# Final Report
# June 2019

## Fire and Water: The Interplay Between Wetlands and Fire Management
## Mapping and Classification for Wetlands Protection
## Sacramento Mountains Region, New Mexico

## Assistance Agreement No. CD #00F906-01-0 (FY 2014)

Bluff Springs springbrook, Lincoln National Forest, September 2014. (Photo by M. McGee)


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

## Project Goals and Objectives

The goal of this project was to map and identify priority wetland resources for protection and restoration in the Sacramento Mountains and develop a landscape level functional assessment model. In addition, from the mapping exercise, a method was developed for identifying wetlands water quality classified segments for future wetlands standards development.

The NMED SWQB Wetlands Program mapped and classified wetlands in the Sacramento Mountain range area as part of our Landscape Level 1 Wetlands Assessment Strategy. Mapping and classification followed the Federal Geospatial Data Committee (FGDC) standards to update the National Wetlands Inventory. The wetlands were further classified with the Landscape Position, Landform, Water Flow Path, and Waterbody Type (LLWW) classification system (also known as NWI+), and Hydrogeomorphic (HGM) wetland subclasses were identified and mapped for the area. The NWI and LLWW classifications allowed the modeling of a landscape level functional assessment for these data. The System for Mapping Riparian Areas in the Western United States Classification (Western Riparian Classification) was also used for mapping distinctly riparian areas not included in wetland mapping.

Project tasks included mapping and classification of wetlands in the Sacramento Mountains; a landscape level functional assessment of the mapping data; the assembly of a technical advisory team to review and analyze the information; using the mapping products to help develop classified segments for water quality standards; and continued participation in a New Mexico mapping consortium to network about our wetlands mapping efforts (Geospatial Advisory Committee).

Project products included mapping and classification of approximately 135 quadrangles in the Arizona/New Mexico Mountains ecoregion using the Cowardin and LLWW Version 3.0 Classifications (NWI and NWI+); classification of riparian areas using the Western Riparian Classification; mapping of HGM wetland subclasses in this region; landscape level functional assessment of mapped wetlands; a draft of classified segments for water quality standards; information necessary for continuation of New Mexico Rapid Assessment Method (NMRAM) development and use in the State.

## Project Outputs

Through this project ten major objectives were accomplished:

1) Approximately 135 quadrangles in southern New Mexico were mapped and classified for wetlands identification, 45 more than originally proposed, and in an area where little up-to-date mapping was available.
2) The application of LLWW classification provided geomorphological information about the wetlands and provided needed information to apply the HGM classification system in the project area.
3) A landscape level functional assessment model and outputs were developed for the State,

public land managers, local planners, and communities to identify protection and restoration priorities.

4) Three map books and a project Story Map were developed as outreach and communication tools.

5) A GIS based labeling tool was developed to provide a unique alpha numeric code for each identified wetland polygon. The current project area list provides labels for 6903 unique wetlands.

6) A draft interactive New Mexico wetlands map, that includes the Sacramento Mountains project data, was developed by NMED IT staff and is available at:
https://gis.web.env.nm.gov/oem/?map=wetlands

7) State, Federal and Local agencies and stakeholders were provided project process presentations and involvement in the Technical Advisory Committee.

8) Participation in the New Mexico Geospatial Advisory Committee shared resources, and increased awareness, sought partnerships, and funding opportunities for future mapping projects and priorities.

9) Informative presentations about New Mexico mapping and classification and about this project were given at several venues open to stakeholders and the public.

10) The information collected through the mapping and classification by SWQB was analyzed to begin development of classified segments for wetland water quality standards by wetland HGM subclass in this project area.

## Project Outcomes

- A gap in New Mexico wetlands mapping was completed in a major recreational and wildland-urban interface. The area is composed of private and public lands where the water resources are at risk from ground water extraction, urban development and a high risk of catastrophic wildfire.
- A landscape level functional assessment was developed utilizing the wetland mapping and classification data, relying on the New Mexico functional correlation tables and the assistance of the Technical Advisory Committee. Mapping, classification and functional assessment information will help land managers, local watershed groups, and the public regarding the identification and location of wetland resources for protection and/or restoration.
- The mapping and classification data was utilized to inform the creation of classified segments for Water Quality Standards based on the wetland subclasses described through the mapping process which 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.
- The SWQB Wetlands Program and partners now have mapping data for landscape level wetlands resource analysis and monitoring capabilities that will assist with better wetlands protection, restoration and mitigation.
- This project creates improved tools for assessing and evaluating the condition of New Mexico's Wetlands in the project area. Mapping and classification projects are used to identify New Mexico's wetlands resources, assisting with targeting wetlands in need of special protection, wetlands that are particularly impacted and wetlands that can be restored.

- Mapping and classification projects are filling a critical data gap for an integrated and comprehensive approach to wetlands protection by SWQB and its partners.
- 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.
- Through our development of an integrated SQUID database at SWQB, wetlands identification, classification and assessment data will be available for inclusion in CWA Section 305(b) reports, increasing access to stakeholders and decision makers to improve their knowledge and understanding of wetlands issues.
- 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.
- The inclusion of up-to date mapping of New Mexico in the National Wetlands Inventory improves that dataset by providing more accurate map data than older mapped data as well as areas mapped by the Scalable Mapping initiative.

**Figure 1. Pre-mapping field review site, Bugscuffle Fen, Sacramento Mountains, May 3, 2016. Andy Robertson (left), John Anderson (pointing at fen) (GSS contractors), are examining the consequences of headcut erosion and dewatering in a groundwater-supported fen wetland. New Mexico Department of Game and Fish fenced and signed the area to prevent cattle trampling, however cattle continue to trespass. (Photo by M. McGraw)**

- The maps, classification, literature search and wetland subclass descriptions will advance the implementation of our NMRAM of wetland condition throughout New Mexico. This information includes all wetlands identified by HGM subclass, implementation of appropriate NMRAM in high priority wetland subclasses, and the future development of NMRAM modules for this ecoregion.
- The maps provided by this project and the classification should assist the Corps in determining CWA Section 404 protected waters and to prevent further loss and degradation of wetlands in an area at risk. This could include more efficient jurisdictional determinations and more wetlands protected.
- The mapping products and landscape level functional assessment will help local governments and communities to protect, restore and sustain wetland and riparian habitat. This could include more requests to work on wetlands restoration, more local government and private citizen involvement in wetlands protection and restoration.
- This project will help SWQB Wetlands Program to reach wetlands protection, restoration, mitigation and monitoring goals by the development of classified segments for water quality standards for wetlands. This could include more effective and stronger wetlands protection and restoration by SWQB Wetlands Program.

## Project Location

The project is located from just east of the Manzano Mountains, near Corona; through parts of the Capitan and Sacramento Mountains, Sierra Blanca, excluding Mescalero Apache Nation; south to Timberon and from the Bitter Lake National Wildlife Refuge, south to Carlsbad Caverns National Park; and east to Jal (Figure 2).

## Original Timeframe

The Notice of Award on the Cooperative Agreement CD #00F906-01-0 was issued on August 18, 2014. A no-cost extension of the Cooperative Agreement to June 30, 2019 was approved by EPA on May 31, 2018 in order to complete additional work for Tasks 1, 6, 7, 8 & 9. The additional time was needed to finalize work with the Technical Advisory Committee, perform public outreach and finalize work on Map Books and the Story Map project deliverables. While the project was mostly complete, having expended nearly all Federal funds available, additional time was needed to complete the match commitments, and additional outreach proved beneficial to further Wetlands Program development.

The original federal amount requested in the FY13/14 WPDG Proposal for this project was reduced and some tasks were eliminated, including those associated with an analysis of wetlands as a fire management tool in the Sacramento Mountains Region. The original title of the project is “Fire and Water: The Interplay Between Wetlands and Fire Management.” The key tasks remaining in the grant were associated with mapping and classification of wetlands in and around the Sacramento Mountains. Accordingly, the current project is internally known at SWQB as “Mapping and Classification for Wetlands Protection, Sacramento Mountains Region, New Mexico.”

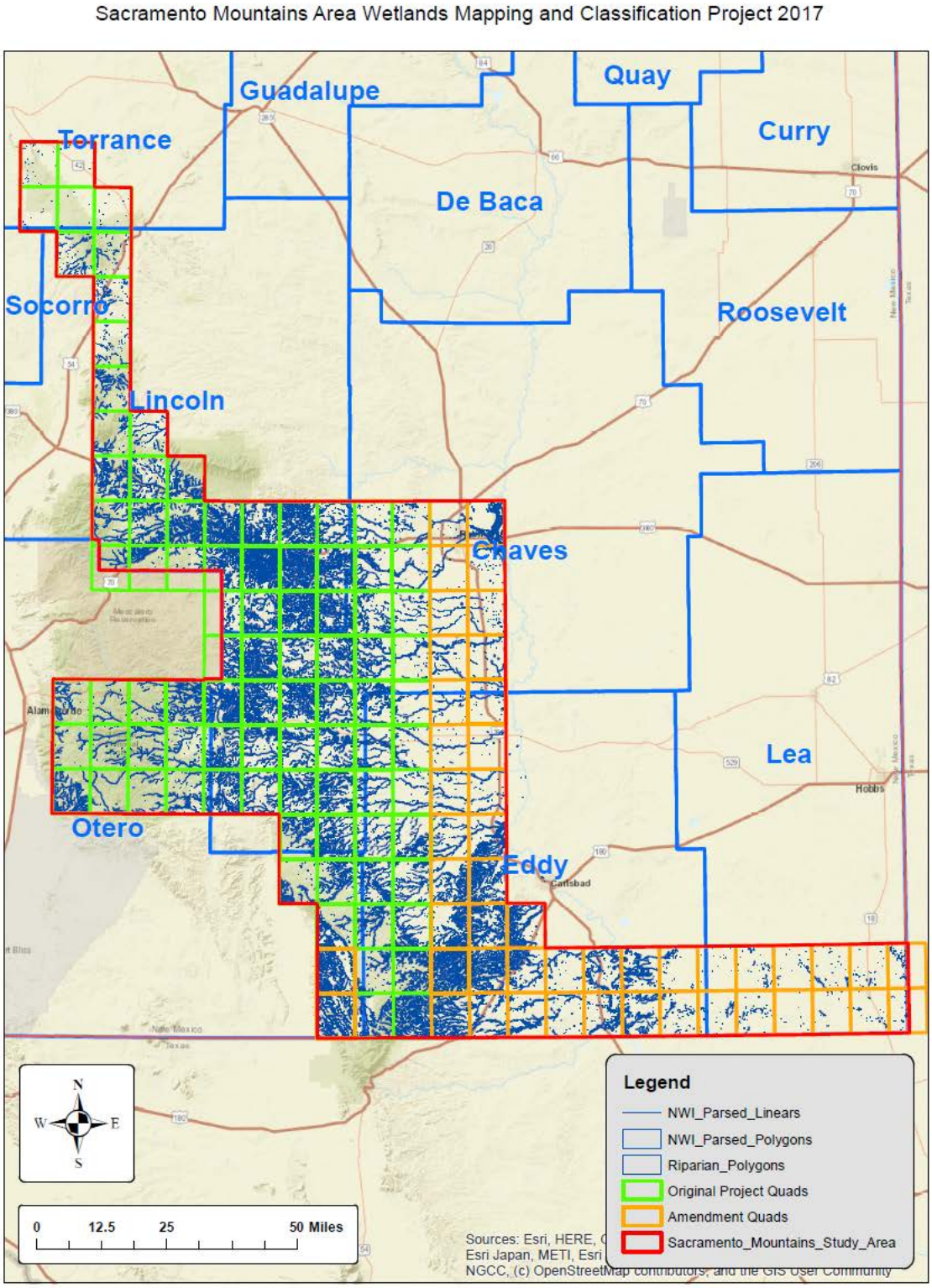


**Figure 2. Map of Sacramento Mountains Project Area Linear and Polygon Wetlands by E. Sawyer.**

## Partners Involved

Saint Mary's University of Minnesota, GeoSpatial Services Program (GSS) is the principal contractor in partnership with SWQB Wetlands Program in performing the mapping, classification and modelling exercises for this project. The principal mappers at GSS included John Anderson (GSS GIS Analyst) and Andy Robertson (GSS Director). NMED IT staff (Elizabeth Zeiler and Zachary Stauber) were integral to data review and acceptance. Eric Boyda, Village of Ruidoso; Lewis Land, National Cave and Karst Institute; and Michael McGee, USBLM Hydrologist were invaluable in their support. USEPA (Sondra McDonald, Sharon Daugherty and Leslie Rauscher) provided project progress guidance and technical assistance.

SWQB Wetlands Program was involved in every aspect of project, participating in the Technical Advisory Committee meetings, pre-mapping and draft map review field mapping trips, review of mapping products and reports.

**Figure 3. Rio Bonito looking west, upstream toward the Sacramento Mountains crest, during Pre-mapping review. (Photo E. Sawyer)**

The Project involved an Advisory Committee whose members are as follows:

***Mapping and Classification for Wetlands Protection, Sacramento Mountains Region Technical Advisory Committee Members***

| Name | Organization |
|---|---|
| Eric Boyda | Village of Ruidoso |
| David Baker | USFS Lincoln National Forest |
| Gary Hunt | US Fish & Wildlife Service, Regional Wetlands Coordinator |
| Larry Cordova | USFS Lincoln National Forest |
| Octoviano Lucero | USFS Lincoln National Forest |
| Nano Lucero | USFS Lincoln National Forest |
| Miranda Butler-Valverde | USFS Lincoln National Forest |
| Micheal McGee | USBLM, Roswell Field Office |
| Quentin Hayes | Eastern New Mexico University |
| Chris Canavan | NMED/SWQB Watershed Protection Section |
| Matthew Gonzales | New Mexico State University |
| Marvin Jojolo | New Mexico State University |
| Julie Alcon | US Army Corps of Engineers |
| Shelly Barnes | US Army Corps of Engineers |
| Tim Frey | USBLM, Las Cruces Field Office |
| Emile Sawyer | NMED/SWQB Wetlands Program |
| Maryann McGraw | NMED/SWQB Wetlands Program |
| Andy Robertson | Saint Mary's University of Minnesota, Geospatial Services |
| John Anderson | Saint Mary's University of Minnesota, Geospatial Services |

***Sacramento Mountains Region Field Team*** *(Pre-map and Draft Map Reviews)*

| | |
|---|---|
| Gary Hunt | US Fish & Wildlife Service, Regional Wetlands Coordinator |
| Andy Robertson | Saint Mary's University of Minnesota, Geospatial Services |
| John Anderson | Saint Mary's University of Minnesota, Geospatial Services |
| Maryann McGraw | NMED/SWQB Wetlands Program |
| Emile Sawyer | NMED/SWQB Wetlands Program |

**Figure 4. Some of the Pre-Mapping Review Team discussing the hydrologic regime of a reach of the Rio Hondo. May 2016. Left to right: Emile Sawyer, NMED; Michael McGee, USBLM; John Anderson, GSS, Gary Hunt, USFWS and Maryann McGraw, NMED. (Photo by A. Robertson)**

## Funding

The original Federal amount was **$237,084.00** and **$85,069.00** match. The **final federal amount** spent was **$233,172.93,** and the **final match amount** was **$89,140.61 ($4,071.61 overmatched).** See semi-annual reports for details.

## Major Project Highlights and Chronology

- SWQB Wetlands Program was awarded federal assistance for this project on August 18, 2014.
- Shelly Barnes was assigned as the Project Officer for this Project.
- Shelly Barnes announced the project and the Annual USFS/SWQB meeting in Albuquerque, November 4, 2014, and at the SWQB/ USFS monthly meetings.
- In early 2015, Shelly Barnes took a position with Army Corps of Engineers and Maryann McGraw (Wetlands Program Coordinator) has taken over as Project Officer for this project.
- An RFP to hire a mapping contractor was released in August 2015 with proposal submission by September 23, 2015.

- Currently, the plan is being developed to determine the best way to classify wetlands water quality segments (assign AU codes). The Wetlands Program Coordinator is meeting with SWQB staff to determine a potential scheme and what data will be needed to classify water quality segments.
- In September 2015 Emile Sawyer was hired as a Wetlands Program Project Officer and will administer this project.
- Emile Sawyer attends the New Mexico Geospatial Advisory Committee meetings monthly to represent wetlands, present wetlands mapping findings and to keep abreast in GIS and spatial data development and to inform other Geospatial representatives of opportunities associated with wetland mapping and classification. This group also provides opportunities to share resources, to partner on stream and wetland mapping projects and to reduce duplicative efforts.
- The Contract with Saint Mary's University of Minnesota, Geospatial Services to conduct wetland mapping was finalized on April 18, 2016.
- Project QAPP was submitted to EPA on May 20, 2016 and approved by EPA June 6, 2016.
- The Pre-Mapping Field Review was conducted in conjunction with the first Technical Advisory Committee meeting, May 1-6, 2016 throughout the project area. The purpose of this trip was to orient the project photo interpreters to the study area; correlate typical and atypical image signatures to ground conditions for the full range of wetland types included in the project; review classification standards for all systems being mapped during the project; and, develop a set of project photo interpretation conventions to ensure consistent mapping and classification throughout the project. The conventions document correlates photo signature "keys" (colors, tones, size, shapes, patterns, textures, associations, and shadows) with associated ground features and forms the primary reference for project photo interpreters. NWI Field Data Sheets were prepared for each formal site (8 in total) documenting presence or absence of hydric soils, hydrophytic vegetation and wetland hydrology. The field trip report and photo interpretation conventions were written, reviewed, revised and delivered to the SWQB Project Manager on July 13, 2016.

**Figure 5. Example of riparian vegetation (in the distance) mapped using Western Riparian Classification along ephemeral and intermittent streams in the Sacramento Mountains mapping area. (Photo by M. McGraw)**

- Technical Advisory Committee was convened May 2, 2016 at Eastern New Mexico University – Ruidoso campus with 14 participants in attendance and 3 more attending remotely.
- The primary imagery that was used for the wetland delineation and classification is 2014 National Agriculture Imagery Program (NAIP), one-meter resolution, true color emulsion, mid-summer capture. Decision making was supported by additional imagery: 2011 NAIP true color, 2009 NAIP color infrared, 2005 NAIP, ESRI World Imagery layer, Google Earth historic imagery, and 1992 DOQQ black and white. GSS has also acquired multiple spatial datasets that assisted the image interpreters including: National Hydrography Dataset (NHD), SSURGO soils, NMED perennial streams, USGS Digital Raster Graphic topographic sheets, HUC watershed boundaries, and existing National Wetland Inventory data.
- The WPO obtained springs data layers for the project GIS from the Lincoln National Forest, USGS and *data.gov*. These layers were forwarded to GSS for inclusion in the mapping project.
- A contract Amendment was finalized with Saint Mary's University of Minnesota – Geospatial Services to map an additional 45 quadrangles on October 21, 2016.
- The Draft Map Review was conducted from October 17 to 21, 2016 in conjunction with a follow-up Technical Advisory Committee meeting on October 19, 2016.

- The Technical Advisory Committee was convened October 19, 2016 at Eastern New Mexico University – Ruidoso campus. In addition to the reviewing the draft map, functional correlations were presented to the project technical advisory committee.

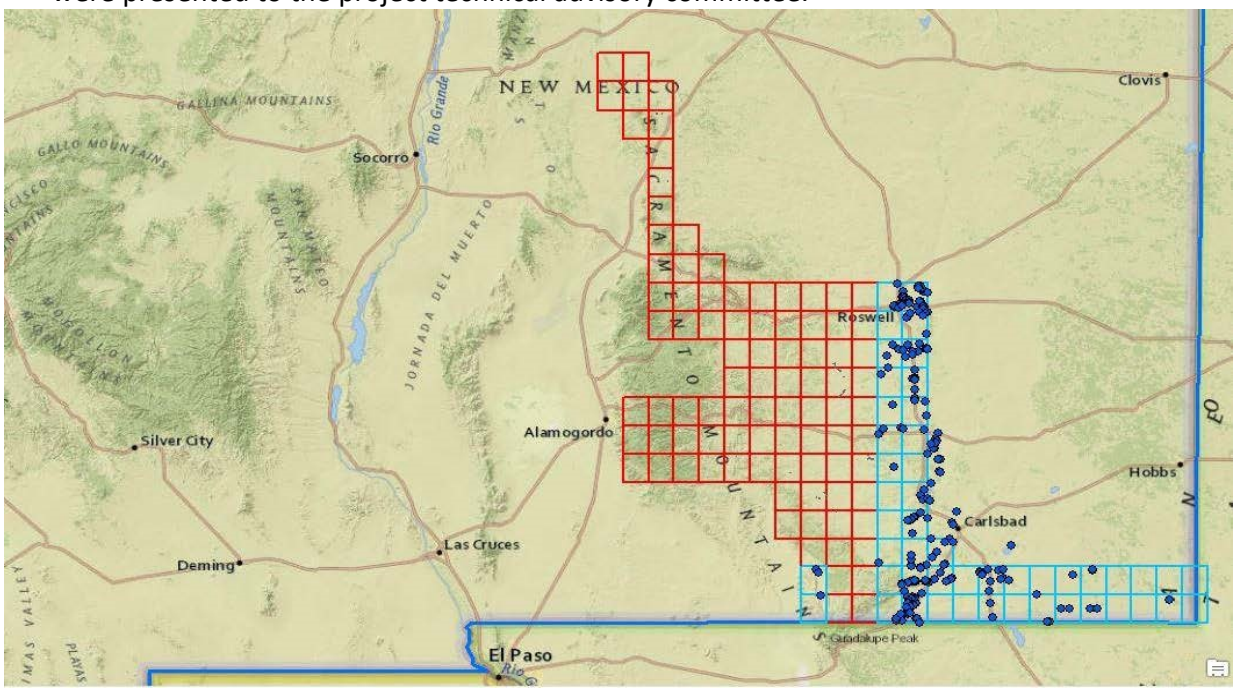


**Figure 6. Original project area red quads. Addendum area blue quads with Pre-Mapping Check Sites blue dots.**

- By January 2017 a draft version of the completed wetlands data was sent to both the New Mexico Environment Department and the US Fish and Wildlife Service for review. The draft dataset included wetland polygons, wetland linears, and riparian areas with NWI, LLWW and HGM and Western Riparian classifications coding as well as full wetland functions.
- A Request for Quotes was advertised on April 21, 2017 and a contract was awarded to GSS on July 1, 2017 to name Sacramento Mountains Classified Segments for Wetlands Water Quality Standards.
- USFWS sent a Notification of Acceptance to NMED for the Sacramento Mountains project data to be uploaded to the National Wetlands Inventory.
- GSS developed three PDF map books in May 2017 for Agua Chaquita, Bluff Springs and Two Rivers Park in the project area. The mapbooks were used for EPA visit with partners and SWQB staff to the Sacramento Mountains May 15-19, 2017 and for outreach and presentations about the project.

**Figure 7. Field Trip to wetland restoration site in the Sacramento Mountains on May 17, 2017. In attendance were Sharon Daugherty (EPA), Maryann McGraw (SWQB WPC), Abe Franklin (SWQB), Emile Sawyer (SWQB WPO), Dan Guevara (SWQB), Brian Fontenot (EPA), Pete Haradan (USFS), Chris Canavan (SWQB), Alan Klatt (SWQB), Randy Rush (EPA), several ranchers from the area. (Photo by Dan Guevara)**


**Figure 8A. EPA and SWQB staff at wetlands mapping site at Two Rivers Park in Ruidoso. 8B. Two Rivers Park area featured in Two Rivers Park map book. (photos by Dan Guevara)**

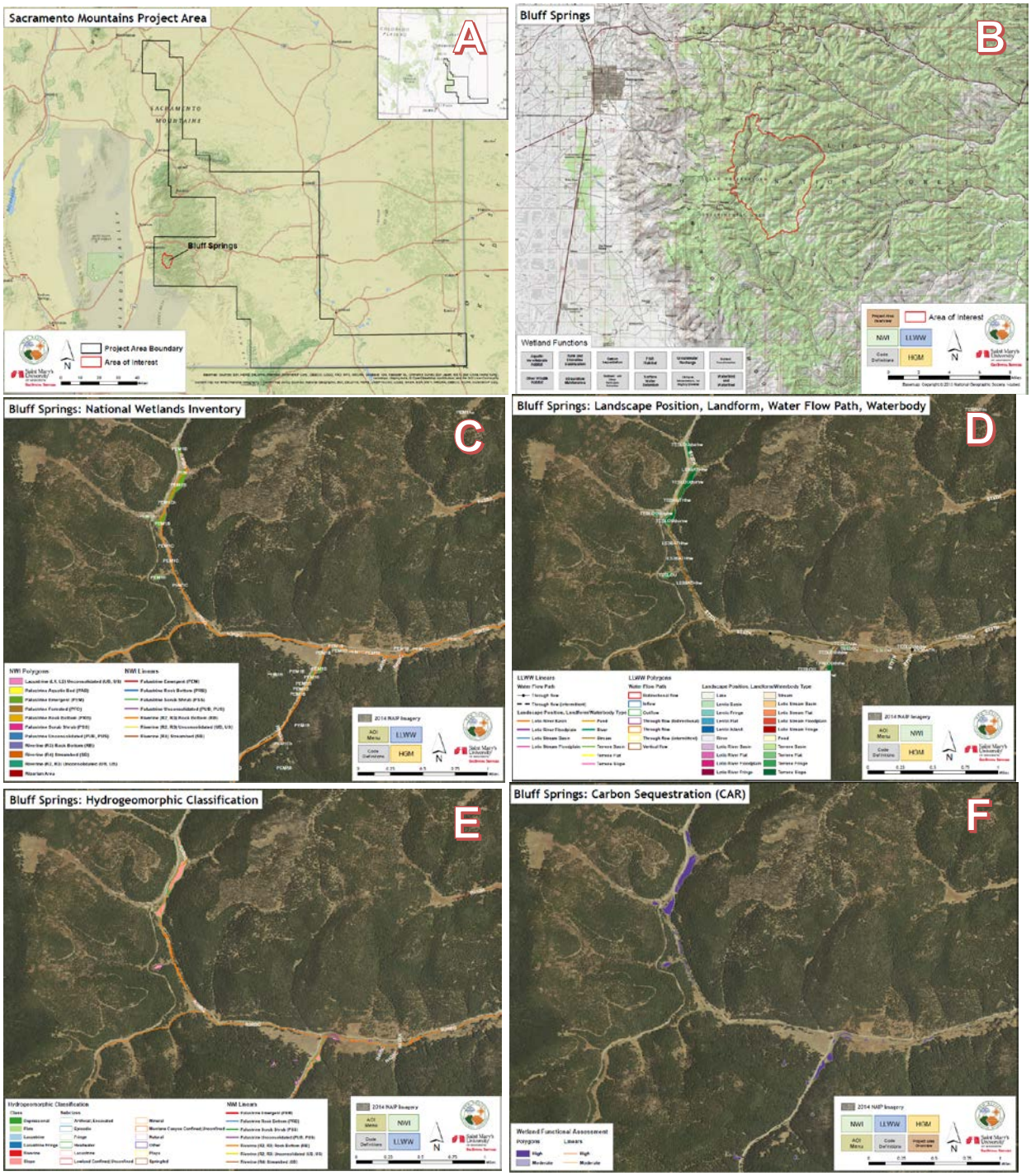


**Figure 9. Example pages from Bluff Springs Map Book. 9A. Location Map. 9B. Bluff Springs Area of Interest. 9C. Bluff Springs NWI. 9D. Bluff Springs LLWW. 9E. Bluff Springs HGM. 9F. Bluff Springs example of mapped functions - Carbon Sequestration Function.**

- A Project Story Map prototype was submitted to NMED by GSS in May 2017. The application is structured as a story that will walk the user through background project information, example

pictures, text and live maps that provide instructional example of the mapping and classification effort related to the project area and specific regional wetland types. Field check of the 45 Quads Add-on was conducted by a New Mexico Field Team on October 17 and 18, 2017. These additional data were used to enhance mapping in the area.

- WPO presented project status to Annual SWQB / USFS Coordination Meeting on November 8, 2017.
- Draft wetlands naming report was delivered by GSS on December 21, 2017, entitled "Development of a Naming Convention for Wetland Features in the Sacramento Mountains Mapping and Classification Project Area".
- The WPO attended the October 10, 2017, January 9, and February 13, 2018, New Mexico Geospatial Advisory Committee (NMGAC) meetings.
- On January 11, 2018 the WPO submitted to GSS a draft review document to assist with Wetlands Functional Assessment modeling. Entitled, "Geology Units and Groundwater Recharge", this document correlated the NM GIS surface geology layer, entitled "Geology". Geospatial layer units were identified by using a cursory GIS spatial query to derive high and moderate values for groundwater function potential within the project area. The query and review were performed by the WPO and reviewed by Lewis Land, National Cave and Karst Institute Geologist.
- The final project geodatabase was delivered on March 16, 2018. NMED IT staff and the WPO reviewed the data with GSS to discuss architectural consistency between previous project databases and the current delivery and areas that the NMED field team visited during October 2017.
- A no-cost extension to the Cooperative Agreement to June 30, 2019 was approved by EPA on May 31, 2018.
- The Wetlands Functional Correlation modeling, and final Geodatabase was accepted by NMED in September 2018.
- The WPO worked with GSS to review draft unique wetlands names created by the GIS-based application for the naming of unique wetlands features, Wetland ID. Wetland ID and Create Wetland ID support documents were provided to NMED as deliverables.
- WPO presented to New Mexico Geospatial Advisory Committee on NM Wetlands Mapping project November 8, 2018.
- WPC presented "NMED Wetlands Program and the Future of New Mexico's Wetlands" to a New Mexico Highlands University Water Resources Graduate Seminar Class on February 27, 2019. Twelve university faculty and graduate students were in attendance.
- WPO was interviewed by KRSN AM 1490, the local Los Alamos radio station on March 5, 2019. The topic was NM Wetlands Mapping.
- The GSS Final Report and Appendices for this project were accepted in March 2019. The Report and Appendices are on file at SWQB and can be viewed with the on-line SWQB draft Wetlands Map at: https://gis.web.env.nm.gov/oem/?map=wetlands
- Saint Mary's University of Minnesota Geospatial Services Director, Andy Robertson, gave presentations at the Society of Wetland Scientists 2018 Annual Meeting; the Association of State Wetland Managers 2018 Annual Meeting and the New England Biological Assessment

Wetlands Workgroup 2018 Fall Meeting which included New Mexico examples of wetland mapping in the Southwest.

- Using the Wetland ID GIS tool, a table and list of named unique wetlands features was created for the project area.

**Figure 10. Looking southeast across the Black River, Black River Recreation Area, BLM. Photo from cover page of Story Map "Exploring Southeastern New Mexico Wetlands." (Photo by M. McGraw)**

- WPC finalized draft Story Map template and it is housed on GSS server with a link to the NMED SWQB Wetlands Program website. The Story Map can be viewed here. Sacramento Story Map. https://smumn.maps.arcgis.com/apps/MapJournal/index.html?appid=ced60f87d9b3493e8c874397826538bc
- WPO presented the NM Wetlands Mapping project to the Pajarito Environmental Education Center, Los Alamos, NM on June 4, 2019; to the NM Geospatial Advisory Committee June 11, 2019; and to the Albuquerque Wildlife Federation, Albuquerque, NM on June 13, 2019.

**Figure 11. Looking east from Two Rivers Dam at the Rio Hondo drainage flowing toward the Pecos River. (Photo by M. McGraw)**

## List of Major Deliverables

- Scope of Work for Contractor
- RFP for Mapping Contractor
- Contract with Mapping Contractor
- Contract amendment
- QAPP and acknowledgements
- TAC Agenda, sign-in sheet and presentations
- Monthly GAC meeting info
- GSS Field trip report and photo interpretation conventions
- Technical Advisory Committee Agendas, sign-in sheets and presentations
- Draft Pre-Map Review Fieldtrip Report
- RFQ and signed contract for Wetlands Assessment Unit naming
- Online link to Sacramento Story Map template.
- Three Map Books: Agua Chaquita, Bluff Springs and Two Rivers Park.
- Report on Wetlands Naming model
- Geology Units and Groundwater Recharge document for wetland functional correlation model

- Draft Map Review field trip report
- Annual USFS/NMED Coordination meeting agenda and presentation
- CD #00F90601-1 No-Cost Extension Amendment.
- GSS draft final report and final report Appendices
- Wetland ID and Create Wetland ID support documents
- November 13, 2018 GAC meeting agenda, sign in sheet and presentation
- February 27, 2019 New Mexico Highlands University presentation
- Online link to Emile Sawyer KRSN Radio interview
- Unique wetlands features table and list
- June 11, 2019 GAC meeting agenda, sign-in sheet and presentation
- NM Wetlands Mapping Project presentation and sign-in sheet for Pajarito Environmental Education Center, Los Alamos, NM
- Presentation to New Mexico Highlands University and attendees list.
- NM Wetlands Mapping Project presentation and sign-in sheet for Albuquerque Wildlife Federation, Albuquerque, NM
- Finalized Story Map template
- Letters for additional match contributed by Contractor

**Figure 12. John Anderson, GSS, taking notes during the Draft Map Review field trip, at an ephemeral section of the Black River, south of Carlsbad Caverns National Park. Note the dry tinaja (arrow) – a unique arid lands wetland feature formed in bedrock that holds surface water. (Photo by M. McGraw)**

**Figure 13. Pond fringe wetlands at Headwaters Spring, the first perennial water in the Black River southwest of Carlsbad Caverns National Park. (Photo by M. McGraw)**

## Lessons Learned

This project is a continuation of NM Wetlands Mapping and Classification Projects in the Canadian Basin and Jemez Mountains Area. During the project period, a new technology was presented to us in the form of interactive story maps, which the NM Wetlands Program intends to use to present all of the mapping and classification data being developed for the entire State going forward. We also learned that two data review field trips may not be enough to cover all of a large project area. An additional field trip may be attempted for future mapping and classification projects.

*What made the project successful?*

This project has been overall successful in achieving its goals.

The project was successful in the quality of the products that were produced. Mapping coverage was 1.5 times the area anticipated when the project started. This was in part due to the efficiency and expertise of the mapping contractors. Habitat (Cowardin), hydrogeomorphic (LLWW) and (HGM), and Western Riparian classifications were applied to all wetlands.

All HGM subclasses were mapped in the project area. This is important for identifying the extent of the reference domain for each subclass and finding sites and correctly use the NMRAM for

assessment on that subclass. Another important use of HGM classification is that it is easier to communicate with the public compared to the codes of Cowardin and LLWW.

In addition, the NWI and LLWW classifications allowed for the modeling of a landscape level functional assessment for these data, which evaluates moderate and high functioning wetlands for each of up to 12 different wetlands functions.

Three mapbook products were created for areas that recent 319 grant projects were implemented or considered: Agua Chiquita, Bluff Springs and Two Rivers Park in Ruidoso, NM.

The Story Map shows the diversity of wetlands in NM and where they are located. The HGM classification page provides an easily understandable introduction to the broad classes of wetlands with images such as those in the figures above to illustrate wetlands by HGM class and subclass. The Wetlands Functions page explains why wetlands are important, what functions they serve, and which wetlands perform which functions in simple terms. Future iterations may include additional sections on wetland assessment, protection, and restoration.

These mapping products are used by Watershed Groups to better understand the wetland resources in their watershed and to prepare more comprehensive Wetlands Action Plans; by the US Forest Service as part of Forest Plan Revisions to better manage and protect wetland resources. The Wetlands Program continues participation in the NM Geospatial Advisory Committee to stay up-to-date on mapping initiatives, new products and partnerships that can be useful to the Wetlands Program.

The variety of applications in all aspects of the Wetlands Program - monitoring, restoration, standards and regulations, made this project all the more successful. The project demonstrates successful and innovative tools that the SWQB Wetlands Program, agencies, tribes and the public - on the local level and on the national level, can use for a variety of applications.

**Figure 14. Pond fringe wetlands near Brantley Reservoir, near Carlsbad, NM. (Photo by M. McGraw)**

*What made the project not so successful?*

The project was delayed by the need for additional time to complete tasks and obtain the required match for the project. Additional time was also required due to Financial Staff turnover; taking longer than anticipated to get contracts in place and needed accounting information.

## Technical Transfer

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

Three mapbooks locations were produced for the project: Agua Chiquita (HUC – 130600100201), Bluff Springs and Two Rivers Park in Ruidoso, NM.

Ten presentations were made to government, environmental organizations, students and the general public.

A radio interview was conducted with Emile Sawyer about the NM Wetlands Mapping project on KRSN AM 1490, a local radio station in Los Alamos, New Mexico on March 5, 2019. The interview is available on line.

A draft story map was produced and will be available for public viewing via the website: https://smumn.maps.arcgis.com/apps/MapJournal/index.html?appid=ced60f87d9b3493e8c874397826538bc

A draft interactive wetlands map with New Mexico current wetlands data was developed and is available via the website: https://gis.web.env.nm.gov/oem/?map=wetlands

A GIS tool to label unique wetlands polygons was developed by GSS for this project and has already been used to develop a list of wetlands polygons for the project area. The tool will be used for the remainder of wetlands polygons mapped within the State.

## 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.

## Future Activity Recommendations

This project is now the standard for four more current mapping projects funded by EPA Wetlands Program Development Grants including the Middle Rio Grande (MRG) and mountain ranges east of MRG, and the Gila/San Antonio watersheds and surrounding areas in the southwest corner of New Mexico, the Lower Rio Grande, including the Tularosa Basin. The SWQB Wetlands Program continues to keep up to date with current technological innovations to make these future projects even more useful and successful. In addition, we intend to update and improve mapping for all lands in New Mexico under state jurisdiction.

Also, there are many follow-up activities that can be developed using the mapping products in the area of wetland standards development, protecting rare or high-quality wetlands identified from the map products, additional monitoring of wetland types, etc. We also intend to continue with outreach and technical transfer activities to continue to make these map products useful for other applications and into the future.

**Figure 15. Looking southeast at a view of Bridal Veil Falls, near Cloudcroft, NM. (Photo by M. McGee)**