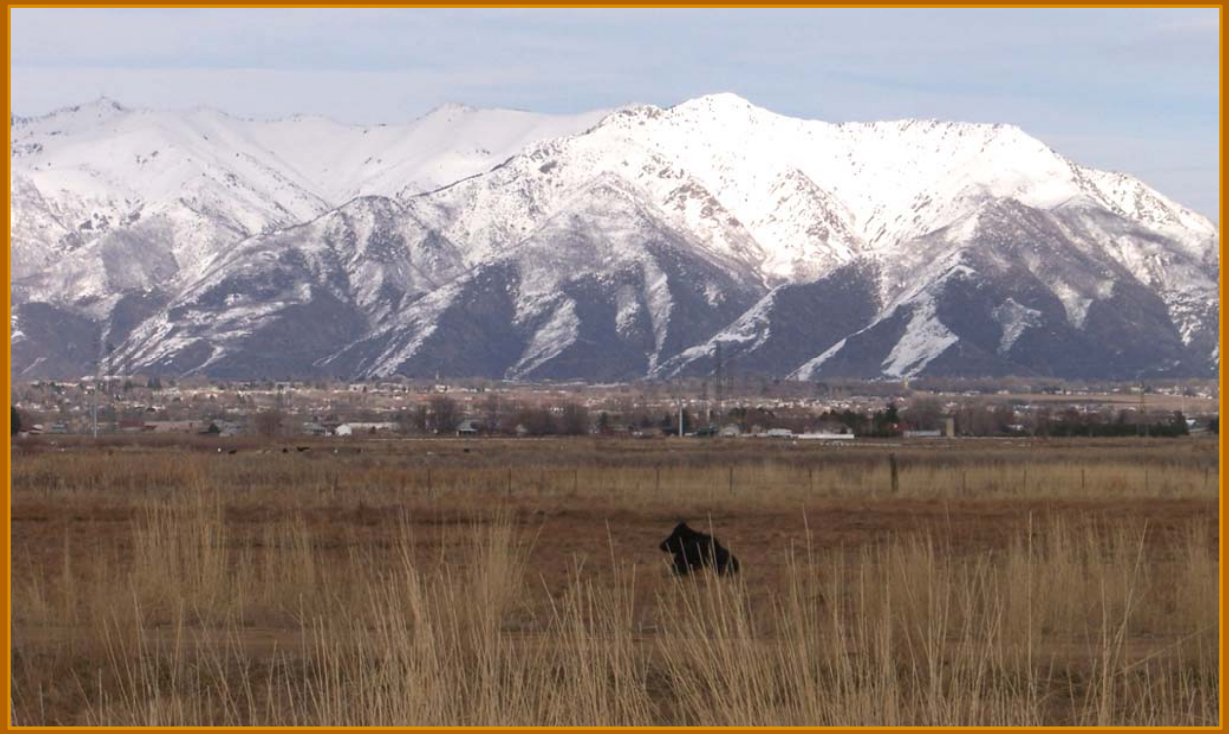
GROUNDWATER QUALITY CLASSIFICATION FOR THE BASIN-FILL AQUIFER, EAST SHORE AREA, DAVIS COUNTY, UTAH



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OUTLINE

- Background
  - Who started it?
  - Define “groundwater classification”
  - Explain the purpose
  - Davis County hydrogeology
- Methods
  - Data Collection and Compilation
    - Potential contaminants
    - Groundwater quality
- Results
  - Maps!
- Summary

GROUNDWATER QUALITY CLASSIFICATION PROGRAM

- Administrative Rules for Groundwater Quality Protection R317-6-5
- Utah Division of Water Quality (DEQ) program
- Local government, water conservancy district
- Classification petition performed under the direction of the Utah Geological Survey
- Petition submitted to Utah Water Quality Board

WHAT DOES CLASSIFICATION ENTAIL?

- A description of groundwater based on total dissolved solids and contaminant concentrations
- Potential contamination sources
- Ground-water flow direction
- Current beneficial uses of the groundwater
- Location of water wells

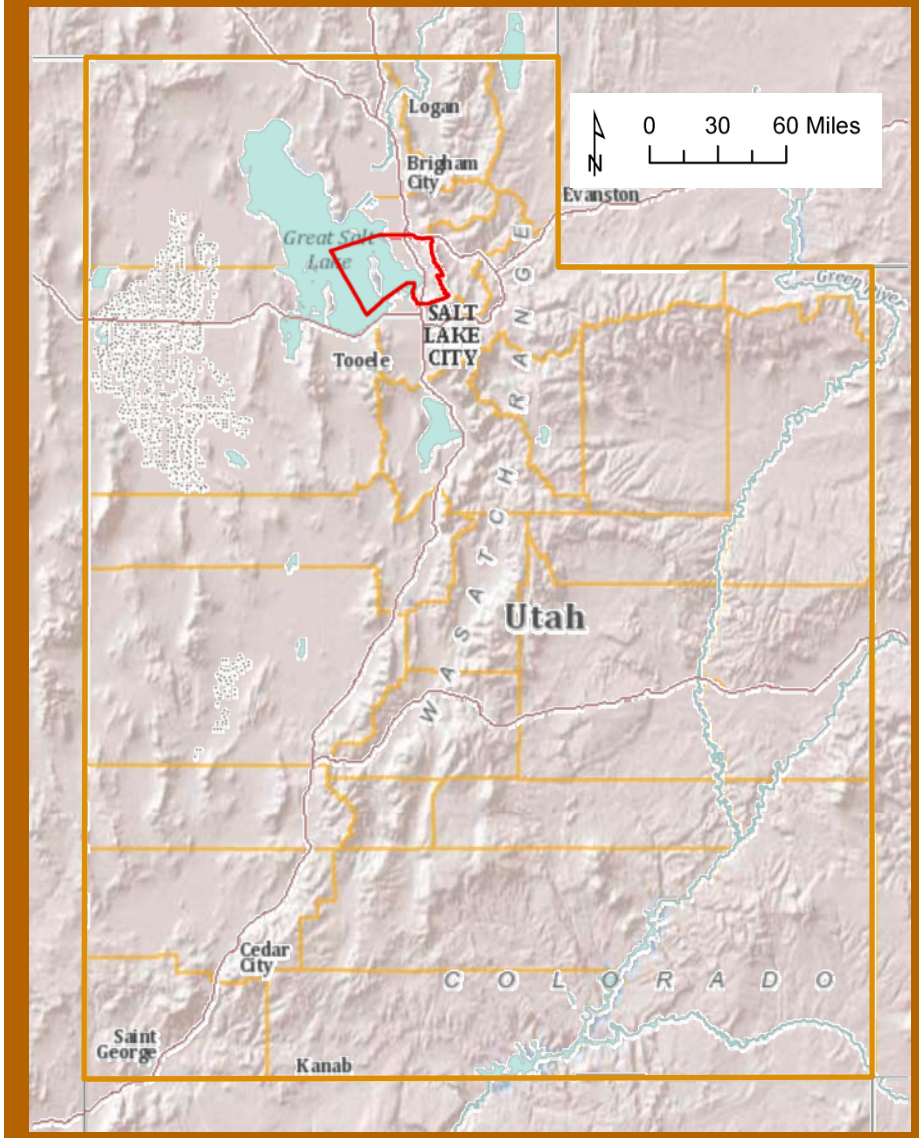
GROUNDWATER QUALITY CLASSES

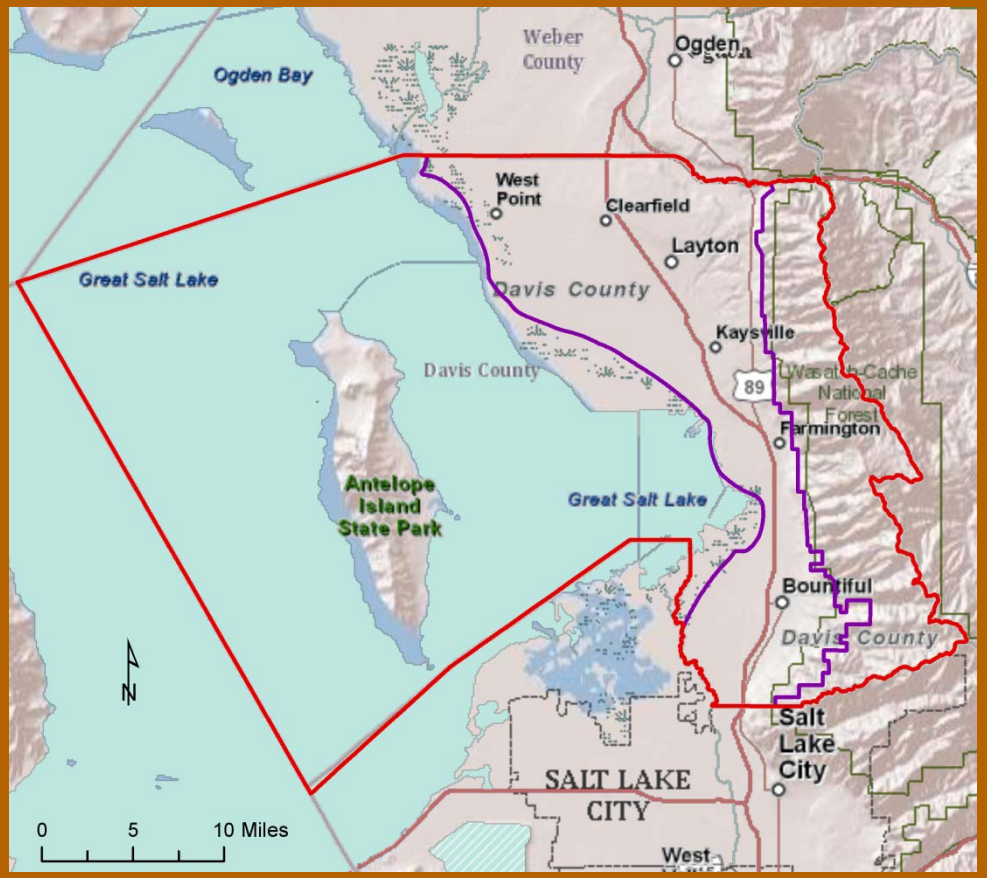
Groundwater Class	Total Dissolved Solids (mg/L)	Beneficial Use
CLASS IA/IB	0 - 500	PRISTINE/ IRREPLACABLE
CLASS II	500 - 3,000	DRINKING WATER
CLASS III	3,000 - 10,000	LIMITED USE
CLASS IV	>10,000	SALINE

WHY CLASSIFY?

- Formally determine the beneficial use
- Acknowledge the resource's value
- Basis for enacting and defending new regulations
- Benchmark for discussion
- Defendable mechanism to take protective action

DAVIS COUNTY



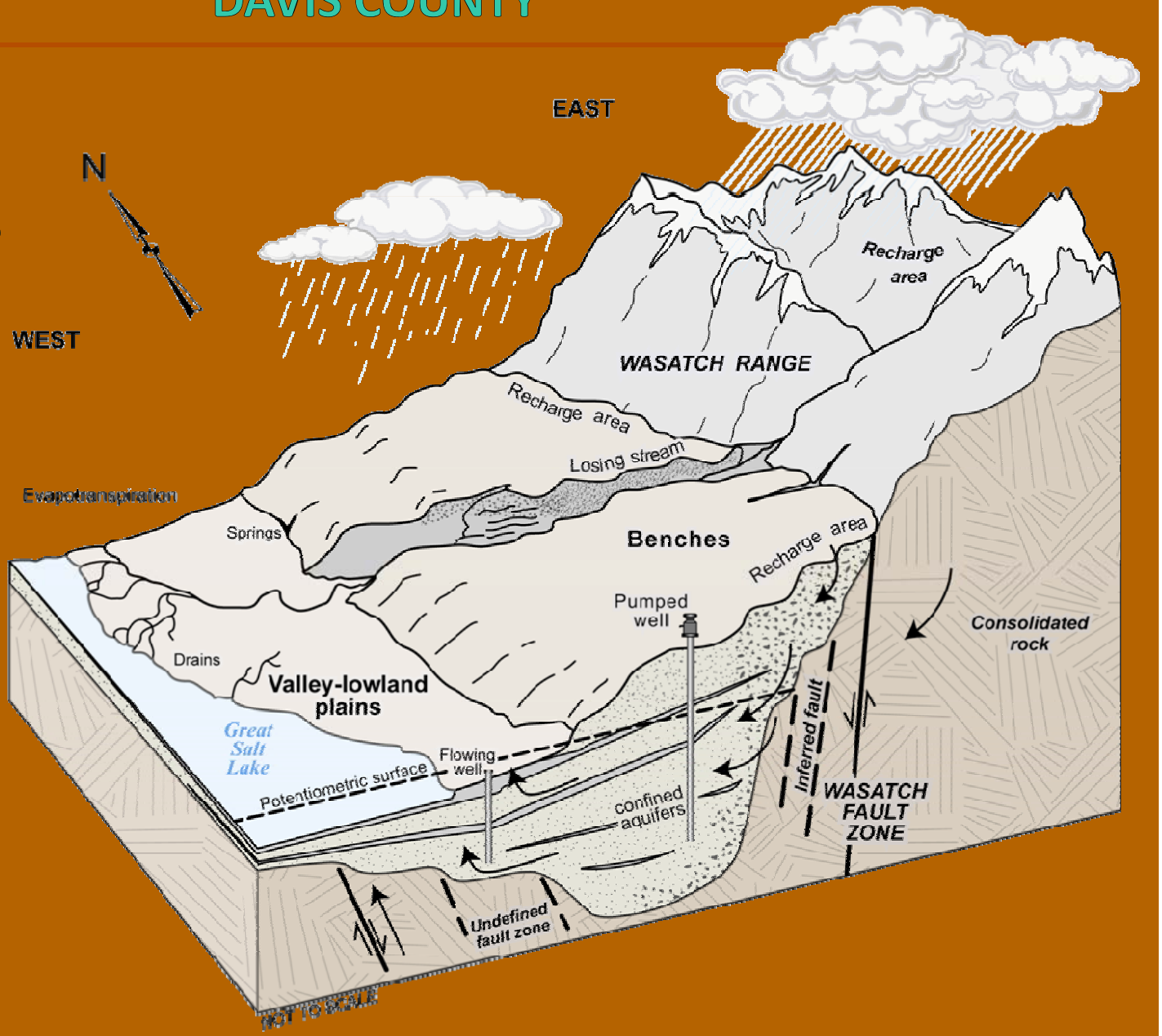


Background – Davis County Hydrogeology

DAVIS COUNTY

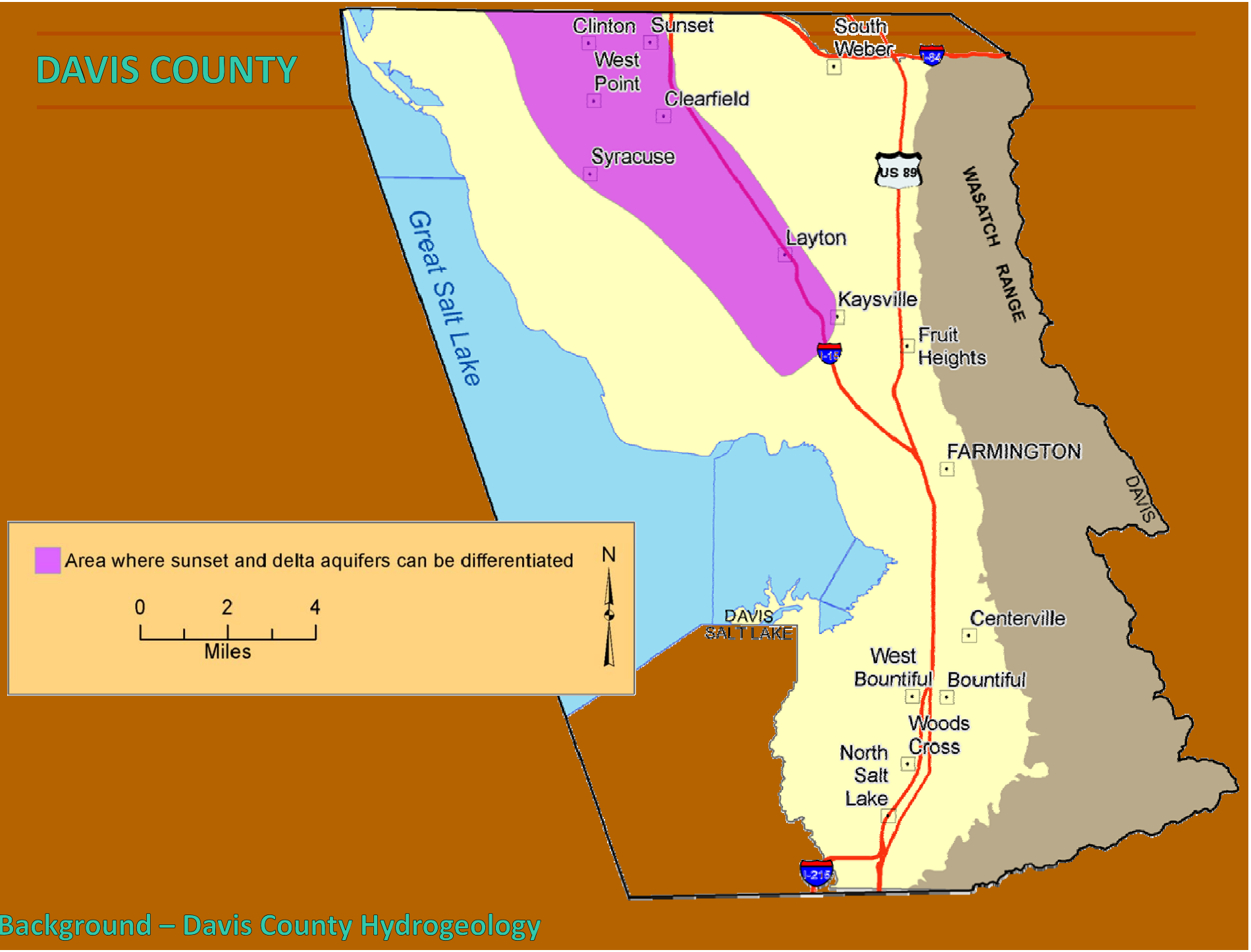
Basin-fill aquifer

Sunset and Delta aquifers



Background – Davis County Hydrogeology

DAVIS COUNTY



Background – Davis County Hydrogeology

POTENTIAL CONTAMINANTS

- Looking for <u>POTENTIAL</u> sources of aquifer contamination
  - examples: gas station, dry cleaners, feed lot, refineries

- Windshield survey –
  - driving around in circles
  - noting location and describing

- Data compilation –
  - Underground storage tanks from U.S. EPA
  - Toxic release inventory and Tier II from Department of Environmental Quality
  - Cemeteries, parks, mines, and health care facilities from AGRC
  - Examination of high resolution air photos

GROUND-WATER QUALITY SAMPLING

- Sampled for:
  - Dissolved metals - 20 wells
  - Nutrients (nitrate, phosphorous, ammonia) – 20 wells
  - Pesticides - 2 (of the 20) wells
  - Organics – 2 (of the 20) wells
  - Radionuclides – 2 (of the 20) wells

- Measured field parameters
  - pH
  - Conductivity
  - Dissolved oxygen
  - Temperature

GROUNDWATER QUALITY DATA COMPILATION

- Compiled data from:
  - UT Division of Drinking Water – 39 municipal wells
  - USGS – 64 samples

- We used the most recent samples and removed duplicates

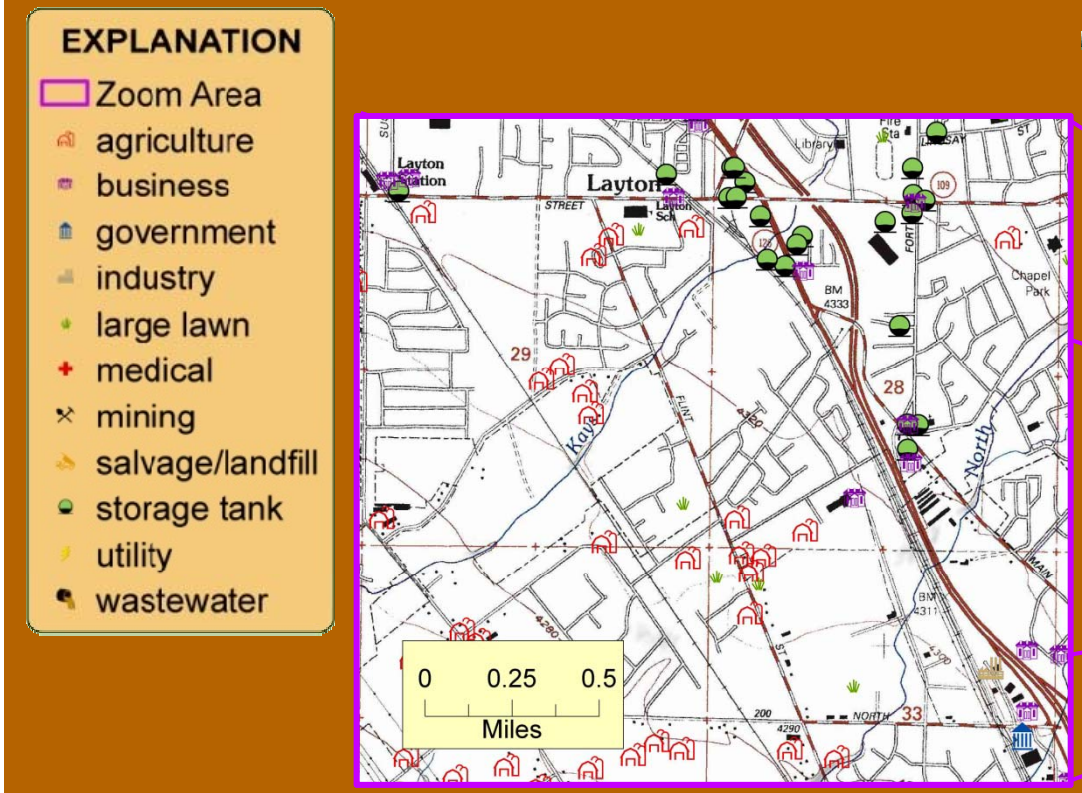
- When possible, we checked to ensure charge balance

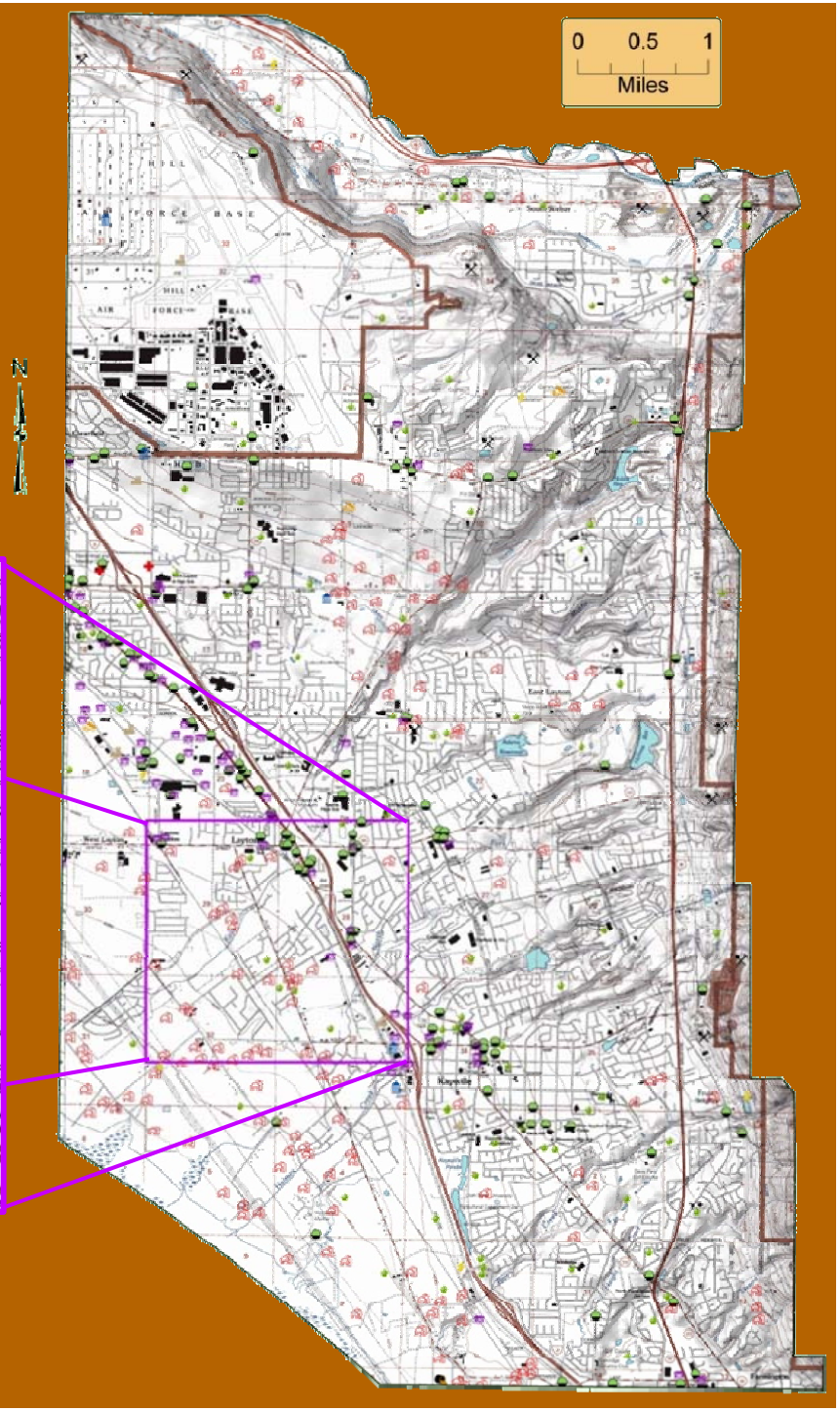
POTENTIAL CONTAMINANTS

- 1,798 potential contaminant sites
  - 997 from windshield survey
  - 801 from compiled sources
- Density of sites required three 1:24,000 scale maps
- 1 EPA Superfund site
- Also included 2,785 water wells (134 of which are public supply)
- Also included septic tanks (locations provided by Davis Co.)

POTENTIAL CONTAMINANTS

Northeast area

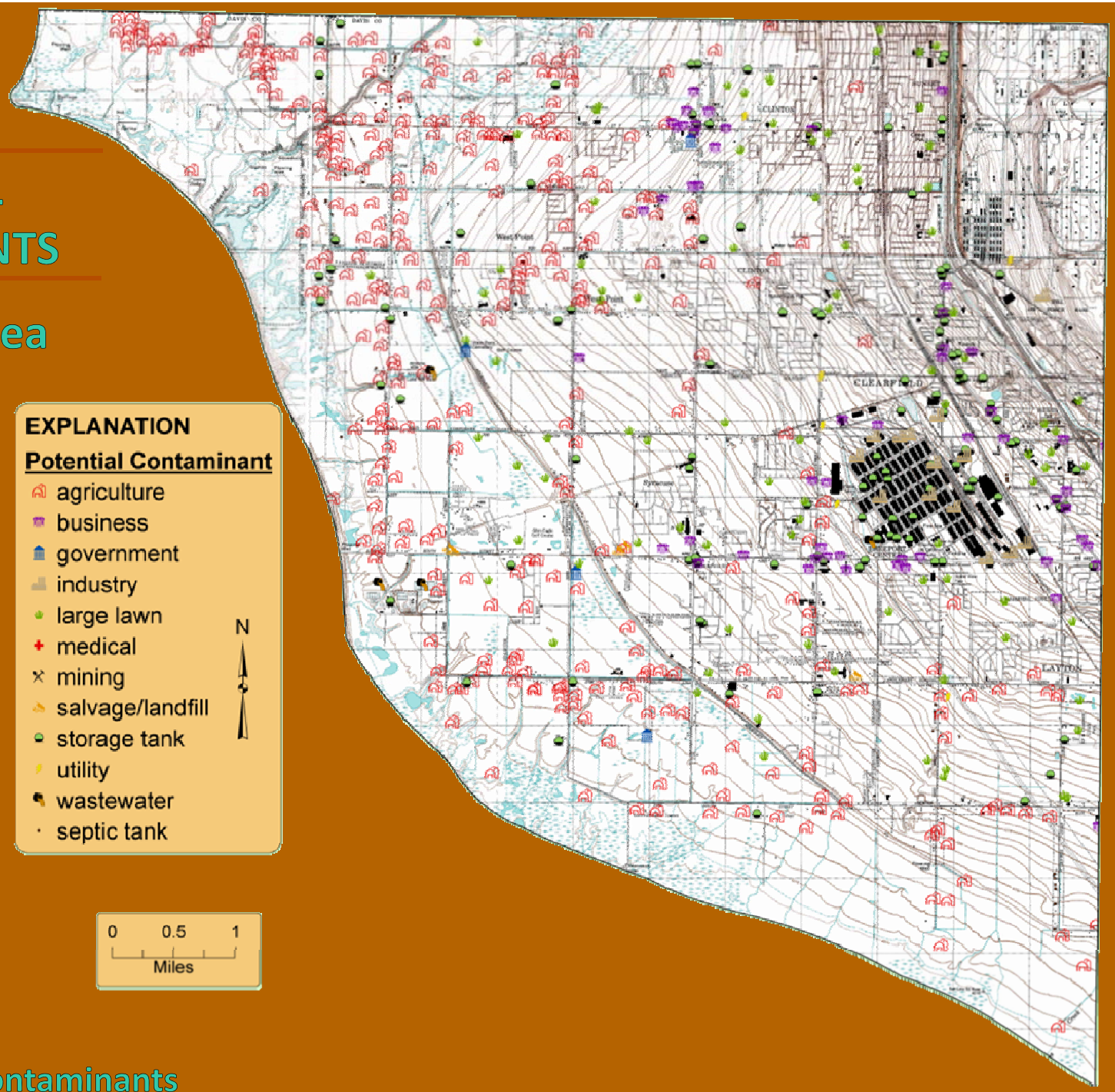




Results – Potential contaminants

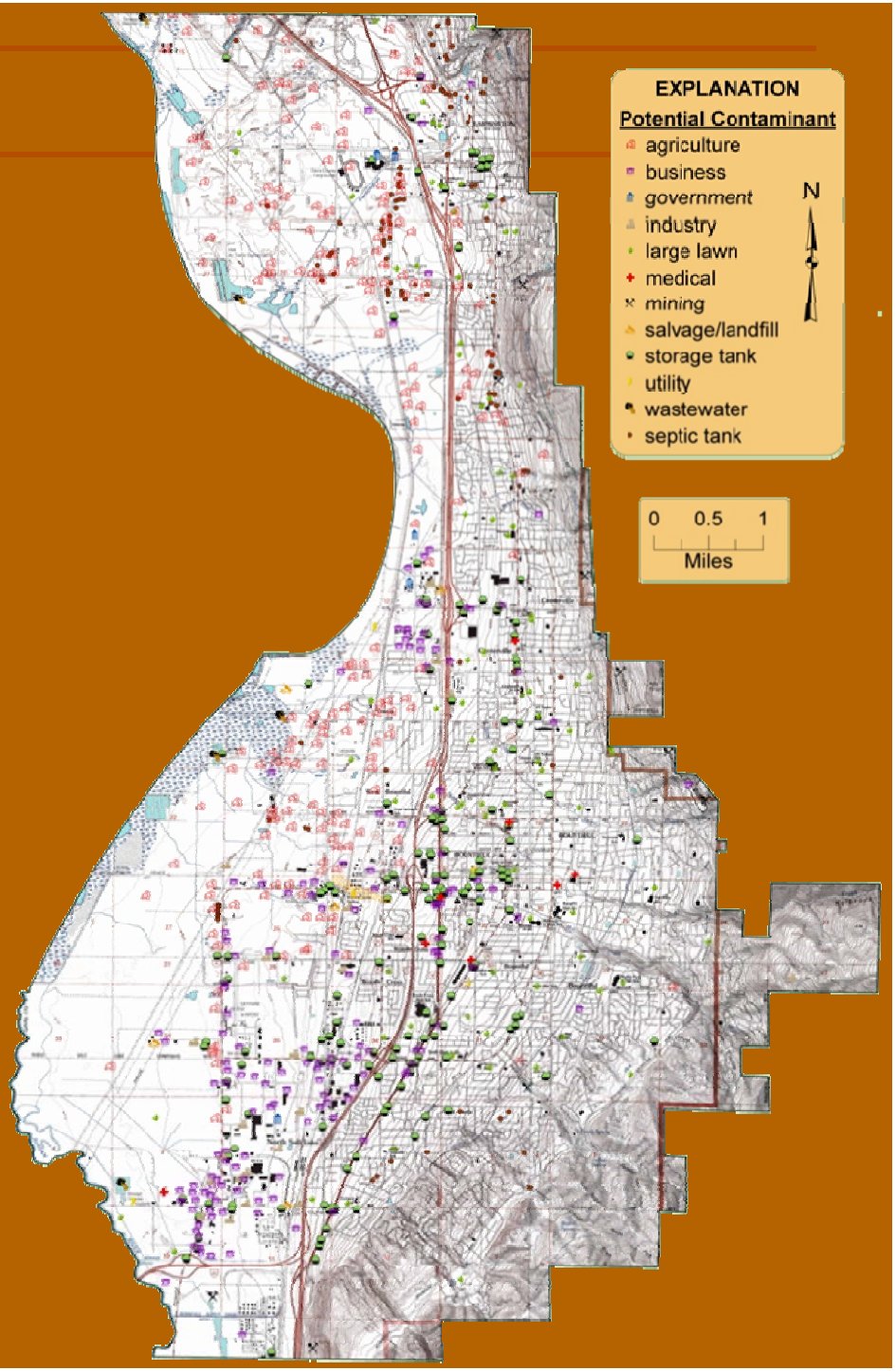
POTENTIAL CONTAMINANTS

Northwest area



Results – Potential contaminants

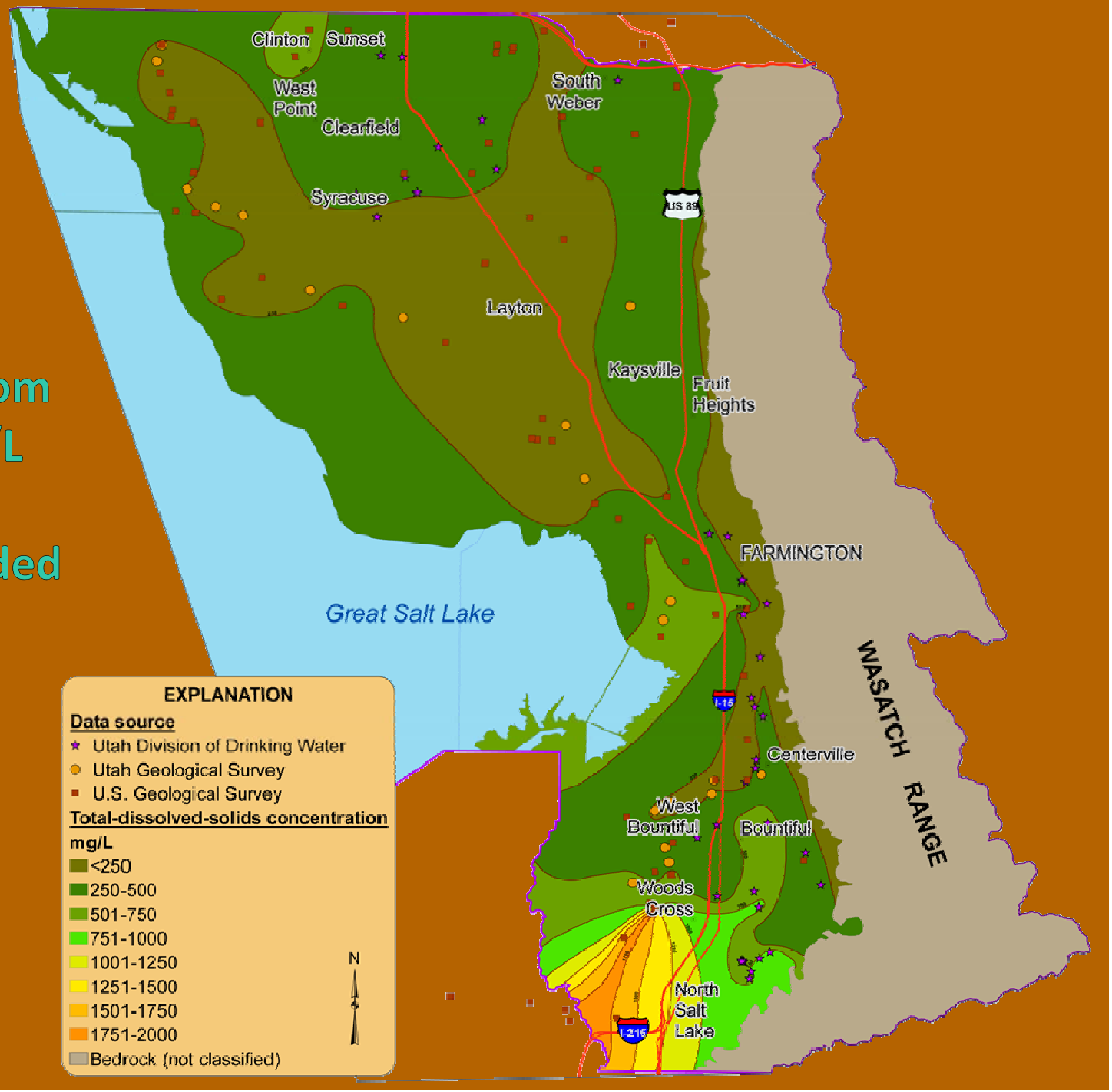
POTENTIAL CONTAMINANTS



South area

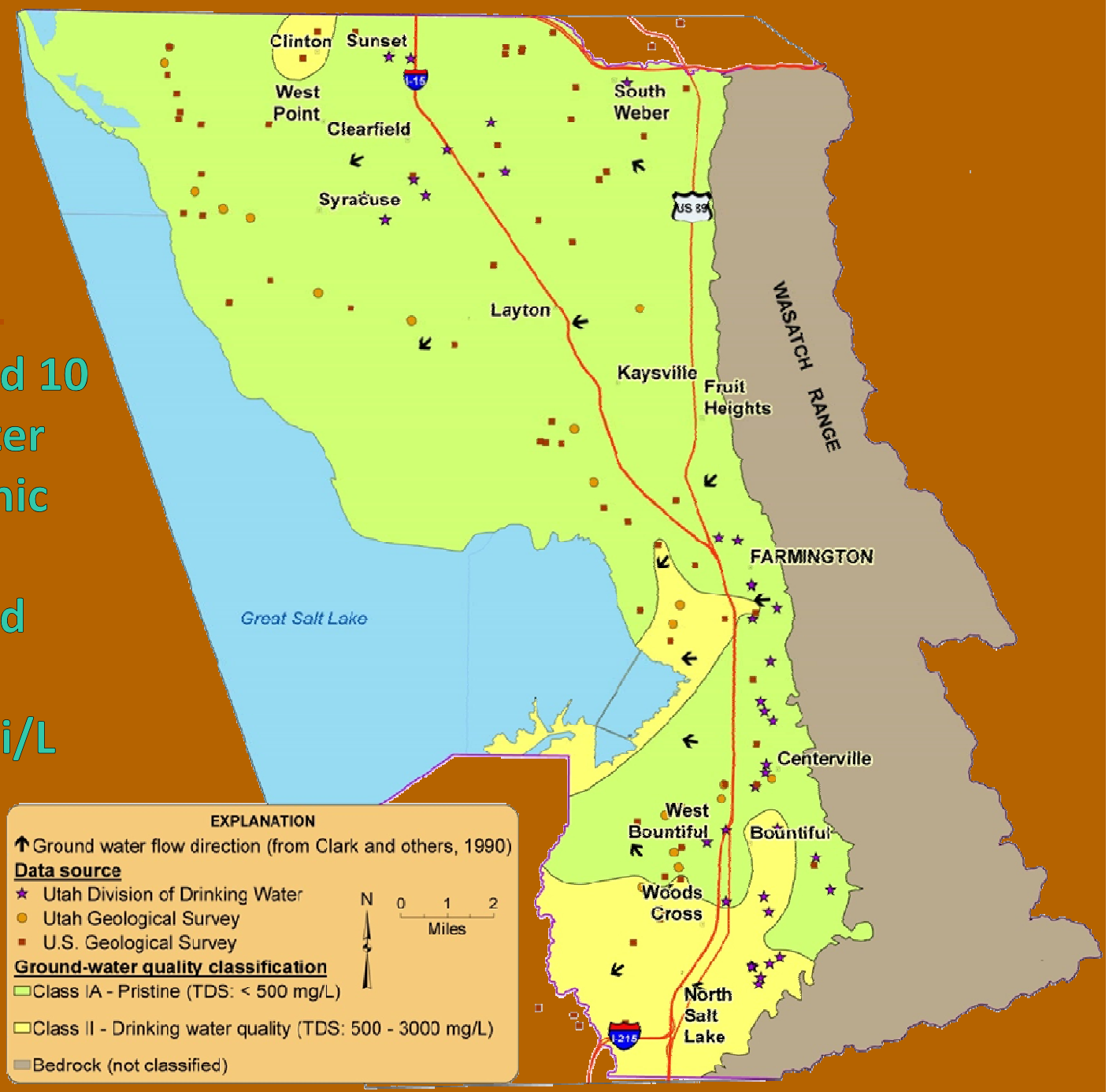
TOTAL DISSOLVED SOLIDS DISTRIBUTION MAP

- TDS ranges from 82 to 1,780 mg/L
- 3 wells exceeded 1,000 mg/L
- Mean TDS 369 mg/L



GROUND-WATER QUALITY CLASSIFICATION MAP

- 3 wells exceeded 10 µg/L drinking water standard for arsenic
- 3 wells exceeded the standard α – gross of 15 pCi/L



GROUND-WATER QUALITY CLASSIFICATION MAP

Results – Quality

QUESTIONS???

Utah Geological Survey Ground Water (and Paleontology) Program:
http://geology.utah.gov/utahgeo/water/index.htm

Division of Water Quality:
http://www.waterquality.utah.gov/GroundWater

Utah Administrative Rule:
http://www.rules.utah.gov/publicat/code/r317/r317.htm