

**Search for Excellence in Environmental Quality,
Forestry and Natural Resources**

Arizona Cooperative Extension Rangeland Monitoring Program

Andrew Brischke¹, Ashley Hall¹, and Kim McReynolds²

¹Area Assistant Agent, Agriculture & Natural Resources, The University of Arizona Cooperative Extension.

²Area Agent, Natural Resources, The University of Arizona Cooperative Extension.

73% of Arizona is classified as rangeland. Arizona's rangelands provide both ecological and economic benefits. Monitoring the condition of rangelands over time is important to ranchers, researchers, public land management agencies, and the general public. Continuing for more than 20 years, The University of Arizona Cooperative Extension Monitoring Program (ACEMP) assists in collecting rangeland monitoring data used for land management decisions.

Educational Objectives:

- Ranchers and federal agency staff know the importance of monitoring.
- Ranchers and federal agency staff will actively participate in informal and formal monitoring practices.
- Ranchers and federal agency staff will gain confidence and competence in collecting, analyzing, and interpreting monitoring data.
- Ranchers and federal agency staff incorporate monitoring data to inform management decisions and to determine if management objectives are being met.
- The quality of relationships increases between ranchers and federal agencies, specifically US Forest Service (USFS) and Bureau of Land Management (BLM).

Program Activities:

The ACEMP is comprised of three similar programs: Southeastern Arizona Monitoring Program (SEAMP), Reading the Range (RtR), and the Arizona Cooperative Rangeland Monitoring Program (ACRMP). While cooperative agreements with federal partners have ebbed and flowed over the 20-year history, since 2018 ACEMP have agreements with the Coronado National Forest (NF), Tonto NF, Apache-Sitgreaves NF, Arizona Strip BLM District, Kingman BLM District (ended 2019), and Safford BLM District (ended 2019). An additional cooperative agreement was signed in 2020 to partner with the Kaibab, Coconino, and Prescott NFs.

A key aspect of monitoring in contrast to other ecological sampling such as inventory or assessment is that monitoring observes changes over time. Because monitoring depends on observing change over time, the overwhelming majority of the sites monitored by the ACEMP have been monitored multiple times (3-5 year return interval). Collectively, the ACEMP has monitored over 2,500 sites throughout Arizona since the program has started.

The SEAMP and ACRMP generally use Research Specialists to complete much of the day-to-day work which includes coordinating monitoring schedules with partner priorities, and inviting ranchers, agency personnel, and other interested parties to participate in collecting monitoring data. Additionally, monitoring staff produce summary reports for ranchers and agencies for their files. RtR is slightly different and relies on the Extension Agent to coordinate and complete the workload with help from independent contractors for field work and rancher participation is expected.

Workshops and field days hosted by Extension include a variety of topics related to range management and monitoring. Classroom workshops may include topics such as management goals and objectives, ecological sites, state-and-transition models, data interpretation, etc. Field workshops may include demonstrations or practice on specific monitoring methods, soils, plant identification, etc. Other topics may include teaching about new technology or tools available.

Teaching Methods:

- One-on-one education in the field
- Classroom workshops and hands-on field demonstration/practice days
- Publications, bulletins, guides, newsletter articles, and data sheet templates
- Website serving as a repository for monitoring resources
- YouTube videos
- Phone and field consultations

Results:

- Over 2,500 sites monitored with multiple visits. Since 2018, 989 sites have been monitored on 344 federal grazing allotments.
- Rancher and agency participation varies from year to year but since 2018 participation ranges/averages:
 - SEAMP: 52% Rancher, (55% goal)
 - RtR: 100% Rancher, 90-100% Agency (100% goal)
 - ACRMP: 12% - 46% Rancher (50% goal), 35% - 68% Agency (50% goal)
- Numerous workshops, demonstrations, and field practice events have been hosted by ACEMP with hundreds of attendees throughout the 20-year history of the programs. Since 2018, ACEMP has hosted 13 workshops with a total of 166 participants. Monitoring workshops were cancelled in 2020 due to Covid-19 restrictions.
- Several Extension publications, bulletins, and newsletter articles. Since 2018, five Extension publications or guides related to monitoring or plants were published as well as a quarterly range and livestock newsletter with multiple articles related to monitoring and/or plant identification.

Impacts:

- Arizona ranchers and agency personnel recognize the value of rangeland monitoring and all the ranchers surveyed reported using one or more types of informal monitoring.

- 86% of survey respondents reported they did formal monitoring on their ranch, slightly higher than 79% rate reported in 2002 (Fernandez-Gimenez et al. 2005)
- Ranchers who were involved with Cooperative Extension reported using significantly more methods than ranchers who were not (involved: 7.3; not involved: 4.3; $p=.011$).
- Ranchers often discussed how informal monitoring influenced management decisions.
- 86% of respondents indicated that having an unbiased third-party participate in rangeland monitoring was very important (47%) or somewhat important (38%).
 - Cooperative Extension is rated the most unbiased of resources available. 94% rated Extension as completely (56%) or somewhat (38%) unbiased.
- Ranchers and agency staff place a high value on the multiple decades of consistent monitoring data that ACEMP has been able to provide.
 - Focus group participants indicated the importance of monitoring as two-fold: 1) providing a regular measure of range conditions and moving towards management goals and objectives, and 2) maintaining grazing permits, especially in case of litigation.
 - Help ranchers know if the conditions of the range are improving or not was rated highest as a reason for monitoring (82% very important; 15% somewhat important).
 - Help ranchers determine if management objectives are being met was rated second (76% very important; 20% somewhat important).
- 88% of ranchers said Extension monitoring services or information had increased their knowledge and understanding of rangeland monitoring.
 - Cooperative Extension was rated second (76%) behind other ranchers (82%) in where they find information to improve their ranching operation. County Agent was fourth (49%), Extension publications was sixth (47%).
 - RtR participants indicated a high degree of confidence in their ability to understand the monitoring process and inform their management decisions, other areas less so.
 - Less confident respondents indicated monitoring is still valued primarily during the permit renewal process and in case of litigation.
- 63% of respondents indicated they did more than enough monitoring (14%) or about the right amount of monitoring (49%).
 - Ranchers involved with Extension more frequently reported they did about the right amount of monitoring compared to those not involved with Extension (involved: 56%; not involved: 22%; $p=.014$).
- Rancher/Agency relationships are complicated, 71% of ranchers said their relationship with USFS has improved due to monitoring while only 40% of rancher relationships with BLM have improved.
- The 20+ year success of the ACEMP spun-off another self-sustaining program, the Vegetation GIS Data System (VGS), a software application for recording and managing vegetation and other ecosystem related data. The program supports monitoring efforts

throughout the state and most of the West. Some involved with ACEMP are also on the VGS Development team.

Evaluation:

Evaluation surveys are distributed at the conclusion of each workshop. Participants are generally asked to evaluate: change in knowledge for each topic before and after the workshop, overall quality of the workshop, if they learned a new concept, plan to implement at least one practice, if they have implemented a practice learned from a previous workshop and topics they would like to explore for future workshops.

In 2018, ACEMP commissioned our Extension Community Research, Evaluation, and Development (CRED) team to comprehensively examine the attitudes and behaviors of ranchers and federal agency staff toward range monitoring, as well as examine the working relationships between ranchers and agencies. The CRED team utilized interviews, focus groups, and surveys from ranchers and agency range staff throughout the state. 65% of respondents indicated they had obtained monitoring services from Cooperative Extension and 31% had not received monitoring services. A selection of results from the comprehensive evaluation are summarized in the above impacts or can be found in the supporting documents.