State of New Mexico
Oil Conservation Division

Incident ID	nAPP2200536812
District RP	
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: ***Each of the following items must be included in the closure report.***

☒ N/A A scaled site and sampling diagram as described in 19.15.29.11 NMAC

☒ X Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)

☒ N/A Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

☒ N/A Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Arsenio Jones Title: RES Specialist

Signature: Clint Talley Date: 12/05/2022

email: arsenio.jones@matadorresources.com Telephone: 575-361-4333

OCD Only

Received by: Jocelyn Harimon Date: 12/05/2022

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: Robert Hamlet Date: 3/3/2023

Printed Name: Robert Hamlet Title: Environmental Specialist - Advanced

VERTEX

February 23, 2022 Vertex Project #: 21E-03780-01

Spill Closure Report: Rustler Breaks Oil CDP
Section 31, Township 23 South, Range 28 East
County: Eddy
API: N/A
Incident Report: nAPP2200536812

Prepared For: San Mateo Black River Oil Pipeline, LLC
5400 Lyndon B. Johnson Freeway
Dallas, Texas 75240

New Mexico Oil Conservation Division – District 2
811 South 1st Street
Artesia, New Mexico 88210

San Mateo Black River Oil Pipeline, LLC (San Mateo) retained Vertex Resource Services Inc. (Vertex) to conduct a Spill Assessment for a release of crude oil into the secondary containment that occurred when the lact unit diverted oil to the incorrect tank at Rustler Breaks Oil CDP, Incident nAPP2200536812 (hereafter referred to as "Rustler Breaks"). San Mateo provided spill notification to New Mexico Oil Conservation Division (NMOCD) District 2 and the state, who owns the property, via submission of an initial C-141 Release Notification (Attachment 1) on October 8, 2021. This letter provides a description of the spill assessment and includes a request for spill closure. The spill area is located at N 32.262877, W -104.133867.

Background

The site is located approximately 2.18 miles southwest of Loving, New Mexico. The legal location for the site is Section 31, Township 23 South and Range 28 East in Eddy County, New Mexico. This location is within the Permian Basin in southeast New Mexico and has been historically used for oil and gas exploration and production.

The Geological Map of New Mexico (New Mexico Bureau of Geology and Mineral Resources, 2019) indicates the site's surface geology is comprised primarily of Pr – Rustler formation (Upper Permian) consisting of siltstone, gypsum, sandstone and dolomite. The Natural Resources Conservation Service Web Soil Survey characterizes the predominant soil texture on the site is Reeves-gyspum land complex. It tends to be well drained with high runoff and very low to moderate available moisture levels in the soil profile (United States Department of Agriculture, Natural Resources Conservation Service, 2020).

The surrounding landscape is associated with ridges, plains and hills at elevations of 1,250 to 5,000 feet above sea level. The climate is semi-arid, with an average annual precipitation ranging between 10 to 25 inches. Historically, the plant community was dominated by grasses with shrubs and half-shrubs sparse and evenly distributed. Black grama, blue grama, and tobosa are dominant with a variety of perennial forbs. Globemallow, verbena, grousnels, croton and filaree are commonly found. Fourwing saltbush and winterfat are more palatable shurbs.

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Incident Description

The spill occurred on October 8, 2021, due to a lact unit diverting oil to an out of service tank and involved the release of approximately 20 barrels (bbl.) of produced oil into the secondary lined containment. All fluids were contained with the lined Spill Prevention Control and Countermeasures (SPCC) containment and no oil was released into undisturbed areas or waterways. Approximately 20 bbl. of free fluid was removed during initial spill clean-up. The NMOCD C-141 Report: nAPP2200536812 is included in Attachment 1. The Daily Field Report (DFR) and site photographs are included in Attachment 2.

Closure Criteria Determination

The depth to groundwater was determined using information from Oil and Gas Drilling records and the New Mexico Office of the State Engineer Water Column/Average Depth to Water report. A 0.5-mile search radius was used to determine groundwater depth. The closest recorded depth to groundwater was determined to be 200 feet below ground surface (bgs) and 0.30 miles from the site in 2017. Documentation used in Closure Criteria Determination research is included in Attachment 3.

Closure Criteria Worksheet			
Site Name: Rustler Breaks CDP			
Spill Coordinates:		**X: 32.262877**	**Y: -104.133867**
Site Specific Conditions		**Value**	**Unit**
1	Depth to Groundwater	**200**	feet
2	Within 300 feet of any continuously flowing watercourse or any other significant watercourse	10,781	feet
3	Within 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark)	30,166	feet
4	Within 300 feet from an occupied residence, school, hospital, institution or church	3,824	feet
5	i) Within 500 feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, **or**	1,565	feet
	ii) Within 1000 feet of any fresh water well or spring	1,565	feet
6	Within incorporated municipal boundaries or within a defined municipal fresh water field covered under a municipal ordinance adopted pursuant to Section 3-27-3 NMSA 1978 as amended, unless the municipality specifically approves	No	(Y/N)
7	Within 300 feet of a wetland	5,450	feet
8	Within the area overlying a subsurface mine	No	(Y/N)
9	Within an unstable area (Karst Map)	Medium	Critical High Medium Low
10	Within a 100-year Floodplain	500	year
11	Soil Type	Reeves-Gypsum	
12	Ecological Classification	Loamy	

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13 Geology	Pr	
NMAC 19.15.29.12 E (Table 1) Closure Criteria	>100'	<50' 51-100' >100'

The closure criteria determined for the site are associated with the following constituent concentration limits as presented in Table 1.

Table 1. Closure Criteria for Soils Impacted by a Release

Minimum depth below any point within the horizontal boundary of the release to groundwater less than 10,000 mg/l TDS	Constituent	Limit
> 100 feet	Chloride	20,000 mg/kg
	TPH (GRO+DRO+MRO)	2,500 mg/kg
	GRO+DRO	1,000 mg/kg
	BTEX	50 mg/kg
	Benzene	10 mg/kg

Remedial Actions Taken

An initial site inspection of the spill area was completed on February 23, 2022, which identified the area of the spill specified in the initial C-141 Report. The DFR associated with the site inspection is included in Attachment 2.

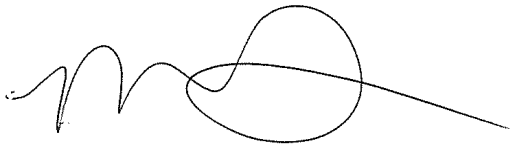
Notification that a liner inspection was scheduled to be completed was provided to the NMOCD on January 5, 2022, as required by Subparagraph (a) of Paragraph (5) of Subsection A 19.15.29.11 NMAC. Due to scheduling conflicts, the original inspection was unable to be performed. A second notification was scheduled and provided to NMOCD on February 17, 2022. Visual observation of the liner on all sides and the base of the containment, around equipment, and of all seams in the liner and was completed on February 23, 2022. As evidenced in the DFR (Attachment 2), liner integrity was confirmed. The Liner Inspection Notification emails are presented in Attachment 4.

Closure Request

Vertex recommends no remediation action to address the release at Rustler Breaks. The secondary containment liner appeared to be intact and had the ability to contain the release, as shown in the inspection photographs included with the DFR (Attachment 2). There are no anticipated risks to human, ecological or hydrological receptors associated with the release site.

Vertex requests that incident nAPP2200536812 be closed as all closure requirements set forth in Subsection E of 19.15.29.12 NMAC have been met. San Mateo certifies that all information in this report and the attachments is correct, and that they have complied with all applicable closure requirements and conditions specified in Division rules and directives to meet NMOCD requirements to obtain closure on the open release at Rustler Breaks.

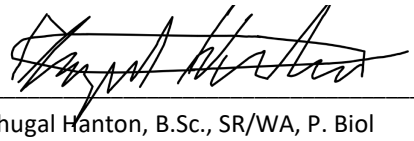
Should you have any questions or concerns, please do not hesitate to contact the undersigned at 575.361.9880 or mpeppin@vertex.ca.



February 24, 2022

Monica Peppin
SR. ENVIRONMENTAL TECHNICIAN, REPORTING

Date



March 8, 2022

Dhugal Hanton, B.Sc., SR/WA, P. Biol
VICE PRESIDENT, REPORT REVIEW

Date

Attachments

Attachment 1. NMOCD C-141 Report
Attachment 2. Daily Field Report with Pictures
Attachment 3. Closure Criteria Research
Attachment 4. Required 48 Hour Liner Inspection Notifications and Extension Request

Received by OCD: 12/5/2022 10:45:15 AM

References

Water Column/Average Depth to Water Report. New Mexico Water Rights Reporting System, (2019). Retrieved from http://nmwrrs.ose.state.nm.us/nmwrrs/waterColumn.html

Assessed and Impaired Waters of New Mexico. New Mexico Department of Surface Water Quality Bureau, (2019). Retrieved from https://gis.web.env.nm.gov/oem/?map=swqb

Interactive Geologic Map. New Mexico Bureau of Geology and Mineral Resources, (2019). Retrieved from http://geoinfo.nmt.edu

Measured Distance from the Subject Site to Residence. Google Earth Pro, (2019). Retrieved from https://earth.google.com

Point of Diversion Location Report. New Mexico Water Rights Reporting System, (2019). Retrieved from http://nmwrrs.ose.state.nm.us/nmwrrs/wellSurfaceDiversion.html

Measured Distance from the Subject Site to Municipal Boundaries. Google Earth Pro, (2021). Retrieved from https://earth.google.com

National Wetland Inventory Surface Waters and Wetland. United State Fish and Wildlife Service, (2021). Retrieved from https://www.fws.gov/wetlands/data/mapper.html

Coal Mine Resources in New Mexico. NM Mining and Minerals Division, (2021). Retrieved from http://www.emnrd.state.nm.us/MMD/gismapminedata.html

New Mexico Cave/Karsts. United States Department of the Interior, Bureau of Land Management, (2019) Retrieved from https://www.blm.gov/programs/recreation/recreation-programs/caves/new-mexico

Flood Map Number 35015C1875D. United States Department of Homeland Security, FEMA Flood Map Service Center, (2010). Retrieved from https://msc.fema.gov/portal/search?AddressQuery=malaga%20new%20mexico#searchresultsanchor

Well Log/Meter Information Report. NM Office of the State Engineer, New Mexico Water Rights Reporting System. (2019). Retrieved from http://nmwrrs.ose.state.nm.us/nmwrrs/meterReport.html

Natural Resources and Wildlife Oil and Gas Releases. New Mexico Oil Conservation Division, (2019). Santa Fe, New Mexico.

Soil Survey, New Mexico. United States Department of Agriculture, Soil Conservation Service in Cooperation with New Mexico Agricultural Experiment Station. (1971). Retrieved from http://www.wipp.energy.gov/library/Information_Repository_A/Supplemental_Information/Chugg%20et%20al%201971%20w-map.pdf

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Limitations

This report has been prepared for the sole benefit of San Mateo Black River Oil Pipeline, LLC. This document may not be used by any other person or entity, with the exception of the New Mexico Oil Conservation Division, without the express written consent of Vertex Resource Services Inc. (Vertex) and San Mateo Black River Oil Pipeline, LLC. Any use of this report by a third party, or any reliance on decisions made based on it, or damages suffered as a result of the use of this report are the sole responsibility of the user.

The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted scientific practices current at the time the work was performed. The conclusions and recommendations presented represent the best judgement of Vertex based on the data collected during the assessment. Due to the nature of the assessment and the data available, Vertex cannot warrant against undiscovered environmental liabilities. Conclusions and recommendations presented in this report should not be considered legal advice.

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ATTACHMENT 1

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	nAPP2200536812
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party San Mateo Black River Oil Pipeline, LLC	OGRID 329461
Contact Name Arsenio Jones	Contact Telephone 575-361-4333
Contact email arsenio.jones@matadorresources.com	Incident # *(assigned by OCD)* nAPP2200536812
Contact mailing address 5400 LBJ Freeway, Suite 1500 Dallas, TX 75240	

Location of Release Source

Latitude 32.262877 Longitude -104.133867
(NAD 83 in decimal degrees to 5 decimal places)

Site Name Rustler Breaks Oil CDP	Site Type CDP
Date Release Discovered 10/8/2021	API# *(if applicable)*

Unit Letter	Section	Township	Range	County
L	31	23S	28E	Eddy

Surface Owner: [x] State [ ] Federal [ ] Tribal [ ] Private (*Name:* _____)

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

[X] Crude Oil	Volume Released (bbls) 20	Volume Recovered (bbls) 20
[ ] Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	[ ] Yes [ ] No
[ ] Condensate	Volume Released (bbls)	Volume Recovered (bbls)
[ ] Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
[ ] Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release

The lact unit diverted crude oil to a tank that was not in service yet causing a release into lined (concrete) containment.

State of New Mexico
Oil Conservation Division

Incident ID	nAPP2200536812
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? ☐ Yes ☒ No	If YES, for what reason(s) does the responsible party consider this a major release?
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?	

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

☒ The source of the release has been stopped.
☒ The impacted area has been secured to protect human health and the environment.
☒ Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices.
☒ All free liquids and recoverable materials have been removed and managed appropriately.

If all the actions described above have not been undertaken, explain why:

Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Arsenio Jones Title: RES Specialist

Signature: Clint Talley Date: 12/05/2022

email: arsenio.jones@matadorresources.com Telephone: 575-361-4333

OCD Only

Received by: Jocelyn Harimon Date: 12/05/2022

State of New Mexico
Oil Conservation Division

Incident ID	nAPP2200536812
District RP	
Facility ID	
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Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	200 (ft bgs)
Did this release impact groundwater or surface water?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☐ Yes ☒ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☒ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☒ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☒ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☒ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☒ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☒ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☒ No
Did the release impact areas **not** on an exploration, development, production, or storage site?	☐ Yes ☒ No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: ***Each of the following items must be included in the report.***

- ☒ N/A Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- ☒ N/A Field data
- ☒ N/A Data table of soil contaminant concentration data
- ☒ Depth to water determination
- ☒ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
- ☒ N/A Boring or excavation logs
- ☒ Photographs including date and GIS information
- ☒ N/A Topographic/Aerial maps
- ☒ N/A Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

Form C-141
Page 4

State of New Mexico
Oil Conservation Division

Incident ID	nAPP2200536812
District RP	
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Printed Name: Arsenio Jones Title: RES Specialist

Signature: Clint Talley Date: 12/05/2022

email: arsenio.jones@matadorresources.com Telephone: 575-361-4333

OCD Only

Received by: Jocelyn Harimon Date: 12/05/2022

State of New Mexico
Oil Conservation Division

Incident ID	nAPP2200536812
District RP	
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Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: ***Each of the following items must be included in the closure report.***

☒ N/A A scaled site and sampling diagram as described in 19.15.29.11 NMAC

☒ X Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)

☒ N/A Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

☒ N/A Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Arsenio Jones Title: RES Specialist

Signature: Clint Talley Date: 12/05/2022

email: arsenio.jones@matadorresources.com Telephone: 575-361-4333

OCD Only

Received by: Jocelyn Harimon Date: 12/05/2022

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: _____ Date: _____

Printed Name: _____ Title: _____

ATTACHMENT 2

Daily Site Visit Report

Client:	San Mateo Black River Oil Pipeline, LLC	Inspection Date:	2/23/2022
Site Location Name:	Rustler Breaks CDP	Report Run Date:	2/23/2022 6:37 PM
Client Contact Name:	Arsenio Jones	API #:	
Client Contact Phone #:	(575)361-4333		
Unique Project ID		Project Owner:	
Project Reference #		Project Manager:	

Summary of Times

Arrived at Site	2/23/2022 9:00 AM
Departed Site	2/23/2022 9:37 AM

Field Notes

9:00 Complete liner inspection

9:00 No apparent signs of rips or tears around containment area

9:25 Slight staining visible from release. No rips or tears visible in liner while walking around

Next Steps & Recommendations

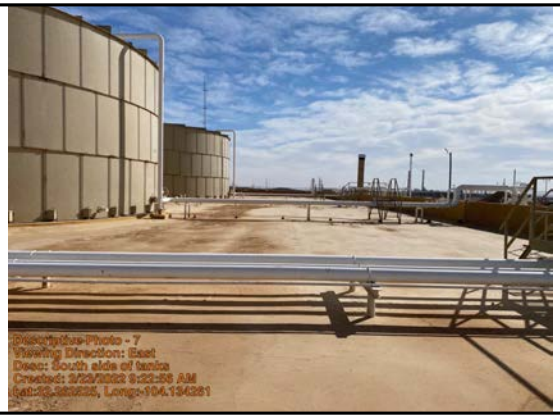
1 Complete closure report

Daily Site Visit Report

Site Photos

Viewing Direction: South	**Viewing Direction**: North
	
East area	East area
Viewing Direction: West	**Viewing Direction**: South
	
North area	In between tanks

Daily Site Visit Report

Viewing Direction: East	**Viewing Direction**: South
	
North area	West area of tanks
Viewing Direction: North	**Viewing Direction**: East
	
West area	South side of tanks

Daily Site Visit Report

Viewing Direction: North	**Viewing Direction**: West
	
In between tanks	South area

Daily Site Visit Report

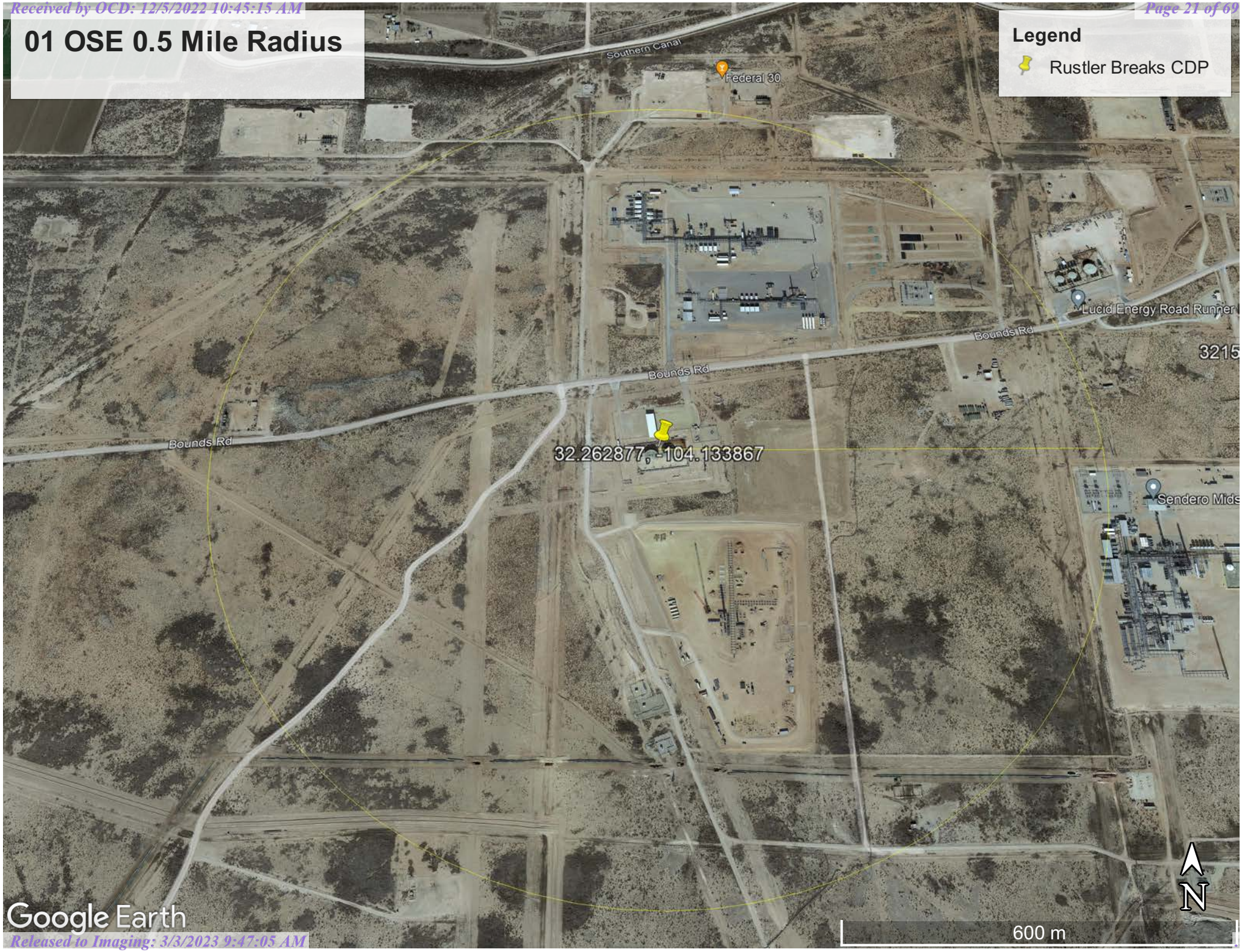
Daily Site Visit Signature

Inspector: Monica Peppin

Signature: 
Signature

ATTACHMENT 3

01 OSE 0.5 Mile Radius



New Mexico Office of the State Engineer
Point of Diversion Summary

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters)

Well Tag	POD Number	Q64	Q16	Q4	Sec	Tws	Rng	X	Y
NA	C 04085 POD1	1	4	1	31	23S	28E	582039	3570027

Driller License: 331 **Driller Company:** SBQ2, LLC DBA STEWART BROTHERS DRILLING CO.

Driller Name:

Drill Start Date:	08/08/2017	**Drill Finish Date:**	08/30/2017	**Plug Date:**	
Log File Date:	09/29/2017	**PCW Rcv Date:**		**Source:**	Shallow
Pump Type:		**Pipe Discharge Size:**		**Estimated Yield:**	30 GPM
Casing Size:	6.00	**Depth Well:**	250 feet	**Depth Water:**	200 feet

Water Bearing Stratifications:	Top	Bottom	Description
	212	250	Sandstone/Gravel/Conglomerate

Casing Perforations:	Top	Bottom
	70	230

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	Code	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
C 04085 POD1		C	ED	1	4	1	31	23S	28E	582039	3570027	477	250	200	50
C 04085 POD2		CUB	ED	2	4	1	31	23S	28E	582083	3569982	511	240	100	140
C 04281 POD1		C	ED	2	4	1	31	23S	28E	582193	3570055	633	200	100	100
C 04037 POD1		C	ED	4	3	2	31	23S	28E	582576	3569872	998	99	60	39
C 00010 CLW191724	O	CUB	ED	2	3	2	25	23S	27E	580926	3571666*	1879	259		
C 00010		CUB	ED	1	2	2	25	23S	27E	581129	3572075*	2217	250	103	147
C 00010 CLW191759	O	CUB	ED	1	2	2	25	23S	27E	581129	3572075*	2217	259		
C 00010 ENLGD		CUB	ED	1	2	2	25	23S	27E	581129	3572075*	2217	259		
C 01648		C	ED		2	3	29	23S	28E	583667	3571184*	2450	65	15	50
C 02037		C	ED		2	3	29	23S	28E	583667	3571184*	2450	260		
C 01477		CUB	ED	1	3	3	19	23S	28E	581532	3572484*	2581	127	10	117
C 02004		C	ED		3	4	24	23S	27E	580825	3572378*	2586	232	190	42
C 01244		C	ED		4	4	06	24S	28E	582860	3567543*	2686	109	70	39
C 00108		CUB	ED	1	1	4	29	23S	28E	583974	3571285*	2765	152	10	142
C 02567		C	ED	2	1	2	26	23S	27E	579314	3572049*	3119	187	89	98
C 00232		CUB	ED	1	3	2	07	24S	28E	582362	3566826*	3175	160		
C 01992		C	ED	3	4	1	19	23S	28E	581929	3573094*	3209	232	45	187
C 00406		C	ED		1	1	08	24S	28E	583270	3567142*	3238	78	50	28
C 01731		C	ED		4	2	05	24S	28E	584483	3568367*	3286	80	30	50
C 03031		C	ED	1	3	3	35	23S	27E	578315	3569206*	3336	150	67	83
C 03706 POD1		C	ED	3	4	4	22	21S	27E	584939	3569812	3362	200		
C 03831 POD1		C	ED	4	3	1	33	23S	28E	584939	3569812	3362	300	52	248
C 00312		CUB	ED	3	3	1	20	23S	28E	583094	3573015	3461	230	70	160
C 04202 POD1	R	C	ED	4	3	3	28	23S	28E	585049	3570665	3553	400	60	340
C 00481		C	ED	3	2	1	33	23S	28E	585182	3570283*	3623	225	190	35
C 02976		C	ED	4	2	3	12	24S	27E	580519	3566195*	3856	57	27	30
C 03390 POD1		C	ED	1	4	2	23	23S	27E	579511	3573200	3891	200	180	20
C 04289 POD1		C	ED	1	1	2	19	23S	28E	582387	3573717	3899	91	78	13
C 00276 S		CUB	ED		1	1	24	23S	27E	580017	3573576*	3990	248	130	118
C 00539		C	ED	3	3	3	21	23S	28E	584767	3572308*	3994	28	6	22
C 03542 POD2		CUB	ED	2	4	4	20	23S	28E	584620	3572497	3997	30		
C 03542 POD1		CUB	ED	2	4	4	20	23S	28E	584615	3572530	4015	22	16	6
C 00519		C	ED	2	1	1	28	23S	28E	584970	3572100*	4041	250		

C 00911 POD2		C	ED	1	2	4	20	23S	28E	584359	3572911*		4096	69	34	35
C 00911 POD3		C	ED	1	2	4	20	23S	28E	584359	3572911*		4096	218	60	158
C 00276		CUB	ED	1	1	1	24	23S	27E	579945	3573670		4105	232	70	162
C 00650		C	ED	1	3	3	21	23S	28E	584767	3572508*		4117	32	12	20
C 03740 POD1		C	ED	4	4	4	12	24S	27E	581283	3565795		4118	340		
C 03037		C	ED	4	3	4	12	24S	27E	580930	3565795*		4159	116	25	91
C 03260 POD2	O	C	ED	1	3	3	12	24S	27E	580100	3565984		4188	80	56	24
C 03082		C	ED	1	3	3	18	23S	28E	581529	3574096*		4192	220	217	3
C 03779 POD1		C	ED	2	3	3	18	23S	28E	581707	3574103		4201	110	70	40
C 00518 CLW197989	O	CUB	ED	2	1	3	23	23S	27E	578510	3572840*		4246	210		
C 00577		C	ED	3	1	3	21	23S	28E	584764	3572714*		4248	35	10	25
C 00578		C	ED	3	1	3	21	23S	28E	584764	3572714*		4248	28	18	10
C 00643		C	ED	3	1	3	21	23S	28E	584764	3572714*		4248	76	10	66
C 03260 POD1		C	ED	3	3	3	12	24S	27E	579995	3565935		4272	80	56	24
C 00518 POD2		CUB	ED	2	4	4	22	23S	27E	578105	3572431*		4295	220	98	122
C 02180		C	ED			3	18	23S	28E	581831	3574198*		4302	140	80	60
C 00313		CUB	ED	3	3	3	17	23S	28E	583136	3573915*		4303	250	75	175
C 00368		CUB	ED	3	3	3	13	23S	27E	579916	3573877*		4307	250	40	210
C 00361	C	CUB	ED		3	3	08	24S	28E	583283	3565926*		4327	2575		
C 03922 POD1		C	ED	3	2	3	18	23S	28E	581844	3574230		4335	138	75	63
C 00368 CLW197578	O	CUB	ED		3	3	13	23S	27E	580017	3573978*		4363	250	40	210
C 00368 S		CUB	ED		3	3	13	23S	27E	580017	3573978*		4363	250	120	130
C 02306		C	ED		3	2	04	24S	28E	585690	3568382*		4384	75	25	50
C 02999		C	ED	2	1	2	23	23S	27E	579314	3573661*		4386		160	
C 00518		CUB	ED	1	1	3	23	23S	27E	578310	3572840*		4393	178		
C 04400 POD1		C	ED	3	1	3	18	23S	28E	581496	3574309		4406	200	120	80
C 03488 POD1		C	ED	4	3	1	23	23S	27E	578430	3573023		4432	217	122	95
C 02697		C	ED		1	3	18	23S	28E	581629	3574401*		4497	220	42	178
C 01472		CUB	ED	2	3	2	28	23S	28E	585730	3571652		4505	162	10	152
C 03147		C	ED	3	3	3	12	24S	27E	579885	3565715		4517	140		
C 00544		C	ED	3	3	1	21	23S	28E	584762	3573120*		4526	27		
C 02848		CUB	ED	3	3	1	21	23S	28E	584762	3573120*		4526	130		
C 03703 POD1		C	ED	1	2	1	09	24S	28E	585259	3567225		4552	74	15	59
C 04225 POD1		C	ED	2	2	3	18	23S	28E	582167	3574424		4558	120	71	49
C 04415 POD9		CUB	ED	4	1	4	04	23S	28E	585714	3572094		4680	40	36	4
C 00231 AS		CUB	ED	4	1	1	23	23S	27E	578512	3573447*		4685	230	100	130
C 00498		CUB	ED	4	1	1	23	23S	27E	578512	3573447*		4685	210	120	90
C 00498 CLW194833	O	CUB	ED	4	1	1	23	23S	27E	578512	3573447*		4685	165	80	85
C 01938		C	ED		2	4	28	23S	28E	586085	3571205*		4691	80	3	77
C 00347		CUB	ED		1	1	13	24S	27E	580010	3565479*		4694	60	30	30
C 00851		C	ED			3	17	23S	28E	583438	3574217*		4697	200	50	150
C 03753 POD1		C	ED	3	3	1	18	23S	28E	581515	3574658		4755	210	60	150

C 01943		C	ED			1	13	24S	27E	580221	3565275*	4823	30	25	5
C 03732 POD1		C	ED	1	3	3	27	23S	28E	586321	3570929	4853	171	10	161
C 03941 POD2		CUB	ED	3	4	2	13	23S	27E	581152	3574745	4860	32		
C 03941 POD1		CUB	ED	3	4	2	13	23S	27E	581110	3574757	4876	37	19	18
C 04401 POD1		C	ED	2	3	1	18	23S	28E	581696	3574825	4923	200	120	80
C 01240		C	ED			1	3	34	23S	28E	586494	3569592*	4925	125	25	100
C 04066 POD1		C	ED	2	4	1	18	23S	28E	582038	3574823	4941	155	80	75
C 04315 POD1		C	ED	1	3	1	18	23S	28E	581620	3574847	4944			
C 00573		CUB	ED	2	2	4	04	24S	28E	586188	3568087*	4954	250	35	215
C 00342	C	CUB	ED			4	1	13	24S	27E	580432	3565080*	4957	2565		
C 00716		C	ED				21	23S	28E	585471	3573012*	4981	140	69	71

Average Depth to Water: **66 feet**

Minimum Depth: **3 feet**

Maximum Depth: **217 feet**

Record Count: 86

UTMNAD83 Radius Search (in meters):

Easting (X): 581577.96 **Northing (Y):** 3569903.39 **Radius:** 5000

***UTM location was derived from PLSS - see Help**

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10/29/21 10:30 AM WATER COLUMN/ AVERAGE DEPTH TO WATER

OSE Closest Water Well

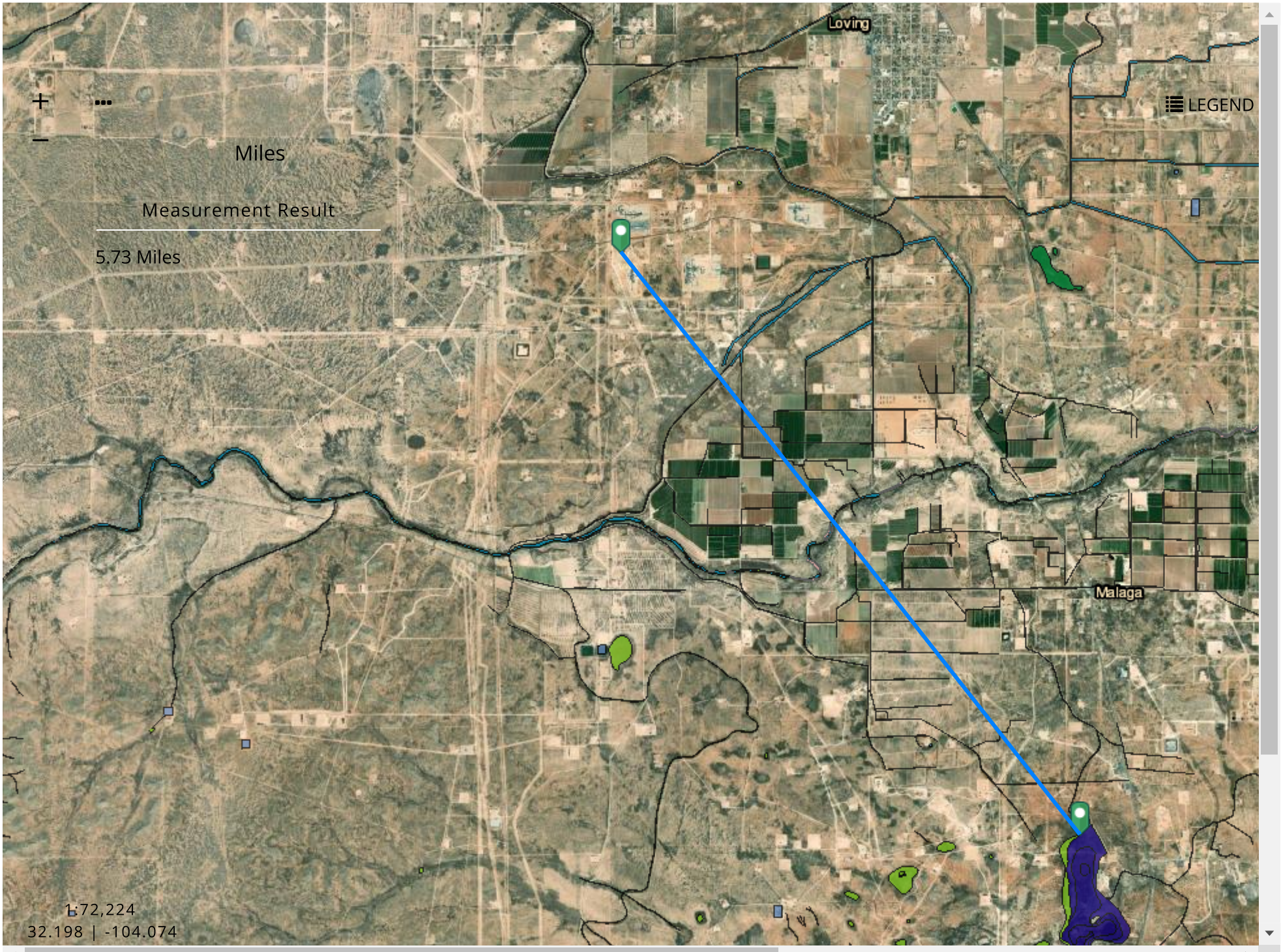
0.30 Miles

Legend

Water Well 04085 POD1

01 San Mateo Rustler Breaks CDP OSE 0.5 Mile Radius

Nearest Watercourse: Black River
Distance: 2.04 miles (10,781 feet)


Loving
Malaga
LEGEND
Miles
Measurement Result
5.73 Miles
1:72,224
32.198 | -104.074

Distance to Nearest Residence

3,824 feet (0.72 miles)

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(acre ft per annum) (R=POD has been replaced and no longer serves this file, C=the file is closed) (quarters are 1=NW 2=NE 3=SW 4=SE) (quarters are smallest to largest) (NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Well Tag	Code	Grant	Source	q 64	q 16	q 4	Sec	Twn	Rng	X	Y	Distance
C 04085	C	SAN	1	SUMMIT PERMIAN TRANS LLC	ED	C 04085 POD1	NA			Shallow	1	4	1	31	23S	28E	582039	3570027	477
C 04205	C	PRO	0	B & R TRUCKING	ED	C 04085 POD1	NA			Shallow	1	4	1	31	23S	28E	582039	3570027	477
C 04206	C	PRO	0	B & R TRUCKING	ED	C 04085 POD1	NA			Shallow	1	4	1	31	23S	28E	582039	3570027	477
C 04207	C	PRO	0	B & R TRUCKING	ED	C 04085 POD1	NA			Shallow	1	4	1	31	23S	28E	582039	3570027	477
C 04085	C	SAN	1	SUMMIT PERMIAN TRANS LLC	ED	C 04085 POD2	NA			Shallow	2	4	1	31	23S	28E	582082	3569982	511
C 04281	C	SAN	1	TRAVIS MANN	ED	C 04281 POD1	22157			Shallow	2	4	1	31	23S	28E	582192	3570055	633
C 02022	C	PRO	0	AMOCO PRODUCTION COMPANY	ED	C 02022				Shallow	1	4	3	31	23S	28E	581941	3569250*	747
C 02955	C	PRO	0	MARBOB ENERGY	ED	C 02955					1	4	3	31	23S	28E	581941	3569250*	747
C 03218	C	PRO	0	NADEL & GUSSMAN	ED	C 02022				Shallow	1	4	3	31	23S	28E	581941	3569250*	747
C 03108	CUB	STK	6	LOVING RANCH WATTS LAND AND CATTLE	ED	C 03108					1	3	2	31	23S	28E	582348	3570063*	786
C 01936	C	PRO	0	AMOCO PRODUCTION COMPANY	ED	C 01936						3	2	31	23S	28E	582449	3569964*	873
C 04311	C	SAN	1	TRAVIS MANN	ED	C 04311 POD1	22215				2	1	4	31	23S	28E	582490	3569583	966
C 04037	C	SAN	1	SENDERO CARLSBAD MIDSTREAM LLC	ED	C 04037 POD1				Shallow	4	3	2	31	23S	28E	582575	3569872	998
C 03366	C	DOL	0	DAN MOORE	ED	C 03366 POD1					4	1	2	31	23S	28E	582597	3570199	1061
C 00054	CUB	IRR	0	ARTHUR LANCASTER	ED	C 00054					1	1	4	25	23S	27E	580727	3571263*	1603

Record Count: 15

UTMNAD83 Radius Search (in meters):

Easting (X): 581577.96 **Northing (Y):** 3569903.39 **Radius:** 1610

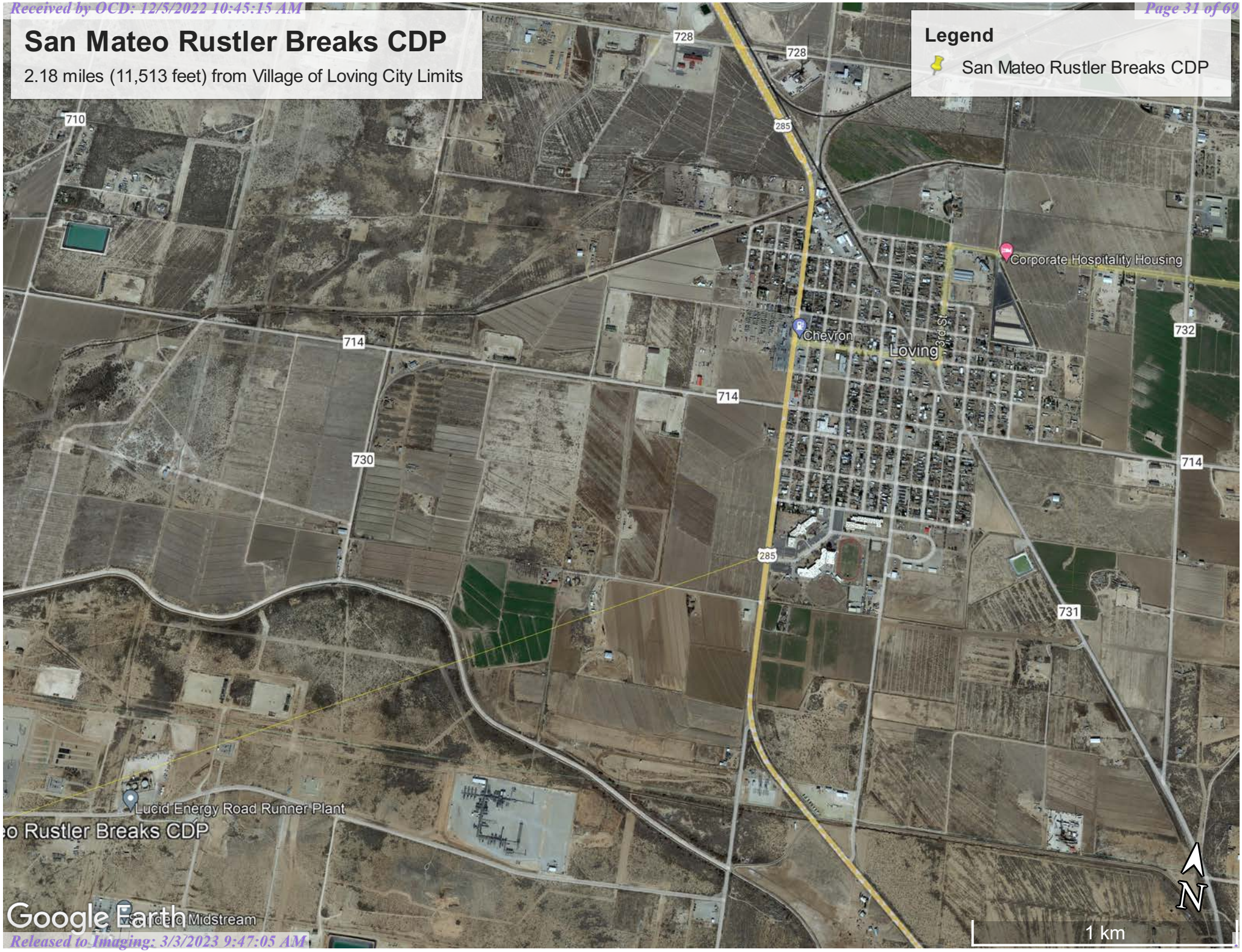
Sorted by: Distance

***UTM location was derived from PLSS - see Help**

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

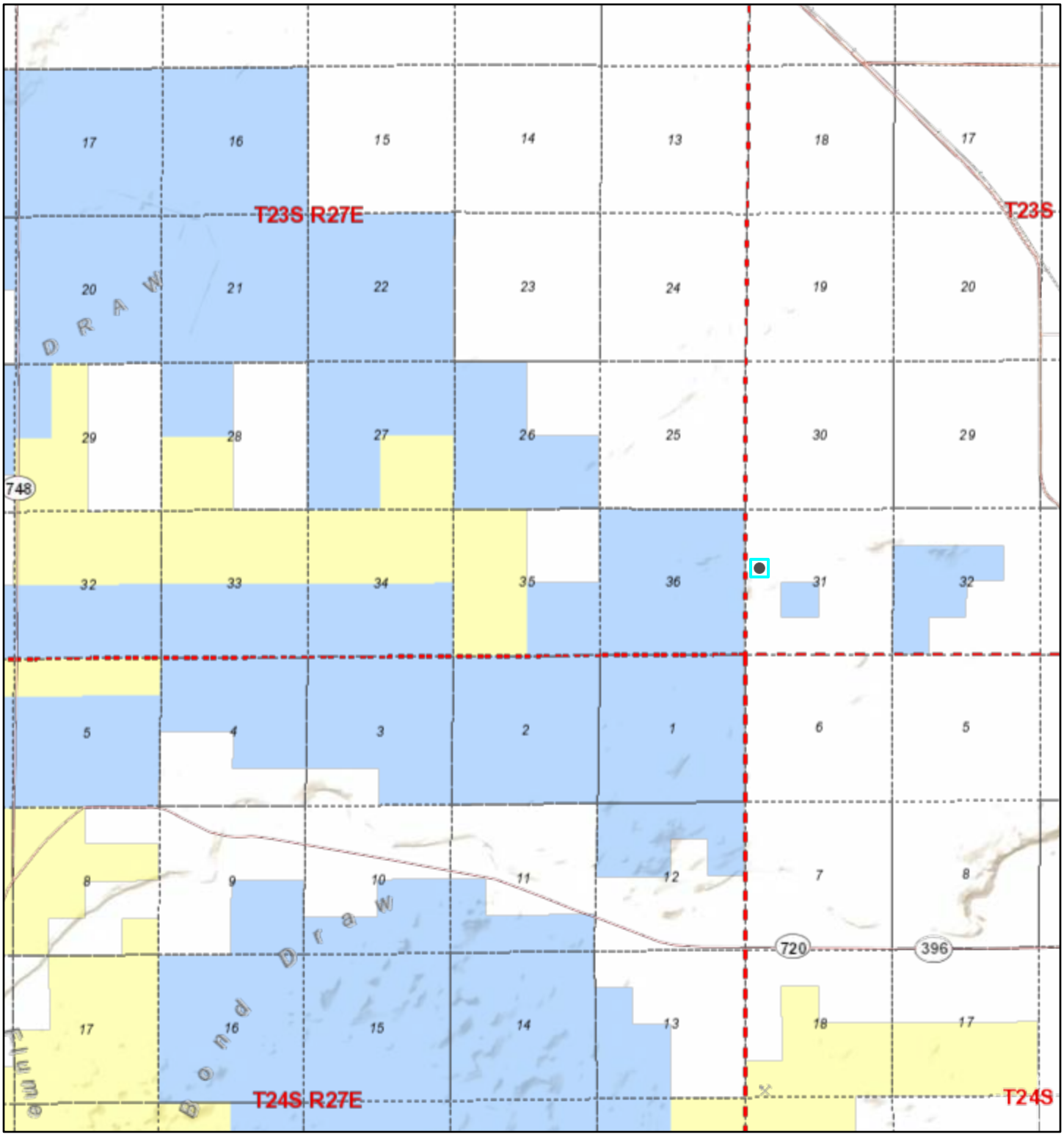
San Mateo Rustler Breaks CDP

2.18 miles (11,513 feet) from Village of Loving City Limits



1:9,028
32.270 | -104.119

Active Mines in New Mexico



10/29/2021, 1:56:29 PM

1:72,224

0 0.5 1 2 mi

0 0.75 1.5 3 km

- Township / Range
- Sections

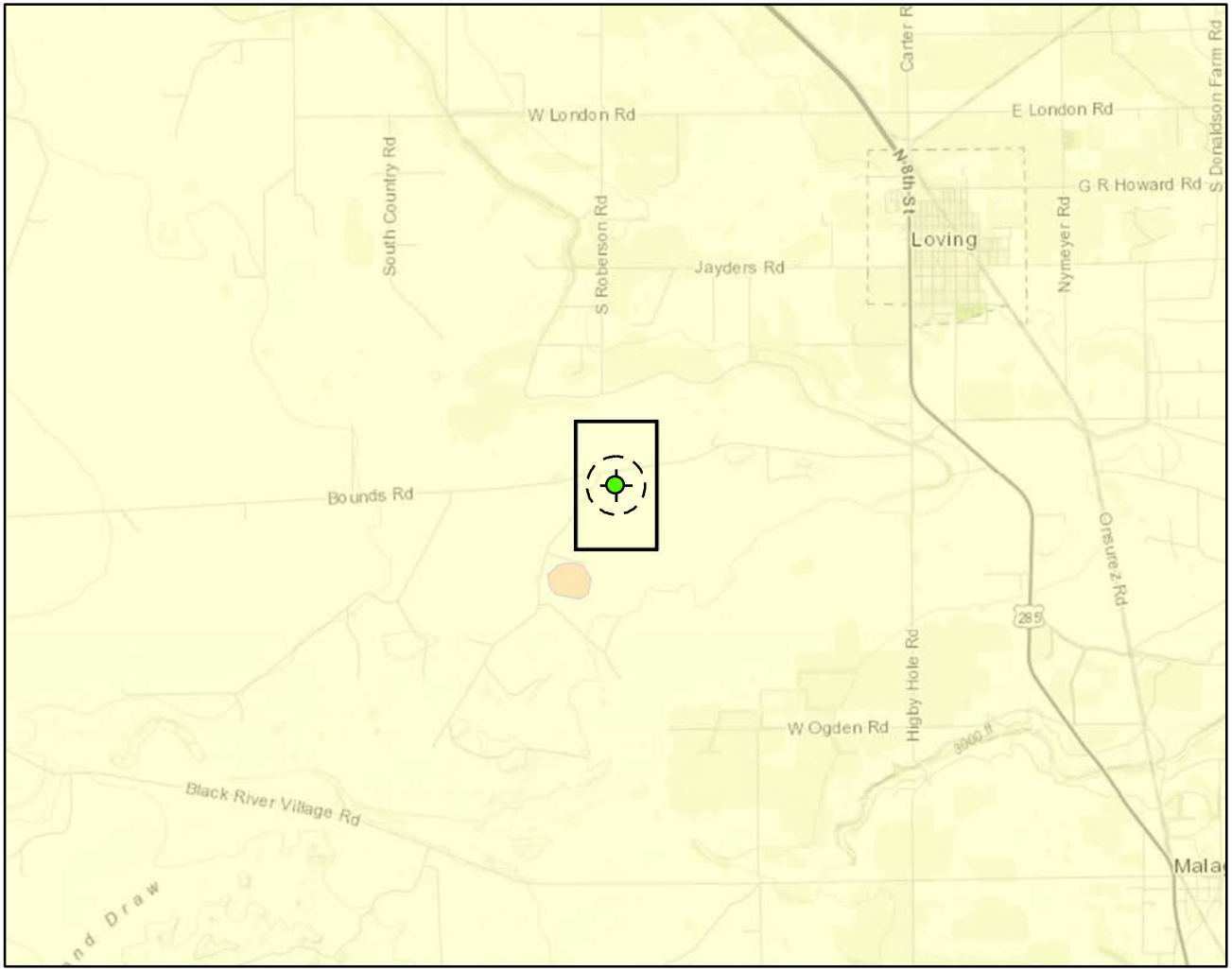
Land Ownership

- Bureau of Land Management
- Bureau of Reclamation
- Department of Agriculture
- Department of Defense
- Department of Energy
- National Park Service
- Private Land
- State Game and Fish
- State Land
- State Parks
- Tribal

U.S. Bureau of Land Management - New Mexico State Office, Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS

EMNRD MMD GIS Coordinator

New Energy, Minerals and Natural Resources Department (http://nm-emnrd.maps.arcgis.com/apps/webappviewer/index.html?id=1b5e577974664d689b47790897ca2795)



Karst Potential

- Critical
- High
- Medium
- Low

Site Location

Site Buffer (1,000 ft.)

Overview Map

0 0.25 0.5 1 mi

Detail Map

0 150 300 600 ft.

VERTEX

Map Center:
Lat/Long: 32.262877, -104.133825

NAD 1983 UTM Zone 13N
Date: Nov 16/21

N

Karst Potential
Rustler Breaks CDP

FIGURE:
X

Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

Note: Inset Map, ESRI 20XX; Overview Map: ESRI World Topographic

VERSATILITY. EXPERTISE.

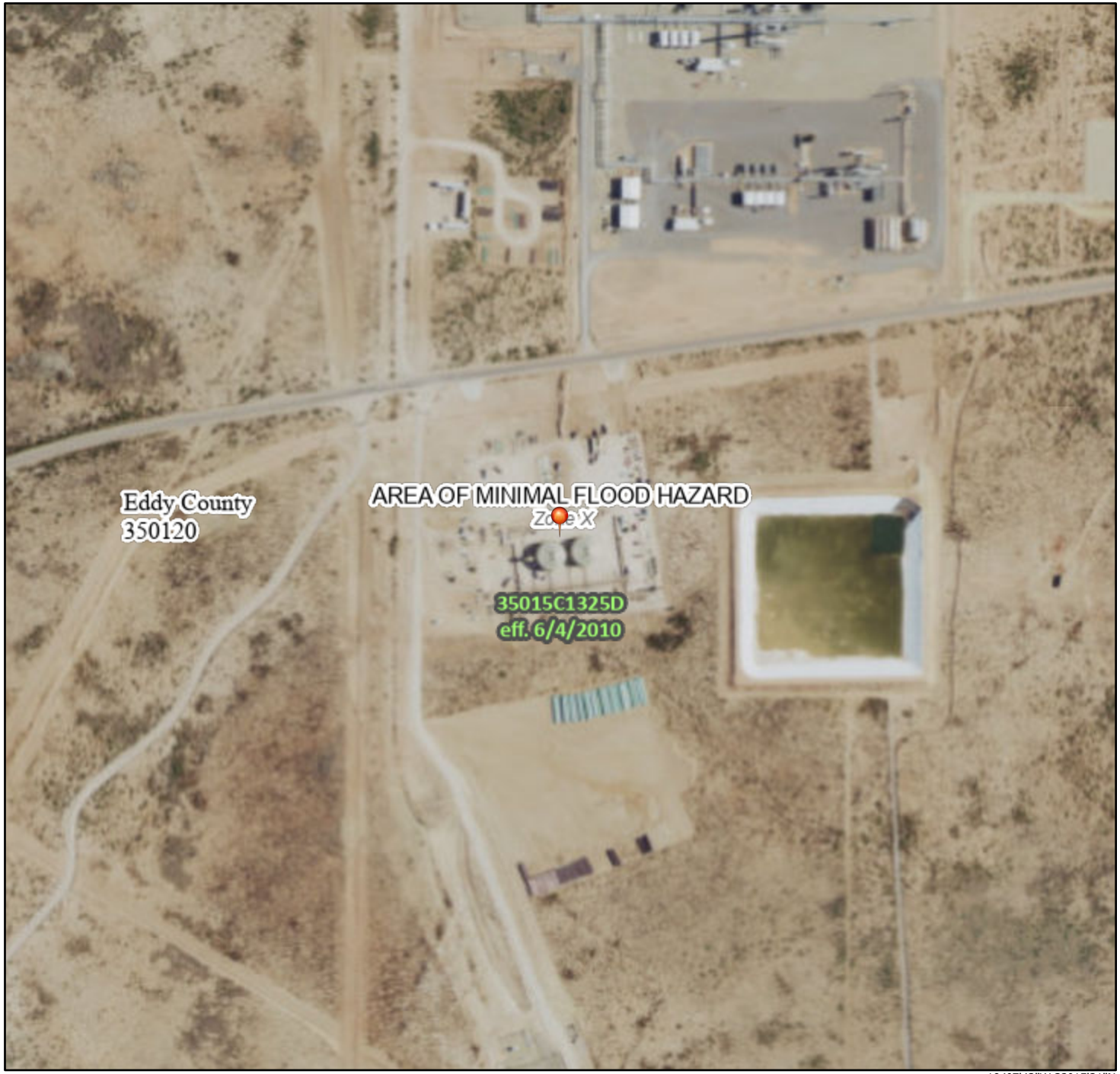
Document Path: G:\1-Projects_US PROJECTS\Matador Resources\21E-03780\01 - Rustler Breaks CDP\Fig X Karst Potential Rustler Breaks CDP.mxd

Received by OCD: 12/5/2022 10:45:15 AM

National Flood Hazard Layer FIRMette

FEMA

104°8'21"W 32°16'2"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

104°7'43"W 32°15'31"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/29/2021 at 4:34 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Released to Imaging: 3/3/2023 9:47:05 AM

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Eddy Area, New Mexico

October 29, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,310 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Eddy Area, New Mexico
Survey Area Data: Version 17, Sep 12, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 27, 2020—Feb 28, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
RG	Reeves-Gypsum land complex, 0 to 3 percent slopes	7.0	100.0%
Totals for Area of Interest		**7.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Eddy Area, New Mexico

RG—Reeves-Gypsum land complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1w5f
Elevation: 1,250 to 5,000 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 57 to 70 degrees F
Frost-free period: 190 to 235 days
Farmland classification: Not prime farmland

Map Unit Composition

Reeves and similar soils: 55 percent
Gypsum land: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Reeves

Setting

Landform: Ridges, plains, hills
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Side slope, crest, nose slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from gypsum

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 32 inches: clay loam
H3 - 32 to 60 inches: gypsiferous material

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 80 percent
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: R042XC007NM - Loamy
Hydric soil rating: No

Description of Gypsum Land

Setting

Landform: Ridges, plains, hills
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Side slope, crest, nose slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from gypsum

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Largo

Percent of map unit: 5 percent
Ecological site: R042XC007NM - Loamy
Hydric soil rating: No

Cottonwood

Percent of map unit: 5 percent
Ecological site: R042XC033NM - Salty Bottomland
Hydric soil rating: No

Reagan

Percent of map unit: 5 percent
Ecological site: R042XC007NM - Loamy
Hydric soil rating: No

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USDA Natural Resources Conservation Service

Ecological site R042XC007NM
Loamy

Accessed: 10/29/2021

General information

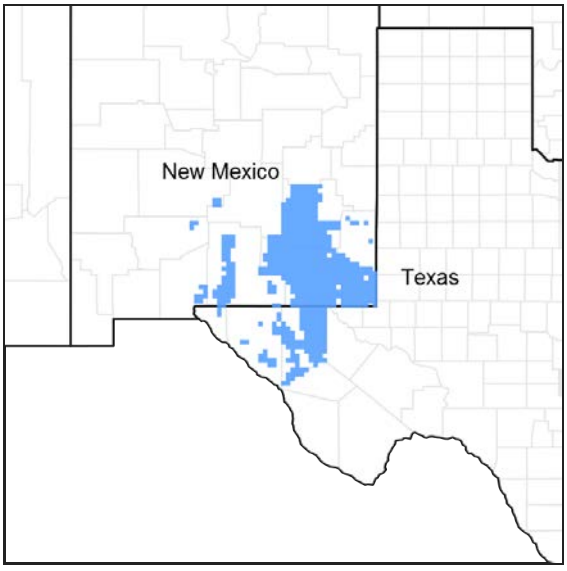


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on uplands landforms, mainly on hill slopes, ridges, plains, terraces and some fan remnants. Slopes range from 1 to 5 percent and average about 3 percent. Average annual precipitation is about 8 to 14 inches. Elevations range from 2,842 to 5,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Plain (2) Terrace (3) Fan piedmont
Flooding frequency	None
Ponding frequency	None
Elevation	2,842–5,000 ft
Slope	0–5%
Aspect	E, S, W

Climatic features

The average annual precipitation ranges from 8 to 13 inches. Variations of 5 inches, more or less, are common. Over 80 percent of the precipitation falls from April through October. Most of the summer precipitation comes in the form of high intensity short duration thunderstorms.
Temperatures are characterized by distinct seasonal changes and large annual and diurnal temperature changes. The average annual temperature is 61 degrees with extremes of 25 degrees below zero in the winter to 112 degrees in the summer.
The average frost-free season is 207 to 220 days. The last killing frost is in late March or early April, and the first killing frost is in late October or early November.
Temperature and rainfall both favor warm season perennial plant growth. In years of abundant spring moisture, annual forbs and cool season grasses can make up an important component of this site. Strong winds blow from the southwest in January through June rapidly drying out the soil during a critical time for cool season plant growth.

Climate data was obtained from http://www.wrcc.sage.dri.edu/summary/climsmnm.html web site using 50% probability for freeze-free and frost-free seasons using 28.5 degrees F and 32.5 degrees F respectively.

Table 3. Representative climatic features

Frost-free period (average)	221 days
Freeze-free period (average)	240 days
Precipitation total (average)	13 in

Influencing water features

This site is not influenced by wetland or streams.

Soil features

The soils of this site are deep to moderately deep. The moderately deep soils have either a petrocalcic, petrogypsic or gypsum horizon between 30 and 40 inches.

Surface textures are loam, silt loam, very fine sandy loam, or clay loam. Substratum textures are loam, silty clay loam, clay loam, or silt loams. Subsoil textures are silt loam , clay loam silty clay loam, gravelly loam, gravelly clay loam or very gravelly loam. Permeability is moderate to slow and the available water holding capacity is high to moderate. The Atoka, Reeves, Russler, Milner soils may have highr amounts of CaC03, ranging as high as 40 percent in the subsoil. Rock fragments range fro 5 to 50 percent in the subsoil. Reeves, Rusler, Milner, Holloman soils will have 40 to 80 percent gypsum in the underlying material.

Maximum and minimum values listed below represent the characteristic soils for this site.

Characteristic Soils:

Atoka (petrocalcic)
Bigetty
Reagan
Reakor
Reeves (gypsum)
Russler (gypsum)
Largo
Russler (gypsum)
Largo
Berino
Tinney
Midessa
Ratliff

Holloman (gypsum)
Milner (gypsum)

Table 4. Representative soil features

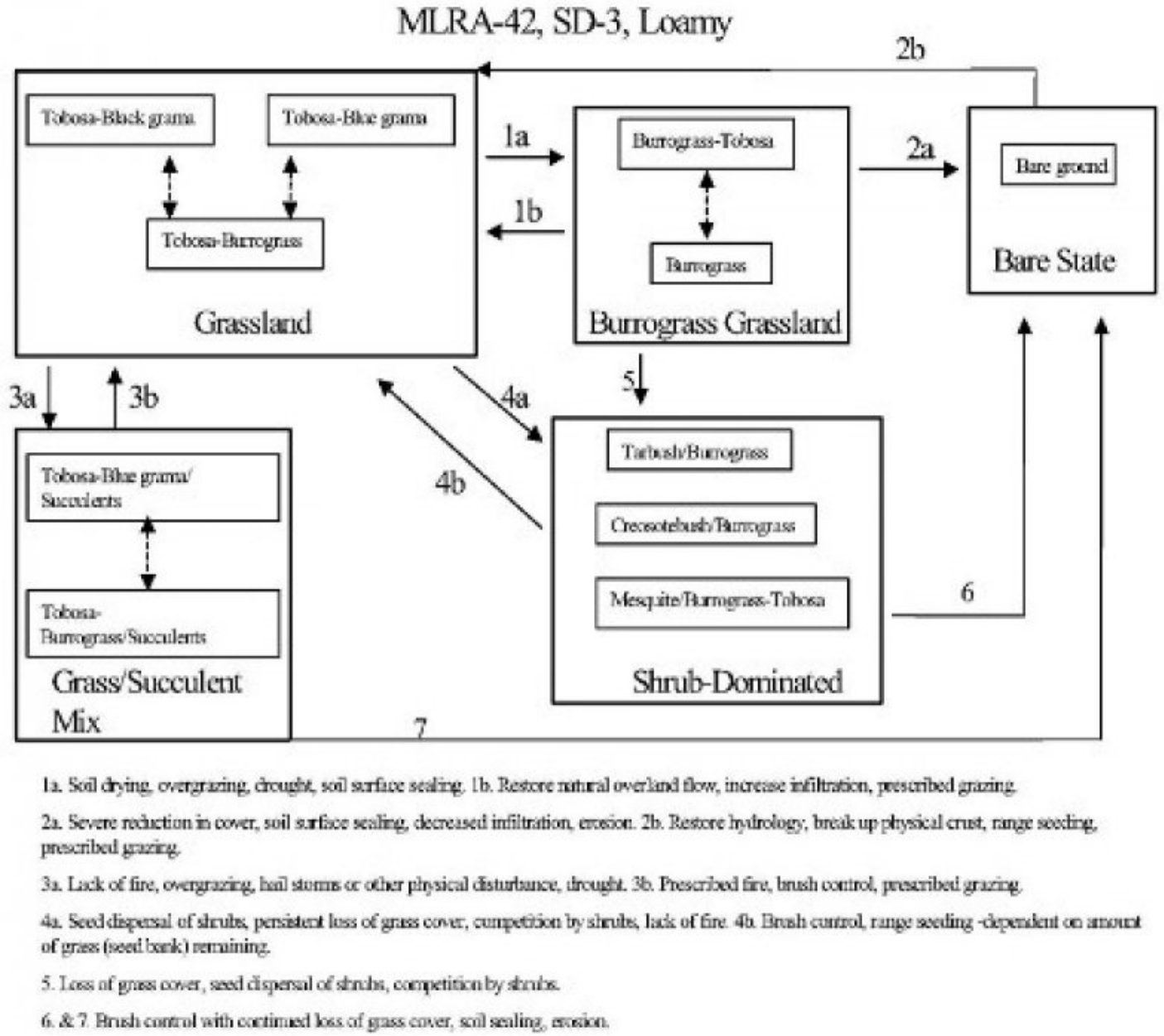
Surface texture	(1) Loam (2) Very fine sandy loam (3) Silt loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to slow
Soil depth	30–72 in
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	5–12 in
Calcium carbonate equivalent (0-40in)	0–10%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–6
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Overview: The Loamy site is associated with the Gyp Upland ecological site with which it intergrades. There is a pronounced increase in alkali sacaton along this interface. The loamy site is also associated with the Gravelly and Shallow ecological sites from which it receives run-on water. The Draw site often dissects Loamy sites and is distinguished from the Loamy site by increased production or greater densities of woody species. The historic plant community has a grassland aspect, dominated by grasses with shrubs and half-shrubs sparse and evenly distributed. Tobosa, black grama and blue grama are the dominant species. Retrogression within this state is characterized by a decrease in black and blue grama and an increase in burrograss. Continuous overgrazing and drought can initiate a transition to a Burrograss- Grassland state. Continued reduction in grass cover and resulting infiltration problems may eventually effect a change to a Bare State, with very little or no remaining grass cover. Alternatively, creosotebush, tarbush or mesquite may expand or invade. Transitions back to a Grassland State from a Bare or Shrub-Dominated state are costly and may not be economically feasible. Decreased fire frequency may play a part in the transition to the Grass/Succulent Mix state with increased amounts of cholla and prickly pear.

State and transition model

Plant Communities and Transitional Pathways (diagram)



1a. Soil drying, overgrazing, drought, soil surface sealing. 1b. Restore natural overland flow, increase infiltration, prescribed grazing.

2a. Severe reduction in cover, soil surface sealing, decreased infiltration, erosion. 2b. Restore hydrology, break up physical crust, range seeding, prescribed grazing.

3a. Lack of fire, overgrazing, hail storms or other physical disturbance, drought. 3b. Prescribed fire, brush control, prescribed grazing.

4a. Seed dispersal of shrubs, persistent loss of grass cover, competition by shrubs, lack of fire. 4b. Brush control, range seeding -dependent on amount of grass (seed bank) remaining.

5. Loss of grass cover, seed dispersal of shrubs, competition by shrubs.

6. & 7. Brush control with continued loss of grass cover, soil sealing, erosion.

Figure 4.

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

State Containing Historic Climax Plant Community
Grassland:

The historic plant community has a grassland aspect, dominated by grasses with shrubs and half-shrubs sparse and evenly distributed. Black grama, blue grama, and tobosa are the dominant grass species. There are a variety of

perennial forbs and their production varies widely by season and year. Globemallow, verbena, groundsels, croton and filaree are forbs commonly found on this site. Fourwing saltbush and winterfat are two of the more palatable shrubs. The Loamy ecological site encompasses a wide variety of soils, with surface textures ranging from sandy loams to clay loams. Soil depths range from shallow to very deep and can include sub surface features such as calcic, petrocalcic, and gypsic horizons. These variations cause differences in plant community composition and dynamics. Black grama is found at highest densities on coarser textured sandy loams, with blue grama preferring finer textured loam and silt loam, and tobosa favoring lower landscape positions and loam to clay loam surface textures. Burrograss may often be the dominant grass species on silty soils, perhaps in part due to the seedlings ability to auger into and establish on physically crusted soils. Gypsum influenced soils typically have greater amounts of tobosa, burrograss, and ephedra. There is greater representation of sideoats and vine mesquite within the tobosa-blue grama community. Retrogression under continuous heavy grazing results in a decrease of black grama, blue grama, sideoats grama, plains bristlegrass, bush muhly, cane bluestem, vine mesquite, winterfat, and fourwing saltbush. Species such as burrograss, threeawns, sand dropseed, sand muhly, and broom snakeweed increase under continuous heavy grazing or prolonged periods of drought. Under continued retrogression burrograss can completely dominate the site. Creosotebush, tarbush, and mesquite, can also dominate. Cholla and prickly pear can increase on areas that are disturbed or overgrazed.

Diagnosis: Tobosa, black grama, and blue grama are the dominant species. Grass cover is uniformly distributed with few large bare areas. Shrubs are sparse and evenly distributed. Slopes range from level to gently sloping and usually display limited evidence of active rills and gully formation if plant cover remains intact. Litter movement associated with overland flow is limited to smaller size class litter and short distances.

Other shrubs include: yucca, mesquite, tarbush, cholla and creosote bush.

Other forbs include: desert holly, scorpionweed, bladderpod, flax, nama, fleabane, Indianwheat, Indian blanket flower, groundcherry, deerstongue, and rayless goldenrod.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	585	833	1080
Forb	39	55	72
Shrub/Vine	26	37	48
Total	**650**	**925**	**1200**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	15-30%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	25-30%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	40-50%

Figure 6. Plant community growth curve (percent production by month).

NM2807, R042XC007NM Loamy HCPC. R042XC007NM Loamy HCPC Warm Season Plant Community..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	10	25	30	15	5	0	0

State 2
Burrograss-Grassland

Community 2.1
Burrograss-Grassland

Burrograss-Grassland: Changes in hydrology resulting in decreased available soil moisture, reduces grass cover and increases bare ground. Burrograss is the dominant grass. Tobosa cover is variable and can range from sizeable areas to small patches occupying only depressions or the lowest and wettest positions within the site. Threeawns, ear muhly, sand muhly, and fluffgrass occur at increased densities compared to the grassland state. Shrub densities may increase especially mesquite, creosotebush or tarbush. Retrogression within this state is characterized by a further decrease in grass cover and increased bare ground. Further deterioration of this site can result in the transition to a bare state or becoming shrub dominated.

Diagnosis: Burrograss is the dominant species. Grass cover is no longer uniformly distributed, instead tending to be patchy with large areas of bare ground present. Physical crusts are present in bare areas reducing infiltration and suppressing seedling establishment by any grass species other than burrograss.

Transition to Burrograss-Grassland (1a): Transitions from grassland to a burrograss-grassland state may occur due to changes in hydrology. Gullies, roads or obstructions that alter natural water flow patterns may cause this transition. Changes in surface hydrology may also occur due to overgrazing or drought. The reduction in grass cover promotes increased soil physical crusts and reduces infiltration. 5

Key indicators of approach to transition:
? Diversion of overland flow resulting in decreased soil moisture.
? Increase in amount of burrograss cover
? Reduction in grass cover and increase in size and frequency of bare patches.
? Formation of physical crusts—indicating reduced infiltration.
? Evidence of litter movement—indicating loss or redistribution of organic matter.

Transition back to Grassland (1b) The natural hydrology of the site must be returned. Culverts, turnouts, or rerouting roads may help re-establish natural overland flow, if roads or trails have altered the hydrology. Erosion control structures or shaping and filling gullies may help regain natural flow patterns and establish vegetation if the flow has been channeled. Breaking up physical crusts by soil disturbance may promote infiltration and seedling emergence. Allow natural revegetation to take place. Prescribed grazing will help ensure proper forage utilization and reduce grass loss due to grazing.

State 3
Bare State

Community 3.1
Bare State

Bare State: Extremely low ground cover, soil degradation and erosion characterize this state. Very little vegetation remains. Burrograss is the dominant grass and cover is extremely patchy. Physical soil crusts are extensive. Erosion and resource depletion increase as site degrades.

Diagnosis: Very little cover remains. Erosion is evident by soil sealing, water flow patterns, pedestals or terracettes. Rills and gullies may be present and active.

Transition to Bare State (2a): Extended drought, continuous heavy grazing, or other disturbance that severely

depletes grass cover can effect this transition. As grass cover decreases, sheet flow and erosion increase, and physical soil crusts form, thereby further reducing infiltration.

Key indicators of approach to transition:
? Continued reduction in grass cover.
? Increased soil surface sealing.
? Increased erosion.
? Reduced aggregate stability in bare areas.

Transition back to Grassland (2b) Restore the hydrology, see (1a). With the extent of grass loss range seeding may be necessary. Utilizing livestock or mechanical means to break up the physical crusts may increase infiltration and aid seedling establishment. Prescribed grazing will help ensure adequate deferment period following seeding, and proper forage utilization once the grass stand is well established. The degree to which this site is capable of recovery depends on the restoration of hydrology, extent of degradation to soil resources, and adequate rainfall necessary to establish grasses.

State 4
Grass/Succulent Mix

Community 4.1
Grass/Succulent Mix

Grass / Succulent Mix: Increased representations of succulents characterize this site. Increased densities of cholla or pricklypear is recognized as a management concern, but their impact on grass production is unclear. Light to medium cholla or prickly pear infestation doesn't seem to greatly reduce grass production, however it limits access to palatable grasses and interferes with livestock movement and handling. Tobosa and blue grama are the dominant species on this site. Retrogression within this site is characterized by a decrease in blue grama and an increase in succulents, tobosa and burrograss.

Diagnosis: Cholla or prickly pear is found at increased densities. Grass cover is variable ranging from uniformly distributed to patchy with frequent areas of bare ground present. Tobosa or blue grama is the dominant grass species.

Transition to Grass/Succulent Mix (3a): If fire was historically a part of desert grassland ecosystem and played a role in suppressing seedlings of shrubs and succulents, then fire suppression may favor the increase of succulents.1 Heavy grazing by livestock or other physical disturbances may help disseminate seed and increase the establishment of succulents. Areas historically overgrazed by sheep are sometimes associated with higher densities of Succulents. Intense hailstorms can spread pricklypear by breaking off joints causing new plants to take root.3 During severe drought perennial grass cover can decline significantly, leaving resources available for use by more drought tolerant succulents. Cholla and pricklypear are both adapted to and favored by drought due to the ability of their shallow, wide spreading root systems to absorb and store water.4

Key indicators of approach to transition:
? Decrease or change in distribution of grass cover.
? Increase in amount of succulent seedlings.
? Increased cover of succulents.

Transition back to Grassland (3b) Fire is an effective means of controlling cholla and prickly pear if adequate grass cover remains to carry fire.2 Cholla greater than two feet tall or pricklypear with a large amount of pads (>15-20) are harder to kill. Chemical control is effective in controlling prickly pear and cholla; apply when growth starts in May. Hand grubbing is also effective if cholla or pricklypear is severed 2-4 inches below ground and care is taken not to let broken joints or pads take root. Stacking and burning piles and grubbing during winter or drought help keeps broken joints and pads from rooting. Prescribed grazing will help ensure proper forage utilization and sustain grass cover.

State 5
Shrub Dominated

Community 5.1
Shrub Dominated

Shrub Dominated: Increased shrub cover characterizes this state. Mesquite, creosotebush, and/or tarbush are the dominant shrub species. Burrograss or tobosa is the dominant grass species. Grass cover is decreased, typically patchy with large bare areas present; however, sometimes grass cover can remain relatively high for extended periods when associated with light to moderate infestations of mesquite. Variations in soil characteristics play a part in determining which shrub species increase. Mesquite is well adapted to a wide range of soil types, but increases more often on deep soils low in carbonates, that have a sandy surface overlying finer textured soils. Tarbush prefers finer textured, calcareous soils, usually in lower positions that receive some extra water. Creosotebush is less tolerant of fine textured soils, preferring sandy, calcareous soils that have some gravel. Creosotebush also does well on soils that are shallow over caliche. Retrogression within this state is characterized by a decrease in tobosa, and an increase in burrograss. As the site continues to degrade shrub cover continues to increase and grass cover is severely reduced.

Diagnosis: Mesquite, Creosotebush, and/or tarbush are the dominant shrubs. Blue grama and black grama cover is low or absent. Burrograss or tobosa are the dominant grasses. Typically grass cover is patchy with large interconnected bare areas present. Physical soil crusts are present, especially on silt loam surface soils.

Transition to Shrub Dominated (4a): Wildlife and livestock consume and disperse mesquite seeds. Flood events may wash creosote or tarbush seeds off adjacent gravelly sites onto the loamy site and supply adequate moisture for germination. Persistent loss of grass cover due to overgrazing or drought can cause large bare patches, providing competition free areas for shrub seedling establishment. As shrub cover increases, competition for soil resources, especially water, becomes a major factor in further reducing grass cover. Reduction of fire, due to either fire suppression policy or loss of adequate fine fuels may increase the probability of shrub encroachment. Increased soil surface physical crusts and associated decreased infiltration, may prevent the establishment of grass seedlings.

Transition to Shrub Dominated (5): The dispersal of creosotebush, tarbush or mesquite seed, combined with loss of grass cover and resource competition by shrubs may cause this transition.

Key indicators of approach to transition:
? Decreased grass and litter cover.
? Increased bare patch size.
? Increased physical soil crusts.
? Increased amount of mesquite, creosotebush, or tarbush seedlings.
? Increased shrub cover.

Transition back to Grassland (4b) Brush control will be necessary to remove shrubs and eliminate competition for resources necessary for grass establishment or reproduction. Seeding may be necessary on those sites where desired grass species are absent or very limited. Pitting and seeding may increase the chances of successful grass establishment. Prescribed grazing will help ensure adequate time is elapsed before grazing seeded area is allowed and proper forage utilization following seeding establishment.

Transition to Bare State (6): If grass cover on the shrub-dominated state is severely limited and shrubs are removed a bare state may result. This transition will depend on amount of grasses or seed remaining, whether site is seeded, or if seeding is successful.

Transition to Bare State (7): Removal of succulents and continued overgrazing or drought may cause loss of remaining grasses and erosion. Soil surface physical crusting may also be an important factor in inhibiting grass seedling establishment

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					

Grass/Grasslike					
1	**Warm Season**			278–324	
	tobosagrass	PLMU3	*Pleuraphis mutica*	278–324	–
2	**Warm Season**			9–46	
	burrograss	SCBR2	*Scleropogon brevifolius*	9–46	–
3	**Warm Season**			231–278	
	black grama	BOER4	*Bouteloua eriopoda*	231–278	–
	blue grama	BOGR2	*Bouteloua gracilis*	231–278	–
4	**Warm Season**			28–46	
	sideoats grama	BOCU	*Bouteloua curtipendula*	28–46	–
5	**Warm Season**			46–93	
	bush muhly	MUPO2	*Muhlenbergia porteri*	46–93	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	46–93	–
6	**Warm Season**			9–28	
	Arizona cottontop	DICA8	*Digitaria californica*	9–28	–
7	**Warm Season**			46–93	
	threeawn	ARIST	*Aristida*	46–93	–
	muhly	MUHLE	*Muhlenbergia*	46–93	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	46–93	–
8	**Warm Season**			28–46	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	28–46	–
Shrub/Vine					
9	**Shrub**			9–28	
	fourwing saltbush	ATCA2	*Atriplex canescens*	9–28	–
	jointfir	EPHED	*Ephedra*	9–28	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	9–28	–
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	5–24	–
	Arizona cottontop	DICA8	*Digitaria californica*	5–24	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	5–24	–
10	**Shrub**			9–28	
	javelina bush	COER5	*Condalia ericoides*	9–28	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	9–28	–
	Grass, annual	2GA	*Grass, annual*	5–15	–
11	**Shrubs**			9–28	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	9–28	–
Forb					
12	**Forb**			9–46	
	threadleaf ragwort	SEFLF	*Senecio flaccidus var. flaccidus*	9–46	–
	globemallow	SPHAE	*Sphaeralcea*	9–46	–
	verbena	VEPO4	*Verbena polystachya*	9–46	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	5–15	–
	pricklypear	OPUNT	*Opuntia*	5–15	–
13	**Forb**			9–28	
	croton	CROTO	*Croton*	9–28	–

	woolly groundsel	PACA15	*Packera cana*	9–28	–
14	**Forb**			9–28	
	Goodding's tansyaster	MAPIG2	*Machaeranthera pinnatifida ssp. gooddingii var. gooddingii*	9–28	–
	woolly paperflower	PSTA	*Psilostrophe tagetina*	9–28	–
15	**Forb**			9–28	
	redstem stork's bill	ERCI6	*Erodium cicutarium*	9–28	–
	Texas stork's bill	ERTE13	*Erodium texanum*	9–28	–
16	**Forb**			9–28	
	Forb (herbaceous, not grass nor grass-like)	2FORB	*Forb (herbaceous, not grass nor grass-like)*	9–28	–

Animal community

This site provides habitats which support a resident animal community that is characterized by pronghorn antelope, black-tailed jackrabbit, black tailed prairie dog, yellow-faced pocket gopher, banner-tailed kangaroo rat, hispid cotton rat, swift fox, burrowing owl, horned lark, mockingbird, meadowlark, mourning dove, scaled quail, Great Plains toad, plains spadefoot toad, prairie rattlesnake and western coachwhip shake.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydraulic cover conditions and hydrologic soil groups.

Hydrologic Interpretations
Soil Series Hydrologic Group
Atoka C
Bigetty B
Ratliff B
Reyab B
Holloman B
Largo B
Holloman B
Bigetty B
Berino B
Reagan B
Reakor B
Reeves B
Russler C

Recreational uses

This site offers limited potential for hiking, horseback riding, nature observation and photography. Game bird, antelope and predator hunting are also limited.

Wood products

This site has no potential for wood products

Other products

This site is suitable for grazing by all kinds and classes of livestock, during all seasons of the year. Under retrogression, such plants as black grama, blue grama, sideoats grama, bush muhly, plains bristlegrass, Arizona cottontop, fourwing saltbush and winterfat decrease and there is an increase in burrograss, threeawns, sand dropseed, muhlys, broom snakeweed and javilinabush. Under continued retrogression, burrograss can completely

dominate the site. Creosotebush, mesquite, and tarbush can also dominate. Grazing management alone will not improve the site in the above situation. This site is well suited to a system of management that rotates the season of use.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index Ac/AUM
100 - 76 3.0 – 4.2
75 – 51 4.1 – 5.5
50 – 26 5.3 – 7.0
25 – 0 7.1 +

Inventory data references

Other References:
Data collection for this site was done in conjunction with the progressive soil surveys within the Southern Desertic Basins, Plains and Mountains, Major Land Resource Areas of New Mexico. This site has been mapped and correlated with soils in the following soil surveys. Eddy County Lea County and Chavez County.

Other references

Literature References:

1. Brooks, M.L., AND D.A. Pyke. 2001. Invasive plants and fire in the deserts of North America. Pages 1–14 in K.E.M. Galley and T.P. Wilson (eds.). Proceedings of the Invasive Species Workshop: the Role of Fire in the Control and Spread of Invasive Species.

2. Bunting, S.C., H.A. Wright, and L.F. Neuenschwander. 1980. Long-term effects of fire on cactus in the Southern Mixed Prairie of Texas. J. Range. Manage. 33: 85-88.

3. Laycock, W.A. 1982. Hail as an ecological factor in the increase of prickly
pear cactus. p. 359-361. In: J.A. Smith and V.W. Hays (eds.) Proc. XIV Int. Grassland Congr. Westview Press, Boulder, Colo.

4. Vallentine, J.F. 1989. Range Developments and Improvements. 3rd Edition. Academic Press. San Diego, California.

5. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheet. Rangeland Soil Quality—Physical and Biological Soil Crusts. Rangeland Sheet 6, [Online]. Available: http://www.statlab.iastate.edu/survey/SQI/range.html

Contributors

David Trujillo
Don Sylvester

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

---

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

---

14. **Average percent litter cover (%) and depth (in):**

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

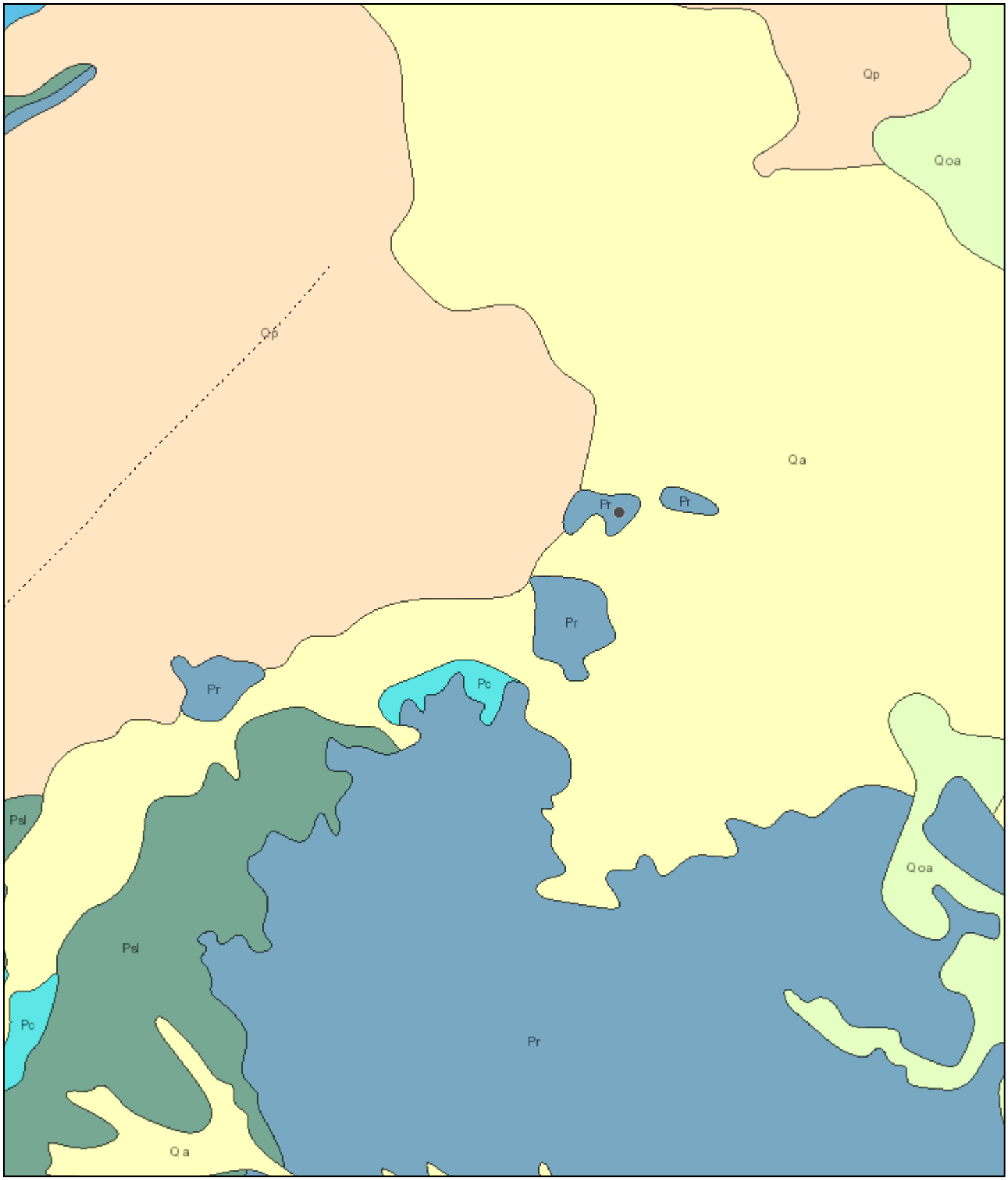
---

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

---

17. **Perennial plant reproductive capability:**

ArcGIS Web Map



10/29/2021, 3:45:39 PM

1:144,448

0 1 2 4 mi

0 1.5 3 6 km

Lithologic Contacts

- Contact, Exposed
- Contact, Gradational
- Nomenclature change
- Map Boundary

Faults

- Fault, Exposed
- Fault, Intermittent
- Fault, Concealed
- Shere Zone

Dikes

- <all other values>
- Dike
- Dike intruding fault
- Volcanic Vents

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S.

ArcGIS Web AppBuilder

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National

ATTACHMENT 4

Monica Peppin

From: Dhugal Hanton <vertexresourcegroupusa@gmail.com>
Sent: Wednesday, January 5, 2022 11:08 AM
To: Monica Peppin
Subject: Fwd: 48 HR Notification and Extension Request nAPP2200536812 Rustler Breaks Oil CDP

---------- Forwarded message ---------
From: **Dhugal Hanton** <vertexresourcegroupusa@gmail.com>
Date: Wed, Jan 5, 2022 at 11:07 AM
Subject: 48 HR Notification and Extension Request nAPP2200536812 Rustler Breaks Oil CDP
To: Enviro, OCD, EMNRD <OCD.Enviro@state.nm.us>, <spills@slo.state.nm.us>
Cc: Arsenio Jones <arsenio.jones@matadorresources.com>, <csnow@matadorresources.com>

All,

Please accept this email as 48-hr notification that Vertex Resource Services has scheduled a liner inspection to be conducted at Rustler Breaks Oil CDP for the following releases:

nAPP2200536812 DOR: 10/8/2021

Vertex Resources would also like to file a 90 day extension to complete the liner inspection and closure report for Rustler Breaks Oil CDP.

This work will be completed on behalf of San Mateo Black River Oil Pipeline, LLC.

On Friday, January 7, 2022 at approximately 11:00 a.m., John Ramirez, will be onsite to conduct a liner inspection. He can be reached at 575-725-1809. If you need directions to the site, please do not hesitate to contact him. If you have any questions or concerns regarding this notification, please give me a call at 575-361-9880.

Thank you,

Monica Peppin
Sr. Environmental Technician

Vertex Resource Services Inc.
3101 Boyd Drive,
Carlsbad, NM 88220

P 575.725.5001 Ext. 711
C 575.361.9880
F

www.vertex.ca

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Gmail

Dhugal Hanton <vertexresourcegroupusa@gmail.com>

48 HR Notification nAPP2200536812 Rustler Breaks Oil CDP Liner Inspection

1 message

Dhugal Hanton <vertexresourcegroupusa@gmail.com> Thu, Feb 17, 2022 at 9:22 AM
To: "Enviro, OCD, EMNRD" <OCD.Enviro@state.nm.us>
Cc: Arsenio Jones <arsenio.jones@matadorresources.com>

All,

Please accept this email as 48-hr notification that Vertex Resource Services has scheduled a liner inspection to be conducted at Rustler Breaks Oil CDP for the following releases:

nAPP2200536812 DOR: 10/8/2021

This work will be completed on behalf of San Mateo Black River Oil Pipeline, LLC.

On Wednesday, February 23, 2022 at approximately 8:00 a.m., Monica Peppin, will be onsite to conduct a liner inspection. She can be reached at 575-361-9880. If you need directions to the site, please do not hesitate to contact her. If you have any questions or concerns regarding this notification, please give me a call at 575-361-9880.

Thank you,

Monica Peppin
Sr. Environmental Technician

Vertex Resource Services Inc.
3101 Boyd Drive,
Carlsbad, NM 88220

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District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 163750

CONDITIONS

Operator: MATADOR PRODUCTION COMPANY One Lincoln Centre Dallas, TX 75240	OGRID: 228937
	Action Number: 163750
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
rhamlet	We have received your closure report and final C-141 for Incident #NAPP2200536812 RUSTLER BREAKS OIL CDP, thank you. This closure is approved.	3/3/2023