

Public Water Sources and Hydraulic Fracturing

A State Drinking Water Perspective

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USDW and TDS Standards

- Underground Source of Drinking Water
 - Supplies a public water system or contains sufficient quantity (1 gpm)
 - TDS <10,000 mg/L
 - Not an exempted aquifer
 - Used by Utah DEQ and Oil, Gas & Mining
- Utah drinking water primary standard
 - 2000 mg/L
 - If >1000 mg/L water supplier must demonstrate that no better water is available



Underground Injection Control in Utah

- Division of Water Quality, DEQ
 - Regulates injection wells except Class II
 - Does not normally deal with hydraulic fracturing
- Division of Oil, Gas and Mining, DNR
 - Regulates Class II wells

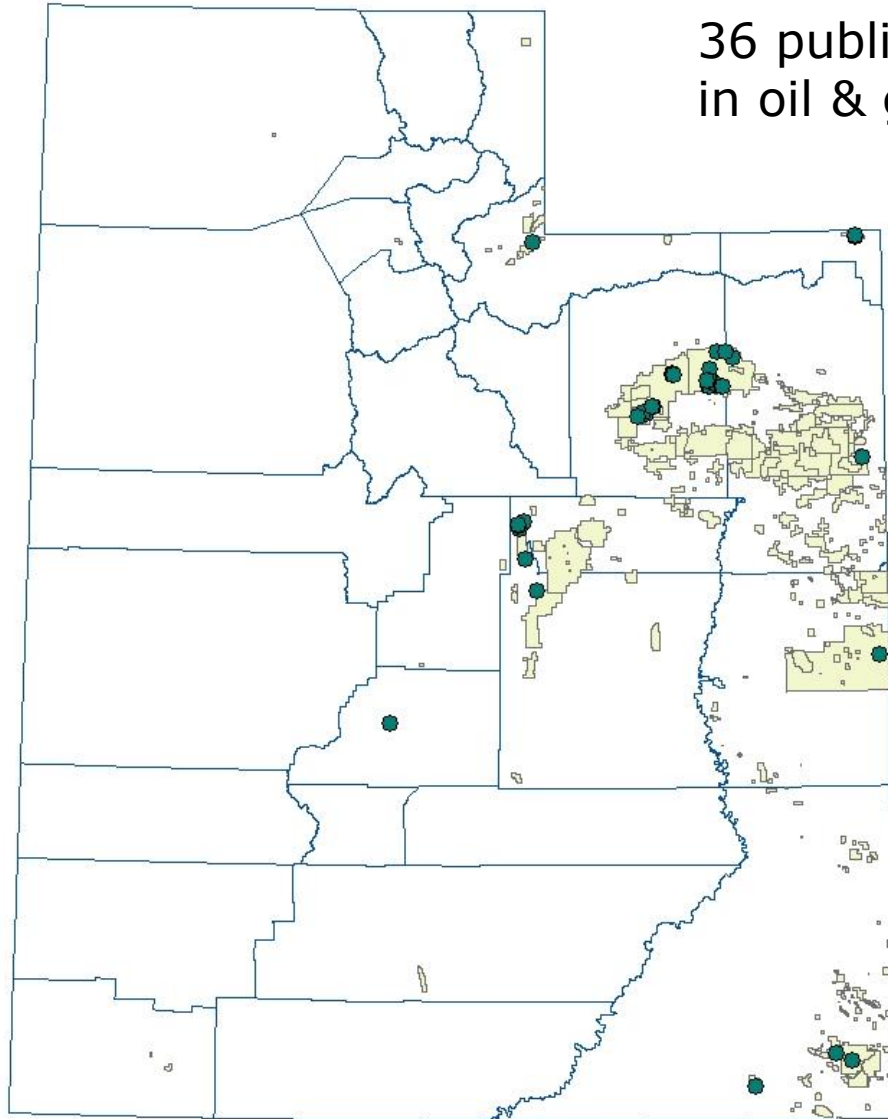


Construction of Drinking Water Wells

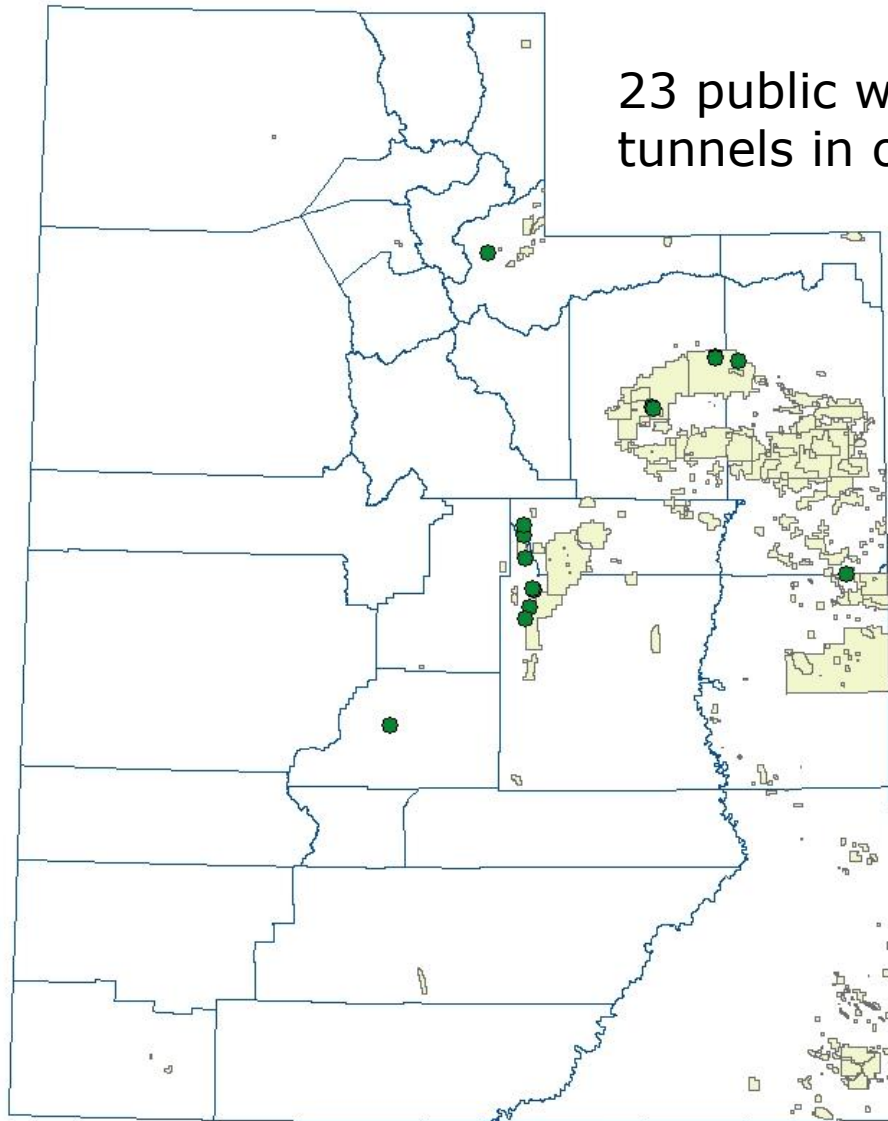
- ❑ Must be grouted to at least 100 feet below ground surface.
- ❑ Protected aquifer
 - Clay layer at least 30 feet thick above aquifer.
 - Clay layer must extend throughout zone 2.
 - Grouted from the ground surface down to at least 100 feet, and least 30 feet through the protective clay layer.
- ❑ Most public water wells in Utah ~100s – 1,500 feet TD.



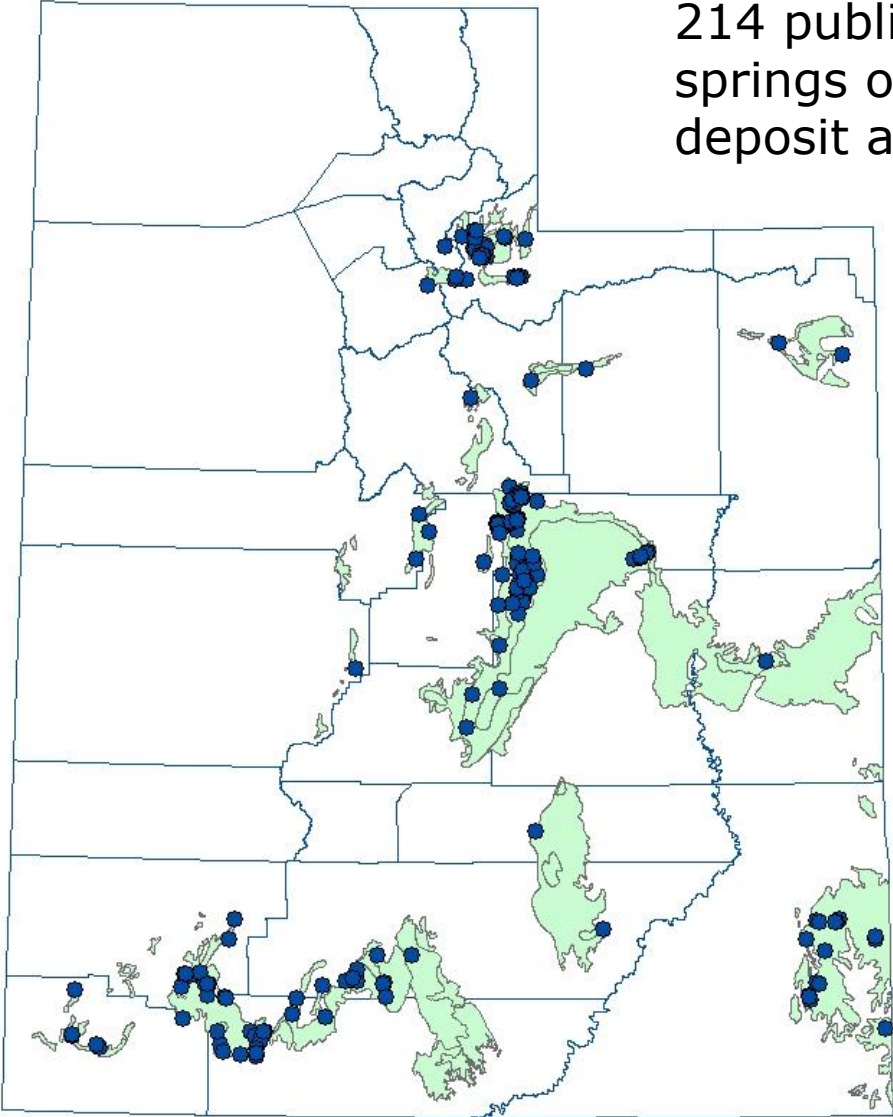
36 public water wells in oil & gas fields



23 public water springs and tunnels in oil & gas fields



214 public water wells,
springs or tunnels in coal
deposit areas



Utah Drinking Water Source Protection Program

- ❑ 1996 Amendments to SDWA
- ❑ Applies to all public drinking water sources:
 - Drinking Water Source Protection Program
 - ❑ Community and non-transient non-community systems, and transient systems with new sources
 - Source Water Assessments
 - ❑ Transient non-community systems with existing water sources



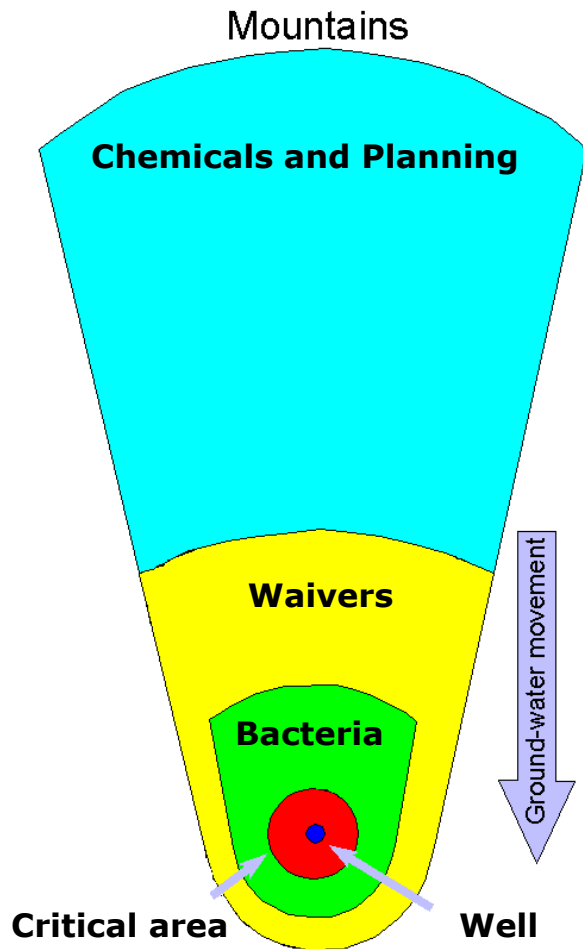
Drinking Water Source Protection Plans

Three principal steps:

- ❑ Delineate protection zones
 - ❑ Inventory potential contamination sources
 - ❑ Management programs for existing and future PCSs
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- ❑ Program must be feasible for very small water systems



Ground-Water Protection Zones



- ❑ Zone 1 – 100-foot radius
- ❑ Zone 2 – 250-day ground-water time of travel (TOT), boundary of aquifer, or ground-water divide
- ❑ Zone 3 – 3-year TOT...
- ❑ Zone 4 – 15-year TOT...

Delineation Report

- Geologic Data
- Well Construction Data
- Aquifer Data
- Hydrogeologic Methods and Calculations
- Map Showing Boundaries of DWSP Zones
- Protected Aquifer Conditions



Delineation Report

□ Geologic Data

- Geologic features and aquifer characteristics
- Stratigraphy, lithology, confining units.
- Fractures, solution cavities, and faults.

□ Well Construction Data

- Well driller's log
- Borehole, casing, TD
- Screened or perforated intervals
- Pump and maximum projected pumping rate



Delineation Report

□ Aquifer Data

- Hydraulic conductivity from a constant-rate aquifer test.
- Hydraulic gradient, direction of GW flow, effective porosity, saturated thickness.

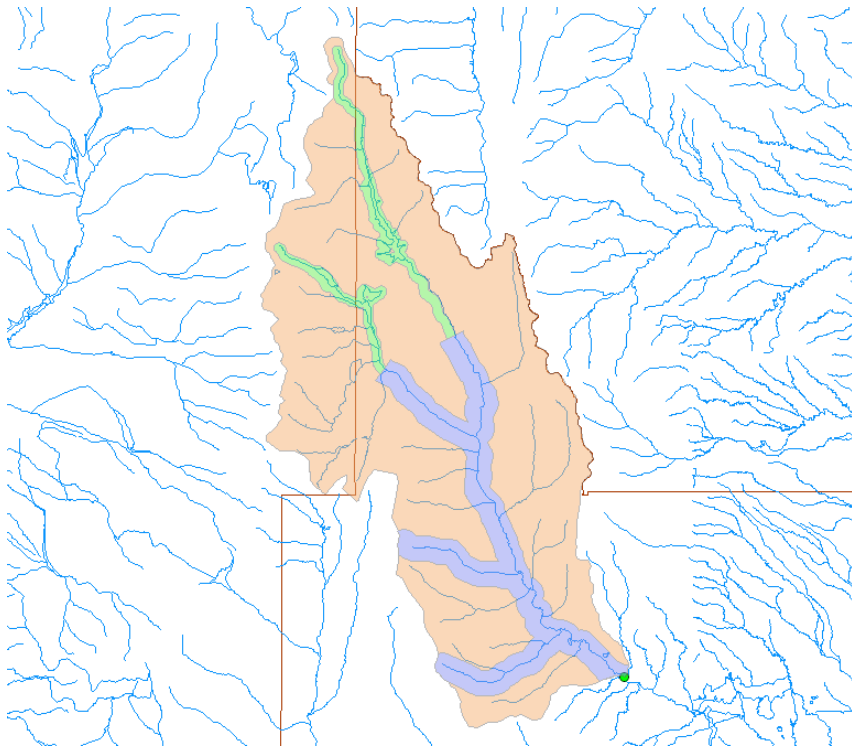
□ Hydrogeologic Method

- Must be reasonably applicable for the aquifer setting.

□ Map showing boundaries of delineated zones.



Surface Water Zones



- ❑ **Zone 1** – ½ mile from high water mark, and 15 miles upstream, to watershed boundary or state line
- ❑ **Zone 2** – 1000 feet from HWM, and additional 50 miles
- ❑ **Zone 3** – 500 feet from HWM, and to watershed boundary or state line
- ❑ **Zone 4** – remainder of watershed

Inventory of Potential Contamination Sources

- ❑ Any facility or site which employs an activity or procedure which may potentially contaminate ground water or surface water. A pollution source is also a potential contamination source.
- ❑ Prioritize list.
- ❑ Assess hazards at each PCS.



Land Management Strategies

- ❑ Public water system must plan land management strategies to control PCSs.
- ❑ May be regulatory or non-regulatory.
- ❑ In Utah, cities and towns have extraterritorial jurisdiction to protect their water sources.
- ❑ State Drinking Water does not have land-use authority.



Public Water System Involvement

- ❑ Source Protection Plan is developed and implemented by the PWS, using requirements from the State.
- ❑ PWS is involved with the PCS.
- ❑ May require assistance from DEQ and Division of Oil, Gas & Mining.
- ❑ BLM drilling permits.
- ❑ Forest Service watershed management plans.



Drinking Water Sources and Hydraulic Fracturing

- ❑ Multiple possibilities for hydraulic fracturing to be a PCS.
- ❑ Hazards would be managed by the public water system and the PCS owner.
- ❑ With assistance and guidance from State and Federal agencies.



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The statements made during the workshop do not represent the views or opinions of EPA. The claims made by participants have not been verified or endorsed by EPA.

The Utah Drinking Water Source Protection program is designed to help the public water suppliers to protect their wells, springs, and intakes. Source protection zones in Utah are delineated based on groundwater travel time or hydrogeologic boundaries. This delineation method requires site-specific hydrogeologic and source construction information. About 58 public wells, springs and tunnels are located in oil and gas fields, but over 200 public water sources are located in coal deposit areas. Land management strategies within the protection zones are developed and implemented by the public water systems, and the public water systems would be involved in potential hydraulic fracturing projects that may impact their water sources.