



January 23, 2025

(5E33088-BG6)

EMNRD – Oil Conservation Division  
506 W. Texas Ave  
Artesia, NM 88210

SUBJECT: Closure Request Report for the Shetland 11 CTB 1, Incident ID # nAPP2429928425  
Eddy County, New Mexico.

## **1.0 Introduction**

On behalf of Devon Energy Production Company, LP (Devon), Souder, Miller & Associates (SMA) has prepared this Closure Request Report that describes the corrective actions for a produced water incident related to oil and gas production activities at the Shetland 11 CTB 1 (Shetland), Incident ID nAPP2429928425. The incident occurred at N 32.0532694, W -103.7499.

Devon completed a release notification to the New Mexico Energy, Minerals, and Natural Resources Department – Oil Conservation Division (OCD) via Operators Electronic Permitting and Payment Portal on October 25, 2024, for the submission of Notice of Release (NOR), followed by the submission of the Form C-141, Release Notification on October 25, 2024. This letter provides a description of the spill assessment and includes a request for spill closure.

Table 1: Release Information and Closure Criteria			
Name	Shetland 11 CTB 1	Company	Devon Energy Production Company, LP
API Number	fAPP2123649550	Location	D-11-26S-31E 32.0531694, -103.7499
Incident Number	nAPP2429928425	Land Status	Federal (BLM)
Date of Release	October 24, 2024		
Cause of Release	Corrosion on pipe fitting inside containment		
Released Volume	10 bbls	Recovered Volume	10 bbls
NMOCD Closure Criteria	DTGW Determination is <50 feet bgs (below ground surface)		

## **2.0 Background**

On October 24, 2024, a fitting located on the piping inside the secondary containment started leaking due to corrosion. The total volume of released fluids was 10 barrels (bbls) of produced water. The release occurred within the secondary lined containment at Shetland. Initial response activities were conducted by the operator, including source elimination, photographs of standing fluids, recovery of approximately 10 bbls of produced water, and verification that the affected area was properly exposed and cleaned for visual observation. Documentation of the Site Assessment Report with photographs is included in Attachment 1.

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### **3.0 Site Information and Closure Criteria**

The Shetland is located approximately 16.23 miles northeast of Angeles, Texas, on Federal (BLM) land at an elevation of approximately 3,206 feet above mean sea level (amsl). SMA completed a site assessment/characterization pursuant to 19.5.29.11-12 NMAC to determine potential environmental impacts and closure criteria. Site assessment and characterization results are included in Attachments 1 and 2.

The Geologic Map of New Mexico by New Mexico Bureau of Geology and Mineral Resources indicates the surface geology at the incident location area is comprised of primarily Qep –Eolian and piedmont deposits (Holocene to middle Pleistocene) – interlayered eolian sands and piedmont-slope deposits and is characterized as Simona-Bippus complex and Tonuco loamy fine sand. Soil texture is dominantly loamy fine sand to gravelly fine sandy loam and becomes indurated. Ecological settings include vegetation of black grama and dropseeds, tall grasses, giant sacaton, forbs, shinnery oak, sand sage, honey mesquite, and bunch grasses. Creosote, yucca, saltbrush, and ephedra are subdominant.

The surrounding geography and terrain is associated with uplands, plains, dunes, fan piedmonts, terraces, interdunal areas at elevations between 2,842 feet and 4,000 feet above sea level. The annual average rainfall and precipitation ranges between 8 to 13 inches. The soil in the release location area tends to be well to excessively well drained with very high runoff and very low to moderately low available water supply.

There is no surface water located on site or within closure criteria parameters of the site. The nearest significant watercourse, as defined in 19.15.17.7.P NMAC, is an intermittent stream, also called a riverine, located approximately 1.35 miles north of the site, a playa lake or freshwater pond is located 4.24 miles southeast, and a freshwater emergent wetland is located 1.15 miles southeast from Shetland (Google Earth Pro®, 2024). There are no continuous flowing watercourses or significant watercourses, lakebeds, sinkholes, playa lakes, or other critical water or community features as outlined in Paragraph (4) of Subsection C of 19.15.29.11 NMAC.

The nearest active well to the release site is a well identified by the Office of the State Engineers (OSE) used for livestock watering, Pod LWD-01187 located approximately 0.77 miles west of the site and has no known depth recorded. The second nearest OSE pod with recorded well data is a temporary borehole, Pod C-04637-POD1 located 0.87 miles north of the site. The well record indicates the temporary borehole was drilled to a depth of 51 feet below ground surface (bgs) where no groundwater was accumulated or discovered. There are no active wells or temporary boreholes placed within a half mile radius of Shetland. Documentation in reference to site characterization and depth to groundwater is included in Attachment 2.

Karst potential for the area that Shetland is in is in a medium karst and is located 2.88 miles southwest outside of a low karst potential area based off the New Mexico State Land Office Status Interactive Map (NMSLO).

Due to lack of groundwater depth data within ½-mile of the site and the medium karst potential designation, the closure criteria for the site are the constituent concentration limits associated with the less than 50 feet depth to groundwater as stated in Table I of 19.15.29.12 NMAC.

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#### **4.0 Remediation Activities**

Notification of the liner inspection, scheduled for November 8, 2024, was provided to Devon OCD and the Bureau of Land Management (BLM) through email by SMA personnel on November 5, 2024. Devon provided notification to OCD through the ENMRD Electronic Permitting and Payment Portal for Operators on November 5, 2024, with form C-141L, Liner Inspection Notification. Notification documentation is included in Attachment 3.

On Friday, November 8, 2024, SMA personnel performed a visual inspection of the secondary containment to verify liner integrity as outlined in Paragraph (5)(a) of Subsection A of 19.15.29.11 NMAC.

Visual observation of the liner was completed on all sidewalls and base of the containment, around equipment, and all seams of the liner. The inspection included observations for any potential perforations in the liner that could lead to a breach of the secondary containment. These observations concluded no signs of any rips, cuts, tears, or weathering in any conditions that showed signs in need of repairs or replacements. As evidence, photo documentation is included in the Site Assessment Report and Photolog (Attachment 1).

#### **5.0 Conclusions and Recommendations**

As evidenced by the liner inspection and assessment, SMA concludes the liner integrity is adequate to contain the spill related to incident nAPP2429928425, and there is no evidence of release to the environment.

Based on the professional activities and site assessment, Devon respectfully requests closure on the incident nAPP2429928425 that occurred at Shetland 11 CTB 1.

#### **6.0 Scope and Limitations**

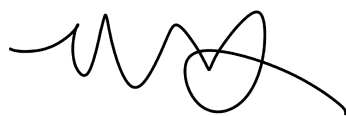
The scope of our services included: visual inspection for liner integrity; regulatory liaison; and preparing this report. All work has been performed in accordance with generally accepted professional environmental consulting practices for oil and gas releases in the Permian Basin in New Mexico.

If there are any questions regarding this report, please contact Monica Peppin at (575) 909-3418 or Stephanie Hinds at (505) 302-1127.

Submitted by:

SOUDER, MILLER & ASSOCIATES

Reviewed by:



Monica Peppin  
Project Manager



Stephanie Hinds, P.E.  
Senior Engineer

Shetland 11 CTB 1 (nAPP2429928425)

Devon Energy

Liner Inspection Closure Report

January 23, 2025

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**REFERENCES:**

New Mexico Office of the State Engineer (NMOSE) online water well database

[Http://gis.ose.state.nm.us/gisapps/ose\\_pod\\_locations/](Http://gis.ose.state.nm.us/gisapps/ose_pod_locations/)

USGS National Water Information System: Web interface online water well database

[https://nwis.waterdata.usgs.gov/nwis/gwlevels?site\\_no=321205103544701&agency\\_cd=USGS&format=html](https://nwis.waterdata.usgs.gov/nwis/gwlevels?site_no=321205103544701&agency_cd=USGS&format=html)

**ATTACHMENTS:**

Attachment 1: Site Assessment Field Report and Photolog

Attachment 2: Closure Criteria Determination Research

Attachment 3: Correspondence



# ATTACHMENT 1: SITE ASSESSMENT FIELD REPORT AND PHOTOLOG

# Site Assessment Report

Client: Devon Energy Corporation

Site Name: Shetland 11 CTB 1

Date/Time: Nov 8, 2024, at 10:41AM

Incident ID: nAPP2429928425



## Field Notes

~ Arrive on site at 10:24 AM and complete safety paperwork, begin inspection of secondary containment

~ Conduct visual inspection of secondary containment and collect photos of liner in a 360-degree view for proof of liner integrity

~ Inspected for any visible perforations, cuts, rips, tears, or substantial weathering that could lead to the potential breach through the liner

~ Inspection concluded that there are no signs of permeation through the liner and the barrier between the secondary containment and ground surface is isolated to withhold fluids.

~ Standing water inside containment is from a recent rain event. No issues in observations due to the rain water inside the containment and will be able to complete inspection.

## Site Photographs



Photograph #1: Lease sign



Photograph #2: Facing northeast to view northwest corner around equipment



Photograph #3: Facing northwest showing east side of containment





Photograph #4: Facing north from south side of containment showing west wall

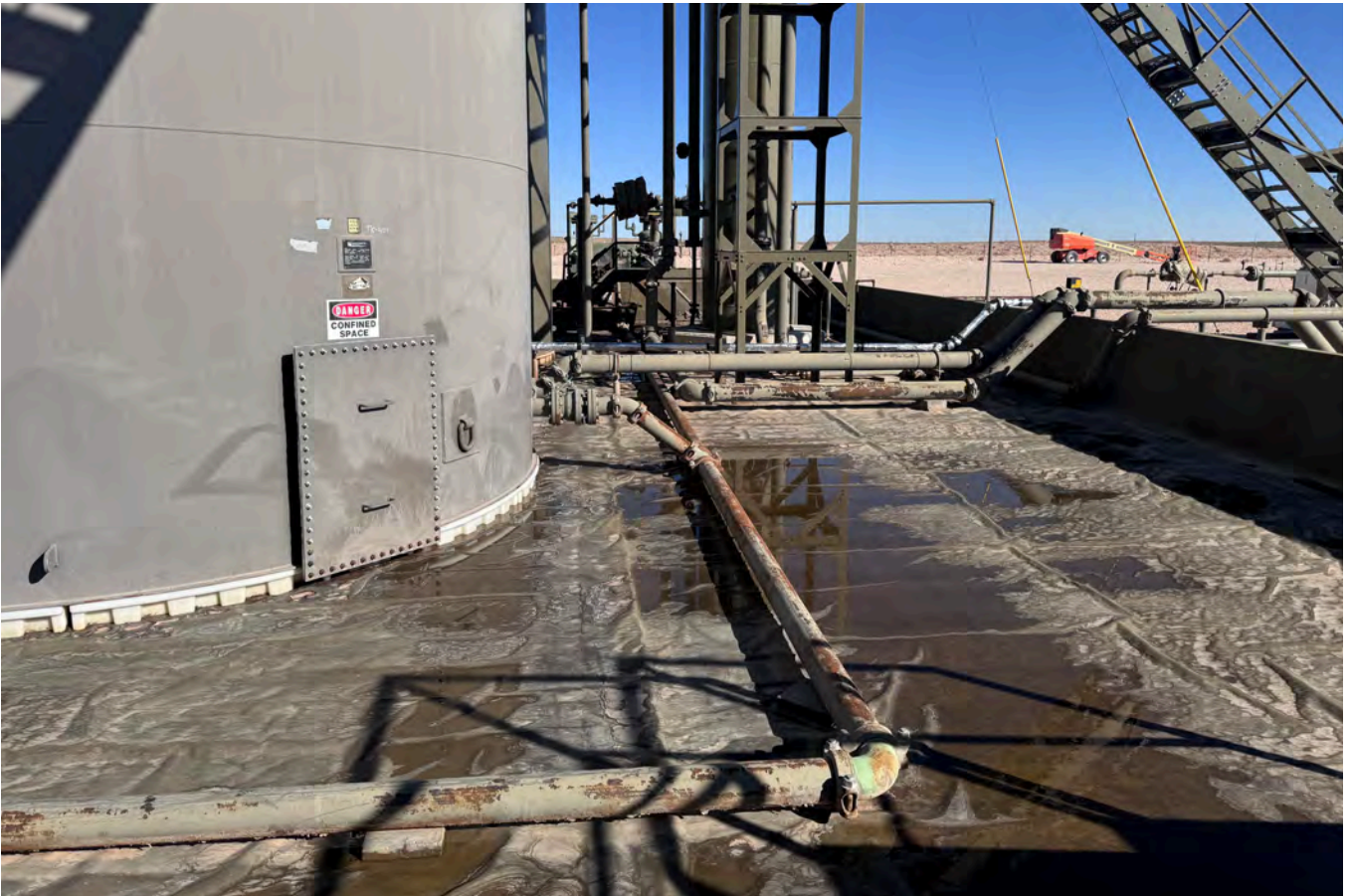


Photograph #5: Facing west from east side of containment to show between tanks





Photograph #6: Facing west showing south area of containment



Photograph #7: Facing east from west side of containment





Photograph #8: South end of containment facing north



Photograph #9: Facing northwest between tanks on east side





Photograph #10: Facing north to get visual of liner between tanks



Photograph #11: Facing north showing liner between tanks





Photograph #12: Facing north showing east side of containment



Photograph #13: Facing southeast from northwest corner





Photograph #14: Facing northeast showing southwest corner of containment

Technician: Monica Peppin

Date: 11/8/2024

Signature:  \_\_\_\_\_



# ATTACHMENT 2: CLOSURE CRITERIA DETERMINATION RESEARCH



## Shetland 11 CTB 1

Approx Square Footage of Containment: 6,525 square feet  
POR Coordinates: 32.0531694, -103.7499

### Legend

-  Containment Area
-  Shetland 11 CTB 1



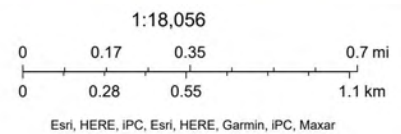


# Shetland 11 CTB 1



11/28/2024, 11:48:49 PM

- |                 |                          |                              |
|-----------------|--------------------------|------------------------------|
| — Override 1    | ● Plugged                | New Mexico State Trust Lands |
| GIS WATERS PODs | ●                        | Subsurface Estate            |
| ● Active        | □ OSE District Boundary  | Both Estates                 |
| ● Pending       | Water Right Regulations  | NHD Flowlines                |
|                 | □ Artesian Planning Area | Stream River                 |



Online web user  
This is an unofficial map from the OSE's online application.

File No. C-04637

## NEW MEXICO OFFICE OF THE STATE ENGINEER



## WR-07 APPLICATION FOR PERMIT TO DRILL

## A WELL WITH NO WATER RIGHT

(check applicable box):

For fees, see State Engineer website: <http://www.ose.state.nm.us/>

Purpose:	<input type="checkbox"/> Pollution Control And/Or Recovery	<input type="checkbox"/> Ground Source Heat Pump
<input type="checkbox"/> Exploratory Well (Pump test)	<input type="checkbox"/> Construction Site/Public Works Dewatering	<input checked="" type="checkbox"/> Other(Describe): Groundwater Determination
<input type="checkbox"/> Monitoring Well	<input type="checkbox"/> Mine Dewatering	

A separate permit will be required to apply water to beneficial use regardless if use is consumptive or nonconsumptive.

<input type="checkbox"/> Temporary Request - Requested Start Date:	Requested End Date:
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Plugging Plan of Operations Submitted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
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## 1. APPLICANT(S)

Name: Devon Energy	Name:
Contact or Agent: Dale Woodall check here if Agent <input type="checkbox"/>	Contact or Agent: check here if Agent <input type="checkbox"/>
Mailing Address: 6488 7 Rivers Hwy	Mailing Address:
City: Artesia	City:
State: NM Zip Code: 88210	State: Zip Code:
Phone: 575-748-1838 <input type="checkbox"/> Home <input checked="" type="checkbox"/> Cell	Phone: <input type="checkbox"/> Home <input type="checkbox"/> Cell
Phone (Work):	Phone (Work):
E-mail (optional): Dale.Woodall@dvn.com	E-mail (optional):

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FOR OSE INTERNAL USE

Application for Permit, Form WR-07, Rev 11/17/16

File No.: C-04637	Tm. No.: 726494	Receipt No.: 2-44561
Trans Description (optional): 2 265 312 4-4-3		
Sub-Basin: C	PCW/LOG Due Date: 5/24/23	

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**2. WELL(S)** Describe the well(s) applicable to this application.

<b>Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).</b> <b>District II (Roswell) and District VII (Cimarron) customers, provide a PLSS location in addition to above.</b>			
<input type="checkbox"/> NM State Plane (NAD83) (Feet) <input type="checkbox"/> NM West Zone <input type="checkbox"/> NM East Zone <input type="checkbox"/> NM Central Zone		<input type="checkbox"/> UTM (NAD83) (Meters) <input type="checkbox"/> Zone 12N <input type="checkbox"/> Zone 13N	
<input checked="" type="checkbox"/> Lat/Long (WGS84) (to the nearest 1/10 <sup>th</sup> of second)			
<b>Well Number (if known):</b>	<b>X or Easting or Longitude:</b>	<b>Y or Northing or Latitude:</b>	<b>Provide if known:</b> -Public Land Survey System (PLSS) (Quarters or Halves, Section, Township, Range) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
C-04637-POD1(FW-1)	-103°44'57"	32°3'57.21"	SE SE SW Sec.2 T26S R31E NMPM
<b>NOTE: If more well locations need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)</b> <b>Additional well descriptions are attached:</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <b>If yes, how many</b> _____			
Other description relating well to common landmarks, streets, or other:			
Site ID:25			
Location Name:Snapping 2 State 013H			
Well is on land owned by: State of New Mexico			
<b>Well Information: NOTE: If more than one (1) well needs to be described, provide attachment. Attached?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, how many _____			
Approximate depth of well (feet): 55		Outside diameter of well casing (inches): 2.375 or 1.315	
Driller Name: Jackie D. Atkins		Driller License Number: 1249	

**3. ADDITIONAL STATEMENTS OR EXPLANATIONS**

A Soil Boring to determine depth up to 55 feet. Temporary PVC well material will be placed to total depth and secured at surface. Temporary well will be in place for minimum of 72 hours. If ground water is encountered the boring will be plugged immediately using augers as tremie to land a slurry of Portland TYPE I/II Neat cement less than 6.0 gallons of water per 94 lb. sack. If no water is encountered then drill cuttings will be used to (10) ten feet of land surface and plugged using hydrated bentonite.

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Application for Permit, Form WR-07

File No.: C-04637

Trm No.: 72094

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**4. SPECIFIC REQUIREMENTS:** The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application:

<b>Exploratory:</b> <input type="checkbox"/> Include a description of any proposed pump test, if applicable.	<b>Pollution Control and/or Recovery:</b> <input type="checkbox"/> Include a plan for pollution control/recovery, that includes the following: <input type="checkbox"/> A description of the need for the pollution control or recovery operation. <input type="checkbox"/> The estimated maximum period of time for completion of the operation. <input type="checkbox"/> The annual diversion amount. <input type="checkbox"/> The annual consumptive use amount. <input type="checkbox"/> The maximum amount of water to be diverted and injected for the duration of the operation. <input type="checkbox"/> The method and place of discharge.	<b>Construction De-Watering:</b> <input type="checkbox"/> Include a description of the proposed dewatering operation, <input type="checkbox"/> The estimated duration of the operation, <input type="checkbox"/> The maximum amount of water to be diverted, <input type="checkbox"/> A description of the need for the dewatering operation, and, <input type="checkbox"/> A description of how the diverted water will be disposed of.	<b>Mine De-Watering:</b> <input type="checkbox"/> Include a plan for pollution control/recovery, that includes the following: <input type="checkbox"/> A description of the need for mine dewatering. <input type="checkbox"/> The estimated maximum period of time for completion of the operation. <input type="checkbox"/> The source(s) of the water to be diverted. <input type="checkbox"/> The geohydrologic characteristics of the aquifer(s). <input type="checkbox"/> The maximum amount of water to be diverted per annum. <input type="checkbox"/> The maximum amount of water to be diverted for the duration of the operation. <input type="checkbox"/> The quality of the water.
<b>Monitoring:</b> <input type="checkbox"/> Include the reason for the monitoring well, and, <input type="checkbox"/> The duration of the planned monitoring.	<input type="checkbox"/> The method of measurement of water produced and discharged. <input type="checkbox"/> The source of water to be injected. <input type="checkbox"/> The method of measurement of water injected. <input type="checkbox"/> The characteristics of the aquifer. <input type="checkbox"/> The method of determining the resulting annual consumptive use of water and depletion from any related stream system. <input type="checkbox"/> Proof of any permit required from the New Mexico Environment Department. <input type="checkbox"/> An access agreement if the applicant is not the owner of the land on which the pollution plume control or recovery well is to be located.	<b>Ground Source Heat Pump:</b> <input type="checkbox"/> Include a description of the geothermal heat exchange project, <input type="checkbox"/> The number of boreholes for the completed project and required depths. <input type="checkbox"/> The time frame for constructing the geothermal heat exchange project, and, <input type="checkbox"/> The duration of the project. <input type="checkbox"/> Preliminary surveys, design data, and additional information shall be included to provide all essential facts relating to the request.	<input type="checkbox"/> The method of measurement of water diverted. <input type="checkbox"/> The recharge of water to the aquifer. <input type="checkbox"/> Description of the estimated area of hydrologic effect of the project. <input type="checkbox"/> The method and place of discharge. <input type="checkbox"/> An estimation of the effects on surface water rights and underground water rights from the mine dewatering project. <input type="checkbox"/> A description of the methods employed to estimate effects on surface water rights and underground water rights. <input type="checkbox"/> Information on existing wells, rivers, springs, and wetlands within the area of hydrologic effect.

#### ACKNOWLEDGEMENT

I, We (name of applicant(s)), Dale Woodall (Devon Energy)

Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Dale Woodall

Dale Woodall (Apr 25, 2022 11:13 MDT)

Applicant Signature

Applicant Signature

#### ACTION OF THE STATE ENGINEER

This application is:

☒ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

Witness my hand and seal this 26 day of May, 20 22, for the State Engineer,

Mike Hamman, P.E. State Engineer

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By: K. Parekh  
Signature

Kashyap Parekh  
Print

Title: Water Resource Manager I  
Print

FOR OSE INTERNAL USE

Application for Permit, Form WR-07

File No.:

C-04637

Trn No.:

726494

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Jesse Baker



STATE OF NEW MEXICO            )  
   : ss  
 COUNTIES OF LEA & EDDY        )

**SURFACE USE AGREEMENT**

This Agreement made effective this 19 day of February 2013 by and between Jesse T. Baker and/or Susan Baker, Co-Owners, dba Baker Ranch, P.O. Box 24, Silver City, New Mexico 88062 (hereinafter referred to as "Owner") and Devon Energy Production Company, L.P., whose address is 333 W. Sheridan, Oklahoma City, Oklahoma 73102 (hereinafter referred to as "Operator"), witnesseth:

Whereas, Owner owns the surface estate of various lands identified on the attached Exhibit "A" as "fee" lands and is also the grazing lessee under Agricultural Lease(s) issued by the New Mexico Commissioner of Public Lands for various state owned surface identified as "state" lands, all in Lea and Eddy County, New Mexico, sometimes hereafter collectively referred to as "Owner's Lands". This agreement does not cover federal surface, whether or not identified. Except in situations where there is damage to Owner's private property, Operator shall NOT pay any sums under this Agreement for lands where Owner has contractual rights to use certain lands owned by the United States of America unless the rules and/or regulations of the United States of America respectively provide otherwise.

Whereas, Owner actively conducts, upon its ranch properties including the Owner's Lands, the business of ranching, livestock raising and other agricultural related activities, including, but not limited to, practices for conservation of the land, habitat improvement and wildlife preservation;

Whereas, Operator is the leaseholder of certain oil and gas leases on portions of the Owner's Lands or lands adjacent thereto and in connection therewith Operator intends to cause the drilling of oil and gas wells on the Owner's Lands or lands adjacent thereto;

Whereas, subject to applicable statutes, rules, regulations, laws and the terms and provisions of this Agreement set forth below, Owner hereby acknowledges Operator has the right to enter upon and to use only so much of Owner's Lands as is reasonably necessary for the purpose of exploring for, capturing, producing and selling oil and gas underlying Owner's Lands or lands adjacent thereto; and

Whereas, the purpose of this Agreement is to set forth the agreed compensation to Owner from Operator in connection with the use of and damages to the Owner's Lands. Further the purpose of this Agreement is to assign responsibilities and obligations as between the Owner and Operator in regard to all activities associated with the locating, constructing, drilling, completing, re-working, re-completing, operating and producing Operator's wells on the Owner's Lands or lands adjacent thereto.

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NOW, THEREFORE, FOR AND IN CONSIDERATION OF THE TERMS, PROVISIONS AND CONDITIONS HEREINAFTER SET FORTH IT IS MUTUALLY AGREED THAT UPON COMMENCEMENT OF OPERATIONS FOR EACH OF THE FOLLOWING, OPERATOR SHALL PAY OWNER AS FOLLOWS:

(1) COMPENSATION FOR USE OF AND DAMAGES TO FEE LANDS:

A. [REDACTED]

B. Electric Lines: [REDACTED]

C. Pipelines: [REDACTED]

D. Roads: [REDACTED]

[REDACTED]

(2) COMPENSATION FOR USE OF AND DAMAGES TO STATE LANDS:

- A. Well Location: Operator shall pay to Owner the [REDACTED] for the drill site location, not to exceed a drilling location pad size of [REDACTED], which shall represent surface damages for the reasonable use of the surface, including the drill site and reserve pit. Operator also agrees to pay Owner the one-time payment of [REDACTED] for each successive well placed on the same drilling location. [REDACTED]

[REDACTED]

- B. Electric Lines: Operator shall pay to Owner [REDACTED] overhead electric lines.

- C. Pipelines: Operator shall pay to Owner [REDACTED]

- D. Roads: Operator shall pay to Owner [REDACTED]

- (3) [REDACTED]

- (4) [REDACTED]

- [REDACTED]
- (5) [REDACTED]
- (6) [REDACTED]
- (7) Operator shall keep all of its production equipment located on Owner's Lands painted in accordance with the Bureau of Land Management and state rules and regulations.
- (8) For so long as caliche and/or topsoil is available in sufficient quality and quantity to support Operator's operations on Owner's Lands as contemplated by this Agreement. Operator agrees to purchase caliche and/or topsoil from Owner's existing caliche and/or topsoil pit(s), for [REDACTED]
- (9) If requested by Owner, Operator shall fence off the entire well location, including drill site pad, reserve pit, and, if applicable, tank batteries and pumping unit, so as to prevent any livestock from coming on the drill site location at any time. If livestock enter upon the drill site location and become "oiled" or otherwise injured due to Operator's negligence in fencing off the location, Operator shall be liable to Owner for such damages.
- (10) If one of Owner's bovine animals is hit by a vehicle owned or operated on behalf of Operator or its invitee, and such animal is killed, injured to the extent it has to be destroyed or injured to the extent it is no longer acceptable in a ranching operation, Operator shall pay Owner [REDACTED] if such animal is a bull, [REDACTED] if such animal is a cow, and [REDACTED] or if proof of value can be established by credible documentation then that value shall be paid.

- (11) Operator shall not conduct drilling activity with ½ mile of ranch headquarters [REDACTED]  
[REDACTED]  
[REDACTED]
- (12) Operator or its invitees shall permit no dumping of trash, debris, litter or liquids of any sort on the Owner's Lands. Operator shall maintain metal trash containers at all work sites.
- (13) Operator shall stockpile, adjacent to the location, the topsoil taken during the building of the drill site location. If the well is a producer, Operator shall redistribute the topsoil over the reserve pit area and restore the surface as near as practical to its condition prior to drilling operations. If the well is a dry hole, Operator shall pick up the caliche pad, redistribute the topsoil over the drill site location and restore the surface as near as practical to its condition prior to drilling operations.

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

Operator will cooperate with Owner as to the type and quantity of seed to be planted and the time of year and technique of planting grass seed until a native stand of grass has been established.

Operator agrees that it will not bring topsoil and/or caliche into the Owner's Lands from a source outside of the boundaries of the Owner's Lands unless the needed supply cannot be provided by the Owner as found in Section 8 above.

- (14) Upon cessation of production, or if the well is non-commercial, Operator shall within six (6) months, remove all equipment, all production lines and all other items of equipment used directly or indirectly by Operator as it pertains to the well drilled, and restore the site as near as practical to its original condition.

- (15) [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

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- (16) To the fullest extent permitted by applicable law, Operator, its successors and assigns, hereby agree to relieve, release, indemnify, and hold harmless and agree to defend Owner, its managers, members, successors, assigns, employees, agents, invitees, and licensees from any and all claim of damage to any person or property arising out of Operator's use of the Owner's Lands. Operator agrees specifically to comply with all lawful and applicable federal, state, tribal, and local environmental regulations in effect upon the Owner's Lands.
- (17) The parties agree, with respect to any other matters, damages or uses which are not provided for herein, that they will diligently and in good faith negotiate same on an issue by issue basis.
- (18) **Notice of Proposed Operations**

Except for routine maintenance or production operations, Operator shall give Owner ten (10) calendar days' notice prior to entry upon the Owner's Lands. Owner will be contacted by telephone or e-mail prior to entry upon the Owner's Lands for construction of well sites, pipelines, roads, etc. Operator's contact information is as follows:

Baker Ranch  
Name: Jesse T. Baker and/or Susan Baker, Co-Owners  
Telephone No.: 575-538-1523 cell  
E-mail: jskearc@hotmail.com

Operator's contact information for notice by Owner to it is as follows:

Devon Energy Production Company, LP  
Name: Richard Torres, Field Landman  
Telephone No.: 575-746-5542 office  
575-513-9431 cell  
E-mail: [richard.torres@devon.com](mailto:richard.torres@devon.com)

Operator shall consult with Owner as to the location of the drill sites, roads and other facilities, so as to cause the least interference with Owner's operations. The notice and consultation requirement provided herein is the result of the negotiations between the parties regarding both notice to the Owner and consultation with the Owner regarding Operator's plan of work and operations and other development plans and activities, and is in lieu of any other notice requirements and requirements to provide development related plans, including those set forth in the New Mexico Owners Protection Act, 2007 New Mexico Laws, Chapter 5 (HB827). By execution of this Agreement Owner hereby agrees the Operator is in full compliance with the New Mexico Owners Protection Act, 2007 New Mexico Laws, Chapter 5 (HB827) and the provisions contained herein are substituted therefore in all respects.

The parties hereto agree that this Agreement shall not be placed of record without the written consent of both parties. A memorandum of this Agreement may be recorded.

This Agreement shall remain in force and effect for a period of ten (10) years from the date hereof. At the end of the ten (10) year period all parties agree to work in good faith toward the re-negotiation of a new agreement if necessary.

[illegible]

If it is alleged that the provisions of this Agreement are violated or breached by either party, any dispute shall be first submitted to mediation before any party files a lawsuit or seeks intervention of a regulatory agency to force a cessation of all or part of Operator's activities. The prevailing party in any lawsuit related to or arising out of this Agreement shall recover its reasonable costs of litigation, including attorneys' fees. In the event of a default by Operator in the payment of any sums due hereunder, Owner shall notify Operator, in writing, of such default and Operator shall have thirty (30) days in which to make payment. Operator may make payment and reserve objection to the necessity of making such payment. In the event of a default by Operator regarding any other terms and conditions of this Agreement, Owner shall notify Operator, in writing, of such claimed default and Operator shall have sixty (60) days within which to cure the default, or, if the default cannot be cured within sixty (60) days, to begin diligent and good faith action to cure the default and carry the corrective action to completion.

This Agreement may be signed on any number of counterparts with the same effect as if signatures hereto and thereto were on the same instrument. Such executed counterparts considered together shall constitute the Agreement.

All express and implied covenants of this Agreement shall be subject to all federal, state, county or municipal laws, executive orders, rules and regulations, and Operator's

obligations and covenants hereunder, whether express or implied, shall be suspended at the time or from time to time as compliance with such obligations and covenants is prevented or hindered or is in conflict with federal, state, county or municipal laws, rules, regulations or executive orders asserted as official by or under public authority claiming jurisdiction, or Act of God, adverse field or weather conditions, inability to obtain materials in the open market or transportation thereof, wars, strikes, lockouts, riots or other conditions or circumstances not wholly controlled by Operator; and, this Agreement shall not be terminated in whole or in part, nor shall Operator be held liable for damages for failure to comply with any such obligations or covenants, if, after good faith effort made by Operator fails to remove such cause and compliance therewith is prevented or hindered by or is in conflict with any of the foregoing eventualities, provided Operator's compliance with such obligations and covenants is resumed within a reasonable time after removal of such cause.

(24) Successors and Assigns

THIS AGREEMENT shall be binding on Operator's successors, assigns and agents and it shall be binding on Owner's heirs, agents, successors, representatives, administrators and assigns. Operator agrees to provide copies of this Surface Use Agreement to its agents and independent contractors who will enter upon the Land and shall require that the agents and independent contractors comply with the terms and conditions set forth therein. The covenants hereunder shall be performable in Lea County, New Mexico.

OWNER: **Jesse T. Baker and/or Susan Baker, dba Baker Ranch**

SIGNED this 19 day of Feb, 2013

By: Jesse T. Baker  
Jesse T. Baker, Co-Owner

By: Susan Baker  
Susan Baker, Co-Owner

OPERATOR: **Devon Energy Production Company, L.P.**

SIGNED this 13<sup>th</sup> day of March, 2013

By: Bill A. Penhall  
Bill A. Penhall, Agent and Attorney-in-Fact

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RT, SW



STATE OF NEW MEXICO )

COUNTY OF Grant )

Before me, a notary public in and for said County and State, on this 19<sup>th</sup> day of Feb, 2013, personally appeared **Jesse T. Baker, Co-Owner, dba Baker Ranch** to me known to be the identical person who executed the foregoing instrument and acknowledged to me that he executed same as his free and voluntary act for the uses and purposes therein set forth.

My Commission Expires: 10/20/16

Notary Public



OFFICIAL SEAL  
AARON PENA  
NOTARY PUBLIC-STATE OF NEW MEXICO  
My commission expires 10/20/16

STATE OF NEW MEXICO )

COUNTY OF Grant )

Before me, a notary public in and for said County and State, on this 19<sup>th</sup> day of Feb, 2013, personally appeared **Susan Baker, Co-Owner, dba Baker Ranch** to me known to be the identical person who executed the foregoing instrument and acknowledged to me that he executed same as his free and voluntary act for the uses and purposes therein set forth.

My Commission Expires: 10/20/16

Notary Public



OFFICIAL SEAL  
AARON PENA  
NOTARY PUBLIC-STATE OF NEW MEXICO  
My commission expires 10/20/16

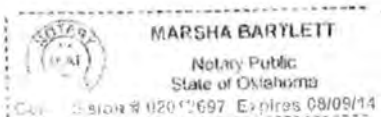
STATE OF OKLAHOMA )

COUNTY OF OKLAHOMA )

The foregoing instrument was acknowledged before me this 13<sup>th</sup> day of March, 2013, by **Bill A. Penhall, Agent and Attorney-in-Fact for Devon Energy Production Company, L.P.**, an Oklahoma limited partnership, on behalf of the partnership.

My Commission Expires: 8-9-14

Marsha Bartlett  
Notary Public



Page 9 of 10

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FORM 72 -

COF.

LEASE NO.

LG 0690

APPLICATION NO.

LG 0690

## OIL AND GAS LEASE

THIS AGREEMENT, dated this the 1st day of OCTOBER, A.D., 19 72, made and entered into by and between the state of New Mexico, acting by and through the undersigned, its commissioner of public lands, thereunto duly authorized, party of the first part and hereinafter called the "Lessor", and

**YATES PETROLEUM CORPORATION, A New Mexico Corporation**

**207 SOUTH 4th STREET, ARTESIA, NEW MEXICO 88210**

party of the second part, hereinafter called the "Lessee", whether one or more,

## WITNESSETH:

WHEREAS, the said lessee has filed in the office of the commissioner of public lands an application for an oil and gas lease covering the lands hereinafter described and has tendered therewith the required first payment being not less than the amount required by law and by the rules and regulations of the New Mexico State Land Office; and

WHEREAS, all of the requirements of law relative to said application and tender have been duly complied with and said application has been approved and allowed by the commissioner of public lands;

THEREFORE, for and in consideration of the premises as well as the sum of SEVEN THOUSAND THREE HUNDRED NINETY TWO DOLLARS AND NO/100----- (\$ 7,392.00 ) Dollars, the same being the amount of the tender above mentioned, paid in cash, and evidenced by official receipt no. \_\_\_\_\_ and of the further sum of \$ 10.00 filing fee, and of the covenants and agreements hereinafter contained on the part of the lessee to be paid, kept and performed, the said lessor has granted and demised, leased and let, and by these presents does grant, demise, lease and let unto the said lessee, exclusively, for the sole and only purpose of exploration, development and production of oil or gas, or both thereon and therefrom with the right to own all oil and gas so produced and saved therefrom and not reserved as royalty by the lessor under the terms of this lease, together with rights-of-way, easements and servitudes for pipelines, telephones and telegraph lines, tanks, power houses, stations, gasoline plants, and fixtures for producing, treating and caring for such products, and housing and boarding employees, and any and all rights and privileges necessary, incident to or convenient for the economical operation of said land, for oil and gas, with right for such purposes to the free use of oil, gas, casing-head gas, or water from said lands, but not from lessor's water wells, and with the rights of removing either during or after the term hereof, all and any improvements placed or erected on the premises by the lessee, including the right to pull all casing, subject, however, to the conditions hereinafter set out, the following described land situated in the county of EDDY, state of New Mexico, and more particularly described as follows:

Line	SUBDIVISION	Sec.	Twp.	Rge.	Acres	Institution	✓
1	ALL	2	26S	31E	640.00	C.S.	
2							
3	Lessee, including their heirs, assigns, agents, and contractors shall at their own expense fully comply with all laws, regulations, rules, ordinances, and requirements of the city, county, state, federal authorities and agencies, to all matters and things affecting the petroleum and operations thereon which may be enacted or promulgated under the governmental police powers pertaining to public health and welfare, including but not limited to conservation, sanitation, aesthetics, pollution, cultural properties, fire, and ecology.						
4							
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14							

RECEIVED  
OCT 25 12 44 PM '72  
STATE LAND OFFICE  
SANTA FE, N.M.

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Said lands having been awarded to lessee and designated as Tract No. 14 at a public sale held by the commissioner of public lands on SEPTEMBER 19, 1972. (To be filled in only where lands are offered at public sale.)

To have and to hold said land, and all the rights and privileges granted hereunder, to and unto the lessee for a primary term of five years from the date hereof, and as long thereafter as oil and gas in paying quantities, or either of them is produced from said land by the lessee, subject to all of the terms and conditions as hereinafter set forth.

In consideration of the premises the parties covenant and agree as follows:

1. Subject to the free use without royalty, as hereinbefore provided, the lessee shall pay the lessor as royalty one-eighth part of the oil produced and saved from the leased premises or the cash value thereof, at the option of the lessor, such value to be the price prevailing the day oil is run into a pipeline, if the oil be run into a pipeline, or into storage tanks, if the oil be stored.

2. Subject to the free use without royalty, as hereinbefore provided, at the option of the lessor at any time and from time to time, the lessee shall pay the lessor as royalty one-eighth part of the gas produced and saved from the leased premises, including casing-head gas. Unless said option is exercised by lessor the lessee shall pay the lessor as royalty one-eighth of the cash value of the gas, including casing-head gas, produced and saved from the leased premises and marketed or utilized, such value to be equal to the greater of the following amounts:

(a) the net proceeds derived from the sale of such gas in the field, or

(b) five cents (\$0.05) per thousand cubic feet (m.c.f.) the volume of gas for such purposes to be computed on a pressure basis of 10 ounces above an assumed atmospheric pressure of 14.4 pounds per square inch, or 15.025 pounds per square inch absolute, at 60° Fahrenheit, and pursuant to appropriate regulations of the commissioner of public lands which may provide, among other things, for a flowing temperature of 60° Fahrenheit to be assumed and applied in volume computation in all cases where a recording thermometer is not employed by the lessee in gas measurement, and for specific gravity tests at the lessee's expense at intervals not greater than one year in all cases where a recording gravimeter is not employed by the lessee in gas measurement; provided, however, the cash value for royalty purposes of carbon dioxide gas and of hydrocarbon gas delivered to a gasoline plant for extraction of liquid hydrocarbons shall be equal to the net proceeds derived from the sale of such gas, including any liquid hydrocarbons recovered therefrom.

Notwithstanding the foregoing provisions, the lessor, acting by its commissioner of public lands may require the payment of royalty for all or any part of the gas produced and saved under this lease and marketed or utilized at a price per m.c.f. equal to the maximum price being paid for gas of like kind and quality and under like conditions in the same field or area or may reduce the royalty value of any such gas (to any amount not less than the net proceeds of sale thereof in the field) if the commissioner of public lands shall determine such action to be necessary to the successful operation of the lands for oil or gas purposes or to encouragement of the greatest ultimate recovery of oil or gas or to the promotion of conservation of oil or gas.

This lease shall not expire at the end of either the primary or secondary term hereof if there is a well capable of producing gas in paying quantities located upon some part of the lands embraced herein where such well is shut-in due to the inability of the lessee to obtain a pipeline connection or to market the gas therefrom; provided, however, the owner of this lease as to the lands upon which such well is located shall pay an annual royalty equal to the annual rental payable by such owner under the terms of this lease but not less than one hundred dollars (\$100) per well per year, said royalty to be paid on or before the annual rental paying date next ensuing after the expiration of ninety days from the date said well was shut-in and on or before said rental date thereafter. The payment of said annual royalty shall be considered for all purposes the same as if gas were being produced in paying quantities and upon the commencement of marketing of gas from said well or wells the royalty paid for the lease year in which the gas is first marketed shall be credited upon the royalty payable hereunder to the lessor for such year. The provisions of this section shall also apply where gas is being marketed from said leasehold premises and through no fault of the lessee, the pipeline connection or market is lost or ceases, in which case this lease shall not expire so long as said annual royalty is paid as herein provided. Notwithstanding the provisions of this section to the contrary, this lease shall not be continued after ten years from the date hereof for any period of more than five years by the payment of said annual royalty.

3. Lessee agrees to make full settlement on the 20th day of each month for all royalties due the lessor for the preceding month, under this lease, and to permit the lessor or its agents, at all reasonable hours, to examine lessee's books relating to the production and disposition of oil and gas produced. Lessee further agrees to submit to lessor annually upon forms furnished by lessor, verified reports showing lessee's operations for the preceding year.

4. It is expressly agreed that the consideration hereinbefore specified is a good, valid and substantial consideration and sufficient in all respects to support each and every covenant herein, including specifically the option granted the lessee to prevent the termination of this lease from year to year, by the payment or tender of the further rental hereinafter provided for.

An annual rental at the rate of 25¢ per acre shall become due and payable to the lessor by the lessee, or by any transferee or assignee of the same, or any part hereof, where such transferee or assignee has been recognized, and such transfer or assignment approved by the lessor as hereinafter provided, upon each acre of the land above described and then claimed by such lessee, transferee or assignee hereunder, and the same shall be due and payable in advance to the lessor on the successive anniversary dates of this lease, but the annual rental on any assignment shall in no event be less than six dollars (\$6.00).

In the event the lessee shall elect to surrender any or all of said acreage, he shall deliver to the commissioner a duly executed release thereof and in event said lease has been recorded, then he shall upon request furnish and deliver to said commissioner a certified copy of a duly recorded release.

5. The lessee may at any time by paying to the state of New Mexico, acting by its commissioner of public lands, or other authorized officer, all amounts then due as provided herein and the further sum of ten dollars (\$10.00), surrender and cancel this lease insofar as the same covers all or any portion of the lands herein leased and be relieved from further obligations or liability hereunder, in the manner as hereinbefore provided. Provided, this surrender clause and the option herein reserved to the lessee shall cease and become absolutely inoperative immediately and concurrently with the institution of any suit in any court of law or equity by the lessee, lessor, or any assignee, to enforce this lease, or any of its terms expressed or implied.

6. All payments due hereunder shall be made on or before the day such payment is due, in cash or by certified exchange at the office of the commissioner of public lands in Santa Fe, New Mexico.

7. The lessee with the consent of the lessor, shall have the rights to assign this lease in whole or in part. Provided, however, that no assignment of an undivided interest in the lease or in any part thereof nor any assignment of less than a legal subdivision shall be recognized or approved by the lessor. Upon approval in writing by the lessor of an assignment, the assignor shall stand relieved from all obligations to the lessor with respect to the lands embraced in the assignment and the lessor shall likewise be relieved from all obligations to the assignor as to such tracts, and the assignee shall succeed to all of the rights and privileges of the assignor with respect to such tracts and shall be held to have assumed all of the duties and obligations of the assignor to the lessor as to such tracts.

8. In the event a well or wells producing oil or gas in paying quantities should be brought in on adjacent land draining the leased premises, lessee shall drill such offset well or wells as a reasonably prudent operator would drill under the same or similar circumstances.

9. The lessee agrees to notify the lessor of the location of each well before commencing drilling thereon; to keep a complete and accurate log of each well drilled and to furnish a copy thereof, verified by some person having actual knowledge of the facts, to the lessor upon the completion of any well, and to furnish the log of any unfinished well at any time when requested to do so by the lessor.

If any lands embraced in this lease shall be included in any deed or contract of purchase outstanding and subsisting issued pursuant to any sale made of the surface of such lands prior to the date of this lease, it is agreed and understood that no drilling operation shall be commenced on any such lands so sold unless and until the lessee or his assignee shall have filed a good and sufficient bond with the lessor as required by law, to secure the payment for such damage to the livestock, range, water, crops or tangible improvements on such lands as may be suffered by the purchaser holding such deed or contract of purchase, or his successors, by reason of the developments, use and occupation of such lands by such lessee. Provided, however, that no such bond shall be required if such purchaser shall waive the right to require such bond to be given in the manner provided by law.

10. In drilling wells all water-bearing strata shall be noted in the log, and the lessor reserves the right to require that all or any part of the casing shall be left in any nonproductive well when lessor deems it to the interest of the state of New Mexico to maintain said well or wells for water. For such casing so left in wells the lessor shall pay to the lessee the reasonable value thereof.

11. Lessee shall be liable and agree to pay for all damages to the range, livestock, growing crops or improvements caused by lessee's operations on said lands. When requested by the lessor, the lessee shall bury pipelines below plow depth.

12. The lessee shall not remove any machinery or fixtures placed on said premises, nor draw the casing from any well unless and until all payments and obligations due the lessor under the terms of this agreement shall have been paid or satisfied. The lessee's right to remove the casing is subject to the provision of Paragraph 10 above.

13. Upon failure or default of the lessee or any assignee to comply with any of the provisions or covenants hereof, the lessor is hereby authorized to cancel this lease and such cancellation shall extend to and include all rights hereunder as to the whole of the tract so claimed; or possessed by the lessee or assignee so defaulting, but shall not extend to, nor affect the rights of any other lessee or assignee claiming any portion of the lands upon which no default has been made; provided, however, that before any such cancellation shall be made, the lessor shall mail to the lessee, or assignee so defaulting, by registered or certified mail, addressed to the post office address of such lessee or assignee as shown by the records of the state land office, a notice of intention of cancellation specifying the default for which cancellation is to be made, and if within thirty days from the date of mailing said notice the said lessee or assignee shall remedy the default specified in said notice, cancellation shall not be made.

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14. All the terms of this agreement shall extend to and bind the heirs, executors, administrators, successors and assigns of the parties hereto.

15. If the lessee shall have failed to make discovery of oil or gas in paying quantities during the primary term hereof or if such discovery shall have been made and production shall have ceased for any reason, the lessee may continue this lease in full force and effect for an additional term of five years and as long thereafter as oil and gas in paying quantities or either of them is produced from the leased premises by paying each year in advance, as herein provided, double the rental provided herein for the primary term, or the highest rental prevailing at the commencement of the secondary term in any rental district, or districts in which the lands, or any part thereof, may be situated, if it be greater than double the rental provided for the primary term; provided, however, such rental shall be paid within the time provided by Section 13 hereof, and provided, further, that if oil or gas in paying quantities should be discovered during the secondary term hereof but production should cease, this lease shall continue for the remainder of said secondary term of five years so long as said rental is paid, and if oil or gas in paying quantities is being produced at the end of the secondary term of five years so long thereafter as oil and gas in paying quantities or either of them is produced from the leased premises.

16. If this lease shall have been maintained in accordance with the provisions hereof and if at the expiration of the secondary term provided for herein oil or gas is not being produced on said land but lessee or any assignee is then engaged in bona fide drilling or reworking operations thereon, this lease shall remain in full force and effect so long as such operations are diligently prosecuted and, if they result in the production of oil or gas, so long thereafter as oil and gas in paying quantities, or either of them, is produced from said land; provided, however, such operations extending beyond the secondary term shall be approved by the lessor upon written application filed with the lessor on or before the expiration of said term; and a report of the status of all of such operations shall be made by the lessee to the lessor every thirty days and a cessation of such operations for more than twenty consecutive days shall be considered as an abandonment of such operations and thereupon the provisions hereof shall be of no further force or effect.

If during the drilling or reworking of any well under this section, lessee loses or junks the hole or well and after diligent efforts in good faith is unable to complete said operations, then within twenty days after the abandonment of said operations, lessee may commence another well within three hundred thirty feet of the lost or junked hole or well and drill the same with due diligence. Operations commenced and continued as herein provided shall extend this lease as to all lands as to which the same is in full force and effect as of the time said drilling operations are commenced; provided, however, this lease shall be subject to cancellation in accordance with Section 13 hereof for failure to pay rentals or file reports which may become due while operations are being conducted hereunder.

17. Should production of oil or gas or either of them in paying quantities be obtained while this lease is in force and effect and should thereafter cease from any cause after the expiration of ten years from the date hereof this lease shall not terminate if lessee commences additional drilling or reworking operations within sixty days after the cessation of such production and shall remain in full force and effect so long as such operations are prosecuted in good faith with no cessation of more than twenty consecutive days, and if such operations result in the production of oil or gas in paying quantities, so long thereafter as oil or gas in paying quantities is produced from said land; provided, however, written notice of intention to commence such operations shall be filed with the lessor within thirty days after the cessation of such production, and a report of the status of such operations shall be made by the lessee to the lessor every thirty days, and the cessation of such operations for more than twenty consecutive days shall be considered as an abandonment of such operations and this lease shall thereupon terminate.

In witness whereof, the party of the first part has hereunto signed and caused its name to be signed by its commissioner of public lands thereunto duly authorized, with the seal of his office affixed, and the lessee has signed this agreement the day and year first above written.

STATE OF NEW MEXICO

By: Alfred J. Jennings  
Commissioner of Public Lands, Lessor

ATTEST:

Assistant Secretary

SEP 19 1972

Distributed this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_.

**YATES PETROLEUM CORPORATION**

By: John A. Yates (Seal) President Lessee

(PERSONAL ACKNOWLEDGMENT)

STATE OF \_\_\_\_\_ } ss.  
COUNTY OF \_\_\_\_\_ }

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, by \_\_\_\_\_

My commission expires: \_\_\_\_\_ Notary Public

(ACKNOWLEDGMENT BY ATTORNEY-IN-FACT)

STATE OF \_\_\_\_\_ } ss.  
COUNTY OF \_\_\_\_\_ }

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, by \_\_\_\_\_

as attorney-in-fact in behalf of \_\_\_\_\_

My commission expires: \_\_\_\_\_ Notary Public

(ACKNOWLEDGMENT BY CORPORATION)

STATE OF NEW MEXICO } ss.  
COUNTY OF EDDY }

The foregoing instrument was acknowledged before me this 28th day of September, 1972, by

John A. Yates (Name) Vice President (Title) of YATES PETROLEUM CORPORATION (Corporation)

a New Mexico corporation, on behalf of said corporation.

My commission expires November 30, 1975 Notary Public

**NEW MEXICO STATE ENGINEER OFFICE  
PERMIT TO EXPLORE**

**SPECIFIC CONDITIONS OF APPROVAL**

- 17-16 Construction of a water well by anyone without a valid New Mexico Well Driller License is illegal, and the landowner shall bear the cost of plugging the well by a licensed New Mexico well driller. This does not apply to driven wells, the casing of which does not exceed two and three-eighths inches outside diameter.
- 17-1A Depth of the well shall not exceed the thickness of the valley fill.
- 17-4 No water shall be appropriated and beneficially used under this permit.
- 17-6 The well authorized by this permit shall be plugged completely using the following method per Rules and Regulations Governing Well Driller Licensing, Construction, Repair and Plugging of Wells; Subsection C of 19.27.4.30 NMAC unless an alternative plugging method is proposed by the well owner and approved by the State Engineer upon completion of the permitted use. All pumping appurtenance shall be removed from the well prior to plugging. To plug a well, the entire well shall be filled from the bottom upwards to ground surface using a tremie pipe. The bottom of the tremie shall remain submerged in the sealant throughout the entire sealing process; other placement methods may be acceptable and approved by the state engineer. The well shall be plugged with an office of the state engineer approved sealant for use in the plugging of non-artesian wells. The well driller shall cut the casing off at least four (4) feet below ground surface and fill the open hole with at least two vertical feet of approved sealant. The driller must fill or cover any open annulus with sealant. Once the sealant has cured, the well driller or well owner may cover the seal with soil. A Plugging Report for said well shall be filed with the Office of the State Engineer in a District Office within 30 days of completion of the plugging.

Trn Desc: C 04637 POD1

File Number: C 04637

Trn Number: 726494

page: 1



**NEW MEXICO STATE ENGINEER OFFICE  
PERMIT TO EXPLORE**

**SPECIFIC CONDITIONS OF APPROVAL (Continued)**

- 17-7 The Permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.
- 17-B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with 72-12-12 NMSA 1978. A licensed driller shall not be required for the construction of a well driven without the use of a drill rig, provided that the casing shall not exceed two and three-eighths (2 3/8) inches outside diameter.
- 17-C The well driller must file the well record with the State Engineer and the applicant within 30 days after the well is drilled or driven. It is the well owner's responsibility to ensure that the well driller files the well record.  
The well driller may obtain the well record form from any District Office or the Office of the State Engineer website.
- 17-C2 No water shall be diverted from this well except for testing purposes which shall not exceed ten (10) cumulative days, and well shall be plugged or capped on or before , unless a permit to use water from this well is acquired from the Office of the State Engineer.
- 17-G If artesian water is encountered, the well driller shall comply with all rules and regulations pertaining to the drilling and casing of artesian wells.
- 17-P The well shall be constructed, maintained, and operated to prevent inter-aquifer exchange of water and to prevent loss of hydraulic head between hydrogeologic zones.

Trn Desc: C 04637 POD1

File Number: C 04637

Trn Number: 726494

**NEW MEXICO STATE ENGINEER OFFICE  
PERMIT TO EXPLORE**

**SPECIFIC CONDITIONS OF APPROVAL (Continued)**

- 17-Q The State Engineer retains jurisdiction over this permit.
- 17-R Pursuant to section 72-8-1 NMSA 1978, the permittee shall allow the State Engineer and OSE representatives entry upon private property for the performance of their respective duties, including access to the ditch or acequia to measure flow and also to the well for meter reading and water level measurement.
- LOG The Point of Diversion C 04637 POD1 must be completed and the Well Log filed on or before 05/26/2023.

IT IS THE PERMITTEE'S RESPONSIBILITY TO OBTAIN ALL AUTHORIZATIONS AND PERMISSIONS TO DRILL ON PROPERTY OF OTHER OWNERSHIP BEFORE COMMENCING ACTIVITIES UNDER THIS PERMIT.

**ACTION OF STATE ENGINEER**

Notice of Intention Rcvd:	Date Rcvd. Corrected:
Formal Application Rcvd: 05/11/2022	Pub. of Notice Ordered:
Date Returned - Correction:	Affidavit of Pub. Filed:

This application is approved provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare of the state; and further subject to the specific conditions listed previously.

Witness my hand and seal this 26 day of May A.D., 2022

Mike A. Hamman, P.E., State Engineer

By: K. Parekh  
KASHYAP PAREKH

Trn Desc: C 04637 POD1

File Number: C 04637  
Trn Number: 726494



41851, 67235

Larry Brotman, Esri, HERE, Garmin, (c) OpenStreetMap contributors, U.S.  
Department of Energy Office of Legacy Management

**Coordinates****UTM - NAD 83 (m) - Zone 13**

Easting 618068.317

Northing 3548423.017

**State Plane - NAD 83 (f) - Zone E**

Easting 722296.799

Northing 388196.777

**Degrees Minutes Seconds**

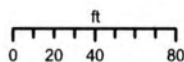
Latitude 32 : 3 : 57.210000

Longitude -103 : 44 : 57.000000

Location pulled from Coordinate Search

NEW MEXICO OFFICE  
OF THE  
STATE ENGINEER

1:1,128



M. TELLES

5/26/2022



Reasonable efforts have been made by the New Mexico Office of the State Engineer (OSE) to verify that these maps accurately integrate the source data used in their preparation; however, a degree of error is inherent in all maps, and these maps may contain omissions and errors in scale, resolution, reification, positional accuracy, development methodology, interpretation of source data, and other circumstances. These maps are distributed "as is" without warranty of any kind.

**Spatial Information****County:** Eddy**Groundwater Basin:** Carlsbad**Abstract Area:** Carlsbad 72-12-1  
Carlsbad Underground Basin**Land Grant:**  
Not in Land Grant**Restrictions:**

NA

**PLSS Description**

NESESESW Qtr of Sec 02 of 026S 031E

Derived from CADNSDI- Qtr Sec. locations are calculated and are only approximations

**Parcel Information**

UPC/DocNum: 4185151267235

**Parcel Owner:** State Of New Mexico**Address:** null null null

**Legal:** Quarter: Ne S: 2 T: 26S R: 31E Quarter: Nw S: 2 T: 26S R: 31E Quarter: Sw S: 2 T: 26S R: 31E Quarter: Se S: 2 T: 26S R: 31E All Sec Loc Off Buckthorn Road Yates Petroleum In Section 2 Exempt

**POD Information****Owner:****File Number:****POD Status:** NoData**Permit Status:** NoData**Permit Use:** NoData**Purpose:**

Calculated PLSS  
Coord Search Location  
OSE District Boundary  
New Mexico State Trust Lands  
Both Estates  
Bernalillo County Parcels 2021

● Catron County Parcels 2021  
□ Chaves County Parcels 2021  
□ Cibola County Parcels 2021  
□ Colfax County Parcels 2021  
□ Curry County Parcels 2021  
● De Baca County Parcels 2021

□ Doña Ana County Parcels 2021  
□ Eddy County Parcels 2021  
□ Grant County Parcels 2021  
□ Harding County Parcels 2021  
□ Hidalgo County Parcels 2021  
□ Guadalupe County Parcels 2021

□ Lea County Parcels 2021  
□ Lincoln County Parcels 2021  
□ Los Alamos County Parcels 2021  
□ Luna County Parcels 2021  
□ McKinley County Parcels 2021  
● Mora County Parcels 2021

□ Otero County Parcels 2021  
● Quay County Parcels 2021  
□ Rio Arriba County Parcels 2021  
□ Roosevelt County Parcels 2021  
□ Sandoval County Parcels 2021

□ San Juan County Parcels 2021  
□ San Miguel County Parcels 2021  
□ Santa Fe County Parcels 2021  
□ Sierra County Parcels 2021  
□ Socorro County Parcels 2021

□ Taos County Parcels 2021  
□ Torrance County Parcels 2021  
● Union County Parcels 2021  
□ Valencia County Parcels 2021  
□ Site Boundaries

Mike A. Hamman, P.E.  
State Engineer



Roswell Office  
1900 WEST SECOND STREET  
ROSWELL, NM 88201

**STATE OF NEW MEXICO  
OFFICE OF THE STATE ENGINEER**

Trn Nbr: 726494  
File Nbr: C 04637

May. 26, 2022

DALE WOODALL  
DEVON ENERGY  
6488 7 RIVERS HWY  
ARTESIA, NM 88210

Greetings:

Your approved copy of the above numbered permit to drill a well for non-consumptive purposes is enclosed. You must obtain an additional permit if you intend to use the water. It is your responsibility to provide the contracted well driller with a copy of the permit that must be made available during well drilling activities.

Carefully review the attached conditions of approval for all specific permit requirements.

- \* If use of this well is temporary in nature and the well will be plugged at the end of the well usage, the OSE must initially approve of the plugging. If plugging approval is not conditioned in this permit, the applicant must submit a Plugging Plan of Operations for approval prior to the well being plugged. The Plugging Record must be properly completed and submitted to the OSE within 30 days of the well plugging.
- \* If the final intended purpose and condition requires a well ID tag and meter installation, the applicant must immediately send a completed meter report form to this office.
- \* The well record and log must be submitted within 30 days of the completion of the well or if the attempt was a dry hole.
- \* This permit expires and will be cancelled if no well is drilled and/or a well log is not received by the date set forth in the conditions of approval.

Appropriate forms can be downloaded from the OSE website [www.ose.state.nm.us](http://www.ose.state.nm.us).

Sincerely,

A handwritten signature in black ink, appearing to read "Megan Telles".

Megan Telles  
(575) 622-6521

Enclosure

explore





## WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging. This form may be used to plug a single well, or if you are plugging multiple monitoring wells on the same site using the same plugging methodology.

**Alert!** Your well may be eligible to participate in the Aquifer Mapping Program (AMP)-NM Bureau of Geology [geoinfo.nmt.edu/resources/water/cgmn/](http://geoinfo.nmt.edu/resources/water/cgmn/) if within an area of interest and meets the minimum construction requirements, such as there is still water in your well, and the well construction reflected in a well record and log is not compromised, contact AMP at 575-835-5038 or -6951, or by email [nmbg-waterlevels@nmt.edu](mailto:nmbg-waterlevels@nmt.edu), prior to completing this prior form. Showing proof to the OSE that your well was accepted in this program, may delay the plugging of your well until a later date.

**I. FILING FEE:** There is no filing fee for this form.

**II. GENERAL / WELL OWNERSHIP:** ☐ Check here if proposing one plan for multiple monitoring wells on the same site and attaching WD-08m

Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: C-4644-POPA

Name of well owner: Plains Pipeline, L.P.

Mailing address: 1106 Griffith Drive

County: \_\_\_\_\_

City: Midland

State: \_\_\_\_\_

Texas

Zip code: 79706

Phone number: \_\_\_\_\_ E-mail: khudgens@paalp.com

### III. WELL DRILLER INFORMATION:

Well Driller contracted to provide plugging services: White Drilling Company, Inc.

New Mexico Well Driller License No.: WD-1456

Expiration Date: 09/30/2022

**IV. WELL INFORMATION:** ☐ Check here if this plan describes method for plugging multiple monitoring wells on the same site and attach supplemental form WD-08m and skip to #2 in this section.

Note: A copy of the existing Well Record for the well(s) to be plugged should be attached to this plan.

1) GPS Well Location: Latitude: 32 deg, 03 min, 41.2 sec  
Longitude: 103 deg, 44 min, 17.3 sec, NAD 83

2) Reason(s) for plugging well(s):

Plugging will be for environmental soil boring, which may encounter water. A well will not be installed, however the boring will be plugged within 72 hours upon completion if groundwater is encountered.

3) Was well used for any type of monitoring program? No If yes, please use section VII of this form to detail what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging.

4) Does the well tap brackish, saline, or otherwise poor quality water? Unknown If yes, provide additional detail, including analytical results and/or laboratory report(s): \_\_\_\_\_

5) Static water level: Unknown feet below land surface / feet above land surface (circle one)

6) Depth of the well: Unknown feet

OSE OIT JUN 3 2022 AM 9:15  
WD-08 Well Plugging Plan  
Version: March 07, 2022  
Page 1 of 5

- 7) Inside diameter of innermost casing: N/A inches.
- 8) Casing material: N/A
- 9) The well was constructed with:  
☐ an open-hole production interval, state the open interval: \_\_\_\_\_  
☐ a well screen or perforated pipe, state the screened interval(s): \_\_\_\_\_
- 10) What annular interval surrounding the artesian casing of this well is cement-grouted? \_\_\_\_\_
- 11) Was the well built with surface casing? \_\_\_\_\_ If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? \_\_\_\_\_ If yes, please describe:
- 12) Has all pumping equipment and associated piping been removed from the well? \_\_\_\_\_ If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.

**V. DESCRIPTION OF PLANNED WELL PLUGGING:** ☐ If plugging method differs between multiple wells on same site, a separate form must be completed for each method.

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical information, such as geophysical logs, that are necessary to adequately describe the proposal. Attach a copy of any signed OSE variance to this plugging plan.

Also, if this planned plugging plan requires a variance to 19.27.4 NMAC, attach a detailed variance request signed by the applicant.

- 1) Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology proposed for the well:

If groundwater is encountered, Tremie Type 1 cement-bentonite slurry from bottom of boring to ground level. In the event that groundwater is not encountered, backfill with clean dry cuttings or clean native fill to 10 feet, 10' -0", 99lbs of 3/8 bentonite chips hydrated with 10 gallons of fresh water.

- 2) Will well head be cut-off below land surface after plugging? \_\_\_\_\_

**VI. PLUGGING AND SEALING MATERIALS:**

Note: The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant. Attach a copy of the batch mix recipe from the cement company and/or product description for specialty cement mixes or any sealant that deviates from the list of OSE approved sealants.

- 1) For plugging intervals that employ cement grout, complete and attach Table A.
- 2) For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
- 3) Theoretical volume of grout required to plug the well to land surface: 154 Gallons or 20.6CF
- 4) Type of Cement proposed: Type 1 Cement-Bentonite Slurry
- 5) Proposed cement grout mix: 8.45 gallons of water per 94 pound sack of Portland cement
- 6) Will the grout be: \_\_\_\_\_ batch-mixed and delivered to the site  
X mixed on site



- 7) Grout additives requested, and percent by dry weight relative to cement:

- 8) Additional notes and calculations:

**VII. ADDITIONAL INFORMATION:** List additional information below, or on separate sheet(s):

**VIII. SIGNATURE:**

I, Sam White, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

  
\_\_\_\_\_  
Signature of Applicant

6.2.22  
\_\_\_\_\_  
Date

**IX. ACTION OF THE STATE ENGINEER:**

This Well Plugging Plan of Operations is:

OSE DTJ JUN 3 2022 AM 9:15

☒ Approved subject to the attached conditions.  
☐ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 6<sup>th</sup> day of JUNE, 2022

Mike A. Hamman P.E., New Mexico State Engineer

By: K. Parekh  
KASHYAP PAREKH  
W.R.M. I

WD-08 Well Plugging Plan  
 Version: March 07, 2022  
 Page 3 of 5





**TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.**

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)	0 feet		
Bottom of proposed interval of grout placement (ft bgl)	105 feet		
Theoretical volume of grout required per interval (gallons)	154 gallons		
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement	8.45 gallons of water		
Mixed on-site or batch-mixed and delivered?	On-site		
Grout additive 1 requested	5% Bentonite		
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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**TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.**

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant or grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

QSE DIT JUN 3 2022 AM9:15



**STATE OF NEW MEXICO**  
OFFICE OF THE STATE ENGINEER  
ROSWELL

**Mike A. Hamman, P.E.**  
State Engineer

**DISTRICT II**  
1900 West Second St.  
Roswell, New Mexico 88201  
Phone: (575) 622-6521  
Fax: (575) 623-8559

June 6, 2022

Plains Pipeline L.P.  
1106 Griffith Drive  
Midland, TX 79706

RE: Well Plugging Plan of Operations for **C-4644-POD1**


Greetings:

Enclosed is your copy of the Well Plugging Plan of Operations for the above referenced well subject to the attached Conditions of Approval. The proposed method of operation is found to be acceptable and in accordance with the Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells 19.27.4 NMAC adopted June 30, 2017 by the State Engineer. subject to the attached Conditions of Approval.

Applications need to be filed in **triplicate** with original signatures on each application.

Within 30 days after the well is plugged, the well driller is required to file a complete plugging record with the OSE and the permit holder.

Sincerely,

  
Kashyap Parekh  
Water Resources Manager I





**STATE OF NEW MEXICO**  
**OFFICE OF THE STATE ENGINEER**

**ROSWELL**

1900 West Second St.  
Roswell, New Mexico 88201  
Phone: (575) 622-6521  
Fax: (575) 623- 8559

Applicant has identified wells, listed below, to be plugged. White Drilling Company Inc. (WD-1456) will perform the plugging.

Permittee: Plains Pipeline L.P.  
NMOSE Permit Number: C-4644-POD1

NMOSE File	Casing diameter (inches)	Well depth (feet bgl)	Approximate static water level (feet bgl)	Latitude	Longitude
C-4644-POD1	Unknown	105.0	Unknown	32° 03' 41.2"	103° 44' 17.3"

**Specific Plugging Conditions of Approval for Well located near Carlsbad, NM, in Eddy County.**

1. Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4 NMAC, which requires any person engaged in the business of well drilling within New Mexico to obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE). Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
2. Theoretical volume of sealant required for abandonment approximately 154 gallons. Total minimum volume of necessary sealant shall be calculated upon sounding the actual pluggable depth of well.
3. **Ground Water encountered:** (a) The cement-bentonite slurry (bentonite powder) shall be mixed using a maximum of 5.2 gallons water per 94-lb sack of Type I/II Portland cement **PLUS** 0.65 gallons per 1% increase in bentonite up to a maximum 6% bentonite by dry weight ratio. (b) The bentonite shall be hydrated separately with its required increments of water prior to being mixed into the cement slurry.
4. **Dry Hole:** (a) Drill cuttings up to ten feet of land surface. (b) 10 feet to 0 feet – 3/8 Bentonite chips – fresh water to be added above water column at rate of 5 gallons per 50-lb sack/bucket.

- 5 Placement of the sealant within the wells shall be by pumping through a tremie pipe extended to near well bottom and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 6 Should cement "shrinks-back" occur in the well, use of a tremie for topping off is required for cement placement deeper than 20 feet below land surface or if water is present in the casing. The approved sealant for topping off is identified in condition 3. of these Specific Conditions of Approval.
- 7 Any open annulus encountered surrounding the casing shall also be sealed by the placement of the approved sealant. When plugging shallow wells with no construction or environmental concerns, and if the well record on a well to be plugged shows a proper 20-foot annular seal, a plugging plan can propose the use of clean fill material to a nominal 30 feet bgs, then placing an OSE approved sealant to surface. Lacking that information, we would require an excavation of at least 2-feet which shall then be filled in its entirety with sealant to surface.
- 8 Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 9 NMOSE witnessing of the plugging of the non-artesian well will not be required.
- 10 Any deviation from this plan must obtain an approved variance from this office prior to implementation.
- 11 A Well Plugging Record itemizing actual abandonment process and materials used shall be filed with the State Engineer within 30 days after completion of well plugging. For the plugging record, please resurvey coordinate location for well and note coordinate system for GPS unit. Please attach a copy of these plugging conditions.

The NMOSE Well Plugging Plan of Operations is hereby approved with the aforesaid conditions applied.

Witness my hand and seal this 6<sup>th</sup> day of June 2022

Mike A. Hamman, P.E. State Engineer



By: \_\_\_\_\_

*K. Parekh*

Kashyap Parekh  
Water Resources Manager I





# WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

[www.ose.state.nm.us](http://www.ose.state.nm.us)

2022 AUG 8 2:22 PM 0320

1. GENERAL AND WELL LOCATION	OSE POD NO. (WELL NO.) POD 1 (TW-1)		WELL TAG ID NO. N/A		OSE FILE NO(S). C-4637			
	WELL OWNER NAME(S) Devon Energy				PHONE (OPTIONAL) 575-748-1838			
	WELL OWNER MAILING ADDRESS 6488 7 Rivers Hwy				CITY Artesia	STATE NM	ZIP 88210	
	WELL LOCATION (FROM GPS)	DEGREES LATITUDE 32	MINUTES 3	SECONDS 57.21	N	* ACCURACY REQUIRED: ONE TENTH OF A SECOND		
		LONGITUDE 103	44	57.0	W	* DATUM REQUIRED: WGS 84		
DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE SE SE SW Sec.2 T26S R31S NMPM								
2. DRILLING & CASING INFORMATION	LICENSE NO. 1249		NAME OF LICENSED DRILLER Jackie D. Atkins			NAME OF WELL DRILLING COMPANY Atkins Engineering Associates, Inc.		
	DRILLING STARTED 6/15/2022		DRILLING ENDED 6/15/2022		DEPTH OF COMPLETED WELL (FT) Temporary Well	BORE HOLE DEPTH (FT) ±51	DEPTH WATER FIRST ENCOUNTERED (FT) N/A	
	COMPLETED WELL IS: <input type="checkbox"/> ARTESIAN <input checked="" type="checkbox"/> DRY HOLE <input type="checkbox"/> SHALLOW (UNCONFINED)					STATIC WATER LEVEL IN COMPLETED WELL (FT) N/A	DATE STATIC MEASURED 6/15/2022, 7/19/2022	
	DRILLING FLUID: <input type="checkbox"/> AIR <input type="checkbox"/> MUD ADDITIVES - SPECIFY:							
	DRILLING METHOD: <input type="checkbox"/> ROTARY <input type="checkbox"/> HAMMER <input type="checkbox"/> CABLE TOOL <input checked="" type="checkbox"/> OTHER - SPECIFY: Hollow Stem Auger						CHECK HERE IF PITLESS ADAPTER IS INSTALLED <input type="checkbox"/>	
	DEPTH (feet bgl)		BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE (add coupling diameter)	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
	FROM	TO						
	0	55	±6.5	Boring-HSA	--	--	--	--
3. ANNULAR MATERIAL	DEPTH (feet bgl)		BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT		
	FROM	TO						

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 01/28/2022)

FILE NO. <u>C-04637-POD1</u>	POD NO. <u>1</u>	TRN NO. <u>726494</u>
LOCATION <u>26S.31E.02.4.4.3.</u>	WELL TAG ID NO. <u>                    </u>	PAGE 1 OF 2

#### 4. HYDROGEOLOGIC LOG OF WELL

WR-20 WELL RECORD & LOG (Version 01/28/2022)





2904 W 2nd St.  
Roswell, NM 88201  
voice: 575.624.2420  
fax: 575.624.2421  
www.atkinseng.com

August 4, 2022

DII-NMOSE  
1900 W 2<sup>nd</sup> Street  
Roswell, NM 88201

*Hand Delivered to the DII Office of the State Engineer*

Re: Well Record C-4637 Pod1

To whom it may concern:

Attached please find a well log & record and a plugging record, in duplicate, for a one (1) soil borings, C-4637 Pod1.

If you have any questions, please contact me at 575.499.9244 or [lucas@atkinseng.com](mailto:lucas@atkinseng.com).

Sincerely,

A handwritten signature in black ink, appearing to read "Lucas Middleton".







Lucas Middleton

Enclosures: as noted above

RECEIVED PLUS 8 2022-08-04 10:15



### Legend

-  Distance to Residence
-  Distance to Significant Watercourse
-  Distance to Wetlands
-  Freshwater Emergent Wetlands
-  Shetland 11 CTB 1
-  Significant Watercourse

## Shetland 11 CTB 1

Nearest Significant Watercourse:  
Riverine  
Distance: 1.35 miles (7,113 feet)  
Nearest Wetlands: Freshwater  
Emergent Wetlands  
Distance: 1.15 miles (6,087 feet)

Significant Watercourse

Shetland 11 CTB 1

Freshwater Emergent Wetlands



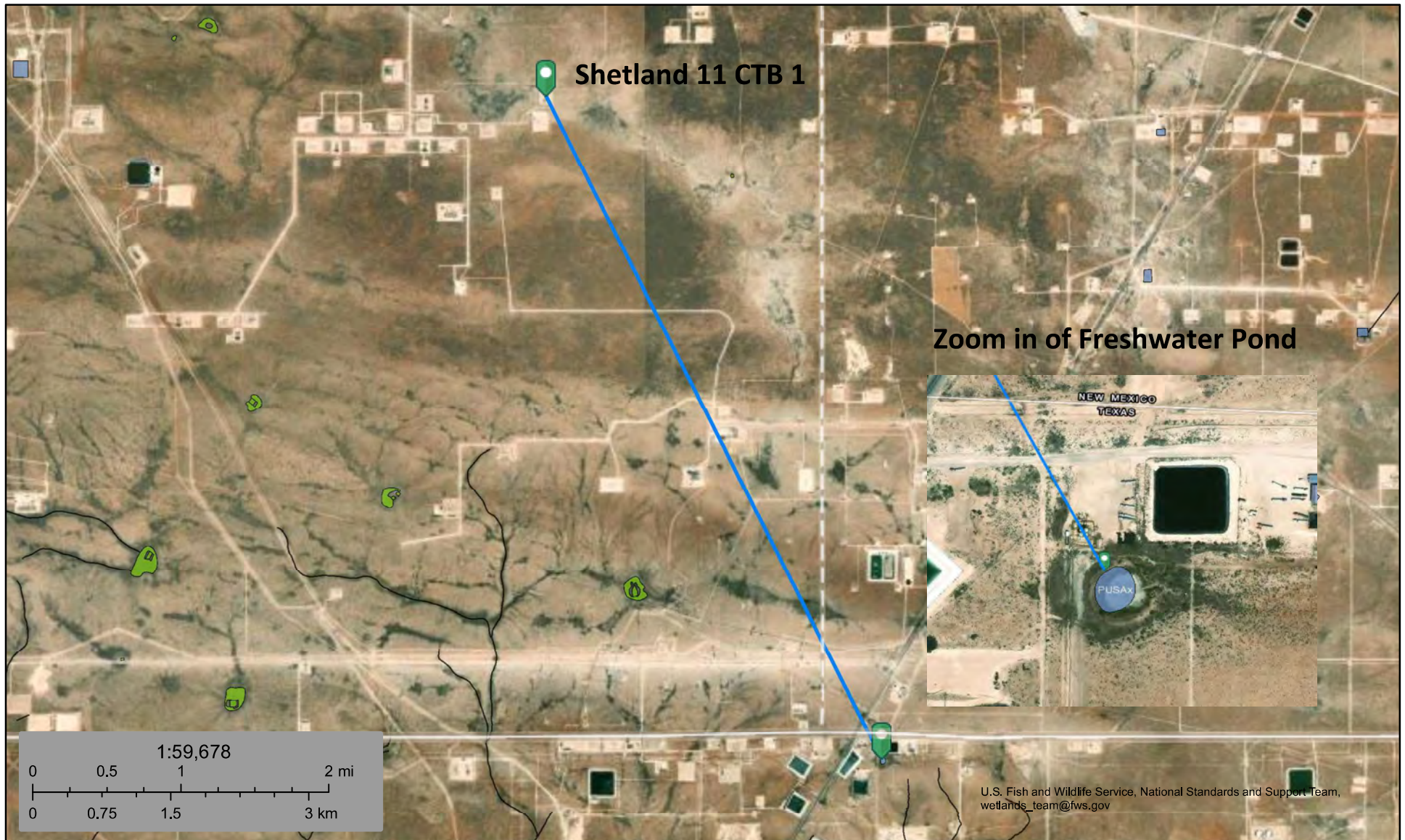




## Shetland 11 CTB 1

Nearest Play Lake/Freshwater Pond

Distance: 4.24 miles (22,384 feet)



January 23, 2025

## Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

- Lake
- Other
- Riverine



This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.



# Shetland 11 CTB 1

Nearest Residence: 4.29 miles (22,660 feet)

## Legend

-  Residence
-  Shetland 11 CTB 1

Shetland 11 CTB 1

Residence

Google Earth



1 mi



Shetland 11 CTB 1



11/28/2024, 11:51:19 PM

- Override 1

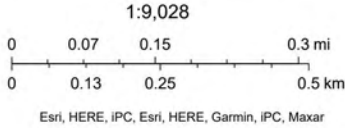
● Plugged

■ OSE District Boundary
- Water Right Regulations

■ Artesian Planning Area

■ New Mexico State Trust Lands

■ Both Estates




Online web user  
This is an unofficial map from the OSE's online application.




# Shetland 11 CTB 1

Nearest Town: Angeles, TX  
Distance: 16.23 miles (85,703 feet)

## Legend

 Shetland 11 CTB 1

 Shetland 11 CTB 1

TEXAS

NEW MEXICO

285

Angeles

Google Earth

Released to Imaging: 1/29/2025 4:10:10 PM

Image © 2024 Airbus

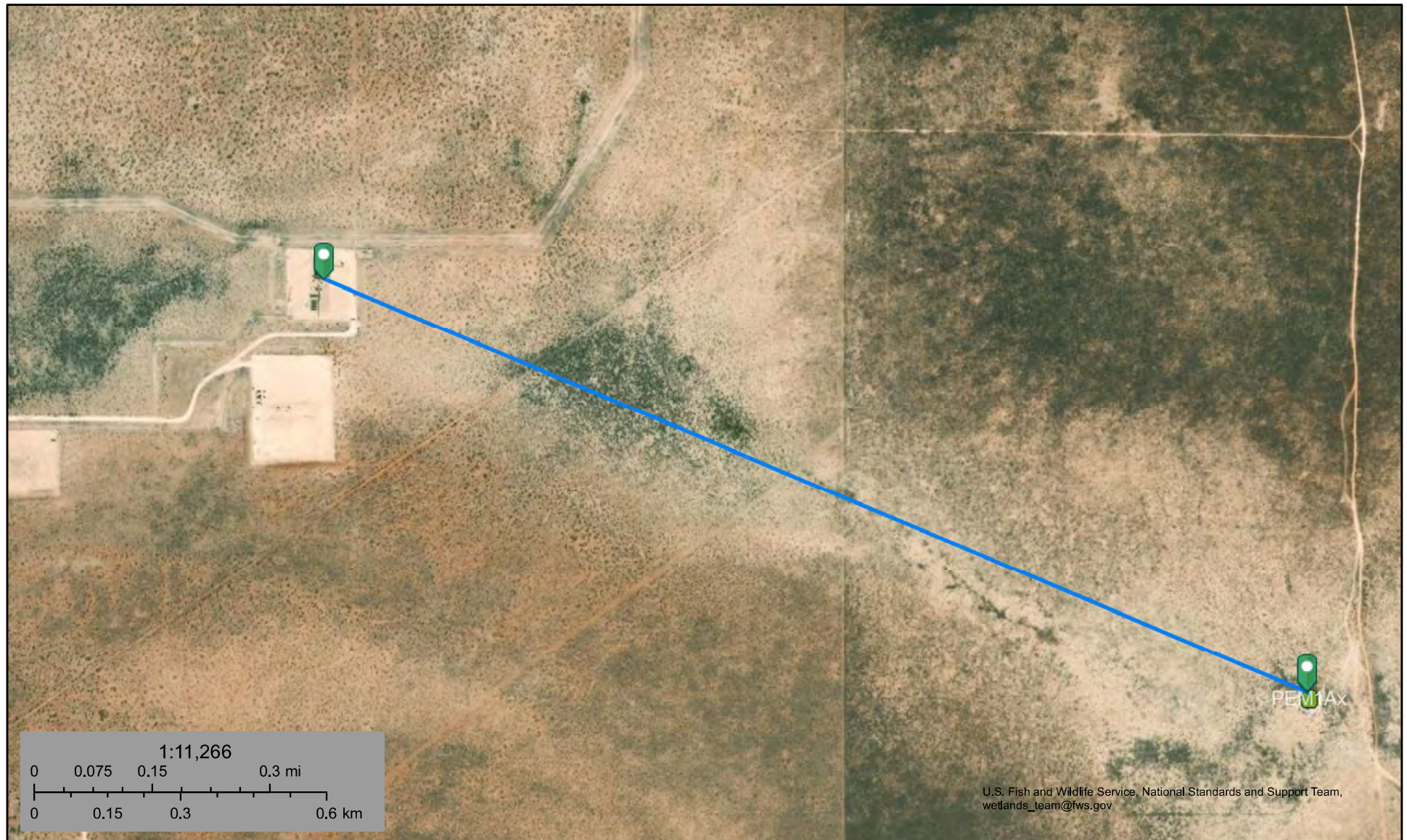
7 mi







## Shetland 11 CTB 1



November 29, 2024

**Wetlands**

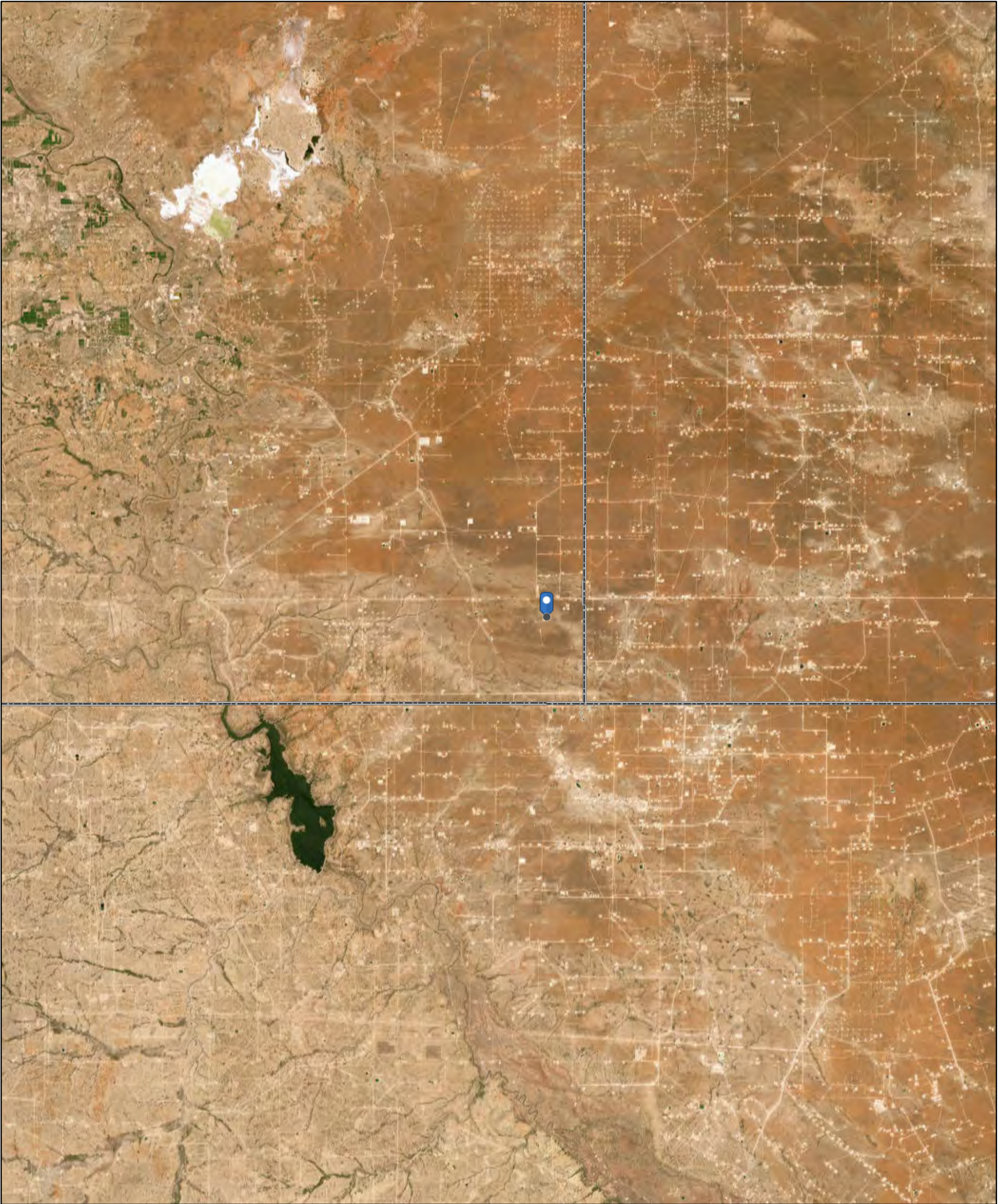
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

- Lake
- Other
- Riverine

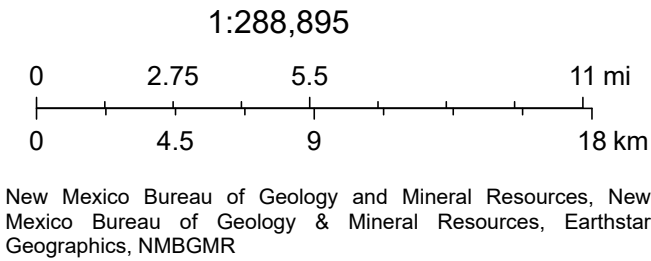
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.



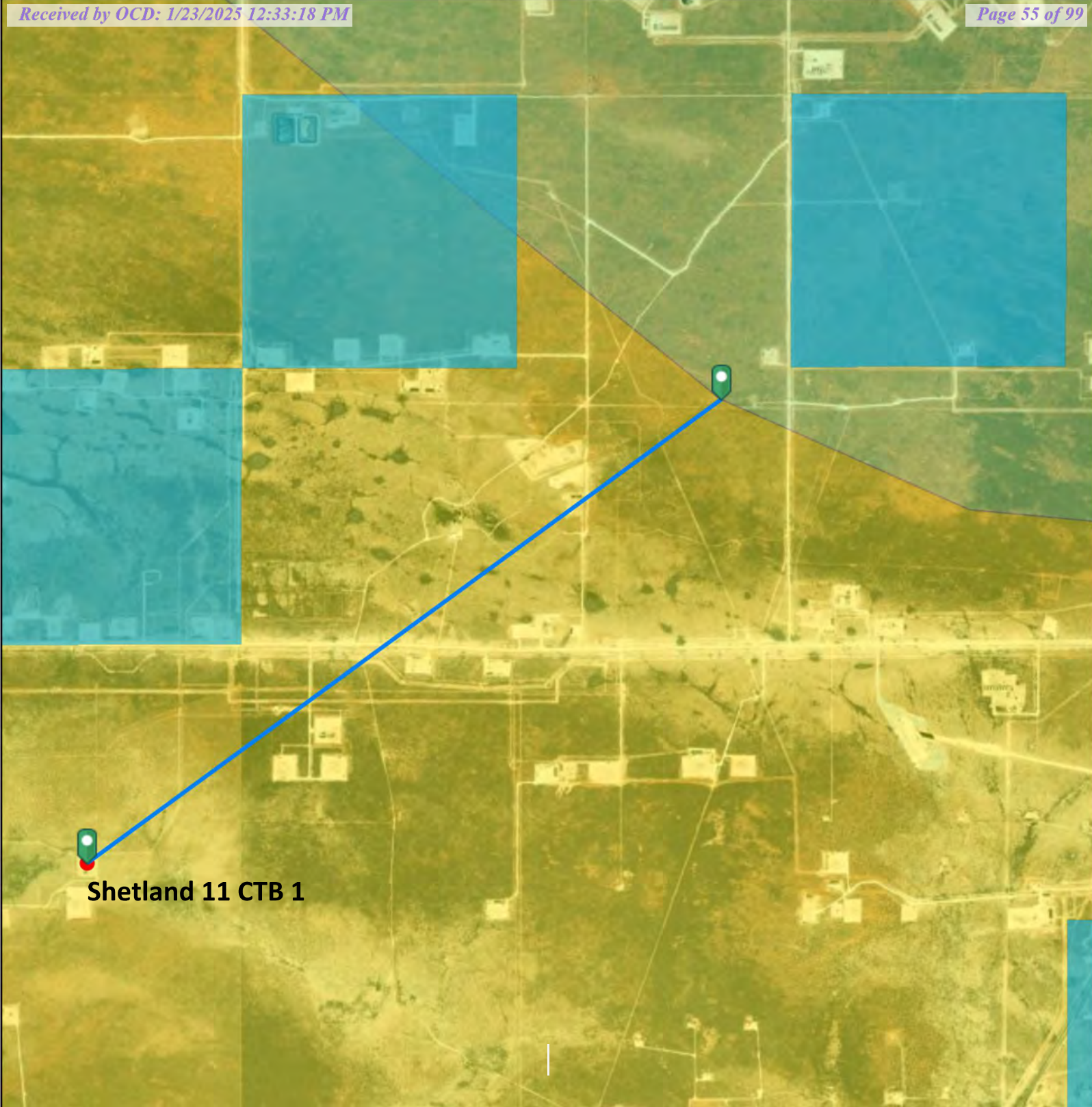


11/29/2024, 1:07:29 AM

- Mining\_Ghost\_Towns
- Counties
- REE\_Districts
  - Fe skarn, carbonate-hosted Pb-Zn
  - REE-Th-U veins, fluorite veins
  - Vein and replacement deposits in Proterozoic rocks, tin veins, volcanic-epithermal vein
  - carbonatite
  - beach-placer sandstone







**Shetland 11 CTB 1**

## Shetland 11 CTB 1 - Karst Potential/Distance

0 0.2 0.4 0.8  
mi



**New Mexico State Land Office**

**Disclaimer:**  
The New Mexico State Land Office assumes no responsibility or liability for, or in connection with the accuracy, reliability or use of the information provided herein with respect to State Land Office data or data from other sources.

Data pertaining to New Mexico State Trust Lands are provisional and subject to revision, and do not constitute an official record of title. Official records may be reviewed at the New Mexico State Land Office in Santa Fe, New Mexico.

Released to Imaging: 1/29/2025 4:10:10 PM

Map Created: 1/23/2025

● User drawn points

New Mexico State Trust Lands

■ Subsurface Estate

■ Surface Estate

■ Both Estates

Karst\_Potential\_NM

Potential

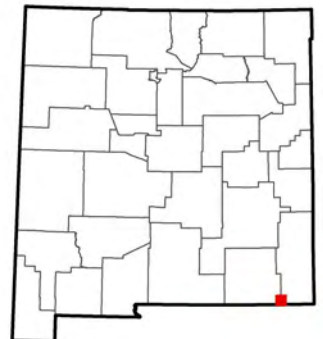
■ High

■ Medium

■ Low

■ Critical\_Karst\_Zone\_NM

**Distance from a Low Karst Potential Feature:**  
2.88 miles (15,223 feet)





Shetland 11 CTB 1: Zone X/100-500 Year  
Distance to Zone A: 0.09 miles (492 feet)

National Flood Hazard Layer FIRMette

Released to Imaging: 1/29/2025 4:10:10 PM



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, AE, AH, VE, AP*
- With BFE or Depth  
*Zone AE, AO, AH, VE, AP*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with averaging 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 X*

**OTHER AREAS**

- Area of Minimal Flood Hazard  
*Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard  
*Zone D*
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**

- Cross Sections with 1% Annual Chance  
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

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.

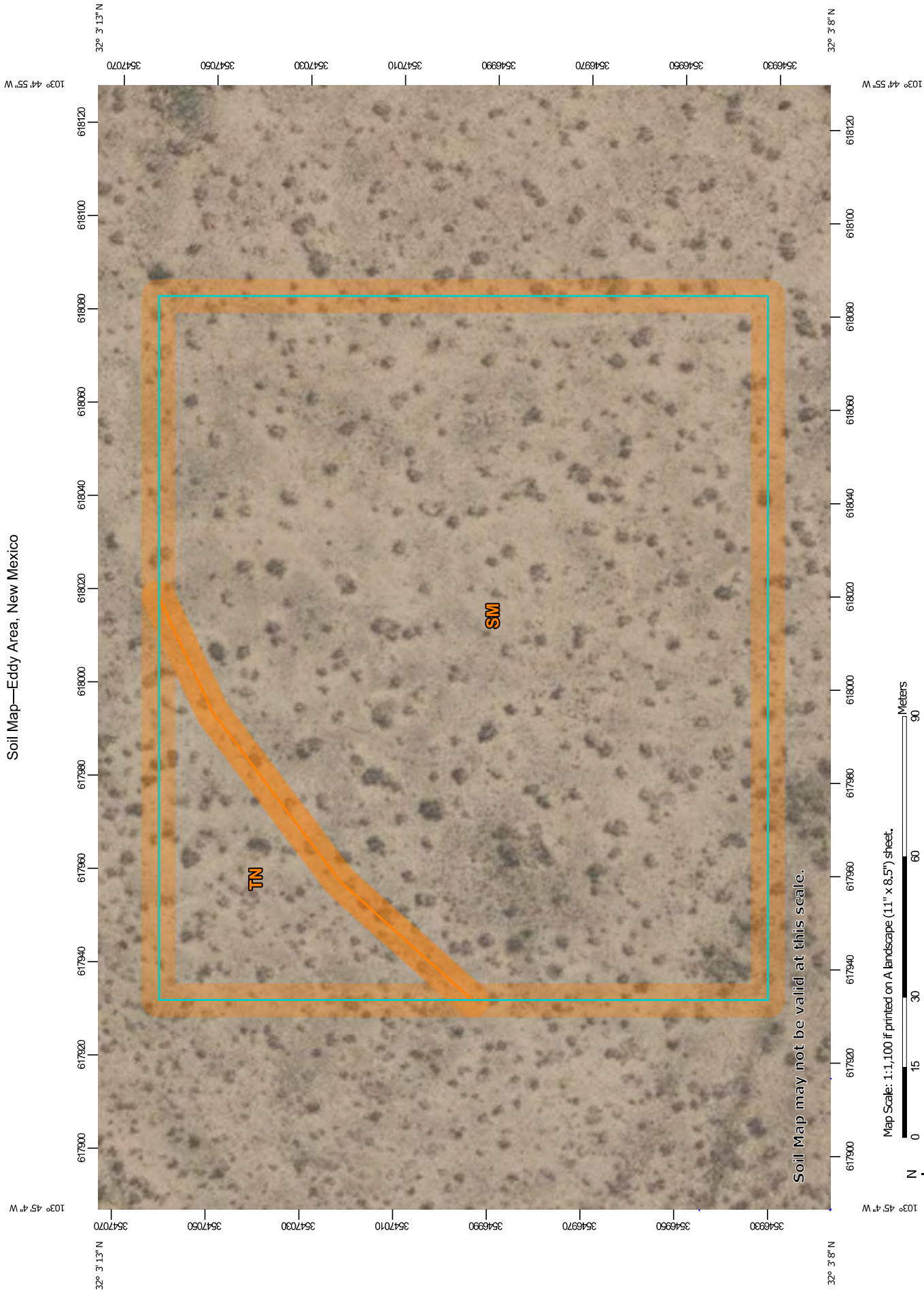
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/14/2024 at 4:43 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by 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.





Soil Map—Eddy Area, New Mexico



Map Scale: 1:1,100 if printed on A landscape (11" x 8.5") sheet.

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

## MAP LEGEND

**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.

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

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

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

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.

Area of Interest (AOI)	
	Area of Interest (AOI)
	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
Water Features	
	Streams and Canals
Transportation	
	Rails
	Interstate Highways
	US Routes
	Major Roads
	Local Roads
Background	
	Aerial Photography



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
SM	Simona-Bippus complex, 0 to 5 percent slopes	4.3	87.8%
TN	Tonuco loamy fine sand, 0 to 3 percent slopes, eroded	0.6	12.2%
Totals for Area of Interest		4.9	100.0%

Map Unit Description: Simona-Bippus complex, 0 to 5 percent slopes---Eddy Area, New Mexico

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## Eddy Area, New Mexico

### SM—Simona-Bippus complex, 0 to 5 percent slopes

#### Map Unit Setting

*National map unit symbol:* 1w5x

*Elevation:* 1,800 to 5,000 feet

*Mean annual precipitation:* 8 to 24 inches

*Mean annual air temperature:* 57 to 70 degrees F

*Frost-free period:* 180 to 230 days

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Simona and similar soils:* 55 percent

*Bippus and similar soils:* 30 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Simona

##### Setting

*Landform:* Plains, alluvial fans

*Landform position (three-dimensional):* Rise

*Down-slope shape:* Convex, linear

*Across-slope shape:* Linear

*Parent material:* Mixed alluvium and/or eolian sands

##### Typical profile

*H1 - 0 to 19 inches:* gravelly fine sandy loam

*H2 - 19 to 23 inches:* indurated

##### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* 7 to 20 inches to petrocalcic

*Drainage class:* Well drained

*Runoff class:* Very 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:* 15 percent

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Sodium adsorption ratio, maximum:* 1.0

*Available water supply, 0 to 60 inches:* Very low (about 2.1 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* D



Map Unit Description: Simona-Bippus complex, 0 to 5 percent slopes---Eddy Area, New Mexico

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*Ecological site:* R070BD002NM - Shallow Sandy  
*Hydric soil rating:* No

### Description of Bippus

#### Setting

*Landform:* Flood plains, alluvial fans  
*Landform position (three-dimensional):* Talf, rise  
*Down-slope shape:* Convex, linear  
*Across-slope shape:* Linear  
*Parent material:* Mixed alluvium

#### Typical profile

*H1 - 0 to 37 inches:* silty clay loam  
*H2 - 37 to 60 inches:* clay loam

#### Properties and qualities

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Very low  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* Occasional  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 40 percent  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Sodium adsorption ratio, maximum:* 1.0  
*Available water supply, 0 to 60 inches:* Moderate (about 8.7 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 2e  
*Land capability classification (nonirrigated):* 3e  
*Hydrologic Soil Group:* B  
*Ecological site:* R070BC017NM - Bottomland  
*Hydric soil rating:* No

### Minor Components

#### Simona

*Percent of map unit:* 8 percent  
*Ecological site:* R070BD002NM - Shallow Sandy  
*Hydric soil rating:* No

#### Bippus

*Percent of map unit:* 7 percent  
*Ecological site:* R070BC017NM - Bottomland

Map Unit Description: Simona-Bippus complex, 0 to 5 percent slopes---Eddy Area, New Mexico

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*Hydric soil rating:* No

## Data Source Information

Soil Survey Area: Eddy Area, New Mexico

Survey Area Data: Version 20, Sep 3, 2024



Map Unit Description: Tonuco loamy fine sand, 0 to 3 percent slopes, eroded---Eddy Area,  
New Mexico

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## Eddy Area, New Mexico

### TN—Tonuco loamy fine sand, 0 to 3 percent slopes, eroded

#### Map Unit Setting

*National map unit symbol:* 1w62

*Elevation:* 3,000 to 4,100 feet

*Mean annual precipitation:* 10 to 14 inches

*Mean annual air temperature:* 60 to 64 degrees F

*Frost-free period:* 200 to 217 days

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Tonuco and similar soils:* 98 percent

*Minor components:* 2 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Tonuco

##### Setting

*Landform:* Plains, alluvial fans

*Landform position (three-dimensional):* Rise

*Down-slope shape:* Convex, linear

*Across-slope shape:* Linear

*Parent material:* Mixed alluvium and/or eolian sands

##### Typical profile

*H1 - 0 to 5 inches:* loamy fine sand

*H2 - 5 to 15 inches:* loamy fine sand

*H3 - 15 to 19 inches:* indurated

##### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* 6 to 20 inches to petrocalcic

*Drainage class:* Excessively drained

*Runoff class:* Very 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

*Maximum salinity:* Nonsaline (0.0 to 1.0 mmhos/cm)

*Sodium adsorption ratio, maximum:* 1.0

*Available water supply, 0 to 60 inches:* Very low (about 1.3 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* D

*Ecological site:* R070BD004NM - Sandy

*Hydric soil rating:* No

Map Unit Description: Tonuco loamy fine sand, 0 to 3 percent slopes, eroded---Eddy Area,  
New Mexico

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### Minor Components

#### **Tonuco**

*Percent of map unit:* 1 percent

*Ecological site:* R070BD004NM - Sandy

*Hydric soil rating:* No

#### **Dune land**

*Percent of map unit:* 1 percent

*Hydric soil rating:* No

## Data Source Information

Soil Survey Area: Eddy Area, New Mexico

Survey Area Data: Version 20, Sep 3, 2024







## Ecological site R070BD004NM Sandy

Accessed: 11/14/2024

### General information

**Provisional.** A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

**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 is on uplands, plains, dunes, fan piedmonts, terraces and in inter dunal areas. The parent material consists of mixed alluvium and or eolian sands or calcareous alluvium derived from sedimentary rock. Slope range on this site range from 0 to 9 percent with the average of 5 percent.

Low stabilized dunes may occur occasionally on this site. Elevations range from 2,800 to 5,000 feet.

**Table 2. Representative physiographic features**

Landforms	(1) Plain (2) Fan piedmont (3) Terrace
Flooding frequency	None
Ponding frequency	None
Elevation	2,842–4,500 ft
Slope	0–5%
Aspect	Aspect is not a significant factor

### 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 which rapidly dries out the soil during a critical period 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)	200 days
Freeze-free period (average)	219 days
Precipitation total (average)	12 in

## Influencing water features

This site is not influenced from water from wetlands or streams.

## Soil features

Soils are moderately deep or very deep. Surface textures are loamy fine sand, fine sandy loam, loamy very fine sand or gravelly sandy loam.

Subsurface is a sandy loam, loam, sandy clay loam, clay loam (contains more than 45 percent sand and 18 to 35 percent clay) and less than 15 percent carbonates.

Substratum is a sandy loam, fine sandy loam, sandy clay loam, clay loam, coarse sandy loam, or coarse sand and Calcium carbonate equivalent of 15 to 40 percent. Some layers high in lime or with caliche fragments may occur at depths of 20 to 30 inches.

These soils, if unprotected by plant cover and organic residue, become wind blown and low hummocks are formed. They contains more than 45 percent sand and 18 to 35 percent clay.

Minimum and maximum values listed below represent the characteristic soils for this site.

Characteristic Soils Are:

Anthony  
Berino  
Cacique  
Harkey  
Pajaritio  
Reakor  
Mobeetie  
Wink  
Sotim  
Vinton  
Drake  
Onite  
Alma  
Poquita  
Dona Ana  
Monahans

Note: \*Cacique soils is a shallow soil.



**Table 4. Representative soil features**

Surface texture	(1) Fine sandy loam (2) Sandy loam (3) Loamy fine sand
Family particle size	(1) Loamy
Drainage class	Well drained to moderately well drained
Permeability class	Moderately rapid to moderately slow
Soil depth	30–72 in
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3–11 in
Calcium carbonate equivalent (0-40in)	5–30%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–1
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0%

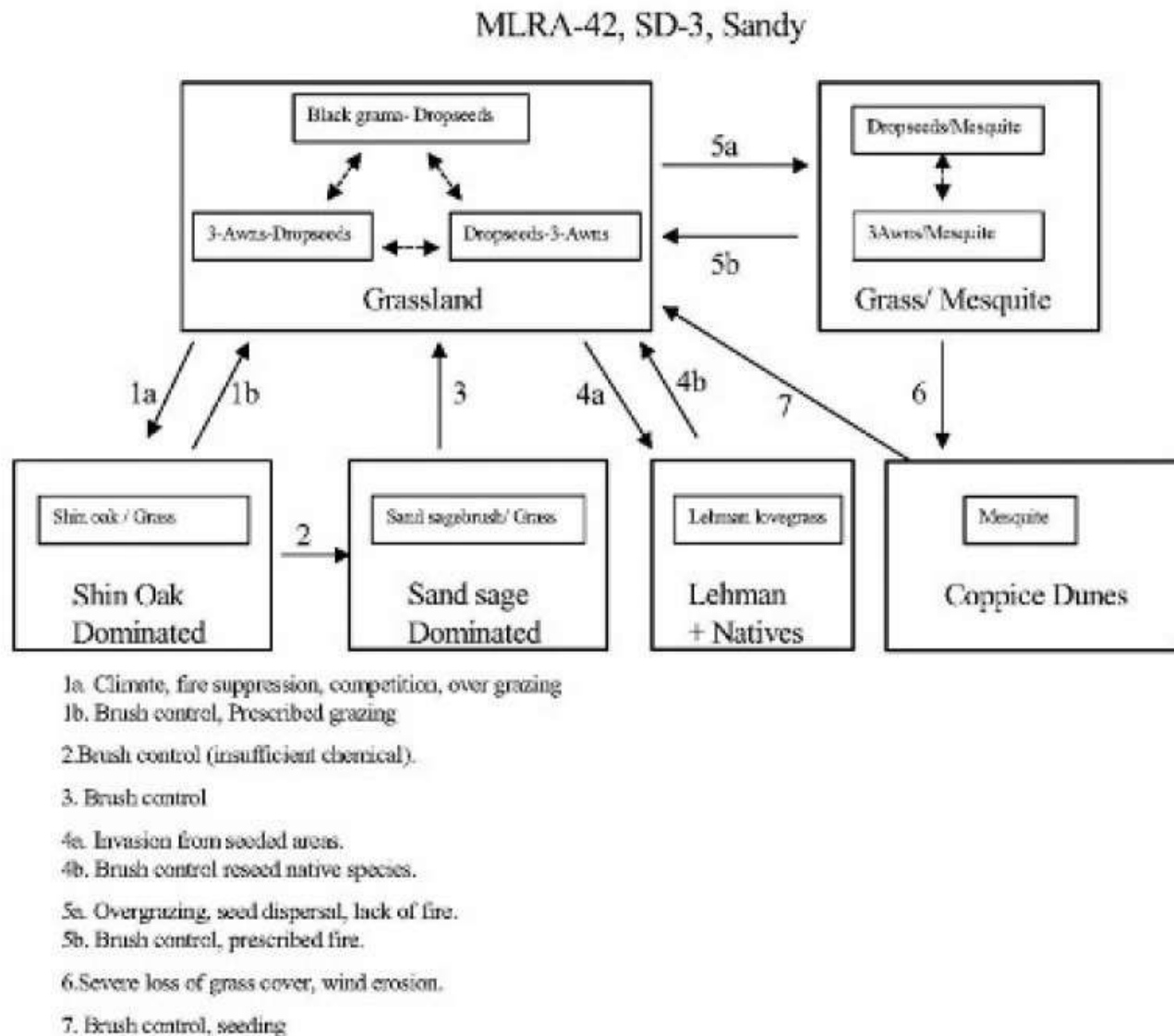
## Ecological dynamics

### Overview

The Sandy site often intergrades with the Loamy Sand and Deep Sand sites (SD-3). Sandy sites occur on plains, fans, or terraces between drainages. Slopes average less than five percent. Surface textures are usually sandy loams. The historic plant community of the Sandy site is dominated by black grama (*Bouteloua eriopoda*) and dropseeds (*Sporobolus flexuosus*, *S. contractus*, *S. cryptandrus*). Blue grama (*B. gracilis*) also occurs as a subdominant species. Perennial and annual forb abundance is distributed relative to precipitation occurrence. Litter and to a lesser extent, bare ground, compose a significant proportion of the ground cover while grasses compose the remainder. Decreases in black grama and other grass species' cover indicate a transition to states with an increased shrub component. Shinnery oak (*Quercus havardii*), sand sage (*Artemisia filifolia*), and honey mesquite (*Prosopis glandulosa*) can all increase in composition. Lehmann lovegrass (*Eragrostis lehmanniana*) also may occur as a result of invasion and competition among grass species. Heavy grazing intensity and/or drought are influential in decreasing grass cover and subsequently increasing shrub cover. Fire suppression further supports shrub cover increase and an advantage over grass species. However, brush and grazing management may restore grass species and reverse shrub or grass/shrub dominated states back toward the historic plant community.

### State and transition model

## Plant Communities and Transitional Pathways (diagram)



### State 1 Historic Climax Plant Community

#### Community 1.1 Historic Climax Plant Community

Grassland: The historic plant community is composed primarily of black grama, dropseeds, and a secondary component of blue grama. Black grama tends to dominate due to the predominance of sandy loam soils; however, dropseeds increase on more loamy soils. Perennial and annual forbs are common but their abundance and



distribution are dependent on seasonal precipitation. Historical fire frequency is unknown but probably contributed to shrub reduction to the competitive advantage of grass species. Excessive grazing and drought are likely the dominant drivers that decrease black grama and increase dropseed and threeawn abundance within the historic plant community. Black grama has low seed viability, and therefore, reproduces vegetatively during the summer growing season. However, black grama growth is delayed one season after normal precipitation. Black grama is dormant for the remainder of the year; however, black grama retains nutritive value yearlong for grazing. In contrast, dropseeds have relatively abundant, viable seed production and can benefit from early spring as well as summer precipitation. Threeawns also respond to spring and summer moisture and tend to be the year's first palatable species. Threeawns and dropseeds, however, are not palatable during dormant periods, which extends grazing pressure to black grama. Moderate to heavy grazing reduces vegetative cover of black grama which increases its susceptibility to wind erosion and drought (Canfield 1939). Black grama is especially vulnerable to grazing during the summer growing season when stoloniferous growth and rooting occur. Black grama sustains short droughts through reduction of plant tufts which will subsequently emerge with sufficient moisture. Prolonged drought or grazing concurrently under drought conditions can delay or impede recovery of black grama (Nelson 1934) and increase abundance of dropseeds, threeawns, and blue grama. Historical fire events may have benefited black grama, especially, frequent, light intensity/severity fires in conjunction with sufficient moisture to increase stolon production (McPherson 1995). Fires which were hot and severe, however, probably contributed to black grama mortality, more so in drought conditions. Diagnosis: This state is a grassland dominated by black grama, dropseeds, and threeawns, with subdominant blue grama. Shrubs, such as sand sage and mesquite, are sparsely dispersed throughout the grassland. Forb populations are present and fluctuate with precipitation variability. Other grasses that could appear on this site include: fall withchgrass, slim tridens, Alamejita signalgrass, Indian ricegrass and fluffgrass. Other shrubs include: pale wolfberry, lotebush, tarbush, Apacheplume, and mesquite. Other forbs include: plains tickseed, plains blackfoot, scorpionweed, nama, wooly guara, wooly dalea, spectaclepod mustard, bladderpod mustard, menodora, prickly lettuce, lambsquarter, wooly Indianwheat and wild buckwheat.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	480	720	960
Forb	90	135	180
Shrub/Vine	30	45	60
<b>Total</b>	<b>600</b>	<b>900</b>	<b>1200</b>

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	35-40%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	35-45%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	15-20%

Figure 7. Plant community growth curve (percent production by month).  
 NM2804, R042XC004NM-Sandy-HCPC. SD-3 Sandy - Warm season plant community .

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	3	4	10	10	25	30	12	5	0	0

## State 2

### Shinnery Oak Dominated

#### Community 2.1

##### Shinnery Oak Dominated

Shinnery Oak Dominated: This state is dominated by Shinnery oak with subdominant grass species from the historic plant community. Bare ground is a significant component in this state. Shinnery oak tends to be clumped in distribution in finer soil textures. Shinnery oak density increases (as well as dropseeds, threeawns, and blue grama) in coarse textured (e.g., Loamy Sand sites) and deeper, coarse textured (e.g., Deep Sand and Sandhills sites) soils. Shinnery oak predominates during periods of above average (i.e., 16 in.) precipitation during the months of July and August. Abundance and distribution also increases with disturbance, such as excessive grazing and fire, due to an aggressive rhizome system. Shinnery oak's extensive root system allows competitive exclusion of grasses and forbs. Brush control with herbicide treatments applied in the spring can reduce Shinnery oak (Herbel et al. 1979, Pettit 1986). In addition, repetitive seasons of goat browsing can also decrease Shinnery oak abundance. However, brush management should maintain shrub patches to prevent erosion and to provide wildlife cover and forage. Diagnosis: This state represents a clumped distribution of Shinnery oak with patches of bare ground and subdominant grass species, such as black grama, dropseeds, threeawns, and blue grama. Shinnery oak density increases, as do dropseeds, threeawns, and blue grama, as Sandy site intergrades with Deep Sand and Sandhills sites. Transition to Shinnery Oak-Dominated State (1a): Decrease in black grama with subsequent decrease in dropseeds and threeawns. Increase in Shinnery oak as a result of drought, above average precipitation (>16 inches), grazing, fire suppression, interspecific competition, and coarse textured soils. Key indicators of approach to transition: • Loss of black grama and other grass species cover • Increase of dropseed/threeawn and shinnery oak • Surface soil erosion and bare patch expansion Transition to Historic Plant Community (1b): The Shinnery oak-dominated state begins to transition toward the historic plant community as drivers such as drought, but also above average precipitation (e.g., 16 inches) discontinue. Brush control can also drive the Shinnery oak state toward a grassland state.

## State 3

### Sand Sage Dominated

#### Community 3.1

##### Sand Sage Dominated

Sand Sage Dominated: This state is dominated by sand sage with subdominant grass species from the historic plant community. Sand sage occurs as a result of insufficient herbicide application in Shinnery oak dominated sites with subdominant sand sage. Sand sage either reestablishes dominance or colonizes from an off-site location and stabilizes soils. Sand sage stabilizes light sandy soils from wind erosion and provides a harbor for grass and forb species in heavily grazed conditions (Davis and Bonham 1979). Sand sage abundance increases with drought and/or heavy grazing, but decreases with light grazing due to herbaceous plant competition. Grass and forb species can reestablish as competition from sand sage is relatively light. Herbicide applied in the spring, especially when growth and photosynthesis rates are greatest, can reduce sand sage if there is subsequent rest from grazing (Herbel et al. 1979, Pettit 1986). Brush management should maintain patches of sand sage to prevent wind erosion and subsequent dune formation. Diagnosis: This state is dominated by sand sage with subdominant grass species, such as black grama, dropseeds, threeawns, and blue grama. Sand sage tends to occur in sites with coarser textured soils. Transition to Sand Sage Dominated (2): Sand sage appears from off-site locations and/or increases after insufficient herbicide applications aimed at removing Shinnery oak and sand sage. Key indicators of approach to transition: • Increase of sand sage seedlings and grasses • Reduced soil erosion Transition to Historic Plant Community (3): The sand sage dominated state transitions toward the historic plant community as sand sage decreases primarily through brush management but also with light intensity grazing management. Drought reduction will also support a transition to the historic plant community.



**State 4****Lehmann Lovegrass + Natives****Community 4.1****Lehmann Lovegrass + Natives**

Lehmann Lovegrass + Natives: This state is dominated by Lehmann lovegrass with subdominant grass species from the historic plant community. Lehmann lovegrass is a warm-season, perennial bunchgrass that was introduced from South Africa in the 1930's for rangeland restoration purposes (Humphrey 1970). Lehmann lovegrass invades from off-site locations with projects utilizing lovegrass for reseeding, soil stabilization, or highway projects. Lehmann lovegrass provides a winter and early spring forage for grazing. Lehmann lovegrass is vigorous in sandy to sandy loam soils which receive approximately 6-8 inches of summer precipitation (Cox et al. 1988). Lehmann lovegrass's aggressive competitive exclusion of native grass species has been attributed to lovegrass's low summer palatability, which reduces vigor of native species and allows lovegrass to increase vigor before grazing. Also, Lehmann lovegrass abundant seed production and establishment, especially after disturbances, allows for increased competition (Cable 1971, Cox et al. 1981). Lehmann lovegrass generally is tolerant to fire because of an aggressive seed-bank; however, severe fires can cause mature lovegrass mortality (Sumrall et al. 1991). Herbicide and reseeding is recommended for control of Lehmann lovegrass (Winn 1991). Diagnosis: Lehmann lovegrass and grass species from the historic plant community, such as black grama, dropseeds, threeawns, and blue grama, dominate this state. Transition to Lehmann lovegrass and native grass species (4a): Decrease in black grama with subsequent decrease in dropseeds and threeawns. Increase in Lehmann lovegrass as a result of drought, grazing, fire and interspecific competition from nearby sources of Lehmann lovegrass. Key indicators of approach to transition: • Loss of black grama and other grass species cover • Disturbance and nearby source of Lehmann lovegrass • Increase of Lehmann lovegrass seedlings Transition to Historic Plant Community (4b): The Lehmann lovegrass/native grass state transitions toward the historic plant community after actions such as herbicide application and native reseeding have occurred. In addition, prevention of disturbances such as fire and livestock grazing also will encourage the transition to a native grass community

**State 5****Grass/Mesquite****Community 5.1****Grass/Mesquite**

Grass/Mesquite: This state is dominated by honey mesquite with dropseeds and/or threeawns. Black grama generally is rare as a result of heavy grazing intensity. Honey mesquite invades through seed dispersal from grazing livestock and/or wildlife. Dropseeds and threeawns cohabitate with mesquite due to sufficient precipitation. Mesquite tends to be arborescent due to less soil erosion relative to the Coppice Dunes state which reflects large soil loss. Mesquite obtains approximately half of its nitrogen from symbiotic bacteria housed in root nodules (Lajtha and Schlesinger 1986). Mesquite also provides nitrogen and soil organic matter to co-dominant grasses (Ansley and Jacoby 1998, Ansley et al. 1998). Historical fire occurrences reduced mesquite abundance by disrupting seed production cycles and suppressing seedlings; thus, grass species remained dominant. However, fire suppression has allowed mesquite to increase in density and abundance, increasing mesquite resistance to fires through aggressive resprouting. Herbicide application combined with subsequent prescribed fire may be effective in mesquite reduction (Britton and Wright 1971). Diagnosis: This state is co-dominated by honey mesquite and dropseeds or threeawns. Transition to Grass/Mesquite State (5a): This state occurs due to a decrease in black grama primarily from heavy grazing intensity and from an introduction of mesquite seeds from grazers. Dropseeds and threeawns increase and co-exist in the absence of black grama. Fire suppression also is responsible for an increase in mesquite. Key indicators of approach to transition: • Loss of black grama • Increase of dropseeds and/or threeawns • Increase of mesquite seedlings Transition to Historic Plant Community (5b): Transition to the historic plant community requires brush management though herbicide application and possibly prescribed fire to reduce mesquite abundance. Once shrub species are removed, prescribed fire may be useful in maintaining a dominant grassland. Precipitation is also necessary in conjunction with management activities to support a dominant grassland.

**State 6**

## Coppice Dunes

### Community 6.1 Coppice Dunes

Coppice Dunes: This state is dominated by coppice mesquite dunes with minimal or no grass cover. Honey mesquite occurs in a multi-stemmed growth form which cultivates its dune formation by entrapping drifting sands. Mesquite utilizes its extensive tap and lateral roots to benefit from moisture deep in coarse textured soils. Grass species cannot compete for moisture, especially with compounding perturbations such as heavy grazing and drought. Soils succumb to wind erosion with the depletion of grass cover and eventually dunes form around mesquite plants (Gould 1982). Brush management is limited to herbicide application, biological control, or manual removal, as a lack of grass cover prevents prescribed burning. Seeding subsequent to brush control may transition this State toward the historic plant community. Diagnosis: This state is characterized by low growing, multi-stemmed mesquite plants which form Coppice dunes by drifting soils from wind erosion. As grass cover decreases, windblown soils are removed from unprotected, inter-dune areas. Soils are then re-deposited on dunes which increases dune size. Transition to Mesquite Coppice Dunes State (6): Decrease in black grama with subsequent decrease in dropseeds and threeawns due to competition with mesquite especially during drought, heavy grazing, and fire suppression. Competitive exclusion of grasses leads to wind erosion of sandy soils and dune formation of low growing mesquite plants. Key indicators of approach to transition: • Loss of black grama and other grass species cover • Wind erosion as evidenced by pedestalled plants • Bare patch expansion • Increase of Coppice dune mesquites Transition to Historic Plant Community (7): Transition toward the historic plant community requires mesquite removal though either herbicide application, biological control, or manual removal. In addition, seeding of native grass species with subsequent years of sufficient moisture is critical.

### Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Warm Season</b>			315–360	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	315–360	–
2	<b>Warm Season</b>			45–90	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	45–90	–
3	<b>Warm Season</b>			27–45	
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	27–45	–
4	<b>Warm Season</b>			90–135	
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	90–135	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	90–135	–
	mesa dropseed	SPFL2	<i>Sporobolus flexuosus</i>	90–135	–
5	<b>Warm Season</b>			27–45	
	threeawn	ARIST	<i>Aristida</i>	27–45	–
6	<b>Warm Season</b>			27–45	
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	27–45	–
7	<b>Warm Season</b>			27–45	
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	27–45	–
8	<b>Warm Season</b>			45–72	
	silver bluestem	BOSA	<i>Bothriochloa saccharoides</i>	45–72	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	45–72	–
9	<b>Warm Season</b>			9–27	
	vine mesquite	PAOB	<i>Panicum obtusum</i>	9–27	–



10	<b>Warm Season</b>			9–27	
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	9–27	–
11	<b>Other Perennial Grasses</b>			9–27	
	Grass, perennial	2GP	<i>Grass, perennial</i>	9–27	–
<b>Shrub/Vine</b>					
12	<b>Shrub</b>			9–45	
	yucca	YUCCA	<i>Yucca</i>	9–45	–
13	<b>Shrub</b>			9–27	
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa var. biuncifera</i>	9–27	–
14	<b>Shrub</b>			9–27	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	9–27	–
15	<b>Shrub</b>			9–27	
	jointfir	EPHED	<i>Ephedra</i>	9–27	–
16	<b>Shrub</b>			9–27	
	javelina bush	COER5	<i>Condalia ericoides</i>	9–27	–
17	<b>Shrub</b>			9–27	
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	9–27	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	9–27	–
18	<b>Other Shrubs</b>			9–27	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	9–27	–
<b>Forb</b>					
19	<b>Forb</b>			27–63	
	croton	CROTO	<i>Croton</i>	27–63	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	27–63	–
20	<b>Forb</b>			27–45	
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	27–45	–
	woolly groundsel	PACA15	<i>Packera cana</i>	27–45	–
21	<b>Forb</b>			9–27	
	Adonis blazingstar	MEMU3	<i>Mentzelia multiflora</i>	9–27	–
22	<b>Forb</b>			27–45	
	redstem stork's bill	ERCI6	<i>Erodium cicutarium</i>	27–45	–
	Texas stork's bill	ERTE13	<i>Erodium texanum</i>	27–45	–
23	<b>Other Forbs</b>			9–27	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	9–27	–

## Animal community

This site provides habitat which support a resident animal community that is characterized by pronghorn antelope, black-tailed jackrabbit, spotted ground squirrel, black-tailed prairie dog, yellow-faced pocket gopher, Ord's kangaroo rat, Northern grasshopper mouse, southern plains woodrat, badger, meadowlark, roadrunner, burrowing owl, white-necked raven, cactus wren, pyrrhuloxia, lesser prairie chicken, mourning dove, scaled quail, Harris' hawk, side-blotched lizard, marbled whiptail, Texas horned lizard, prairie rattlesnake, plains spadefoot toad, and ornate box turtle.

## 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

Anthony B

Berino B

Cacique C \*shallow soil

Harkey B

Pajaritio B

Reakor B

Mobeetie B

Wink B

Sotim B

Vinton B

Drake B

Onite B

Alma B

Poquita B

Dona Ana B

Monahans B

## Recreational uses

This site offers recreation potential for hiking, horseback riding, nature observation, and photography, bird, antelope and predator hunting. During years of abundant spring moisture, this site displays a colorful array of wildflowers.

## Wood products

This site has no potential for wood products.

## Other products

This site is suitable for grazing by all classes and kinds of livestock during all seasons of the year. Under retrogression, plants such as black grama, blue grama, bush muhly, plains brome, Arizona cottontop, vine mesquite, little bluestem and fourwing saltbush will decrease while the dropseeds, threeawns, tobosa, yucca, catclaw mimosa, javelinabush, mesquite and broom snakeweed will increase. This site responds well to brush management and deferment. It is best 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 2.7 – 3.8

75 – 51 3.5 – 5.0

50 – 26 5.0 – 8.0

25 – 0 8.1 +

## 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 Chaves County.



## Other 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 Chaves County.

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## Contributors

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Quinn Hodgson

## 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:**

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17. **Perennial plant reproductive capability:**

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# Ecological site R070BC017NM Bottomland

Accessed: 11/14/2024

## General information

**Provisional.** A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

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 broad valleys, flood plains or basins at the lowest position in relation to adjacent landscapes. They are derived from mixed alluvium for sandstone, shale and limestone. It is found at the mouth of intermittent drainages or draws. Slopes are level to nearly level, averaging less than 3 percent. Elevations range from 2,842 to 4,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Alluvial flat (2) Valley floor (3) Basin floor
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	2,842–4,000 ft
Slope	1–3%
Aspect	Aspect is not a significant factor

## Climatic features

The climate of the area is “semi-arid continental”. 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. This site receives overflow from heavy summer rains periodically. Occasionally water will stand on the surface for short periods. When this happens frequently, or when water stands for longer periods, only the plants that can tolerate inundation, such as giant sacaton, will survive. During drought periods or when long periods occur between overflows, a variety of plants will move in and establish on the site.

**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 may be associated or influenced by wetlands and/or streams but does not normally meet wetland criteria.

## Soil features

The soils of this site are deep and very deep. Surface textures are loamy fine sand, very fine sandy loam, fine sandy loam, sandy loam, silty loam, loam, clay loam or silty clay loam. The underlying layers may be loam, silt loam, clay loam, silty clay loam, sandy loam, fine sandy loam or loamy fine sand. These soils may have thin stratas of sand, silt, clay, very fine sand or very fine sandy loam. The soils have rapid to moderately slow permeability.

Minimum and maximum values listed below represent the characteristic soils for this site.

Characteristic Soils:

Glendale  
Bippus  
Bigetty  
Largo  
Harkey  
Pecos  
Pima  
Dev  
Pima Variet

**Table 4. Representative soil features**

Surface texture	(1) Loamy fine sand (2) Loam (3) Fine sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to rapid
Soil depth	72 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–1%
Available water capacity (0-40in)	3–8 in

Calcium carbonate equivalent (0-40in)	3–15%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–1%

## Ecological dynamics

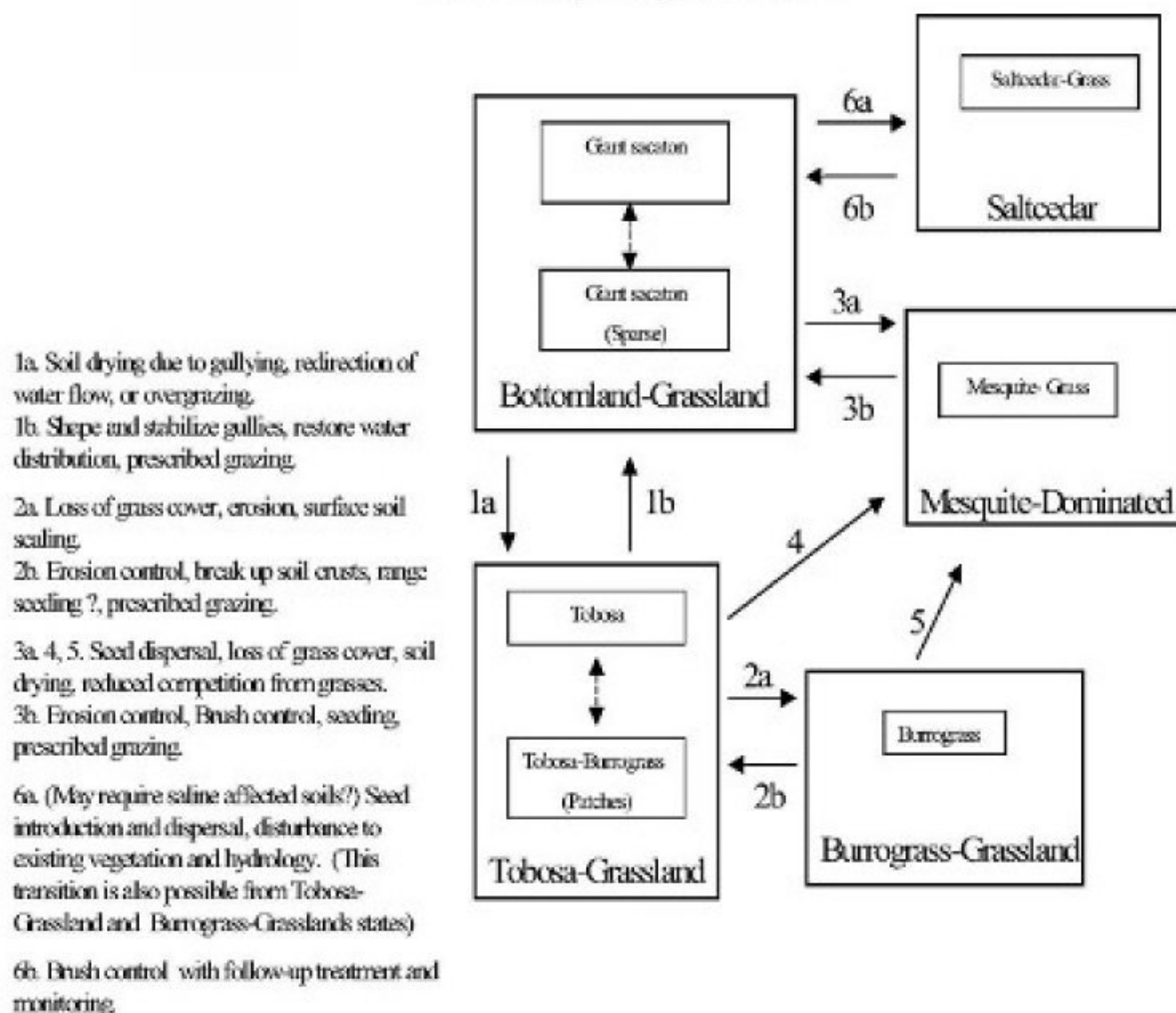
The Bottomland site occurs on broad valleys and flood plains at the lowest positions on the landscape and is subject to periodic flooding. This periodic flooding and deep wetting essentially determine vegetation patterns on this site. The Bottomland site is associated with and often found at the mouth of Draw sites. The potential plant community exhibits a tall grass aspect largely dominated by giant sacaton. Soil drying due to overgrazing, gullyng, and redirection or blockage of water flow may cause the transition to a tobosa-dominated state. A state dominated by burrograss may result due to continued loss of tobosa, erosion, and soil surface sealing—especially on silt loam and silty clay loam textured surface soils. A mesquite-dominated state may result from the loss of grass cover and dispersal of mesquite seed. Saltcedar may invade in response to changes in the historical flow regimes and the introduction of its seed—especially along stream channels or on soils adjacent to areas with a high water table.

## State and transition model



## Plant Communities and Transitional Pathways (diagram)

## MLRA-42, SD-3, Bottomland

**State 1****Historic Climax Plant Community****Community 1.1****Historic Climax Plant Community**

**Bottomland Grassland:** The historic plant community is principally dominated by giant sacaton. Some additional grass species representative of this site include alkali sacaton, tobosa, vine mesquite, plains bristlegrass, and twoflower trichloris. Fourwing saltbush and mesquite are two of the more common shrubs associated with this site, but in the historic community they are sparsely scattered across the site. Giant sacaton has the capability to produce large amounts of aboveground biomass, which provides important forage for livestock and helps to slow runoff, increase infiltration, and protect the site from erosion. Grazing in the spring, deferring grazing in the fall, or during dry summers, can maximize forage production.<sup>4</sup> Mowing giant sacaton during the summer may improve forage

quality and accessibility while minimizing negative effects on production.<sup>3</sup> Fire has produced mixed results depending on time of year and fire intensity. Several growing seasons may be required for giant sacaton to recover pre-burn production levels. Overgrazing, drought, or fire can cause a decrease in giant sacaton, vine mesquite, alkali sacaton, plains bristlegrass, and twoflower trichloris. A sparser, less vigorous sacaton community may result. Continued loss of grass cover increases erosion, effectively drying the site causing the transition to an alternate grassland state (Tobosa Grassland). Diagnosis: Giant sacaton is the dominant grass. Grass cover is uniform. Litter cover is high, and bare patches are few and less than 2 m in length. Shrubs are sparse, averaging less than three percent canopy cover.

**Table 5. Annual production by plant type**

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2125	3188	4250
Shrub/Vine	200	300	400
Forb	175	262	350
<b>Total</b>	<b>2500</b>	<b>3750</b>	<b>5000</b>

**Table 6. Ground cover**

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	35-40%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	40-45%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	15-20%

**Figure 5. Plant community growth curve (percent production by month). NM2817, R042XC017NM Bottomland HCPC. R042XC017NM Bottomland 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 Tobosa Grassland

### Community 2.1 Tobosa Grassland

Additional States: Tobosa Grassland: This state is characterized by the predominance of tobosa. On fine-textured soils that receive surface run-in water, tobosa may attain dense almost pure stands. On drier sites that receive less water due to gullyng, or due to decreased infiltration, associated with loss of grass cover, tobosa occurs in scattered patches with large areas of bare ground. Burrograss is the sub-dominant species. In the absence of grazing, tobosa tends to stagnate and accumulates large amounts of standing dead material. Rotational grazing, or burning during years with adequate precipitation following fire may help to maximize tobosa production and forage quality.<sup>1,12</sup> Burning during years with below average precipitation may limit increases in tobosa yield the first year



following fire.6 Diagnosis: Tobosa is the dominant grass species. Grass cover is variable (depending on the degree of site degradation) ranging from uniform to patchy. Transition to Tobosa Grassland (1a) The transition to a tobosa-dominated community is believed to result from decreased available soil moisture due to the redirection or blockage of run-in water, gullying, or overgrazing. Roads or other physical barriers on site or off site may cause the redirection or blockage of run-in water. Reduction of overland flow and decreased residence time of stand water may favor tobosa dominance. Tobosa is favored by sites that receive periodic flooding, but cannot withstand extended periods of inundation. Overgrazing increases runoff rates and gully formation, reduces infiltration, effectively drying the site. Sites with finer textured soils may have a greater susceptibility for dominance by tobosa. 12 Key indicators of approach to transition: Decreased vigor and cover of giant sacaton Increase in the amount of tobosa Reduced overland flow and residence time of standing water Formation of gullies or deepening of existing channels Transition back to Bottomland Grassland (1b) The natural hydrology of the site must be restored. Culverts, turnouts, or rerouting roads may help re-establish natural overland flow, if roads or trails have blocked or altered the flow of run-in water. Erosion control structures or shaping and filling gullies may help regain natural flow patterns and establish vegetation if the flow has been channeled. Prescribed grazing will help establish proper forage utilization and maintain grass cover and litter necessary to protect the site from accelerated erosion.

### **State 3 Burrograss Grassland**

#### **Community 3.1 Burrograss Grassland**

Burrograss Grassland: Burrograss is the dominant species. Tobosa is typically present in varying amounts, usually in patches or clumps occupying the more moist depressions. Burrograss ranks poor as a forage grass, but begins growth early and is used to some extent when young and green. Burrograss is favored by calcareous fine textured soils and spreads by seed and stolons. It produces large amounts of seed with wiry awns that help in dissemination, and in augering the hardened callus (tip of the seed) into the soil. The ability of burrograss to auger into soils enables it to establish and expand on bare soils prone to crust over with physical and biological crusts. Diagnosis: Burrograss is the dominant grass species. Grass cover is variable ranging from patchy to very patchy. Large bare areas are present and interconnected. Physical crusts are present and may occupy most of the bare areas. Transition to Burrograss Grassland (2a) Loss of grass cover, decreased soil moisture, soil surface sealing, and erosion enable this transition. As grass cover declines, organic matter and infiltration decrease. Erosion increases, removing soil and nutrients from bare areas, which results in soil sealing. Burrograss produces substantial amounts of viable seed and is one of the few grasses able to maintain, and even increase, on bottomland soils that are sealed by biological and physical crusts. Key indicators of approach to transition: Decrease in cover of tobosa Increased amount of bare ground Increased evidence of physical and biological crusts. Transition back to Tobosa Grassland (2b) Erosion control structures may help regain natural overland flow and increase vegetation cover (see transition 1b above). Re-establishing grass cover will further decrease erosion and increase infiltration. Breaking up physical crusts by soil disturbance may promote infiltration and seedling emergence. Seeding may be necessary if inadequate seed source remains. Prescribed grazing will help establish proper forage utilization and maintain grass cover.

### **State 4 Mesquite-Dominated**

#### **Community 4.1 Mesquite-Dominated**

Mesquite-Dominated State: This state is characterized by the dominance of mesquite, and by accelerated erosion. Grass cover is variable, but typically patchy. Diagnosis: Mesquite is the dominant species in aspect and composition. Grass cover is typically patchy with large, interconnected bare areas present. Giant sacaton and alkali sacaton are absent or restricted to small patches. Tobosa or burrograss are the dominant grasses on this site. Rills and gullies may be common and actively eroding. Transition to Mesquite-Dominated (3a, 4, 5) The reasons for different pathways in transitions to a mesquite-dominated state versus a tobosa or burrograss grassland with few shrubs are not known. Dispersal of shrub seed, persistent loss of grass cover, and competition between shrubs and remaining grasses for resources may drive this transition. Loss of grass cover reduces infiltration, decreasing available soil moisture necessary for grass seedling establishment. Reduced soil moisture may favor mesquite

establishment and survival. Accelerated erosion due to loss of grass cover can relocate organic matter and nutrients from shrub interspaces, and concentrate them around shrub bases.<sup>14</sup> This relocation of resources further increases the shrubs competitive advantage. Key indicators of approach to transition: Increase in size and frequency of bare patches. Loss of grass cover in shrub interspaces. Increased signs of erosion. Transition back to Bottomland Grassland (3b) Erosion control methods such as shaping and filling gullies, net wire diversions, rock and brush dams, etc. may be needed to curtail erosion and restore site hydrology. Brush control will be necessary to overcome competition between shrubs and grass seedlings. Seeding may expedite recovery or may be necessary if an adequate seed source is no longer remaining. Prescribed grazing will help ensure adequate deferment and proper forage utilization following grass establishment. The degree to which this site is capable of recovery depends on the restoration of hydrology, the extent of degradation to soil resources, and adequate rainfall necessary to establish grasses.

## **State 5 Saltcedar State**

### **Community 5.1 Saltcedar State**

Saltcedar State: Saltcedar is an aggressive invader that typically invades on fine-textured soils where its roots can reach the water table, but once established it can survive without access to ground water. It reaches maximum density where the water table is from 1.5 to 6 m deep, and forms more open stands where the water table is deeper.<sup>9,10</sup> Saltcedar is a prolific seed producer. It is resistant to fire, periods of inundation with water, salinity, and re-sprouts following cutting. Saltcedar can also increase soil salinity by up-taking salts and concentrating them in its leaves and subsequent shedding of the leaves to the soil surface. Diagnosis: This state is characterized by the presence of saltcedar. Saltcedar cover is variable ranging from sparse to dense. Densities may depend on such variables as depth to ground water, timing and duration of flood events, and soil texture and salinity. Grass cover varies in response to saltcedar density. Transition to Saltcedar State (6a) It is not know if this transition occurs only on saline affected soils, or if it can occur on non-saline sites. Salty Bottomland sites typically have a higher susceptibility to the invasion of saltcedar. The invasion of saltcedar is associated with saline soils, the presence of saltcedar on adjacent sites and dispersal of its seed, and disturbance to existing vegetation or hydrology. Saltcedar propagules must be present to invade and establish on bottomland sites. Disturbance such as fire, grazing, or drought may facilitate the establishment of saltcedar by decreasing the vigor of native vegetation and providing bare areas for saltcedar seedling establishment with minimal competition. Changes in seasonal timing, rate and volume of run-in water may facilitate the establishment of saltcedar on Bottomland sites.<sup>8</sup> Damming rivers has reduced flow volume and caused shifts in the timing of peak flow from spring to summer. The reduced flows have increased fine sediments, creating the ideal conditions for saltcedar seedling establishment. Summer water discharges provide water at times consistent with saltcedar seed production. Increases in salinity due to return of irrigation water to streams and ditches may also support the establishment of saltcedar. (This transition should also possible from the Tobosa-Grassland and Burrograss-Grassland states). Key indicators of approach to transition: Increase in size and frequency of bare patches. Changes in timing and volume of peak discharge Increased soil salinity Presence of saltcedar propagules Transition back to Bottomland Grassland (6b) Saltcedar control is costly and often labor intensive. Control programs utilizing herbicide, or herbicide in conjunction with mechanical control or prescribed fire have proven effective in some instances.<sup>5,7,11</sup> Without restoring historical flow regimes, extensive follow-up management may be necessary to maintain the bottomland grassland.<sup>13</sup>

## **Additional community tables**

**Table 7. Community 1.1 plant community composition**



Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1				2438–2625	
	big sacaton	SPWR2	<i>Sporobolus wrightii</i>	2438–2625	–
2				263–375	
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	263–375	–
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	263–375	–
3				263–375	
	vine mesquite	PAOB	<i>Panicum obtusum</i>	263–375	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	263–375	–
4				113–188	
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	113–188	–
	white tridens	TRAL2	<i>Tridens albescens</i>	113–188	–
	false Rhodes grass	TRCR9	<i>Trichloris crinita</i>	113–188	–
5				113–188	
	Grass, perennial	2GP	<i>Grass, perennial</i>	113–188	–
<b>Shrub/Vine</b>					
6				113–188	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	113–188	–
7				38–113	
	honey mesquite	PRGL2	<i>Prosopis glandulosa</i>	38–113	–
8				38–113	
	Apache plume	FAPA	<i>Fallugia paradoxa</i>	38–113	–
	American tarwort	FLCE	<i>Flourensia cernua</i>	38–113	–
	littleleaf sumac	RHMI3	<i>Rhus microphylla</i>	38–113	–
9				38–113	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	38–113	–
<b>Forb</b>					
10				75–188	
	coyote gourd	CUPA	<i>Cucurbita palmata</i>	75–188	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	75–188	–
	broadleaved pepperweed	LELA2	<i>Lepidium latifolium</i>	75–188	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	75–188	–
11				75–188	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	75–188	–

## Animal community

This site provides habitats which support a resident animal community that is characterized by black-tailed jackrabbit, yellow-faced pocket gopher, coyote, meadowlark, mourning dove, scaled quail, sparrow hawk, Western spadefoot toad and Western diamondback rattlesnake. Where this site includes riparian vegetation along the Pecos and Black rivers, the resident animal community is characterized by raccoon, gray fox, muskrat, red-winged blackbird, summer tanager, ferruginous hawk, mourning dove, Gambel's quail, killdeer, tree lizard, Eastern fence lizard, tiger salamander, leopard frog, bullfrog and checkered garter snake.

Most resident birds and Bullock's oriole, blue grosbeak, painted bunting, Swainson's hawk and mourning dove nest. Where aquatic macrophytes occur, yellow-throated warbler nest. Sandhill crane and long-billed curlew winter along the Pecos River and American avocet and blacknecked stilt utilize this site during migration. The golden eagle utilizes larger trees for roosting and occasionally, nesting.

## 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

Bippus----- B

Bigetty----- C

Glendale----- B

Harkey----- B

Largo----- B

Pima----- B

Dev----- A

Pecos----- D/B

## Recreational uses

This site offers recreation potential for hiking, nature observation and photography in addition to antelope, quail and dove hunting.

Natural beauty is enhanced by the contrast between this lush vegetated site and the drier, more barren sites which surround it.

## Wood products

This site has no real potential for wood products. Where woody species have increased, they can be used for curiosities or small furniture.

## Other products

This site is well suited for all kinds and classes of livestock, during all seasons of the year. It is best suited for cows during the growing season. Periodic removal of excess coarse stalk material by burning, shredding or mowing every other year will help to keep new growth available to livestock. Burning, if practiced, should be done in late winter or early spring when soil surface moisture is present. Retrogression is characterized by a decrease in vine-mesquite and vigor of giant sacaton. Alkali sacaton, plains bristlegrass and twoflower trichloris decrease. This causes an increase in tobosa to a point of being a colony type of vegetation. Continued retrogression can cause severe water erosion that can destroy the potential of this site.

## Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index - Ac/AUM

100 - 76----- 1.0 – 2.3

75 – 51----- 2.0 – 3.3

50 – 26----- 3.4 – 6.0

25 – 0----- 6.1 - +

## Other references

Literature References:



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13. Smith S. D. and D. A. Devitt. 1996. Physiological ecology of saltcedar: why is it a successful invader? Presentation at Saltcedar Management and Riparian Restoration Workshop, Las Vegas, NV, September, 1996.
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## 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):**
- 

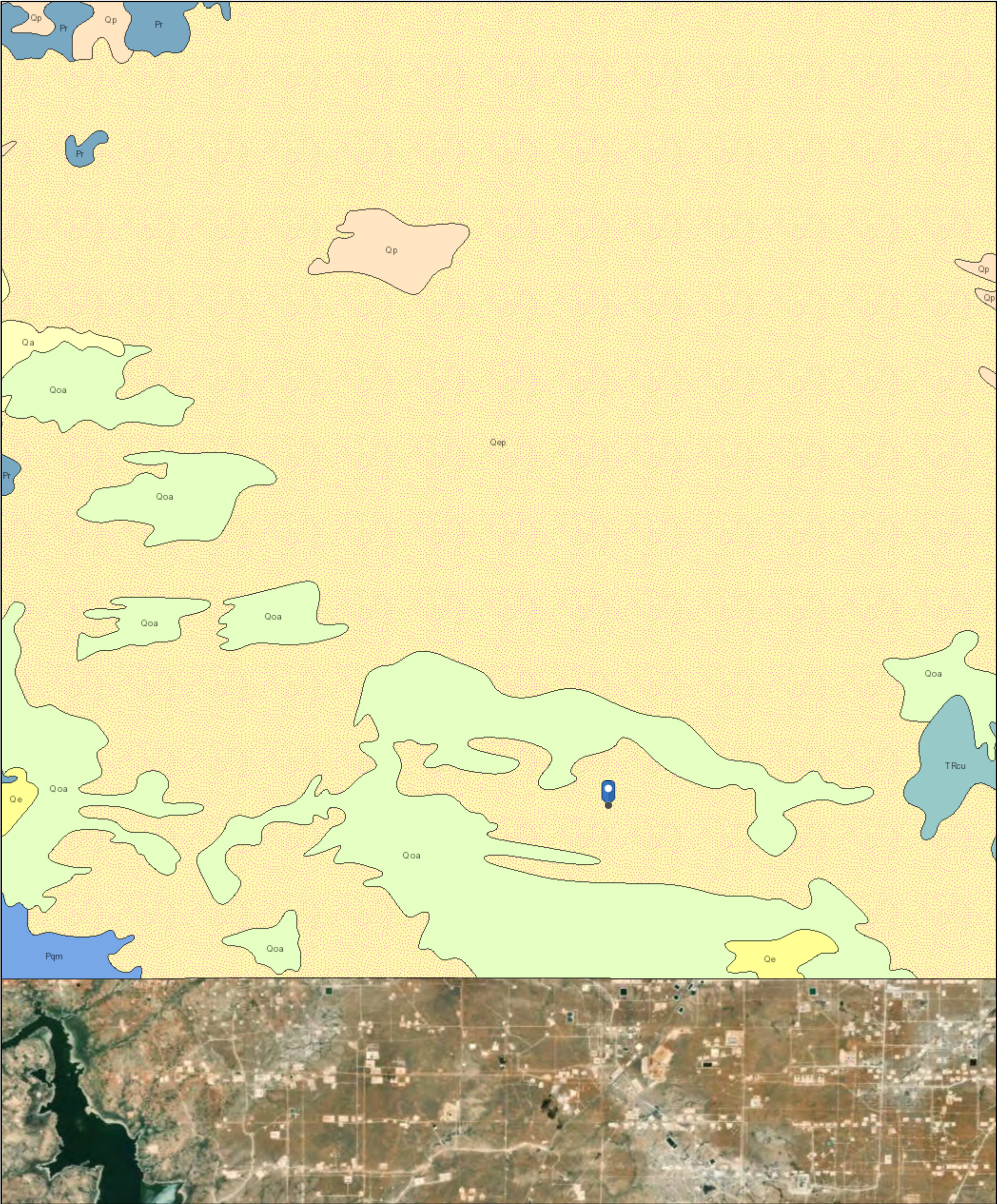
14. **Average percent litter cover (%) and depth ( in):**
- 

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:**
-

# Shetland 11 CTB 1

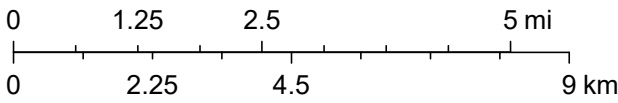


11/13/2024, 10:55:44 PM

Lithologic Units

- Playa—Alluvium and evaporite deposits (Holocene)
- Water—Perennial standing water
- Qa—Alluvium (Holocene to upper Pleistocene)

1:144,448



Earthstar Geographics, NMBGMR



# ATTACHMENT 3: CORRESPONDENCE



Outlook

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**RE: [EXTERNAL] nAPP2429928425 Shetland 11 CTB 1 Liner Inspection Notification**

---

**From** Raley, Jim <jim.rale@dv.com>**Date** Tue 11/5/2024 2:42 PM**To** Monica Peppin <Monica.Peppin@soudermiller.com>**Cc** blm\_nm\_cfo\_spill@blm.gov <blm\_nm\_cfo\_spill@blm.gov>; Stephanie Hinds <stephanie.hinds@soudermiller.com>; ocd.enviro@emnrd.nm.gov <OCD.Enviro@emnrd.nm.gov>

Submitted 11/5/2024

Jim Raley | Environmental Professional - Permian Basin

5315 Buena Vista Dr., Carlsbad, NM 88220

C: (575)689-7597 | [jim.rale@dv.com](mailto:jim.rale@dv.com)

---

**From:** Monica Peppin <Monica.Peppin@soudermiller.com>**Sent:** Tuesday, November 5, 2024 2:21 PM**To:** Raley, Jim <Jim.Raley@dv.com>**Cc:** blm\_nm\_cfo\_spill@blm.gov; Stephanie Hinds <stephanie.hinds@soudermiller.com>; ocd.enviro@emnrd.nm.gov**Subject:** [EXTERNAL] nAPP2429928425 Shetland 11 CTB 1 Liner Inspection Notification

All,

**SMA anticipates conducting a liner inspection at the following site on November 8, 2024:****Proposed Date:** 11.8.24/ Friday November 8,2024**Proposed Time Frame:** On location 10:30 AM**Site Name:** Shetland 11 CTB 1**Incident Number:** nAPP2429928425**API: (Facility ID)** fAPP2429928425**Below is the following information that will be added in the NMOCD website by the client.**

<b>Site Name and Incident ID:</b>	<b>Shetland 11 CTB 1 nAPP2429928425</b>
<b>Containment surface area: (Approximate)</b>	<b>6525 sq ft</b>
<b>Have all impacted materials been removed from the liner:</b>	<b>Yes, pressure washed</b>
<b>Liner inspection date pursuant to Subparagraph (a) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC</b>	<b>Friday November 8, 2024</b>
<b>Time sampling/liner inspection will commence:</b>	<b>On site at 10:30 AM</b>
<b>Contact information:</b>	<b>Monica Peppin 575.909.3418</b>
<b>Navigation to site:</b>	<b>Intersection of 128/C1 travel south on C1 for 10.42 miles, turn right/west on pipeline rd, in front of western refining station, travel 5.22</b>



miles, turn left, south, on lease rd travel 0.90 miles, turn left, east, travel 0.88 miles, turn left, north and drive onto location

Thank you,  
MP



*Stronger Communities by Design*

**Monica  
Peppin, A.S.**

**Project  
Manager**

**Direct/Mobile:  
575.909.3418**

**Office:  
575.689.7040**

**201 S  
Halagueno St.**

**Carlsbad, NM  
88220**



**[www.soudermiller.com](http://www.soudermiller.com)**

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

QUESTIONS

Action 424160

QUESTIONS

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 424160
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

QUESTIONS

Prerequisites	
Incident ID (n#)	nAPP2429928425
Incident Name	NAPP2429928425 SHETLAND 11 CTB 1 @ 0
Incident Type	Produced Water Release
Incident Status	Remediation Closure Report Received
Incident Facility	[fAPP2123649550] SHETLAND 11 CTB 1

Location of Release Source	
Please answer all the questions in this group.	
Site Name	SHETLAND 11 CTB 1
Date Release Discovered	10/24/2024
Surface Owner	Federal

Incident Details	
Please answer all the questions in this group.	
Incident Type	Produced Water Release
Did this release result in a fire or is the result of a fire	No
Did this release result in any injuries	No
Has this release reached or does it have a reasonable probability of reaching a watercourse	No
Has this release endangered or does it have a reasonable probability of endangering public health	No
Has this release substantially damaged or will it substantially damage property or the environment	No
Is this release of a volume that is or may with reasonable probability be detrimental to fresh water	No

Nature and Volume of Release	
Material(s) released, please answer all that apply below. Any calculations or specific justifications for the volumes provided should be attached to the follow-up C-141 submission.	
Crude Oil Released (bbls) Details	Not answered.
Produced Water Released (bbls) Details	Cause: Corrosion   Fitting   Produced Water   Released: 10 BBL   Recovered: 10 BBL   Lost: 0 BBL.
Is the concentration of chloride in the produced water >10,000 mg/l	Yes
Condensate Released (bbls) Details	Not answered.
Natural Gas Vented (Mcf) Details	Not answered.
Natural Gas Flared (Mcf) Details	Not answered.
Other Released Details	Not answered.
Are there additional details for the questions above (i.e. any answer containing Other, Specify, Unknown, and/or Fire, or any negative lost amounts)	Not answered.



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QUESTIONS, Page 2

Action 424160

**QUESTIONS (continued)**

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 424160
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

**QUESTIONS**

<b>Nature and Volume of Release (continued)</b>	
Is this a gas only submission (i.e. only significant Mcf values reported)	<b>No, according to supplied volumes this does not appear to be a "gas only" report.</b>
Was this a major release as defined by Subsection A of 19.15.29.7 NMAC	<b>No</b>
Reasons why this would be considered a submission for a notification of a major release	<i>Unavailable.</i>
<i>With the implementation of the 19.15.27 NMAC (05/25/2021), venting and/or flaring of natural gas (i.e. gas only) are to be submitted on the C-129 form.</i>	

**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	<b>True</b>
The impacted area has been secured to protect human health and the environment	<b>True</b>
Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices	<b>True</b>
All free liquids and recoverable materials have been removed and managed appropriately	<b>True</b>
If all the actions described above have not been undertaken, explain why	<i>Not answered.</i>

*Per Paragraph (4) of Subsection B of 19.15.29.8 NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please prepare and attach a narrative of actions to date in the follow-up C-141 submission. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see Subparagraph (a) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC), please prepare and attach all information needed for closure evaluation in the follow-up C-141 submission.*

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.

I hereby agree and sign off to the above statement	Name: James Raley Title: EHS Professional Email: jim.raley@dvsn.com Date: 01/23/2025
--	---

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QUESTIONS, Page 3

Action 424160

**QUESTIONS (continued)**

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 424160
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

**QUESTIONS**

<b>Site Characterization</b>	
<i>Please answer all the questions in this group (only required when seeking remediation plan approval and beyond). This information must be provided to the appropriate district office no later than 90 days after the release discovery date.</i>	
What is the shallowest depth to groundwater beneath the area affected by the release in feet below ground surface (ft bgs)	Between 51 and 75 (ft.)
What method was used to determine the depth to ground water	NM OSE iWaters Database Search
Did this release impact groundwater or surface water	No
<b>What is the minimum distance, between the closest lateral extents of the release and the following surface areas:</b>	
A continuously flowing watercourse or any other significant watercourse	Between 1 and 5 (mi.)
Any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)	Between 1 and 5 (mi.)
An occupied permanent residence, school, hospital, institution, or church	Between 1 and 5 (mi.)
A spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes	Between ½ and 1 (mi.)
Any other fresh water well or spring	Between ½ and 1 (mi.)
Incorporated municipal boundaries or a defined municipal fresh water well field	Greater than 5 (mi.)
A wetland	Between 1 and 5 (mi.)
A subsurface mine	Greater than 5 (mi.)
An (non-karst) unstable area	Between 1 and 5 (mi.)
Categorize the risk of this well / site being in a karst geology	Medium
A 100-year floodplain	Between 300 and 500 (ft.)
Did the release impact areas not on an exploration, development, production, or storage site	No

<b>Remediation Plan</b>	
<i>Please answer all the questions that apply or are indicated. This information must be provided to the appropriate district office no later than 90 days after the release discovery date.</i>	
Requesting a remediation plan approval with this submission	Yes
<i>Attach a comprehensive report demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined, pursuant to 19.15.29.11 NMAC and 19.15.29.13 NMAC.</i>	
Have the lateral and vertical extents of contamination been fully delineated	Yes
Was this release entirely contained within a lined containment area	Yes
<i>Per Subsection B of 19.15.29.11 NMAC unless the site characterization report includes completed efforts at remediation, the report must include a proposed remediation plan in accordance with 19.15.29.12 NMAC, which includes the anticipated timelines for beginning and completing the remediation.</i>	
On what estimated date will the remediation commence	11/05/2024
On what date will (or did) the final sampling or liner inspection occur	11/08/2024
On what date will (or was) the remediation complete(d)	11/08/2024
What is the estimated surface area (in square feet) that will be remediated	6525
What is the estimated volume (in cubic yards) that will be remediated	0
<i>These estimated dates and measurements are recognized to be the best guess or calculation at the time of submission and may (be) change(d) over time as more remediation efforts are completed.</i>	
<i>The OCD recognizes that proposed remediation measures may have to be minimally adjusted in accordance with the physical realities encountered during remediation. If the responsible party has any need to significantly deviate from the remediation plan proposed, then it should consult with the division to determine if another remediation plan submission is required.</i>	



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QUESTIONS, Page 4

Action 424160

**QUESTIONS (continued)**

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 424160
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

**QUESTIONS**

<b>Remediation Plan (continued)</b>	
<i>Please answer all the questions that apply or are indicated. This information must be provided to the appropriate district office no later than 90 days after the release discovery date.</i>	
<b>This remediation will (or is expected to) utilize the following processes to remediate / reduce contaminants:</b>	
<i>(Select all answers below that apply.)</i>	
Is (or was) there affected material present needing to be removed	Yes
Is (or was) there a power wash of the lined containment area (to be) performed	Yes
OTHER (Non-listed remedial process)	Not answered.
<i>Per Subsection B of 19.15.29.11 NMAC unless the site characterization report includes completed efforts at remediation, the report must include a proposed remediation plan in accordance with 19.15.29.12 NMAC, which includes the anticipated timelines for beginning and completing the remediation.</i>	
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.	
I hereby agree and sign off to the above statement	Name: James Raley Title: EHS Professional Email: jim.raley@dmv.com Date: 01/23/2025
<i>The OCD recognizes that proposed remediation measures may have to be minimally adjusted in accordance with the physical realities encountered during remediation. If the responsible party has any need to significantly deviate from the remediation plan proposed, then it should consult with the division to determine if another remediation plan submission is required.</i>	

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QUESTIONS, Page 6

Action 424160

**QUESTIONS (continued)**

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 424160
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

**QUESTIONS**

<b>Liner Inspection Information</b>	
Last liner inspection notification (C-141L) recorded	<b>399738</b>
Liner inspection date pursuant to Subparagraph (a) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC	<b>11/08/2024</b>
Was all the impacted materials removed from the liner	<b>Yes</b>
What was the liner inspection surface area in square feet	<b>6525</b>

**Remediation Closure Request**

*Only answer the questions in this group if seeking remediation closure for this release because all remediation steps have been completed.*

Requesting a remediation closure approval with this submission	<b>Yes</b>
Have the lateral and vertical extents of contamination been fully delineated	<b>Yes</b>
Was this release entirely contained within a lined containment area	<b>Yes</b>
What was the total surface area (in square feet) remediated	<b>6525</b>
What was the total volume (cubic yards) remediated	<b>0</b>
Summarize any additional remediation activities not included by answers (above)	<b>Secondary Containment inspection completed. No breach through liner</b>

*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 (in .pdf format) 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.*

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.

I hereby agree and sign off to the above statement	Name: James Raley Title: EHS Professional Email: jim.raley@dmv.com Date: 01/23/2025
--	--



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CONDITIONS

Action 424160

CONDITIONS

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 424160
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

CONDITIONS

Created By	Condition	Condition Date
scwells	None	1/29/2025