



UTAH DEPARTMENT *of*
ENVIRONMENTAL QUALITY
**WATER
QUALITY**

E. COLI RESPONSE PLAN

Utah Division of Water Quality

April 2018

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Introduction

The purpose of this document is to:

- Provide guidance for local health departments to determine when an *E. coli* related advisory should be considered, including when an existing advisory can be removed.
- Provide information about the Utah Division of Water Quality (DWQ) Recreational *E. coli* Monitoring Program.
- Describe DWQ's response to a potential *E. coli* problem in surface water.
- Provide background information about *E. coli* in surface waters and DWQ's assessment of *E. coli* data.

CHAPTER 1. Escherichia coli (*E. coli*) Basics

Escherichia coli, or *E. coli*, are bacteria commonly found in the intestines and feces of healthy warm-blooded animals and humans. With some notable exceptions, *E. coli* are not generally harmful to healthy people but their presence indicates that other pathogenic microorganisms might also be present. *E. coli* is a reliable indicator of the presence of fecal contamination and other possible disease-causing pathogens in water. Health officials use the presence of *E. coli* to assess the potential for the presence of microbial pathogens.

1.1. HEALTH EFFECTS

Most strains of *E. coli* are not dangerous to healthy people. However, some strains of *E. coli* may cause illness such as vomiting, diarrhea, urinary tract infections, and other infections. Some infections are very mild, but others are severe or even life-threatening. *E. coli* outbreaks in the news are usually referring to one of the pathogenic strains of *E. coli* such as O157:H7.

E. coli O157:H7 is a strain of *E. coli* which may be present in streams and lakes contaminated by feces, but is most commonly spread through contaminated meats and vegetables and direct contact with infected people and animals. Waterborne transmission is possible through swimming and ingestion of water contaminated by *E. coli*. Additional information on *E. coli* and pathogenic strains can be found at the [Center for Disease Control and Prevention](#).

To reduce potential health risks, individuals should assume all surface waters contain some *E. coli* whether or not it has been monitored or an advisory has been issued. This means care should be taken to not swallow untreated water. If you have touched the water, make sure to wash your hands before touching your mouth or eyes. Avoid swimming if you have open cuts or wounds, and avoid swimming within 48 hours of a major storm. Dispose of diapers and dog waste properly.

1.2. E. COLI AND FISH

Since fish are cold-blooded, it is unlikely that *E. coli* can live in the fillets. If you choose to eat fish caught in affected waters, remember that the water covering the fish could contain *E. coli*, as well as the guts of the fish. Wash and cook the fish thoroughly, and wash your hands after handling fish and lake water to reduce your risk.

1.3. SOURCES OF *E. COLI*

E. coli comes from human and animal waste from sources such as improper waste dumping, faulty septic tanks or sewer systems, domesticated animals—such as dogs and livestock, large concentrations of waterfowl and other wildlife, and stormwater runoff. Pollution of all kinds, including *E. coli*, are typically higher after rainstorms since water draining into streams and lakes travels over lawns, farm fields, sidewalks, and streets which may all be sources of fecal contamination.

CHAPTER 2. DWQ and *E. coli*

DWQ conducts *E. coli* monitoring around the state to support various projects and programs including the Nonpoint Source Program, Watershed Protection, Total Maximum Daily Load (TMDL) development, Targeted Monitoring, Assessment, and Recreational Monitoring. This document focuses primarily on activities related to DWQ's Recreational *E. coli* Monitoring Program. For more information on DWQ programs, please visit deq.utah.gov.

2.1 DWQ'S RECREATIONAL *E. COLI* MONITORING PROGRAM

The purpose of DWQ's Recreational *E. coli* Monitoring Program is to monitor *E. coli* concentrations at priority waterbodies, and inform local health departments if monitoring results indicate *E. coli* concentrations are exceeding numeric criteria as articulated in Utah Administrative Code R317-2-7.1.b

Ideally, all Utah surface waters would be monitored and assessed for *E. coli* concentrations on a weekly basis. However, the resources available to DWQ and DWQ's monitoring cooperators are insufficient to monitor at this frequency and scale. DWQ works with local health departments each year to prioritize water bodies for monitoring. Testing for potential *E. coli* contamination is prioritized by a number of factors including (but not limited to) recreational use or visitation, potential for *E. coli* problems, and available resources. The goal of this routine monitoring is to collect and analyze at least one sample per month from high priority waters.

DWQ's current monitoring plan includes sampling at targeted waterbodies once a month from May through October. More frequent sampling may be needed at specific waterbodies if the data suggest *E. coli* concentrations are above numeric thresholds. DWQ's role is to then to conduct further sampling (or help coordinate sampling), cooperate with the LHDs to inform the public, and provide guidance to local health departments on factors to consider when issuing or rescinding *E. coli* related recreational advisories.

2.2 UTAH WATER QUALITY STANDARDS

DWQ uses *E. coli* concentrations to determine if waterbodies are meeting recreational and drinking water beneficial uses for microbial pathogens as articulated in Utah Administrative Code R317-2-7.1.b. Different waterbodies have different numeric criteria based on their beneficial use. All waters of the State are protected for contact recreation (Class 2A and 2B), and some waters are classified as drinking water sources (Class 1C). Class 2A waters are protected for frequent primary contact, while Class 2B waters are protected for infrequent primary contact. Utah's numeric criteria are described in Table 1.

TABLE 1 - NUMERIC CRITERIA FOR *E. COLI* CONCENTRATIONS IN WATERS OF THE STATE FROM UTAH ADMINISTRATIVE CODE R317-2-14.

Parameter	Domestic Source (1C)	Recreation and Aesthetics (2A)	Recreation and Aesthetics (2B)
30-DAY GEOMETRIC MEAN (No./100 ml)	206	126	206
MAXIMUM (No. /100ml)	668	409	668

2.3 *E. COLI* SAMPLING PROCEDURES & QUANTIFICATION METHODS

DWQ uses the IDEXX Colilert Method for determining *E. coli* concentrations in surface water samples. This method is an enzyme-substrate, MPN-based, EPA-approved method for quantifying total coliform and *E. coli* bacteria in water samples. The detection limit for this test using the QuantiTray2000 system ranges from 1 Most Probable Number (MPN)/100 ml of sample to >2419.6 MPN/100 ml of sample. Test results are available in 18 to 24 hours.

Personnel performing water sampling should be familiar with sampling techniques, safety procedures, proper handling, and record keeping. Samplers are responsible for attending refresher meetings and/or watching video trainings to review procedures and techniques. More information about DWQ's Quality Assurance and Quality Control Program, and DWQ Standard Operating Procedures can be found online at:

<https://deq.utah.gov/legacy/monitoring/water-quality/quality-assurance-quality-control.htm>

2.4 PRIORITY WATERBODIES

Routine *E. coli* sampling is conducted during the peak recreation season of May 1st through October 31st for waterbodies on the *Priority Waterbody List*. Priority waterbodies are identified at the beginning of each recreation season and are posted on [DWQ's *E. coli* Monitoring webpage](#). DWQ's list of priority waterbodies has the potential to change each recreation season based on the following factors:

- Beneficial use class of the waterbody
- Recreational use or visitation
- Population density
- Potential for *E. coli* problems or history of *E. coli* problems
- Special request by state, local, or federal agency
- Waterbody location (based on DWQ targeted watershed planning)
- Available resources for monitoring

CHAPTER 3. DWQ Response Plan and Recreational Advisories

DWQ uses the *E. coli Response Worksheet* (Table 2) when evaluating the level of response to an *E. coli* related incident on any waterbody, whether or not it is on the *Priority Waterbody List*. A score is assigned for each criterion on the worksheet. DWQ's response is based on the total number of points and ranges from simply informing the local health department, to inspection and verification sampling within 24 hours.

3.1 TYPES OF INITIAL NOTIFICATION:

DWQ may be informed of a potential *E. coli* problem through any of the following ways:

- *E. coli* bacteria quantification – a sample was collected and a density count obtained via the IDEXX Colilert method or other quantification method (such as the Coliscan Easygel method).
- Observational – received a report or witnessed improper dumping, prevalent human or animal waste, or foul odor.
- Incident Report – an incident was reported through the DEQ spill line related to *E. coli*.

TABLE 2 - *E. COLI* RESPONSE WORKSHEET

Name of Waterbody:
Date of Report:
Evaluator:
Date of Evaluation:

<i>E. coli</i> Response Criteria Worksheet	Points	Point Values
Waterbody classified as 2A in <u>Utah Administrative Code R317-2-13</u> or <u>DEQ Interactive Map</u> ?		15
Waterbody identified as Priority on DEQ website? (heavy recreational use, high risk based on land use, special request, or previous impairment)?		10
Initial sample result value >WQS AND sample collected by DWQ trained individual (government agency/trained private volunteer)?		5
Report received between May st – October 31 st ?		5
Other indication of <i>E. coli</i> problem such as animals in or around water, such as human or animal waste, foul odor, improper waste dumping, or stormwater runoff?		15
Heavy recreational use observed at time of sampling?		10
Total Points		
Evaluation Key: Level 1: Total Points > 30 Information forwarded to LHD and local DEQ District Engineer (DE) Coordinate inspection and verification sampling (response within 24 hours or ASAP)		
Level 2: Total Points 15 to 30 Information forwarded to LHD and local DEQ District Engineer (DE) Coordinate inspection and verification sampling (response time within 1 week)		
Level 3: Total Points <15 Information forwarded to LHD and local DEQ District Engineer (DE) response time and actions at discretion of LHD and DE		

3.2 ADVISORY PROTOCOL FOR PRIORITY WATERBODIES

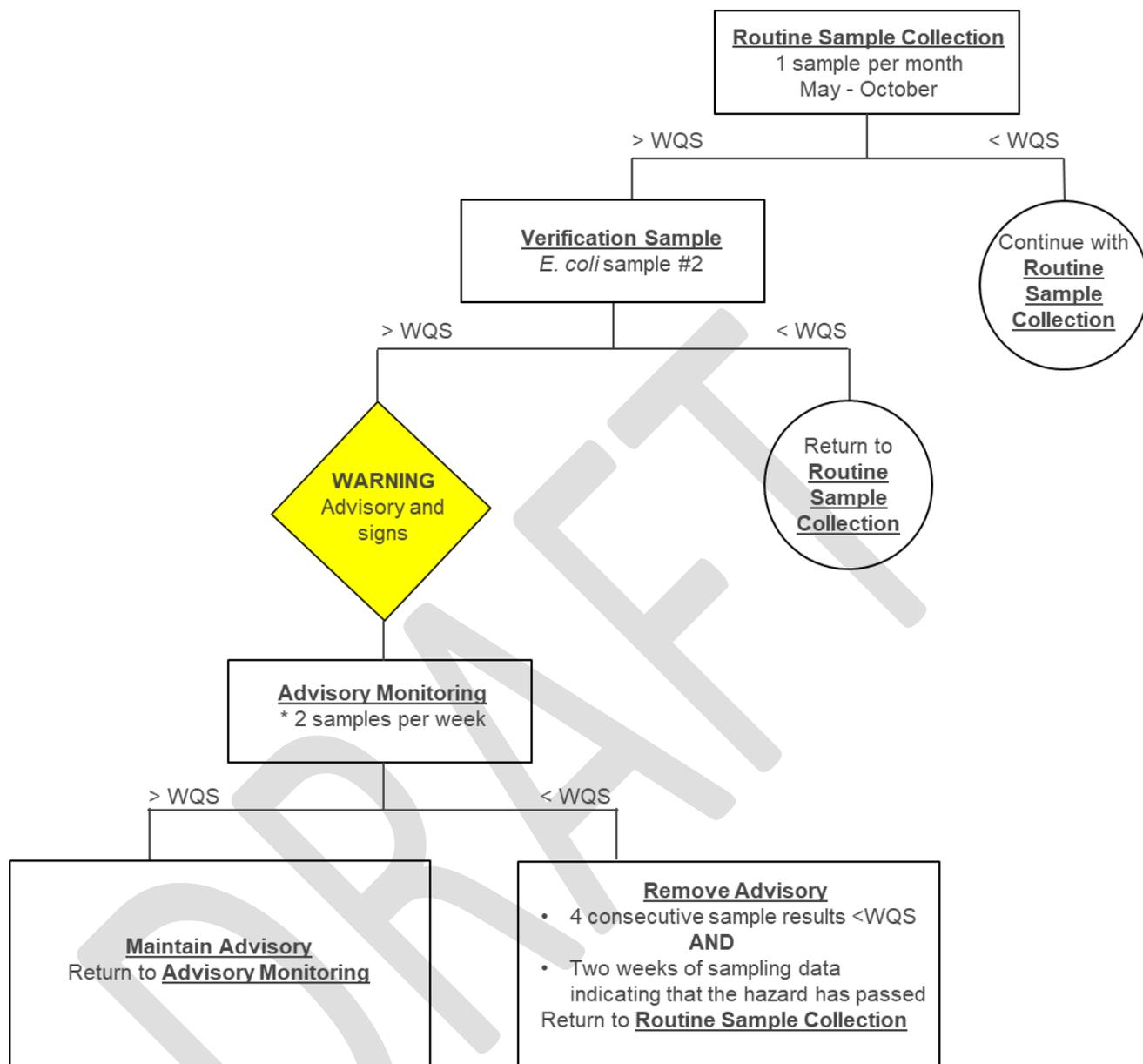
Figure 1 outlines the general protocol for collecting *E. coli* samples from waterbodies on the *Priority Waterbody List* and recommendations if an exceedance occurs.

Routine samples are collected once per month from May to October at Priority Waterbodies. No action is needed if sample results from routine sampling yield results below the water quality standard (WQS).

If a sample is collected that exceeds the WQS, a verification sample is collected the following day or as soon as reasonably possible by the original sampler or by DWQ. The local health department is informed of the potential for an advisory.

If the verification sample also exceeds the WQS, DWQ alerts the local health department and any other appropriate officials, such as the District Engineer, and the agency managing the waterbody. At this time, the local health department may choose to issue an *E. coli* advisory and post signs at the affected area. A standardized *E. coli* Advisory Sign is available online, and is included as an Appendix to this document (see Appendix A).

During an active advisory, *E. coli* monitoring is increased to two times per week. DWQ and the local health department may jointly decide to increase or decrease the frequency of sampling on a case-by-case basis. Once an advisory is issued, DWQ recommends there be at least two weeks of data and four consecutive sample results below the WQS to remove the advisory. Once an advisory has been lifted, routine monitoring can be resumed.



* DWQ and the local health department may jointly decide to increase or decrease the frequency of sampling during an active advisory on a case-by-case basis.

Figure 1 - DOH and DWQ Recommended *E. coli* Advisory Protocol for Priority Waterbodies

3.3 AREA ADVISORY COVERS

- For a stream, the advisory applies to the entire reach (from one tributary to the next).
- For a lake, the advisory applies to the entire beach area up to 500 meters from either side of sample collection.

CHAPTER 4. Roles and Responsibilities

4.1 *UTAH DWQ RESPONSIBILITIES*

- Assess water quality, provide sampling support, data, and guidance
- Provide equipment, supplies, and training for DWQ personnel and approved Cooperators participating in DWQ's Recreational *E. coli* Monitoring Program.
- Provide a list of priority waterbodies for *E. coli* monitoring each recreation season and post on website.
- Conduct monthly monitoring at priority waterbodies from May 1st to October 31st.
- Notify the local health department and other appropriate officials if concentrations are greater than WQS or greater than water quality standards.
- Provide local health departments with a sign template that may be posted to provide consistent messaging throughout Utah.
- Support the local health department public notification efforts by posting local health department advisories on the DEQ website.
- Conduct Advisory Monitoring (or assist in the coordination of Advisory Monitoring) during an active *E. coli* advisory.

4.2 *LOCAL HEALTH DEPARTMENT AUTHORITY*

In Utah, the authority to post health advisories and close water bodies lies with the local health departments. As always, DWQ stands ready to support their local partners by providing sampling equipment and supplies, performing monitoring, and consulting with local health departments on the interpretation of results.

A local health department may:

- Prepare, publish, and disseminate information necessary to inform and advise the public concerning the health and wellness of the population, specific hazards, and risk factors. - Utah Code 26A-1-114 (1)(i)(i)
- Close theatres, schools, and other public places and prohibit gatherings of people when necessary to protect public health. - Utah Code 26A-1-114 (1)(e)

CHAPTER 5. E. coli Contacts

Immediate Health Concerns: Utah Poison Control Center: 1-800-222-1222

Table 3 contains contact information for DWQ personnel and a web address for local health department contact information (see also, Appendix B).

Table 3 - E. coli Contacts

DWQ E. coli Contacts	Local Health Departments & District Engineers	Department of Health (DOH)
<p>Calah Worthen, DWQ E. coli Monitoring Coordinator (801) 536-4376 calahworthen@utah.gov</p> <p>Kevin Okleberry, DWQ Spills Coordinator (801) 536-4054 kokleberry@utah.gov</p> <p>TBD, DWQ Monitoring Section Manager (801) 536-xxxx Emailaddress@utah.gov</p>	<p>Please visit the following web address for a map showing the health districts of the State of Utah and a complete list of local health department contacts.</p> <p>https://deq.utah.gov/Topics/Resources/healthdptsdw.htm</p> <p>This information is also available in Appendix B.</p>	<p>Nathan La-Cross, DOH Epidemiologist Department of Health (801) 538-6705 nlacross@utah.gov</p>

References

CDC (Centers for Disease Control and Prevention). December 1, 2014. *E. coli (Escherichia coli*. Available online at: <https://www.cdc.gov/ecoli/general/index.html>.

Utah Administrative Code R317. January 1, 2018. *Environmental Quality, Water Quality. Rule R317-2. Standards of Quality for Waters of the State*. Available online at: <https://rules.utah.gov/publicat/code/r317/r317-002.htm>

USEPA (US Environmental Protection Agency). 2012. *Recreational Water Quality Criteria*. EPA 820-F-12-058. Environmental Protection Agency. Office of Water. Washington, DC. Available online at: <https://www.epa.gov/sites/production/files/2015-10/documents/rwqc2012.pdf>.

WHO (World Health Organization). January 2018. *E. coli Fact Sheet*. Available online at: <http://www.who.int/mediacentre/factsheets/fs125/en/>

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APPENDIX A. E. COLI ADVISORY SIGN TEMPLATE

CAUTION

WATER QUALITY ADVISORY

A temporary advisory has been issued for this area based on recent monitoring for *E. coli* bacteria.

FOR YOUR SAFETY

- **Do not ingest water.**
No ingiera el agua.
- **Water is unsafe for swimming and deep wading.**
El agua no es segura para nadar o vadear profundamente.
- **Wash hands after handling fish and lake/river water.**
Lávese las manos después de manipular el pescado y el agua del lago/río.



Date Posted:

Call your doctor if you have sudden or unexplained sickness.
For more information visit:
deq.utah.gov/legacy/divisions/water-quality/health-advisory/ecoli

Contact your local health department:

Utah Poison Control Center
(800) 222-1222







APPENDIX B. LOCAL HEALTH DEPARTMENT CONTACT INFORMATION

UTAH LOCAL HEALTH DEPARTMENTS

Current as of January 29, 2018

Official Name and Distance from DEQ	Health Officer	Environmental Director	Other Key Contacts
<p>Bear River Health Department HO and ED in different buildings From DEQ: 90 min/85 miles</p> <p>Counties: Box Elder, Cache, and Rich</p>	<p>Lloyd Berentzen lloydber@brhd.org 435-792-6483 435-994-1120 (cell) Logan Main Office (435) 792-6500 655 East 1300 North Logan, UT 84341</p>	<p>Grant Koford gkoford@brhd.org 435-792-6575 (office) 435-994-1135 (cell) Logan – EH Building 85 East 1800 North Logan, UT 84341</p>	
<p>Central Utah Public Health Department 70 Westview Drive Richfield, UT 84701 From DEQ: 2.5 hours/161 miles</p> <p>Counties: Juab, Millard, Sanpete, Sevier, Piute, and Wayne</p>	<p>Sue Hilderbrand, MSN shilderbrand@utah.gov (435) 896-5451 ext. 315 (office) (435) 896-3517 (cell)</p>	<p>Nathan Selin nselin@utah.gov 435-896-5451 ext. 342 435-452-8557 (cell)</p>	<p>DEQ District Engineer John Chartier jchartier@utah.gov 435-896-5451 x314 (office) 435-559-1969 (cell)</p>
<p>Davis County Health Department 22 State Street Clearfield, UT 84015 From DEQ: 20 min./18 miles Mailing Address: Davis County Health Department Attn. P.O. Box 618 Farmington, Utah 84025</p>	<p>Brian Hatch, Health Officer brianh@co.davis.ut.us 801-525-5161</p>	<p>Dennis Keith dkeith@co.davis.ut.us 801-525-5118 (office) 801-856-4558 (cell)</p>	<p>Dave Spence, Deputy Director davids@daviscountyutah.gov 801-525-5162 (office) 801-726-8545 (cell)</p>
<p>Salt Lake County Health Department HO and ED in different buildings From DEQ: To SLC: 10 min/ 7 miles To Murray: 17 min/12 miles</p>	<p>Gary Edwards, Health Officer gedwards@slco.org 385-468-4117</p> <p>2001 South State, S2500 Salt Lake City, UT 84190-2150</p>	<p>Royal DeLegge, Ph.D. rdelegge@slco.org 385-468-3874 (office) 801-556-7584 (cell) 788 Woodoak Lane Salt Lake City, UT 84107</p>	<p>Dorothy Adams, Deputy Director DGAdams@slco.org 385-468-4119</p> <p>Eric Peterson, EH Deputy epeterson@slco.org 385-468-3875</p>

Official Name and Distance from DEQ	Health Officer	Environmental Director	Other Key Contacts
San Juan County Public Health 735 South 200 West Suite 2 Blanding, UT 84511 From DEQ: 5 hrs 7 min/310 miles	Kirk Bengé, Health Officer kbenge@sanjuancounty.org 435-359-0038 (office) x1009 801-613-0669 (cell)	Rick Meyer rmeyer@sanjuancounty.org 435-359-0038 (office) 435-459-9924 (cell)	DEQ District Engineer Scott Hacking scotth@utah.gov c/o Southeast Utah Health Dept 28 South 100 East PO Box 800 Price, UT 84501 (435) 636-1163 office (435) 559-3825 cell
Southeast Utah Health Department HO and ED in different buildings To Price: 2 hours/122 miles To Moab: 3 h 45 m/236 miles Counties: Carbon, Emery and Grand	Brady Bradford, Health Officer bbradfor@utah.gov 435-637-3671 (office) 435-630-1149 (cell) 28 South 100 East Price, UT 84501	Orion Rogers orogers@utah.gov Office: 435-259-5602 Cell: 801-557-6978 575 S Kane Creek Blvd. Moab, UT 84532	DEQ District Engineer Scott Hacking scotth@utah.gov (435) 636-1163 office (435) 559-3825 cell
Southwest Utah Public Health Department 620 South 400 East St. George, UT 84770 From DEQ: 4.5 hours/305 miles Counties: Beaver, Iron, Washington, Garfield, and Kane	Dr. David Blodgett dblodgett@swuhealth.org 435-986-2587 (office) 435-817-0701 (cell)	Jeremy Roberts jroberts@swuhealth.org 435-986-2562 (Office) 435-632-1201 (cell)	Gary House, Deputy Director ghouse@swuhealth.org 435-986-2562 801-791-0289 (cell) DEQ District Engineer Paul Wright pwright@utah.gov 435-986-2590
Summit County Health Department 650 Round Valley Drive Park City, UT 84060 From DEQ: 51 min./48 miles	Richard Bullough rbullough@summitcounty.org 435-333-1582 (office) 435-714-9826 (cell)	Phil Bondurant pbondurant@summitcounty.org 435-333-1584 (office) 435-659-1878 (cell)	
Tooele County Health Department 151 North Main Street Tooele, UT 84074 From DEQ: 34 min./31 miles	Jeff Coombs jcoombs@tooelehealth.org 435-277-2461 (office) 435-830-2014 (cell)	Bryan Slade bslade@tooelehealth.org 435-277-2450 (office) 435-830-2349 (cell)	
Tri-County Health Department 133 South 500 East	Jordan Mathis jmathis@tricountyhealth.com	Darrin Brown dbrown@tricountyhealth.com	DEQ District Engineer Nathan Hall

Official Name and Distance from DEQ	Health Officer	Environmental Director	Other Key Contacts
Vernal, UT 84078 From DEQ 3 hours/176 miles Counties: Duchesne, Daggett, and Uintah	435-247-1172 (office) 435-650-7222 (cell)	435-247-1160 (office) 435-790-5375 (cell)	<i>nhall@utah.gov</i> 435-247-1167 (office) 435-630-3852 (cell)
Utah County Health Department 151 S. University Ave. Provo, UT 84601 From DEQ: 52 min. 47.5 miles	Ralph Clegg <i>ralph@utahcounty.gov</i> v 801-851-7016	Bryce Larsen <i>brycel@utahcounty.gov</i> 801-851-7519 (office) 801-558-8442 (cell)	
Wasatch County Health Department 55 South 5th East Heber, UT 84032 From DEQ: 53 min/49 miles	Randall Probst <i>rprobst@co.wasatch. ut.us</i> 435-657-3263	Dwight Hill <i>Dhill@co.wasatch.ut.us</i> 435-657-3261 (office) 435-671-3124 (cell)	
Weber-Morgan Health Department 477 23 rd Street Ogden, UT 84401 From DEQ: 43 min./38 miles	Brian Bennion <i>bbennion@co.weber .ut.us</i> 801-399-7101 801-710-0198 (cell)	Michela Harris <i>mharris@co.weber.ut.us</i> 801-399-7103 (office) 801-866-5277 (cell)	

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