Ecosystem Service Review: Methods for Round 1 and Round 2 Data Cleaning and Compilation, and Round 2 Review Assignment

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Note:

All code and raw and cleaned datasets used in the methods below (with the exception of the Round 1 Google forms dataset) reside at github.com/caitlintwhite/kremeny\_analyses. The Round 1 Google forms dataset resides on the ES Google Drive as a Google Sheet file. Specific files and locations described below.

Reviewers:

Laurel Brigham (LB), Laura Dee (LD), Nick Dragon (ND), Kathryn Grabenstein (KCG), Sierra Jech (SDJ), Claire Karban (CK), Aislyn Keyes (AK), Tim Korpita (TK), Julie Larson (JL), Travis McDevitt-Galles (TM), Anna Spiers (AIS), Grant Vagle (GV), Caitlin White (CW/CTW)

1. Round 1

1.a. Initial abstract review and assignment methods.

TK described ES abstract selection from Web of Science (sent to LD). Fourteen people reviewed 1932 abstracts from November 2019 – January 2020. Each person reviewed either 148 or 149 abstracts, with the exception of LD and CTW (LD helped CTW review about half of her abstracts as she was away). Specifically, five reviewers (one was LD/CW) were assigned 148 abstracts, and the other eight reviewers 149 abstracts.

1.b. Survey instrument

Google form, with seven yes/no exclusion questions (a “yes” to any of these questions resulted in paper excluded from further consideration in review). Reviewers entered their name, paper title, answered the yes/no exclusion questions, and could optionally enter comments about the abstract. Exclusion questions were:

1. Is this a meta-analysis?

2. Is this a review?

3. This paper does NOT directly measure/model an EF and/or ES

4. This paper focuses ONLY on valuation or risk assessment

5. This paper describes ONLY a tool, but not does report implications for EF/ES on said tool

6. This paper only measures biodiversity/abundance but NOT as an explicit proxy for ES/EF

The sixth question was added in December, after abstract screening started. Everyone agreed to go back to abstracts they had already reviewed that might screen out based on question 6, but only those abstracts (not all abstracts). Therefore, the biodiversity question was repeated in the Round 2 Qualtrics survey as a catch for any papers that should have been excluded in Round 1 based on stopping at biodiversity or abundance without connection to ecosystem function or service.

1.c. Data cleaning and compilation

Google form survey results are read in dynamically from the ES Google Drive into R using the ‘googledrive’ and ‘googlesheets4’ packages. Because of the simplicity of the survey, data cleaning was mostly limited to correcting paper titles with typos. CTW screened each paper for either all “No” answers or at least 1 “Yes” among the first six questions. CTW contacted reviewers to resubmit their survey if questions 1-5 were a combination of “No” and missing answers (looser on question 6 since it was added partway through review and was going to repeat in the round 2 survey).

1.d. Round 1 summary

Of the 1932 unique starting abstracts, 1149 (59.5%) were excluded and 793 (40.5%) kept for Round 2 review. Reason for exclusion from most to least frequent were: 1) no direct measure of ecosystem function or service (733 papers, 63.8%), 2) review only (268 papers, 23.3%), 3) stopped at biodiversity/abundance, no connection to ecosystem service (60 papers, 5.22%), 4) meta-analysis only (38 papers, 3.31%), 5) assessment of ecosystem service valuation or risk study [social dimensions paper] (27 papers, 2.35%), 6) primary intent is to introduce new method or evaluation tool (23 papers, 2%).

2. Round 2

2.a. Paper selection and assignment

Of the 793 studies that proceeded from round 1, 392 (roughly half) were randomly selected for further in-depth systematic review. Recognizing the amount of time likely required to review a paper more in depth, the range of study topics and systems in the paper pool, and breadth of knowledge among the review group (and therefore potential for multiple interpretations/different levels of understanding), we decided to subset the dataset so two reviewers could independently review a given paper, then converge on final answers for any conflicting answers.

The same fourteen reviewers from round 1 reviewed papers for round 2 (LD and CTW reviewed papers separately). Each reviewer was assigned as the primary reviewer for 28 papers and paired as a second reviewer for two other primary reviewers, charged with 14 papers from each primary reviewer. In total, every reviewer was assigned 56 papers (28 as primary reviewer, 28 as secondary reviewer). Papers were assigned and reviewers paired with two other reviewers via random selection, with the caveat no person reviewed a paper they had already screened in round 1. We used R to randomize round 2 paper selection, reviewer pairing, and paper assignment.

2.b. Survey instrument

As a group we designed the study survey questions and KCG created the survey in Qualtrics.

2.c. Data cleaning and compilation

As the survey for round 2 was more in-depth, data quality assurance and cleaning for round 2 was more involved. Generally, data QA was as follows:

1. Flag papers for additional review based on survey notes, methods, ecosystem

2. Logic checks

3. Apply reviewer corrections to individual papers

4. Assign bins to driver response variables

5. Screen double-reviewed papers, flag as needed

6. Apply reviewer corrections to double-reviewed papers

7. Compile final version cleaned ES dataset

CTW used R to QA and compile the final ES dataset and excluded papers dataset.

2.d. Round 2 summary

Of the 392 papers reviewed in Round 2, 119 (30.4%) were excluded. Reason for exclusion, from most to least frequent were: 1) stopped at biodiversity/abundance (49, 41.2%), 2) review/framework/synthesis/meta-analyses only (34, 28.6%), 3) social dimensions/valuation study only (31 papers, 26.1%), and 4) did not measure ecosystem function or service (should have been excluded in round 1) (5 papers, <1%).

Of the 273 studies retained, 34 were evaluated by two reviewers independently and the other papers were evaluated the assigned primary reviewer only. While our intent was for all papers to be double-reviewed, time involved in evaluating one paper necessitated single reviews and we use the 34 double reviewed papers to qualify consistency of our data. Generally, reviewers evaluated the same paper similarly for most questions. Questions that had the most frequent, albeit slight, discrepancies between reviewers concerned ecosystem studied, methods used, temporal component, which of the 4 areas Kremen (2005) outlined were addressed by the study, and type of Ecosystem Service Provider studied. These are multiple selection questions, and typically reviewers would overlap in one or two options selected and differ by one. Reviewers re-assessed questions with incongruent answers to determine on a final answer.

3. Overall summary

In total, of 1932 starting papers identified in WOS search, 1268 (65.6%) didn’t meet our criteria. Lumping review or framework papers, meta-analyses, and new methods or evaluation tool/approach papers into one category, across both rounds reason for exclusion from most to least frequent were: 1) no direct measure of ecosystem function or service (738 papers, 58.2%), 2) review/conceptual/synthesis/new methods only (363 papers, 28.6%), 3) study stopped at biodiversity or abundance, did not link to ecosystem service (109 papers, 8.6%), and 4) study was social dimensions/valuation paper only (58 papers, 4.6%).

Imagen que contiene pájaro

Descripción generada automáticamenteTable 1. Ungrouped reason for exclusion

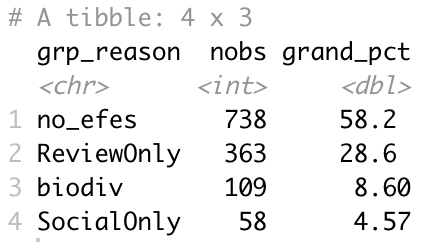


Table 2. Grouped reason for exclusion.

References

Qualtrics fields: <https://www.qualtrics.com/support/survey-platform/data-and-analysis-module/data/download-data/understanding-your-dataset/>