5 months - that seems optimistic to me, I would suggest that it will take longer especially since it involves external experts.

RESPONSE: The process has been extended to appr. 6 months. The timeline did not accurately reflect design phases of the Delphi process and has been extended.

Reviewer 4: Having seen the structure, I feel that there is a clear line of outcomes to be achieved. Seeing the timeline, it should allow for a thorough and robust report if all of the steps are followed in succession.

RESPONSE: Noted

Reviewer 5: no comment

Reviewer 6: Yes, the aims are well stated and the methods clearly structured. In this context, I really appreciated figure 1 on the methodological framework, as it gives a good overview on the foreseen activities and methods, and on how they are interrelated. Moreover, query strings, search languages and the geographic scope seem appropriate for the aims of the study.

RESPONSE: Thank you

4. IS THE COMBINATION OF METHODS PROPOSED APPROPRIATE AND JUSTIFIED?

Reviewer 1: no comment

Reviewer 2: yes.

RESPONSE: Thank you

Reviewer 3: Yes

RESPONSE: Thank you

Reviewer 4: N/A

Reviewer 5: no comment

Reviewer 6: Yes, I think the proposed mix of using both semi-quantitative (systematic review) and qualitative (deliberative consultation) research approaches is appropriate to achieve the envisaged objectives.

RESPONSE: Thank you

5. IS THERE AN UNDUE EMPHASIS ON ONE STEP/RESEARCH QUESTION? IF SO, HOW MIGHT IT BE OVERCOME? ON THE CONTRARY, SHOULD ONE STEP/RESEARCH QUESTION BE LOOKED INTO MORE?

Reviewer 1: See my comment on the research objectives.

RESPONSE: Noted, and objectives modified to reflect the comments.

Reviewer 2: No, it is well balanced.

RESPONSE: Thank you

Reviewer 3 : I know it is might be difficult to include more due to resources and time but, I think it would be interesting to involve more than the 8-10 experts in parts of the Delphi process? Would it be possible at one of the stages to use some of the questions posed to the experts to create a survey to send to a broader group of experts? When I read the first part of the document I thought that was the idea, but from the section on page 10-11 it does not seem like it is.

RESPONSE: The EWG have matched the resources available in time and persons to constitute a panel of 8-10 members. We have invested in a process at outset to try and secure commitment and traction of the panel through a round zero interview approach. The process is transparent, however, which means that the information will be available more widely at a later date.

Reviewer 4: Focusing on factors that might inhibit people's willingness to engage with or implement change upon reading this report.

RESPONSE: These should come from the Delphi process when challenges are looked at.

Reviewer 5: no comment

Reviewer 6: No, in general the two main research steps are well balanced.

RESPONSE: Thank you

6. ARE APPROPRIATE AND UP-TO-DATE SOURCES USED? DO YOU KNOW OF ANY ADDITIONAL SOURCES, EXAMPLES WE COULD USE AND WHERE (PLEASE BE AS PRECISE AS POSSIBLE)?

Reviewer 1: These 2 references are probably of interest:

Bull J.W., Sonter L., Gordon A., Maron A., Narain D., Reside A., Sanchez L., Shumway N., von Hase A. & Quétier F. (2021): Quantifying the 'avoided' biodiversity impacts associated with economic development. Frontiers in Ecology and the Environment, in press.

Vaissière A-C, Quétier F., Bierry A., Baptist F. & Lavorel S. (2021): Modelling alternative approaches to the biodiversity offsetting of urban expansion in the Grenoble area (France): what is the role of spatial scales in 'no net loss' of wetland area and function? Sustainability (special issue on 'neutrality'), 13(11), 5951.

RESPONSE: Thank you for these. They have been noted for the systematic mapping.

Reviewer 2: see above. Maybe avoid Chrome as browser and OS, perhaps Linux and duckduckgo delivers more neutral results.

RESPONSE: Duckduckgo appears to return US-centric results, which may prejudice the results, but would be interesting to compare.

Reviewer 3: no comment

Reviewer 4: Upon looking at the references, I do not currently have any newer sources that may add to the collection of information here. I therefore conclude that the sources used are sufficient to substantiate the claims in this method protocol.

RESPONSE: Noted

Reviewer 5: no comment

Reviewer 6: The foreseen systematic review is based on the most important scientific literature databases (namely, Web of Science and Scopus) which should guarantee that the most important work is detected/included. What regards grey literature it might be worth considering also newly launched databases such as the on of the British Ecological Society (BES) named "Applied Ecological Resources" (available at https://www.britishecologicalsociety.org/applied-ecology-resources/).

RESPONSE: Thank you for the suggestion. Added to the grey literature resources

7.   ANY FURTHER GENERAL COMMENTS:

Reviewer 1: no comment

Reviewer 2: no comment

Reviewer 3: no comment

Reviewer 4: no comment

Reviewer 5: no comment

Reviewer 6: no comment

8.   ARE YOU INTERESTED IN THE FURTHER DEVELOPMENT OF THE KNOWLEDGE SYNTHESIS?

Reviewer 1: Yes, I am interested

Reviewer 2: Yes, I am interested

Reviewer 3: Yes, I am interested

Reviewer 4: Yes, I am interested

Reviewer 5: No, I am not interested

Reviewer x6: Yes, I am interested

9.   WOULD YOU LIKE TO BE ACKNOWLEDGED AS A REVIEWER IN THE FINAL REPORT AND HOW?

Reviewer 1: Yes (i.e. Last name, First name AND affiliation)

Reviewer 2: Yes (i.e. Last name, First name AND affiliation)

Reviewer 3: Yes (i.e. Last name, First name AND affiliation)

Reviewer 4: Yes (i.e. Last name, First name AND affiliation)

Reviewer 5: No, I prefer to be anonymous

Reviewer 6: No, I prefer to be anonymous

10.   GLOSSARY (PAGES II-III)

Reviewer 1: I was surprised to see the definition of ecosystem services from the 2005 MEA, rather than more recent work like that of IPBES. Where are "nature's contributions to people".

Frames of reference, reference scenarios and counterfactual scenarios are missing yet essential concepts. They relate to "baselines" and areas of analysis which determine how, and at what spatial and time scales ES are assessed in the context of EIA and other environmental evaluation processes.

RESPONSE: ES definition changed to the one from CICES for consistency as CICES categorisation will be used in data extraction and coding. Additional terms considered and a few more added, e.g. nature's contributions to people. Although frames of reference, reference scenarios and counterfactual scenarios are important concepts, they are not important for understanding the methods protocol as they relate more to primary research.

Reviewer 2: "...aim is to minimise the impacts; and, when impacts occur..." More fullstops, maybe?

RESPONSE: The definition has been modified to make it more clear

Reviewer 3: no comment

Reviewer 4: Very useful to include the glossary, identifying the audience that will consume this report will allow for one to know what terms to include, as I am a university student, there is a chance that I am simply needing to research certain terms that are widely understood.

RESPONSE: Additional terms considered and a few more added to clarify some terms that appear in the methods protocol and may not be as widely understood as the Expert Working Group thought.

Reviewer 5: no comment

Reviewer 6: The most important technical terms are covered

RESPONSE: Noted

11.   INTRODUCTION (PAGE 1)

Reviewer 1: *no comment*

Reviewer 2: "Hierarchy" is written in both ways: Capitalized as "Mitigation Hierarchy" and as hierarchy.

RESPONSE: *capitals removed except where it forms part of a title or emphasis in the very beginning of the introduction.*

Reviewer 3: In line 36 in the introduction you use the phrase "if time allows" - you also use it later on. I am not a fan of writing that, since I believe that unless you plan for it time never allows for something extra. It might be just me, but something to consider.

RESPONSE: *A good point. The phrase reflects a cautionary approach to not to over promise even though producing the guidance has been included in the timeline. In light of that, the phrase has been removed.*

Reviewer 4: Introduction is clear and to the point, it allows me to understand instantly the challenge, as well as the proposed direction in solving it and its necessary steps.

RESPONSE: *Thank you*

Reviewer 5: *no comment*

Reviewer 6: *no comment*

12.   OBJECTIVES (PAGES 1-2)

Reviewer 1: See my earlier comment on objectives. Objective #1 should be removed, and Objective #2 narrowed.

RESPONSE: *The scope of objective 1 has been narrowed by adding reference to planning processes, this has also been reflected in the updated search string.*

Reviewer 2: n/a

Reviewer 3: *no comment*

Reviewer 4: Having read this, I am much closer to understanding the direction that this work is aimed at. I understand it is not to fall onto this research to answer, but how do humanitarian concerns fall into evaluating environmental conservation in this topic. Where we try quantify the cost of certain environmental impact projects, do we only focus on the planetary impacts and evaluation?

RESPONSE: Environmental impacts and humanitarian ones are interlinked. We will consider social impacts/humanitarian concerns where those have been focus of the research.

Reviewer 5: *no comment*

Reviewer 6: As stated before, I see objective number 3 as crucial step in improving adherence to the mitigation hierarchy based on ecosystem services concept. So, I hope that this part will be covered in the 12-month study period.

RESPONSE: We also recognise this would make a potentially valuable contribution and so we will endeavour to focus our attention to achieve this and derive maximum benefit from the research process.

13.   METHODOLOGICAL FRAMEWORK (PAGES 2-3)

Reviewer 1: *no comment*

Reviewer 2: *no comment*

Reviewer 3: *no comment*

Reviewer 4: The framework is very well produced, it outlines very clearly the thorough steps being taken to meet the research objectives. As an outsider with less knowledge than the wide audience consuming this, I would add that it isnt clear as to what EWG

RESPONSE: EWG refers to the expert working group. Clarification added to the title of the figure.

Reviewer 5: *no comment*

Reviewer 6: The combination between a literature review and deliberative consultation is a promising approach and fits to the overall scope. Figure 1 is helpful in this context.

RESPONSE: Thank you

14.   SELECTED METHODOLOGICAL APPROACH: SYSTEMATIC MAPPING (PAGES 5-10)

Reviewer 1: It's unsurprising that don't find many publications when looking for "ecosystem services" and other recently emerged terms. Most EIA and related regulations are older than that, and will focus on more widely used terms like water, forests, recreational uses etc. This explains why you get millions of findings when searching for specific ecosystem services. The methodological approach doesn't describe how this will be handled.

Another blindspot in the method is the issue of economic approaches. If the priority is to consider avoidance, and the role that ES/NC information can inform decisions to avoid (or go forward) with a development, then it's important to acknowledge that many countries have adopted economic cost-benefit appraisal steps (esp. for public infrastructure). This should be an explicit focus of the systematic mapping.

RESPONSE: We did find over 22000 publications with the included terms. This raises to over 1 million if all possible ES terms are included. As the mitigation hierarchy is the key concept here and relatively new, we are confident that the cut-off year of 2000 is appropriate considering also resource availability and timeline of this project. Regarding economic approaches, the research will cover the cases where the link has been explicitly made between the economic approach and impact on biodiversity (avoidance of it).

Reviewer 2: *no comment*

Reviewer 3: On page 7 you have a list of organisational websites that you will specifically search. As an outsider I find this a little strange, why do you pay those such special attention? Would their resources not show up in your web-search in any case?

RESPONSE: This list is not comprehensive and other organisations will be covered as well. To ensure coverage of the search (comprehensiveness), it is common practice to search key organisational websites. They may come up in the web search but that is not necessarily the case. Hence, this is a simple safeguarding strategy to ensure key information is not missed by accident.

Reviewer 4: *no comment*

Reviewer 5: *no comment*

Reviewer 6: The foreseen systematic review is based on the most important scientific literature databases (namely, Web of Science and Scopus) which should guarantee that the most important work is detected/included. What regards grey literature it might be worth considering also newly launched databases such as the on of the British Ecological Society (BES) named "Applied Ecological Resources" (available at https://www.britishecologicalsociety.org/applied-ecology-resources/).

RESPONSE: Added to the list of grey literature sources.

15. SELECTED METHODOLOGICAL APPROACH: APPLIED POLICY DELPHI PROCESS (PAGES 10-11)

Reviewer 1: *no comment*

Reviewer 2: *no comment*

Reviewer 3: *no comment*

Reviewer 4: *no comment*

Reviewer 5: *no comment*

Reviewer 6: I highly recommend to carefully define the criteria for the selection of expert panel members in order to guarantee a good balance and high representativeness. In particular, I recommend to consider also criteria such as the level of expertise (i.e. early career vs senior), age and gender.

RESPONSE: The Delphi panel was selected based on the following criteria. 1. Expertise in the area of mitigation hierarchy; 2. Geographical location and 3. Gender. Experts were then selected to achieve a range of experience from the following categories A: practitioners and professionals; B: researchers; C: policy-makers and decision-makers; D: nongovernmental organisations; E: private sector and business). The focus was on obtaining expertise from a wide variety of contexts rather than age, which would be difficult to ascertain and justify. Gender added as a criteria to the methods protocol where it had been accidentally omitted

16. EXPECTED RESULTS (PAGES 11-12)

Reviewer 1: Expected Result #1 seems unnecessary.

RESPONSE: Result #1 clarified to differentiate between #1 and #2]

Reviewer 2: *no comment*

Reviewer 3: *no comment*

Reviewer 4: *no comment*

Reviewer 5: *no comment*

Reviewer 6: Also here, I recommend to work towards "expected result 3" in order to provide recommendations for planners and other decision makers on how to translate mitigation hierarchy into practice in projects/programmes.

RESPONSE: Noted

17. TIMELINE (PAGE 12)

Reviewer 1: Good luck !

RESPONSE: Thank you.

Reviewer 2: *no comment*

Reviewer 3: *no comment*

Reviewer 4: *no comment*

Reviewer 5: *no comment*

Reviewer 6: Task 2 and 3 seem not well balanced: I would allocate more time for reviewing the actual papers and extracting information and less for the systematic mapping.

RESPONSE: The systematic review (task 3) builds on the systematic mapping (task 2). Systematic mapping forms a large part of any systematic review process. As a large amount of the data will have been extracted during the systematic mapping process already, the time needed to proceed with the remaining data extraction and data analysis will be considerably less. Also, the pool of potential papers is likely to be relatively small for the systematic review if one is even possible.

18. REFERENCES (PAGES 13-14)

Reviewer 1: *no comment*

Reviewer 2: *no comment*

Reviewer 3: *no comment*

Reviewer 4: Clear well organised.

RESPONSE: Thank you.

Reviewer 5: *no comment*

Reviewer 6: *no comment*

19. ANNEX I: PERFORMANCE OF THE SEARCH STRING (PAGES 15-26)

Reviewer 1: *no comment*

Reviewer 2: *no comment*

Reviewer 3: *no comment*

Reviewer 4: *no comment*

Reviewer 5: My comments concern the search string and its structure. Now the search string (presented on pages 4-5) contains only two subgroups (groups #1 and #2). When doing this kind of large international study with only 2 subgroups (and which contain common words), search string may give thousands or even tens of thousands references as a result, of which many can be irrelevant.

One way to condense the results is to divide search string in three subgoups. From the information search point of view every subgroup should contain words which are synonomyms or they somehow represent the same thing/phenomenon. Now the subgroup #1 clearly contains words which do not represent the same thing (for example: avoid vs "land use planning").

I would suggest, that there could be three subgroups as follows:

#1 AVOIDANCE WORDS: (avoid* OR prevent* OR mitigat*). *To this group could also be added words reduce/reduc* ; minimis/minimiz*. Perhaps also word compensation/compensat* and phrase "impact assessment" belogs to this group.*

Please, see a separete note in the end of my comments.

2# PLANNING WORDS: This group seems to be ok from the logical point of view, because it contains words which somehow are connected to planning. I suggest that following words could be tested also and added to subgroup #2, if needed: zoning ; "town planning" ; "urban desing" ; "coastal planning".

Some of these words are found from General Finnish ontology (YSO): https://finto.fi/yso/fi/?clang=en . There may be other words to consider as well.

3# ECOSYSTEM SERVICES AND BIODIVERSITY WORDS: These words seems to be ok, but I would recommend you to test and possibly include to search string the following synonyms to biodiversity: "biological diversity" OR "nature diversity" OR "natural diversity".

Ecosystem services is a broad concept and it is possible divide it into smaller components using for example CICES-classification. This approach was used in BONUS ROSEMARIE-project, more about this in the following article:

Kuhn et al. 2021. "Participatory systematic mapping as a tool to identify gaps in ecosystem services research: insights from a Baltic Sea case study" https://doi.org/10.1016/j.ecoser.2020.101237

NOTE: If the project wants to consider also the positive effects of ecosystem services and biodiversity in planning (not just "avoiding or mitigating"), then these "posivive/promoting" words can be added to subgroup #1. These words could be something like: foster, enhanc, *integrat* etc. Although in this case "positive" words are not synonyms to "avoidance-words", they can be added to subgroup #1 with OR-operator without breaking the search logic.

RESPONSE: Thank you for the suggestions. The search string has been modified to include three groups with the positive words included. Originally the scope of the research made it difficult to have a separate group for the avoidance/enhance terms but as the scope was narrowed, the search string has been modified as well.

Reviewer 6: *no comment*

20.   ANNEX II: LIST OF ARTICLES USED TO TEST THE COMPREHENSIVENESS OF THE SEARCH STRING (PAGES 27-28)

Reviewer 1: *no comment*

Reviewer 2: *no comment*

Reviewer 3: *no comment*

Reviewer 4: *no comment*

Reviewer 5: *no comment*

Reviewer 6: *no comment*

21.   HOW DID YOU GET TO KNOW ABOUT THIS CALL FOR REVIEW?

Reviewer 1: I heard about this from several channels.

Reviewer 2: Email from Eklipse

Reviewer 3: Email from Eklipse

Reviewer 4: Colleague

Reviewer 5: Colleague

Reviewer 6: Email from Eklipse

22.   ANY OTHER COMMENTS?

Reviewer 1: *no comment*

Reviewer 2: *no comment*

Reviewer 3: *no comment*

Reviewer 4: Thank you for this opportunity to gain insight into this work!

RESPONSE: Thank you

Reviewer 5: *no comment*

Reviewer 6: *no comment*