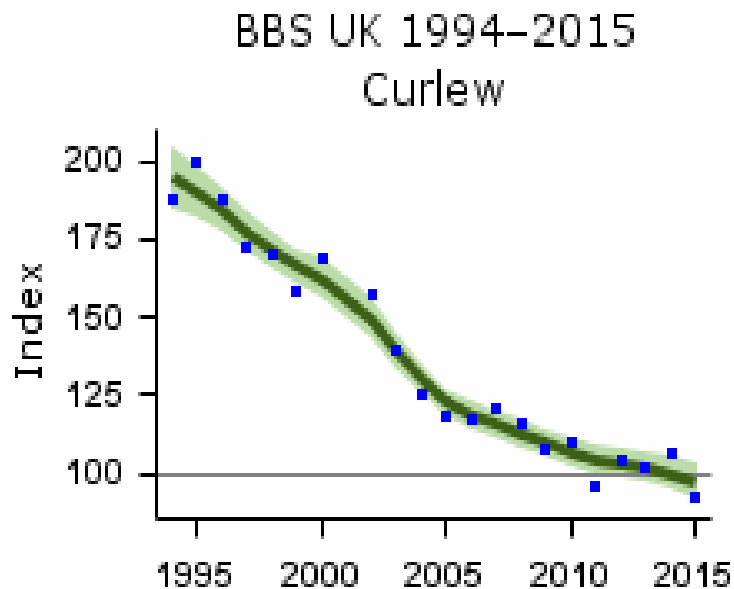


Does predator control work for waders?

Andrew Hoodless



Declines are long-term and driven by landscape change



- Field drainage
- Sward improvement
- Earlier mowing
- Conversion of grass to arable
- Change in livestock densities
- Forestry plantations

Loss/degradation of breeding habitat + high levels of predation
➡ reduced breeding success

Franks et al. 2017. Environmental correlates of breeding abundance and population change of Eurasian Curlew *Numenius arquata* in Britain. *Bird Study*

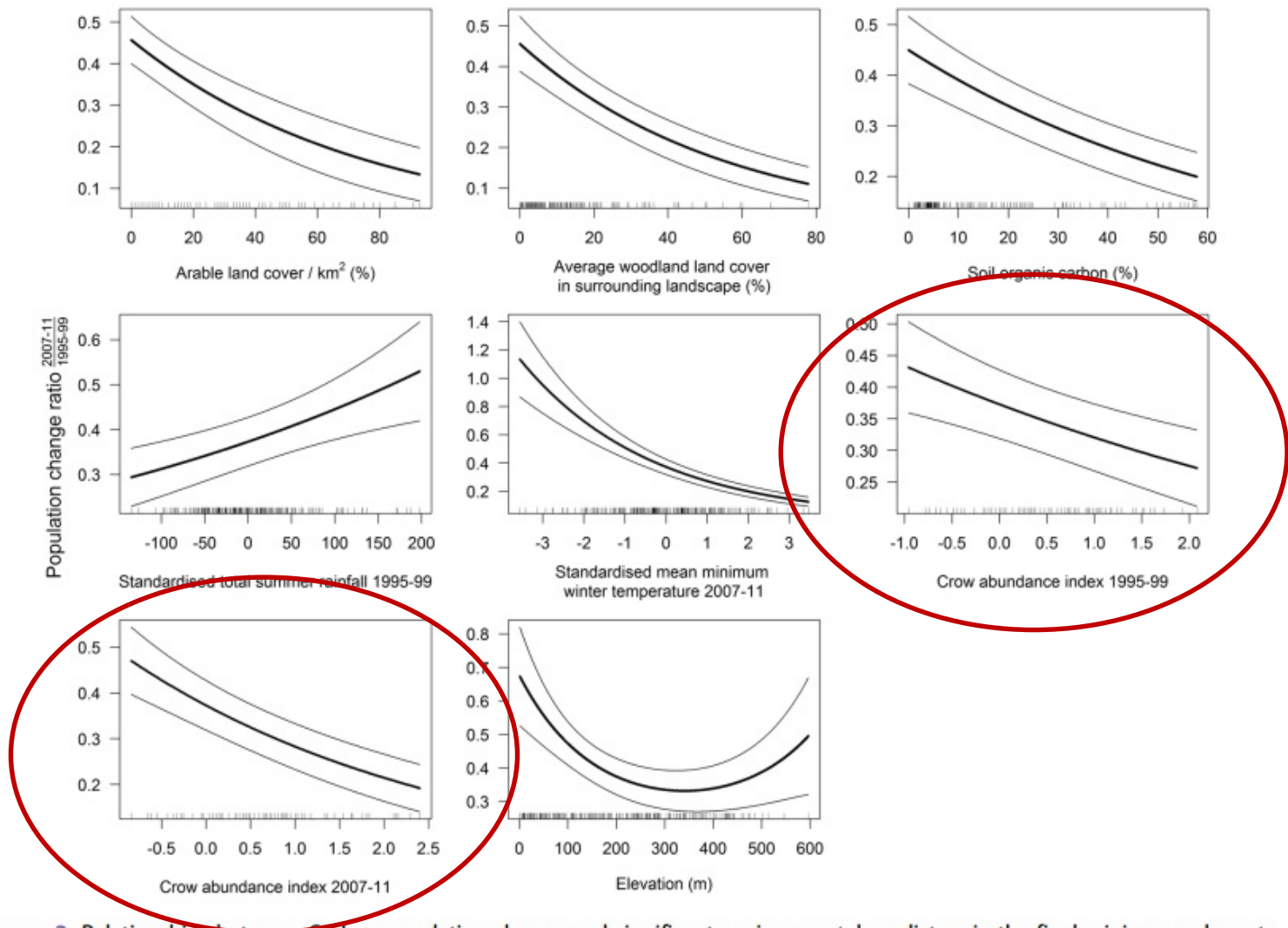


Figure 3. Relationships between Curlew population change and significant environmental predictors in the final minimum adequate GAM. The 1 km squares included in the analysis ($n = 241$) were those surveyed in both periods and where Curlew increased, remained stable, declined or went extinct. Population change values from 1995–99 to 2007–11 are given as a ratio where a value of 1.0 = stability between the two periods. Solid lines show the significant predicted relationship between population change and covariates, while dashed lines show the 95% confidence intervals. Rug plots along the x-axis show the distribution of the original values of the predictor variable which were used in the model.

Curlew populations

Annual adult survival = 83%

First-year survival = 47%



For a stable population, each pair needs to fledge on average 0.48-0.62 young per year

Average estimated productivity across Europe is 0.34 chick/pair (Roodbergen et al. 2012 *J. Ornithol.* 153, 53-74)

Decline driven by reduced breeding success



Game & Wildlife CONSERVATION TRUST

Predation is the main cause of poor breeding success

Curlew, Northern Ireland, 1990s:

97% of nest failure, 74% of chick mortality due to predation, mainly by foxes and crows

(Grant et al. 1999 *J. Appl. Ecol.* 36, 59-74)

Curlew nest predation has increased across Europe:

16% pre-1980 to 65% 1996-2006

(Roodbergen et al. 2012 *J. Ornithol.* 153, 53-74)

Curlew Country project:

No chicks fledged in 2015 or 2016 from c.30 pairs





Predation can limit lapwing populations on wet grassland

Data from RSPB reserves and the Netherlands indicate that predation can limit productivity:

Nest survival typically 30-50%

Nest predation – mainly red fox

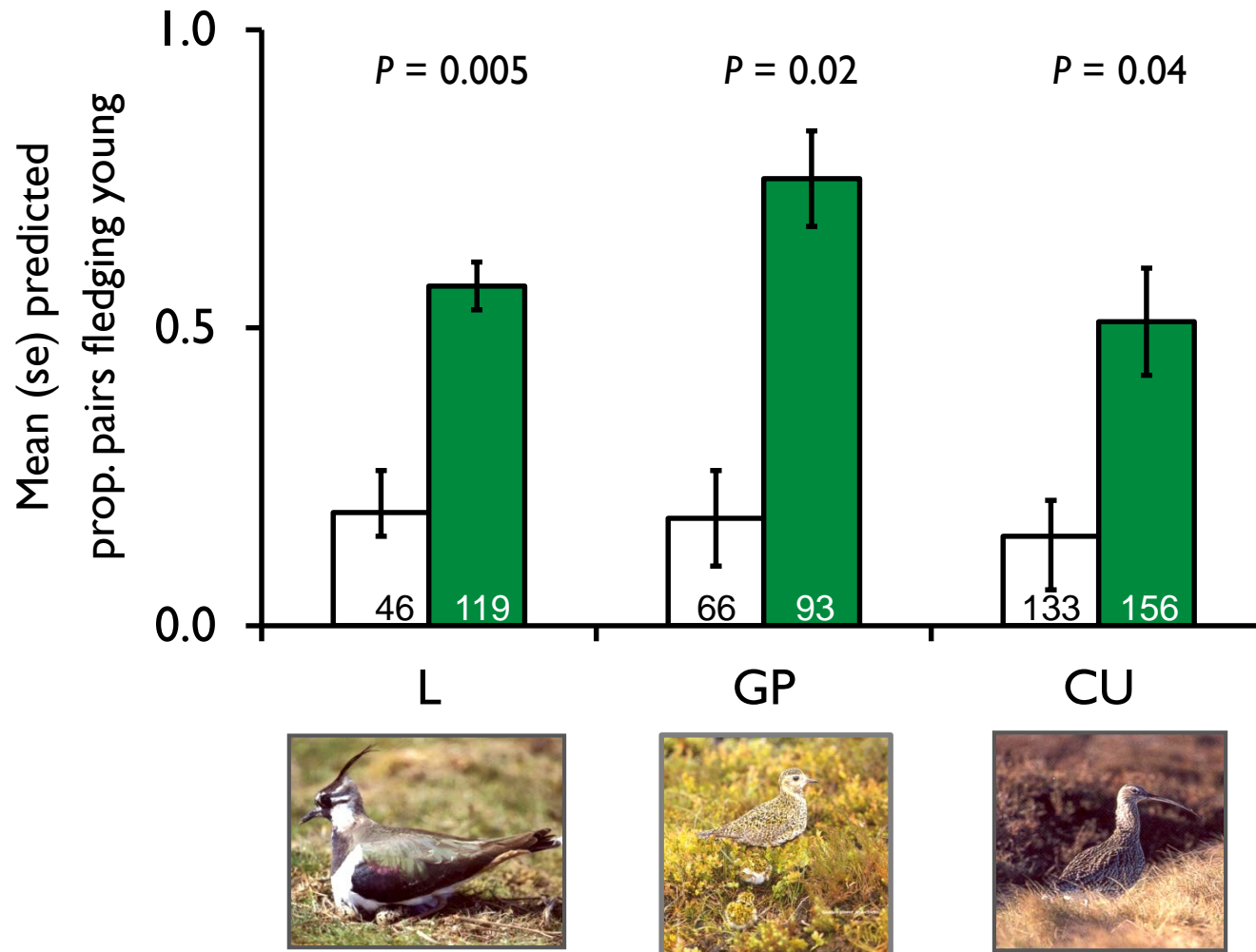
Chick survival 14%-23%

Chick predation – grey heron, buzzard, carrion crow

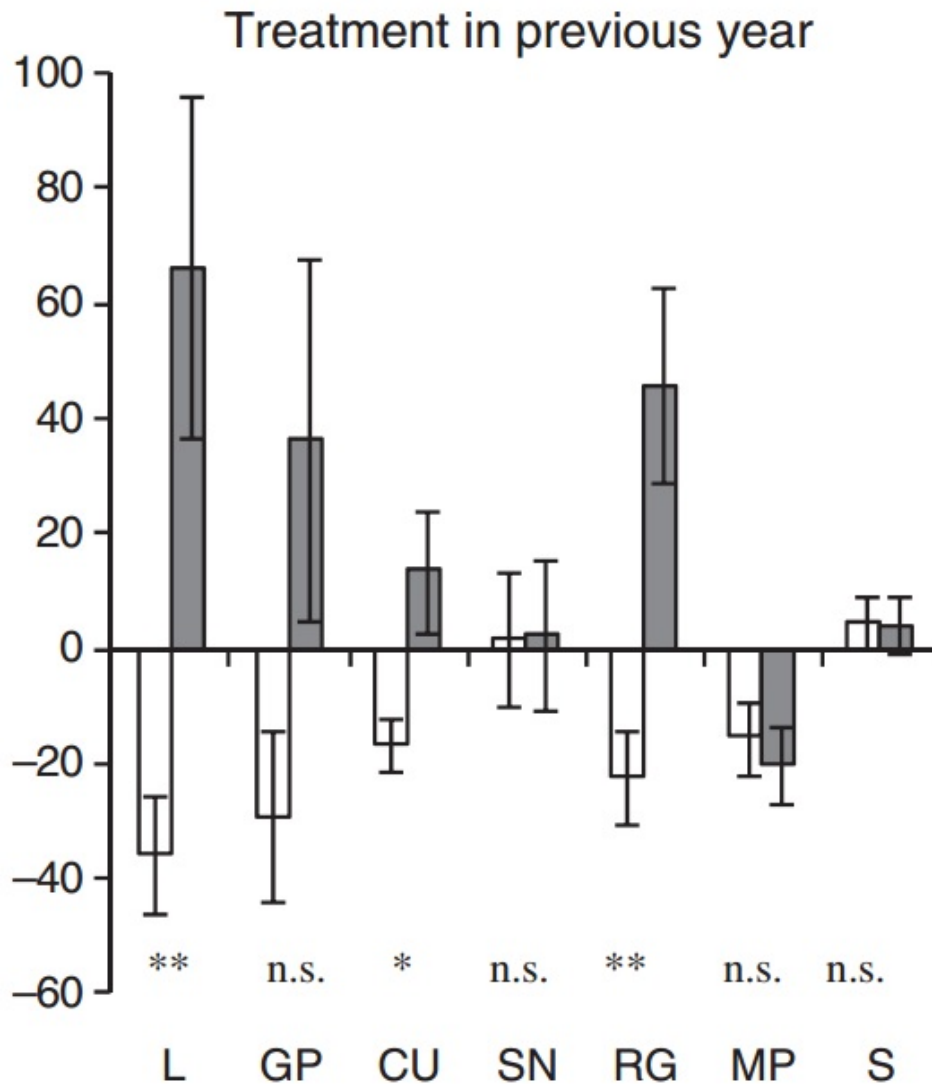


Experimental predator control, moorland: wader breeding success

Fletcher et al. 2010
J. Appl. Ecol. 47, 263-272



Annual change in breeding pairs

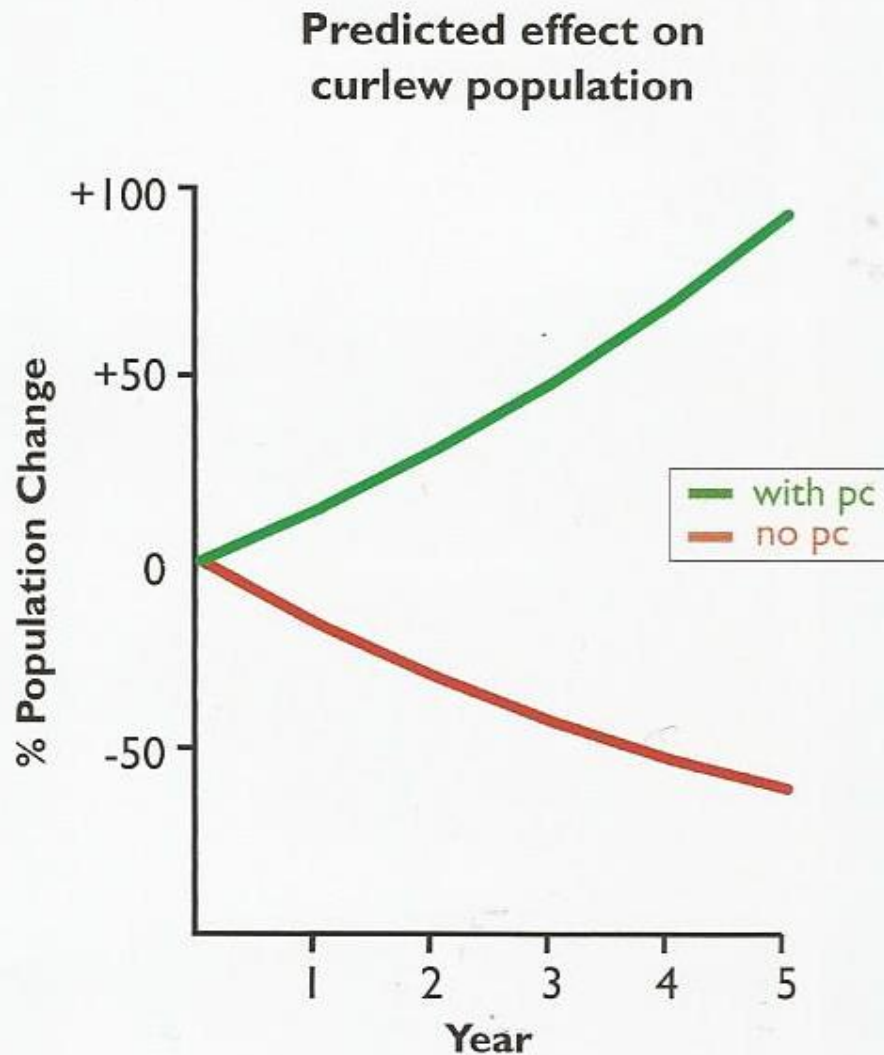


Fletcher et al. 2010
J. Appl. Ecol. 47, 263-272



Game & Wildlife CONSERVATION TRUST

Predicted population trends



An effect is not always apparent

Bolton et al. 2007
J. Appl. Ecol. 44, 534-544

Experimental predator control,
lapwings on 13 nature reserves:

No effect on nest survival

7 sites, no effect on chick survival
(predator densities low)

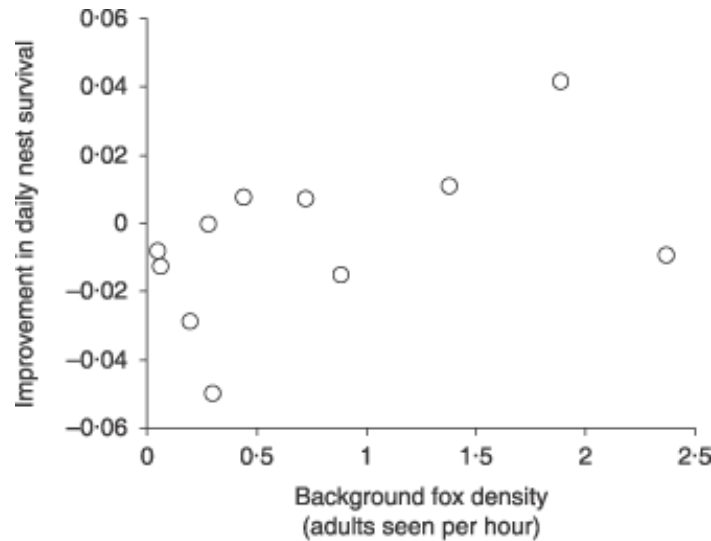
6 sites, twice as many pairs with fledged
young with predator control

No overall effect on population trends

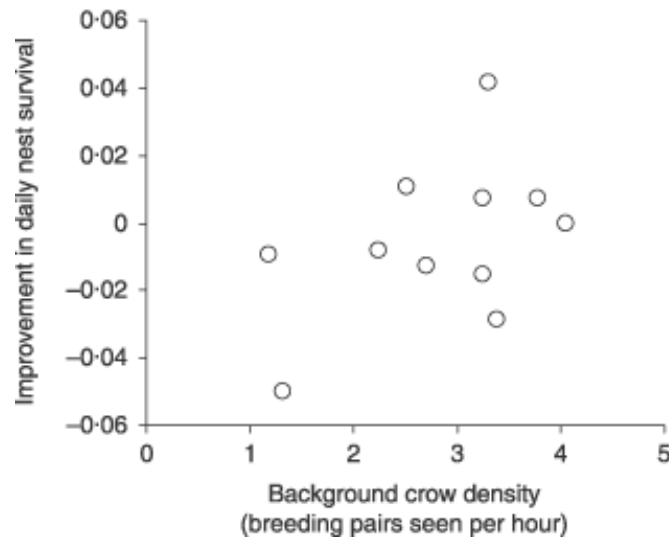


Game & Wildlife CONSERVATION TRUST

Effects may depend on predator density

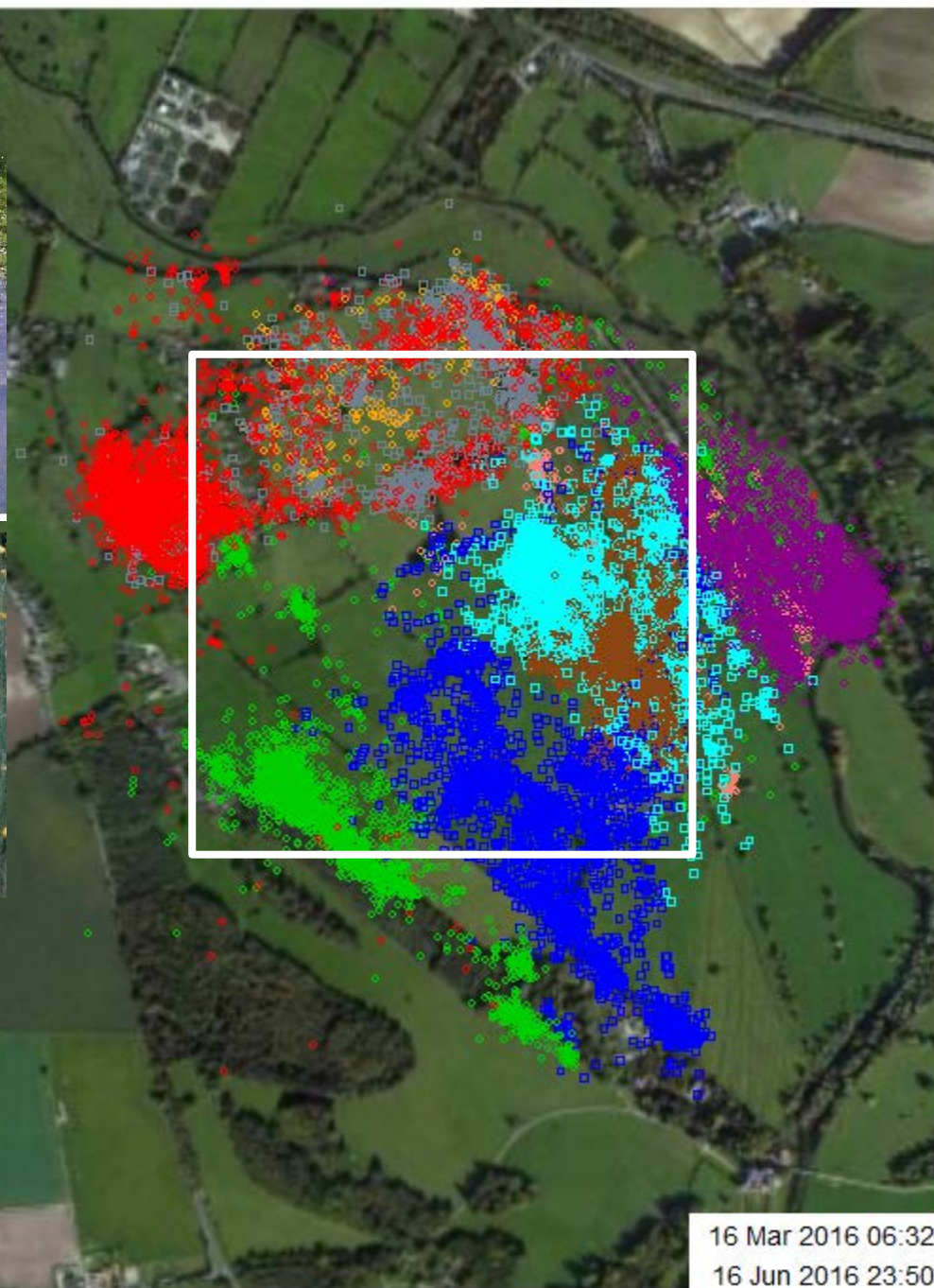


Bolton et al. 2007
J. Appl. Ecol. 44, 534-544



M4971a M4972 M4973 F5546 M5545a M5544 F5543 F4971b M5545b

Untagged foxes



16 Mar 2016 06:32

16 Jun 2016 23:50

Meta-analysis of 40 studies where predator control was deployed in the UK

Holt et al. 2008. *PlosOne* 3, e2400

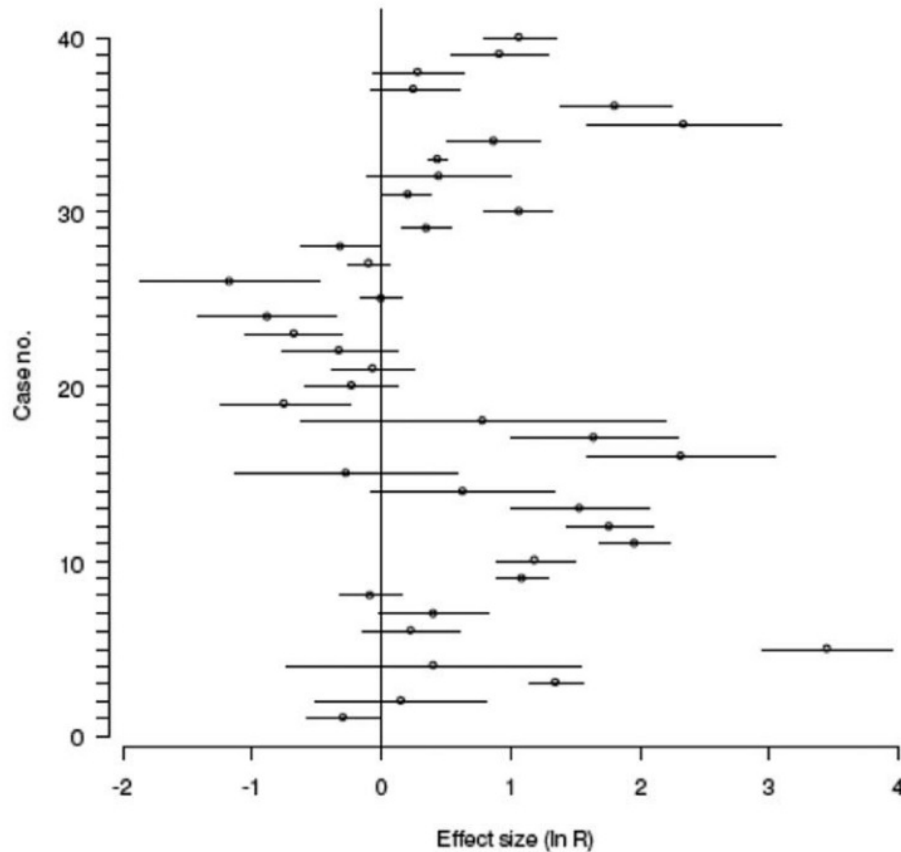


Figure 1. Plot of effect sizes (ln R) \pm SE for each of the forty cases in the meta-data set. Overall mean effect size 0.47, df = 39, 95% CI = 0.39–0.55 (fixed effects model).

Curlew population recovery

Stable population 0.48-0.62 young/pair/annum

Productivity required to get from 20 to 50 pairs in:

10 years = 1.29 chick/pair

20 years = 1.14 chick/pair



Addressing predation is likely to be necessary

- Predator control must be legal
- Competent practitioners, following best practice
- Focus on February-July
- Appropriate scale, collaboration



Moving forward

- Creation and maintenance of optimum habitat is crucial
- Need good evidence that predation is having a population-level impact
- What are the key predators?
- Understanding of circumstances where predation is highest
- Scope for reducing predation through habitat manipulation?
- Predator management - predator exclusion and/or lethal control
- Scale at which action is needed
- Undesirable effects?
- Continued monitoring
- Curlew conservation is a long-term commitment

