REDUCING MAMMALIAN RISK TO AIRCRAFT USING ALTERNATE LANDCOVERS

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INTRODUCTION

- Wildlife incidents have affected aircraft globally, with >$1.2 billion lost annually by the civil aviation industry worldwide (Blackwell et al. 2009).

- An estimated $1.4 billion has been spent on damages to U.S. civil aircraft from 1990-2009 due to wildlife incidents (Biondi et al. 2011).

INTRODUCTION

- Birds (*n* = 105,947) accounted for 97.2% of wildlife incidents with U.S. civil aircraft from 1990–2010
  - Only 14% of bird incidents cause damage to aircraft
- Terrestrial mammals (*n* = 2,558) accounted for 2.3% of wildlife incidents
  - 59% of mammal incidents cause damage to aircraft

Dolbeer et al. 2012

INTRODUCTION

- Damage to aircraft increases as species body mass increases (DeVault et al. 2011, Dolbeer et al. 2000, Biondi et al. unpublished data)

- Mule deer (*Odocoileus hemionus*), white-tailed deer (*O. virginianus*), and domestic dog are considered the most hazardous mammal species to U.S. civil aircraft (Biondi et al. unpublished data)

MANAGEMENT TECHNIQUES

- Fencing is most effective exclusion technique for airports (Cleary and Dolbeer 2005, DeVault et al. 2008, Seamans and VerCauteren 2006)

- Exclusion techniques can be supplemented with control or harassment techniques
  - Lethal
  - Non-lethal

MANAGEMENT TECHNIQUES

- Habitat modification is a long-term management option that reduces habitat suitability (DeVault et al. 2011)
  - Vegetation type (Seamans et al. 2007, Blackwell et al. 2009)
  - Vegetation height (Barras and Seamans 2002, Seamans et al. 2007)
- Most airports use turf grass (Seamans et al. 2007)
  - Expensive and high maintenance (ICAO 1991, Cleary and Dolbeer 2005)

ISSUES WITH MANAGEMENT

- Non-certificated (general aviation) airports have less funding available and cannot afford to implement techniques, particularly fencing(DeVault et al. 2008, Dolbeer et al. 2008)

- Inconsistencies over vegetation species attributes (composition and height)

SOLUTION?

- Find a vegetation species or composition that would reduce wildlife use and provide additional income

- Some native warm season grasses can be used as a biofuel
  - Switchgrass (*Panicum virgatum*)
  - Big bluestem (*Andropogon gerardii)*
  - Indian grass (*Sorghastrum nutans*)

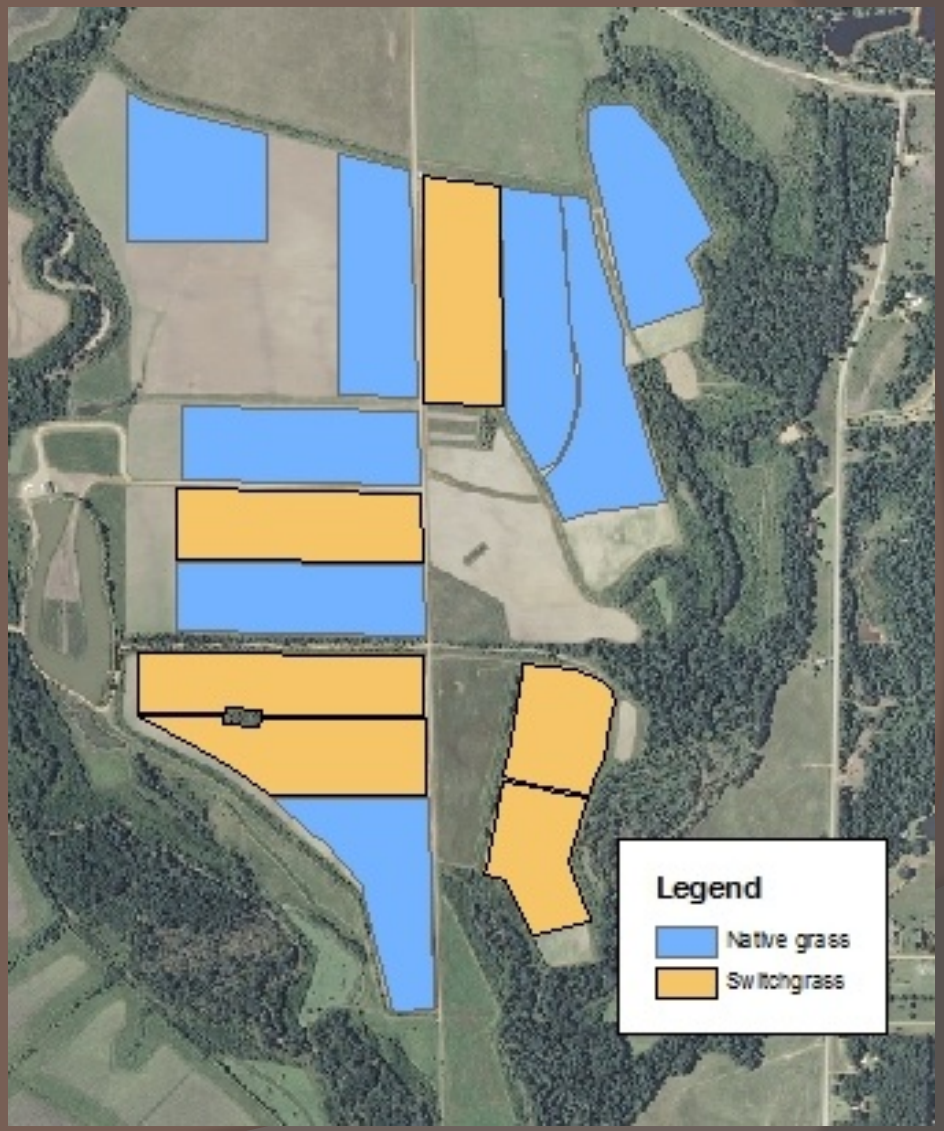
OBJECTIVE

- Compare relative use by mammals of a native warm season grass mixture and a switchgrass monoculture

METHODS

- The study site is located on B. Bryan Farms, West Point, Mississippi, USA, within the blackland prairie geological province

- 14 plots ranging from 5–8.4 ha
  - 8 native warm season grass mixture
  - 6 switchgrass monocultures



Native grass

Switchgrass

METHODS

- Vegetation composition and height
  - 5 50 m transects
  - Robel pole method
    - Species identification and height every 5 m from 0m to 45 m

- Relative species use from June 2011–May 2012
  - Photographic Index
    - Monthly 14 24-hour periods
    - 2 motion sensor cameras/plot
    - Skunk lure
  - Track Surveys
    - Disced perimeter
    - Walked 2-4 days after discing or heavy rain
    - Only recorded tracks going into plot

METHODS

- Calculated an overall relative hazard score using:

Score = (sp_1 #visits * sp_1 hazard score) + (sp_2 #visits * sp_2 hazard score)…+ (sp_n #visits * sp_n hazard score)

- Species hazard scores were calculated using:

$$\text{Score} = -28.1 + 5.01*(\log \text{body mass})^2$$

METHODS

- Seasonality
  - Summer: Jun-Aug
  - Fall: Sep-Nov
  - Winter: Dec-Mar
  - Spring: Apr-May

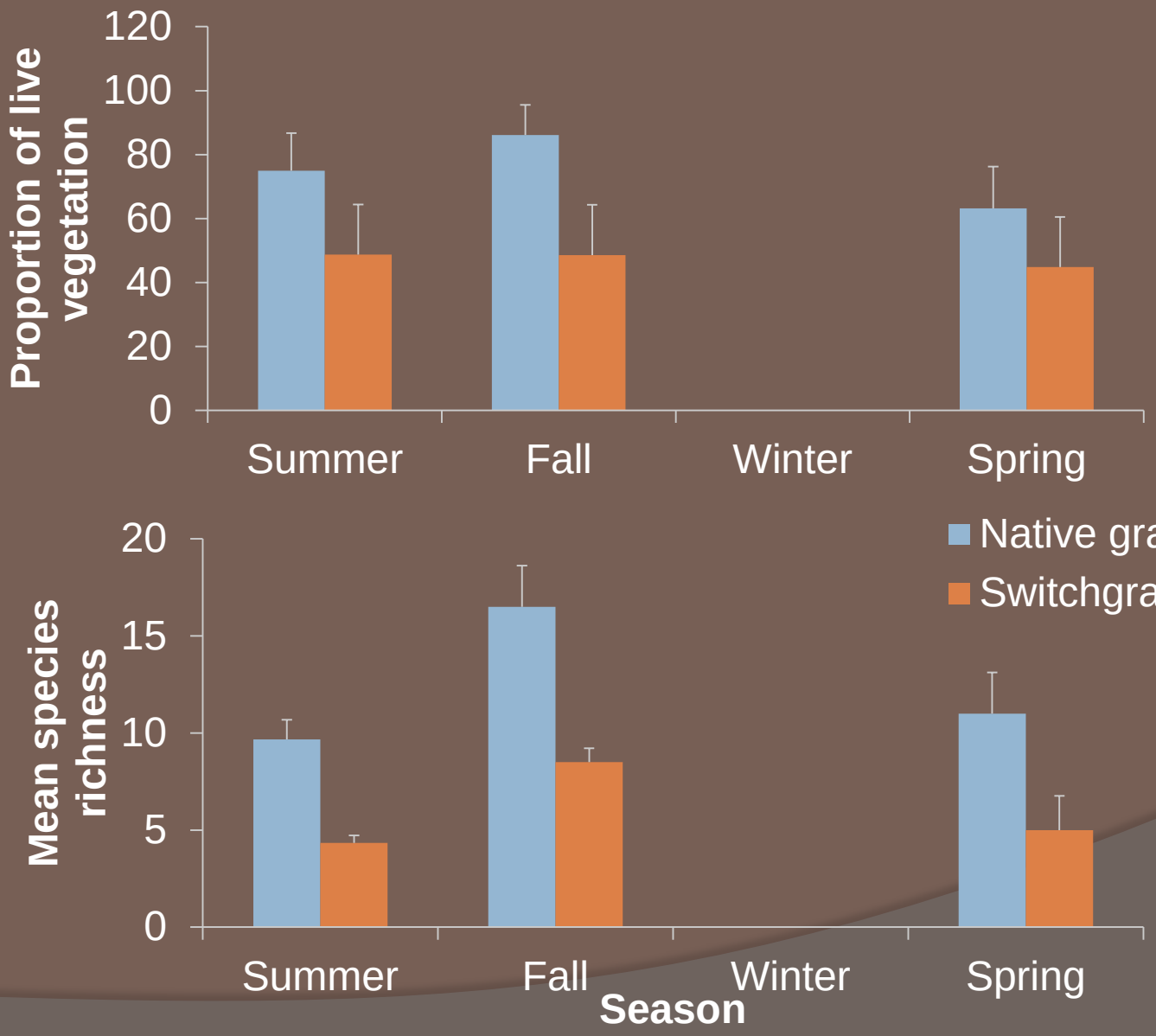
- Standardized seasonal data by averaging by months

ANALYSIS

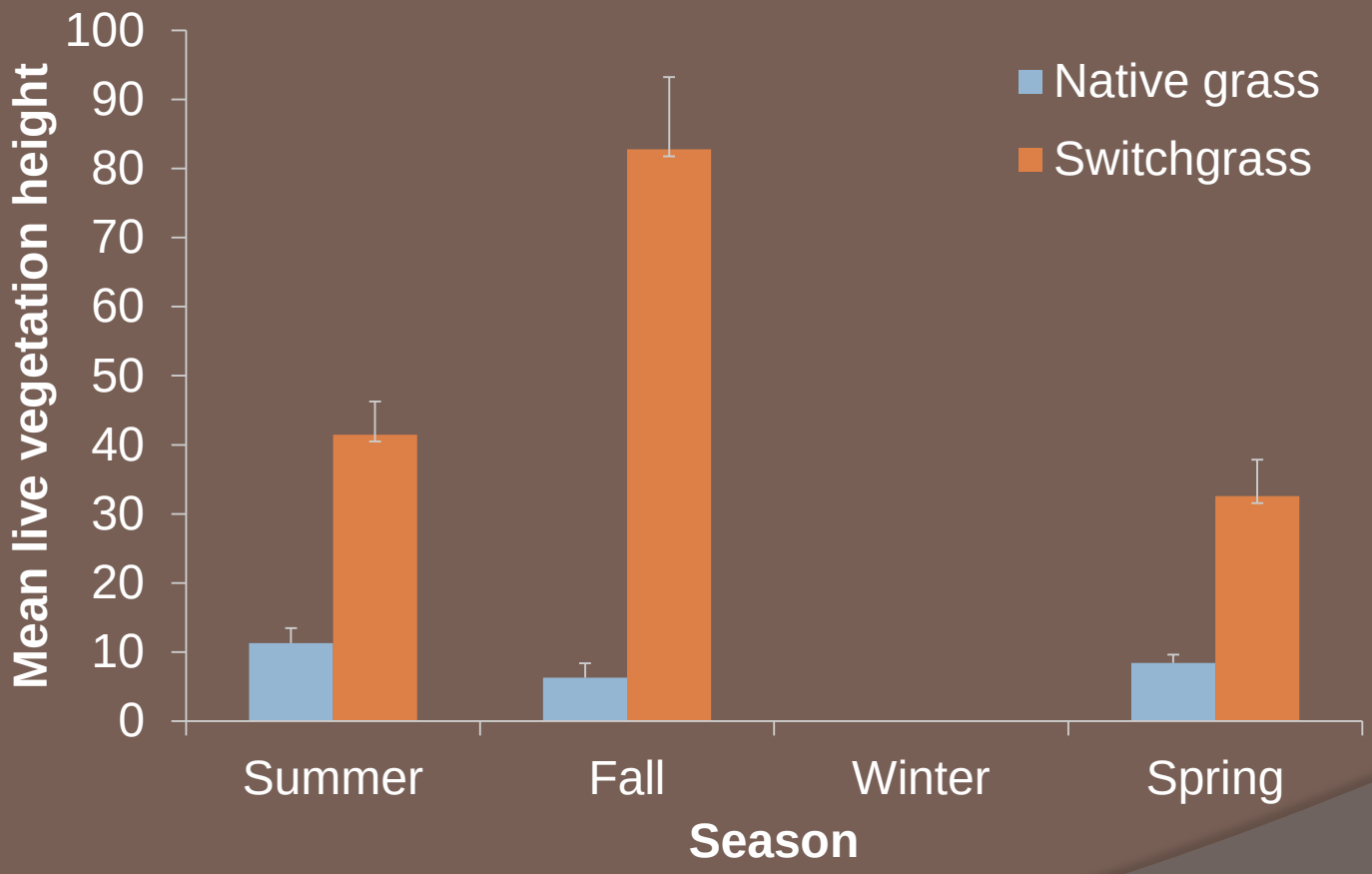
- Mixed model ANOVA
  - Fixed effects: treatment, season, treatment*season
  - Random effect: block
- Significance at $\alpha = 0.05$
  - Post hoc analysis: least square means

PRELIMINARY RESULTS

VEGETATION COMPOSITION

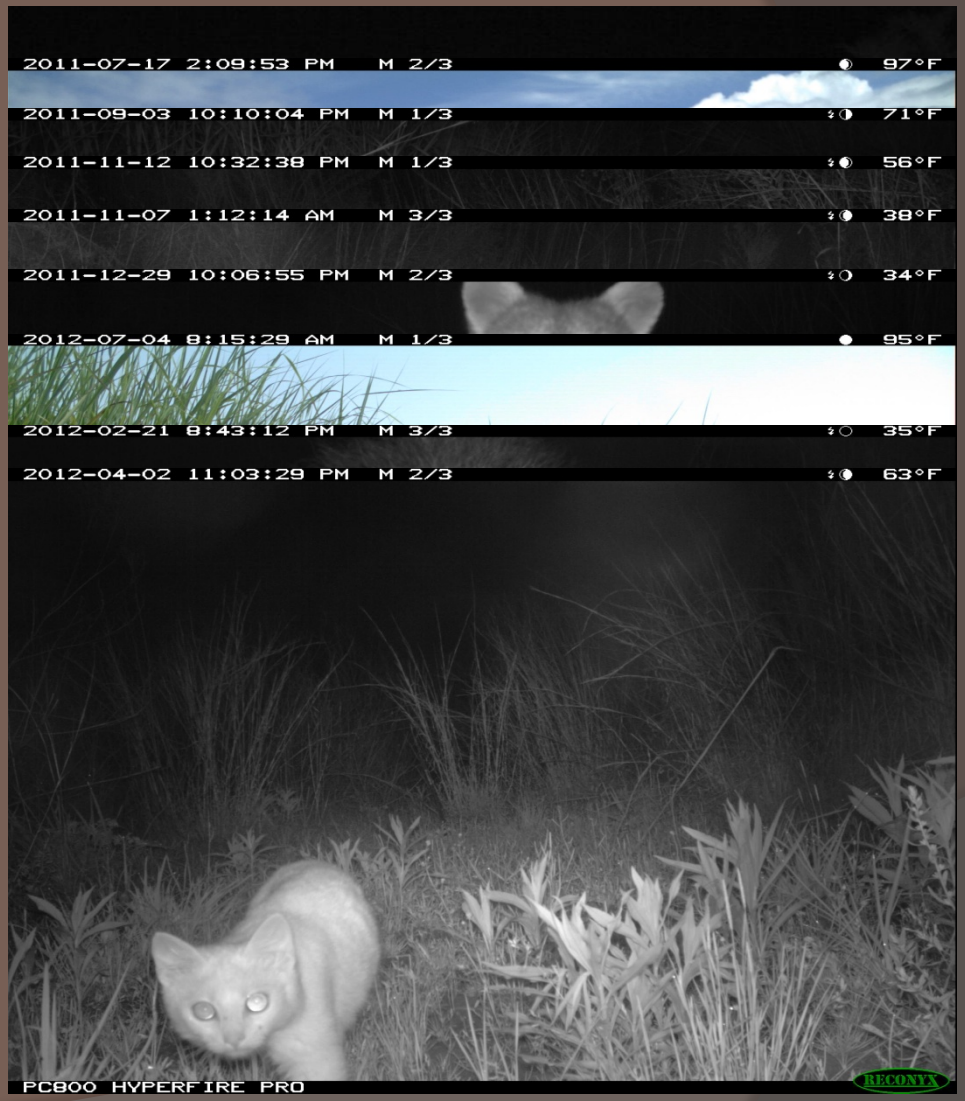


VEGETATION HEIGHT

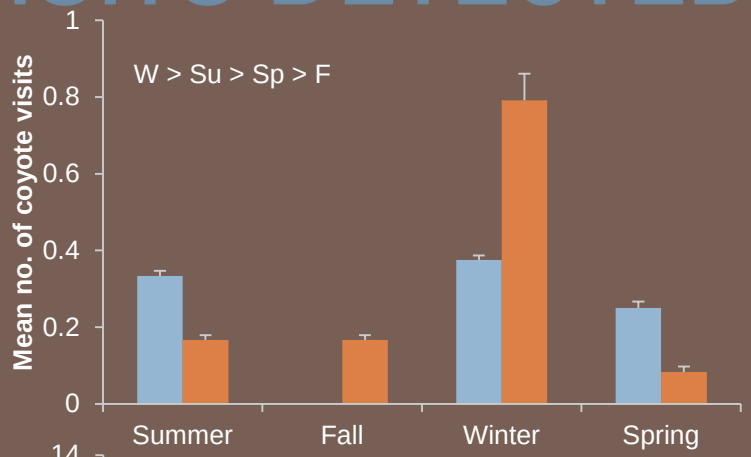


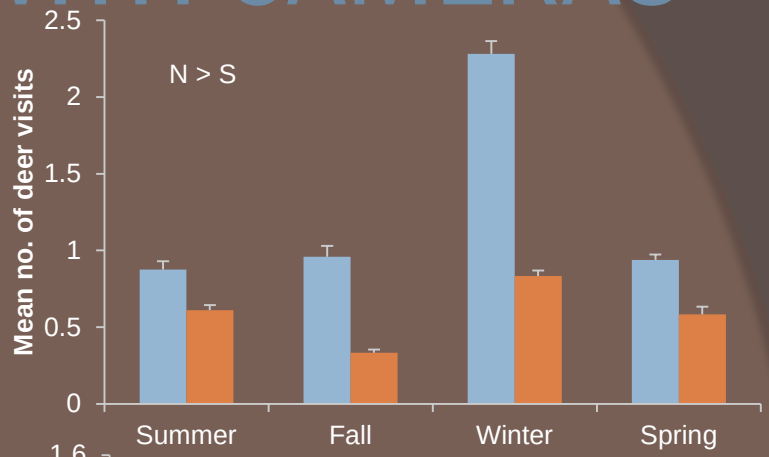
SPECIES DETECTED WITH CAMERAS

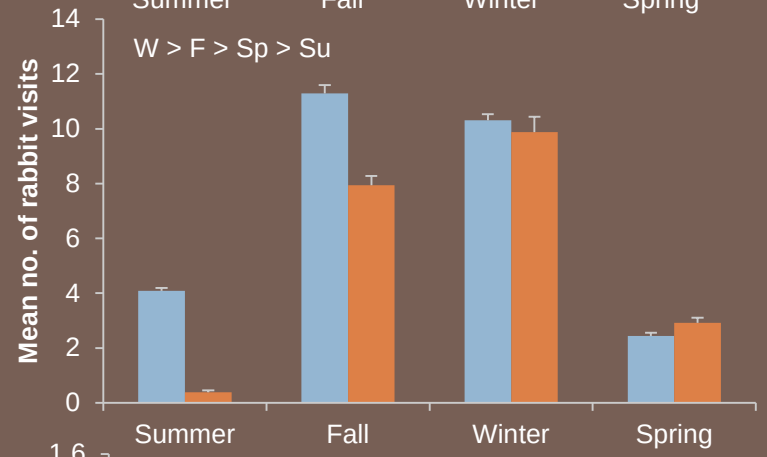
- Coyote (*Canis latrans*)
- White-tailed deer (*Odocoileus virginianus*)
- Eastern cottontail (*Sylvilagus floridanus*)
- Nine-banded Armadillo (*Dasypus novemcinctus*)
- Virginia Opossum (*Didelphis virginiana*)
- Raccoon (*Procyon lotor*)
- Bobcat (*Lynx rufus)*
- Striped Skunk (*Mephitis mephitis*)
- Domestic Cat (Only seen in native grass)

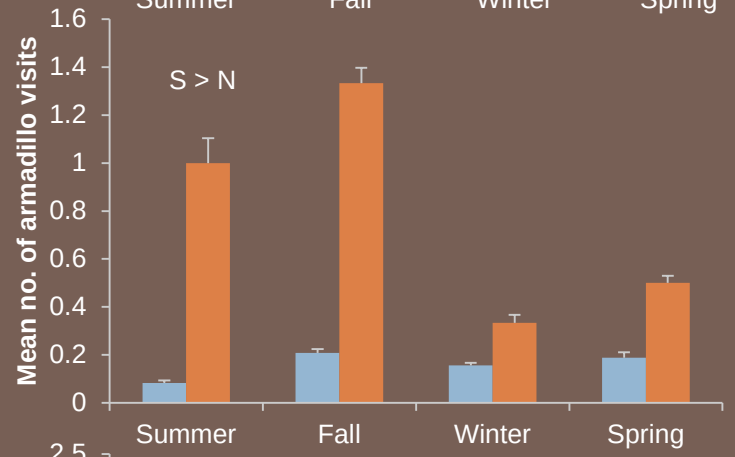


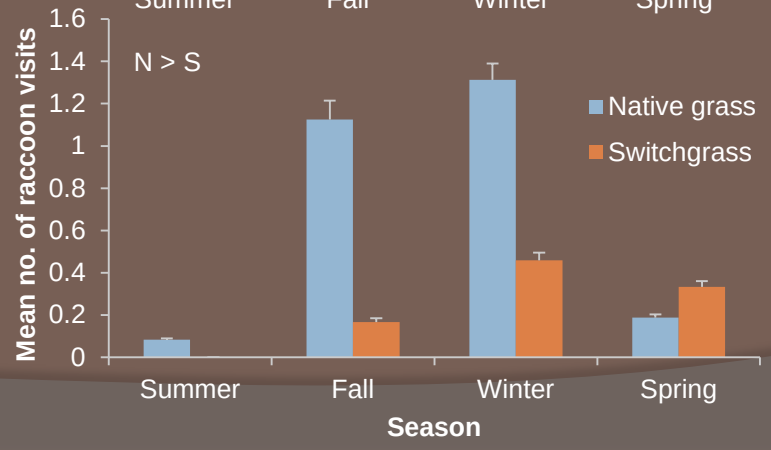
VISITS DETECTED WITH CAMERAS

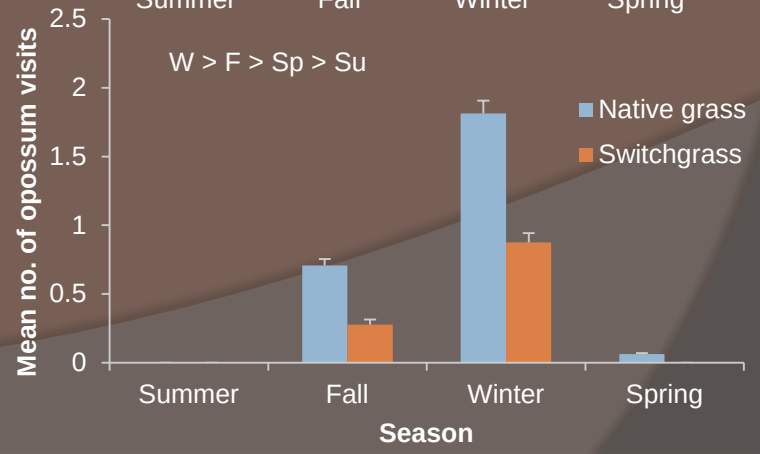




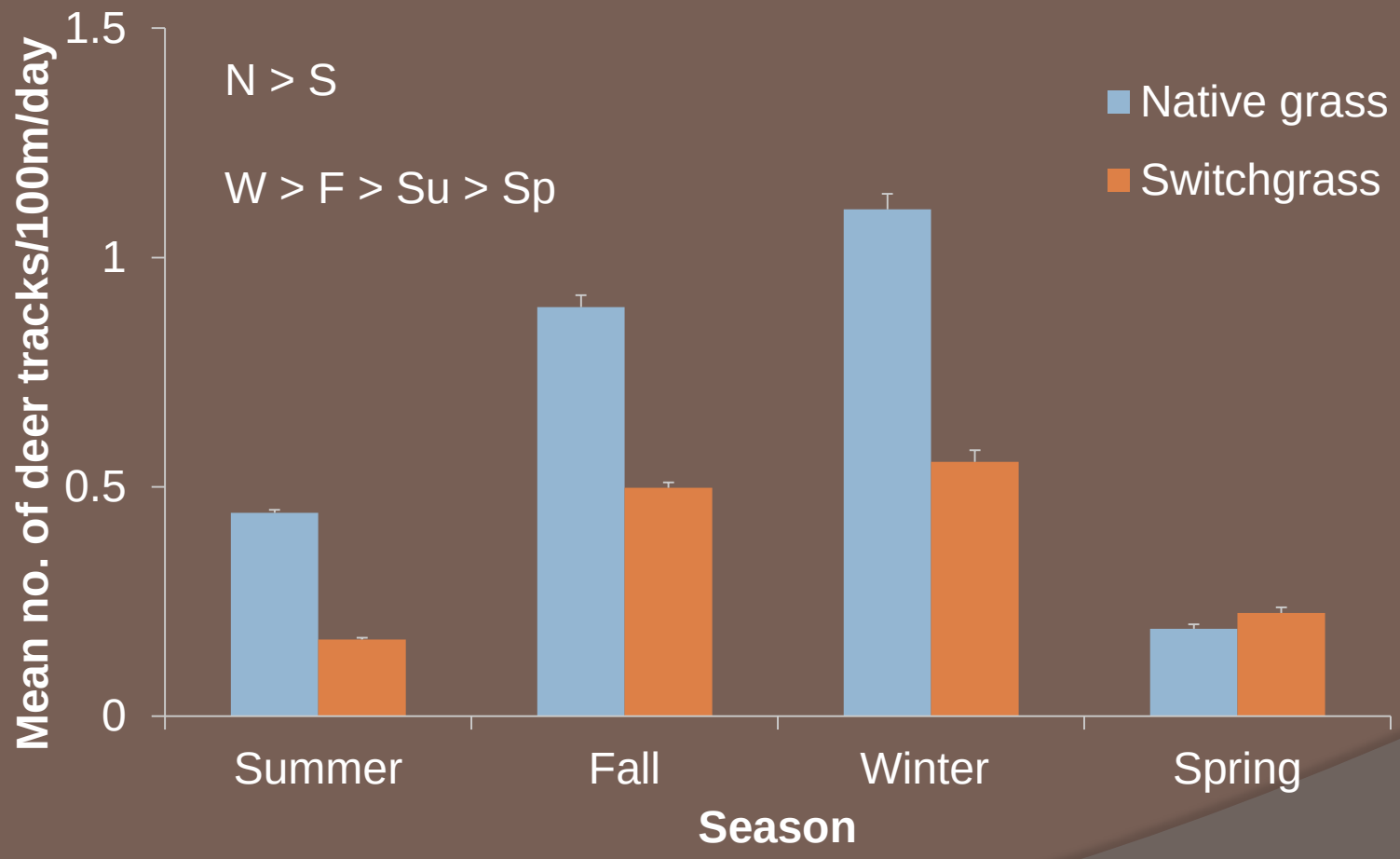




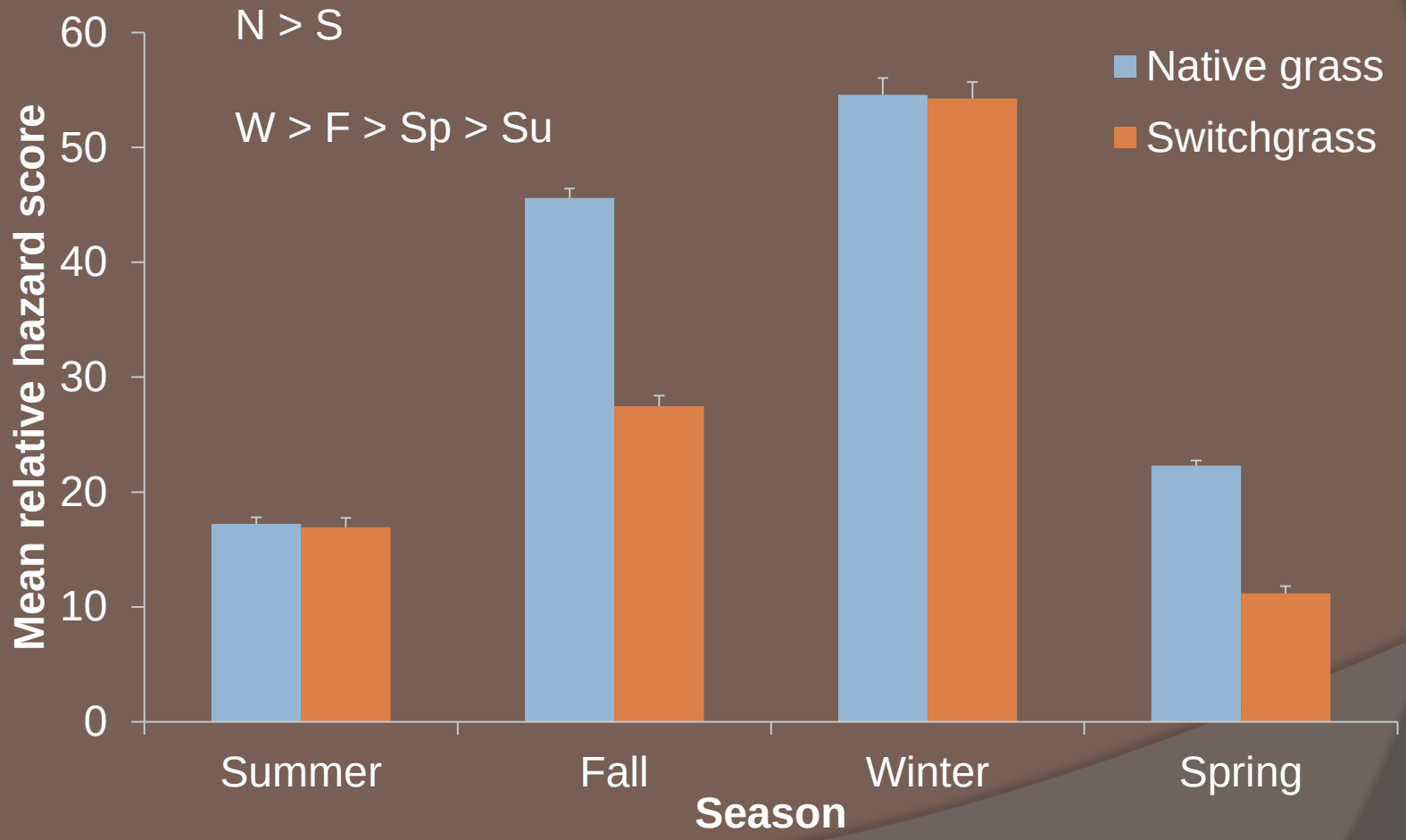




DEER TRACKS


1.5
1
0.5
0
Mean no. of deer tracks/100m/day
N > S
W > F > Su > Sp
Native grass
Switchgrass
Summer
Fall
Winter
Spring
Season

OVERALL RELATIVE HAZARD



CONCLUSIONS

- Native warm season grass mixture appears to have more mammal use, particularly deer, than switchgrass
- Switchgrass may be a potential mammal management vegetation cover that would provide an additional income for airports
- Fencing should still be a priority with the vegetation management as a supplement technique
- Airports with effective management techniques already in place, or that do not have issues with high hazard species, could use either vegetation cover

QUESTIONS?