# Project Proposal
# Study of Reduced Winter Flows in Mill Creek, Moab, UT

Date: September 6, 2013

Agreement or Funding Opportunity No.: N/A

Project Title: Study of reduced winter flows in Mill Creek, Moab, UT

Period of Performance (POP) for this project: 2013 to 2016 or as approved

## I. **Background and Mission:**

Ken's Lake is a 2,600 Acre Foot (AF) irrigation storage reservoir located in San Juan County approximately ten miles southeast of Moab, UT. The reservoir is owned by the Grand County Water Conservancy District and operated by Grand Water & Sewer Service Agency (the Agency.) Construction began on the lake in 1979 under a Bureau of Land Management (BLM) Right-of-Way (ROW) grant number 36754 dated March 28, 1979. Three (3) cfs or minimum natural flow must be maintained in Mill Creek year-round as a stipulation of the ROW as well as a 400 AF conservation pool in the reservoir for stocked fish habitat.

Water right number 05-1523 allows the Agency to divert approximately 4,000 AF per year at the Sheley diversion to Ken's Lake from Mill Creek when the water is available. The water is distributed to about 150 users according to stock assignments in Moab Irrigation Company through 15+ miles of pipeline.

During average or better water years - enough water flows from Mill Creek to meet irrigation requirements, maintain the conservation pool and maintain the minimum flow downstream. Less than average water years have found the Agency restricting users by up to 60%, shortening the irrigation season by over two months, and still unable to maintain the conservation pool near the end of the season.

Grand Water & Sewer Service Agency's mission is: to utilize our expertise, knowledge, experience, and long range planning to secure and maximize the resources to protect our community's health and welfare by providing culinary water, irrigation water and wastewater collection services with a commitment to efficiency, sustainability, safety, and public awareness.

The Agency has a "Critical Water Year Action Plan" on file with the BLM. The Agency references this plan during low water years to request a

waiver from the BLM to allow Ken's Lake to drop below the 400 AF conservation pool.

The Action Plan is a useful tool to help maintain the balance between wildlife and irrigation needs in the Spanish Valley. Unfortunately, 2012 and 2013 have proven to be especially difficult water years. Even with the use of conservation pool water, the persistent drought has reduced available irrigation water below economic sustainability for many local irrigators.

## II. Purpose, Objective, and Relevance

If the flow in Mill Creek was reduced below 3 cfs from approximately October 15th to March 15th and diverted to Ken's Lake; it could provide as much as 450 AF to the reservoir prior to the start of the irrigation season. While 450 AF is less than 12% of the Agency's water right; in 2013 it would have increased available irrigation water by 73%. This action could have reduced or possibly eliminated the number of days Ken's Lake level was below the 400 AF conservation pool and potentially eased some of the restrictions placed on users.

The Agency proposes a testing and monitoring plan to evaluate the effects of winter flow reductions in the south fork of Mill Creek from below the Sheley Tunnel diversion and approximately 8.5 miles downstream to the confluence with the north fork of Mill Creek. The Agency proposes a year-round, three year study period as outlined in Section III.

The objective of the study is to determine the feasibility of winter flow reductions on Mill Creek. The study will help to support our mission of sustainability and best use of resources.

The Agency believes it is in the best interest of the general public to perform the study. Water resources in the valley are difficult to quantify and each and every resident would benefit from the study of loss in the creek. Presently an unknown amount of water goes into the aquifer from Mill Creek. When the lake is low in the summer, irrigation wells are employed both by the Agency and private individuals to supplement the system. This is the time of highest culinary water demand by all residents. There may be a negative effect on the Agency's supply, the City of Moab's supply and private wells throughout the valley. The general public would also gain if Ken's Lake was maintained at a level above the conservation pool. It would increase recreation quality at the lake and produce higher quality irrigation water. The general public also benefits from the recreational opportunities downstream and the habitat that Mill Creek provides to many species of plants and wildlife. The study will provide data

that will assist in balancing all concerns and help determine if reducing winter flows is feasible.

## III. **Technical Approach**

Scope and Area: The Agency proposes a three-year testing and monitoring plan to evaluate the effects of winter flow reductions in the south fork of Mill Creek from below the Sheley Tunnel diversion and approximately 8.5 miles downstream to the confluence with the north fork of Mill Creek.

Participants/Technical Team: The study will be implemented by representatives from the organizations listed below. These representatives will also form the Technical Team. Each member organization of the Technical Team employs experts in their respective fields with experience and qualifications to collect and analyze respective data for the study.

Grand Water and Sewer Service Agency (the Agency)
The City of Moab, Utah (Moab)
U.S. Bureau of Land Management (BLM)
U.S. Geological Survey (USGS)
Utah Geological Survey (UGS)
Utah Department of Environmental Quality (DEQ)
Utah Department of Natural Resources (DNR)
    Division of Water Rights
    Division of Wildlife Resources
Other organization as needed

Areas of Interest: The effects of climate change and population growth in Spanish Valley have increased the demand on an already fragile ecosystem. The following items of environmental and economic concern have been identified:

Ground water recharge
Water quality
Wildlife habitat
Riparian health
Future climate changes
Local population
Economic impact

Study Plan: The Agency will install an engineered outflow structure designed to release measured flows, adjustable from 0 – 3 cfs at the Sheley Tunnel Diversion just upstream from the USGS measuring gage; this will eliminate flow variance due to sanding. With the assistance of the

USGS, UGS, and the DEQ; install and rate a temporary flow/pressure gage just above the confluence of the north and south forks of Mill Creek. These two gages will be used to monitor the flow differential between the sites. A temperature probe could also be installed if deemed valuable.

With the assistance of the DNR Wildlife Resources and DEQ, Identify and install pressure probes to measure wintertime accessible subject pools within the study area, along with subject pools outside of the study area for comparison.
DNR Wildlife Resources and the BLM will use the Rapid Assessment Guidelines for the American Southwest to identify riparian areas within the study area as a baseline for evaluation along with riparian areas outside of the study area for comparison.
The Agency will contract with or work under the direction of the USGS and/or the UGS to measure the creek flow and identified subject pools during the monitoring period.
The Agency will contract with the experts at the Utah DNR during the study period to monitor and evaluate the riparian health within the identified study area as well as the identified study outside the study area to be used for comparison.
Moab City and the Agency will continue to monitor and record their well and/or spring levels and water use. The water level and water use data will be part of the Technical Team evaluation.

First Year Testing and Monitoring: Beginning no later than Oct 15, the Agency will start a year round testing and monitoring program. Starting October 15th and continuing to on or about January 2nd, the Agency will maintain a stream flow of the greater of 3 cfs or the natural flow of the stream. The flow rates of Mill Creek at the upper and lower end of the test area will be measured and recorded. Subject pools and wildlife/riparian areas will also be measured and recorded.
Starting January 2nd to March 17th, the Agency will reduce the flow from the Sheley diversion to the greater of 1.5 cfs or the natural flow of the stream. The flow rates of Mill Creek at the upper and lower end of the test area will be measured and recorded. Subject pools and wildlife/riparian areas will also be measured and recorded.
Beginning March 17th, the Agency will return the flow to the greater of 3 cfs or the natural flow of the stream. The flow rates of Mill Creek at the upper and lower end of the test area will be measured and recorded. Subject pools and wildlife/riparian areas will also be measured and recorded.
The first year of testing and monitoring will conclude on or about October 15th.

Second Year Testing and Monitoring: Starting October 15th and continuing to approximately January 2nd, the Agency will maintain a stream flow of the

greater of 1.5 cfs or the natural flow of the stream. The flow rates of Mill Creek at the upper and lower end of the test area will be measured and recorded. Subject pools and wildlife/riparian areas will also be measured and recorded.
On or about January 2nd, the Agency will increase the flow from the Sheley diversion to the greater of 3.0 cfs or the natural flow of the stream. The flow rates of Mill Creek at the upper and lower end of the test area will be measured and recorded. Subject pools and wildlife/riparian areas will also be measured and recorded.
The second year of testing and monitoring will conclude on or about October 15th.

Third Year Testing and Monitoring: Starting October 15th and continuing to the following October 15th, the Agency will maintain a stream flow of the greater of 1.5 cfs or the natural flow of the stream. The flow rates of Mill Creek at the upper and lower end of the test area will be measured and recorded. Subject pools and wildlife/riparian areas will also be measured and recorded.
The third year testing and monitoring will conclude on or about October 15th.

Data collection: The upper gage is a real-time gage operated by the USGS under contract by the BLM. The gage at the lower reach of the test area will not be real-time. Weather permitting; the Agency and/or a member agency of the Technical Team will retrieve the probe data and physically measure the flows at the probe locations on a 30 day cycle. The data on the lower gage is stored for up to one year and can be retrieved at any time, allowing for flexibility due to weather conditions. Weather permitting, the Agency will retrieve the probe data and physically measure and record the depth of the subject pools on a 30 day cycle. As with the flow meter probe, the data is stored for up to one year and can be retrieved at any time, allowing for flexibility due to weather conditions.

Technical Team Evaluation: The Technical Team will meet monthly or as needed to evaluate the collected data during the monitoring period. Should the Technical Team determine at any time during the study and evaluation period that the data shows an unacceptable effect on the study area; the Technical Team may recommend suspension or discontinuation of the study.
The Technical Team may also postpone the study to unforeseen circumstances; such as an extreme weather condition or natural disaster. The three year study will allow the Technical Team to evaluate and compare the effects of low flows in both early and late winter months. It will also allow for an evaluation and comparison of low flows for the entire winter season.

At the conclusion of the Reduced Flow Evaluation; the Technical Team will present a final report with its recommendations to the BLM. Based on the recommendations of the Technical Team; the Agency may propose a permanent change to the ROW Grant agreement.

Goals: The Agency is aware of the complexities of the groundwater system in the Moab area. While all participating agencies agree that a more in-depth study is needed to get the “big picture”, this monitoring and study plan will potentially be a segue to a comprehensive study of the hydrology of the Moab valley from the La Sal mountains to the Colorado River. The goal of the Agency is to help find solutions to mitigate the negative effects of drought on the people of Moab with the least negative impacts to the watershed and the environment. Even if the study data shows that lowering the flows in Mill Creek is not feasible for any reason, the Agency still believes in the value of collecting the information to help with future decisions and determinations and to avoid a permanent negative change to our beautiful home.