Aerial Surveys to Estimate Abundance of Wintering Waterfowl in Mississippi

Aaron Pearse, Rick Kaminski, Steve Dinsmore, and Ken Reinecke

Monitoring Waterfowl

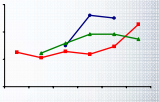
- Banding program
- Breeding-ground survey(s)
- Hunter surveys
- Wintering waterfowl surveys

Objectives

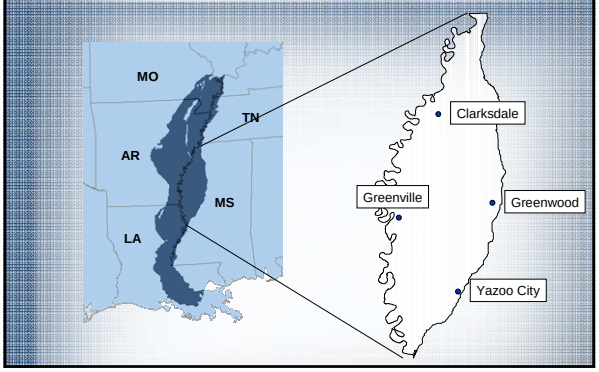
Design	Evaluate	Application
1) Sampling 2) Visibility bias	1) Empirical 2) Simulation	4 examples

$$MSE(\hat{N}) = Var(\hat{N})$$

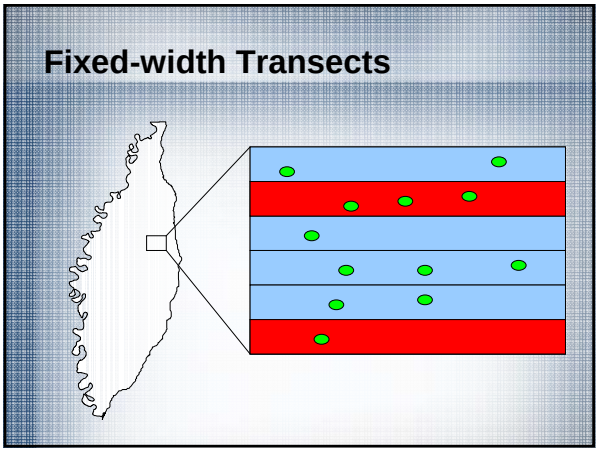
$$MSE(\hat{I}) = (\hat{N} - \hat{I})^2 + Var(\hat{I})$$



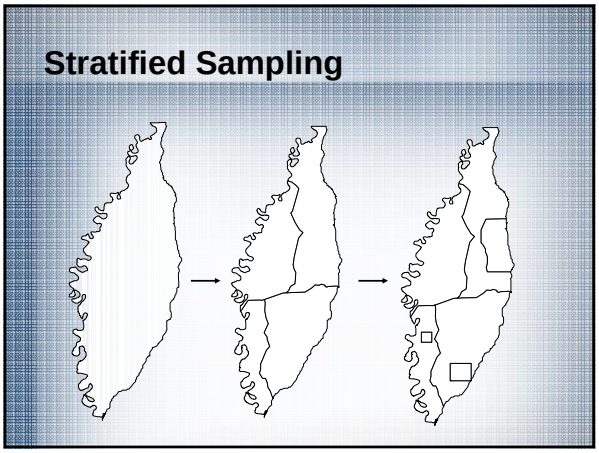
Study Area



Fixed-width Transects



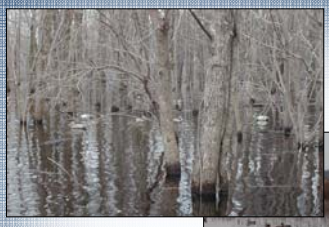
Stratified Sampling



Survey Implementation

- Altitude 500 ft
- Transect 250 m
- Data collected
  - Number of ducks
  - Habitat type
  - GPS location

Visibility Bias

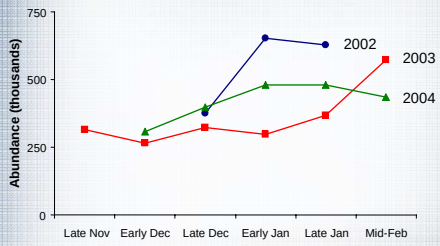


Less bias in open vs. forested wetlands

Less bias for large vs. small groups

Application – Management

- Describe patterns in abundance within and among winters.

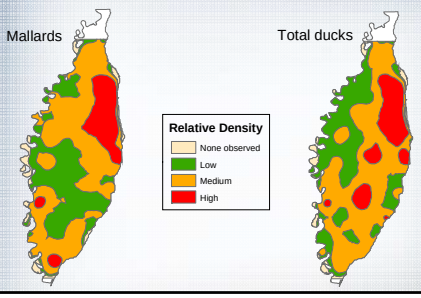


Mallards: late 1980s vs. 2000s

Source	Winters	Mallard index
Reinecke et al. 1992	1987-1989	330,000
This study	2002-2004	115,000

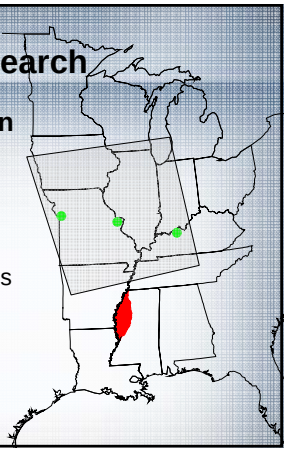
Application – Outreach

- Depict relative densities of ducks based on survey data.

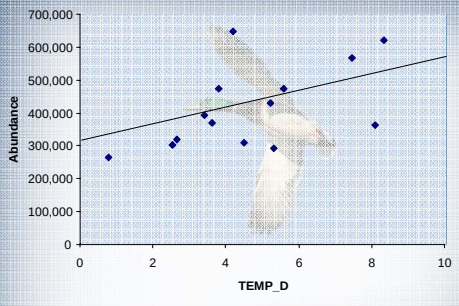


Application - Research

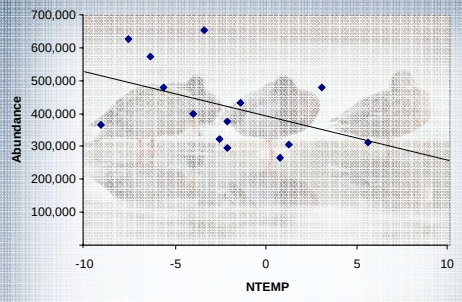
- **Energy conservation**
  - Temperature
  - Wind
- **Food acquisition**
  - Availability of wetlands
  - Snow cover



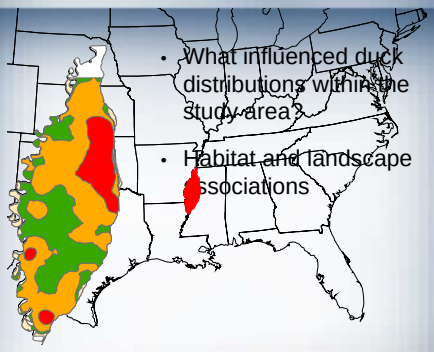
Temperature Differential



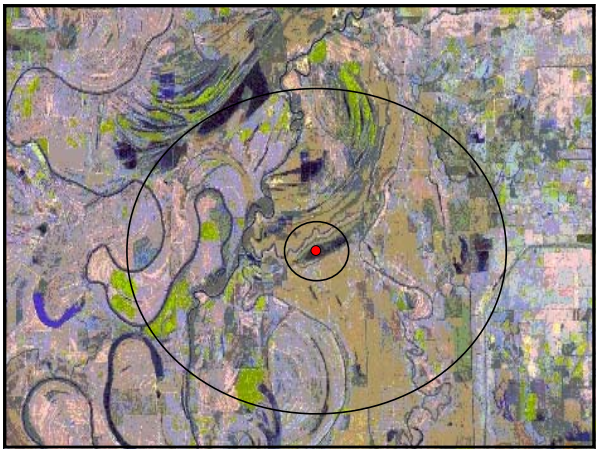
Northerly Temperatures



Application – Research

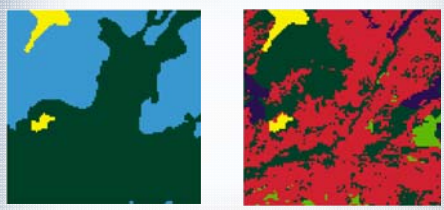


- What influenced duck distributions within the study area?
- Habitat and landscape associations

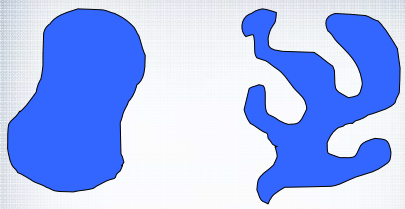


1. Complexity

- Diversity and interspersion of wetland habitats more important than presence or amount of specific wetland habitats



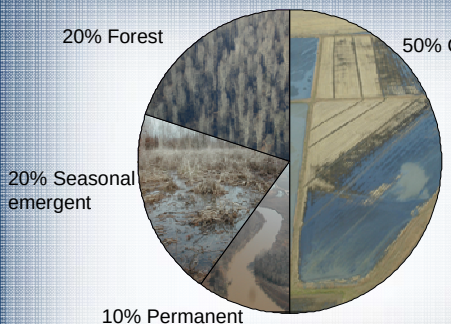
2. Wetland Shape



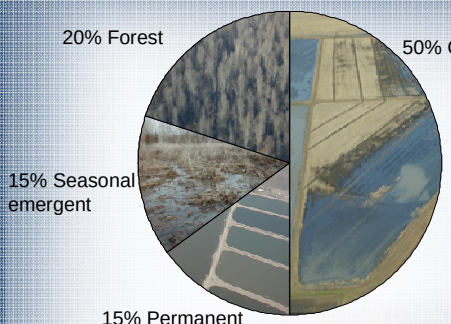
3. Scales of Management

- Focus on diversity and interspersion at large scale
  - ~12,000 acres
- Focus on shape and wet-dry interface at local scale
  - ~50 acres

Mallard Wetlands



Other Dabblers Wetlands



Conclusions

- Survey methodology performed well
- Application of results and data are extensive