

The CEEDER database of evidence reviews: an open-access evidence service for researchers and decision-makers

by Konno, K., Cheng, S.H., Eales, J., Frampton, G., Kohl, C., Livoreil, B., Macura, B., O'Leary, B.C., Randall, N.P., Taylor, J.J. and Woodcock, P.

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1 **The CEEDER database of evidence reviews: An open-access evidence**
2 **service for researchers and decision-makers**

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34 **Highlights**

35 • The number of evidence reviews is increasing but their rigour and risks of bias

36 vary

37 • Easier access to rigorous evidence reviews may support evidence-informed

38 decision-making

39 • CEEDER collates published evidence reviews into a searchable open-access

40 database

- 41 • CEEDER assesses evidence reviews for their reliability using the CEESAT
42 appraisal tool
- 43 • CEEDER will be further developed through co-production with evidence user
44 organisations

45 **Abstract**

46 Evidence-informed decision-making aims to deliver effective actions informed by the
47 best available evidence. Given the large quantity of primary literature, and time
48 constraints faced by policy-makers and practitioners, well-conducted evidence reviews
49 can provide a valuable resource to support decision-making. However, previous
50 research suggests that some evidence reviews may not be sufficiently reliable to inform
51 decisions in the environmental sector due to low standards of conduct and reporting.
52 While some evidence reviews are of high reliability, there is currently no way for
53 policy-makers and practitioners to quickly and easily find them among the many lower
54 reliability ones. Alongside this lack of transparency, there is little incentive or support
55 for review authors, editors and peer-reviewers to improve reliability. To address these
56 issues, we introduce a new online, freely available and first-of-its-kind evidence service:
57 the Collaboration for Environmental Evidence Database of Evidence Reviews
58 (CEEDER: www.environmentalevidence.org/ceeder). CEEDER aims to transform
59 communication of evidence review reliability to researchers, policy-makers and
60 practitioners through independent assessment of key aspects of the conduct, reporting
61 and data limitations of available evidence reviews claiming to assess environmental
62 impacts or the effectiveness of interventions relevant to policy and practice. At the same
63 time, CEEDER will provide support to improve the standards of future evidence

64 reviews and support evidence translation and knowledge mobilisation to help inform
65 environmental decision-making.

66 **Keywords:** Critical appraisal; Decision support tool; Evidence synthesis; Evidence-
67 based; Policy making; Risk of bias

68 **1. Introduction**

69 Reviewing, collating and synthesising evidence is an essential prerequisite for
70 supporting evidence-informed decision-making in environmental management (Pullin
71 and Knight, 2001). Evidence reviews collate and synthesise data from primary studies
72 with the aim of providing answers to specific questions for evidence users (i.e., anyone
73 who uses evidence, such as policy-makers, managers, researchers, the general public,
74 research funding agencies) (Collins et al., 2015; O’Leary et al., 2016). They are
75 published under various names such as literature, critical, rapid or systematic reviews,
76 as well as meta-analyses and evidence syntheses (Cook et al., 2017). [Although](#)
77 [enhanced provision of evidence is not guaranteed to lead to more evidence-informed](#)
78 [decision-making, there have been many recent calls from the policy community for](#)
79 [production of more rigorous and relevant evidence reviewssyntheses \(e.g. Donnelly et](#)
80 [al., 2018; Morikawa, 2017; Uchiyama et al., 2018\), and use of rigorous syntheses of](#)
81 [‘best available evidence’ is now widely recommended in policy-making \(e.g. Research](#)
82 [and Innovation, 2019; Science Advice for Policy by European Academies, 2019\).](#)
83 [There are also and statements of intent by environmental organisations to use ‘best](#)
84 [available evidence’ \(e.g. Natural England, 2020\), and many demand-driven evidence](#)
85 [reviews have been \(and are being\) produced \(e.g. impact of the COVID-19 pandemic on](#)
86 [UK air quality; Air Quality Expert Group, 2020\). If the global body of](#) evidence reviews

87 [is are](#) reliable and accessible, then [itthey](#) can be an important option for supporting
88 decision-making (Bayliss et al., 2012; Cook et al., 2013, 2010; Pullin and Knight,
89 2005). [Unfortunately, many current environmental reviews are unlikely to be fit for the](#)
90 [purpose of informing decision making due to lack of transparency and risk of bias](#)
91 [\(O’Leary et al. 2016\).](#)

92 To support the goal of producing reliable evidence reviews, the Collaboration for
93 Environmental Evidence (CEE; www.environmentalevidence.org) has established
94 standards for collating and synthesising evidence in environmental management (CEE,
95 2018). CEE provides freely available materials and tools for helping review authors to
96 conduct rigorous, objective, replicable and transparent evidence reviews, such as step-
97 by-step methodological guidelines (CEE, 2018), a set of reporting standards of review
98 conduct (Haddaway et al., 2018) and an online tool for supporting conduct of evidence
99 syntheses to follow the standards (Kohl et al., 2018). Such methods and tools are
100 increasingly used for organising evidence (Dicks et al., 2014), as well as for raising the
101 bar for standards in research, thereby contributing to scientific advances (Gurevitch et
102 al., 2018).

103 However, the majority of currently published environmental evidence reviews do not
104 meet CEE standards, and terminology referring to systematic review and meta-analysis
105 is frequently misused (Haddaway et al., 2017; Koricheva and Gurevitch, 2014; O’Leary
106 et al., 2016; Pullin et al., 2020; Roberts et al., 2006; Woodcock et al., 2017). As a result,
107 many evidence reviews that claim to estimate impacts or effectiveness are less reliable,
108 lacking rigour, transparency and/or objectivity (Haddaway et al., 2015; O’Leary et al.,
109 2016; Woodcock et al., 2017). This is problematic for environmental decision-makers,

110 as management efforts informed by unreliable evidence reviews may be ineffective,
111 wasting limited resources and risking unintended consequences (Pullin and Knight,
112 2012).

113 Presently, evidence users face three challenges in finding relevant and reliable evidence
114 reviews:

115 • First, evidence reviews themselves may be hidden in the sheer abundance of
116 scientific publications (Forscher, 1963; Jinha, 2010; Johnson et al., 2018) with
117 evidence users often having limited time available to search literature or access
118 to databases to retrieve articles (Pullin et al., 2004; Pullin and Knight, 2005).

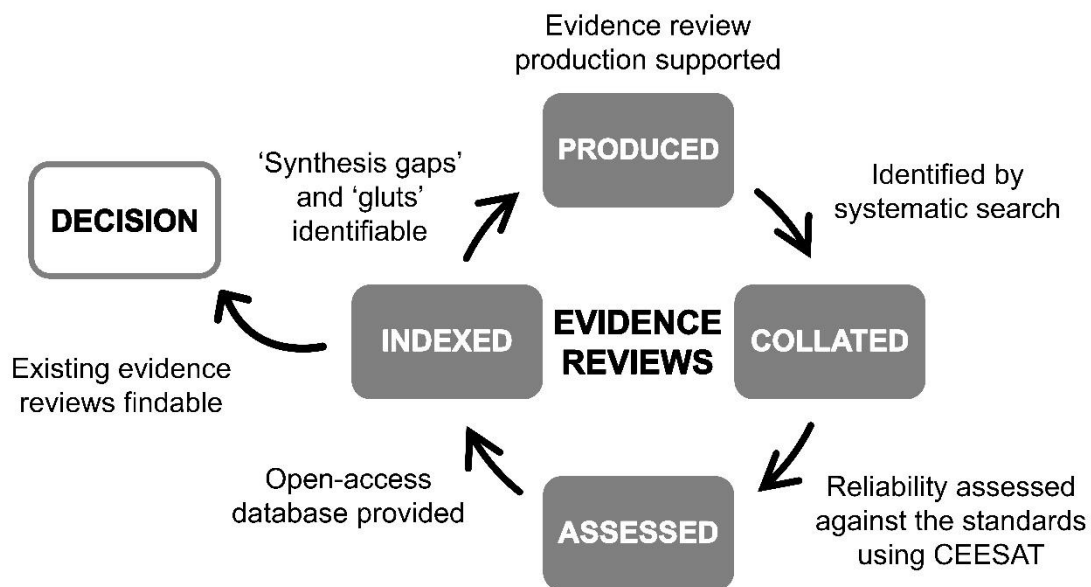
119 While one of the major justifications for conducting evidence reviews is to
120 collate primary studies for evidence users, as more and more are published, the
121 problem of large volumes of literature extends to evidence reviews themselves
122 (Gurevitch et al., 2018; Haddaway et al., 2015).

123 • Second, evidence users will increasingly have to choose which of the many
124 evidence reviews on the same subject are the most reliable sources of evidence,
125 and recognising strengths and weaknesses of evidence reviews takes time and
126 training (O’Leary et al., 2017, 2016; Woodcock et al., 2017, 2014).

127 • Third, ‘synthesis gaps’ (i.e., unaddressed review questions or obsolete syntheses
128 that need updating with new evidence) and ‘synthesis gluts’ (i.e., proliferation of
129 similar reviews) are not easily identified, making it difficult to avoid redundancy
130 of evidence reviews (O’Leary et al., 2017; Woodcock et al., 2017). In the health
131 sector, unnecessary duplication of systematic reviews has already become a
132 problem leading to research waste (Chalmers and Glasziou, 2009; Moher, 2013),

133 and a similar trend could emerge soon for reviews in the environmental sector
134 (O’Leary et al., 2017; Woodcock et al., 2017).

135 To address these problems and to help overcome some access-related barriers to
136 evidence-informed decision-making, we introduce a new online and freely available
137 evidence service: the CEE Database of Evidence Reviews (CEEDER:
138 www.environmentalevidence.org/ceder; **Figure 1**). CEEDER provides an interactive
139 database that facilitates searching for relevant and reliable evidence reviews. CEEDER
140 collates and indexes evidence reviews addressing questions relevant to environmental
141 policy and practice (see eligibility criteria in **Text S1**), and independently assesses them
142 against the methodological standards using an established assessment tool: CEE
143 Synthesis Assessment Tool (CEESAT; described below). The assessment produces
144 reliability ratings for each question addressed by a review, based on reported
145 methodology. Here, we describe an overview of CEEDER (the evidence service) and
146 the details of CEESAT (the assessment tool), and discuss how CEEDER benefits
147 decision-makers in policy and practice, and supports evidence review production.



148

Figure 1. CEEDER logic model. Evidence reviews are collated, assessed and indexed in an open-access database for decision-makers and researchers.

149 **2. The CEEDER evidence service**

150 **2.1 Aims and objectives**

151 The principal aim of CEEDER is to enable evidence users to locate relevant
 152 environmental evidence reviews that have been independently and objectively assessed
 153 for their reliability in terms of transparency, level of procedural rigour (susceptibility to
 154 bias) and limitations of primary data for synthesis. CEEDER also aims to contribute to
 155 improving the conduct and reporting of evidence reviews across the environmental
 156 sector. Thus, intended users of the CEEDER evidence service (service users) are
 157 researchers, editors and peer-reviewers, as well as decision-makers.

158 The main objectives of CEEDER are:

- 159 1. To provide an online, freely available service for evidence users to identify
160 the most robust and reliable reviews of evidence suitable and relevant to
161 their needs (e.g., for integration into policy and practice);
- 162 2. To provide a measure of alignment of environmental evidence reviews with
163 evidence needs in environmental policy and practice by identifying gaps and
164 gluts in data and reviews; and
- 165 3. To provide support to the research community to improve standards of
166 environmental evidence synthesis.

167 **2.2 Key actors in the evidence service**

168 CEEDER is currently maintained by key actors who belong to specific divisions:

- 169 • CEEDER Executive Team
- 170 • CEEDER Editorial Team
- 171 • CEEDER Review College

172 The Executive Team developed CEESAT (**Section 2.5**), and provides strategic
173 leadership of CEEDER. The Editorial Team administers the evidence service, and
174 manages the CEEDER process (including assessments) and communications. The
175 Review College is a large group of members, trained by experienced mentors, who
176 assess evidence reviews for their reliability using CEESAT.

177 **2.3 Scope of evidence reviews**

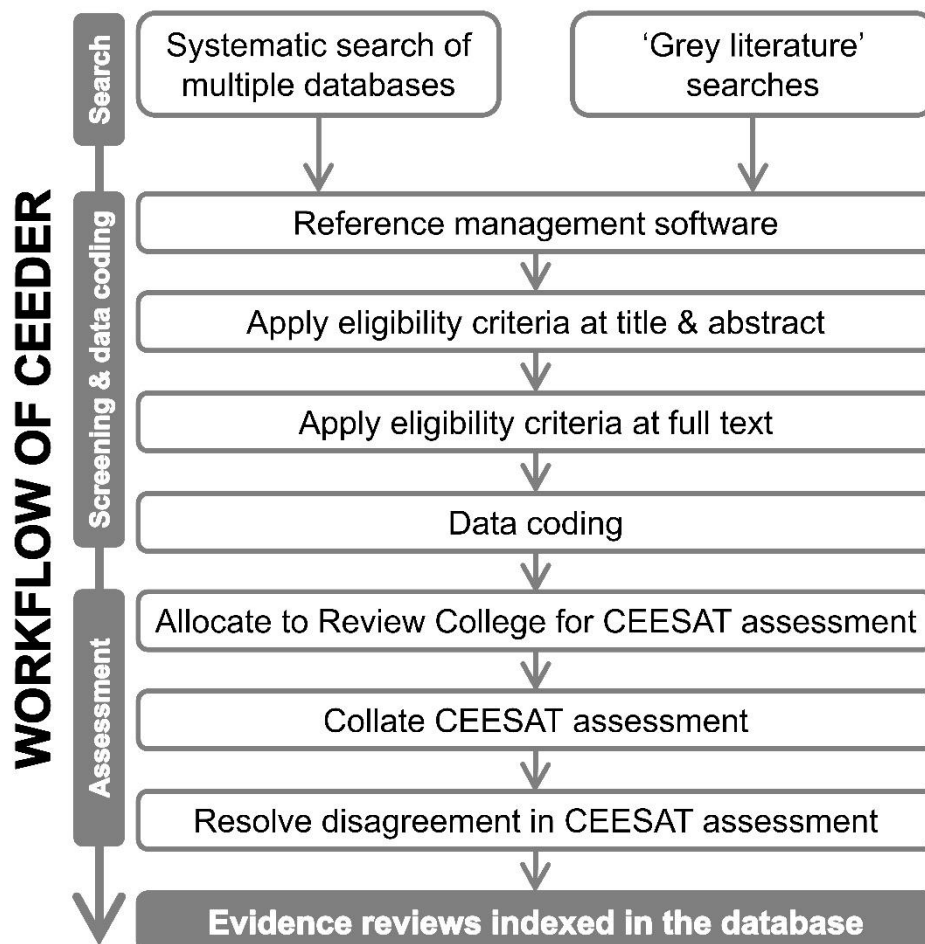
178 The scope of evidence reviews included in CEEDER covers the global environmental
179 sector. CEEDER is regularly updated (see **Section 2.4**) and includes evidence reviews
180 dating from 2018. To be included in CEEDER, the review should: (1) address a

181 question or a topic with relevance for environmental policy or practice; and (2) have the
182 intent to synthesise primary studies (either narratively or quantitatively) and provide a
183 measure or estimate of effect (e.g., impact of an activity or effectiveness of an
184 intervention; see **Text S1** for detailed criteria and methods). Reviews that simply
185 describe a potential cause of impact or an intervention, or ‘expert’ opinion articles are
186 not included unless the authors claim to provide a measure of effect. Configurative
187 evidence reviews, that assess only distribution and abundance of evidence (e.g.,
188 overviews and systematic maps (CEE, 2018; Gough et al., 2012; James et al., 2016)),
189 are therefore currently excluded although they may be included in the future (**Section**
190 **3.4**). The review questions included in the database therefore vary from broad global
191 issues (e.g., impact of plastic waste on the marine environment) to precise cause and
192 effect relationships in single species or restricted areas. Note many review articles
193 address multiple questions of impact or effect, some of which may not be eligible for
194 CEEDER and so assessment are made with respect to individual questions (**Text S1**). In
195 addition to the source review article information, all of the eligible questions addressed
196 in a review article are coded in a standard format for service users to easily find relevant
197 evidence reviews (**Section 2.6**). Evidence reviews addressing subjects closely related to
198 environmental management, such as human health and animal veterinary science are
199 included when there is a significant environmental impact or intervention component in
200 the question.

201 **2.4 Workflow of the evidence service**

202 CEEDER follows a specific workflow consisting of four key steps: (1) searching; (2)
203 screening and data coding; (3) assessment (rating); and (4) data presentation. Each

204 consists of a series of activities (**Figure 2; Text S1**). It starts with collecting potential
 205 evidence reviews by comprehensive searches of multiple bibliographic databases and
 206 grey literature followed by eligibility screening, data coding, and assessment of
 207 evidence reviews using CEESAT, and indexing evidence reviews in the database. To
 208 provide an up-to-date archive of evidence reviews, searches are updated monthly, and
 209 records are actively screened. The entire process provided in **Figure 2** is overseen by
 210 the Editorial Team and the assessment is conducted by the Editorial Team and Review
 211 College members.



212

213

Figure 2. Workflow of CEEDER.

214 **2.5 CEE Synthesis Assessment Tool (CEESAT versions 1 and 2)**

215 The original tool, CEESAT v1, was developed in 2013 for assessing evidence reviews
216 (see Woodcock et al., 2014), and has subsequently been tested and modified (O’Leary et
217 al., 2017, 2016; Woodcock et al., 2017). An updated version, CEESAT v2, was
218 produced following a two-day workshop in Stockholm in 2017; this is the version that is
219 currently applied for assessment in CEEDER (see **Table 1** for summary: full version is
220 available at www.environmentalevidence.org/ceeder). In CEESAT v2, there are seven
221 review components consisting of 16 elements. For each of the 16 elements, an evidence
222 review is rated as either: Gold, Green, Amber or Red. The Gold and Green ratings
223 equate to the high and minimum standards respectively recognised by CEE for evidence
224 synthesis in environmental management (except for the elements 7.1, 7.2 and 7.3 that
225 assess provision of statistical estimates, variances and heterogeneity which may not be
226 possible because of limitations of primary data), while Red is regarded as unreliable.
227 Note that CEESAT (v1 and v2) does not distinguish between lack of reporting of
228 methodological steps in the review process and lack of implementation of them. For
229 example, failure to report methods that might have reduced risk of bias is considered
230 equivalent to not implementing them.

231 The question explored by each review is identified by the Editorial Team and provided
232 to the Review College (this is often only a subquestion/subsection of the entire review).
233 All question elements (known as ‘PICO’ or ‘PECO’ elements: **P**opulation (statistical or
234 biological), **I**ntervention/**E**xposure, **C**omparator and **O**utcome) required for measuring
235 effect are determined by applying the eligibility criteria (**Text S1**), and then coded for
236 allocations to the Review College. Review College members thus can identify what

237 question they are being asked to assess for each review and service users can see the
 238 question for which the review was assessed. To provide consistent reliability ratings in
 239 CEEDER, at least two members from the Editorial Team/Review College independently
 240 assess each evidence review with disagreements checked and, if necessary, resolved by
 241 the Editorial Team.

242 **Table 1.** 16 Elements of CEESAT v2 criteria and corresponding review components.

Review components	16 elements of CEESAT v2 criteria
1. Review question	1.1 Are the elements of review question clear?
2. Method/Protocol	2.1 Is there an a-priori method/protocol document?
3. Searching for studies	3.1 Is the approach to searching clearly defined, systematic and transparent?
	3.2 Is the search comprehensive?
4. Including studies	4.1 Are eligibility criteria clearly defined?
	4.2 Are eligibility criteria consistently applied to all potentially relevant articles and studies found during the search?
	4.3 Are eligibility decisions transparently reported?
5. Critical appraisal	5.1 Does the review critically appraise each study?
	5.2 During critical appraisal was an effort made to minimise subjectivity?
6. Data extraction	6.1 Is the method of data extraction fully documented?
	6.2 Are the extracted data reported for each study?
	6.3 Were extracted data cross checked by more than one reviewer?
7. Data synthesis	7.1 Is the choice of synthesis approach appropriate?

7.2 Is a statistical estimate of pooled effect (or similar) provided together with measure of variance and heterogeneity among studies?

7.3 Is variability in the study findings investigated and discussed?

7.4 Have the authors considered limitations in the synthesis?

243

244 **2.6 Service platform**

245 To provide a user-friendly, functional and useful service platform, we took a user-
246 centred design approach where potential service users were engaged in multiple rounds
247 of scoping and testing for developing the beta version of the platform
248 (www.environmentalevidence.org/ceeder). A CEEDER workshop was held in Cardiff
249 (UK) in July 2019 to engage with potential service users from Welsh Government and
250 Natural Resources Wales. This engagement with stakeholders yielded pertinent
251 information needs they wished to be displayed in the website and suggestions for
252 functionality and visualisation. This beta version website features the evidence review
253 database along with functionality for querying and visualising results. Further, we have
254 invited potential service users from other governmental organisations for an online
255 questionnaire survey via email and website. While this process is ongoing, we welcome
256 further opportunities for co-production, discussion and comment from potential service
257 users. Here, we describe the currently developed functionality and support for review
258 authors, editors and peer-reviewers.

259 ***2.6.1 Search functionality***

260 Service users can use keywords to search the database for: (1) titles, abstracts and
261 keywords of the source article; (2) coded review questions; or (3) a combination of

262 these two search options. Basic search functions such as some Boolean operators (AND
263 and OR), wildcards, parentheses and quotation marks can be used.

264 Returned results feature bibliographic information and coded review question along
265 with visual representation ratings for all 16 assessment criteria of CEESAT v2. Search
266 results can be sorted by the reliability ratings of each of the 16 elements, enabling
267 service users to find the most reliable evidence reviews based on categories they deem
268 of importance to them. Further information about the evidence review, including title,
269 abstract, year, authors and a link to the full text can be obtained. The website also
270 allows service users to export the search results as, for example, a CSV file.

271 ***2.6.2 Support for authors, editors and peer-reviewers***

272 We recognise that limitations in evidence reviews may be partly a consequence of the
273 resources required to follow the most rigorous methodology, as well as perhaps lack of
274 awareness of some aspects of these methods. To support improvements in the reliability
275 of evidence reviews across the environmental sector, the CEEDER website provides
276 guidance on what materials and tools are freely available to review authors, editors and
277 peer-reviewers. Currently, this includes links to: CEE Guidelines and Standards for
278 Evidence Synthesis (CEE, 2018); ROSES, a set of reporting standards (Haddaway et al.,
279 2018); and CADIMA, an online tool for supporting the conduct of evidence syntheses
280 (Kohl et al., 2018). In addition, the full assessment criteria of CEESAT (currently v2)
281 are provided and authors, editors and peer-reviewers are encouraged to use them as a
282 planning guide to support the standards expected of reliable evidence reviews.

283 **3. Discussion**

284 **3.1 How CEEDER benefits evidence users**

285 CEEDER provides an open-access database of independently assessed evidence reviews
286 from which users can easily find relevant and reliable evidence reviews, and export their
287 search results. The reliability ratings based on the 16 CEESAT criteria enable users to
288 compare the reliability of evidence reviews. Although current licensing agreements do
289 not allow us to provide the full texts of each assessed evidence review, CEEDER
290 provides the necessary information and links for users to navigate to the original
291 publication websites. We believe that using CEEDER would reduce the time required
292 for locating relevant evidence reviews and screening them for rigour in comparison to
293 using web-based search engines (e.g., Google Scholar, Google) or subscription-based
294 bibliographic platforms (e.g., Scopus, Web of Science). CEEDER may offer a higher
295 value to users, and we are committed to enabling easier location of relevant and reliable
296 evidence reviews through further engagement and co-production.

297 Early stakeholder engagement suggests that evidence users would like to avoid
298 consequences of unknowingly using unreliable evidence reviews. Indeed, they
299 requested CEEDER to provide educational resources for deepening their understanding
300 of the concept of risk of bias (CEE, 2018; Higgins et al., 2019). We are therefore
301 planning to provide such resources and links to relevant literature and external websites
302 for users. Thus, the evidence service will have the potential to support the policy and
303 practice communities to build critical skills capacity (e.g., critical thinking of scientific
304 claims and methods used) and to increase access to evidence reviews which might

305 enable better evidence-informed decision-making (Aronson et al., 2019; Donnelly et al.,
306 2018).

307 **3.2 How CEEDER supports evidence review production**

308 Another objective of CEEDER is to support review authors, editors and peer-reviewers
309 in producing more reliable evidence reviews. To achieve this, CEEDER’s website
310 provides guidance to users on materials and tools for building capacity to collate and
311 synthesise evidence. It has been argued that the importance of formal training in
312 environmental evidence reviews should be recognised in academia (Kareiva and
313 Marvier, 2012). CEEDER is designed to raise awareness of the formally established
314 evidence synthesis methodology and its value for the research community.

315 CEEDER will support more efficient and effective production of evidence reviews by
316 providing users with a dynamic searchable database of reviews from which they can
317 search for and identify reviews of interest. For example, reviews are coded by research
318 question—so if users (say future review authors) were to check existing reviews on
319 ‘climate change’, they could easily see what review questions are already addressed on
320 the topic and determine where gaps remain to be filled and what areas have already
321 been extensively and rigorously covered (gluts). Further, we are planning to provide
322 visual exploration features in the service platform which may enable easier
323 identification of gaps and gluts. The evidence service may also facilitate linkage
324 between the production side and the user side of evidence reviews which in turn may
325 motivate evidence review producers to generate reliable evidence reviews for
326 unaddressed review questions (O’Leary et al., 2017), as well as to update existing
327 evidence reviews (Bayliss et al., 2016; Pullin, 2014). CEEDER therefore provides an

328 opportunity for evidence review producers to engage with evidence users, as well as to
329 effectively and efficiently produce reliable evidence reviews for informing decisions.

330 **3.3 Challenges and limitations**

331 CEEDER itself is open-access; however, it cannot provide open-access to all articles
332 since following links will often lead to a ‘paywall’. Consequently, it does not solve the
333 problem of lack of access to scientific publications—a challenge faced by many
334 organisations and individuals who may wish to use evidence for informing their work.
335 Hopefully, with the increase in open-access publishing, this will become less of a
336 problem over time.

337 There are challenges for users in interpretation of the CEEDER review appraisals and
338 we plan to develop online help and training to address this. Currently, the CEEDER
339 website provides advice on interpretation of overall review appraisals and the individual
340 criteria. For example, the CEESAT estimate of reliability of each review is not
341 equivalent to an estimate of the probability of the review findings being an accurate
342 estimation of the truth. CEESAT does not identify specific errors (e.g., statistical or
343 errors in searching and screening articles) or scientific fraud. Therefore, in the same
344 sense that journals cannot guarantee the papers they publish do not contain errors or
345 fraudulent claims, a high reliability rating cannot guarantee the findings of the evidence
346 review are sound.

347 As mentioned above, CEEDER indexes evidence reviews published from 2018. For
348 practical reasons, we are not planning to index reviews published in 2017 or before.
349 However, this limitation is likely to become progressively less important as new
350 primary research and review articles are published. Furthermore, evidence reviews

351 published from 2018 onwards which are rated as being reliable (i.e., whose searches
352 were likely to have been extensive) should capture (include, discuss or list) any
353 pertinent evidence reviews published prior to 2018, subject to any date restrictions
354 applied within the reviews themselves. Therefore, by identifying the most reliable
355 recent evidence reviews, CEEDER may also assist service users in the location of older
356 evidence reviews, if required.

357 **3.4 Future development of CEEDER**

358 CEEDER currently includes evidence reviews addressing only specific types of
359 questions (**Text S1**). More diverse types of review question exist, and some of those
360 may be included in the future. For example, environmental evidence reviews frequently
361 assess interventions or exposures that are not compared against defined comparators,
362 such as ‘what is the prevalence of rabies in European red fox populations?’ Collating
363 reviews addressing this type of question might be useful for evidence users although it
364 is not designed to answer causal effects or effectiveness of interventions.

365 CEEDER currently excludes reviews of qualitative research. Qualitative evidence
366 syntheses can help evidence users contextualise environmental issues by addressing
367 questions seeking qualitative data such as ‘why does an intervention work, for whom
368 and in what circumstances?’ (CEE, 2018; Macura et al., 2019). However, CEESAT is
369 designed to assess evidence reviews providing measure of effect, and therefore for
370 CEEDER to index qualitative evidence syntheses, a dedicated assessment tool would
371 need to be developed and tested.

372 Configurative evidence reviews, that only describe the nature of evidence and collate
373 relevant primary studies but do not attempt to synthesise their findings (e.g., overviews

374 and systematic maps (CEE, 2018; Gough et al., 2012; James et al., 2016)), are currently
375 excluded from CEEDER. However, there could be potential benefits of including this
376 type of evidence review since configurative reviews as well as aggregative reviews are
377 prone to variation in reliability.

378 CEEDER is currently designed to cover evidence reviews of relevance to environmental
379 policy and practice. Evidence reviews assessing scientific methods, as well as other
380 subjects such as animal behaviour may be included in the future to expand the subject
381 scope of the evidence service.

382 **4. Conclusions**

383 The CEEDER evidence service supports evidence-informed decision-making in the
384 environmental sector by enabling the identification of pre-screened reliable evidence
385 reviews in a searchable open-access database. CEEDER will also help to identify gaps
386 and gluts in evidence reviews in environmental management and support production of
387 more reliable evidence reviews by providing resources for authors, editors and peer-
388 reviewers. We welcome further engagement with the CEEDER evidence service by
389 users and user organisations to facilitate co-production of the service and ensure its
390 relevance to their evidence needs.

391 **Supplementary materials**

392 **Supplementary file S1.** CEEDER methods

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