

GROUP A. PROJECT MANAGEMENT AND INFORMATION/DATA QUALITY OBJECTIVES

A1. Title Page

Quality Assurance Project Plan

Shush'Kin Fen Wetland Restoration

Revision 0

Funding Source:

Wetlands Development Grant #02F12301

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Submitted by:

New Mexico Environment Department
Surface Water Quality Bureau

A2. Approval Page

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Acronyms

DQO	Data Quality Objectives
USEPA	United States Environmental Protection Agency
NMED	New Mexico Environment Department
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
SOP	Standard Operating Procedures
SWQB	Surface Water Quality Bureau

A4. Project Purpose, Problem Definition, Background

This QAPP is the primary QA planning document for this project and there are no other relevant QA planning documents to cite. This QAPP refers to the project as the Shush'Kin Fen Wetland Restoration Project is being managed by River Source.

Project Purpose

The purpose of this Quality Assurance Project Plan (QAPP) is to ensure valid and defensible data is used in the Shush'Kin Fen Wetland Restoration Project. River Source will utilize innovative restoration methods for the Shush'Kin Fen (SKF) on the Cibola National Forest in New Mexico with the assistance of the SWQB Wetlands Program and Cibola National Forest staff.

Watershed Project Implementation for Shush'Kin Fen: A fen such as Shush'Kin is a wetland characterized by slow-moving water, often on a slope and containing peat-forming soils. While the Fen has water emerging from the center of the wetland, the water discharge from the Fen as of November 2025 is zero (0) cubic feet per second as all the emerging water infiltrates or evaporates before leaving the wetland. The main objective of the project is to utilize innovative methods to restore hydrology and re-wet the headwater slope wetlands which have been impacted by livestock trampling and trailing and soil erosion that has removed soils and wetland vegetation and reduced the water-holding capacity of the Fen. This project will improve ecological condition, hydrologic function, water quality, and wildlife habitat. The monitoring methods will provide indicators of wetland condition, vegetation response, and hydrologic retention of water.

Problem Definition

Shush'Kin Fen exhibits soil disturbance, hydrologic channelization, and degraded wetland vegetation communities. Restoration activities aim to improve hydrologic retention as indicated by the aerial extent (geographic size) of native wetland plants. Monitoring will document conditions before and after restoration to determine ecological response and guide adaptive management.

The data collection and monitoring components of the Shush'Kin Fen Wetland Restoration Project:

1. Wetland Classification and Condition Assessment

- Field-Verified Wetland Classification: Site-level determination of wetland types (e.g., riverine, depressional) through **direct observation**.
- Baseline Wetland Condition Assessment: **Visual**, ecological, and spatial evaluation of wetland health and stressors during the 2025–2026 field season

2. Photographic Documentation

- Photo Point Monitoring: Use of **standardized photo documentation methods** per Let the Water Do the Work (Zeedyk et al., 2009), Appendix I.

3. GIS (Geographic Information System)-Based Mapping and Analysis

- GPS-Based Field Mapping: **Collection** of geospatial coordinates using handheld GPS to identify wetland boundaries.

- GIS Spatial Analysis: Use of GIS tools to integrate field GPS data with existing datasets (e.g., NWI, NRCS soils).

4. Vegetation Monitoring

- Presence/absence Vegetation Surveys observed visually (no samples will be collected). **Purpose:** Classify vegetation community types and assess the location of wetlands and riparian areas.

5. Drone Imagery Monitoring

- Collection of Drone Imagery. **Purpose:** Assess the aerial extent of surface water and the as-built location of structures. Aerial imagery will be captured by a DJI drone.

More information on the type, quantity, and quality of information needed for its intended use (including performance and acceptance criteria) is discussed in section A6.

The monitoring data gathered will be used to help address the problems listed above and answer the question “Does the proposed restoration activities increase the aerial extent of native wetland plant vegetation?”

Background

Shush'Kin Fen is a groundwater-dependent wetland associated with Bluewater Creek headwaters. River Source will implement monitoring tasks in coordination with NMED SWQB Wetlands Program. Monitoring follows field methods recommended in “Monitoring Techniques List Suggested for Shush'Kin Fen Restoration (Bluewater Watershed Action Plan) including presence/absence vegetation surveys, GPS and GIS wetland mapping, drone imagery, and repeat photo point documentation.

River Source developed a conceptual restoration design with the Forest Stewards Guild for the Shush'Kin Fen in 2023 shortly after a pipe fence was installed. The wetlands have been degraded from years of overgrazing and the pipe fencing project was a critical start to protecting the Fen from livestock grazing. Today, the Fen has a hummocky appearance of mixed wetland/upland vegetation pedestals surrounded by continuous rill and gully formation caused by trampling and trailing, severe erosion and drying of the headwater wetland complex. Soil erosion processes along the edges and in the center of the Fen have crossed a threshold whereby what remains of the Fen will continue degrading without some intervention to reconnect the wetland sod continuous swales following the contour of the land to stop the draining of the Fen.



Image 1. View down the slope of SKF with hummocks that are eroded and no longer connected to other vegetation in the foreground. Note the absence of surface water.



Image 2. A view uphill through the center of the Fen with staff walking on top of the hummocks.



Image 3. A view uphill along the edge of the Fen showing where trampling by ungulates has caused soil erosion and draining and drying out of the Fen.

A5. Project Task Description

Restoration Activities

The innovative wetland restoration techniques will focus on harvesting and placing wetland sod plugs in approximately 9-10 swales along the contour of the land to slow, spread and sink water to improve wetland hydrology and re-wet former fen wetlands. The goal of the restoration will be to capture and restore sources of moisture and contributing hydrology, such as snow melt infiltration and/or redirecting spring flow back to the fen. When hydrology is restored, wetland vegetation productivity will increase creating opportunities for sediment capture and wetland soil formation. In addition, the project will include placing 4-5 feet tall brush piles in selected locations to deter deer and elk from continuing to create eroding trails on the edge of the Fen and to deter trampling of newly placed sod plugs. The project will contribute to Clean Water Act goals for protecting wetlands.

Monitoring

This project includes monitoring activities to:

- identify wetland vegetation plants using presence/absence surveys for the purpose of selecting sod plugs for harvest
- document site condition with repeat photography
- map wetland plant boundaries and the presence of surface water using GPS field mapping and GIS analysis
- capture drone imagery to assess the aerial extent of surface water, the presence of wetland vegetation and the location of as-built structures.

Schedule

The activities that are planned include: December 2025 -Draft QAPP for approval; Field reconnaissance site visit January 2026; Design and permitting by May 2026; Construction of approved design; May 2026 – October 2027: hold two public events; Outreach with Partners and interested Parties August 2027: Project Completion November 30th 2027

Table 1. Project Task, products, responsible party, timeline

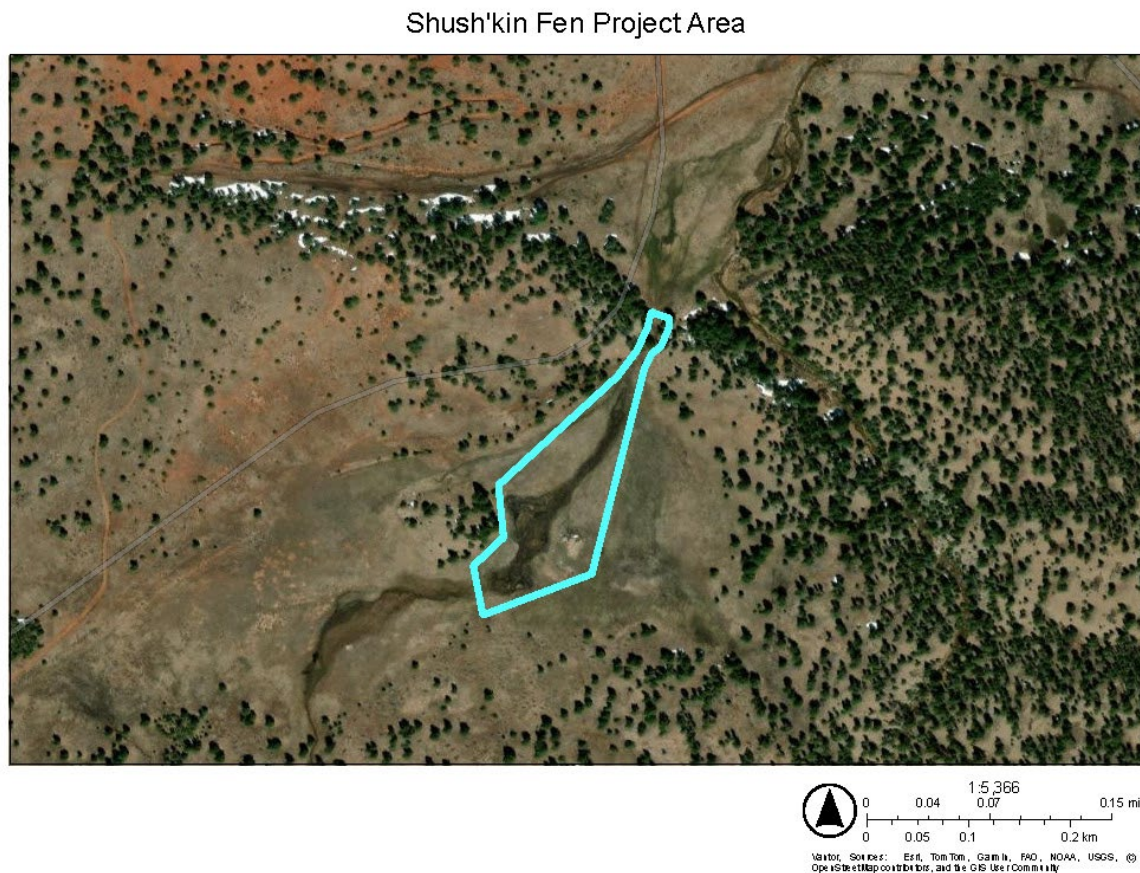
Task	Product	Responsible Party	Approximate Start Date	Approximate Completion Date
1: Project administration and Reporting	Timely reports complete semi-annual progress reports.	River Source-Project director and supervisor	December 1,2025	Month 1 of Year 1 Reporting Ongoing; due January 31 and July 31 each year Ending November 30, 2027
2: Field Reconnaissance	Draft implementation map of features complete field work to produce a map.	River Source staff	January 15, 2026	March 31, 2026
3: QAPP - Monitoring (pre/post)	Draft QAPP submit a draft QAPP to WPO for approval. NMED staff will give feedback and approve	River Source staff in collaboration with NMED	December 12,2025	February 28,2026
4: Final Design	Final design narrative and maps. Staking on-the-ground for project construction	River Source completes final design for WPO review and approval	February 1, 2026	May 1, 2026

5a: Construction - staging materials	Staging of materials and ingress/egress established	River Source will stage materials and clearly establish ingress/egress routes to minimize impact	May 1, 2026	August 31 st , 2026
5b: Construction - Sod swale construction	All clearances secured and swale construction is complete	River Source and volunteers install and protect plantings with brush fencing	May 15 th , 2026	October 1 st , 2027
5c: Mechanical placement of rocks	One rock dams, Zuni bowls and media lunas built	Install rock structures	May 15 th , 2026	October 1 st , 2027
6: Two workshops	Public engagement and connection with the restoration techniques and outcomes	River Source will partner with AWF, TU, Forest Stewards Guild and others to recruit and supervise volunteers	May 28, 2026	August 31 st , 2027
7: Outreach	Broad-based outreach in the region to ranchers, tribal, and US Forest Service staff to cultivate long-term wetlands restoration management	River Source works with WPO to effectively connect stakeholders with meaningful engagement in the project.	December 1 st , 2026	August 31 st , 2027

Project Area

River Source will implement on-the-ground methods for restoring at least 20 acres of degraded Shush'Kin Fen wetlands in partnership with the US Forest Service staff of the Mount Taylor Ranger District, Cibola National Forest, New Mexico.

Figure 1. Project Area Map



Monitoring Location Selection Criteria

Monitoring Locations will be selected based on representation of treatment areas, Fen hydrology, vegetation condition, and visual documentation points. Monitoring locations for repeat photopoints will be determined and documented during the design phase in January-March 2026 based on the location of the sod plug swales that will be built.

A6. Information/Data Quality Objectives and Performance/Acceptance Criteria

The Project will result in updated information about the current conditions of Shush 'Kin Fen to understand pre - post restoration effectiveness. From this information, we will produce maps of where restoration structures will be implemented and to serve to provide a baseline of the presence/absence of wetlands which can serve to track the effectiveness of the wetland restoration project. This can be tracked with accuracy since the points of data collection will be georeferenced and photo points of these locations will be provided. This will be elaborated in more detail in Identification of Project Environmental Information Operations section B1.

Data Quality Objective (DQO)

The quality of the data will be adequate to provide a high level of confidence in determining measurable indicators of wetland condition, vegetation response, hydrologic retention, and ecological change following restoration of the Shush'Kin Fen Restoration Project.

Data Quality Indicators

The measurement quality objectives will be sufficient to achieve the DQO and will be in conformance with those listed in the SWQB's QAPP. The Data Quality Indicators listed in the SWQB's QAPP and applicable to the data collected for this project are precision, accuracy, representativeness, comparability, completeness, and sensitivity.

DQI	Determination Methodologies
Precision	Photos will be GPS-ed and monumented for repeat sampling events for the life of the project. The basis for determining precision relocating the physical monuments and by training and consistently assigning the same people the responsibilities of collecting, recording and analyzing data, and staffed experienced staff members of the project team.
Accuracy	The basis for determining accuracy will be the comparison of photo-documentation, measurements obtained from monument locations, the recording of GPS location data for each sampling event as well as through the expert assessments of members of the monitoring team.
Representative	Repeat photos will be collected at a minimum of 50% of each of the estimated 9-10 sod plug swales in the restoration area.
Comparability	This project will collect new data where no data is available for comparison. However, methods for data collection are standardized and reproducible using procedures identified in this QAPP. Drone mapping and photographic monitoring will employ established methods that can be compared to other data collected with the same method.
Completeness	Sampling at 100% of the photo-point locations and annual mapping with the drone will achieve the completeness to generate usable data for the proper evaluation of project success or failure along with using the expert assessments of members of the SWQB/River Source project team. Complete datasets will be ensured by collecting all required data for each sampling method and verifying before leaving the field.
Sensitivity	Sensitivity is ensured based on the manufacturer's specified range and accuracy of the equipment being used and the expertise of the field staff to use and apply data collection methods in a manner that minimizes subjectivity or gross data collection errors.

A7. Distribution List

The QA Officer will ensure that copies of this QAPP and any subsequent revisions are distributed to members who have signature authority to approve this QAPP. The SWQB Project Officer will ensure that copies of the approved QAPP and any subsequent revisions are distributed to the Project Manager. The Project Manager will distribute to all other project personnel listed below. All members of the distribution list who do not have signature authority to approve this QAPP will review the QAPP and sign the Acknowledgment Statement prior to initiating any work for this project. The signed Acknowledgement Statements will be collected by the SWQB Project Officer and will be given to the QA Officer for filing with the original approved QAPP.

New Mexico Environment Department Surface Water Quality Bureau

Wetlands Program Project Officer: Shinya Burck, (505) 500-9783

Program Manager: Kathryn Lacey-Young, (505) 946-8863

Quality Assurance Officer: Emily Miller, (505) 660-3534

River Source

Director: Rich Schrader, rich@riversource.net, (505) 660-7928

Director of Operations: Carlos Herrera, carlos@riversource.net, (505) 231-4860

Project Outreach Coordinator: Kathy Hillock, kathy@riversource.net, (505) 660-7928

U.S. Environmental Protection Agency Region 6

Project Officer: Kyla Chandler, (214) 665-2166

A8. Project Organization

The table below lists all staff involved in EIO and describes their roles and responsibilities. The Project Officers will ensure that any staff responsible for conducting work in accordance with this QAPP will be provided a copy to read and acknowledge the QAPP requirements by signing the Acknowledgement Statement.

Table 2. Project Roles and Responsibilities

<i>Name</i>	<i>Organization</i>	<i>Title/Role</i>	<i>Responsibility</i>	<i>Contact Information</i>
Kate Lacey-Young	SWQB	Program Manager	Reviewing and approving QAPP, managing project personnel and resources	(505) 946-8863 kathryn.lacey@env.nm.gov
Emily Miller	SWQB	QA Officer	Reviewing and approving QAPP	(505) 660-3534 emily.miller@env.nm.gov
Shinya Burck	SWQB	Project Officer	Preparing and revising QAPP, distribution of QAPP, project reporting, coordinating with contractors, oversight of data collection, and EPA reporting	(505) 500-9783 Shinya.burck@env.nm.gov

Rich Schrader	River Source	Senior Manager	Project oversight, data management, and submittal of quarterly reports	(505) 660-7928 rich@riversource.net
Carlos Herrera	River Source	Project Operations Manager	Project design and implementation, construction oversight	505-231-4860 arlos@riversource.net
Kathy Hillock	River Source	Field Team Supervisor #1	Field training and supervision, monitoring, data collection, record keeping, and submitting reports	505-660-7928 kathy@riversource.net
Kyla Chandler	USEPA	Project Officer, Region 6	Reviewing and approving QAPP	(214) 665-2166 chandler.kyla@epa.gov

A9. QAO Independence

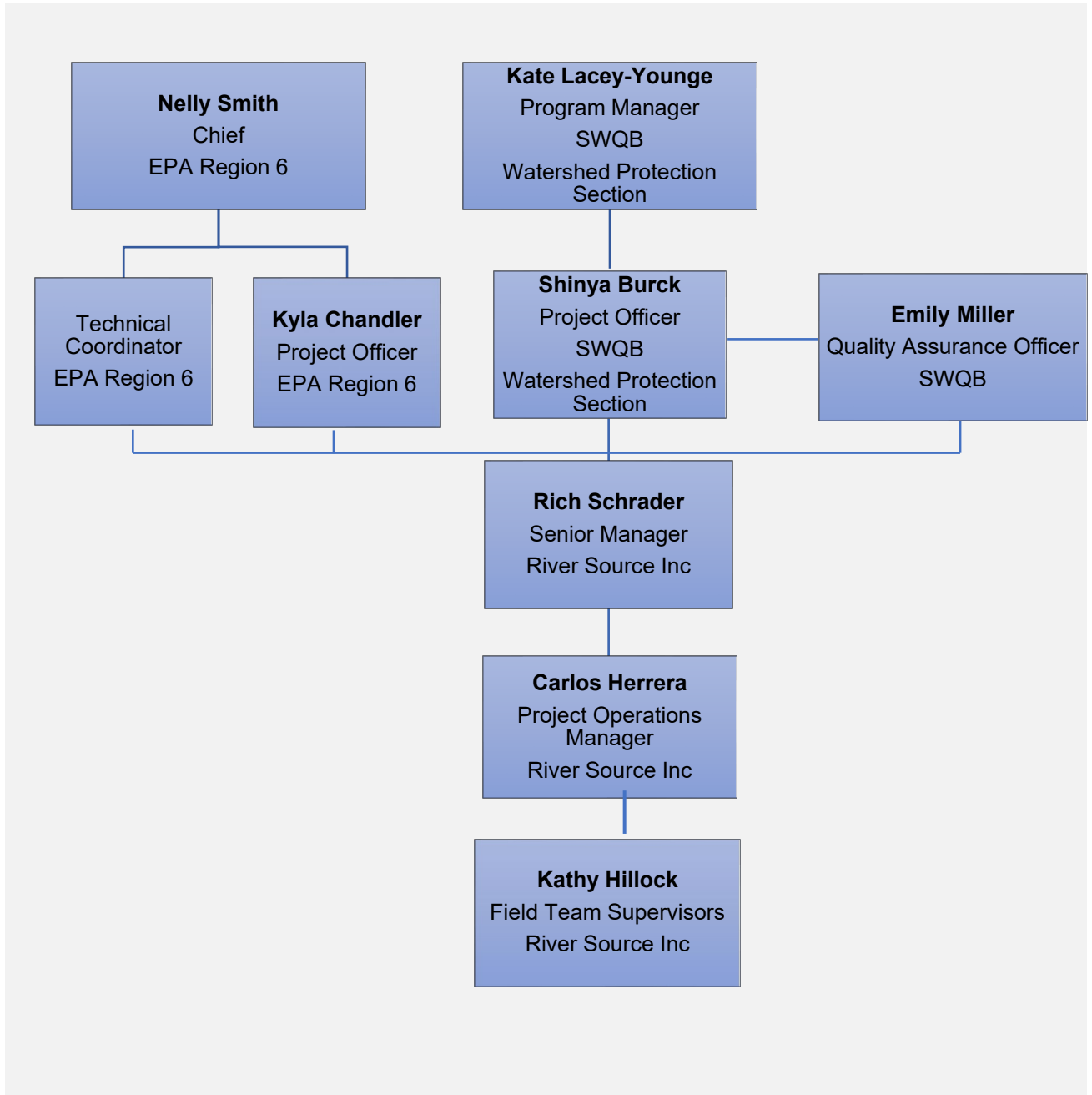
The QAO shall maintain independence in all QA matters and has the ability to directly and independently interact and initiate communication with technical staff and management. This direct access allows the QAO to independently elevate critical, quality-related issues to the attention of the Bureau Chief at their discretion without challenge or section approval. The QAO communicates with NMED senior management through the Bureau Chief and the Standards, Planning, and Reporting Team Supervisor. The SWQB Quality Management Plan (NMED/SWQB 2024) further documents the independence of the Quality Assurance Officer (QAO) from this project. The QAO is responsible for maintaining the official approved QAPP.

A10. Project Organization

The Organizational Chart (Figure 2, below) shows both the lines of authority to include the reporting relationships and lines of communication both within the organization responsible for the environmental operations and between the organization responsible for the work and all organizations involved in the project. The standard communication procedure when addressing concerns regarding data integrity, project discrepancies, or QAPP nonconformances involves the QAO and the Program or Project Manager, although the QAO also has a separate and direct line of communication to the EPA Region 6 Project Officers and Quality Assurance Manager as needed.

- Rich Schrader, (Director/Senior Management Project lead) will inform Project oversight, data management, and submittal of quarterly reports. He will also be responsible for communication with NMED and USEPA personnel listed below.
- Carlos Herrera (Project Operations Manager) will assist in project design and implementation, data management, construction oversight.
- Kathy Hillock (Field Team Supervisor) will assist in field training and supervision, monitoring, data collection, record keeping, and submitting reports.

Figure 2. Organizational Chart



A11. Personnel Training/Certification

This project will be primarily implemented by River Source, who will be trained by the SWQB Project Officer in accordance with procedures identified in SOPs referenced in this QAPP. Data collection and monitoring for this project will be implemented by River Source with technical assistance and oversight from the SWQB Project Officer. Any individual conducting work for the project will review this QAPP and sign the acknowledgment statement prior to initiating any work for this project. The signed acknowledgment statements will be kept on file with original QAPP by the QAO.

Rich Schrader is the Director of River Source which provides ecology, planning, monitoring, watershed restoration design and meeting facilitation services. Rich Schrader started River Source in 1997 to develop ecological restoration and citizen science projects with significant public involvement that lead to long-term and community-based watershed stewardship. He has designed erosion control, river restoration and revegetation projects and set-up ecological monitoring with private and public landowners on over 140 sites throughout New Mexico. He holds a Masters in Community and Regional Planning with a focus on watersheds from the University of New Mexico.

Carlos Herrera is the Director of Operations for River Source since 2011. He has 22 years of experience in water quality monitoring, riparian forest assessment, aquatic invertebrate sampling and analysis and environmental education. He has 14 years of experience in designing and implementing erosion control and revegetation projects from the Rio Puerco, Cochiti Pueblo and in the City of Santa Fe. He is skilled in the use GPS technology, ecological monitoring design, and data analysis using MS Excel. He holds an BS in Natural Resources from New Mexico Highlands University.

Kathleen "Kathy" Hillock is Project Outreach Coordinator and will serve as Field Team Supervisor, has worked in land conservation in the Santa Fe region since 2002. She holds a 2024 Master of Science for Teachers from New Mexico Tech and before that served as the Lead Teacher for the May School, teaching all core subjects students with learning differences starting in 2015. She joined River Source in March 2025 after running our Watershed Watch program with excellence for over 5 years.

Any new staff for the project will be trained by River Source project lead prior to field work.

A12. Documents and Records

The SWQB Project Officer will make copies of this approved QAPP and any subsequent revisions available to the Project Manager. The Project Manager will distribute to all individuals on the distribution list who do not have signature authority for approving the QAPP. When changes affect the scope, implementation, or assessment of the outcome, this QAPP will be revised to keep project information current. The SWQB Project Officer, with the assistance of the QAO, will determine the effects of any changes to the scope, implementation, or assessment of the outcome on the technical and quality objectives of the project. This Project Plan will be reviewed annually by the SWQB Project Officer to determine the need for revision.

Project documents include this QAPP, field notebooks, calibration records, validation and verification records, recorded field data, records of analytical data in hard copy or in electronic form, and QC records. Also included are project interim and final reports. Data captured on a global positioning system (GPS), camera, drone, smart phone, tablet, or laptop will be downloaded to a River Source's computer or an external hard drive at the end of each day. Copies will be made of all data and stored separately from the original data.

All digital project data will be kept in a project file on a River Source computer and on a separate external backup hard drive at the River Source office. Hard copy project documents will be kept in a project folder in a binder at the River Source office. All hard copy documents will be digitized and stored on a River Source computer and backup hard drive (see Table 3). Copies of the data will be distributed by River Source to NMED SWQB Project Officer after each field season, typically at the end of November. More detail on the management of project information is covered in B7. Environmental Information Management.

Table 3. Data Records for the Project

Document	Type of Form	Storage Location	Field Sheet Used
QAPP	Electronic (.doc) & Hard Copy	River Source Computer and Microsoft (MS) One Drive	Quality Assurance Project Plan Standard. C10 2105-S-02.1 . Located at: https://www.epa.gov/system/files/documents/2024-04/quality_assurance_project_plan_standard.pdf
Wetland Vegetation presence or absence information	Electronic (.doc)	River Source Computer and MS One Drive	Field observations made on site. No data form will be used
Photographic Documentation	Electronic Form Survey123	River Source Computer and ESRI Survey 123 online	Repeat photos with Photo Point Record. "Let the Water do the Work" and digital Survey 123 Form
GIS-Based Mapping and Analysis	Electronic Files	River Source Computer, MS One Drive and Survey 123/ESRI online	NA
Drone Imagery Monitoring	Electronic (.mp4) and GeoTiff & Hard Drive	River Source Computer and MS One Drive	NA

Interim and Final Reports	Electronic (.doc) & Hard Drive	River Source Computer and MS One Drive	NA
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GROUP B. IMPLEMENTING ENVIRONMENTAL INFORMATION OPERATIONS

This QAPP was developed following the Quality Assurance Project Plan Standard and QAPP Standard Checklist (EPA, 2023).

B1. Identification of Project Environmental Information Operations

Table 4 describes specifics for the monitoring that will be conducted for the Shush’Kin Fen Restoration Monitoring for this project including activities to measure wetland vegetation community change using presence/absence surveys, documenting site condition changes using repeat photographic documentation, map wetland boundary and condition using GPS field mapping and GIS analysis, perform Vegetation Monitoring which supports adaptive management by measuring ecological change, and using drone imagery monitoring to assess the aerial extent of surface water and the as-built location of structures. For more details about the monitoring refer to section B2.

Table 4. Project Monitoring Specifics

Responsible Party	Monitoring	Location	Frequency
River Source	Wetland Vegetation Presence / Absence Mapping with Survey 123	At Shush’Kin Fen inside the pipe fence area	Pre and Post Restoration spring 2026 & fall 2027
River Source	Photographic Documentation	At Shush’Kin Fen inside the pipe fence area, on the edges of the Fen on the sides of the swales	Pre and Post Restoration spring 2026 & fall 2027
River Source	GIS-Based Mapping and Analysis	GPS data on the extent of the Fen edge boundary	Pre and Post Restoration spring 2026 & fall 2027
River Source	Drone Imagery Monitoring	At Shush’Kin Fen inside the pipe fence area	Pre and Post Restoration spring 2026 & fall 2027

The activities listed above will satisfy monitoring the effectiveness of the Shush’Kin Fen Restoration, provide data that will adhere to the established project DQO’s and help to assess the performance and acceptance criteria of data collected during the Shush’Kin Fen Restoration.

B2. Methods for Environmental Information Acquisition

The Project Operations Manager will be responsible for recording any changes or updates made to the procedural documents used for data collection as outlined below. If alterations are made to the EIO the Program Manager must let the SWQB Project Officer know so the QAPP can be updated. No modifications are planned or expected at this time. The EIO described in this QAPP are not intended to support emergency response activities.

Field Activities Environmental Measurements

1. Photographic Documentation

Photo Point Monitoring: Use of standardized photo documentation methods per Let the Water Do the Work, Appendix I (Zeedyk et al., 2009) by developing photo monitoring locations and filing out the Form Appendix II and taking photos of the site before during and after the restoration. Purpose: Track visible changes in condition over time using Survey 123 to create a georeferenced photo repository. Status: Field data collection and long-term documentation. Form: Permanent Photo Point Record (see Appendix III).

2. GPS and GIS-Based Mapping and Analysis

GPS-Based Field Mapping: Collection of geospatial coordinates using handheld GPS and Survey 123 to identify wetland boundaries. Purpose: Accurately map location and extent of wetlands. Status: Informs the GIS datasets if wetland extent.

Analysis using Survey 123 , Google Earth Pro and ArcGIS: Use of Google and ArcGIS tools to integrate field Survey 123 data with existing datasets (e.g., National Wetland Inventory, and Google Earth) to create pre and post maps of the aerial extent of wetland vegetation. Purpose: Identify wetland extent, degradation, and prioritize areas for protection. Status: Pre and Post-field analysis technique.

3. Wetland Vegetation Presence / Absence

Presence/absence Vegetation Surveys Purpose: Assess the location of fen wetland boundary. Status: Field technique. Field team uses a vegetation identification handbook per Common Wetland Plants of New Mexico (Sivinski, 2016). Status: Visual/Qualitative vegetation identification and no samples will be collected. This will be performed before and after the projects at or near the 9 swales

4. Drone Imagery Monitoring

Purpose: Assess and quantify the aerial extent of wetland vegetation boundaries and the as-built location of structures to quantify the change in wetland vegetation before and after the project. Aerial imagery will be captured by a DJI drone along with ground-truthed observations of the location of obligate wetland vegetation marked with GPS point features and location of built structures. The point feature data on wetland vegetation will assist in associating the distinct color of obligate wetland vegetation to enable drawing of boundaries and polygons of wetland

vegetation. The resulting drone imagery and point features will enable drawing of the boundaries of the wetland vegetation polygons. The drawing of the polygons will be made on a computer using GIS by the staff who collected the GPS and drone imagery. The drone will be flown with GPS location active, ensuring home point GPS coordinates have been recorded, all firmware and flight map data have been updated with manufacturer's specifications, and airspace clearance has been authorized. The pilot will fly the drone below 400 feet above ground level and take nadir photos of the Shush'Kin Fen.

Laboratory Analyses

Because there are no plans to collect samples for lab analyses, no laboratory analytical methods are needed.

Existing Information

The only non-direct measurement used during this project will be Google Earth imagery to compare with the drone imagery we will collect. Google Earth imagery will not affect the quality of data related to this project as it will not be the primary source of data analysis, but only as a way to compare the map we create with the drone.

B3. Integrity of Environmental Information

Data generated for this project will only be in electronic form and therefore there are no chain of custody or handling requirements. The handling and storage of field logs and imagery data are described in section B7.

B4. Quality Control

The Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs) guide the collection, processing, and validation of geospatial and environmental data for the Shush'Kin Fen Restoration to ensure accuracy, consistency, and reliability. Repeat photographs will be taken from the same monitoring locations and utilize the form from Appendix III for establishing ground benchmarks, GPS location data to establish GPS consistency, and past images to confirm photo alignment from the same locations. Quality control (QC) activities—including GPS field data collection, standardized map digitizing, ground-truthing of the location of obligate wetland vegetation, and visual inspection of drone overlays—are performed routinely throughout the project to verify data precision and reliability. We will validate the identification of wetland vegetation using the regional wetland plant guide. Each QC activity is done on a regular schedule, and any errors or inconsistencies are quickly corrected and recorded in the metadata. Corrective actions are determined based on the nature and magnitude of discrepancy and are recorded to ensure transparency and traceability. All QC procedures, frequency schedules, corrective actions, and documentation follow the Quality Objectives and Criteria for Measurement Data, the SWQB Standard Operating Procedures (SOPs), and the photo-documentation procedures outlined in this QAPP. These practices reduce variability, improve data quality, and ensure dependable vegetation classification

and watershed assessment results.

B5. Instrument/Equipment Calibration, Testing, Inspection, and Maintenance

Calibration and Frequency

The equipment requiring calibration and testing is the DJI Drone and phones used for data collection. The proper functioning and use of current firmware for the DJI drone will be checked before deployment. Documentation of calibration and verification will be maintained by Richard Schrader and records will be kept with resulting data.

The DJI drone will be calibrated before each flight. This includes checking to see if the gimbal for the camera is working properly and that the drone controls (joysticks correctly directs the drone flight pattern) are functioning properly. Before collecting data, the drone needs to demonstrate to the pilot that it responds correctly such as showing that the camera gimbal is turning towards the nadir position and back up to horizontal and the wings are operating to properly move the drone forward, back, up and down. In addition, the GPS on the drone and on the controller need to show that the GPS location has been established. The drone will only be flown in authorized airspace with the GPS location active, and a home point has been recorded. The drone controller automatically prompts the pilot to update all firmware and flight map data to manufacturer's specifications before each flight and this step will be completed in the office before every drone mission.

Testing, Inspection, and Maintenance

Field (GPS, camera and drone) equipment will be inspected prior to each sampling trip. All instruments and equipment will be tested, inspected and maintained in accordance with the manufacturer's specifications as included in the associated instrument/equipment manual. The DJI drone, Garmin GPS, and GPS-enabled phones will be inspected for damage and fully charged before each field event. In addition, drone flight restriction maps on the drone will be updated before each flight. If condition of equipment is in doubt, it will not be used. In the event of instrument failure, Rich Schrader and Carlos Herrera will correct the problem, reject the resultant data or accept the data with notations.

B6. Inspection/Acceptance of Supplies and Services

There are no supplies or consumables that could affect the quality of data related to this project.

B7. Environmental Information Management

River Source will be responsible for data management of Survey 123 data, ArcGIS and GoogleEarth maps, and drone images. Software updates to use the current version of ArcGIS, Survey123 and GoogleEarth will be completed on a daily basis when the software is used. All data will be converted to electronic format, stored and backed up by River Source as well as stored online using ESRI cloud data services. Computer hard drives are backed up daily using online cloud data storage on Microsoft One

Drive. Hard copies of field sheets will be converted to electronic format and maintained in a project electronic binder organized by assessment date and stored on computer hard drives and a project back-up hard drive at River Source offices. Data will be sent to the SWQB Project Officer by the end of each field season by River Source, typically by the end of November. Upon receiving data, the SWQB Project Officer will store data on SWQB network drive. The SWQB will retain project documents in accordance with applicable sections of New Mexico's Disposition of Public Records and Non-Records regulation, codified at 1.13.30 New Mexico Administrative Code (NMAC) and Retention and Disposition of Public Records regulations, codified at 1.21.2 NMAC.

GROUP C. ASSESSMENT, RESPONSE ACTIONS, AND OVERSIGHT

C1. Assessment and Response Actions

The Project Officer will provide project oversight by periodically assisting with and/or reviewing data collection efforts. A review of the baseline data collection and monitoring efforts by the SWQB Project Officer will take place at the end of each monitoring season, typically in November-January months after the preceding summer-fall field season. The SWQB Project Officer will assess project progress to ensure the QAPP is being implemented, including periodic audits by the QAO, as needed. Any problems encountered during this project will be immediately reported to the SWQB Project Officer who will consult with appropriate individuals to determine appropriate action. Should the corrective action impact the project or data quality, the SWQB Project Officer will alert the QAO. The QAO or SWQB Project Officer may request re-monitoring, correction, or additional documentation. If it is discovered that monitoring methodologies must deviate from the approved QAPP, a revised QAPP must be approved before work can continue. All problems and adjustments to the project plan will be documented in the project file and included in the final report.

C2. Oversight and Reports to Management

Annual reports will be submitted by the Director of River Source to the SWQB Project Officer and will include the progress of the project and any available data. Printouts, status reports or special reports for SWQB or EPA will be prepared upon request. The final report will be submitted to the SWQB Project Officer by November 30th, 2027. The SWQB Project Officer will be responsible for submitting the final project deliverables to EPA through their Grants Reporting Tracking System.

GROUP D. ENVIRONMENTAL INFORMATION REVIEW AND USABILITY DETERMINATION

D1. Environmental Information Review

Data will be reviewed by the Field Team Supervisor for erroneous data, incomplete data, and transcription errors prior to demobilization from the field site. Data will be considered usable if the requirements of this QAPP are followed and the data is within acceptable range limits as defined under

this QAPP. Data that appears incomplete or questionable for the parameter will be flagged for review. Flagged data will be discussed with the SWQB Project Officer to determine the potential cause and usability. If a reasonable justification for use of the data cannot be attained, those data will not be used in analysis and implementation of activities listed under this QAPP unless the data can be recollected and assessed for usability.

Validation and Verification Methods

River Source will ensure that valid and representative data are acquired. Verification of field sampling and analytical results will be performed by the River Source in accordance with the SWQB SOP 15.0 for *Data Verification and Validation Procedures*. Verification and validation (V&V) of data and equipment will occur after every field season using the attached Verification and Validation Worksheet in Appendix II. In the event questionable data are found, the SWQB Project Officer will be notified and will consult appropriate personnel to determine the validity of the data. Results of the verification and validation process will be included in the final reports.

D2. Usability Determination

The quality of the data will be adequate to provide a high level of confidence in determining whether the Shush'Kin Fen Restoration Project is meeting the project goals, as stated in the approved scope of work and in this QAPP. Data will be reviewed by the Field Team Supervisor for errors in data, incomplete data and transcription errors prior to demobilization from the field site. Data will be considered usable if the requirements of this QAPP are followed and the data is acceptable as defined under this QAPP. River Source will ensure that valid and representative data are acquired. Verification of field sampling and analytical results will be performed by River Source. Verification and validation (V&V) of data will occur after every field season using the attached V&V worksheets. In the event questionable data are found, the SWQB Project Officer will be notified and will consult appropriate personnel to determine the validity of the data. Results of the verification and validation process will be included in the final reports. If the project's results do not meet this requirement, then additional monitoring may be necessary to fill in data, which may include an extension of the monitoring period to measure effects that were not apparent during the project period.

References

New Mexico Environment Department/Surface Water Quality Bureau (NMED/SWQB). 2021. *Quality Assurance Project Plan for Water Quality Management Programs* [QAPP].

Harrelson, Cheryl et al. Stream Channel Reference Sites: An Illustrated Guide to Field Technique. US Department of Agriculture, US Forest Service Rocky Mountain Research Station. 1994.

Sivinski, Robert. Common Wetland Plants of New Mexico. US Army Corps of Engineers, Albuquerque, NM. 2016.

Zeedyk, Bill; Clothier, Van. Let the Water Do the Work, Appendix I, Outline for Photographic Monitoring Plan. The Quivira Coalition, Santa Fe, NM, 2009.

Zeedyk, Bill; Walton, Mollie; PhD, and Tamara Gadzia. Characterization and Restoration of Slope Wetlands in New Mexico: A Guide for Understanding Slope Wetlands, Causes of Degradation and Treatment Options October, Quivira Coalition, NMED 2014.

Bluewater Wetland Action Plan, River Source and NMED, 2026

U.S. Fish & Wildlife Service. National Wetland Inventory on the National Wetlands Mapper
<https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/>

Appendix I - Monitoring Techniques List Suggested for Shush'Kin Fen Restoration

The list summarizes the suggested field-based techniques to be used for Shush'Kin Fen Restoration Project. Each entry includes a brief description, purpose, and relevant SOP reference where applicable.

1. Wetland Classification and Condition Assessment

- **Field-Verified Wetland Classification:** Site-level determination of wetland types (e.g., riverine, depressional) through direct observation relying on the US Fish and Wildlife Service National Wetlands Inventory. Purpose: Establish ecological types for mapping and prioritization.
- **Baseline Wetland Condition Assessment:** Visual, ecological, and spatial evaluation of wetland health and stressors during the 2025–2026 field season. Purpose: Identify degradation and restoration needs. Status: Active. No samples will be collected or chemical/lab methods used.

2. Photographic Documentation

Photo Point Monitoring: Use of standardized photo documentation methods per Let the Water Do the Work (Zeedyk et al., 2009), Appendix I. Purpose: Track visible changes in condition over time using Survey 123 to create a georeferenced photo repository. Status: Field data collection and long-term documentation. Form: Permanent Photo Point Record.

3. GIS-Based Mapping and Analysis

- **GPS-Based Field Mapping:** Collection of geospatial coordinates using handheld GPS to identify wetland boundaries. Purpose: Accurately map location and extent of wetlands. Status: Active; informs GIS datasets.
- **GIS Spatial Analysis:** Use of GIS tools to integrate field GPS data with existing datasets (e.g., NWI, NRCS soils). Purpose: Identify wetland types, connectivity, degradation, and prioritize areas for protection. Status: Post-field analysis technique.

4. Vegetation Monitoring

Visual Presence/Absence Vegetation Surveys, *Purpose:* Classify vegetation community types and assess the location of wetlands and riparian areas. Field technique. Field team uses a vegetation identification handbook per Common Wetland Plants of New Mexico, Handout for US Army Corps of Engineers Workshop, 2016. Status: Active. No samples will be collected or chemical/lab methods used.

5. Drone Imagery Monitoring

Collection of Drone Imagery, *Purpose:* Assess the aerial extent of surface water and the as-built location of structures. Aerial imagery will be captured by a DJI drone. Drones will be flown with GPS location active, ensuring home point GPS coordinates have been recorded, all firmware and flight map data have been updated with manufacturer's specifications, and airspace clearance has been authorized. The pilot will fly the drone below 400 feet above ground level and take nadir photos of the Shush'Kin Fen.

Appendix II – Verification and Validation Worksheet

Data and Equipment Verification and Validation Worksheet

Type of Data: _____

Name and Date of Personnel Collecting Data: _____

Verification of Complete Record [Y/N]: _____

Instrument in working order [Y/N]: _____

Checked for anomalous data [Y/N]: _____

Validated by [name of reviewer]: _____

Validated on [Date]: _____

Appendix III – Permanent Photo Point Record

PERMANENT PHOTO POINT RECORD — INITIAL TAKE (FORM 1)

Photo Point No. _____ Project Name _____

Grant/Project Name and Number: _____

Landowner/Property Name: _____

Subject and Purpose of Photo: _____

Retake Frequency: _____ Retake Due: _____

Retake Dates: _____

Photo Point Description (Describe access to point, point vicinity, and specific location; include sketch map below)

Legal Description: _____

USGS Quad Map: _____ UTM Coordinates: _____

Sketch Map: Include background reference points to help with relocation (use additional pages as needed)

Reference Point 1:
Description: _____

Reference Point 2:
Description: _____

Acknowledgement Statement



New Mexico Environment Department Surface Water Quality Bureau

Shush'Kin Fen Restoration
Quality Assurance Project Plan Acknowledgement Statement

This is to acknowledge that I have received a copy (in hard copy or electronic format) of the "Shush'Kin Fen Restoration" Quality Assurance Project Plan.

As indicated by my signature below, I understand and acknowledge that it is my responsibility to read, understand, become familiar with and comply with the information provided in the document to the best of my ability.

Signature or Electronic Signature (e-certified accepted)

Name (Please Print)

Date

Return to SWQB QAO Emily Miller