

# FINAL REPORT

## Mapping and Classification of Wetlands in the Lower Rio Grande Basin

*Assistance Agreement CD# 01F39701 (FY2017)*



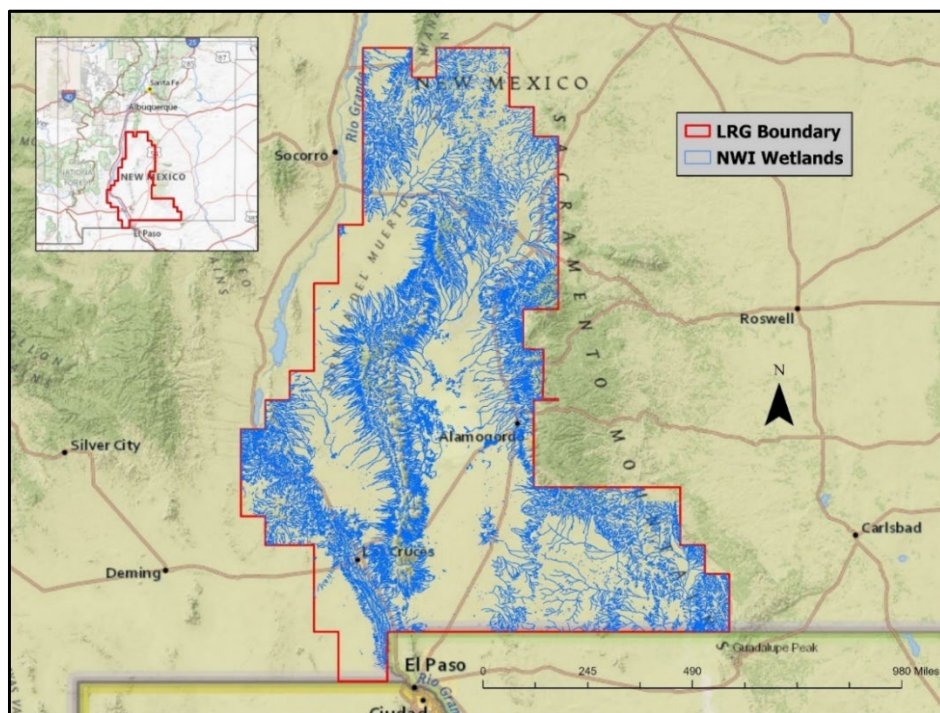
Wetlands at White Sands National Park – October 2019

**New Mexico Environment Department  
Surface Water Quality Bureau  
Wetlands Program  
October 2022**

## Project Goals and Objectives

The New Mexico Environment Department Surface Water Quality Bureau Wetlands Program (SWQB Wetlands Program), in cooperation with Saint Mary's University of Minnesota Geospatial Services (GeoSpatial Services), undertook this project with the goal of performing new wetlands mapping and updating existing wetlands mapping for South Central New Mexico as part of an overall statewide wetlands mapping effort. Objectives of the project were to update the US Fish and Wildlife Service National Wetland Inventory (NWI) in the Lower Rio Grande project area, and apply additional wetland classifications consistent with prior mapping projects in New Mexico and used by the SWQB Wetlands Program for a variety of applications. Additional classifications applied to mapped wetlands included the Landscape Position, Landform, Waterflow Path and Waterbody Type (LLWW) Classification (Tiner 2014), the Riparian Classification System (USFWS 2009), and the Hydrogeomorphic Classification System (HGM) (Brinson 1993). A Wetlands Functional Assessment to identify and rank 12 important wetland functions for wetland types was also completed.

Additional objectives were to engage interested stakeholders in the wetland inventory process through Technical Advisory Committee meetings and wetland mapping webinars, and to promote the use of the mapping products. Contributions to an ArcGIS StoryMap© as a tool for ongoing outreach was undertaken as well as updating the NMED Wetlands Map [OpenEnviroMap \(nm.gov\)](https://openenviromap.nm.gov). A nomenclature system for identifying individual wetland assessment units (AUs) in preparation for developing wetland standards was applied to HGM subclasses of wetlands throughout the project area.



**FIGURE 1. MAP OF LOWER RIO GRANDE PROJECT AREA AND MAPPED WETLANDS IN BLUE. (NOTE AT THIS SCALE, MAPPED WETLANDS POLYGONAL FEATURES ARE EXAGGERATED FOR VIEWING.)**

## Description of the Project

The SWQB Wetlands Program worked with GeoSpatial Services as a contractor to map and classify wetlands in the Lower Rio Grande Basin below Caballo Reservoir, the San Andres and Organ Mountains, Chupadera and Otero Mesas, the Salt Basin, and contiguous areas in south central New Mexico. Mapping was performed in accordance with 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). In addition, wetlands were coded in accordance with LLWW mapping classification (Tiner 2014) which includes recommended descriptors for arid lands wetlands. The LLWW Classification provided geomorphic mapping data for assigning HGM wetland subclasses (Brinson 1993) to wetlands throughout the mapping area. Mapping is at 1:12,000 with a minimum mapping resolution of at least one-half acre and complies with the Federal Geographic Data Committee (FGDC) Wetlands Mapping Standard (FGDC-STD-015-2009). A Technical Advisory Committee was established to provide expertise and local knowledge, to help review the wetland function correlation table, and to ensure proper application of wetland water regimes and LLWW to project area wetlands.

New Mexico is in the process of developing the New Mexico Rapid Assessment Method (NMRAM), which combines the assessment of wetland condition and function for restoration, planning, and regulatory applications. NMRAM uses HGM subclasses to identify discrete types of wetlands for NMRAM development; HGM subclasses are also used to identify wetlands for AU naming purposes. Ecological functions were assigned and ranked by wetland type to be used for developing wetland water quality standards designated uses. SWQB Wetlands Program staff participated in the NM Geospatial Advisory Committee (GAC) and the National Wetlands Mapping Consortium 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. This project was necessary for the SWQB Wetlands Program to continue program development and capacity-building in south-central New Mexico.

## Project Outputs

Project outputs include:

- 1) Mapping and Classification for upload to NWI is completed for approximately 8.9 million acres (~226 US Geological Survey 1:24,000 quadrangle equivalents) and uploaded on the USFWS NWI V.2.0 for national use. The project area is just under 8.9 million acres in size. Based on the final wetland mapping using the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979), 8,745,555 acres (~98.5%) of the study area is upland habitat and 133,438 acres (~1.5%) is a combination of wetland, deepwater habitat, and riparian area habitat. Riverine system wetlands make up 54.4% of the wetlands, palustrine 44.8%, and lacustrine 0.8% (Allen et al., 2002). Nearly 25,200 polygons representing wetlands greater than one-quarter acre in size (FGDC 2009) were mapped and classified, totaling 131,346 acres (205 sq mi). The polygonal wetland features and deepwater habitat features include marshes, floodplains, cienegas, lakes and ponds, playas, and rivers. Additionally, 522 riparian polygonal features equaling

approximately 2,092 acres (3.3 sq. mi) of riparian areas were captured and mapped using the *System for Classification of Riparian Areas in the Western United States* (USFWS 2009) (Allen et al 2022).

2) During the project period, the USFWS NWI adopted new mapping requirements called NWI Version 2.0. All mapping for the project area was updated by GeoSpatial Services (under a no-cost contract amendment) to NWI Version 2.0 mapping requirements late in the mapping process so that the mapping would be accepted for the NWI mapper. In addition, the USFWS agreed to update to NWI 2.0 requirements previously completed mapping adjacent to the Lower Rio Grande Project quads at no cost to the SWQB Wetlands Program.

3) The LLWW Classification was applied, and the mapped wetlands were then assigned to one of several regional HGM wetland subclasses. As part of this process, the project team worked jointly to develop a method of querying combinations of NWI and LLWW coded wetlands and other spatial layers (e.g., elevation bands representing alpine, montane and lowland ecoregions and confined and unconfined riverine valleys) to assign wetlands to a New Mexico HGM Regional Subclass. The wetland polygons mapped in the LRG project area fell into five HGM classes and 14 HGM subclasses (Table 1). Among the five classes, riverine wetlands were most common, with nearly 56% of total polygons and 45% of wetland area. Depressional was second most common, comprising 43% of polygons but over 52% of total area. Lacustrine fringe took up the least area at less than 0.1%. 61 Among Riverine subclasses, episodic wetlands were most prevalent, making up 51.8% of all wetland polygons and approximately 41% of total area. Playa Depressional wetlands were 19% of total polygons and nearly 45.2% of total area. Slope wetlands were least common, with <0.1% of polygons and wetland area (Allen et al 2022).

Based on collateral data, ground-truthing and knowledge of the landscape by NMED SWQB staff, GSS staff and the Technical Advisory Committee, modifiers were also applied to the HGM subclasses.

**TABLE 1. HGM REGIONAL SUBCLASSES FOR NEW MEXICO.**

<b><i>Riverine Class</i></b>	<b><i>Depressional Class</i></b>	<b><i>Slope Class</i></b>
Episodic Riverine	Artificial Depressional	Spring-fed Slope
Lowland Confined Riverine	Natural Depressional	Headwater Slope
Lowland Unconfined Riverine	Playa Depressional	Other Slope
Montane Confined Riverine		
Montane Unconfined Riverine		
	<b><i>Flats Class</i></b>	<b><i>Lacustrine Fringe Class</i></b>
	Mineral Flats	Lacustrine
	Organic Flats	

4) A functional correlation was applied to the wetlands. Twelve select ecological functions (Table 2) that can be identified from mapping data and applied to the semiarid region of the project area, were mapped based on a ranking of moderate or high functioning. A series of functional assessment maps were then produced, one map for each of the twelve functions in the project area. These data can then be sourced for wetland types for water quality standards designated uses. Results from the wetland functional assessment indicated that Groundwater Recharge (GR) and Other Wildlife Habitat (OWH) were the most common wetland functions performed at a high level in the project area and were performed by over 90% of all wetland acreage. Performance of Surface Water

Detention (SWD) at a moderate level was also common, representing 45% wetland acreage. The least common functions performed include Bank and Shoreline Stabilization; Streamflow Maintenance (SM); and Unique, Uncommon, or Highly Diverse Wetland Plant Communities (UWPC) (Allen et al 2022). Although these three functions were the least common, where they were identified they ranked moderate or high.

<b>Table 2</b>
<b>FUNCTIONAL ASSESSMENT FOR MAPPED WETLANDS</b>
<b>Surface Water Detention</b>
<b>Streamflow Maintenance</b>
<b>Groundwater Recharge</b>
<b>Bank and Shoreline Stabilization</b>
<b>Nutrient Transformation</b>
<b>Carbon Sequestration</b>
<b>Unique, Uncommon or Highly Diverse Wetland Plant Communities</b>
<b>Sediment and Other Particulate Retention</b>
<b>Aquatic Invertebrate Habitat</b>
<b>Waterfowl and Waterbird Habitat</b>
<b>Fish Habitat</b>
<b>Other Wildlife Habitat</b>

**TABLE 2. HGM CLASSIFIED WETLAND POLYGONS ARE IDENTIFIED BY THE FUNCTIONS THEY PROVIDE FROM THIS TABLE AND FOR EACH OF THESE FUNCTIONS THEY ARE RATED MODERATE OR HIGH.**

5) Mapping and classification for NWI, LLWW, HGM and functional correlation will be added to the NMED Interactive Wetlands Map at: <https://gis.web.env.nm.gov/oem/?map=wetlands>. The mapping geodatabase is available upon request to the NMED Wetlands Program.

6) Post-mapping field reports and a Contractor Final Report were prepared by GeoSpatial Services and are available upon request to the NMED Wetlands Program.

7) A draft Statewide wetlands StoryMap was prepared. Upon completion it will be posted to the NMED Wetland Program webpage: <https://www.env.nm.gov/surface-water-quality/wetlands/>.

8) Classified wetland segments were named for the project area and will be used to develop wetland water quality standards.

9) To complete match requirements for this project, the SWQB Wetlands Program and GSS developed and conducted virtual Wetlands Mapping Webinars which were also recorded. The virtual mapping webinar format has been added to the outreach toolbox for the SWQB Wetlands Program.

## Project Outcomes

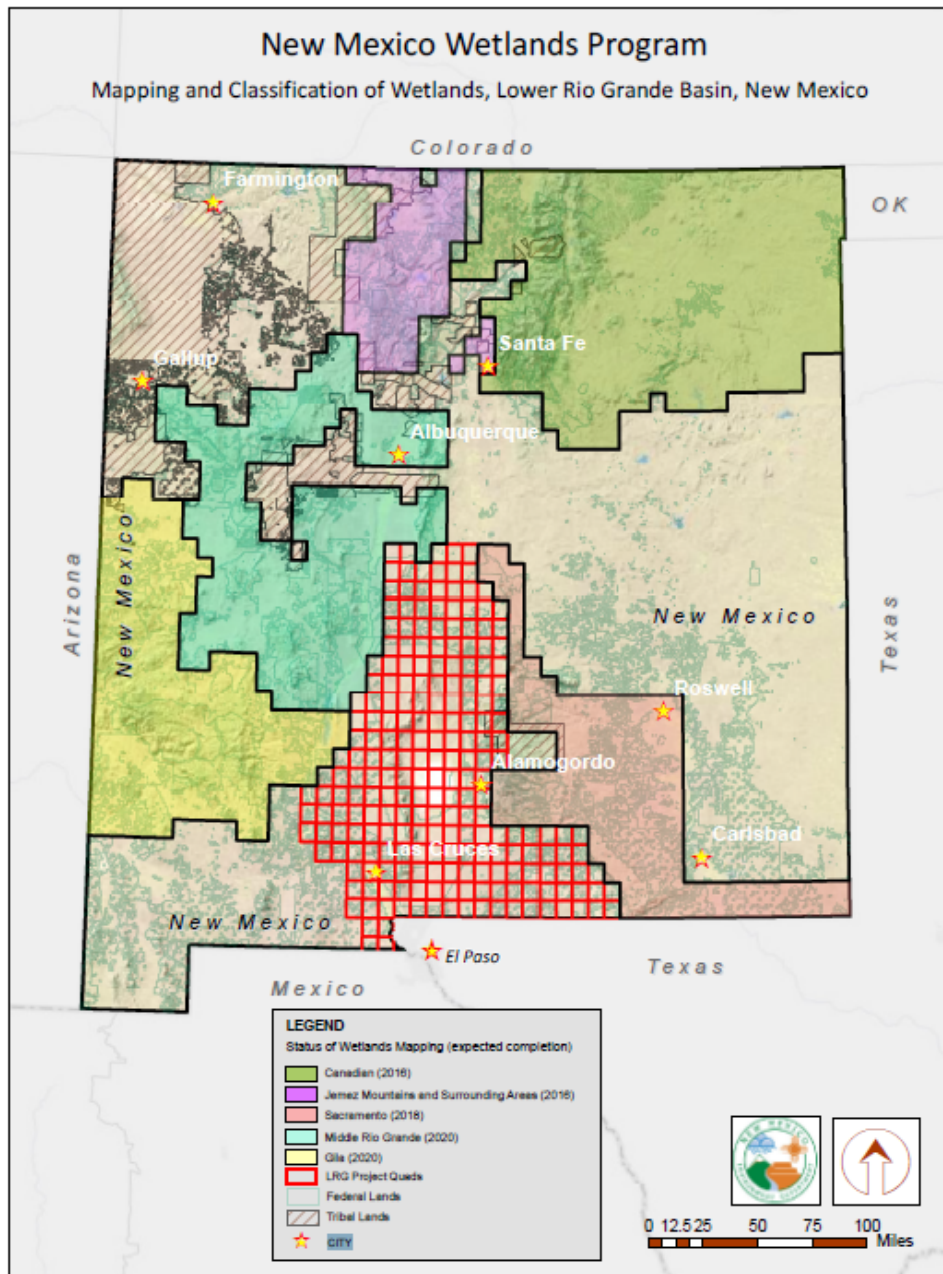
Project outcomes include:

- New and updated wetland mapping information is now available for use by the public. These data will foster and increased understanding of the location, extent, and type of wetlands in the project area on a landscape scale for an area that comprises over 11% of the State of New Mexico. The inclusion of up-to date mapping of New Mexico in the National Wetlands Inventory and on the NMED Wetland Map improves these datasets by providing more accurate map data than older mapped data, and areas of the NWI mapped by the Scalable Mapping initiative.
- Results from the wetland functional assessment indicated that Groundwater Recharge (GR) and Other Wildlife Habitat (OWH) were the most common wetland functions performed at a high level in the project area and were performed by over 90% of all wetland acreage. Performance of Surface Water Detention (SWD) at a moderate level was also common, representing 45% wetland acreage. The least common functions performed include Bank and Shoreline Stabilization; Streamflow Maintenance (SM); and Unique, Uncommon, or Highly Diverse Wetland Plant Communities (UWPC). These results can inform land managers, local watershed groups and the public about what functions wetland types perform, their ability to perform important functions at moderate to high levels, and the need to protect wetlands for the functions they provide.
- The mapping and classification data was used to inform the application of classified segments for wetland water quality standards based on wetland HGM subclasses described through the mapping process. This effort is furthering the development of water quality standards for New Mexico's wetlands as well as creating an example for other states. This project provides the supporting data and information needed to take the next steps for developing water quality standards for subclasses of New Mexico's wetlands resources.
- As future wetlands mapping and classification projects are completed, an iterative monitoring program linked to water quality assessments by watershed will continue to be developed and will increase the capacity and understanding of ecological linkages, natural variability and changes that result from human activities.
- Mapping and classification projects are filling a critical data gap for an integrated and comprehensive approach to wetlands protection by SWQB and its partners.
- The oversight of mapping and classification wetlands data at NMED will provide the capability to combine wetlands analysis and results with other SWQB water quality programs that will result in overall improvement to water resources of the State.
- Participation by the WPO in the NM Geospatial Advisory Committee advanced the use of wetlands mapping and classification, provided a forum to share mapping resources, prevents duplication of efforts, pools funding, and keeps wetlands mapping current.
- The maps, HGM classification, literature search and Technical Advisory Committee advanced the implementation of NM Rapid Assessment Method (NMRAM) development in southern New Mexico.
- The creation of a Statewide Story Map provides a tool that can be accessed and understood by classrooms, students and the public as well as informing land managers, restoration practitioners and others interested in wetlands. The Statewide Story Map will increase understanding and empathy for wetland resources.
- Updated and improved wetlands mapping fills a critical gap in wetland planning, and facilitates improved development of Wetlands Action Plans which results in improved ecosystem understanding and long-term protection.

- The use of virtual formats during COVID stay-at home orders turned out to be an exceedingly effective tool for outreach in a state as large as New Mexico. Technical Advisory Committee meetings and Mapping and Classification webinars will continue to inform and educate stakeholders who cannot travel long distances to attend in-person meetings, increasing the number of people participating in wetland mapping documentation and trained in using mapping data.

## Project Location

The project is located in South Central New Mexico, including the Lower Rio Grande below Caballo Reservoir, watersheds of the San Andres and Organ Mountains, and Chupadera and Otero Mesas and the Salt Basin. 8-digit HUCs: 13030102, 13030103, 13050003, 13020210, 13050001, 13020211, 13050004, 13020203. The project area spans nearly 8.9 million acres, creating an irregular-shaped rectangle comprised of 226 USGS 1:24,000 quadrangle equivalents (quads), excluding Native American tribal lands. The project area stretches from the Mountainair area in the North to the state border in the south, including portions of Torrance, Lincoln, Sierra, Socorro, Doña Ana, Otero, Luna, and Chaves counties. The majority of the project area lies on the eastern side of the Rio Grande.



**FIGURE 2. LOCATION MAP SHOWING THE LOWER RIO GRANDE PROJECT AREA WITH RED QUADRANGLES, IN RELATION TO PRIOR WETLAND MAPPING PROJECTS.**

## Original Timeframe

The grant for this project was partially awarded (\$30,890.00 federal) on September 6, 2017 with an October 1, 2017 start date. The grant award was amended on July 23, 2018 adding the remaining federal amount to full award. A no-cost grant amendment was approved on July 28, 2021 to extend the budget period to October 1, 2022. The extension period was used to complete work products to include NWI Version 2.0 requirements and to complete tasks that were delayed due to Covid pandemic restrictions.



# Funding

The original federal funding amount was **\$354,353.00** and the original match was **\$125,577.00**. The final federal amount spent was **\$314, 233.78** and the final match amount was **\$128,085.68 (\$2,508.68 overmatched)**. The unused federal funds were principally due to Wetlands Program Project Officer vacancies during the project period.

## Partners Involved

Below is a list of partners involved in the project and their titles.

### **Saint Mary's University of Minnesota, GeoSpatial Services (Contractor)**

Andy Robertson, Director/Project Manager

John Anderson, Image Analyst/Mapper

David Rokus, QA/QC Specialist

Zach Ansell, GIS Analyst

Josh Balsiger, GIS Analyst

Kathy Allen, GSS Final Report Author

### **US Fish and Wildlife Service:**

Gary Hunt, Regional Wetlands Coordinator

### **White Sands National Park**

David Bustos, Chief of Resources, National Park Service

Patrick Martinez, Biological Science Technician, National Park Service

### **Technical Advisory Committee Participants**

#### **October 8, 2019, In-Person TAC meeting**

1. Mike Gaglio, High Desert Environmental
2. Hope VanBrocklin, City of Sunland Park
3. Beth Bardwell, citizen and owner of wetland in the project area
4. Elizabeth Verdecchia, USIBWC

#### **April 27, 2022, Virtual TAC meeting**

1. Johnny Chavez, Valencia SWCD
2. Alan Klatt, SWQB
3. David Baker, USDA
4. Liza Yazzie, USBR
5. Kurt Anderson, Sierra Club
6. Michele Gallagher, USBR
7. Adrian Coppage, EPA
8. Corinne Fox, Tetra Tech

9. Levi Dean, SWQB
10. Cassidy Steckbeck, USBR
11. Jason Martinez, SWQB
12. Susan A. LucasKamat, SWQB
13. Santiago Misquez, NRCS
14. R Sanchez, USBR
15. Eric Gonzales, USBR
16. Yasmeen Najmi, MRGCD
17. Chelsey Sherwood, EPA
18. S Woods, USBR
19. Emily Toczek, SWQB
20. Tim Lyons, Biopark Society
21. Kyla Chandler, EPA
22. Davena Crosley, SWQB
23. Emile Sawyer, SWQB
24. Breanne Klockzien, EPA
25. Lynette Giesen, USBR
26. Nori Koehler, USDA
27. Jony Cockman, BLM
28. Loribeth Tanner, EPA
29. Rob Peters, Defenders of Wildlife
30. Cameron Weber, Rio Grande Return
31. Elizabeth Verdecchia, USIBWC
32. Rachel Jankowitz, SWQB
33. Scott Hebner, Bur Reclamation
34. Jennifer Fullam, SWQB
35. Lucas Graunke, SWQB
36. Susan Styer SWQB
37. Iftikhar Islam, SWQB
38. Mike Freehling, UNM
39. J Branum, USBR
40. Miguel Montoya, SWQB
41. Brianna Wadley, EPA
42. Linnea Spears-Lebrun, SWCA
43. Earl F. Burkholder, Global COGO, Inc.
44. John Rihs, USDA
45. Katie Kruthaupt, NMDA
46. Laura Mae Eaton, Defenders of Wildlife
47. Daniel Guevara, SWQB
48. Jacqueline Tilligkeit, SWCA
49. Madeline Miller, Valencia SWCD
50. Gwen Kolb, USFWS
51. Michael Porter, USACE
52. Martine Quintana, Audubon
53. Charlie J, NMSU
54. Karen Menetrey, GWQB
55. Roy Jemison, USFS

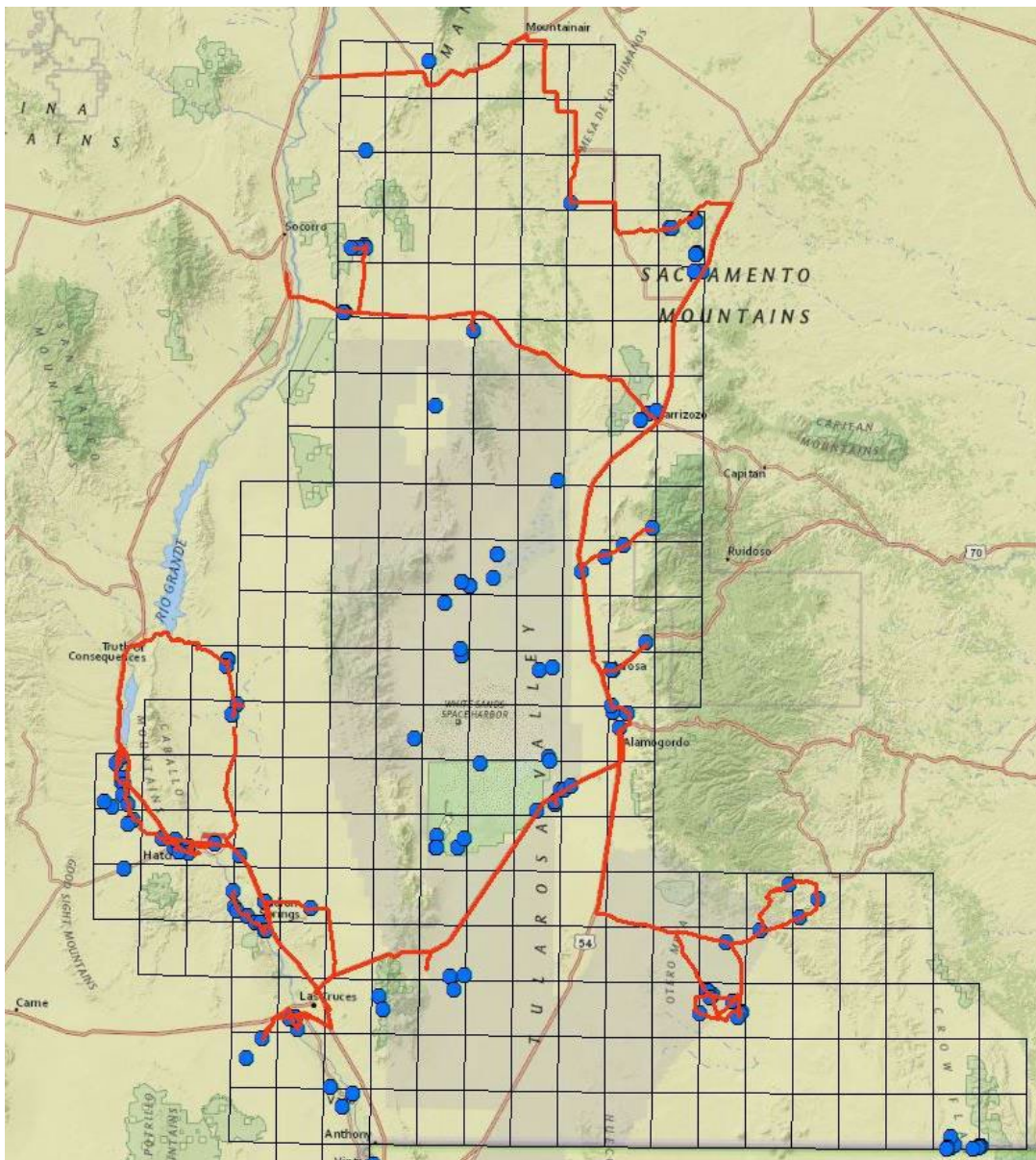
56. Katie Sandbom, USFWS
57. Grace Haggarty, NMOSE
58. Diane Van Hoy, NMOSE
59. Ariel Elliott, USFWS
60. Josh Holguin, NMDOT
61. Lisa Haynes, Univ Arizona
62. Dana Price, USACE

## Project Highlights and Chronology

- Partial funding in the amount of \$30,890.00 was awarded to NMED in October 2017. Karen Menetrey was assigned as the Project Officer (WPO) for the project. Maryann McGraw was the Wetlands Program Coordinator (WPC).
- Contract #18-667-2060-0018 was approved on February 22, 2018 with GeoSpatial Services for wetland mapping and classification. The contract provided a price structure and allowed for the addition of subproject areas through contract amendments, but the Lower Rio Grande subproject was not initially included because full funding was not available.
- After EPA awarded partial funding to NMED in the amount of \$30,890.00 in October 2017, EPA then awarded the remainder of the grant budget of \$323,463.00 in August 2018.
- EPA approved the QAPP (QTRAK #18-283) that includes this project on April 5, 2018 with an expiration date of April 5, 2021.
- The Wetlands Mapping and Classification contract #18-667-2060-0018 was amended (Amendment 18-667-2060-0018 A2) to add the Lower Rio Grande Subproject to the contract, as well as two other subprojects.
- The WPO coordinated with the US Bureau of Land Management (BLM) regarding their ongoing update for wetlands mapping on BLM lands in the western United States. The state and federal programs worked together to share data, promote consistency and prevent duplication of efforts.
- The WPO gathered technical information (collateral data) on wetlands in the project area and shared it with the GeoSpatial Services, including:
  - Shapefiles for International Boundary Water Commission restoration sites along the Lower Rio Grande
  - Shapefiles and a data report for wetlands on Holloman Air Force Base
  - Report on ground water at White Sands National Park
  - A research report on playas at Jornada Experimental Range
  - Shapefiles for New Mexico Rapid Assessment Method Lowland Riverine Wetlands data

- The WPO scheduled a Technical Advisory Committee meeting for October 8, 2019 in Las Cruces and invited federal, state and local agencies, conservation organizations and other interested persons.
- The WPO assisted GeoSpatial Services with selecting 152 check sites and the route for a pre-mapping field trip for October 2019. See Figure 3. The primary purpose of the pre-mapping field trip was to assist the GeoSpatial Services image analyst with recognizing the photographic signatures of various wetland types versus upland sites, which he could then apply throughout the project area. On-site assessments consist of comparisons of imagery signature keys, color, tone, texture, shape, size, pattern, and elevation to the presence or absence of surface water, saturated soils, hydrophytes, hydric soils, or other evidence of flooding or ponding. Some of the general questions also asked as part of pre-mapping field work include:
  - Are surface water conditions as seen on imagery average? Above average? Below average?
  - Are surface water conditions as seen in the field average? Above average? Below average?
  - Which collateral imagery or other data would be useful in resolving signature questions?
  - Are there other local resources available?

Typically, such questions would be resolved onsite collaboratively among the field mapping team.



**FIGURE 3. PRE-MAPPING FIELD TRIP CHECK SITES. RIO GRANDE RUNS NORTH-SOUTH SHOWN ON THE LEFT SIDE OF THE FIGURE. WHITE SANDS NATIONAL PARK IS THE GREEN POLYGON IN THE SOUTH-CENTRAL PART OF THE FIGURE. LINES IDENTIFY USGS QUADRANGLES WITHIN THE PROJECT AREA. THE BLUE DOTS ARE PROPOSED CHECK SITES, AND THE RED LINES INDICATE THE ROUTE TAKEN. FOR EACH CHECK SITE, GEOSPATIAL SERVICES MADE A FIELD MAP THAT ZOOMED TO 1:24,000, WITH ACCOMPANYING CURRENT AND HISTORIC AERIAL PHOTOS FOR COMPARISON AND EVALUATION OF WETLAND VISUAL SIGNATURE.**

- The pre-mapping field trip was conducted October 7-11, 2019. Participants included the WPO, WPC, Gary Hunt from US FWS, and Andy Robertson and John Anderson from GeoSpatial Services. The mapping team visited 72 of 152 selected mapping check sites.
- A Technical Advisory Committee meeting was conducted October 8, 2019 in Las Cruces, NM. Participants were familiar with Lower Rio Grande wetlands and provided information on key mapping issues. Three people attended in person and one person attended by phone: Mike Gaglio, Owner, High Desert Plants; Elizabeth Verdecchia, US International Boundary Water Commission (by phone); Hope VanBrocklin, GIS Specialist, Sunland Park;

and Beth Bardwell, private landowner and former Director of Freshwater Conservation Programs for Audubon New Mexico. After the introductory presentation, participants examined aerial imagery of wetland areas of interest and shared knowledge about wetland flow regimes in the project area. Specifically, along the lower Rio Grande there was a question of whether overbank flow occurs in low areas along the riverbanks that are populated by woody riparian vegetation (primarily salt cedar). The local experts at the meeting confirmed that overbank flow does not occur, because the Lower Rio Grande is highly managed for water delivery to New Mexico irrigators and to comply with New Mexico/Texas and US/Mexico water compacts. This information applies to the entire Lower Rio Grande reach. After the meeting, Mike Gaglio and Beth Bardwell visited field check sites with the mapping team (WPO, WPC, GeoSpatial Services, and US Fish and Wildlife Service).



**FIGURE 4. MARYANN MCGRAW, MIKE GAGLIO, AND BETH BARDWELL TAKE A CLOSER LOOK AT WETLANDS ON BETH BARDWELL'S PROPERTY NEAR RADIUM SPRING, NMS. THESE WETLANDS WERE CODED PALUSTRINE (PEM) FOR THE NWI CLASSIFICATION. PHOTO LOOKING WEST.**

Examples of sites visited by the Pre-mapping Field Team are shown below.



**FIGURE 5. WETLANDS ADJACENT THE RIO GRANDE NEAR RINCON, NM CODED AS PALUSTRINE (PEM - NEAR BANK) AND (PSS - FAR BANK) FOR THE NWI CLASSIFICATION AND CODED AS RIVERINE FOR THE HGM CLASSIFICATION.**



**FIGURE 6. WETLANDS IN THE JORNADA DEL MUERTO AREA CODED AS PEM1A FOR THE NWI, AND DEPRESSIONAL FOR THE HGM CLASSIFICATION.**



**FIGURE 7. WETLANDS LOCATED AT THE SOUTHERN END OF THE SACRAMENTO MOUNTAINS CODED AS PEM1A FOR THE NWI AND DEPRESSIONAL FOR THE HGM CLASSIFICATION.**



**FIGURE 8. PONDED AREAS WEST OF THE SAND DUNES AT WHITE SANDS NATIONAL PARK INDICATE WETLANDS. IODINE BUSH WAS IDENTIFIED AS A UNIQUE HABITAT BY THE NATIONAL PARK SERVICE. WHERE VEGETATION MAP POLYGONS FOR IODINE BUSH ARE REPRESENTED BY A DISTINCTIVE SIGNATURE IN AERIAL IMAGERY AND THE VEGETATION LAYER, THOSE AREAS ARE CLASSIFIED AS PALUSTRINE (PSS1A OR WETTER) AT THE DISCRETION OF THE IMAGE INTERPRETER, AND DEPRESSIONAL FOR THE HGM CLASSIFICATION.**



- There are extensive wetlands on White Sands National Park. The Chief of Natural Resources provided access and transportation to these water resources located in a non-public part of the park.



FIGURE 9. THE WETLANDS MAPPING TEAM PREPARED FOR AN ALL-DAY WETLAND VERIFICATION TRIP AT WHITE SANDS NATIONAL PARK IN A UTILITY TERRAIN VEHICLE (UTV) DRIVEN BY PATRICK MARTINEZ, NATIONAL PARK SERVICE. PROPER SAFETY EQUIPMENT AND INFORMATION WERE PROVIDED, INCLUDING HELMETS, WATER AND A CAUTIONARY VIDEO ABOUT MAINTAINING DISTANCE FROM UNEXPLODED ORDNANCE IN THE FORM OF BOMBLETS FROM WHITE SANDS MISSILE RANGE TEST BOMBS.

- The following three vignettes highlight pre-mapping field checks and draft mapping and classification for three unique locations in the Lower Rio Grande project area where wetlands are important for ongoing scientific research in the fields of bird conservation and archeology: White Sands National Park, Percha State Park, Jornada del Muerto.
- **White Sands National Park** in the Tularosa Basin of New Mexico is famous for its white sand dunes. The sand is derived from the evaporite mineral gypsum that forms in the depression of large Pleistocene-age lakes (Lake Lucero and Lake Otero). The gypsum crystals are transported eastward by prevailing winds, where they disintegrate into sand grains and settle into dunes. Shallow ground water underlying the dunes wicks upward and helps hold the dunes in place by making the sand heavier and more cohesive. Wetlands data in the current NWI Mapper, the federal repository for NWI mapping, includes only the remnant open water playas of hypersaline Lake Lucero and Lake Otero, but the wetlands are actually more extensive.

The wetlands mapping team spent a full day conducting field checks in the non-public areas of White Sands National Park with National Park Service staff. As a result of this ground-truthing, mapping includes hundreds of acres of wetlands that would not have been identified solely through aerial imagery. Aerial imagery of this area tends to be over-

exposed and washed out due to reflection from the white sand. However, on-the-ground observance of interdunal ponds, shallow ground water in pits, and the distribution of Iodine bush (*Allenrolfea occidentalis*), a facultative wetland plant (FACW), supports an increase in mapped NWI wetland acreage. In order to map this area, collateral spatial data will be relied upon to confirm presence or absence of wetland and to more accurately classify wetland and deep water habitat, including: digital raster graphic (DRG) topographic map surface water symbols, multiple dates of imagery via Google Earth, and a vegetation layer from a study at White Sands National Park.

Below is an excerpt from the White Sands National Park website (National Park Service 2020) that illustrates the paleontological significance of this area. In addition to the mammals noted in this excerpt, archaeologists have found human artifacts and human footprints indicative of interaction with other mammals. An accurate wetland inventory will help preserve the area for future scientific discoveries.



Mammoths, ground sloths and dire wolves inhabited the Tularosa Basin during the Pleistocene epoch.

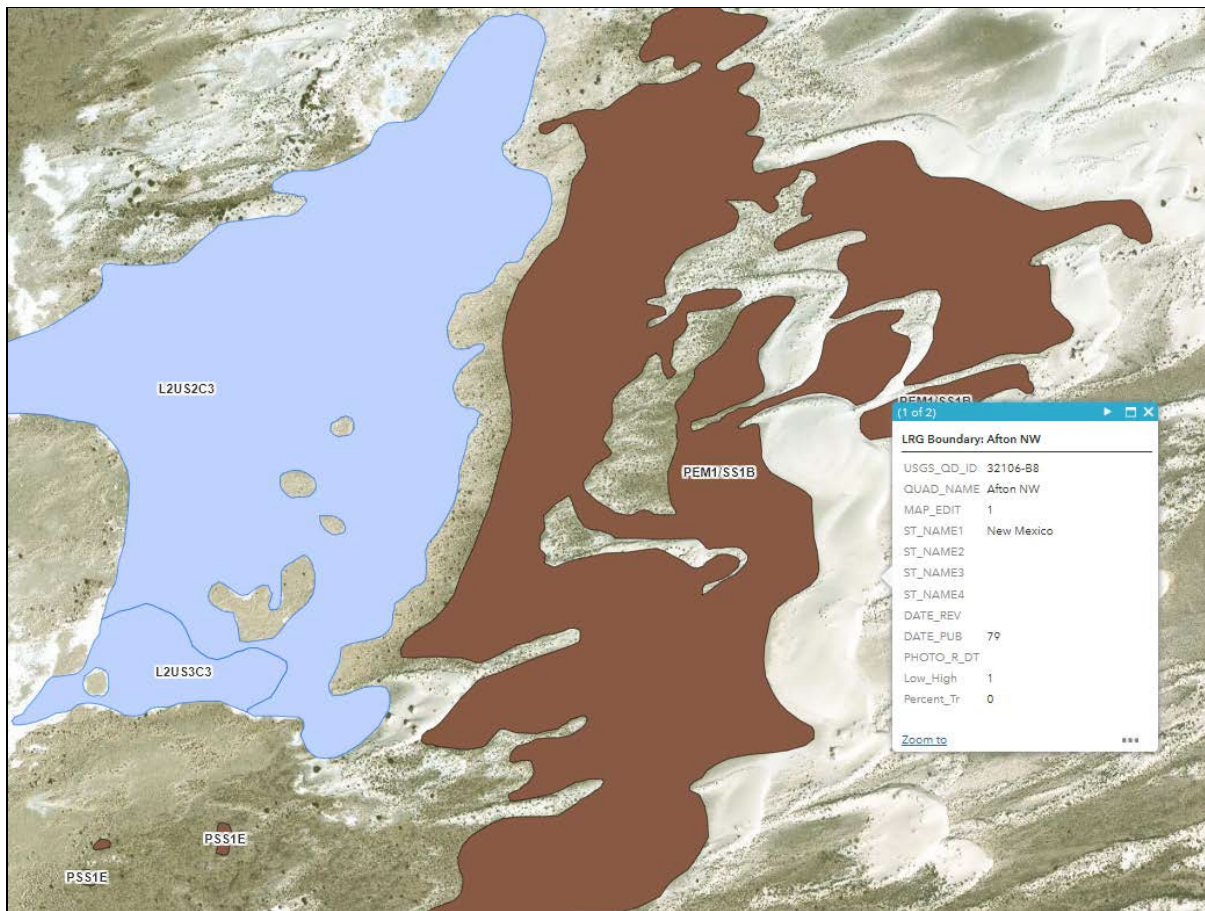
NPS Photo

Long before the world's largest gypsum dunefield formed, the Tularosa Basin looked very different. In fact, before the Pleistocene epoch ended about 12,000 years ago, there were giant lakes, streams, and grasslands here! The climate was wetter and cooler, producing a lot more rain and snow than today. All this water created one of the largest lakes in the southwest, called Lake Otero. This lake covered 1,600 square miles - that's larger than the state of Rhode Island!

Under this wetter environment, the basin teemed with life. Along with the small rodents and rabbits we have today, there were also enormous ice age mammals that roamed the shores of Lake Otero and the surrounding grasslands. Mammoths, ground sloths, ancient camels, dire wolves, and saber-toothed cats, all of these once crossed the Tularosa Basin where the white sands dunes lie today.

How do we know these incredible animals were here? Well, they left fossil footprints (trace fossils)! As these ancient giants walked the muddy shores of Lake Otero, their body weight compressed the wet clay and gypsum, creating footprints that that can be found today! In the ever-changing environment of our shifting sands, these fragile tracks are uncovered by the wind before rapidly eroding away, with many tracks having disappeared only after two years. Who knows what is still out there for us to discover?

**FIGURE 10. DESCRIPTION OF PALEONTOLOGICAL FINDINGS AT WHITE SANDS NATIONAL PARK (NATIONAL PARK SERVICE 2020).**

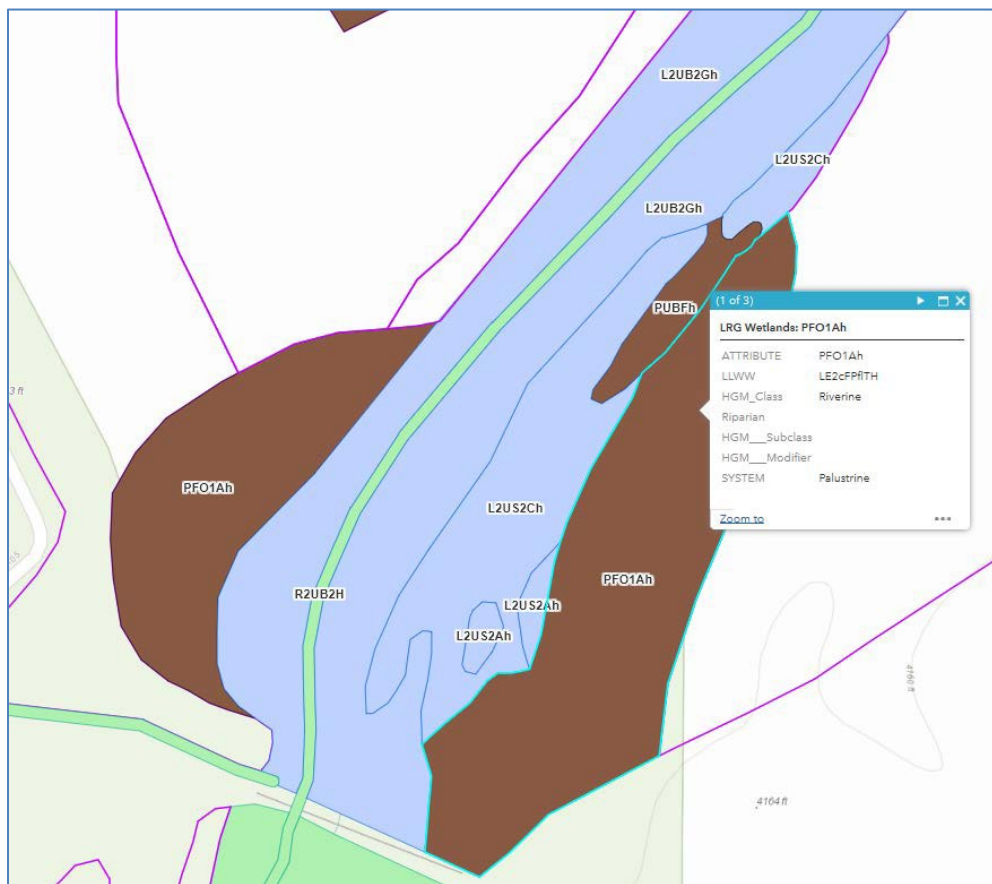


**FIGURE 11. DRAFT MAPPING SHOWS LACUSTRINE WETLANDS IN THE PRESENT-DAY PLAYA LAKE OTERO (BLUE) AND PALUSTRINE WETLANDS (PEM/PSS) ALONG THE ANCESTRAL SHORES OF THE LAKE AND INTERDUNAL AREAS OF WHITE SANDS NATIONAL PARK.**

- Percha Dam State Park** is a popular birdwatching, fishing and camping destination along the Lower Rio Grande, especially during the sweltering summer months in southern New Mexico. These recreational activities are all supported by wetlands. Percha State Park, Caballo Reservoir and Paloma Marsh to the north are recognized by the Audubon Society as an *Important Bird Area in the United States* because of the abundance and variety of birds found there (greater than 300 species) (Audubon 2013). Notably, the area is critical habitat for the federally listed threatened Western Yellow-billed Cuckoo (*Cozyzus americanus*). The following is an excerpt from the State Parks Division website about birding at Percha State Park (State Parks Division 2020). An accurate wetlands inventory will help protect this birding hot spot by documenting current conditions. *Located north of Hatch along the Rio Grande, this is one of the best places in the state for bird watching. The central area is an open bosque and is good for phainopepla, woodpeckers, flycatchers and vireos. The willow and cottonwood habitat boasts some of the best warbler watching during spring and fall migrations. The half-mile river trail is excellent for birds in all seasons. Watch the river for ducks, shorebirds and kingfishers, the bosque for passerines, hawks, owls and woodpeckers. Within a small woodland at the park, there are commonly flycatchers, woodpeckers and warblers during migration. Accipiters and falcons often seek the smaller birds here.*



**FIGURE 12. AT PERCHA DAM STATE PARK, WATER IMPOUNDED BEHIND THE DIVERSION DAM IS BOUNDED BY RIPARIAN FOREST. PHOTO LOOKING NORTHEAST (UPSTREAM FROM THE DAM).**



**FIGURE 1. DRAFT MAPPING OF THE PERCHA STATE PARK ABOVE THE DIVERSION DAM INCLUDES LACUSTRINE AND PALUSTRINE WETLANDS FOR THE NWI CLASSIFICATION. THE WHITE BARRIER ACROSS THE BOTTOM OF THE MAP IS THE DAM.**

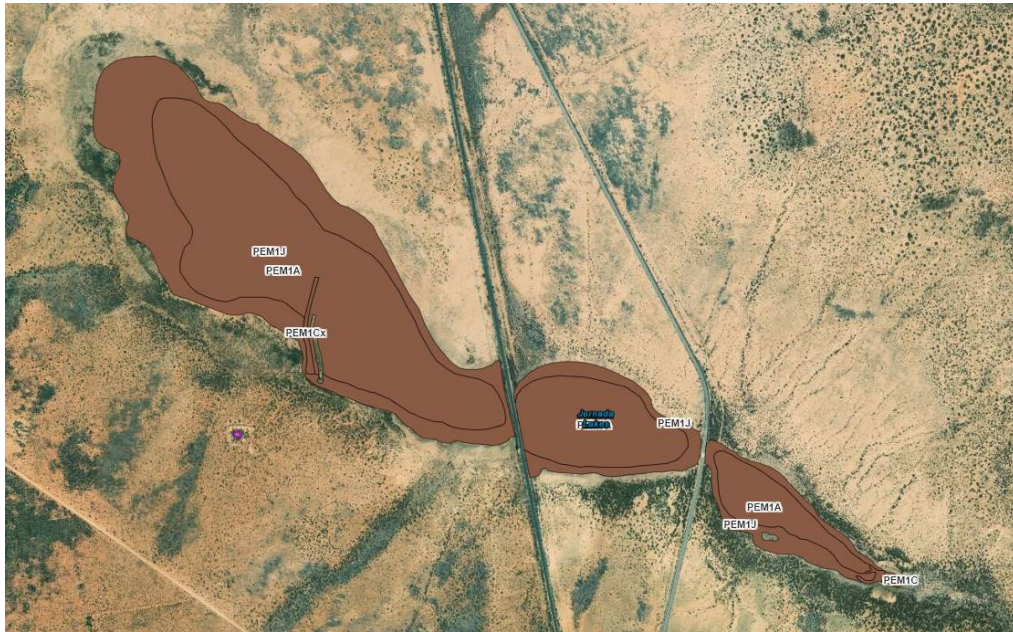
- **Jornada del Muerto**, loosely translated as “journey of the deadman,” is a 100-mile stretch of the historic camino real de tierra adentro trail that spaniards travelled between the areas now known as Mexico City to Santa Fe. In 2015 the New Mexico Bureau of Geology and Mineral Resources published a report (Newton et al. 2015) and companion poster (Kludt et al. 2015) on the hydrogeology of the Jornada del Muerto and implications for historic travelers (between approximately 1598-1885). Although this portion of the trail is very dry, there are springs that provide small reliable quantities of high-quality water. However, playas were the key water sources for large travel parties and military contingents that consisted of hundreds of people and thousands of livestock (sheep). Travel had to be timed to coincide with monsoon season and even then, there was only a moderate probability of finding enough water in the playas to support water needs of large groups.

The Jornada report and poster are examples of collateral data that provide supporting evidence for wetland mapping and assigning water regimes under the NWI classification. The following is an excerpt from the Jornada poster (Kludt et al. 2015).

*Playa lakes, when filled, have the capacity to provision large groups and herds. However, the playas did not always contain water and did not fill every year. Even if there was a good monsoon there was no guarantee that the playas would have water, since the playas only flood as a result of major storm events. We found that between September and October travelers would have a ~35% chance of finding water in the playas. During the months of August, November and December the probability of water being present drops to 20%. In other words, on average, travelers would have found water every third to fifth year.*



**FIGURE 14. JORNADA LAKE WAS RELATIVELY DRY IN OCTOBER 2019, WITH WATER PONDED ONLY IN THE CENTER OF THE PLAYA.**



**FIGURE 15. MAPPING OF JORNADA LAKE AND OTHER PLAYAS ALONG THE JORNADA DEL MUERTO INCLUDES PALUSTRINE WETLANDS FOR THE NWI CLASSIFICATION WITH A WETTER WATER REGIME IN THE CENTER AND DRIER REGIME ON THE PERIMETER INDICATING THAT THE PLAYAS.**

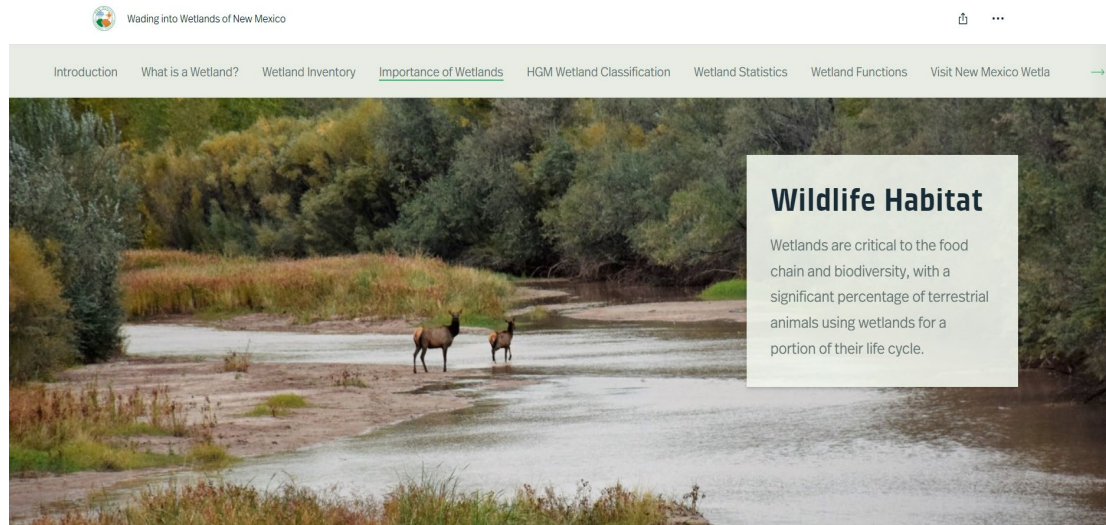
- On February 27, 2020, the WPC gave a presentation to students at Central New Mexico (CNM) Community College and answered their questions about wetlands and climate change and wetland mapping and classification. The student’s time at the class is counted as match for this project.
- A post-mapping field review and second Technical Advisory Committee meeting was scheduled for the week of March 30 - April 3, 2020, but was postponed due to COVID-19 travel restrictions.
- The Wetland Mapping and Classification QAPP (QTRAK # 20-178) was updated with a new expiration date of March 17, 2022.
- Draft mapping was updated monthly by GeoSpatial Services on a web application where the WPO was able to check progress.
- On April 17, 2020, GeoSpatial Services, the WPO and the WPC participated in a webinar conducted by the NM Bureau of Geology and Mineral Resources about hydrogeologic research in the Salt Basin, which is in the southeastern part of the project area. GeoSpatial Services gave a brief overview of the mapping and classification project.



**FIGURE 2. A PLAYA WETLAND IN THE SALT BASIN, CODED PEM1A FOR THE NWI CLASSIFICATION AND DEPRESSIONAL FOR THE HGM CLASSIFICATION.**

- In April 2020, the WPO was notified by the USFWS NWI Coordinator that new mapping requirements will need to be met in order for this mapping project to be included in the NWI mapper. Current National Wetlands Inventory is being updated to NWI Version 2.0 by the USFWS. The NWI 2.0 includes new mapping requirements that are under development by USFWS NWI staff. The WPO, WPC and contractor have conducted meetings and discussions with NWI staff in order to understand the new requirements and how much additional mapping or revisions will be needed to meet them.
- A draft of the New Mexico Statewide Wetlands StoryMap was created by the GeoSpatial Services based on content and input from the NMED Wetlands Program. <https://storymaps.arcgis.com/stories/ddb814415aad4df880bd99754cf88973>. The NMED Wetlands Program team met with the GeoSpatial Services on July 31, 2020, and October 6, 2020 to strategize, design and review content for the Statewide Wetlands StoryMap. The WPO compiled images and narrative for the first phase of the StoryMap, which focuses on describing, illustrating and locating wetlands in New Mexico according to the HGM classification system. Narrative is accompanied by maps of NM wetlands showing HGM class and functions they provide. The StoryMap also identifies

public locations where people can observe wetlands in New Mexico.



**FIGURE 17. SCREEN SHOT OF PAGE OF “WADING INTO WETLANDS OF NEW MEXICO,” A DRAFT STATEWIDE STORY MAP FOR WETLAND OUTREACH AND EDUCATION.**

- The WPO provided a mapping presentation and project description at the September 16, 2020 SWQB Watershed Protection Section staff meeting.
- The WPO attended NM Geospatial Advisory Committee (GAC) meeting in September behalf of the NMED Wetlands Program.
- The WPO prepared Geology Units and Ground Water Recharge Table for use in the Wetland Functional Correlation, and provided it to GeoSpatial Services on September 29, 2020.
- The USFWS National Wetlands Inventory 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.
- WPO Karen Menetrey left the NMED Wetlands Program in December 2020 for another position at NMED. Maryann McGraw was the WPO for this project starting December 2020.
- An Amendment #4 to the GSS contract was developed in January 2021, and is circulating NMED for final approval. The No-Cost Contract Amendment #4 for PSC #18-667-2060- 0018 A4 adds NWI 2.0 mapping updates, allows for alternative activities and deliverables due to Covid travel restrictions, and combines story map activities into a Statewide Wetlands Story Map.

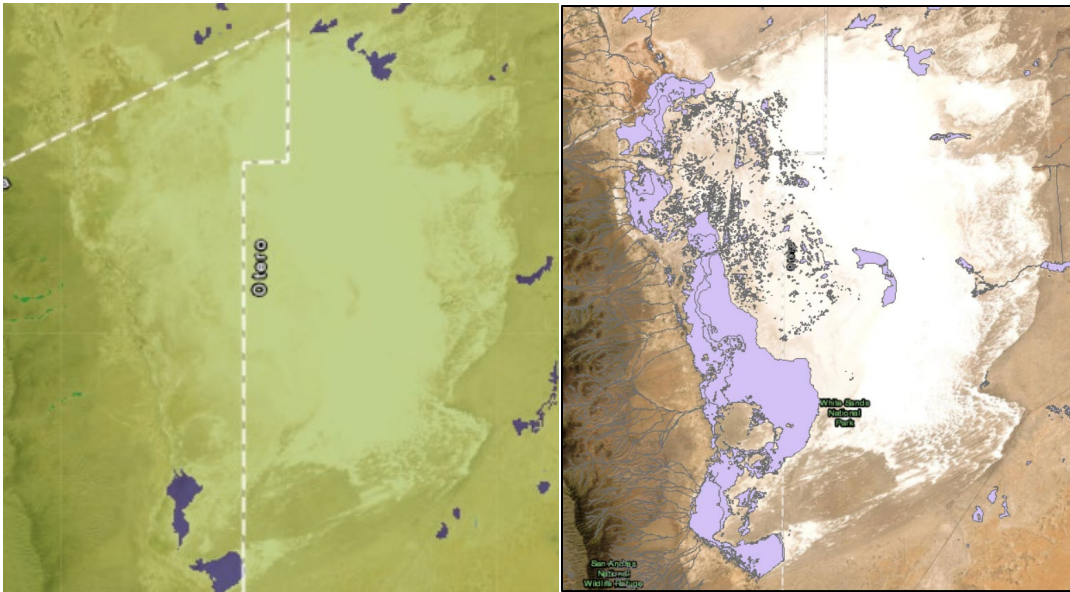


- In order to accommodate the upgrade of the NWI dataset to Version 2.0 standards the WPC developed a contract amendment to move the funds from the draft map field review to the inclusion of NWI Version 2.0 as soon as the guidance for implementing Version 2.0 was finalized by National Wetlands Inventory staff. To ensure the data production was on target for approval by the NWI Program, GeoSpatial Services produced a draft NWI 2.0 compliant dataset for the project area during the editing phase in this reporting period. The revised NWI 2.0 draft guidance required the dissection of plains and playas within the sub project area lending itself to further delaying the overall draft data delivery date.
- A meeting to edit, revise and add to the Story Map was conducted on March 15, 2021 with GeoSpatial Services, the WPC and Emile Sawyer (WPO for other wetland mapping projects).
- The WPC attended a Mapping Wetland Functions NRCS Webinar “Quantifying Ecosystem Functions to Facilitate Wetland Monitoring and Assessment,” on March 25, 2021 as match for this project.
- The WPC attended the Association of State Wetland Managers virtual Annual State/Tribal/Federal Coordination Meeting - April 12-15, 2021 entitled “Adaptation & Resiliency for the Advancement of Wetland Science, Policy and Practice.”
- A no-cost Amendment #4 to the mapping contract with GeoSpatial Services was approved on May 17, 2021 to: 1) add NWI Version 2.0 mapping updates, 2) allow for alternative activities due to Covid travel restrictions and 3) combine story map activities into the Statewide Wetlands StoryMap.
- The USFWS NWI agreed to update completed mapping for areas adjacent to the Lower Rio Grande project quads to NWI 2.0 standards and at no cost to the SWQB Wetlands Program.
- In May 2021, after discussions with Gary Hunt of the US FWS NWI, the NWI assigned two staff to update previously completed Mapping and Classification in the adjacent Sacramento Mountains Project area of Southern New Mexico to NWI 2.0 at no cost to the NMED Wetlands Program. The WPC sent a letter of appreciation to the NWI for conducting this service. The updated 2.0 classified wetlands layer will be provided to NMED once it is completed. Ongoing discussions of changes with NWI and GeoSpatial Services during the mapping update is ongoing.
- In July 2021, J.T. Jones was hired by the SWQB Wetlands Program and was assigned to be the WPO for this project.

- A no-cost grant Amendment 2 (CD - 01F39701 - 2) was approved by EPA on July 28, 2021 to extend the end date for this project to October 1, 2022.
- The full post-mapping field review by NMED Wetlands Program, GeoSpatial Services, and US FWS had been cancelled due to Covid travel restrictions. Post-mapping field work funding was adjusted to cover to NWI Version 2.0 mapping updates. However, in April 2021, following new guidance for Covid restrictions, post-mapping field review was conducted the Bootheel/Permian Basin and Eastern Plains mapping projects. Due to proximity to the Lower Rio Grande sub-project area, several key wetland sites were visited in and around White Sands National Park. The objectives of these visits were to review initial mapping of interdunal ponds within the Park and mineral flats close to Holloman Air Force Base.



**FIGURE 18. INTERDUNE GYPSIFEROUS WETLAND DEPRESSION AT WHITE SANDS NATIONAL PARK, APRIL 2021. THE SHRUB IS IODINE BUSH (*ALLENROLFEA OCCIDENTALIS*) WHICH IS A FACULTATIVE WET WETLAND INDICATOR PLANT. THE MAP POLYGONS HAVE A DISTINCTIVE SIGNATURE AND ARE CLASSIFIED AS A PSS1E USING THE NWI COWARDIN CLASSIFICATION.**

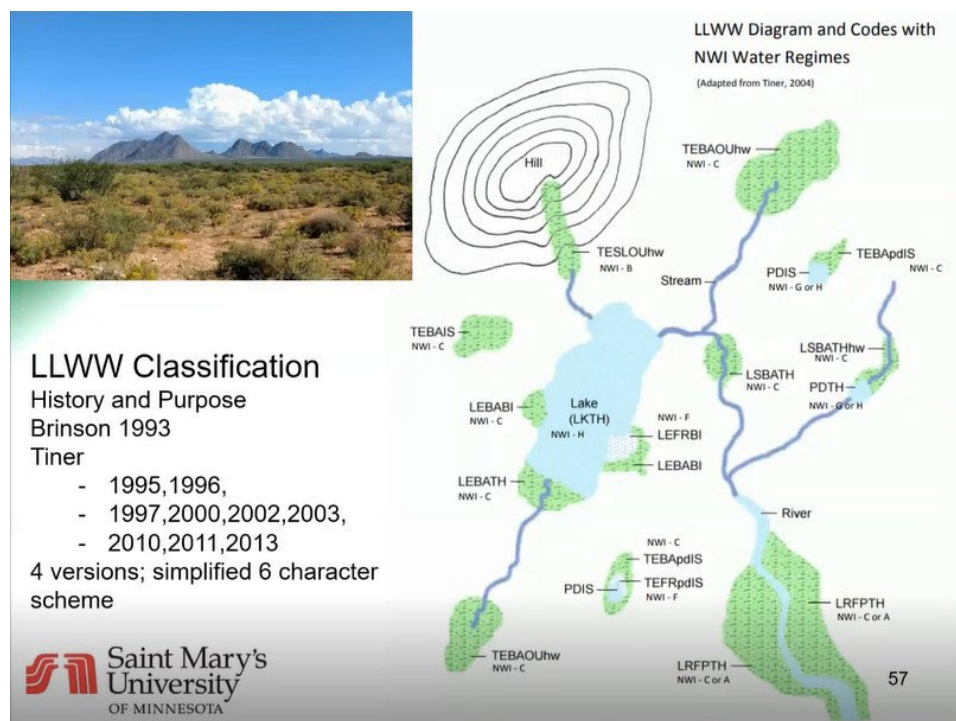


**FIGURE 3. COMPARISON OF PREVIOUS NATIONAL WETLAND INVENTORY (LEFT) AND NEW WETLANDS MAPPING FROM THIS LOWER RIO GRANDE PROJECT (RIGHT), SHOWING THE INCREASE IN IDENTIFIED AND CLASSIFIED WETLANDS ON WHITE SANDS NATIONAL PARK AND WHITE SANDS MISSILE RANGE. NOTICE THE LIGHT OUTLINE OF THE BASIN. ON THE LEFT THE WETLANDS ARE DARK BLUE, WHEREAS ON THE RIGHT THE WETLANDS ARE PURPLE.**

- Mineral soil flat wetlands, intermontane basin wetlands and additional White Sands National Park wetlands were again visited in October 2021 while traveling between Bootheel and Permian Basin Wetlands and Eastern Plains Wetlands to review mapping codes and water regimes. The field visits confirmed and improved wetland delineations and water regime classifications. Soil samples were reviewed at most sites visited during the reviews as collateral data. Note that 100s of acres of previously unmapped wetlands have been included for White Sands National Park and adjoining White Sands Missile Range.
- A Report titled “White Sands National Parks Field Trips Summary Report” was submitted by the GeoSpatial Services and covers the pre-mapping field trip in 2019 and the interim visits made to important and key sites in the LRG project area during the mapping reviews for Bootheel and Permian Basin and Eastern Plains trips during April 2021 and October 2021.
- J.T. Jones left the Wetlands Program in January 2022 and Maryann McGraw (WPC ) assumed the Project Officer role for this project.
- An updated QAPP was submitted to EPA on March 2, 2022 and was approved by EPA on March 15, 2022 with the new QTRAK #22-128 and an expiration date of March 10, 2025.
- The WPC attended and presented at the Society of Wetland Scientists Rocky Mountain Chapter Annual Meeting, April 6, 2022, in Denver, Colorado. The one-day meeting was held at the Denver Botanical Gardens and the WPC presented “New Mexico Rapid

Assessment Method for Confined Valley Riverine Wetlands.” The presentation was an outcome of a recently completed Wetland Program Development Grant for the development of the NM Rapid Assessment Method for Confined Valley Wetlands and was novel and applicable to the Rocky Mountains in states beyond New Mexico.

- NMED conducted a second Technical Advisory Meeting as a virtual meeting on April 27, 2022 with 70 participants in attendance. Conducted in collaboration with the GeoSpatial Services, the workshop started with an overview of wetland mapping in New Mexico followed by an introduction to the various classifications used by the Wetlands Program to map wetlands throughout the state. The suite of wetland functions that are identified for each wetland by HGM class (New Mexico Wetlands Functions) was also explained. The workshop concluded with a survey of mapped wetlands along the Lower Rio Grande and how the classifications were applied. Also highlighted were extensive wetlands recently mapped at White Sands National Park. Wetlands mapping completed for New Mexico is currently being added to the NMED Interactive Wetlands Map (<https://gis.web.env.nm.gov/oem/?map=wetlands>) and all completed and available mapping can be acquired from the Wetlands Program at any time.



**FIGURE 4. SCREENSHOT FROM APRIL 27, 2022 WORKSHOP MEETING EXPLAINING THE CLASSIFICATION SYSTEMS AND HOW THEY ARE MAPPED. THIS FIGURE SHOWS THE APPLICATION OF THE LLWW CLASSIFICATION SYSTEM.**

- A half-day Wetlands Mapping and Classification virtual workshop was conducted on September 28, 2022 with 97 participants in attendance. The successful workshop agenda included an overview of mapping and classification along the Lower Rio Grande highlighting key features and mapping units for the Rio Grande. New and interesting wetland types in southern New Mexico were also discussed and shown and included inter-

basin groundwater-dependent systems, miner soil flats and mapping at White Sands National Park. A Wetlands Mapping Data Use discussion completed the mapping workshop.



**FIGURE 21. INTRO POWERPOINT FOR MAPPING AND CLASSIFICATION WORKSHOP.**



**FIGURE 22. INTER-BASIN GROUNDWATER-DEPENDENT SYSTEM IDENTIFIED BY WETLAND SOILS DURING OCTOBER DRAFT MAP REVIEW IN OCTOBER 2021 AND DISPLAYED DURING THE MAPPING AND CLASSIFICATION WORKSHOP.**



**FIGURE 23. SCREENSHOT DURING MAPPING AND CLASSIFICATION WORKSHOP TO DISCUSS MAPPING THE VEGETATED ISLAND AND BANK VEGETATION ALONG A PORTION OF THE RIO GRANDE WHICH WAS DRY DURING THE FIELD VISIT IN OCTOBER 2021.**

- GeoSpatial Services updated Lower Rio Grande mapping data to NWI Version 2.0 mapping standards under the no-cost contract Amendment #4.
- Rachel Jankowitz, Monitoring, Assessment and Standards Section, Surface Water Quality Bureau, NMED attended Wetlands Delineation Training under this project on August 23-25, 2022.
- A Request for Quotes “To Develop Wetlands Program StoryMap and Complete Tasks for the Bootheel and Permian Basin, Eastern Plains, San Juan/Estancia Basin, and Lower Rio Grande Mapping Areas” was developed by the SWQB Wetlands Program to complete mapping and classification tasks after the original contract with GSS expired. The small purchase contract was awarded to GeoSpatial Services (contract # 23-667-2060-0001) which included completing final tasks and a final report for this project.
- GeoSpatial Services staff traveled to New Mexico during the summer of 2022 to continue to collect stories and photos for the NMED Wetlands StoryMap. Their time and travel expenses are included in the match documentation for completion of Tasks for this project and the San Juan Estancia Map and Class Project.
- The WPC attended a Rio Grande Silvery Minnow webinar presented by the Isleta Reach Stewardship Association (IRSA) on September 15, 2022. The Rio Grande Silvery Minnow is

an endangered species in the Middle and Lower Rio Grande that depends on riverine wetlands for portions of its lifecycle. Attendance at the webinar is counted as match for this project.

- GeoSpatial Services data delivery to the NMED Wetlands Program was completed on September 30, 2022 under the completion contract 23-667-2060-0001. All wetland mapping and coding for LLWW and HGM and the functional correlation for the project area were delivered to SWQB Wetlands Program.
- Wetland assessment unit codes for wetlands water quality standards development were derived from the HGM maps. A GIS-based application for naming wetlands was developed by GeoSpatial Services as part of the Sacramento Mountains Mapping and Classification project (Fire and Water: The Interplay Between Wetlands and Fire Management, CD#00F906-01-0). A final step was to define and apply wetland assessment unit codes for wetlands water quality standards development derived from the HGM maps. The WPC, Dustin Nelson (Watershed Protection Section Project Officer) and Phil Polzer (NMED IT GIS Specialist) met to discuss applying the model to HGM defined wetlands in the Lower Rio Grande project area. Assessment Unit Code naming was completed by Phil Polzer utilizing a python-based code tool in ArcMap created by the GeoSpatial Services. From GeoSpatial Services-created wetland and riparian area database, features with the Cowardian Classifications of Riparian and Riverine are identified and removed from the data set. The remaining polygons were dissolved on the three HGM attributes to merge adjacent wetlands that share those characteristics. The wetland ID python tool created by Geospatial Services was then run. This program generated 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. See Figures 16 and 17. The following is an example of a generated wetland assessment unit code:

42RArGr\_RLC.0059

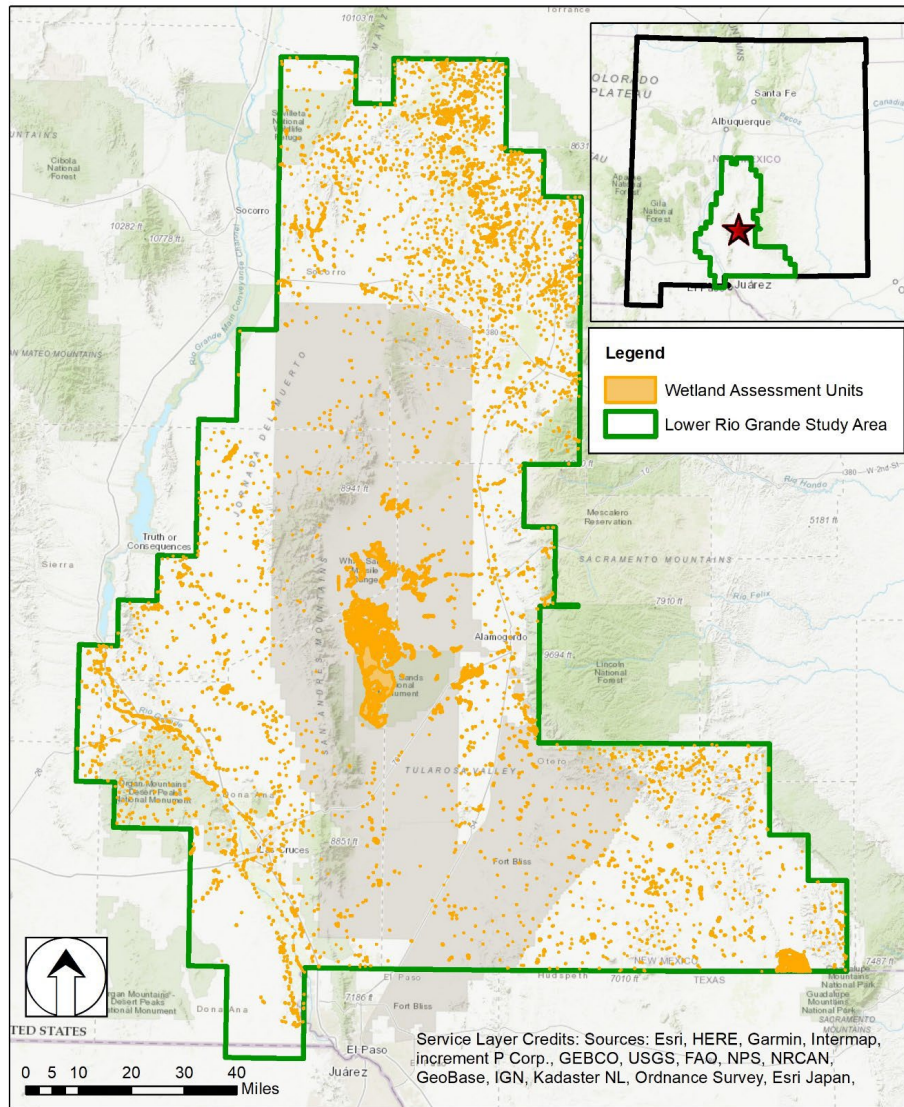
42 is the 2-digit NMED SWQB HUC 8 Station code

ArRGr is the abbreviation for HUC 12 - Arroyo Angustura – Rio Grande

RLC is the abbreviation for Riverine Lowland Confined

0059 is the randomly generated number in that HUC 12

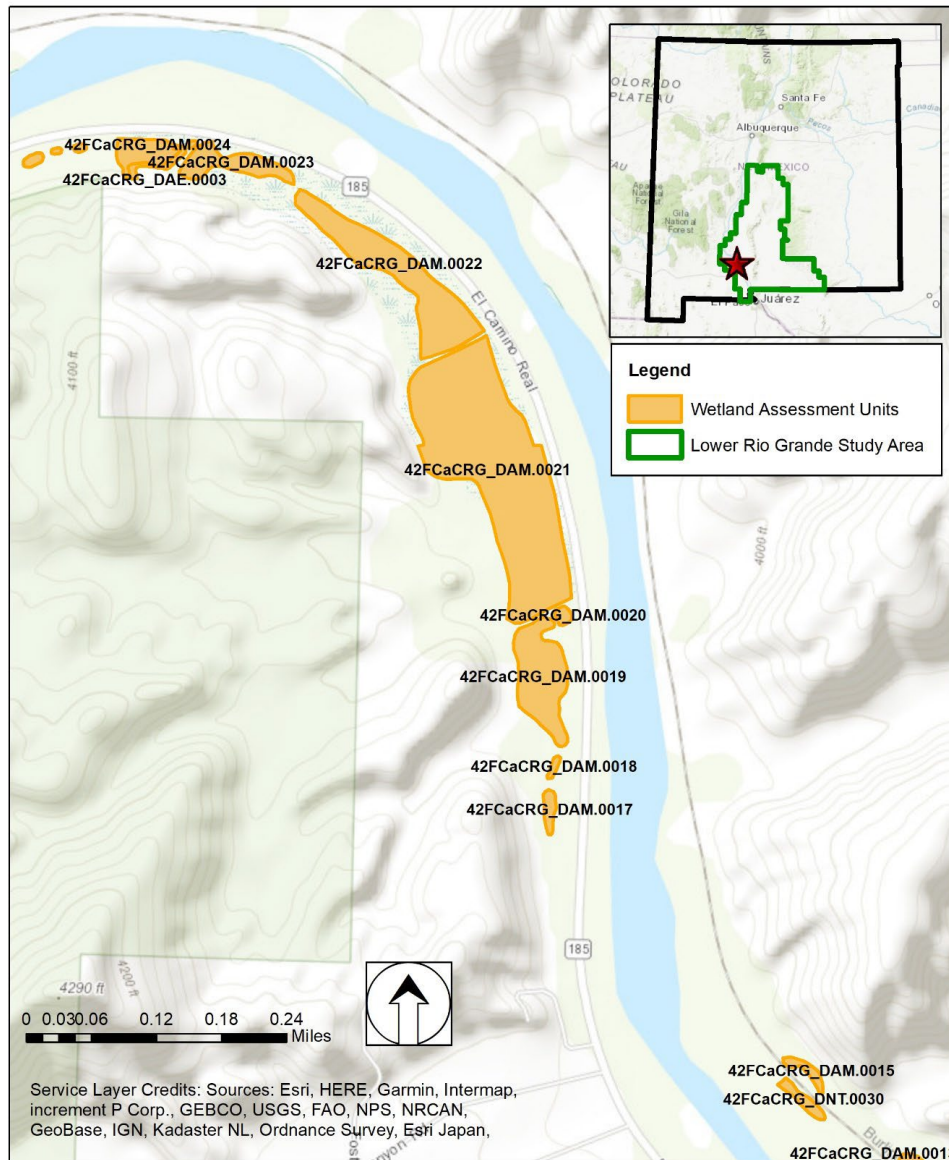
# New Mexico Wetlands Program Lower Rio Grande Assessment Units



**FIGURE 24. MAP OF WETLAND ASSESSMENT UNITS FOR ENTIRE LOWER RIO GRANDE PROJECT AREA.**



# New Mexico Wetlands Program Lower Rio Grande Assessment Units



**FIGURE 25. EXAMPLE OF A LOWER RIO GRANDE PROJECT AREA ASSESSMENT UNIT IN THE SOUTHWEST PART OF THE STUDY AREA.**

- GeoSpatial Services submitted a Contractor Final Report to the SWQB Wetland Program in September 2022.
- Creation of the Statewide StoryMap will continue under the Bootheel and Permian Basin Map and Class Project and the Eastern Plains Map and Class project under contract 23-667-2060-0001.

## List of Deliverables (on file at NMED)

- Amendment #2 for GSS 18-667-2060-0018 Adding the Lower Rio Grande Mapping and

#### Classification Sub-Project

- Draft Technical Advisory Committee list
- Quality Assurance Project Plan and updates
- Lower Rio Grande Pre-mapping Field Trip Summary Report and Photo Interpretation Conventions
- First and Second Technical Advisory Committee agendas, sign-in sheets or attendee reports, and presentations
- Contract Amendment #4 that includes Task changes for GSS
- Grant Amendments and Requests for Grant Amendment documentation
- GSS Quarterly Reports
- White Sands National Parks Field Trips Summary Report
- Draft Guidance Document for NWI 2.0 from NWI “Incorporating Buffered Linears into the NWI Polygonal Data Layer.”
- Story Map updates and link
- Outreach presentations
- Correspondence between NMED and NWI
- EPA Sponsored Meeting Agendas and/or Presentations.
- Wetlands Assessment Unit Identification List
- Functional Assessment and Geologic Units documents
- Final Report and metadata from GSS
- Final Mapping Geodatabase from GSS and approved by NWI
- Semi-Annual Reports to EPA (including photographs of project progress)
- Documentation of expenditures, including project match

## Lessons Learned

The data and information developed through this mapping project supports several conclusions. Most importantly, there are a considerable number of wetlands and riparian areas across this portion of south-central New Mexico (approximately 25,200) and they are providing a wide range of important ecological functions. Secondly, 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 in order to support decisions related to wetland delineation, classification, and function. This is especially true in a semi-arid environment such as southern New Mexico, which experienced severe to extreme drought conditions during 2018 and extreme to exceptional drought in early 2021. Finally, this is a landscape-level mapping project and the resulting data should be used to support decision making at that scale. It is appropriate to use these data as a guide for further field data collection and investigation but not for site-specific compliance or mitigation activities.

No one anticipated the events of 2020 and 2021, with all the pandemic-related restrictions that cause project delays. The primary lesson learned from these events is to write a flexible work plan that allows the project to pivot to meet opportunities and challenges.

## What Made the Project Successful?

The project was successful due to the perseverance of NMED Wetlands staff, the knowledge and commitment of USFWS NWI staff and GeoSpatial Services, and the participation of many competent and helpful individuals and organizations through the Technical Advisory Committee. This participation strengthened the effectiveness of this project and future mapping projects. Because the GeoSpatial Services' headquarters are in Minnesota, the SWQB Wetlands Program was already accustomed to video conferencing with them on a regular basis and sharing mapping updates on-line. When the Covid-19 pandemic hit, ongoing virtual communication was already established and continued without interruption. In fact, attendance in virtual Technical Advisory Committee meetings was greatly increased compared to prior in-person Technical Advisory Committee meetings, because of the ability of participants to attend virtually from all over the state without traveling long distances. There were even participants from neighboring states.

The Wetlands Mapping and Classification Workshop was an offshoot of the success of a virtual Technical Advisory Committee meeting reaching so many more participants. The invitation to the Wetlands Mapping and Classification Workshop was open to a broader range of participants which in turn had many more participants attend the workshop. However, there is still a need for on-the-ground workshops where participants are visiting the wetlands to help make water regime calls and comparing evidence on the ground. More virtual Wetlands Mapping and Classification workshops will be scheduled under future Mapping and Classification projects.

The application of the Assessment Unit model to the more wetlands gets the state closer to developing water quality standards for wetlands in New Mexico.

## What Made the Project Challenging?

The SWQB Wetlands Program, our contractor GSS, and the USFWS NWI were very successful in meeting the goals of the Project and exceeding goals. However, there were challenges and obstacles to be met and overcome.

In the Lower Rio Grande project area, there are several large land tracts that posed access challenges for the pre-mapping field trip because of Department of Defense restrictions. Department of Defense properties include White Sands Missile Range, Holloman Air Force Base, and Fort Bliss. There was convenient public access to a portion of the Holloman Lake wetlands complex. Fort Bliss is very dry and therefore a lower priority for the pre-mapping field trip. However, White Sands Missile Range has playas and springs distributed over a large area. It would have been helpful to visit and ground truth these water resources; however, entry was prohibited during mapping field trips due to Department of Defense operations.

Covid-19 meeting and travel restrictions created a barrier to completion during a critical time in project management. At one point, out-of-state contractors were not even permitted to enter New Mexico, and for several months NMED staff were not permitted to travel. Even when travel restrictions were eased, NMED staff were required to travel in separate vehicles.

Project work was also delayed during 2020 when there was NMED financial staff turnover and purchase orders were not issued for the first eight weeks of the state fiscal year.

The US Fish and Wildlife Services NWI Program decided to implement Version 2.0 of NWI during the course of this project. Initially the agency did not issue timely written guidance on how to comply with the new requirements but ultimately, they worked with NMED and the GeoSpatial Services to find satisfactory solutions to accept the mapping data into the NWI.

## Technical Transfer

Two Technical Advisory Committee meetings were conducted. A Mapping and Classification Workshop was conducted to 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, SWQB staff, and the Society of Wetland Scientists. Progress was also made on a statewide wetlands Story Map. 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 and activity modifications to complete high quality and meaningful work.

## Future Activity Recommendations

NMED will continue to share project results through its website, wetland roundtables, wetland mapping Story Map, 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 Map 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.

With the completion of this Lower Rio Grande project, there is updated National Wetland Inventory mapping for nearly all of New Mexico. There remain some gaps in the vicinity of the northern Rio Grande and near tribal lands that need to be completed for full state coverage. There should also be focus on analyzing the mapping statewide for summary data of wetlands acreage and type, identification of unique and rare wetlands, development of additional outreach and education tools, and analysis of baseline data.

The New Mexico wetlands mapping and classification is nearly complete, however the Wetlands Program sees the need for refinement of the mapping products where significant changes have occurred due to natural disasters (e.g. wildfires, flooding or extended drought). The Wetlands Program will also use the products to locate and protect unique and rare wetlands, those with protected species, reference wetlands, and ground-water dependent systems. The SWQB Wetlands Program will develop measures to track wetland resources that will be most vulnerable

to climatic changes in the west, and will ensure that these mapping products are included in the State effort to consolidate water data throughout the state.



FIGURE 26. PRE-MAPPING FIELD TEAM AT WHITE SANDS Andy Robertson (GSS), Karen Menetrey (SWQB Wetlands Program), Maryann McGraw (SWQB Wetlands Program,) John Anderson (GSS), Gary Hunt (USFWS NWI).

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