Cameron Endowed Professorship

- Funding & Support:
  - Bair Foundation
  - Montana Stockgrowers Association
  - Others..

- Position Description:
  - 60% Research
  - 30% Teaching
  - 10% Service

- My Thoughts ..
Designing Research for the Montana Beef Industry!
Sustainable Range Beef Production Systems

Sustainable Range Beef Production Systems

Economic Sustainability
- production per cow
- cost per cow per year
- genetic value added
- marketing programs

Ecologic Sustainability
- plant & animal biodiversity
- forage production
- esthetic values
- water and riparian values

Social Acceptability
- quality of life
- values, tradition, and history
- honor and dignity

DelCurto & Olson, 2010
Beef Production Systems

- Understanding Grazing Behavior
  - Landscape use patterns
  - Distribution relative to water

- Sustainable Management Systems for Montana Producers
  - Beef Cattle/wildlife interactions
  - Beef Cattle/vegetation interactions
Strategic Supplementation Optimizes the Use of Low-Quality Forages

• Past Research
Beef Production Systems

• Optimal Supplementation Strategies
  – Individual cow intake, feed intake ratios
  – Forage dynamics in winter grazing scenarios
    • Composition of diets and diet quality with increased levels of use

• Matching Production Expectation with the Environment

• Evaluating Beef Cow Efficiency
  – Should cows be able to wean 50% of the BW
  – Production per unit of cows exposed
  – Cow size & production efficiency
**Beef Cattle Nutritional Requirements:**

<table>
<thead>
<tr>
<th>Cow Size</th>
<th>Milking Level</th>
<th>lb of milk/cow/day</th>
<th>lb TDN Needed</th>
<th>lb CP Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>Below Avg</td>
<td>10</td>
<td>12.4</td>
<td>1.9</td>
</tr>
<tr>
<td>1000</td>
<td>Average</td>
<td>20</td>
<td>14.8</td>
<td>2.6</td>
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<tr>
<td>1000</td>
<td>Above Avg</td>
<td>30</td>
<td>17.2</td>
<td>3.5</td>
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<tr>
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<td>Average</td>
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<td>16.2</td>
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<td>1200</td>
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<td>18.7</td>
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<td>3.0</td>
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<tr>
<td>1400</td>
<td>Above Avg</td>
<td>30</td>
<td>20.1</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Typical Herd Weight & Condition

Feed & manage to age group & condition
Winter Grazing Research 2016 & 2017 at Havre

- Influence of Supplement Intake and Cow Age on Grazing Behavior and Rangeland Use Patterns
  - Sam Wyffels, Jan Bowman, Lance McNew, Darrin Boss, Cory Parsons, Julia Dafoe, Alyson Hicks-Lynch, and Tim DelCurto
    - Vegetation: production and cover by species, forage quality, robel structure estimates
    - Soil organic matter, temperature maps (GIS Layers)
Winter Grazing Research 2016 & 2017 at Havre

- Influence of Cow % BW Weaned and Size on Supplement Intake and Grazing Behavior
  - Alyson Hicks-Lynch, Tim DelCurto, Jan Bowman, Darrin Boss, Cory Parsons, Julia Dafoe, and Sam Wyffels
  - Objective: Design a 2X2 Factorial design contrast Cow Size (weight) and % BW weaned
Cows at the Thackery Ranch 2016

135 1st, 2nd, and 3rd Calf Cows

142 4 to 11 yr old Cows
Cow Weight vs Calf Weaning Wt

Calf Wean Wt

\[ y = 0.1162x + 448.66 \]

\[ R^2 = 0.0601 \]
%BW Weaned vs Cow Weight

High Weaning Weight Ratio

Low Weaning Weight Ratio

\[ y = -0.0274x + 80.547 \]

\[ R^2 = 0.1463 \]
The Supplement

• We are working with Kim Hager CHS
• Salt-limited 30% CP supplement fortified with vitamins and minerals
  – 25% Salt
  – Bentonite used as binder for pelleting

✓ Potential Research Project at BART Farm
Research Techniques

• Lotek 3300 GPS Collars and Activity monitors
• Smart Feed Pro Feeders by C-Lock
Preliminary Data

- 45 day grazing period:
  - 42,472 visits to the feeders
    - Cow EID read
    - Time of day
    - Entry and exit are recorded
    - Coupled with weather station and GPS collar data
  - Avg Supple Intake = 2.75 lbs (1.25 kg)
  - 264 cows were recorded
Supplement Intake Variation
Supple. Intake vs Avg. Temperature
Cow Efficiency Study

- Using the NARC cattle records:
  - We have identified the high indexing (> 53% BW Weaned) and the low indexing (< 45% BW Weaned Cows)
  - Within index groups we further sorted by cow size

- Treatment Groups:
  1. High Index Light Wt Cows (1107 BW & 57% WR)
  2. High Index Heavy Wt Cows (1191 BW & 55% WR)
  3. Low Index Light Wt Cows (1294 BW & 43% WR)
  4. Low Index Heavy Wt Cows (1395 BW & 43% WR)
Supplement Intake vs Biological Type

- HI-Light: 1.05
- Hi-Hwy: 0.99
- LI-Light: 0.77
- LI-Heavy: 0.94

Values:
- 1107
- 1191
- 1294
- 1395
Cow Efficiency Study (cont’):

• Two year study

• Three Phases
  – Winter Grazing Segment
  – Spring “dry-lot” intake study (total DMI & Milk)
  – Late Spring/Early Summer Grazing

• Potential Findings
  – How does performance translate to grazing behavior & distribution
  – What is consumption per unit of production
Future Research

• Strategic Supplementation
  - Optimal nutrient delivery systems
  - Optimal use of Rangelands
  - Optimal use of Low-Quality Forages
Future Research (cont’)

• Matching Cow Type and Optimal Use of Montana Rangelands
  - Influence of Cow Size
  - Influence of Productivity (ie. % BW weaned)
  - Milk production
  - Stage of Production
Future Research (cont’)

• Sustainable Management Systems for Montana Producers
  - Beef Cattle/wildlife interactions
  - Beef Cattle/vegetation interactions
    - Targeted grazing
  - Distribution relative to riparian areas
    - Water development and optimal use

“Hey, wait a minute! This is grass! We’ve been eating grass!”
Thank You!

Questions?

"Yes...I believe there's a question in the back."