Surveying trees for bats; can we do better?

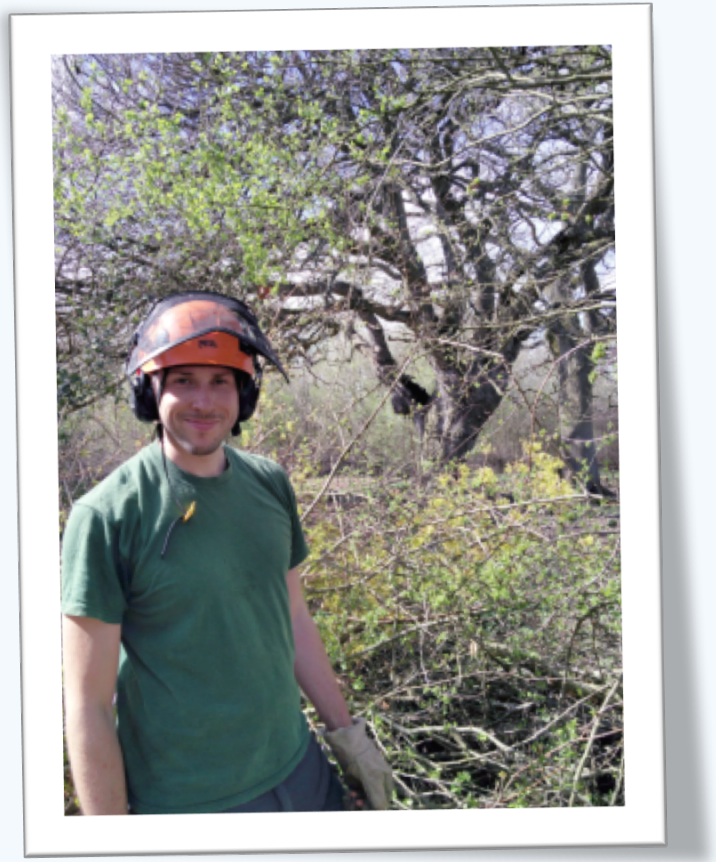
Jim Mullholland

Contents

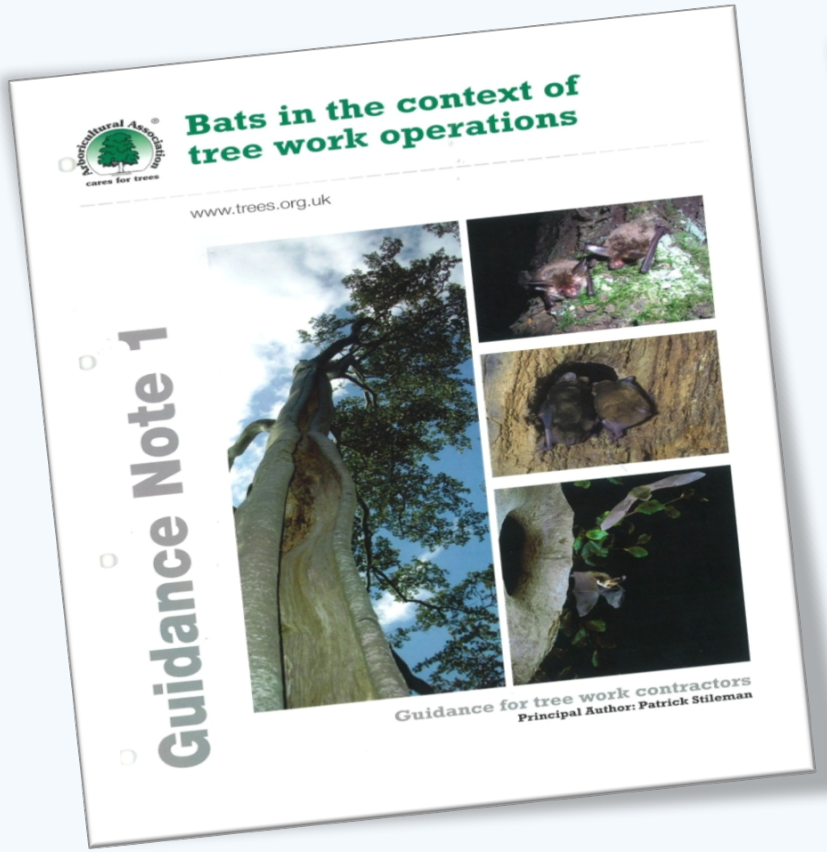
- Bats roost in trees – Legal context
- Industry guidance
- Introduction to the tree roost research project
- Key findings (take home messages)
- The future

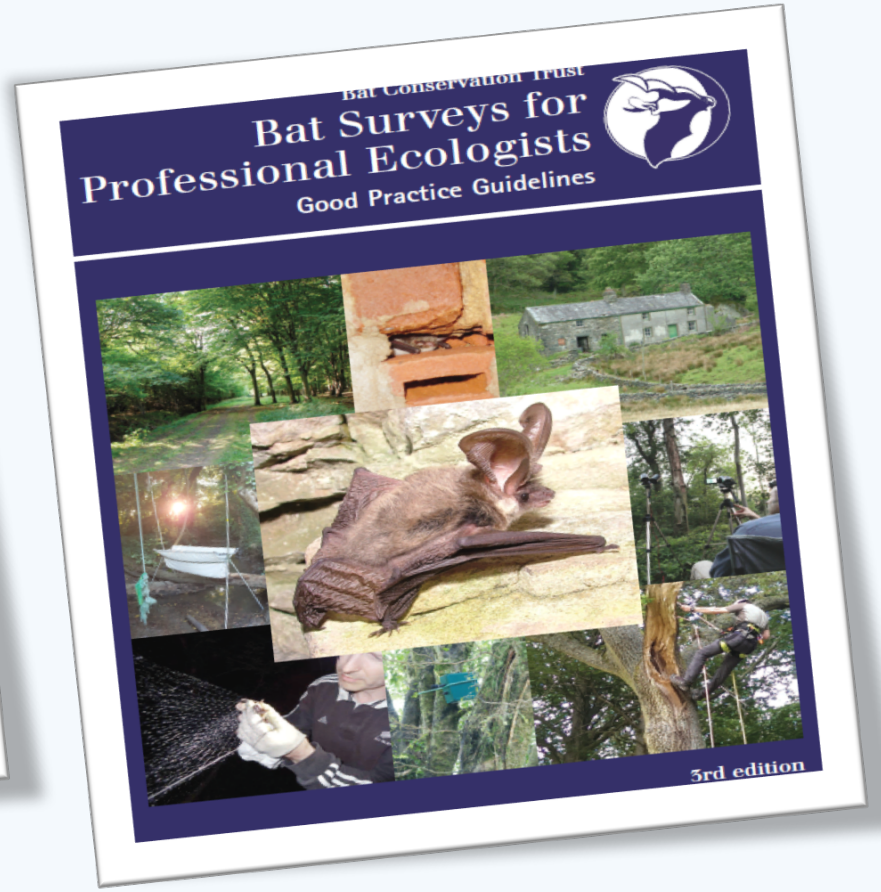
Legal context

- Bats and their roosts protected from (two most pertinent):
  - Disturbance
  - Damage or destruction (whether bats are present or not)



Industry Guidance





Industry Guidance

- Guidance recommends a three-staged iterative approach:
  - Ground based tree assessment
  - Potential Roost Feature inspection
  - Presence/absence surveys (emergence /re-entry surveys)

Industry Guidance

- Lack of scientific data
- Largely based on received wisdom
- Inaccuracies
- No real consideration of seasonality
- Focuses on looking for bats

Tree Research Project

- Trees with suitable Potential Roost Features (PRFs) identified and subject to physical inspection once a month for a year.

- Two locations: Tortworth and Trowbridge

Tree Research Project

- Known roosts recorded to Bat Tree Habitat Key standard

  - Approximately 50 measurements/ recordings taken each month

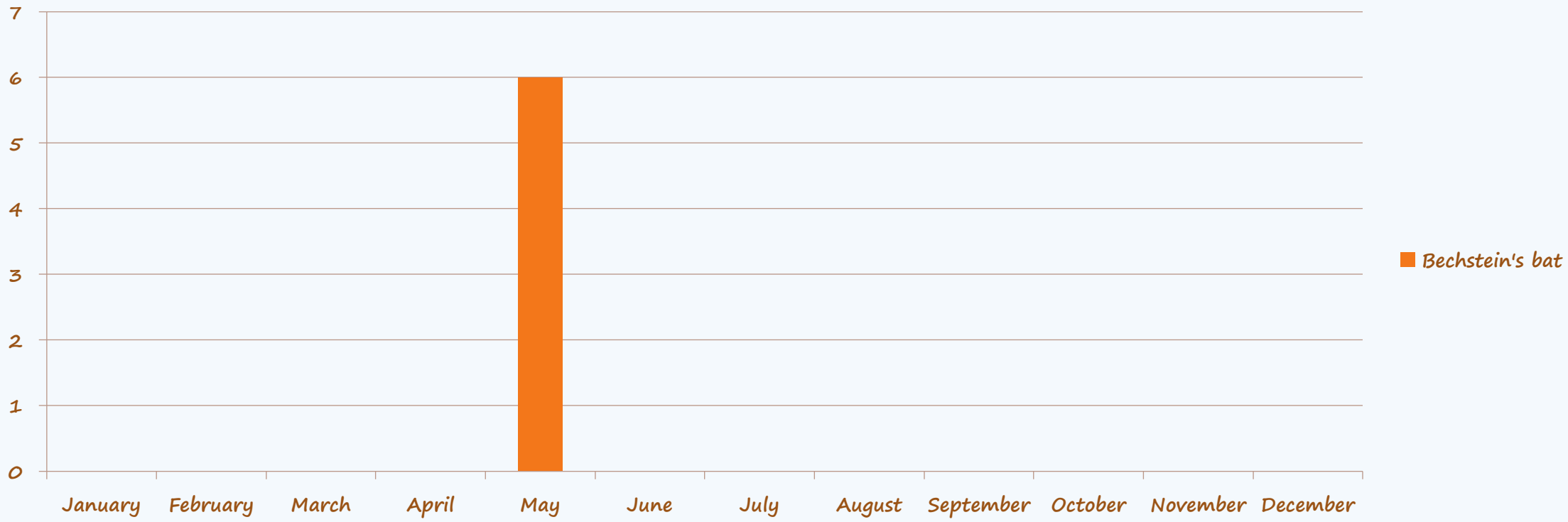
No. 1 Take home message!!

Most tree roosts are more likely to be empty than occupied

Tree Roost Examples

- Tree Roost GLW25
  - Tree species – oak
  - Habitat – woodland interior
  - Feature type – wound
  - Aspect – north east
  - Height – 1.5m

- Tree Roost GLW25

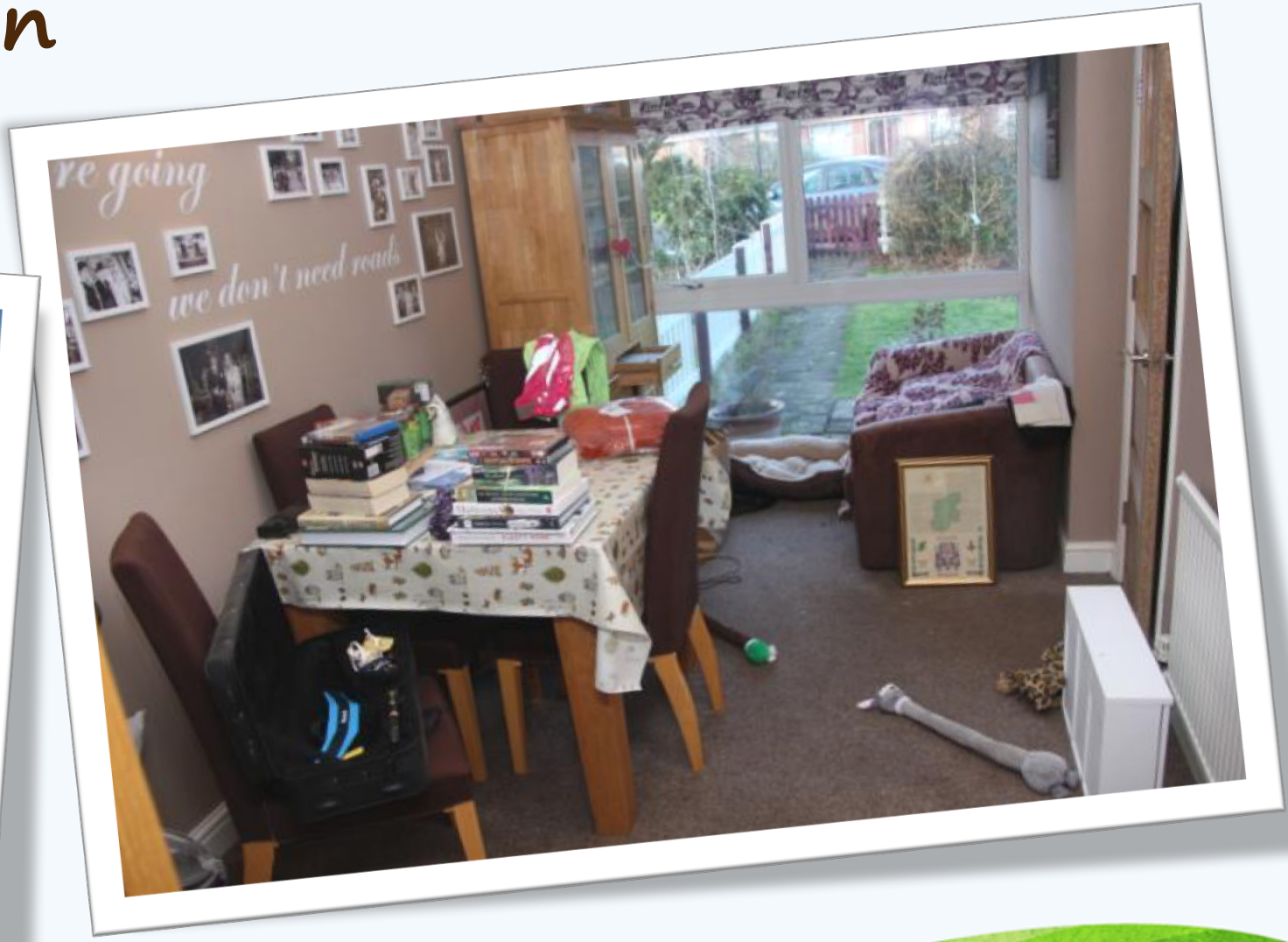


My chair collection

My chair collection

My chair collection

My chair collection



My chair collection

=

My chairs are more likely to be empty than occupied

To climb
or not to climb?

Schrödinger's ~~Cat~~ Bat

Two options for detemining the contents of a box


Option A
Step 1 - Walk over to the box
amazon.it
A34

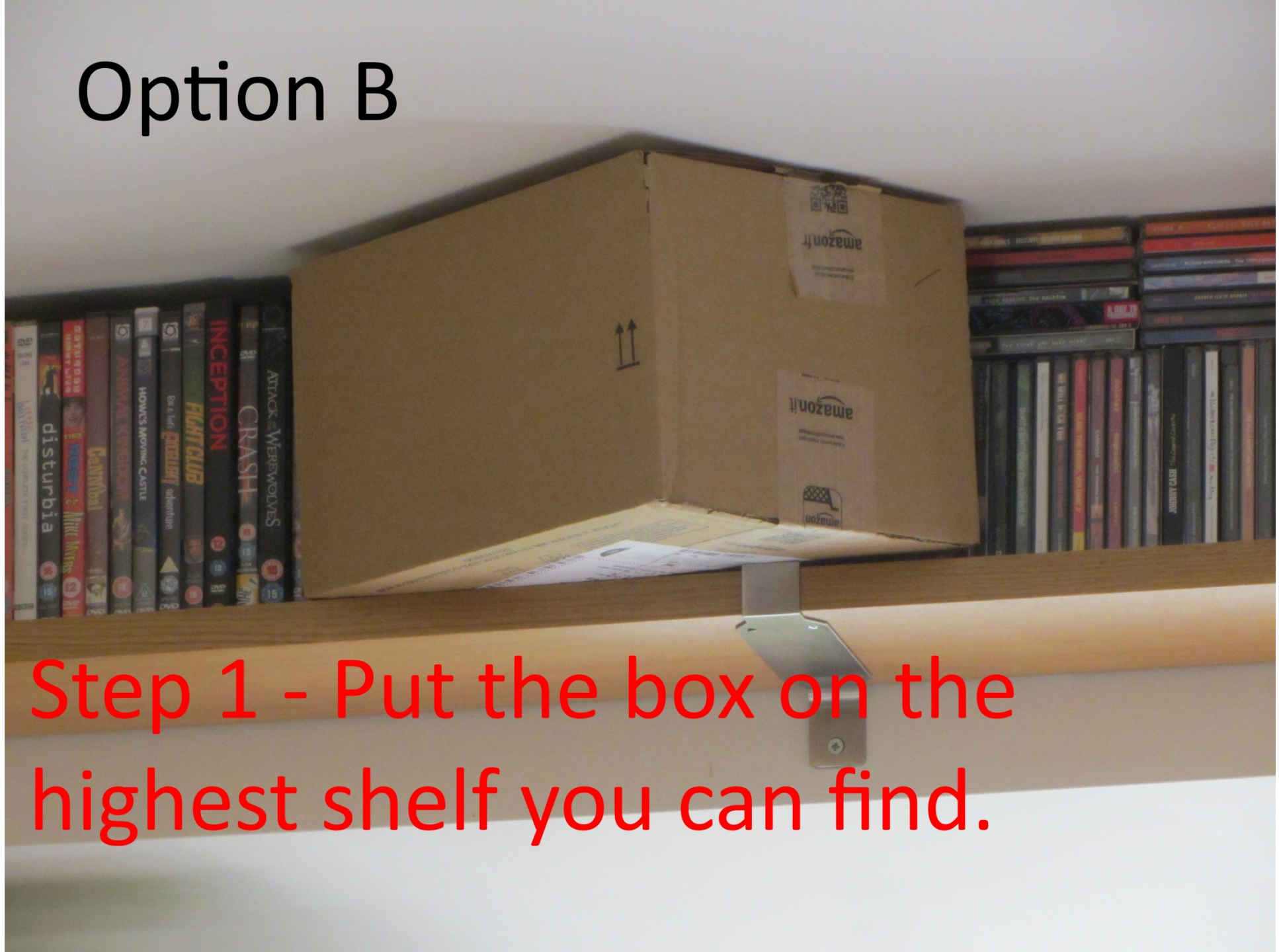
Option A

Step 2 look inside the box.

Option A

Step 2 look inside the box.

Or

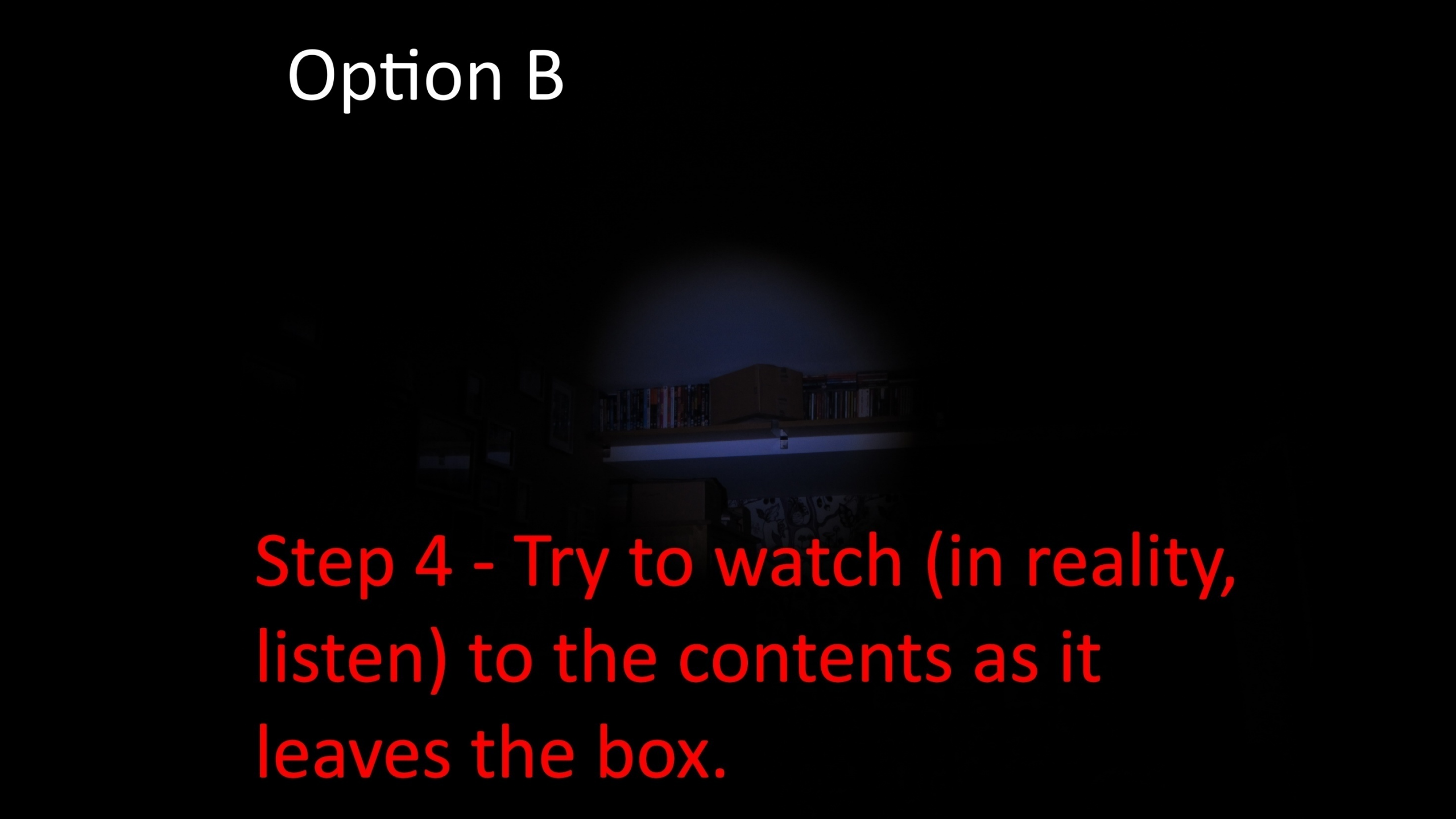

Option B
Step 1 - Put the box on the highest shelf you can find.

Option B

Option B

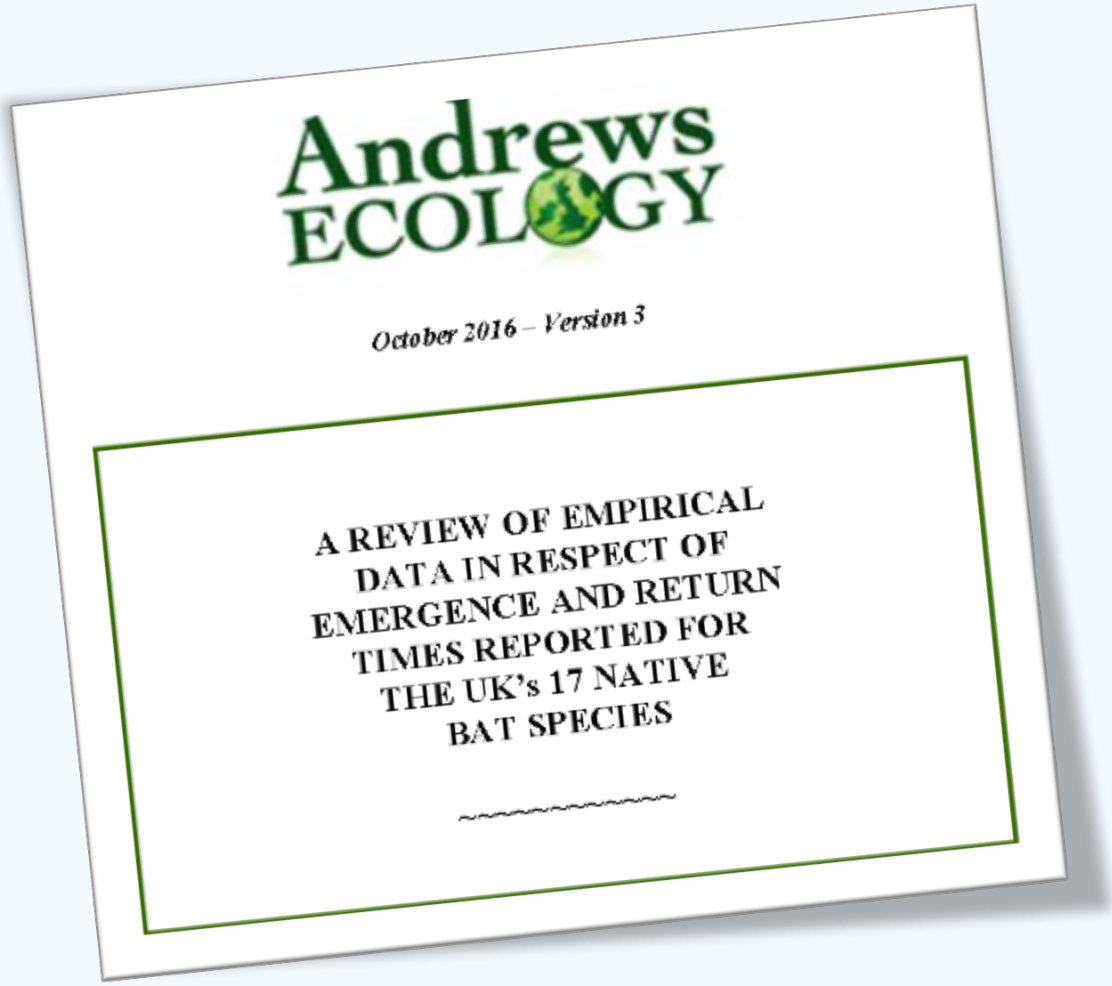
Step 3 - Wait for it to get dark

Option B



Step 4 - Try to watch (in reality, listen) to the contents as it leaves the box.

To climb
or not to climb?



To climb or not to climb?

Table 2. Return times for the barbastelle *Barbastella barbastellus* reported in empirical data (Zeale *et al.* 2012).

SEX	SEASON	AVERAGE RETURN TIME (minutes before/after sunrise)	± RANGE* (minutes before/after sunrise)	ACTUAL RANGE (minutes before/after sunrise)
F	Pregnancy – May/June	Mean: 194 minutes before (3 hours and 14 minutes) (Zeale *et al.* 2012)	SD: 254-135 minutes before (4 hours and 14 minutes up to 2 hours and 15 minutes) (Zeale *et al.* 2012)	No data
F	Lactation – July			
F	Weaning – August			
M	All	No data	No data	No data

* range in which 95% of observations occurred.

To climb or not to climb?

Table 24. Return times for the common pipistrelle *Pipistrellus pipistrellus* reported in empirical data (Davidson-Watts & Jones 2006).

SEX	SEASON	AVERAGE RETURN TIME (minutes before/after sunrise)	± RANGE* (minutes before/after sunrise)	ACTUAL RANGE (minutes before/after sunrise)
F	Pregnancy – May/June	Mean: 177.8 minutes before (2 hours and 57.8 minutes before) (Davidson-Watts & Jones 2006)	SD: 289.5-66.1 minutes before (4 hours and 49.5 minutes up to 1 hour and 6.1 minutes before) (Davidson-Watts & Jones 2006)	No data
F	Lactation – July			No data
F	Weaning – August			No data
M	All	No data	No data	No data

* range in which 95% of observations occurred.

Lessons Learned

Lessons Learned

Substrate doesn't change

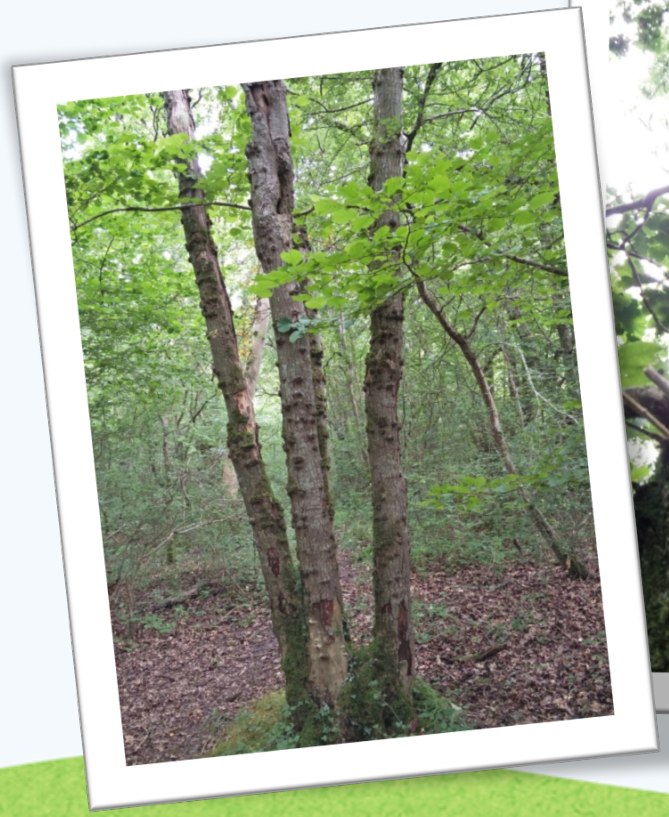
= Best field sign

Lessons Learned

Droppings may not last long

Lessons Learned

Smell can be persistent



Lessons Learned

PRFs extending downwards can be used by bats

Primary signs of bat use	Occasional signs of bat presence
The presence of bats (live or dead)	Staining immediately around the potential entry point
Open cavities which extend above the opening, and have sections that are smooth and free of debris	Smoothing of surfaces around the potential entry point
Bat droppings in, around or below the entrance	The distinctive smell of bats or ammonia
	Audible chattering at dusk or in warm weather
	Accumulation of prey debris such as insect wings

Lessons Learned

Parasites

No. 2 Take home message!!

For presence/absence surveys, undertake physical inspections (climbing) as standard.

Only if this is not possible, defer to alternative method.

No. 2 Take home message!!

- Limitations of emergence surveys, unless expensive equipment use.
- Dawn re-entry surveys ineffective.
- Climbing surveys, at the least, provide contextual information (Substrate, Smell, Droppings).

No. 3 Take home message!!

Don't worry about the tree, focus on the feature

No. 4 Take home message!!

Think about seasonal use

Courtesy of James Bird

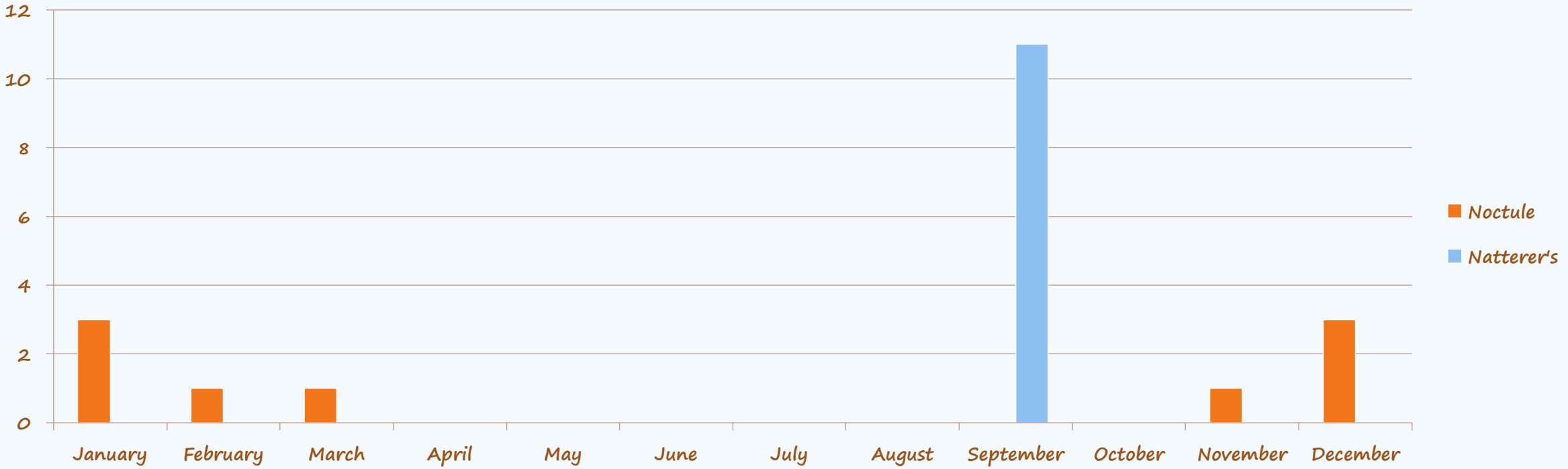
Courtesy of Jane Cole

Courtesy of Dan Flew

Tree Roost Examples

- Tree Roost 2
  - Tree species – oak
  - Habitat - parkland
  - Feature type – tear out with cavity
  - Aspect – south
  - Height – 5.8m

- Tree Roost 2


12
10
8
6
4
2
0
January
February
March
April
May
June
July
August
September
October
November
December
Noctule
Natterer's

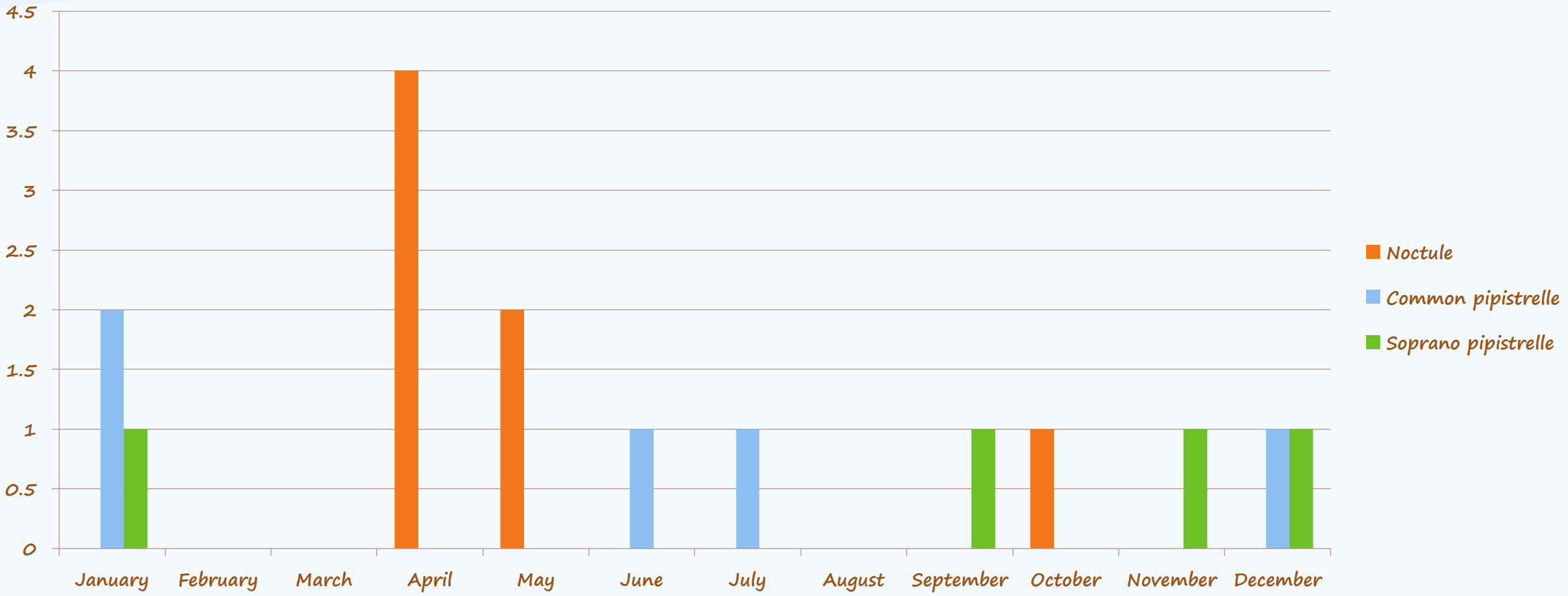
No. 4 Take home message!!

Think about seasonal use

Tree Roost Examples

- Tree Roost 4
  - Tree species – oak
  - Habitat – woodland edge
  - Feature type – tear out, flaking bark and dead snag
  - Aspect – south, north, south
  - Height – 11m, 3.5m, 8m

Tree Roost 4


4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
January
February
March
April
May
June
July
August
September
October
November
December
Noctule
Common pipistrelle
Soprano pipistrelle

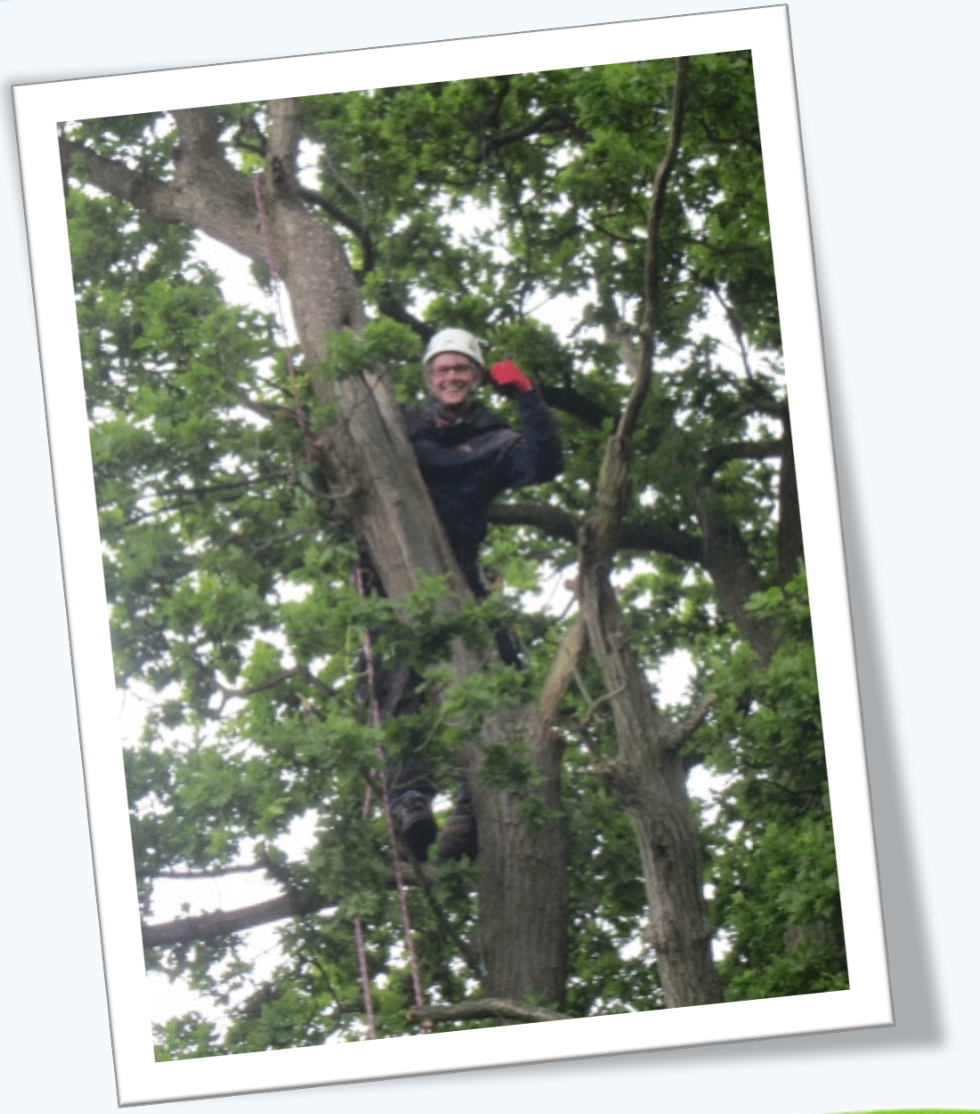
No. 4 Take home message!!

Think about seasonal use

Take home messages

- Tree roosts are more likely to be empty than occupied
- Undertake physical inspections as standard
- Don't worry about the tree, focus on the feature
- Think about seasonal use

Can we do better?



The Future

- An evolving science – more input needed
- Greater collaboration between disciplines
- Guidance based evidence (more input needed)

Re-Cap

- Bats roost in trees – Legal context
- Industry guidance
- Introduction to the tree roost research project
- Key findings (take home messages)
- The future

Thank you to...

Henry Andrews, Steve Hancock, Steve Allen, Alastair Barnes, Ben Mitchell, Tom Bennett, Rich Flight, Brady Roberts, James Pattenden, James Austrums, Richard Murphy, Louis Pearson, Chris Morrel, Paul Melarange, Sally Clark, Dan Flew, Lee Gwyther, Sean Shereston, Annie Hatt, Adam Day, Sam Arthur, Sam Braine, John Daw, Andrew Barret-Mold and Keith Cohen.

Thank you