Northern Bobwhite Nest Site Characteristics and Artificial Brush Structure Use in Weeping Lovegrass CRP

C. Wade Abbott, Department of Range, Wildlife, and Fisheries, Texas Tech University

C. Brad Dabbert, Department of Range, Wildlife, and Fisheries Management, Texas Tech University

Duane R. Lucia, Texas Parks and Wildlife Department

Robert B. Mitchell, Department of Range, Wildlife, and Fisheries Management, Texas Tech University

Alicia K. Andes, Department of Natural Resource Management, Texas Tech University

INTRODUCTION

- Decreasing populations of grassland birds
- Northern bobwhite quail
- Habitat loss and fragmentation

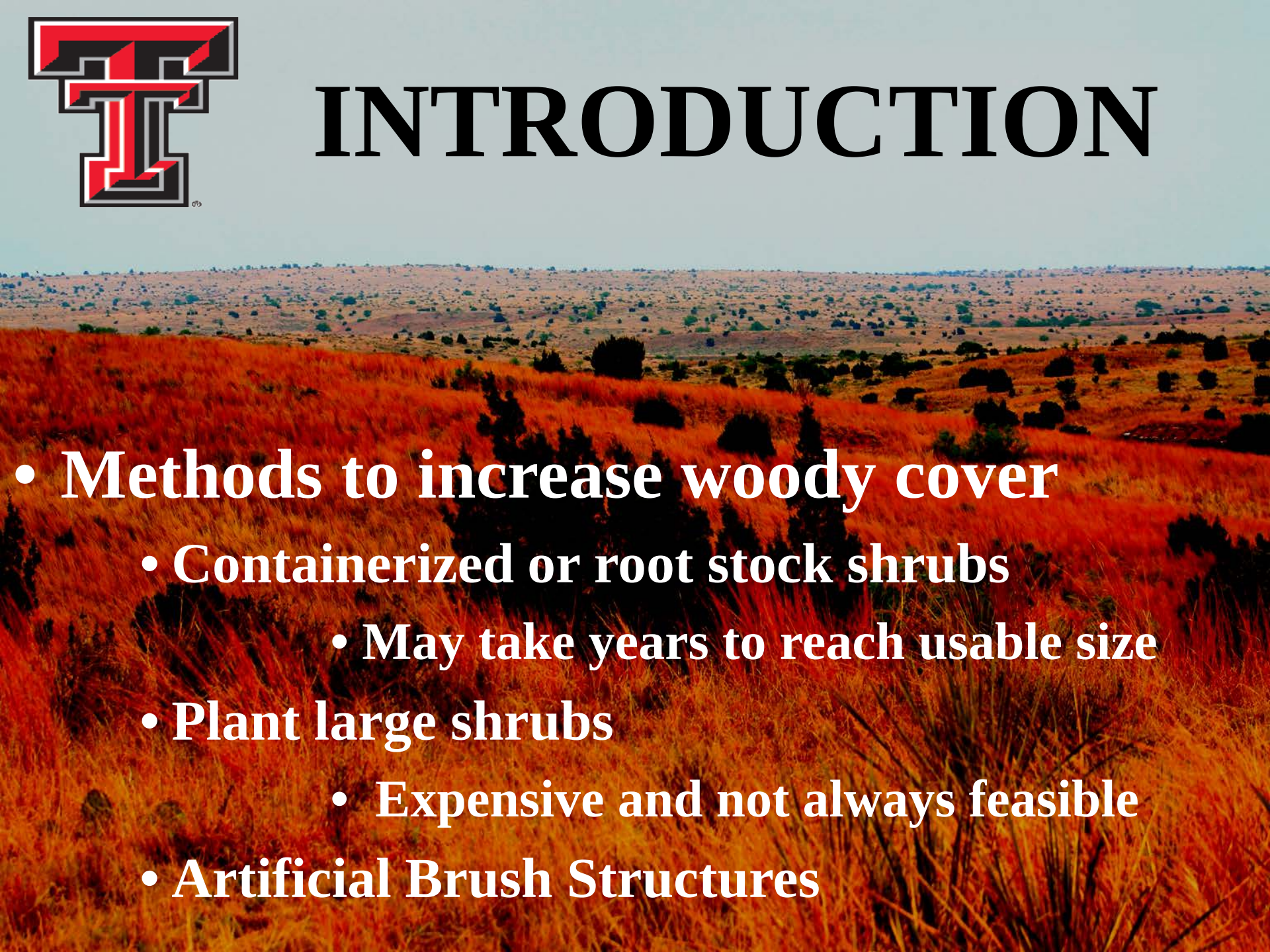
INTRODUCTION

- **1985- Food Security Act initiated the Conservation Reserve Program (CRP)**
  - **Protect highly erodible lands**
  - **Reduce crop surpluses**
  - **Improve water quality**
  - **<u>PROVIDE WILDLIFE HABITAT</u> (secondary purpose)**
- **≥ 1 million acres enrolled into CRP in Texas Southern High Plains at one time**
- **Native and exotic grasses seeded**

INTRODUCTION

- **Northern bobwhite quail (NOBQ) nest success in weeping lovegrass (*Eragrostis curvula)* ?**
- **Woody cover and forb production limiting factors?**
- **↑ woody cover = ↑ BOQU use?**

INTRODUCTION



- Methods to increase woody cover
  - Containerized or root stock shrubs
    - May take years to reach usable size
  - Plant large shrubs
    - Expensive and not always feasible
  - Artificial Brush Structures

INTRODUCTION

- **Artificial Brush Structures (ABS)**

- **Teepee-type ABS used most by BOQU (Webb and Guthery 1982)**
- **Nest Success ↑ 2X by addition of predator exclusion welded wire on teepee-type ABS (Treadway 2002)**

OBJECTIVES

- **Estimate nesting success in WL CRP**
- **Identify habitat features associated with successful nests**
- **Identify habitat features selected by BOQU for nest sites**
- **Observe the use of ABS by BOQU**

STUDY AREA

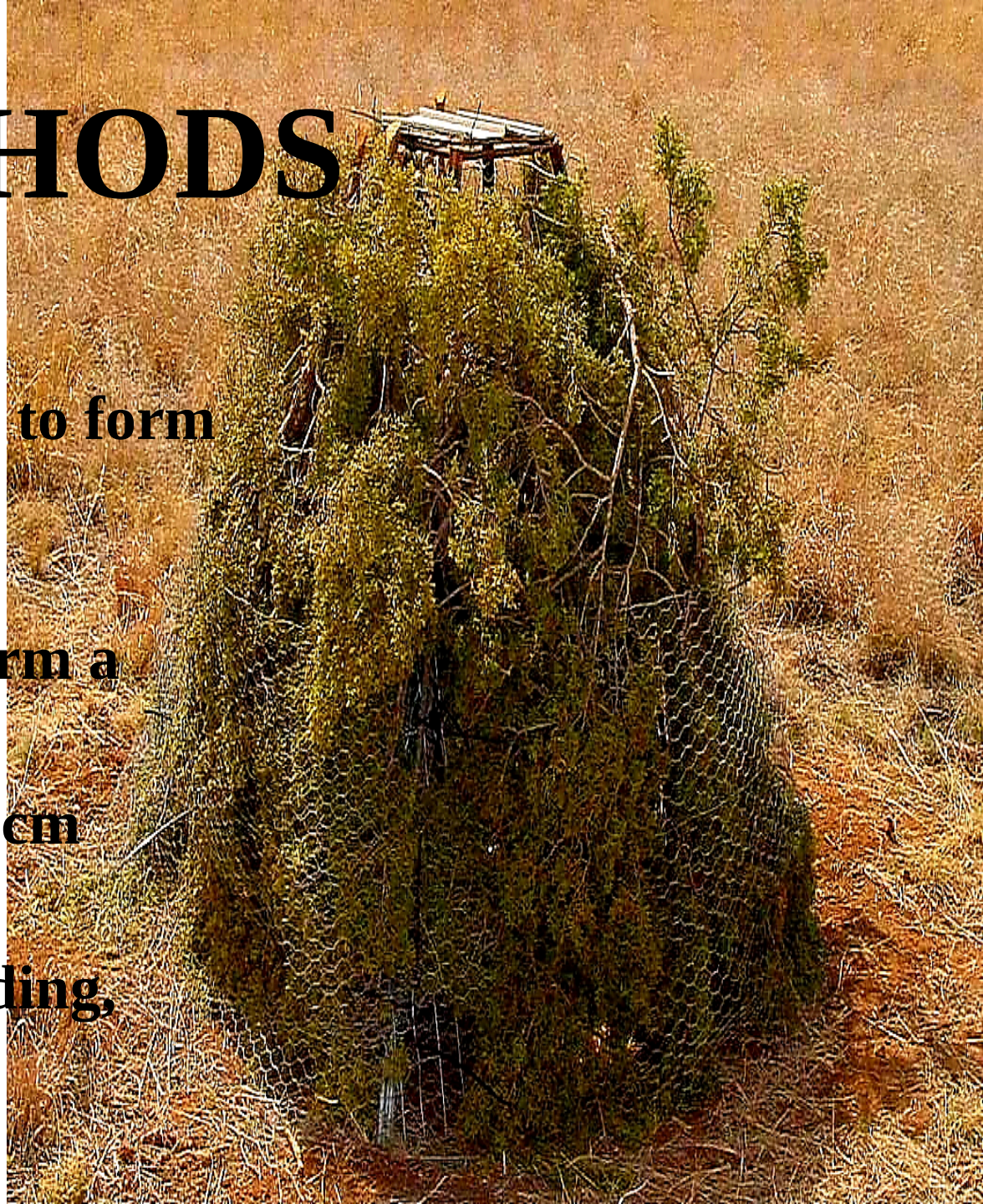
- **400 ha CRP**
- **Lynn County, TX**
- **Weeping lovegrass, silver bluestem (*Bothriochloa laguroides*), three awns (*Aristida* spp.)**

STUDY AREA

- Subhumid climate
- Hot summers and moderate winter temperatures
- Loam and sandy loam soils with ≤ 1% slopes
- 951 m elevation
- 51 cm average annual precipitation
- 85% precipitation between April 1st to October 31st

METHODS

- Weld 4 t-posts
- Remove upper 30cm to form a flat-topped teepee structure
- Weld rebar to top form a square
- Cover with 5cm x 10cm welded wire
- Rebar, wire, vinyl siding, hog rings for door
    - Screening cover



ABS SETUP

- 24 transported to study site
  - 1 Structure/2.7 ha
- Cedar boughs (*Juniperus pinchotti)*
  - screening cover
- 1 feeder + 1 waterer / ABS
  - ≥ 30% protein feed and water
- Chicken wire at base
  - Detain BOQU temporarily

CAPTURE

- 2/20/2002-4/04/2002
- 3/01-24/2003
- Walk-in funnel traps
- Trapped quail
  - Ventilated cotton bags
  - Banded
  - Sexed
  - Aged
  - Weighed to nearest 0.01 g

RELEASE

- Ventilated cage
  - Transportation
- 6.5 necklace style radio transmitter
  - Monitored 1/ 3 days until 8/15
  - Bird use of ABS noted
- Birds trapped together
  - Released together as covey

NEST MONITORING

- **Incubation activity**
  - **Determined by telemetry**
- **Nest**
  - **Found when hen absent**
  - **Eggs counted**
  - **Location flagged**
- **Successful nest**
  - **Any hatched eggs**

NEST SITE CHARACTERISTICS

- Evaluated after nest termination
- Visual obstruction with Robel pole
- % ground cover
  - Weeping lovegrass
  - Native grass
  - Forbs
  - Bare ground
- Measurements
  - At nest site
  - 10 m in cardinal directions
- Characteristics measured at random points

DATA ANALYSIS

- **Stepwise logistic regression**
  - **Identify habitat characteristics of successful vs predated nests and selected by BOQU for nest sites**
    - **Predictor variables - % weeping love grass, native grass, forbs, bare ground and visual obstruction**
- **Predictor variables + distance from ABS → Successful nest characteristics**
- **Nest site location and success solved separately**
  - **Identify habitat characteristics of potential and successful nests sites**

DATA ANALYSIS

- **Interpreted logistic regression coefficients by stating odd ratios**
- **2-factor ANOVA**
  - **Year and location**
  - **Year and success**
  - **Determine differences in predictor variables**
- **Binomial proportions tests**
  - **Compare nest success between years**

RESULTS

2002

- 15 hens radiomarked
- 5 hens nested in weeping lovegrass area
    - 7 nests
- 2 hens nested in a wheat (*Triticum aestivum)* field with no weeping lovegrass
- 2 hens renested
    - Occurred after loss of a nest
- No hens nested > 2
- 71% nest success

2003

- 32 hens radiomarked
- 15 BOQU nested in weeping lovegrass area
    - 20 nests
- 7 BOQU nested in areas with no weeping lovegrass
    - 8 nests
- 4 BOQU renested
- 4 ♂ incubated a nest
- No BOQU nested > 2
- 70% nest success

RESULTS

- % bare ground + nest location relationship
  - B=-0.156, SE=0.040, Wald=15.61, P<0.001, Exp(B)=0.856
- Potential nest sites ↓ 14% with each 1% ↑ in bare ground
- No other variable predicted nest location
- % weeping lovegrass > @ nest vs random site
  - Not selected as predictor variable for location
- No variables predicted successful nests (P=0.19)

RESULTS

- **Variable vegetation characteristics between yrs**
  - **No difference**
  - **Except for nest site distance from ABS**
    - **2002: Nest sites closer to ABS (n=7, v=32.9, SE=5.5)**
    - **2003: Nest sites further from ABS (n=20, v=343.9, SE=72.8)**
- **2-factor ANOVA revealed no differences in predictor variables ($P > 0.05$)**
- **BOQU observed frequently using ABS**
  - **60% of nests located ≤ 55m**
  - **Use peaked during hot summer temperatures**
  - **♂ observed using structure as calling perches**
  - **Brooding adults used structures > other individuals**

DISCUSSION

- **High nest success = 70-71%**
  - **38% (Mueller 1999)**
  - **46% (Hernandez 1999)**
  - **38% (Carter et al. 2002)**
  - **42% (Treadway 2002)**
- **Reasons for high nest success unclear**
  - **Nest predators observed @ site throughout study**
- **Weeping lovegrass CRP composition @ site**
  - **thick but did not form monoculture**
  - **Not avoided by BOQU**
  - **Weeping lovegrass present in ¼ m^2 quadrats @ nest**
  - **Suitable nest cover for BOQU**

DISCUSSION

- **Reasons unclear why no variables differentiated successful from predated nests**
- **Reasons unclear why nests closer to ABS in 2002 than 2003**
  - **Possibly caused by increased forb abundance**
  - **↑ forbs = ↑ food = ↓ reliance on ABS food source =↑ nest distance from ABS**
- **Confirmed consumption of high protein feed**
  - **Radiomarked bird predated but crop left intact**

MANAGEMENT IMPLICATIONS

- **1000s acres of weeping lovegrass CRP in Texas Southern High Plains**
- **Landowners attempting to convert weeping lovegrass CRP to native grasses**
  - **Land ownership changes**
  - **CRP rules**
  - **Belief that BOQU will not nest in weeping lovegrass**
- **Conversion process expensive**
  - **Establishment of native grasses relies on substantial > average precipitation**

MANAGEMENT IMPLICATIONS

- **Results suggest complete conversion of weeping lovegrass to native grass CRP unnecessary**
- **Steps to ↑ BOQU usable space in weeping lovegrass CRP**
  - **Burn strips in December-January**
  - **Disk 10% of burnt strips to ↑ forb abundance and diversity**
  - **Plant woody species**
  - **Install ABS**
    - **Too expensive to install ABS @ densities used in study**

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