

# Quantifying Spatial Variability of Habitat Suitability Parameters in the Weber Watershed

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## Objectives

- Quantify spatial variability of habitat suitability
- Identify which stream orders have lowest and highest variability of stream temperature, dissolved oxygen and total dissolved solids
- Analyze data to identify potential correlations in relation to stream order and elevation
- Establish field locations and record initial measurements for ongoing studies

## Results

- DO: 5<sup>th</sup> and 2<sup>nd</sup> order streams have lowest and highest variability with a standard deviation of 0.61 mg/L and 1.9 mg/L, respectively (Figure 3)
- TDS: 5<sup>th</sup> and 4<sup>th</sup> order streams have lowest and highest variability with a standard deviation of 44.6  $\mu\text{s/cm}$  and 173.0  $\mu\text{s/cm}$ , respectively (Figure 4)
- Temperature: 1<sup>st</sup> and 5<sup>th</sup> order streams had lowest and highest variability with a standard deviation of 1.5 $^{\circ}\text{C}$  and 3.2  $^{\circ}\text{C}$ , respectively (Figure 5)

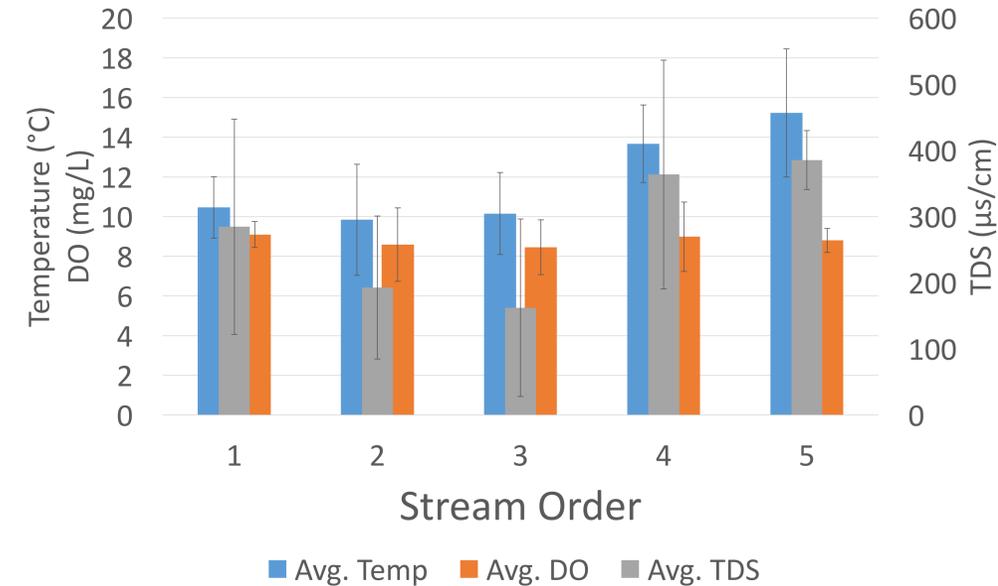


Figure 5: Temperature, DO and TDS compared to Stream Order with standard deviation

	Stream Order P value	Elevation P value
Temperature	<0.01	<0.01
DO	0.90	0.05
TDS	0.02	0.15

Table 1: ANOVA results for data grouped by stream order, geographic area and elevation. Green values are significant at 95% confidence level, red values are insignificant.

## Discussion

- Standard deviation of temperature, DO and TDS were 2.9  $^{\circ}\text{C}$ , 1.4 mg/L, and 156  $\mu\text{s/cm}$ , respectively in the Weber watershed
- Future applications of these data may include temporal variability and variation due to land use and geographic area
- ANOVA determined a significant difference in mean temperature and TDS by stream order, and temperature and DO by elevation



Figure 1: Measuring stream temperature, DO and TDS (left), and discharge (right)

## Methods

- Locate field sites using GIS and other spatial mapping tools
- Measure habitat quality parameters at 37 sites in May and June, 2017 at varying elevations within the watershed
  - Stream Temperature ( $^{\circ}\text{C}$ )
  - Dissolved Oxygen (DO) (mg/L)
  - Total Dissolved Solids (TDS) ( $\mu\text{s/cm}$ )
- Record geomorphic conditions
- Determine substrate composition with pebble count
- Analyze data in relation to stream order and elevation
- Run analysis of variance (ANOVA) on data grouped by stream order, geographic area and elevation (Table 1)

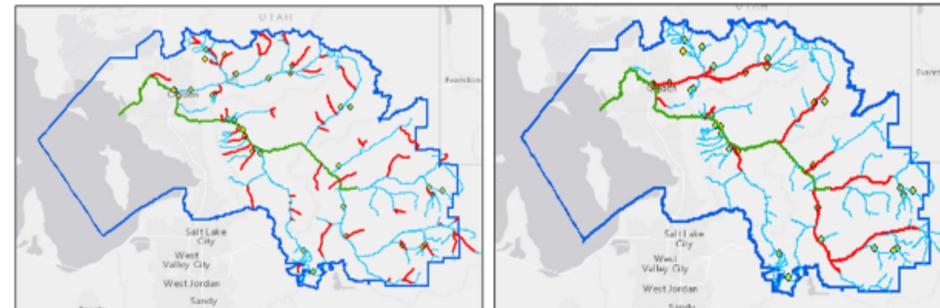


Figure 2: DO variability by Stream Order

Figure 3: TDS variability by Stream Order

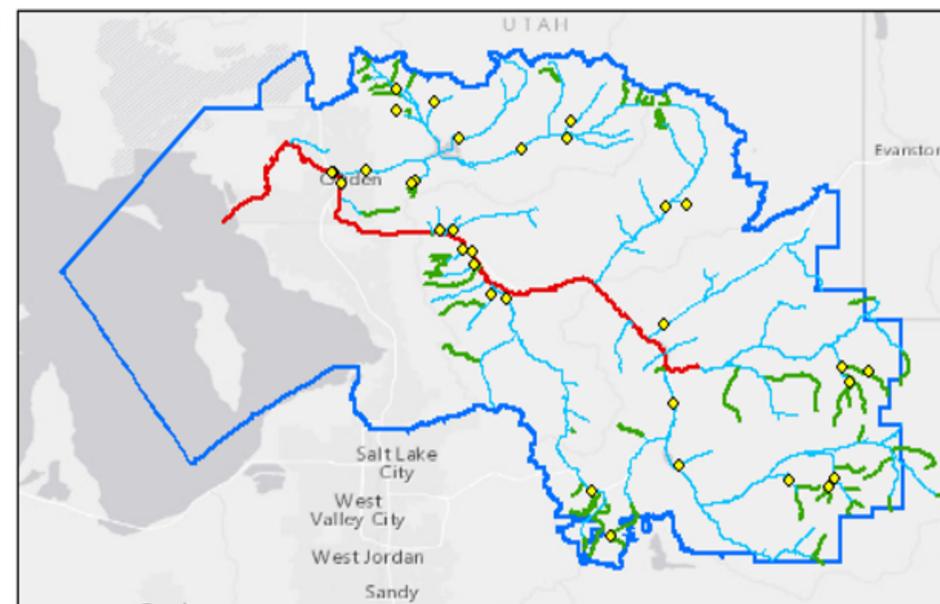
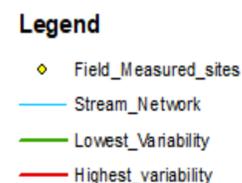


Figure 4: Temperature variability by Stream Order



Figures 2-4: Field sites, stream network, and highest and lowest stream order variability for DO (upper left), TDS (upper right), and stream temperature (bottom) in the Weber watershed.

