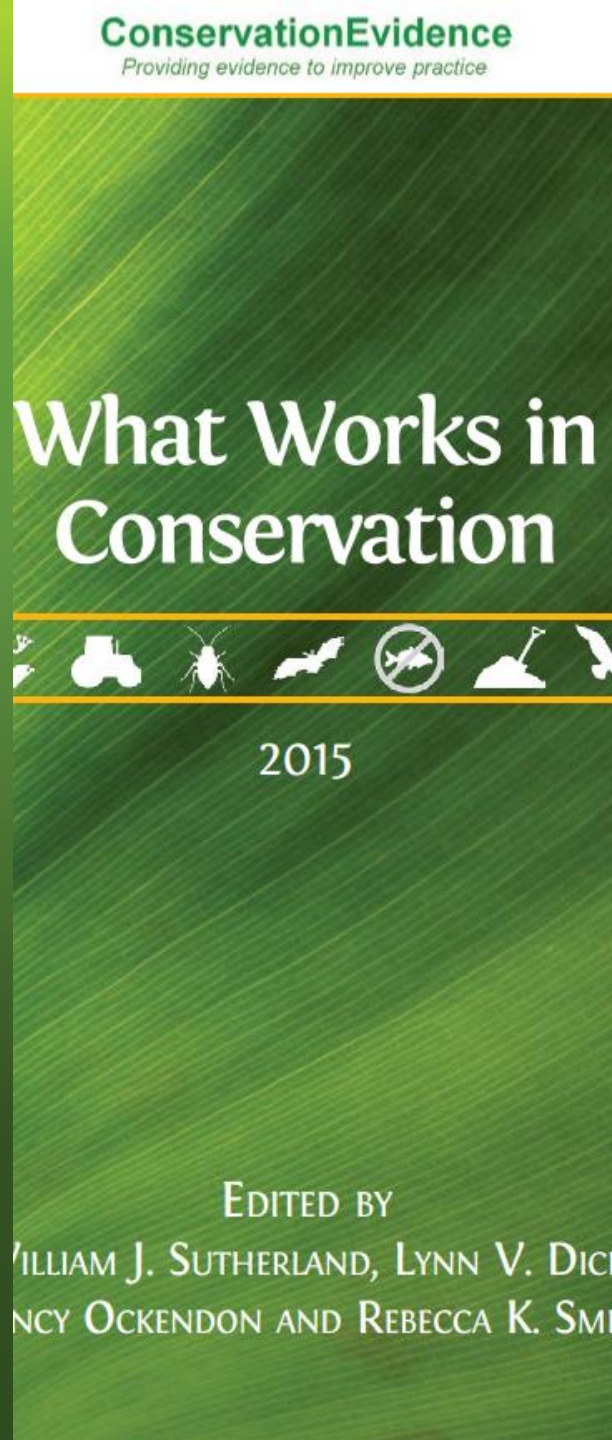
Conservation Evidence

CLAIRE WORDLEY AND NIGEL TAYLOR
CONSERVATION EVIDENCE
UNIVERSITY OF CAMBRIDGE



Science: Using and Doing

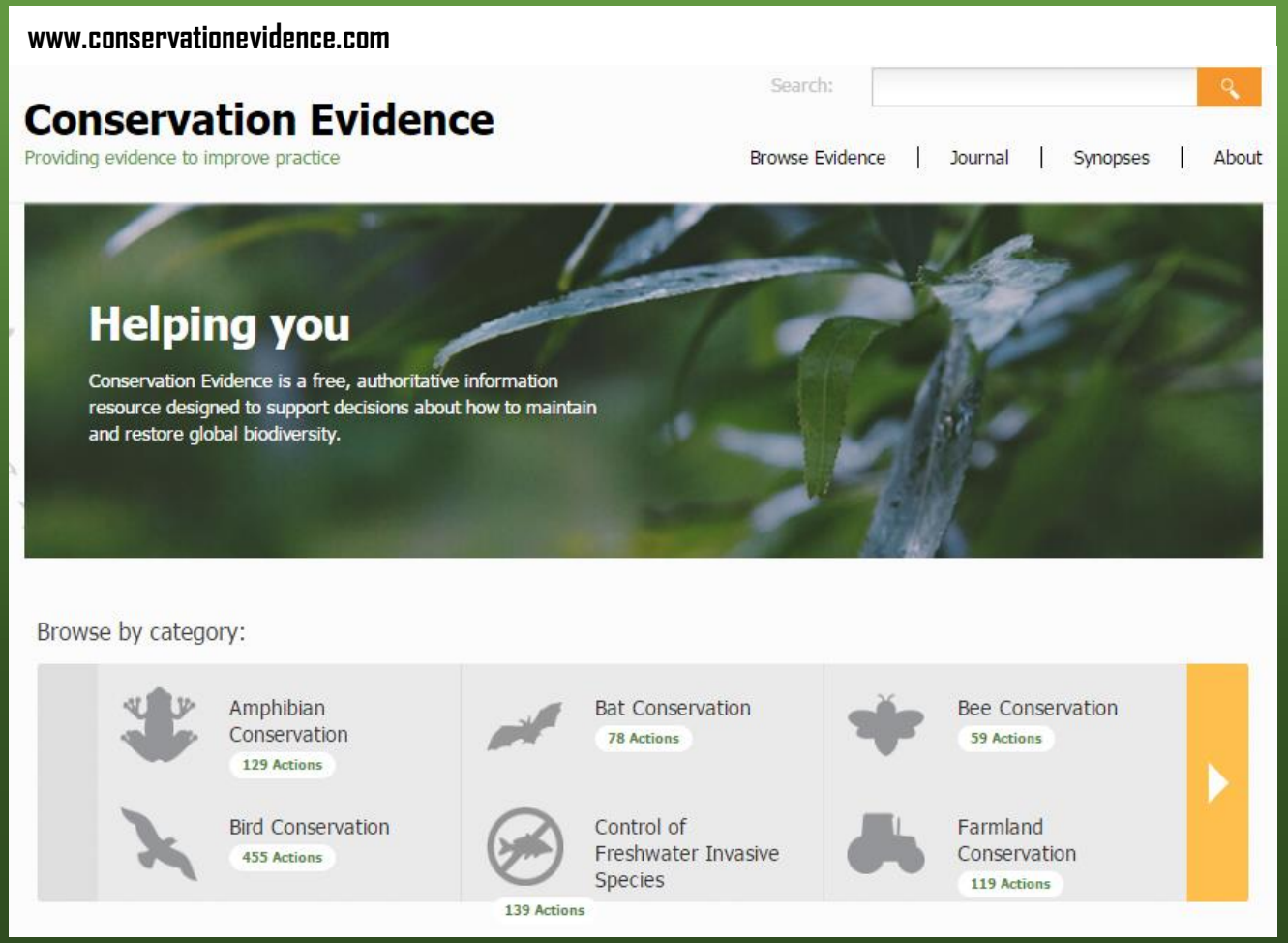
- Think of a recent project you've undertaken.
    - What information did you look for at the start of the project?
    - Where did you find it?
    - How did it change your thinking or planning?

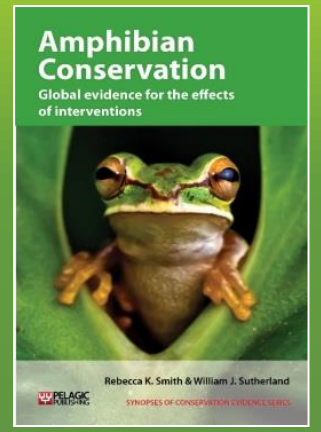
Science: Using and Doing

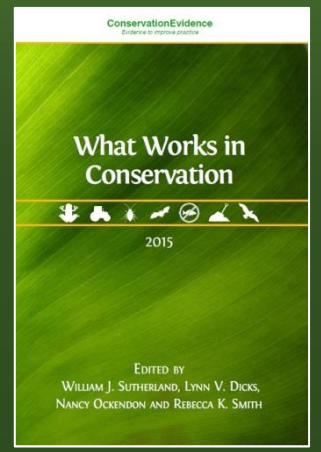
- Think of a recent project you've undertaken.
  - What monitoring did you undertake?
  - How did you decide what to monitor?
  - How did you communicate the key outcomes?
  - Who did you reach?

Conservation Evidence

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

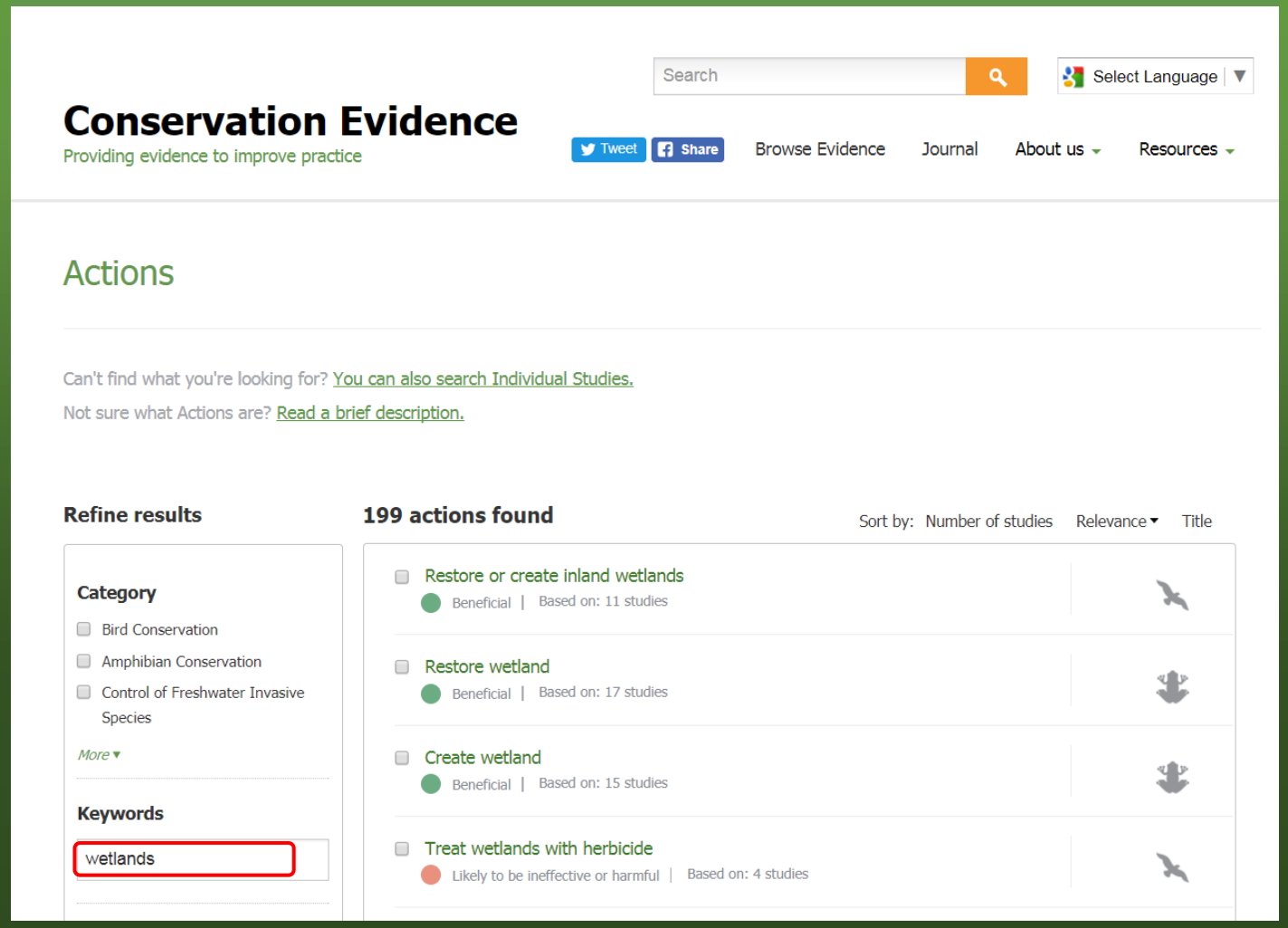






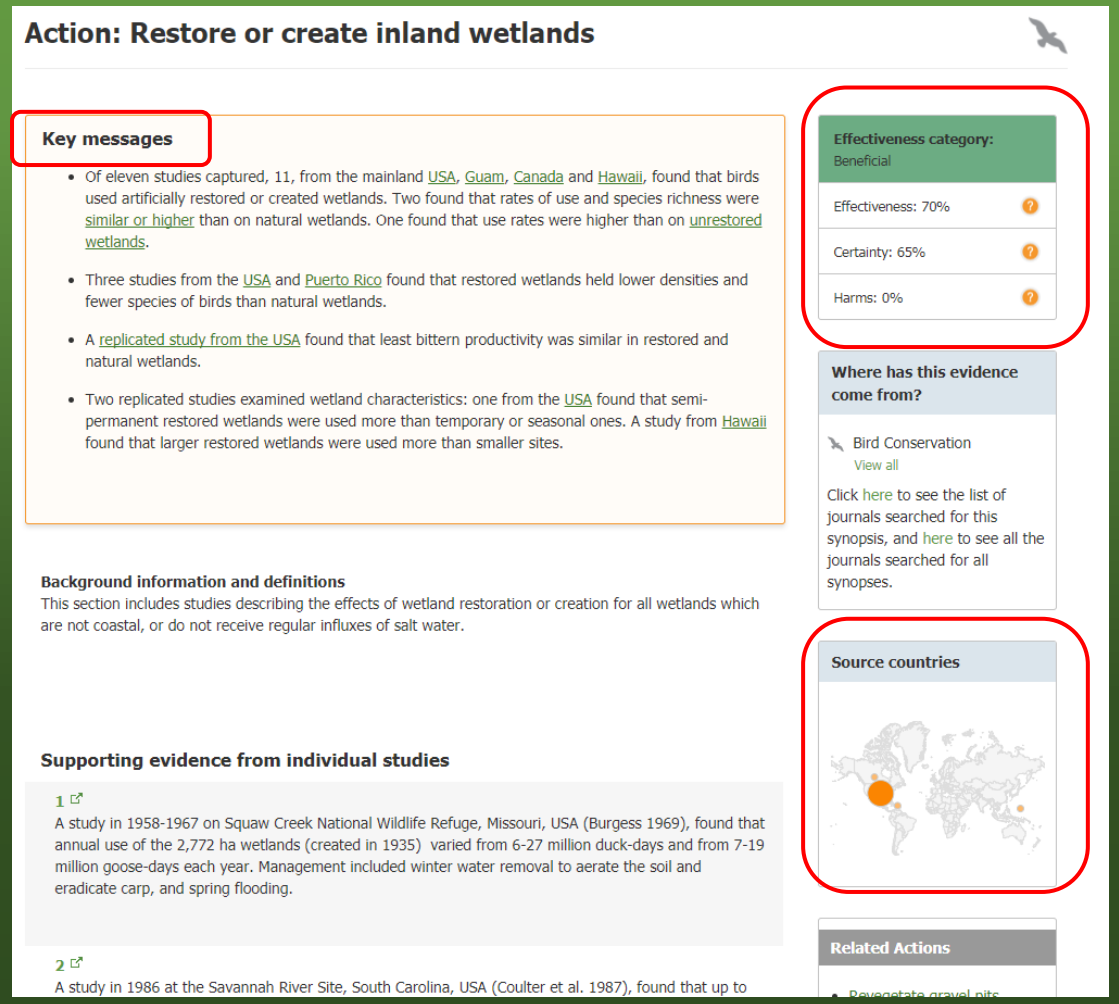
Using Conservation Evidence

- Search CE website for appropriate studies



Using Conservation Evidence

- Click through to look at evidence



Action: Restore or create inland wetlands

Key messages

- Of eleven studies captured, 11, from the mainland USA, Guam, Canada and Hawaii, found that birds used artificially restored or created wetlands. Two found that rates of use and species richness were similar or higher than on natural wetlands. One found that use rates were higher than on unrestored wetlands.
- Three studies from the USA and Puerto Rico found that restored wetlands held lower densities and fewer species of birds than natural wetlands.
- A replicated study from the USA found that least bittern productivity was similar in restored and natural wetlands.
- Two replicated studies examined wetland characteristics: one from the USA found that semi-permanent restored wetlands were used more than temporary or seasonal ones. A study from Hawaii found that larger restored wetlands were used more than smaller sites.

Effectiveness category: Beneficial

Effectiveness: 70%

Certainty: 65%

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

Background information and definitions

This section includes studies describing the effects of wetland restoration or creation for all wetlands which are not coastal, or do not receive regular influxes of salt water.

Supporting evidence from individual studies

1

A study in 1958-1967 on Squaw Creek National Wildlife Refuge, Missouri, USA (Burgess 1969), found that annual use of the 2,772 ha wetlands (created in 1935) varied from 6-27 million duck-days and from 7-19 million goose-days each year. Management included winter water removal to aerate the soil and eradicate carp, and spring flooding.

2

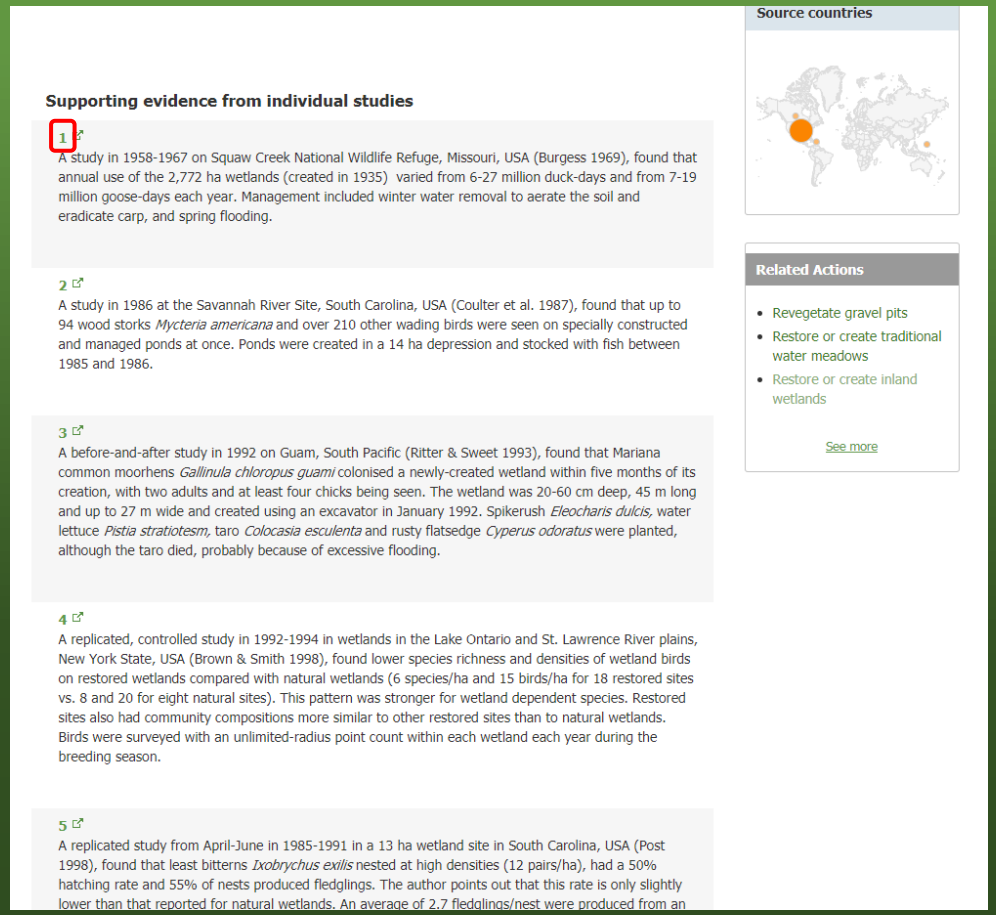
A study in 1986 at the Savannah River Site, South Carolina, USA (Coulter et al. 1987), found that up to

Related Actions

- Revegetate gravel pits

Using Conservation Evidence

- Scroll down



Supporting evidence from individual studies

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2
A study in 1986 at the Savannah River Site, South Carolina, USA (Coulter et al. 1987), found that up to 94 wood storks *Mycteria americana* and over 210 other wading birds were seen on specially constructed and managed ponds at once. Ponds were created in a 14 ha depression and stocked with fish between 1985 and 1986.

3
A before-and-after study in 1992 on Guam, South Pacific (Ritter & Sweet 1993), found that Mariana common moorhens *Gallinula chloropus guami* colonised a newly-created wetland within five months of its creation, with two adults and at least four chicks being seen. The wetland was 20-60 cm deep, 45 m long and up to 27 m wide and created using an excavator in January 1992. Spikerush *Eleocharis dulcis,* water lettuce *Pistia stratiotesm,* taro *Colocasia esculenta* and rusty flatsedge *Cyperus odoratus* were planted, although the taro died, probably because of excessive flooding.

4
A replicated, controlled study in 1992-1994 in wetlands in the Lake Ontario and St. Lawrence River plains, New York State, USA (Brown & Smith 1998), found lower species richness and densities of wetland birds on restored wetlands compared with natural wetlands (6 species/ha and 15 birds/ha for 18 restored sites vs. 8 and 20 for eight natural sites). This pattern was stronger for wetland dependent species. Restored sites also had community compositions more similar to other restored sites than to natural wetlands. Birds were surveyed with an unlimited-radius point count within each wetland each year during the breeding season.

5
A replicated study from April-June in 1985-1991 in a 13 ha wetland site in South Carolina, USA (Post 1998), found that least bitterns *Ixobrychus exilis* nested at high densities (12 pairs/ha), had a 50% hatching rate and 55% of nests produced fledglings. The author points out that this rate is only slightly lower than that reported for natural wetlands. An average of 2.7 fledglings/nest were produced from an

Source countries

Related Actions

- Revegetate gravel pits
- Restore or create traditional water meadows
- Restore or create inland wetlands

See more

Using Conservation Evidence

- Click through to look at evidence

Referenced papers

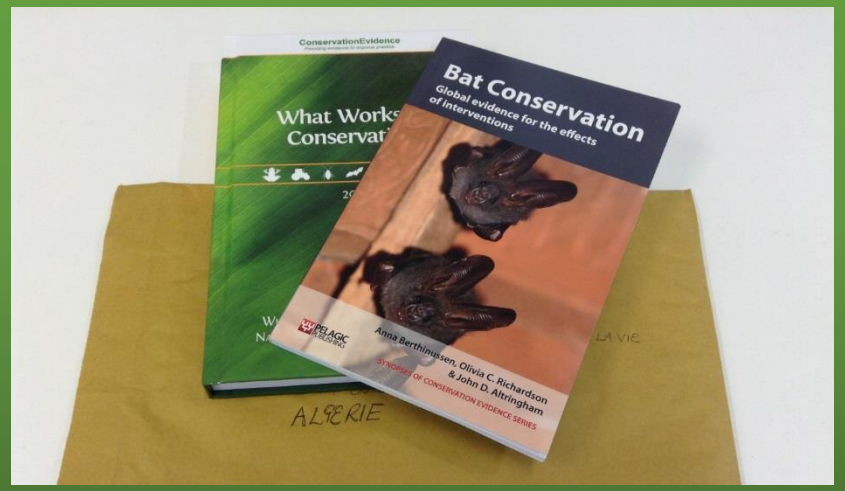
1. Burgess H.H. (1969) Habitat management on a mid-continent waterfowl refuge. *The Journal of Wildlife Management*, 33, 843-847
2. Coulter M.C., McCort W.D. & Bryan Jr A.L. (1987) Creation of artificial foraging habitat for wood storks. *Colonial Waterbirds*, 203-210
3. Ritter M.W. & Sweet T.M. (1993) Rapid colonization of a human-made wetland by Mariana common moorhen on Guam. *Wilson Bulletin*, 105, 685-687
4. Brown S.C. & Smith C.R. (1998) Breeding season bird use of recently restored versus natural wetlands in new york. *The Journal of Wildlife Management*, 62, 1480-1491
5. Post W. (1998) Reproduction of Least Bitterns in a Managed Wetland. *Colonial Waterbirds*, 21, 268-273
6. Ratti J.T. (2001) Comparison of Avian Communities on Restored and Natural Wetlands in North and South Dakota. *The Journal of Wildlife Management*, 65, 676-684
7. Snell-Rood E.C. & Cristol D.A. (2003) Avian communities of created and natural wetlands: bottomland forests in Virginia. *The Condor*, 105, 303-315
8. Stevens C.E., Gabor T.S. & Diamond A.W. (2003) Use of restored small wetlands by breeding waterfowl in Prince Edward Island, Canada. *Restoration Ecology*, 11, 3-12
9. Acevedo M.A. (2007) Bird feeding behavior as a measure of restoration success in a Caribbean forested wetland. *Ornitologê Neotropical*, 18, 305-310
10. O'Neal B.J., Heske E.J. & Stafford J.D. (2008) Waterbird Response to Wetlands Restored Through the Conservation Reserve Enhancement Program. *Journal of Wildlife Management*, 3, 654-664
11. Uyehara K.J., Engilis A. Jr. & Dugger B.D. (2008) Wetland features that influence occupancy by the endangered Hawaiian duck. *Wilson Journal of Ornithology*, 120, 311-319

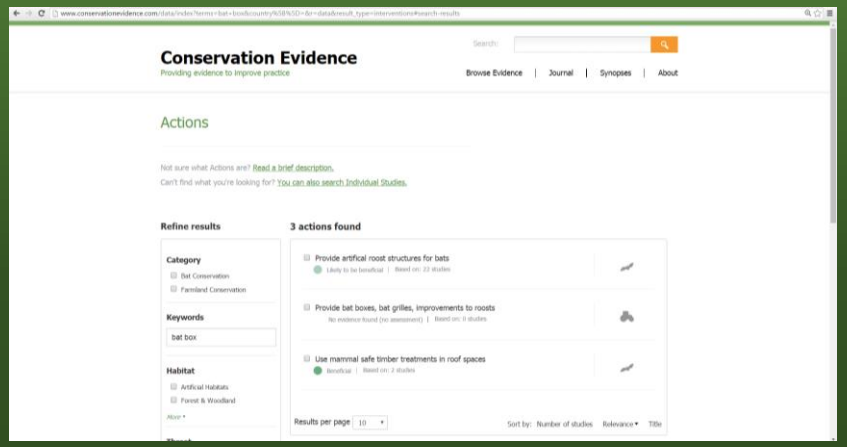
Please cite as:

Williams, D.R., Child, M.F., Dicks, L.V., Ockendon, N., Pople, R.G., Showler, D.A., Walsh, J.C., zu Ermgassen, E.K.H.J. & Sutherland, W.J. (2017) Bird Conservation. Pages 95-244 in: W.J. Sutherland, L.V. Dicks, N. Ockendon & R.K. Smith (eds) What Works in Conservation 2017. Open Book Publishers, Cambridge, UK.

The Conservation Evidence project

Summarising evidence and encouraging its use by practitioners



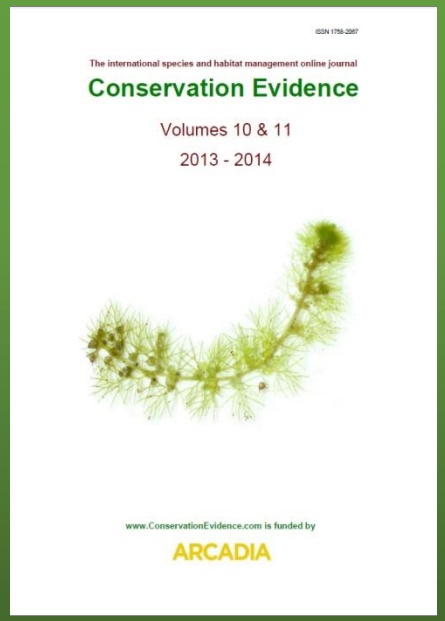


The Conservation Evidence project

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



The Conservation Evidence journal

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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.

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Effects of culverts and roadside fencing on the rate of roadkill of small terrestrial vertebrates in northern Limpopo, South Africa

Collinson W. J., Davies-Mostert H. T. & Davies-Mostert W. (2017), 14, 39-43

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Guidelines for authors

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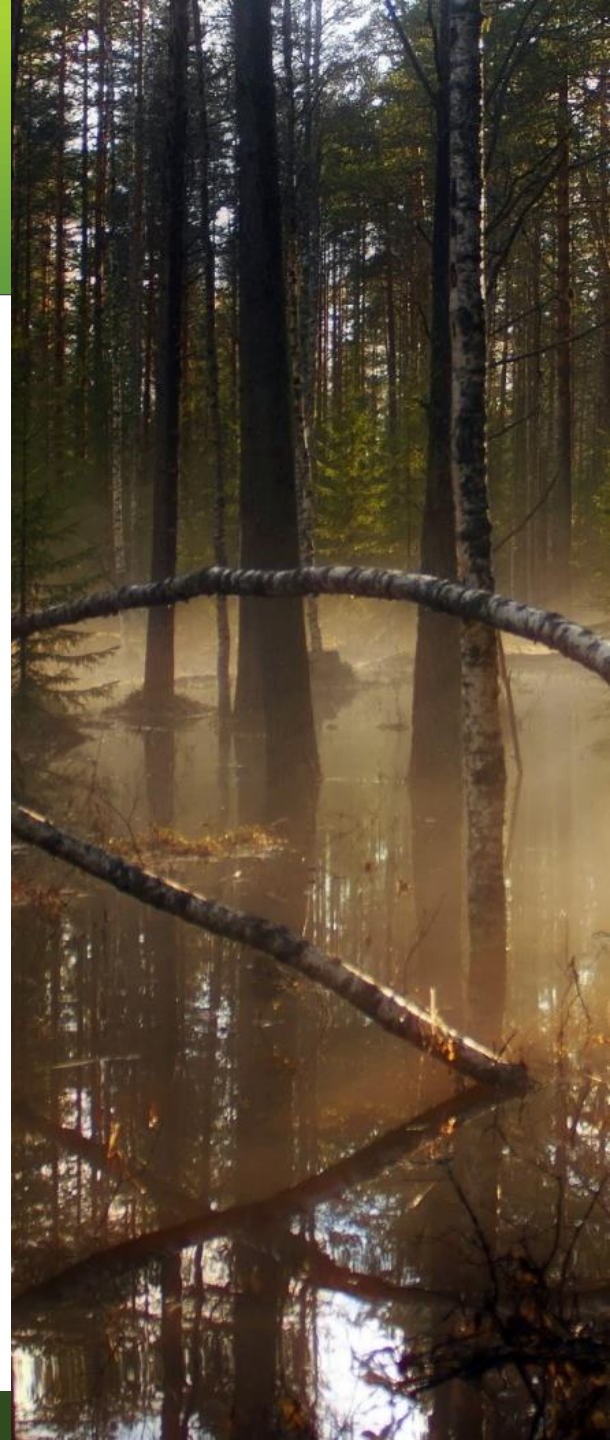


Vegetation response to th
mire and wet heath

Giles M. Groome[1]* & Peter Shaw[2]
[1] c/o Surrey Wildlife Trust, School Lane, Pi
[2] Centre for Research in Ecology, Dept. Lif

SUMMARY

We report the results of a
post-fire recovery of veget
distinct vegetation commu
outside grazing exclosures
grazing-induced decreases
Uncompetitive liverworts
moor-grass and litter rem
trampling in the wettest w
substrates of the wet hea
cover and species richne
heather *Calluna vulgaris* a
resumption of low intens
managers need to conside
and levels as conditions d
continue to be required.

BACKGROUND

The reintroduction of grazin
management tool for European lowl
considerably in recent years (Newton
there has been little research on
especially on wet heaths and valley
Newton *et al*, 2009). Frequently c
grazing is important, if not essenti
habitats (Clarke 1987, Byfield & P
there have been no long-term replicat
the impacts of livestock grazing on lo
mires where it has been restored follo
abandonment.

The aim of this study was to
vegetation composition of reintrodu
lowland valley mire and wet heath sit
least five decades of grazing aba
interest was the effect that livestock
bog-mosses, purple moor-grass, dw
floristic diversity.

Conservation Evi

Identif
heath
peatla
Orkne

John Rober
School of Bi
Chester Stree

Correspondin

SUMMARY

Trials were und
vegetation at H
growth had oc
management hi
restoration tech
develop a list o
eight sets of tre
were surveyed
with 80% cove
seed addition p
species (red fes
(40%) of *Callu*
the untreated co

BACKGROU

West Europea
habitat found
dominated by e
heather *Callu*
Although sem
successional h
years of anth
livestock grazi
very important
Young 1972, G
threatened (Cru
Heathlands fo
one third of t
(Averis *et al.* 2
ha of lowland
about 16% of

Conservation Evider

Introdu
bubalis
Kingfish
England

Gulickx M.M
[1] *Conservation*
Cambridge, CB
[2] *Wildlife and*
8QE, UK
[3] *Kingfishers B*
5XL, UK

SUMMARY

At a newly create
was introduced wi
vegetation structu
submerged tracks.
areas for bitterns *B*

BACKGROUND

Since 1995, the K
transformed 61 ha
mosaic of wetlan
the site requires gr
as without it the a
scrub and loose m
has been shown t
Bubalus bubalis c
low height veg
meadows and kep
helophytes (Kazog
of vegetation by
channels which ca
fish into reedbeds
and achieve a va
reed *Phragmites*
water buffalos we
Bridge. It was ho
the buffalo might
Botaurus stellaris

Raising water levels to revert arable land to grazing marsh at Berney Marshes RSPB Reserve, Norfolk, England

Lyons G. & Ausden M.
Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire SG19 2DL, UK

SUMMARY

At Berney Marshes RSPB Reserve (eastern England) water levels were raised, foot drains added, and sheep grazing introduced. The plant communities shifted towards communities' characteristic of lowland wet grassland. Breeding wading bird numbers increased in response to these habitat changes.

BACKGROUND

Berney Marshes Royal Society for the Protection of Birds (RSPB) Reserve (National Grid ref: TG465055) located in Norfolk, eastern England, comprises flooded grazing marsh and estuarine mudflats. It is important for wintering waders, wildfowl and raptors. In the summer it supports a number of breeding wader species such as lapwing *Vanellus vanellus*, redshank *Tringa totanus* and snipe *Gallinago gallinago*, populations of which have all declined dramatically in lowland Britain in recent decades. An area of arable farmland adjoining the existing reserve was purchased in 1998 with a view to raise water levels and revert the arable land back to grazing marsh.

ACTION

Management area: Arable farmland 84 ha in area, comprising 11 fields adjoining the northern edge of the existing reserve were acquired by the RSPB in 1998. Water levels were subsequently raised and botanical surveys undertaken in eight of the 11 fields, covering about 59 ha (70%) of the area.

Raising water levels: The fields had been managed as arable for some 40 years and as such the water table had been lowered through

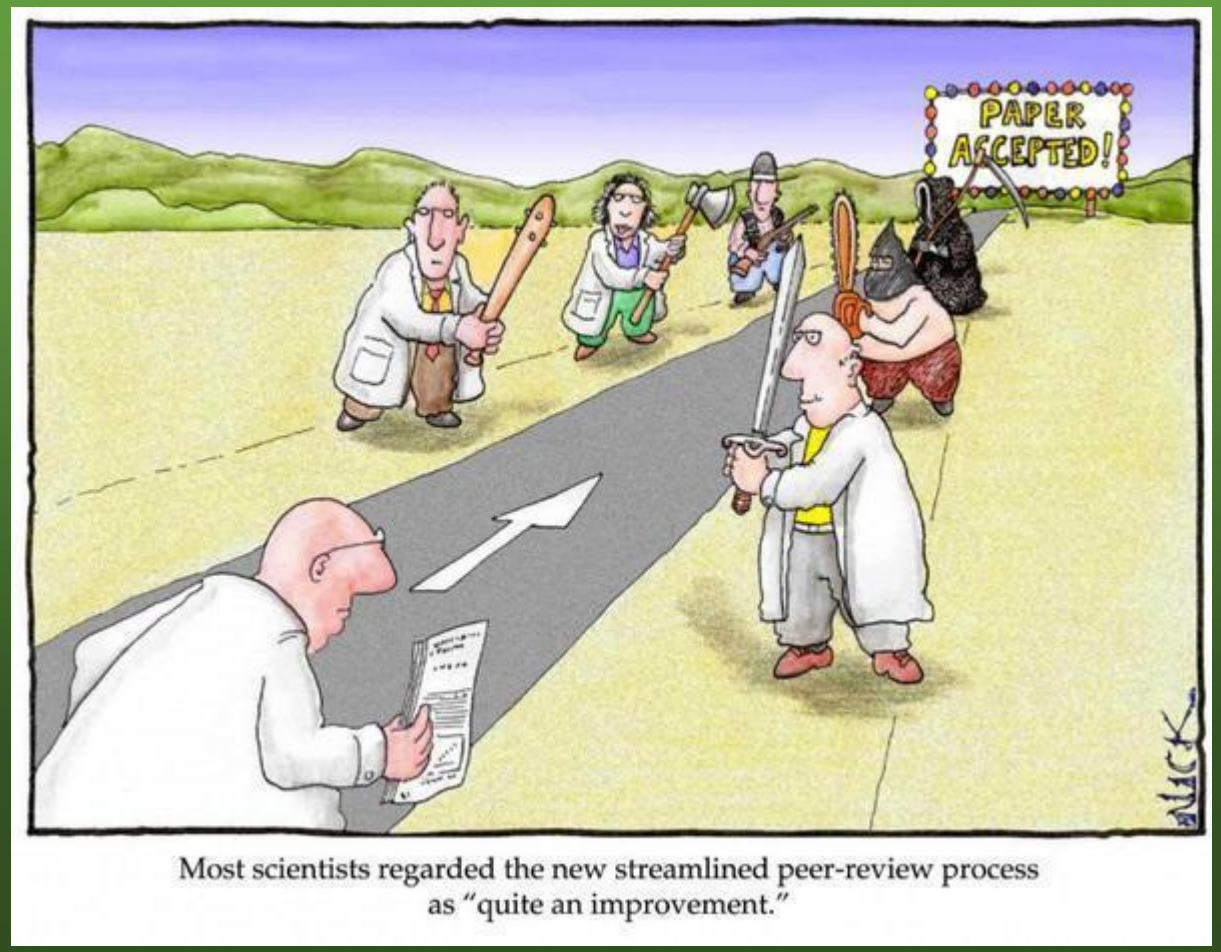
added to the site to allow the fields to hold more areas of standing water during the summer to benefit breeding birds (Smart & Coutts 2004) with the aim to provide a 5-year average of 10-20% surface flooding.

Grazing: In 1998, the site was initially grazed with sheep and there was no reseeding. By 2000, a reasonable enough sward had developed to allow cattle onto the fields and to graze nearly all-year round. However, if the sward became too short, sheep are used to graze the site occasionally.

Botanical surveys: In 2001 and 2003, vegetation changes were monitored in eight of the 11 fields. Percentage cover estimates of each plant species was recorded in 28 randomly positioned 1 m² quadrats. The same number of quadrats in 2003 was allocated per compartment as in the first survey in 2001. The surveys were conducted on 6, 7 and 11 August. This protocol should be followed in future to provide an equivalent random survey coverage across the arable reversion area.

Permanent quadrats were considered in order to remove potential statistical errors due to the mosaic of vegetation types existing on the site. However, this was decided against due to the difficulty of locating permanent markers with a GPS (Global Positioning System). A sometimes long grass sward and damage to

Publishing a paper



Most scientists regarded the new streamlined peer-review process as "quite an improvement."

Conservation Evidence Journal

- Free
- Open access
- At least one non-academic per paper
- Testing interventions
- Does not have to be long
- No need for huge novelty/broad applicability
- We try to be helpful not brutal

Conservation Evidence Journal

Template article for Conservation Evidence.

All text in black should be typed over; the font and paragraph is formatted for these sections.
All text in grey should be left as it is.
All text in blue should be deleted before submitting your manuscript.

Please type your title here. This should include the intervention, the species or habitat, and the location of the study e.g. Effect of nest box design on nest box occupancy by predatory birds in the Mongolian steppe

Please add all authors, including the person that carried out the intervention:
Jane A. Jones[1]* & Bill B. Smith[2]*

[1] *Organisation and postal addresses for author 1*
[2] *Organisation and postal addresses for author2 etc for all authors*

*corresponding author email address: jane.jones@auniversity.ac.uk

SUMMARY

A 150-200 word summary of the main findings of the study. This should briefly describe the aims, methods and results.

BACKGROUND

Please give the rationale for carrying out the intervention. Describe the relevant aspects of the study site, species and/or system. Explain the problem and focus of your management action. Please note there is no need for an extensive literature review. In the final sentence set out the aim of the study.

ACTION

Provide full details of how and when you carried out the intervention, and give information about the control (where relevant). Be as precise as possible, giving information such as the number and size of sites used and the precise dates that actions were carried out, so that others can repeat or adapt your actions. Please also describe when and how the monitoring was undertaken. You may want to include photos of the management action. E.g. Two different designs of artificial nests were made from 60 cm diameter steel drums. One was open-topped (approximately 30 cm height), and the other was a closed box 60 cm tall with a side entrance 30 cm high × 40 cm wide (Figure 1).

Please include a breakdown of the time taken and cost incurred if possible.

Sub-headings: can be helpful for structuring the Action and Consequences sections.

CONSEQUENCES

This is the results section that describes what happened. Please give data to show the effect of your intervention compared to the control, or a before-and-after comparison. Please use tables and figures to present data wherever possible. We are particularly keen on tables containing raw and/or mean data as others can see the exact figures. Simple statistical tests to support your conclusions may also be appropriate.

E.g. Saker falcons ($\chi^2 = 51.3$, d.f. = 1, $p < 0.001$) and common ravens ($\chi^2 = 20.6$, d.f. = 1, $p < 0.001$) selected closed nest boxes more frequently than open boxes. The total number of breeding pairs of both species occupying boxes increased over the study period (Table 1).

Please do not state the implications of your results in this section as facts (e.g. Therefore it is likely that breeding success increased), unless you have data to support them.

DISCUSSION

Briefly discuss the implications of your results, by putting your findings into context. The discussion need not be longer than one or two paragraphs. You may make suggestions based on your results in this section e.g. It is likely that providing nest boxes increased the number of chicks reared.

ACKNOWLEDGEMENTS

Please include any appropriate acknowledgements, including sources of funding.

REFERENCES

An alphabetical list of any references cited in the text. These are not required, and should not be lengthy; we suggest a maximum of 15 references for a standard article. The format for different types of reference is shown below:

Journal article: Pykala J. (2005) Plant species responses to cattle grazing in mesic semi-natural grassland. Agriculture, Ecosystems & Environment, 108, 109-117.

Report: Pywell R., Hulmes L., Meek W. & Nowakowski M. (2008) Creation and Management of Pollen and Nectar Habitats on Farmland: Annual report 2007/8. NERC report 6443.

PhD thesis: Smith D.W. (2006) Managing agri-environment grass fields and margins for Orthoptera and farmland birds. PhD thesis. University of Reading.

Book: Astuti R. (1995) People of the Sea: Identity and Descent among the Vezo of Madagascar. Cambridge University Press, Cambridge.

Book chapter: Pilgrim E.S., Potts S.G., Vickery J., Parkinson A.E., Woodcock B.A., Holt C., Gundrey A.L., Ramsay A.J., Atkinson P., Fuller R. & Tallowin J.R.B. (2007) Enhancing wildlife in the margins of intensively managed grass fields. Pages 293-296 in: J. J. Hopkins, A. J. Duncan, D. I. McCracken, S. Peel & J. R. B. Tallowin (eds.) High Value Grassland: Providing Biodiversity, a Clean Environment and Premium Products. British Grassland Society Occasional Symposium No.38, British Grassland Society (BGS), Reading.

Internet link: Forest Agency (2010) Managed woodland data and calculations. http://www.internetaddresshere.com (accessed 21 March 2013). NB. Date only required for pages on which contents change.

Generating evidence for wetland conservation:

Designing and carrying out experiments

Why should we do experimental conservation?

- Learn from successes – and failures (30% interventions in CE journal did not work!)
- Able to see how different approaches compare to each other
- Get away from subjective opinions
- Make conservation more effective

What is the question?

- Develop a clear question, rather than just monitoring 'to see what happens'.

- Questions must be **SMART:**
- **Specific**
- **Measurable**
- **Achievable**
- **Relevant**
- **Time-bound**

SMART questions

For example…

"*We aim to monitor the impact of rewetting on peatland plants*"

vs

*"Do **Sphagnum abundance** and **peatland plant species diversity** change in the **first five years** after rewetting and if so, **by how much**? Are the changes **statistically significant**?"*

What are you measuring, and to answer which question?

- Will the data you are collecting **answer your question**?
- e.g.
  - Are you looking at species **presence/ abundance/ community composition**?
  - Are you interested in vegetation **biomass, height or density?**
  - Are you interested in one particular **species**, or the whole **community**?

Consistency

- ‘Compare like with like’.
- Using the same survey **method**
- and **equipment**
- in the same **location**
- at comparable **times** (of year, per night etc)
- in comparable **weather**

How will you analyse the data?

- BEFORE you gather the data, plan how you will analyse it.
  - Will your data meet the basic requirements for a t-test? An ANOVA?
  - Are you looking at a year by year trend?

- Will you measure potential confounding factors such as weather that year in your analysis?

In summary

- Ask a clear, answerable question.
- Decide on analysis method before you gather data.
- Decide what you are measuring, and do it consistently.
- Choose appropriate methods and equipment.
- Implement methodology consistently.
- Ensure adequate length of study and number of repeats.
- Try to measure/control for confounding factors.

Basics of study design

3.6 Exclude livestock from peatlands using fencing

- One replicated, paired, controlled study in a bog in the UK[1] found that excluding sheep reduced cover of one *Sphagnum* moss species and increased heather cover in drier areas of the bog, but had no effect on other common plant species or in wetter areas of the bog.

Background

Domestic livestock directly consume peatland vegetation, destroy peatland vegetation by trampling, create bare patches of ground (e.g. repeatedly-used tracks), and affect nutrient balance through excretion (Lindsay et al. 2014). Excluding livestock from a peatland, or sensitive area of peatland, could completely avoid these impacts.

Chapters 8 and 9 consider the use of low-intensity grazing as a conservation tool. Section 9.10 considers exclusion of wild herbivores from peatlands. Interventions in Chapter 13 may be needed if peatlands have already been damaged by livestock.

Lindsay R., Birnie R. & Clough J. (2014) *Grazing and Trampling*. IUCN UK Committee Peatland Programme Briefing Note No. 7.

A replicated, paired, controlled study in 1988–2002 in a grazed bog in England, UK (1) found that excluding sheep had no effect on the vegetation community in wetter parts of the bog, but increased cover of drier peatland species in drier parts of the bog over 14 years (data reported as graphical analyses). In both wet and dry areas, excluding sheep did not affect cover of most common plant species including cottongrasses *Eriophorum* spp. (exclusion: 4–23%; grazed: 6–19%) and three of four *Sphagnum* moss species (exclusion: 4–21%; grazed: 3–36%). However, in drier areas excluding sheep reduced cover of Magellan's bog moss *Sphagnum magellanicum* (exclusion: 8%; grazed: 23%) and increased cover of heather *Calluna vulgaris* (exclusion: 7%; grazed: 1%). In 1988, ten pairs of 200 m^2 plots were established: five pairs in the wetter central part of the bog and five pairs in the drier margins. Sheep were excluded from one plot per pair by erecting fences; the other remained grazed (0.65 sheep/ha). In 1988 and 2002, vegetation cover was visually estimated in ten 1 m^2 quadrats per plot.

(1) Smith R.S., Charman D., Rushton S.P., Sanderson R.A., Simkin J.M. & Shiel R.S. (2003) Vegetation change in an ombrotrophic mire in northern England after excluding sheep. *Applied Vegetation Science*, 6, 261–270.

Basics of study design

- You want to design a study to test whether excluding sheep will affect vegetation in a bog.
- The bog has two distinct areas: one that is much wetter and one that is much drier.
- How would you test this?
- 15 mins to plan studies in 2 groups using materials provided

Study design

- Adding different elements to your study can make it stronger
- Controlled
- Before and after
- Replicated
- Paired
- Randomised
- Repeated

Keep in touch

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