A 319(h) Nonpoint Source Water Quality Project

# Land Application of Feedyard Manure and Compost

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Texas Cattle Feeders Association
Texas A&M AgriLife Extension
Soil Water TSSWCB

# Acknowledgment

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# Objective

Sustain and support the long-term availability of off-site manure transfers as a manure- and nutrient-management tool for cattle feeders without increasing the risk of nonpoint-source (NPS) water pollution in cattle-feeding-intensive watersheds

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# Audiences

- Third-party contractors
  - Feedyard manure-harvesting personnel
  - Manure haulers/ spreaders
  - Composters
- Farmers
  - Historical manure users
  - Those "on the bubble"
- Agencies
  - USDA-NRCS
  - EPA R6, TSSWCB, TCEQ
  - SWCDs

# CALIBRATING MANURE AND COMPOST SPREADERS

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"What we said" = "What we did"

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# Why Calibrate?

How well does the spreader's output match the whole-field target?

# The Methods

## Whole-field vs. Single-pass

# Whole-Field Calibration

- Really not a "spreader calibration" *per se*
- Stacking 5,000 tons in the corner of a 500-acre pivot
- Target application = 10 tons/acre (as received)
- ***But does the truck put out 10 tons/acre?***

# Single-Pass Calibration

- Helps answer that question
- Helps:
  - Match spreader output to whole-field application target
  - Avoid shorting, overapplication
  - Optimize overlap of adjacent swaths
  - Optimize ground speed or engine RPM

# Calibration Demos


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# Single-Pass Calibration Kit

- Collection tarps
  - 112” x 28” = 1/2,000 acre (centerline)
  - 56” x 56” = 1/2,000 acre (offset)
- Tarp weights
- Weighing tarp
- Fisherman’s scale

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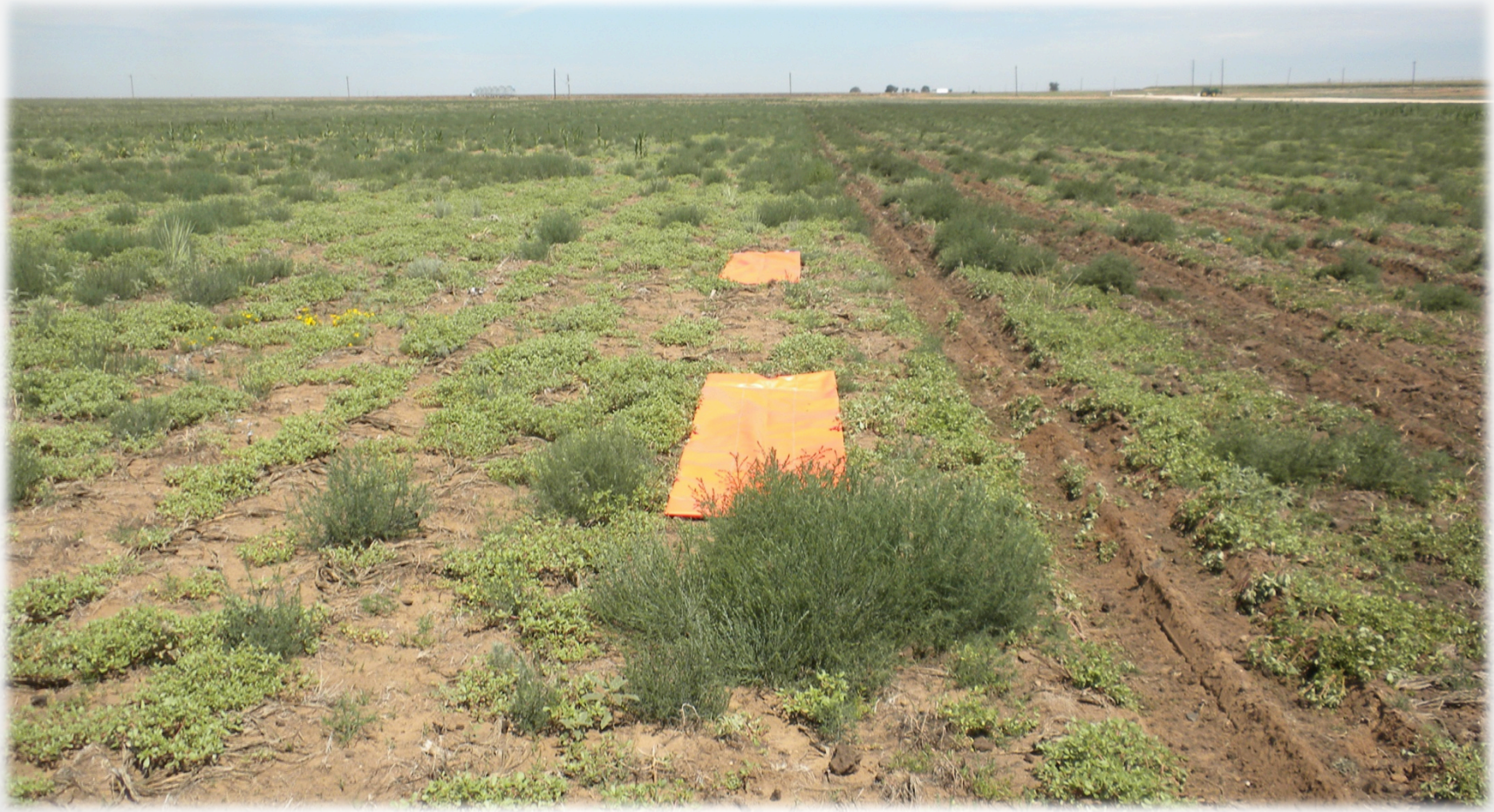
# 1 lb on CL tarp = 1 ton/acre



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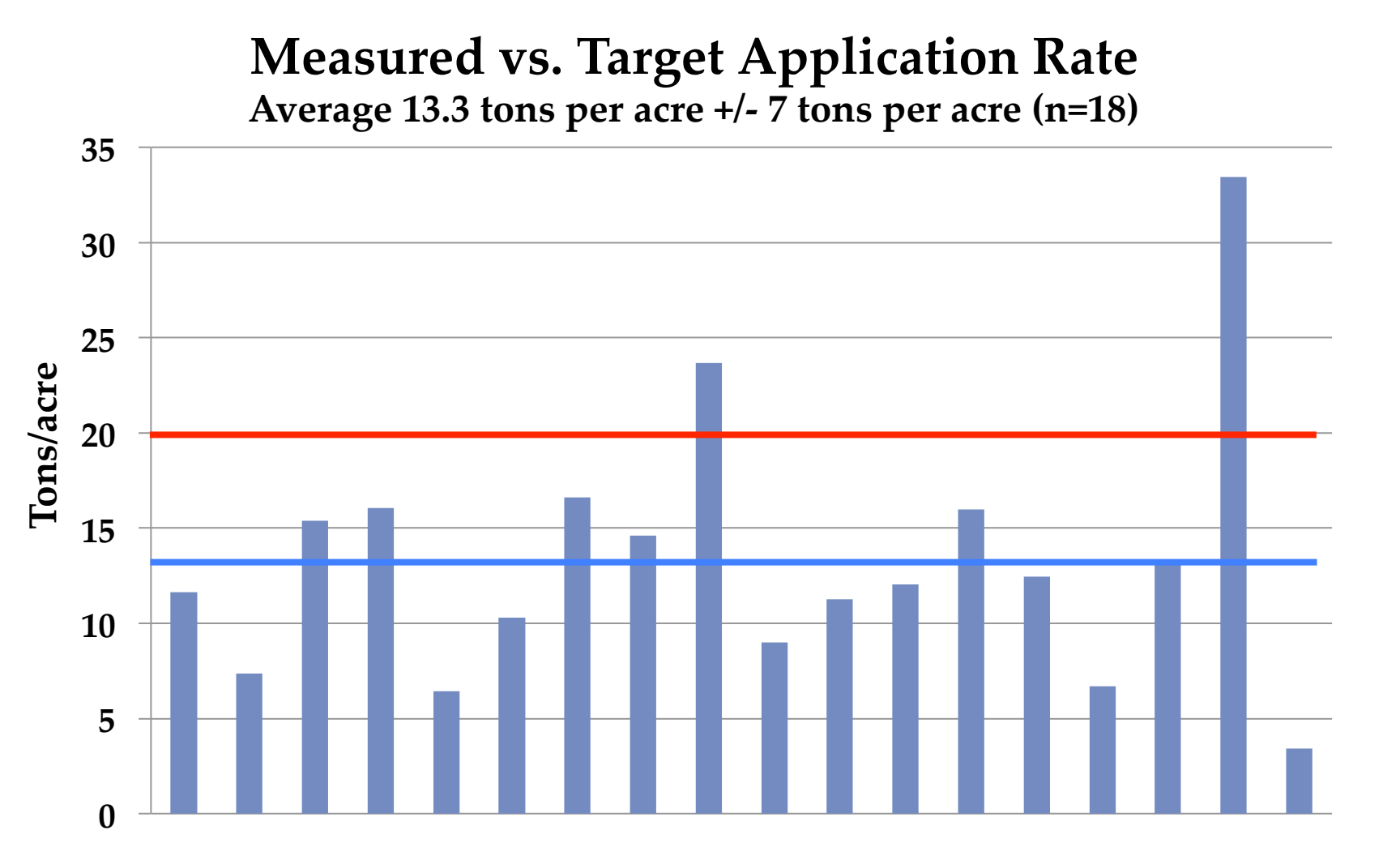
# Consistently Inconsistent

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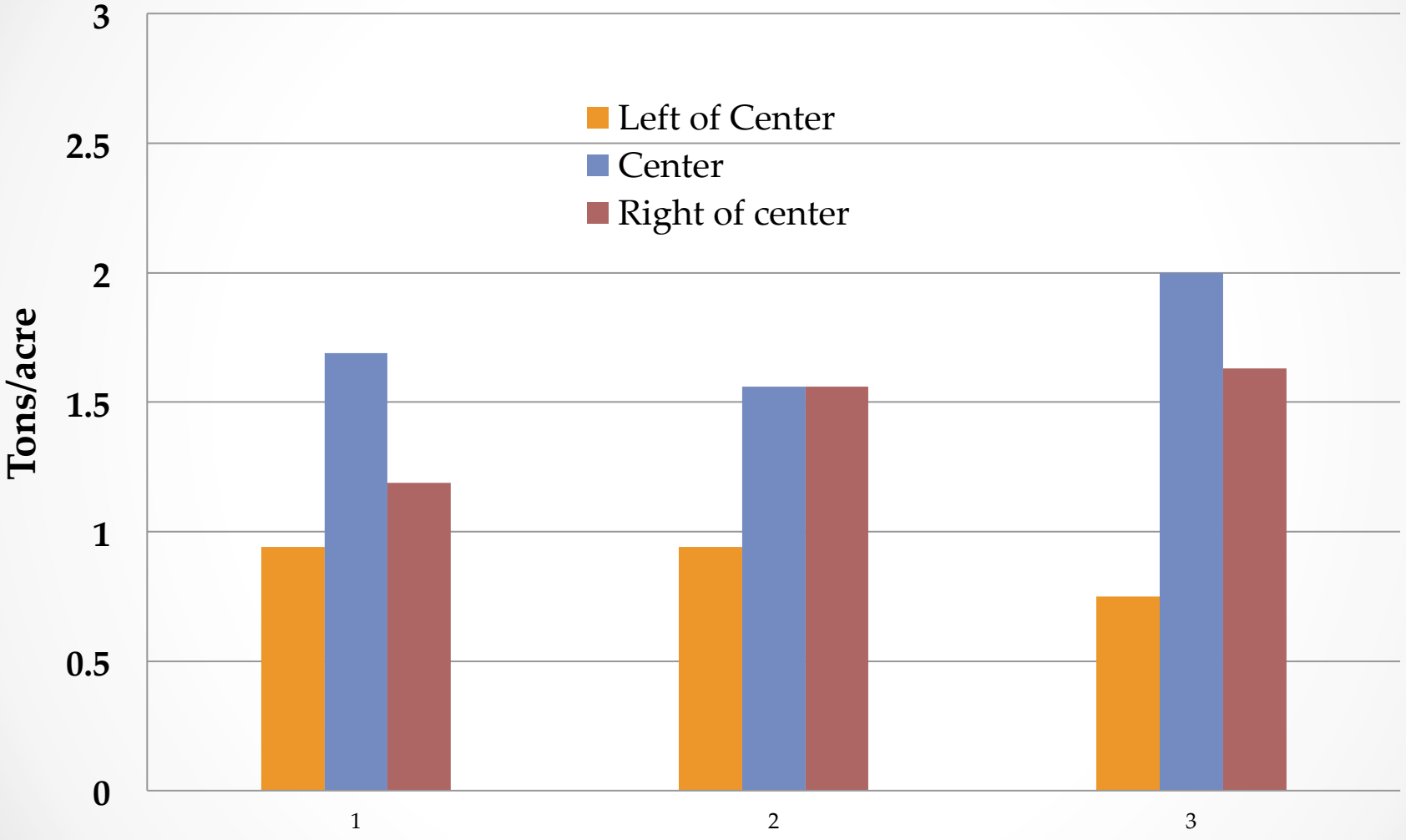
# Compost Application vs Tarp Position
## (Single Pass Method, Application Rate 3 Tons/acre)

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# There's More To It

Accounting for overlap of adjacent passes

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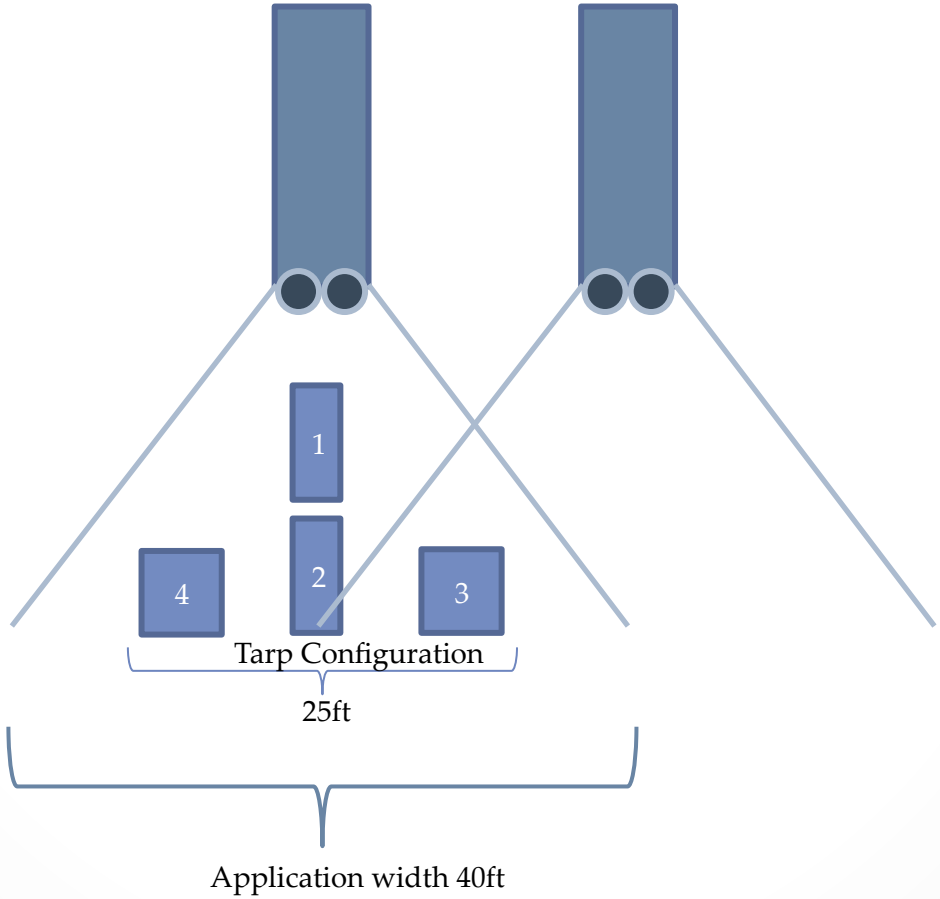
# How do you calculate application rate when there is overlap by the spreader?

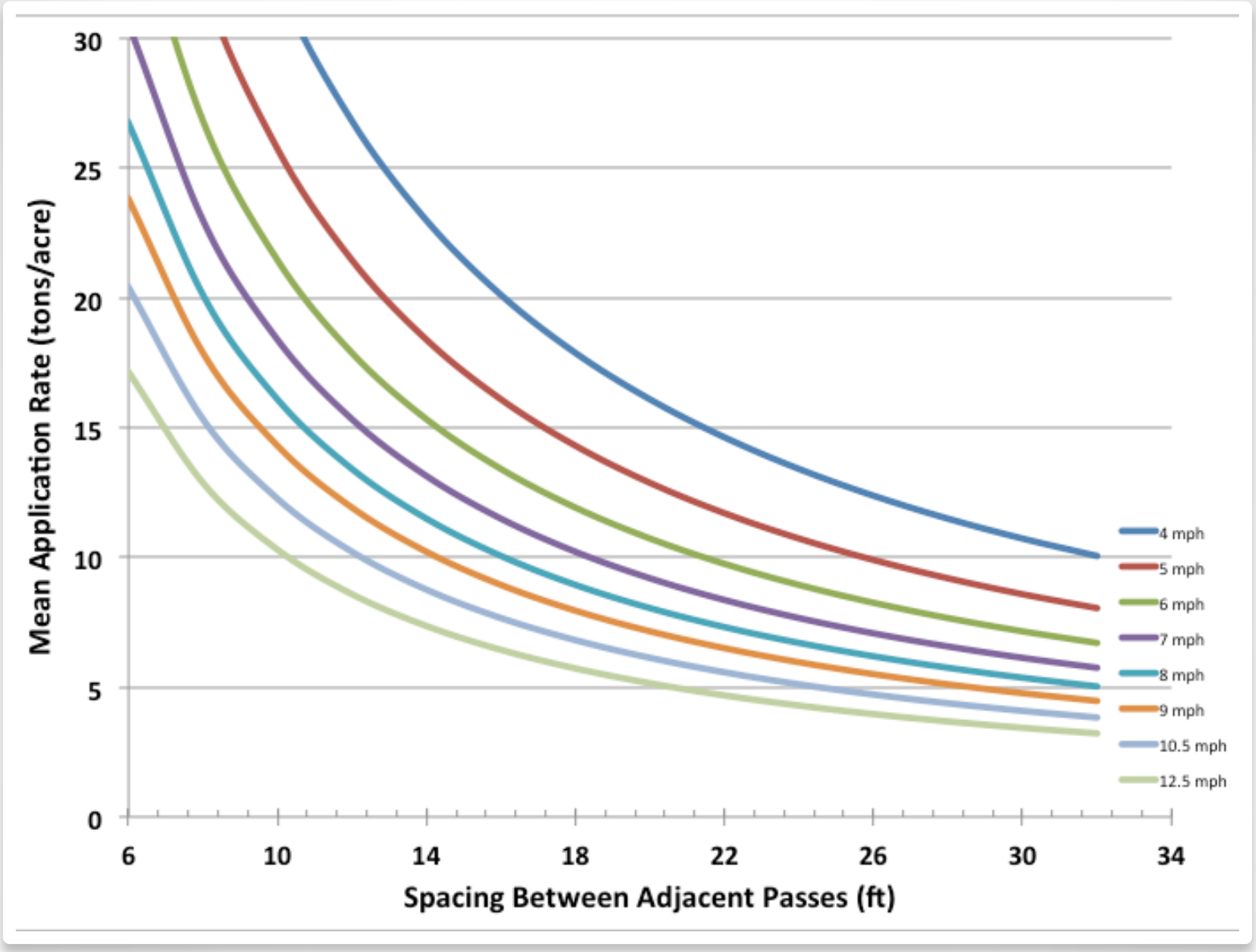


# Mean Application Rate

- Spreader capacity (tons), $C_T$
- Time to empty (minutes), $t_D$
- Ground speed (mph), v
- Distance between adjacent pass centerlines (feet), X

# Mean Application Rate

$$\overline{AR} = \frac{495 \cdot C_T}{X \cdot v \cdot t_D}$$




13 ton spreader capacity; empties in ~5 minutes

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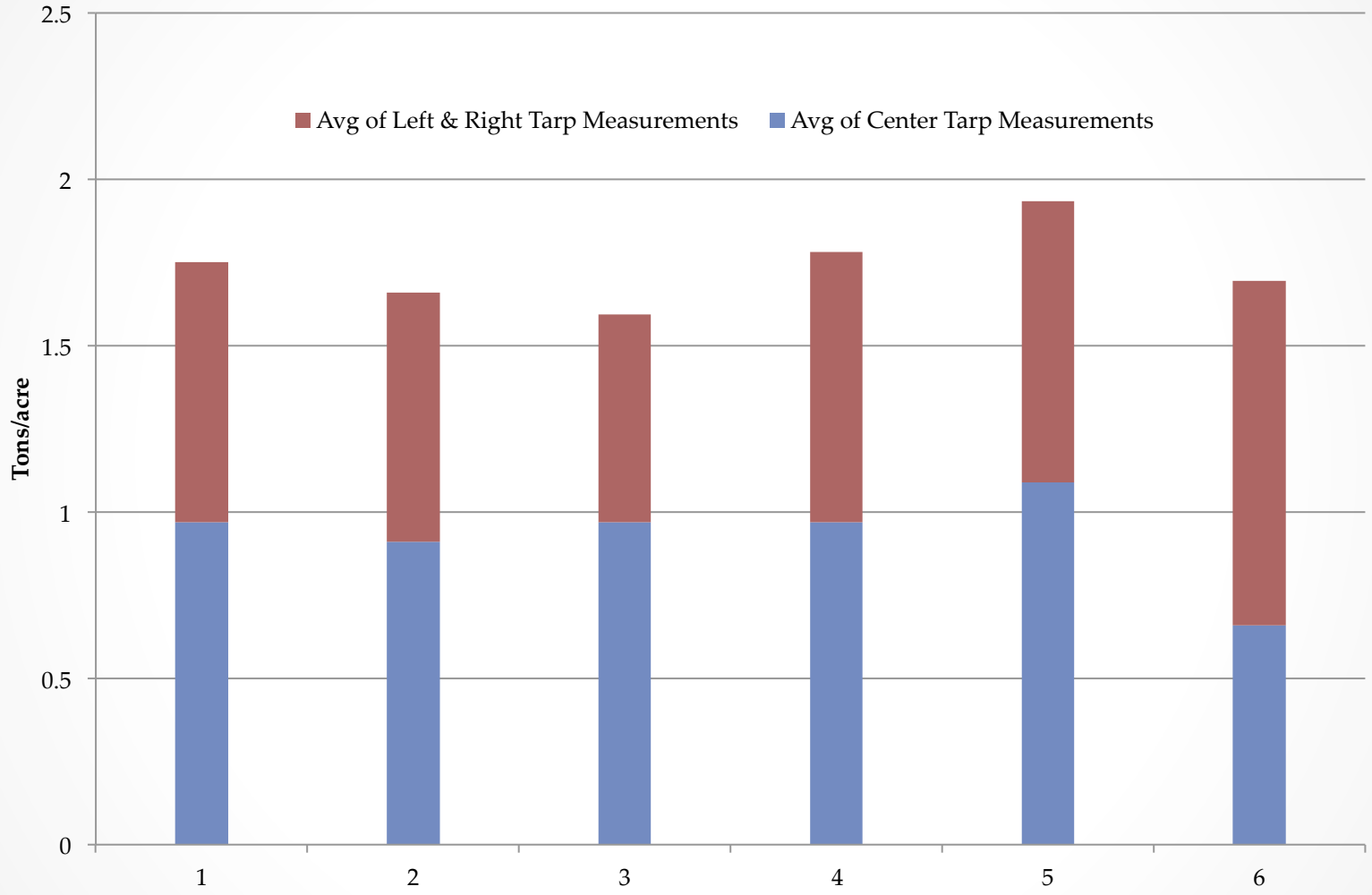
# Rule of Thumb

To optimize uniformity, the spacing between adjacent passes should be about ½ the width of the spreader pattern, if ground speed and discharge speed permit

# Compost Application Measurement With Overlap (Application Rate 2 Tons/Acre)

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