Habitat Associations and Flock Characteristics of Rusty Blackbirds Wintering in Louisiana

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Dr. Phil Stouffer
Dr. Mike Kaller
Dr. Sammy King

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Study Objectives

1. develop survey strategies for detecting and quantifying Rusty Blackbird presence.

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2. determine habitat requirements at spatial scales appropriate to foraging movements (100 m and 25 m)

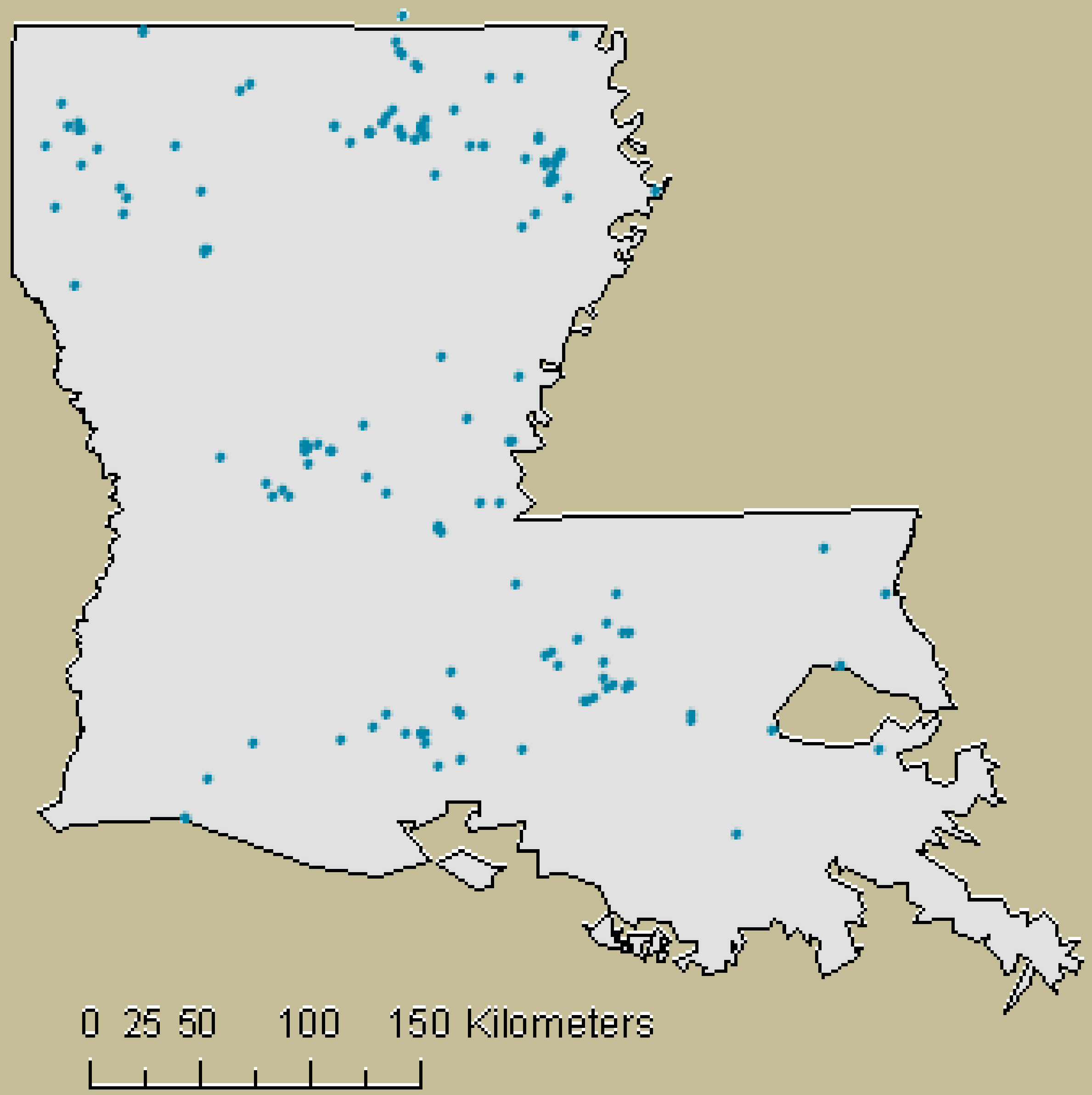
3. examine inter- and intraspecific flock associations for potential competition

1. Survey Strategy

M. Brooks

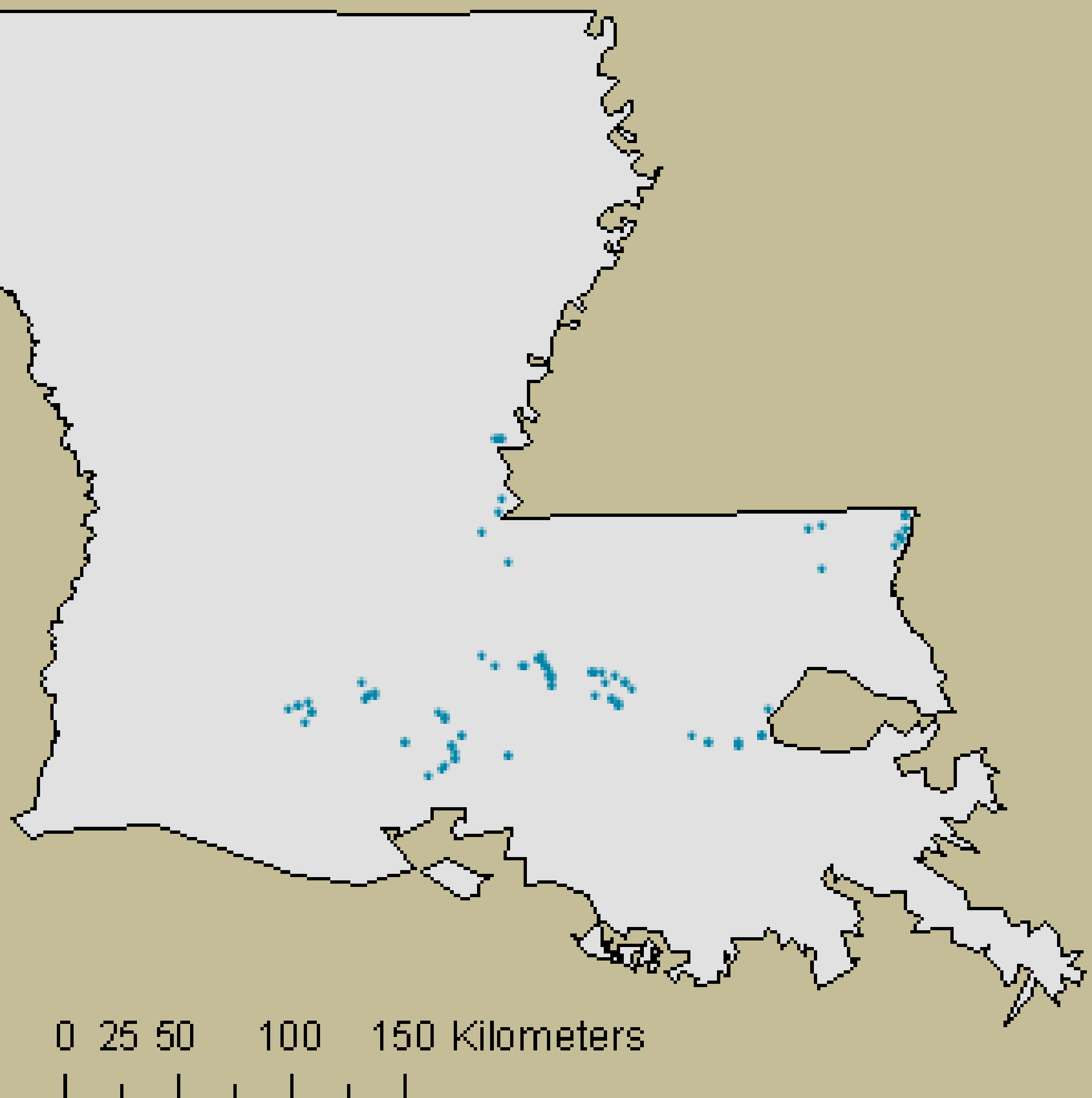
Incorporating Citizen Science

163 birder reports



Repeated Occupancy Surveys

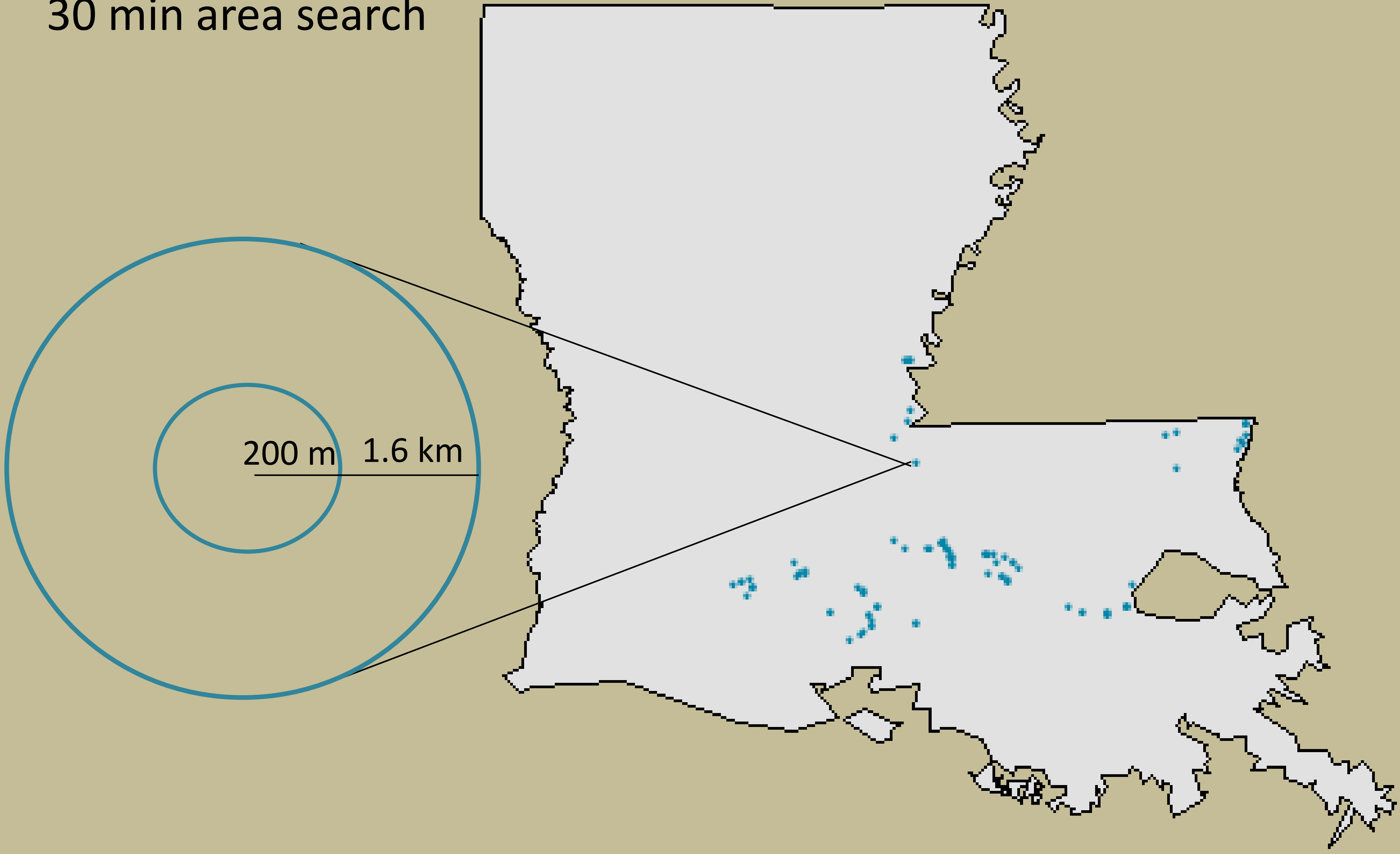
74 survey sites



Point Count Protocol

15 min point count

30 min area search



Efficiency of Site Selection

occupancy rate at “random” sites = 0.33

occupancy rate at birder-reported sites = 0.62

occupancy rate at sites from previous year = 0.67

Survey Results

recommend short point counts or transects covering large areas

74% point count birds detected within 5 mins

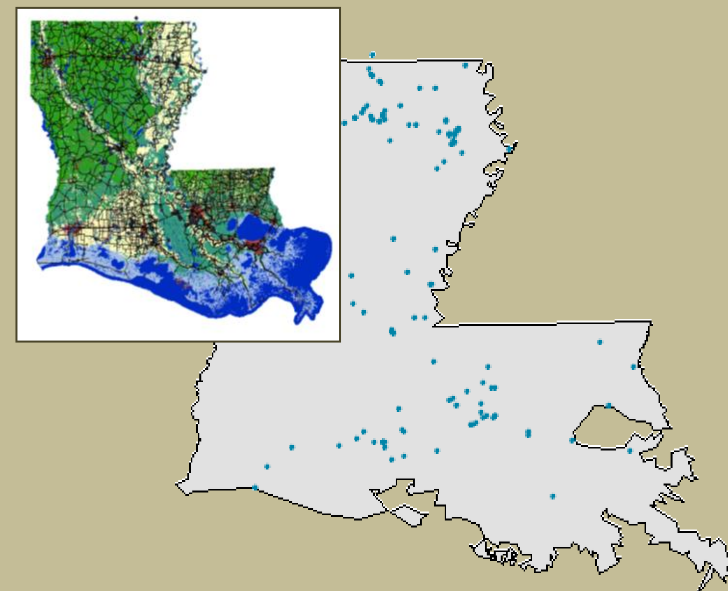
59% birds detected on extended searches

survey methods should focus on visual detection

2% response rate with playback

52% visual only detections vs. 10% aural only

Similarities Between Surveys and Citizen Science

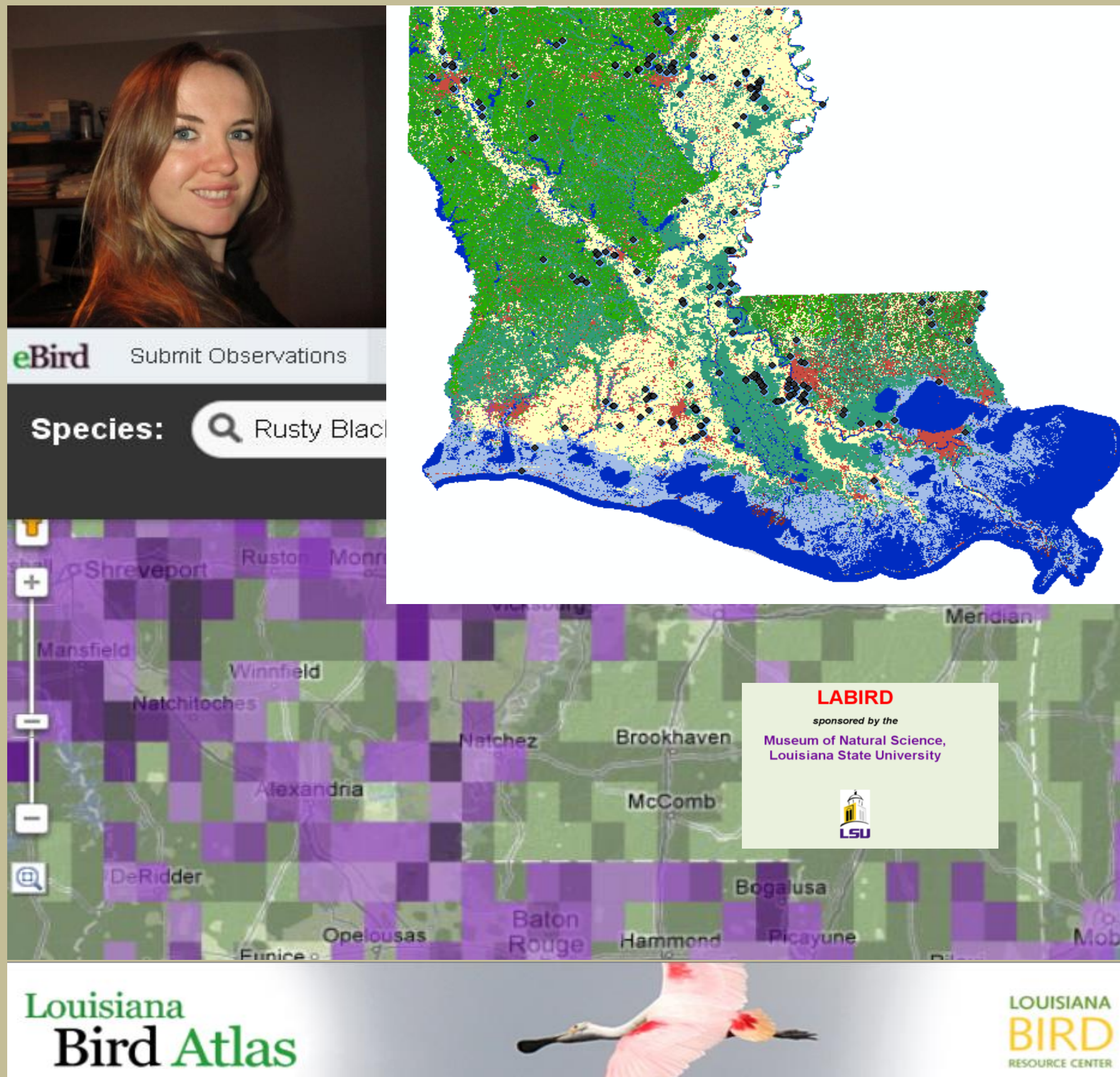


more birds in 2011 than 2010

average flock size

seasonal difference in migration timing

Potential for Future Landscape Work!



2. Foraging Habitat Requirements

Survey Protocol

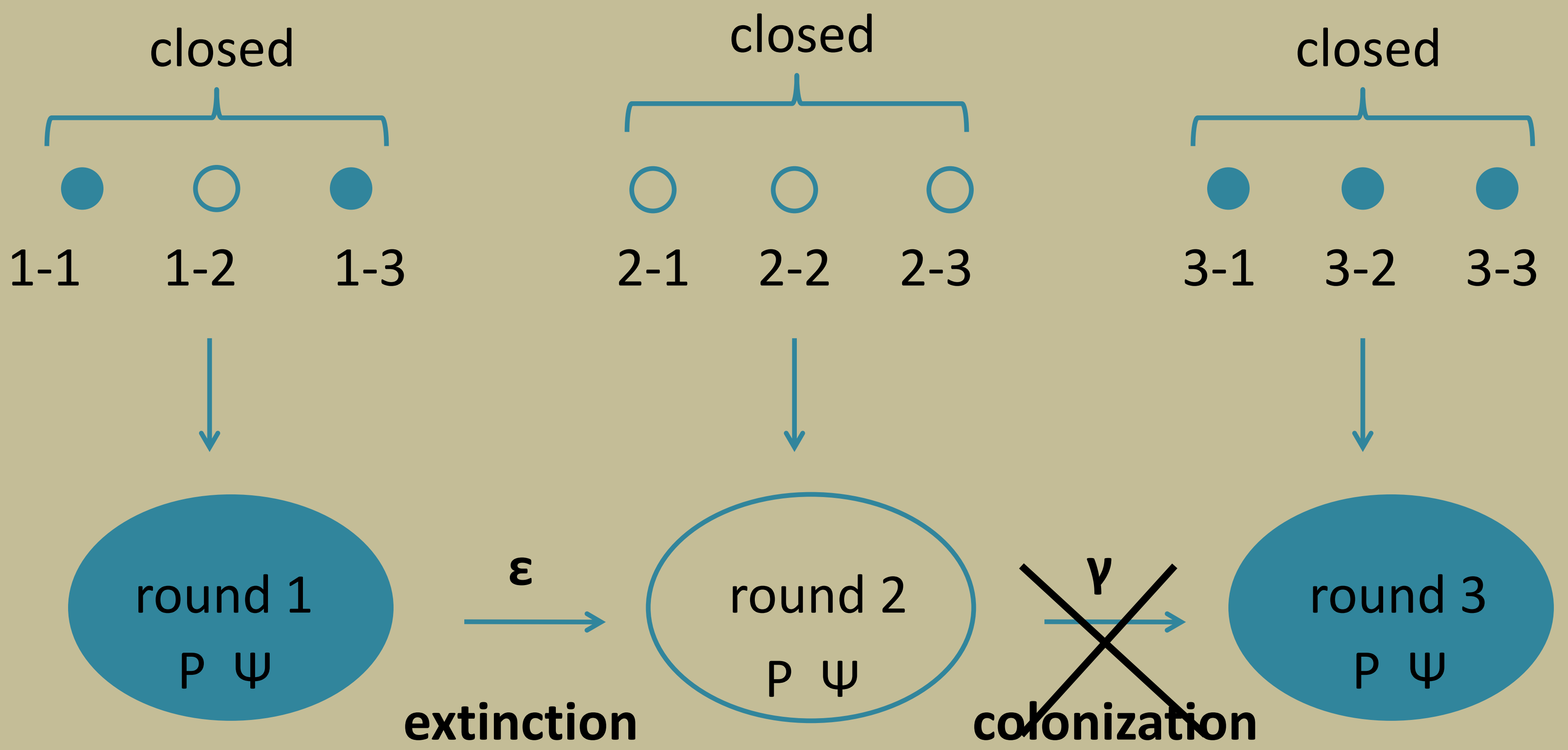
3 repeated surveys on consecutive days (closure)

3 rounds per winter (multi-season occupancy models)

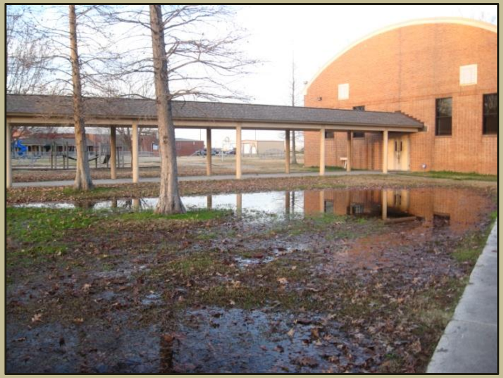
- 1 habitat survey
- 1 food availability survey

Multi-Season Occupancy Models

occupancy Ψ
detectability P



Transient Site Conditions May Be Important!






Modeling species dynamics (Ψ and ε) along with habitat covariates allows for stronger, process based, inferences.

100 m Habitat Covariates

variable	description
water	% ground covered by water
shallow	% ground covered by shallow water
grass	% ground covered by short vegetation or lawn
wetlitter	% ground covered by wet leaf-litter
toforest	average distance to nearest tree cover

100 m Habitat Model Results

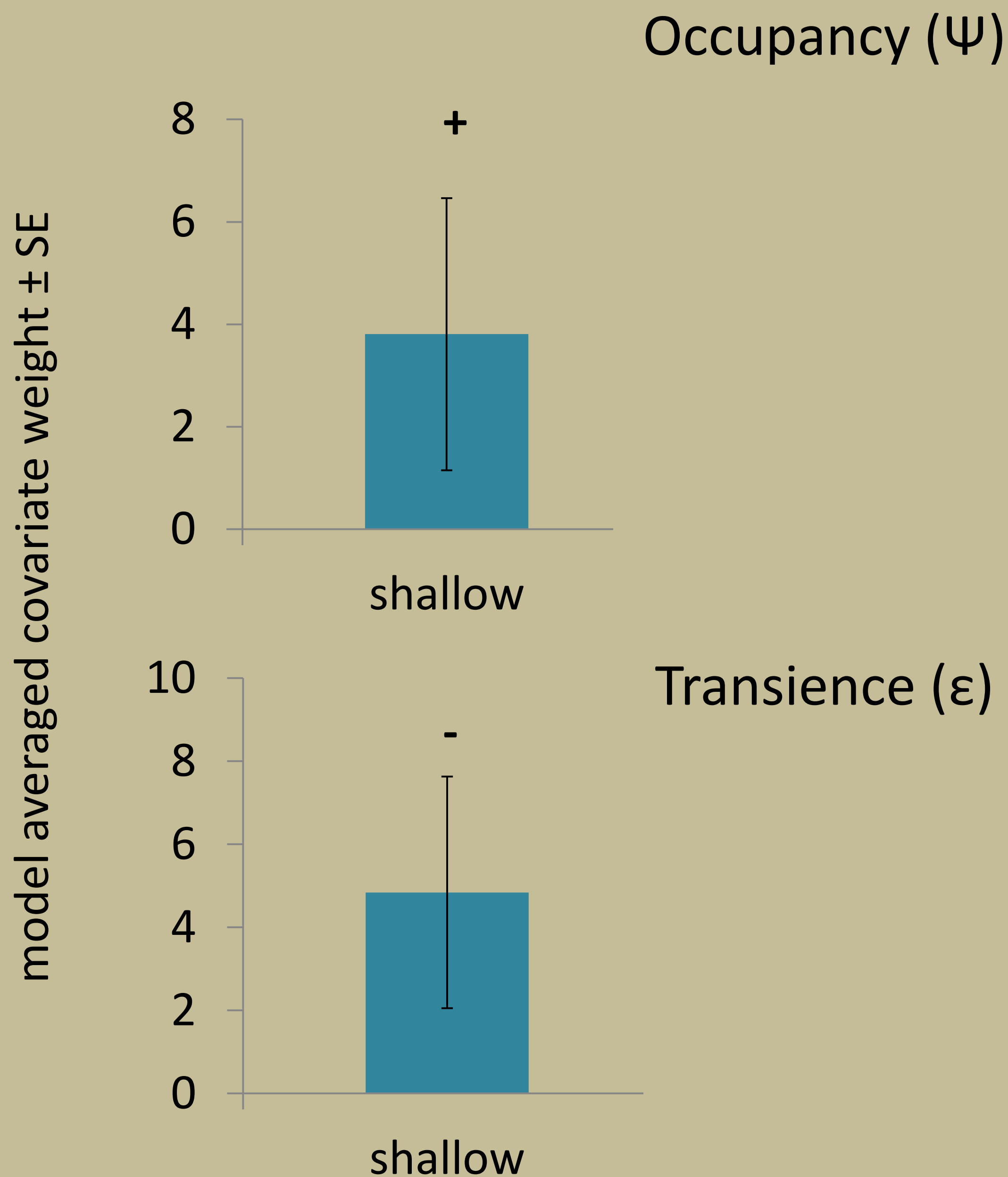
Model γ(.)P(year+round+flock)	**AICc**	**ΔAICc**	**weight**	**k**	**-2log like**
Ψ(shallow+grass)ε(shallow+grass)	464.95	0.00	0.21	11	438.62
Ψ(wetlitter+grass)ε(wetlitter+grass)	465.60	0.65	0.15	11	439.27
Ψ(water)ε(.)	466.33	1.38	0.11	8	448.08
Ψ(grass)ε(grass)	466.42	1.47	0.10	9	445.56
Ψ(.)ε(.)	469.43	4.48	0.02	7	453.71

shallow, grass, wetlitter and water

top model fit good :

Chi-square Goodness-of-Fit test (χ^2 = 33.64, df = 61, α =.05, p = 0.99)

Most Important Model Averaged Habitat Covariates



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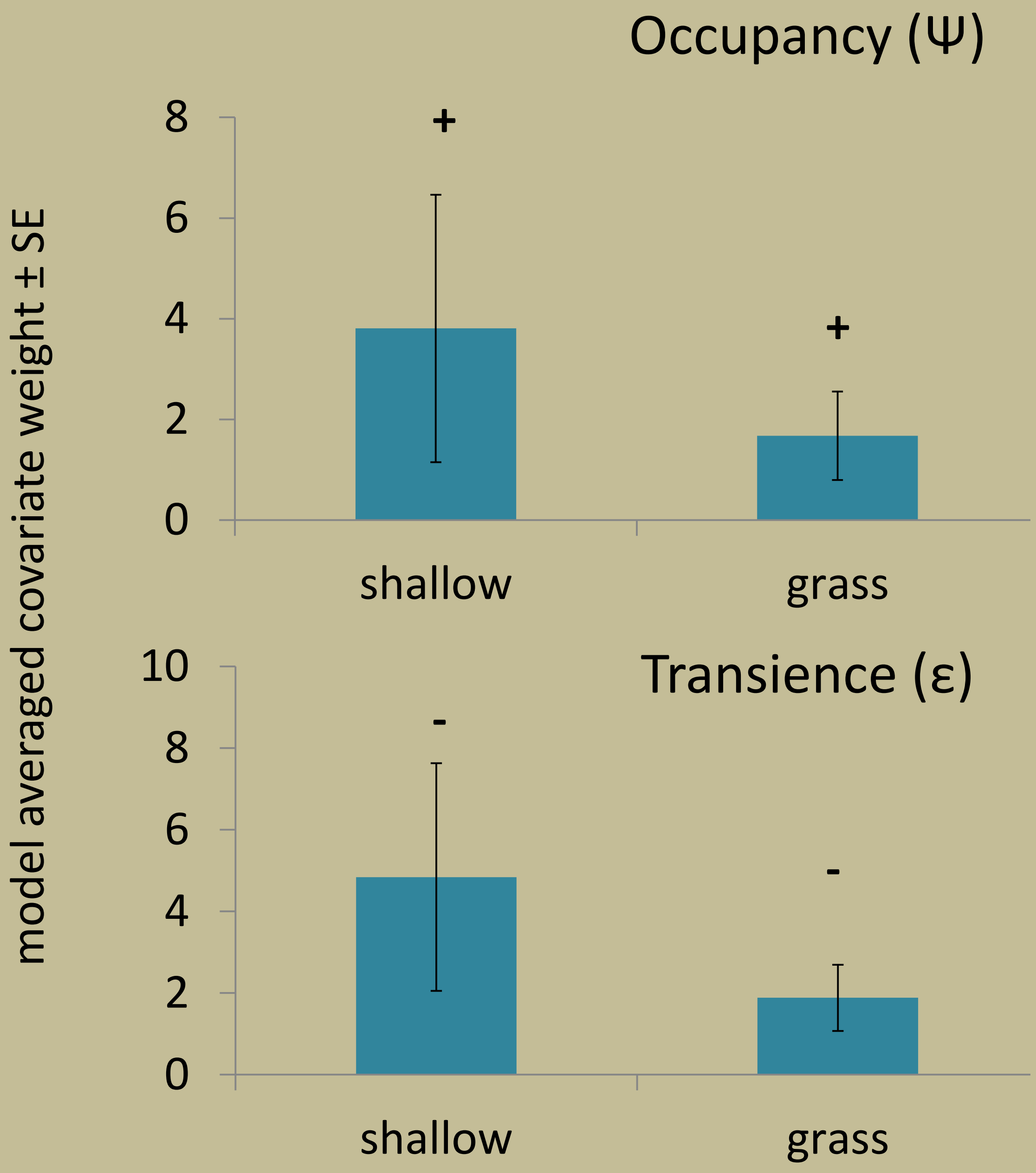

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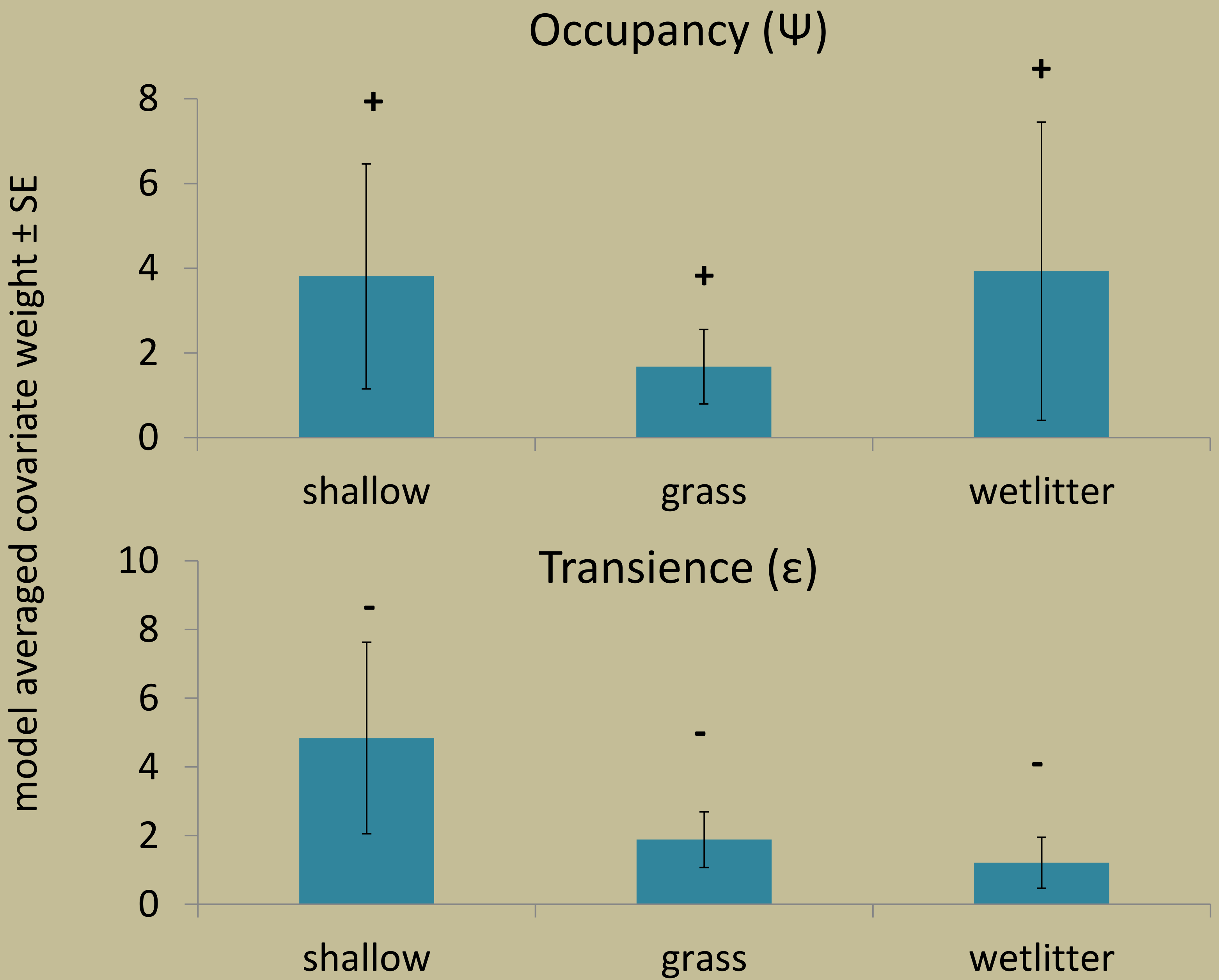

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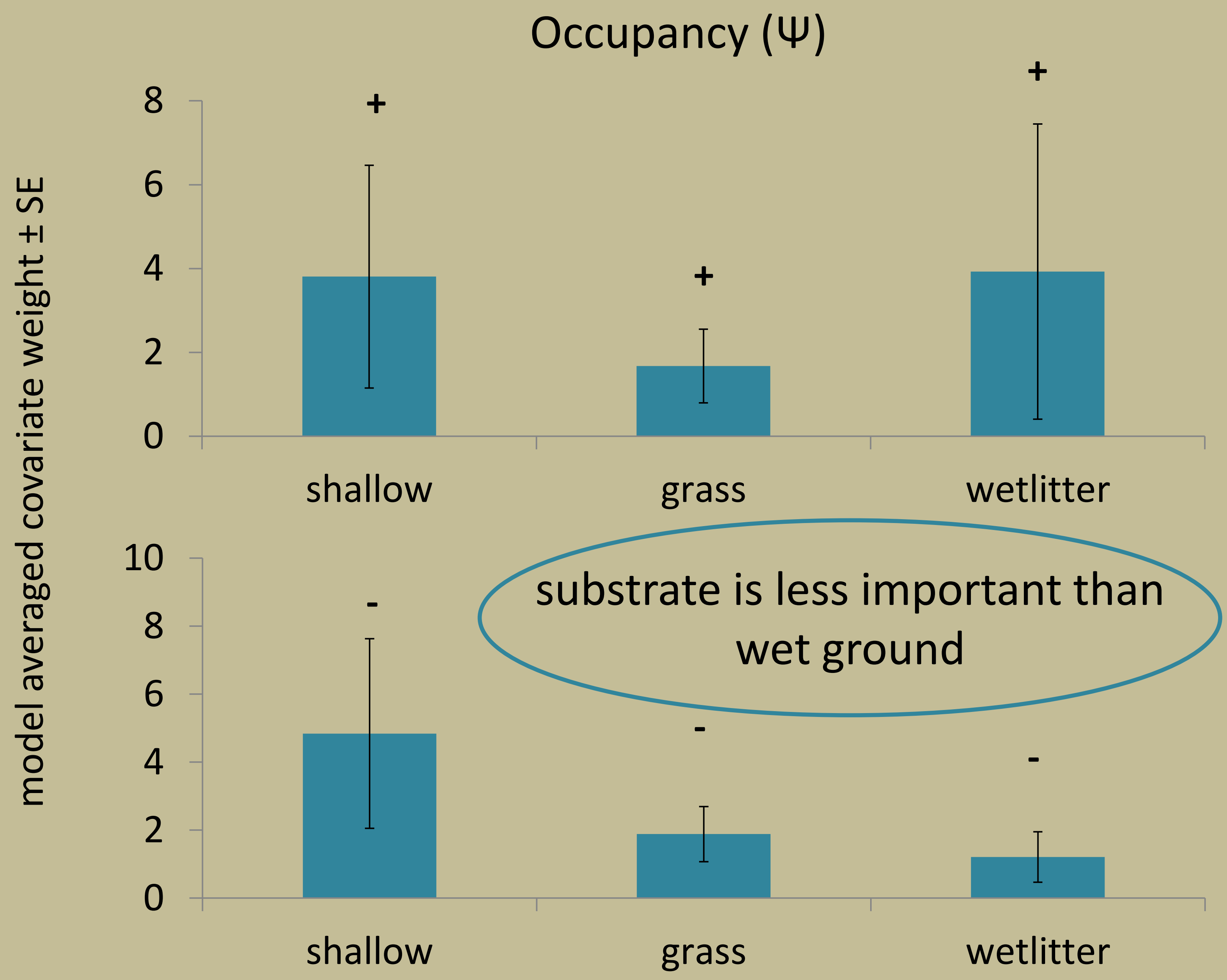


Abundance Adjusted 100 m Habitat Model Results
Ψ ≥ 7 Birds

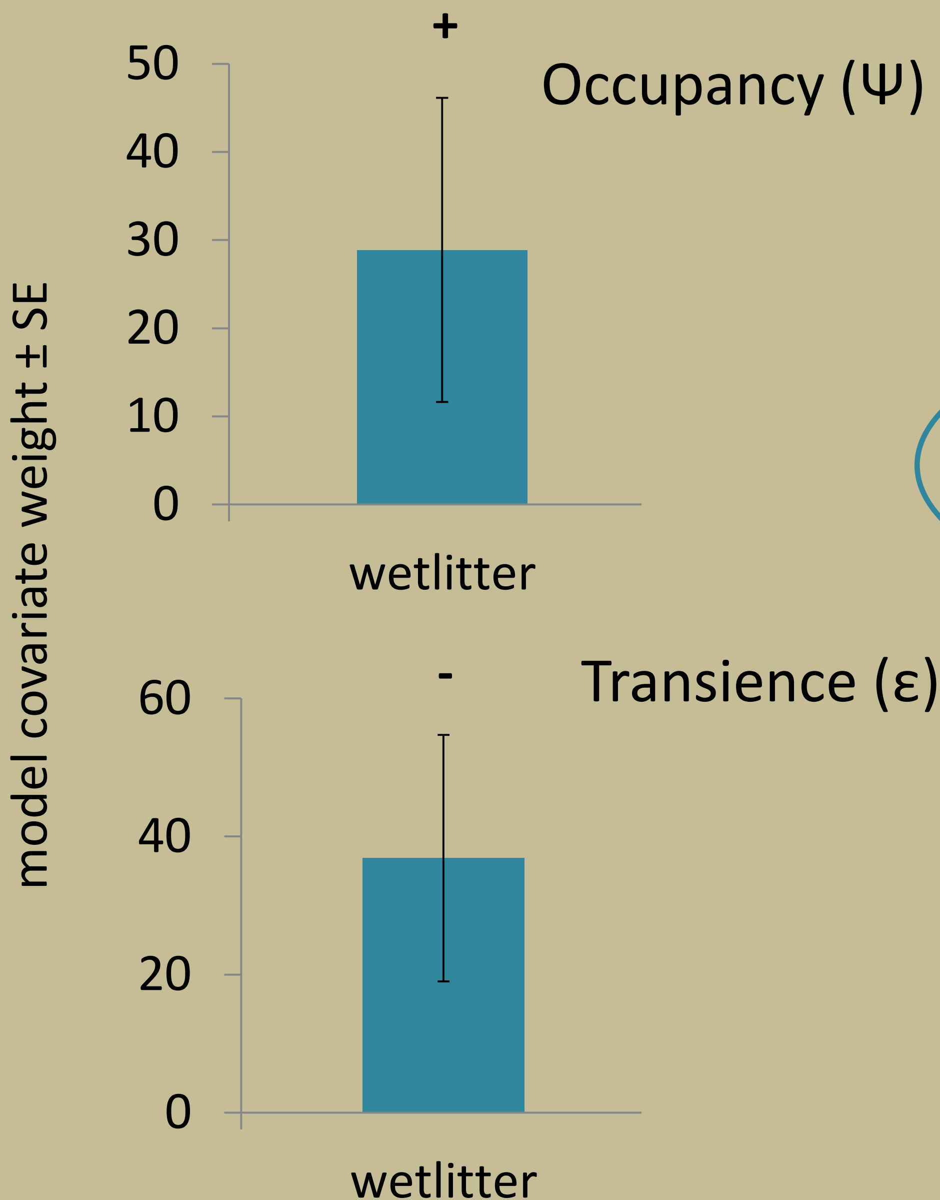
model γ(.)P(year+round+flock)	**AICc**	**ΔAICc**	**weight**	**k**	**-2log like**
Ψ(wetlitter+water)ε(wetlitter+water)	314.01	0.00	0.74	11	287.68
Ψ(.)ε(.)	327.05	13.04	0.00	7	311.33

wetlitter and water

top model fit good:

Chi-Square Goodness-of-Fit test (χ^2 = 13.50, df = 61, α = .05, *p* > 0.99)

Most Important Habitat Covariate



substrate more important
for attracting and maintaining
larger flocks

25 m Habitat Covariates

variable	description
towater	distance to water of any kind
water	water depth
litter	litter depth
visobs	average visual obstruction at 1 m height
trees	number of trees or stems >1 cm DBH
DBH	average DBH
toforest	average distance to nearest substantial tree cover

25 m Habitat Model Results

model	AICc	ΔAICc	weight	k	-2log like
Ψ(visobs)γ(.)ε(.)	327.66	0.00	0.3735	7	310.05
Ψ(visobs)γ(.)ε(towater)	329.53	1.87	0.1466	8	308.73
Ψ(.)γ(.)ε(.)	335.49	7.83	0.0074	7	317.88

Ψ -visobs
ε -towater

top model fit good:

Chi-Square Goodness-of-Fit test (χ^2 = 19.50, df = 31, α = .05, p = 0.95)

Importance of Sampling Scale

scale of measurement should reflect site use

movement >25 meters

transience of habitat characteristics

larger scale better

Habitat Conclusions

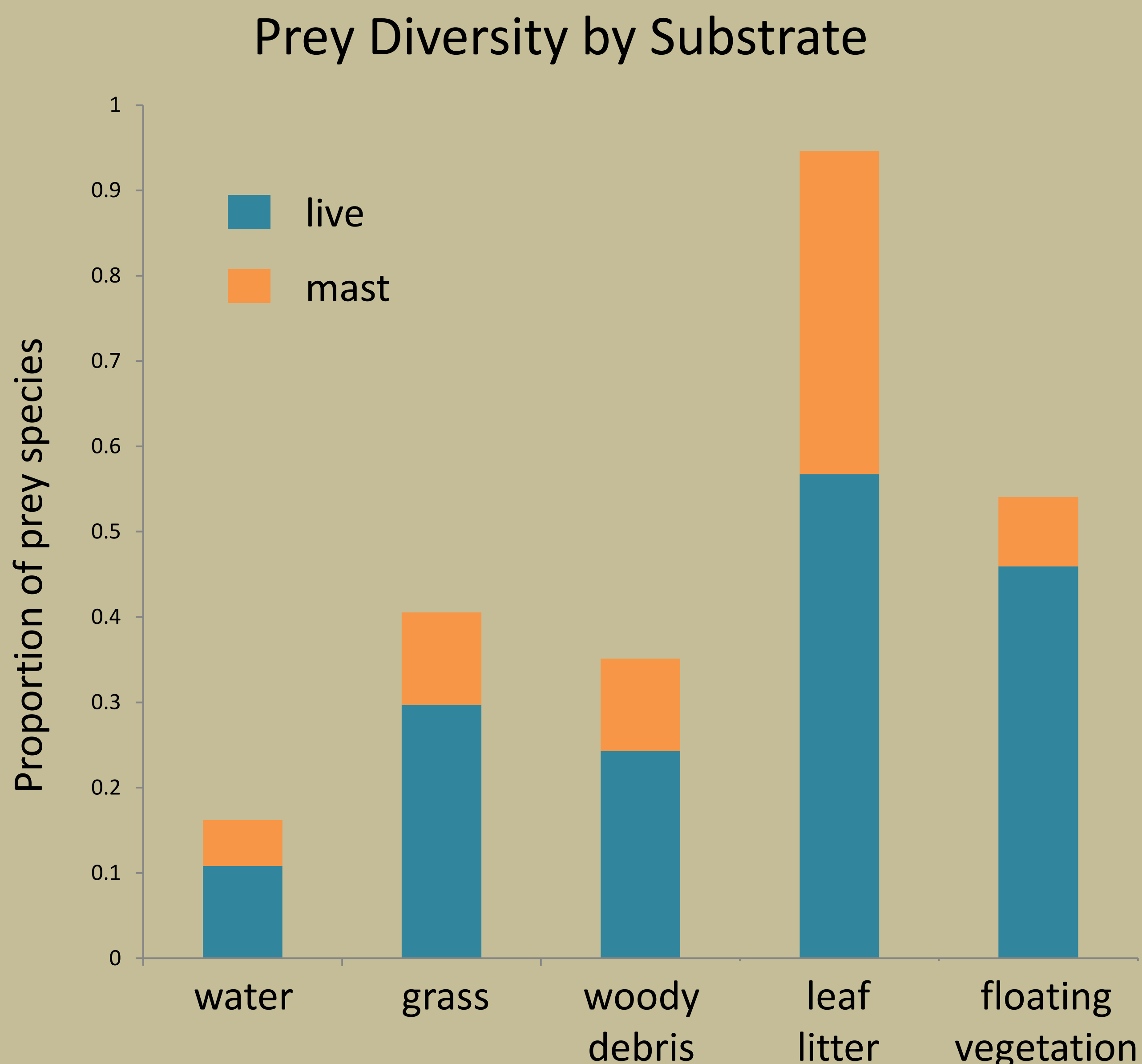
transient shallow water and wet ground cover adequately explain Rusty Blackbird presence and persistence

birds do not avoid open space while foraging

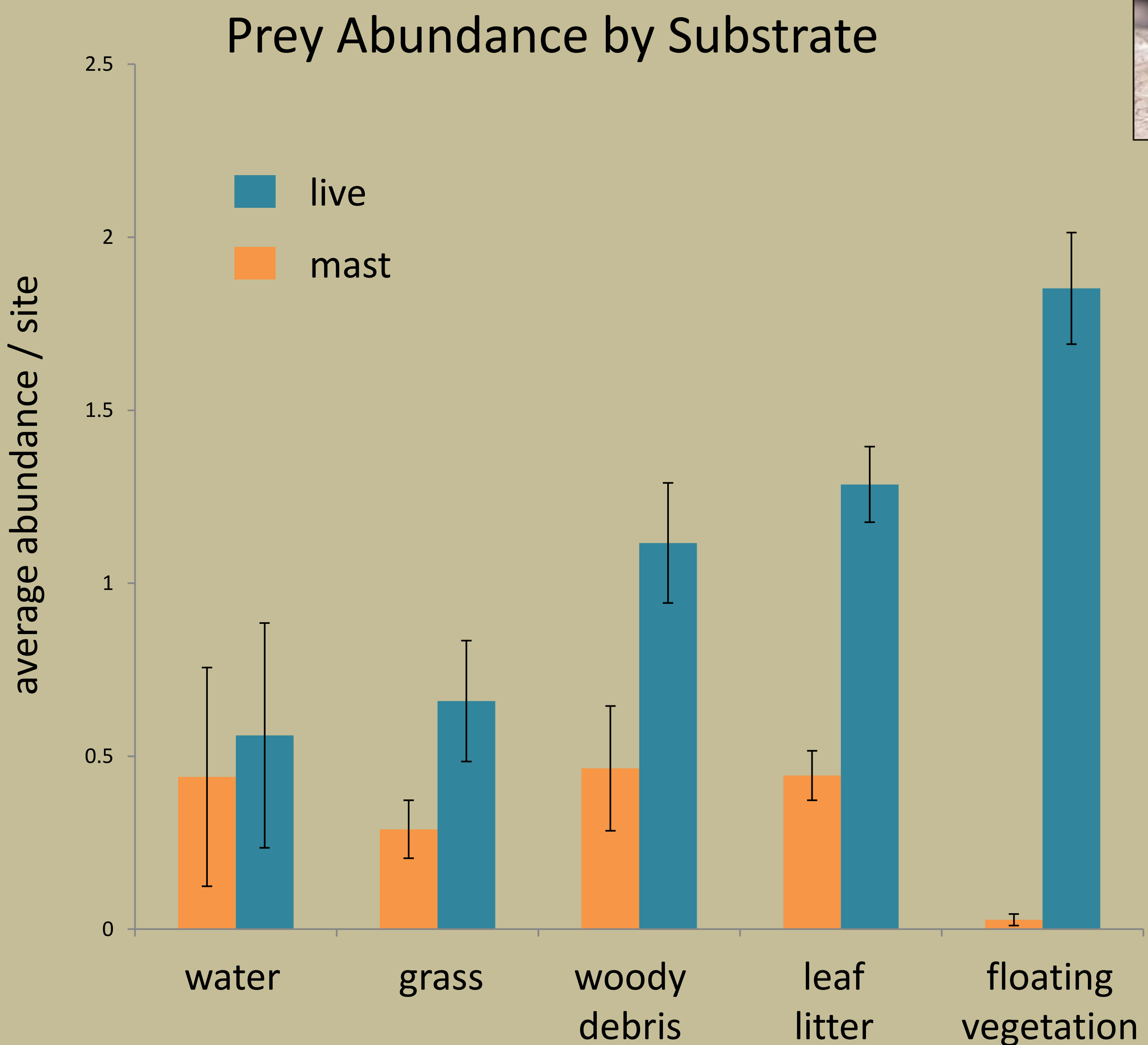
wet ground more important than any specific substrate

but….wet leaf litter may be best for consistent occupancy by larger flocks

Quality Foraging Habitat?



Quality Foraging Habitat?



Changes in Shallow Water Availability Could affect Rusty Blackbirds

water control and drainage of bottomland forest

↓

less shallow standing water
changes in location, duration and depth

↓

sources less predictable?
lower quality?

↓

Rusty Blackbird decline?

3. Flock Associations and Competition

S. Pagans

No Evidence of Intraspecific Competition

no difference in regional migration

2010 (Wilcoxon Rank Sum test, W = 26146, p = 0.89)

2011(Wilcoxon Rank Sum test, W = 53655, p = 0.38)

48% male

52% female

flock sex ratios not significantly different from 1:1

(χ^2 = 174.38, df = 187, α = .05, p = 0.74)

Interspecific Associations

Red-winged Blackbird

multi-species
occupancy modeling

Common Grackle

some evidence for conditional occupancy and or detectability:

- all 5 top RWBL models
- 2 of 3 top COGR models

similar positive association between Ψ and grassy space

- 3 of 5 top RWBL models
- all 5 top COGR models

shallow water not associated with co-occupancy

Possible Interspecific Competition?

Rusty Blackbirds frequently occur in mixed flocks
…especially in grassy habitat?

Conclusions

Citizen science and smaller scale surveys are both important and are compatible.

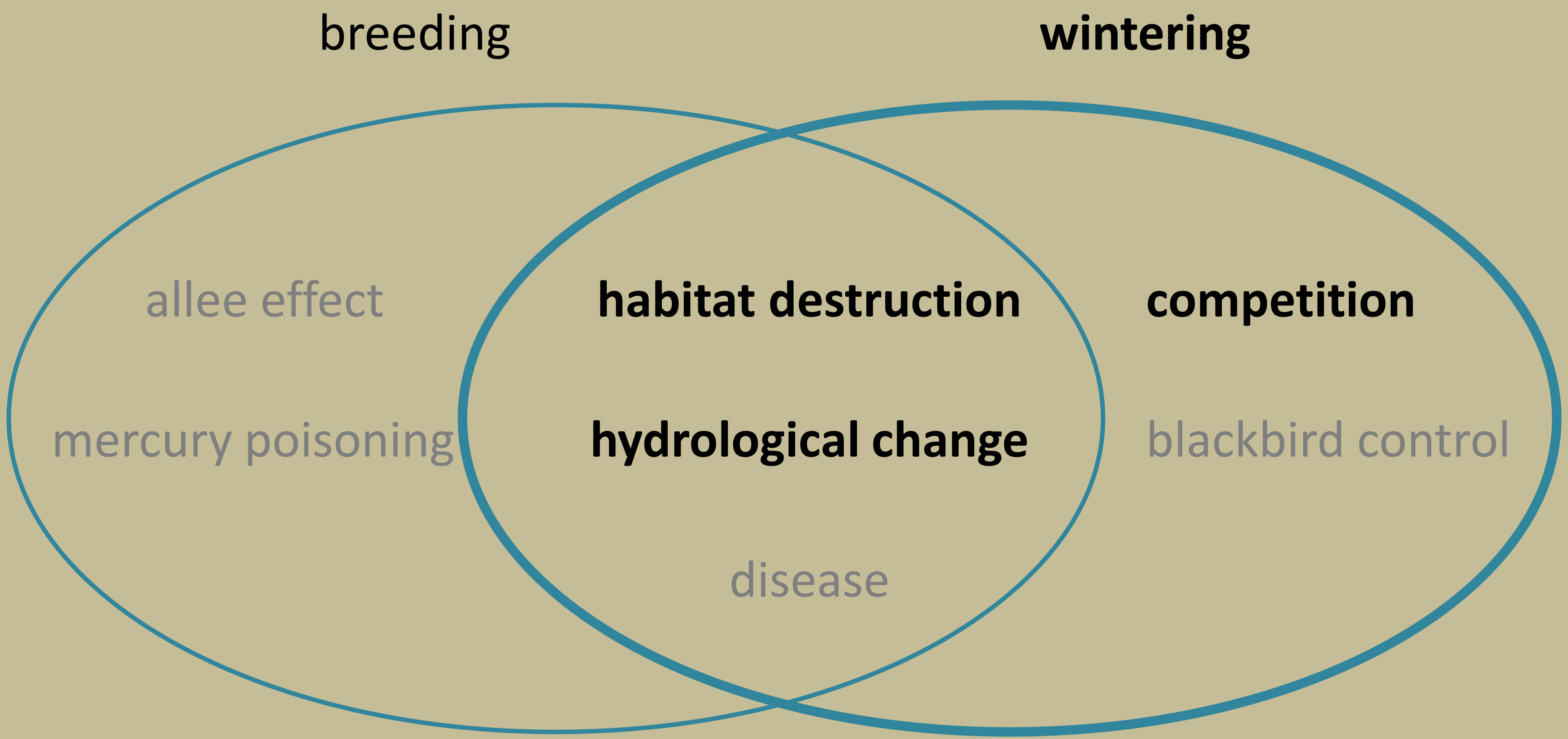
Wet ground cover is the most important predictor of foraging scale habitat use.

Quality and availability of transient shallow water could contribute to Rusty Blackbird decline.

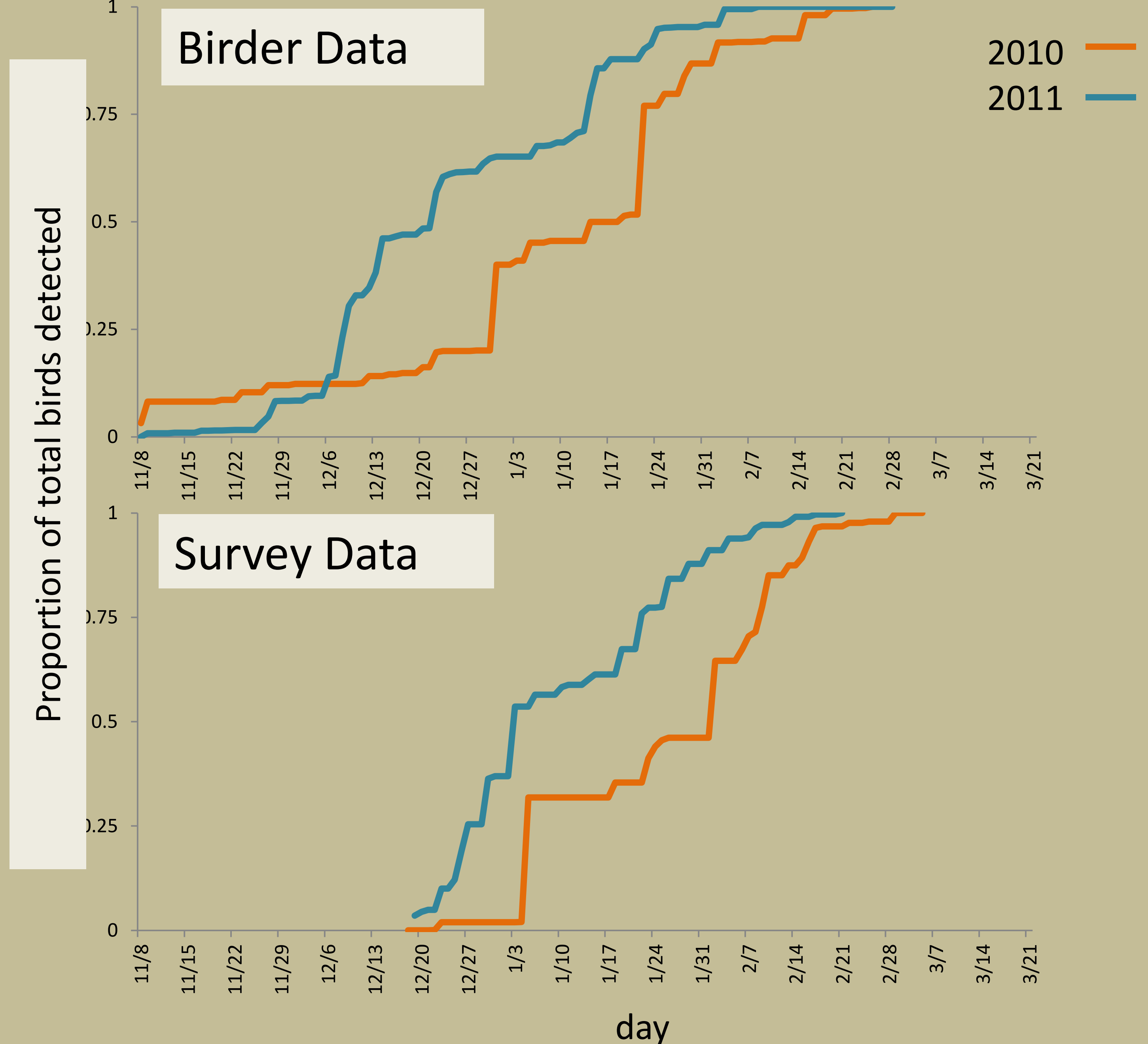
Frequent co-occurrence with RWBL and COGR may merit further study.

Questions?

Hypotheses for Decline



Similarities in Seasonal Trends



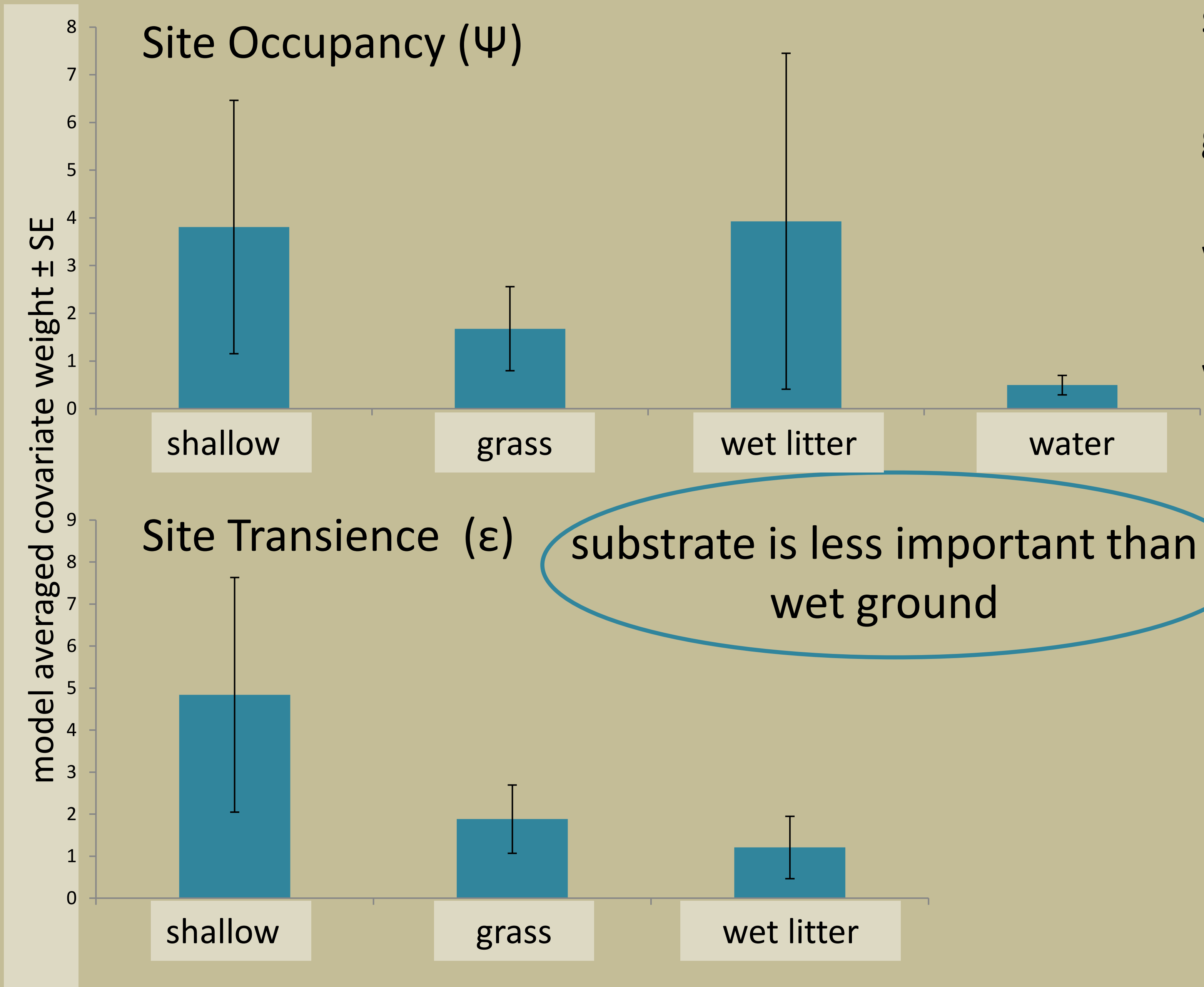
detectability results

Model Ψ(.) γ(.)ε(.)	**AICc**	**ΔAICc**	**weight**	**k**	**-2log like**
P(year+flock)	634.34	0.00	0.49	6	621.41
P(round+year+flock)	634.91	0.57	0.37	7	619.65
P(global)	641.09	6.75	0.017	11	615.98
P(.)	674.61	40.72	0.00	4	666.18

global = P(year+round+ time+weather+prior+flock+open)

All multi-round habitat models will include
year+round+flock

Most Important Model Averaged Habitat Covariates



shallow +

grass +

wet litter +

water -

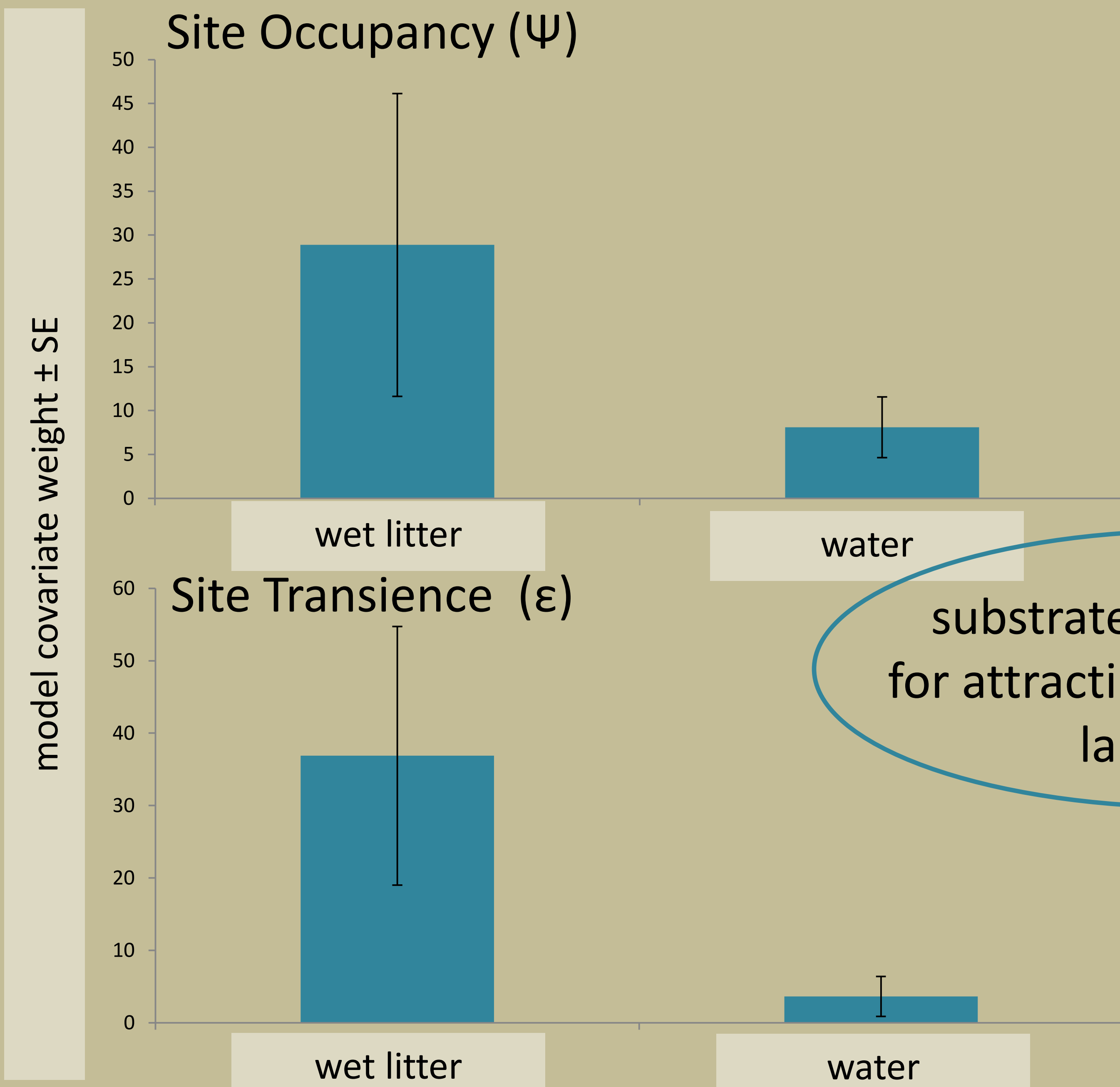
substrate is less important than wet ground

shallow -

grass -

wet litter -

Most Important Model Averaged Habitat Covariates



wet litter +

water -

substrate more important for attracting and maintaining larger flocks

wet litter -

water +

Co-occurrence with Red-winged Blackbirds

model (round 1)	AICc	ΔAICc	weight	k	-2loglike
Ψ(cond+grass),p(cond)	416.57	0.00	0.2559	7	400.53
Ψ(uncond),p(cond+grass)	417.17	0.60	0.1896	6	403.67
Ψ(cond),p(cond+grass)	417.53	0.96	0.1583	7	401.49
Ψ(cond+condshallow),p(cond+grass)	423.67	7.1	0.0074	10	399.44
Ψ(.),p(.)	427.20	10.63	0.0013	2	423

model (round 2)	AICc	ΔAICc	weight	k	-2loglike
Ψ(cond+grass),p(cond)	500.56	0.00	0.2339	7	484.81
Ψ(cond+grass),p(uncond)	500.75	0.19	0.2127	6	487.46
Ψ(uncond+grass),p(cond)	500.99	0.43	0.1886	6	487.7
Ψ(.),p(.)	509.15	8.59	0.0032	2	504.98
Ψ(cond+condshallow),p(cond+grass)	513.81	13.25	0.0003	10	490.2

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Co-occurrence with Common Grackles

model (round 1)	AICc	ΔAICc	weight	k	-2loglike
Ψ(uncond+grass),p(cond)	369.7	0.00	0.6025	6	356.20
Ψ(cond+grass),p(cond)	370.9	1.20	0.3306	7	354.86
Ψ(cond+condshallow),p(cond+grass)	388.68	18.98	0.0000	10	364.45
Ψ(.),p(.)	399.85	30.15	0.0000	2	395.65

model (round 2)	AICc	ΔAICc	weight	k	-2loglike
Ψ(uncond+grass),p(cond)	456.54	0	0.37	6	443.25
Ψ(uncond+grass),p(uncond)	457.05	0.51	0.29	5	446.14
Ψ(.),p(.)	461.74	5.20	0.03	2	457.57
Ψ(cond+condshallow),p(cond+grass)	473.07	16.53	0.00	10	449.46

Co-occurrence with Common Grackles

model (round 1)	**AICc**	**ΔAICc**	**weight**	**k**	**-2loglike**
Ψ(uncond+grass),p(**cond**)	369.7	0.00	0.6025	6	356.20
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