18th Annual
Nebraska Grazing Conference

Proceedings

August 6-8, 2018
Kearney Ramada - Kearney, NE

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Introduction

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

This year's Nebraska Grazing Conference is reaffirming its commitment to the graziers, managers, and grassland stewards. 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. Learning from successful managers and translating science into application have been the cornerstones of the Conference. The role of the producer as a teacher and a learner has paramount and this year's conference contains enhancements to strengthen the commitment to our producers and honor the intent of those who organized the first conference:

- All presenters submitting papers for inclusion in the Conference proceedings have been asked to prepare an abstract emphasizing producer/land user relevance.
- Each paper should also include a section entitled 'Implications' that highlights the broad implications of the paper for grazing.
- Each presentation should also include discussion on the producer relevance and the broad implications for graziers, land managers and stewards.
- Homer Buell has agreed to provide a 'producer reflections' at the closing on Wednesday to discuss the take home message and application to management strategies.
- A tour has been added for the first time to the Conference to provide hands-on, interactive experiences for the participants. The tour is scheduled Monday afternoon.
- Two producer panels will highlight the two-day conference.
- This year will initiate a new registration scholarship program for first time producer attendees. Funding will be developed during the coming year and the first scholarships will be available for the 2019 Conference.
- Session moderators will provide transitions between presentations highlighting the relevance and application for management practices (now and in the future).

The importance of translating the 'experiential science' of our graziers, land managers and stewards and the 'experimental science' of researchers is a priority of the Nebraska Grazing Conference. Everyone truly can be a teacher and a learner.

Conference Schedule

MONDAY, AUGUST 6

Tour

12:30 p.m.	Charter tour bus departs Ramada Kearney
1:15 p.m.	*Choquette Ranch Overview* by **Jim Choquette**, Producer, Upland, NE
1:45 p.m.	*Field Applications of Pasture and Ecological Monitoring* by **Christine Su**, PastureMap, San Francisco, CA
2:30 p.m.	*Field Monitoring Exercise* with **Christine Su**; **Jim O'Rourke**; **Bethany Johnston**; **Brad Schick**, **Ben Beckman**, Extension Educator, Nebraska Extension, Hartington, NE; **Jace Stott,** Assistant Extension Educator, Nebraska Extension, Ainsworth, NE
3:30 p.m.	Depart Choquette Ranch for Rowe Sanctuary
3:30 p.m.	*Prescribed Fire, Bird Monitoring, and Butterfly Date* by **Andrew Pierson**, Director of Conservation, Rowe Sanctuary, Gibbon, NE
4:45 p.m.	Depart Rowe Sanctuary for Buffalo County Extension Office
5:15 p.m.	Catered Dinner at Buffalo County Extension Office
6:15 p.m.	*Strategies for Rangeland Monitoring* by **Jim O'Rourke**, RuJoDen Ranch, Chadron, NE
8:00 p.m.	Return to Ramada Kearney

TUESDAY, AUGUST 7

9:00 a.m.	Registration (Refreshments in Exhibit Area)
10:00 a.m.	Welcome and Opening Remarks

Ranch Succession Planning

10:15 a.m.	*Keeping Your Ranching Operation in the Family for Future Generations* by **Ron Hanson**, Harlan Agribusiness Professor Emeritus, University of Nebraska-Lincoln, Nipomo, CA
12:00 p.m.	Lunch

Mixed-species Grazing

(Randy Saner, Moderator)

1:00 p.m.	*Multi-species Grazing: Incorporating on Your Ranch* by **Sage Askin**, Askin Land & Livestock, Lusk, WY
1:40 p.m.	*Why do Ewe Run Cows?* by **Brock Terrell**, Terrell Farms, Hay Springs, NE
2:10 p.m.	*Cattle + Sheep + Goats = Environment + $* by **Mike Wallace**, Double M Ranch, Nelson, NE
2:40 p.m.	Discussion
3:00 p.m.	Break

Grazinglands and Wildlife

(Brad Schick, Moderator)

3:30 p.m.	*Lesser Prairie Chicken, Grazing Systems and a Search for Solutions* by **John Kraft**, Kansas State University, Manhattan, KS
4:15 p.m.	*It Depends: Relationships between Wildlife and Livestock Grazing Management Vary Across Space and Time* by **Lance McNew**, Montana State University, Bozeman, MT
5:00 p.m.	Social (Compliments of Kearney Ramada)
6:00 p.m.	Banquet
7:15 p.m.	*Sharing Our Ranch Succession Planning Strategies and Experiences: A Ranch Producer Panel*—**Ron Hanson** (moderator), Harlan Agribusiness Professor Emeritus, University of Nebraska-Lincoln, Nipomo, CA; **Lynn Myers**, Lewellen, NE and **Mike Wintz**, Bingham, NE.

Conference Schedule

WEDNESDAY, AUGUST 8

7:30 a.m.	Registration (Refreshments in Exhibit Area)

Pasture Monitoring

(Bethany Johnston, Moderator)

8:00 a.m.	*Keeping Human Knowledge at the Center of Technology* by **Christine Su**, PastureMap, San Francisco, CA
8:45 a.m.	*Field Experience* with **Jeff Nichols**, Natural Resources Conservation Service, North Platte, NE; **Beau Mathewson**, Producer, Potter, NE; and **Mitch Stephenson**, Nebraska Extension, Scottsbluff, NE
9:45 a.m.	Discussion
10:15 a.m.	Break

Planting Decisions for Alternative Forages

(Daren Redfearn / Mary Drewnoski, Moderators)

10:45 a.m.	*Plant Perspectives*, **Daren Redfearn**, Agronomy and Horticulture, University of Nebraska-Lincoln
11:05 a.m.	*Animal Perspectives*, **Mary Drewnoski**, Animal Science, University of Nebraska-Lincoln
11:25 a.m.	Discussion
12:00 p.m.	Lunch

Producer Reflections

1:00 p.m.	**Homer Buell**, Shovel Dot Ranch, Bassett, NE
1:30 p.m.	Final Comments and Evaluations
1:45 p.m.	Adjourn

Nebraska Grazing Conference (NGC) was:

- Planned by the NGC Coordinating Committee: **Bruce Anderson**, University of Nebraska-Lincoln; **Nadine Bishop**, USDA NRCS; **Ron Bolze**, Nebraska Grazing Lands Coalition; **Julie Elliott**, USDA NRCS; **Mark Goes**, Southeast Community College; **Jim Jenkins**, producer; **Erin Laborie**, Nebraska Extension; **Rob Mitchell**, USDA ARS; **Lynn Myers**, producer; **Brent Plugge**, Nebraska Extension; **Daren Redfearn**, University of Nebraska-Lincoln; **Bob Scriven**, Nebraska Extension; **Bill Vodehnal**, Nebraska Game and Parks Commission; **Jerry Volesky**, West Central Research and Extension Center; and **Doug Whisenhunt**, USDA NRCS.
- Coordinated by **Daren Redfearn (Conference Chair)**, **Brent Plugge**, and **Margo McKendree**;
- Co-hosted by the Center for Grassland Studies, University of Nebraska-Lincoln, 203 Keim Hall, Lincoln, NE 68583-0953, (402) 472-4101, grassland@unl.edu, and the Department of Agronomy & Horticulture, University of Nebraska-Lincoln, 202 Keim Hall, Lincoln, NE 68583-0915, (402) 472-2811, agrohort@unl.edu, and our co-sponsors (see Page 7).

Proceedings edited by Margo McKendree, Administrative Coordinator, Center for Grassland Studies

Cover photo by Nicole Finkner, University of Nebraska-Lincoln, 2017 Grazing Livestock Systems Graduate

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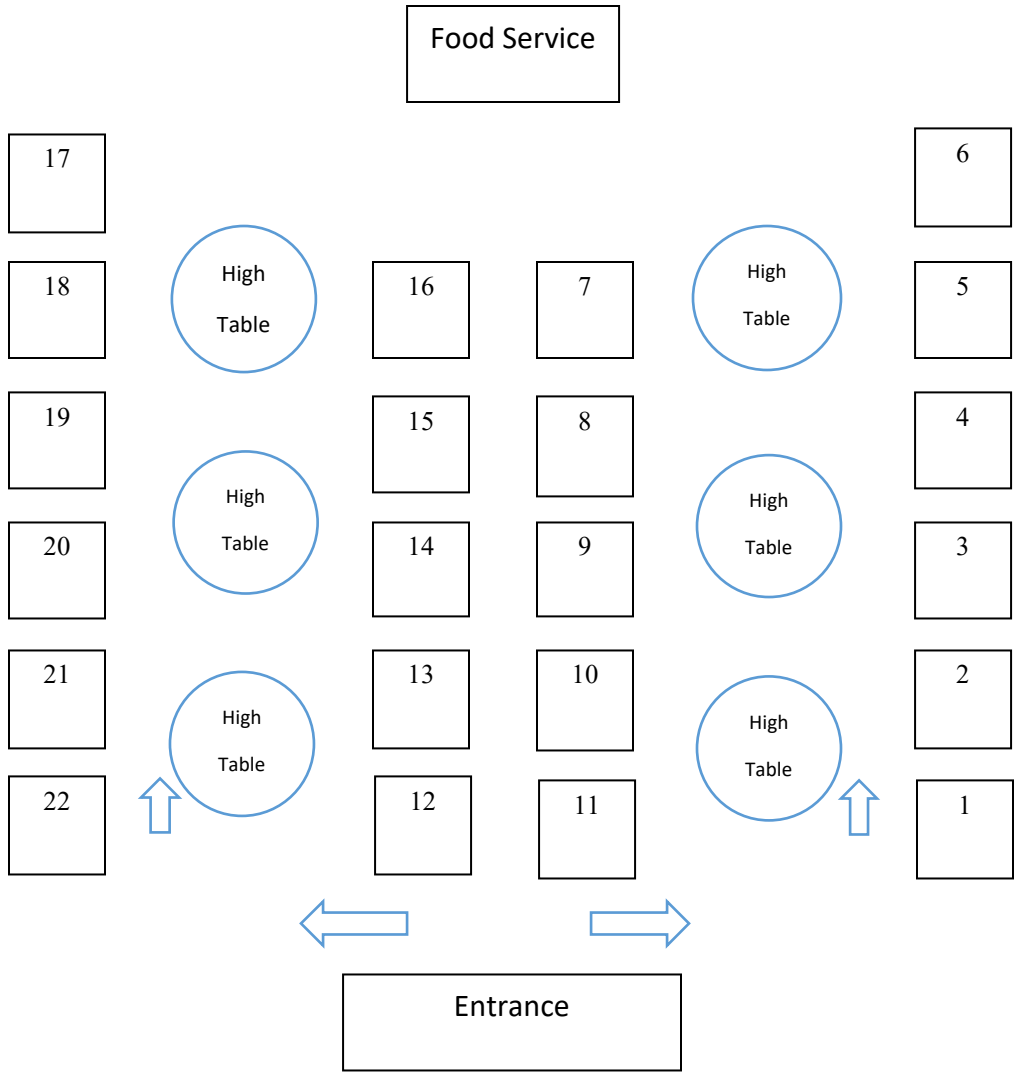
Exhibit Map



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Speaker Biography

TOUR

Jim Choquette

The Choquette family has been farming and ranching in south-central Nebraska (Franklin County) for nearly 130 years. Through the late 1880s and the Homestead Act era, through the 1920s and the Dust Bowl era, through the 1940s and the Rural Electrification era, the family farming practices have continued to evolve and adapt, helping the operation to survive and thrive.

About 30 years ago, however, the ranch began a new focus on fostering soil health and changing the way "grazing had always been done." After all, while bare soil, tilled soil and fenced-in soil existed across Franklin County in the 1980's, it did not exist in Franklin County prior to the homesteaders of the 1880's.

Today, the 5th generation continues to build on this work to graze cattle efficiently and cost-effectively – always looking holistically at the soil-sun-livestock cycle. Cover crops and rotational grazing are two of the most critical parts of the success of the ranching operation.

The Choquette ranch focus has been on a no-till strategy and trying to mimic nature in as many ways as possible. For example, large pastures all have been divided into smaller paddocks via portable fenceline, and cattle must intensively graze their paddock before moo-ving to the next paddock, similar to how bison herds once grazed the Great Plains. By allowing the grasses and plants time to recover and renew, the ranch grazing system is more productive and allows for more significant gains in the cattle herd. At the same time, labor and equipment costs have been significantly reduced, and profits come from cutting the costs of expensive farming equipment. "Our focus is to spend less, and grow more," says James Choquette, who began this strategy in the 1980s. "We are managing our operation to compliment and work with nature, to work with the natural prairie environment."

Some other sustainable grazing and soil health practices that the Choquettes follow:

- Areas that are least productive are re-seeded into natural prairie with a diverse mix of plants, legumes, and pollinators to feed not only the soil and microbes, but also nature and wildlife.
- Soil is "armored" by adding plants that increase the amounts of carbon in the soil, even those plants that cattle may not like to eat. Perennial grasses provide the best filters and the best long-term benefits.
- Minimize disturbance and optimize root systems.
- Change practices but not your principles: To build biological wealth and biological health.

Speaker Biography

Field applications of Pasture and Ecological Monitoring by Christine Su

Christine is the CEO and co-founder of PastureMap, a technology company helping ranchers increase profits on healthy grasslands. Christine has worked on farms and ranches in four continents. Christine has three degrees from Stanford, including an M.S. in Land Use and Agriculture and an M.B.A. Prior to founding PastureMap, Christine worked at McKinsey and at KKR Capstone, where she was an operations executive building performance improvement software for companies from $500 million to $2 billion in revenue size.

Christine believes that human knowledge and creativity on the land is the key to regenerating landscapes and building vibrant and just food systems.

Producer Abstract

This talk will cover practical tools to do ecological monitoring for pasture recovery, soil health, and perennial species in the field. Christine will share practical applications of mobile field tools used by producers across North America to make daily decisions on grazing planning, team management, and infrastructure planning. She will also talk about rangeland monitoring networks that are getting built for rancher-to-rancher knowledge sharing.

Ben Beckman

Ben Beckman works as a beef systems Extension Educator in Hartington, NE. His background includes work with management intensive grazing systems and root/soil/plant responses to grazing pressure. With degrees from the University of Nebraska-Lincoln for range ecology and forage management, Ben provides assistance and programing on grazing and forage systems in northeast Nebraska.

Jace Stott

Jace Stott is the beef systems extension educator for Brown, Cherry, Keya Paha, and Rock Counties. Jace's education includes a Bachelor's degree in Ecology, Range, Wildlife, and Fisheries with a range emphasis from BYU – Idaho, and a Master's degree in Range and Forage from the University of Nebraska – Lincoln. Jace's graduate work dealt specifically with examining cattle distribution patterns in the Nebraska Sandhills as well as the effectiveness of extended release dewormer in controlling internal parasites and horn flies, and examining production traits (weight gains and conception rates) of treated versus non-treated cattle. Jace was born and raised on a feedlot in Emmett, Idaho where his family raised Holstein bulls. Prior to graduate school Jace worked for several seasons as a range technician on the Boise National Forest as well as a season as a range technician for the University of Arizona – Extension.

Speaker Biography

Prescribed Fire, Bird Monitoring, and Butterfly Date by Andrew Pierson
[Discussion Format Only]

Andrew is the Director of Conservation at the Iain Nicolson Audubon Center at Rowe Sanctuary. He is responsible for the planning, development and implementation of the conservation program. He grew up on a farm and ranch near Arcadia, NE, received his B.S. in biological sciences, and has a strong background with at-risk wildlife through past employment with the U.S. Forest Service, Bird Conservancy of the Rockies, and Nebraska Game and Parks Commission.

Strategies for Rangeland Monitoring by James T. O'Rourke
[Discussion Format Only / Worksheet Provided on Tour]

Jim has spent eight years in Africa on range livestock projects, taught range management at Utah State University for six years and at Chadron State College for 15 years and worked for the U.S. Forest Service for two years. He is Past President of the Society for Range Management, Past President of the Nebraska Section of the Society for Range Management, Past President and current Secretariat of the Continuing Committee of the International Rangeland Congresses. Since 1988, concurrently with teaching at Chadron State College, he has run the family ranch involving intensive grazing management of native and introduced pastures, seed production of grass species biologically competitive with noxious weeds, timber management, expansion of riparian areas with planted hardwood mast species suitable for wildlife, and development of a recreation business involving sheepwagon stays. The O'Rourke RuJoDen Ranch has been recognized as the recipient of the Leopold Conservation Award in Nebraska for 2018.

Speaker Biography

RANCH SUCCESSION PLANNING

Keeping Your Ranching Operation in the Family for Future Generations by Ron Hanson

Ron currently holds the title as the Harlan Agribusiness Professor Emeritus at UNL. His 46 year college teaching career earned 31 university and national award recognitions. These honors included being the first Nebraska professor to receive the USDA Excellence in University Teaching Award, being named the Nebraska Professor of the Year by the Carnegie Foundation, and selected as the University Educator of the Year.

Ron was raised on an Illinois family farm. He earned his graduate degrees from the University of Illinois. He has counseled with Nebraska farm families for more than 40 years to help them resolve family conflicts and to improve family relations through better communications. He has been recognized by the Nebraska Farm Bureau, Nebraska Agricultural Leadership Council, Nebraska Ag Youth Council and the Nebraska FFA Foundation for his dedicated service to both rural youth and farm families.

His most recent efforts have been directed at farm business ownership succession and the transfer of management control between generations. Through his publications and professional travels, Ron is recognized as a keynote program speaker on the topic of farm succession planning and management transition to the next generation of young farm producers.

Mapping Out a Business Succession Plan for the Transfer of Ranch Ownership and the Transition of Management Control to the Next Generation of Family Ranchers

When transferring ownership of a family ranching operation to the next generation (especially if this ranch has been in the same family for several generations), this entire succession process itself can result in a lot of emotional stress as well as potential conflict among the family members involved. The question becomes whether the family itself (specifically the parents) has put in place a ranch business ownership succession plan to protect their ranch estate and to insure that their family ranching legacy continues for the next generation.

Most families have an estate plan and/or a family will, but very few actually have a ranch business succession plan. A successful succession plan spells out the process for the ranch to remain in family if something unexpected happened to the ranch and/or even to a ranch family member, does everyone in the entire family already know as well as understand what happens next. **Very simply, if something unexpectedly happened today (such as a family death, sudden illness, ranching accident, divorce within the family, etc.), does everyone in the family clearly understand what would happen tomorrow?** Planning for ownership succession plan is vital to keeping a ranch in the family for the next ranching generation and that a family ranching legacy continues into the future. How do we make sure the family name on the ranch mail box never changes?

Ranch families fully realize the importance and need for having a ranch succession plan to protect as well as continue their family ranching legacy, but these families quite often fail to ever put a plan in place for the next generation. Too many times personal obstacles as well as the fears of succession planning become road blocks which prevent a ranch family from developing and implementing a succession plan for their ranching operation.

Some ranch owners will never admit to the fact that someday they will die and no longer have their ranch. The fear of no longer being in control can be overwhelming. What if the next generation screws it up and loses my ranch. Or worse yet would sell my ranch. Or a non-family member gets part of my ranch or part of my estate. Who takes care of me in my later years if I turn over the ranch now? Maybe I just better keep everything to myself. **Thus a very common mistake by some parents can result: hanging on to "too much" for "too long".**

Succession planning is difficult for many ranch families because it takes them out of their "comfort zone". It requires the family to begin open and honest conversations within the entire family. No more secrets and/or hidden agendas. More importantly, succession planning means making life changing decisions (putting the ranch into a Family Trust or a LLC). Bottom line, decisions have to be made and final actions taken as well as implemented to accomplish a successful ranch succession plan for the next generation.

Always remember that it is never too early for a ranch family to begin this succession planning process. Just do not make the mistake of waiting until it is actually too late and now nothing can be done. That mistake happens all too often. Many times with the ranching operation being divided up or sold to pay estate taxes and/or to settle legal disputes between the family siblings since lawyers have now become involved in the situation and communications within the family has ceased. Can the ranch business itself afford these legal costs and still survive for another generation? Many times not.

Ranch succession is very time consuming (there are no short cuts or easy answers) and quickly becomes quite complicated (especially with the tax implications involved). Not to mention that succession planning can be emotionally draining as well as a stressful situation for many individuals when confronted with the thought of passing on their ranch estate. **The solution is to start planning now!**

Unfortunately, there are **many family issues** which can confront ranch families when working through this transition between generations without disrupting the ranch business operation due to legal disputes or personal conflicts between siblings. These ownership succession issues must eventually be discussed by all family members involved and then resolved to everyone's agreement for a successful transfer of ranch business ownership as well as passing on management control to the next family generation.

The failure by family members themselves to communicate effectively as well as their inability to resolve any issues of potential conflict quickly leads to misunderstandings and disagreements within the family. **That's when the family fighting and personal bickering really starts.** Legal problems and disputes soon arise, often bringing lawyers into the family situation. This usually results in a lot of bitterness and resentment with some family members no longer speaking to each other. This puts an end to a family legacy with the ranch itself being sold and/or the ranching operation dissolved. The next generation in the family loses the opportunity to gain ownership as well as the chance to carry forward the family ranching operation into the future. Thus sadly ending a family ranching legacy.

Understanding the Impact of Ownership Succession to a Family

Remember that the father wears two hats in a family ranching operation (Boss Hat and Dad Hat). When wearing the Boss Hat, Dad is in charge (authoritative power) and supervises the adult children as ranch employees. When wearing the Dad Hat, now he listens and better understands their concerns. This presents a difficult task since Dad must know when (and how long) to be wearing which hat. The adult children in the family ranch business must make this distinction between the Boss and Dad roles that a father plays in the ranching operation.

Rather than trying to boss/supervise/control these adult ranching children, Dad should try to mentor these adult ranching children. Provide them the opportunity to learn and to gain experience making ranch business decisions. This build confidence and management experience for these adult ranching children and helps to insure their success for the next ranching generation.

Another related issue is that fact that Mom many times outlives Dad. What if Dad dies unexpectedly or long before retirement? Will Mom operate the ranching operation "as if Dad were still living" or would Mom start making the changes she always wanted but Dad would not allow. Mom might rent out the ranchland to a neighbor or even sell the ranch within a relatively short period of time. How does the ranching son or daughter now fit into this situation? Would Mom turn over full control of the ranching operation to them and now let them make all the management decisions.

Things really get complicated in the family if Mom remarries and now there is a new step-Dad to contend with. Also consider that Mom may actually wear the "Boss Hat" in the family and/or Mom may actually even own the ranch operation. When that happens, expect very few changes in the ranch business itself even if Dad would die unexpectedly.

Eleven Challenges to Ranch Business Ownership Succession Planning

As a ranch family (in particular Mom and Dad) undertakes and begins the process of mapping out a ranch ownership succession plan for the next generation, there are eleven (11) immediate challenges which could limit their success or even result in a failed attempt to pass on their ranch to the next generation. Thus putting an end to a family ranching legacy and ruining the dreams/hopes of some family members.

FIRST CHALLENGE: **The issue of "who is actually family" and thus entitled to someday owning the family ranch. This quickly becomes quite emotional among all the members of the family.** Who are considered the "real family members" in the ranching business? This is an issue that most families never want to openly discuss or even admit to. But when it comes down to money, wealth, property, and especially land ownership, who fits this title of "family"?

Who is entitled to someday owning the family ranching operation? Are only the "blood related" family members included in financial business decisions, have management authority, or even the chance for ownership? Are the in-laws even treated as "family" in the ranching operation and allowed to have a voice in business matters?

Some families adopt the strategy that the less the in-laws know about our personal family business and financial affairs, the better we are for it. But that can be a huge mistake. If the in-laws are kept in the dark about the ranch and are entirely excluded from family discussions and business decisions, relationships of trust between family members quickly fail. This then leads to suspicions and a definite lack of respect for other family members. Once this element of doubt is created (what else have you done without telling me), honest communications within the entire family will cease and barriers are quickly formed. Once family members refuse to communicate with others, a family business breakup and/or a ranch sale is just waiting to happen next.

SECOND CHALLENGE: Are there favorites among the adult children in the family? Have some adult ranching children already been chosen to take over the ranch? Consequently, the most sensitive issue of the non-ranching children comes into play when passing on ownership of the family ranch or business. This issue is hard to discuss because parents often have "certain favorites" among their children. But to avoid the problems of sibling jealousy and resulting grudges, parents must block out their personal feelings of favoritism and devise an estate plan in a **fair and equitable manner** to all children (sons/daughters or ranching child/non-ranching child makes no difference within a family). Parents love their children. That is never an issue within a family. **The issue is simply fairness.** That is the challenge that parents must address for their adult children.

Ranch family operations are the most difficult to handle in terms of fairness among all the children since some children worked harder than others and may have contributed more to the parents' ranching operation (as well as their ranch estate). Also remember that some children care more about the family ranching operation (and will focus on its continued success) while other adult children are only interested how much money they might inherit from the parents' final estate.

THIRD CHALLENGE: Parents usually have a difficult time giving up or sharing control with the next generation. Some parents actually raise (or expect) their adult children to be followers. Children are often expected to do what the parents always want. "Work hard and do things our way" might be the standard rule in some families. Now parents cannot understand why their adult children have no drive or ambition.

What is the behavior expected by the parents for the adult children working in the ranching business? Do the parents want these children to be just puppets or independent thinking adults with their own ideas? Is it the parents' dream for the children to return back home to the family ranch or is it the children's dream to ranch with Mom and Dad? Children should never feel obligated to return back to the family ranching operation when their career interests and dreams might actually lie elsewhere.

FOURTH CHALLENGE: When will this transfer of ownership and sharing of management actually happen? Who will end up owning the ranching operation when the parents retire? Or will the parents still retain total ownership (as well as control) even after retirement while the ranching children keep doing all the work? Which children will have the chance to gain a share of the actual ownership? When will this happen or do the parents plan to retain total ownership until their death? What entitlements do the ranching children actually have in the ranch business? Have previous promises by the parents already been made to any of the children? Will these promises be honored by the parents or have the parents changed their mind without telling anyone? And again everything remains a bunch of secrets by the parents as to their plans for the next generation.

FIFTH CHALLENGE: **What should be a fair selling price for a family ranch? What is sweat equity worth by the adult ranching children who worked helping their parents build their ranching operation?** If the parents decide to sell their ranch (or part of the ranch) to any of their children (particularly the adult children ranching with them who have invested a lot of sweat equity), what is a "fair selling price" for this family ranch property.

Here lies a real problem with many ranch families. The largest share of the parents' financial investment for retirement is tied up in their ranching operation. If the parents decide to sell their ranch for "the highest mar-ket dollar", could a ranching son/daughter ever afford to pay that high of a purchasing price. Not to mention try-ing to pay off the amount of debt that would be required to buy out the family ranching operation from the other siblings.

Yet on the other side of this issue, the parents cannot afford to just give their ranch operation away or sell at the lowest bargain price. Parents can expect to live a longer retirement and will need a secure financial future for their personal care for the many years ahead. Working out a fair selling price for the ranch that provides the parents with a secure financial retirement but at a price that the children buying the ranch can afford as a feasible financial investment is certainly no easy matter. One solution to consider is for the parents to help a ranching son/daughter from the very start to acquire assets so that someday they have the net worth necessary to financially take over the family ranching operation and now build their future with further success.

SIXTH CHALLENGE: What if the parents are not willing to discuss the "real life what if issues" that are often involved with succession planning? Most families fail to address these issues since it is so much easier to pretend that this could never happen in our family.

No one wants to talk about the empty chair at the family table. But it will happen someday. To avoid potential misunderstandings as well as possible conflicts, these issues have to be resolved in order for a ranch succession plan to be carried out. These issues are difficult to discuss as well as emotional to work through. **Remember that "what if" usually happens when you least expect it. So expect the unexpected and have a plan ready for when it does happen.** Get things discussed and put things in writing so everyone remembers. Stop making the assumption that these issues will find their own solution. Time seldom solves a problem.

A successful ranch business succession plan for a family must accomplish one key objective. If something unexpected happened today to the ranch business and/or within the family, does everyone in the family already know and understand what happens tomorrow for the ranching business operation to survive and a family ranching legacy to continue for the next generation. **That is the secret to having a successful ranch business** ranching legacy to continue for the next generation. **That is the secret to having a successful ranch business ownership plan in place for the next generation of family ranch owners. The question is whether the ranch family members themselves are willing to put forth the effort (both time and commitment) to achieve this accomplishment.**

SEVENTH CHALLENGE: What if the parents themselves cannot agree on their succession plan? This many times happens especially when the parents each have different favorites among their children. Mom and Dad are the starting point to this planning process. This is their ranch, their family, and their estate. They worked their whole life to build and accomplish this. Now what are they going to do with it? **If the parents fail to reach agreement with each other and are unable to work through this succession process together, nothing will ever happen.** No ranch ownership succession plan will ever be developed and put in place.

Unfortunately, some parents will even pretend/ignore that these issues even exist in their family or take the approach that after I die I will not be there when the kids start to fight it out. So why care and worry now? And again the parents do nothing to put a plan of ownership succession in place.

EIGHTH CHALLENGE: Some adult children in the family may already feel that they are entitled. It is important for these adult children to understand that their parents actually owe them nothing. Parents do not owe their children a ranch or even an inheritance. That is truly a gift of love and generosity by the parents if they decide to pass on their ranch and/or their wealth to their adult children. These adult children must always respect the decisions being made by their parents even if they do not agree with those decisions. **This is the parents' estate, not the adult children's estate.** Parents have the right to divide up their estate according to their wishes. Hopefully this will be done in a fair and equitable manner for all the adult children in the family.

NINTH CHALLEGE: Greed has now become a factor in some ranch families especially with the huge increase in ranchland values in recent years. A generation ago the non-ranching children who left the ranch took the approach my brother/sister can have the ranch, all the endless work, and all the debts and worry. Now they have taken on a new attitude. Know what this ranch is now worth? Do you realize what we could sell this ranch for? How much am I getting? **Be careful of the curse of "family wealth".** This is one reason why many times lawyers become involved in settling a ranch estate. **Wealth can eventually destroy family relationships and thus put an end to a family ranching legacy.** There are too many sad examples of this situation in rural communities. This usually results in family members (especially siblings) no longer speaking to each other as well as carrying with them grudges/bitterness that can last a lifetime. Hard to believe but greed can turn love into hate within a family and quickly destroy relationships between ranch family members.

TENTH CHALLENGE: Family members are simply not able to communicate together as a family. The family fails to have open and honest discussions with each other and with all the family members being involved. This results in misunderstandings, family conflicts, bitterness and resentment. Nothing positive is accomplished by that. Parents must sit down with all their adult children and begin these conversations. That is the starting point. And most importantly, each of the adult children must have the opportunity to express their feelings and reactions in an open and honest family conversation while everyone listens and understands to what is being shared.

ELEVENTH CHALLENGE: Do the parents actually have a VISION for the future of their ranch and their family ranching legacy? Parents must have a clear vision for the future of their ranch and then be willing to share their hopes and dreams with their children (especially those who returned back to the family ranch). Is there a plan in place to protect and preserve these hopes and dreams? Is the family willing to make that commitment to put a succession plan in place for the next generation and to continue their family ranching legacy?

Parents are now living much longer lives. Many parents are now living into their 80's and 90's. If they are not willing to share ownership and/or not willing to give up management control of their ranch or business, how does the next generation (their adult children) ever have an opportunity to take over? Does this limit their ability to build their own net worth? Some of these ranching children could be in their 70's before they ever have a chance to own part of the family ranch. Would their years of sweat equity ever be fully recognized and rewarded? Worse yet, some parents may even outlive their ranching children. Now what happens? **This all goes back to the initial issue of parents often not willing to give up and/or share control.** Control offers a sense of having power. Things will be done my way or else. Some individuals can never force themselves to let go of the controlling power that ownership provides. **Again the mistake of hanging on to too much for too long.**

Starting the Process for Ranch Ownership Succession Planning

Parents have many questions regarding ranch succession planning. Where do we start? How does this process even begin? How can our ranch family succession plan be accomplished? Who carries out our plans and our wishes after our death?

Always remember that the parents themselves are the starting point. They must begin by discussing their hopes and dreams together. What is the ultimate goal they wish to accomplish in their lives? Keeping their ranch in the family for the next generation? Insuring that their adult children always remain together as a loving and caring family (especially after their death)? Continuing a family ranching legacy for their adult ranching children? For their grandchildren?

Parents have to put their feelings/hopes/dreams into words. Start writing it down on paper. Draft out a plan. No matter how simple or brief, get something in writing to start this process. Once a plan is drafted, it can always be revised/updated/expanded. But you have to have something to start with. With nothing in writing, how can a succession plan ever be accomplished? Consequently, there is a lot of talking but never any results to show for it. This happens a lot in many family ranching situations.

Now for the most important step in ranch ownership succession planning. The parents need to put together a ranch ownership management succession team to guide them through this succession planning process and to accomplish a plan for the next generation.

Ranch families will need to have four representatives on their succession planning team: (1) their accountant or CPA; (2) their attorney; (3) their ranch ag lender; and (4) their financial/estate planning specialist. These four representatives have the expertise and a wealth of experience to assist the family in developing and implementing their ranch succession plan for the next generation. They can answer the questions and point out various options for the family members to consider before making any final decision.

Ranch families need to take full advantage of having their own ranch ownership succession management team. The benefits as well as the peace of mind of developing (and more importantly implementing) an ownership succession plan for passing on a family ranch to the next generation far outweigh the time commitment involved as well as the costs/fees that will be incurred. **Continuing a family ranching legacy and preserving a ranching heritage for the next generation is priceless.**

Ironically, most parents actually avoid discussing these family issues and/or tackling these challenges of ranch succession planning. There are just too many personal emotions involved. Some parents may ignore these issues entirely and just assume that their children will work it out later by themselves. Or even pretend that these issues do not exist. This only results in a lot of bitterness and potential feuding which can split a family apart for future generations, thus ending a family ranching legacy that previous generations worked so hard to build and to accomplish. Consequently, the planning process never even starts and nothing gets accomplished.

It important to have a strategic plan for ownership succession in place for the success of this next generation of ranch owners. But there are some rather sticky as well as emotional issues to discuss among all family members involved. Always remember that avoiding these issues of ranch business ownership succession within a family now could result in disastrous consequences later (especially for the next ranching generation).

Summary and Some Final Thoughts to Consider

Parents must have a clear vision for the future of their family ranch and business operation for the next generation. This vision becomes the blue print for developing and implementing their family ownership succession plan. Once this succession plan is drafted, it must be communicated and explained to all the adult children in the entire family so there are no misunderstandings as to the parents' wishes and hopes for the next generation. Most importantly, these adult children must ultimately respect the decisions which their parents have made. It is the parents' estate, not the children's estate. Too many times children have this personal feeling of entitlement (I deserve this. You owe this to me). That only causes tensions between the parents and their adult children.

Always remember that a ranch can actually be replaced but a ranch family cannot be replaced. No ranch or ranching business is ever worth the cost of losing a family (tearing a family apart and destroying relationships between family members). But this happens many times when attempting to pass on the ranch to the next ranching generation. Ranch families are important. They represent our heritage and ranching culture. Keep these issues in perspective. **And remember what is most important: FAMILY.**

Speaker Biography

MIXED-SPECIES GRAZING

Randy Saner (Moderator)

Randy is an Extension Educator for Nebraska Extension in Lincoln, Logan and McPherson Counties, responsible for agriculture education focusing on Beef Systems.

Before returning to Nebraska, Randy worked for the University of Missouri Extension as a Regional Livestock Specialist for 15 years. He also worked for Colorado State Cooperative Extension as an Extension Agent in Weld County, Colorado.

Awards received are the MU Extension Team Work Award, National Association of County Agricultural Agents (NACAA) Achievement and Distinguished Service Award, NACAA Communications Direct Mail Piece 2nd Place National Winner, and the MU Extension Association Meritorious Service Award.

Some of the programs he is involved with are: Husker Ag SMARTS, West Central Cattlemen's, UNL Beef Lab, 4-H Youth Development serving 3200 youth and 4S Goat Expo. He has taught many educational programs on managing sheep and goats.

He has held various offices in Missouri Extension and the University of Nebraska Association of County Agricultural Agents.

Multi-species Grazing: Incorporating on Your Ranch by Sage Askin
[Photo Unavailable / Discussion Format Only]

Sage is a Wyoming native and young start-up rancher. He graduated with degrees related to Rangeland Ecology and Watershed Management in 2012, and started the business in the spring of 2013. Sage and his wife, Faith, were married in 2016, and have one daughter, Alpharetta, and one more on the way this November. He and his family have multiple enterprises on leased land, including cow/calf, stocker, breeding heifers, stocker goats, hair sheep/ewe lamb production, and some consulting work. Sage and Faith are active members of the Executive Link program of Ranch Management Consultants, and the Young Producers Assembly of the Wyoming Stockgrowers Association. They plan to eventually purchase land that will be paid for by livestock, and concentrate on their mission:

> "We choose the freedom to enjoy life and the ability to learn, while raising satisfied, healthy livestock, which equals satisfied, healthy people. We will have financial security and create a suitable, safe, and fun work environment and organized business, with a high quality of life. We promote honesty through Agriculture using our retained profits for investing in land, always "BY HIS GRACE, FOR HIS GLORY."

BE WISE EAT WISE: SATISFIED, HEALTHY LIVESTOCK for SATISFIED, HEALTHY PEOPLE.

Speaker Biography

Why Do Ewe Run Cows? by Brock Terrell

Brock Terrell is co-owner of Terrell Farms, LLC and Terrell Ranch, LLC, both diversified operations located south of Hay Springs, NE. The enterprises include cow calf, stockers, backgrounding feedlot, sheep, hay, row crop, seed crop, and forage crops. The operation is primarily leased native Sand Hills range and irrigated farm land. He is focused on holistic management and the use of the Savory System to improve range and animal performance. Brock holds a bachelor's degree in Animal Science from the South Dakota State University. He has also attended Bud Williams Stockmanship, Nebraska Ranch Practicum, High Plains Practicum, Ranching for Profit (twice), and a King Ranch lectureship. He is in business with his family, wife Heidi, and four sons.

Terrell Ranch
Hay Springs, NE

Why Do EWE Run Cows?

Ideas

- Sheep
- Wild Horses
- Pony Enterprises
- Chicken (Broilers or Eggs)
- Goats
- Graze Crop Ground in Summer and in Winter
- Entertainment / Education Guest Ranch

Harvest Multiple Layers Off the Same Land

- Decrease Marketing Risk
- Increase Diversity
- Spread Out Labor and Other Overheads

Decrease Risk

- Disease
  - ◊ Break Each Others Parasite Cycles
  - ◊ Very Few Diseases that Cross Species
- Drought
- Marketing
  - ◊ More Opportunities to Sell

Increase Diversity

Decrease Overheads

- Labor
  - Fence
  - Fall and Winter Cattle Work
- Land
- One Cow/Ewe

Sheep

- Two Crops
- Wool — Pays All Direct Costs and Labor
- Lambs — Only Cost is Land

Wool 2017

Merino: 20.4 Micron 15.76# x $2.41=$38/Head
Wf: 22.4 Micron 13# x $2 =$26/Head
Bf 9.2# x $.51 =4.66/Head

Buy Replacements

- Quickly De-stock / Re-stock
- Buy the Undervalued
- Follow the Droughts

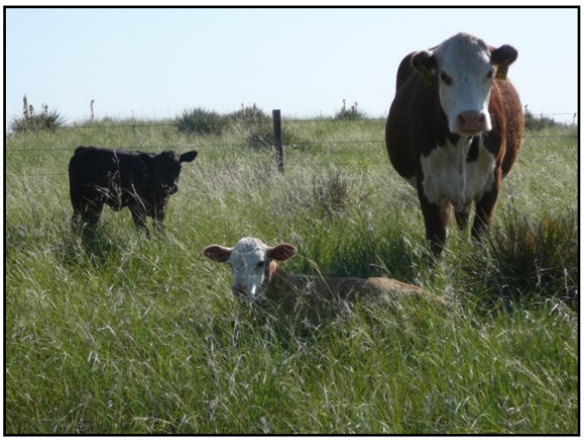
Bucks

- Turn out over Christmas
- 50:1 Ratio
- Black face Vs White face

Lamb in Sync with Nature

Low Input : High Output

- Low Labor
- Low Supplemented Feed
- Low Value (Cost) Animals
- Low Overheads
- Low Depreciation



High Value Products and Diverse Marketing Opportunities

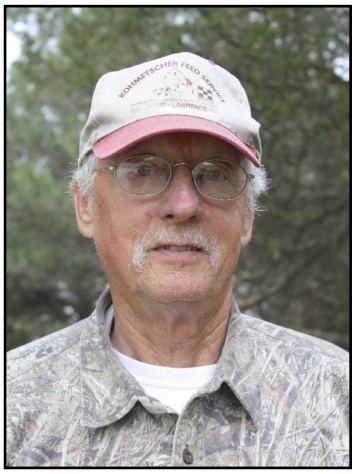
Flexibility

- Different Species / Classes
- Corn Grazing
- Mob Grazing
- Winter Range / Corn Stalks


FD70
FLEXDRAPER
MacDon
STRIDER
Profitable
Good Labor
Wool
Family Friendly
Humanitarian
Range Impact
Enterprise Stacking
Meeting New People
H2A Program
Guard Dogs
Cold May Rains
Lambing with Wool On
Prejudice Against Sheep
Steep Learning Curve

Speaker Biography

Cattle + Sheep + Goats = Environment + $ by Mike Wallace



Mike Wallace was raised on a dairy farm in south central Ohio. His father bought him a Horned Dorset bummer for his fifth birthday, which grew to 100 ewes by the time he went to Vietnam for his senior trip. Mike received a bachelor of science degree from Wilmington College in Ohio, 1972, and a masters degree in Agriculture from the University of Kentucky, 1973. He functioned as an Associate Animal Scientist, managing, and conducting research with 1,000 ewes for the University of Illinois at the Dixon Springs Agricultural Center, 1973-1978. Starting in 1978, he served as the Sheep Operations Manager, and other duties, including chair of the Pasture-Forage Committee at the U. S. Meat Animal Research Center. He retired from those positions in 2012. He is a past president of the Nebraska Sheep and Goat Producers Association, past Blue Hill school board member, current member of the Nebraska Grazing Lands Coalition, Nebraska Cattlemen, and South Central Nebraska Cattlemen.

Mike and his wife, Fran, raised four children, and maintained the personal flock of purebred Dorset, as Double M Sheep until 2006. During the mid-1990's their interest transitioned to sustainable land management and livestock production. They own, and operate the Double M, a 400 acre sheep-cattle-goat year-round grazing operation in Nuckolls County, Nebraska.

Producer Abstract

The Double M, https://www.facebook.com/Double-M-138083779651280/, has been in operation since 2001. It is a pasture-based, multi-species livestock operation in south central Nebraska that features 12-month grazing with minimum use of mechanically produced-harvested-delivered feedstuffs. Target brood stock numbers are: 40 mother cows, 230 ewes, and 40 does. The presentation will include observations on: cedar control, reclamation management of abandoned cattle feedlots, changes over years in actual income/animal unit by species, and changes in animal days per grazed acre.

Presentation

The Double M, https://www.facebook.com/Double-M-138083779651280/, is a pasture-based, multi-species livestock operation in south central Nebraska that features 12-month grazing with minimum use of mechanically produced-harvested-delivered feedstuffs (MPHD). Target brood stock numbers are: 40 mother cows, 230 ewes, and 40 does. There are four major components to the Double M operation:

Land — The land consists of two sets of pastures about three miles apart that are divided into 18 (on 240a/97ha) and 13 (on 160a/64ha) permanently fenced paddocks. About half of the land is native mixed tall/mid-grass prairie. Dominant species are big bluestem, little bluestem, sideoats grama, hairy grama, and blue grama plus various other warm and cool season grasses, forbs, and browse.

Most of the remaining land was previously dryland crop ground been planted to complex mixtures of native and introduced varieties of warm and cool season perennial and annual grasses and legumes. The property includes about 17 acres of abandoned cattle feedlots that grow annual volunteer mixtures of various forbs (weeds). When properly managed, these lots are extremely productive through spring and summer with very high quality forage for all three livestock species.

Line fences are multi-strand barbwire with an associated high-tensile electrified wire at about 10 inches above ground level. The newer internal divider fences are two-strand, high-tensile electrified wires.

The paddocks are rotationally grazed. The rate of movement through paddocks is determined by rate of plant growth and rest time needed for plants to recover based on Holistic Management principles, and Holistic Management International's "Planned Grazing Program" spreadsheet written by Ralph Tate. Like air conditioning and 4-wheelers – once used – this spreadsheet has become a necessity.

When needed, usually February-early April, the protein of stockpiled winter pasture is supplemented with limited quantities of alfalfa hay unrolled on paddocks one or two days per week. A supply of hay sufficient to feed all the brood stock for 60 days is restocked every fall. Some of this supply is used to feed developing females, does during kidding, during extreme ice-snow cover, and as a drought reserve. We raise no crops (except pasture) and make no hay. All MPHD feedstuffs are purchased.

Cattle — Cows are calved primarily on pastures starting in mid-April. Calves are sold off the cow in mid-December. Replacement heifers are drylotted through their first winter. Cattle diversify income sources, help deter predation, are beneficial for the range/pasture sustainability, help control parasite contamination of pastures, and can be easily moved/dispersed in response to drought.

Sheep — Romanov-White Dorper-St. Croix composite (hairsheep/no shear) crossbred ewes are lambed on pastures separate from the cows between May 5 and May 24. Ewe families are merged with the other stock at the end of the lambing period. Lambs and ewes are not handled until August when lambs are tagged, counted, vaccinated for the anaerobes, and the intact buck lambs are weaned and moved to pastures that are several miles away from the ewes and ewe lambs. Lambs are sold off pasture at the end of October at 55-70 pounds. Replacement ewe lambs are weaned the end of November, put in lots, and bred before being merged back with the mature ewes on pasture in March before they lamb in May. Mature ewes are wintered and bred on pasture with the other stock.

Goats — Spanish-Boer crossbred does are kidded in barn lots in April. Kids are vaccinated for the anaerobes, tagged, and castrated before the families are moved to pastures with the other livestock in May. The kid crop is sold off their moms/pasture at the end of September. Replacement doelings are weaned, bred, and kept in dry lots until they go to pasture with their kids the following May. Nannies are bred and wintered with the other stock on pasture until early February when they come back to the barn lots before kidding.

Implications — This presentation will include observations on: cedar control, reclamation management of abandoned cattle feedlots, changes over years in actual income/animal unit by species, and animal days per grazed acre.

Speaker Biography

GRAZINGLANDS AND WILDLIFE

Brad Schick (Moderator)

Brad Schick is a Nebraska Extension Beef Systems Educator based in Webster County, and serves eight counties in south central Nebraska. He grew up in Northeast Nebraska on a small farm raising primarily corn, soybeans, and livestock. He attended Concordia University in Seward, NE where he earned a Bachelor of Science degree in biology and minored in chemistry and physical science. He then earned his Master of Science degree in Range and Forage Management at the University of Nebraska-Lincoln. He worked as a Research Manager and Technician in southern Iowa, Lincoln and Mead, NE in rangelands, mixed pasture establishment/grazing, ruminant nutrition, as well as crop and cover crop areas, and grassland restoration before coming to Nebraska Extension. He has also been a member of the Society for Range Management for four years.

Speaker Biography

Lesser Prairie Chicken, Grazing Systems and a Search for Solutions by John Kraft

John Kraft is currently a Research Assistant with the Kansas Cooperative Fish and Wildlife Research Unit. He obtained a B.S. in Ecology and Biodiversity from Emporia State University and an M.S. in Biology from Kansas State University. His research interests are focused on grassland ecology and conservation on private, working lands.

Introduction

Grazing is the most wide-spread driver of grassland maintenance and enhancement in the Great Plains (Milchunas et al. 1988, Knapp et al. 1999, Samson et al. 2004). Contemporary grazing management strategies (smaller pastures, shorter grazing periods, and higher stocking densities) are growing in popularity and are often designed to create and maintain uniform grazing pressure within grazing units (Holechek et al. 1998, Fuhlendorf and Engle 2001). As grazing strategies strive for uniformity in grazing pressure, habitat heterogeneity and biodiversity is sacrificed. Although some wildlife species reap benefits of homogenous or uniform grazing disturbance, the costs to species more reliant on variable vegetation structure are significant (Knopf 1994). Among the negatively affected are grassland bird species native to the Great Plains (Fleischner 1994). A shift in management towards goals of landscape heterogeneity has been proposed to remedy these effects (Fuhlendorf et al. 2006). Most commonly, patch-burn grazing has been the management regime of choice for creating l andscape and pasture level heterogeneity beneficial to grassland wildlife. However, fire is commonly precluded as a management tool due to a culture of skepticism and fear. Ecologically, prescribed fire may not always be beneficial to management objectives. Derner et al (2009) calls for the evaluation of heterogeneity based management strategies that use grazing livestock as the sole drivers of habitat. Past research indicates that deferment, pasture area, and stocking density can increase heterogeneity by employing grazer exclusion (deferment; Adler and Lauenroth 2000), topo-edaphic heterogeneity (pasture area; Fuhlendorf and Smeins 1999, Barnes et al. 2008), and grazer selectivity (stocking density; Barnes et al. 2008, Bailey and Brown 2011). However, a glaring absence of efforts to evaluate the influence of deferment, pasture area and stocking density on wildlife species is evident.

Objectives

Lesser prairie-chickens (*Tympanuchus pallidicinctus;* hereafter LEPC) require heterogeneous grassland habitats and are an ideal case-study candidate for evaluating the effects of heterogeneity-based grazing strategies on a species of conservation concern. Our research objectives focused on developing the baseline LEPC response (habitat selection and fitness) to grazing disturbance and investigating how heterogeneity-based grazing strategies (lower stocking densities, larger pastures, and shorter deferment periods) influence baseline observations. We also investigated the influence of heterogeneity-based grazing management on vegetation structure.

Results

Our findings indicate that non-breeding LEPC hens use a large range of forage utilization values (0-50%; Figure 1). This pattern in driven by the inherent variability in rangeland condition across our research sites (e.g., pastures with variable annual forage production). Breeding females did not place nests within pasture grazed at rates greater than 40% forage utilization and most nests were placed on sites with forage utilization rates between 0 and 20%.

Investigations into the impact of heterogeneity-based grazing strategies produced predictable results. We found that regardless of forage utilization, LEPC habitat use increased as stocking densities decreased (Figure 1). A positive influence of pasture size on habitat use was also observed (Figure 1). In fact, it is likely a combination of these two interrelated variables (stocking density and pasture area) that produce optimal LEPC habitat quality. As pastures increase in size, the environmental variability present within the pasture increases as well. In large pastures with relatively low stocking densities, the lack of competition for high quality forage by grazing livestock creates a spatially variable grazing distribution. A spatially variable grazing distribution produces a desired habitat characteristic; spatially variable habitat structure. A pattern describing the influence of deferment on habitat use was difficult to quantify (Figure 1). However, it is likely that site-specific characteristics such as plant species composition and precipitation play a significant role. Vegetation surveys indicate a negative relationship between increasing stocking density and habitat heterogeneity.

Implications

While there is much debate on the merits of rotational and continuous grazing systems, the superiority of one system over another in terms of livestock production and ecosystem health is not widely accepted among professionals. In rangelands that already have the diverse vegetative structure that lesser prairie-chickens require, range managers can maintain large-scale (i.e., across pastures) heterogeneity through a mix of low-to-moderate forage utilization goals between pastures. Small-scale heterogeneity (i.e., within pasture) can be maintained by implementing low stocking densities, greater pasture areas, and shorter deferment periods. In rangelands where vegetative structure suitable for nesting is limited, or where the most important grass species for nesting are also among the most palatable, longer deferment and rest-rotation may be needed to restore or create advantageous vegetative structure. Further, periodic, year-long deferment is likely essential to maintain the integrity of grazed lands regardless of plant community composition.

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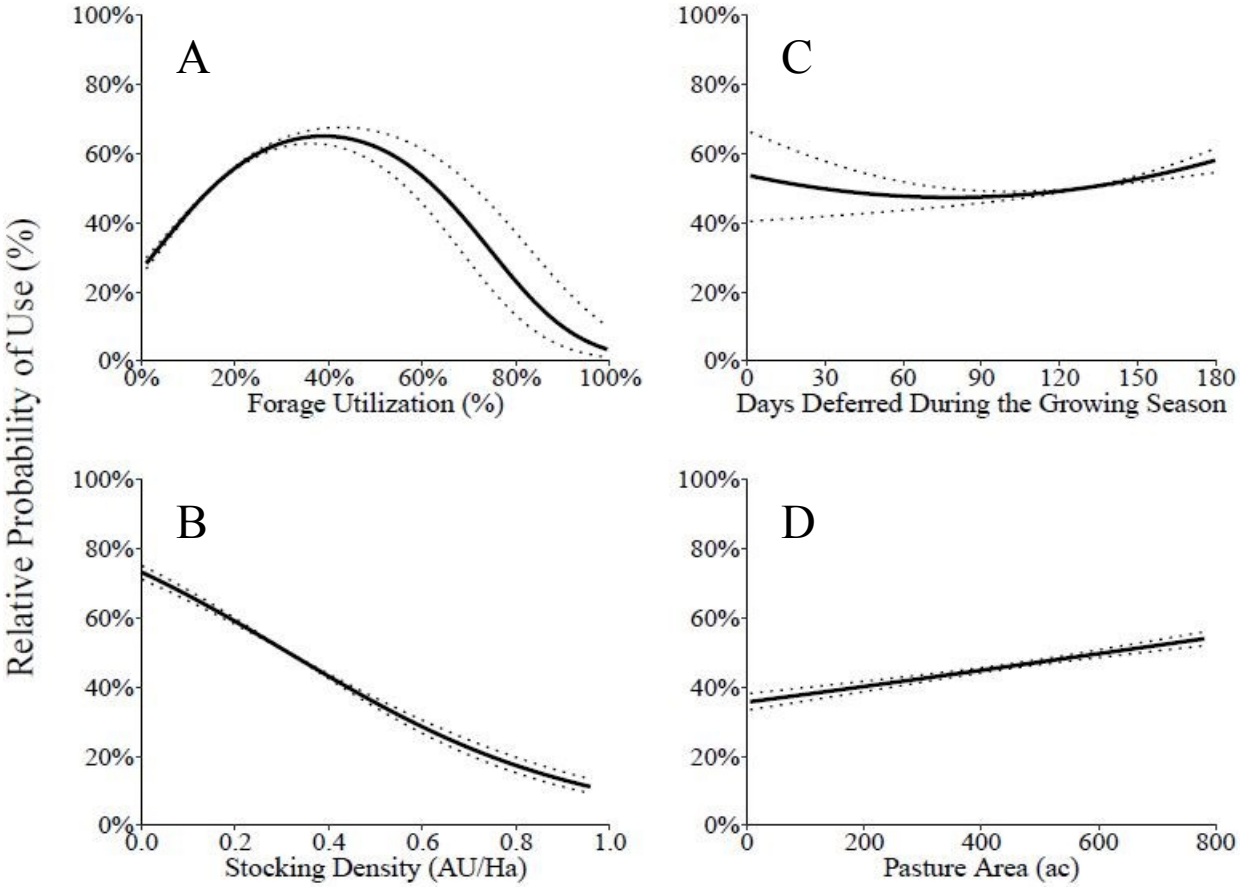
Figure 1. Relative probability of use response curves illustrating non-breeding habitat selection by female lesser prairie-chickens in relation to A) forage utilization (%); B) stocking density (AU/ha); C) number of days deferred during the growing season; and D) pasture area (ha) within monitored rangelands grazed by cattle from 2013-2015 in western Kansas, USA. Forage utilization was calculated assuming a 50% grazing efficiency (proportion of the allocated forage consumed by livestock). The prediction curves are enveloped with 95% confidence intervals.



Speaker Biography

It Depends: Relationships between Wildlife and Livestock Grazing Management Vary Across Space and Time by Lance McNew

Lance McNew is an Assistant Professor of Wildlife Habitat Ecology at Montana State University. He and his students conduct applied research in wildlife ecology with a focus on space use and demography in working landscapes. During the past 15 years, he has conducted extensive research evaluating the effects of rangeland and livestock management on grassland -associated birds in a variety of prairie ecosystems, including prairie-chickens in tallgrass prairies, sharp-tailed grouse in mixed-grass prairies, sage-grouse in sage-steppe, and songbirds in all types in between. Lance has a bachelor's degree in zoology from Eastern Illinois University, a master's degree in wildlife biology from Southern Illinois University, and a Ph.D. in ecology from Kansas State University.

Introduction

The temperate grasslands of North America are among the most imperiled ecosystems on the planet. More than half have been converted from their native state, with the largest losses occurring in tallgrass prairie (>95% alteration), followed by mixed-grass prairie (>70% alteration) and shortgrass prairie (>48% alteration; Howe 1994, Samson et al. 2004, Hoekstra et al. 2005). Conversion of remnant grasslands to row crop agriculture is still occurring throughout mixed- and tallgrass prairie ecosystems at rates from 1.0 – 5.4% annually, with significant losses in the northern Great Plains (Wright and Wimberly 2013). The slowing of grassland losses in the last decade of the 20th century resulting from federal and state conservation easement programs has been recently reversed as commodity grain prices and government crop subsidies for ethanol-production have increased (Holechek 2007, Fargione et al. 2008, Wright and Wimberly 2013).

Grassland associated wildlife, especially obligate grassland birds, have declined more rapidly than any other guild of wildlife during the past 60 years (Knopf 1996, Sauer et al. 2013). Declines in grassland birds, who serve as literal 'canaries in the coalmine' of prairie ecosystem health, have paralleled the rapid loss and fragmentation of native grasslands (Browder et al. 2002, VerCauteren and Gillihan 2004, Askins et al. 2007, Rosenberg et al. 2016). Unsurprisingly, the remaining native prairie habitats of the Great Plains, spared the plow and the surveyor's transit, are as critical to the persistence of many grassland species as they are to America's cattle production industry. As such, the interests of cattle producers and grassland wildlife overlap. With habitat loss at the forefront of grassland wildlife population declines, rangelands managed for livestock grazing offer a form of market-based habitat conservation, keeping large areas of native grassland from conversion to agricultural or other anthropogenic development (Brunson and Huntsinger 2008). However, protecting rangelands from development, in itself, is not typically sufficient to sustain proper functionality of these grassland ecosystems.

The Effects of Livestock Grazing on Grasslands and Wildlife

The grazing of livestock can either positively or negatively impact the health and productivity of grasslands, as well as the abundance and performance of wildlife populations (Risser et al. 1981, Messmer 1990, Krausman et al. 2009). Grazing of grassland vegetation has been shown to facilitate ecological functioning, improve rangeland condition, and increase aboveground vegetation productivity in some grassland ecosystems, and the ecological process of grazing is important for the grassland wildlife species that evolved with and depend upon the vegetation structure created by large herbivorous grazers (Risser 1990, Frank and McNaughton 1993, Fuhlendorf and Engle 2001, Derner et al. 2009, Holechek et al. 2011). However, improper rangeland management, characterized by sustained high-intensity grazing and vegetative defoliation, has resulted in reduced plant biodiversity, along with biomass losses of residual grass, grass roots, and litter, leading to the deterioration of long-term range condition and native grassland habitat (Dyksterhuis 1949, Fleischner 1994, Ostlie et al. 1997, Biondini et al. 1998, Holechek et al. 2011).

Grazing management is often cited to explain patterns of occurrence, abundance, and demography of remaining grassland wildlife populations. However, the success of livestock grazing systems for improving wildlife habitat quality varies widely in the literature (Holechek et al. 1999, Briske et al. 2008, Krausman et al. 2009, Schieltz and Rubenstein 2016). The regional evolution of grassland ecosystems to a continuum of grazing pressures, as well as large-scale differences in average annual rangeland productivity may largely contribute to these inconsistencies. A livestock grazing system that improves grassland bird habitat quality in a highly productive tallgrass prairie ecosystem (Fuhlendorf et al. 2006, Coppedge et al. 2008) may not have a similar effect in the semi-arid shortgrass prairie (Augustine and Derner 2015). However, even within a single grassland ecosystem such as the northern mixed-grass prairie, researchers have found variable responses to livestock grazing management in terms of grassland bird habitat selection.

Case Studies from Across Ecosystems

Improper or inadequate rangeland management has often been implicated in the decline of grassland birds (Peterjohn and Sauer 1999, Johnson and Igl 2001, Brennan and Kuvlesky 2005). As a result, evaluation of the effects of livestock grazing management on the ecology of grassland birds has been a major focus of research during the past two decades (Askins et al. 2007, Lusk and Koper 2013, Pipher et al. 2016). The rapid accumulation of information regarding grazing-wildlife relationships has undoubtedly benefited our understanding of regional wildlife ecology in grasslands. However, the effects of livestock grazing on even a single species often vary across studies, making broad applicability of results to rangeland management unclear. Consider for example the grasshopper sparrow (*Ammodramus savannarum*), an obligate grassland bird and indicator species for prairie ecosystems (Elliott and Johnson 2018). Even within a single grassland ecosystem type such as the northern mixed -grass prairie, researchers have found large variation in the apparent responses of grasshopper sparrow populations to livestock grazing management, ranging from no association with grazing management (Davis et al. 2014), to a positive response to rotational grazing systems (Messmer 1990, Buskness et al. 2001), to, alternately, a positive response to seasonal-long livestock grazing (Ranellucci et al. 2012). Clearly, rangeland management recommendations to benefit grasshopper sparrows from these studies are inconsistent at best.

Recent work has highlighted the importance of structural and compositional heterogeneity in grassland vegetation for grassland birds and other taxa. Livestock grazing management designed to create or restore patch-level structural heterogeneity to rangelands, such as patch-burn grazing, has been successfully applied to tallgrass prairie habitats, and in many cases, have had positive effects on grassland birds (Fuhlendorf et al. 2006, Churchwell et al. 2008, Coppedge et al. 2008, Hovick et al. 2015, Davis et al. 2016), prairie-grouse (McNew et al. 2015, Winder et al. 2016, Lautenbach 2017), and small mammals (Ricketts and Sandercock 2016) relative to

grazing systems designed to homogenize forage utilization by livestock. For example, nest survival, adult survival, and habitat use by greater prairie-chickens (*Tympanuchus cupido*) were improved on rangelands managed with patch-burn grazing relative to intensive early stocking and annual spring burning in the Flint Hills of Kansas (McNew et al. 2015, Winder et al. 2016, 2017). Similar results have recently been reported for lesser prairie-chickens (*T. pallidicinctus*) in short-grass prairie habitats of southcentral Kansas (Lautenbach 2017, LPCI 2017). In contrast, recent research in my lab has shown that rest-rotation grazing, another livestock system designed to promote patch-level structural heterogeneity, has no apparent effect on sharp-tailed grouse (*T. phasianellus*; the northern congener of prairie-chickens) demography, relative to traditional season-long grazing in mixed-grass prairie habitats of eastern Montana (McNew et al. 2018). Moreover, the relative effects of grazing-influenced habitat conditions on habitat selection and demography of greater prairie-chickens were spatially variable and dependent on habitat conditions considered at broader spatial scales (McNew et al. 2013), suggesting potential variation in best management practices for the species even within a single tallgrass prairie ecosystem.
Results from studies in eastern tallgrass prairies are generally consistent with regard to the negative effects of common intensive and homogenizing rangeland management practices on wildlife diversity (Hovick etal. 2014, Ricketts and Sandercock 2017), population processes (McNew et al. 2012, McNew et al. 2015, Sandercock et al. 2016, Ripper et al. 2017, Winder et al. 2018), and abundance (Erickson 2017). However, nest survival, a key vital rate for grassland bird populations, was not always positively associated with patch-burn grazing relative to other grazing systems (Erikson 2017, but alternately see Hovick et al. 2011). In contrast to findings in tallgrass prairie ecosystems, patch-burn grazing was ineffective at improving abundance of grassland birds in semi-arid short-grass prairies of northeastern Colorado (Augustine and Derner 2015). Similarly, recent research in Montana has found that heterogeneity-focused grazing management does not provide improved habitat for grassland- and sagebrush-associated birds relative to traditional grazing systems (Golding and Dreitz 2017, Smith et al. 2018, McNew et al. 2018). So what's a rangeland manager to do? Conservation-minded landowners and livestock producers who strive to sustain ecosystem function of their ranches are reasonably frustrated by conflicting recommendations on proper rangeland management.

Mediating Factors that Cloud the Issue

Lipsey and Naugle (2017) hypothesized and found that annual precipitation and rangeland productivity interacted with livestock grazing to determine patterns in avian abundance at the landscape scale. Consistent with findings at broader spatial scales, my students and I have observed that even fine-scale variability in rangeland production potential can mediate the effects grazing system management on grassland birds in northern mixed-grass prairies (McNew et al. 2018, Vold 2018). Cumulatively, our work suggests spatially-explicit variation in the relationship between livestock grazing and grassland bird abundance and habitat use, and may explain the inconsistencies reported in the literature related to the implementation of livestock grazing systems on grassland bird habitat quality. Grassland bird species evolved to fill ecological niches associated with gradients in vegetation composition and structure created by shifting gradients of disturbance (e.g., fire and herbivore grazing) over time and space (Fuhlendorf and Engle 2001). As a result, some birds are habitat specialists (e.g., Sprague's pipit, Anthus spragueii) requiring particular type and density of vegetation for nesting, whereas others are generalists (e.g., western meadowlark, Sternella neglecta). Because vegetation growth and productivity in grassland ecosystems are directly determined by local soil conditions and precipitation, rangeland management for optimal habitat for a particular species will be site-specific. For example, creating suitable nesting habitat for Sprauge's pipit will likely require a different grazing management system in more productive eastern ranges than in more arid and sandy western portions of their range.

Conclusion and Recommendations

Practices and principles within rangeland management are fundamentally dependent upon geographic location (Holechek et al. 2011). The broad spatial extent of North America's prairie ecosystems accentuates the importance of recognizing innate structural variability when managing rangelands. Considering only the prairies of the Great Plains, rangeland management actions implemented within the tallgrass prairies of Kansas, Nebraska, and Iowa will not produce similar results when applied to the northern mixed-grass prairies of North Dakota, South Dakota, and eastern Montana. Variable rangeland productivity among prairie ecosystems, driven largely by regional climate, influences the vegetative characteristics within a specific grassland landscape (Holechek et al. 2011). Even within a single prairie ecosystem, the northern mixed-grass prairie for example, annual variability in precipitation from one growing season to the next has been shown to significantly affect range vegetation structure and composition (Lwiwski et al. 2015). Without accounting for these differences between geographic regions in the rangelands' ability to produce vegetation, even on an annual temporal scale, management actions may not improve range condition in terms of climax community regeneration or wildlife habitat quality.

So here are some summary points for wildlife researchers as well as rangeland managers to consider:

1. All livestock grazing is not the same. In the past, wildlife researchers have not been specific when evaluating and describing the grazing systems used on their study areas. The lack of specificity makes interpretation to management impossible. To evaluate the applicability of results of any study, specific information regarding livestock management (i.e., turn out and in dates, grazing duration, stocking density) at the pasture-level need to be reported. In addition to descriptions of plant communities, researchers and managers should report soil type and/or ecological site descriptions for their study area. If possible, measures of primary productivity should be a component of any study evaluating the effects of rangeland and grazing management. If not possible, normal rangeland production potential for the site, available from the NRCS web soil survey, should be reported, with the actual precipitation for the study site. Reporting specific site conditions will allow land managers in other locations to evaluate the applicability of research results to their properties.
2. The effects of a specific grazing system on wildlife population processes and community patterns, and likely other ecosystem components, is mediated by rangeland productivity and precipitation. Annual precipitation is a primary driver of vegetation structure and composition, and variation in rangeland productivity results in broad structural variability within grassland habitats (Ahlering and Faaborg 2006, Vermeire et al. 2008, Lwiwski et al. 2015). Precipitation is probably the most significant mediator of livestock grazing effects on wildlife.
3. Because the interactions between livestock grazing management and the host of mediating factors vary over space and time, the 'silver bullet' of proper grazing management for all but the most geographically restricted species of wildlife is a myth. Grassland birds, for example, have shown species-specific or guild -specific responses to livestock grazing intensity within the context of variable rangeland productivity at the landscape scale (Lipsey and Naugle 2017), as well as the ranch-scale (Vold 2018; Figure 1). General fire and grazing guidelines for a particular species of wildlife are appropriate at the regional level, but flexibility in site-specific management is necessary to adjust for local soil and production conditions.

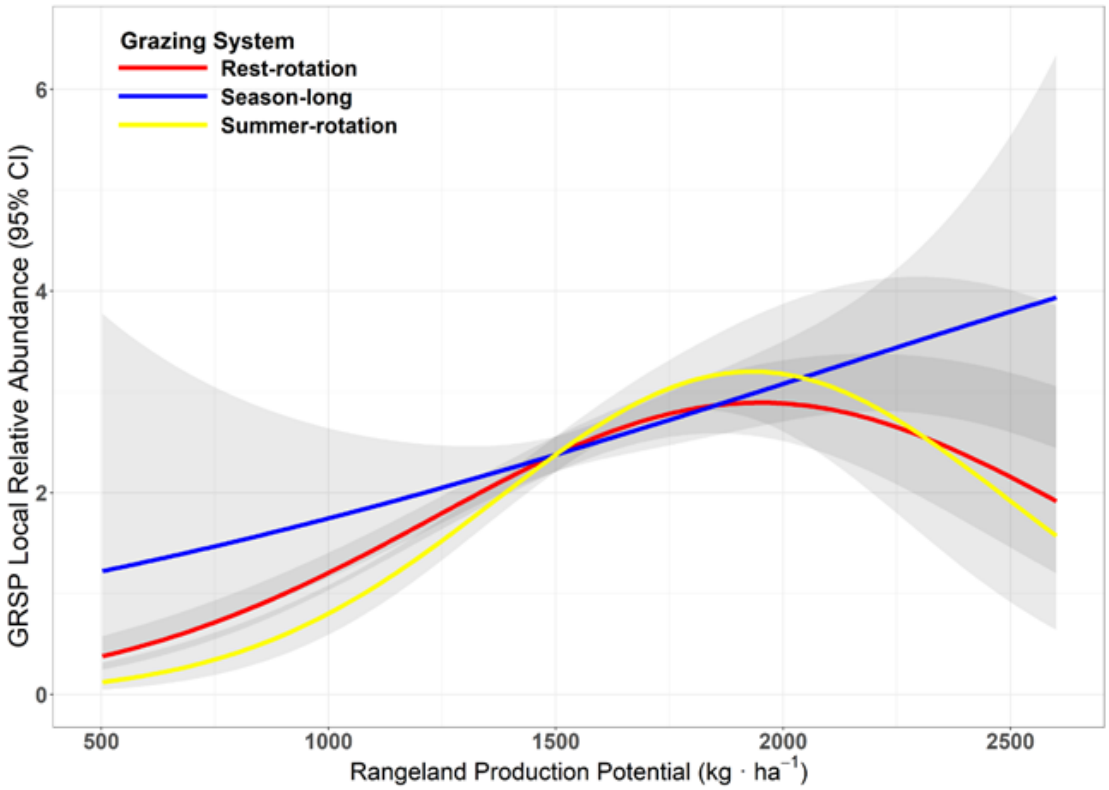


Figure 1. Relationship between estimated grasshopper sparrow abundance and rangeland production potential under three grazing systems in eastern Montana during 2016–17. Figure from Vold (2018).

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Panel Biographies

RANCH SUCCESSION PLANNING

O. Lynn Myers

A Nebraska Sandhills rancher who, along with Marlene (wife), Creston (son) and family, and Carissa (daughter) and family, operates Tippetts Myers Ranch LLC. The ranch has been in Marlene's family over 100 years. Marlene, Lynn, their children, and grandchildren are the 7th generation to live on the ranch. Conservation of the land, industry, community involvement, profit, and sustainability have always been stressed as priorities.

Lynn earned a B.A. in Business Administration from Chadron State College. He has served on the Nebraska Cattlemen Board of Directors, Nebraska Grazing Land Coalition Board, and Rackett Rural Fire District as Secretary-Treasurer. Mentoring and helping young people become involved in the industry is one of Lynn's passions. He also loves good horses, good cattle, my family, neighbors, and friends. He enjoys playing the banjo, singing, and a good joke or story.

Mike Wintz

Mike and his wife, Kayla, lease a ranch 20 miles south of Bingham, NE, where they run a cow/calf operation. Mike grew up in northeast Nebraska, and after graduation joined the Air Force, where he was a heavy equipment mechanic stationed in England and Minot, ND. After serving 4 years, Mike went to work for a farmer/rancher in Minot for a couple of years. A job opportunity brought him to the John Brenneman Ranch at Hyannis, NE. He worked there for 10 years, and then at Sibbitt Cattle Company in Hyannis for 5 years. Kayla and Mike were married in February of 2005, and in May they took over the lease of her retiring parents' ranch to start their own operation. Mike has two step-children and 4 step-grandchildren. He's a member of the Heart of the Hills Fire Department in Lakeside, NE, and Commander of the local American Legion Post #57 in Hyannis. Mike also always enjoys a day of fishing.

Moderator / Speaker Biographies

PASTURE MONITORING

Bethany Johnston (Moderator)

Bethany Johnston grew up in the middle of no-where. In the very corner of Rock County, she attended a one-room schoolhouse, 35 miles from the nearest town. Here she lived and worked on the family's purebred Angus ranch nestled in the eastern edge of the Sandhills. After attending UNL with food science and meat science degrees, Bethany currently works for Nebraska Extension based in Thedford, NE. Bethany currently lives on her husband's family ranch, with their daughter.

As an extension educator, Bethany reaches beef producers in the heart of the Sandhills, in the heart of cattle country. She enjoys learning about improving Sandhills grasslands and running a quality and cost-effective cowherd. She and her UNL team completed an app (called "GrassSnap") to help producers detect changes in their pastures.

Keeping Human Knowledge at the Center of Technology by Christine Su

Christine is the CEO and co-founder of PastureMap, a technology company helping ranchers increase profits on healthy grasslands. Christine has worked on farms and ranches in four continents. Christine has three degrees from Stanford, including an M.S. in Land Use and Agriculture and an M.B.A. Prior to founding PastureMap, Christine worked at McKinsey and at KKR Capstone, where she was an operations executive building performance improvement software for companies from $500 million to $2 billion in revenue size.

Christine believes that human knowledge and creativity on the land is the key to regenerating landscapes and building vibrant and just food systems.

Producer Abstract

This talk will focus on technology and information trends over the next 5-10 years, and how next generation's grazing operations might evolve. How do satellites, remote sensing data, virtual fencing, robotics, and software fit in with practical applications of grazing management? What exactly is big data, machine learning, and what can and can't it be used for? Understanding these trends will empower the next generation of producers to quickly share knowledge, build resilience, and respond to shifting patterns in a rapidly changing world.

Grazing for soil health and diversity

Regenerative Agriculture describes farming and grazing practices that, among other benefits, **reverse climate change** by **rebuilding soil organic matter** and restoring degraded **soil biodiversity** – resulting in both **carbon drawdown** and improving the **water cycle**.

Specifically, Regenerative Agriculture is a holistic land management practice that leverages the power of photosynthesis in plants to close the carbon cycle, and build soil health, crop resilience and nutrient density.

-CSU Chico Regenerative Agriculture Initiative

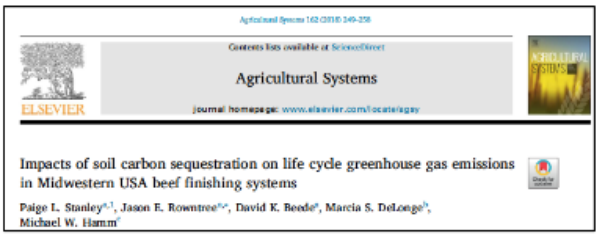
Non-agricultural scientific communities becoming more aware of grazing for soil and ecosystem health

FOOD
SILVOPASTURE
#9

FOOD
MANAGED GRAZING
#19

Source: Project Drawdown. www.drawdown.org

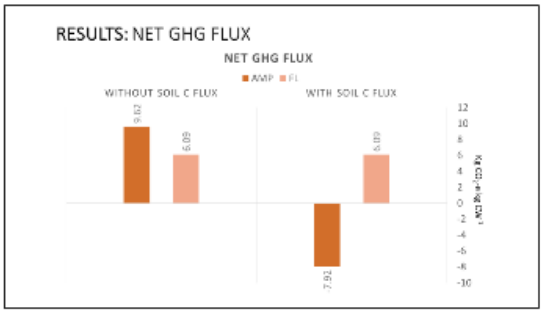
AMP grazing research is promising…



Agricultural Systems

Impacts of soil carbon sequestration on life cycle greenhouse gas emissions in Midwestern USA beef finishing systems

Paige L. Stanley, Jason E. Rowntree, David K. Beede, Marcia S. DeLonge, Michael W. Hamm



Source: Paige Stanley, PhD UC Berkeley

…and the media is finally becoming responsive to cattle's relationship to grasslands

CIVIL EATS

Can Responsible Grazing Make Beef Climate-Neutral?

Forbes

Going Vegan? Eating Sustainable Beef Can Be Good For The Environment

JPR Jefferson Public Radio

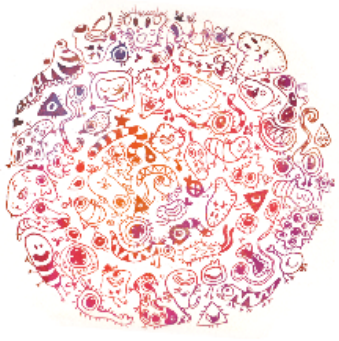
How Grazing Can Be Good For The Land

BeefProducer

New research says grass finishing can build soil

It is not the strongest of the species that survives, nor the most intelligent. It is the one that is most **adaptable to change**.

-Charles Darwin



Information Trends

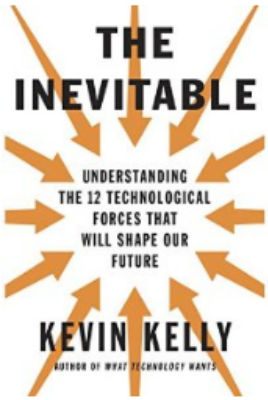
- More tech, more human
- Knowledge and creativity over assets are the currency of future business
- The future belongs to those who are adaptive and resilient
- Free up space for creativity

More tech, more human

- What is technology good at?
  - Repeating simple, repetitive tasks quickly and accurately
  - Not taking breaks, not asking for pay
- What are humans good at?
  - Creativity and curiosity
  - Decisions and judgment
  - Connection, empathy, caring
  - Enjoying life and creating meaning

Things become services, ownership becomes access

- Cars > Uber/Lyft
- Hotel > Airbnb
- Music > Spotify
- Farm > infrastructure-as-a-service
- Land > grazing-as-a-service



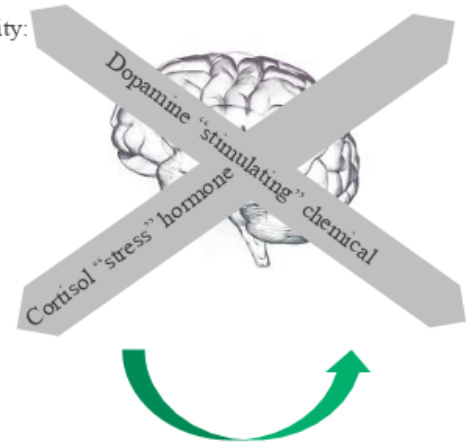
The future is:

- Connected
- Open
- Sharing
- Learning
- Nimble
- Creative
- Evolving

- How do we succeed in this new world?
- How do we maximize adaptiveness and resilience?

Switching to Abundance Mindset

Seeking new ideas
Ideal combo for productivity:
Dopamine and serotonin
Creative, productive
Open to taking risks



Anger, fear, anxiety, fight-flight

Seek comfort, safety, stay on beaten path
Serotonin – "calming" chemical

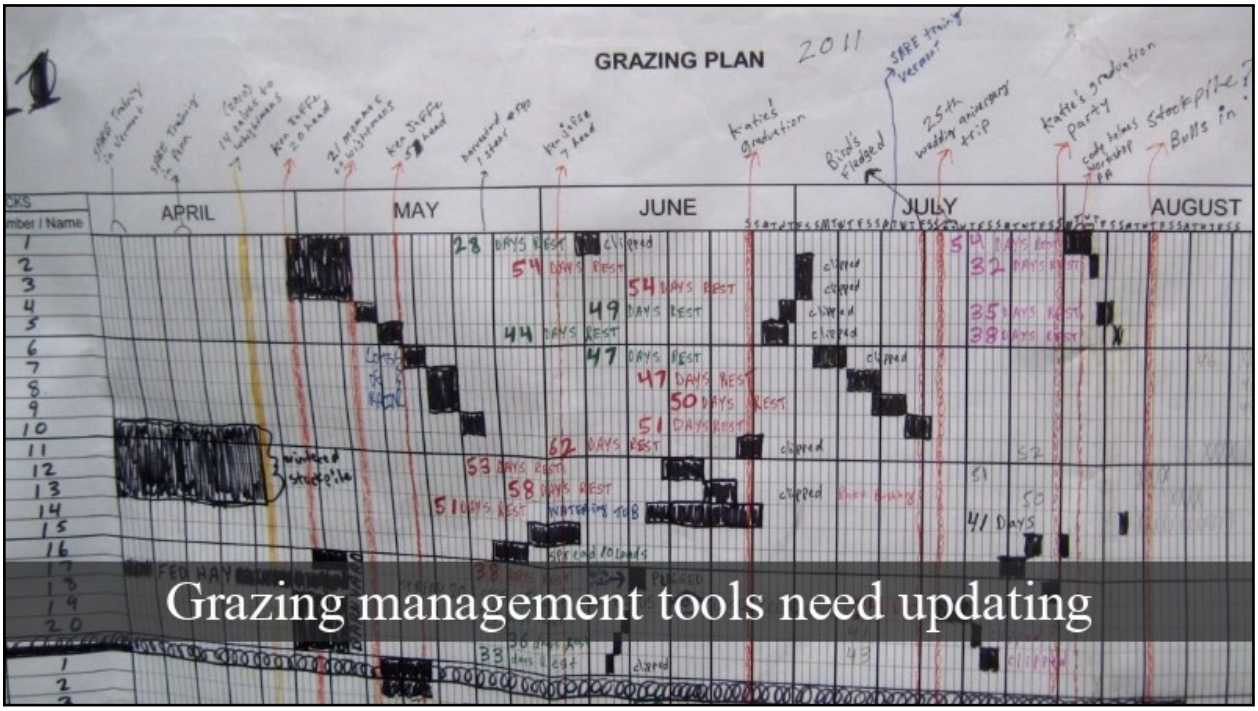
Low excitement
Boredom, apathy

Low stress state

What is Regenerative Work?

- Weaning yourself off extractive labor (long hours, degrading health). Leave yourself more energy than you take.
- Prioritizing full recovery and rest for yourself, instead of continuous stress. Invest in long term productivity.
- Invest in your carrying capacity by developing personal skills and expertise.
- Deepen your roots. Know your "why" and let it keep you grounded through changes.
- Fertilize the relationships in your "people food web". Expand networks to exchange knowledge and support. Nurture others beyond your immediate goals.

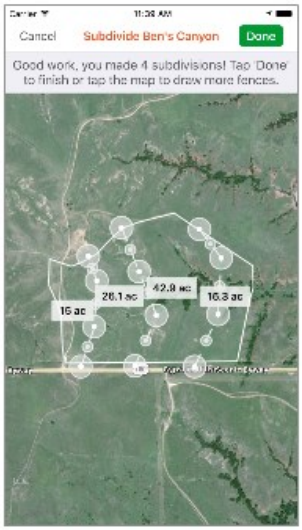

Enabling mobility of professional graziers
13

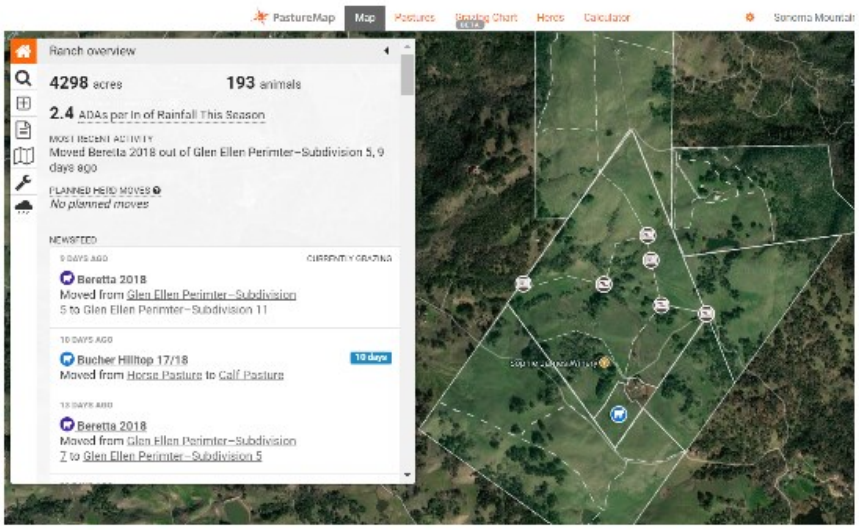

GRAZING PLAN
2011
APRIL
MAY
JUNE
JULY
AUGUST
Grazing management tools need updating

PastureMap

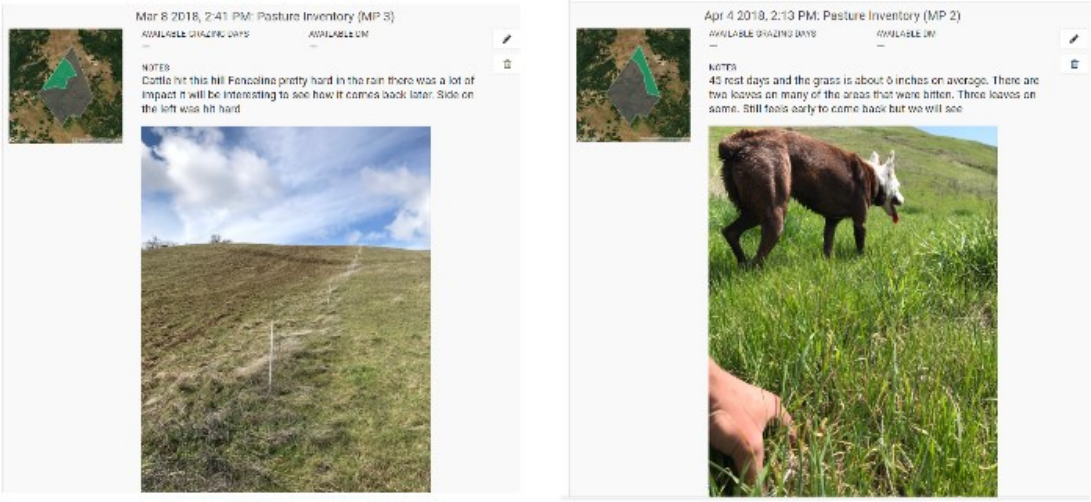
- Create accurate adaptive grazing maps and plans
- Make informed decisions based on prior season moves, ADAs, rest periods
- Make adaptive grazing planning adjustments in realtime
- Get ahead of drought using rainfall data
- Share knowledge across landscapes and teams

Create accurate adaptive grazing maps and plans

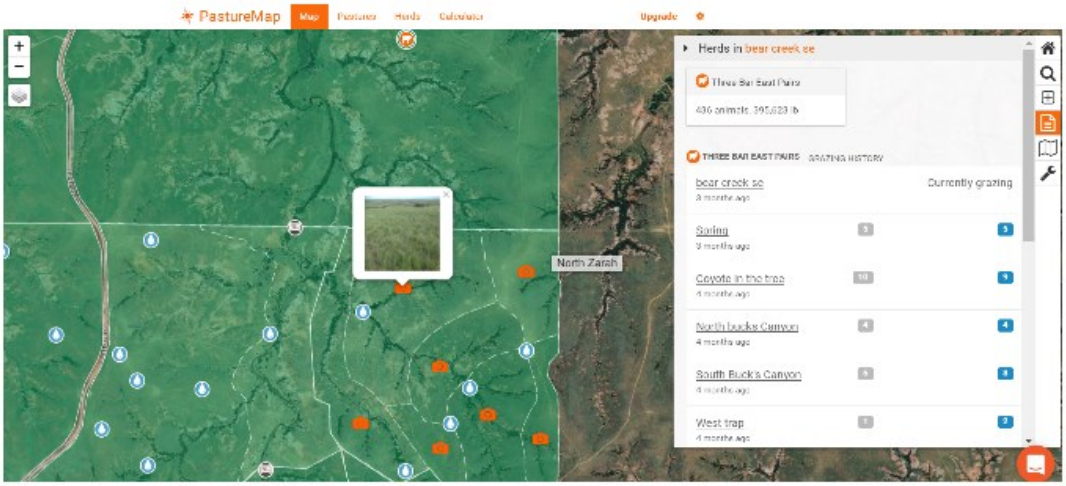




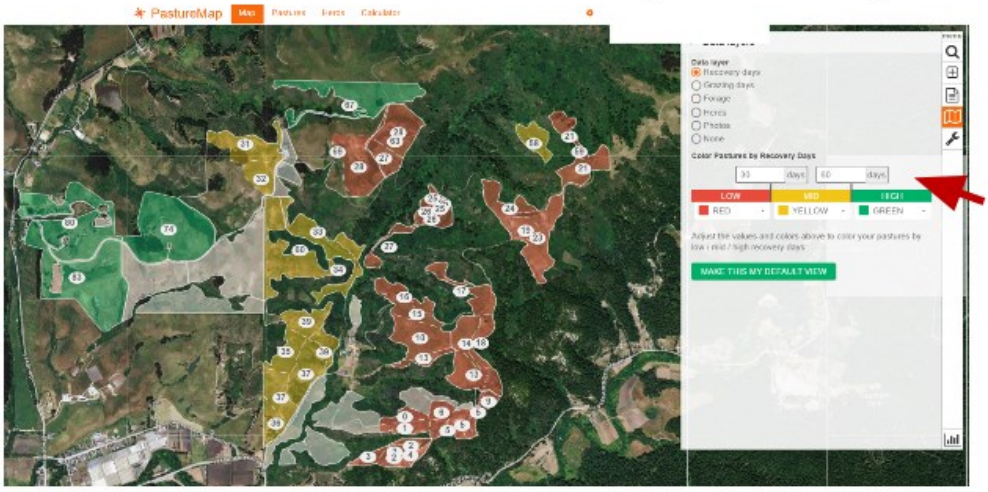
GPS photo monitoring with pasture inventories and field notes



Make informed decisions based on prior season moves, ADAs, rest periods

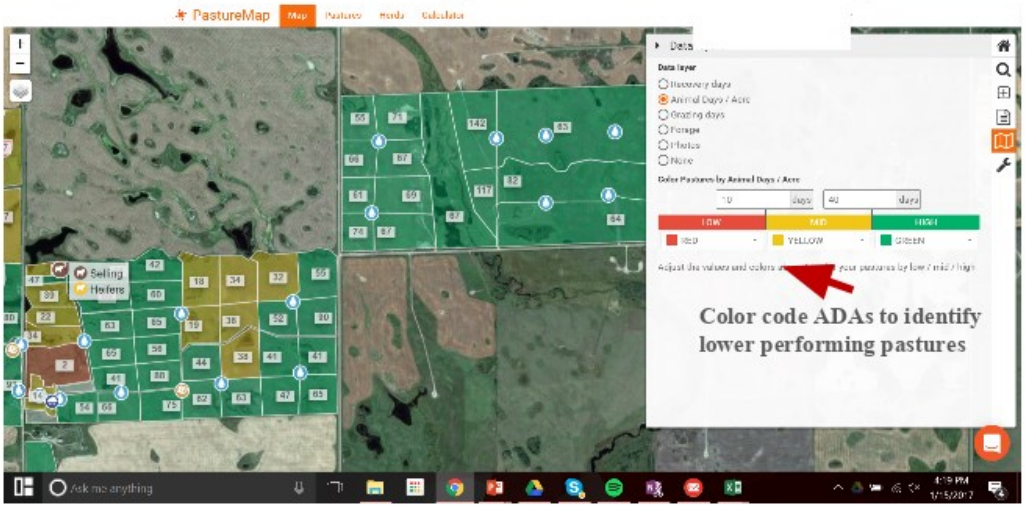


View real-time rest days across pastures



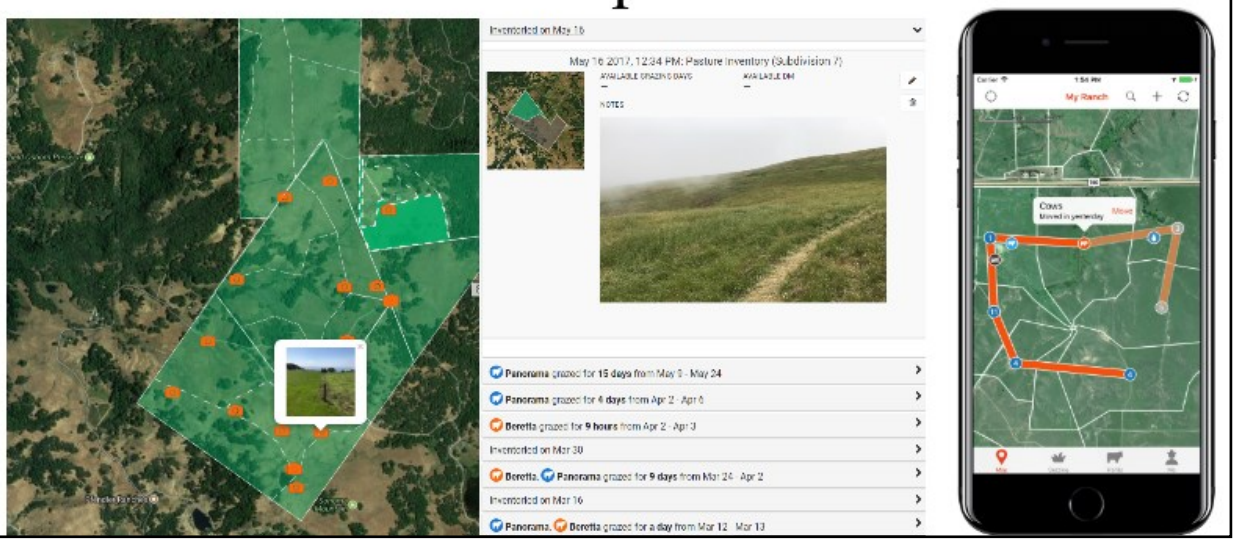
Set your optimal recovery periods – they turn from yellow to green when rested

Measure grazing intensity with Animal Days / Acre grazed in each pasture

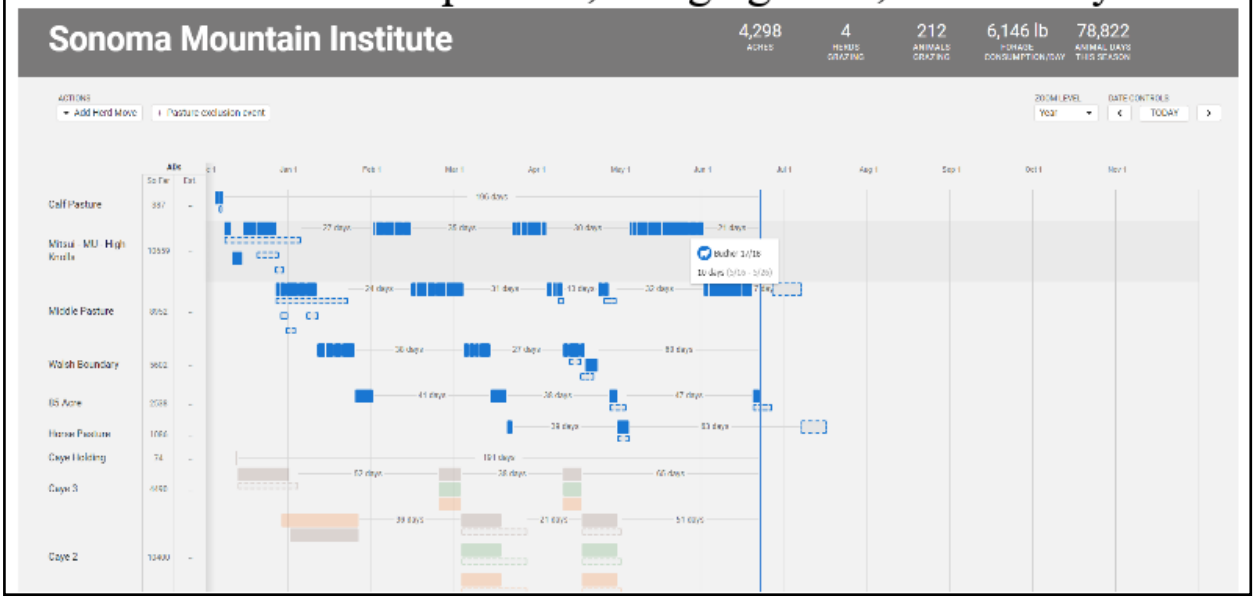


Color code ADAs to identify lower performing pastures

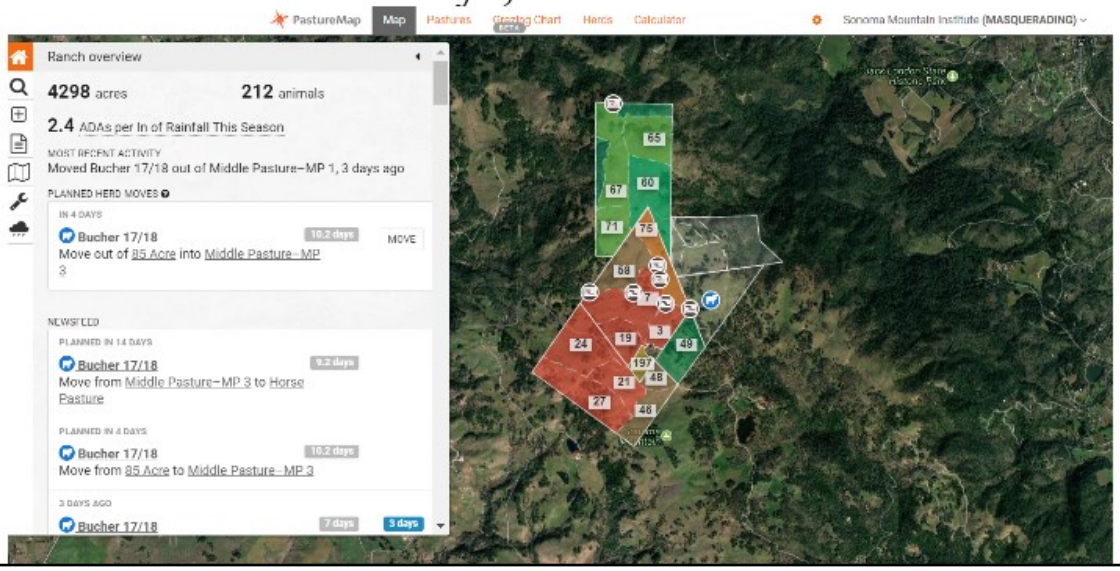
Enabling human knowledge sharing across landscapes and teams



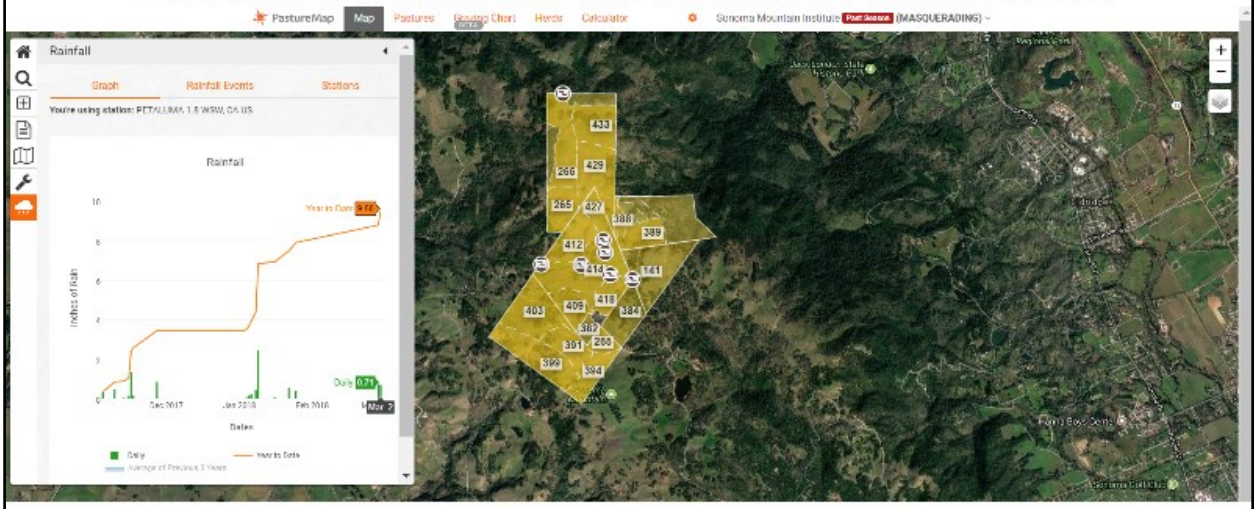
Grazing planning chart shows whole ranch-level grazing records and rest periods, forage grazed, animal days



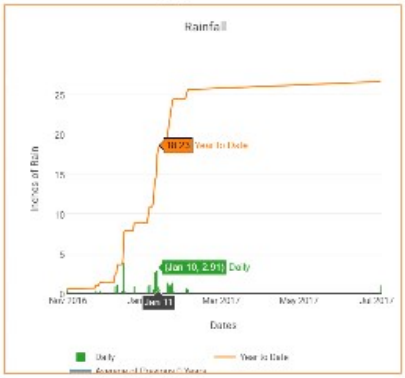
ROI: better grazing decisions in realtime with ADAs and rest days, as ranchers move herds



ROI: get ahead of drought using rainfall data for in-season decisions



We use USDA soil data and NOAA rainfall data to help ranchers pinpoint areas with grazing improvement opportunities



- Which pastures are performing at higher ADAs because of soil type, vs management activity? Can ranches improve other pastures with similar soil types?
- What ADAs did ranches get out of this season compared to last season? How much did rainfall affect ranches' grazing performance, compared to management practices?

ROI: Freeing hours of ranch team's time with simple, easy to use data input

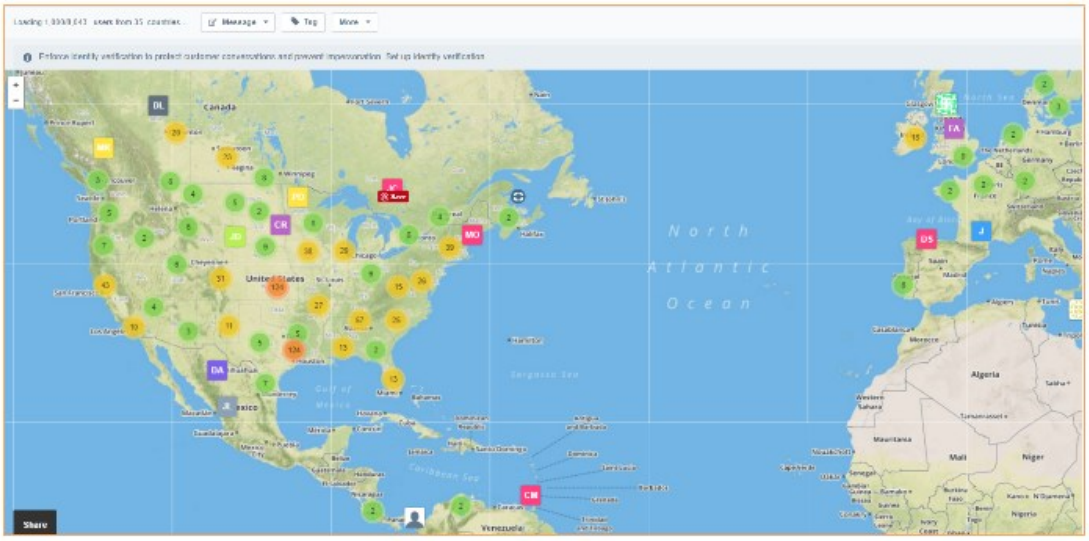
"Joe can plan out the moves for all 3 properties so we can all see the plan without driving half an hour to HQ.

I can mark out where valves are, or where the tree is down on the fence, and teammates can find it on their phone.

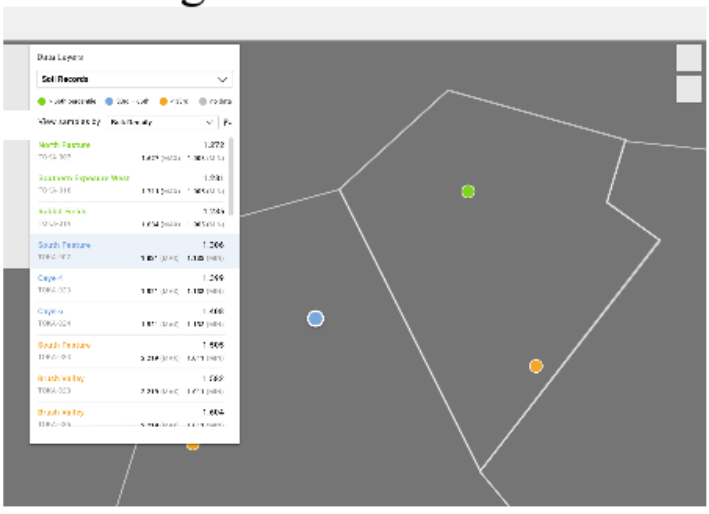
I don't have to drive out to watch high schoolers spend 6 hours digging for the pipeline."
-Senior ranch staff

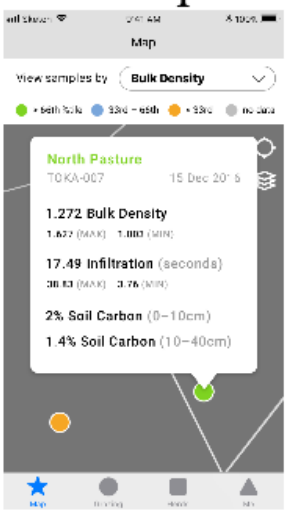
MORRIS GRASSFED

PastureMap has a user community of 10,000 farms and ranches in 40 countries. 5500+ are in North America



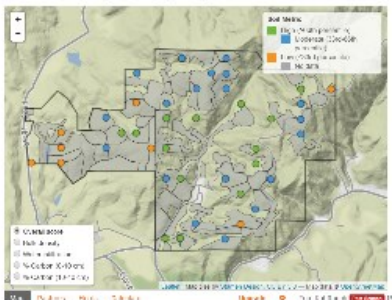
USDA Conservation Innovation Partnership under way to integrate soil carbon data into PastureMap





Integrating satellite or aerial imagery overlays

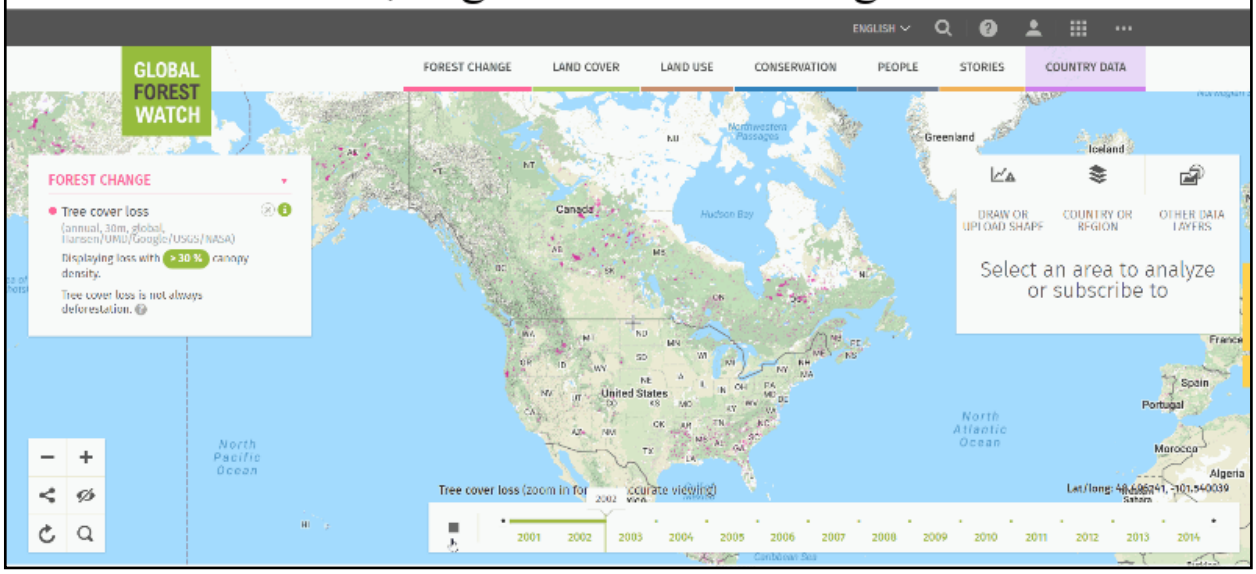
Goal: show soil regeneration outcomes with data



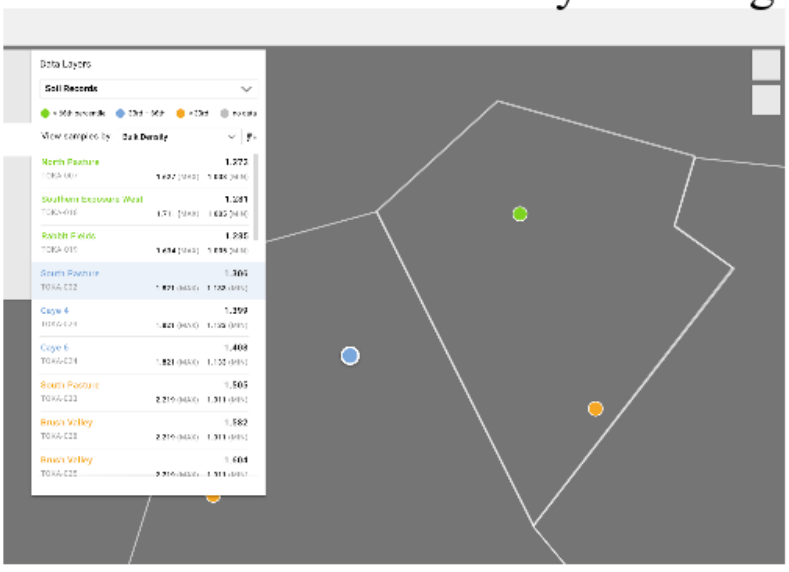
Point Blue Conservation Science

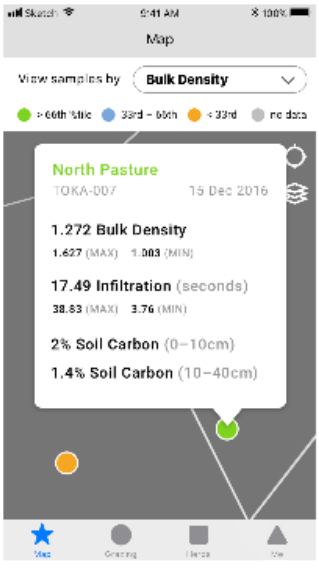
TomKat Ranch Educational Foundation

Why satellite imaging is important: Soil is a lagging indicator, vegetation is a leading indicator

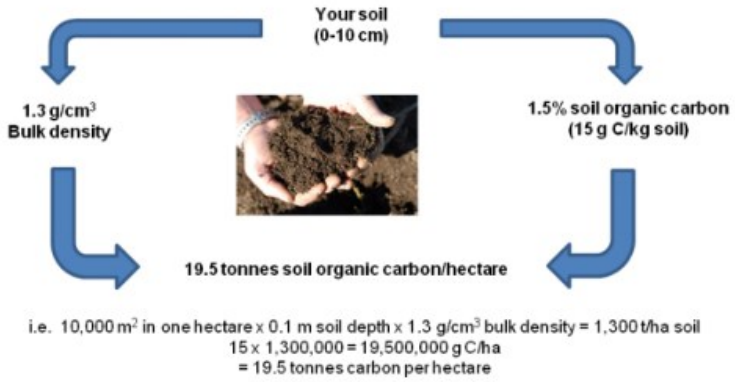


Ground truthing and monitoring is the critical "translation" layer for big data





How do we get to tons C / acre?



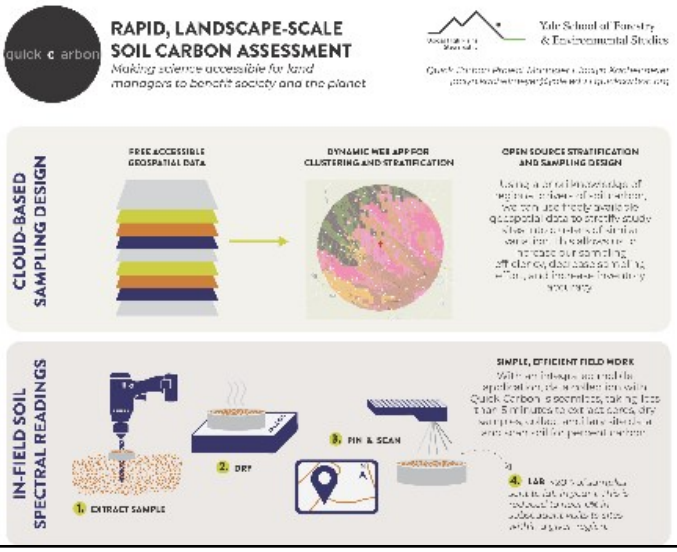
Get at least 0-10cm and 10-40cm depths

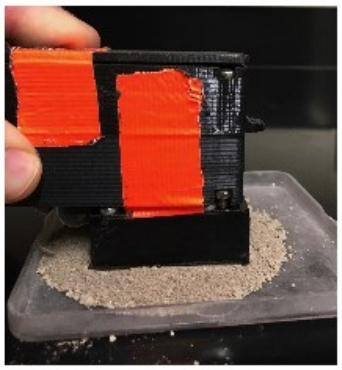
Simple in theory, difficult in practice

Challenges

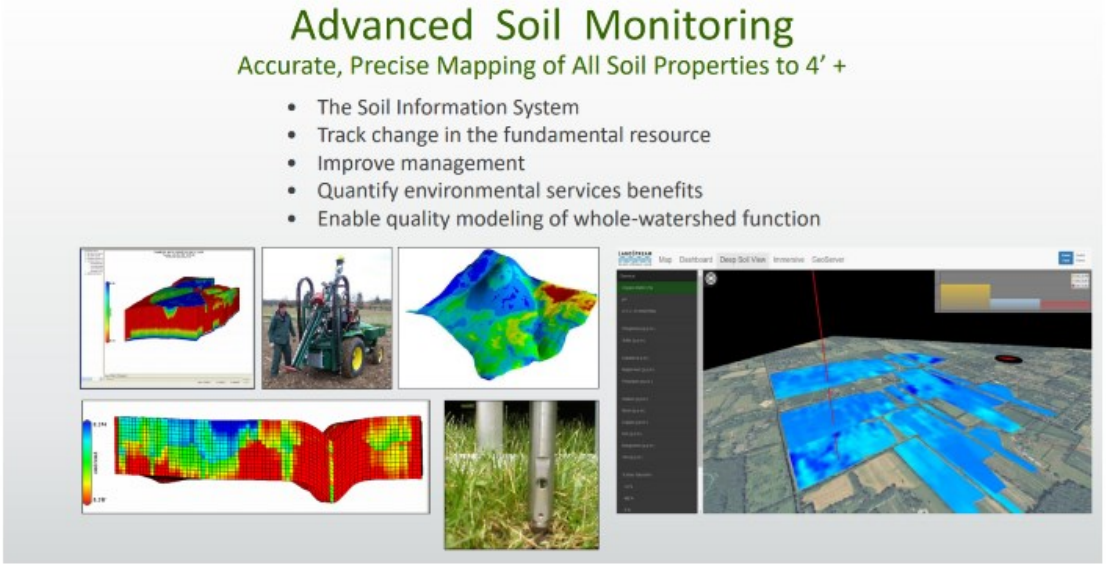
- Soil bulk density changes
- Soil grows "up", gets fluffy

Handheld soil spectrometer – Yale UCross





Watershed monitoring – LandStream



What is Regenerative Work?

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Asking the creative questions: How do I turn poop to power? Challenges into opportunities

KQED News TOPICS PROGRAMS & BLOGS SPECIAL COVERAGE

THE CALIFORNIA REPORT

Poop-Powered Electric Feed Truck Debuts at Northern California Creamery

By Tiffany Camhi

Storytelling: The Perennial's mission is to educate eaters about regenerative farming

Anthony Myint and Karen Leibowitz are an SF chef couple teaching city consumers, with carbon farming meals, postcards, and kernza (perennial grain) bread and ale

Top chefs advocating for healthy soils and for consumers to learn about carbon farming

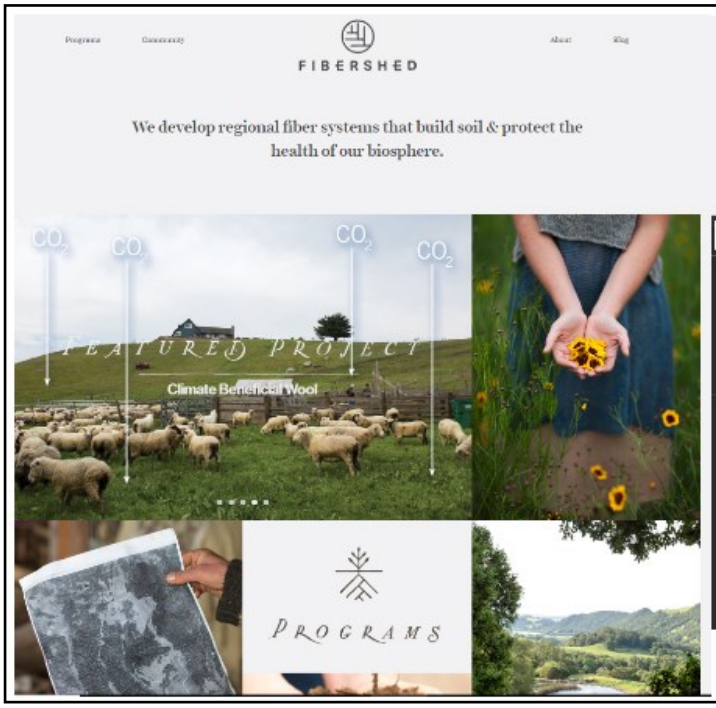
"In one spoonful of soil there are more living organisms than the number of people on earth."

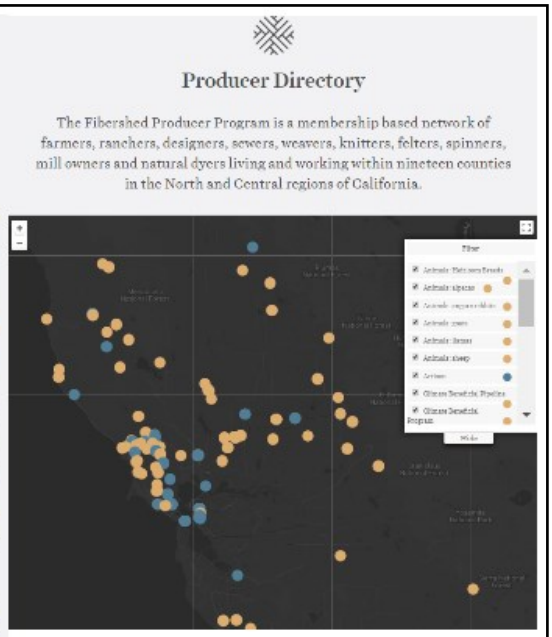
"We think in urban environments we're removed from rural environments, but we're not – through food we're directly connected."

"Healthy soil fights climate change by storing GHG as soil carbon."
Source: Healthysoilguide.com

"Soil is where nutrients come from in produce. We don't get it aboveground without biodiversity underground."

"Healthy soil stores more rainwater. Food is the core of society. That starts with soil."

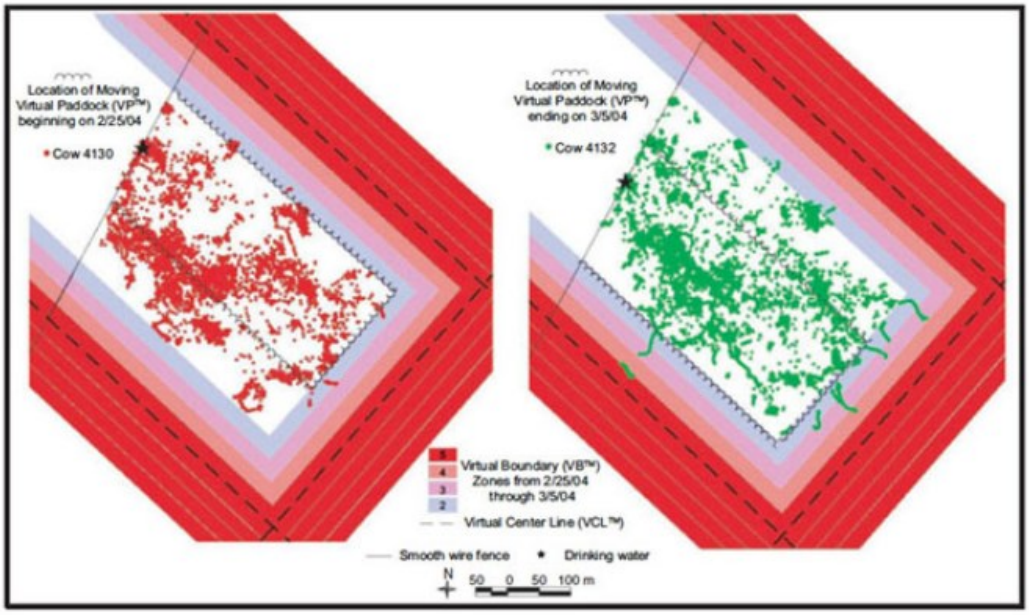




Storytelling: connecting consumers to the land and people

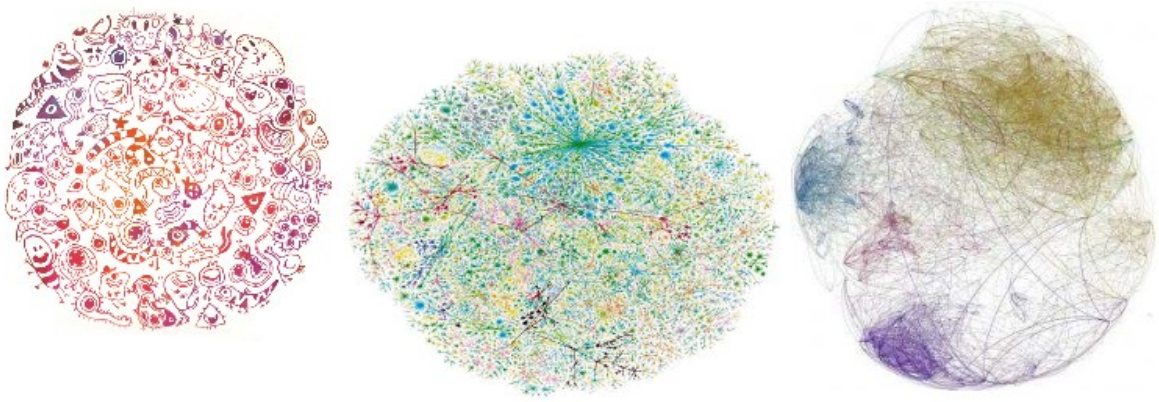
"I like to think of the carbon farming and the climate beneficial work that we're doing now as a change of thought." (Photos: The North Face)

patagonia
PROVISIONS



Dean M. Anderson, USDA-ARS

How can machine learning help us manage complex ecosystems? What is Big Data?



Big Data and Artificial Intelligence

- We are in still the phase of small, siloed data
- Sharing and digitization drives value
- Connected data creates collective intelligence
- The current model of data is extractive – we are the ones being farmed for data. Data is produced by many, and used by the few for purposes that are annoying at best (ad revenue), and unethical at worst (addiction)
- We are moving to a new equilibrium. Democratization of the uses of data for benefit to many

The Future Belongs to Regenerative Business

- Successful businesses will be connected, open, and sharing.
- Creates far more value outside ecosystem than it captures for itself.
- Promotes a vibrant, diverse ecosystem. It is not a single-company land grab or a monoculture.
- Accelerates the growth of other life in the system. It does not try to squash new life, or different players.
- Embraces change and transformation as part of the natural life cycle. A company may thrive perennially, re-seed in unexpected ways, or get composted into a new form altogether.
- Invests in processes that turn sh*t into gold.

Implications

- Good technology makes us more human
- Frees up space for creativity - abundance mindset
- Human knowledge and sharing knowledge will be at the center of value creation
- Successful businesses will be connected, open, create more value than they capture
- Data is a foundation for storytelling


Thank you!
PastureMap
christine@pasturemap.com

Panel Biographies

Jeff Nichols

Jeff grew up at North Platte and learned an appreciation for grasslands and agriculture at an early age. He spent many of his summers as a youngster working on a diversified family farm in Kansas. Jeff attended the University of Nebraska -Lincoln and obtained a degree in Agronomy, Crop Production and Range Management. Jeff and his wife, Diane, live on an acreage near North Platte, and have three children.

Jeff has worked for the Natural Resources Conservation Service (NRCS) for nearly 30 years, stationed at several locations around Nebraska, but mostly in the west-central part of the state. His emphasis has been working with private landowners to improve their grazing lands resources through technical and program assistance. Jeff has witnessed many changes to the landscape through practices such as prescribed fire, perennial vegetation restoration and prescribed grazing. His anchor point throughout his career has been to help Nebraskan's conserve their natural resources and stay connected to the land.

Beau Mathewson

Beau Mathewson is a third generation rancher from Potter, NE. He has been very active in both community activities and statewide agricultural advocacy. After graduating from the University of Wyoming with a degree in Agricultural Business and Farm and Ranch Management, he embarked on his dream, which was to manage the family ranch. Beau and his family (RGM Corporation) have received many conservation awards for their constant improvement of their lands, with an eye to sustainability and best-practices based management; as well as allowing a host of conservation groups to use their ranch for studies. They have had extensive monitoring programs in place for two decades, in conjunction with a deferred rotation grazing system on all their acres.

Beau's family has been recipients of the 2011 Leopold Conservation Award, the 2017 SRM Nebraska Chapter Rangeman's Award, the 2017 South Platte NRD Grassland Manager of the Year, and the 2018 State NRD Grassland Manager of the Year awards. Beau has been named one of the Top 10 Cattlemen Under 40 by *Cattle Business Weekly*.

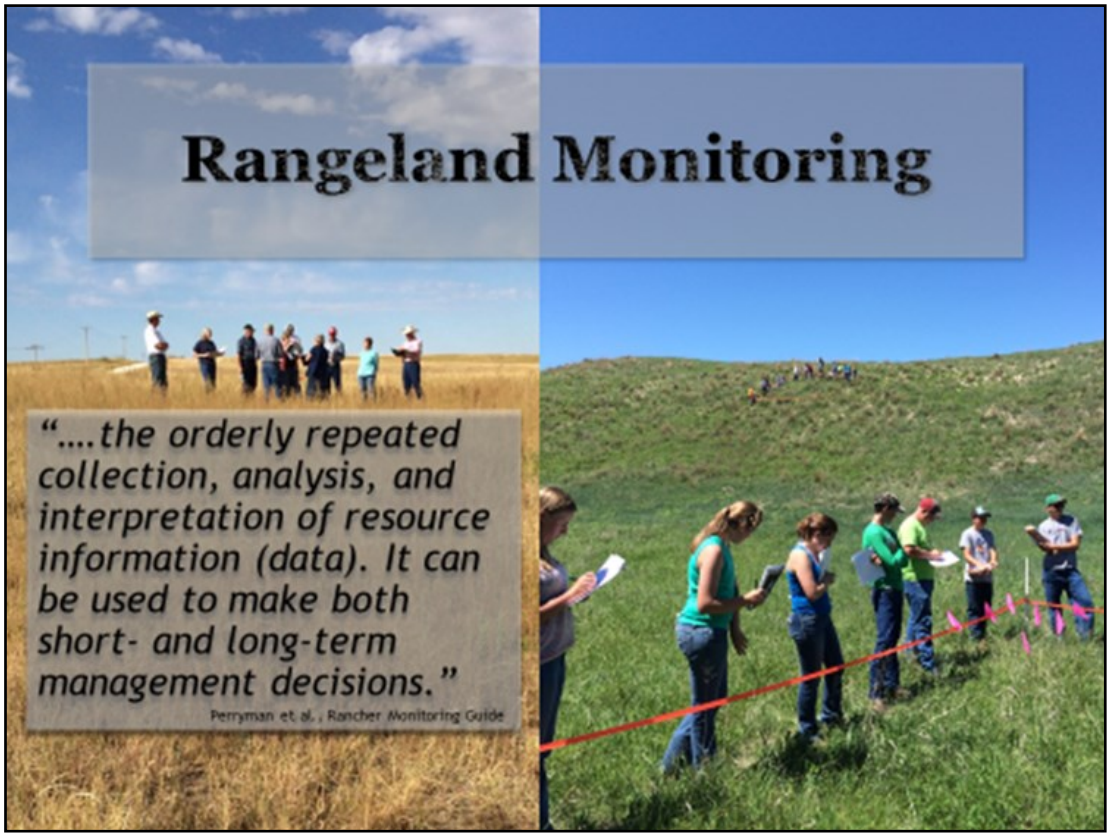
Beau speaks on behalf of sustainable grazing and conservation at industry conferences. RGM Corporation has been a longtime early adopter, and Beau utilizes technology to run a data-driven operation in order to monitor and thereby manage grazing lands in the best way possible. He believes that proper grazing is the most sustainable practice for agriculture, and has helped convert over two thousand acres of the family's marginal farmland back to grasslands.

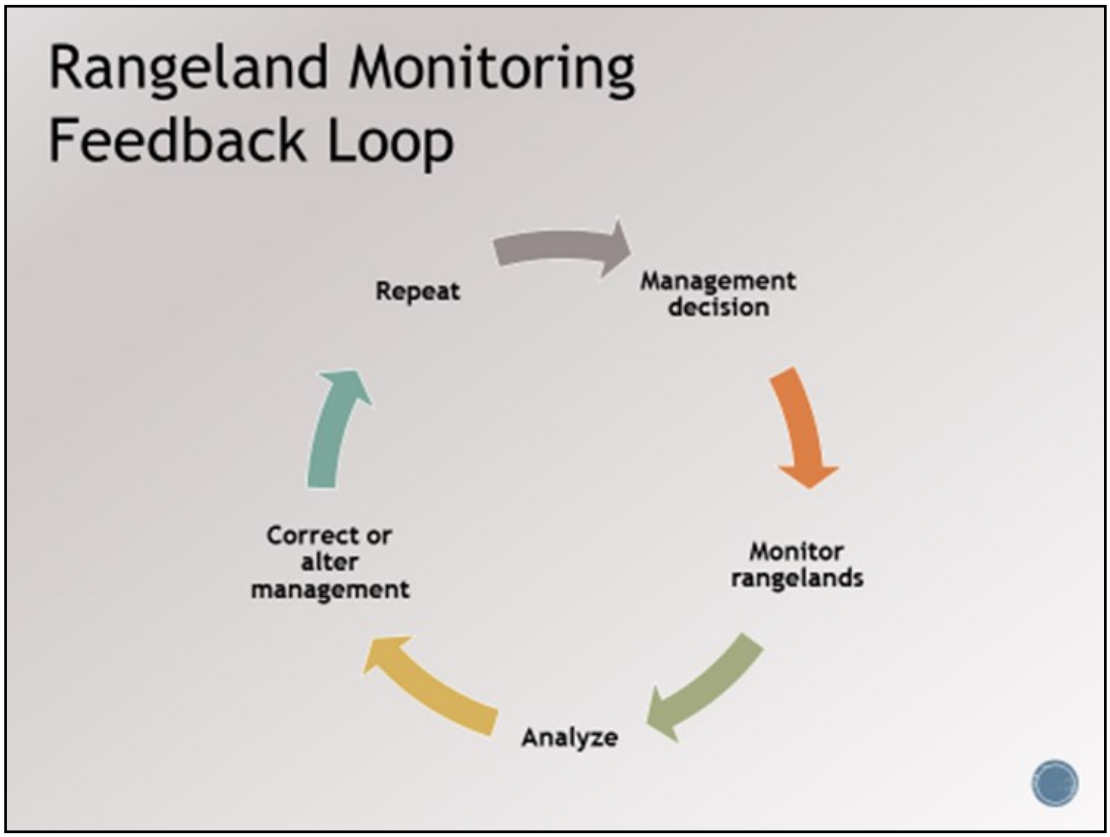
Beau's past and current involvements include youth group leader at the Sidney First United Methodist Church, membership on the Cheyenne County Extension Board and Cheyenne County Fund Board, Night of Hope organizer, member of the Potter Volunteer Fire Department, and Treasurer for the Nebraska Grazing Lands Coalition.

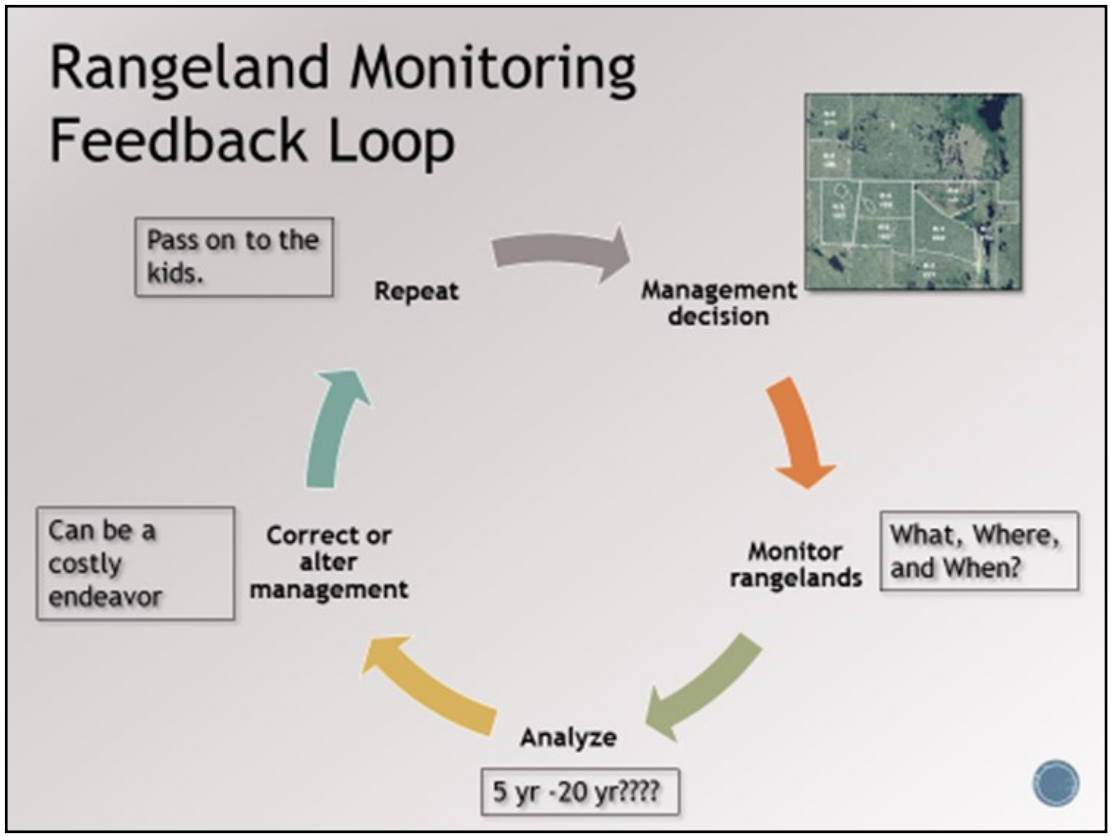
Panel Biographies

Mitch Stephenson

Mitch Stephenson received a M.S. degree from the University of Nebraska-Lincoln in Range Science in 2010 where he evaluated the effect of rotational grazing methods and time of grazing on livestock performance and vegetation characteristics in the eastern Nebraska Sandhills. Following his time at UNL, Mitch worked as a rangeland ecologist in Wyoming and Nevada where he assisted livestock producers in developing sustainable grazing management plans and range vegetation monitoring reports. He completed his Ph.D. in Range Science in December 2014 from New Mexico State University where his research was focused on targeting cattle grazing with low-stress herding and low-moisture block protein supplement and evaluating factors that affect cattle grazing distribution behavior, grazing site selection, and social association patterns within cattle herds. Following his Ph.D., Mitch worked with the University of Nevada, Reno as a Post-doctoral researcher evaluating the use of livestock grazing as a tool to reduce annual invasive grass biomass on a landscape scale. Mitch is currently working as a Range and Forage Extension Specialist with the University of Nebraska-Lincoln based out of the Panhandle Research and Extension Center in Scottsbluff, NE.


Rangeland Monitoring
"....the orderly repeated collection, analysis, and interpretation of resource information (data). It can be used to make both short- and long-term management decisions."
Perryman et al., Rancher Monitoring Guide


Rangeland Monitoring Feedback Loop
Repeat
Management decision
Monitor rangelands
Analyze
Correct or alter management



Monitoring Methods

Short-term

- Grazing plans
- Weather data
- Production
- SanDris
- Utilization/stubble heights

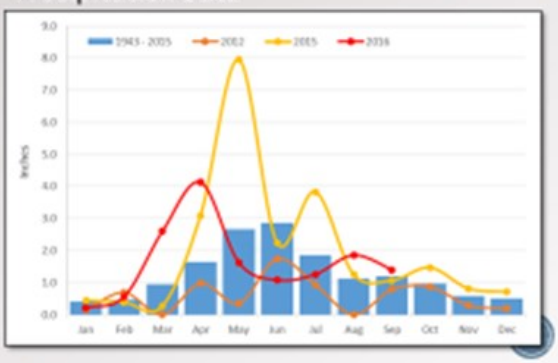
Long-term

- Photo-point
- Cover
- Frequency of Occurrence
- Similarity Index
- Range Health Assessment

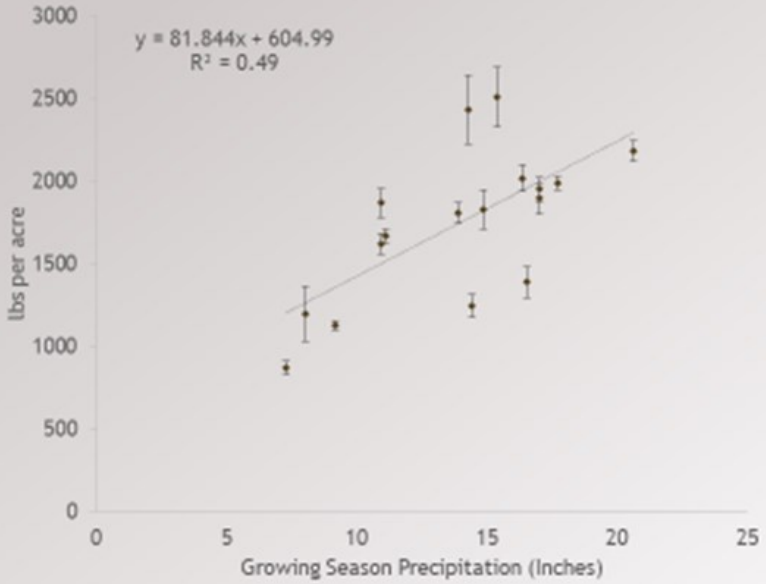
Monitoring Methods

UNL Grazing and Hay Record Spreadsheet - Volesky et al.

Precipitation Data

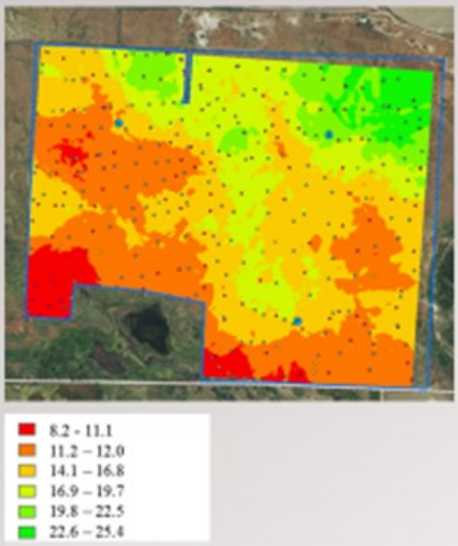


Monitoring Methods



Monitoring Methods

Key Grass Species Stubble Heights



Sandhills Defoliation Response Index System (SanDRIS)

Season of Defoliation (Grazing, Hail, Fire & Grasshoppers)	Index
March-April: sedges green-up and grass	+2
May: cool-season grasses green-up	+1
June: early growth of warm-season tallgrasses	-1
July: rapid growth of warm-season tallgrasses	-2
Multiple events during June-August	-3
August: warm-season grass seed heads emerge	0
September: nearly full growing-season deferment	+2
October-February: dormant season	+4

Precipitation Regime (October through September)	Index
Well above average: 3-5 feet of moist soil by April 30 and abundant precipitation during June-July	+2
Near average: 3-4 feet of moist soil by April 30 and abundant precipitation during June-July	0
Drought: little or no dormant-season precipitation during October-April and/or well below average precipitation during June-July	-2

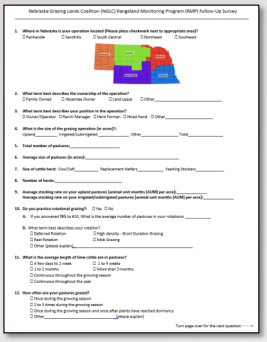
End of the Season Residual Herbage (Hydrologic Condition)	Index
Excellent: standing herbage of palatable species and litter abundant throughout (>1500 lb/ac)	+2
Adequate: litter and standing herbage uniformly distributed (750-900 lb/ac)	0
Poor: standing herbage absent, litter uncommon	-2

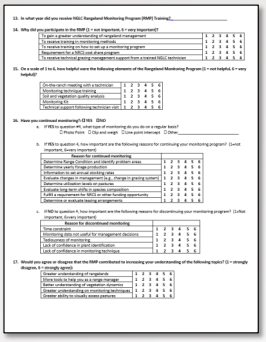
Nebraska Grazing Land Coalition Rangeland Monitoring Program (RMP)

- On-ranch training for rangeland monitoring from a NGLC trained technician
  - ✓ Forage production
  - ✓ Line-point transects
  - ✓ Photo points
  - ✓ Trend
  - ✓ Utilization/stubble height
- Monitoring tool kit ($175 value)
  - ✓ Clipping frame, exclosure, clippers, etc.
- Began in 2009
- Survey sent out in Jan 2016 to evaluate the effectiveness of this program
- Ron Bolze (NGLC) and Ben Schiltz (UNL Technician)

Survey

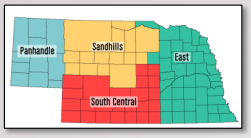
- Operation and Grazing Management
- Effectiveness of the Rangeland Monitoring Program
- Topics of interest for future NGLC and UNL Extension Projects





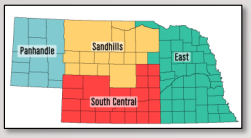
Number of participants

		Panhandle	Sandhills	South Central	East	Other	Total
RMP Trainings							
	2009	2	4	11	12	6	35
	2010	24	22	34	31	8	119
	2011	15	6	21	11	3	56
	2012	25	1	13	2	2	43
	2013	12	7	10	5	2	36
	2014	5	2	16	1	7	31
	2009 - 2014	83	42	105	62	28	320
Surveys							
	Sent (n)	78	22	71	47	12	230
	Returned (n)	25	12	22	11	-	70
	Returned (%)	32.1%	54.5%	31.0%	23.4%	-	30.4%



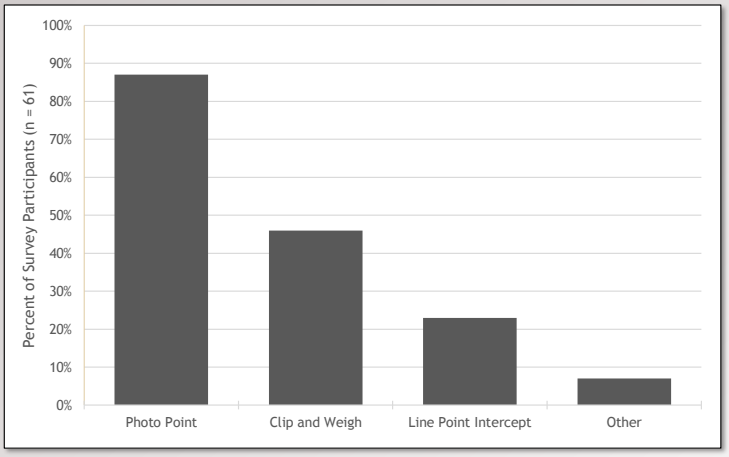
Survey Participants

	Panhandle	Sandhills	South Central	East	All Regions
Size of operation (ac)					
Number of responses	24	12	20	11	67
Mean	4,159	3,678	2,577	534	2,737
Max	18,000	10,240	18,000	2,000	18,000
Min	70	70	320	50	50
Total Acres	99,799	44,130	51,549	5,874	201,352
Cattle (n)					
Number of responses	24	11	21	9	65
Mean	322	388	315	173	300
Max	900	1,150	1,300	700	1,300
Min	3	30	35	27	3
Total	7,730	4,270	6,624	1,561	20,185
Number of pastures (n)					
Number of responses	23	12	22	11	68
Mean	13	16	11	7	12
Max	43	40	60	15	60
Min	2	1	1	1	1
Average size of pastures (ac)					
Number of responses	20	10	21	10	61
Mean	327	245	222	70	216
Max	800	640	600	200	800
Min	5	15	65	5	5

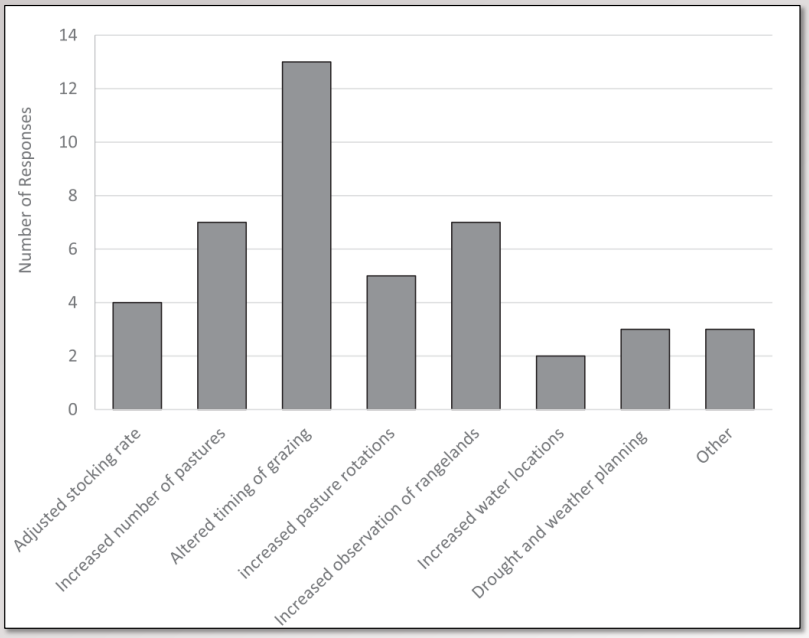


Have participants continued monitoring?

63 (86 %) participants have continued monitoring and 11 (14%) indicated they no longer monitor



Changes in management



Changes in management based on the RMP

"Adjust grazing times to build plant diversity."

"More pasture rotation, more grass left each year"

"Pay closer attention to when we turn our cows in a particular pasture."

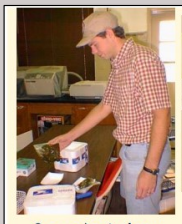
"Not as many head per acre"

"Increased number of paddocks. Longer rest periods for each paddock."

"Pay closer attention to amount of forage remaining and using pastures according to warm or cool season forage"

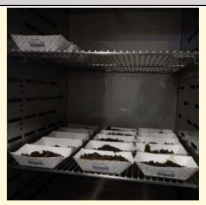
- "It does take time, but visual inspection can sure be improved by doing the clipping"

Nutrition Balancer (NutBal)



Sample Arrives and is assigned #

Sample is unboxed, And emptied into drying trays



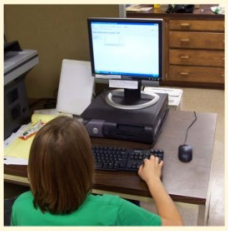
Fresh feces placed in oven overnight

Dried feces is ground 36 hrs later

NIRS Fecal Profiling Laboratory Procedures

sample cups are prepared

Sample scanned with NIR spectrophotometer



NUTBAL is run and results sent to producer

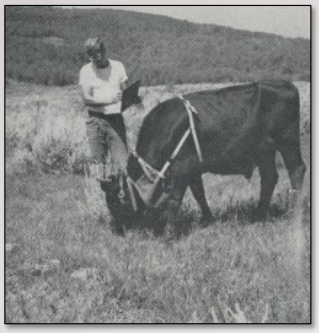
Nutrition Balancer (NutBal)

Fecal samples analyzed with NUTBAL

Grazing Animal Nutrition Lab, Temple, TX

VS.

Diet samples from fistulated cows



Lincoln, NE

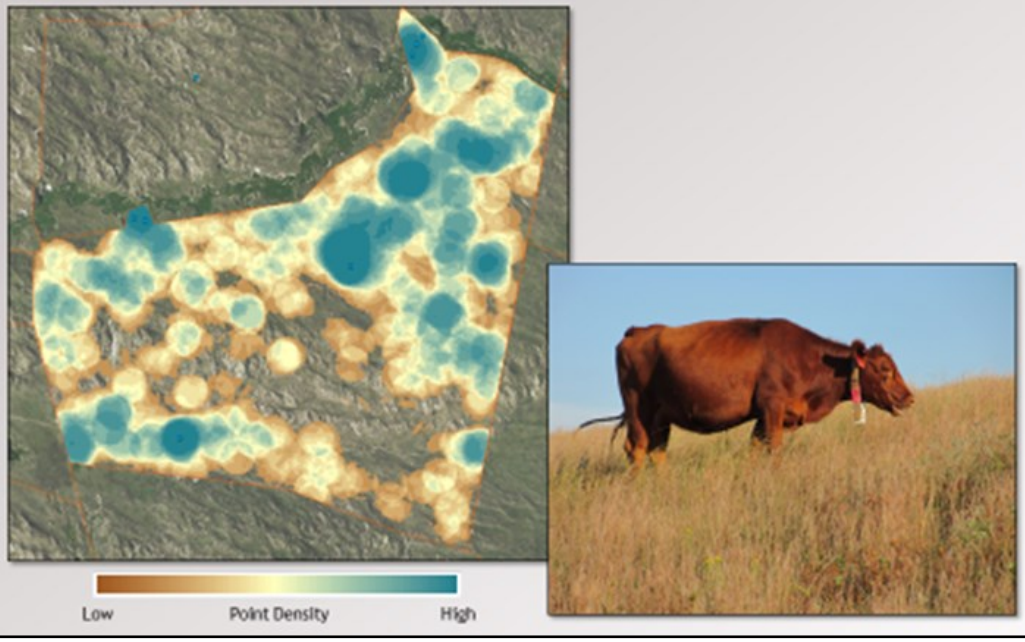
VS.

Pasture hand-clipped samples

Lincoln, NE

Grazing Distribution

Gudmundsen Sandhills Lab near Whitman, NE
1423 acres, 5 tracked cows



Thank You!

Questions?

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Speaker Biographies

Daren Redfearn

Daren Redfearn is a member of a multidisciplinary team hire focused on enhancing and developing forage-based beef production systems. His efforts have been focused on developing, analyzing, and implementing integrated crop/ forage/livestock systems. He is a member of the American Society of Agronomy and Crop Science Society of America. He has served as editor and co-editor for Crop, Forage, and Turfgrass Management. He is currently serving as co-editor for Volume II of Forages: The Science of Grassland Agriculture.

His research program emphasizes the development of management, production, and utilization strategies for annual forage cover crops double cropped after row crops. He is also involved in evaluating the influence of crop residue management systems on forage cover crop establishment, and creation of unique crop residue management systems that facilitate use of annual forage cover crops. His extension program focus areas are enhancing the use of crop residues and annual forage cover crops into existing beef production systems and implementing economical crop residue harvest and grazing methods.

He received a doctorate and master's degree in Agronomy from the University of Nebraska-Lincoln. He has a bachelor's degree from Texas Tech University in Animal Science.

Mary Drewnoski

Dr. Mary Drewnoski is a Beef Systems Specialist with the University of Nebraska -Lincoln. Prior to joining UNL, she spent time learning and working in cattle systems in many locations across the U.S. including: Kentucky, North Carolina, Iowa, and Idaho. She is a beef cattle nutritionist and is a part of an interdisciplinary team evaluating Economical Systems for Integrated Crop and Cattle Production. Her current research and extension program is focused on the utilization of crop residues and cover crop forage for backgrounding calves and feeding beef cows.

Planting Decisions for Alternative Forages: Plant and Animal Perspectives

Daren D. Redfearn[1] and Mary Drewnoski[2]
[1]University of Nebraska, Department of Agronomy and Horticulture; [2]University of Nebraska,

Department of Animal Science

Introduction

Ultimately, alternative forages are annual forages. They are "alternative" because they are used as cover crops after a grain crop has been harvested or damaged or destroyed following a wind or hail event and as an emergency forage crop during short-term drought events. With all alternative forages, it is important to determine the goal for planting and establishment. In nearly all of these scenarios, the end use will be as a harvested or grazed forage.

For use as a forage, yield (biomass), nutritive value (quality), and regrowth are important goals. Other considerations are season of production to meet forage needs and the target planting date to meet the forage yield and forage nutritive value goals.

Season of growth and plant maturity are important forage quality factors. For example, most annual forages can have outstanding nutritive value in the fall. The exceptions to this result from planting too early. While this does increase the forage yield potential, it results in lower forage nutritive value of warm-season summer annual species, such as sorghums or millets.

Why diverse mixtures?

There is always interest in planting a diverse mixture of cool-season species with warm-season species. The idea is that these can planted together, the warm-season species can be grazed, and the cool-season species will begin growth and can be grazed later.

Predictably, we see one or two species dominate with two to four other species contribute to the forage yield. Grasses are the biomass producers and consistently dominate if they are included in the mixtures. The legumes and other broadleaves do not compete well with the grasses in diverse mixtures. In diverse mixtures, legumes do not provide the forage yield for the seed cost. For the legumes to provide additional N, soil N should be low, otherwise legumes will use soil N and not fix N.

There are many opinions regarding diverse cover crop mixes (more than 10 species), but not much data to support their widespread use. Likewise, there is also no data to suggest that this is false. Likewise, reliable information on forage growth and production together with animal performance of diverse mixtures does not exist.

Planting date considerations

With the alternative forage crops, there is often a short window for forage growth. Many species can be added into the mixes, but each should have a defined contribution. If the stated goal is forage production, either for grazing or hay, then the mixes need to be predominately grass. Occasionally, mixes will have lower proportions of

grass in an attempt to promote growth in other species. Again, if forage is the stated goal, then this can be a mistake. However, this does not mean that other species cannot be added, but it is important that the grass component not be reduced. Generally, no less than 75% of the mixture should be a grass (the higher the better) for summer planting.

With a mid-summer planting (July), the warm-season species stand the best chance of success for producing adequate forage yield and should be planted prior to August 1. After August 1, cool-season species such as oats and rapeseed are better options (Drewnoski and Redfearn, 2015).

Including cool-season species may provide additional growth later in the season or they may be outcompeted by the warm-season species. It is likely that the seeding rate for the warm-season species would need to be reduced in order for the cool-season species to establish and be productive. This would lower the forage yield potential of the warm-season species, especially the grass component. Based on this, current recommendations do not lower the warm-season seeding rate as a means to increase cool-season growth later in the season. If it is necessary to plant a mixture to meet program compliance, including an inexpensive species, such as a brassica (rapeseed) would be the least costly trade-off.

What are the logical forage options?

The first is sorghum x sudangrass for haying, stockpiling and windrow grazing during winter, or waiting until after frost and grazing. It will have the greatest yield for a one time harvest. Sorghum x sudangrass does not regrow as well after grazing. This is especially evident when grazed such that much of the stem is removed. For grazing only, sudangrass and pearl millet are better options because they are leafier. However, it is better managed if grazed 45 days or so after planting, allowed to regrow, and then grazed again since regrowth is better.

Selection of appropriate forages should be based on when the grazing is needed. If summer grazing is a possibility, then sudangrass would be the first option. If grazing will occur during the fall, sorghum x sudangrass might be an option. Pearl millet can also be used. It will produce less forage than sudangrass or sorghum x sudangrass, but it can be grazed during frost with reduced risk from prussic acid poisoning. If grazing is needed in late September and other grazing options do not exist, pearl millet has an advantage over the sorghum species.

The best grazing management for these summer annual grasses is to graze in a short, rotational grazing system. Fields can be subdivided into three or more pastures and each pasture can be grazed for 7 to 10 days. Stagger the date of planting each pasture by about 10 to 14 days so that grazing will begin on each pasture when growth is at the appropriate height (Anderson and Volesky, 2013).

Implications

Alternative forage selection should be based on seasonal availability and forage production. Establishment costs, including seed costs, seeding costs, and fertility needs are also important. Finally, planting date is the most important management factor that affects forage production. Late summer planting reduces fall forage growth potential and these effects carry over into the spring with reduced spring forage production, especially for winter small grains.

Forage yield and quality of fall-grown cover crops can be high and stay high during the winter. From a plant perspective it is common to see variable growth or forage production due to planting date and also moisture availability. From an animal perspective, variable nutritional value is often observed and can be attributed to forage availability due to differences in plant growth, plant species in the mix, and overall plant maturity that can either increase or decrease the nutritional value.

References

Anderson, B.E., and J.D. Volesky. 2013. Summer annual forages, Nebraska Extension NebGuide G2183.

Drewnoski, M.E., and D.D. Redfearn. 2015. Annual cool-season forages for late-fall or early –spring double-crop, Nebraska Extension NebGuide G2262.

Speaker Biography

PRODUCER REFLECTION

Homer Buell
[Discussion Format Only]

Homer Buell is the fourth-generation co-owner of the Shovel Dot Ranch near Rose, Nebraska. Homer has been an advocate for agriculture and the cattle industry through his service in trade organization leadership roles. He is a former President of the Nebraska Cattlemen's Association and the Nebraska Hereford Association, and has held many positions within the National Cattlemen Beef Association in his 14 years of board service. Homer is currently Chairman of the Environmental Stewardship Award Program selection committee. In regard to charitable organizations, he has been President of the State 4-H Foundation, committee Chair for the Campaign for Nebraska Sustainable Animal Production Systems, and is currently Chairman of the Rock County Community Fund and the board of the Sand County Foundation.

A graduate of the University of Nebraska, he is a strong supporter of youth activities and has worked with the University of Nebraska for the benefit of students and research programs. Homer currently serves on the University of Nebraska President's Advisory Council.