



# Holistic perspectives— Understanding rancher experiences with holistic resource management to bridge the gap between rancher and researcher perspectives

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## On the Ground

- Holistic Resource Management (HRM) is a ranch management strategy plagued by controversy; experimental evidence from ecological studies has consistently failed to support that HRM provides ecological benefits, yet many ranchers staunchly support the method.
- Using a qualitative approach, we found that the HRM processes used on four case study ranches in eastern Colorado provided a systematic framework for key ranch stakeholders to improve long-term, adaptive approaches to managing ranches as complex socio-ecological systems.
- Notably, the ranchers emphasized the planning benefits of HRM over the grazing benefits, suggesting the value of the system is not in how the cattle are grazed but in how it changes the way ranchers make decisions about how to graze their cattle and manage the many other complexities of operating a ranch.
- Approaching HRM as a planning framework versus as a grazing strategy may be a key factor in the difference in claims between ranchers practicing HRM and researchers studying grazing systems.

**Keywords:** Grazing systems, Ranch management, Decision making, Qualitative methods, Conservation grazing, Social-ecological systems

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## Introduction

Holistic Resource Management (HRM; often called holistic management) is the subject of considerable debate and controversy. Associated with one its core developers, Allan Savory, and sometimes referred to as the Savory Grazing Method, HRM is a type of systematic ranch planning framework that integrates financial, grazing, infrastructure, and land management elements into a holistic strategy.<sup>1,2</sup> The grazing element of the framework, holistic planned grazing (HPG), incorporates intensive short-duration grazing rotations of livestock through multiple paddocks and the adaptation of grazing management plans informed by continuous monitoring of range conditions. Although livestock producers around the world use HRM and many are adamant supporters of the approach, experimental evidence from controlled range studies fails to support many of the ecological benefits HRM proponents claim to observe, such as increases in soil carbon and plant and animal production.<sup>3–7</sup> Yet, many ranchers remain steadfast and vocal advocates of HRM, pointing to their own experiences as sufficient evidence to promote HRM as an effective tool for sustainable rangeland management.<sup>8,9</sup> As a result, science and personal experience stand at an impasse.<sup>10</sup>

Addressing the debate over HRM and understanding the roots of the divergent perspectives can contribute to a better understanding of the limitations and potential of HRM as a tool for sustaining livelihoods and ecological function through grazing—an extensive land use covering roughly 25% of the world’s land area.<sup>11</sup> In this study, we examined the implementation of HRM on four ranches in eastern Colorado, exploring the personal experiences of the ranchers, owners, and other stakeholders involved with the properties to understand the perceived benefits they have derived from HRM and its

drawbacks. We found that stakeholders emphasized many components of HRM beyond its grazing practices. They highlighted a range of skills developed as part of the benefits of HRM, such as drought planning and business management. Interviewees also acknowledged that the steep learning curve and the significant infrastructure expenses that may be associated with implementing HRM could be a barrier to adoption. While certainly not a panacea, these stakeholders felt that HRM provided tools for making management decisions that gave them increased confidence in the face of uncertainty and risk inherent in the ranching enterprise. Our goal is to present this research to broaden the discussion on HRM to understand its multiple perceived benefits that go beyond ecological dimensions and the HPG element of the framework. The different emphases in the debate may be a source of divergent perspectives on HRM's contribution to sustainable rangeland management.

## Methods

To examine ranchers' and other stakeholders' experiences with HRM, we used a qualitative multiple-case study approach<sup>12</sup> of four ranches in eastern Colorado. The Nature Conservancy (TNC), a conservation group active in the region, is a key stakeholder on all four ranches and facilitated our connection to the ranches through their sustainable grazing lands program. The qualitative methodology allowed participating ranchers the freedom to describe their processes and experiences in their own words,<sup>13</sup> highlight what they find important about their ranch management outcomes, and describe how these relate to ecological change dynamics on their land. We used iterative, semi-structured interviews with the ranchers and supplemented these in-depth interviews with interviews of the ranch owners (all four ranches lease the ranches), a TNC representative, and HRM consultants from Holistic Management International (HMI) and the Savory Institute (SI). During May and June of 2017, we completed a total of 17 interviews, which ranged from 30 minutes to over 2 hours in length. Site visits and tours of three of the four ranches complemented our formal interviews and provided additional context for our analysis.

We recorded, transcribed, and took detailed notes of all the interviews. We then conducted a preliminary analysis of the interviews using a code-book of themes determined *a priori*, which we refined based on emergent themes from the interviews. We selected *a priori* themes to focus on components of HRM suggested as important to understanding ranch outcomes via ongoing communication between TNC staff and ranchers using HRM. We then analyzed the interviews using a more in-depth coding process to understand the importance of the themes among the ranches.

The four ranches are in eastern Colorado in semi-arid grassland ecosystems. The region has cycled in and out of significant, multi-year droughts over the last two decades. Ranchers discussed the difficulties of finding land on which to ranch when new to the business, or on which to expand. This

anecdotally suggests that the practice of ranchers leasing ranches from non-rancher owners is increasingly common with "amenity" or absentee ownership becoming more common in the American West.<sup>14–16</sup> As discussed in the analysis, this is a socio-economic pattern that may have significant effects on both the long-term ecological and social sustainability of rangelands and ranching communities. Ranches 1 and 4 were both owned by TNC at the time data were collected and the organization is an active participant in land management planning and ecological monitoring on all ranches. The four ranches varied across socioecological characteristics (Table 1). TNC ecologists qualitatively assessed ranch ecological conditions by comparing observed rangeland conditions with Natural Resources Conservation Service's (NRCS) Ecological Site Descriptions (Table 1). While all ranches exhibited dominant grasses found in reference conditions for their soil type, Ranches 2 and 3 showed degraded rangelands at the start of the lease as a result of stress from previous drought years and management and were determined to be recovering while Ranches 1 and 4 matched reference conditions.

## Results

Three major themes emerged from the interviews: adaptation to drought, business planning and decision-making, and stakeholder coordination and partnership. These played out in ways that affected socio-economic outcomes, and both drove and were driven by ecological decisions and outcomes.

### A framework for adapting to drought

The producers we interviewed discussed how HRM gave them tools for adapting to changing environmental conditions—especially drought and its various impacts. In line with a HRM framework, the four producers we interviewed developed a drought plan at the beginning of each year that outlined how they would adapt their enterprise under different conditions. More than just planning through an HRM framework, however, producers used the short duration, rotational components of HRM to better gauge current forage conditions and project the implications of those conditions forward throughout the growing season. This gave them information to make timely decisions to destock or make other adjustments and allowed them to be "proactive instead of reactive" in response to changing conditions. In discussing their response to a drought in 2012, the rancher from Ranch 4 explained,

*That is the cool thing about the short duration of grazing periods, and a grazing chart that's spread out over several months. If I'm going to be in a paddock for four days... and I'm monitoring, and I get out there and I realize, 'Oh no, I can't be here four days, I barely made three' then we move. Set stocking, I would say you don't really notice it at all... You don't really notice that you're out of grass [until] early until September, and now you don't have time to do anything... We did that in 2012. We estimated how much we thought we had left, how far we had to go. We multiplied the use, took the use of the yearling herd and multiplied it out and*

**Table 1. Summary of key ranch characteristics, covering both the histories of the ranches and their socioecological goals, as set during the Holistic Resource Management process. Ownership and lease structure are described. To assess the ecological conditions of degraded rangelands at the start of the lease, the rangeland conditions were compared with the Natural Resources Conservation Service's Ecological Site Descriptions. Ranches 2 and 3 showed degraded rangelands at the start of the lease, as a result of stress from previous drought years and management, and were determined to be recovering while Ranches 1 and 4 matched reference conditions.**

Ranch number	Ranch lessee history	Ownership and lease structure	Major ranch goals in addition to profitable ranching enterprise	Degraded rangelands at start of lease
1	Multi-generational; managing multiple properties; lessee used variations on rotational and planned grazing before leasing land from TNC, but did not call it HRM. Lessee is the first generation to use HRM or variations thereof.	TNC-owned, leased to ranching family for 5 years starting in 2016; under conservation easement	Experiment with ecological management tools including prescribed fire; experiment with vegetation for long-billed curlew ( <i>Numenius americanus</i> ) habitat	Minimal
2	First generation, started with HRM	Privately owned, leased to land manager for 5 years starting in 2014; under conservation easement	Improve range condition and productivity to help sell property at a profit	Extensive
3	Multi-generational; managing multiple properties; first generation to use HRM; operating separate from family operation	Owned by the Colorado State Land Board, leased to ranching family for 5 years starting in 2014	Improve and protect the productivity and ecological function of the property	Extensive
4	Multi-generational; first generation to use HRM	TNC-owned, leased to ranching family for 25 years starting in 2016, following previous 10-year lease starting in 2006; under conservation easement	Improve greater prairie-chicken ( <i>Tympanuchus cupido</i> ) habitat; improve biodiversity and riparian ecosystems; maintain or improve range condition and productivity	Minimal

HRM indicates Holistic Resource Management; TNC, The Nature Conservancy.

*determined our ship date, determined our late September ship date in the first week of July, because we could tell we were, and we were right... that we had like 65 days of grazing in front of us instead of 90.*

The lessee on Ranch 3 had similar comments about how the HRM framework helped him make adaptive decisions on when to sell his cattle and how to manage his grass in drought conditions. Reflecting on his decision-making during dry conditions in 2016, the lessee commented that,

*We never ran out of forage [for the cows we kept], and that's part of the plan that comes along with holistic planned grazing, is because you know exactly how much grass you have in front of you, which gives you a pretty critical piece of information when you're projecting a drought or you think you're going into a drought situation. If you know exactly where you're at in terms of how many cow days you've got on the ranch before you ... and if it doesn't rain by that point you know how many animals you've got to get rid of.*

The same lessee also commented on how having a written drought plan ensures everyone knows what to do during a drought. It helps create indicators that trigger management actions, such as selling off a planned number of cattle if there is no rain by a certain date or deciding to run a yearling herd that is easier to liquidate instead of a cow-calf herd. He described how he set up and responded to drought triggers, saying,

*It got really dry last summer and we're probably, for all likelihood, going into drought. So, we structured our cow herd. We sized down our cows and expanded into yearlings, which are a lot more liquid than cows. If we happen to not get rain, we could liquidate those yearlings without having to sell the cows. So, it was a way to adjust our stocking rate really fast... [In our drought plan] we got triggers that say, 'All right, we're darn sure we're in a drought...' [We're] two inches below where we should be this time of year, what animals need to go?*

The manager of Ranch 2 also emphasized the benefits of the adaptive planning framework HRM sets up, which he describes as a “plan, monitor, re-plan,” process. He commented that HRM helps “you evaluate overhead and keep close tabs on what production costs are throughout the year.” These decision-making processes, while expressed in business terms, reflect the influence of underlying climate and ecological factors. These factors and the management decisions impact both business outcomes and the impacts of cattle grazing on ecological functions and conditions on the ranch. In drought conditions, ecological systems are more stressed. Drought planning and close monitoring of grass conditions that comes with short-duration, planned rotations across a ranch enable ecological conditions to be assessed regularly along with ranch operation conditions. In fact, the practice of HRM entails explicit ecological monitoring to be effective.

Monitoring can be implemented and inform the management of ranches not using short-duration rotations. However, the rotational requirements of HRM necessitate that a rancher knows the state of his or her grass is in each paddock and how that state relates to the needs of their cattle and the timing of their cattle rotations. The frequent and continuous monitor-

ing of the land associated with HRM contributes to keeping cattle healthy (and profitable) throughout a season by helping ranchers keep stock of the grass available for their cattle. Ranchers interviewed tended to particularly identify the importance between grass monitoring and long-term cattle health during drought. When both the land and the animals are stressed, the volume and nutritional value of accessible grass becomes an even more significant variable driving rancher decision-making.

Monitoring the land also enables producers to manage for general range condition (e.g., ecological function, desirable or undesirable species present, degree of recovery or damage from grazing) and puts them in the best position to recover range function and value post-drought. In interviews, the benefits of monitoring were generally couched in terms of “knowing the land”. The HRM approach guided ranchers in collecting data that facilitated decision-making despite not necessarily having access to multi-generational observational knowledge on how to judge land health. Ranchers we interviewed contrasted this approach with their previous techniques or those used by their non-HRM peers by describing rules of thumb like “take half, leave half” or simply “eyeballing the ground.” While these techniques may be effective for some ranchers with experience on their landscape, they lack the systematic and transferable process inherent in the HRM framework. In summary, the HRM process provides a structure that enables a rancher to better engage with dynamic ecological conditions and make informed decisions in the face of uncertainty.

## Adopting a business mindset

An HRM framework also provides business-planning tools to help producers think through the financial implications of management decisions. One of the ranchers described how his exposure to the financial side of holistic thinking resulted in a paradigm shift in his thinking, going from simply running cattle to running a long-term business focusing on cattle. The manager of Ranch 4 described how he used to see himself as a rancher, but now he sees himself as a business owner,

*[HRM] forces you to stop being a practitioner and start being a business owner or a manager... The practitioner just wants to run cows, and the manager has to figure out all the other things that go into running a business... It's both its biggest benefit and its biggest cost. Because before, I just ran cows, and it's what I felt like I was good at, and it's fun. It tends to be low-stress. It has its stressful time, but for the most part it's just fun. And being a business owner makes you, or a manager, makes you focus on things ... It's not true of everybody but certainly true of me that I don't have a great deal of skill in money management and accounting, and those kind of things. It makes you focused on your strategic vision, which again, is something that I and most people in my shoes just don't have any skill doing.*

This reveals the way HRM provides a method for changing the way ranchers make decisions. Although a more business-oriented mindset does not necessarily lead to the

application of the mindset in ranching, it does open the door for long-term planning that can lead to increased financial stability. Thus, the ranchers have more capacity to better consider the ecological elements of an operation, like plant community health and diversity, that can ultimately improve ranch operations. For all four ranchers, when speaking of decisions regarding grass production and diversity, those decisions were often driven by a business mindset as much as, if not more than, a land ethic or conservation mindset. This may be an important aspect of HRM as it provides a process that gives ranchers who may not be conservation-minded incentive to better incorporate conservation goals and management into their operations.

Two of the ranchers also used HRM as a marketing tool that helped them differentiate themselves from other ranchers when competing for grazing leases. These ranchers actively advertised their ability to meet ecological goals and turn a profit through HRM practices to increase their chances of obtaining a lease. In other words, by stating they can improve the land's productivity during their lease, they have an advantage over larger operations that may be able to pay more for the forage their livestock consume but who are not focusing on creating long-term value in the underlying ranch asset for the landlord via improved range condition. HRM users are using feedback from ecological monitoring to support their business goals and successes. This, in turn, helps them fulfill their social goals (e.g., gaining long-term leases that can support a growing family). The manager of Ranch 3 described how he uses his skill with the HRM process when trying to get a lease, saying,

*It's been our strategy that if I can go to a landlord and say, 'Here's what I want to do with your ranch. Here's what I think the long-term improvements are going to be. When I get done with your ranch, the carrying capacity is going to be this much higher, and it's going to be this amount better.' There's some value there. It improved their [the landowner's] asset is what it does, and it improves their ability to make income.*

By being able to point to the improved grazing capacities of ranches they managed previously, these ranchers are using HRM's compatibility with ecological restoration work to stand out from the crowd of other potential lessees. The manager of Ranch 2 shared a similar strategy and runs his company on this idea. Although there are other approaches to restoring the ecological health of rangelands, the managers of Ranches 2 and 3 have used HRM to increase the productive capacity of ranches they have managed and that success has a competitive advantage when pursuing other leases.

## Coordinating multiple stakeholder goals

The holistic planning process at the core of HRM also provides a framework to coordinate multiple stakeholder goals. The partners in each case included ranchers, landowners, and conservationists. Some ranches also had other uses (e.g., energy and hunting) and land management activities (e.g., groups implementing prescribed fires or managing for invasive plants) that complicated management planning and

implementation. The formal HRM planning process served as an important communication tool that improved communications and understanding among the different stakeholders and improved coordination and management of activities.

The planning framework was key for integrating ecological and business goals into grazing plans to test their compatibility and to drive desired outcomes for both. Although the monitoring and managing of forage via seasonal grazing plans does not necessarily align with conservation or ecological restoration goals, the HRM framework makes it possible to systematically consider and incorporate such goals into grazing plans. For instance, heterogeneity in vegetation on the landscape benefits a range of declining grassland bird species,<sup>17,18</sup> and the HRM process can be used to plan for a desired intensity and timing of grazing across a ranch to increase landscape heterogeneity or provide for life cycle needs of specific species at different times of the grazing season. On Ranch 4, improving nesting and brood rearing conditions for greater prairie-chickens (*Tympanuchus cupido*) is an important conservation goal for the owner (TNC). The HRM planning framework allowed the rancher and the landowner to collaboratively develop a grazing plan that supported grazing in locations important to nesting and brood rearing, but also enabled the ranch to "carry over" more residual growth to provide structural cover in the spring of the year when the birds need it. As the TNC representative working with Ranch 4 describes below, the HRM planning framework created a foundation for TNC and the rancher to understand wildlife conservation and ranch business goals as a means of allocating pasture and forage use that met both needs,

*[The rancher] was saying things to me that I didn't really understand, and I was saying things or TNC was saying things that he didn't really understand. By engaging together in developing a holistic context for [Ranch 4] and then implementing holistic management plans broadly, including planned grazing, we closed that gap and are on a much firmer footing now and are in the second year of a 25-year lease that we entered into at least in good measure due to closing this gap on communication and understanding via holistic management.*

It also helped TNC and the rancher create a grazing plan to test how high-intensity grazing might improve long-billed curlew (*Numenius americanus*) habitat at Ranch 1. The HRM planning approach can provide a way to integrate management needs for target species that are a priority for conservationists into grazing plans and practices that work for ranchers.

One producer commented, "[HRM's] helped us to have a clear vision of what we're trying to accomplish, and why we're trying to accomplish it." The owner of Ranch 2 agreed, and, not coming from a ranching background, the process of creating an HRM plan for the ranch and going through the training helped the landowner understand more about where his lessee was coming from in terms of decision-making. It also aided in understanding how the different pieces of the ranch—grazing, fences, and water systems—fit together as a whole and affected one another. Although Ranch 2's owner was not of the opinion that the HRM planning process and

framework improved owner-manager communication, the lessee felt that creating a holistic framework for the ranch helped all parties get a “clear vision of what we’re trying to accomplish” on the ranch and establish shared definitions. This, in the lessee’s opinion, helped with communication overall.

Coordinating diverse stakeholder goals on a property may be of growing importance as societal expectations for western rangelands continue to change with increasing demands and competing interests placed on these lands for amenity values, wildlife conservation, energy development, and agricultural production.<sup>14,16,19</sup> The ranch manager of Ranch 1 summarized the need and benefits of HRM in stating,

*[HRM has] been able to get all the pieces and partners and all the different players together, so that as we plan through something, then everybody's involved instead of grazing just saying, “Okay, we're just gonna do this pasture, that pasture, that pasture,” but we don't really check and see, well, how does that affect what the fire guys want to do? Well then, how does that affect what the hunting operation is like? Instead of all working together making sure that everything benefits each other, you know, it would have just been everybody going their own way. The holistic type of management is a good way to bring all of that together.*

## Discussion

The HRM approaches used in the four cases provided a systematic framework for the key stakeholders involved with each ranch to develop comprehensive plans that addressed economic, social, and ecological aspects of ranch management. The four ranches we analyzed all incorporated HRM in different social and ecological contexts, demonstrating HRM’s versatility and adaptability. From a social standpoint, ranch managers ranged from a young ranching family using HRM for the first time to a multi-generational ranching family that has used HRM for several decades. From an ecological perspective, the ranches included two properties that exhibited signs of degradation likely due to previous management and drought, based on internal TNC qualitative assessments that compared sites with NRCS reference conditions. On these properties (Ranches 2 and 3), HRM was used to improve ecological conditions and eventually improve land value. The other two properties (Ranch 1 and 4) showed minimal signs of degradation and largely matched reference conditions. HRM was used on these properties to balance and enhance outcomes relative to both conservation and business goals. Despite the spectrum of contexts considered and the circumstances of each ranch and land manager, we highlight several findings that resonated across the four cases and may have broad relevance to ranch management in the region.

The HRM approaches used in the four cases provide a decision-making framework facilitating adaptability to changing market and drought conditions and minimizing risk. The tools provided through HRM allowed the ranchers to assess the condition of the land in real time and project the implications of management alternatives on their financial bottom line. These projections informed ranchers on optimal

times to sell cattle during periods of market volatility and drought. Such information gave ranchers more control and confidence in situations that were otherwise stressful and difficult to navigate. The benefits from planning and tools for adapting to volatility was cited as one of the most beneficial aspects of HRM and is emphasized in trainings.<sup>20</sup> The connection between risk perception and decisions regarding ranch management or grazing strategies has also been noted in previous research that found that managing risk is a key driver in rancher decision-making.<sup>21,22</sup>

It is worth distinguishing these HRM values from the elements of the debate over the merits of intensive, rotational grazing practices associated with HRM. The planning and financial management aspects of the HRM strategy is largely unexplored in academic debates and experiments, although these themes have been examined more broadly for ranch management strategies.<sup>5</sup> This could be one source of the divergent claims stemming from experimental outcomes and ranchers’ experiences along with different epistemologies for understanding complex rangeland ecosystems.<sup>8,23</sup>

Despite the multiple benefits that the HRM planning process provided stakeholders, implementing HRM presents significant obstacles, including a steep learning curve. The ranchers involved with the four case studies had access to external consultants (HMI, SI, and TNC), but one rancher suggested that the skillful implementation of HRM could take as long as 5 years, even with aid. All the ranchers interviewed also cited continued learning as part of their process and talked about their involvement with outside groups like TNC, NRCS, HMI, SI, other systematic ranch planning approaches like Ranching for Profit, and their willingness to study rangeland and management science.

Another significant obstacle to implementation is related to the cost of water and fencing infrastructure often required to implement the grazing component of HRM. Infrastructure improvements were financially expensive and required cost-share support from NRCS or large outlays from the property owners. This begs the question of whether an owner not affiliated with large organizations like TNC, or with significant liquid capital, would be willing and able to afford HRM as it is currently taught. Although the finding that upfront costs may be a barrier to adoption is not novel and is found across many resource issues,<sup>24–26</sup> understanding how ranch planning, monitoring, and infrastructure can be implemented in a more cost-effective manner remains an important area of research, particularly when cost issues are viewed through the lens of socioecological systems and ecological stress.

Notably, all the ranchers interviewed for these case studies lease the ranches, and only two ranchers owned additional grazing land. Generally speaking, leasing affects lessee motivations by increasing uncertainty, favoring an emphasis on short-term profitability rather than long-term land health and productivity. This obstacle was largely overcome at Ranch 4 where the lessee was able to work with TNC to extend his lease to 25 years. He spoke of how the certainty of his position makes him more willing to experiment with new grazing

practices and make longer-term investments. Other ranches leveraged their experience with HRM to help them compete for new leases. Although this approach helped improve their financial situation, it did not increase feelings of economic or social stability, a factor that can have detrimental impacts particularly in terms of creating a stable family life. These changing ownership norms are challenging the social structure of ranching communities.<sup>27,28</sup> Adverse ecological consequences could emerge from this situation if the insecurity of short-term leases inhibits investments in the long-term productivity and ecological condition of the land, as well as the multi-generational social structures that support land-based values.

The financial obstacles to adopting HRM may prove to be a substantial barrier for the widespread adoption of HRM approaches among traditional land managers without access to significant external capital or those that lease their land on relatively short-term leases. Further exploration of how changing land ownership patterns in the western United States are affecting the socioecological makeup of the region and the decision-making strategies of ranchers is an area that deserves further exploration.<sup>16,28</sup>

While the focus of this paper was on examining the HRM approach in depth to understand how it is being applied and what perceived and actual benefits users are finding in their usage, this focus did not allow for comparison with non-HRM ranches. A comparison approach looking at similar socioeconomic variables across a diverse array of ranch management approaches would be a beneficial addition to this area of research. Increasing the number and diversity of ranchers included would also benefit our understanding of the generalizability of these findings. Ranchers may take diverse management pathways to achieve similar outcomes and an appropriate livestock management strategy depends on overall land management goals.<sup>5,29</sup> The complexity of socioecological systems precludes a “best” ranch management strategy, as system drivers and a rancher’s control over them vary widely across socioecological landscapes, and adaptive learning, flexibility, and a focus on long-term goals are likely to be key to successful management.<sup>5</sup>

## Conclusions

These case studies show that ecological and socio-economic goals can be aligned and advanced on eastern Colorado ranches. HRM shows promise as a way of managing toward diverse goals simultaneously. The actual grazing implications of the method (or the HPG elements), which are the primary focus of most rangeland science studies, need to be further evaluated in the context of the social and economic needs and drivers operating on ranches, and in the context of rancher decision-making.<sup>6</sup> Most of the ranchers emphasized the planning benefits of HRM over the grazing benefits, suggesting the value of the system is not in how the cattle are grazed but in how it changes the way ranchers make decisions about how to graze their cattle and manage the many other complexities of operating a ranch. Although these

benefits are not exclusive to HRM and can likely be achieved through other systematic planning approaches, HRM provides a well-developed framework for managing the complexity inherent in a ranching enterprise and tools for adaptive decision-making. The difference in claims between ranchers practicing HRM and researchers studying grazing systems may be driven by confusion about HRM as a planning framework versus a grazing strategy (i.e., HPG). Additional investigation of its social and decision-making components may help bridge the current divide or tease out specific values of HRM.

## Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Authors E. Barton and W. Burnidge were affiliated with The Nature Conservancy (TNC) at the time the research was conducted and W. Burnidge works for the organization as a full-time paid employee. TNC’s interest in the potential of Holistic Resource Management for their sustainable grazing program drove the initiation of this research project and aided our ability to gather data.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.rala.2020.05.003>.

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