



# Cow-Calf Herd Size:

## How Has the Industry Responded to Elevated Uncertainty?

Amber Oerly, Risk & Profit 2022

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### Overview



- U.S. beef cow herd declining since 2020
- Cow-calf producers' herd decisions impact total beef supplies
- Costs, structure, technology, demographics, climate, and barriers to entry/asset fixity impact herd expansion/contraction decisions
- Unexpected events disrupted supply chains and created economic, environmental, and social uncertainty in beef industry
- Future cattle inventory is dependent on drought conditions

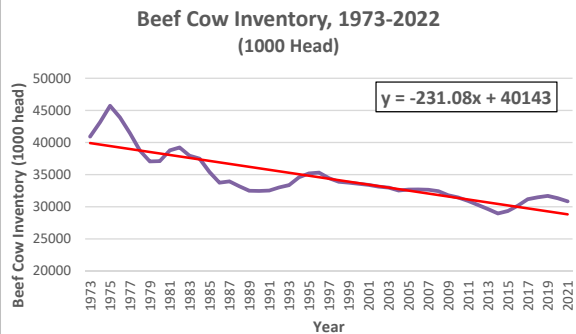
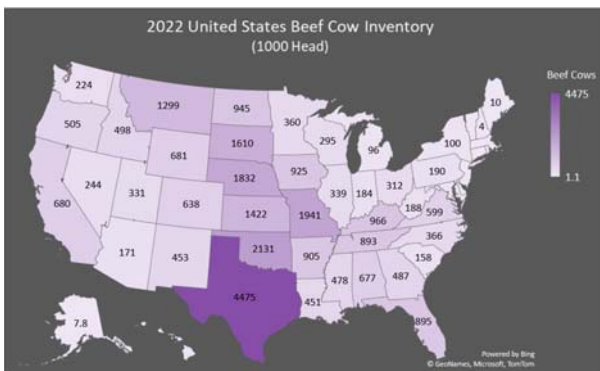


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# Expansion/Contraction Factors

Expansion	Contraction
<ul style="list-style-type: none"> <li>• High cow-calf returns</li> <li>• Global beef demand growth</li> <li>• Timing in current cattle cycle</li> </ul>	<ul style="list-style-type: none"> <li>• Land availability and drought conditions</li> <li>• Increasing production efficiency</li> <li>• Producer demographics</li> <li>• Capital requirements</li> <li>• Commodity price volatility</li> </ul>

# U.S. Beef Cow Herd



## Questions

- Has the relationship between feeder cattle price and cow-calf herd size changed over time?
  - Has increased uncertainty in the beef industry impacted how cow-calf producers respond to price changes when making herd expansion/contraction decisions?
- **Hypothesis:** Cow-calf producer sensitivity to changes in feeder cattle price has decreased overtime
  - Reducing the impact of a given % feeder cattle price change has on decisions to expand/contract herd



## Objective

- Estimate the current relationship between feeder cattle prices and cow-calf herd size
  - Quantify the effect of changes in feeder cattle price has on herd size
- **GOAL:** Provide a better understanding of future cow herd expansion/contraction and update knowledge on cow-calf herd price sensitivity

# Data

Variable	Description
$Q_{BC}$	Beef Cows (1000 Head)
$P_{FS}$	Feeder Steer Price (\$/cwt)
Drought	PDSI Drought Index (-4.0 = extreme drought, +4.0 = extreme moisture)
$P_H$	Hay Price (\$/ton)
$P_{PR}$	Pasture Rental Rate (\$/acre)
Slt	Steer Slaughter Weight (Pounds)

+

+

-

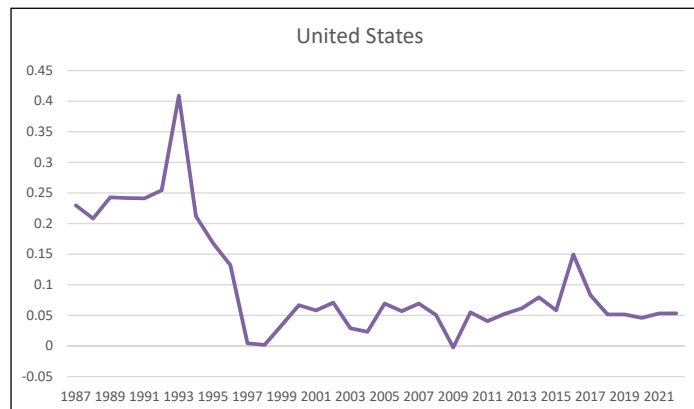
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+ / - = Expected effect on inventory

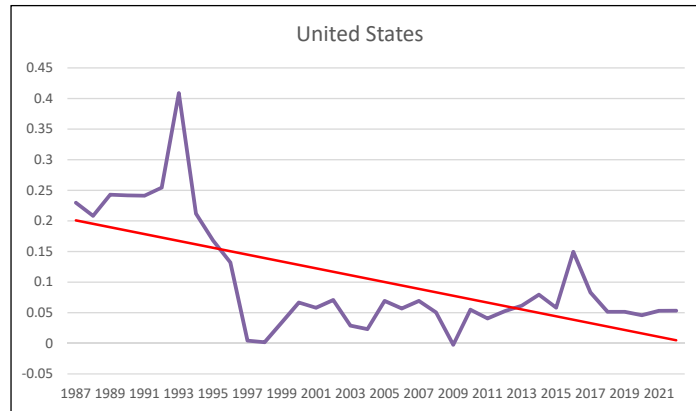
# National Results

## Cow-Calf Price Sensitivity Overtime



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## Cow-Calf Price Sensitivity Overtime



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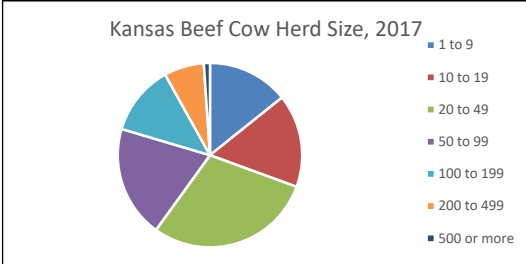
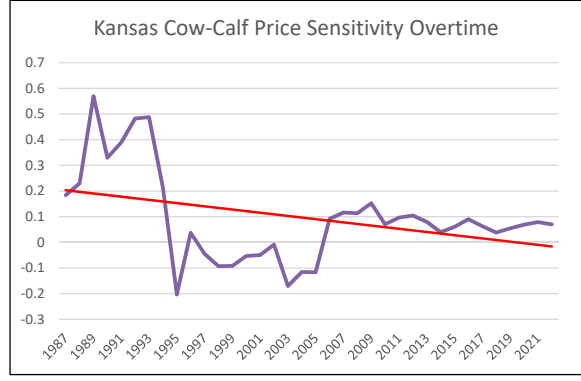
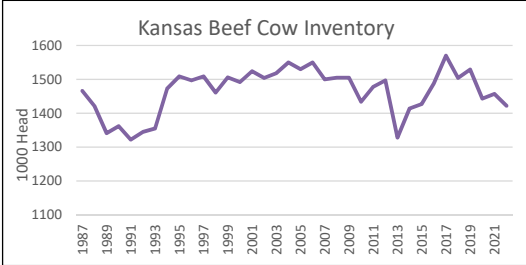
## Regional Results

NOAA Climate Regions  
– PDSI Drought Index

U.S. Climate Regions

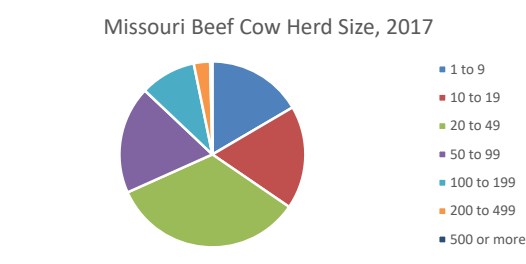
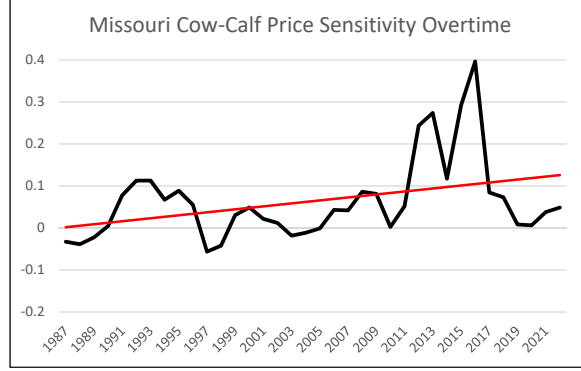
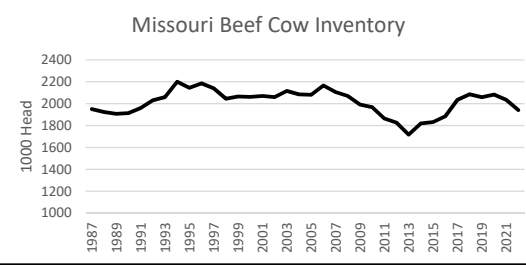


# Kansas



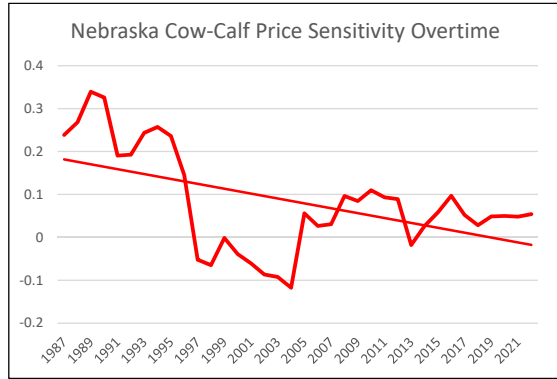
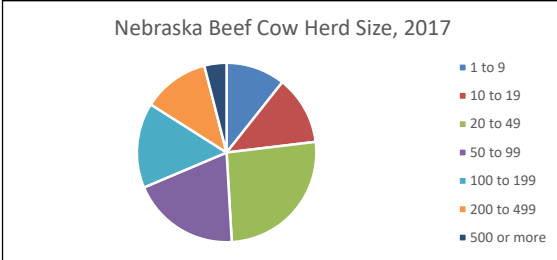
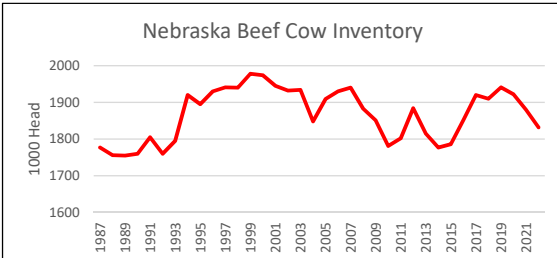
- Ranks 6<sup>th</sup> in Beef Cow Inventory
- Ranks 3<sup>rd</sup> in All Cattle and Calves

# Missouri



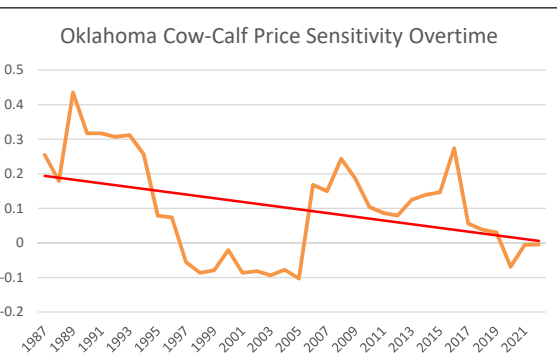
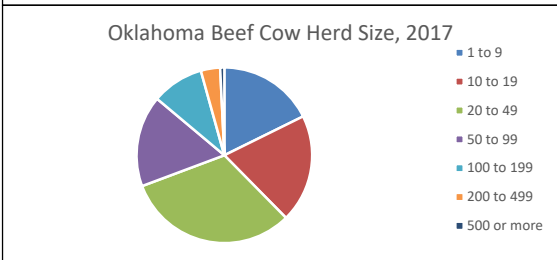
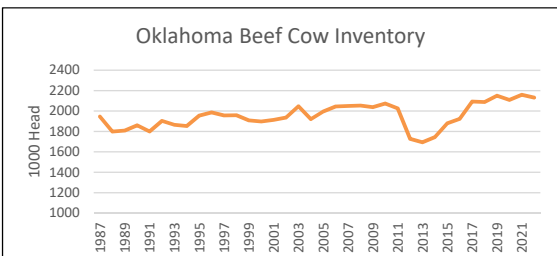
- Ranks 3<sup>rd</sup> in Beef Cow Inventory
- Ranks 6<sup>th</sup> in All Cattle and Calves

# Nebraska



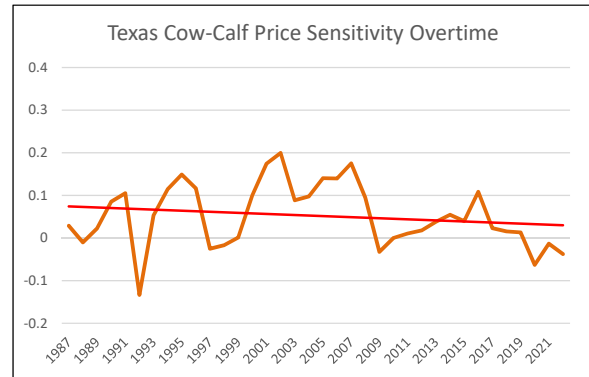
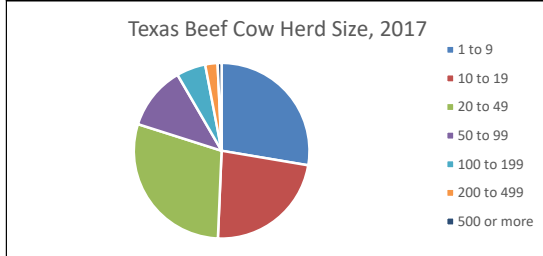
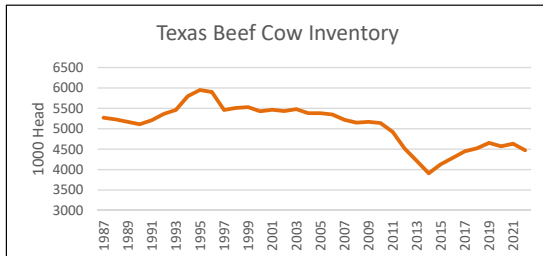
- Ranks 4<sup>th</sup> in Beef Cow Inventory
- Ranks 2<sup>nd</sup> in All Cattle and Calves

# Oklahoma



- Ranks 2<sup>nd</sup> in Beef Cow Inventory
- Ranks 5<sup>th</sup> in All Cattle and Calves

# Texas



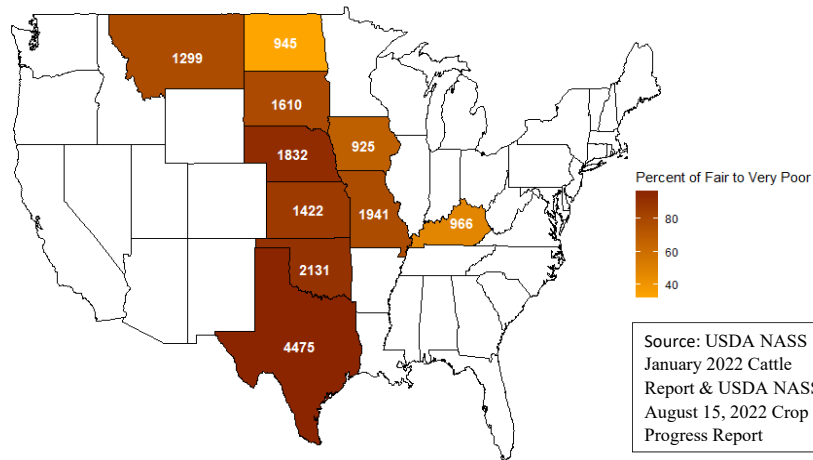
- Ranks 1<sup>st</sup> in Beef Cow Inventory
- Ranks 1<sup>st</sup> in All Cattle and Calves





## Drought Conditions

### Beef Cow Inventory compared to Pasture and Range Conditions



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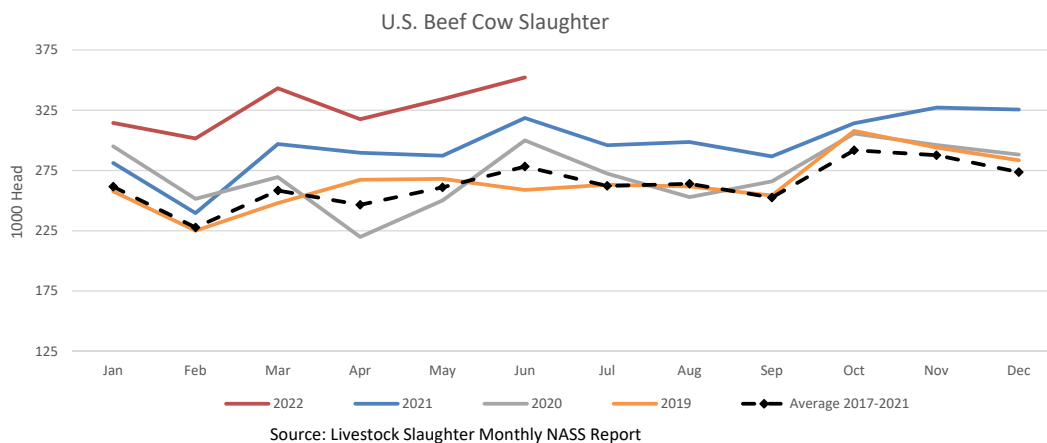
## Drought Conditions

- Drought can decrease pasture availability
- Drought can increase corn and hay prices
- Leads to herd liquidation in key cow-calf regions



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## U.S. Beef Cow Slaughter



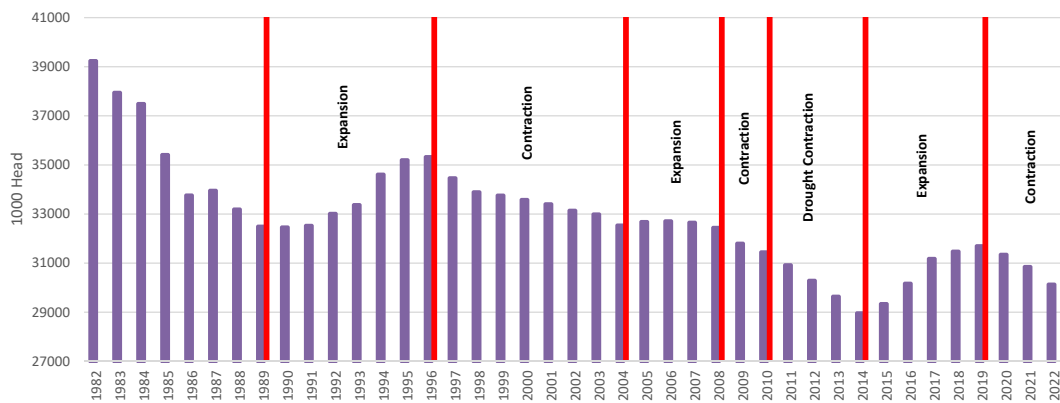
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## U.S. Beef Cow Slaughter

- Drought increases cow slaughter
  - Increases beef production in short-run
- Heifer slaughter has also increased in 2022
  - Producers are selling heifer they intended to retain
- Impacts calf numbers in future seasons

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## U.S. Beef Cow Inventory



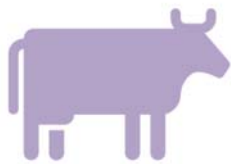
Source: USDA NASS Cattle Report

## U.S. Beef Cow Inventory

- Drought is not sole reason for contraction
  - Position in cattle cycle
  - Elevated costs
- Cattle cycles are the expansion/contraction of the cow herd overtime
  - Market signals and biological nature

## Conclusions

- Cow-calf producer sensitivity to changes in feeder cattle price has decreased overtime
  - Potentially due production efficiency, changes in costs, structure, technology, demographics, climate, and barriers to entry/asset fixity impact, and uncertainty
- Regionally differences impact price sensitivity and cattle inventories
- Drought conditions make future inventories uncertain



## Questions?

Thank You!

## References

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