

CARSON WATER SUBCONSERVANCY DISTRICT Regional Water System & Flood Committee

NOTICE OF PUBLIC MEETING

DATE: February 6, 2023
TIME: 10 am
LOCATION: CWSD Conference Room & Zoom
777 E. William Street, Suite 209
Carson City, NV 89701

Virtual attendance is available via [Zoom](#). If you prefer to phone in, call (669)900-9128.
Meeting ID: 844 0365 2037; Passcode: 457167

AGENDA

Please Note: The Carson Water Subconservancy District (CWSD) Board may: 1) take agenda items out of order; 2) combine two or more items for consideration; and/or 3) remove an item from the agenda or delay discussion related to an item at any time. All votes will be conducted by CWSD Board of Directors. Reasonable efforts will be made to assist and accommodate individuals with disabilities who wish to join the meeting. Please contact Catrina Schambra at (775)887-7450 (catrina@cwsd.org), at least two business days in advance so that arrangements can be made.

1. Call to Order the CWSD Regional Water System & Flood Committee
2. Roll Call
3. For Discussion Only: Public Comment - Action may not be taken on any matter brought up under public comment until scheduled on an agenda for action at a later meeting.
4. For Possible Action: Approval of Agenda
5. For Possible Action: Approval of the Regional Water System and Flood Committee January 24, 2022, Meeting Minutes
6. For Possible Action: Update on the 30-Year Regional Water Plan
7. For Possible Action: Discussion regarding Updating the Regional Floodplain Management Plan
8. For Possible Action: Discussion regarding future regional water funding needs
9. For Discussion Only: Public Comment - Action may not be taken on any matter brought up under public comment until scheduled on an agenda for action at a later meeting.
10. For Possible Action: Adjournment

Supporting material for this meeting may be requested from Catrina Schambra at 775-887-7450 (catrina@cwsd.org) and is available on the CWSD website at www.cwsd.org.

AGENDA ITEM #5

**MINUTES OF LAST
BOARD MEETING**

CARSON WATER SUBCONSERVANCY DISTRICT
Regional Water System & Flood Committee

January 24, 2022, 2 pm

Minutes

The CWSD Regional Water System & Flood Committee meeting was held in the CWSD Conference Room, 777 E. William Street, Suite 110A, Carson City, NV 89701 and via Zoom.

Committee Members Present:

January Riddle (Zoom)
Lisa Schuette
Mike Workman
Pete Olsen (Zoom)

CWSD Staff Present:

Ed James

Absent Committee Members:

Fred Stodieck

Also Present:

N/A

Director Workman called the video/teleconference meeting of the CWSD Regional Water System & Flood Committee to order at 2 pm. Roll call determined a quorum of the committee was present.

Item #3 – Discussion Only: Public Comment - None

Item #4 - For Possible Action: Approval of Agenda

Director Schuette made a motion to approve the Regional Water System and Flood Committee Agenda. The motion was seconded by Director Olsen and unanimously approved by the Regional Water System and Flood Committee.

Item #5 - For Possible Action: Approval of the Regional Water System and Flood Committee Minutes of August 25, 2021

Director Workman made a motion to approve the Regional Water System and Flood Committee Minutes from August 25, 2021. The motion was seconded by Director Schuette and unanimously approved by the Regional Water System and Flood Committee.

Item #6 For Possible Action: Discuss the Regional 30-year Water Resource Project.

Item # 7 For Possible Action: Review the draft RFQ for selecting an Engineering firm to help develop the Regional 30-Year Water Resource Project.

Item # 8 For Possible Action: Discuss Funding Alternatives for the Regional 30-year Water Resource Project.

All three items were combined for discussion.

Mr. James discussed the goals of the Regional 30-Year Water Resource Project. One goal would be to collect the future water demands and sources for all the major water purveyors. Included in this would be the proposed locations of the water sources. This data would be given to the USGS to run in the Middle and Upper watershed models. The results would show what impacts, if any, there would be to the groundwater levels and surface flows. The results generated from the models will identify if there are any shortfalls in water supply or would downstream users be adversely impacted. If there are any shortfalls the plan would identify ways to mitigate the impacts and what infrastructure would be needed to meet the future demands. The plan would then be run using different climate change scenarios to see how these changes could impact the water plan.

CWSD has submitted a grant request to NDEM to help fund this project. We have been told we have a very good chance of getting the funds but we do not know when these funds will become available. To hedge our bets staff is proposing to submit a funding request to the Bureau of Reclamation under the WaterSmart grant for Basin Studies. If we do not need these funds, we would withdraw our grant application. Mr. James asked the committee if CWSD should begin the process of hiring a consulting firm to start this study or wait until we have heard back on our funding request. The committee recommended holding off hiring the consultant to see if we do receive the grant funds. If we do not get the grant funds the committee mentioned the possibility that CWSD could pay for the consultant.

As part of the RFQ, the committee recommended that one of the criteria for selecting the consultant is their knowledge of the Alpine Decree and Nevada Water Law.

No action taken.

Item # 8 – Discussion Only: Public Comment - None

There being no further business to come before the Regional Water System and Flood Committee, Director Workman adjourned the meeting at 2:50 pm.

Respectfully submitted,
Edwin James
General Manager

AGENDA ITEM #6

CARSON WATER SUBCONSERVANCY DISTRICT
Regional Water System & Flood Committee

TO: Committee Members

FROM: Edwin James

DATE: February 6, 2023

SUBJECT: Agenda Item # 6– For Possible Action: Discuss the Regional 30-Year Water Resource Project

DISCUSSION: CWSD received two proposals to conduct the Regional 30-Year Water Resource Project. The selection committee reviewed the proposals and recommended hiring Lumos. Attached is a copy of their proposal. On February 6, CWSD, Lumos, and the USGS will get together to review the work that the USGS is doing for this project. The discussion will focus on the scope, schedule, and costs for Lumos to complete their portion of the project.

STAFF RECOMMENDATION: Provide direction to staff.



PREPARED FOR CARSON WATER SUBCONSERVANCY DISTRICT

CARSON RIVER WATERSHED 30-YEAR REGIONAL DROUGHT AND WATER SUSTAINABILITY PLAN

Carson City, Nevada

JANUARY 13, 2023



Carson City
308 N. Curry Street, Suite 200
Carson City, Nevada 89703
775.883.7077

January 13, 2023

Edwin James, General Manager
Carson Water Subconservancy District
777 E. William Street, Suite 110A
Carson City, NV 89701

Subject: Carson River Watershed 30-Year Regional Drought and Water Sustainability Plan

Dear Ed James and Members of the Selection Committee:

Lumos & Associates (Lumos) is pleased to submit our team's qualifications to the Carson Water Subconservancy District (CWSD) for the opportunity to continue our previous work developing long range plans to help manage water resources within the Carson River Watershed. We have assembled a team that will provide CWSD with unmatched legacy knowledge of the Carson River Watershed and regional river planning expertise required to exceed the project goals.

With this project's 3-year timeframe, we believe it is essential to provide CWSD with team continuity and longevity. Our Lumos team will be led by Tim Russell as Principal in Charge and Project Manager, and Jonathan Lesperance as assistant Project Manager. Additionally, our primary support staff including Mike Hardy and Kristin Tokheim, both of whom have extensive experience in water system and water resource master planning.

The Lumos team has worked with stakeholders and water purveyors in the Carson River Watershed for decades, serving municipalities such as Carson City, Churchill County, City of Fallon, TCID, GRGID, IHGID, Lyon County, Town of Minden, Douglas County, Storey County, Carson Water Subconservancy District, and Alpine County. We bring to this project longstanding relationships with the watershed stakeholders, understanding of how the watershed functions, and expertise in the water law governing the watershed — the Alpine Decree.

Assisting our Lumos team on this project are our partners who each bring their own expertise:

- **PWRE Water Resource Engineering (PWRE)** has developed and managed the water resource models for the Truckee River Operating Agreement (TROA) and the Truckee Carson Irrigation District (TCID). Their experience and knowledge of how to manage resources on a regional river corridor like the Carson River is essential to developing a resource management plan for the 30-year Regional Drought and Water Sustainability Plan. PWRE's work on the drought component of the Water for the Seasons report is also critical experience to bring to this proposed effort.
- **Resource Concepts, Inc. (RCI)**, specifically **Bruce Scott**, has an extensive history of water right management within the Carson Basin, knowledge of the Alpine Decree, and a working relationship with the Division of Water Resources and the Federal Water Master. Bruce is a recognized expert when it comes to water rights on the Carson River.

We look forward to working with you on this project and hope to hear from you soon. If you have any questions, please do not hesitate to contact Jonathan or myself directly at trussell@LumosInc.com, jlesperance@lumosinc.com or via telephone at 775.883.7077.

Sincerely,

Tim Russell, P.E., WRS
Principal in Charge, Project Manager

Jonathan Lesperance, P.E.
Assistant Project Manager

2.1 Firm's Experience on Similar Projects

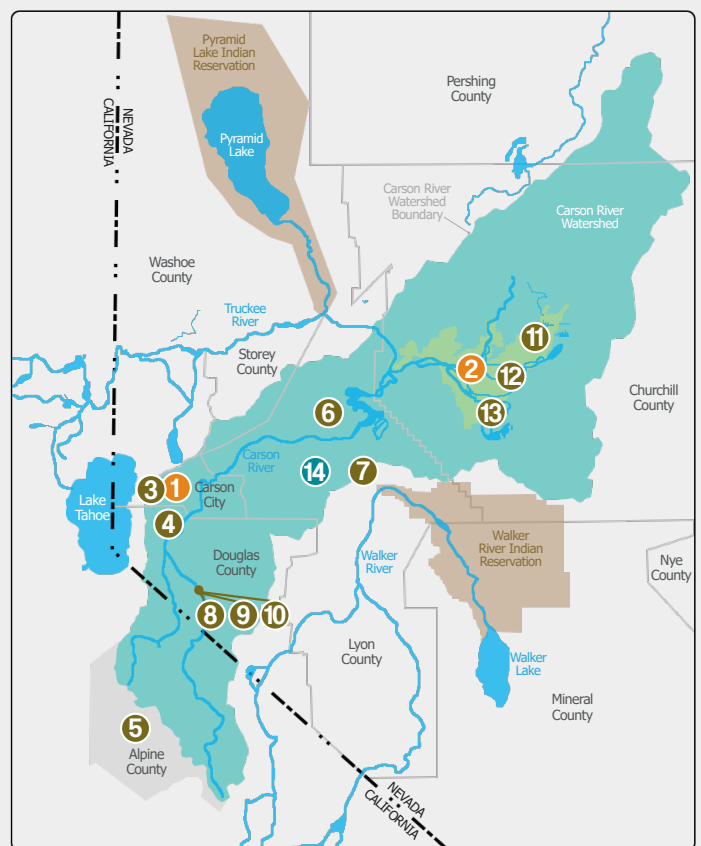
Team Overview

Lumos & Associates has over 40 years of experience providing long-range water resource and water system planning for local governments, municipalities, and water utilities in the Carson River Watershed. This includes the Town of Minden, Carson City, Indian Hills GID, Gardnerville Ranchos GID, Lyon County, Douglas County, TCID, Churchill County, the City of Fallon, CWSD, and others. Our experience has allowed Lumos to gain an unparalleled understanding of how the Carson River Watershed functions, as well as to develop longstanding relationships with its water stakeholders so that we can provide CWSD with the most qualified and experienced team for developing the Carson River Watershed 30-Year Regional Drought and Water Sustainability Plan.

Joining Lumos are regional experts PWRE Water Resources Engineering (PWRE), and Resource Concepts, Inc., (RCI). PWRE is an engineering firm that specializes in modeling water resource systems, including both surface and ground water systems. PWRE is an industry leader with expertise in defining, communicating, and solving complex water resource management challenges. PWRE's expertise is evidenced by their work in developing and managing the Truckee River Operating Agreement (TROA) operational model for Truckee Meadows Water Authority (TMWA) as well as managing the water resource model for Truckee Carson Irrigation District (TCID) in Churchill County. PWRE's work and experience on the Water for Seasons Project to model drought and climate change impacts will provide CWSD with the confidence that the drought model can be reliably used for effective drought management planning on the Carson River. RCI brings an extensive portfolio on water rights and the Alpine Decree within the Carson River Watershed. Lumos has previously partnered with RCI on CWSD's Water Marketing Study.

Regional river corridors like the Carson River Watershed span complex and diverse geographic, climatic, and political conditions, all of which can make water resource management a challenging undertaking. The Lumos team brings regional expertise in water resource management of a regional river corridor and we understand how to navigate these challenges. This experience is highlighted in the following pages and details the Lumos team's experience with addressing water resource management needs for Carson River Watershed stakeholders, modeling of riverine systems, and Water Rights expertise and knowledge of the Alpine Decree.

Cumulatively, our decades of related experience in regional river corridors, and especially our local experience in the Carson River Watershed (detailed in the figure below), demonstrates the Lumos team's ability to navigate the challenges of water resource planning for a regional river corridor. This will ensure that CWSD can build an effective, practical, and longstanding plan for the benefit of all of the stakeholders within the watershed, both now and through the next 30 years.



Lumos Offices

- 1 Carson City
- 2 Fallon

Lumos Projects/Experience




- 3 Carson City, Marlette/Hobart Planning
- 4 Indian Hills, District Engineer
- 5 Alpine County, County Engineer and Surveyor
- 6 CWSD, Water Marketing Study
- 7 Lyon County, Past County Engineer
- 8 Gardnerville Ranchos GID, District Engineer
- 9 Gardnerville Ranchos GID, Water Master Plan
- 10 Gardnerville Ranchos GID, Water Resource Plan
- 11 Truckee-Carson Irrigation District System Improvement Plan Master Plan (Water Efficiency and Drought Upgrades)
- 12 Various Water Projects in Churchill County and Fallon
- 13 Nearly 20 Projects for NAS Fallon

Team Experience (Not a Lumos project)

- 14 CWSD, 2013 Master Plan (Tim Russell)

Team's Experience

The Lumos approach will be very collaborative. We will serve as the prime consultant with PWRE and RCI as subconsultants. The distribution of project involvement is as follows:

	<ul style="list-style-type: none"> Overall project management and primary point of contact for Client and Stakeholder coordination for the project Schedule, oversee, and facilitate the multiple agency/utility meetings and coordination Review and assess/update existing water master plans for the 13 major water users within the Carson River Basin Tabulate existing water use for major water users 	<ul style="list-style-type: none"> Prepare estimates of future water use Analyze water quality and quantity (including water rights) to highlight potential shortcomings in future water needs for the agencies. Coordinate with PWRP on modeling components related to drought, climate change, and water management Primary authorship of the 30 Year Regional Drought and Water Sustainability Plan
	<ul style="list-style-type: none"> USGS model interpretation Water resource allocation model development Drought and climate change impacts to water resource availability and allocation, 	<ul style="list-style-type: none"> Potential inclusion of an Alpine Decree/Riverware Model to assess the management of surface water resources from a different modeling perspective than the Modflow model developed by USGS
	<ul style="list-style-type: none"> Analyze water rights to highlight potential shortcomings in future water needs for the agencies 	<ul style="list-style-type: none"> Compliance with the Alpine Decree

We are familiar with the project and understand CWSD's expectations that this project will require a collaborative approach to address the needs a diverse group of stakeholders in an ever-changing climatic context. The following comparable projects specifically highlight our prior experience with similar scopes and include the following:

- Water master planning
- Regional water supply planning
- Water resource planning
- Water rights
- Addressing complex stakeholder issues and resolution
- Presenting potentially contentious issues to the public
- Knowledge of the Alpine Decree and Nevada Water Law

Carson Water Subconservancy District Water Marketing Study

Project Relevance | Lumos' work on the Water Marketing Study laid the initial groundwork for the proposed 30-Year Regional Drought and Water Sustainability Plan being proposed. The Marketing Study examined storage opportunities including managed aquifer recharge (MAR) and aquifer storage and recovery (ASR), both of which are potential drought and sustainability concepts. The Marketing Study also included an initial climate and runoff analysis that demonstrated the increase in runoff earlier in the season. This knowledge will be expanded upon as part of the climate portion of the proposed Sustainability Plan. This project is an example of our regional water resource planning experience. Stakeholder coordination with the following entities: Carson City, Storey County, Douglas County, Minden, IHGID, Churchill County, Federal Water Master, Nevada Division of Water Resource (State Engineer), Lyon County, and others.

Work Description | Working with the Carson Water Subconservancy District, Lumos prepared the Carson River Water Marketing Study to develop the initial concepts for managing surface water within the watershed. This effort analyzed the changing runoff patterns and showed that statistically more runoff is

occurring earlier outside of irrigation season, resulting in water running down river due to the Carson River's lack of storage. As part of the Marketing Study, Lumos identified potential storage areas for surface water to allow for a more effective use of the water resources. Additionally, Lumos conducted an engineering assessment related to water supply, use of existing infrastructure, new infrastructure, and viability of the potential storage and recovery of water along the river.

Additional efforts during the Water Marketing Study included coordination with the State Engineer's Office, Federal Water Master, public utilities along the Carson River, ranchers, TCID, Bureau of Reclamation, and USGS. The Water Marketing Study was funded through the Bureau of Reclamation (BOR) and is an initial tool to enhance the reliability of water within the entire water shed. The study also explored partnerships and the feasibility of exchanging water amongst the various stakeholders along the River.

Client | Ed James, Carson Water Subconservancy District, 775.887.7450, edjames@cwds.org

Contract Details | Lumos was the Prime Consultant and Resource Concepts was a successful partner. Initial Contract: \$149,900 | Final Contract: \$122,278.50 Schedule: Project was completed on schedule

Carson City Public Works, Marlette Lake Water System Demand Evaluation

Project Relevance | The Marlette Lake Water System (MLWS) Demand Study was an analysis of the sustainability of the MLWS to determine the available water resource, water rights, and the sustainability of the resource during drought and other seasonal changes. Lumos prepared this evaluation for Carson City to help the City determine its need for the MLWS water resources now and in the future. This effort is nearly identical to the regional effort proposed for the Carson River Basin as part of the 30-Year Regional Drought and Water Sustainability Plan only a smaller scale. Stakeholder coordination with the following entities: Carson City, Storey County, State of Nevada

Work Description | Carson City uses a combination of ground and surface water sources to meet municipal water demand. One source of surface water is the historic Marlette Lake Water System (MLWS), owned by the State of Nevada. Currently, the MLWS supplies water from Marlette Lake, Hobart Reservoir, and east slope springs to Virginia City and Carson City. Carson City needed to quantify their current and future water demands from the MLWS so that this water can be reserved for the City's needs.

Lumos was retained by Carson City to study and complete MLWS Demand Study to the City quantify their claims and future use of the surface water resource attributed to Marlette and Hobart Lake. The analysis considered future demands and water supply scenarios to meet these demands. Scenarios were developed based on existing and planned water supplies as well as supply capacity during dry, average, and wet precipitation years (from the MLWS). Based on these water supply scenarios, Lumos determined the feasible demand required/available from the MLWS across variable climatic conditions and time of use (seasonality). Lumos was able to produce a final product that provided the City with the knowledge to plan for and manage their water needs from the MLWS now and into the future.

Client

Eddy Quaglieri, Water Utility Manager, Carson City Public Works, 775.283.7395, equaglieri@carson.org

Contract Details

Lumos was the Prime Consultant | Initial Contract: \$33,000 | Final Contract: \$33,000 | Contract Variance: Not Applicable | Schedule: Project was completed on schedule

Gardnerville Ranchos General, Improvement District Water Master Plan and Updates

Project Relevance | For the Gardnerville Ranchos General Improvement District (GRGID) Water Master Plan, Lumos evaluated the existing usage, water rights, pumping capacity, storage, and transmission capabilities of the District's water system. Part of the evaluation included identifying shortcomings within the system as well as the means to address those shortcomings. This evaluation is similar to the effort that the Lumos team will perform for the water purveyors in the Carson River Watershed. Stakeholder coordination with the following entities: GRGID, Douglas County

Work Description | Building upon our earlier GRGID Water Resource Plan, GRGID commissioned Lumos to develop a water master plan for its water system. The purpose of the water master plan was to develop comprehensive water system maps, assess the condition of existing facilities, prioritize life cycle infrastructure replacements, determine capacity upgrades required to accommodate future growth, evaluate future water supply strategies, and develop a short-term and long-term capital improvement plan over a 20-year planning period. As part of the master planning efforts, water demand factors were developed based on metered usage records by land use type. Future water demands were estimated by assessing potential growth areas that could be served by the GRGID water system. The GRGID water system was evaluated against existing and future water demands in accordance with Nevada Administrative Code (NAC) requirements for water storage, supply, and distribution using hydraulic modeling software. The master plan also provided initial alternative analysis related to future water resources that may be available to GRGID to supply future growth or replace other dwindling/contaminated supplies.

Client

Greg Reed, District Manager, Gardnerville Ranchos GID, 775.265.2048, agreed@grgid.com

Contract Details

Lumos was the Prime Consultant | Initial Contract: \$88,100 | Final Contract: \$88,100 | Contract Variance: Not Applicable | Schedule: Project was completed on schedule

Gardnerville Ranchos General Improvement District Water Resource Plan

Project Relevance | Lumos evaluated the existing water quality and quantity available to the Gardnerville Ranchos General Improvement District (GRGID). This same type of evaluation of the primary water systems within the Carson River will be required for the proposed plan. Stakeholder coordination with the following entities: GRGID, Douglas County

Work Description | GRGID commissioned Lumos to develop a water resource plan for its water utility. The purpose was to provide background of its water resource status in terms of water rights, water quantity and quality concerns, current water resource availability, and the effects of up to a 9-year drought to evaluate the groundwater resource and future water supply outlook. The plan also made recommendations on monitoring mechanisms for the wells and provided a growth projection analysis for the next twenty years with recommendations and options for GRGID to obtain additional water supplies to meet future demand.

Client

Greg Reed, District Manager, Gardnerville Ranchos GID, 775.265.2048, agreed@grgid.com

Contract Details

Lumos was the Prime Consultant | Initial Contract: \$48,000 | Final Contract: \$48,000 | Contract Variance: Not Applicable | Schedule: Project was completed on schedule

Truckee Carson Irrigation District (TCID) System Improvement Plan

Project Relevance | Our efforts on the SIP for TCID was a master plan to determine the means of creating a more efficient system for the delivery of water to the TCID customers. The efficiency gains will help create a more sustainable system that will function better in drought conditions. This effort for TCID is similar in concept to the effort that Lumos will utilize for the 30-Year Regional Drought and Water Sustainability Plan, but on a regional basis. Our work for the proposed Plan will evaluate means to better manage the available water resources and create a program for sustaining the resource now and in the future. Stakeholder coordination with the following entities: TCID, BOR

Work Description | Truckee-Carson Irrigation District (District) is located in Northern Nevada, encompassing the cities of Fallon and Fernley, and 20 miles west of the city of Reno. The District serves a dual purpose of operating and maintaining the United States Bureau of Reclamation's (Reclamation) Newlands Project (herein referred to

as the Project) and acting as the established and elected representative of the Project's water right owners. The Project's conveyance begins at both the Truckee and Carson Rivers and runs generally east terminating at a variety of state and federally managed wildlife areas. TCID delivers water through 391 miles of canals and laterals to 2,500 patrons and 59,000 irrigated acres. In addition to delivering water to hundreds of farms, the District also delivers water to the City of Fernley, the United States Fish and Wildlife Service, the Fallon Paiute-Shoshone Tribe, United States Navy, and State of Nevada Department of Wildlife.

Lumos was retained by Farmers Conservation Alliance (FCA) under a contract via the Bureau of Reclamation to assist TCID in developing a System Improvement Plan (SIP) to identify ways to improve the efficiency and sustainability of the existing TCID delivery, monitoring, and management system. The SIP provides an evaluation of the existing Carson Division's delivery system (Canal, laterals, and sublaterals); how this delivery system could be modernized (automation, flow measurements); and ultimately represent a 10 percent design level and budgetary cost estimates. Principle methods for modernization that were explored include:

- ▶ Lining the delivery system with concrete, geosynthetics, or a combination
- ▶ Piping the delivery system with materials such as HDPE and Concrete
- ▶ Installation of monitoring and control equipment including SCADA, automation, and telemetry equipment

This plan identified significant areas of water loss that can be removed by upgrades to the delivery system. Efforts to improve the efficiency of the delivery system and reduce water losses will help create a more sustainable system that better utilizes the water resources within the TCID system especially in drought years.

Client

Mattie Bossler, Water Resource Engineer, Farmers Conservation Alliance, 541.423.3549, mattie.bossler@fcasolutions.org
Ben Shawcroft, General Manager, TCID, 775.423.2141

Contract Details

Lumos was the Prime Consultant for FCA (Subconsultant to FCA) | Initial Contract: \$70,000 | Final Contract: \$70,000 | Contract Variance: Not Applicable | Schedule: Project is ongoing and on schedule

Great Basin Water Co. 2021 Integrated Resource Plan (IRP) - Water Master Planning

Project Relevance | This evaluation of the existing systems within the Great Basin Water Company's service area that Lumos provided is very similar to the effort that will be performed for the Carson River. As part of the proposed 3-Year Regional Drought and Water Sustainability Plan, Lumos will need to evaluate the existing usage, water rights, pumping capacity, storage, and transmission capabilities of the systems within the Carson River Basin. Part of the necessary evaluation will also identify shortcomings within the systems in terms of water rights, production, storage, etc. and identify means to address those shortcomings on a local and regional basis.

Work Description | The Great Basin Water Co. (GBWC) contracted with Lumos & Associates to develop Consolidated Integrated Resource Plans (IRP) of all four of their utility business divisions in Nevada. These divisions include the Cold Springs Division (Water System Only), Spanish Springs Division (Water System Only), Spring Creek Division (Water & Wastewater Systems), and Pahrump Division (Water & Wastewater Systems). An IRP is similar to a utility master plan and is required by the Public Utility Commission of Nevada (PUCN) every three years for private utilities with annual revenues over \$1 million. Lumos has developed the IRPs for GBWC, since 2016.

Tasks in developing the IRP include condition assessments of existing infrastructure, a review of the historical water meter and sewer flow data for creating water demand and sewer flow forecasts, evaluation of the water and sewer systems for capacity to meet existing and future demands, hydraulic modeling of existing and proposed conditions, and development of near-term action plans (3-year timeline) and long-term preferred plans (20-year timeline) identifying critical projects to address insufficiencies and aging infrastructure. Other tasks included assistance in preparing written testimony for public hearings with the PUCN and Bureau of Consumer Protection (BCP) and responding to data requests from both agencies for technical information.

Client

James Eason, Vice President Operations, Great Basin Water Co., 775.337.1001, jameseason@greatbasinwaterco.com

Contract Details

Lumos was the Prime Consultant | Initial Contract: \$361,025 | Final Contract: \$361,025 | Contract Variance: Not Applicable | Schedule: Project was completed on schedule

Water for the Seasons - "A Program for Sustaining Water Resources in a Changing Climate"

Project Relevance | The work performed by PWRE in terms of the water management model impacts from climate change and drought is identical to the work efforts proposed as part of the Drought and Sustainability Plan. Additionally, the outreach and coordination with the entities involved in the Waters for the Seasons is very closely mirrored by the outreach and parties that will be involved in the proposed sustainability plan. As part of the proposed 30-Year Regional Drought and Water Sustainability Plan, the Lumos Team will need to evaluate the impacts of climate and drought on the water resource management within the Carson River Basins. Stakeholder coordination with the following entities: most of the water users within the northern Nevada area.

Work Description | From 2014 to 2019, PWRE teamed with the University of Nevada Reno, the Desert Research Institute, and the USGS to win a \$3.8 million competitive grant from the National Science Foundation and the United States Department of Agriculture, to perform a five-year climate change study focused on the Truckee and Carson Basins in northern Nevada and California. The purpose of the project was to integrate science and water policy research with extensive community outreach to identify the expected impacts of climate change and solutions for protecting valuable water resources throughout northern Nevada, and by extension to inform climate change solutions to snow-fed arid lands worldwide. PWRE conducted the operations modeling component of the study, collaborated closely with the climate change hydrology team in the development of a library of relevant hydrology datasets, and was a key participant in the community outreach portion of the project.

Client

Dr. Maureen McCarthy, 775.784.8023 and Dr. Greg Pohll, 775-674-7523, National Science Foundation (NSF), United States Department of Agriculture (USDA), subcontractor to the Desert Research Institute (DRI)

Contract Details

PWRE was the Prime Consultant | Initial Contract: \$450,000 | Final Contract: \$450,000 | Contract Variance: Not Applicable | Schedule: Project was extended from four years to five years due to other partners on the team needing more time to develop models

TMWA 2020-2040 Water Resources Plan

Project Relevance | This scope of work performed for TMWA is nearly identical to the proposed work on the Carson River Basin in terms of water resource management.

Work Description

Every 5-years Truckee Meadows Water Authority (TMWA) completes a Water Resource Plan that is made available to the public. PWRE was contracted to participate in the development of the 2020-2040 plan. PWRE's role was to conduct the analysis for and to author the Climate Change portion of the report, which examined the potential impacts to TMWA's supply/demand nexus due to changing climate. PWRE engineers used climate change hydrology data from eight General Circulation Models (GCMs) that were developed in the Water for the Seasons project to evaluate impacts to TMWA's supply under climate change. As a part of this project, methodologies and tools were developed to allow TMWA to independently run the Climate Change hydrology data through the Truckee/Carson RiverWare® Planning Model with various system supply alternatives. At the conclusion of this project PWRE President, Shane Coors presented the findings to the TMWA Board of Directors.

Client/Contact: Truckee Meadows Water Authority, Bill Hauck (bhauck@tmwa.com)

Contract Details

PWRE was the Prime Consultant | Initial Contract: \$75,000 | Final Contract: \$75,000 | Contract Variance: No variance | Schedule: 2018 - 2020, Completed on schedule



2.1 Personnel Availability and Experience



Tim Russell, P.E., WRS
Principal-in-Charge &
Project Manager

Tim brings over 20 years of engineering and project management experience to northern Nevada, has been a dedicated Lumos Team member since 2014. Prior to joining Lumos, Tim worked with Bruce Scott to author the 2013 Regional Comprehensive Water System Plan. Tim is a Water Rights Surveyor who manages Indian Hills GID water rights, and previously managed the Town of Minden. Tim is a Principal Owner at Lumos, allowing for contractual agreements and decisions to be made at a local level.

Comparable Project 1
Carson City Water Marketing Study
Full Project Description in Section 2.1.

Comparable Project 2
TCID System Improvement Plan
Full Project Description in Section 2.1.

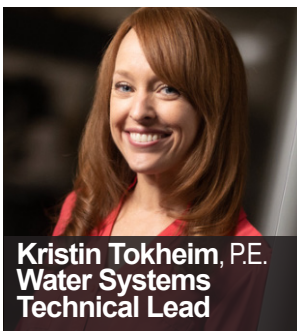


Jonathan Lesperance, P.E.
Assistant PM

As Assistant Project Manager, Jonathan brings prior experience in assisting Clients with addressing complex stakeholder issues and presenting potentially contentious issues to the public. Jonathan presently serves as District Engineer for the Gardnerville Ranchos General Improvement District (GRGID), and County Engineer for Eureka County, Nevada. In these roles especially, Jonathan routinely provides public testimony and presentations to the public as well as their publicly elected Boards. Jonathan has participated in developing water master plans and water infrastructure designs for both entities.

Comparable Project 1
Carson City Water Marketing Study
Full Project Description in Section 2.1.

Comparable Project 2
Gardnerville Ranchos GID Water Master Plan.
Full Project Description in Section 2.1.



Kristin Tokheim, P.E.
Water Systems
Technical Lead

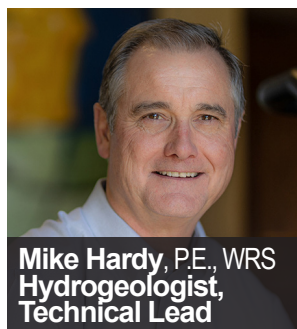
Kristin has over 18 years of experience in the planning and design of water infrastructure projects. Her background includes water supply, treatment, storage, and distribution; water systems; master planning; permitting; and engineering services during construction. Since joining Lumos in 2016, Kristin has completed a variety of projects as the Water System and Water Resources Technical lead, this includes the water master plans for the Gardnerville Ranchos GID and the Great Basin Water Co. Integrated Resource Plans (IRPs).

Comparable Project 1
Gardnerville Ranchos
GID Water Master Plan
and Updates

Full Project Description
in Section 2.1.

Comparable Project 2
Great Basin Water
Co. Integrated Water
Resource Plans

Full Project Description
in Section 2.1.



Mike Hardy, P.E., WRS
Hydrogeologist,
Technical Lead

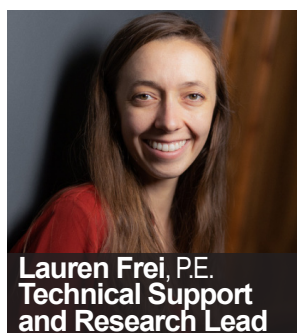
Mike joined Lumos in 2003 and since has managed multiple water resource projects including exploration drilling, monitoring wells and production well, groundwater investigations, county wide water resource master plans, water rights management, water and sewer planning documents, preliminary design reports, master plans, and feasibility studies. Several of these documents were used successfully to obtain grants and loans from State and Federal funding agencies, and many of those projects have been developed into successful water, sewer, and water treatment projects. As a Water Rights Surveyor, Mike has experience working with the Alpine Decree including litigation expert witness.

Comparable Project 1
Gardnerville Ranchos
GID Water Master Plan
and Updates

Full Project Description
in Section 2.1.

Comparable Project 2
Great Basin Water
Co. Integrated Water
Resource Plans

Full Project Description
in Section 2.1.



Lauren Frei, P.E.
Technical Support
and Research Lead

Lauren has over 7 years of civil engineering experience specifically related to Water and Wastewater Projects. Her project knowledge includes hydrologic and hydraulic watershed studies, Flood Insurance Study (FIS) report development and internal review, Hydraulic modeling and internal review, Wastewater disinfectant research, Wastewater bench scale testing, Conveyance analysis, and Inflow & infiltration field studies.

Comparable Project 1
Hobart Dam/Marlette
Demand Study

Full Project Description
in Section 2.1.

Comparable Project 2
Gardnerville Ranchos
GID Water Master Plan
and Updates

Full Project Description
in Section 2.1.



Shane Coors, P.E.
Principal, PWRE

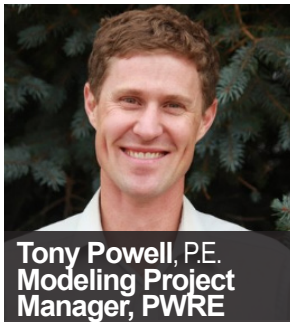
Shane's primary area of expertise is water resources systems modeling. He oversees the design, construction, operation, and training of clients to operate state-of-the-art hydrologic and hydraulic modeling tools that are in use throughout the western United States for managing large, complex, high-profile water resource systems. These models are used for a wide variety of purposes including long-term planning, short-term operations, hydrologic and operations forecasting, uncertainty and risk analysis, water accounting, for the official administration of complex policy and court decrees, and for litigation support.

Comparable Project 1
Water for the Seasons
"A Program for
Sustaining Water
Resources in a
Changing Climate

Full Project Description
in Section 2.1.

Comparable Project 2
TMWA 2020-2040 Water
Resources Plan

Full Project Description
in Section 2.1.



Tony Powell, P.E.
Modeling Project
Manager, PWRE

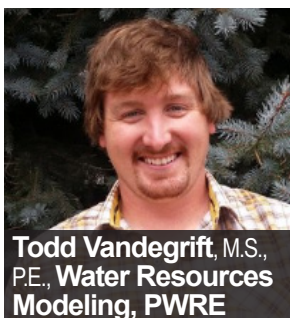
Tony is a water resources engineer specializing in complex basin modeling and reservoir operations with short and long-term outlooks. He is a project manager at PWRE where his focus is on water resources system model using the RiverWare modeling software. He has maintained, designed, and used several models in the Western United States including in the Truckee-Carson and Colorado River Basins. His work has focused on designing modeling tools to evaluate risk in these basins.

Comparable Project 1
Water for the Seasons “A
Program for Sustaining
Water Resources in a
Changing Climate

Full Project Description in
Section 2.1.

Comparable Project 2
TMWA 2020-2040 Water
Resources Plan

Full Project Description in
Section 2.1.



Todd Vandegrift, M.S.,
P.E., Water Resources
Modeling, PWRE

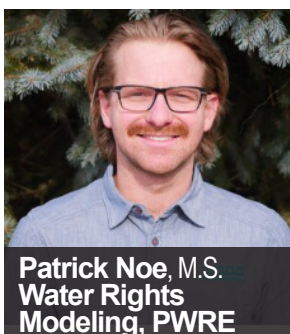
Todd joined PWRE Water Resources Engineering in February 2016. Before joining PWRE, he spent the first five years of his career as a Hydrologic Engineer for the Bureau of Reclamation at the Technical Services Center in Denver, CO, where he gained a wide variety of experience in many aspects of water resource modeling in many river basins across the western United States. His primary area of expertise is water resources system modeling utilizing the RiverWare modeling software and has designed, developed, maintained, and used numerous hydrologic models for varying purposes in many different river basins across the Western United States.

Comparable Project 1
Water for the Seasons “A
Program for Sustaining
Water Resources in a
Changing Climate

Full Project Description in
Section 2.1.

Comparable Project 2
TMWA 2020-2040 Water
Resources Plan

Full Project Description in
Section 2.1.



Patrick Noe, M.S.
Water Rights
Modeling, PWRE

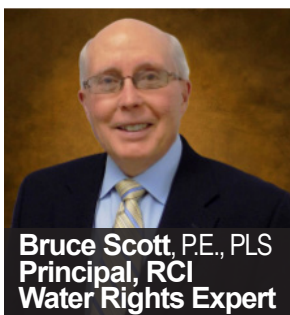
Patrick is a water resources engineer with a specialty in river basin modelling. He has developed and implemented complex policy and modeling techniques in both short-term operations models and long-term planning models for the Truckee and other western basins. He has experience in water rights and flood operations modelling having developed numerous decision support tools in the Truckee Basin including a Multi-Objective Evolutionary Algorithm. These tools aid clients in making probabilistic, risk-based operations decisions, developing long term planning strategies, and evaluating policy alternatives.

Comparable Project 1
Water for the Seasons “A
Program for Sustaining
Water Resources in a
Changing Climate

Full Project Description in
Section 2.1.

Comparable Project 2
TMWA 2020-2040 Water
Resources Plan

Full Project Description in
Section 2.1.



Bruce Scott, P.E., PLS
Principal, RCI
Water Rights Expert

Mr. Scott heads one of the most active and well-respected water rights groups in the state of Nevada. Since 1978 he has represented hundreds of water right applicants, and filed thousands of documents with the Division of Water Resources. He is a recognized water resources professional who has been tapped by three different Governors to serve on the Nevada State Board for Financing Water Projects.

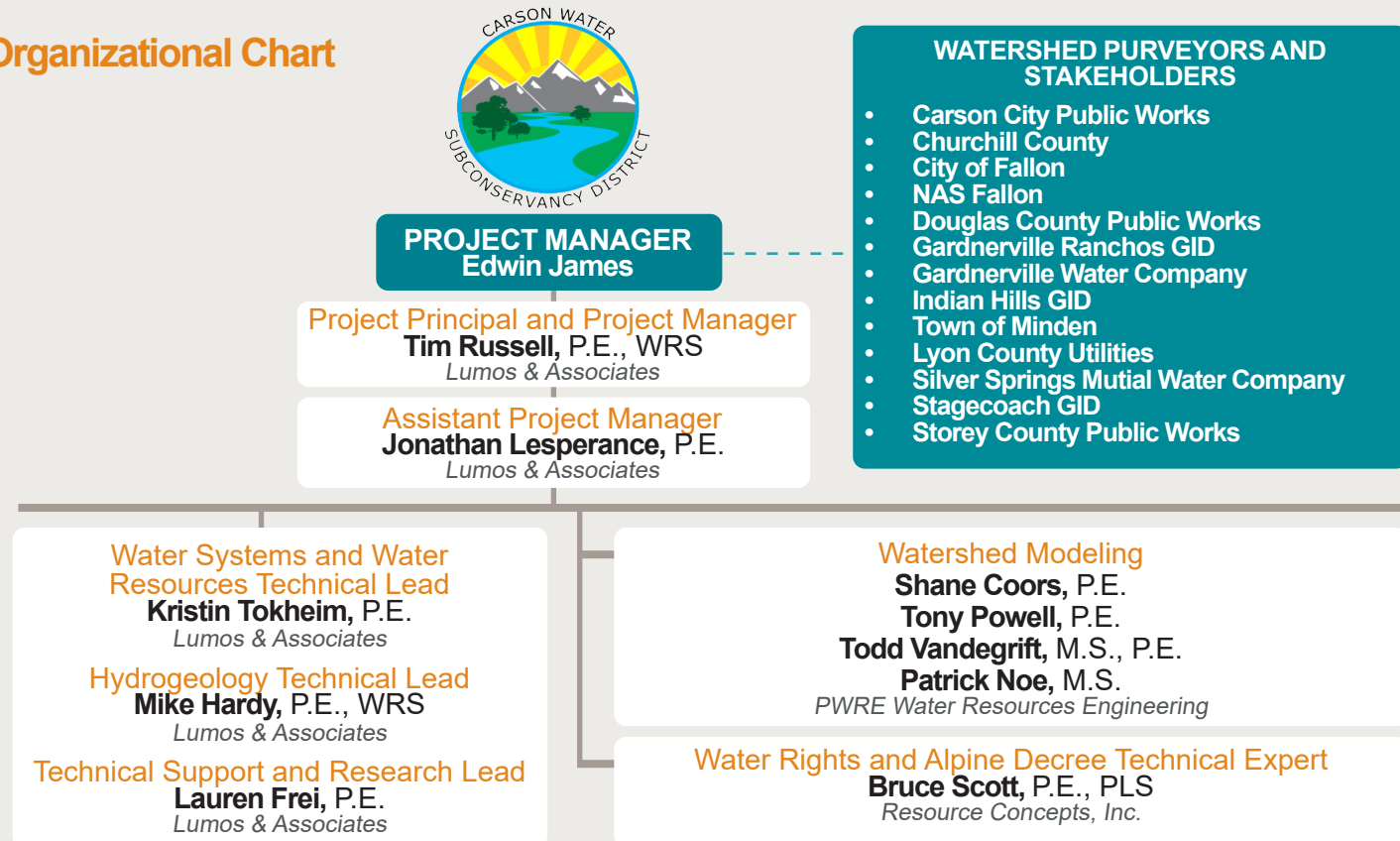
Comparable Project 1
2013 Regional
Comprehensive Water
System Plan

Full Project Description in
Section 2.1.

Comparable Project 2
Carson City Water
Marketing Study

Full Project Description in
Section 2.1.

Organizational Chart



Availability for Key Personnel

Tim Russell | Firm Tenure **9 years** | Availability **45%**

Jonathan Lesperance | Firm Tenure **3 years** | Availability **50%**

Kristin Tokheim | Firm Tenure **7 years** | Availability **60%**

Mike Hardy | Firm Tenure **19 years** | Availability **55%**

Lauren Frei | Firm Tenure **1.5 years** | Availability **65%**

Shane Coors | Firm Tenure **14 years** | Availability **50%**

Tony Powell | Firm Tenure **10 years** | Availability **50%**

Todd Vandegrift | Firm Tenure **6 years** | Availability **65%**

Patrick Noe | Firm Tenure **4 years** | Availability **65%**

Bruce Scott | Firm Tenure **44 years** | Availability **45%**

In addition to the team presented in this RFP, Lumos has nearly 40 licensed Engineers to augment our ability to complete this work if the need arises.

2.3 Project Understanding and Approach

The Carson River and its tributaries are managed by the Federal Water Master via the Alpine Decree and other similar court orders and decrees, similar to the original management of the Truckee River prior to the establishment of TROA. These decrees were established based upon historic watershed demographics, stakeholders, climatic conditions, and traditional water uses, all of which have been shifting since the inception of these decrees and which will continue to change into the future. CWSD has been shepherding efforts to initiate a comprehensive regional approach to the sustainable and equitable management of water resources within the Carson River Watershed for beneficial use by current and future stakeholders. The creation of a Carson River Watershed 30-Year Regional Drought and Water

Sustainability Report is the next step in establishing a management framework for the water resources of the Carson River Watershed.

A comprehensive approach to managing these water resources is critical now, given the region's increasingly variable climatic conditions including both drought and flood. These variable climatic conditions result in increasing water instability, while water demands are simultaneously increasing due to population growth within the watershed.

Based upon the Lumos team's knowledge of the Carson River Watershed and its stakeholders, we have preliminarily identified the following challenges, as well as potential solutions, to developing a 30-Year Regional Drought and Water Sustainability Plan:

Implementation of the Alpine Decree into the Existing Water Resource Model. USGS modeling of the groundwater/surface water interactions has historically been accomplished via Modflow. Modflow was initially developed as a groundwater modelling software and does not model the surface water resource of a riverine system as effectively as Riverware (which is utilized by TROA to manage the water resources in the Truckee River). The overlay of the Alpine Decree on the surface water resources cannot be effectively accomplished via Modflow.

Mitigation Strategy As a mitigation to this issue, we would propose the development of a Riverware model for the Carson River Watershed to allow for a more accurate modeling of the Alpine Decree and the associated segments within the Carson River. This model could be utilized by the Federal Water Master to better understand how to allocate irrigation water, while municipal stakeholders could similarly better identify and implement opportunities for conjunctive use by maximizing their surface water resources.

Stakeholder Equitability. The primary challenge with any comprehensive water resource management plan is ensuring that all stakeholders needs are identified and addressed. The Carson River has 13 primary stakeholders, and their participation in the planning process is critical to identify each stakeholder's current and future needs.

Mitigation Strategy The Lumos team and CWSD will meet with each stakeholder during development of the plan to listen and document their specific needs and goals, as well as providing opportunities for public participation via workshops and presentations. The Alpine Decree is the established water law for the Watershed and it will be imperative to rely on the Decree as the current management structure for the allocation of water rights over the 30-year planning window.

Movement, Storage, and Management of Water. When Lumos developed the Water Marketing Study for CWSD to evaluate options for the utilization of available surface water, there were three (3) primary challenges:

- 1 How to transport water from areas of greater availability to areas of lower availability?
- 2 Can storage of surface water during periods of high flows for use during times of lower flows be achieved?
- 3 Who would manage such a system?

These same challenges exist for the 30-Year Regional Drought and Water Sustainability Plan. Our initial solutions to these primary challenges were explored in the CWSD Water Marketing Study and will be investigated further in development of the 30-Year Regional Drought and Water Sustainability Plan:

Mitigation Strategy 1

Transporting water within the basin could be accomplished by utilizing the river as the transport mechanism since this would have the benefit of maintaining streamflow and supporting fish and aquatic habitat. However, the Alpine decree does not provide an opportunity to accomplish this as priority rights along segments of the river are not arranged geographically. Given this, Lumos' current solution to the movement of surface water is to utilize and expand regional pipelines and induction wells in the upstream areas during periods of lower water use to convey water to downstream areas for storage and future use. As part of this effort, the Lumos team would develop the initial models that illustrate how water resources can be managed and shared across the region with infrastructure improvements.

Mitigation Strategy 2

Storage on the Carson River is very limited when compared to the Truckee River. The Truckee River has significant storage reservoirs with Tahoe, Boca, Stampede, etc., all in the upper portion of the watershed allowing for efficient storage and metered release of the water resources during times of low stream flow. The Carson River's primary storage reservoir is Lahontan that is located at the bottom of the riverine system, which provides little value to the majority of stakeholders. Solidifying storage locations further upstream in the water shed would be a significant benefit for drought resiliency to the majority of stakeholders. Storage can potentially include reservoirs or aquifer storage and recovery (ASR) and managed aquifer recharge (MAR). Lumos would take our previous efforts from the Water Marketing Study and create a process flow chart for each potential reservoir site to be utilized as a road map of how to bring that reservoir into reality in the future. The Lumos team would also model these storage sites to demonstrate their efficacy during projected periods of drought.

Mitigation Strategy 3

The management of water within the Carson River Watershed is likely the most significant challenge since there so many stakeholders that rely on the water resources within the watershed. All of the stakeholders have different needs, varying level of resources, including both permitted water rights (paper water) as well as actual water (wet water), and varying perspectives on how the Carson River should be managed. While developing and implementing a comprehensive management structure and operating agreement is beyond the scope of the 30-Year Regional Drought and Water Sustainability Plan, we understand that addressing the needs for drought management and water sustainability will include preliminary considerations that could serve as the conceptual framework for such a management structure.

Balance Across Varied Users. There are two primary user groups within the watershed – agricultural and municipal. The use of the Alpine Decree and water right priority will be the primary framework for the initial evaluation of the balance between different users within this study. Most agricultural users hold priority rights on the surface water according to the Alpine Decree, while most municipal users rely primarily on groundwater resources within the watershed. However, over the 30-year planning period, it is anticipated that water demands for the municipal water purveyors will increase, resulting in greater demands on the groundwater resource within the watershed.

Mitigation Strategy Balancing the anticipated increase in municipal demands without adversely impacting priority surface rights for agricultural use will require creative solutions to maximize the available water resources while still complying with the Alpine Decree. One example could include capturing early peak runoff prior to the irrigation season for storage, either as surface water or for aquifer recharge.

Climate Change. Climate change, as discussed in the CWSD Water Marketing Report prepared by Lumos and within other efforts such as the Water for the Seasons report, is changing how the Carson River Watershed functions. Increasingly variable climatic conditions change both the manner and timing of streamflow. Streamflow in the Carson River is peaking earlier in the season, and can result in water flowing past agricultural users prior to the growing season.

Mitigation Strategy Part of the drought and sustainability mitigation will need to evaluate options for how to store, use, or manage the water flows in non-irrigation periods to better match water availability to water demands during irrigation season. The Lumos team will build off our prior work for CWSD and other watershed stakeholders to address these challenges. This will include modeling climate impacts for drought conditions and modified runoff regimes to develop recommendations for maximizing sustainable use of the water resources.

In order to complete the Carson River Watershed 30-Year Drought and Sustainability Plan, our team will complete the following primary tasks:

Task 1	Project Management and Administration. Lumos will prepare and update monthly summary progress reports, monthly invoicing, and perform regular project coordination with CWSD.																
Task 2	<p>Communications and Outreach. The Lumos team will work with CWSD to set up, present, and facilitate meetings with the stakeholders for the Carson River Watershed. The diversity of interests and needs vary across the watershed area and we will support CWSD in its efforts to establish a planning team potentially including water purveyors from both the upper and lower watershed areas, Carson River Coalition, agriculture users, the Federal Water Master, USGS, and the State Engineer.</p> <p>We estimate a minimum of four (4) to six (6) Planning Team meetings. The planning team established by CWSD are anticipated to attend all meetings to discuss, review, and complete the various plan elements. Lumos will provide updated working drafts of the planning documents and present the information at each meeting. Lumos will develop and provide materials to aid the Planning Team discussions and this will require extra effort outside of the planning meeting. Each of the meetings will be scheduled between two (2) and three (3) months apart and are anticipated to last about 3-hours. Each subsequent meeting will build upon the progress from the prior meeting.</p> <p>Planning Meetings Format:</p> <table> <tr> <td>Meeting 1</td><td> <ul style="list-style-type: none"> ▶ Introductions ▶ Discussion of Scope and Schedule ▶ Overview of Project and Process/ Requirements ▶ Determine Planning Area ▶ Proposed Outline for Analysis </td><td> <ul style="list-style-type: none"> ▶ Planning Team Roles and Responsibilities ▶ Discuss Public Involvement Strategy and Plan ▶ Develop a list of needs (Existing Plans, Studies, Reports and Technical Information etc.) </td></tr> <tr> <td>Meeting 2</td><td colspan="2">▶ Asset Inventory Review (Existing Water System Master Plans)</td></tr> <tr> <td>Meeting 3</td><td colspan="2">▶ Modeling and Climate Discussion</td></tr> <tr> <td>Meeting 4</td><td colspan="2">▶ Draft Plan Review</td></tr> <tr> <td>Meeting 5 & 6</td><td colspan="2">▶ Further Coordination</td></tr> </table>		Meeting 1	<ul style="list-style-type: none"> ▶ Introductions ▶ Discussion of Scope and Schedule ▶ Overview of Project and Process/ Requirements ▶ Determine Planning Area ▶ Proposed Outline for Analysis 	<ul style="list-style-type: none"> ▶ Planning Team Roles and Responsibilities ▶ Discuss Public Involvement Strategy and Plan ▶ Develop a list of needs (Existing Plans, Studies, Reports and Technical Information etc.) 	Meeting 2	▶ Asset Inventory Review (Existing Water System Master Plans)		Meeting 3	▶ Modeling and Climate Discussion		Meeting 4	▶ Draft Plan Review		Meeting 5 & 6	▶ Further Coordination	
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Meeting 2	▶ Asset Inventory Review (Existing Water System Master Plans)																
Meeting 3	▶ Modeling and Climate Discussion																
Meeting 4	▶ Draft Plan Review																
Meeting 5 & 6	▶ Further Coordination																
Task 3	Data Gathering and Analysis of Water Supplies and Demands for Water Purveyors. The Lumos team will attend meetings with CWSD and the major water purveyors to gather their current and future water supplies and demands. The specific Water Purveyor data we will analyze is outlined on the next page.																

Task 3 cont.

- ▶ Reviewing existing and future water sources and locations for each water purveyor, including reviewing water rights and adequacy of existing water rights.
 - ▶ Reviewing existing and future water quality issues and constraints. This will include water quality data from wells and potentially reviewing trends in the water quality data to see if there are future concerns.
 - ▶ We will establish potential growth scenarios for the major water purveyors in the Watershed,
 - ▶ Analyze if the water purveyor has sufficient quality and quantity to satisfy the existing and future demands. This will include a review of water use, metering data, system losses, and related data to see if there is a need for further water production or if there are other areas to improve efficiency within existing systems.
 - ▶ Analyze existing and future sustainable water supplies throughout the watershed. The Lumos team will develop a water resource management
- model to evaluate the sustainability of water supply within the watershed.
- ▶ We will identify each community's risks associated with droughts.
 - ▶ With our team of licensed water right surveyors and in coordination with the State Engineer's Office and the Federal Water Master, we will ensure our analysis is consistent with the Alpine Decree and Nevada Water Law

Task 4

Develop a Drought and Water Sustainability Plan. We will build upon the efforts for Tasks 2 and 3 above to develop an initial comprehensive water resource plan based upon existing water resource demands and current conditions for the watershed that will serve as the existing conditions baseline plan. Lumos will then develop an outline for the Regional Drought and Water Sustainability Plan that will be submitted to CWSD for concurrence. Once the plan outline has been approved, Lumos will begin to execute upon the development of each detailed plan component. Specifically, we anticipate developing the following plan components:

Evaluation of future demands projected for each of the major water users in the Watershed, including: Impacts to surface flows and downstream users based upon increased water demand, especially resulting from municipal and agricultural pumping; identify potential water shortages resulting from projected water demands under the baseline conditions plan, including an analysis of whether the shortage results from insufficient rights, groundwater declines, or both.

The Lumos team will also evaluate the impacts of future water demands during various scenarios utilizing USGS modeling results for drought and/or climatic conditions in the Watershed. Specifically, Lumos will evaluate impacts to surface flows and downstream users under the following modeled conditions: Drought scenarios with reduced overall precipitation values; Variable climatic conditions resulting in earlier peak runoff; and a combination of these scenarios where peak flows not only occur sooner but also at lower peaks due to drought. Similarly, under these scenarios, we will identify possible water shortages resulting from increased water demand, including where and when (i.e. which scenario) these shortages are expected.

Lumos will also identify potential water quality constraints, including scenarios for the migration of nitrogen plumes in areas of high septic density, as well as potential for arsenic impacts to reduce water availability in portions of the watershed.

Where communities are projected to have water availability shortages, Lumos will identify and quantify the magnitude of the shortage and develop conceptual alternatives mitigation.

Finally, Lumos will compile a draft comprehensive 30-Year Regional Drought and Water Sustainability Report for submittal to CWSD and watershed stakeholders. Following review and comments received, Lumos will issue a final draft of the plan.

2.4 Water Rights and Alpine Decree Knowledge

Lumos brings together a team that has been working with water and water rights in Nevada, including the Carson River Watershed, for decades. Leading this effort will be Bruce Scott with Resource Concepts, Inc. (RCI). With Bruce's years of work within the Carson River Basin on water rights, he is widely accepted as the regional water rights expert with unmatched knowledge of the water rights process and the Alpine Decree. Bruce and RCI have managed water rights for the Town of Minden, Douglas County, Carson City, the City of Fernley, and multiple private landowners and ranchers within the Carson River Basin.

This team has a working relationship with Adam Sullivan (State Engineer) as well as the Federal Water Master. These existing relationships will support the meaningful development of the plan with the two entities overseeing the water rights within the Carson River Watershed.

For water rights legal counsel and Alpine Decree interpretation, we will coordinate with Sev Carlson, Esq., located in Carson City. Sev is a partner at Keampfer Crowell in Carson City with a focus on water right legal counsel. Sev is not formally a member of the team but available if required.



Appendix A

Key Personnel Resumes



Tim Russell, P.E., WRS | Project Principal, Project Manager

Tim has over 20 years of engineering experience, with a focus in water resources and water system planning. A member of the Lumos Team since 2014, Tim and his team have quickly established themselves as one of the leading water system engineering teams in the northern Nevada area through the design of multiple booster stations, tanks, wells and miles of pipeline. Tim's background includes multiple major water system planning and design efforts for the Town of Minden, Topaz Ranch Estates GID, Carson City, and Indian Hills GID. Tim has also led the Lumos team on several drainage master planning projects with Carson Water Subconservancy District, Lyon County, Douglas County, and Storey County.

Selected Relevant Projects

Carson Water Subconservancy District, Water Marketing Study | Nevada

Project Principal. Working with the Carson Water Subconservancy District, Lumos prepared the Carson River Water Marketing Study to develop the initial concepts for managing surface water within the watershed. This effort looked at the changing runoff patterns and showed that statistically more runoff is occurring earlier outside of irrigation season, resulting in water running down river due to the Carson River's lack of storage. As part of the Marketing Study, Lumos identified potential storage areas for surface water to allow for a more effective use of the water resources. Additionally, Lumos conducted an engineering assessment related to water supply, use of existing infrastructure, new infrastructure, and viability of the potential storage and recovery of water along the river.

Carson Water Subconservancy District – Comprehensive Regional Water System Plan for the Carson River Watershed | Carson City, Nevada

The purpose of the Comprehensive Regional Water Management Plan (Plan) was to evaluate future water demands and how these new water demands can be met by minimizing the impact on the environment and agriculture. The planning area for the regional plan consisted of the entire Carson River Watershed, from the headwaters in Alpine County to Stillwater refuge in Churchill County. All the water in the watershed, both surface and groundwater is fully allocated, so any new demands for water must come from existing sources. The Plan touched on how changes to runoff patterns and flows in the Carson River may impact the current water supply picture and possible impacts on future supplies. The report also provided information on the various major water purveyors in the watershed, looks at potential interconnections between those purveyors, and presents some basic data related to available water rights in the hydrologic basins as determined by the State Engineer which will relate to how much reliable water is actually available on a long term basis in different areas of the watershed.

Bureau of Reclamation, Truckee-Carson Irrigation District System Improvement Plan | Fallon, Nevada

Project Manager. Modernizing irrigation systems across the country, such as the Truckee-Carson Irrigation District (TCID), is a priority for the Bureau of Reclamation, especially given the region's severe drought and continual scarcity of water resources. Caroline is working with TCID, Reclamation, and the Farmers Conservation Alliance to develop a System Improvement Plan (SIP) for TCID. The SIP will highlight a pathway for TCID to provide more efficient and reliable delivery of water to over 2,500 users across 59,000 irrigated acres. Various Stakeholders include City of Fernley, the United States Fish and Wildlife Service, the Fallon Paiute-Shoshone Tribe, United States Navy, and State of Nevada Department of Wildlife.

Marlette Lake Water System Demand Evaluation | Carson City, Nevada

Project Principal. Lumos was retained by Carson City to study and complete MLWS Demand Study to the City quantify their claims and future use of the surface water resource attributed to Marlette and Hobart Lake. The analysis considered future demands and water supply scenarios to meet these demands. Scenarios were developed based on existing and planned water supplies as well as supply capacity during dry, average, and wet precipitation years (from the MLWS). Based on these water supply scenarios, Lumos determined the feasible demand required/available from the MLWS across variable climatic conditions and time of use (seasonality). Lumos was able to produce a final product that provided the City with the knowledge to plan for and manage their water needs from the MLWS now and into the future.

EDUCATION

Master of Science, Civil Engineering, Auburn University, 2003

Bachelor of Science, Chemical Engineering, Auburn University, 2001

PROFESSIONAL LICENSURE & CERTIFICATIONS

Registered Civil Engineer, Nevada #017582 and California #68777

Nevada Water Rights Surveyor, #1269

INDUSTRY TENURE

20 years

LUMOS TENURE

7 years



EDUCATION

Bachelor of Science, Civil Engineering, Arizona State University, 2009

PROFESSIONAL LICENSURE & CERTIFICATIONS

Registered Civil Engineer, Nevada #22326 and California #84438

INDUSTRY TENURE

20 years

LUMOS TENURE

3 years

Jonathan Lesperance, P.E. | Assistant Project Manager

As Assistant Project Manager, Jonathan brings prior experience in assisting Clients with addressing complex stakeholder issues and presenting potentially contentious issues to the public. Jonathan presently serves as District Engineer for the Gardnerville Ranchos General Improvement District (GRGID), and County Engineer for Eureka County, Nevada. In these roles especially, Jonathan routinely provides public testimony and presentations to the public as well as their publicly elected Boards. Jonathan has participated in developing water master plans and water infrastructure designs for both entities.

Selected Relevant Projects

Carson Water Subconservancy District, Water Marketing Study | Nevada

Working with the Carson Water Subconservancy District, Lumos prepared the Carson River Water Marketing Study to develop the initial concepts for managing surface water within the watershed. This effort looked at the changing runoff patterns and showed that statistically more runoff is occurring earlier outside of irrigation season, resulting in water running down river due to the Carson River's lack of storage. As part of the Marketing Study, Lumos identified potential storage areas for surface water to allow for a more effective use of the water resources. Additionally, Lumos conducted an engineering assessment related to water supply, use of existing infrastructure, new infrastructure, and viability of the potential storage and recovery of water along the river.

Gardnerville Ranchos General Improvement District Water Master Plan and Updates | Nevada

Building upon our earlier GRGID Water Resource Plan, GRGID commissioned Lumos to develop a water master plan for its water system. The purpose of the water master plan was to develop comprehensive water system maps, assess the condition of existing facilities, prioritize life cycle infrastructure replacements, determine capacity upgrades required to accommodate future growth, evaluate future water supply strategies, and develop a short-term and long-term capital improvement plan over a 20-year planning period. As part of the master planning efforts, water demand factors were developed based on metered usage records by land use type. Future water demands were estimated by assessing potential growth areas that could be served by the GRGID water system. The GRGID water system was evaluated against existing and future water demands in accordance with Nevada Administrative Code (NAC) requirements for water storage, supply, and distribution using hydraulic modeling software. The master plan also provided initial alternative analysis related to future water resources that may be available to GRGID to supply future growth or replace other dwindling/contaminated supplies.

Marlette Lake Water System Demand Evaluation | Carson City, Nevada

Project Principal. Lumos was retained by Carson City to study and complete MLWS Demand Study to the City quantify their claims and future use of the surface water resource attributed to Marlette and Hobart Lake. The analysis considered future demands and water supply scenarios to meet these demands. Scenarios were developed based on existing and planned water supplies as well as supply capacity during dry, average, and wet precipitation years (from the MLWS). Based on these water supply scenarios, Lumos determined the feasible demand required/available from the MLWS across variable climatic conditions and time of use (seasonality). Lumos was able to produce a final product that provided the City with the knowledge to plan for and manage their water needs from the MLWS now and into the future.

Bureau of Reclamation, Truckee-Carson Irrigation District System Improvement Plan | Fallon, Nevada

Project Manager. Modernizing irrigation systems across the country, such as the Truckee-Carson Irrigation District (TCID), is a priority for the Bureau of Reclamation, especially given the region's severe drought and continual scarcity of water resources. Caroline is working with TCID, Reclamation, and the Farmers Conservation Alliance to develop a System Improvement Plan (SIP) for TCID. The SIP will highlight a pathway for TCID to provide more efficient and reliable delivery of water to over 2,500 users across 59,000 irrigated acres. Various Stakeholders include City of Fernley, the United States Fish and Wildlife Service, the Fallon Paiute-Shoshone Tribe, United States Navy, and State of Nevada Department of Wildlife.



EDUCATION

Bachelor of Science, Civil Engineering, University of the Pacific, Stockton, California, 2005

PROFESSIONAL LICENSURE & CERTIFICATIONS

Professional Civil Engineer, Nevada #24064
California #72381

LEED Green Associate

INDUSTRY TENURE

17 years

LUMOS TENURE

7 years

Kristin Tokheim, P.E. | Water Systems Technical Lead

Kristin has over 17 years of experience in the planning and design of water and wastewater infrastructure projects in both the public and private sector. Her background includes water supply, treatment, storage, and distribution; wastewater treatment and conveyance; master planning; permitting; and engineering services during construction. Since joining Lumos in 2016, Kristin has completed a variety of projects including water and sewer master plans for the Gardnerville Ranchos General Improvement District, the design of a sludge removal and pond relining project for the City of Fernley WWTP, and the planning and design of phased water and sewer infrastructure for the StoneGate Development (to serve 5,000 residential units and other land uses). Her previous experience includes serving as the design engineer for several state-funded water supply and treatment projects requiring coordination and compliance with regulatory agencies in California. Kristin is a registered civil engineer in both California and Nevada and has a LEED Green Associate credential.

Selected Relevant Projects

Gardnerville Ranchos General Improvement District Water Master Plan and Updates | Nevada

Building upon our earlier GRGID Water Resource Plan, GRGID commissioned Lumos to develop a water master plan for its water system. The purpose of the water master plan was to develop comprehensive water system maps, assess the condition of existing facilities, prioritize life cycle infrastructure replacements, determine capacity upgrades required to accommodate future growth, evaluate future water supply strategies, and develop a short-term and long-term capital improvement plan over a 20-year planning period. As part of the master planning efforts, water demand factors were developed based on metered usage records by land use type. Future water demands were estimated by assessing potential growth areas that could be served by the GRGID water system. The GRGID water system was evaluated against existing and future water demands in accordance with Nevada Administrative Code (NAC) requirements for water storage, supply, and distribution using hydraulic modeling software. The master plan also provided initial alternative analysis related to future water resources that may be available to GRGID to supply future growth or replace other dwindling/contaminated supplies.

Great Basin Water Co. Integrated Resource Plan | Statewide Nevada

Lumos has developed the IRPs for GBWC, since 2016, on four divisions throughout the state of Nevada. Tasks in developing the IRP include condition assessments of existing infrastructure, a review of the historical water meter and sewer flow data for creating water demand and sewer flow forecasts, evaluation of the water and sewer systems for capacity to meet existing and future demands, hydraulic modeling of existing and proposed conditions, and development of near-term action plans (3-year timeline) and long-term preferred plans (20-year timeline) identifying critical projects to address insufficiencies and aging infrastructure. Other tasks included assistance in preparing written testimony for public hearings with the PUCN and Bureau of Consumer Protection (BCP) and responding to data requests from both agencies for technical information.

Bermuda Water Company, Water Master Plan | Arizona

Lumos & Associates completed the Water Master Plan for Bermuda's water system which encompasses the southern portion of Bullhead City, most of Fort Mojave Mesa and the northern portion of Mohave Valley which are located along the Colorado River in Mohave County, Arizona. The system spans an area 10 miles north to south and two to four miles east to west with the certificated area covering all or a portion of 24 of the square mile sections. The southern portion of the service area resembles a "checker board" due to land ownership of alternating sections by the Fort Mojave Indian Reservation, the State of Arizona, and the U.S. Department of the Interior, Bureau of Land Management, (BLM). Bermuda Water Company was experiencing dated infrastructure, further analysis of 10 wells of which 9 are operational, and water capacity for existing and future needs.

Calaveras County Water District, Sheep Ranch Water Supply Reliability Study and Facilities Master Plan | Calaveras County, California

Lumos & Associates put together a Reliability Study and Facilities Master Plan for the Sheep Ranch Water System, in Calaveras County, California. This project included a Demand Assessment to evaluate current and potential future demand for water in the area, water supply alternatives and provide recommendations from a financial perspective and reliability standpoint, and improvements.



Mike Hardy, P.E., WRS | Hydrogeologist, Technical Lead

Tim has over 20 years of engineering experience, with a focus in water resources and water system planning. A member of the Lumos Team since 2014, Tim and his team have quickly established themselves as one of the leading water system engineering teams in the northern Nevada area through the design of multiple booster stations, tanks, wells and miles of pipeline. Tim's background includes multiple major water system planning and design efforts for the Town of Minden, Topaz Ranch Estates GID, Carson City, and Indian Hills GID. Tim has also led the Lumos team on several drainage master planning projects with Carson Water Subconservancy District, Lyon County, Douglas County, and Storey County.

Selected Relevant Projects

EDUCATION

Bachelor of Science, Geology,
Bemidji State University, 1984

Graduate Studies in Geology,
Idaho State University, ID,
1985-1988

PROFESSIONAL LICENSURE & CERTIFICATIONS

Registered Civil Engineer,
Nevada #21862 and Arizona
#71093

Nevada Water Rights
Surveyor, #1274

Professional Geologist in
California 7927

INDUSTRY TENURE

33 years

LUMOS TENURE

19 years

Gardnerville Ranchos General Improvement District Water Master Plan and Updates | Nevada

Building upon our earlier GRGID Water Resource Plan, GRGID commissioned Lumos to develop a water master plan for its water system. The purpose of the water master plan was to develop comprehensive water system maps, assess the condition of existing facilities, prioritize life cycle infrastructure replacements, determine capacity upgrades required to accommodate future growth, evaluate future water supply strategies, and develop a short-term and long-term capital improvement plan over a 20-year planning period. As part of the master planning efforts, water demand factors were developed based on metered usage records by land use type. Future water demands were estimated by assessing potential growth areas that could be served by the GRGID water system. The GRGID water system was evaluated against existing and future water demands in accordance with Nevada Administrative Code (NAC) requirements for water storage, supply, and distribution using hydraulic modeling software. The master plan also provided initial alternative analysis related to future water resources that may be available to GRGID to supply future growth or replace other dwindling/contaminated supplies.

Great Basin Water Co. Integrated Resource Plan | Statewide Nevada

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Lauren Frei, P.E. | Technical Support and Research Lead

Lauren has over 7 years of civil engineering experience specifically related to Water and Wastewater Projects. Her project knowledge includes hydrologic and hydraulic watershed studies, Flood Insurance Study (FIS) report development and internal review, Hydraulic modeling and internal review, Wastewater disinfectant research, Wastewater bench scale testing, Conveyance analysis, and Inflow & infiltration field studies.

Selected Relevant Projects

Marlette Lake Water System Demand Evaluation | Carson City, Nevada

Lumos was retained by Carson City to study and complete MLWS Demand Study to the City quantify their claims and future use of the surface water resource attributed to Marlette and Hobart Lake. The analysis considered future demands and water supply scenarios to meet these demands. Scenarios were developed based on existing and planned water supplies as well as supply capacity during dry, average, and wet precipitation years (from the MLWS). Based on these water supply scenarios, Lumos determined the feasible demand required/available from the MLWS across variable climatic conditions and time of use (seasonality). Lumos was able to produce a final product that provided the City with the knowledge to plan for and manage their water needs from the MLWS now and into the future.

Gardnerville Ranchos General Improvement District Water Master Plan and Updates | Nevada

Building upon our earlier GRGID Water Resource Plan, GRGID commissioned Lumos to develop a water master plan for its water system. The purpose of the water master plan was to develop comprehensive water system maps, assess the condition of existing facilities, prioritize life cycle infrastructure replacements, determine capacity upgrades required to accommodate future growth, evaluate future water supply strategies, and develop a short-term and long-term capital improvement plan over a 20-year planning period. As part of the master planning efforts, water demand factors were developed based on metered usage records by land use type. Future water demands were estimated by assessing potential growth areas that could be served by the GRGID water system. The GRGID water system was evaluated against existing and future water demands in accordance with Nevada Administrative Code (NAC) requirements for water storage, supply, and distribution using hydraulic modeling software. The master plan also provided initial alternative analysis related to future water resources that may be available to GRGID to supply future growth or replace other dwindling/contaminated supplies.

Bermuda Water Company, Water Master Plan | Arizona

Lumos & Associates completed the Water Master Plan for Bermuda's water system which encompasses the southern portion of Bullhead City, most of Fort Mojave Mesa and the northern portion of Mohave Valley which are located along the Colorado River in Mohave County, Arizona. The system spans an area 10 miles north to south and two to four miles east to west with the certificated area covering all or a portion of 24 of the square mile sections. The southern portion of the service area resembles a "checker board" due to land ownership of alternating sections by the Fort Mojave Indian Reservation, the State of Arizona, and the U.S. Department of the Interior, Bureau of Land Management, (BLM). Bermuda Water Company was experiencing dated infrastructure, further analysis of 10 wells of which 9 are operational, and water capacity for existing and future needs.

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EDUCATION

Master of Science,
Environmental Engineering,
Duke University

Bachelor of Science, Civil
Engineering: Environmental
Engineering/Water Resources
Bucknell University

PROFESSIONAL LICENSURE & CERTIFICATIONS

Registered Civil Engineer,
Nevada # 29018

INDUSTRY TENURE

7 years

LUMOS TENURE

1.5 years



Adolph (Shane) Coors, P.E.

Precision Water Resources Engineering, Inc.

Education:

M.E., Civil Engineering,
Texas A&M University, 2003
Computational Physics,
University of Utah, 1994-1998
B.S., Engineering Physics,
Westmont College, 1993

Years Experience:

Current Firm: 14
Total: 21+

System Modeling

Experience:

RiverWare
Custom (Excel, VBA)
WRAP
MODSIM

Software/Programming Expertise

RiverWare RPL
ArcGIS
Visual Basic
WRAP/WAM
Matlab
HEC-GeoRas
C

Registrations and Memberships:

Registered Professional Engineer:
State of Nevada (#019410)
Member, Joint Evaluation
Committee - Dept of
Civil Engineering at
University of Colorado
Boulder (2018)
Member, American Water
Resources Association
Member, American Society of Civil
Engineers
Member, Nevada Water
Resources Association

EXPERIENCE NARRATIVE

Mr. Coors is a water resources engineer with experience in water resources planning and management. His specialty is the development and application of state-of-the art water system modeling tools for a variety of management purposes. He has held positions both in the federal government and private sector. In 2008 Mr. Coors founded and is currently the president of Precision Water Resources Engineering (Precision). Precision employs a team of water resources professionals and manages contracts throughout the western United States. Mr. Coors oversees all aspects of the business including business development, senior project management.

Water Resources Modeling

Mr. Coors' primary area of expertise is water resources systems modeling. He oversees the design, construction, operation, and training of clients to operate state-of-the-art hydrologic and hydraulic modeling tools that are in use throughout the western United States for managing large, complex, high-profile water resource systems.

These models are used for a wide variety of purposes including long-term planning, short-term operations, hydrologic and operations forecasting, uncertainty and risk analysis, water accounting, for the official administration of complex policy and court decrees, and for litigation support.

Some of the modeling platforms he has direct experience with include:

- RiverWare, developed by CADSWES at the University of Colorado. RiverWare is a versatile, comprehensive water resource modeling software utilized throughout the country in major basins such as the Lower and Upper Colorado River Basin, the Tennessee Valley Authority System, multiple USACE systems in the Midwest, the Truckee River Basin, and the Rio Grande Basin.
- Custom models. These have consisted mostly of Excel/VBA based modeling systems. Mr. Coors developed a short-term high-precision modeling system for meeting precise ESA flow targets downstream of large dams and below major confluences. Models have been constructed for the Green, Gunnison, San Juan, Carson and Truckee Rivers. Springtime peak release decisions from Flaming Gorge Dam on the Green River were made using this tool from 2004-2012 with great success. The tool has been used for numerous other purposes when short-term high-precision forecasts and operations are required.

Mr. Coors has authored numerous publications and reports on decision support systems. He has also presented his work at many professional conferences and workshops.

Shane Coors, P.E.
Precision Water Resource Engineering

River/Reservoir Operations

Mr. Coors has extensive experience with developing and employing state-of-the-art water management tools to support reservoir operations, planning and management. He has provided direct technical support to the Federal Watermaster (Truckee River), the Truckee Meadows Water Authority, the USFWS, the Truckee-Carson Irrigation District, the Pyramid Lake Paiute Tribe and the Bureau of Reclamation in the operations of the 8 major reservoirs in the Truckee- Carson River Basins including Lake Tahoe. Mr. Coors and Precision have supported planning and operations of all major reservoirs in the Upper and Lower Colorado River Basin including Flaming Gorge, the Aspinall Unit, Navajo Reservoir, Lake Powell, Lake Mead and other smaller reservoirs. Mr. Coors and Precision have developed and/or operated RiverWare models of the Arkansas River, the Colorado Big Thompson Project, the San Juan River, and the Provo River in Utah for a variety of clients and purposes.

Climate Change Studies

Mr. Coors is experienced in performing long-term modeling to support high-profile climate change studies, working collaboratively with leading climate change scientists. Mr. Coors has developed long term planning models that have been used in numerous climate change studies. Further Mr. Coors has served as the supervising engineer overseeing all modeling used to support climate change impact analysis and mitigation strategy development and evaluation. Mr. Coors and Precision staff have performed modeling for climate change studies in the Arkansas River Basin, to support the Truckee Meadows Water Authority's 2020 Water Use Plan, and in the San Juan river basin.

Litigation Support

Mr. Coors and Precision have been retained to support legal proceedings on several occasions. Clients have included the Department of Justice, the Environmental Protection Agency, the United States Bureau of Reclamation and the Federal Watermaster, Pueblo Water, and the State of Texas. In these projects Mr. Coors and his staff utilized hydrologic modeling to support clients' interests and to provide accurate information about water resource systems in a variety of contentious legal proceedings. Currently Mr. Coors is an expert witness in a high-profile court case being argued in the United States Supreme Court.

Flood Analysis

Mr. Coors is experienced in flood analysis and simulation. He has participated in FEMA flood mapping projects. He led projects involving flood routing and has developed routing techniques for routing hourly hydrographs to a high degree of accuracy. He has performed many hydrologic frequency analyses to help assess dam safety and emergency preparedness. Mr. Coors also has experience in determining flood inundation areas using GIS based tools and hydraulic modeling.

Risk and Decision Analysis

Mr. Coors has developed systems to characterize and quantify the uncertainty associated with model results and operational forecasts. Model inputs like hydrology forecasts, demand forecasts, and others are more accurately represented by distributions than single values or time series. This uncertainty in model inputs is propagated to uncertainty in model results, often in very complex ways. Mr. Coors and PWRE engineers have developed a suite of tools and techniques to accompany the water resource system models to provide water managers with more accurate and complete information needed to make confident water resource management decisions. Mr. Coors has overseen implementation of production decision-support forecasting and operations models that incorporate uncertainty characterization and risk management in operations.

Registrations: Mr. Coors is a registered Professional Engineer in the state of Nevada (license #019410)

Shane Coors, P.E.
Precision Water Resource Engineering

RECENT PROJECT EXPERIENCE*Water Resources System Planning Studies*Central Utah Water Conservancy District – Utah Lake Jordanelle Exchange Model (2020)

Mr. Coors and Precision staff worked closely with CUWCD staff to construct a RiverWare model of the Provo River system in Utah. The model included imports from the Strawberry and Duchesne River basins, Jordanelle Reservoir, Deer Creek Reservoir, and Utah Lake. The model was used to determine operational criteria and to identify potentially available water for new purposes. Along with the model, an Excel-based controller was developed to enable CUWCD staff a simple interface with the model to develop scenarios, initiate runs of the model and visualize results.

Truckee Meadows Water Authority Climate Change Impacts Study (2019)

Mr. Coors and Precision staff conducted a Climate Change impacts study for TMWA. Two ensembles of eight climate change hydrology sets from the Water for the Seasons project were used and run through the Truckee Planning model. Future demand projections were also modeled. Impacts to TMWA's water supply through to the end of the century were simulated. Results were compiled and presented to the TMWA board of directors at its July, 2019 meeting. The project was written up in a technical report which is included as a supplement to TMWA's 2020 Water Use Report. <https://tmwa.com/wrp2020/>

Pueblo Water Agricultural Shares Change Case (2018-2019)

Mr. Coors and Precision staff participated on a team of experts on behalf of Pueblo Water to support their water rights change case through Colorado Water Court. The case sought to change existing Bessemer Ditch agricultural water rights owned by PBWW to allow for municipal and storage uses. However, as PBWW has numerous existing supply sources from water rights and projects of varying yields and reliability, the case was subject to an anti-speculation clause requiring PBWW to demonstrate a legitimate need for the additional Bessemer yields within a 50-year planning horizon. Precision performed the surface water modeling using the ABRW model to simulate the addition of the Bessemer shares, projected demands for the next 50 years, and future supply including supply being altered by climate change and potential Colorado River Compact calls limiting imported supplies available

Pueblo Reservoir Annual Excess Capacity Account Impacts Analysis (2017-2018)

The ABRW model was used to complete an analysis of the potential impacts of Reclamation's Pueblo Reservoir Excess Capacity Storage account program on the system as part of a NEPA Environmental Assessment (EA) of the program. These Excess Capacity storage accounts, which are granted by Reclamation through contract with other basin entities, allow for the storage of other water in the "excess" storage space in Pueblo Reservoir when it is not filled with FryArk Project water. The analysis utilized the model's ability to explicitly simulate the distinct water sources of many basin entities, including water rights and other sources such as non-federal trans-basin imports, and track how these different water types are moved and managed throughout the system. To evaluate the potential impacts of the proposed actions, multiple future scenarios were developed to represent future levels of development, including increasing demands for both water deliveries and storage space. The modeling analysis was central to Reclamation's Finding of No Significant Impact (FONSI) for the EA, which allows for continued use of Excess Capacity storage accounts in Pueblo Reservoir to facilitate efficient water management and interagency cooperation.

Water Sustainability in Snow-Fed Arid Land River System (2014-2019)

Precision along with the Desert Research Institute, the University of Nevada Reno, and the USGS were awarded a grant from the National Science Foundation and the United States Department of Agriculture for \$3.8M to assess the impacts of Climate Change on the Truckee and Carson Basins in Northern Nevada and California. The project was a highly collaborative effort with basin stakeholders to assess the potential impacts of climate change, propose mitigation strategies. Precision was responsible for the operational modeling component of the project and to participate in stakeholder outreach throughout. Mr. Coors served as the project manager for this project.



Anthony (Tony) Powell, P.E.
Precision Water Resources Engineering, Inc.

Education:

M.S. Civil Engineering
University of Colorado at Boulder,
2008,
*Engineering Teaching and Research
Assistant*

B.S. Civil Engineering
University of Colorado at Boulder,
2005

Experience:

Current Firm 10 years
Total 13+ years

System Modeling Experience:

RiverWare®
HEC-RAS
HEC-HMS
SWMM
Custom (Excel, VBA)

Software Programming

Expertise

RiverWare (RPL)
MICROSOFT SUITE
VBA
Python
R

Registration and

Memberships:

Registered Professional Engineer
State of Colorado

ENGINEERING EXPERIENCE

Project Manager, Precision Water Resources Engineering

Feb 2011 – September 2015, July 2017 – Present

Consulting Engineer, McDowell Engineering LLC

Feb 2017 – July 2017

Consulting Engineer, World Bank Group

Feb 2011 – Sep 2012

Water Resource Project Engineer, Ninham Shand

Consulting Services, Cape Town, South Africa

Sep 2006 – July 2007

ENGINEERING NARRATIVE

Mr. Powell is a water resources specializing in complex basin modeling and reservoir operations with short and long-term outlooks. He spent a year working in South Africa consulting in a firm that specialized in reservoirs, flood prediction, and water supply systems. In his time there, he contributed to several projects with concentration on predicting flood potential in non-gauged river basins. At the World Bank he studied the impact of climate change on river basins and used risk-based analysis to identify potential impacts caused by climate change within a broader set of economic analyses. His primary role at Precision Water Resources Engineering is a project manager where his focus is on water resources system model using the RiverWare modeling software. He has maintained, designed, and used several models in the Western United States including in the Truckee-Carson and Colorado River Basins. His work has focused on designing modeling tools to evaluate risk in these basins. In the Colorado Basin, he works with the Central Utah Water Conservancy District, the Colorado River Authority of Utah, the US Bureau of Reclamation for the Upper and Lower Colorado Regions in designing and maintaining the Mid-Term Operations Model of the Colorado River Basin Storage Projects.

PRIMARY AREAS OF EXPERTISE

Mr. Powell's primary area of expertise and experience is in collaborating with clients to maintain, build, and analyze river basins utilizing RiverWare modeling and associated tools. These tools support short-term, mid-term, and long-term operational and planning efforts that include scheduling, forecasting, and probabilistic analysis to benefit operations and decision making for the river basin. He has experience in working with operations and accounting RiverWare models that allow for management of physical and accounting systems. This includes expertise in writing of RiverWare Policy Language (RPL) and designing systems that are both efficient and useful for clients over long and sustained periods of time.

Anthony Powell, P.E.
Precision Water Resource Engineering

Mr. Powell's notable water resources modeling projects include:

- Operational and Planning RiverWare model development for the Central Utah Water Conservancy District simulating the water collection and delivery systems in the Duchesne, Provo, Spanish Fork, Diamond Fork, and Utah Lake basins.
- Evaluation of the Colorado River Simulation System and Colorado River Mid Term Modeling Systems in comparative manners to evaluate the impacts of various operational decisions and potential future changes to the Colorado Basin operations. Specific operational analyses include, among others, guidelines for Lake Powell and Lake Mead Operations and evaluation of Drought Response Operations Agreement actions under the Colorado River Drought Contingency Plan. This analysis is for the Central Utah Water Conservancy District and the Colorado River Authority of Utah.
- RiverWare Model development for the Truckee-Carson Basins in Northern Nevada and California for both short-term operations and long-term planning models. This includes support in designing and maintaining those models for parties of the Truckee-Carson Basin including the Lahontan Area Basin Office of the US Bureau of Reclamation, the State of California, the Truckee Meadows Water Authority, and the Reno, Sparks, and Washoe County entities.
- Mid-Term Operations Model (MTOM) for support in the Colorado River Basin for the Upper and Lower Colorado Regions of the US Bureau of Reclamation. Design of rule logic, model development, and tools to allow users to load, run, and evaluate ensemble runs for risk-based analysis of basin indicators regarding the 2007 Interim Guidelines.

Areas of Expertise

- Analysis of Climate Change GCM model output to evaluate impacts to river basin hydrologic parameters.
- Preparation of tools to support RiverWare models including ensemble control tools based in Microsoft Excel to run RiverWare models in risk-based analyses.
- Development of Planning tools (data, RiverWare planning models, output visualization) for evaluation of ensembles of output given a variety of input to RiverWare models.
- Development of operational accounting RiverWare models that account for water (system, stakeholder, customer, project, etc.) given observed operations. This can be in consideration of water rights distribution, delivery of water to customers, reservoir operations, or any combination of delivery of stored water.
- Institutional knowledge of basin operations in the Truckee River Basin and in 2007 Interim Guideline operation in the Colorado Basin and the RiverWare models that assist in operations and planning in those basins.

SELECT PROFESSIONAL PRESENTATIONS AND PUBLICATIONS

Powell, A and Scott, T., "Modeling the Truckee River Operating Agreement as a Basis for Stakeholder Negotiation" June 2019, SEDHYD Joint Conference, Reno, NV

Powell, A and Tighi, S., "Utilizing Probabilistic Forecasts for Colorado River Reservoir Operations: Decision Making and Risk Management" April 2015, SEDHYD Joint Conference, Reno, NV

Anthony Powell, P.E.
Precision Water Resource Engineering

Powell, A., "Using Batch Mode to Run RiverWare Models for the Use of Logic Testing and Model Change Verification" February 2015, RiverWare User Group Meeting, Boulder, CO

Gacek, H and Powell, A., "Modeling TROA in the Truckee River Basin: Operations and Planning Tools for a Multi-Reservoir System," April 2014, EWRI World and Environmental and Water Resource Congress, Portland, OR

Powell, A., "Mid-Term Operations Probabilistic Model on the Colorado River Basin," August 2013, River Ware User Group Meeting, Boulder, CO

Len Wright, et. Al, "Estimated effects of climate change on flood vulnerability of U.S. bridges." Mitigation and Adaptation Strategies for Global Change. Volume 17, Issue 8, December 2012, pp 939 – 955

Görgens, A, et. Al, "Joint Peak-Volume (JPV) Design Flood Hydrographs for South Africa." South African Research Commission. Report No 1420/3/07, May 2007



Todd Vandegrift, M.S., P.E.
Precision Water Resources Engineering, Inc.

Education:

M.S. Civil Engineering
University of Minnesota, 2010
Minor: Natural Resources
Science and Management
Post-Bacc Cert: Stream Restor.
Science and Engineering
GPA: 4.00

B.S. Civil Engineering
University of Minnesota, 2009
GPA: 3.92, Summa Cum Laude

Years Experience: 13

Current Firm 6
Other Employers 7

System Modeling Experience:

RiverWare
StateMod
CalSim II & Lite
HEC-ResSim
HEC-RAS
HEC-HMS
Custom (Excel, VBA)

Software/Programming

Expertise

RiverWare RPL
Excel VBA
TSTool
ArcGIS
HEC-GeoHMS, GeoRAS
Python

Registrations and

Memberships:

Registered Professional Engineer:
State of Colorado

ENGINEERING EXPERIENCE

Project Manager, Precision Water Resources Engineering

Feb 2016 - Present

**Hydrologic Engineer, U.S. Bureau of Reclamation,
Technical Services Center, Denver, CO**

Water Resources Planning and Operations Support Group

Sep 2010 – Jan 2016

**Student Trainee, Hydraulic Engineering, U.S. Army Corps
of Engineers, St. Paul District, St. Paul, MN
Hydraulics and Hydrology Branch**

Jan 2009 – Aug 2010

EXPERIENCE NARRATIVE

Mr. Vandegrift joined Precision Water Resources Engineering in February 2016. Before joining PWRE, he spent the first five years of his career as a Hydrologic Engineer for the Bureau of Reclamation at the Technical Services Center in Denver, CO, where he gained a wide variety of experience in many aspects of water resource modeling in many river basins across the western United States. Mr. Vandegrift's primary area of expertise is water resources system modeling utilizing the RiverWare modeling software. He has designed, developed, maintained, and used numerous hydrologic models for varying purposes in many different river basins across the Western United States. These purposes have included both long- and short-term planning and analysis, operations support and forecasting, policy development and analysis, climate change studies, uncertainty and risk analysis, and water accounting needs. Over the past several years, Mr. Vandegrift has become immersed in the unique world of Colorado water resources while building and implementing a detailed and multipurpose RiverWare model of Colorado's complex and contentious Arkansas River Basin. Another recent area of interest includes the application of Multi-Objective Evolutionary Algorithms (MOEAs) with water resource system models for optimization and trade-off analysis of system objectives.

Todd Vandegrift, M.S., P.E
Precision Water Resource Engineering

AREAS OF EXPERIENCE AND NOTABLE PROJECTS**Operational and Planning Modeling of River and Reservoir Systems**

Experienced with the development, writing, building, running, and analyzing river and reservoir system models using various software including RiverWare, StateMod, HEC-ResSim, WRIMS, CalSim II and III, and CalLite, while working both individually and with a professional team. Post-processing and analysis of modeling results to determine dependent and independent, controlling variables and further analyze system operations to increase efficiency and meet project goals and objectives while limiting negative impacts. Notable projects include:

- RiverWare model development for the Arkansas Basin in Colorado, both for long-term planning and short- to mid-term operations. Complex basin operations necessitate detailed modeling of the physical and accounting water systems including water rights allocation. Initial model uses include NEPA analysis of Excess Capacity contracts for excess storage space in Pueblo Reservoir and municipal water supply planning, water right change of use, and system operations studies.
- Individually developing, running, analyzing, and maintaining the San Joaquin River Restoration Program (SJRRP) RiverWare models for various purposes including restoration release scheduling, forecast use analysis, restoration channel and structure design criteria, and program requirement compliance analysis.
- RiverWare modeling, maintenance, and development for the San Juan River Recovery Implementation Program, both individually and with local and regional team members. Coordination with Colorado's San Juan Basin StateMod model to provide input datasets for various scenarios.
- Developing, running, post-processing, and analyzing RiverWare models for the Gunnison and San Juan River basins for the Airborne Snowpack Observatory Value of Information (ASO VOI) study in conjunction with NASA Jet Propulsion Laboratory to evaluate the potential benefits of investments in state-of-the-art remote sensing data collection and runoff forecasting procedures.
- Operational modeling, review, and technical support for the Upper Colorado Region Mid-Term Operations Model (MTOM, RiverWare) as part of a detail assignment in the Water Resources Group of the Upper Colorado Regional Office.
- Involved in development, testing, and running of CalLite and CalSim II with team members.
- Other notable projects include: RiverWare and various modeling support for the Truckee River (TROA) planning and operation models, Missouri Basin Impacts Assessment, and Klamath Dam Removal Hydrologic Analysis for the Environmental Impacts Statement project

Climate Change Analysis

Experienced with the development, analysis, and management of meteorological and hydrologic data incorporating climate change. Experienced with associated procedures including bias-correction and spatial downscaling and various techniques to summarize and provide useful information for climate change analysis from large and variable datasets such as CMIP-3 climate projections, including both transient and period change (e.g., hybrid delta ensemble) analysis techniques.

- Lead researcher and author for the San Juan Recovery Implementation Program Climate Change Study (November 2020).
- Involved in developing, managing, processing, and analyzing observed and synthetic meteorological and hydrologic data for climate change analysis associated with Reclamation's WaterSMART West-Wide Climate Risk Assessments (WWCRA) and Basin Studies programs.

Todd Vandegrift, M.S., P.E.
Precision Water Resource Engineering

- Peer reviewer of climate change modeling and analysis for the Milk St. Mary's Basin Study as part of Reclamation's WaterSMART.

Hydrologic Modeling of River Basins

Experienced and familiar with the development, running, processing, and analyzing of various hydrologic and rainfall-runoff river basin models including both lumped and distributed (physical, full water and energy balance solutions) macroscale hydrologic models including HEC-HMS, VIC, SAC-SMA/Snow17, and DHVSM.

- Involved with developing, running, and processing HEC-HMS models to provide hydrologic inputs for various hydrologic and hydraulic models.
- Involved in evaluating, analyzing, and incorporating data from VIC, SAC-SMA/Snow17, and DHVSM hydrologic model results for input into operational models for various projects including the ASO VOI study, West-Wide Climate Risk Assessments studies, and SJRRP modeling and analysis.

Evapotranspiration (ET) and Agricultural Demands Modeling

Experienced with developing, running, and analyzing ET models such as the Penman-Monteith model and the associated data management, manipulation, and processing. Involved in the ET and evaporation model development, data management, and analysis for the West-Wide Climate Risk Assessments: Bias-Corrected and Spatially Downscaled Irrigation Demands and Reservoir Evaporations Projections study as part of the SECURE Water Act.

River Hydraulics and Sediment Dynamics Modeling

Experienced with developing, running, and analyzing results from hydraulic models using software such as HEC-RAS and ArcGIS. Personally developed, evaluated, and ran HEC-RAS models for reaches of the San Joaquin River Restoration Program as part of a detail assignment in Reclamation TSC's River Hydraulics and Sedimentation Group. Experienced with analyzing and post-processing input and output of more complex hydraulic models such as SRH-2D.

Fieldwork and Physical Data Collection and Processing

Experienced and trained in leading and assisting with field work investigations and physical data collection procedures including:

- River, stream, and canal flow measuring using various water velocity meters including handheld flow meters, Acoustic Doppler Current Profilers (ADCPs), and Acoustic Doppler Velocity Meters (ADVMs).
- Fish and biological monitoring using various sampling methods including electro-fishing and netting.
- Dual-tube, targeted piston, and auger flight shallow soil sampling.
- Shallow groundwater investigations for infiltration and drainage applications including hydraulic conductivity testing such as well bail-out, constant and falling head permeability, double ring infiltrometer, and continuous hydraulic conductivity testing utilizing state of the art Hydraulic Profiling Tool (HPT) equipment.

Irrigation District and Water User Efficiency Analysis, Evaluation, and Planning Projects

Experienced with evaluating current irrigation district system performance, operations, and efficiencies, and developing, analyzing, and planning projects to meet various goals such as increased efficiency and environmental gains. Acted as project manager, team leader, and engineer on the Grande Ronde Water



PRECISION
WATER RESOURCES ENGINEERING

Patrick Noe, M.S.
Precision Water Resources Engineering, Inc.

Education:

BS Physics,

UT Austin, 2014

GPA: 3.9

MS Civil Engineering,

Colorado State University,
2021

GPA: 4.0

Years Experience:

Current Firm 4

System Modeling

Experience:

RiverWare

HEC-HMS

Software Programming

Expertise

RiverWare Policy Language

(RPL)

Python

R

JavaScript

SQL

Django

VueJS

VBA

Matlab

EXPERIENCE NARRATIVE

Mr. Noe is a water resources engineer with a specialty in river basin modelling. During his tenure at Precision, he has developed and implemented complex policy and modeling techniques in both short-term operations models and long-term planning models for the Truckee and other western basins. He has experience in water rights and flood operations modelling. He has developed numerous decision support tools in the Truckee Basin including a Multi-Objective Evolutionary Algorithm. These tools aid clients in making probabilistic, risk-based operations decisions, developing long term planning strategies, and evaluating policy alternatives. Mr. Noe's primary role at Precision is project manager, and he oversees several clients in the Truckee Basin.

Water Resource Engineer, Precision Water Resources Engineering, Loveland, CO

Dec 2018 – Present

- **Truckee Basin Water Management Options Pilot (2020 – Ongoing)** – Developed the technical infrastructure necessary to implement Multi-Objective Evolutionary Algorithm (MOEA) as a tool to allow Truckee Basin Stakeholders to evaluate the benefits of alternative flood operations policy using Forecast Informed Reservoir Operations.
- **California Department of Water Resources Decision Support (2018 – Present)** – Consults and provides technical information to help stakeholder make operational decisions to support environmental and recreation objectives in the Truckee River Basin.
- **Reno, Sparks, and Washoe County Decision Support (2020 – Present)** – Provides technical expertise to aid the basin stakeholder in water rights utilization and planning.
- **Truckee River Operating Agreement Planning Model (2019 – Present)** – Development and improve the model logic per the requests of the U.S. Bureau of Reclamation Lahontan Area Basin Office.
- **Truckee River Operating Agreement Operations Model (2019 – 2022)** – Perform development of an operations model that evaluates forward looking reservoir operations and backward-looking accounting of observed reservoir releases. Provide technical support to the U.S. District Court Water Master Staff. Build and improve user tools to facilitate more efficient interaction with and analysis of the model results.
- **White River StateMod and RiverWare Model Comparison (2020)** – Built a RiverWare model of Colorado's White River Basin and facilitate a comparison of functionality between it and the StateMod Model of the basin.
- **Model Control Tools (2019 – Present)** – Development, maintenance, and improvement of decision support tools (TECU, Ensemble Control Workbook, Utah Lake Jordanelle Exchange Model Controller, and TMWA Controller).
- **White Papers Materials (2019 – Present)** – Development an assortment of educational materials related to the Truckee Basin and the TROA Ops Model for the California Department of Water Resources
- **Lahontan Flood Analysis (2020)** – Performed a 100-year flood flow analysis below Lahontan Reservoir in accordance with FEMA Guidelines for Churchill County.

Patrick Noe, M.S.
Precision Water Resource Engineering

- **Truckee Meadows Water Authority (TMWA) Climate Change Analysis (2019-2020)** – Conducted a climate change analysis for TMWA to assess water supply questions for the future by utilizing the TROA Planning Model.
- **TROA Operations Training (2020)** – Development of a 6-week course intended to allow clientele within the Truckee Basin to become more familiar and experienced in techniques of utilizing the TROA Ops Model.

Previous Employment History

August 2015 – November 2018. **Austin Christian Fellowship – Youth Pastor.**

- Plan sermons and speak to groups of fifty or more on a weekly basis
- Counsel adolescents in seeking help for issues of addiction, sexual harassment, anxiety, and depression
- Mobilize and inspire adult volunteer leaders to build the organization
- Recruit, hire and manage five summer interns each year.

February 2015 – September 2015. **Recreational Equipment Inc. – Salesman.**

- Sold co-op memberships, camping equipment, shoes, and clothing merchandise to customers
- Developed and enriched interest in the outdoors through supporting the REI outdoor school

June 2014 – December 2014. **Fairfield Nodal – Geophysical Analyst (Onboard).**

- Analyzed field seismic data into SEG Y standard format in North Sea operations.
- Conducted several quality control procedures to ensure client specifications were met.
- Worked offshore on a five weeks on/five weeks off schedule.
- Communicated routinely with clients, management, and office personnel on operations.
- Performed routine maintenance on processing hardware and software.

Publications and Professional Conference Presentations

Erkman, C., Noe, P. “Accounting in the Truckee River Basin,” Nevada Water Resource Association Annual Conference, February 2022. Las Vegas, NV.

Reports

Noe, P., Powell, A. *TROA Planning Model Verification*. Precision Water Resources Engineering. August 2022.

Erkman, C., Coors, S., Powell, A, Noe, P. *TMWA Climate Change Analysis*. Precision Water Resources Engineering. July 2020.

Erkman, C., Noe, P. *2020 TROA Annual Report*. Precision Water Resources Engineering. Loveland, CO. March 2021.

Erkman, C., Noe, P. *2019 TROA Annual Report*. Precision Water Resources Engineering. Loveland, CO. March 2020.

Erkman, C., Noe, P. *2018 TROA Annual Report*. Precision Water Resources Engineering. Loveland, CO. March 2019.

Bruce Scott, PE, PLS, WRS

Principal/Senior Civil Engineer

Professional Profile

For more than 40 years, Mr. Scott has been active in Nevada water resources, engineering, and surveying. After 4 years with the Nevada Division of Water Resources, he co-founded a consulting engineering firm in Carson City, Nevada. In 1978 he was a founding principal of Resource Concepts, Inc. with direct responsibilities in engineering, surveying, and water rights. That began a long history of successful projects and satisfied clients. Resource Concepts, Inc. counts a number of clients for whom professional services have been provided since the late 1970's. Among these are clients such as the Minden-Gardnerville Sanitation District, for whom Mr. Scott serves as their engineer, and the Great Basin Water Company, a client since 1978. He has been involved in many engineering and construction projects, combining sensitivity for the resource with experience and practicality in design and construction.

Mr. Scott heads one of the most active and well-respected water rights groups in the state of Nevada. Since 1978 he has represented hundreds of water right applicants and filed thousands of documents with the Division of Water Resources. He is a recognized water resources professional who has been tapped by four different Governors to serve on the Nevada State Board for Financing Water Projects.

Mr. Scott is a strong believer and practicing professional in the collaborative development, planning, and implementation of projects. The multi-disciplinary resource-sensitive approach to projects is a founding principle of Resource Concepts, Inc. Mr. Scott serves as the administrative professional for the firm. He is active in the community as well as in his professional capacity.

Areas of Expertise

- | | |
|--------------------------------------|---|
| • Water system design and permitting | • Commercial and residential land development |
| • Water rights review and analysis | • Technical drainage studies |
| • Sanitary sewer design | • Source water protection |
| • Earthwork and grading | • Public outreach |
| • Roadway design and permitting | • Water rights |

Representative Project Experience

Carson City Regional Water Transmission Main & System Connection, Carson Valley. Mr. Scott has worked closely with the Town of Minden, Carson City, Douglas County, Indian Hills, and the Carson Water Subconservancy District in concept development, preliminary project analysis, and project development, design and implementation for a regional water system which combines the water service areas of Minden, Douglas County, Indian Hills, and Carson City. This project created a backbone regional system and includes over \$30 million of investment in new infrastructure to provide a good quality water supply to areas of Douglas County, Indian Hills, and Carson City where arsenic, uranium, and other constituents created water quality limitations. This project was placed in service online in 2014.



EXPERIENCE: 40+ YEARS

EDUCATION

BS Civil Engineering, University of Illinois, 1968

REGISTRATIONS/CERTIFICATIONS

Professional Civil Engineer
NV #3579, AZ#26133

Certified Water Right Surveyor
NV #427

Professional Land Surveyor,
NV#3579, CA#6550

Fellow, American Society of Civil Engineers

AWARDS:

Nevada Water Resource Association's Lifetime Achievement Award 2021

Andy Aldax Carson Watershed Award 2022

EMAIL: bruce@rci-nv.com

PHONE: (775) 883-1600



Resource Concepts, Inc. 340 N. Minnesota St., Carson City, NV 89703

(775) 883-1600

www.rci-nv.com

Scott, Continued



Water Rights & Water Resources, Statewide. Mr. Scott and the RCI water rights team provide support for hundreds of clients in water rights administration, filings, maintenance, and water rights issues. RCI takes great pride in handling water rights for everyone from the largest gold miner in Nevada to an individual with a small domestic well. The water rights team provides services at all levels to all types of clients, dealing in both surface and groundwater resources within Nevada.

Overall Surveying and Municipal Engineering Supervision, for Resource Concepts Inc. Mr. Scott is the Principal in charge of surveying, water rights and is actively involved in RCI's municipal engineering. This involves the overall responsibility for registered professional engineers, land surveyors and technical staff working on a wide variety of engineering, surveying, water rights, and related resource projects. RCI has an outstanding reputation with regard to the quality of its design work, the care with which projects are conceived and executed, relations with clients, and the ability to get the best from every contractor, minimizing issues professionally and promptly dealing with questions or concerns. RCI's focus is to solve problems and not point fingers or blame others. RCI represents its clients in a fair, straightforward, and honest way. Our overriding goal is to have a project done well with a satisfied client who looks to RCI the next time they need professional services.



REPRESENTATIVE NEVADA WATER RIGHTS CLIENTS:

Municipalities & Water Companies

- Carson City
- Minden Gardnerville Sanitation District
- Town of Minden
- Great Basin Water Co.
- Incline Village General Improvement District
- Stagecoach General Improvement District
- Douglas County
- Humboldt County
- Gardnerville Water Company
- Lyon County Utilities
- Nevada Public Works Division

Ranches & Private Companies

- Barrick Gold, US
- Masini Ranches
- Vidler Water Company
- Pan Gold
- Heavenly Ski Resort
- Kinross Gold
- Quintus Resorts
- America West Homes
- Nevada Land and Resource Company
- Wynn Resorts
- Pahrump Utilities Company
- Pershing Gold
- Nevada Gold Mines
- Bently Enterprises
- Burning Man
- Delmar Livestock

Other Clients

- The Nature Conservancy
- Trust for Public Lands
- University of Nevada
- Title Companies
- Attorneys
- Realtors

Main Office

340 North Minnesota Street
Carson City, NV 89703
(775) 883-1600

Lake Tahoe Office

276 Kingsbury Grade, Suite 206
Stateline, NV
PO Box 11796
Zephyr Cove, NV 89448

(775) 588-7500

Email: bruce@rci-nv.com

AGENDA ITEM #7

CARSON WATER SUBCONSERVANCY DISTRICT

Regional Water System & Flood Committee

TO: Committee Members

FROM: Edwin James

DATE: February 6, 2023

SUBJECT: Agenda Item # 7– For Possible Action: Discussion regarding Updating the Regional Floodplain Management Plan

DISCUSSION: In 2008 CWSD created the first Regional Floodplain Management Plan. This plan outlined goals to reduce flood risks in the Carson River Watershed. The plan focused mostly on the Carson River flooding. This plan needs to be updated every five years. In 2013, the plan was updated. In 2018, the Regional Floodplain Management Plan went through a complete revision and alluvial fan flooding was added. In 2023, CWSD needs to update the plan. This plan enables Douglas County, Carson City, and Storey County to get CRS points to help reduce their FEMA flood insurance premiums. Originally, CWSD was going to apply in the next round of FEMA funding to conduct this study, but with FEMA not offering any funding this year, staff is evaluating other ways to conduct the update. There is a possibility that we can use some unused funds in our latest FEMA grant. If not, CWSD staff could do the update. Staff will review various options on how to update the Regional Floodplain Plan and the costs.

STAFF RECOMMENDATION: Provide direction to staff.

AGENDA ITEM #8

CARSON WATER SUBCONSERVANCY DISTRICT

Regional Water System & Flood Committee

TO: Committee Members

FROM: Edwin James

DATE: February 6, 2023

SUBJECT: Agenda Item # 8– For Possible Action: Discussion regarding future regional water funding needs

DISCUSSION: In 2010, CWSD created a list of various regional water projects throughout the watershed. Staff is in the process of meeting with all the water purveyors to update the 2010 list. This process has been delayed as we wait for the NDEM grant. It is anticipated that staff will meet with all the water purveyors before the end of this fiscal year. A preliminary cost request for just three projects is close to \$1,500,000. Currently, we have \$1,184,997.03 in the Acquisition/Construction Account. Staff will give an update on this program at the meeting.

STAFF RECOMMENDATION: Provide direction to staff.