

Visually Estimating Residual Dry Matter - A training tool for land managers and ranchers on East Bay Municipal Utility District Mokelumne Watershed Unit

By: Scott Oneto, Theresa Becchetti, University of California Cooperative Extension

Residual dry matter (RDM) is a standard used by land management agencies for assessing the level of grazing use on annual rangeland and associated savannas and woodlands. RDM is the old herbaceous plant material left standing or on the ground at the beginning of a new growing season. It indicates the combined effects of the previous season's forage production, breakdown over summer, and its consumption by grazing animals of all types. The standard assumes that the amount of RDM remaining in the fall, subject to site conditions and variations in weather, will influence subsequent species composition and forage production. Properly managed RDM can also be expected to provide a high degree of protection from soil erosion and nutrient losses.

For RDM management purposes, East Bay Municipal Utility District (EBMUD) Mokelumne Watershed Unit has adopted RDM thresholds for grazing lands in the Mokelumne watershed based on University of California standards. For RDM management purposes, California grasslands and associated oak woodlands and savannas can be divided into three types: **dry annual grasslands** (these are annual plant dominated with average annual rainfall less than 12 inches); **annual grasslands/hardwood range** (these are annual plant understory with variable oak or shrub canopy with average rainfall between 12 and 40 inches); and **coastal prairie** (these are dominated by both perennial and annual grasses, variable woody overstory and variable rainfall). The grazing lands within the EBMUD Mokelumne watershed all fall into the **annual grasslands/hardwood range**. RDM is evaluated based on two major site characteristics, plant woody tree cover and percent slope. Based on these factors, RDM is then classified into three categories; Below, Target, or Above threshold.

Woody Cover	0 – 20% Slope	>20% Slope
0 – 25	<500; T; >750	<750; T; >1000
25 – 50	<500; T; >750	<750; T; >1000
50 – 75	<500; T; >750	<500; T; >750
75 – 100	<500; T; >750	<500; T; >750

*Rated at Below, Target and High residual dry matter (RDM). Measured in lbs./acre

Estimating Residual Dry Matter

A variety of means are available for estimating RDM. The two most common methods are clipping and visual assessment. Clipping can be extremely accurate for determining the RDM at a defined location on the landscape. Clipping is also an extremely valuable tool for training one's eyes for visual assessments of entire pastures or the landscape.

Clipping a Plot

The technique for clipping a plot for RDM measurement varies between agencies and individuals. The following procedure, recommended by the University of California, is the method that was used in the research on which the guidelines are based.

1. Place the quadrat (usually 1 square foot) on the ground surface.
2. Remove all summer annuals such as tarweed, yellow starthistle, and turkey mullein as well as tree leaves.
3. It is important to groom the forage to make sure that you only clip the forage that is rooted in the quadrat.
4. Clip the plant material within the quadrat as close to the ground surface as you can without disturbing the soil.
5. Collect as much of the clipped plant material as is practical without inadvertently including bits of soil.
6. Weigh the dry plant material (1 gram per square foot = 96 pounds per acre). The plant material should be air dry in October or November unless there has been unusually early rain.

Visual Monitoring

In order to visually estimate RDM for an individual pasture or across the landscape, it is critical to calibrate your eyes to recognize a number of RDM levels. Based on EBMUD's thresholds, the following RDM levels can be a good basis for training one's eyes; 0, 500, 750, and >1,000 pounds/acre. It is important to recognize that the aforementioned values may look different from pasture to pasture. For example a pasture comprised entirely of grasses that is estimated to be at 750 pounds per acre, will look drastically different than a pasture that is comprised of grasses and broadleaf plants at the same level. Each season, you should start by clipping around 12 plots to train your eye.

Visually Estimating RDM

0 pounds / acre



Key Features:

- Bare ground
- Manure and rocks highly visible
- Only non desirable summer annuals present

Visually Estimating RDM 500 pounds / acre



Key Features:

- Some bare ground may be present
- Vegetation sparse and low, patchy appearance
- Vegetation often ranges from 0-4 inches tall
- Manure visible

Visually Estimating RDM

750 pounds / acre



Key Features:

- Minimal to no bare ground
- Vegetation sparse
- Vegetation often ranges from 0-7 inches tall
- Manure visible

Visually Estimating RDM

750 pounds / acre



Key Features:

- Minimal to no bare ground
- Vegetation sparse
- Vegetation often ranges from 0-7 inches tall
- Manure visible
- This pasture contained clover

Visually Estimating RDM 1000 pounds / acre



Key Features:

- No bare ground
- Vegetation often ranges from 6-16 inches tall
- Manure slightly visible

Visually Estimating RDM

2250 pounds / acre



Key Features:

- No bare ground
- Vegetation thick, appearing ungrazed
- Vegetation often ranges from 8-20 inches tall
- Manure slightly visible

Visually Estimating RDM 3400 pounds / acre



Key Features:

- No bare ground
- Vegetation thick, appearing ungrazed
- Vegetation often ranges from 12-24 inches tall
- Manure not visible