State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Alan Matheson
Executive Director

DIVISION OF WATER QUALITY
Walter L. Baker, P.E.
Director

Utah Water Quality Board Meeting
DEQ Board Room 1015
195 N 1950 W
Salt Lake City, UT 84116
October 26, 2016

Work Meeting Begins @ 8:30 a.m.
Utah's POTWs and Readiness for TBPEL……. John Mackey

Board Meeting Begins @ 9:00 a.m.
AGENDA

A. **Water Quality Board Meeting – Roll Call**

B. (Tab 1) **Minutes:**
Approval of Minutes for September 27, 2016 WQ Board Meeting..... Myron Bateman

C. **Executive Secretary's Report**.....Walt Baker

D. (Tab 2) **Funding Requests:**
1. **Financial Report**.....Emily Cantón

2. **San Juan-Spanish Valley SSD:** *Request for Project Funding Authorization*
.....John Mackey

3. **Ground Water Data Assessment:** *Request for Funds to Evaluate Groundwater Quality from Selected Wells in Utah*..... ……Dan Hall/Bill Damery

4. **Summit County:** *Funding Authorization*.....John Mackey

F. (Tab 3) **Other Business:**
1. **Permission to Proceed with Rulemaking on 19-5-105.3:** *Independent Peer Review Proposal*.....Erica Gaddis

2. **TMDL for Upper Nine Mile Creek:** *Request to Initiate Rulemaking to Adopt TMDL*
..... Sandy Wingert

Next Meeting December 14, 2016
DEQ Board Room 1015
195 N 1950 W
Salt Lake City, UT 84116

Revised 10/20/2016
In compliance with the American Disabilities Act, individuals with special needs (including auxiliary communicative aids and services) should contact Ashley Nelsen, Office of Human Resources, at (801) 903-3978, TDD (801) 903-3978, at least five working days prior to the scheduled meeting

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MINUTES
UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY
UTAH WATER QUALITY BOARD
195 N 1950 W
Salt Lake City, UT 84116
September 27, 2016

UTAH WATER QUALITY BOARD MEMBERS PRESENT

Clyde Bunker	Steven Earley
Gregg Galecki	Myron Bateman
James VanDerslice	Jennifer Grant

Excused: Alan Matheson, Shane Pace, Michael Luers

DIVISION OF WATER QUALITY STAFF MEMBERS PRESENT

Walter Baker, Leah Ann Lamb, Nicole Froula, Linda Gould, Ally Gagon, Lisa Nelson, Skyler Davies, Marsha Case, Kim Shelley, Emily Cantón, John Mackey, Jim Bowcutt, Wynn John, Judy Etherington, Jennifer Robinson, Jeff Studenka.

OTHERS PRESENT

Name	Organization Representing
Jenny Potter	DEQ
Brian Edwards	Plain City
Bruce Higley	Plain City
Justin Atkinson	Sunrise Engineering
Mark Crouter	Tetra Tech
Donna Sackett	Senator Lee's Office
Nate Talbot	Aqua Engineering/Plain City
Gary Vance	JUB Engineers
Christian Buelow	U of U/ OEHS

Myron Bateman called the Board meeting to order at 9:35 AM and took roll call for the members of the Board and audience.

APPROVAL OF MINUTES OF THE AUGUST 24, 2016 MEETING

Motion: **It was motioned by Mr. Earley to approve the minutes for August 24, 2016 Board meeting. Mr. Galecki seconded the motion. The motion was unanimously passed.**

EXECUTIVE SECRETARY REPORT

- Mr. Baker discussed how the Division of Water Quality (DWQ) is working to address harmful algal blooms (HABs). There have been blooms in Mantua Reservoir, Scofield Reservoir, Payson Lakes and Utah Lake. The reason for the blooms is higher temperatures, low water levels and high nutrient levels. There are things that can be done to help abate and reduce harmful blooms, including freshening up water and managing water flows better. However, if the food source cannot be controlled (nutrients that are feeding the algae), algal blooms will continue. The levels of cyanotoxins witnessed in Scofield Reservoir this summer were unprecedented. Cyanotoxin concentrations above 10 micrograms per liter pose a public health threat, Scofield Reservoir had levels exceeding 60,000 mg/l. DWQ has currently deployed data sondes onto Utah Lake for real time monitoring. An additional one or two sondes will soon be available thanks to an EPA grant that DWQ recently received. DWQ cannot prevent the algal blooms but we can work to better understand them and predict them more effectively.

- The Union Pacific Railroad causeway in the Great Salt Lake separates the north arm, Gunnison Bay, from the south arm, Gilbert Bay. The north arm has about 25% salinity while the south arm has about 14% salinity. The mineral extraction industry prefers a higher amount of salinity in the north arm and the brine shrimp industry prefers a lower amount of salinity in the south arm. With the causeway being closed for the construction of the bridge there is an increased differential between the lake elevations in the two arms of the lake. Typically, the two levels parallel each other. With the two culverts having been dismantled and replaced by the bridge (and the bridge not yet being opened) the elevation difference is growing between the north and the south arms. The north arm, that has no fresh water inputs, is decreasing faster than the south arm. An agreement has been made to allow the bridge opening to remain closed until December 1, 2016. This will help maintain salinity levels in the south arm at a concentration that is not harmful to the brine shrimp.

- Tibble Fork Reservoir had a discharge as a result of reconstruction of the dam. DWQ will be issuing a Notice of Violation (NOV) to the conservancy district that owns the reservoir and dam. The district will need to respond to several questions, including: what occurred, why it occurred and what actions should have been taken to prevent the release of large quantities of sediment. Several elected officials and stakeholders visited Tibble Fork Dam, and the Live Yankee Mine that is on Snowbird property. There is controversy over the expansion of Snowbird Ski Resort relative to the impact that it will have on the watershed. DWQ participated in this site visit. There are a number of similarly abandoned mines in Utah. DWQ intends is to issue a discharge permit for the Live Yankee Mine to monitor the discharge and see what the pollutant concentrations are coming out of the mine. The entire watershed feeds into the Tibble Fork Reservoir.

- Budgetary items that DWQ will send to the Governor include funding to support a spill coordinator position and funding to support monitoring of HABs.

FUNDING REQUESTS

Financial Reports: Ms. Cantón updated the Board on the Loan Funds and Hardship Grant Funds, as seen in the Board Packet on pages 6-7.

Plain City *Request for Hardship Planning Advance*: Ms. Nelson presented staff recommendations for the Board to fund a hardship planning advance of $55,000 to Plain City to be repaid when a project is identified and funded.

Motion: **Following a discussion, a motion was made by Mr. Galecki to approve the hardship grant of $55,000, with the following special conditions: DWQ must approve the engineering agreement and plan before the advance will be executed, and the facility plan must be submitted to DWQ at the completion of the project. Ms. Grant seconded the motion. The motion unanimously passed.**

Request for Approval of Norbest Settlement Agreement: Ms. Robinson presented to the Board the settlement agreement between the DWQ and Norbest, Inc., formerly known as Moroni Feed Company. On June 24, June 25, and August 22, 2015, Norbest overflowed its equalization basin. These overflows were reported by Norbest to DWQ as required under its permit. DWQ subsequently issued a Notice of Violation (NOV) for these overflows and negotiated a penalty of $57,000.

Motion: **Following a discussion, a motion was made by Mr. Earley to approve the $57,000 penalty which settles the NOV. Mr. VanDerslice seconded the motion. The motion unanimously passed.**

OTHER BUSINESS

Nonpoint Source Annual Report: Mr. Bowcutt presented to the Board the FY2016 Nonpoint Source annual report. DWQ receives grants funds to help implement nonpoint source pollution control projects throughout the state. Mr. Bowcutt presented the summary of the FY2016 accomplishments submitted to EPA for the Nonpoint Source program.

To listen to the full recording of the Board meeting go to: http://www.utah.gov/pmn/index.html

Next Meeting October 26, 2016
DEQ Board Room 1015
195 N 1950 W
Salt Lake City, UT 84116

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Myron Bateman, Chair
Utah Water Quality Board

LOAN FUNDS
FINANCIAL STATUS REPORT

STATE REVOLVING FUND (SRF)	State Fiscal Year 2017	State Fiscal Year 2018	State Fiscal Year 2019
Funds Available			
2014 Capitalization Grant	767,362	-	-
2015 Capitalization Grant	4,726,800	-	-
2016 Capitalization Grant	4,507,700	-	-
Principal Forgiveness	4,657,415		
State Match	2,867,354	-	-
SRF - 2nd Round	98,130,902	116,512,791	61,915,699
Interest Earnings at 0.9%	883,178	1,048,615	557,241
Loan Repayments	9,377,079	12,442,293	12,632,187
Total Funds Available	**125,917,791**	**130,003,699**	**75,105,127**
Project Obligations			
Logan City	-	(39,131,000)	(30,000,000)
Loan Authorizations			
Duchesne City	(1,000,000)	(1,000,000)	(700,000)
Moab City	(8,405,000)	(2,000,000)	-
Salem City	-	(10,000,000)	(3,000,000)
Planned Projects			
Nutrient Projects - Various	-	(14,989,000)	(17,671,500)
*San Juan Spanish Valley SSD	-	(968,000)	(1,547,000)
Total Obligations	**(9,405,000)**	**(68,088,000)**	**(52,918,500)**
SRF Unobligated Funds	$ 116,512,791	$ 61,915,699	$ 22,186,627

UTAH WASTEWATER LOAN FUND (UWLF)	State Fiscal Year 2017	State Fiscal Year 2018	State Fiscal Year 2019
Funds Available			
UWLF	$ 20,695,476	$ 17,866,801	$ 23,188,471
Sales Tax Revenue	1,818,694	3,587,500	3,587,500
Loan Repayments	2,443,484	3,156,170	2,837,662
Total Funds Available	**24,957,655**	**24,610,471**	**29,613,633**
General Obligations			
State Match Transfer	(2,867,354)	-	-
DWQ Administrative Expenses	(1,066,500)	(1,422,000)	(1,422,000)
Project Obligations			
Helper City	(557,000)		
Murray City	(1,110,000)	-	-
Loan Authorizations			
Eagle Mountain City - White Hills	(490,000)	-	-
Planned Projects			
*Summit County	(1,000,000)		
Total Obligations	**(7,090,854)**	**(1,422,000)**	**(1,422,000)**
UWLF Unobligated Funds	$ 17,866,801	$ 23,188,471	$ 28,191,633

*Presenting to the Water Quality Board

HARDSHIP GRANT FUNDS
FINANCIAL STATUS REPORT

HARDSHIP GRANT FUNDS (HGF)	State Fiscal Year 2017	State Fiscal Year 2018	State Fiscal Year 2019
Funds Available			
Beginning Balance		$ 1,124,831	$ 1,445,233
Federal HGF Beginning Balance	4,655,017	-	-
State HGF Beginning Balance	1,090,728	-	-
Interest Earnings at 0.9%	51,712	10,123	13,007
UWLF Interest Earnings at 0.9%	46,565	40,200	52,174
Hardship Grant Assessments	1,062,382	1,346,351	1,225,888
Interest Payments	252,501	323,727	282,239
Advance Repayments	-	-	-
Total Funds Available	**7,158,904**	**2,845,233**	**3,018,541**
Project Obligations			
Big Plains - Planning Grant	(38,000)	-	-
Duchesne City - Construction Grant	(400,000)		-
Eagle Mountain City - White Hills - Construction Grant	(580,000)	-	-
Emigration Sewer Imp Dist - Planning Grant	(26,158)	-	-
Francis City - Construction Grant	(513,000)	-	-
Hinckley Town - Hardship Grant	(160,000)		
Plain City - Planning Advance	(55,000)		
Tri-County - Construction Grant	(221,000)	-	-
Non-Point Source Project Obligations			
(FY11) Gunnison Irrigation Company	(48,587)	-	-
(FY11) DEQ - Willard Spur Study	(113,326)	-	-
(FY12) Utah Department of Agriculture	(689,758)	-	-
(FY13) DEQ - Great Salt Lake Advisory Council	(260,717)	-	-
(FY15) DEQ - Ammonia Criteria Study	(70,674)		
(FY15) DEQ - Nitrogen Transformation Study	(123,849)		
(FY16) DEQ - Harmful Algal Bloom Study	(94,000)	-	-
(FY16) DEQ - San Juan River Monitoring	(194,615)		
(FY17) DEQ - Utah Lake Water Quality Study	(300,000)	(400,000)	(300,000)
FY 2012 - Remaining Payments	(23,334)	-	-
FY 2013 - Remaining Payments	(25,076)	-	-
FY 2014 - Remaining Payments	(119,041)	-	-
FY 2015 - Remaining Payments	(290,015)	-	-
FY 2016 - Remaining Payments	(653,907)	-	-
FY 2017 Allocation	(965,915)	-	-
FY 2018 Allocation	-	(1,000,000)	-
FY 2019 Allocation	-	-	(1,000,000)
Planned Projects			
*DEQ - Groundwater Quality Study	(68,100)	-	-
Summit County - Construction Grant		-	-
Total Obligations	**(6,034,073)**	**(1,400,000)**	**(1,300,000)**
HGF Unobligated Funds	$ 1,124,831	$ 1,445,233	$ 1,718,541

*Presenting to the Water Quality Board

State of Utah
Wastewater Project Assistance Program
Project Priority List

Ranking as of 7.22.2016	Project Name	Funding Authorized	Total Points	Point Categories			
				Project Need	Potential Improvement	Population Affected	Special Consideration
1	Moab City	x	120	50	24	6	40
2	Salem City	x	108	50	12	6	40
3	White Hills - Eagle Mountain	x	106	40	5	1	60
4	Summit County		98	45	32	1	20
5	San Juan Spanish Valley SSD		86	25	0	1	60
6	Hinckley Town	x	82	60	20	2	0
7	TriCounty Health Dept (Stonegate)	x	76	70	5	1	0
8	Duchesne City	x	52	10	0	2	40

Project Number:
Date Received: June 2016
Date to be presented to the WQB: October 26, 2016

WATER QUALITY BOARD
FEASIBILITY REPORT FOR WASTEWATER TREATMENT PROJECT
AUTHORIZATION

APPLICANT:	San Juan Spanish Valley SSD P.O. Box 9 Monticello, Utah 84535-009 Telephone: (435) 597-3225
PRESIDING OFFICIAL:	Frank Darcy, Chairman
CONTACT PERSON:	Kelly Pehrson, County Administrator
TREASURER/RECORDER:	Louis Jones, City Recorder
CONSULTING ENGINEER:	Ryan Jolley, P. E. Jones & DeMille Engineering, Inc. 1635 South, 100 West Richfield, Utah 84701 (435) 896-8266
BOND COUNSEL:	Richard Chamberlain Chamberlain & Associates 81 East, 100 South Monticello, Utah 84534 Telephone: (435) 587-2223

APPLICANT'S REQUEST:

San Juan Spanish Valley Special Service District (District) is requesting a grant in the amount $2,000,000 and a loan in the amount $505,000 loan repayable over 30 years at an interest rate of 0% for construction of a new wastewater collection system. The District is also requesting a Design Advance in the amount of $220,000.

APPLICANT'S LOCATION:

The District is located in northern San Juan County, south of Moab and the Grand-San Juan Counties line. The proposed sewerage system would connect the District to the regional Moab wastewater treatment facility through Grand Water & Sewer Service Agency's system.

MAP OF APPLICANT'S LOCATION

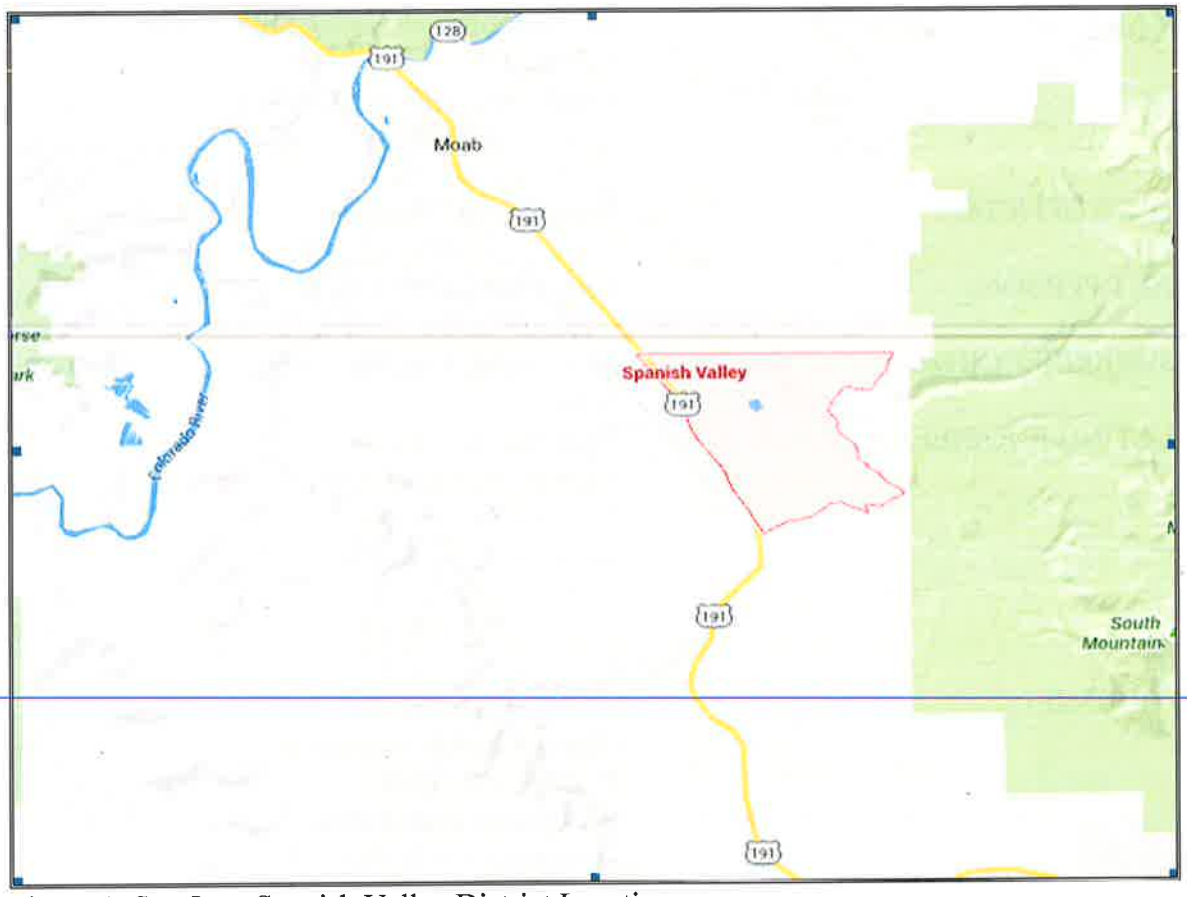

Figure 1. San Juan Spanish Valley District Location

BACKGROUND:

Staff introduced the proposed project to the Water Quality Board at its August 24, 2016 meeting. The principal drivers for the project are protection of important groundwater resources underlying the District and rapid growth that is occurring throughout the region.

The District completed a draft Culinary Water/ Sanitary Sewer Master Plan that considered water and sewer needs for the next 30 years. The Master Plan concluded that centralized water and sewer systems are needed to support the community's planned growth and to protect its drinking water supply. The Drinking Water Board and the Permanent Community Impact Board (CIB) have together authorized a total $5.1 million in financing for the recommended community culinary water system. A total of $5.0 million is needed to finance the proposed sewerage system, requested 50:50 from the Water Quality Board and from CIB.

At the August 24, 2016 meeting, the Water Quality Board raised questions about the density of development in the District, the expected growth in the service area, and the timing of the project. These questions are addressed in the following section of this report.

PROJECT NEED:

The District overlies groundwater aquifers that are classification Class IA (pristine) and Class II (drinking water quality) groundwater and these aquifers supply drinking to the community. The 2007 Utah Department of Natural Resources (DNRe) study *Hydrogeology of Moab-Spanish Valley, Grand and San Juan Counties Utah with Emphasis on Maps for Water Resource Management and Land-Use Planning,* the potential impacts of adding additional septic tanks was analyzed and concluded that to keep nitrate concentrations below 3 mg/L, new septic tank system development should be confined to building lots of size 10 to 20 acres per residence.

Current septic tank (and water well) densities in the District are shown in Figure 2. The figure illustrates the concentration of development in the Moab-Spanish Valley; the development is not distributed uniformly across the counties and over the aquifers. Rather, development is focused along Highway 191 and in lower lying, buildable areas. As a result, septic tank densities are much greater than recommended in the 2007 DNRe study and water wells in the area are at greater risk of nitrate contamination in the developed areas. Both Southeast Utah Health Department and the San Juan County Health Department expressed concerns about the potential contamination of individual culinary water wells by older septic system in the area.

The U.S. Census Bureau estimates population growth in the Moab area to be 2% per annum. Based on recent building permit applications, the District's engineer estimates the current growth rate is more like 6%. Although this rate of growth is unlikely to be sustained throughout the 30 year planning period, it is consistent with recreation-driven growth in neighboring Moab. This growth is expected to continue for the next 3 or 4 years and as Moab grows, the need for affordable housing and services should continue to expand in San Juan.

Timing needed to implement the project is dictated primarily by availability of wastewater treatment services from Moab. Moab City expects to break ground on its new wastewater treatment plant in November or December 2016. Until this plant is completed in Summer 2018, Moab is unable to accept the District's wastewater. The implementation schedule for the District's project (see below) would have wastewater beginning to flow to Moab in the Spring of 2019.

The construction of the District's sewerage system on the proposed schedule will allow the District to minimize the number of new septic tank systems in its developing areas without curtailing its planned and expected growth while safeguarding the aquifers that provide drinking water to the community.

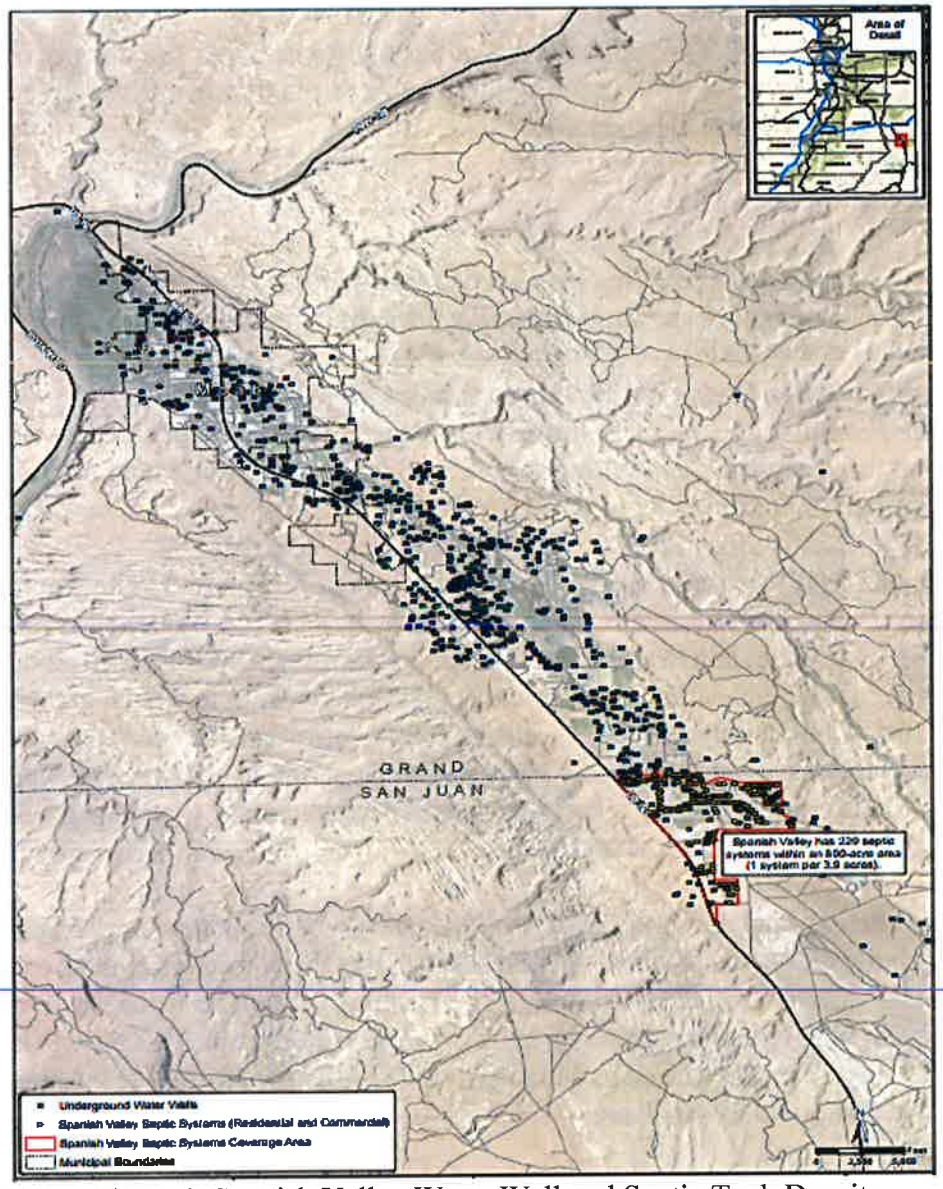

Figure 2. Moab-Spanish Valley Water Well and Septic Tank Density

PROJECT DESCRIPTION:

The District is proposing to construct approximately 44,000 linear feet of 8-inch gravity sewer lines and 145 manholes for sewage collection, as well as 4,800 linear feet of 8-inch interceptor sewer to transfer the wastewater to the Grand Water & Sewer Service Agency (GWSSA). The wastewater will then be conveyed to Moab City's new wastewater treatment system for treatment and disposal (alternative No. 4 as listed below).

ALTERNATIVES EVALUATED

The Facilities Plan evaluated the following alternatives:

1. No action.

2. Construction of a new "stand alone" sewerage system and treatment works by the District.
    a. Total Containment lagoons
    b. Mechanical treatment plant (sequencing batch reactor) with discharge of treated effluent into Pack Creek in Grand County.
3. Construction of a new sewerage system and an interceptor connecting to Moab's sewerage system and regional treatment works.
4. Construction of a new sewerage system that transfers wastewater to the GWSSA and the Moab regional treatment works.

The recommended alternative is No. 4, which is to construct a new sewerage system that connects to GWSSA and the Moab treatment works.

POSITION ON PROJECT PRIORITY LIST:

The District is ranked No.4 out of 8 projects on the FY 2016 Wastewater Treatment Project Priority List.

POPULATION GROWTH:

	Year	Population[1]	ERC[2]
Current	2016	575	230
Design	2047	1,065	426

[1] The average population growth through the year 2047 is estimated to be 2% by the US Census Bureau.
[2] ERC = Equivalent Residential Connections

PUBLIC PARTICIPATION AND DEMONSTRATION OF PUBLIC SUPPORT:

The District held a public meeting on May 16, 2016, as required by the Utah Wastewater State Revolving Fund (SRF) program. The District will hold a final public hearing once funding is secured.

IMPLEMENTATION SCHEDULE:

Public Meeting	May 2016
Apply to WQB for Funding:	August 24, 2016
WQB Funding Authorization:	October 2016
CIB Review / Prioritization	November 2016
Public Hearing:	January 2017
Advertise EA (FONSI):	February 2017
CIB Funding Authorization	February 2017
Engineering Report Approval:	March 2017
Commence Design:	May 2017
Issue Construction Permit:	October 2017
Advertise for Bids:	October 2017
Bid Opening:	October 2017
Loan Closing:	December 2017
Commence Construction:	March 2018

APPLICANT'S CURRENT USER CHARGE:

The District does not currently have a public sewer system.

COST ESTIMATE:

Abandonment & New Connection Costs	$700,000
Engineering - Design	$220,000
Engineering – CMS	$175,000
Geotechnical Evaluation & Permit	$40,000
Land/Easement/Water Rights	$155,000
Capacity Purchase from Moab and GWSSA	$795,000
Construction	$3,270,000
Contingency (~10 % of construction)	$330,000
DWQ Loan Origination Fee*	$5,000
Legal/Bonding	$15,000
Total:	$5,705,000

*Based on a $500,000 WQB loan

COSTS SHARING:

The total cost of the project is $5,705,000. The district has requested the Permanent Community Impact Board (CIB) fund half of the total cost in the amount of $2,500,000 for this project. This request will be presented during the CIB's meeting that will be held November 4, 2016. The following cost sharing is proposed for this project:

Funding Source	Cost Sharing	Percent of Project
Local Cost[1]	$700,000	12%
WQB Funding	$2,505,000	44%
CIB Funding	$2,500,000	44%
Total:	$5,705,000	100%

[1]The current residents would need to pay to abandon existing septic systems and to run sewer laterals to the new community sewer system, and a connection fee was estimated to cost $3,000 per residence. The total local cost is estimated $700,000 to be paid by the community.

ESTIMATED ANNUAL COST FOR SEWER SERVICE:

Staff developed cost models (static and dynamic) to evaluate several financing alternatives for the project. The basic cost data used in modeling financial alternatives for the project are provided below.

Operation & Maintenance – Annual	$35,000
Existing Debt Service	$0
Median Adjusted Gross Household Income- Moab (2014)	$33,922
WQB Maximum Affordable Rate at 1.4% MAGI	$37.24

The static model financing alternatives considered are given in Attachment 1. The applicant's requested financing terms were: a construction grant of $2,000,000, and a $500,000 loan with a 30 years term and 0% interest. The requested financing package is highlighted in Attachment 1. The loan origination fee of 1% was added to the WQB loan amount. For modeling purposes, it was assumed that CIB would extend the same financing package as the WQB except that CIB does not charge a loan origination fee.

The static model shows that a 30 year, 0% interest loan of $600,000 plus $6,000 origination fee is affordable with a grant of $1,900,000. The basic results from this calculation are as follows:

WQB Debt Service (0.0%; 30 yrs)	$20,200
WQB Annual Reserve Payment (first 10 years)	$3,030
CIB Debt Service (0.0%; 30 yrs)	$20,000
CIB Annual Reserve Payment (first 10 years)	$3,000
Total Annual Cost	$102,000
Monthly Cost / ERU	$36.93
Cost calculated as % of MAGI	1.39%

Staff developed a dynamic cost model for the project to determine if growth-based sewer revenues could contribute significantly toward financing the project and reducing the amount of grant needed. The dynamic model presented in Attachment 2 uses a 30 year term and 0% interest rate to establish a graduated loan repayment schedule that recognizes growth in sewer revenue as new connections are made each year. This model uses a 2% annual growth rate, 1.8% annual cost inflation, and the maximum affordable sewer rate of $37.24 per month per ERC. A minimum debt-to-service ratio of 1.25% is maintained throughout the loan term.

For these conditions, the dynamic model shows that a WQB loan of $968,000 is affordable; the grant amount would be $1,547,000. Comparable loan and grant amounts (and terms) from CIB, and a minimum District impact fee of $2,100, are needed to keep the project affordable. The basic results from the dynamic model calculation are as follows:

Average WQB Debt Service (0.0%; 30 yrs)	$32,267
Average WQB Annual Reserve Payment (first 10 years)	$3,880
Average CIB Debt Service (0.0%; 30 yrs)	$31,933
Average CIB Annual Reserve Payment (first 10 years)	$3,830
Average Total Annual Cost	$142,690
Monthly Cost / ERU	$37.24
Cost calculated as % of MAGI	1.4%

Cost sharing by this cost model would be as follows. Should CIB elect to fund this project with and interest bearing loan (likely) their loan / grant amounts would differ.

Funding Source	Cost Sharing	Percent of Project
Local Cost[1]	$700,000	12%
WQB Loan (30 year, 0% int.)	$968,000	17%
WQB Grant	$1,547,000	27%

CIB Loan (30 year, 0% int.)	$958,000	17%
CIB Grant	$1,537,000	27%
Total:	$5,710,000	100%

STAFF COMMENTS:

Staff supports the District's plan to implement a public sewerage system that will protect a valuable regional drinking water resource and contribute to orderly growth in the area. The recommended alternative would connect the District's sewer to the regional wastewater treatment plant in Moab City, linking the regional needs for water quality protection.

Financing the project is challenging because of its high cost and the limited number of potential sewer customers in the District at present. Current growth and rising costs support the need for planning and constructing a public sewerage system now.

Using a back-loaded repayment schedule as defined in the dynamic model allows the WQB to apply more loan funds to the project and allows the District to defer loan payments while its builds its customers. Both the WQB and the District take on greater risk when depending on this growth to maintain the system and make future debt service payments. Staff believes that this risk is manageable with prudent management of the assets and the utility's finances, including but not limited to regular attention to its cost of services, establishing sewer fees that are consistent with uses, adequately funding depreciation, and maintaining impact fees.

Staff anticipates that this project, when authorized by the WQB, would be funded with first round or equivalency-project federal dollars and that the grant component would be provided as 2015 Capitalization Grant "principal forgiveness."

STAFF RECOMMENTATION:

Staff recommends that the Water Quality Board authorize **SJSVSSD a loan in the amount of $968,000 at an interest rate of 0% repayable over 30 years and a grant in the amount of $1,547,000, along with a Design Advance in the amount of $220,000** subject to these special conditions:

1. The District must agree to participate annually in the Municipal Wastewater Planning Program (MWPP).

2. As part of the facility planning, the District must complete a Water Conservation and Management Plan.

3. The District must pursue and retain additional funding necessary to fully implement the project.

4. The District must negotiate an inter-local agreement between the District, Moab City and GWSSA and establish a construction schedule that indicates the date when Moab and GWSSA will accept its wastewater.

5. As part of its Plan of Operations, the District must develop and implement an asset management program that is consistent with the SRF's Fiscal Sustainability Plan.

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File: Spanish Valley SSD/Planning/Section 1

ATTACHMENT 2 - DYNAMIC COST MODEL
San Juan Spanish Valley SSD Cash Flow Model (2016 dollars)

WQB Loan Terms		
Funded Project Cost:	$	5,710,000
CIB Grant Amount:	$	1,537,000
CIB Loan Amount:	$	958,000
WQB Grant Amount:	$	1,547,000
WQB Loan Amount:	$	968,000
Local Contribution:	$	700,000
Loan Term:		30
Interest Rate:		0.0%
Average Annual WQB Payment:	$	32,267

Annual Sewer Expenses (Estimated)		
Proposed WQB Loan Amount:	$	968,000
Estimated O&M Cost:	$	35,000
Annual O&M Cost Increase:		1.80%
Existing Debt Service:	$	-
Incremental Increase Year 1 - 10 =		31.0%
Incremental Increase Year 11 - 30 =		25.0%

Sewer Revenue Sources (Projected)		
Beginning Cash:	$	-
Initial Customers (ERU):		230
Projected Growth Rate:		2.00%
District Impact Fee:	$	2,100
Moab + GWSSA Impact Fee	$	3,800
Proposed Monthly User Charge:	$	37.24

Sewer Revenue Projections

Year	Growth Rate (%)	Annual Growth (ERU)	Total Users (ERU)	User Charge Revenue	District Only Impact Fee Revenue	Total Revenue	Amortized WQB Loan	WQB Loan Reserves	Amortired CIB Loan	CIB Loan Reserves	Remaining Principal	Moab/GWSSA Sewer Fee	O&M Expenses	Total Expenses	Beginning Cash	Ending Cash Flow	Net Revenue	Debt Service Ratio
2018	2.0%		230							-	1,926,000	-	-	-	-	-	-	-
2019	2.0%	5	235	-	-	-				-	1,926,000	-	-	-	-	-	-	
2020	2.0%	5	240	107,251	10,500	117,751	22,705	3,406	22,372	3,356	1,880,923	21,600	35,630	109,068	-	8,683	8,683	1.34
2021	2.0%	5	245	109,486	10,500	119,986	23,398	3,510	23,064	3,460	1,834,461	22,050	36,271	111,753	8,683	16,916	8,233	1.33
2022	2.0%	5	250	111,720	10,500	122,220	24,090	3,614	23,757	3,564	1,786,614	22,500	36,924	114,449	16,916	24,687	7,771	1.31
2023	2.0%	5	255	113,954	10,500	124,454	24,783	3,717	24,450	3,667	1,737,381	22,950	37,589	117,156	24,687	31,985	7,298	1.30
2024	2.0%	5	260	116,189	10,500	126,689	25,476	3,821	25,142	3,771	1,686,763	23,400	38,265	119,876	31,985	38,798	6,813	1.28
2025	2.0%	5	265	118,423	10,500	128,923	26,168	3,925	25,835	3,875	1,634,760	23,850	38,954	122,608	38,798	45,113	6,315	1.27
2026	2.0%	5	270	120,658	10,500	131,158	26,861	4,029	26,528	3,979	1,581,371	24,300	39,655	125,352	45,113	50,918	5,805	1.26
2027	2.0%	5	275	122,892	10,500	133,392	27,554	4,133	27,220	4,083	1,526,598	24,750	40,369	128,109	50,918	56,201	5,283	1.25
2028	2.0%	6	281	125,573	12,600	138,173	28,385	4,258	28,052	4,208	1,470,161	25,290	41,096	131,288	56,201	63,087	6,886	1.27
2029	2.0%	6	287	128,255	12,600	140,855	29,216	4,382	28,883	4,332	1,412,062	25,830	41,836	134,479	63,087	69,462	6,375	1.26
2030	2.0%	6	293	130,936	12,600	143,536	28,492		28,159		1,355,412	26,370	42,589	125,609	69,462	87,389	17,926	1.32
2031	2.0%	6	299	133,617	12,600	146,217	29,162		28,829		1,297,420	26,910	43,355	128,257	87,389	105,349	17,960	1.31
2032	2.0%	6	305	136,298	12,600	148,898	29,833		29,499		1,238,088	27,450	44,136	130,918	105,349	123,330	17,981	1.30
2033	2.0%	6	311	138,980	12,600	151,580	30,503		30,170		1,177,415	27,990	44,930	133,593	123,330	141,317	17,987	1.30
2034	2.0%	6	317	141,661	12,600	154,261	31,173		30,840		1,115,402	28,530	45,739	136,282	141,317	159,295	17,979	1.29
2035	2.0%	6	323	144,342	12,600	156,942	31,844		31,510		1,052,048	29,070	46,562	138,986	159,295	177,251	17,956	1.28
2036	2.0%	6	329	147,024	12,600	159,624	32,450		32,117		987,481	29,610	47,400	141,577	177,251	195,298	18,047	1.28
2037	2.0%	7	**336**	150,152	14,700	164,852	33,296		32,963		921,222	30,240	48,253	144,752	195,298	215,397	20,099	1.30
2038	2.0%	7	343	153,280	14,700	167,980	34,078		33,745		853,399	30,870	49,122	147,815	215,397	235,562	20,165	1.30
2039	2.0%	7	350	156,408	14,700	171,108	34,860		34,527		784,012	31,500	50,006	150,893	235,562	255,777	20,215	1.29
2040	2.0%	7	357	159,536	14,700	174,236	35,642		35,309		713,061	32,130	50,906	153,987	255,777	276,026	20,249	1.29
2041	2.0%	7	364	162,664	14,700	177,364	36,424		36,091		640,546	32,760	51,823	157,098	276,026	296,293	20,267	1.28
2042	2.0%	7	371	165,792	14,700	180,492	37,206		36,873		566,467	33,390	52,755	160,225	296,293	316,561	20,268	1.27
2043	2.0%	7	378	168,921	14,700	183,621	37,988		37,655		490,824	34,020	53,705	163,368	316,561	336,813	20,252	1.27
2044	2.0%	8	386	172,496	16,800	189,296	38,882		38,549		413,393	34,740	54,672	166,842	336,813	359,266	22,453	1.29
2045	2.0%	8	394	176,071	16,800	192,871	39,776		39,442		334,175	35,460	55,656	170,334	359,266	381,803	22,537	1.28
2046	2.0%	8	402	179,646	16,800	196,446	40,670		40,336		253,169	36,180	56,658	173,843	381,803	404,405	22,602	1.28
2047	2.0%	8	410	183,221	16,800	200,021	41,563		41,230		170,376	36,900	57,677	177,371	404,405	427,055	22,650	1.27
2048	2.0%	8	418	186,796	16,800	203,596	42,457		42,124		85,795	37,620	58,716	180,916	427,055	449,735	22,679	1.27
2049	2.0%	8	426	190,371	16,800	207,171	43,064		42,731		0	38,340	59,772	183,907	449,735	472,999	23,264	1.27
					401,100		**968,000**		**958,000**									

NO PRINT BOX			
	0%	$967,999.76	$957,999.76
	1%	$889,732.84	$880,468.15
	1%	$819,631.45	$811,028.88
	2.00%	$700,202.44	$692,736.95
	2.50%	$649,302.80	$642,326.03

ATTACHMENT 2 - DYNAMIC COST MODEL
San Juan Spanish Valley SSD Cash Flow Model (2016 dollars)

WQB Loan Terms	
Funded Project Cost:	$ 5,710,000
CIB Grant Amount:	$ 1,537,000
CIB Loan Amount:	$ 958,000
WQB Grant Amount:	$ 1,547,000
WQB Loan Amount:	$ 968,000
Local Contribution:	$ 700,000
Loan Term:	30
Interest Rate:	0.0%
Average Annual WQB Payment:	$ 32,267

Annual Sewer Expenses (Estimated)	
Proposed WQB Loan Amount:	$ 968,000
Estimated O&M Cost:	$ 35,000
Annual O&M Cost Increase:	1.80%
Existing Debt Service:	$ -
Incremental Increase Year 1 - 10 =	31.0%
Incremental Increase Year 11 - 30 =	25.0%

Sewer Revenue Sources (Projected)	
Beginning Cash:	$ -
Initial Customers (ERU):	230
Projected Growth Rate:	2.00%
District Impact Fee:	$ 2,100
Moab + GWSSA Impact Fee	$ 3,800
Proposed Monthly User Charge:	$ 37.24

Sewer Revenue Projections

Year	Growth Rate (%)	Annual Growth (ERU)	Total Users (ERU)	User Charge Revenue	District Only Impact Fee Revenue	Total Revenue	Amortized WQB Loan	WQB Loan Reserves	Amortired CIB Loan	CIB Loan Reserves	Remaining Principal	Moab/GWSSA Sewer Fee	O&M Expenses	Total Expenses	Beginning Cash	Ending Cash Flow	Net Revenue	Debt Service Ratio
2018	2.0%		230							-	1,926,000	-	-	-	-	-	-	-
2019	2.0%	5	235	-	-	-				-	1,926,000	-	-	-	-	-	-	
2020	2.0%	5	240	107,251	10,500	117,751	22,705	3,406	22,372	3,356	1,880,923	21,600	35,630	109,068	-	8,683	8,683	1.34
2021	2.0%	5	245	109,486	10,500	119,986	23,398	3,510	23,064	3,460	1,834,461	22,050	36,271	111,753	8,683	16,916	8,233	1.33
2022	2.0%	5	250	111,720	10,500	122,220	24,090	3,614	23,757	3,564	1,786,614	22,500	36,924	114,449	16,916	24,687	7,771	1.31
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2040	2.0%	7	357	159,536	14,700	174,236	35,642		35,309		713,061	32,130	50,906	153,987	255,777	276,026	20,249	1.29
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					401,100		968,000		958,000									

NO PRINT BOX			
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	1%	$889,732.84	$880,468.15
	1%	$819,631.45	$811,028.88
	2.00%	$700,202.44	$692,736.95
	2.50%	$649,302.80	$642,326.03

Project Number:
Date Received: October 5, 2016
Date to be presented to the WQB: October 26, 2016

WATER QUALITY BOARD
REQUEST FOR HARDSHIP PLANNING GRANT TO PREPARE GROUNDWATER QUALITY STUDY
AUTHORIZATION

APPLICANTS:	Division of Water Quality 195 North 1950 West Salt Lake City, Utah 84114 801-536-4300 U.S. Geological Survey Utah Water Science Center 2329 Orton Circle Salt Lake City, UT 84119-2047 801-908-5048
CONTACT:	Daniel Hall, Manager, DWQ Ground Water Section
TREASURER:	N/A
PRINCIPAL INVESTIGATOR:	Corey Angeroth Hydrologist/Chief Surveillance Section 2329 Orton Circle Salt Lake City, UT 84119-2047 801-908-5048
CITY ATTORNEY:	N/A

APPLICANT'S REQUEST:

The Division of Water Quality (Division) requests a **Hardship Planning Grant in the amount of $68,100** to complete a groundwater quality study in conjunction with the U.S. Geological Survey (USGS) and the Division of Drinking Water (DDW). The study will evaluate trends in water quality data from the DDW Safe Drinking Water Information System (SDWIS) and USGS National Water Information System (NWIS). These two data sets provide an opportunity to analyze spatial patterns in ground water quality in parts of Utah to evaluate changes in ground water quality over time. Based on the findings the Division will work with DDW to identify additional resources to seek solutions in partnership with the identified local community or county.

APPLICANT'S LOCATION

The applicant for this grant is the Division of Water Quality. Funds from the grant will be combined with committed funds from the USGS and the Division of Drinking Water to support this project.

BACKGROUND

Since the 1960s, ground water quality data have been collected and recorded across Utah by the USGS and by public water suppliers, providing information on changing conditions in the State. To date, there has not been a comprehensive analysis of temporal trends in these water quality data. Given the long period of record (50+ years) at many sites, an opportunity exists to quantify changes in ground water quality and investigate regional trends.

Two water quality databases exist for trend analysis: 1) SDWIS and 2) NWIS. These databases provide an opportunity to analyze spatial patterns in ground water quality in parts of Utah and to evaluate changes over time. The area along the Wasatch Front was selected to test the assessment of ground water quality trends because of significant levels of ground water development that occur in several of the basins (Figure 1 in attachment). Study Area Basins include the Cache Valley, Utah and Goshen Valleys, Tooele Valley, Juab Valley, Sevier Desert, Pahvant Valley, Escalante Valley, Cedar Valley, Parowan Valley and the Beryl-Enterprise area.

The existing ground water quality data represents a major investment in understanding the ground water resources of the State. The need for good quality water increases as the population increases, but growth can also adversely affect water quality through the addition of new contaminants or the movement of existing ones. A better understanding of long term trends in concentration will help water mangers evaluate possible management scenarios and better plan for potential future changes.

Information on water quality trends will help water managers assess and plan for potential changes in ground water quality and will also provide a better understanding of how changes in water quality may relate to natural processes or land uses, such as urban development and agricultural activities. The available data also provide current, baseline information on which future water quality changes may be evaluated. Future changes could result from natural climate variability or human activities, including land-use changes and water development

PROJECT DESCRIPTION:

The proposed study will be conducted by the United States Geological Survey under direct contract with the Division. The proposed grant would be issued to the Division, at the request of the USGS, to facilitate (simplify) fund management and disbursement of payment requests. The study incorporates ground water data analysis that will evaluate and identify the relation between trends and selected factors to indicate areas where the ground water system is susceptible or vulnerable to the effects of natural variation or human activities.

The study shall include the following tasks and deliverables:

- Compile existing information for water-quality parameters of interest;
- Use grid-based approach to de-cluster and extrapolate ground water quality data;

- Time series trend analysis of ground water quality data using the Regional Kendall statistical test;
- Spatial analysis of ground water quality trends;
- Evaluate the relation between trends and selected factors to indicate areas where the ground water system is susceptible or vulnerable to the effects of natural variation or human activities;
- Project approach and progress will be reviewed quarterly per USGS Utah Water Science Center QA/QC plans. Report review will follow USGS peer-review procedures and policies;
- Results of the study will be presented in a USGS Scientific Investigations Report. The report will be published electronically in digital PDF format available free to the public on the internet through the USGS Publications Warehouse website (*http://pubs.er.usgs.gov/*). Data and any relevant GIS coverages (if any) with metadata will be transferred to cooperators and made available online through NWIS and the Geo spatial One-Stop site at URL: *http://geodata.gov/* .

IMPLEMENTATION SCHEDULE:

The study is planned to be completed in 24 months. The final report will be issued on or before December 31, 2018.

PROJECT PRIORITY LIST

A construction project is not anticipated at this time; therefore, the study is not given a priority listing. The study results are expected to inform decision makers for community planning, including the impacts that the community is having, e.g., by septic tank densities, on its groundwater.

COST ESTIMATE:

The proposed study will cost $208,100. The USGS plans to share the cost of their labor and expenses in the amount of $80,000. The balance of $128,100 would be paid by the Utah Division of Drinking Water, and the grant requested from the Water Quality Board.

Data compilation and analysis	$	108,100
Data analysis and writing	$	90,000
Publication Costs	$	10,000
Total	**$**	**208,100**

Cost Sharing:

U.S. Geological Survey	$	80,000
Division of Drinking Water	$	60,000
Water Quality Board Grant	$	68,100
Total	**$**	**208,100**

STAFF COMMENTS AND RECOMMENDATION:

This project is being presented as an authorization request to the Water Quality Board. Staff recommends the Board authorize the $68,100 requested for Hardship Planning Grant to the Division. The grant is needed to assist water planners and providers in analyzing this important data.

SPECIAL CONDITIONS:

1. The Division of Water Quality must approve the plan of study before the grant agreement will be executed.
2. This Planning Advance is a grant and will not be repaid.

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File: SRF-Central Utah Public Health Department/Planning/Section 1

Quantifying trends in water quality from selected wells in Utah

Prepared by U.S. Geological Survey Utah Water Science Center, May 5, 2016

Problem

Groundwater is an important part of the water supply in many parts of Utah, with annual withdrawals estimated over 1,000,000 acre-feet (Burden and others, 2015). Groundwater is used mostly for irrigation (597,000 acre-feet in 2014), public supply (268,000 acre-feet in 2014), and industrial uses (129,000 acre-feet in 2014) (Burden and others, 2015), and acts as an important buffer for water supplies when climatic conditions (i.e. drought) limit surface water availability. Since the 1960s, groundwater-quality data have been collected and recorded across Utah by the U.S. Geological Survey (USGS) (Burden and others, 2015) and by public-water suppliers, providing information on changing conditions in the State. To date, there has not been a comprehensive analysis of temporal trends in these water-quality data. Given the long period of record (50+ years) at many of these sites, an opportunity exists to quantify changes in groundwater quality and investigate regional trends.

Water-quality data from a network of more than 400 wells, primarily used for irrigation in areas with significant groundwater development (figure 1), have been collected by the USGS as part of an annual groundwater monitoring program done in cooperation with the Utah Divisions of Water Quality and Water Rights. Several of these wells have analyses dating back to the 1960s, some with data since the 1930s. Wells sampled in 2014 as part of the annual groundwater monitoring program are shown on figure 2. Additional water-quality data have been collected for regional studies or smaller localized studies addressing specific areas in the State. The water-quality data collected by the USGS resides in the National Water Information System (NWIS) database. While plots of dissolved-solids concentration with time for selected wells are included in the Groundwater Conditions in Utah report (figure 3; Burden and others, 2015), no comprehensive analysis of water-quality changes in the network wells in the NWIS database has been done.

The Utah Division of Drinking Water (UDDW) maintains a water-quality database consisting of analyses of samples collected from water sources used for public supply in Utah (figure 4). The UDDW Safe Drinking Water Information System (SDWIS) database contains millions of sample results from public-supply sources in Utah. For example, the SDWIS data set contains more than 70,000 nitrate concentrations for groundwater used for public supply collected from 1977 to 2012 (Wallace and Inkenbrant, 2013). Water samples are required to be collected from public-supply wells and analyzed every 3 years for inorganic constituents and selected metals (antimony, arsenic, barium, beryllium, cadmium, chromium, copper, cyanide, fluoride, lead, mercury, nickel, selenium, sodium, sulfate, thallium, and dissolved solids), unless a waiver is issued and the sampling frequency is reduced to once every nine years. The sampling frequency for nitrate and nitrite is annually, unless advised otherwise by the Utah Division of Drinking Water (Utah Division of Drinking Water, 2013).

The NWIS and SDWIS data sets provide an opportunity to analyze spatial patterns in groundwater quality in parts of Utah and to evaluate changes in groundwater quality over time. The area along and near the Wasatch Front was selected to test the assessment of groundwater

quality trends because of significant levels of groundwater development that occur in several of the basins (figure 1). Groundwater basins in the study area include the Cache Valley, lower Bear River area, East Shore area, Salt Lake Valley, Utah and Goshen Valleys, Tooele Valley, Juab Valley, Sevier Desert, Pahvant Valley, Escalante Valley, Parowan Valley, Cedar Valley in Iron County, and Beryl-Enterprise area.

Assessment of groundwater quality trends at the basin scale is complicated because of the long time frames for groundwater movement in basin-fill aquifers, sparse or uneven data coverage, and the wide variety of well types, well depths, and data sources. The proposed evaluation of changes in groundwater quality is facilitated by the availability of the NWIS data set, which contains quality-assured data collected using documented and consistent methods, and the SDWIS data set, which stores analyses from mandated periodic sampling of public-supply wells.

Information on water-quality trends will help water managers assess and plan for potential changes in groundwater quality and will also provide a better understanding of how changes in water quality may relate to natural processes or land uses, such as urban development and agricultural activities. The available data also provide information on which future water-quality changes may be evaluated. Future changes could result from natural climate variability or human activities, including land-use changes and water development.

Objectives

The overall goal of the proposed study is to use the NWIS and SDWIS data sets to provide information on if and how groundwater quality has changed over time in areas along and near the Wasatch Front in Utah. Groundwater samples collected from wells from about 1960 to 2015 will be studied using the water-quality parameters dissolved solids, nitrate and nitrite, and selected major ions and trace elements. Specific study objectives are to:

1. Determine the significance and magnitude of decadal-scale trends in groundwater quality for aquifers along the Wasatch Front and in selected nearby basins.
2. Examine how temporal trends in groundwater quality vary spatially at the study area and basin scale.
3. Evaluate the relation between trends and selected natural and human-related factors.

Relevance and Benefits

The existing groundwater quality data set represents a major investment in understanding the groundwater resources of the State. The need for good quality water increases as the population increases, but growth also can adversely affect water quality through the addition of new contaminants or the movement of existing ones. A better understanding of long-term trends in concentration will help water managers evaluate possible management scenarios and better plan for potential future changes.

This study is consistent with the national USGS mission and goals and to water-resource issues identified in the USGS Water Science Strategy. The study will contribute to meeting the USGS goal "Assessment of Water Resources and their Suitability to Meet Human and Ecosystem Needs" (goal 1, objective 3) (Evenson and others, 2013). This study is appropriate for inclusion in the USGS Cooperative Water Program because it will "provide reliable, impartial, and timely

information needed to understand the Nation's water resources" (U.S. Geological Survey, 2015), and will be eligible for supplemental funding available through that program.

Approach

Task 1: Compilation of existing information

Water-quality parameters of interest for this study include dissolved solids, nitrate and nitrite (and variations), and selected major ions and trace elements. Groundwater-quality data and ancillary information will be compiled from the NWIS and SDWIS databases for the aquifers along the Wasatch Front and from nearby areas. The Utah Geological Survey will gather, format, and quality assure the SDWIS data to be combined with the NWIS data for trend analysis. The combined data sets will be screened for duplicate sites and the water-quality values recensored to a common value for each constituent, generally the highest detection limit. Additionally, the studied areas will be analyzed for gaps or redundancy in the NWIS and SDWIS data sets. Concentrations for the selected water-quality parameters will be retained in the study data set so that there is not more than one value per well per year. If there is more than one constituent result available in a year, a sample collected in the summer or irrigation season will have a higher priority because this is typically when most wells are pumped and sampled.

The sample collection, processing, and analysis methods used for analyses in the NWIS and SDWIS data sets will be described and compared. Limitations of each data set and those resulting from combining the data sets will be evaluated. For example, public-supply wells generally are not used if the water quality is not suitable for consumption. This would skew the SDWIS data set toward water that meets drinking-water standards. The extent of the groundwater basins is available as a geographic information system (GIS) data layer. Other GIS layers needed to be compiled include water use, land use, and surrogate information used to estimate recharge, constituent loading, and aquifer susceptibility to contamination.

Task 2: Use grid-based approach to decluster and extrapolate groundwater-quality data

The methods used to analyze decadal-scale trends in nitrate in groundwater in the Central Valley, California (Burow and others, 2013) will be used in this study. The aquifers along the Wasatch Front and nearby areas are in unconsolidated basin-fill deposits, most with recharge areas near the mountain fronts and discharge areas in the lower parts of the basins. There is a gradient in land use in the study area basins from mostly urban to mostly agricultural with varying amounts of undeveloped or range land areas. Public-supply wells are more common in urban areas and irrigation wells are more prevalent in agricultural areas. Because some areas have a high density of wells and other areas have few, a spatially unbiased, grid-based approach will be used to decluster the densely spaced data and extrapolate the sparse data (Belitz and others, 2010). A minimum of 30-50 equal area cells will be computed with a GIS-based program to form a grid covering the study area. The actual number of cells to be generated is dependent on the spatial distribution of wells with long-term water quality data. Wells also can be stratified by well depth into shallow and deep zones within the same grid. Domestic-supply and stock wells generally are completed in the shallow zone and public-supply and irrigation wells typically are completed

in the deep zone. A median concentration for the constituent of interest will be computed for each cell for each decade using available well data for that cell. This analysis will allow for statistical tests of trends in water quality across multiple decades through aggregation of the data in a cell and provides a consistent means to compare trends by basin and depth. As an example, the distribution of grid cells within each physiographic subregion in the Central Valley, California is shown in figure 5.

Task 3: Time-series analysis of groundwater-quality data for trends

The Regional Kendall statistical test (Helsel and Frans, 2006) will be used to analyze the magnitude and significance of trends in water quality for selected constituents within the gridded area. The Regional Kendall Test will be applied to the grid-cell decadal median concentration for the constituent of interest. The test will determine whether or not there is a significant increase or decrease in the dependent variable over time in each cell and depth zone (Helsel and Frans, 2006). Data analysis routines using the R statistical package will be used (R Core Team, 2015).

Cells or groups of cells in a particular basin that show a statistically significant trend in water quality can be further examined using time-series plots of constituents prepared for wells with adequate data to better present patterns of concentration change over time and the spatial distribution of the change. Figure 6 illustrates how dissolved-solids concentrations vary over time for wells in Salt Lake Valley (Thiros and Spangler, 2010), and indicates that consistent increases in concentration occurred across the area. Results of the time-series analysis using statistical and graphical methods will be summarized and described using tables, maps, and diagrams as shown in Burow and others (2013).

Task 4: Spatial analysis of trends in groundwater quality

How decadal trends in groundwater-quality vary spatially along the Wasatch Front and nearby areas will be examined using maps depicting changes in median concentrations of the constituent of interest by cell. The spatial patterns can be studied and used to identify areas and (or) depth zones with the highest rates of change in groundwater-quality constituent concentration. An example of a map of change in median decadal nitrate concentrations in the Central Valley, California, is shown in figure 7.

The percentage of wells with a concentration greater than an arbitrary threshold value for the constituent can be computed for each cell for each decade to provide an estimate of the areal proportion of the aquifer impacted by elevated concentration of the constituent. For example, a threshold of 5 mg/L for nitrate as nitrogen would represent concentrations well above background levels. The percentage of aquifer with nitrate concentrations greater than 5 mg/L would be computed for each decade to provide an estimate of the areal proportion of the study area affected by elevated nitrate over time.

Task 5: Evaluate the relation between trends and selected factors

Trends in existing water-quality data can indicate areas where the groundwater system is susceptible or vulnerable to the effects of natural variation or human activities. Decadal trends in groundwater quality in areas and depth zones will be related to various factors, such as water and land use and other surrogate information used to estimate recharge, geochemical redox condition, constituent loading, and aquifer susceptibility. Several of these factors are available as GIS layers that can be compared to the grid cell decadal concentration changes and used to develop hypotheses to explain the changes in groundwater quality.

Quality Assurance/Quality Control

No new field data will be collected during this study. Much of the water-quality data in the NWIS data set was collected and processed as described in the USGS National Field Manual (*http://water.usgs.gov/owq/FieldManual/index.html*) and analyzed by the USGS National Water Quality Laboratory. Much of the data in the SDWIS data set was collected and processed as described by the Utah Division of Drinking Water (*http://www.deq.utah.gov/Compliance/monitoring/drinkingwater/docs/2014/03Mar/lab_costs_and_sampling_procedures.pdf*) and analyzed by a state certified laboratory. Project approach and progress will be reviewed quarterly per USGS Utah Water Science Center QA/QC plans. Report review and processing will follow USGS peer-review procedures and policies.

Products

Results of this study will be presented in a USGS Scientific Investigations Report. The report will be published electronically in digital PDF format available free to the public on the Internet through the USGS Publications Warehouse website (*http://pubs.er.usgs.gov/*) in perpetuity. Data and relevant GIS coverages (if any) with metadata will be transferred to cooperators and made available online through NWIS and the Geospatial One-Stop site at URL: *http://geodata.gov/*.

Personnel

A USGS hydrologist will act as project chief and principal investigator.The project chief will be responsible for project planning, coordination of activities, data management, and design and preparation of the report. Assistance will be provided for spatial and statistical analysis and interpretation and for GIS layer development and manipulation.

The Utah Geological Survey (Paul Inkenbrandt) will support efforts of the U.S. Geological Survey (USGS) by modifying data from the Safe Drinking Water Information System (SDWIS) to match the standard schema of the USGS National Water Information System (NWIS) database. To make the SDWIS schema match that of NWIS, UGS will alter existing Python programming language scripts he has created for similar projects will provide support on the SDWIS data set and possibly on providing ancillary data for the public-supply wells.

Budget and Schedule

The study is planned to be completed in approximately 24 months. The project as described in this proposal is budgeted for a total cost of $200,000 over two fiscal years (FY). The USGS will provide Cooperative Water Program matching funds to cover 40 percent of the cost ($80,000). The State of Utah, Division of Water Quality will contribute the remaining 60 percent ($120,000).

Tasks and gross cost	FY2017	FY2018	Total
Data compilation and analysis	$100,000		$100,000
UGS data compilation	$6,000	$2,100	$8,100
Data analysis and writing		$90,000	$90,000
Publication costs		$10,000	$10,000
Total:	**$106,000**	**$102,100**	**$208,100**
Utah Division of Water Quality contribution	**$66,000**	**$62,100**	**$128,100**
USGS Cooperative Water Program contribution	**$40,000**	**$40,000**	**$80,000**

(FY, Federal fiscal year)

Selected References

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Wallace, Janae and Inkenbrandt, Paul, 2013, Mapping tool to show trends in groundwater nitrate concentrations in Utah: Utah Geological Survey Open-File Report 610, 23 p. Accessed May 5, 2016 at: *http://files.geology.utah.gov/online/ofr/ofr-610.pdf*

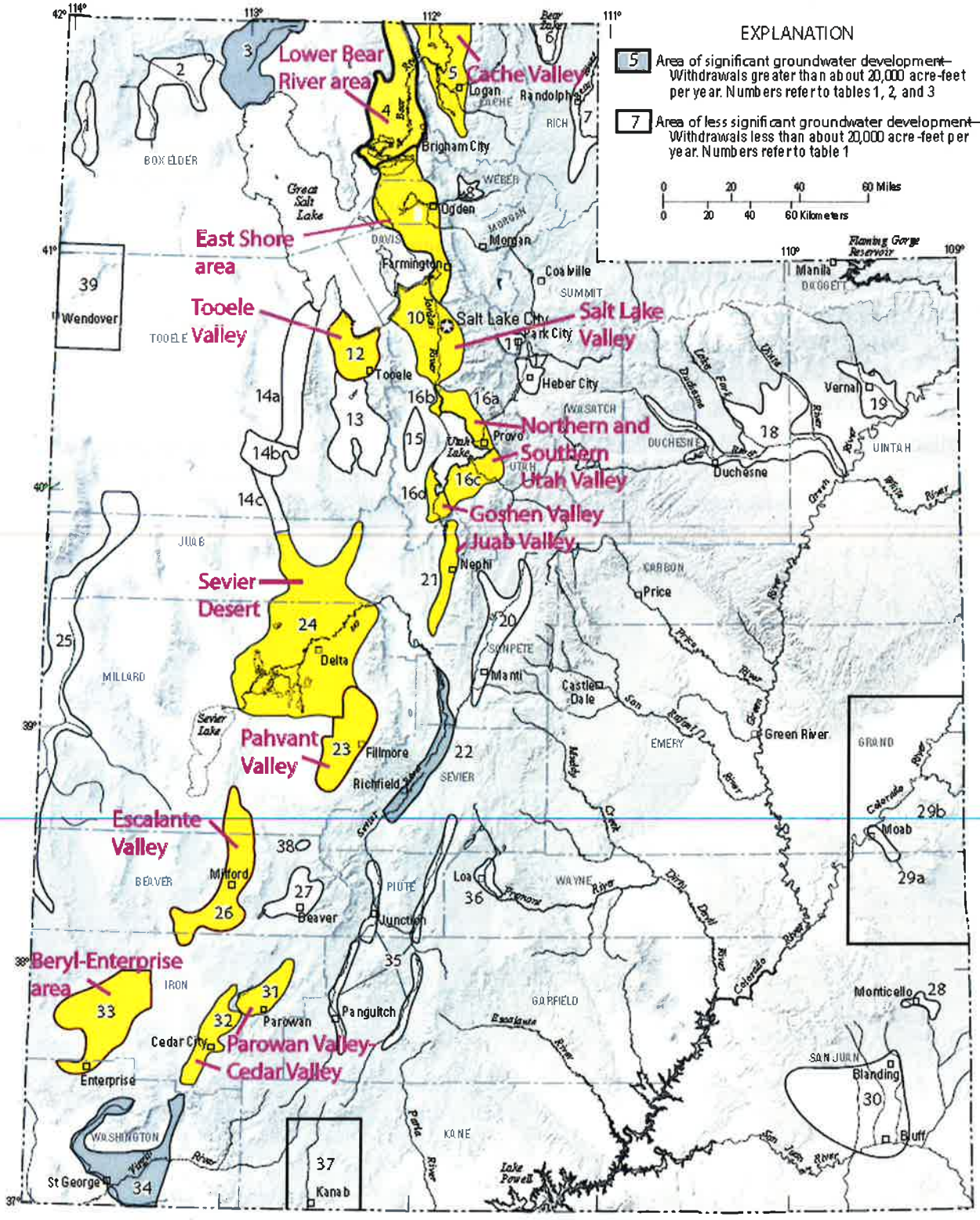

Figure 1. Trends in water quality using the NWIS data set will be determined for the labeled areas along and near the Wasatch Front. These basins are part of the monitored areas discussed in the Groundwater Conditions in Utah report (Burden and others, 2015).

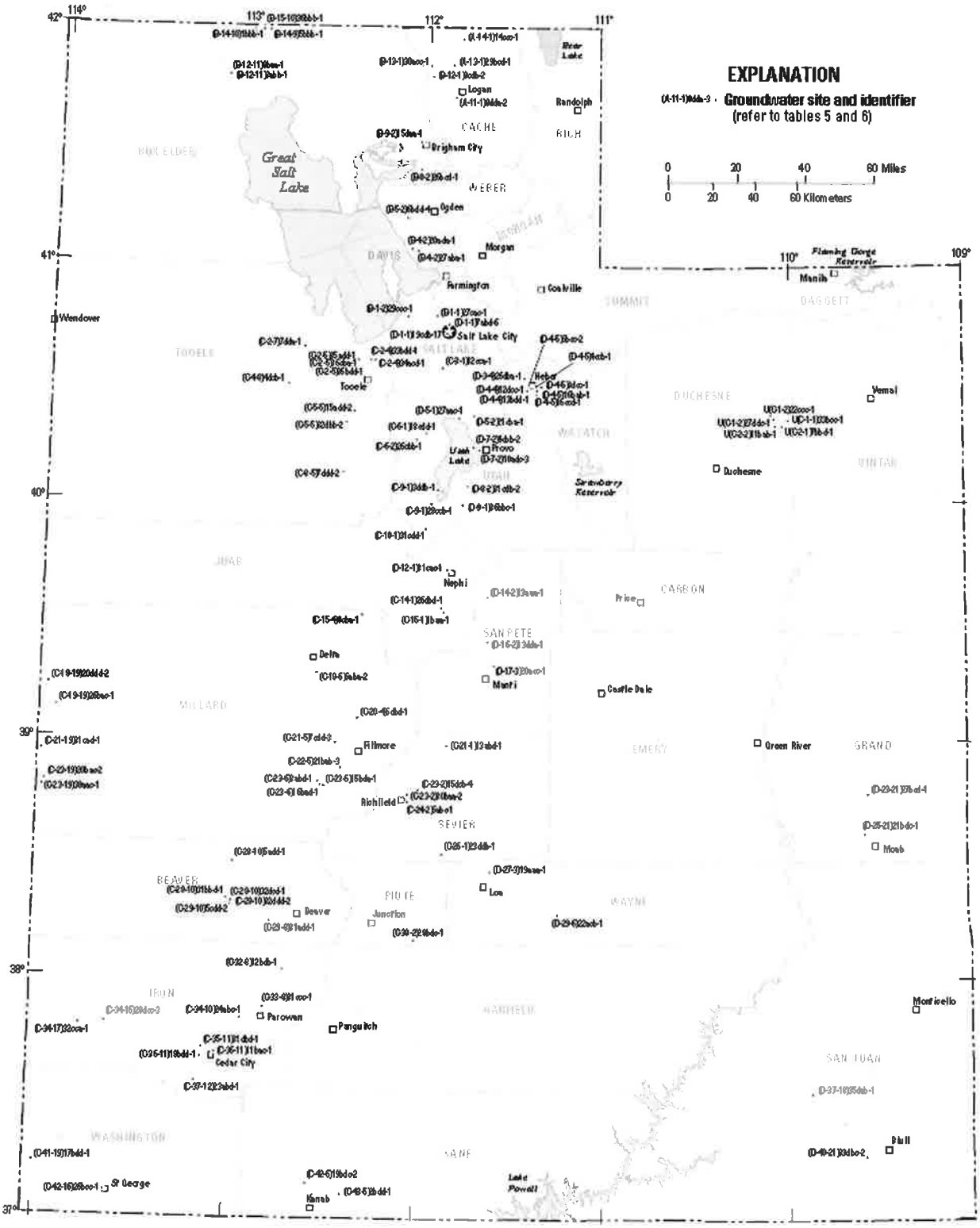

Figure 2. The USGS sampled 104 of the more than 400 wells in its groundwater-quality network during the summer of 2014. These water-quality analyses are stored in the USGS National Water Information System (NWIS) database (Burden and others, 2015).

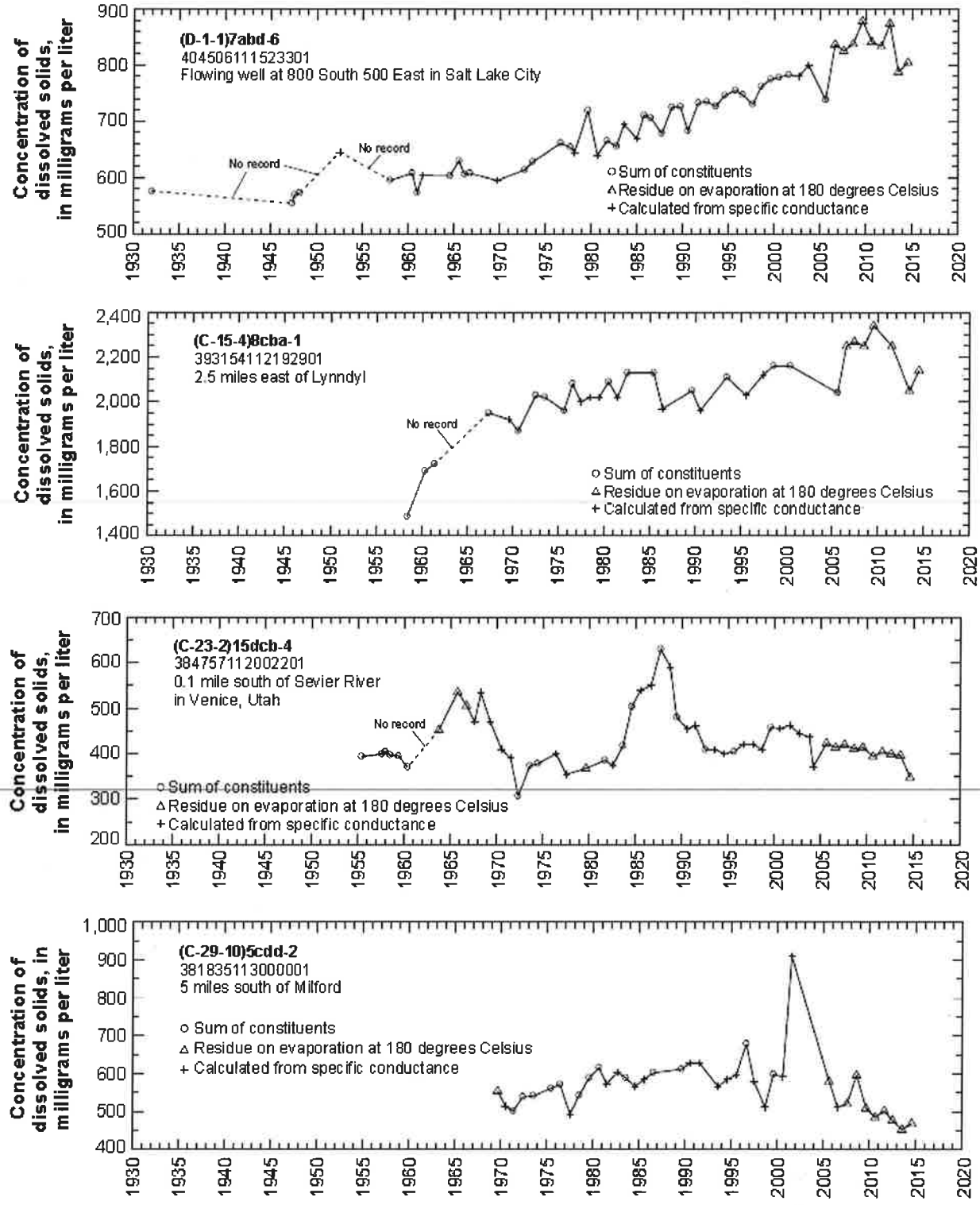

Figure 3. Concentration of dissolved solids in water from selected wells is plotted with time and shown in the Groundwater Conditions in Utah report (Burden and others, 2015).

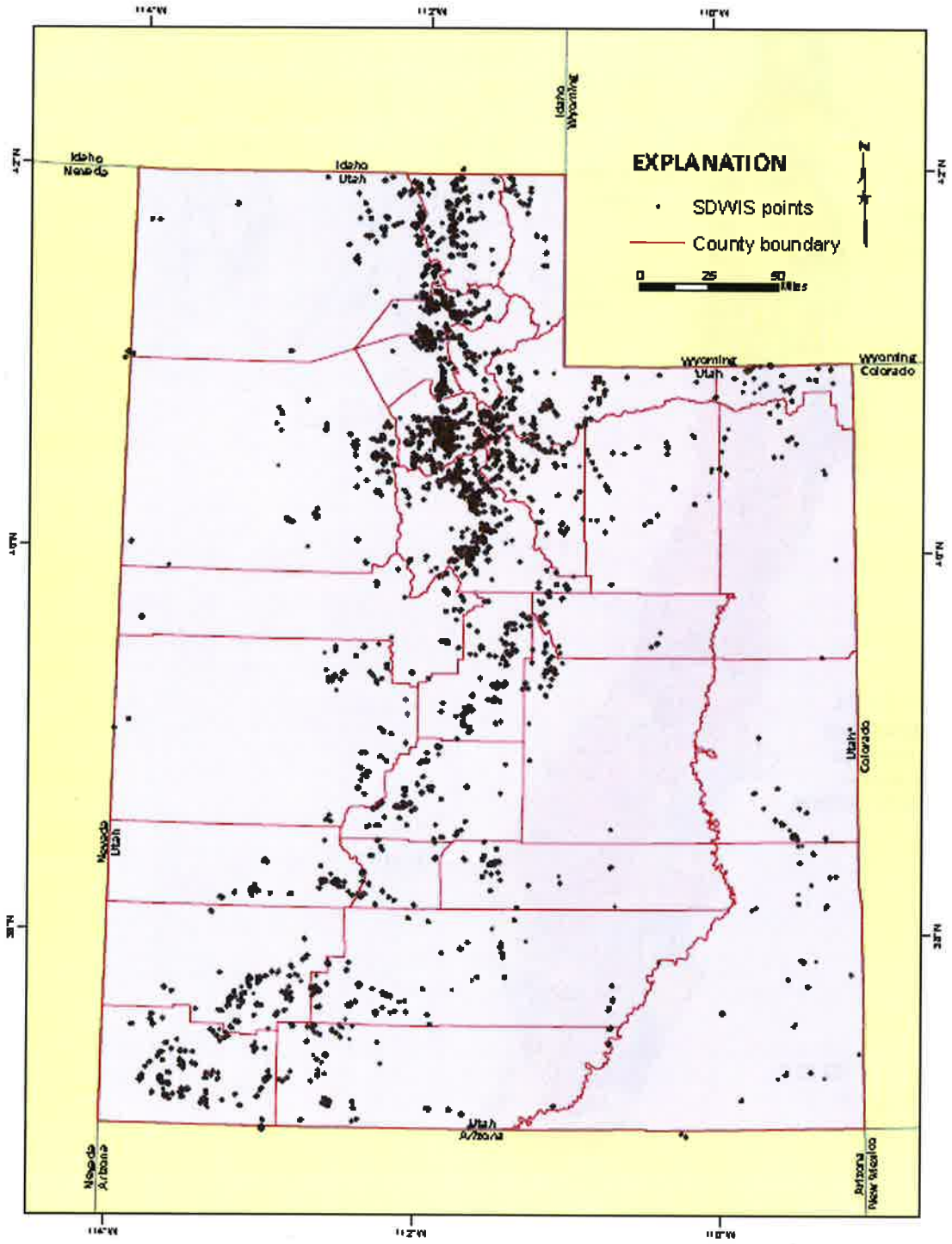

Figure 4. Nitrate data is collected annually from most wells used for public supply in Utah. The data is maintained by the Utah Division of Drinking Water in the Safe Drinking Water Information System (SDWIS) database (Wallace and Inkenbrant, 2013).

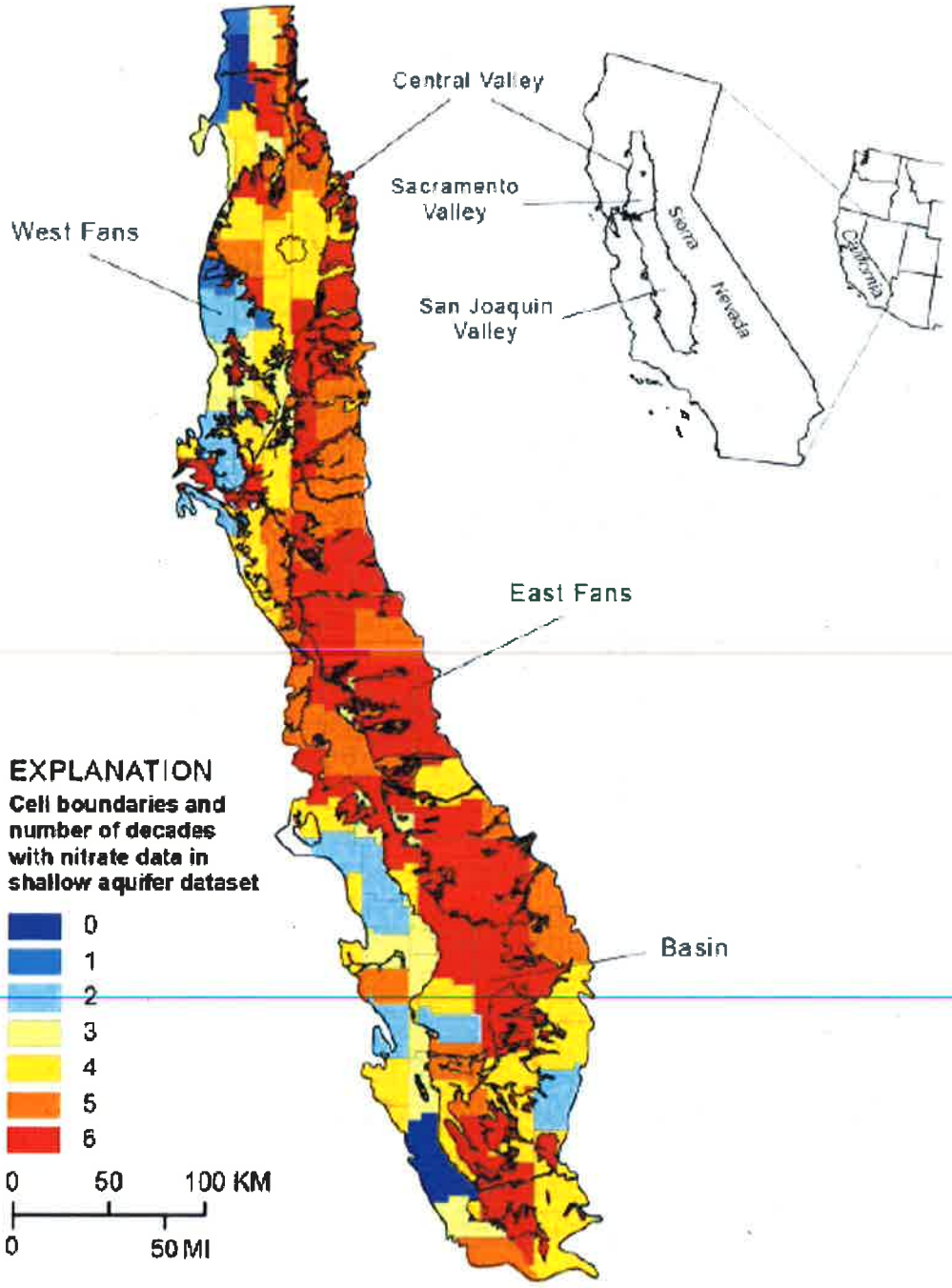

Figure 5. Map of the Central Valley, California, and the distribution of grid cells within each physiographic subregion (Burow and others, 2013).

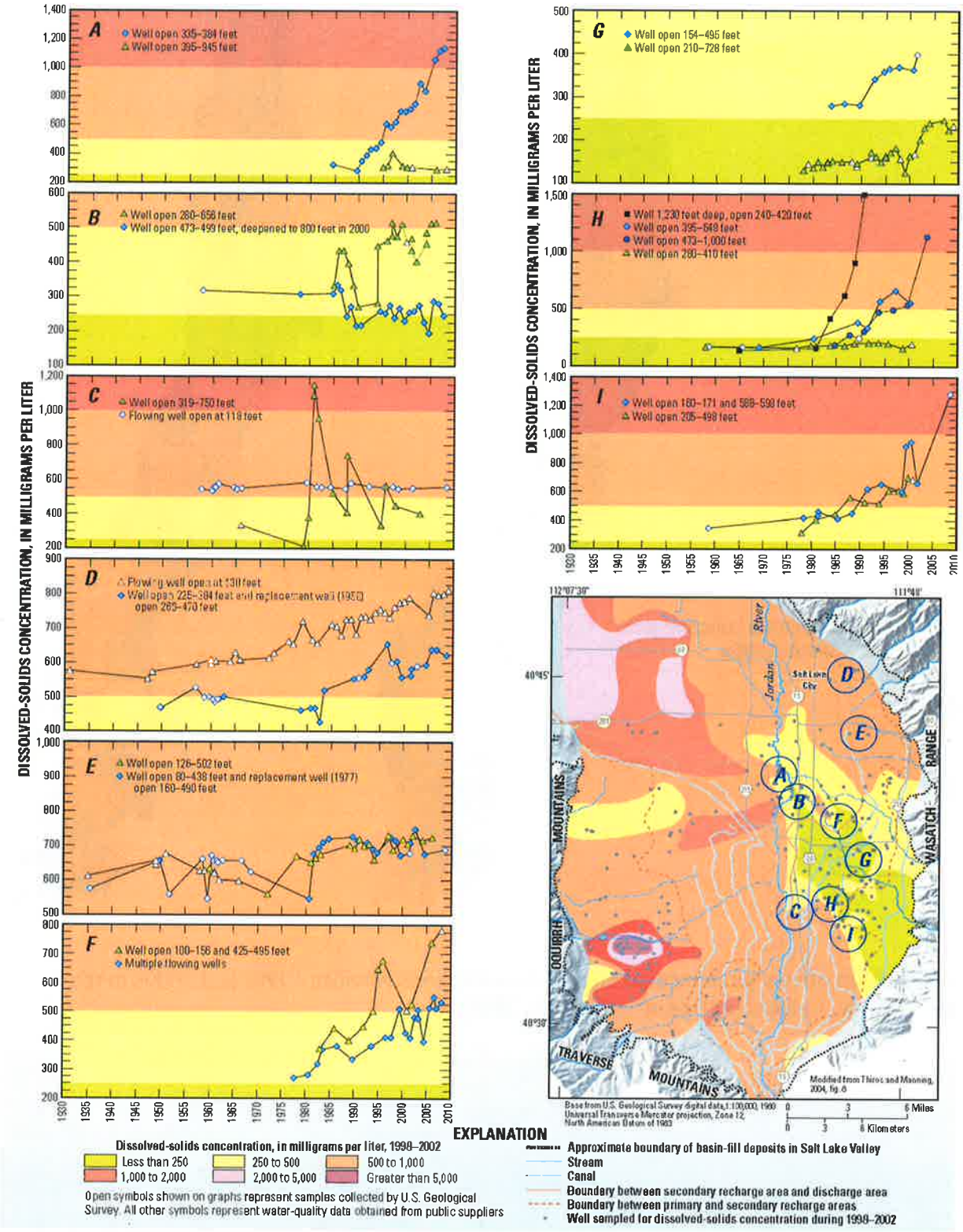

Figure 6. Dissolved-solids concentrations in water from some wells in the principal aquifer in Salt Lake Valley, Utah, have increased to more than 1,000 milligrams per liter (Thiros and Spangler, 2010).

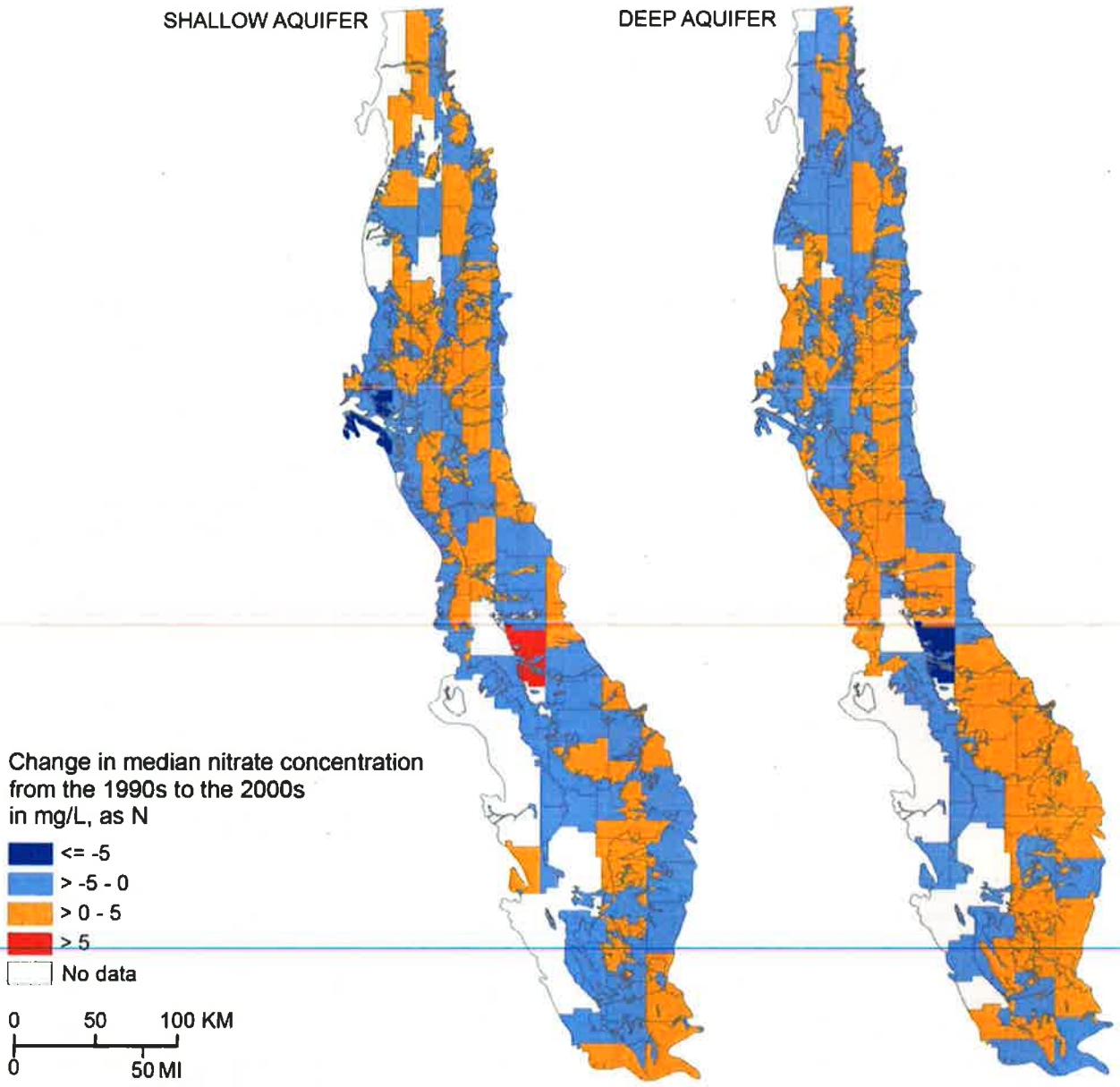

Figure 7. Map of change in median nitrate concentrations between 1990s and 2000s in the Central Valley, California (Burow and others, 2013).

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Alan Matheson
Executive Director

DIVISION OF WATER QUALITY
Walter L. Baker, P.E.
Director

Date Received: July 20, 2016
Date to be presented to the WQB: October 26, 2016

WATER QUALITY BOARD
FEASIBILITY REPORT FOR WASTEWATER TREATMENT PROJECT

INTRODUCTION

APPLICANT:	Summit County 60 N, Main P.O. Box 128 Coalville, Utah 84017 435-336-3220
PRESIDING OFFICIAL:	Richard Bullough, Health Officer Summit County Health Department 650 Round Valley Drive Park City, Utah 84060 435-333-1582
CONTACT PERSON:	Richard Bullough, Health Officer
TREASURER:	Corrie Forsling, Summit County
COUNTY ENGINEER:	Derrick Radke, Summit County Public Works P.0. Box 128 435-336-3978
CONSULTING ENGINEER:	James Milligan, PE Glison Engineering 12401 South 450 East, Building C, Unit 2. Draper, Utah 84020 801-571-9414

APPLICANT'S REQUEST:

Summit County is requesting financial assistance in the amount of a $400,000 grant for construction of a new wastewater collection system that will connect to the Snyder Basin Water Reclamation District (SBWRD) for treatment and disposal.

APPLICANT'S LOCATION

Silver Creek Subdivision Unit I (Subdivision) is located in unincorporated Summit County and is found adjacent to two watersheds, the East Canyon Creek and the Silver Creek watersheds. The proposed project area is west of the Subdivision and it is found within the East Canyon Creek watershed.

MAP OF APPLICANT'S LOCATION

BACKGROUND

This project was introduced to the Water Quality Board at its August 24, 2016 meeting. The Board requested that staff develop a range of feasible funding alternatives for the project and to consider them in the context of its available funds, account requirements, and the applicant's requirements. This analysis is presented under "Project Financing" below.

The Subdivision sits within the drainage at the headwaters of East Canyon Creek watershed. This watershed was identified as impaired by the Utah Division of Water Quality and was listed on Utah's 1998 303d list of impaired water bodies for nutrients. Currently, a Total Maximum Daily Load (TMDL) plans to restore the beneficial uses and meet water quality standards.

PROJECT NEED

The Subdivision is currently served by on-site wastewater treatment systems. The Subdivision is a high density mixed-use area and consists of businesses, homes, and undeveloped commercial and residential lots.

The Subdivision is believed to be contributing pollutants into the East Canyon Creek watershed and Silver Creek watershed. The following are some of the risks:

- The Subdivision straddles the East Canyon and Silver Creek Watersheds. Both the East Canyon Creek and Reservoir TMDL (2010) and the Rockport Reservoir and Echo Reservoir TMDL (2014) identify this subdivision as a priority area for nutrient load reductions based on septic system contributions. Both TMDLs recommend a long-term strategy to reduce nutrient loads from septic systems throughout their respective watersheds. The Echo Reservoir TMDL was for both nitrogen and phosphorus. Since even properly functioning septic systems do not treat nitrogen, the TMDL recommended sewer at the subdivision scale to address nutrient loading.

- Studies by the Summit County Health Department (SCHD) have identified the Subdivision as a source of pollutants and one of the critical primary areas is the failure of existing septic system. Site conditions do not support the high density land use of the subdivision. The Subdivision has older septic systems with a high rate failure.

- According to the 2014 TMDL, the majority of the Subdivision utilizes deep trench septic systems. However, future development with type of wastewater disposal system is not feasible due to high ground water in the area.

- On April 3, 2015, the draft document Developing an Understanding of Spatio-Temporal Bioaccumulation of Pharmaceuticals by Aquatic Life in East Canyon Creek stated that contaminants sucralose, caffeine and benzolecgonine were detected in samples upstream of the East Canyon Creek. These indicators of human waste are an emerging concern.

By extending sewer to this area, protection of both surface and groundwater resources will be achieved by immediately decreasing the amount of pollutants into the groundwater and subsequently to the East Canyon Creek watershed. This will result in improved water quality in both the East Canyon Creek and Silver Creek watersheds.

Extending sewer to this area first will allow for the future expansion of sewer to the broader upper area of the Subdivision.

The Summit County Council (SCC) and SCHD have identified water quality as a strategic priority and plan to execute projects through local government financing with low interest rates. SCHD and SCC have proposed forming a voluntary special assessment district to the project area to secure funding for the project.

PROJECT DESCRIPTION:

The SCC is proposing to construct approximately 3,600 linear feet of 10-inch and 8-inch gravity sewer lines and manholes for sewage collection and transfer to the SBWRF for treatment system. The proposed project will extend sewer to the mixed-use Subdivision. This is the region of highest density and most intensive use in Silver Creek, and is the area believed to contribute the most pollutants into East Canyon Creek. Completion of this project will allow for the future expansion of sewer to that upper reaches of Silver Creek. This proposed sewer extension will allow the County to address failing septic systems throughout Silver Creek in the future. Extending sewer to this high-density and high-use zone is an essential first step toward achieving long-term protection of both surface and ground waters in the greater East Canyon Creek drainage.

ALTERNATIVES EVALUATED

The County evaluated the following alternatives:

1. No action.
2. Construction of a new sewer extension that can serve the Subdivision and upper reaches of Silver Creek in the future.

POSITION ON PROJECT PRIORITY LIST:

The District is ranked No. 5 out of 8 projects on the FY 2016 Wastewater Treatment Project Priority List.

POPULATION GROWTH:

	Year	ERC[1]
Current	2016	20
Design	2035	30+

[1]ERC = Equivalent Residential Connections

PUBLIC PARTICIPATION AND DEMONSTRATION OF PUBLIC SUPPORT:

In 2014, the SCHD began meeting with property owners in the proposed expansion area to discuss sewer extension and the possible formation of a voluntary special assessment area. Upon judging that there was significant interest in the proposed project, the option of bonding for the project was investigated. Because of the mixed-use and variable risk within the project area, however, a bond interest rate of nearly 12% was proposed by potential lenders. This interest rate would make the repayment amount an unreasonable burden for the property owners. *Therefore, Summit County Treasurer, with the support of Summit County Council and the Summit County Manager, agreed to finance the project, and agreed to an interest rate of 3.25%.* This commitment on behalf of Summit County reflects the priority they place on this project.

During 2015, Summit County Health Department continued to work with property owners to secure signed and notarized waivers indicating the property owners are committed to the project and formation of the voluntary assessment area. Over 50% (16 of 30 parcels) have signed the waivers to date. Due to state law, it is almost impossible to form a non-voluntary assessment area. Therefore, it is not possible to force all property owners into this assessment area, only those who volunteer to participate.

IMPLEMENTATION SCHEDULE:

WQB Funding Introduction:	August 24, 2016
WQB Funding Authorization:	October 26, 2016
Issue Construction Permit	December 2017
Loan Closing	February 2017
Commence Construction	March 2017
Complete Construction	October 2017

COST ESTIMATE:

Abandonment & New Connection Fee	$120,000
Engineering (Design)	$32,300
Engineering (CMS)	-
Construction	$1,134,980
Contingency	$12,720
Rights of Way, Easements, Misc.	-
Total	**$1,300,000**

COST SHARING:

Funding Source	Cost Sharing

*Other Funding (3.25%, 0, 20 years)	$600,000
WQB Grant	$400,000
Local Contribution	$300,000
Total	**1,300,000**

PROJECT FINANCING:

The proposed project will serve 20 existing structures: 11 residential and 9 commercial connections. There are 11 undeveloped (mostly commercial) lots that could be served when developed. The project was originally estimated to have a total cost of $600,000. The SCC proposed to finance the project under a special assessment area with terms of 3.25% interest for 20 years. Bids were opened in June 2016 and the low bid was $1,300,000.

Summit County Public Works identified two bid items that they can provide to reduce the contract price by about $300,000. With this local contribution the amount to be financed is $1,000,000; $600,000 from SCC and the $400,000 balance requested from WQB.

As requested by the Board, staff prepared a cost model that evaluates a range of project financing alternatives. The cost model is provided in Attachment 1. The cost model is based on $1,000,000 in needed financing. The principal alternatives considered are:

- An "affordable" financing package, based on a sewer bill equal to 1.4% of the MAGI. Loan terms of 20- and 30-years are included;
- A joint funding package wherein Water Quality Board funds (grant or loan) would supplement the proposed $600,000, 20-year, 3.25% County loan; and
- Alternative loan scenarios (no grant) using a range of interest rates and both 20- and 30year terms. These loans could be provided by either the County or the Water Quality Board.

The affordable loan package analysis was based on a local MAGI (Park City) of $54,580 and the resulting monthly sewer bill of $63.68/month/ERC. In spite of this high sewer rate, the affordable loans are quite small, ranging from $89,000 (20-year, 0%) to $133,000 (30-year, 0%), with correspondingly high grant components (about $900,000 +/-). This situation results from the extremely small sewer user based that is available to service the loan.

Staff believes that the Water Quality Board's affordability criteria are not applicable to the commercial component in the proposed service area and given the size of this component, it may be acceptable to exceed the criteria. The County and many of the area residents appear ready to accept higher sewer charges to protect water quality and for the growth and betterment of the community. Nonetheless, the high (not "affordable") sewer rates that are considered in the remainder of the cost model and this analysis, are extreme when measures by the 1.4% MAGI standard.

The affordable financing package, should the Board decide to authorize one, could be drawn from either State Loan / Grant funds or from Federal SRF funds using principal forgiveness for

the grant component. State funds are preferable because they can be accessed more quickly and the costs of meeting program requirements are lower. State grant funds would need to be drawn from the Perry-Willard escrow repayment. Because of the size of the grant component in these scenarios, the Board could quickly become limited in its ability to fund future planning and design advances, non-point-source projects, and other discretionary needs. For this reason, the affordable financing package should be funded through the Federal SRF. See discussion below on the cost of Federal SRF funding.

In the remaining funding scenarios, we use the applicant's proposed financing package as the metric for comparison, i.e., can we come up with a better deal than that. The proposed financing package results in the following:

Summit County Loan Amount	$600,000
Loan Term	20-years
Loan Interest Rate	3.25%
Water Quality Board Grant / PF	$400,000
Monthly Sewer Cost per ERC	$255.44
Sewer Bill as a % of MAGI	5.62%

In all cases where the County proposed loan and conditions remain the same (as above), additional loan simply increases the cost of sewer to the users and the "unaffordability" of the package. In cases where the County loan interest rate is reduced, the Water Quality Board grant component can be reduces. The cost model shows highlighted rows in which produce about the same sewer fee as the County's proposed financing package. Note that to fully fund the $1,000,000 project solely with a loan and hold the sewer bill constant, the term must be extended to 30-years. The Water Quality Board could finance the project under one of these reduced interest rate scenarios if it elects to do so and the County agrees.

Should the Board elect to fund the project solely or jointly with the County under one of the reduced interest rate scenarios, use of State funds is preferable when the grant component can be limited to $250,000, which is 15 to 20 percent of the Hardship Grant annual income.

At the bottom of the cost model, we have included calculations for several "burdened" loan scenarios. Here, we have increased the loan amount by $150,000 to account for additional project costs that will be incurred should Federal funds be applied. These additional costs would result from program requirement such as American Iron and Steel, Davis Bacon Wages, closing costs, as well as the impacts that addition time for meeting requirements can have on construction costs.

STAFF COMMENTS AND RECOMMENDATION:

Staff strongly supports the County's efforts to implement a lasting solution to a significant water quality problem and we appreciate the extraordinary commitment of the County, the Health Department, and community to support this solution.

Financially, the project is challenging because of its break from the affordability criteria that the Board normally adheres to and because of the additional risk that this break could impose on the loan's health. It is in the Board's favor that the proposed sewer extension will be operated and maintained by an effective, well managed utility in SBWRD. The Board can further minimize its risk by minimizing the cost of the project to the user and Staff believes the best way to do this is by minimizing the monthly sewer bill. Therefore, **staff recommends that the Water Quality Board authorize a loan not to exceed $1,030,000 with an interest rate of 0 percent for a term of 30 years, for construction of the proposed Silver Creek Subdivision sewer extension, with the following special conditions.**

SPECIAL CONDITIONS:

1. The County must agree to participate annually in the Municipal Wastewater Planning Program (MWPP).

2. The County must demonstrate that the remainder of the project funding has been secured.

3. The County must create or establish a bonding entity and bonding instrument suitable for purchase by the Board and that is acceptable to its bond attorney.

File: Summit County Health Department /Planning/Section 1

Attachment 1 - Silver Creek Sewer Project

Project Costs	
Engineering - Planning	120,000
Engineering - Design	32,300
Engineering - CMS	0
*DWQ Administrative Fees	
*Legal/Bonding	0
Construction	1,134,980
Contingency	12,720
Total Project Cost:	**1,300,000**
*Closing costs applied as applicable below	

Project Funding	
Other Funding Sources (3.25%, 20 yr.)	600,000
Local contribution	300,000
WQB Grant	**400,000**
Total	1,300,000

Current Customer Base & User Charges	
Residential Connections:	11
Commercial/Industrial Connections:	9
Total Customers (ERU):	20
MAGI for Park City (2014)	$54,580
Current Impact & Connect Fee (ERU):	$8,000
Current Average SBWRD Monthly Sewer	$40.51
Max. Affordable Monthly Sewer @ 1.4% MAGI	$63.68

Funding Conditions	
Loan Repayment Term:	20 or 30 years
Reserve Funding Period:	6 or 10 years

Existing Debt/Bond Debt for proposed project	
Summit County Debt	$41,267
Existing Debt	$0

ESTIMATED COST OF SEWER SERVICE

	WQB	Summit Co.			WQB			Loan	Annual SBWRD	Total Annual	Monthly Sewer	Sewer Cost as
	Grant	Loan	Interest Rate	Debt Service	Loan	Interest Rate	Debt Service	Reserve	O&M	Sewer Cost	Cost/Connection	% of MAGI
Summit Co. Loan / 20 Yr.	**400,000**	**600,000**	**3.25%**	**41,267**				**10,317**	**9,722**	**61,307**	**255.44**	**5.62%**
Affordable Loan / 20 Yrs.	911,000				89,000	0.00%	4,450	1,113	9,722	15,285	63.69	1.40%
WQB & County Loans / 20 Yr.	--	600,000	3.25%	41,267	400,000	0.00%	20,000	15,317	9,722	86,306	359.61	7.91%
		600,000	3.25%	41,267	400,000	1.00%	22,166	15,858	9,722	89,014	370.89	8.15%
		600,000	3.25%	41,267	400,000	2.00%	24,463	16,432	9,722	91,885	382.85	8.42%
		600,000	3.25%	41,267	400,000	3.25%	27,512	17,195	9,722	95,696	398.73	8.77%
Alternative Loan / 20 Yr.	400,000	600,000	0.00%	30,000				7,500	9,722	47,222	196.76	4.33%
	400,000	600,000	1.00%	33,249				8,312	9,722	51,284	213.68	4.70%
	400,000	600,000	2.00%	36,694				9,174	9,722	55,590	231.62	5.09%
	400,000	600,000	3.25%	41,267				10,317	9,722	61,307	255.44	5.62%
	200,000	800,000	0.00%	40,000				10,000	9,722	59,722	248.84	5.47%
	250,000	750,000	1.00%	41,561				10,390	9,722	61,674	256.98	5.65%
	170,000	830,000	0.00%	41,500				10,375	9,722	61,597	256.66	5.64%
	100,000	900,000	0.00%	45,000				11,250	9,722	65,972	274.89	6.04%
		1,000,000	0.00%	50,000				12,500	9,722	72,222	300.93	6.62%
		1,000,000	1.00%	55,415				13,854	9,722	78,992	329.13	7.24%
Affordable Loan / 30 Yrs.	867,000				133,000	0.00%	4,433	1,108	9,722	15,264	63.60	1.40%
WQB Loan / 30 Yr. + closing costs					1,030,000	**0.00%**	34,333	5,150	9,722	**49,206**	**205.02**	**4.51%**
					1,030,000	1.00%	39,911	5,987	9,722	55,620	231.75	5.10%
WQB Loan Burdened / 30 Yr. (w/ SRF red-tape)					1,150,000	**0.00%**	38,333	5,750	9,722	**53,806**	**224.19**	**4.93%**
					1,150,000	0.75%	42,950	6,443	9,722	59,115	246.31	5.42%

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Alan Matheson
Acting Executive Director

DIVISION OF WATER QUALITY
Walter L. Baker, P.E.
Director

MEMORANDUM

TO: Water Quality Board

THROUGH: Walt Baker, P.E.
Director

FROM: Erica Gaddis
Assistant Director

DATE: October 17, 2016

SUBJECT: Request to Initiate Rulemaking R317-1-1, Independent Scientific Review

As a result of the passage to Senate Bill 110 during the 2016 session of the Utah Legislature, new provisions were added to Title 19-5, the Utah Water Quality Act, to include a provision for Independent Peer Review of a Proposal (Title 19-5-105.3). Draft rules to govern this new provision are attached herewith. The key elements of the proposed rules include:

1. The inclusion of new definitions
2. A provision for DWQ to initiate an Independent Scientific Review when the Director determines that an issue may have a significant financial impact on stakeholders or when an action may be precedent-setting or controversial
3. The process for conducting an Independent Scientific Review or Independent Peer Review

With the passage of SB 110, a consortium of twelve organizations made a request to EPA Region 8 that it withdraw its delegation of authority to DWQ to administer the federal Clean Water Act programs in Utah. EPA also registered concerns about the statutory changes resulting from the legislation. Over the last five months DWQ staff has held discussions with EPA and met with POTW managers and representatives of Western Resource Advocates, who represents the referenced twelve organizations, to craft an administrative rule that would satisfy their respective concerns. Staff believes it has been successful in doing so.

Staff requests that the Water Quality Board approve initiating rulemaking to seek broader public input into the proposed changes to R317-1.

R317. Environmental Quality, Water Quality.
R317-1. Definitions and General Requirements.
R317-1-1. Definitions.
Note that some definitions are repeated from statute to provide clarity to readers.

"Assimilative Capacity" means the difference between the numeric criteria and the concentration in the waterbody of interest where the concentration is less than the criterion.

"Biological assessment" means an evaluation of the biological condition of a water body using biological surveys and other direct measurements of composition or condition of the resident living organisms.

"Biological criteria" means numeric values or narrative descriptions that are established to protect the biological condition of the aquatic life inhabiting waters that have been given a certain designated aquatic life use.

"Board" means the Utah Water Quality Board.

"BOD" means 5-day, 20 degrees C. biochemical oxygen demand.

"Body Politic" means the State or its agencies or any political subdivision of the State to include a county, city, town, improvement district, taxing district or any other governmental subdivision or public corporation of the State.

"Building sewer" means the pipe which carries wastewater from the building drain to a public sewer, a wastewater disposal system or other point of disposal. It is synonymous with "house sewer".

"CBOD" means 5-day, 20 degrees C., carbonaceous biochemical oxygen demand.

"Challenging Party" means a Person who has or is seeking a permit in accordance with Title 19, Chapter 5, the Utah Water Quality Act and chooses to use the independent peer review process to challenge a Proposal as defined in Subsection 19-5-105.3(1)(a).

"COD" means chemical oxygen demand.

"Conflict of Interest" means a Person who has any financial or other interest which has the potential to negatively affect services to the Division or Challenging Party because it could impair the individual's objectivity or it could create an unfair competitive advantage for any Person or organization.

"Deep well" means a drinking water supply source which complies with all the applicable provisions of the State of Utah Public Drinking Water rules.

"Digested sludge" means sludge in which the volatile solids

content has been reduced ~~to about 50%~~ by at least 38% using a suitable biological treatment process.

"Director" means the Director of the Division of Water Quality.

"Division" means the Utah State Division of Water Quality.

"Domestic wastewater" means a combination of the liquid or water-carried wastes from residences, business buildings, institutions, and other establishments with installed plumbing facilities, together with those from industrial establishments, and with such ground water, surface water, and storm water as may be present. It is synonymous with the term "sewage".

"Effluent" means the liquid discharge from any unit of a wastewater treatment works, including a septic tank.

"Existing Uses" means those uses actually attained in a water body on or after November 28, 1975, whether or not they are included in the water quality standards.

"Expert" means a person with technical expertise, knowledge, or skills in a subject matter of relevance to a specific water quality investigation, HISA, or Proposal including persons from other regulatory agencies, academia, or the private sector.

"Human-induced stressor" means perturbations directly or indirectly caused by humans that alter the components, patterns, and/or processes of an ecosystem.

"Human pathogens" means specific causative agents of disease in humans such as bacteria or viruses

"Highly Influential Scientific Assessment (HISA)" means a Scientific Assessment developed by the Division or an external Person, that has material relevance to a decision by the Division, and the Director determines could have a significant financial impact on either the public or private sector or is novel, controversial, or precedent-setting, and is not a new or renewed permit issued to a Person.

"Independent Peer Review" means scientific review conducted on request from a Challenging Party in accordance with Section 19-5-105.3 and is a subcategory of Independent Scientific Review.

"Independent Scientific Review" means any technical or scientific review conducted by Experts in an area related to the material being reviewed who were not directly or indirectly involved with the development of the material to be reviewed and who do not have a real or perceived conflict of interest. When an Independent Peer Review is conducted, the conditions in Subsection 19-5-105.3(5) shall apply.

"Industrial wastes" means the liquid wastes from industrial

processes as distinct from wastes derived principally from dwellings, business buildings, institutions and the like. It is synonymous with the term "industrial wastewater".

"Influent" means the total wastewater flow entering a wastewater treatment works.

"Great Salt Lake impounded wetland" means wetland ponds which have been formed by dikes or berms to control and retain the flow of freshwater sources in the immediate proximity of Great Salt Lake.

"Large underground wastewater disposal system" means the same type of device as an onsite wastewater system except that it is designed to handle more than 5,000 gallons per day of domestic wastewater, or wastewater that originates in multiple dwellings, commercial establishments, recreational facilities, schools, or any other underground wastewater disposal system not covered under the definition of an onsite wastewater system. The Division controls the installation of such systems.

"Onsite wastewater system" means an underground wastewater disposal system for domestic wastewater which is designed for a capacity of 5,000 gallons per day or less and is not designed to serve multiple dwelling units which are owned by separate owners except condominiums and twin homes. It usually consists of a building sewer, a septic tank and an absorption system.

"Operating Permit" is a State issued permit issued to any wastewater treatment works covered under Rules R317-3 or R317-5 with the following exceptions:

A. Any wastewater treatment permitted under Ground Water Quality Protection Rule R317-6.

B. Any wastewater treatment permitted under Underground Injection Control (UIC) Program Rule R317-7.

C. Any wastewater treatment permitted under Utah Pollutant Discharge Elimination System (UPDES) Rule R317-8.

D. Any wastewater treatment permitted under Approvals and Permits for a Water Reuse Project Rule R317-13.

E. Any wastewater treatment permitted by a Local Health Department under Onsite Wastewater Systems Rule R317-4.

"Person" means any individual, trust, firm, estate, company, corporation, partnership, association, state, state or federal agency or entity, municipality, commission, or political subdivision of a state. ~~company, or body politic, including any agency or instrumentality of the United States government (Section 19-1-103).~~

"Point source" means any discernible, confined and discrete

conveyance including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, concentrated animal feeding operation, or vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flow from irrigated agriculture.

"Pollution" means such contamination, or other alteration of the physical, chemical, or biological properties of any waters of the state, or such discharge of any liquid, gaseous or solid substance into any waters of the state as will create a nuisance or render such waters harmful or detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life.

"Proposal" means any science-based initiative proposed by the division on or after January 1, 2016, that would financially impact a Challenging Party and that would:

A. change water quality standards;

B. develop or modify total maximum daily load requirements;

C. modify wasteloads or other regulatory requirements for permits; or

D. change rules or other regulatory guidance. A Proposal is not an individual permit issued to a Person, nor is it a technology based limit applied in accordance with Effluent limitations, 33 U.S.C. Sec. 1311, National pollutant discharge elimination system, 33 U.S.C. Sec. 1342, and Information and guidelines, 33 U.S.C. Sec. 1314

"Regulatory requirements" for permits means the methods or policies used by the Division to derive permit limits such as wasteload analyses, reasonable potential determinations, whole effluent toxicity policy, interim permitting guidance, antidegradation reviews, or Technology Based Nutrient Effluent Limit requirements.

"Scientific Assessment" means an evaluation of a body of credible scientific or technical knowledge that synthesizes scientific literature, data analysis and interpretation, and models, and includes any assumptions used to bridge uncertainties in the available information.

"Scientific basis" means empirical data or other scientific findings, conclusions, or assumptions used as the justification for a rule, regulatory guidance, or a regulatory tool.

"Scientifically necessary to protect the designated beneficial uses of a waterbody" as referenced in Subsection 19-5-

105.3(8) means a Technology Based Nutrient Effluent Limit that under current and future growth projections, will:

A. prevent circumstances that would cause or contribute to an impairment of any designated or existing use in the receiving water or downstream water bodies based on Utah's water quality standards, Section R317-2-7; or

B. improve water quality conditions that are causing or contributing to any existing impairment in the receiving water or downstream water bodies, as defined by Utah's water quality standards, Section R317-2-7.

"Sewage" is synonymous with the term "domestic wastewater".

"Shallow well" means a well providing a source of drinking water which does not meet the requirements of a "deep well".

"Sludge" means the accumulation of solids which have settled from wastewater. As initially accumulated, and prior to treatment, it is known as "raw sludge".

"SS" means suspended solids.

"Technology Based Nutrient Effluent Limit" means maximum nutrient limitations based on the availability of technology to achieve the limitations, rather than based on a water quality standard or a total maximum daily load.

Total Maximum Daily Load (TMDL) means the maximum amount of a particular pollutant that a waterbody can receive and still meet state water quality standards, and an allocation of that amount to the pollutant's sources.

"Treatment works" means any plant, disposal field, lagoon, dam, pumping station, incinerator, or other works used for the purpose of treating, stabilizing or holding wastes. (Section 19-5-102)

"TSS" means total suspended solids.

"Underground Wastewater Disposal System" means a system for underground disposal of domestic wastewater. It includes onsite wastewater systems and large underground wastewater disposal systems.

"Use Attainability Analysis" means a structured Scientific Assessment of the factors affecting the attainment of the uses specified in Section R317-2-6. The factors to be considered in such an analysis include the physical, chemical, biological, and economic use removal criteria as described in 40 CFR 131.10(g) (1-6).

"Wastes" means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked

or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water. (Section 19-5-102)

"Wastewater" means sewage, industrial waste or other liquid substances which might cause pollution of waters of the state. Intercepted ground water which is uncontaminated by wastes is not included.

"Waters of the state" means all streams, lakes, ponds, marshes, water-courses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, which are contained within, flow through, or border upon this state or any portion thereof, except that bodies of water confined to and retained within the limits of private property, and which do not develop into or constitute a nuisance, or a public health hazard, or a menace to fish and wildlife, shall not be considered to be "waters of the state" under this definition (Section 19-5-102).

"Water Quality Based Effluent Limit (WQBEL)" means an effluent limitation that has been determined necessary to ensure that water quality standards in a receiving body of water will not be violated.

* * * * *

R317-1-10. Independent Scientific Review.

10.1 Applicability

A. Independent Scientific Review may be used to solicit formal evaluations from outside Experts on the strengths and weaknesses of the scientific basis used to support any new Division Proposal or Highly Influential Scientific Assessment (HISA).

B. Independent Peer Reviews for permits shall be limited to modifications to wasteloads used in UPDES discharge permits, or the scientific basis of any other modification to a regulatory requirement used in developing permit limits. Review of individual permits shall follow existing adjudicative processes that govern their issuance or renewal in accordance with Subsection 19-5-105.3(1)(c)(iii).

C. The Director shall initiate an Independent Scientific Review when one of the following conditions is met:

1. A Challenging Party requests an Independent Peer Review on the scientific basis of a Division Proposal under Section 19-5-

105.3.

2. The Director makes a determination that a new Scientific Assessment is a Highly Influential Scientific Assessment (HISA) and that sufficient resources are available to support an Independent Scientific Review.

10.2 Independent Scientific Review process

A. Independent Scientific Reviews shall be conducted in general accordance with the guidance contained in the United States Environmental Protection Agency's Science and Technology Policy Council Peer Review Handbook 4th Edition.

B. Independent Scientific Reviews shall entail development of a scope of work for review; selection of independent Experts; management of the Independent Scientific Reviews; submission by Experts of findings and recommendations; development of a Division response to review findings; finalization of the Proposal or HISA; and publication for public comment.

1. The Director shall prepare a scope of work that defines the objectives of an Independent Scientific Review and provide instructions for the Experts. The Director shall also prepare a schedule for the review. In the case of an Independent Peer Review the Director will seek and incorporate input from the Challenging Party into the development of the scope of work.

a. The scope of work shall include several components:

i. A summary of the Proposal or HISA under consideration and reasons for the review.

ii. The specific charge questions that articulate the issues, areas of concern, or advice sought through the Independent Scientific Review process. Charge questions shall generally focus on the degree of confidence, certainty, and major data gaps with respect to the interpretation or application of the scientific basis of a proposed rule, regulatory guidance, or regulatory tool.

iii. A compilation of data, reports or other scientific information that has a material influence on the scientific basis of the Proposal or HISA under review.

iv. A statement of qualifications and expertise required for –Experts that will be considered in conducting the Independent Scientific Review.

v. Other important instructions to Experts such as reporting expectations or communication protocols.

vi. A schedule for accomplishing the review.

b. The scope of work shall be made available for public comment for a minimum of 30 days and no more than 60 days to help identify missing data or missing elements of the charge questions.

In the event of a condition which poses hazard to human health or the environment that may increase significantly during a review period, a shorter period may be specified. The Director shall prepare a response to any comments that are received and shall refine the scope of work, as appropriate, before sending the scope of work to the Experts.

2. The Director shall select Experts to conduct Independent Scientific Reviews using the following criteria:

a. Experts shall be selected who have demonstrated expertise in scientific disciplines that are relevant to the scientific basis of the Proposal or HISA.

b. Experts shall not have a conflict of interest that could jeopardize their objectivity or impartiality.

c. An Independent Scientific Review shall be conducted by at least three independent Experts. Additional Experts may be asked to conduct reviews, as needed, to fairly reflect the breadth of scientific perspectives or fields of knowledge related to the scientific basis under review. If the Independent Scientific Review is an Independent Peer Review, the conditions in Section 19-5-105.3 shall apply.

3. Management of Independent Scientific Reviews.

a. Management of Independent Scientific Reviews may be conducted by any of the following:

i. the Division;

ii. the United States Environmental Protection Agency;

iii. an independent contractor; or,

iv. an independent organization such as an editorial board of a relevant scientific journal, appropriate trade organization, or other research institute.

b. From the time they accept the invitation to participate in an Independent Scientific Review, Experts should avoid interaction with the Division, a challenging party, the general public or others that might create a real or perceived Conflict of Interest regarding the Proposal under review to ensure that Expert findings are independent and objective.

4. Compilation of Expert Findings.

a. Each Expert shall submit written comments that include responses to the charge questions and an evaluation of the scientific basis of the Proposal or HISA.

b. The Director shall charge Experts to identify– in their written comments any areas of scientific uncertainty or major data gaps that have a reasonable likelihood of altering material provisions of a Proposal or HISA, including descriptions of the

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DIVISION OF WATER QUALITY
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Director

MEMORANDUM

TO: Water Quality Board

THROUGH: Walt Baker, P.E.
Director

FROM: Sandy Wingert
Watershed Protection Section

DATE: October 14, 2016

SUBJECT: Total Maximum Daily Load (TMDL) for Upper Nine Mile Creek: Request to initiate rulemaking to adopt TMDL

The Division of Water Quality has completed a TMDL study to address water quality impairments in Upper Nine Mile Creek located in the Uinta Basin Watershed Management Unit. Since the cost of implementation is below $10 million, Legislative review is not required for approval.

Finalization Timeline

October 26, 2016	Water Quality Board Preliminary Approval of TMDL/Petition to initiate rulemaking
October 31 – December 1	30-day Division of Administrative Rules Public Notice
December 14, 2016	Petition Water Quality Board for formal adoption of TMDL into rule
December 21, 2016	Submit TMDL to EPA for approval

195 North 1460 West • Salt Lake City, UT
Mailing Address: P.O. Box 144870 • Salt Lake City, UT 84114-4870
Telephone (801) 536-4300 • Fax (801) 536-4301 • T.D.D. (801) 903-3978
www.deq.utah.gov

Upper Nine Mile Creek TMDL Summary

Nine Mile Creek does not meet the 3A cold water aquatic life criteria for temperature. The TMDL study supports the development of a TMDL for the upper part of the watershed while a designated use change or site specific temperature criteria is warranted for the lower reaches. It is necessary to split this watershed into two parts (Upper and Lower) to properly address the cold-water aquatic life use impairment (see Figure 1). Lower sections of Nine Mile Creek regularly exceed the cold-water aquatic life temperature standard of 20° C due to natural and uncontrollable conditions which is also supported by recent and historic fish surveys that do not show any historic presence of cold water species such as trout. This water quality report recommends a use attainability analysis (UAA) for the lower reach. This UAA will be developed in coordination with stakeholders and submitted for approval to EPA after the temperature TMDL is approved.

Sources

There are no permitted point sources in this watershed so potential sources of thermal loading are non-point in nature. High stream temperatures are attributed to decreased effective stream shade levels due to lack of riparian vegetation. This leads to increased incident solar radiation on the water surface and therefore increased thermal loading. The elevated summertime stream temperatures attributable to anthropogenic causes in Nine Mile watershed result from the following conditions:

1. Channel widening (increased width to depth ratio) increases the stream surface area exposed to incident solar radiation
2. Lack of riparian vegetation reduces stream surface shading, riparian vegetation height and density
3. Reduced summertime base flows that result from instream withdrawals

Modeling Approach

A regression model was developed to predict in-stream temperature using an in-stream temperature metric (maximum weekly maximum) as the response variable and several geospatial predictor variables including stream slope, drainage area, elevation, and maximum summer air temperature. The resulting regression equation was applied to the NHD shapefile in ArcGIS which revealed a break point at the confluence of Argyle and Nine Mile Creeks. This area is referred to as Upper Nine Mile Creek (Figure 1).

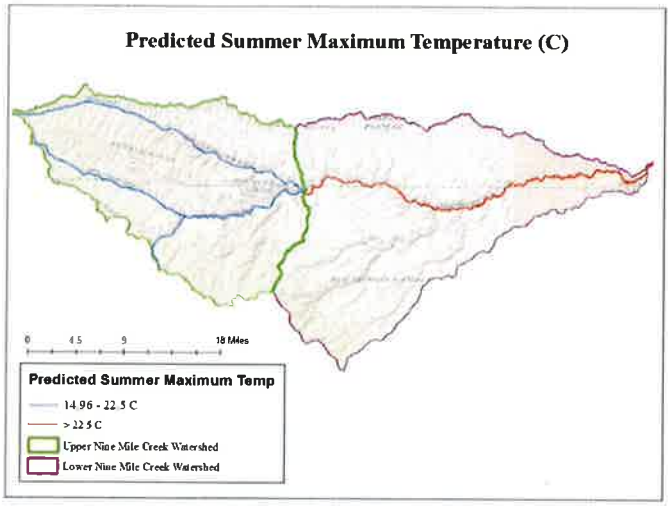

Figure 1. Upper and Lower Nine Mile Creek Watersheds.

Thermal loading modeling required additional inputs such as bankfull width, riparian canopy cover, and solar radiation. Channel widths and riparian shade were calculated using imagery data from Google Earth Pro. Solar radiation data originated from the solar radiation tool in ArcGIS 10.1.1.

The USGS SSTEMP model was used to validate the riparian shade targets required to meet the 20 °C in-stream temperature. Input requirements include stream temperature, channel geometry, flows, vegetative shade, and weather information for single stream segments. The model predicts mean, minimum, and maximum water temperatures. All scenarios of the model were run for the month of July; the most critical month for elevated water temperature. Estimated maximum temperatures were predicted and compared from changes in total shade from "current" conditions to "expected" conditions based on the riparian shade targets for each reach. The SSTEMP model predicted remarkably similar to the regression model used to demarcate an attainable maximum water temperature.

TMDL Recommendations

The TMDL target is to achieve in-stream temperature of 20° C which will require a 72% reduction in solar loading equating to a 36% increase in riparian shading. Since there are no permitted point sources, the necessary reduction in solar loading comes solely from nonpoint sources.

Implementation Strategy and Estimated Costs

In order to achieve the TMDL target and endpoints, it is necessary to implement a system of Best Management Practices (BMP) to protect the physical and biological integrity of Upper Nine Mile Creek with regard to nonpoint sources. Using the NRCS conservation practices as a guide, both structural and non-structural BMPs are identified. BMPs include increasing riparian vegetation, stabilizing streambanks, updating grazing practices, developing a beaver management strategy, and addressing runoff. This implementation strategy is estimated to cost $681,000 and should take 16 years to complete. This TMDL report also includes the 9 Required Elements mandated by EPA for a watershed plan.

Public Involvement

March 2014:	Kickoff stakeholder meeting
September 2015:	Technical approach stakeholder meeting
October 2015:	Introduction to the Water Quality Board

May – August 2016: Stakeholder Review of Draft TMDL
September 2016: Draft TMDL Report Stakeholder Meeting

Active Participants

Carbon County
Duchesne County
Bureau of Land Management
Nine Mile Coalition
EnerVest Company
Nutters Ranch
Utah Department of Agriculture and Food
Natural Resource Conservation District

The Upper Nine Mile Creek Temperature TMDL can be found here on UDWQ's webpage:

http://www.deq.utah.gov/ProgramsServices/programs/water/watersheds/docs/2016/2016-09-09-nine-mile-temperature-tmdl.pdf