

Wildland Solutions

RDM Monitoring Procedure

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November 2007 version

Annually create an RDM zone map and a pasture success map with supporting information collected at monitoring reference sites that shows how well each pasture/management unit meets established RDM objectives for a property. A three part process is involved.

1. Prior to monitoring there is a need to establish the RDM classes to be utilized. The RDM classes of course need to reflect RDM objectives for the site.
2. Collection of supporting information at RDM reference monitoring sites.
3. Development of an annual pasture success map.

Part 1: Establish RDM classes to be utilized in monitoring

Prior to field mapping a decision needs to be made as to what and how many RDM classes are to be utilized. There is no specific best number, some examples are:

A minimum of 2 classes is required.

- Meets the objective
- Does not meet the objective.

UCCE publication 8092 (2006) recommends the use of 3 RDM classes:

- RDM level is high (exceeds the objective)
- RDM level is moderate (meets the objective)
- RDM level is low (below the objective)

Hormay and Faucett, USFS technical note 21 (1942) used 7 classes:

- None use
- Very light use
- Light use
- Moderately light use
- Moderate use (recommended level of use)
- Close use
- Very close use

The RDM classes utilized for monitoring RDM on a typical California annual grassland site producing 1,800-2,000 lbs/acre could be as follows:

- RDM is more than 1,600 lbs/acre
- RDM is between 1,200-1,600 lbs/acre
- RDM is between 800-1,200 lbs/acre (established objective)
- RDM is between 400-800 lbs/acre
- RDM is below 400 lbs/acre
- RDM has been removed by fire and is below 100 lbs/acre

The RDM classes utilized for monitoring RDM on a highly productive coastal prairie site producing 4,000 lbs/acre could be as follows:

- *RDM exceeds 3,600 lbs/acre*
- *RDM is between 2,400-3,600 lbs/acre*
- *RDM is between 1,800-2,400 lbs/acre*
- *RDM is between 1,200-1,800 lbs/acre (established objective)*
- *RDM is between 600-1,200 lbs/acre*
- *RDM is below 600 lbs/acre*
- *RDM has been removed by fire and is below 100 lbs/acre*

Part 2: Collect supplemental supporting information at reference monitoring sites.

Supplemental information can be collected at selected reference monitoring sites to validate and document what the person conducting the RDM zone mapping is seeing. Information collected at the reference monitoring sites is not intended to be extrapolated as representing the entire management unit or pasture. The information is intended to represent that portion of the pasture being surveyed and serve as a reference for documenting the status of a specific RDM zone.

First step - Locate reference monitoring sites

Reference monitoring sites are located in a manner that samples and records the general condition of a portion of a management unit or pasture. Reference monitoring sites are used to provide supporting documentation for the RDM zone maps. The number of reference sites in a pasture depends on the size and complexity of the pasture. A minimum of one reference site is usually established in each pasture with additional monitoring sites added when pastures are over 600 acres.

Reference monitoring sites are typically:

1. Located within a uniform vegetation type, and capable of responding to management actions. *The site should have relatively uniform vegetation and preferably be 1 acre in size.*
2. Located away from water. *1/4 mile is a distance that should avoid the heavy use of sites often associated with water developments.*
3. Located for good access. *Sites should be accessible to facilitate monitoring, avoid sites that are within 20 feet of a road or 50 feet of a fence.*
4. Located on a site that is capable of producing herbage typical of the area. *For the typical California annual grassland site that would mean an area capable of producing 2,000 lbs/acre of RDM.*

Reference monitoring sites at times may be established in low use areas and high use areas to better document the actual range of impacts that may be occurring on large diverse management units. When interpreting an RDM zone map, a reference monitoring site in a potentially high use area near water that has an RDM level that meets the established RDM goal would imply that the pasture as a whole meets

the RDM objective. A reference monitoring site in a potentially low use area with an RDM level that does not meet an established RDM objective would reinforce the point that more than likely most of or all of the pasture did not meet the RDM objective.

Second step - record photo points at reference monitoring sites

1. A Robel pole is placed at a point that shows representative use of the vegetation within the vicinity of the reference monitoring site.
2. Two golf balls are placed about 6" apart on each side of the Robel pole. If vegetation is matted the golf balls are placed on the ground not on the vegetation, in a manner that helps to show herbage quantity.
3. Photos are taken looking in a northerly direction. Photos taken looking north reduce any potential glare on the camera lens and provide optimum light on vegetation.
4. A tripod is utilized to provide more stable pictures with better clarity.
5. The first picture is taken from about a 10 foot distance with tripod set at 5 feet height. With a digital camera it is zoomed in to a point that still includes all 4 golf balls.
6. A second more distant picture is taken from 20 feet with tripod set at 5 feet height. The camera is zoomed to a setting where the Robel pole height appears to be about 1/2- to 2/3 of the picture frame height.
7. The film numbers or digital photo numbers of each picture is recorded on a worksheet for each photo as the photos may all look alike at a later date. A consistent numbering system is utilized. An example is pcr023dy where pcr is the property code, the number is the reference monitoring site number the d is distance of photo N or G, Near or General and the last 2 digits are the year of photo. Consistent numbering helps transfer field data smoothly into the annual report. With digital cameras the date stamp is utilized when available. A 1.2 megapixel image size is considered adequate as photos for most reports do not need to exceed 3"x5".

Third step - estimate RDM class at monitoring reference sites

An estimate of RDM herbage is made utilizing the RDM classes established in part one of the monitoring plan. The classes are used with the desired goal usually being the middle class and 2-3 classes above and 2-3 classes below the desired level plus the burned by fire class.

Clipping and weighing of RDM is conducted as needed to confirm that estimates are being made accurately. The procedure for clipping and weighing RDM is described in the *Wildland Solutions Residual Dry Matter (RDM) Monitoring photo-guide and the UCCE publication 8092. The scales for weighing RDM are set to 0 with the bag attached or the weight of the bag that holds the RDM is subtracted after weighing.*

Fourth step - document any additional information

Additional information such as visual estimates of plant composition, weedy species, noxious weeds, perennial grasses, unusual wildlife seen, GPS coordinates, general location and anything of note that might be of use to future managers is added as comment notes on a standard form for the project. The

amount and types of supplemental data collected will vary depending on the needs of each project. A sample form is shown on page 9.

Fifth step - transfer field information to digital format.

This step provides the ability to archive the field data collected and make multiple copies for future reference and analysis. A format that uses a MS WORD based form allows efficient entry of data.

Sixth step - create a supporting report

The GIS database developed for the monitoring reference sites can be utilized to create a summary report for inclusion in the appendix of the annual RDM monitoring report.

Seventh step – add reference monitoring site locations to the RDM zone map

Placing the location of the monitoring reference sites on the RDM zones map created for the project provides the ability for anyone to easily review the data collected for specific reference sites. The ability for managers to be able to readily identify reference sites that have unusually high or unusually low levels of RDM is a very useful feature when assessing grazing patterns and making management adjustments.

Part 3: Develop RDM zone and pasture success maps

RDM zone or use-pattern maps are developed to show RDM levels that occur within a pasture at the time a survey is made. Pastures typically have a variety of soils, aspects, vegetation and non-uniform livestock use that requires interpretation when developing an RDM zone map.

First step – collect field data

A 1:24,000 scale USGS topographic map, which includes management unit or pasture boundaries and important features such as livestock water, fences and roads, is utilized as a base field map for recording data.

Mapping of RDM zones is conducted by visually examining an adequate amount of the pasture to determine and map which of the 3-7 RDM classes occur within the pasture. A combination of reference photographs, descriptive narrative and clipping and weighing RDM within representative areas is utilized to determine the RDM class for a particular portion of a pasture (Guenther 1998). Mapping units are generally no smaller than 20 acres. The RDM zones are delineated and recorded before leaving a given pasture.

When mapping RDM patterns for a property attention is focused on those areas capable of producing herbage and RDM that is typical for the area during a normal growing season. Notes are made on the map regarding specific information obtained, especially from monitoring reference sites, and sites that have been clipped and weighed.

Livestock tend to graze in a patchy manner, heavily using small areas and lightly using an adjacent area. Boundaries between RDM zones are recorded on the map. When determining the boundary between two classes it is often necessary to decide that an area is “mostly” within a given class and an adjacent area is “mostly” in a higher or lower class. The boundary is placed on the map where one “mostly” shifts to the other “mostly”. Features such as topographic breaks

in slope, changes in aspect and the resulting vegetation changes influence livestock use patterns and often can be used to help determine the boundary between two use classes. Interestingly, even though 6 classes of RDM are typically utilized, most pastures tend to only have 2-3 RDM zone classes as cattle tend to spread out and locate areas of good remaining forage before severely impacting a significant portion of any pasture. The result is that pastures tend to be mostly light-moderate use or moderate-heavy use.

Second step - input data collected into GIS database

Data from the field maps is transferred into a GIS database to allow creation and display of information as an RDM zone map (Fig 1 page 7). The ability to archive and analyze data allows the development of the annual pasture success maps (Fig 2 page 8).

Third step - calculate acreage of each mapped zone

A query of the database calculates the acreage for each RDM zone mapped within a pasture. A simple calculation then determines the percentage of a pasture that meets or does not meet a specific RDM class for the pasture.

Fourth step - determine how well each pasture meets the objective (success)

The criteria used to measure success are quantitative and color coded for visual display. An example with 2 classes above the established objective and 2 classes below the objective could be:

- *90% of pasture exceeds 3,000 lbs/acre RDM*
- *90% of pasture exceeds 2,000 lbs/acre RDM*
- *90% of pasture exceeds 1,200 lbs/acre RDM (established objective)*
- *10-35% of pasture is below 1,200 lbs/acre RDM*
- *more than 35% of pasture is below 1,200 lbs/acre RDM*

The criteria could as well have been:

Three simple classes for success described as:

- *80% of pasture exceeds objective*
- *80% of pasture meets objective*
- *More than 20% of pasture below objective*

Or five classes used to describe levels of success:

- *High (RDM more than 200% of minimum)*
- *Exceeds the objective (RDM is 150-200% of minimum)*
- *Meets the objective (RDM is from 100-150% of minimum)*
- *Below the objective (10-35% of area below minimum)*
- *Low (more than 35% of area below minimum)*

Fifth step - prepare the pasture success map with legend.

Each pasture is assigned one of 3-6 success classes depending on how well it meets the established objective. Pastures are considered to be within an identified success class if a specific percentage of the pasture is at or above the RDM level for the class (typically 80 or 90%). A GIS based map is prepared with color coded levels for pasture success to facilitate visual review and evaluation of success on a management unit or pasture basis.

Sixth step - prepare a pasture summary table

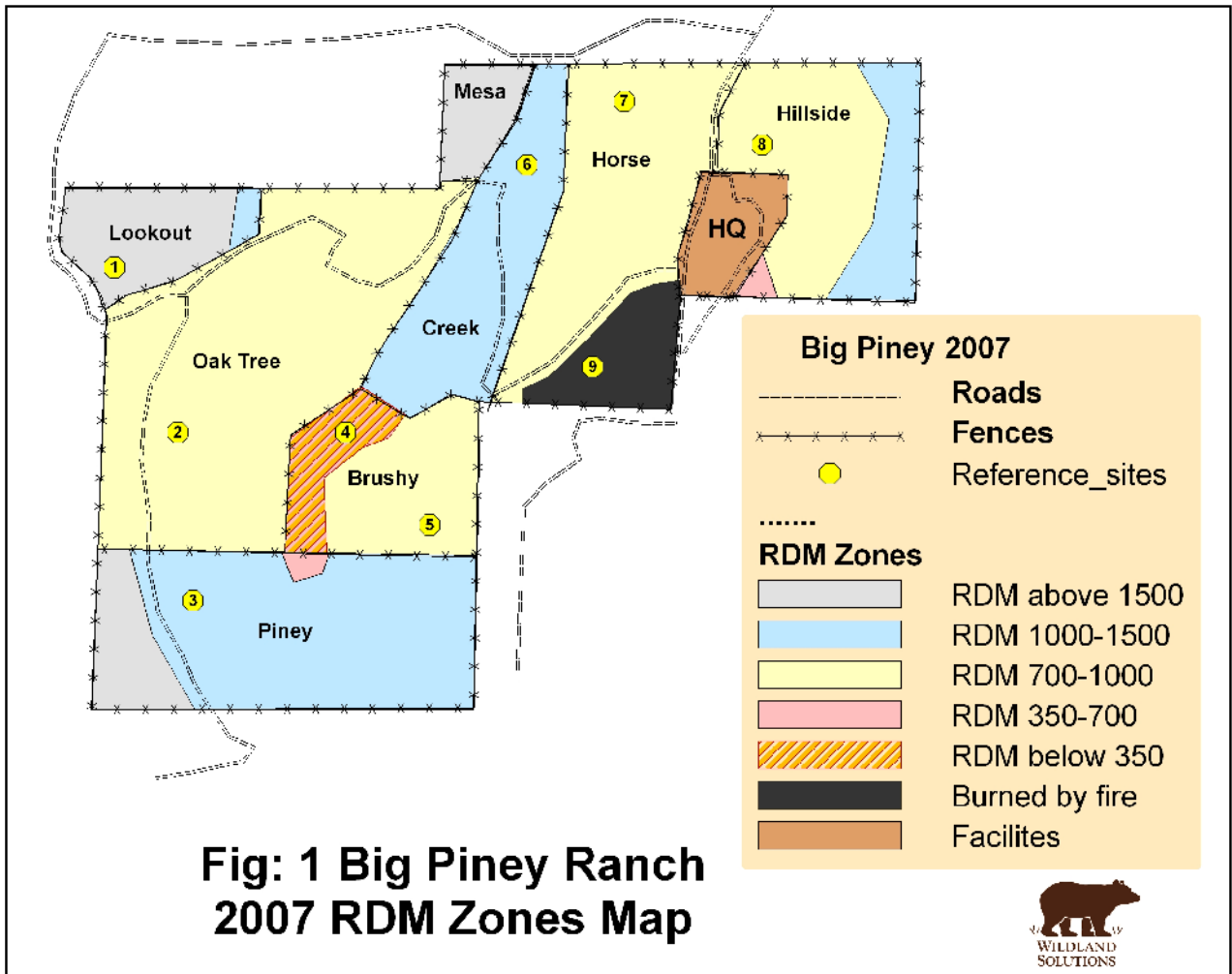
The database associated with the GIS program can be utilized to create a summary report for each pasture that is exported in a text format for inclusion in the appendix of the annual RDM monitoring report. The current year's data can then be compared to data collected for each pasture from previous years.

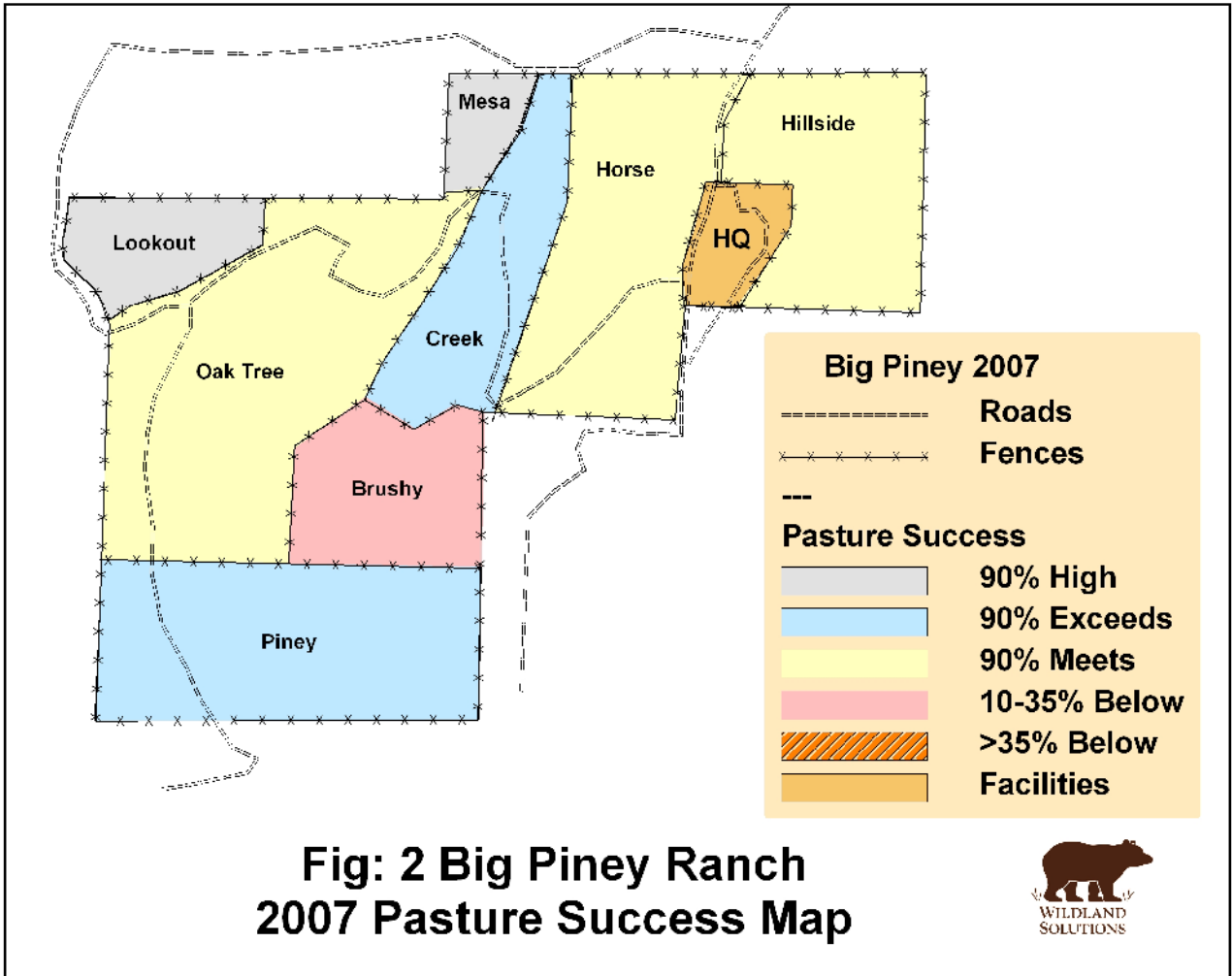
References:

Bartolome, James W. William E. Frost, Neil K. McDougald, Michael Connor. 2006. California Guidelines for Residual Dry Matter (RDM) Management on Coastal and Foothill Annual Rangelands. UCCE pub 8092 <http://anrcatalog.ucdavis.edu/pdf/8092.pdf>

Guenther, Keith. 1998. Residual Dry Matter (RDM) monitoring photo-guide. Wildland Solutions. <http://www.wildlandsolutions.com/>

Hormay, A.L. and A. Fausett. 1942. Standards for judging the degree of forage utilization on California annual type ranges. CA Forest and Range Experiment Station Technical Note 21.





- **Project:** TNC- Mount Hamilton
- **Ranch:** Simon Newman
- **Pasture name:** **Bear Gulch**

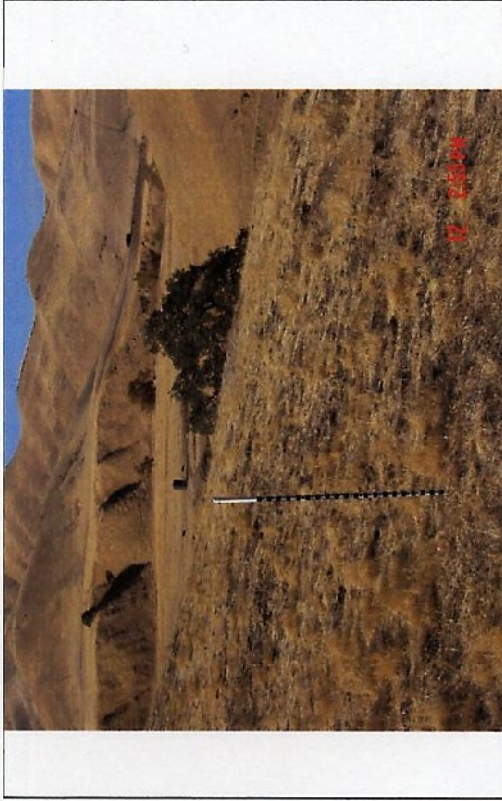
- **UTM Coordinates:** UTM base 27
East: 0664231 North: 4121284
- **General location:**

• **Herbage composition:**

- Perennial Grass:..... %
- Annual Grass:..... **95 %**
- Forbs: **4 %**
- Tree leaves:..... %
- Weeds: **1 %**

Comments:

Weeds: Scattered Mullein Weed, Tarweed and Vinegar Weed.



Monitoring Site #smn61 Date 10/12/2004

Slope: 7 % Aspect: Northeast

Residual Dry Matter Class: 1000

Surveyor: Keith Guenther, Wildland Solutions

- **Project:**
- **Ranch:**
- **Pasture name:**

- **UTM Coordinates: UTM base**
East: North:
- **General location:**

- **Herbage composition:**

- **Perennial Grass:**..... %
- **Annual Grass:**..... %
- **Forbs:**..... %
- **Tree leaves:** %
- **Weeds:** %

Comments:

Distance photo with General View

Close photo with detail view

Monitoring Site # Date
Slope: % Aspect:
Residual Dry Matter Class:

Surveyor: