

A Landscape Perspective on Pheasant Biology and Habitat Needs



Nicole Davros, Ph.D.

Wildlife Research Scientist

MN DNR - Farmland Wildlife Populations & Research Group

Madelia, MN



Overview of talk

- **Natural history**
 - Habitat needs
 - Seasonal movements
- **Pheasant: 9 mi² “habitat recipe”**
 - MN Prairie Plan
 - Working Lands Initiative (WLI)
- **Evidence from the research literature**

Reproductive Habitat

Undisturbed grass, hay, pasture, small grains



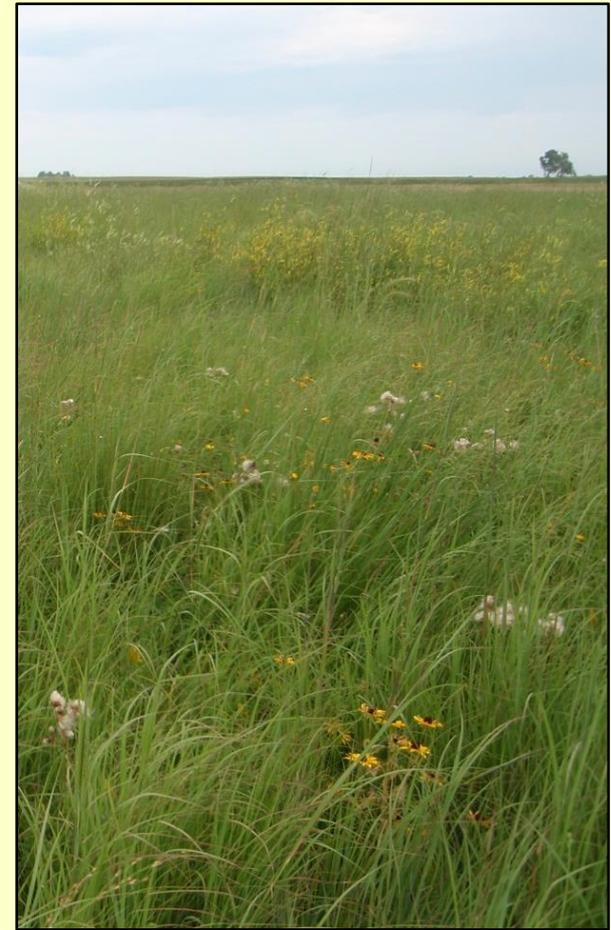
Reproductive Habitat

Female selects nest site & incubates eggs

- Usually ~0.5 mi from winter habitat

Nesting vegetation

- 10-12" by mid-April
- Mix of veg types for structure



Reproductive Habitat

Length of Nesting Period

2+ weeks laying

3+ weeks incubating

≥6 weeks total - *Undisturbed!*



Reproductive Habitat

Brood-rearing habitat

- Broad-leaved forbs
 - Insects = food
 - More open understory



Reproductive Habitat

Edge effects

- Woody vegetation is bad for grassland nesting birds



Winter Habitat



Pheasants in Winter

Conserve energy during extreme cold

Most birds don't move very far in winter

- <0.5 mi on average

Farther movements = increased exposure and/or predation risks

Goal: Keep food near shelter



Winter Habitat

Winter cover

- Cattail marshes, shrub swamps
- Shelterbelts
 - No tall deciduous trees



Winter Habitat

Winter cover

- Cattail marshes, shrub swamps
- Shelterbelts
 - No tall deciduous trees



Caution!

Will decrease

nest success!

Winter Habitat

Winter food availability

- Food plots (especially corn or sorghum)
 - Within 1/4 mi of winter cover
 - Available every winter
 - Sufficient size to protect from drifting snow



Overview of talk

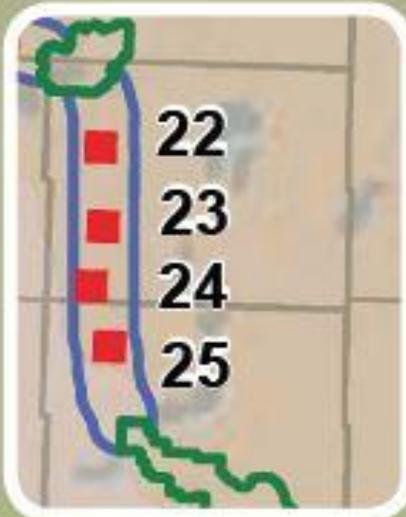
- **Natural history**
 - Habitat needs
 - Seasonal movements
- **Pheasant: 9 mi² “habitat recipe”**
 - MN Prairie Plan
 - Working Lands Initiative (WLI)
- **Evidence from the research literature**

MN Prairie Plan / Working Lands Initiative



Corridors:

- Linear stretches of habitat 6 miles wide that connect Core Areas to each other and moderate the effects of a highly fragmented landscape
- Function as dispersal corridors that allow an exchange of individuals and genetics between populations
- Goal: 10% of each square mile in the Corridor be protected grassland and wetland habitat



Corridor Complexes:

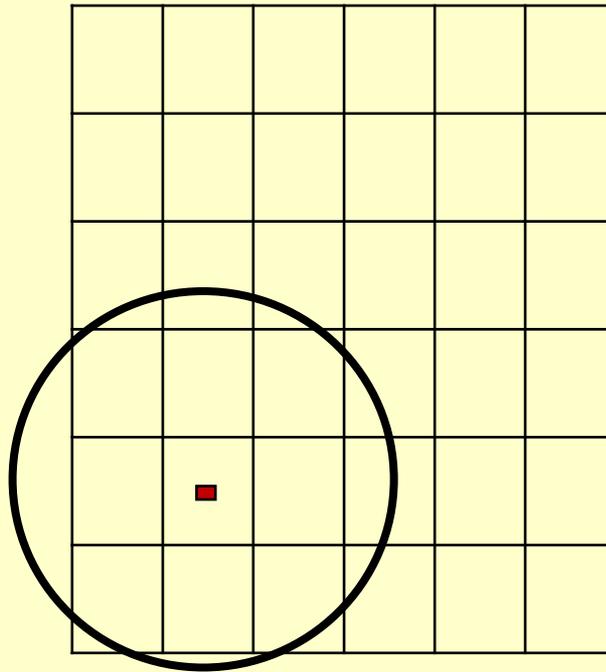
- 9 square mile habitat complexes established every 6 miles within the Corridors
- Function as habitat "stepping stones" for mobile wildlife species within the Corridors
- Goal: reach 40% grassland and 20% wetland within each Corridor Complex

Pheasant “Habitat Recipe”

- **Combining the ingredients on the landscape**
 - **Reproductive habitat**
 - Nesting
 - Brood-rearing
 - **Winter habitat**
 - Cover
 - Food

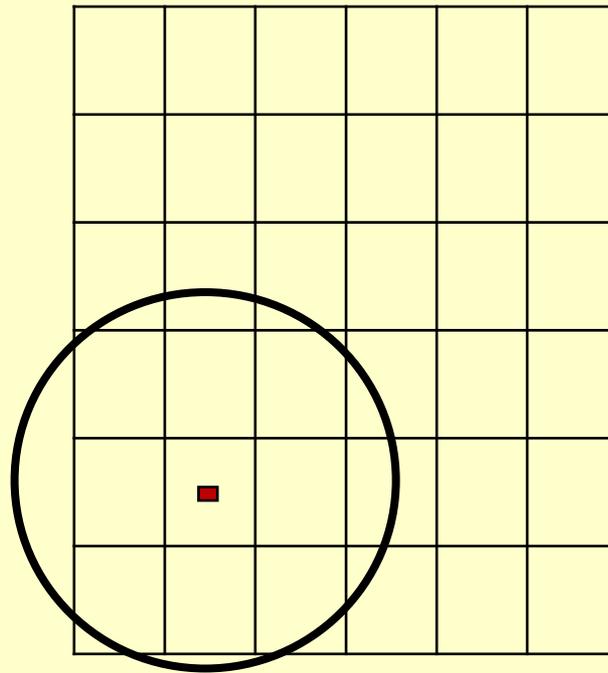
Pheasant “Habitat Recipe”

- Quarter Township (9 mi²)
 - Up to 40% grass
 - 1 winter habitat complex (food & shelter)
 - <2 mi between grass & winter habitat
 - Minimal woody cover & woody edges



Pheasant “Habitat Recipe”

- Quarter Township (9 mi²)
 - Up to 40% grass
 - 1 winter habitat complex (food & shelter)
 - <2 mi between grass & winter habitat
 - Minimal woody cover & woody edges



Prairie Plan
Corridor Complex

“Habitat Recipe” for Corridor Complexes

- **Combining the ingredients on the landscape**
 - **Reproductive habitat**
 - Nesting
 - Brood-rearing
 - **Winter habitat**
 - Cover
 - Food
- **Quarter township**
 - Up to 40% grass
 - 1 winter habitat complex
 - <2 mi between grass & winter habitat
 - Minimal woody cover & woody edges

Overview of talk

- **Natural history**
 - Habitat needs
 - Seasonal movements
- **Pheasant: 9 mi² “habitat recipe”**
 - MN Prairie Plan
 - Working Lands Initiative (WLI)
- **Evidence from the research literature**

Landscape Considerations: How much is enough?

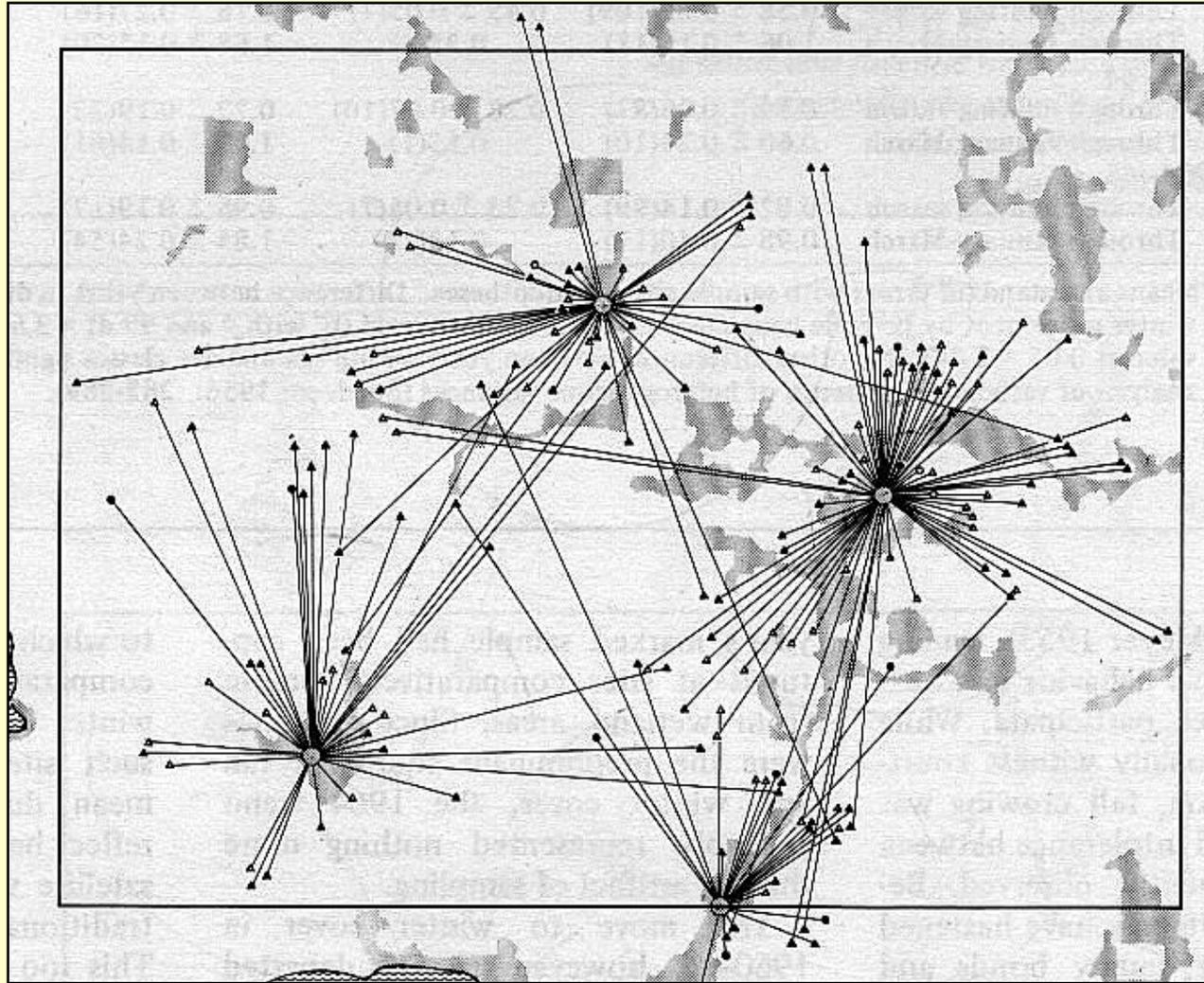


Landscape Considerations: How much grass is enough?

- Question of scale
 - 70-80% of hens move <2 mi
 - Emigrants move >2 mi



Landscape Considerations: How much grass is enough?

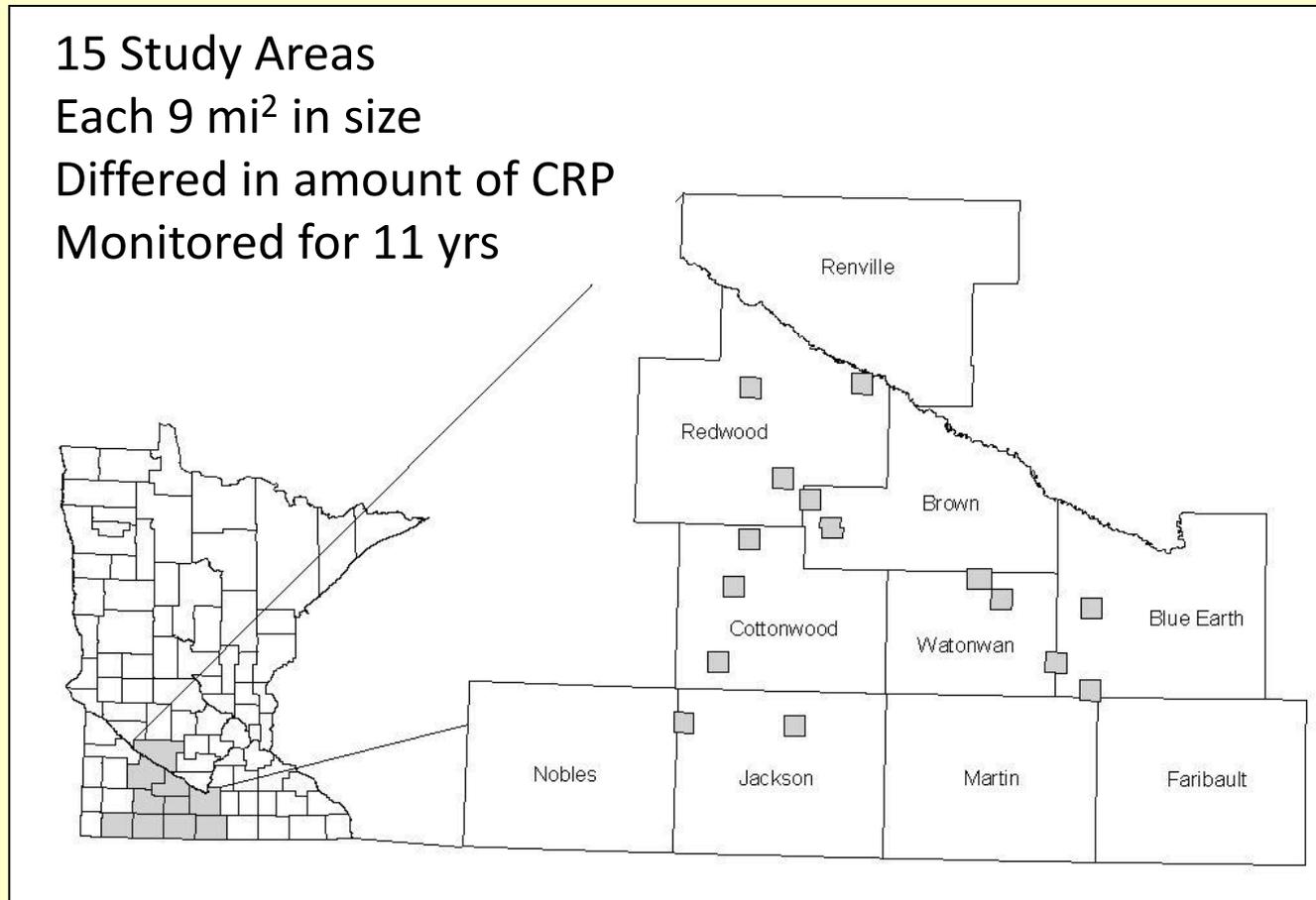


**Gradual
seasonal
movements**

**Average is
<2 miles**

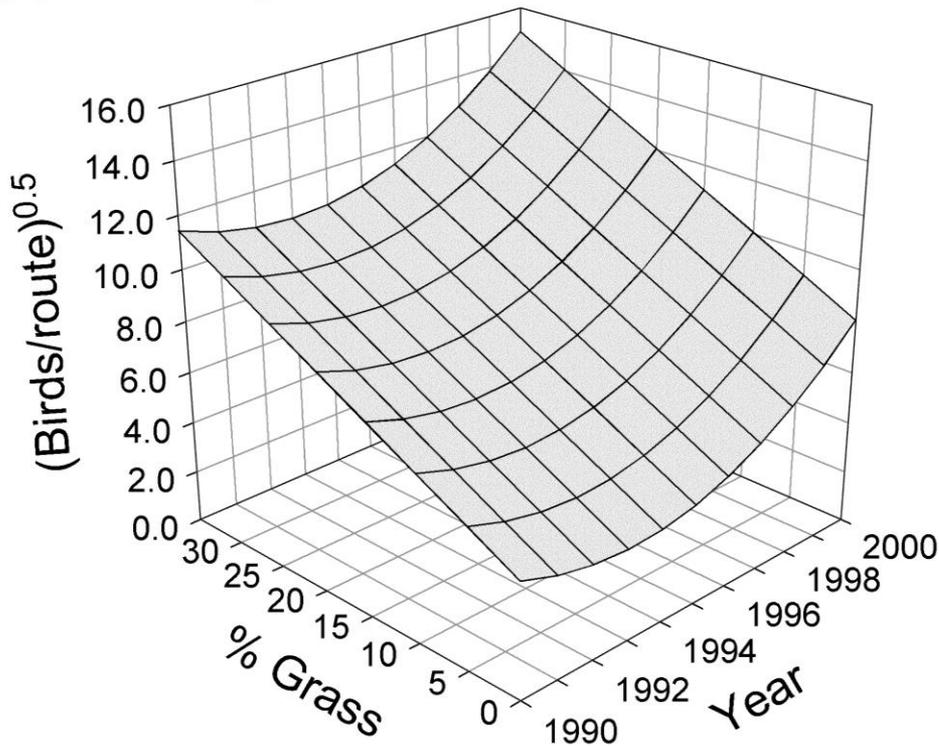
Landscape Considerations: How much grass is enough?

- Haroldson et al. 2006. JWM 70:1276-1284. Association of ring-necked pheasant, gray partridge, and meadowlark abundance to CRP grasslands.



Landscape Considerations: How much grass is enough?

(b) Summer pheasant

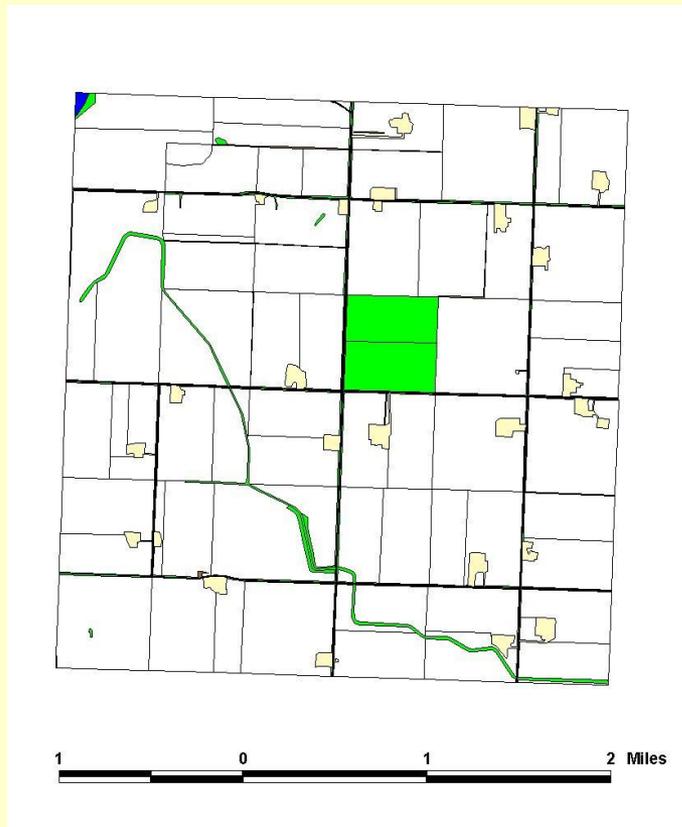


- **More grass = more birds, regardless of weather (year)**
- **Each 10% increase in grass added ~33 birds/route**

Landscape Considerations: How much grass is enough?

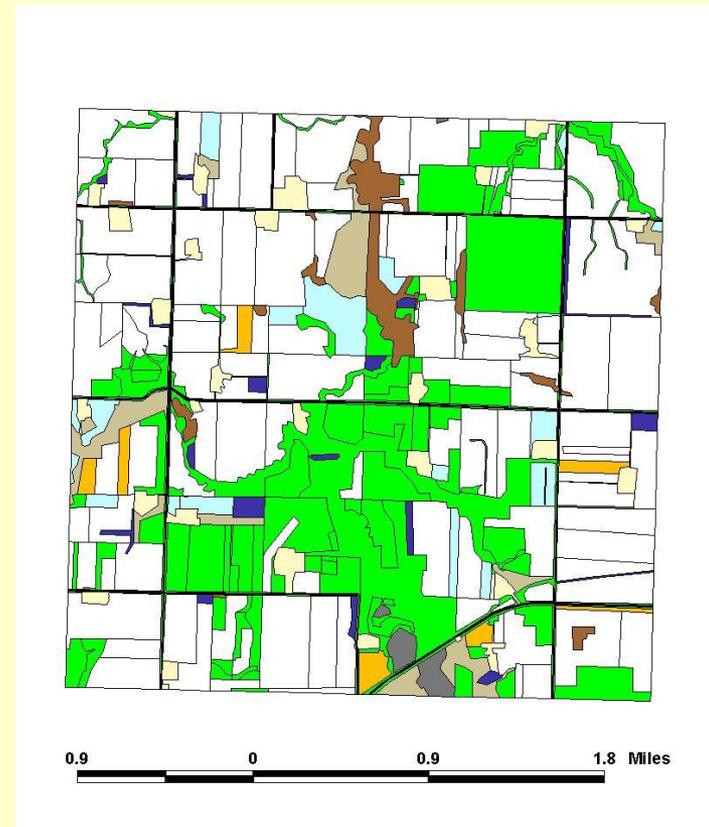
5% grass

30 birds / mi²

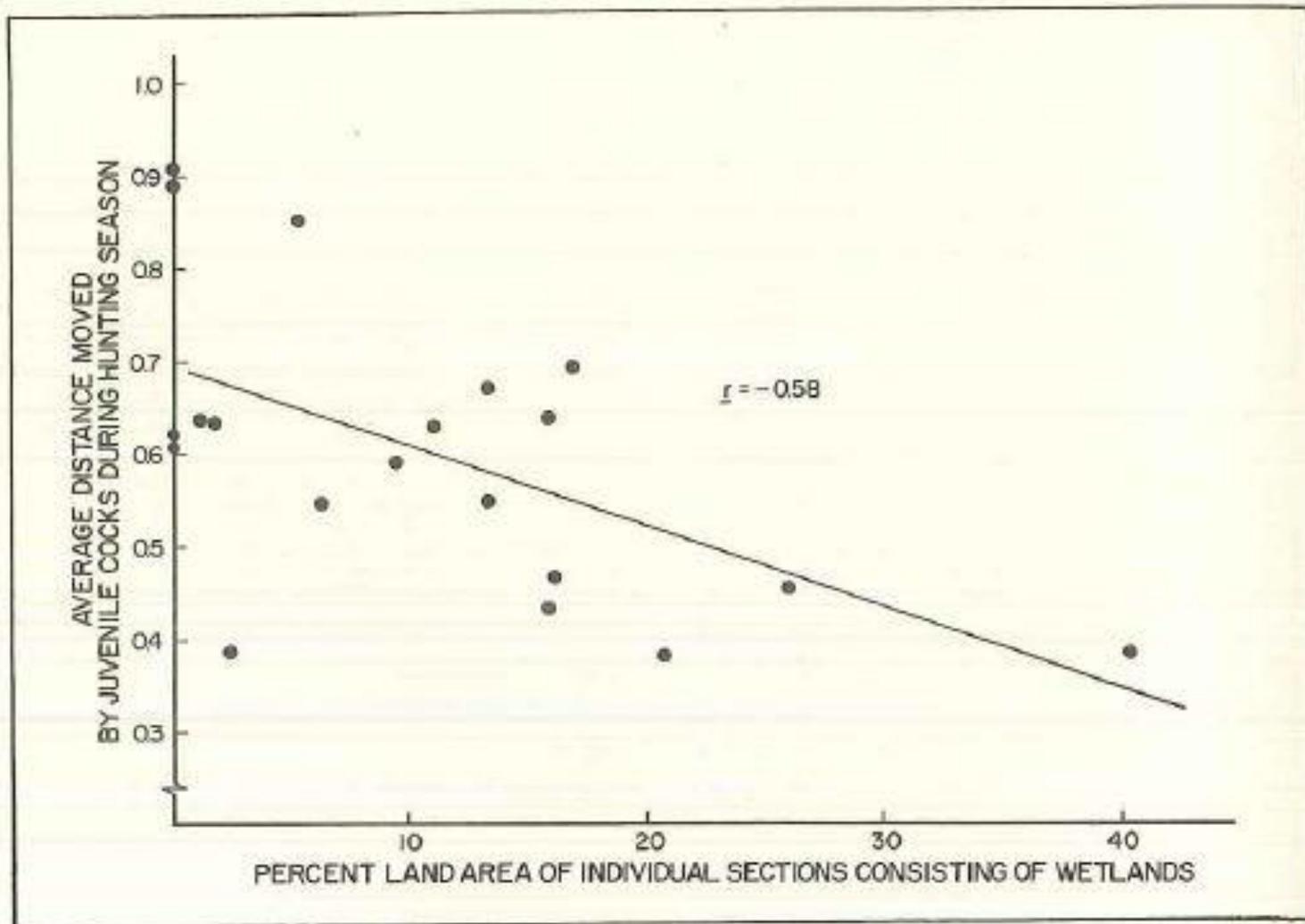


25% grass

160 birds / mi²



Landscape Considerations: How much wetland is enough?



Landscape Considerations: How to arrange patches of habitat?

Patch Size vs. Configuration

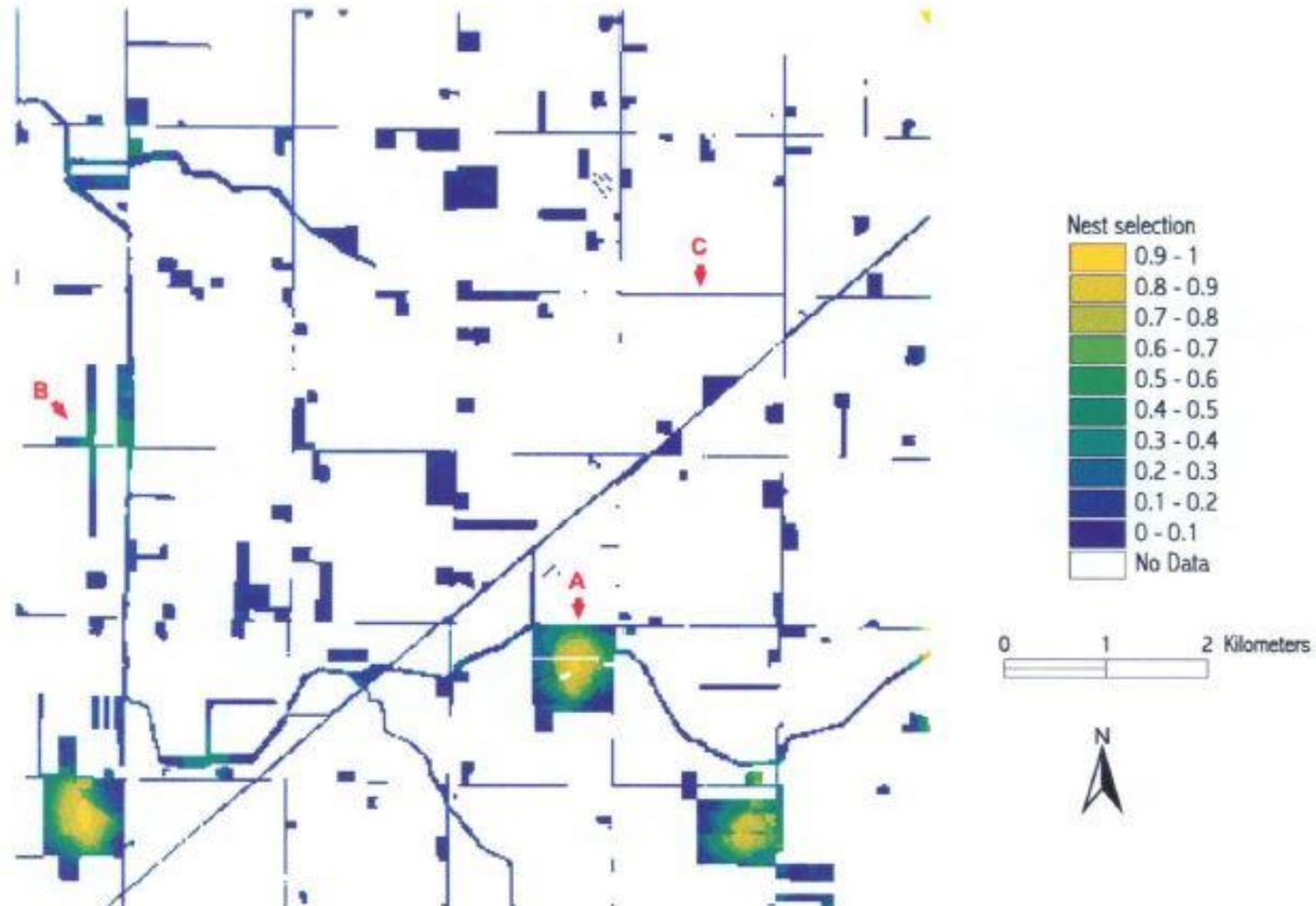


Fig. 1. Probability of nest-site selection of ring-necked pheasants predicted by a logistic regression model that is a function of landscape composition and configuration variables within a 485-m radius of nests at the Kossuth area, northern Iowa. (A) An example of an area with a high probability of being selected as a nest site, (B) an area where selection probability would be predicted to be moderate, and (C) an area predicted to have very low probability of selection.

Patch Size vs. Configuration

- Clark et al. 1999. JWM 63:976-989. Site selection and nest success of ring-necked pheasants as a function of location in Iowa landscapes.



Low Nest Success

High Nest Success

Small patch, strip

Blocks >40 acres

Single large block

Cluster of several large blocks

Patch Size vs. Configuration

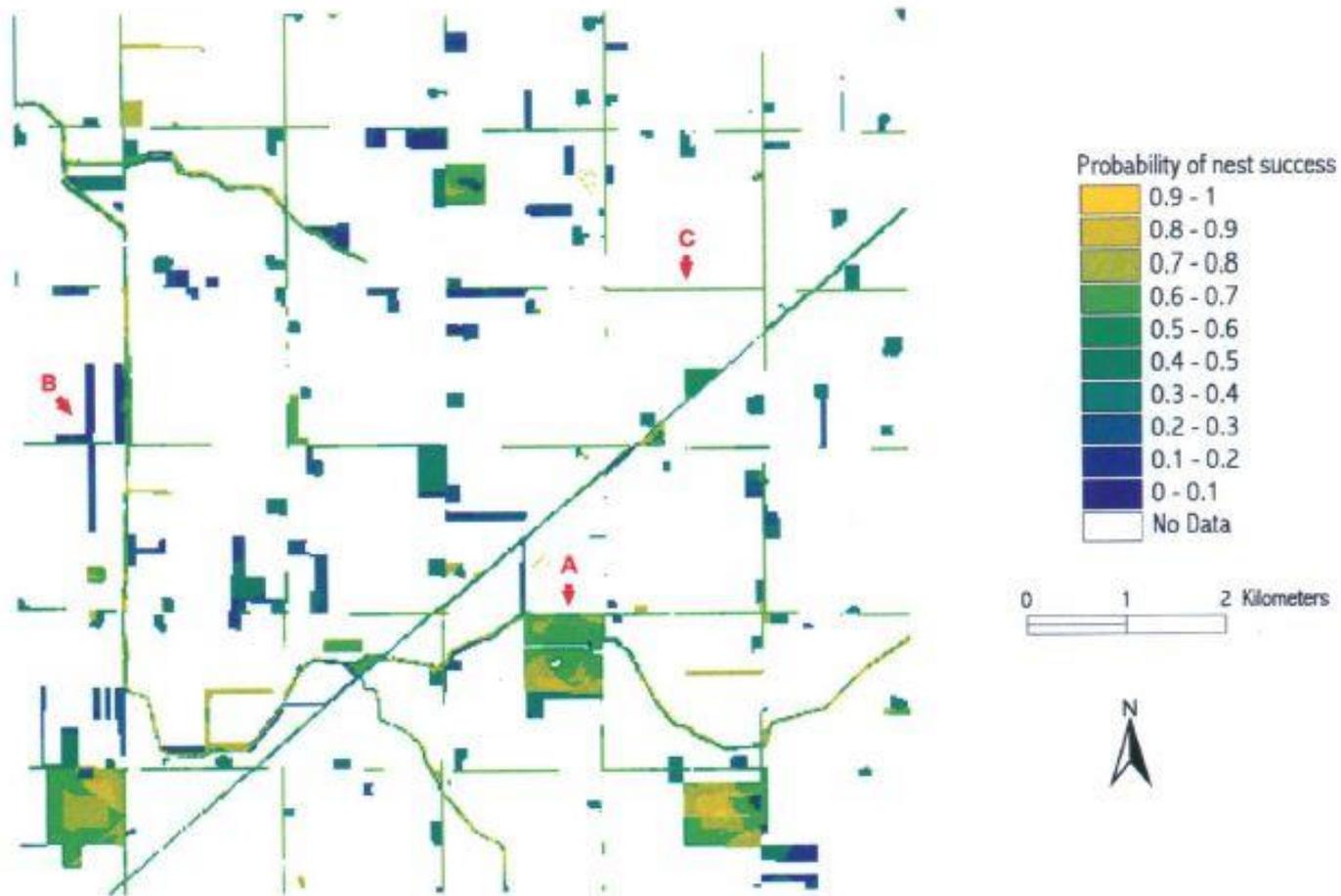
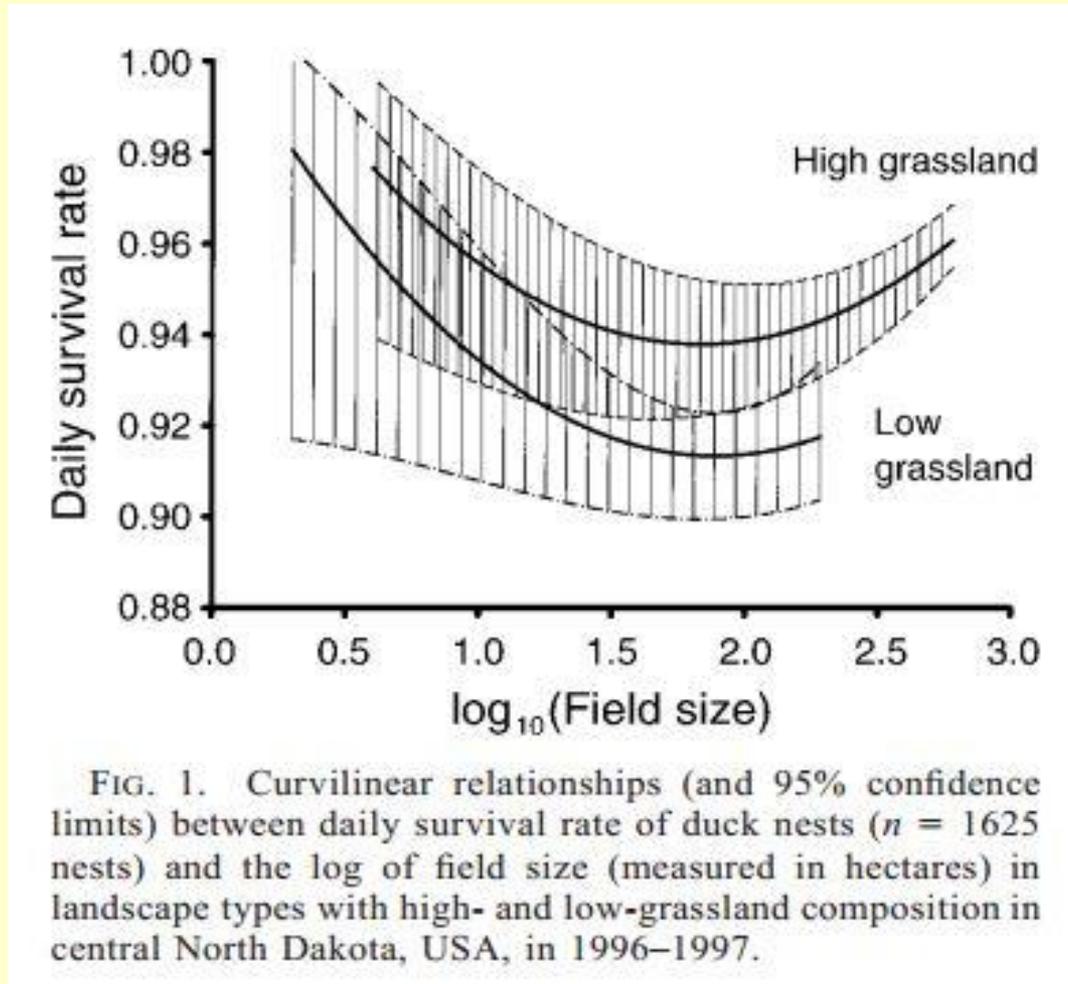


Fig. 4. Probability of nest success of ring-necked pheasants predicted by a logistic regression model that is a function of landscape composition and configuration variables within a 485-m radius of nests at the Kossuth area, northern Iowa. (A) A large patch where success is generally >0.50 but is influenced by the configuration of the landscape surrounding the patch, (B) an area where moderate-sized patches are clustered that would be predicted to have success rates <0.30 , and (C) an isolated road right-of-way where predicted nest success is relatively high.

Patch Size vs. Configuration

- Horn et al. 2005. *Ecol Appl* 15:1367-1376. Landscape composition, patch size, and distance to edges: interactions affecting duck reproductive success.



Patch Size vs. Configuration

- Horn et al. 2005. *Ecol Appl* 15:1367-1376. Landscape composition, patch size, and distance to edges: interactions affecting duck reproductive success.

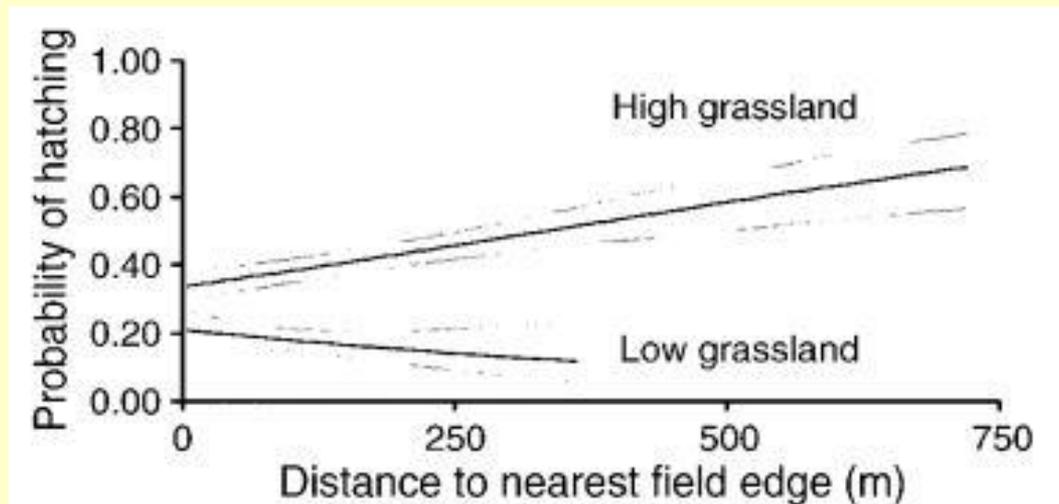


FIG. 2. Relationships between probability of an individual duck nest hatching ($n = 1423$ nests with known UTM coordinates) and distance to nearest field edge in landscape types with high- and low-grassland composition in central North Dakota in 1996–1997. Plotted incidence functions include the 95% confidence limits of expected values of the mean for each distance to nearest field edge. The relationships may be a result of different red fox activity levels in cores of high- and low-grassland composition landscapes.



Patch Size vs. Configuration

- Kuehl & Clark. 2002. JWM 66:1224-1234. Predator activity related to landscape features in northern Iowa.

1228 PREDATOR ACTIVITY RELATED TO LANDSCAPE FEATURES • Kuehl and Clark J. Wildl. Manage. 66(4):2002

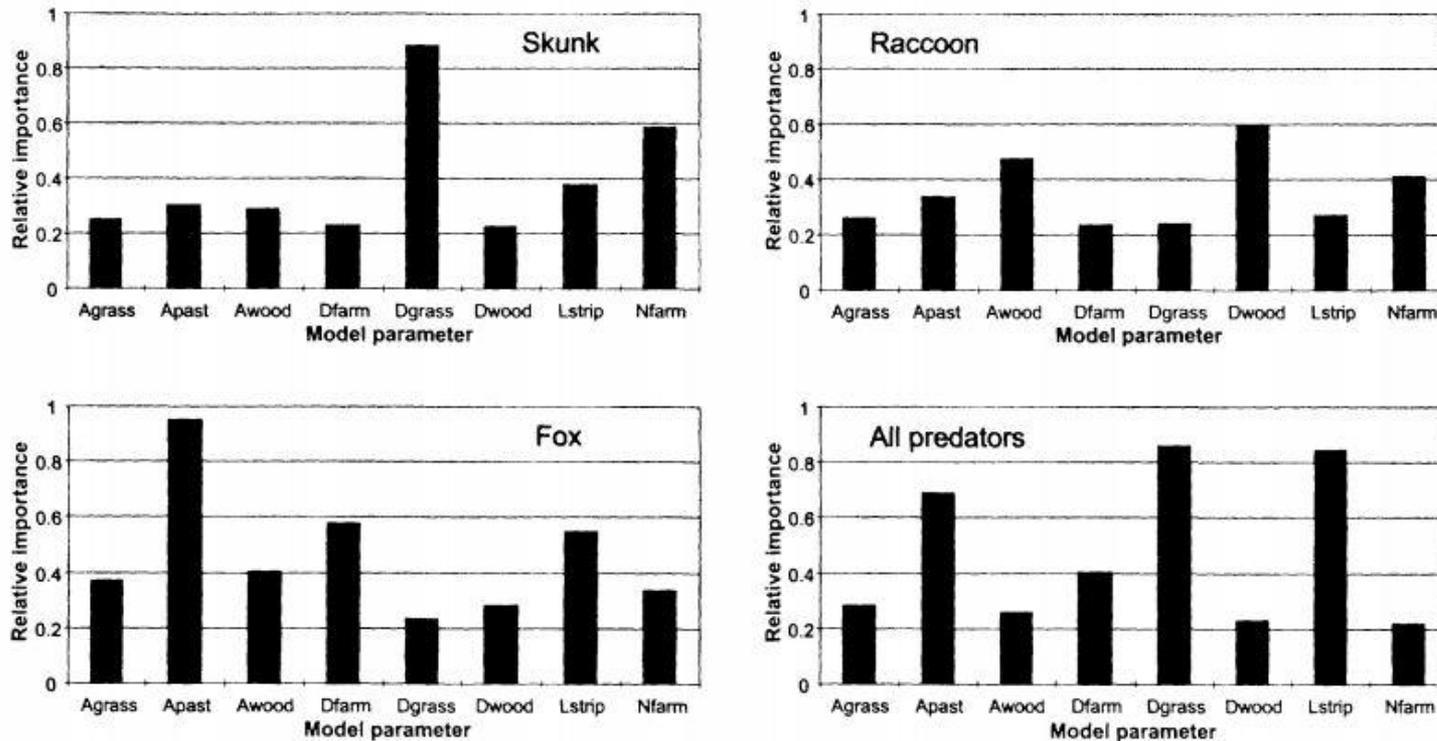


Fig. 2. Relative importance of landscape variables for predicting activity of striped skunk, raccoon, red fox, and all predators on isolated sample units in northern Iowa, USA, May–Jul, 1999 and 2000. Abbreviations of model parameters: Agrass = area of grassland, Apast = area of pasture, Awood = area of woodland, Dfarm = distance to farm, Dgrass = distance to grassland block, Dwood = distance to woodland, Lstrip = length of strip habitat, Nfarm = number of farms.

Patch Size vs. Configuration

- Kuehl & Clark. 2002. JWM 66:1224-1234. Predator activity related to landscape features in northern Iowa.

“Track stations indicated that predators moved into and out of grassland patches at corners of blocks (80% of the time) much more frequently than when they traveled along the straight sides of blocks (7%). If presence of predators is directly related to predation rate, our models predict that risk to nesting birds would be greatest in patches near large grassland blocks where corridors, corners, and smaller patches focus predator activity. We envision that wildlife biologists could use models of predator activity to predict the potential influence of landscape configuration on predation risk to nesting birds.”

Landscape Considerations:

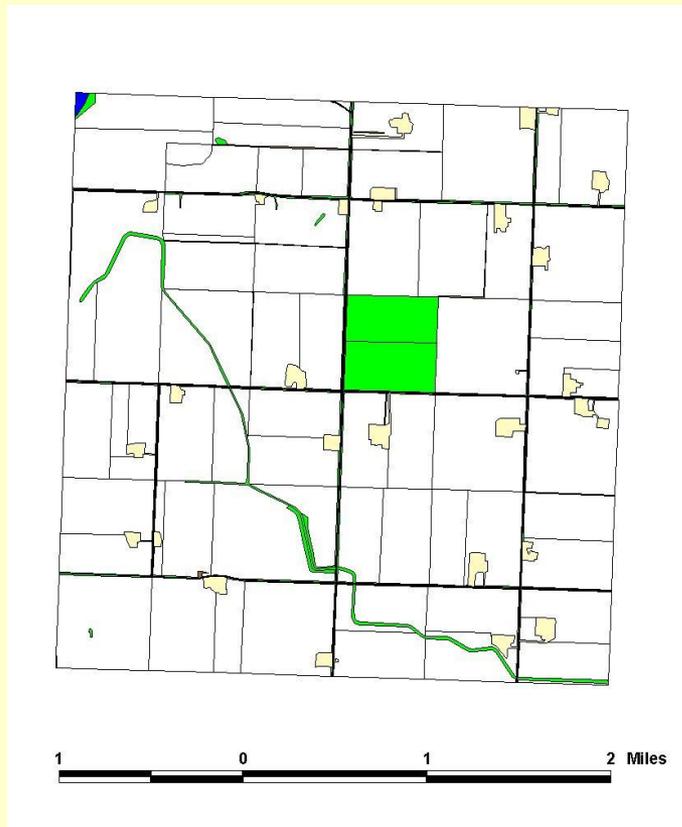
Now how to arrange patches of habitat??????



Landscape Considerations: How much grass is enough?

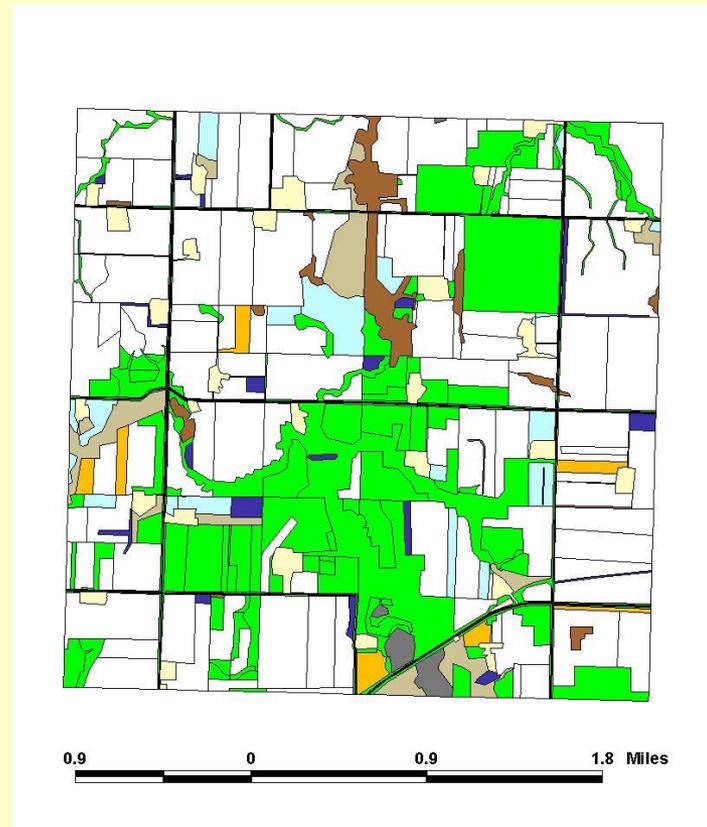
5% grass

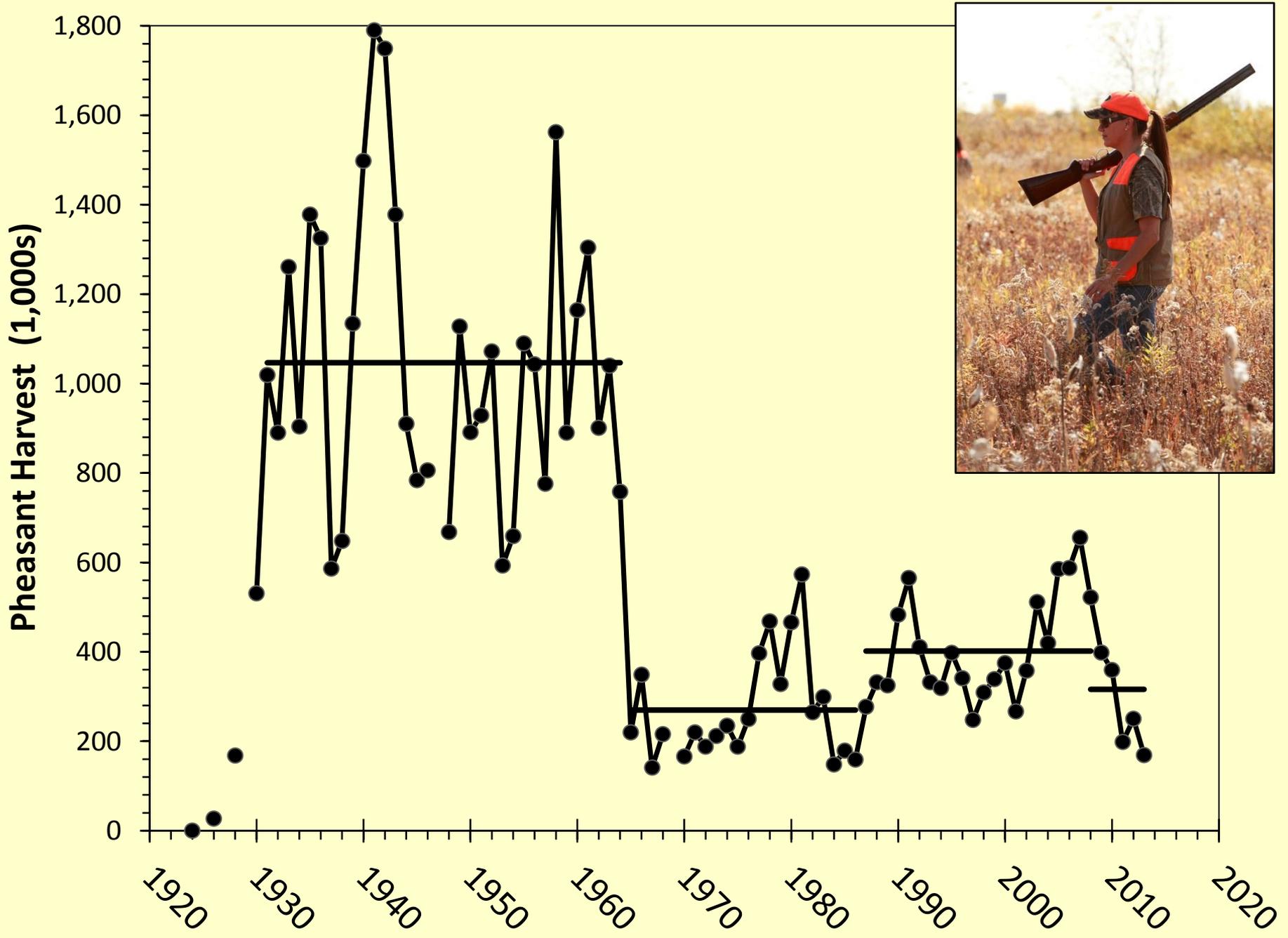
30 birds / mi²

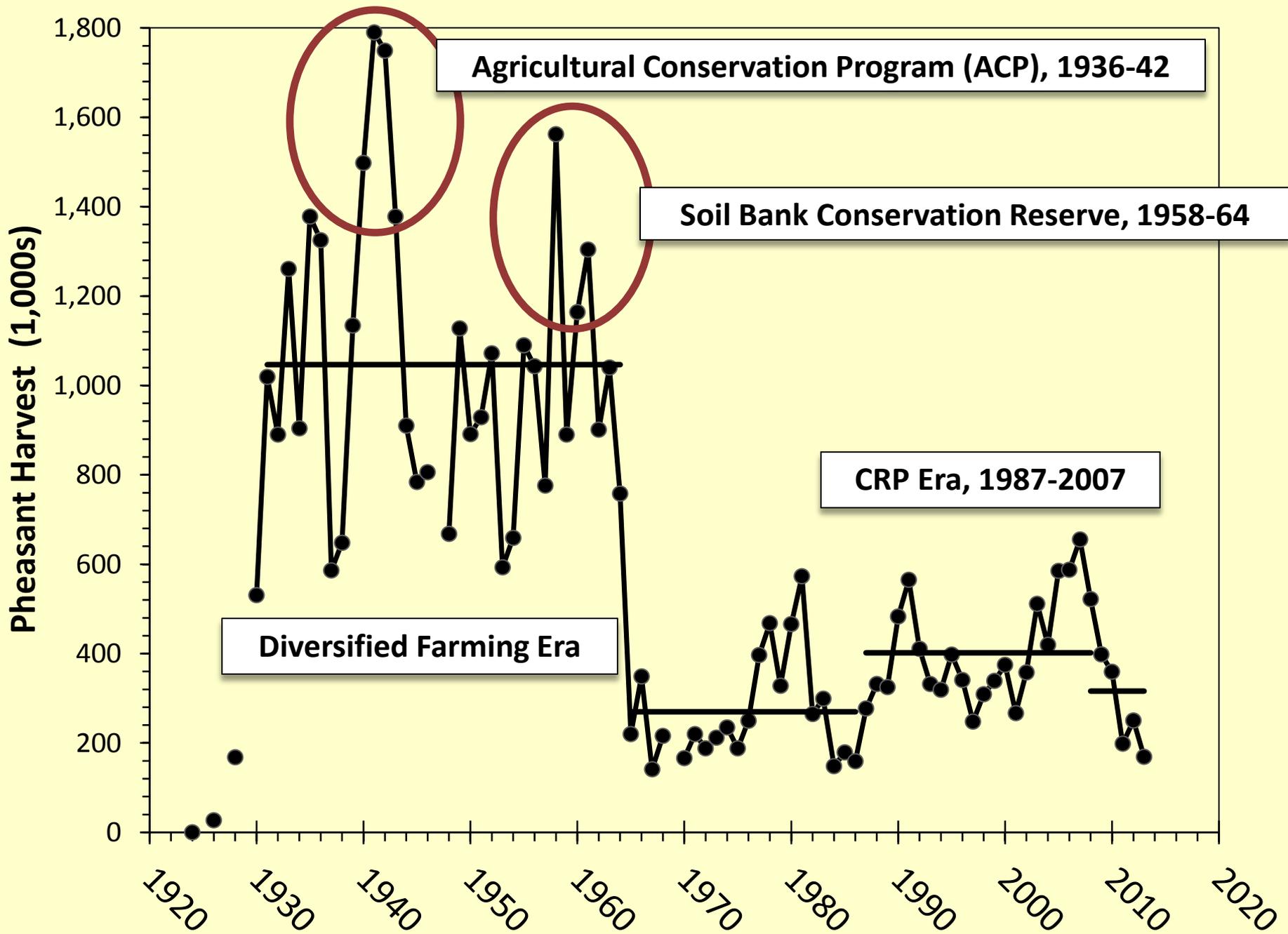


25% grass

160 birds / mi²





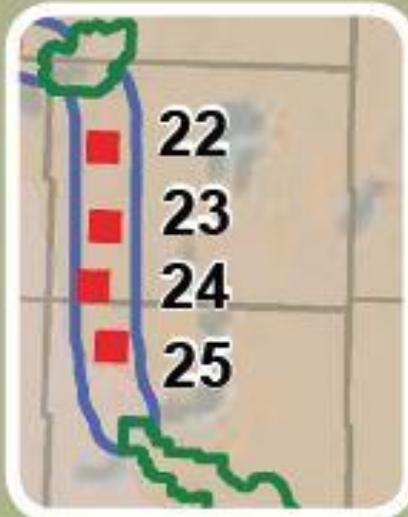


MN Prairie Plan / Working Lands Initiative



Corridors:

- Linear stretches of habitat 6 miles wide that connect Core Areas to each other and moderate the effects of a highly fragmented landscape
- Function as dispersal corridors that allow an exchange of individuals and genetics between populations
- Goal: 10% of each square mile in the Corridor be protected grassland and wetland habitat



Corridor Complexes:

- 9 square mile habitat complexes established every 6 miles within the Corridors
- Function as habitat "stepping stones" for mobile wildlife species within the Corridors
- Goal: reach 40% grassland and 20% wetland within each Corridor Complex

