



**Proceedings  
of the 2017  
Nebraska Grazing Conference**



**17th Annual**

**August 8-9, 2017  
Kearney Ramada  
Kearney, NE**

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Nebraska Grazing Conference (NGC) was:

- Planned by the NGC Coordinating Committee: Bruce Anderson, University of Nebraska; Nadine Bishop, USDA NRCS; Ron Bolze, Nebraska Grazing Lands Coalition; Julie Elliott, USDA NRCS; Mark Goes, Southeast Community College; Jim Jenkins, producer; Erin Laborie, University of Nebraska Extension; Rob Mitchell, USDA ARS; Lynn Myers, Nebraska Grazing Lands Coalition; Brent Plugge, University of Nebraska Extension; Rick Rasby, University of Nebraska Extension; Daren Redfearn, University of Nebraska-Lincoln; Bob Scriven, University of Nebraska Extension; Bill Vodehnal, Nebraska Game and Parks Commission; Jerry Volesky, West Central Research and Extension Center; and Doug Whisenhunt, USDA NRCS.
- Coordinated by Brent Plugge, Daren Redfearn, Shaun Weishaar, and Margo McKendree;
- Hosted by the Center for Grassland Studies, University of Nebraska-Lincoln, 203 Keim Hall, Lincoln, NE 68583-0953, (402) 472-4101, Email—grassland@unl.edu.

Proceedings edited by Margo McKendree.

## Introduction

The 2017 Nebraska Grazing Conference (NGC) will be the seventeenth annual conference in the long history of serving Nebraska's grazers. It began with an exploratory meeting convened by the Center for Grassland Studies, University of Nebraska-Lincoln on October 20, 2000. Dr. Martin Massengale, Director of the Center for Grassland Studies, Dr. Bruce Anderson, Department of Agronomy and Horticulture, and Dr. Rick Rasby, Department of Animal Science, led the discussion. As a result of the overwhelming response from a variety of producers, professional organizations, and state and federal agencies, the Nebraska Grazing Conference Coordinating Committee was established with members representing the diversity of those expressing an interest in a statewide grazing conference. The Center for Grassland Studies was identified as the conference's host organization. The first conference was held in Kearney, Nebraska on August 13-14, 2001 to serve "ranchers, farmers, wildlife managers, conservation groups, and advisers who wanted to make grazing a profitable enterprise" and manage our grasslands in a sustainable way.

The land-grant philosophy of teaching, research, and extension to first serve the citizens of the state remains the NGC hallmark:

- The NGC is still focused on ranchers, farmers, wildlife managers, land managers, conservation interests, and advisors;
- NGC topics for the subsequent year are provided by an audience survey and a conference planning committee to insure relevance and encompass a wide array of grazing land issues;
- There have been 289 speakers through 2016 and 132 have been producers (46%) emphasizing that everyone is a teacher and everyone is a learner;
- Both basic and applied research is often introduced that becomes the foundation for future management innovation;
- Translation of research findings to production-level implementation is the focus of extension presentations;
- The NGC has always enjoyed rich collaborations across many state and federal agencies and not-for-profit groups that provide management insights.

The NGC is one of the longest running statewide conferences of its kind. The roles of Dr. Martin Massengale, former director, and Pam Murray, former coordinator, in the establishment and maintenance of the conference cannot be overlooked. Also important in the history of the NGC is the role that the Nebraska Grazing Lands Coalition (NGLC) has played as the only co-sponsor that has been an underwriter all 17 years. As we recognize the commitment of the NGLC to the conference, we pay tribute to all of our sponsors over the years — they have created a lasting conference that has become a difference maker in grazing management and maintaining a sustainable environment.

Dr. Steven S. Waller, Interim Director  
Center for Grassland Studies

## Conference Schedule

**Tuesday, August 8, 2017**

- 9:00 AM      **Registration Opens**
- 10:00 AM     **Welcome and Announcements ... Erin Laborie**, Extension Educator, West Central Research and Extension Center
- 10:10 AM     **A History of the Nebraska Grazing Conference ... Steve Waller**, Interim Director, Center for Grassland Studies
- 10:20 AM     **Fences and Water Points: Where They Should Go ... Jim Gerrish**, Grazing Consultant/Owner, American GrazingLands Services, LLC
- 11:40 AM     **Beef Systems Initiative ... Archie Clutter**, Dean/Director, Agricultural Research Division, University of Nebraska-Lincoln
- 12:00 PM     **Lunch**
- 1:00 PM      **Grass-based Health and the Ruminant Revolution ... Peter Ballerstedt**, Forage Product Manager, Barenbrug USA
- 2:00 PM      **The Good, Bad, and Ugly of Weedy Plants ... Chris Helzer**, Director, Science for Nebraska Program, The Nature Conservancy
- 2:40 PM      **2016 Leopold Conservation Award Winner ... Nancy Peterson**, Plum Thicket Farms, Gordon, NE
- 3:20 PM      **Break** — Visit Sponsor Booths and Network
- 3:50 PM      **Managing Grassland Vegetation to Benefit Livestock and Wildlife ... Patricia Johnson**, Professor, South Dakota State University, West River Ag Center
- 4:30 PM      **What is Plant Cover, and How Can We Manage it for Wildlife Needs? ... Dwayne Elmore**, Associate Professor and Bollenbach Endowed Chair in Wildlife Management, Oklahoma State University
- 5:15 PM      **Social**—Compliments of Kearney Ramada
- 6:00 PM      **Dinner** (Azalea Room) and **Fencing and Water Development Workshop ... Jim Gerrish**, Grazing Consultant/Owner, American GrazingLands Services, LLC (Paradise Room)



## Conference Schedule

### Wednesday, August 9, 2017

- 8:00 AM      **Registration Opens**
- 8:25 AM      **Welcome and Announcements ... Troy Walz**, Extension Educator, West Central Research and Extension Center, University of Nebraska-Lincoln
- 8:30 AM      **Producer Panel – Annual Forages vs Row Crops Under Irrigation ... John Maddux**, Producer, Wauneta, NE
- 9:00 AM      **Producer Panel – Economics of Grazing Strategies ... Jim Jenkins**, Producer, Callaway, NE
- 10:00 AM     **Break** — Visit Sponsor Booths and Network
- 10:30 AM     **It Costs How Much!? ... Aaron Berger**, Extension Educator, Panhandle Research and Extension Center
- 11:00 AM     **Managing Risks in a Risky World ... Jay Parsons**, Associate Professor, Agricultural Economics, University of Nebraska-Lincoln
- 11:30 AM     **Lunch**
- 12:30 PM     **Selecting Cool-season Grasses for Irrigated or Dryland Conditions ... Peter Ballerstedt**, Forage Product Manager, Barenbrug USA
- 1:30 PM      **Working Lands for Wildlife ... Bill Vodehnal**, Wildlife Biologist II, Nebraska Game and Parks Commission
- 2:00 PM      **NRCS Cost Share Programs ... Brad Soncksen**, Nebraska Assistant State Conservationist, Natural Resources Conservation Service
- 2:40 PM      **Final Comments and Adjourn ... Brent Plugge**, Extension Educator, West Central Research and Extension Center, University of Nebraska-Lincoln

## Sponsors and Exhibitors



Arrow Seed Company, Inc., 126 N 10th Ave, Broken Bow, NE 68822,  
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Kearney Visitors Bureau, 1007 Second Ave, Kearney, NE 68847,  
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Nebraska Association of Resources Districts, 601 S 12th St, Ste 201,  
Lincoln, NE 68508, (402) 471-7671, [www.nrdnet.org](http://www.nrdnet.org)



Nebraska Cattlemen, 1010 Lincoln Mall, Ste 101, Lincoln, NE  
68508, (402) 475-2333, [www.nebraskacattlemen.org](http://www.nebraskacattlemen.org)



**Underwriting Sponsor:** Nebraska Game and Parks Commission, P.O. Box 508, Bassett, NE 69714, (402) 760-3097, [www.outdoornebraska.org](http://www.outdoornebraska.org)



**Underwriting Sponsor:** Nebraska Grazing Lands Coalition, 315 E 5th St, Chadron, NE 69337, (402) 321-0067, [www.nebraskagrazinglands.org](http://www.nebraskagrazinglands.org)



Nebraska Department of Agriculture, 301 Centennial Mall S, Lincoln, NE 68509, (402) 471-6857, [www.nda.nebraska.gov](http://www.nda.nebraska.gov)



Nebraska Section—Society for Range Management, 1802 W 1st St, North Platte, NE 69101, (308) 520-5298, [www.nesrm.org](http://www.nesrm.org)



Pawnee Buttes Seed, Inc., 605 25th St, Greeley, CO 80632, (970) 356-7002, [www.pawneebuttesseed.com](http://www.pawneebuttesseed.com)



Prairie States Seed, LLC, 54564 877th Rd, Wausa, NE 68786, (866) 373-2514, [www.prairiestatsseed.com](http://www.prairiestatsseed.com)



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Truax Company, 4300 Quebec Ave N, New Hope, MN 55428, (763) 537-6639, [www.truaxcomp.com](http://www.truaxcomp.com)



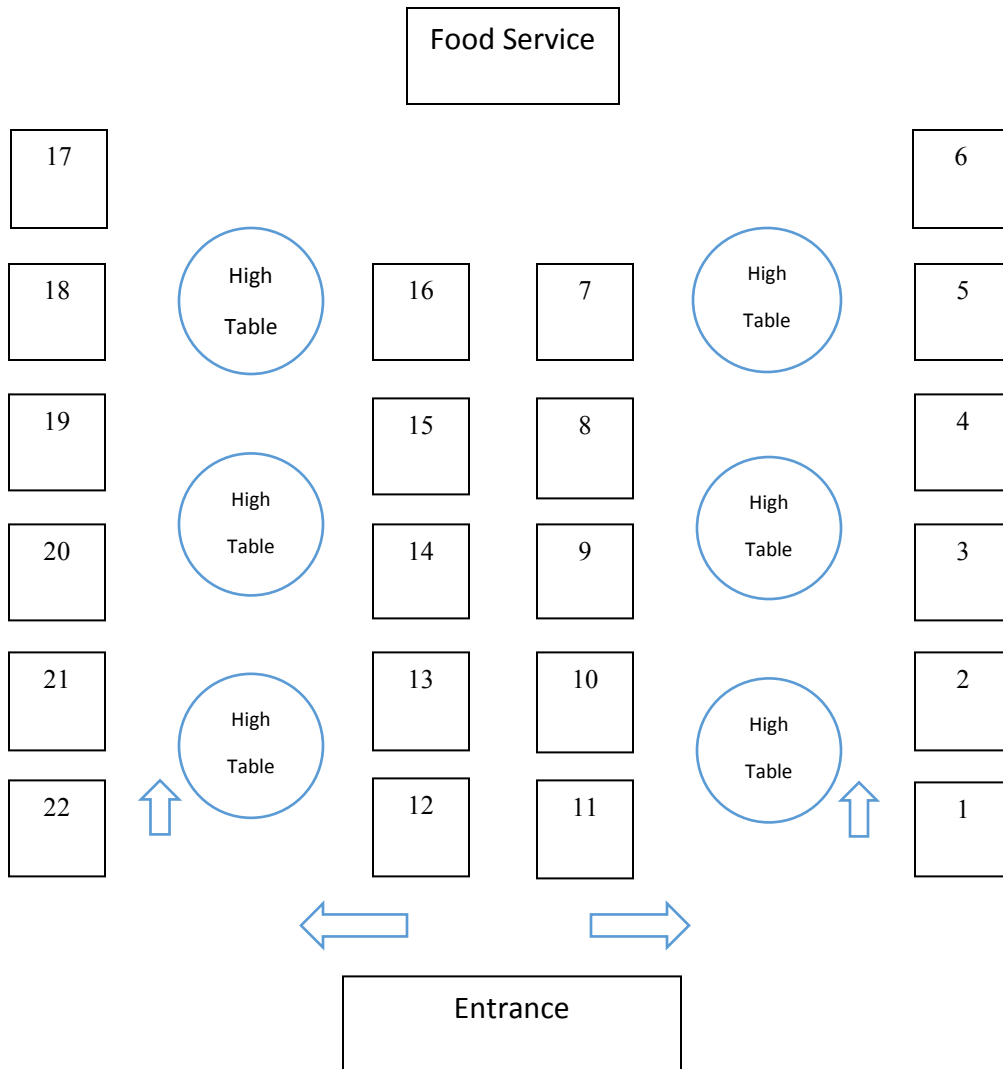
USDA Natural Resources Conservation Service Nebraska State Office, 100 Centennial Mall N, Rm 152, Lincoln, NE 68508, (402) 437-5300, [www.nrcs.usda.gov](http://www.nrcs.usda.gov)



WARD Laboratories, Inc., 4007 Cherry Ave, Kearney, NE 68847, (800) 887-7645, [www.wardlab.com](http://www.wardlab.com)



## Exhibit Map



1. Stock Seed Farms
2. Truax Company
3. Nebraska Association of Resources Districts
4. WARD Laboratories, Inc.
5. Arrow Seed Company, Inc.
6. Center for Grassland Studies
7. Nebraska Game and Parks Commission
8. Nebraska Department of Agriculture
9. Crete Lumber and Farm Supply
10. Timeless Fence System
11. K-Line Irrigation NA

12. NE Section Society for Range Management
13. Audubon Nebraska
14. Green Cover Seeds
15. Genesis Enterprises, LLC
16. Nebraska Grazing Lands Coalition
17. Farm Credit Services of America
18. Prairie States Seed, LLC
19. USDA NRCS
20. Hubbard Feeds & Crystalyx Supplements
21. Dow AgroSciences
22. Pawnee Buttes Seed, Inc.

## Speaker Biography



**Jim Gerrish**

Jim Gerrish is an independent grazing lands consultant providing service to farmers and ranchers on both private and public lands across the US and internationally. He currently lives in the Pahsimeroi Valley in central Idaho and works with numerous ranchers across the U.S., Canada, and Mexico using both irrigated pastures and native rangeland, as well as working in the high natural rainfall environments of the eastern U.S. He received a bachelor of science in agronomy from the University of Illinois and masters degree in crop ecology from University of Kentucky. His past experience includes over 22 years of beef-forage systems research and outreach while on the faculty of the University of Missouri. The University of Missouri-Forage Systems Research Center (FSRC) rose to national prominence as a result of his research leadership. His research encompassed many aspects of plant-soil-animal interactions and provided foundation for many of the basic principles of Management-intensive Grazing.

Jim has written a regular monthly column in *The Stockman Grass-Farmer* magazine for over 15 years. He has authored two books on grazing and ranch management. *Management-intensive Grazing: The Grassroots of Grass Farming*, published in 2004, and *Kick the Hay Habit: A practical guide to year-around grazing*, published in 2010.

Jim was co-founder of the very popular multi-day grazing management workshop program at FSRC. These schools were attended by over 3,000 producers and educators from 39 states and 4 Canadian provinces from their inception in 1990 through 2003. Fifteen other states have conducted grazing workshops based on the Missouri model; Jim has taught in eleven of these states. He is an instructor in the University of Idaho's Lost River Grazing Academy held annually near Salmon, ID. He typically speaks at 40 to 50 producer-oriented workshops, seminars, and field days around the U.S. and Canada each year.

### **Jim Gerrish (continued)**

For 22 of the years he spent in Missouri, he stayed in touch with the real world on a 260-acre commercial cow-calf and contract grazing operation. In this setting, he took a worn out marginal crop farm and converted it to a highly productive grass farm. After the move to Idaho in 2004, Jim keeps his day-to-day grazing tools sharp through management of a ranch unit consisting of 450 center pivot irrigated pastures, 90 acres of flood ground, and several hundred acres of rangeland.

While in Missouri, he was deeply involved in the Green Hills Farm Project, a grassroots producer group centered in north-central Missouri emphasizing sustainability of family farms. He is currently working with the local, natural food networks in the West. His research and outreach efforts have been recognized with awards from the American Forage and Grassland Council, Missouri Forage and Grassland Council, National Center for Appropriate Technology, USDA-NRCS, the Soil and Water Conservation Society, Progressive Farmer, and American Agricultural Editors Association.

**NOTE: The following material applies to all conference presentations by Jim Gerrish.**

## **Grazing cell design: Fixed vs flexible design**

Jim Gerrish, American GrazingLands Services LLC

When it comes to making fence and water developments, we have two basic approaches to setting up a grazing cell. I like to refer to them as fixed or flexible designs. A fixed design is built using primarily permanent fence and water installations to create the grazing cell while a flexible design relies on movable fence and water for paddock subdivisions within a framework of permanent fence and water installation. Then, there is a wide range of combinations of the two.

Deciding which approach is right for your operation depends on a number of factors. Flexible designs allow much more fine tuning of the pasture-animal balance so if you need tight management control, a flexible design might be right up your alley. Fixed designs require less daily labor so, if you're short on time, a fixed design might suit you better. Any kind of fence or water development costs money. Fixed designs are better suited for large operations where paddocks are large enough that development costs can be spread over many acres. If you're short on capital, starting out with a flexible design might be more affordable. There are advantages and disadvantages to each approach.

In a fixed design, all subdivisions are made with permanent fence. My definition of a permanent fence for any class of cattle is a single strand of electrified 12.5 ga hi tensile wire on solid corners with line posts the wildlife don't knock the wire off. In drier conditions, a two-wire fence may be necessary with one strand hot and one strand grounded. For sheep or goats, three strand fences are most commonly used and sometimes four wires might be needed.

Watering points in fixed designs are commonly either the water source itself, such as stream, spring development or pond, or has water delivered to a tank via buried pipelines. Tanks are typically large, often containing a full day's water supply or more. Pipe flow can be pretty slow and the water supply will still be adequate. The negative effect is watering activities always occur at the same locations in fixed designs.

Fixed designs have a number of advantages, particularly on large operations. Because the expensive part of fencing is in energizers, ends and corners, and gates, the more acres you can spread those costs over, the lower the cost per acre. Ultimately it is animal product sold per acre that pays the bills, so lower cost per acre yields higher gross margin per acre. Picture this. It takes the same number of end assemblies and gates to create ten paddocks on 20 acres as it does to make ten paddocks on 200 acres. However, cost per acre is going to be much lower on the 200 acres compared to the 20.

On most days, the labor requirement on a fixed design consists of opening the gate and letting the stock to the next paddock. Use good quality material for the fence and water designs in the first place, install it properly, and maintenance on the grazing design is pretty minimal. The initial investment may be higher up front, but operating costs on a fixed design can be quite low.

The main disadvantage to fixed designs is that management flexibility is limited. As growth rate changes through the season, you can adjust the length of the grazing period but you cannot change the size of the pasture allocation without resorting to temporary fencing. If paddocks are less than ten acres, efficiency of any mechanical operation is also diminished. On smaller operations, the cost per acre can be substantial because of limited number of acres over which to spread costs.

Flexible designs require more management and more daily labor to use effectively, but offer several important advantages. The primary advantage is increased management flexibility from both grazing and mechanical harvest perspective. The ability to flex paddock size and forage allocation as conditions change offers greater management control.



Labor requirements in a well-designed flexible design can be fairly minimal. Getting an easy working design requires setting up the permanent framework to enhance your time efficiency. Laying out the grazing cell as a series of near-parallel grazing corridors is the starting point. I generally recommend keeping corridor width to less than 1,000 feet to accommodate easy use of fence reels and step-in posts.

My personal preference is to space permanent fences at 660 feet with a water line along alternating fence lines. Why 660 feet? Because each 66 foot allocation equals one acre. Install your permanent line posts at 66-ft spacing and you have a built in paddock measuring device. It makes it very easy to keep track of what you are allocating and give instructions to kids and hired help doing chores for you. Most layouts do not lend themselves to such an ideal layout. Generally we try to keep the grazing corridors in the 500 to 1,000 foot range. This is a reasonable amount of movable fence to work with each day. It would typically take me 15 to 25 minutes to take up one fence and set up another with these distances.

Even though the daily labor requirement for operating a flexible design is greater than labor in a fixed design, the time needed to move fence and water is pretty minimal if you are using the right equipment and have set the design up as described above. Over the last 20 years I have timed myself and other people working with portable fence and water designs. Day in and day out, it takes me about 15 minutes to take down a 660 foot section of polywire on step-in posts and reset it for the next grazing strip. Using a 100 gallon plastic tank and quick coupler valves requires about ten minutes to move. In most situations it takes longer to get from the house to the paddock than to make the paddock shift.

During one five-year research project at FSRC, we had eight herds rotating in flexible designs. I could typically go out and move all eight herds in about two hours including walking from pasture to pasture. The lengths of fence ranged from 330 to 600 feet and the water tanks were 25 gallon plastic tubs. Set it up right, use the right equipment, and it doesn't take much time at all.

A water line along each alternating fence allows two corridors to be watered from each line. The spacing of the water outlets depends on expected herd size and the needed allocation area. The key factor to making portable water tanks work is high recharge rate in the delivery design. Whereas water tanks in fixed designs can be large and rely on slower refill rates, flexible designs must be installed with high flow capacity to get rapid refill so that stock can never drain the tank. Some people think this means high pump pressure but it is actually much more related to pipe size. Just increasing pipe size from 1" to 1.25" increases water flow by more than 50%.

Even if you install appropriate sized pipe for the main line, water flow can be restricted by using a small diameter delivery hose or a tank valve that restricts water flow excessively. Hydrants and quick coupler valves are the first point of restriction from the pipeline. Use larger diameter hydrants and valves wherever possible. If you put in a one inch hydrant, don't lose that advantage by running a half-inch hose to the tank, particularly if using hose lengths greater the 20 to 30 feet. Larger diameter hoses cost more but deliver a lot more water. A one inch hose delivers four times as much water as a half-inch hose.

So how do you decide whether to use a fixed or flexible approach? As a general guideline, I suggest flexible if your operation is less than 160 acres. If you are managing over 1,000 acres in a single grazing cell, fixed may be a better option. In between those two benchmarks, a combination design is likely to work best. Having said that, I know operations in excess of 1,000 acres that are almost entirely flexible and I know 40 acre farms set up with fixed facilities.

Travel distance to water is one of the primary considerations in grazing cell design. On productive land in hot, humid environments, we generally recommend trying to keep cattle within 600 - 1,000 feet of water depending upon terrain. As humidity goes down, so does heat stress on livestock. On productive land, such as irrigated pastures, in low humidity environments we extend the travel distance to 1,000 - 1,320 feet. In less productive rangeland environments, the travel distance can be extended out 1/2 to 3/4 mile before grazing distribution is negatively affected. On flat land, 3/4 mile may be acceptable while on rolling landscapes, the travel distance should be kept to less than 1/2 mile to optimize grazing efficiency.

When possible we try to put watering points as high on the landscape as possible. Cattle will always create a manure gradient towards water. If drinking locations are placed high on the landscape, then cattle will tend to transport nutrients back up hill. All other natural processes are moving nitrogen and minerals downhill. Cattle depositing manure nearer to upland water tanks is the only means we have for moving nutrients uphill.

When possible we try to place fences as parallel corridors, but landscape variances often require us to place fences relative to the changing landscape. This leaves us with corridors of varying widths. As long as the widths are easily spanned with a single standard polywire reel, this is no big deal.

Putting substantial forethought & planning into your grazing cell development will get you a long way down the road to success. Keeping daily chore time to a tolerable level makes daily rotation of livestock a relatively simple matter.

## Speaker Biography



**Archie Clutter**

Dean, Agricultural Research Division; Director, Agricultural Experiment Station, Institute of Agriculture and Natural Resources, University of Nebraska.

Archie Clutter has led the University of Nebraska's Agricultural Research Division since September of 2011. The Agricultural Research Division is the only public entity in Nebraska charged with conducting agricultural research, and is part of a national network of state agricultural experiment stations at Land Grant Universities across the U.S.

Clutter has experience in both the public and private sectors. He was previously vice president for research and development at Newsham Choice Genetics in Missouri, and held several research and development leadership positions at Monsanto Co. He also served on the adjunct faculty at Iowa State University and was a professor of animal science at Oklahoma State University, where he managed the swine research farm, animal science small animal laboratory, livestock molecular genetics laboratory, and coordinated the Department of Animal Science's graduate programs.

Clutter holds a doctorate and master's degree in animal science from UNL and a bachelor's degree in agricultural business from Iowa State University.

NOTE: Presentation materials not included in the proceedings.

## Speaker Biography



**Peter Ballerstedt**

Peter Ballerstedt received his bachelor of science in agriculture in 1981 and master's degree in 1983, both from the University of Georgia. He received his doctorate from the University of Kentucky in 1986, specializing in forage management and utilization, minoring in ruminant nutrition. He was the forage extension specialist at Oregon State University from 1986 to 1992. He is currently the Forage Product Manager at Barenbrug USA. Peter, Nancy, and their two dogs, J.J. and Conor, live in western Oregon.

Extensive experience led Peter to study human diet and health. What he has learned does not agree with the low-fat-is-heart-healthy dietary advice we've been given for more than 50 years. This understanding, combined with his forage background, has strengthened his interest in the truly sustainable forms of agriculture — the production of ruminant animal products.

Peter blogs at "Grass Based Health" (<http://grassbasedhealth.blogspot.com>) and Facebook (<https://www.facebook.com/GrassBasedHealth?ref=hl>), and tweets @GrassBased and @ForProdManager.

Grass Based Health and the Ruminant Revolution!  
 17<sup>th</sup> Annual Nebraska Grazing Conference  
 August 8, 2017  
 Kearney, NE



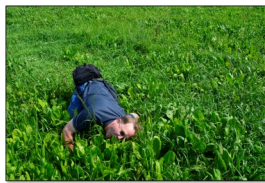
The opinions expressed in this presentation are based upon Dr. Peter J. Ballerstedt's understanding of the relevant published scientific literature. They are not necessarily the opinions of Barenbrug Holding, Barenbrug USA, or the other Barenbrug companies.



But I'm workin' on 'em!



We eat plants



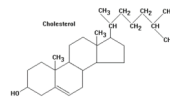
so you don't HAVE to!



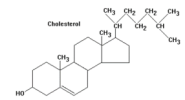
"Why do you call me good?" (or bad?)

Luke 18:19, NIV

This is the cholesterol contained in LDL particles  
 You know, the "bad" kind



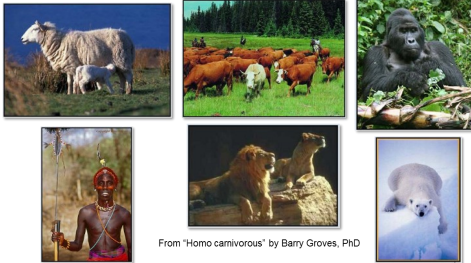
This is the cholesterol contained in HDL particles  
 You know, the "good" kind



If you can't see the difference  
 it's because there *isn't* one.  
 So why the labels "good" & "bad"?



Which mammals are designed to digest a low fat diet?



From "Homo carnivorous" by Barry Groves, PhD



The challenge ahead

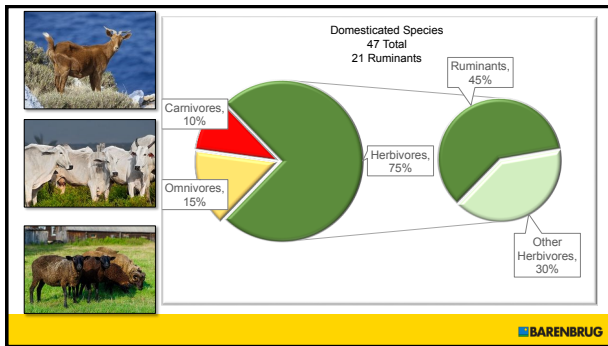
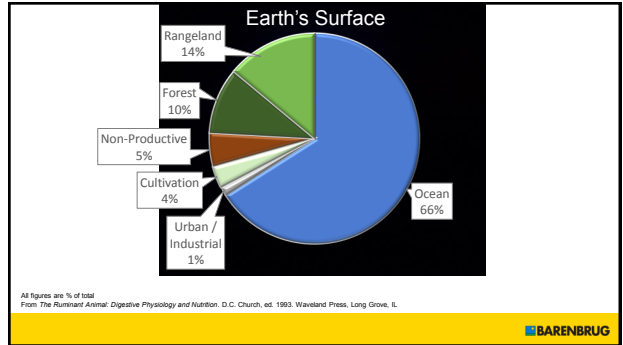
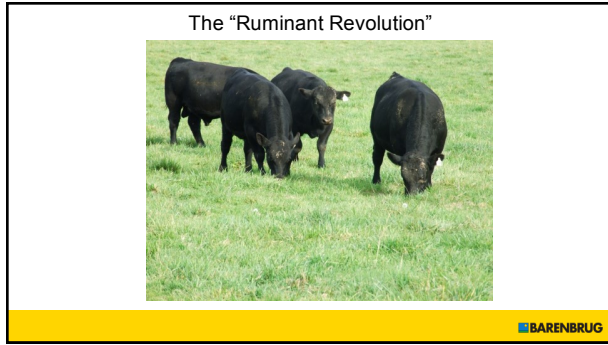


- UN projects world population will reach 9+ billion by mid-century
- UN has called for a 100 percent increase in world food production by 2050
- FAO predicts a 60% increase in demand for meat, milk and eggs by 2050
- Must come from virtually the same land area as today.



The Green Revolution





**Ruminants** (134 species in total, 21 domestic species)

- Are not competitive to humans
- Convert plant "protein" and low nutrient density organic materials into food for humans via anaerobic microbial fermentation of fibrous plants and plant residues in the rumen
- Provide services and assist in recycling soil nutrients

**BARENBRUG**

### Essential Ecological Functions of Ruminants

Via anaerobic microbial fermentation of resources inedible by humans (e.g. plants and crop residues) -

- Convert structural and non-structural carbohydrates into fat.
- Convert plant "protein" and non-protein nitrogen into high-quality animal protein.
- Reduce unstable polyunsaturated fatty acids to monounsaturated and stable saturated fatty acids.
- Produce B12 & other vitamins.
- Increase bio-availability of essential minerals.
- Degrade anti-quality plant components (e.g. phytates)
- Maintain health of grassland ecosystems.
- Recycle nutrient and build soil health.
- Provide services (e.g. draft) and byproducts (e.g. leather).
- Generate new wealth.

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Helping you and your animals thrive on grass

### And wouldn't it be really amazing if...

...there were a way to convert inedible (by humans) materials into high-quality food for humans...

...utilizing that portion of the Earth's surface that cannot produce human-utilizable feedstuffs...

...while improving the environment...

...improving human health...

...and increasing human flourishing?

Oh, wait...

**Ruminants RULE!**

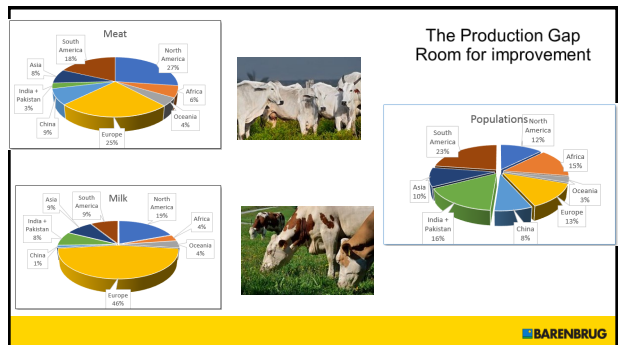
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Rank	Crop	Value 1,000 USD (2012)	Production metric tons (2012)	Top Producing Country & Value (2011)
2	Cow's milk, whole, fresh	\$183,583,111	614,578,723	\$27.6 billion (United States)
3	Cattle, meat	\$170,272,001	63,031,562	\$30.6 billion (United States)
15	Water Buffalo milk	\$37,873,032	95,888,113	\$28.0 billion (India)
21	Sheep, meat	\$22,406,097	8,229,068	\$5.6 billion (Mainland China)
38	Goat, meat	\$9,970,000		\$4.5 billion (Mainland China)
42	Buffalo, meat	\$9,410,000		\$4.0 billion (India)
		\$433,314,241		

[www.fao.org/faostat/en](http://www.fao.org/faostat/en)

**BARENBRUG**





### Grass improves infiltration

Clean-tilt    Over-grazed    Pasture    Cover crop

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### Focus on the water cycle instead of the carbon cycle

Slake Test: Peds from long-term grassland (left) and conventional tillage fields (right) suspended in water column.

Slake Test: After 25 minutes. Water-stable structure on left. No structure on right. Consider impact on water infiltration, runoff, erosion, and surface water quality.

Improved Grazing, Improved Soils, Better Water Quality

**BARENBRUG**

"Cows are nature's carbon capture technology as well as a cheap source of protein for the world."  
Geoff Maynard Australian cattleman & Director of MLA (Meat and Livestock Australia).

See: "Carbon Cows" on Youtube [https://youtu.be/n\\_BD5FApHKc](https://youtu.be/n_BD5FApHKc)

**BARENBRUG**

"Cows [and all other ruminants] are nature's carbon capture technology as well as a cheap source of protein [and fat] for the world."  
Geoff Maynard Australian cattleman & Director of MLA (Meat and Livestock Australia).

See: "Carbon Cows" on Youtube [https://youtu.be/n\\_BD5FApHKc](https://youtu.be/n_BD5FApHKc)

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### I can turn grass into heavy whipping cream.

What's YOUR super power?

**BARENBRUG**

### In the United States

2.1 million principal farm operators<sup>1,3</sup>    2.2 million prisoners (State, Local, & Federal)<sup>2</sup>

\* - But for more than 70% of these, less than 25% of their household income from farming.<sup>3</sup>

1. US Census of Agriculture. 2012. <http://go.usa.gov/fj>  
2. Bureau of Justice Statistics. 2013. <http://go.usa.gov/gGo>  
3. US Census of Agriculture. 2012. <https://go.usa.gov/Vu1K>

**BARENBRUG**

"What's a forage agronomist and what are you doing here?"

**BARENBRUG**

"We didn't evolve to eat meat.  
We evolved *because* we ate meat."

Image from Lascaux Cave, a section of the "Hall of the Bulls" <http://go.usa.gov/gbnc>

**BARENBRUG**



**“Humans are designed to hunt for fat”**  
 Professor Tim Noakes  
 19:10 mark of YouTube video “Full Timothy Noakes interview from Carb-Loaded documentary” <https://goo.gl/zr69IR>

“Eat meat. Not too little. Mostly fat.”  
 Amber O’Hearn  
 ketogenicdietforhealth.org  
 @KetoCarnivore



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**Health food?** **Heart-Healthy Diet Food!**




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**The Products of Forage Agriculture: True Health Food!**



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**Prejudiced marketplace**

“In America, we no longer fear God or the communists, but we fear fat.”  
 David Kritchevsky




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“The great enemy of truth is very often not the lie—deliberate, contrived and dishonest—but the myth—persistent, persuasive and unrealistic. Too often we hold fast to the clichés of our forebears. We subject all facts to a prefabricated set of interpretations. We enjoy the comfort of opinion without the discomfort of thought.”  
 — John F. Kennedy Commencement Address at Yale University, June 11, 1962

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**Know your enemy**



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“What right has the federal government to propose that the American people conduct a vast nutritional experiment, with themselves as subjects, on the strength of so little evidence?”

Phillip Handler, Ph.D., President, National Academy of Sciences, congressional testimony in response to Dietary Goals for the United States, 1980



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This report also cannot begin to discuss the many unanswered research questions. Nevertheless, some of the important questions which are currently being investigated include:

- (1) Does lowering the plasma cholesterol level through dietary modification prevent or delay heart disease in man?
- (2) What is the *exact* relationship between dietary cholesterol and plasma cholesterol?
- (3) Does consumption of a low fat (under 20 percent), low animal protein and high complex carbohydrate diet reduce the risks associated with the intake of dietary cholesterol at current American levels?
- (4) Is hydrogenation of vegetable oils a factor in the development of heart disease?
- (5) How do the various lipoproteins interact, and why does HDL apparently protect against heart disease?

The authors of the *Dietary Goals for the United States* included these questions when the 2<sup>nd</sup> edition was published in 1977.

Quick quiz: How many of these have now been answered?

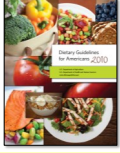
Bonus Question: Have the answers to these questions confirmed or refuted the basic assumptions of the *Dietary Goals*?

Life-Saving Bonus Question: How similar are the recommendations in the *Dietary Goals* and the 8<sup>th</sup> Edition of the *Dietary Guidelines for Americans*?


Discuss amongst yourselves.

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### Unfounded. Untested. Unintended.



**2010 Dietary Guidelines for Americans**



**DIETARY GUIDELINES 2015-2020**

"Though they [the recommended USDA Food Patterns] have not been specifically tested for health benefits, they are similar to the DASH research diet and consistent with most of the measures of adherence to Mediterranean-type eating patterns."  
2010 Dietary Guidelines for Americans — Page 50

"... intended to help individuals improve and maintain overall health and reduce the risk of chronic disease—its focus is disease prevention. The Dietary Guidelines is not intended to be used to treat disease."  
2015-2020 Dietary Guidelines for Americans — Page 6

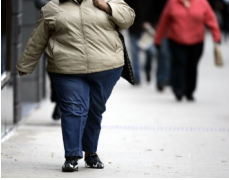
**BARENBRUG**

### Oops, Our Bad ...

"We've all been unwitting subjects in a long observational study, the hypothesis of which is that a low-fat, high-carb diet will reduce obesity, diabetes, and the other so-called diseases of civilization. In my view, it hasn't worked out all that well."

Michael R. Eades, M.D.

"Can we get the low-fat proponents to apologize?"  
Gary Taubes, 2007



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Nearly 30 million Americans have diabetes. 86 million Americans have prediabetes

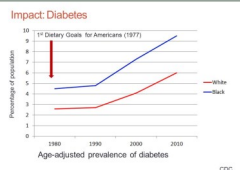
Diabetes and prediabetes cost America \$322 billion per year  
\$1 in \$3 Medicare dollars is spent care for people with diabetes  
\$1 in \$5 health care dollars is spent caring for people with diabetes

Today 3,835 Americans will be diagnosed with diabetes

Today, due to diabetes,  
200 Americans will undergo an amputation  
136 Americans will enter end-stage kidney disease treatment  
1,795 Americans will develop severe retinopathy leading to vision loss and blindness

<http://www.diabetes.org/diabetes-basics/statistics/infographics/diabetes-staggering-cost-of-diabetes.html>


### After 36 years...



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### 2012 in West Virginia

Adults –  
69.0% overweight/obese  
32.4% obese, 3<sup>rd</sup>  
12.1% diabetes, 1<sup>st</sup>  
37.1% hypertension, 6<sup>th</sup>  
Children (10-17y)  
Overweight/Obese 35.5%, 8<sup>th</sup>



<http://healthyamericans.org/assets/files/TFAH2012FasInFatFriRv.pdf>

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<https://www.dietsdoctor.com/member/presentations/eenfeldt-ad>

**BARENBRUG**

I dream of the day when the public understands that their consumption of the products in the background ...

... lessens their need for the products in the foreground.



Happily, THAT day is fast approaching!

**BARENBRUG**

**You can tell when Idols are being worshiped, human beings are being sacrificed.**



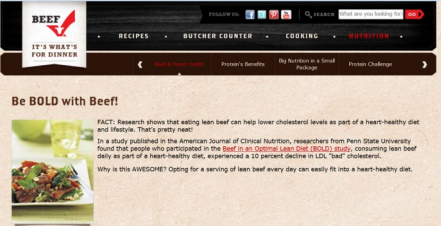
**"Is there anything more pitiful than a life lost in the service of some unsound belief?"**

Thomas Gilovich. 1991. How We Know What Isn't So: The Fallibility of Human Reason in Everyday Life. Free Press, New York, NY

**BARENBRUG**

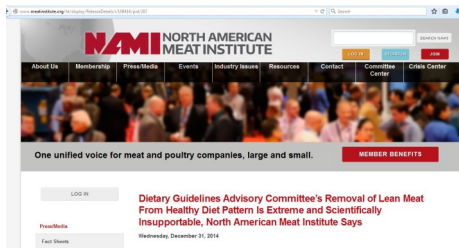
### An example of the Stockholm Syndrome ... ?

It's time to update your marketing to reflect the science!  
Animal fat is not a health threat!!



**BARENBRUG**

## Red meat out ... ?



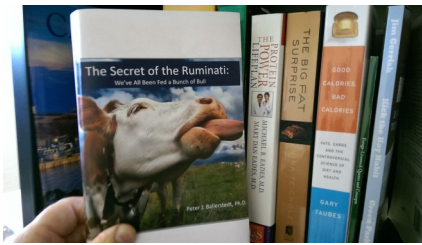
BARENBRUG

## So let's review...

1. "nutrition research does not support that vegetarian diets are healthier than animal based diets"
2. The hypothesis that natural saturated fats from animal products causes vascular diseases has been refuted.
3. The hypothesis that dietary cholesterol lead to vascular diseases was never supported by research. It was primarily a marketing campaign promoting plant product replacements for animal products.
4. Animal protein is superior to plant protein for human nutrition.
5. Polyunsaturated fatty acids from plants have been shown to produce harm in humans.
6. Diets high in animal products and restricted in carbohydrates (high in natural fats) have been shown to produce greater weight loss, better blood glucose control, and reduced CVD risks than low fat (high carbohydrate) diets.
7. Ruminants are not competitive to humans. They convert plant "protein" and low nutrient density organic materials into food for humans via anaerobic microbial fermentation.
8. Modern humans exist because of ruminants, modern societies depend upon them, and they will be critical to the future of humanity.



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## Thank you!



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## Questions



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## Speaker Biography



### Chris Helzer

Chris Helzer is the Director of Science for The Nature Conservancy in Nebraska. He has spent his 20-year career managing and restoring grasslands in the state, both for work and for his family. His current role focuses on evaluating various management strategies, including grazing, prescribed fire, and invasive species control in order to share successful techniques with landowners and other land managers. Chris writes a blog called The Prairie Ecologist and authored a book entitled, *The Ecology and Management of Prairies in the Central United States*. He is also a frequent contributor to *NEBRASKAland Magazine*. Chris lives and works in Aurora, Nebraska.

Helzer holds a bachelor of science degree in forestry, fishery and wildlife, and his master's in landscape ecology, both from the University of Nebraska-Lincoln.

## The Good, Bad, and Ugly of Weedy Plants

Chris Helzer, The Nature Conservancy

There is a critically important difference between “invasive plants” and “weeds” in rangeland. Invasive plants act aggressively to take and hold territory in pastures, displacing other plant species, lowering plant species diversity, and/or reducing forage quantity. Weeds, on the other hand, include a wide range of plant species that generally take advantage of already-weakened grass stands and fill space left open because of drought, intensive grazing, or other impacts. In most cases, weeds are opportunistic and poor competitors, and generally decrease in abundance as dominant grasses regain their vigor.

Weedy plants, including both native and non-native species play necessary roles in the ecology of grasslands. They fill in when other plant species have been weakened, providing forage, pollinator resources, wildlife habitat, soil nutrition/stabilization and other valuable contributions. Once the dominant perennial plants in a pasture are given the chance to recover, weeds decrease in abundance or disappear until their next opportunity. Because of this, attempting to control opportunistic weeds is not cost effective and usually results in opening up additional space for either the same weeds or different ones. Weedy plants are not outcompeting grasses and other desirable plants – they are reacting to those plants being weakened.

Recognizing which plant species are weedy versus invasive can help save money and time. In addition, allowing opportunistic weeds to fill their roles in pastures allows them to provide the pollinator, wildlife and soil health benefits they are capable of.

Examples of invasive species in Nebraska grasslands:

Leafy spurge	Canada thistle
Sericea lespedeza	Eastern red cedar
Siberian elm	Reed canarygrass
Narrowleaf/hybrid cattails	Spotted knapweed
Caucasian bluestem	Crown vetch
Others...	

Examples of weedy species in Nebraska grasslands:

Ragweeds (annual, western, giant)	Annual sunflowers
Marestail	Snow-on-the-mountain
Buffalo bur	Hoary vervain
Evening primroses	Tall thistle
Fleabane	Black medic
Goat’s beard (Salsify)	Gumweed
Others...	

## Speaker Biography

### Nancy Peterson

Dr. Nancy Peterson was born in the Colorado mountains, and grew up with four brothers and 700 cows. By the time she could walk she was passionate about cattle and was never far from her dad's side.

She went to veterinary school in order to bring a useful skill back to the family ranch, and graduated from Colorado State University's School of Veterinary Medicine in 1979. Shortly thereafter, she married Rex Peterson, an architect, and practiced in a small animal hospital in Greeley, Colorado. In 1981, they went back home to Yampa, Colorado where she started her own mixed practice, which was about 85% cow/calf. It was a great place to raise their three children. After 18 years there, the demographics of the Yampa Valley changed so dramatically (way more skiers than cows), it was obvious that Nancy either needed to change the focus of her practice to companion animals, or move to some place with more cows.

In 1996, Nancy had an opportunity to work in a Sandhills practice; the Petersons' jumped at it. Two years later, they were able to purchase a small ranch that later became Plum Thicket Farms. It could run 200 cows for about 5 months and had a small amount of farm ground. After two tours of duty in both Bosnia and Iraq, the Peterson's eldest son, Patrick, came home with a passion to farm. Since that time they have tried to tie the two enterprises together in a symbiotic relationship. The farm ground allows them to run a lot more cows and graze them for 10 months of the year, and the cows hasten the building of top soil and soil fertility.





## Plum Thicket Farms

- Our mission is to produce high quality cattle, forage, and grain with management practices that foster the best stewardship of our land, our livestock, our soil, and our human resources.

- 560 acres under pivot irrigation
- 1740 acres Dry Land farm ground
- 4200 acres of pasture
- Will breed 315 cows
- Will breed 151 yearling heifers for 25 days
- Will sell excess bred heifers this fall
- Feed open heifers and sell direct to consumer
- Back ground all steers calves through March

## Human Resources

- I serve as General Manager.
- My husband and I manage the cattle.
- My son heads the farming operation and does most of the farming.
- We hire two summer interns.
- We would like to develop fall and winter internships

## We are committed to No till farming.

- Farm ground is very sandy with low fertility
- Prone to both water and wind erosion
- Very diverse rotations with plenty of opportunity to add animal interaction
- Builds soil structure and allows the creation of a diverse soil biologic community
- Improves ability for soil to hold water
- After 10 years see improvements in yield

## Dryland Crop Rotation

1. Spring Cash Crop (oats, peas, spring wheat)
2. Wheat → cover crop for fall grazing
3. Corn
4. Warm season cocktail (include clovers)
5. Cool Season Cocktail
6. Wheat
7. Rye for grazing → warm season cocktail
8. Sorghum for swathes



## Irrigated Crop Rotation

1. Oats & peas for forage → Warm season C.T.
2. Wheat → cool season C.T. including rye
3. Rye for grazing → beans → Rye for spring
4. Corn

Goal is to feed as little harvested forage as possible.

- Rye on pivots for late April/May grazing
- Cool season cocktails pre-breeding
- mob grazed sorghum post breeding
- warm season cocktails for fall grazing
- oat/rye cover crops following irrigated wheat
- Corn stalks
- Native range
- Sorghum swathes



Forage Cocktail following rye



Warm Season Cocktail

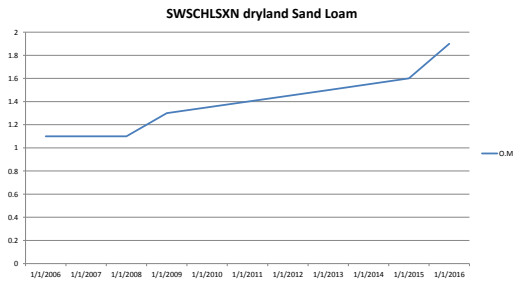


### Why do we mess with annual forages?

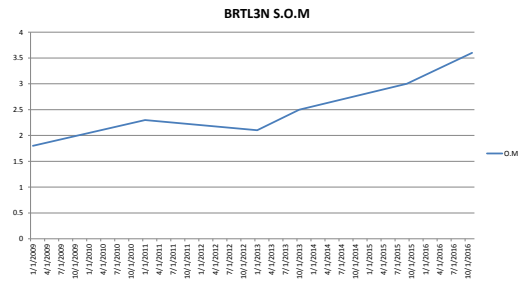
- Pasture is our limiting factor. We could only graze 200 pair and 100 yearling heifers for about 7 months. We could not keep the steers
- Farm ground is sandy and sandy-loam
- Current commodity prices make it hard to make a profit
- We are measuring huge improvements to our soil structure, soil biology, and organic matter



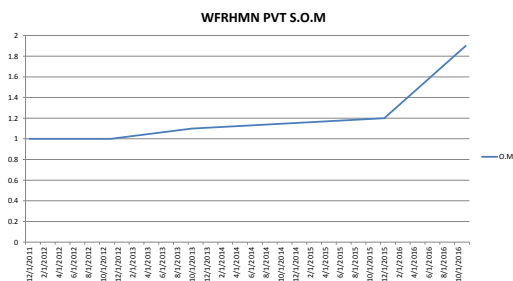
## S.O.M Dryland Sand Loam



## S.O.M. Silt Loam



## S.O.M Irrigated



## Native Pasture Management

- In 1999 an EQUIP grant allowed us to cross fence and develop water to set up a deferred rest-rotation grazing system
- It was in place for the drought years 2002-2007. In spite of drought, pastures improved
- Use of annual forages allows us to push more of it into a full growing season rest which is especially good in drought recovery

Pasture is back-up to dryland forages in case of hail, crop failure or other disaster

Grazing rotation is flexible enough to change at a moment's notice

A second Equip grant has allowed us to further cross fence pastures so we can be on them for only two weeks of the growing season

We have range monitoring sites in all pastures

We have planted over 6000 trees in the last 18 years

## Speaker Biography



**Patricia Johnson**

Pat Johnson is Professor of Range Science in the Department of Natural Resource Management at South Dakota State University (SDSU). She has a bachelor of science in biology and bachelor of arts in mathematics from Fort Lewis College in Durango, CO, and master's of science and doctorate in range ecology and management from Utah State University. She joined the faculty at South Dakota State University in 1986 and has been stationed at the SDSU West River Ag Center in Rapid City for 19 years. Her research has focused on grazing management and plant-animal interactions. Study topics have included grazing systems, patterns of plant utilization, and cattle-prairie dog competition. She is currently working on evaluating the effects of winter-patch grazing on cattle production and wildlife habitat.

## **Managing Grassland Vegetation to Benefit Livestock and Wildlife**

**Patricia S. Johnson, Jameson Brennan, Kenneth C. Olson, and Kent C. Jensen**

### **Introduction**

Plant communities in the Northern Great Plains (NGP) were historically a mosaic of plant communities and habitat types that supported diverse populations of wildlife species. Natural (e.g. lightning caused) and human (Native American) caused fires periodically burned large expanses of grasslands. Large herds of bison migrated nomadically in response to fire and climatic conditions, resulting in a “rotation” of areas of heavy use and areas of minimal or non-use. These pre-settlement grazing and fire regimes resulted in a mosaic of low, mid, and high seral stage plant communities (Samson et al. 2004). Grazing and fire regimes in the NGP have, however, changed markedly over the past 200 years. Fires were largely eliminated out of fear and concerns over forage losses. European settlement brought widespread and constant heavy livestock use in the mid- to late-1800’s, leading to serious deterioration of plant communities and significant soil erosion throughout the NGP (Young, 1994; Laurenroth et al. 1994).

In the early- to mid-1900’s, considerable efforts were made to improve grassland conditions through a variety of grazing management strategies, with the goal of improving all grazed ecosystems to “excellent range condition” (i.e. climax or high seral plant communities). Those strategies, including the more contemporary grazing strategies designed to promote uniform use of plant communities, have resulted in reduced heterogeneity at both small (pasture) and large (landscape) scales (Fuhlendorf and Engle, 2001; Derner et al., 2009).

A known consequence of the loss of heterogeneity in the NGP is the decline of native bird species populations. Grassland birds have declined more than other bird groups in North America in the past 3 to 4 decades (Vickery and Herkert, 2001; Sauer et al., 2008). The NGP are the last stronghold, due to our intact native grassland ecosystems, for several high-priority bird species, including the grasshopper sparrow, short-eared owl, chestnut-collared longspur, long-billed curlew, Wilson’s phalarope, and marbled godwit. Two additional species, lark buntings and chestnut-collared longspurs, are also listed in the latest South Dakota Wildlife Action Plan (SDGFP 2012) as species of greatest concern. Bird species native to prairies evolved within a grazed grassland mosaic ranging in gradient from idle to excessively disturbed areas (Knopf 1996); Reynolds and Symes 2013). This mosaic of habitat types is needed to accommodate the diverse habitat requirements of grassland birds (Bakker et al., 2002; Fritcher, 1998; Fuhlendorf et al., 2006). Conversion of native grasslands to crops has significantly reduced available bird habitat, thus it is critical, for the conservation of grassland species, that we manage for increased heterogeneity on remaining grasslands (Augustine and Derner 2012; Fuhlendorf and Engle 2004).

Another consequence of loss of heterogeneity is reduction in biodiversity, which can lead to decreased resilience and stability of ecosystems with drought (Loreau and Mazancourt, 2013), climate variability (Isbell et al., 2015), and invasion by exotic species (Hooper et al., 2005). Underutilized or unused portions of a heterogeneous mosaic can serve as emergency forage during drought; they may also provide a reservoir of species needed for recovery from disturbances (Keppel and Wardell-Johnson, 2012). Biodiversity also can increase ecosystem productivity (Hooper, et al., 2005) and improve nutrient cycling, soil health, water quality, disease/pest control, and pollination (Kremen 2005).

### **Strategies for Increasing Heterogeneity**

#### **Fire**

Recent studies have examined effects of fire and grazing on grassland birds and their habitats (Fuhlendorf et al., 2006; Churchwell et al., 2008). These studies indicate that patch-burn management is beneficial to grassland bird diversity by promoting a shifting mosaic of habitat types, which can lead to greater bird diversity (Fuhlendorf and Engle, 2004; Derner et al., 2009). In addition to positive impacts on wildlife habitat, livestock responses to shifting mosaics of habitat types caused by patch-burning are very encouraging. Grazing animals focus a disproportionate percentage of their grazing time on the most recently burned patches, and weight gains are similar to those obtained from more traditional grazing strategies (Fuhlendorf and Engle, 2004; Augustine and Derner, 2014).

#### **Grazing**

Fire is not a universally accepted management prescription on all rangelands. Many landowners and managers are very averse to burning. Concerns include safety, liability, forage losses, and limitations of labor, equipment, and insurance to successfully carry out prescribed burns (Toledo et al., 2014). Therefore there is a critical need to evaluate alternative, non-pyric management strategies that will encourage rangeland heterogeneity. Derner et al. (2009) identified the need for evaluating the use of grazing livestock to achieve heterogeneity-based management objectives on rangelands of the NGP. Adoption of management to promote heterogeneity may occur more readily if patches are created using grazing rather than fire. In a recent study, Lwiwski et al. (2015) determined that varying stocking rate levels across a landscape could increase heterogeneity at the landscape scale. At the pasture scale, however, studies evaluating grazed rather than burned patches to create heterogeneity are essentially non-existent, with the exception of our study at the SDSU Cottonwood Research Station.

### **Winter-Patch Grazing**

The **long-term goal** of our research is to develop rangeland management strategies that provide economic benefits to livestock producers while improving the heterogeneity of grassland ecosystems. We have been studying the effectiveness of winter-patch grazing as an alternative to patch-burn grazing (pyric herbivory) for developing rangeland heterogeneity since 2012 at the Cottonwood Research Station in western South Dakota. The objectives of this research are to determine the extent to which winter-patch grazing on NGP mixed prairie pastures 1) increases vegetation structural heterogeneity, 2) increases/improves habitat for at-risk grassland bird species, and 3) affects cattle performance.

Development of grazing-created patches that function similarly to fire-created patches requires heavy grazing for a limited period of time, which can reduce livestock performance (Olson, 2005) and economic returns (Workman, 1986). We chose to create those patches by grazing with non-lactating, gestational beef cows in winter. Winter grazing of beef cows is a common practice in the NGP, and supplementation with a high-protein feedstuff is a standard practice used to overcome the protein deficiency typical of low-quality, dormant forage. Altering the winter grazing pattern to heavy utilization of targeted patches requires an increased level of supplementation, however, it should not require a substantial change in winter management for cattle.

For the first 4 years of our study, we divided each winter-grazed patch (WPG) pasture into 5 areas (patches) of similar size (about 20% of the pasture). One patch was grazed heavily in winter the first year, a different patch the next year, and so on until all 5 patches have been winter-grazed. The rotation of winter-grazed patches was planned to continue in subsequent years. Yearling steers grazing the pastures in summer have access to the entire pasture, including the winter-grazed patches. There is a paired control pasture with no winter-grazed patches for each WPG pasture. Steers graze these pastures in summer at the same time as steers are grazing the WPG pastures. In each year of the study we collected information on steer performance, steer utilization patterns (using GPS collars), plant community species composition, patch and non-patch vegetation, utilization, bird habitat, and bird use of pastures.

### **Some Results**

**Cattle Use Patterns:** Steers prefer ( $P < 0.05$ ) the winter-grazed patch in spring/early summer (Figures 1 and 2A), similar to the results of studies conducted with patch-burning in the Southern and Central Plains (e.g. Fuhlendorf and Engle, 2004; Augustine and Derner, 2014). Heavier use during spring maintains a shorter plant community in the patch, with a taller plant community in the rest of the pasture. This provides potential habitat for birds with different nesting requirements. It also could lead to plant community changes. Steers shifted their preferences to other parts of the WPG pasture later in summer (Figure 2B) as forage availability in the patch declined and vegetation matured.



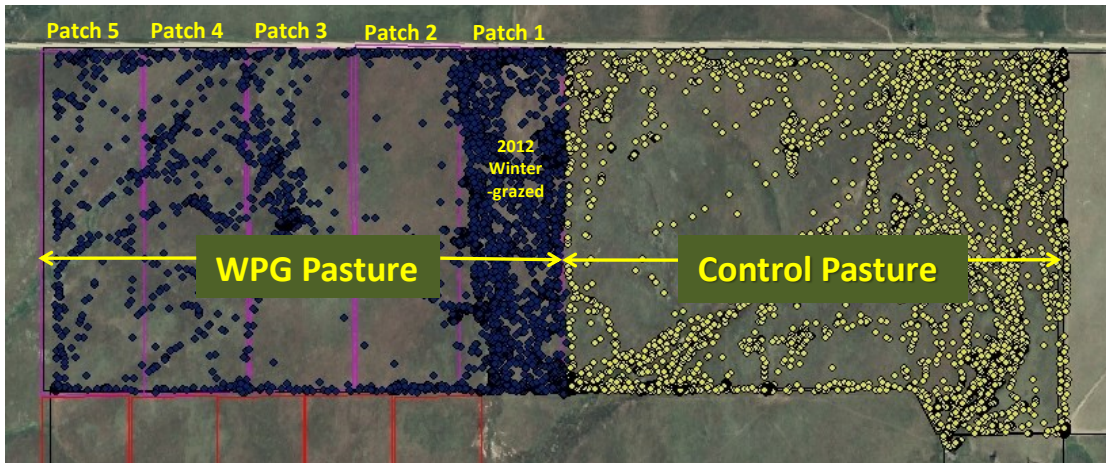


Figure 1. Example of early summer distribution patterns of a GPS-collared steer in the winter-patch grazed pasture (WPG) and control pasture (CG) at the Cottonwood Research Station in 2012.

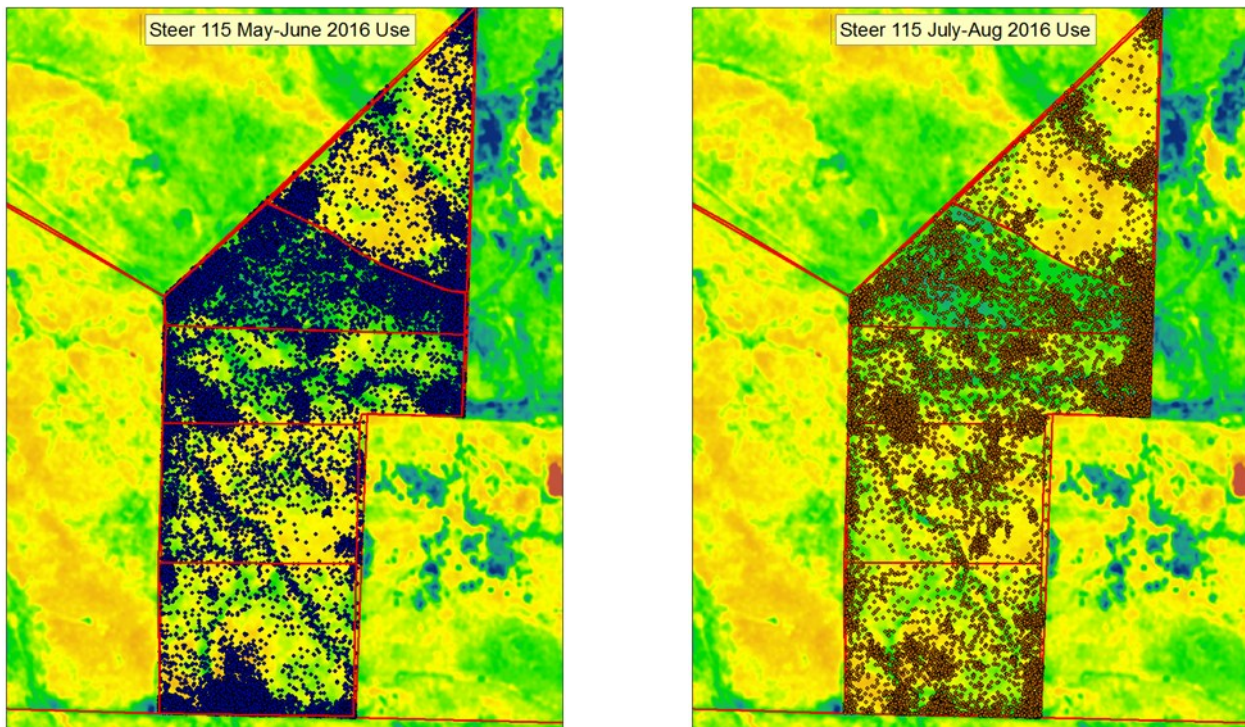


Figure 2. Example of May-June (A) and July-August (B) distribution patterns of one GPS-collared steer in a winter-patch grazed pasture (WPG) at the Cottonwood Research Station in 2016.

**Vegetation:** Satellite imagery taken in May 2016 demonstrates the impact of WPG on the greenness of vegetation (Figures 3 and 4) WPG resulted in greater vegetation structural heterogeneity compared to control pastures. The winter-grazed patch for that year maintained a shorter structure throughout the growing season than was found in the non-patch areas of WPG pastures and in control pastures. This was due initially to the reduction in standing dead from heavy grazing the previous winter. It was maintained, however, by heavy use by the steers, especially early in the season when most cool-season grass species are green and growing.

**Cattle Performance:** Steer weight gains were not different ( $P > 0.05$ ) between the WPG and control pastures (Figure 5). This is a very similar outcome to those of patch-burn studies (e.g. Fuhlendorf and Engle, 2004; Augustine and Derner, 2014). In spring, steers on the WPG pastures are attracted to the winter-grazed patch (Figure 2A) due to the easy availability of nutritious green grass growth. New green growth is much less available in the off-patch area because it is embedded in previous years' standing dead. As the season progresses, steers shift to the off-patch areas (Figure 2B) with more abundant forage. The patterns of grazing by steers on control pastures were very different; they grazed throughout control pastures for the entire grazing season. Grazing strategies that do not at least maintain livestock weight gains represent a significant cost to livestock producers, and are far less likely to be adopted by the NGP ranching community.

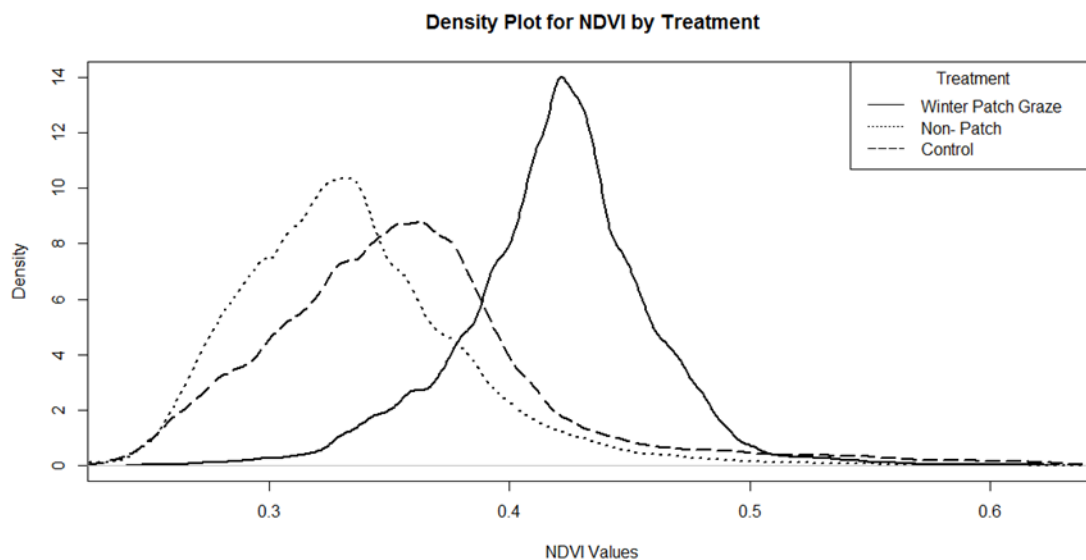


Figure 3. Graph of Normalized Difference Vegetation Index (NDVI) of Pasture 3 at the Cottonwood Research Station in May 2016. Curves indicate the greenness of the winter-grazed patch (WPG—), the remaining non-patch area of the WPG pasture (Non-Patch — ), and the control pasture (Control - - -). Higher NDVI values indicate greater greenness.

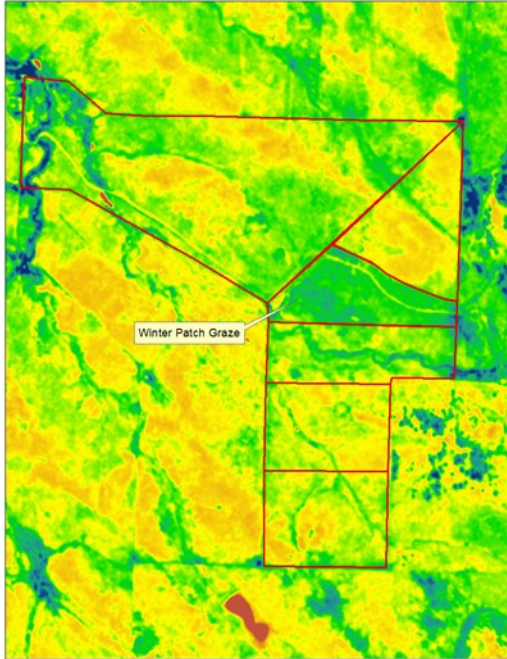


Figure 4. NDVI (Normalized Difference Vegetation Index) image of Pasture 3 at the Cottonwood Research Station in May 2016.

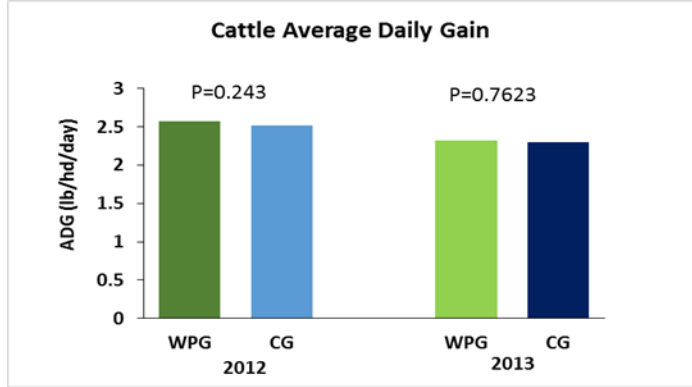


Figure 5. Steer average daily gains (lb/hd/day) while grazing winter-patch grazed pastures (WPG) and control pastures (CG) at the Cottonwood Research Station in 2012 and 2013.

**Birds:** It appears that birds responded positively to WPG. Bird abundance was greater on the WPG pastures than on control pastures (Figure 4). Perhaps more importantly, bird diversity was either the same or greater (depending on year) in the WPG than on control pastures (Figure 5). This at least suggests that a greater variety of bird species found conditions in the WPG pastures suitable for their activities compared to the control pastures.

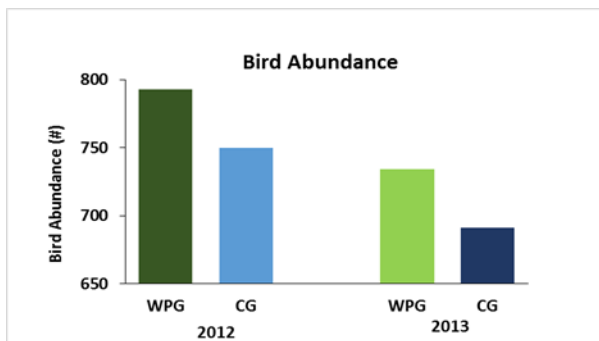


Figure 4. Abundance of birds on winter-patch grazed pastures (WPG) and continuous, season-long pastures (CG) in 2012 and 2013.

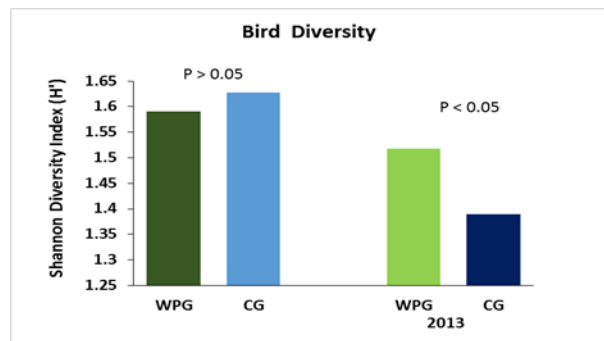


Figure 5. Bird species diversity on winter-patch grazed pastures (WPG) and continuous, season-long pastures (CG) in 2012 and 2013 calculated with the Shannon-Wiener index (H').



## WPG vs. Fire

A wildfire (The Cottonwood Fire, Figure 6) burned through our research station pastures in October 2016, dramatically altering our options for continuing this research. Most of our WPG pastures were burned by the fire, as were parts of our control pastures (Figure 7). Our options for continuation of our WPG vs. control comparisons were severely restricted.

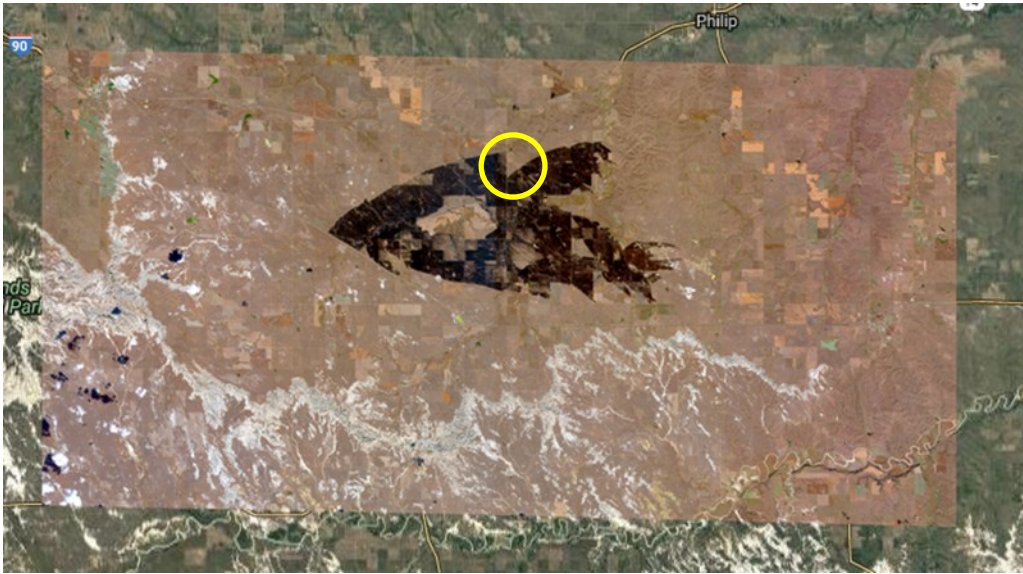


Figure 6. Satellite image of the Cottonwood Fire that burned 41,360 acres on October 16, 2016. Circle (○) indicates approximate location of the South Dakota State University Cottonwood Research Station.

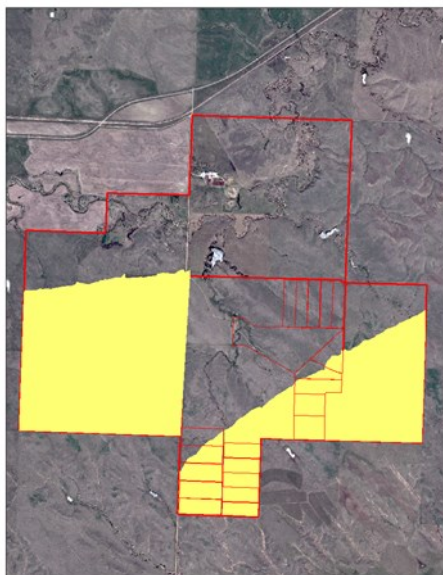


Figure 7. Satellite image of the South Dakota State University Cottonwood Research Station (—). Areas of the station that were burned in the Cottonwood Fire on October 16, 2016 are highlighted (■). The fire burned 1103 acres of the 2580 ac station. Contiguous areas west, south, and east of the station were also burned in the fire.

We had, for two years, submitted proposals to USDA NIFA programs for funding to continue this research and had been asked to consider including fire in our study. We respectfully refused to do so due to the concerns of land owners in the region. In our third proposal submission we were finally approved to do the study without fire. Then the Cottonwood Fire happened. This has provided us with an unintended opportunity to compare WPG with patch-burn grazing (PBG).

In 2017 we modified our research to include areas that had been burned by the Cottonwood Fire in our study by comparing WPG, (PBG), and control areas in 3 pastures. Cattle have access to all 3 areas (WPG, PBG and control) in each pasture from May through August. We are evaluating cattle distribution patterns (using GPS collars), utilization, vegetation community and structure, bird habitat, and bird use on these pastures. Additional studies include evaluation of soil moisture, seed banks, and soil microbial communities.

**Acknowledgements:** This research is being funded by the North Central Region Sustainable Agriculture Research and Education program (NCR-SARE, Project #LNC15-371), USDA National Institute of Food and Agriculture: Agriculture and Food Research Initiative Competitive Grants program (NIFA AFRI, Project # SD00G643-17), and the South Dakota Agricultural Experiment Station (SDAES).

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## Speaker Biography



**Dwayne Elmore**

Dwayne Elmore is a wildlife Extension specialist and Bollenbach Chair in Wildlife Biology in the Department of Natural Resource Ecology and Management at Oklahoma State University. He has both Extension and research responsibilities. Specific areas of interest include wildlife habitat relationships, the role of disturbance to maintain sustainable ecosystems, and social constraints to conservation. Current research projects are focused on how range management and human activity affect northern bobwhite, greater prairie-chicken, lesser prairie-chicken, and wild turkey.

Dwayne works with various stakeholder groups including the Natural Resource Conservation Service, Farm Service Agency, U.S. Forest Service, and the Oklahoma Department of Wildlife Conservation to provide technical assistance on land management issues.

Elmore earned a bachelor of science degree in wildlife biology from Tennessee at Martin, a master's of science degree in wildlife and fisheries science from Mississippi State University, and a doctorate in wildlife biology from Utah State University.

NOTE: Presentation materials not included in proceedings.

## Speaker Biography



**John Maddux**

John Maddux is the fourth generation manager of the family ranch operations, which includes 45,000 deeded and leased acres, 2,500 mother cows, and 6,000 yearlings. In addition to his daily ranch duties, he is a past member of the Nebraska Grazing Lands Coalition; the Nebraska Investment Council, which is responsible for managing the state's \$9 billion in pension assets; and State Bank Board of Directors. Prior to returning to the ranch, John was employed by Goldman Sachs of New York in Fixed Income Sales and Trading, and prior to that worked for Elanco selling herbicides. He has an undergraduate degree in animal science from the University of Nebraska and a master's in finance from the University of Chicago. John and his wife, Julia, have two boys, Taylor, 9, and Thomas, 6.

NOTE: Presentation materials not included in proceedings.

## Speaker Biography



**Jim Jenkins**

Jim received a bachelor's degree from Principia College in Elsah, Illinois and did graduate work at Northwestern Kellogg School of Business in Chicago. In addition to formal studies, Jim has over 35 years of experience in agriculture and food related industries.

Jim is the operating partner for his family's diversified farming and ranching operation near Callaway, Nebraska. Beginning in 2007, Jim transitioned the family cattle operation from cow/calf to a stocker operation. In 2015, the ranch began feeding cattle, both at its own facilities, and with custom feedlots. In 2017, the cattle operation will market 3,000 head of live cattle and yearlings. In addition to livestock, the Jenkins family operation includes crop production of corn, soybeans and alfalfa hay. Since returning to the ranch in 1996, Jim has implemented advanced grazing practices leading to 20% to 40% increase in stocking rates, depending on the year. The Jenkins ranch has been featured in *Nebraska Farmer Magazine*, the *Omaha World Herald* and the *Kearney Hub* for its innovative farming and ranching practices.

Jim is a board member and past chairman of the Nebraska Ethanol Board; is a past board member of the Nebraska Grazing Lands Coalition; former executive director of the Nebraska Corn-Fed Beef program; served for nine years on the Custer County Planning Commission; a past president of the Nebraska Restaurant Association, and a past member of the President's Advisory Council at the University of Nebraska. Jim currently serves as a board member of Agricultural Builders of Nebraska.

In 2000 Jim was presented the Champion of Small Business Award from the University of Nebraska Business Development Center for his role in founding Wild West, Inc., which owned and operated the Whiskey Creek Steakhouse chain. Jim continues to have a business interest in two Skeeter Barnes restaurants located in Kearney and Columbus, Nebraska.

## Operation Overview

Our ranching and farming operation consists of 2,836 acres of pasture, 240 acres of irrigated ground and 560 acres of dry land crop ground. We lease an additional 200 acres of pasture adjacent to our ranch and have a long-term lease on another 1,600 acres of pasture near Ogallala, Nebraska. About 60 percent of our pastures are upland, loess hills and the remaining pastures adjoin two creeks that run through the ranch. Our irrigated ground produces from 200 to 230 bushels of corn per acre, while the dry land ground has averaged near 100 bushels per acre over the ten years. All of our farming is done through a crop share arrangement with a neighbor.

Up until 2007 we were a cow calf operation, selling our calves in the late winter or spring after a 60 to 90 day back grounding period. Beginning in 2007 we began the transition from a cow/calf to a yearling operation, buying calves in the October and November and selling them at 900 pounds in July and early August. In 2013, we decided to add 1,000 head of feeding capacity, bringing our total capacity to 1,500 head. We have divided our operation between two Limited Liability Companies, one owning the land, facilities and equipment and the other owning the cattle.

At our main ranch we rotate our cattle through 24 pastures ranging in size from 35 acres to 325 acres. We typically turn out around May 1 and have all of our cattle sold or in the feedlot by August 1. During the winter phase we graze both cornstalks and leftover winter pasture residue while supplementing the cattle with wet distillers and grind, consisting of medium and low-grade forages. For the finishing stage, we utilize our own feeding facilities as well as custom feed-yards in central Nebraska.

In 2017 our ranch will market 3,200 head of cattle, most of them as finished sold for slaughter, but a few as yearlings.

## The Vision

In 2007 we decided to change the way we operated with the goal of making our business more flexible and nimble thereby enabling us to better avail ourselves of opportunities presented in the ever changing, volatile environment known as agriculture. For a variety of reasons, we were underutilizing our land resources, our equipment and facilities and our human resources. During this period we transitioned from cows and calves to yearlings and eventually added a feedlot component. We invested close to \$150,000 in 10 miles of underground pipeline, 37 new tanks and over 8 miles of new fencing, some high tensile wire and some conventional four wire barbed. We also made an investment in a feed truck, used pay-loader and upgraded our livestock handling facilities.

Our goal was to increase our carrying capacity by roughly 30%. To accomplish this we would need to successfully execute our rotational grazing program and more fully utilize winter pasture and stock residue. We also came to understand the importance of supplementation both in the winter and summer to help extend our forage resources, especially in time of drought. Finally, as our program evolved, we begin to understand the importance of finishing cattle to enhance our financial returns.

A number of business gurus have cited the concept that it takes at least 10 years to reach a high level of proficiency in any field. My personal focus for most of my adult life has been the restaurant business. It was around 2007 that I begin to focus most of my time on our cattle and agriculture business and I can assure you I have needed ever one of the last ten years to reach some level of proficiency on grazing, nutrition, herd health, risk management, marketing, accounting, human resources and the many other issues that cattle producers face each and every year.

## The Economics of Grazing

Pastureland in our area in central Nebraska sells for approximately \$1,000 per acre, depending on the quality of infrastructure, cedar tree infestation and the size of the parcel. That same pasture, cash rents in a range of \$35 to \$45 per acre. If we use \$40 per acre and divide it by \$1,000 for the land cost, we come up with a 4% return on the investment. However, one has to pay taxes on the land and in most instances must pay for the upkeep of fences, wells and other infrastructure. And if there is a mortgage involved, you will have some of your return diminished by interest payments. All of this can easily add another \$10 to \$15 of expense per acre, thereby lowering your return from \$40 dollars to perhaps as low as \$25 dollars, or 2.5 percent. And many people, including my banker, one argue that the return is closer to 1 percent. As a landowner, your hope is that the return over time will be further enhanced by appreciation.

So now that we have established a baseline economic value for an acre of grass, a question to answer is what can we do through our cattle business to enhance that rate of return. One answer might be to improve the profit margins on your cattle by building a business that can be more flexible and opportunistic in capturing better margins. Another answer is to use rotational grazing to run more cattle per acre, thereby increasing your return on your land or (if you are the landowner and cattle owner), lowering the costs of grazing the cattle. More cattle can also help to amortize labor and equipment costs across more cattle. There are other answers that lead to better economic returns that we will discuss later.

In 2017, our land, equipment, labor and facilities entity charges our cattle entity \$1.00 per head per day for yearling cattle. We also charge our cattle entity 30 cents per day per head for yardage. Finally we have some mineral and veterinary charges that amount to another 12 cents per head per day. This totals \$1.42 per head per day. If the cattle gain 1.9 pounds a day, the cost of gain on summer pasture totals 74.7 cents per pound.

Increasing the carrying capacity of a ranch has the potential to provide significant economic returns but has to be carefully balanced against possible negative impacts on animal performance and pasture quality. And as with any capital investment, it is possible to spend too much money on infrastructure thus lowering your return on the investment.

As an example, lets say a ranch can run 750 yearling cattle on a set stocked, continuous grazing program. If the cattle are charged out at \$1.00 per day pasture rent for 150 days the total income generated for the land would be \$112,500 ( $750 \times \$1 \times 150$ ). By increasing the carrying capacity by 20% using a rotational grazing program the ranch can now run 900 head and generate income of \$135,000. At 30% the income jumps to \$146,250. If the ranch spends, for example, \$100,000 to earn an extra \$22,500, the return is just over 4 years, or 22.5%. However, if you spend \$300,000 the return drops to an 7.5%, which is still solid. As is always the case, it is best to use fairly conservative assumptions when calculating the return. Personally on this kind of investment, I would like to see a return well north of 10%.

We believe we have increased carrying capacity on our ranch by at least 20% to 25% over our former set stocking rate approach. This number is hard to nail down because of the variance year to year in rain (both amount and timing) and markets (we have sent cattle early some years because we were selling into a great market). And in some years we have made decisions to improve certain pastures by not grazing them at all. One year we bought fewer cattle because we didn't like the market structure. The bottom line, however, is we want to have the flexibility to surge cattle numbers when the conditions are right.

Other economic benefits that we see from rotational grazing include lower fly populations; higher weight gains and improved herd health from ease of monitoring. Cattle also are easier to handle as a result of intense interaction with humans, horses and equipment because of the rotational grazing process. Finally, we believe we are seeing an overall improvement in pasture health.

#### The Economic Benefits of Yearlings

Our ranch for better or worse has an abundance of cool season grasses. Over the years we have noted that during May and June we were almost never able to keep up with our grass. Much of the cool season grasses grew up, headed out with nary a chance of being consumed by an animal. This high volume spring/early summer grass growth phenomenon in combination with high seasonal prices for yearling cattle in mid-July and early August lead us into the yearling business.

The yearling business allows us to fit the cattle much better to the time of highest grass growth and productivity. We also discovered through sample weights and fecal samples that our best weight gains occurred in the May 1 to July 1 time frame, with gains falling off pretty significantly in late July and August.

By resting our pastures from mid-July to frost, our warm seasons grasses experience regrowth up through the end of August and our cool season grasses enjoy some regrowth in September and early October. This typically leaves us with significant winter residue in our pastures, which can be grazed in the winter months with little if any negative impact to our pastures. For wintering grazing we typically charge our livestock 27 to 30 cents per day depending upon hay prices.

Perhaps most importantly the yearling business allows us to run significantly more cattle when the grass and market conditions are right. This year is a good example. We received excellent moisture in the fall of 2016 and so went into the winter with an excellent soil profile. In March, April and May we received excellent moisture as well. At the same time the calves we bought in the fall were gaining significant equity as the market made a dramatic rebound from the October lows. Our original plan was to graze 800 to 850 head on our core ranch until July 15. Because of market conditions and grass conditions, we ended up grazing an average of 1,100 head during that same time frame.

The decision to graze more cattle in the spring and early summer of 2017, was made easier because the cost of gain in the feedlot for calves on a grower diet was approximately 1.35 cents a day (including yardage) or 67.5 cents per pound of gain. Finish diets as of early June were projecting cost of gains for steers around 70 cents and heifers at 75 cents. So the cost of gain in the yard was in fact equal to, and probably better than the cost of gain on grass. An offset to this is that cattle coming off grass perform better in the feed-yard than cattle coming out of back-grounding lots. Grass is also important if you need to grow frame on lesser quality cattle before putting them onto full feed.

A yearling program also enables one to purchase cattle in the fall of the year during the seasonal lows of the calf market. The bigger end of those calves can go immediately onto a full feed, while the lighter and smaller framed cattle can be back-grounded on winter pasture and cornstalk residue, supplementing them with wet distillers and grind to gain 1.75 pounds per day. Our goal is to have cattle to sell throughout most of the year, thereby spreading our risk over several different marketing windows.



The flexibility of our grazing program is demonstrated in the pasture rent charged to our cattle operation since the 2012 drought year. In the 2013 to 2014 cycle our pasture rent at our core ranch totaled \$89,031. Using \$40 per acre as a benchmark rent, the income (without drought issues) should have been \$113,000 (this is our baseline for measuring the economic performance of our pastures ground). In 2014 to 2015 we collected pasture rent of \$120,869 and in the 2015 to 2016 cycle we collected \$158,297. In 2016 to 2017 we are budgeted (as of mid-July when this was written) to collect somewhere around \$130,000 of pasture rent. The pasture rent numbers comprise of both summer rent and rent for the harvesting of winter residue.

#### Rainfall

Broken Bow, near my ranch has received an average of 21 inches of rain per year. We have tracked the rainfall on our ranch since 2007 and have received more than 21 inches in 7 out of 10 years...with 2017 still not in the books. In 2015 we received 29.70 inches and we have had two other years over 30 inches. The point is that we have enjoyed better than average rainfall over the past ten years and therefore need a flexible stocking program to help us leverage those wet years.

#### Conclusion

The economics of grazing goes well beyond managing the grass, although that is key. Improving the financial returns of a grazing operation requires that the operator look at a variety of tools including short season grazing, flexible stocking rates, winter residue grazing, more flexible marketing strategies and more flexible feeding strategies.

## Speaker Biography



**Aaron Berger**

Aaron Berger is a University of Nebraska-Lincoln Extension Educator in the southern Nebraska panhandle. Aaron believes utilizing a systems approach to management decisions and financial analysis is critical to the profitability of cattle operations. Delivering research based information and learning experiences clients can use to meet their goals are his main objective.



IT COSTS HOW MUCH?!



Dr. Harlan Hughes



Dave Pratt  
Ranching for Profit



Dr. Dillon Feuz  
Utah State



Burke Teichert



Dr. Barry Dunn  
SDSU



Terry DeGross  
Dallas Mount UW  
Extension Educator

Terry DeGross  
Management Information Systems



Dr. Tom Field UNL



Roger Wilson UNL

## Unit Cost of Production

$$\text{UCOP} = \frac{\text{Cost}}{\text{Units Produced}}$$



## UNIT COST OF PRODUCTION

- What is UCOP?
- How is it calculated?
- What are the benefits to knowing UCOP for owners and managers?



## UNIT COST OF PRODUCTION

- Combines both input costs and production
- Measures impact/benefit of inputs



## TWO TYPES OF COSTS

- Direct Costs
  - Health Products
  - Feed and Supplements
- Overhead Costs
  - Labor
  - Equipment
  - Horses
  - Buildings



## WHAT ARE THE TOP 3 COSTS FOR MOST RANCHES?



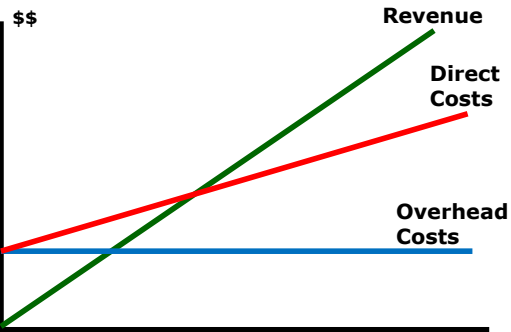
Photo from agrisk.tamu.edu/agrisk/quickbooks/index.php

**N** EXTENSION

## TOP 3 COSTS FOR MOST RANCHES?

- Feed
- Cow Depreciation
- Labor and Equipment

**N** EXTENSION



**N** EXTENSION

## You Can't Manage What You Don't Measure



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Photo courtesy of USDA NRCS

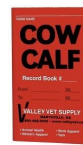


Photo courtesy of USDA NRCS

## Most Management Decisions Influence UCOP!!!



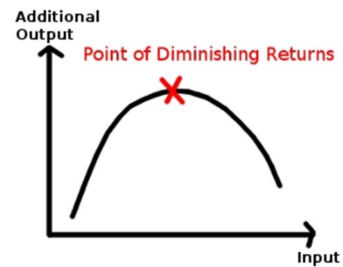
Photo courtesy of USDA NRCS

Photo courtesy of USDA NRCS



Photo courtesy of USDA ARS

## DIRECT COSTS AND THE POINT OF DIMINISHING RETURNS



**N** EXTENSION

EVERY DIRECT COST DOLLAR INTO THE COWS, SHOULD RETURN MORE THAN A DOLLAR!



**N** EXTENSION

MOST OPERATIONS HAVE MORE THAN ONE ENTERPRISE.

WHAT ENTERPRISES ARE PART OF YOUR OPERATION?

**N** EXTENSION

### Break the Ranch into Enterprises

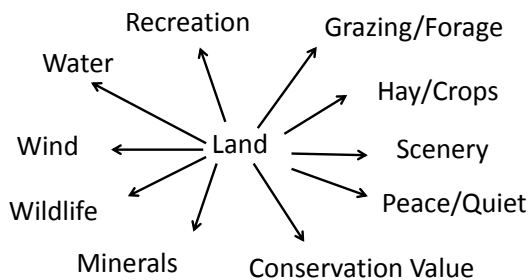


### THE LAND ENTERPRISE



What Value does this Produce?

**N** EXTENSION



### ENTERPRISE ANALYSIS

- Enterprises “pay” fair market value or costs are identified when resources move in or out
- Where is value being generated?
- Where do costs occur?
- Which enterprise returns the greatest net dollars per unit of input of forage?
- Look at the long term 3-5 year analysis **N** EXTENSION

## CHALLENGES AND DANGERS OF ENTERPRISE ANALYSIS

- How to break out and allocate costs?
- Variations in production/expenses can skew results especially for one year.
- Eliminating an enterprise won't always eliminate all the costs associated with it.



## KNOWING ENTERPRISE UCOP GIVES INFORMATION TO MAKE MANAGEMENT DECISIONS



Photo courtesy of USDA NRCS



## VALUE IN KNOWING UCOP

- Budgeting
- Evaluating Inputs
- Evaluating Enterprises or Entities
- Marketing and Risk Management
- Benchmarking the Operation



## VALUE IN KNOWING UCOP

### Planning and Projecting

- What are my costs going to be?
- What are prices expected to be?
- What can I influence and change?
- Where are points of leverage?



## OPPORTUNITIES TO CHANGE WHAT CHANGES CAN BE MADE

1. Pick one or two areas to focus on this year.
2. Choose areas where the greatest progress can be made.
3. Set goals for where you want to be and make a plan to get there.



## UCOP SUMMARY THOUGHTS

- UCOP is a valuable tool for decision making
- Most decisions influence UCOP
- Enterprise analysis is needed for UCOP
- UCOP should be used with a systems approach to decision making





## FRESH PERSPECTIVE ON POSSIBLE CHANGES

- Successful Ranchers / Business Owners
- Banker
- Accountant
- Consultant
- Extension Personnel
  - Reproductive Physiologist
  - Nutritionist
  - Geneticist



## UCOP WORKSHOPS FALL/WINTER

- Two day workshop introduces UCOP and works through an example ranch
- Record keeping needed for UCOP is discussed
- Excel Spreadsheets for inputting numbers
- Personal follow up



## CONTACT INFORMATION

Aaron Berger  
308-249-6605  
aberger2@unl.edu



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## Speaker Biography




**Jay Parsons**


Jay Parsons is an agricultural economist with the University of Nebraska-Lincoln. He specializes in farm and ranch management decision analysis, risk management, and production systems analysis. He teaches Advanced Farm Management and Linear Programming and is a part of an interdisciplinary research and extension team evaluating economical systems for integrated crop and livestock production in Nebraska. He worked at Colorado State University prior to joining UNL in 2014 and has almost 20 years of experience helping farmers and ranchers understand risk and emerging management tools.

Parsons earned a bachelor of science degree in mathematics and math education from Hastings College, and he received his master's and doctorate at Colorado State University, with a focus on mathematics and agricultural and resource economics, respectively.




## Managing Risks in a Risky World


**Jay Parsons, Associate Professor**  
 Department of Agricultural Economics  
 University of Nebraska-Lincoln

  
United States Department of Agriculture  
 National Institute of Food and Agriculture

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## Definition of Risk

- RISK is the effect of uncertainty on your objectives.<sup>1</sup>
  - Risk is objective focused.
  - Risk has both positive and negative effects.
  - Risk management:
    - creates value as well as protects it
    - is fundamentally about increasing the probability of achieving your objectives



<sup>1</sup>ANSI/ASSE/ISO 31000 Risk Management Principles and Guidelines

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## Sources of Risk in Agriculture

1. Marketing/Price Risk
2. Production Risk
3. Institutional Risk
4. Human Risk
5. Financial Risk





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## Strategies for Managing Risk

1. Avoid it
2. Transfer it outside the business
  - a) Insurance
  - b) Contracting
3. Control it
  - a) Control the probability
  - b) Control the impact
    - 1) Increase reserves
    - 2) Maintain flexibility
    - 3) Diversification
4. Accept it




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Risk Management Response	Relative Ranking by Study (1=top)		
	Top Crop Manager Workshop 1999 (Mussor and Patrick, 2002)	Beef producers in Texas and Nebraska (Hall et al., 2003)	National Study: ERS- Agricultural Resource Management Study, 1996 data. (Harwood et al., 1999) <sup>a</sup>
Being a low-cost producer	1	1	
Liability Insurance	2		
Government program participation	3		
Forward Contracting or Pricing	4	ns <sup>b</sup>	3
Flexible production technologies	5 (tie)		
Futures- hedging, options	5 (tie)	ns	4
Life Insurance	6		
Debt-leverage management	7		
Maintain animal health		1	
Cash/credit Reserves		3	1
Off-farm investments		4	
Specialization in management		5	
Diversify Enterprises		ns	2

<sup>a</sup> ERS survey based on actual use rather than on preferences.  
<sup>b</sup> Rated but neutral or less importance in the study


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## Federal Insurance/Program Tools

- Crop insurance (USDA-Risk Management Agency)
  - Livestock Risk Protection (LRP) insurance
  - Rainfall Index (RI) insurance
    - Pasture, Rangeland, and Forage
    - Annual Forage
  - Whole Farm Revenue Protection (WFRP)
- Farm Service Agency (FSA) Programs [fsa.usda.gov](http://fsa.usda.gov)
  - Noninsured Crop Disaster Assistance Program (NAP)
  - Livestock Forage Disaster Program (LFP)
  - Livestock Indemnity Program (LIP)
  - Emergency Assistance for Livestock, Honey Bees, and Farm-raised Fish (ELAP)
  - Conservation Programs (NRCS)

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## Diversification

- Reduces risk in a farming operation
- It can take a number of forms
  - Enterprise selections
  - Market timing and methods
  - Geographic locations
  - Business structures, vertical integration, ...

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## Diversification

- Is diversification always good?
- Duchene (2007) says diversity adds complexity which can lead to chaos.
- Magnusson (1969) describes a “range of diversification” inside which diversification makes sense.

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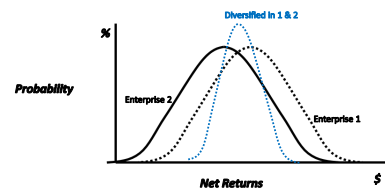
## Range of Diversification

- It makes sense to diversify if
  - The expected payoffs from the two enterprises are relatively close; and,
  - Those payoffs are not highly correlated with one another.
- Otherwise, specialize in the higher paying enterprise.

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## Diversification



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## Summary

- Managing risk is a never-ending task.
  - Embrace it with a positive mindset.
  - You can create value with good risk management as well as protect it.
- Know your strategies
  - Avoid, Transfer, Control, or Accept
  - Diversification, Flexibility, and Reserves

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Jay Parsons, Associate Professor  
Department of Agricultural Economics  
jparsons4@und.edu  
402-472-1911

**THANK YOU!**

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# Managing Risks in a Risky World

Jay Parsons, Associate Professor  
Department of Agricultural Economics  
University of Nebraska-Lincoln

## 1 Introduction

---

We live in a complex world that seems to be getting more complicated every day. One of the reasons is that we have information traveling all over the world in a virtual instant. That information affects markets, sets policy, influences the behavior of people, and keeps all of us pretty busy just reading about it. This situation coupled with the inherent risk in agriculture and the volatile weather and market patterns we seem to be experiencing, make managing risk on today's ranches and farms extremely challenging. In times like these, it is important to keep the focus on what you are trying to achieve and let your objectives be your guide.

Risk is defined as "the effect of uncertainty on objectives" (ANSI/ASSE/ISO 31000 (Z690.2-2011) Risk Management Principles and Guidelines, 2011). Identifying risk is the task of identifying uncertainties that have an effect on what you are trying to achieve. There are five main sources of risk in agriculture: marketing/price risk, production risk, institutional risk, human risk, and financial risk (Crane, Gantz, Isaacs, Jose, & Sharp, 2013). All of these risks are worthy of some attention in your risk management plan. What, if anything, you do about each of them is a matter of evaluating strategies and the tradeoffs that come with them.

## 2 Strategies for managing risk

---

There are many management actions you can take and tools you can employ to manage risk but four main strategies exist: (1) avoid the risk; (2) transfer the risk; (3) control the risk; or, (4) accept the risk. Each of these comes with its own set of costs and rewards depending upon the situation and how you go about implementing them.

### 2.1 Avoid the Risk

Avoiding risk is simply not doing something that exposes you to the risk. For example, if you are not comfortable with the risk of retaining calves, you can avoid it by simply not retaining calves. If you don't like the uncertainty involved with retaining calves, you can avoid it by simply not doing it making your net outcome from retaining calves certain to be zero. To evaluate this strategy, you need to compare the benefits of not taking on the risk of growing the calves against the lost income potential along with the uncertainty surrounding that income potential. As another example, if you don't like the institutional and financial risk associated with relying on rented pasture resources, you can avoid the risk by simply not renting any pastures. Obviously, this could have a large effect on how you structure your business but it does erase the uncertainty around rented pastures, namely, pricing and availability.

## 2.2 Transfer the Risk Outside the Business

Transferring risk outside your farm or ranch is usually done through insurance or marketing contracts. Insurance contracts provide protection from downside risk in exchange for a premium expense. By paying the premium, you essentially transfer some of the potentially bad outcomes to a large insurance company that can better tolerate the risk. The insurance company maintains a diversified portfolio through reinsurance mechanisms and by pooling risks over many people or types of coverage so it can afford to pay for individual losses when they occur. Insurance has the effect of truncating your distribution of possible outcomes on the downside in exchange for subtracting the insurance premium expense from every outcome. Marketing tools like a put option work exactly the same way.

A marketing contract that locks in your price on some or all of your production would have the effect of squeezing your distribution of outcomes into a tighter range of possibilities. You are transferring the risk associated with the full range of possibilities to the person you are contracting with in exchange for a risk premium that they collect from you up front by offering you a contract price that is slightly in their favor compared to what they expect the actual price to be at the end of the contract period. The more you lock in, the tighter the range. As you lock in more and more, you transfer more of the potential upside and more of the risk premium to the person you are contracting with in exchange for transferring more of the downside risk to them, also.

It used to be that there were not a lot of insurance or government programs that allowed a livestock producer to transfer risk to another entity. Producers were pretty much limited to marketing tools. A lot has changed over the last 20 years and the USDA Risk Management Agency (RMA) now oversees several insurance programs that cattle producers can utilize to help manage their risks in production and market price. These include the Livestock Risk Protection (LRP) insurance program for managing market price risk and the Rainfall Index (RI) insurance programs for managing forage production risk. Both Pasture, Rangeland, and Forage (PRF) and Annual Forage are available in Nebraska to insure acres intended for livestock feed production based off of a precipitation index produced by NOAA, the National Oceanic and Atmospheric Administration. Finally, there is a Whole Farm Revenue Protection (WFRP) insurance product that has been modified in recent years to be more applicable and more appealing for livestock producers to use to manage uncertainties in their overall farm revenues. To learn more about any of these products, producers should consult the RMA website ([rma.usda.gov](http://rma.usda.gov)) and their local crop insurance agent.

The disaster programs offered the USDA Farm Service Agency (FSA) also transfer some the risk off the ranch. These include the Noninsured Crop Disaster Assistance Program (NAP), the Livestock Forage Disaster Program (LFP), the Livestock Indemnity Program (LIP), and the Emergency Assistance for Livestock, Honey Bees, and Farm-raised Fish (ELAP) program. Conservation programs can also be thought of in this light in that they transfer some of the financial risk in the land to another entity in exchange for adopting particular production and/or conservation practices.

## 2.3 Controlling the Risk

Controlling risk is by far the most active form of managing risk. There are two primary ways to control risk. They are to either control the probability of various outcomes occurring or to control the impact of those outcomes if they do occur. Very seldom can you do both.



For example, a piece of machinery may break down at any moment. You can control the risk of a machinery breakdown by properly maintaining the machine and lessening the chance it will break down thus expanding its useful life or saving you money on a costly repair. To evaluate if this is a good strategy, you need to compare the extra expense of maintaining the machine versus the effect it has on lessening the probability of a breakdown. The probability of losing a lease can be diminished by putting lease agreements in writing and writing them in such a way that they are multi-year commitments with appropriate conditions. This would cost you time and perhaps a little bit of money if you paid a lawyer to help you with it but provide benefits in terms of reducing uncertainty and providing piece of mind. Similarly, time and energy could be put into properly training and supervising employees to reduce the probability of an injury occurring while on the job.

Controlling the impact of risk involves using strategic risk management tools like diversification, keeping extra reserves on hand, and maintaining flexibility to lessen the impact of a bad outcome or increase the impact of a good outcome. For example, having extra cash reserves will lessen the impact of poor revenue in a given year. To evaluate this strategy, it is a matter of evaluating what it costs you in potential income to keep those cash reserves on hand versus the ability they give you to weather the storm of a bad year and the associated piece of mind it brings.

Diversification is a major strategy for managing risk that can take a number of forms including diversified production (producing more than one product for sale or producing similar products in different ways) and diversified marketing (different products, marketing multiple times during the year, or reaching multiple markets). In short, not putting all of your eggs in one basket is called diversification. Having said that, it is possible to diversify too much or in the wrong way.

Diversification adds complexity to an operation and too much complexity can lead to chaos (Duchene, 2007). Magnusson (1969) described a “range of diversification” within which diversification makes sense. Simply put, diversification makes sense if you are not giving up too much expected income with the lower earning enterprise compared to the reduced variance in income that comes from having two enterprises instead of one. Figure 1 shows the notion of what you are trying to get accomplished by diversify into more than one enterprise. This also applies to diversified market timing and other situations where you spread out the risk by not putting your eggs all in the same basket.

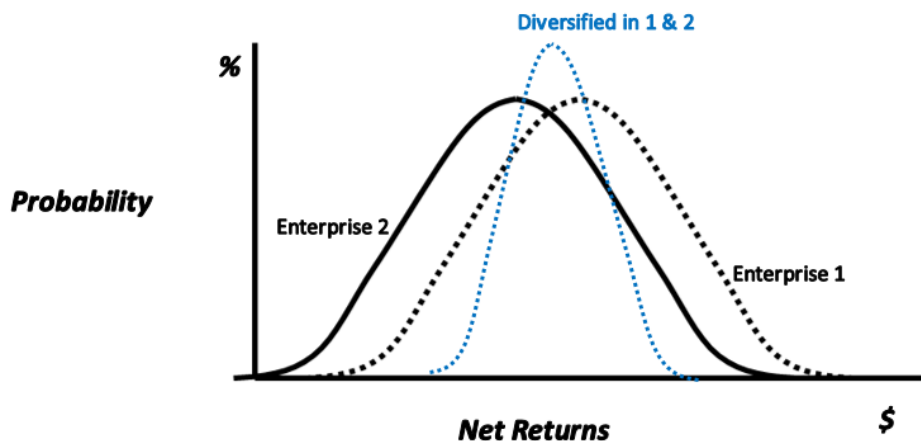


Figure 1. The desired effect of diversification into more than one enterprise.

Finally, maintaining flexibility is a great way to control risk. Similar to diversification in that it involves not being locked into one thing. If you have the flexibility to use different feed resources depending upon the circumstances it increases the probability of having a good outcome and reduces the impact of bad weather events and other things that can go wrong.

## 2.4 Accept the Risk

Finally, accepting risk is a strategy. Risk is usually associated with a potential reward. Sometimes there are no tools available to control or transfer the risk or they are just too expensive to justify using them. For example, sometimes insurance premiums are more expensive than we are willing to pay for the protection the insurance product provides. Another example would be employee benefit programs that would increase the morale of your workforce and decrease the probability of losing a key employee but that are cost prohibitive for you to provide. You may choose to accept the risk of employee turnover rather than incur the large expenses necessary to mitigate it.

Producers speculate on risk all the time. That's where a lot of the profit in farming and ranching exists. However, this should be done with careful evaluation of the potential impacts and your willingness to accept the probability of them occurring.

## 3 Summary

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Managing risk has never been easy on America's farms and ranches. It is a never ending task that demands constant attention. Embrace it with a positive mindset and you can create good value by managing risk. Know your strategies and what you are trying to accomplish and you can do a lot of great things that bring stability and prosperity to your operation.

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## Speaker Biography




**Peter Ballerstedt**



Refer to biography on Page 15.

### Selecting Cool Season Grasses for Irrigated or Dryland Conditions



17<sup>th</sup> Annual Nebraska Grazing Conference  
August 8, 2017  
Kearney, NE

**"Increase animal productivity to help feed the world and enhance the enjoyment of green spaces."**

### Since 1908

### Barenbrug USA's Professional Forage Team for the Western US

Bryan Weech Western Territory Manager  
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Justin Burns National Forage Sales Manager



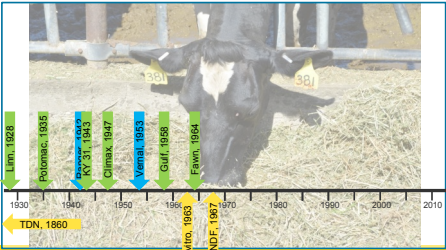
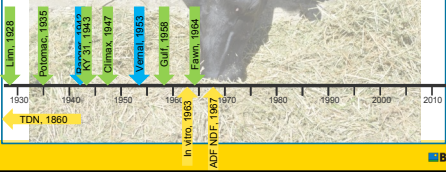

### Barenbrug's Breeders





### Progress in Agriculture




### Grandfather's Grasses

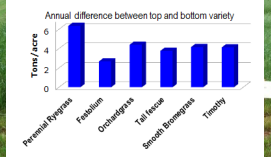



Year	Grass Variety
1800	TDN, 1860
1908	Uprn
1908	Polonic
1943	KV 31
1947	Climax
1959	Yamish
1958	Culf
1964	Fawn
1967	ADF NDF




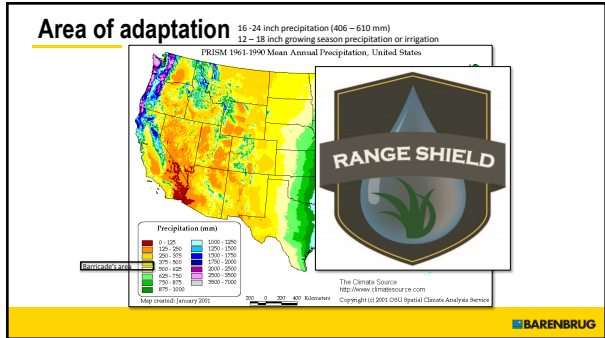
### Varietal differences

"Greater differences exist among grass varieties than among corn hybrids and soybean varieties"  
Dr. Dan Undersander, Univ. WI



Grass Variety	Annual difference (Tons/Acre)
Fernex 8 Pyramax	~5.5
Festulium	~3.5
Oxchardgrass	~4.5
Tall fescue	~4.5
Smooth Bromegrass	~4.5
Timothy	~4.5





- ### Bromes
- Smooth Brome:
    - Rhizomatous, Creeping
    - Early maturing, less regrowth in summer
  - Meadow brome:
    - Small or no rhizomes
    - good regrowth in summer
    - Less drought tolerant than smooth brome
  - Alaska brome (Hakari)
    - No rhizomes
    - Very late heading
    - Fast establishment and good regrowth
    - Winter hardy
    - High yields in the early years
- BARENBRUG

- ### New Varieties
- Available in 2017
- Meadow Brome: Arsenal (BAR BCF 1FRRL)
    - Selected for germination from deep seeding and drought tolerance
  - Smooth Brome: Artillery (BAR BIF 1GRL)
    - Selected over multiple years of drought in Oklahoma
- Coming
- Tall Fescue: Amory
    - A new drought tolerant tall fescue selected in Oklahoma
  - Creeping Wheatgrass
    - A new species for the market
- BARENBRUG

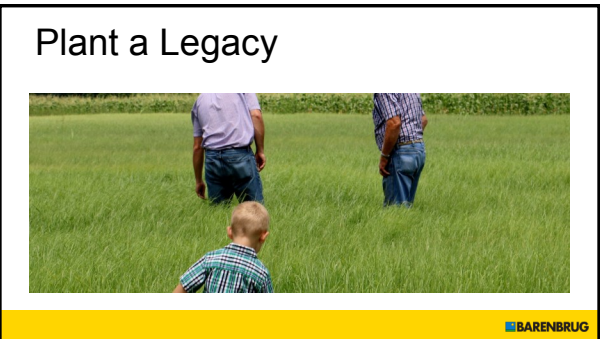
### First Product

Available in Fall 2017

Barricade

BARENBRUG

- ### Barricade
- Available in 2017
- Meadow Brome: Arsenal
  - Smooth Brome: Artillery
  - Alaska Brome: Hakari
  - Tall Fescue: Drover
  - Intermediate Wheatgrass
- BARENBRUG



## Speaker Biography



**Bill Vodehnal**

Bill Vodehnal currently is a Fish and Wildlife Biologist II for Nebraska Game and Parks Commission (NGPC) in Bassett, NE, and has worked for the agency for over 35 years. He focuses on wildlife habitat improvement of private and public lands in the Sandhills of Nebraska. Over the years, Bill has been greatly involved in management and research of greater prairie-chickens and sharp-tailed grouse. He earned a bachelor's degree from University of Nebraska-Lincoln and a master's degree from South Dakota State University.



## **Funding Wildlife Conservation on Private Lands**

The Nebraska Game and Parks Commission (Commission) assist private landowners with developing wildlife habitat on their farms or ranches through its Wild Nebraska Program administered by the Habitat Partners Section within the Wildlife Division. Through the years, funds have been allocated to improve wetland, woodland, and grassland habitats in Nebraska. Private lands biologists are available around the state to assist with developing a conservation plan to benefit wildlife and the landowner.

The Commission has allocated funds towards two grassland related initiatives in Nebraska to benefit grassland dependent wildlife and other species of greatest conservation need. One such source is the Nebraska Natural Legacy Project in which the state has 40 biologically unique landscapes (BUL). The Keya Paha, Verdigris-Bazile, Niobrara River, Oglala Grasslands, Central Loess Hills, Loess Canyons, Southeast Prairies, and Sandstone Prairies BULs all have dedicated funding and staff to address grassland restoration and grazing related projects. Each BUL has a Coordinating Wildlife Biologist available to assist with developing a restoration plan and project. Funding comes through federal State Wildlife Grants funds and Nebraska Environmental Trust Fund.

The second funding pool was started in 2015 and will implement projects through at least the next couple of years and is titled, "Enhancing Prairie Grouse Habitat in Eastern Nebraska." Funding for this effort comes from the Pitman-Robertson Act fund, which are federal dollars generated by an excise tax on guns and ammo and allocated back to the states. The focus of this project is within Southeast Prairie, Sandstone Prairie, Willow Creek Prairies, Elkhorn River Headwaters, Verdigris-Bazile, Keya Paha, and Central Loess Hills BULs. The quality and quantity of grassland habitat for greater prairie-chickens and sharp-tailed grouse has primarily declined due to grassland conversion to cropland, invasive tree encroachment, and grazing management concerns. The Commission allocated \$960,000 towards this effort and approximately half of those funds are available.

The U.S. Fish and Wildlife Service (Service) has the Partners for Fish and Wildlife Program (Partners Program) which is a voluntary private lands habitat restoration program. The program started in the Prairie Pothole Region, assisting landowners with grassland and wetland habitat restoration and enhancement. The program has grown into a national program, with private lands biologists in all 50 states. Through voluntary agreements, the Partners Program provides financial and technical assistance to private landowners to restore fish and wildlife habitat, while also supporting rural communities and viable agriculture. Projects include wetland restoration, riparian/stream restoration, prairie restoration, invasive species removal/control, grass and forb seeding, fencing, and other conservation practices.

The Nebraska Partners Program works to efficiently achieve voluntary habitat restoration on private lands, through financial and technical assistance, to increase and maintain Federal Trust Species populations (e.g., migratory birds, federally listed species, monarch butterflies and other pollinators). The Program serves as a bridge to owners and managers of private lands for developing partnerships to restore important wildlife habitat. Our approach is simple: engage willing partners and find win-win solutions to conserve and protect fish and wildlife values on their property.

The Partners Program focuses in ecosystems or watersheds where such efforts will result in the greatest number of benefits. Seven major geographic areas are recognized as priorities for the Nebraska Partners Program; including the Rainwater Basin, Central Platte River, Sandhills, North Platte River, Loess Hills/Loup Rivers, Loess Canyons, and Eastern Tallgrass Prairies.

The Partners Program recently launched the 2017 - 2021 strategic planning effort, with five overarching goals: conserve habitat, broaden and strengthen partnerships, improve information sharing and communication, enhance our workforce, and increase accountability. Working together with a variety of partners, the Partners Program helps benefit focal fish and wildlife species and furthers the mission of the Service. The key to the success of the Partners Program in Nebraska has been the partnerships developed with private landowners, local groups and organizations, and agencies. The program's voluntary, incentive-based approach to restoring habitat on private lands in Nebraska has led to over 1,400 landowner agreements within many different ecosystems throughout Nebraska.

The Sandhills Task Force: Ranchers and conservation organizations have historically approached management of the Sandhills resources from their own perspectives. Occasionally there were conflicts. Recognizing that ranchers and conservationists share much common ground, a coalition was formed in 1991 to address issues and problems facing the 20-county Sandhills region in north-central Nebraska. The resulting non-profit called the Sandhills Task Force, recognized that the greatest potential for wildlife habitat enhancement in the region is on private lands. While Sandhills ranchers have done an excellent job protecting the region's fragile soils, native rangelands and water resources, they often lacked the funds or expertise to accomplish even more. That was the role the Sandhills Task Force was formed to play.

The vision of the Sandhills Task Force is an intact rolling prairie landscape intermixed with wetlands, meadows, and streams, where diverse native plant and animal life prospers along with robust communities supported by a thriving ranching economy.

The Sandhills Task Force is non-political and not active in forming or changing land-use policy. Rather, it works to build partnerships between ranchers, conservation organizations and natural resource agencies to accomplish its goal. Landowners have a strong voice on the 16-member Board of Directors that makes up the Sandhills Task Force. At least none positions are filled by ranchers. The remaining members represent conservation organizations and local, state, and federal government. The Sandhills Task Force helps ranchers, land managers, and governing bodies make informed decisions regarding Sandhills resources.

The Sandhills Task Force works directly with landowners to address their resource concerns through 10-year projects that bring partnering organizations together to provide funding and technical expertise. Some of the project types are eastern red cedar and other invasive clearing, prescribed burning, grazing system infrastructure enhancement, wetland restorations, stream restorations, lake renovations, and more. Trainings and tours are also hosted by the Sandhills Task Force to share information about a variety of topics important to the Sandhills region.

All of the partnering agencies work together providing technical assistance and developing 10-year cooperative agreements with landowners; 10-year agreements are a requirement for the funding sources. Generally, one agreement is signed by the landowner with all the partnering agencies providing different colors of money to the project agreement. The goal is to have all management activities that have been developed with the landowner accomplished in the first couple of years so that the wildlife benefits can be realized for the life of the contract and beyond.

## Speaker Biography



**Brad Soncksen**

Brad Soncksen grew up in Hayes County, Nebraska and since 1983 has been working as a Soil Conservationist, District Conservationist and Assistant State Conservationist for the Natural Resources Conservation Service.

After receiving his bachelor of science in agronomy and mechanized agriculture from the University of Nebraska–Lincoln in 1983, Brad worked as a Soil Conservationist in McCook, Lincoln, Wahoo, Syracuse, and Tecumseh, Nebraska.

Brad spent four years as a Soil Conservationist until 1988, when he became the Liaison District Conservationist in David City. In 1993, he left David City to become the District Conservationist in Wahoo, Nebraska. After thirteen years as the District Conservationist in Wahoo, Brad returned to Lincoln in 2007 to assume the duties of the Assistant State Conservationist for Programs.

As the Assistant State Conservationist for Programs, Brad is responsible for managing various NRCS natural resource programs including Agricultural Conservation Easement Program (ACEP), Conservation Stewardship Program (CSP), Environmental Quality Incentives Program (EQIP) and others.

# Conservation Programs

## Helping Nebraska Producers Invest in Our Future



USDA NRCS United States Department of Agriculture  
Natural Resources Conservation Service

## The Agency

Since 1935, the Natural Resources Conservation Service (NRCS) has provided leadership in a partnership effort to help private landowners conserve their soil, water, and other natural resources.

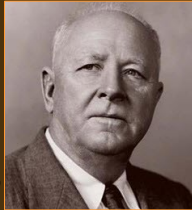


## The Agency

Conservation Planning began in the early 1940s

Hugh Hammond Bennett –  
"Father of Soil Conservation"

- Considers the needs and capabilities of each acre
- Considers the farmer's abilities, machinery, and economic situation



## The Agency

- Incorporates the farmer's willingness to try new practices
- Considers the land's relationship to the entire farm, ranch, or watershed
- Ensures the conservationist's presence on the land



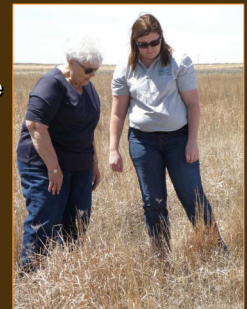
## The Mission

NRCS strives to reach its mission of "*Helping People Help the Land*" through its employees who provide technical assistance based on sound science suited to a customer's specific needs.



## The Agency

NRCS provides many services; however, the foundation of the Agency is the free technical assistance offered to develop conservation plans and resource management systems.



## Conservation Planning

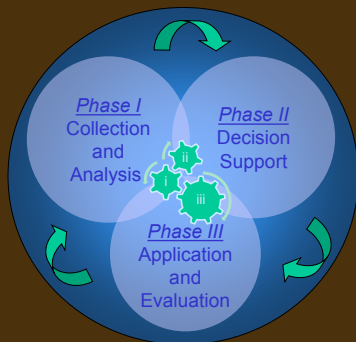
Conservation planning is a process from which plans are developed by first understanding the resource needs and a landowner's desired land use goals.



## Conservation Planning

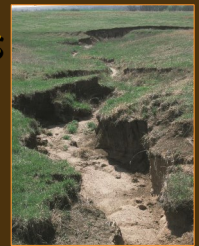
- Dynamic three-phase, nine-step process
- Natural resources problem solving
- Landowner and resource-driven
- Process which considers:

- Physical
- Environmental
- Economic
- Social
- Management



## Resource Concerns

- The degradation of soil, water, air, plant, or animal resources to the extent the sustainability or intended use is impaired.
- NRCS programs can help with this.



## NRCS Programs to address resource concerns.

- The 2014 Farm Bill was enacted on February 7, 2014.
- Included are voluntary, incentive based, conservation programs administered by NRCS that benefit both agricultural producers and the environment.
- NRCS is committed to helping people help the land. That is our mission !

## 3 General Kind of Programs

1. Financial Assistance Programs
2. Easement Programs
3. Partnership Programs

# 1. Financial Assistance



- NRCS offers financial and technical assistance to help agricultural producers make and maintain conservation improvements on their land.
- Environmental Quality Incentives Program (EQIP)
- Conservation Stewardship Program (CStP)

# Financial Assistance



- Provides financial and technical assistance to agricultural producers in order to address natural resource concerns and deliver environmental benefits.
  - Improved water and air quality
  - Conserved ground and surface water
  - Reduced soil erosion and sedimentation
  - Improved or created wildlife habitat

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# How EQIP Works

- Continuous signup
- Conservation plan developed
  - Resource concerns identified
  - Practices selected
- Applications ranked
- Contracts developed and practices applied
- Practice Payment Schedule
  - [www.nrcs.usda.gov](http://www.nrcs.usda.gov)

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# EQIP Practices

- Waste Storage Facilities
- Grazing Management
- Water Facilities



# EQIP Practices

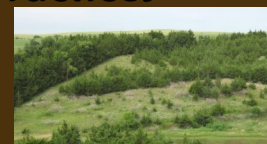
- Grazing Management
  - Pipelines
  - Fence



# EQIP Practices

Brush Management

Prescribed Burn





## EQIP Practices

Cover Crop  
Multi Species  
Mix – Corn  
Stalks & Wheat  
Stubble



## EQIP Practices

- Seasonal High Tunnels
- Nutrient Mgmt
- Pest Mgmt
- Organic



## EQIP Practices

- Terraces
- Diversions
- Grade Stabs
- Waterways
- Underground Outlet
- No till
- Windbreak/Shelterbelt



## EQIP Practices

- SDI Systems
- Sprinkler Systems
- IWM



## EQIP Payments

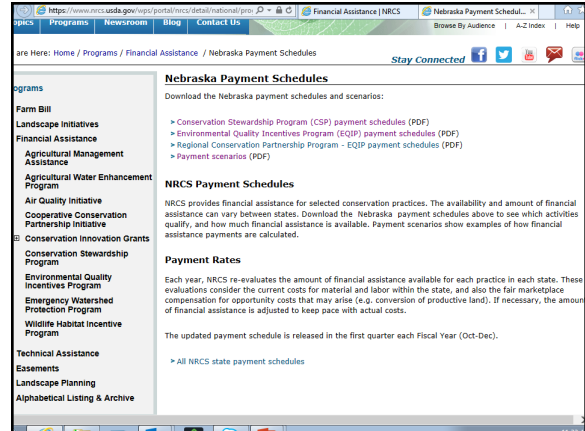
- Payments are made on completed practices or activities identified in an EQIP contract that meet NRCS standards.
- Payment rates are set each fiscal year and are attached to the EQIP contract when it is approved.
- Payment rates for each conservation practice can be found at each NRCS State Programs website.
- The link can be found under **Financial Assistance**, in the left toolbar



State Payment Schedules

## State Payment Schedules

- New Website for NRCS Payment Schedules
- You can use this link and click on NE to see the cost lists.
- <https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/financial/?cid=nrcseprd1328426>



## Financial Assistance



- The Conservation Stewardship Program helps agricultural producers maintain and improve their existing conservation systems and adopt new conservation activities to address priority resource concerns.
- Participants earn CSP payments for conservation performance—the higher the performance, the higher the payment.

## CSP Purpose

- The purpose of CSP is to encourage producers to address **priority resource concerns** and improve their conservation performance by installing and **adopting additional conservation activities** and improving, maintaining, and **managing existing conservation activities** on eligible land.

## Land Stewardship

- Through CSP, we can help you build your business while implementing conservation practices that help ensure the sustainability of your entire operation.
- Good land stewardship not only conserves the natural resources on your farm, ranch or forest, it also provides multiple benefits to local communities, including better water and air quality and wildlife habitat, as well as food and fiber.

## CSP - Sustainable Production

- CSP is for working lands. It is the largest conservation program in the United States with 70 million acres of productive agricultural and forest land enrolled in CSP.
- Thousands of people that have made the choice to voluntarily enroll in the program because it helps them enhance natural resources and improve their business operation.

## Real Results with CSP

- CSP participants are seeing real results. Some of these benefits include:
  - Improved cattle gains per acre
  - Increased crop yields
  - Decreased inputs
  - Wildlife population improvements
  - Better resilience to weather extremes

## CSP Statutory Limitations

- Private Land
- Five year contract term with option for the producer to renew for one additional 5-year period at the end of the initial contract
- Payment Limitations
  - A person or legal entity may not receive, directly or indirectly, payments under CSP that, in the aggregate, exceed \$200,000 under all contracts entered into during fiscal years 2014 - 2018
- Payments after October 1 for activities completed in the previous fiscal year

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## CSP Statutory Limitations

- Stewardship Threshold
  - General sign-ups:
    - Applicants must **meet at least two resource concerns** at the time of application and **one additional resource concern** by the end of the contract on every land use included in the application
  - Exceptions:
    - Farmstead Exemption
    - Associated Ag Land Exemption

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## Ranking of Applications

- In general ranking status improves when:
  - Larger number of Resource Concerns are met and exceeded
  - More new activities are scheduled
  - Greater number of acres are receiving new activities
  - Greater number of years where new activities are scheduled

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## Resource Concerns

- Soil Erosion
- Soil Quality Degradation
- Excess Water
- Insufficient Water
- Water Quality Degradation
- Air Quality
- Degraded Plants
- Fish & Wildlife
- Livestock Production Limitation
- Insufficient Energy

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## Resource Concern Causes

- CSP evaluates the causes within each resource concern
- Example:
  - Soil Erosion causes
    - Sheet & Rill
    - Wind erosion
    - Ephemeral gully
    - Classic gully
    - Streambank, shoreline

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## Resource Concern Causes

- Example:
  - Soil Quality Degradation
    - Organic matter depletion
    - Compaction
    - Concentration of salts or other chemicals

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## Resource Concern Causes

- Example:
  - Water Quality Degradation
    - Pesticides in surface/ground water
    - Nutrients in surface/ground water
    - Salts in surface/ground water
    - Excess pathogens in surface/ground water

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## CStP Enhancement Activities

- Popular in Nebraska
  - Wildlife Friendly Fencing
  - Monitor Key Grazing Areas
  - Cover Crops to Break up Compaction
  - Wildlife Habitat
  - Advanced Nutrient Management
  - Water Quality/Water Quantity

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## Wildlife Friendly Fencing



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## Wildlife Friendly Haying



## Unharvested Grain



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# Range Monitoring



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# Pollinator Seedings



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# Cover Crops



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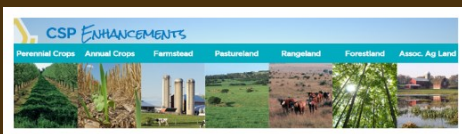
# Field Border



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# Enhancements

- Full listing can be found on the NE NRCS website



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Crop	Water Quality Degradation	Installation of a saturated vegetated drip system	E3561182	Crop (Perennial), Associated Ag Lands
Crop (Annual and Mixed)	Water Quality Degradation	Installation of end of pipe or ditch treatment for nitrogen	E3561182	Crop (Perennial), Associated Ag Lands
Crop (Annual and Mixed)	Water Quality Degradation	Reduce risks of nutrient losses to surface water by utilizing precision agriculture technologies for plan and apply nutrients	E3561185	Crop (Perennial)
Crop (Annual and Mixed)	Water Quality Degradation	Improving nutrient uptake efficiency and reducing risk of nutrient losses to surface water	E3561186	Crop (Perennial)
Crop (Annual and Mixed)	Water Quality Degradation	Improving nutrient uptake efficiency and reducing risk of nutrient losses to groundwater	E3561187	Crop (Perennial)
Crop (Annual and Mixed)	Water Quality Degradation	Reduce risk of pesticides in surface water by utilizing precision pesticide application techniques	E3561188	Crop (Perennial)
Crop (Annual and Mixed)	Water Quality Degradation	Reduce risk of pesticides in surface water by utilizing site specific application techniques	E3561189	Crop (Perennial)
Crop (Annual and Mixed)	Water Quality Degradation	Cropland conversion to trees for long term improvement of water quality	E3562282	Crop (Perennial)
Crop (Annual and Mixed)	Water Quality Degradation	Manage livestock access to streams, ditches, and other waterbodies to reduce pathogens in surface water	E3572212	Crop (Perennial), Pasture, Rangeland, Forest, Associated Ag Lands, Perennial
Crop (Annual and Mixed)	Water Quality Degradation	Cropland conversion to grass-based agriculture to reduce sediment loading	E3572213	Crop (Perennial)
Crop (Annual and Mixed)	Water Quality Degradation	Increase riparian forest buffer width for nutrient reduction	E3572214	Crop (Perennial), Forest, Associated Ag Lands

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USDA  
United States Department of Agriculture

CONSERVATION ENHANCEMENT ACTIVITY  
E590118Z

CONSERVATION STEWARDSHIP PROGRAM

Improving nutrient uptake efficiency and reducing risk of nutrient losses to surface water

Conservation Practice 590: Nutrient Management

APPLICABLE LAND USE: Crop (annual & mixed); Crop (perennial)

RESOURCE CONCERN ADDRESSED: Water Quality Degradation

PRACTICE LIFE SPAN: 1 year

Enhancement Description

Nutrient management encompasses managing the amount, source, placement, and timing of the application of plant nutrients and soil amendments. Nutrients are currently being applied on the farm based on the 4R nutrient stewardship principles. Enhanced nutrient use efficiency strategies or technologies are utilized to improve nutrient use efficiency and reduce risk of nutrient losses.

Criteria

- Documentation of producer's record of nutrient management meeting all Conservation Practice Standard Nutrient Management (CPS 590) general criteria and additional criteria to minimize agricultural nonpoint source pollution of surface and groundwater.
- For Nitrogen, Phosphorus, and Potassium (N-P-K), rates of application are to be agronomic application rate (based on soil test and yield goal).

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## Payment Rates

- Existing Activity Payment
  - \*Number of resource concerns met at the time of application x \$350 (land use neutral) Land use rate x acres
  - Crop and Pastured Cropland= \$7.50 per acre
  - Pasture = \$3.00 per acre
  - Range = \$1.00 per acre
  - Forest = \$0.50 per acre
  - Farmstead=\$7.50 per acre
  - Associated Agriculture Land=\$0.50 per acre

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## 2. Easement Programs



**Easements**

- NRCS offers easement programs to eligible landowners to conserve working agricultural lands, wetlands, grasslands and forestlands.
- Agricultural Conservation Easement Program (ACEP)

## ACEP –

### Agricultural Conservation Easement Program

ACEP has 2 components:

- Agricultural Land Easement Component (ALE)
  - ALE easements can only be held by an eligible entity not by the United States
  - ALE permits a landowner to continue agricultural use
  - ALL ALEs subject to an “Agricultural Land Easement Plan.”
  - No longer a GRP Rental Agreement option
- Wetland Reserve Easement Component (WRE)
  - Retains purpose and function of WRP

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## Wetland Reserve Benefits

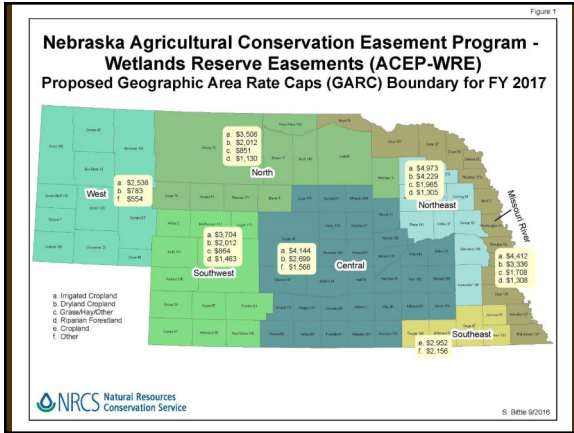
- Under the Wetlands Reserve Easements component, NRCS helps to restore, protect and enhance enrolled wetlands
  - Provide habitat for fish and wildlife, including threatened and endangered species.
  - Improve water quality by filtering sediments and chemicals, reduce flooding, and recharge groundwater.
  - Protect biological diversity.
  - Provide opportunities for educational, scientific and limited recreational activities.

## Wetlands Reserve Easements (WRE)

- Enrollment Options
  - Permanent Easement
  - Reserved Grazing Rights Easements
    - Must be in a landform where grazing can sustain habitat
  - 30-year Easement
  - 30 year contract with Indian Tribes

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## 3. Partnership Programs

**Partnerships**

- NRCS works with partners to leverage additional conservation assistance for agricultural producers and landowners in priority conservation areas.
- Resource Conservation Partnership Program (RCPP)

## RCPP

- RCPP combines the authorities of four former conservation programs – the Agricultural Water Enhancement Program, the Chesapeake Bay Watershed Program, the Cooperative Conservation Partnership Initiative and the Great Lakes Basin Program.
- Assistance is delivered in accordance with the rules of EQIP, CSP, ACEP and HFRP; and in certain areas the Watershed Operations and Flood Prevention Program.

## RCPP Funding

Available Funding - National

- \$100 Million of Direct RCPP funding each year
- 7% of funds from the four covered programs (ACEP, CStP, EQIP, HFRP) reserved annually through April 1st

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Allocates funding by:

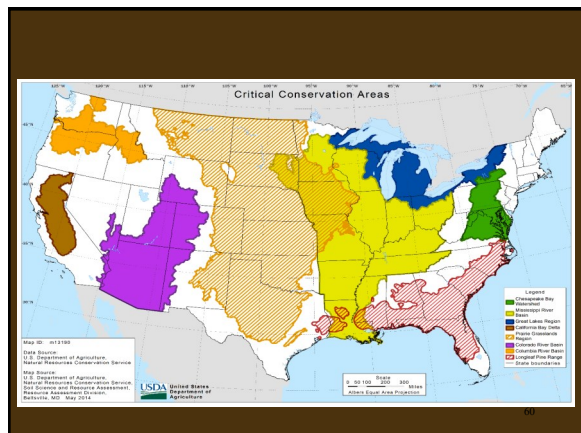
- 40% for projects based on a national competitive process;
- 25% for a state competitive process administered by the State Conservationist, and;
- 35% for projects in critical conservation areas.

**40% National**  
(multi-state projects)

**25% State**  
(state projects)

**35% Critical Conservation Areas**  
(areas designated by Secretary)

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## NRCS Conservation Programs in Nebraska

**Brad Soncksen**  
*Assistant State Conservationist for Programs*  
Lincoln, NE  
[brad.soncksen@ne.usda.gov](mailto:brad.soncksen@ne.usda.gov)  
[www.ne.nrcs.usda.gov](http://www.ne.nrcs.usda.gov)

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# Questions?



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# Steps to Assistance

How to Get Assistance from NRCS for Farms, Ranches and Forests

1 PLANNING

Visit your local NRCS field office to discuss your goals and work with staff on a conservation plan.

2 APPLICATION

With the help of NRCS, complete an application for financial assistance programs.

3 ELIGIBILITY

Find out if you're eligible for NRCS' variety of financial assistance programs.

4 RANKING

NRCS ranks applications according to local resource concerns.

5 IMPLEMENTING

Put conservation to work by signing a contract and implementing conservation practices.

## Get Started with NRCS

**Do you farm or ranch and want to make improvements to the land that you own or lease?**

Natural Resources Conservation Service offers technical and financial assistance to help farmers, ranchers and forest landowners.

1 Planning

**To get started with NRCS, we recommend you stop by your local NRCS field office.**

**We'll discuss your vision for your land.**

NRCS provides landowners with free technical assistance, or advice, for their land. Common technical assistance includes: resource assessment, practice design and resource monitoring. Your conservation planner will help you determine if financial assistance is right for you.

2 Application

**We'll walk you through the application process. To get started on applying for financial assistance, we'll work with you:**

- To fill out an AD 1026, which ensures a conservation plan is in place before lands with highly erodible soils are farmed. It also ensures that identified wetland areas are protected.
- To meet other eligibility certifications.

Once complete, we'll work with you on the application, or CPA 1200.

Applications for most programs are accepted on a continuous basis, but they're considered for funding in different ranking periods. Be sure to ask your local NRCS district conservationist about the deadline for the ranking period to ensure you turn in your application in time.

3 Eligibility

**As part of the application process, we'll check to see if you are eligible.**

**To do this, you'll need to bring:**

- An official tax ID (Social Security number or an employer ID)
- A property deed or lease agreement to show you have control of the property; and
- A farm tract number.

If you don't have a farm tract number, you can get one from USDA's Farm Service Agency. Typically, the local FSA office is located in the same building as the local NRCS office. You only need a farm tract number if you're interested in financial assistance.

4 Ranking

**NRCS will take a look at the applications and rank them** according to local resource

concerns, the amount of conservation benefits the work will provide and the needs of applicants.

5 Implementing

**If you're selected, you can choose whether to sign the contract for the work to be done.**

Once you sign the contract, you'll be provided standards and specifications for completing the practice or practices, and then you will have a specified amount of time to implement. Once the work is implemented and inspected, you'll be paid the rate of compensation for the work if it meets NRCS standards and specifications.

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To find out more, go to: [www.nrcs.usda.gov/GetStarted](http://www.nrcs.usda.gov/GetStarted)





## Overview

The Conservation Stewardship Program (CSP) helps agricultural producers maintain and improve their existing conservation systems and adopt additional conservation activities to address priority resources concerns. Participants earn CSP payments for conservation performance—the higher the performance, the higher the payment.

# CSP



Conservation Stewardship Program



USDA's Natural Resources Conservation Service offers voluntary Farm Bill conservation programs that benefit both agricultural producers and the environment.

## Benefits

Through CSP, participants take additional steps to improve the resource conditions on their land—including soil, air and habitat quality, water quality and quantity, and energy conservation.

CSP provides two types of payments through five-year contracts: annual payments for installing new conservation activities and maintaining existing practices; and supplemental payments for adopting a resource-conserving crop rotation. Producers may be able to renew a contract if they have successfully fulfilled the initial contract and agree to achieve additional conservation objectives. Payments are made soon as practical after October 1 of each fiscal year for contract activities installed and maintained in the previous year.



## Eligibility

Eligible lands include private and Tribal agricultural lands, cropland, grassland, pastureland, rangeland and nonindustrial private forest land. CSP is available to all producers, regardless of operation size or type of crops produced, in all 50 states, the District of Columbia and the Caribbean and Pacific Island areas. Applicants may include individuals, legal entities, joint operations or Indian tribes that meet the stewardship threshold for at least two priority resource concerns when they apply. They must also agree to meet or exceed the stewardship threshold for at least one additional priority resource concern by the end of the contract.

Producers must have effective control of the land for the term of the proposed contract. Contracts include all eligible land in the agricultural operation.

Additional restrictions and program requirements may apply.

## How to Apply

Visit your local USDA Service Center to apply or visit [www.nrcs.usda.gov/getstarted](http://www.nrcs.usda.gov/getstarted).

## More Information

For more information visit your local USDA Service Center or [www.nrcs.usda.gov/farmbill](http://www.nrcs.usda.gov/farmbill).

## Find Your Local USDA Service Center

<http://offices.usda.gov>

## What's New in CSP

The 2014 Farm Bill increased the program's focus on generating additional conservation benefits, removed the limitation on the number of nonindustrial private forestland acres that can be enrolled in CSP, and increased flexibility to enroll land coming out of the Conservation Reserve Program.

Payment Limit: A person or legal entity may not receive more than \$200,000 during fiscal years 2014 through 2018.



NRCS can help producers conserve water with efficient irrigation systems.

[www.nrcs.usda.gov](http://www.nrcs.usda.gov)

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## Overview

The Environmental Quality Incentives Program (EQIP) provides financial and technical assistance to agricultural producers in order to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation or improved or created wildlife habitat.

# EQIP



Environmental Quality Incentives Program



USDA's Natural Resources Conservation Service offers voluntary Farm Bill conservation programs that benefit agricultural producers and the environment.

## Benefits

Eligible program participants receive financial and technical assistance to implement conservation practices, or activities like conservation planning, that address natural resource concerns on their land. Payments are made to participants after conservation practices and activities identified in an EQIP plan of operations are implemented. Contracts can last up to ten years in duration.

## Eligibility

Agricultural producers and owners of non-industrial private forestland and Tribes are eligible to apply for EQIP. Eligible land includes cropland, rangeland, pastureland, non-industrial private forestland and other farm or ranch lands.





Socially disadvantaged, beginning and limited resource farmers, Indian tribes and veterans are eligible for an increased payment rate and may receive advance payment of up to 50 percent to purchase materials and services needed to implement conservation practices included in their EQIP contract.

Applicants must:

- Control or own eligible land
- Comply with adjusted gross income limitation ( AGI ) provisions
- Be in compliance with the highly erodible land and wetland conservation requirements
- Develop an NRCS EQIP plan of operations

Additional restrictions and program requirements may apply.

### How to apply

Visit your local USDA Service Center to apply or visit [www.nrcs.usda.gov/getstarted](http://www.nrcs.usda.gov/getstarted).

NRCS will help eligible producers develop an EQIP plan of operations, which will become the basis of the EQIP contract.

EQIP applications will be ranked based on a number of factors, including the environmental benefits and cost effectiveness of the proposal.

### More Information

For more information visit your local USDA Service Center or [www.nrcs.usda.gov/farmbill](http://www.nrcs.usda.gov/farmbill).

### Find your local USDA Service Center

<http://offices.usda.gov>

### What's New in EQIP

- The former Wildlife Habitat Incentive Program was folded into EQIP.
- Advance payment opportunities now exist for veteran agricultural producers.
- Advance payments for socially disadvantaged, beginning and limited resource farmers, Indian tribes and veterans were raised from 30 percent to 50 percent.
- Payment limitations are set at \$450,000 with no ability to waive.



A water trough in a pasture keeps cattle out of critical riparian area.

[www.nrcs.usda.gov](http://www.nrcs.usda.gov)

Natural Resources Conservation Service



## Overview

The Agricultural Conservation Easement Program (ACEP) provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits.

Under the Agricultural Land Easements component, NRCS helps Indian tribes, state and local governments and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land.

Under the Wetlands Reserve Easements component, NRCS helps to restore, protect and enhance enrolled wetlands.

# ACEP



Agricultural Conservation Easement Program



USDA's Natural Resources Conservation Service offers voluntary Farm Bill conservation programs that benefit agricultural producers and the environment.

## Benefits

Agricultural Land Easements protect the long-term viability of the nation's food supply by preventing conversion of productive working lands to non-agricultural uses. Land protected by agricultural land easements provides additional public benefits, including environmental quality, historic preservation, wildlife habitat and protection of open space.

Wetland Reserve Easements provide habitat for fish and wildlife, including threatened and endangered species, improve water quality by filtering sediments and chemicals, reduce flooding, recharge groundwater, protect biological diversity and provide opportunities for educational, scientific and limited recreational activities.



## **Agricultural Land Easements**

NRCS provides financial assistance to eligible partners for purchasing Agricultural Land Easements that protect the agricultural use and conservation values of eligible land. In the case of working farms, the program helps farmers and ranchers keep their land in agriculture. The program also protects grazing uses and related conservation values by conserving grassland, including rangeland, pastureland and shrubland. Eligible partners include Indian tribes, state and local governments and non-governmental organizations that have farmland or grassland protection programs.

Under the Agricultural Land component, NRCS may contribute up to 50 percent of the fair market value of the agricultural land easement. Where NRCS determines that grasslands of special environmental significance will be protected, NRCS may contribute up to 75 percent of the fair market value of the agricultural land easement.

## **Wetland Reserve Easements**

NRCS also provides technical and financial assistance directly to private landowners and Indian tribes to restore, protect, and enhance wetlands through the purchase of a wetland reserve easement. For acreage owned by an Indian tribe, there is an additional enrollment option of a 30-year contract.

Through the wetland reserve enrollment options, NRCS may enroll eligible land through:

- *Permanent Easements* are conservation easements in perpetuity. NRCS pays 100 percent of the easement value for the purchase of the easement, and between 75 to 100 percent of the restoration costs.
- *30-Year Easements* expire after 30 years. Under 30-year easements, NRCS pays 50 to 75 percent of the easement value for the purchase of the easement, and between 50 to 75 percent of the restoration costs.
- *Term Easements* are easements that are for the maximum duration allowed under applicable state laws. NRCS pays 50 to 75 percent of the easement value for the purchase of the term easement and between 50 to 75 percent of the restoration costs.
- *30-year Contracts* are only available to enroll acreage owned by Indian tribes. Program payment rates are commensurate with 30-year easements.

For wetland reserve easements, NRCS pays all costs associated with recording the easement in the local land records office, including recording fees, charges for abstracts, survey and appraisal fees, and title insurance.

## **Eligibility**

Land eligible for agricultural easements includes cropland,

rangeland, grassland, pastureland and nonindustrial private forest land. NRCS will prioritize applications that protect agricultural uses and related conservation values of the land and those that maximize the protection of contiguous acres devoted to agricultural use.

Land eligible for wetland reserve easements includes farmed or converted wetland that can be successfully and cost-effectively restored. NRCS will prioritize applications based the easement's potential for protecting and enhancing habitat for migratory birds and other wildlife.

To enroll land through agricultural land easements, NRCS enters into cooperative agreements with eligible partners. Each easement is required to have an agricultural land easement plan that promotes the long-term viability of the land.

To enroll land through wetland reserve easements, NRCS enters into purchase agreements with eligible private landowners or Indian tribes that include the right for NRCS to develop and implement a wetland reserve restoration easement plan. This plan restores, protects, and enhances the wetland's functions and values.

## **How to apply**

- *Agricultural land easements* - eligible partners may submit



proposals to NRCS to acquire conservation easements on eligible land.

- *Wetland reserve easements* - landowners may apply at any time at a local USDA Service Center.

### **More Information**

For more information visit your local USDA Service Center or the NRCS Farm Bill website at [www.nrcs.usda.gov/farbill](http://www.nrcs.usda.gov/farbill).

### **Find your local USDA Service Center**

<http://offices.usda.gov>

### **What's New in ACEP**

The ACEP is a new program that consolidates three former programs -- the Wetlands Reserve Program, Grassland Reserve Program, and Farm and Ranch Lands Protection Program.



This wetland area is used as an outdoor classroom on the Pyramid Lake Indian Reservation, Washoe County, NV.

[www.nrcs.usda.gov](http://www.nrcs.usda.gov)

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