

Evidence in Conservation Teaching Initiative

エビデンスに基づいた生物多様性保全

(科学者向けの内容)

An Introduction to evidence-based conservation (content tailored for research scientists)

By Harriet Downey, Tatsuya Amano and Jessica Walsh

Exercise created by Rachel Antwis

2020

Translated to Japanese by Tatsuya Amano

<https://www.britishecologicalsociety.org/applied-ecology-resources/about-aer/additional-resources/evidence-in-conservation-teaching/>

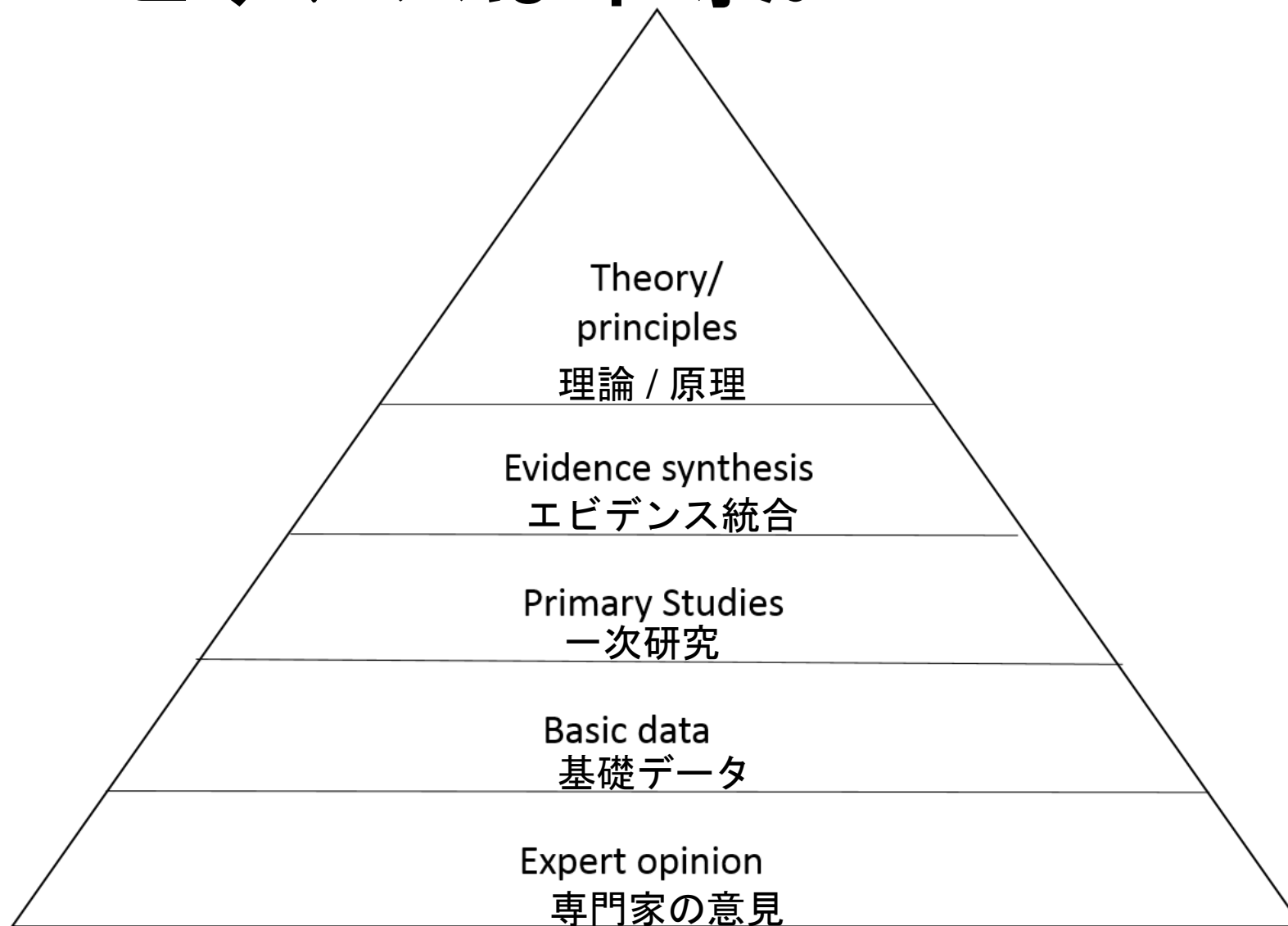
概要

- エビデンス（科学的根拠）とは何か・なぜエビデンスは重要なのか
- エビデンスは生物多様性保全でどのように利用されているのか
- 何が保全におけるエビデンスの利用を妨げているのか
- どうすればエビデンスの利用を促進できるか
- エビデンスの統合
 - 体系的レビュー
 - 体系的マッピング
 - 統合/要約
 - 意思決定支援ツール
- エビデンスの統合における課題

エビデンスとは何か？

- 対象とする課題に関した一つ以上の仮説を検証するために使われる「情報」
- 特に科学的手法を用いて収集された情報を「科学的エビデンス」と呼ぶ。これには学術誌で査読・出版された研究や、学位論文やレポート等で発表された研究が含まれる。

全てのエビデンスは平等か？

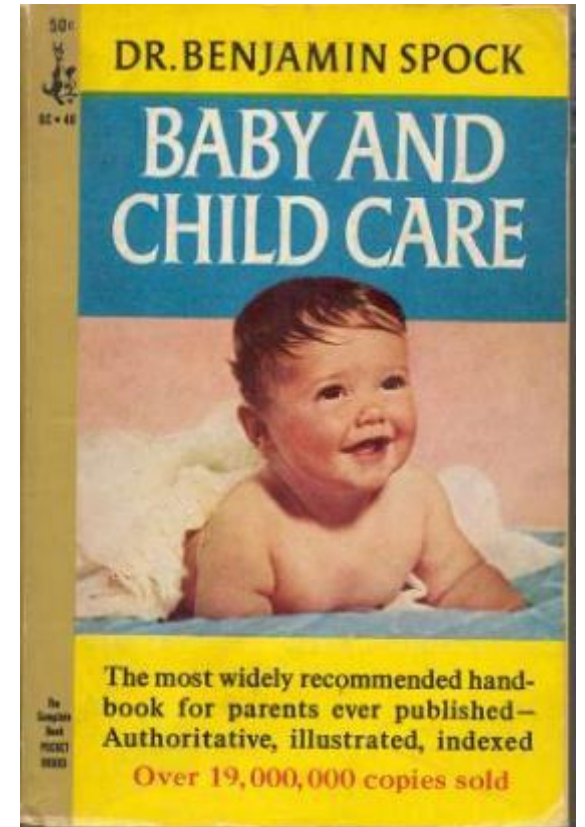


なぜ科学的エビデンスが重要か？



Dakota Corbin

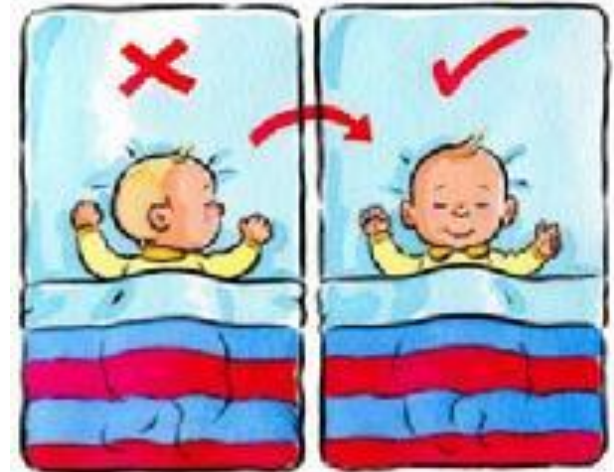
- 乳幼児突然死症候群 (SIDs: Sudden Infant Death Syndrome) は1960年代から70年代に流行し始める
- ピーク時には経済的に発展した国でも250人に1人の割合で乳幼児が死亡



- 1980年代初頭、Peter Flemming博士が乳幼児を亡くした両親のインタビューを始め、全員が共通してうつ伏せ寝をさせていたことに気づく
- その後詳細な研究が行われ、うつ伏せ寝と乳幼児突然死症候群の関係が示される
- しかしNHS（英国の国民保健サービス）のガイダンス変更にはなかなか至らなかった



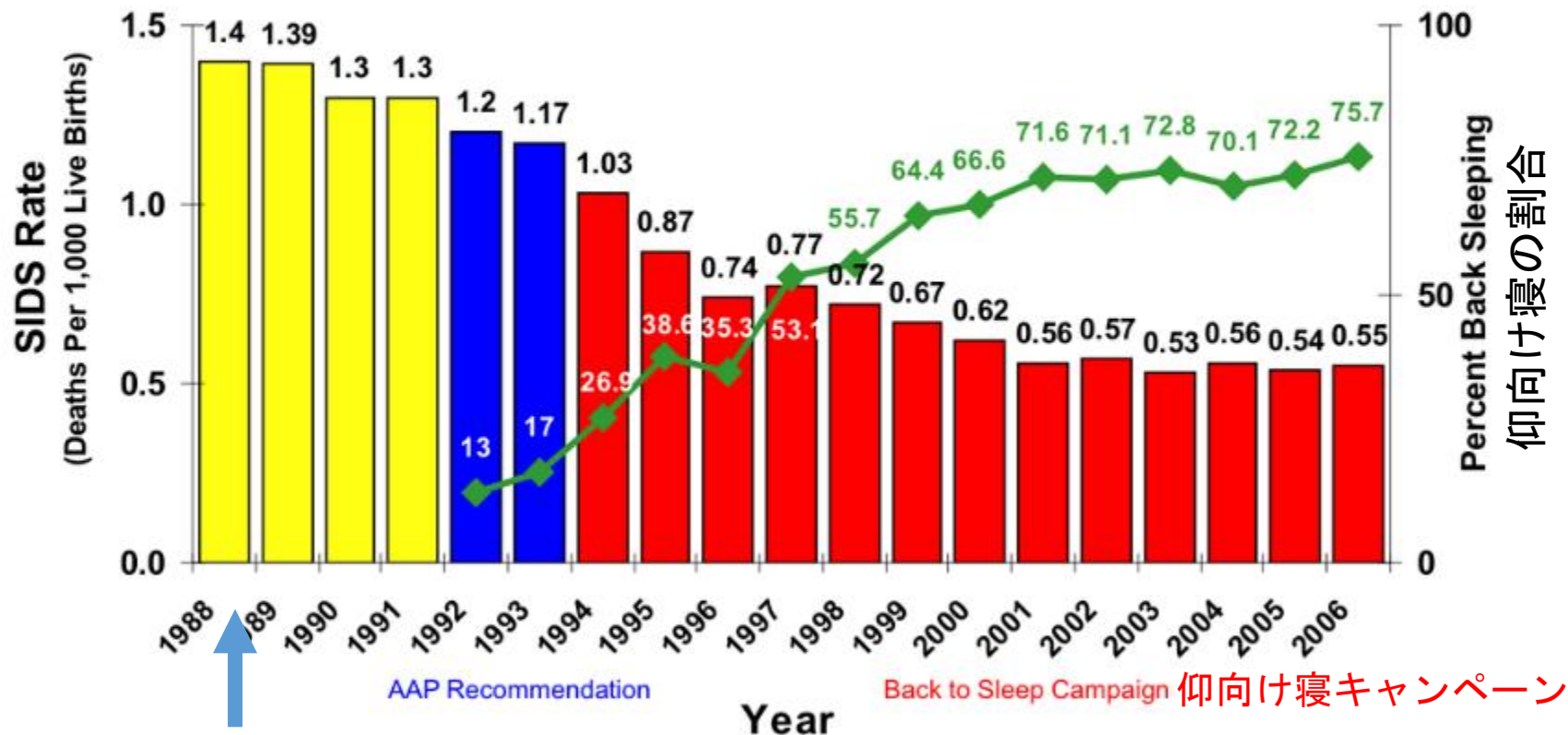
**Safe Sleep for
Your Baby**



乳幼児突然死症候群による死亡率と仰向け寝の関係

SIDS Rate and Back Sleeping (1988 – 2006)

乳幼児突然死症候群による死亡率
(1000出生あたりの死亡数)



- 仰向け寝の推奨によって、乳幼児突然死症候群による死亡は250人に1人から3000人に1人に減少した

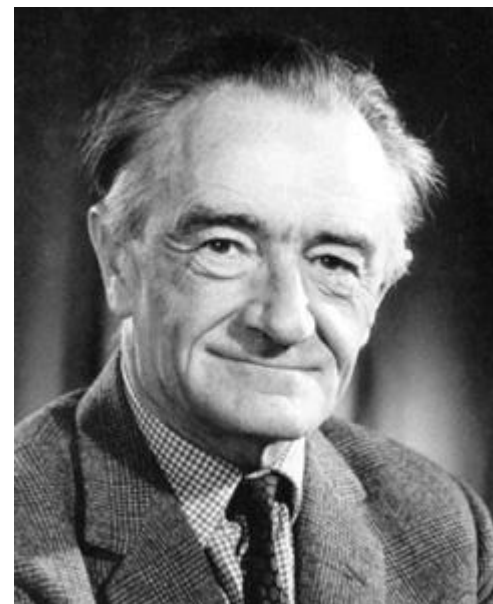
Evidence published エビデンスの出版

SIDS Rate Source: CDC, National Center for Health Statistics,
Sleep Position Data: NICHD, National Infant Sleep Position Study.

エビデンスに基づいた意思決定

- エビデンスの体系的な照合・統合を促進
- 意思決定に利用できるエビデンスの質を向上
- バイアスとチェリーピッキング（都合のいいエビデンスだけ利用すること）を減らす
- 意思決定の透明性を向上
- 管理の効果を向上
- 知識が欠如した部分を見極める

(Sutherland *et al.* 2004)

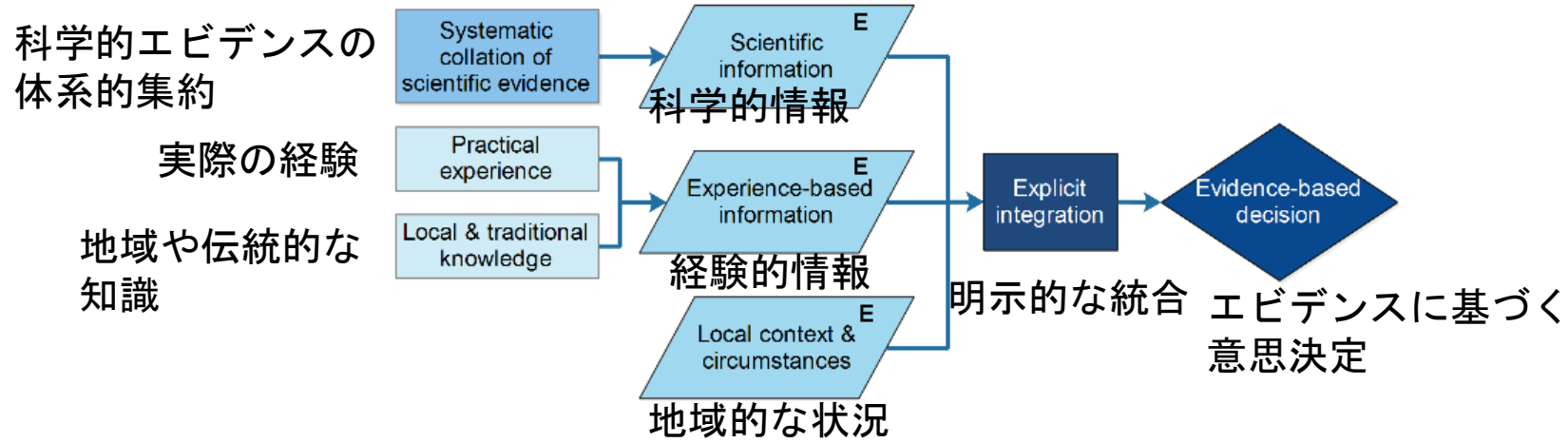


THE ROCK CARLING FELLOWSHIP
1971
EFFECTIVENESS
AND EFFICIENCY
RANDOM REFLECTIONS ON
HEALTH SERVICES
A. L. Cochrane
CBE, FRCP
Director
MRC Epidemiology Unit
Cardiff
THE NUFFIELD
PROVINCIAL HOSPITALS TRUST
1972

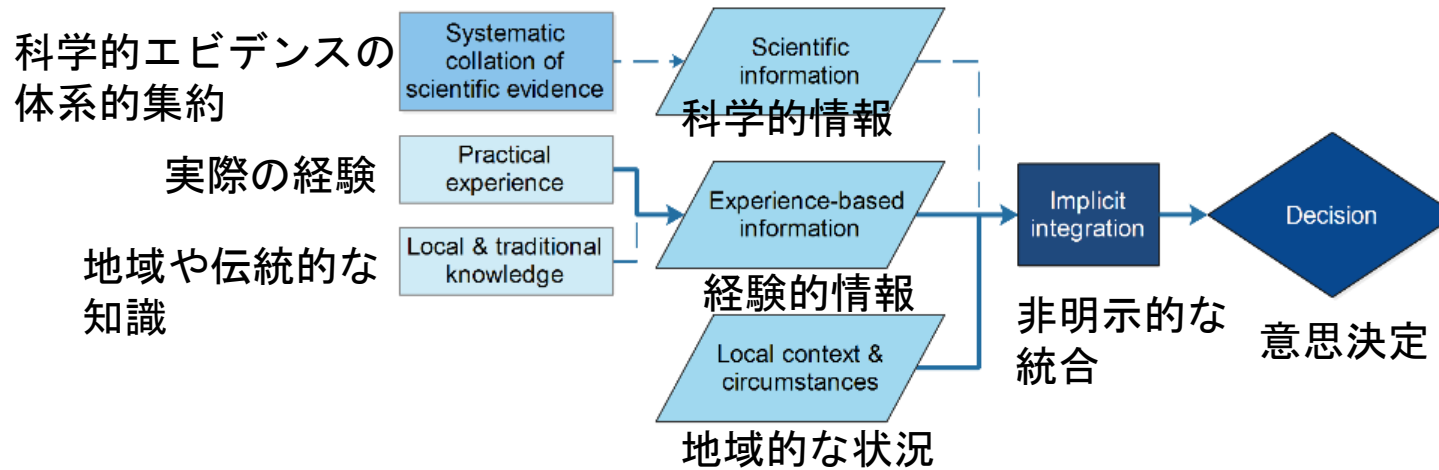
意思決定において他に何を考慮する必要があるか？

- 地域住民の知識
- 先住民族の知識・伝統的な知識
- 経験に基づく知識・専門家の意見
- 社会的価値観・文化
- 経済的コスト
- 資源（経済的・人的・時間等）
- 実現可能性

a) Revised model for evidence-based conservation

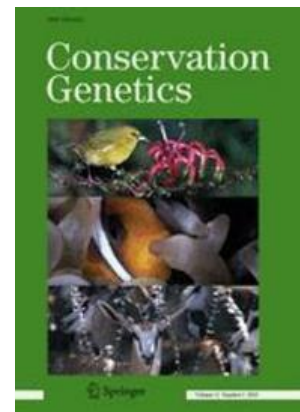
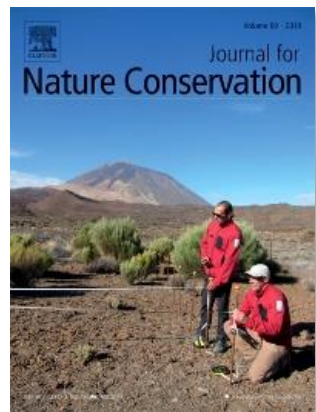


b) Model of current conservation practice



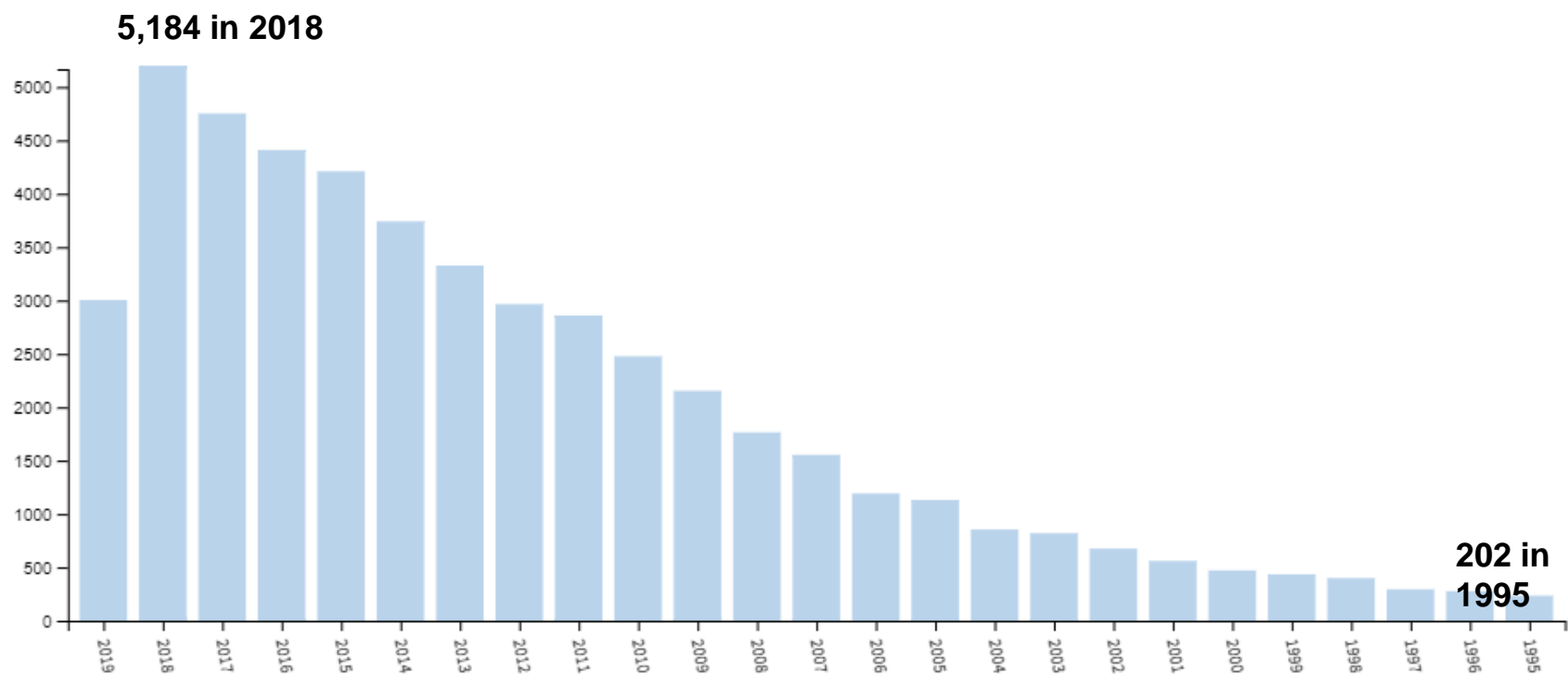
保全に関わる科学的エビデンス

保全に関する科学的エビデンスの蓄積



保全に関する科学的エビデンスの蓄積

Web of Science で“biodiversity”と“conservation”を検索した場合の該当数

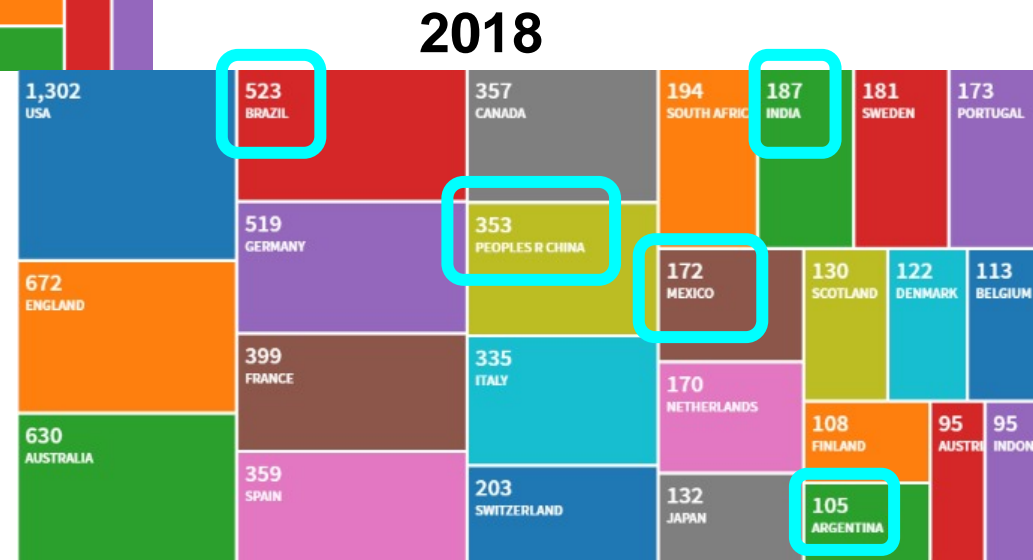


保全に関わる科学的なエビデンスの蓄積



1995

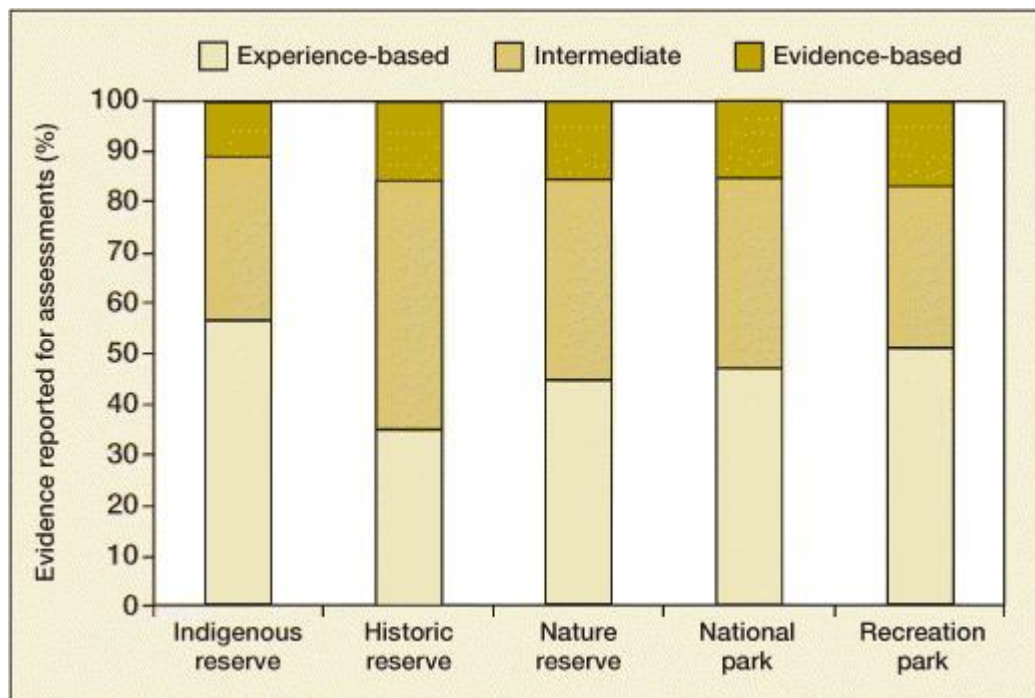
Web of Science で「“biodiversity” and “conservation”」と検索した場合の検索数



蓄積された知識は、実際に保全に使われた？



意思決定に使われる 科学的なエビデンスの欠如



保全の実務者が
用いた情報

研究と実践の隔たり

88の保全に関わるアセスメントに関わる科学論文(1998-2002に発表)のうち、何らかの活動に繋がった割合は**33%のみ** (Knight et al 2008 Cons Biol)

イギリスで自然保護区の管理計画をまとめる際、意思決定者が学術論文を使った割合は**23%のみ**(Pullin et al 2004 Biol Conserv)

オーストラリアにおける保全管理に関わる意思決定に科学的なエビデンスが使われた割合は**10%のみ**(Cook et al 2010 Front Ecol Environ)

カリフォルニアの自然資源管理者のうち、外来植物の侵入に関する情報を得る際に、査読付き学術誌を使った割合は**約66%** (Matzek et al 2014 Cons Lett)

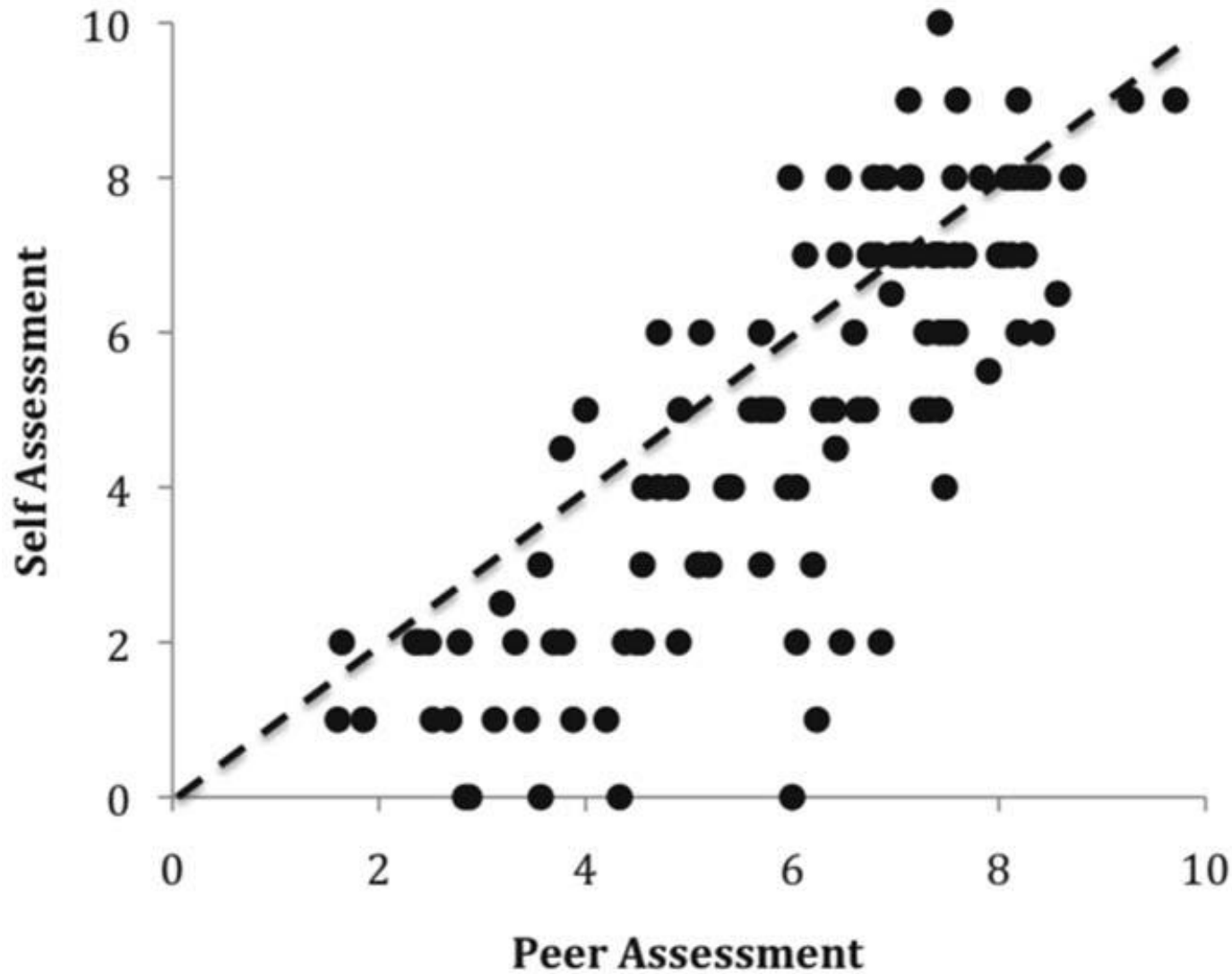
学術論文は、イギリスのブロードランド地方の保全実務者が用いた情報源の占める割合は**2.4%のみ** (Sutherland et al 2004 TREE)

スイスの保全の専門家のうち、国際学術誌を意思決定に用いた割合は**20%のみ**(Fabian et al 2019 Biol Conserv)

なぜ科学的エビデンスの活用が重要？

- 意思決定の根拠の質を高める
- バイアスといいとこ取り(都合の良い結果だけを選ぶ)を減らす
- 意思決定の透明性を高める
- 管理の有効性を高める
- 知識の足りない部分を明確にする

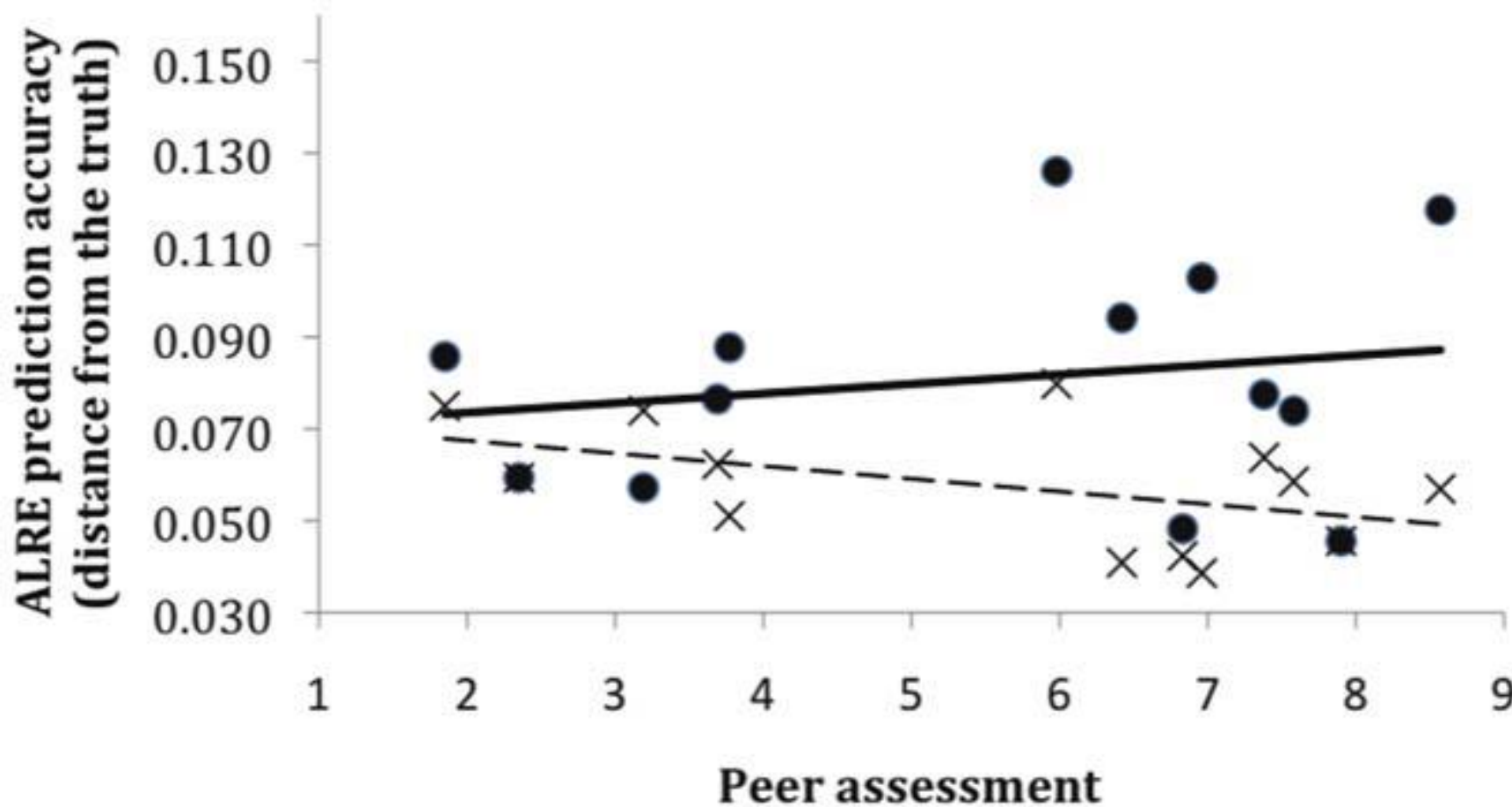
専門家にきけばよいのでは?



自身と同分野の他者による評価との間での明確で一貫性のある専門性のランキング

Burgman et al. (2011)

専門性の自己評価と同分野の専門家（同分野他者）による評価。全ワークショップのデータ（全体の相関関係、 $r = 0.85$ ）。同分野他者による評価は、ワークショップ当日に各人に対して同分野他者が提供した11点満点の点数の平均値。強い関係性は5つのグループ間で一貫しており、相関は0.67～0.94の範囲であった。破線はパリティ（自己評価と他者評価が等しい場合）である。



BUT ランキングと
成績の間には関係
がない!

図2. 同分野他者による専門化の知識の評価と実際の成績。予測精度はALREとして計算される（Burgman et al 2011参照）。予測精度の値が小さいほど良い。黒丸と実線はラウンド1からの推定値（ $r = 0.19$ ）。バツ印と破線はラウンド2からの推定値（ $r = 20.47$ ）。x軸に近い推定値は、回答が正解に近いことを示しています。

なぜ科学的エビデンスを使うのことが大事か



Sutherland and Wordley (2017) Nat Ecol Evol

道路上でのコウモリの死亡率を減らすために英国では10年以上にわたって約250万ポンドの総費用をかけて使用されてきたバットガントリは、効果がないことが明らかになってるが、現在でも使用されている。

EUの共通農業政策の下、異常な密度で設置された鳥の巣箱

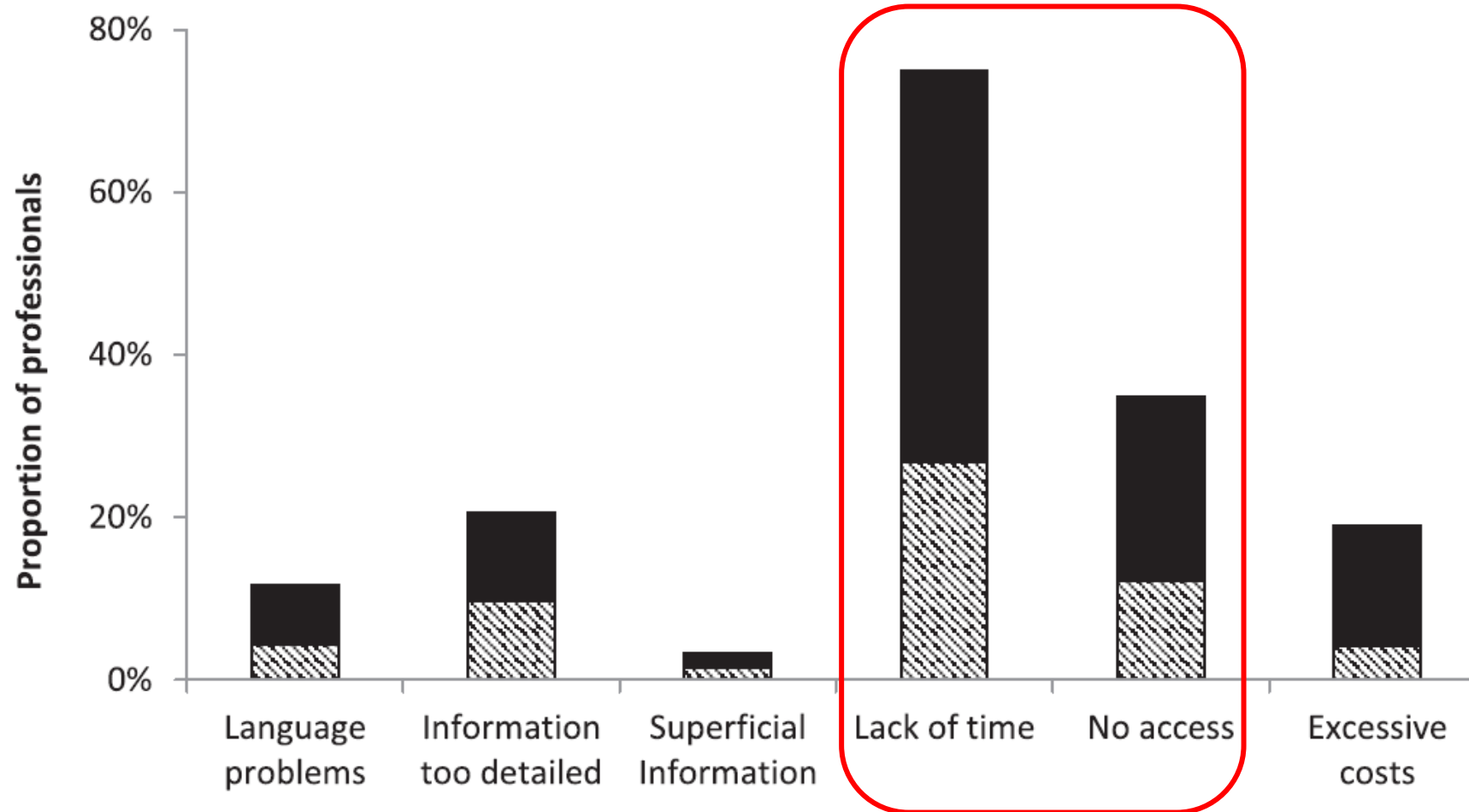


Pe'er et al (2014) Science

そんなに重要なのになぜ使われないのか

なぜ科学的なエビデンスが実務で使われないのか

専門誌はスイスの保全実務者には読まれていなかった



A word cloud on a black background listing various barriers to research implementation. The words are in different colors (white, green, blue, yellow) and sizes, indicating their relative frequency or importance. The most prominent words are 'lack of capacity and resources', 'poor organisational management and structure', 'no use of research in decision process', and 'lack of access to research'. Other visible words include 'nature of issue', 'science doesn't exist', 'lack of skills to use research', 'practitioner characteristics', 'practitioners' attitudes about research', 'poor academic-practitioner relationships', 'context of scientific evidence', 'negative organisational culture', 'lack of awareness', 'high demand to publish', 'difficult to implement', 'negative stakeholders' attitudes and beliefs', 'poor practitioner-stakeholder relationships', 'lack of support for advisors', 'culture of practitioners', 'research not relevant or applicable', 'poor manager-advisor relationships', 'lack of skills to communicate research', 'lack of engagements with wider community', 'reluctant or inexperienced decision maker', 'social, political and economic context', and 'culture of researchers'.

nature of issue
science doesn't exist
lack of skills to use research
practitioner characteristics
practitioners' attitudes about research
poor academic-practitioner relationships
context of scientific evidence
negative organisational culture
lack of capacity and resources
lack of awareness
poor organisational management and structure
high demand to publish
no use of research in decision process
difficult to implement
negative stakeholders' attitudes and beliefs
poor practitioner-stakeholder relationships
social, political and economic context
lack of support for advisors
culture of practitioners
poor manager-advisor relationships
lack of skills to communicate research
research not relevant or applicable
lack of engagements with wider community
reluctant or inexperienced decision maker
culture of researchers

A word cloud on a black background featuring various phrases related to barriers to research use. The phrases are arranged in a dense, overlapping manner. Five specific phrases are highlighted with orange rectangular boxes: 'lack of capacity and resources', 'poor organisational management and structure', 'no use of research in decision process', 'social, political and economic context', and 'lack of support for advisors'. Other visible phrases include 'nature of issue', 'science doesn't exist', 'lack of skills to use research', 'lack of access to research', 'practitioner characteristics', 'poor academic-practitioner relationships', 'culture of researchers', 'practitioners' attitudes about research', 'context of scientific evidence', 'negative organisational culture', 'lack of awareness', 'high demand to publish', 'difficult to implement', 'negative stakeholders' attitudes and beliefs', 'poor practitioner-stakeholder relationships', 'poor manager-advisor relationships', 'culture of practitioners', 'research not relevant or applicable', 'poor quality evidence', 'lack of skills to communicate research', 'lack of engagements with wider community', and 'reluctant or inexperienced decision maker'.

nature of issue

science doesn't exist

lack of skills to use research

lack of access to research

practitioner characteristics

poor academic-practitioner relationships

culture of researchers

practitioners' attitudes about research

context of scientific evidence

negative organisational culture

lack of capacity and resources

lack of awareness

poor organisational management and structure

high demand to publish

no use of research in decision process

difficult to implement

negative stakeholders' attitudes and beliefs

poor practitioner-stakeholder relationships

social, political and economic context

lack of support for advisors

poor manager-advisor relationships

culture of practitioners

research not relevant or applicable

poor quality evidence

lack of skills to communicate research

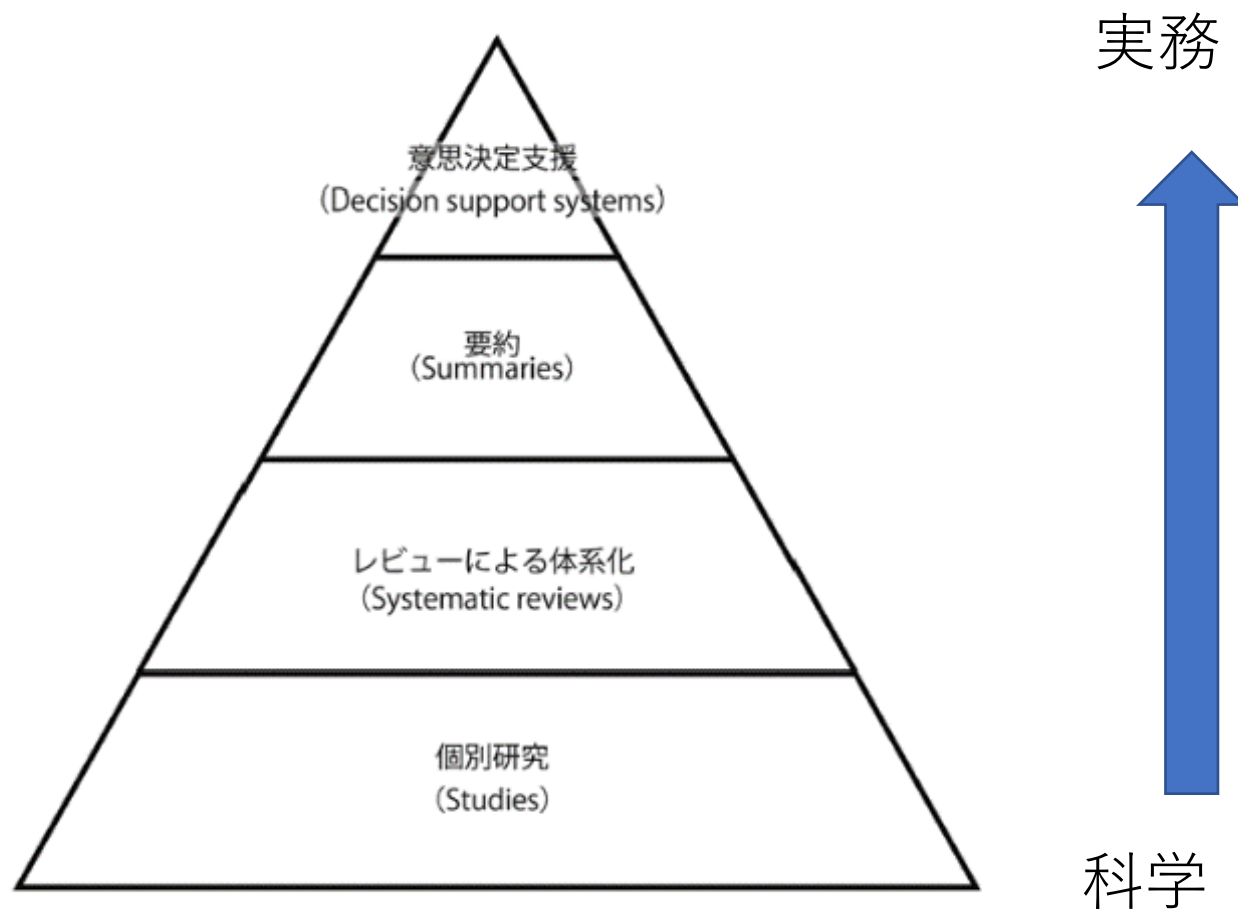
lack of engagements with wider community

reluctant or inexperienced decision maker

研究成果の利用促進に向けた考え方

“4S”ピラミッドを用いたエビデンスの体系化

Dicks et al. 2014 TREE



Dicks et al. (2014) を改変

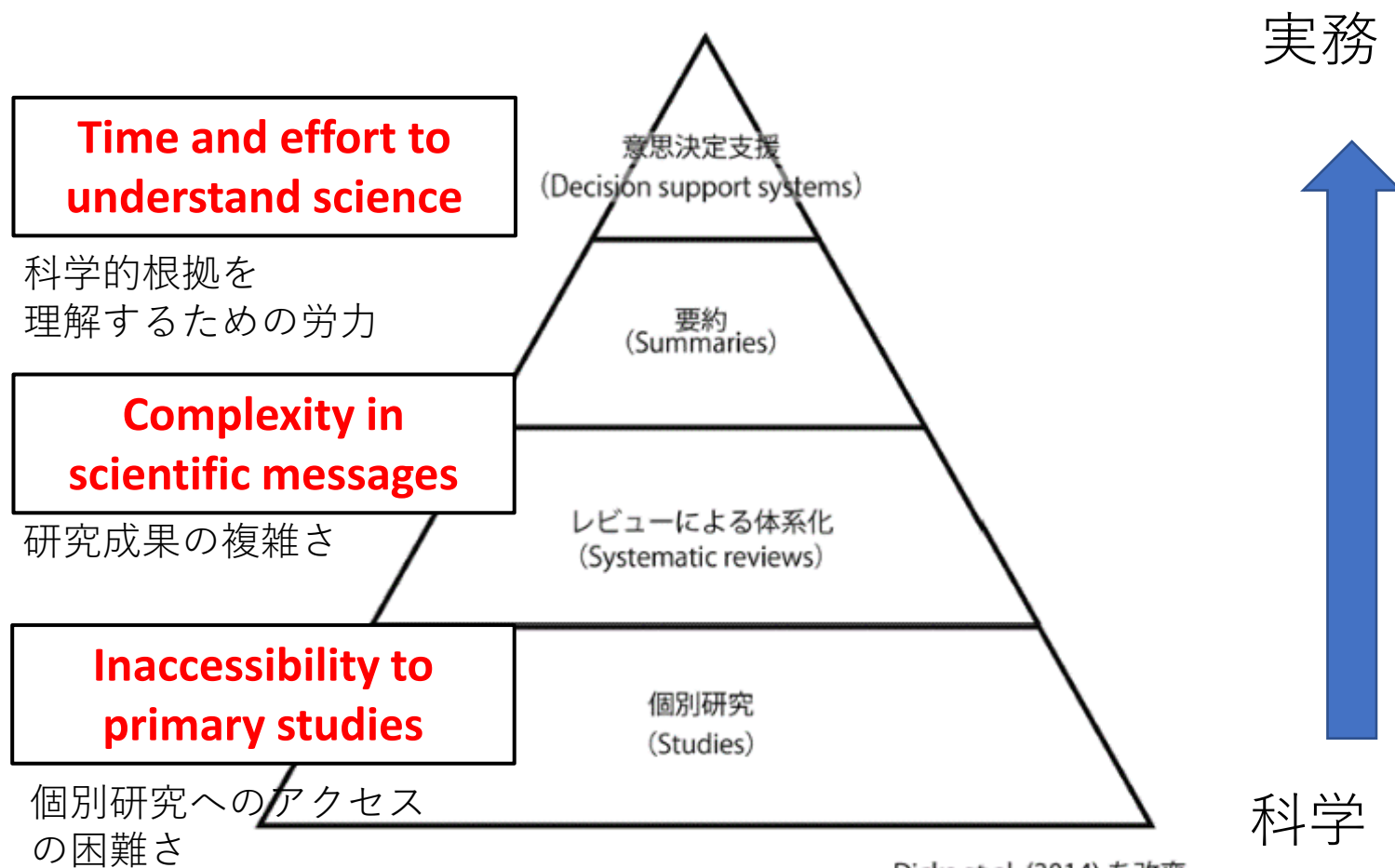
4Sの図については

大澤・上野（2017）日本生態学会誌 67: 257-265の訳を利用

研究成果の利用促進に向けた考え方

“4S”ピラミッドを用いたエビデンスの体系化

Dicks et al. 2014 TREE



Dicks et al. (2014) を改変

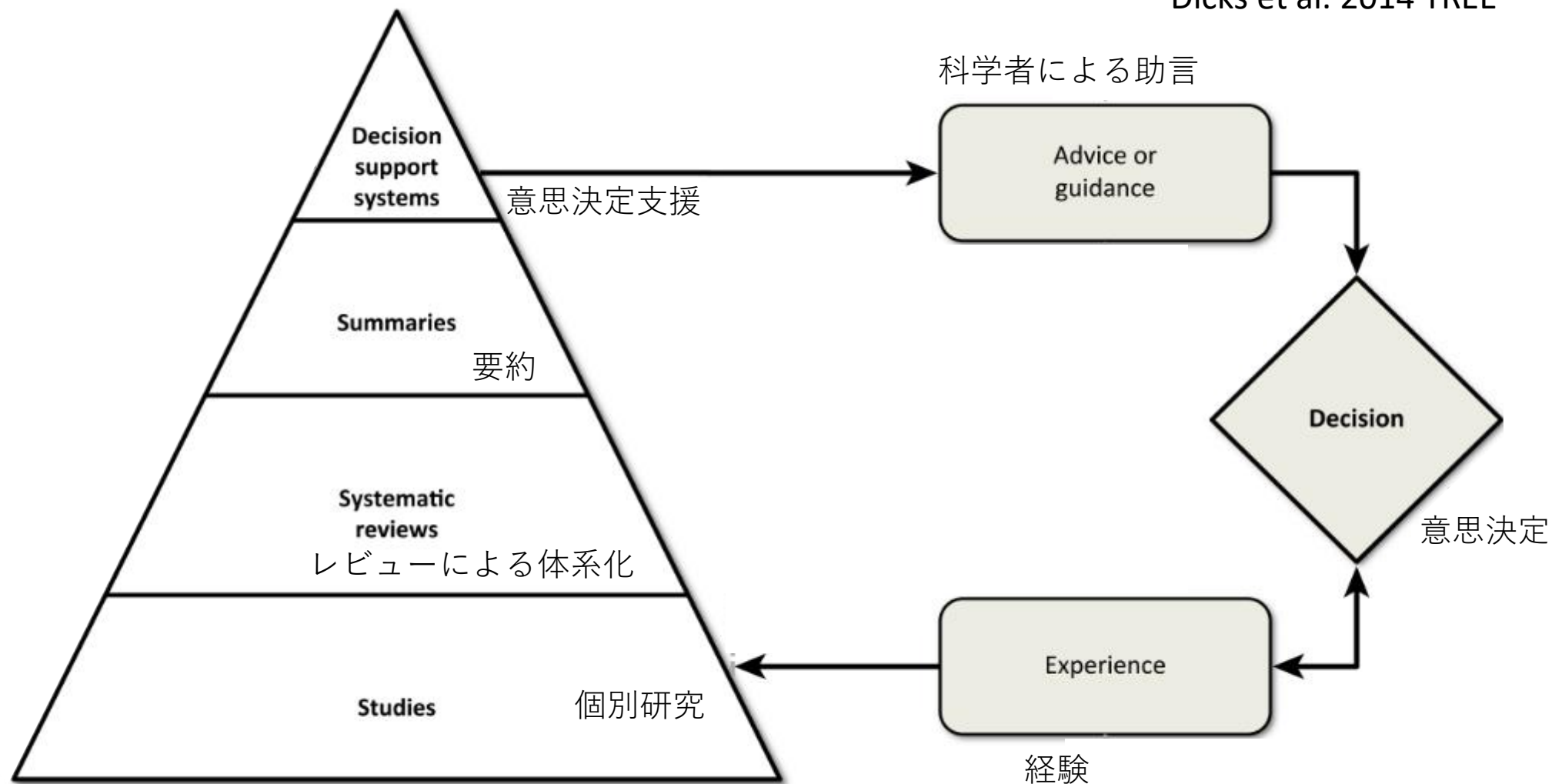
4Sの図については

大澤・上野（2017）日本生態学会誌 67: 257-265の訳を利用

研究成果の利用促進に向けた考え方

“4S”ピラミッドを用いたエビデンスの体系化

Dicks et al. 2014 TREE



Systematic review体系的レビュー

体系的レビューとは、問いに関連する利用可能なエビデンスを収集し、評価し、統合的な知見を得ることです。実施者は、バイアスを最小限にするために定義された手法を取ることで、意思決定に役立つ信頼性の高い知見を提供することが可能になります。

The screenshot shows the homepage of the Collaboration for Environmental Evidence (CEE) Evidence Syntheses. The header includes the CEE logo, a search bar, a 'CAF Make A Donation' button, and a menu icon. The main content area features a large image of a rocky coastline with the text 'Evidence Resources' and 'CEE Evidence Syntheses'. Below this, a welcome message states: 'Welcome to the Environmental Evidence Library of Evidence Syntheses. This library contains all systematic reviews and systematic maps that have been approved by CEE. In the list below, the reviews are ordered by registration number (most recent first). They are not in exact chronological order of completion date. Please scroll down to find a review or use the search tools below.' A search instruction follows: 'To search using titles or keywords, place terms in the box below. Add another field to search by author's name or year of completion.' At the bottom left is a 'Search Terms:' input field. On the right, a 'Find Out More' sidebar lists: 'CEE Evidence Syntheses', 'Syntheses In Progress', 'EE Journal', and 'That's a Claim!'.

Collaboration for Environmental Evidence

CAF Make A Donation

Evidence Resources
CEE Evidence Syntheses

Welcome to the Environmental Evidence Library of Evidence Syntheses. This library contains all systematic reviews and systematic maps that have been approved by CEE. In the list below, the reviews are ordered by registration number (most recent first). They are not in exact chronological order of completion date. Please scroll down to find a review or use the search tools below.

To search using titles or keywords, place terms in the box below. Add another field to search by author's name or year of completion.

Search Terms:

Find Out More

- CEE Evidence Syntheses
- Syntheses In Progress
- EE Journal
- That's a Claim!

Systematic review: 体系的レビューの実例

Jakobsson et al. *Environ Evid* (2018) 7:17
<https://doi.org/10.1186/s13750-018-0129-z>

Environmental Evidence

SYSTEMATIC REVIEW

Open Access



How does roadside vegetation management affect the diversity of vascular plants and invertebrates? A systematic review

Simon Jakobsson^{1*} , Claes Bernes², James M. Bullock³, Kris Verheyen⁴ and Regina Lindborg¹

Systematic review: 体系的レビューの実例

Primary question

How does roadside maintenance and restoration implementing non-chemical vegetation removal affect the diversity of vascular plants and invertebrates?

Components of the primary question

Population: roadside habitats and the species of vascular plants and invertebrates found within them.

Intervention: maintenance or restoration of roadside habitats based on non-chemical vegetation removal such as mowing, grazing, burning, clearance of shrubs and saplings, coppicing, pruning, or mechanical removal of invasive plants.

Comparator: non-intervention or alternative forms of the interventions.

Outcomes: measures of functional/taxonomic diversity (including abundance) of vascular plants or invertebrates.



Systematic review: 体系的レビューの実例

Population: roadside*, “road side*”, (road* AND (verge* OR edge*)), roundabout*, “traffic island*”, “median strip*”, “central reservation*”, boulevard*, parkway*, (avenue* AND tree*).

Outcomes: *diversity, species, abundance, vegetation.

検索に用いたキーワード群

97 studies of roadside vegetation removal identified in the systematic map

8 studies from the systematic map excluded due to irrelevant outcomes

1284 articles found through updated search in Scopus and TRID

230 articles excluded as duplicates or already identified

1054 articles screened on title

734 articles excluded based on title

320 articles screened on abstract

265 articles excluded based on abstract

1 article added from Google Scholar, 1 received from author

57 articles to be screened on full text

46 articles excluded based on full text, 5 not found in full text

89 studies from the systematic map included as relevant to the review

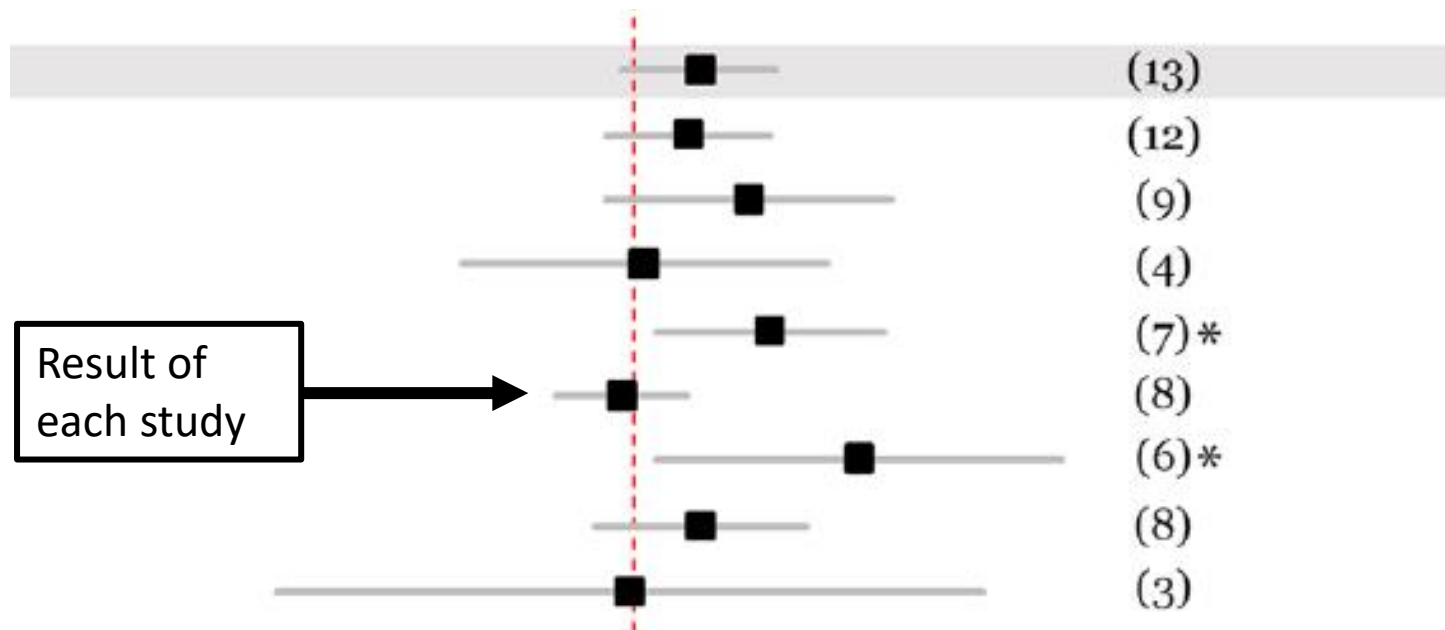
95 studies critically appraised

41 studies excluded based on critical appraisal

54 studies included in the review

スクリーニングの流れ
最終的に54の論文が選ばれた

Systematic review: 体系的レビューの実例



結論：

薬剤を使わない刈り取りの効果は、その頻度と刈り取った草の除去に大きく依存していた。このため、生物多様性への影響について統計的に有意な差は検出できなかった。

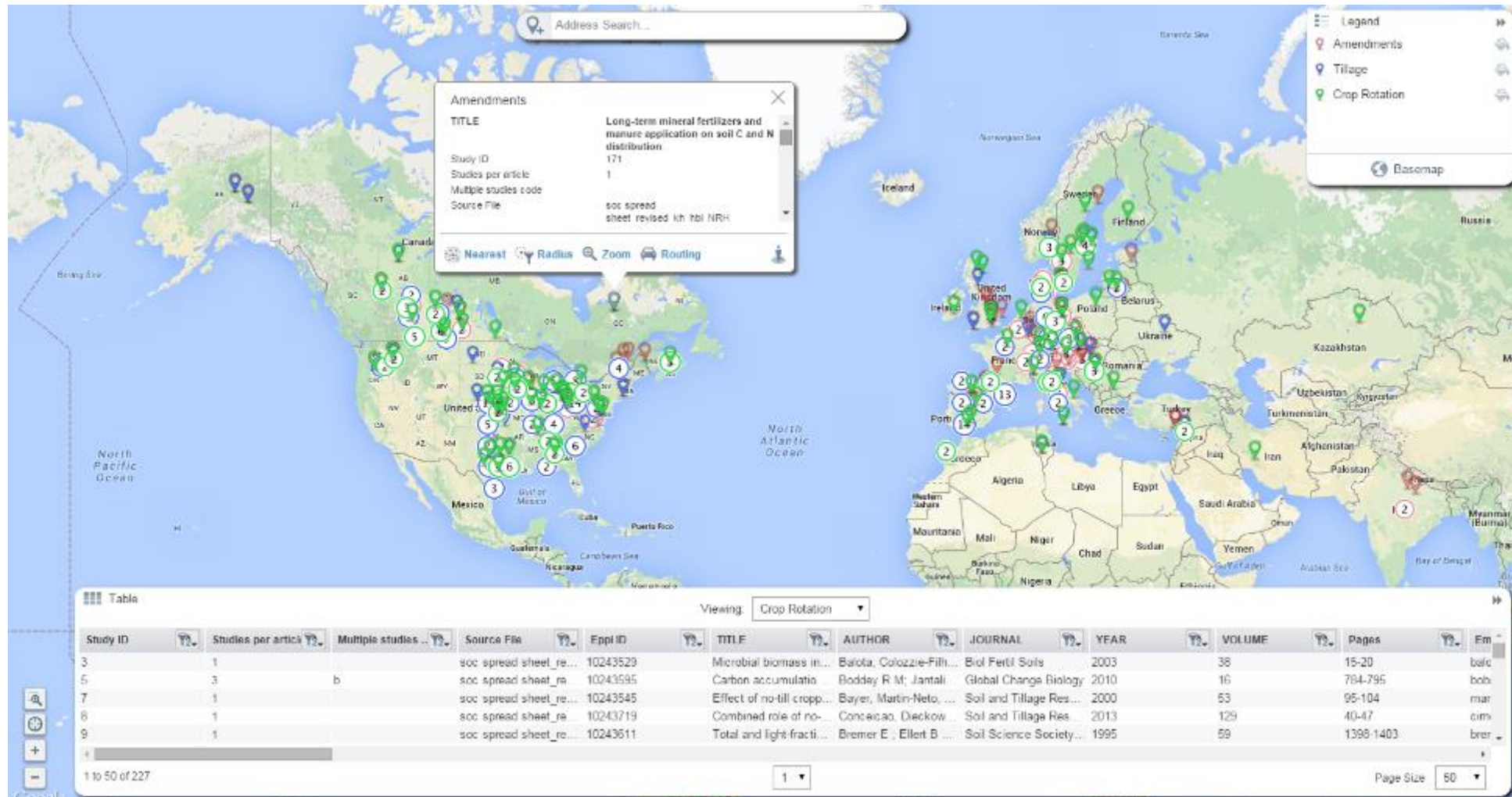
道端に存在する植物種は少ない

道端に多数の植物種が存在している

Systematic mapping体系的マッピング

- 対象トピックにおいて、こういった研究が実施されているかを明確化すること（手法は体系的レビューに似ている）
- 対象トピックの現状分析が目的
- 体系的レビューを行うための基盤情報になる
- 期待される成果:
 - 研究成果をまとめたデータベース
 - 根拠となりうる情報の現状について視覚化

Systematic mapping体系的マッピングの例



Haddaway, N.R., Hedlund, K., Jackson, L.E. *et al.* What are the effects of agricultural management on soil organic carbon in boreo-temperate systems?. *Environ Evid* 4, 23 (2015). <https://doi.org/10.1186/s13750-015-0049-0>

Collaboration for Environmental Evidence: CEE

- Collaboration for Environmental Evidenceは体系的レビューや地図化の方法論的な支援と出版を調整する組織
- その作業は、透明性、包括性、客観的な手順に基づいている

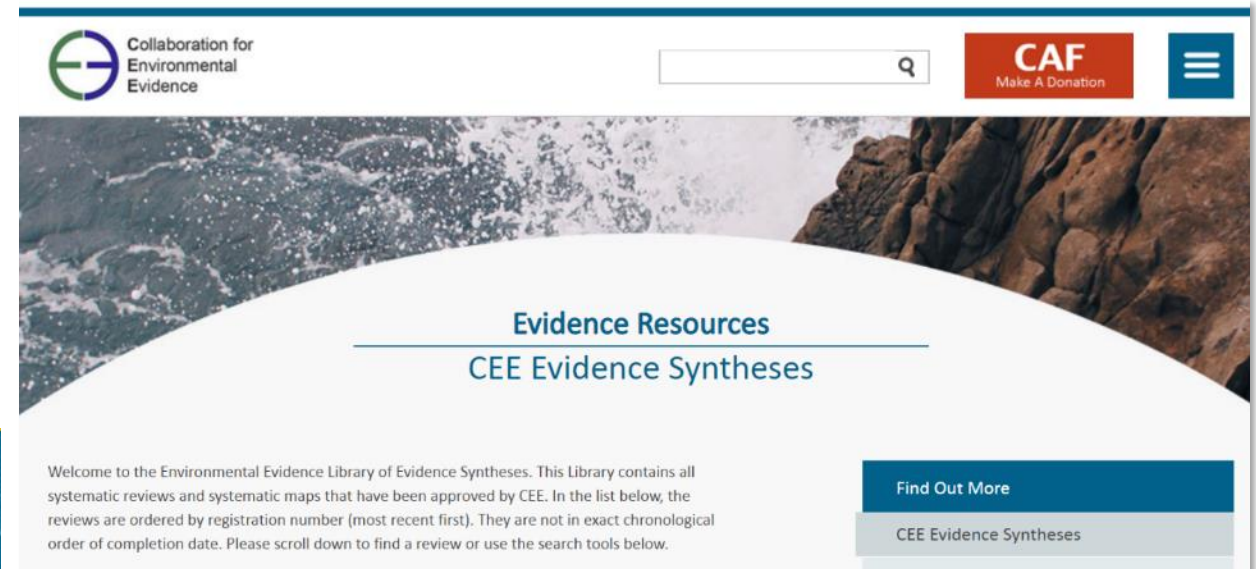


The Cochrane Collaboration



THE CAMPBELL COLLABORATION

What helps? What harms? Based on what evidence?



「エビデンスに基づく保全」プロジェクト

Conservation Evidence

Providing evidence to improve practice



Browse Evidence

Journal

About us ▾

Resources ▾

Conservation Evidence in numbers

Over 600,000 scientific papers scanned



Click image to browse over 5,400 studies

Over 34,000 downloads of 'What Works in Conservation'



Over 1.25 million webpage views of
www.conservationevidence.com



Browse by category:



両生類の保全

Amphibian Conservation

129 Actions



コウモリの保全

Bat Conservation

190 Actions



ハチの保全

Bee Conservation

59 Actions



鳥類の保全

Bird Conservation

454 Actions



淡水域の外来種の抑制

Control of Freshwater
Invasive Species



農地の保全

Farmland Conservation

119 Actions

See more

「エビデンスに基づく保全」プロジェクト

Actions

Can't find what you're looking for? [You can also search Individual Studies.](#)

Not sure what Actions are? [Read a brief description.](#)

Refine results

Category

☒ Bird Conservation (454)

Keywords

Habitat

- ☐ Artificial Habitats
☐ Forest & Woodland
☐ Coastal

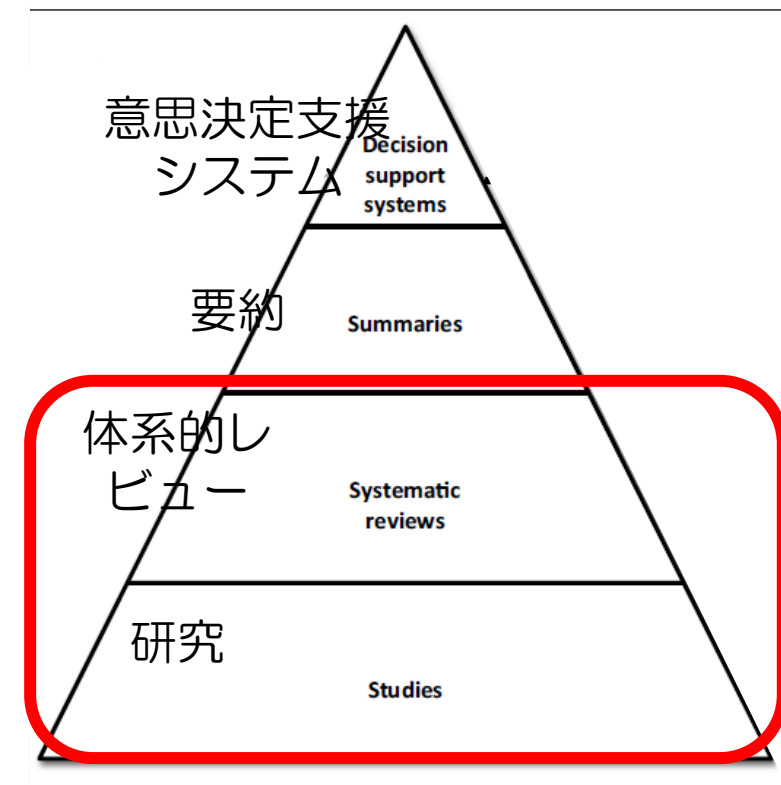
[More ▼](#)

Threat

454 actions found

Sort by: Number of studies ▲ Relevance Title

- | | |
|--|--|
| <input type="checkbox"/> Provide artificial nesting sites for songbirds
● Beneficial Based on: 65 studies | |
| <input type="checkbox"/> Plant wild bird seed or cover mixture
● Beneficial Based on: 40 studies | |
| <input type="checkbox"/> Provide supplementary food for songbirds to increase reproductive success
● Likely to be beneficial Based on: 37 studies | |
| <input type="checkbox"/> Provide supplementary food for songbirds to increase adult survival
● Beneficial Based on: 34 studies | |
| <input type="checkbox"/> Pay farmers to cover the costs of bird conservation measures
● Likely to be beneficial Based on: 30 studies | |



「エビデンスに基づく保全」プロジェクト

Supporting evidence from individual studies

1

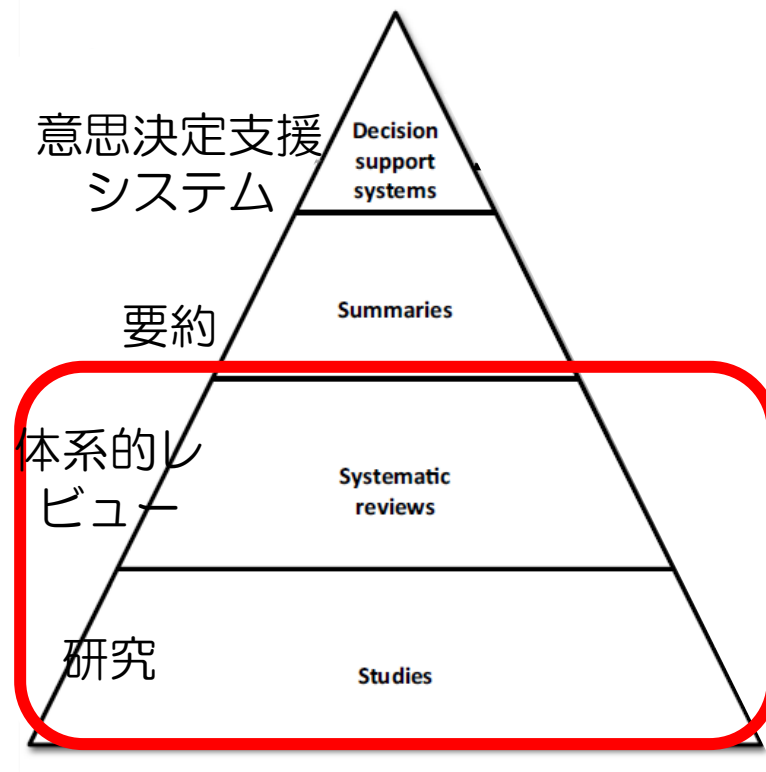
A replicated study in 1945-6 in garden habitats in Ohio, USA (Calhoun 1948), found that American robins *Turdus migratorius* nesting in artificial nests had lower success rates than those natural nests (33% success for 24 nesting attempts in artificial nests vs. 50% of 48 in natural nests). Fourteen pairs of robins used the nests, but only seven successfully raised chicks. Nests consisted of cones of black or green roofing paper 17.8 cm at the widest and 5.1 cm deep. This study also examines nest use by mourning doves *Zenaidura macroura* (formerly *Zenaidura macroura*), and the effect of different coloured nests in 'Use differently-coloured artificial nests'.

2

A controlled study in mixed farmland in north-east Scotland in 1971 (Yom-Tov 1974) found that carrion crows *Corvus corone* did not nest in artificial trees, irrespective of whether they were provided with supplementary food or not. In one experiment, a line of 15 artificial trees (3-6 m branches tied to fence posts and provided with an old crow's nest) were set up, approximately 70 m apart. Two pairs of crows established territories, but neither attempted to breed. A second experiment provided a single artificial tree in two occupied territories, 70 m from the tree used by the resident pair. Neither artificial tree was used, as the resident pairs successfully defended their territories. This study also investigated the effects of supplementary feeding on crow reproduction, discussed in 'Provide supplementary food to increase reproductive success'.

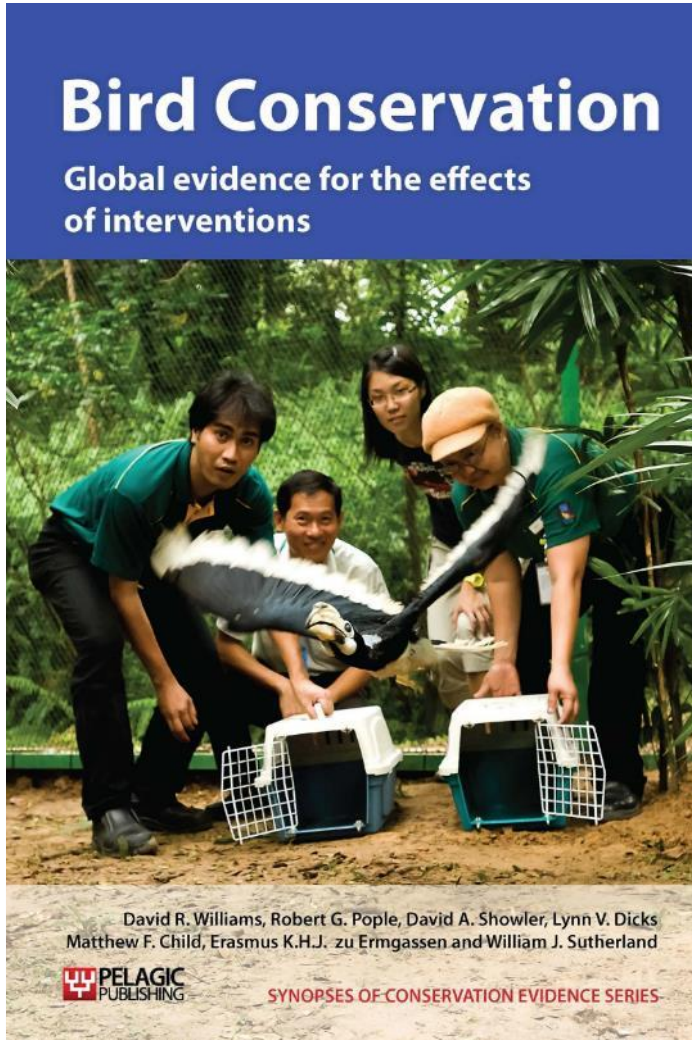
3

A small study in 1976-9 in three scrub and grassland habitats in Idaho, USA (Howard & Hilliard 1980), found that common ravens *Corvus corax* nested on nesting platforms provided, with four pairs using them in 1976, but only a single attempt in 1979. An average of 2.8 chicks/nest were produced. Twenty four platforms were provided in shaded/un-shaded pairs, with 23 out of 29 young fledged from shaded platforms. This study also discusses platform use by ferruginous hawks *Buteo regalis*, discussed in



「エビデンスに基づく保全」プロジェクト

Synopses



Action: Provide artificial nesting sites for songbirds

Key messages Read our guidance on Key messages before continuing

- Only three studies out of 66 from across the world found low rates of nest box occupancy, although this may be partially the result of publishing biases. Thrushes, crows, swallows and New World warblers were the target species with low rates of use. Thrushes, crows, finches, swallows, wrens, tits, Old World and tyrant flycatchers, New World blackbirds, sparrows, waxbills, starlings and ovenbirds all used nest boxes. One study from the USA found that wrens used nest boxes more frequently than natural cavities.
- Five studies from across the world found higher population densities or population growth rates in areas with nest boxes, whilst one study from the USA found higher species richness in areas with nest boxes. One study from Chile found that breeding populations (but not non-breeding populations) were higher for two species when nest boxes were provided.
- Twelve studies from across the world found that productivity of birds in nest boxes was higher or similar to those in natural nests. One study found there were more nesting attempts in areas with more nest boxes, although a study from Canada found no differences in behaviour or productivity between areas with high or low densities of nest boxes. Two studies from Europe found lower predation of some species using nest boxes. However, three studies from the USA found low production in nest boxes, either in absolute terms or relative to natural nests.
- Thirteen studies from across the world found that use, productivity or usurpation varied with nest box design, whilst seven found no difference in occupation rates or success with different designs.
- Similarly, fourteen studies found different occupation or success rates depending on the position or orientation of artificial nest sites. Two studies found no difference in success with different positions.

意思決定支援
システム

Decision
support
systems

要約

Summaries

体系的シ
ビュー

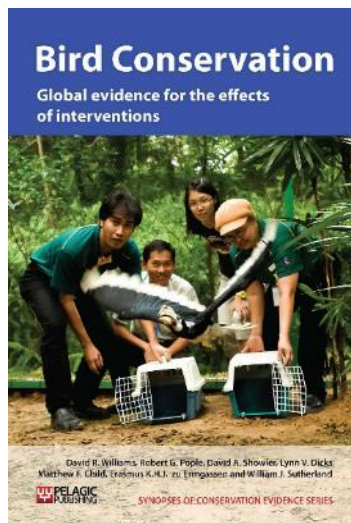
Systematic
reviews

研究

Studies

「エビデンスに基づく保全」プロジェクト

454 actions



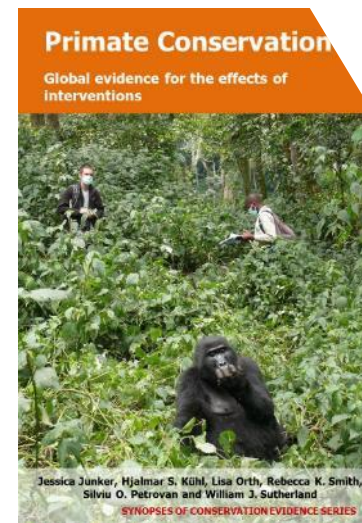
129 actions



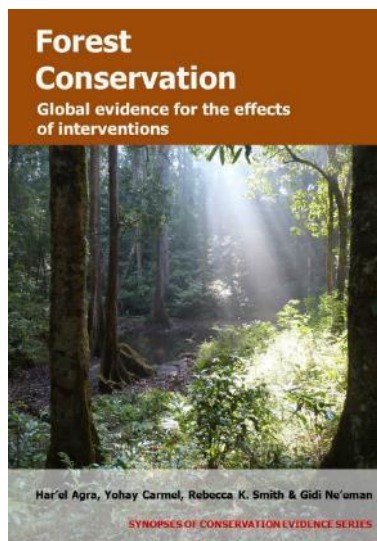
190 actions



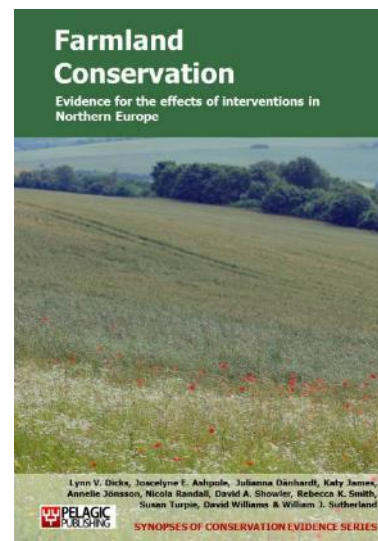
162 actions



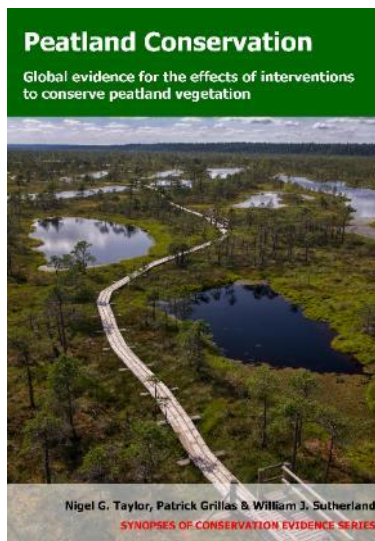
122 actions



119 actions



125 actions



161 actions



意思決定支援
システム

要約

体系的シ
ンビュー

研究

Decision
support
systems

Summaries

Systematic
reviews

Studies

... and aiming to cover
actions for all habitats
and taxa within four
years

...今後4年のうちに、全
ての生息地と分類群を
対象にした保全活動を
網羅したい

「エビデンスに基づく保全」プロジェクト

保全活動：鳴禽類への人工巢の提供に関するエビデンスを示している66の事例研究

Action: Provide artificial nesting sites for songbirds

66 studies providing evidence

Supporting evidence from individual studies

1

A replicated study in 1945-6 in garden habitats in Ohio, USA (Calhoun 1948), found that American robins *Turdus migratorius* nesting in artificial nests had lower success rates than those natural nests (33% success for 24 nesting attempts in artificial nests vs. 50% of 48 in natural nests). Fourteen pairs of robins used the nests, but only seven successfully raised chicks. Nests consisted of cones of black or green roofing paper 17.8 cm at the widest and 5.1 cm deep. This study also examines nest use by mourning doves *Zenaidura macroura* (formerly *Zenaidura macroura*), and the effect of different coloured nests in 'Use differently-coloured artificial nests'.

2

A controlled study in mixed farmland in north-east Scotland in 1971 (Yom-Tov 1974) found that carrion crows *Corvus corone* did not nest in artificial trees, irrespective of whether they were provided with supplementary food or not. In one experiment, a line of 15 artificial trees (3-6 m branches tied to fence posts and provided with an old crow's nest) were set up, approximately 70 m apart. Two pairs of crows established territories, but neither attempted to breed. A second experiment provided a single artificial tree in two occupied territories, 70 m from the tree used by the resident pair. Neither artificial tree was used, as the resident pairs successfully defended their territories. This study also investigated the effects of supplementary feeding on crow reproduction, discussed in 'Provide supplementary food to increase reproductive success'.

3

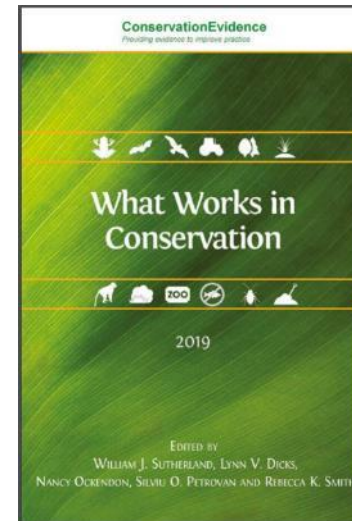
A small study in 1976-9 in three scrub and grassland habitats in Idaho, USA (Howard & Hilliard 1980), found that common ravens *Corvus corax* nested on nesting platforms provided, with four pairs using them in 1976, but only a single attempt in 1979. An average of 2.8 chicks/nest were produced. Twenty four platforms were provided in shaded/un-shaded pairs, with 23 out of 29 young fledged from shaded platforms. This study also discusses platform use by ferruginous hawks *Buteo regalis*, discussed in

Delphi法を用いた
専門家による評価
Expert assessment with
the Delphi method

Effectiveness: 67%

Certainty: 85%

Harms: 0%



意思決定支援
システム

要約

体系的レビュー

研究

Decision
support
systems

Summaries

Systematic
reviews

Studies

Categories	Effectiveness score	Certainty score	Harms score
Beneficial	>60	>60	<20
Likely to be beneficial	>60	40 – 60	<20
OR	40 - 60	≥40	<20
Trade-offs between benefits & harms	≥40	≥40	≥20
Unknown effectiveness	Any score	<40	Any score
Unlikely to be beneficial	<40	40-60	<20
Likely to be ineffective or harmful	<40	>60	Any score
OR	<40	≥40	≥20

「エビデンスに基づく保全」プロジェクト

56 actions found

Sort by: Number of studies Relevance ▼ Title

☐ Provide artificial nesting sites for songbirds

● Beneficial | Based on: 65 studies



☐ Provide artificial nesting sites for raptors

● Likely to be beneficial | Based on: 9 studies



☐ Provide artificial nesting sites for woodpeckers

● Unknown effectiveness (limited evidence) | Based on: 11 studies



☐ Use vocalisations to attract birds to safe areas

● Likely to be beneficial | Based on: 10 studies



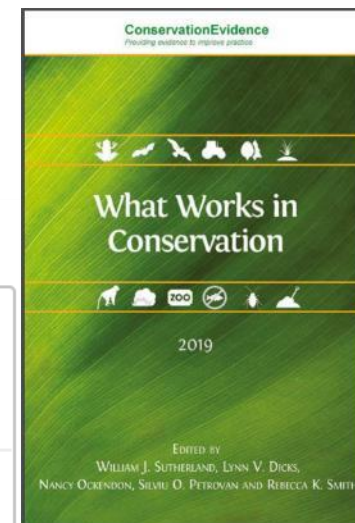
☐ Provide artificial nesting sites for wildfowl

● Beneficial | Based on: 27 studies



☐ Provide supplementary food for songbirds to increase reproductive success

● Likely to be beneficial | Based on: 37 studies



意思決定支援
システム
Decision
support
systems

要約
Summaries

体系的シ
レビュー
Systematic
reviews

研究
Studies

「エビデンスに基づく保全」プロジェクト

Actions

Can't find what you're looking for? [You can also search Individual Studies.](#)
Not sure what Actions are? [Read a brief description.](#)

Refine results

Category
☒ Bird Conservation (3)

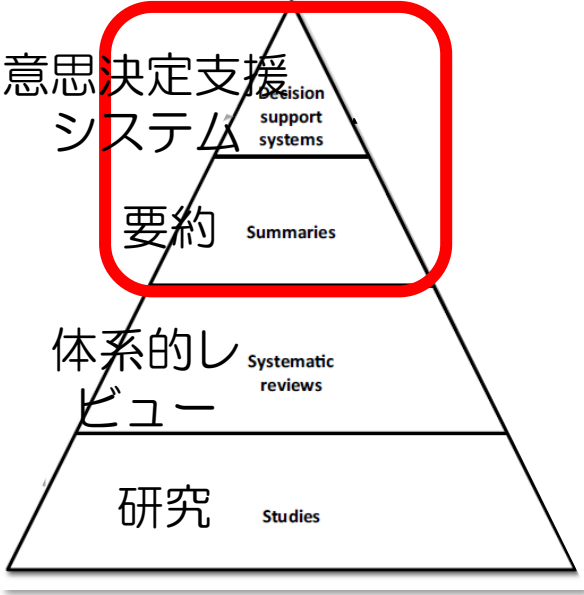
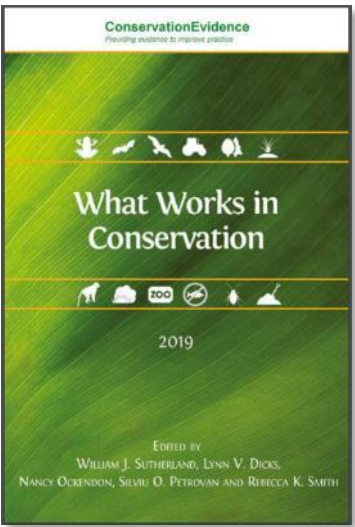
Keywords

Habitat

3 actions found

Sort by: Number of studies

- ☐ Physically protect nests with individual exclosures/barriers or provide shelters for chicks of ground nesting seabirds
● Likely to be beneficial | Based on: 4 studies
- ☐ Provide artificial nesting sites for ground and tree-nesting seabirds
● Likely to be beneficial | Based on: 11 studies
- ☐ Use signs and access restrictions to reduce disturbance at nest sites
● Likely to be beneficial | Based on: 10 studies



JJ Harrison CC BY-SA 3.0

「エビデンスに基づく保全」プロジェクト



[Advanced](#)
[About](#)
[Assessment process](#)
[Resources & Publications](#)



Eurasian Curlew

Numenius arquata

CITATION

Taxonomy |
 Assessment Information |
 Geographic Range |
 Population |
 Habitat and Ecology |
 Threats |
 Use and Trade |
 Conservation Actions |
 Bibliography

Images and External Links |
 CITES Legislation from Species+ |
 Conservation Evidence |
 Expand all

Studies and Actions from Conservation Evidence

DATA SOURCE

The information below is from the [Conservation Evidence](#) website.

▼ Studies and Actions from Conservation Evidence in detail

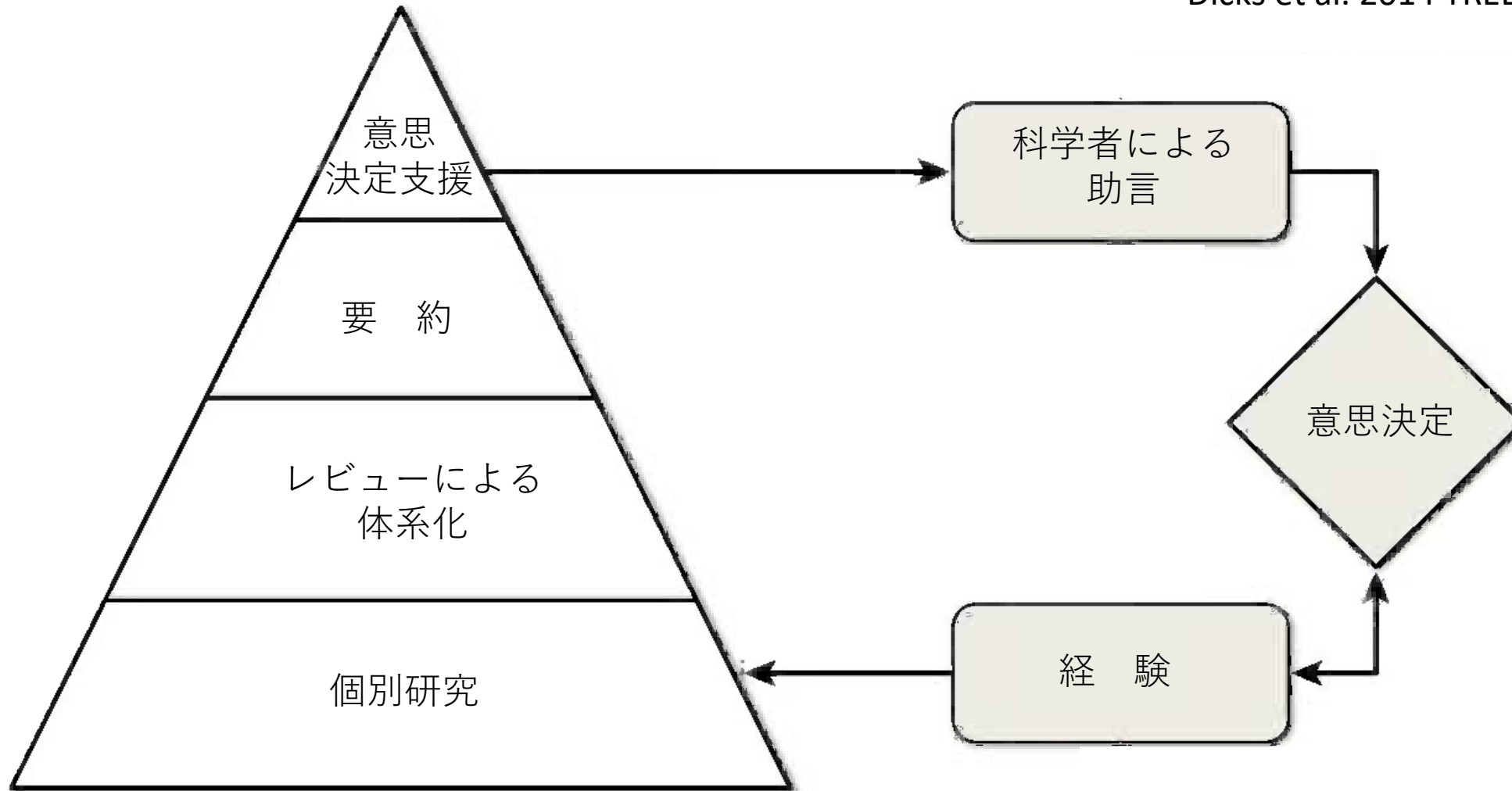
SEARCH TERM: "NUMENIUS ARQUATA" (SHOWING 8 OF 8)

Studies	Actions
Nest predation and numbers of golden plovers <i>Pluvialis apricaria</i> and other moorland waders Show	<ul style="list-style-type: none"> Control predators not on islands for waders Show
Artificial feeding to attract wild birds close to a viewing area at Belfast Lough RSPB Reserve, Antrim, Northern Ireland Show	<ul style="list-style-type: none"> Provide supplementary food for waders to increase adult survival Show Provide supplementary food for wildfowl to increase adult survival Show
Botanical monitoring of restored lowland wet grassland at Campfield Marsh RSPB Reserve, Cumbria, England Show	<ul style="list-style-type: none"> Raise water levels in ditches or grassland Show Raise water levels in ditches or grassland Show
Rush cutting to create nesting patches for lapwings <i>Vanellus vanellus</i> and other waders, Lower Lough Erne RSPB reserve, County Fermanagh, Northern Ireland Show	<ul style="list-style-type: none"> Mow or cut semi-natural grasslands/pastures Show
The effectiveness of different methods to deter large gulls <i>Larus</i> spp. from competing with nesting terns <i>Sterna</i> spp. on Coquet Island RSPB reserve, Northumberland, England Show	<ul style="list-style-type: none"> Reduce inter-specific competition for nest sites of ground nesting seabirds by removing competitor species Show
The recent declines of farmland bird populations in Britain: an appraisal of causal factors and conservation actions Show	<ul style="list-style-type: none"> Pay farmers to cover the cost of conservation measures (as in agri-environment schemes) Show Pay farmers to cover the costs of bird conservation measures Show
Some effects of set-aside on breeding birds in northeast Scotland Show	<ul style="list-style-type: none"> Provide or retain set-aside areas in farmland Show Provide or retain set-aside areas in farmland Show
Habitat restoration for curlew <i>Numenius arquata</i> at the Lake Vyrnwy reserve, Wales Show	

<https://www.iucnredlist.org/species/22693190/117917038>

まとめ～エビデンスの統合

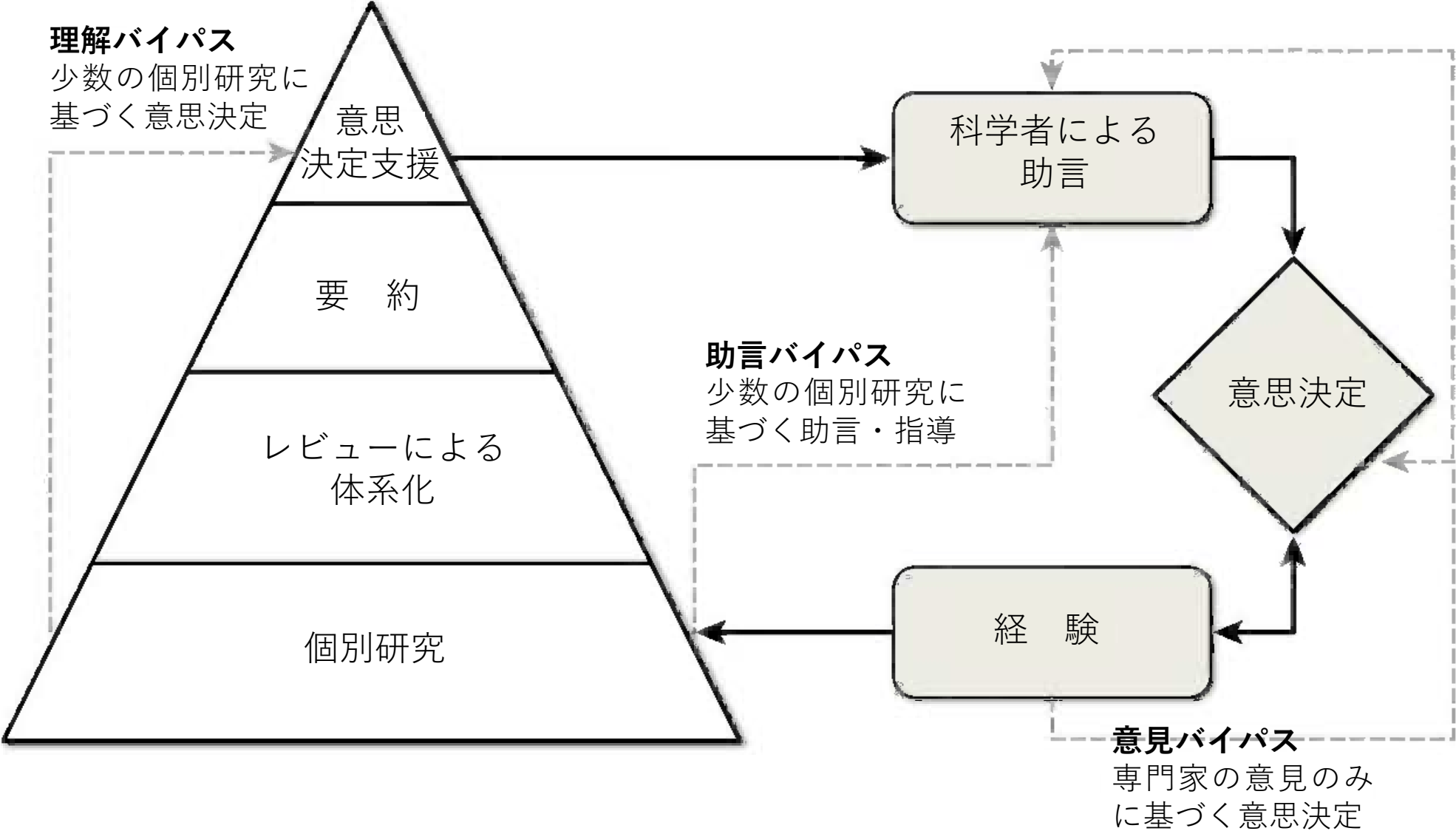
Dicks et al. 2014 TREE



まとめ～エビデンスの統合

(避けるべきバイパス)

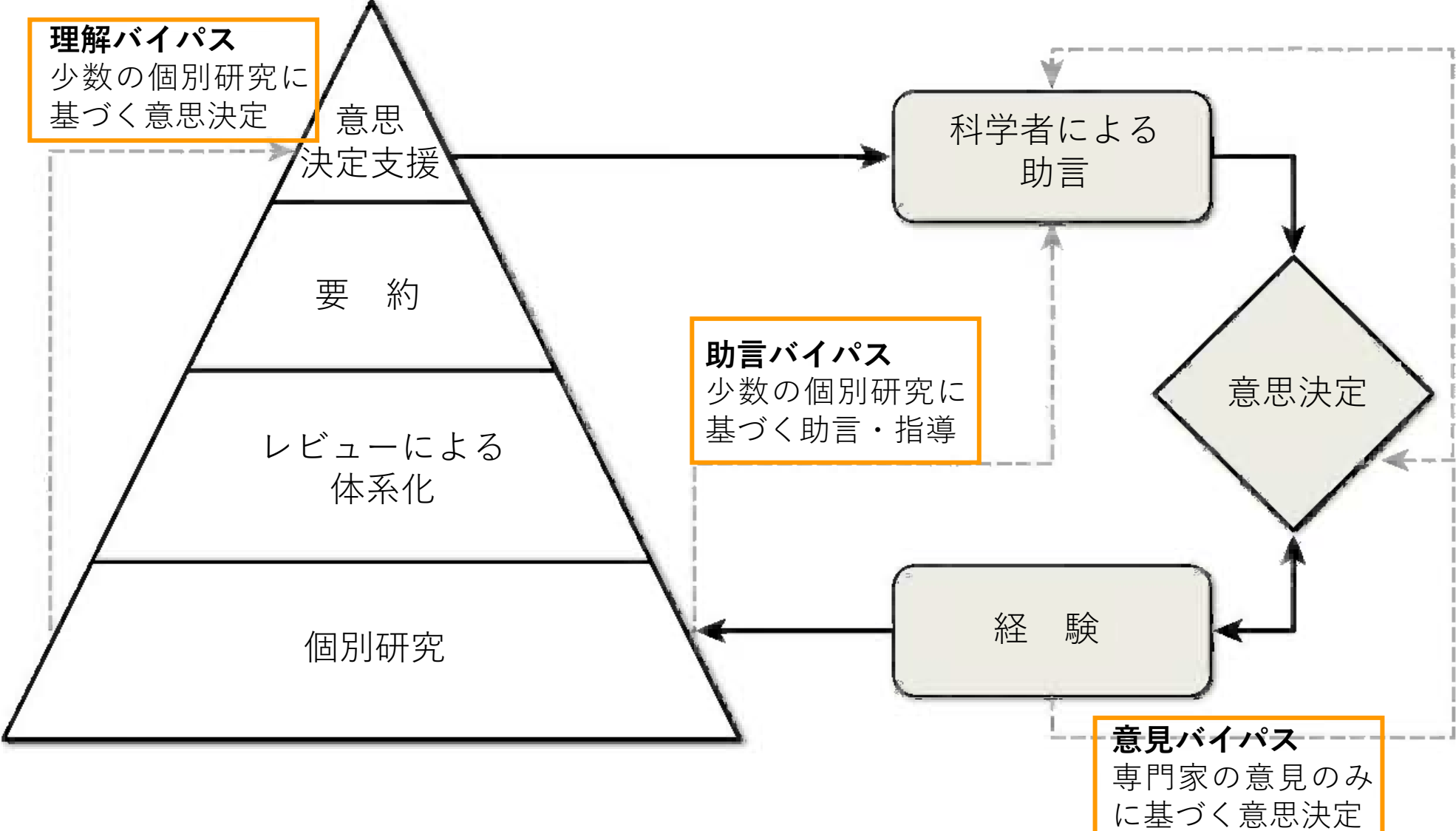
Dicks et al. 2014 TREE




まとめ～エビデンスの統合

(避けるべきバイパス)

Dicks et al. 2014 TREE



エビデンスの統合における課題

 Collaboration for
Environmental
Evidence

CAF
Make A Donation

☰



Evidence Resources

CEE Evidence Syntheses

Welcome to the Environmental Evidence Library of Evidence Syntheses. This Library contains all systematic reviews and systematic maps that have been approved by CEE. In the list below, the reviews are ordered by registration number (most recent first). They are not in exact chronological order of completion date. Please scroll down to find a review or use the search tools below.

To search using titles or keywords, place terms in the box below. Add another field to search by author's name or year of completion.

Find Out More

CEE Evidence Syntheses

Syntheses In Progress

EE Journal

That's a Claim!

Conservation Evidence

Providing evidence to improve practice



Browse Evidence

Journal

About us ▾

Resources ▾

Conservation Evidence in numbers

Over 600,000 scientific papers scanned



Click image to browse over 5,400 studies

Over 34,000 downloads of 'What Works in Conservation'



Over 1.25 million webpage views of www.conservationevidence.com



Browse by category:

**Amphibian Conservation**
129 Actions

**Bat Conservation**
190 Actions

**Bee Conservation**
59 Actions

**Bird Conservation**
454 Actions

**Control of Freshwater Invasive Species**
100 Actions

**Farmland Conservation**
119 Actions

See more ▸

課題：時間と努力量

体系的レビューの各ステージに扱われる個別論文数

レビューステージ

平均

Searching

11,786

Duplicate removal

8,493

Title screening

1,236

Abstract screening

311

Full text retrieval

468

Full text screening

100

Critical appraisal

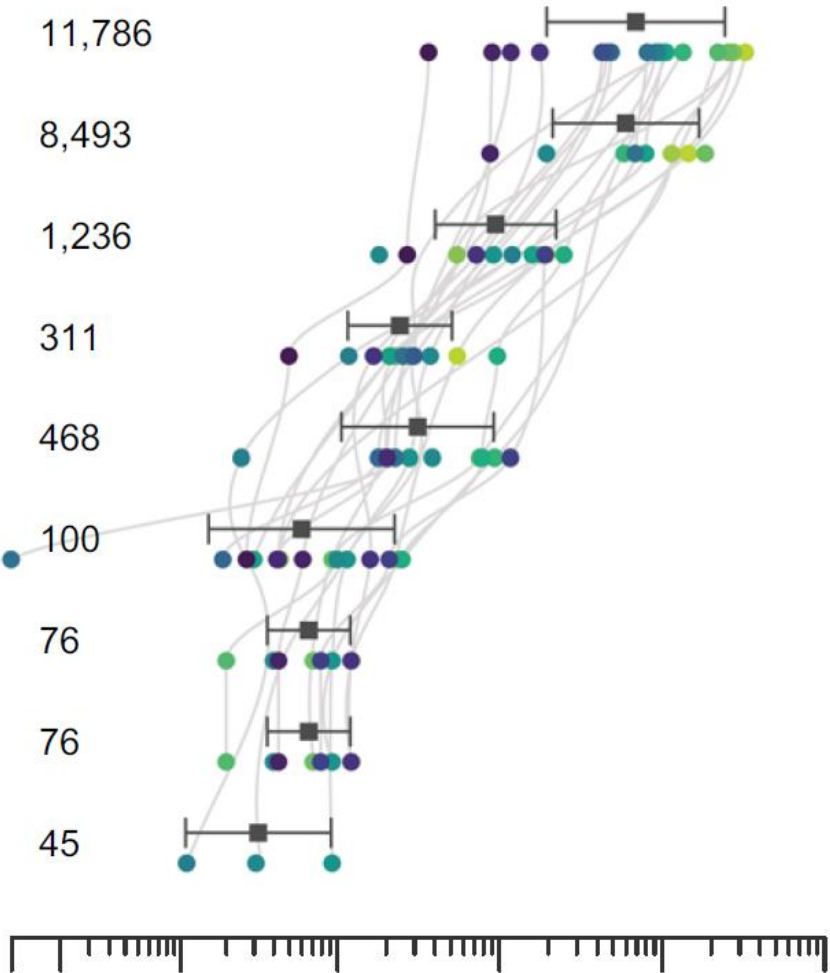
76

Narrative synthesis

76

Quantitative synthesis

45



課題：時間と努力量

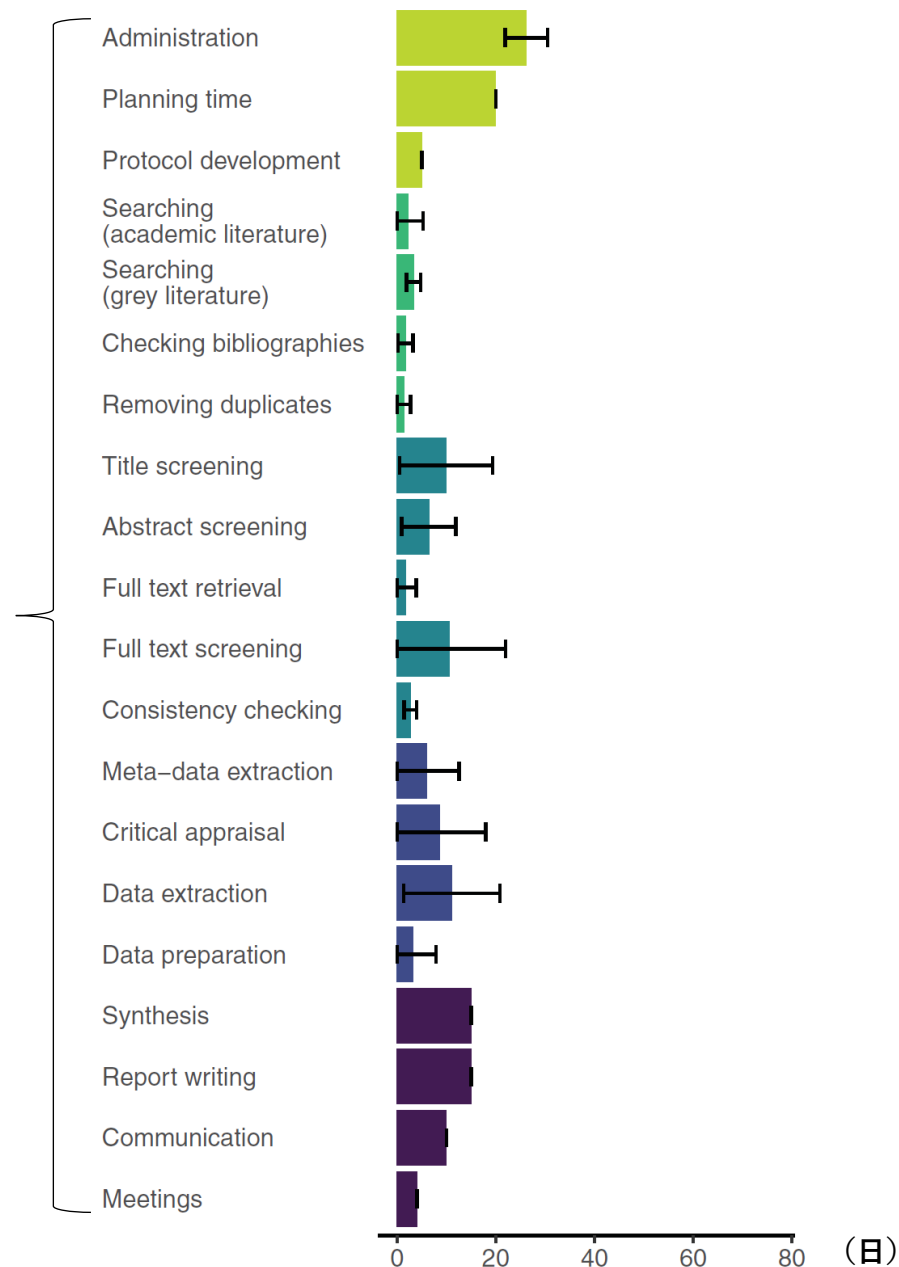
Question

「道路脇の植生管理は生物多様性に影響するか？」
のような一つの問いに答えるために必要な労力は？

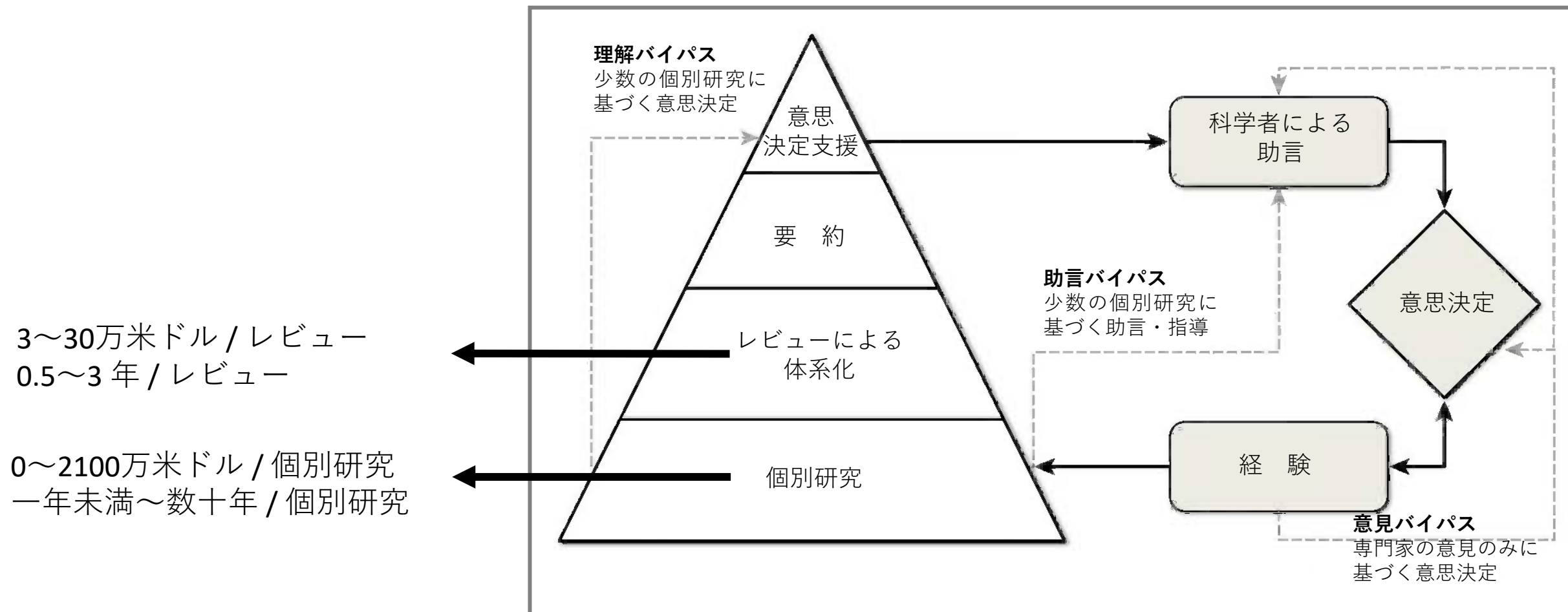
Answer

164日（/1人・全時間就労）

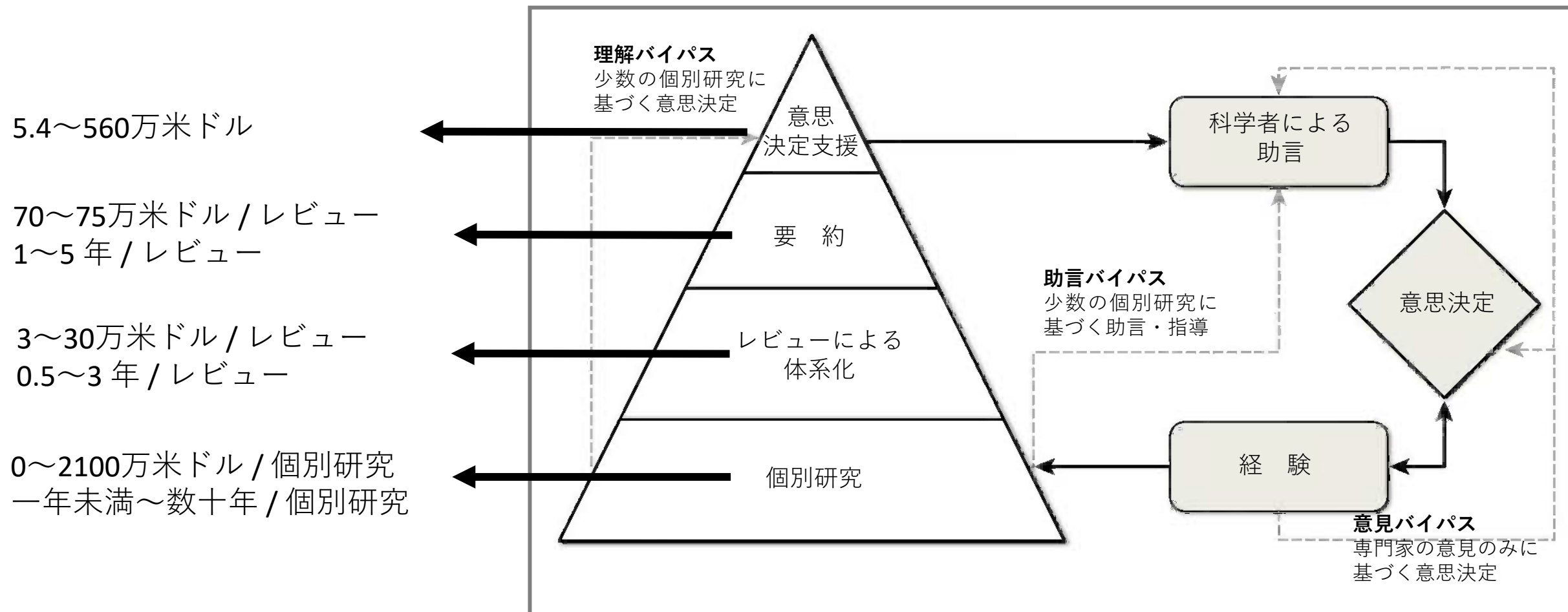
レビューステージ



課題：時間と努力量



課題：時間と努力量



課題：空間的な情報のギャップ

アクション：鳴き鳥に人工巣を提供する

Action: Provide artificial nesting sites for songbirds

Key messages [Read our guidance on Key messages before continuing](#)

- Only three studies out of 66 from across the world found [low rates](#) of nest box occupancy, although this may be partially the result of publishing biases. Thrushes, crows, swallows and New World warblers were the target species with low rates of use. Thrushes, crows, finches, swallows, wrens, tits, Old World and tyrant flycatchers, New World blackbirds, sparrows, waxbills, starlings and ovenbirds all used nest boxes. One study from the [USA](#) found that wrens used nest boxes more frequently than natural cavities.
- [Five studies](#) from across the world found higher population densities or population growth rates in areas with nest boxes, whilst one study from the [USA](#) found higher species richness in areas with nest boxes. One study from [Chile](#) found that breeding populations (but not non-breeding populations) were higher for two species when nest boxes were provided.
- [Twelve studies](#) from across the world found that productivity of birds in nest boxes was higher or similar to those in natural nests. One [study](#) found there were more nesting attempts in areas with more nest boxes, although a study from [Canada](#) found no differences in behaviour or productivity between areas with high or low densities of nest boxes. Two studies from [Europe](#) found lower predation of some species using nest boxes. However, three studies from the [USA](#) found low production in nest boxes, either in absolute terms or relative to natural nests.
- Thirteen studies from across the world founds that [use](#), [productivity](#) or [usurpation](#) varied with nest box design, whilst seven found no difference in [occupation rates](#) or [success](#) with different designs.

Overall Effectiveness Category:
Beneficial ?

Effectiveness: 67% ?

Certainty: 85% ?

Harms: 0% ?

Where has this evidence come from?

Bird Conservation [View all](#)

Click [here](#) to see the list of journals searched for this synopsis, and [here](#) to see all the journals searched for all synopses.

デビデンスが提供された国



課題：空間的な情報のギャップ



Actions

Can't find what you're looking for? [You can also search Individual Studies.](#)

Not sure what Actions are? [Read a brief description.](#)

Refine results

Category

☒ Bird Conservation (36)

Keywords

skylark

Habitat

☐ Artificial Habitats

☐ Grassland

☐ Wetlands

[More](#) ▼

Threat

☐ Agriculture & aquaculture

☐ Natural system modifications

36 actions found

☐ Create skylark plots for bird conservation

● Likely to be beneficial | Based on: 7 studies

☐ Provide or retain set-aside areas in farmland

● Beneficial | Based on: 22 studies

☐ Leave overwinter stubbles

● Likely to be beneficial | Based on: 14 studies

☐ Raise mowing height on grasslands to benefit birds

● Unknown effectiveness (limited evidence) | Based on: 2 studies

☐ Plant nectar flower mixture/wildflower strips for birds

● Likely to be beneficial | Based on: 7 studies

☐ Use mowing techniques to reduce chick mortality

● Likely to be beneficial | Based on: 3 studies

課題：空間的な情報のギャップ



Daniel Pettersson CC BY-SA 2.5 SE

Actions

Can't find what you're looking for? [You can also search Individual Studies.](#)
Not sure what Actions are? [Read a brief description.](#)

Refine results

Category

☒ Bird Conservation (36)

Keywords

skylark

Habitat

☐ Artificial Habitats

☐ Grassland

☐ Wetlands

[More](#)

Threat

☐ Agriculture & aquaculture

☐ Natural system modifications

36 actions found

☐ Create skylark plots for bird conservation

● Likely to be beneficial | Based on: 7 studies

☐ Provide or retain set-aside areas in farmland

● Beneficial | Based on: 22 studies

☐ Leave overwinter stubbles

● Likely to be beneficial | Based on: 14 studies

☐ Raise mowing height on grasslands to benefit birds

● Unknown effectiveness (limited evidence) | Based on: 2 studies

☐ Plant nectar flower mixture/wildflower strips for birds

● Likely to be beneficial | Based on: 7 studies

☐ Use mowing techniques to reduce chick mortality

● Likely to be beneficial | Based on: 3 studies

Action: Provide or retain set-aside areas in farmland

Key messages [Read our guidance on Key messages before continuing](#)

- [Three replicated studies](#) and a review of five studies from Europe and North America examining species richness or diversity found that more species were found on set-aside than on crops. [One](#) found fewer species on set-aside than other agricultural habitats.
- All 21 studies, including a systematic review, 12 replicated experiments and two reviews, from Europe and North America that investigated population trends or habitat associations found that some species were found at higher densities or used set-aside more than other habitats, or were found on [set-aside](#). [Four studies](#) (three replicated) from the UK found that some species were found at lower densities on set-aside compared to other habitats.
- [Three](#) of four replicated studies from the UK found that waders and Eurasian skylarks had higher productivities on set-aside, compared to other habitats. [One study](#) found that skylarks nesting on set-aside had lower productivity compared to those on cereal crops, and similar productivities to those on other crops.
- [One replicated paired study](#) from the UK found that rotational set-aside was used more than non-rotational set-aside, [a replicated paired study](#) found no differences between rotational and non-rotational set-aside. A [review](#) from Europe and North America found that naturally regenerated set-aside held more birds and more species than sown set-aside.

Background information and definitions

Allocation of some farmland to 'set-aside' (fields taken out of production) was compulsory under European agricultural policy from 1992 until 2008. Originally intended as a method of reducing production, set-aside has also been promoted as a way of protecting on-field biodiversity. Set-aside fields can be sown with fallow crops or left to naturally regenerate. Set-aside can be rotational (in a different place every year) or long term (retained for 5–20 years).

A 2008 literature review of the Environmental Stewardship programme, particularly Entry Level Stewardship (ELS) in the UK (Vickery *et al.* 2008) found that the population trends of all Farmland Bird Index species were positively correlated with the availability of set-aside in that year and that Entry Level Stewardship may not be able to effectively replace set-aside.

Overall Effectiveness Category:

Beneficial

Effectiveness: 70%

Certainty: 75%

Harms: 0%

Where has this evidence come from?

 Bird Conservation

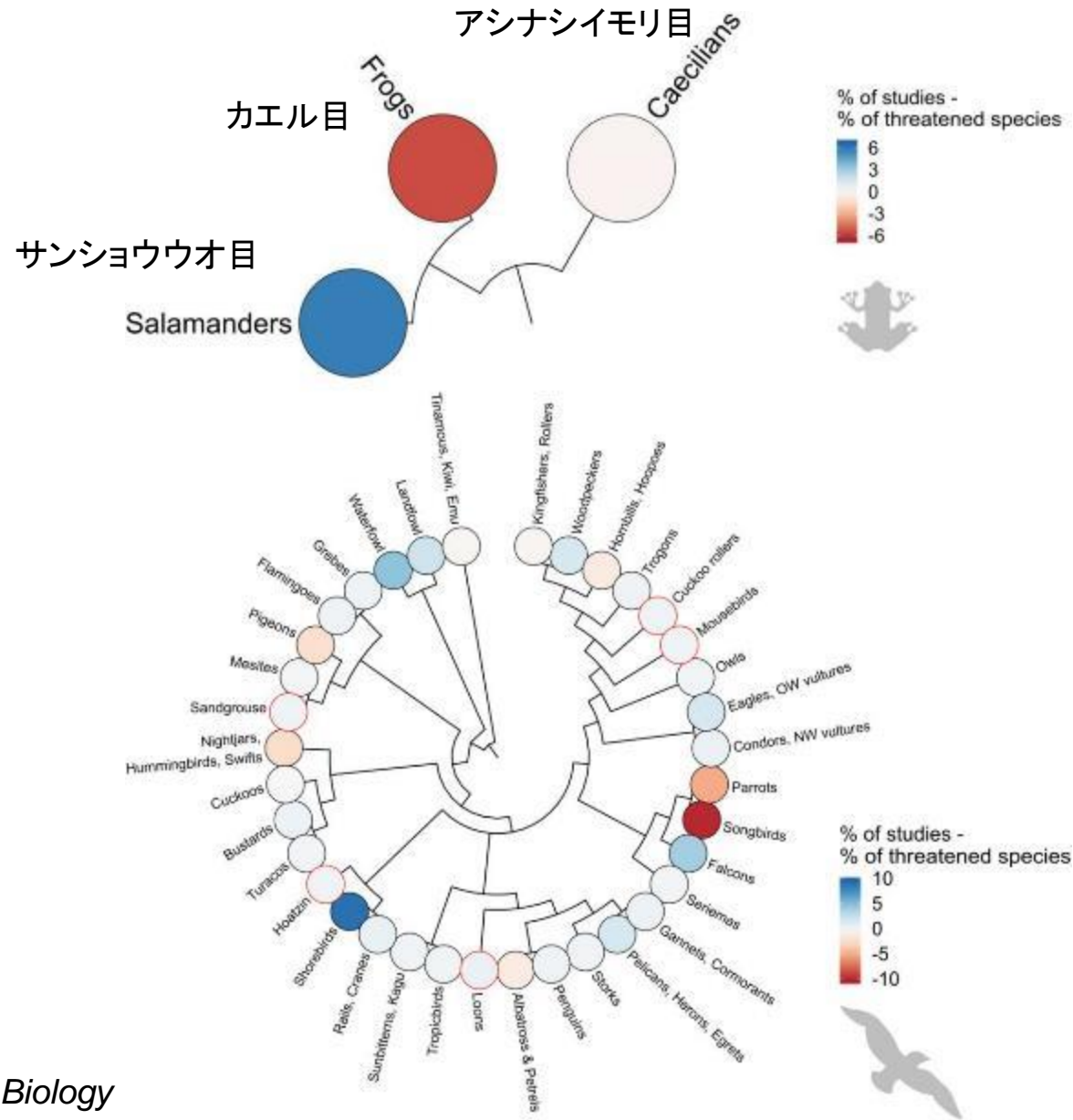
[View all](#)

Click [here](#) to see the list of journals searched for this synopsis, and [here](#) to see all the journals searched for all synopses.

Source countries



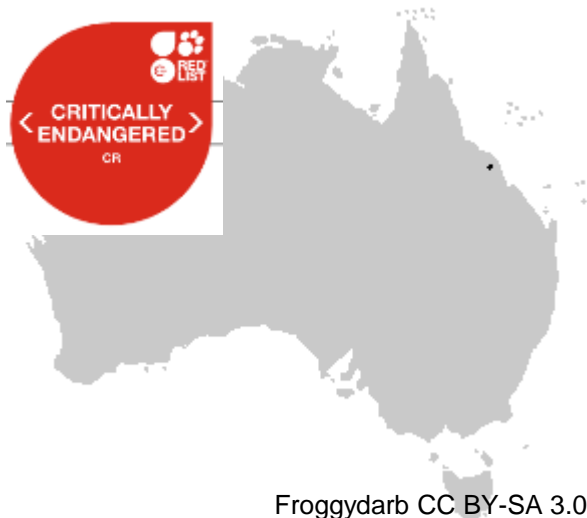
課題：分類学的な情報のギャップ



課題：分類学的な情報のギャップ



Tnarg CC BY 2.5



ユンゲラ・トレント・カエル

Actions

Can't find what you're looking for? [You can also search Individual Studies.](#)

Not sure what Actions are? [Read a brief description.](#)

Refine results

Category

Keywords

Taudactylus eungellensis

Habitat

Threat

Action type

0 actions found

No action results

Sorry, your search didn't return any action pages. Please consider the following tips:

- Start with broad search terms, refining your search using the panel on the left
- If you're looking for evidence about a particular species, try searching at the genus or family level
- Check your spelling
- You can also search [Individual Studies](#).
- Bear in mind that the Conservation Evidence project is a **work in progress**. We have actively collected evidence on a range of specific topics, as shown on the [Synopsis page](#). Beyond these subjects our coverage may be less thorough.

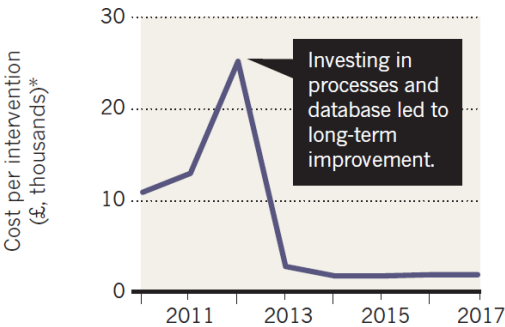
Results per page 25 ▼

エビデンスの統合における課題の克服

COST-EFFECTIVE

Manually searching journals to find studies on actions designed to conserve species is costly at first. But as the searches accumulate, subsequent evidence syntheses require fewer resources.

Spending per intervention



New journals searched and conservation actions accessed

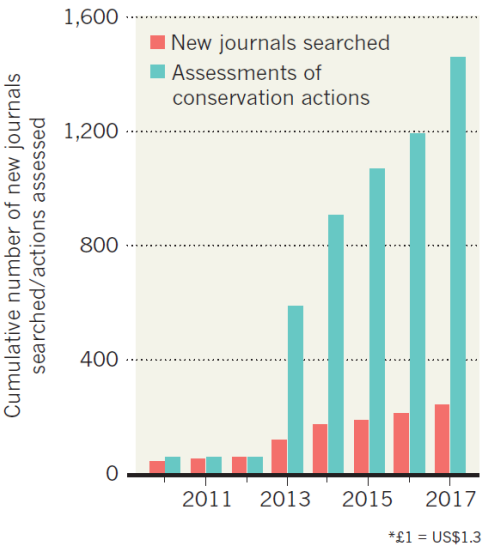


Table 1 | Emerging methods for rigorous and efficient research synthesis

Stage	Problem	Description	Solution
Planning	Planning workflow	Large numbers of software tools are available, but their relative strengths and weaknesses are unclear	Online databases of relevant tools ¹⁵
	Data collection	Sources of 'grey literature' such as organizational websites often lack convenient download functions	Web scraping ²⁷
Searching	Search record extraction	Downloading information from academic databases is slow and labour-intensive	No user-based solution: provider-dependent
	Incomplete search results	Downloading information from academic databases is slow and labour-intensive	Semantic analysis of key texts to locate additional search terms (synonyms)
	Duplicates	Same content repeated many times in the dataset because of multiple databases searched	Duplicate detection algorithms ²⁸
	Classification	Need for overview of broad trends to ensure only relevant topics are included	Simple machine-learning approaches such as topic modelling ¹¹
	Inclusion of irrelevant material	Non-target subjects included in search results	Dynamic classification using machine learning ²¹
Screening	Locating full text articles	Download of full-text documents often requires manual searching and downloading	Built in to some software platforms ²⁹ . Limited by copyright and access issues
	Data extraction	Information located in a combination of text, tables and figures, requiring manual checking	Automated image and natural language processing ^{30,31}
	Meta-analysis	Appropriate statistical models, methods and workflows can be complex, particularly for new users	Many tools available ^{29,32}
	Data visualization	Presenting complex data for broad audiences is difficult	Open source/access to data. Interactive diagrams, such as evidence atlases, heat maps and visualizations ⁸

批判的吟味の必要性

- 全ての研究の妥当性が同じではない
- 妥当性が高いものもあれば低いものもある
- 内的妥当性（研究の質）と外的妥当性（研究の一般性）
- 厳密なエビデンスの統合は、含まれる研究の妥当性を評価し、体系化する際に妥当性の違いを考慮しなければならない。

例：より妥当性の高い研究に焦点を当てる

妥当性の高い研究のみを解析に使う（メタ解析など）。

体系化する際に妥当性の評価を調整変数に用いる

エビデンスの統合における課題の克服

Conservation Evidence

Providing evidence to improve practice



Browse Evidence

The journal, *Conservation Evidence*

Our online journal publishes research, monitoring results and case studies on the effects of conservation interventions. All papers include some monitoring of the effects of the intervention and are written by, or in partnership with, those who did the conservation work. It includes interventions such as habitat creation, habitat restoration, translocations, reintroductions, invasive species control, and education or integrated conservation development programmes, from anywhere around the world.

Watch a brief video on our journal [here](#).

A *volume* is created each year with peer-reviewed papers published throughout the year. We now accept Short Communications as well as standard papers.

Special issues contain new papers on a specific topic.

Virtual collections collate papers published in the journal on specific topics such as management of particular groups of species.

To search for papers on a specific topic within the journal select [Advanced search](#), enter your keyword(s) and within the Source box type: "conservation evidence". This will take you to a list of actions that contain *Conservation Evidence* papers. In order to see the list of individual *Conservation Evidence* papers on the topic, please click on 'You can also search Individual Studies' at the top of this page.



まとめ

保全に関するエビデンスは世界中で急速に蓄積されているが、研究と実践の連携を強化する必要がある。

エビデンスに基づく保全は、以下の3つの点を通して、上記の問題を解決することを目指している。

- エビデンスの統合と批判的吟味（体系的レビュー、要約）
- わかりやすく、アクセスしやすい方法でエビデンスを示す（要約と意思決定支援ツール）
- エビデンスに基づいた意思決定は、バイアスを避け、透明性を高め、有効性を高めるのに役立つ

参考文献

- Sutherland, W. W. J., Pullin, A. A. S., Dolman, P. P. M., & Knight, T. M. (2004). The need for evidence-based conservation. *Trends in Ecology & Evolution*, 19, 305–308. <https://doi.org/10.1016/j.tree.2004.03.018>
- Cook, C. N., Mascia, M. B., Schwartz, M. W., Possingham, H. P., & Fuller, R. A. (2013). Achieving conservation science that bridges the knowledge-action boundary. *Conservation Biology*, 27, 669–678. <https://doi.org/10.1111/cobi.12050>
- Dicks, L. V., Walsh, J. C., & Sutherland, W. J. (2014). Organising evidence for environmental management decisions: a “4S” hierarchy. *Trends in Ecology & Evolution*, 29, 607–613. <https://doi.org/10.1016/j.tree.2014.09.004>
- Salafsky, N., Boshoven, J., Burivalova, Z., Dubois, N. S., Gomez, A., Johnson, A., ... Wordley, C. F. R. (2019). Defining and using evidence in conservation practice. *Conservation Science and Practice*, 1, e27. doi: 10.1111/csp2.27
- Sutherland et al. (2020). *Conservation Research, Policy and Practice*. Cambridge University Press. <https://doi.org/10.1017/9781108638210> Open Access book.
- Walsh, J. C., Dicks, L. V., Raymond, C. M., Sutherland, W. J. (2019) A typology of barriers and enablers of scientific evidence use in conservation practice. *Journal of Environmental Management*, 250, 109481. <https://doi.org/10.1016/j.jenvman.2019.109481>
- 天野 (2017) 保全科学における情報のギャップと3つのアプローチ。保全生態学研究 22: 5-20.
- 大澤・上野 (2017) 生態学研究と実務の間に存在するギャップを考える。日本生態学会誌 67: 257-265.
- 大澤・天野・大澤・高橋・櫻井・西田・江成 (2019) 生物多様性に関わる政策課題を俯瞰するlegislative scan（生物多様性に関する政策動向走査）－日本における研究と実践の隔たりの解消に向けて－。保全生態学研究 24: 135-149.

その他の情報源

- Conservation Evidence www.conservationevidence.com
- Collaboration of Environmental Evidence www.environmentalevidence.org/
- Campbell Collaboration <https://campbellcollaboration.org/>
- Biodiversity Knowledge Network www.vliz.be/projects/biodiversityknowledge/
- Guide to influencing decision-making – Science to Action
 - <http://seaknowledgebank.net/e-library/science-action-guidebook-scientists-guide-influencing-decision-making-decision-makers>

Glossary of terms (taken from Dicks et al. 2014)

助言・手引き：記述された形、もしくは口頭で意思決定者に対して行われる提言。これらの提言は、特定の状況下で統合されたエビデンスや意思決定システムから得られた結果を解釈することで得られる場合がある。

意思決定支援システム：様々な可能性のある結果を視覚的・数值的に表示したり、利用者を論理的な意思決定ステップに導いたりすることで、特定の意思決定を行う意思決定者を支援するように設計されたツール（通常はソフトウェア）。

経験：試行錯誤により得られた情報、もしくは特定の場所、環境、管理目標に関しての経験的な知識。経験が意思決定や個別の研究のデザインに情報を提供する。

研究：特定の操作や変数の効果を科学的に検証したひとまとまりの報告。体系的なまとめを行う際には、研究は個々の実験や比較のレベルまで詳細に検討する必要がある。研究には質的なものと量的なものがある。

要約：入手できる研究論文、レビュー論文から確認できるエビデンスに基づいて、実践手法や手法の改善等、推奨される選択について、標準化された手法に基づいて簡潔に結果を説明するもの。この作成には別の選択肢およびその影響、さらにはどういった方法で各種エビデンスをまとめたかという過程も明示することが望ましい。

概要：事例研究あるいは体系的な文献レビューの結果を簡潔に平易な言葉で記載したもの。概要は、データベースや保全実践者向けの雑誌には記載されていることが多い。実践可能性を検証し、意思決定者に対しての提言や助言が記載されている場合は、要約としての必須事項を満たしている。

体系的マッピング：環境科学の特定分野に関わる、利用可能なエビデンスのデータベースや一覧表のこと。査読を伴う検索や選択手順を用いて作成される。体系的マッピングは、保全に関わる個別の問題に答えるためにデータをまとめたり、解析したりはしない。しかし、選択された研究を網羅的に調べることで、定性的あるいは一定程度は定量的なエビデンスや結果を得ることができる。

体系的レビュー：ある特定の科学的問題に関して、査読付きの文献の検索と評価プロトコルに基づいて行われたレビュー、批判的吟味、量的・質的解析結果のこと。体系的レビューで抽出されたデータは量的手法、質的手法（記述的な統合）、およびそれらの混合手法により統合することができる。