



Collaboration for
Environmental
Evidence

2023 ANNUAL REPORT

www.environmentalevidence.org





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A Message from the Board of Trustees



The world is facing unprecedented environmental challenges, and the need for effective, evidence-informed solutions has never been more pressing. It is with great pleasure therefore that I present the Board's 2023 Report for the Collaboration for Environmental Evidence (CEE), which outlines the collective efforts, achievements, and challenges faced by our community over the past year to support evidence synthesis researchers, deliver crucial evidence services to users, and expand the scope and efficacy of evidence-informed decision-making in environmental management.

I was delighted to welcome Dave Stone, Chief Scientist of the UK's Joint Nature Conservation Committee, to the Board in February 2023. Dave's wealth of experience in UK research and policymaking, combined with his passion for evidence synthesis, will be invaluable as we continue to enhance the diversity and expertise of the CEE Board. We remain committed to attracting individuals from diverse backgrounds and regions, particularly outside of Europe and North America, who share our dedication to evidence-informed environmental decision-making.

The Board was also pleased to welcome Dr Biljana Macura, from the Stockholm Environment Institute in Sweden, as the new joint Editor-in-Chief for CEE's *Environmental Evidence* journal, to work alongside Andrew Pullin until he retires from his role as founder Editor-in-Chief in late 2024. In addition, Board member Steven Cooke assumed the new role of joint Editor-in-Chief with responsibility for new article types.

The journal is one of CEE's flagship products, providing both research and user communities with quality syntheses and other articles that were downloaded over 700,000 times in 2023. Ten new Plain Language summaries of recent Systematic Reviews were published on our website. CEE continued developing a range of cutting-edge, open-access products to enhance accessibility and quality of environmental

evidence. These include a critical appraisal tool for evaluating 'risk of bias' in primary studies assessing effectiveness of interventions or impacts of exposures in environmental management, and PROCEED, a global database of prospectively registered evidence reviews and syntheses in the environmental sector, which should ensure others are alert to environmental evidence reviews/syntheses already in progress, avoiding duplication and allowing more effective planning in decision-making. These initiatives depend on the tireless efforts of a small group of amazing volunteers, and they demonstrate CEE's commitment to driving evidence-informed decision-making in environmental management.

The Board, the project teams, and Centres continued to develop the next 10-year strategy for CEE, based on three pivotal themes that will drive our mission to catalyse evidence-informed decision-making in environmental management by governments, NGOs, industry, and similar entities, with plans to publish it in early 2024.

CEE has faced significant resource challenges in recent years, exacerbated by the widespread general financial and political upheavals, longer term impacts of the pandemic, and a changing academic recognition culture that increases pressure on research staff and students. However, CEE continues to demonstrate its resilience and adaptability, thanks to the constant dedication of our volunteers and support of our stakeholders. We remain committed to our mission to see the environment survive and flourish through the most effective interventions, and we are confident that, together, we can overcome these challenges and continue to drive evidence-informed decision-making in environmental management.

A Message from the CEO



During this year CEE has engaged in extensive discussions to shape our Strategic Plan for the next ten years (2024-33). Strategic Planning is often viewed as an unexciting exercise resulting in a document that sits on a shelf only to be used to write the next Strategic Plan. I don't see it this way at all, particularly for a volunteer-based organisation like CEE. With limited resources at our disposal, we need to ensure that we concentrate on actions that we can sustain into the future and will continue to have impact. This is a particular challenge for CEE as we are committed to providing free services wherever possible. Our first Strategic Plan implemented in 2013 set goals that were largely achieved in key project areas such as our Journal (Environmental Evidence), Guidance and Standards for evidence synthesis, Meetings and Communications, and new projects, unanticipated in the Strategic Plan, such as our evidence service (CEEDER). These achievements were only possible due to the willingness of many volunteers to devote some of their precious time to work for CEE. For the new Strategic Plan, my personal priorities have been to ensure we can at least sustain these activities as well as responding to key developments in the evidence synthesis field. Like many volunteer-based organisations, our biggest challenge over the last ten years has been to develop an organisational structure that allows sustainable development, resilience and agility, whilst not placing too much burden, or dependence, on individual volunteers. To this end we have developed a structure based on Teams of volunteers responsible for key activities and projects, as well as having the Board of Trustees a small Executive Office

and, of course, our Centres. The Teams will take responsibility for both Internal activities such as, Communications, Meetings, and People and Culture (human resources and finance), whilst others focus on projects and services such as our Journal, Guidance & Standards, Training, and CEEDER. Although we have modest sources of funding for some of these and hope to receive more in the future, the ambitious programme of work to be set out in our new Strategic Plan (to be published in 2024) will rely heavily on the success of these Teams. Although we already have some fantastic volunteers, as we expand our activities, ensuring the workload is sufficiently spread across our network means recruiting more individuals prepared to volunteer their time to lead in key areas of activity. This is both a challenge for CEE and also a great opportunity for others to get involved and take leadership of an organisation promoting the synthesis and use of evidence for better environmental management.

- Andrew Pullin



**Collaboration for
Environmental
Evidence**

CEE Officers



Andrew Pullin
Chief Executive Officer
Professor of Evidence-Based Conservation,
Bangor University, UK



Meagan Harper
Assistant to the Secretary
PhD Student, Biology
Carleton University, Canada



Morgan Piczak
Communications Officer
Website and Social Media
PhD Candidate, Biology
Carleton University, Canada



Andrew Kadykalo
Communications Officer
Plain Language Summaries
Postdoctoral Researcher,
McGill University, Canada

CEE Board of Trustees



Kathryn Monk
Chair
Honorary Professor, Swansea
University, UK



Steven Cooke
Honorary Secretary and Trustee
Director of the Institute of Environmental and
Interdisciplinary Science, Carleton University,
Canada



Ruth Garside
Trustee
Professor in Evidence Synthesis,
University of Exeter



Henrik Smith
Trustee
Director of the Centre for Environmental and
Climate Research, Lund University, Sweden



Neal Haddaway
Trustee
Senior Research Fellow, Stockholm
Environment Institute, Sweden



Ruth Stewart
Trustee
Founding Chair, Africa Evidence
Network



Gill Shepherd
Trustee
Visiting Professor, Department of the
London School of Economics and
Political Science, UK



Matthew Grainger
Trustee
Researcher, Norwegian Institute for
Nature Research, Norway



Dave Stone
Trustee
Chief Scientist, UK Joint Nature
Committee, UK

The Collaboration

CEE Mission

To effectively promote an evidence-based approach to environmental management by facilitating the conduct and dissemination of high-quality syntheses of evidence that will inform decision making and better conserve biodiversity and ecosystem services for global benefit.

CEE Vision

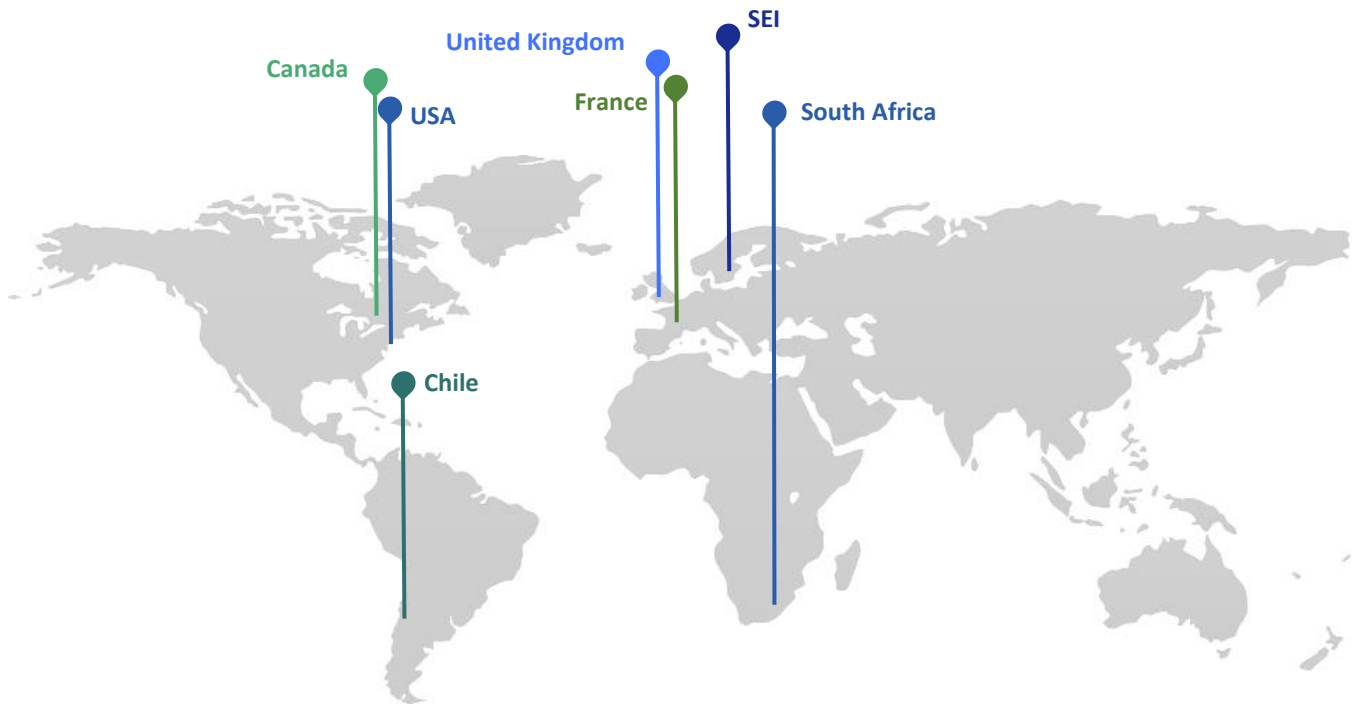
Effective environmental management resulting from policy and management decisions that are informed by the best available evidence on questions of concern.

A culture of scientific evaluation of environmental management through objective assessment and synthesis of available evidence.

A society that appreciates and is supportive of the role of science in informing decisions that affect the environment and human wellbeing.



CEE Centres in 2023



The CEE is a global collaboration that has a network of Centres around the world

Centres contribute to the work of the CEE by encouraging evidence-based practice and systematic review activity within their geographic region. At present there are seven national CEE Centres, based in Canada, Chile, France, South Africa, the United Kingdom, the United States of America, and one international CEE Centre (SEI). Centres obtain their own funds to perform centre functions.

<https://environmentalevidence.org/cee-centres/>

Centre Snapshots 2023

Canadian Centre for Evidence-Based Conservation

2023 was a productive and collaborative year with several Evidence Syntheses with national and international partners, including some significant projects with the U.S. Fish & Wildlife Service and Parks Canada. Centre members attended the “What Works Global Summit” in Ottawa. Members support CEE on the Board (1 member), the Executive Office (1), the CEEDER Editorial Board and Review College (3) and as communications officers (2).



Fondation pour la Recherche sur la Biodiversité (FRB)

FRB ran two systematic review courses in 2023, an introductory methods workshop, and a 4-day in-depth course in collaboration with IRN Wan@bi: West African Network on Biological Invasions. Additionally, calls for research projects were produced, with work continuing into 2024. FRB continues to support the CEE Trainings Team.



Stockholm Environmental Institute (SEI)

The SEI CEE Centre continues to be involved in evidence synthesis activities in a variety of topics relevant to the environment and development. This year Dr. Biljana Macura took on the coordination of the SEI CEE, and will be joining *Environmental Evidence* as co-Editor-in-Chief in 2024.



CEE South Africa (Formerly CEE Joburg)

In 2023 CEE Joburg became CEE South Africa and has a new organizational host at the Pan-African Collective for Evidence. Members were participants at Evidence 2023, the biennial event of the Africa Evidence Network, the What Works Global Summit in Ottawa, and are on the Scientific Steering Committee for the “What Works Climate Solutions Summit” (Berlin 2024). CEE South Africa team members serve on the board (1 member) and the Editorial Board of *Environmental Evidence* (1).



CEE Centre UK

The Centre continued to be involved in many CEE activities in 2023. As well as acting on the Training Team (2 members), CEE Centre UK hosted two 4-day CEE evidence synthesis courses (funded by NERC) and rapid review training with UK bodies including Environment Agency, among others. Members are on the CEE board (1), are *Environmental Evidence* and PROCEED handling editors (2) and PROCEED rolling editor-in-chief (2).



U.S. Centre based at the Center for Biodiversity and Conservation

This year saw the U.S. Centre transition to Affiliated Group status. CEE thanks the Centre for Biodiversity and Conservation for their continued involvement within the CEE community and looks forward to working with them in their new capacity.



Communications Strategy



CEE Communications and Engagement Strategy

Aims to:

Ensure effective communication among the CEE Centres and beyond

Provide a strategy to share knowledge and coordinate activity among the CEE Centres

Provide clarity and consistency in the development and delivery of key messages

Provide a framework to build awareness of the CEE and celebrate achievements

Define roles and scope with respect to communications

Define review and evaluation processes.

Under the direction of the CEE Communications Team, Morgan Piczak (website and social media) and Andrew Kadykalo (Plain Language Summaries) continued the role of joint Communications Officers. Their responsibilities included conducting the communications work set out in the CEE Strategic Plan and overseeing activities across various communications channels and functions.

The priority for the CEE Communication Team in 2023 has been to further refine the Communication Plan and develop the Team Strategic Plan to ensure that limited resources are best focused on activities with maximal output. Leveraging journal outputs including the summaries and maintaining an active social media presence remain essential activities. Efforts to further expand CEE's YouTube Channel and to highlight the activities of the CEE (such as External Meetings and CEEDER) were top priorities.

Evidence Services

Environmental Evidence

New and upcoming evidence

5 Systematic Map protocols

6 Systematic Review protocols

11 Systematic Maps

5 Systematic Reviews

<https://environmentalevidencejournal.biomedcentral.com/>

Plain Language Summaries

New evidence to save users valuable time

10 Systematic Map summaries

5 Systematic Review summaries

<https://environmentalevidence.org/policy-briefs/>

CEEDER

Assessing quality of new syntheses

65 Evidence Overviews

223 Evidence Reviews

<https://environmentalevidence.org/ceeder-search/>

PROCEED

New registered protocols

12 Systematic Map protocols

11 Systematic Review protocols

1 Rapid Review
3 Other reviews (configurative or aggregative)

<https://environmentalevidence.org/proceed/>

CEE at What Works Global Summit 2023

Part of the Collaboration for Environmental Evidence mission as a global network is to promote rigorous evidence synthesis for environmental management. CEE joined over 300 delegates at the What Works Global Summit 2023, co-hosted by the Campbell Collaboration and the Bruyère Research Institute in Ottawa Canada. The theme of the 3-day summit was 'Evidence for Global Challenges' and covered diverse topics ranging from climate change solutions to equity and inclusion, to evidence synthesis capacity building. The summit brought together researchers, evidence-based decision makers and practitioners to share the latest in evidence synthesis methods, practices, and research.

Ruth Stewart (CEE Board Trustee), Ruth Garside (Board Trustee), Steven Cooke (Board Trustee and WWGS2023 Science Advisor), Trina Rytwinski (Canadian CEBC research associated) and Meagan Harper (Assistant Secretary to the Board), represented CEE by attending and presenting in sessions on a variety of topics, sitting on several panels, and hosting workshops. CEE was able to build on its visibility among the wider evidence synthesis community during the summit by participating as an exhibitor. During WWGS2023, the Communications Team used X (formerly Twitter) and LinkedIn to promote sessions with CEE members and Centre involvement, highlighting talks on evidence syntheses done in environmental management and conservation, to CEE standards.

There were many synergies and opportunities for potential future activities with other Collaborations identified during the Summit, such as synergies on environment, health and climate change, or Sustainable Development Goals. It is encouraging to see how open other Collaborations, such as Campbell, are to building on these synergies in the future. Continued efforts to foster these collaborations will be an ongoing goal for the CEE. CEE plans on attending additional external meetings in the coming year, such as the What Works Climate Solutions Summit in Berlin, to help foster these connections and increase CEE's influence on the evidence community.

Selected presentations and workshops:

- Plenary: Lessons learned from COVID-19 for rapid evidence synthesis (Ruth Stewart)
- Workshop: Introduction to Qualitative Evidence Synthesis: what, why, when and how? (Ruth Garside)
- Presentation: Amplifying the impact of environmental research and institutionalizing evidence-based decision-making: the Canadian experience (Steven Cooke)
- Presentation: Evidence syntheses to support hydropower management and policy (Meagan Harper)



WHAT WORKS
GLOBAL SUMMIT 2023

CEE Community Spotlight



The CEE Database of Evidence Reviews [\(CEEDER\)](#) is an open access Evidence Service aiming to help policy makers, managers, funders, and the general public in finding reliable evidence syntheses to inform environmental decisions. In 2023 Barbara Livoreil became CEEDER Manager, welcoming new members to the CEEDER teams and Review College. Barbara's efforts have increased CEEDER's visibility and community interest. She took some time to describe her experience and the future of CEEDER:

The first time I heard about the Collaboration for Environmental Evidence was at an international conference of the Society for Conservation Biology, more than 15 years ago. Working as a scientific officer in field-based conservation, I found systematic reviews so relevant I progressively learnt, promoted and taught evidence synthesis and kept doing so since then. I joined CEEDER first as a Review College member, then contributed to Title & Abstract screening and finally joined the Full text screening and metadata extraction team. In 2022, Andrew Pullin proposed that I take over the management of the CEEDER programme, succeeding Jessica Taylor who had been there since the beginning. Thanks to the efficient mentoring from Jessica and Andrew, I discovered all the steps underlying the development of the database.

The main activity of the CEEDER manager is to oversee preparation and conduct of the Rounds of assessments of reviews and overviews. Challenges are to keep the Rounds on time throughout the year, motivate volunteers, and train new ones. We aim at updating the CEEDER database within 6 months after relevant reviews are published, but we need to increase the number of volunteers, and make the processes more efficient. In 2023 we have developed material for training new volunteers willing to join Title and Abstract, Full Text Metadata extraction, and the Review College. A registration form and a series of videos were created to introduce CEEDER and its various teams. Meetings have been organised regularly to answer questions and keep volunteers informed about any advancements.

From this experience we aim to develop self-training online modules to facilitate the process. Another challenge is the future of CEEDER. We started to write a strategic plan that encompasses both internal concerns and the challenge of making CEEDER useful to a large community of users (i.e., researchers, decision makers and policymakers, students...). First, the database had to be developed based on the rigour and transparency that CEE promotes for evidence synthesis. Now that CEEDER is a well-populated database, with already 2000 reviews and overviews, we need to explain how it can be used for training, teaching, and decision making. This may require transforming the interface (currently the website) into something more convenient for users, with more explanations regarding the assessments and their consequences for decision-making. Developing a new interface, presentations, videos, and new tools will be the challenges for future years. CEEDER sustains the efforts of CEE in developing and highlighting high quality evidence synthesis.

Working freelance since 2021, I have more time to dedicate to CEEDER and environmental endeavours, which I really enjoy. Nothing would be possible without the dedication of many people from various parts of the world, various backgrounds and professional skills. Developing a more visible community of contributors and users and integrating technological advances such as AI will be major goals of the CEEDER strategic plan over the next 10 years.

- Barbara Livoreil 13

Environmental Evidence Journal

The official journal of the CEE is *Environmental Evidence*, an open-access journal that accepts submission of Systematic Reviews, Systematic Maps, Rapid Reviews, review and map protocols, Evidence in Action articles, commentaries, research and methodological papers related to the conduct of Systematic Reviews, evidence generation, synthesis, use and impact.

Editors-in-Chief

- Prof Andrew Pullin, Bangor University, UK

Senior Editors

- Prof Paul Ferraro, John Hopkins University, United States of America
- Prof David B Lindenmayer, Australian National University, Australia
- Prof Hugh Possingham, University of Queensland, Australia

Associate Editors

- Ruth Garside, PhD, University of Exeter, UK
- Nicola Randall, PhD, Harper Adams University College, UK
- Steven Cooke, PhD, Carleton University, Canada
- Biljana Macura, PhD, Stockholm Environment Institute, Sweden

Editorial Board

- Péter Batáry, Georg-August University, Germany
- Monique Borgerhoff-Mulder, UC Davis, USA
- András Báldi, Hungarian Academy of Sciences, Hungary
- Samantha Cheng, American Museum of Natural History, USA
- Carly Cook, Monash University, Australia
- Mélanie Douziech, Agroscope, Switzerland
- Adam Felton, Swedish University of Agricultural Sciences, Sweden
- Geoff Frampton, Southampton University, UK
- Louise Glew, World Wildlife Fund, USA
- Elena Kulinskaya, University of East Anglia, UK
- Malgorzata Lagisz, University of New South Wales, Australia
- Barbara Livoreil, Fondation pour la Recherche sur la Biodiversité, France
- Gabor Lovei, University of Aarhus, Denmark
- Alejandro Martinez-Abraín, University of A Coruña, Spain
- Gillian Petrokofsky, University of Oxford, UK
- Carina van Rooyen, University of Johannesburg, South Africa
- Karen E. Smokorowski, Carleton University, Canada
- Yefeng Yang, University of New South Wales, Australia

Annual Journal Metrics

Citation Impact*

3.3 - 2-year Impact Factor

5.1 - 5-year Impact Factor

1.084 - SNIP (Source Normalized Impact per Paper)

0.967 - SJR (SCImago Journal Rank)

Speed

4 days submission to first editorial decision for all manuscripts (Median)

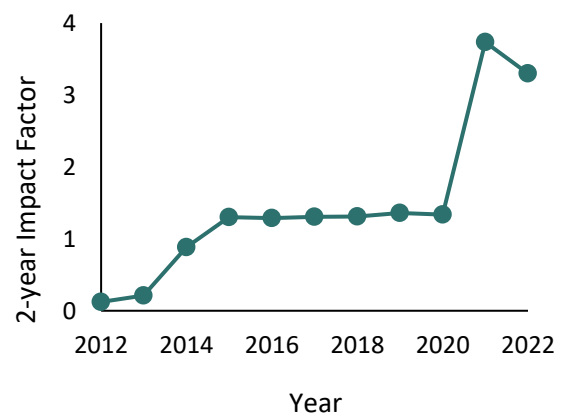
150 days submission to accept (Median)

Usage

659,656 downloads

2,781 Altmetric mentions

**Citation impact details are updated in the middle of the calendar year following the release of these metrics by both Clarivate Analytics and Scopus. (2023 metrics will be released in mid-2024)*



Featured Reviews



Photo by Jason Blackeye on Unsplash

Evidence on the efficacy of small unoccupied aircraft systems (UAS) as a survey tool for North American terrestrial, vertebrate animals: a systematic map

Elmore, J.A., Schultz, E.A., Jones, L.R. et al. Evidence on the efficacy of small unoccupied aircraft systems (UAS) as a survey tool for North American terrestrial, vertebrate animals: a systematic map. *Environ Evid* 12, 3 (2023). <https://doi.org/10.1186/s13750-022-00294-8>

This synthesis systematically mapped the current state of knowledge on the efficacy and use of small unoccupied aircraft systems (UAS) to replace or supplement occupied aircraft and ground surveys in animal monitoring. The map describes the distribution of evidence and provides a searchable database to information future decision-making on the topic. The map identified several topic clusters, including: (1) evidence on the types of factors and constraints influencing UAS imagery (e.g., resolution and obstruction); (2) evidence on the types of UAS and sensors used; (3) evidence on the types of ecosystems and species studied. In addition to determining that many studies considered single species, other areas with high abundance of articles were those considering large mammals and birds in open landscapes. The systematic map identified several gaps in the current research on UAS, such as research on best practices for conducting standardized surveys and surveying whole wildlife communities. Another gap was identified in the types of sensors used, with thermal and nocturnal surveys much less represented than those conducted with visible (RGB) sensors. Further to improve image quality and automating surveys is recommended.

Effects of mosquito control using the microbial agent *Bacillus thuringiensis israelensis* (Bti) on aquatic and terrestrial ecosystems: a systematic review

Land, M., Bundschuh, M., Hopkins, R.J. et al. Effects of mosquito control using the microbial agent *Bacillus thuringiensis israelensis* (Bti) on aquatic and terrestrial ecosystems: a systematic review. *Environ Evid* 12, 26 (2023). <https://doi.org/10.1186/s13750-023-00319-w>

In this systematic review, authors provide evidence of the direct and indirect effects of a mosquito control microbial agent (Bti) on non-target organisms and the ecosystems where they occur. By compiling over 200 studies on the responses of non-target taxa to Bti exposure, the authors identified 119 different response variables. Many studies considered metrics such as non-target organism abundance and life history, but the authors note that other metrics such as diversity and community composition were also well represented in the literature. The authors found that Chironomidae and Crustacea consistently respond negatively in terms of abundance to exposure to Bti, with additional negative effects on emergence in Chironomidae. The systematic review identified several limitations of the current literature, including poor reporting and high risk of bias. However, the authors recommend that the risks of non-target effects should still be considered as potentially damaging, even in the face of these limitations. Future work to improve study rigour and the development of extensive monitoring to reduce uncertainty is encouraged.

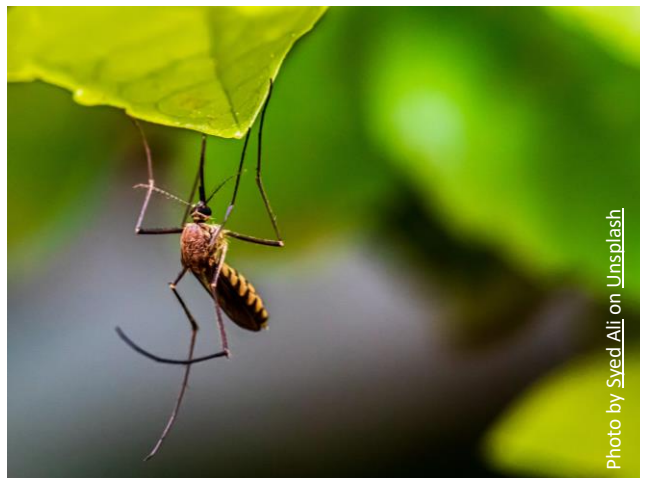


Photo by Syed Ali on Unsplash

Featured Reviews

Existing evidence on the effects of photovoltaic panels on biodiversity: a systematic map with critical appraisal of study validity

Lafitte, A., Sordello, R., Ouédraogo, D.Y. et al. Existing evidence on the effects of photovoltaic panels on biodiversity: a systematic map with critical appraisal of study validity. *Environ Evid* 12, 25 (2023).

<https://doi.org/10.1186/s13750-023-00318-x>

This systematic mapping exercise of photovoltaic panels and solar thermal installations considered the primary question: “what evidence exists regarding the effects of PV installations, whatever their scales (i.e. cells, panels, arrays, USSE facilities), on wild terrestrial and semi-aquatic species?”. The authors collated the global evidence of the impacts of PV installations on any terrestrial or semi-aquatic species, resulting in 158 relevant articles. Authors provided an assessment of the risk of bias for each study through critical appraisal of internal validity. The majority of included studies had either low or high risk of bias. The authors identified three knowledge clusters with sufficient evidence for future systematic reviewing of the effects of PV. These include PV effects on 1) plants, 2) arthropod communities and 3) ecosystem scale effects on overall species abundance. Future research should investigate other environmental components such as non-flying mammals or amphibians and reptiles. There is also a need to consider different types of PV installations and designs, such as floating PV installations, or solar thermal panels. Additional research is required to help provide accurate and reliability information to managers and decision-makers.



Climate change and the global redistribution of biodiversity: substantial variation in empirical support for expected range shifts

Rubenstein, M.A., Weiskopf, S.R., Bertrand, R. et al. Climate change and the global redistribution of biodiversity: substantial variation in empirical support for expected range shifts. *Environ Evid* 12, 7 (2023).

<https://doi.org/10.1186/s13750-023-00296-0>

Read the [Plain Language Summary](#)

In this systematic review, authors compiled and synthesized evidence on range-shifts in response to climate change across plants and animals in terrestrial, freshwater and marine ecosystems. Expected temperature driven range shifts included shifts to higher latitude, elevation and deeper marine depth. The authors found that of studies that considered these types of range shifts, species had significant shifts towards higher latitudes and elevation, but there was not significant evidence for shifts to greater marine depth. Support for common range shifts was most common in freshwater systems, followed by terrestrial and marine systems. However, results were mixed, with less than half of all observed shifts occurring as expected, implying that other processes may contribute to global redistribution of biodiversity. Plants, insects and birds were the most commonly studied taxonomic groups, with limited information available for other taxonomic groups. The authors note that it was difficult to determine uncertainty as most studies lacked reporting of standard error. Studies on range shifts should aim to compare to historical range variability to decrease uncertainty. The authors provide evidence to managers and policy makers to help improve understanding of unpredictable range shifts and the need for flexible monitoring and management policies.



Featured Plain Language Summaries


Collaboration for Environmental Evidence
Plain Language Summary
March 2023

CEE is an independent, not-for-profit, global network of researchers and practitioners that produces evidence summaries to inform environmental policy and practice.

Systematic Review
CEE 23-018

Regulatory values set to protect marine organisms from chemical pollutants do appear to protect corals, except for the metal copper and the pesticides 'diuron' and 'irgarol 1051'

Ouello-Yabdo Ouedraogo, Hugo Mell, Olivier Perceval, Karen Burgin, Isabelle Donati-Coulon, Laurita Pedraza, Marilene Sheehy, Mónica M. G. Gullone, Magala Casanova, Christophe Calvezan, Odia Karibali, Román Soriano, Yeric Reyjol and Christine Ferrar-Pagès



Toxicity thresholds of 56 chemical pollutants for tropical reef-building corals were derived from experimental ecotoxicological studies from 103 articles. They were compared to regulatory values that are used to protect marine organisms in general, and which are calculated by extrapolating the results of toxicity tests that have generally been carried out on non-coral species. Overall, the regulatory values were found to be protective of corals for the chemicals assessed, except for copper and the pesticides 'diuron' and 'irgarol 1051'.

Why is this Evidence Synthesis Needed?

Tropical coral reefs provide important ecosystem services to millions of people, but 70% of these reefs are currently threatened by both climate change and local stressors, the latter including chemical pollutants from agriculture, aquaculture, and industry. Some countries, limited by the climate change problem scope, may not seek to reduce local stressors such as chemical pollution, which can exacerbate the effects of climate change on reefs. To provide evidence of impacts, we systematically reviewed experimental studies assessing the toxicity of chemical pollutants to tropical reef-building corals, which are the main exposure point of ecosystems. All categories of chemical pollutants were included except nutrients (i.e., pesticides, metals, herbicides, inorganic acids, inorganic phosphates, inorganic nitrogen, inorganic salts, and inorganic silicon). From the quantitative evidence of effects, we identified the chemicals with the highest exposure levels at which no statistically significant adverse effects were observed, and we compared them to regulatory values that are used to protect a wide range of marine organisms, to assess whether these reference values are indeed protective of corals.

This Collaboration for Environmental Evidence Systematic Review compiles all the experimental studies evaluating the toxicity of chemical pollutants to tropical reef-building corals to calculate toxicity thresholds and to assess whether existing regulatory thresholds are protective of corals. The review summarises evidence from 103 studies corresponding to 947 studies.

Regulatory values set to protect marine organisms from chemical pollutants do appear to protect corals, except for the metal copper and the pesticides 'diuron' and 'irgarol 1051'

Read the [Plain Language Summary](#)

Read the Article: Ouedraogo, DY., Mell, H., Perceval, O. et al. What are the toxicity thresholds of chemical pollutants for tropical reef-building corals? A systematic review. *Environ Evid* **12**, 4 (2023).

<https://doi.org/10.1186/s13750-023-00298-y>

Collaboration for Environmental Evidence
Plain Language Summary
April 2023

CEE is an independent, not-for-profit, global network of researchers and practitioners that produces evidence summaries to inform environmental policy and practice.

Systematic Review
CEE 23-015

There is no behavioural test or predator cue that is most effective for quantifying anti-predator responses in mammals, but accounting for variation in behaviour between males and females, and using appropriate control treatments is critical

Naxahla Harrison, Rochelle Dixon, Ben Phillips, Zoe Hennis, Adam Wayne and Nick Mitchell



We compared six types of behavioural assay (evaluation of response) that quantified seven different behaviours. No single assay or predator cue was most effective. Studies that separated male and female responses found greater effects, demonstrating that it is important to account for sexual dimorphism in behaviour. We make suggestions for the experimental design of studies of this type, and highlight existing work, making it accessible for researchers and conservation managers alike.

Why is this Evidence Synthesis Needed?

Understanding anti-predator responses in mammals is essential for informing effective population management and conservation. To quantify such behaviour responses, robust behavioural assays and representative predator stimuli are required. This review evaluates the efficacy of six behavioural assay types (behavioural task, capture probability, feeding response, flight response, group cohesiveness, and ultimate risk) and compares the predictive power of predator stimuli (visual, olfactory, auditory, and chemical) to the quantitative evidence of effects. We identify differences in behavioural responses between the treatment and control groups in each study (effect sizes).

This Collaboration for Environmental Evidence Systematic Review synthesises evidence to identify the most effective behavioural tests for quantifying anti-predator responses in mammals, comparing evidence from over 1000 studies.

There is no behavioural test or predator cue that is most effective for quantifying anti-predator responses in mammals, but accounting for variation in behaviour between males and females, and using appropriate control treatments is critical

Read the [Plain Language Summary](#)

Read the Article: Harrison, N.D., Steven, R., Phillips, B.L. et al. Identifying the most effective behavioural assays and predator cues for quantifying anti-predator responses in mammals: a systematic review. *Environ Evid* **12**, 5 (2023). <https://doi.org/10.1186/s13750-023-00299-x>


Collaboration for Environmental Evidence
Plain Language Summary
May 2023

CEE is an independent, not-for-profit, global network of researchers and practitioners that produces evidence summaries to inform environmental policy and practice.

Systematic Map
CEE 23-013

More research is needed on the effects of radio waves from high-frequency wireless technology like 5G on plants and animals

Ken Karipidis, Chris Brzozek, Rohan Mee, Chloee Ray Bratt, Sarah Laughran, Andrew Wood



The literature search for this systematic map initially identified 74,320 studies, of which 334 studies met the inclusion criteria: 97 plant studies and 237 studies on animals (excluding humans). Many of those 334 studies did not include quantitative estimates of the effects of radio waves on plants and animals from new and emerging technologies like the 5G network. To ensure that the environment is protected from the harmful effects of radiation, more research is needed on the effects of radio waves (including high-frequency wireless technology) to inform radiation and environmental protection agencies.

Why is this Evidence Synthesis Needed?

Exposure to sufficiently high levels (THz) of radio waves can heat a person's biological tissue and potentially cause damage. Radio waves (microwaves) accounted for the most significant public concern to low to produce any significant heating or increases in body temperature.

Many countries have safety standards to protect humans from harmful or high-over radio wave exposure. Often these standards are based on guidelines by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and are based on the scientific evidence of the potential adverse effects of radio waves on humans. However, there are no international guidelines specific to protecting plants and animals. Assessment of any environmental impacts of radio waves is therefore important to also inform the protection of animals and plants.

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) is currently preparing a statement on the environmental effects of radio waves and whether the current human exposure guidelines also protect plants and animals in their natural environment.

This Collaboration for Environmental Evidence systematic map aimed to highlight what research has been done to date on the effects of radio waves on plants and animals. In doing so, this map outlines knowledge gaps for future research and aims to inform regulatory authorities on how to protect the environment from radio waves.

More research is needed on the effects of radio waves from high-frequency wireless technology like 5G on plants and Animals

Read the [Plain Language Summary](#)

Read the Article: Karipidis, K., Brzozek, C., Mate, R. et al. What evidence exists on the impact of anthropogenic radiofrequency electromagnetic fields on animals and plants in the environment: a systematic map. *Environ Evid* **12**, 9 (2023). <https://doi.org/10.1186/s13750-023-00304-3>

For more, go to CEE's [list of Plain Language Summaries](#) and the [CEE Evidence Synthesis Library](#).

Securing the Future of CEE



The Collaboration for Environmental Evidence was established in 2007 and is registered for charitable purposes within the UK. In line with legal requirements, the endeavors of CEE satisfy three 'charitable purposes' under UK Charity Law:

- the advancement and improvement of environmental protection
- the advancement of science
- the advancement of education

and the two 'public benefit principles': the general public will benefit from more effective environment management and conservation action because those working in the environmental sector will be able to more easily access information to help them improve the effectiveness of their work. The CEE places no restrictions on who can benefit.

The CEE Constitution sets out how the CEE will operate within Charity Law. The CEE operates as a 'not-for-profit' organization and has a Board of Trustees responsible for proper

governance of the CEE, probity, adherence to regulations for 'not for profit' organizations and charity law. The CEE is open to all who wish to contribute to the conduct, or use, of CEE Systematic Reviews and who are committed to the principle of evidence-based practice. As CEE activity increases through greater engagement in evidence synthesis, Thematic and Methods Groups, and the establishment of new CEE Centres, the demands placed the CEE infrastructure are also increasing.

The continued success of CEE's 'open-access' strategy is dependent on adequate and sustainable funding of the core infrastructure. Many funding streams, such as environment research grants, do not fund infrastructure costs and environmental funding tends to support direct action. CEE therefore seeks donations to enable it to continue to support and coordinate environmental evidence synthesis activity worldwide.

Potential donors are encouraged to contact us at:
info@environmentalevidence.org

Thank You

The existence and growth of the CEE is due in no small part to a wide range of individuals and organizations who have actively supported its vision and aims, either through funding, giving it visibility in key arenas, through giving their time to key CEE activities, or through active involvement in CEE Evidence Synthesis.

Particular thanks for 2023 are due to:

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More information:

www.environmentalevidence.org

Email:

info@environmentalevidence.org

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