


DEPARTMENT OF THE INTERIOR
BUREAU OF GEOLOGICAL SURVEY
DIVISION OF WATER RESOURCES
WATER RESOURCES DIVISION



Spring 28/61-11d1 discharging from alluvium in Northern Butte Valley.

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WATER RESOURCES-RECONNAISSANCE SERIES

REPORT 49

WATER-RESOURCES APPRAISAL OF BUTTE VALLEY, ELKO
AND WHITE PINE COUNTIES, NEVADA

DESERT RESEARCH INSTITUTE

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Table 6.--Estimated average annual runoff

Mountain segment	Location	Runoff area (acres)	Estimated runoff (acre-feet per year)
<u>NORTHERN BUTTE VALLEY</u>			
Cherry Creek Range	North and west flanks of mountains above 7,000 feet	18,000	1,900
Spruce Mountain	Southwest flank of mountain above 7,000 feet	4,600	600
Medicine Range and Valley Mountain	Northeastern flank of Medicine Range and southeastern flank of Valley Mountain above 7,000 feet	5,400	180
Subtotal (rounded)		28,000	2,700
<u>SOUTHERN BUTTE VALLEY</u>			
Cherry Creek Range	West flank of mountains above 7,000 feet north of road connecting Butte Valley and Cherry Creek	25,000	4,000
Cherry Creek Range	West flank of mountains above 7,000 feet south of road connecting Butte Valley and Cherry Creek	28,000	1,700
Egan Range	West flank of mountains above 7,000 feet	27,000	1,600
Butte Mountains and Medicine Range	East flank of mountains and southeast flank of range above 7,000 feet	47,000	2,100
Subtotal (rounded)		127,000	9,400

of the average annual precipitation recharges the ground-water reservoir. Hardman (1965) showed that in gross aspect the average annual precipitation in Nevada is related closely to altitude and that it can be estimated with a reasonable degree of accuracy by assigning precipitation rates to various altitude zones. Estimates of recharge are shown in table 7. The estimated average annual precipitation on Butte Valley is about 560,000 acre-feet, and the estimated average annual recharge is about 19,000 acre-feet. Thus, about 3.4 percent of the total precipitation is computed to reach the ground-water reservoir.

Much of the recharge probably occurs by seepage loss as the streams cross the alluvial fans; however, the estimated mean annual runoff at the valley fill-consolidated rock contact of 12,000 acre-feet is considerably less than the estimated average annual recharge of 19,000 acre-feet. Much of the recharge reaching the valley floor may occur in the mountains by infiltration of precipitation and runoff into the carbonate rocks. The highly transmissive and structurally deformed character of the carbonate rocks can strongly affect the magnitude and direction of ground-water flow through these rocks. Therefore, the recharge boundaries, arbitrarily chosen to be coincident to surficial drainage boundaries for the compilation of table 7, may not be correct. However, because of the reconnaissance nature of the study and the lack of conclusive data that would permit a more accurate determination of recharge boundary locations, the surficial drainage boundaries were utilized for computation purposes. Some of the recharge in the mountains of southern Butte Valley may actually be moving as underflow through the carbonate rocks to northern Butte Valley or to adjacent valleys.

Table 7.--Estimated average annual precipitation and ground-water recharge

Altitude zone (feet)	Estimated annual precipitation		Estimated recharge	
	Area (acres)	Range (inches)	Average (acre-feet)	Assumed percentage of precipitation per year)
<u>NORTHERN BUTTE VALLEY</u>				
Above 9,000	1,100	20+	1.8	25
8,000-9,000	6,900	15-20	1.5	15
7,000-8,000	19,500	12-15	1.1	7
6,000-7,000	141,000	8-12	.8	3
Below 6,000	2,000	<8	.4	--
Subtotal (rounded)	170,000		140,000	3,900
<u>SOUTHERN BUTTE VALLEY</u>				
Above 9,000	3,200	20+	1.8	25
8,000-9,000	21,600	15-20	1.5	15
7,000-8,000	95,100	12-15	1.1	7
Below 7,000	345,000	<12	.8	3
Subtotal (rounded)	465,000		420,000	15,000
Total (rounded)	635,000		560,000	19,000

a. Most of this area is underlain by alluvium where the estimated 8 to 12 inches of precipitation probably supplies negligible recharge. About 15,000 acres in northern Butte Valley and about 70,000 acres in southern Butte Valley are assumed to be effective for estimating recharge by this method.