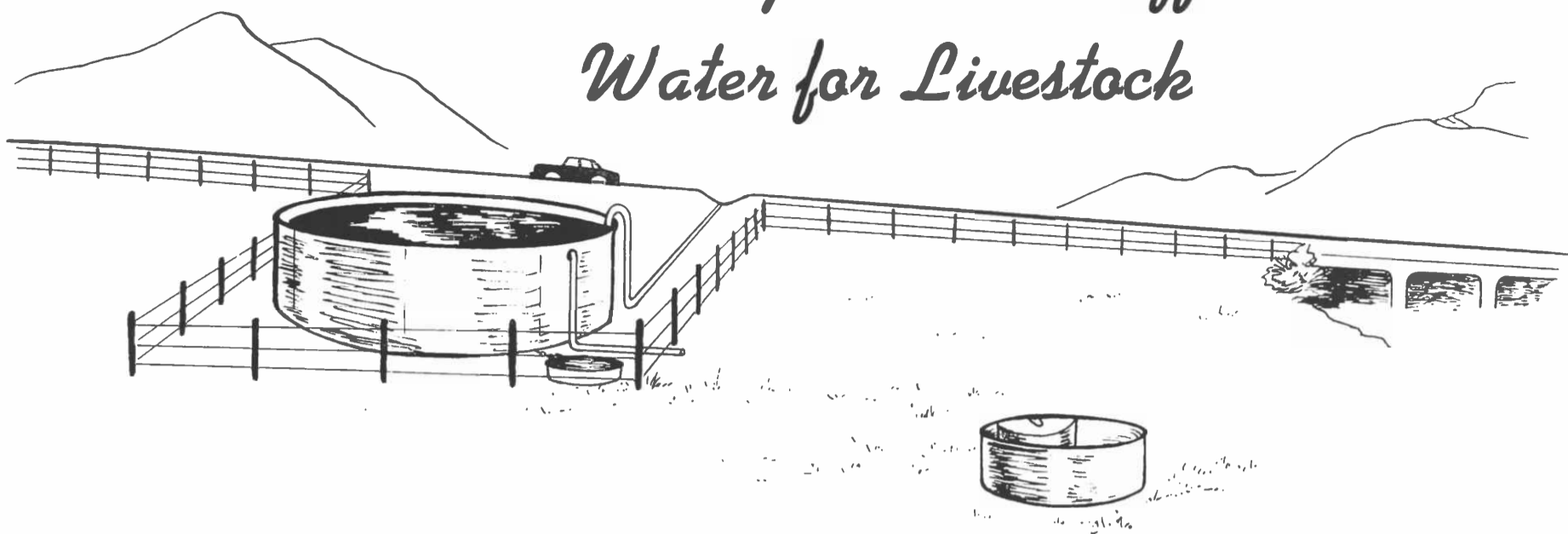


# Saving Road Runoff Water for Livestock



By W. T. Welchert and Robert G. Gray

Several years ago Gunter Prude, Head Stockman for the San Carlos Apache Indian Tribal Council, was touring with a visiting group on the Reservation. During a rainstorm someone remarked that it was too bad that they couldn't catch some of the run-off from the road and store it. Mr. Prude took this matter up with the BIA Land Operations Officer at San Carlos. As a result, a system was developed to intercept highway water run-off.

For those ranch areas fortunate enough to have a satisfactory site such as illustrated, this is a good way to develop a livestock water supply. During a rainstorm look for a point to intercept run-off from an area of 20,000 to 30,000 square feet. If the slope from the intercept to the tank and water trough is adequate, a fairly inexpensive stock water supply can be constructed.

## Get An Adequate Tank

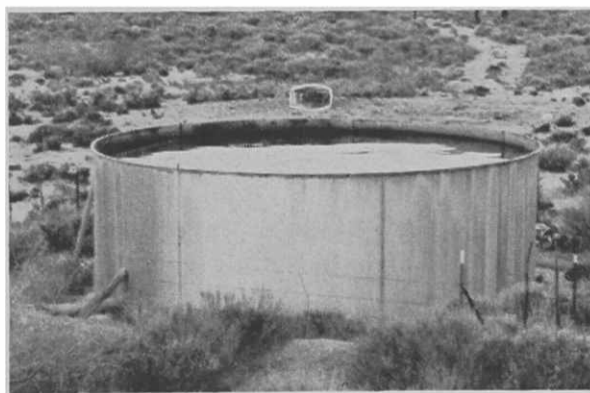
Assuming that the catchment area is adequate, a 50,000 to 100,000 gallon storage tank is desirable. Tank storage capacity can be estimated by determining the range carrying capacity, the length of grazing season, and the character of the precipitation pattern.

For example, assume that the storage will provide water for stock ranging out for one to 1½ miles in all directions (cattle pass under the road). This would include an area of about four sections. If the range will carry

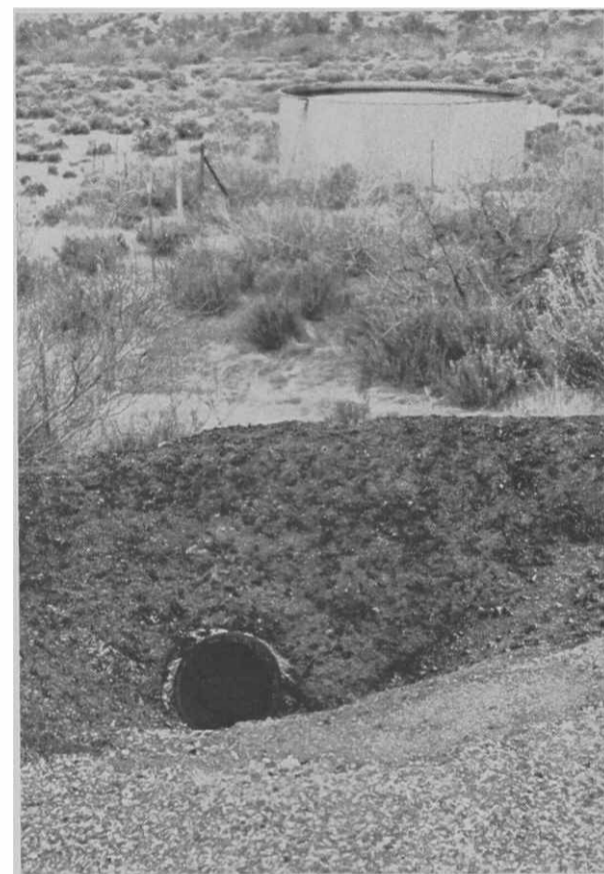
8 head per section, water will have to be provided for 32 head plus calves. Taking 12 gallons per day as the average cow-calf daily water use, the total daily consumption is 384 gallons or 11,500 gallons per month.

Rainfall is related to elevation, but the frequency, intensity and distribution are difficult to predict. In most of the good range areas in the state, about 14 inches per year is expected. About half falls from April through September, and half from October through March. Uneven distribution may yield no water collection in a particular area for six or more months.

Six months of storage will require about 70,000 gallons. Should the grazing season be less than six months,



**CLOSER VIEW OF** the 50,000 gallon storage tank shown above right. Note that tank, when photo was taken in late March, was full. Stock watering tank, as a small dark circle immediately behind the storage tank, can be seen in background. Fence around storage tank protects it from livestock.



**THIS PHOTO SHOWS** actual installation of the road catchment basin and storage tank. In foreground, on edge of blacktop roadway, is pipe opening, while in the background is the storage tank. This set-up is along highway 70, the Safford-Globe road, and located about 10 miles east of Globe.

storage capacity may be proportionately less. If several watering troughs are fed by gravity through a pipe distribution system some distance from the storage tank, a considerable area can be served by one storage tank. In that case, the storage tank should be that much larger.

## Actual Rainfall Impressive

Few people realize how much water falls on an area of 10,000 square feet — an area 100 feet square, 100

“Ted” Welchert, as he is popularly known by the many Arizonans who have profited from his capabilities, is agricultural engineer in the Extension Service. “Pat” Gray is county agent in Gila County. This is one of several practical schemes on which these two have collaborated. Others are cattle traps, horse corrals, and a variety of devices helpful to the cattleman and rancher.

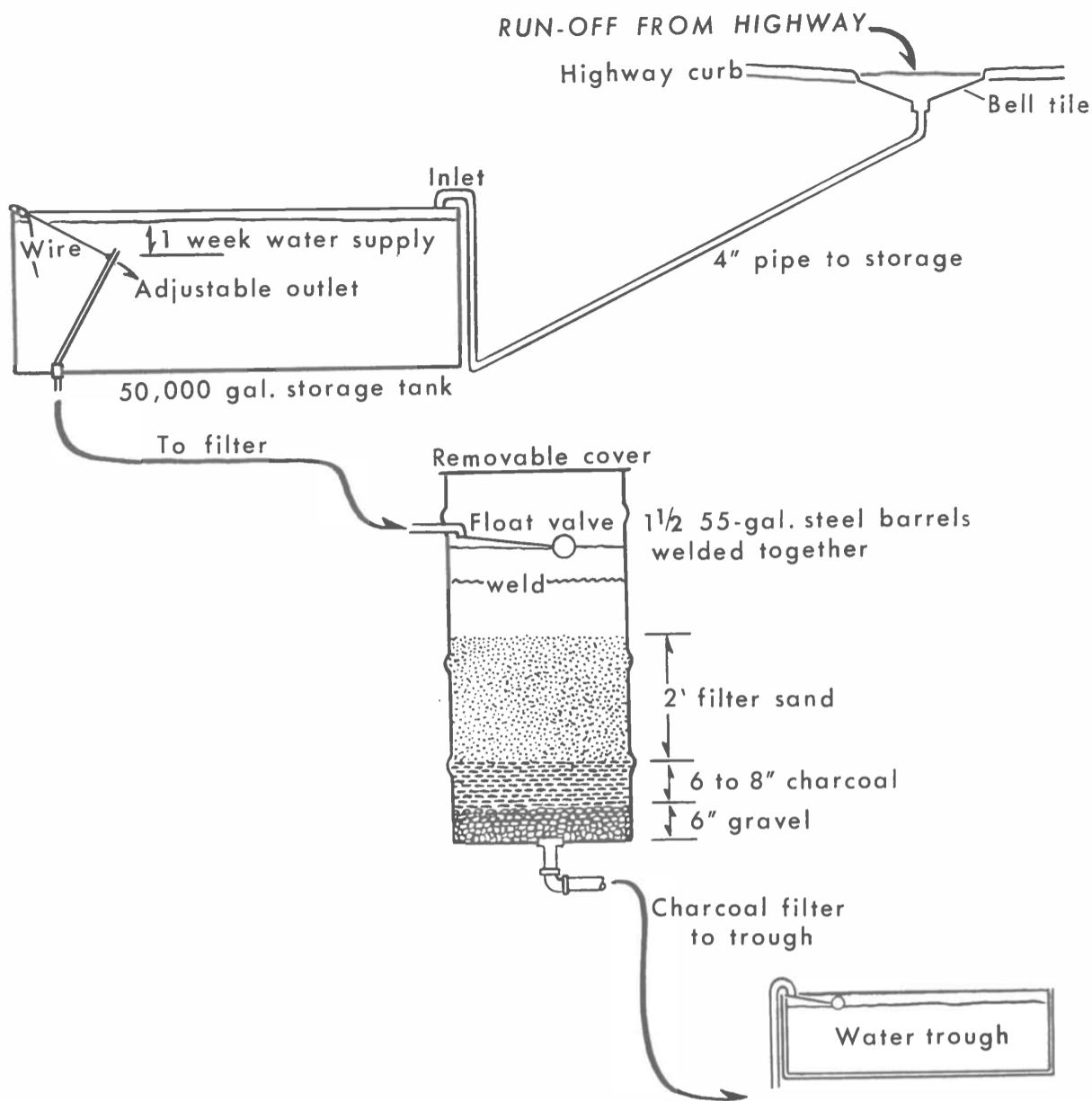


DIAGRAM ABOVE OUTLINES exact setup of entire operation, from highway runoff to storage tank, filter and thence to watering trough.

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### Theoretical Storage from 10,000 Square Feet Run-off Area

feet on each side. If the area is impermeable, shaped and sloped right so that all the water will run off, the total water collected is impressive. Eight inches of summer rains, assuming no loss, would total 50,000 gallons. Note the accompanying table.

In the device described here, the water inlet to storage should be large enough to handle road runoff. A minimum of 4-inch pipe is suggested. An overflow pipe may or may not be used to control the direction of excess water in case the storage cannot handle all of the run-off.

The outlet system should include provision for drainage and cleaning of the tank periodically. On steel tanks, a rubber gasket manhole cover in the side of the tank might be considered for easy cleanout.

The outlet may be screened and adjustable for various heights inside the tank. A float controlled tube is not as good as an adjustable elbow with pipe extension. (See diagram.) An adjustable pipe extension set about a foot below the surface, (or a week's water supply) has an advantage should the stock trough float fail.

Precip. (inches)	Storage (gallons)	Precip. (inches)	Storage (gallons)
0.1	625	1.0	6,250
0.2	1,250	2.0	12,500
0.3	1,875	3.0	18,750
0.4	2,500	4.0	25,000
0.5	3,125	5.0	31,250
0.6	3,750	6.0	37,500
0.7	4,375	7.0	43,750
0.8	5,000	8.0	50,000
0.9	5,625	9.0	56,250

Only a week's water supply is lost, whereas the entire water supply may be lost with other systems. All water supplies should be checked and adjusted at least twice a week. A shut-off valve near the tank is necessary for servicing components below the storage tank. An adjustable pipe outlet system can be used as a shut-off valve by raising the pipe extension above the water storage line.

### Protect Float Valves

Float valves on both the filter and water trough should be protected. Normally the successful installation of such a system requires some water

## INSECTS' RADAR DEFENSE

Researchers, trying to develop electronic devices that will send noises over farm fields to drive insects away, have been learning things from South Carolina experiments.

When bats hunt at night, they emit high-pitched cries and listen for echoes that bounce off their insect prey. But the insects can pick up the sound waves of the bat squeaks and take evasive action.

Scientists have now been able to reproduce sounds that make bollworm moths react as if to bat squeaks.

head differential between the bottom of the storage tank, and the top of the filter system, and again to the water trough. This can vary from 2 to 100 feet. One alternate that may work is to place the water trough at the same level as the filter. The filter float is then used to also control the water level of the trough.

A water palatability problem may develop on asphalt-covered catchment systems. Filters are used to remove solid materials from the water. Filtering does not necessarily remove bacteria. Good filters are made of fine sand, wood, charcoal, (the pieces averaging the size of wheat grains) and gravel.

The sand filters out solid materials, the charcoal removes color, taste and odor, and the gravel prevents the loss of sand and charcoal. The sand bed should be about 2 feet thick, the charcoal and gravel each about 6 inches. As the surface sand becomes clogged, half an inch should be scraped off. Do not allow the bed to be reduced less than one foot in thickness. The charcoal should be changed annually.

### Between Storage and Use

One of the accompanying drawings illustrates a sand-charcoal-gravel filter. Such a filter should be installed between the storage tank and the water trough. The rate of flow through a filter of this type is about 10 gallons per hour per square foot.

A 55-gallon barrel, such as indicated in the diagram, has about three square feet of surface area, thus 30 gallons per hour could be expected to filter through to the stock tank.

This is about the expected usage of a stock water trough. However, the water trough should have a sufficient reserve capacity, estimated at 200 gallons — in order to take care of peak demands at morning and evening. Also, if the watering area is to be used as a stopping off spot for cattle drives, it would be necessary to have a larger water trough and also, in that case, larger filtering capacity.