Proposed Site-specific TDS Standard for Blue Creek, Box Elder County, UT

Utah Water Quality Standards Workgroup

October 21, 2013

Overview

1. site setting
2. methods
3. results
4. Antidegradation
5. Variances
6. Compliance Schedules

Comments due to EPA by December 3, 2013

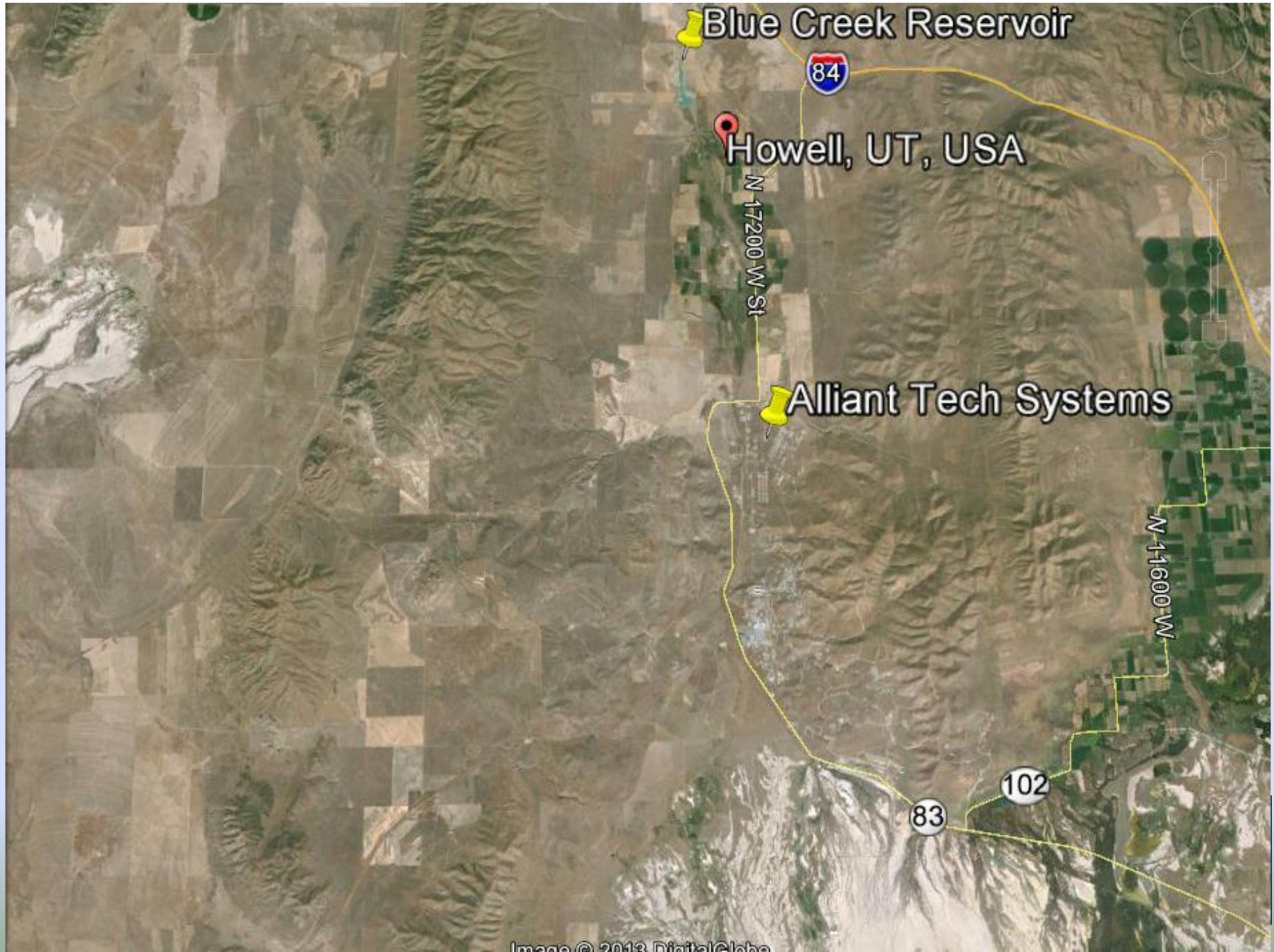

Blue Creek Reservoir
84
Howell, UT, USA
N 17200 W St
Alliant Tech Systems
N 11600 W
102
83
Image © 2013 DigitalGlobe

Figure 1
Agricultural Use in the Blue Creek Watershed, 2012

0 0.87 1.74 2.61
miles

Land Cover Categories
(by decreasing acreage)

AGRICULTURE*
- Grassland Herbaceous
- Fallow/Idle Cropland
- Winter Wheat
- Pasture/Hay
- Safflower
- Alfalfa
- Other Crops
- Barley
- Spring Wheat
- Triticale
- Corn
- Peaches
- Onions
- Oats
- Sod/Grass Seed
- Sweet Corn

NON-AGRICULTURE**
- Shrubland
- Developed/Open Space
- Developed/Low Intensity
- Herbaceous Wetlands
- Barren
- Open Water

Produced by CropScape - http://nassgeodata.gmu.edu/CropScape

* Only top 16 agriculture categories are listed ** Only top 6 non-agriculture categories are listed

Methods

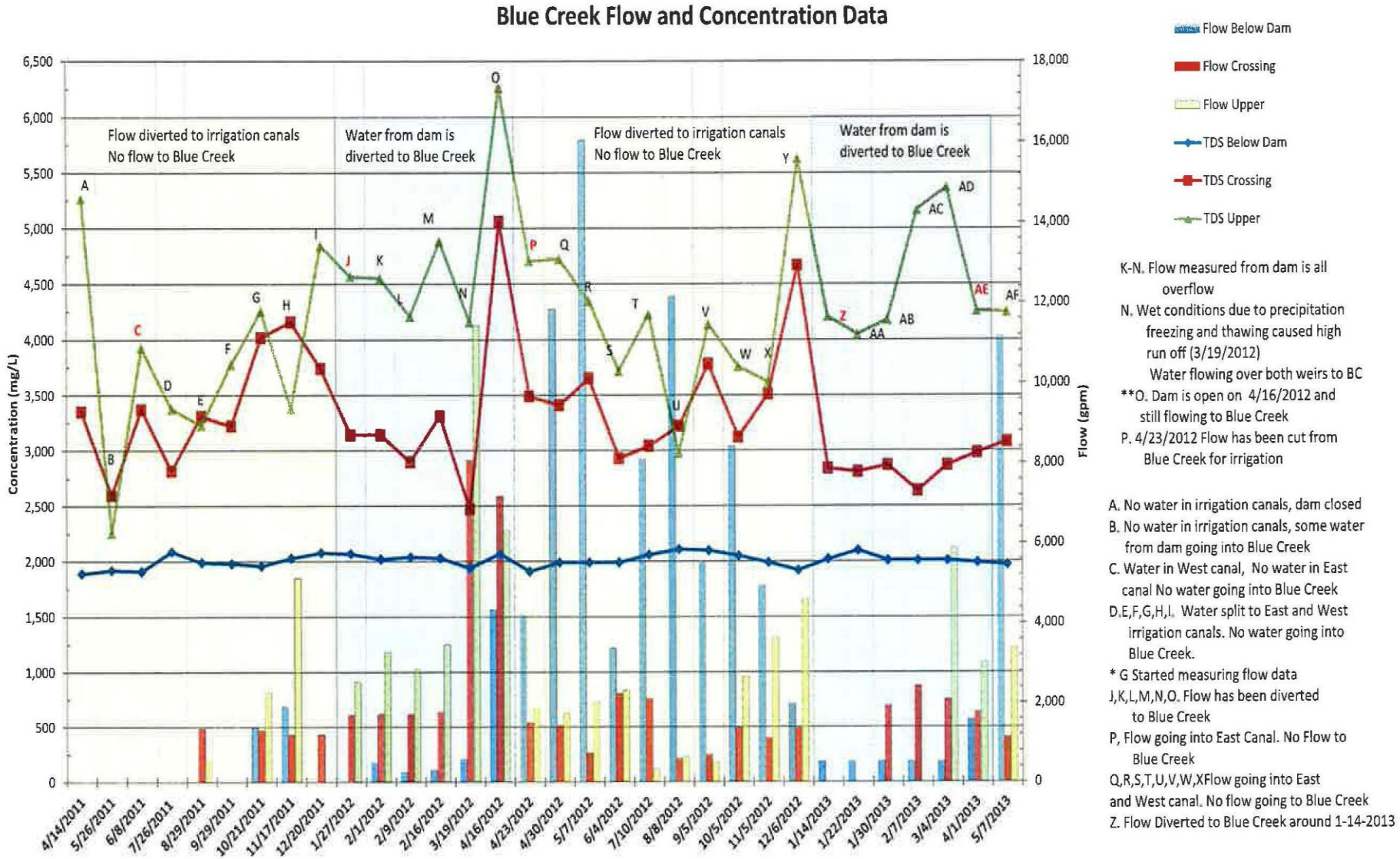
- Two year study
- Three sample sites (next slide)
- Samples collected monthly
- Irrigation status recorded
- Additional sampling event to characterize TDS concentration of visible inflows to creek


Blue Springs
Blue Creek Reservoir below the Dam
Blue Creek Crossing @ 14400 N
Blue Creek Upper
© 2009 Tele Atlas
Google
N
Pointer 41°46'42.95" N 112°26'18.72" W elev 4521 ft Streaming 100%
Eye alt 10.09 mi

Results

- TDS concentrations appx. 2,000 mg/l at Blue Springs
- TDS concentrations increase downstream
- Increases due to saline groundwater/springs
- TDS poorly correlated with irrigation status

Results



K-N. Flow measured from dam is all overflow

N. Wet conditions due to precipitation freezing and thawing caused high run off (3/19/2012)
Water flowing over both weirs to BC

**O. Dam is open on 4/16/2012 and still flowing to Blue Creek

P. 4/23/2012 Flow has been cut from Blue Creek for irrigation

A. No water in irrigation canals, dam closed

B. No water in irrigation canals, some water from dam going into Blue Creek

C. Water in West canal, No water in East canal No water going into Blue Creek

D,E,F,G,H,I. Water split to East and West irrigation canals. No water going into Blue Creek.

* G Started measuring flow data

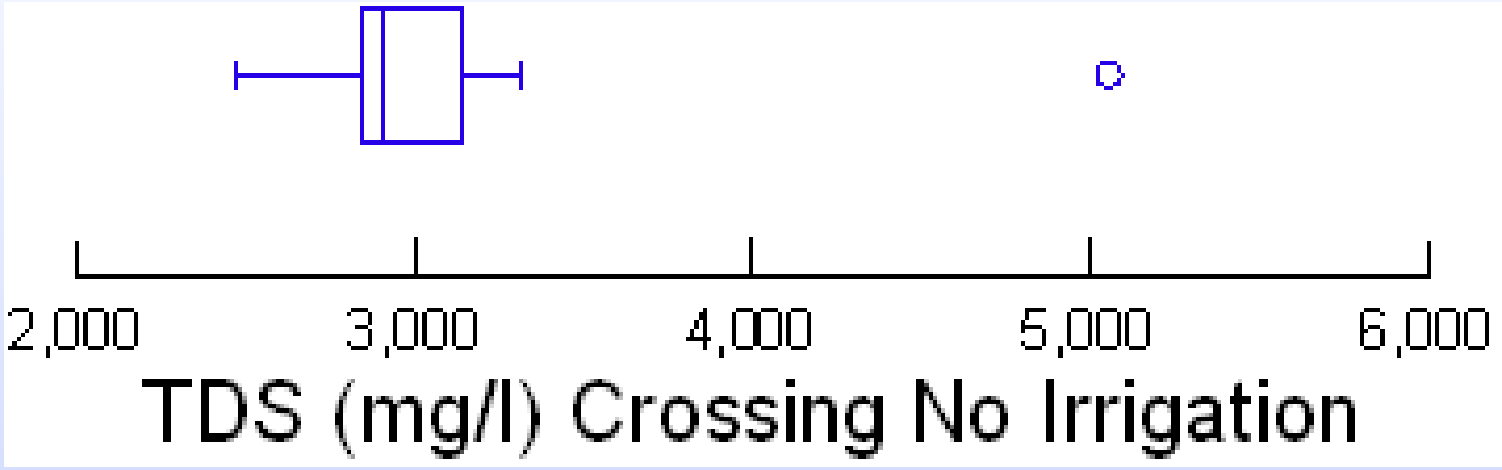
J,K,L,M,N,O. Flow has been diverted to Blue Creek

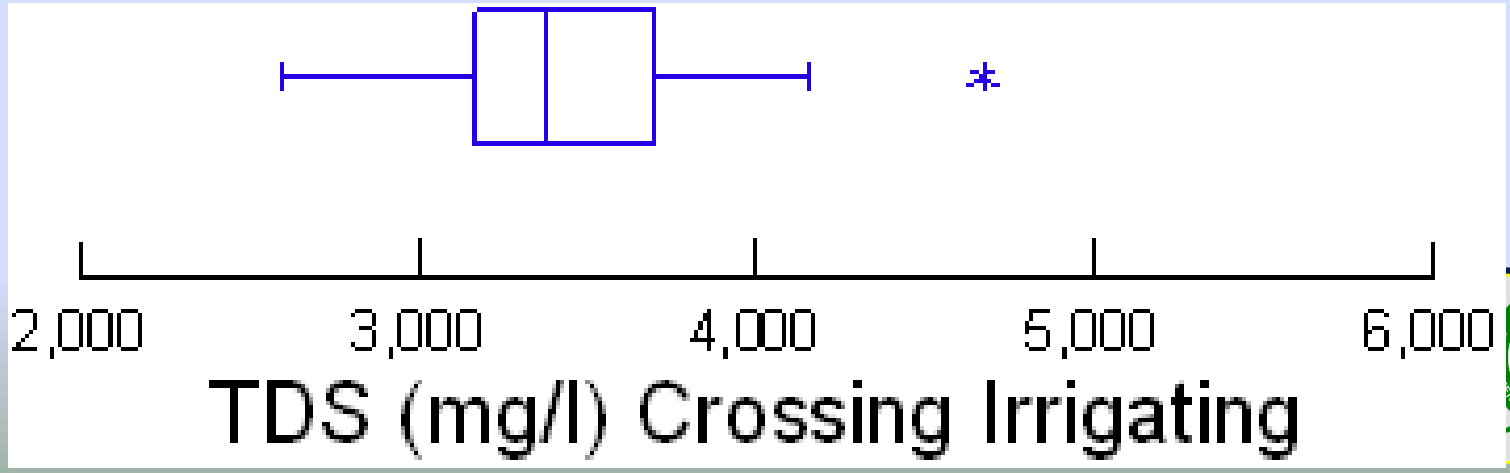
P, Flow going into East Canal. No Flow to Blue Creek

Q,R,S,T,U,V,W,XFlow going into East and West canal. No flow going to Blue Creek

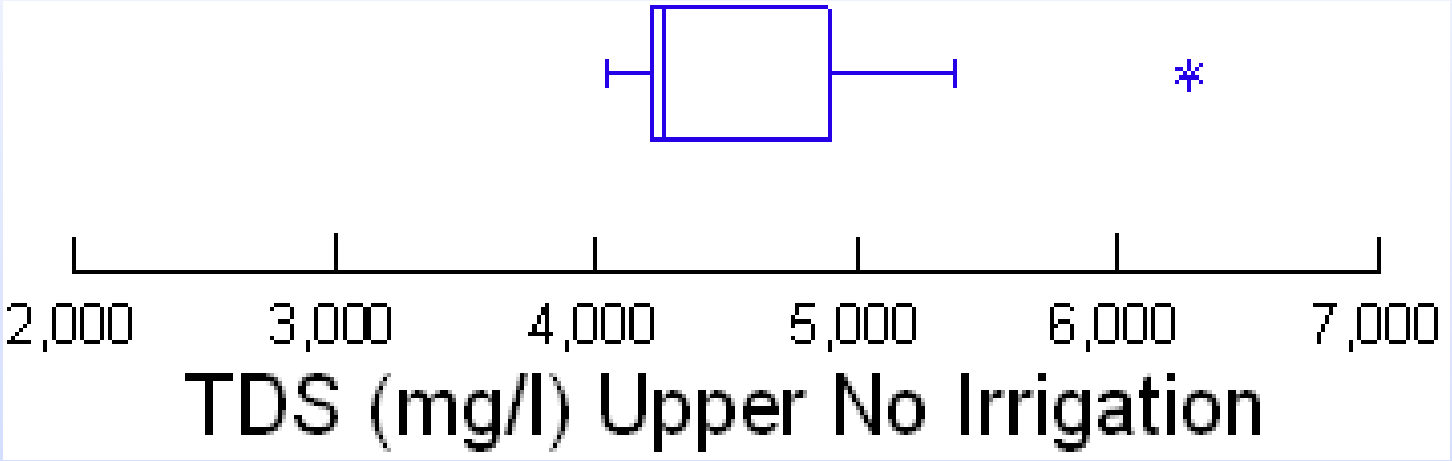
Z. Flow Diverted to Blue Creek around 1-14-2013

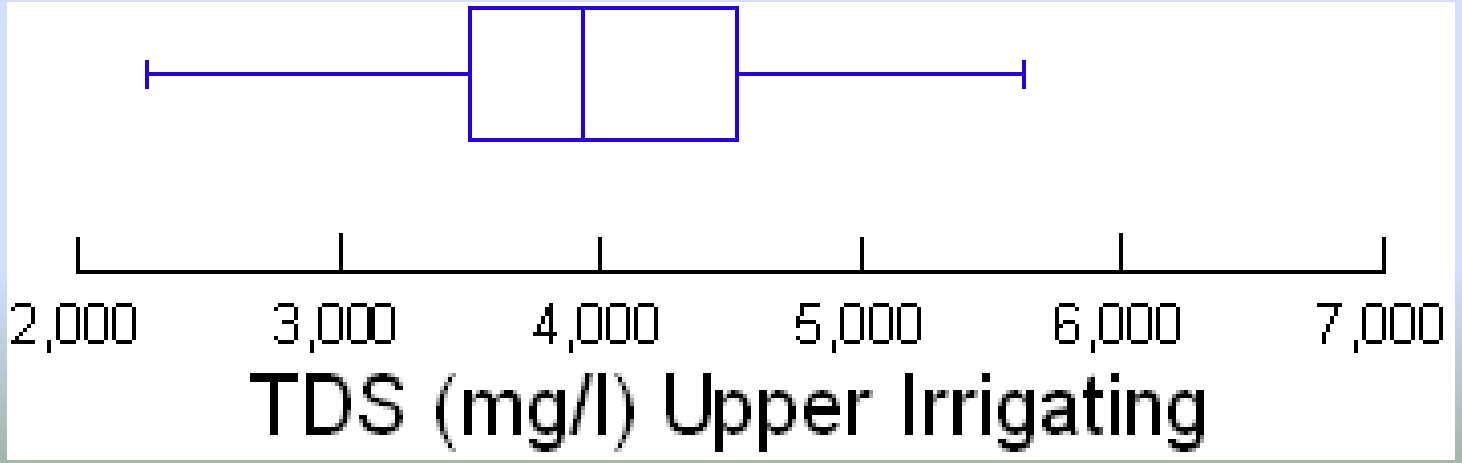
Results


2,000
3,000
4,000
5,000
6,000
TDS (mg/l) Crossing No Irrigation


2,000
3,000
4,000
5,000
6,000
TDS (mg/l) Crossing Irrigating

Results


2,000
3,000
4,000
5,000
6,000
7,000
TDS (mg/l) Upper No Irrigation

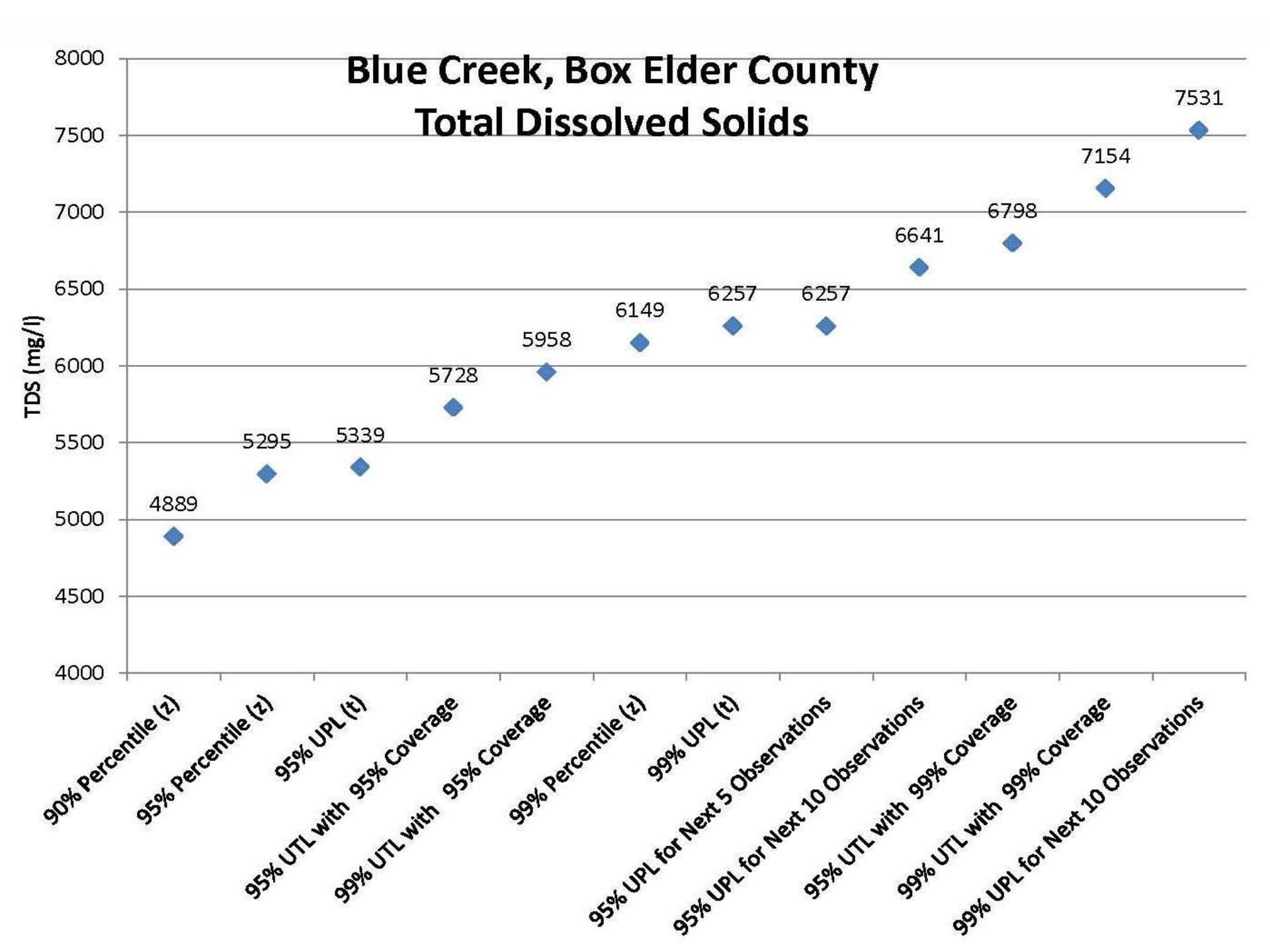

2,000
3,000
4,000
5,000
6,000
7,000
TDS (mg/l) Upper Irrigating

Results

- Two site-specific TDS criterion based on natural conditions recommended
  - Blue Creek Reservoir
  - Blue Creek

Results

- Blue Creek Reservoir: one statistical parameter, an upper bound, adequate to characterize natural conditions
- Blue Creek: two statistical parameters, and upper bound and average, recommended to characterize natural conditions


Blue Creek, Box Elder County
Total Dissolved Solids
TDS (mg/l)
8000
7500
7000
6500
6000
5500
5000
4500
4000
4889
5295
5339
5728
5958
6149
6257
6257
6641
6798
7154
7531
90% Percentile (z)
95% Percentile (z)
95% UPL (t)
95% UTL with 95% Coverage
99% UTL with 95% Coverage
99% Percentile (z)
99% UPL (t)
95% UPL for Next 5 Observations
95% UPL for Next 10 Observations
95% UTL with 99% Coverage
99% UTL with 99% Coverage
99% UPL for Next 10 Observations

Proposed Criteria

Proposed Site-specific Total Dissolved Criteria for Blue Creek Reservoir and Blue Creek (mg/l)		
Blue Creek Reservoir	Blue Creek	
Upper Bound	Upper Bound	Average
2,200	6,300	3,900


Questions,
Comments,
Suggestions,
Concerns