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Riparian-friendly grazing project

SUMMARY

The project team, working with California's range livestock industry, surveyed 300 rangeland riparian sites. Using survey results the team developed:

1. A simple method to assess riparian health
2. Recommendations on grazing management that can improve riparian health
3. Consistent guidelines to monitor changes in rangeland riparian health
4. Demonstration sites that illustrate these results

The tools will help managers conduct, monitor and document riparian-friendly grazing. The project illustrates how combining producer knowledge of land and management with researchers' technical skills can solve a problem.

INTRODUCTION

Livestock grazing on rangeland riparian areas can affect vegetation, stream channel stability, hydrology, water quality and habitat. Responsible grazing managers will want to know 1) if their grazing management is degrading riparian health, 2) if it is, what grazing management tools can resolve the problem and 3) whether grazing management changes improve riparian health. A literature search showed extensive publications but few examinations of proper grazing management in functioning riparian areas. The literature clearly shows that improper grazing degrades riparian function, but it contains no toolbox of tested proper grazing recommendations or methods of assessment.

OBJECTIVES/PERFORMANCE TARGETS

The overall project objective was to conduct applied research and extension to provide managers with tools to conduct, assess, monitor and document riparian-friendly grazing management. Specific objectives are:

1. Collect and analyze data on health, type and grazing management at each of 300 riparian sites enrolled in the project, looking at relationships, both positive and negative, between grazing management and riparian health; analysis of this data, along with relevant literature, will serve as the scientific base for achieving Objectives 2, 3 and 4
2. Develop *Riparian Health Assessment Methods for Rangelands*, the first step a manager must take to assess riparian health
3. Develop *Riparian Grazing Management Recommendations to Improve Riparian Resources* that a manager can employ once a riparian grazing problem has been identified
4. Develop *Guidelines for Establishing and Monitoring Riparian Grazing Case Studies*, providing managers with a framework to monitor health over time following changes in management
5. Establish 20 demonstration sites across California that represent the state's major range types to serve as classrooms to show how products from Objectives 2, 3 and 4 can be applied

METHODS AND MATERIALS

Objective 1. Survey of Grazed Rangeland Sites

The project team surveyed 300 rangeland stream-dependent riparian areas in range, foothill and mountain locations throughout California. Areas selected represent a cross-section of California riparian vegetation communities. Three visual riparian health assessments were conducted at each site:

1. The U.S. Environmental Protection Agency's *Habitat Assessment Field Data Sheet*, developed to provide visual assessment of in-stream habitat type and quality for interpreting macro-invertebrate data collected during rapid bio-assessments. Ten questions target abundance and quality of a specific habitat feature ranked from 1 (poor) to 20 (excellent).
2. The Natural Resource Conservation Service's *Stream Visual Assessment*, developed to use with landowners and focusing on physical parameters of stream health relative to in-stream habitat. Fifteen questions target habitat-related features on a score of 1 (poor) to 10 (excellent).
3. The Bureau of Land Management's *Proper Functioning Condition* visual assessment, designed to evaluate stream hydrologic function. Seventeen questions assess hydrology, vegetation and erosion/deposition, providing outcomes of "functional," "functioning at risk" and "nonfunctional."

A questionnaire with 130 questions surveyed general information, current management, historic management and current monitoring practices. It was conducted with the manager during a site visit or by phone.

Objective 2. Riparian Health Assessment Methods for Rangelands

Instead of developing a new method for assessing rangeland health, the project team sought to refine the existing riparian health assessment methods, using correlation analysis to evaluate the overlap and dissimilarity in information gathered across a subset of stream reaches.

Objective 3. Recommendations to Improve Riparian Resources

At the time this report was being submitted, an extension publication synthesizing the results of the analysis for use by land managers had been drafted and was being peer-reviewed before being posted on the Web. In addition, the results were being prepared for the scientific community in a peer-reviewed journal article.

Objective 4. Guidelines for Establishing and Monitoring Riparian Grazing Case Studies

The project team synthesized riparian monitoring recommendations based on project data analysis and input from grazing managers and natural resources agency staff. The team field tested the recommendations during demonstration site setup, and the results will be published as a free Web-based product.

Objective 5. Establish 20 Demonstration Sites

The sites were selected from among the 300 surveyed and represent major range types, landowner cooperation and long-term commitment to the site. Guidelines for establishing and monitoring grazing were employed at each site to develop baseline data. Additional data collected include photos, stream channel morphology, habitat type and quality, vegetation, water quality and macro-invertebrate communities.

RESULTS AND DISCUSSION/MILESTONES

Objective 1. Survey of Grazed Rangeland Sites

From the completed survey at 300 riparian sites, the gathered data have allowed the project team to evaluate relationships between riparian health and grazing management. Because the data were collected from managed systems on a scale at which management decisions are made and riparian areas function, the team has taken a valuable snapshot of how these complex systems work. The data collection lends itself to future analysis of the costs of incremental improvements based on the management options selected, such as herding, drift fencing and developing off-site water. The cross-sectional approach to studying the relationship between management and ecosystem response offers a credible approach to understanding sustainable management at the landscape scale. And, most importantly, the research approach brings producers into research projects, applying their knowledge of livestock management to the problem and building partnerships for future research.

Objective 2. Riparian Health Assessment for Rangelands

The project team applied the three visual assessments used by three federal agencies (listed above) to determine 1) how well the assessments correlate and 2) how site-specific stream and riparian characteristics affect the outcome of each assessment. Based on this analysis, the team distilled the 52 assessment questions found in the three techniques down to 10 questions, which essentially provide the same amount of information. The visual assessment method developed is a straightforward, simple, cost-effective procedure rangeland managers can use to make a rapid "first-cut" evaluation of riparian health. If a problem is indicated,

then more detailed analysis can be conducted to relate problems to practices with the goal of correcting the problem and monitoring progress.

Objective 3. Riparian Grazing Recommendations to Improve Riparian Resources

The survey provided information on relationships between grazing practices and riparian health, showing that many simple, practical management practices can have a positive impact on riparian health. Collectively and depending on the ranching operation, these practices have been found to impact riparian health:

1. Reduce stocking density. Holding all other grazing management factors constant, as stock density increased, riparian health decreased. Reducing the stock density combined with changing frequency and rest between grazing can lessen the impacts of livestock grazing.
2. Reduce frequency of grazing. As the frequency of grazing increases, riparian health decreases. A significant interaction exists between the frequency of grazing and stock density. Heavier stock densities combined with little rotation of livestock degrades riparian health more than light stock densities with little rotation of livestock.
3. Increase rest between grazing. As rest between grazing increases, riparian health increases. Providing rest and allowing the vegetation an opportunity to maintain its very fine roots will maintain stream bank stability in relation to both compressive strength and root length density.
4. Increase efforts to herd livestock from riparian areas. Increased time spent herding to improve distribution and reduce time spent in the riparian area was associated with an increase in riparian health. Herding can be used to introduce livestock to underused areas and reduce concentrations in preferred areas – often riparian areas.
5. Increase the development and maintenance of off-site livestock attractants. Increasing the amount of time a livestock manager spends providing livestock with offsite attractants – water, feed, salt, minerals or supplements like protein – increases riparian health. The distance to water, for example, often determines grazing range, so if the only water source is the stream, livestock are likely to congregate there.

Objective 4. Guidelines for Establishing and Monitoring Riparian Grazing Case Studies

The monitoring document outlines methods that will assess current riparian condition and quantify changes under new management. It basically answers several questions:

Why should I monitor? In establishing a new riparian grazing system, a manager would like to compare the success of the new system with the old. The guidelines provide an outline for monitoring based upon published methods that will provide feedback regarding changes in riparian management.

Should I monitor the same things as my neighbor? If each manager implementing changes selects different monitoring tools, he or she will not be able to compare changes in riparian health between systems. By monitoring the same items at all sites, managers can share the information gathered.

How soon will I see results? Some changes in riparian health can be observed in a few months to a year, depending on the status of the area when changes are implemented. Others will be observed over the long term, two years or more. For example, within a year willow growth may increase but the canopy may not change for many years. Standardizing data collected when riparian grazing is modified allows for comparisons among systems and assessments of which practices work and which don't, providing land managers with one of their best learning opportunities.

“Therefore,” says the project team in its final report, “it is important that time and care is taken when the original data are gathered. Without adequate data collection at the beginning of a project, the following years of information will be of little importance.”

Objective 5. Establish 20 Demonstration Sites

Each of the 20 sites represents one or more of the positive grazing management recommendations under Objective 3. The health at each site was assessed with the Health Assessment Method for Rangelands, and baseline data were collected following the Guidelines for Establishing and Monitoring Riparian Grazing Case Studies. The information has been compiled and is being made available to local extension educators and technical support staff for use in Ranch Water Quality Planning Short Courses, field days and other outreach venues.

IMPACT OF THE RESULTS/OUTCOMES

Results from this project are expected to increase producer knowledge about the effects of grazing practices on riparian areas and why riparian health is important. This will enable riparian managers to make sustainable management decisions that will improve the health and function of Western rangeland riparian areas. Because the project spans the major ranch types found in California, which has around 40 million acres of rangeland, and in much of the West, the results may well be applied West wide. They can also be applied with other agricultural commodities, such as row crops and dairies.

In addition to their impacts on rangeland managers, the project team reached professionals in natural resource protection. For example, the American Fisheries Association invited members to sit on a panel of national riparian management experts and to present the SARE-funded study at the association's national conference in Phoenix. This provided an opportunity to build relationships with fisheries experts and to show how proactive riparian management can lead to improved riparian health.

ECONOMIC ANALYSIS

The project team is providing economically feasible and tested grazing management options to ranch families in the West that will allow them to continue grazing livestock on grazing areas. The statistical analysis of grazing impacts on riparian areas lends itself to economic analysis. If ranchers can place a value on things like their time, the cost of resting a pasture for x days and the cost of x days of livestock herding, then they can compute the cost of each unit increase in riparian health. The costs will be site specific and depend on the grazing tools implemented and the individual operation's costs.

In addition to the potential for improved economics for the ranch, improved riparian health will yield tangible economic benefits in the form of enhanced fisheries, wildlife and other ecosystem services, many of which can be marketed in the form of fishing, hunting and environmental tourism.

PUBLICATIONS AND OUTREACH

Results are being disseminated to producers, industry groups, state and federal regulatory and land management agencies, researchers and other interested parties through a University of California Cooperative Extension/Natural Resources Conservation Service Ranch Water Quality Planning Short Course, continuing education venues for professionals and peer-reviewed journal articles.

FARMER ADOPTION

"Producer support for this project has been massive," says the final report. "Given the conflict that exists over riparian grazing, the fact that so many producers have been willing to participate illustrates the importance this information has to the livestock industry."

The collaborative nature of the project, funded initially by the California Cattlemen's Association and the California Farm Bureau and using producer knowledge and researcher technical and statistical tools, underscores both its credibility and mutual respect among participants. The grazing management practices recommended from the project are finding their way back to ranchers via field days, short courses, technical agency support staff, industry association and demonstrations. Given the multiple outreach venues, rancher adoption of the results is expected to be high.

AREAS NEEDING MORE STUDY

The project team says to assure maximum credibility it needs to reconfirm the results of the project (especially those of Objective 3) using direct physical measures of riparian stream health and additional analysis. The team also suggests the need for a simple, site-specific protocol grazing managers can use to achieve riparian health targets.

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