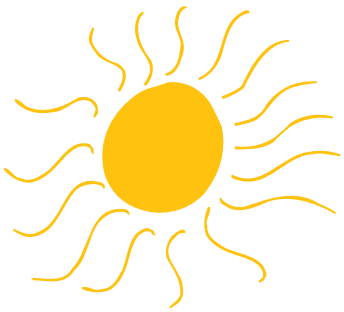

CONSERVING WATER IN AGRICULTURE

Livestock Water Management During A Drought

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When normal range livestock water supplies are reduced, the results can be (1) poor livestock performance and condition, and (2) range damage caused by both overuse and underuse. Locating additional sources of stock water becomes critical to avoid damaging both animals and range resources. The following suggestions may help make the best use of the water that is available.

Springs and seeps

Many areas still exist where springs and seeps can be developed. Any such water source, however small, is vital in a drought year—and it should prove helpful even in normal years. If possible, store the water in a larger tank, then pipe it to a trough(s); this way, you'll increase the usability of even a very slow-flowing spring or seep. A flow of only ½ gallon a minute amounts to 720 gallons a day, which is enough water for 48 cows with calves.

Horizontal wells

Horizontal wells have proved economical and desirable in the Southwest, but little has been done with them in Oregon. A horizontal well consists of a pipe bored at a slight angle down into a hillside to tap small, seepy flows of water. The water is controlled with appropriate valve systems. As with springs, water usually is of high quality.

Deep wells

Although initially expensive, deep wells can provide consistent and reliable supplies of water. To extend a well's usefulness, its water often is piped long distances. Large storage tanks are desirable if you expect wind to be the power source.

Pipeline

High-pressure plastic pipe often is used to carry water over large areas from a central source to watering locations. Piping generally is by gravity. Laying pipe above ground will work as a temporary measure, though the pipe will not last as long as it will if you bury it. Pipelines provide flexibility and conservation—you can turn water on as you need it.

Stock ponds

Once you're in a drought, digging stock ponds may not provide a solution. Chances generally are poor that precipitation will accumulate to fill these ponds. However, if you do build ponds, dig them relatively deep in relation to surface area; then either fence them and pipe water to a trough(s) or provide a livestock walkway.

Fencing and troughing will minimize water loss and improve drinking quality. Ponds lose water through evaporation and seepage. You can reduce both—on either existing or new ponds. Reduce seepage by introducing various soil amendments (bentonite or sodium salts, for example) or by lining the bottom of the pond with plastic.

Plastic bottom lining is not effective on a pond if you expect it to dry out, if nothing shelters it from the next hailstorm, or if it's likely to be trampled by wildlife or livestock.

If you reduce evaporation by covering the water surface with butyl rubber, plastic, floating wax, or polystyrene blocks. you'll increase the yield of usable water.

Water from seasonal streams

You can develop small ponds near seasonal streams and fill them during periods of high water. You could fence these ponds and hold the water until the stream dries up later in the summer, which will provide water further into the grazing season.

Vegetation management

Manage vegetation to improve the capture, storage, and beneficial release of precipitation. If properly managed, vegetation helps protect the soil from raindrop impact during summer and frost formation during winter. It also helps precipitation safely reach and infiltrate the ground, where it can be used by plants or travel underground to springs and seeps.

In uplands, vegetation helps protect the soil from erosion. Downcutting and lowering of the water table might occur if upland soils are not adequately protected.

There are many beneficial effects of riparian vegetation, including the following:

- Reduced stream energy and erosion during runoff
- Sediment trapping, which helps rebuild and maintain streambanks
- Shading and insulation of water during summer
- Reduced ice formation in smaller streams
- Reduced evaporation

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Although streamside vegetation loses water during transpiration, its benefits might outweigh that loss. Therefore, manage vegetation so that watersheds, including the riparian zones, meet overall land use objectives.

Some vegetation manipulations might be helpful. For example, control and eliminate noxious weeds where possible so desirable vegetation can provide site protection and improve watershed conditions.

Vegetation treatment in uplands, where appropriate, might benefit groundwater conditions. For example, juniper frequently invades mountain big sagebrush sites, aspen groves, open meadows, grasslands, and riparian communities. Juniper can intercept, evaporate, and/or transpire much of the precipitation in semiarid environments.

On these invasion sites, the transition to juniper woodland can reduce understory vegetation to the point that the soil no longer is adequately protected. When this happens, runoff may increase erosion and produce downcuts, which eventually might result in lowered water tables.

Prior to this occurring, a well-designed removal of the juniper overstory may enhance understory vegetation, resulting in better capture, storage, and beneficial release of precipitation. This can help maintain stream flows longer into dry season and droughts.

Vegetation management involves complex interactions. Give careful consideration to all vegetation management, including how it impacts livestock water during drought. It is important to be sure that any vegetation removal plan is carefully designed and based on site-specific characteristics.

Water hauling

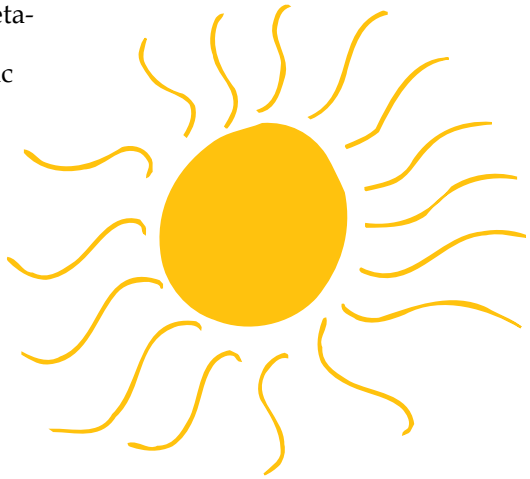
Hauling stock water becomes a viable alternative when no other source of water exists on range and your grazing animals can harvest an adequate supply of forage. Haul your daily water to existing stock tanks, or dump it directly into movable troughs. You also can use large tanks or holding structures and pipe the water into troughs.

On an emergency basis, scoop out small depressions in the soil. Line them with plastic, fence them, fill them with hauled water, and pipe the water to troughs. After the drought is over, you might rehabilitate the area.

Design water-hauling routes in advance. You might need to construct access roads. Try to work access roads in with other needs. Ranchers often find that roads and trails made for water hauling become quite desirable in later years. However, keep in mind that weeds spread along roads, and roads can be a source of erosion problems and sediment in streams.

Plan to water stock in small groups. This will require more watering locations but less frequent movement of locations. It also is less likely to damage range plants.

You could haul water on alternate days for mature dry cows or yearlings if you can't develop adequate storage on site. There should be no permanent weight loss on these classes of cattle with alternate-day



watering. Certainly, the fewer hauling trips you make, the more economical the water will be.

However, if you haul water to cows with calves on alternate days, some weight reduction will occur. You can expect ½ pound less calf gain per day,

Research in eastern Oregon shows the following summer water consumption rates (gallons per day):

- Yearlings, watered daily—8 to 9
- Yearlings, watered every other day—6.5
- Cows and calves—15
- Dry cows—10 to 12

Watering every other day reduces daily intake about 25 percent. You'll need to consider evaporation and spillage losses, too.

Table 1 shows some estimated costs for hauling water over varying distances.

Other considerations

Patrolling range areas might be worthwhile to ensure that livestock are not without water. You could do this with a publicly owned plane or helicopter—perhaps in cooperation with one of the frequent Fish and Wildlife surveys—or through a cooperative arrangement with a neighbor.

Dry cows will graze farther from water than cows with calves—and use less water. If providing water becomes very expensive, weaning calves early would allow you to use range forage more efficiently, at less total cost.

Table 1.—Stock water hauling costs ($ per head per day).*

Round-trip distance (miles)	Cost/trip	Cost/gal water each trip	Water hauled (gallons per head per day)				
			8	10	12	14	16
10	$33.95	$0.034	$0.272	$0.340	$0.407	$0.475	$0.543
20	49.90	$0.050	0.399	0.499	0.599	0.699	0.798
30	65.85	$0.066	0.527	0.659	0.790	0.922	1.054
40	81.80	$0.082	0.654	0.818	0.982	1.145	1.309
50	97.75	$0.098	0.782	0.978	1.173	1.369	1.564

*Assumptions: Labor based on driving time @ 15 mph, 1.5 hours loading and unloading time, @ $12 per hour. Only operating and labor costs are included, assuming that available trucks are used. Cost per mile of truck use is $0.795. Estimates by Bart Eleveld, Extension economist, and Mike Borman, Extension rangeland resources specialist, Oregon State University.

Need for water permits

A permit from the Oregon Water Resources Department to develop water is required for certain actions. These are: (a) springs that are boxed and piped to a trough, and (b) stock ponds, whether in a playa, a drainage way, or a site for diverted water.

No permit is needed to drill a stock water well (whether vertical or horizontal) or to clean out a natural spring and leave it flowing.

If you develop a seep and don't channel it, no permit is necessary; however, for your own protection, it's a good idea to have a permit. Check for policy and legal changes before proceeding.

The permit is for the protection of the owner. On land administered by the Bureau of Land Management, the BLM gets the permit. On National Forest land, the permittee obtains it.

Agency policies also are being evaluated for changes. Check with them in advance.

You can obtain a permit application from watermaster offices and most Natural Resources Conservation Service offices. Enter the legal description of your location to the nearest 40 acres. Address your permit application to: Water Resources Dept., 3850 Portland Rd. NE, Salem, Oregon 97310.

After you file a permit, the Water Resources Department (WRD) normally takes 3 to 8 months to process the permission. However, if you request speedier action because of need—and if your letter accompanies your permit application—you'll usually receive a waiver of this time period. (You might speed up the process by phoning after you file.)

File a completion notice after you complete the development. A representative of the WRD normally will check on completed developments.

Public assistance

Public assistance might be available for some practices related to livestock water. Check with your local Farm Services Agency (FSA) to get information about potential assistance.

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