

# Precipitation Monitoring to Accurately Depict Drought Conditions on your Allotment

*Charlie Clements, USDA ARS; John McLain, Resource Concepts Inc.*

**N**evada public lands permittees have recently been subjected to sometimes onerous and costly decisions being imposed on livestock turn out as a result of Nevada BLM drought policies, and agency use of broad scale precipitation data generated across a wide expanse of the state. Use of this information, while of value at the landscape level, does little to provide basin by basin precipitation as may actually occur in a given year. Variable, and sporadic storm events across the state can leave measureable precipitation in one mountain or basin area, while completely avoiding adjoining or nearby areas. Every bit of measureable precipitation can influence plant growth and help to counter perceived drought by BLM as denoted in the

landscape scale maps. This in turn can influence if, when, and how proposed grazing limitations

might be imposed. Establishing portable precipitation stations on your allotment is not a time consuming, nor high cost process, but clearly one that should be high on every permittees list of priorities. While it may not help to defend growing conditions on your allotment on a given year due to drought and no measureable precipitation, it will very likely provide the defense you need on another year as a result of storm events that are accurately recorded to support range conditions for a more reasonable turnout. The following is a simple means of establishing precipitation monitoring stations on your allotment(s) and the kind of easy to use equipment you should consider:

The Great Basin rangelands Research Unit of the U.S. Department of Agriculture, Agricultural Research Service has been reading numerous precipitation gauges throughout the Great Basin for more than three decades. State climatologists, land owners and researchers have obtained data from this long-term monitoring effort. The construction and application of using these precipitation gauges is quite inexpensive. The proto-type, 26" circular base, 8" width x 13" height cylinder can be constructed at the local sheet

**Photo 1:  
Portable precipitation gauge with ruler and beaker utilized by USDA ARS to measure precipitation on rangelands.**





**Table 1.**

**Divide total (mL) by the factor based on container opening diameter (inches) to get inches of rain. Based on the formula (mL/16.4297) / (0.785 x diameter<sup>2</sup>) = rain inches.**

Dia.	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
factor	332.4	390.15	464.31	544.92	631.97	725.48	825.43	931.84	1044.69	1163.99	1289.74

metal shop for about \$36 or possibly even constructed in your shop for less. The sheet metal gauge is dependent on the weight that you prefer which can aid in keeping the precipitation gauge in place during very windy conditions. They do not have to be all that heavy as they lay on the ground and we do not typically experience that problem. The precipitation gauge can be read at whatever interval the user prefers. At ARS we read our precipitation gauges monthly (1st of the month give or take a couple of days), or in some cases quarterly do to distance from field office. You simply add in oil (300 mL) in summer months and for winter months oil (200 mL) and anti-freeze (300 mL). At each monitoring date you empty the precipitation gauge into a graduated cylinder (we use 1000 mL), subtract the oil and/or anti-freeze amount and divide by 826 and you have your precipitation for that time period in inches (see table). Empty and discard oil and anti-freeze into a disposable container and add new oil and anti-freeze. In the early 1990s

a permittee in northern Nevada was experience difficulties with some resource managers regarding plant growth. The resource managers assumed the habitat had experienced a certain amount of favorable precipitation, our precipitation gauge actually pointed out that the specific area they were commenting on did not receive favorable precipitation. Just recently another permittee was kept off of an allotment due to drought maps, yet spring precipitation recorded in the precipitation gauges in the area revealed a different story as did the excellent plant growth that had taken place. Precipitation gauges are excellent tools to better understand the variation in precipitation across a small area, over a landscape and allotment as well as provide an incentive to accurately record this data and further understand the true meaning of favorable precipitation. The table below will help to determine the proper factor to use based on the diameter of the cylinder opening.



**Photo 2:**  
**Portable precipitation gauge with anti-freeze and motor oil utilized with appropriate mixes to fit seasonal changes. Beaker used to measure mL of fluid.**

