

Monitoring for success

CLAIRE WORDLEY
CONSERVATION EVIDENCE GROUP
UNIVERSITY OF CAMBRIDGE

ERIKA NEWTON
APPLIED ECOLOGY RESOURCES
BRITISH ECOLOGICAL SOCIETY



Get into groups



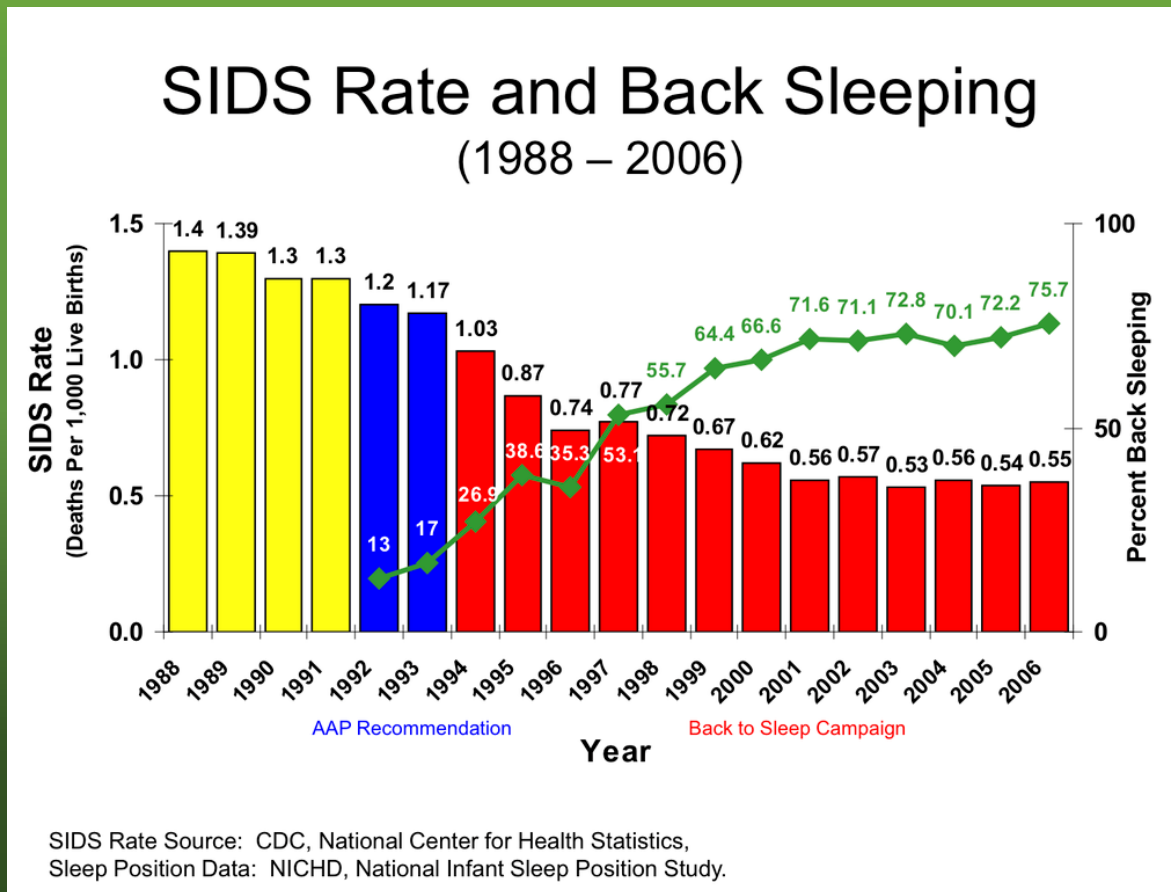
Think of a project you have undertaken recently

- ▶ 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?

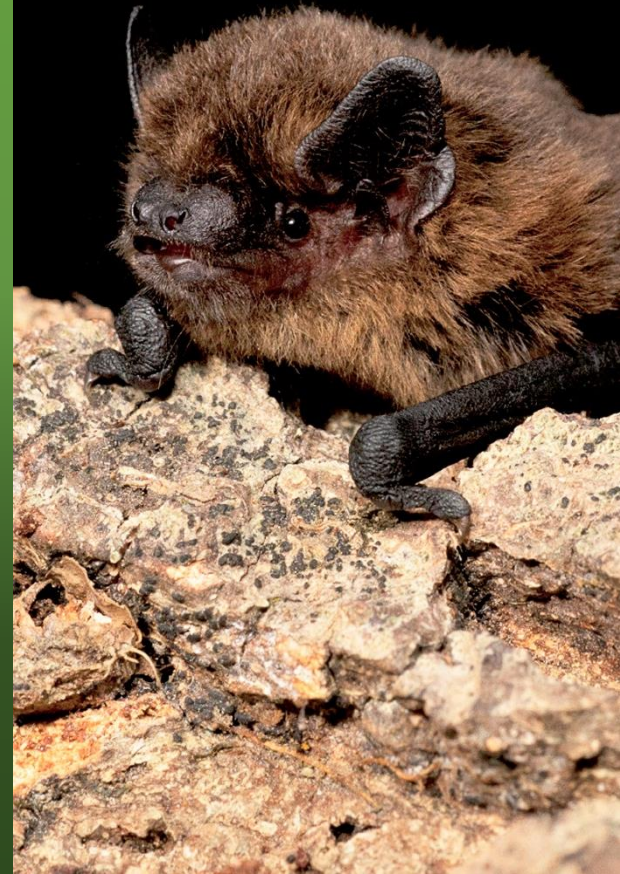


Why use evidence?

- 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

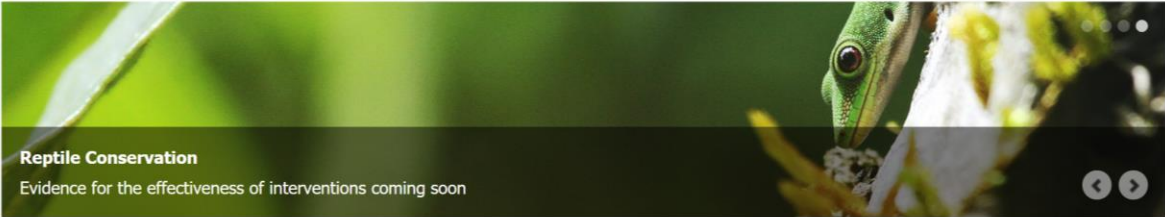
← → ↻ 🔒 Secure | https://www.conservationevidence.com

Conservation Evidence

Providing evidence to improve practice

🔍 Select Language ▼










[Tweet](#) [Share](#) [Browse Evidence](#) [Journal](#) [About us ▼](#) [Resources ▼](#)



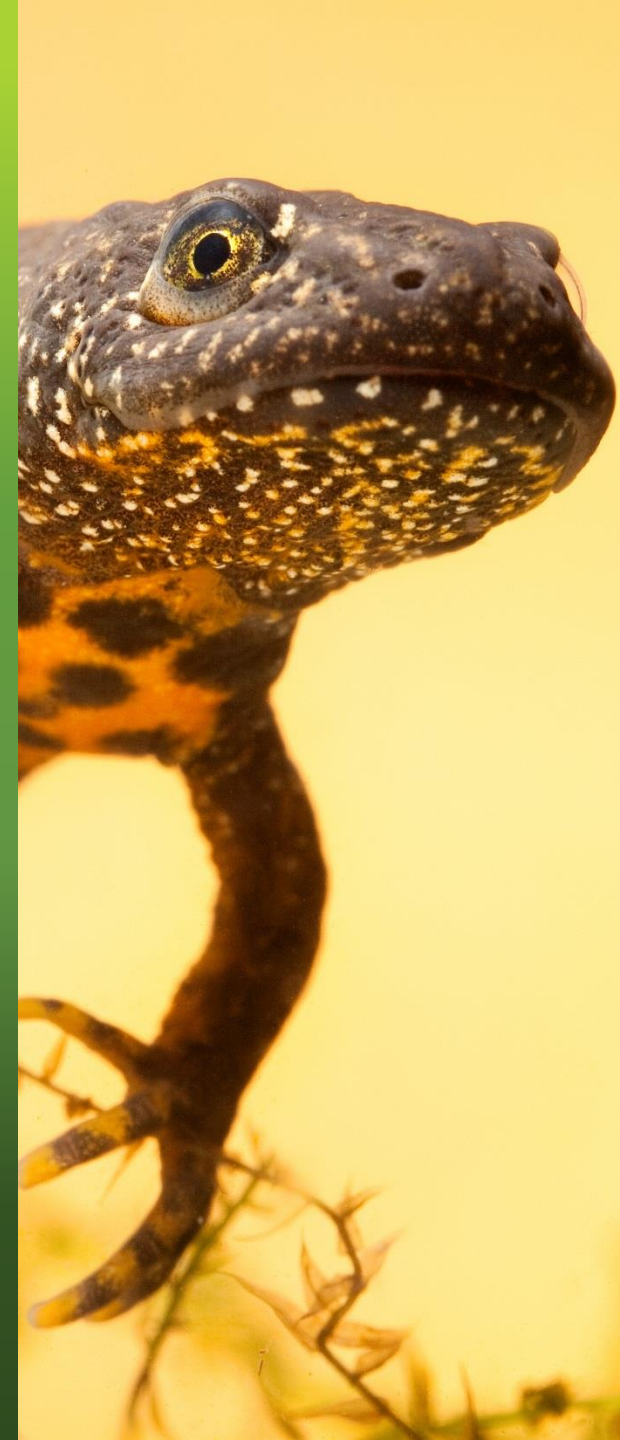
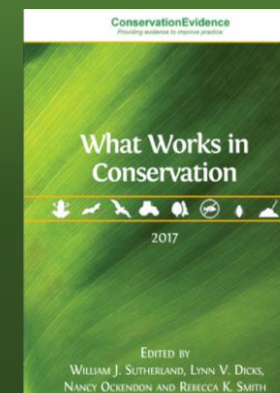
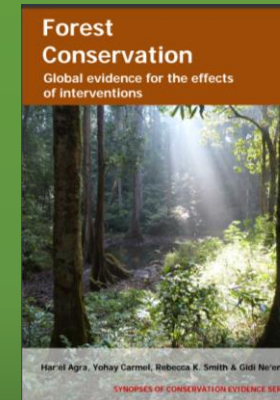
Reptile Conservation

Evidence for the effectiveness of interventions coming soon

Browse by category:

 <div>Amphibian Conservation 129 Actions</div>	 <div>Bat Conservation 78 Actions</div>	 <div>Bee Conservation 59 Actions</div>
 <div>Bird Conservation 455 Actions</div>	 <div>Control of Freshwater Invasive Species 139 Actions</div>	 <div>Farmland Conservation 119 Actions</div>
 <div>Forest Conservation 122 Actions</div>	 <div>Management of Captive Animals 29 Actions</div>	 <div>Mediterranean Farmland 75 Actions</div>

See more ▶



Conservation Evidence

Search

Q

Select Language ▼

Conservation Evidence

Providing evidence to improve practice

Tweet

Share

Browse Evidence

Journal

About us ▼

Resources ▼

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

78 actions found

Sort by: Number of studies ▲ Relevance Title

Category

☒ Bat Conservation (78)

Keywords

Habitat

☐ Artificial Habitats

☐ Forest & Woodland

☐ Rocky Habitats & Caves

More ▼

Threat

☐ Agriculture & aquaculture

☐ Biological resource use

☐ Pollution

More ▼

Action type

☐ Species management

☐ Provide artificial roost structures for bats

Likely to be beneficial | Based on: 22 studies

☐ Use cave gates to restrict public access

Trade-off between benefit and harms | Based on: 10 studies

☐ Use selective harvesting/reduced impact logging instead of clearcutting

Likely to be beneficial | Based on: 9 studies

☐ Use prescribed burning

Trade-off between benefit and harms | Based on: 7 studies

☐ Encourage agroforestry

Likely to be beneficial | Based on: 6 studies

☐ Deter bats from turbines using ultrasound

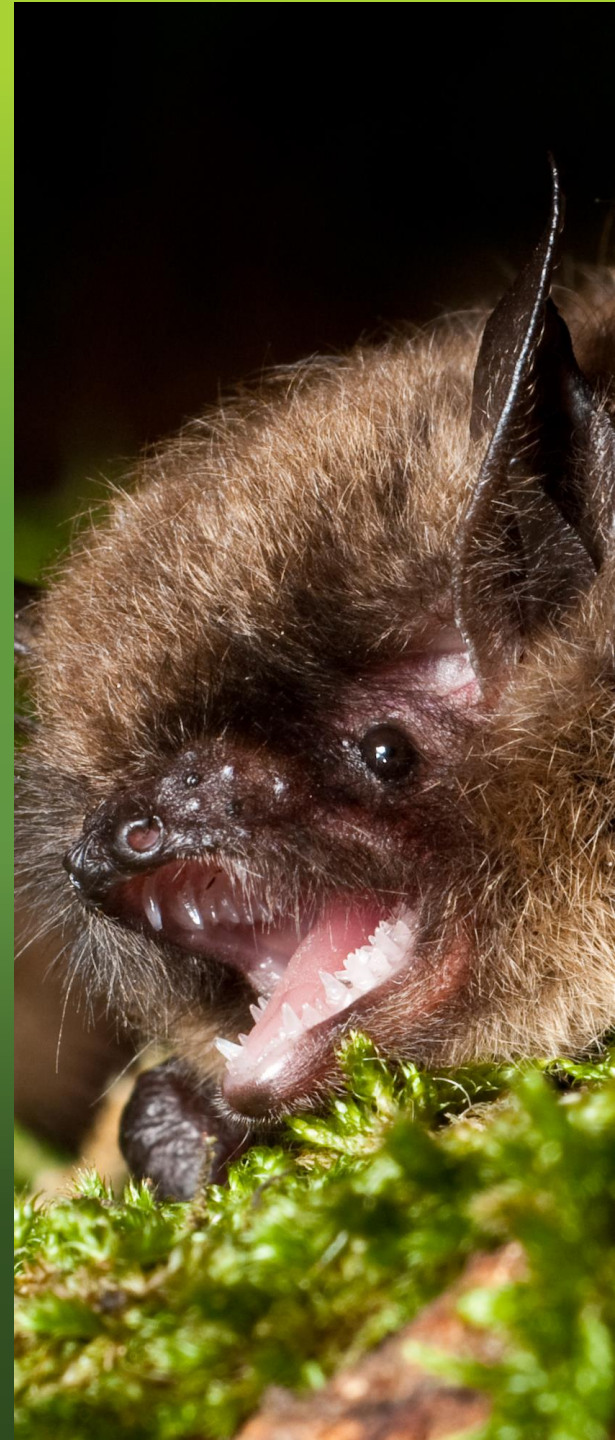
Likely to be beneficial | Based on: 6 studies

☐ Incorporate forested corridors or buffers into logged areas

Likely to be beneficial | Based on: 5 studies

☐ Convert to organic farming

Likely to be beneficial | Based on: 4 studies



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](#).

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.

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 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:

Berthiusen, 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

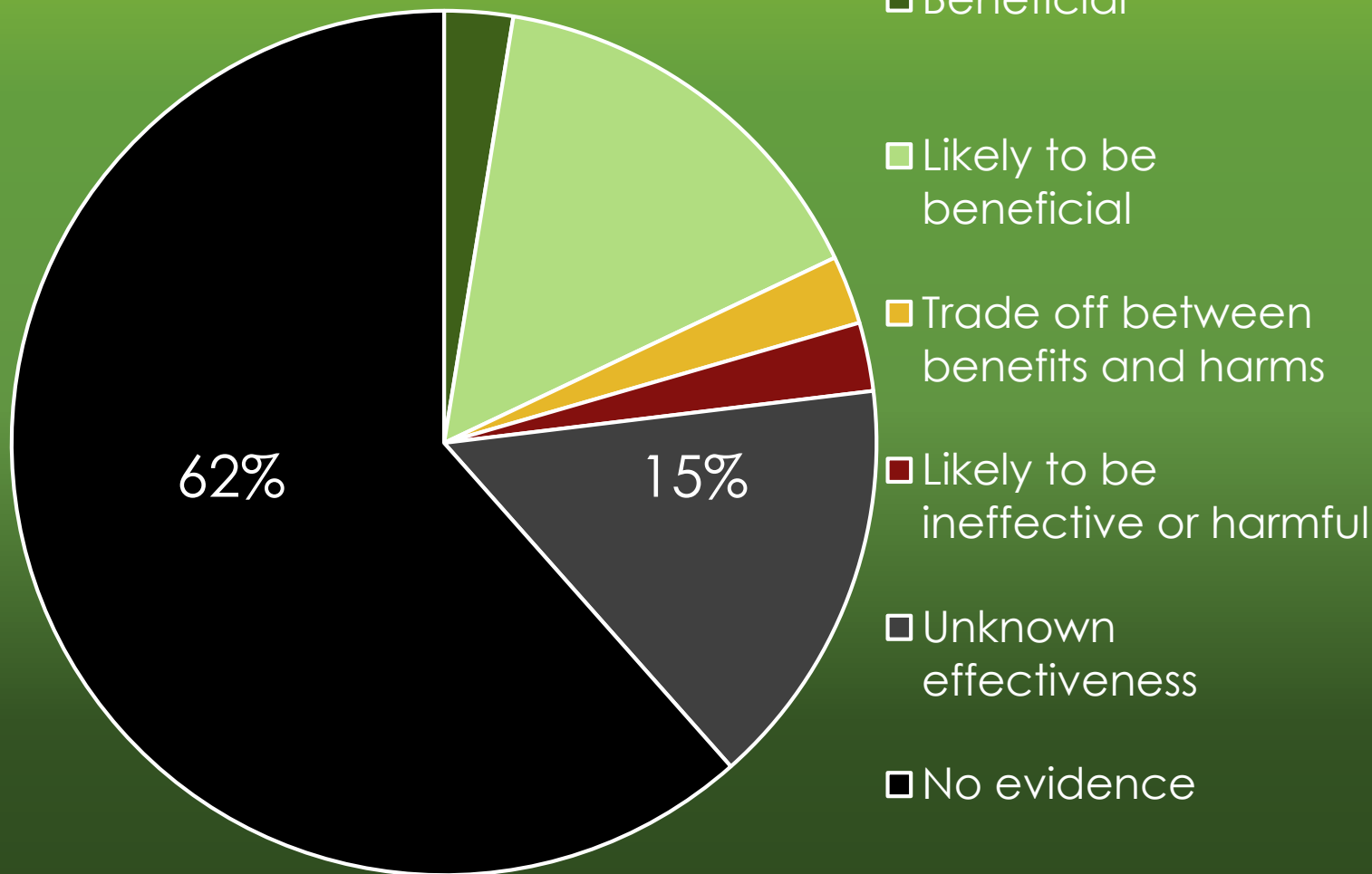
- Legally protect bat hibernation sites
- Educate the public to reduce disturbance to hibernating bats
- Use cave gates to restrict public access

[See more](#)



Evidence available

Bat synopsis (78 actions)



Bat Conservation

Global evidence for the effects of interventions

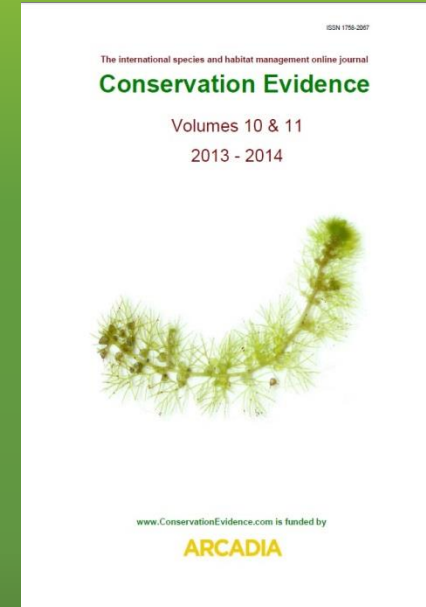


Anna Berthinussen, Olivia C. Richardson
& John D. Altringham



SYNOPSIS OF CONSERVATION EVIDENCE SERIES

The Conservation Evidence project



Papers by consultants include...

A comparison of bat roosting sites in Buckinghamshire

Matthew Dodds^{1,2*} &
¹ Aylesbury Vale District Council
² North Bucks Bat Group, Hemel Hempstead

SUMMARY

An experiment was conducted to compare the roosting preferences of *Plecotus auritus* in lowland mixed woodcrests, woodlands, and woodland bat clusters. The results showed that *P. auritus* preferred the woodland bat clusters over the other two habitats. The experiment was conducted in the summer of 2009 and 2010, and the results were compared and contrasted with previous studies.

BACKGROUND

North Bucks Bat Group (NBBS) has been monitoring bat roosting sites in the Buckinghamshire Wildlife Trust reserve, Buckinghamshire since 2009. The NBBS has been monitoring bat roosting sites in the Buckinghamshire Wildlife Trust reserve, Buckinghamshire since 2009. The NBBS has been monitoring bat roosting sites in the Buckinghamshire Wildlife Trust reserve, Buckinghamshire since 2009.

Previous studies at Fenny Stratford (Dodds 2008, Phillips 2009) and lowland mixed deciduous woodland (Dodds 2008, Phillips 2009) have demonstrated the preference of bat populations for other authors (Boyd & Wood 2009) has sought to address the use of box checking as a method of monitoring bat roosting. Previous studies at Fenny Stratford (Dodds 2008, Phillips 2009) and lowland mixed deciduous woodland (Dodds 2008, Phillips 2009) have demonstrated the preference of bat populations for other authors (Boyd & Wood 2009) has sought to address the use of box checking as a method of monitoring bat roosting.

* To whom correspondence should be addressed

Rapid response to UK

Chris J. Damant* and El
Bernwood ECS, Dodley Hill Park

SUMMARY

Historical records of bat roosting in the UK have been limited by the lack of a national bat roosting survey. The rapid response to the UK bat roosting survey has been limited by the lack of a national bat roosting survey.

BACKGROUND

Historical records of bat roosting in the UK have been limited by the lack of a national bat roosting survey. The rapid response to the UK bat roosting survey has been limited by the lack of a national bat roosting survey.

In 2009, a noctule was recorded roosting in a tree in the local bat group. The noctule was recorded roosting in a tree in the local bat group. The noctule was recorded roosting in a tree in the local bat group.

* To whom correspondence should be addressed

Conservation Evidence (2017) 14, 52-57

Adder Vip as part of England

Christian Whiting
Halcrow Group Ltd.
House, 112 – 114 Park

*Corresponding author

SUMMARY

A significant adder, *Vipera*, was recorded during a baseline survey of flood defence sites. The adder was recorded during a baseline survey of flood defence sites. The adder was recorded during a baseline survey of flood defence sites.

BACKGROUND

The Broadland Flood Alleviation Scheme is a long-term project to improve flood defence and emergency response in the River Great Ouse. The Broadland Flood Alleviation Scheme is a long-term project to improve flood defence and emergency response in the River Great Ouse.

This paper describes the results of a survey of floodbank (Ordnance Survey grid TG4483423552) as the

Performance of art

Lincoln Garland^{1*}, Mike
¹ Biodiversity by Design Ltd, W
² Marquis and Lord, 13 John St

SUMMARY

Surveys were conducted to assess the performance of art in the UK. The surveys were conducted to assess the performance of art in the UK. The surveys were conducted to assess the performance of art in the UK.

BACKGROUND

Bats require different roosting conditions to other animals. The roosting conditions for bats are different from other animals. The roosting conditions for bats are different from other animals.

Artificial bat roosts can be used to provide roosting for bats. The artificial bat roosts can be used to provide roosting for bats. The artificial bat roosts can be used to provide roosting for bats.

*corresponding author email address: l.garland@biodiversitybydesign.co.uk

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. 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.

BACKGROUND

Under UK law, actions such as destroying or modifying a bat roost, or obstructing access to a roost, normally constitute an offence. The 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 (Berthinsen 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 to 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

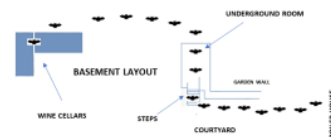
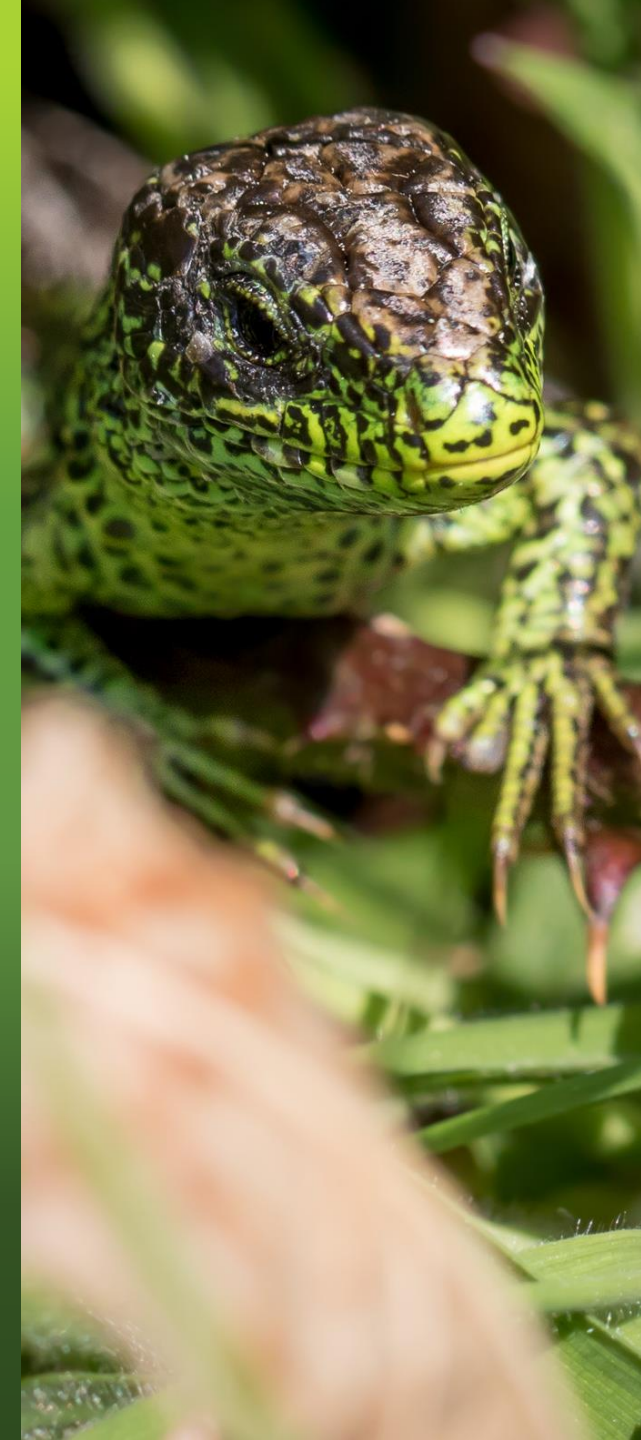
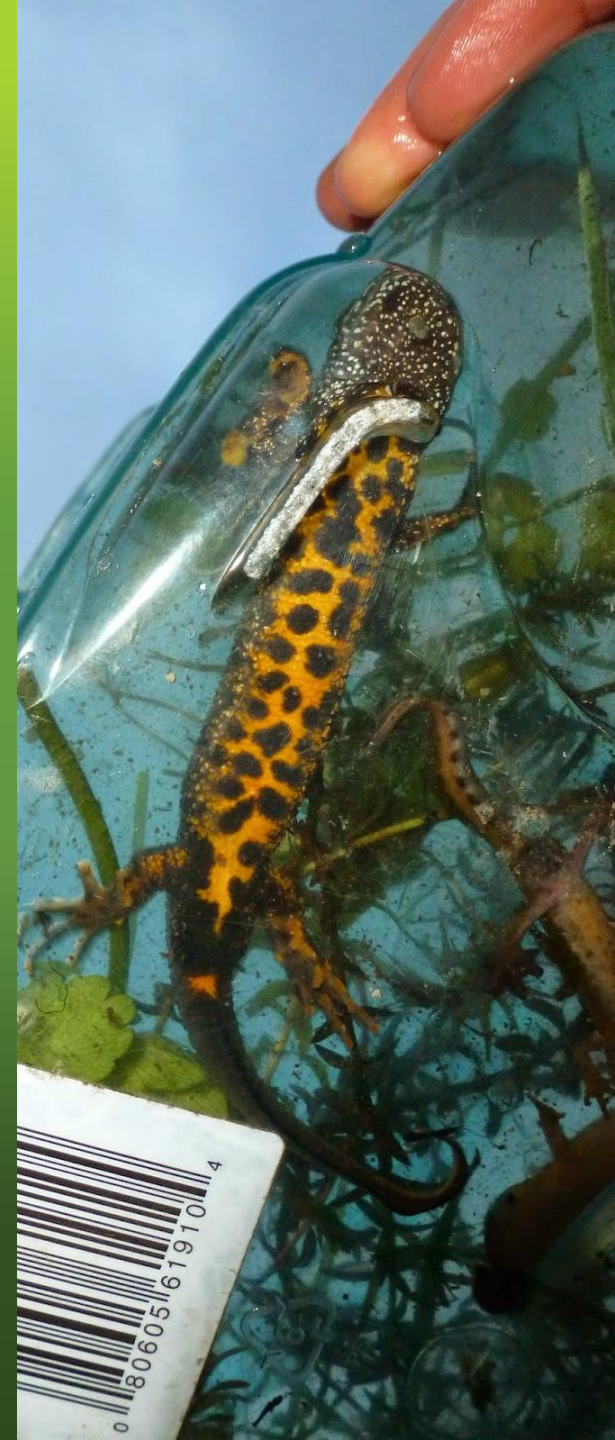


Figure 1. Pre-intervention lesser horseshoe bat roost location (pre-2000). Bats were located within two adjoining former wine cellars (shaded) and in a separate small boiler house roof. To exit the roost, they flew along ducts within the basement, into a small rectangular underground room, up steps, 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.

*corresponding author email address: paola.reason@arcadis.com



► www.conservationevaluation.org

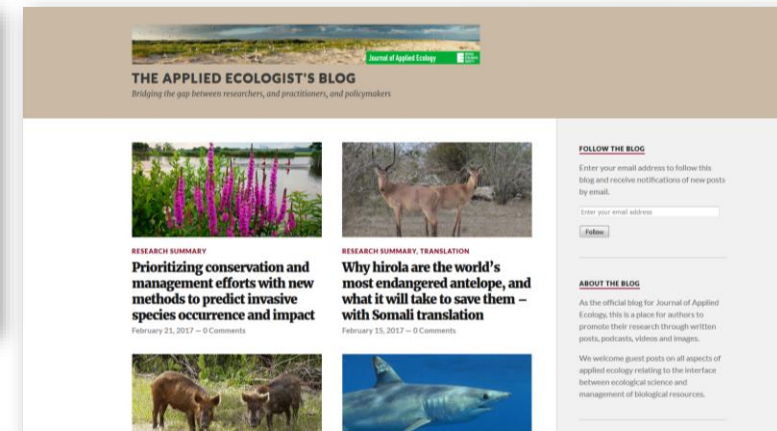
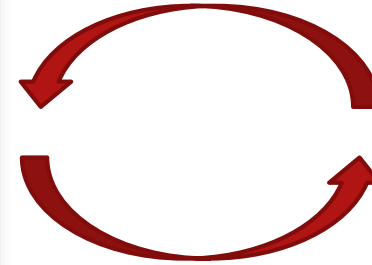
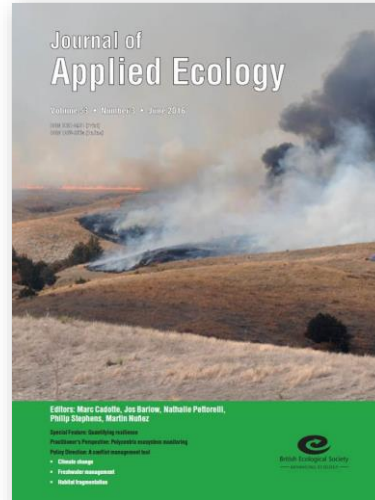


Applied Ecology Resources



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

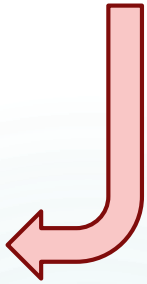


Overview

Article summaries:



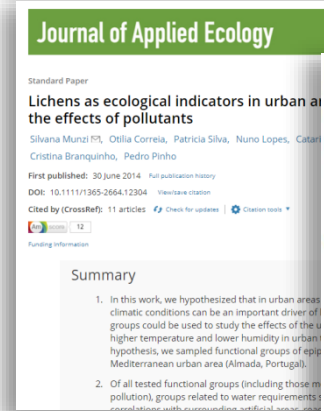
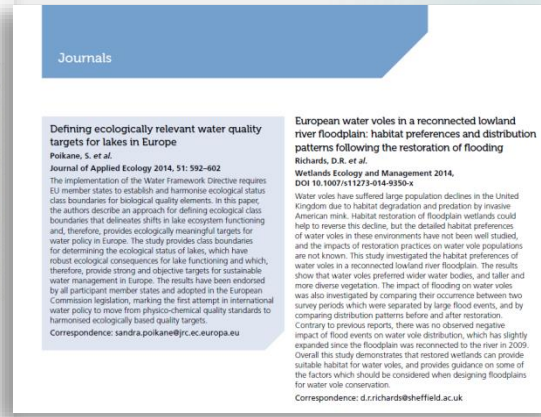
Biomonitoring



Tailored Email
alerts for content
updates

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?

