

Effects of conservation interventions on vegetation in inland aquatic habitats: a protocol for subject-wide evidence synthesis

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Abstract

Inland aquatic habitats such as rivers, lakes and lagoons are under pressure from multiple threats, including pollution, aquaculture, biological invasions and land-use change. Meanwhile, they provide numerous benefits to both biodiversity and humans, many of which are facilitated by the vegetation they contain. There is therefore an increasing need for evidence-based conservation of vegetation in aquatic habitats. Reviewing the evidence is a time-consuming and costly exercise. In general, the assessment of evidence in conservation is approached on a case-by-case basis and different stakeholders independently conduct evidence reviews for each specific application or enquiry. This approach is counter to the philosophy of ‘produce once and use many times over’ and is a highly inefficient use of resources. The methods outlined in this protocol are designed to identify and synthesize the available global evidence for the effectiveness of conservation interventions for vegetation in inland aquatic habitats. This protocol uses wording that is standard for a subject-wide Conservation Evidence synthesis.

Key Words: canal, lagoon, lake, macrophyte, pond, reservoir, river, subject-wide evidence synthesis

Background

Inland aquatic habitats include natural features such as rivers, lakes, ponds, estuaries and lagoons, as well as artificial environments like canals and reservoirs. These habitats occupy a small proportion of the Earth’s terrestrial surface – lakes are estimated to cover <4% (Pi *et al.* 2022) and rivers <1% (Allen & Pavelsky 2018) – yet they support a disproportionate number of species and provide vital functions and services for both aquatic and terrestrial species, including humans (Strayer & Dudgeon 2010; Costanza *et al.* 2014).

Inland aquatic habitats are some of the most degraded on Earth, having been subject to severe anthropogenic pressures. The loss, alteration and degradation of inland aquatic habitats and their associated species is a global concern (Zhang *et al.* 2017; Tickner *et al.* 2020). Major threats include: pollution from agricultural, urban and industrial areas; physical modifications such as the straightening of river channels, artificialization of banks and construction of dams; flow regulation and excessive water abstraction; introduction of invasive species; fishing and aquaculture; and climate change (Strayer & Dudgeon 2010; Reid *et al.* 2019). These can all have negative impacts on the abundance and diversity of aquatic species, and the structure and quality of aquatic habitats.

Vegetation is a key component of inland aquatic habitats. Aquatic macrophytes (plants and algae visible with the naked eye) are a diverse group with a worldwide distribution (Chambers *et al.* 2008) that provide many important functions and services (Thomaz 2021). They maintain good water quality, for example through oxygenation and purification (Scheffer *et al.* 1993); they aid

in stabilising bank and bed substrates, limiting erosion (O’Hare *et al.* 2011); and they provide food and habitat for other aquatic flora and fauna (Garner *et al.* 1996). Microscopic plants and algae – which grow on substrates such as macrophytes, rocks or dead wood, or float free in the water column – are an important food source for aquatic animals and play a key role in nutrient cycling (Vadeboncoeur & Steinman 2002). Thus, managing and conserving aquatic vegetation can have benefits for entire aquatic ecosystems.

There is a globally recognized need to protect and restore inland aquatic habitats (Strayer & Dudgeon 2010; Céréghino *et al.* 2014; Gonçalves & Hermoso 2022; UN 2022). Effective and efficient conservation of vegetation requires knowledge of, amongst other things, how it responds to interventions and management practices (Sutherland *et al.* 2004). However, to date, there is limited available synthesis of evidence for the effects of conservation interventions for vegetation in inland aquatic habitats, especially at a global scale.

Targeted reviews may be carried out to collate evidence on the effects of a particular conservation intervention, often in a particular location, but this approach is labour-intensive, expensive and ill-suited for subjects where the data are scarce and patchy. Here, we use a subject-wide evidence synthesis approach (Sutherland *et al.* 2019) to simultaneously summarize the evidence for the wide range of interventions dedicated to the conservation of vegetation in inland aquatic habitats. This will complement previous Conservation Evidence syntheses covering the conservation of peatland vegetation (Taylor *et al.* 2018) and marsh and swamp vegetation (Taylor *et al.* 2021). By simultaneously targeting the entire range of potential interventions, we are able to review the evidence for each intervention cost-effectively, and the resulting synthesis can be updated periodically and efficiently to incorporate new research. The synthesis will be freely available at www.conservazionevidence.com and, alongside the *Conservation Evidence* online database, will be a valuable addition to the toolkit of practitioners and policy makers seeking sound information to support the conservation of aquatic vegetation.

Scope of the synthesis

1. Review subject

This synthesis will include evidence for the effectiveness of interventions for the conservation of vegetation in inland aquatic habitats, anywhere in the world. This includes habitats such as rivers, lakes, ponds, estuaries, lagoons, canals and reservoirs. These are habitats characterized by standing or running water for at least part of the year, and where most of the vegetation present is submerged or floating (we define habitats where $\geq 30\%$ of the vegetation present in the target state is emergent as marshes or swamps; Taylor *et al.* 2021). For this synthesis, “conservation interventions” includes management measures that aim to conserve vegetation in a broad sense, i.e. with a focus on the overall community or habitat-defining species.

This subject has not yet been covered using subject-wide evidence synthesis, and is therefore a priority to complete and add to the discipline-wide Conservation Evidence database. Subject-wide evidence synthesis is a systematic method of evidence synthesis that covers entire subjects at once, including all closed review topics within that subject at a fine scale, and analyses results

through study summary and expert assessment, or through meta-analysis; the term can also refer to any product arising from this process (Sutherland *et al.* 2019).

The output of the project will be an authoritative, transparent, freely accessible evidence synthesis – available as a synopsis document and within the Conservation Evidence database – that will support aquatic vegetation management and help to achieve conservation outcomes.

2. Advisory board

An advisory board has been formed, made up of international conservationists and academics with expertise in the conservation of vegetation in inland aquatic habitats. These experts will provide input to the evidence synthesis at three key stages: a) reviewing the protocol, including identifying key sources of evidence, b) developing a comprehensive list of conservation interventions for review, and c) reviewing the draft evidence synthesis. The advisory board is listed above, although more experts may be added during production of the synthesis. The final list will be published in the synopsis document and online (www.conservationevidence.com/content/page/119).

3. Creating the list of interventions

At the start of the project, a comprehensive list of interventions will be developed by scanning the literature and in partnership with the advisory board. The list will also be checked by Conservation Evidence to ensure that it follows their standard structure. The aim is to include all actions that have been carried out or advised to conserve aquatic vegetation, whether evidence for the effectiveness of an action is available or not. During the synthesis process further interventions may be discovered, which will be integrated into the synthesis structure.

The list of interventions will be organized into categories based on the International Union for the Conservation of Nature (IUCN) classifications of direct threats (www.iucnredlist.org/resources/threat-classification-scheme) and conservation actions (www.iucnredlist.org/resources/conservation-actions-classification-scheme).

Methods

1. Literature searches

Literature will be obtained from the Conservation Evidence discipline-wide literature repository, and from searches of additional subject-specific literature sources. The Conservation Evidence literature repository is compiled using systematic searches of academic journals, report series and specialist websites. All titles and abstracts are scanned, and relevant publications describing studies of conservation interventions for all species groups and habitats are saved and added to the repository (Sutherland *et al.* 2019).

a) Global evidence

Evidence from all around the world will be included in the synthesis.

b) Languages included

Articles in any language will be included in the synthesis. A recent study on the topic of language barriers in global science indicates that approximately 35% of conservation studies may be in non-English languages (Amano *et al.* 2016). Online translation tools will be used when the synthesis authors cannot read a language. Fluent users of each language will be consulted, where possible, to check the accuracy of summaries.

c) Journals searched

i) From Conservation Evidence literature repository

As of March 2023, all of the journals (and years) listed in Appendices 1a (English-language journals) and 1b (non-English-language journals) have already been searched and relevant papers have been added to the Conservation Evidence discipline-wide literature repository. An asterisk (*) indicates the journals most relevant to this synthesis. Others are less likely to have included papers relevant to this synthesis, but if they did, they will be summarized.

ii) Update searches

Searches will be updated to the end of 2022 for English-language journals likely to yield studies relevant to the conservation of vegetation in inland aquatic habitats (listed below, and marked with an asterisk in Appendix 1a). It may not be possible to update searches for all journals listed within the time frame of this project, so journals will be searched in the order below (prioritized by likelihood to yield relevant studies).

- Aquatic Conservation: Marine and Freshwater Ecosystems
- Aquatic Ecosystem Health & Management
- Estuaries and Coasts
- Journal of Aquatic Plant Management
- Journal of Wetlands Environmental Management
- Knowledge & Management of Aquatic Ecosystems
- Lake and Reservoir Management
- River Research and Applications

- Aquatic Botany
- Aquatic Ecology
- Aquatic Invasions
- Canadian Journal of Fisheries and Aquatic Sciences
- Freshwater Biology
- Freshwater Science
- Hydrobiologia
- Journal of Great Lakes Research
- Journal of Vegetation Science
- Journal of Wetlands Ecology
- Limnologica
- Marine and Freshwater Research
- New Zealand Journal of Marine and Freshwater Research
- New Zealand Plant Protection
- Plant Ecology

- South African Journal of Botany
- Wetlands
- Wetlands Ecology and Management
- Applied Vegetation Science
- Aquatic Biology
- Aquatic Living Resources
- Coastal Engineering
- Cunninghamia
- Journal of Coastal Research
- New Journal of Botany
- Plant Protection Quarterly
- Preslia
- Weed Research

iii) New searches

New searches will target additional journals relevant to the conservation of vegetation in inland aquatic habitats, as listed below. These searches will scan every article title and abstract within each journal, up to the end of 2022. These journals were identified through expert judgement by the synthesis authors and the advisory board.

It may not be possible to update searches for all journals listed within the time frame of this project, so journals will be searched in the order below (prioritized by likelihood to yield relevant studies). Journals with a large number of papers (i.e. long-running, or publishing many papers each year) may not be searched from the first year of publication. Instead, searches may be undertaken backwards from the end of 2022, for 30 years.

- African Journal of Aquatic Science
- Inland Waters
- Lakes & Reservoirs: Science, Policy and Management for Sustainable Use (formerly Lakes & Reservoirs: Research and Management)
- Aquatic Sciences (formerly Swiss Journal of Hydrology; Schweizerische Zeitschrift für Hydrologie; Zeitschrift für Hydrologie)
- Fundamental and Applied Limnology (formerly Archiv für Hydrobiologie)
- Limnetica
- Limnology and Oceanography
- Water, Air, & Soil Pollution
- Journal of Phycology
- Plant Sociology (formerly Fitosociologia)

d) Report series and other specialist literature searched

i) From Conservation Evidence literature repository

As of March 2023, all of the sources (and years) listed in Appendix 1c have already been searched and relevant documents have been added to the Conservation Evidence discipline-wide literature repository. An asterisk (*) indicates the sources most relevant to this synthesis.

Others are less likely to have included documents relevant to this synthesis, but if they did they will be summarized.

ii) Update searches

Additional searches up to the end of 2022 will be undertaken for sources likely to yield studies relevant to the conservation of vegetation in inland aquatic habitats (listed below, and marked with an asterisk in Appendix 1c).

- IUCN-SSC Freshwater Plant Specialist Group (Reports)
- MedWet (Publications)
- Ramsar (Documents)
- Wetlands International (Publications, Case Studies)

iii) New searches

New searches will target specialist sources relevant to the conservation of vegetation in inland aquatic habitats, as listed below. These searches will scan every document title and abstract or summary within each source, up to the end of 2022. These sources were identified through expert judgement by the synthesis authors and the advisory board.

- European Centre for River Restoration (Publications) www.ecrr.org/publications
- International Society of Limnology News <https://limnology.org/publications/sil-news/>
- The River Restoration Centre Manual of River Restoration Techniques (Case Examples) www.therrc.co.uk/manual-river-restoration-techniques

e) Other literature searches

The online database www.conservationevidence.com will be searched for relevant publications that have already been summarized for other subjects. This will be done using search terms for aquatic habitats (e.g. river, lake, pond, canal, reservoir, aquatic, wetland) and the filters on the Conservation Evidence website for study Category (plants, wetlands) and Habitat (coastal, rivers/streams/creeks, wetlands).

Additional searches of journals, report series or other specialist literature may be undertaken during the production of the synthesis. The final list of evidence sources searched for this synthesis will be published in the synopsis document (including a summary using the template in Appendix 2) and online (www.conservationevidence.com/journalsearcher/synopsis).

f) Supplementary literature identified by advisory board or relevant stakeholders

If time permits, relevant publications suggested by the advisory board or other stakeholders will also be considered for inclusion in the synthesis.

g) Search record database

A database will be created of all potentially relevant publications found during searches or identified by advisors/stakeholders. Reasons for exclusion will be recorded for all those included during screening that are not summarized for the synthesis.

2. Publication screening and inclusion criteria

A summary of the total number of papers/documents screened will be published in the synopsis as part of the diagram in Appendix 2.

a) Screening

To ensure consistency/accuracy when screening publications for inclusion in the literature repository, an initial test using the Conservation Evidence inclusion criteria (Section 2b) and a consistent set of references will be carried out by the synthesis authors, then compared with the decisions of the experienced core Conservation Evidence team. Results will be analysed using Cohen's Kappa test (Cohen 1960). Where initial results do not show 'substantial' ($K = 0.61-0.80$) or 'almost perfect' ($K = 0.81-1.00$) agreement, authors will be given further training. A second Kappa test will be used to assess the consistency/accuracy of article screening for the first two years of the first journal searched by each author. Again, where results do not show 'substantial' ($K = 0.61-0.80$) or 'almost perfect' ($K = 0.81-1.00$) agreement, authors will receive further training before carrying out further searches.

Authors of other syntheses who have searched journals and added relevant publications to the Conservation Evidence literature repository since 2018, and all other searchers since 2017, have undertaken the initial inclusion test described above; searchers prior to that have not. Kappa tests of the first two years searched have been carried out for all new searchers who have contributed to the Conservation Evidence literature repository since July 2018.

We acknowledge that the literature search and screening method used by Conservation Evidence, as with any method, will result in gaps in the evidence. The Conservation Evidence literature repository currently includes relevant papers from over 300 English language journals as well as over 320 non-English journals. Additional journals are frequently added to those searched, and years searched are often updated. It is possible that searchers will have missed relevant papers from those journals searched. Publication bias will not be taken into account, and it is likely that additional biases will result from the evidence that is available, for example there are often geographic biases in study locations (Christie *et al.* 2021).

b) Inclusion criteria for Conservation Evidence literature repository

The following Conservation Evidence inclusion criteria will be used when adding publications to the Conservation Evidence discipline-wide literature repository:

Criterion A: *Conservation Evidence includes studies that measure the effect of an action that might be done to conserve biodiversity.*

Criterion B: *Conservation Evidence includes studies that measure the effect of an action that might be done to change human behaviour for the benefit of biodiversity.*

Further explanation of these criteria is provided in Appendix 3.

c) Relevant subject

Studies relevant to the synthesis will focus on the conservation or management of native vegetation in inland aquatic habitats such as rivers, streams, estuaries, lakes, ponds, lagoons, canals and reservoirs. “Vegetation” includes both true plants and algae, of any size (from visible macrophytes to microscopic phytoplankton). We define “aquatic habitats” as having standing or running water for at least part of the year, and where <30% of the vegetation present in the target state is emergent (cf. Taylor *et al.* 2021). Therefore, the synthesis will focus on submerged and floating vegetation, but may include some results for emergent vegetation within otherwise aquatic habitats. Aquatic habitats may occur within broader emergent wetlands (e.g. deep pools within a marsh). Studies may have taken place anywhere in the world.

The synthesis will not include: evidence from habitats dominated by emergent vegetation (marshes, swamps and peatlands); evidence from marine habitats; evidence on the husbandry of vegetation in laboratories and aquaria, unless it tests interventions to assist planted vegetation; evidence relating to the conservation of rare plants (that exist in few locations, or that are not abundant/not major components of the target community); evidence purely describing the effects of interventions on problematic/undesirable vegetation (whether native or non-native); or evidence relating to organisms other than plants/algae (e.g. fish and invertebrates).

d) Relevant types of intervention

The synthesis will include any intervention that could be put in place by a manager, conservationist, policy maker, advisor or consultant to protect, manage, restore or reduce the impacts of threats to vegetation in inland aquatic habitats. Alternatively, interventions could be put in place to change human behaviour (actual or intentional), which is likely to protect, manage, restore or reduce threats to vegetation in inland aquatic habitats. See the Conservation Evidence inclusion criteria above (Section 2b) for further details.

If the following two criteria are met, a combined intervention will be created within the synthesis, rather than repeating evidence under all the separate interventions: a) there are five or more studies that use the same well-defined combination of interventions, with a very clear description of what they were, without separating the effects of each individual intervention, and b) the combined set of interventions is a commonly used conservation strategy.

e) Relevant types of comparator

To determine the effectiveness of interventions, studies in the synthesis will usually include an explicit comparison, i.e. monitoring change over time (typically before and after an intervention was implemented) or space (typically at sites that have and have not received an intervention). Alternatively, a study could compare one specific intervention (or implementation method) against another. For example, a study could compare the abundance of a plant species before and after the banning of pesticides in an area, or compare the change in plant diversity under different grazing or cutting practices. Study designs without explicit comparisons will be included for some interventions if they provide useful information about the effectiveness of that intervention (e.g. data on plant species that colonize a newly created site, or data on the survival rate of planted vegetation).

f) Relevant types of outcome

The list below outlines anticipated core outcomes that will be extracted from all relevant studies where they appear and included in the synthesis. Other vegetation outcomes may be included if reported and quantified within studies.

Vegetation community

- *Overall extent*
- *Community types*
- *Community composition*
- *Overall richness/diversity*
- *Characteristic plant richness/diversity**

Vegetation abundance*

- *Overall abundance*
- *Characteristic plant abundance**
- *Macrophyte abundance*
- *Surface algae abundance*
- *Phytoplankton abundance*
- *Individual species abundance*

Vegetation structure

- *Overall structure*
- *Height*

Other

- *Germination/emergence*
- *Survival*
- *Growth*

* *Characteristic plants – plants characteristic of particular habitat types or conditions (e.g. plants that are usually found in flowing water, low-nutrient levels, or ‘pristine’ ponds in the southeast USA) and identified as such in the source publication.*

* *Vegetation abundance – includes metrics such as cover, density, frequency and biomass.*

Human behaviour outcomes will be included for selected interventions, where they are most relevant and where monitoring vegetation responses is difficult or impossible: for example, interventions to address *Human Intrusions and Disturbance*, *Habitat Protection* interventions, and *Education and Awareness-Raising* interventions. The key messages for an intervention (see Section 5f) will specify when human behaviour outcomes were considered as part of the evidence base.

g) Relevant types of study design

The table below lists the study designs that will be included. The strongest evidence comes from replicated, randomized, controlled trials with paired sites and before-and-after monitoring.

Table 1. Study designs

Term	Meaning
Replicated	The intervention was repeated on more than one site or individual. In conservation and ecology, the number of replicates is much smaller than it would be for medical trials (when thousands of individuals are often tested). If the replicates are sites, pragmatism dictates that between five and ten replicates is a reasonable amount of replication, although more would be preferable. We provide the number of replicates wherever possible. Replicates should reflect the number of times an intervention has been independently carried out, from the perspective of the study subject. For example, 10 plots within a mown field might be independent replicates from the perspective of plants with limited dispersal, but not for larger motile animals such as birds. In the case of planting, replicates should be sites, not individuals.
Randomized	The intervention was allocated randomly to individuals or sites. This means that the initial condition of those given the intervention is less likely to bias the outcome.
Paired sites	Sites are considered in pairs, within which one was treated with the intervention and the other was not. Pairs, or blocks, of sites are selected with similar environmental conditions, such as sediment type or surrounding landscape. This approach aims to reduce environmental variation and make it easier to detect a true effect of the intervention.
Controlled	Sites or individuals treated with the intervention are compared with control sites or individuals not treated with the intervention. The treatment is usually allocated by the investigators (randomly or not), such that both the eventual treatment or control groups/sites could have received the treatment.
Before-and-after	Monitoring was carried out before and after the intervention was imposed.
Site comparison	A study that considers the effects of interventions by comparing sites that historically had different interventions (e.g. intervention vs no intervention) or levels of intervention. Unlike controlled studies, it is not clear how the interventions were allocated (i.e. the investigators did not allocate the treatment to some of the sites or individuals).
Review	A conventional review of literature. Generally, these have not used an agreed search protocol or quantitative assessments of the evidence.
Systematic review	Follows structured, predefined methods to comprehensively collate and synthesize existing evidence. It should weight or evaluate studies, in some way, according to the strength of evidence they offer (e.g. based on sample size and study design). Many environmental systematic reviews are available at www.environmentalevidence.org/index.htm .
Study	If none of the above apply, for example a study measuring change in vegetation cover over time in only one site and only after an intervention, or a study measuring the survival rate of planted vegetation.

3. Study quality assessment & critical appraisal

The evidence from each study will not be quantitatively assessed or weighted according to quality. However, to allow interpretation of the evidence by the reader, the size and design of each summarized study will be clearly reported.

A basic critical appraisal of each potentially relevant study will be carried out. Studies will generally be excluded if they (a) have obvious errors in their design or analysis, (b) do not provide data for an explicit comparison, and meaningful conclusions about effectiveness cannot be drawn without a comparison (see Section 2e), or (c) do not give enough information to interpret the results (e.g. reporting survival rate without the time period over which this was measured). A record of the reason for excluding any of the publications included during screening will be kept within the synthesis database (see Section 1g).

4. Data extraction

Data on the effectiveness of each intervention (e.g. vegetation abundance in lakes with vs without added lime, or survival rates of planted vegetation) will be extracted from, and summarized for, publications that include the relevant subject, types of intervention, comparator and outcomes outlined above. A summary of the total number of publications included following data extraction will be published in the synopsis as part of the diagram in Appendix 2.

In addition to ensuring consistency/accuracy when screening publications for inclusion in the discipline-wide literature repository (see Section 2a), for a subset of publications, relevant data will be extracted by a member of the core Conservation Evidence team as well as the synthesis authors to ensure agreement for inclusion in the synthesis. In addition, at the start of each month, authors will swap three summaries with another author to ensure that the correct type of data has been extracted and that the summary follows the standard Conservation Evidence format.

5. Evidence synthesis

a) Summary protocol

Each publication will usually have just one paragraph for each intervention it tests describing the study in no more than 150 words using plain English. Multiple summaries may be written if there are multiple conceptually distinct tests of a specific intervention within a publication. Each summary will be in the following format:

A [TYPE OF STUDY*] in [YEARS X–Y] in [HOW MANY SITES] in/of [HABITAT] in [REGION and COUNTRY] [REFERENCE] found that [INTERVENTION] [SUMMARY OF ALL KEY RESULTS] for [SPECIES/HABITAT TYPE]. [DETAILS OF KEY RESULTS, INCLUDING DATA]. In addition, [EXTRA RESULTS, IMPLEMENTATION OPTIONS, CONFLICTING RESULTS]. The [DETAILS OF EXPERIMENTAL DESIGN, INTERVENTION METHODS and KEY DETAILS OF SITE CONTEXT*]. Data was collected in [DETAILS OF SAMPLING METHODS].

* *Type of study* — use terms and order in Table 1.

* *Site context* – for the sake of brevity, only nuances essential to the interpretation of the results are included. The reader is always encouraged to read the original source to get a full understanding of the study site (e.g. history of management, physical conditions).

For example:

A replicated, randomized, paired, controlled study in 1936–2009 in eight sagebrush steppe sites in Oregon, USA (1) found that increasing the number of livestock decreased grass and herb cover, but did

not significantly alter shrub cover. Grass and herb cover in grazed areas were lower (grass: 9%, herb: 17%) than in areas that were not grazed (grass: 18%, herb: 24%). However, shrub cover was not significantly different in grazed (16%) and ungrazed (16%) areas. Eight 2-ha fenced areas excluding livestock were established in 1936. Areas adjacent to the fenced areas were grazed by cattle from 1936–2008. In summer 2009, four 20-m transects were established in each study area and vegetation cover was assessed using a line intercept method.

- (1) Davies K.W., Bates J.D., Svejcar T.J. & Boyd C.S. (2010) Effects of long-term livestock grazing on fuel characteristics in rangelands: an example from the sagebrush steppe. *Rangeland Ecology & Management*, 63, 662–669.

A replicated, randomized, controlled, before-and-after study in 1993–1999 of five harvested hardwood forests in Virginia, USA (2) found that harvesting trees in groups did not result in higher salamander abundances than clearcutting. Abundance was similar between treatments (group cut: 3; clearcut: one/30 m²). Abundance was significantly lower compared to unharvested plots (six/30 m²). Species composition differed before and three years after harvest. There were five sites with 2 ha plots with each treatment: group harvesting (2–3 small area group harvests with selective harvesting between), clearcutting and an unharvested control. Salamanders were monitored on 9–15 transects (2 x 15 m)/plot at night in April–October. One or two years of pre-harvest and 1–4 years of post-harvest data were collected.

- (2) Knapp S.M., Haas C.A., Harpole D.N. & Kirkpatrick R.L. (2003) Initial effects of clearcutting and alternative silvicultural practices on terrestrial salamander abundance. *Conservation Biology*, 17, 752–762.

b) Terminology used to describe the evidence

Table 1 above defines the terms used to describe study designs. Unless specifically stated otherwise, results (i.e. terms like higher/lower and increased/decreased) will reflect statistical tests performed in the original publications.

c) Dealing with multiple interventions within a publication

When a publication provides separate results for the effects of each of the different interventions tested, separate summaries will be written under each intervention heading. However, when several interventions were carried out at the same time and only the combined effect reported, the result will be described with a similar paragraph under all relevant interventions. The first sentence will make it clear that there was a combination of interventions carried out, e.g. ‘... (REF) found that [x intervention], along with [y] and [z interventions] resulted in [describe effects]’. The summary will also contain a sentence such as: ‘It is not clear whether these effects were a direct result of [x], [y] or [z] interventions’, or ‘The study does not distinguish between the effects of [x], and other interventions carried out at the same time: [y] and [z].’

d) Dealing with multiple publications reporting the same results, and reviews

If two publications describe results from the same intervention implemented in the same space and at the same time, only one of the publications will be included (usually the most stringently peer-reviewed publication). If one includes initial results (e.g. after one year) of another (e.g.

after 1–3 years), only the publication covering the longest time span will be included. If two publications describe at least partially different results, both will be included, but it will be made clear they are from the same project, e.g. ‘A controlled study... (Gallagher *et al.* 1999; same experimental set-up as Oasis *et al.* 2001)...’.

e) Dealing with reviews

New or collective data from reviews (both systematic and non-systematic) will be summarized. An example of new data would be previously unpublished data from a case study, which may be used to support or illustrates points arising from the review. Examples of collective data would be a meta-analysis of results from previously published studies, a table listing the survival rate of planted vegetation in previously published studies, or combination of multiple published studies to describe long-term changes in one study site. Summary paragraphs for reviews will indicate which other summarized studies they include (if any). Due to time constraints, reviews will not be used to identify further publications to summarize unless they are explicitly identified by the advisory board.

f) Taxonomy

Taxonomy will not be updated but will follow that used in the original publication. Where possible, common names and scientific names will both be given the first time each species is mentioned within each summary.

g) Key messages

Each intervention will have a set of concise, bulleted key messages at the top, written once all the literature has been summarized. These will include information such as the number, design and location of studies included.

The first bullet point will describe the total number of studies that tested the intervention and the locations of the studies. Subsequent bullet points will provide key information on the relevant outcomes presented under the headings and sub-headings shown below (with number of summarized studies in parentheses). Additional sub-headings may be created if appropriate for particular interventions, for example if studies monitor a type of outcome not currently listed.

- **X studies** examined the effects of [INTERVENTION] on vegetation in aquatic habitats [or human behaviour; see Section 2c]. Y studies were in [LOCATION 1]^{1,2} and Z studies were in [LOCATION 2]^{3,4}.

VEGETATION COMMUNITY

- **Overall extent (x studies):**
- **Community types (x studies):**
- **Community composition (x studies):**
- **Overall richness/diversity (x studies):**
- **Characteristic plant richness/diversity (x studies):**

VEGETATION ABUNDANCE

- **Overall abundance (x studies):**
- **Characteristic plant abundance (x studies):**
- **Macrophyte abundance (x studies):**
- **Surface algae abundance (x studies):**
- **Phytoplankton abundance (x studies):**
- **Individual species abundance (x studies):**

VEGETATION STRUCTURE

- **Overall structure (x studies):**
- **Height (x studies):**

OTHER *(included only for interventions/chapters where relevant)*

- **Germination/emergence (x studies):**
- **Survival (x studies):**
- **Growth (x studies):**
- **Human behaviour (x studies):**

6. Dissemination/communication of evidence synthesis

The information from this evidence synthesis will be available in three ways:

- A **synopsis** pdf, downloadable from www.conservationevidence.com, will contain the study summaries, key messages and background information on each intervention.
- The searchable **database** at www.conservationevidence.com will contain all the summarized information from the synopsis, along with expert assessment* scores for effectiveness, certainty and harms associated with each intervention.
- A **chapter** in *What Works in Conservation*, available as a pdf to download and a book from www.conservationevidence.com/content/page/79, will contain the key messages from the synopsis as well as expert assessment* scores for effectiveness, certainty and harms associated with each intervention, with links to the online database.

* The expert assessment process is described in the introduction to *What Works in Conservation* (Sutherland *et al.* 2021).

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APPENDIX 1a. English-language journals searched, and for which papers potentially relevant to the Inland Aquatic Vegetation Synthesis have been added to the Conservation Evidence discipline-wide literature repository. English-language journals are those with a substantial proportion of articles (approximately 80% or more, during the searched period) available in English.

An asterisk (*) indicates the journals most relevant to this synthesis (e.g. with a focus on aquatic habitats or vegetation). For these journals, updated searches to the end of 2022 will be conducted, where time allows.

A dagger symbol (†) indicates journals that appear to have ceased publication after the latest date searched.

Journal Name	Dates Searched
Acrocephalus	2009–2018
Acta Chiropterologica	1999–2019
Acta Herpetologica	2006–2018
Acta Oecologica	1990–2018
African Bird Club Bulletin	1994–2017
African Journal of Ecology	1963–2016
African Journal of Herpetology (formerly The Journal of the Herpetological Association of Africa)	1990–2018
African Journal of Marine Science (formerly South African Journal of Marine Science)	1983–2018
African Primates	1995–2012
African Sea Turtle Newsletter	2014–2018
African Zoology (formerly South African Journal of Zoology)	1979–2013
Agriculture, Ecosystems & Environment	1983–2020
Agroforestry Systems	1982–2007
Ambio	1972–2019
American Journal of Primatology	1981–2019
American Naturalist	1867–2019
Amphibian & Reptile Conservation	1996–2018
Amphibia-Reptilia	1980–2018
Animal Biology	2003–2013
Animal Conservation	1998–2019
Animal Nutrition	2015–2019
Animal Welfare	1992–2019
Animals	2011–2019
Annales Zoologici Fennici	1964–2013
Annales Zoologici Societatis Zoologicae Botanicae Fennicae Vanamo	1932–1963 †
Annual Review of Ecology, Evolution, and Systematics (formerly Annual Review of Ecology and Systematics)	1970–2020
Annual Review of Entomology	2000–2019
Antarctic Science	1980–2018
Anthrozoos	1987–2019
Apidologie (formerly Annales de l'Abeille)	1958–2009
Applied Animal Behaviour Science	1984–2019

Applied Herpetology	2003–2009 †
* Applied Vegetation Science	1998–2017
Aquarium Sciences and Conservation	1997–2001 †
* Aquatic Biology	2007–2018
* Aquatic Botany	1975–2017
* Aquatic Conservation: Marine and Freshwater Ecosystems	1991–2018
* Aquatic Ecology (formerly Netherland Journal of Aquatic Ecology; Hydrological Bulletin; Hydrobiologische Vereniging; Mededelingen van de Hydrobiologische Vereniging)	1968–2018
* Aquatic Ecosystem Health & Management	1998–2018
* Aquatic Invasions	2006–2016
* Aquatic Living Resources	1988–2018
Aquatic Mammals	1972–2018
Arid Land Research and Management (formerly Arid Soil Research and Rehabilitation)	1987–2013
Asian Herpetological Research	2010–2018
Asian Journal of Conservation Biology	2012–2018
Asian Primates	2008–2012
Asiatic Herpetological Research	1993–2008 †
Austral Ecology (formerly Australian Journal of Ecology)	1976–2019
Australasian Journal of Herpetology	2009–2012
Australian Mammalogy	2000–2019
Avian Conservation and Ecology	2005–2016
Basic and Applied Ecology	2000–2020
Basic and Applied Herpetology	2011–2018
Behavioral Ecology	1990–2013
Behaviour	1948–2013
Biawak	2001–2017
Bibliotheca Herpetologica (formerly International Society for the History and Bibliography of Herpetology Newsletter and Bulletin)	1999–2017
BioControl (formerly Entomophaga)	1956–2016
Biocontrol Science and Technology	1991–1996
Biodiversity	2000–2018
Biodiversity and Conservation (formerly Biodiversity & Conservation)	1994–2019
Biological Conservation	1981–2020
Biological Control	1991–2017
Biological Invasions	1999–2017
Biology and Environment: Proceedings of the Royal Irish Academy	1993–2017
Biology Letters	2005–2018
Biotropica	1990–2019
Bird Conservation International	1991–2016
Bird Study	1980–2016
Boreal Environment Research	1996–2014
Bulletin of the Chicago Herpetological Society	1990–2018
Bulletin of the Maryland Herpetological Society	1980–2015 †

	Canadian Field-Naturalist (formerly Ottawa Naturalist)	1887–2019
*	Canadian Journal of Fisheries and Aquatic Sciences (formerly Journal of the Fisheries Research Board of Canada; Journal of the Biological Board of Canada)	1934–2018
	Canadian Journal of Forest Research	1971–2018
	Caribbean Herpetology	2010–2018
	Caribbean Journal of Science	1961–2013
	CCAMLR Science	1985–2016 †
	Chelonian Conservation and Biology	1993–2018
	Chelonian Research Monographs	1996–2017
*	Coastal Engineering	2000–2018
	Collinsonum	2012–2018
	Community Ecology	2000–2012
	Conservation Biology	1987–2019
	Conservation Evidence	2004–2020
	Conservation Genetics	2000–2013
	Conservation Letters	2008–2019
	Contemporary Herpetology	1998–2009 †
	Contributions to Canadian Biology and Fisheries	1901–1933 †
	Contributions to Primatology	1974–1991 †
	Copeia	1910–2018
*	Cunninghamia	1981–2016
	Current Herpetology (formerly Japanese Journal of Herpetology; Acta Herpetologica Japonica)	1964–2018
	Dodo	1977–2001 †
	Ecological and Environmental Anthropology	2005–2008 †
	Ecological Applications	1991–2019
	Ecological Entomology	1985–2018
	Ecological Indicators	2001–2007
	Ecological Management & Restoration	2000–2019
	Ecological Restoration (formerly Ecological Restoration, North America; Restoration & Management Notes)	1981–2020
	Ecology	1936–2019
	Ecology Letters	1998–2019
	Écoscience	1994–2019
	Ecosystems	1998–2013
	Emu	1980–2016
	Endangered Species Bulletin	1966–2003
	Endangered Species Research	2004–2019
	Entomologia Experimentalis et Applicata	2015–2018
	Environmental Conservation	1974–2019
	Environmental Entomology	1990–2018
	Environmental Evidence	2012–2019
	Environmental Management	1977–2019
*	Estuaries and Coasts	2013–2017

Ethology Ecology & Evolution	1989–2014
European Journal of Wildlife Research	2004–2019
Evolutionary Anthropology	1992–2014
Evolutionary Ecology	1987–2014
Evolutionary Ecology Research	1999–2014
Fire Ecology	2005–2016
Fish and Fisheries	2000–2018
Fisheries	2017–2018
Fisheries Management and Ecology	1990–2018
Fisheries Oceanography	1992–2018
Fisheries Research	1990–2018
Flora	1991–2017
Folia Primatologica	1963–2014
Folia Zoologica	1959–2013
Forest Ecology and Management	1976–2019
Forestist	2018–2019
* Freshwater Biology	1975–2016
* Freshwater Science (formerly Journal of the North American Benthological Society; Freshwater Invertebrate Biology)	1982–2018
Frontiers in Marine Science	2017–2018
Frontiers in Psychology	2019
Functional Ecology	1987–2013
Genetics and Molecular Research	2002–2013
Gibbon Journal	2005–2011 †
Global Change Biology	1995–2017
Global Ecology and Biogeography (formerly Global Ecology and Biogeography Letters)	1991–2014
Global Ecology and Conservation	2014–2018
Grass and Forage Science	1980–2017
Herpetofauna	2003–2007
Herpetologica	1936–2018
Herpetological Conservation and Biology	2006–2018
Herpetological Monographs	1982–2018
Herpetological Review	1967–2018
Herpetology Notes	2008–2018
Herpetozoa	1988–2018
Human–Wildlife Interactions (formerly Human–Wildlife Conflicts)	2007–2019
* Hydrobiologia	1995–2018
Hystrix, the Italian Journal of Mammalogy	1986–2019
Ibis	1980–2016
ICES Journal of Marine Science	1990–2018
iForest	2008–2016
Insect Conservation and Diversity	2008–2018
Integrative Zoology	2006–2013

International Journal of Primatology	1980–2019
International Journal of the Commons	2007–2016
International Journal of Wildland Fire	1991–2016
International Wader Studies	1986–2006 †
International Zoo Yearbook	1960–2019
Invasive Plant Science and Management	2008–2016
Israel Journal of Ecology & Evolution (formerly Israel Journal of Zoology)	1963–2013
Italian Journal of Zoology (formerly Bollettino di Zoologia)	1978–2013
Journal for Nature Conservation	2002–2019
Journal of Animal Ecology	1932–2019
Journal of Apicultural Research	1962–2009
Journal of Applied Animal Nutrition	2012–2019
Journal of Applied Animal Welfare Science	1998–2019
Journal of Applied Ecology	1964–2020
* Journal of Aquatic Plant Management (formerly Hyacinth Control Journal)	1962–2016
Journal of Arid Environments	1993–2017
Journal of Asia-Pacific Biodiversity (formerly Journal of Korean Nature)	2008–2018
Journal of Avian Biology (formerly Omis Scandinavica)	1994–2016
Journal of Cetacean Research and Management	1999–2018
* Journal of Coastal Research	2015–2018
Journal of Ecology	1933–2019
Journal of Ecology & Natural Resources	2017–2019
Journal of Environmental Management	1973–2020
Journal of Experimental Marine Biology and Ecology	2000–2018
Journal of Field Ornithology	1980–2016
Journal of Forest Research	1996–2019
* Journal of Great Lakes Research	1975–2017
Journal of Herpetological Medicine and Surgery	2009–2018
Journal of Herpetology	1968–2018
Journal of Insect Conservation	1997–2018
Journal of Insect Science	2003–2018
Journal of Kansas Herpetology	2002–2011 †
Journal of Mammalian Evolution	1993–2014
Journal of Mammalogy	1919–2019
Journal of Mountain Science	2004–2016
Journal of Negative Results: Ecology & Evolutionary Biology	2004–2016
Journal of North American Herpetology	2014–2017
Journal of Ornithology	2004–2018
Journal of Primatology	2012–2013
Journal of Raptor Research	1966–2016
Journal of Sea Research (formerly Netherlands Journal of Sea Research)	1961–2018
Journal of the Marine Biological Association of the United Kingdom	1887–2018
Journal of Tropical Ecology	1986–2020

* Journal of Vegetation Science	1990–2017
* Journal of Wetlands Ecology	2008–2012
* Journal of Wetlands Environmental Management	2012–2016
Journal of Wildlife Diseases	1965–2012
Journal of Wildlife Management	1945–2019
Journal of Zoo and Aquarium Research	2013–2019
Journal of Zoo and Wildlife Medicine (formerly Journal of Zoo Animal Medicine)	1970–2019
Journal of Zoology	1966–2019
Kansas Herpetological Society Newsletter	1974–2001 †
* Knowledge and Management of Aquatic Ecosystems	2008–2018
* Lake and Reservoir Management	1984–2016
Land Degradation & Development (formerly Land Degradation & Rehabilitation)	1989–2016
Latin American Journal of Aquatic Mammals	2002–2018
Lemur News	1993–2012
* Limnologica	1999–2018
Mammal Research (formerly Acta Theriologica)	1977–2019
Mammal Review	1970–2019
Mammal Study	2005–2019
Mammalia	1937–2019
Mammalian Biology	2002–2018
Mammalian Genome	1991–2013
Management of Biological Invasions	2010–2016
Mangroves and Salt Marshes	1996–1999 †
* Marine and Freshwater Research (formerly Australian Journal of Marine and Freshwater Research)	1980–2018
Marine Ecology	1980–2018
Marine Ecology Progress Series	2000–2018
Marine Environmental Research	1978–2018
Marine Mammal Science	1985–2019
Marine Pollution Bulletin	2010–2018
Marine Turtle Newsletter	1976–2018
Marsh Bulletin	2010–2020
Mesoamerican Herpetology	2014–2017
Mires and Peat	2006–2016
Natural Areas Journal	1992–2017
Nature Conservation (Instytut Ochrony Przyrody PAN)	2001–2008 †
Nature Conservation (Pensoft)	2012–2019
NeoBiota	2011–2017
Neotropical Entomology	2004–2018
Neotropical Primates	1993–2012
* New Journal of Botany	2011–2013
* New Zealand Journal of Marine and Freshwater Research	1967–2018
New Zealand Journal of Zoology	1974–2019
* New Zealand Plant Protection	2000–2016

Northwest Science	2007–2016
Oecologia	1969–2020
Oikos	1949–2020
Oryx	1950–2020
Ostrich	1980–2016
Pacific Conservation Biology	1993–2020
Pakistan Journal of Zoology	2004–2013
PANS (formerly PANS Pest Articles & News Summaries)	1969–1979
Phyllomedusa	2002–2018
* Plant Ecology (formerly Vegetatio)	1948–2007
* Plant Protection Quarterly	2008–2016 †
Polish Journal of Ecology	2002–2013
Population Ecology (formerly Researches on Population Ecology)	1952–2013
* Preslia	1973–2017
Primate Conservation	1981–2014
Primates	1957–2013
Rangeland Ecology & Management (formerly Journal of Range Management)	1948–2016
Raptors Conservation	2005–2016
Regional Studies in Marine Science	2015–2018
Reptile Rap - Newsletter of the South Asian Reptile Network (SARN)	1999–2016
Restoration Ecology	1993–2020
Riparian Ecology and Conservation	2013–2017 †
* River Research and Applications (formerly Regulated Rivers: Research & Management)	1987–2016
Russian Journal of Herpetology	1994–2018
Slovak Raptor Journal	2007–2016
Small Ruminant Research	1988–2017
* South African Journal of Botany	1982–2016
South African Journal of Wildlife Research	1971–2014
South American Journal of Herpetology	2006–2018
Southern Forests	2008–2013
Testudo	1978–2017
The Auk	1980–2016
The Condor	1980–2009
The Environmentalist	1981–1988
The Herpetological Bulletin	2008–2018
The Herpetological Journal	1985–2016
The Open Ornithology Journal	2008–2016
The Rangeland Journal (formerly The Australian Rangeland Journal)	1976–2016
The Southwestern Naturalist	1956–2018
The Wilson Journal of Ornithology (formerly Wilson Bulletin)	1980–2016
Trends in Ecology and Evolution	1986–2019
Tropical Conservation Science	2008–2018
Tropical Ecology	1960–2018

Tropical Grasslands	1967–2010 †
Tropical Zoology	1988–2018
Turkish Journal of Zoology	1996–2014
Ursus (formerly Bears: Their Biology and Management; Proceedings of the First Bear Workshop, Whitehorse, Yukon)	1968–2019
Vietnamese Journal of Primatology	2007–2009
Wader Study Group Bulletin	1970–1972
Waterbirds (formerly Colonial Waterbirds)	1983–2016
Weed Biology and Management	2001–2016
* Weed Research	1961–2017
West African Journal of Applied Ecology	2000–2016
Western North American Naturalist	2000–2017
* Wetlands	1981–2016
* Wetlands Ecology and Management	1989–2016
Wildfowl	1948–2018
Wildlife Biology	1995–2013
Wildlife Monographs	1958–2013
Wildlife Research	1974–2019
Wildlife Society Bulletin	1973–2019
Zoo Biology	1982–2019
ZooKeys	2008–2013
Zoologica Scripta	1971–2014
Zoological Journal of the Linnean Society	1856–2013
Zootaxa	2004–2014

APPENDIX 1b. Non-English-language journals searched, and for which papers potentially relevant to the Inland Aquatic Vegetation Synthesis have been added to the Conservation Evidence discipline-wide literature repository. Non-English-language journals are those with a substantial proportion of articles (approximately 20% or more, during the searched period) only available in a language other than English.

An asterisk (*) indicates the journals most relevant to this synthesis.

An 'E' after dates searched indicates journals that changed their name after the given year and began publishing predominantly in English. If these new journals were searched, they are included in the list of English-language journals above.

A dagger symbol (†) indicates journals that appear to have ceased publication after the latest date searched.

Languages: **ara** – Arabic; **cat** – Catalan; **chi (s)** – Chinese (simplified); **chi (t)** – Chinese (traditional); **fre** – French; **ger** – German; **hun** – Hungarian; **ind** – Indonesian; **ita** – Italian; **jpn** – Japanese; **kor** – Korean; **per** – Persian; **pol** – Polish; **por** – Portuguese; **rus** – Russian; **tur** – Turkish; **ukr** – Ukrainian.

Lang.	Journal Name (Original Language/Official Name)	Journal Name (English Translation)	Dates Searched
ara	مجلة آفاق علمية	Afak Ilmia Journal	2017–2020
ara	مجلة بغداد للعلوم	Baghdad Science Journal	2004–2020
ara	مجلة العلوم الزراعية والبيئية والبيطرية	Journal of Agricultural, Environmental and Veterinary Sciences	2018–2020
ara	مجلة جامعة الملك عبدالعزيز: الاقتصاد والإدارة	Journal of King Abdulaziz University: Economics and Administration	2015–2020
ara	مجلة جامعة الملك عبد العزيز: علوم تصميم البيئة	Journal of King Abdulaziz University: Environmental Design Science	2003–2017
ara	مجلة جامعة الملك عبدالعزيز: علوم البحار	Journal of King Abdulaziz University: Marine Sciences	2000–2018
ara	مجلة علوم البحر والتقنيات البيئية	Journal of Marine Sciences and Environmental Techniques	2016–2019
* ara	مجلة وقاية النبات العربية	Journal of Plant Protection	1993–2019
ara	مجلة علوم ذي قار	Journal of Thi-Qar Science	2014–2018
ara	المجلة العربية للبيئات الجافة	The Arab Journal for Arid Environments	2009–2018
ara	مجلة جامعة تشرين للبحوث والدراسات العلمية – سلسلة العلوم البيولوجية	Tishreen University Journal for Research and Scientific Studies: Biological Sciences Series	2001–2020
chi (s)	草地学报	Acta Agrestia Sinica	1989–2017
* chi (s)	西北植物学报	Acta Botanica Boreali-Occidentalia Sinica	2012–2016
chi (s)	生态学报	Acta Ecologica Sinica	1981–2016
* chi (s)	水生生物学报	Acta Hydrobiologica Sinica	1997–2017
chi (s)	土壤学报	Acta Pedologica Sinica	1948–2017
chi (s)	植物保护学报	Acta Phytophylacica Sinica	1962–2017
chi (s)	草业学报	Acta Prataculturae Sinica	2008–2017
chi (s)	兽类学报	Acta Theriologica Sinica	1981–2017
chi (s)	动物学报	Acta Zoologica Sinica	1935–2008 E
chi (s)	海洋科学进展	Advances in Marine Science	1983–2017
chi (s)	生态毒理学报	Asian Journal of Ecotoxicology	2006–2017

	chi (s)	生物多样性	Biodiversity Science	1993–2016
*	chi (s)	植物研究	Bulletin of Botanical Research	1959–2017
	chi (s)	水土保持通报	Bulletin of Soil and Water Conservation	1981–2017
	chi (s)	中国环境科学	China Environmental Science	1981–2017
*	chi (s)	植物学报	Chinese Bulletin of Botany	2006–2016
	chi (s)	生命科学	Chinese Bulletin of Life Science	1988–2017
	chi (s)	应用与环境生物学报	Chinese Journal of Applied and Environmental Biology	1995–2017
	chi (s)	应用生态学报	Chinese Journal of Applied Ecology	1990–2016
	chi (s)	中国生物防治学报	Chinese Journal of Biological Control	1985–2017
	chi (s)	中国生态农业学报	Chinese Journal of Eco-Agriculture	1993–2017
	chi (s)	生态学杂志	Chinese Journal of Ecology	1982–2016
	chi (s)	中国草地学报 (formerly 中国草地)	Chinese Journal of Grassland (formerly Grassland of China)	1979–2016
	chi (s)	中国微生态学杂志	Chinese Journal of Microecology	1989–2017
*	chi (s)	植物生态学报 (formerly 植物生态学与地植物学学报; 植物生态学与地植物学丛刊)	Chinese Journal of Plant Ecology (formerly Acta Phytoecologica Sinica; Acta Phytoecologica et Geobotanica Sinica)	1963–2016
	chi (s)	野生动物学报	Chinese Journal of Wildlife	1979–2016
	chi (s)	动物学杂志	Chinese Journal of Zoology	1957–2016
	chi (s)	生态科学	Ecological Science	1982–2016
	chi (s)	生态环境学报 (formerly 生态环境; 土壤 与环境; 热带亚热带土壤科学)	Ecology and Environmental Sciences (formerly Ecology and Environment; Soil and Environment; Tropical and Subtropical Soil Science)	1992–2016
	chi (s)	环境科学	Environmental Science	1976–2017
	chi (s)	农业环境科学学报	Journal of Agro-Environment Science	1981–2017
	chi (s)	干旱区资源与环境	Journal of Arid Land Resources and Environment	1987–2017
	chi (s)	生物学杂志	Journal of Biology	1983–2016
	chi (s)	中国农业大学学报	Journal of China Agricultural University	1955–2017
	chi (s)	中国沙漠	Journal of Desert Research	1981–2017
	chi (s)	生态与农村环境学报 (formerly 农村生态环境)	Journal of Ecology and Rural Environment (formerly Rural Eco-Environment)	1985–2017
	chi (s)	水产学报	Journal of Fisheries of China	1965–2017
*	chi (s)	水生态学杂志水生态学杂志 (formerly 水利渔业)	Journal of Hydroecology (formerly Reservoir Fisheries)	1981–2017
*	chi (s)	湖泊科学	Journal of Lake Sciences	1989–2017
	chi (s)	山地学报	Journal of Mountain Science/Research	1983–2017
	chi (s)	自然资源学报	Journal of Natural Resources	1986–2016
*	chi (s)	植物资源与环境学报	Journal of Plant Resources and Environment	1992–2016
	chi (s)	水土保持学报	Journal of Soil and Water Conservation	1987–2017
*	chi (s)	热带亚热带植物学报	Journal of Tropical and Subtropical Botany	1992–2016
	chi (s)	生命科学研究	Life Science Research	1997–2016
	chi (s)	海洋环境科学	Marine Environmental Science	1982–2017
	chi (s)	海洋科学	Marine Sciences	1977–2017

* chi (s)	植物保护	Plant Protection	1963–2016
* chi (s)	植物分类与资源学报杂志	Plant Diversity and Resources	1975–2017
chi (s)	草业科学	Pratacultural Science	1984–2017
chi (s)	长江流域资源与环境	Resources and Environment in the Yangtze Basin	1992–2017
chi (s)	资源科学	Resources Science	1977–2016
chi (s)	林业科学	Scientia Silvae Sinicae	1955–2017
chi (s)	上海环境科学	Shanghai Environmental Science	1982–2017
chi (s)	四川动物	Sichuan Journal of Zoology	1996–2016
chi (s)	土壤	Soils	1958–2017
chi (s)	城市环境与城市生态	Urban Environment & Urban Ecology	1988–2016
* chi (s)	湿地科学	Wetland Science	2003–2017
chi (s)	世界林业研究	World Forestry Research	1988–2017
chi (s)	动物学研究	Zoological Research	1980–2016
chi (s)	动物分类学报	Zoological Systematics	1964–2017
chi (t)	生物學報	Bio Formosa	1966–2014 †
chi (t)	生物科學	Chinese Bioscience	2003–2014 †
chi (t)	中华真菌学会会刊	Fungal Science	1995–2019
chi (t)	農林學報	Journal of Agriculture and Forestry	2000–2018
chi (t)	環境與生態學報	Journal of Ecology and Environmental Sciences	2008–2012
chi (t)	國家公園學報	Journal of National Park	1989–2019
chi (t)	臺灣大學生物資源暨農學院實驗林研究報告	Journal of the Experimental Forest of National Taiwan University	1987–2019
chi (t)	國立臺灣博物館學刊	Journal of the National Taiwan Museum	2005–2019
chi (t)	野生動物保育彙報及通訊	Notes and Newsletter of Wildlifers	2005–2012 †
chi (t)	中華林學季刊	Quarterly Journal of Chinese Forestry	2004–2019
chi (t)	台灣猛禽研究	Raptor Research of Taiwan	2003–2016
chi (t)	動物園學報	Taipei Zoo Bulletin	1989–2013
chi (t)	台灣生物多樣性研究	Taiwan Journal of Biodiversity	1999–2019
chi (t)	臺灣林業科學	Taiwan Journal of Forest Science	1986–2020
fre	Alauda	–	2000–2005
fre	Biotechnologie, Agronomie, Société et Environnement	Biotechnology, Agronomy, Society and Environment	2008–2020
fre	Bois et Forêts des Tropiques	Tropical Woodlands and Forests	2009–2020
fre	Bulletin de la Société Zoologique de France	Bulletin of the French Zoology Society	1973–2015
fre	Bulletin Français de la Pêche et de la Pisciculture	French Bulletin of Fishing and Aquaculture	1986–2007 E
fre	Courrier Scientifique du Parc Naturel Régional du Luberon et de la Réserve de Biosphère Luberon-Lure	Scientific Letters from the Regional Natural Park of Luberon and the Biosphere Reserve Luberon-Lure	1997–2016
fre	Ecologia Mediterranea	–	2000–2019
fre	Le Naturaliste Canadien	The Canadian Naturalist	2008–2018
fre	Naturae	–	2017–2020

fre	Revue d'Écologie (La Terre et La Vie)	Ecology Review (Earth and Life)	2006–2018
fre	Travaux Scientifiques du Parc National de la Vanoise	Scientific Reports of the Vanoise National Park	1986–2009 †
fre	Travaux Scientifiques du Parc National de Port-Cros	Scientific Reports of the Port-Cros National Park	2000–2019
fre	VertigO	–	2009–2019
ger	ABU-Info (Arbeitsgemeinschaft Biologischer Umweltschutz im Kreis Soest e.V.)	ABU-Info (Working Group for Biological Environmental Protection in Soest District)	2006–2017
ger	Allgemeine Forst- und Jagdzeitung	Journal of Forestry and Forest Science	2000–2016
ger	ANLiegen Natur: Zeitschrift für Naturschutz und Angewandte Landschaftsökologie	Concerning Nature: Journal of Nature Conservation and Applied Landscape Ecology	2006–2017
ger	Arachnologische Mitteilungen	Arachnological Letters	1991–2017
ger	Archiv für Forstwesen und Landschaftsökologie	Archive for Forestry and Landscape Ecology	2013
* ger	Auenmagazin (Magazin des Auenzentrums Neuburg a. d. Donau)	Floodplains Journal (Magazine of the Auenzentrums Neuburg a. d. Danube)	2010–2017
ger	Biodiversität und Naturschutz in Ostösterreich	Biodiversity and Conservation in Eastern Austria	2015–2018
* ger	Botanik und Naturschutz in Hessen	Botany and Nature Conservation in Hessen	1987–2018
ger	Bulletin de la Société des Naturalistes Luxembourgeois	Bulletin of the Luxemburg Naturalist Society	1950–2017
ger	Der Ornithologische Beobachter	Ornithological Observer	1950–2017
ger	Der Zoologische Garten: Zeitschrift für die Gesamte Tiergärtnerei (Neue Folge)	The Zoological Garden: Journal for the Entire Zoo	2007–2017
ger	Die Bodenkultur: Journal of Land Management, Food and Environment	Soil Culture: Journal of Land Management, Food and Environment	2016–2017
ger	Die Erde	The Earth	1952–2004
ger	Die Orchidee	The Orchid	1949–2016
ger	Die Vogelwelt: Beiträge zur Vogelkunde	Bird Life: Contributions to Ornithology	2005–2017
ger	Fachzeitschrift für Waldökologie, Landschaftsforschung und Naturschutz (formerly Waldökologie Online)	Journal of Forest Ecology, Landscape Research and Nature Conservation (formerly Forest Ecology Online)	2004–2016
ger	Forstarchiv	Forestry Archive	2007–2017
ger	Freiberg Online Geoscience (FOG)	–	1998–2017
ger	Gesunde Pflanzen: Pflanzenschutz, Verbraucherschutz, Umweltschutz	Healthy Plants: Crop Protection, Consumer Protection, Environment Protection	2002–2017
ger	Hercynia	–	1963–2017
ger	Inatura Forschung Online	Inatura Research Online	1996–2007
ger	Insecta	–	1992–2014 †
ger	Journal für Ornithologie	Journal of Ornithology	1959–2003 E
ger	Libellula	–	1982–2016
ger	Mertensiella	–	1988–2017
ger	Mitteilungen des Badischen Landesvereins für Naturkunde und Naturschutz	Communications of the Baden Association for Natural History and Nature Conservation	1953–2015
ger	Natur und Landschaft: Zeitschrift für Naturschutz und Landschaftspflege	Nature and Landscape: Journal of Nature Conservation and Landscape Management	1990–2017
ger	Naturschutz und Landschaftsplanung	Conservation and Landscape Planning	2003–2017

ger	Nyctalus: Internationale Fledermaus-Fachzeitschrift	Nyctalus: International Bat Journal	2005–2017
ger	Ornithologischer Anzeiger	Ornithological Journal	1951–2017
* ger	Pulsatilla: Zeitschrift für Botanik und Naturschutz	Pulsatilla: Journal of Botany and Nature Conservation	2000–2007
ger	RANA - Mitteilungen für Feldherpetologie und Ichthyofaunistik	RANA - Communications for Field Herpetology and Ichthyofauna	1983–2016
ger	Salamandra	–	1965–2018
ger	Silva Fera: Wissenschaftliche Nachrichten aus dem Wildnisgebiet Dürrenstein	Silva Fera: Scientific News from the Dürrenstein Wildmess Area	2012–2017
ger	Telma	–	1971–2019
* ger	Tuexenia	–	1981–2016
ger	Vogelwarte: Zeitschrift für Vogelkunde	Bird Observatory: Ornithology Journal	2005–2017
ger	Zeitschrift für Feldherpetologie	Journal of Field Herpetology	1994–2017
ger	Zeitschrift für Jagdwissenschaft	Journal of Hunting Science	1955–2003 E
hun	Állattani Közlemények	Journal of Zoology	2010–2019
* hun	Botanikai Közlemények	Journal of Botany	2010–2020
hun	Tájökológiai Lapok	Journal of Landscape Ecology	2010–2019
hun	Természetvédelmi Közlemények	Journal of Nature Conservation	2010–2019
ind	Jurnal Primatologi Indonesia	Journal of Indonesian Primatology	2009
ita	Alula (SROPU)	–	1992–2019
ita	Avocetta	–	2000–2013
ita	Biologia Ambientale	Environmental Biology	1994–2018
ita	Forest@ - Rivista di Selvicoltura ed Ecologia Forestale	Forest @ - Journal of Silviculture and Forest Ecology	2004–2020
ita	Picus	–	2004–2018
ita	Rivista Italiana di Ornithologia	Italian Journal of Ornithology	2010–2019
jpn	爬虫両棲類学会報	Bulletin of the Herpetological Society of Japan	1999–2008
jpn	応用生態工学	Ecology and Civil Engineering	1998–2017
jpn	保全生態学研究	Japanese Journal of Conservation Ecology	1996–2016
jpn	日本生態学会誌	Japanese Journal of Ecology	1954–2017
jpn	日本鳥学会誌	Japanese Journal of Ornithology	1917–2015
jpn	日本森林学会誌 (formerly 日本林学会誌)	Journal of the Japanese Forest Society (formerly Journal of the Japanese Forestry Society)	1985–2017
jpn	ランドスケープ研究 (formerly 造園雑誌)	Journal of the Japanese Institute of Landscape Architecture (formerly Journal of the Japanese Institute of Landscape Architects)	1934–2017
jpn	哺乳動物学雑誌	Journal of the Mammalogical Society of Japan	1959–1986 E
jpn	景観生態学 (formerly 国際景観生態学会日本支部会報)	Landscape Ecology and Management (formerly Bulletin of the International Association for Landscape Ecology – Japan)	2002–2016
jpn	ランドスケープ研究 (オンライン論文集)	Landscape Research Japan Online	2008–2017
jpn	哺乳類科学	Mammalian Science	1961–2016
jpn	野生復帰	Reintroduction	2011–2019
jpn	ストリクス	Strix	1982–2017

jpn	造園学雑誌	The Journal of the Japanese Landscape Architectural Society	1925–1927 †
jpn	野生生物と社会	Wildlife and Human Society	2013–2017
jpn	野生生物保護	Wildlife Conservation Japan	1995–2013 †
jpn	動物学雑誌	Zoological Journal	1888–1983 †
kor	한국산림과학회지(한국임학회지)	Journal of Korean Society of Forest Science	2002–2020
* kor	한국습지학회지	Journal of Wetlands Research	1999–2020
kor	한국환경생태학회지	Korean Journal of Environment and Ecology	2001–2020
kor	환경생물	Korean Journal of Environmental Biology	2002–2020
kor	한국조류학회지	Korean Journal of Ornithology	1994–2020
per	پژوهش های محیط زیست	Environmental Researches	2010–2017
per	زیست شناسی جانوری تجربی	Experimental Animal Biology	2012–2017
per	بوم شناسی کاربردی	Iranian Journal of Applied Ecology	2012–2017
per	مجله منابع طبیعی ایران	Iranian Journal of Natural Resources	2002–2009 †
per	فصلنامه محیط زیست جانوری	Journal of Animal Environment	2014–2017
per	پژوهش های جانوری	Journal of Animal Research	2013–2017
per	علوم محیطی محیطی	Journal of Environmental Sciences	2004–2017
per	محیط شناسی	Journal of Environmental Studies	2009–2017
per	نشریه محیط زیست طبیعی	Journal of Natural Environment	2010–2017
pol	Chrońmy Przyrodę Ojczystą	Let's Protect Our Indigenous Nature	2004–2019
pol	Kulon	Stone Curlew	1996–2018
pol	Naturalia	–	2012–2016
pol	Nietoperze	Bats	2000–2011 †
pol	Ornis Polonica (formerly Notatki Omitologiczne)	Ornis Polonica (formerly Ornithological Notes)	1989–2020
pol	Parki Narodowe i Rezerwy Przyrody	National Parks and Nature Reserves	2009–2015
pol	Przegląd Przyrodniczy	Nature Review	2010–2019
pol	Studia Naturae	–	1987–2013
por	Acta Amazônica	–	1971–2019
por	Ambiência	Ambience	2005–2019
por	Arquipelago - Life and Marine Sciences	Archipelago - Life and Marine Sciences	1980–2020
por	Biodiversidade (UFMT)	Biodiversity (UFMT)	2007–2019
por	Biodiversidade Brasileira	Brazilian Biodiversity	2011–2016
por	Bioikos	–	1987–2016 †
por	Biota Amazônica	–	2011–2018
por	Biota Neotropica	–	2001–2011
por	Biotemas	–	1988–2018
por	Boletim da Sociedade Brasileira de Mastozoologia	Bulletin of the Brazilian Society of Mastozoology	1985–2017
por	Boletim do Museu de Biologia Mello Leitão	Bulletin of the Mello Leitão Biology Museum	2013–2018
por	Chiroptera Neotropical	Neotropical Chiroptera	1995–2015 †
por	Ciência & Ambiente	Science and Environment	1990–2015 †
por	Evolução e Conservação da Biodiversidade	Evolution and Conservation of Biodiversity	2010–2011

por	FLORAM - Revista Floresta e Ambiente	Brazilian Journal of Forestry and Environment	1994–2020
por	Floresta	Forest	1969–2017
por	Iheringia: Série Zoologia	Iheringia: Zoology Series	2000–2018
por	Megadiversidade	Megadiversity	2005–2009 †
por	MG Biota	–	2008–2016
por	Natureza & Conservação	Brazilian Journal of Nature Conservation	2003–2016 E
por	Neotropical Biology and Conservation	–	2006–2017
por	Portugaliae Acta Biologica	–	2000–2003 †
por	Revista Brasileira de Ecologia	Brazilian Journal of Ecology	1997–2009
por	Revista Brasileira de Gestão Ambiental e Sustentabilidade	Brazilian Journal of Environmental Management and Sustainability	2014–2017
por	Revista CEPSUL – Biodiversidade e Conservação Marinha	CEPSUL Journal – Marine Biodiversity and Conservation	2010–2017
por	Revista de Biologia Neotropical	Journal of Neotropical Biology	2004–2018
por	Revista de Ciências Agrárias (SCAP)	Journal of Agricultural Sciences (SCAP)	2007–2019
* por	Revista de Gestão Costeira Integrada	Journal of Integrated Coastal Zone Management	2007–2019
por	Revista Nordestina de Biologia	Northeastern Journal of Biology	1978–2016
rus	Известия РАН, серия биологическая	Biology Bulletin	1957–2020
rus	Бюллетень МОИП, серия биологическая	Bulletin of Moscow Society of Naturalists: Biological Series	1935–2020
rus	Сибирский экологический журнал	Contemporary Problems of Ecology	1994–2020
rus	Современная герпетология	Current Studies in Herpetology	2000–2019
rus	Вестник охотоведения	Herald of Game Management	2007–2020
rus	Журнал Общей Биологии	Journal of General Biology	1972–2013
rus	Вопросы ихтиологии	Journal of Ichthyology	1961–2020
rus	Заповедная наука	Nature Conservation Research	2016–2020
rus	Поволжский экологический журнал	Povolzhsky Journal of Ecology	2002–2020
rus	Экология	Russian Journal of Ecology	1993–2020
rus	Русский орнитологический журнал	Russian Journal of Ornithology	1993–2020
rus	Зоологический журнал	Russian Journal of Zoology	1939–2020
rus	Степной бюллетень	Steppe Bulletin	1998–2020
spa	A Carriza: Sociedad Gallega de Ornitología	A Carriza: Galician Ornithology Society	2001–2009 †
spa	Acta Zoológica Mexicana	–	1984–2019
spa	Agrociencia Uruguay	Agroscience Uruguay	1997–2017
spa	Anales de Biología	Annals of Biology	1984–2019
spa	Ardeola	–	1954–2019
spa	Biodiversity and Natural History	–	2009–2018
spa	Bioma (El Salvador)	–	2012–2016 †
spa	BioScriba	–	2008–2017 †
spa	Boletín Científico Centro de Museos	Bulletin of the Museum Scientific Center	1996–2019
spa	Boletín de Biodiversidad de Chile	Chilean Bulletin of Biodiversity	2009–2014 †
spa	Boletín de la Asociación Herpetológica Española	Bulletin of the Spanish Herpetological Association	2004–2018

spa	Boletín de la Real Sociedad Española de Historia Natural: Sección Biológica	Bulletin of the Royal Spanish Society of Natural History: Biological Section	2003–2017
spa	Boletín de la Sociedad Argentina de Botánica	Bulletin of the Argentinean Society of Botany	2013–2018
spa	Bosques Latitud Cero	Forests Latitude Zero	2014–2018
spa	Caldasía	–	1940–2019
spa	CEDAMAZ	–	2014–2018
spa	Centros: Revista Científica Universitaria	Centros: Scientific Journal of the University	2012–2018
spa	Colombia Forestal	Colombia Forestry	2000–2018
spa	Cuadernos de Herpetología	Herpetology Notes	2010–2018
spa	Ecología Aplicada	Applied Ecology	2002–2018
spa	Ecología Austral	Austral Ecology	2001–2018
spa	Ecosistemas y Recursos Agropecuarios	Ecosystems and Agropecuary Resources	1994–2018
spa	Ecosistemas: Revista Científica de Ecología y Medio Ambiente	Ecosystems: Scientific Journal of Ecology and Environment	2001–2018
spa	Edentata	–	1994–2018
spa	El Homero: Revista de Ornitología Neotropical	El Homero: Journal of Neotropical Ornithology	2003–2017
spa	Etología	Ethology	1989–2003 †
spa	Folia Amazónica	–	1988–2018
spa	Galemys	–	1997–2017
spa	Gestión Ambiental	Environmental Management	1999–2017
* spa	Hidrobiológica	Hydrobiology	1991–2018
spa	Historia Natural	Natural History	2011–2018
spa	Huitzil: Revista Mexicana de Ornitología	Huitzil: Journal of Mexican Ornithology	2000–2018
spa	Journal of Bat Research & Conservation (formerly Barbastella)	–	2000–2019
spa	Madera y Bosques	Wood and Forests	1995–2018
spa	Mammalogy Notes	–	2014–2017
spa	Mastozoología Neotropical	Neotropical Mammalogy	1994–2018
spa	Mediterránea: Serie de Estudios Biológicos	Mediterranean: Biological Studies Series	1982–2015 †
spa	Notulas Faunísticas	Faunal Notes	2008–2018
spa	Novitates Caribaea	–	1999–2019
spa	Ocelotlán	–	2003–2012 †
spa	Orinoquia	–	2003–2018
spa	Quebracho: Revista de Ciencias Forestales	Quebracho: Journal of Forest Sciences	2008–2018
spa	Revista Chilena de Historia Natural	Chilean Journal of Natural History	1897–2018
spa	Revista Chilena de Ornitología (formerlly Boletín Chileno de Ornitología)	Chilean Journal of Ornithology (formerlly Chilean Bulletin of Ornithology)	1994–2018
spa	Revista de Biología Tropical	Journal of Tropical Biology	1976–2018
spa	Revista Española de Herpetología	Spanish Journal of Herpetology	2003–2007
spa	Revista Internacional de Contaminación Ambiental	International Journal of Pollution	1985–2018
spa	Revista Mexicana de Biodiversidad	Mexican Journal of Biodiversity	2005–2018
spa	Revista Mexicana de Ciencias Forestales	Mexican Journal of Forestry Sciences	2010–2018

spa	Revista Mexicana de Mastozoología	Mexican Journal of Mastozoology	1995–2017
spa	Revista Nicaragüense de Biodiversidad	Nicaraguan Journal of Biodiversity	2015–2019
spa	Revista Peruana de Biología	Peruvian Journal of Biology	1974–2019
spa	Semiárida	–	2013–2018
spa	Studia Oecológica	–	1981–1995 †
spa	Therya	–	2010–2018
spa	Zoologica Baetica	–	1990–2015 †
spa/cat	Animal Biodiversity and Conservation (Museu de Ciències Naturals de Barcelona)	Animal Biodiversity and Conservation (Barcelona Museum of Natural Sciences)	2001–2019
spa/cat	Arxius de Miscel·lània Zoològica	Archives of Zoological Miscellany	2003–2019
spa/cat	Revista Catalana d'Omitologia (formerly Butlletí del Grup Català d'Anellament)	Catalan Journal of Ornithology (formerly Bulletin of the Catalan Ringing Group)	1981–2018
spa/por	Ornitología Neotropical	Neotropical Ornithology	1990–2018
tur	Akademik Ziraat Dergisi	Journal of Academic Agriculture	2012–2019
tur	Akdeniz Üniversitesi Ziraat Fakültesi Dergisi	Mediterranean Agricultural Sciences	2009–2019
tur	Anadolu Orman Araştırmaları Dergisi	Anatolia Journal of Forest Research	2015–2019
tur	Artvin Çoruh Üniversitesi Orman Fakültesi Dergisi	Artvin Coruh University Journal of Forestry Faculty	2000–2020
tur	Atatürk Üniversitesi Ziraat Fakültesi Dergisi	Atatürk University Journal of Agricultural Faculty	2008–2020
tur	Bağbahçe Bilim Dergisi	Journal of Bagbahce Science	2019
tur	Bartın Orman Fakültesi Dergisi	Journal of Bartin Faculty of Forestry	2000–2019
* tur	Deniz Bilimleri ve Mühendisliği Dergisi	Aquatic Sciences and Engineering	2007–2020
tur	Dicle Üniversitesi Fen Bilimleri Enstitüsü Dergisi	Journal of Dicle University Natural Sciences Institute	2019
tur	Doğanın Sesi	Journal of Nature's Voice	2018–2019
tur	Doğu Coğrafya Dergisi	Journal of Eastern Geography	2010–2019
tur	Dumlupınar Üniversitesi Fen Bilimleri Enstitüsü Dergisi	Journal of Dumlupınar University Institute of Science	2000–2019
tur	Ege Üniversitesi Ziraat Fakültesi Dergisi	Journal of Ege University Faculty of Agriculture	2014–2019
tur	Iğdır Üniversitesi Fen Bilimleri Enstitüsü Dergisi	Journal of Iğdır University Institute of Science	2019–2020
tur	İstanbul Üniversitesi Orman Fakültesi Dergisi	Journal of the Faculty of Forestry Istanbul University	2009–2017
tur	Kastamonu Üniversitesi Orman Fakültesi Dergisi	Journal of Kastamonu University Faculty of Forestry	2001–2019
tur	Kommagene Biyoloji Dergisi	Commagene Journal of Biology	2017–2019
tur	Orman Bilimleri Dergisi	Turkish Journal of Forest Science	2017–2019
tur	Su Ürünleri Dergisi	Journal of Fisheries	2000–2019
tur	Toprak Bilimi ve Bitki Besleme Dergisi	Journal of Soil Science and Plant Nutrition	2012–2019
tur	Trakya University Journal of Natural Sciences	Trakya University Journal of Natural Sciences	2000–2019
tur	Türk Coğrafya Dergisi	Turkish Geographical Review	2000–2019
tur	Türk Tarım - Gıda Bilim ve Teknoloji Dergisi	Turkish Journal of Agriculture - Food Science and Technology	2014–2019

tur	Türkiye Ormanlık Dergisi	Journal of Turkey Forestry	2000–2019
tur	Uluslararası Doga Bilimleri ve Biyoteknoloji Dergisi	International Journal of Life Sciences and Biotechnology	2018–2019
tur	Uluslararası Doğu Anadolu Fen Mühendislik ve Tasarım Dergisi	Journal of International East Anatolia Science Engineering and Design	2019
tur	Zeugma Biyolojik Bilimler Dergisi	Zeugma Biological Science	2020
ukr	Заповідна справа (formerly Заповідна справа в Україні)	Nature Conservation (formerly Nature Reserves in Ukraine)	1995–2016 †
ukr	Питання біоіндикації та екології	Problems of Bioindication and Ecology	2008–2019
ukr	Вісник Львівського університету: Серія біологічна	Visnyk of Lviv University: Biological Series	2005–2019

APPENDIX 1c. Report series and other specialist literature sources searched, and for which documents potentially relevant to the Inland Aquatic Vegetation Synthesis have been added to the Conservation Evidence discipline-wide literature repository.

An asterisk (*) indicates the sources most relevant to this synthesis. For these sources, updated searches to the end of 2022 will be conducted.

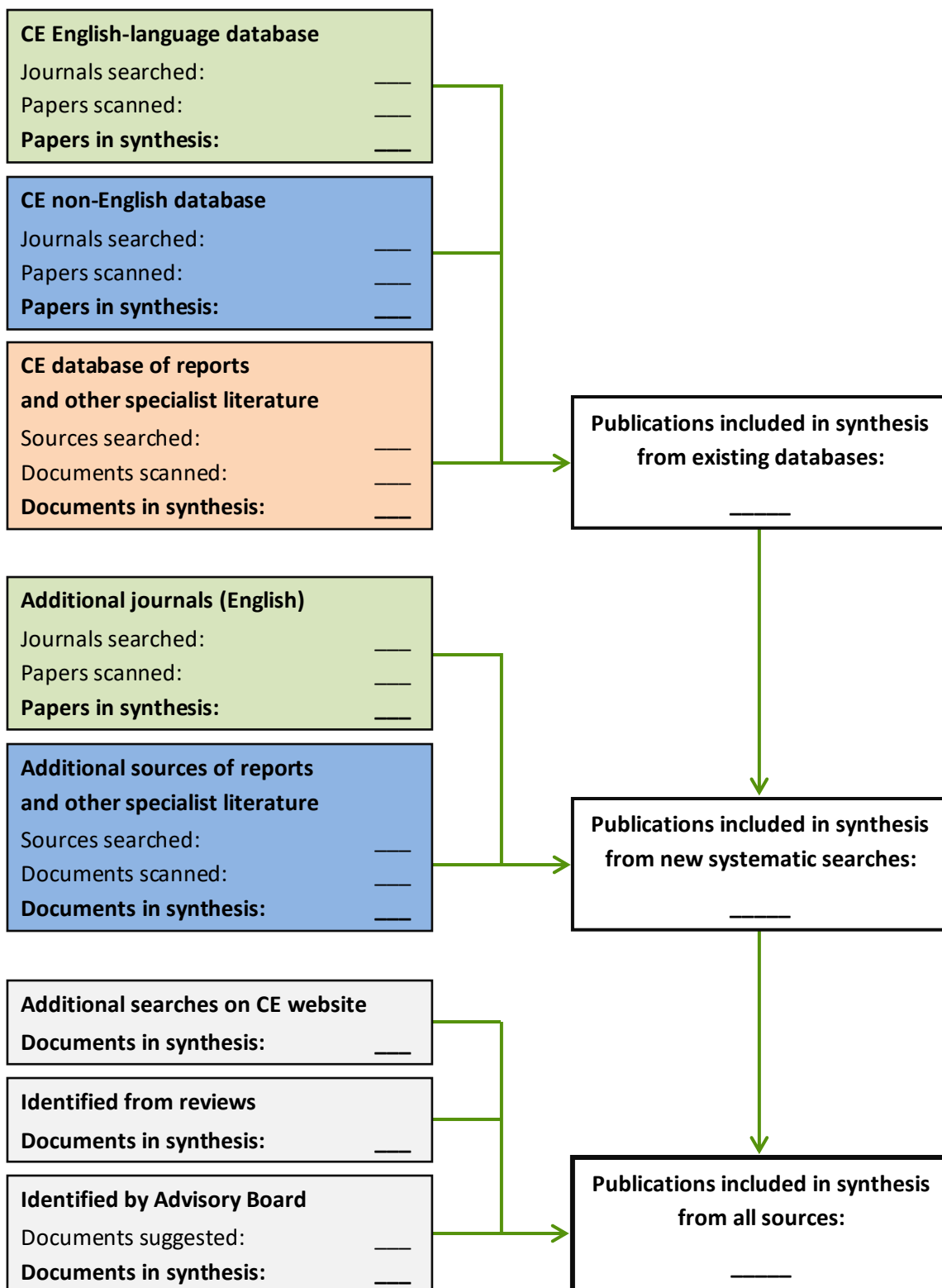
A dagger symbol (†) indicates sources that appear not to have been updated after the latest date searched.

Organization	URL	Documents	Dates Searched
Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS)	www.accobams.org/documents-resolutions/resolutions	Resolutions: Cons. Actions	45 numbered documents
Amphibian and Reptile Conservation (ARC)	www.arc-trust.org/technical-reports	Technical Reports	2021
Amphibian Survival Alliance	https://www.amphibians.org/resources/library/froglog/	FrogLog	1994–2012
Back from the Brink: Shifting Sands	www.naturebftb.co.uk/the-projects/shifting-sands/	Documents	2021 †
British Trust for Ornithology	www.bto.org/research-data-services/publications/research-reports	Research Reports	1981–2016
Centre for Evidence Based Conservation	http://www.cebc.bangor.ac.uk/CEELibrary.php	CEE Systematic Reviews and Maps	2004–2016 †
Convention on the Conservation of Migratory Species of Wild Animals (CMS)	www.cms.int/	Documents	1998–2018
Grupo Jaragua	http://www.grupojaragua.org.do/publicaciones.html	Publications	1997–2011 †
International Council for the Exploration of the Sea (ICES): Working Group on Bycatch of Protected Species	www.ices.dk/publications/our-publications/Pages/Expert-Group-Reports.aspx	Expert Reports	2011–2018
International Council for the Exploration of the Sea (ICES): Working Group on Marine Mammal Ecology	www.ices.dk/publications/our-publications/Pages/Expert-Group-Reports.aspx	Expert Reports	2003–2018
International Society for Mangrove Ecosystems	www.mangrove.or.jp/english/subpage/publications.html	Occasional Papers, Technical Reports	1993–2014 †
IUCN-SSC Cetacean Specialist Group	www.iucn-csg.org/downloads/	Reports	1989–2018
IUCN-SSC Crocodile Specialist Group	www.iucncsg.org/pages/Publications.html	Articles, Reports	2005–2018
* IUCN-SSC Freshwater Plant Specialist Group	www.iucn.org/commissions/ssc-groups/plants-fungi/plants/plants-ag/freshwater-plant	Reports	2016–2018
IUCN-SSC Invasive Species Specialist Group	www.issg.org/publications.htm	Aliens: The Invasive Species Bulletin	1995–2013 †
IUCN-SSC Marine Mammal Protected Area Specialist Group	www.marinemammalhabitat.org/downloads/	Reports	2017–2018
Joint Nature Conservation Committee (JNCC)	www.jncc.gov.uk/	Reports	1991–2018
* MedWet	www.medwet.org/publications/	Publications	1994–2017
National Oceanic and Atmospheric Administration (NOAA)	www.fisheries.noaa.gov/	Fisheries Science & Data Resource Reports	1962–2018

Natural England	www.publications.naturalengland.org.uk/category/7002 www.publications.naturalengland.org.uk/category/10002	Selected Reports	1991–2018
NatureScot	www.nature.scot/information-library-data-and-research/information-library	Reports	2004–2018
North Atlantic Marine Mammal Commission	www.nammco.no/scientific-publication-series/	Scientific Publication Series	1998–2018 †
* Ramsar	www.ramsar.org/search	Documents	1998–2017
Scientific Committee on Antarctic Research (SCAR): Expert Group on Birds and Marine Mammals	www.scar.org/science/eg-bamm	Reports, Publications	2004–2018
Sea Mammal Research Unit (SMRU)	www.smru.st-andrews.ac.uk/research-policy/reports-to-scottish-government/	Reports to Scottish Government	2012–2018
Sea Mammal Research Unit (SMRU)	www.smru.st-andrews.ac.uk/reports/	Reports for Funders	1990–2018
* Wetlands International	www.wetlands.org/	Publications, Case Studies	1980–2017
Whale and Dolphin Conservation (WDC)	https://uk.whales.org/policy/wdc-publications-and-reports/	Reports	2001–2018

APPENDIX 2. Literature reviewed for the Inland Aquatic Vegetation Synthesis

The diagram below will be completed and included in the synopsis document to show the numbers of journals and specialist sources searched for the synthesis, the total number of documents scanned within those, and the number of publications that were summarized from each source of literature. CE – Conservation Evidence.



APPENDIX 3. General inclusion criteria for Conservation Evidence literature repository

Criterion A: Conservation Evidence includes studies that measure the effect of an action that might be done to conserve biodiversity

1. Does this study measure the effect of an action that is or was under the control of humans, on wild taxa (including captives), habitats, or invasive/problem taxa? If yes, go to 3. If no, go to 2.
2. Does this study measure the effect of an action that is or was under the control of humans, on human behaviour that is relevant to conserving biodiversity? If yes, go to Criterion B. If no, the study will be excluded.
3. Could the action be put in place by a conservationist/decision maker to protect, manage, restore or reduce impacts of threats to wild taxa or habitats, or control or mitigate the impact of the invasive/problem taxon on wild taxa or habitats? If yes, the study will be included. If no, the study will be excluded.

Explanation:

- 1a. Study must have a measured outcome on wild taxa, habitats or invasive/problematic species: excludes studies on domestic/agricultural species, theoretical modelling, or opinion pieces. See Criterion B for actions that have a measured outcome on human behaviour only.
- 1b. Action must be carried out by people: excludes impacts from natural processes (e.g. wave action, natural storms), impacts from background variation (e.g. sediment type, climate change), correlations with habitat types, where there is no test of a specific action by humans, or pure ecology (e.g. movement, distribution of species).
2. Study must test an action that could be put in place for conservation. This excludes assessing impacts of threats (actions which remove threats would be included). The test may involve comparisons between sites/factors not originally put in place or modified for conservation but which could be (e.g. fished vs unfished sites, dredged vs undredged sites – where the removal of fishing/dredging is as would be done for conservation, even if that was not the original intention in the study).

If the title and/or abstract are suggestive of fulfilling our criteria, but there is not sufficient information to judge whether the action was under human control, the action could be applied by a conservationist/decision maker or whether there are data quantifying the outcome, then the study will be included. If the article has no abstract, but the title is suggestive, then the study will be included.

Publications will be sorted into folders by which taxon/habitat they have an outcome on. If the title/abstract does not specify which species/taxa/habitats are impacted, then the full publications will be scanned and then assigned to folders accordingly.

The **outcome** for wild taxa/habitats can be negative, neutral or positive, does not have to be statistically significant but must be quantified (if hard to judge from abstract, then it will be included). It could be any outcome that has implications for the health of individuals, populations, species, communities or habitats, including, but not limited to the following:

- *Individual health, condition or behaviour*: growth, size, weight, stress, disease, immune function, movement, use of natural/artificial habitat/structure, range, predatory or nuisance behaviour that could lead to retaliatory action by humans.
- *Breeding*: egg/sperm production, seed production, sperm motility/viability after freezing, artificial fertilization success, mating success, birth rate, germination rate, litter size, calf/pup condition, overall recruitment.
- *Genetics*: genetic diversity, genetic suitability (e.g. adaptation to local conditions, use of correct flyways for migratory species).
- *Life history*: age/size at maturity, survival, mortality.
- *Population*: number, abundance, density, presence/absence, biomass, cover, age structure, species distributions (only in response to a human action), disease prevalence, sex ratio.
- *Community/habitat*: richness, diversity (including trait/functional diversity), community composition, community structure (e.g. trophic structure), area covered (e.g. by different habitat types), physical habitat structure (e.g. rugosity, height, basal area).

Actions within the scope of Conservation Evidence include:

- Clear management actions, e.g. closing an area to fishing, modifying fishing gear to reduce bycatch, controlling invasive species, creating or restoring habitats.
- International or national policies.
- Reintroductions or management of wild species in captivity.
- Actions aiming to reduce human-wildlife conflict.
- Actions aiming to change human behaviour, resulting in an impact on wild taxa or habitats.

See <https://www.conservationevidence.com/data/index> for more examples of actions.

Criterion B: Conservation Evidence includes studies that measure the effect of an action that might be done to change human behaviour for the benefit of biodiversity

1. Does this study measure the effect of an action that is or was under human control on human behaviour (actual or intentional) which is likely to protect, manage, restore or reduce threats to wild taxa or habitats? If yes, go to 2. If no, the study will be excluded.
2. Could the action be put in place by a conservationist, manager or decision maker to change human behaviour? If yes, the study will be included. If no, the study will be excluded.

Explanation:

- 1a. Study must have a measured outcome on actual or intentional human behaviour including self-reported behaviours; excludes outcomes on human psychology (tolerance, knowledge, awareness, attitude, perceptions or beliefs).
- 1b. Potential change in human behaviour must be linked to outcomes for wild taxa and habitats; excludes changes in behaviour linked to outcomes for human benefit, even if these occurred under a conservation program (e.g. increased school attendance in villages under a community-based conservation program).
- 1c. Action must be under human control: excludes impacts from climatic or other natural events.

2. Study must test an action that could be put in place for conservation: excludes studies with no action, e.g. correlating human personality traits with likelihood of conservation-related behaviours.

The human behaviour **outcome** of the study can be negative, neutral or positive, does not have to be statistically tested but must be quantified (if hard to judge from abstract, then it will be included). It could be any behaviour that is likely to have an impact on wild taxa and habitats (including mitigating the impact of invasive/problem taxa on wild taxa or habitats). Outcomes include, but are not limited to the following:

- *Change in adverse behaviours (which directly threaten biodiversity):* unsustainable fishing (industrial, artisanal, recreational), urban encroachment, creating noise, entering sensitive areas, polluting or dumping waste, habitat clearance or destruction, introducing invasive species.
- *Change in positive behaviours:* uptake of alternative/sustainable livelihoods/practices, number/value of donations.
- *Change in policy or conservation methods:* placement/establishment of protected areas, protection of key habitats/species.
- *Change in consumer or market behaviour:* purchasing, consuming, buying, selling, illegal trading, advertising, consumer fraud.
- *Behavioural intentions to do any of the above:* willingness to pay (e.g. for protection).

Actions which are particularly likely to have a behaviour change outcome include, but are not limited to the following:

- *Enforcement:* restrict fishing/hunting seasons, impose size limits, restrict fishing/hunting gear, require auditable/traceable reporting, carry out market inspections, increase number of rangers/patrols or frequency of patrols in/around/within protected areas, improve fencing/physical barriers, improve signage, improve equipment/technology used by guards, use UAVs/drones for rapid response, DNA analysis, GPS tracking.
- *Governance:* protect or reward whistle-blowers, increase government transparency, ensure independence of judiciary, provide legal aid.
- *Market Regulation:* impose trade bans, adjust taxation, supply chain transparency laws.
- *Consumer demand reduction:* increase awareness or knowledge, fear appeals (negative association with undesirable product), benefit appeals (positive association with desirable behaviour), worldview framing, moral framing, employ decision defaults, provide decision support tools, simplify advice to consumers, promote desirable social norms, legislative prohibition.
- *Sustainable alternatives:* develop/promote certification schemes, develop/promote captive bred or artificial alternatives, develop/promote alternative/sustainable livelihoods.
- *Other:* offer payment for ecosystem services or other financial incentives, develop ecotourism, reduce poverty, provide education/training to increase knowledge or appreciation, debunk misinformation, alter or re-enforce local taboos, create new policies for conservation/protection.

We allocate studies to folders by their outcome. All studies under Criterion B go in the

'behaviour change' folder. They are additionally duplicated into a taxon/habitat folder if there is a specific intended final outcome of the behaviour change (if none mentioned, they will be filed only in 'behaviour change').

Note on **study types**: Literature reviews, systematic reviews and meta-analyses that include studies that fulfil these criteria will be included. Theoretical modelling studies will be excluded, as no action has been taken. However, studies that use models to analyse real-world data, or compare models to real-world situations will be included (if they otherwise fulfil these criteria).