Mapping and Classification of Wetlands in the Bootheel and Permian Basin of New Mexico

Assistance Agreement No. CD-01F674-01-0 (FY 2019)

New Mexico Environment Department
Surface Water Quality Bureau
Wetlands Program

Final Report

November 2024

Project Goals and Objectives

The climate in the Bootheel and Permian Basin project areas is arid (~13 inches annual precipitation), therefore surface water is scarce, and drought is an ever-present threat. Wetlands in the Bootheel and Permian Basin project areas include the perennial Pecos River and associated riverine wetlands, intermittent or ephemeral creeks, playa lakes, spring-fed slope wetlands (i.e. cienegas) and excavated stock tanks. The US Fish and Wildlife Service (USFWS) National Wetlands Inventory mapping was incomplete for the area. Scalable mapping was conducted in 2012 by the USFWS, but it does not meet the FGDC National Wetland Mapping Standard and was intended to be interim. Diverse flora and fauna rely on the wetlands, including 90 federal or state threatened or endangered species (e.g. Jaguar, Mexican long-nosed bat, Chiricahua leopard frog, Piping plover, Least tern, Pecos bluntnose shiner). Playa wetlands provide important stopover habitat for migratory shorebirds and other waterfowl. The wetlands in the project area are threatened by surface and ground water withdrawal for agricultural, municipal, mining and energy development uses. Many critical ground-water dependent springs and cienegas have already been desiccated and lost from groundwater withdrawal.

Figure 1. Ranger Lake Check site on the Permian Basin Pre-Mapping field review conducted April 18 through April 27, 2021.

Historically, the Bootheel project area has been subject to extensive mineral development (copper, silver, lead, zinc, manganese, and fluorite) and mining companies own substantial surface and ground water rights. Mining exploration continues to be a threat to water resources in the Bootheel area, including exploration for lithium on Lordsburg Playa, copper in the Burro Mountains, and magnesium in the Florida Mountains. Wetlands along the Pecos River in the Permian Basin area are affected by groundwater withdrawal for municipal and agricultural uses. The Permian Basin holds the largest reserves of potash in the U.S. and is subject to significant oil and gas activity. Solar and wind development is increasing. Without complete wetlands mapping, it is unclear how wetland resources may be affected by these industrial activities.

The goal of the SWQB Wetlands Program and many of its southern New Mexico partners is to increase wetland acreage by restoring existing wetlands and protecting isolated and scarce desert wetlands. Human activities in the region will irreversibly affect wetland resources if the State is not prepared to protect and restore the remaining resources. As the SWQB Wetlands Program develops, the need for mapping and classification of wetlands has become more critical. Opportunities to restore and protect wetlands are hindered or lost by the lack of a comprehensive inventory and it is imperative to obtain accurate mapping and appropriate classification of wetlands that meet the State's needs. All states in the southwest are lacking adequate mapping/assessment of wetlands and need an arid-land landscape functional assessment (LLWW) model, which this project refined. No wetlands in New Mexico are listed on the State's impaired waters list and actions needed to support and justify wetlands water quality standards are acute. The mapping products from this project include the identification and assignment of wetland functions that may be interpreted as designated uses for wetlands narrative water quality standards, and the assignment of classified segments. The mapping products also provide support 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 Bootheel and Permian Basin project areas uploaded on Wetlands Mapper | U.S. Fish & Wildlife Service for national use. The wetland features and deepwater habitat features include marshes, floodplains, cienagas, lakes and ponds, playas, and rivers. The Bootheel project area was nearly 5.2 million acres in size and the Permian study area was just over 5.1 million acres. Based on the final wetland mapping, 97.8% of the Bootheel study area and 98.8% of the Permian study area are upland habitat. Just 116,222 acres (~2.2%) in Bootheel and 38,014 acres (~1.2%) in the Permian are a combination of wetland, deepwater habitat, and riparian area habitat. In the

Bootheel area, riverine system wetlands make up approximately 52% of the total wetland area, lacustrine wetlands were 28% of area, and palustrine 20%. In the Permian project area, palustrine wetlands dominated with 60% of total wetland area, followed by riverine at 33% and lacustrine at 8% of wetland area.

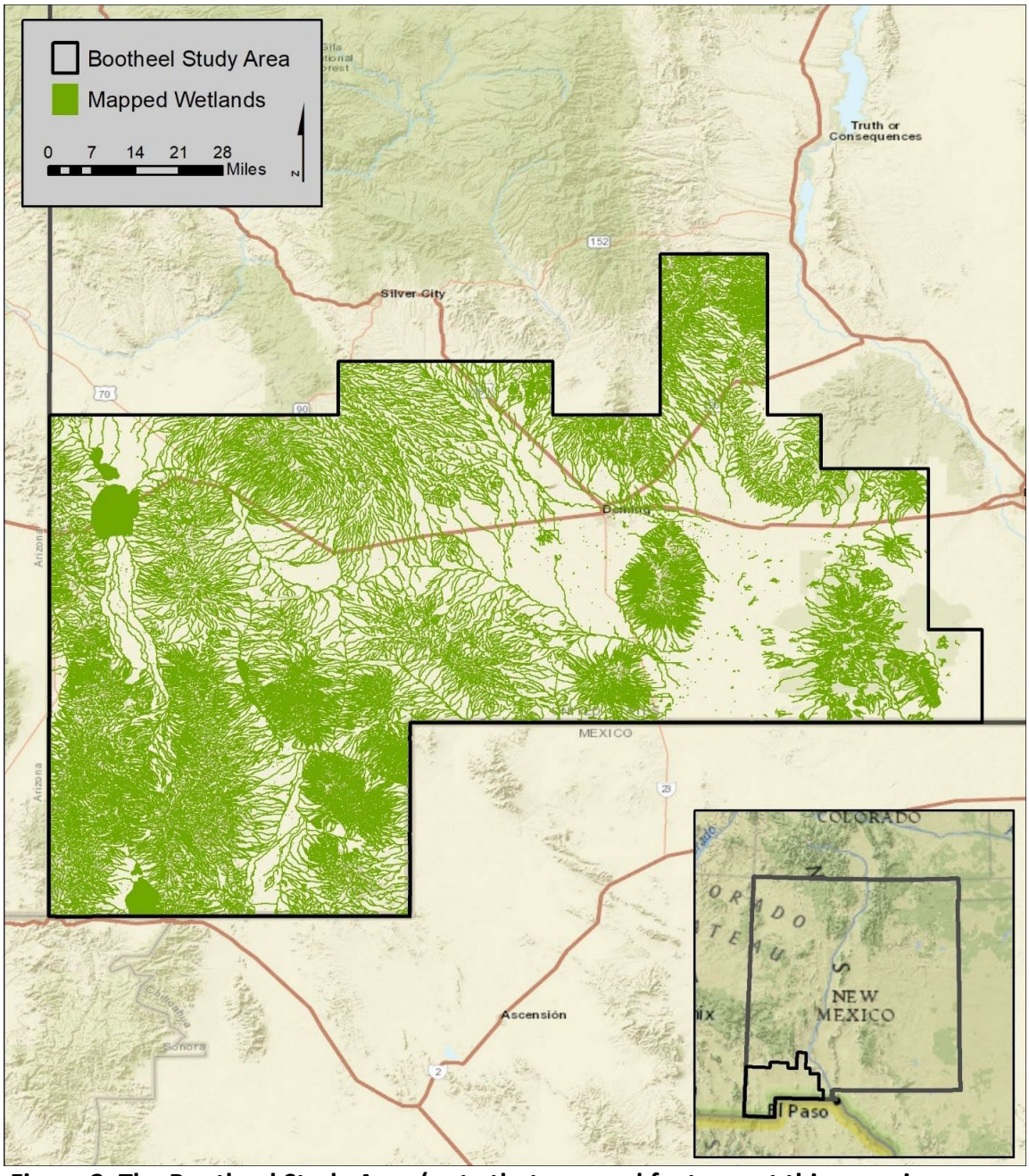

Figure 2. The Bootheel Study Area (note that mapped features at this mapping scale look denser due to line width.)

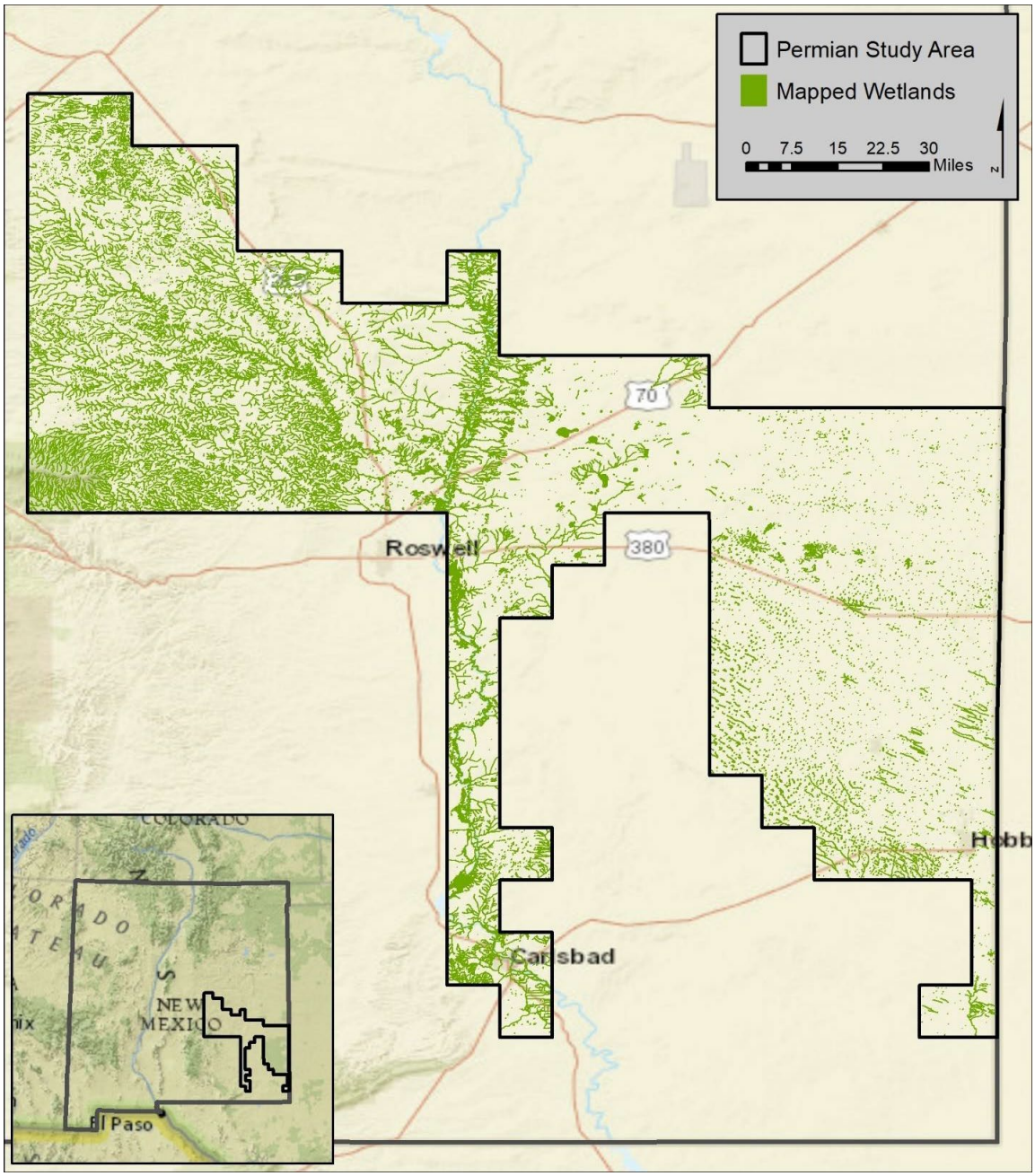

Figure 3. Permian Basin Study Area (note that wetland mapped features look denser at this mapping scale due to line width).

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; 110 riparian features equaling approximately 175

acres of riparian areas were captured in the Bootheel area, with 196 features totaling 1,524 acres in the Permian area.

3. Landscape Position, Landform, Water Flow Path, Waterbody Type (LLWW) and Hydrogeomorphic (HGM) classification and mapping of wetlands were completed for approximately 236 quadrangles. Wetland features were assigned codes from the LLWW classification system developed by Tiner (2014). 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.
4. 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.
5. 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.
6. Under this grant wetland maps were created for all 35 State Parks in New Mexico by SWQB Wetlands Program staff and a cover letter was created for delivering mapping products to end users.

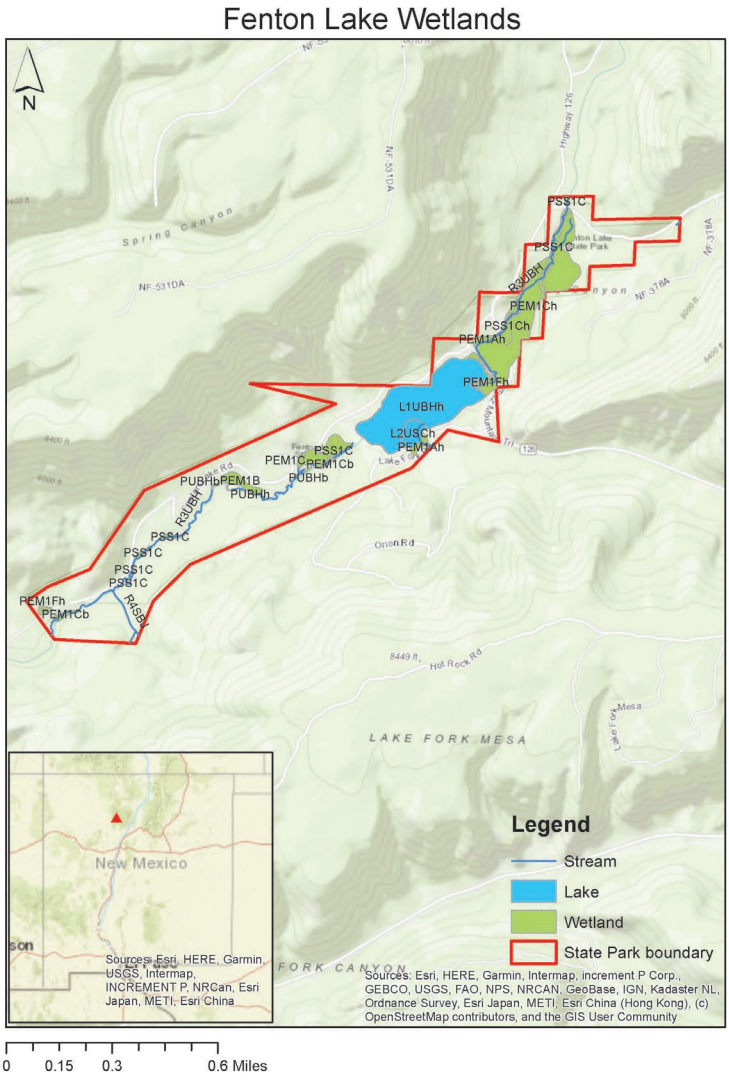

Figure 4. Example State Parks map for Fenton Lake State Park, NM.

7. An Outreach Plan was created by the SWQB Wetlands Program and expanded and implemented by contractor Saint Mary's University of Minnesota Geospatial Services (GSS) and subcontractor Rio Grande Return (RGR). Outreach included providing in-person presentations, fact sheets and materials to 10 stakeholder groups in or near the project area. In addition, presentations were made to New Mexico Highlands University Students and at the New Mexico Fall Southern Wetlands Roundtable in November 2024. A Stakeholder Engagement Report describes the stakeholder groups and lists questions from attendees and answers as feedback to the SWQB Wetlands Program.

Figure 5. Outreach by GSS was conducted as part of the Carlsbad SWCD meeting in October 2024.

8. This project contributed to a story map about wetlands that is on the SWQB Wetlands website called Wading into Wetlands of New Mexico, Wading into Wetlands of New Mexico. SWQB Wetlands staff including Maryann McGraw, Karen Menetrey, Emile Sawyer, JT Jones, Dustin Nelson, Tiffany Anders and Codie Vileno contributed to the development of this story map which was created by GSS.
9. As part of the Outreach Plan an additional story map "Mapping and Exploring Southern New Mexico Wetlands: Bootheel and Permian Basin Project Areas" was created for the Bootheel and Permian Basin project area by GSS. The story map was used to present at the outreach meetings and is available here. https://storymaps.arcgis.com/stories/66cf61eb52da4aa780550efc8a249f99 The story map includes photographs of wetlands in the Bootheel and Permian Basin project area and includes a feature that allows users to provide their observations on wetlands that are mapped in the area.

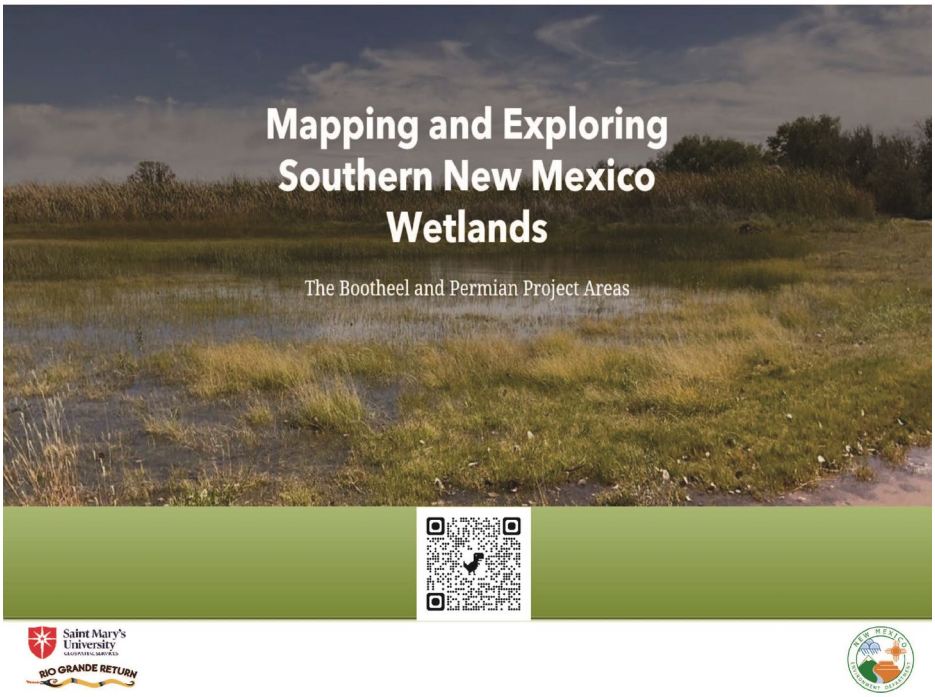

Figure 6. Cover page of the story map, "Mapping and Exploring Southern New Mexico Wetlands" produced by GSS.

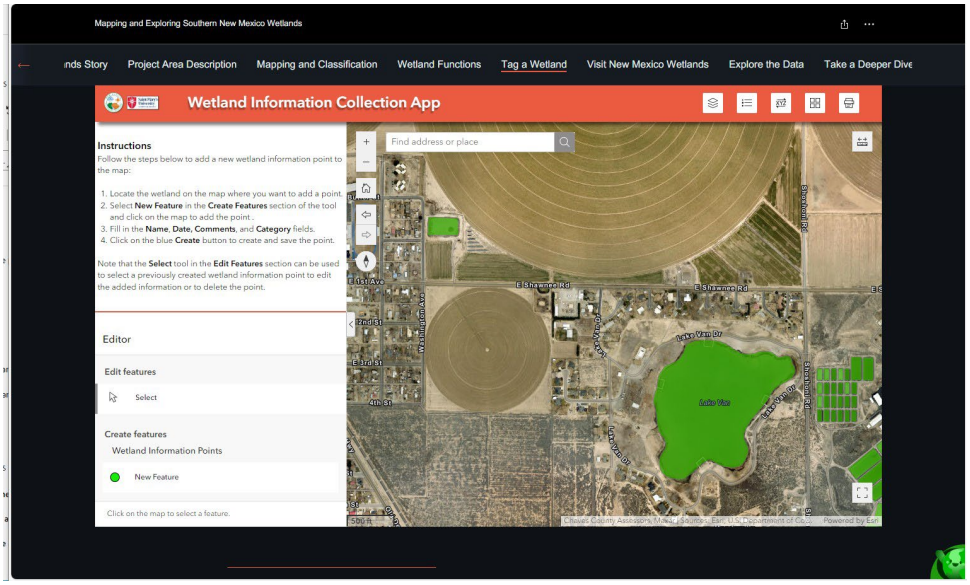

Figure 7. Tag a Wetland! This interactive map where the story map visitor can find a wetland in the project area and add what they know about the wetland is a feature of the "Mapping and Exploring Southern New Mexico Wetlands" story map.

10. 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 Bootheel and Permian Basin project areas, features with the Cowardian Classifications of Riparian and Riverine are identified and removed from the data set (Figure 8). The remaining polygons were dissolved on the three HGM attributes (class, subclass and modifier) to merge adjacent wetlands that share those characteristics (Figure 9). 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.

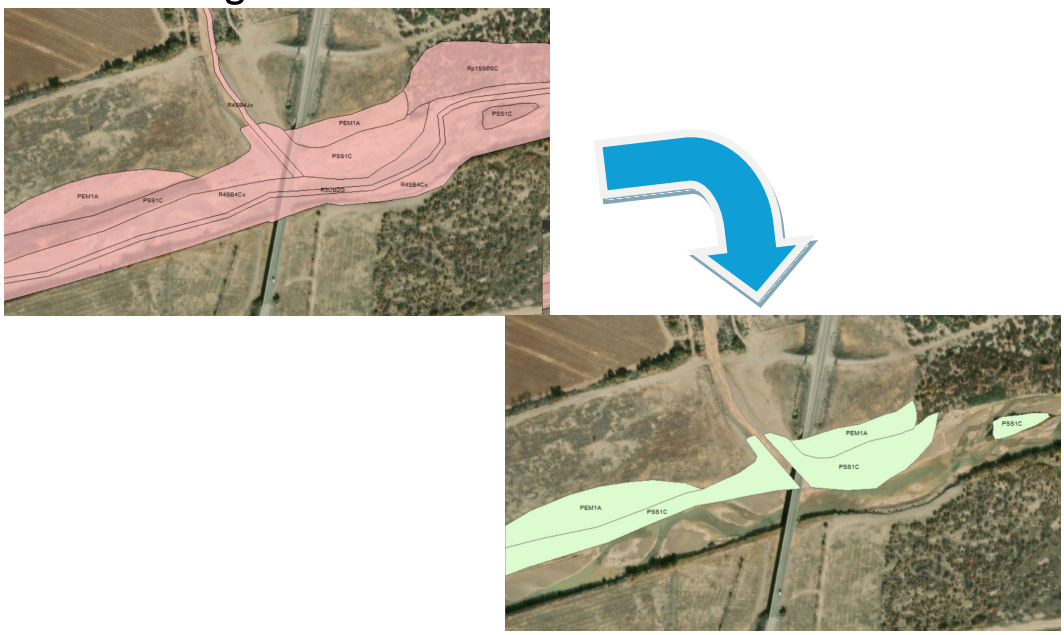

Figure 8. Features with rivers, streams and deepwater habitat are identified and removed from the data set.

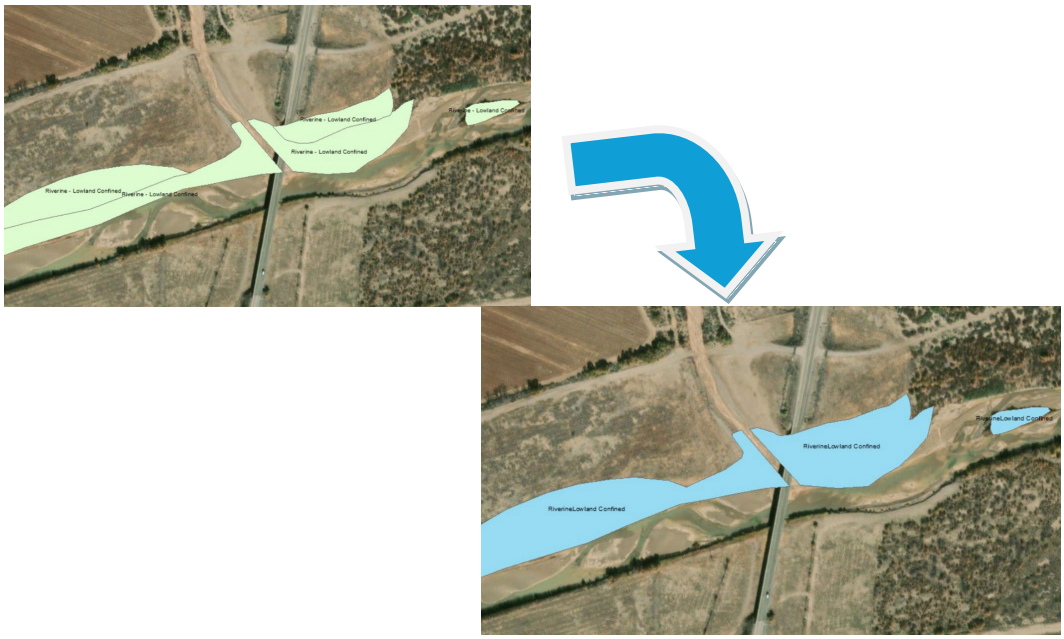

Figure 9. The remaining polygons are dissolved on the three HGM attributes below to merge adjacent like wetlands.

- **HGM_Class**
- **HGM_Subclass**
- **HGM_Modifier**

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 Southeastern and Southwestern NM in the Counties of Hildalgo, Luna, Grant, Lea, Eddy, Chaves, and Roosevelt at the following 8-digit HUCs: 12050001, 12080001, 12080003, 12080004, 12080006, 13030102, 13030201, 13030202, 13060003, 13060005, 13060006, 13060007, 13060008, 13060009,13060011, 13070007, 15040002, 15040003, 15040006, 15080302, 15080303**.** See mapping areas below.

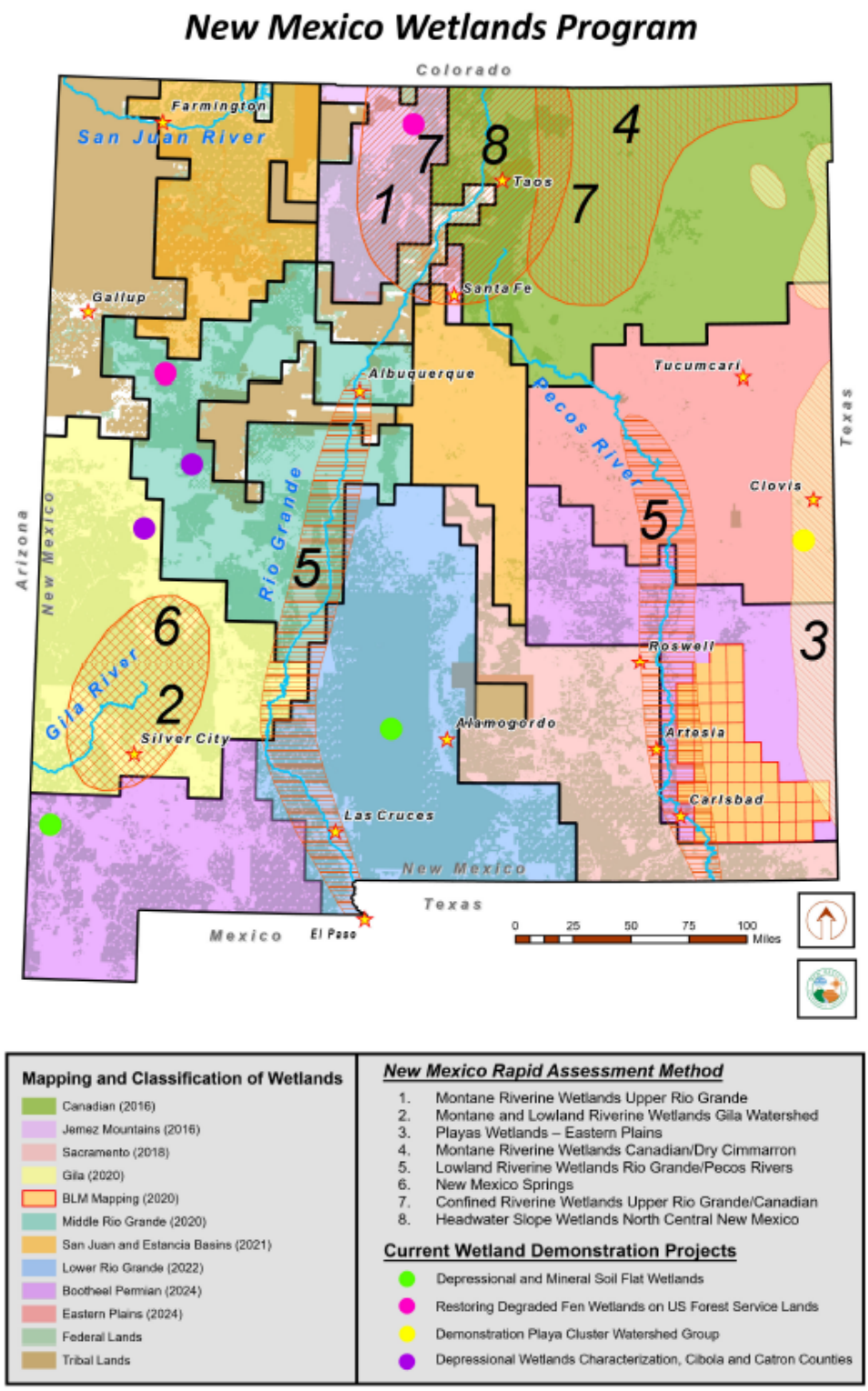

Figure 10. The Bootheel and Permian Project Areas in southern New Mexico are shown in violet.

Original Timeframe

NMED SWQB Wetlands Program received an award from EPA of $375,406 in federal funds for the project on September 16, 2019 with an effective date of October 1, 2019. On August 29, 2023, a no cost extension for grant CD #01F67101-1 was approved by EPA Region 6 to extend the end date to November 30, 2024. 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. 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 in Wetlands story map. Saint Mary's University of Minnesota Geospatial Services and Rio Grande Return conducted outreach following a plan developed by the SWQB Wetlands Program. The Project involved a Technical Advisory Committee whose members are as follows:

Technical Advisory Committee Members

Name	Organization
Myles Traphagen	Science Advisor, Malpais Borderland Group
A.T. Cole	Owner, Pitchfork Ranch
Ellen Soles	Northern Arizona University
David Certain	State Parks Division
Dan Taylor	Bat Conservation International
Will Barnes	State Land Office
John Sherman	US Bureau of Land Management
Tim Frey	US BLM Las Cruces Field Office
Corey Durr	US BLM Las Cruces Field Office
Van Clothier	Owner, Stream Dynamics
Michael McGee	US BLM Roswell Field Office
Danica Cook	US BLM Roswell Field Office
Cassy Brooks	US BLM Carlsbad Field Office
Ty Allen	US BLM Carlsbad Field Office
Shawn Denny	NMDGF
Sam Smith	Diamond A Ranch

Funding

The original Federal amount was **$375,406.00** and **$131,731.00** match. The federal amount spent was $353,853.58, and the **final match amount** was **$138,321.27 ($6,590.27 overmatched).** See semi-annual reports for details.

Major Project Highlights and Chronology

- NMED SWQB Wetlands Program received an award from EPA of $375,406 in federal funds for the project on September 16, 2019, with an effective date of October 1, 2019.
- Karen Menetrey was the Wetlands Program Project Officer (WPO) for this project.
- The WPO drafted and submitted Contract Amendment #3 to add the Bootheel and Permian Basin 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.
- Contract #18-667-2060-0018 Amendment 3 with Saint Mary's University of Minnesota was approved on June 5, 2020, allowing mapping to commence.
- The Wetland Project Officer (WPO), Wetland Program Coordinator (WPC), and Contractor met on June 18, 2020 for a project kick-off meeting.
- The WPO had discussions with various project stakeholders to prepare for a pre-mapping field trip scheduled for October 2020.
- The WPO created a draft bibliography of hydrogeology references for the Bootheel area.
- The WPO communicated with private landowners and agency land managers in the project areas to discuss access and local knowledge about wetlands and water regimes.
- The Malpais Borderland Group science advisor shared information with the WPO about access and frequency of inundation in the Bootheel playas, and the State Parks Division of the NM Energy, Minerals and Natural Resources provided information about access to state parks.
- Emile Sawyer (Wetlands Program WPO) communicated with Earth Data Analytics Center (EDAC) at University of New Mexico to obtain all available LiDAR for the wetland mapping and classification project areas.

- A no-cost Amendment #4 to update some of the tasks in GSS Contract # 18-667-2060-0018 was developed to include NWI 2.0 protocols, change in-person meetings to virtual, allowing for alternative activities due to covid travel restrictions and combining story map activities into statewide Wetlands Story Map was approved on May 17, 2021.
- The end date for draft NWI data delivery was extended to 2022 to accommodate the upgrade of the NWI dataset to NWI Version 2.0 standards.
- The USFWS National Wetlands Inventory staff provided revised NWI Version 2.0 guidance to GSS during the last reporting period. Compliance with the new guidance is requiring considerable additional effort to implement due to dissected plains and playas within the sub project area.
- The Pre-Mapping field review scheduled for October 2020 was postponed due to Covid travel restrictions.
- The WPC Maryann McGraw participated on a NMED Team for scoping potash mining expansion impacts to wetlands and surface water in the Permian Basin portion of the Project Area.
- Karen Menetrey left the Surface Water Quality Bureau and Davena Crosley replaced her as the Wetlands Project Officer.
- The Pre-mapping field review was conducted for this project from April 18 through April 27, 2021, as a part of a larger field review of subprojects delayed by Covid restrictions.

Figure 11. 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.

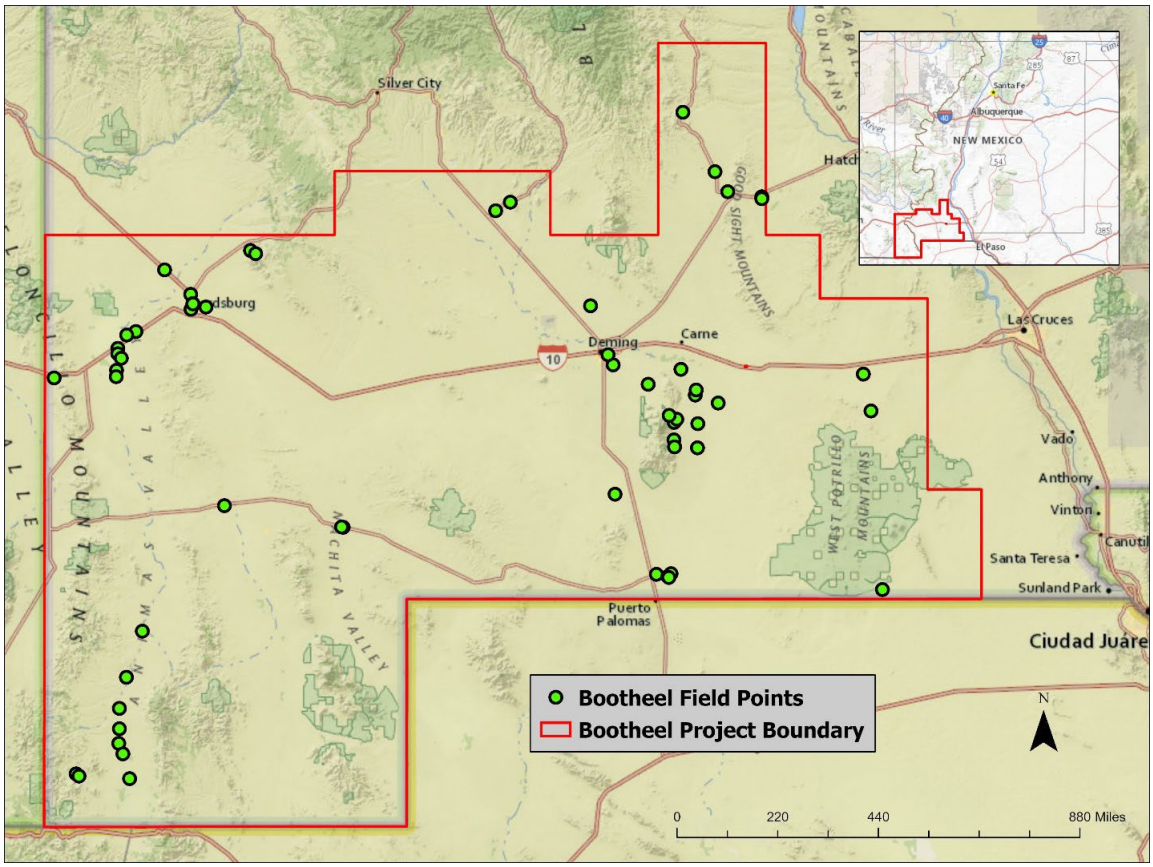

Figure 11. Locations of field check-sites that were visited from the Bootheel study area during pre-mapping field review (1:1,300,000) April 18-27, 2021.

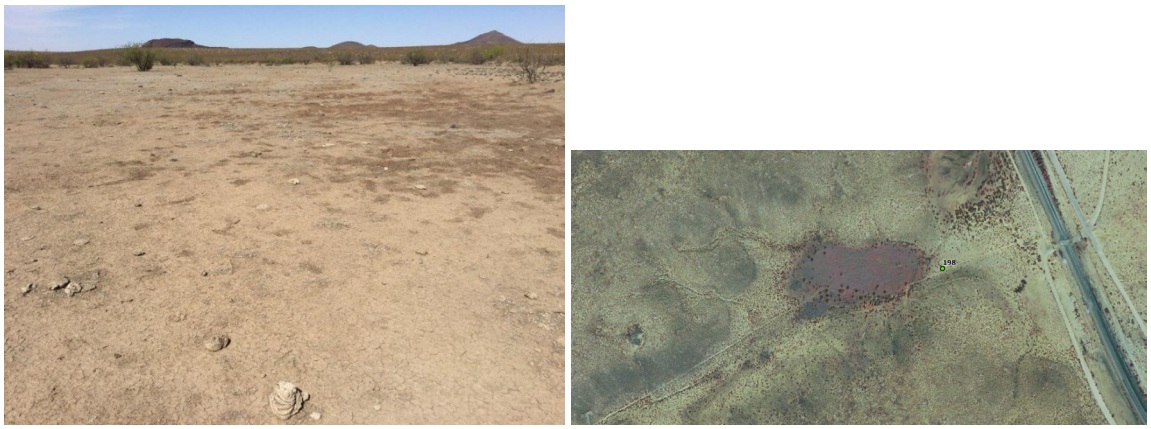

Figure 12. Check site #198 Bootheel. Left - isolated playa PEM1A wetlands, heavily grazed. Right – Unique dark signature of the playa (107.1315144°W 32.1542171°N).

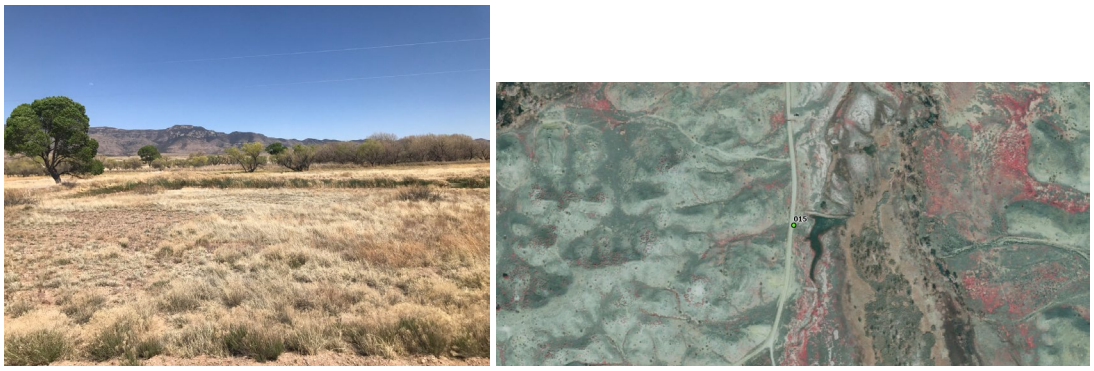

Figure 13. Check site #15, Bootheel. Left – Cattail (Typha spp.) and rush (Juncus spp.) Cienega. Seep has been impounded to create surface flooding. Right – Surface water in imagery, Saturated "B" and permanently saturated "D" surrounding open water defined as Seasonally Flooded/Saturated "E" directly behind the impoundment where water accumulates. (108.8749156°W 31.5271062°N)

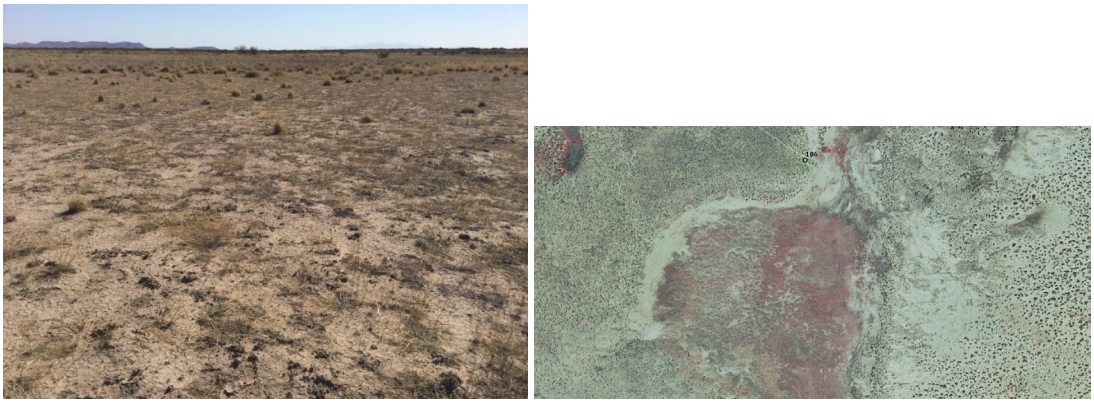

Figure 14. Check site #186 Bootheel. Left - Photo taken in the playa looking toward playa edge showing the border of playa to upland. PEM1J (Palustrine, Emergent, Persistent, Intermittently Flooded). These are areas where water may pool or flow infrequently. Right - Photographic textures are smooth as they are usually dominated by grasses. Randall clay bottom captures and ponds the little water that is received and basin configuration aggregates sheet and overland flow. (107.1492515°W 32.2269304°N)

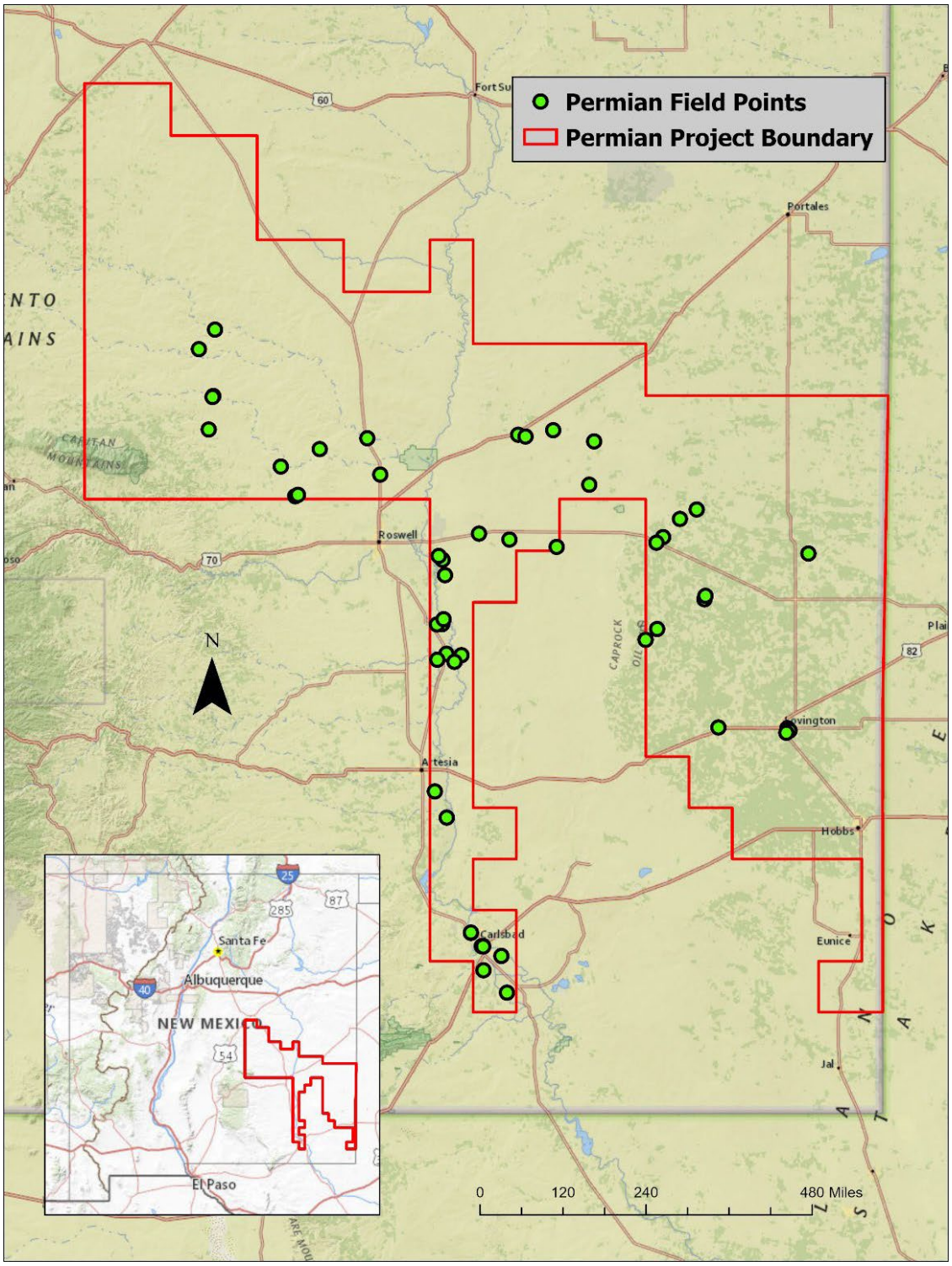

Figure 15. Locations of check-sites that were visited in the Permian project area pre-mapping field review. (1:1,300,000) April 17-28, 2021.

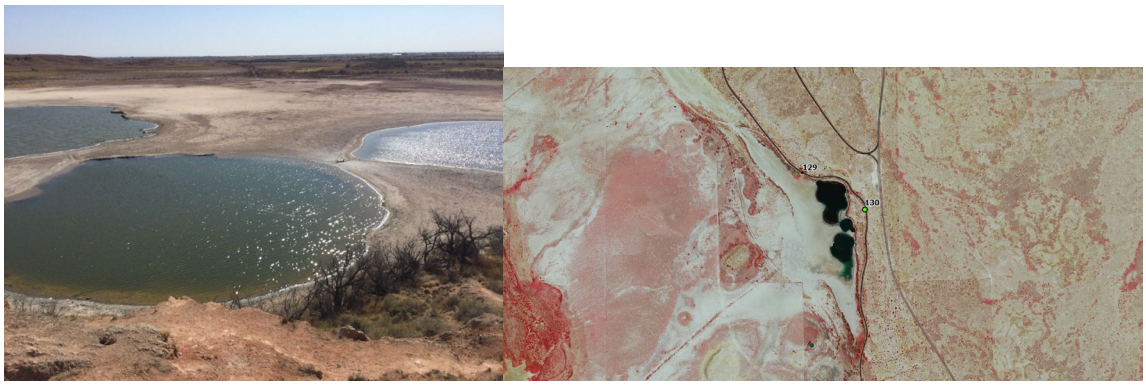

Figure 16. Check site #130 Permian. Left - Karst Sinkholes at Bottomless Lakes State Park range from 17-90 ft deep. The lakes are a part of a larger network of karst sinkholes that run north and south of this complex. Surface flooding flows to the Pecos River to the southwest. Right – karst lake signatures.

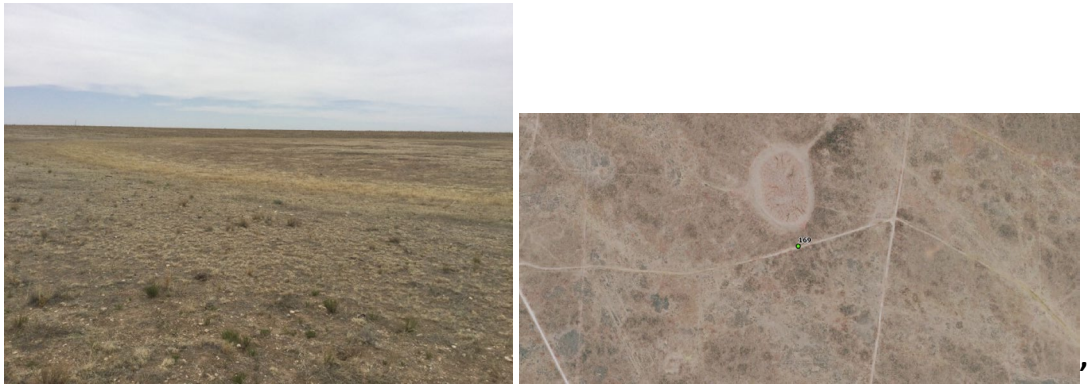

Figure 17. Check site #169 Permian. Left - This playa drops to two DRG lines into a basin configuration and has a significantly different plant community from the surrounding upland with *Juncus* throughout the basin. PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded). These emergent wetland areas are most frequently associated with wetter playas and basins in floodplains. Right - Slightly magenta signature of playa is indicative that seasonal flooding (103.5802168°W 33.2573891°N)

- During the pre-mapping field trip, NWI field data sheets were completed for each formal check site, and two field trip reports documenting all findings for the Bootheel of New Mexico (173 pre-selected sites and 63 visited) and for the Permian Basin (117 pre-selected sites and 53 visited) were submitted for review to the WPO in July 2021.
- Mapping is being performed by the GSS using aerial photos from the National Agriculture Imagery Program (NAIP) and other corroborative data as identified for the project area. Polygonal and linear wetlands are mapped with Version 2.0 updates using the Cowardin classification and in preparation for submittal to NWI. The Western Riparian Classification, LLWW and HGM classifications are also being

applied. At this point, GSS estimates that preliminary mapping is 80% completed and the Landscape Level Assessment is at 50% by September 2021. Status of mapping can be viewed and is available via Status Webapp at: http://smumn.maps.arcgis.com/apps/webappviewer/index.html?id=065224034e164e20a4056bdeac1eb215

- The WPO attended the ASWM Federal, State and Tribal Coordination virtual meeting on April 12-15, 2021.
- A Draft Map Review field trip for this project was conducted in October 2021 to review completed mapping and assess draft final data for errors of omission and commission. The dates for this trip were 10/12/2021 to 10/18/2021 and the team spent considerable time assessing playas, mineral flats, and riverine floodplains while in the field.

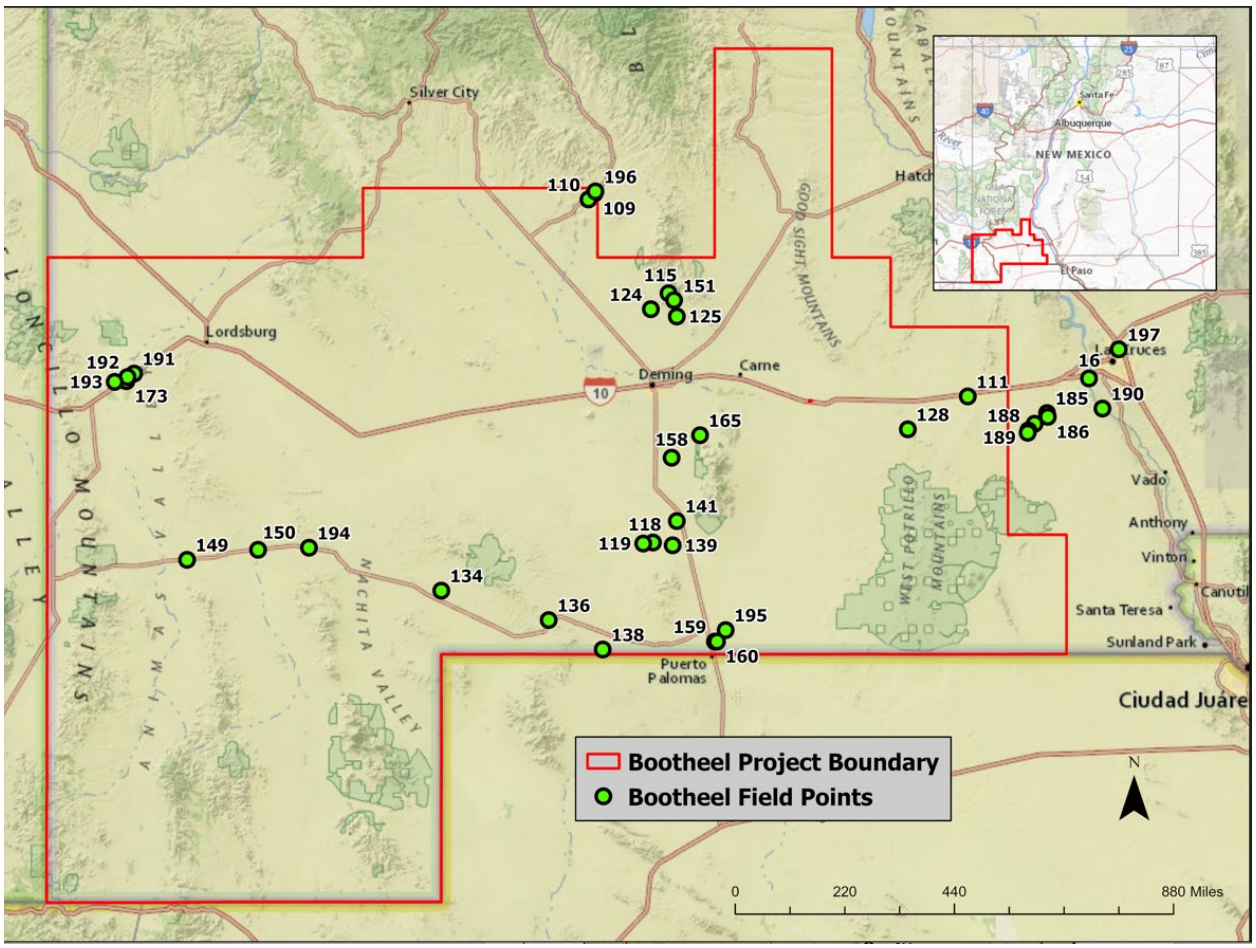

Figure 18. Locations of check-sites that were visited from the Bootheel study area during field verification draft map review. 1:1,300,000.

Figure 19. Check site #136 Bootheel. Left - Saturation is evident across the slope from left to right discharging into a basin with more permanent saturation adjacent to the cottonwoods on the right. PEM1b (Palustrine, Emergent, Persistent, Seasonally Saturated). Right - Magenta intensifying as saturation runs from slope into depression. Roughness of signature indicative of the sparse vegetation. (107°58'44"W 31°50'44"N)

Figure 20. Check site #195. Left - Obligate wetland vegetation present at this site, combined with the recurring presence of waterfowl in April as well as October, led to the decision of a Semi-permanently Flooded regime. PEM1F (Palustrine, Emergent, Persistent, Semi-Permanently Flooded). Right - South of point, the scraggly red signature across the depressional area is used to identify areas inundated with flooding. Evidence of artificial flooding in the pond north of the road. (107°36'6"W 31°49'39"N)

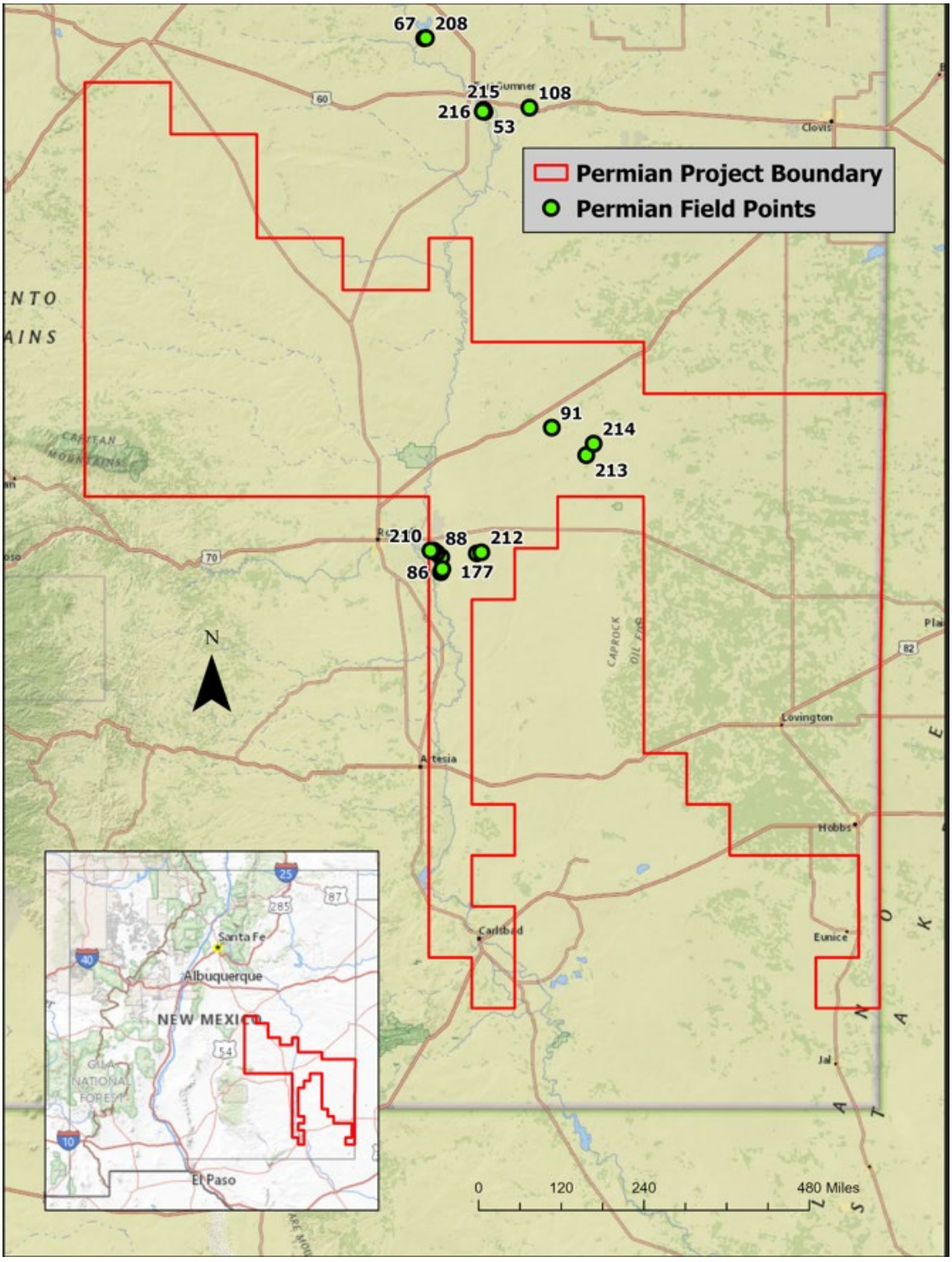

Figure 21. Locations of check-sites that were visited from the Permian project area field verification draft map review. 1:1,300,000.

- Two Technical Advisory Committee workshops were held on Thursday, February 24, 2022 and Wednesday, March 2, 2022. In these 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. A total of 90 participants attended these meetings.
- SWQB Wetlands Program 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 draft version of the Story Map was completed.
- NWI mapping of the project areas were completed by GSS under the original contract on April 30, 2022. NWI mapping was delivered to both NMED and USFWS National Wetlands Inventory Regional Coordinator, Gary Hunt, for review on May 02, 2022. The original contract with GSS ended June 30, 2022.
- A small purchase contract with Saint Mary's University of Minnesota Geospatial Services (GSS) was signed on August 8, 2022 for the completion of the contractual tasks for this project.
- Draft data review was completed by Gary Hunt of the USFWS in June 2022 and the data were finalized for submission to the National Map based on comments received by June 30, 2022.
- GSS Analysts are adding LLWW attributes in preparation for assigning HGM codes and functional attributes to the mapping areas.
- Work is ongoing on the NM Statewide Wetland Story Map
- Davena Crosley (WPO) attended Wetlands Delineation Training presented by the Wetlands Program in cooperation with the Army Corps of Engineers, on August 23-25, 2022, at the Valles Caldera National Preserve.
- Work is ongoing on the Landscape Position, Landform, Water Flow Path and Waterbody Type (LLWW) assessment.
- Work is ongoing on the Statewide Wetlands Story Map titled, "Wading into Wetlands of New Mexico".
- Map and class field training was conducted June 12-15
- On August 29, 2023, a no cost extension for grant CD #01F67101-1 was approved by EPA Region 6 to extend the end date to November 30, 2024.
- Work is completed on the landscape position, landform, water flow path and waterbody type (LLWW) assessment.
- Work is completed on the NM statewide Wetland Story Map
- The final wetland mapping geodatabase for the project was delivered to NMED by the contractor on August 23, 2023.

- All deliverables have been submitted by the GSS on August 23, 2023, including supplemental map information and the final report.
- Tiffany Anders is the new WPO for the project
- Because the SWQB Wetlands Program has obtained three new staff members in 2023, training under all Wetlands Program Development Grants had become a priority to familiarize all staff with project-related education and experience. The WPO, Tiffany Anders attended a number of trainings under this grant as match.
- On June 12-15, 2023, WPO Tiffany Anders, WPC Maryann McGraw organized and attended a week-long Map and Class field training under this project as project match. The training was led by GSS' Andy Robertson and USFWS' Gary Hunt, with WPO Dustin Nelson and WPO Codie Vileno, NMED GIS specialist Phil Polzer and former Wetlands Program Staff Karen Menetrey. The Map and Class field training was to familiarize new WPOs and NMED GIS Specialist Phil Polzer with the Mapping and Classification process.
- WPO, Tiffany Anders, presented "Mapping and Classification of the Bootheel and Permian Basin" and displayed the story map at the Southern Wetlands Roundtable on December 14, 2023.
- An NMED Weekly Activity Report was created to advertise the completion of the Story Map "Wading into Wetlands."

Figure 22. Wading into Wetlands of New Mexico Story Map cover page.

- The WPO created an outreach plan so that outreach can be accomplished during the remainder of this project.
- Maps for all 35 NM State Parks were completed and provided to NM State Parks Division of Energy, Minerals and Natural Resources Department.
- The WPC and WPO created a letter to accompany distribution of NM Wetland mapping products.
- The WPO attended a Hazardous Substance H2S training put on by NMED.
- Shinya Burck is the new WPO for the project as of June 2024

- A small purchase contract with Saint Mary's University of Minnesota Geospatial Services (GSS) was executed on the 19th of September (contract # 25-667-2060-43635) to conduct outreach for the project.
- The first of two kickoff meetings for conducting "Outreach and Transfer of Results for Mapping and Classification of Wetlands in the Bootheel and Permian Basin" outreach project was conducted with GSS and Rio Grande Return staff on September 27, 2024.
- Mapping of the Bootheel and Permian Basin under this grant is now available at: Wetlands Mapper | U.S. Fish & Wildlife Service
- Saint Mary's University of Minnesota Geospatial Services (GSS) submitted a schedule of meetings under contract Task 1 to be reviewed by Wetlands Program staff on October 3, 2024.
- A "Bootheel and Permian Basin Wetlands Outreach Fact Sheet" was created by Rio Grande Return and reviewed and approved by the WPC for use at outreach events.
- In-person outreach to eight entities in southern New Mexico under the "Outreach and Transfer of Results for Mapping and Classification of Wetlands in the Bootheel and Permian Basin Project" (contract # 25-667-2060-43635) was conducted October 14 – 18, 2024.

Figure 23. Outreach meeting at Carlsbad SWCD.

Figure 24. Depressional Wetlands at Bosque Redondo Lake, Fort Sumner. Image taken by GSS during outreach week in southern New Mexico.

- A presentation to NM Highlands University's Watershed Management Class was given on November 11, 2024 as part of the outreach effort.
- Andy Robertson of GSS presented "New Mexico: Where the Wetlands Are, Turns Out There's A Lot" at the NM Southern Wetlands Roundtable on November 19th, 2024.
- Work under this small purchase contract for "Outreach and Transfer of Results for Mapping and Classification of Wetlands in the Bootheel and Permian Basin Project" with Saint Mary's University was completed by November 30, 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-Story map "Mapping and Exploring Southern New Mexico Wetlands" can be accessed at https://storymaps.arcgis.com/stories/66cf61eb52da4aa780550efc8a249f99

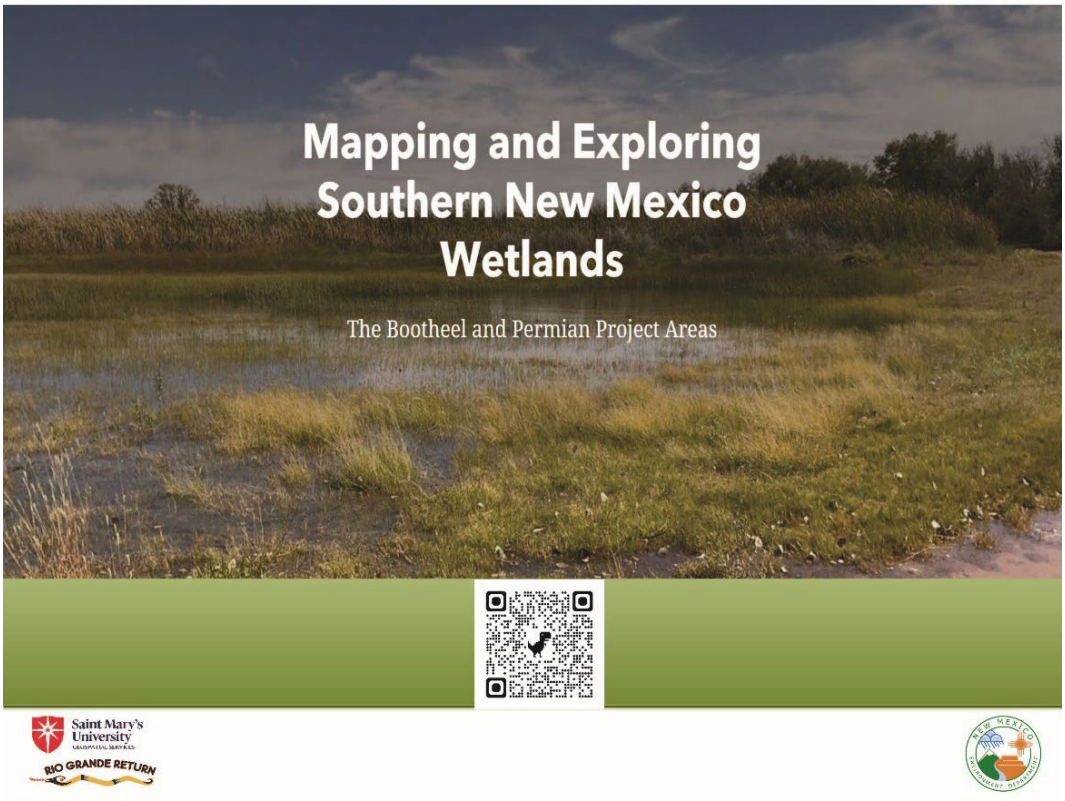

Figure 25. Story Map created for the Bootheel and Permian Basin Outreach Project.

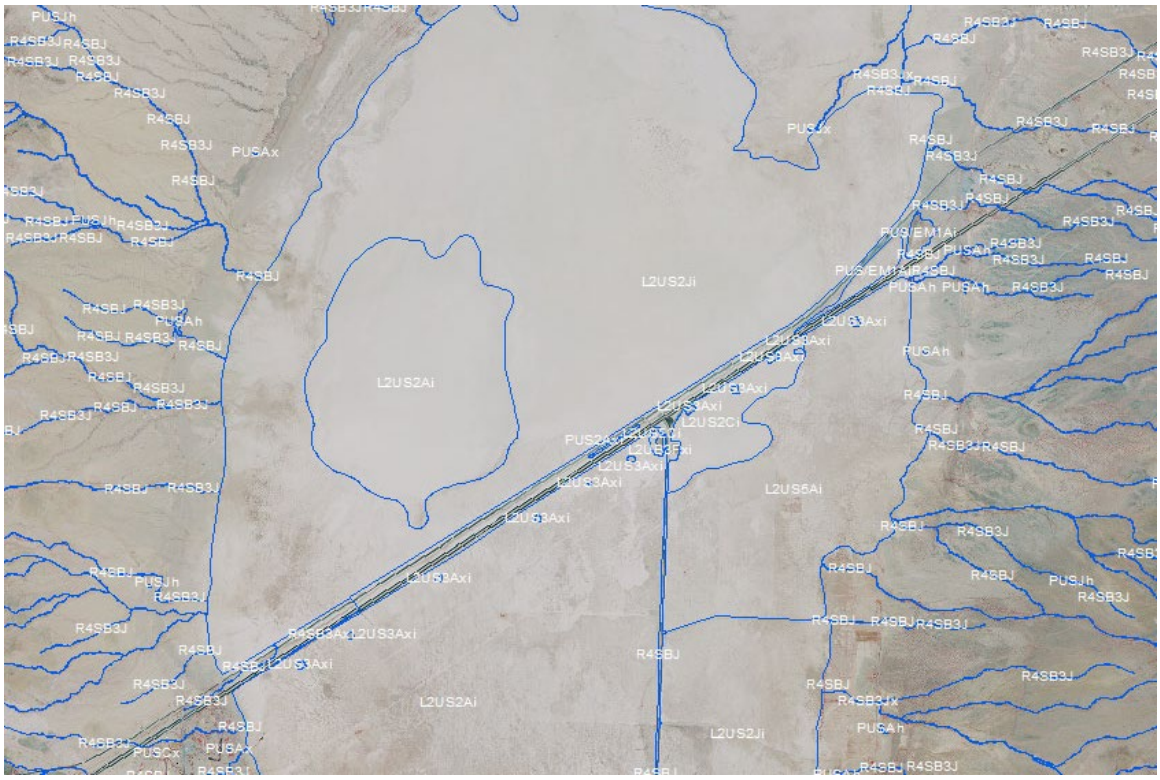

Figure 26. NWI mapping of the Lordsburg Playa, Bootheel project area.

List of Major Deliverables

- Geodatabase assembled
- Cowardin, Riparian, LLWW and HGM classified maps
- Contractor Quarterly Reports
- Pre-mapping and post-mapping field Trip Summary Reports
- Technical Advisory Committee Reports
- Geology Units and Groundwater function Ratings for the Bootheel and Permian Basin
- Outreach Plan
- Outreach Presentation, Fact Sheet and Report
- NM State Parks Wetlands Maps
- Statewide Wetlands Story Map
- Presentations at the Southern Wetland Roundtable and to Highlands University
- Mapping published on SWQB Wetlands Mapper
- Bootheel and Permian Basin Story Map
- MOA 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 tasks.

Both in the Bootheel and Permian Basin, depressional wetlands and mineral soil flat wetlands were identified that will need more research to fully understand water sources and water regime to better classify and protect these invaluable resources.

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 southern New Mexico, which experienced severe to extreme drought conditions, 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 outreach meetings were principally conducted in-person and used presentations and fact sheets to distribute information to already established interest groups which was also very successful. An important outcome of this project is to distribute mapping information to groups, stakeholders and individuals that can use them. 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.

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. 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. Presentations were made to college students at Highlands University, and at the Wetlands Roundtables. 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). The development of an outreach plan and then implementing that plan reached many groups and individuals in the mapping areas. 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. Also, many wetlands in southern New Mexico were identified that needed further research due to their unique and poorly understood characteristics. These wetlands should be recommended for further study, monitoring and research.