

OCCUPANCY MODELING FOR BOBWHITES IN OKLAHOMA



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PAO and Index of Abundance

Index

- No defined relationship between abundance and call count index

Proportion of Area Occupied

- Done using presence/absence surveys
- May act as a surrogate for abundance

Standard Presence/Absence

Normally analyzed with logistic regression

Does not account for detection probability

Low detection probabilities can lead to extremely low-biased PAO estimates

Occupancy Modeling: Accounting for Detection Probability

$$\psi(obs) = \psi \times p$$

$$\psi = \frac{\psi(obs)}{p}$$

Questions

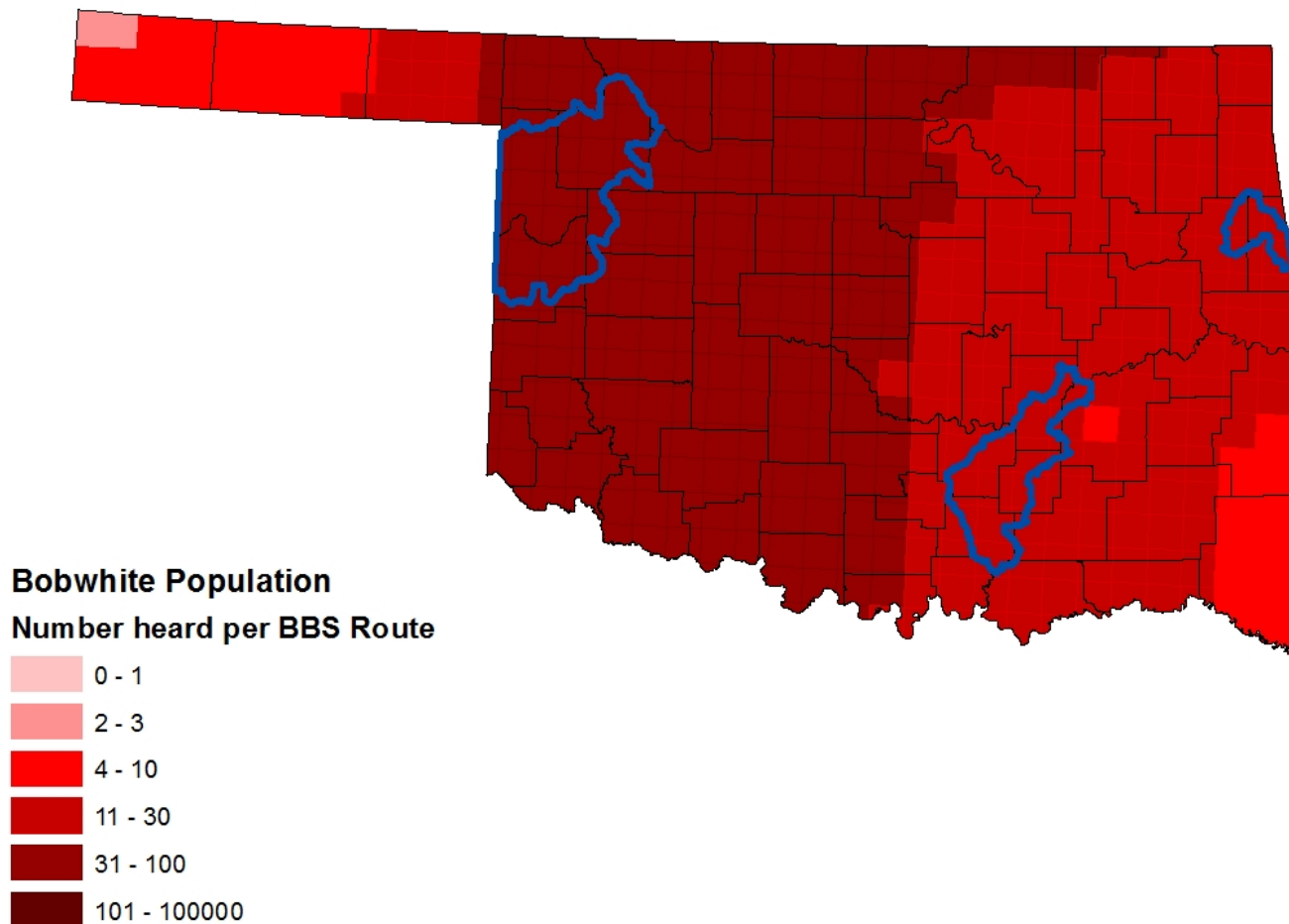
How does PAO estimate change based on:

1. Number of surveys per year?
2. Abundance of bobwhites in region?
3. Accounting for detection probability?

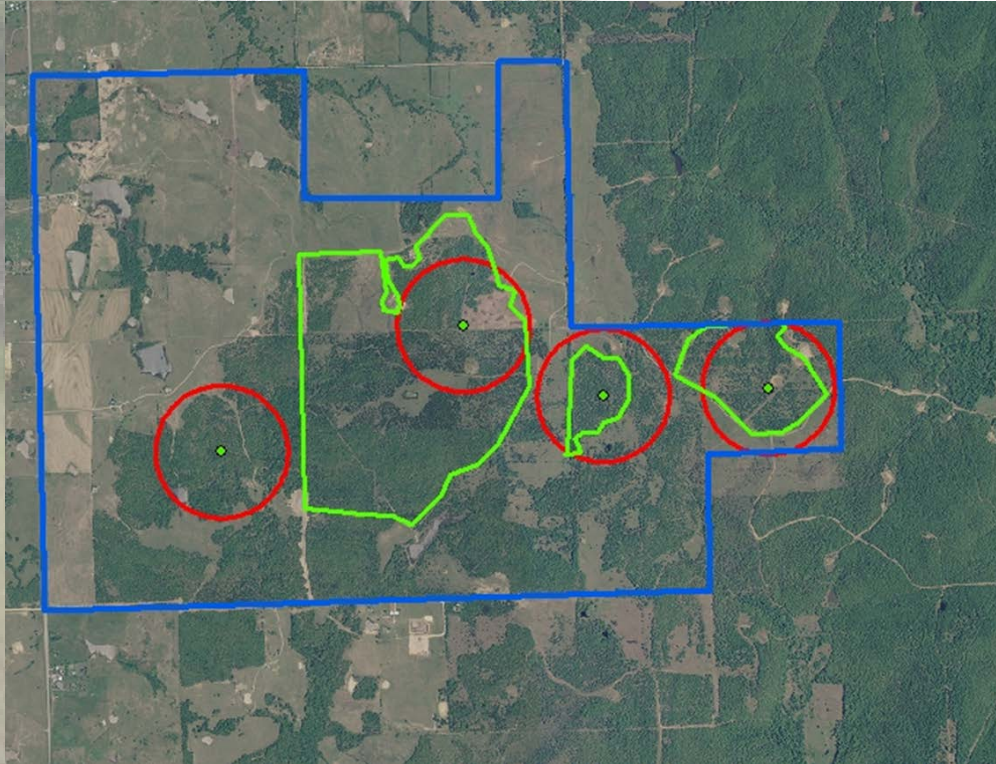
How does time during the breeding season effect detection probability?

Population

From BBS Routes 1966-2003



Sample Unit Placement



3 Surveys per Year (2009-2011)

Mid-May – Late July



Analysis

Analyzed Presence/Absence using 1, 2, and 3 surveys/year

Calculated detection probability and occupancy using 2 and 3 surveys/year

Regression of detection probability on Julian day

Results

Uncommon

Sites = 31

Site \times year = 91

Detections = 21

Common

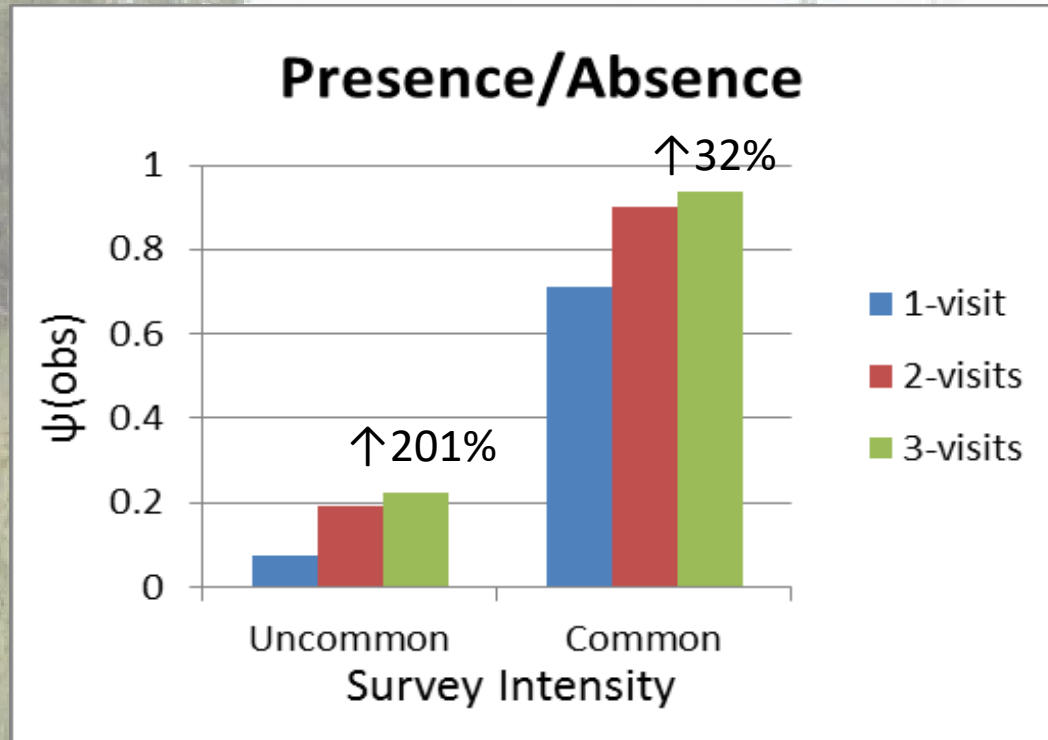
Sites = 27

Site \times year = 80

Detections = 75

Presence/Absence

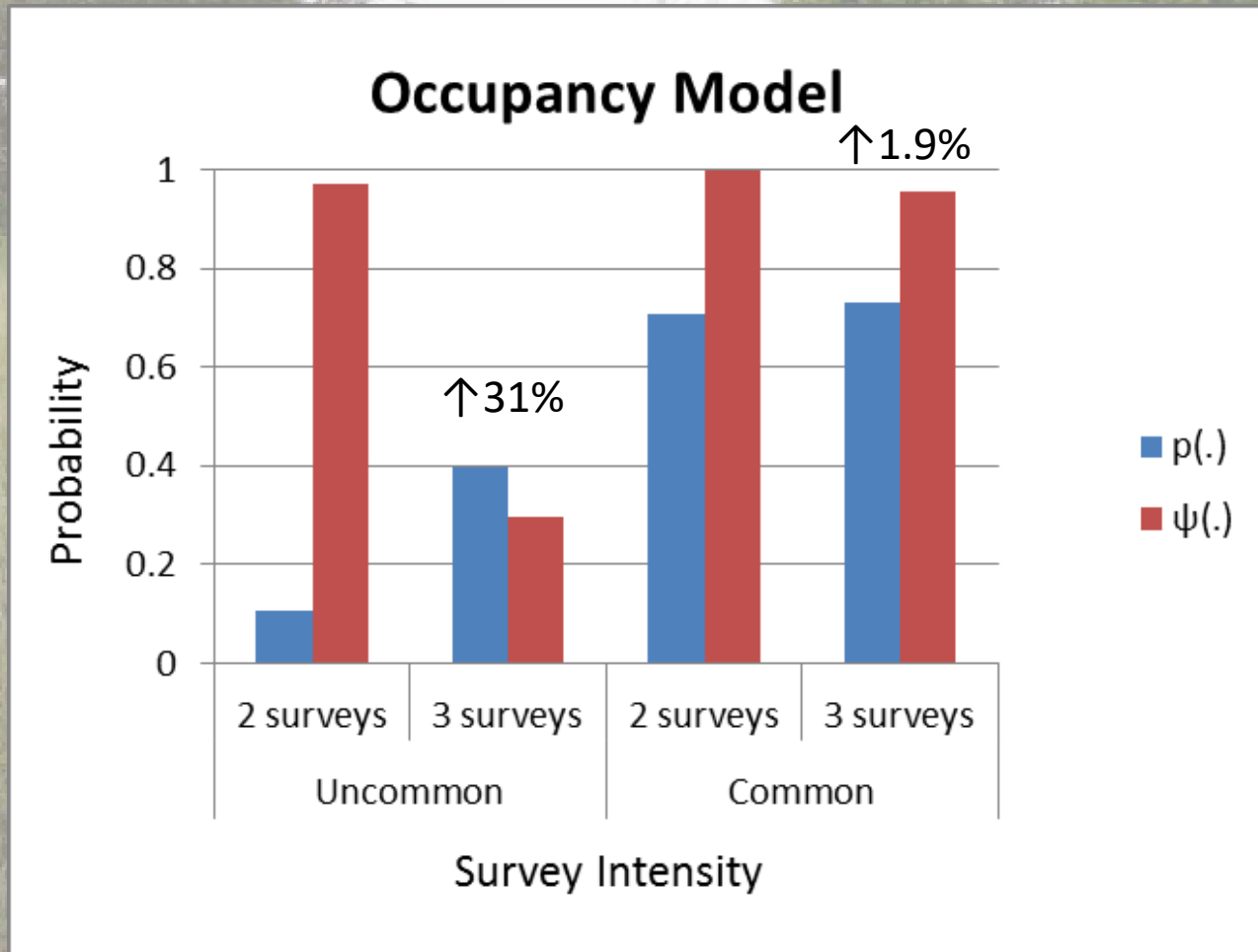
(not accounting for detection probability)



Compared Intensities	p-value	
	Uncommon	Common
1 and 2	0.002569	6.15E-05
1 and 3	0.000512	2.15E-05
2 and 3	0.2482	0.4795

Occupancy Model

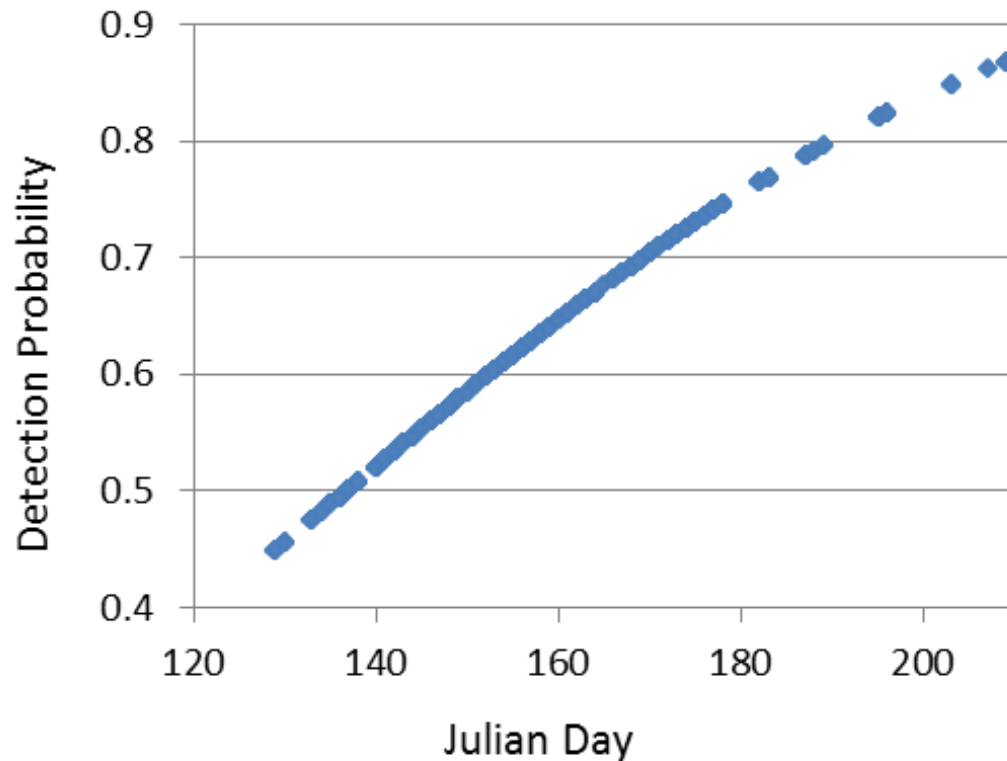
(accounting for detection probability)



Compared Occupancy Estimates

	<i>1-visit</i>	<i>2-visits</i>	<i>3-visits</i>	$\psi(2\text{-visits})$	$\psi(3\text{-visits})$
Uncommon	0.075	0.194	0.226	0.9704	0.296
Common	0.711	0.901	0.938	0.997	0.956

Effect of time during breeding season



Discussion

Single surveys can give very inaccurate estimates of the state of the population

Accounting for detection probability can be critical

≥ 3 surveys/year needed if bobwhites are uncommon

Management Implications

Maximizing p should be done through survey design

p varies based on N

p may be a good predictor of relative abundance

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