



Northern New Mexico Stockman's Association

Dennis Gallegos, President

P.O. Box 306 Abiquiu, NM 87510



**The Future of Livestock Grazing on New Mexico's National Forests
Northern New Mexico Stockman's Association**

Youngsville Allotment Assessment 2023

Project Team:

Dr. Cristóbal Valencia, (PI) Northern New Mexico Stockman's Association

Donald Martinez, (Co-PI) Rio Arriba County Extension NMSU

Dr. Casey Spackman, (Co-PI) Range Improvement Task Force NMSU

Carlos Salazar, Producer Representative Northern New Mexico Stockman's Association

"This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2022-38640-37490 through the Western Sustainable Agriculture Research and Education program under project number SW23-953. USDA is an equal opportunity employer and service provider. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture."



National Institute of Food and Agriculture

U.S. DEPARTMENT OF AGRICULTURE



YOUNGSVILLE ALLOTMENT

Area: 10,545 grazable acres
Allotment owners: 15
Total Permitted Livestock: 769 cow/calf pairs and bulls
Possible Stocking Rate: 1120 (based on 40% of 2023 forage production)

Allotment is permitted at 68% of actual carrying capacity.
Permitted livestock are consuming 27.5% of allowable use forage.

Transects: Punta de la Sierra/Lookout
El Valle (South)
Rincon
Cerro de Grants
Cañada de Grants

Monitoring Dates: 5/22/23
6/14/23
8/2/23
10/16/23
10/17/23

Participants: Dr. Cristóbal Valencia (Principal Investigator)
Dr. Casey Spackman (Co-Principal Investigator)
Donald Martinez (Co-Principal Investigator)
Carlos Salazar (Producer Representative)
Paul Serrano (Producer)
Cornelio Salazar (Producer)
Levi Lucero (Producer)
Armando Gurule (Producer)
Ramon Serrano (Producer)
Jeanette Suazo (Producer)
Clara Suazo (Producer)
Lorenzo Salazar (Producer)
Robert Archuleta (Producer)

Methodology: Qualitative data was systematically gathered using ethnographic methods: face-to-face accompaniment in diverse social, political, and economic contexts of everyday life (Valencia 2015). The Project Team conducted participant-observation (DeWalt and DeWalt 2002) prior to livestock entry, during livestock grazing, and after livestock exit. The Project Team also attended cattle association meetings, feast days, fiestas, county fair events, and meetings between producers and management agencies. During participant-observation the Project Team paid close attention to producers' descriptions, interpretations, and explanations of rangeland conditions and impacts on their livestock operations. The Project Team also focused on ranchers' management practices and decision-making processes. Dr. Valencia kept ethnographic field notes (Emerson et al. 2011) of participant-observation, recording what is meaningful and important to producers, how producers grapple with sustainability, how understandings of conditions and impacts emerge and change over time, and what knowledge ranchers rely on to make assessments and management decisions. Dr. Valencia also conducted structured and unstructured interviews (Warren and Karner 2015, Brinkmann 2013, Weiss 2004) with producers focusing on their descriptions, interpretations, and explanations of climate and rangeland conditions and impacts on livestock operations. Additionally, the Project Team conducted participatory mapping exercises (Robinson et al. 2016) with producers to plot forage, water, and wildlife observations. The Project Team also used visual and audio methods to record qualitative data (Warren and Karner 2015). The Project Team met with producers and USFS staff to review and analyze data write rangeland assessments and make recommendations.

Objective: Qualitative data produces culturally situated understandings of rangeland conditions and impacts on livestock operations. It supports the development of better management targets and more inclusive decision-making processes.

SUMMARY

- Utilization for the 2023 grazing season exceeded the allocated 40 percent use guideline. Utilization was 65% in 2023.
- However, cattle only consumed 27.5% of grazing season forage.
- Authorized livestock numbers were 68% of possible stocking rates.
- Tree encroachment, and dead and down trees are a fire hazard, decrease forage growth and livestock access to water and forage.
- Water infrastructure has more of an impact on operations than water quantity or quality.
- Permanent elk herds deplete forage and damage water sources before, during, and after livestock grazing.
- Management and management decision-making processes also have a negative impact on rangeland conditions and livestock operations.

CONDITIONS

Across the allotment tree encroachment is shrinking pasture size and reducing forage. CERRO de GRANTS (right) offers a good example of conifer encroachment especially pine and spruce on the pasture. Similarly, tree growth within the forest canopy limits sunlight and precipitation that reaches the ground further reducing forage. Since 2020 USFS notified producers they were not in compliance with stubble height requirements. Producers disagree. Across the allotment there are abandoned exclusion cages in disrepair and not reliable for determining annual production or utilization. This raises questions about Forest Service transparency and decision-making processes. By October grass is sparse in areas not stocked but grazed by elk. Dead and down trees litter the pastures and forest canopy, obstructing cattle trails, and limiting livestock access to forage and water, for example the trail to Cañones Creek (right). Useable forage was also reduced by campsites and UTV traffic in all areas of the allotment.





In the spring earthen dams across the allotment were full or breached. Abundant water conditions such as these were unknown in previous years. Dead and down trees obstruct cattle trails and livestock access to water. Producers spent one week clearing dead and down trees to clear livestock trails and restore access to Cañones Creek. The allotment is characterized by micro-climates. Rainfall during the grazing season ranged from 3.5 inches to 4.74 inches. The water quality in the OJO de LECHE POND, LOOKOUT POND, VALDEZ POND, AND

RINCON SPRING showed extremely high iron likely due to improper equipment function resulting in increased microbial growth and biofilm buildup in watering equipment. High iron in drinking water may also reduce water intake which can directly reduce feed intake or milk production. This water may impart an off-taste to the meat of young animals (e.g., veal calves) or to milk. Excess absorbed iron from drinking water can lead to cellular oxidative stress, can inhibit copper and zinc absorption, and reduced growth or production. Producers are advised to seek professional advice regarding use of this water for livestock. August 2023 labs showed that manganese was extremely high in the OJO de LECHE, LOOKOUT, and VALDEZ ponds, and RINCON spring likely due to improper equipment functions resulting in increased microbial growth and biofilm buildup. Manganese may impart an off-taste to meat of young animals (e.g.,

veal calves). However, by October manganese had dropped from extremely high to high in the LOOKOUT and VALDEZ water sources. The PAVO SPRING water source showed no problems.



Across the allotment there are large permanent elk herds that make their homes in the pastures, the nearby forest canopy, and in the bordering Valles Caldera National Preserve. Producers observed herds from 80-150 cow elk and calves on any one pasture throughout the entire season. By October permanent elk herds

have significantly reduced forage after livestock exit in all areas of the allotment including where there is limited water and no livestock. Wildlife cameras show permanent elk herds grazing in the mornings, during the day, at dusk, and throughout the night across the allotment. A rotational system only allows elk to utilize forage before livestock. By the time livestock are rotated to an area it is bare. As one producer remarked, “rotating livestock only works if elk are kept off the

allotment. By the time we move the cows *todo esta pelado*” (everything is stripped bare). Producers interpreted wildlife conditions and impacts as trespassing and robbing. One producer summed up the problem saying, “I am not aware that NM Game and Fish have permission to graze on our allotments.” He was referring to NMGF responsibility for managing elk. He continued, “I am not a permittee. I am an allotment owner. I have rights to all that grass and water on the Youngsville allotment. Elk are trespassing on our allotment.” Producers concluded that the allotments are managed in favor of elk in particular elk calving. Fencing is built and repaired to protect elk and elk calving not to support grazing. The rotational system used within an allotment allows elk to be one step ahead of livestock. Producers do not consider NMGF a stakeholder in the National Forest.



Management decisions and decision-making processes also have an impact on livestock operations. Producers pointed out management that favors other stakeholder groups, a lack of knowledge of the allotment, no data to support decision-making, a lack of transparency, and racism and retaliation all have a negative impact on rangeland conditions and livestock operations. Producers understand their rights as a legal issue rather than a political issue. Thus, not subject to public opinion or the agendas of special interest groups whom they consider “false stakeholders.”

PRACTICES

- Producers abandoned the rotation system to address permanent elk utilization.

RECOMMENDATIONS

- Thin conifers and other trees to restore pasture size.
- Allow more tree cutting including commercial lumber and Christmas tree cutting.
- Clear dead and down from forest canopy.
- Contract with local woodcutters that know what and where to thin and or/clear.
- Address NM Game & Fish on wildlife (elk) issues with USFS support.

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The following information is a summary of the data collected over the 2023 grazing season. Data was collected using the Rapid Assessment Methodology (RAM; Spackman et al., 2022). Summaries were produced using the Rangeland Data Analysis and Record program (RaDAR; rangelandradar.app) and include individual pasture assessments and the allotment averages for each collection period. This is a single year of data and should not be used to make long-term management decisions or increases/decreases in stocking rates. Multiple years of monitoring is required (minimum of 3-5 years) to begin developing management decisions (Holecheck et al., 2011). An explanation of report contents is explained below.

Biomass Availability (also called standing crop or production residuals) is the amount of vegetation, expressed as a weight per area, present during a given point in time, not excluded from grazing activity. Five clippings were taken along the transect, dried, and weighed. The five weights were then converted to pounds per acre based on a 0.96 ft² hoop and averaged to obtain biomass availability +/- standard error (variability in weights). It can be used as a grazing intensity guide during the season, if location and number of samples are representative of the landscape, to make temporary adjustments in livestock distribution.

Annual Forage Production is plant material collected from grazing exclusion cages, expressed as a weight per area, and used to assess forage production for an entire year. This is an estimate of what the land can produce without grazing. Three cages were placed near each transect at the beginning of the grazing season. Samples were collected at the end of the season by clipping forage within a 0.96 ft² hoop, which was placed in the middle of each cage. Each sample was subsequently dried, weighed and converted to pounds per acre. The three clippings were averaged and a standard error calculated.

Estimated Stocking Rate is the calculation of animal unit equivalents (AUE) that the allotment could support for a duration of one month (AUM). Mid-season stocking rates were not calculated as stocking rates can only be estimated from annual forage production. Furthermore, individual pasture stocking rates were not calculated as grazable acres were only known for the whole allotment. Estimates are based upon the average collected annual forage production across the allotment, forest service provided grazable acres (pasture size in report), cattle forage demand of 26 pounds per day (SRM 1998), a conservative 40 percent forage use allocation (Holechek & Galt 2000), and a 30 day grazing period (Holecheck et al., 2011; Vallentine 2001). The AUM calculation equation is:

$$\frac{(\text{annual production} \times \text{grazable acres} \times \text{use allocation})}{\text{animal forage demand} \times 30 \text{ days}} = \text{AUM}$$

Percent Cover is the proportion of the ground surface that is covered by vegetation, litter, rocks, bare soil, or other attributes. It is used to assess distribution and composition of different material covering the ground. The assessment was done along a transect using the step-point method. At each step basal cover was recorded at the tip of the boot until 100 readings were taken. Each cover type was summed to give a percent. Percent cover is slow to change and should be looked at over several years (5 to 10 years) to provide insights about vegetation density, potential erosion, and livestock management (Holechek et al., 2011).

Vegetation Cover – Grasses is the percentage of grasses (grazing forage) by common name and scientific abbreviation (symbol) based on the amount of percent cover of vegetation along the transect. The percentage provides the land manager with species forage composition and diversity. Furthermore, changes in composition can be used as an indicator of grazing impact and vegetation trends over time.

Other Vegetation Cover is the percentage of vegetation that are not grasses based on percent cover of vegetation along the transect. This is similar to vegetation cover – grasses and can also be used as an indicator of forage and habitat for wildlife.

Forage Composition is the percentage of all grass species found along the transect even if cover was not vegetation; where nearest grass species was recorded on the datasheet. Additionally, height of each species is recorded by extending leaves upward and recording the average leaf lengths of all leaves. This provides an inventory and relative abundance (vegetation cover) or diversity of all grasses including their stubble heights. It identifies the specific combination and distribution of different species and helps assess the overall forage biodiversity within the plant community. Furthermore, the stubble heights give an estimate of grazing intensity and potential insight to make mid-season adjustments to grazing strategies (i.e., animal distribution and duration). Species are listed by their common name, scientific abbreviation (symbol), percent, with the addition of height and their minimum height grazing guideline (Holechek and Galt 2000).

Fecal Counts are used to estimate and monitor relative presence or absence of animals. It is not used to assess animal abundance but can be used generally as an indicator of increases or decreases in animal visitations over time (years).

Photos are used as a qualitative assessment to support quantitative information. They can be used as an illustrative record of the conditions that occurred at a given point in time. Ground photos when accompanied with a scaled ruler can be used to quantify cover or species composition, but are limited unless multiple ground photos are taken. Landscape photos can be used to demonstrate grazing intensity and correlated to the quantitative data.

Utilization

A summary of production and utilization is provided at the end of the reports (Table 1). Utilization is a guide and should not be used as a standard or threshold for range management decisions (SRM-RAMC 2018; Ruyle et al., 2007). Conservative grazing (30-40 percent utilization) is the recommended in the southwest to sustain or improve rangeland conditions and optimize livestock productivity (Holechek and Galt 2000). The following equation was used to calculate percent utilization:

$$\frac{(\text{annual production} - \text{available biomass})}{\text{annual production}} \times 100 = \text{percent utilization}$$

Physical Constraint of Animal Intake

Utilization is a very useful guide when all grazing species are accounted for. When multiple grazing species or uncontrolled grazers such as wildlife are present, it becomes difficult if not

impossible to determine how much each species has consumed in relation to utilization. This concept, known as resource partitioning, is an ongoing issue for rangeland managers. Currently there is no direct measurement to partition use on rangelands. However, forage intake of range cattle has been extensively researched (Vallentine 1990, McKown et al., 1991, and Holechek et al 2011) and a 1,000-pound mature cow consumes on average 26 pounds of dry forage per day (SRM 1998). Intake can vary depending on other factors such as reproductive status or environmental conditions but the scientifically accepted intake is between 2 and 2.6 percent of the animals body weight (NASEM 2016). Thus, a physical constraint of intake model can be used to calculate approximate cattle use on rangelands. This calculation uses the stocking rate equation, described previously, rearranging the parameters to solve for the desired utilization rather than animal units. It is worth noting that this is a calculation, not a direct measurement of utilization, and should be used as an approximate use level by cattle. A calculated estimate of cattle use can be found in Table 2. The equation used was:

$$\frac{(\text{animal demand} \times \text{grazing duration} \times \text{permitted animals})}{(\text{animal production} \times \text{grazable acres})} \times 100 = \text{percent utilization}$$

Similarly, the equation can be rearranged to determine how much an individual animal would consume daily (animal demand) to account for the observed utilization level. This equation helps determine if there is any disparity between physical constraint of intake and the observed utilization level on the allotment. Excess intake above 26 pounds can be contributed to other grazing animals and environmental influences.


$$\frac{(\text{annual production} \times \text{grazable acres} \times \text{observed utilization})}{(\text{grazing duration} \times \text{permitted animals})} = \text{animal demand or daily intake}$$

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RaDAR - Rangeland Data Analysis & Record

Producer Name:	Youngsville	Pasture Name:	Cañada de Grants
Date:	8/2/2023	Collector Names:	NNMSA, FS
Transect Number:	1	GPS Coordinates:	36.02083, -106.57083 (80°)

Notes:		
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Biomass Availability	Pasture Size	Estimated Stocking Rate	Annual Forage Production
611.2 ± 129.8 lbs per acre	10545 acres	n/a AUM	n/a

Percent Cover		Vegetation Cover - Grasses			Other Vegetation Cover	
		<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Common Name</u>	<u>Percent</u>
Bare Ground	12	Kentucky Bluegrass	POPR	7	Dandelion	13
Litter	58	Sedge	Carex	3	Yarrow	2
Vegetation	29	Rush spp.	Rush	3		
Rock (>3/4")	1					
	100			13		16

Forage Composition				
<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Avg. Height (inches)</u>	<u>Minimum Stubble Height Guideline</u>
Kentucky Bluegrass	POPR	49	2.2	2.5
Sedge	Carex	27	2.4	1.5
Rush spp.	Rush	18	3.8	2.5
Wild Oat	Oat	5	2.4	
Timothy	PHPR	1	3.0	4
		100	2.5	Below Minimum Height


Fecal Counts							
Horse	0	Elk	6	Cattle	1	Deer	1

Photos



RaDAR - Rangeland Data Analysis & Record

Producer Name:	Youngsville	Pasture Name:	Cañada de Grants
Date:	10/17/2023	Collector Names:	NNMSA, FS
Transect Number:	1	GPS Coordinates:	36.02083, -106.57083 (80°)

Notes:		

Biomass Availability	Pasture Size	Estimated Stocking Rate	Annual Forage Production
432.0 ± 153.6 lbs per acre	10545 acres	n/a AUM	1610.0 ± 330 lbs per acre

Percent Cover		Vegetation Cover - Grasses			Other Vegetation Cover	
		<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Common Name</u>	<u>Percent</u>
Bare Ground	14	Kentucky Bluegrass	POPR	51	Forb Unknown	24
Litter	11					
Vegetation	75					
Rock (>3/4")	0					
100		51			24	

Forage Composition					
<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Avg. Height (inches)</u>	<u>Minimum Stubble Height Guideline</u>	
Kentucky Bluegrass	POPR	100	2.0	2.5	Below Minimum Height
		100	2.0		


Fecal Counts							
Horse	0	Elk	26	Cattle	7	Deer	0

Photos



RaDAR - Rangeland Data Analysis & Record

Producer Name:	Youngsville	Pasture Name:	Cerro de Grants
Date:	8/2/2023	Collector Names:	NNMSA, FS
Transect Number:	1	GPS Coordinates:	36.00917, -106.53944 (274°)

Notes:		

Biomass Availability	Pasture Size	Estimated Stocking Rate	Annual Forage Production
425.0 ± 66.3 lbs per acre	10545 acres	n/a AUM	n/a

Percent Cover		Vegetation Cover - Grasses			Other Vegetation Cover	
		<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Common Name</u>	<u>Percent</u>
Bare Ground	12	Kentucky Bluegrass	POPR	25	Clover spp.	12
Litter	31		Carex	1	Dandelion	10
Vegetation	56	Sedge			Globe Mallow	5
Rock (>3/4")	1				Yarrow	2
					Forb Unknown	1
	100			26		30

Forage Composition

<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Avg. Height (inches)</u>	<u>Minimum Stubble Height Guideline</u>	
Kentucky Bluegrass	POPR	92	1.6	2.5	Below Minimum Height
Sedge	Carex	5	2.5	1.5	
Wild Oat	Oat	2	1.5		
Interm. Wheatgrass	AGIN	1	5.5	4	
		100	1.7		

Fecal Counts


Horse	0	Elk	6	Cattle	16	Deer	0
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Photos



RaDAR - Rangeland Data Analysis & Record

Producer Name:	Youngsville	Pasture Name:	Cerro de Grants
Date:	10/17/2023	Collector Names:	NNMSA, FS
Transect Number:	1	GPS Coordinates:	36.00917, -106.53944 (274°)

Notes:		

Biomass Availability	Pasture Size	Estimated Stocking Rate	Annual Forage Production
431.8 ± 149 lbs per acre	10545 acres	n/a AUM	930.5 ± 190 lbs per acre

Percent Cover		Vegetation Cover - Grasses			Other Vegetation Cover	
		<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Common Name</u>	<u>Percent</u>
Bare Ground	17	Kentucky Bluegrass	POPR	39	Forb Unknown	25
Litter	19					
Vegetation	64					
Rock (>3/4")	0					
100		39			25	

Forage Composition					
<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Avg. Height (inches)</u>	<u>Minimum Stubble Height Guideline</u>	
Kentucky Bluegrass	POPR	100	2.0	2.5	Below Minimum Height
		100	2.0		


Fecal Counts					
Horse	0	Elk	22	Cattle	10
				Deer	0

Photos



RaDAR - Rangeland Data Analysis & Record

Producer Name:	Youngsville	Pasture Name:	El Valle
Date:	8/2/2023	Collector Names:	NNMSA, FS
Transect Number:	1	GPS Coordinates:	36.07461, -106.56447 (340°)

Notes:		
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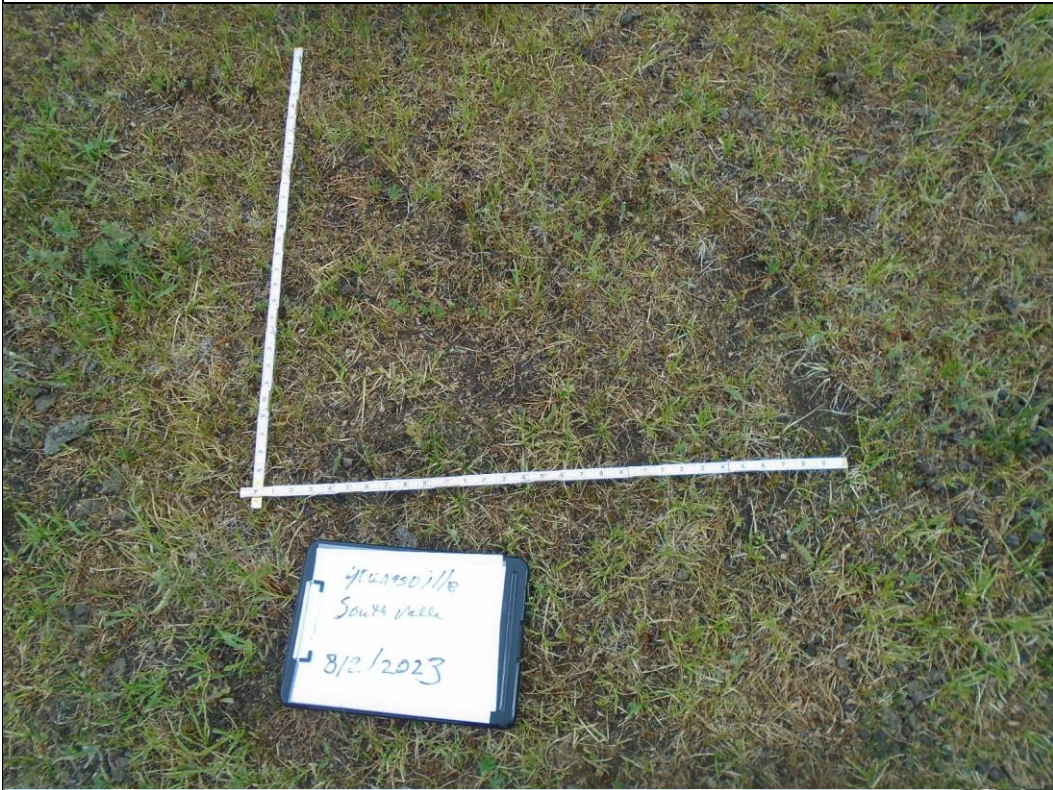
Biomass Availability	Pasture Size	Estimated Stocking Rate	Annual Forage Production
330.6 ± 49 lbs per acre	10545 acres	n/a AUY	n/a

Percent Cover		Vegetation Cover - Grasses			Other Vegetation Cover	
Cover Type	Percent	<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Common Name</u>	<u>Percent</u>
Bare Ground	7	Sedge	Carex	1	Forb Unknown	3
Litter	86				Pussytoes	3
Vegetation	7					
Rock (>3/4")	0					
100				1		6

Forage Composition					
<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Avg. Height (inches)</u>	<u>Minimum Stubble Height Guideline</u>	
Sedge	Carex	73	1.7	1.5	
Kentucky Bluegrass	POPR	15	2.7	2.5	
Rush	JUNCU	12	3.3	2.5	
		100	2.0		


Fecal Counts							
Horse	0	Elk	7	Cattle	4	Deer	0

Photos



RaDAR - Rangeland Data Analysis & Record

Producer Name: Youngsville	Pasture Name: El Valle
Date: 10/17/2023	Collector Names: NNMSA, FS
Transect Number: 1	GPS Coordinates: 36.07461, -106.56447 (340°)

Notes:	80 plus elk herd passed through meadow while monitoring	
	0	
	very dry landscape during assessment	

Biomass Availability	Pasture Size	Estimated Stocking Rate	Annual Forage Production
249.2 ± 17.2 lbs per acre	10545 acres	n/a AUM	952.0 ± 20 lbs per acre

Percent Cover		Vegetation Cover - Grasses			Other Vegetation Cover	
		<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Common Name</u>	<u>Percent</u>
Bare Ground	23	Kentucky Bluegrass	POPR	30	Forb Unknown	20
Litter	27					
Vegetation	50					
Rock (>3/4")	0					
100		30			20	

Forage Composition

<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Avg. Height (inches)</u>	<u>Minimum Stubble Height Guideline</u>	
Kentucky Bluegrass	POPR	99	1.9	2.5	Below Minimum Height
West. Wheatgrass	AGSM	1	3.5	2.5	
		100	1.9		

Fecal Counts


Horse	0	Elk	3	Cattle	2	Deer	0
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Photos



RaDAR - Rangeland Data Analysis & Record

Producer Name:	Youngsville	Pasture Name:	Punta de la Sierra
Date:	8/2/2023	Collector Names:	NNMSA, FS
Transect Number:	1	GPS Coordinates:	36.12583, -106.54889 (330°)

Notes:		
	0	

Biomass Availability	Pasture Size	Estimated Stocking Rate	Annual Forage Production
151.4 ± 26.3 lbs per acre	10545 acres	n/a AUM	n/a

Percent Cover		Vegetation Cover - Grasses			Other Vegetation Cover	
		<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Common Name</u>	<u>Percent</u>
Bare Ground	8	Sedge	Carex	3	Forb Unknown	2
Litter	70	Kentucky Bluegrass	POPR	3	Pussytoes	1
Vegetation	14	Prairie Junegrass	KOMA	2	Buckwheat spp.	1
Rock (>3/4")	8	Blue Grama	BOGR	1		
		Grass Unknown	GUNK	1		
	100			10		4

Forage Composition					
<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Avg. Height (inches)</u>	<u>Minimum Stubble Height Guideline</u>	
Sedge	Carex	42	3.8	1.5	Below Minimum Height
Kentucky Bluegrass	POPR	32	3.4	2.5	
Prairie Junegrass	KOMA	15	2.9	2.5	
Grass Unknown	GUNK	9	5.6		
Blue Grama	BOGR	1	1.0	1.5	
Wild Oat	Oat	1	4.5		
		100	3.7		


Fecal Counts							
Horse	0	Elk	1	Cattle	5	Deer	1

Photos



RaDAR - Rangeland Data Analysis & Record

Producer Name:	Youngsville	Pasture Name:	Punta de la Sierra
Date:	10/17/2023	Collector Names:	NNMSA, FS
Transect Number:	1	GPS Coordinates:	36.12583, -106.54889 (330°)

Notes:		

Biomass Availability	Pasture Size	Estimated Stocking Rate	Annual Forage Production
427.0 ± 98.3 lbs per acre	10545 acres	n/a AUM	788.3 ± 90 lbs per acre

Percent Cover		Vegetation Cover - Grasses			Other Vegetation Cover	
		<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Common Name</u>	<u>Percent</u>
Bare Ground	24	Kentucky Bluegrass	POPR	19	Forb Unknown	18
Litter	33					
Vegetation	37					
Rock (>3/4")	6					
100		19			18	

Forage Composition				
<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Avg. Height (inches)</u>	<u>Minimum Stubble Height Guideline</u>
Kentucky Bluegrass	POPR	100	1.9	2.5 Below Minimum Height
		100	1.9	

Fecal Counts							
Horse	0	Elk	2	Cattle	4	Deer	0

Photos




Punta de la Sierra
Lookout
Youngsville N/10/2023
Cora 1



Punta de la Sierra
Lookout
Youngsville N/10/2023
Cora 1

RaDAR - Rangeland Data Analysis & Record

Producer Name:	Youngsville	Pasture Name:	Rincon
Date:	8/2/2023	Collector Names:	NNMSA, FS
Transect Number:	1	GPS Coordinates:	36.04989, -106.55314 (331°)

Notes:		

Biomass Availability	Pasture Size	Estimated Stocking Rate	Annual Forage Production
350.4 ± 63.7 lbs per acre	10545 acres	n/a AUM	n/a

Percent Cover		Vegetation Cover - Grasses			Other Vegetation Cover	
		<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Common Name</u>	<u>Percent</u>
Bare Ground	11	Sedge Kentucky Bluegrass	Carex POPR	1 1	Forb Unknown	1
Litter	86					
Vegetation	3					
Rock (>3/4")	0					
100		2			1	

Forage Composition					
<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Avg. Height (inches)</u>	<u>Minimum Stubble Height Guideline</u>	
Sedge	Carex	42	3.5	1.5	
Kentucky Bluegrass	POPR	40	2.6	2.5	
Rush	JUNCU	16	6.2	2.5	
West. Wheatgrass	AGSM	1	8.0	2.5	
Grass Unknown	GUNK	1	8.0		
		100	3.6		


Fecal Counts							
Horse	0	Elk	5	Cattle	5	Deer	0

Photos



RaDAR - Rangeland Data Analysis & Record

Producer Name:	Youngsville	Pasture Name:	Rincon
Date:	10/17/2023	Collector Names:	NNMSA, FS
Transect Number:	1	GPS Coordinates:	36.04989, -106.55314 (331°)

Notes:		

Biomass Availability	Pasture Size	Estimated Stocking Rate	Annual Forage Production
287.2 ± 28.7 lbs per acre	10545 acres	n/a AUM	1346.0 ± 90 lbs per acre

Percent Cover		Vegetation Cover - Grasses			Other Vegetation Cover	
Cover Type	Percent	<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Common Name</u>	<u>Percent</u>
Bare Ground	21	Kentucky Bluegrass	POPR	25	Forb Unknown	21
Litter	33					
Vegetation	46					
Rock (>3/4")	0					
100		25			21	

Forage Composition				
<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Avg. Height (inches)</u>	<u>Minimum Stubble Height Guideline</u>
Kentucky Bluegrass	POPR	94	1.9	2.5
Sedge	Carex	6	3.8	1.5
		100	2.0	Below Minimum Height

Fecal Counts					
Horse	0	Elk	20	Cattle	11
				Deer	0

Photos



RaDAR - Rangeland Data Analysis & Record

Producer Name:	Youngsville	Pasture Name:	n/a
Date:	8/2/2023	Collector Names:	n/a
Transect AVERAGES	1,2,3,4,5	GPS Coordinates:	n/a

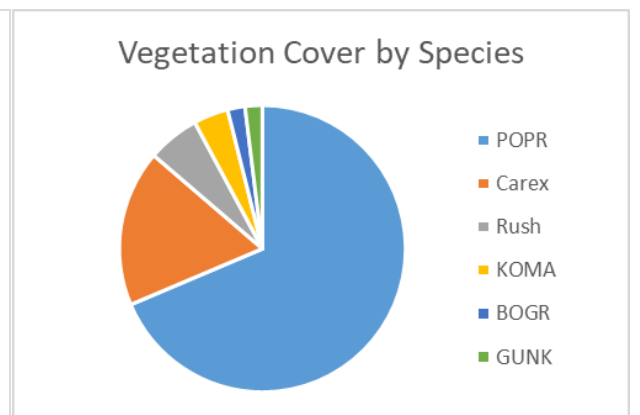
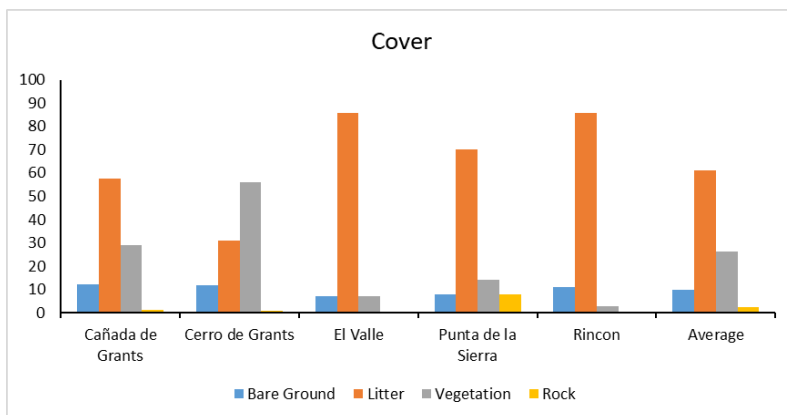
Notes:	AVERAGES	
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Biomass Availability	Pasture Size	Estimated Stocking Rate	Annual Forage Production
373.7 ± 43.2 lbs per acre	10545 acres	n/a AUM	n/a

Percent Cover		Vegetation Cover - Grasses			Other Vegetation Cover	
		<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Common Name</u>	<u>Percent</u>
Bare Ground	10	Kentucky Bluegrass	POPR	9	Dandelion	5
Litter	61	Sedge	Carex	2	Clover spp.	3
Vegetation	26	Rush spp.	Rush	1	Forb Unknown	2
Rock (>3/4")	3	Prairie Junegrass	KOMA	0	Globe Mallow	1
		Blue Grama	BOGR	0	Yarrow	1
		Grass Unknown	GUNK	0	Pussytoes	1
	100			13		13

Forage Composition					
<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Avg. Height (inches)</u>	<u>Minimum Stubble Height Guideline</u>	
Kentucky Bluegrass	POPR	45	2.2	2.5	Below Minimum Height
Sedge	Carex	38	2.7	1.5	
Rush	JUNCU	6	4.9	2.5	
Rush spp.	Rush	4	3.8		
Prairie Junegrass	KOMA	3	2.9	2.5	
Grass Unknown	GUNK	2	5.8		
		98	2.7		

Fecal Counts								
Horse	0	Elk	25	Cattle	31	Deer	2	0



RaDAR - Rangeland Data Analysis & Record

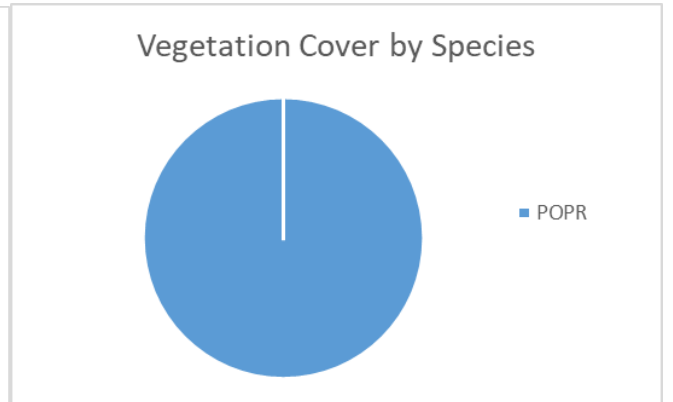
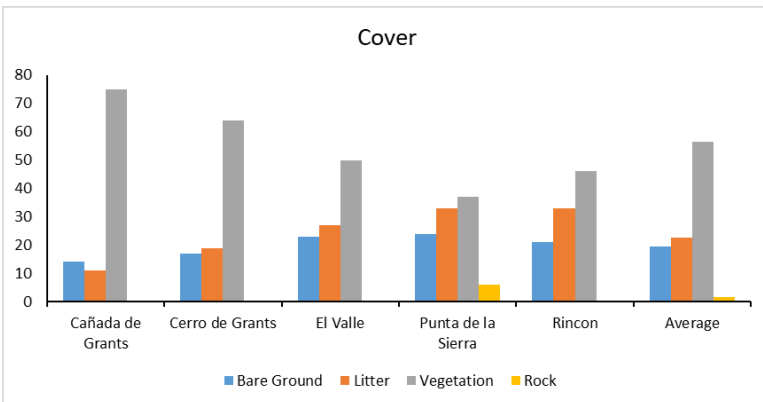
Producer Name:	Youngsville	Pasture Name:	n/a
Date:	10/17/2023	Collector Names:	n/a
Transect AVERAGES	1,2,3,4,5	GPS Coordinates:	n/a

Notes:	AVERAGES	
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Biomass Availability		Pasture Size	Estimated Stocking Rate	Annual Forage Production		
365.4 ± 46.4 lbs per acre		10545 acres	6160.9 AUM	1139.3 ± 124.3 lbs per acre		
Percent Cover		Vegetation Cover - Grasses			Other Vegetation Cover	
Bare Ground	20	<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Common Name</u>	<u>Percent</u>
Litter	23	Kentucky Bluegrass	POPR	34	Forb Unknown	23
Vegetation	57					
Rock (>3/4")	2					
100						

Forage Composition					
<u>Common Name</u>	<u>Symbol</u>	<u>Percent</u>	<u>Avg. Height (inches)</u>	<u>Minimum Stubble Height Guideline</u>	
Kentucky Bluegrass	POPR	99	1.9	2.5	Below Minimum Height
Sedge	Carex	1	3.8	1.5	
West. Wheatgrass	AGSM	0	3.5	2.5	
		100	2.0		

Fecal Counts									
Horse	0	Elk	73	Cattle	34	Deer	0		0



	Mid-Year Biomass (lbs/acre)	Year-End Biomass (lbs/acre)	Annual Production (lbs/acre)	Utilization as a Percent
Cañada de Grants	611.2 ± 129.8	432.0 ± 153.6	1610.0 ± 330.0	73.2
Cerro de Grants	425.0 ± 66.3	431.8 ± 149.0	930.5 ± 190.0	53.6
El Valle	330.6 ± 49.0	249.2 ± 17.2	952.0 ± 20.0	73.8
Riñcon	350.4 ± 63.7	287.2 ± 28.7	1346.0 ± 90.0	78.7
Punta de la Sierra	151.4 ± 26.3	427.0 ± 98.3	788.3 ± 90.0	45.8
Averages	373.7 ± 43.2	365.4 ± 46.4	1139.3 ± 124.3	65.0 ± 6.4

	Observed Utilization as a Percent	Cattle Utilization as a Percent	Other Utilization as a Percent	Cow Intake for Observed Utilization (pounds/day)
Allotment Average	65.0	27.5	37.5	61.5

	Grazable Acres	*Permitted Livestock (AUE)	Cattle Intake (lbs/day)	Grazing Duration (days)
Allotment	10545	769	26	165
*AUE = animal unit equivalent				
*includes cow/calf as 1 AUE and bulls 1.5 AUE				

Youngsville Allotment

Elevation	Key Area	Date	Measurement
9,822 ft.	Punta de la Sierra	6/14/2023	hang
		8/2/2023	0.13
		9/15/2023	2.84
		10/11/2023	0.58
		10/16/2023	0
		Total	3.55
9,866 ft.	Rincon	6/14/2023	hang
		8/2/2023	0.17
		9/1/2023	1.9
		9/15/2023	1.04
		10/1/2023	0.1
		10/16/2023	0.29
Total	3.5		
9,652 ft.	Cañada de Grants	6/14/2023	hang
		8/2/2023	0.66
		8/30/2023	2.26
		9/17/2023	1.36
		10/16/2023	0.46
		Total	4.74
10,158 ft.	Cerro de Grants	6/14/2023	hang
		8/2/2023	0.61
		8/30/2023	1.6
		10/5/2023	1.57
		Total	3.78
9,559 ft.	Valle Sur	6/14/2023	hang
		8/2/2023	rehang
		9/15/2023	3.52
		10/16/2023	0.62
		Total	4.14



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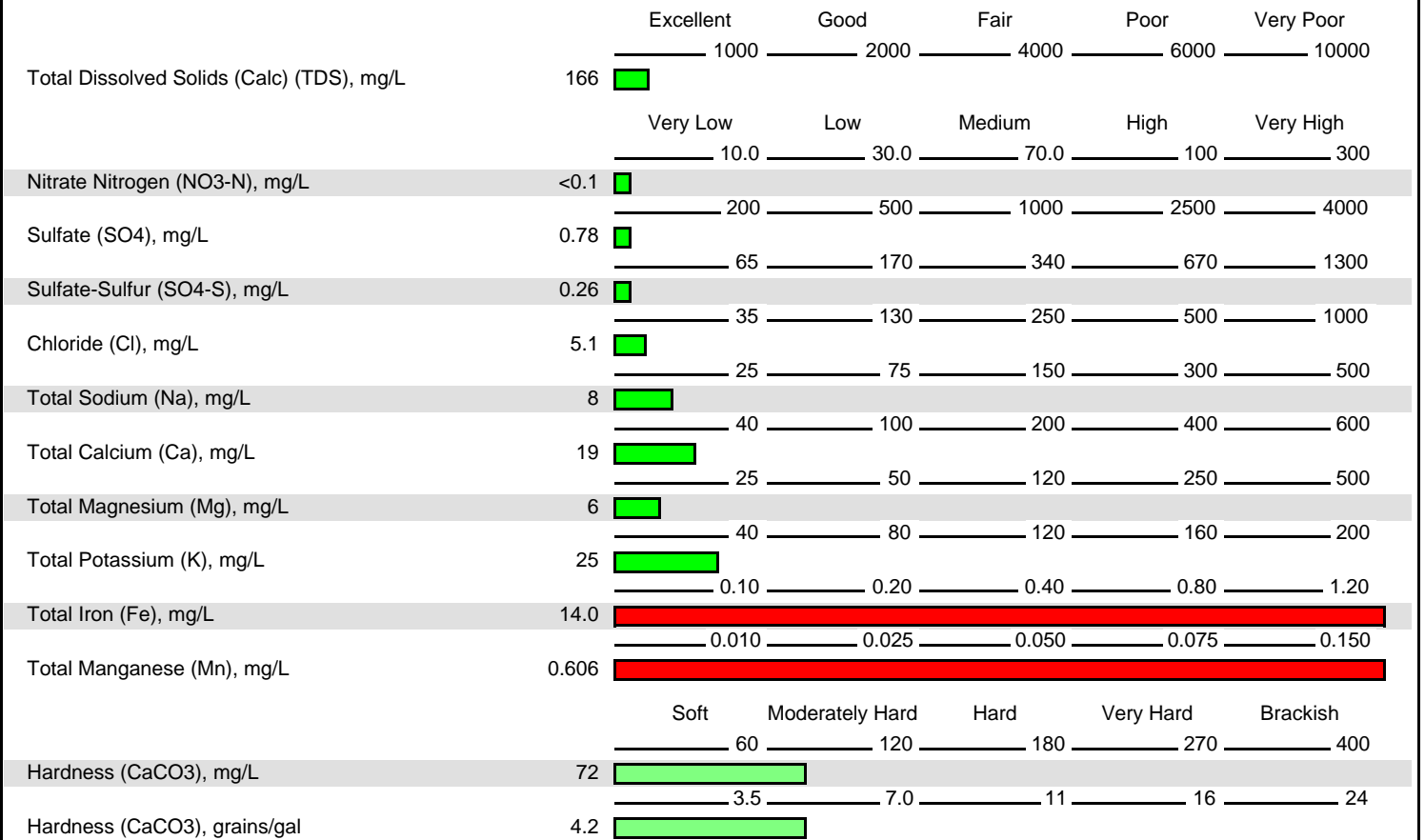
Fax: 806.677.0329

Lab No.: 3954 **LABORATORY ANALYSIS RESULTS** **Date Reported: 08/18/2023**

Send To: 55267	TIERRA GRANDE RESEARCH AND CONSULTING DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
--------------------------	--	--

Sample ID: OJO DE LECHE POND	Date Received:
Client Name:	Invoice No: 423654
Location:	P.O. #: DR CRISTOBAL VALENCIA
Date/Time Sampled: 08/02/2023	Name of Sampler: C VALENCIA
Date/Time Submitted: 08/09/2023	Name of Submitter: UPS
Subject: Livestock Water Lab Analysis	Depth:

Livestock



Additional Tests

Electrical Conductivity (EC @ 25C), µmho/cm	260
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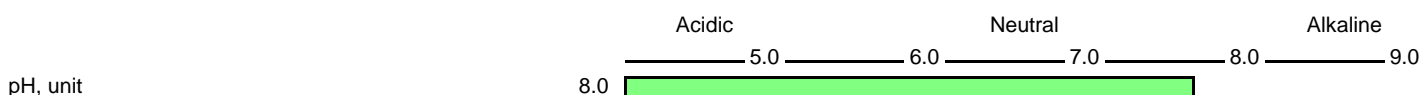
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800.557.7509
Fax: 806.677.0329

Lab No.: 3954 LABORATORY ANALYSIS RESULTS Date Reported: 08/18/2023

Send To: 55267	TIERRA GRANDE RESEARCH AND CONSULTING DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
--------------------------	--	--

Sample ID:	OJO DE LECHE POND	Date Received:	
Client Name:		Invoice No:	423654
Location:		P.O. #:	DR CRISTOBAL VALENCIA
Date/Time Sampled:	08/02/2023	Name of Sampler:	C VALENCIA
Date/Time Submitted:	08/09/2023	Name of Submitter:	UPS
Subject:	Livestock Water Lab Analysis	Depth:	

Livestock



INTERPRETATIONS for GENERAL LIVESTOCK PRODUCTION The following statements are general interpretations for a wide range of common livestock and poultry animals. The actual effect of a particular water source on health or performance depends on many factors, including diet, animal activity, air temperature, animal size, and condition. Interpretations for specific livestock types are available on request, including: *beef cattle, beef calves, dairy cattle, dairy calves, mature hogs, young pigs, poultry, horses, or sheep/goats.*

TOTAL DISSOLVED SOLIDS, CONDUCTIVITY: EXCELLENT QUALITY ("fresh" water): Low salinity level. Suitable for all classes of livestock and poultry.

NITRATE-NITROGEN: VERY LOW: Should have no effect on animal health or performance.

SULFATE: VERY LOW: Considered safe for all classes of livestock. No problems are expected. Could possibly affect poultry performance at upper end of range when sodium, magnesium, or chloride levels are high.

CHLORIDE: VERY LOW: Chloride is considered a dissolved solid. See TDS comments. Levels greater than 15 to 25 mg/L might affect poultry production when sodium exceeds 50 mg/L.

SODIUM: VERY LOW: Presents little or no risk to livestock or poultry.

CALCIUM: VERY LOW: No effect expected for livestock or poultry use. Calcium mineral supplementation may be needed in certain cases.

MAGNESIUM: VERY LOW: Presents little or no risk to livestock or poultry.

POTASSIUM: VERY LOW: This water is considered satisfactory for all classes of animals.


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Lab No.: 3954		LABORATORY ANALYSIS RESULTS		Date Reported: 08/18/2023																
Send To: 55267	TIERRA GRANDE RESEARCH AND CONSULTING DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102		 Amy Meier Data Review Coordinator																	
Sample ID:	OJO DE LECHE POND	Date Received:																		
Client Name:		Invoice No:	423654																	
Location:		P.O. #:	DR CRISTOBAL VALENCIA																	
Date/Time Sampled:	08/02/2023	Name of Sampler:	C VALENCIA																	
Date/Time Submitted:	08/09/2023	Name of Submitter:	UPS																	
Subject:	Livestock Water Lab Analysis	Depth:																		
<p>IRON: EXTREMELY HIGH: Performance likely to be affected by improper equipment function, due to high iron concentration resulting in increased microbial growth and biofilm buildup in watering equipment. High iron in drinking water may also reduce water intake which can directly reduce feed intake or milk production. This water may impart off-taste to meat of young animals (e.g., veal calves) or to milk. Excess absorbed iron from drinking water can lead to cellular oxidative stress, can inhibit copper and zinc absorption, and reduced growth or production. Seek professional advice regarding use of this water for livestock consumption.</p>																				
<p>MANGANESE: EXTREMELY HIGH (over 0.0150 mg/L): Performance likely to be affected by improper equipment functions due to high manganese concentration (resulting in increased microbial growth and biofilm buildup) rather than specific livestock health problems. May impart off-taste to meat of young animals (e.g., veal calves).</p>																				
<p>HARDNESS: MODERATELY HARD: Hardness has no direct effect on drinking water safety or animal health.</p>																				
<p>AVERAGE DAILY WATER CONSUMPTION (gallons per day)</p> <table border="0"> <tr> <td>Beef cattle</td> <td>7 to 12 per head</td> <td>Sheep, goats</td> <td>2 to 4 per head</td> </tr> <tr> <td>Dairy cattle</td> <td>10 to 40 per head</td> <td>Chickens</td> <td>8 to 10 per hundred birds</td> </tr> <tr> <td>Swine</td> <td>2 to 8 per head</td> <td>Turkeys</td> <td>10 to 15 per hundred birds</td> </tr> <tr> <td>Horses</td> <td>8 to 12 per head</td> <td></td> <td></td> </tr> </table> <p>(Note: Water consumption may increase by 1½ to 2 times when temperatures exceed 80°F.)</p>					Beef cattle	7 to 12 per head	Sheep, goats	2 to 4 per head	Dairy cattle	10 to 40 per head	Chickens	8 to 10 per hundred birds	Swine	2 to 8 per head	Turkeys	10 to 15 per hundred birds	Horses	8 to 12 per head		
Beef cattle	7 to 12 per head	Sheep, goats	2 to 4 per head																	
Dairy cattle	10 to 40 per head	Chickens	8 to 10 per hundred birds																	
Swine	2 to 8 per head	Turkeys	10 to 15 per hundred birds																	
Horses	8 to 12 per head																			

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Lab No.: 3952		LABORATORY ANALYSIS RESULTS		Date Reported: 08/18/2023
Send To: 55267	TIERRA GRANDE RESEARCH AND CONSULTING DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator		
Sample ID:	LOOKOUT POND/PUNTA DE LA SI	Date Received:		
Client Name:		Invoice No:	423654	
Location:		P.O. #:	DR CRISTOBAL VALENCIA	
Date/Time Sampled:	08/02/2023	Name of Sampler:	C VALENCIA	
Date/Time Submitted:	08/09/2023	Name of Submitter:	UPS	
Subject:	Livestock Water Lab Analysis	Depth:		
Livestock				
Excellent Good Fair Poor Very Poor _____ 1000 _____ 2000 _____ 4000 _____ 6000 _____ 10000				
Total Dissolved Solids (Calc) (TDS), mg/L	81			
Very Low Low Medium High Very High _____ 10.0 _____ 30.0 _____ 70.0 _____ 100 _____ 300				
Nitrate Nitrogen (NO3-N), mg/L	<0.1			
Sulfate (SO4), mg/L	<0.6			
Sulfate-Sulfur (SO4-S), mg/L	<0.2			
Chloride (Cl), mg/L	2.3			
Total Sodium (Na), mg/L	1			
Total Calcium (Ca), mg/L	12			
Total Magnesium (Mg), mg/L	5			
Total Potassium (K), mg/L	13			
Total Iron (Fe), mg/L	5.05			
Total Manganese (Mn), mg/L	0.410			
Soft Moderately Hard Hard Very Hard Brackish _____ 60 _____ 120 _____ 180 _____ 270 _____ 400				
Hardness (CaCO3), mg/L	50			
_____ 3.5 _____ 7.0 _____ 11 _____ 16 _____ 24				
Hardness (CaCO3), grains/gal	2.9			
Additional Tests				
Electrical Conductivity (EC @ 25C), µmho/cm	126			

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Lab No.: 3952 **LABORATORY ANALYSIS RESULTS** Date Reported: 08/18/2023

Send To: 55267	TIERRA GRANDE RESEARCH AND CONSULTING DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
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Sample ID: Client Name: Location: Date/Time Sampled: Date/Time Submitted: Subject:	LOOKOUT POND/PUNTA DE LA SI 08/02/2023 08/09/2023 Livestock Water Lab Analysis	Date Received: Invoice No: P.O. #: Name of Sampler: Name of Submitter: Depth:	423654 DR CRISTOBAL VALENCIA C VALENCIA UPS
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Livestock



INTERPRETATIONS for GENERAL LIVESTOCK PRODUCTION The following statements are general interpretations for a wide range of common livestock and poultry animals. The actual effect of a particular water source on health or performance depends on many factors, including diet, animal activity, air temperature, animal size, and condition. Interpretations for specific livestock types are available on request, including: *beef cattle, beef calves, dairy cattle, dairy calves, mature hogs, young pigs, poultry, horses, or sheep/goats.*

TOTAL DISSOLVED SOLIDS, CONDUCTIVITY: EXCELLENT QUALITY ("fresh" water): Low salinity level. Suitable for all classes of livestock and poultry.

NITRATE-NITROGEN: VERY LOW: Should have no effect on animal health or performance.

SULFATE: VERY LOW: Considered safe for all classes of livestock. No problems are expected. Could possibly affect poultry performance at upper end of range when sodium, magnesium, or chloride levels are high.

CHLORIDE: VERY LOW: Chloride is considered a dissolved solid. See TDS comments. Levels greater than 15 to 25 mg/L might affect poultry production when sodium exceeds 50 mg/L.

SODIUM: VERY LOW: Presents little or no risk to livestock or poultry.

CALCIUM: VERY LOW: No effect expected for livestock or poultry use. Calcium mineral supplementation may be needed in certain cases.

MAGNESIUM: VERY LOW: Presents little or no risk to livestock or poultry.

POTASSIUM: VERY LOW: This water is considered satisfactory for all classes of animals.

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Lab No.: 3952 LABORATORY ANALYSIS RESULTS Date Reported: 08/18/2023

Send To: 55267	TIERRA GRANDE RESEARCH AND CONSULTING DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
--------------------------	--	---

Sample ID:	LOOKOUT POND/PUNTA DE LA SI	Date Received:	
Client Name:		Invoice No:	423654
Location:		P.O. #:	DR CRISTOBAL VALENCIA
Date/Time Sampled:	08/02/2023	Name of Sampler:	C VALENCIA
Date/Time Submitted:	08/09/2023	Name of Submitter:	UPS
Subject:	Livestock Water Lab Analysis	Depth:	

IRON: EXTREMELY HIGH: Performance likely to be affected by improper equipment function, due to high iron concentration resulting in increased microbial growth and biofilm buildup in watering equipment. High iron in drinking water may also reduce water intake which can directly reduce feed intake or milk production. This water may impart off-taste to meat of young animals (e.g., veal calves) or to milk. Excess absorbed iron from drinking water can lead to cellular oxidative stress, can inhibit copper and zinc absorption, and reduced growth or production. Seek professional advice regarding use of this water for livestock consumption.

MANGANESE: EXTREMELY HIGH (over 0.0150 mg/L): Performance likely to be affected by improper equipment functions due to high manganese concentration (resulting in increased microbial growth and biofilm buildup) rather than specific livestock health problems. May impart off-taste to meat of young animals (e.g., veal calves).

HARDNESS: SOFT: "Soft" water has no direct effect on drinking water safety or animal health, but may influence equipment, plumbing, and fixture performance.

AVERAGE DAILY WATER CONSUMPTION (gallons per day)

Beef cattle	7 to 12 per head	Sheep, goats	2 to 4 per head
Dairy cattle	10 to 40 per head	Chickens	8 to 10 per hundred birds
Swine	2 to 8 per head	Turkeys	10 to 15 per hundred birds
Horses	8 to 12 per head		

(Note: Water consumption may increase by 1½ to 2 times when temperatures exceed 80°F.)

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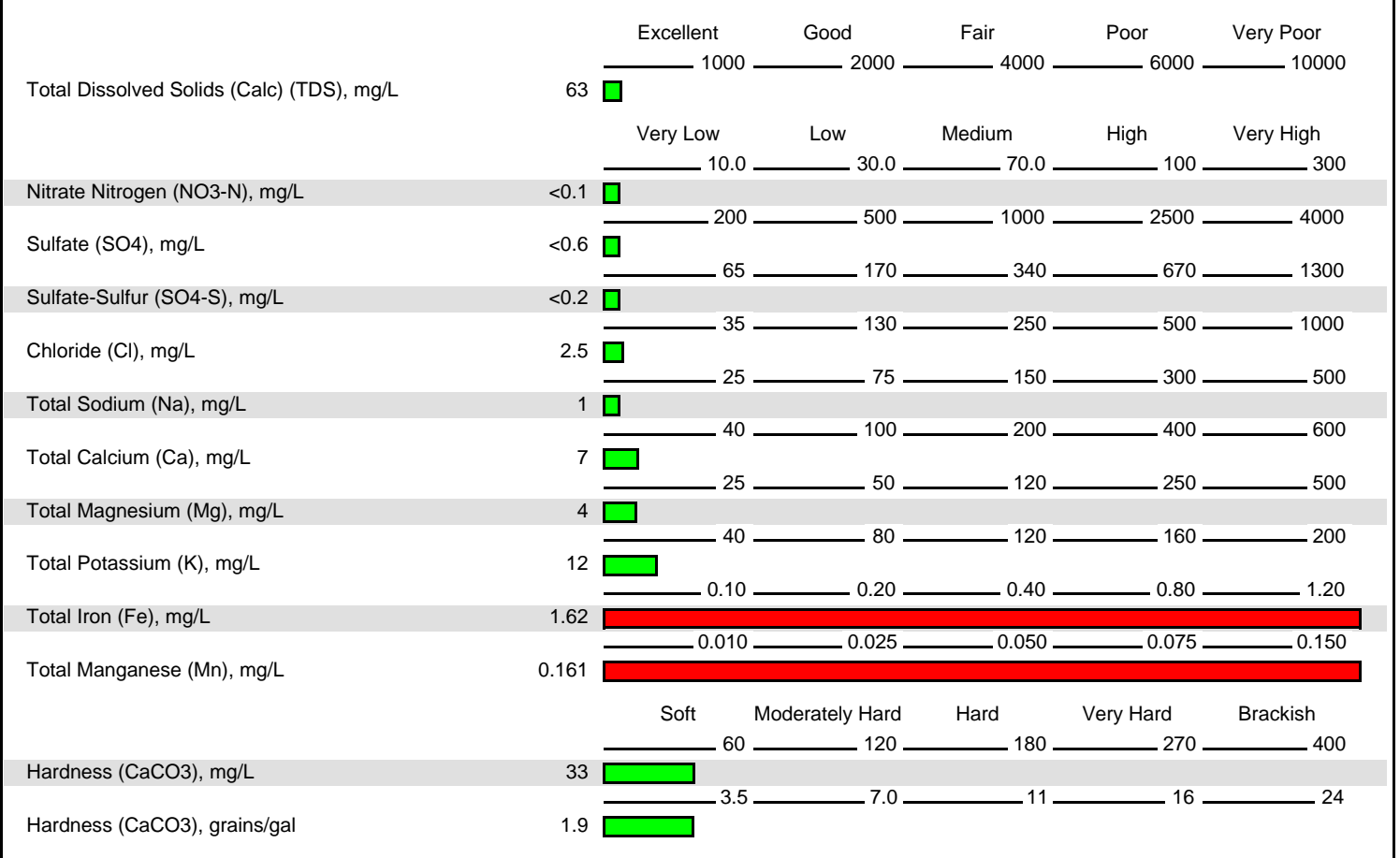
Fax: 806.677.0329

Lab No.: 3953 **LABORATORY ANALYSIS RESULTS** **Date Reported: 08/18/2023**

Send To: 55267	TIERRA GRANDE RESEARCH AND CONSULTING DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
--------------------------	--	--

Sample ID: VALDEZ POND	Date Received:
Client Name:	Invoice No: 423654
Location:	P.O. #: DR CRISTOBAL VALENCIA
Date/Time Sampled: 08/02/2023	Name of Sampler: C VALENCIA
Date/Time Submitted: 08/09/2023	Name of Submitter: UPS
Subject: Livestock Water Lab Analysis	Depth:

Livestock



Additional Tests

Electrical Conductivity (EC @ 25C), µmho/cm	98.7
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Lab No.: 3953 LABORATORY ANALYSIS RESULTS Date Reported: 08/18/2023

Send To: 55267	TIERRA GRANDE RESEARCH AND CONSULTING DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
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Sample ID:	VALDEZ POND	Date Received:	
Client Name:		Invoice No:	423654
Location:		P.O. #:	DR CRISTOBAL VALENCIA
Date/Time Sampled:	08/02/2023	Name of Sampler:	C VALENCIA
Date/Time Submitted:	08/09/2023	Name of Submitter:	UPS
Subject:	Livestock Water Lab Analysis	Depth:	

IRON: EXTREMELY HIGH: Performance likely to be affected by improper equipment function, due to high iron concentration resulting in increased microbial growth and biofilm buildup in watering equipment. High iron in drinking water may also reduce water intake which can directly reduce feed intake or milk production. This water may impart off-taste to meat of young animals (e.g., veal calves) or to milk. Excess absorbed iron from drinking water can lead to cellular oxidative stress, can inhibit copper and zinc absorption, and reduced growth or production. Seek professional advice regarding use of this water for livestock consumption.

MANGANESE: EXTREMELY HIGH (over 0.0150 mg/L): Performance likely to be affected by improper equipment functions due to high manganese concentration (resulting in increased microbial growth and biofilm buildup) rather than specific livestock health problems. May impart off-taste to meat of young animals (e.g., veal calves).

HARDNESS: SOFT: "Soft" water has no direct effect on drinking water safety or animal health, but may influence equipment, plumbing, and fixture performance.

AVERAGE DAILY WATER CONSUMPTION (gallons per day)

Beef cattle	7 to 12 per head	Sheep, goats	2 to 4 per head
Dairy cattle	10 to 40 per head	Chickens	8 to 10 per hundred birds
Swine	2 to 8 per head	Turkeys	10 to 15 per hundred birds
Horses	8 to 12 per head		

(Note: Water consumption may increase by 1½ to 2 times when temperatures exceed 80°F.)

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Lab No.: 344 **LABORATORY ANALYSIS RESULTS** **Date Reported: 10/30/2023**

Send To: 55267	NORTHERN NM STOCKMANS ASSOC DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
--------------------------	--	--

Sample ID: PAVO SPRING	Date Received:
Client Name:	Invoice No: 424247
Location:	P.O. #:
Date/Time Sampled: 10/16/2023	Name of Sampler:
Date/Time Submitted: 10/24/2023	Name of Submitter:
Subject: Livestock Water Lab Analysis	Depth:

Livestock				
Excellent	Good	Fair	Poor	Very Poor
_____ 1000	_____ 2000	_____ 4000	_____ 6000	_____ 10000
Total Dissolved Solids (Calc) (TDS), mg/L	37			
Very Low	Low	Medium	High	Very High
_____ 10.0	_____ 30.0	_____ 70.0	_____ 100	_____ 300
Nitrate Nitrogen (NO3-N), mg/L	0.68			
Sulfate (SO4), mg/L	2.4			
Sulfate-Sulfur (SO4-S), mg/L	0.79			
Chloride (Cl), mg/L	1.7			
Total Sodium (Na), mg/L	4			
Total Calcium (Ca), mg/L	5			
Total Magnesium (Mg), mg/L	1			
Total Potassium (K), mg/L	1			
Total Iron (Fe), mg/L	0.10			
Total Manganese (Mn), mg/L	<0.005			
Soft	Moderately Hard	Hard	Very Hard	Brackish
_____ 60	_____ 120	_____ 180	_____ 270	_____ 400
Hardness (CaCO3), mg/L	16			
Hardness (CaCO3), grains/gal	0.9			
Additional Tests				
Electrical Conductivity (EC @ 25C), µmho/cm	57.8			

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Lab No.: 344 **LABORATORY ANALYSIS RESULTS** Date Reported: 10/30/2023

Send To: 55267	NORTHERN NM STOCKMANS ASSOC DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
--------------------------	--	--

Sample ID: PAVO SPRING	Date Received:	Invoice No: 424247
Client Name:	Invoice No:	P.O. #:
Location:	Name of Sampler:	Name of Submitter:
Date/Time Sampled: 10/16/2023	Name of Submitter:	Depth:
Date/Time Submitted: 10/24/2023		
Subject: Livestock Water Lab Analysis		

Livestock



INTERPRETATIONS for GENERAL LIVESTOCK PRODUCTION The following statements are general interpretations for a wide range of common livestock and poultry animals. The actual effect of a particular water source on health or performance depends on many factors, including diet, animal activity, air temperature, animal size, and condition. Interpretations for specific livestock types are available on request, including: *beef cattle, beef calves, dairy cattle, dairy calves, mature hogs, young pigs, poultry, horses, or sheep/goats.*

TOTAL DISSOLVED SOLIDS, CONDUCTIVITY: EXCELLENT QUALITY ("fresh" water): Low salinity level. Suitable for all classes of livestock and poultry.

NITRATE-NITROGEN: VERY LOW: Should have no effect on animal health or performance.

SULFATE: VERY LOW: Considered safe for all classes of livestock. No problems are expected. Could possibly affect poultry performance at upper end of range when sodium, magnesium, or chloride levels are high.

CHLORIDE: VERY LOW: Chloride is considered a dissolved solid. See TDS comments. Levels greater than 15 to 25 mg/L might affect poultry production when sodium exceeds 50 mg/L.

SODIUM: VERY LOW: Presents little or no risk to livestock or poultry.

CALCIUM: VERY LOW: No effect expected for livestock or poultry use. Calcium mineral supplementation may be needed in certain cases.

MAGNESIUM: VERY LOW: Presents little or no risk to livestock or poultry.

POTASSIUM: VERY LOW: This water is considered satisfactory for all classes of animals.

MANGANESE: VERY LOW (less than 0.010 mg/L): No production problems expected for livestock consuming this water.

HARDNESS: SOFT: "Soft" water has no direct effect on drinking water safety or animal health, but may influence equipment, plumbing, and fixture performance.

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Lab No.: 344 LABORATORY ANALYSIS RESULTS Date Reported: 10/30/2023

Send To: 55267	NORTHERN NM STOCKMANS ASSOC DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
--------------------------	--	---

Sample ID: PAVO SPRING	Date Received:
Client Name:	Invoice No: 424247
Location:	P.O. #:
Date/Time Sampled: 10/16/2023	Name of Sampler:
Date/Time Submitted: 10/24/2023	Name of Submitter:
Subject: Livestock Water Lab Analysis	Depth:

AVERAGE DAILY WATER CONSUMPTION (gallons per day)

Beef cattle 7 to 12 per head	Sheep, goats 2 to 4 per head
Dairy cattle 10 to 40 per head	Chickens 8 to 10 per hundred birds
Swine 2 to 8 per head	Turkeys 10 to 15 per hundred birds
Horses 8 to 12 per head	

(Note: Water consumption may increase by 1½ to 2 times when temperatures exceed 80°F.)


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Lab No.: 341		LABORATORY ANALYSIS RESULTS		Date Reported: 10/30/2023
Send To: 55267	NORTHERN NM STOCKMANS ASSOC DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102		 Amy Meier Data Review Coordinator	
Sample ID:	PUNTA DE LA SIERRA	Date Received:	424247	
Client Name:		Invoice No:	424247	
Location:		P.O. #:		
Date/Time Sampled:	10/16/2023	Name of Sampler:		
Date/Time Submitted:	10/24/2023	Name of Submitter:		
Subject:	Livestock Water Lab Analysis	Depth:		
Livestock				
Excellent Good Fair Poor Very Poor _____ 1000 _____ 2000 _____ 4000 _____ 6000 _____ 10000				
Total Dissolved Solids (Calc) (TDS), mg/L	95			
Very Low Low Medium High Very High _____ 10.0 _____ 30.0 _____ 70.0 _____ 100 _____ 300				
Nitrate Nitrogen (NO3-N), mg/L	<0.1			
Sulfate (SO4), mg/L	<0.6			
Sulfate-Sulfur (SO4-S), mg/L	<0.2			
Chloride (Cl), mg/L	4.6			
Total Sodium (Na), mg/L	1			
Total Calcium (Ca), mg/L	9			
Total Magnesium (Mg), mg/L	5			
Total Potassium (K), mg/L	17			
Total Iron (Fe), mg/L	4.44			
Total Manganese (Mn), mg/L	0.054			
Soft Moderately Hard Hard Very Hard Brackish _____ 60 _____ 120 _____ 180 _____ 270 _____ 400				
Hardness (CaCO3), mg/L	43			
Hardness (CaCO3), grains/gal	2.5			
Additional Tests				
Electrical Conductivity (EC @ 25C), µmho/cm	149			

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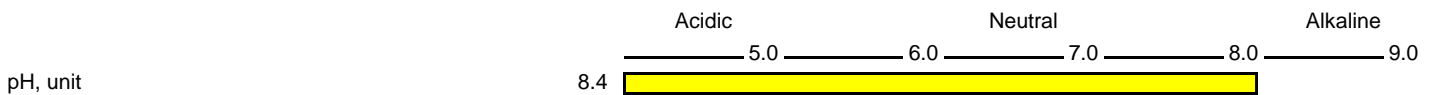
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Lab No.: 341 **LABORATORY ANALYSIS RESULTS** Date Reported: 10/30/2023

Send To: 55267	NORTHERN NM STOCKMANS ASSOC DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
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Sample ID:	PUNTA DE LA SIERRA	Date Received:	
Client Name:		Invoice No:	424247
Location:		P.O. #:	
Date/Time Sampled:	10/16/2023	Name of Sampler:	
Date/Time Submitted:	10/24/2023	Name of Submitter:	
Subject:	Livestock Water Lab Analysis	Depth:	

Livestock



INTERPRETATIONS for GENERAL LIVESTOCK PRODUCTION The following statements are general interpretations for a wide range of common livestock and poultry animals. The actual effect of a particular water source on health or performance depends on many factors, including diet, animal activity, air temperature, animal size, and condition. Interpretations for specific livestock types are available on request, including: *beef cattle, beef calves, dairy cattle, dairy calves, mature hogs, young pigs, poultry, horses, or sheep/goats.*

TOTAL DISSOLVED SOLIDS, CONDUCTIVITY: EXCELLENT QUALITY ("fresh" water): Low salinity level. Suitable for all classes of livestock and poultry.

NITRATE-NITROGEN: VERY LOW: Should have no effect on animal health or performance.

SULFATE: VERY LOW: Considered safe for all classes of livestock. No problems are expected. Could possibly affect poultry performance at upper end of range when sodium, magnesium, or chloride levels are high.

CHLORIDE: VERY LOW: Chloride is considered a dissolved solid. See TDS comments. Levels greater than 15 to 25 mg/L might affect poultry production when sodium exceeds 50 mg/L.

SODIUM: VERY LOW: Presents little or no risk to livestock or poultry.

CALCIUM: VERY LOW: No effect expected for livestock or poultry use. Calcium mineral supplementation may be needed in certain cases.

MAGNESIUM: VERY LOW: Presents little or no risk to livestock or poultry.

POTASSIUM: VERY LOW: This water is considered satisfactory for all classes of animals.

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Lab No.: 341 LABORATORY ANALYSIS RESULTS Date Reported: 10/30/2023

Send To: 55267	NORTHERN NM STOCKMANS ASSOC DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
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Sample ID:	PUNTA DE LA SIERRA	Date Received:	
Client Name:		Invoice No:	424247
Location:		P.O. #:	
Date/Time Sampled:	10/16/2023	Name of Sampler:	
Date/Time Submitted:	10/24/2023	Name of Submitter:	
Subject:	Livestock Water Lab Analysis	Depth:	

IRON: EXTREMELY HIGH: Performance likely to be affected by improper equipment function, due to high iron concentration resulting in increased microbial growth and biofilm buildup in watering equipment. High iron in drinking water may also reduce water intake which can directly reduce feed intake or milk production. This water may impart off-taste to meat of young animals (e.g., veal calves) or to milk. Excess absorbed iron from drinking water can lead to cellular oxidative stress, can inhibit copper and zinc absorption, and reduced growth or production. Seek professional advice regarding use of this water for livestock consumption.

MANGANESE: HIGH (0.050 - 0.075 mg/L): No production problems expected for livestock consuming this water. May impart off-taste to meat of young animals (e.g., veal calves).

HARDNESS: SOFT: "Soft" water has no direct effect on drinking water safety or animal health, but may influence equipment, plumbing, and fixture performance.

AVERAGE DAILY WATER CONSUMPTION (gallons per day)

Beef cattle	7 to 12 per head	Sheep, goats	2 to 4 per head
Dairy cattle	10 to 40 per head	Chickens	8 to 10 per hundred birds
Swine	2 to 8 per head	Turkeys	10 to 15 per hundred birds
Horses	8 to 12 per head		

(Note: Water consumption may increase by 1½ to 2 times when temperatures exceed 80°F.)

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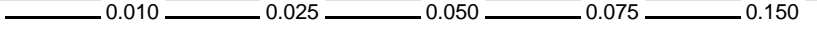




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Lab No.: 343		LABORATORY ANALYSIS RESULTS		Date Reported: 10/30/2023
Send To: 55267	NORTHERN NM STOCKMANS ASSOC DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102		 Amy Meier Data Review Coordinator	
Sample ID:	RINCON SPRING	Date Received:	424247	
Client Name:		Invoice No:	424247	
Location:		P.O. #:		
Date/Time Sampled:	10/16/2023	Name of Sampler:		
Date/Time Submitted:	10/24/2023	Name of Submitter:		
Subject:	Livestock Water Lab Analysis	Depth:		
Livestock				
Excellent Good Fair Poor Very Poor _____ 1000 _____ 2000 _____ 4000 _____ 6000 _____ 10000				
Total Dissolved Solids (Calc) (TDS), mg/L	59			
Very Low Low Medium High Very High _____ 10.0 _____ 30.0 _____ 70.0 _____ 100 _____ 300				
Nitrate Nitrogen (NO3-N), mg/L	<0.1			
Sulfate (SO4), mg/L	1.4			
Sulfate-Sulfur (SO4-S), mg/L	0.48			
Chloride (Cl), mg/L	1.8			
Total Sodium (Na), mg/L	5			
Total Calcium (Ca), mg/L	10			
Total Magnesium (Mg), mg/L	3			
Total Potassium (K), mg/L	5			
Total Iron (Fe), mg/L	2.29			
Total Manganese (Mn), mg/L	0.363			
Soft Moderately Hard Hard Very Hard Brackish _____ 60 _____ 120 _____ 180 _____ 270 _____ 400				
Hardness (CaCO3), mg/L	37			
_____ 3.5 _____ 7.0 _____ 11 _____ 16 _____ 24				
Hardness (CaCO3), grains/gal	2.2			
Additional Tests				
Electrical Conductivity (EC @ 25C), µmho/cm	91.9			

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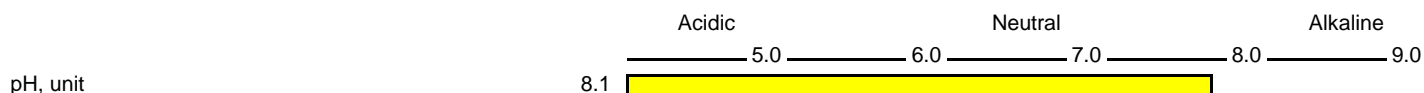
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Lab No.: 343 LABORATORY ANALYSIS RESULTS Date Reported: 10/30/2023

Send To: 55267	NORTHERN NM STOCKMANS ASSOC DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
Sample ID:	RINCON SPRING	Date Received:
Client Name:		Invoice No: 424247
Location:		P.O. #:
Date/Time Sampled:	10/16/2023	Name of Sampler:
Date/Time Submitted:	10/24/2023	Name of Submitter:
Subject:	Livestock Water Lab Analysis	Depth:

Livestock



INTERPRETATIONS for GENERAL LIVESTOCK PRODUCTION The following statements are general interpretations for a wide range of common livestock and poultry animals. The actual effect of a particular water source on health or performance depends on many factors, including diet, animal activity, air temperature, animal size, and condition. Interpretations for specific livestock types are available on request, including: *beef cattle, beef calves, dairy cattle, dairy calves, mature hogs, young pigs, poultry, horses, or sheep/goats.*

TOTAL DISSOLVED SOLIDS, CONDUCTIVITY: EXCELLENT QUALITY ("fresh" water): Low salinity level. Suitable for all classes of livestock and poultry.

NITRATE-NITROGEN: VERY LOW: Should have no effect on animal health or performance.

SULFATE: VERY LOW: Considered safe for all classes of livestock. No problems are expected. Could possibly affect poultry performance at upper end of range when sodium, magnesium, or chloride levels are high.

CHLORIDE: VERY LOW: Chloride is considered a dissolved solid. See TDS comments. Levels greater than 15 to 25 mg/L might affect poultry production when sodium exceeds 50 mg/L.

SODIUM: VERY LOW: Presents little or no risk to livestock or poultry.

CALCIUM: VERY LOW: No effect expected for livestock or poultry use. Calcium mineral supplementation may be needed in certain cases.

MAGNESIUM: VERY LOW: Presents little or no risk to livestock or poultry.

POTASSIUM: VERY LOW: This water is considered satisfactory for all classes of animals.

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Lab No.: 343 LABORATORY ANALYSIS RESULTS Date Reported: 10/30/2023

Send To: 55267	NORTHERN NM STOCKMANS ASSOC DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
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Sample ID:	RINCON SPRING	Date Received:	
Client Name:		Invoice No:	424247
Location:		P.O. #:	
Date/Time Sampled:	10/16/2023	Name of Sampler:	
Date/Time Submitted:	10/24/2023	Name of Submitter:	
Subject:	Livestock Water Lab Analysis	Depth:	

IRON: EXTREMELY HIGH: Performance likely to be affected by improper equipment function, due to high iron concentration resulting in increased microbial growth and biofilm buildup in watering equipment. High iron in drinking water may also reduce water intake which can directly reduce feed intake or milk production. This water may impart off-taste to meat of young animals (e.g., veal calves) or to milk. Excess absorbed iron from drinking water can lead to cellular oxidative stress, can inhibit copper and zinc absorption, and reduced growth or production. Seek professional advice regarding use of this water for livestock consumption.

MANGANESE: EXTREMELY HIGH (over 0.0150 mg/L): Performance likely to be affected by improper equipment functions due to high manganese concentration (resulting in increased microbial growth and biofilm buildup) rather than specific livestock health problems. May impart off-taste to meat of young animals (e.g., veal calves).

HARDNESS: SOFT: "Soft" water has no direct effect on drinking water safety or animal health, but may influence equipment, plumbing, and fixture performance.

AVERAGE DAILY WATER CONSUMPTION (gallons per day)

Beef cattle	7 to 12 per head	Sheep, goats	2 to 4 per head
Dairy cattle	10 to 40 per head	Chickens	8 to 10 per hundred birds
Swine	2 to 8 per head	Turkeys	10 to 15 per hundred birds
Horses	8 to 12 per head		

(Note: Water consumption may increase by 1½ to 2 times when temperatures exceed 80°F.)

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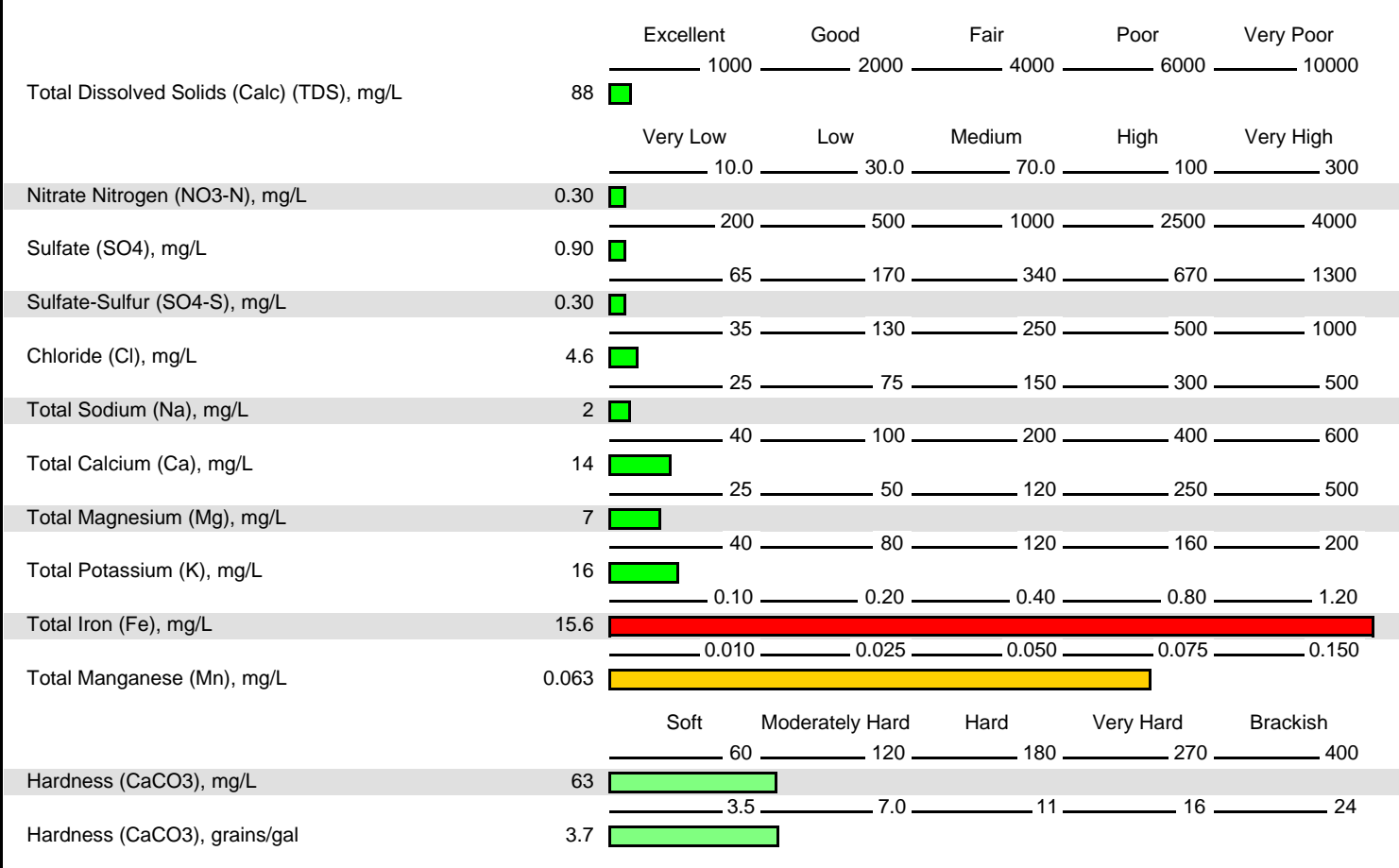
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Lab No.: 342 LABORATORY ANALYSIS RESULTS Date Reported: 10/30/2023

Send To: 55267	NORTHERN NM STOCKMANS ASSOC DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
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Sample ID: VALDEZ	Date Received:
Client Name:	Invoice No: 424247
Location:	P.O. #:
Date/Time Sampled: 10/16/2023	Name of Sampler:
Date/Time Submitted: 10/24/2023	Name of Submitter:
Subject: Livestock Water Lab Analysis	Depth:

Livestock



Additional Tests

Electrical Conductivity (EC @ 25C), µmho/cm	137
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Lab No.: 342 LABORATORY ANALYSIS RESULTS Date Reported: 10/30/2023

Send To: 55267	NORTHERN NM STOCKMANS ASSOC DR CRISTOBAL VALENCIA 1116 SILVER AVE SW UNIT I ALBUQUERQUE, NM 87102	 Amy Meier Data Review Coordinator
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Sample ID: VALDEZ	Date Received:
Client Name:	Invoice No: 424247
Location:	P.O. #:
Date/Time Sampled: 10/16/2023	Name of Sampler:
Date/Time Submitted: 10/24/2023	Name of Submitter:
Subject: Livestock Water Lab Analysis	Depth:

IRON: EXTREMELY HIGH: Performance likely to be affected by improper equipment function, due to high iron concentration resulting in increased microbial growth and biofilm buildup in watering equipment. High iron in drinking water may also reduce water intake which can directly reduce feed intake or milk production. This water may impart off-taste to meat of young animals (e.g., veal calves) or to milk. Excess absorbed iron from drinking water can lead to cellular oxidative stress, can inhibit copper and zinc absorption, and reduced growth or production. Seek professional advice regarding use of this water for livestock consumption.

MANGANESE: HIGH (0.050 - 0.075 mg/L): No production problems expected for livestock consuming this water. May impart off-taste to meat of young animals (e.g., veal calves).

HARDNESS: MODERATELY HARD: Hardness has no direct effect on drinking water safety or animal health.

AVERAGE DAILY WATER CONSUMPTION (gallons per day)

Beef cattle	7 to 12 per head	Sheep, goats	2 to 4 per head
Dairy cattle	10 to 40 per head	Chickens	8 to 10 per hundred birds
Swine	2 to 8 per head	Turkeys	10 to 15 per hundred birds
Horses	8 to 12 per head		

(Note: Water consumption may increase by 1½ to 2 times when temperatures exceed 80°F.)

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