

**Do bats swarm where
they hibernate?**

Lime kilns in northern England



Tottergill lime kiln

- RSPB Geltsdale, north Cumbria
- Initial survey October 2012
- 4900 bat files recorded in one night!
 - Significant bat use
- Is this a swarming site?
- Swarming sites are under recorded, in 2012 no swarming sites were known for northern England

Tree removal



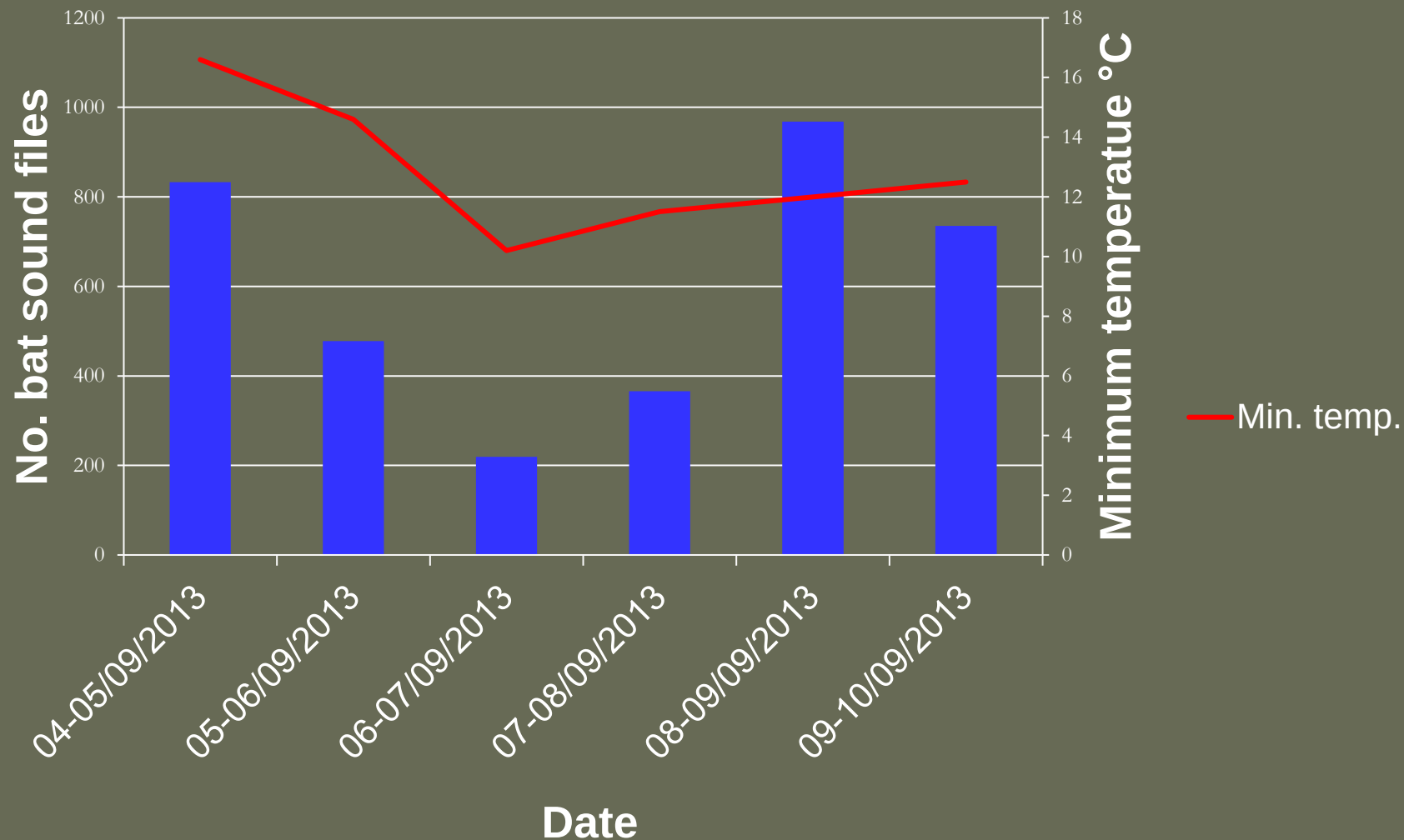
Tree removal

- Tree partially removed in September 2013



Monitoring

Number of bat sound files per night September 2013



So is this swarming?

- Mating behaviour, August-October¹
 - *Myotis* and *Plecotus* species bat
 - Sex ratio²
 - Species seasonality³
 - Time after sunset⁴
- Hibernation sites³

1. Parsons et al., 2003a
2. Rivers et al., 2006
3. Van Schaik et al., 2015
4. Parsons et al., 2003b

Research project

- Acoustic monitoring
- Additional kiln, 2017



Visual inspections

- Natterer's bats recorded April-November
- Highest numbers present September-November
 - 9 bats 04/11/2016
 - 11 bats 04/10/2017
- No bats seen December-March
 - Bats deeper in kiln in hibernation?



Trapping

- Trapping at kilns in swarming period
- 364 bats of 8 species caught
 - Brandt's bat caught 28/08/2016
- Sex ratio, all bats
 - 280 male
 - 84 female
- Swarming species
 - 205 male
 - 50 female



Ringling

- All *Myotis* species bats and brown long-eared bats ringed since 2013
- Total of 214 bats ringed
- 27 retraps; 18 individuals



Retraps

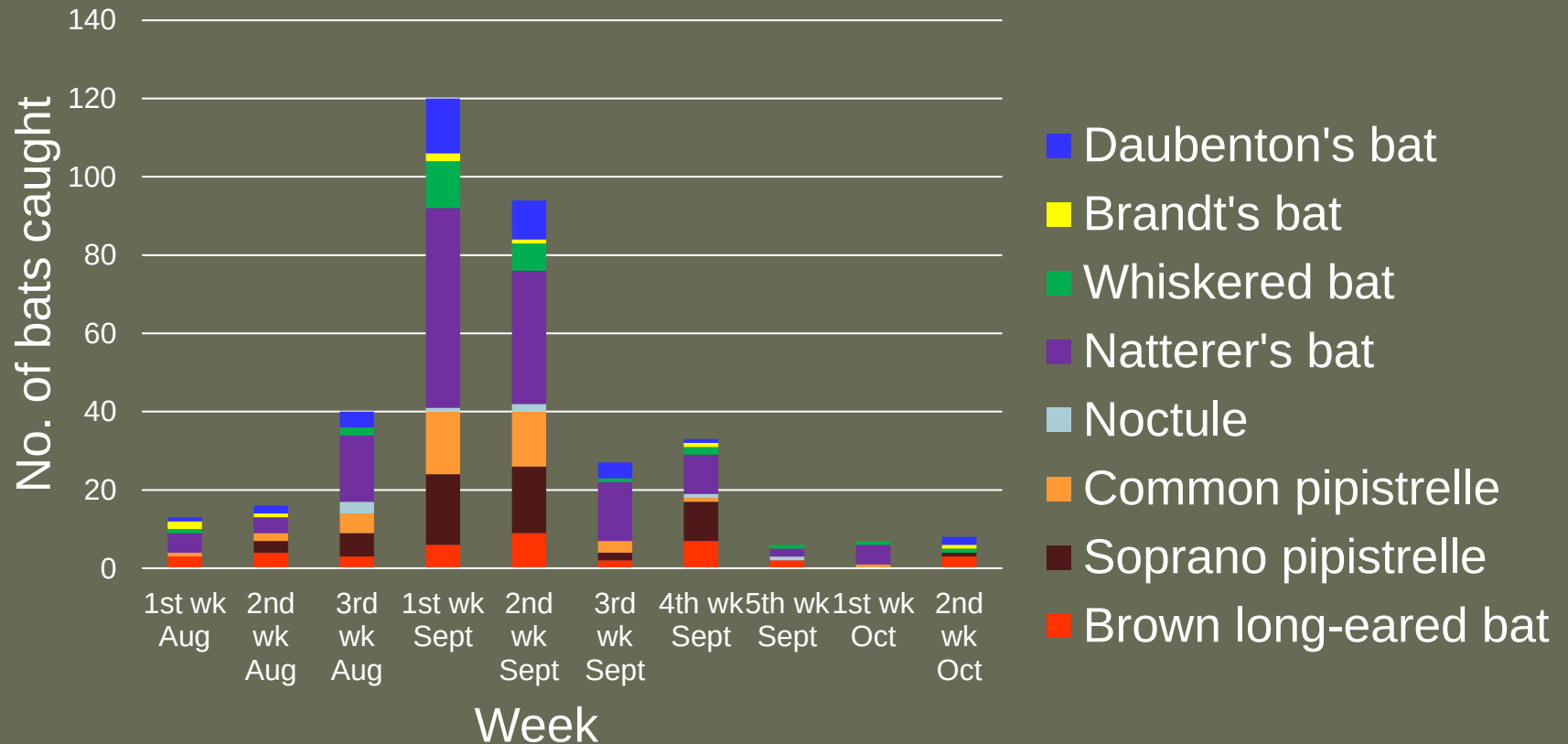
14 Natterer's bats retrapped

- Y4927 trapped 14/09/2013
 - Caught in kiln 29/09/2014
 - Caught again 26/09/2015
 - 3 years, spanning 15 days
- H4990 trapped 28/08/2016
 - Caught in kiln 13/08/2018
 - Caught again 09/09/2019
 - Caught again 17/09/2019
 - 4 years, 35 days
- H4960 trapped 31/08/2015
 - Caught in kiln 21/09/2021
 - 6 years, 21 days



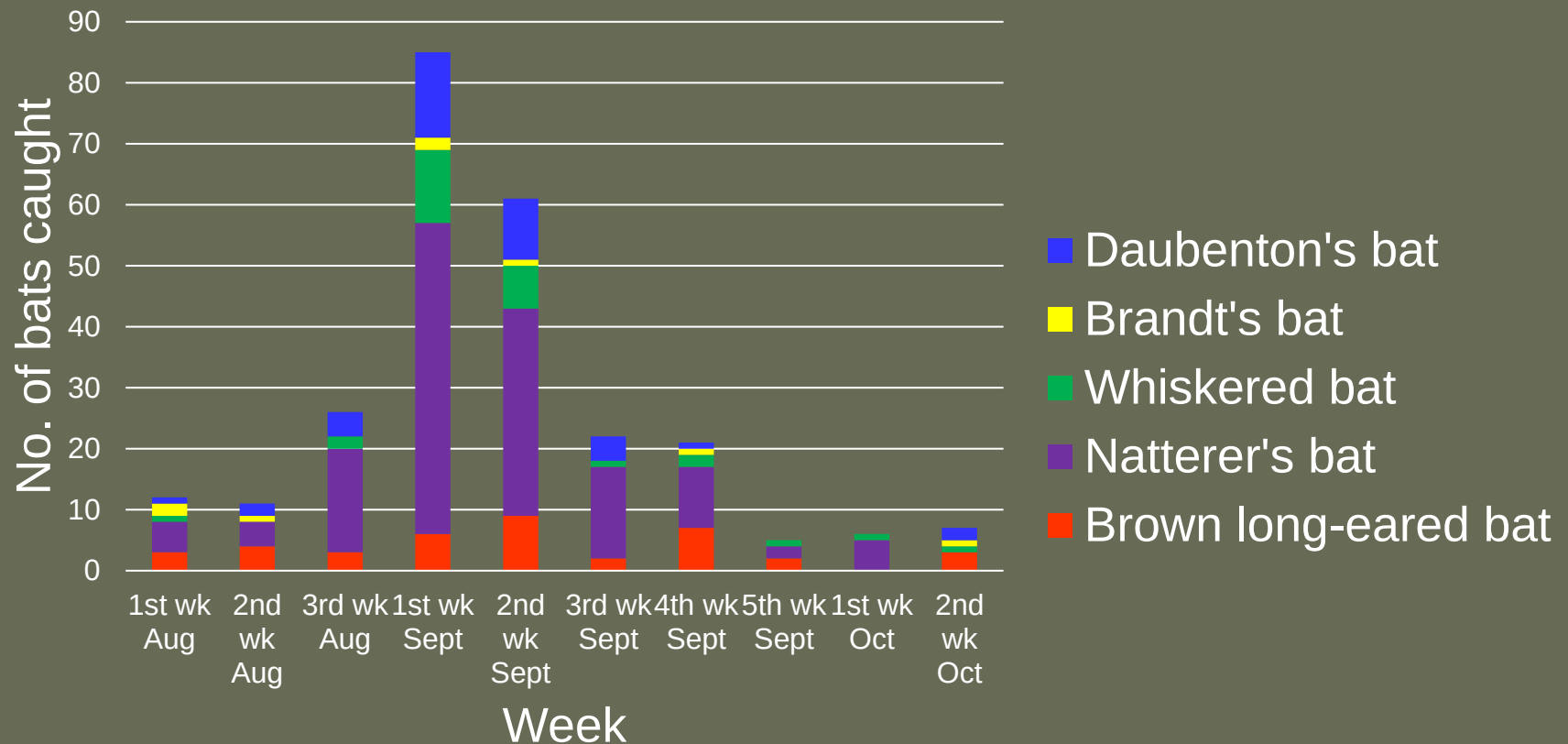
Results, seasonality

Bat species caught per week



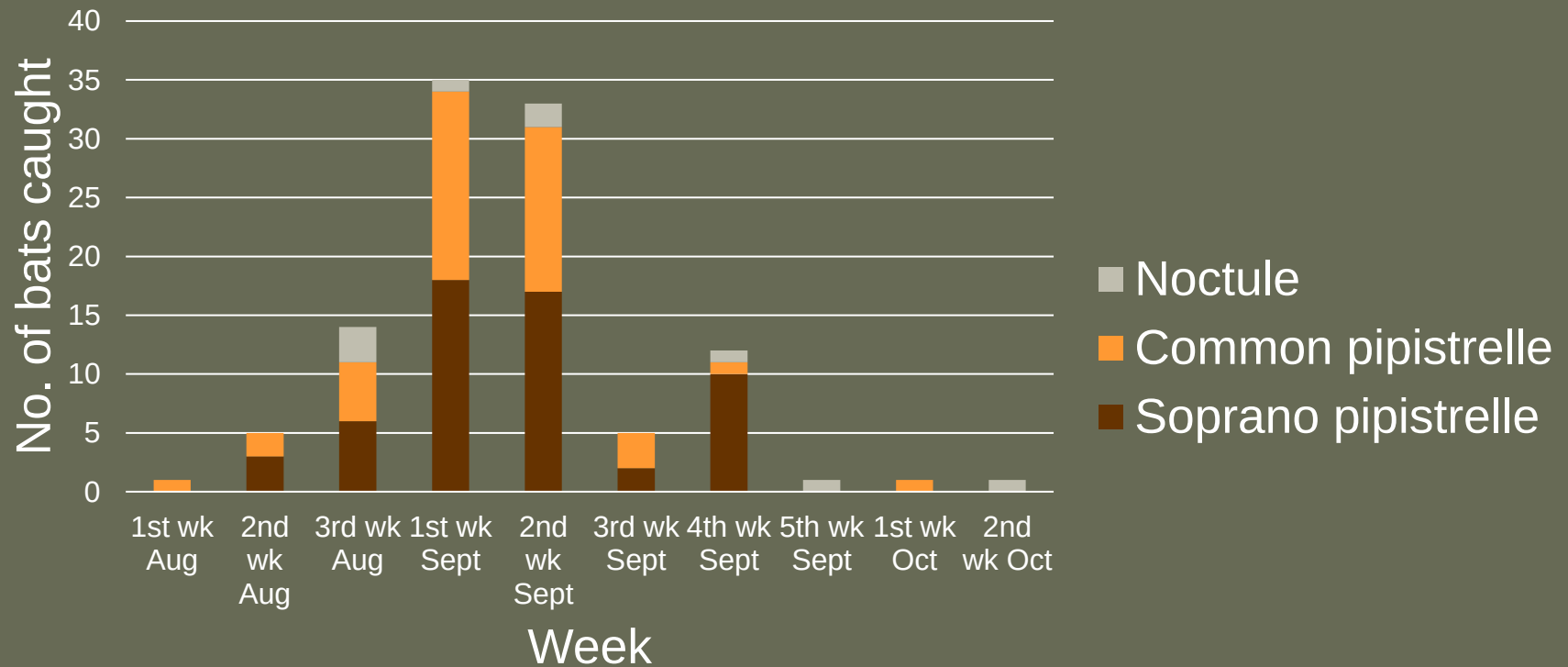
Results, seasonality

Swarming bat species caught per week



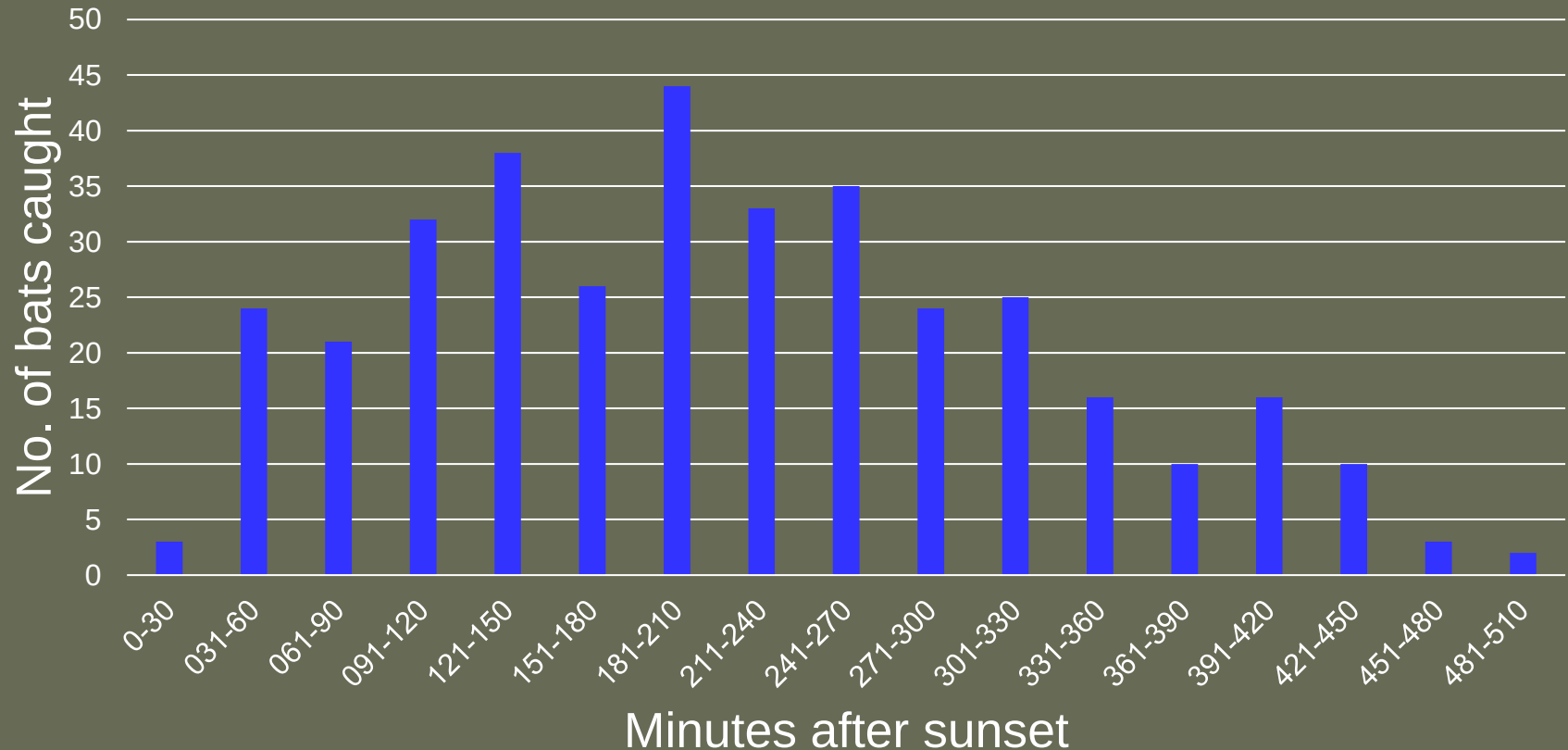
Results, seasonality

Non-swarming bat species caught per week



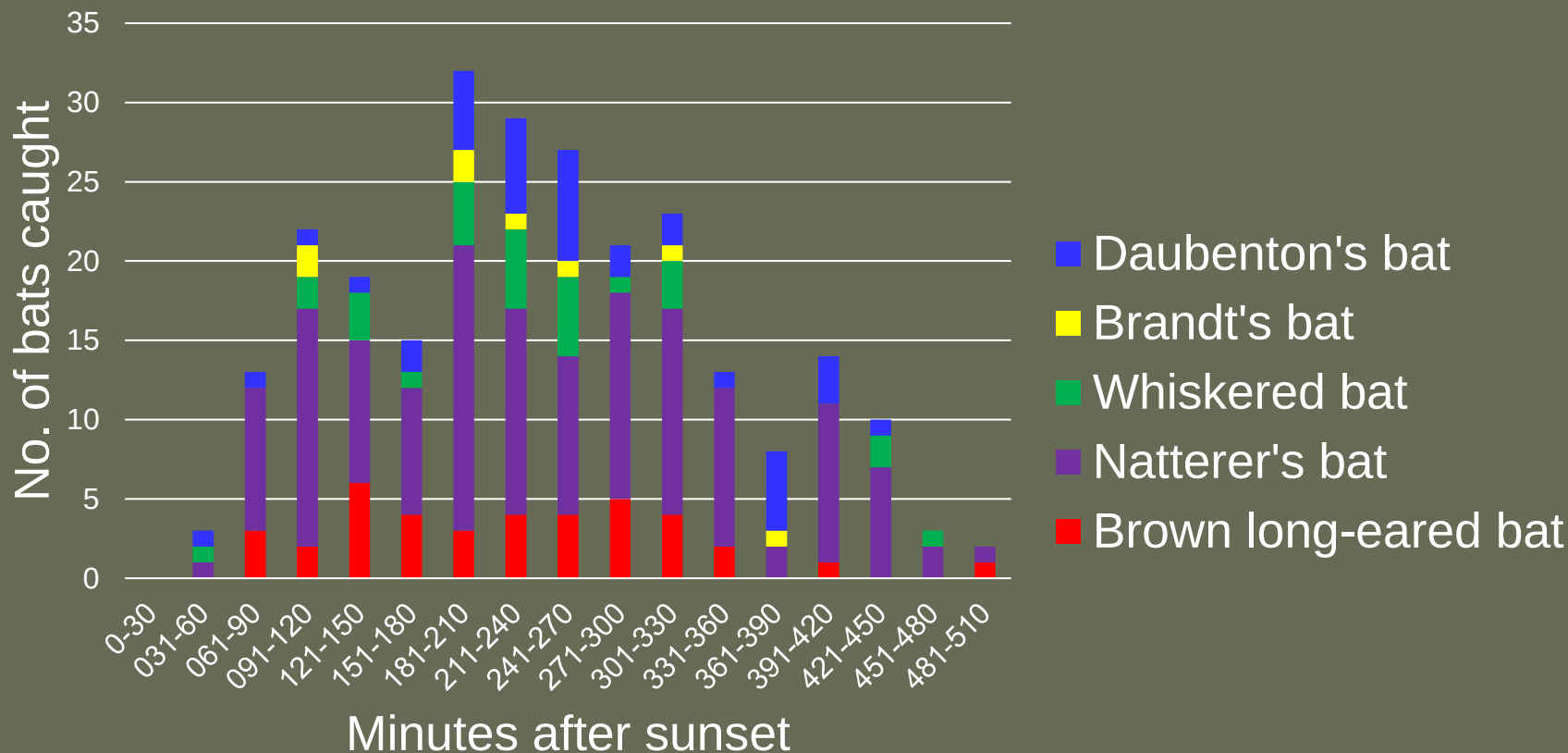
Results, time after sunset

Time bats caught after sunset



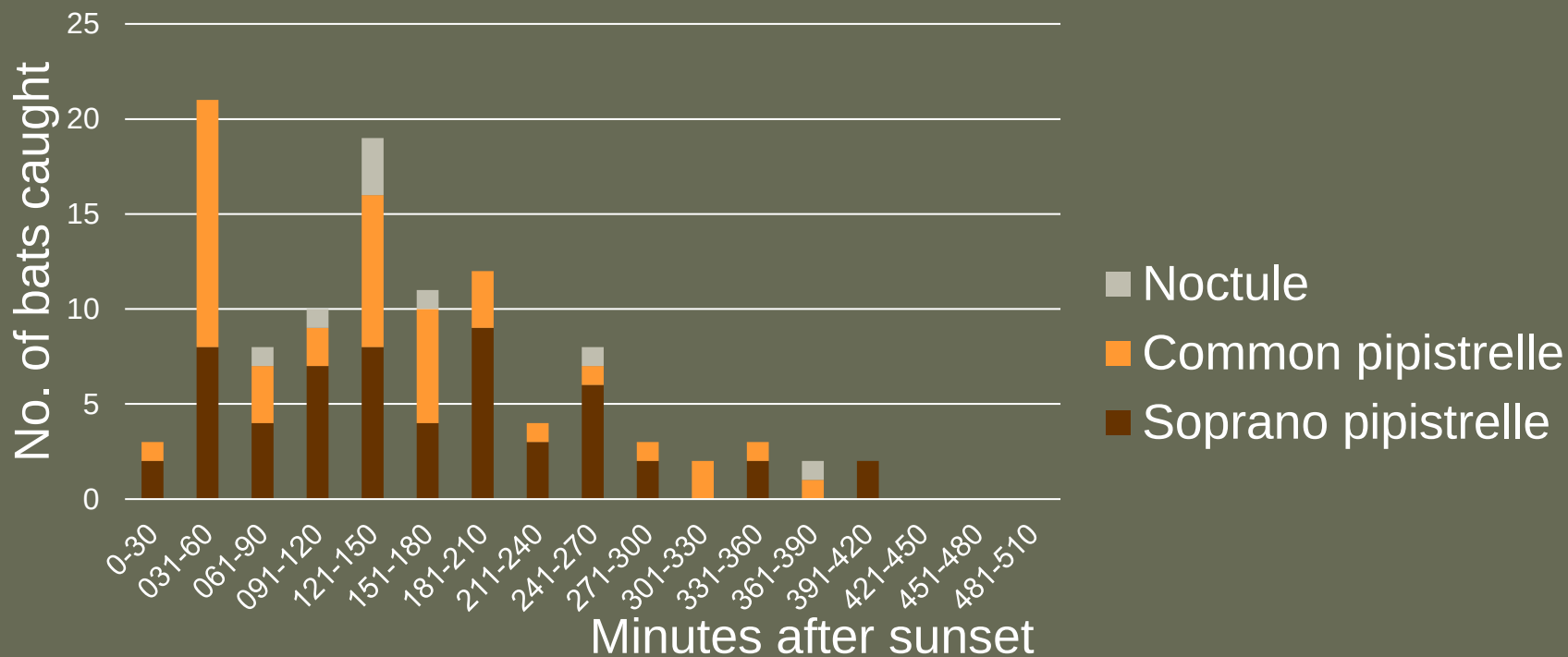
Results, time after sunset

Time swarming bats caught after sunset



Results, time after sunset

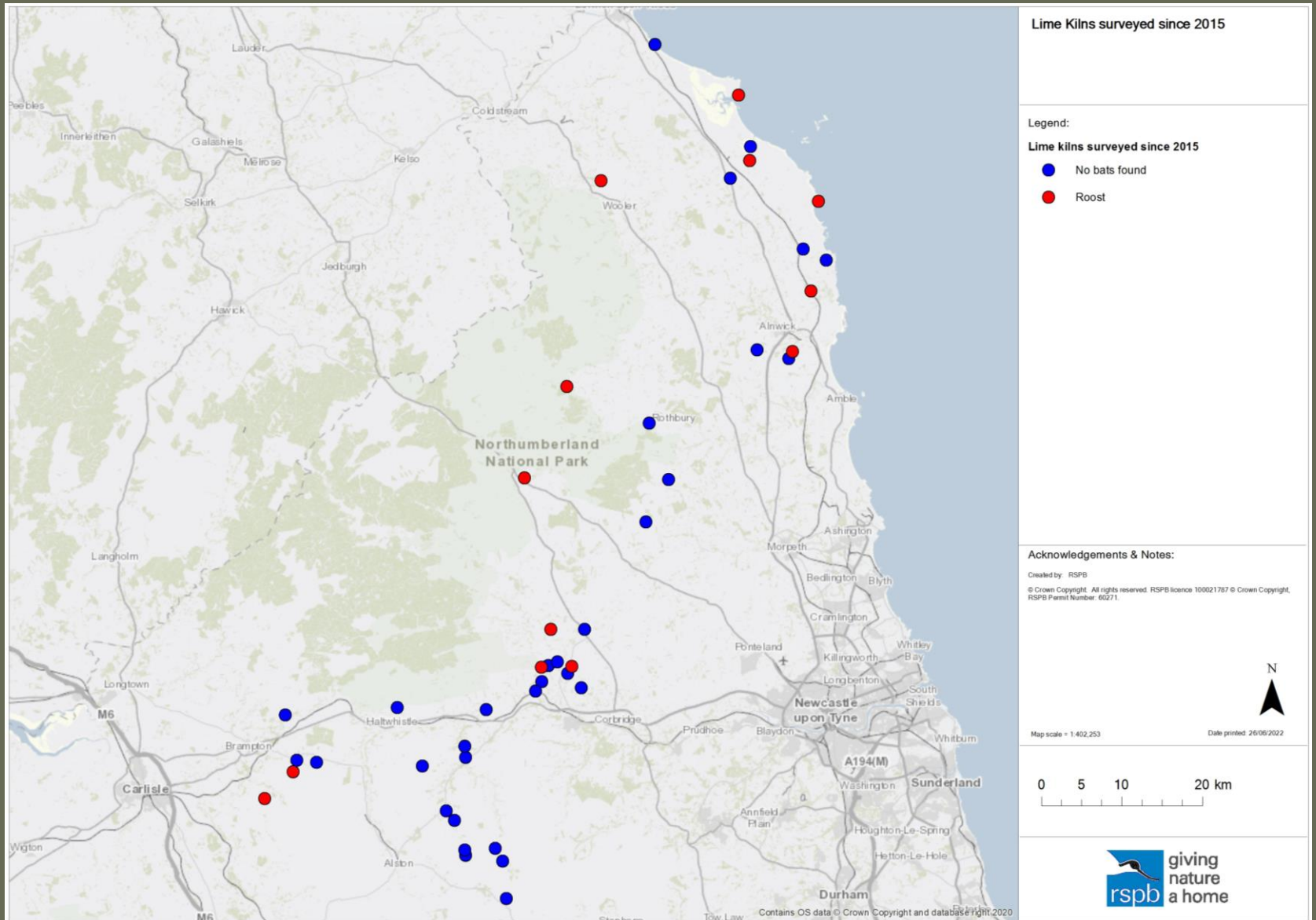
Time non-swarming bats caught after sunset



So is this a swarming site?

- Species present:
 - *Myotis* and *Plecotus* species bats
 - But also *Pipistrellus* and *Nyctalus*
 - Sex ratio
 - Species seasonality
 - Time after sunset
- Hibernation sites?

Lime kiln survey



References

- Parsons, K.N., Jones, G., Davidson-Watts, I., Greenaway, F. (2003a) Swarming of bats at underground sites in Britain – implications for conservation. *Biological Conservation* 111, 63–70.
- Parsons, K.N., Jones, G., Greenaway, F. (2003b) Swarming activity of temperate zone microchiropteran bats: effects of season, time of night and weather conditions. *Journal of Zoology* (London) 261, 257–264.
- Randall, J. and Broders, H. (2014) Identification and characterization of swarming sites used by bats in Nova Scotia, Canada. *Acta Chiropterologica* 16, 109-116.
- Rivers, N.M., Butlin, R.K., Altringham, J.D. (2006) Autumn swarming behaviour of Natterer's bats in the UK: population size, catchment area and dispersal. *Biological Conservation* 127, 215–226.
- Van Schaik, J., Janssen, R., Bosch, T., Haarsma, A.J., Dekker, J., Kranstauber, B. (2015) Bats swarm where they hibernate: compositional similarity between autumn swarming and winter hibernation assemblages at five underground sites. *PLoS ONE* 10(7): e0130850.

Thank you!

- RSPB staff and volunteers
- Cumberland and Northumberland bat group volunteers
- This project is featured within Northern Bats, a forerunner of British Islands Bats

<https://www.bats.org.uk/resources/accessing-journal-papers/british-islands-bats>

Northern Bats

