

North Texas GCD

Discussion of
Well Spacing Rules

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Two Evaluations

1. Outcrop Analysis

Concern: wells on small lots with small saturated thickness

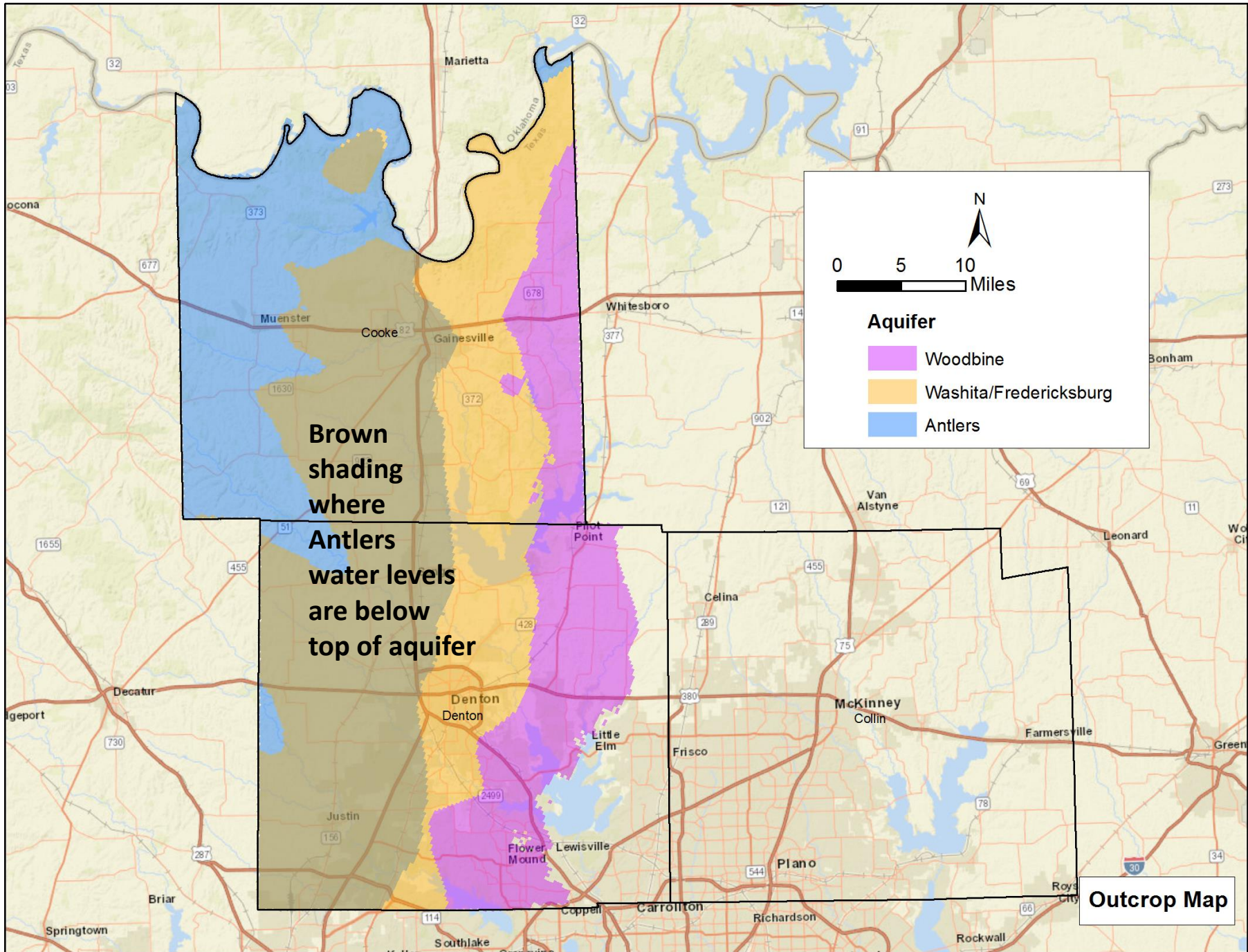
2. General Well Spacing

Concern: Impact of wells (especially high capacity wells) on nearby wells

Outcrop Analysis

Objective: Assessment impact of various size lots on groundwater availability and water level decline

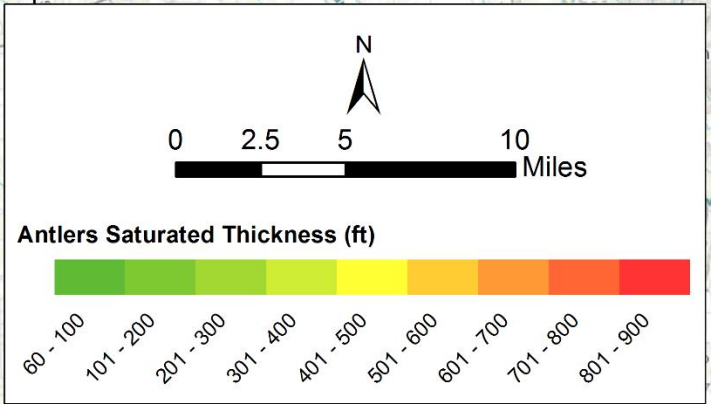
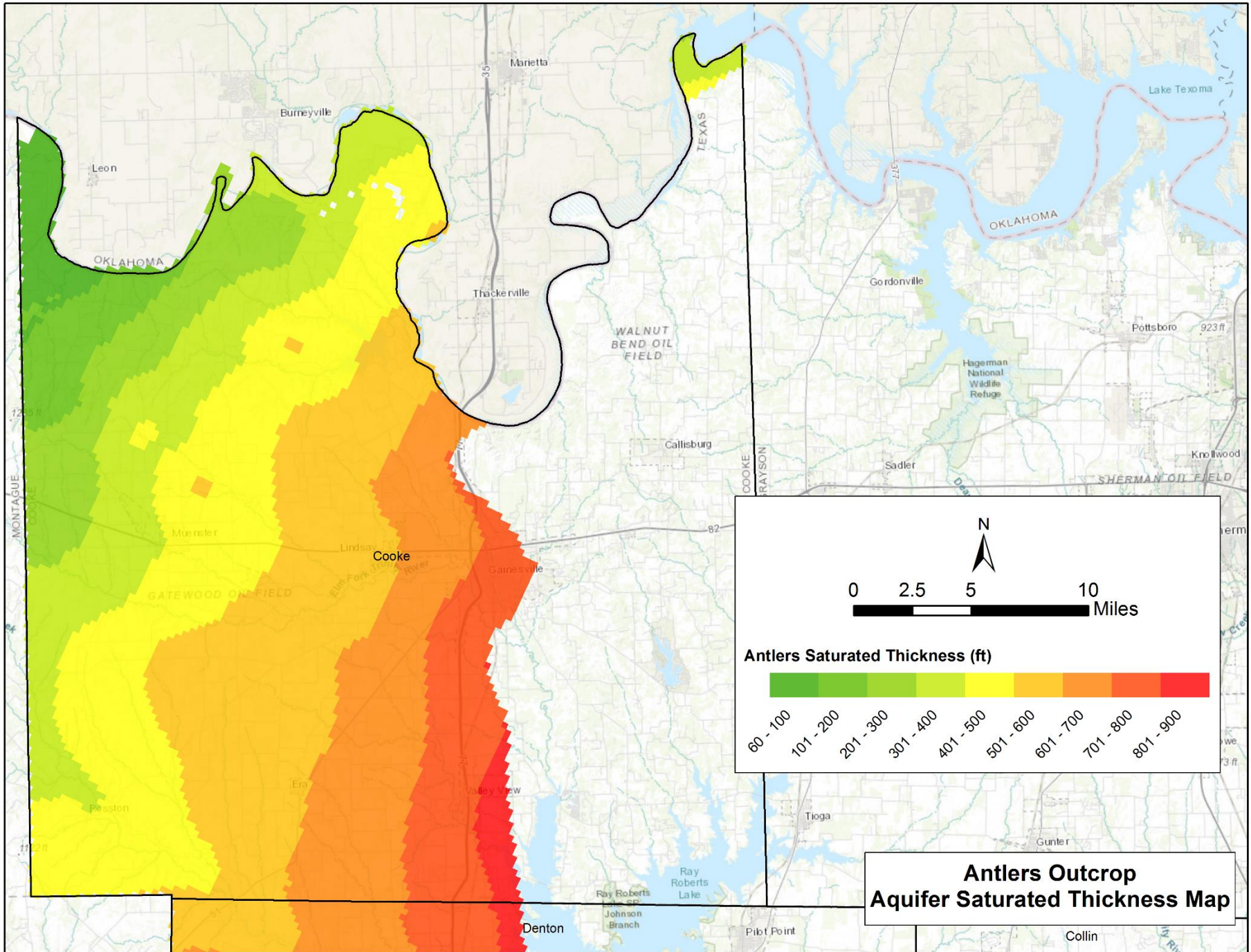
- Transmissivity and saturated thickness data was taken from the North Trinity Woodbine GAM
- Statistical analysis of data was used to determine the median values of each outcrop within each county
 - Transmissivity
 - Saturated Thickness
 - Specific Yield was held at a constant for the model and was therefore the same for each aquifer
- Those values were used to simulate drawdown conditions over 4 different scenarios
 - Scenarios varied over lot acreage size (1,2,5,10)
 - Analysis used the Neuman solution for unconfined aquifers



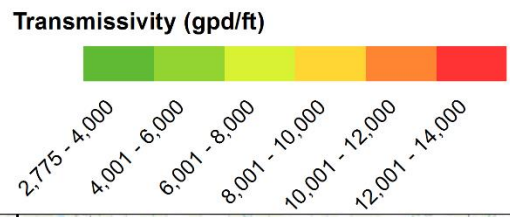
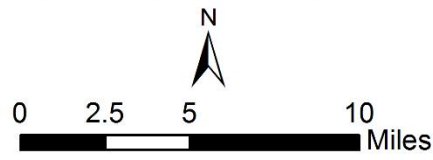
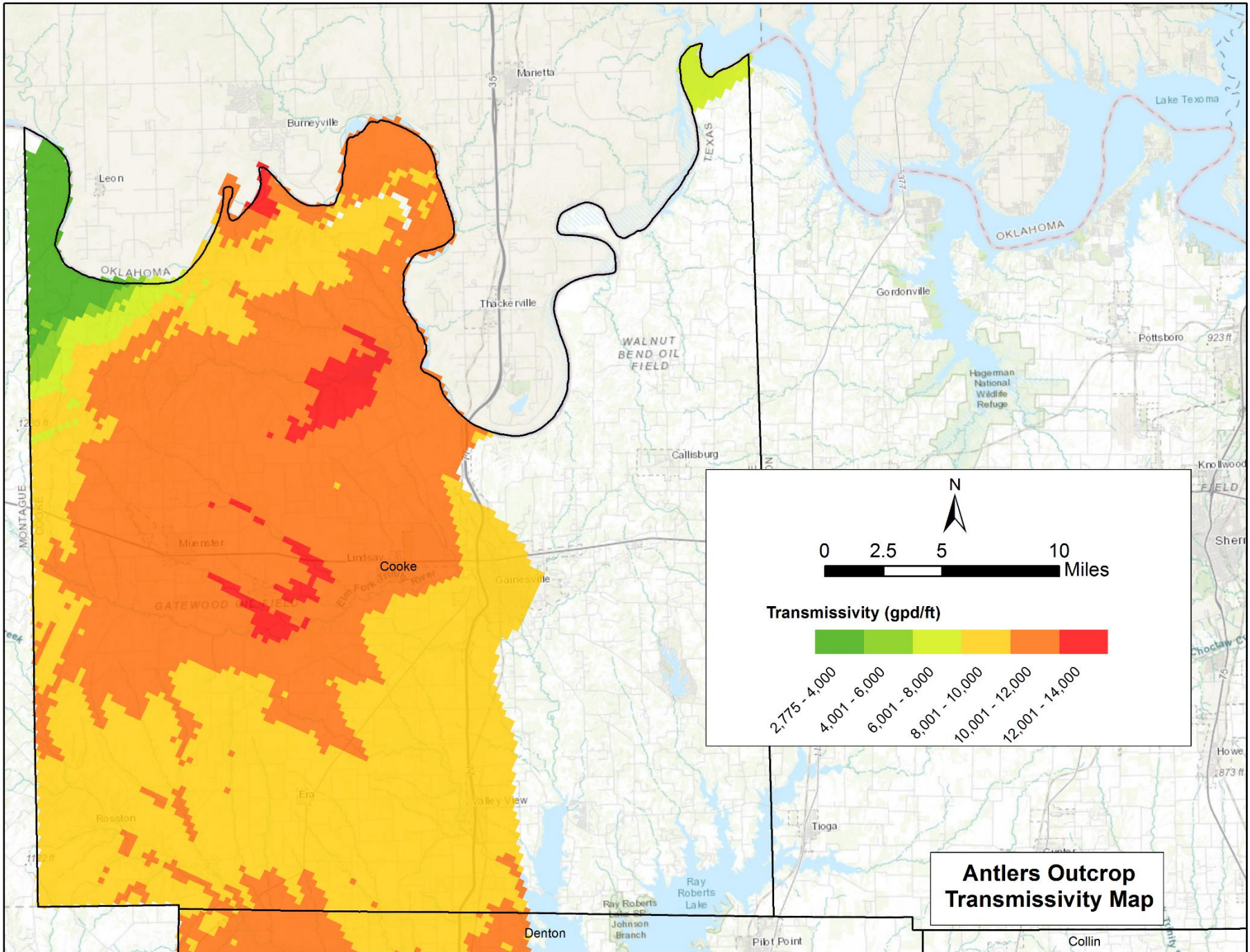
Cooke County Outcrop Analysis

- Cooke County has three aquifers outcrops
 - Antlers, Washita/Fredericksburg, and Woodbine

Aquifer	Median Saturated Thickness (feet)	Median Transmissivity (gpd/ft)	Median Specific Yield
Antlers	486	9,986	0.1
Washita/ Fredericksburg	199	998	0.1
Woodbine	103	579	0.1

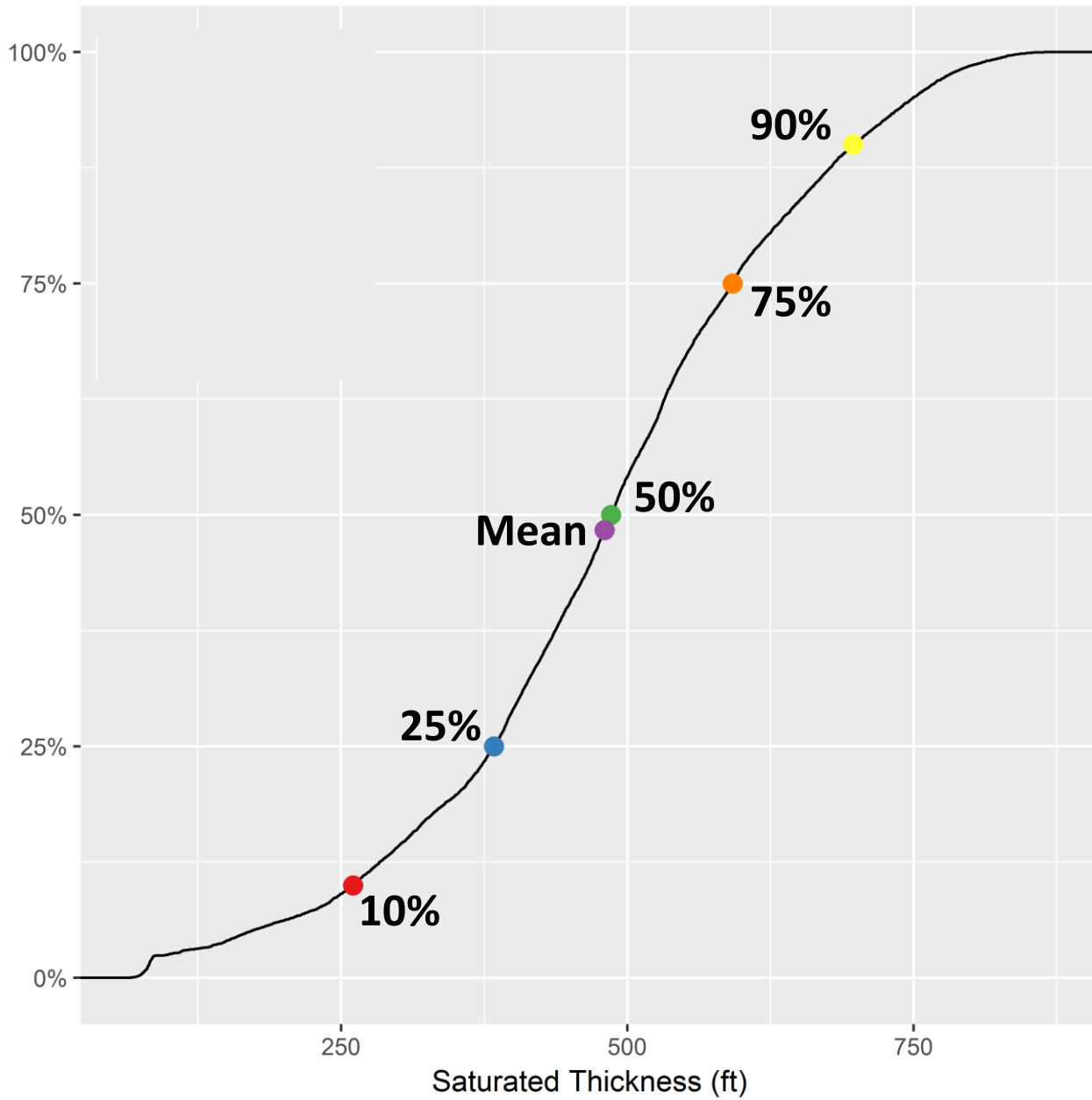


**Antlers Outcrop
Aquifer Saturated Thickness Map**

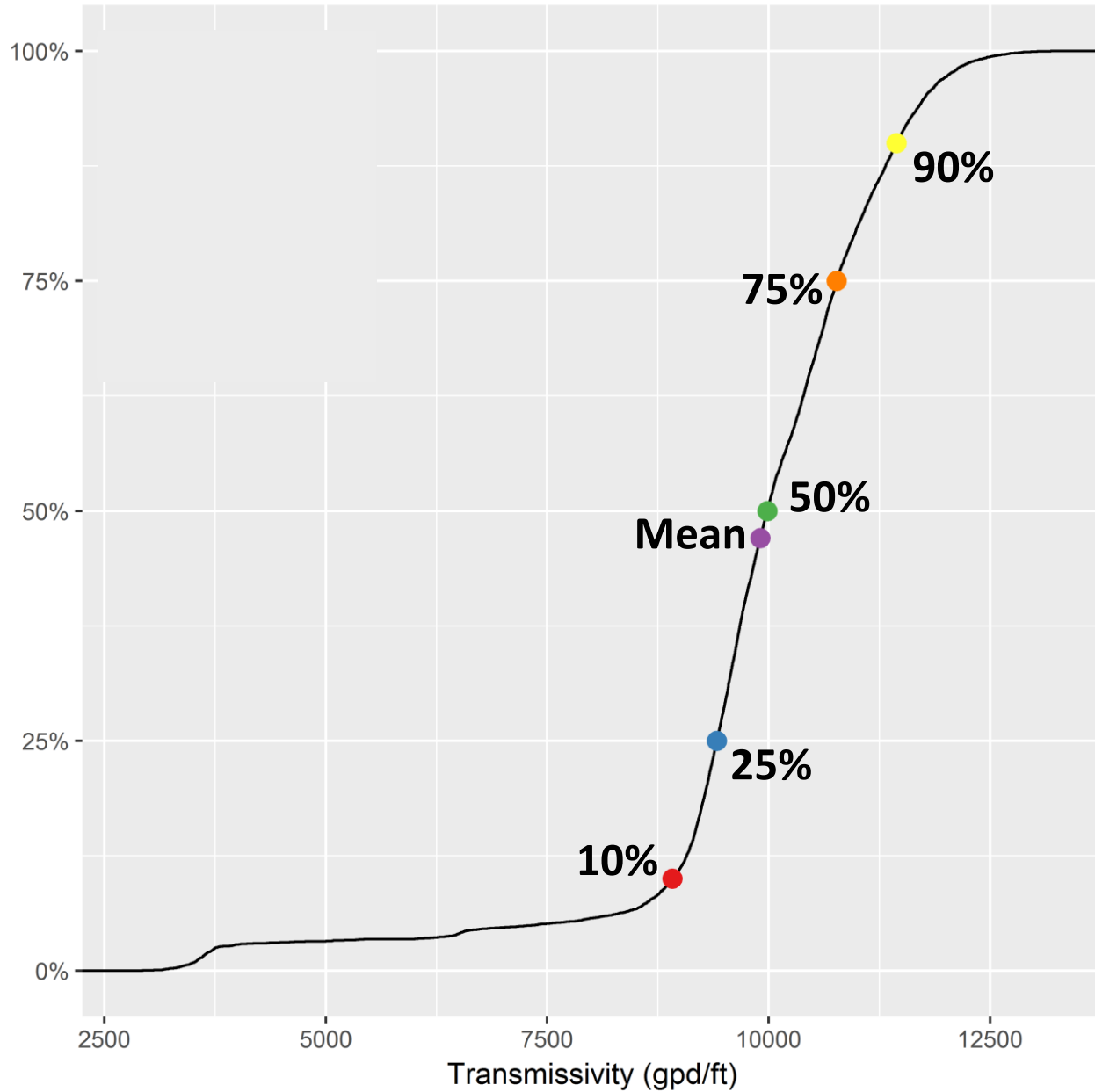


**Antlers Outcrop
Transmissivity Map**

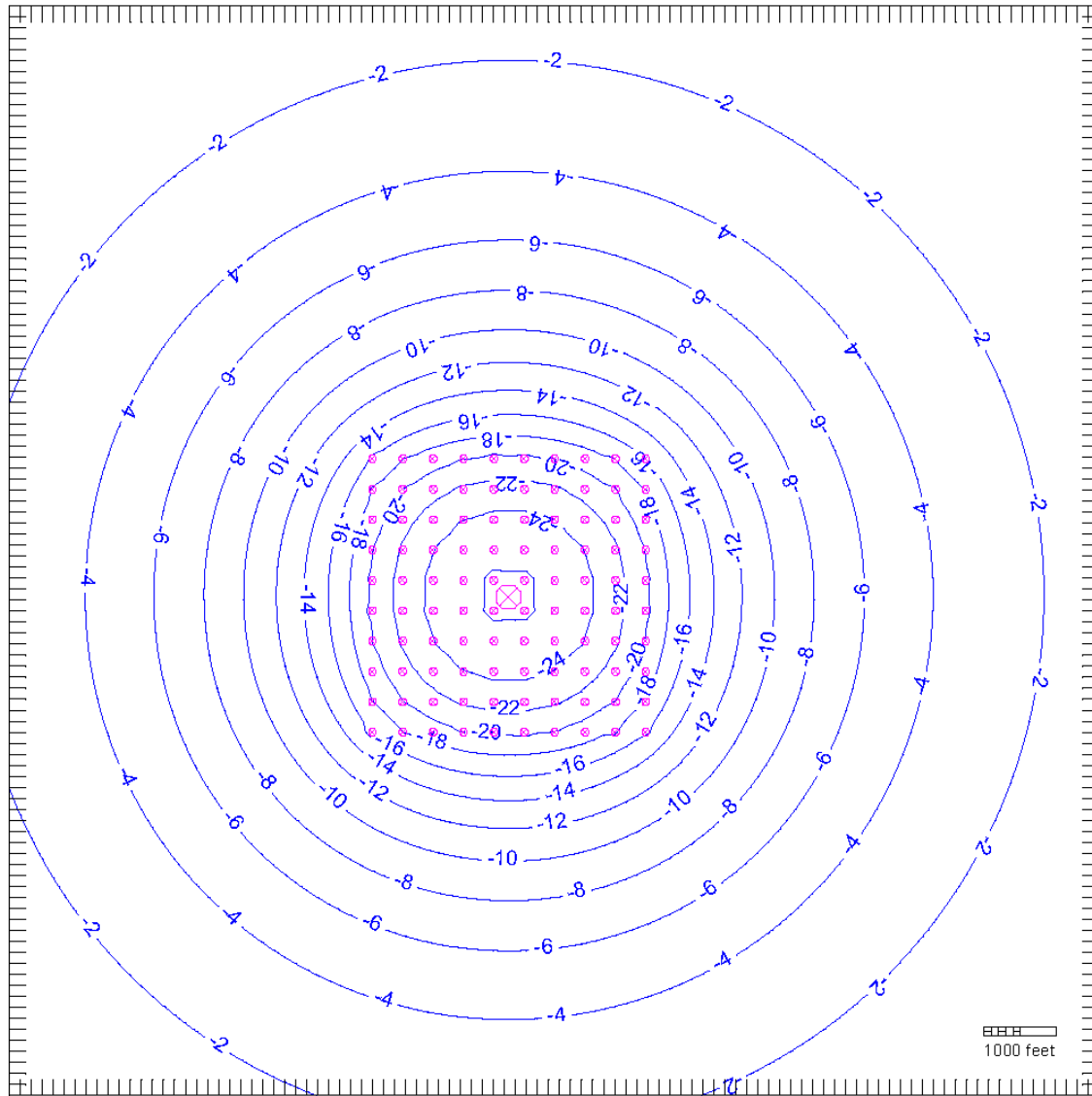
Antlers CDF of Saturated Thickness Values in Cooke



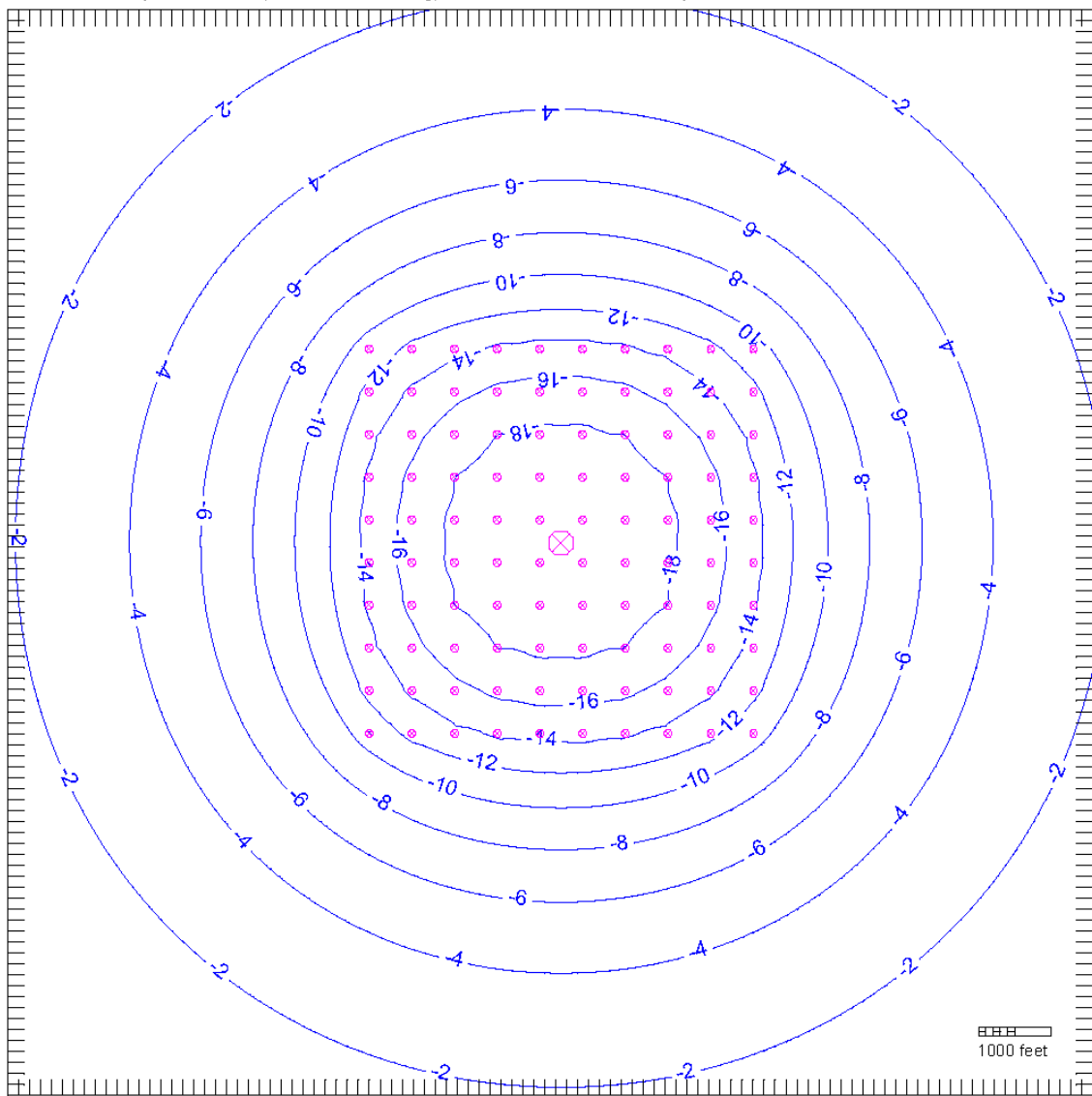
Antlers CDF of Transmissivity Values in Cooke



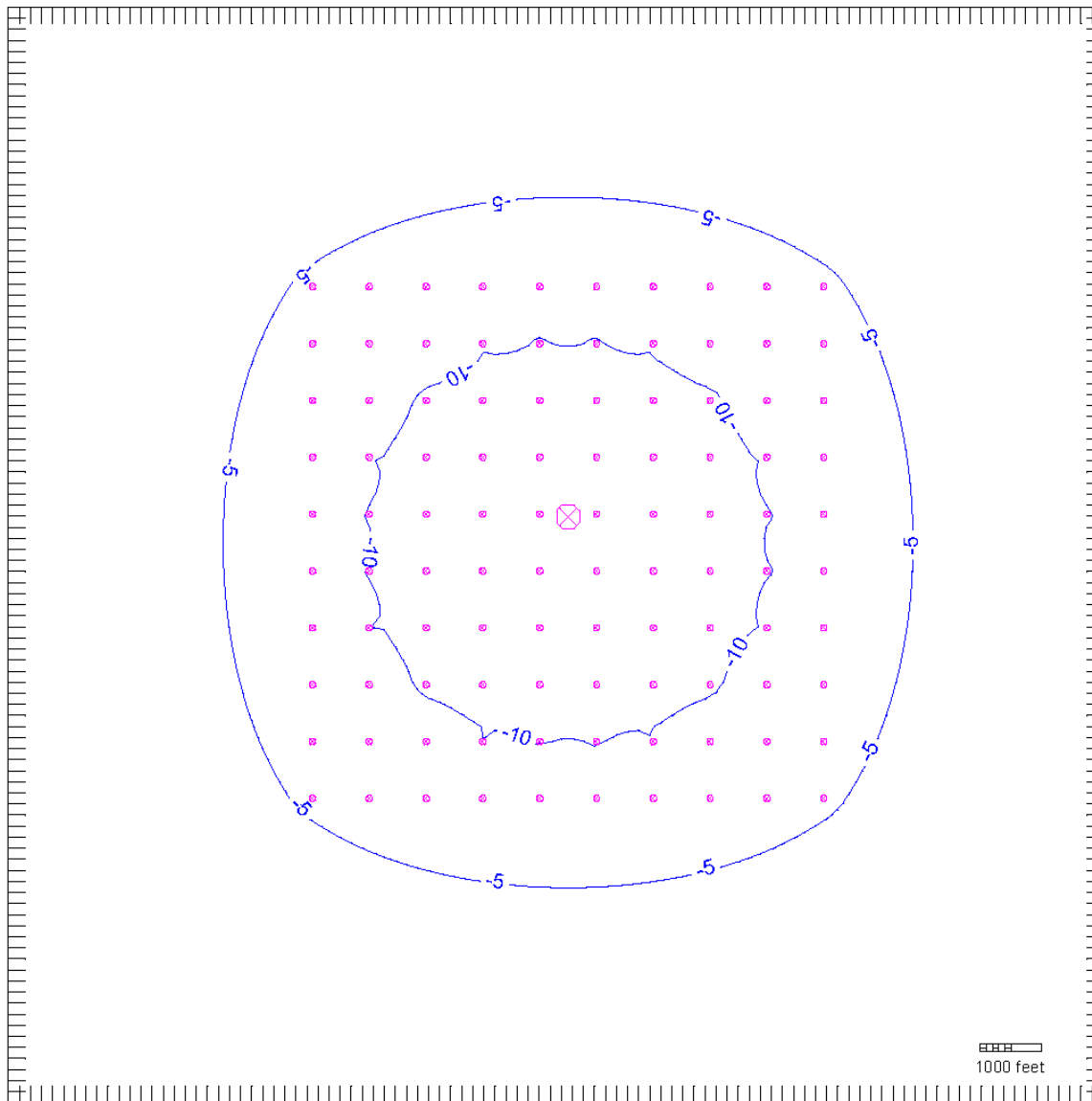
Cooke County Antlers Outcrop Drawdown: 12,500 gpd Over 5 Years for a 100 Well System on 1 Acre Plots



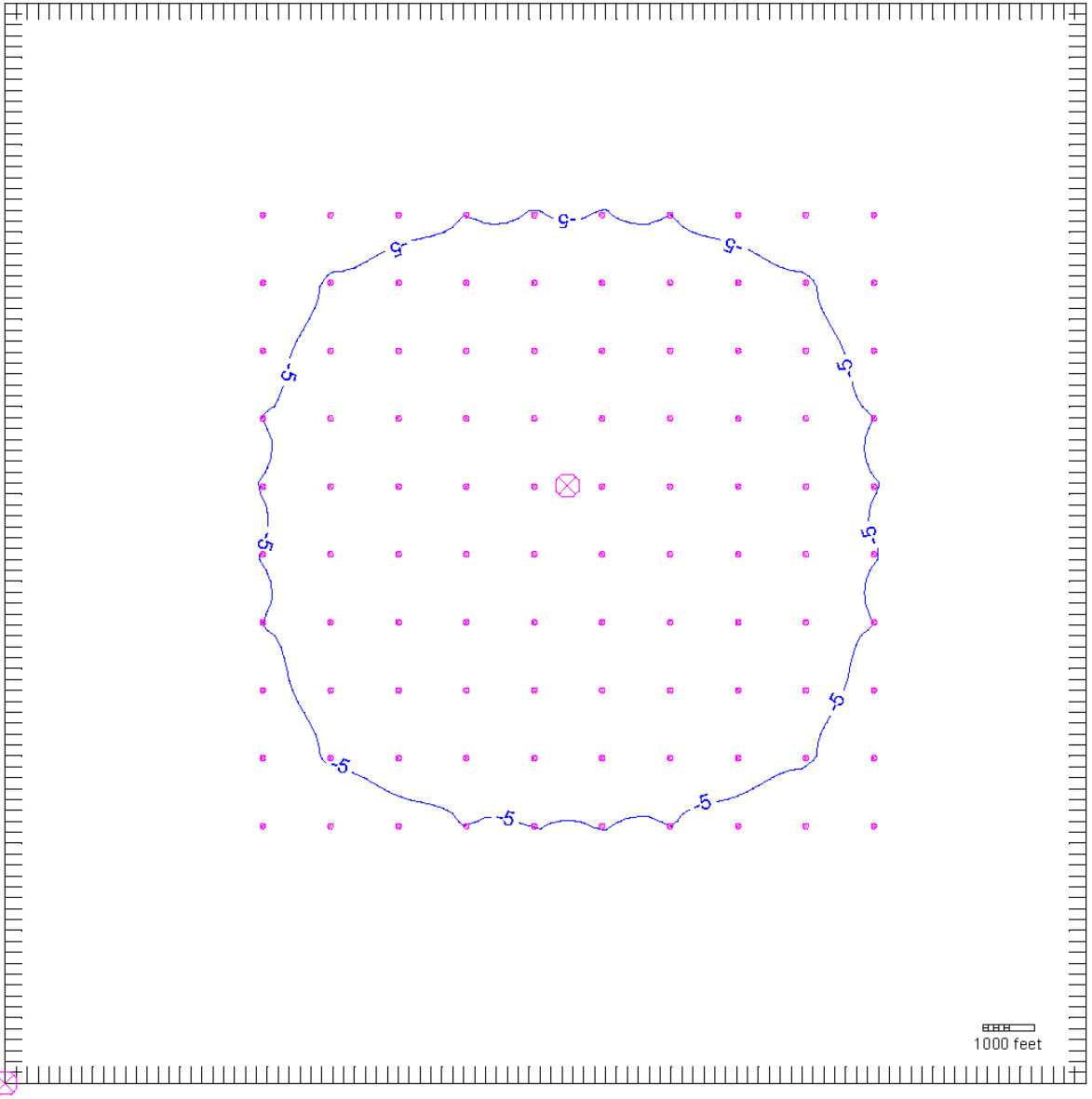
Cooke County Antlers Outcrop Drawdown: 12,500 gpd Over 5 Years for a 100 Well System on 2 Acre Plots



Cooke County Antlers Outcrop Drawdown: 12,500 gpd Over 5 Years for a 100 Well System on 5 Acre Plots



Cooke County Antlers Outcrop Drawdown: 12,500 gpd Over 5 Years for a 100 Well System on 10 Acre Plots



Cooke County Drawdown Analysis: Antlers

Lot Size (Acre)	Max Drawdown (feet)
1	26
2	20
5	12
10	8

Drawdown Summary Cooke County

Lot Size (Acres)	Max Drawdown in Woodbine after 5 years (feet)	Max Drawdown in Antlers after 5 years (feet)
1	82	26
2	43	20
5	17	12
10	8	8

Denton County Hydraulic Properties

Aquifer	Median Saturated Thickness (feet)	Median Transmissivity (gpd/ft)	Median Specific Yield
Antlers	670	10,344	0.1
Woodbine	219	1,204	0.1

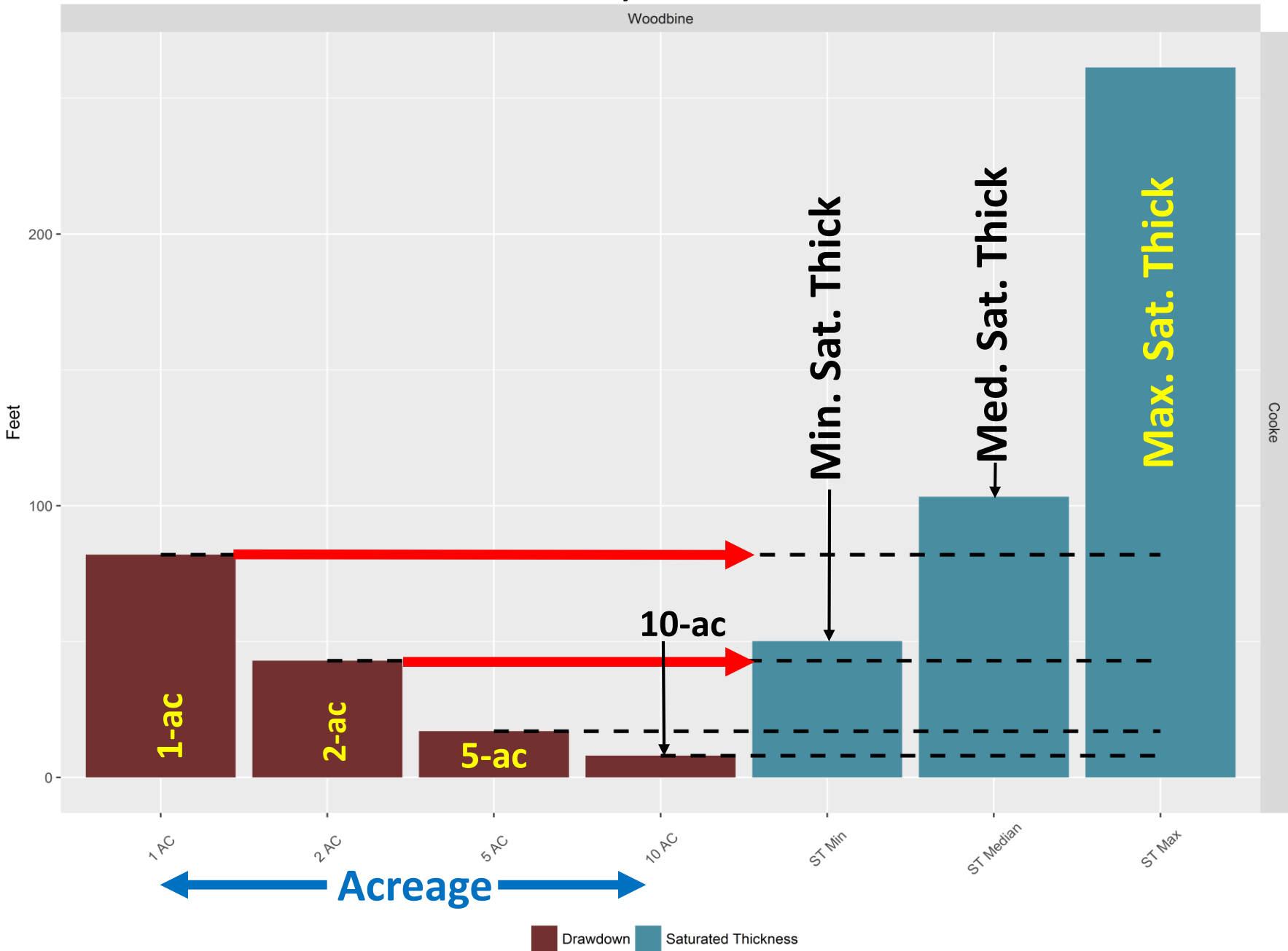
Drawdown Summary

Denton County

Lot Size (Acres)	Max Drawdown in Woodbine after 5 years (feet)	Max Drawdown in Antlers after 5 years (feet)
1	72	26
2	41	19
5	17	12
10	8	8

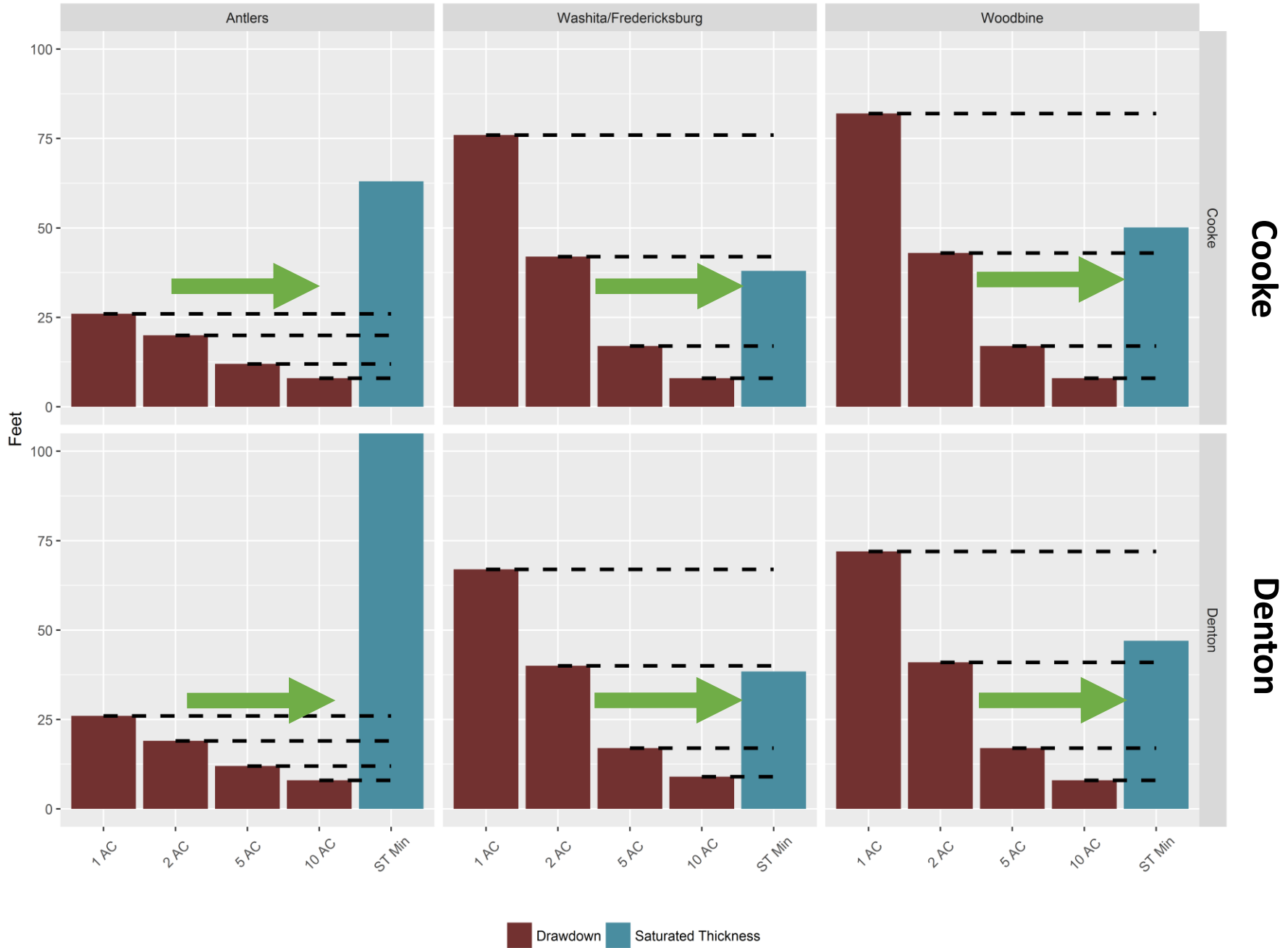
Cooke County - Woodbine

Max Drawdown after 5 years (feet)

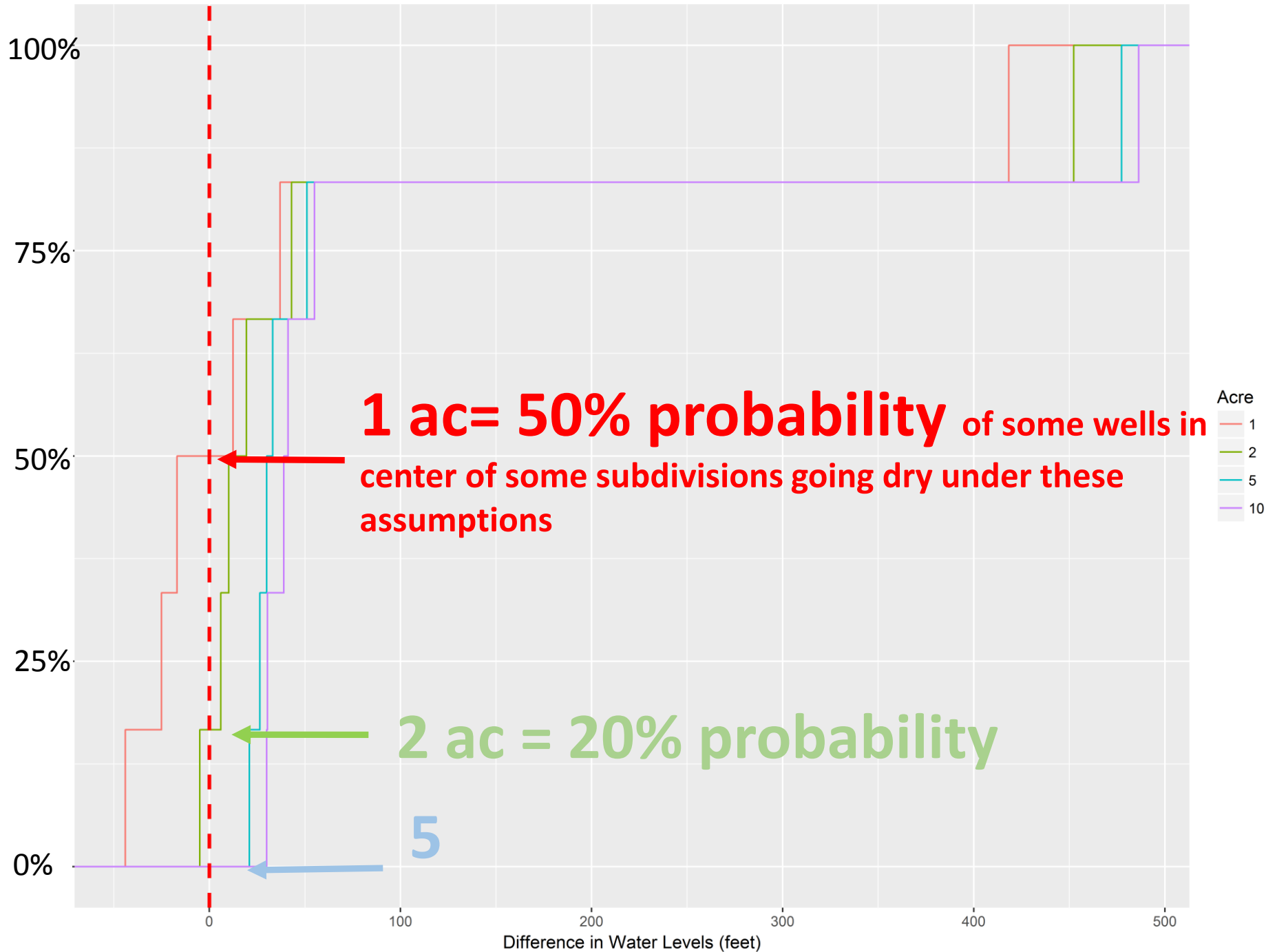


Max Drawdown Compared to Minimum Saturated Thickness

Max. Drawdown after 5 years (feet)



Cumulative Distribution of Difference between Max Drawdown and Minimum Saturated Thickness



Summary of Findings

- Larger lots = less risk of dry wells
- Increased lot size won't solve every potential problem where saturated thickness is very small, but it does decrease risk in general