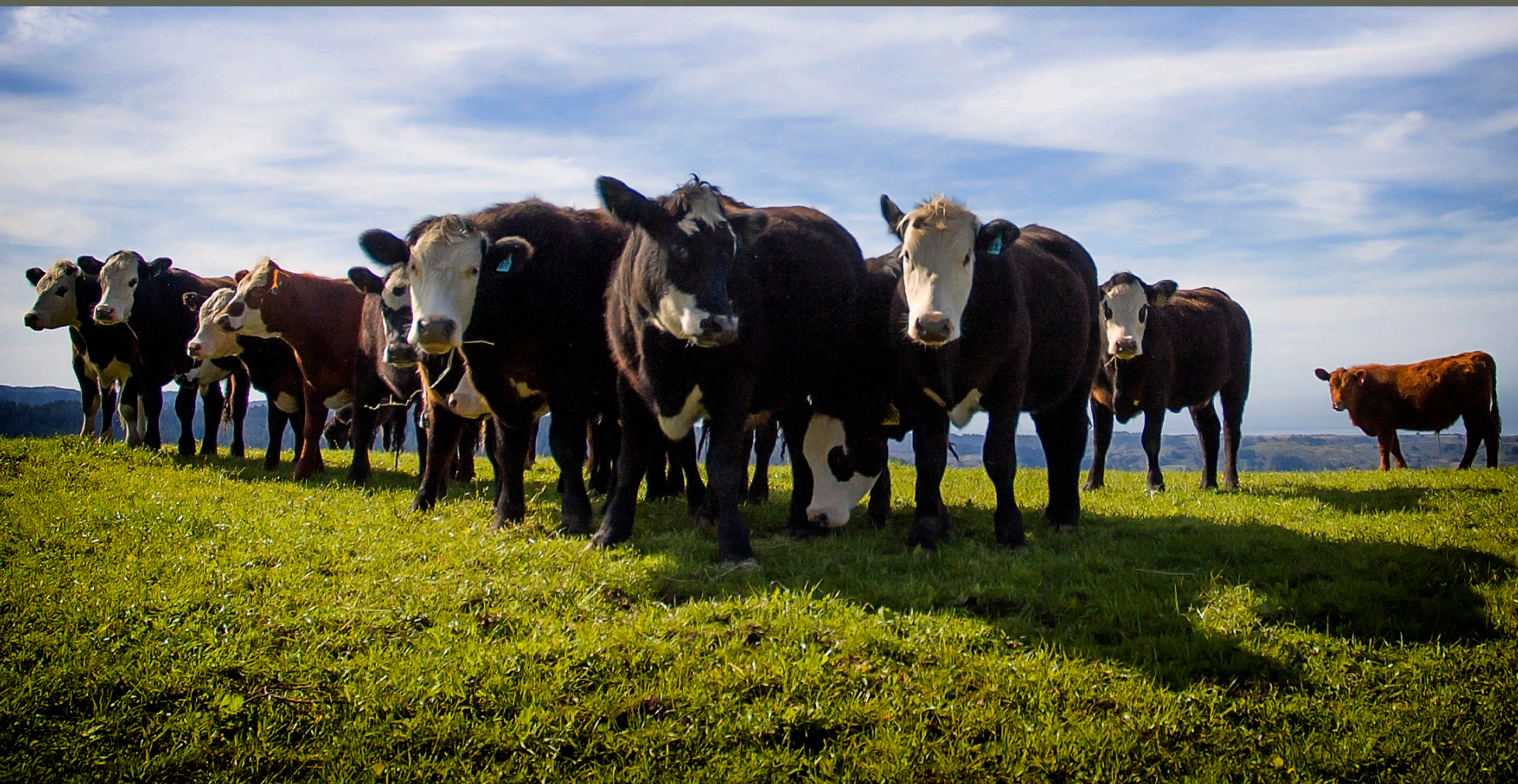


Growing Abundant Rangelands

AN INTRODUCTION TO REGENERATIVE RANCHING



TomKat Ranch
Educational Foundation



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Well-managed rangelands provide benefits for everyone

Introduction

Ranchers and conservationists care about the land. Many in these professions want the same things and work hard to grow productive, diverse, and resilient rangelands that provide habitat for wildlife, food for livestock, a carbon sink for the atmosphere, and economic well-being for rural families and communities.

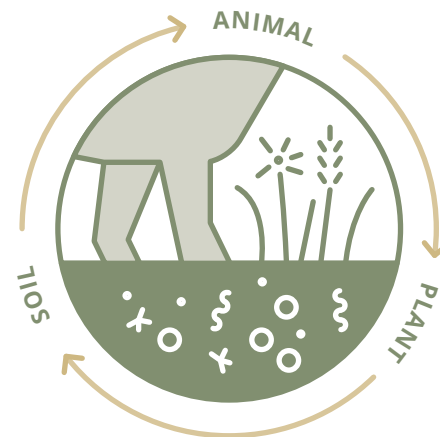
However, conflicts between ranchers and conservationists are not uncommon and are often driven by the notion that land should be devoted to either production or conservation. However, as ranching practices and conservation science evolve, it is clearer than ever that healthy rangelands and healthy livestock can be mutually beneficial.

Thoughtful livestock management can provide the disturbance and nutrient cycling that helps to maintain rangeland diversity and productivity. Many rangelands grew to be diverse, productive, and resilient as communities of plants harvested energy from the sun and carbon from the atmosphere to grow great quantities of forage that nourished the soil microbiology and fed herbivores that pruned and fertilized those grasses.

Similarly, conservation efforts that increase the biodiversity and resiliency of the land can be a significant help for ranching operations. Healthy communities of native and perennial grasses can extend the forage growing season and help ranchers weather

droughts, vibrant populations of birds can help mitigate fly and pest problems, and healthy riparian vegetation can help prevent flooding and improve stream health.

This guide seeks to provide a helpful introduction to those interested in incorporating lessons from modern rangeland science and livestock management into a productive, resilient, and profitable regenerative ranching practice.

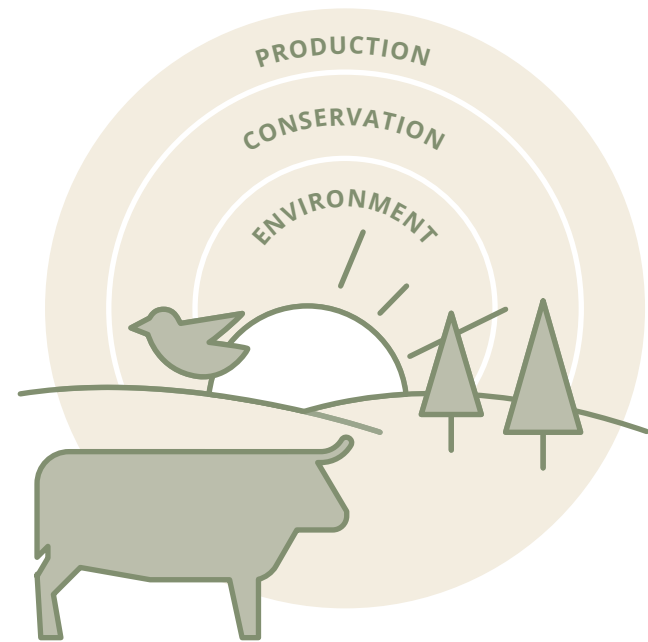


Co-Benefits of Regenerative Ranching

Regeneratively managed rangelands provide significant benefits for producers, conservationists, and the local and global community.

Potential Benefits for Land, Conservation, and Production

- Increase Atmospheric Carbon Sequestration
- Increase Forage Production
- Increase Plant and Animal Diversity
- Decrease Soil Compaction
- Increase Forage Quality and Diversity
- Increase Soil Microbiome Health
- Increase Water Infiltration
- Support Livestock Health
- Decrease Invasive Plants
- Increase Soil Water Holding Capacity
- Increase Drought Resilience
- Support Wild Pollinators and Beneficial Insects
- Improve Watershed Water Quality and Reduce Nutrient Runoff
- Decrease Risk of Flooding
- Increase Biodiversity
- Reduce Dependency on Chemical Fertilizers, Pesticides, and Herbicides
- Decrease Predation Risk
- Lower Risk of Land Development



Tools

The basic tools of regenerative ranching are four inter-related elements: *density*, *timing*, *duration*, and *location*. These tools tailor livestock impact (in the form of herbivory, fertilization, and hoof impact) to achieve specific management goals.

Animal Density refers to the relationship between the size of the herd and the acres being grazed. Density affects the intensity of the animals' hoof and grazing impacts, how the animals behave and what they are willing to eat.

Timing refers simply to when, and if, grazing occurs. Timing of grazing is a critical tool for adapting to seasonal changes on the land and giving plants optimal time for recovery after they have been grazed.

Duration refers to how long animals are grazed in an area.

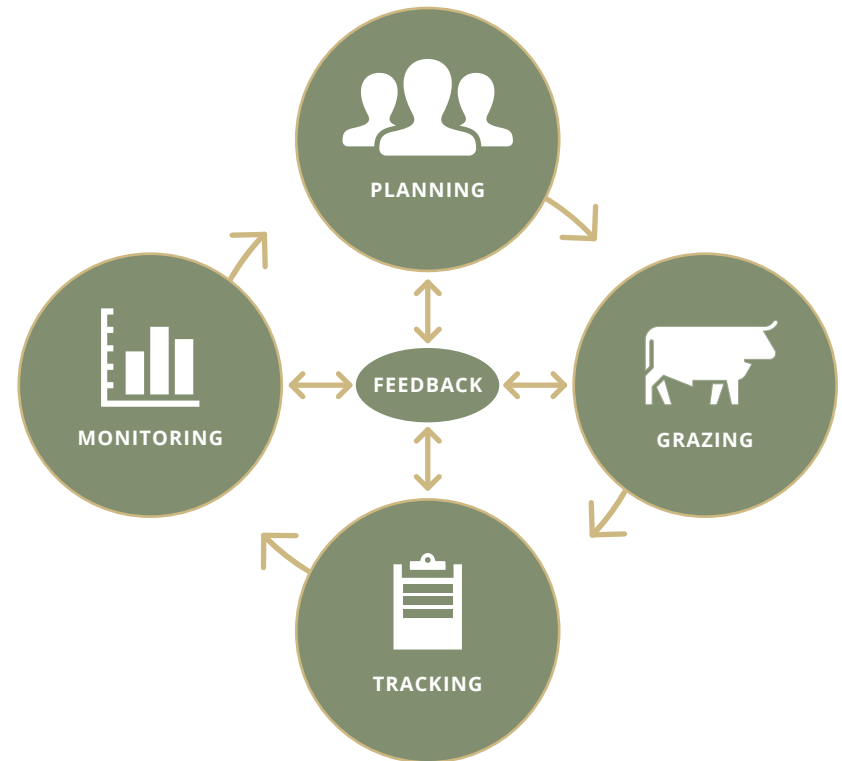
Location refers to the geographic area that is grazed. It is important to note here that location should be as specific as possible because within a field there can be a lot of variation in soil, vegetation, and wildlife characteristics.

Additional tools to help you reach your Regenerative Ranching goals may include:

- Livestock Species (cattle, goats, sheep, pigs, poultry, etc.)
- Ranch Infrastructure (water, fencing, roads, etc.)
- Agricultural Infrastructure (livestock auction yards, equipment vendors, feed mills, etc.)
- Informational Resources (Natural Resources Conservation Service, Resource Conservation Districts, Agricultural Extension Offices, etc.)
- Community (local knowledge, emergency support, etc.)
- Operational Flexibility (off-site properties to move livestock to, livestock transportation infrastructure, resilient business plans and financing options, etc.)
- Adaptation Resources (planning, monitoring, evaluation, etc.)

Process

The foundational process for developing a regenerative ranching program is creating an on-going cycle of defining clear goals, tracking outcomes of management choices, and adapting management to suit realities on the ground. Acknowledging and responding to feedback from the land, animals, business, community, stake-holders, etc. is critical for growing abundant rangelands and resilient operations. Feedback is paying attention through careful observation and systematic monitoring to see which strategies are and are not helping you achieve your goals



Reliable feedback is crucial for developing economic, ecological and social resiliency



Focus on the results you want to achieve, not those you want to avoid

Planning

Regenerative ranching is a process that begins with thoughtful planning driven by your full range of short- and long-term goals. Below are some suggestions for getting started.

1 BRING THE RIGHT PEOPLE TO THE TABLE

When developing effective management plans, it is critical and beneficial to have the goals and concerns of all stakeholders represented in order to accurately define the goals of the management program. At a basic level, involving both land managers and landowners is essential, but the process could also include neighbors, community organizations, customers, and local conservation, farm, or relevant interests.

Creating opportunities to learn from others is important in developing a local knowledge base around conservation priorities, grazing practices, and economic viability.

2 SPEAK THE SAME LANGUAGE

During the planning process, it is possible that differences in the cultural backgrounds, educations, and histories of stakeholders may

create communications challenges. For instance, some see over-grazing as a reference to the duration or timing of a grazing event, others to the density of the grazing, and still others to the condition of an individual plant. Similarly, some may judge goals around bare soil by the amount of residual dry matter (RDM) left standing, while others will be looking to trample all standing dry matter into a protective mulch, thereby reducing bare soil but also RDM at the same time! Whenever possible, assume that parties have compatible goals and spend time establishing common vocabulary so you can effectively discuss goals and management actions.

3 CLEARLY DEFINE GOALS

Livestock grazing is a tool and any plan to use that tool requires a clear understanding of the goals you want to accomplish. Taking the time to create clear management goals that are achievable, measurable, understandable, and bound by consensus is critical. Examples of grazing goals can include:

Planning

- **Goal: Support Soil and Water Health.** Graze livestock in drier highland fields during wet seasons to minimize soil compaction and risks for nutrient runoff.
- **Goal: Support Wildlife and Biological Diversity.** Avoid grazing fields with grassland nesting birds during the nesting season.
- **Goal: Maximize Weight Gain for Cattle Before Sale.** Graze fields with the most nutritious forage in the weeks before animals go to market.
- **Goal: Maintain Good Relationships with Neighbors.** Place breeding bulls in fields with strong fences to reduce the risk of them breaking into the neighbors' fields.
- **Goal: Staff Quality of Life.** Ensure that livestock are in fields where they can be easily managed by a reduced or temporary staff during staff holidays.

4

WRITE A PLAN

When writing a grazing plan, it is important to focus on the results you want to achieve, not just those you want to avoid. Working with all the decision makers for the land and livestock's management, use a calendar or a grazing chart to record the plan for the coming season (or at the most the coming year). Remember that sometimes

it's easier to work backwards by eliminating all the times and places that may not be appropriate for grazing given your goals. Make sure the final plan states the goals of the grazing program as well as the density (total animal units & size of their specific grazing area), duration, timing, and location of every grazing activity.

5

SCHEDULE FOLLOW-UPS TO CHECK-IN

To help facilitate good communication and avoid conflict, set up regular follow-ups with key decision makers and stakeholders to review the progress of the grazing plan and the effectiveness of your strategies. In general, monthly or quarterly check-ins are recommended especially for operations with complex goals or collaboration structures.

Taking the time to create clear goals that are measurable, understandable, and bound by consensus is critical.



Rangelands must be managed as a whole system

Regenerative Ranching Practices

Grazing priorities and strategies will vary by season and by location. While the condition of grass and soil are often closely related to specific seasons, unforeseen changes in climate, land health, and vegetation are all possible, and it is important to adapt your strategies more to the land and livestock than to the calendar.

GREEN GROWING GRASS | SOGGY SOIL

- Primary Goal: Minimize the impact of livestock on wet, easy to compact soil.
- Low or no grazing density.
- Long recovery periods (60–100 days) for heavily impacted areas.



GREEN GROWING GRASS | FIRM SOIL

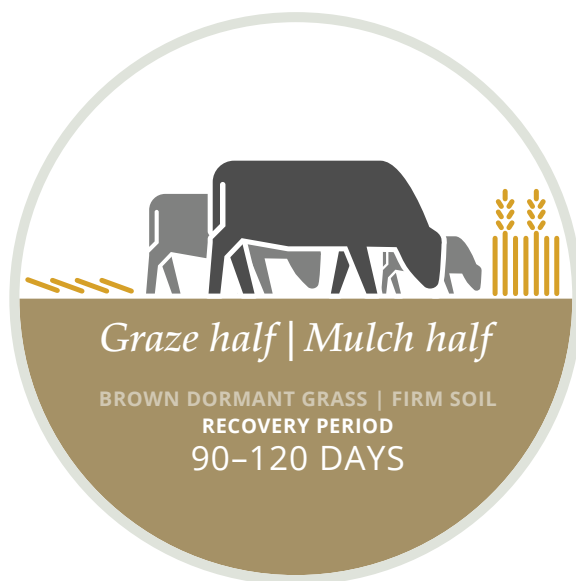
- Primary Goal: Maximize biomass growth: keep plants growing quickly for as long as possible.
- "Graze half / Leave half" to keep plants growing at peak efficiency.
- Short recovery periods (21–45 days) for fast growing areas.



Regenerative Grazing Practices

BROWN DORMANT GRASS | FIRM SOIL

- Primary Goal: Maximize future biomass growth: prepare for rain by protecting the soil with biomass and clearing old growth out of the way to make way for new growth.
- “Graze half/ Mulch half” strategy to trample standing residual dry matter onto the soil’s surface and minimize bare ground.
- Long recovery periods (90–120 days) for well-grazed areas to avoid creating bare ground or over-impacting perennial grasses.



BROWN DORMANT GRASS | SOGGY SOIL

- Primary Goal: Minimize the impact of livestock on wet, easy to compact soil.
- Low or no grazing density in areas that have already been trampled by livestock.
- Long recovery periods (90–120 days) for areas that have already been mulched to avoid creating bare ground or over-impacting perennial grasses.



Monitoring

Feedback is a critical component of effective adaptation, and therefore anyone looking to grow abundant rangelands should remember the adage “you can’t manage what you don’t measure.” Monitoring and evaluation are important tools for regenerative ranching because they help provide reliable and actionable feedback that helps managers see if they are accomplishing their goals.

Above all your monitoring program should help you measure and achieve the unique goals of your operation and its stakeholders. More data is not always better and managers can get tired of collecting data if it is time-consuming and expensive or if it doesn’t provide effective feedback. As such, it is worthwhile to remember that a few well-collected and consistent measurements can be FAR more valuable than an unorganized ranch-wide audit of measures that don’t suit your goals.

While the best metrics and monitoring methods will vary with the goals of the regenerative ranching program, below is a list of metrics that very often are valuable to land managers looking to grow abundant rangelands:

SIMPLE AND INEXPENSIVE

Bare Ground

Exposed soil at any time of year is at risk of erosion and will hold less water to support growing plants and soil life. This metric can be cheaply gathered by a land manager using ocular estimation, photographs, or step point transects. Bare ground can also be passively tracked across the entire landscape using aerial or satellite imagery.

Net Primary Production/NDVI

Net primary production refers to the total biomass grown in a given area. This is often measured through clipping and weighing plant matter or passively through aerial/satellite imaging calculating the NDVI (Normalized Difference Vegetation Index), which can estimate the amount of green growing plant matter on the ground. This measure can be very helpful for land and livestock managers who are interested in the effect of their management of forage productivity.

Monitoring

Total Annual Livestock Weight Gain per Acre per Inch of Rain

Tracking livestock productivity can be an important tool for achieving economic goals, but it can also be very helpful to measuring the ecological efficiency of an operation. Expanding that measure to look at the total pounds of livestock weight gained per acre per inch of rain (total weight gain/total grazing acres/inches of rain) gives an indication if management choices are making the land and livestock more efficient and resilient across both wet and dry years.

INVOLVED AND POTENTIALLY INEXPENSIVE

Biodiversity of Flora and Fauna

Tracking the biodiversity of plants and animals in your fields can provide meaningful insights into the effectiveness of your grazing program. While net primary production/NDVI and % bare ground are excellent indicators of total biomass production, they cannot tell you if you are growing the plants that will help you accomplish your goals. Seasonal blooms of net primary production/NDVI from fields dominated by annual grasses may be less desirable to your operation than more sustained and year-round biomass production by perennial species. Tracking biodiversity can be done by land managers or trained

specialists using ocular estimation to identify and track vegetation and wildlife species at specific sites at the same time each year.

Soil Water Infiltration

Soil water infiltration is a simple and inexpensive way to measure and track soil compaction, structure, and function. When measured with the ring infiltrometer method, all that is required is recording the amount of time it takes for a given area of soil to absorb a quantity of water. In addition to being very easy to gather by land managers, this measure also has the benefit of being correlated to soil bulk density and soil carbon and therefore is a great option if you can only track one measure of soil health.

INVOLVED AND EXPENSIVE

Soil Bulk Density

Soil bulk density is a way to quantify soil compaction. Looser, loamier soils with thriving plant and micro-biological life will tend to be less dense than those that are bare and have less life in them. Over time, tracking this measure will show if management has been improving soil structure or leading to greater compaction. To measure soil bulk density, land managers must collect soil samples from representative sites and send them to a soil laboratory for professional testing.

Monitoring

Soil Carbon

Tracking changes in soil carbon can be an illuminating way to see if management choices have been helping to increase the ability of the land to better utilize rain and solar energy to grow forage. Soil carbon can be an expensive metric to track because soil samples must be carefully collected and sent to a professional laboratory, but it is closely tied to the soil's water holding capacity, and sustained increases in soil carbon are an excellent indication of overall rangeland health. Be aware, tracking changes in soil carbon can be difficult because there is considerable variation in soil carbon rates even within a small part of a field. As such, if you are interested in tracking the effect of management on soil carbon storage, it is critical to develop a testing protocol that will provide an accurate picture of soil carbon change in a given area.

IN CONCLUSION

It is important to note that with monitoring programs, there may be diminishing returns as programs become more complex. Operations with limited resources should not be dissuaded from starting a monitoring program as there is often a great deal of explanatory power in simple and inexpensive variables (e.g. % Bare Ground, NPP/NDVI, and Total Annual Livestock Weight Gain per Acre per Inch of Rain) that are tracked consistently and carefully over time. For more information on these metrics, please see the Additional Resources section.

Ultimately, as with grazing practices, monitoring practices should be created to suit the goals and resources of the stakeholders involved and should be evaluated each year to see if they are providing useful and actionable feedback.

Additional resources

WEBSITES

Point Blue Conservation Science, Rangeland Monitoring Network Handbook:

<http://www.pointblue.org/our-science-and-services/conservation-science/working-lands/rangeland-monitoring-network/>

Soil Carbon Coalition, Measuring Soil Carbon Change:

<http://soilcarboncoalition.org/files/MeasuringSoilCarbonChange.pdf>

NASA, Landsat Imagery:

<http://landsat.gsfc.nasa.gov/>

BOOKS

Holistic Management Handbook: Healthy Land, Healthy Profits

by Allan Savory, Jody Butterfield, and Sam Bingham,
Island Press 2006.

Grass-Fed Cattle by Julius Rachel, Storey Publishing 2006.

The Art and Science of Grazing: How Grass Farmers Can Create Sustainable Systems for Healthy Animals and Farm Ecosystems

by Sarah Flack, Chelsea Green Publishing 2016.

ORGANIZATIONS

Savory Institute

Holistic Management International

Ranch Management Consultants- Ranching for Profit School

Point Blue Conservation Science

Quivira Coalition



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*Providing healthy food on working lands in a way
that sustains the planet and inspires others to action*


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