The Comings and Goings of Lesser Prairie-chickens: Intrinsic and Extrinsic Influences on Female Nest Attendance

Jacquelyn Gehrt, Daniel Sullins, and David Haukos
Kansas Cooperative Fish and Wildlife Research Unit

The perils of being a bird

What's the risk?

o Increased risk of
   predation (Skutch 1957, Conway
   and Martin 2000)

o Temperature variation in
   eggs (Kovarik, Pavel, and Chutny
   2009, Grisham et al. 2016)

Minimizing the risk
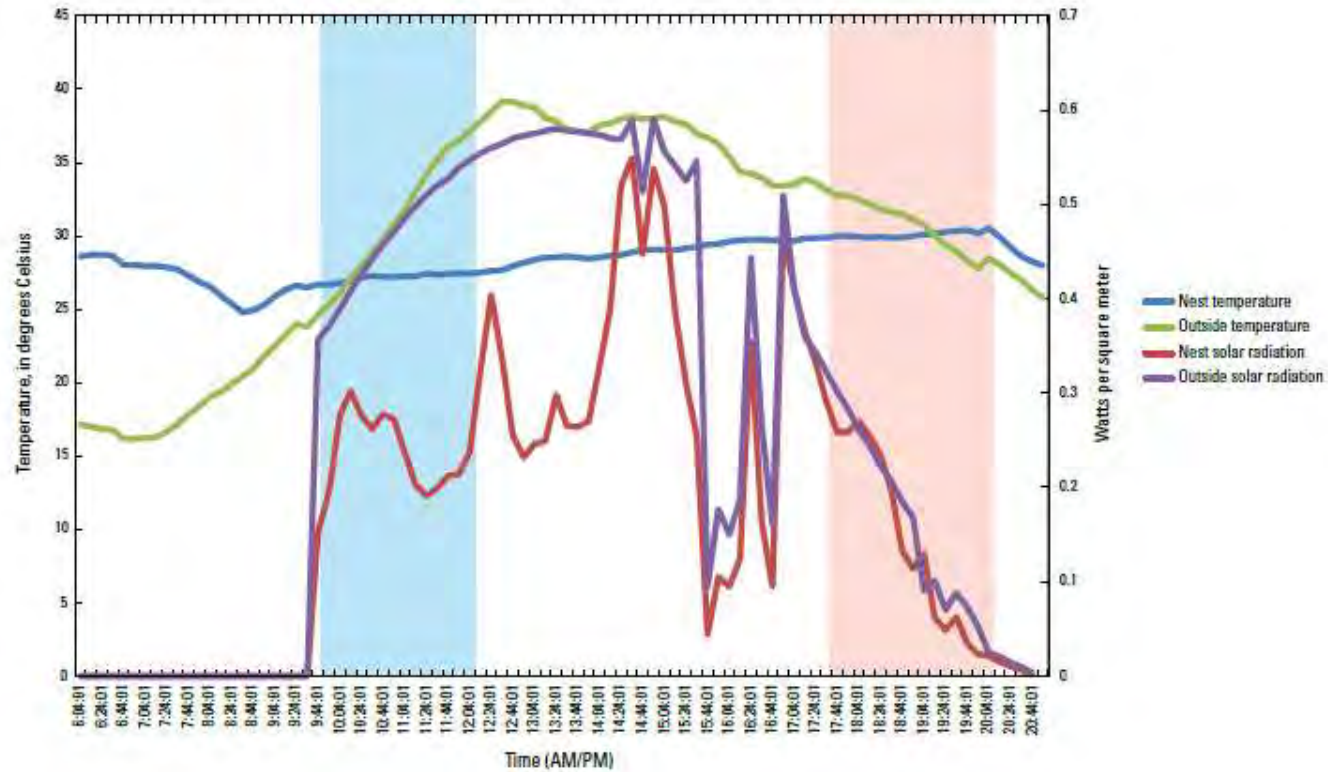
o Minimiz

o Nest str

o Timing

Boal et al. 2014

TABLE 5. Model ranking of 29 a
estimate nest survival for 101 L
Mixed-Grass Prairie, Sand Shinn
Prairie ecoregions, 2010–2014.

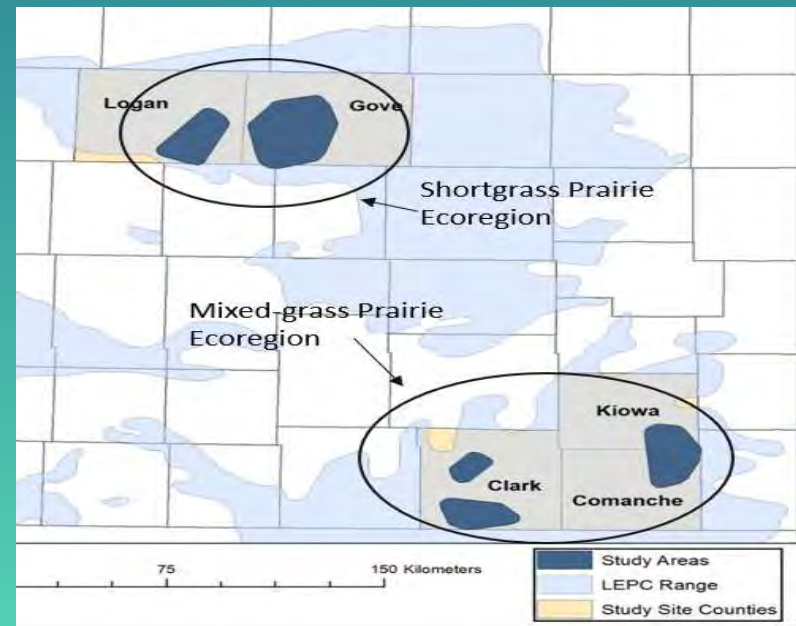| Model	ΔAIC_c [a]				
VOR*HA [b]	0	0.40	1	6	513.60
VOR*DayVPD	1.31	0.20	0.5	6	514.91
VOR+HA	1.92	0.15	0.38	5	517.54
HA	3.16	0.08	0.20	4	520.79
DayTemp	5.98	0.02	0.05	4	523.62
VOR+DayTemp	6.53	0.01	0.03	5	522.16
VOR+NightTemp	6.88	0.01	0.03	5	522.50
VOR	7.09	0.01	0.02	4	524.72
VOR*NightTemp	7.78	0.01	0.02	6	521.39

Grisham et al. 2016

4

Minimizing the risk

o Which factors affect nest presence?

o When do females time their breaks?

o Where do they go on their breaks?

© Joel Sartore / joelsartore.com

# Study Area

o Western ½ of Kansas

o 2 of the 4 ecoregions occupied by Lesser Prairie-Chickens
   o Mixed-Grass Prairie
   o Shortgrass Prairie

o 2013-2015

Tracking female movement

o Captured and outfitted females with GPS backpacks
- o Locations from 83 females used

o Locations taken every 2 hours from 0600-2400
- o Subset from start of incubation to nest completion date (16,282 pts)

o Recorded and measured nest site vegetation
- o 98 nests

o Measured used and available points on the landscape
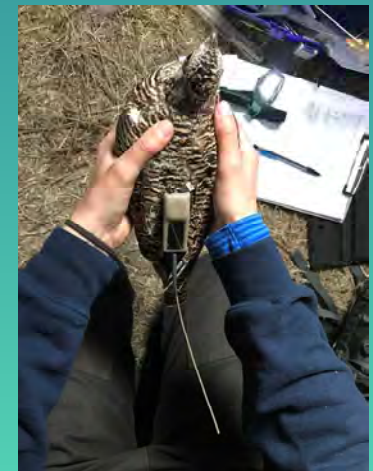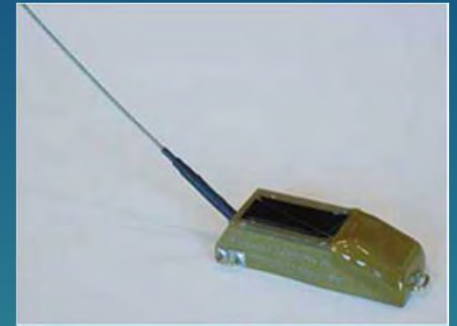
Recognizing incubation breaks

o Used hen presence at nest as response variable
- o 0/absent = >25m from nest location
- o 1/present

Sharon Stiteler

Which covariates to choose from?

Environmental characteristics

- Temperature (max. daily)
- Precipitation

Morphometric characteristics

- Age
- Mass

Top model

Nest veg characteristics

- Grass height
- Visual obstruction
- Forb cover
- Grass cover
- Bare ground cover
- Shrub cover
- Litter depth

**Descriptive characteristics**

- Site
- Year
- Nesting attempt

9

Model selection output

| Model	df	LL	AICc	ΔAICc	ω_i
R75 * %grass + precip^2 + age*mass + fate	12	-8331.89	16687.8	0.00	0.51
R75 * %grass + site*yr + precip^2 + age*mass + fate	17	-8327.61	16689.27	1.47	0.24
R75 * %grass + site * yr + precip^2 + age*mass	16	-8329.27	16690.58	2.77	0.13
R75 * %grass + precip^2 + age*mass	11	-8334.68	16691.38	3.58	0.08
R75 * %grass + site * yr + age*mass	14	-8333.19	16694.4	6.59	0.02
R75 * %grass + age*mass	9	-8338.41	16694.82	7.02	0.02
Constant	1	-8423.28	16848.55	160.75	0.00

Results

Female presence increases with amount of cover
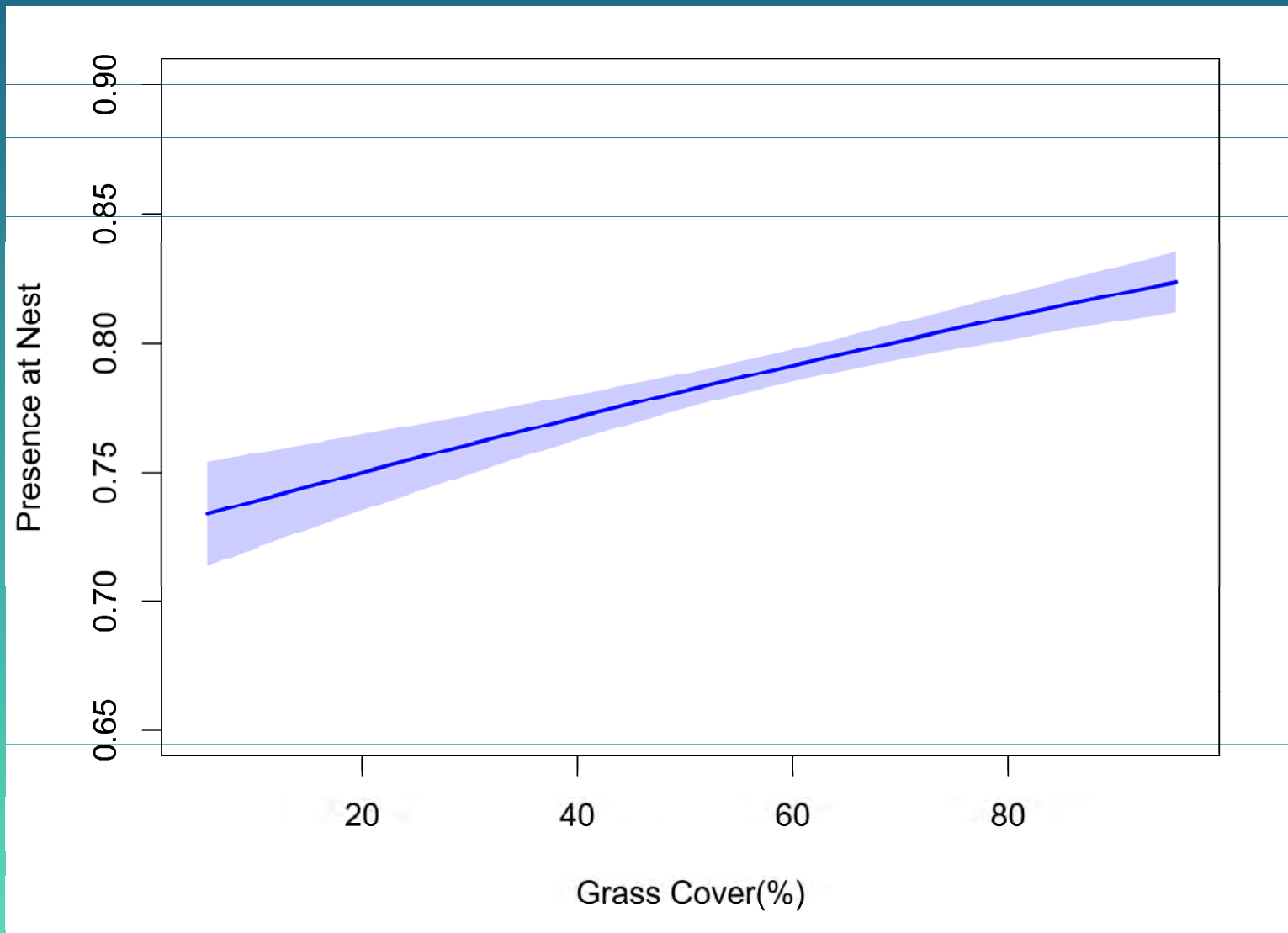
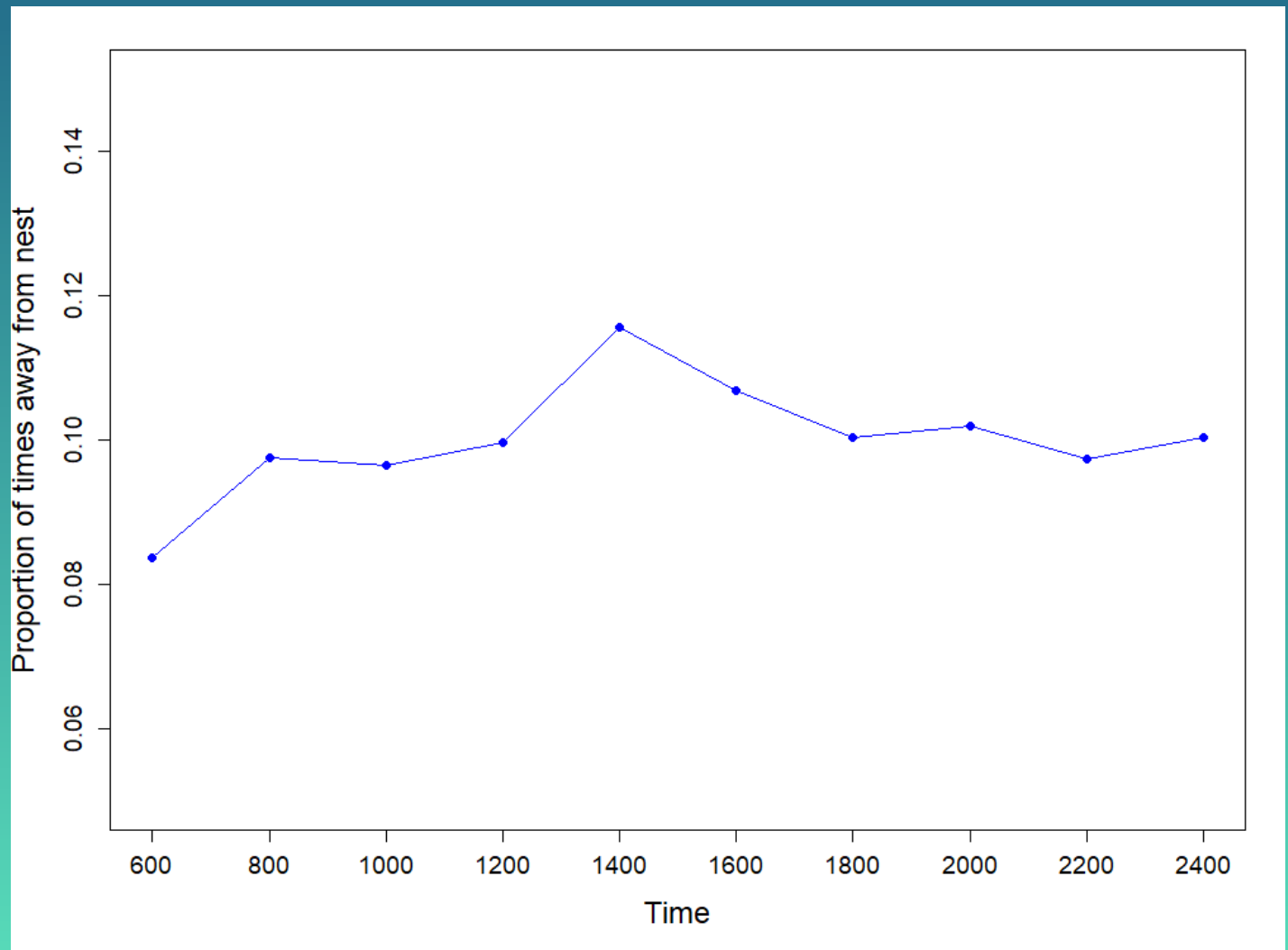# Females prioritize nest success during precipitation events
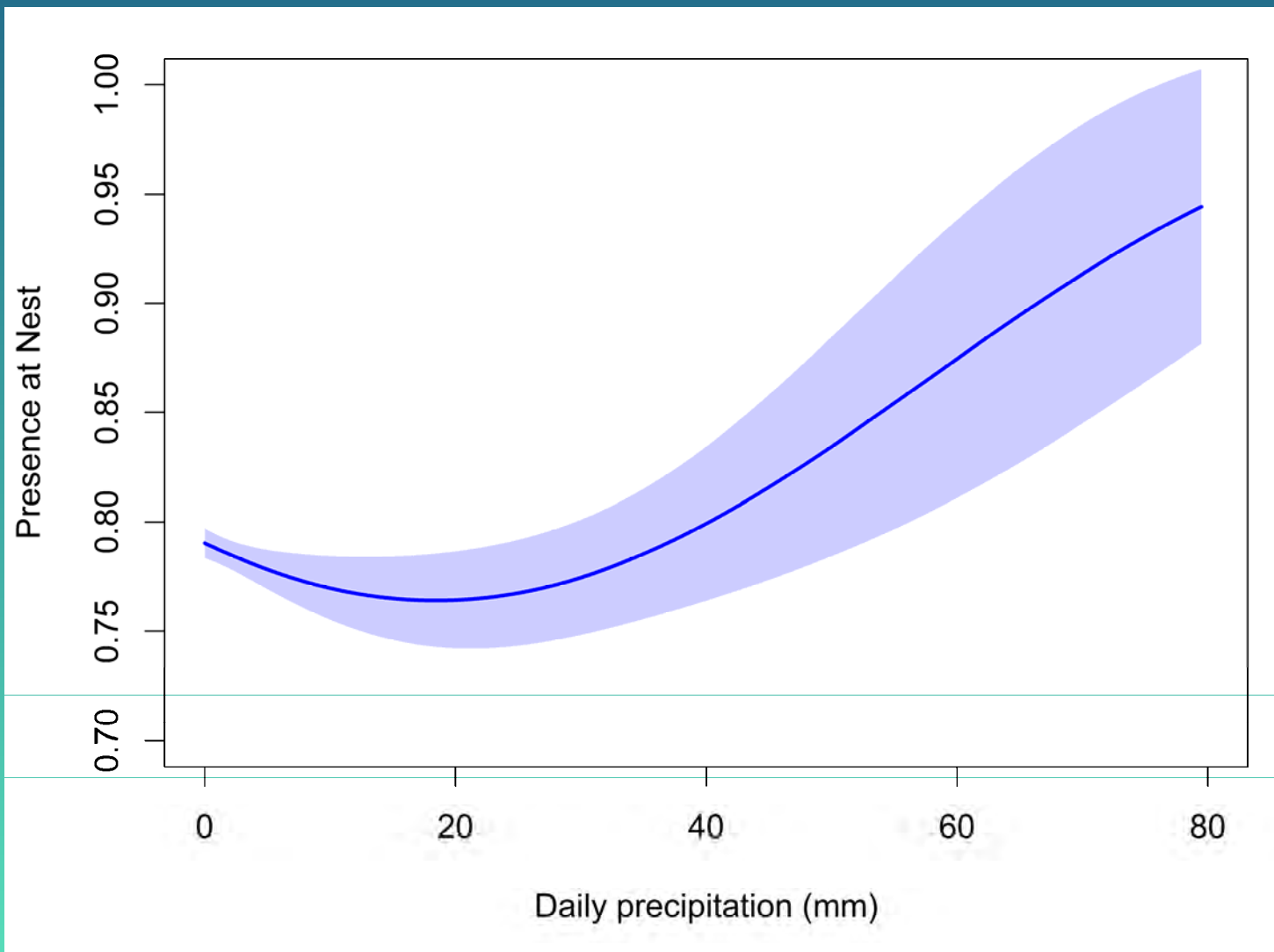
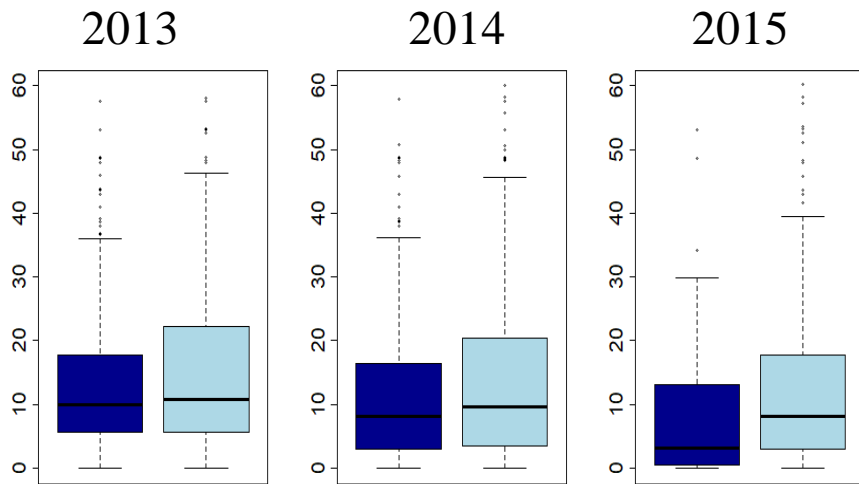# Older females have higher proportional nest attendance
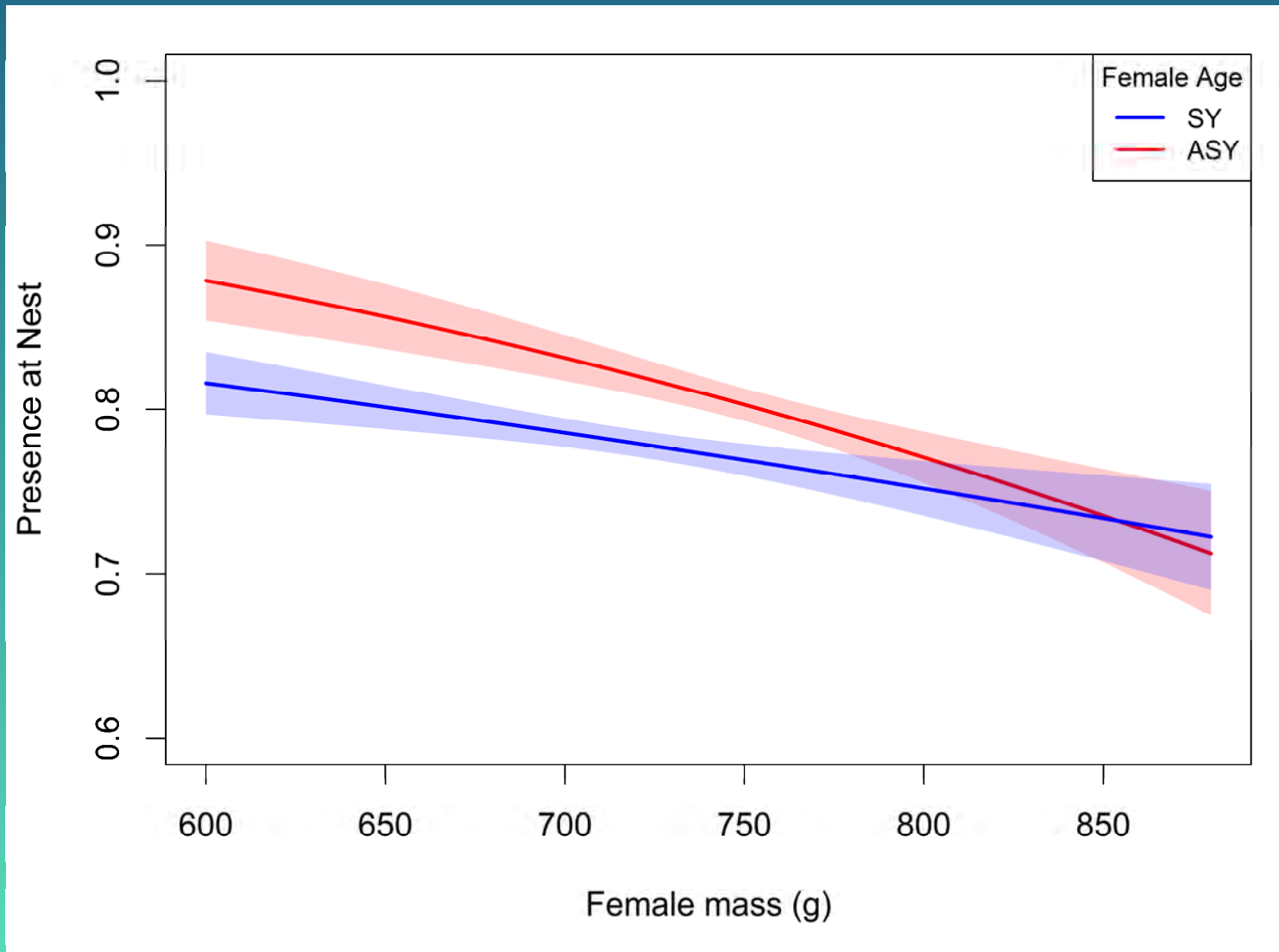
Neither timing of breaks nor distance moved during breaks vary

Time	Distance ± SE
6:00	552±52
8:00	544±46
10:00	575±45
12:00	537±44
14:00	553±38
16:00	621±56
18:00	607±59
20:00	553±43
22:00	578±46
0:00	559±45

Annual and site variation in selection: bare ground
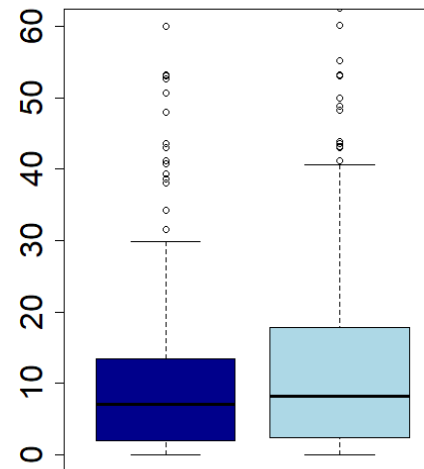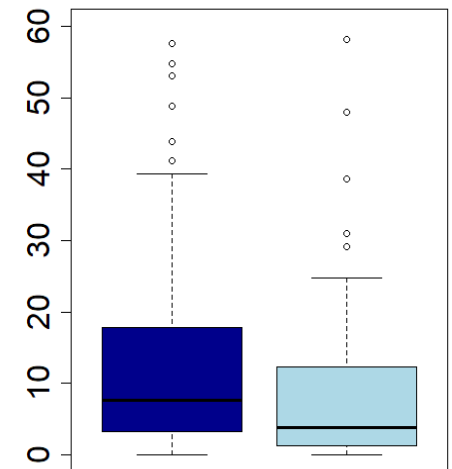
Annual and site variation in selection: litter depth

Red Hills:Litter Depth (cm)

2013   2014   2015

Northwest:Litter Depth (cm)
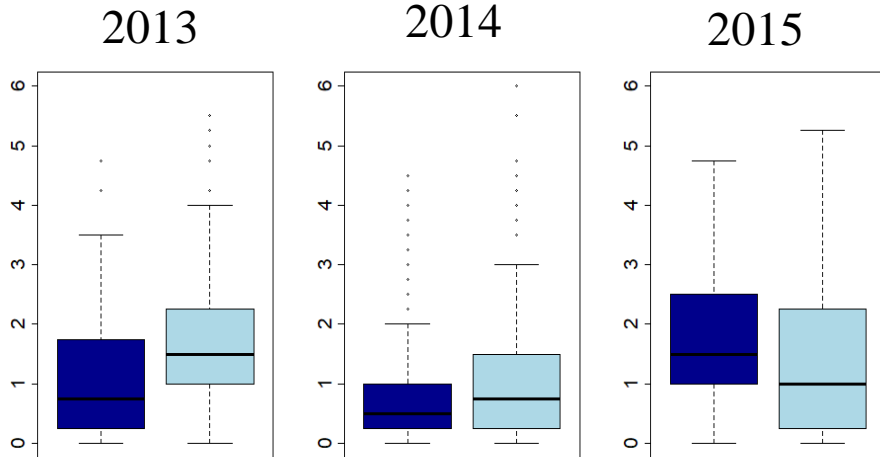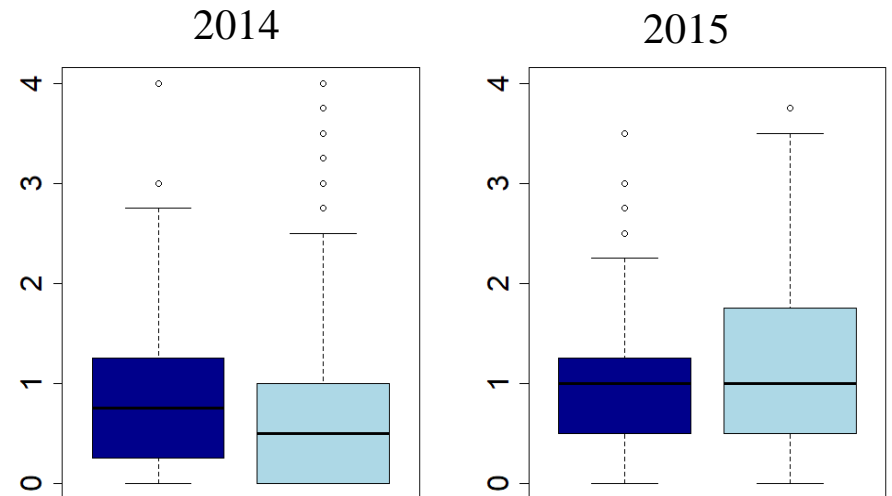
2014   2015

Used   Random

17
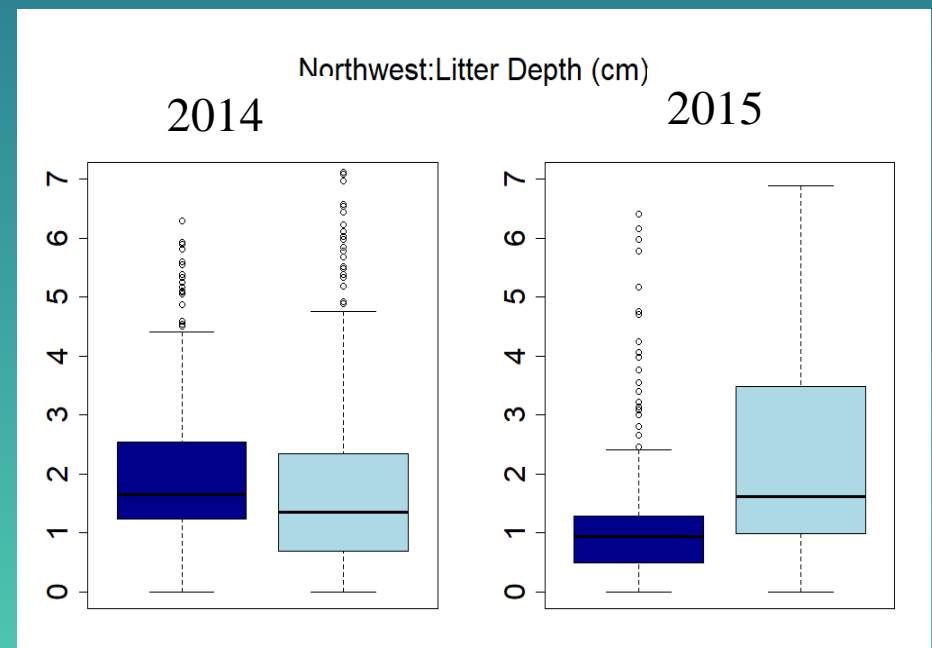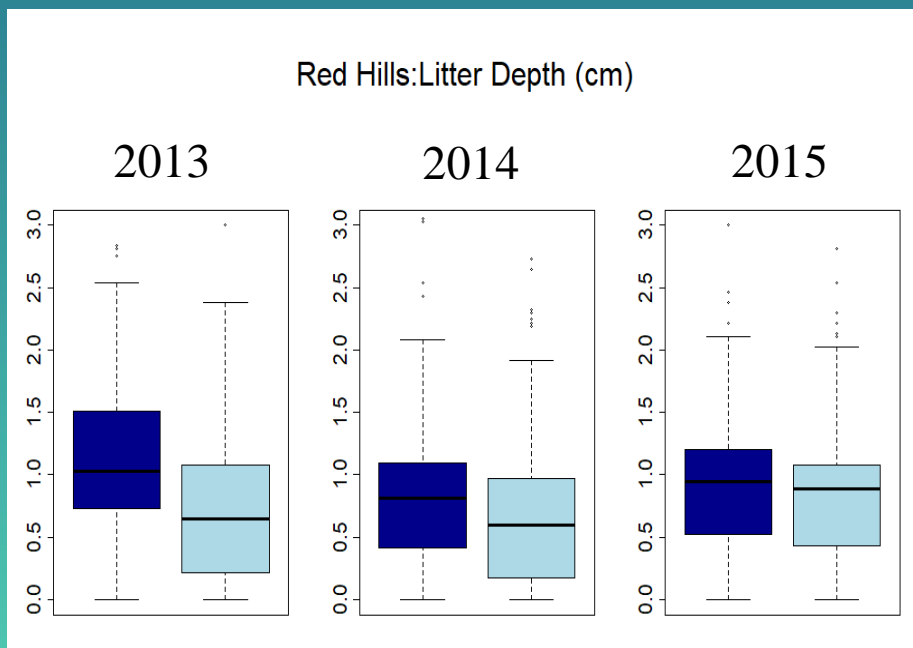
Annual and site variation in selection: visual obstruction

Red Hills: Visual obstruction at 75% (dm)

2013   2014   2015

Northwest: Visual obstruction at 75% (dm)

2014   2015

■ Used   ■ Random

18

Female behavioral trends in the literature

- Female response to increased grass cover
  - Thermal refugia (Grisham et al. 2016)
- Female response to precipitation events
  - Exposure = nest failure? (Skagen and Adams 2012)
  - Exposure = nest success? (Fogarty et al. 2017)
- Nest attendance differs by age
  - Fewer future opportunities? (Montgomerie and Weatherhead 1988)
- Mass inversely related to nest attendance

Incubation breaks may be used as scouting expeditions

- Individual and site heterogeneity
- Seek out limiting factors
    - Less dense vegetation
    - Increased litter depth
- Balance of hen/offspring success?

Further questions to be answered…

o We looked only at factors affecting female nest presence.
  o How would distance traveled on breaks vary?

  o Duration of breaks?

  o Frequency of breaks?

o Incubating females select for certain areas during breaks.
  o Do incubation breaks serve as scouting trips for
    females?

Acknowledgments

- Landowners
- All Technicians

KSU
- Beth Ross
- Haukos Lab

KDWPT
- Kent Fricke
- Jeff Prendergast
- Kraig Schultz

WAWFA
- Jim Pitman

Colorado Parks and Wildlife
- Jonathan Reitz
- Mindy Rice

NRCS
- Christian Hagen
- Adam Elliott
- Dusty Tacha
- David Kraft