Does predator control work for Curlew?

Dave Parish

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Long-term Curlew declines are caused by changes in land use

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

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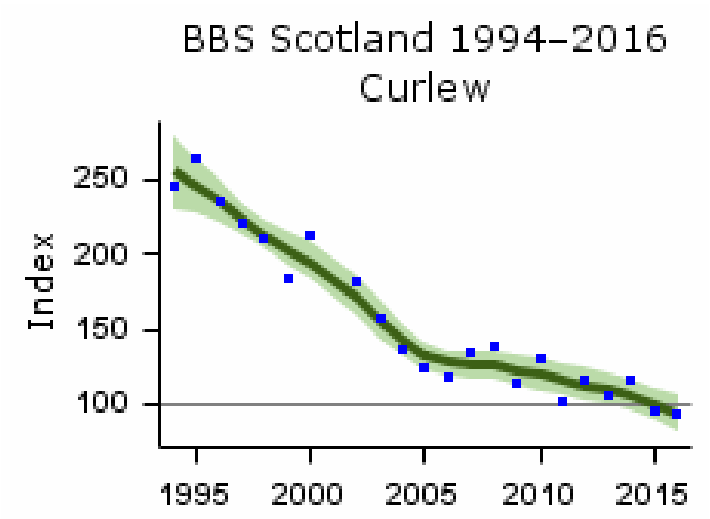
The proximate driver of decline is reduced productivity



Annual adult survival = 75-90%
First-year survival = 47%

For a stable population, average of 0.48-0.62 young per pair/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

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Predation is the main cause of poor breeding success

Curlew, Northern Ireland, 1990s:

85-97% 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)

High levels of predation (+ loss/degradation of breeding habitat) ➡ reduced breeding success

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M4971a M4972 M4974 M4973 F5546 M5545a M5544 F5543 F4971b M5545b

Untagged foxes

N

100 m

16 Mar 2016 06:32
16 Jun 2016 23:50

Franks *et al.* 2017. *Bird Study*, 64: 393-409.

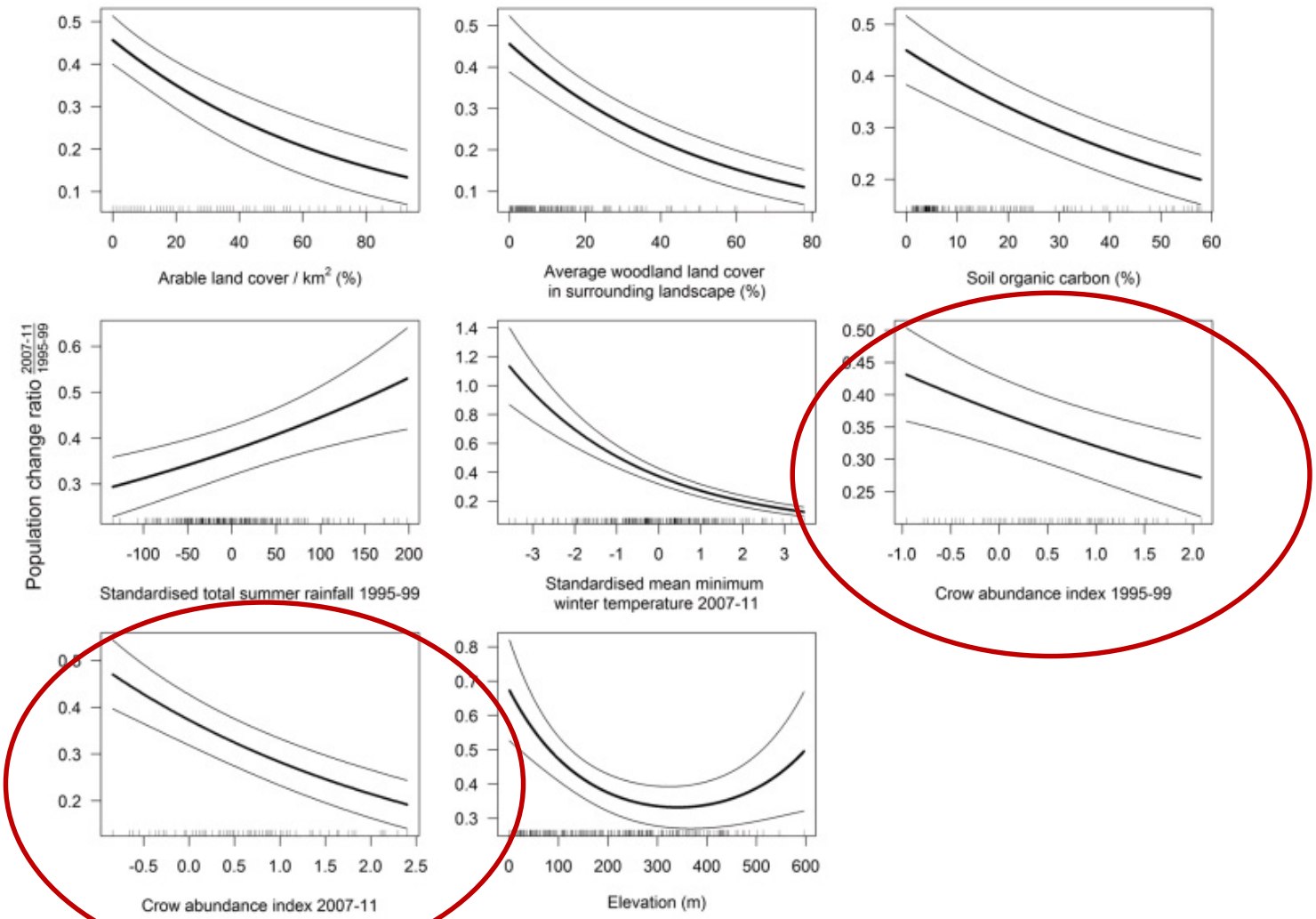
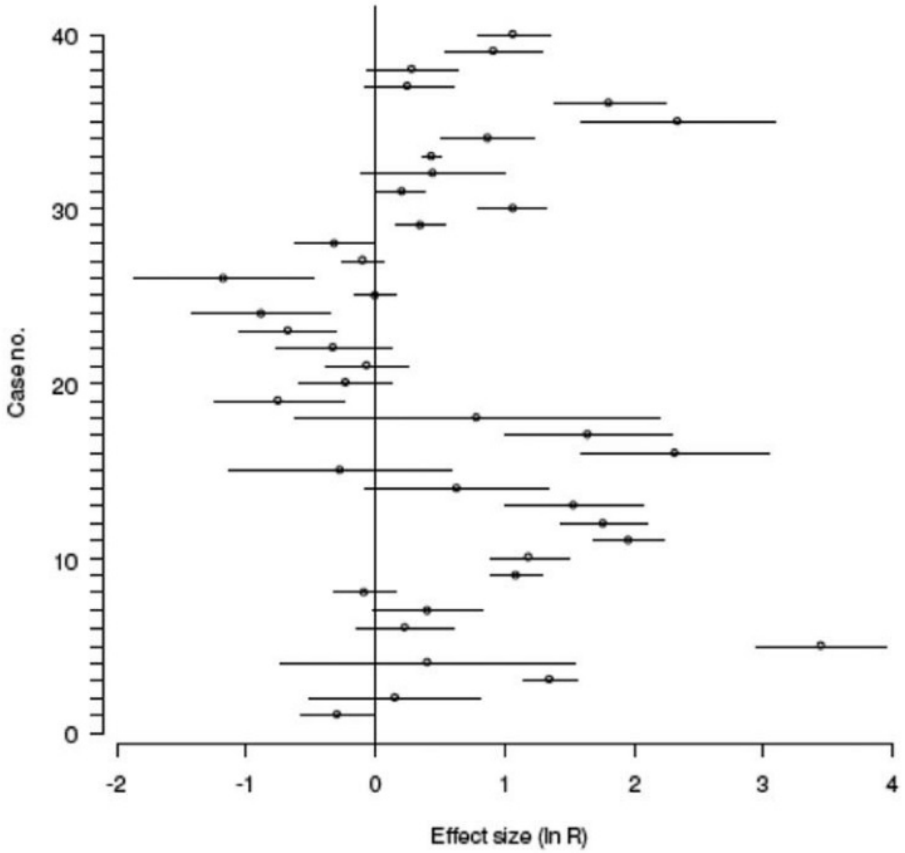


Figure 3. Relationships between Curlew population change and significant environmental predictors in the final minimum adequate GAM. The 1 km squares included in the analysis ($n = 241$) were those surveyed in both periods and where Curlew increased, remained stable, declined or went extinct. Population 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.

Meta-analysis of 40 cases investigating predator impacts on prey in the UK



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

Figure 1. Plot of effect sizes (ln R)±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).

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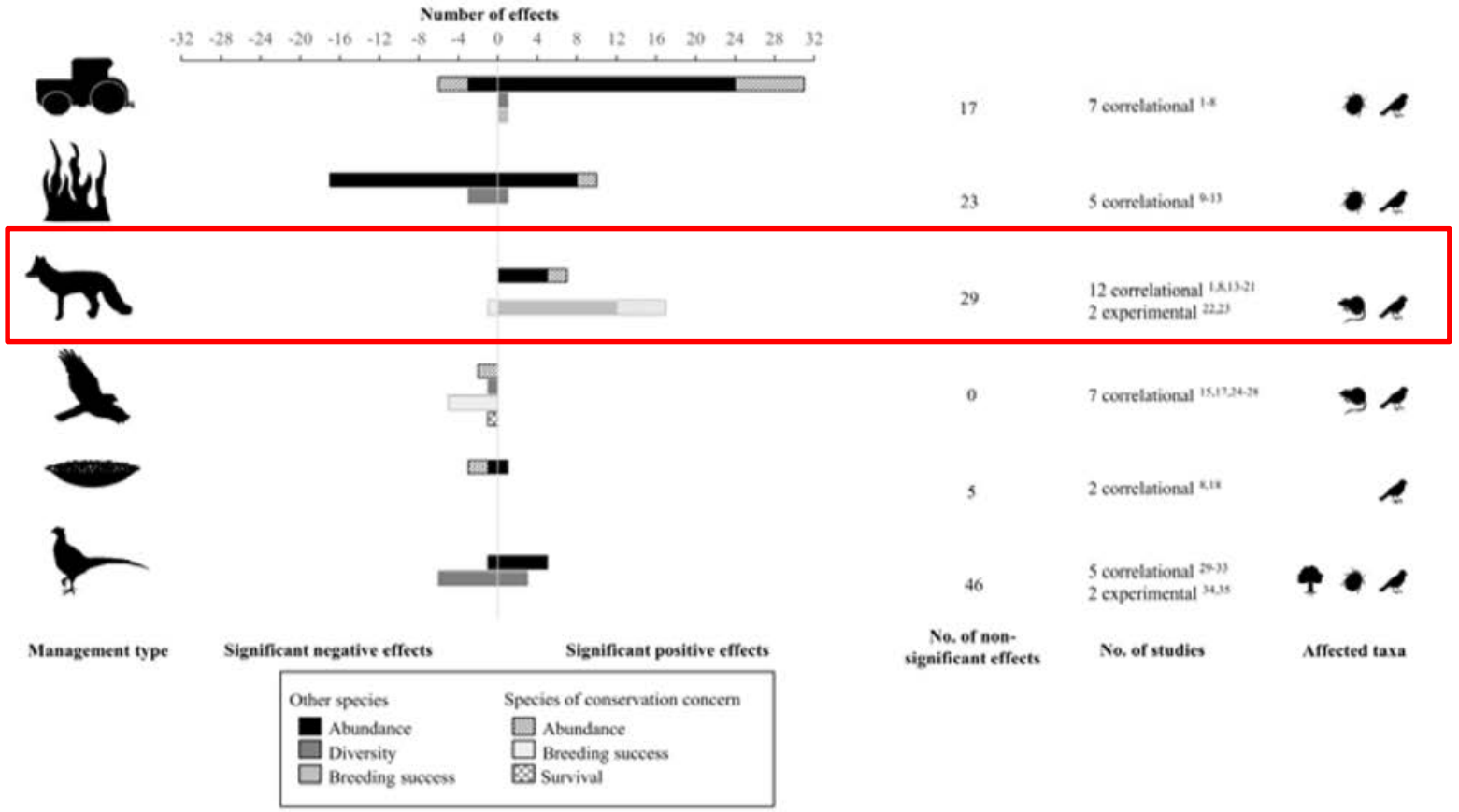
Review of 35 studies; 13 investigating effect of predator control on non-target species, UK



Mustin *et al.* 2018, *J. Appl. Ecol.* 55: 2285-2295

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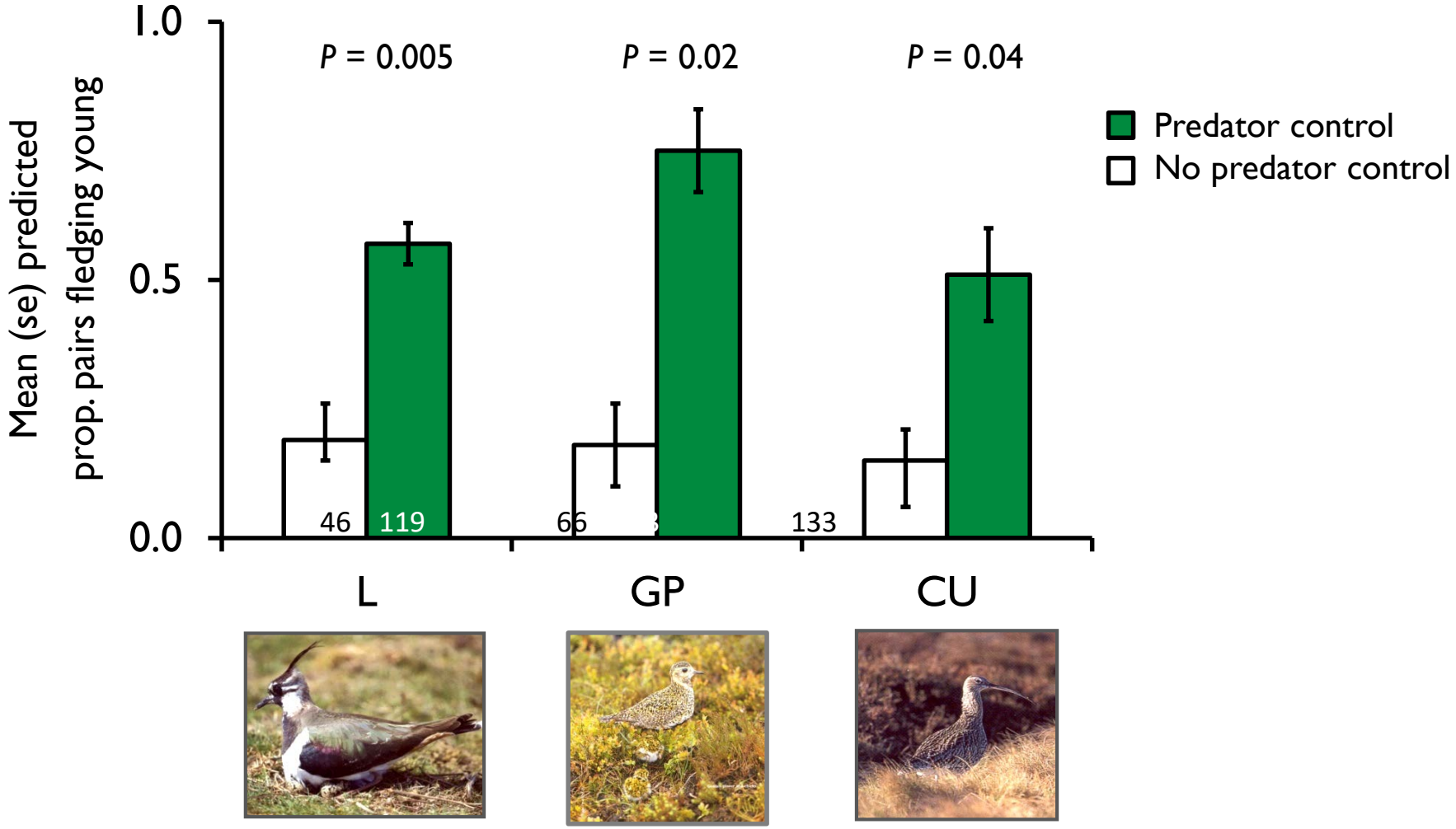
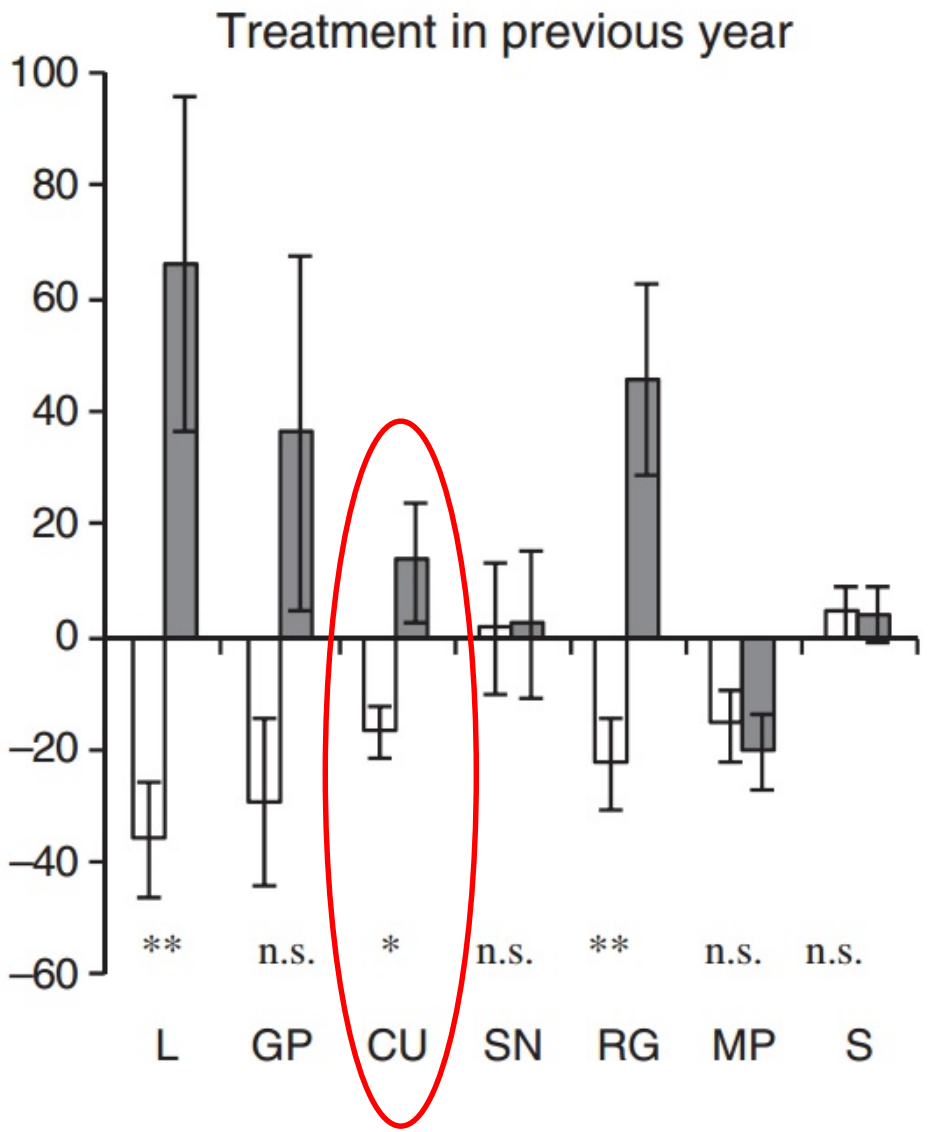
Experimental predator control, moorland: wader breeding success

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

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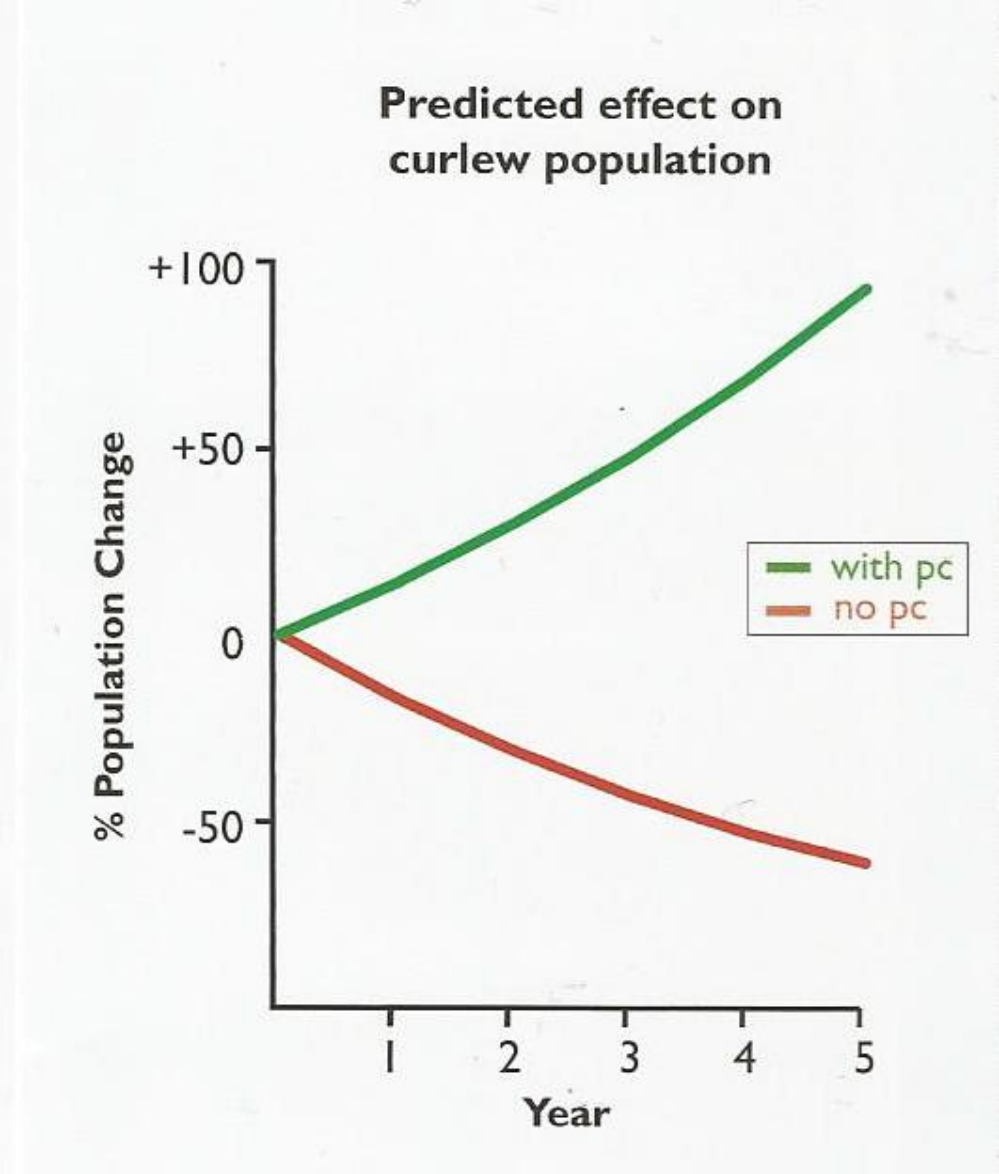
Predicted population trends



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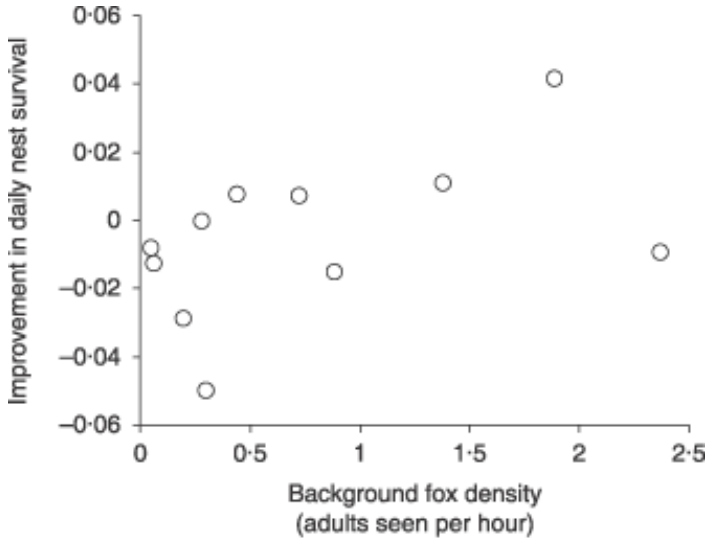
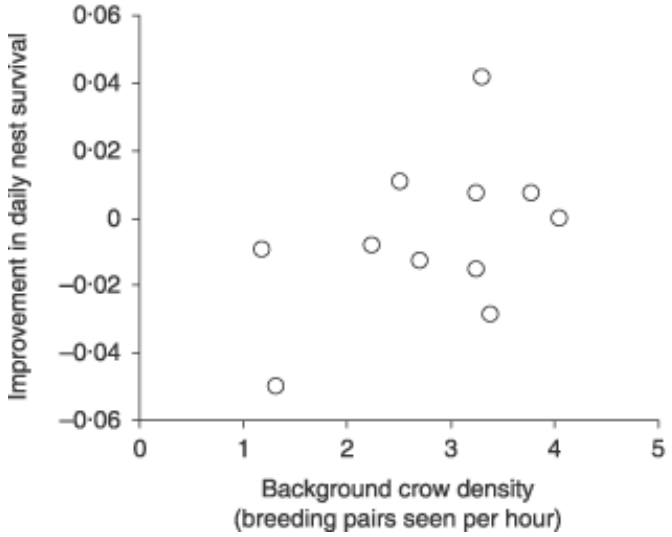
Effects may depend on predator density





Experimental predator control, lapwings on 13 nature reserves

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

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Routes to success will be different in each situation

- Predator exclusion may be a valuable addition
- High public access will make predator control difficult

Curlew population recovery

Addressing predation is likely to be necessary

- Predator control must be legal
- Focus on February-July
- Appropriate scale; collaboration with neighbours

- Competent practitioners, following best practice

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