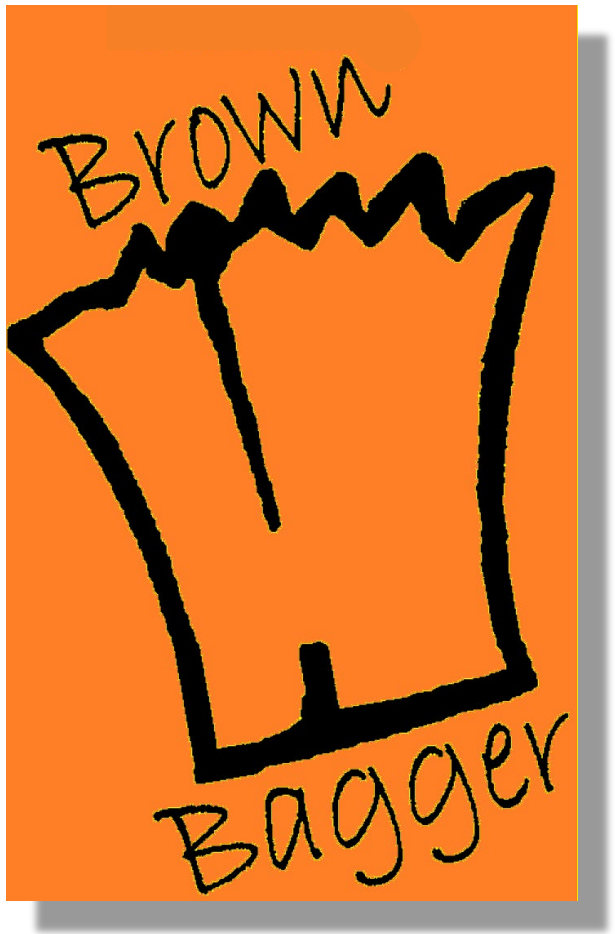
Welcome to Session 2



2024 Future-proofing Beef Selection Decisions

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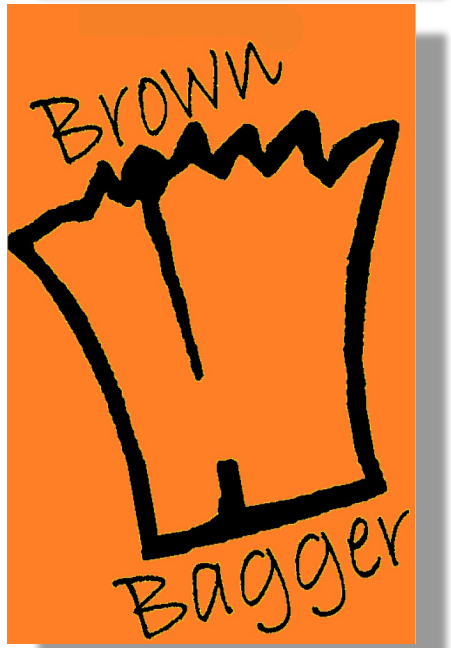

Session 2-Part 1
Strategic Selection Decision Making

Effects of milk and mature size on feed intake and cow cost

Dr. David Lalman
Oklahoma State University

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Effects of Milk and Mature Size on Feed Intake and Cow Cost

David Lalman, Emma Briggs, Sam Talley, Mariana Garcia, Bailey Tomson

DEPARTMENT OF
ANIMAL AND
FOOD SCIENCE

Example of Energy Partitioning in a Cow

- 1,200 lb beef cow
- 24 lb peak milk yield
- 80 lb calf birth weight

- Energy pools
  - Maintenance
  - Lactation
  - Pregnancy
  - Heat and cold stress

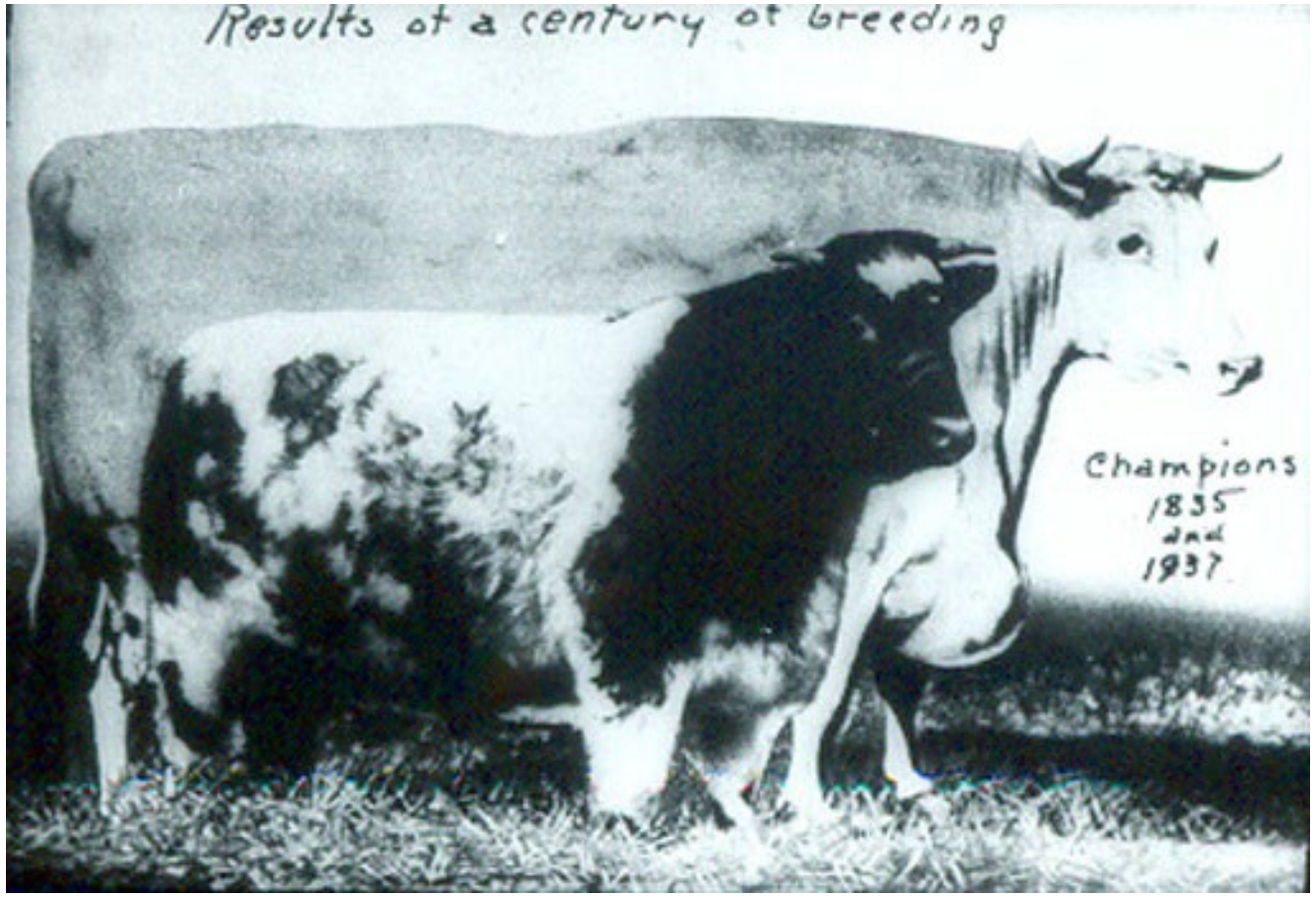
Energy needed to achieve no net loss or gain of energy retained in the tissues of the animal's body (NASEM, 2016).

Energy Partitioning

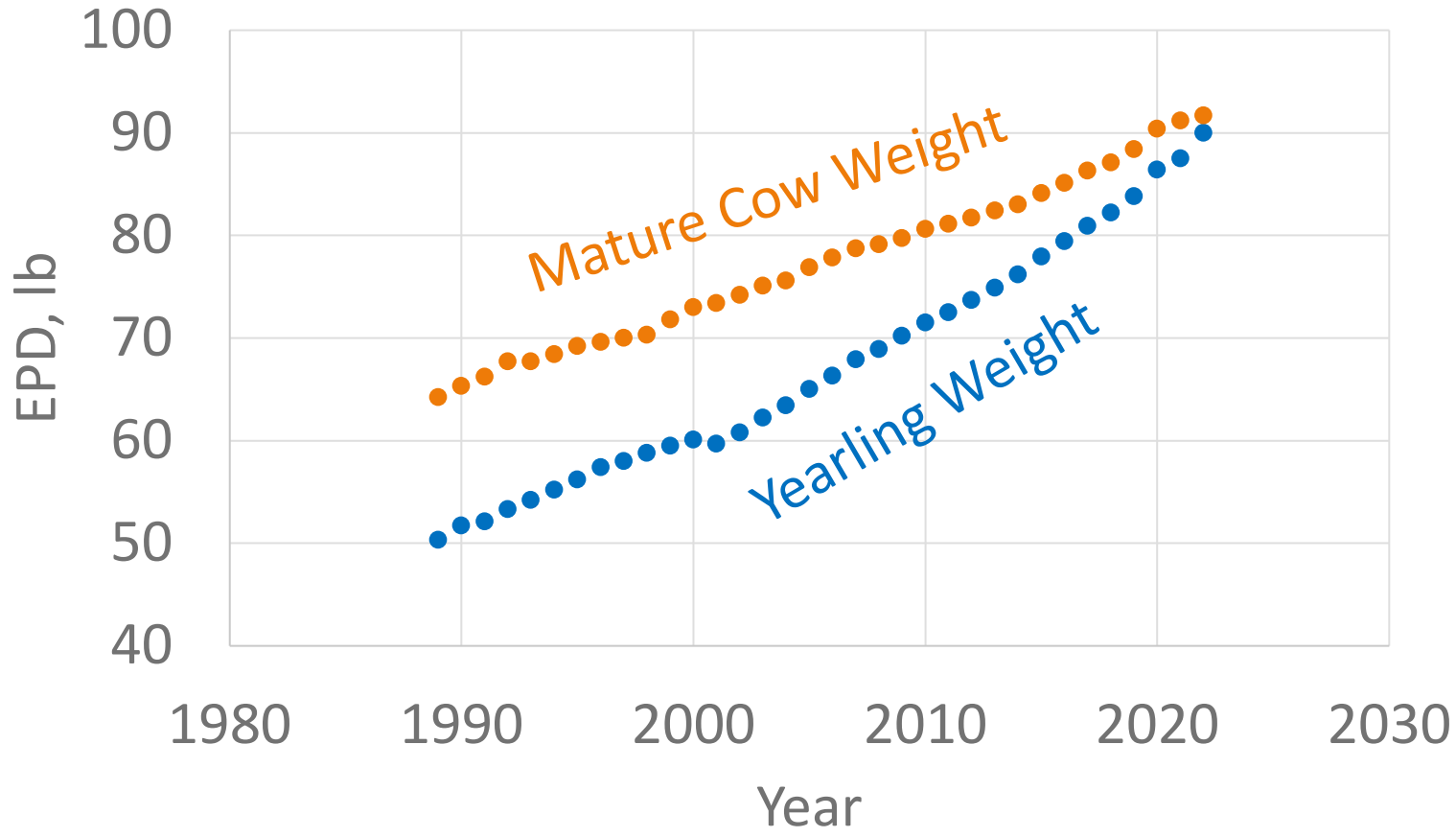
Energy Pool	Mcal NEm/Year	Percent	Grass Hay Required, lbs
Maintenance	3,419	67%	5,795
Lactation	1,194	23%	2,023
Pregnancy	354	7%	600
Heat and cold stress	150	3%	254
Total	5,117		8,672

Cow Weight Considerations

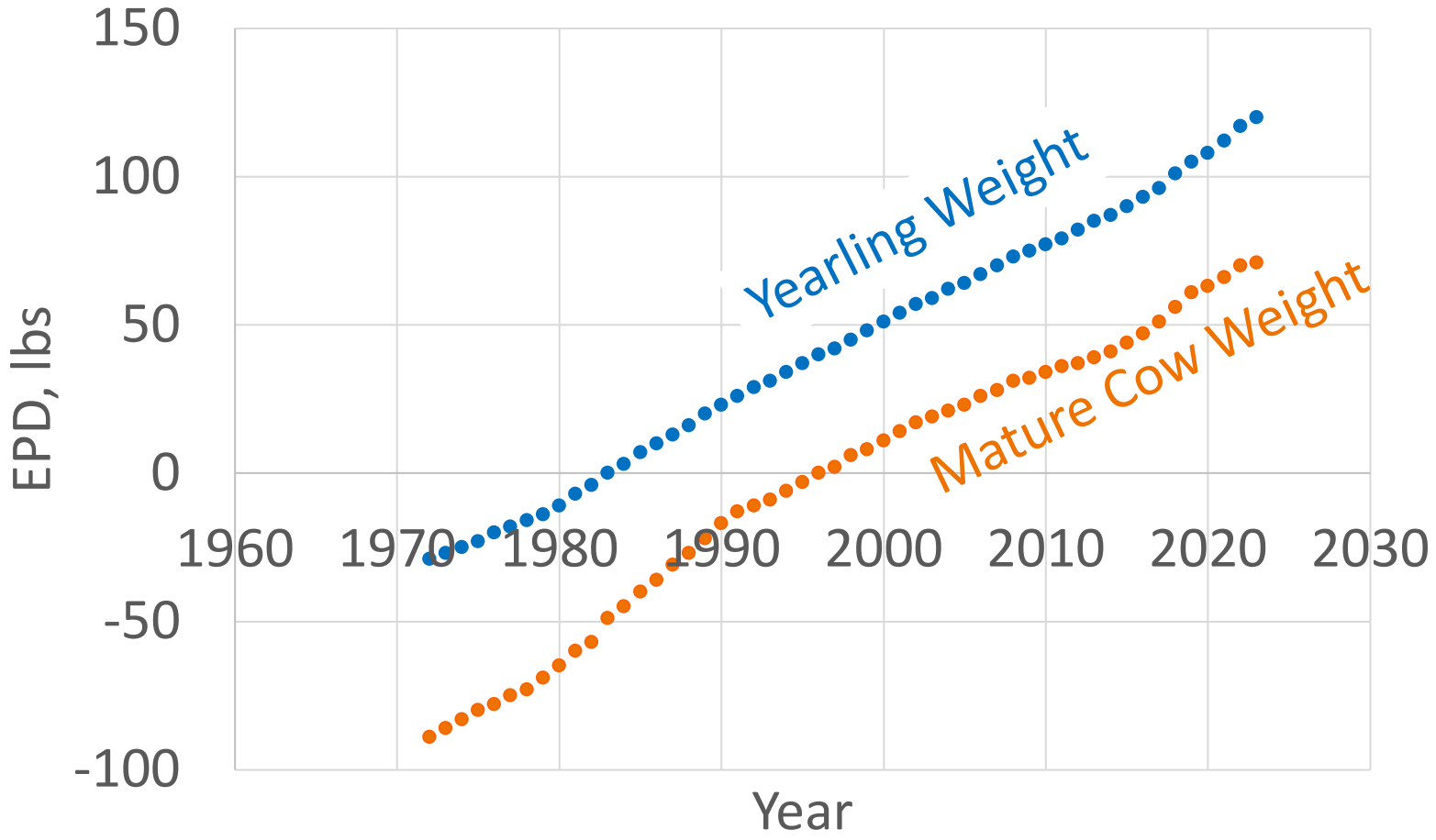
- A proxy for feed intake
- Cull cow market value
- Weaning weight
- Post-weaning growth
- Carcass weight



Genetic Trend
Weight: Hereford



Genetic Trend
Weight: Angus



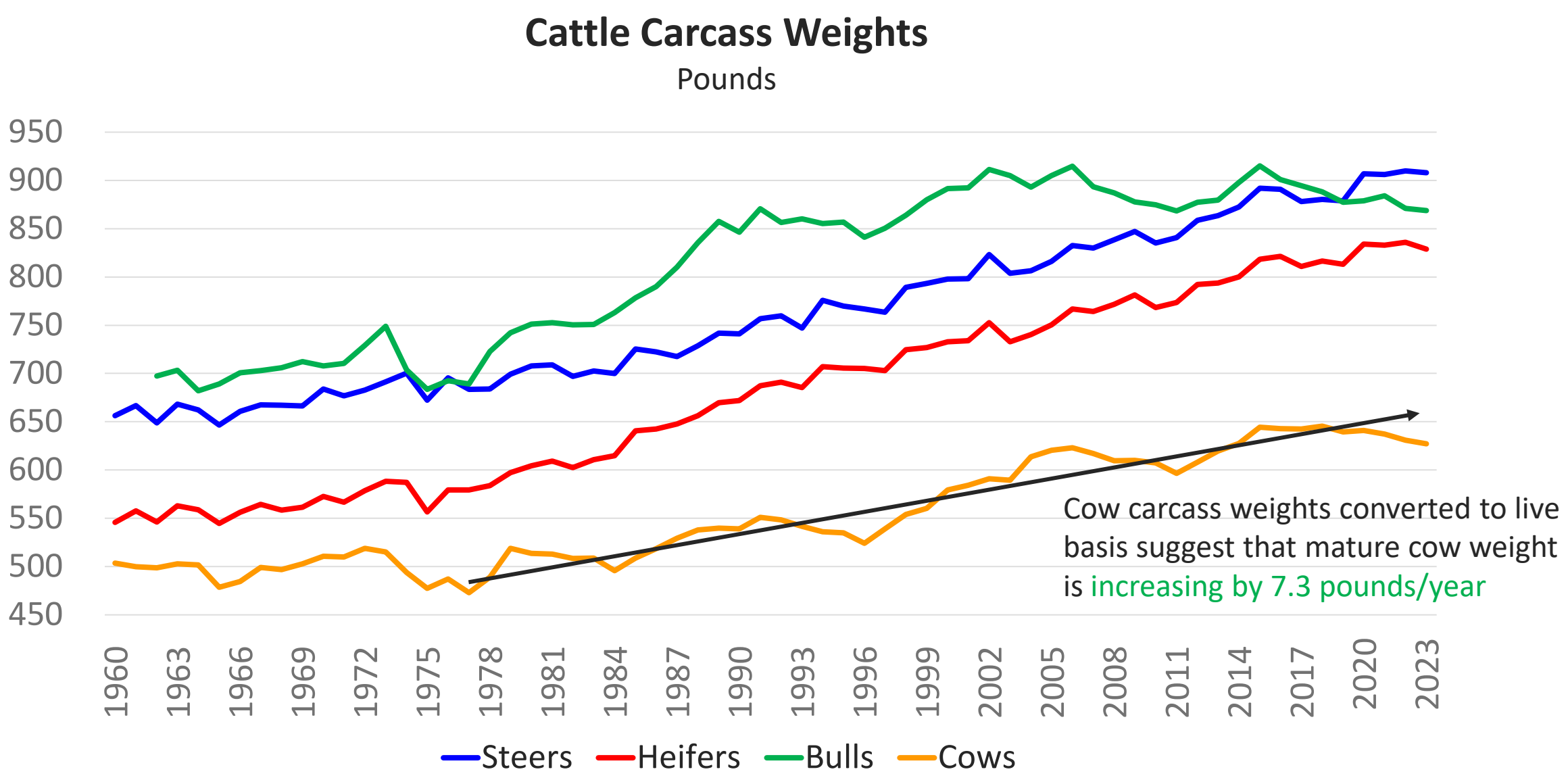
Genetic Correlations

Angus

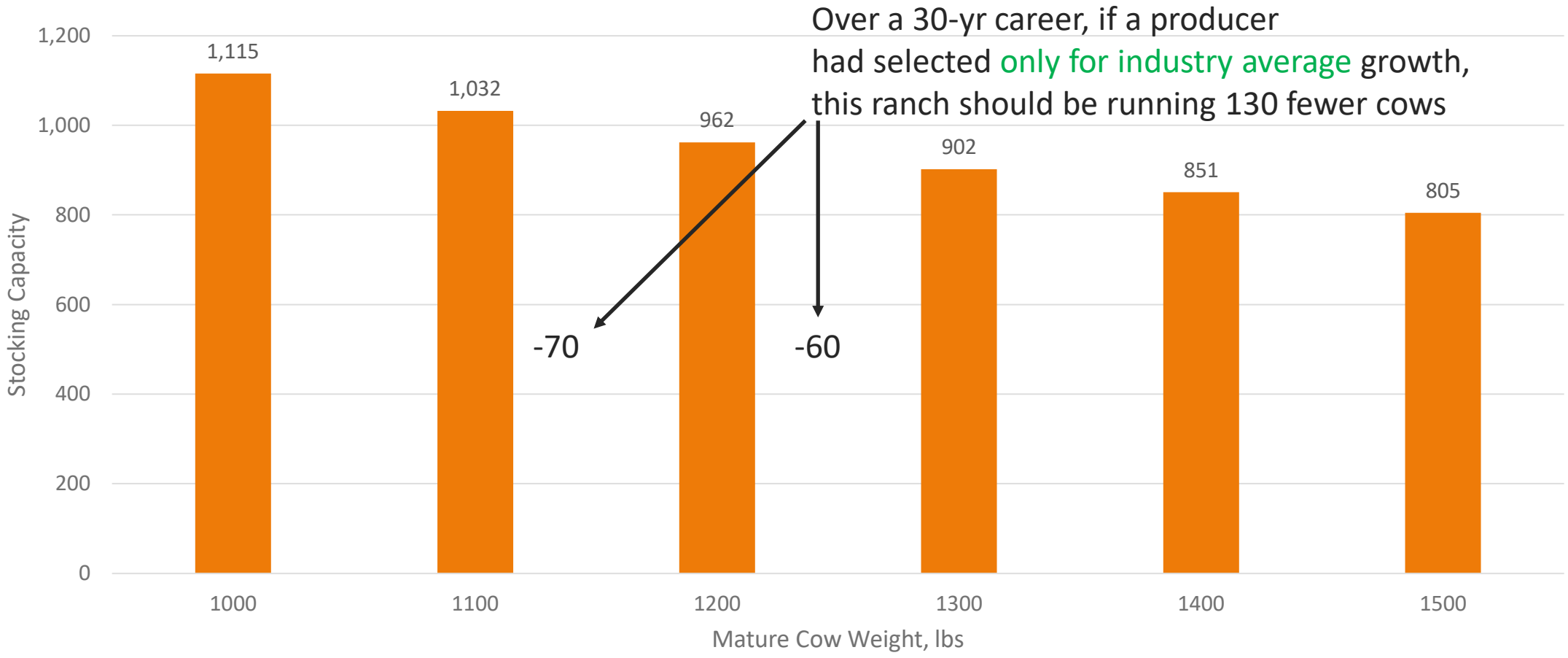
Weaning Weight ⟺ Feed Intake = 0.50

Post-Weaning Gain ⟺ Feed Intake = 0.61

Mature Cow Weight ⟺ Weaning Weight = 0.44


Cattle Carcass Weights
Pounds
950
900
850
800
750
700
650
600
550
500
450
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
2017
2020
2023
Steers
Heifers
Bulls
Cows
Cow carcass weights converted to live basis suggest that mature cow weight is increasing by 7.3 pounds/year

Effect of cow weight on stocking capacity: 10,000-acre ranch, North Central Oklahoma



Feed intake from Gross et al., 2024

How does cow size affect feed intake?

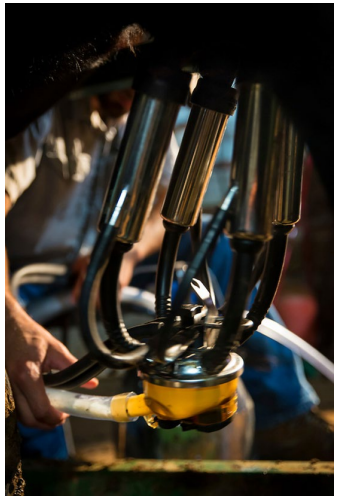
Relationship of Mature Body Weight : Feed Intake

Reference	Class	Lbs Intake / 100 lbs BW
NASEM 1996 & 2016	Lit. Review	1.47

Relationship of Mature Body Weight : Feed Intake

Reference	Class	Lbs Intake / 100 lbs BW
NASEM 1996 & 2016	Lit. Review	1.47
Holder 2022	Angus and AxH cows	1.4 to 2.3
Gross 2024	Lit. Review	1.93
Talley 2024	Angus and AxH cows	2.3

Do Feed Intake EPD's Work for Cows?



Phenotypic Correlations for Feed Intake Hay vs Mixed Diet

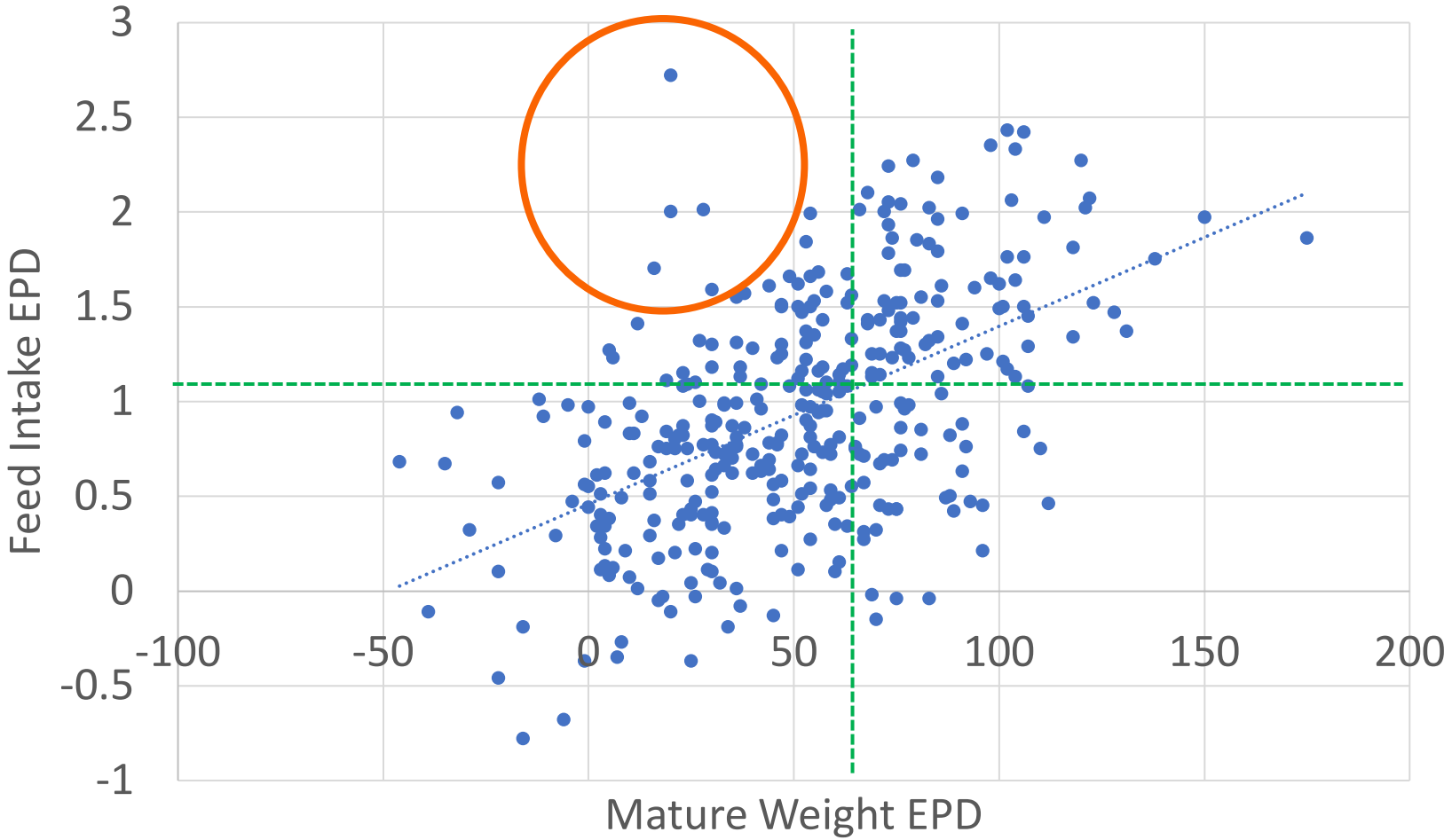
Reference	Class	Feed Intake
Cassady 2016	Crossbred hfrs	0.58*
Foote 2017	Crossbred strs and hfrs	0.51*
Lahart 2020	Crossbred strs and hfrs	0.41*
Holder 2020	Angus cows	0.75*
Holder 2021	Angus cows	0.43*
Briggs 2021	Angus heifers	0.48*
Briggs 2022	Angus heifers	0.48*

*correlation is significant P < 0.05

What can you do now?

Avoid proven sires with

- High inputs
- Low post-weaning productivity
- Low cull cow income

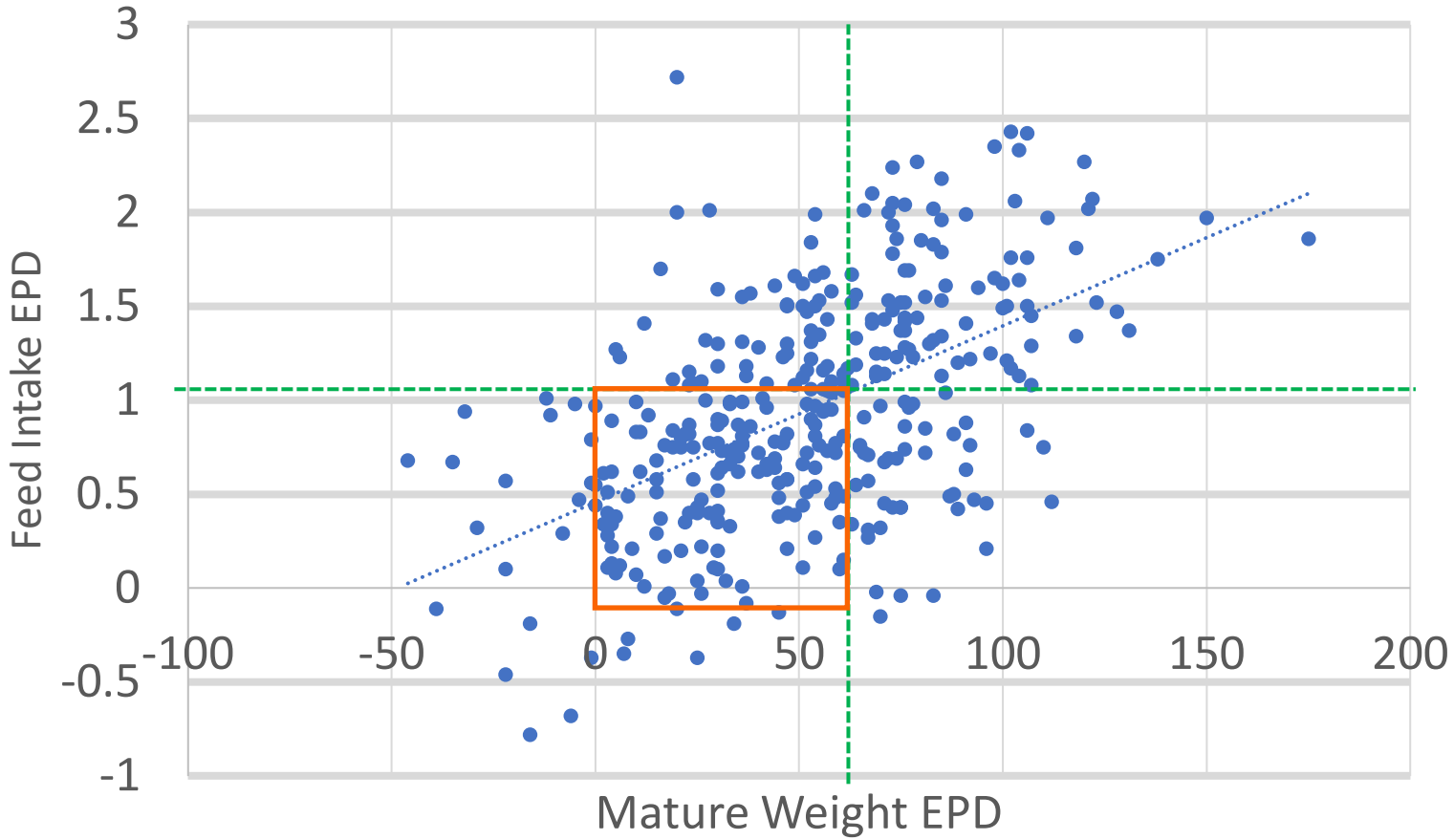


Source: American Angus Association

What can you do now?

For low cow cost/input priority:

- Breed-average or below mature body weight genetics
- Breed-average or below feed intake genetics
  - Should ensure low/modest cow cost/inputs
  - Moderate post-weaning performance and carcass weight
  - Lower cull cow income

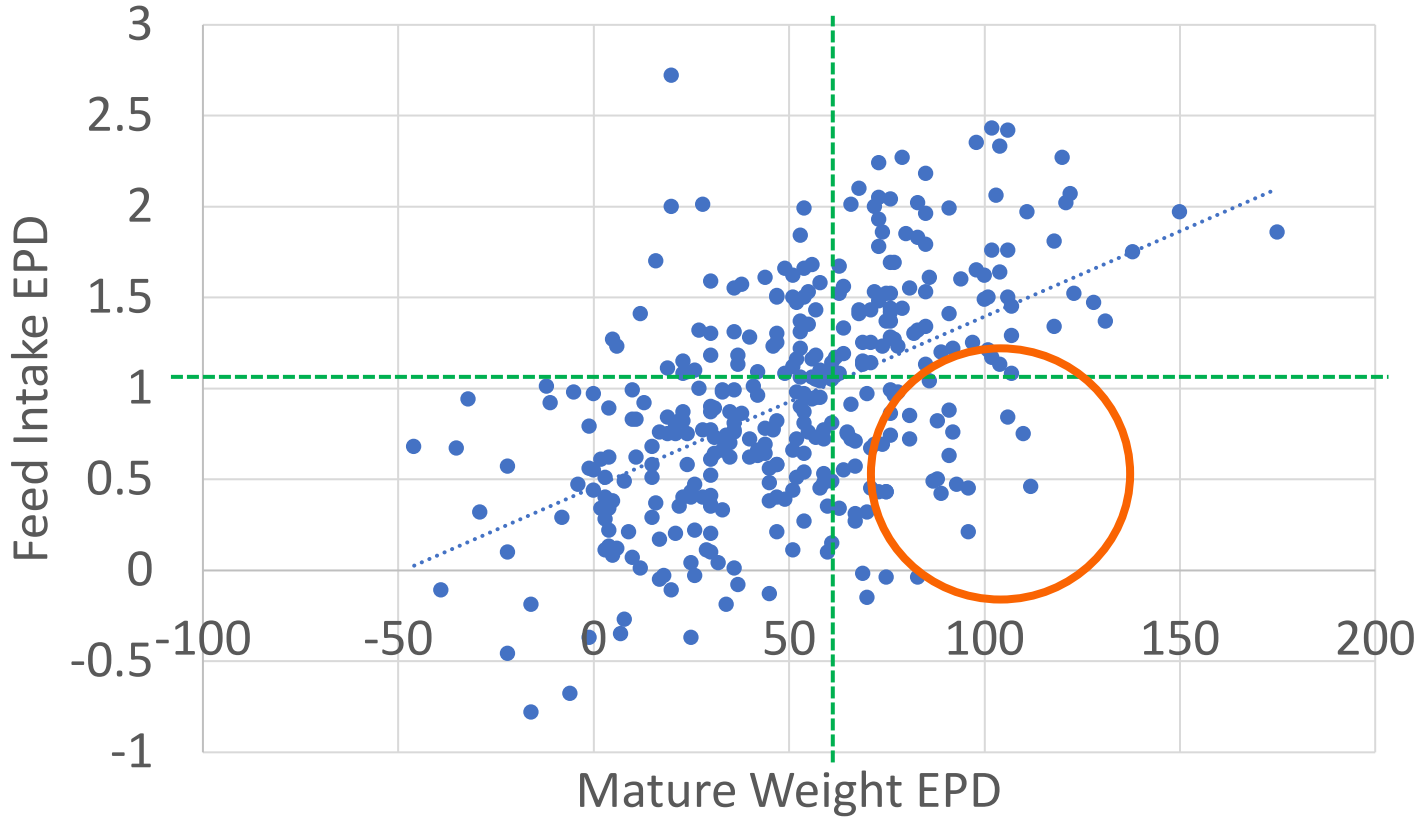


Source: American Angus Association

What can you do now?

Modest cow cost with superior post-weaning performance:

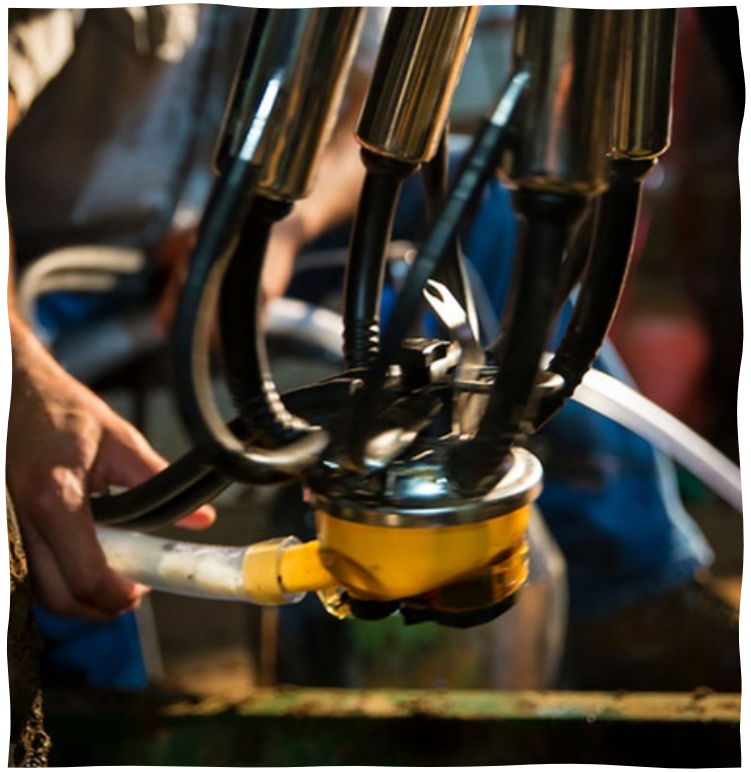
- Breed-avg or below feed intake
- Breed-avg or above mature cow weight
  - Modest cow cost/inputs
  - Increased cull cow income
  - Increased feedlot ADG and carcass weight



Source: American Angus Association

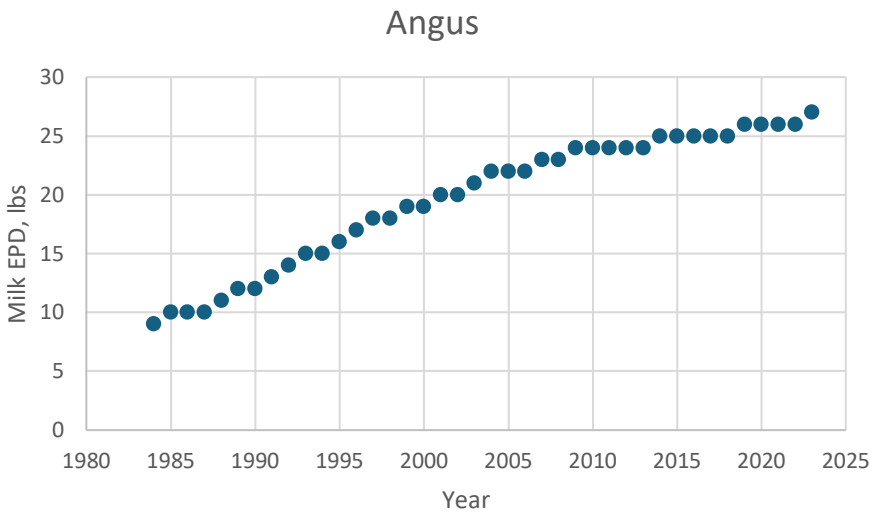
Take-Home

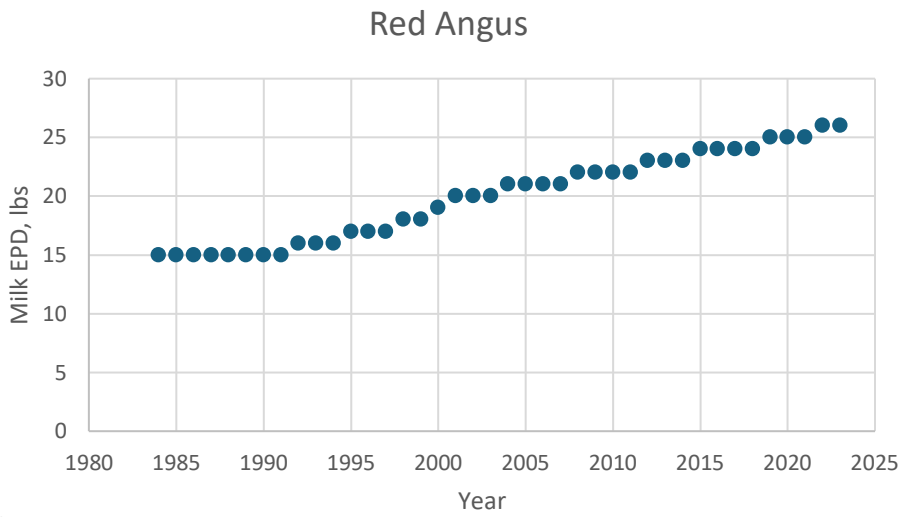
- Consider stocking rate implications related to mature cow weight
- Each 100 lb increase in mature weight
  - ~2.0 lbs more feed/forage per day
  - 730 lbs additional feed/forage per year
- DMI EPD combined with mature cow weight EPD should be effective to stabilize cow feed cost
  - Genetic correlation needed
  - Need more phenotypes collected and reported

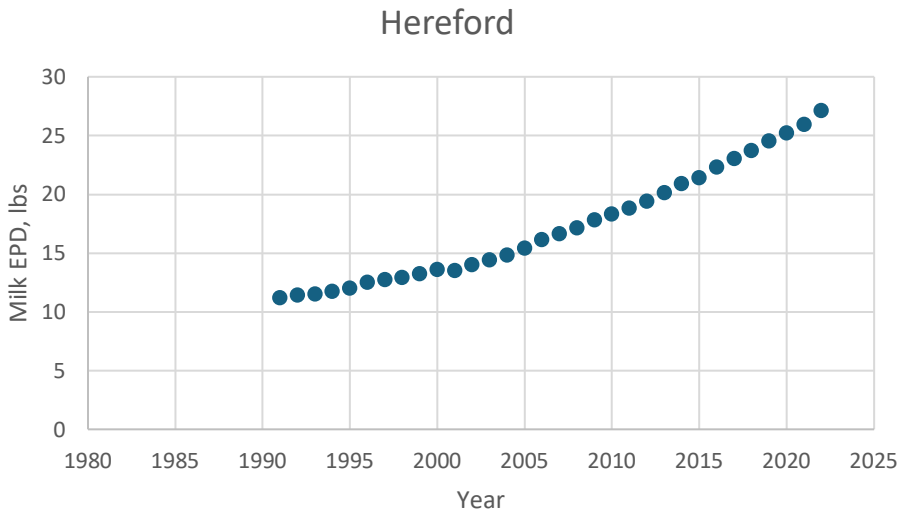


Milk

Genetic Trend for Milk EPD





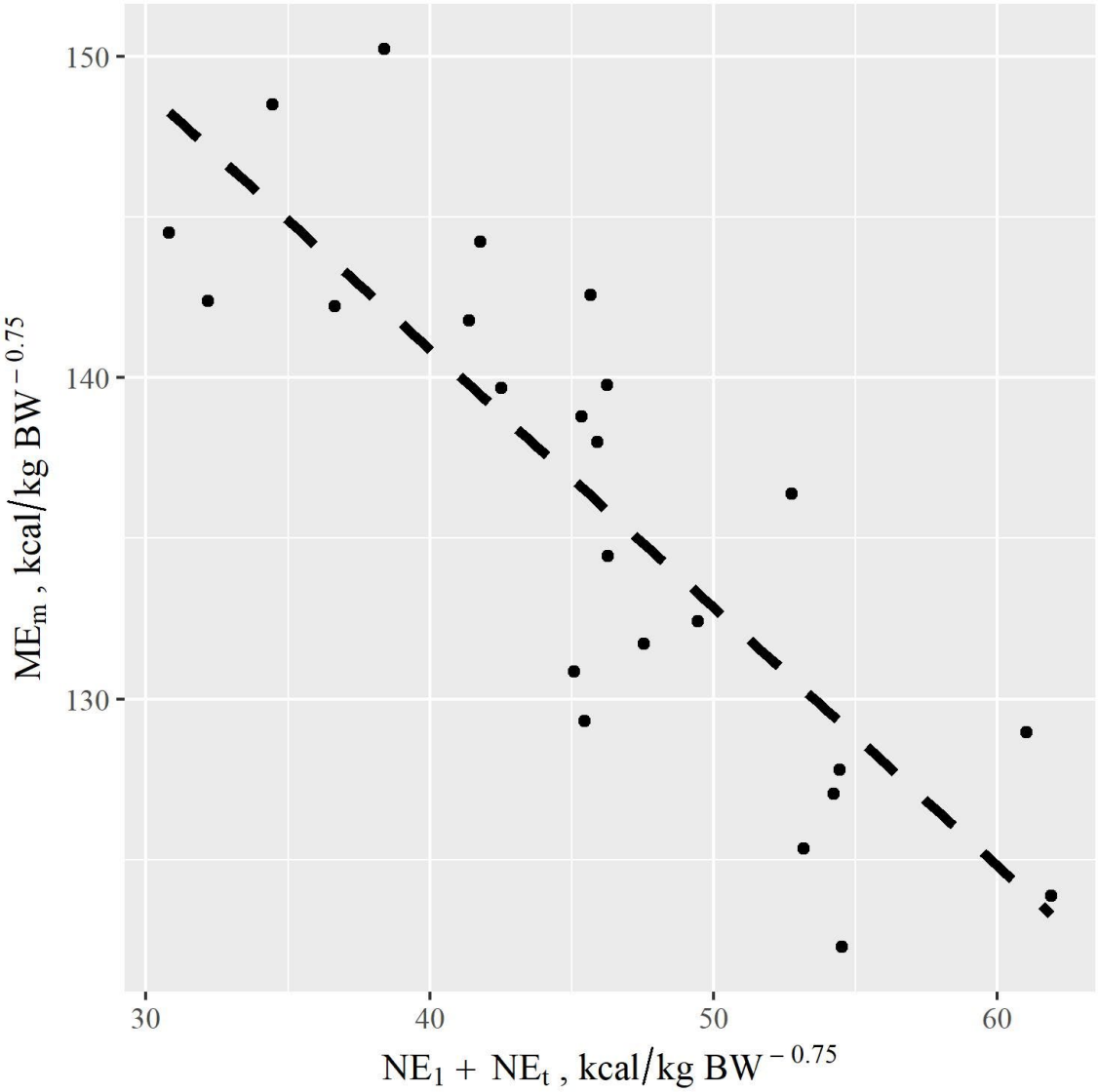


Influence of Milk on Maintenance Requirements

Generalization made in NASEM, 2016:

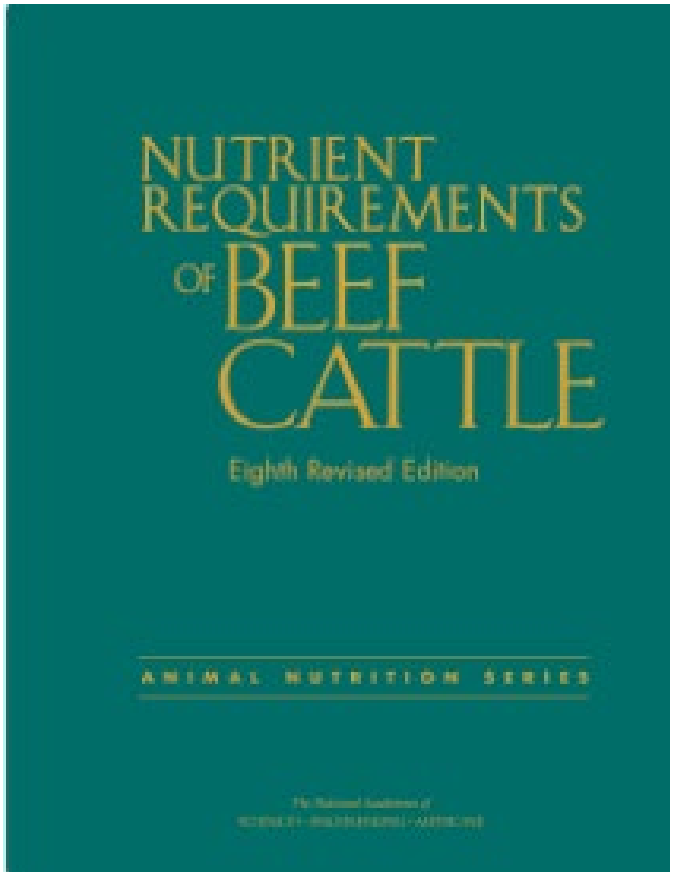
"… a positive relationship exists between maintenance requirement and genetic potential for measures of productivity."

Increasing milk energy yield was associated with decreasing maintenance energy requirement.



Briggs et al., 2022

How does milk yield influence feed intake?



NASEM 1984, 1996, and 2016

One unit milk = 0.2 units feed intake

Feed intake response to increasing milk yield

Author	Feed Intake:Milk
Johnson et al., 2003	0.35
Moore et al., 2022	0.71
Gross et al., 2024	0.45
Talley et al., unpublished	0.51

Take-Home

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  - 730 lbs additional feed/forage per year
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Take-Home

- Productivity may not be antagonistic to maintenance requirements after all.
- Current NASEM model underestimates feed intake, especially in lactating cows.
- Feed intake (and cost) is more sensitive to milk yield than previously thought.