

A Playa Survey
for the
Bureau of Land Management
Carlsbad Resource Area, New Mexico



2008



A Playa Survey for the Bureau of Land Management Carlsbad Resource Area, New Mexico

Yvonne Chauvin, Esteban Muldavin and Sandy Sacher¹

2008

Introduction

Natural Heritage New Mexico (NHNM) in cooperation with the Bureau of Land Management (BLM), Carlsbad Field Office (CFO) conducted a survey of naturally occurring playa lakes within the CFO. Throughout the Field Office area there exist numerous playa lakes that vary in size, shape, vegetation composition, and ecological condition. Given the resources available, this project was focused the BLM-CFO areas within two 7.5-minute topographical maps (Ross Ranch and Phantom Banks) which had the highest density of mapped depressions and hence the potential for playas (Figure 1). In June 2006, 22 playa sites were surveyed following established BLM and NHNM protocols. We provide here a site description of each playa that includes a map with a GPS-surveyed playa boundary, a detailed site description, and representative photograph. In addition, we have provided a plant species list (Appendix A) and a stand alone database containing the original plot data.

Methods

A set of 25 potential depressions within the Ross Ranch and Phantom Banks 7.5-minute quadrangles were chosen for survey. Of these, three were covered with water, but lacked vegetation and were not further evaluated. At the 22 remaining sites, the boundary was surveyed with a high-resolution Trimble GPS supplied by BLM with a built-in data dictionary for recoding a suite of attributes of interest to the BLM. The boundary of each playa was defined as the limit of obligate or facultative wetland species distributions and excluded the upland desert scrub vegetation that typically surrounded a given playa. The boundary coordinate GPS and data dictionary files were directly delivered to the BLM at the completion of the field survey. In addition, the boundaries and locations are provided as GIS shape files on the accompanying data CD. For each selected playa, the major vegetation communities were identified based on the NHNM state vegetation classification and, in the most abundant types, as vegetation plots taken to quantitatively describe the species composition and site characteristics (see field protocols in Appendix B). All the plot data is provided in a stand-alone Access relational database on the accompanying data CD. Each plot was located with a GPS and a documentary photograph taken with a specified azimuth and focal length (all photos are provided digitally on the accompanying CD). All site information was aggregated into a Playa Site Assessment database from which descriptions were generated which are provided below (Table 1).

¹ Final report in partial fulfillment of COOP agreement GDA010009, Task Order 9, between the Bureau of Land Management and the University of New Mexico, New Mexico Natural Heritage Program. Yvonne Chauvin is the Senior Botanical Technician, Esteban Muldavin is the Ecologist and Program Leader, and Sandy Sacher is a Biological Technician with New Mexico Natural Heritage Program

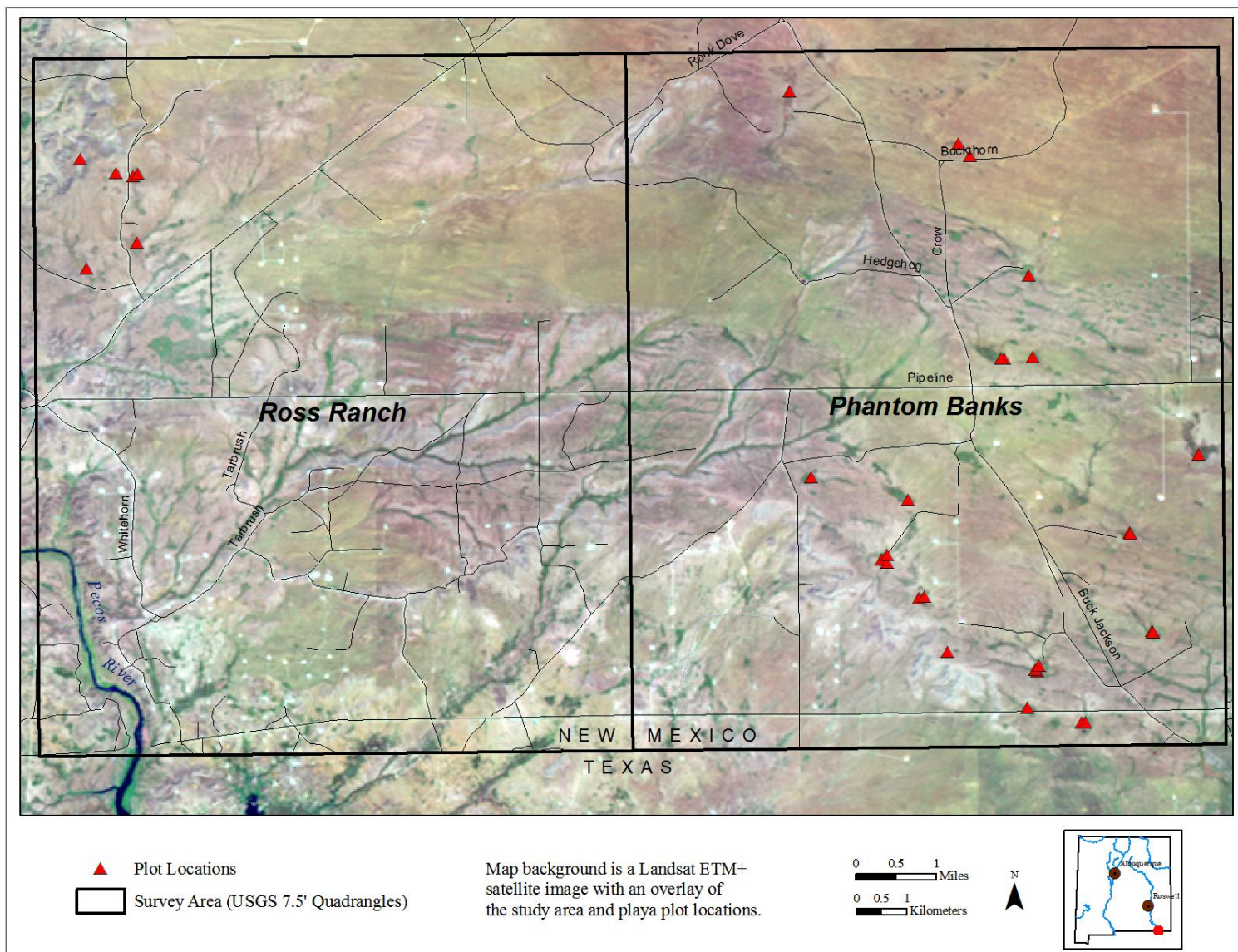


Figure 1. Overview map of BLM Carlsbad Resource Area playas study area showing sample locations.

BLM-CFO Playa Site Descriptions

Table 1. List of playas site description surveyed in 2006 within the Carlsbad Resources Area, Bureau of Land Management (page number is hot-linked).

Site	Page
Depression N of Phantom Banks	5
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Site Name: Depression N of Phantom Banks

Site Number: 1 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 609821 **Northing:** 3546238 05CP001

Size (ha): 0 **Size (ac):** 0 **Elevation (ft):** 3180

Site Description: A depression is shown on topographic map, but difficult to define boundary from upland. Appears to be a shallow swale with dense *Prosopis glandulosa* and *Gutierrezia sarothrae*. *Bouteloua gracilis* is scattered throughout, with a high diversity and density of forbs, including abundant *Psilostrophe tagetina* and *Artemisia ludoviciana*, with some scattered *Ratibida columnifera* and *Plantago* spp. Few *Rhus microphylla* with scattered *Scleropogon brevifolius*, *Panicum obtusum*, *Bouteloua eriopoda*, and *Muhlenbergia repens*.

Vegetation Communities:

Prosopis glandulosa/Bouteloua gracilis, *Gutierrezia sarothrae* Phase Shrubland
(Honey Mesquite/Blue Grama, Broom Snakeweed Phase Shrubland)

Hydrologic Impacts: Unknown

Playa Impacts

Exotics: None known

Grazing: None known

Fuel Wood: None known

Dumping: None known

ORV: None known

Roads: Roads ~425 meters to N and E of plot.

Other Impacts: None known

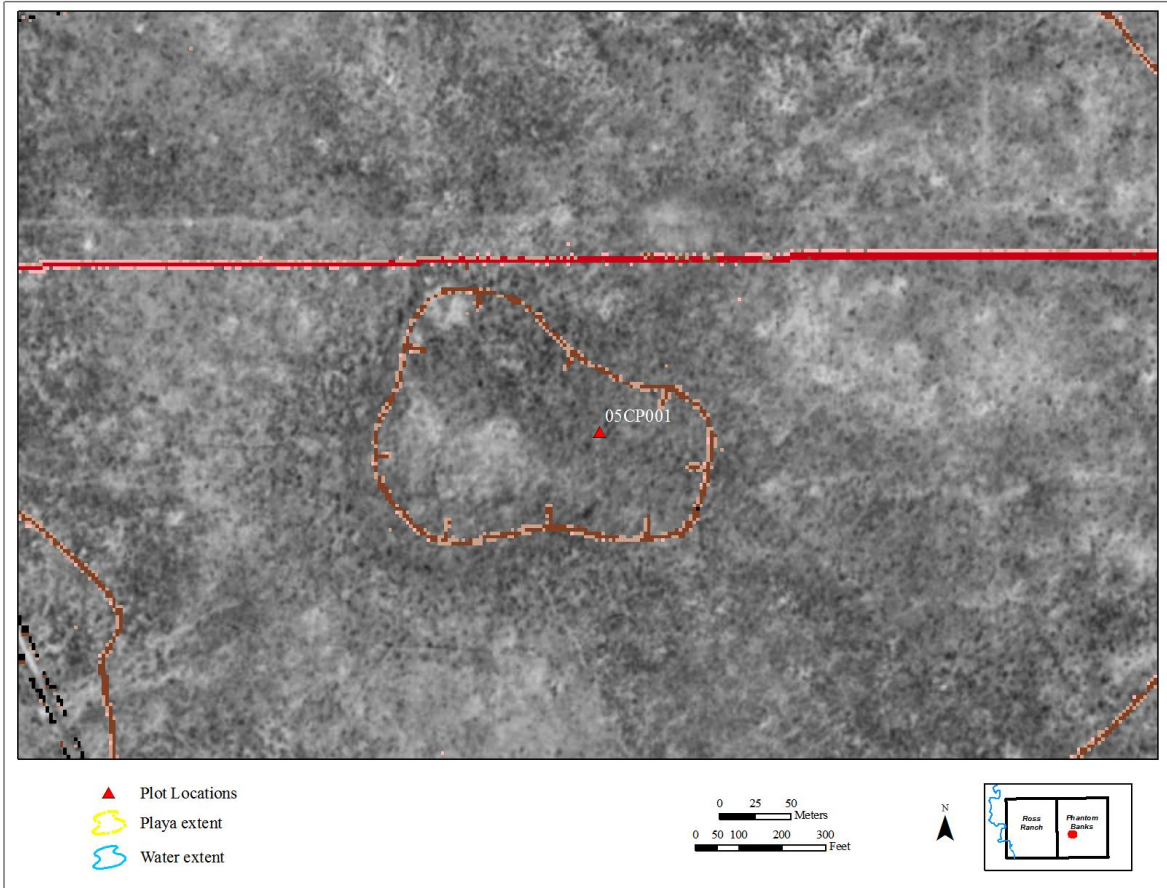
Protection: None known

Animal Obs: None known

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/22/2005

Investigators: Yvonne Chauvin, Esteban H. Muldavin, and Sandy L. Sacher

a)



b)



Figure 2. Depression N. of Phantom Banks: a) map of depression; and b) plot photo showing dense broom snakeweed with honey mesquite.

Site Name: Exclosure N of Lone Tree Tank

Site Number: 2 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 616155 **Northing:** 3545139 05CP002
Easting: 616165 **Northing:** 3545108 05CP003

Size (ha): 2.7 **Size (ac):** 6.7 **Elevation (ft):** 3180

Site Description: Dense *Prosopis glandulosa* throughout most of playa bottom with some open areas (5-15 sq. meters) dominated by *Panicum obtusum* with dense forb cover dominated by *Laennecia coulteri*. There are several small stands of *Celtis laevigata* var. *reticulata* within playa (which is where most bird activity is occurring). Some areas with dense *Gutierrezia sarothrae*. No standing water in playa.

Vegetation Communities:

Prosopis glandulosa/Panicum obtusum Shrubland
(Honey Mesquite/Vine Mesquite Shrubland)

Celtis laevigata var. *reticulata/Prosopis glandulosa/Panicum obtusum* Forest
(Netleaf Hackberry/Honey Mesquite/Vine Mesquite Forest)

Hydrologic Impacts: Wildlife drinker located within exclosure has water, but is heavily trampled from cattle use.

Playa Impacts

Exotics: None known

Grazing: Fence is down in SW corner and cattle are in exclosure. Understory beneath trees is heavily trampled.

Fuel Wood: None known

Dumping: None known

ORV: None known

Roads: Road ends ~ 100m SW of exclosure.

Other Impacts: None known

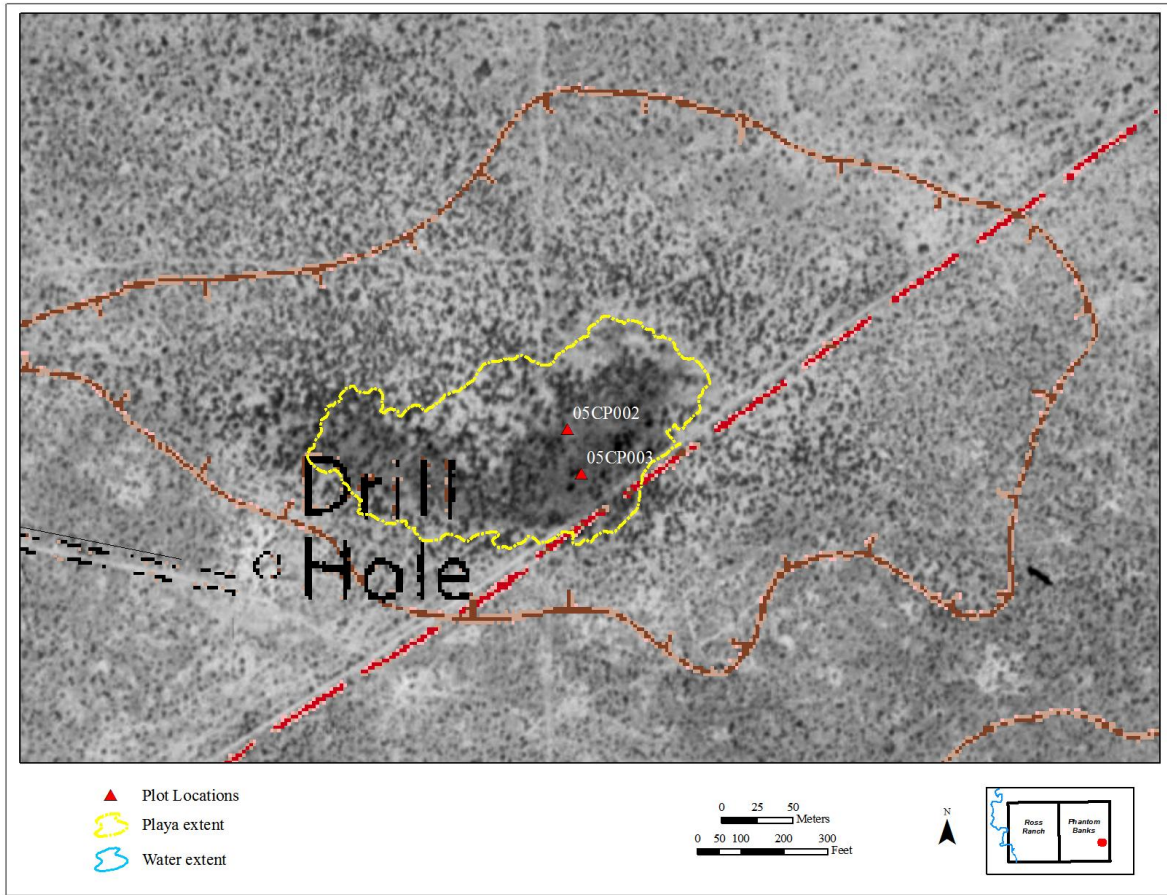
Protection: Playa is exclosed, but fence is down in SW corner.

Animal Obs: At playa: Texas horned-lizard, scaled quail, northern mockingbird, mourning dove, Bullock's oriole (nesting), curve-billed thrasher, greater roadrunner, western kingbird and loggerhead shrike.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/22/2005

Investigators: Yvonne Chauvin, Esteban H. Muldavin, and Sandy L. Sacher

a)



b)

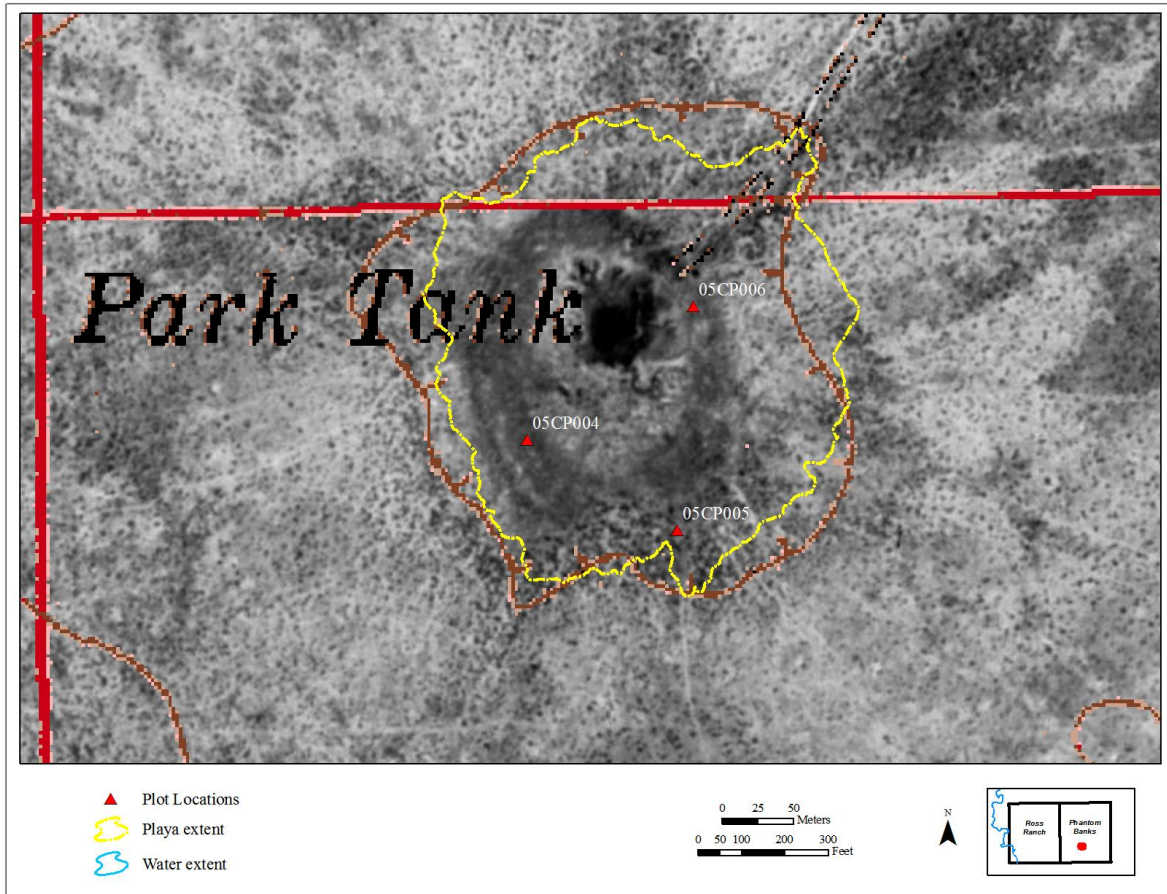


c)



Figure 3. Exclosure N. of Lone Tree Tank: a) map of playa; b) playa bottom; and c) wildlife drinker within exclosure.

a)



b)



c)



Figure 4. Park Tank: a) map of playa; b) playa bottom with dense buffalograss; and c) playa edge with dense honey mesquite and scattered netleaf hackberry.

Site Name: SE of Phantom Banks - Playa 1

Site Number: 4 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 614124 **Northing:** 3541649 05CP007

Size (ha): 4.6 **Size (ac):** 11.3 **Elevation (ft):** 3144

Site Description: Dense stand of *Celtis laevigata* var. *reticulata* north of dirt tank, with dense *Prosopis glandulosa* throughout. Also dense patches of *Helenium microcephalum* around tank edge with *Panicum obtusum* and *Peganum harmala* on berms.

Vegetation Communities:

Celtis laevigata var. *reticulata*/*Prosopis glandulosa*/*Panicum obtusum* Forest
(Netleaf Hackberry/Honey Mesquite/Vine Mesquite Forest)

Hydrologic Impacts: E end of playa has been dug out for stock tank (approximately 50 x 50 m) with dirt berms on E and W edge of tank

Playa Impacts

Exotics: African rue (*Peganum harmala*), puncturevine (*Tribulus terrestris*)

Grazing: Heavily used by cattle.

Fuel Wood: None Known

Dumping: None Known

ORV: None Known

Roads: Pipeline road bisects southern portion of playa.

Other Impacts: None Known

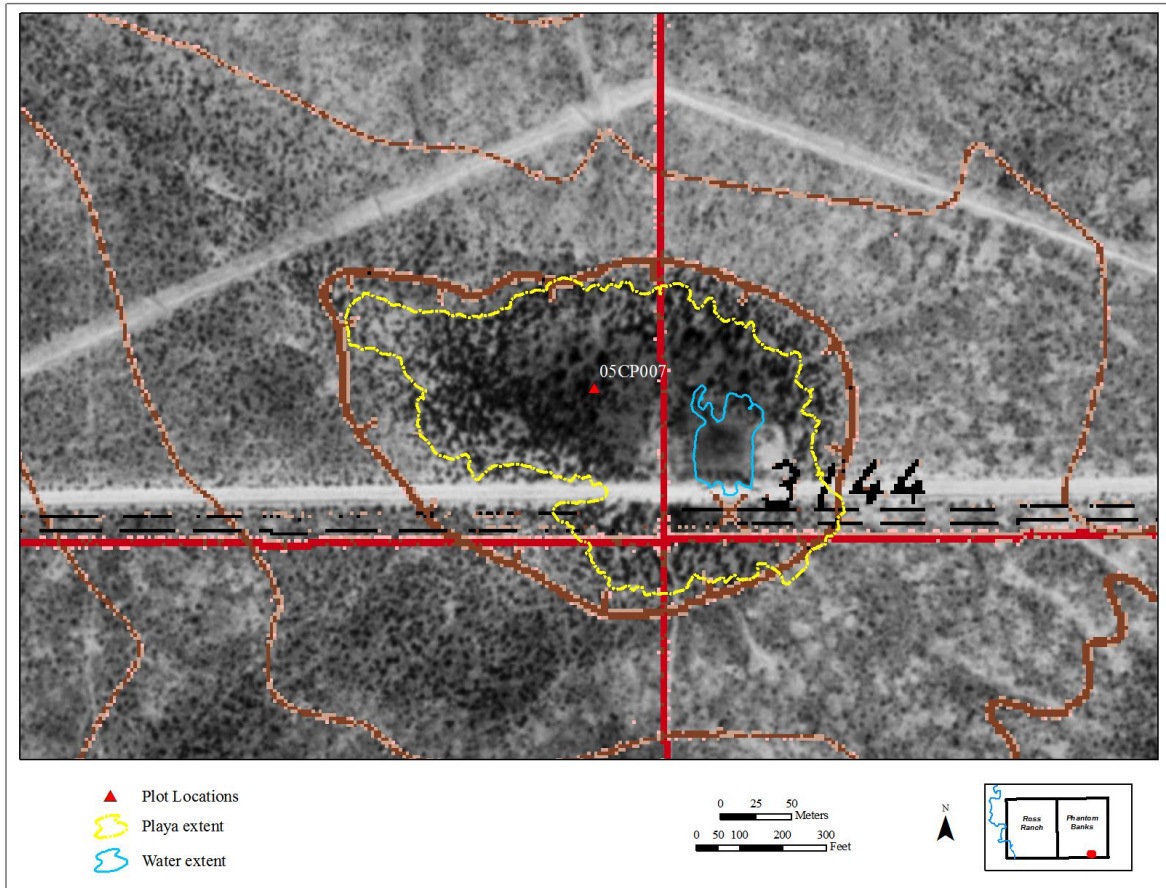
Protection: None Known

Animal Obs: High bird diversity and numbers. Animals observed at playa: Bullock's oriole (nests), killdeer, mourning dove, northern mockingbird, western kingbird, cactus wren, white-winged dove, yellow-billed cuckoo, western tanager (female), common nighthawk, greater roadrunner, Texas horned lizard, and coachwhip.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/23/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



c)



Figure 5. SE of Phantom Banks - Playa 1: a) map of playa; b) view of playa from berm at dirt tank; and c) dense netleaf hackberry within playa bottom.

Site Name: SE of Phantom Banks - Playa 2

Site Number: 5 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 615203 **Northing:** 3541361 05CP008
Easting: 615273 **Northing:** 3541370 05CP009

Size (ha): 6.8 **Size (ac):** 16.9 **Elevation (ft):** 3120

Site Description: Large open area in playa bottom dominated by *Panicum obtusum* and *Helenium microcephalum* with scattered *Prosopis glandulosa*, which continues around the edge of tank. Within the grassland there are scattered patches of dense *Ratibida tagetes*. Playa fringe has dense band of *Prosopis glandulosa*, with only a few scattered *Celtis laevigata* var. *reticulata*. Drainage feeds into north edge of playa, which is also dense with *Prosopis glandulosa*, with *Panicum obtusum* and few scattered *Celtis laevigata* var. *reticulata* with several dead trees - majority of *Prosopis glandulosa* north of drainage is without *Celtis laevigata* var. *reticulata*.

Vegetation Communities:

Prosopis glandulosa/Pleuraphis mutica Shrubland

(Honey Mesquite/Tobosa Shrubland)

Panicum obtusum/Ratibida tagetes-Grindelia nuda Herbaceous Vegetation

(Vine Mesquite/Green Prairie Coneflower-Curlytop Gumweed Herbaceous Vegetation)

Hydrologic Impacts: Earthen tank in the southwestern portion of the playa (approximately 50 x 50 m) with berms to the E and W.

Playa Impacts

Exotics: Malta starthistle (*Centaurea melitensis*) - large dead tree to W of playa has small dense patch of Malta starthistle (approximately 30 x 30 m). Seems localized and not spread throughout.

Grazing: Approximately 40 cows, bulls and calves using area which is heavily grazed. Mineral block at NW corner of open area (UTM's: E:615205, N:3541328).

Fuel Wood: None Known

Dumping: None Known

ORV: None Known

Roads: Two-track goes S along the W edge of playa from main road at N edge to dirt tank.

Other Impacts: None Known

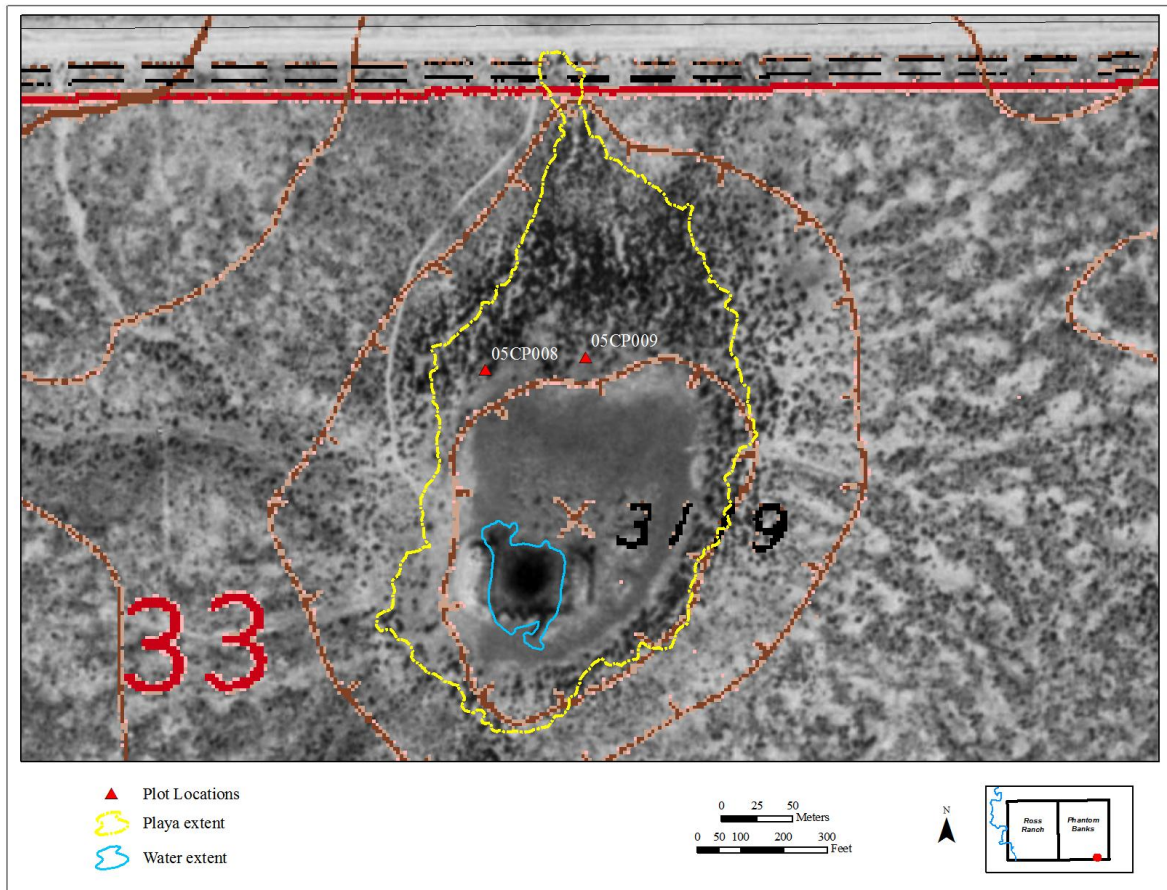
Protection: None Known

Animal Obs: Birds nesting in snags. Animals observed at playa: Bullock's oriole (nests), killdeer, mourning dove, northern mockingbird (nesting in snag), common nighthawk, blue grosbeak.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/23/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



c)



Figure 6. SE of Phantom Banks - Playa 2: a) map of playa; b) playa bottom with dense herbaceous cover; and c) dirt tank at playa.

Site Name: SE of Phantom Banks - Playa 3

Site Number: 6 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13):		Plots:
Easting: 614314	Northing: 3542383	05CP010
Easting: 614276	Northing: 3542415	05CP011
Easting: 614352	Northing: 3542489	05CP012

Size (ha): 10 **Size (ac):** 24.6 **Elevation (ft):** 3150

Site Description: Playa bottom is grass dominated, with the open area of playa within enclosure on southwest end of playa dominated by *Panicum obtusum* and *Ratibida tagetes*. To the east of the enclosure *Helenium microcephalum* becomes dominant. *Panicum obtusum* is tall (0.4m), lush and seeded within enclosure, but mostly cropped to ground (approximately 0.1m) outside. Grass cover is much higher within enclosure. Small dense stand of *Sapindus saponaria* var. *drummondii* with very little understory on the south end of playa just outside and adjacent to enclosure on east side. *Sapindus saponaria* var. *drummondii* is flowering and loaded with insect pollinators. To the west is a *Celtis laevigata* var. *reticulata* stand in the southwest edge of the enclosure. Grass is dominated by *Panicum obtusum* and is lush in understory and shrub interspace, with a high diversity and density of forbs. Outside enclosure are scattered large *Celtis laevigata* var. *reticulata* around perimeter within *Prosopis glandulosa* fringe forming several large stands.

Vegetation Communities:

Sapindus saponaria/Monotypic Forest
(Western Soapberry/Monotypic Stand Forest)
Celtis laevigata var. *reticulata*/*Prosopis glandulosa*/*Panicum obtusum* Forest
(Netleaf Hackberry/Honey Mesquite/Vine Mesquite Forest)
Panicum obtusum/*Ratibida tagetes*-*Grindelia nuda* Herbaceous Vegetation
(Vine Mesquite/Green Prairie Coneflower-Curlytop Gumweed Herbaceous Vegetation)

Hydrologic Impacts: Earthen tank at northern end of playa, with berms to the NW and SE. Water approximately 50 x 50 m. Wildlife drinker just W of plot 11 contains water.

Playa Impacts

Exotics: None Known

Grazing: Approximately 40 cows and calves. Where road ends at N edge of playa near tank, there are several mineral/protein blocks.

Fuel Wood: None Known

Dumping: None Known

ORV: None Known

Roads: Road ends at N edge of playa near tank.

Other Impacts: None Known

Protection: Portion of playa is enclosed.

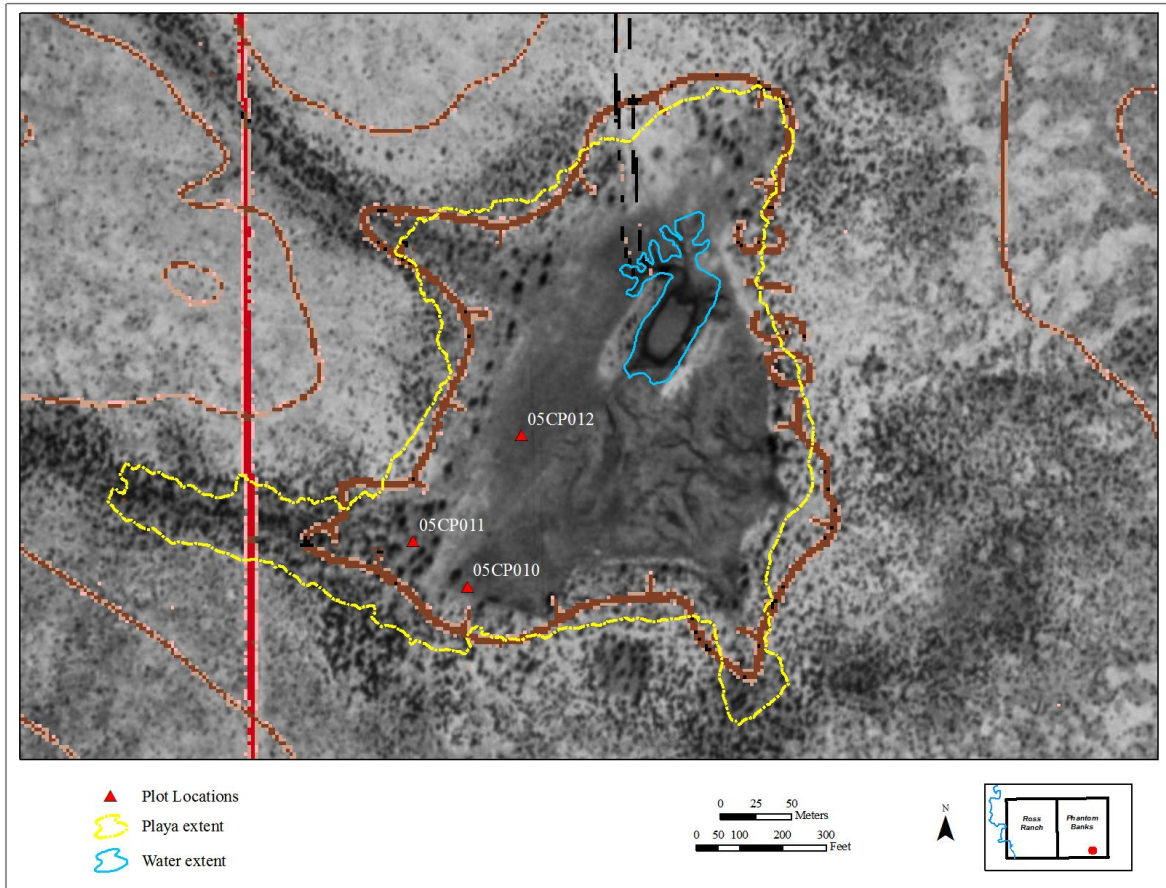
Animal Obs: Soapberry is flowering and loaded with insect pollinators. Numerous tarantula hawks. Hackberry stand has high bird use. Small mouse within plot 12 (light brown, poss. *Reithrodontomys*). Rabbit scat. Other animals observed at playa: Bullock's oriole (nesting in mesquite & hackberry), killdeer, mourning dove, northern mockingbird, western kingbird, blue grosbeak, great horned owl, Swainson's hawk, scissor-tailed flycatcher (many nesting in mesquite), loggerhead shrike, and several hundred juvenile toads at water's edge.

Data: Ground reconnaissance, Field sampling

Survey Date: 6/23/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



c)



Figure 7. SE of Phantom Banks - Playa 3: a) map of playa; b) small stand of western soapberry; and c) lush vine mesquite cover within enclosure.

Site Name: Playa S of Park Tank

Site Number: 7 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 611959 **Northing:** 3543836 05CP013
Easting: 612071 **Northing:** 3543853 05CP014

Size (ha): 9.5 **Size (ac):** 23.5 **Elevation (ft):** 3170

Site Description: Playa is mostly open with scattered *Prosopis glandulosa* in basin area with dense *Prosopis glandulosa* fringe with scattered stands of *Celtis laevigata* var. *reticulata* and individuals. Most of basin bottom with dense patches of *Helenium microcephalum*, *Grindelia nuda* var. *aphanactis*, and *Panicum obtusum*. *Panicum obtusum* and *Buchloe dactyloides* also in patches more towards *Prosopis glandulosa* fringe. *Helianthus ciliaris* abundant in patches along with *Ratibida tagetes* dominant in small patches. *Prosopis glandulosa* fringe of playa with one mature *Celtis laevigata* var. *reticulata* within plot and also scattered along edge. Many young *Celtis laevigata* var. *reticulata* growing within *Prosopis glandulosa*, which has a dense herbaceous understory dominated by *Panicum obtusum* and *Grindelia nuda* var. *aphanactis*, with *Ratibida columnifera* scattered throughout and a high diversity and density of mixed forbs. Closer to upland *Laennecia coulteri* becomes abundant.

Vegetation Communities:

Panicum obtusum/*Ratibida tagetes*-*Grindelia nuda* Herbaceous Vegetation
(Vine Mesquite/Green Prairie Coneflower-Curlytop Gumweed Herbaceous Vegetation)

Celtis laevigata var. *reticulata*/*Prosopis glandulosa*/*Panicum obtusum* Forest
(Netleaf Hackberry/Honey Mesquite/Vine Mesquite Forest)

Hydrologic Impacts: Many small depressions within basin bottom (possibly swalletts). No dirt tank or standing water.

Playa Impacts

Exotics: None Known

Grazing: Appears to be very little grazing.

Fuel Wood: None Known

Dumping: None Known

ORV: None Known

Roads: Old two-track bisects northern third of playa.

Other Impacts: None Known

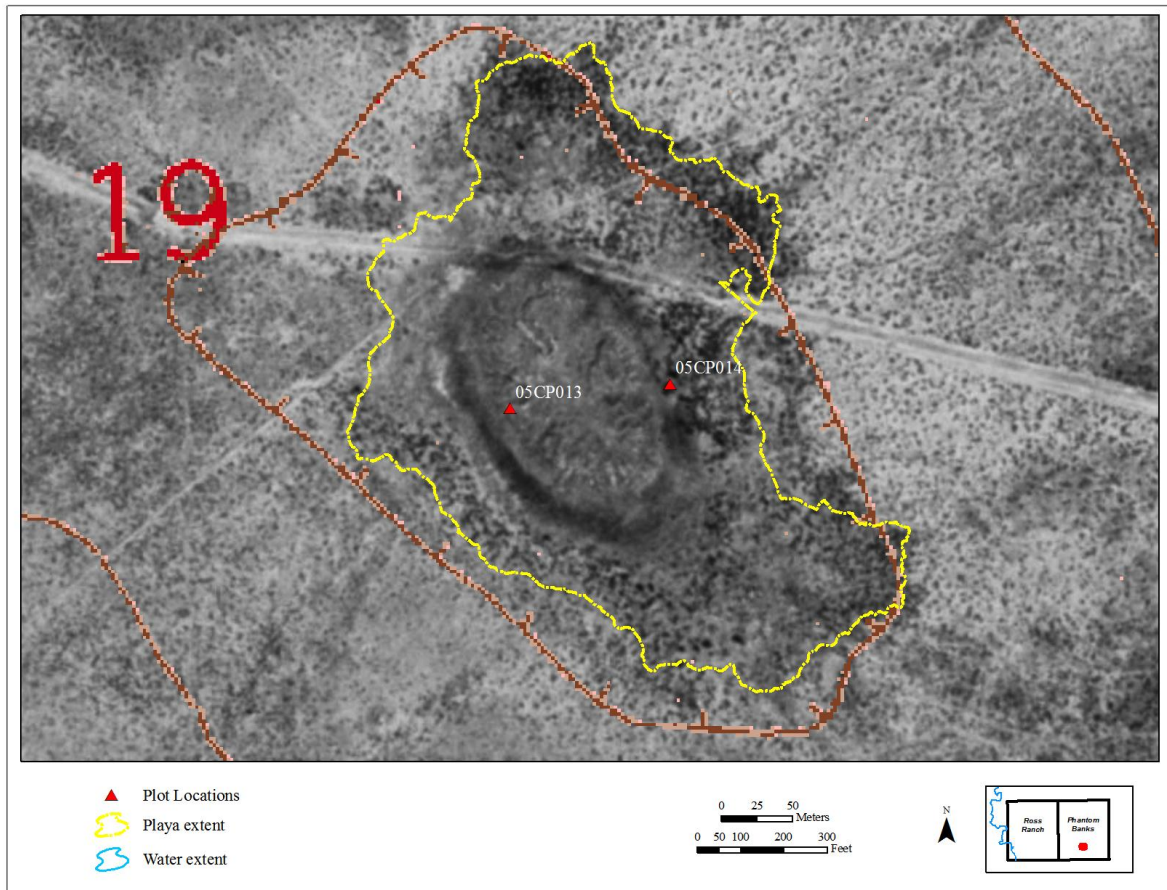
Protection: None Known

Animal Obs: Birds nesting in mesquite and hackberry. Animals observed at playa: Bullock's oriole, mourning dove, western kingbird, loggerhead shrike, cactus wren.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/24/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



c)



Figure 8. Playa S of Park Tank: a) map of playa; b) playa bottom; and c) honey mesquite fringe.

Site Name: Swale SE of Phantom Banks

Site Number: 8 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 612527 **Northing:** 3542767 05CP015

Size (ha): 0.5 **Size (ac):** 1.2 **Elevation (ft):** 3190

Site Description: Small swale near ridge top with scattered *Prosopis glandulosa* fringe and basin dominated by *Panicum obtusum* and *Ratibida tagetes*, with abundant *Ratibida columnifera* mixed in. Grades quickly to upland. *Prosopis glandulosa* is scattered throughout swale, with a dense patch in center. Fair amount of bird activity. Very few *Celtis laevigata* var. *reticulata* scattered within *Prosopis glandulosa* fringe.

Vegetation Communities:

Panicum obtusum/Ratibida tagetes-Grindelia nuda, Prosopis glandulosa Phase
Herbaceous Vegetation
(Vine Mesquite/Green Prairie Coneflower-Curlytop Gumweed, Honey mesquite
Phase Grassland)

Hydrologic Impacts: Appears to be a natural depression. No water.

Playa Impacts

Exotics: Horehound (*Marrubium vulgare*)
Grazing: None Known
Fuel Wood: None Known
Dumping: None Known
ORV: None Known
Roads: Two-tracks S and E of swale ~200 meters.

Other Impacts: None Known

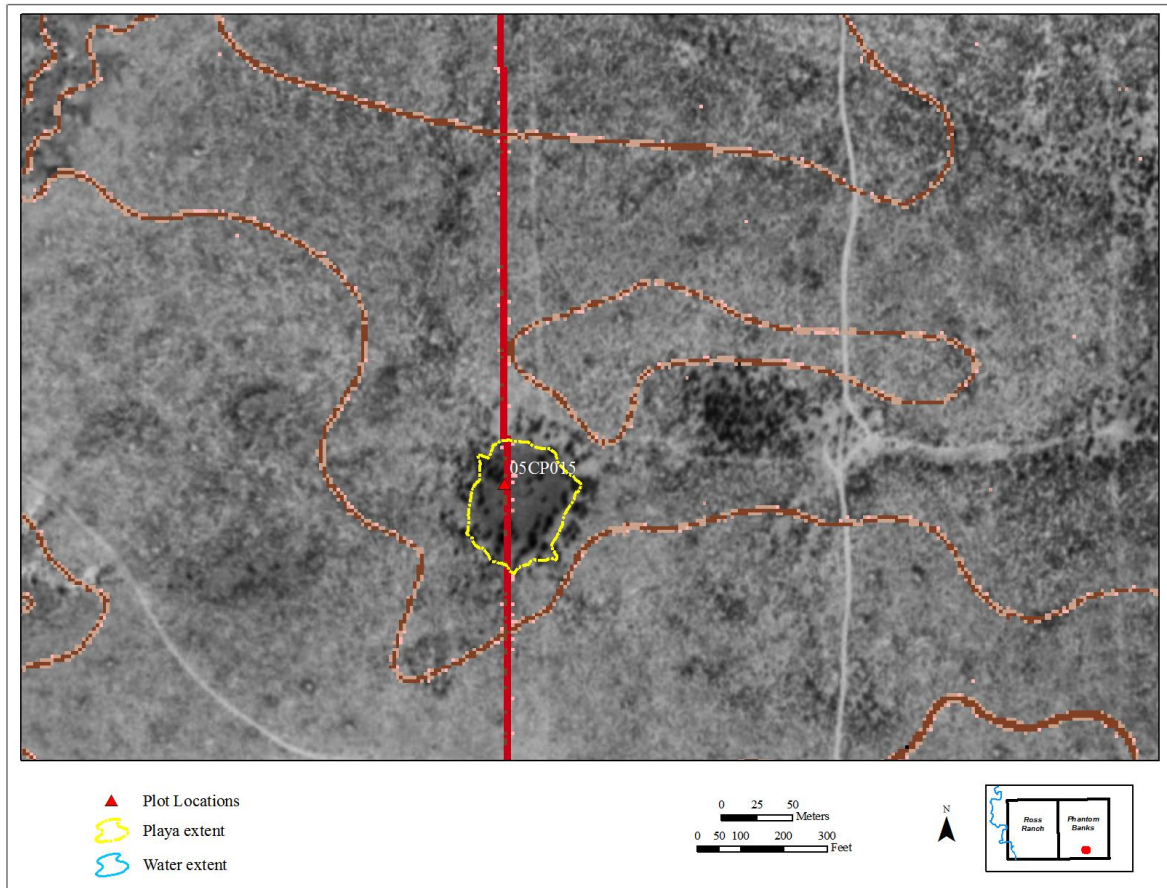
Protection: None Known

Animal Obs: Fair amount of bird activity. Animals observed at playa: Bullock's oriole, mourning dove, common nighthawk, northern mockingbird.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/24/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



Figure 9. Swale SE of Phantom Banks: a) map of swale: and b) swale bottom with honey mesquite fringe.

Site Name: China Lake Exclosure

Site Number: 9 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 616605 **Northing:** 3543182 05CP016
Easting: 616619 **Northing:** 3543144 05CP017

Size (ha): 4.2 **Size (ac):** 10.5 **Elevation (ft):** 3140

Site Description: Southern half of playa with dense *Helenium microcephalum* and *Cynodon dactylon* and heavy cattle use. Northern portion of playa has large stand of *Sapindus saponaria* var. *drummondii* with mix of old and young trees. Several large netleaf hackberries scattered around playa. Playa bottom mosaic of dense *Ratibida tagetes* and *Helenium microcephalum* dominating in patches with *Panicum obtusum*. Open playa bottom is heavily grazed. *Sapindus saponaria* var. *drummondii* stand is main nesting area, along with *Prosopis glandulosa* fringe with scattered *Celtis laevigata* var. *reticulata*. Several *Sapindus saponaria* var. *drummondii* scattered out of stand.

Vegetation Communities:

Sapindus saponaria/Monotypic Forest
(Western Soapberry/Monotypic Stand Forest)
Panicum obtusum/*Ratibida tagetes*-*Grindelia nuda* Herbaceous Vegetation
(Vine Mesquite/Green Prairie Coneflower-Curlytop Gumweed Grassland)

Hydrologic Impacts: Earthen tank in SE corner (approximately 50 x 50m).

Playa Impacts

Exotics: S end of playa where road enters is bermudagrass (*Cynodon dactylon*).

Grazing: Southern half of playa with heavy cattle use and open playa bottom is heavily grazed. N half of playa has exclosure around it, but fence is down in several places and also heavily grazed. Two dead cows near tank.

Fuel Wood: None Known

Dumping: None Known

ORV: None Known

Roads: Road enters from S and goes to dirt tank.

Other Impacts: Wooden wildlife sign down.

Protection: N half of playa has exclosure around it, but fence is down in several places. Fence on N berm top wire loose (reattached). Fence is also down at walkthrough to water.

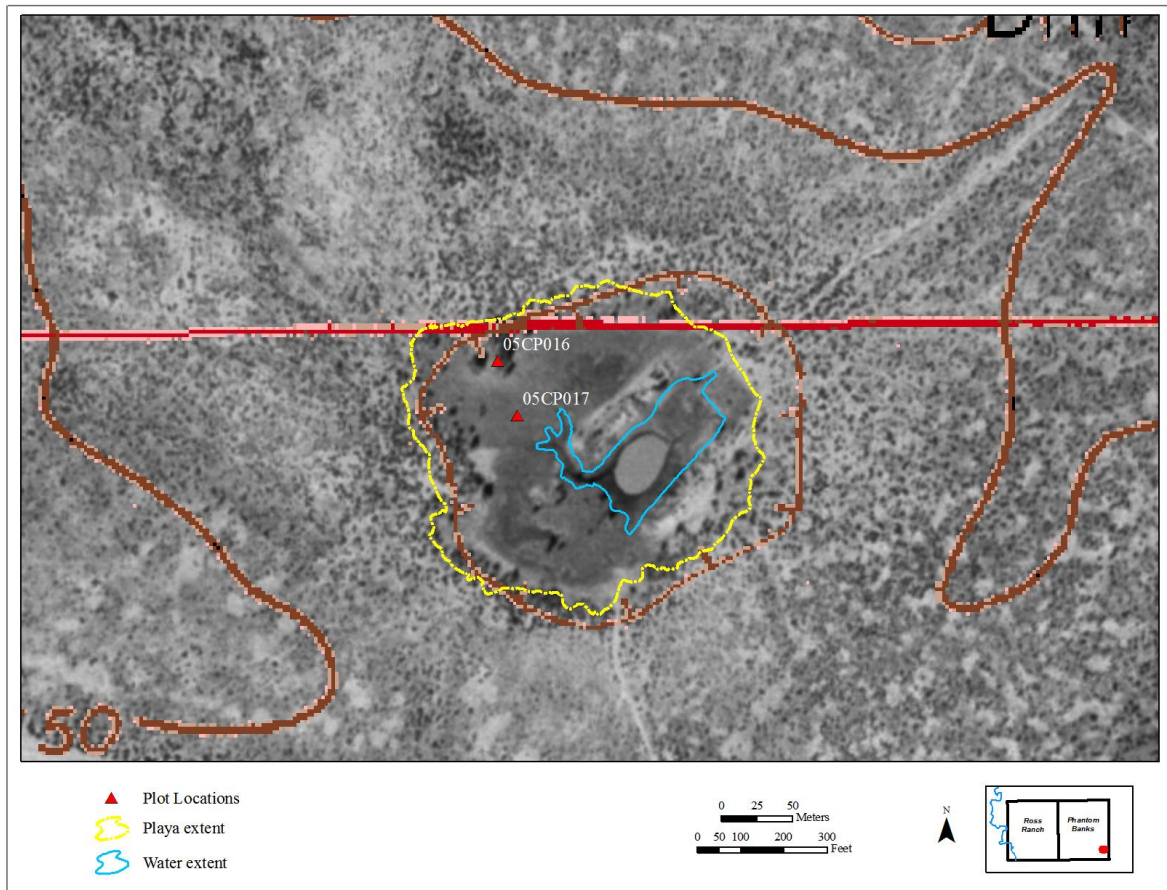
Animal Obs: Herons nesting in large old western soapberry trees (several stick nests, only one appears active with two juveniles). Animals observed at playa: Bullock's oriole (nesting), killdeer, northern mockingbird, western kingbird (nesting), great horned owl, Swainson's hawk, loggerhead shrike, great blue heron (nests w/ young), cactus wren, curve-billed thrasher.

Data: Ground reconnaissance, Field sampling

Survey Date: 6/24/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



c)



Figure 10. China Lake Exclosure: a) map of playa; b) overview of playa from low hill to south; and c) playa bottom with western soapberry stand at north edge.

Site Name: Swale NE of Park Tank

Site Number: 10 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 611751 **Northing:** 3545791 05CP018

Size (ha): 0 **Size (ac):** 0 **Elevation (ft):** 3100

Site Description: More of a shallow swale than a playa, with poorly defined boundary. The boundary was not delineated. Swale is dominated by *Pleuraphis mutica* with dense forb cover, which is dominated by *Laennecia coulteri* and *Sphaeralcea angustifolia*. Honey mesquite is dense in patches and grades into a *Prosopis glandulosa*/*Pleuraphis mutica* association.

Vegetation Communities:

Pleuraphis mutica/Monotypic, *Prosopis glandulosa* Phase Herbaceous Vegetation
(Tobosa/Monotypic Stand, Honey Mesquite Phase Grassland)

Prosopis glandulosa/*Pleuraphis mutica* Shrubland
(Honey Mesquite/Tobosa Shrubland)

Hydrologic Impacts: None Known

Playa Impacts

Exotics: None Known

Grazing: None Known

Fuel Wood: None Known

Dumping: None Known

ORV: None Known

Roads: Small swale ~320 meters N of road to Park Tank.

Other Impacts: None Known

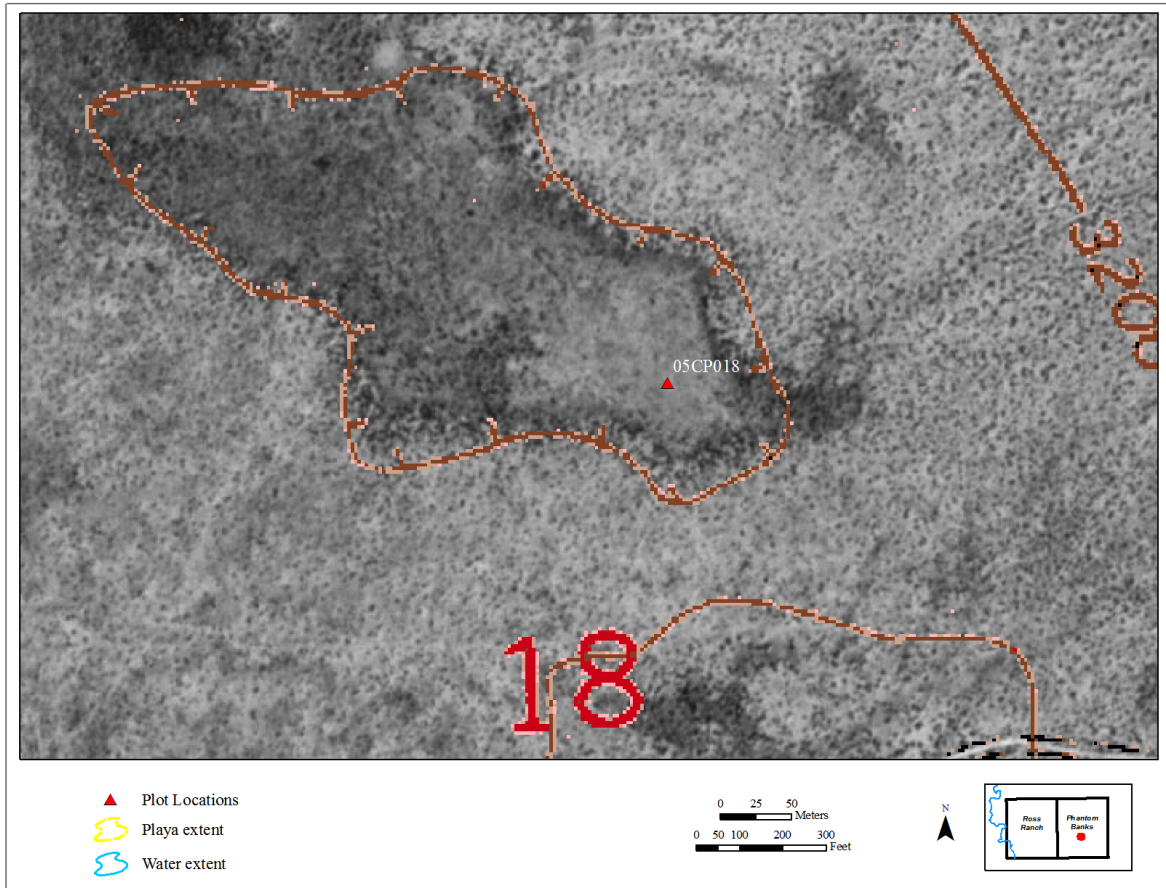
Protection: None Known

Animal Obs: None Known

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/24/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)

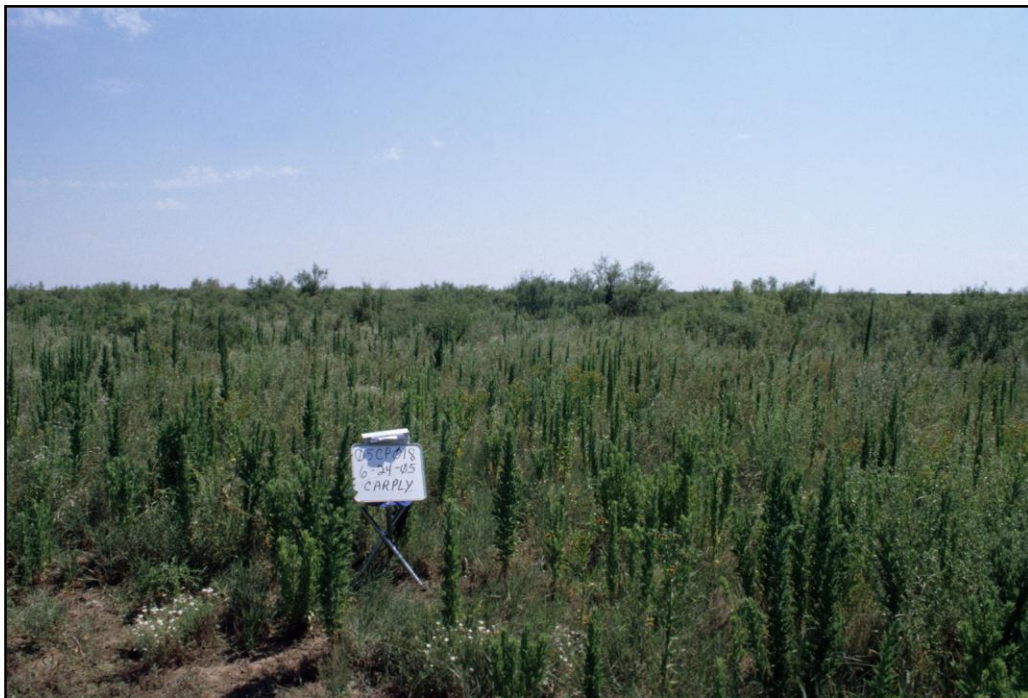


Figure 11. Swale NE of Park Tank: a) map of swale; and b) swale bottom with dense horseweed.

Site Name: Swale E of Steeple Ranch

Site Number: 11 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 617525 **Northing:** 3546682 05CP019

Size (ha): 0 **Size (ac):** 0 **Elevation (ft):** 3200

Site Description: Shallow swale with poorly defined boundary is dominated by *Prosopis glandulosa* with dense *Gutierrezia sarothrae* and very little grass cover, with clay bottom. Possibly just heavily degraded. Not much of an elevation difference from upland vegetation, which is *Prosopis glandulosa*/*Bouteloua eriopoda*/*Gutierrezia sarothrae* with sandy soils and some coppicing.

Vegetation Communities:

Prosopis glandulosa-*Gutierrezia sarothrae* Shrubland
(Honey Mesquite-Broom Snakeweed Shrubland)

Hydrologic Impacts: None Known

Playa Impacts

Exotics: None Known
Grazing: None Known
Fuel Wood: None Known
Dumping: None Known
ORV: None Known
Roads: Drill pad road ~ 700 m W of plot.

Other Impacts: None Known

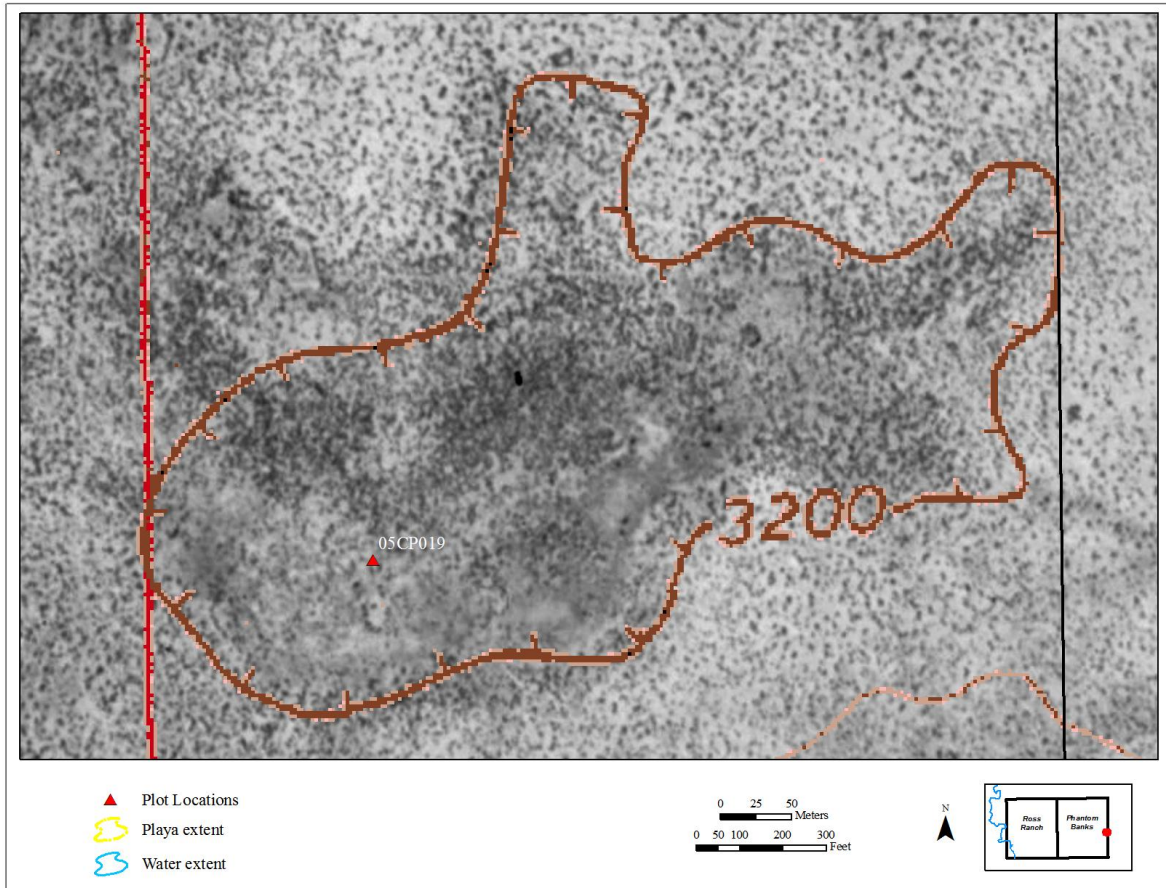
Protection: None Known

Animal Obs: None Known

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/24/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



Figure 12. Swale E of Steeple Ranch: a) map of swale; and b) overview of swale dominated by honey mesquite and snakeweed.

Site Name: NE of Pipeline Rd and Buck Jackson Rd - Playa 1

Site Number: 12 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 614223 **Northing:** 3548621 05CP020

Size (ha): 2.1 **Size (ac):** 5.1 **Elevation (ft):** 3270

Site Description: The eastern and smaller of the two playas, with dense *Prosopis glandulosa*, even within basin center. Open patch of *Panicum obtusum* and *Grindelia nuda* var. *aphanactis* on north edge of playa (approximately 50 x 80 m). *Helenium microcephalum* is dense in patches and scattered throughout. One large (6 m tall) *Celtis laevigata* var. *reticulata* on west edge. Some patches with dense *Ratibida tagetes* and small patches of *Buchloe dactyloides*. Uplands are sandy, forming coppice dunes with *Prosopis glandulosa* and dense *Gutierrezia sarothrae*.

Vegetation Communities:

Prosopis glandulosa/Panicum obtusum/Ratibida tagetes Shrubland
(Honey Mesquite/Vine Mesquite/Green Prairie Coneflower Shrubland)

Hydrologic Impacts: Does not appear altered. No water.

Playa Impacts

Exotics: None Known

Grazing: Very little cattle use.

Fuel Wood: None Known

Dumping: None Known

ORV: None Known

Roads: Very large tire tracks on uplands around both playas. Pipeline Rd. is ~ 500 m to the S.

Other Impacts: None Known

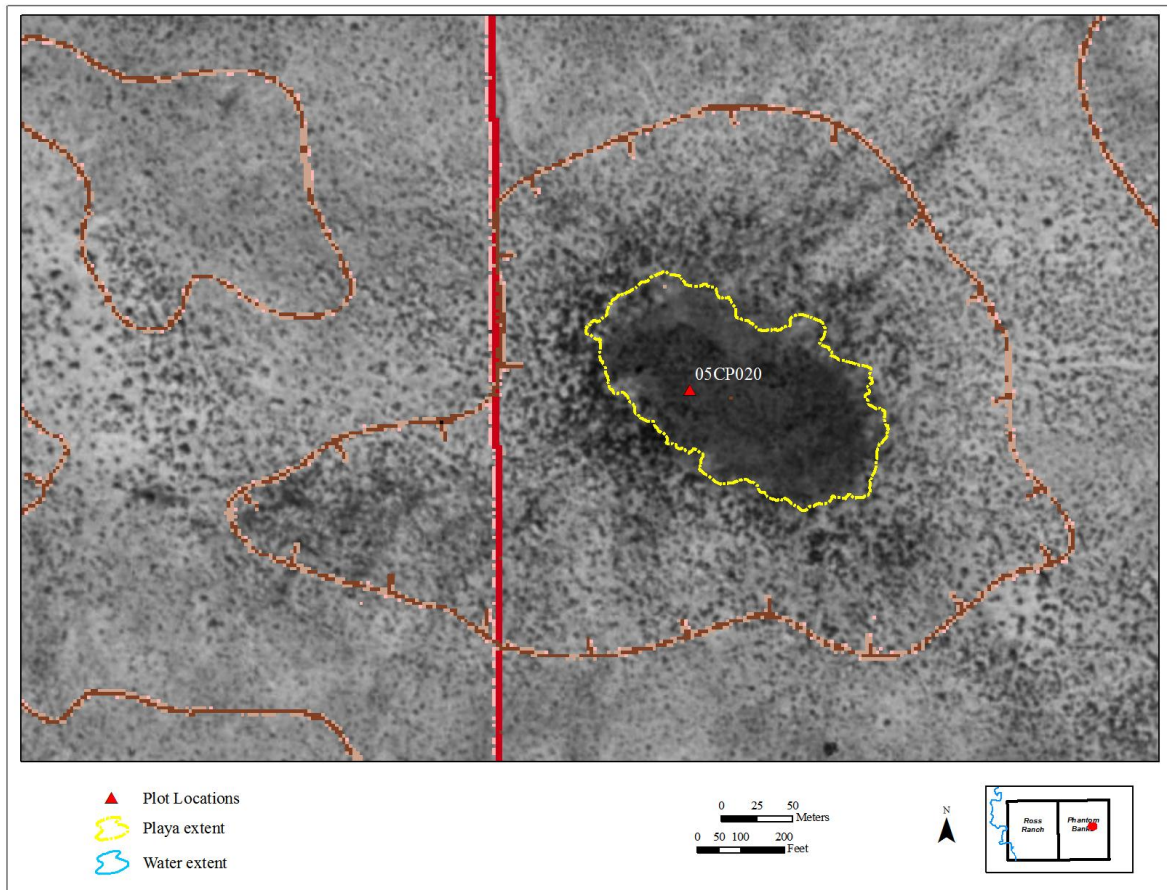
Protection: None Known

Animal Obs: Stick nests in hackberry. Animals observed at playa: brown-crested flycatcher, Bullock's oriole (nesting), cactus wren (nesting), curve-billed thrasher, blue grosbeak, northern mockingbird (nesting), scissor-tailed flycatcher, western kingbird.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/25/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



Figure 13. NE of Pipeline Rd and Buck Jackson Rd – Playa 1: a) map of playa; and b) playa bottom with dense honey mesquite and mixed herbaceous cover.

Site Name: NE of Pipeline Rd and Buck Jackson Rd - Playa 2

Site Number: 13 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 613649 **Northing:** 3548590 05CP021
Easting: 613591 **Northing:** 3548591 05CP022

Size (ha): 7 **Size (ac):** 17.2 **Elevation (ft):** 3270

Site Description: The western and larger of the two playas, which supports dense stands of *Celtis laevigata* var. *reticulata* and scattered *Celtis* within the *Prosopis glandulosa* fringe. Center of basin mostly open with patches of *Prosopis glandulosa* scattered throughout, some quite large. Basin bottom is dominated by *Panicum obtusum* (grass is seeded and tall) with *Ratibida tagetes* and *Helenium microcephalum* forming mosaic patches as co-dominants. *Helenium microcephalum* mostly towards center and *Ratibida tagetes* more towards edge, but also a lot of mixing. Just north of plot 22 is a bare depression approximately 5 meters wide (north-south) by approximately 30-40 meters long (east-west).

Vegetation Communities:

Celtis laevigata var. *reticulata*/*Prosopis glandulosa*/*Panicum obtusum* Forest
(Netleaf Hackberry/Honey Mesquite/Vine Mesquite Forest)

Panicum obtusum/*Ratibida tagetes*-*Grindelia nuda* Herbaceous Vegetation
(Vine Mesquite/Green Prairie Coneflower-Curlytop Gumweed Grassland)

Hydrologic Impacts: Many swallett like depressions throughout basin center. No water.

Playa Impacts

Exotics: None Known

Grazing: Hackberries with a 1.5 - 2 m browse line on most, but overall very little grazing. Some recent grazing in small patches. Some bedding areas within playa.

Fuel Wood: None Known

Dumping: None Known

ORV: None Known

Roads: Very large tire tracks on uplands around both playas. Pipeline Rd. is ~ 500 meters to the S.

Other Impacts: None Known

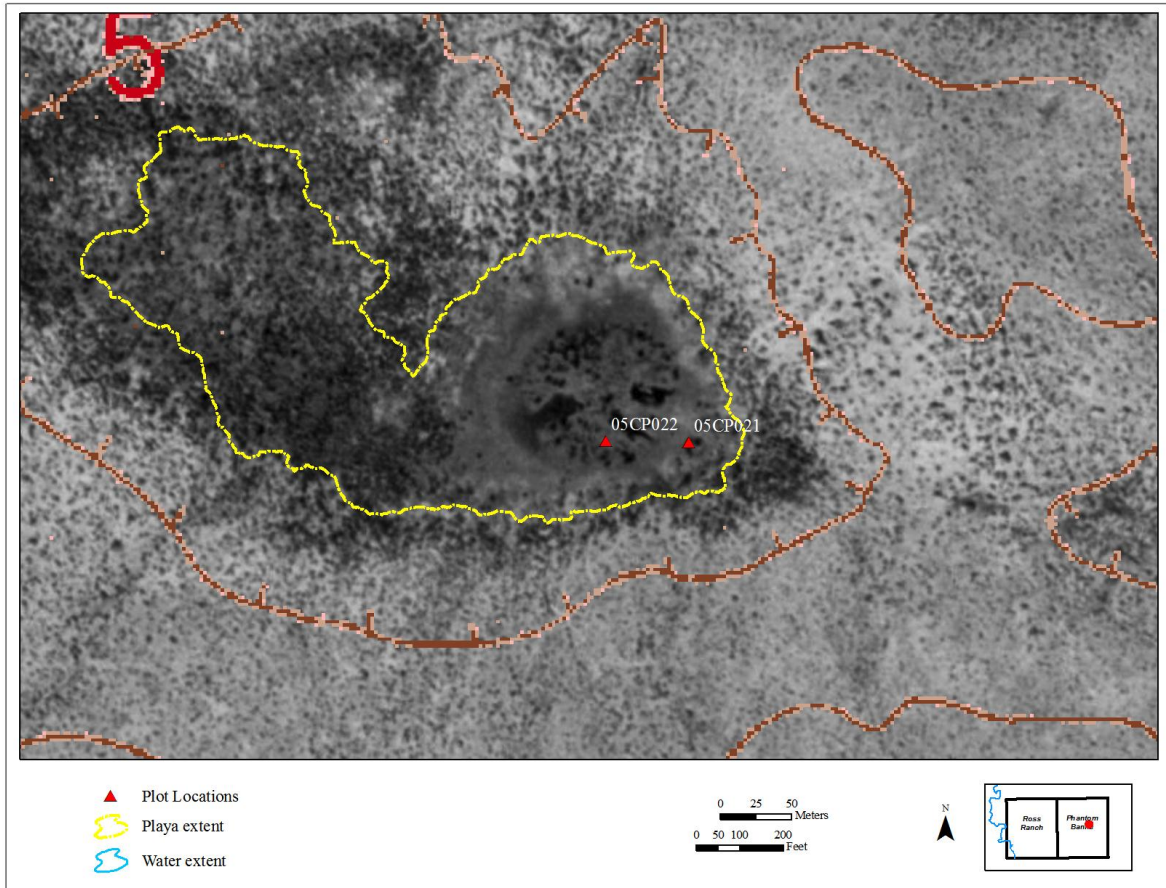
Protection: None Known

Animal Obs: Many nesting birds mostly around hackberries. Animals observed at playa: brown-crested flycatcher, Bullock's oriole (nesting), cactus wren (nesting), curve-billed thrasher, blue grosbeak, northern mockingbird (nesting), scissor-tailed flycatcher, western kingbird.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/25/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



c)



Figure 14. NE of Pipeline Rd and Buck Jackson Rd - Playa 2: a) map; b and c) playa bottom with dense herbaceous cover and scattered honey mesquite and netleaf hackberry.

Site Name: Cockleberry Tank

Site Number: 14 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 614148 **Northing:** 3550236 05CP023

Size (ha): 6.1 **Size (ac):** 15 **Elevation (ft):** 3270

Site Description: Basin dominated by *Panicum obtusum* and *Grindelia nuda* var. *aphanactis* with scattered *Prosopis glandulosa*. *Ratibida tagetes* and *Helenium microcephalum* common throughout. *Helenium microcephalum* is dominant around water's edge forming a band approximately 5-10 meters wide. *Prosopis glandulosa* fringe without *Celtis laevigata* var. *reticulata* present, but has scattered *Mimosa aculeaticarpa* var. *biuncifera*. On east side of east berm is an approximately .5 ha. patch of *Helenium microcephalum*.

Vegetation Communities:

Panicum obtusum/Ratibida tagetes-Grindelia nuda Herbaceous Vegetation
(Vine Mesquite/Green Prairie Coneflower-Curlytop Gumweed Grassland)

Hydrologic Impacts: Dirt tank dug unto center of playa with water, berms to E and W

Playa Impacts

Exotics: None Known

Grazing: Cattle at tank, but left when we arrived. Manager (Buddy Adair) came by looking for cattle - said his fence was cut to the S.

Fuel Wood: None Known

Dumping: None Known

ORV: None Known

Roads: Road along N edge of playa, with spur ending near dirt tank.

Other Impacts: PROGLA on slope south of tank very yellow (possibly herbicide treated).

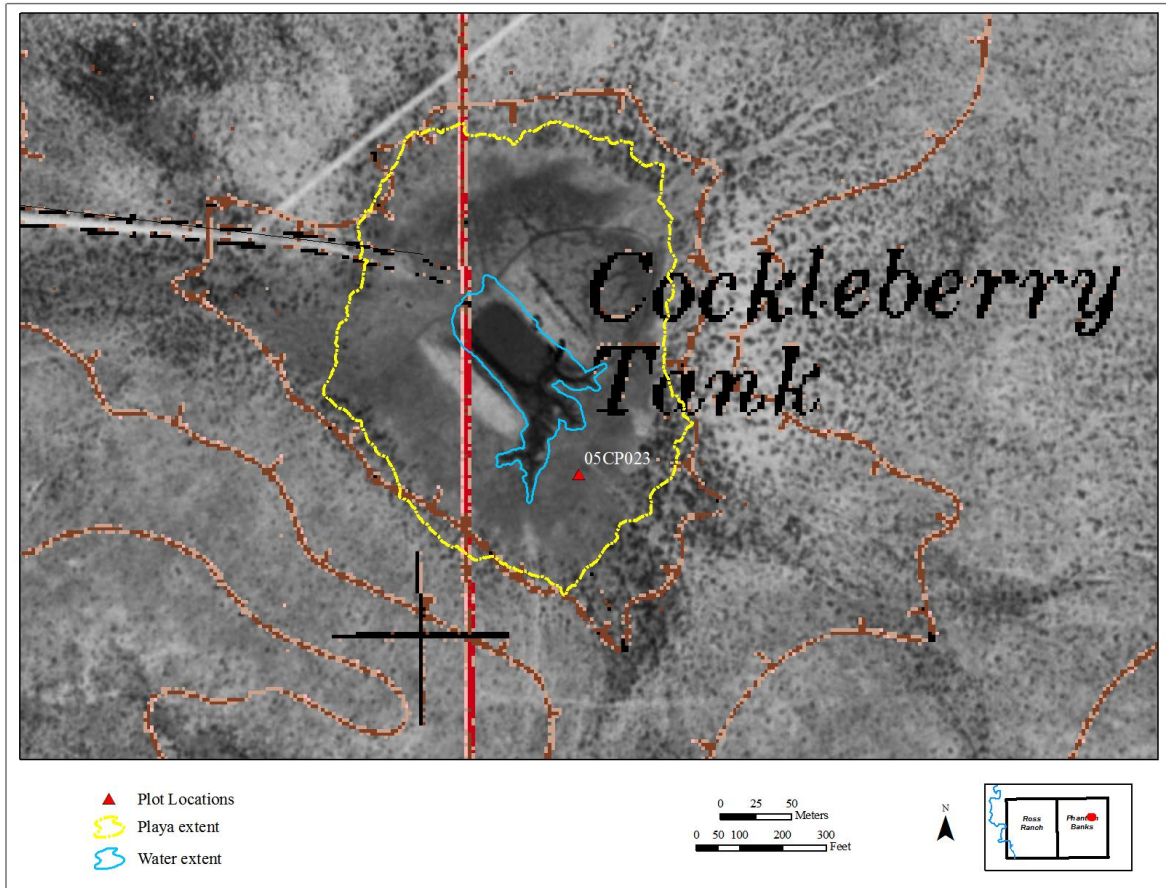
Protection: None Known

Animal Obs: At playa: cactus wren, northern mockingbird, killdeer, red-winged blackbird, mourning dove, swallow.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/25/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



c)



Figure 15. Cockleberry Tank: a) map of playa; b) playa bottom with dense herbaceous cover; and c) dirt tank within playa.

Site Name: Buckhorn Rd E of Crow Rd - Playa 1

Site Number: 15 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 612971 **Northing:** 3552617 05CP024

Size (ha): 0.7 **Size (ac):** 1.8 **Elevation (ft):** 3340

Site Description: Small playa in area that has been herbicide treated for *Prosopis glandulosa*. Few small *Celtis laevigata* var. *reticulata* (1.5-2 m tall) still alive. Most of *Prosopis glandulosa* is dead, only a few still alive. Very weedy with dense *Ambrosia psilostachya*, *Gutierrezia sarothrae*, and scattered *Panicum obtusum*.

Vegetation Communities:

Mesquite treatment/*Panicum obtusum*
(Mesquite treatment/Vine Mesquite)

Hydrologic Impacts: None Known

Playa Impacts

Exotics: None Known
Grazing: None Known
Fuel Wood: None Known
Dumping: None Known
ORV: None Known
Roads: ~ 65 m N of Buckhorn Rd.

Other Impacts: Small playa within mesquite treatment area.

Protection: None Known

Animal Obs: At playa: cactus wren, northern mockingbird, mourning dove, Bullock's oriole.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/25/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

Site Name: Buckhorn Rd E of Crow Rd - Playa 2

Site Number: 16 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 612745 **Northing:** 3552867 05CP025

Size (ha): 1.1 **Size (ac):** 2.7 **Elevation (ft):** 3345

Site Description: Small playa within mesquite treatment area. *Prosopis glandulosa* surrounding playa is dead, but most within the playa area is alive (some partially killed). *Celtis laevigata* var. *reticulata* seems healthy and is co-dominant with *Prosopis glandulosa*, which is throughout the basin bottom with scattered *Mimosa aculeaticarpa* var. *biuncifera*. Playa bottom very disturbed with high forb density and diversity, dominated by mix of *Solanum elaeagnifolium*, *Conyza canadensis*, and *Grindelia nuda* var. *aphanactis*, with scattered *Panicum obtusum*.

Vegetation Communities:

Celtis laevigata var. *reticulata*/*Prosopis glandulosa*/*Panicum obtusum* Forest
(Netleaf Hackberry/Honey Mesquite/Vine Mesquite Forest)

Hydrologic Impacts: None Known

Playa Impacts

Exotics: None Known
Grazing: None Known
Fuel Wood: None Known
Dumping: None Known
ORV: None Known
Roads: ~ 330 m N of Buckhorn Rd.

Other Impacts: Small playa within mesquite treatment area.

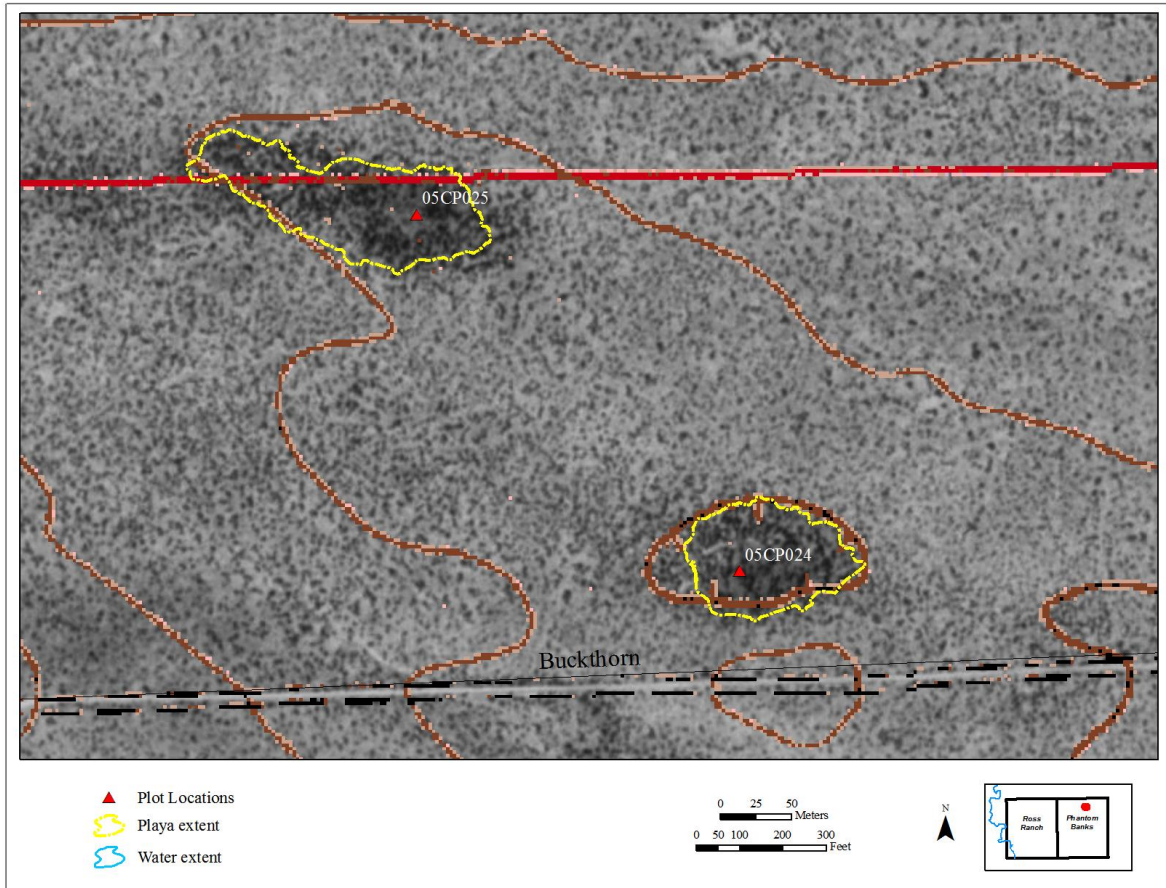
Protection: None Known

Animal Obs: Hackberry with birds nesting, several large stick nests. Animals observed at playa: cactus wren, northern mockingbird, mourning dove, Bullock's oriole (nesting), curve-billed thrasher (nesting).

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/25/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



c)



Figure 16. Buckhorn Rd E of Crow Rd - Playa 1 and 2: a) map of playas; b) bottom of playa 1 (05CP024) with scattered dead honey mesquite; and c) bottom of playa 2 (05CP025).

Site Name: Big Seep Tank

Site Number: 17 **County:** Eddy, NM **Quad:** Phantom Banks

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 609386 **Northing:** 3553905 05CP026

Size (ha): 13.7 **Size (ac):** 33.8 **Elevation (ft):** 3290

Site Description: Long playa running north to south, which is mostly open in basin bottom with few scattered *Prosopis glandulosa*. *Prosopis glandulosa* fringe with very few *Celtis laevigata* var. *reticulata*, one large *Celtis laevigata* var. *reticulata* just south of east berm with dead cow nearby. North of tank large patch of *Helenium microcephalum* (approximately 3 ha) grading into *Ratibida tagetes* to north and along edges before *Prosopis glandulosa* fringe. South of tank mostly *Ratibida tagetes* and *Panicum obtusum* dominated grass (though heavily grazed). Only two *Celtis laevigata* var. *reticulata* south of dirt tank, and small stand at north end (approximately four trees) and one halfway to north on east edge. Few *Mimosa aculeaticarpa* var. *biuncifera* on north of berm scattered along edge. Soils sandy at edge of playa and upland forming small coppice dunes.

Vegetation Communities:

Panicum obtusum/Ratibida tagetes-Grindelia nuda Herbaceous Vegetation
(Vine Mesquite/Green Prairie Coneflower-Curlytop Gumweed Grassland)
Prosopis glandulosa/Unclassified Shrubland
(Honey Mesquite/ Unclassified Shrubland)

Hydrologic Impacts: Dirt tank (approximately 50 x 100 m) with water.

Playa Impacts

Exotics: African rue (*Peganum harmala*) on W berm.

Grazing: > 100 cattle, 4 donkeys, and dead cow just S of E berm. *Panicum obtusum* heavily grazed.

Fuel Wood: None Known

Dumping: None Known

ORV: None Known

Roads: Two-track on E side of playa from tank to N end.

Other Impacts: None Known

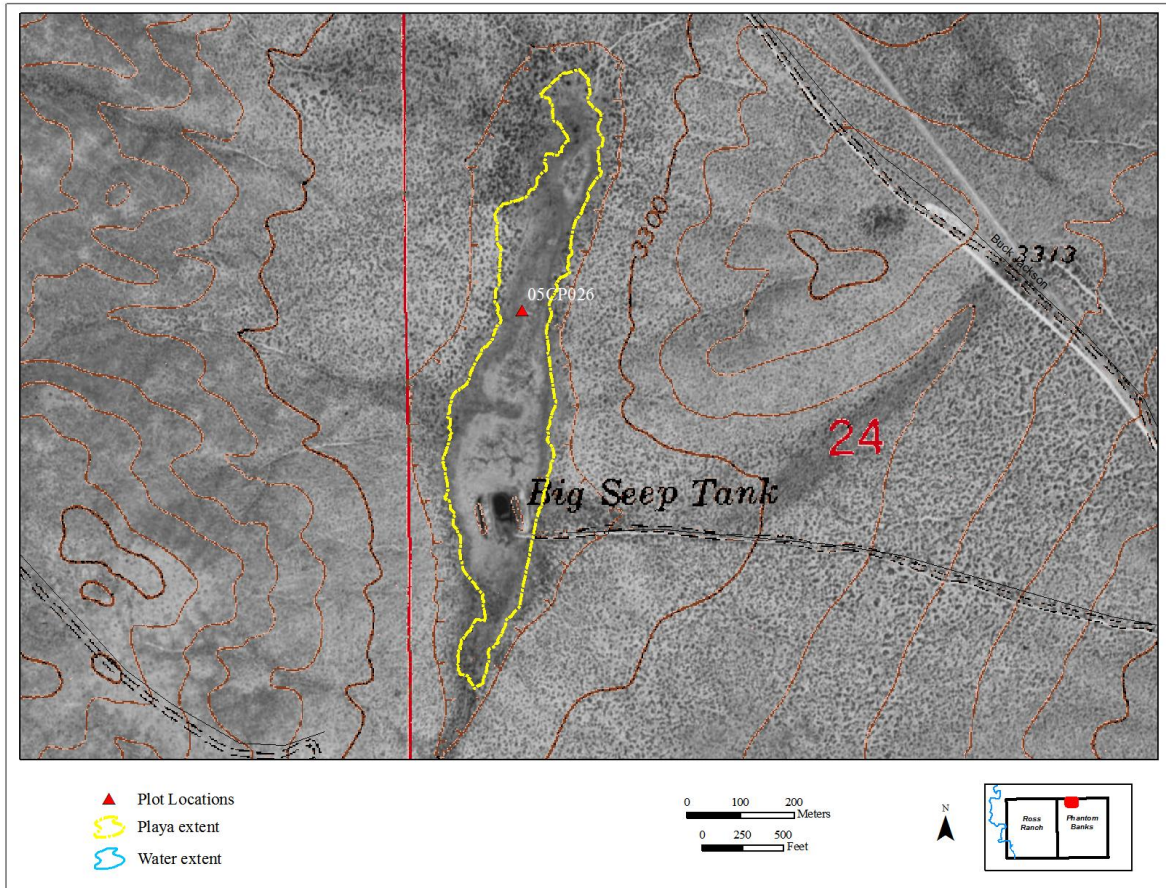
Protection: None Known

Animal Obs: At playa: mourning dove, Bullock's oriole, American avocet (two), killdeer, scissor-tailed flycatcher, Texas horned lizard (S edge of E berm).

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/25/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



c)



Figure 17. Big Seep Tank: a) map of playa; b) playa bottom with dense herbaceous cover; and c) dirt tank within playa.

Site Name: East Rustler Breaks - Playa 1

Site Number: 18 **County:** Eddy, NM **Quad:** Ross Ranch

UTM Coordinates (NAD27, Zone 13):	Plots:	
Easting: 596333	Northing: 3552211	05CP027
Easting: 596413	Northing: 3552266	05CP028

Size (ha): 3.1 **Size (ac):** 7.6 **Elevation (ft):** 3010

Site Description: Grass is dominated by *Pleuraphis mutica* with some scattered *Panicum obtusum* in basin bottom. *Grindelia nuda* var. *aphanactis* is the dominant forb, *Celtis laevigata* var. *reticulata* scattered within basin bottom with playa edge a mix of *Celtis laevigata* var. *reticulata*, *Rhus microphylla* and *Prosopis glandulosa*. Area surrounding playa on uplands to south and west appear to have been treated with herbicide (*Prosopis glandulosa* - mostly dead). Playa does not appear to have been sprayed, except for few *Rhus microphylla* and *Celtis laevigata* var. *reticulata* at southwest edge. Playa edge composed of dense and large *Rhus microphylla*. *Celtis laevigata* var. *reticulata* are scattered throughout and dense in small patches, with *Mimosa aculeaticarpa* var. *biuncifera* and *Prosopis glandulosa* also scattered throughout. Browse line on *Celtis laevigata* var. *reticulata* is approximately two meters high, but not on all of them. High forb diversity and density.

Vegetation Communities:

Celtis laevigata var. *reticulata*/*Rhus microphylla*/*Panicum obtusum* Forest
(Netleaf Hackberry/Littleleaf Sumac/Vine Mesquite Forest)
Pleuraphis mutica-*Panicum obtusum*, *Prosopis glandulosa* Phase Herbaceous
Vegetation
(Tobosa-Vine Mesquite, Honey Mesquite Phase Grassland)

Hydrologic Impacts: Playa basin with many depressions and swallett type drain holes. Does not appear altered.

Playa Impacts

Exotics: None Known
Grazing: Appears moderately/heavily grazed although not recently.
Fuel Wood: None Known
Dumping: None Known
ORV: None Known
Roads: Dirt road ~ 50 m W of playa.

Other Impacts: None Known

Protection: None Known

Animal Obs: Lots of bird activity and nesting in tree fringe. Animals observed at playa: cactus wren, brown-crested flycatcher, northern mockingbird.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/26/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

Site Name: East Rustler Breaks - Playa 2

Site Number: 19 **County:** Eddy, NM **Quad:** Ross Ranch

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 595987 **Northing:** 3552284 05CP029

Size (ha): 0.6 **Size (ac):** 1.5 **Elevation (ft):** 3025

Site Description: Small depression with boundary well defined by band of *Rhus microphylla* and *Mimosa aculeaticarpa* var. *biuncifera*. Center of basin dominated by *Pleuraphis mutica* and *Prosopis glandulosa*. *Pleuraphis mutica* becomes more abundant near *Rhus microphylla* at playa's edge.

Vegetation Communities:

Rhus microphylla-*Mimosa aculeaticarpa* var. *biuncifera* Shrubland
(Littleleaf sumac-catclaw mimosa Shrubland)

Pleuraphis mutica/Monotypic, *Prosopis glandulosa* Phase Herbaceous Vegetation
(Tobosa/Monotypic Stand, Honey Mesquite Phase Grassland)

Hydrologic Impacts: Few small swallett like features.

Playa Impacts

Exotics: None Known

Grazing: Appears moderately/heavily grazed although not recently.

Fuel Wood: None Known

Dumping: None Known

ORV: None Known

Roads: Dirt road ~ 180 m E of playa.

Other Impacts: None Known

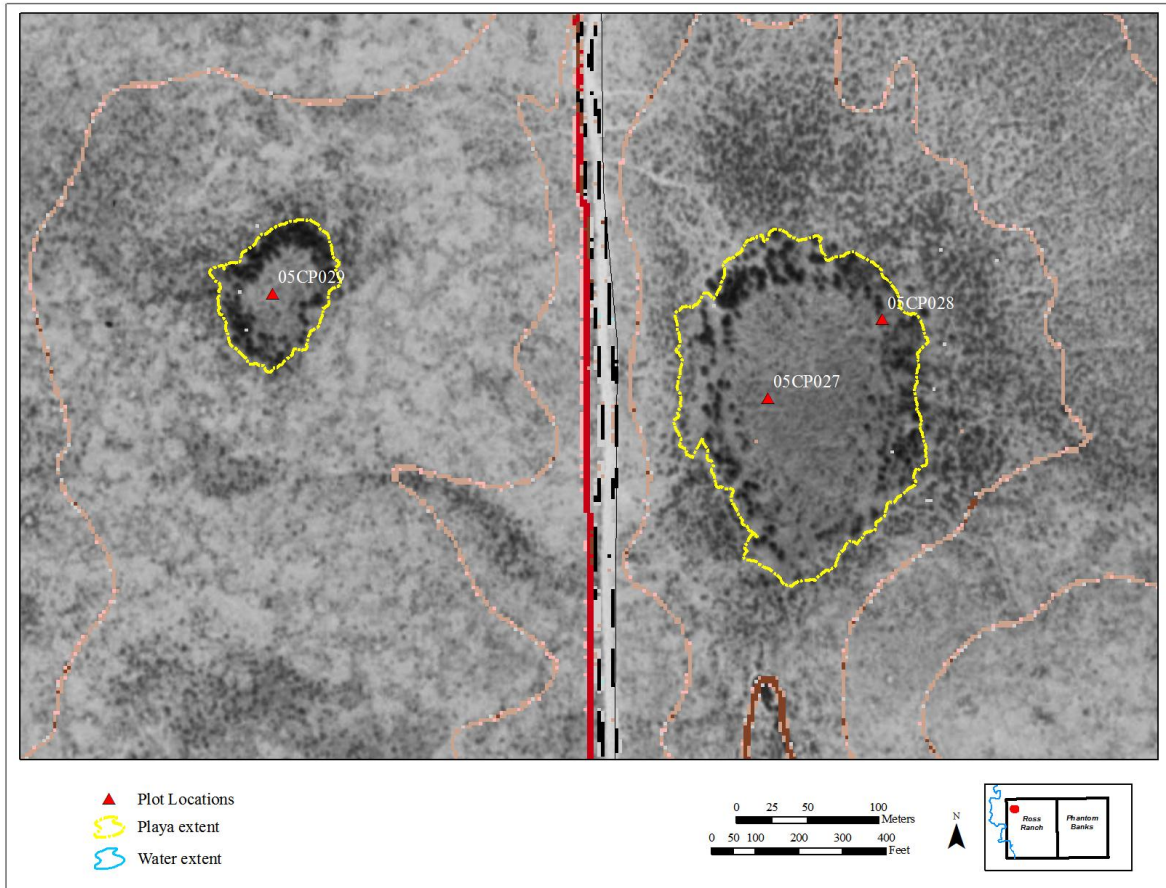
Protection: None Known

Animal Obs: None Known

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/26/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



c)



Figure 18. East Rustler Breaks - Playas 1 and 2: a) map of playas (playa 1 – right, playa 2 – left); b) bottom of playa 1; and c) bottom of playa 2.

Site Name: Rustler Breaks Sinkhole

Site Number: 20 **County:** Eddy, NM **Quad:** Ross Ranch

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 595282 **Northing:** 3552554 05CP030

Size (ha): 1.9 **Size (ac):** 4.6 **Elevation (ft):** 2982

Site Description: Enclosed basin bottom (sinkhole) with sides 20-30 feet to top. Surrounding slopes and upland are dominated by *Acacia neovernicosa* and *Larrea tridentata*. Sparse center of basin with dense *Ratibida columnifera* and abundant *Cucurbita foetidissima* scattered throughout (approximately 60 m in diameter). One small clump of *Sporobolus wrightii* and few scattered *Artemisia dracunculus*. *Lepidium alyssoides* is common throughout, with abundant *Vulpia octoflora* and forms a dense band around the *Ratibida columnifera* to footslope. Several *Prosopis glandulosa* scattered in basin bottom.

Vegetation Communities:

Cucurbita foetidissima-*Ratibida columnifera* Herbaceous Vegetation
(Buffalo Gourd-Upright Prairie Coneflower Herbaceous Vegetation)

Hydrologic Impacts: Few small swallett type features.

Playa Impacts

Exotics: None Known
Grazing: None Known
Fuel Wood: None Known
Dumping: None Known
ORV: None Known
Roads: Dirt road ~ 830 m E of playa.

Other Impacts: None Known

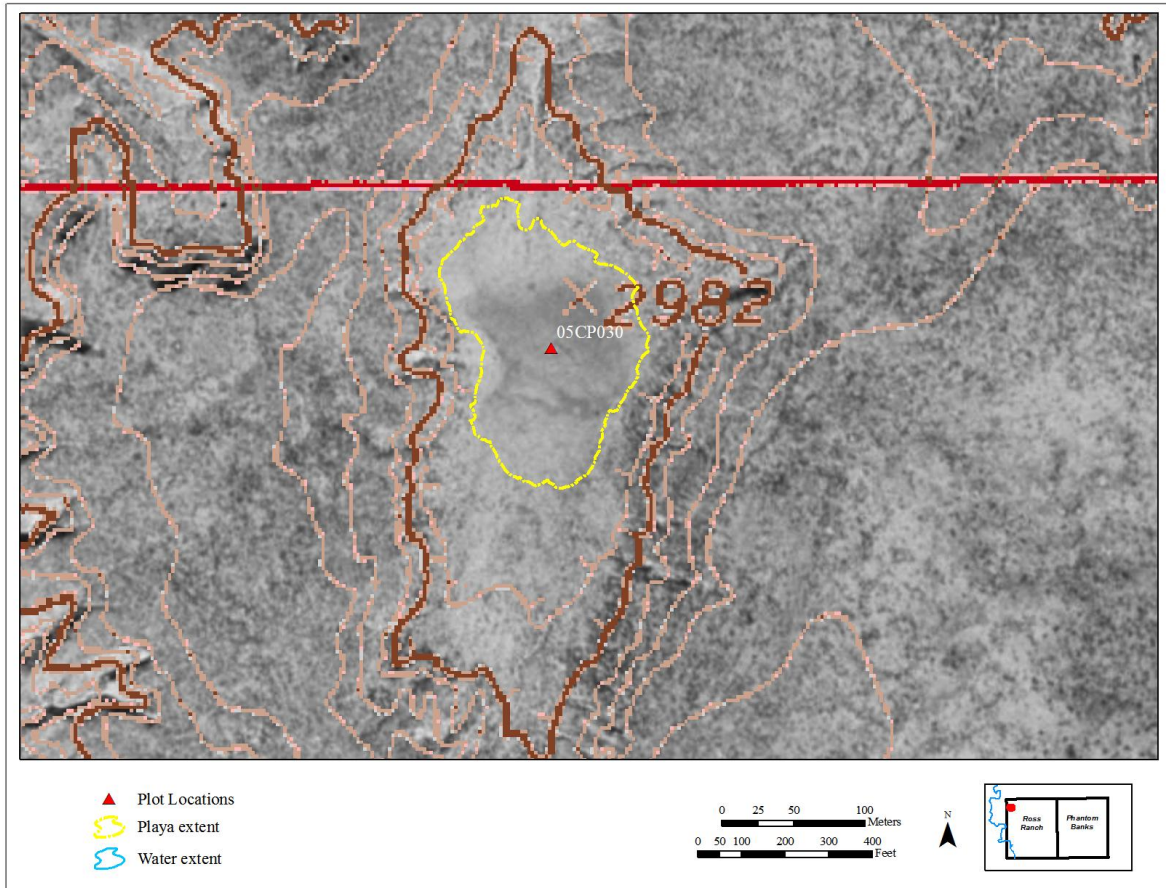
Protection: None Known

Animal Obs: Lots of grasshoppers. More insect than bird activity. One gnarled *Rhus microphylla* at NE edge with small empty birdnest.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/26/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



Figure 19. Rustler Breaks Sinkhole: a) map of sink hole; and b) sinkhole bottom with dense buffalo gourd.

Site Name: East Rustler Breaks - Playa 3

Site Number: 21 **County:** Eddy, NM **Quad:** Ross Ranch

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 596397 **Northing:** 3550897 05CP031

Size (ha): 11.5 **Size (ac):** 28.5 **Elevation (ft):** 2970

Site Description: Very large, open playa. *Grindelia nuda* var. *aphanactis* is dominant in basin, with heavily browsed *Panicum obtusum* understory and few scattered *Prosopis glandulosa*. *Helenium microcephalum* dense in patches (more toward center), with scattered *Ratibida tagetes* and *Helianthus ciliaris*. *Prosopis glandulosa* fringe fairly open with scattered *Mimosa aculeaticarpa* var. *biuncifera*. Small stand of *Celtis laevigata* var. *reticulata* on east edge (2 - 3 live trees, with several dead).

Vegetation Communities:

Panicum obtusum/*Ratibida tagetes*-*Grindelia nuda* Herbaceous Vegetation
(Vine Mesquite/Green Prairie Coneflower-Curlytop Gumweed Grassland)
Prosopis glandulosa/Unclassified Shrubland
(Honey Mesquite/ Unclassified Shrubland)

Hydrologic Impacts: Water trough W of playa is dry. Many swallett type features within playa bottom, but does not appear altered.

Playa Impacts

Exotics: None Known
Grazing: Very large, open playa heavily used by cattle.
Fuel Wood: None Known
Dumping: None Known
ORV: None Known
Roads: Dirt road ~ 40 m W of playa.

Other Impacts: Uplands have had mesquite treated with herbicide.

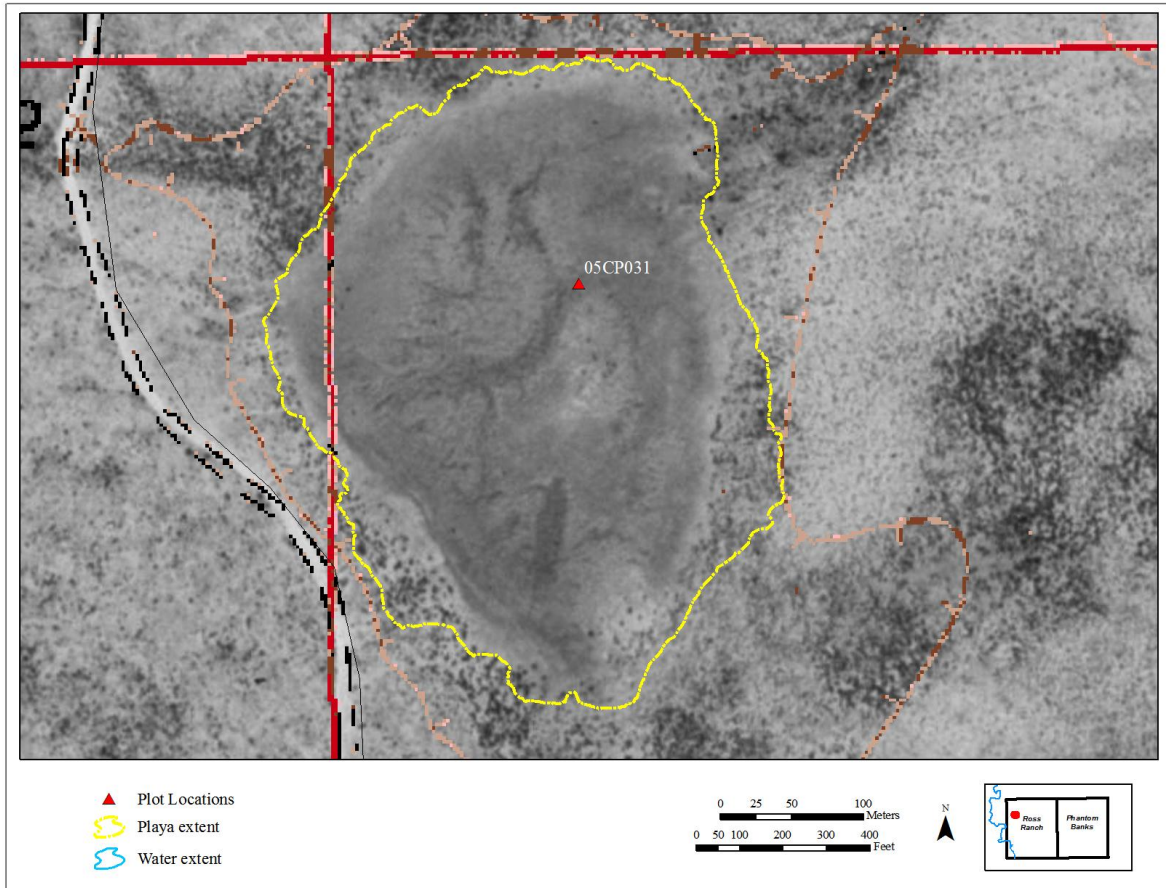
Protection: None Known

Animal Obs: At playa: burrowing owl, northern mockingbird, western kingbird.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/26/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



c)



Figure 20. East Rustler Breaks - Playa 3: a) map of playa; b) playa bottom with scattered honey mesquite; and c) playa bottom with patchy herbaceous cover.

Site Name: East Rustler Breaks - Playa 4

Site Number: 22 **County:** Eddy, NM, **Quad:** Ross Ranch

UTM Coordinates (NAD27, Zone 13): **Plots:**
Easting: 595399 **Northing:** 3550383 05CP032

Size (ha): 7.8 **Size (ac):** 19.3 **Elevation (ft):** 2970

Site Description: *Prosopis glandulosa* fringe is dense (~10 - 20 m wide), with few scattered lotebush. No *Celtis laevigata* var. *reticulata*. Large *Prosopis glandulosa* zone at north end of playa where drainage feeds in with dense *Grindelia nuda* var. *aphanactis*. Uplands have had *Prosopis glandulosa* treated with herbicide (mostly dead). Playa bottom is a mix of *Panicum obtusum*, *Grindelia nuda* var. *aphanactis*, and *Helenium microcephalum* more towards center of playa with large patches of *Ratibida tagetes* more towards edge. *Prosopis glandulosa* is scattered throughout basin bottom.

Vegetation Communities:

Panicum obtusum/*Ratibida tagetes*-*Grindelia nuda* Herbaceous Vegetation
(Vine Mesquite/Green Prairie Coneflower-Curlytop Gumweed Grassland)
Prosopis glandulosa/*Panicum obtusum*/*Ratibida tagetes* Shrubland
(Honey Mesquite/Vine Mesquite/Green Prairie Coneflower Shrubland)

Hydrologic Impacts: Many swallett type features.

Playa Impacts

Exotics: None Known
Grazing: Dead cow on E side of playa at NE end (dead for a while).
Fuel Wood: None Known
Dumping: None Known
ORV: None Known
Roads: Dirt road ~ 170 m S of playa.

Other Impacts: Uplands have had mesquite treatment (mostly dead).

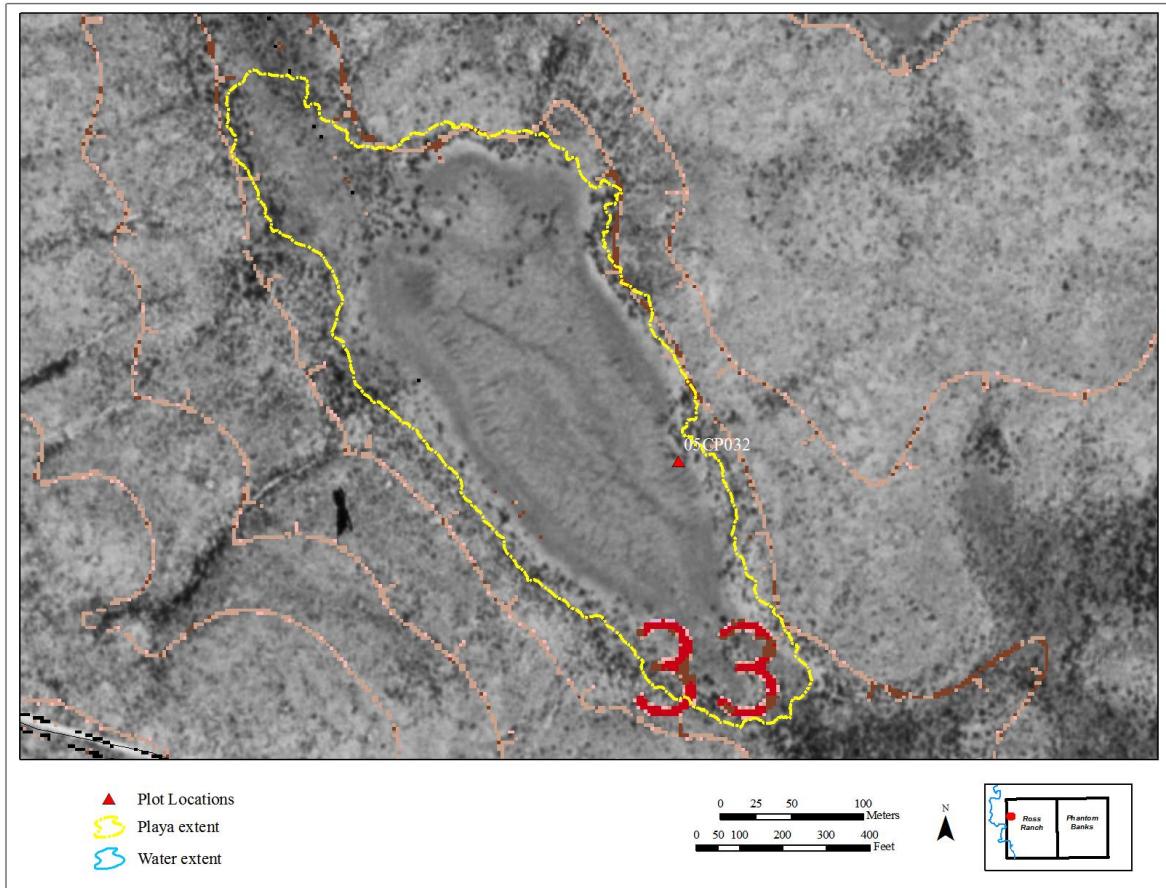
Protection: None Known

Animal Obs: Birds nesting in mesquite. Animals observed at playa: cactus wren, northern mockingbird, Bullock's oriole, scissor-tailed flycatcher.

Data: Ground reconnaissance, Field sampling **Survey Date:** 6/26/2005

Investigators: Yvonne Chauvin and Sandy L. Sacher

a)



b)



Figure 21. East Rustler Breaks - Playa 4: a) map of playa; and b) playa edge with dense honey mesquite.

Appendix A – Plant Species List

Table A-1. Bureau of Land Management Carlsbad Resource Area Playas Survey plant species list ordered alphabetically by life form, family, and scientific name (2006). Symbol is PLANTS database symbol (http://plants.usda.gov/cgi_bin/topics.cgi) with the PLANTS designation of origin.

Family	Scientific Name	Common Name	Symbol	Origin
Trees				
Sapindaceae	<i>Sapindus saponaria</i> var. <i>drummondii</i>	western soapberry	SASAD	Native
Ulmaceae	<i>Celtis laevigata</i> var. <i>reticulata</i>	netleaf hackberry	CELAR	Native
Shrubs				
Agavaceae	<i>Yucca elata</i>	soaptree yucca	YUEL	Native
Anacardiaceae	<i>Rhus microphylla</i>	littleleaf sumac	RHMI3	Native
Berberidaceae	<i>Mahonia trifoliata</i>	algerita	MATR3	Native
Fabaceae	<i>Mimosa aculeaticarpa</i> var. <i>biuncifera</i>	catclaw mimosa	MIACB	Native
Fabaceae	<i>Prosopis glandulosa</i>	honey mesquite	PRGL2	Native
Ranunculaceae	<i>Clematis drummondii</i>	Drummond's clematis	CLDR	Native
Rhamnaceae	<i>Ziziphus obtusifolia</i>	lotebush	ZIOB	Native
Dwarf Shrubs				
Asteraceae	<i>Gutierrezia sarothrae</i>	broom snakeweed	GUSA2	Native
Euphorbiaceae	<i>Croton pottsii</i>	leatherweed	CRPO5	Native
Grasses				
Cyperaceae	<i>Cyperus</i> spp.	flatsedge	CYPER	
Cyperaceae	<i>Eleocharis macrostachya</i>	common spikerush	ELMA5	Native
Poaceae	<i>Aristida purpurea</i> var. <i>longiseta</i>	red threeawn	ARPUL	Native
Poaceae	<i>Bouteloua curtipendula</i>	sideoats grama	BOCU	Native
Poaceae	<i>Bouteloua eriopoda</i>	black grama	BOER4	Native
Poaceae	<i>Bouteloua gracilis</i>	blue grama	BOGR2	Native
Poaceae	<i>Buchloe dactyloides</i>	buffalograss	BUDA	Native
Poaceae	<i>Chloris cucullata</i>	hooded windmill grass	CHCU2	Native
Poaceae	<i>Cynodon dactylon</i>	bermudagrass	CYDA	Introduced
Poaceae	<i>Digitaria californica</i>	Arizona cottontop	DICA8	Native
Poaceae	<i>Hilaria jamesii</i>	galleta	HIJA	Native
Poaceae	<i>Hilaria mutica</i>	tobosa	HIMU2	Native
Poaceae	<i>Muhlenbergia porteri</i>	bush muhly	MUPO2	Native
Poaceae	<i>Muhlenbergia repens</i>	creeping muhly	MURE	Native
Poaceae	<i>Panicum obtusum</i>	vine mesquite	PAOB	Native
Poaceae	<i>Scleropogon brevifolius</i>	burrograss	SCBR2	Native
Poaceae	<i>Setaria leucopila</i>	streambed bristlegrass	SELE6	Native
Poaceae	<i>Sporobolus airoides</i>	alkali sacaton	SPAI	Native
Poaceae	<i>Sporobolus cryptandrus</i>	sand dropseed	SPCR	Native
Poaceae	<i>Sporobolus wrightii</i>	giant sacaton	SPWR2	Native
Poaceae	<i>Tridens albescens</i>	white tridens	TRAL2	Native
Poaceae	<i>Pleuraphis mutica</i>	tobosa	PLMU3	Native
Forbs				
Asclepiadaceae	<i>Asclepias brachystephana</i>	bract milkweed	ASBR	Native

Table A-1. Bureau of Land Management Carlsbad Resource Area Playas Survey plant species list ordered alphabetically by life form, family, and scientific name (2006). Symbol is PLANTS database symbol (http://plants.usda.gov/cgi_bin/topics.cgi) with the PLANTS designation of origin.

Asclepiadaceae	<i>Asclepias subverticillata</i>	whorled milkweed	ASSU2	Native
Asteraceae	<i>Ambrosia psilostachya</i>	Cuman ragweed	AMPS	Native
Asteraceae	<i>Aphanostephus ramosissimus</i>	plains dozedaisy	APRA	Native
Asteraceae	<i>Artemisia dracunculus</i>	tarragon	ARDR4	Native
Asteraceae	<i>Artemisia ludoviciana</i>	Louisiana sagewort	ARLU	Native
Asteraceae	<i>Centaurea americana</i>	American star-thistle	CEAM2	Native
Asteraceae	<i>Centaurea melitensis</i>	Malta starthistle	CEME2	Introduced
Asteraceae	<i>Cirsium spp.</i>	thistle	CIRSI	Native
Asteraceae	<i>Cirsium undulatum</i>	wavyleaf thistle	CIUN	Native
Asteraceae	<i>Conyza canadensis</i>	Canadian horseweed	COCA5	Native
Asteraceae	<i>Erigeron divergens</i>	spreading fleabane	ERDI4	Native
Asteraceae	<i>Grindelia nuda var. aphanactis</i>	curlytop gumweed	GRNUA	Native
Asteraceae	<i>Gutierrezia sphaerocephala</i>	roundleaf snakeweed	GUSP	Native
Asteraceae	<i>Helianthus ciliaris</i>	Texas blueweed	HECI	Native
Asteraceae	<i>Hymenopappus flavescens var. canotomentosus</i>	collegeflower	HYFLC	Native
Asteraceae	<i>Iva dealbata</i>	woolly marshelder	IVDE	Native
Asteraceae	<i>Laennecia coulteri</i>	conyza	LACO13	Native
Asteraceae	<i>Psilostrophe tagetina</i>	woolly paperflower	PSTA	Native
Asteraceae	<i>Ratibida columnifera</i>	upright prairie coneflower	RACO3	Native
Asteraceae	<i>Ratibida tagetes</i>	green prairie coneflower	RATA	Native
Asteraceae	<i>Verbesina encelioides</i>	golden crownbeard	VEEN	Native
Asteraceae	<i>Xanthisma texanum</i>	Texas sleepydaisy	XATE	Native
Asteraceae	<i>Helenium microcephalum</i>	smallhead sneezeweed	HEMI	Native
Brassicaceae	<i>Lepidium alyssoides</i>	mesa pepperweed	LEAL4	Native
Caryophyllaceae	<i>Loeflingia squarrosa</i>	spreading pygmyleaf	LOSQ	Native
Commelinaceae	<i>Commelina erecta</i>	whitemouth dayflower	COER	Native
Convolvulaceae	<i>Convolvulus equitans</i>	Texas bindweed	COEQ	Native
Cucurbitaceae	<i>Cucurbita foetidissima</i>	buffalo gourd	CUFO	Native
Euphorbiaceae	<i>Chamaesyce albomarginata</i>	whitemargin sandmat	CHAL11	Native
Hydrophyllaceae	<i>Nama hispidum</i>	bristly nama	NAHI	Native
Lamiaceae	<i>Marrubium vulgare</i>	horehound	MAVU	Introduced
Malvaceae	<i>Sphaeralcea angustifolia</i>	copper globemallow	SPAN3	Native
Malvaceae	<i>Malvella sagittifolia</i>	arrowleaf mallow	MASA3	Native
Onagraceae	<i>Gaura hexandra ssp. gracilis</i>	harlequinbush	GAHEG	Native
Papaveraceae	<i>Argemone pleiacantha ssp. pleiacantha</i>	southwestern pricklypoppy	ARPLP3	Native
Plantaginaceae	<i>Plantago spp.</i>	plantain	PLANT	
Plantaginaceae	<i>Plantago patagonica</i>	woolly plantain	PLPA2	Native
Plantaginaceae	<i>Plantago rhodosperma</i>	redseed plantain	PLRH	Native
Polypodiaceae	<i>Pleopeltis guttatum</i>	Sorus fern		Native
Portulacaceae	<i>Portulaca oleracea</i>	common purslane	POOL	Native
Solanaceae	<i>Solanum elaeagnifolium</i>	silverleaf nightshade	SOEL	Native
Verbenaceae	<i>Glandularia bipinnatifida</i>	Dakota mock vervain	GLBI2	Native

Table A-1. Bureau of Land Management Carlsbad Resource Area Playas Survey plant species list ordered alphabetically by life form, family, and scientific name (2006). Symbol is PLANTS database symbol (http://plants.usda.gov/cgi_bin/topics.cgi) with the PLANTS designation of origin.

Verbenaceae	<i>Verbena bracteata</i>	bigbract verbena	VEBR	Native
Verbenaceae	<i>Verbena plicata</i>	fanleaf vervain	VEPL	Native
Zygophyllaceae	<i>Peganum harmala</i>	African rue	PEHA	Introduced
Zygophyllaceae	<i>Tribulus terrestris</i>	puncturevine	TRTE	Introduced

Table A-2. Carlsbad Playas list of species ordered alphabetically by common name.

Common Name	Scientific Name	Family	Origin
African rue	<i>Peganum harmala</i>	Zygophyllaceae	Introduced
algerita	<i>Mahonia trifoliata</i>	Berberidaceae	Native
alkali sacaton	<i>Sporobolus airoides</i>	Poaceae	Native
American star-thistle	<i>Centaurea americana</i>	Asteraceae	Native
Arizona cottontop	<i>Digitaria californica</i>	Poaceae	Native
arrowleaf mallow	<i>Malvella sagittifolia</i>	Malvaceae	Native
bermudagrass	<i>Cynodon dactylon</i>	Poaceae	Introduced
bigbract verbena	<i>Verbena bracteata</i>	Verbenaceae	Native
black grama	<i>Bouteloua eriopoda</i>	Poaceae	Native
blue grama	<i>Bouteloua gracilis</i>	Poaceae	Native
bract milkweed	<i>Asclepias brachystephana</i>	Asclepiadaceae	Native
bristly nama	<i>Nama hispidum</i>	Hydrophyllaceae	Native
broom snakeweed	<i>Gutierrezia sarothrae</i>	Asteraceae	Native
buffalo gourd	<i>Cucurbita foetidissima</i>	Cucurbitaceae	Native
buffalograss	<i>Buchloe dactyloides</i>	Poaceae	Native
burrograss	<i>Scleropogon brevifolius</i>	Poaceae	Native
bush muhly	<i>Muhlenbergia porteri</i>	Poaceae	Native
Canadian horseweed	<i>Conyza canadensis</i>	Asteraceae	Native
catclaw mimosa	<i>Mimosa aculeaticarpa</i> var. <i>biuncifera</i>	Fabaceae	Native
collegeflower	<i>Hymenopappus flavescens</i> var. <i>canotomentosus</i>	Asteraceae	Native
common purslane	<i>Portulaca oleracea</i>	Portulacaceae	Native
common spikerush	<i>Eleocharis macrostachya</i>	Cyperaceae	Native
conyza	<i>Laennecia coulteri</i>	Asteraceae	Native
copper globemallow	<i>Sphaeralcea angustifolia</i>	Malvaceae	Native
creeping muhly	<i>Muhlenbergia repens</i>	Poaceae	Native
Cuman ragweed	<i>Ambrosia psilostachya</i>	Asteraceae	Native
curlytop gumweed	<i>Grindelia nuda</i> var. <i>aphanactis</i>	Asteraceae	Native
Dakota mock vervain	<i>Glandularia bipinnatifida</i>	Verbenaceae	Native
Drummond's clematis	<i>Clematis drummondii</i>	Ranunculaceae	Native
fanleaf vervain	<i>Verbena plicata</i>	Verbenaceae	Native
flatsedge	<i>Cyperus</i> spp.	Cyperaceae	
galleta	<i>Hilaria jamesii</i>	Poaceae	Native
giant sacaton	<i>Sporobolus wrightii</i>	Poaceae	Native
golden crownbeard	<i>Verbesina encelioides</i>	Asteraceae	Native
green prairie coneflower	<i>Ratibida tagetes</i>	Asteraceae	Native
harlequinbush	<i>Gaura hexandra</i> ssp. <i>gracilis</i>	Onagraceae	Native
honey mesquite	<i>Prosopis glandulosa</i>	Fabaceae	Native
hooded windmill grass	<i>Chloris cucullata</i>	Poaceae	Native
horehound	<i>Marrubium vulgare</i>	Lamiaceae	Introduced
leatherweed	<i>Croton pottsii</i>	Euphorbiaceae	Native
littleleaf sumac	<i>Rhus microphylla</i>	Anacardiaceae	Native
lotebush	<i>Ziziphus obtusifolia</i>	Rhamnaceae	Native
Louisiana sagewort	<i>Artemisia ludoviciana</i>	Asteraceae	Native

Table A-2. Carlsbad Playas list of species ordered alphabetically by common name.

Malta starthistle	<i>Centaurea melitensis</i>	Asteraceae	Introduced
mesa pepperweed	<i>Lepidium alyssoides</i>	Brassicaceae	Native
netleaf hackberry	<i>Celtis laevigata</i> var. <i>reticulata</i>	Ulmaceae	Native
plains dozedaisy	<i>Aphanostephus ramosissimus</i>	Asteraceae	Native
plantain	<i>Plantago</i> spp.	Plantaginaceae	
puncturevine	<i>Tribulus terrestris</i>	Zygophyllaceae	Introduced
red threeawn	<i>Aristida purpurea</i> var. <i>longiseta</i>	Poaceae	Native
redseed plantain	<i>Plantago rhodosperma</i>	Plantaginaceae	Native
roundleaf snakeweed	<i>Gutierrezia sphaerocephala</i>	Asteraceae	Native
sand dropseed	<i>Sporobolus cryptandrus</i>	Poaceae	Native
sideoats grama	<i>Bouteloua curtipendula</i>	Poaceae	Native
silverleaf nightshade	<i>Solanum elaeagnifolium</i>	Solanaceae	Native
smallhead sneezeweed	<i>Helenium microcephalum</i>	Asteraceae	Native
soaptree yucca	<i>Yucca elata</i>	Agavaceae	Native
southwestern pricklypoppy	<i>Argemone pleiakantha</i> ssp. <i>pleiakantha</i>	Papaveraceae	Native
spreading fleabane	<i>Erigeron divergens</i>	Asteraceae	Native
spreading pygmyleaf	<i>Loeflingia squarrosa</i>	Caryophyllaceae	Native
streambed bristlegrass	<i>Setaria leucopila</i>	Poaceae	Native
tarragon	<i>Artemisia dracunculus</i>	Asteraceae	Native
Texas bindweed	<i>Convolvulus equitans</i>	Convolvulaceae	Native
Texas blueweed	<i>Helianthus ciliaris</i>	Asteraceae	Native
Texas sleepydaisy	<i>Xanthisma texanum</i>	Asteraceae	Native
thistle	<i>Cirsium</i> spp.	Asteraceae	Native
tobosa	<i>Hilaria mutica</i>	Poaceae	Native
tobosa	<i>Pleuraphis mutica</i>	Poaceae	Native
upright prairie coneflower	<i>Ratibida columnifera</i>	Asteraceae	Native
vine mesquite	<i>Panicum obtusum</i>	Poaceae	Native
wavyleaf thistle	<i>Cirsium undulatum</i>	Asteraceae	Native
western soapberry	<i>Sapindus saponaria</i> var. <i>drummondii</i>	Sapindaceae	Native
white tridens	<i>Tridens albescens</i>	Poaceae	Native
whitemargin sandmat	<i>Chamaesyce albomarginata</i>	Euphorbiaceae	Native
whitemouth dayflower	<i>Commelina erecta</i>	Commelinaceae	Native
whorled milkweed	<i>Asclepias subverticillata</i>	Asclepiadaceae	Native
woolly marshelder	<i>Iva dealbata</i>	Asteraceae	Native
woolly paperflower	<i>Psilostrophe tagetina</i>	Asteraceae	Native
woolly plantain	<i>Plantago patagonica</i>	Plantaginaceae	Native

VEGETATION SURVEY HANDBOOK

NATURAL HERITAGE NEW MEXICO

DEPARTMENT OF BIOLOGY

UNIVERSITY OF NEW MEXICO



New Mexico Natural Heritage Program Vegetation Survey Protocols

Plot Establishment Guidelines and Techniques (May 2002)

Locating a plot: How plots are located varies with the survey/experimental design. For mapping/classification purposes where the intent is to place a plot in a stand of homogeneous vegetation, aerial photos and/or field reconnaissance generally determine where a plot is going to be established. Plots should be allocated to cover the range of variation in a study area (with the help of soils/geology and topographic maps i.e. gradsect sampling), but for logistical purposes this usually still entails landscape cluster sampling by a team usually in a small target watershed with a variety of habitats and vegetation types (but clusters should be widely separated). Where a map/photo is available, plot locations can be determined beforehand with prescribed UTM locations (often used in map validation) and navigated to with a GPS.

Plot size and design: NMNHP standard plots (STP) are typically 400 sq. meters and either circular with an 11.3-m radius or square and 20 m on a side. These are the typical dimension for a forest or closed woodland. They can vary in dimension depending on the vegetation type. For riparian types, long and narrow (10 x 40 m) plots, fitted into the linear structure of a river bar or terrace is a common design. In large, for open savanna or grassland types, the plots may need to be larger (50 x 50 m or more) to capture tree numbers successfully and sub-sampled to determine shrub/herbaceous cover. This sub-sampling is done with a series of 40, 1 m quadrat frames or a set of 3 to 5, 10 x 10 m quadrats in which specie covers are estimated and then averaged. For small patch communities, i.e. vegetation around a spring or a cryptogam community, the plot size may be as small as a 10 x 10 by itself or even a single quadrat frame in the latter case. Use a cloth tape or a self winding "Spencer" tape to measure the boundaries.

Releve plots (RP) are established in the same way as standard plots, but the species list includes species from the surrounding stand (homogeneous area). Both standard and releve plots include an in depth floristic analysis that not only allows for community classification, but also provides species richness and diversity.

Quick plots (QP) are generally used in conjunction with standard or releve plots for vegetation mapping. Only the dominant and most common species are recorded with their abundance to ensure proper identification of the type.

Observation points (OPT) contain mostly qualitative data on an occurrence, including: location and community type, which may or may not include photos. These points are generally used as supplemental points for vegetation mapping or to record the location of other element occurrences.

Monitoring plots are variable, but the general design is two parallel 30 m transects spaced 5 m apart within a 13.3 x 30 m macroplot (400 sq. meters). 1 m quadrat frames are placed at every third meter and cover estimated to the nearest 1% class and the median height measured to the nearest 1 cm. Since the exact spot is re-measured over time, the tapes must drawn tight, through shrubs not around, and as near the ground as possible. The quads should be aligned along one side of the tape with the inside of the corner of the frame at the position mark on the tape. Precision is key to good data in monitoring, particularly grasslands.

Along each line, 150 point intercepts are read for basal cover (intercept at ground level) at every 20 cm, starting from a different random location on the line for each monitoring session.

Quadrat framing and point intercept are the most precise methods and other ocular estimates of cover must be calibrated to them (plot cover estimated using scalars).

Monumenting a plot: Typically, the plot will be monumented in the center of a circular or square plot; or sometimes at the corners of square or rectangular plots, or if there are transects such as in a monitoring plot, at each end of a transect. Monuments are usually 3/8 " rebar driven 0.5 m or more into the ground to ensure stability. They can extend anywhere from 5 cm to 1 meter above the surface depending on the circumstances. Where aesthetics is not an issue and for ease of relocation, the rebar should be covered with 1/2 inch PVC pipe that can act as visible extensions of the rebar. The rebar should be tagged with permanent steel tags that are wired near the base with bailing wire or similar gauge. Where possible, have the tag flush with the ground.

Photo points: The intensity of photo documentation varies with the purpose of the project. As a minimum, there should be a single photo taken from above the center monument stake in a direction that best encompasses the character of the plot. Additional photos can be taken at 90 degree angles from each other around the central monument, or in the case of transects, from either end looking back along the line. **Record the azimuth/direction of the photo and the focal length of lens being used.** Photos taken off monuments back at the plot or at elements of special interest are not normally considered for repeat photography. For analysis, it helps to have a photo taken from off of the plot looking back to get an overview of the composition and structure.

Instructions and Forms – 2004

General Plot Description (Form 2)

PLOT ID: (seven-character alphanumeric code). **[Required]**

This is the master NMNHP record identification number for all sampling at the site. All subsequent sampling or other independent data at the site will be tied to this number. It must be unique and is formatted as follows:

Record in order: the year (2-digits), the first and second initial of lead surveyor as designated under the Surveyors field (2-characters) or the assignment as designated for the project (2-characters), and the plot ascension number (3-digits).

Example (lead surveyor): The 33rd plot sampled in 1991 by Hank Gleason would be entered as 91HG033.

Example (project assignment): The 54th plot sampled in 2003 at Bandelier would be entered as 03BD054.

Monitoring data are assigned sub-record monitoring numbers under the PLOT ID, as are any quadrat sample numbers.

PLOT TYPE: **[Required]**

RP = Releve or Reconnaissance plot. Full species list of both plot and stand are recorded and their abundance estimated, may also include Element Quality Ranking using the ranking form.

STP = Standard plot where all species within the plot are recorded and their abundance estimated, and enough site information to provisionally rank the quality of the occurrence.

QP = Quick plot where only the dominant and most common species recorded with their abundance to ensure proper identification of the type, and enough site information to provisionally rank the quality of the occurrence.

OPT = Observation point with mostly qualitative data on an occurrence, including: dominant species recorded with their abundance, location, community type and size; and at least one photos.

AP = Analytical plot. Full species list of both plot and stand with sub-sampling of abundance (usually quadrat based). May include Element Quality Ranking using the ranking form.

OVP = Observation video plot; community type or size is interpreted from either video or aerial photography.

OSP = Observation scope plot is used for surveys of plants growing on steep cliff faces that are otherwise inaccessible.

FSP = Floristic survey plot is used for general plant inventories when site information is not required and location encompasses an area greater than a standard size plot. Quantitative data is not recorded.

PROJECT: Project code – for example: LANL98. If no code is available, enter temporary project designation. **[Required]**

SUBPROJECT: Subproject code if applicable

MO DATE YEAR: Two digit month, day and year numbers. **[Required]**

EO/PA: Element Occurrence / Plant Association (community type) to which vegetation data refers to. Use six (seven) letter species acronyms. For example: PINPON/QUEGAM. Whoever makes the CT determination must date and initial the designation. Refer to the NMNHP vegetation classification for current types and acronyms. If the type does not appear to match any on the list, assign a temporary name and indicate your reasoning behind the assignment in the **EO/PA COMMENT** field. If you are uncertain about what to call it, enter **UNCLASS**.

EO/PA Comment: Comments on plant association designation. Indicate whether it was assigned in the field or in the office; was vegetation key used or an analysis of the quantitative data etc. If you assigned a new acronym, indicate your reasons for the designation and any specific decision rules you have developed. If CT is questionable, make notes concerning the problem.

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SURVEY SITE: Name assigned to the plot site at the time it is sampled, or the name of the site on a Survey Site form if it had been previously surveyed.

Naming guidelines:

1. Do not use element names in the site name
2. Use local place names when available or features on topographic maps.
3. Avoid names that are too generalized such as “Spring Site” or “Flat Top Mountain.”
Good examples: “Lower Big Gyp Mountain East”, “Animas Canyon Main Spring”

SURVEYORS: Last names and initial of first name of sampling personnel, **led by the person responsible for botanical determinations.**

LOCATION/ DIRECTIONS: Provide a brief description or place name that further defines where the survey site is located, so that a person reading the plot does not have to reference a map to know approximately where the site is, e.g., “the upper north slope of Freelove Canyon.” Give the directions as necessary to ensure that the plot can be relocated with ease, as needed. Directions to remote areas can be given as arrow marked routes on a topo map, or by a sketch on the back of the form. Indicate if the route is marked on the back or on a topo map.

COUNTY and STATE: Abbreviations. (NMNHP code for the county assigned when entered into Biological Conservation Database – BCD).

MAP NAME: Map used to locate and mark plot, usually the USGS 7.5' topographic quadrangle map name. If duplicate maps are used, indicate by adding 1, 2, 3 etc. at end of map name.

MARGINUM: Margin number on the field map associated with the mapped plot position. Each plot position within the map is marked with a dot and associated margin number. The margin number for the plot is also placed along the margin of the topographic map. Associated with each margin number is a margin note indicating the PlotID, CT acronym and, in parentheses, the 10,10 (described below).

10,10: The 10,10 is an imaginary grid over the map, (10 cells across and 10 cells down) to facilitate locating the dot at a later time on the map. For example, (5,6) indicates 5 cells across from left to right and 6 cells down from top to bottom. This would be almost half way across the map, and more than half way down.

GPS Unit: Write name and number of GPS unit used, such as: Garmin 1, 2, 3, etc. or Trimble 221230 (UNM Number).

GPS File: List the name of the file, either default pt assigned by unit or name designated by user.

UTM: Enter **Easting** and **Northing** UTM coordinates and **Zone**. Datum as either **NAD27** or **WGS84**. If something else was used please indicate such in the comment field.

PREC (PRECISION): +/- meters from GPS unit or one letter code for the precision of the plot/EO location, indicated by one of the following:

MONUMENT: If plot is permanently marked, indicate with what (rebar, PVC, etc.) and where it is located (such as center of plot). Indicate if it was used as a photo point.

PHOTO PT.: Check off if there are plot photos. Indicate if there is a permanent photo point established and describe its location, e.g., “over the plot monument” or elsewhere and how it is monumented for repeat photography. Indicate the height of the camera (**CAM Ht**) from the surface of the ground to the mid-point of the lens.

LOG #: Indicate name or number assigned to the photo log.

PHOTOGRAPHER: record the initials of the person taking the photographs

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PP1 – PP8: Photo points: Indicate each photo taken of, or from the plot, with indication of direction (**AZM**), focal length (**FocLen**) and subject (**Notes**). e.g., "looking N across entire plot" or "looking to the western horizon towards the Tularosa Basin." Photos should have plot numbers on a chalk board, flip pad or something similar, and a reference to show scale, but preferably not people (at least not in the center of the picture). High precision repeat photo points should be done on a tripod and the height indicated along with the focal length of shot.

OTHER SITE PHOTOS: indicate if other photos were taken of the EO and surrounding landscape.

ELEV: Elevation *in feet* unless otherwise noted.

SLOPE %: Enter the angle of the slope on which the plot occurs in *percent slope*.

ASPECT: Enter the *azimuth (0-360 degrees)* of the slope aspect on which the plot occurs.

SLOPE SHAPE: Enter one of the following codes to indicate the vertical shape of the slope on which the plot lies.

S - straight or even

R - rounded or convex

D - depression or concave

P - patterned (micro-relief of hummocks and swales)

U - undulating pattern or low ridges or knolls and draws

X – other, explain in landform comments section.

LANDFORM: (six number code). Enter the landform name (or describe it as best you can in the comments field below) and the **code** as classified in the **NMNHP Landform Classification Handout**.

LANDFORM/GEOLOGY/SOIL COMMENTS: Additional comments of landforms and rock types in the EO and surrounding landscape and comments on soils including soil texture by feel using standard SCS techniques and the soil triangle and/or evidence of dune formation and/or erosion.

EOMAPPED: indicate whether or not the EO boundaries were mapped on an aerial photo, topo map, or sketched on the back of the form. **List number(s) of aerial photos used.** Use sketch maps to help explain relationship among stands and plots in the area as necessary. A **solid** line indicates an actual boundary and a **dashed** line indicates a boundary of unknown extent.

OCC SIZE: (hectares/acres). Occurrence or total stand size surrounding the plot. Indicate if the area was estimated on the ground or from a map. This information is very important for accurate mapping.

PLOTDIM: Plot size and shape.

L/R: Plot Radius or Length - enter plot radius (for circular plots) or length (for rectangular plots). Indicate units of measurement. Note: a 400 m squared plot has a radius of 11.3 m (37.1 ft); a 100 m squared plot has a radius of 5.6 m (18.5 ft)

PLOT W: Enter width if a rectangular plot shape is used. Enter 0 (numeric) if a circular plot shape is used. Indicate units of measurement.

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SURFACE ROCK TYPE: Enter the code for the dominant surface rock type:

Sedimentary

SETU - type unknown
LIME - limestone
DOLO - dolomite
SAND - sandstone
CASA - calcareous sandstone
SILT - siltstone
CASI - calcareous siltstone
SHAL - shale
RESH - red shale
CASH - calcareous shale
CONG - conglomerate
CACO - calcareous conglomerate

Metamorphic

METU - type unknown
ARGI - argillite
CAAR - calcareous argillite
SILI - siltite
QUAR - quartzite
SLAT - slate
PHYL - phyllite
SCHI - schist
BISC - biotite schist
MISC - mica schist
GNBG - gneiss and biotite gneiss

Igneous

IGTU - type unknown
BASA - basalt (including obsidian)
ANDE - andesite
DIGA - diorite to gabbro
LATI - latite
QUMO - quartz monzonite
TRSY - trachyte and syenite
RHYO - rhyolite
GRBG - granite and biotite granite
WETU - welded tuf (tufa)
SCOR - scoria (porcelanite), clinker

Miscellaneous

GRAL - gravelly alluvium
SAAL - sandy alluvium
SIAL - silty alluvium
CLAL - clayey alluvium
MIAL - mixed alluvium
GLTI - glacial till, mixed origin
ASHT - ash (of any origin)
MISE - mixed sedimentary
MIME - mixed metamorphic
MIIG - mixed igneous
LOES - loess
MIRT - mix of two or more rock types
DUNE - sand dunes

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SITE /VEGETATION SUMMARY: Is a description (a "word picture") of the site and community sampled. Indicate stand dominants, the structure and physiognomy of the community along with a landscape position and site features narrative (including geomorphology, soils and geology). Indicate successional status if known (e.g. climax (old growth); young second growth). Reserve other condition comments for Condition section below. Use clear, complete sentences and avoid extraneous personal comments that do not belong in a scientific database (no jokes please or comments in bad taste; these plots are long-term records that will be read again and again in the future).

Adjacent Communities: Indicate surrounding plant associations and the spatial relationships (e.g. the occurrence is a matrix community with other smaller patch communities within it, or vice versa). Indicate the width and nature of ecotones to other communities.

Condition (Disturbance, Fragmentation, Erosion): Describe disturbances both natural and otherwise, their extent, intensity and time frame: livestock grazing utilization and impacts; roads, number and distance from; logging and fuelwood cutting; buildings and obstructions; and fires, floods, landslides, significant recent erosion features, etc. Estimate frequency and degree of disturbance (light, moderate, heavy, etc.). Indicate degree of element fragmentation, i.e., reduced patch size and corridors, and other watershed -level impacts (dams, parking lots, settlements).

Disease/exotics: Dwarf mistletoe damage (give a rating of average % extent spread of within and among trees); insect damage (SPRUCE BUDWORM); fungal rot and rusts.

Animal use evidence: Wildlife browse damage, sightings and sign (bird calls, tracks, scat and animal disturbances such as beaver dens, gopher holes etc., and remember the insects).

EO LANDSCAPE CONTEXT: Specify whether the occurrence is: a "matrix" community dominating the landscape; a "large patch", but dominant type, common elsewhere in the landscape; or a "small patch" community found in limited, small and often unique areas.

FINAL EO QUALITY RANKS: Element occurrence ranks based on either field or office evaluations or both. Also indicate if the EO Assessment form was completed. Use the following ranking grades:

- A - excellent
- B - good
- C - fair
- D - poor

MANAGEMENT/CONSERVATION/ OTHER COMMENTS: Comment on any stewardship (new or additional) needed to ensure continued existence of the community occurrence, and chances (and means) of bringing it about. Any other pertinent comments go here as well, e.g., "... clearing of competing vegetation has been tried in the past but without success". Comment on the conservation attributes of the occurrence, long-term viability and threats. Also, add miscellaneous comments from all sections. Again, no jokes please or comments in bad taste.

FORMS CHECKOFF: please indicate if other forms were used besides those given.

Floristic Inventory (Form 3)

PLOT ID: (seven-character alphanumeric code). NMNHP standard record tracking number (see general description – Form 2).

BOTANIST: Name of person responsible for assessing the botany.

DATE: Date of vegetation inventory. Two-digit month, day and year numbers.

GROUND SURFACE: Enter % cover fraction for each of the following types of cover as they occur over the surface of the plot (must add up to 100%).

S - exposed soil: particles < 1/16 in. (2 mm dia.)

G – gravel: particles 1/16 to 3 in. dia. (2 mm to 7.5 cm dia.)

R - rock as composed of cobbles, stones and bed rock: particles > 3 in. (>7.5 cm dia.)

L - litter and duff. Litter includes dead and detached vegetation, freshly fallen leaves, needles, twigs < 2 in. (5cm), bark, fruits, seeds; duff is decomposed litter (fermentation layer and humus layer)

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HCC – herbaceous canopy cover is the total combined canopy cover of forbs and graminoids, including attached litter and current years standing dead annuals, and does not include overlapping cover where canopies interlock

WO – woody, downed debris: > 2 in. (5 cm dia.)

M - microphytic (cryptogams) crust cover; mosses, lichens and algae on soil surface (excludes cover found on logs, rocks and tree bases)

WA – water, standing pools of water or streams if within the plot.

VEGETATION COMPOSITION AND ABUNDANCE CONVENTIONS: All species within the plot **and/or** in the stand, depending on plot type, are listed by Strata/lifeform categories (See the NMNHP species list for lifeform classification of individual species).

SPECIES NAME: Use the accepted acronyms from the current NMNHP species list or spell out the species scientific name.

Do not use common names. If the species is not on the list, spell it out.

Tree species can occur in several height strata and should be listed separately under different acronyms representing different operating taxonomic units (OTU's). A number is attached to the end of the acronym to indicate which strata the OTU is from. For example: PINPON0 represents *Pinus ponderosa* seedlings of the forb layer, PINPON1 represents saplings < 1 in. dia. of the dwarf shrub layer, PINPON2 are saplings 1 in to 2 in. dia. of the shrub layer, and PINPON3 are mature trees of the tree layer.

If you do not know the name of a species, but know the genus or family, enter those acronyms or spell out the name. Otherwise indicate unknowns with the code UNIDT for unknown trees; UNIDS for unknown shrubs; UNIDDS for dwarf shrub, etc. for each different unknown species with in the different lifeforms. The species ID number will differentiate them.

SPECIES ID NUMBER: Each species that is listed has a line number on the form associated with it by strata/lifeform (T1, S3, G10, F20, etc.). Blank species number lines are available on the forb side of the form for additions: grasses, shrubs, and trees. **Circle the species number when a voucher has been taken for that species.**

Ht: Modal height of each species to the nearest *meter* for trees, nearest *half meter* for shrubs, and *decimeter* for grasses and forbs, but measured in meters. For example a 3dm high grass would be recorded on the data sheet as 0.3m.

P: Phenology. Use "*" for flowering or "@" for fruiting; "X" if it is a dead annual; and leave blank if vegetative.

VOUCHERS: When a **voucher specimen** is taken for species identification, the species ID number **MUST BE CIRCLED** on the plot sheet, and the plot number and species number put on the plant tag or collection sheet of the voucher.

**Voucher Tag
Format:**

Plot ID	Date
Species ID #	Project

05YC001	3/30/05
G5	BAND-Val

If an unknown species from a previous data form is referred to on the current data sheet, **be sure the plot and species ID numbers** that the plant refers to are recorded on the current data sheet and the species ID number is **circled**. For example if you're at plot 05YC001 and you collect UNIDG5 (G5 should be circled on this plot form), then at plot 05YC004 you have the same unknown grass that is the 2nd grass on this data form; **circle G2** and write **05YC001-G5** after the species ID number. If you **know the genus or family, enter those acronyms or spell out the name** before the plot ID number.

Data sheet from 05YC004:

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G1 MUHMON	@ 20 .4
G2 BROMUS - 05YC001-G5	5 .2
G3	

Circle G2

TREES: usually single bole with lateral branches, and with the potential to grow over 5 m tall (some may be less than 5 m such as various *Juniperus* spp.). See NMNHP species list for lifeform classification for verification.

SHRUBS: usually multi-stemmed woody species, spiny rosettes or succulents (cacti, yuccas and agave etc.) less than 5 m and greater than 0.5 m.

DWARF SHRUBS: usually multi-stemmed woody species, spiny rosettes and succulents (cacti, yuccas and agave etc.) less than 0.5 m. Small suffrutescent species that are only woody at or near the base or at the root-crown are usually considered forbs, e.g., *Eriogonum*. See the NMNHP species list for lifeform classification.

GRAMINOIDS: grasses and grass-like plants such as sedges and rushes, but not showy flowering monocots such as iris, lily or dayflower (Iridaceae, Liliaceae or Commelineaceae).

FORBS: non-woody perennial and annual species that are not grass-like (includes monocots of the Iridaceae, Liliaceae, Commelineaceae).

TOTAL COV. (BY STRATA): percent aerial cover for tree, shrub, dwarf shrub, graminoid and forb layers. This is the total canopy cover of a strata as projected over the surface, regardless of species, and does not include overlapping cover where canopies interlock within a strata. ***Note: cover cannot exceed 100%.** For graminoids an additional category is added for % **green** which includes the current years growth (green or tawny), but disregards the standing dead litter (grey).

COV.: percent cover for each species within the plot is estimated by either directly using the precision guidelines below, *or* the Modified Domin-Krajina scale in Table 1 (both are at the bottom of Floristics-Form 3 and Standard Data Form).

Be sure to check box on data sheet to indicate which cover type is used.

Percent Cover Estimation Precision Guidelines:

- +0 – species outside the plot, but within the stand
- + – for < .05% (trace <0.2m²/400m²)
- 0.1% – for .05 - < 0.5% (>0.2m² - <2.0 m² /400m²)
- 0.5% – For .5 - < 1% (>2.0 m² - <4.0 m² /400m²)
- 1-10% to the nearest 1% (each % equals 4m²/400m²)
- 10-30% to the nearest 5%
- 30-100% to nearest 10%

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Table 1. Cover Scale - Domin-Krajina cover-abundance scale.

Scalar	Cover Range	Concept	Midpoint Value	Data Value	m ² / 400m ²
+0	N/A	Outside quadrat	0.001	.001	
+	<0.05%	Solitary or very few	0.025	.025	<.2m ²
1	0.05- 0.124%	very scattered	0.0875	0.1	0.2m ² - <.5m ²
2	0.125- 0.99%	scattered	0.56	0.5	.5 m ² - <4 m ²
3	1.0 - 4.9%	common	3.0	3.0	4m ² - <20m ²
4	5.0 - 9.9%	well-represented	7.5	7.5	20m ² - <40m ²
5	10.0- 24.9%		17.5	17.5	40m ² - <100m ²
6	25.0- 32.9%	abundant	29.0	29.0	100m ² - <132m ²
7	33.0 - 49.9%		41.5	41.5	132m ² - <200m ²
8	50.0 -74.9%	luxuriant	62.5	62.5	200m ² - < 300m ²
9	75.0 - 94.9%		85.0	85.0	300m ² - <380m ²
10	95.0 -100.0%	full cover	97.5	97.5	380m ² - 400m ²