

BOBWHITE RESPONSE TO TWO LARGE-SCALE WILDFIRES IN THE TEXAS PANHANDLE

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March 2006



- 12-18 Mar 2006
 - <10% relative humidity
 - 74 km/h sustained winds (gusts of 93 km/h)
- Fire initiated by downed power lines
 - Ex: advanced 72 km in 9 h
 - Flame lengths > 3 m



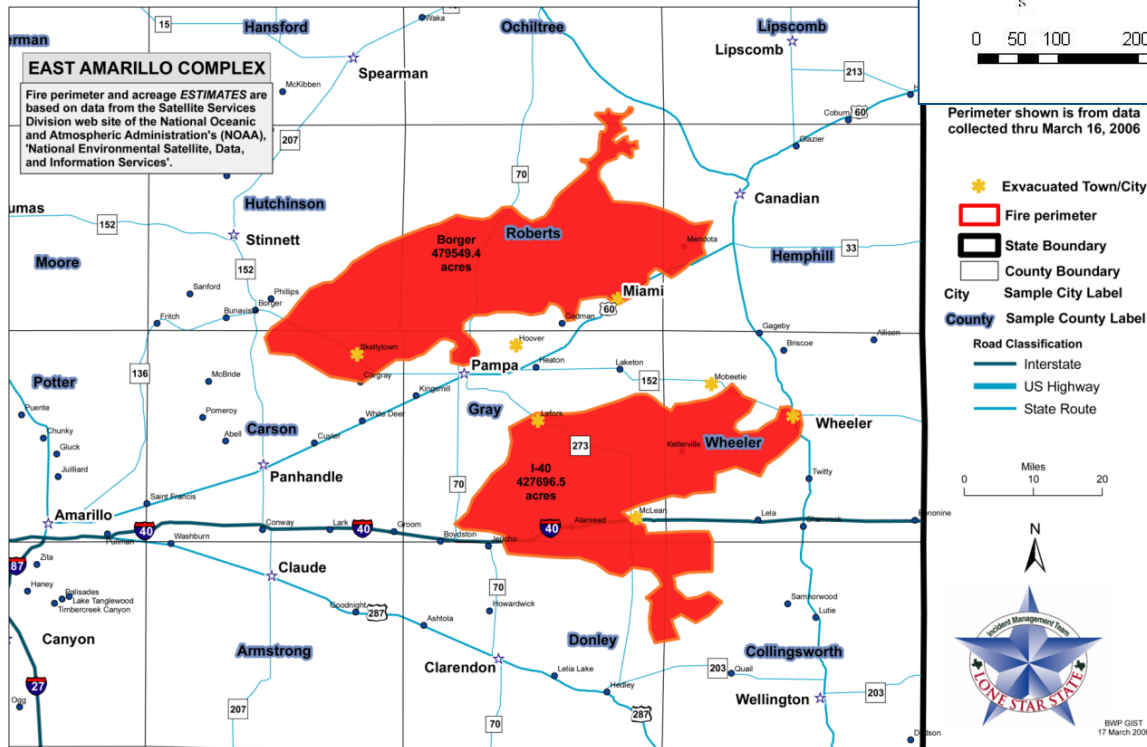
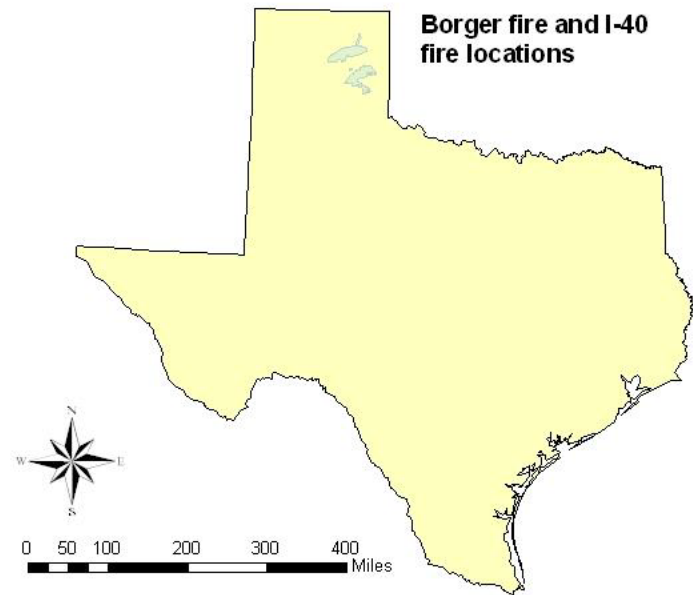
03/15/2006

12-18 Mar 2006

275,805 ha burned

Borger (North)

- 143,775 ha I-40 (South)
- 132,030 ha



Wildfire quail mortalities

Mar 06 Gray County

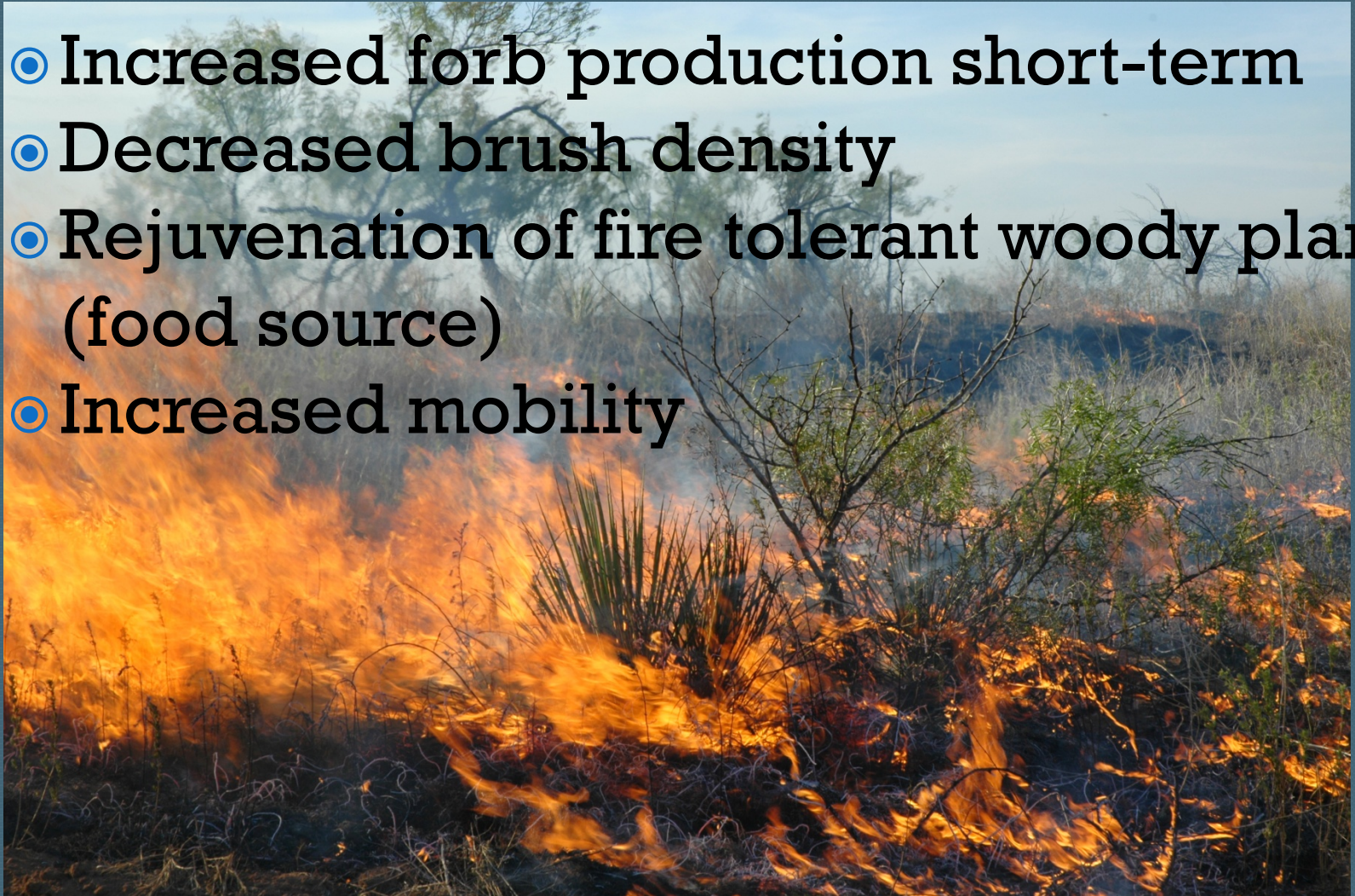


Impact on quail populations?



Benefits of burning relative to quail habitat

- ⦿ Increased forb production short-term
- ⦿ Decreased brush density
- ⦿ Rejuvenation of fire tolerant woody plants (food source)
- ⦿ Increased mobility



Expectations post-burn

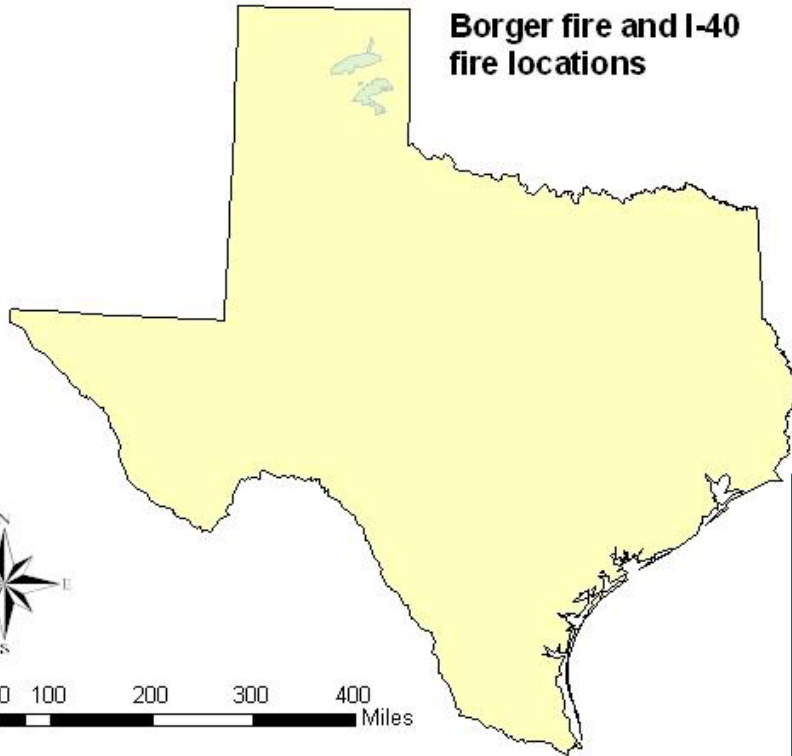
- Lowered survival rate short-term
 - Decreased availability of cover
 - Increased effectiveness of predators
- Flush of re-growth if adequate soil moisture and follow-up precipitation
 - Successful nesting
 - Recruitment
- In subsequent few years higher populations on burned areas than on un-burned areas due to habitat improvement

07/10/2006

**Borger fire and I-40
fire locations**



0 50 100 200 300 400 Miles



Precipitation

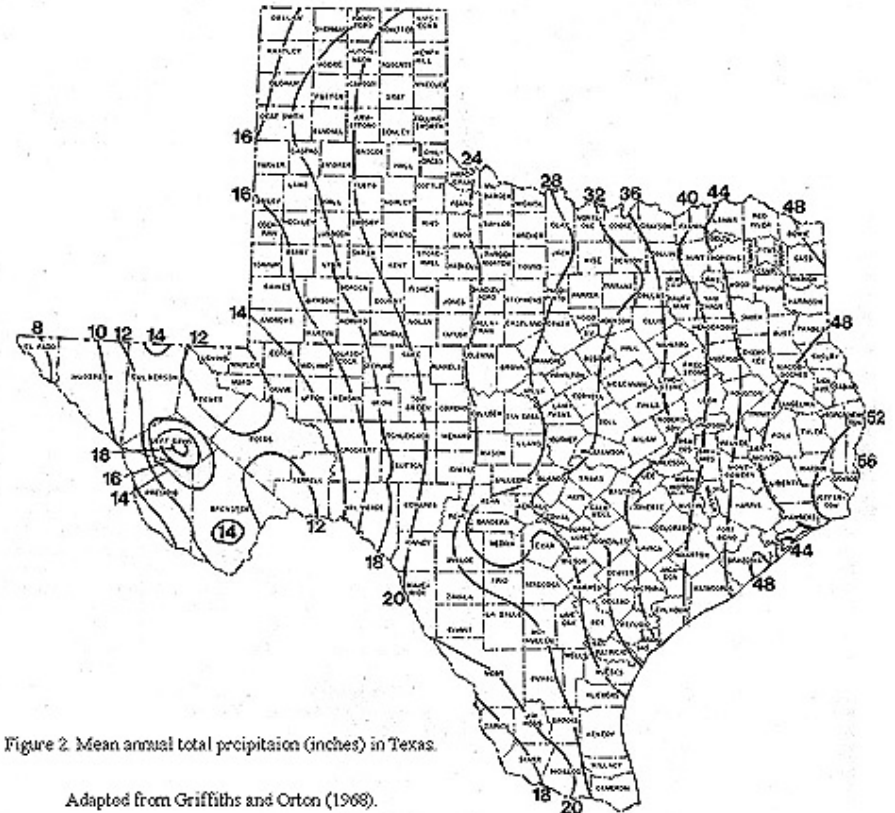
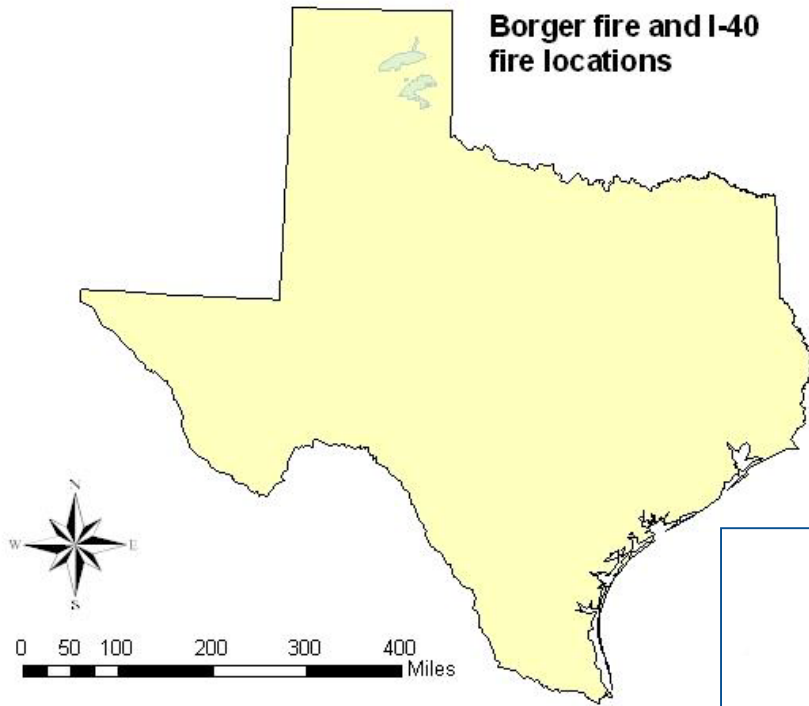


Figure 2. Mean annual total precipitation (inches) in Texas.

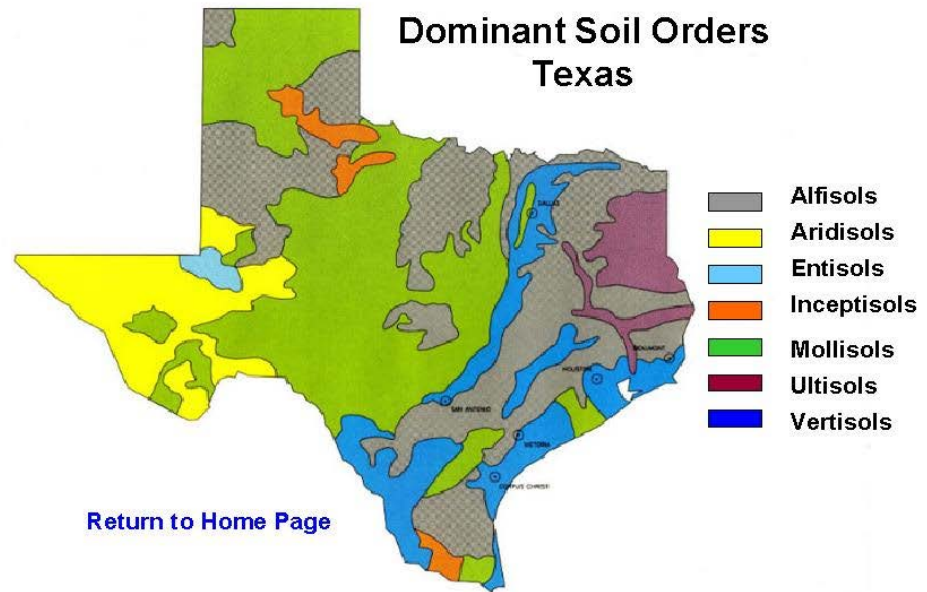
Adapted from Griffiths and Orton (1968).

Soils

**Borger fire and I-40
fire locations**



**Dominant Soil Orders
Texas**



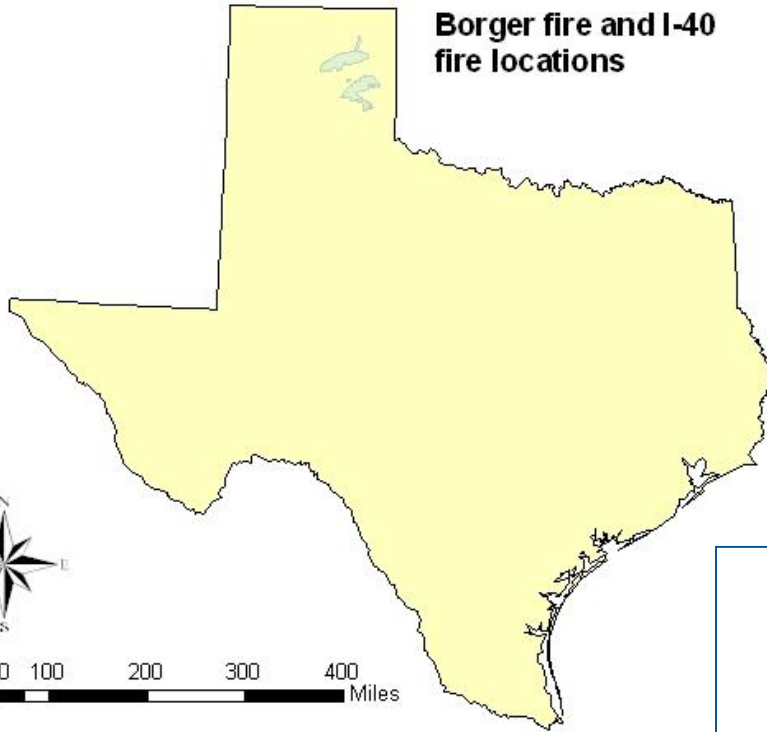
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Vegetation

**Borger fire and I-40
fire locations**



0 50 100 200 300 400 Miles

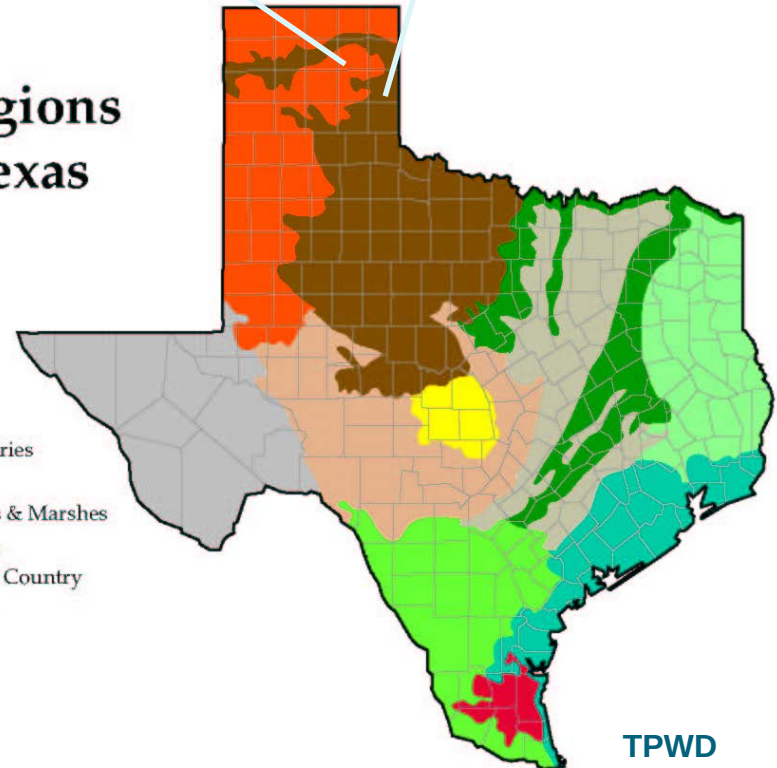


Shortgrass

Midgrass

Ecoregions of Texas

- Piney Woods
- Oak Woods & Prairies
- Blackland Prairie
- Gulf Coast Prairies & Marshes
- Coastal Sand Plain
- South Texas Brush Country
- Edwards Plateau
- Rolling Plains
- High Plains
- Trans Pecos
- Llano Uplift



TPWD

Methods

- Count individual calling males
- 16 km transects
 - 11 listening points
 - 1.6 km intervals
 - Oriented north-south
 - Three per burned block
 - $\geq$ three points within burned area
 - $\geq$ three points in the unburned area
- 30 min. before sunrise + 2 hrs.
- Listen 5 min.
- 3 counts, different days
- Peak breeding season- late May to early July



Methods

- Gross characterization of soils within 81 ha Area of Interest (AOI)
 - Web Soil Survey
 - (<http://websoilsurvey.nrcs.usda.gov>)

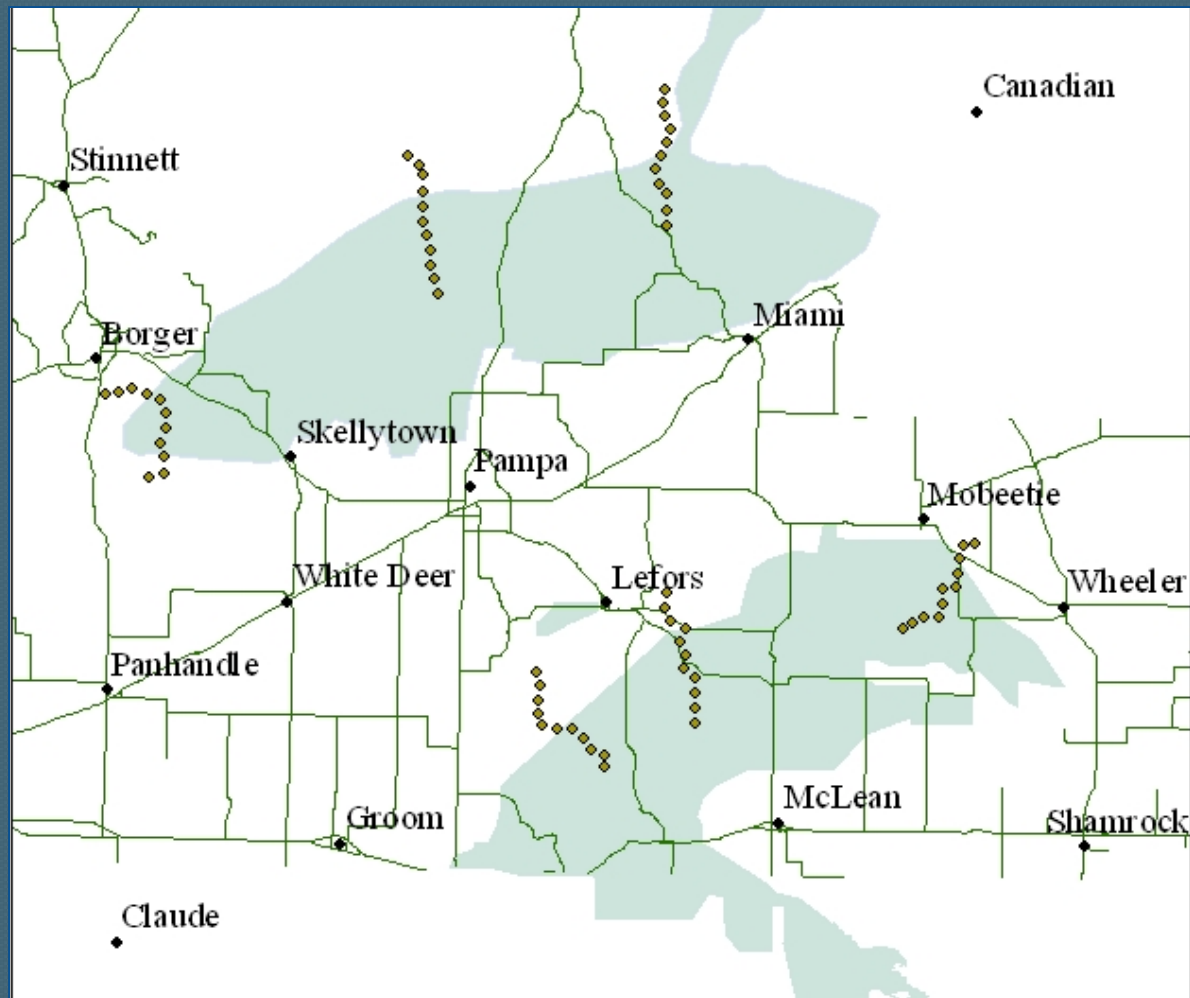
Monitoring Sites

Counties

Gray

Carson

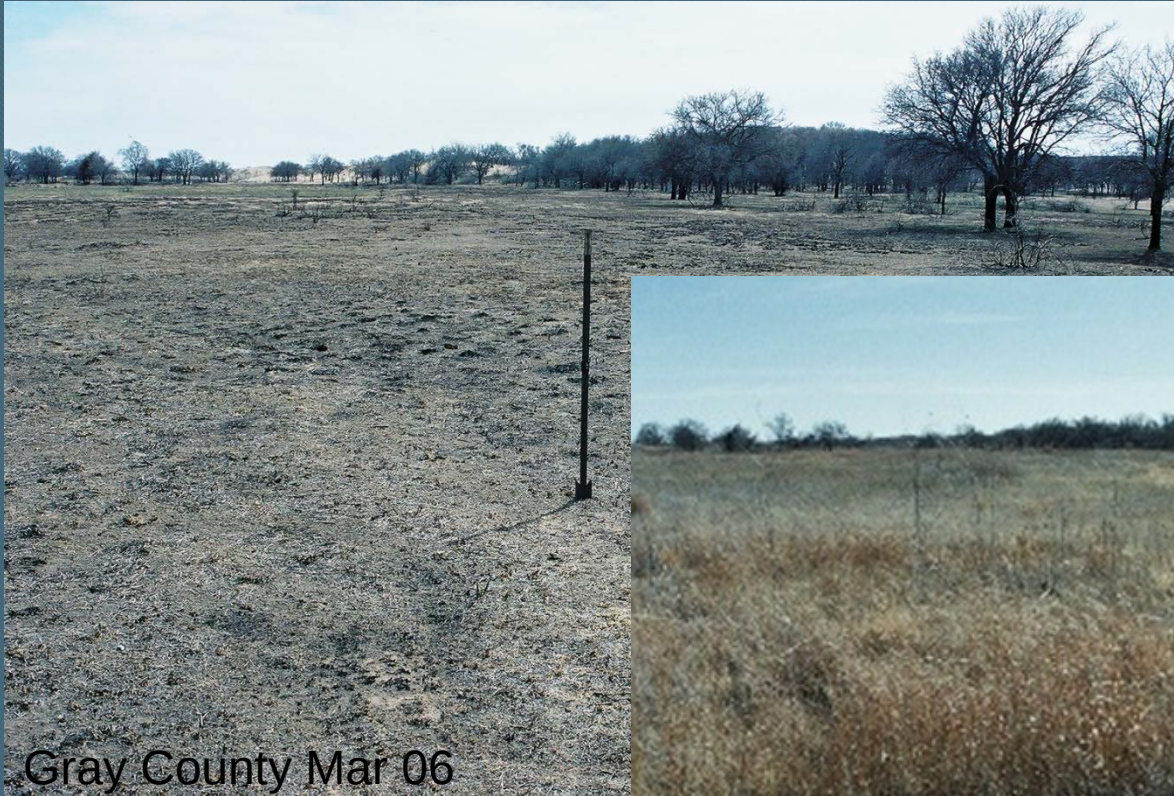
Roberts

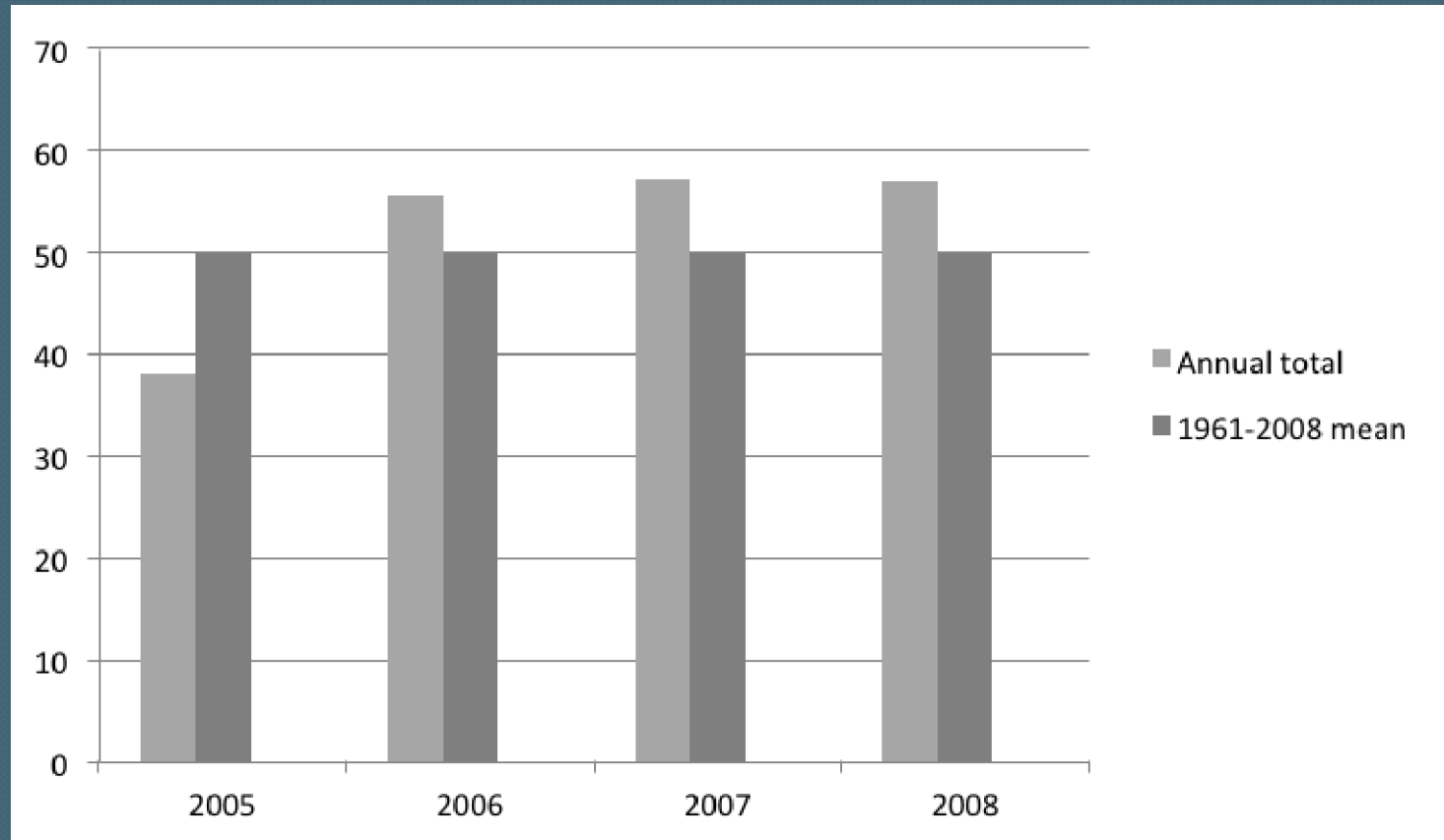


Recovery

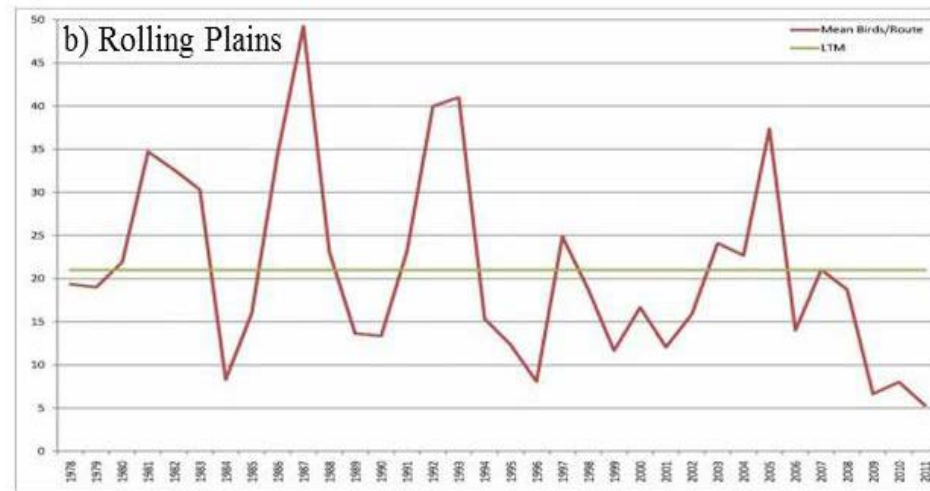
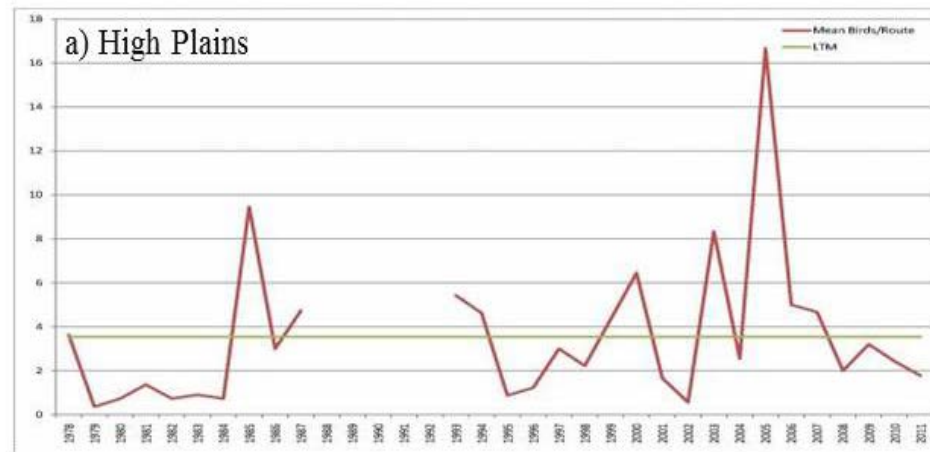


Recovery



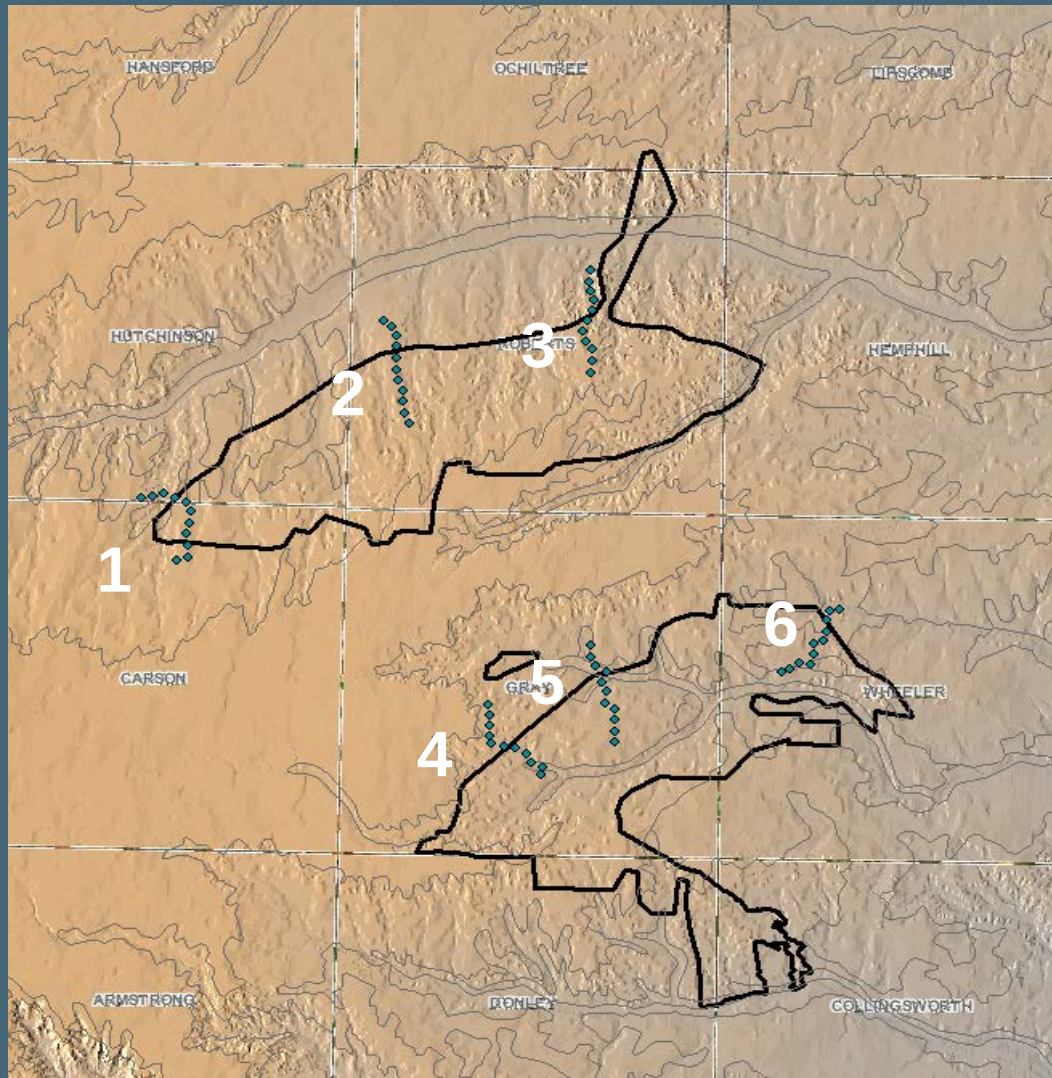


Annual precipitation totals (cm) and long-term mean for Amarillo, Texas.
Data from National Oceanic and Atmospheric Administration



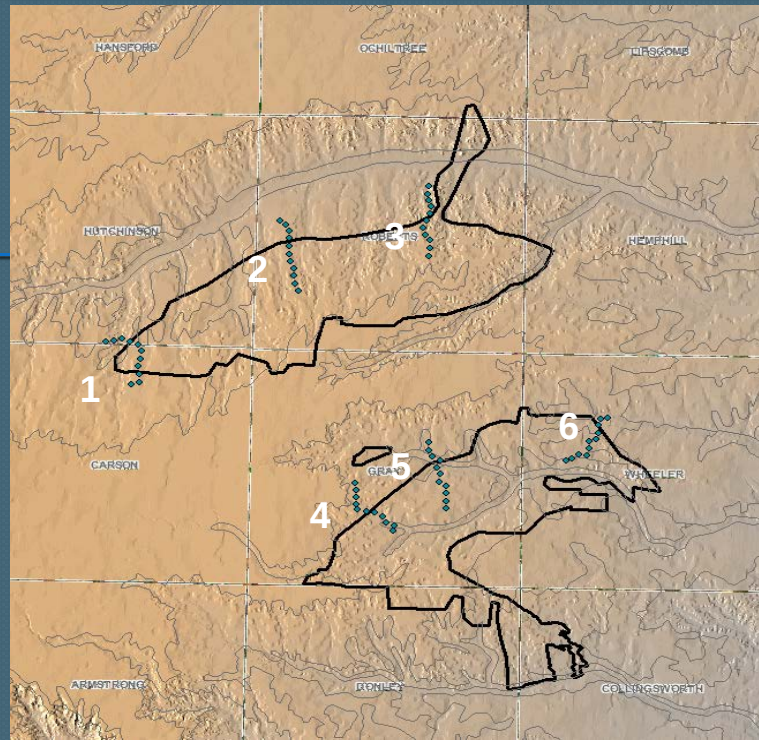
Bobwhite abundance from 1978-2011 for the High Plains (a) and Rolling Plains (b) ecoregions as estimated by summer roadside counts. Data from Texas Parks and Wildlife Department

Bobwhite average densities by transect.



1	06	07	08	06-08
Burned	3.33	1.83	1.33	2.00
Unburned	1.92 ^a	3.19 ^a	0.89 ^b	2.17
2	06	07	08	06-08
Burned	0.71 ^a	1.33 ^{ab}	0.86 ^b	0.97
Unburned	4.67	5.42	5.50	5.19
3	06	07	08	06-08
Burned	0.00 ^a	0.00 ^a	0.17 ^b	0.55
Unburned	2.93	1.93^a	5.33^b	3.40
4	06	07	08	06-08
Burned	1.13	2.80	2.80	2.24
Unburned	1.67 ^{ab}	2.28 ^a	0.44 ^b	1.46
5	06	07	08	06-08
Burned	0.57 ^a	3.76 ^b	4.38 ^{ab}	2.9
Unburned	4.75^{ab}	4.67 ^a	6.50^b	5.3
6	06	07	08	06-08
Burned	4.21 ^a	8.71^b	11.37^b	8.10
Unburned	4.56	5.56	5.89	5.33
Combined	06	07	08	
Burned	1.22 ^a	2.68 ^b	2.48 ^{ab}	
Unburned	3.11	3.59	3.42	

Significant difference ($p \leq 0.05$) indicated by differing superscript (years) or **bold** (treatment, within year(s)).

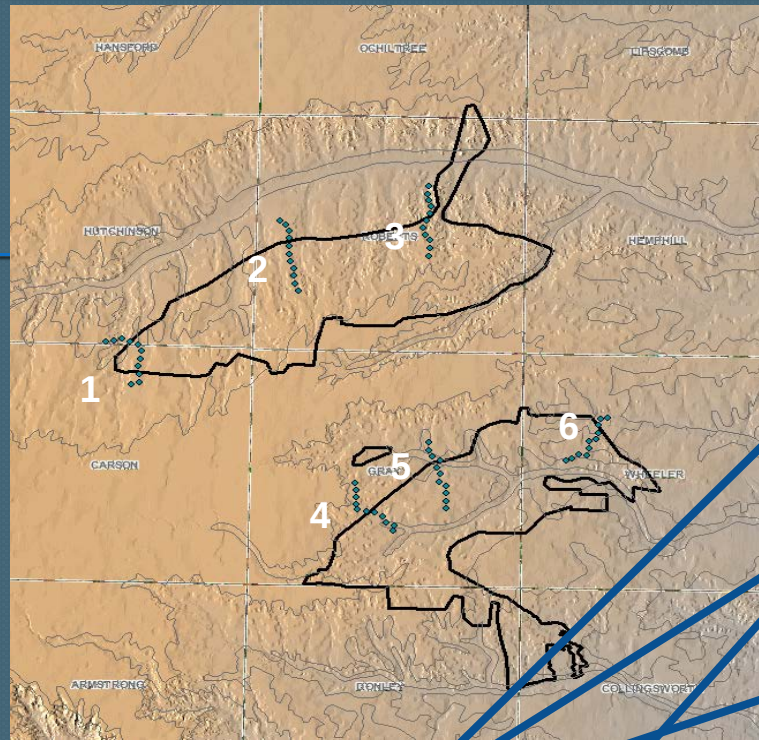


Results

- Combined
 - Burned < Unburned 2006
 - Burned 06 < Burned 07
- North Block
 - B < UB 2006
 - B < UB 06/07, 06/08
- South Block
 - B < UB 2006, 2007, 2008

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Results



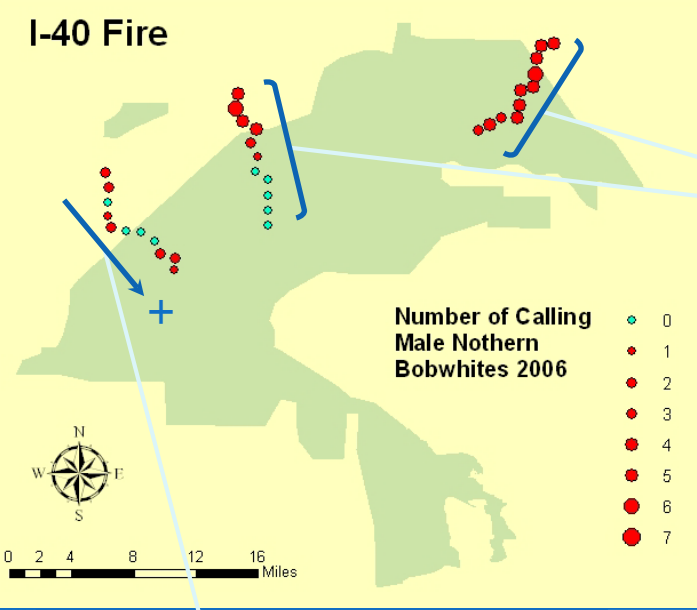
- 2 of 6 lines, all 3 years combined, B < UB
- 4 of 6 lines 2006 B < UB
- Only 3 lines showed higher densities on burned areas
 - 2 in 2008 only
 - 1 (sandy site) in 2007 and 2008
- 2 lines showed higher densities on unburned areas all three years

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Transect 1		
Point	Burn status	Two most prominent soil types
0	yes	fine sandy loam / loamy fine sand
1	yes	loamy fine sand / fine sandy loam
2	yes	fine sandy loam / clay loam
3	yes	clay loam / fine sandy loam
4	yes	loam / clay loam
5	no	loam / sandy clay loam
6	no	gravelly loam / clay loam
7	no	loam / clay loam
8	no	loam / clay loam
9	no	gravelly loam / clay loam
10	no	clay loam / gravelly loam

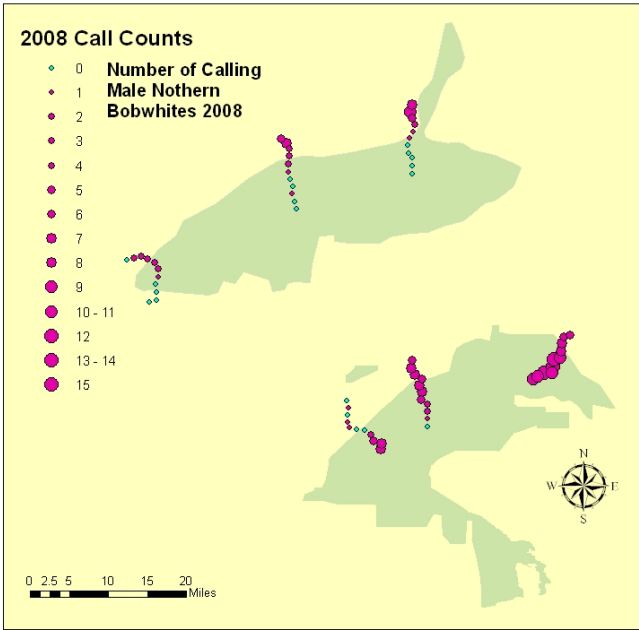
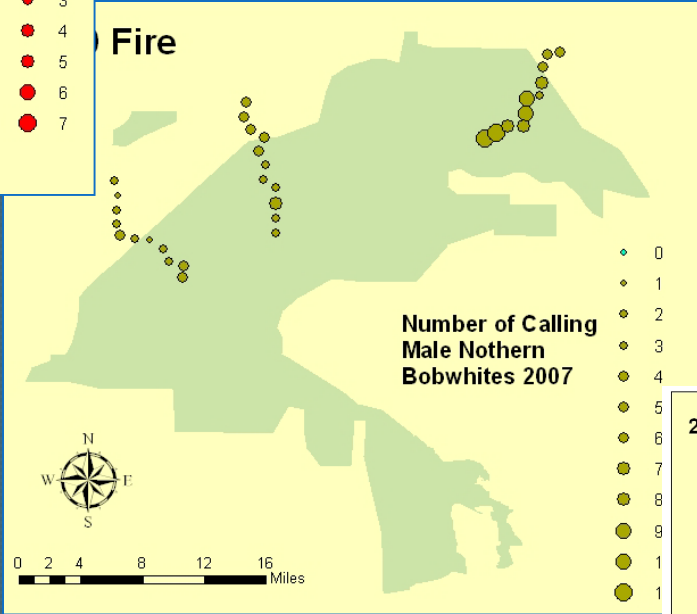
Example transect with burn status assignment and soil characterization from Web Soil Survey (2009).

I-40 Fire



Soil Particle Size

- Fine Sandy Loam (S)
- Clay Loam (N)

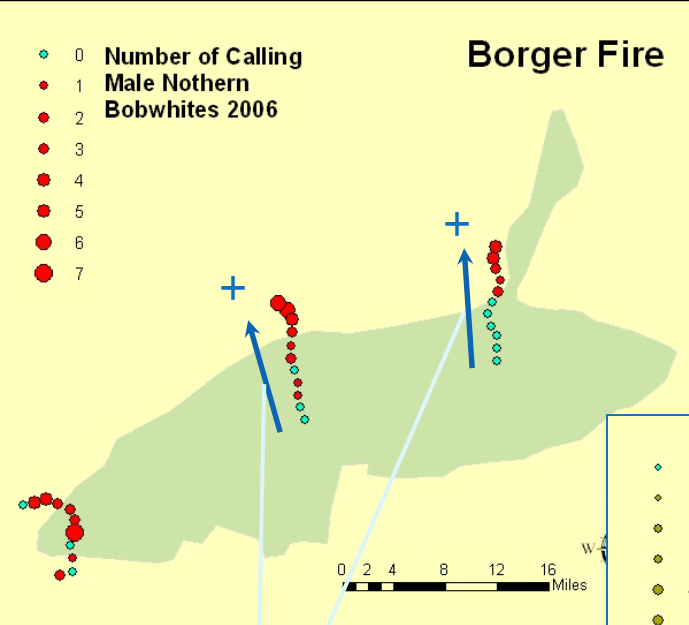


Results

Soil Particle Size

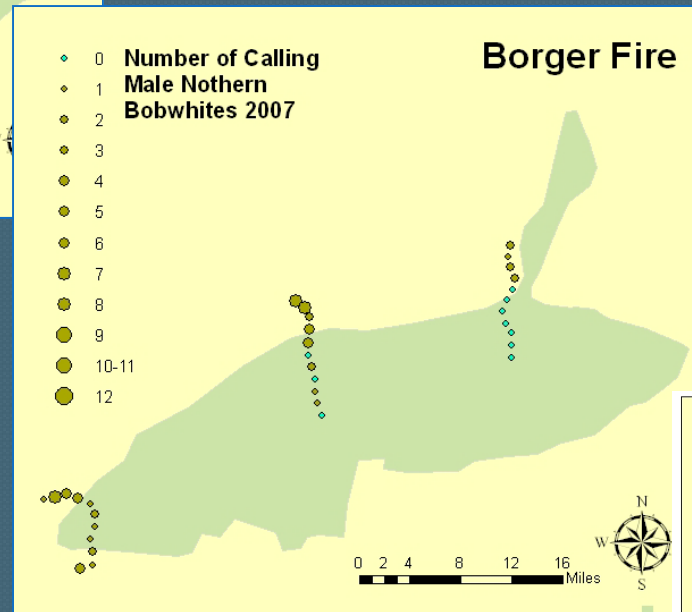
- Fine Sand / Loamy Fine Sand

Results

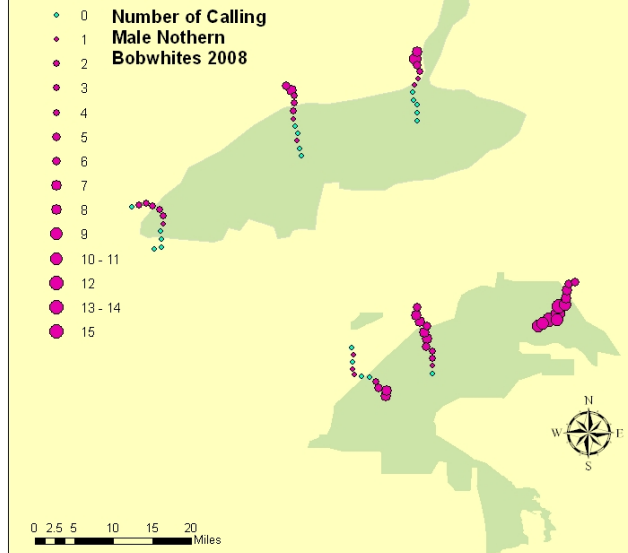


Soil Particle Size

- Clay Loam (S)
- Fine Sandy Loam (N)

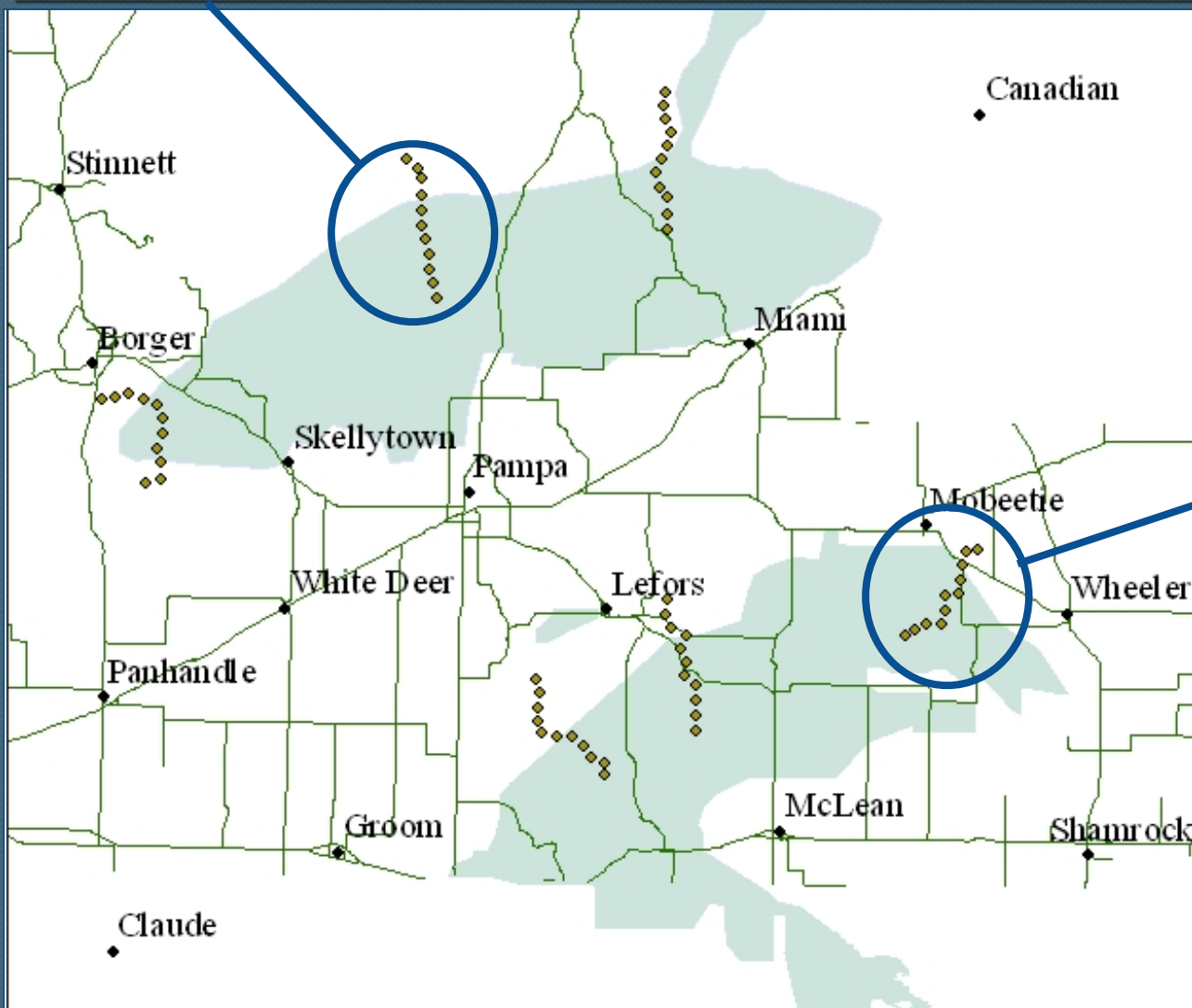


2008 Call Counts



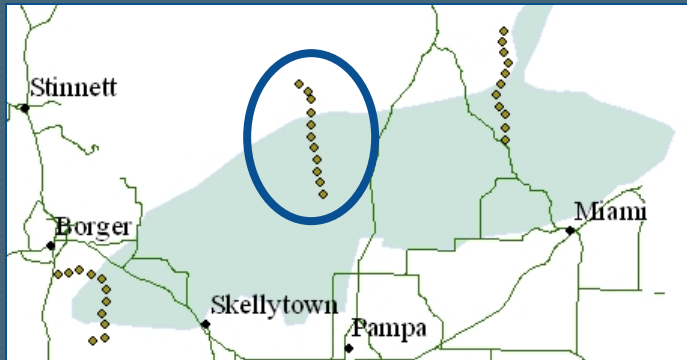
- Clay Loam
- Loam
- Fine Sandy Loam
- Gravelly Loam

Soils

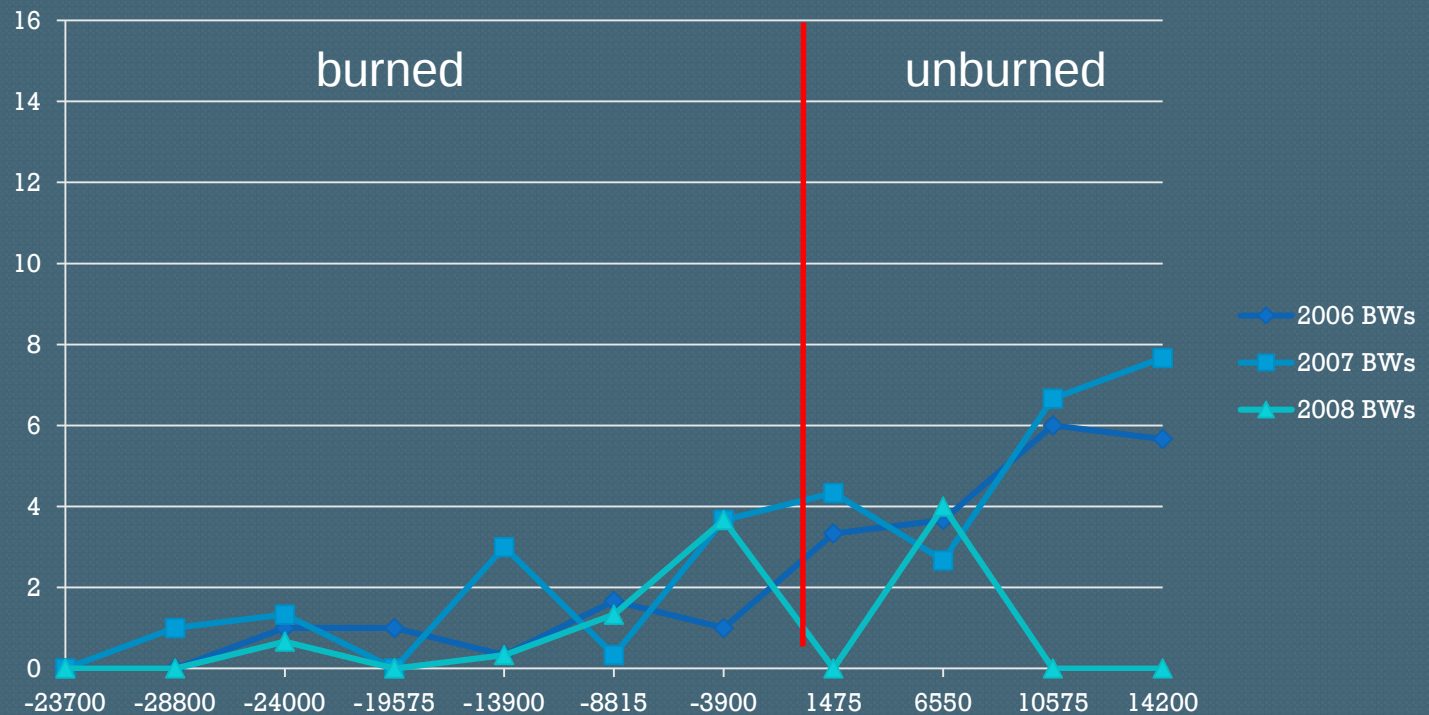


- Loamy Fine Sand
- Fine Sandy Loam
- Fine Sand

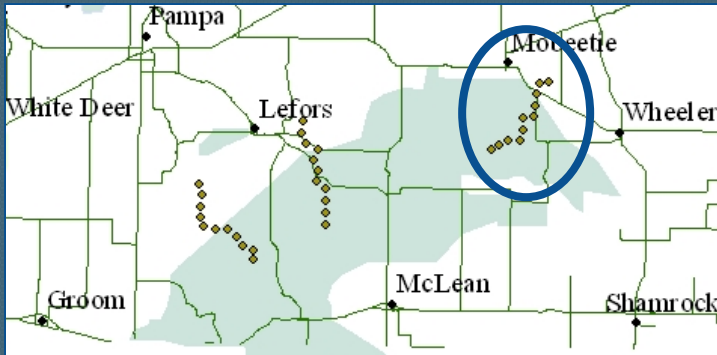
Results



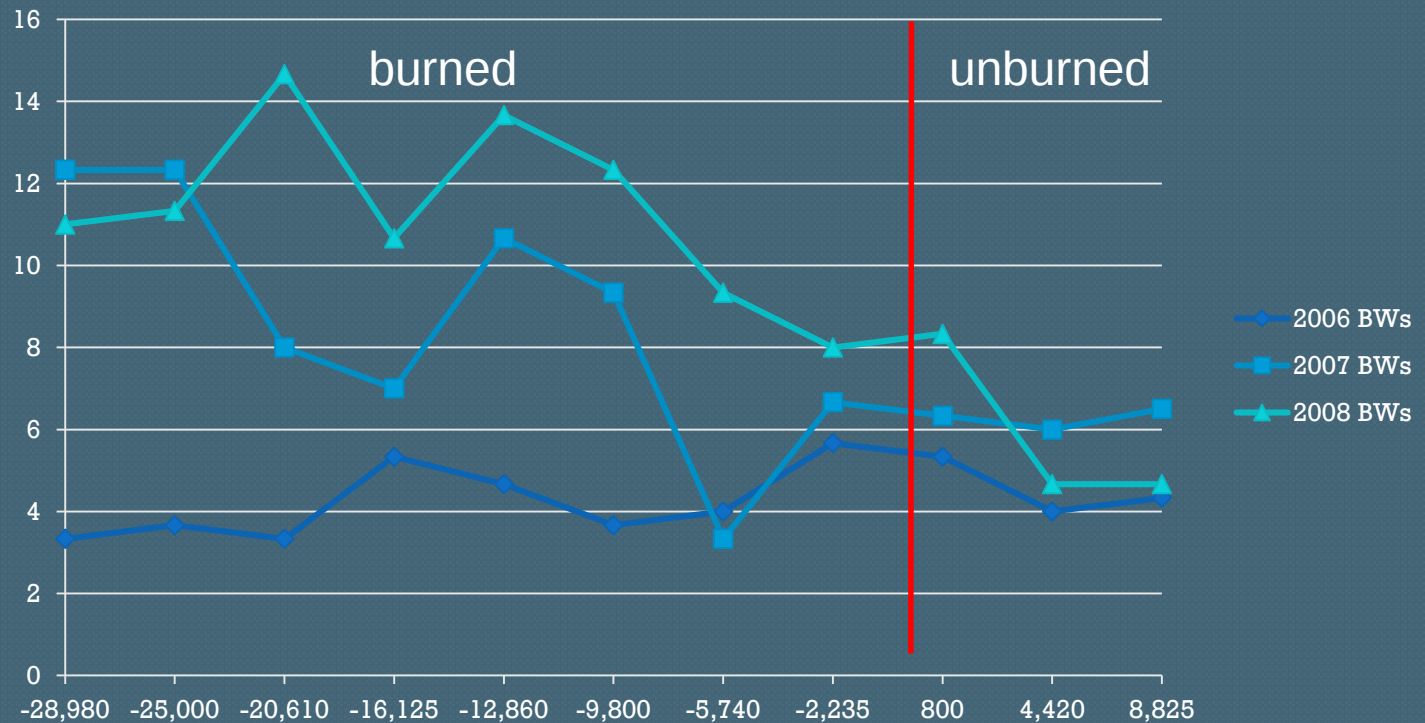
Borger C (loamy site)
Bobwhite calls and distance (ft) from and within
(-) burn



Results



I-40 E (sandy site)
Bobwhite calls and distance (ft) from and within
(-) burn



Shinoak resprouting post-fire



Summary

- Abundance unknown pre-burn
- Shortgrass Prairie inherently lower potential than midgrass/Rolling Plains
 - Shortgrass sites probably less habitable
 - Yucca, buffalograss, blue grama
 - Woody structure lacking
 - Woody component on midgrass sites more resilient
 - E.g. shinnery
- Call counts varied according to soil type, i.e. sandier soils responded more quickly
 - Likely higher pre-burn numbers than harder sites

Summary cont'd

- Rough, broken topography (with more shrubs) likely mitigated impact of the fire on some sites by providing unburned refugia
- Substantial early rainfall on eastern, more sandy side contributed to early recovery

Management Implications

- Wildfire $\neq$ Prescribed Fire
- Slow recovery of quail populations possibly the result of
 1. Amount and timing of rainfall post-burn
 2. Soil type and accompanying plant response
 3. Size of the burned areas may have overwhelmed ability to recolonize in 3 years, especially where devoid of woody cover
- Grazing deferment through at least one full growing season would encourage earlier recovery

Acknowledgments

- Panhandle Chapter Quail Unlimited
- Texas AgriLife Extension Service
 - Ricardo Hernandez
 - Corbin Neill
- Quail Decline Initiative
- WTAMU
 - Ray Matlack
- NRCS local offices

