TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE Boise, Idaho SOIL CONSERVATION SERVICE

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The following information, taken from a technical note prepared by California, was submitted by Roche D. Bush, Range Conservationist.

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The information in this note is intended to be an aid to planning and application of range conservation practices to attain range proper use.

"THE INFLUENCE OF SLOPE GRADIENT, DISTANCE FROM WATER, AND OTHER FACTORS IN LIVESTOCK DISTRIBUTION ON NATIONAL FOREST CATTLE ALLOTMENTS OF THE INTERMOUNTAIN REGION"

The source of this information is from a study on National Forest allotments in Idaho and Nevada made by Thomas A. Phillips, Range Conservationist, Sawtooth National Forest.

Although the forage species involved in the study are different than those found on California annual ranges, the factors affecting livestock distribution have equal application here. An exception to this is the coastal areas where placement of aalt may not materially influence grazing distribution. In the study, distances were measured in chains. These distances have been converted to miles on the attached charts.

This material was taken from Range Improvement Notes, Vol. 10, No. 3, dated July, 1965, published by the Intermountain Region, Forest Service, U. S. Department of Agriculture, Ogden, Utah.

Attachments

"THE INFLUENCE OF SLOPE GRADIENT, DISTANCE FROM WATER, AND OTHER FACTORS ON LIVESTOCK DISTRIBUTION ON NATIONAL FOREST CATTLE ALLOTMENTS OF THE INTERMOUNTAIN REGION"

Effects of Slope Gradient and Distance from Water

Utilization decreased rapidly as slope gradient and distance from water increased; however, slope gradient influenced utilization to a greater extent than did distance from water (Figure 1). For example, at 10 chains from water, utilization averaged 64 percent on a 10 percent slope gradient, but only 27 percent on a 30 percent gradient, and 11 percent on a 50 percent gradient.

Utilization decreased most rapidly within 10 chains of water on all slope gradients, but the rate of decrease per chain of distance from water became more pronounced, with increased slope gradient (Table 1). On the 10 percent slope gradient, use declined at the rate of 3.6 percent per chain increase in distance from water; while on the 30 percent gradient, the rate of decrease was 7.2 percent per chain. The highest rate of decrease occurred on the 50 percent slope gradient where use declined at the rate of 8.9 percent per chain of distance from water.

Utilization was evident at a much greater distance from water on the gentler slopes than on the steeper slopes. Discernible use extended to approximately 100 chains from water on the 10 percent slope gradient, but only to 23 chains on the 30 percent gradient, and to 14 chains on the 50 percent slope gradient.

Table 1. Decrease in utilization per chain increase in distance from water on average slope gradients of 10, 30 and 50 percent.

Average Slope Gradient %	Distance from water in 10 chain intervals						
	0-10	11-20	21-30	31-40	41-50	51-60	61-70
	Percent Decreased in Utilization per Chain of Distance from Water						
10	3.6	1.8	1.1	0.7	0.5	0.5	0.4
30	7.2	2.5					
50	8.9						

Effect of Salt

Salt significantly influenced utilization at all distances from water. Average utilization increased 12 percent at 5 to 10 chains from salt grounds where such grounds were located within 60 chains of water. Beyond 60 chains, utilization decreased regardless of the presence of salt, but the rate of decrease per chain of the distance from water was much lower in areas where salt was present. The characteristic use pattern was one of heavy use in the vicinity of water; decreasing use away from water to within approximately 10 chains of salt; then increased use in the vicinity of salt; followed by a rapid decline in use beyond salt in the direction away from water. (Figure 2).

Effect of Shade

Shade and salt influenced utilization in a similar manner (Figure 3). On areas between shade and water, utilization increased 10 percent at a distance of 10 chains from shade, but then decreased rapidly beyond shade in the direction away from water.

Effect of Aspect

Average utilization was 7 to 13 percent lower on north exposures than on south, east, or west exposures. Heaviest use, and the widest spread in use, occurred on the 0 to 10 percent slope gradient interval. As slope gradient increased utilization declined on all exposures and the spread in utilization among exposures gradually narrowed. On 0-10 percent slope gradients, utilization averaged 54 percent and was 17 to 22 percent lower on north exposures than on other exposures, while on a 45 percent gradient, utilization averaged 4 percent and was 0 to 7 percent lower on north exposures than on other exposures (Figure 4). It is not clear why utilization was significantly lower on north exposures. Lighter use could be expected on steep north exposures due to the adverse effects of shade on forage palatability. However, this was apparently not a factor on this study since the widest spread in utilization occurred on the gentler slopes where shading would have little effect on forage palatability.

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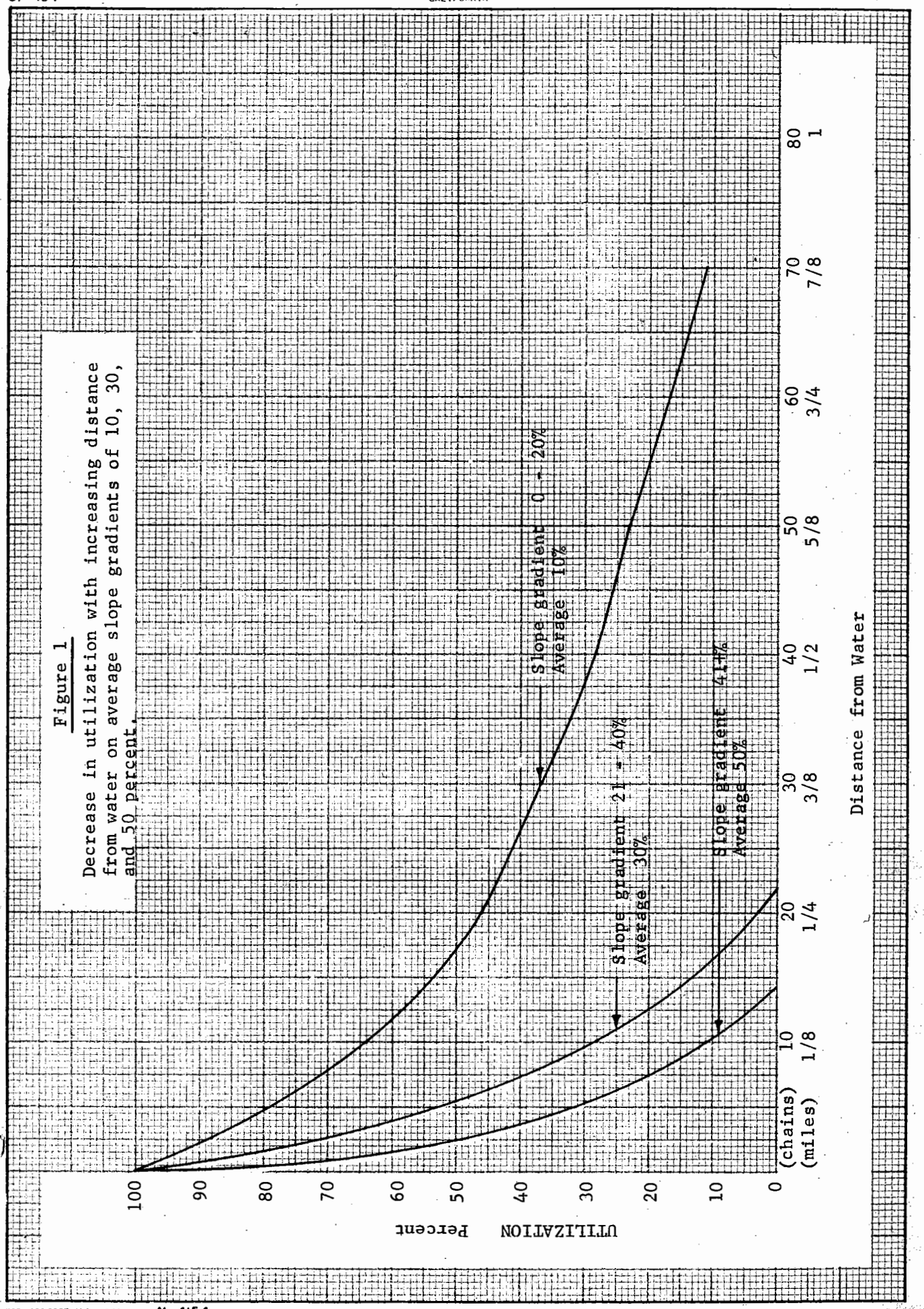

Figure 1

Decrease in utilization with increasing distance from water on average slope gradients of 10, 30, and 50 percent.

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Figure 2

Effect of salt on utilization in areas between salt and water and in areas beyond salt and away from water. (Salt grounds less than 60 chains from water and on slope gradients less than 20 percent)

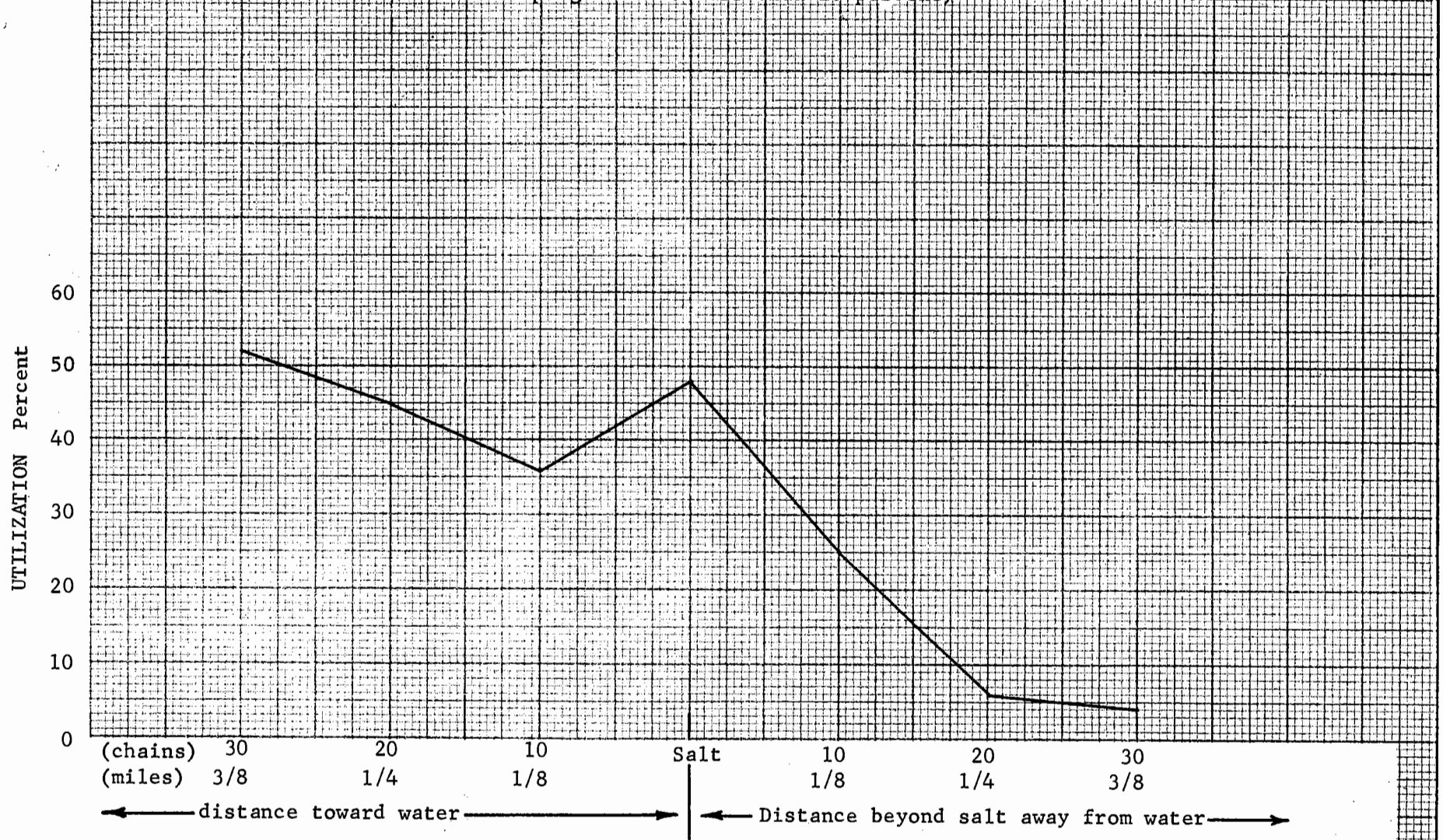

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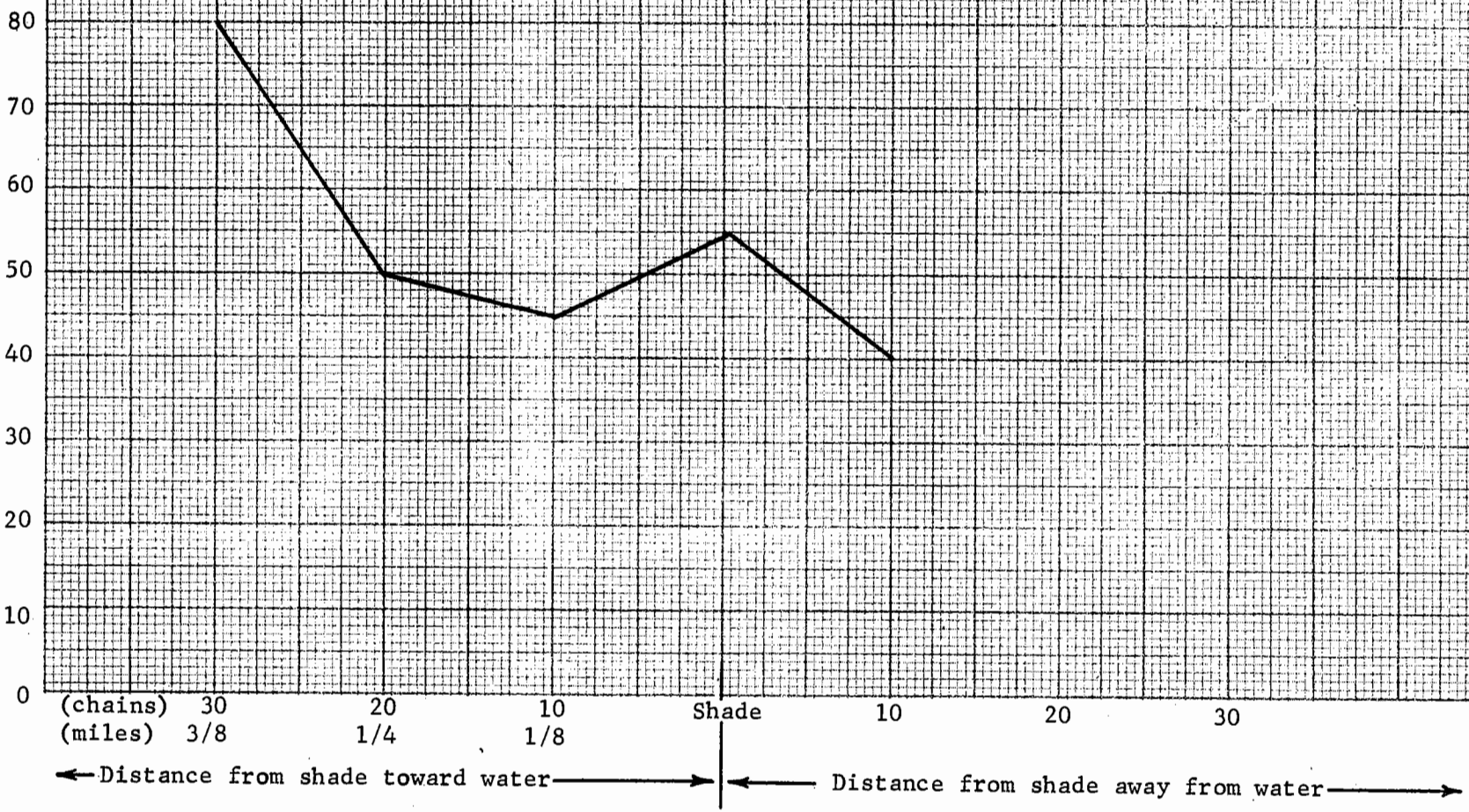
Figure 3

The effects of shade on utilization in areas between shade and water and in areas beyond shade and away from water. (Slope gradient less than 20%)



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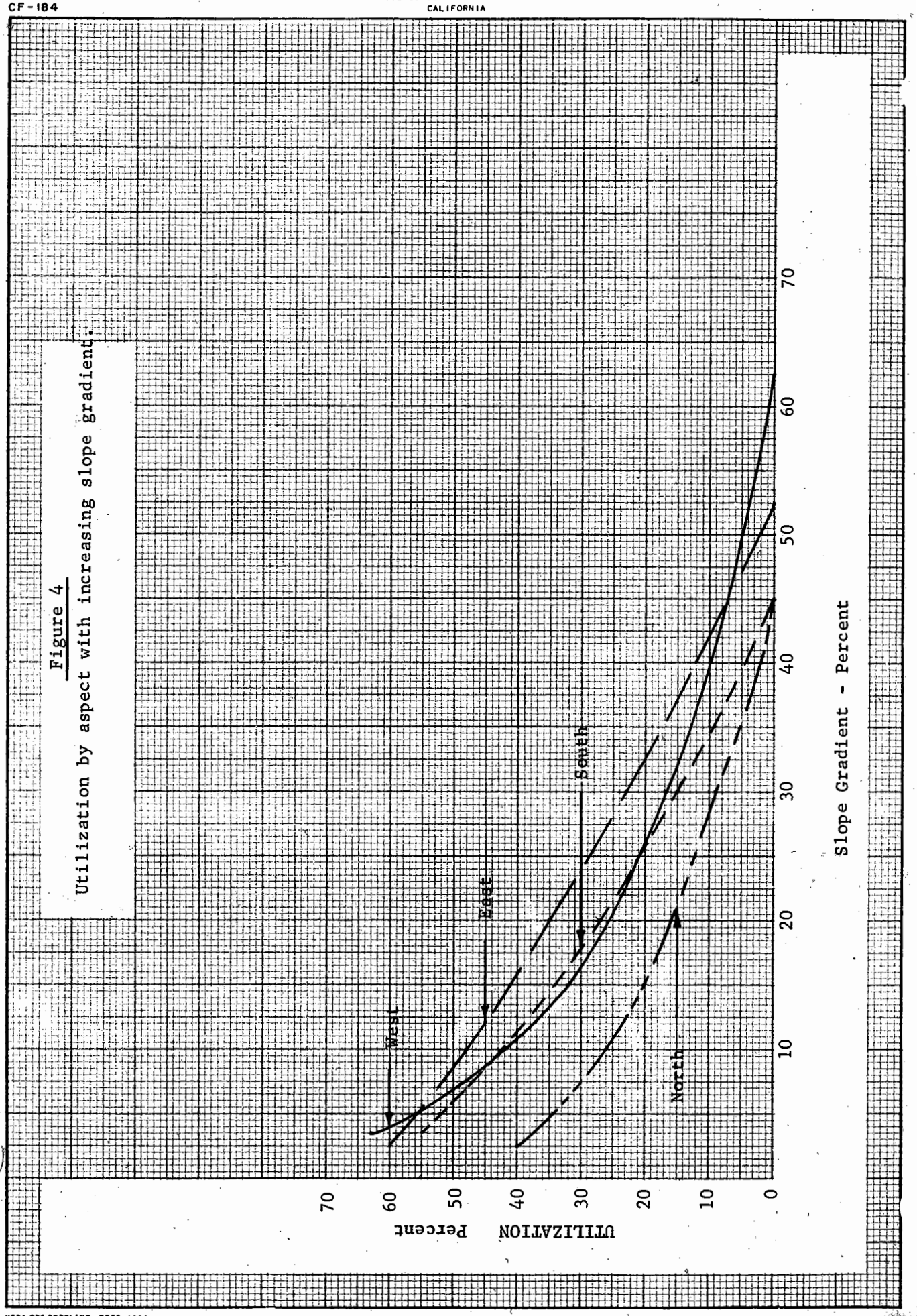

Figure 4

Utilization by aspect with increasing slope gradient.

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