

Economic impacts of climate change to ranching

Challenges Associated with Increased Variability

John Ritten



Key Points

- Rangelands are important
- Cheaper/easier to maintain what we have
- Rangelands are under threat of conversion
- Need to be *proactive* to prevent degradation and/or transition



Climate Variability...

- Destocking/Restocking cycles impact economic viability
 - Biological time lag
 - Impacts of wet vs dry years are not equal
- Impacts of increased variability will be difficult to overcome



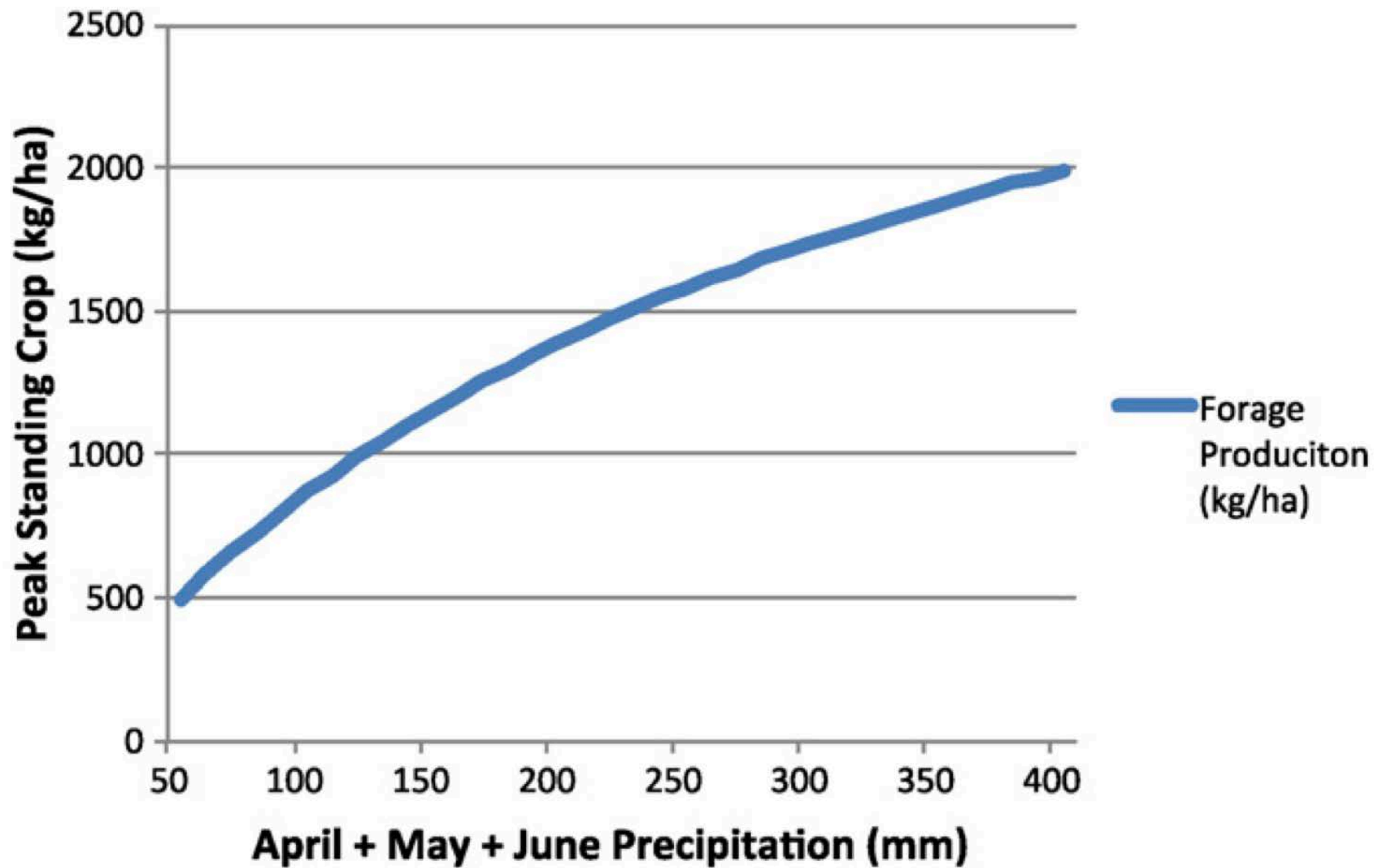
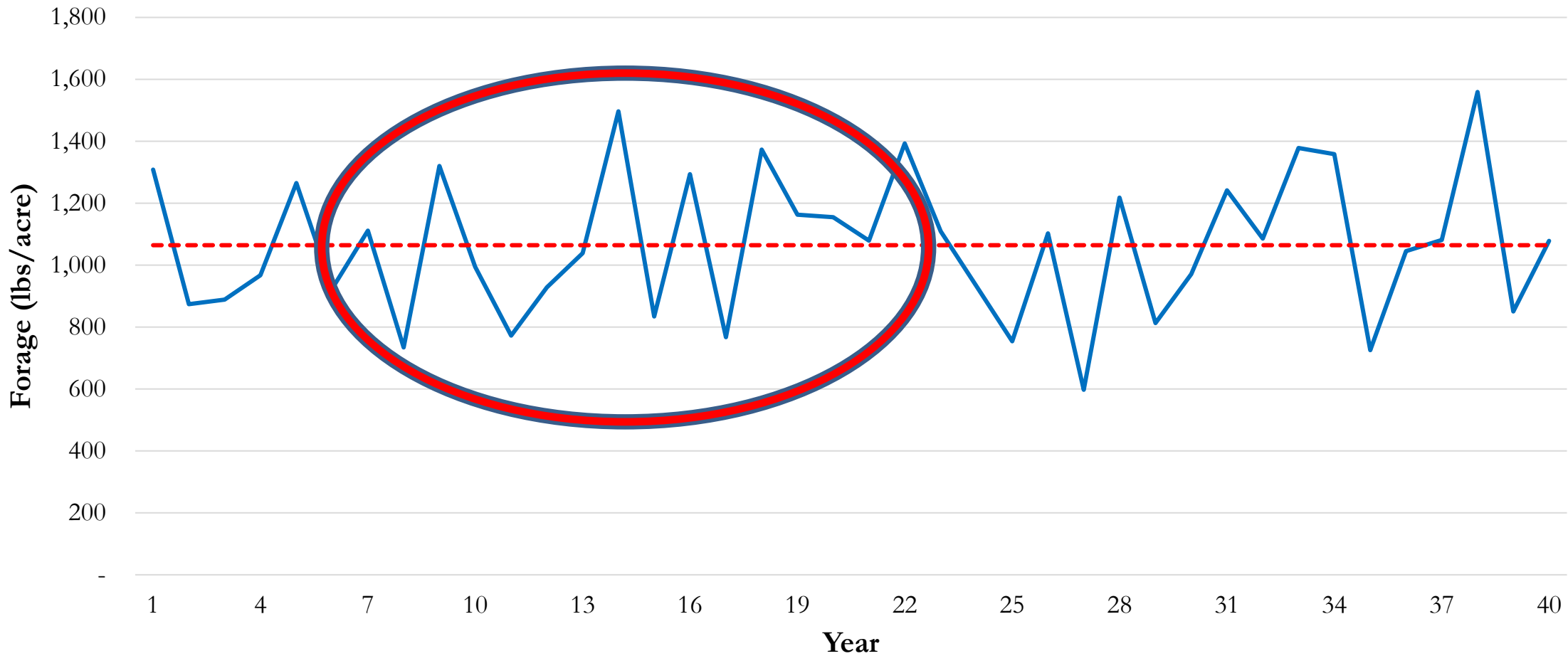


Figure 3. Relationship of spring precipitation and peak standing crop.

Forage Production



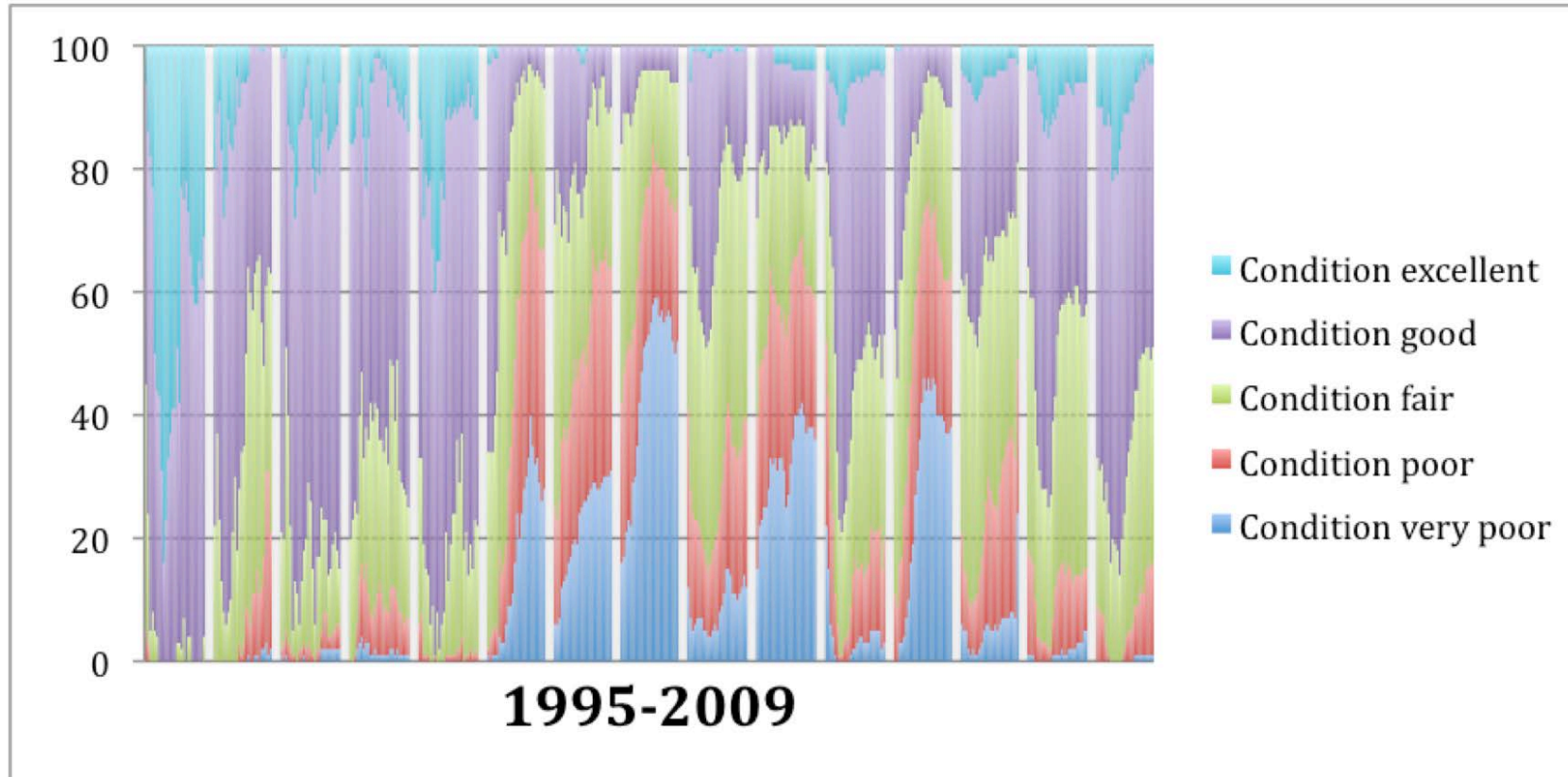
— Total Forage Production (lbs/acre)

- - - Average Forage Production (lbs/acre)

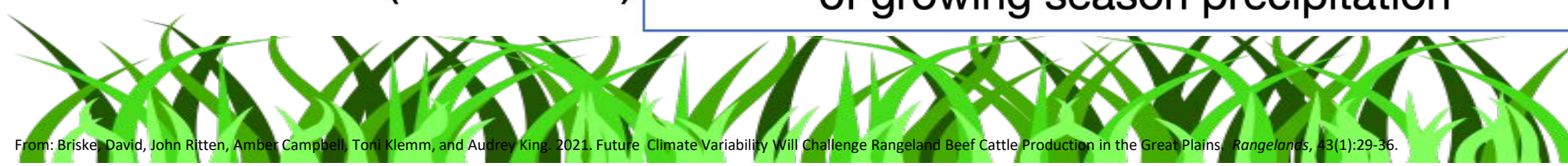
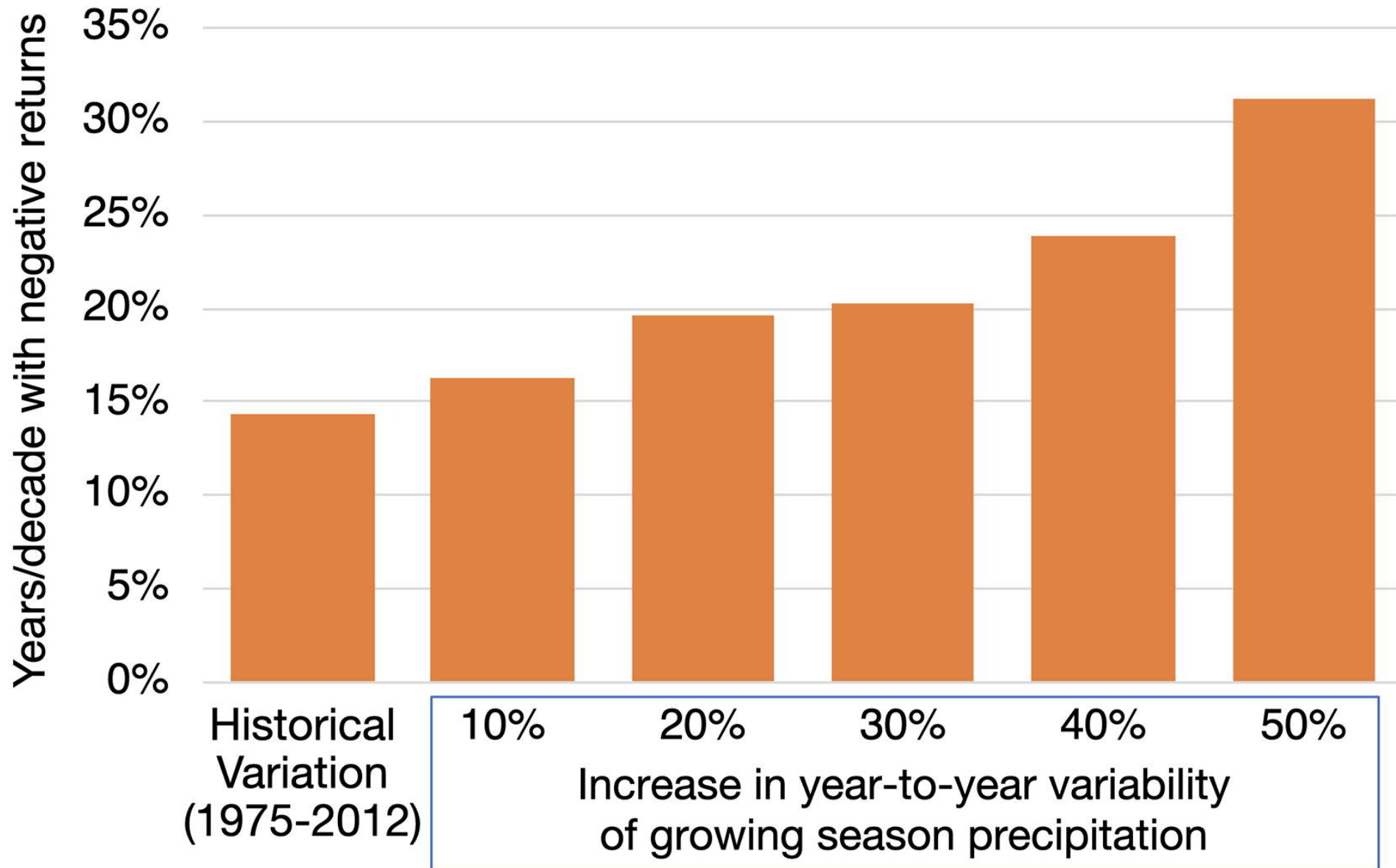


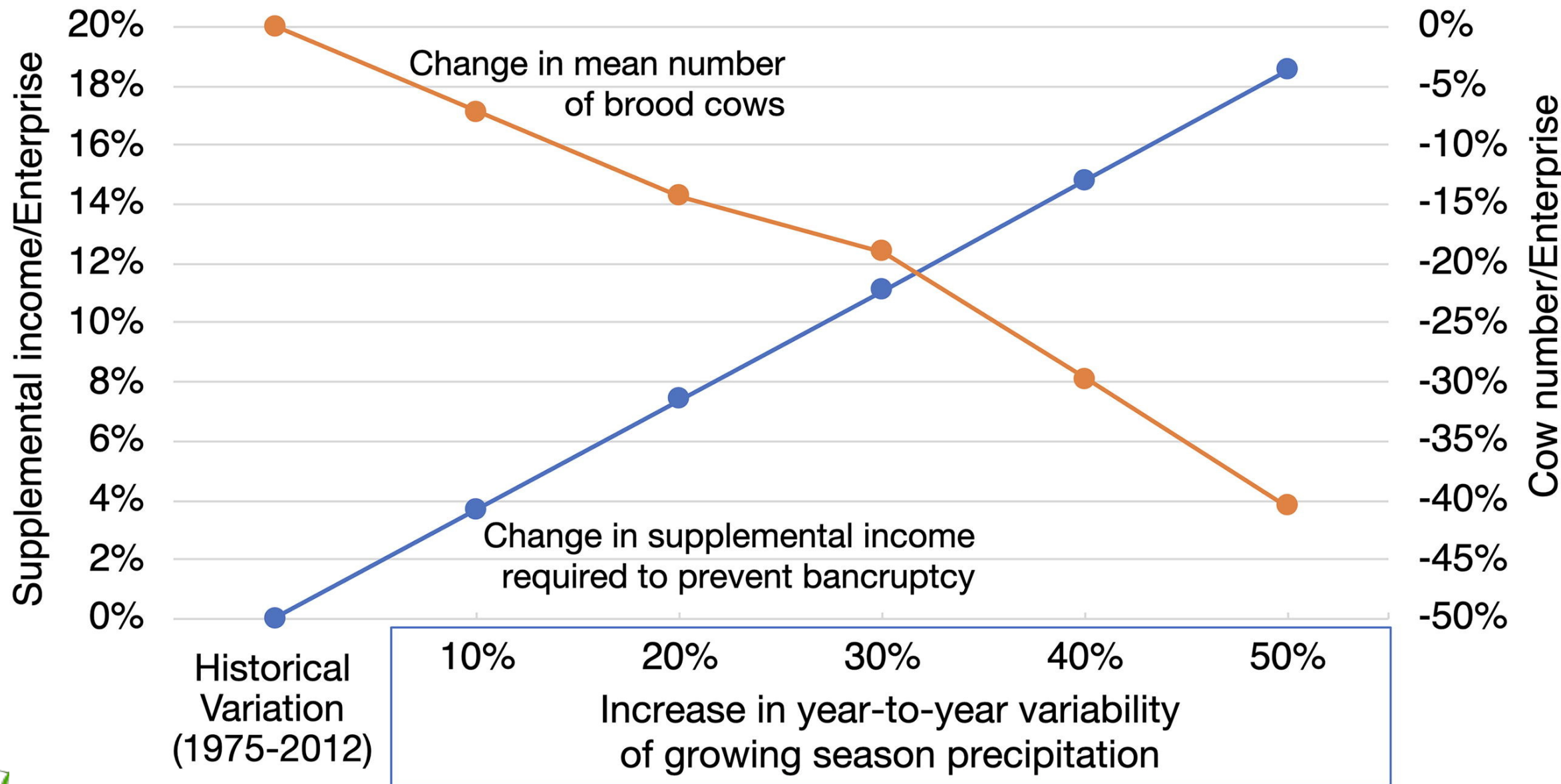
Wyoming Range Condition

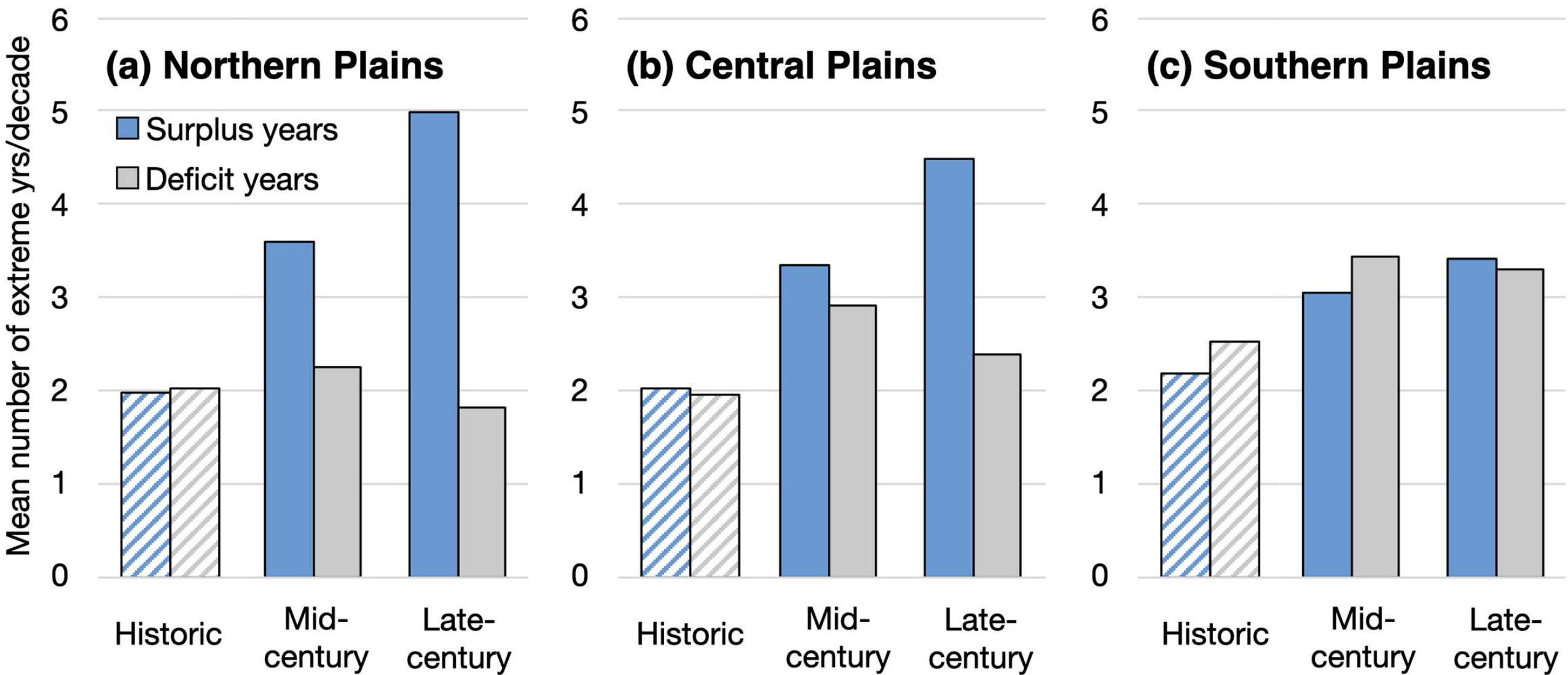
Figure 2. Wyoming Pasture condition 1995-2009, May through November, Weekly Observations



Available at: http://www.nass.usda.gov/Statistics_by_State/Wyoming/index.asp#.html







What about Stockers?

- Added benefit of annual flexibility
- Western WY Model
- Impacts of expected changes to precipitation



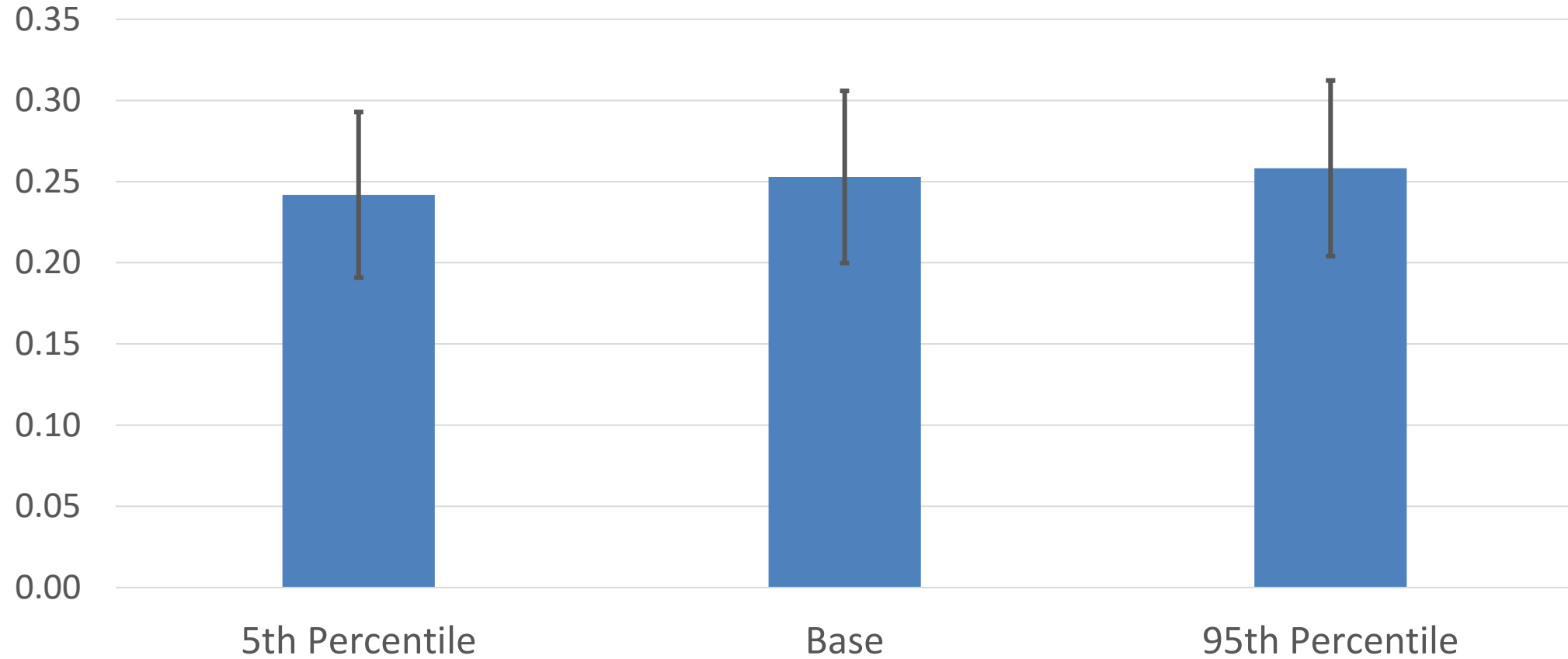
Projected Climate Impacts on Mean Precipitation

Percent Changes in Mean Precipitation over Various Climate Projections

Percentile	5	25	50	75	95
Percent Change in Mean Precipitation	-10.25	-5.5	-2.75	0	5

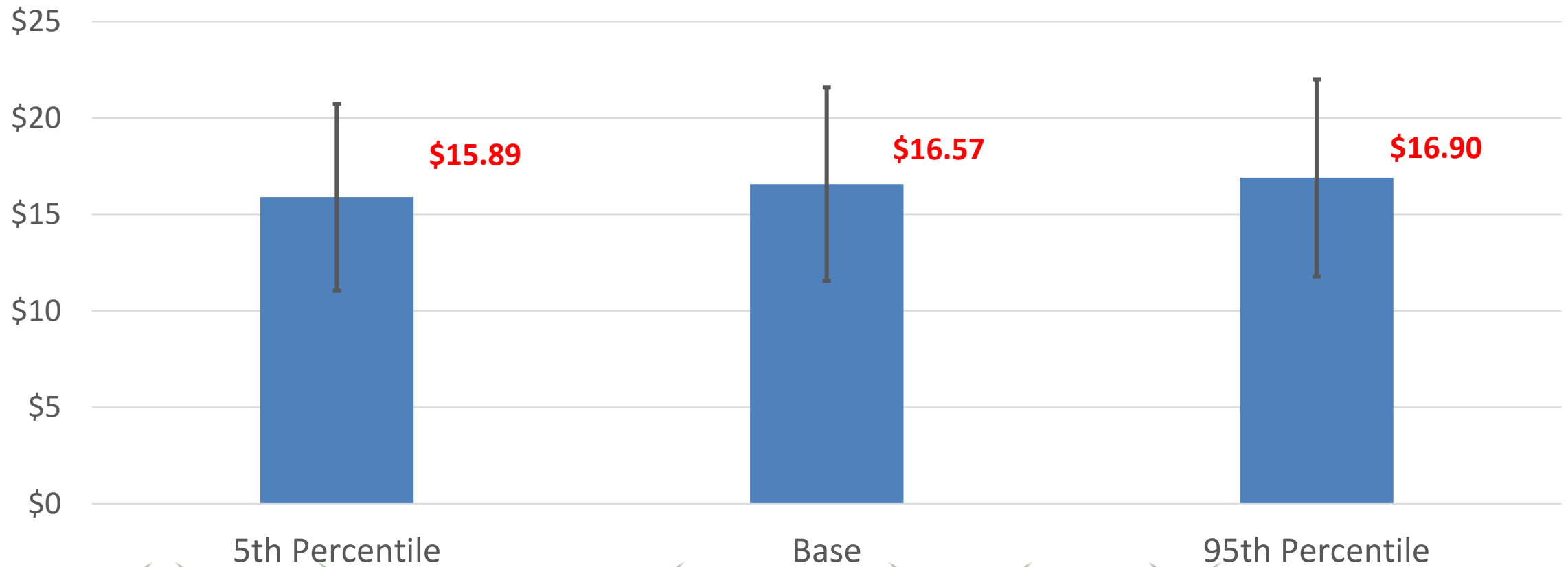
Stocking Rate Impacts, Just Shifting Mean

Average Stocking Rate (head/acre)



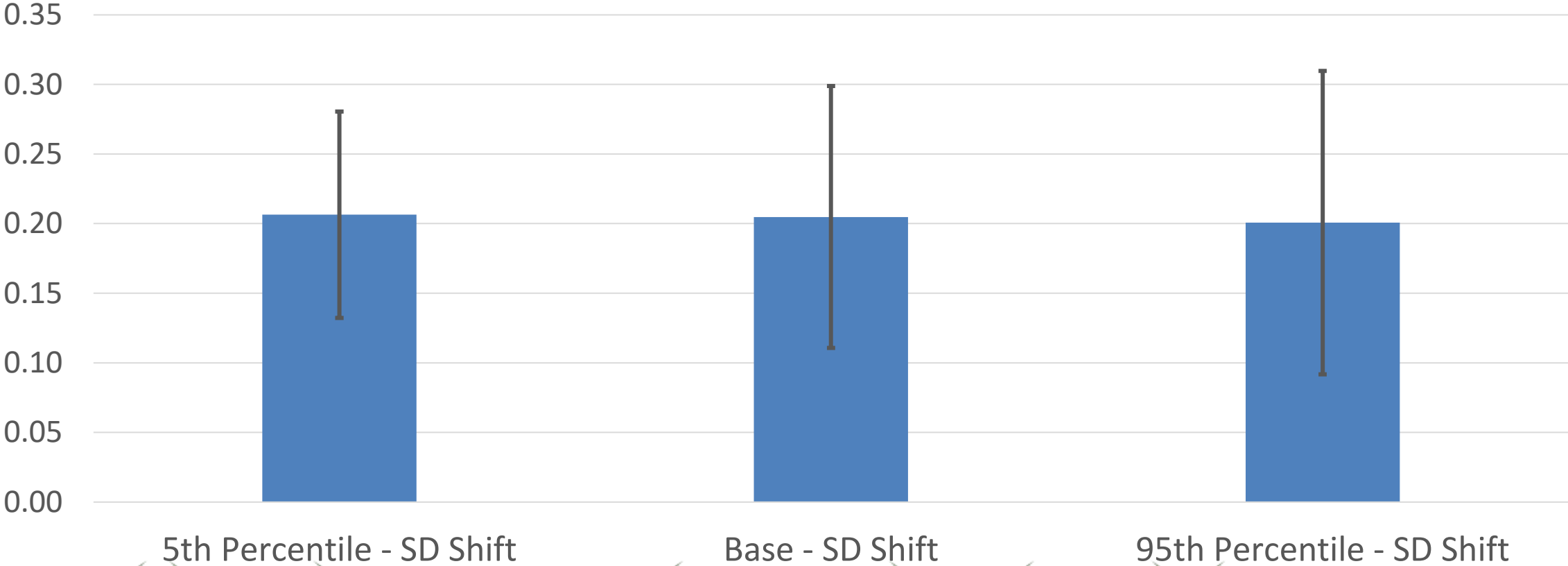
Returns per Acre, Just Shifting Mean

Average Returns (\$/acre)



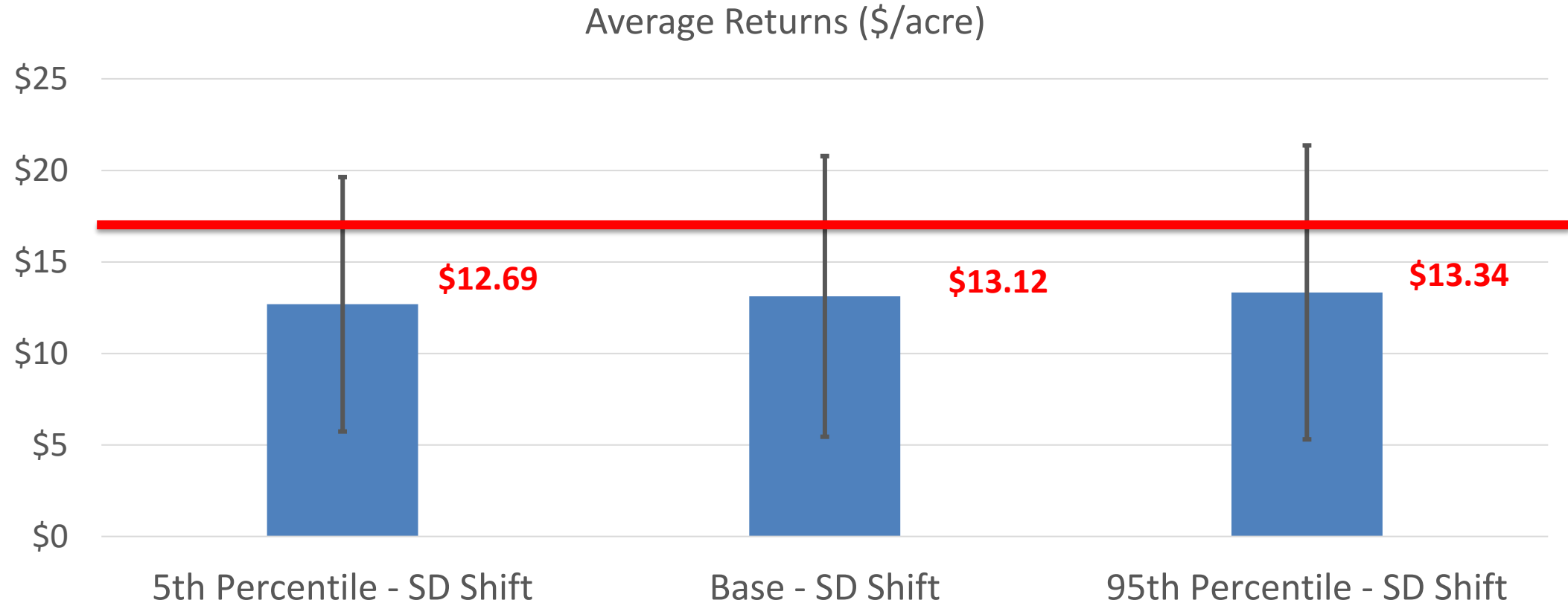
Stocking Rate, with Increased Variability

Average Stocking Rate (head/acre)



From: Ritten, John P., W. Marshall Frasier, Chris T. Bastian, Steven T. Gray. 2010. "Optimal Rangeland Stocking Decisions Under Stochastic and Climate-Impacted Weather." *American Journal of Agricultural Economics*, 92(4): 1242-1255.

Returns, with Increased Variability



What can we do?

- Flexibility
- Diversify
 - Livestock (stockers, multispecies)
 - Land/geography
 - Income sources
- Time, scale, and framing issues
 - Animal production/loan payments vs soil erosion/plant community
 - Local solutions to regional/national issues
 - “Climate preparedness” as opposed to “Climate disaster response”

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Thank you!

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