

Northern Bobwhite Nest Site Selection in Field Borders



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Intensive Agriculture Results in Habitat Loss and Population Decline



Traditional



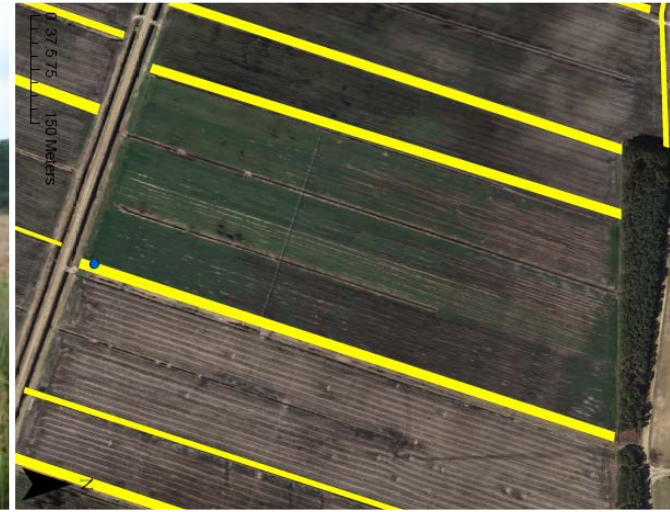
Modern Intensive

Field Borders: A Conservation Solution



**Do bobwhite
nesting in field
borders select
nest sites at
multiple scales?**

Nest Site Selection At Multiple Scales



Site

Does vegetation at the nest differ from the surrounding habitat?

Patch

Does vegetation at the nest differ from the general field border habitat?

Landscape

Does the distance to land-cover types differ between nests and nonuse sites?

Nest Site Selection in Contiguous Habitat

- **Site:** Vegetation at the nest is generally taller (Taylor et al. 1999), denser and composed of more strata (Townsend et al. 2001).
- **Patch:** Vegetation composition of patches did not predict use for nesting (Taylor et al. 1999).
- **Landscape:** Bobwhite did not use agricultural lands juxtaposed with forest edge (Duren et al. 2011).



Selective Pressures in Field Borders

**Depredation Risk in
Fragmented Habitat**

**Thermal Stress
Resulting From
Agricultural Practices**



Objectives

To determine whether:

1. **At the site level**, if the structure and composition of the vegetation at the nest differed from the surrounding habitat
2. **At the patch level**, if the structure and composition of the vegetation at the nest differed from the general field border habitat
3. **At the landscape level**, if distance to various cover types differed between nests and non-use sites

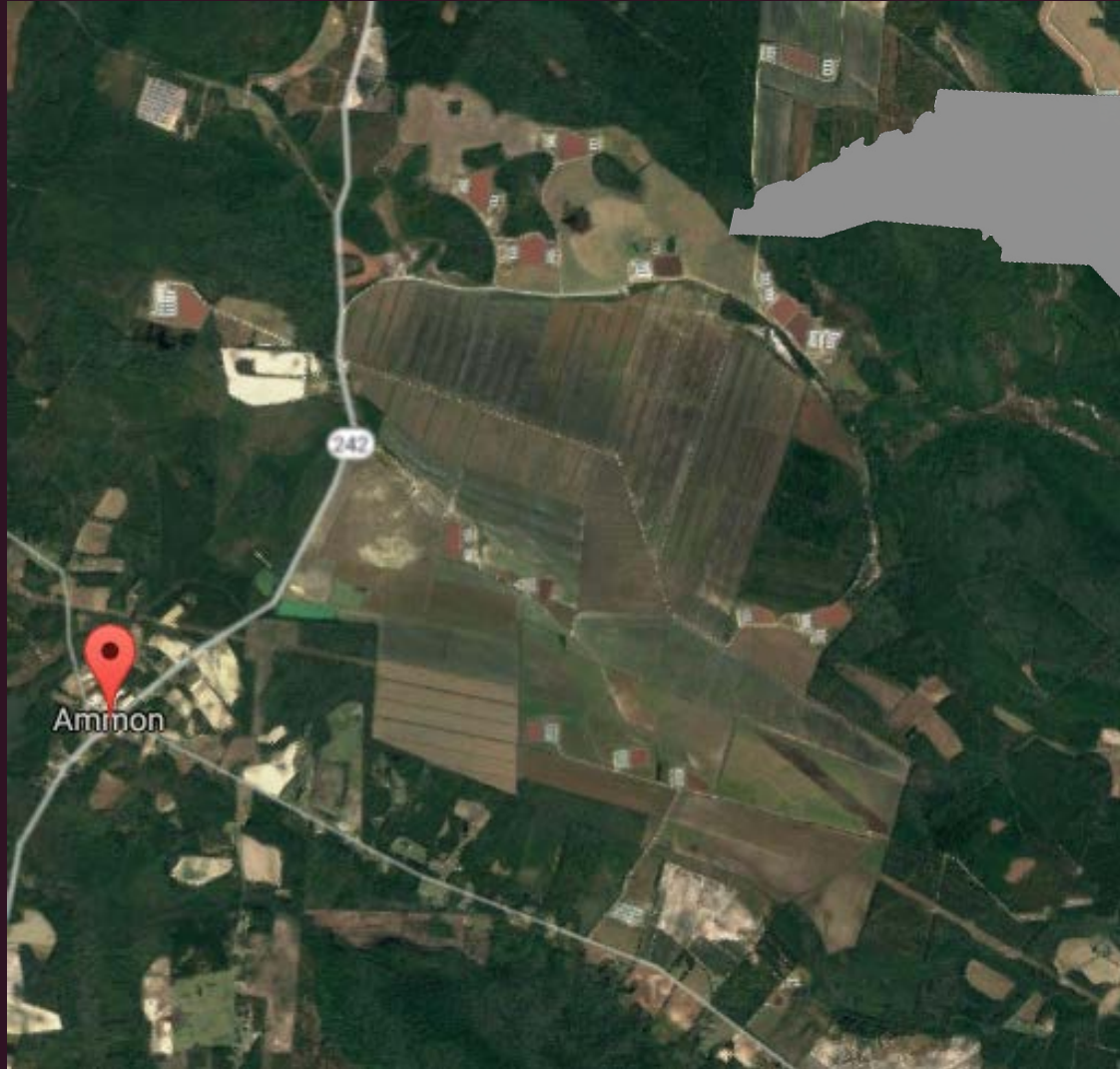


Hypotheses

- H1:** Top models across all scales will include vegetation parameters that contribute to greater concealment of the nest.
- H2:** The top patch-landscape model will demonstrate bobwhite avoidance of woody edges.



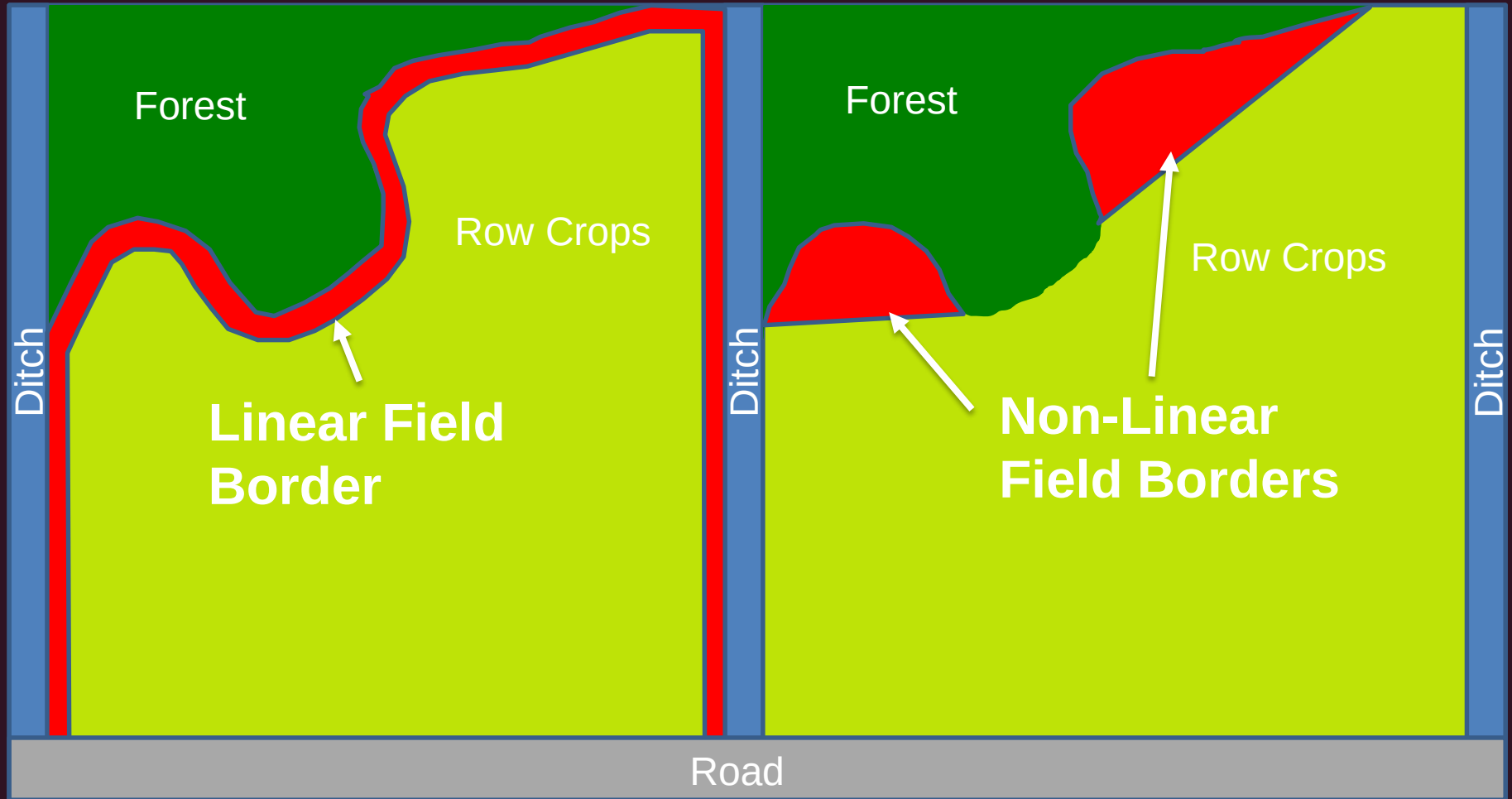
North Carolina Study Site



141 Linear

**24 Non-Linear
Field Borders**

Field Borders



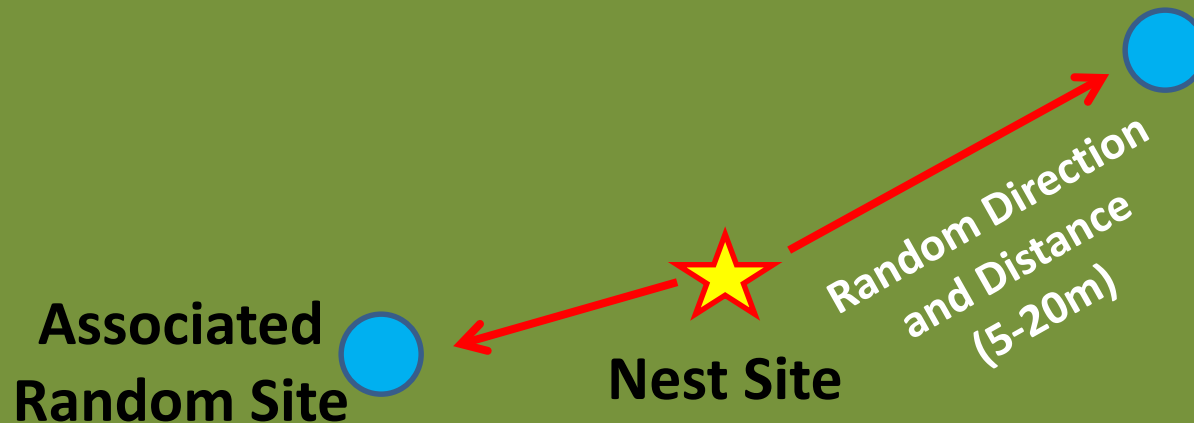
Nest Searching Procedure



Vegetation Measurements: Nest Site

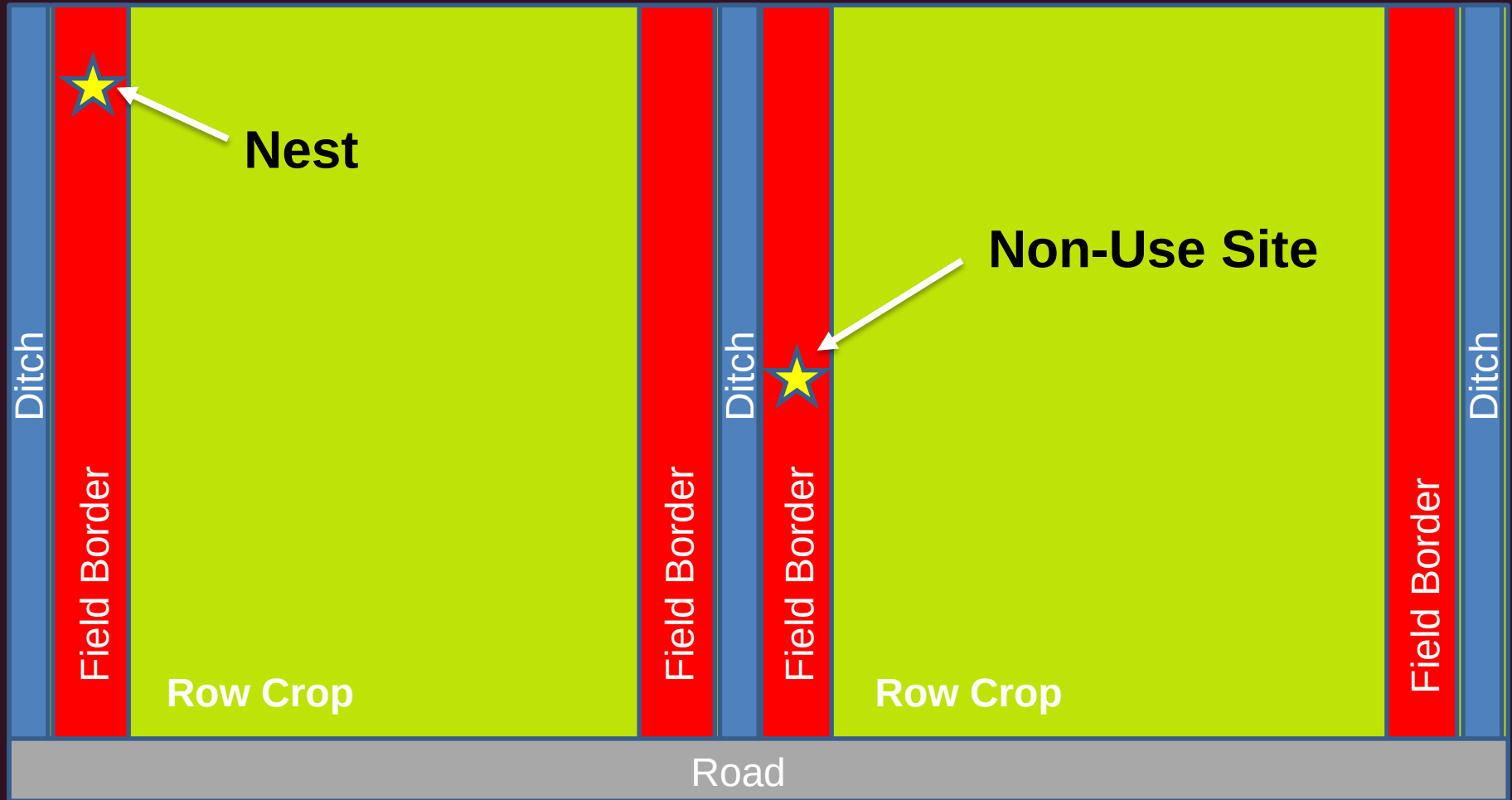
Row Crop

Field Border

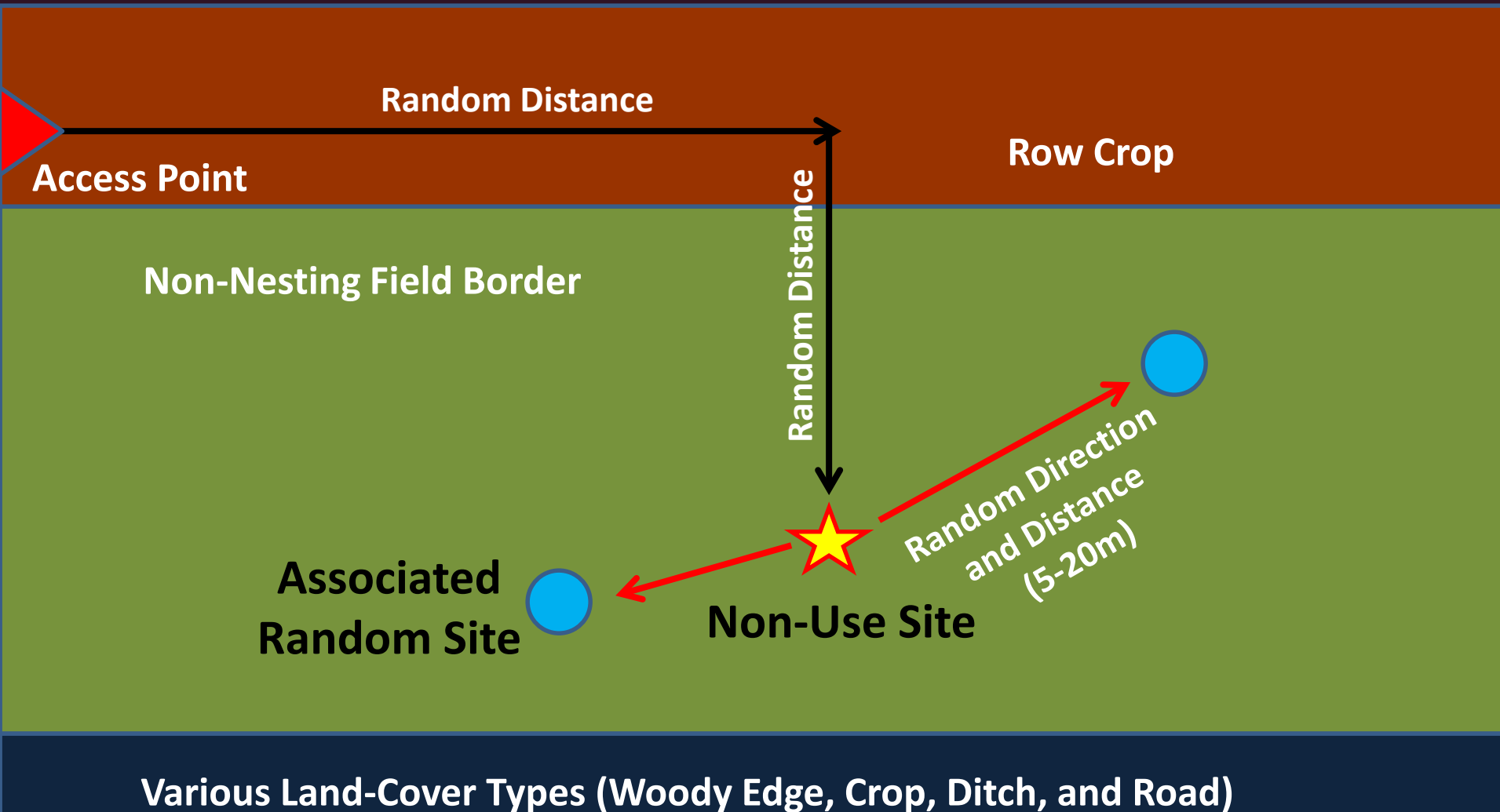


Various Land-Cover Types (Woody Edge, Crop, Ditch, and Road)

Nest vs. Non-use Site



Vegetation Measurements: Non-Use Site



Edge Distance Measurements



Data Analysis

Site-Level: Conditional logistic regression comparing the nest to the 2 associated random sites

Patch-Landscape Level: Logistic regression comparing the nest to the average of the non-use site and two associated random sites

Model selection was performed using AICc.



Site Scale Models

Model Description	K	AIC _c	Δ AIC _c	W _i
Woody + Open Soil	3	40.852	0	0.527
Global	6	42.857	2.004	0.193
Open Soil	2	44.113	3.260	0.103
Open Soil + Herbaceous	3	44.155	3.303	0.101
Open Soil + Grass	3	45.389	4.537	0.055
Woody	3	47.718	6.866	0.017
Woody + Herbaceous	2	51.550	10.697	0.003
Intercept	1	53.604	12.752	0.001
Grass	3	59.180	18.328	0.000
% Cover	2	59.747	18.894	0.000
Herbaceous	2	60.461	19.608	0.000
Grass + Herbaceous	2	60.590	19.737	0.000

Open Soil

$\beta = -0.2233$

S.E. = 0.0865

RIV = 0.979

Woody Cover

$\beta = 0.0507$

S.E. = 0.0250

RIV = 0.740

N= 26 nests

Open

Open Soil

$\beta = -0.0775$

S.E. = 0.0386

RIV = 0.533

Woody Cover

$\beta = 0.0317$

S.E. = 0.0147

RIV = 0.352

N= 26 nests

Pe

Model Description

K

AIC_c

Δ AIC_c

W_i

Open Soil + Herbaceous

3

69.446

0

0.202

Woody + Grass

3

69.467

0.021

0.200

Grass + Open Soil

3

70.762

1.316

0.104

Open Soil

2

71.331

1.884

0.078

Global

10

71.416

1.970

0.075

Herbaceous

2

72.124

2.677

0.053

Woody + Open Soil

3

72.493

3.047

0.044

Grass

2

72.647

3.200

0.040

Grass + Herbaceous

3

72.828

3.382

0.037

Woody + Herbaceous

3

73.762

4.316

0.023

Road

2

73.990

4.543

0.020

Woody Edge

2

74.066

4.619

0.020

Intercept

1

74.139

4.693

0.019

Distance

5

74.169

4.723

0.019

Vegetation

6

74.337

4.890

0.017

Ditch

2

74.554

5.107

0.015

Crop

2

75.217

5.770

0.011

Woody

2

76.039

6.592

0.007

% Cover

2

76.072

6.625

0.007

Discussion: Vegetation

- **Bobwhite select for woody plants and avoid open soil at the nest.**
- **Overall concealment was a poor predictor of nest site selection.**
- **Structural characteristics of vegetation may be of greater importance than overall concealment.**
- **Microhabitat characteristics that influenced nesting decisions within a field border did not determine which field borders were utilized for nesting.**

Discussion: Land-Cover

- Distance to various land-cover types did not influence nest placement.
- Piispanen and Riddle (2012) were unable to show the nest placement relative to land-cover types conferred a survival advantage on our study site.
- Nests were an average of 400m from the nearest woody edge. Non-use sites were an average of 300m from woody edge.
- Field borders in an agriculture-dominated landscape may be sufficiently far from woody edges to avoid increased predation risks associated with woody edges.

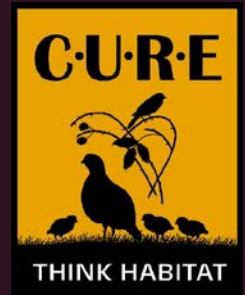
Management Implications

- Management practices should encourage some presence of woody vegetation and minimize open soil.
- Field-border placement may be flexible in an agriculture-dominated landscape.



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Cooperative Research Unit



Citations

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Questions?



