Brief primer on scoping and preparing evidence synthesis proposals

Updated October 2, 2020 (by Sam Cheng, adapted by Suzanne Macey)

This primer covers the synthesis methods that one may want to incorporate into a broader proposal or exist as a stand alone proposal. Syntheses are often combined with other methods in order to provide a well-rounded picture of overall state of knowledge and context for application. For example, syntheses are often combined with expert/stakeholder consultation to interpret results as well as focus groups, scenario and structured decision modeling to apply the results of the synthesis. This document is geared towards teams who are working with stakeholders to scope (plan) a review, but students performing a synthesis for a course might find it a useful overview. (Note: time estimates are reflective of the project being a full-time and extensive commitment, consider the realities of your other responsibilities and the scope of your project when estimating the time it will take you to undertake these steps.)

Step 1: Scoping question and objectives with stakeholder group

The first step is working with the stakeholder group to define what they want the synthesis to inform. Is it a policy decision? Is it to help guide future explorations and prioritization? Depending on what the synthesis is intended to inform (and for whom) – this will shape the final review questions and scope. As well, at this stage it is pertinent to begin to ask what are allowable levels of risk and uncertainty in not having an exhaustive synthesis? Or in other words, what level of risk exists if the synthesis misses something? In addition, it is useful here to ask what the ideal timeline of the client/stakeholder is so as to gauge what types of questions could be feasible at this stage.

Examples of synthesis questions/objectives:

A systematic map (van der Meer et al. 2020)

Main question: What evidence exists on the impact of agricultural practices in fruit orchards on biodiversity indicator species groups?

Objectives: Potential uses of the map are (1) to show, for each indicator species group and agricultural practice, whether existing research is ample enough to answer impact questions regarding e.g., production and management systems, methodologies, and geographic distribution; (2) to help in determining priorities for future research on the impact of discrete practices on discrete indicators; and (3) to provide agricultural extension services and public science with a wide-ranging overview of existing evidence aligning with major priorities in biodiversity research, in order to improve knowledge transfer from science to agricultural practice.

A systematic review (Häkkilä et al. 2019)

Main question: Do small protected habitat patches within production forests provide value for biodiversity conservation in boreal forests?

Secondary questions: We will review if the biodiversity of small protected habitat patches differs from that of unprotected forests. Because Woodland Key Habitats are protected because of

their biological values, we will also review if their biodiversity differs from that of larger protected forests that should be closer to natural state than smaller patches. We will further review to what extent will protected small-scale habitats retain their original biodiversity if their immediate surroundings are heavily managed.

This systematic map protocol lays out very nicely their stakeholder engagement process along with estimates of time.

Step 2: Determining the type of synthesis for the questions and objectives at hand
The question and objectives will determine the type of synthesis. See below for resources that provide good guidance on the pros and cons of many different review types. In general, having a reproducible protocol is a primary factor for general success :-)

Resources for different types of syntheses:

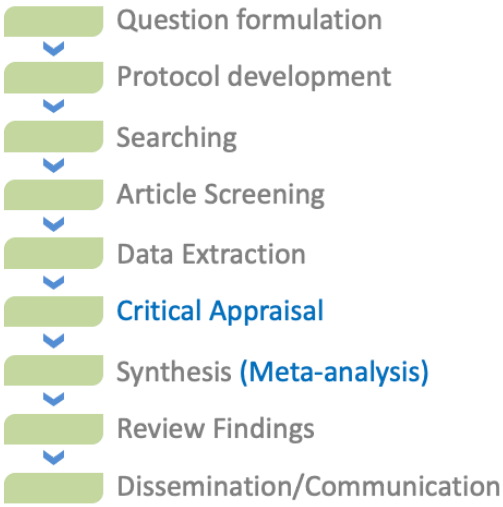
- EKLIPSE Guidance
- Cook et al. 2017. Simplifying the selection of evidence synthesis methods to inform environmental decisions: A guide for decision makers and scientists. Biological Conservation 213: 135-145

Table 1. *Brief synopsis of commonly used types drawing from Eklipse document*

Type	Description	Benefits	Challenges
Scoping review	"A structured, step-wise methodology, preferably following an a priori protocol 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." (see Collins et al. 2015)	Rapid (1-6 months) and can be useful to understand what the lay of the land is before delving into a full map/review	Wide range of methodologies, so the *reliability* of this types of reviews will depend how well their methods are reported and on conduct
Rapid review	"A structured, step-wise methodology, usually following an a priori protocol to comprehensively collate, critically appraise and synthesise existing research evidence (traditional academic and grey literature), *following systematic review methodology* but with components of the process simplified or omitted to produce information in a short period of time." (see Collins et al. 2014, Tricco et al. 2015)	Rapid (3-6 months) and can be useful to inform instances where the demand for information has a short timeframe and could benefit from a systematic approach	Wide range in methodologies out there, so the *reliability* of this types of reviews will depend how well their methods are reported and on conduct
Systematic map	"Structured, step-wise methodology following an a priori protocol to comprehensively collate and describe the state of existing research evidence	Highly rigorous, peer-reviewed, reproducible, and	Depending on the scope of the topic, can be

	(traditional academic and grey literature)" typically within a policy-relevant framework. (see guidelines from CEE and James et al. 2016)	transparent, with low risk of bias (if conducted well) Can guide future prioritization of reviews	time-intensive (6 months to 4 years) = high staff time Cannot tell you direction or magnitude of impact/effect
Systematic review	"A structured, step-wise methodology following an a priori protocol to comprehensively collate, critically appraise and synthesise existing research evidence (traditional academic and grey literature). This method is applicable to specific questions such as: What is the effectiveness of an intervention? What is the effect of X on Y? What is the prevalence of a phenomenon? How reliable is a specific method?" (see guidelines from CEE)	Highly rigorous, peer-reviewed, reproducible, and transparent with low risk of bias (if conducted well) Intended to be exhaustive	Time-intensive (6 months to 4 years) = high staff cost

Generally the synthesis will require a number of steps, although time commitment and intensity of each step will depend on the aim of the synthesis, the scope, and type of synthesis. In the figure below, stages in blue are only associated with some types of syntheses.



Step 3: Determining the number and type of sources to be searched

This step likely will need to occur more than once, however, it helps to go into the discussions on scoping with an idea of where likely useful sources may be. For example, for syntheses focused on biological topics – searching places like EconLit may not be so fruitful, but focusing on Web of Science may be. In addition to databases of literature, this is a good stage to begin a

list of potential sources of grey literature that you can bring to the stakeholder group for feedback on where and how to search these typically web-based sources. Lastly, now is the time to come up with a list of relevant reviews whose bibliographies you may want to search. Scoping the list of sources will also give you an idea of how many individual searches you will have to run and the likely number of resources within each (to get an estimate of time).

Step 4: Scoping protocol for synthesis with stakeholder group
The synthesis scoping requires assessing and agreeing upon several central elements of the synthesis. These include:

- **Study questions and synthesis objectives** (how broad or narrow is the question? Is everyone in agreement about the bounds of the question?)
- **How exhaustive/comprehensive must this synthesis be?** What is the level of risk/uncertainty of the decision(s) that this synthesis is intended to inform? This will help you determine how many sources you will search, whether you will screen all search results or a subset. This will also determine whether you think that your review topic requires full double screening (all articles are checked by more than one reviewer and then a consensus decision is reached) OR a subset is double screened OR none are double screened (i.e. one reviewer per article which may be ok, but may also result in inconsistencies and bias).
- **What is the scope of your synthesis parameters?** I.e., what will your synthesis include and not include? Here, it is important to lay out what your PICO criteria are. PICO stands for Population, Intervention, Comparator, Outcome. Not all syntheses may include criteria under all these categories, but it is important to structure your synthesis with a set of key parameters both for future users as well as for consistency across the review team. An example of a synthesis's PICO elements are follows (from Dick et al. 2019):

Population	Intervention	Comparator	Outcome
Human populations in OECD countries	Adoption or implementation of nature-based solutions (NBS) to address a specific challenge related to cost-efficacy of NBS, governance in planning, environmental justice, and the acoustic environment (cityscapes, seascapes and soundscapes)	With/without NBS actions, before/after	Positive or negative effect on domains of human well-being defined by McKinnon et al. [15]

- **What are your frameworks/conceptual models for analysis?** As often syntheses are intended to inform a question of effectiveness or state of knowledge around a certain set of interventions/outcomes – it is important to clearly define the system within which the

synthesis will operate. Oftentimes synthesis teams will work with stakeholder groups to define or select a theory of change that drives the synthesis question and will inform the type of information that is extracted from included papers.

- **What are the fields of information that are important to draw from this analysis?** Depending on the scope of the synthesis, there will be several types of information you will want to extract from each included article. These can include bibliographic, study and geography, intervention, outcome, and study design information. Data extraction tends to be more intensive and detailed for systematic reviews where you are attempting to gain inference on the direction, magnitude, and effect size of outcomes as well as qualitative measures of context (i.e., the how).

Step 5: Running preliminary searches to get an idea of synthesis load

At this stage, it's prudent to begin to develop the search string that you may use to find data sources for the synthesis. This involves usually 0.5-1 day of prep work to devise the search string with some alternative terms and run it through a couple of main publication databases (e.g. Scopus, Web of Science) to see how many likely results you will get. A note here, running super broad searches (like "conservation" AND "sustainability") are likely going to result in an absolute deluge of relevant and (mostly) irrelevant papers. But super super specific searches are also not going to be very informative at all either. Best practice here is to brainstorm a set of key terms and synonyms for each of your PICO categories (where relevant) and use this as your scoping search string, modifying some terms as needed that may throw up way more results than is informative (e.g., searching broad terms like "rules" and "law" tend to add a lot of nonspecific results depending on what other terms they are combined with).

References

CEE – Collaboration for Environmental Evidence Guidance for Authors

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