BRYTE RANCH

UPLAND RANGE MONITORING AND MANAGEMENT RECOMMENDATIONS

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INTRODUCTION

The Bryte Ranch Mitigation Bank is managed for a variety of sensitive species associated with vernal pools. Upland range conditions were monitored on the Bryte Ranch Mitigation Bank June 24, 2005. The ranch is grazed seasonally in winter and spring. Approximately 20 pairs of cows were on the property during monitoring (late spring). During the rainy season or winter, 200 pairs are brought on to the ranch. During the summer, few livestock are present on the ranch. Management of livestock is seasonal continuous grazing.

METHODS

Upland range conditions were monitored by estimating Residual Dry Matter (RDM) visually (Guenther 1998) and following RDM monitoring guidelines recommended by Bartolome et al., (2002). In addition to visual estimates of RDM a total of 6 plots were clipped, dried, and weighed for estimating RDM and annual rangeland conditions (Bartolome et al., 2002).

Upland areas were also assessed visually for condition of ecosystem processes (mineral cycle, water cycle, community dynamics, and energy flow) based on the National Research Council (1994) guidelines to monitor rangeland health. Residual Dry Matter is used to monitor and manage annual rangelands, but is an ineffective tool for the restoration and management of native grasslands (Stromberg and Kephart 1996, Burkhardt 1997, Barry 1998, Sayre 2001). Management recommendations are based on the potential for this site to be restored and managed for native grasses and the benefits to the sensitive species associated with native perennial grasslands.

RESULTS

The upland areas of Bryte Ranch consist primarily of annual grasses and are classified as Annual Grassland habitat according to the California Wildlife Habitat Relationship (CWHR) system (Mayer and Laudenslayer 1988). This area is also classified as Annual Brome within the Non-Native Grassland type described in the California Terrestrial Natural Communities recognized by the California Natural Diversity Database (CNDDB 2003). This non-native invasive community is classified as the Annual Grassland Series by the California Native Plant Society (Sawyer and

Keeler-Wolf 1995). Vernal pools are interspersed throughout the ranch and are dealt with in a separate section of the monitoring report. Percent slope of the upland sites is typically less than 10%.

Plant composition of the upland areas consists primarily of non-native annuals such as bromes (*Bromus diandrus* and *B. hordeaceus*), wild oats (*Avena fatua*), medusahead (*Taeniatherum caput-medusae*), and tar plant. These species are found in varying percentages with medusahead representing 10-50% of the upland areas, based on visual estimates.

Residual Dry Matter

Visual estimates of RDM indicated clear evidence of light grazing use, with considerable ground cover present at the time of the survey. Some bare soil was apparent, but was minimal compared with last year's site observations. Between 1,000 lbs./acre and 2,500 lbs./acre of RDM were estimated visually on the Bryte Ranch.

The visual estimates of RDM were substantiated by the RDM clip plot data (Table 1).

Table 1. Clip Plots and Estimated RDM

Clip Plots	Residual Dry Matter lbs./acre
	2,496
	3,264
	2,400
	2,016
	1,248
6	2,784
Average	**2,368**

The amount of RDM ranged from 1,248 lbs./acre to 3,264 lbs./acre (Table 1). Average RDM based on clip plots exceeded 2,000 lbs./acre (Table 1). Clip plot locations are shown in Figure 1, and individual clip plot photographs can be found in Appendix A.

Both the visual estimates and the clip plot estimates of RDM amounts indicated light to very light grazing, however, RDM data are likely to have been falsely skewed in 2004-2005 by the unseasonably heavy and late rains of the 2004-2005 growing season that resulted in more abundant plant growth than in normal years.

In general, the site was lightly grazed, however, there was observed underutilization of rangeland forage in some localized areas, and over-utilization of rangeland forage in others. For example, areas near the gate and corral where cattle are fed are almost devoid of palatable rangeland grasses. The presence of food, water troughs, and salt licks tends to congregate cattle in this area, resulting in localized over-utilization. In contrast, the portion of the site nearest to Grant Line Road tends to be underutilized, with a dense upland vegetation layer of tarweeds, medusahead, and California brome. At present, no water and no salt licks are present in this area,

and there are no cross fences to keep cattle from migrating towards other portions of the site, therefore this area may be less heavily grazed by cattle than other portions of the site.

The Land Manager, Mr. Steve French, is currently installing a well near Grant Line Road, and intends to have water and power available to feed a well and water trough in this area next year. Further, the Land Manager is currently installing cross-fencing in this area, and is conducting a mowing program to control medusahead and tarweed. The mowing program is also expected to benefit burrowing owl, a species of concern that favors short grass areas and tends not to be present in the types of dense vegetation that are present in this area. The landowner is also considering a controlled burn of the site to control medusahead and other non-native upland species, bending issuance of burn permits and assistance by CDF.

Ecosystem Processes

Mineral Cycle

This ecosystem process represents the flow of nutrients such as nitrogen and phosphorus through the physical and biotic components of the environment. Breakdown of manure, incorporation of biotic material into soil, and soil capping are taken into consideration when evaluating this process.

The site has numerous old cow manure piles that were not breaking down or incorporating into the soil. Hard capping of soil was evident with little or no incorporation of biological material into the soil. Based on the visual observation, this ecosystem process was functioning poorly at the site.

Water Cycle

Permeability and effective rainfall are dependent on ground cover, soil type and condition, aeration, organic content, slope, and other factors.

Plant litter observed on the site was high, and resting on capped compacted soil. The observed heavy mat of plant litter was likely a result of the heavy and late rainfall in the 2004 and 2005 season, however, its presence so late in the year may indicate that there are problems with water infiltration and aeration, and resulting composting of the plant litter layer by year's end. Visual estimation of this parameter indicated a poor to fair water cycle in upland areas of the ranch.

Community Dynamics

This is the process of change and development in communities of living organisms within the environment.

The site has a low level of species diversity, and a prevalence of undesirable rangeland species, including the non-native species medusahead grass (*Taeniatherum caput-medusae*)and undesirable native forage plants such as tarweed (primarily *Holocarpha virgata*). There was evidence of presence of only 1-2 species of small rodents (pocket mice, voles), further

suggesting that the site has a low level of biological diversity and a low level of succession in the upland grassland component of the site.

Energy Flow

This ecosystem process is essentially the conversion of sunlight to plant, and ultimately, animal matter. It is a function of the total area of leaves actively converting sunlight into forage, the length of time this conversion goes on, the efficiency of the conversion, and what happens to the forage after it is grown.

Based on the preponderance of non-native invasive annual grasses in the upland areas of the ranch, this process is functioning fairly.

DISCUSSION

Based on the visual and clip plot RDM levels, Bryte Ranch is lightly grazed, as was reported in the 2004 monitoring report. The stocking rates are similar to last year, and also indicate light grazing.

The RDM values for 2005 are almost twice as much as the amounts measured in 2004. The high RDM levels and corresponding visual estimates of dense vegetation/ range cover may be attributed to the unusually heavy and late rainfall in the 2004-2005 season, a trend that may not continue in future years. Heavy rainfall and high levels of RDM tend to favor the plants observed at the ranch in 2005 such as wild oats, California brome, tarweed, and medusahead (Guenther 1998), as well as invasive plants.

There are two main problem range plants present at the ranch: medusahead and tarweed. CalIPC (1999) considers medusahead a widespread List A-1 most invasive wildland pest plant. Medusahead out-competes native grasses and forbs, and, once established, can reach densities of 1,000 to 2,000 plants per square meter (Bossard et al., 2000). After seed set, the silica-rich plants persist as a dense litter layer that prevents germination and survival of native species, ties up nutrients, and contributes to fire danger in summer. Because of its high silica content, medusahead is unpalatable to livestock and native wildlife except early in the growing season. The sharp awns can injure the eyes and mouths of livestock (Bossard et al., 2000). Mowing to reduce medusahead was conducted in late spring in the southeastern portion of the ranch, and may be effective in controlling the spread of this species if continued over time.

Tarweed *(Holocarpha virgata)* is a native grassland species that can periodically become problematic in rangeland settings. It is widely recognized that rainfall plays an important role in shifting rangeland composition towards annual grasses or towards annual forb species. During wet cycles, forbs such as tarweed, turkey mullein *(Eremocarpus setigerus)*, and vinegar weed *(Trichostema lanatum)* tend to become more dominant in the rangelands, while grasses are more dominant during dry years. Other factors that can affect rangeland composition include frequency of wildfires, presence of nitrogen, grazing pressure, and presence of RDM. The 2005 season, like the 2004 season was reported to be particularly favorable for tarweeds, with heavy infestations of the species reported throughout the Central Valley and surrounding foothills. The Bryte Ranch, like the rest of the surrounding area, had a prevalence of this species. The Land

Manager is currently conducting a mowing effort to help control tarweed, as well as reduce medusahead. The southeast portion of the site was mowed in late spring, and mowing will be conducted again in summer in an effort to reduce tarweed at the ranch. Studies have suggested that mowing tarweed to 4 inches or less in May, followed by mowing in July can reduce tarweed by as much as 90% (Perrier, et. al. 1981, 1982). A multiple-year mowing program (suggested at 5 years) is underway to control the species at the site.

Overall, rangeland health is low based on the visual assessment of the ecosystem processes on the ranch. Use of Residual Dry Matter to monitor the upland habitat of the ranch is required under the Bank, however, exclusive use of this monitoring tool would likely result in management towards a non-native annual grassland. Although RDM monitoring can provide basic information about grazing levels, it does not provide the necessary information to facilitate a change in site conditions towards a more native grassland system.

MANAGEMENT RECOMMENDATIONS

It is still recommended that a desired future landscape vision be developed for the ranch (Reeves 2004). The development of this vision should include all interested parties who manage or oversee the management of Bryte Ranch. This vision should include:

- Quality of the rangeland
- Habitat quality for sensitive biological resources that are the subject of the Mitigation Bank
- Forms of production for the property
- Desired future landscape that sustains longterm production

Relative to the desired future landscape, invasive non-native annual plants and undesirable native and non-native rangeland plants can be controlled by mowing, burning, and herbicides – but planned grazing is the most practical and economical way to manage vegetation across a large landscape (Barry 2003). Based on the low stocking rate and density observed during rangeland monitoring in 2004 and 2005, an effective grazing management program intended to enhance biological site values has not yet been developed for Bryte Ranch. The continuance of low stocking densities and light grazing at the Bank will not, in and of itself result in a desired future landscape that favors native grassland plants.

Livestock is an effective tool for restoring and managing native grasses (Amme and Pitschel 1998, Dagget and Dusard 1995, Dagget 1997, Reeves and Morris 1999, Macon 2000, Morris et al., 2001, Sayre 2001). Livestock, when managed to mimic native ungulates, will have a profound positive effect on ecosystem processes. Native ungulates are essential to the health of ecosystem processes (McNaughton 1983, McNaughton 1995, Hobbs 1996, Augustine and McNaughton 1998, Frank 1998). In the absence of native ungulates, which are considered grassland keystone species (Sinclair and Norton-Griffiths 1979, Sinclair and Arcese 1995); livestock can serve in a similar capacity if managed appropriately (Reeves and Morris 1999, Barry 2003, Creque 2004). Using planned grazing should include the following strategies (after Barry 2003):

- Consider the sites historical land use, and the current facilities and infrastructure to implement planned grazing;
- Clearly describe a monitoring program (National Research Council 1994, Reed et al., 1999, Orchard and Mehus 2001): grazing must be closely monitored and the animals removed when the proper amount of non-desirable plant control has been achieved and/or before desirable native species are impacted; and
- Include adaptive management: the land manager must be flexible and have control over livestock movements – lack of control can result in overgrazing of desirable species (National Research Council 1994, Reed et al., 1999), which may enhance invasive non-native plants or allow new invasive plants to become established.

Managers of Bryte Ranch should choose a planned grazing regime with an appropriate herbivory. The selected herbivore should be managed with appropriate timing and intensity (Reeves and Morris 1999, Barry 2003). An appropriate grazing system will control the timing and intensity of the selected livestock. Tools to manipulate livestock include; fencing, herding, water, and supplemental feeding. The Land Manager is already implementing some of these tools to manipulate livestock utilization by installing a well and cross fencing in the southeast portion of the site. This is an important first step towards a coordinated livestock grazing program. Future recommendations include heavier grazing for a brief duration. This approach would include stocking many more cattle at the site than are currently present, and moving the cattle around the ranch such that the grazing pattern mimics historic patterns of large ungulates. This approach may not be realistic given the constraints of the current cattle lease, but could be implemented over time when the lease renews. If the ranch were to be divided into 4 to 8 sections, and the lessee was required to move cattle from paddock to paddock on a certain schedule, then removed from the range during a rest period, then it may be possible to mimic the grazing patterns that would be necessary to favor native plants on the site. If the Land Manager elects to take this approach, we recommend that a grazing management plan be prepared with the participation of both the lessee and the Land Manager to develop a workable solution that will benefit the landscape and sustain cattle grazing at the site. Once a grazing regime is established, an appropriate monitoring program should be implemented so as to meet longterm landscape goals for the ranch. Future actions may include installing additional cross fencing and water sources, developing a rotational system and schedule, and perhaps also interspersing active management actions such as mowing, burning, and seeding to help the site re-establish natural processes such as mineral cycling.

However, in the absence of this sort of intensive land management, the Land Manger still can promote long-term range health by continuing the types of land management that he has already initiated at the site.

Burning is a desirable management tool for manipulating the landscape. Prescribed burning may be incorporated into the livestock grazing plan if desirable. Several studies have shown that burning stands of non-native annual grasses, and in particular medusahead prior to seed dispersal, is an effective control measure (Stromberg and Kephart 1996, Pollack and Kan 1998, Bossard et al., 2000). If determined to be appropriate to the site, burns should be scheduled for late spring, after seed set but before seed heads have shattered (known as the "soft dough" stage of seed development). The burn destroys seeds still on the plants, while dispersed seeds lying on or buried below the soil surface are protected from the intense heat of the burn. With few seed reserves in the soil, medusahead abundance can be dramatically reduced if the seed input for

even one year is eliminated. This method takes advantage of the fact that medusahead matures later than most of the surrounding vegetation, so most other species have already dispersed their seeds and are dry enough to carry a burn. Proper timing may vary depending on local conditions and weather. Some studies have found medusahead to increase after burning, but most of these studies conducted burns in August, presumably after seed dispersal.

The Land Manager has been exploring the possibility of conducting controlled burns at the Bryte Ranch, however, burns are subject to increasingly strict air quality control restrictions, and can only be conducted if a burn permit is issued.

Instead, the Land Manger has initiated a program of mowing for medusahead and tarweed. If properly timed, mowing may take the place of burning in controlling these two species and suppressing the seed bank at the site, resulting in less tarweed and medusahead at the ranch over time. We recommend that the mowing program that was initiated in 2005 be continued into the future, and monitored in subsequent years to determine its effect on rangeland forage composition. Prior to mowing, the Land Manager should check with a wildlife biologist to locate any burrowing owl active burrows that are on site during that year. In previous years, burrowing owls were occasionally observed onsite, and there was evidence of foraging onsite by burrowing owl (i.e. feathers, pellets) but this species has not in the past been known to nest onsite. In 2005, several burrowing owls were observed onsite, and may have been attempting to nest (although monitoring was inconclusive as to their breeding status onsite). As mentioned above, burrowing owls tend to favor short grass areas, and the mowing of 2005 will tend to favor their establishment at the site into the future. The Land Manager therefore should conduct a burrowing owl habitat assessment, and have a wildlife biologist mark the location of any active burrows before the start of mowing.

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