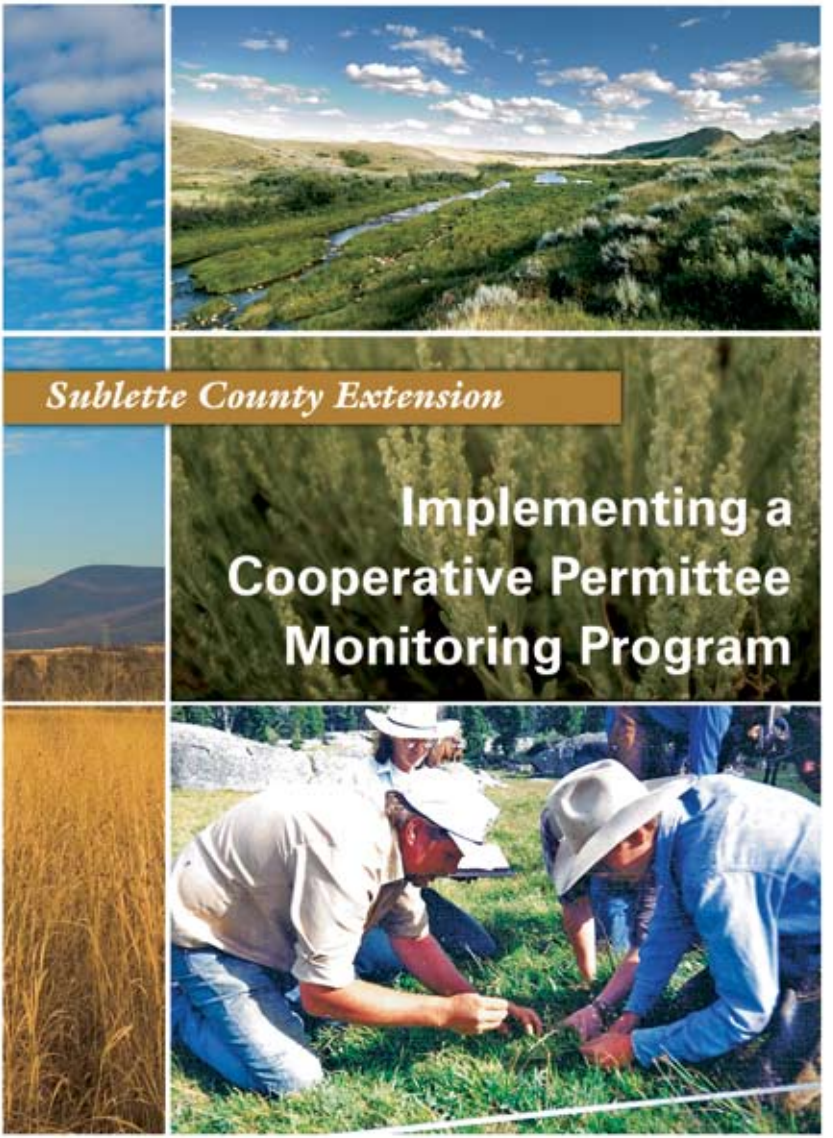

Eric Peterson, Area Natural Resource Education Specialist

University of Wyoming
Cooperative Extension Service

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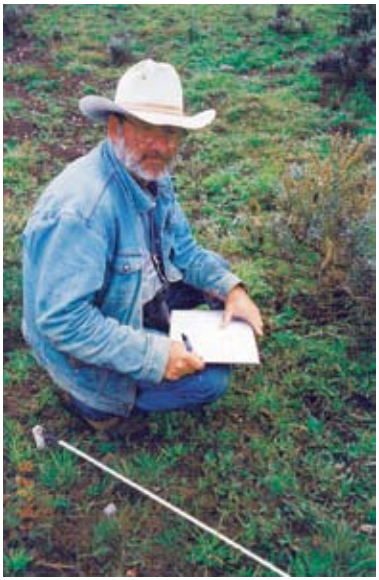
Contents

Introduction

Congratulations on finding yourself here! Becoming involved in a cooperative permittee monitoring program, or initiating monitoring of private rangelands, is a clear indication you are an innovative and proactive producer or an agency professional who understands the value of permittee involvement in the operation of a permit. We know that you are very likely a leader interested in stewardship of their rangeland resources.

There are several things which will occur to you as you become experienced in your monitoring efforts. First, you are going to learn and understand much more about rangeland and its ecology than you ever dreamed. And, it's going to be enjoyable. I've not met a single grazing permittee who didn't exhibit keen interest in learning more about the plants of the rangeland, their relationships, their physiology and responses to management pressures. I've never met a range professional who wasn't anxious to understand the things that a cattleman knows. And I've not met the person who wasn't willing to teach the other! It isn't the purpose of a monitoring program to specifically teach you these things, but I'll guarantee that you'll catch yourself asking great questions about rangeland plants and rangeland ecology, or animal husbandry and ranch management. It just happens.

Conservation through consultation, cooperation and communication - the 4C's. That is what cooperative permittee monitoring programs are all about.



Secondly, it's virtually guaranteed that a permittee and rangeland specialist team is going to understand each other better. I don't care if you've had an amicable relationship or if you despise each other; I'm willing to bet each of you will come to appreciate and trust each other more. It just happens.

Third, you will begin to create a body of information about the status and changing nature of your rangeland which simply cannot be matched by current information. Hopefully, you'll be documenting the success of past stewardship and demonstrating continued successes. If your rangeland has some problems, you'll be able to demonstrate you are aware of difficulties, present objectives illustrating where you wish to go with your management, outline management strategies which will get you there, and show how you will measure and document that change. This piece is work. It requires commitment and cooperation. But, it's worth it.

Topic 1. The Need for and Utility of Cooperative Permittee Monitoring

When we began developing the concept of cooperative permittee monitoring programs, we were worried that critics would cry out, "Yeah, sure. Like the fox guarding the henhouse!" We were worried about agency range specialists resenting permittees being involved in monitoring work. And we were worried that permittees would point at agency professionals and cry out, "It's your job – you do it!" Finally, we were worried that agency personnel would fear the additional commitment of time.

Quite frankly, we were wrong on all counts. It has turned out that permittee involvement in a cooperative program has been educational for both permittee and specialist, and both have gained better understanding of each other's needs and challenges. This invariably lead to considerable

respect for each other's profession and professionalism. Scientifically, the data that permittees and specialists gather in monitoring programs certainly withstand scrutiny for reliability and validity measures of research. Agency personnel certainly find themselves devoting a greater amount of time to a permit in the beginning, but later they'll concede their investment is repaid. This because they've suddenly acquired, in the form of a rancher, a competent monitoring technician for that allotment. And finally, agency professionals and permittees both understand the grazing program must be able to document good stewardship of the public resource. If not, then grazing programs are vulnerable to fickle political winds.

If these points weren't enough, it is clear the improved communication, knowledge, information sharing and relationships built through permittee monitoring must invariably lead to better management of the resource.

Topic 2. Coordination Between the Permittee and the Agency Range Professional

In the development of a Cooperative Permittee Monitoring Program, the absolutely most important component is the close coordination of permittee and agency professional. Without this coordination, neither party will understand why any monitoring is being done. Without cooperation, there will be resistance by both parties and there will be reluctance to defend the results of the monitoring research if faced with challenges. The data gleaned from the monitoring studies must be defensible. To achieve this, there must be training adequate to assure the validity of the data and, in many cases, there must be provisions for quality control. Finally, if the monitoring plan (including the development of objectives, selection of methodology, etc.) hasn't been jointly developed and implemented by the range specialist and permittee, the data doesn't go into the official allotment files.

The success of a cooperative monitoring program revolves around the development of clear objectives for the monitoring which everyone understands and agrees to. They must be achievable, and they must be objectives which the permittee has the ability to affect via the management of grazing.

It is extremely important to understand and acknowledge that an agency professional and a permittee live in different worlds, react to different pressures, and have different levels of investment in the grazing program. We need to be careful to understand that agency professionals often feel pressure to look at range assessment and inventory issues and other driving forces emanating from within the agency. Meanwhile, a stockman is compelled by his need to maintain a financially viable operation. The agency professional has to manage within regulations, land planning documents, their training and experience.

The tool the permittee has is the management of animals that graze. The agency professional isn't likely to feel much compulsion to adopt cowman objectives like 550-pound weaning weights. Neither is a permittee going to be motivated by a statement dealing with recreational user days.

The point is, both parties have different perspectives, but there is common ground where common objectives thrive. The management which can achieve these objectives can be defined, and uncomplicated research which measures the progress or achievement of these objectives can be prescribed through agreement between those involved.

If both parties cannot support and contribute to monitoring and achieving a monitoring objective, then we need to think hard about that objective's appropriateness in a monitoring program.

Furthermore, the close collaboration of agency personnel and permittees must continue well beyond the setting of objectives. There needs to be lots of handholding, particularly in the beginning. Permittees will be tentative

about issues revolving around monitoring methodology. They will feel vulnerable when it comes to their understanding of ecological processes. On the other hand, agency professionals will be vulnerable in their knowledge of cattle management practices, animal behavior, and many of the other issues which a producer probably grew up understanding.

Ultimately, the vulnerabilities will fade, replaced by recognition that each has important knowledge and ability to bring to the partnership. Not unlike a marriage, the differences contribute to a stronger team.

Topic 3. Starting a Cooperative Permittee Monitoring Program

Here is what we've found works in the cooperative programs. First of all, all of the really great cooperative monitoring programs seem to be voluntary. Both parties need to want success. While compulsory programs can gather data, that data's purpose is generally to support a regulatory objective, and it is doubtful if there is a lot of commitment to managing to achieve great stewardship objectives. So, both parties need to affirm their sincere interest in securing the long-term health of the resource. Often, we assume that this is a given, but it is important that both parties hear each other affirm this wish. This common goal may be the first point of agreement, and it must be a point of agreement or there is no sense in proceeding.

Now that we've got common ground at least on this umbrella objective, it makes a lot of sense to convene a meeting of people who can be or are important to the success of the monitoring program.

A range conservationist, technician, or specialist is going to want the support of the administrative hierarchy. Be sure they are included. A permittee will want them at the table, too, for they must support the program, endorse the objectives and data, and are invaluable allies in support of a program that they see is honestly working toward objectives they support. They like success. Don't be bashful about inviting people in the range administrative lines right up to the district manager or ranger.

A permittee needs to be sure all the principals in the administration and operation of the permit are at the table. Brothers, children, partners, wives, or fellow permittees (in the case of common grazing permits), or the people who program the cattle movements, need to be in the monitoring

program's birth. A permittee may also wish to invite to the table individuals who have the ability to make valuable contributions to the process. Agency range specialists, with responsibilities of integrating all the demands on the resource, should serve as ambassadors for those other uses and bring those perspectives to the table; therefore, one should refrain from gathering together a listing which would look like a Coordinated Resource Management group (CRM). The birthing process should be a rather exclusive affair, dedicated to the **development of a program**. The time for inclusiveness is later, when the program is underway and mature enough to answer the concerns and demands of other interests.

Quite often, we will see Cooperative Extension Service personnel (county- and/or department-based) contributing expertise in a number of arenas. Other agencies are burgeoning with knowledge, skill, and expertise which can be assets to the development of a program. More and more there are other permittees or commodity group representatives with first-hand experience in monitoring programs — and more than a little technical knowledge!

Understand that in the beginning, the hard work really isn't range management. It is group process. Oftentimes, particularly in cases where there is some pent up animosity, people who are skilled in guiding group development can be the most important additions to the table. Cooperative Extension Service and Wyoming Department of Agriculture have or can identify such skilled persons.

This first meeting is one where it is useful to have free-ranging discussions regarding the resource, agency needs, and producer needs. It's not a bad idea to have some idea of what one would hope to cover during the discussions, but realize that great discussions probably won't cover everything one might list. As an example, Appendix 1 contains a list which was effectively employed to plan an initial meeting.

You may be relieved that we did not cover all items on the list in detail. But we did accomplish the important parts, namely, both groups signaled their commitment to the resource, support for involvement in a collaborative monitoring program, discussed agency and permittee needs, discussed issues and concerns peculiar to the permit, reviewed the allotment file, and we planned a tour.

And I believe that organizing a tour of the permit with the people who have critical input to the development of the monitoring program is the next big step. We've seen that it is important to be as inclusive as "reasonable" in assembling a tour group. Remember that the purpose of the tour should be constructive and not confrontational. People should be invited to tour because they have some important contribution to the understanding of the operation of the permit. They may be valuable for their knowledge of the area ecology, administrative responsibilities or jurisdiction overlap, academic expertise, etc. It's not a recreational outing. The purpose of the tour would be to facilitate everyone's understanding of the resource, important operational issues, livestock movement, etc.

There are three important accomplishments of the first tours.

1) To identify areas which reflect conditions over a greater portion of the landscape (a key area) and to come to some agreement to what the objective should be for that "key area."

2) Writing the objective for this key area. This is a very critical task and is not to be taken lightly. It will guide management strategies, identify data requirements, determine monitoring methodology and frequency. It must be a statement that can be agreed to by the principals and it must be attainable via livestock management. You will read much more about objectives as you get further into this guide. Pay attention to this critical task!

3) You'll learn to install and take data from monitoring methodologies. You will participate in data collection with everyone present, and all will go away with confidence in the data.

Topic 4. Monitoring Basics

Rangeland monitoring is the orderly collection, analysis, and interpretation of resource information (data) used to make both short- and long-term management decisions. *(Wyoming Rangeland Monitoring Guide)*

There are probably hundreds of different ways to monitor. Some are as simple as reading a rain gauge while others are difficult, tedious, intensive exercises in taxonomy and drudgery. All have their value; however, since we are working at developing a monitoring program which is user friendly, particularly for folks who may not have any academic training in range sciences, we will concentrate on simple, repeatable, and reputable methods!

Use KISS as your watchword – Keep It Simple, Silly! Permittees have no obligation to gather bodies of information which looks like resource inventory or resource assessment. That is the obligation of your range specialist. A permittee should be interested in picking indicators. By agreeing to watch some discrete indicator that a data set represents, you can evaluate progress toward the objective; therefore, you should choose indicators which have a clear relationship with your objective. If you have an objective calling for less bare ground, then monitor for bare ground! Resist choosing a grand methodology which provides the frequency of a particular species of grass in your data collection! KISS! And remember that folks with lots of training, expertise, and experience will suggest grand research schemes well beyond the minimal requirements that are needed to evaluate progress. Don't be afraid to say, "Gee, that would be interesting to know, but what objective are we serving?"

The Wyoming Rangeland Monitoring Guide, available through extension offices, Forest Service offices, and Bureau of Land Management area offices outlines most of the KISS friendly monitoring protocols. It also contains the following statement which is so very important that it warranted inscription on the cover of the guide, and inside is set apart like this:

> When the procedures in this guide are followed, the information gathered is acceptable to federal and state cooperating agencies. Coordinate public lands monitoring with the appropriate public land manager, and jointly collect the information whenever possible. The information collected will be referenced and will contribute to evaluating whether rangelands are meeting standards, goals, or objectives.

There are two general categories of monitoring that we talk about. They are short-term and long-term monitoring. Short-term monitoring generally looks at what happened or is happening during the growing season. Most commonly, we are interested in the amount of grazing use that occurred or how much stubble height is left. But there are other important bits of monitoring data which are important. These could include the amount of rainfall, odd climatic events during the year, actual use records, turn on/off dates, etc. Sometimes, short-term monitoring of use or residue often is installed in support of erosion or water-retention objectives; however, a great deal of the time, short-term monitoring of the vegetation is aimed at complying with terms and conditions of permitted use. And, that is OK! Certainly maintaining compliance with regulation is a completely legitimate objective, although it may not be an objective directly linked to site specific ecology.

The other general category is long-term monitoring. This is really where the rubber meets the road and we have the opportunity to get excited about: 1) Landscape and ecological objectives, 2) Management prescriptions and their implications, and 3) Watching our management achieve the changes that we desire. Long-term monitoring really is aimed at documenting changes in the resource over time. Trend is the operative word. Are we seeing progress toward our objective? Discerning trend is difficult to accomplish because each year's growing season offers different

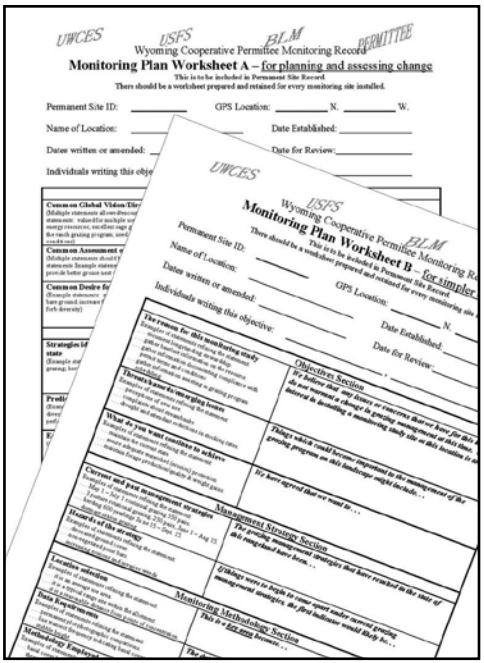
potential. This is why it is important to correlate trend information with the short-term climatic conditions we record.

When we install a monitoring site, we need to be very careful about site selection. When we are interested in monitoring the impact of grazing management, we need to place our monitoring sites in areas where there is average livestock use relative to the use throughout the allotment. These are "key areas," which are defined as being representative of larger areas; therefore, they probably ought to be nondescript. If you can point toward a watering hole, fence corner or gate and say that you've got a monitoring site there, I know that it's not in a key area. It's more likely in a "critical area" –a sore spot or a place you know that use will be well above average because of cattle travel and loafing patterns. It is perfectly fine to initiate a special investigation by creating an objective and monitoring strategy very specific to a small critical area or situation; however, you must be sure to understand that it is not representative of a larger area, and data from a critical area should always be used with that fact firmly understood.

You will also need to be thinking about the portion of the growing season in which you schedule your monitoring. It's always best to set up your monitoring so you can get to it about the same time of year. If monitoring for grazing use, you'll either want to do your monitoring shortly after the cattle leave or at the end of season, depending upon the objective for the monitoring. If you are monitoring for trend, you'll want to repeat your measurements at about the same time in the growing season so that the maturity of the vegetation is about the same. It should be intuitive, but I'll say this anyway. **The data you get off a transect line, or the appearance of a picture, will be different in June than September**. Your objective will help you determine appropriate monitoring date schedules, and each site should have a tight time window established for monitoring.

Topic 5. Monitoring Program Design

The design of each and every monitoring program will differ. In fact, the monitoring program in each pasture might be different. The design of the program must be in response to the monitoring objectives. Those objectives are the first job, and they must be set cooperatively by the agency professional and permittee. This is why it is so important for the agency manager and the permittee to have talked about what they would want to accomplish. Once there is agreement, then proceeding through the difficult task of writing good, complete objectives becomes much simpler. It's important to remember that each and every bit of monitoring installed should be in support of an objective. Selecting the actual monitoring methodology is simple after that, because the objective will determine the type of data needed, and the type of data needed guides you to the actual procedure used. Monitoring plan worksheets are an invaluable aid in working through the thought process and archiving the decisions made in designing the monitoring plan (www.wyorange.net/monitoring.htm).



It's important that the objective be written and saved for future reference. You must be able to remind yourself of why you are doing this monitoring, why you are employing the grazing strategies you have implemented, be able to evaluate those strategies, and know if you are moving toward the objective set.

Topic 6. Short-term Monitoring

Short-term monitoring is the act of capturing data which is important to that year's growing season. In addition to rainfall, actual use, on/off dates, etc., the most likely bit of short-term monitoring is done to gauge utilization. The objectives which would be written asking for utilization monitoring would generally be objectives which involve proper livestock management, resource-related objectives, or objectives involving compliance with contracts, permits, etc.

There are also resource objectives which really don't call for estimates of utilization, but are centered on what is left – the stubble height or residual.

In this case, we would do stubble height monitoring which is a series of direct measurements aimed at learning average stubble height. These are pretty straightforward because what we are trying to boil down to a number is right there in front of us and can be measured.

Generating a number characterizing utilization is more difficult, because that which is utilized isn't there any more! We must estimate it. There are a number of ways which utilization can be estimated. The simplest is "ocular estimation." This is a fancy term for an estimate made by a practiced eye! Every cowman does this when riding his pastures and making an assessment as to whether or not there is feed left. Experience is the basis of making the judgment; however, few are practiced at assigning a number or "use category" to the amount of use which would have occurred. Nonetheless, eyeball (ocular) estimates can be quite good if the estimator is practiced, frequently recalibrates the eye, or employs categories of utilization rather than trying to assign a precise number.

Initially, we all feel more comfort with a utilization methodology which involves sampling and numbers. After all, if we put more effort into it,

there should be more security in the numbers! Probably the best sampling method would be paired plots where cages are installed to preclude grazing and paired with a plot which allowed use; however, to be statistically defensible, there must be many more cages installed than is generally practicable. Cages can be a useful tool to visually observe undisturbed annual production, but one must be very cautious about numbers derived from methodologies employing cages.

The problem of having sufficient observations to provide statistically sound estimates of utilization is overcome by the "USFS Utilization Gauge" methodology, sometimes referred to as "the wheel." This method requires the measurement of a large number of individual plants from a "key species" (the species you chose based upon its dominance, palatability, etc.), recording their height and whether or not they are grazed. These measurements, often up to 100 observations, are processed to extract average height of ungrazed plants which is then used to calibrate a scale developed for the species of plant being used as the key species to derive utilization estimates.

The basis for this methodology rests in that the distribution of a plant's mass can be described as a function of its height. There are different scales used for different plant species because different species have their mass concentrated at different heights. Some plants are tall and slender; while others have a clump of mass closer to the ground. If we know that the average ungrazed plant height is 10 inches, and a plant has been grazed to 4 inches, we can consult the height/weight curve for that species and read an estimate of utilization. If we were measuring straws which have even distribution of weight throughout the height, the utilization would be 60 percent (4/10ths left, means 6/10ths gone, or 60 percent utilization). But, since we aren't measuring straws, the height/weight relationship is more likely to have a higher preponderance of mass distributed in the lower portions of the plant. In reality, a plant grazed to 2 inches, and having an average ungrazed height of 10 inches, might yield a utilization estimate of 50 percent.

Another utilization methodology described in the Wyoming Rangeland Monitoring handbook is called the "Landscape Appearance" method. It involves training yourself to look at a plot of land, assign to it a class (or

category) of use, and compiling these estimates into an aggregate estimate of utilization. The key to this method is learning to assess visual signs or indicators of level of use and being able to assign the amount of use for the plot you are observing to a general use category. The guide provides great descriptions of indicators you'll see in the landscape to guide assigning a plot to a use category. These sample observations, probably 25 per transect, are then aggregated to obtain an average utilization number. Here are the use categories and descriptions associated with them:

Class	Description of Landscape Appearance
0-5%	The rangeland shows evidence of no grazing, or of negligible use.
6-20%	The rangeland has the appearance of very light grazing. The herbaceous forage plants may be topped or slightly used. Few current seedstalks and young plants are grazed
21-40%	The rangeland may be topped, skimmed, or grazed in patches. The low value herbaceous plants are ungrazed and 60 to 80% of the number of current seedstalks of herbaceous plants remain intact. Fewer than 50% of the young plants are grazed.
41-60%	The rangeland appears entirely covered as uniformly as natural features and facilities will allow. 15 to 25% of the number of current seedstalks of herbaceous species remain intact. No more than 10% of the number of low-value herbaceous forage plants have been utilized.
61-80%	The rangeland has the appearance of complete search. Herbaceous species are almost completely utilized with less than 10% of the current seedstalks remaining. Shoots of rhizomatous grasses are missing. More than 10% of the number of low-value herbaceous forage plants have been utilized.
81-94%	The rangeland has a mown appearance and there are indications of repeated coverage. There is no evidence of reproduction or current seedstalks of herbaceous species. Herbaceous forage species are completely utilized. The remaining stubble of preferred grasses is grazed to the soil surface.
95-100%	The rangeland appears to have been completely utilized. More than 50% of the low-value herbaceous plants have been utilized.

Topic 7. Trend Monitoring

Monitoring for trend, or long-term monitoring, would be done in support of objectives which are concerned with the rangeland resource's sustainability, improvement, or to determine the effect of management strategies which are in place. These objectives aren't concerned with yearly fluctuations in temperature, precipitation, animal numbers, or even use of the forage. Rather, these objectives are more concerned with the state of the resource and if that resource is changing. Annual events accumulatively impact the resource's trend.

Trend is, by definition, a comparison of two or more points in time. Any measurement, regardless of its sophistication, cannot determine change or trend until it is considered in relation to information collected from at least one other point in time. There are some indicators which are sometimes used to ascertain "apparent trend."

There are a multitude of monitoring protocols which might be employed to gather information which would indicate trend. Some are very complex, requiring superior taxonomic skills and the ability to tolerate tedious work, while others are as simple as periodically taking a picture from the same place. Again, the objective you set for the key area in which you install the monitoring should steer you toward a monitoring protocol which would generate the data required to understand progress toward the objective.

Most sampling-based trend monitoring protocols will evaluate the composition of the plant community. Different methods may generate plant frequencies, diversity, or density, to name a few measures. The monitoring protocol we have settled upon is called "Cover by Lifeform." This method's strength is that it provides useful indication of the relative abundance of different plant lifeforms, it is simple and repeatable, and doesn't require sophisticated taxonomic skills. In this method, 100 points along a permanent transect line are observed. At each point, the first intercept is classified and recorded into one of six categories. These

categories are rock, bare ground, litter, forb, graminoid (grass or sedge), or shrub. Using the data thus generated, one can make assessments regarding many long-term objectives, particularly when those objectives are written carefully to accommodate the limitations of the methodology. A variant on this method, "basal cover," would make the observation at ground level, ignoring any intercepts above ground level. This method will yield different numbers than sampling the first intercept and is less susceptible to annual variation in productivity.

A monitoring method which is even simpler is the use of permanent photograph points which are revisited periodically. Pairing, or assembling a chronological sequence of photographs, can be very informative. While they are not (yet) very useful in generating statistically defensible numbers, the axiom that "one picture is worth a thousand words" holds true.

Pairing a photo strategy with the Cover by Lifeform methodology is simple and is recommended. The process we've adopted is to take landscape photographs, shot down the line, from each end of the Cover by Lifeform transect and also take overhead photographs of a 3-foot by 3-foot square (framed by carpenter rules) at the 10-, 50-, and 90-foot markers. These photographs are then presented with the Cover by Lifeform data form in the annual record of monitoring notebook.

In any trend monitoring methodologies, it is important to be sure and read the transect or take the photographs at the same time of year. Variation between years and within growing years is tremendous. It only makes sense to remove as much variation as possible by scheduling monitoring to occur at the same time each year.

Since trend monitoring is set up to ascertain change over time, and since plant community change generally happens slowly, it may not be necessary to repeat trend monitoring each and every year. In some cases, it might be entirely appropriate to monitor on five-year intervals; however, the monitoring protocol demands little investment of time and resource. In recognition of the value of continuity of record, variation in year, and enhanced experience and memory of those who would perform the monitoring; it becomes easy to argue that trend monitoring should be scheduled to occur as frequently as practicable.

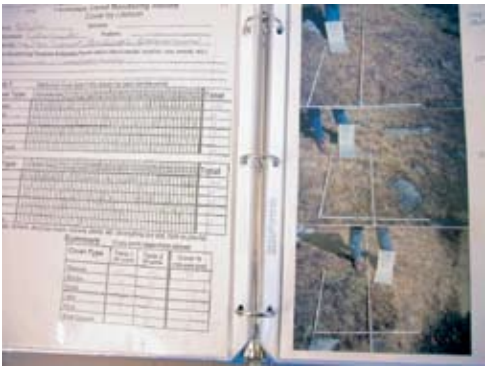
Topic 8. Riparian Concerns

Riparian areas probably require additional mention because they so frequently are the areas in which cattle and critics congregate. Stream banks and their condition are most often noted as the key indicator of riparian function. As a result, objectives directed at stream banks are often written. Stream bank health is a direct function of the plant community on that stream bank, and as a result a number of research protocols have been developed to monitor stream bank (or streamside plant community) health.

It is common to see regulatory objectives for stream sides in the form of "greenline stubble height." These "trigger" levels are commonly incorporated into planning documents and permit terms and conditions. Upon reaching the trigger level of residual height, the expectation is that grazing would be removed. These regulations seek to preserve stubble at the streamside to capture sediment and enhance streambank building and to assure sufficient plant vigor to continue successional processes in that streamside community.

More long-term, resource-based management objectives for stream sides (objectives prescribing a desired trend or future condition), lend themselves quite handily to being documented with permanent photo points. There are also "greenline" monitoring methodologies designed to monitor the frequency of conditions or plant forms along a transect placed along the greenline of the stream. Comparison of the numbers observed at two or more points in time can be important in ascertaining trend and progress toward objective.

Topic 9. Other Methods



In addition to the methodologies described here, there are many more monitoring methods which may be applicable when developing documentation in support of an objective. There are many described in Interagency Technical References ("Utilization Studies and Residual Measurements" or "Sampling Vegetation Attributes," available at http://www.blm.gov/nstc/library/techref.htm), and your range specialist may suggest methodologies which are favorites. When selecting a monitoring protocol, remember these important points:

1. The protocol must be agreed upon by both parties.
2. The protocol must be within the ability of either party to repeat with the full confidence of the other.
3. The protocol must generate data or documentation which clearly supports the objective for the monitoring.
4. The protocol must be generally accepted as valid and reliable for the data to be credible to any party and earn a place in official files.

Topic 10. Maintaining a Record of Results

All of this monitoring is nothing but recreation if there isn't a complete record available. The monitoring record might take any form but should include several items. It is advisable that several copies of the monitoring record be made and distributed to key people or locations. At minimum, there must be copies of the record made for the agency and the permittee. In reality, houses burn, people move on in careers, and other events can happen which threaten permanent records.

Most monitoring records will contain a substantial number of color photographs. Most towns have a place which can produce high-quality color copies. Initially, it may seem that color copies are expensive, but it is important to keep in mind that much more is invested in gathering, recording and assembling the data. The color copy machine is not the time to turn frugal! In most instances, your county extension agent will be thrilled to have a copy of the monitoring record for two reasons –they can serve as another repository of the record in the event that the other copies of the record are lost, and they would be happy to have a copy of the monitoring record to show others the fine job you are doing and to encourage others to follow your footsteps.

The "monitoring record" really needs to serve the objective of presenting the data gathered in your monitoring program, and each monitoring program will be different; however, there are several items which really are excellent items to include in the monitoring record. It makes sense to think of a two-part record.

The first part of the record should be a permanent site record. This permanent site record would hold information which does not change from year to year and could be argued that they need not be presented in each year's monitoring record. The permanent site record can be prepared one time and referred to as necessary. It would include:

Permanent Record Notebook

Locations of monitoring sites by map, description and/or GPS coordinates

Objectives cooperatively set for monitoring at those locations

Grazing strategies linked to expectations which support the objective.

Previously captured data pertinent to the site and objective

The second portion of the record will change from year to year. Data which should be included into each year's monitoring record would include:

Annual Monitoring Data Record Notebook

A Collaborative Agreement dated and signed by permittee and agency range specialist indicating that the data has been collected and documented according to methods and procedures that have been cooperatively approved by the permittee and agency and accepted for inclusion into the permanent allotment files.

A Weather Log presenting precipitation data and abnormal weather events which provide background for anyone who would evaluate the data.

A Livestock Grazing Record which presents on/off dates, cattle numbers and class, cattle movement within the allotment or pastures, etc.

Short-term data forms and documentation for study sites referenced in the permanent site record.

Long-term data forms and documentation for study sites referenced in the permanent site record.

Objectives for and data from investigations initiated for special purposes and not intended to become permanent monitoring locations, i.e., critical areas, photographs of off-road vehicle crossings, etc.

Other noteworthy observations or events which are important to the administration or operation of the permit or interpretation of the data.

Topic 11. Equipment and Expertise

The listing of equipment is required to implement a monitoring program is pretty short and can easily be carried in a daypack or tool bag. Depending upon the camera and GPS (or not) that you may acquire, the investment can be as low as about $150. The dateback camera (which inscribes the date of the photograph on the photo) will be about $100 of that low-end

estimate. A 35-millimeter film camera is preferred. Many people express interest in digital cameras, however, pixel density is extremely important in photographic resolution. A five megapixel digital camera is going to cost many hundreds of dollars, while a 35-millimeter film camera can be had for $100 and delivers in excess of 10 megapixel quality. If you ever hope that someday we will have the technology to take quantitative data from photography, pixels will be extremely important. Be sure to retain the negatives of your prints if using print film!

More and more, GPS is being used to mark or find location. In most instances, recreational grade GPS delivers 15-foot accuracy. Expect to pay at least $100 for this technology. If you do not plan to employ GPS, then you'll also want to include some metal witness posts to drive into the ground a measured distance and direction from your plot.

The rest of the equipment can generally be obtained from your local hardware store or mail order suppliers. The exception is the USFS utilization gauge, which is available from the Colorado State University Bookstore (www.bookstore.colostate.edu or (970) 491-6692).

Equipment list

A durable clipboard or metal form box

Data forms

A 35-millimeter film camera – "dateback"

35-millimeter film for daylight shooting

USFS Utilization Gauge

Two 6-foot folding carpenter rules

100-foot tape

PVC stakes for permanent transect ends

Markers for making notation signs included in photographs (for photography purposes, dry erase markers may be useful on metal form boxes overlain by dry erase material)

Survey pins or wire flagging

Permanent plot stakes (3/4-inch PVC will do!)

Items which may be useful but generally not mandatory:

A recreational grade GPS

Copies from the permanent site record to help reposition permanent photographs

Before starting, it is recommended all involved in the monitoring program go through short training designed to familiarize everyone with identification of objectives, key areas, key species, installation of monitoring sites, and reading and recording data from the monitoring sites. This is particularly important for monitoring partnerships in which no one has experience in developing a cooperative monitoring program. In the beginning, it is important that the reading of monitoring sites be done as a party of appropriate agency personnel and permittees so everyone feels confident with the data. Even after all parties are comfortable with the collected data, it is useful to reconvene as a monitoring party periodically to maintain that comfort with the data, reaffirm objectives, discuss strategies, etc.

The University of Wyoming Cooperative Extension Service and its extension educators and extension range specialists has been in the forefront of the educational efforts to implement monitoring programs across the state. Do not hesitate to call your local extension office for help in designing and launching your monitoring program or providing education or assistance to help solve problems you may encounter in developing your cooperative monitoring program.

Topic 12. Conclusion

Done properly, two or three years of a truly cooperative monitoring program will place you in a position where you will be ready, willing, and able to defend the data generated by the monitoring program, regardless of who gathered a particular set of data. You'll be able to explain what it means and predict the ecological response of the plant community based upon the management you've imposed. You will understand the motivations of your monitoring partners and explain how those motivating factors are incorporated into the objectives you've designed for the monitoring program. You will have assembled a body of data more complete than ever existed. You'll be able to show how grazing strategies are responsive to long-term stewardship objectives. You'll be able to greet your partner at the grocery store or stop in for coffee with a smile, a handshake, and bits of information about good things which are happening on the allotment.

Now, isn't that worth the time and effort involved, and a lot better situation than you are in now? (And, I'm talking to both sides of the partnership!)

Appendix 1: Prototype agenda for cooperative monitoring program initial meeting

Date: _____ Time: _____

Location: A "safe place" (extension office, agency office, permittee's kitchen)
Participants: Permittee, agency rangeland specialist, district ranger (area manager), county extension, ???

1) **Introductions all around**

2) **Why you want a permittee monitoring program:** Permittee
   a. for everyone to understand everyone's objectives and concerns
   b. to identify grazing impacted or affected resource issues
   c. to identify plant community resource objectives from the resource issues
   d. to cooperatively develop a monitoring program which will assist in understanding and measuring management decision impact and progress toward objectives and support management decision-making capability.
   e. to monitor compliance with permit terms and conditions.

3) **Overview of voluntary cooperative permittee monitoring**, vision of this monitoring program: Extension Agent

4) **Identifying and developing the issues** - presenting and understanding goals and objectives of all
   a. **Ranch needs: Permittee**
      i. The role of the permits in your operation
      ii. Desire for predictability/sustainability
      iii. Pressures
   b. **Agency Needs: Agency rangeland specialist**
      i. Vegetation/Plant community goals
      ii. Wildlife goals
      iii. Pressures

5) **The operation of the permit:** Permittee and rangeland specialist (important to include the cattle manager here)
   (We need maps, overlays, etc., at this point!!!!)
   a. numbers, on date, movements, off date
   b. resources required
   c. management strategies and information types/sources/needs
   d. wild cards and barriers to meeting objectives
   e. additional information needs

6) **Review of the official allotment file** (existing information, study sites, etc.)

7) **Planning a Tour: Everyone**
   a. **Initial discussions on potential key areas**
      (Objective, data needed to support objective, potential methodologies, grazing management response to data)
   b. **Initial discussions on areas of concern**
      (Objective?, data needed to support objective, potential methodologies, grazing management response to data)
   c. **Tour particulars** (Date, route, personnel needs, equipment needs)

About the author:

Eric Peterson is a University of Wyoming Cooperative Extension Service Senior University Extension educator in Sublette County, Wyoming. He is a member and past-chair of the Cooperative Extension Service's Sustainable Management of Rangeland Resources Initiative team. As a natural resource education specialist, his responsibilities include Sublette, Lincoln, and Teton counties of western Wyoming.

Western Wyoming is largely public land area and, as a result, Peterson has been actively involved in the implementation of many Cooperative Rangeland Monitoring Programs involving volunteer permittees, U.S. Forest Service and Bureau of Land Management rangeland staff.

Peterson is a steering committee member of a Department of Interior pilot project introducing Cooperative Permittee Monitoring onto BLM lands. A portion of the funding for this BLM "4-C's" project have supported the development and publication of this booklet to further the objective of encouraging Cooperative Permittee Monitoring programs throughout the west.

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At the heart of the Four C's is the belief that for conservation to be successful, we must involve the people who live on, work on, and yes, love the land.

Secretary Gale A. Norton, December 5, 2001

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