FEMALE WILD TURKEY ECOLOGY ON A MIDWEST RECLAIMED SURFACE MINE

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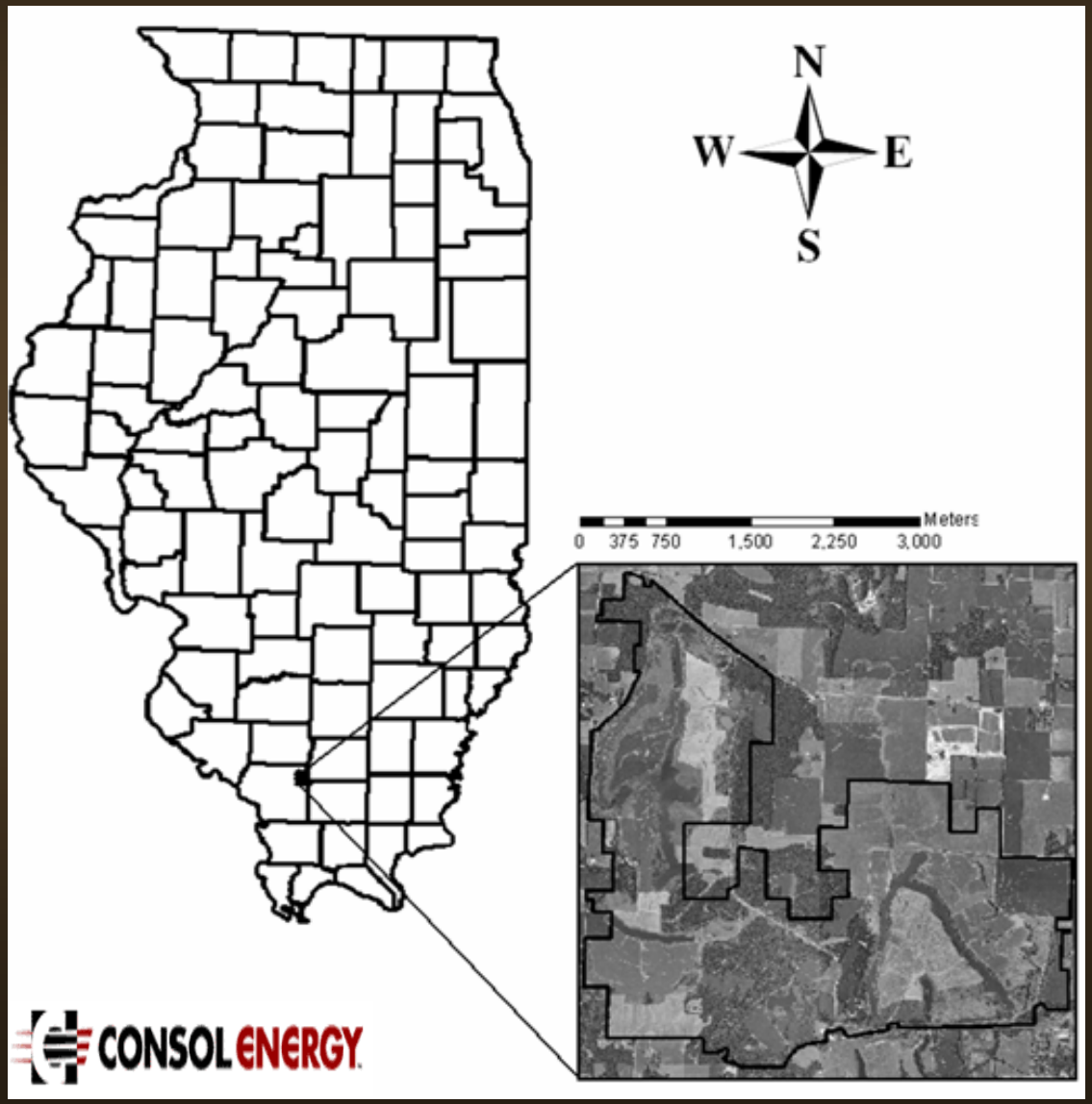
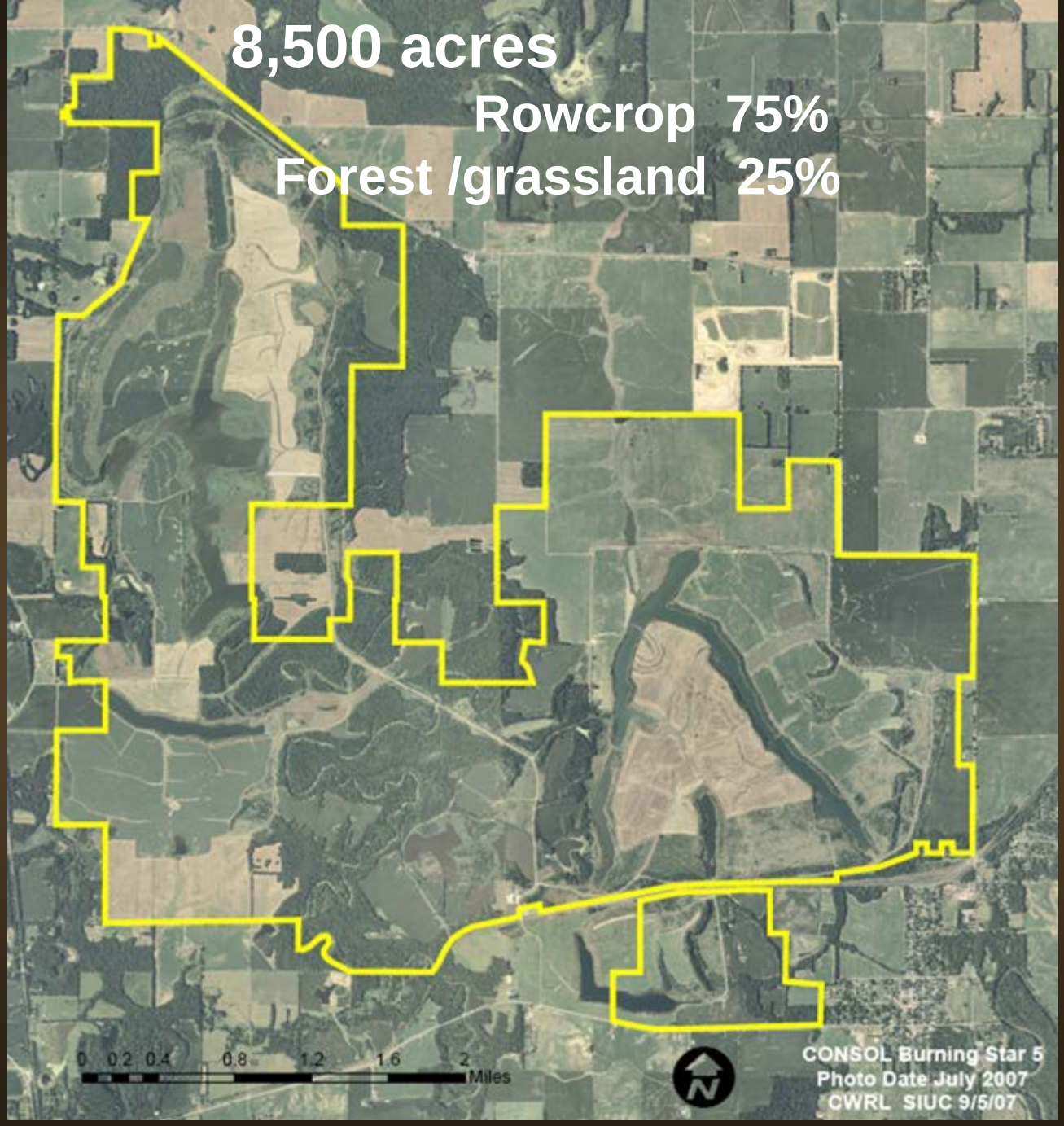
Study Site:
CONSOL Energy Burning Star 5




8,500 acres
Rowcrop 75%
Forest /grassland 25%
0 0.2 0.4 0.8 1.2 1.6 2
Miles
CONSOL Burning Star 5
Photo Date July 2007
CWRL SIUC 9/5/07

Diverse Wildlife Habitat

Diverse Wildlife Habitat

Barn Owl

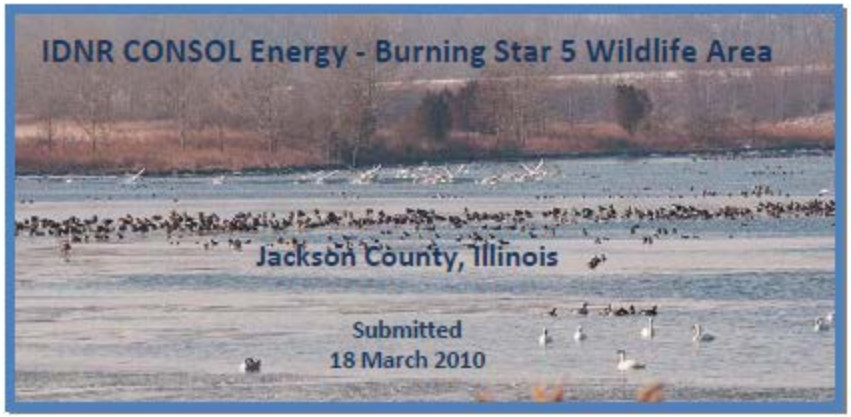
Marsh Hawk

Trumpeter Swan

Audubon IMPORTANT BIRD AREAS

BirdLife INTERNATIONAL

Illinois IBA Nomination Form



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Turkey Research

Majority of research in dense forested areas

Minimal research in areas interspersed with agriculture and open grasslands

Few studies on reclaimed surface mine sites

Objectives

Hen, nest, and brood survival rates

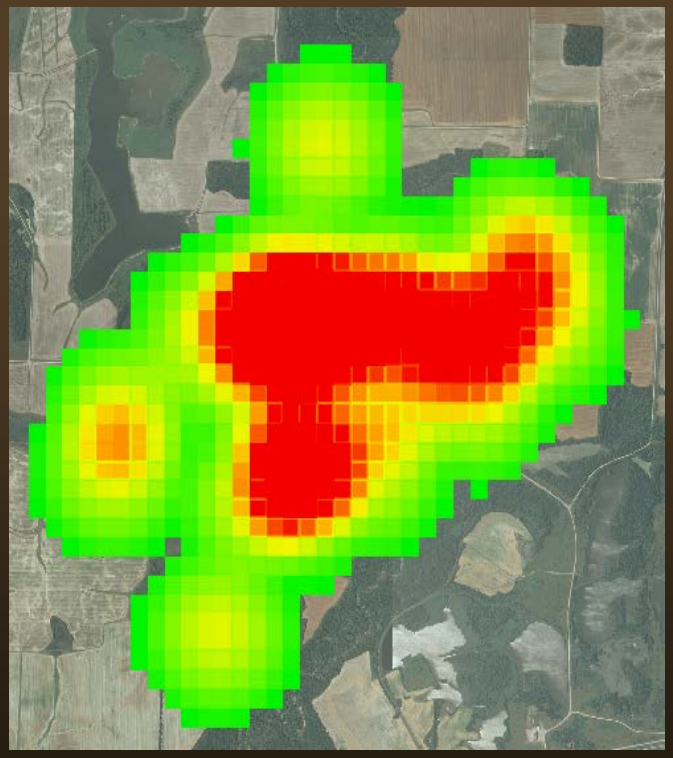
Factors limiting hen and nest survival

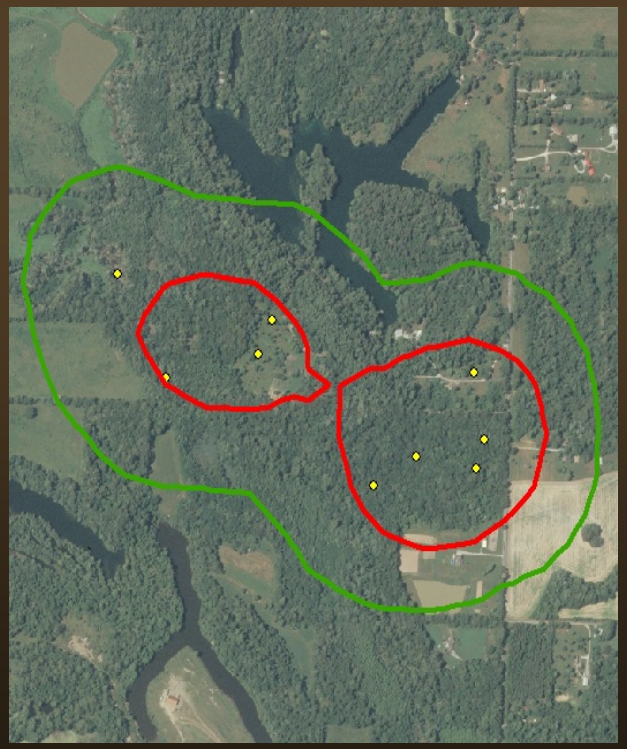
Objectives

Hen breeding home range

Brooding home range

Brood habitat selection





Methods

Capture and Handling

Rocket netting (Winter 2008 – 2010; 2011-13)

- Weight
- Age
- 100 g transmitters w/ mortality sensors

Radiotelemetry Triangulation

- ≥3 compass bearings/bird
- ≥5 locations/week

Breeding Home Range

Home range

>30 locations

Program Locate III

ArcGIS (Hawths tools)

95 & 50% fixed kernel

Brooding Home Range

Home range

4 - week period

>10 locations

Program Locate III

ArcGIS (Hawths tools)

95, 50% fixed kernel

Habitat* Selection

*Brood Nest

Nest Site Habitat

Cover type

Dominant species

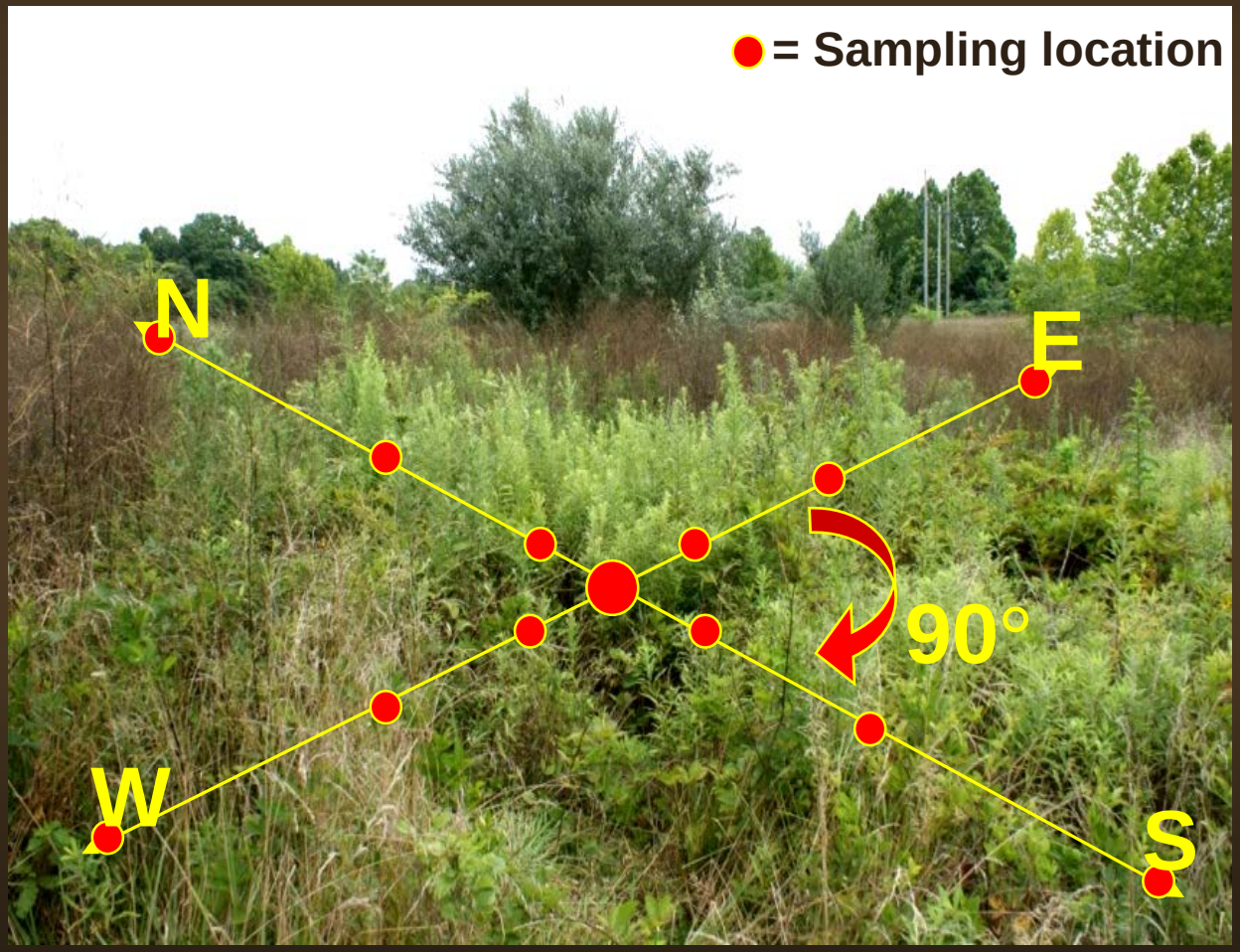
Nest visibility
- Davis disk

Veg. height

Veg. density
- Poor ≤ 5%
- Sparse 5-25%
- Moderate 25-75%
- Good > 75%

Canopy cover

Litter depth



Land Use Measurements

Elevation

Slope

- Level (< 5°)
- Slight slope (5-20°)
- Steep slope (> 20°)

Distance measurements

- Water source
- Road
- Ag. edge
- Forest cover

Nest Sites and Random Sites

Nest vs. Random

1:1 ratio

ArcGIS - Hawths tools

Delete points

- Active agriculture
- Gravel roads
- Water

Nest Site Selection and Success

Nest Site vs. Random Site

Successful Nest vs. Failed nest




ANOVA Logistic Regression

Nesting Variables

Land use

- Slope
- Elevation
- Distance to:
  - Agriculture edge
  - Forest cover
  - Permanent water
  - Road edge

Microhabitat

- 1 m nest visibility
- Nest vegetation density
- 1 m vegetation density
- Cover pole
- Cover type
- Season

Hen and Nest Survival

Cause of mortality

- Carcass characteristics
- Pattern of crushed eggs
- Tracks/ and or scat

Mortality categories

- Predation (spp.)
- Human caused
- Weather
- Unknown


Results

2008 - 2011

64 Hens*

(11 Juveniles)

100 Nests

(Radio hens)

106 Nests

106 Random sites

23 Broods

* 44 (2012 2013)

Hen Survival – 74%

Causes of mortality (n=21)	%
Coyote	42.8
Bobcat	42.8
Owl	9.5
River Otter	4.8

Hen Survival

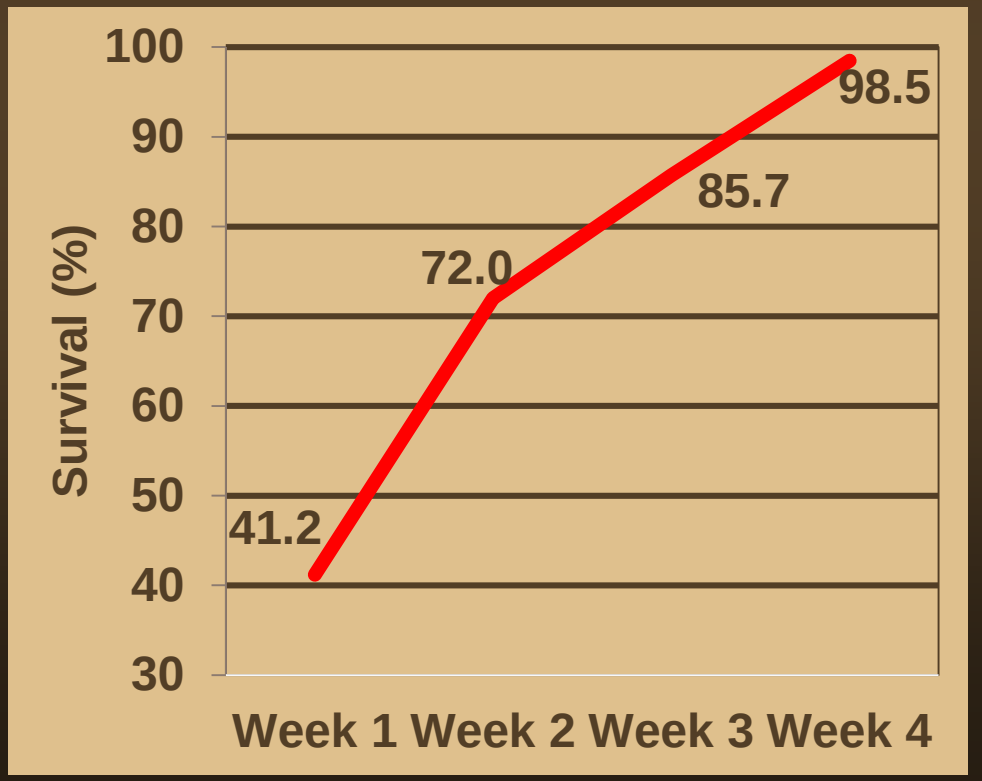
Seasonal* survival

Nesting	68 -74%
Winter	86%

MARK *weekly

Brood Survival

Total hatched	260 (93%)
4 weeks post hatch	66 (25.4%)



Nest Fate

Nest mortality (77/100)

Mortality Factors %

Coyotes	**40.3**
Raccoons	**27.3**
Striped skunk	9.1
Flood/ weather	7.8
Unknown	6.4
Human	3.9
Bobcat	1.3
Crow	1.3
Opossum	1.3
Weasel	1.3

Nest Survival (23%)

- Successful vs. Failed nests

Habitat

- Overhead Cover
- Trees/shrubs
- Grasses -

Land use

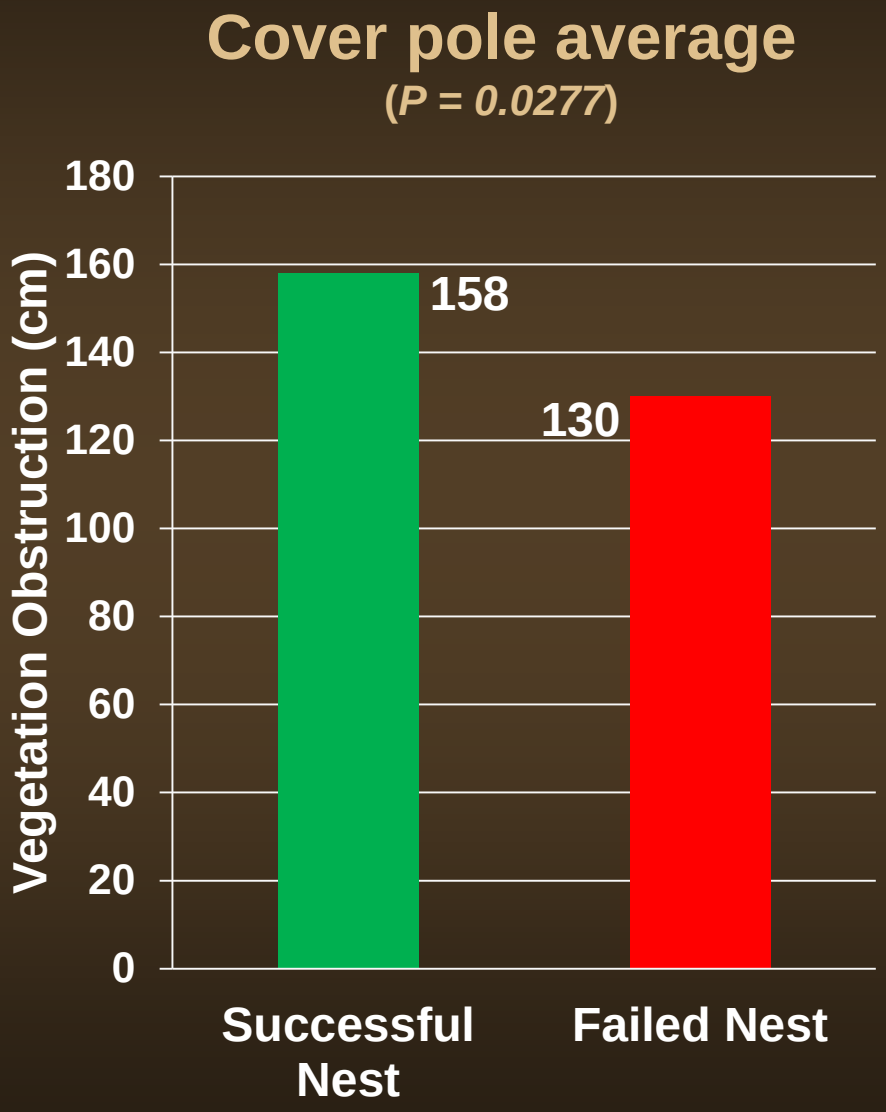
- Distance to forest cover
- Distance to road edge

Logisitic Regression

Vegetation Composition

Successful	%	Failed	%	
Forbs/ Legumes	78.3	Forbs/ Legumes	80.5	
Grasses	56.5	Grasses	71.4	0.0473
Briars / Vines	73.9	Briars / Vines	64.9	
Trees/ Shrubs	56.5	Trees/ Shrubs	35.1	0.0606

Successful vs. Failed Nests



Nest Site Selection

Nest Site vs. Random Site

Habitat

Land use

Vegetation Composition

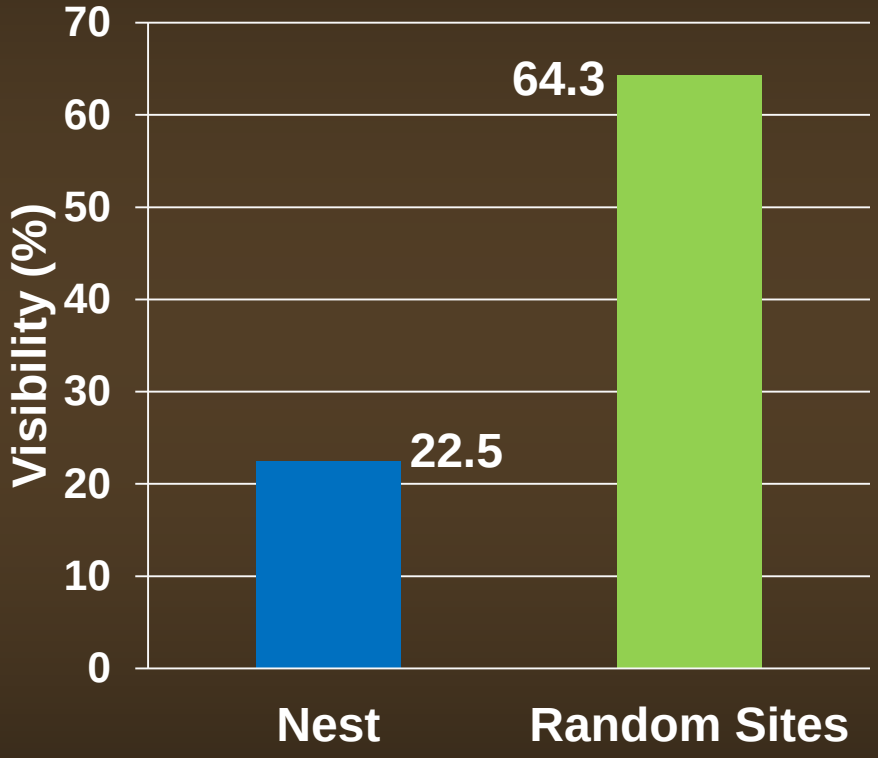
Nest	%	Random	%
Forbs/ Legumes	80	Forbs/ Legumes	78
Grasses	69	Grasses	77
Briars / Vines	**68**	**Briars / Vines**	**16**
Trees / Shrubs	41	Trees / Shrubs	42

< 0.0001

Nest Site vs. Random Site

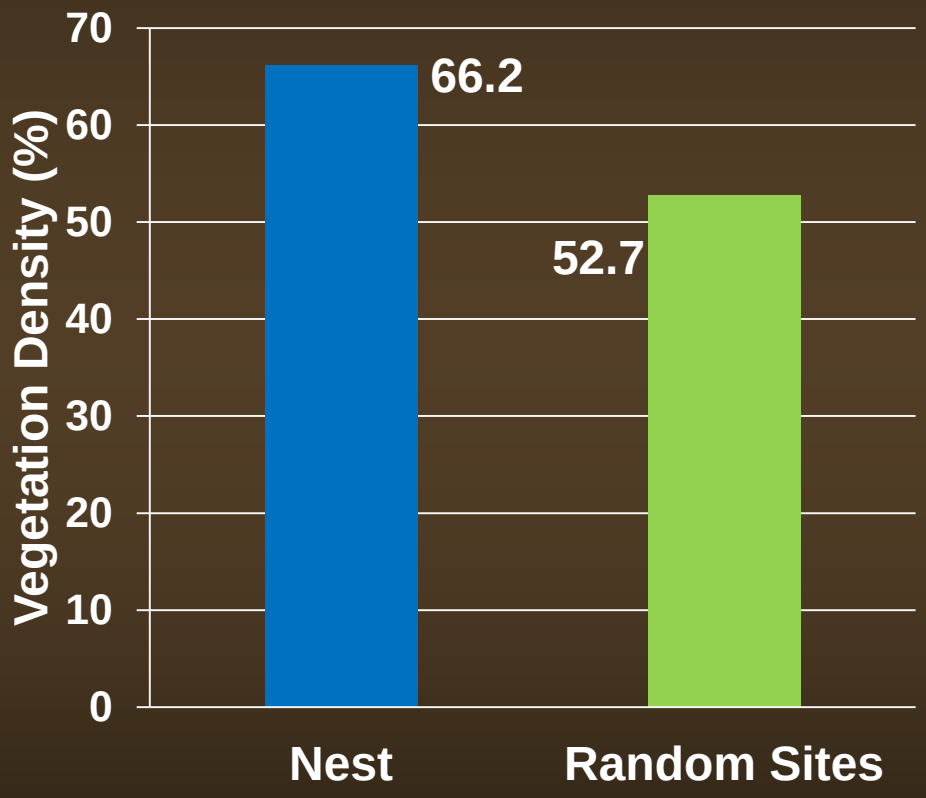
Mean visibility at 1 m

(P < 0.0001)



Vegetation density

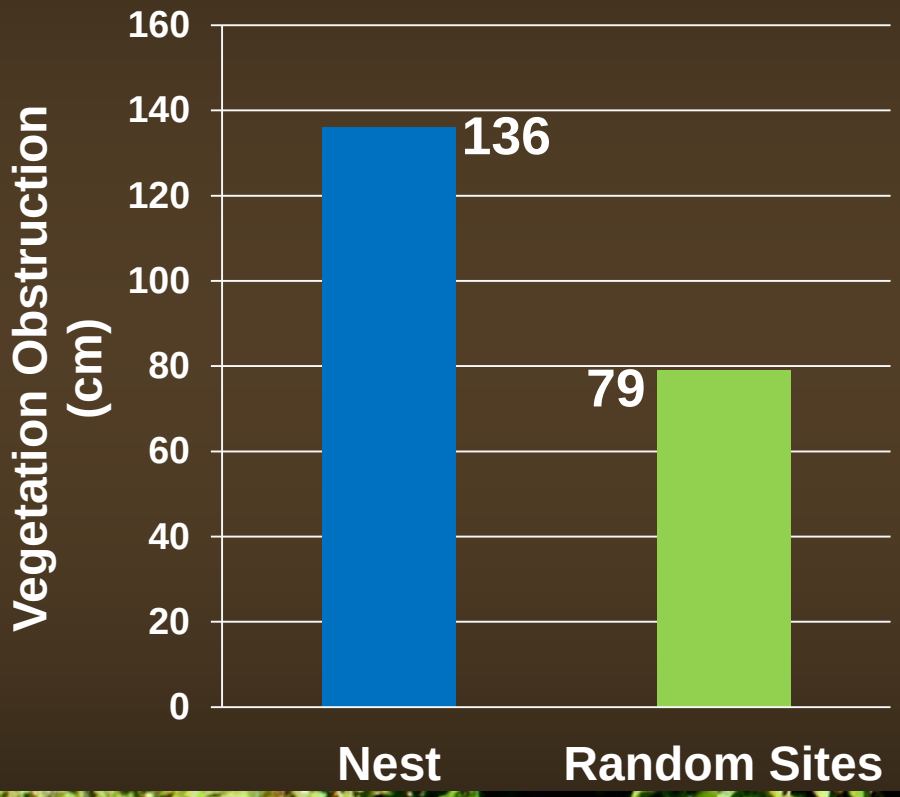
(*P =< 0.0001*)



Nest Site vs. Random Site

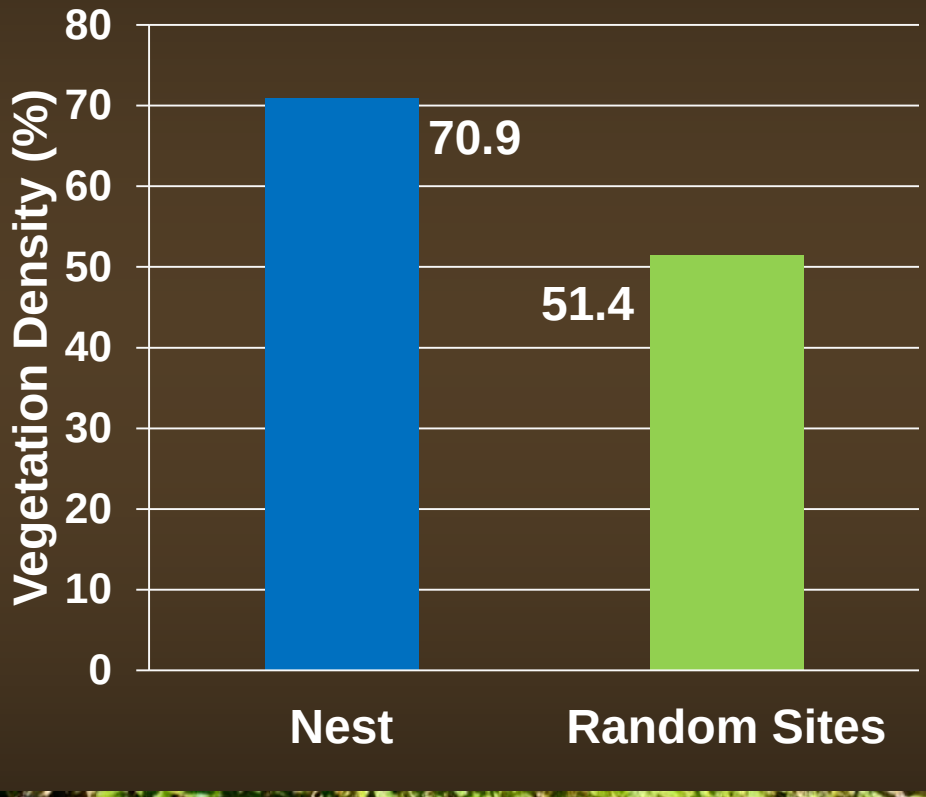
Cover pole average

(*P < 0.0001*)



Mean vegetation density 1 m

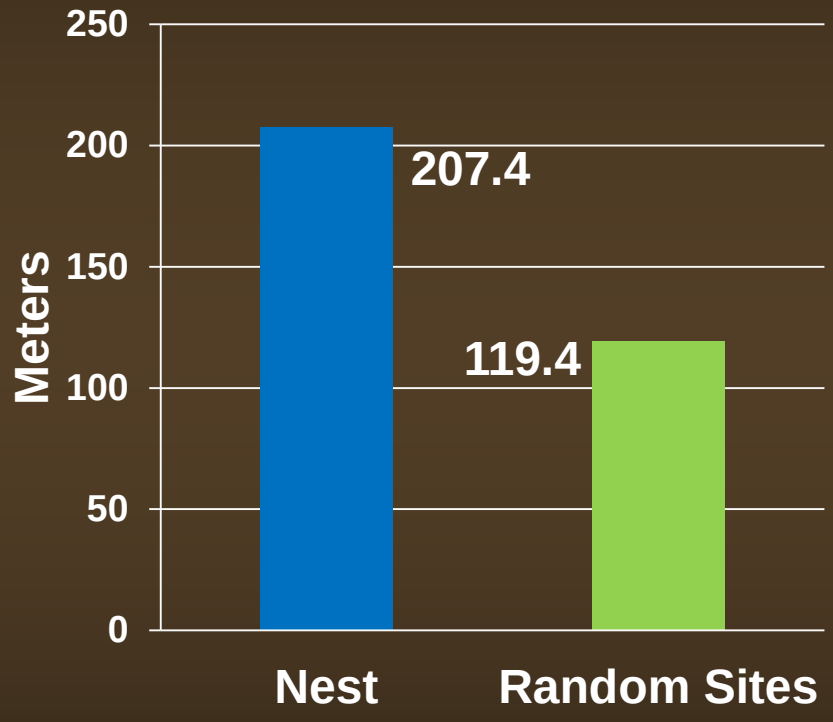
(*P < 0.0001*)



Nest Site vs. Random Site

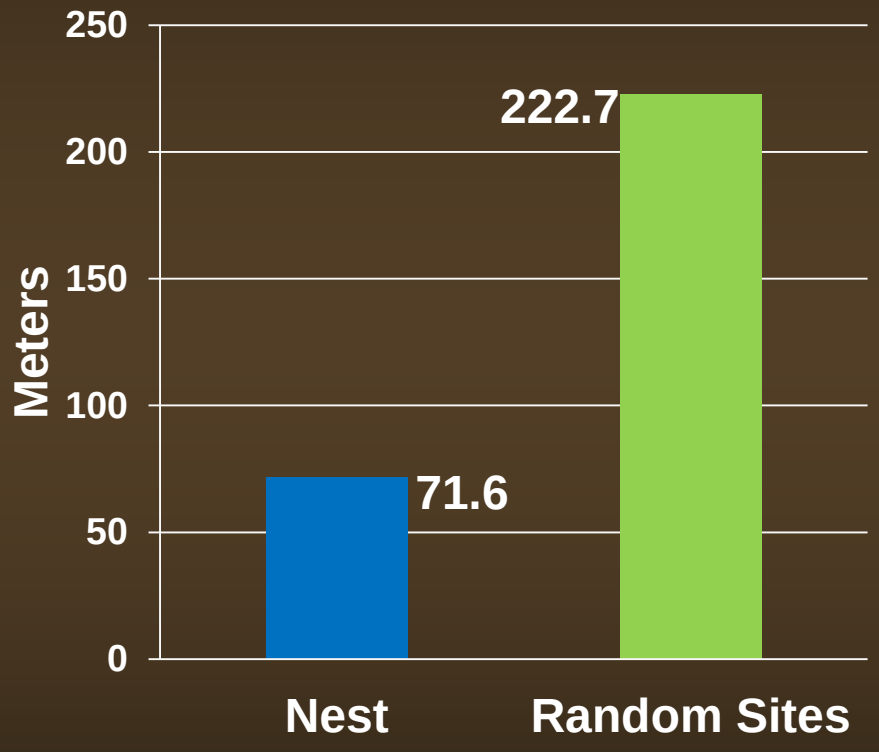
Distance to Agriculture

(*P = 0.0004*)



Distance to Forest

(*P < 0.0001*)



Breeding Home Range

95% Range

1121 ac

50% Core area

226 ac

Brooding Home Range

15 Brooding home ranges

95% Range

244.1 ac

50% Core

68.9 ac

Brooding Habitat Selection

167 Brooding sites, 149 Random Brooding sites

Cover	Brooding	Expected	P-value
Forest	**90.4**	**17.4**	< 0.0001
Grassland	**7.8**	**38.3**	< 0.0001
Shrubland	**1.2**	**10.1**	0.0001
Agriculture	**0.6**	**34.2**	< 0.0001

Brooding Habitat Selection

Habitat Categories	Brooding	Expected
Vegetation density (25-50%)	**41.3**	14.8
Vegetation height (26-50 cm)	45.5	34.9
Litter depth (0-4 cm)	**91.6**	51.7
Canopy cover (50-75%)	**43.7**	9.4

Brooding Habitat Selection

Week	Forest			Grassland	Shrub	Ag
	Upland	Bottomland	Total			
1 (n=20)	52.5	47.5	100	0	0	0
2 (n=17)	39.4	45.4	84.8	12.2	0	3.0
3 (n=16)	59.4	31.2	90.6	6.3	3.1	0
4 (n=15)	60.0	23.3	83.3	16.7	0	0

SUMMARY

Hen Survival (%)

Illinois	**70.5**
Iowa	69.5
Mississippi	49.7- 63.8
Missouri	43.5

Nest Survival (%)

New York	23.2
Missouri	30.6
Mississippi	27.9
Illinois	23.2

Brood Survival (%)

Iowa	
Missouri	25.4 40
Minois	25.4
New York	
Alabama	30.2
Illinois	25.4
Massachusetts	23

Hen Survival

Closed roads

Limited access

↑ Hen survival

↓ Hen poaching

↓ Hunting

Brood and Nest Survival

Closed roads

Limited access

↓ Brood and nest survival

↓ Predator poaching

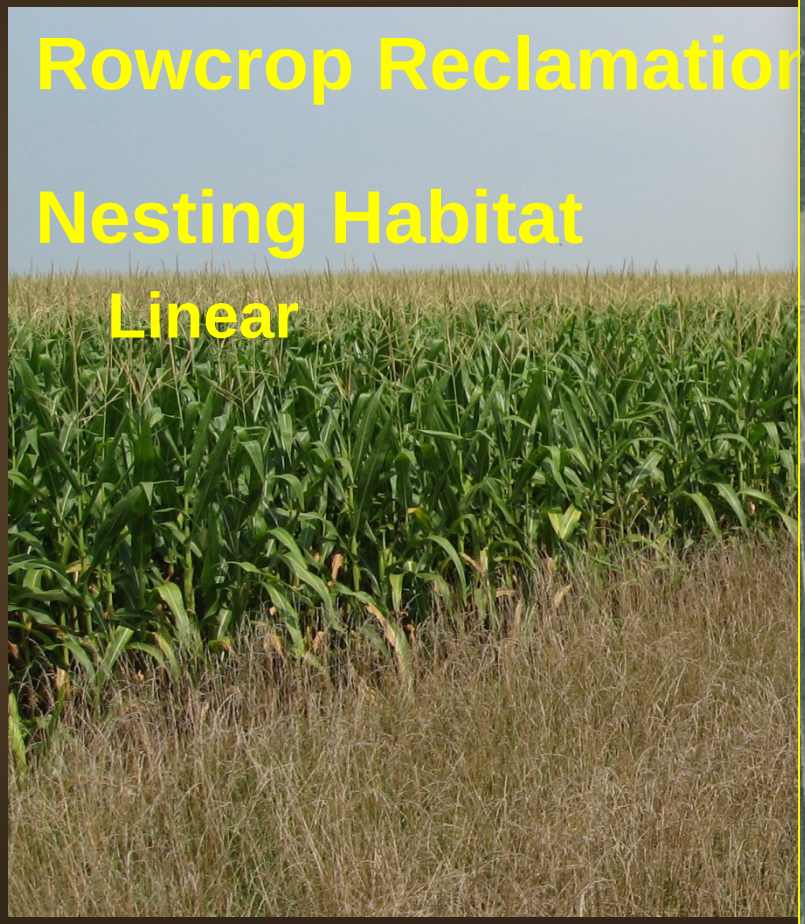
↓ Hunting/trapping

↓ Predator road mortality

Management

- Allow predator trapping and hunting
- “Predator Proof” Habitat

“Edge Effect”



Nesting “Edge Effect”

Rowcrop Reclamation

Brood Habitat Enhancement

Not managed

↑ Litter depth

↓ Foraging efficiency

↓ Poult mobility

Habitat Management

Early successional cover management

Prescribed Fire*

- ↓ Litter depth
- ↑ Seeds and Insects
- ↑ Foraging efficiency
- ↑ Available habitat

*2012 2013

Acknowledgements

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