

2015 NATIONAL INSTITUTE FOR ANIMAL AGRICULTURE

Small Ruminant Committee

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NIAA 2015: WATER AND THE FUTURE OF ANIMAL AGRICULTURE

- “The conversation NIAA is pursuing at the Annual Conference, about water quality, quantity and the operating environment, will be dynamic and complex.”
- **“Water. Without doubt the most important and controversial environmental issue on our planet.”**
 - “How can production agriculture be as sustainable as it can be?”
 - “How is animal agriculture impacting water quality?”
 - “Is fracking affecting water quality for animal agriculture?”
 - “What water regulations need to be in place or changed?”

SMALL RUMINANT GRAZING: A WATER-FRIENDLY PRODUCTION SYSTEM

- From a SR-grazing, semi-arid/arid, and landscape-use perspective...
 - SR production and water quality
 - Need for water regulations???
 - “Water” and sustainability of SR grazing

WATER USE AND QUALITY: WATER USE...A FUNCTION OF NEED AND ACQUISITION

- Water retention/conservation: GI
 - Sheep void feces at 50% DM vs. cattle at 30%
 - *Fecal water loss can account for >55% of TWI in cattle*
- Water retention/conservation: Renal
 - Goats and sheep can excrete twice the solute concentration than cows

WATER USE AND QUALITY: WATER USE...A FUNCTION OF NEED AND ACQUISITION

■ Water replenishment

○ Free water

- *Solute concentration: Sheep can consume water with nearly 40% more solutes compared with cattle*
- *Water loading, which is a fxn of GI and solute regulation*
 - * *Bedouin goats consumed 30% of dehydrated BW (Choshniak and Shkolnik, 1978), which is > sheep > cattle*
 - * *Rumen-reticulum water can provide > 50% of dehydration need in sheep and goats; < 50% in cattle (Silanikove, 1994)*

WATER USE AND QUALITY: WATER USE...A FUNCTION OF NEED AND ACQUISITION

■ Water replenishment

○ Forage water

- *As grasses dry, ruminants tend to shift to browse, which is highly preferred by goats.*
- *Ability of goats and sheep to rapidly shift to forbs and shrubs provides an added advantage in water acquisition over cattle.*
- *Goats and sheep can graze nearly twice as long without access to free water compared with cattle.*

WATER USE AND QUALITY: WATER USE...A FUNCTION OF NEED AND ACQUISITION

- When free water is limiting, SR can continue to persist and produce better than cattle under grazing conditions:
 - More flexible/adaptive physiology
 - *Water conservation*
 - *Diet selection (and don't forget snow/ice)*
- Physiology allows SR to utilize rangelands differently than strict grazers, which keeps SR out of political trouble...most of the time

WATER USE AND QUALITY: WATER QUALITY...A FUNCTION OF LANDSCAPE USE

- Under normal grazing conditions, SR are amenable to grazing extensive and difficult landscapes as opposed to congregating in areas due to water availability
 - Cattle “hold” close to daily watering holes.
- Sheep and goats will avoid riparian bottoms and utilize hillsides and ridgetops for grazing and bedding

WATER USE AND QUALITY: WATER QUALITY...A FUNCTION OF LANDSCAPE USE

- **Sheep bedding sites**
 - No effect on vegetation and did not result in an increase of annuals or exotics (Seefeldt and Leytem, 2011)
 - Immediate increase in nutrient depots, but after 1 year, soil was similar to non-bedded sites (Leytem and Seefeldt, 2008)
- **Stream crossings sites**
 - Disturbed suspended-solids and bacteria were at background levels less than 1 hour after crossing or 500 m downstream (Clark et al., 2012)

SMALL RUMINANT GRAZING: WATER USE AND QUALITY

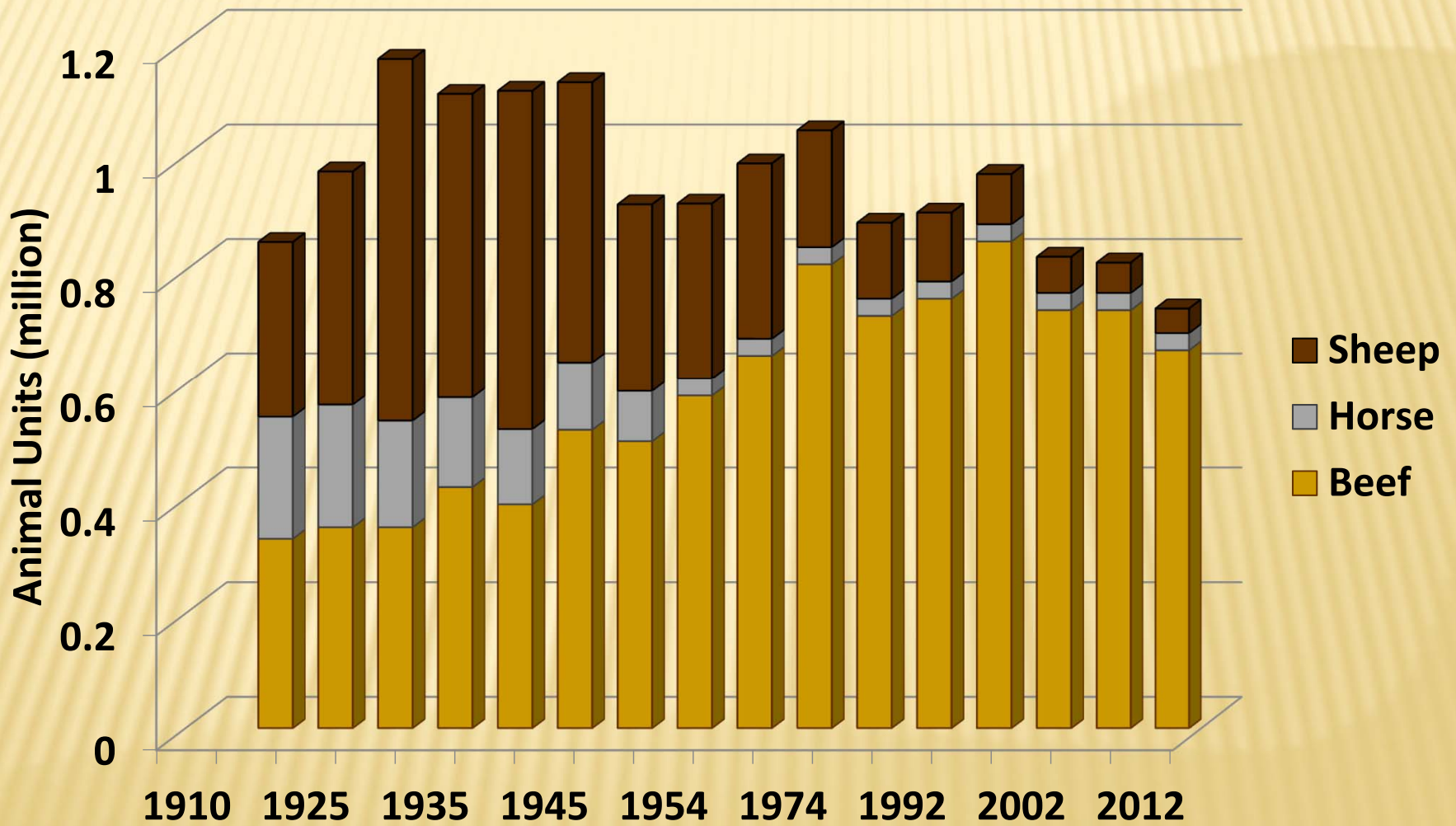
- Small Ruminants require less water to produce
- Small Ruminants are not as dependent upon free water as cattle
- Small Ruminants avoid riparian and stream-bank areas
- Small Ruminants can utilize landscapes and forages not available to cattle
- Small Ruminants utilize landscapes in a way that results in minimal to no negative impact on water quality

A CALL FOR WORLD-WIDE SHRUB CONSUMPTION

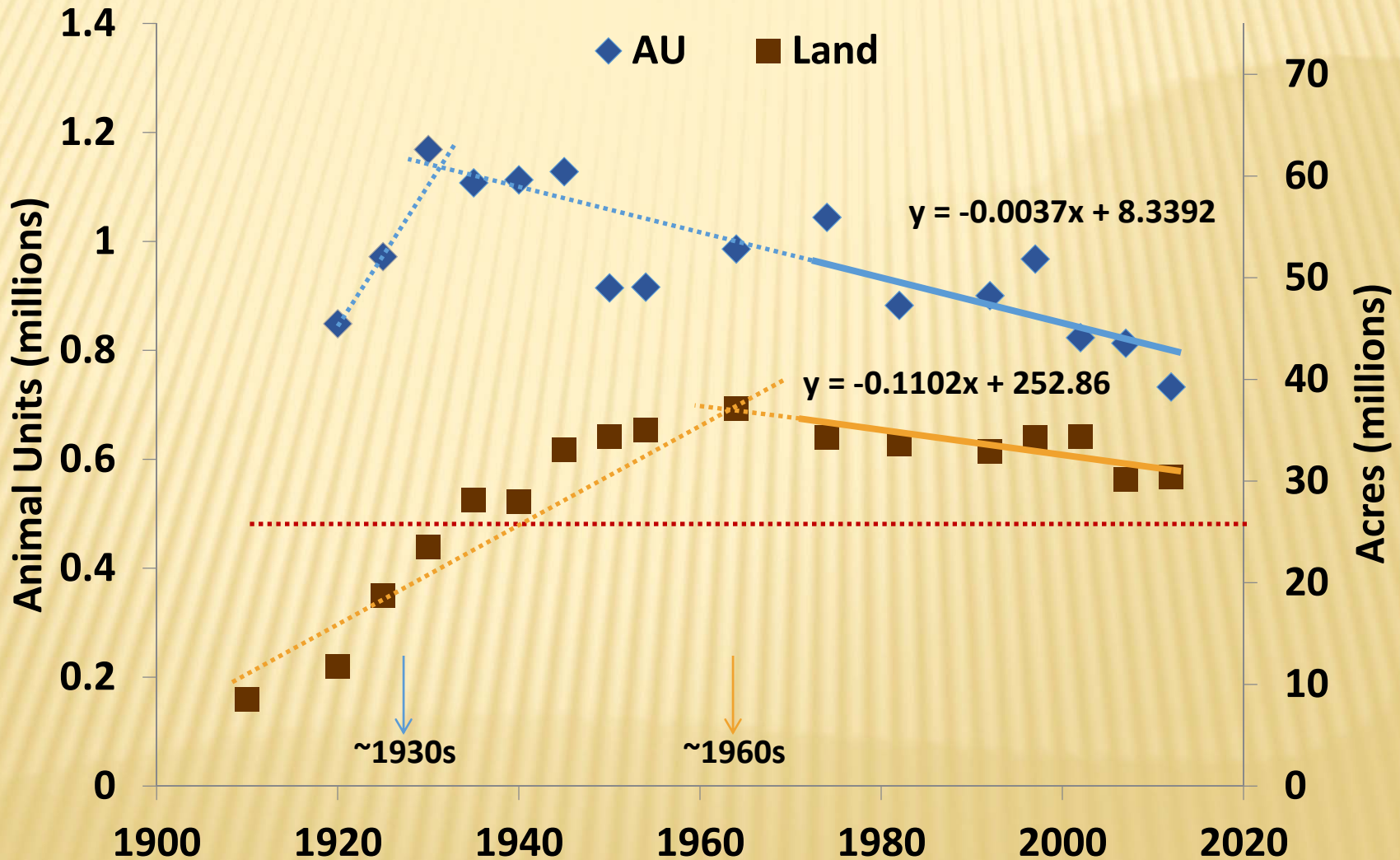
- Estell et al. (2012): “Increasing Shrub Use by Livestock in a World with Less Grass”
 - World meat demand continues to rise
 - Grasslands are converted to croplands
 - Woody encroachment continues
 - Yet world livestock numbers are increasing

Answer: Increase shrub consumption!

WYOMING LIVESTOCK AGRICULTURE



WYOMING AGRICULTURAL LANDS



A CALL FOR WORLD-WIDE SHRUB CONSUMPTION

- Estell et al. (2012): “Increasing Shrub Use by Livestock in a World with Less Grass”

So...what does this have to do with “SR Grazing: A Water-friendly Production System”???

SMALL RUMINANT GRAZING: WATER-RELATED REGULATIONS

- Anti-agriculturalists and wildlife preservationists seek to bypass the Executive and Legislative branches (i.e., branches of the people) and use courts to stop livestock grazing on public (and private) lands
 - Assumed water contamination
 - Assumed destruction of wildlife habitat
 - Assumed direct effect on ES

SMALL RUMINANT GRAZING: SUSTAINABILITY

- Special interest groups are creating a situation that threatens proven sustainability of SR production. Much litigation and challenges are based on water and watersheds.
- Of all livestock production systems, SR grazing is most optimized for minimal use of fossil fuels.

SMALL RUMINANT GRAZING: DEMAND FOR SMALL RUMINANT PRODUCTS

- Huge world demand, as demonstrated with increased SR numbers (sustainability of SR production on “troublesome” landscapes)
- US demand is huge, sustainability is proven, yet SR production in the US lags. Why? Even when SR guarantees
 - Premium nutritious foods and the best clothing
 - Low-impact agriculture yielding clean water
 - Woody plant management and clean water
 - Minimal use of fossil fuels and clean water
 - Wide-open-spaces and wildlife habitat preservation