

Mapping and Classification of Wetlands in the Eastern Plains of New Mexico

Assistance Agreement No. CD-01F67201 (FY 2019)



**New Mexico Environment Department
Surface Water Quality Bureau
Wetlands Program**

**Final Report
December 2024**

Project Background

The climate in the Eastern Plains project area is semi-arid (~17 inches of annual precipitation). Surface water is scarce, and drought is an ever-present threat. The Eastern Plains of New Mexico project area includes the Pecos River Valley, portions of the Southern High Plains, and the Llano Estacado (Figure 1). In these areas, wetlands are associated with the perennial Pecos River, are found along intermittent and ephemeral creeks, are represented as playas, groundwater-fed depressions, fringes along reservoirs, spring-fed meadows (i.e. cienegas) and excavated impoundments. In the easternmost portion of New Mexico, the Llano Estacado is characterized by extremely flat terrain with scarce draws carrying flowing water during storm events. Most water and wetland resources are contained within thousands of playas surrounded by their own watersheds. These playas are also the main pathway to recharge of the underlying freshwater Ogallala Aquifer which supplies most of the freshwater in the Llano Estacado area.

The current wetlands mapping in the Eastern Plains project area was incomplete when this mapping project was started. Scalable mapping of playas was revised for Curry and Quay Counties in 2006 by the USFWS National Wetlands Inventory (NWI). Much of the western portion of the project area was revised by the NWI in 2010 using 1980s imagery, and with 2000s imagery for much the eastern portion of the project area. No imagery was used in about 25% of the project area. This level of mapping does not meet the FGDC National Wetland Mapping Standard and was intended to be interim. Additional data were available from the Playa Lakes Joint Venture to update the NWI mapping conducted for this project.

Diverse flora and fauna rely on the wetlands, including 44 federal or state threatened or endangered species in the Eastern Plains region (e.g. Piping plover, Least tern, Pecos bluntnose shiner, Pecos gambusia). Water resources along the Pecos River are affected by large reservoirs (Santa Rosa, Sumner, Brantley and Avalon Reservoirs) for the Fort Sumner and Carlsbad Irrigation Districts and groundwater withdrawal for the Pecos Valley Artesian Conservancy District and municipal uses. Threats to the wetlands include surface water impoundment and ground water diversion for industrial, agricultural, municipal, mining and energy development uses. Wind energy development is also having a significant impact on wildlife surrounding playas. Critical springs, cienegas and groundwater-fed saline lakes are threatened by ground water pumping and many have already been lost. Historic farming and ranching practices have had a large impact on soil stability causing infilling of playas resulting in hydrologic and biologic changes. Historically, the project area has been subject to some mineral development for copper and uranium near Santa Rosa, and gypsum, oil and gas, and sand and gravel mining throughout the region. Roads are a significant threat to the region's wetlands, affecting hydrology, drainage pathways and bisecting playa wetlands.

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Project Goals

The goal of the SWQB Wetlands Program and many of its Eastern Plains partners is to increase wetland acreage by restoring existing wetlands and protecting isolated and scarce arid-land wetlands. The goal of this project was to map and classify wetlands in the Eastern Plains (east central region) of New Mexico. Mapping was performed in accordance with the National Wetlands Inventory (NWI) protocols, using the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) and *System for Classification of Riparian Areas in the Western United States* (USFWS 2009). Wetlands were also coded in accordance with the landscape position, landform, waterflow path, and waterbody types (LLWW) mapping classification (Tiner 2014) and Regional LLWW Keys for the Western U.S. (GeoSpatial Services 2018). Mapping ratio was at 1:12,000 or better with a minimum mapping resolution to 1/2 half acre and in compliance with the National Wetland Mapping Standard of the Federal Geospatial Data Committee (FGDC). A Technical Advisory Committee (TAC) was established to provide expertise and local knowledge, to help review the wetland function correlation table, and to ensure proper application of LLWW to the project area. New Mexico is developing the New Mexico Rapid Assessment Method (NMRAM), which combines the assessment of wetland condition and function for restoration, planning, and regulatory applications. The LLWW provides information to help assign wetlands to Hydrogeomorphic (HGM) subclasses for NMRAM development. This project included remapping and more accurately mapping wetlands in the Eastern Plains project area, the identification and assignment of wetland functions that can be interpreted as designated uses for wetlands narrative water quality standards, and the assignment of classified segments for developing assessment units for monitoring. Through this effort SWQB assigned ecological functions to wetlands and designated classified wetland segments as a next step toward developing wetland water quality standards. SWQB Wetlands Program staff participated in the NM Geospatial Advisory Committee (GAC) to encourage cooperation and collaboration in wetlands mapping efforts, and to obtain corroborative mapping products such as LIDAR and SSURGO soils updates for New Mexico. Interactive mapping products were created, and the project details presented to a variety of stakeholders, interest groups and other states. This project is necessary for the SWQB Wetlands Program to continue program development and capacity-building in southeastern New Mexico. The mapping products will also provide support in select areas of interest for the SWQB Wetlands Program to identify and target wetlands that need monitoring, restoration and protection.

Project Outputs

The project outputs include:

1. National Wetlands Inventory (NWI) (Cowardin et al. USFWS (1979)) mapping of all wetlands and deep-water habitats in the Eastern Plains project areas uploaded on [Wetlands Mapper | U.S. Fish & Wildlife Service](#) for national use.

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The wetland features and deepwater habitat features include marshes, floodplains, cienagas, lakes and ponds, playas, and rivers. The project area is nearly 8.3 million acres in size. Based on the final wetland mapping, 8,189,153 acres (~98.7%) of the study area is upland habitat and 110,392 acres (~1.3%) is a combination of wetland, deepwater habitat, and riparian area habitat. Riverine system wetlands make up ~44% of the wetland area, palustrine 37%, and lacustrine 19%.

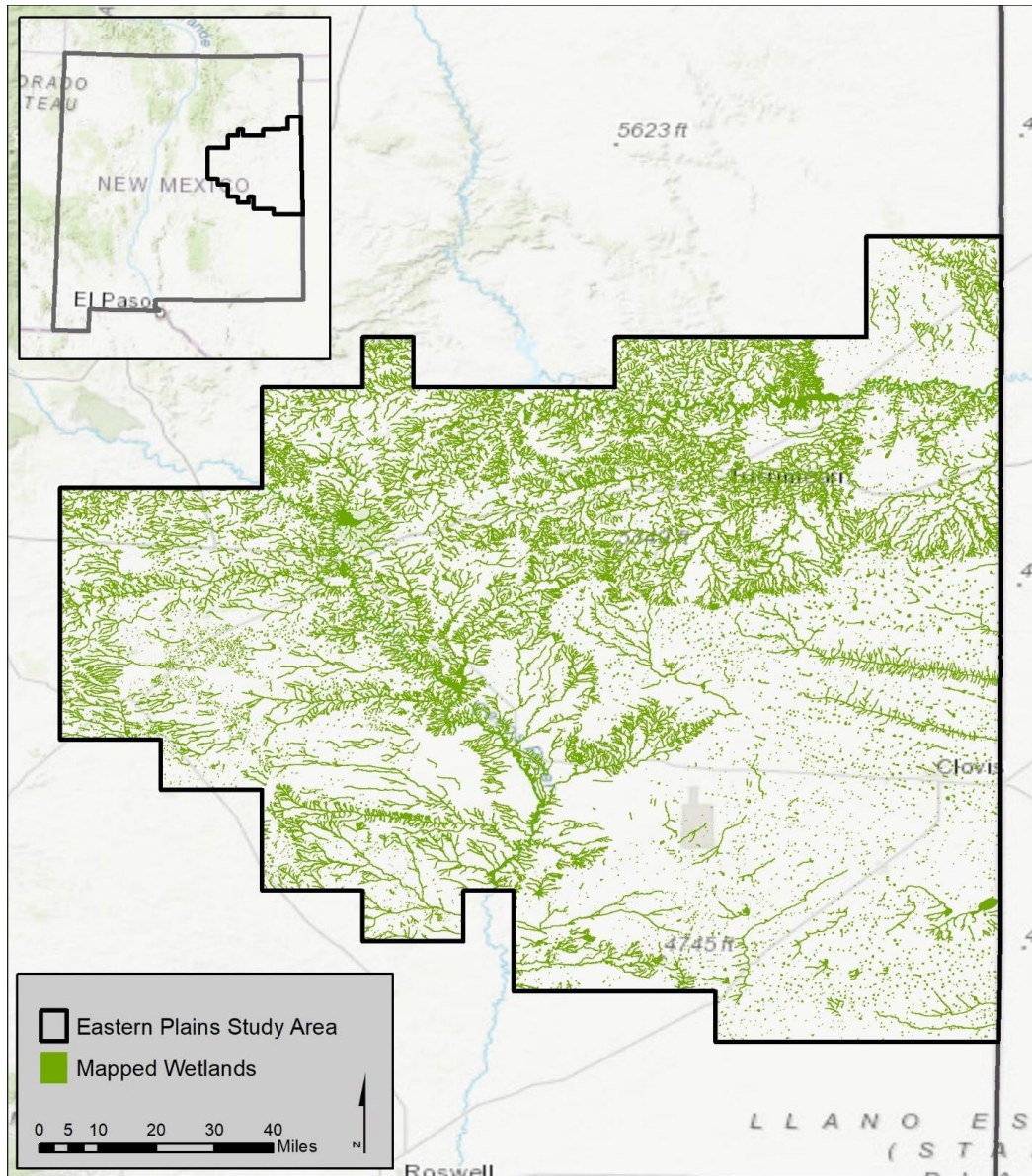


Figure 1. The Eastern Plains Study Area (note that mapped features at this mapping scale look denser due to line width.)

2. Riparian areas were mapped, often adjacent to floodplain wetlands, using “A System for Mapping Riparian Areas in the Western United States” developed by Dick et al. (USFWS 2009). Riparian polygon features are transition zones between rivers or lakes and upland; 195 riparian features equaling approximately 704 acres of riparian areas were captured in the Eastern Plains mapping area.
3. Landscape Position, Landform, Water Flow Path, Waterbody Type (LLWW) classification was completed for all mapped wetland features. Wetland features were assigned codes from the LLWW classification system developed by Tiner (2014). To enhance the LLWW classification system being applied for New Mexico, the team utilized the Water Regime classifications from the NWI (Cowardin et al., 1979) data to contribute to the identification of LLWW Landforms. These Landforms included Basin, Flat, Floodplain, Fringe, or Slope wetland areas. Many unique LLWW attributes or codes were identified in the Eastern Plains project area. These included 276 codes for polygon wetland features.
4. To add richness to the wetland data, wetlands were also characterized by HGM descriptors developed by Brinson (1993) and then correlated to a variety of potential wetland functions. The wetland polygons mapped in the Eastern Plains project area fell into five HGM classes and 11 HGM subclasses. Among the classes, riverine wetlands were most common, with over 49% of total polygons and nearly 52% of wetland area (Table 9). Depressional was second most common, comprising 45% of total area. Lacustrine fringe comprised approximately 2% of wetland area, while Flats and Slopes were each <1% by area.
5. Functional correlation was applied to the wetlands. Mapping for 12 select ecological functions that can be identified from mapping data and applied to the semiarid region were mapped based on a ranking of moderate or high functioning. The ecological functions included Surface Water Detention, Streamflow Maintenance, Groundwater Recharge, Sediment & Other Particulate Retention, Nutrient Transformation, Carbon Sequestration, Bank and Shoreline Stabilization, Fish Habitat, Aquatic Invertebrate Habitat, Waterfowl and Water Bird Habitat, Other Wildlife Habitat, and, Unique, Uncommon, or Highly Diverse Wetland Plant Communities. A series of functional assessment maps overlays were then produced, one map for each of the twelve functions in the project area, that can then be sourced for wetlands water quality standards designated uses and for other uses such the recognition of high functioning wetlands.
6. Mapping and classification for NWI, LLWW, HGM and functional correlation can be accessed on the NMED Interactive Wetlands Map at: [OpenEnviroMap](#). The mapping geodatabase is also available upon request to the SWQB Wetlands Program.

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7. This project contributed to the development of a NM Statewide Wetland Story Map “Wading into Wetlands of New Mexico” which was completed by St. Mary’s University of Minnesota Geospatial Services (GSS) and SWQB Wetlands Program staff. The Story Map can be found here: [Wading into Wetlands of New Mexico](https://storymaps.arcgis.com/stories/81df9f1c7b47467895377e9772964d07)
[HTTps://storymaps.arcgis.com/stories/81df9f1c7b47467895377e9772964d07](https://storymaps.arcgis.com/stories/81df9f1c7b47467895377e9772964d07)



Figure 2. Cover page of the story map, “Wading into Wetlands of New Mexico.”

8. As outreach for this project, the Wetlands Program partnered with USFWS Partners for Fish and Wildlife, Natural Channel Design Engineering, Keystone Restoration Ecology and the Grasslans Charitable Foundation to conduct a Playa Restoration Workshop on the Weaver Ranch near Causey, in eastern New Mexico. The attendees learned about numerous free on-line GIS and remote sensing tools as well as drone imagery that can be used for designing restoration and monitoring playas. Participants were in the field to view previously completed playa restoration on the Grasslans Playa, and equipment work restoring playa gullies and drone monitoring was demonstrated. Presentations were given by Sam Ebright and Jake Fleishman of NCDE, and Steve Vrooman of Keystone Restoration Ecology. The Workshop attracted 17 participants from both New Mexico and Texas. Playas of the Southern High Plains are a form of depressional wetlands unique to the High Plains region of the United States.
9. A Story Map was created by Natural Channel Design Engineering about Restoration of Playas of the Southern High Plains entitled “Playa Enhancement, Monitoring and Stability Assessment, Ephemeral Wetlands on the Plains. What these playas can do for us, and what we can do for them.” The Story Map emphasizes the features and functions of High Plains Playas, an important freshwater feature in eastern New Mexico. The Story Map can be accessed on the SWQB Wetlands Program website and at the link below.
<https://storymaps.arcgis.com/stories/a1e6612037a04c9e9eaf3866efcc10d8>

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Figure 3. Cover page of the story map, “Playa Enhancement, Monitoring and Stability Assessment” produced by NCDE.

10. Pre and post-mapping field reports and a Contractor Final Report were prepared by GSS and are available upon request to the NMED Wetlands Program.
11. Other products include reference materials, Technical Advisory Committee (TAC) meeting minutes and input to the process, pre- and post-mapping field trip reports, interactive maps for stakeholder use in key areas and on the NMED Wetlands website, and presentations for outreach.
12. A wetland naming application was run for this project to prepare a draft of obtainable classified segments for Wetlands Water Quality Standards. Because only wetlands that will be assessed receive an Assessment Unit name and since we are applying this model to all mapped wetlands, the names are currently unique “Wetland ID” names on the Wetlands Mapper. Defined and applied potential wetland assessment unit codes (Wetland ID names) were derived from HGM maps utilizing a python-based code tool in ArcMaps created by GSS. From the GSS wetland mapping database created for the Eastern Plains project areas, features with the Cowardian Classifications of Riparian and Riverine are identified and removed from the data set (Figure 4). The remaining polygons were dissolved on the three HGM attributes (class, subclass and modifier) to merge adjacent wetlands that share those characteristics (Figure 5). The naming program generates a name that combines a 2-digit code for the HUC 8 that contains the wetland's centroid, an abbreviated HUC 12 name, a short-hand version of the HGM class, subclass, and modifier, and finally a randomly generated number to each wetland in the HUC 12.

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Naming New Mexico Wetlands Assessment Units

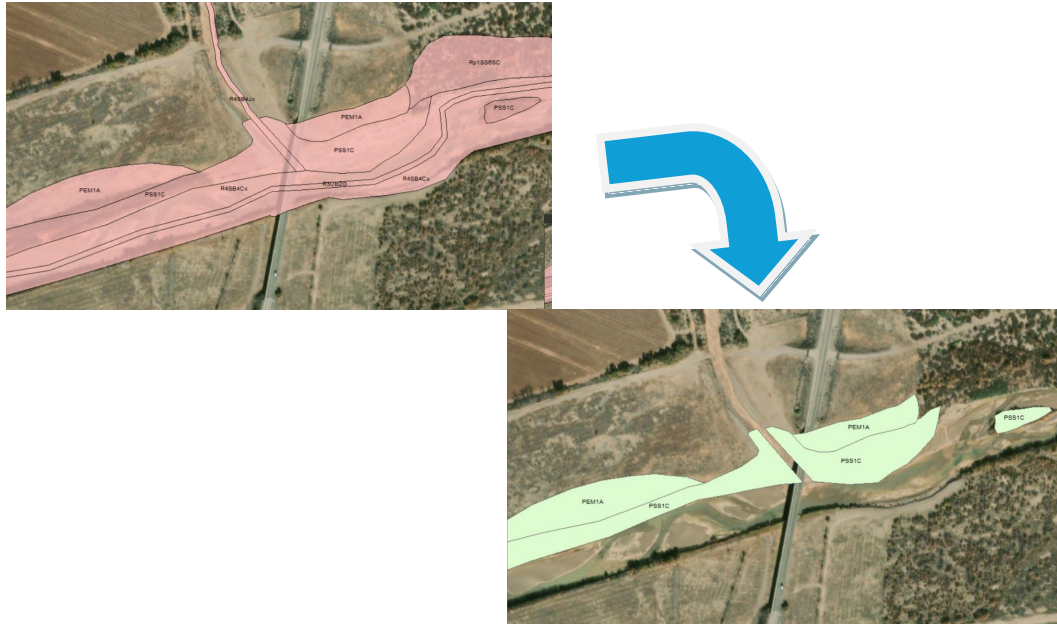


Figure 4. Features with rivers, streams and deepwater habitat are identified and removed from the data set.

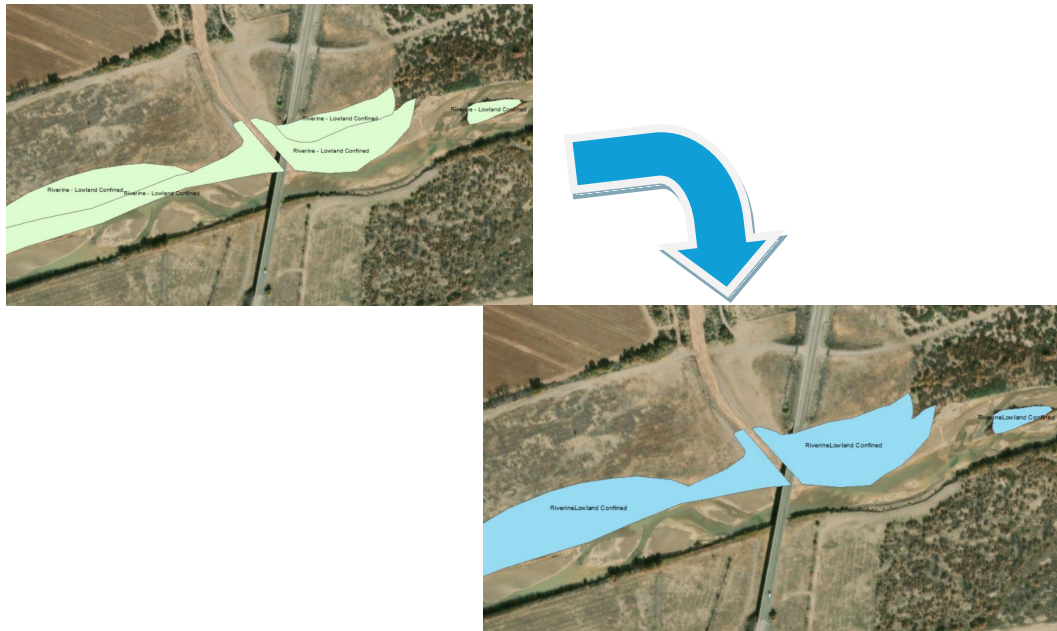


Figure 5. The remaining polygons are dissolved on the three HGM attributes below to merge adjacent like wetlands.

- HGM_Class
- HGM_Subclass
- HGM_Modifier

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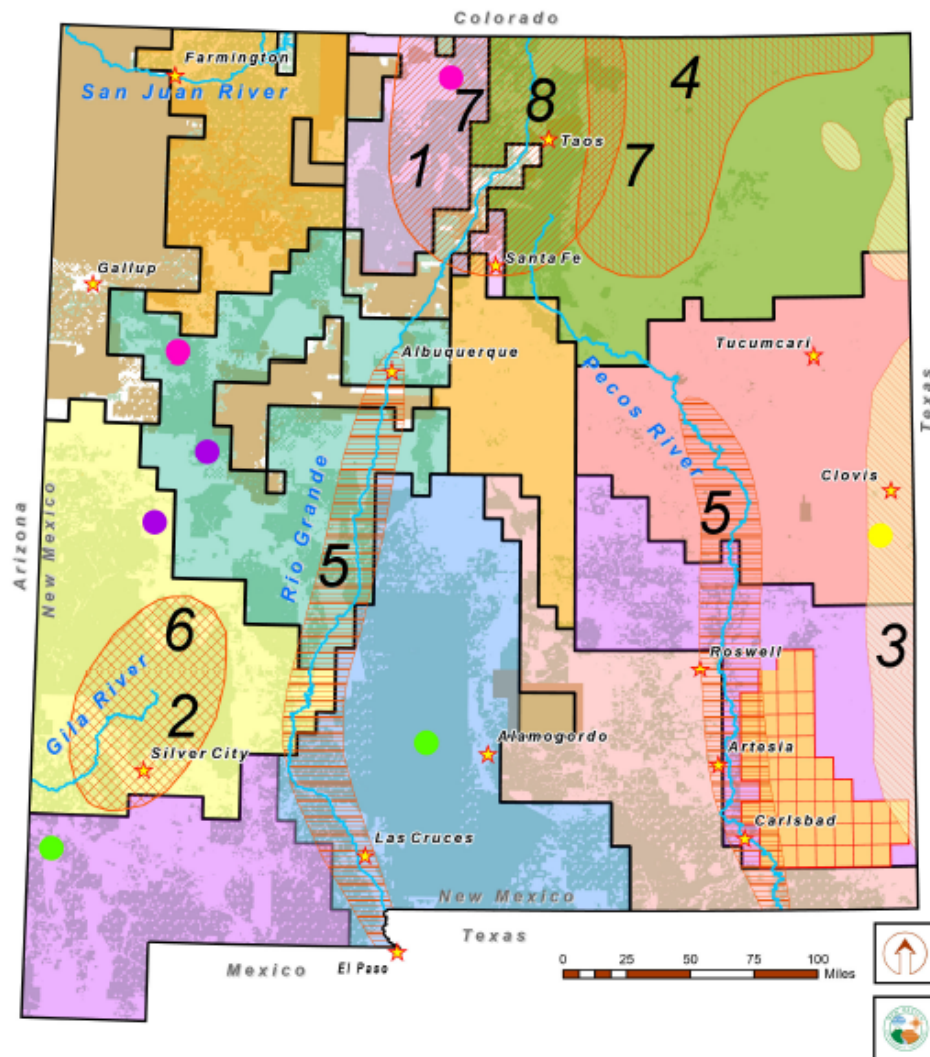
Project Outcomes

- The project will increase knowledge of the location, extent, and type of wetlands and their functions in the project area on a landscape scale.
- WPO participation in the GAC will advance the use of wetlands mapping and classification, provide a forum to share mapping resources, prevent duplication of efforts, pool funding, keep wetlands mapping current.
- The maps, HGM classification, literature search and advisory committee will advance New Mexico Rapid Assessment Method development for classes of wetlands in the project area.
- Understanding the location and extent of wetlands in the project area by agencies and local governments will help prevent further loss and degradation of wetlands and riparian habitat in an area at risk.
- Story Maps on the NMED SWQB website and mapping products at [OpenEnviroMap](#) will help increase understanding of wetland resources by agencies, watershed groups, students and the public.
- Wetlands planning, protection, restoration, mitigation and monitoring by SWQB Wetlands Program is improved through the products of this project.
- Data gaps in Wetlands Action Plan development are filled by wetlands mapping products being available to WAP developers. It will assist in improved ecosystem understanding and long-term protection.

Project Location

The Project occurs in Eastern NM in the Counties of Chaves, Curry, DeBaca, Guadalupe, Harding, Quay, Roosevelt, San Miguel, and Torrence at the following 8-digit HUCs: 11080005, 11080006, 11080007, 11080008, 11090101, 11120101, 11120102, 12050001, 12050002, 12050005, 12080001, 13050002, 13060001, 13060002, 13060003, 13060004, 13060005, 13060007. See mapping areas below.

New Mexico Wetlands Program



Mapping and Classification of Wetlands	New Mexico Rapid Assessment Method
- Canadian (2016) - Jemez Mountains (2016) - Sacramento (2018) - Gila (2020) - BLM Mapping (2020) - Middle Rio Grande (2020) - San Juan and Estancia Basins (2021) - Lower Rio Grande (2022) - Bootheel Permian (2024) - Eastern Plains (2024) - Federal Lands - Tribal Lands	1. Montane Riverine Wetlands Upper Rio Grande 2. Montane and Lowland Riverine Wetlands Gila Watershed 3. Playas Wetlands – Eastern Plains 4. Montane Riverine Wetlands Canadian/Dry Cimarron 5. Lowland Riverine Wetlands Rio Grande/Pecos Rivers 6. New Mexico Springs 7. Confined Riverine Wetlands Upper Rio Grande/Canadian 8. Headwater Slope Wetlands North Central New Mexico
	Current Wetland Demonstration Projects ● Depressional and Mineral Soil Flat Wetlands ● Restoring Degraded Fen Wetlands on US Forest Service Lands ● Demonstration Playa Cluster Watershed Group ● Depressional Wetlands Characterization, Cibola and Catron Counties

Figure 6. The Eastern Plains Project Area in eastern New Mexico is shown in peach.

Original Timeframe

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NMED SWQB Wetlands Program received a partial award from EPA of \$333,806 in federal funds for the project on September 11, 2019, with an effective date of October 1, 2019. The match amount for the project remained the original requested amount. The SWQB Wetlands Program received an additional award of \$18,000 on May 21, 2020 to bring the federal amount to \$351,806.00 which was the requested amount in the project proposal. On August 29, 2023, a no cost extension for grant CD #01F67201-1 was approved by EPA Region 6 to extend the end date to December 31, 2024. On March 14, 2024, the Wetlands Program Coordinator requested EPA Region 6 to move \$32,109.00 from personnel to contractual to hire a contractor to assist with outreach for this project since the Wetlands Program was understaffed. The request was approved by EPA on March 27, 2024. This amount was less than 10% of the federal project funds so a formal grant amendment was not needed. The stated goals and objectives of the project remained the same, as well as the key project Tasks and deliverables.

Partners Involved

Saint Mary's University of Minnesota Geospatial Services (GSS) was the principal mapping contractor in partnership with SWQB Wetlands Program involved in the mapping and classification project. Gary Hunt, USFWS Regional Wetland Coordinator provided NWI guidance and assisted with pre- and post-field mapping reviews, as well as coordinating conference calls with NWI Management. USEPA Region 6, Leslie Rauscher and Kyla Chandler provided project progress guidance and technical assistance. SWQB Wetlands Program was involved in the identification of the mapping areas, mapping and classification field trips, ground truthing the mapping data, reviewing the results and development of the Wading into Wetlands of New Mexico story map. Natural Channel Design Engineering was hired and along with SWQB Wetlands Program and other partners (see below) conducted a Workshop, developed materials and handouts, and created a Storymap for Playa Monitoring and Restoration as outreach for the SWQB Wetlands Program. The Project involved a Technical Advisory Committee whose members are as follows:

Technical Advisory Committee Members

Name	
Christopher Rustay	Playa Lakes Joint Venture
Katie Sandbom	
Linda Delay	EMNRD
Redi Riley	US Army Corps
Charlie Cassagnol	Western Ecology LLC
Austyn Chester	
Emile Sawyer	Enchanted Waters LLC
Emily Toczek	SWQB
Ryan Schmidt	CEHMM
Davena Crosley	SWQB

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Kate Lacey-Young	SWQB
Rene Romo	Senator Lujan Ofc
Justin Riggs	US Army Corps
Sandra Tanner	CEHMM
John Busemeyer	NMDOT
Sarah Yates	US FWS
Ashlie Carabajal	City of Ruidoso
Dustin Nelson	SWQB
Susan Ostlie	RGVBB Great Old Broads Wilderness
Frank Scott	Interstate Stream Commission
David Rokus	GSS
Zach Ansell	GSS
Valerie Morgan	National Park Service
John Gwynn	Independent
Antonio Griego	NMDOT
Scott Hebner	US Bur Rec
Mike Freeling	UNM
Wiebke Boeing	NMSU
Constance Williams	NMSU
John Shermann	BLM
Scott P Lerich	BLM
Cassie Brooks	BLM
Matthew Heckel	NMHU/USFS
Corey Durr	BLM
Kurt Anderson	Independent
Katie Kruthaupt	Independent
Luis Castillo	NMTDC ACM
Colleen Cunningham	NMED
John Littlefield	USFS
Randy Sauzo	Independent
Eric Chavez	Senator Lujan Office
Sarah Yates	USFWS

Note: Due to COVID restrictions during the project period, Technical Advisory Committee meetings were held virtually and participants were invited with expertise both from the CD #01F62101 and this project. The non-federal attendees match was split between the two projects.

Playa Monitoring and Restoration Workshop Partners and Attendees

Partners

1. Maryann McGraw	NMED-SWQB
2. Angel Montoya	USFWS Partners
3. Sam Ebright	NCDE, Inc
4. Jake Fleishman	NCDE, Inc
5. Willard Heck	Grasslans and Weaver Ranch

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6. Steve Vrooman	Keystone Restoration Ecology
7. Jim Weaver	Grasslans and Weaver Ranch

Attendees

1. Price Rumbelow	Rio Grande Joint Venture
2. Ethan Seavey	USFWS
3. Jocelyn Harimon	NMED-SWQB
4. Shinya Burck	NMED-SWQB
5. Jacob Lobato	Tetra-Tech
6. Lauren Rangel	USFWS
7. Erik Nelson	New Mexico State Land Office
8. Tavin Dotson	Ducks Unlimited
9. Alyssa Besser	NRCS-NM
10. Gary Mizer	NMDGF - Raton
11. Jack Marchetti	NMDGF - Wetlands
12. Nick Loveland	Rio Grande Joint Venture
13. Taylor Bruecher	Rio Grande Joint Venture
14. Maceo Martinet	USFWS Partners

Funding

The original Federal amount was **\$351,806.00** and **\$123,697.00** match. The federal amount spent was \$312,643.41, and the **final match amount** was **\$169,314.27 (\$45,617.27 overmatched)**. See semi-annual reports for details.

Major Project Highlights and Chronology

- NMED SWQB Wetlands Program received a partial award from EPA of \$333,806 in federal funds for the project on September 11, 2019 with an effective date of October 1, 2019.
- Emile Sawyer was the Wetlands Program Project Officer (WPO) for this project.
- The WPO drafted and submitted Contract Amendment #3 to add the Eastern Plains subproject to the “Mapping and Classification of Wetlands in New Mexico” contract between NMED and Saint Mary’s University of Minnesota Geospatial Services.
- The revised QAPP (QTRAK #20-178) that includes this project was approved on March 24, 2020 with an expiration date of March 17, 2022.
- The SWQB Wetlands Program received an additional award of \$18,000 on May 21, 2020 to bring the federal amount to \$351,806.00 which was the requested amount in the project proposal.
- Contract #18-667-2060-0018 Amendment 3 with Saint Mary’s University of Minnesota was approved on June 5, 2020, allowing mapping to commence.

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- The Wetland Project Officer (WPO), Wetland Program Coordinator (WPC), and Contractor met on June 18, 2020 for a project kick-off meeting.
- A project geodatabase has been assembled by GSS for the project area. In November 2020, EDAC shared DEM mosaics and LiDAR for Southwestern New Mexico with the WPO and the WPO forward the link to the data to GSS to add to the project database.
- GSS updated the NMED Web App in November 2020 to include data in the Eastern Plains area for the production of linear wetlands, updating them to polygons, and performing consistency reviews based on feedback from Gray Hunt (NWI Mapping Coordinator). GSS mapped linear wetlands in the project area by September 2020 and the data were available to review at <https://smumn.maps.arcgis.com/apps/webappviewer/index.html?id=065224034e164e20a4056bdeac1eb215>
- A no-cost Amendment #4 to update some of the tasks in GSS Contract # 18-667-2060-0018 was developed to include virtual meetings, mapping compliant with USFWS National Wetlands Inventory (NWI) Guidance 2.0, and to change map book deliverables to a statewide story map.
- The Pre-Mapping field review scheduled for October 2020 was postponed due to Covid travel restrictions.
- The USFWS NWI circulated a draft guidance for implementing NWI Version 2.0 in November 2020.
- A meeting was held between SWQB Wetlands Program staff and National Wetlands Inventory staff on November 18, 2020 to discuss the implications of NWI Version 2.0 data additions to New Mexico mapping data and consistency of mapping data statewide.
- NWI staff committed to helping NMED implement the changes that NWI Version 2.0 requires.
- Wetlands Program staff met with Andy Robertson and Roger Meyer (GSS Story Map developer) to work on the New Mexico Statewide Wetland Story Map.
- The WPO attended the Geospatial Advisory Committee meeting representing the Wetlands Program on November 10, 2020, and December 8, 2020, under this project.
- The No-Cost Amendment #4 to GSS contract was signed on May 17, 2021 to update some tasks for current wetlands mapping sub-projects including this Eastern Plains Subproject.
- A pre-mapping field review trip was conducted from April 18 through May 01, 2021, with the Eastern Plains Project Area visited on April 27 through May 1, 2021. The Field Trip was attended by GSS Analysts, SWQB Staff and the USFWS Regional Wetlands Coordinator.

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Figure 7. GSS (Josh Balsiger, Zach Ansell, and Dave Rokus) and USFWS (Gary Hunt) staff field checking a potential wetland site on the Pre-mapping field review April 17-28, 2021.



Figure 8. Andy Robertson, Josh Balsiger and Zach Ansell (GSS) observing waterfowl at pond 3 miles Southeast of Portales, NM. April 28, 2021 Pre-Mapping field review.

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- The field trip was conducted for verification of wetland features and non-wetland features so that a “selective key’ of image signatures could be amended and tailored to the Eastern Plains project area. This baseline information serves as a guide for identifying and classifying features (as interpreted from the project imagery) within the National Wetland Inventory (NWI), the Riparian Classification System, NWI Plus (LLWW -Landscape Position, Landform, Water Flow Path, and Waterbody), and HGM Classification Systems.



Figure 9. Pre-mapping Field Team members check soils for hydric indicators at Pre-mapping Field Review April 27, 2021.

- A total of 111 check sites were pre-selected for the Eastern plains and during the trip 47 field points were visited in the Eastern Plains area and were documented with photographs, map delineations and observation notes, wetland plant identification, surface hydrology indicators, wetland soils indicators and hydrologic regimes.

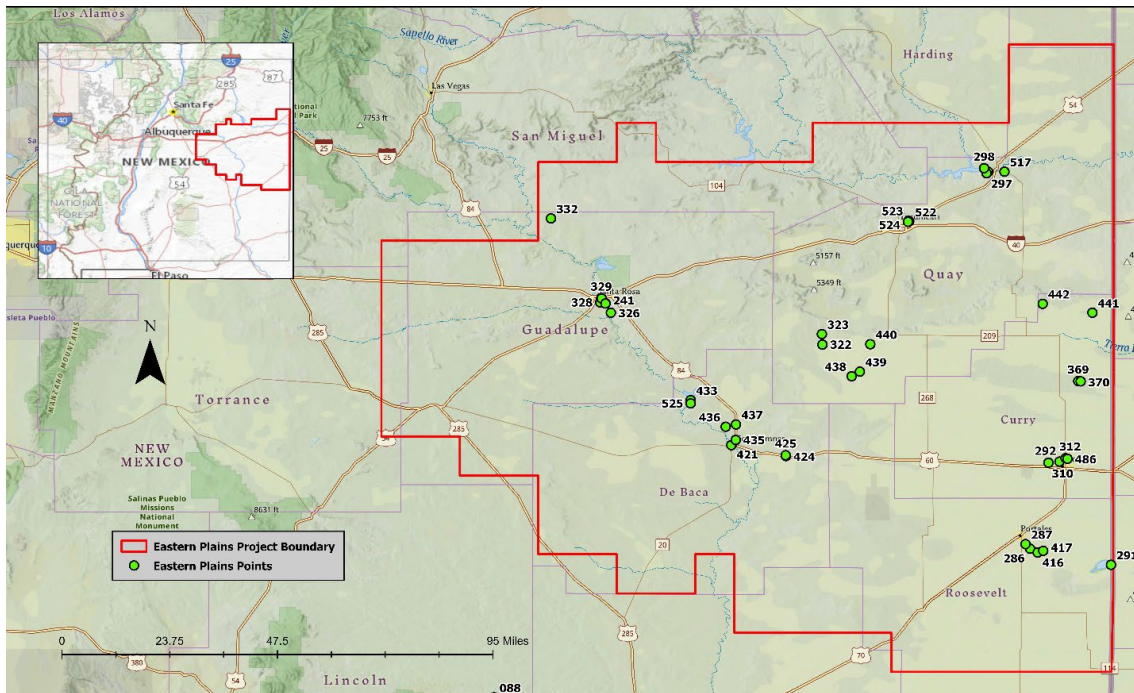


Figure 10. Check site locations in the Eastern Plains project area visited between April 27, 2021 and May 1, 2021.



Figure 11. Playa Check site #440. This emergent depressional wetland (playa) is characterized by emergent vegetation (light red signature) and basin shape (103.8173201°W 34.7942404°N). A pit excavation captures and alters flow. The presence of a pit was indicative of the playa holding more water throughout the year within the pit but contributing to drying of the historical playa bottom along with the encroachment of upland species.

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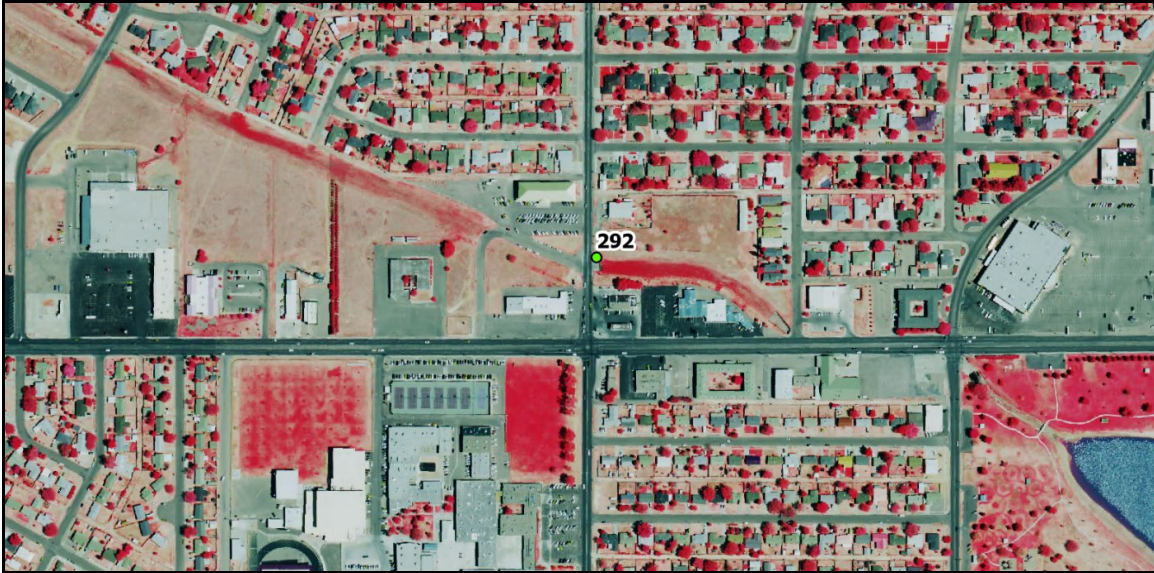


Figure 12. The City of Clovis has playas within the city limits and also ditches with saturated bottoms. Note red ditch at Checkpoint #292. Clovis is very flat and the ditches carry stormwater away from homes and infrastructure. (103.2140620°W 34.4201793°N)



Figure 13. Checksite #310. Altered playa on the right of the road may be partially wetted from center pivot field runoff as indicated by the trees on the southeast corner of the field. On the south end of the playa is smooth, uniform pink vegetation, which is a very deep excavation that captures much of the water that would flood the rest of the playa area. (103.2493769°W 34.4167486°N)

- A Field Trip Report was prepared by GSS for the Eastern Plains Portion of the Pre-mapping Field Review.
- The WPO and WPC are communicating with GSS staff and NWI staff regularly to work out the changes required for including NWI Version 2.0 updates.

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- The WPO and WPC continue discussions on the NM state-wide Wetlands Story Map.
- A Request for Quotes to complete remaining tasks when the current contract (18-667-2070-0018) with GSS expires on June 30, 2022, has been developed by Dustin Nelson (Watershed Protection Section Project Officer) who is helping with Wetlands Program tasks.
- A Draft Map Review field trip for this project was conducted in October 13 – 21, 2021 to review completed mapping codes and signatures, and to assess completed mapping data for errors of omission and commission, and to review how required mapping data will be added for NWI 2.0.
- Twenty-seven field points were visited in the Eastern Plains project area during the Draft Map review and were documented with photographs, map delineations, vegetation, soils, and hydrology indicators.

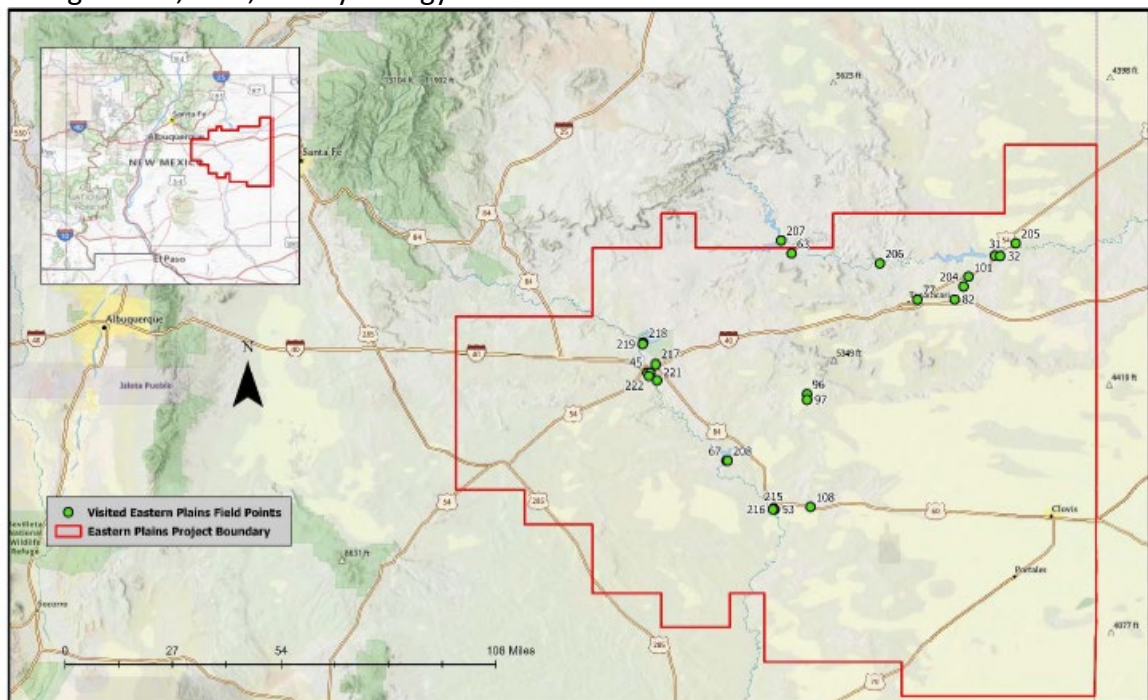


Figure 14. Locations of check-sites that were visited from the Eastern Plains study area during field verification. 1:1,300,000. The Eastern Plains study area is outlined in red.

- The field-verification process involved three stages: check-site selection; in-field examination and discussion and, post-trip documentation. Check-sites were selected in advance for areas that could not be clearly identified as upland or wetland or classified accurately on the imagery.
- GSS submitted a field verification Field Trip Report documenting the post-mapping field trip activities and mapping conclusions.

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Figure 17. Check site #45. Permanently saturated meadow with hillside groundwater source, likely due to the karst geology of the area. These areas have permanently saturated hydric soils and are often associated with springs, seeps, or cienegas.



Figure 18. Check site #45. Semi-smooth, reddish brown emergent vegetation signature breaking out in areas with more dense saturation. Dark signature and light, smooth signature both indications for wetland vegetation. PEM1D (Palustrine, Emergent, Persistent, Permanently Saturated).

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Figure 19. Check site #108. This vegetated playa holds water for long periods after precipitation events. NWI classification requires that wetland depressional features greater than 80 acres are mapped as lacustrine features. This playa is mapped as L2US5A ((Lacustrine, Littoral, Unconsolidated Shore, Vegetated, Temporarily Flooded).

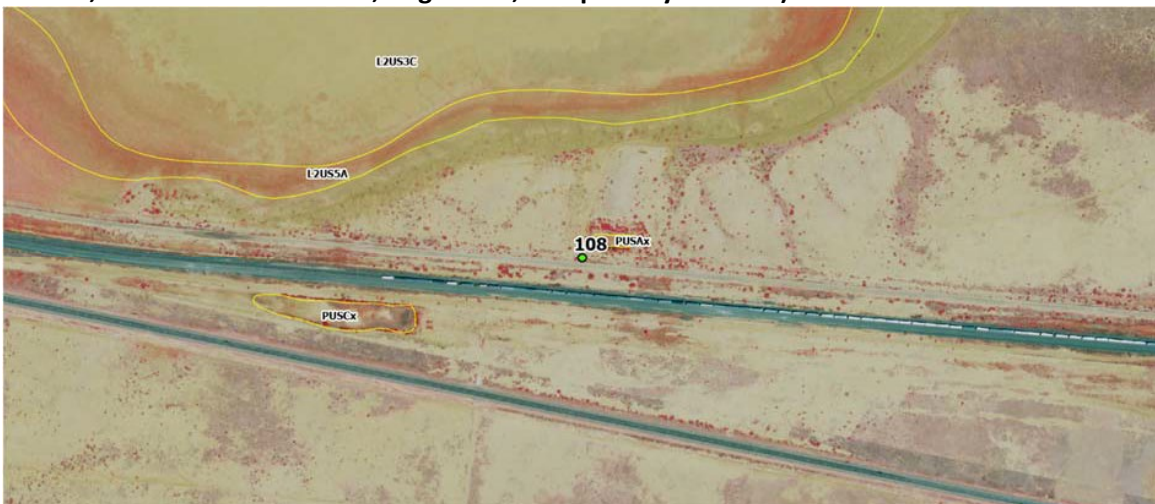


Figure 20. Check site #108. Sheet flow and precipitation flood this large playa. (108°54'16"W 32°16'34"N)

- A series of virtual Technical Advisory Committee (TAC) meeting workshops were conducted on February 24, 2022 and March 2, 2022 with 50 participants at the first workshop and 38 participants at the second workshop.



Figure 21. Intro slide for the Technical Advisory Committee Meeting.

- In these TAC 2-3-hour sessions, participants were provided with an overview of the 4 mapping and classification systems used to map wetlands in New Mexico, a review of unique wetland types specific to each project area, how mapping products can be used. The meetings concluded with a discussion of potential applications with the participants.
- The TAC meetings were recorded and the presentation links are listed below.

Link	Recording Access Password
Bootheel-Permian and Eastern Plains Mapping and Classification TAC meeting & training-20220224 1959-1	mFtKuwH3
Bootheel Mapping and Classification TAC meeting & training-20220302 1715-1	wJWJgtf7

- NMED staff completed a revision and updating of the QAPP which was submitted to EPA by the SWQB QA Officer, Miguel Montoya on March 2, 2022.
- The QAPP was approved by EPA on March 14, 2022, with the new QTRAK #22-128.
- A Request for Quotes to complete remaining tasks when the current contract

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(18-667-2070-0018) with GSS expired on June 30, 2022, was completed.

- St. Mary's University of Minnesota Geospatial Services (GSS) was selected for a Contract 23-667-2060-0001 to complete final mapping tasks, the statewide Story Map, and a final report for this project.
- Full production mapping was completed by April 30, 2022 and a draft delivery of the project to both NMED and USFWS was made on May 02, 2022.
- Draft data review was completed by the Wetlands Program who submitted the draft data to US Fish and Wildlife Service National Wetlands Inventory (NWI) Gary Hunt in June, 2022. However, the submission to NWI has not yet been reviewed.
- GSS analysts began adding LLWW attributes in preparation for assigning HGM codes and functional attributes to the completed wetlands mapping.
- Dustin Nelson was hired into the Wetlands Program in February 2023 and is now the Wetlands Program Project Officer (WPO) for this project.
- WPO and WPC provided additional information on groundwater recharge in the project area to St. Mary's University of Minnesota Geospatial Services (GSS) to continue mapping wetland functions.
- Work on the NM Statewide Wetlands Story Map by Wetlands Program staff and GSS staff continues. A draft version of the Story Map was available for review.
- WPO and Tiffany Anders (NMED Wetlands Staff) attended Geomorphic Processes of Natural Stream Channels in the Arid Southwest training, held in Flagstaff, AZ on April 25 – 28, 2023.
- NMED staff, including WPO and WPC attended a wetlands mapping and classification field training with Andy Robertson of Saint Mary's University of Minnesota Geospatial Services (GSS), Gary Hunt, U.S. Fish and Wildlife Service Regional NWI Coordinator (USFWS), and Karen Menetrey, volunteer, June 12 through June 15, 2023. The group visited 27 sites to familiarize new Wetlands Program staff, including the WPO for this project, with the Mapping and Classification process. GSS provided NMED staff with digital mapping layers and hard copy maps/data sheets for wetland classification validation practice. Dustin Nelson's and Codie Vilen's per diem for this field trip was charged to this grant.
- A no-cost extension for the project was approved by the EPA on August 29, 2023 to extend the end date of this project to December 31, 2024.
- NM Statewide Wetland Story Map was completed by St. Mary's University of Minnesota Geospatial Services (GSS) on August 31, 2023, with input from WPO and WPC. The final version of the Story Map is available at this location: <https://storymaps.arcgis.com/stories/81df9f1c7b47467895377e9772964d07>
- The WPO and WPC completed a list of geology units and their recharge potential for mapping the groundwater recharge function in April 2023. With the submission, GSS completed adding the functional attributes to the database in August 2023.
- The final wetland mapping geodatabase for the project was delivered to NMED by the contractor on August 23, 2023.

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- All deliverables have been submitted by the Contractor, GSS on August 23, 2023, including supplemental map information and the final report.
- A wetlands naming application was run by NMED GIS IT specialist Phil Polzer to apply unique wetlands IDs to all wetlands in the project area. These Wetland IDs can then be used to identify future wetlands assessment units (AUs).
- The WPC met with Natural Channel Design Engineering (NCDE) staff and Angel Montoya (USFWS Partners for Wildlife Program) to develop a plan and contract tasks for outreach for Eastern Plains playas.
- The WPC met with staff from NCDE via Teams on December 5, 2023, to discuss a workshop and outreach materials as a follow-up for the virtual training and including the demonstration restoration Keystone Restoration Ecology conducted at the Grasslans Charitable Foundation playa.
- In early 2024, the WPC discussed partnering options for the workshop with Angel Montoya (USFWS Partners for Wildlife Program). The Partners Program agreed to pay for Keystone Restoration Ecology to demonstrate the on-the-ground restoration while building additional restoration structures at the Grasslans Playa, and the WPO agreed to pay NCDE for conducting the classroom portion of the workshop and to help with the walkthrough of the completed structures. NCDE also investigated demonstrating drone monitoring and videotaping the workshop for future use. The video idea was replaced with a Story Map due to costs associated with videotaping.
- On January 16, 2024, Dustin Nelson attended a coordination meeting with the US Army Corps of Engineers as match for this project.
- On March 14, 2024, the Wetlands Program Coordinator requested EPA Region 6 to move \$32,109.00 from personnel to contractual to hire a contractor to assist with outreach for this project since the Wetlands Program was understaffed. The request was approved by EPA on March 27, 2024.
- The final NWI data was uploaded into the NWI database in May of 2024.
- A wetlands naming application was run by NMED GIS IT specialist Phil Polzer to apply unique wetlands IDs to all wetlands in the project area. These Wetland IDs can then be used to identify future wetlands assessment units (AUs).
- In July, Shinya Burck, Wetlands Program Project Officer, obtained a printing quote for a 50 copies of the Playa Erosion Control Technical Guide to be handed out at the Playa Restoration and Monitoring Workshop.
- On August 16, a contract with Natural Channel Design Engineering (NCDE) to conduct a Playa Workshop on the Weaver Ranch and to create a Story Map was approved.
- On August 27, partners including NCDE, Keystone Restoration Ecology, US Fish and Wildlife Service Partners for Fish and Wildlife, Grasslans Foundation and Weaver Ranch planned for the Workshop to take place on the Weaver Ranch on October 28-29, 2024.
- Invitations were sent to potential Playa Monitoring and Restoration Workshop participants including to Colorado and Texas on October 4, 2024.

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Figure 22. Playa Gully on the Grasslans Playa example sent with invitation to the Workshop.



Figure 23. Grasslans Playa Gully restored example sent with invitation to the Workshop.

- The Playa Workshop was conducted on October 28 and 29 at the Weaver Ranch near Causey, NM with 14 attendees. The Weaver Ranch provided a barn for the classroom portion of the Workshop where a power point on monitoring playas and drone

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monitoring was given by NCDE Engineers. NCDE also handed out thumb drives with the powerpoint and other materials to attendees.

- On October 29, Workshop attendees met at the Grasslans Foundation Playa where NCDE staff led a field trip to areas already restored on the grasslans playa. After lunch, the group watched Keystone Restoration Ecology Steve Vrooman use heavy equipment to build restoration structures on gullies entering the playa.



Figure 24. Classroom portion of the Playa Monitoring and Restoration Workshop at the Weaver Ranch near Causey, NM.



IMG_8407.MOV

Movie of equipment restoration and drone monitoring. (Tap to play)

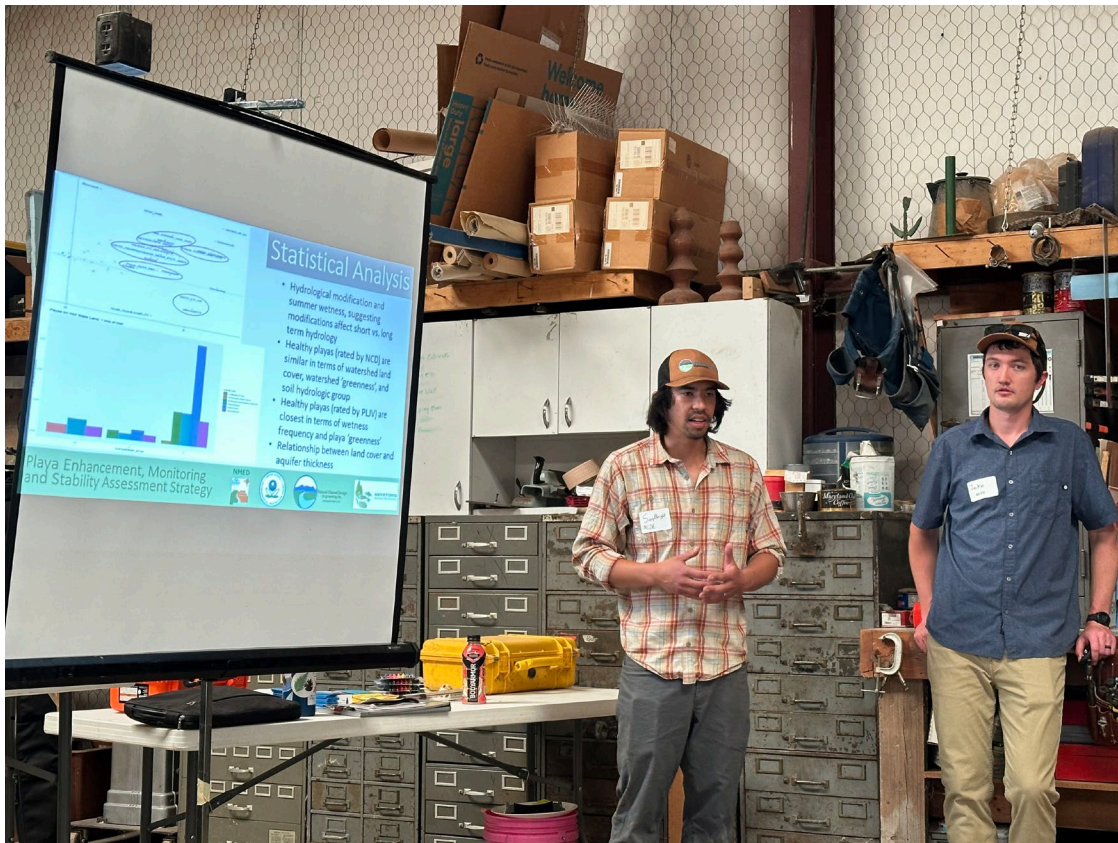


Figure 25. Sam Ebright and Jacob Fleishman (NCDE) give presentation about statistical analyses that they conducted on 20+ playas in the Southern High Plains. Mapping from this project helped them identify playas for the statistical analyses. The also talked about pre- and post-monitoring techniques and software for playa analyses for successful restoration.



Figure 26. Steve Vrooman (Arrow) providing agenda to the attendees for the field day at the Grasslans Playa.



Figure 27. Workshop Attendees look at successful restoration where significant plant growth stabilizes gullies where shear stress is reduced.



Figure 28. Workshop attendees participate in measuring slopes and watching equipment work during second part of field day.

- On December 19, 2024, NCDE submitted the final version of the Story Map, Playa Enhancement, Monitoring and Stability Project.” the Story Map can be accessed here: <https://storymaps.arcgis.com/stories/a1e6612037a04c9e9eaf3866efcc10d8>
- Work was completed on the NCDE contract on December 23, 2024.
- A wetlands naming application was run by NMED GIS IT specialist Phil Polzer to apply unique wetlands IDs to all wetlands in the project area. These Wetland IDs can then be used to identify future wetlands assessment units (AUs).
- A Final Deliverable is the Story map “Playa Enhancement, Monitoring and Stability Project “<https://storymaps.arcgis.com/stories/a1e6612037a04c9e9eaf3866efcc10d8>

List of Major Deliverables

- Geodatabase assembled
- Cowardin, Riparian, LLWW and HGM classified maps
- GSS Contractor Quarterly Reports
- Pre-mapping and post-mapping field Trip Summary Reports
- Technical Advisory Committee meeting recordings and list of attendees

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- Geology Units and Groundwater function Ratings for the Eastern Plains Project
- Statewide Wetlands Story Map
- Mapping published on SWQB Wetlands Mapper
- Playa Enhancement, Monitoring and Stability Story Map
- Playa Workshop handouts and thumb drive, workshop photos
- Contracts and amendments
- QAPPs and updated QAPP
- Contractor final mapping report
- Semi-Annual Reports and Final Report, Match reporting to EPA

Lessons Learned

During this project, the Wetlands Program experienced delays due to Covid and turnover in Wetlands Project Officers. Extensive training including mapping and classification week-long training helped keep the project on task.

Getting contractor help when the SWQB Wetlands Program was understaffed also helped complete project outreach.

The Technical Advisory Committee proved invaluable for local knowledge. When attempting to adapt mapping methodologies based on regional and local conditions, it is essential to involve local, regional, and national experts plus local stakeholders in the mapping and assessment processes.

It is important to incorporate both field evaluations (qualitative and quantitative) and collateral spatial data sources to support decisions related to wetland delineation, water regimes, classification, and function. In semi-arid environments such as eastern New Mexico, which can experience severe to extreme drought conditions, or continuous precipitation during the monsoon season, a single site visit may influence water regime decisions especially during times of prolonged or severe drought.

What made the project successful?

The Wetlands Mapping and Classification Workshops were an offshoot of the success of virtual Technical Advisory Committee meetings reaching so many more participants. The invitation to a Wetlands Mapping and Classification Workshop was open to a broader range of participants, which in turn had many more participants attend the workshop. However, the Playa Restoration Workshop was conducted in-person and proved invaluable to have practitioners on site. An important outcome of this project was to use mapping information to find wetlands in need of restoration, in this case for playas. This was a key goal of the SWQB Wetlands Program.

What made the project not so successful?

This project has been overall successful in achieving its goals, even after delays and restrictions due to the Covid pandemic.

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Technical Transfer

What information can you pass along to other agencies, cooperators, or local landowners in other watersheds about this project?

Two Technical Advisory Committee meetings were conducted as workshops, that attracted a broad audience interested in wetland mapping. These workshops were recorded and can be used for additional outreach to those not in attendance. Mapping products were distributed to Agencies and organizations on request. Wetlands Program personnel attended the NM Geospatial Advisory Committee monthly meeting to share resources and stay abreast of mapping activities. Two Story Maps were completed and are available on the NMED Wetlands Program website. Mapping is available to the public on the NWI Mapper Wetlands Mapper | U.S. Fish & Wildlife Service (fws.gov) and on the NMED Wetlands Program website OpenEnviroMap (nm.gov). This final report will also be available on the NMED Wetlands Program website.

EPA Feedback Loop

What would you suggest that EPA do differently to improve the process in regard to this project?

EPA was very supportive in all aspects of this project during the project period, especially allowing grant period extensions to complete high quality and meaningful work during times of uncertainty and change.

Future Activity Recommendations

The NMED Wetlands Program will continue to share project results through presentations, wetland roundtables, the Story Maps, and on the NWI website. Mapping of HGM subclasses will continue to be used to develop the New Mexico Rapid Assessment Methods by subclass. The Story Maps will be used for education and outreach about New Mexico's wetlands, providing a tool to help people visit and appreciate wetlands, as well as understand the ways that they are classified and the meaning of the classifications. Now that New Mexico mapping is nearly complete, transfer of these mapping products for a variety of uses to stakeholders will be a priority.

As wetland mapping is nearly completed for New Mexico, the Wetlands Program should devise a methodology to identify and record trends, especially in southern New Mexico which experiences drought conditions, and use mapping products to locate wetlands with unique and special features for further protection.