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MONITORING GRAZING LANDS: HOW, WHY, WHEN, WHAT?

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INTRODUCTION

Monitoring is the orderly collection, analysis and interpretation of information and data used to make short- and long-term management decisions (Wyoming Range Service Team 2001). Therefore, monitoring is an evaluation process used by animal and natural resource managers to help determine how rangeland or pasture systems respond to management (Holechek et al. 2004). The identification of monitoring as a process is crucial and suggests a number of important considerations. Monitoring has multiple components. This process includes not just collection, but also analysis and interpretation of information and data. Simply collecting information and data (for example taking lots of pictures) does not necessarily meet the definition of monitoring. The information and data collected as part of a monitoring effort must be put to use. The primary use of monitoring data and information is to support management decisions, and this requires analysis and interpretation of the information and data relative to management objectives, inputs and decisions. Analysis and interpretation are difficult or perhaps impossible in the absence of management objectives. Objectives facilitate evaluation by defining success. Natural resource objectives on grazing lands might describe the desired characteristics of vegetation, soil or water resources. Livestock or wildlife production objectives are often included in monitoring efforts as well. Finally, because monitoring is an ongoing process, organization and repeatability are important. Conducting monitoring efforts in an orderly manner ensures organization and repeatability. Evaluation of management decisions and actions relative to objectives depends on the ability to establish some relationship between management choices and responses observed on the land. The lack of organization and repeatability will likely lead to erroneous conclusions regarding the adequacy of management choices because differences (or lack there of) might be a result of different methods, timing or location of data / information collection.

Monitoring is a tool that must be used properly. Tools have utility for particular tasks but may be useless if they don't fit the application. When a piece of machinery breaks down, it is rarely productive to grab a 5/8" end wrench and start looking for something to tighten or loosen with it. It is much more effective to troubleshoot the problem, identify what needs to be done and then find the appropriate tool. Monitoring is very similar, so before addressing the what, when and how of monitoring grazing lands, it is important to establish why one would implement a monitoring program.

WHY MONITOR GRAZING LANDS?

Monitoring of grazing lands is best suited to answer questions related to the effectiveness of management decisions. In doing so, the manner in which the questions are asked has important implications to those who are monitoring or anyone else who might be interested in the information provided by the process. Monitoring efforts established "to see if", "to make sure" or "to find out" are quite different from those that are established "to prove". The former suggest that managers are open to the possibility that management changes may be necessary, while the latter implies that the managers have already decided what the appropriate management actions are and need only collect the information to prove that is the case. Interestingly, this situation is not too different from science. Scientific endeavors that set out to prove a theory are often referred to as "junk science" and the researchers involved are suspected of furthering their own agenda. Similarly, managers who set out to prove the appropriateness of their management will likely collect information to support that claim, but it may or may not be accurate. More importantly, the managers that take this approach, their results and their commitment to stewardship will be viewed with suspicion and they may be suspected of furthering their own agenda.

Those involved in monitoring grazing lands have identified a number of important reasons for their involvement in the monitoring process. Some of the most commonly identified reasons included increased credibility, increased overall value of the ranching operation, the ability to maintain or increase permitted grazing use and the ability to improve management (animal numbers, when and where to move animals) (Fernandez-Gimenez 2005).

Sometimes, the reasons not to monitor grazing lands seem to outnumber the reasons to do so. A common concern is that the information collected through monitoring might reveal a problem with current management. Some even ask, "Why would I put a bullet in the gun that is pointing at me?" First of all, if there are problems of that magnitude they are probably not secrets, and it is far more important to identify potential solutions to the problem. Second, the individuals who implement monitoring programs have the opportunity to identify problems and address them before others are aware of them. In doing so, managers are solidifying their commitment to effective management and good stewardship. Other common obstacles to monitoring include the lack of time, help and knowledge of monitoring methods (Fernandez-Gimenez 2005). The lack of time is a hurdle that can only be addressed through prioritization. Monitoring is a process that does require time, but the potential benefits are great. Most individuals who have implemented monitoring programs feel that the investment of time has been well worth it. Many of these folks agree that the best time to start monitoring was 10 years ago, but believe that the second best time is right now! There are numerous sources for help initiating monitoring programs and learning about monitoring methods. Cooperative Extension educators and specialists in many states have active programs related to monitoring grazing lands. In addition, state and federal agencies and conservation districts often help organize monitoring workshops and provide information.

The best reason to monitor grazing lands is to make sure that management objectives are being met or that management decisions are resulting in progress toward meeting those objectives. Management objectives for grazing lands can take on numerous forms, but all

should describe the desired conditions for the land. Managers might wish to increase total plant cover and reduce bare ground, increase the abundance of certain desirable plants while reducing that of less desirable plants, or improve streambank stability. If the existing characteristics of the land represent the desired conditions, objectives should focus on maintaining those conditions. In order to evaluate the effectiveness of management actions relative to objectives, two basic types of information are needed. First, one needs to be able to compare existing conditions of the grazing land to those described in the objectives. Often, this can be thought of as the land's response to management inputs and the numerous other factors that affect plant growth (and other characteristics of the land). Most often, this requires information about plants and plant communities. Second, there is a need for information about the numerous factors that the system is responding to. These factors can be thought of as inputs and are often subject to change from one year to the next. Examples include the amount and timing of precipitation, growing conditions, animal numbers, timing duration and intensity of herbivory (domestic animals and wildlife) and insect outbreaks. Considered together, these two types of information provide the best opportunity for managers to evaluate the effectiveness of management relative to objectives.

THE "HOW", "WHAT", AND "WHEN"

One of the first steps that should be taken when initiating a monitoring program is to determine who should be involved. On private land, the landowner may be the only individual involved in the program. On leased private land, the landowner and lessee might both be involved. Depending on the objectives and the mix of land uses, participation by others might be desirable. On public land, monitoring efforts should begin with the permittee and the natural resource specialist from the agency responsible for managing the land. Similar to the discussion for private land, participation by others might be advantageous or necessary, but should be discussed by the permittee and the agency specialist first.

The next step is to identify objectives for the land. Again, objectives should describe the desired conditions of the land and are most useful if they include a component of time. For example, one might wish to increase the cover of perennial grasses from 20 to 40% over the next 10 years. Identification of objectives usually happens as a result of considering long term goals or a vision for an operation or a unit of land. On private land, this again comes back to the landowner, but can be supported by input or information from various natural resource specialists if such input is desired by the landowner. On public lands, objectives will be influenced by planning efforts of the land management agencies.

Once the objectives have been identified, consideration can be given to the types of information and data that need to be collected (what), when the information should be collected and where monitoring should occur. All of these decisions are influenced to some degree by the objectives. Because objectives describe the desired conditions of the land, the information and data collected must allow the manager to determine whether or not progress is being made toward meeting objectives. If the objective is to increase the cover of perennial grasses over the next 10 years, the monitoring program must include measurement of perennial grass cover.

Monitoring provides information to support both short term and long term management decisions, so monitoring programs include both short term and long term methods. Short term monitoring involves collection of information on conditions that have the potential to change from year to year. This may include growing conditions for plants (e.g. cool, wet spring, warm dry spring, early frost, late frost, precipitation), animal numbers, timing and duration of livestock grazing, estimates of annual use (utilization), and wildlife use patterns. Short term monitoring often focuses on the factors that influence the conditions of growth for plants on grazing lands. As a result, they can be considered inputs. Grazing lands respond to inputs from Mother Nature as well as inputs related to management decisions. Long term monitoring focuses on the responses of grazing lands to the variety of inputs and is sometimes referred to as trend. Plants are excellent integrators of their surroundings. Their survival or demise and patterns of their growth can provide a wealth of information about previous growing conditions and management. Therefore, characteristics of plants and plant communities are often the focus of long term monitoring. Changes in plant communities often take place over several to many years and require repeated measurements. As a result, long term monitoring data may be collected at longer time intervals (once every 2 to 10 years). Consideration of short term and long term information together provides the best opportunity to detect changes in grazing lands (responses) and to identify the effectiveness of management.

Finally, consideration must be given to the location of monitoring areas. For most types of monitoring, it is impossible to measure the entire area on which management decisions are made. As a result, smaller monitoring locations must be identified and objectives are closely linked to monitoring areas. Three common types of monitoring areas include representative areas, key areas and critical areas. Representative areas are chosen to "represent" a larger unit such that the information or data collected there would be the same as that collected if the entire area could be measured. A key area is slightly different. Key areas are selected to indicate the effectiveness of management, but the data or information collected there could differ from the surrounding area. Critical areas are areas that require special management, and the information or data collected there may only be applicable to that area and is most likely not applicable to other areas.

REFERENCES

Fernandez-Gimenez, M.E, G. Ruyle and S.J. McClaran. 2005. An evaluation of Arizona Cooperative Extension's rangeland monitoring program. Rangeland Ecology and Management 58:89-98.

Holechek, J.L., R.D. Pieer and C.H. Herbel. 2004. Range Management: Principles and practices. Prentice Hall, Upper Saddle River, N.J. 607 p.

Wyoming Range Service Team. 2001. Wyoming Rangeland Monitoring Guide. ftp://ftp-fc.sc.egov.usda.gov/WY/Range/wy_rangeland_monitoring_guide.pdf accessed 15 October 2007.3