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Presenter Information

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Promoting rangeland restoration and climate resilience through grazing case studies

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Abstract

Cow-calf beef operations are the primary users of the 8.75 million hectares of rangelands in the U.S. Pacific Northwest and will have to adapt to ongoing and future climate change. Management directed toward current rangeland stressors which may be amplified under a changing climate—including fire risk, invasive plants, and droughts—is likely to improve future resilience. And although climate change discussions have become highly politicized, our experience suggests that Pacific Northwest ranchers support "no-regrets" strategies that provide ecological and economic benefits under a variety of future conditions. Our goal is to foster adoption of these strategies by sharing individual success stories. A similar case study approach focused on crop producers has been used effectively in the Pacific Northwest, with over 20,000 views of 13 videos from 2016-2019, and more than 1600 views of case study documents. Our multi-media case studies profile successful ranchers who are using practices that increase resilience to climate change alongside economic, production, environmental, and other risks. By detailing their experience and insights the case studies encourage other ranchers to consider similar changes. Each case study consists of a brief video and a peer-reviewed written factsheet with descriptions of the rancher's personal context and motivations; process of innovation; benefits, challenges and solutions to adopting practices. This narrative is paired with easy-to-read sidebars providing key science findings relevant to the practices being discussed. By connecting these insights with key science findings we give ranchers tools to adjust these practices to their particular operational context.

Introduction

Rangeland-based agricultural businesses, such as beef cow ranchers in the Western United States, are dependent on rangeland forage production for their livelihood. These families' incomes rely on sustainable use of a moderately fragile natural resource. Society should value land-based businesses that are able to produce agricultural products as well as ecosystem goods and services if this can be done without sacrificing the productive capacity of these rangelands. Research and experience show that it is more cost-effective to manage in such a way as to prevent degradation than to apply expensive rehabilitation efforts after degradation has taken place. However, some unsustainable grazing practices persist; efforts to educate and motivate ranchers toward economically and ecologically sustainable grazing practices requires something innovative educational approaches. Ranchers already manage multiple risks—including those related to economics, production, the environment, and weather (Neibergs et al. 2018). Climate change represents an added risk, but one that is challenging to manage because impacts are uncertain, variable over space and time, and often perceived as being only of concern in the distant future (Ding et al. 2011; Leiserowitz, Smith, and Marlon 2011). We endeavored to show, rather than tell, a variety of proven practices for building and sustaining resiliency in beef operations so that both people and land are cared for well. The project team interviewed three ranch families who were already recognized as leaders in sustainability and developed a short film and a written publication for each that described and demonstrated economic, ecological, and social resilience.

Methods and Study Site

This case study education strategy is informed by the diversity of research that has explored how and why adults are motivated to learn. (Knowles, Holton, and Swanson 2005) establish that adult learners need to be involved in their instruction, that they are motivated by relevance to their work and life, and targeting solving problems, and that experiences play an important part in learning. Studies of what drives memory systems in the brain, as captured in the AGES model and subsequent updates (Davachi et al. 2010; Davis et al. 2014) suggest additional principles for adult learning: a) there must be sufficient attention (A) on the new material; b) learners must generate (G) their own connections to knowledge that they already have; c) moderate levels of emotion (E) are necessary; and d) spacing (S) of learning opportunities is necessary. In addition, peer-to-peer learning has been shown to strengthen knowledge transfer through social networks and develop personal and collective responses (Röling and Wagemakers 1998; Mills-Novoa 2011). Farmers, in particular, more readily receive instruction and example from other farmers than from scientific authorities such as researchers or outreach professionals. These bodies of research provide the foundational components of our proposed instructional materials and trainings.

Results

Many strategies can enhance resilience to climate change and other future challenges – and these strategies often also provide immediate benefits to farming and ranching operations. The grazing resilience case study series explores strategies that innovative farmers and ranchers in our region are already using, and which may be of interest to others. Each case study and its complementary video centers around the experience of a regional producer, and provide summaries of relevant biophysical, economic, and social science that help inform when and how these strategies might work in other places.

One common definition of resilience, suitable for rangelands and other ecological systems, is “the capacity of a system to absorb disturbance and reorganize while undergoing change so as to retain the same function, structure, identity, and feedbacks” (Walker and Carpenter 2004). In rangeland management we seek to build social-ecological systems that have high resistance to permanent change; one in which human actors are able and willing to respond in real time to biological feedback and to adjust management, and in which humans are prepared to make transformative changes in management to adapt when conditions change enough that continuing “business-as-usual” is not possible.

Current ecosystem models for rangelands identify relatively stable “states” inside of which predictable assemblages of plant species dominate. In response to excessive or compounded disturbances, the plant community can transition across a threshold into a new, different stable state characterized by different species. These thresholds can be thought of like wind moving soil. At 3 mph, 5 mph, 10 mph, 15 mph nothing happens, the system remains stable. But at 20 mph there is sufficient energy to lift soil particles and move them, and the system shifts into a new, different (eroded) stable state. Managing for resilience means managing landscapes such that the current plant community stays well away from these ecological thresholds, so that disturbances are less likely to drive the system beyond that threshold.

Stingley Ranch

The “Grazing for Multiple Use Goals” case study describes principles and practices supporting ecological resilience on the Stingley Ranch. The Stingleys exemplify landscape grazing that avoids ecological tipping points in their grazing management. They use multiple practices which are known to promote good rangeland condition:

They apply dormant-season grazing as often as practical, which maintains or increases litter cover, maximizes grass vigor and reproductive success, and avoids stressing perennial grasses to protect their competitiveness against undesirable plants, such as invasive annual grasses. They observe light stocking rates relative to historical forage production. Grazing planning combines short grazing periods (less than 30 days) with long recovery times to minimize plant exposure to grazing animals and ensure species diversity. High ecological resilience is especially important in cases when

operational flexibility is low. For example, if a rancher is unable to make rapid changes in herd size to accommodate reduced forage available in a given year, due to drought for example, stocking conservatively at all times is a sound practice.

Ecological resilience also promotes long-term profitability in several obvious ways. High forage yield is conserved with diverse, site-adapted plant populations. The duration of active growth is maximized with a diversity of plant species, increasing yield and reducing fire risk. Animal health is maintained where animals have access to a wide variety of plant species. The diverse landscape meets nutrient requirements and provides a diversity of plant secondary compounds which maintain animal health when animals are able to be selective.

Watch the short documentary film on Russ Stingley and ecological resilience at <https://youtu.be/95ycSybYKTk>.

Jack Southworth

The “Building A Tradition of Adaptive Rangeland Management” case study describes an operation near Seneca, Oregon, where Jack Southworth runs a cow-calf-yearling operation, grazing high-desert rangelands and dry forest systems using holistic management with a strong focus on managing for rangeland and soil health. He has implemented a variety of strategies to balance animal health, profitability, and land health. These practices, in combination with the ability and willingness to be flexible, have given Southworth’s ranch both ecological and operational resilience. Fundamentally, this allows him to remain profitable now while helping him manage the risks posed by changing climatic conditions. Watch the short documentary film on Jack Southworth and operational resilience at <https://youtu.be/n0zJDjkaP3o>.

Richards Ranch

The case study “Building Resilience Through Engagement” describes Brenda and Tony Richards’ family cow-calf operation in Murphy, Idaho. Their cattle graze a combination of private and public rangelands. The Richards actively work with agencies and other entities that have rule-making authority around grazing management on public lands. This engagement set a good foundation for actions during and after a 2015 wildfire. The Richards hope such engagement also lays the foundation for providing them and other public lands lessees with the flexibility they need to have a resilient operation, necessary to address both current and future challenges that arise as the climate, their community, and society’s needs and values change. Watch the short documentary film on Tony & Brenda Richards and social resilience at <https://youtu.be/iAzIMOYK1-g>.

Discussion [Conclusions/Implications]

There is a growing recognition that the same strategies that make ranches and rangelands more resilient to climate change will also provide other important co-benefits. These include enhanced resilience to current weather-related variability, enhanced ecological functioning, and in at least some cases, enhanced or more sustainable economic performance. Implementing these “no-regrets” strategies is thus important for enhancing the resilience of rangelands to a wide variety of shocks including, but not limited to, climate change. Specific strategies include:

- Management-intensive grazing or other strategies to ensure adequate rest periods. For example, relatively short rotations that ensure that native grasses are allowed to set seed in some years.
- Regeneration and recovery of degraded plant communities by actively managing grazing. The intent is to manage cattle in a way that the plants’ phenological stage when they are grazed, the duration of each pasture’s use, and the multi-year sequencing of grazing events are selected to promote tillering, seed production, seed-to-soil contact, litter deposition, seed germination, and seedling establishment.
- Grazing management that increases soil water holding capacity, reduce evaporation from the soil surface, and moderates soil temperatures.

- Management to reduce fire risk through promotion of native perennial plants and suppression of seed production and establishment of invasive annual grasses.
- Early de-stocking in the face of drought, to limit over-grazing and economic losses.

Livestock farmers in most semi-arid regions can successfully use these principles and practices to increase resilience of landscapes historically variable in the timing and amount of precipitation, landscapes where that variability may very well increase in the coming decades. People whose livelihoods dependent on naturally-occurring vegetation can learn from others who have been successful through the case studies described here.

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