APPENDIX F
RESPONSES TO COMMENTS

This page left intentionally blank.

Comments on VCNP Watershed TMDL

Comment Set A:

From: Foster, Dean, NMENV

Sent: Wednesday, May 17, 2006 9:31 AM

To: Henderson, Heidi, NMENV

Subject: Jemez River TMDL's – public comment

Attachments: *ms-15_Ager.pdf*

I am in favor of the proposed TMDL's. The TMDL's can probably be acheived through land management practices which exclude livestock grazing. This statement wasn't in the the draft document but it was understood. And so the public comments will probably focus on cattle grazing - pro and con.

Perhaps the draft document could investigate the economics of removing domestic livestock grazing from the Caldera.

For example:	Lost Revenue	Gained Revenues
	grazing fees	saved personnel salaries
		saved fencing and cattlegaurd costs
		saved water development, seeding, and brush control costs
		increased elk herd size - increased Game and Fish Revenues via tag sales

A good place to start a cattle/elk energetics investigation is with the attached document or by contacting the Game and Fish wildlife specialist for the region.

As for me I enjoy elk hunting, elk on my table, and walking through a forest without stepping into cowpatties or arriving at a spring for a drink without finding the water fouled by cattle; so I would be in favor of permanently removing cattle grazing from the Caldera as was done temporarily this spring/summer (2006) in response to poor forage due to prolonged drought.

Dean

Dean Foster
New Mexico Environment Department
Department of Energy Oversight Bureau, Carlsbad Office
dean.foster@state.nm.us
604B N. Canal Street, Carlsbad NM 88220
Phone Office - 505-887-6851
WIPP site - 505-234-8674
Fax Office - 505-887-6862
WIPP site - 505-234-6012

Note: the following 21 page attachment was included along with this correspondence:
Ager, A.A., B.K. Johnson, P.K. Coe, and M.J. Wisdom. 2005. Land Simulation of Foraging by Elk, Mule Deer, and Cattle on Summer Range. Pages 170-184 in Wisdom, J.J., technical editor, The Starkey Project: a synthesis of long-term studies of elk and mule deer. Reprinted from the 2004 Transactions of the North American Wildlife and Natural Resouces Conference, Alliance Communications Group, Lawrence, Kansas, USA.

Landscape Simulation of Foraging by Elk, Mule Deer, and Cattle on Summer Range

Alan A. Ager[1], Bruce K. Johnson, Priscilla K. Coe, and Michael J. Wisdom

Introduction

Cattle, mule deer (Odocoileus hemionus), and elk (Cervus elaphus) share more area of spring, summer, and fall range than any other combination of wild and domestic ungulates in western North America (Wisdom and Thomas 1996). Not surprisingly, conflicts over perceived competition for forage have a long history, yet knowledge about actual competition is limited (Van Dyne et al. 1984b, Hobbs et al. 1996, Johnson et al. 1996). One of the first studies of the Starkey Project (Rowland et al. 1997) was designed to address the issue of whether mule deer and elk compete with cattle for available forage on summer range. A component of this study was to build a forage allocation model that could be used to analyze forage allocation problems on summer range in the Blue Mountains. This model would use data on animal spatial distributions, resource selection patterns, behavioral interactions, and diet selection of cattle, elk, and deer collected as part of the Starkey Project at the Starkey Experimental Forest and Range (Johnson et al. 2000; Coe et al. 2001, 2004; Findholt et al. 2004).

Modeling the forage removal and animal performance for multiple species of ungulates across large landscapes is a complex problem (Weisberg et al. 2002). The high degree of temporal and spatial variability in ungulate distributions, forage production, and nutritional value of forage contribute to the problem (Wisdom and Thomas 1996). Several early forage allocation models built for western rangelands were never widely used, owing to insufficient data, model complexity, and institutional barriers (Van Dyne et al. 1984a, McInnis et al. 1990). A prototype forage allocation model built from Starkey data (Johnson et al. 1996) suffered from similar problems, but did provide a framework for further discussions and model development (Vavra et al. 2004). This model used linear programming with a weighted objective function that contained terms for forage production, forage energy content, and resource selection coefficients. Animal foraging behavior could be optimized with respect to each of these three variables or some weighted combination. The Johnson et al. (1996) model generated reasonable predictions of species distributions and forage consumption patterns at monthly time steps. However, the linear programming framework was cumbersome and had limited capability to analyze the temporal dynamics of ungulate foraging behavior.

Using many of the parameters from the earlier work, we built a more detailed, spatially-explicit individual animal foraging model (heretofore Starkey Foraging Model, SFM). Initial testing of this model was described in Vavra et al. (2004). In this paper we describe additional developments and testing, and demonstrate the model's capability to predict forage removal and animal performance at Starkey. Ultimately, the model or subsequent outgrowths are intended for use in allotment management planning on summer ranges shared by cattle, mule deer, and elk.

Methods

The Starkey Foraging Model uses empirical data on habitat preferences, forage production, forage quality, and energy dynamics of cattle, mule deer, and elk. These data are coupled with information on foraging behavior to simulate forage consumption by the three ungulates on the Starkey landscape. The SFM was developed in Object Pascal using the Delphi 6 (Borland Inc., Scotts Valley CA) integrated

---

[1] Suggested citation: Ager, A. A., B. K. Johnson, P. K. Coe, and M. J. Wisdom. 2005. Land Simulation of Foraging by Elk, Mule Deer, and Cattle on Summer Range. Pages 170-184 in Wisdom, M. J., technical editor, The Starkey Project: a synthesis of long-term studies of elk and mule deer. Reprinted from the 2004 Transactions of the North American Wildlife and Natural Resources Conference, Alliance Communications Group, Lawrence, Kansas, USA.

development environment. Data sources used for the SFM are described in detail by Vavra et al. (2004) and summarized here.

Habitat preferences for each species were incorporated using resource selection functions developed at Starkey (Johnson et al. 2000, Coe et al. 2001). These resource selection functions (RSFs) were estimated from Starkey telemetry data collected between 1993 and 1996, and were estimated for monthly time steps, from April through October (Tables 1, 2). The RSF's represent the probability of an animal visiting a particular pixel over the monthly interval, as described by Johnson et al. (1996, 2000).

Forage production was estimated using several empirical models built from Starkey data (clipped plots from 1993-2000) and other sources (Vavra et al. 2004). We built functions to predict herbage production as a function of calendar day for grasslands, ponderosa pine (Pinus ponderosa) and riparian ecotypes. The equations for these ecotypes were extrapolated to the seven plant association groups in the model (moist meadows, dry meadows, bunch grass and shrub lands, warm dry forests with grass understory, warm dry forests with shrub understory, cool moist forest with grass understory, cool moist forest with shrub understory). The forage production was partitioned into forbs, grass, and shrubs using scaling factors developed by Hall (1973) and Johnson and Hall (1990). The growth functions were also adjusted for canopy closure on a pixel basis using relationships developed at four grazing exclosures at Starkey and the data of Pyke and Zamora (1982). Forage growth was represented in the model on a daily time step, and we used the same growth functions for forage re-growth as those used for initial forage growth.

Forage quality, as measured by in-vitro digestible energy (IVDDM) of forage was obtained from the literature (Holechek et al. 1981, Svejcar and Vavra 1985, Sheehy 1987, Westenskow 1991) and data from Starkey. Digestible energy (DE) was calculated from IVDDM using methods of McGinnis et al. (1990), with estimates made on a monthly time step.

The spatial dynamics of animal foraging were modeled as a multi-scale process that involved the selection of foraging patches and subsequent selection of forage within the patch. We used concepts and data from a variety of sources for the foraging component of the model (Spalinger and Hobbs 1992; Gross et al. 1993, 1995; Shipley and Spalinger 1995; Bailey 1996) as well as observations on elk and deer movements at Starkey (Ager et al. 2003). Foraging patches were defined at the same scale as the Starkey spatial database, that is, each 30 by 30 m pixel. Selection of foraging patches was modeled by using a neighborhood search algorithm that searched a 10 by 10 pixel neighborhood, and that subsequently chose the pixel that maximized an index of preference according to:

$$PREF_p = (RSF_{spm} * W_{rsf}) + (DE_{pm} * W_{qual}) + (F_{pm} * W_{mass}) \qquad (1)$$

where
$PREF_p$ = pixel preference score for pixel p
RSF_{spm} = resource selection function score ($0 < RSF < 1$) for pixel p, species s, and month m;
DE_{pm} = digestible energy in mcal/kg forage for pixel p and month m;
F_{pm} = forage (kg/ha) present on pixel p and month m.

Here, W_{rsf}, W_{qual}, W_{mass} are weighting coefficients that control the relative importance of habitat selection, forage quality (DE) and standing forage biomass in the foraging process. The formulation recognized that both resource selection functions and forage characteristics need to be considered in the selection of foraging areas. Initially we used a product of $RSF_{spm,}$ $DE_{pm,}$ and F_{pm} to calculate the preference score and included the weighting coefficients W_{qual}, W_{rsf}, W_{mass} as exponents. This method created some scaling issues that led to the current formulation. Although the weighting coefficients could be species-specific, we used the same values for each species in the present simulations. Pixels were selected for foraging by randomly sampling the pixels and respective preference scores in each 10 by 10 pixel neighborhood 90 times (90 percent of the total number of pixels) to reflect the fact that animals have a less than perfect knowledge of the surrounding forage conditions. The pixel with the highest preference score was selected and foraging initiated. A range of values were used for the weighting coefficients in

equation (1) as well as the spatial search parameters as part of the model building process. Values used in the simulations for equation (1) are described later. To prevent animals from foraging on high RSF pixels with very low or non-existent forage biomass, we added a constraint that required a selected pixel to contain 80 percent of the forage biomass of the previously selected pixel. Although areas still could be selected based primarily on their RSFs, this constraint also had the effect of moderating the rate of forage depletion of the pixels with the highest RSF scores, and allowed the simulation of RSF-driven foraging without resulting in infinite pixel searches.

To allow for selection of foraging areas outside the animal's sensory detection range, we nested the neighborhood search within a low-frequency meta-neighborhood search that allowed simulated animals to move (i.e. Levy flight, Marell et al.2002) to another neighborhood if larger values for equation (1) were found. We experimented with a range of values for the search neighborhood size, the meta-neighborhood size, the "jump" frequency and "jump" distance, and found that these variables would strongly influence animal movement measurements. In the current simulations we set values for the meta-neighborhood at 100 by 100 pixels, the "jump" frequency at 0.1, and the "jump" distance at 1,000 meters.

Once a foraging pixel was selected, consumption of forage (grass, forbs, and shrubs) was modeled with simulated individual bites. Bite size was estimated using data from foraging trials conducted at Starkey (Findholt et al. 2004) and elsewhere (J. Cook, personal communication), and was 1.1 g for cows, 0.20 g for mule deer, and 0.55 g for elk. It should be noted that we did not constrain intake rate by bite size or other bite-dependent variable (Gross et al. 1993) and hence the bite process served primarily as a mechanism to sample the three types of vegetation data in the pixel over successive bites. Bite selection in the pool of simulated forage at each pixel was modeled as a Monte Carlo process that simulated successive bites that removed forage types in proportion to the sum of total forage available multiplied by simulated forage DE at the pixel, quantified as:

$$P_{ts} = \frac{(F_{pdt} * WB_{mass}) + (DE_{pmt} * WB_{qual})}{\sum_{1}^{t} [(F_{pdt} * WB_{mass}) + (DE_{pmt} * WB_{qual})]} \qquad (2)$$

where
P_{ts} = probability of removing forage type t for species *s* $(0 < P_{ts} < 1)$;
F_{pdt} = forage (kg/ha) of type t on pixel p at day d;
DE_{pmt} = digestible energy (Mcal/kg) for forage type t, pixel p, and month m;
WB_{mass} = weighting factor for forage biomass; and
WB_{qual} = weighting factor for forage quality.

This foraging process simulated removal of vegetation in proportion to biomass and energy content, and/or some weighted combination, and recognized that while animals can focus their foraging on specific forage types, other non-preferred types are also depleted at some lesser rate. Initially we used WB_{mass} of 1.0 and WB_{qual} = (body weight)$^{-0.75}$, with the idea that mule deer would select for high forage DE and cattle would select for forage bulk (Findholt et al. 2004). Elk, with their intermediate body weight, were simulated as having a foraging behavior intermediate to that of deer and cattle (Findholt et al. 2004). Initial simulations showed that stronger weighting of the energy component was needed to significantly influence the forage composition.

Using the foraging rules described above, simulated animals were allowed to forage until they consumed 135 g of forage dry weight per kg of metabolic body weight (Cook et al 2004), or until the total foraging time per day exceeded 12 hours (Cook 2002), whichever condition came first. The foraging time was calculated using relationships between standing biomass and intake rate from Wickstrom et al (1984:1291) for elk and deer, and from data from Starkey for cattle (Figure 1). For elk, we used the relationship for mixed forest conditions presented by Wickstrom et al. (1984), and combined the grass

and mixed forest data to develop a relationship for deer. Intake rates could also have been predicted using relationships between bite size and plant size (Spallinger and Hobbs 1993), but the latter data were not available for conditions at Starkey.

Energy balance and weight change was updated daily using pro-rated monthly energy requirements (Table 3) obtained from a number of sources (Leege 1982; Hudson and White 1985a, b; Cook 2002). Daily energy generated by consumed forage was calculated using the energy conversion equation as:

$$Me = 1000 \times (F \times (0.038 \times \%DE + 0.18)/1.22) \qquad (3)$$

Where,
DE = digestible energy (mcal/kg forage), and
F = forage biomass (dry matter kg/ha) consumed on a given day of forage.

Negative energy balances were translated into a weight loss by using a conversion of 6 mcal/kg. Positive daily energy balances were translated into a weight gain by using the conversion of 12 mcal/kg.

Most simulations used herd sizes of 500 cows, 450 elk, and 250 mule deer under a summer deferred-rotation grazing system (April 15 to November 15, 210 days). These are the approximate stocking rates and summer range foraging season at Starkey. In other simulations, the stocking rates varied depending on the objective of the simulation. On each day, cattle foraging was simulated first, followed by elk and then mule deer, which gave cattle preference over elk and mule deer and elk preference over mule deer for the available forage (Coe et al. 2004). Initial weights were set at 992 pounds (450 kg), 507 pounds (230 kg), and 132 pounds (60 kg) per animal for cows, elk and mule deer, respectively, based on data from Starkey. Typical execution times for the model were about one minute. We first ran simulations to examine the effects of different weights in equation (1) on animal performance, foraging patterns and movements. This involved 125 simulations where each weight was varied by a factor of 10 between 1 and 100,000. We selected a set of weights where the model outputs appeared to be not overly influenced by the values and replicated observed animal performance at Starkey. The effects of different weights in equation (2) were then tested in a similar process in an additional 25 simulations and selected weights for equation (2). We then ran additional simulations to test how incremental changes in the number of cattle, mule deer and elk (2-2,500), and forage production (10-100 percent of normal) affected animal performance. The latter simulations were intended to represent varying drought intensities. Reductions in forage quality from drought (Vavra and Phillips 1980, Weisberg et al. 2002) were not modeled due to limited data.

Results

Simulations using a range of values (1-100,000) for the W_{rsf}, W_{mass}, and W_{qual} coefficients in equation (1) were found to produce reasonable outputs in terms of predicted weight gains for cattle, elk, and mule deer (Figures 2-4). For instance, mule deer, which generally gain around 11-22 pounds (5-10 kg) per animal at Starkey, showed simulated weight gains of 15.4-19.8 pounds (7-9 kg) for the range of coefficients tested. Cattle and elk showed more pronounced changes in animal weights (Figures 2, 4), although a wide range of coefficients replicated the weight changes observed for cattle 0-22 pounds (0-10 kg) and elk 22-44 pounds (10-20 kg) at Starkey. For all species, increasing W_{rsf} relative to W_{mass} forced simulated animals to forage in areas of high RSF values (Figure 5) and generally resulted in decreased animal weights. The effect of increasing W_{rsf} on weight reductions was dampened as the forage biomass (F_{mass}) coefficient was increased to values above 1000.

Changes in average cattle weights ranged from -72.6 to 26.4 pounds (-33 to 12 kg) (Figure 2), the negative weight changes being associated with a high values of W_{rsf} and low values of W_{mass}. Cattle showed an intermediate optimal weight gain of 22 pounds (10 kg) when the W_{rsf} was increased by a factor of 10 over the W_{mass}. This trend was not found for elk or mule deer (Figures 3, 4). The most plausible

explanation for this is that a higher forage quality is realized at this combination of W_{mass} and W_{rsf}, although this was not tested.

Results of simulations for elk showed weight changes between -44 pounds (-20 kg) and 77 pounds (35 kg), with weight gains over a wide range of W_{rsf} and W_{mass}. However, when the W_{rsf} became 1,000 times the W_{mass}, negative weight changes were observed. Unlike cattle, weight changes with different combinations of W_{rsf} and W_{mass} were asymptotic with the maximum values at about 77 pounds (35 kg). Compared to the W_{mass} and W_{rsf} coefficients, changing the forage quality (W_{qual}) coefficient had a very minor effect, producing weight differences less than 2.2 pounds (1 kg) over the entire range (1-10,000) of values simulated.

Simulated animal distributions were compared with the maps of the RSF scores to examine how well the model replicated observed animal distributions at Starkey (Figure 5). For space reasons we limit the comparison to elk and note that the findings for elk are typical for the cattle and mule deer. The comparison is made difficult by the fact that the RSF maps represent a long-run probability of animal use during presumed periods of peak foraging based on six years of telemetry data, whereas the outputs from a simulation run represent animal use for one season, and represent only foraging activities. We did not perform statistical testing of the differences in simulated versus observed distributions, although this would have provided more definitive comparison. The maps show that simulations with high values of W_{rsf} generated animal distributions that were compatible with the RSF maps (Figure 5). In contrast, simulations with a relatively high weighting for W_{mass} generated markedly different animal distributions that reflected high levels of foraging on productive grassland meadows (Figure 6a).

The effect of changing W_{rsf} and W_{mass} weights on the relative use of pixels with different RSF scores was examined by assigning the RSF probabilities to integer classes from 1 to 40 and then measuring the forage removal for each class. The integer classes were generated by re-scaling the RSF scores by 100x. Values above 0.4 were assigned the integer class 40. Simulations were run with W_{rsf} of 10,000 and W_{mass} of 1, and W_{rsf} and W_{mass} both equal 1. The results (Figure 7) showed that a significant amount of forage was removed from higher RSF class pixels when W_{rsf} was weighted at 10,000 versus 1. The difference is somewhat magnified however by the overall higher total forage removal in the simulations where both the W_{rsf} and W_{mass} coefficients are set at one.

To choose a set of coefficients for further simulations we looked for values that resulted in weight changes that approximated those observed at Starkey using the highest possible values of W_{rsf}. In this way we could simulate the approximate animal performance at Starkey while replicating animal distributions to the extent possible. We also were interested in finding coefficients where the simulated weight gains did not change sharply with small changes in the coefficients. Using these criteria we selected a W_{mass} of 1,000 and W_{rsf} of 10,000, and W_{qual} of 1, and then simulated a range of values for the WB_{mass} and WB_{qual} coefficients in equation (2). These simulations were to examine how selecting for forage biomass versus energy within a pixel would affect animal performance. The results of this simulation showed that a wide range of coefficients generated the same results for all three species, except for the case when the WB_{qual} coefficient was reduced to less than 10. In the latter case, weights dropped by a maximum of 22 pounds (10 kg) for elk and lesser amounts for the other species. Accordingly, we set both WB_{qual} and WB_{mass} at 10 for the remaining simulations.

In a subsequent set of simulations, the forage production was varied from 10 to 100 percent of normal using the model coefficients selected above. These simulations examined the effect of disturbances like drought on animal performance. The results showed that, as forage production was decreased, weights for cattle and elk were markedly reduced, while mule deer were not affected (Figure 8). The effect of reduced forage production on weight change was nonlinear and started when forage production was about 60 percent of normal for cattle, and 50 percent for elk (Figure 8). For all species, the response resembled the intake rate functions incorporated into the model (Figure 1), and most likely the weight reductions resulted from lower intake rates associated with reduced standing forage biomass. Some slight differences were noted in the simulated animal distributions for between normal and 10 percent forage production, the latter showing more area foraged (Figure 6a,b) .

Simulations to examine how animal performance varied under different population levels showed intraspecific effects for all three species. Simulations where the cattle herd was varied between 2 and 2,500 animals did not result in changes in elk or mule deer weights. However, average weight change per cow was reduced from 34.9 to 3.2 when the herd size was increased (Figure 9). Likewise, when the mule deer population was increased from 2 to 2500 animals, mule deer weights decreased from 17 to 4 pounds (7.8 to 1.7 kg) per animal. Elk population increases from 2 to 2500 animals resulted in elk weights decreasing from 74 to 15 pounds (33.7 to 6.8 kg) per animal. Interspecific effects on animal weights were negligible except in the case of the elk simulations where cattle weights declined from 44 to 35.9 pounds (20.0 to 16.3 kg) per animal when elk were increased from 2 to 2,500 animals. Elk weight decreased by only a fraction 73.7 versus 73.3 pounds (33.5 versus 33.3 kg) per animal and mule deer weights were unchanged when the cattle population was increased from 2 to 2,500.

Discussion

Foraging behavior by free ranging ungulates on large landscapes over time is a complex process that can only be approximated with models (Turner and Wu 1994, Moen et al. 1997, Weisberg et al. 2002). The current work illustrates the inherent complexity of the problem for summer range conditions in the Blue Mountains. While our model does not consider many of compensatory mechanisms in the foraging process, it can replicate animal weight dynamics observed at Starkey as well as provide reasonable predictions of animal distributions. The model demonstrated that both forage biomass and RSF scores need to be included in a simulation model to replicate observed animal distributions and weight changes, and that some balance between the two best summarizes actual foraging behavior at the landscape scale. We found that modeling forage site selection based on RSF scores resulted in significant weight loss for cattle and elk, and to a lesser extent, mule deer. Forage depletion on high RSF pixels probably reduced forage intake rates and led to the lower weight gains. In addition, RSF scores for elk and mule deer did not always reflect selection of the most productive foraging areas, due to other habitat considerations like distance to open roads. When forage site selection was based primarily on standing biomass, the simulated animal distributions were not representative of Starkey telemetry data. Simulations showed that by weighting the RSF about 100 times less than forage biomass to calculate pixel preference scores, the model would produce reasonable animal weights and select high RSF pixels as well.

Comparing empirical animal distribution with those from the simulations were made difficult by the fact that the former were developed from six grazing seasons of data and show more diffuse spatial patterns of animal use compared to simulated distributions. Although the RSF values used for the model were estimated for peak foraging periods, they likely include observations when animals were not foraging as well. Thus without consideration of these other activities in the model there will always be some discrepancy between RSF values and simulated animal foraging patterns. The two data sources could be made more comparable if the animal distributions generated by the forage model were compared with the same number of animal locations simulated directly from the RSF probabilities.

When we measured forage removal with respect to RSF probabilities on the Starkey landscape and changed the RSF weights in the pixel preference equation, we found that the model did indeed lead simulated animals to spend more time foraging in areas with higher RSF scores. Using these methods, additional simulations could be performed to measure the loss of foraging opportunities as a result of selecting foraging pixels on the basis of distance to roads or other human influences. In this way the effect of human disturbance on animal performance could be examined.

We were also able to quantify changes in animal performance resulting from a reduction in forage production at the landscape scale. Reductions in forage production might result from drought or natural disturbance. Changes in animal weight with decreasing forage production closely resembled the functional response of intake rate to decreasing forage biomass for the three species (Figure 1), and shows the importance of forage intake dynamics in the context of modeling animal performance (Gross et al. 1993). Simulating animal performance under a range of forage production values should also consider increased movements (Wickstrom et al. 1984), and, in the case of drought-limited forage production, a

reduction in forage quality (Vavra and Phillips 1980, Weisberg et al. 2002). The latter relationship could easily be incorporated into the SFM, although there is little data from which to develop a quantitative relationship. Vavra and Phillips (1980) observed a 20-30 percent reduction in digestible dry matter during a drought year when precipitation was 39 percent of normal. Reductions in forage quality of this magnitude would have a significant impact on simulated animal weights.

We observed negligible interspecific effects on animal weight when population levels of each species were varied between 2 and 2,500 animals. However intraspecific effects were observed for all three species as manifested in reduced weight gain compared to simulations where population levels replicated those at Starkey. Weisberg et al. (2002) also found stronger intraspecific than interspecific competition for forage when they modeled cattle and elk on shared range. Hobbs et al. (1996) in their study of elk and cattle competition found significant reductions in calf weights while cow weights were not significantly unchanged. Competitive effects among the species might be better studied with our model by examining changes in forage intake rates over the season instead of animal weights. Adding calves to the model might also provide a means to study the competition question in more detail. In any event, additional model refinements and a battery of simulations are probably needed to carefully examine questions of competition among the three species.

The major challenge to refine the current model is to determine what mechanisms in the foraging process are the most important determinants of landscape scale foraging behavior and animal performance. Factors such as environmental heterogeneity (Shipley and Spalinger 1995, Etzenhouser et al. 1998, WallisDeVries et al. 1999, Johnson et al. 2002), movement rules (Gross et al. 1995), and cognitive abilities (Bailey 1995), all influence the foraging behavior of ungulates on large landscapes. However, for the purposes of analyzing stocking on summer range in the Blue Mountains, some of the finer details of the foraging process may not be needed in the current model. One important gap in the model is the lack of local data on the functional response of intake rate for cattle, elk, and mule deer for conditions at Starkey. Development of these relationships should be a high priority since these functions are strong determinants of animal performance for scenarios where forage biomass is limited due to high stocking rates or low forage production. Modeling intake rate at the bite level rather than using standing biomass may provide different results than obtained here, since intake rate is poorly correlated with standing biomass for highly selective foragers like mule deer (Spallinger and Hobbs 1993).

Considerable detail could be added to the energetic component of our model by building on previous work (Wickstrom et al. 1984; Hudson and White 1985a,b). For instance, we did not change energy budgets to reflect increased daily movements at lower levels of standing forage biomass. We also did not consider the energy requirements as a function of animal age. Another important addition would be the growth and development of calves for all three species.

Our ultimate goal is to use the SFM to evaluate different grazing management strategies on summer range landscapes in areas like the forest types of the interior western United States, and test various hypotheses about the effects of alternative stocking rates for ungulates. In this regard, the objective might be to identify the existence of key stocking thresholds that correspond to changes in animal performance at the species level (Hobbs et al. 1996). Such a tool is currently not available for use in allotment management planning on lands administered by the U.S. Department of Agriculture, Forest Service (FS) and U.S. Department of Interior, Bureau of Land Management (BLM), the two largest federal land managers in the United States. Moreover, the mechanistic structure of our model, based on individual foraging behavior, could help managers and public interests improve their understanding of how ungulates use the landscape to meet their foraging needs.

Acknowledgements

We thank C. Borum, N. Cimon, B. Dick, R. Kennedy, J. Nothwang, J. Noyes, R. Stussy, and M. Vavra for assistance with this study. Funding was provided by the Pacific Northwest Research Station and Pacific Northwest Region, U.S. Department of Agriculture, Forest Service, and by the Oregon Department of Fish and Wildlife under provisions of the Federal Aid in Wildlife Restoration Act

(Pittman-Robertson Act). We thank C. Gobar, P. Weisberg, and M. Vavra and J. Cook for reviews and helpful comments. We are grateful to L. Dillavou for editorial assistance.

Literature cited

Ager, A. A., B. K. Johnson, J. W. Kern, and J. G. Kie. 2003. Daily and seasonal movements and habitat use by female Rocky Mountain elk and mule deer. *Journal of Mammalogy* 84:1076-1088.

Coe, P. K., B. K. Johnson, K. M. Stewart, and J. G. Kie. 2004. Spatial and temporal interactions of elk, mule deer, and cattle. *Transactions of the North American Wildlife and Natural Resource Conference 69*: 656-669.

Coe, P. K., B. K. Johnson, J. W. Kern, S. L. Findholt, J. G. Kie and M. J. Wisdom. 2001. Responses of elk and mule deer to cattle in summer. *Journal of Range Management* 54: A51-A76.

Cook, J. G. 2002. Nutrition and food. In *North American elk: ecology and management*, eds. D. E. Toweill and J. W. Thomas, 259-349. Washington, DC: Smithsonian Institution Press.

Cook, J. G., B. K. Johnson, R. C. Cook, R. A. Riggs, T. Delcurto, L. D. Bryant, and L. L. Irwin. 2004. Effects of summer-autumn nutrition and parturition date on reproduction and survival of elk. *Wildlife Monographs* 155:1-61.

Etzenhouser, M. T., M. K. Owens, D. E. Spalinger, and S. B. Murden. 1998. Foraging behavior of browsing ruminants in a heterogeneous landscape. *Landscape Ecology* 13:55-64.

Findholt, S. L., B. K. Johnson, D. Damiran, T. DelCurto, and J. G. Kie. 2004. Diet composition, dry matter intake, and diet overlap among mule deer, elk, and cattle. *Transactions of the North American Wildlife and Natural Resource Conference 69*: 670-686.

Gross, J. E., L. A. Shipley, T.N. Hobbs, D. E. Spalinger, and B. Wunder. 1993. Functional response of herbivores in food-concentration patches: tests of a mechanistic model. *Ecology* 74:778-791.

Gross, J. E., C. Zank, N. T. Hobbs, and D. E. Spalinger. 1995. Movement rules for herbivores in spatially heterogeneous environments: responses to small scale patterns. *Landscape Ecology* 10(4)209-217.

Hall, F. C. 1973. *Plant communities of the Blue Mountains in eastern Oregon and southeastern Washington*. U.S. Department of Agriculture, Forest Service Pacific Northwest Region, R-6 Area Guide 3-1, Portland, Oregon.

Hobbs, N. T., D. L. Baker, G. D. Bear, and D. C. Bowden. 1996. Ungulate grazing in sagebrush grassland: effect of resource competition on secondary production. *Ecological Applications* 6:218-227.

Holechek, J. L., M. Vavra, and J. Skovlin. 1981. Diet quality and performance of cattle on forest and grassland range. *Journal of Animal Science* 53:291-298.

Hudson, R. J., and R. G. White. 1985a. Computer simulation of energy budgets. In *Bioenergetics of wild herbivores*, eds. R. J. Hudson and R. G. White, 261-290. Boca Raton, Florida: CRC Press.

Hudson, R. J., and R. G. White. 1985b. *Bioenergetics of wild herbivores*. Boca Raton, Florida: CRC Press.

Johnson, B. K., A. Ager, S. A. Crim, M. J. Wisdom, S. L. Findholt, and D. Sheehy. 1996. Allocating forage among wild and domestic ungulates--a new approach. In *Proceedings, Sustaining rangeland ecosystems symposium*, eds. W. D. Edge and S. L. Olson-Edge, 166-169. Oregon State University, SR 953, Corvallis.

Johnson, B. K., J. W. Kern, M. J. Wisdom, S. L. Findholt, and J. G. Kie. 2000. Resource selection of mule deer and elk during spring. *Journal of Wildlife Management* 64:685-697.

Johnson, C. G., Jr., and F. C. Hall. 1990. *Plant associations of the Blue Mountains*. R6 Ecol. Area 3. U.S. Department of Agriculture, Forest Service Pacific Northwest Region, Portland, Oregon.

Johnson, C. J., K. L. Parker, D. C. Heard, and M. P. Gillingham. 2002. Multiscale behavioral approach to understanding the movements of woodland caribou. *Ecological Applications* 12:1840-1860.

Marell, A., J. P. Ball, and A. Hofgaard. 2002. Foraging and movement paths of female reindeer: insights from fractal analysis, correlated random walks, and Levy flights. *Canadian Journal of Zoology* 80:854-865.

McInnis, M. L., T. M. Quigley, M. Vavra, and H. R. Sanderson. 1990. Predicting beef cattle stocking rates and live weight gains on Eastern Oregon rangelands: description of a model. *Simulation* 1990:137-145.

Moen, R., J. Pastor, and Y. Cohen. 1997. A spatially explicit model of moose foraging and energetics. *Ecology* 78:505-521.

Pyke, D. A., and B. A. Zamora. 1982. Relationships between overstory structure and understory production in the grand fir/myrtle habitat type of northcentral Idaho. *Journal of Range Management* 35:769-773.

Sheehy, D. P. 1987. Grazing relationships of elk, deer, and cattle on seasonal rangelands in Northeastern Oregon. Ph.D dissertation. Oregon State University, Corvallis.

Shipley, L. A., and D. E. Spalinger. 1995. Influence of size and density of browse patches on intake rates and foraging decisions of young moose and white-tailed deer. *Oecologia* 104:112-121.

Spalinger, D. E., and N. T. Hobbs. 1992. Mechanisms of foraging in mammalian herbivores: new models of functional response. *American Naturalist* 140:325-348.

Svejcar, T., and M. Vavra. 1985. *Seasonal forage production and quality on four native and improved plant communities*. Agricultural Experiment Station Technical Bulletin 149. Oregon State University, Corvallis.

Turner, M. G., and Y. Wu. 1994. Simulating winter interactions among ungulates, vegetation, and fire in Northern Yellowstone Park. *Ecological Applications* 4:472-496.

Van Dyne, G. M., W. Burch; S. K. Fairfax; and W. Huey. 1984a. Forage allocation on arid and semiarid public grazing lands: summary and recommendations. In *Developing strategies for rangeland management*, eds. National Research Council/National Academy of Sciences, 1-26. Boulder, Colorado: Westview Press.

Van Dyne, G. M., P. T. Kortopates, and F. M. Smith (ed.). 1984b. Quantitative frameworks for forage allocation. In *Developing strategies for rangeland management*, eds. National Research Council/National Academy of Sciences, 289-416. Boulder, Colorado: Westview Press.

Vavra, M., and R. L. Phillips. 1980. Drought effects on cattle performance, diet quality and intake. *Western Section, American Society of Animal Science* 31:157-160.

Vavra, M., A. A. Ager, B. K. Johnson, M. J. Wisdom, M. A. Hemstrom, and R. R. Riggs. 2004. Modeling the effects of large herbivores. In *The Interior Northwest Landscape Analysis System*, Tech. eds. J. Hayes, A. Ager, and R. Barbour, 82-103. U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, General Technical Report PNW-GTR-610. Portland, Oregon.

WallisDeVries, M. F., E. Laca, M. W. Demment. 1999. The importance of scale of patchiness for selectivity in grazing herbivores. *Oecologia* 121:355-363.

Weisberg, P. J., N. T. Hobbs, J. E. Ellis, and M. B. Coughenour. 2002. An ecosystem approach to population management of ungulates. *Journal of Environmental Management* 65:181-197.

Westenskow, K. J. 1991. Conditioning bunchgrass on elk winter range. M.S. Thesis. Oregon State University, Corvallis.

Wickstrom, M. L., C. T. Robbins, and T. Hanley. 1984. Food intake and foraging energetics of elk and mule deer. *Journal of Wildlife Management* 48:1285-1301.

Wisdom, M. J., and J. W. Thomas. 1996. Elk. In *Rangeland Wildlife*, ed. P. R. Krausman, 157-181. Denver, Colorado: Society For Range Management.

Table 1. Coefficients of resource selection functions for mule deer and elk during six monthly time steps in Main Study Area 1993-1996, Starkey Experimental Forest, northeastern Oregon. Seasons 1-6 correspond to May 16-June 15, June 16-July 15, July 16-August 15, August 16-September 15, September 16-October 15, and October 16-November 15. Coefficients are standardized (top) and non-standardized (bottom). Coefficients for elk when cattle were not present were estimated in Smith-Bally pasture (seasons 2 and 5) and Bear pasture (seasons 3 and 4).

	Season	Intercep	Dist. Edge of Patch	Forage Prod.	Shape of Patch	Dist. Traffic Zero	Dist. Traffic Low	Dist. Traffic Med.	Dist. Traffic High	Perc. Slope	Aspect East West	Aspect North South	Topog Conve x	Soil Depth	Dist. Cover	Perc. Can. Cover	Dist. to Cattle Fence	Elk Dist To Water
Deer	1	-3.4588						-0.4284	-0.3431	0.2505	0.2159		0.2346					
		-25.2478						-0.0005	-0.0003	0.0200	0.2951		0.0449					
	2	-3.8910							-0.5615	0.2326	0.1344		0.1250					
		-15.4409							-0.0003	0.0186	0.1830		0.0239					
	3	-4.4878							-0.5473	0.3817	0.1723	0.2151	0.0818					
		-12.1049							-0.0006	0.0305	0.2353	0.3210	0.0156					
	4	-3.7869							-0.4496	0.2767	0.1254		0.0936		-0.2073			
		-12.3734							-0.0007	0.0221	0.1703		0.0179		-0.0016			
	5	-3.9353						-0.3948	-0.5563	0.2355			0.1174					
		-14.3405						-0.0003	-0.0006	0.0188			0.0224					
	6	-3.9259									0.0811		0.1466		-0.1514			
		-17.8403									0.1097		0.0280		-0.0012			
Elk	1	-2.4546						0.1191		-0.1119			0.1181	0.1470		0.0552		
		-14.0412						0.0001		-0.0089			0.0226	0.0121		0.0025		
	2	-2.8329	-0.0378	-0.0568	-0.0455		-0.2775	0.0741		0.1075	-0.0442	0.1034	0.1944	0.1384				
		-21.2643	-0.0008	-0.0003	-0.2897		-0.0004	0.0001		0.0086	-0.0607	0.1543	0.0371	0.0114				
	No	-2.9761			-0.1288		-0.2905			-0.2912	-0.1899		0.2856	0.1601	-0.2750	0.2510	0.2891	
	cattle	-26.8541			-0.7677		-0.0004			-0.0223	-0.2701		0.0477	0.0126	-0.0021	0.0015	0.0007	
	3	-3.6208	0.1038	0.0377	-0.0681			0.1237	0.2306	0.1190		0.2491	0.1617	0.1851	-0.1919	0.1776		
		-20.3917	0.0022	0.0002	-0.4333			0.0002	0.0002	0.0095		0.3722	0.0309	0.0153	-0.0015	0.0081		
	No	-3.3056			-0.1649		0.3010	0.3256	0.5570	-0.1375	-0.1520	0.1803	0.3226	0.3783	-0.4220			0.1815
	cattle	-32.3572			-0.9822		0.0004	0.0003	0.0008	-0.010	-0.2119	0.2587	0.0534	0.0300	-0.0032			0.0011
	4	-3.0575	0.0992			0.1182	0.0984		0.1946			0.1946	0.1706	0.1527	-0.1558	0.1709		
		-20.4503	0.0021			0.0005	0.0002		0.0003			0.2900	0.0326	0.0126	-0.0012	0.0078		
	No	-2.6522		-0.1112								0.1301	0.1945	0.1697		0.2209		0.1823
	cattle	-19.5567		-0.0005								0.1867	0.0323	0.0134		0.0098		0.0011
	5	-3.1617	0.0463				0.0822					0.2379	0.1598	0.1212	-0.1813	0.1874		
		-19.0188	0.0010				0.0001					0.3556	0.0305	0.0100	-0.0014	0.0085		
	No	-2.2976		-0.2736	-0.1136							0.2324	0.0907		-0.3904			0.2638
	cattle	-9.4488		-0.0012	-0.6781							0.3325	0.0151		-0.0030			0.0016
	6	-3.2960								0.0978		0.1396	0.1757	0.0915	-0.1612	0.0580		
		-20.4223								0.0078		0.2073	0.0336	0.0075	-0.0012	0.0026		

Table 2. Coefficients of resource selection functions for cattle during four monthly time steps in cattle pastures 1993-1996 at Starkey Experimental Forest, northeastern Oregon. Seasons 2-5 correspond to June 16-July 15, July 16-August 15, August 16-September 15, and September 16-October 15. Coefficients are standardized (top) and non-standardized (bottom).

	Season	**Intercept**	**Dist. Edge of Patch**	**Forage Prod**	**Dist. to Road**	**Dist. to Fence**	**Perc. Slope**	**Aspect East West**	**Topog Convex**	**Soil Depth**	**Dist. Cover**	**Perc. Can. Cover**	**Dist. to Water**
Cattle	2	-2.4895	-0.0613		-0.1756	0.3043	-0.4726	-0.1063	-0.0526		-0.2089	-0.2743	0.1252
		2.8039	-0.0014		0.0008	0.0008	-0.0365	-0.1489	-0.0088		-0.0016	-0.0123	0.0008
	3	-3.0240	-0.1597	0.0452	-0.9849		-0.1370	-0.0917	-0.0660	0.0943		0.0563	-0.1300
		4.0840	-0.0033	0.0005	-0.0007		-0.0120	-0.1217	-0.0139	0.0078		0.0028	-0.0007
	4	-2.8177	-0.1728	0.0747			0.0747	-0.0584					-0.7470
		-2.4244	-0.0036	0.0007			0.0007	-0.0754					-0.0009
	5	-2.7450	-0.2228	0.0864		0.1516			-0.4536	0.0711		-0.1650	
		0.9900	-0.1710	0.0004		0.0004			-0.0075	0.0056		-0.0013	

Table 3. Daily energy demands of adult female deer, cow and elk (mcal per day) by month. Data from (Hudson and White 1985a,b; Sheehy 1987; Cook 2002).

Species	**Month**						
	Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**
Cattle	23	23	23	22	21	19	18
Elk	10.0	10.5	16.0	15.9	13.2	12.0	11.0
Deer	3.0	3.0	6.3	4.3	4.3	3.6	3.1

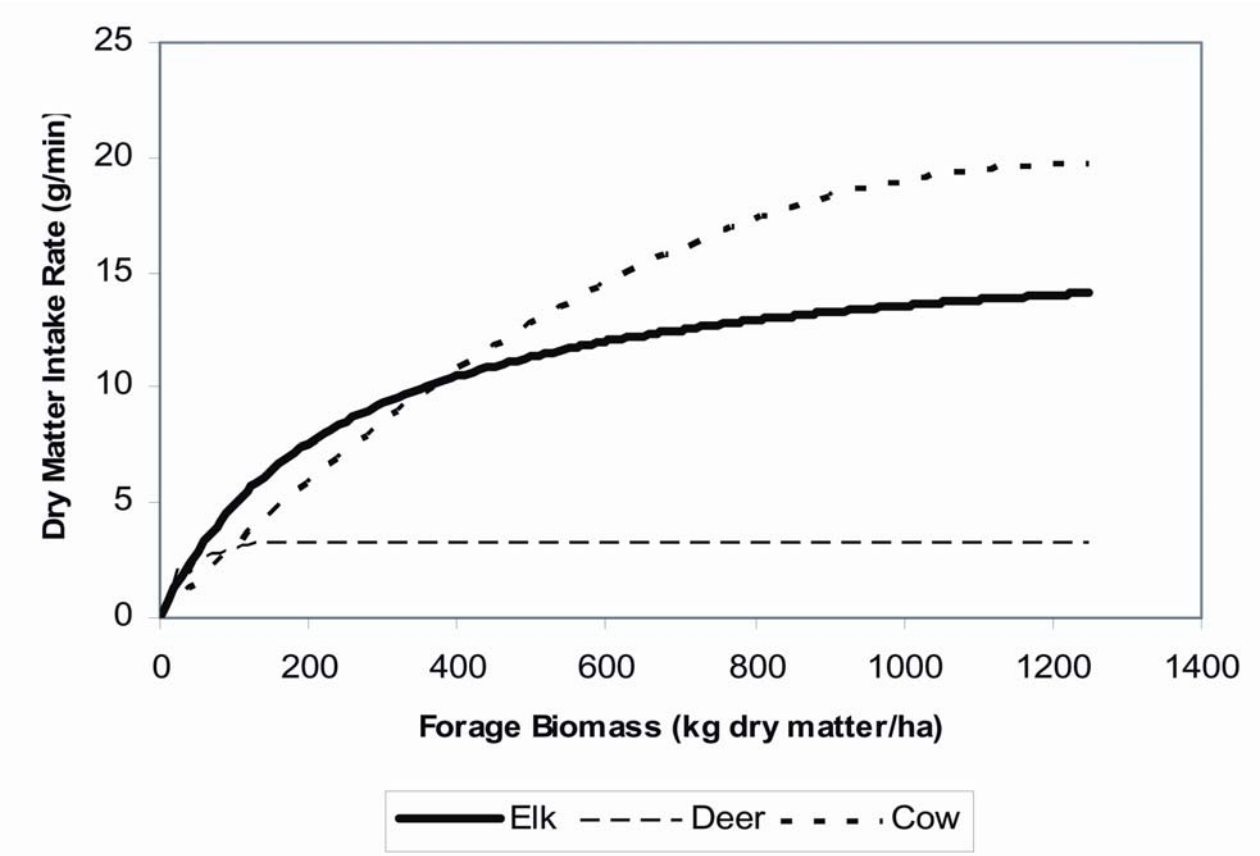


Figure 1. Relationship between standing forage biomass and dry matter intake rate for elk, mule deer and cattle. Functions for elk and deer were developed from data in Wickstrom et al. (1984). The elk relationship was developed from the Wickstrom et al. (1984) mixed forest type relationship. The function for cattle was developed from grazing trials on Starkey and the bison data in Spallinger and Hobbs (1992).

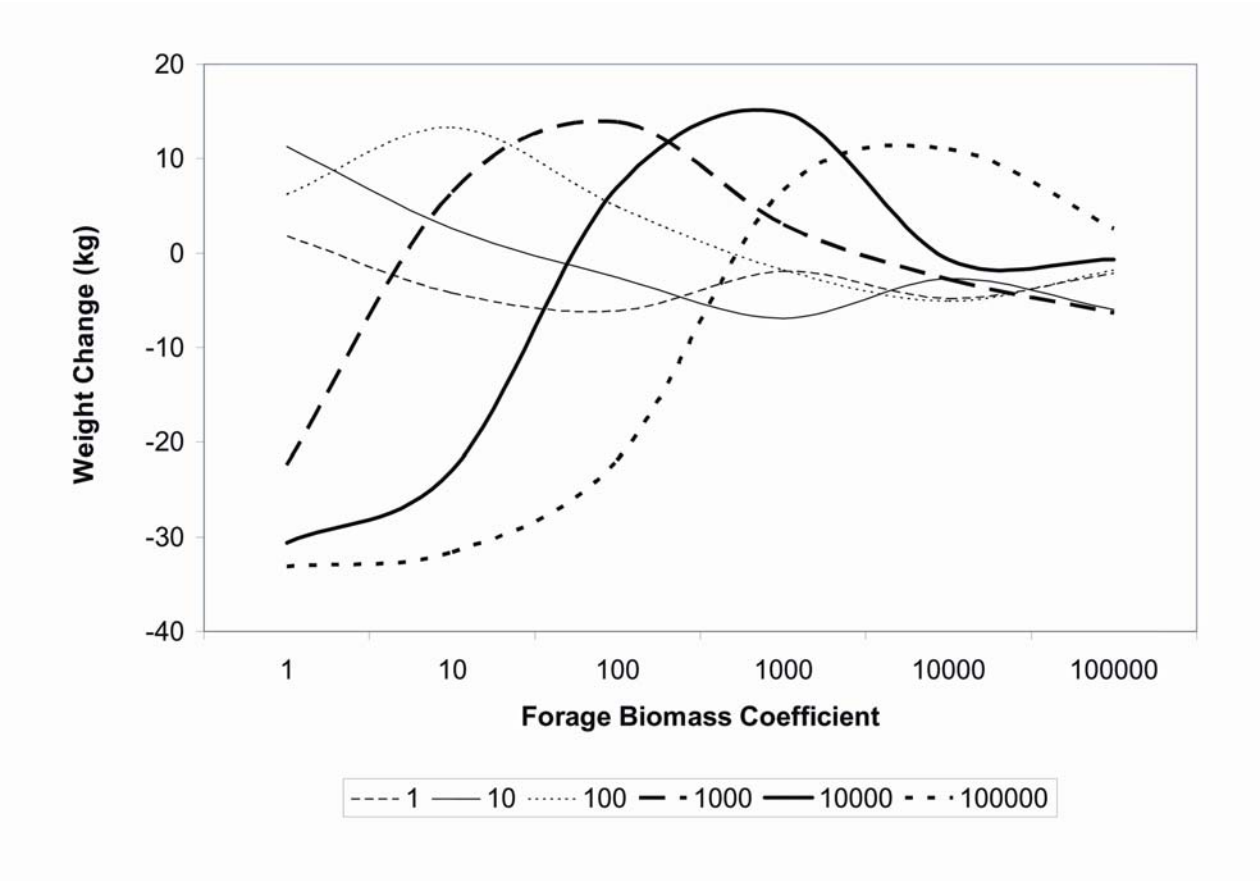


Figure 2. Simulated weight change in cattle for a range of values for W_{rsf} and W_{mass} in equation (1). X-axis contains values for the W_{mass} (forage biomass) weights for equation (1). Legend entries are the values for W_{rsf} in equation (1). Animal populations were 500 cattle, 450 elk, and 250 mule deer.

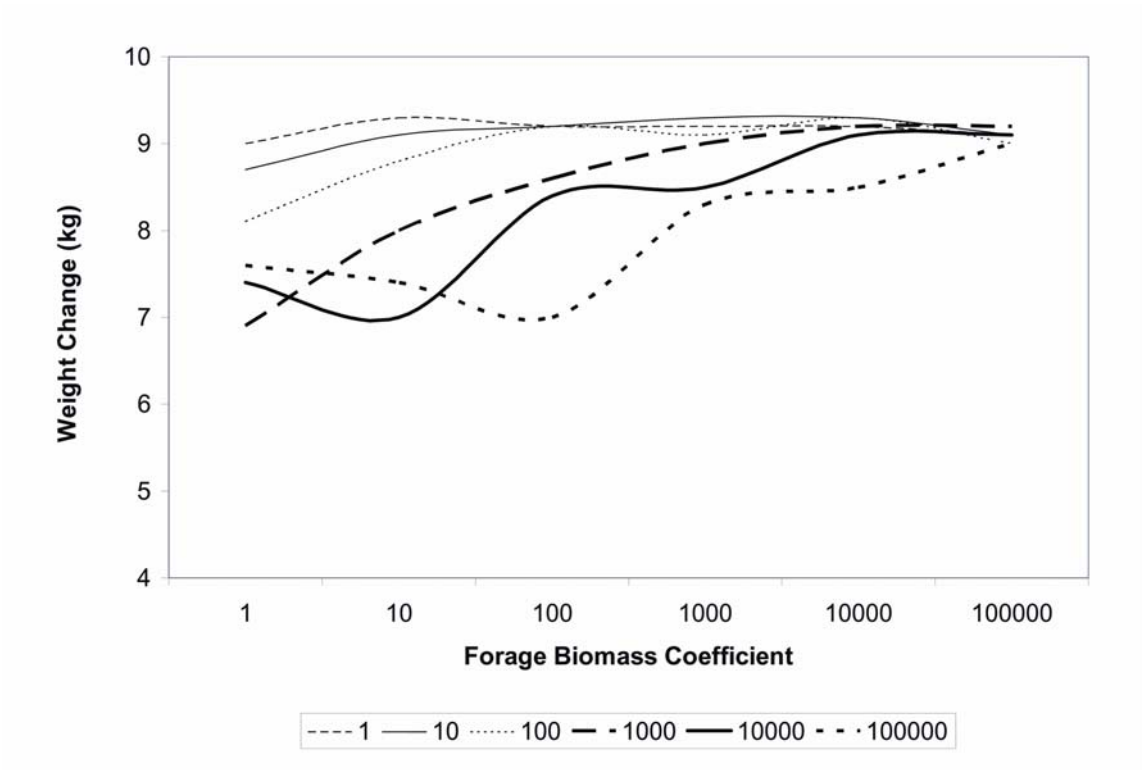


Figure 3. Simulated weight change in mule deer for a range of values for W_{rsf} and W_{mass} in equation (1). X-axis contains values for the W_{mass}. Legend entries are the values for the W_{rsf}. Animal populations were 500 cattle, 450 elk, and 250 mule deer.

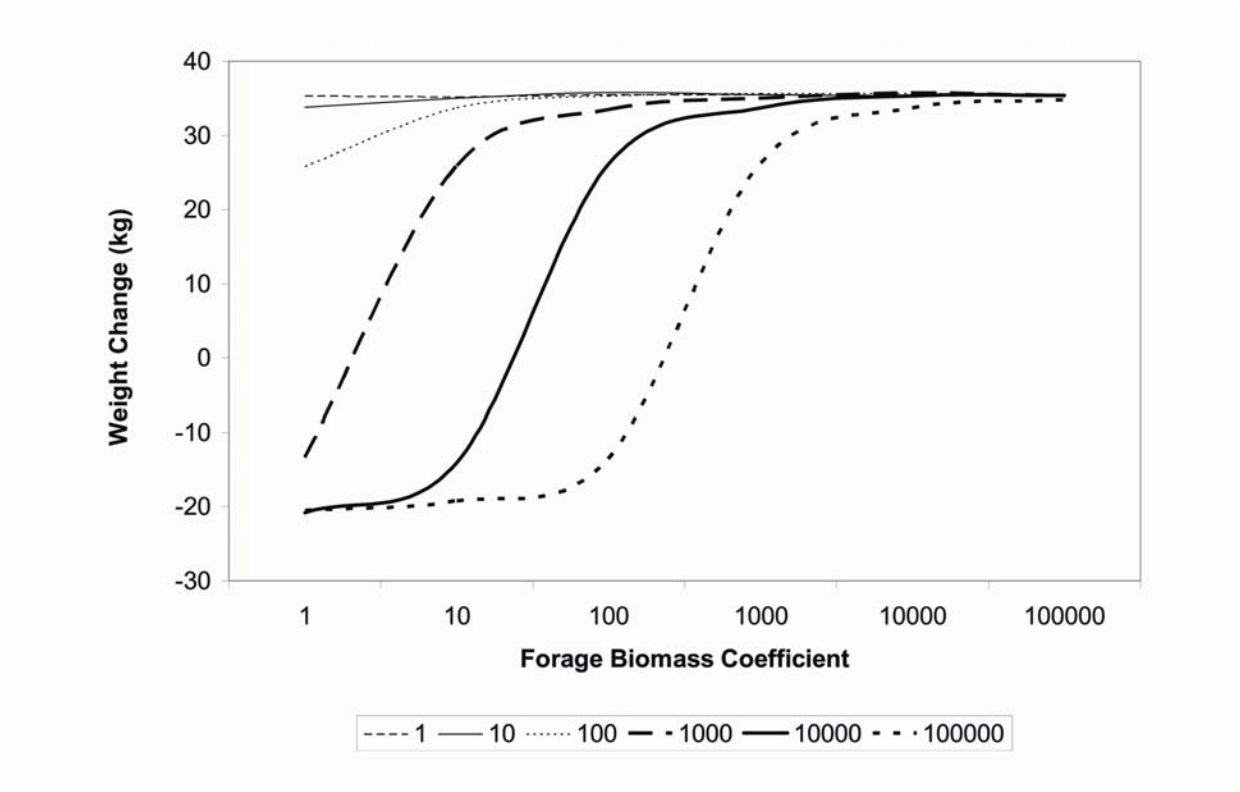


Figure 4. Simulated weight change in elk for a range of values for W_{rsf} and W_{mass} in equation (1). X-axis contains values for the W_{mass} weights for equation (1). Legend entries are the values for the W_{rsf} weights in equation (1). Animal populations were 500 cattle, 450 elk, and 250 mule deer.

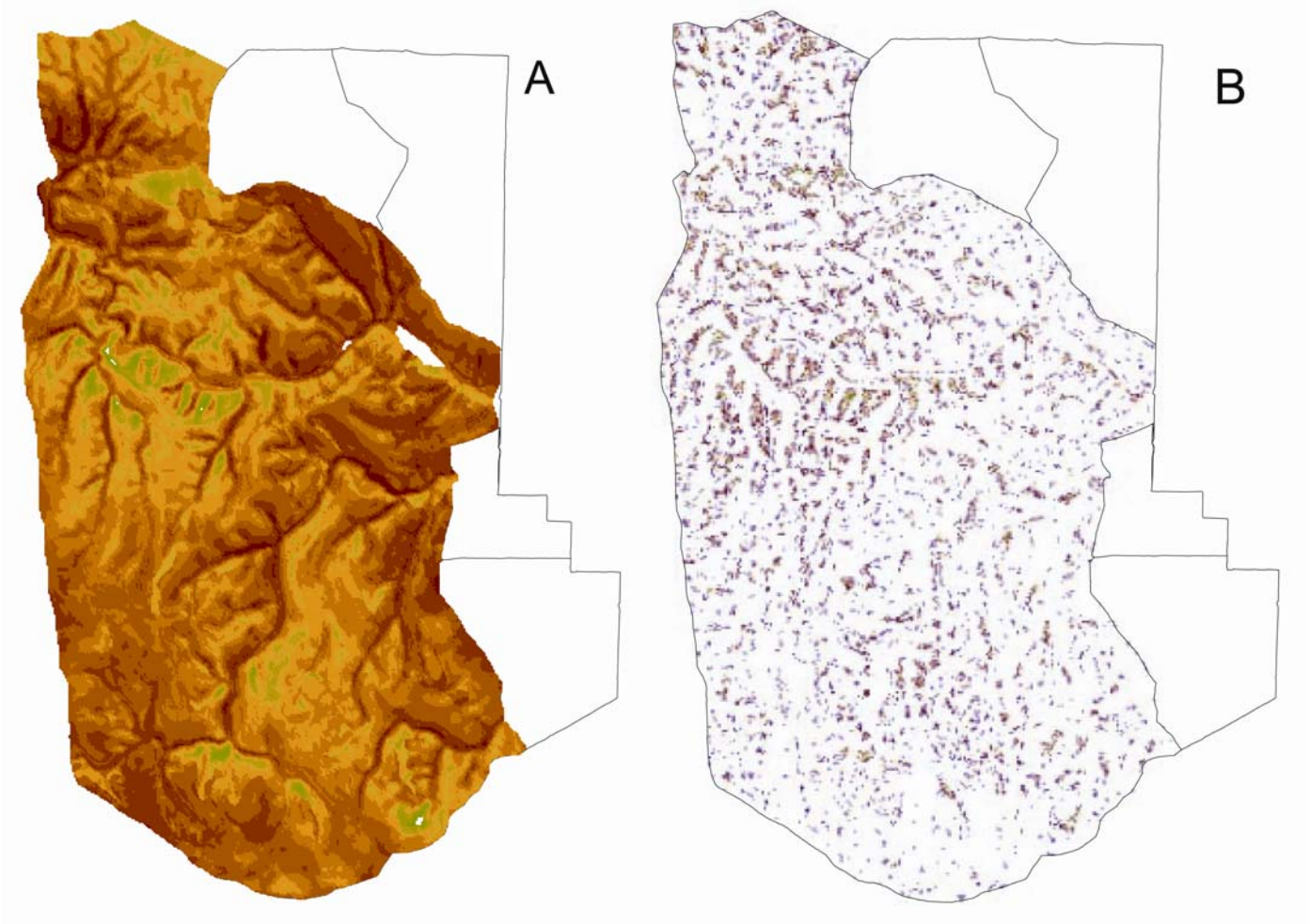


Figure 5. (A) Plot of resource selection functions for elk developed for Starkey data (Coe 2004). Values plotted were the sum of the monthly RSF scores as described in Coe (2004), and range from near 0.15 (white) to 1.5 (black). B) Results of simulation showing relative forage removal by elk within the Starkey area using W_{rsf} of 10,000 and W_{mass} if 1000. Dark areas correspond to areas of highest forage removal.

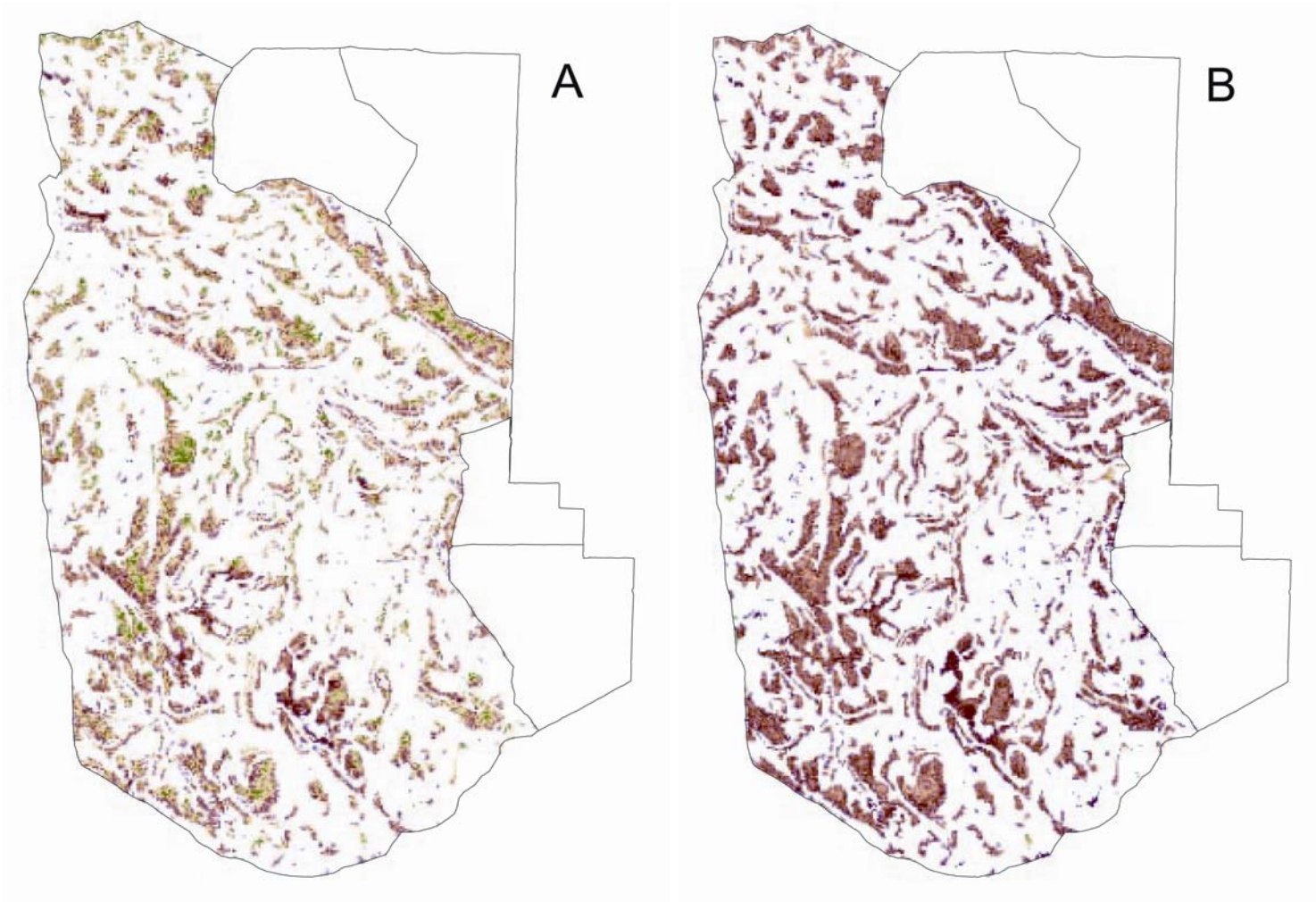


Figure 6. Results of simulation showing relative forage removal by elk within the Starkey area using weights of W_{rsf} of 1000 and W_{mass} if 10,000. Dark areas correspond to areas of highest forage removal. B) Same as (A) with forage production reduced to 10 percent of normal.

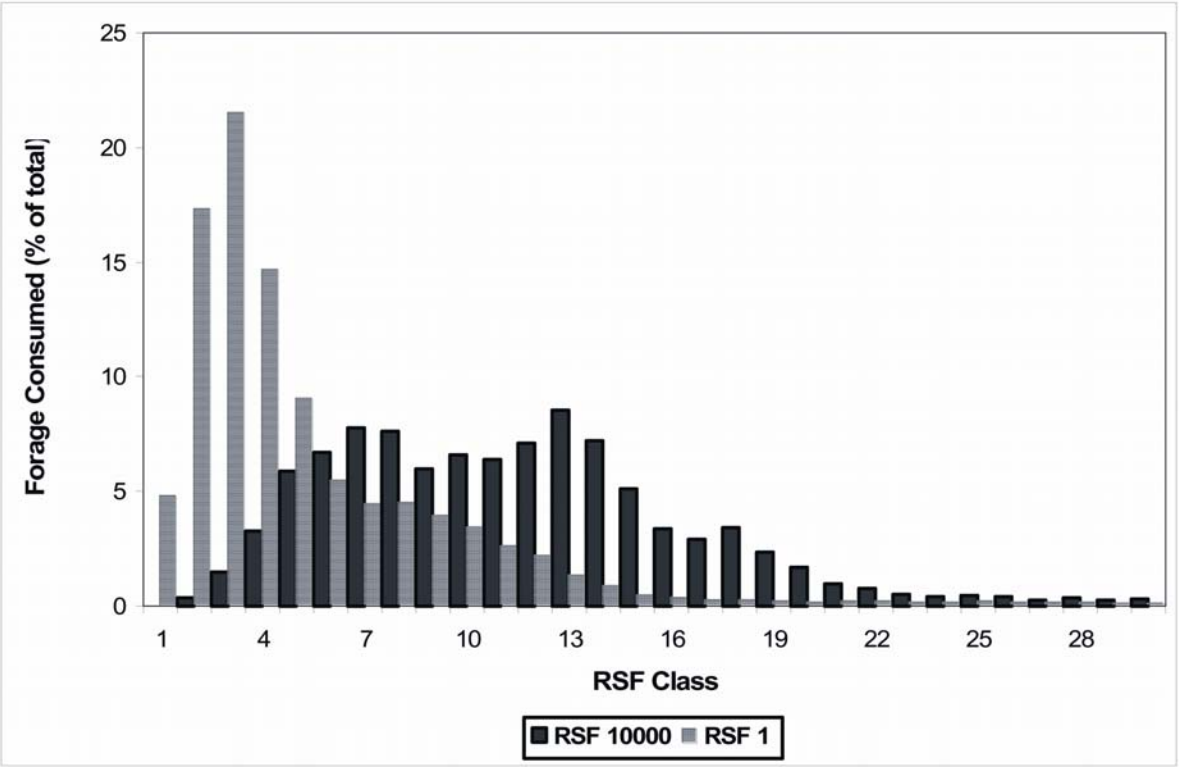


Figure 7. Forage consumption by two simulated elk using W_{rsf} weights of 1 and 10,000 and W_{mass} of 1. Data plotted are the percent of total forage consumed in each RSF class. RSF classes were calculated as RSF x 100. The figure shows that increasing the RSF weight for selecting foraging pixels results in a larger percentage of forage removal from the higher RSF pixels.

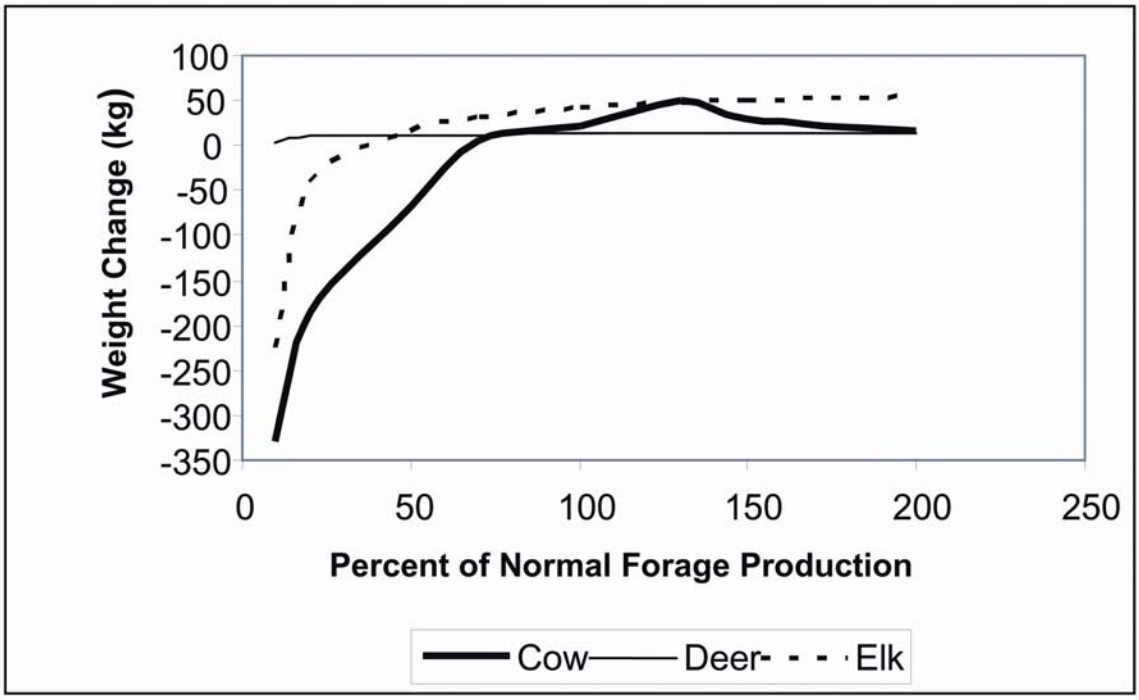


Figure 8. Results of simulations to examine the effect of reductions in forage production on average animal weight change for cattle, elk, and mule deer. Simulations used 500 cows, 60 mule deer and 450 elk. Forage production was reduced by a constant percentage of the normal growth rate throughout the growing season

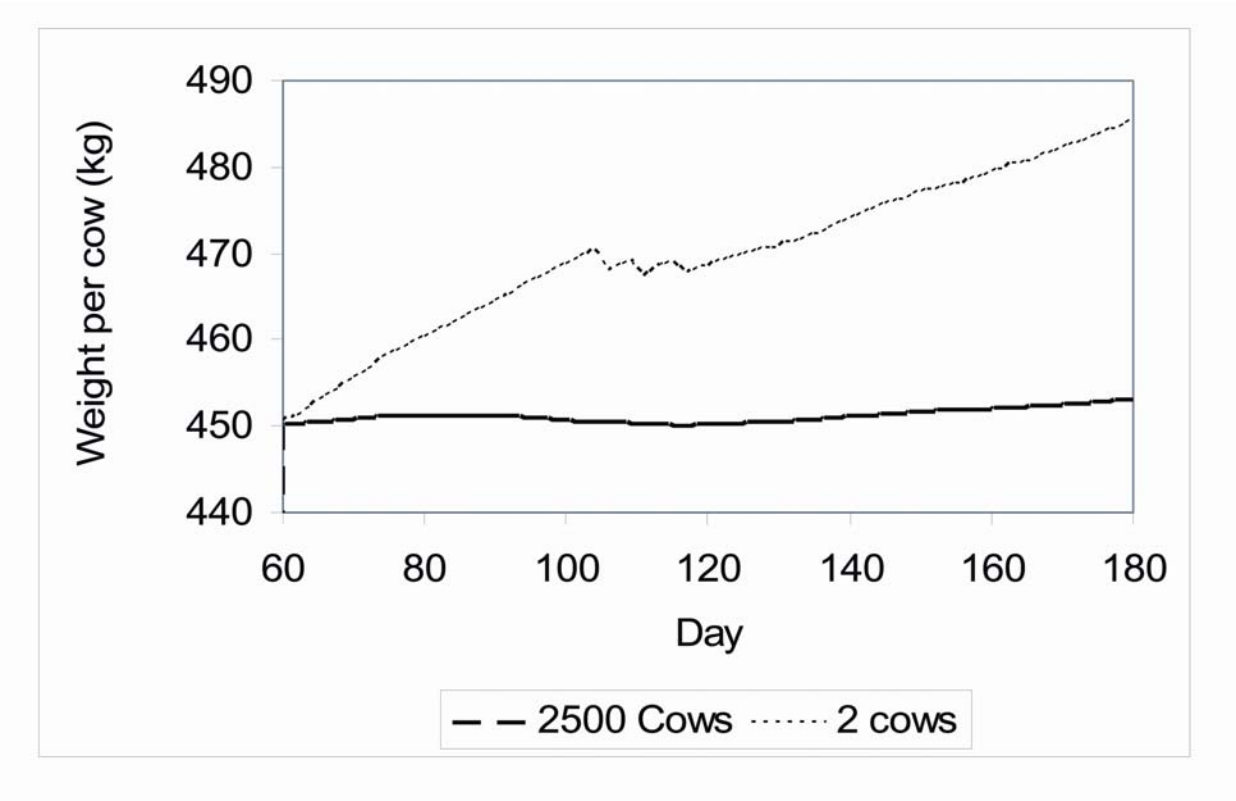


Figure 9. Changes in average animal weight for cattle over the grazing season for a cattle population of 2 and 2500.

Response:

Thank you for your comments and your favorable response to the TMDLs. Rangeland grazing has been identified as a probable source of impairment for both East Fork Jemez River (VCNP boundary to headwaters) and Jaramillo Creek (VCNP boundary to headwaters). Your land management suggestions will be passed along to SWQB's Watershed Protection Section as well as staff at the Valles Caldera National Preserve.

Comment Set B

This page left intentionally blank.

copies of all pages, plus exhibits copy retained
sent to D. Clark, R. Curry, M. Dechter, J. Garcia, J. Isaacs, M. Peale, B. Richardson, R. Salazar, D. Trujillo, N. Wells, and K. Wiegner

RECEIVED
MAY 31 2006
SURFACE WATER QUALITY BUREAU

May 27, 2005
135 Rincon Valverde
Ponderosa, NM
87044

Ms Heidi Henderson
TMDL Coordinator
New Mexico Environment Department
Surface Water Quality Bureau
Harold Runnels Building, Room N2163
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, NM 87502-6110

USPS CMR 7005 3110 0002 1105 3285
Robert Y. Perry Ryan

Dear TMDL Coordinator Henderson,

I hope that you are fine, I, and my family, are, as well. Enclosed is my most recent non-technical written public comment on a supporting document to the Jemez River Watershed TMDL named, presently, either Draft Total Maximum Daily Load (TMDL) for Valles Caldera National Preserve Watershed Valles Caldera National Preserve Boundaries to Headwaters, May 15, 2006, or Draft Total Maximum Daily Load (TMDL) For The Jemez River

copy retained
Page 2 of 20
May 27, 2006

Watershed VCNP Boundaries To Headwaters, May 15, 2006; as well as my request for a copy of amended draft of aforementioned TMDL document that is to be presented to WQCC, and should be available 10 days before said presentation to be printed and mailed to me; as well as my invocation of procedural due process should you not be able to address my concerns as requested in this non-technical written public comment. Accordingly, this non-technical written public comment should be acknowledged as adhering to procedural due process in that it contains my informing you of my intent to personally appear at the meeting where same TMDL document is presented to WQCC. Also, accordingly, this non-technical written public comment should be acknowledged as adhering to procedural due process in that it contains my informing you of

USPSCMR 7005 3110 0002 1105 3285
Rebecca J. Perry-Pepin

my intent to present a non-technical oral public comment, at the time of the presentation of said TMDL document; contains the text of my oral public comment; contains the time it will take to deliver my non-technical oral public comment; contains the number of pages of handwritten notes I will hold in my hands, to refer to, during my non-technical oral public comment; contains copies of the exhibits I will distribute to each person present during my non-technical oral public comment, at the time indicated in my non-technical oral public comment; contains the nature and scope of my interest in appearing before WQCC at the presentation of this same TMDL document; contains the names of who I will represent in appearing before WQCC at the presentation of this same TMDL document; contains the mailing address I wish to be notified, in a timely manner of when and where the

USPSCMR 7005 3110 0002 1105 3285
Rebecca G. Perry-Pipin

USPSCMR 7005 3110 0002 1105 3285
Steven D. Perry-Pepin

presentation of this same TMDL document will occur so that I might arrive to deliver my non-technical oral public comment and simultaneously distribute copies of my exhibits to those present in a punctual manner; and contains my legal signature.

I have also included a copy of my initial non-technical written public comment, dated May 26, 2006, and mailed, U.S. Postal Service Certified Mail Receipt/Article Number 7005 3110 0002 1105 3292, with a copy of my stamped certified mail receipt. I, for the record, would like to state that all contained in that May 26, 2006 non-technical written public comment is now superseded by the non-technical written public comment that follows here-in; which serves, dually, as the non-technical oral public comment that I am notifying you that I will orally deliver, with exhibits that I will simultaneously

copy retained

May 27, 2006

deliver, in person, before WQCC, when NMEDSWQB presents said TMDL document. If it is necessary for me to demand that there be a hearing, according to appropriate procedural due process, concerning NMEDSWQB's presentation of this aforementioned TMDL document (named, at printing, Draft Total Maximum Daily Load (TMDL) for Valles Caldera National Preserve Boundaries to Headwaters, May 15, 2006; and also named; at Valles Caldera N.P. Community Meeting, Thursday, May 25, 2006, conducted by the NMEDSWQB; Draft Total Maximum Daily Load For The Jemez River Watershed VCNP Boundaries To Headwaters, May 15, 2006), concerning the amendment of same TMDL document before presentation to WQCC (or that the presentation of same TMDL document for WQCC approval take on hearing status), then consider this my written, for-the-record, demand

USPS CMR 7005 3110 0002 1105 3285

Rebecca J. Perry-Piper

copy retained

May 27, 2006

that it be so, that I demand a hearing. I will also demand such in my non-technical written public comment contained herein this May 27, 2006 correspondence to you.

-beginning of non-technical written public which I am notifying NMED SWQB I intend to present, reading from notes for 25 minutes and distributing 4 submitted exhibits, as delivery calls for, during the meeting NMED SWQB will have with WQCC to submit a TMDL document named; on May 15, 2006; Draft Total Maximum Daily Load (TMDL) for Valles Caldera National Preserve Watershed Valles Caldera National Preserve Boundaries To Headwaters, and also named; on May 25, 2006; Draft Total Maximum Daily Load (TMDL) for The Jemez River Watershed VCNP Boundaries To Headwaters, May 15, 2006; as amended; or during the hearing I have requested, if I am not

USPSCMR 7005 3110 0002 1105 3285
[signature]

Copy retained

May 27, 2006

allowed to present my non-technical oral public comment at the meeting SWQB will be presenting before WQCC at before WQCC gives approval to aforementioned TMDL document-

"Greetings. My name is Rebecca G. Perry-Piper. I represent the members of my family who live with me at 135 Rincon Valverde, Ponderosa. I have been a member of the Jemez Watershed Group since August, 2004. Thank you for letting me present my non-technical oral public comment on five concerns I have about the Draft Total Maximum Daily Load (TMDL) document, made public for comment on May 15, 2006, on a part of a still ongoing intensive water survey study for the Jemez River Watershed.

My first concern has to do with the covers, Draft, WQCC-Approved and Final, of the parts of this Jemez River Watershed study,

USPS CMR 7005 3110 0002 1105 3285
Rebecca G. Perry-Piper

-cont comment-

as each is completed. I have no need for a Final Draft cover version in Exhibit 1, which I now ask you to refer to. As we go through this together, I'd like you to imagine that the completed comprehensive Jemez River Watershed intensive water survey study TMDL is going public during a series of consecutive community meetings and that all present at these community meetings; as well as commenting public-at-large; approve of them, from headwaters to the incorporated Village of San Ysidro. Five of these covers are working covers at these imaginary meetings. One is presented to the imaginary public at the imaginary meeting for assurances. Please open Exhibit 1, if you haven't already, and find your first Draft, Part 1, please.

• I propose Part 1 of the Jemez River Watershed document be named Draft Total Maximum Daily

USPSCMR 7005 3110 0002 1105 3285
Rebecca G. Perry-Pepin

-cont comment- May 27, 2006

Load (TMDL) For The Jemez River Watershed Rio Grande River To Headwaters (Part 1) (East Fork Jemez River And Jaramillo Creek ▪ VCNP Boundary To Head Waters ▪ May 15, 2006, skip over the second and third identical WQCC-Approved and Final Approved versions and look at Draft, Part 1, assurances version,

• I propose that this version be approved for Valles Caldera National Preserve's next completed TMDL document for this study on the Jemez River Watershed and that it be named Draft Total Maximum Daily Load (TMDL) For The Jemez River Watershed Rio Grande River To Headwaters (Part 2) (Vallecito Creek ▪ Jemez Pueblo Boundary To USFS Boundary), its undated,

• looking at Draft, Part 3, I propose Part 3 of the Jemez River Watershed document be named Draft Total Maximum Daily Load

USPSCMR 7005 3110 0002 1105 3285
Patricia J. Perry-Pipin

copy retained
Page 10 of 20
May 27, 2006

-cont comment-

(TMDL) For The Jemez River Watershed Rio Grande River To Headwaters (Part 3) (East Fork Jemez River, Redondo Creek And Sulphur Creek ■ Rio Jemez To VCNP Boundary ■ Rio Guadalupe ■ USPS Boundary To Headwaters ■ San Antonio Creek, Rio Cebolla and Rio de las Vacas ■ USFS Boundary To VCNP Boundary), it's undated,

- on to Part 4, Draft cover and I propose Part 4 cover be named Draft Total Maximum Daily Load (TMDL) For The Jemez River Watershed Rio Grande River To Headwaters (Part 4) (Rio Jemez ■ Jemez Pueblo Boundary To USFS Boundary ■ Rio Guadalupe ■ Rio Jemez To USFS Boundary), it's undated,
- and, finally, for this, looking at Draft Part 5, I propose that this cover be named Draft Total Maximum Daily Load (TMDL) For The Jemez River Watershed

USPSCMR 7005 3110 0002 1105 3285
[signature] G. Rory-Ripin

copy retained

-cont comment- May 27, 2006

Rio Grande River To Headwaters (Part 5) (Rio Jemez ■ Jemez Pueblo Boundary To Zia Pueblo Boundary), its undated. Please, down Exhibit 1.

My second concern has to do with the uses of two abbreviations (TMDL and WRAS); and their plurals; and three words; and their plurals; both capitalized and uncapitalized (watershed, subwatershed and basin), that occur in same TMDL document, May 15, 2006. Exhibit 2 lists the following rules that must be followed for best use practices:

• Rule 1 • all uses of the word TMDL should reflect that, at the end of this study as well as during same, there will be only one comprehensive TMDL and it will be the Jemez River Watershed TMDL;

• Rule 2 • all uses of the word WRAS should reflect that, at the end of this study as well as during same, there will be only one comprehensive WRAS and it will be the Jemez Watershed Group WRAS;

USPSCMR 7005 3110 0002 1105 3285

copy retained

May 27, 2006

-cont comment-

- Rule 3 • all uses of the word watershed should reflect that, at the end of this study as well as during same, there will be only one watershed (for science's sake), and it will be the Jemez River Watershed, which is actually the subwatershed in this TMDL study; the Jemez River Watershed is a subwatershed of the Rio Grande River;
- Rule 4 • all uses of the word subwatershed should also reflect that, at the end of this study as well as during same, there will be only one subwatershed (for science's sake) and that the Jemez River Watershed's streams are being studied;
- Rule 5 • all uses of the word basin should reflect that, at the end of this study as well as during same, there will be only one basin and it will be the Rio Grande River Basin;

USPSCMR 7005 3110 0002 1105 3285
Teresa G. Perry-Ryan

Copy retained

-cont comment- May 27, 2006

I ask, in closing on this concern, that all uses of the abbreviations TMDL and WRAS; and words watershed, subwatershed and basin; singular or plural, capitalized or uncapitalized where applicable; that do not follow Rules 1-5 be deleted or changed in the Draft TMDL, as it stood on May 15, 2006, on Pages ii, iii, 1, 4, 5, 6, 7, 8, 10, 12, 14, 15, 17, 18, 19, 20, 37, 38, 39, 41, 44, 45, 46, 49, 50, 51, 52, 53, 54, 55, 57; Appendix C, Pages i, ii, iii, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 before document receives WQCC approval. I ask that the amended version be only Draft status until follow-up is complete. Exhibit 2 down.

My third concern has to do with making sure that the definition of stakeholder that is used in this TMDL document, May 15, 2006, is expanded so as to be including, as shown in

USPSCMR 7005 3110 0002 1105 3285

Rebecca D. Perry-Rapp

-cont comment-

Exhibit 3. Look first at Page 53, 7.1, "Coordination", Sentence 4, from the Draft TMDL, May 15, 2006. This sentence reads:

"It includes opportunities for private landowners and public agencies in reducing and preventing impacts to water quality."

"It" refers to WRAS development. Now please turn to the next page in Exhibit 3.

In the future, TMDL stakeholder definition should not exclude any interested party wishing to become a member of the Jemez Watershed Group on the grounds of:

- not owning property in the Jemez River Watershed,
- not residing in the Jemez River Watershed,
- not deriving income from the Jemez River Watershed,
- not utilizing a particular type

USPS CMR 7005 3110 0002 1105 3285
Helen G. Perry Piper

copy retained

-cont comment- May 27, 2006

of communicative device, process or system, and

- not being able to participate in real-time.

I ask that the stakeholder definition on Page 53, 7.1, "Co-ordination", Sentence 4, in TMDL document, May 15, 2006, be expanded with the 5 points listed on the second page of Exhibit 3 adhered to before WQCC approves this same TMDL document.

My fourth, and last, concern has to do with a concern that was expressed on October 14, 2005, in a non-technical written public comment to NMEDSWQB on Draft Total Maximum Daily Load For The San Juan Watershed (Part Two) Navajo Nation Boundary At The Hogback To Navajo Dam, September 23, 2005, New Mexico Environment Department Surface Water Quality Bureau.

Please find the first page, which

USPSCMR 7005 3110 0002 1105 3285
Rebecca D. Perry-Rapp

copy retained

May 27, 2006

USPSCMR 7005 3110 0002 1105 3285

Rebecca G. Perry-Ripin

-cont comment-

is Page 37 from said TMDL document, Figure 4.5 "Residences that fall within 100 meters of the Animas River, NM", the next page in Exhibit 4 is my comment continuing on the subject of this type of data collection. It is the same comment I made, just about, in October, 2005, except it's about 7 months later and this study is in the Jemez River Watershed; coming to Ponderosa on June 21, 2006.

Exhibit 4: Collection Of Addresses Of Residences That Fall Within 100 Meters Of Streams Of The Jemez River Watershed: Is this intensive water survey study continuing to go from waterbody identifior to waterbody identifior gathering addresses of residences built, or hauled, within 100 meters of a stream without asking if they wish to be added to the data bank; without explaining why there needs to be such a data

copy retained

May 27, 2006

-cont comment-

bank? Granted, since I made a non-technical written public comment on this matter on October 14, 2005, I have never seen a figure like Figure 4.5, on Page 37 of the San Juan Watershed TMDL document, in any other TMDL document I have reviewed since. Again, this practice, if it is still going on, needs to be stopped in the Jemez River Watershed study, now. If the data bank has been compiled, each person that is in the data bank needs to receive a letter notifying them that this has happened, when, who helped give contributing information, who was their personal information given to, and why is this data bank listing every residence within 100 meters of streams in the Jemez River Watershed being compiled, and involuntarily. How could SWQB respond to me, in Final Draft Total Maximum

USPSCMR 7005 3110 0002 1105 3285

Rebecca J. Rainy-Rapin

copy retained

-cont comment- May 27, 2006

Daily Load (TMDL) For The San Juan River Watershed (Part Two) Navajo Nation Boundary At The Hogback To Navajo Dam, October 23, 2005, that implementation of the TMDL is on a voluntary basis? If all of the information on said Page 37 isn't voluntary then that's wrong. Did all the folks on Page 37 volunteer that information? WQCC should prohibit such data gathering if its without permission.

The Exhibits are yours to keep. I hope that you will not approve any TMDL document on the Jemez River Watershed study that does not take my concerns into consideration and adhere to my non-technical oral public comment and exhibits.

Thank you,

Rebecca G. "Gert" Perry-Piper

Rebecca G. "Gert" Perry-Piper

USPS CMR 7005 3110 0002 1105 3285

Rebecca G. Perry-Piper

copy retained

May 27, 2006

-end of non-technical written public which I am notifying NMED SWQB I intend to present, reading from notes for minutes and distribute 4 submitted exhibits, as delivery calls for, during the meeting NMEDSWQB will have with the WQCC to submit a TMDL document named; on May 15, 2006; Draft Total Maximum Daily Load (TMDL), or Valles Caldera National Preserve Watershed Valles Caldera National Preserve Boundaries To Headwaters, and also named; on May 25, 2006; Draft Total Maximum Daily Load (TMDL); or The Jemez River Watershed VCNP Boundaries To Headwaters, May 15, 2006; as amended; or during the hearing I have requested, if I am not allowed to present my non-technical oral public comment at the meeting SWQB will be presenting before WQCC at before WQCC gives approval to aforementioned TMDL document-

USPSCMR 7005 3110 0002 1105 3285
Februm G. Perry-Ripin

USPSCMR 7005 3110 0002 1105 3285

copy retained

May 27, 2006

Heidi, I have enclosed your copy of the Exhibits. I would appreciate it if you would be kind enough to tell me how many commissioners will be present so that I might have enough exhibits prepared. I will also need to know when, where the meeting, where SWQB presents this amended TMDL to WQCC will be, as well as a hearing, if it comes to that.

It was a pleasure to finally organize my thoughts on the matter of this Jemez River Watershed study. I look forward to seeing you again soon. Send all surface-mail to:

Rebecca G. Perry-Piper
135 Rincon Valverde
Ponderosa, NM 87044

Thanks, Rebecca G. "Gert" Perry-Piper

7005 3110 0002 1105 3292

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com®

OFFICIAL USE

Postage	$ .87
Certified Fee	2.40
Return Receipt Fee (Endorsement Required)	1.85
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 5.12

PONDEROSA
Postmark Here
MAY 27 2006
USPS 87044

Sent To Heidi Henderson State of New Mexico Environment Department Office of the Secretary
Street, Apt. No. or PO Box No. Harold Runnels Building ~~1190 S. Francis Drive P.O. Box 26110~~
City, State, ZIP+4 Santa Fe, NM 87502

PS Form 3800, June 2002 See Reverse for Instructions

May 26, 2006 superseded
non-technical written public comment on TMDL

Rebecca G. Perry-Rupe
5-27-06

NOT AN EXHIBIT FOR
WQCC MEETING/HEARING

copy retained
May 26, 2006

-cont non-technical written public comment-
convey the existence of a Valles Caldera Watershed TMDL seperate from a Jemez River Watershed TMDL. Page 4, Paragraphs 1 and 2, begin desensitizing the reader to the use of the plural 'watersheds', in same TMDL. Page 14, in same TMDL, is another example of this overuse of the word 'watersheds', as well as simultaneously overusing the word 'TMDLs'. By the time the reader makes his way to Page 56, in same TMDL, the eyes don't even notice the 's' after 'TMDL' in the last sentence on the same page:

Helen G. Perry-Pepin 5-27-06

'The cooperation of watershed stakeholders will also be pivotal in the implementation of these TMDLs.'

All of this overuse of 'TMDLs' and 'watersheds' needs to be cleaned up. There is one watershed,

NOT AN EXHIBIT FOR WQCC MEETING/HEARING

Attachment to document correction to Page 13 of 16, line 4 of May 26, 2005, non-technical written public comment.
Helen G. Perry-Pepin 5-27-06

NOT AN EXHIBIT FOR
WQCC MEETING/HEARING

USPSCMR 7005 3110 0002 1105 3292

*request for letter of assurances, or a hearing, if no hardcopy of amended TMDL received
* 5 attachments enclosed
* copies of all 16 pages sent to Ron Curry, Marty Peale, Bill Richardson, Dennis Trujillo, Nina Wells, Kathleen Wiegner

copy retained

May 26, 2006
135 Rincon Valverde
Ponderosa, NM
87044

-non-technical written public comment on a supporting document to the Jemez River Watershed TMDL named, presently, either Draft Total Maximum Daily Load (TMDL) for Valles Caldera National Preserve Watershed Valles Caldera National Preserve Boundaries to Headwaters, May 15, 2006 or Draft Total Maximum Daily Load (TMDL) For The Jemez River Watershed VCNP Boundaries To Headwaters, May 15, 2006 -

Heidi Henderson
State of New Mexico Environment Department
Surface Water Quality Bureau
Office of the Secretary
Harold Runnels Building
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

NOT AN EXHIBIT FOR WQCC MEETING/HEARING

USPSCMR 7005 3110 0002 1105 3292

copy retained
May 26, 2006

-start non-technical written public comment-

Dear Heidi,

Thank you for the informative power point presentation and townball concerning Draft Total Maximum Daily Load (TMDL) For The Jemez River Watershed VCNP Boundaries To Headwaters May 15, 2006. I commend Jill, Adam and you for your efforts.

After thorough review of aforementioned TMDL and Prepared Pursuant to the Clean Water Action Plan and Unified Assessment of New Mexico Watersheds Jemez Watershed Restoration Action Strategy (WRAS) Revised August 2005 Jemez Watershed Group under a 319 Grant administered by the Meridian Institute 2004 Revised August 2005, I would like to submit non-technical written public comment on two concerns I still have. Please respond in writing and surface-mail it to me at the following

NOT AN EXHIBIT FOR WQCC MEETING/HEARING

USPSCMR 7005 3110 0002 1105 3292

copy retained
May 26, 2006

-cont non-technical written public comment

address:
Rebecca G. Perry-Piper
135 Rincon Valverde
Ponderosa, NM 87044

My first concern, though you and the TMDL Team have been extremely sensitive to my previous concerns on this same subject, is, again, the cover of the present TMDL document for the Jemez River Watershed streams in the Valles Caldera National Preserve that were included. I, as many other citizens do, support the two-year-old Information Quality Act. I advocate for data used by federal regulators, as well as state regulators funded by federal regulators, to be correct. In light of this, I assert that Water Quality Control Commission should not approve said TMDL until the title is changed from what was, firstly, Draft Total Maximum Daily Load

NOT AN EXHIBIT FOR WQCC MEETING/HEARING

USPSCMR 7005 3110 0002 1105 3292

copy retained
May 26, 2006

-cont non-technical written public comment-
(TMDL) For The Valles Caldera National Preserve Watershed VCNP Boundaries To Headwaters, May 15, 2006, to what, secondly, became (as was explained and disseminated to all present at the May 25, 2006 SWQB Community Meeting on said TMDL) Draft Total Maximum Daily Load (TMDL) For The Jemez River Watershed VCNP Boundaries To Headwaters, May 15, 2006, should now become Draft (I have been so bold as to send you my version of the WQCC-Approved cover) Total Maximum Daily Load (TMDL) For The Jemez River Watershed Rio Grande River To Headwaters (Part 1) (East Fork Jemez River And Jaramillo Creek VCNP Boundary To Headwaters), May 15, 2006.

I assert that root principles of fairness dictate that procedural due process be afforded whenever a government

NOT AN EXHIBIT FOR WQCC MEETING/HEARING

-cont non-technical written public comment-
decision threatens to deprive an individual of a fundamental liberty (State of New Mexico, ex rel. Children, Youth & Families Department v Maria C., 136 N.M. 53, (N.M. Ct. App. 2004). The essence of procedural due process is notice and an 'opportunity to be heard at a meaningful time and in a meaningful manner', State of New Mexico, ex rel. Children, Youth & Families Department v Mafin M., 133 N.M. 827, 70 P.3d 1266 (N.M. 2003).

Accordingly, notice must be 'reasonably calculated, under all circumstances, to apprise interested parties of the pendancy of the action and afford them an opportunity to present their objections', Id. at 314; see also City of Albuquerque v Juarez, 93 N.M. 188, 190, 598 P.2d 650, 652 (Ct. App. 1979). Increasingly, however, the bureaucratic expectation to access and share real-time, transaction-level data, in a secure

NOT AN EXHIBIT FOR WQCC MEETING/HEARING

USPSCMR 7005 3110 0002 1105 3292

copy retained

May 26, 2006

-cont non-technical public written comment -

fashion, overlaid by rapid technological changes in the workplace, represent an increasing national on-site communicative standard that discriminates against stakeholders that have the liberty to choose paper-based, surface-mailed processes for participating in procedural due-process. In light of this paragraph's first two sentences, I assert that the TMDL Team should have surface-mailed me Draft Total Maximum Daily Load (TMDL) For The Valles Caldera National Preserve Watershed VCNP Boundaries To Headwaters, May 15, 2006, so that I could have presented the enclosed version to you, Heidi, and to those present at the May 25, 2006 Community Meeting. I would like a written explanation as to why this cover cannot be used at the TMDL presentation of the WRAS planning meeting for the Jemez Watershed Group on June 21, 2006,

NOT AN EXHIBIT FOR WQCC MEETING/HEARING

-cont non-technical public written comment- copy retained May 26, 2006

in time to ask for a hearing before the 30 day comment period expires. If I cannot be accommodated, I would like for there to be a hearing on this matter. I, personally, do not see why you won't rectify this, and I will be glad to cooperate with you as much as I possibly can to achieve this end.

My second concern has to do with narrow definitions of what a WRAS stakeholder is limiting citizens from bringing much-needed diverse representation into the 'living document' process. As recently as April 24, 2006, I was given this reply to my asking to sit at Rio Puerco Management Committee's table to participate in the update of their 2001 WRAS after the Rio Puerco Watershed TMDL was opened to public comment:

'Your interest in the water-

NOT AN EXHIBIT FOR WQCC MEETING/HEARING

-cont non-technical public written comment-
shed adjacent to where you live
is appreciated. The State and
the USEPA continue to expand
the required scope of these
documents, hence the need
for this one to be updated.
The first version gathered in-
put and contributions from
life-long resident landowners,
involved agencies, and contrib-
uting experts in a number of
fields of physical and social
sciences. I predict that the
update will be similarly treated
as we encourage the people
who occupy and derive their
living from their home water-
shed to take ownership of the
ideas and commit to the restora-
tive activities that are strategized,
via this document and its updates.
It is disturbing to see on Page
53 of Draft Total Maximum
Daily Load (TMDL) For The
Jemez River Watershed VCNP
Boundaries To Headwaters, May 15, 2006,

NOT AN EXHIBIT FOR
WQCC MEETING/HEARING

-cont non-technical public written comment-
7.0 'Implementation Of TMDLS'
7.1 'Coordination', Paragraph 1,
Sentences 3 and 4 stating:

'The WRAS is a written plan intended to provide a long-range vision for various activities and management of resources in a watershed. It includes opportunities for private landowners and public agencies in reducing and preventing impacts to water quality.'

As I was informed by Heidi Henderson, by you, and by Nina Wells, New Mexico Environment Department Environmental Specialist, and fellow Jemez Watershed Group member, a hard-working founding member, Prepared Pursuant to the Clean Water Action Plan and Unified Assessment of New Mexico Watersheds Jemez Watershed Restoration Action Strategy (WRAS) under a 319 Grant ad-

NOT AN EXHIBIT FOR WQCC MEETING/HEARING

copy retained
May 26, 2006

-cont non-technical written public comment-
ministered by The Meridian Institute and Prepared by the Jemez Watershed Group, October 2004 Revised August 2005, will be the presently standing WRAS for the aforementioned TMDL. Let Page 53, of said TMDL, said heading, said paragraph, said sentences, be changed so that Page 4, said WRAS, Paragraph 4, Sentences 1 and 2, become the definition of a WRAS stakeholder:

'JWG Members agreed on the need for diverse stakeholder representation, and identified individuals and stakeholder groups to be involved. Stakeholders currently involved in the JWG include members of the general public, representatives of acequia associations, water users, private landowners, local government, environmental groups, state and

NOT AN EXHIBIT FOR WQCC MEETING/HEARING

-cont non-technical written public comment-
federal agencies, and some of the Pueblos.

I would like written assurances that Page 53's narrow stakeholder definition will be changed from that found in the May 15, 2006 TMDL to that found in the JWG WRAS, Revised August 15, 2005, in time to ask for a hearing before the 30 day comment period expires if this cannot be done. The Valles Caldera National Preserve Trust thinks it needs the public to perceive VCNPT as "guarding" the Jemez River Watershed. Jemez Watershed Group thinks it needs the public to perceive it as "respecting" and "caring about" the Jemez River Watershed.

My third concern is about incorrect wording in the May 15, 2006 TMDL. I have categorized these types of incorrect wordings into three categories and have begun to identify where they

NOT AN EXHIBIT FOR WQCC MEETING/EXHIBIT

-cont non-technical written public comment-
are located throughout May 15, 2006
TMDL. The first category is
identified as instances where the
words 'Valles Caldera Watershed'
or 'Valles Caldera National Preserve
Watershed' (sometimes VC Watershed,
VC watershed, VCNP Watershed, or
VCNP watershed) appear in the
title, heading, subheading or caption,
as well as in tables and figures.
I have noticed this to happen
at least once, and in some instances,
as many as 4 or 5 times, on approx-
imately 36 pages in the May 15, 2006
TMDL. All of these miswordings
need to be replaced with wording
that recognizes the only watershed
being assessed in this TMDL of
May 15, 2006, is the Jemez River
Watershed.

The second category is identi-
fied as instances where a word
repeatedly is overused until the
reader is so desensitized to the
use of this word that "TMDLs"
can be used quite openly to

NOT AN EXHIBIT FOR
WQCC MEETING/HEARING

-cont non-technical written public comment-
convey the existence of a Valles Caldera Watershed TMDL seperate from a Jemez River Watershed. Page 4, Paragraphs 1 and 2, begin desensitizing the reader to the use of the plural 'watersheds', in same TMDL. Page 14, in same TMDL, is another example of this overuse of the word 'watersheds', as well as simultaneously overusing the word 'TMDLs'. By the time the reader makes his way to Page 56, in same TMDL, the eyes don't even notice the 's' after 'TMDL' in the last sentence on the same page:

'The cooperation of watershed stakeholders will also be pivotal in the implementation of these TMDLs.'

All of this overuse of 'TMDLs' and 'watersheds' needs to be cleaned up. There is one watershed,

NOT AN EXHIBIT FOR
WQCC MEETING/HEARING

-cont non-technical written public comment-
the Jemez River Watershed. The May 15, 2006 TMDL needs to reflect this. There is one TMDL and it is the TMDL for the Jemez River Watershed. The May 15, 2006 TMDL needs to reflect this.

The third category is identified as instances where the words "basin", "Basin", "subwatershed or "Subwatershed" are misused to convey the existence of a Valles Caldera or Rio Valles Caldera National Preserve Basin or Watershed. You can find examples of this on Pages i, ii, 1, 5, 14 and 15. I have already discussed that there is only one watershed, the Jemez River Watershed. These flows in the Valles Caldera National Preserve are not subwatersheds, they are streams of the Jemez River Watershed and should not be viewed in such an isolated manner. As for the misuse of the term "basin" and "Basin";

NOT - AN EXHIBIT FOR WQCC MEETING/HEARING

-cont non-technical written public comment-
there is only one basin or Basin, the Rio Grande River Basin. It should not be implied that any of these streams of the Jemez River Watershed are in any other basin or Basin. The reader that persists to Appendix B, 'Field Sheets For Assessing Designated Uses And Non-Point Source of Pollution', Field Sheet For Assessing Designated Uses And Non Point Sources of Pollution, 1 and 2, will see both Jaramillo Creek and East Fork of the Jemez River are in the Rio Grande River Basin as both sheets are filled in at top right. The errors concerning the misuse of 'basin', 'Basin', 'subwatershed' or 'Sub-watershed' need to be corrected.

I would like written assurances that the misuse of the words 'Valles Caldera Watershed', 'Valles Caldera National Preserve Watershed', 'TMDLs', 'watersheds', 'Basins', 'subwatersheds', and/or their

USPSCMR 7005 3110 0002 1105 3292

copy retained
May 26, 2006

-cont non-technical written public comment-
near facsimilies or abbreviations, will be deleted from this May 15, 2006 TMDL document and replaced properly, I would like to receive these assurances in time to ask for a hearing before the 30 day period expires if this cannot be done. I see in the Public Participation Flowchart in Appendix E that you must have the ammended version of the May 15, 2006 TMDL available to the public 10 days before the WQCC meeting for final adoption. I invoke procedural due process, respectfully, be followed and WQCC not hold its meeting until you can present the public with a TMDL document that addresses these 3 significant concerns."

-end of non-technical written public comment-

Sincerely,

Rebecca G. Perry-Piper

Rebecca G. Perry-Piper

NOT AN EXHIBIT FOR WQCC MEETING HEARING

List of Exhibits Per Commissioner

Exhibit 1: Cover Proposals For Five Parts Of The Jemez River Watershed Study

Exhibit 2: Best Use Practices Of Two Abbreviations and Three Words In Five Parts Of The Jemez River Watershed Study

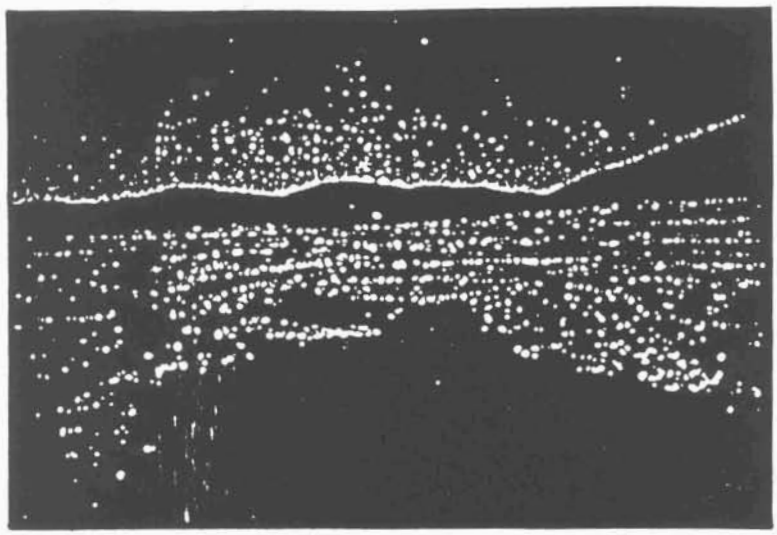
Exhibit 3: Expanding WRAS Stakeholder Definition In Five Parts Of The Jemez River Watershed Study

Exhibit 4: Collection Of Addresses Of Residences That Fall Within 100 Meters Of Streams Of The Jemez River Watershed

Rio Pueblo Viejo
Rio de Las Vacas
Rio Grande
Rio Salado
Rio Chico
Rio Pueblo
Rio Tecolote
Rio Tecolote Creek
Rio Pueblo Creek
Rio Lucero
Rio Lucero Creek
Rio Pueblo Creek
Rio Pueblo
Rio Pueblo Creek
Rio Pueblo Creek
Rio Pueblo Creek

DRAFT
TOTAL MAXIMUM DAILY LOAD (TMDL)
FOR THE
JEMEZ RIVER WATERSHED
RIO GRANDE RIVER TO HEADWATERS
(PART 1.)

(EAST FORK JEMEZ RIVER AND JARAMILLO CREEK - VCNP BOUNDARY TO HEADWATERS)



MAY 15, 2006

WQCC-APPROVED

TOTAL MAXIMUM DAILY LOAD (TMDL)

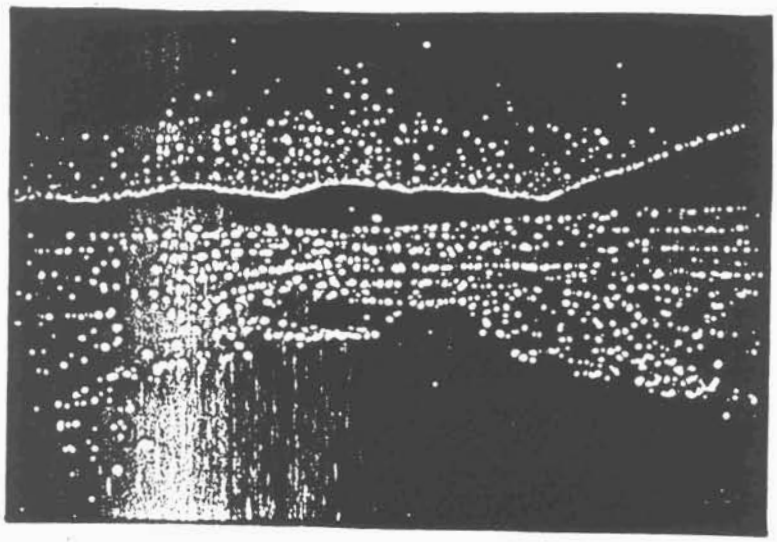
FOR THE

JEMEZ RIVER WATERSHED

RIO GRANDE RIVER TO HEADWATERS

(PART 1)

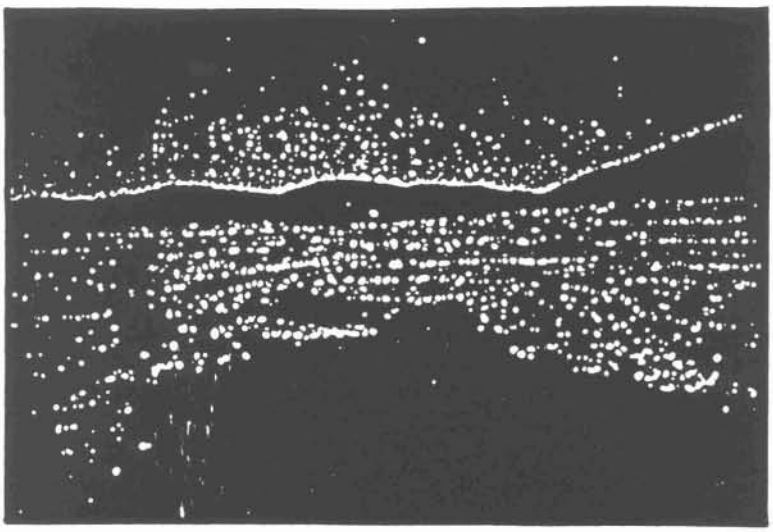
(EAST FORK JEMEZ RIVER AND JARAMILLO CREEK VCNP BOUNDARY TO HEADWATERS) Y)



MAY 15, 2006

FINAL APPROVED
TOTAL MAXIMUM DAILY LOAD (TMDL)
FOR THE
JEMEZ RIVER WATERSHED
RIO GRANDE RIVER TO HEADWATERS
(PART 1.)

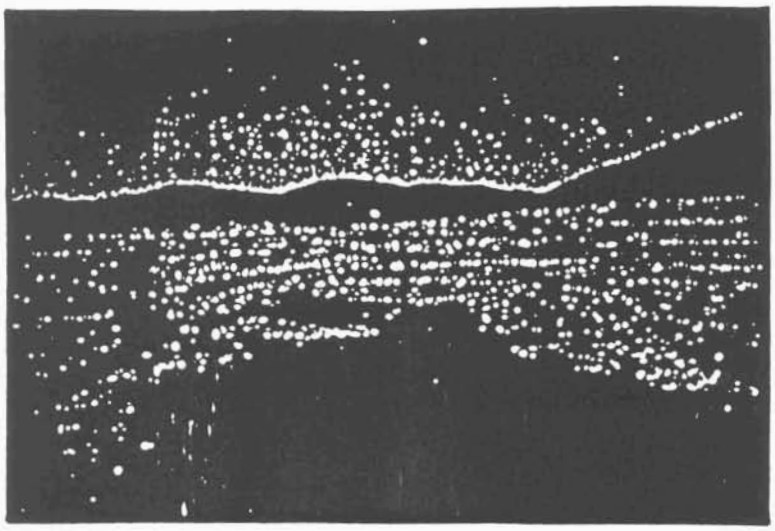
(EAST FORK JEMEZ RIVER AND JARAMILLO CREEK VCNP BOUNDARY TO HEADWATERS)



MAY 15, 2006

DRAFT
TOTAL MAXIMUM DAILY LOAD (TMDL)
FOR THE
JEMEZ RIVER WATERSHED
RIO GRANDE RIVER TO HEADWATERS
(PART 1.)

(EAST FORK JEMEZ RIVER, San Antonio Creek, Redondo Creek, and Sulphur Creek - **VCNP BOUNDARY TO HEADWATERS)**



WQCC-APPROVED

TOTAL MAXIMUM DAILY LOAD (TMDL)

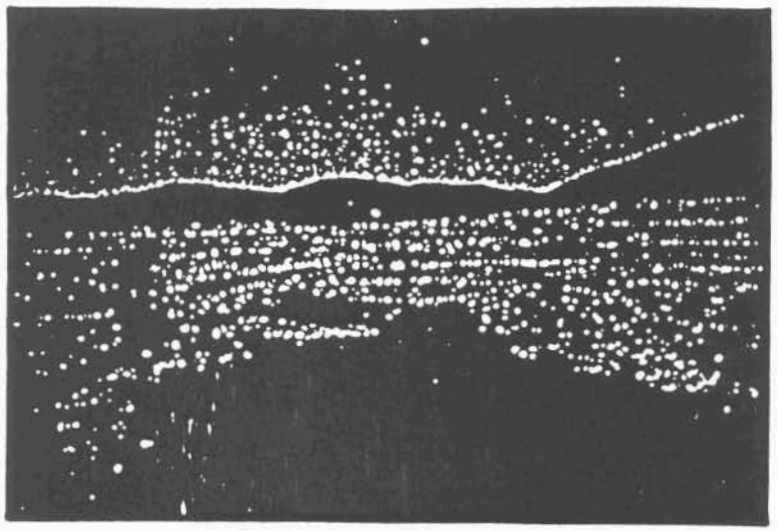
FOR THE

JEMEZ RIVER WATERSHED

RIO GRANDE RIVER TO HEADWATERS

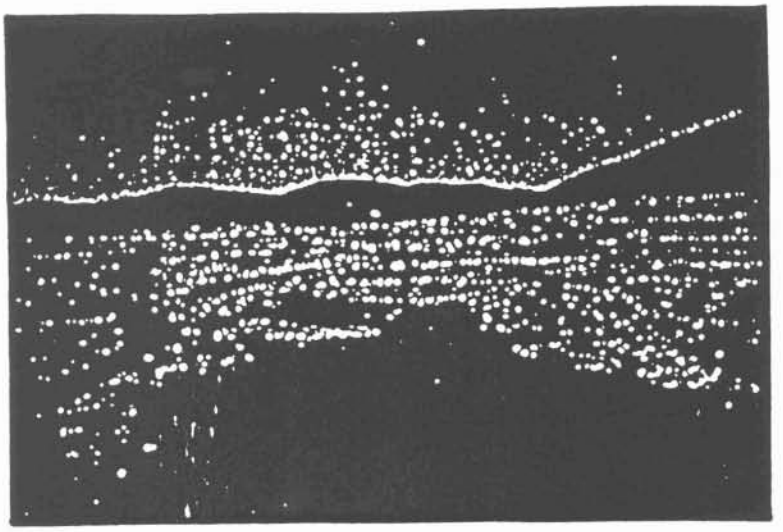
(PART 1.)

(EAST FORK JEMEZ RIVER, San Antonio Creek, Redondo Creek, and Sulphur Creek - **VCNP BOUNDARY TO HEADWATERS)**



FINAL APPROVED
TOTAL MAXIMUM DAILY LOAD (TMDL)
FOR THE
JEMEZ RIVER WATERSHED
RIO GRANDE RIVER TO HEADWATERS
(PART 1.)

(EAST FORK JEMEZ RIVER, San Antonio Creek, Redondo Creek, and Sulphur Creek - **VCNP BOUNDARY TO HEADWATERS)**



DRAFT

TOTAL MAXIMUM DAILY LOAD (TMDL)

FOR THE

JEMEZ RIVER WATERSHED

RIO GRANDE RIVER TO HEADWATERS

(PART 2.)

(Vallecito Creek ▪ Jemez Pueblo BOUNDARY TO USFS BOUNDARY)

WQCC-APPROVED

TOTAL MAXIMUM DAILY LOAD (TMDL)

FOR THE

JEMEZ RIVER WATERSHED

RIO GRANDE RIVER TO HEADWATERS

(PART 2.)

(Vallecito Creek ▪ Jemez Pueblo BOUNDARY TO USFS BOUNDARY)

FINAL APPROVED
TOTAL MAXIMUM DAILY LOAD (TMDL)

FOR THE
JEMEZ RIVER WATERSHED
RIO GRANDE RIVER TO HEADWATERS
(PART 2.)

(Vallecito Creek ▪ Jemez Pueblo BOUNDARY TO USFS BOUNDARY)

DRAFT

TOTAL MAXIMUM DAILY LOAD (TMDL)

FOR THE

JEMEZ RIVER WATERSHED

RIO GRANDE RIVER TO HEADWATERS

(PART 3.)

(EAST FORK JEMEZ RIVER, Redondo Creek and Sulphur Creek • Rio JEMEZ TO VCNP BOUNDARY •

Rio Guadalupe • USFS BOUNDARY TO HEADWATERS •

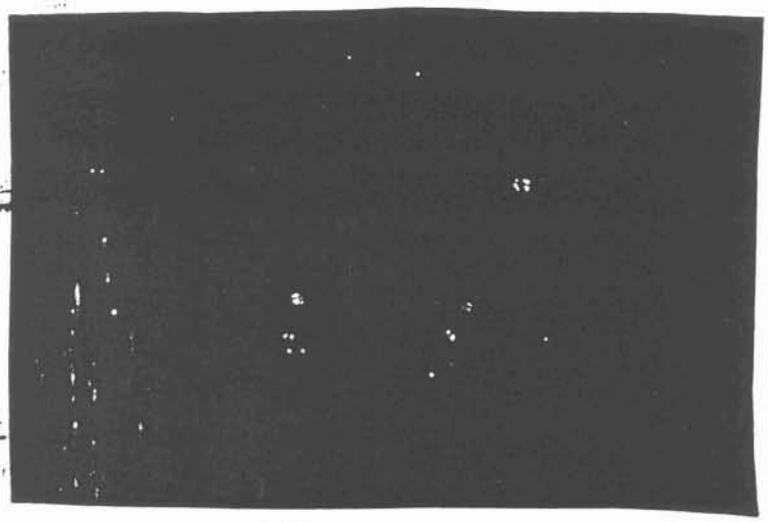
San Antonio Creek, Rio Cebolla and Rio de las Vacas • USFS BOUNDARY TO VCNP BOUNDARY)

WQCC-APPROVED
TOTAL MAXIMUM DAILY LOAD (TMDL)
FOR THE
JEMEZ RIVER WATERSHED
RIO GRANDE RIVER TO HEADWATERS
(PART 3.)

(EAST FORK JEMEZ RIVER • Redondo Creek and Sulphur Creek • Rio JEMEZ TO VCNP BOUNDARY •

Rio Guadalupe • USFS BOUNDARY TO HEADWATERS •

San Antonio Creek, Rio Cebolla and Rio de las Vacas • USFS BOUNDARY TO VCNP BOUNDARY)



FINAL APPROVED

TOTAL MAXIMUM DAILY LOAD (TMDL)

FOR THE

JEMEZ RIVER WATERSHED

RIO GRANDE RIVER TO HEADWATERS

(PART 3.)

(EAST FORK JEMEZ RIVER - Redondo Creek and Sulphur Creek - Rio JEMEZ TO VCNP BOUNDARY -

Rio Guadalupe - USFS BOUNDARY TO HEADWATERS -

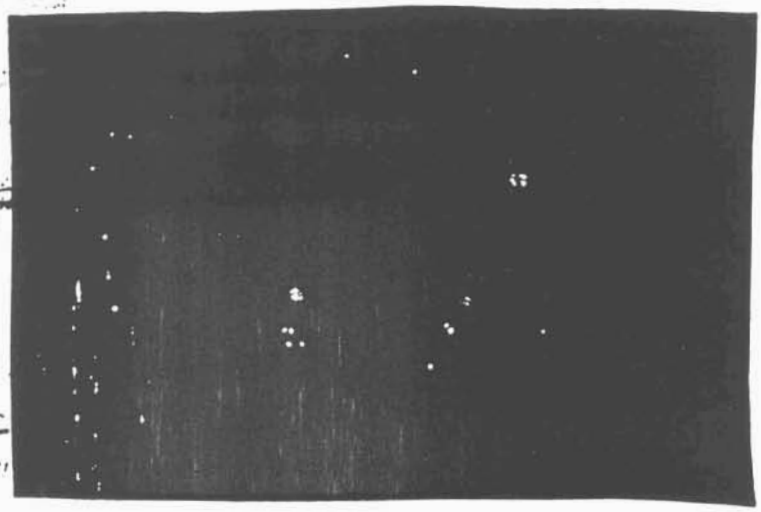
San Antonio Creek, Rio Cebolla and Rio de las Vacas - USFS BOUNDARY TO VCNP BOUNDARY)

DRAFT

TOTAL MAXIMUM DAILY LOAD (TMDL)
FOR THE
JEMEZ RIVER WATERSHED
RIO GRANDE RIVER TO HEADWATERS
(PART 4.)

(Rio JEMEZ - Jemez Pueblo BOUNDARY TO USFS BOUNDARY -

Rio Guadalupe - Rio JEMEZ TO USFS BOUNDARY)



FINAL APPROVED

TOTAL MAXIMUM DAILY LOAD (TMDL)

FOR THE

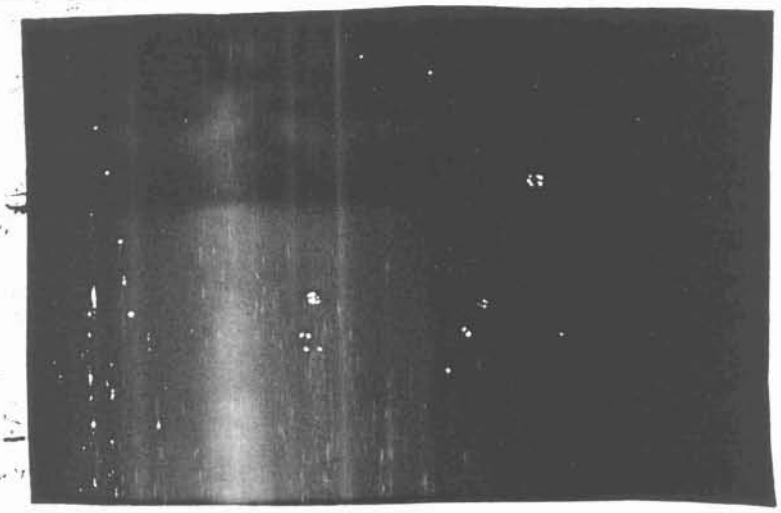
JEMEZ RIVER WATERSHED

RIO GRANDE RIVER TO HEADWATERS

(PART 4.)

(Rio JEMEZ - Jemez Pueblo BOUNDARY TO USFS BOUNDARY -

(Rio Guadalupe - Rio JEMEZ TO USFS BOUNDARY)

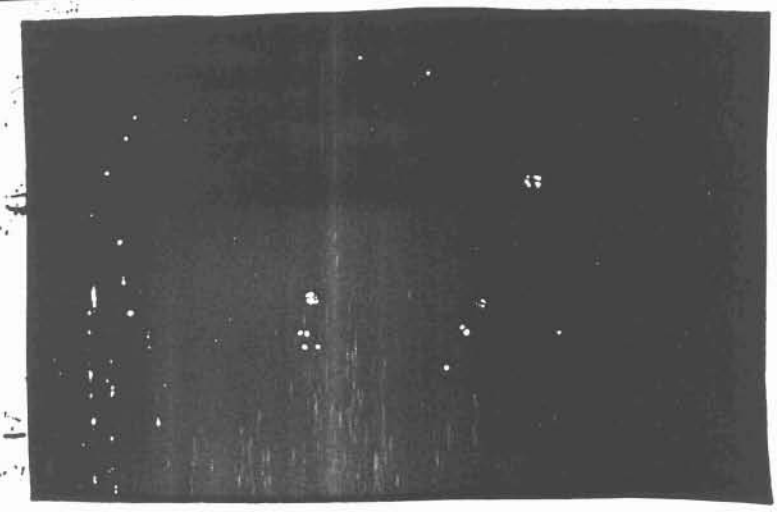


WQCC-APPROVED

TOTAL MAXIMUM DAILY LOAD (TMDL)
FOR THE
JEMEZ RIVER WATERSHED
RIO GRANDE RIVER TO HEADWATERS
(PART 4.)

Rio JEMEZ - Jemez Pueblo BOUNDARY TO USFS BOUNDARY -

Rio Guadalupe - Rio JEMEZ TO USFS BOUNDARY



DRAFT

TOTAL MAXIMUM DAILY LOAD (TMDL)

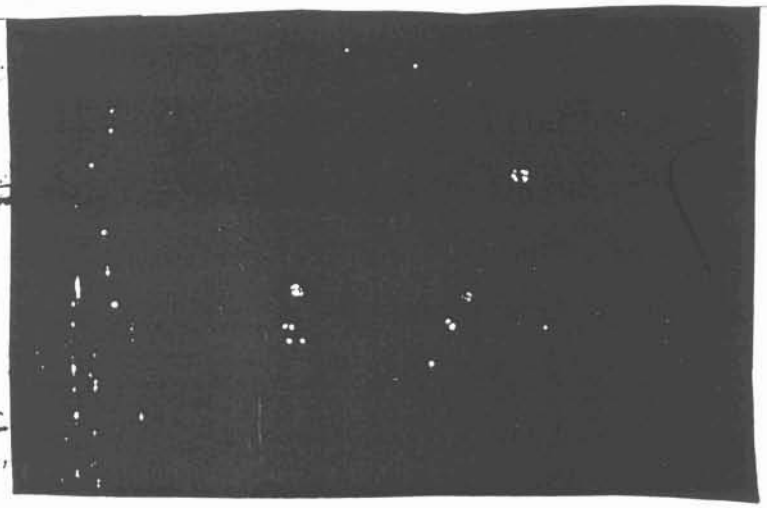
FOR THE

JEMEZ RIVER WATERSHED

RIO GRANDE RIVER TO HEADWATERS

(PART 5.)

(Rio JEMEZ Jemez Pueblo BOUNDARY TO Zia Pueblo BOUNDARY)



FINAL APPROVED

TOTAL MAXIMUM DAILY LOAD (TMDL)

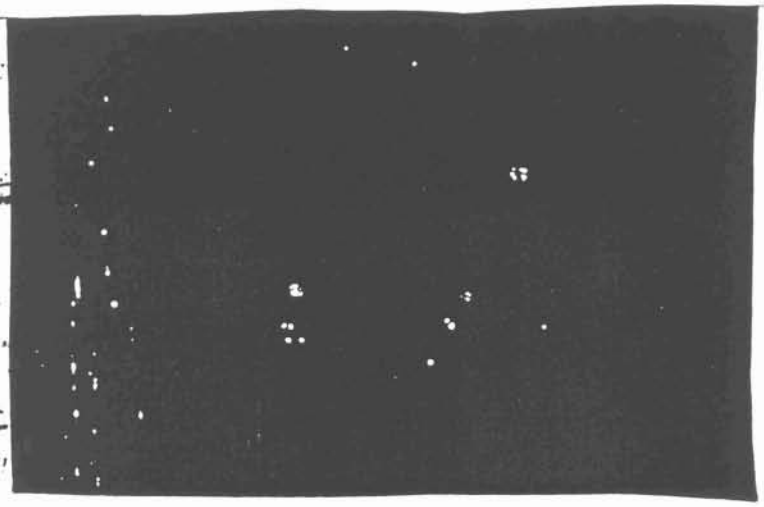
FOR THE

JEMEZ RIVER WATERSHED

RIO GRANDE RIVER TO HEADWATERS

(PART 5.)

(Rio JEMEZ Jemez Pueblo BOUNDARY TO Zia Pueblo BOUNDARY)



WQCC-APPROVED

TOTAL MAXIMUM DAILY LOAD (TMDL)

FOR THE

JEMEZ RIVER WATERSHED

RIO GRANDE RIVER TO HEADWATERS

(PART 5.)

(Rio JEMEZ Jemez Pueblo BOUNDARY TO Zia Pueblo BOUNDARY)

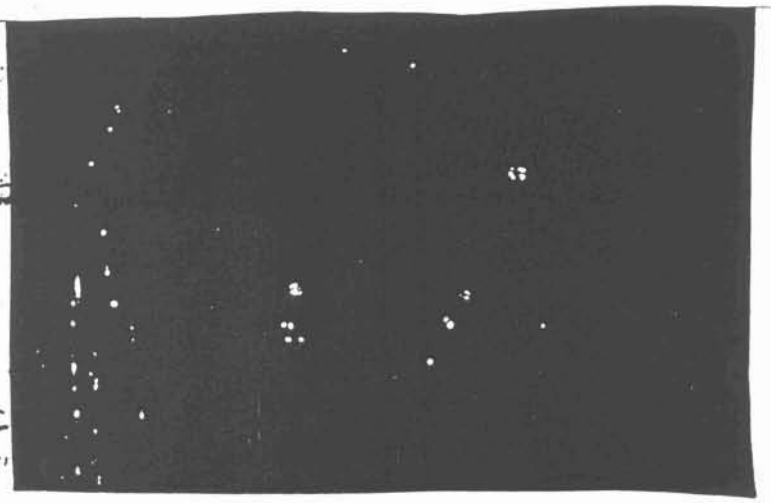


Exhibit 1

May 27, 2006

Rio Grande River To Headwaters (Part 5) (Rio Jemez ■ Jemez Pueblo Boundary To Zia Pueblo Boundary), its undated. Please, down Exhibit 1.

My second concern has to do with the uses of two abbreviations (TMDL and WRAS), and their plurals, and three words; and their plurals; both capitalized and uncapitalized (watershed, subwatershed and basin), that occur in same TMDL document, May 15, 2006. Exhibit 2 lists the following rules that must be followed for best use practices:

• Rule 1 • all uses of the word TMDL should reflect that, at the end of this study as well as during same, there will be only one comprehensive TMDL and it will be the Jemez River Watershed TMDL;

• Rule 2 • all uses of the word WRAS should reflect that, at the end of this study as well as during same, there will be only one comprehensive WRAS and it will be the Jemez Watershed Group WRAS;

May 27, 2006

- Rule 3 - all uses of the word watershed should reflect that, at the end of this study as well as during same, there will be only one watershed (for science's sake), and it will be the Jemez River Watershed, which is actually the subwatershed in this TMDL study; the Jemez River Watershed is a subwatershed of the Rio Grande River;
- Rule 4 - all uses of the word subwatershed should also reflect that, at the end of this study as well as during same, there will be only one subwatershed (for science's sake) and that the Jemez River Watershed's streams are being studied;
- Rule 5 - all uses of the word basin should reflect that, at the end of this study as well as during same, there will be only one basin and it will be the Rio Grande River Basin;

Exhibit 2

Now please turn to the next page in Exhibit 3.

In the future, TMDL stakeholder definition should not exclude any interested party wishing to become a member of the Jemez Watershed Group on the grounds of:

- not owning property in the Jemez River Watershed,
- not residing in the Jemez River Watershed,
- not deriding income from the Jemez River Watershed,
- not being affiliated with any organization or public agency, and
- not utilizing a particular type of communicative device, process or system

I ask that the stakeholder definition on Page 53, 7.1, "Coordination", Sentence 4, in TMDL document May 15, 2006, be expanded with the 5 points above adhered to before WQCC approves this same TMDL document.

Exhibit 3

7.0 IMPLEMENTATION OF TMDLS

7.1 Coordination

Watershed public awareness and involvement will be crucial to the successful implementation of these plans to improve water quality. Staff from SWQB have worked with stakeholders to develop a WRAS for the Jemez Watershed (Jemez Watershed Group 2005). The WRAS is a written plan intended to provide a long-range vision for various activities and management of resources in a watershed. It includes opportunities for private landowners and public agencies in reducing and preventing impacts to water quality. This long-range strategy will become instrumental in coordinating and achieving constituent levels consistent with New Mexico's WQS, and will be used to prevent water quality impacts in the watershed. The WRAS is essentially the Implementation Plan, or Phase Two of the TMDL process. The completion of the TMDLs and WRAS leads directly to the development of on-the-ground projects to address surface water impairments in the watershed.

SWQB staff will continue to assist with any technical assistance such as selection and application of BMPs needed to meet WRAS goals. Stakeholder public outreach and involvement in the implementation of this TMDL will be ongoing. Stakeholders in this process will include SWQB, VCNP, and members of the Jemez Watershed Group.

Implementation of BMPs within the watershed to reduce pollutant loading from nonpoint sources will be encouraged. Reductions from point sources will be addressed in revisions to discharge permits.

7.2 Time Line

The Jemez Watershed Group was established in 2003 after the first set of Jemez Watershed TMDLs were prepared in 2002. As a result, the Jemez Watershed WRAS was developed and finalized before preparation of these TMDLs. The general implementation timeline is detailed below (Table 7.1).

Table 7.1 Proposed Implementation Timeline

Implementation Actions	Year 1	Year 2	Year 3	Year 4	Year 5
Public Outreach and Involvement	X	X	X	X	X
Form watershed groups	X	X			
WRAS Development		X	X	X	
Establish Performance Targets		X			
Secure Funding		X	X		

Exhibit 4

Collection Of Addresses Of Residences That Fall Within 100 Meters Of Streams Of The Jemez River Watershed

Is this intensive water survey study to continuing to go from waterbody identifior to waterbody identifior gathering addressess of residences built or hauled within 100 meters of a stream without asking if they wish to be added to the data bank; without explaining why there needs to be such a data bank? Granted, since I made a non-technical written public comment on this matter on October 14, 2006, I have never seen a figure like Figure 4.5, on Page 37 of the San Juan Watershed TMDL document, in any other TMDL document I have reviewed since. Again, this practice, if it is still going on, needs to be stopped in the Jemez River Watershed study, now. If the data bank has been compiled, each person that is in the data bank needs

to receive a letter notifying them that this has happened, when, who helped give contributing information, who was their personal information given to, and why is this data bank listing every residence within 100 meters of streams in the Jemez River Watershed being compiled, and involuntarily. How could SWQB respond to me, in Final Draft Total Maximum Daily Load (TMDL) For The San Juan River Watershed (Part Two) Navajo Nation Boundary At The Hogback To Navajo Dam, October 23, 2005, that implementation of the TMDL is on a voluntary basis? If all of the information on said Page 37 isn't voluntary then that's wrong. Did all the folks on Page 37 volunteer that information? WQCC should prohibit such data gathering if its without permission.

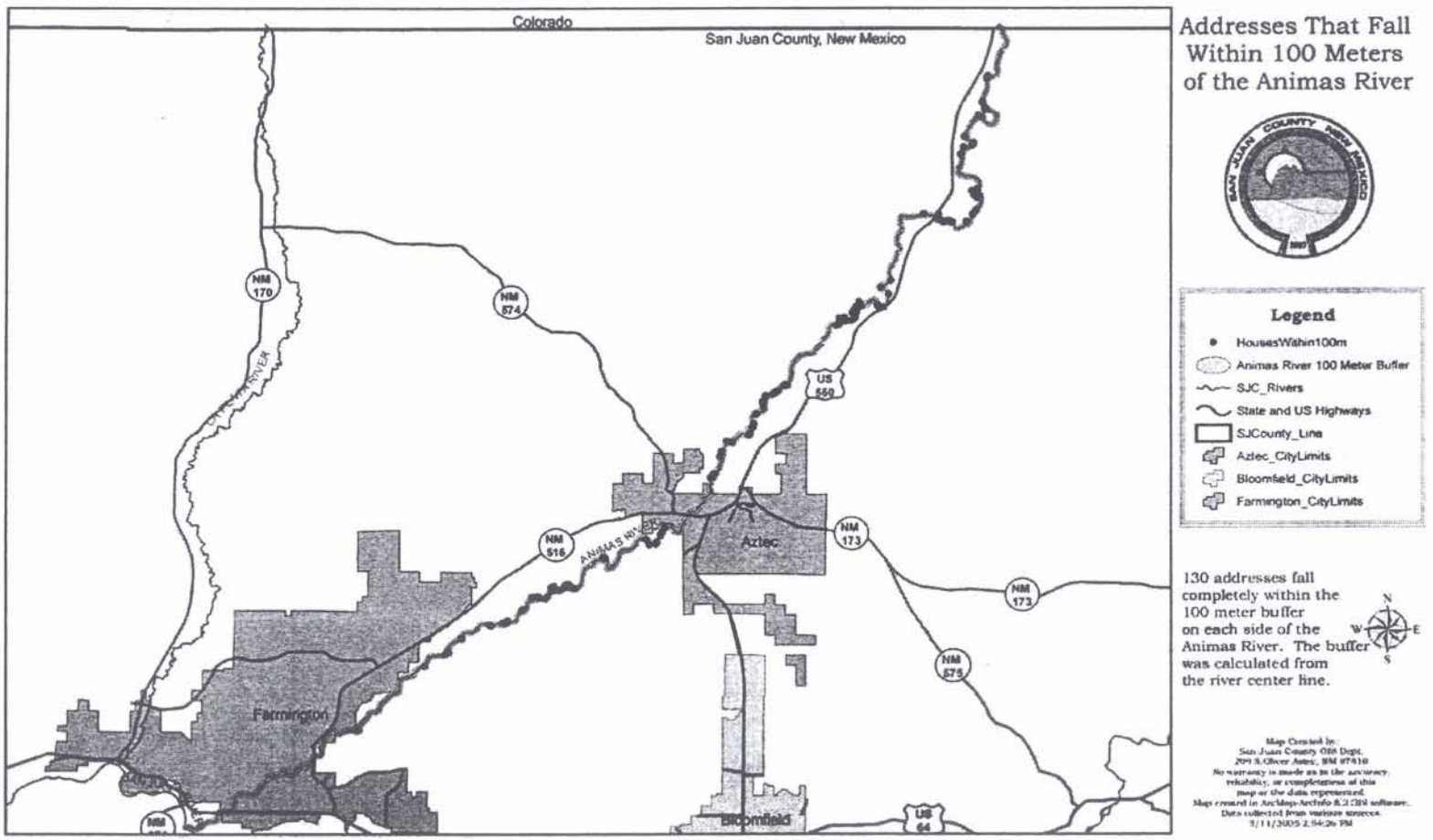


Figure 4.5 Residences that fall within 100 meters of the Animas River, NM

Response:

Thank you for your continued dedication to the Jemez Watershed. We appreciate your continued input in the public participation process through your involvement in the local watershed group and your numerous sets of comments during the TMDL development process.

As you mentioned, the new title page was presented at the May 25, 2006 public meeting in Jemez Springs. Per one of your initial suggestions, the new title will read: Jemez River Watershed (VCNP boundary to headwaters). Also based on your timely reminder, all references to the title within the document will be changed accordingly.

As you requested, copy of the updated TMDL that will include Appendix F-Response to Comments will be sent to you at least 10 days before the July 11, 2006 meeting at which SWQB expects to request approval of the Jemez River Watershed (VCNP boundary to headwaters) TMDL. During the WQCC meeting, the public is generally given an opportunity to provide input. These issues as well as your questions regarding a hearing were addressed in a letter SWQB sent on July 19, 2006 and is included below. Responses to your four specific concerns are detailed here:

1. ***Title page concern***
   The titles of TMDL documents explain the watersheds to be discussed as directly and concisely as possible. TMDLs are written based on a completed water quality survey and, thus, the TMDL document encompasses assessment units within this same watershed area. Any following TMDLs in the Jemez River Watershed will have an appropriate subtitle to designate which portion of the Jemez River Watershed is being discussed.
2. ***Use of TMDL, WRAS, watershed, subwatershed, and basin concern***
   - *Rule 1- TMDLs have been written in two parts due to the fact that some impairments are not able to be assessed with the existing data. Any other necessary TMDLs can be written once the absent water quality data is collected. For subsequent TMDLs, SWQB includes references to each previous TMDL that has been written for that watershed. SWQB is continuing to work on addressing these water quality data gaps during the year of the original survey to avoid TMDL documents that exist in various parts.*
   - *Rule 2-The existing Jemez Watershed WRAS is a living document and can be updated without changing the name of the document.*
   - *Rules 3,4,5- In the current document, the watershed refers to the larger watershed, Jemez River Watershed, whereas the use of "subwatershed" is used to discuss the individual streams. The VCNP itself is not a watershed but a management unit, so the word "watershed" has been removed from discussions involving the assessment units within the VCNP and replaced with the more general term "basin."*
3. ***Stakholder concern***
   SWQB does not exclude anyone from participating in watershed groups. Public notices, however, are generally printed in local papers and posted in local places of note in order to solicit the local interest. Any member of the public is welcome to submit their name and contact information to SWQB in

order to be included in statewide mailings. The statements on page 53 of the TMDL are inclusive statements and do not exclude anyone from participating in the public participation process. Many of SWQB's core documents are made available to the public via the SWQB website, but the Bureau is always willing to provide information via phone calls or surface mail.

4. ***Citizen Addresses***
   The addresses collected for the San Juan Part 2 TMDL document were gathered from public San Juan County records of the location of septic tanks. The information was only used to discuss the nutrient issues in the area. No such addresses were used in the development of the Jemez River Watershed (VCNP boundary to headwaters) TMDL as there were no nutrient TMDLs written for this document.

Thank you for providing your presentation and exhibits.

State of New Mexico
ENVIRONMENT DEPARTMENT
Surface Water Quality Bureau
Harold Runnels Building Room N2050
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502-6110
Telephone (505) 827-0187
Fax (505) 827-0160
Fed Ex (87505)
www.nmenv.state.nm.us

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

CINDY PADILLA
ACTING DEPUTY SECRETARY

June 19, 2006

Rebecca G. Perry-Piper
135 Rincon Valverde
Ponderosa, NM 87044

Dear Ms. Rebecca G. Perry-Piper:

I am currently compiling a response to your comments to be included in the final draft of the TMDL. I will provide you with a hard copy of the final draft TMDL as soon as it is ready, but it will at least be 10 days before the July 11, 2006 Water Quality Control Commission (WQCC) meeting. If that meeting is cancelled, the TMDL will be presented at the August 8, 2006 WQCC meeting. The WQCC generally allows the public to provide input during its meeting after the department's presentation on the proposed TMDLs and before they make their final decision. In case you still feel your comments have not been sufficiently addressed after reading my response to your written comments and after you have had an opportunity to present remaining concerns to the WQCC, I wanted to remind you of your right to request a hearing on the TMDL during the WQCC meeting. Also, we extend an invitation to you to meet with us in our offices in order to address your concerns prior to the July WQCC meeting. Please let us know when a convenient date and time is in order for us to arrange a meeting.

As far as your eight questions that are included in your letter dated June 12, 2006 (which I received on June 19, 2006), I have included answers below:

1) The WQCC Administrator (Joyce Medina) can be reached at: 1190 St. Francis Dr. Santa Fe, NM 87502 or (505) 827-2425. There are 12 members of the WQCC.

2) and 3) Previous WQCC meetings have been held at 9am at the New Mexico State Capitol Building (Room 321) in Santa Fe, NM. . The agenda for the July 11, 2006 meeting is not yet set.

4) Joyce Medina has confirmed that I am scheduled to present the Jemez Watershed (VCNP boundary to headwaters) TMDL after which the public is generally allowed to make comments.

5), 6), and 7) I do not yet know the exact date when the updated draft TMDL will be mailed or by which route it will be mailed. It is not necessary to send any money for postage.

8) I can be reached at (505) 827-2901 in Santa Fe or (505) 222-9571 in Albuquerque (generally on Tuesdays and Wednesdays) during regular business hours.

Sincerely,

Heidi Henderson
TMDL Coordinator
Surface Water Quality Bureau