Contextualising the risk to breeding birds from spring seed treatments: UK example

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Cambridge Environmental Assessments

Background

- Environmental risk assessments for Plant Protection Products. Seed treatments.
- Avian risk assessment
  - Acute
  - Long term (reproduction)

Bayer CropScience

RSPB

Risk assessment

- Tiered assessment scheme
- Early tiers conservative; scope for refinement
  - Residues, diet
- Nonetheless, fairly high ‘failure’ rate
- Assumes
  - One field basis
  - Breeding coincides with spring application/drilling (varies with MS)

Guidance

- EFSA (2009):

  "*An avian reproductive toxicity study and associated risk assessment should* ***not*** *be necessary* ***if it can be demonstrated that exposure will not occur*** *during the reproductive season for birds*." **Temporal aspects?**

- "*Factors that could potentially reduce the risk of population consequences include:*
  - ***The proportion of the population that is exposed*** *to an active substance at* ***any one time*** *(including the* ***area likely to be treated*** *in relation to population distribution)*" **Temporal and spatial aspects?**

Scenario

- Risk assessment for Skylark slightly below trigger value for safety
- Relatively minor, spring drilled crop
- UK

Aim

- Test assumptions, add realism, contextualise the assessment:
  - To what proportion of breeding activity might the long term assessment apply?
- Do this by:
  - Comparing timing of breeding to timing of drilling
  - Land area under crop of concern
- ***Description of a simple method***

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Question 1: To what extent do breeding and drilling activity coincide?

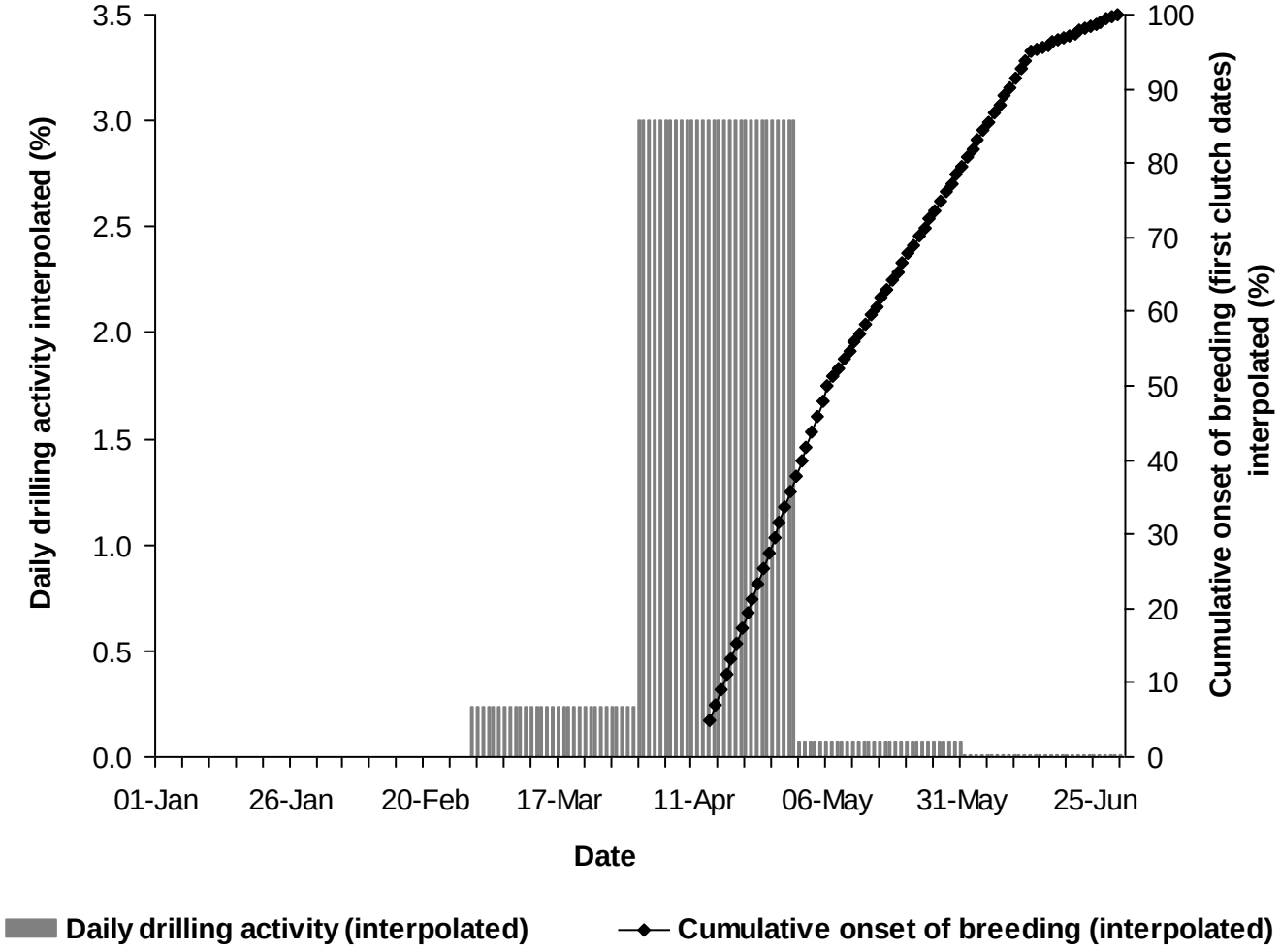
Temporal aspects

Temporal aspects

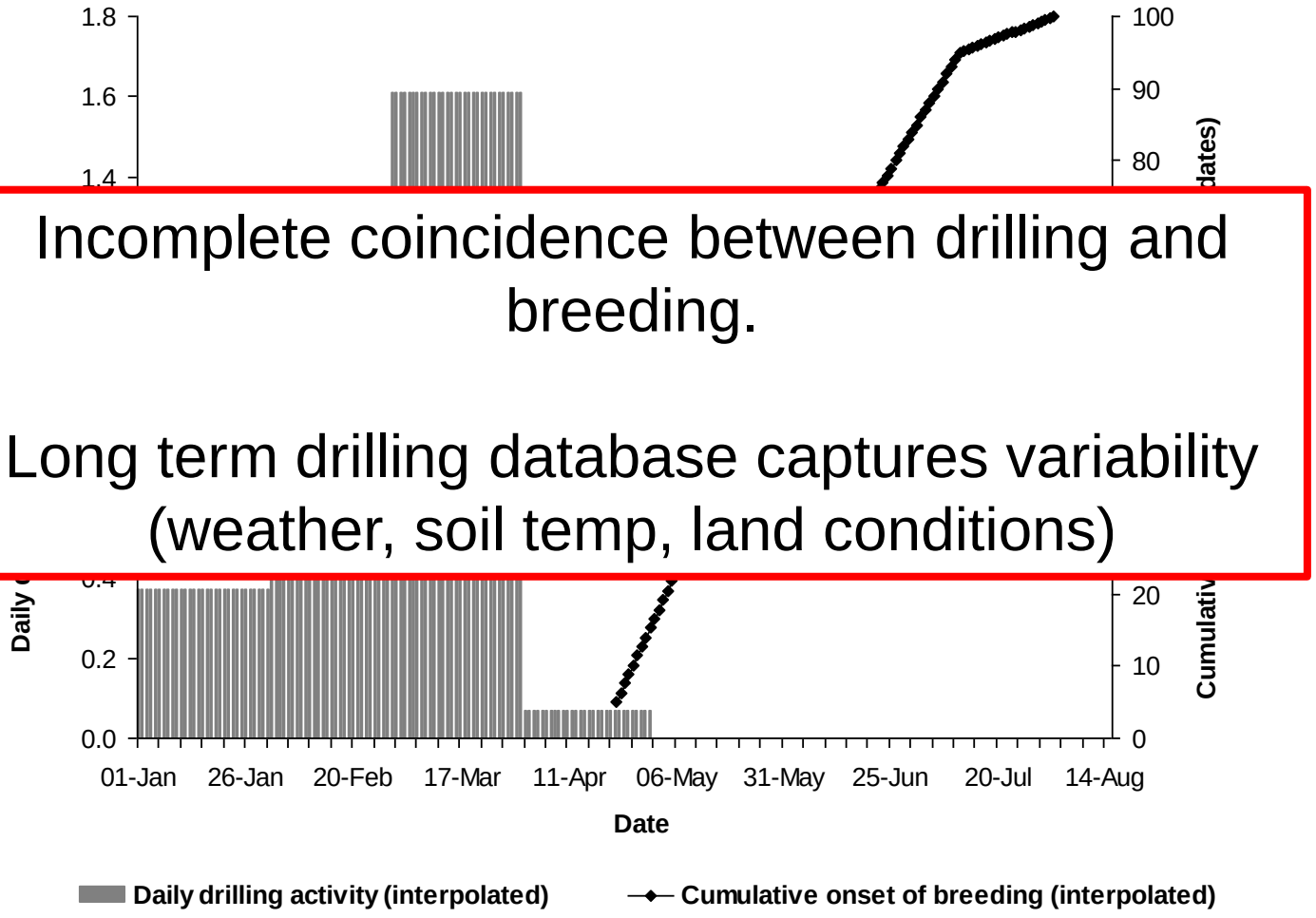
- Requires data on:
  - Timing of onset of breeding in focal species
  - Timing of drilling activity

- Published egg laying dates, by English region
  - Adjusted for pre-egg laying activities. PS2364.
- Drilling activity
  - 10 yr dataset, by month & region. Provided by client
  - *Analogous ADAS database available*

Temporal aspects – worst case



Temporal aspects – best case year



Incomplete coincidence between drilling and breeding.

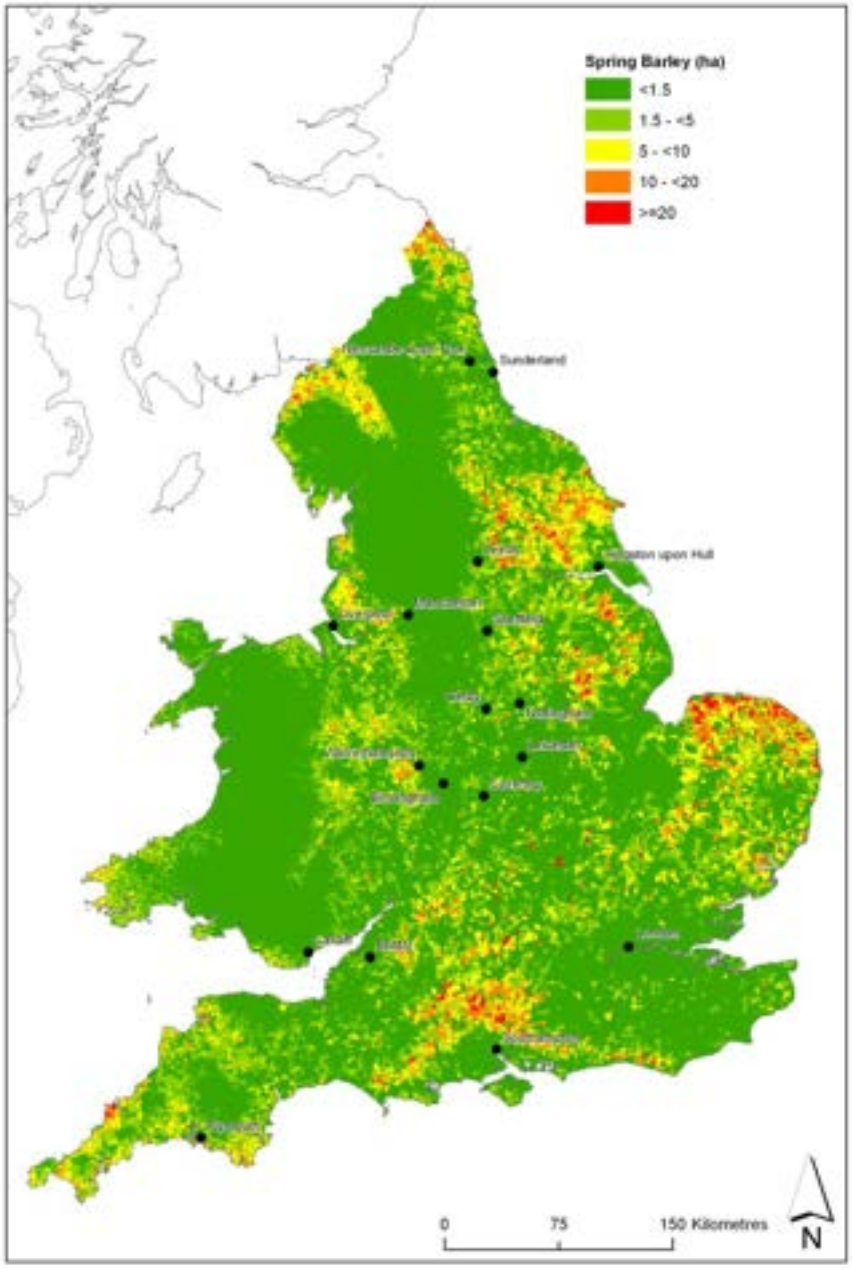
Long term drilling database captures variability (weather, soil temp, land conditions)

Question 2: How likely are Skylark to nest within foraging range of newly drilled crop?

Spatial aspects

Spatial aspects: Land cover

- Distribution & density of crop at a regional scale
  - Census data
  - Eng, Wal, Sco, NI
- Worst-case regions identified
  - Density, total area
  - Representative of other regions
- Can this be used to infer exposure at regional population level?



Spatial aspects: foraging ecology

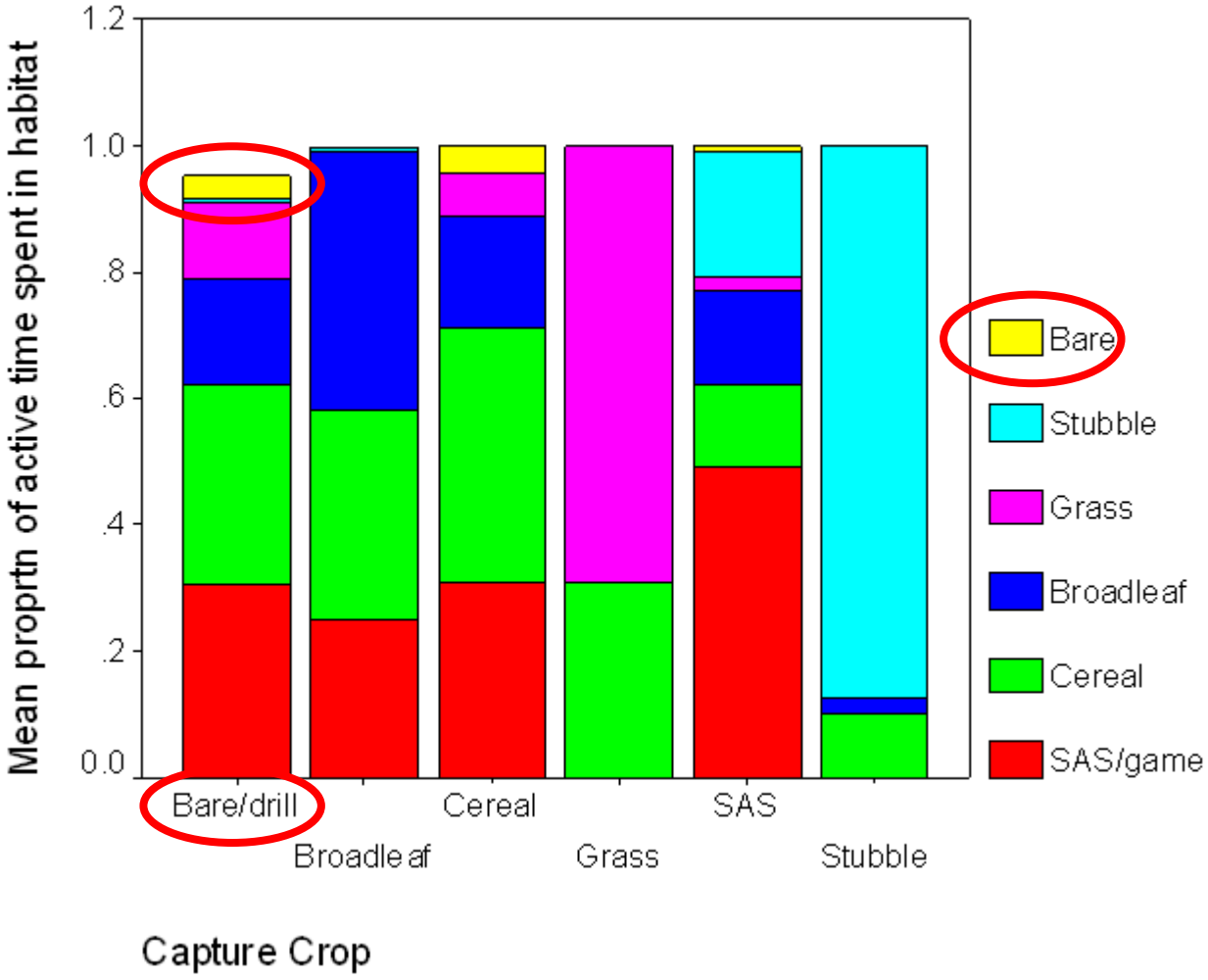
- No good if Skylark actively seek out crop of concern!
- Important to understand breeding & foraging ecology in relation to land use

- In this case (Skylark, spring barley), considered that land cover can be used as an indicator of likely encounter rate at regional population level…

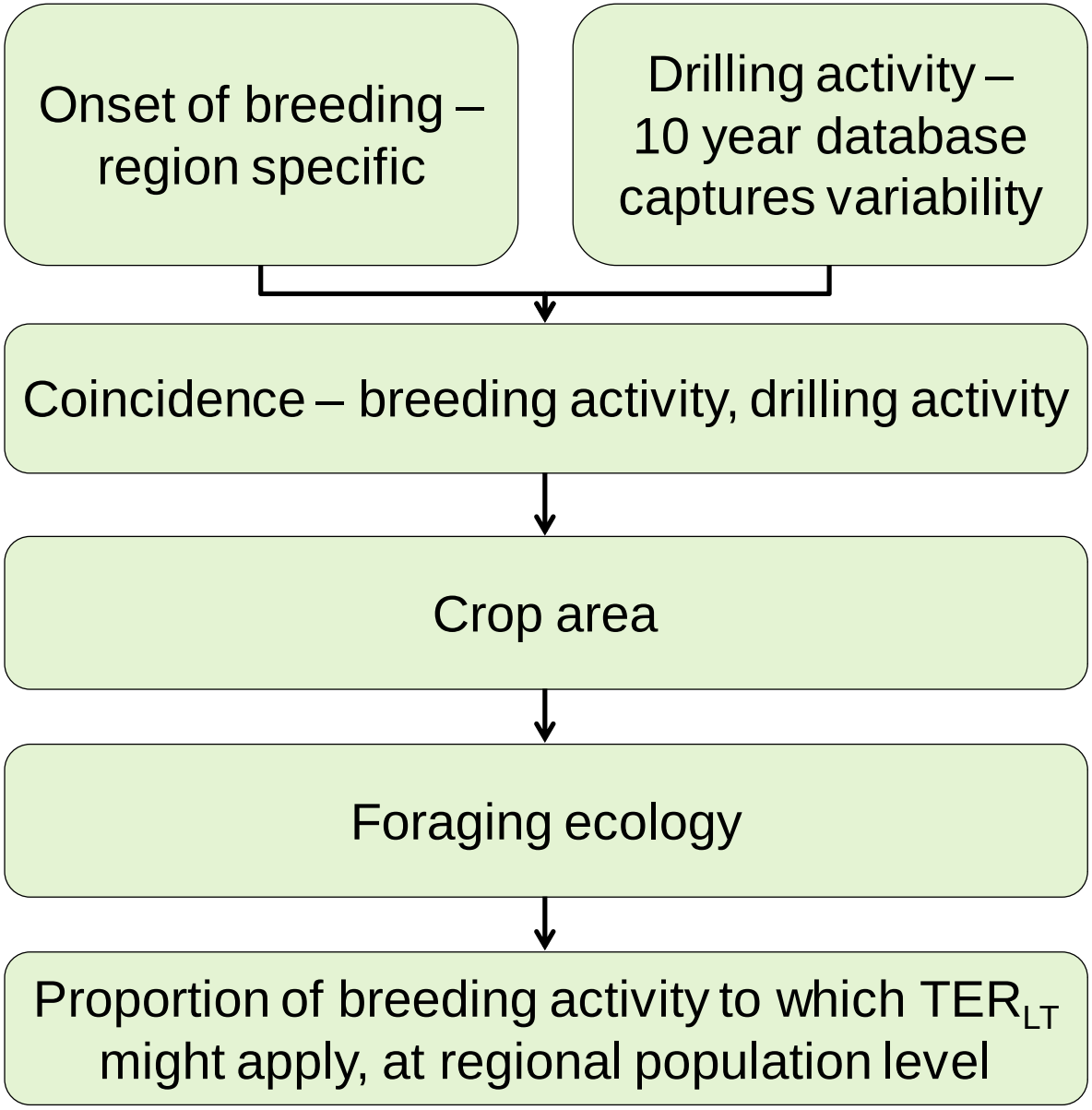
Themes from literature

- Skylark like to nest in spring cereals, but only after germination
- There are optimum crop heights for nesting
- Crops are abandoned as nesting sites when too dense/tall
- Access to soil surface critical – for invertebrate foraging
- Territories are restricted – foraging flights 200-300 m, decline with development of young
- Newly drilled fields do not appear to be favoured as a foraging habitat during breeding

PN 0915



Proportion of active time spent by Skylarks in major habitat types (y) according to the habitat type in which they were caught (x), from April - August. SAS = set-aside/game bird cover. After Crocker et al (PN0915).



Temporal aspects

Spatial aspects

~2%

Sensitivity & uncertainty analysis

- What effect do changes in drilling time have?
  - April. Breeding commences, 55% onset by 30th
  - 90% drilling in April, Scotland, 2006
  - Artificially adjusted cropping dates to end April
  - Only slight increase in overall coincidence of drilling and breeding activity, when spatial aspects included
- Key aspect was % land cover
- But worst-case scenario is not necessarily area with highest crop coverage
  - Interaction between all factors

Summary

- Drivers & mitigation of farmland bird decline:
- Habitat heterogeneity
  - Varied & successive foraging & breeding opportunities
- Skylark plots
  - Prolonged breeding season; productivity up by 50%;
- Loss of winter stubbles
  - Spring cropping!
- Output – risk management; input for population model
- Challenge: what does 2% exposure to TER_{LT} 4.5 mean for productivity? Validation of TER_{LT}?

Thanks for your attention

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