Monitoring for success

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BRITISH ECOLOGICAL SOCIETY

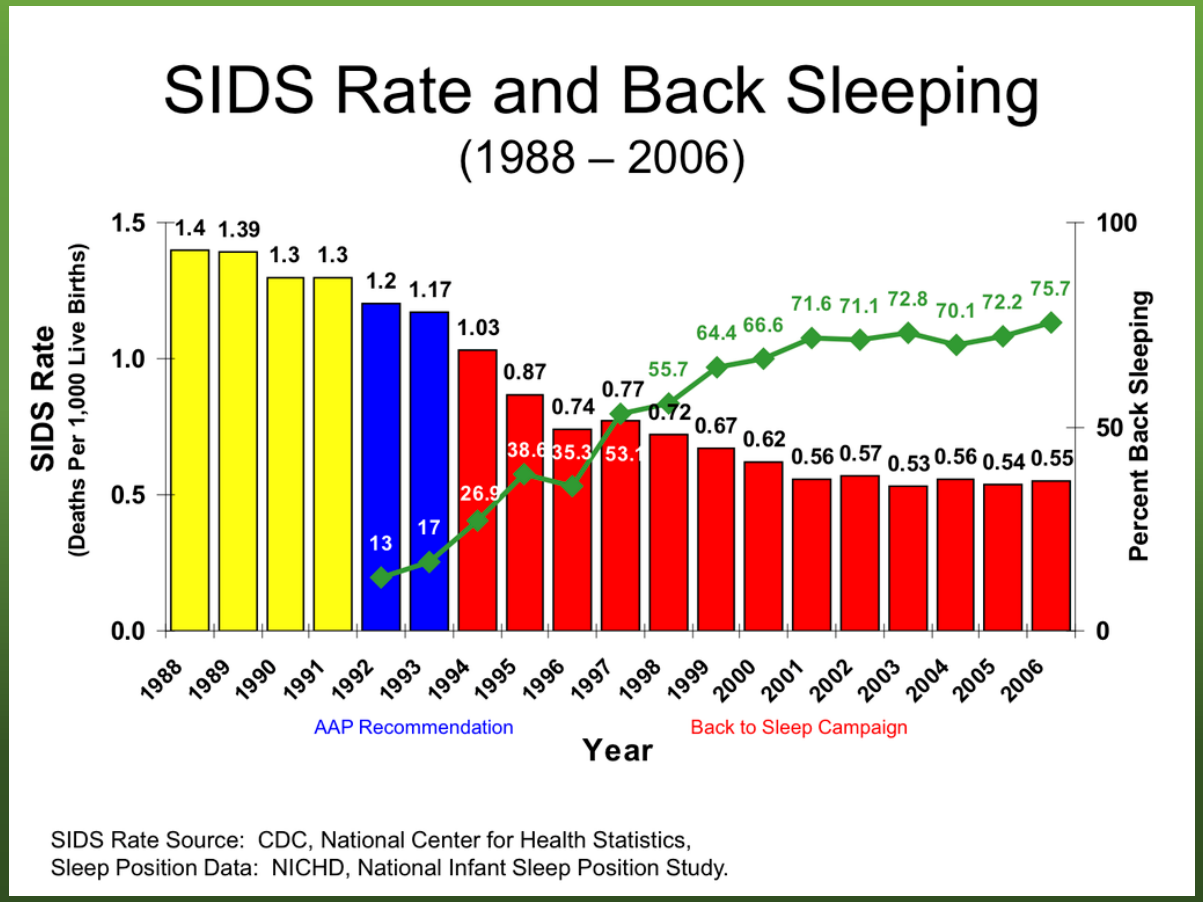
Get into groups

Think of a project you have undertaken recently

- What information did you look for at the start of the project?
- Was the information you needed available?
- Where did you find it?
- What monitoring did you undertake?
- How did you communicate the key outcomes?

Why use evidence?

- Examples of standard approaches making things WORSE in many fields



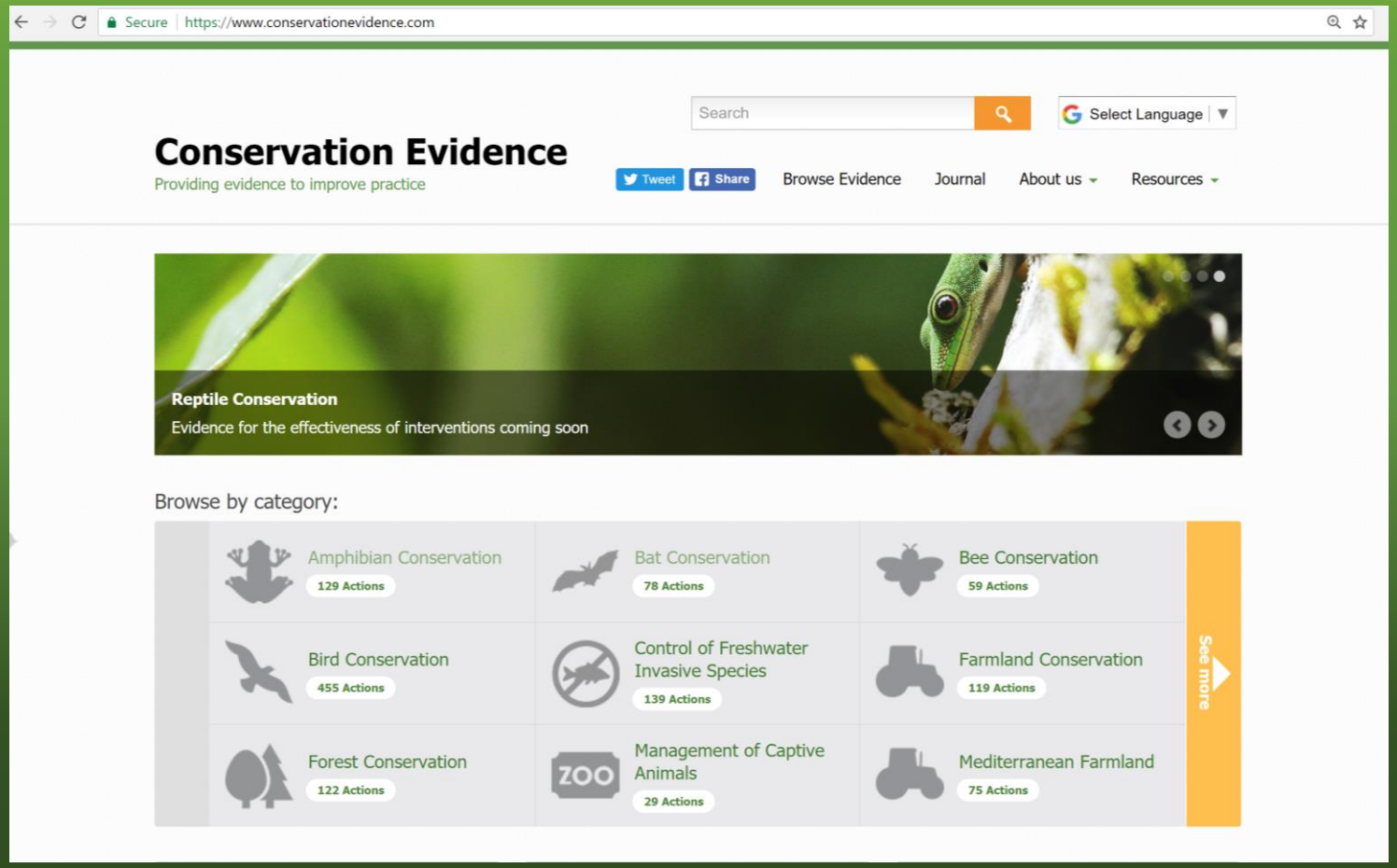
Why use evidence?

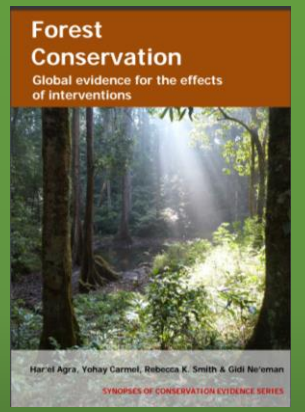
Two key resources

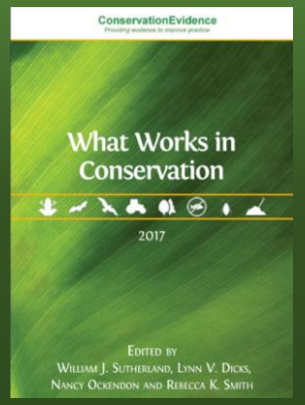
- Conservation Evidence
- Applied Ecology Resources (not yet launched)

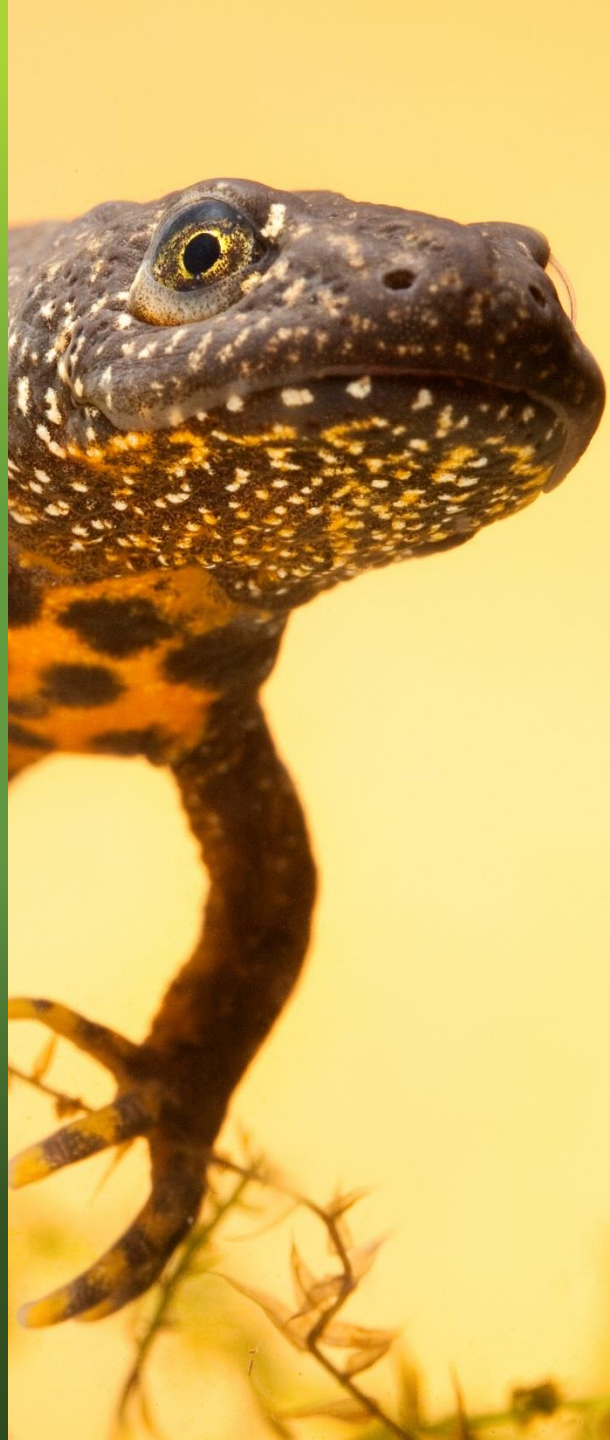
Conservation Evidence

- Set up by Professor Bill Sutherland in 2004
- Based at the University of Cambridge

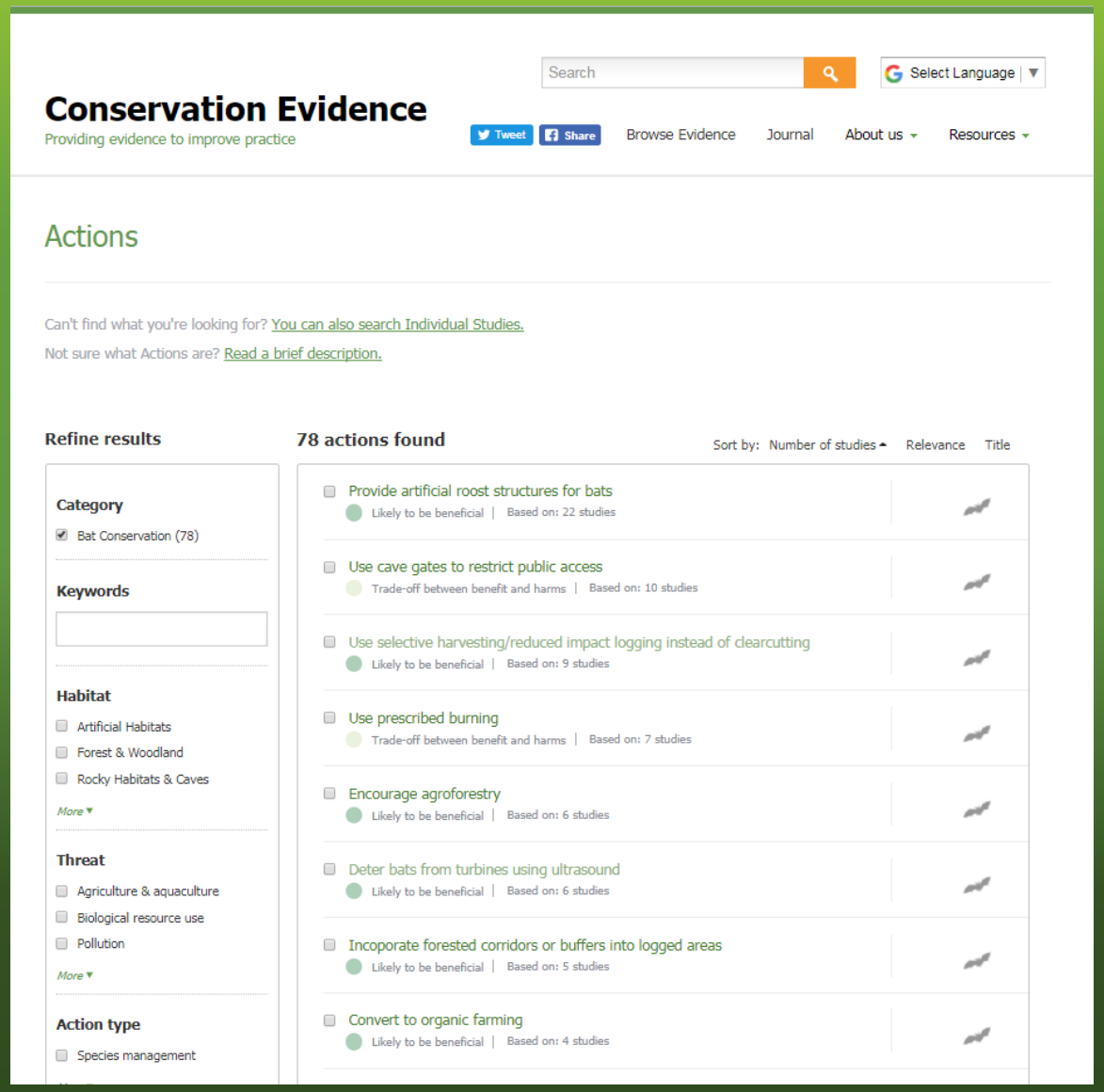


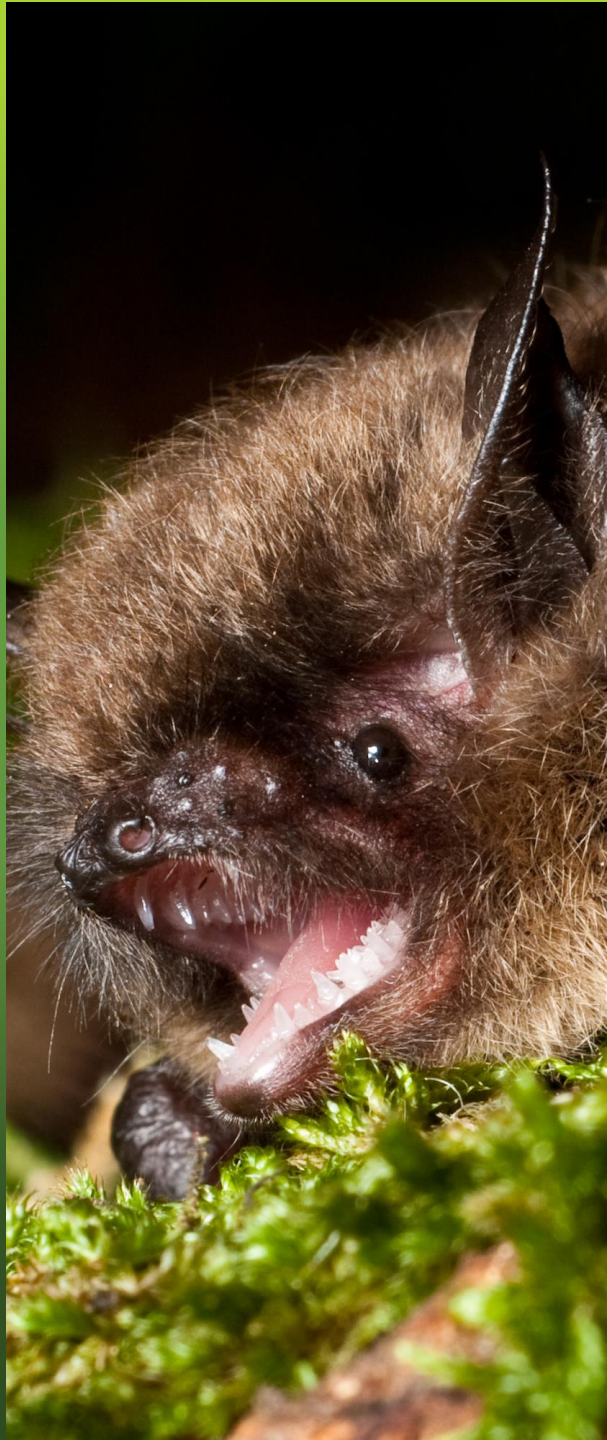






Conservation Evidence





Conservation Evidence

Action: Use cave gates to restrict public access

Key messages

- Ten studies in Europe, North America, Canada and Australia provide evidence for the effects of cave gating on bats, with mixed results.
- Four studies (one of which was a replicated, before-and-after trial) found more or equal numbers of bats in underground systems after gates were installed to restrict public access.
- Two studies (both before-and-after, one replicated) found mines were abandoned or had reduced bat populations after gating of entrances.
- Five studies (including two replicated, controlled, before-and-after and site comparison trials) provide evidence for changes in bat flight behaviour when cave gates are installed, and an effect of cave gate design.

Effectiveness category:
Trade-off between benefit and harms

Effectiveness: 50%

Certainty: 60%

Harms: 50%

Where has this evidence come from?

Bat 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

Related Actions

- Legally protect bat hibernation sites
- Educate the public to reduce disturbance to hibernating

Background information and definitions

Recreational users of caves can disturb both hibernating and nursing colonies of bats causing abandonment of young or arousal from hibernation. Gates have been installed at cave entrances to restrict public access and reduce human disturbance. However, cave gating can also impede access by bats and early attempts from the 1950s to the 1970s often resulted in roost abandonment (Tuttle 1977). Gates that are more 'bat-friendly' have since been designed. Seven studies provide evidence for the effects of cave gates on bat populations. Five studies are also included which provide evidence for changes in flight behaviour and the effect of gate design on bats.

Tuttle M.D. (1977) Gating as a means of protecting cave dwelling bats. Pages 77–82 in: T. Aley & D. Rhodes (eds.) *1976 National Cave Management Symposium Proceedings*, Speleobooks, Albuquerque, USA.

Supporting evidence from individual studies

1

An unreplicated, site comparison study from 1976 to 1977 in two caves in Indiana, USA (Richter *et al* 1993) found that Indiana bats *Myotis sodalis* hibernating within a cave modified with a stone wall and gate constructed at the entrance entered hibernation at a 5% higher body mass and lost 42% more body mass than bats in an unmodified cave 4 km away. The stone wall and gate in the modified cave restricted the cave opening by 62% reducing airflow and resulting in average winter temperatures 5°C higher than in the unmodified cave. Cave temperatures were measured near to hibernation sites every other week, and bats were counted and weighed in early winter (October–November 1976) and late winter (March 1977). In 1977 the stone wall was removed and replaced with steel bars. A biannual census until 1991 reported a subsequent increase in the population of Indiana bats in the cave from 2,000 to 13,000 bats.

Conservation Evidence

Referenced papers

1. Richter A.R., Humphrey S.R., Cope J.B. & Brack V. (1993) Modified cave entrances: thermal effect on body mass and resulting decline of endangered indiana bats (*Myotis sodalis*). *Conservation Biology*, 7, 407-415
2. Voûte A.M. & Lina P.H.C. (1986) Management effects on bat hibernacula in the Netherlands. *Biological Conservation*, 38, 163-177
3. White D.H. & Seginak J.T. (1987) Cave gate designs for use in protecting endangered bats. *Wildlife Society Bulletin*, 15, 445-449
4. Ludlow M.E. & Gore J.A. (2000) Effects of a cave gate on emergence patterns of colonial bats. *Wildlife Society Bulletin*, 28, 191-196
5. Martin K.W., Leslie D.M., Payton M.E., Puckette W.L. & Hensley S.L. (2003) Internal cave gating for protection of colonies of the endangered gray bat (*Myotis grisescens*). *Acta Chiropterologica*, 5, 143-150
6. Spanjer G.R. & Fenton M.B. (2005) Behavioral responses of bats to gates at caves and mines. *Wildlife Society Bulletin*, 33, 1101-1112
7. Slade C.P. & Law B.S. (2008) An experimental test of gating derelict mines to conserve bat roost habitat in southeastern Australia. *Acta Chiropterologica*, 10, 367-376
8. Navo K.W. & Krabacher P. (2005) The use of bat gates at abandoned mines in Colorado. *Bat Research News*, 46, 1-8
9. Pugh M. & Altringham J.D. (2005) The effect of gates on cave entry by swarming bats. *Acta Chiropterologica*, 7, 293-299
10. Paksuz S. & Özkan B. (2012) The protection of the bat community in the Dupnisa Cave System, Turkey, following opening for tourism. *Oryx*, 46, 130-136

Please cite as:

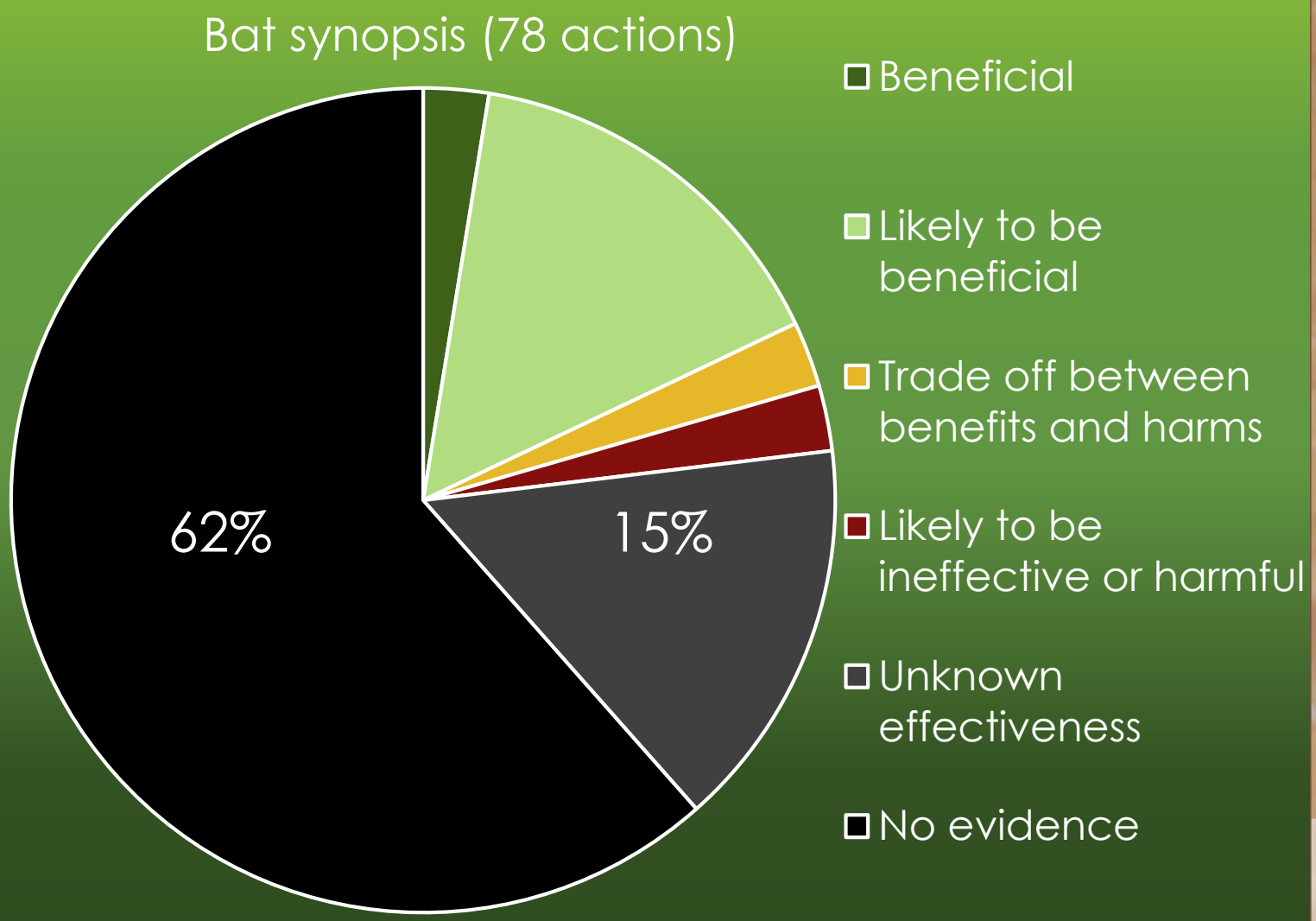
Berthinussen, A., Richardson, O.C., Smith, R.K., Altringham, J.D. & Sutherland, W.J. (2017) Bat Conservation. Pages 67-93 in: W.J. Sutherland, L.V. Dicks, N. Ockendon & R.K. Smith (eds) What Works in Conservation 2017. Open Book Publishers, Cambridge, UK.

Related Actions

- Legally protect bat hibernation sites
- Educate the public to reduce disturbance to hibernating bats
- Use cave gates to restrict public access

See more

Evidence available

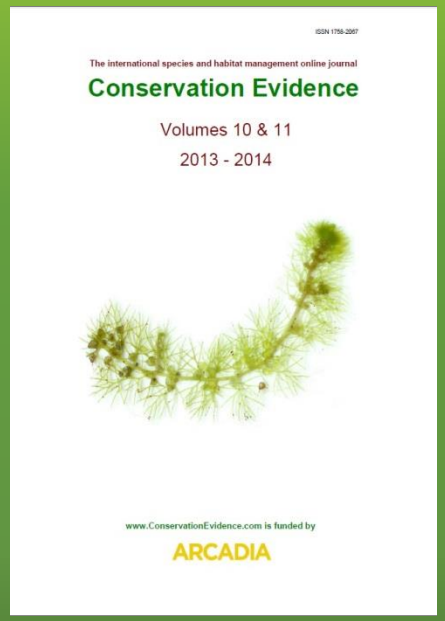


The Conservation Evidence project

Summarising evidence and encouraging its use by practitioners

Encouraging generation of new evidence by practitioners

Enabling the publishing of new evidence to share with others



Papers by consultants include…

P. F. Reason / Conservation Evidence (2017) 14, 52-57

Designing a new access point for lesser horseshoe bats, Gloucestershire, UK

Paola F. Reason[1]*

[1] Arcadis Consulting (UK) Ltd. The Mill, Brimscombe Port, Brimscombe, Stroud, GL5 2QG, UK

SUMMARY

The aim of this intervention was to create a new flight-path and roost access point for lesser horseshoe bats (*Rhinolophus hipposideros*) in Gloucestershire, UK. Their existing access point was to be enclosed within an extension to the building they occupied, as part of a redevelopment project. Two designs were tried, and detailed observations were made of bats exiting and attempting to return to their roost. The initial design required the bats to execute a 90° turn at the base of a short vertical shaft, and very few bats returned to the roost through this access point design. The final design provided a clear 'line-of-sight' through the structure enclosing the flight-path; bats did return to the roost via this access point. Before the intervention colony numbers did not exceed 35 bats (adults and young); during the construction period, numbers dropped to just seven individuals. Post-intervention (after 15 years), numbers of lesser horseshoe bats (adults and young) have exceeded 400 individuals.

BACKGROUND

Under UK law, actions such as destroying or modifying a bat roost, or obstructing access to a roost, normally constitute an offence. Actions which may be detrimental to bats (including those arising from development) can be undertaken under a derogation licence, which usually requires appropriate mitigation to be incorporated into any development proposals. However, evidence of the value of many commonly applied mitigation techniques is limited. There is no published evidence on whether actions to retain a bat roost location but alter its entrance points work in practice, or whether bats no longer use a roost once the access points have been changed (Berthinussen *et al.* 2017). This paper reports on the consequences of altering the access points to an existing single-species roost.

A small maternity roost of lesser horseshoe bats (*Rhinolophus hipposideros*) occupied the basement of a large manor house in Gloucestershire which had been converted into a nursing home. The roost had been monitored by the Gloucestershire Bat Group (GBG) between 1993 and 2000, with up to 25 adult individuals recorded. From late 2000, the property was subject to a radical conversion into a luxury hotel, which called for improved kitchen facilities within an extension to the building footprint.

The bats roosted within two adjoining former wine cellars and, to a lesser degree, in a small boiler house roof separated from the main house. To exit the wine cellars, they flew along ducts within the basement, into a small rectangular underground room, up steps, over the top of a cut-down door into a large courtyard, turned left to fly along the adjacent garden wall, entered the boiler-house roof via its open eaves, and exited the other side into garden/woodland (Figure 1).

The proposed footprint of the kitchen extension enclosed the underground room and steps, so bats would no longer be able use this route post-construction. The initial mitigation entailed dividing the underground room, redirecting the bats around the retained section, 'following' the line of the garden wall whilst still underground (Figure 2), and exiting via a 'chute' (Figure 3). The intention was to allow the bats to continue to use the wine cellars without significantly altering the proposals for the kitchen layout. This paper describes the diversion of the flight route and the design and installation of the new access point, which all took place after construction had started.

ACTION

Construction activities relevant to the new access point were: i) separating the underground room into two parts, one dedicated to use by bats; (ii) digging the underground trench along which bats would fly; (iii) linking that service trench to the underground room; and (iv) installing the initial (i.e. vertical) design of the chute as the new roost access point (Figure 4a). In October 2000, the training period began. The original access point was temporarily blocked during the emergence period, forcing* bats to use the newly provided chute to emerge. It was then unblocked after the colony had left, so bats were not

Figure 1. Pre-intervention lesser horseshoe bat roost location (pre-2000). Bats were located within two adjoining former wine cellars (shaded) and in a separate small boiler house roof. To exit the roost, they flew along ducts within the basement, into a small rectangular underground room, up steps, over the top of a cut-down door into a large courtyard, turned left to fly along the adjacent garden wall, entered the boiler house roof via its eaves, and exited the other side into garden/woodland.

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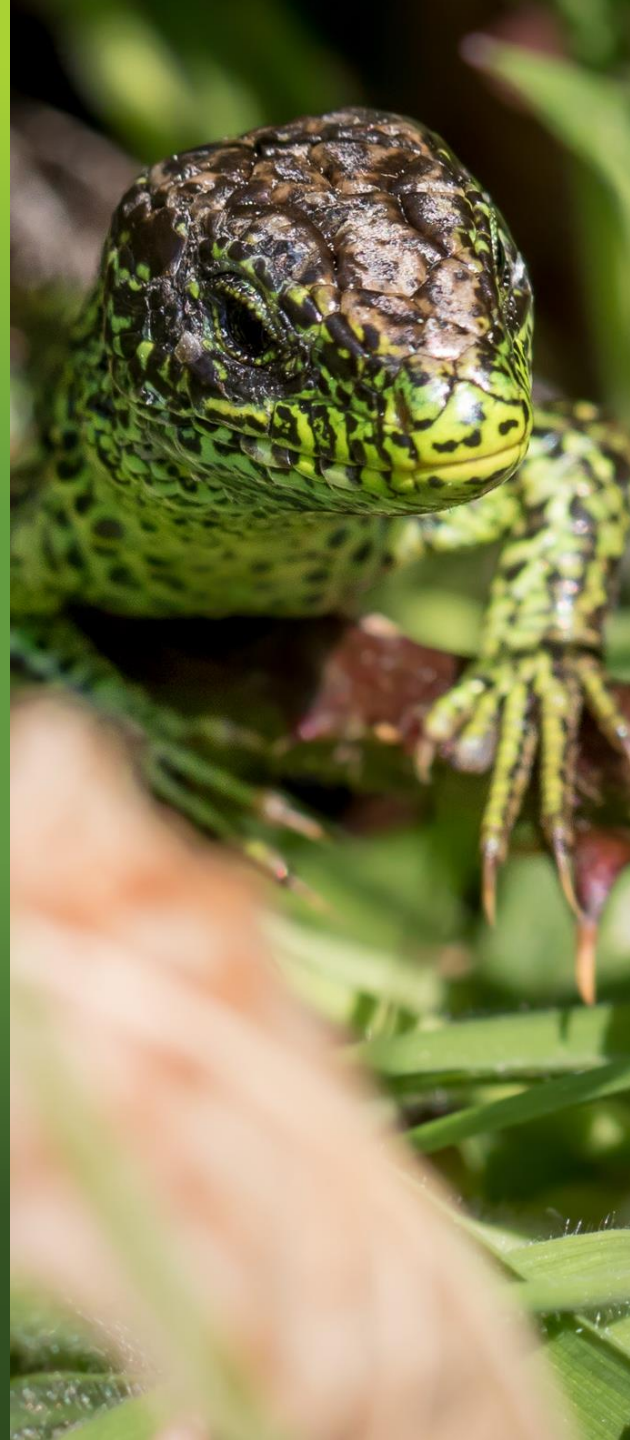
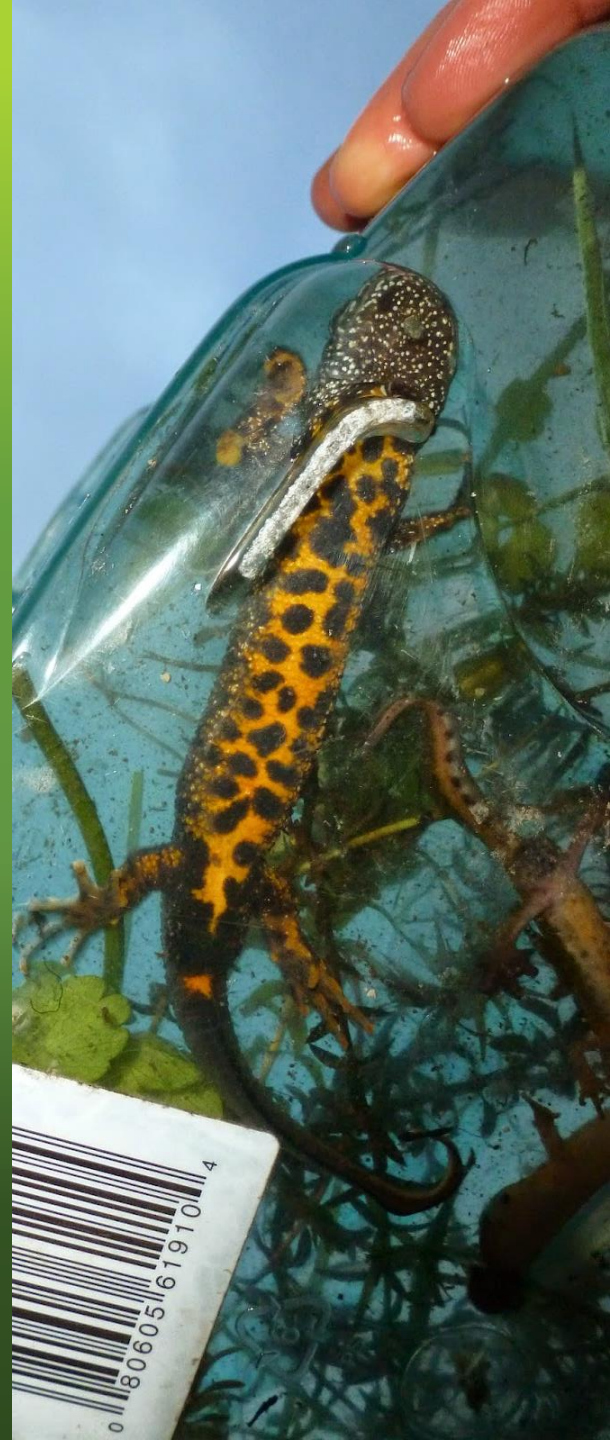


How to undertake monitoring?

- www.conservationevaluation.org

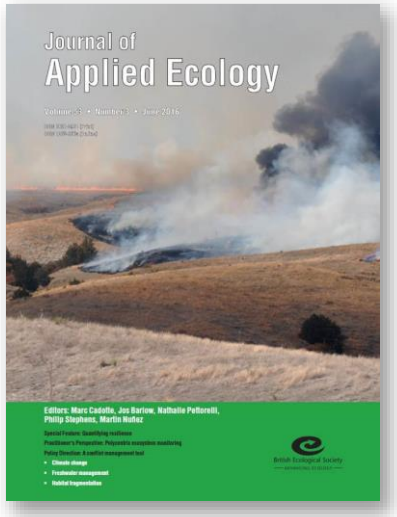


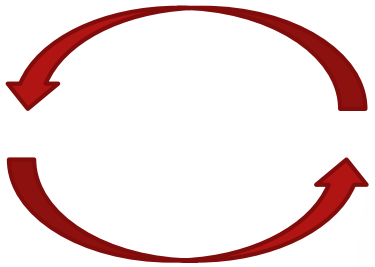
Applied Ecology Resources

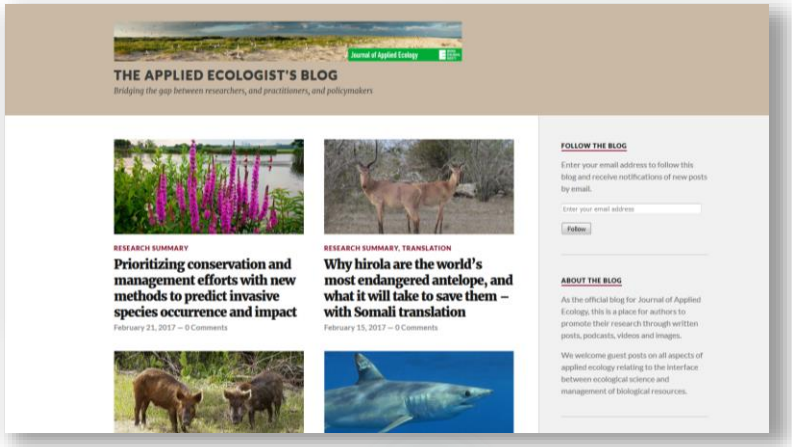
BRITISH ECOLOGICAL SOCIETY

Background

- Recognise the limitations of traditional academic publishing
- New strategies to facilitate a two-way flow of information
- To deliver the right type of information in new ways







Aims of the resource

- To improve the **discoverability and preservation** of ecological knowledge
- To increase the **flow of information** within and between academic and practitioner groups
- To promote **evidence-based decision-making** for issues affecting the management of biodiversity and the environment
- To **identify knowledge gaps** and enable practitioners to communicate their research needs

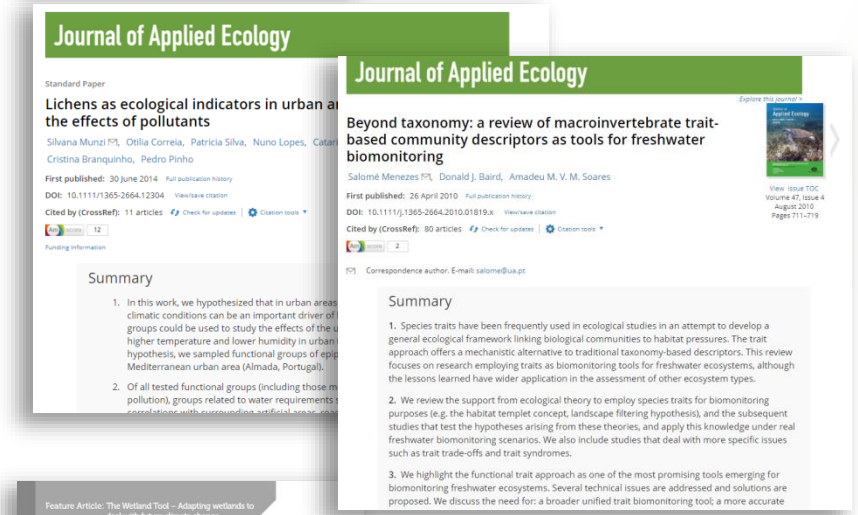
Overview

Biomonitoring

Tailored Email alerts for content updates

Article summaries:

Journal articles:



Grey literature (reports, technical documents):

Current status

- Aiming for 2018 launch

- Express your interest, get involved and receive updates via sign-up form on BES website: http://bit.ly/AERsignup

  Looking for:

  - Advisors to provide input on strategic direction
  - Advisors and representatives of ecological organisations to explore potential partnerships
  - Participants for focus groups to provide feedback during the development of the resource
  - Ambassadors to promote the project through their networks

Back in groups

- If you were starting the same project now…
- Of the resources we showed you, which are you most likely to use
  - To search for evidence?
  - To share evidence?
- Looking back at Q1, how could the information you collected as part of this project contribute to the evidence base?
  - Could you write this into a paper?
  - Could you share a report?
- In the future, could you undertake monitoring in a manner that would contribute to the evidence base?