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# Priorities, Needs, and Motivations of Ranchers for Monitoring

**jg** | RESEARCH &  
EVALUATION

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## Background

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Public agencies, non-profit organizations and private companies that work with ranchers have become increasingly aware over the past decade of the need to monitor the impacts of ranch management decisions to achieve climate change mitigation and adaption goals, as well as maintain rural community vitality<sup>1</sup>. More recently, Nature Conservancy scientists and their colleagues synthesized ranch monitoring indicators—those both proposed and currently used—across agencies, organizations, and individuals.<sup>2</sup> In a related effort and collaboration led by researchers at Colorado State University, The Nature Conservancy (TNC) assessed the environmental, social, and economic outcomes for ranchers who use rangeland management plans.<sup>3</sup> Together, these studies identify a set of commonly used categories or types of indicators meaningful to issues of sustainability (soil properties, biodiversity, animal management), as well as a plethora of specific indicators, metrics, and protocols offered by various compliance and sustainability programs.

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**Monitoring is defined as making systematic observations and documenting them on paper or digitally.**

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TNC's North America Regenerative Grazing Lands strategy is leading a collaborative effort among non-profit and market actors that support sustainable ranching to review, align, and define a shortlist of indicators that can be efficiently and effectively used by ranchers for three purposes:

- Support ranch management decision-making;
- Report on performance and compliance to federal and state agencies, as well as supply chain actors; and
- Maintain or enhance market opportunities through storytelling to customers and other consumers.

However, the goals of rangeland stakeholders can be largely individualized. For example, public agencies can be more focused on compliance with complex environmental regulations, while the private sector tends to focus on offsetting or decreasing companies' Scope 3 emissions, and individual consumers may approach management with a wide range of interests in climate change mitigation, animal welfare, and human health. Adequately appealing to the diversity of rangeland interests and goals is a recognized challenge for existing monitoring efforts. Furthermore, the TNC team has noted that both past research and their own initial review of indicators with ranchers and agricultural professionals gives priority to dominant voices in the ranching community. To address the need to both develop a holistic set of indicators relevant to a wide range of priorities and ensure that marginalized or underrepresented experiences and views are included in the development of the toolkit, TNC decided to conduct further systematic research.

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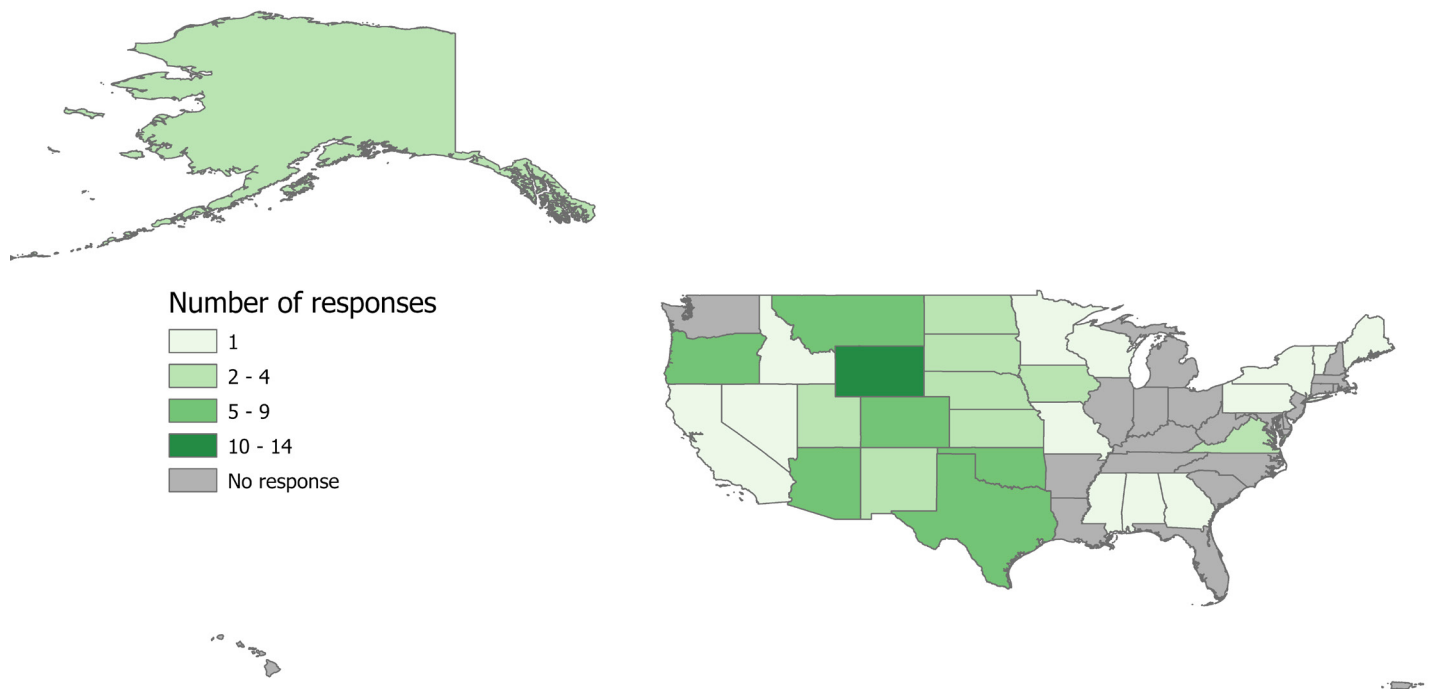
## Methodology

This study asks three overarching questions:

- Do ranchers see utility in the shortlist of indicators for management, reporting, and storytelling purposes, and do these perceptions differ based on rancher characteristics?
- Why or why not are ranchers currently paying attention to each of the indicators on the shortlist and do these monitoring actions differ based on rancher characteristics?
- What suggestions do ranchers have for other types of indicators or ways of monitoring those indicators that could be more useful for management, reporting and/or storytelling?

The study used a mixed-method design, combining responses from a structured survey (n=86) and qualitative data from semi-structured interviews and focus groups with 17 ranchers from 28 U.S. states, including all of those in the Great Plains and Intermountain West. Special efforts were made to capture diverse perspectives by engaging ranchers and ranching communities most often underrepresented in rangeland social science (e.g., female; Black, Indigenous, and People of Color [BIPOC]; as well as new and beginning ranchers). Respondents were asked about a short list of decision-making and outcome indicators, whether they monitor these and why, how they approach monitoring and learning about indicators, barriers to monitoring, and needs from any tools developed to enhance or expand their monitoring activities.

**Figure 1. Map of states in which survey respondents ranch (n=85)**

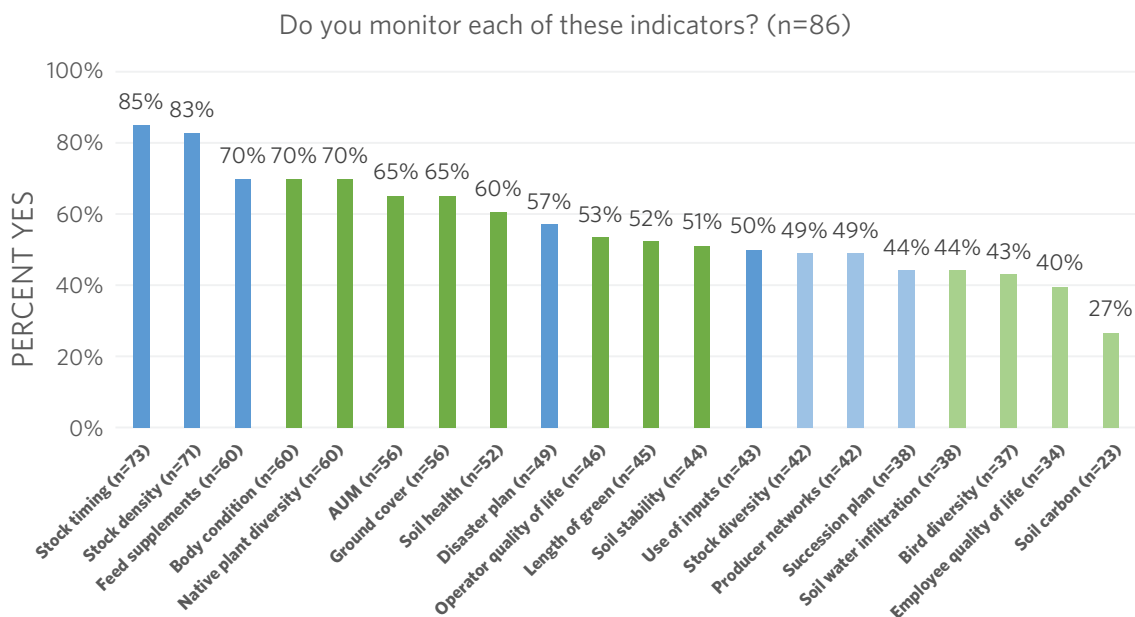




## What and why are ranchers monitoring?

**Many ranchers are monitoring many indicators, and motivations for monitoring and planning are related to ranch management decision-making and long-term outcomes.** In the survey, ranchers were asked to respond yes or no to whether they currently monitor each of the individual indicators that have been identified for possible inclusion in the TNC Toolbox. As **Figure 2** shows, there are patterns in which types of indicators enjoy a high degree of agreement (defined as over two-thirds [66%] of respondents selecting yes) in terms of ranchers currently monitoring them. These include decision-making indicators about animal management (density, timing, and feed supplements), and outcome indicators related to animal health (body condition) and forage/pasture condition (animal units per month [AUMs], ground cover, and native plant diversity). At least half of the respondents report monitoring most other indicators. The only indicator not commonly monitored is soil carbon, with only about one-quarter (27%) of respondents noting that they are currently monitoring for it.

**Figure 2. Proportion of survey respondents who reported that they monitor each individual indicator**



There is a core set of most commonly monitored indicators that connect ranch management decision-making to long-term outcomes, and that are useful for reporting and storytelling. These include stock timing, stock density, the use of feed supplements, body condition, ground cover, native plant diversity, animal unit-months, and soil health.

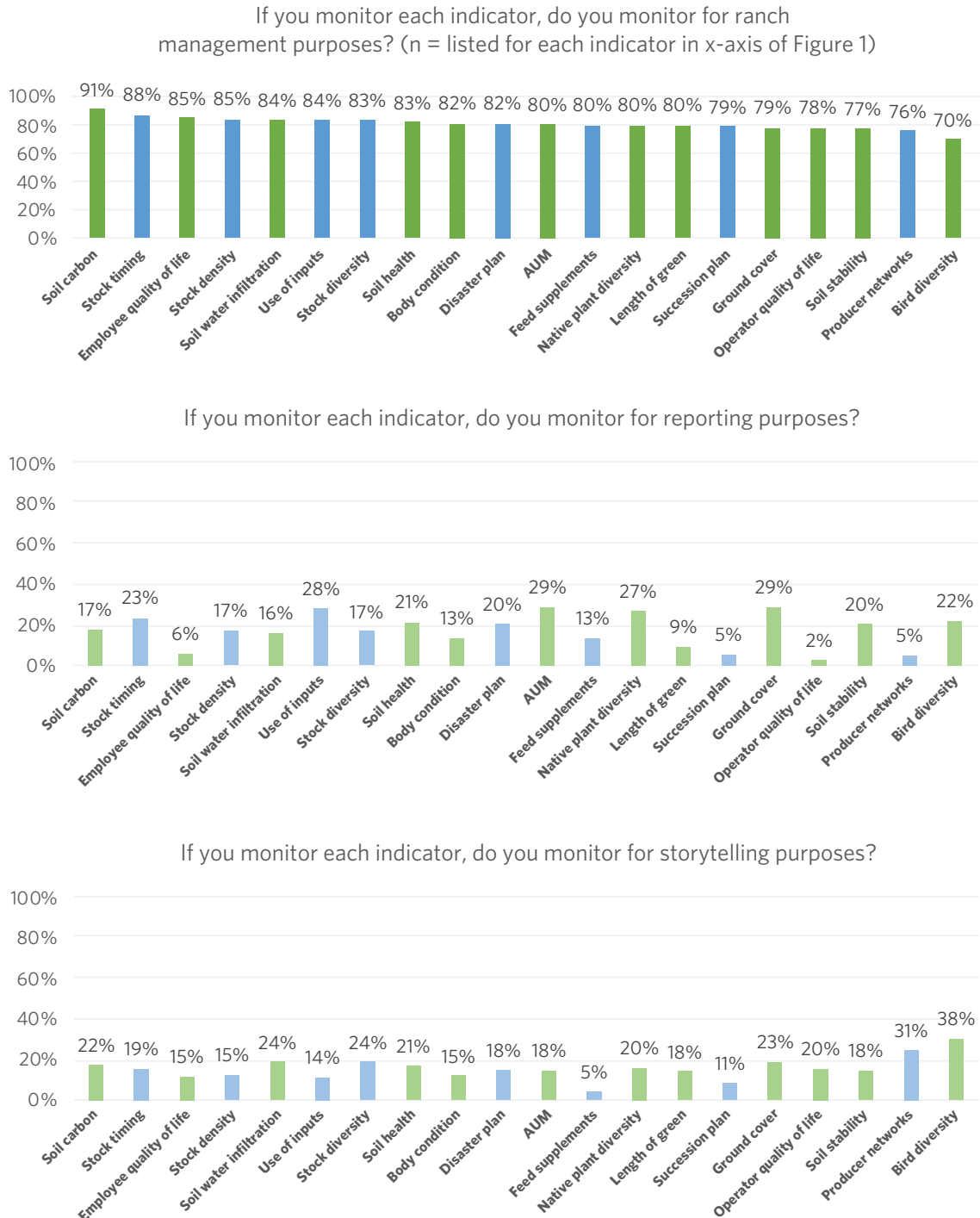
The patterns shown in **Figure 2** are consistent across all individual rancher identities (gender, age, race/ethnicity) and type of grazing system. Overall, smaller proportions of women monitor each indicator as compared to men; larger proportions of BIPOC ranchers monitor more indicators as compared to white non-Hispanic ranchers; smaller proportions of younger ranchers (age 45 and under) monitor each indicator as compared to older ranchers; and larger proportions of rancher using intensive grazing management strategies monitor each indicator as compared to ranchers using rest-rotation management approaches. In general, these differences are not statistically significant, but do show patterns that could be further investigated. However, women and younger ranchers are less likely than other ranchers to monitor soil health, and these differences are statistically significant.

Once survey respondents selected yes for any given indicator, they were asked about their motivation or reason for monitoring. The TNC Toolbox identifies three primary reasons for monitoring:

- To support **ranch management** decision-making and their associated outcomes.
- To meet the **reporting requirements** of public agencies and market actors.
- To provide ranchers with information that can be used for **storytelling** to their peers, consumers, and the public about the positive impacts of responsible ranching to maintain and enhance market opportunities.

**Figure 3** shows that the vast majority of ranchers are motivated to monitor based on their perception that the indicator is useful for their own ranch management decision-making. Although the absolute number and proportion of survey respondents who report monitoring each indicator varies considerably across the list of indicators, as shown in **Figure 3**, most ranchers (70% or more) who choose to monitor any specific indicator do so for ranch management purposes. Reporting is relevant for a few indicators to a substantial minority of ranchers (around 30%) for a few key outcome indicators that are important mostly to public lands agencies (AUMs, ground cover, and native plant diversity), and storytelling drives a substantial minority of ranchers (around 30-40%) to monitor a few key outcome indicators that are more easily understood by the public. Interestingly, the two indicators most often monitored for storytelling, producer networks and bird diversity, were the two with the lowest proportion of producers saying they also monitor them for ranch management (although in absolute terms, still about three-quarters of producers who monitor these indicators do so for ranch management purposes).

**Figure 3. Proportion of survey respondents who selected each reason for monitoring each indicator they reported to be monitoring (sample size in Figure 2 for each indicator). Blue bars are decision-making indicators, green bars are outcome indicators.**



In focus groups and interviews, we asked participants to comment on if and why they monitor each indicator. Several themes also emerged across interview and focus group participants conversations. The first is that interview and focus group participants report ranch management as a primary motivation for monitoring, in line with results from the survey. Indicators like animal units per acre, stock timing, and body condition were all noted contributors to overall ranch and land management strategies. As one participant explained:

*“I guess the main thing I use for monitoring... I use the cattle. If the cattle aren't happy, there's something wrong. And you can tell by looking at the condition of the cattle, what they ate five days ago, you look at the manure to see how they are in the last 24 hours. So that's a big indicator for me.”*

Relatedly, participants saw indicators useful for ranch management as inherent to the financial capacity of an operation, or its bottom line. In many of the interview and survey responses this theme of 'profitability comes first' came up consistently. Indeed, some participants admitted to having only tentative interest in indicators that lacked concrete connections to the business side of ranching, like establishing peer networks:

*“Peer networking will be of greater importance as we focus on improving the land resource while running a business. We have to keep in mind that the ranch is a business and there has to be time set aside for the planning and business side of the operation.”*

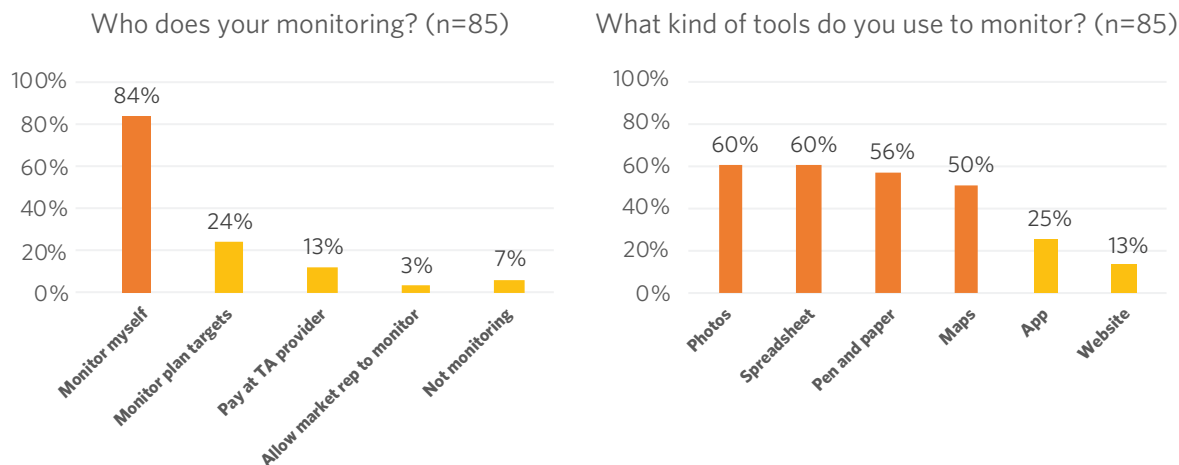
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## How are ranchers monitoring?

**Most ranchers monitor many indicators, and that monitoring is often self-guided and low-tech.** Most monitoring is done by ranchers themselves using pen and paper, photos, and spreadsheets, as well as simply by observing their ground and that of their neighbors.

**Figure 4** shows that most ranchers undertake monitoring on their own and using familiar tools. The vast majority (84%) reported that they monitor themselves, and those who don't mostly pay a technical assistance provider to monitor for them. A majority use one or more simple digital tools: photos (60%), spreadsheets (60%), and maps (50%). Notably, over half (56%) also use pen and paper, though very few (13%) use only pen and paper. Only one-quarter (25%) of survey respondents reported that they use one or more applications as tools for monitoring.

**Figure 4. Proportion of survey respondents who reported each type of person and type of tool used for monitoring (Orange denotes categories selected by more than half of respondents)**



Some participants were willing to consider using more advanced and detailed technology for the reporting:

*"If the software was exactly how I wanted it, I may be willing to spend that money because it's really cool and it's really powerful for future management and the storytelling deal again to have something that I can have on my smartphone and make the notes while I'm out there and then do an analysis, whether it's monthly, yearly, however that is, but right now it's hard to justify that cost, but then on the other hand, the way I'm currently doing it, I'm not getting it all put together at the end of the year how I've done it."*

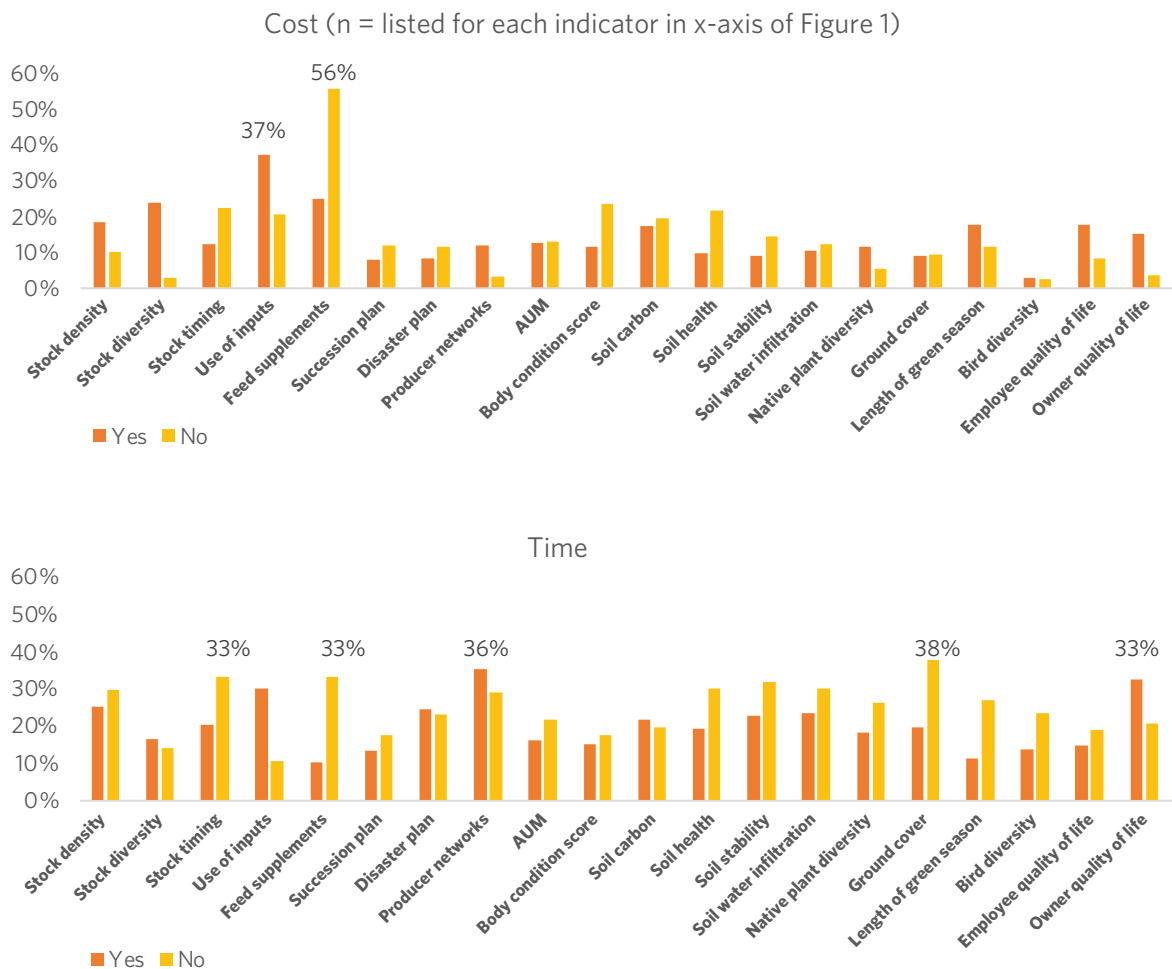
# What barriers do ranchers experience to monitoring?

**Relevance of indicators is a consistent barrier identified across indicators by those who don't monitor; time and capacity are barriers to monitoring specific indicators for those who do and don't monitor.** Explaining how a core set of indicators can support ranch management decision-making and outcomes could encourage more people to start or expand monitoring efforts. For some indicators, especially those that require technical expertise (soil carbon, bird diversity), there is a ceiling on the ability of ranchers to collect accurate information.

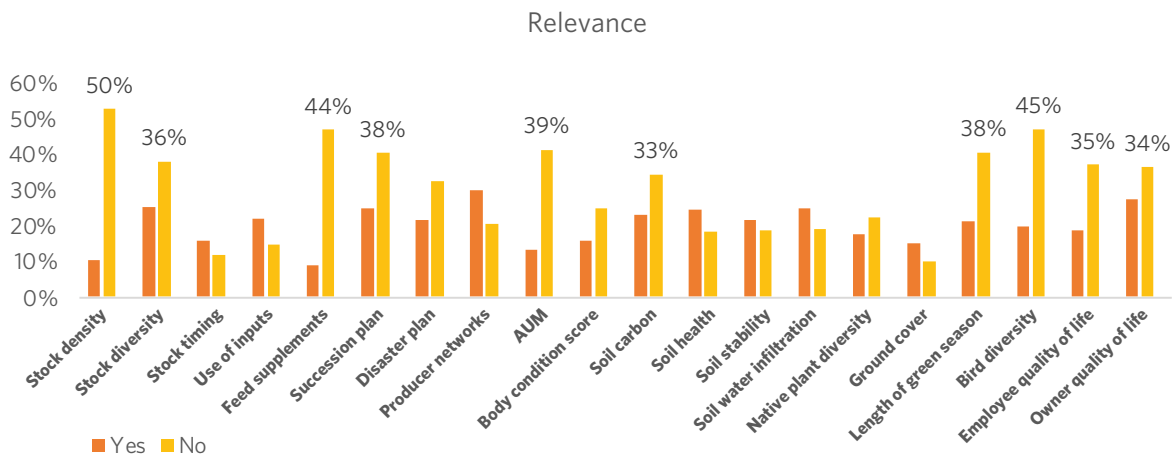
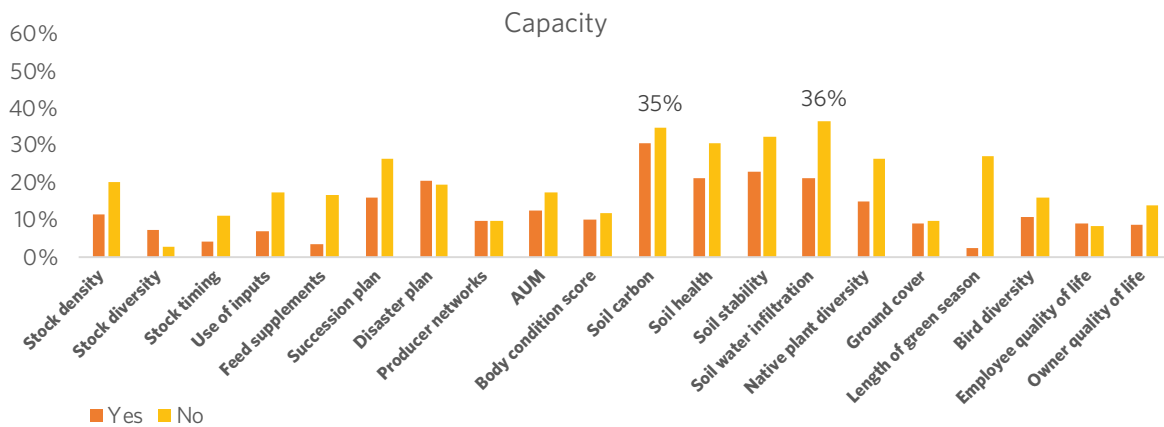
Survey respondents were asked to identify barriers to monitoring that they have experienced for both indicators they reported that they monitor and those they reported that they do not monitor. **Figure 5** shows the barriers to monitoring each indicator noted by survey respondents who reported that they do and do not monitor the given indicator. Not surprisingly, there are overall higher and more consistent proportions of ranchers identifying barriers among those who do not monitor a given indicator as opposed to those who do. Although there is no single barrier that stands out for a majority of ranchers within most indicators or across indicators in general, **Figure 5** shows several important patterns.

The financial cost of monitoring was noted by a substantial minority for only the two indicators related to inputs. Time is not a barrier for most ranchers, for most indicators. Notably, lack of capacity is a barrier to a substantial minority (35%-36%) of ranchers who are not currently monitoring soil carbon and soil water infiltration, and almost as many ranchers who do not currently monitor soil health and soil stability note that capacity is a barrier to monitoring these. Finally, and not surprisingly, a substantial minority (33%-50%) of ranchers who report not monitoring indicators report that relevance is the biggest barrier to monitoring. Interestingly, many indicators are noted as not being relevant by a substantial minority of ranchers who do not currently monitor them, but very few ranchers reported that core metrics of ecological outcomes, including most soil properties, native plant diversity, and ground cover are irrelevant.

**Figure 5. Proportion of survey respondents who noted each barrier they have experienced for each monitor they reported not to be monitoring. (Orange bars are for those ranchers who reported 'yes' to monitoring the indicator, yellow bars are for those ranchers who reported 'no' to monitoring the indicator.)**







Some study participants emphasized that the temporal challenge of monitoring comes more from the fact that monitoring data is most effective and demonstrative of change when collected over long periods of time. One participant noted succinctly: *“Consistency is probably the biggest barrier to collecting meaningful data.”* The time horizons to see impact are also long: *“Our grandkids will maybe see the results of what’s happening on the carbon thing. I may never.”* Consistency and the dedication of time might falter without the ability to look at meaningful results. One rancher speaks to this absence of instant gratification as a barrier to monitoring metrics of soil health:

*“And so, if you can look and say, ‘Okay, yes, we’ve got grass over here and we didn’t used to have it,’ then we assume that soil carbon and soil water infiltration is better. But again, that’s not something that you could really see very much change in even a year. I mean, only so much of this information can you put into and make decisions on.”*

Learning more about applying monitoring to one’s practices was a theme that came up across interviews, focus groups, and the survey. While many producers are familiar with indicators, and in many cases even how to monitor for it, several noted a critical gap when it came to the application of various indicators to management or practice. For example, one survey respondent noted:

*“I would also like to understand some metrics and monitoring of soil health better. I feel soil health is the key to all of this but it’s very hard to understand all of the interactions.”*

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## Why would more ranchers start or expand monitoring?

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As seen in **Figure 3**, ranch management is far and away the dominant motivation for all monitoring that takes place. People are interested in the health and longevity of their operation, no matter how formal such monitoring may be. Ranch management focuses on decision-making metrics around animal management and planning, but these specific indicators quickly link to outcome categories like economic viability and animal health, and are impacted by some of the same contextual barriers, like land access, that limit monitoring more generally:

*“Your integrity has to be there, and you have to be someone that people can trust, as far as lease opportunities for us. That’s what’s keeping us afloat, is being able to lease other people’s places. I mean, we have to have outside grass to make our ranch viable. It just is not. But then along with that too, it’s like we need to find leases that are a decent price, that we’re not paying to truck cows across the state. I mean, we’re only one person, at the end of the day. We only have so much manpower to do it. We don’t have a hired hand to go say, ‘Oh, we need to go check water.’ It’s us and our five kids need to pack up and go to the mountains or go wherever to make it work. So, I think that’s huge. Trying to get in locally is tough because we just moved here, but if we could find a local lease, that would help us immensely.”*

The evidence in this study shows that people are monitoring for the purpose of compliance in two cases. First, if a rancher or a farmer is engaged or enrolled as a part of an agency that either comes to their land to do monitoring or requires them to collect certain data in order to be a part of that program. However, this can sometimes be met with distrust that the data will be used in a meaningful way:

*“Outside of my management, the purpose for reporting information is important. Too much information is gathered without agencies utilizing the information in a constructive way.”*

The second reason is that when leasing land from a landowner, ranchers often try to show the landowner and the community that they will add ecological benefits (or at least not harm) to the land by using it for grazing or planting crops. New technologies like virtual fencing offer the ability to be in compliance with many different demands placed on a rancher, though they are a large up-front investment:

*“[Virtual fencing] is wildlife-friendly fencing, and it plays a lot in fire mitigation and in a lot of different avenues, and now in the carbon market. We’re kind of touching in on that to be able to run cattle where we used to couldn’t run cattle. I have a lot of problems in our area of people not keeping their fences up, so your cattle get where they’re not supposed to be, and you spend all time getting them back. [Virtual fencing] helped that. It’s also helped where I can successfully graze people that don’t have a fence but want their ag status, so I can graze them and not get in their yard, that kind of thing. That’s improved the way we look in our community.”*

The other driving reason to monitor for many ranchers is to support storytelling that leads to market opportunities. Making a profit (whether that is about net income, consumer feedback and relationships branding, market trend research, market opportunities, or pricing) is all about the outward facing components that make up farming and ranching, especially communicating and storytelling:

*“One of the biggest indicators, and we’ve kind of talked about this a little bit, that I think needs to be added is relationships. I mean, we’re all in the relationship business in so many ways... I mean, it drives me crazy when I get on Facebook and everybody’s saying thank a farmer. Well, I want to thank a consumer. If you’re not buying a product from me, then I’m not able to do this... I mean, I’m thankful for the people that are eating the hamburgers and the steaks out there. They’re putting money in my pocket so I can support my family. In all honesty, I don’t mean to be very direct here, but I am, I don’t get up in the morning to feed the world. I get up to feed my family. Thankfully we have an avenue to do that.”*

Storytelling can also be represented through the social interactions one has at the local bar or coffee shop. The conversations that are not formally about monitoring, but where one producer starts talking about a new program they are involved in, or a type of practice they are trying out and how it is going. The results we gathered do not point to doing a significant percentage of monitoring for the purpose of storytelling, but it happens to be a by-product of being part of a community. Making a profit is about being able to communicate and market the operation to sustain the business: *“You have to tell the story that good stewardship almost always results in long-term economic viability.”* This is where storytelling aids in the motivation and encouragement of monitoring and can help producers to manage in order to create lasting economic sustainability:

*“It’s important to tell the story of how adaptive (regenerative) management actually saves time and labor so we can move the needle away from soil destructive practices and toward more healthy food and food systems.”*

## Key takeaways

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**Many ranchers are monitoring many indicators, and motivations for monitoring are related to ranch management decision-making and long-term outcomes.** According to ranchers in this study, monitoring is first and foremost about making useful ranch management decisions. However, at the same time, this study emphasizes the alignment in outcomes across ranch practices that reflect diverse management goals. The ranchers featured in this study are not just invested or interested in monitoring for maximizing productivity; they also view ranch operations holistically. For example, animal conditioning reflects positive outcomes in forage quality, which in turn relates to and reflects improvements in soil health and local biodiversity.

**There are clear opportunities for technical assistance and education around soil health and specific soil properties.** Soil properties are monitored by only a portion of this study's participants, the value of soil health more generally is a major theme across responses. Participants emphasized importance of soil measures to ranch management, the links between soil health and ecological integrity (e.g., lack of erosion) and biodiversity), and as part of broader sustainability goals related to climate change (i.e., carbon storage). This study highlights lower rates of monitoring soil health for women and younger ranchers and opportunities to build capacity for individuals who might have fewer financial resources and less time to devote to monitoring soil health.

**Relevance of indicators is a consistent barrier identified across indicators by those who don't monitor; time and capacity are barriers to monitoring specific indicators.** The most consistent barrier to monitoring for ranchers who currently don't monitor is relevance. This reality underscores the need for clear articulation between monitoring, management, and desired outcomes for individual producers, as well as for other rangeland stakeholders (private industry, etc.) interested in incentivizing ranch or landscape goals.

**Farmers and ranchers benefit from simple monitoring tools and support systems.** This study has revealed important and fine-grained details about the materials used for monitoring. According to study results, producers use relatively simple tools: pen and paper, photos, maps, spreadsheets. This finding underscores how for many ranchers, monitoring is less about adopting a new set of tools or technologies and more about making observations and tracking change through their routine management tasks and experience on the landscape.

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## Endnotes

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1 Jones, M.O., et al. (2020). Beyond inventories: Emergence of a new era in rangeland monitoring. *Rangeland Ecology & Management*, 73(5), 577-583. DOI: 10.1016/j.rama.2020.06.009 and Wilmer, H., Schulz, T., Fernández-Giménez, M.E., Derner, J.D., Porensky, L.M., Augustine, D.J., Ritten, J., Dwyer, A., and Meade, R. (2022). Social learning lessons from Collaborative Adaptive Rangeland Management. *Rangelands*, 44(5), 316-326. DOI: 10.1016/j.rala.2021.02.002.F

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## Acknowledgements

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