




# Influences of Drawdown on Waterbird Use of Mudflats in Kentucky Reservoir



**TVA**  

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## Kentucky Reservoir



The collage includes: 1) A pair of grebes on a grassy bank. 2) A white and black bird, possibly a grebe, standing in shallow water. 3) A group of ducks, including a brown one and a smaller one. 4) A group of white swans swimming in the water. 5) A brown bird, possibly a grebe, standing on a mudflat. 6) A grey bird, possibly a grebe, standing in tall grass.

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## INVERTEBRATES AND MOIST-SOIL SEEDS



The main image shows a wide expanse of mudflats with numerous birds scattered across the area. Two inset photos at the bottom show: 1) A group of birds, likely grebes, feeding in the mud. 2) A single bird, possibly a grebe, standing in shallow water and feeding.

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## Kentucky Reservoir

- ✓ Flood Prevention
- ✓ Hydroelectric Power Production
- ✓ Navigation
- ✓ Recreation

**TVA**

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## Reservoir Management

Prior to 1980 – drawdown initiated in June; mudflats exposed mid-July  
 1980 – drawdown delayed until July 5, mudflats exposed mid-August

**August**

**September**

**October**

Recent legislation – delay drawdown until after Labor Day

Reservoir Operations Study (ROS)

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## Reservoir Operation Study

**TVA**

Regional Assessment and Management of Inland Stopover  
 Habitats for Shorebirds in the Tennessee River Valley

- >What shorebird species migrate through the valley, and in what numbers?
- >When do they migrate through?
- >Where do shorebirds stopover in the Valley?
- >How does TVA management of the river system affect stopover habitats?

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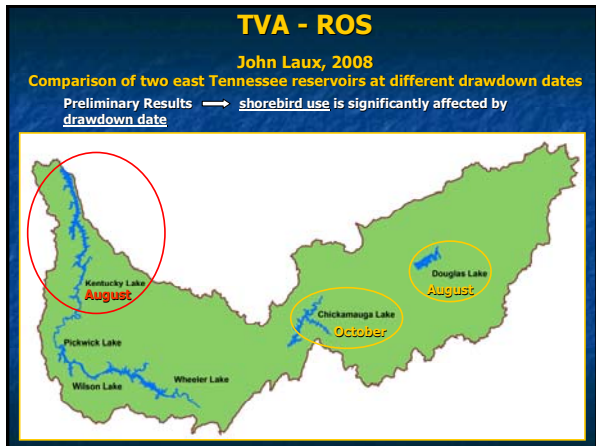
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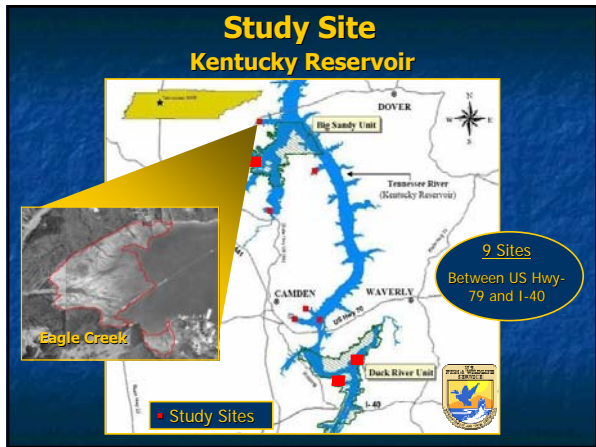
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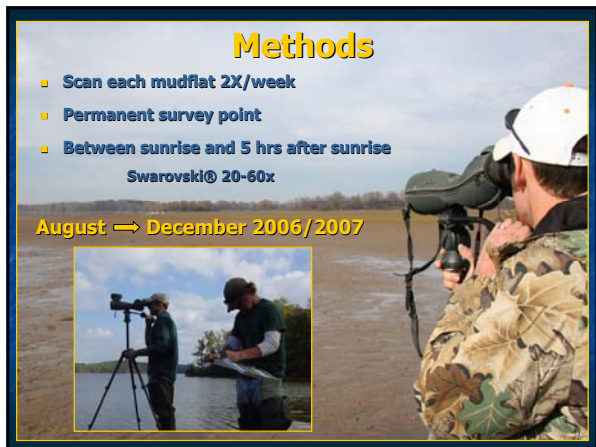
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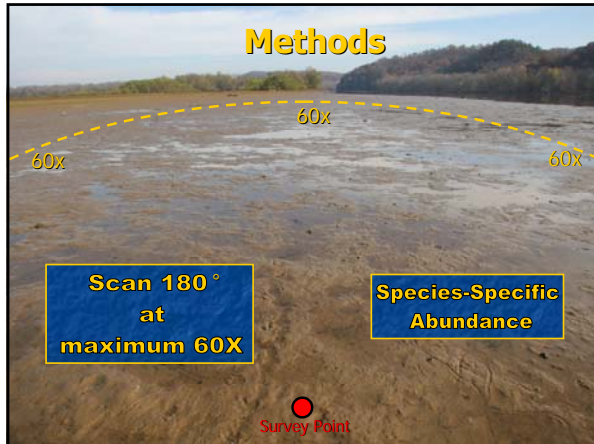
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### Statistical Analysis

Mean Daily Abundance → Among Months (2007)  
Test: Repeated Measures ANOVA

Mean Richness → Among Months (2007)  
Test: Repeated Measures ANOVA

% Composition → Among Months (2006/2007)  
Test: Chi Square Test of Homogeneity  
\*shorebirds and waterfowl

Water Level and Shorebird Total Daily  
Abundance Correlation  
Test: Pearson Correlation; Least-squares Regression

All tests performed at  $\alpha = 0.05$  using SAS® system

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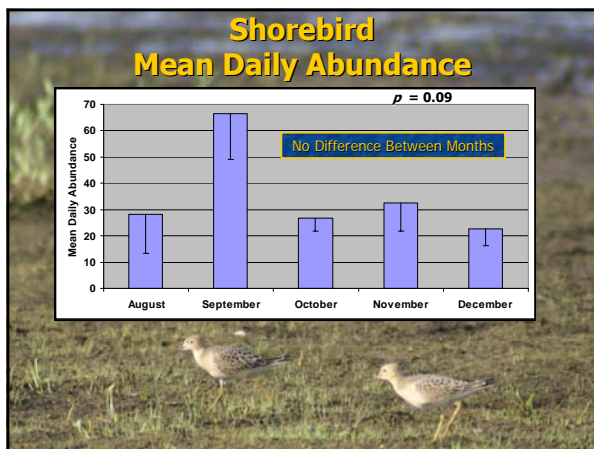
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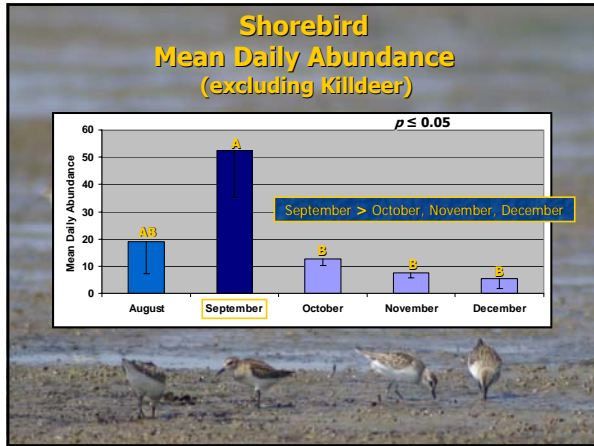
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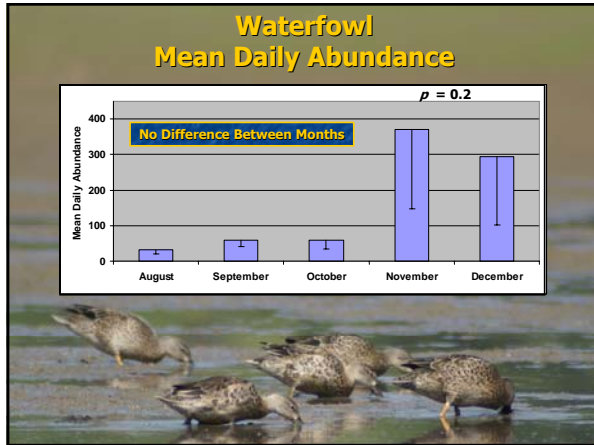
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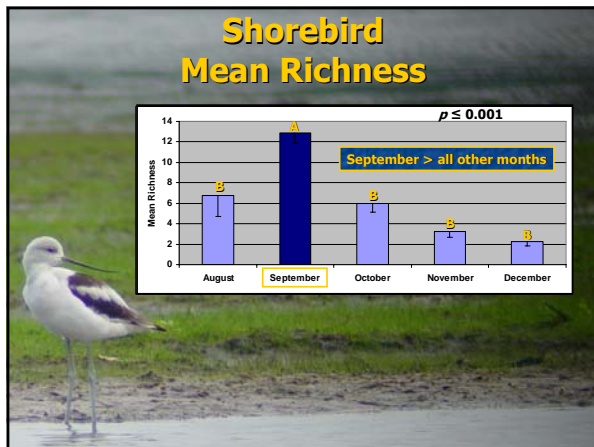
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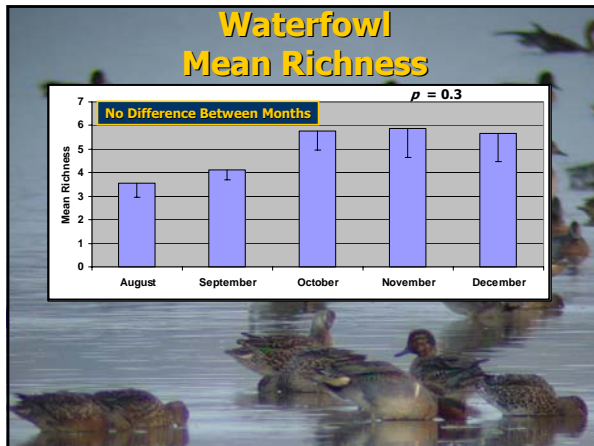
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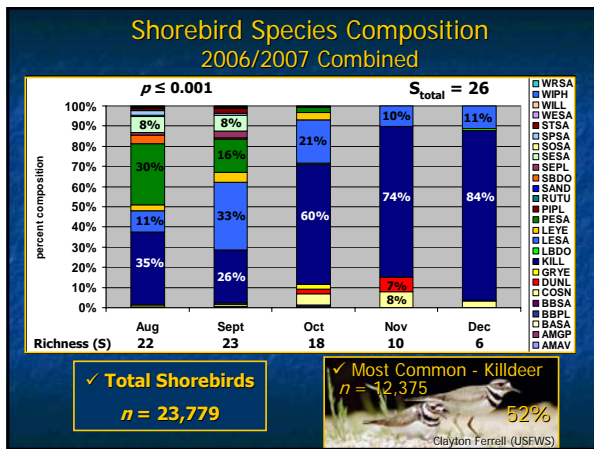
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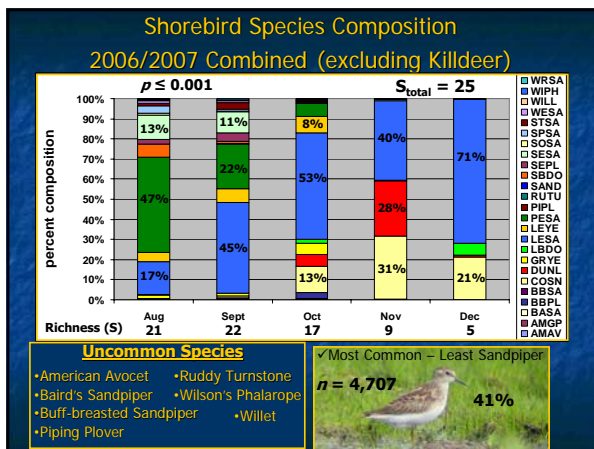
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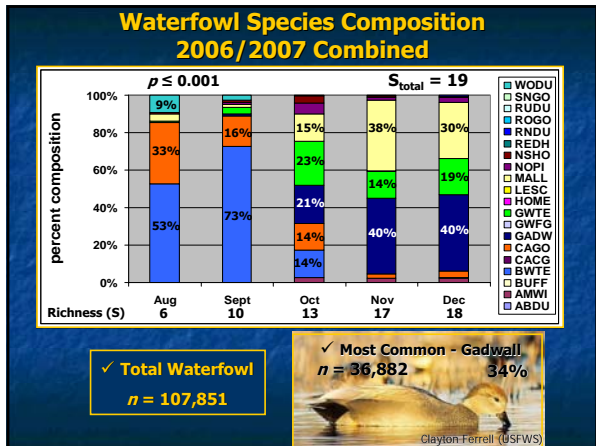
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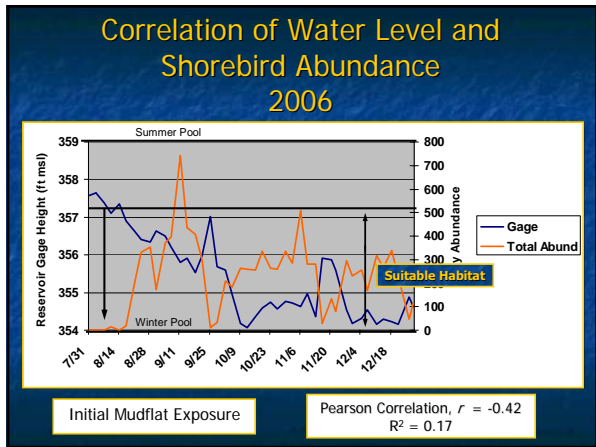
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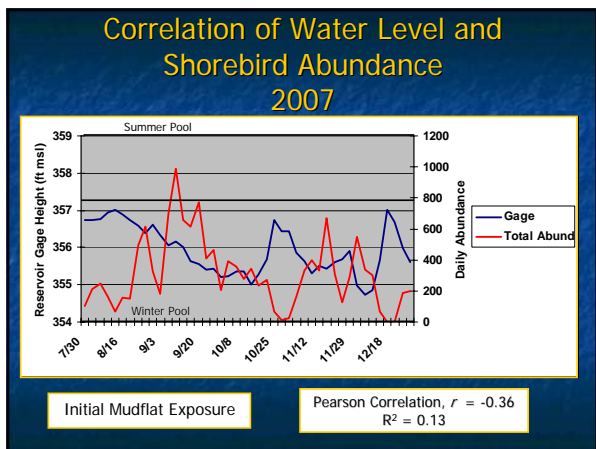
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## Potential Mechanisms Influencing Results

- **Migration**
- **Temperature**
- **Hunting Pressure**
- **Available Habitat**
  - Mudflat acreage at a given lake elevation
- **Microhabitat Factors**
  - Soil moisture/compaction
  - Soil Temperature
  - Food Availability
  - Vegetation Response




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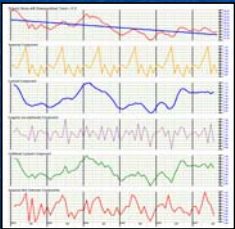
## Future Analysis

### Time Series

Identifying the nature of a phenomenon (i.e., migration) represented by the sequence of observations

**Influencing Factors**

- Mudflat acreage
- Invertebrate Abundance
- Soil Temperature
- Soil compaction
- Soil Moisture
- Vegetation
- Hunting pressure




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## Acknowledgements

Tennessee Valley Authority (TVA)

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University of Tennessee – Knoxville  
Department of Forestry, Wildlife and Fisheries

Tennessee Wildlife Resources Agency (TWRA)




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