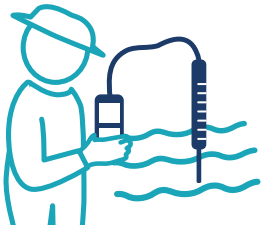


Vermilion River and Stretton Creek Water Quality at Low Flow

Purpose of survey & report

- To update water quality data for the Vermilion River (last collected in the mid 1990s)
- To learn how healthy riparian practices along Stretton Creek are impacting stream water quality

How and when the water data was collected



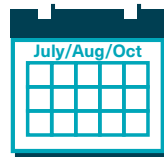
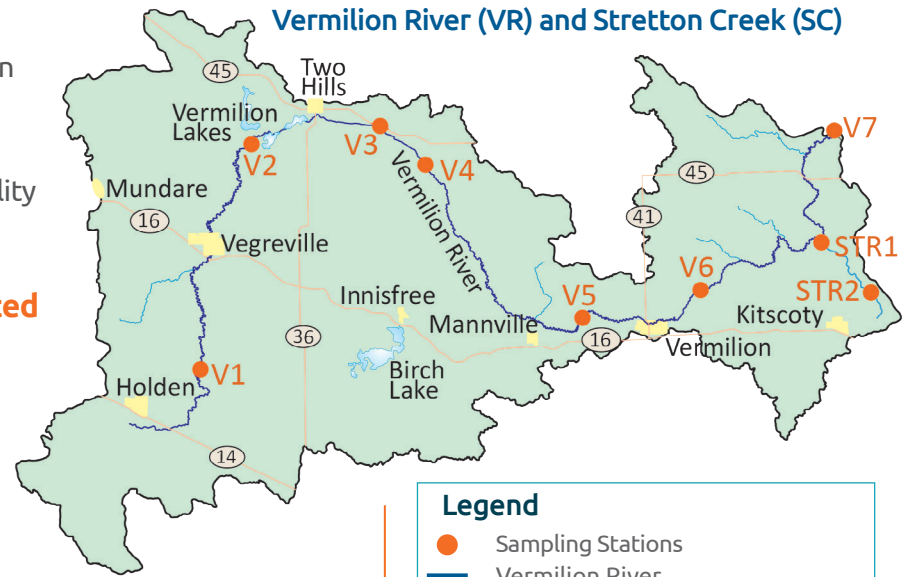
Field surveys

tested for oxygen, temperature, pH, electrical conductivity, flow velocity, and observed vegetation and bank conditions



Lab analysis

tested for physical, chemical, and biological attributes



3 survey dates

July, August, and October in 2014

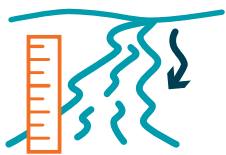
Legend

- Sampling Stations
- Vermilion River
- Stretton Creek + other tributaries

Sampling stations

- 7 along the Vermilion River (V1-7)
- 2 along Stretton Creek (STR1-2)

Measurements for water quality & why they matter



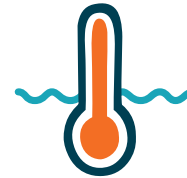
Flow & water column depth: Influences other physical, chemical & biological processes



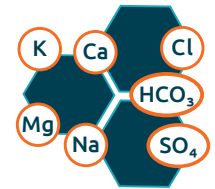
Dissolved oxygen: Critical for survival of aquatic life



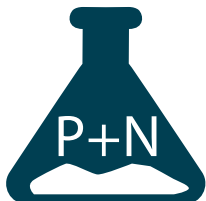
pH and Alkalinity: Affects aquatic life and solubility of heavy metals



Temperature: Affects plant growth rate and aquatic life health



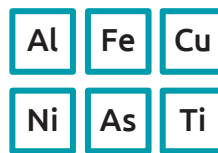
Major ions and water hardness: Impacts livestock watering & crop irrigation



Nutrients (Phosphorus and Nitrogen): Impacts dissolved oxygen levels and algal growth



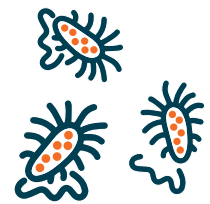
Suspended solids: Increases water temperature, reduces light and oxygen



Metals: Can become concentrated in organisms and impact livestock or crop irrigation



Pesticides: Impacts to aquatic, human, and livestock health

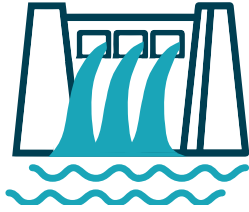


E. coli: Impacts to aquatic, human and livestock health

Human and natural factors which impact water quality in the Vermilion River



Land Cover changes over time



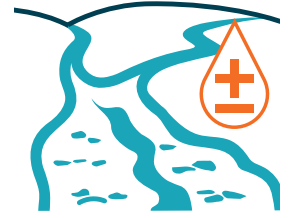
Water infrastructure (weirs, channelizing) alters natural flow



Point-source pollution (e.g. municipal/industrial wastewater)



Non point-source pollution (e.g. agricultural or urban runoff)



Low streamflow and hard water makeup

Water Quality Results: Concerns



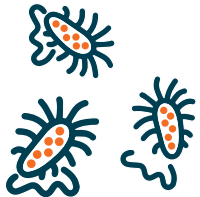
Alkalinity: Well above suggested guidelines in VR & SC



Dissolved oxygen: 7 of 9 stations had 1 or more samples that were too low for the protection of aquatic life



High Nutrients: Most sites were eutrophic, which means too much algal growth and lack of oxygen



E. coli: One sample too high for recreation and several were too high for irrigation guidelines



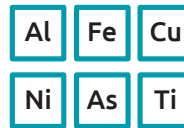
Metals: Arsenic exceeded guidelines near headwaters sites (V1-2)



Pesticides: MCPA high at 3 stations. See note below



Suspended solids: Acceptable range (generally higher during higher flow)



Metals: Generally occurred in low levels (but higher during higher flow)



Water quality: Improves overall in downstream direction because of Vermilion Lakes and groundwater inputs

Next Steps



More data: Three low flow surveys cannot capture the full range of seasonal/daily variability of water quality



Specific tests: May need to test during higher flow (metals) or for more or locally relevant and in-season types (pesticides)



Restoration: Local landowners continue to help improve water quality by partnering with the VRWA to restore wetlands and riparian areas