

Grazing/Carrying Capacity Estimate for Eiad Eltawil, 5360 Box R Ranch Road, Vacaville, CA

The information below provides a carrying capacity estimate for Eiad's grazing operation, followed by an estimate of how many goats could be supported within the calculated carrying capacity. Some assumptions were made, and stated, based on conversations with Eiad regarding his management intentions over a period of many years.

The property at 5360 Box R Ranch Road consists of San Ysidro sandy loam soils while the parcels to the south that are part of the same grazing operation consist of three soil types: San Ysidro sandy loam, Pescadero clay loam and Solano loam. According to the USDA Soil Survey for Solano County, these soils, when managed as irrigated pasture, can support 12 animal unit months per acre (AUM/acre) per year. The grazed area is comprised of four grazing units with a combined total of approximately 70 acres.

Calculation of the total AUMs per year for the 70 acres of irrigated pasture:

$$12 \text{ AUM/acre} \times 70 \text{ acres} = 840 \text{ AUM/year}$$

This suggests that the 70 acres of irrigated pasture has a carrying capacity of 840 AUM/year. The next step is to equate 840 AUMs to a number of goats.

Livestock operations with breeding animals typically have variable numbers of animals throughout the year and nutrient requirements and forage demands that vary according to animal numbers, animal size and physiological stages. Adult animals have a higher forage demand than younger, smaller animals and lactating females will have higher forage demand than non-lactating animals. To estimate forage demand throughout the year I am assuming that breeding does will nurse their kids for six months, after which kids will be weaned and sold. Under this scenario the ranch will have pairs of breeding does (female goats) with kids for 6 months and non-lactating does without kids for six months.

In order to calculate forage demand, doe-kid pairs and non-lactating does require animal unit (AU) equivalents for six month periods. I used AU equivalents provided by Vallentine (2000):

$$1 \text{ doe-kid pair} = 0.24 \text{ AU} \times 6 \text{ months} = 1.44 \text{ AUM/doe-kid pair}$$

$$1 \text{ doe, non-lactating} = 0.17 \text{ AU} \times 6 \text{ months} = 1.02 \text{ AUM/doe, non-lactating}$$

Estimates of annual forage demand is calculated using the above assumptions and AU equivalents:

$$340 \text{ doe-kid pairs} \times 1.44 \text{ AUM/doe-kid pair} = 347 \text{ AUM}$$

$$340 \text{ does, non-lactating} \times 1.02 \text{ AUM/doe, non-lactating} = 490 \text{ AUM}$$

$$347 \text{ AUM} + 490 \text{ AUM} = 837 \text{ AUM}$$

This suggests that 340 breeding does, that nurse kids for six months each year, will have a forage demand just under the estimated carrying capacity of 840 AUM on the 70 acre operation.

There may be some mismatches in forage production and forage demand throughout the year, which can be buffered with supplemental feed during times of forage deficits. One important factor that will increase forage demand is maintaining does that kid twins or triplets. The above forage demand estimate assumes each doe will have only one kid per year. If does tend to have twins or triplets, then the number of breeding does should be reduced to a level that will match the carrying capacity.

Vallentine, J.F., 2000. *Grazing Management*. Elsevier.

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