

# How are Grassland Birds Responding to:

- Patch Size (Area Sensitivity)
- Landscape Context
- Issues of Scale
- Habitat Quality
- How do we translate this to management decision making?



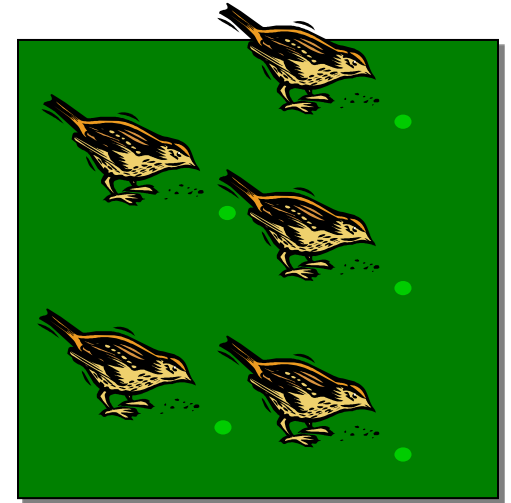
# Old School:

## Patch Size is Important



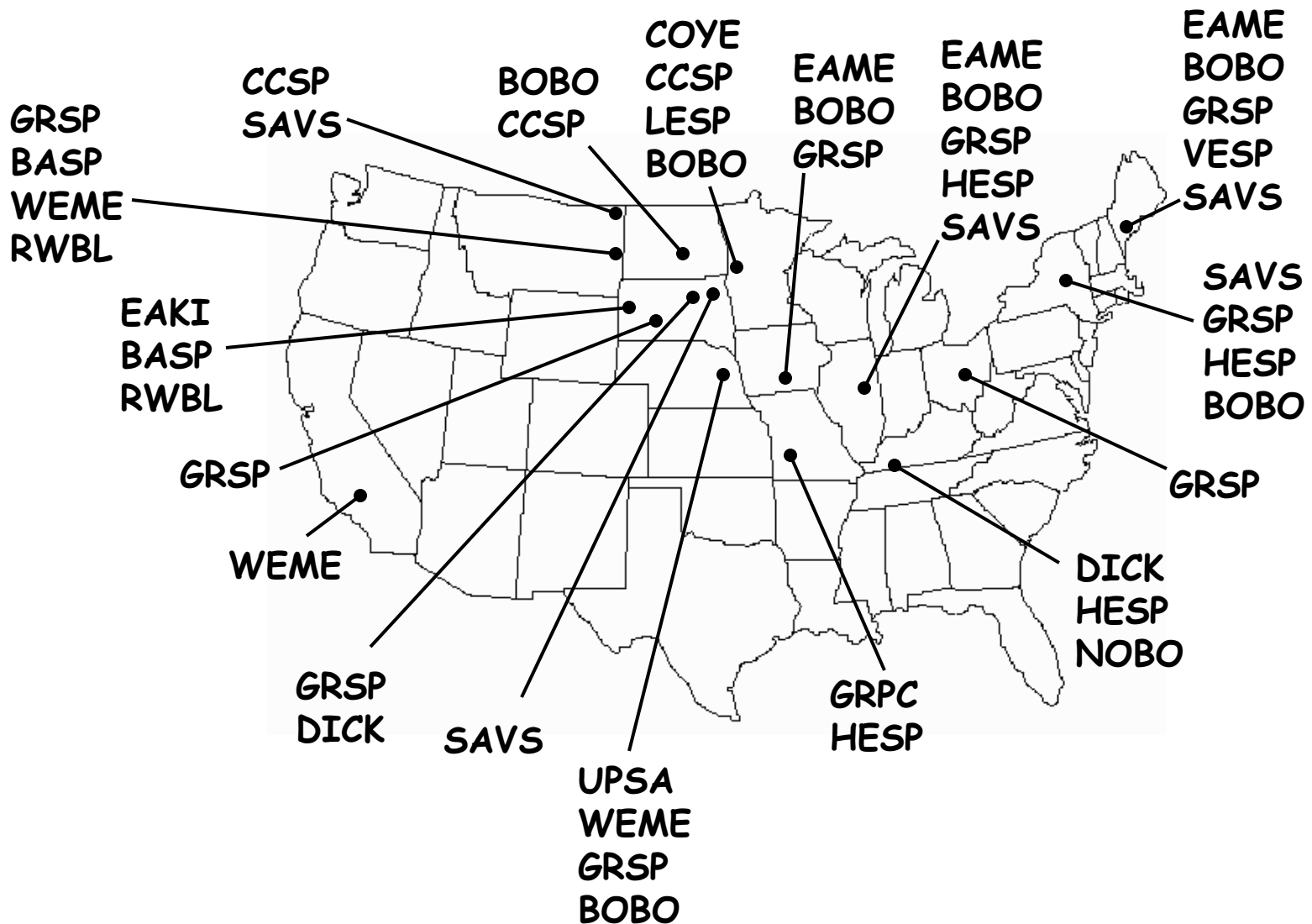
# Area Sensitivity

- Original definition: forest bird species show an increase in both density and probability of occurrence with increasing patch area



# Fragmentation Effects on Grassland Birds in the U.S.

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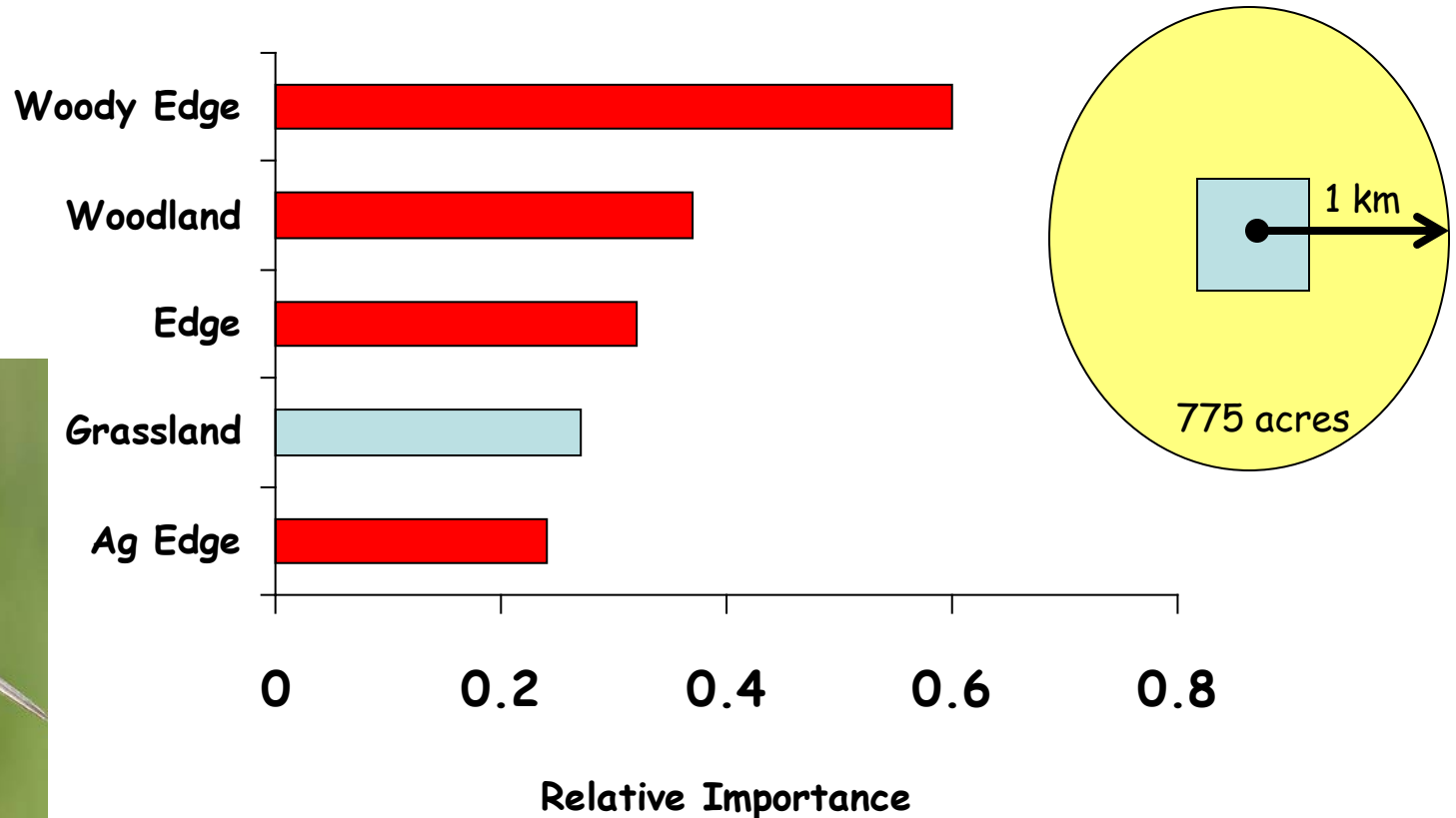


# Evidence for Area Sensitivity in Grassland Birds

- 32 species of grassland bird;
- 16 spp. studied in at least one area;
- results variable: only 8 consistently found to have a positive relationship of density with patch size.... Why??

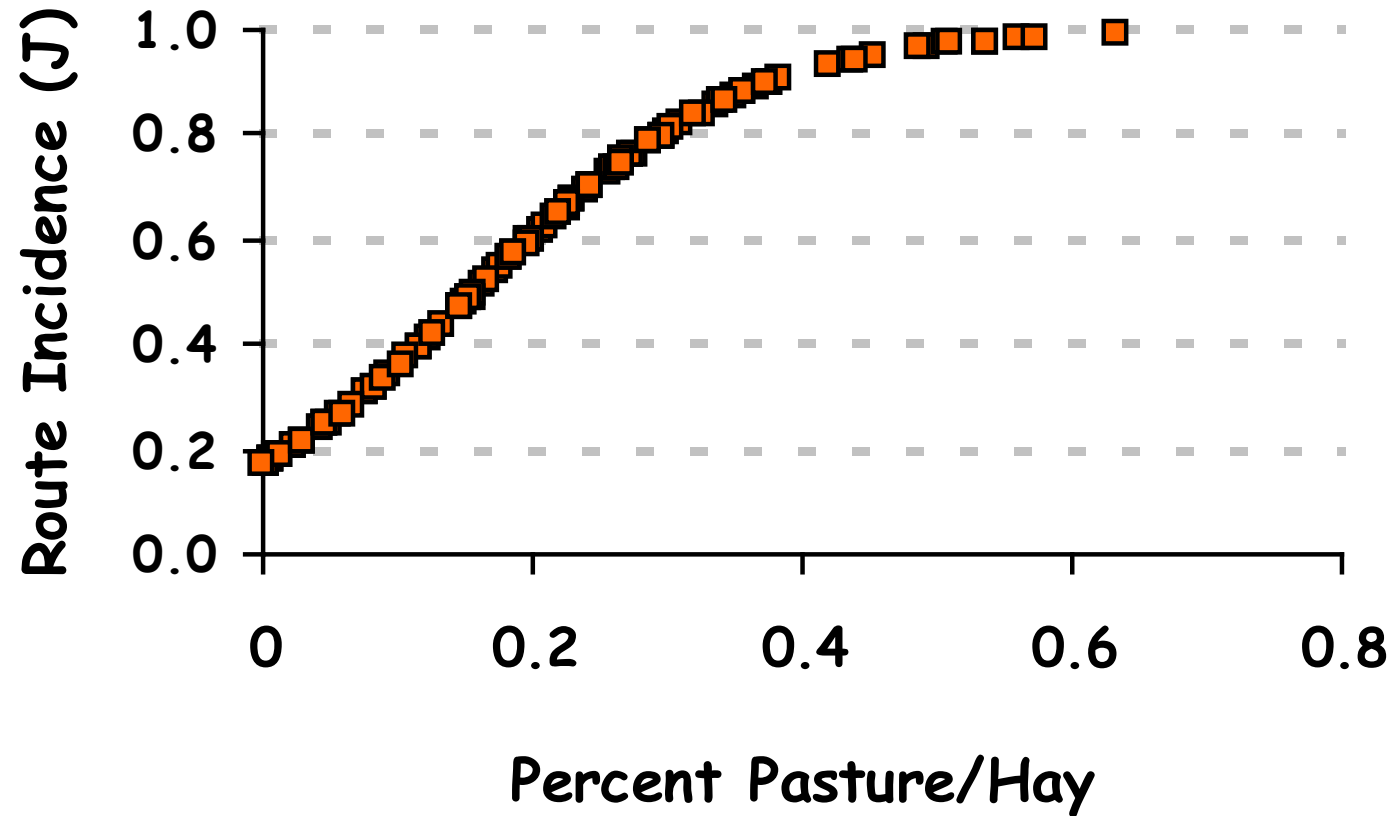


# Issues of Scale: Landscape Effects



Fletcher, R.J., Jr. and R.R. Koford. 2002. Habitat and landscape associations of breeding birds in native and restored grasslands. *Journal of Wildlife Management* 66(4): 1011-1022

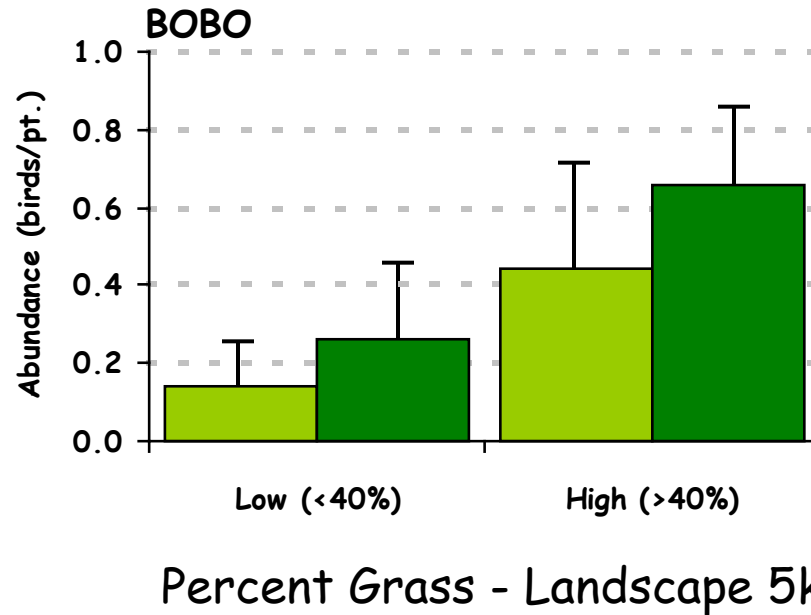
# Issues of Scale: Landscape Effects



BBS DATA, 109 routes, N IL and WI, 1992-2006

# Patch vs. Landscape Effects

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■ Small Patches (<40 ha)    ■ Large Patches (>40 ha)



# Patch vs. Landscape Effects

Research Article

## Patch Size and Landscape Effects on Density and Nesting Success of Grassland Birds

MAIKEN WINTER,<sup>1,2</sup> State University of New York, College of Environmental Sciences and Forestry, 1 Forestry Drive, Syracuse, NY 13210, USA  
DOUGLAS H. JOHNSON, U.S. Geological Survey, Northern Prairie Wildlife Research Center, 8711 37th Street SE, Jamestown, ND 58401, USA  
JILL A. SHAFFER, U.S. Geological Survey, Northern Prairie Wildlife Research Center, 8711 37th Street SE, Jamestown, ND 58401, USA  
THERESE M. DONOVAN, U.S. Geological Survey, Vermont Cooperative Fish and Wildlife Research Unit, University of Vermont, Burlington, VT 05405, USA  
W. DANIEL SVEDARSKY, Northwest Research and Outreach Center, University of Minnesota, Crookston, MN 55716, USA

### Abstract

Current management recommendations for grassland birds in North America emphasize providing large patches of grassland habitat within landscapes that have few forest or shrubland areas. These Bird Conservation Areas are being proposed under the assumption that large patches of habitat in treeless landscapes will maintain viable populations of grassland birds. This assumption requires that patch size and landscape features affect density and nesting success of grassland birds, and that these effects are consistent among years and regions and across focal species. However, these assumptions have not yet been validated for grassland birds, and the relative importance of local vegetation structure, patch size, and landscape composition on grassland bird populations is not well known. In addition, factors influencing grassland bird nesting success have been investigated mostly in small-scale and short-duration studies. To develop management guidelines for grassland birds, we tested the spatial and temporal repeatability of the influence of patch size and landscape composition on density and nesting success of 3 grassland passerines, after controlling for local-scale vegetation structure, climate, and—when analyzing nest success—bird density. We conducted our study during 4 years (1998–2001) in 44 study plots that were set up in 3 regions of the northern tallgrass prairie in Minnesota and North Dakota, USA. In these study plots we measured density and nesting success of clay-colored sparrows (*Spizella pallida*), Savannah sparrows (*Passerulus sandwichensis*), and bobolinks (*Dolichonyx oryzivorus*). Statistical models indicated that density was influenced by patch size, landscape, region, and local vegetation structure more so than by local vegetation structure alone. Both magnitude and direction of the response of density to patch size varied among regions, years, and species. In contrast, the direction of landscape effects was consistent among regions, years, and between Savannah sparrows and bobolinks. In each species, this landscape effect was independent of patch size. Nesting success was not clearly influenced by patch size or landscape composition, and none of the factors that influenced avian density also influenced nesting success in any of the 3 species. General statements on “optimal habitat” for grassland birds should therefore be viewed cautiously. Instead, long-term studies in different regions as well as a deeper understanding of the local system are needed to determine which factors are most important for grassland birds in a particular area. *JOURNAL OF WILDLIFE MANAGEMENT* 70(1):158–172; 2006

### Key words

Bird density, bobolink, clay-colored sparrow, *Dolichonyx oryzivorus*, landscape composition, nest success, *Passerulus sandwichensis*, patch size, replication, Savannah sparrow, *Spizella pallida*, variability.

- Response of density to patch size varied among regions, years, and species.
- Landscape effects were consistent among regions, years, and between species.
- Nesting success was not clearly influenced by patch size or landscape composition

Winter M, Johnson DH, Shaffer JA, Donovan TM, Svedarsky WD. 2006. Patch size and landscape effects on density and nesting success of grassland birds. *Journal of Wildlife Management* 70(1): 158-172

# Research in Wisconsin

In southern Wisconsin,

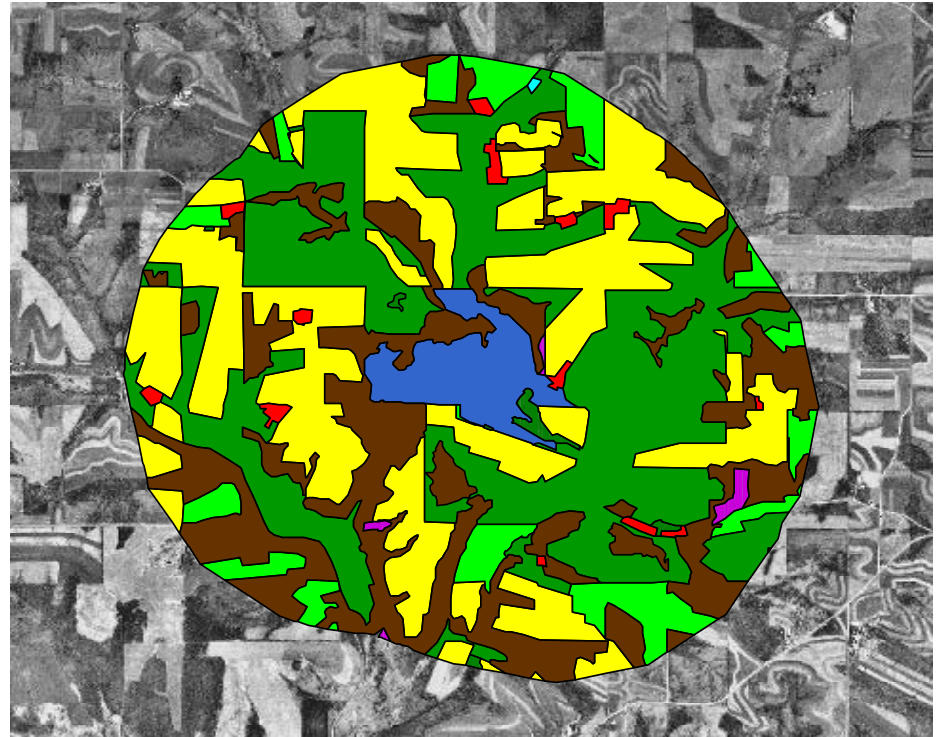
## Patch:

- Habitat type (structure) most important for some species,
- Patch area not associated with densities

## Landscape:

- Higher density of species on patches in low diversity (grass-dominated) landscapes
- Lower densities of species in patches when woodlots are close

- How grassland birds respond to patch-level attributes depends on surrounding landscape
- Detection of area sensitivity may be context dependent



# Landscapes, Patches, and Grassland Birds: Context

grass matrix



(size doesn't matter)

forest matrix



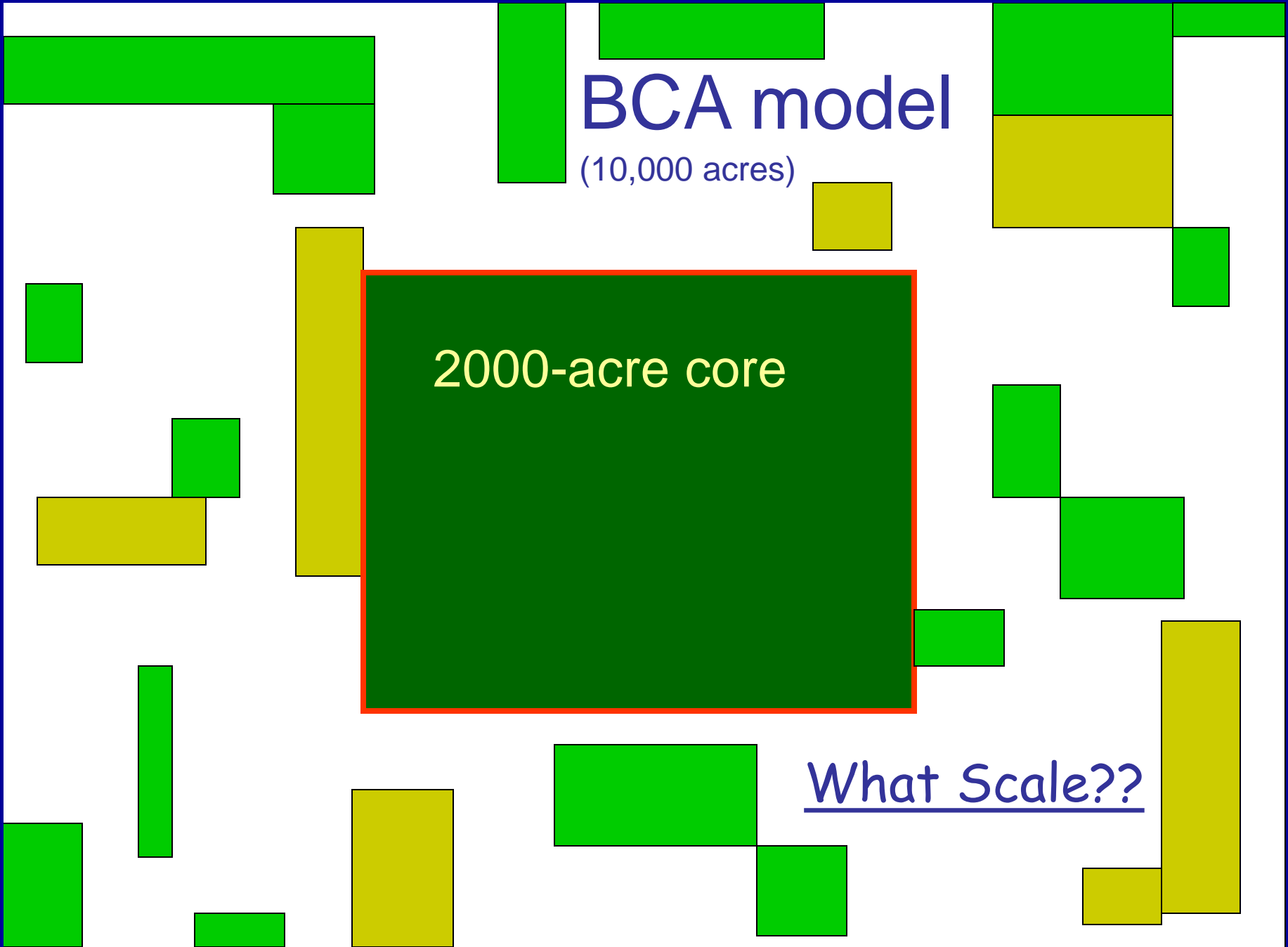
(size matters)

# BCA model

(10,000 acres)

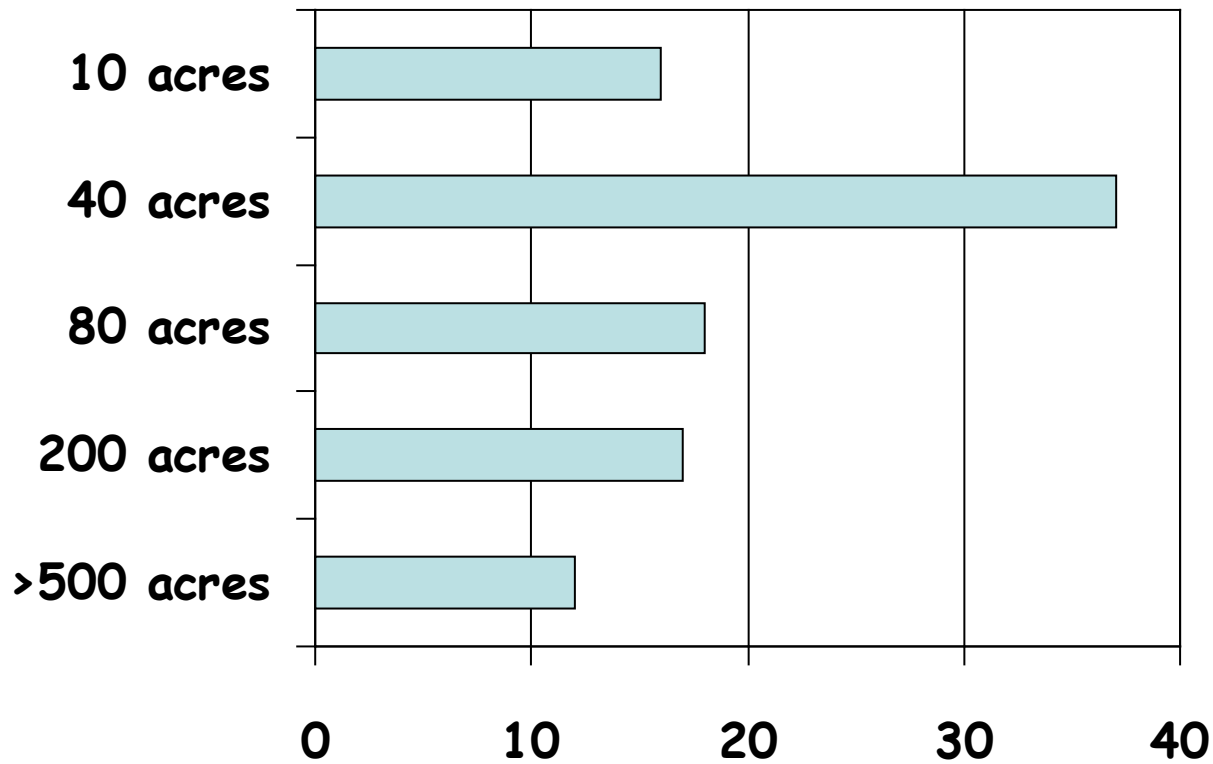
2000-acre core

What Scale??

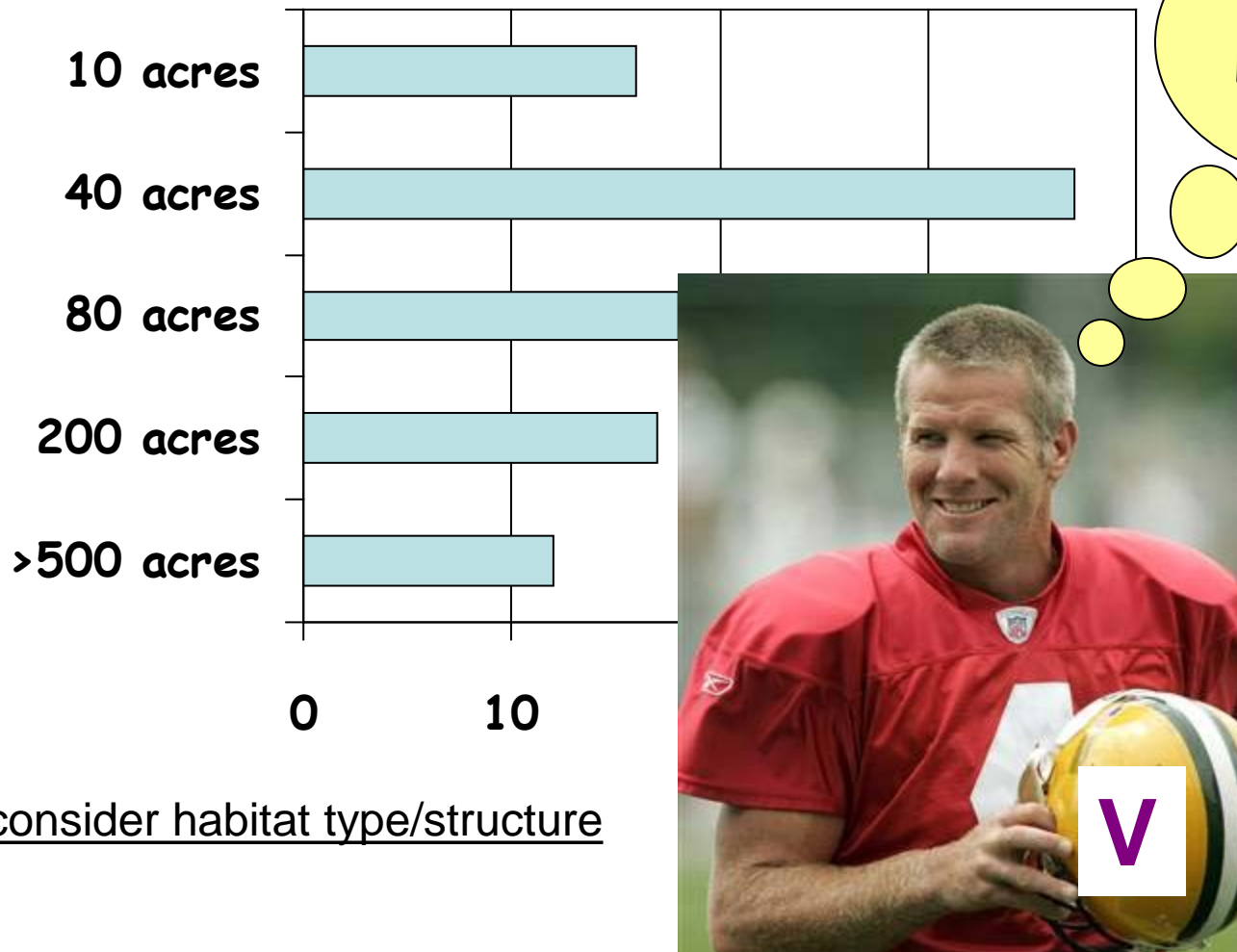


# Old School: What is the Minimum Patch Size That Grassland Managers Should Target In Order To Have Positive Impacts On Priority Species?

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# NEW SCHOOL: Landscape Context, Scale Important\*



"What's  
The  
Landscape  
Context?"

\*also must consider habitat type/structure