

Learning By Doing Comprehensive Watershed Assessment



GRAND COUNTY

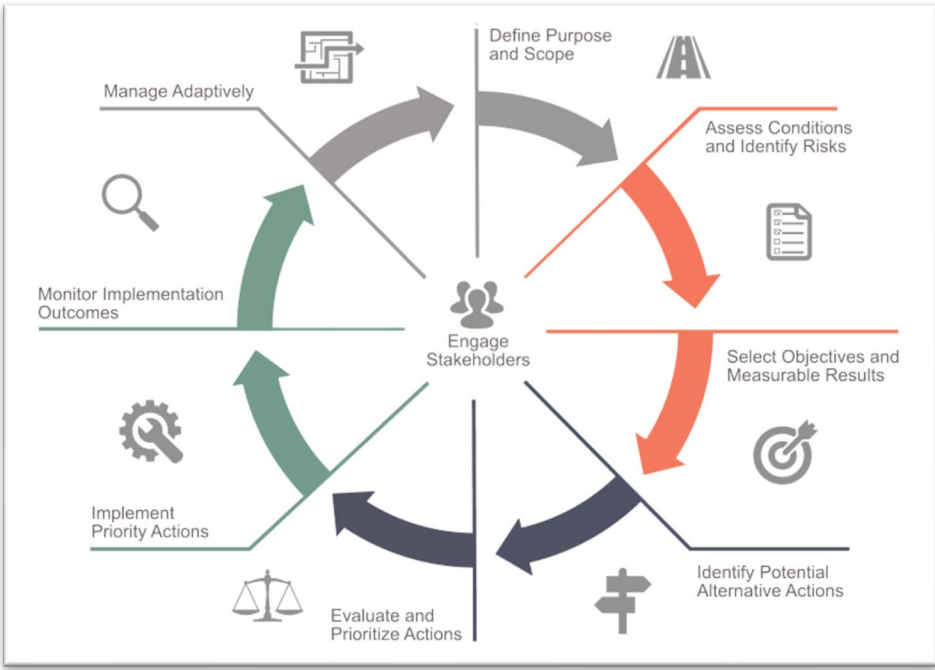
LEARNING BY DOING



Currier Water



Basis for GC SMP Update



LBD IGA Task 11.B – “Continue to Improve the Grand County Stream Management Plan”

Evolved SMP Process

- Guidance and tools
- Holistic scope
- Stakeholder engagement








Changes within CEA

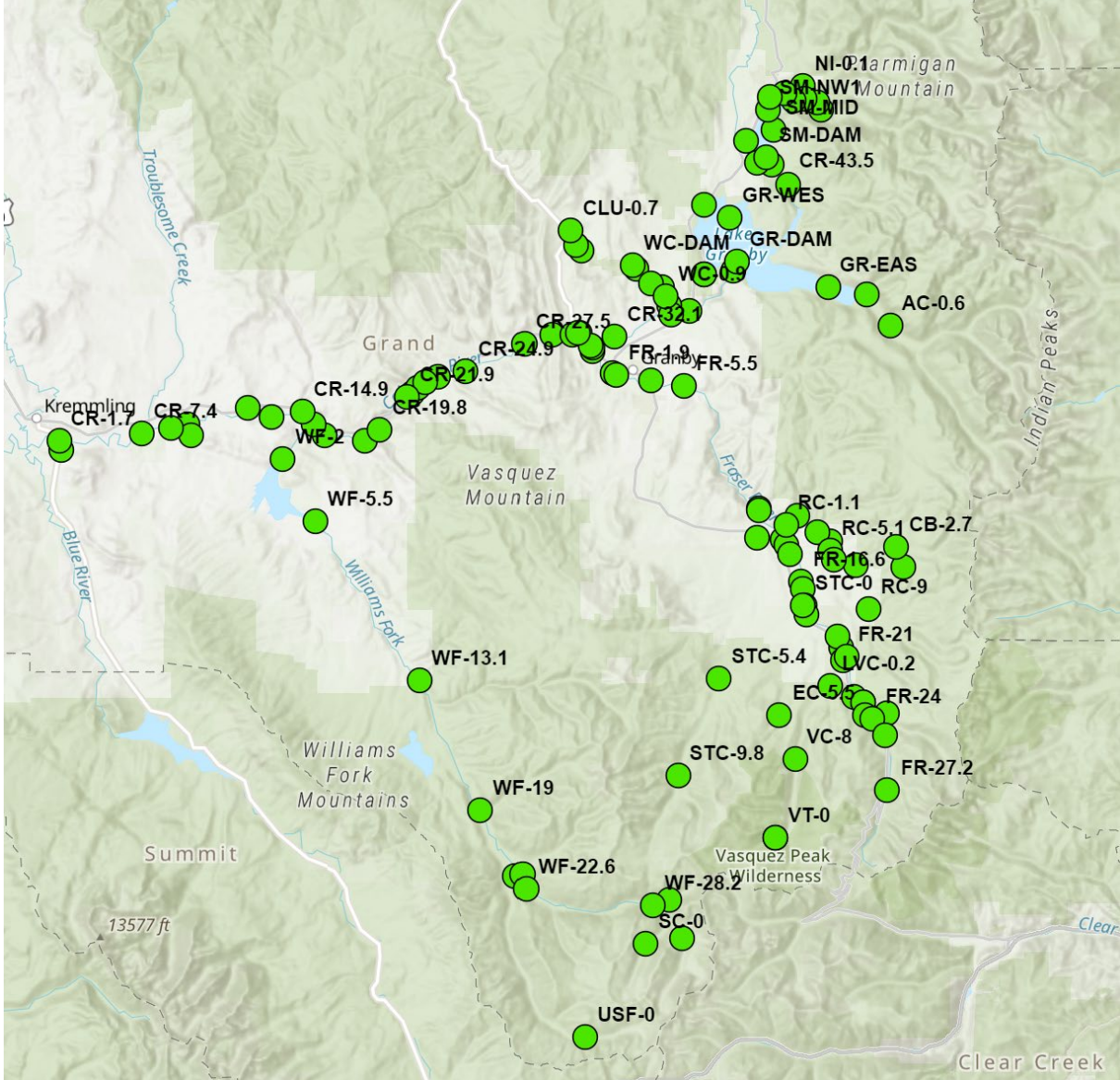
- Land use and urban development
- Watershed scale changes

New Information

- Studies and reports
- Current data collection efforts
- More extensive data available

Data: Cooperative Effort Area

-  Various data sources
-  LBD led monitoring/data compilation
-  Interactive map of locations and data types
-  ~125 monitoring locations
-  LBD monitoring to fill the gaps
-  Comprehensive monitoring and data set
-  Most data accessible through GCWIN



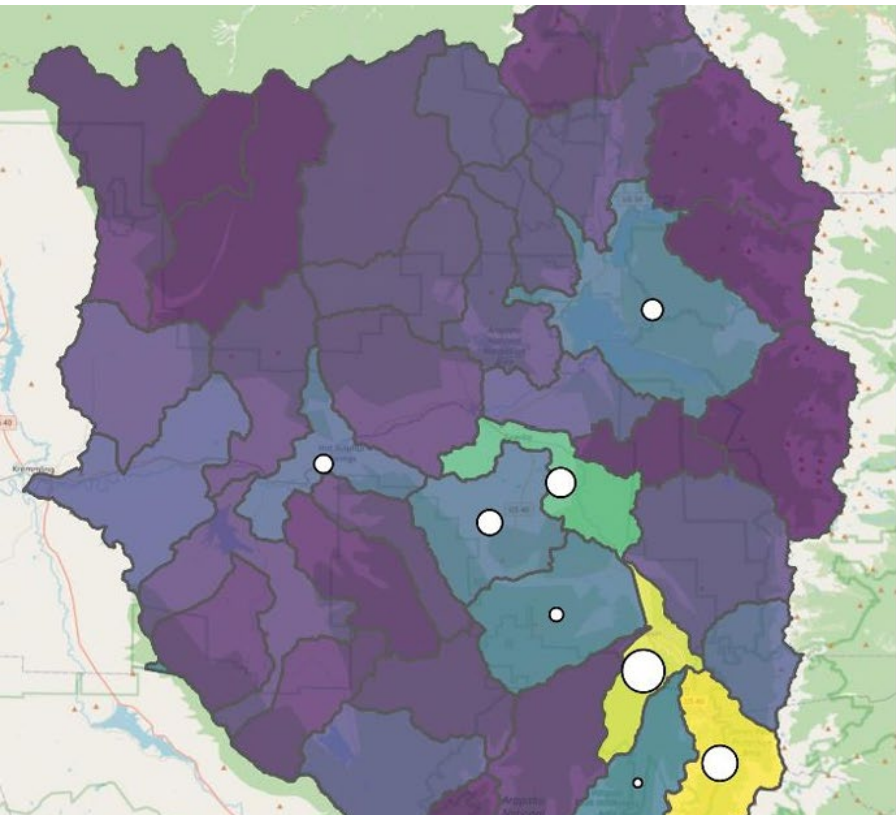
Overview of Watershed Assessment

Purpose: The comprehensive watershed assessment will synthesize changes in the watershed with new information and data which will provide the scientific basis for the update to the SMP.

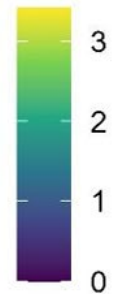
Task 1	Task 2	Task 3	Task 4
Background Chapter	Data Analysis and Interpretation	Report Generation	Maps and Data Visualizations
Conduct Literature Review Inventory Streamflow Data and Summarize Hydrological Change Summarize Past Water Development and Current Water Use and Management. Inventory Notable Landscape Events Characterize Demographic and Land Use/Cover Change Inventory Existing Environmental Data	Analyze Hydrology Characteristics & Trends Analyze Water Temperature Trends Assess Geomorphic Function Assess Aquatic Ecosystem Conditions & Trends Characterize Water Quality Conditions & Trends	Perform Integrative Assessment Provide Recommendations for Monitoring & Studies Draft Report Finalize Report Provide LBD Presentation Provide Stakeholder Presentation	Create Interactive Mapping Layers Generate Interactive Data Visualizations Develop Decision Support Tools

Background Chapter

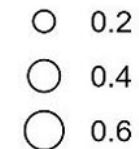
- Changes in hydrology
- Changes in land and water use
- Changes in land cover
- Notable events
- Annotated literature review
- Data inventory



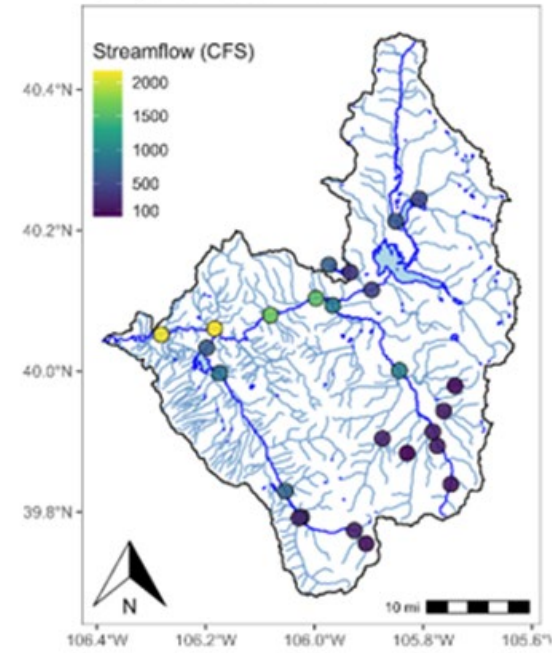
Mean Imperviousness (%)



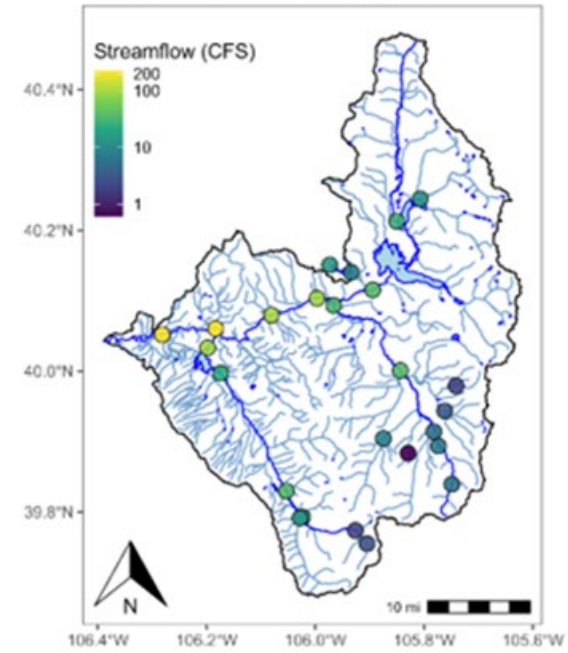
Change in Mean Imperviousness



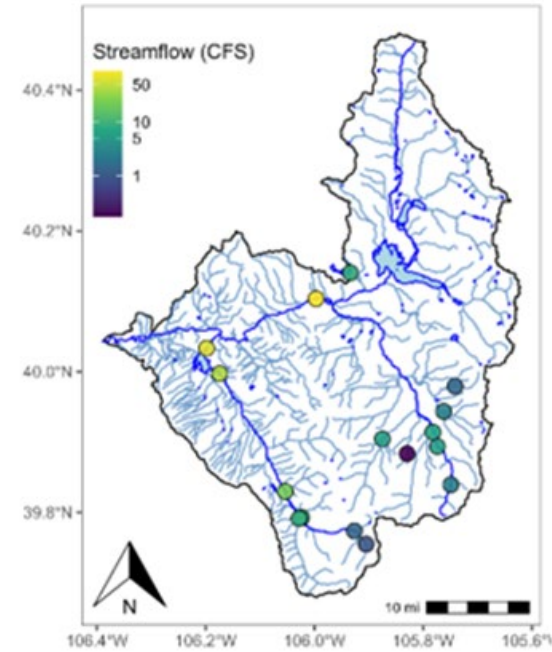
Spring Peak Streamflow



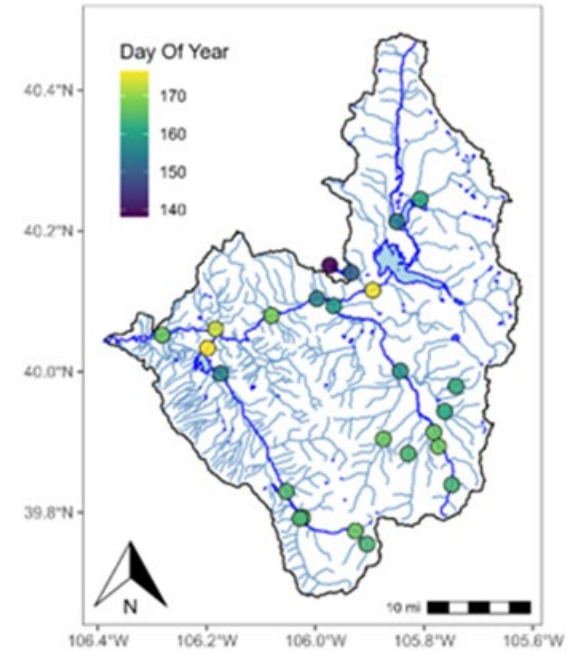
Late Summer Minimum Streamflow



Winter Mean Streamflow



Spring Peak Timing



Data Analysis: Overview

Analyze Hydrology Characteristics & Trends

Analyze Water Temperature Trends

Assess Aquatic Ecosystem Conditions & Trends

Assess Geomorphic Function

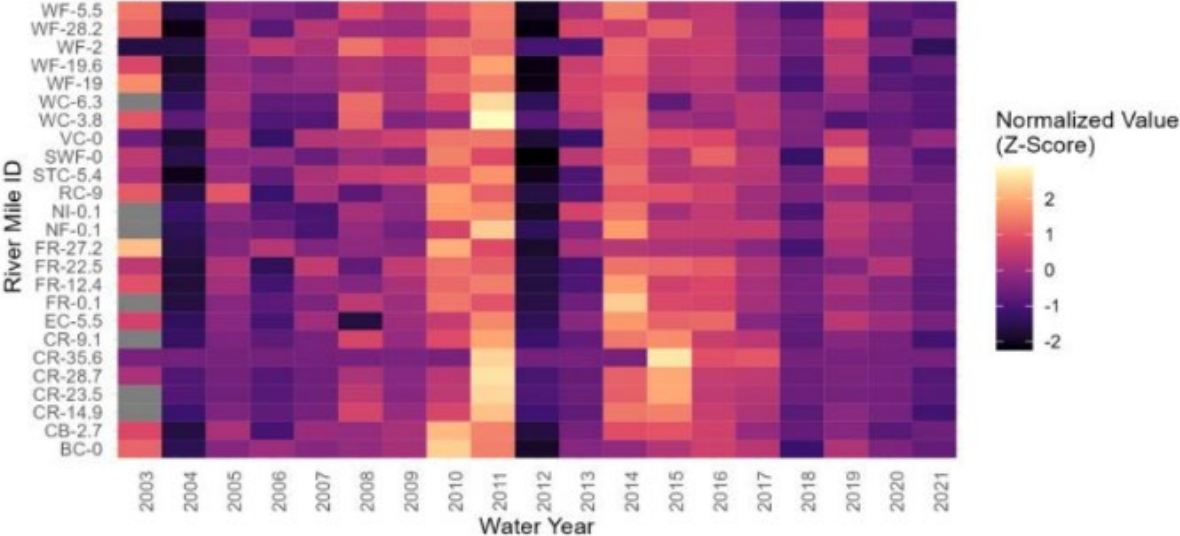
Characterize Water Quality Conditions & Trends

- Integrative Assessment
- Recommendations for Monitoring and Studies
- **Setting the stage for SMP Update Phase 2**

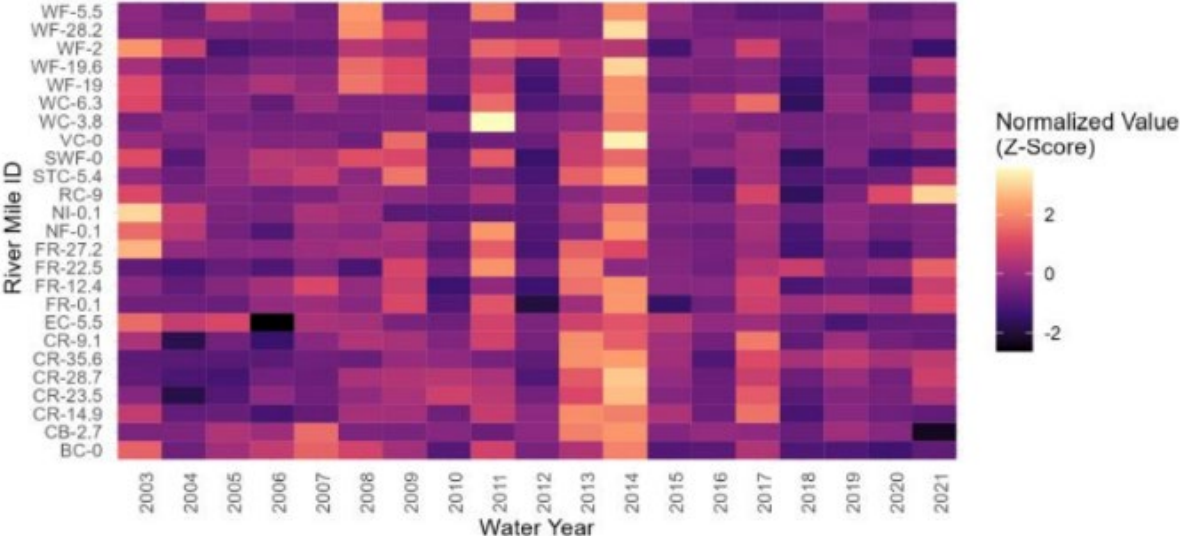
Data Analysis: Hydrology

- **Water cycle variables investigated:**
 - Streamflow
 - Climate (temperature, precipitation)
 - Snowpack
 - Soil moisture
- **How do these variables trend over space and time?**
 - Focus on recent years (since the original SMP)
- **Streamflow analysis also included a look at:**
 - Relationship to climate
 - Summer flushing flows
 - Summer environmental flow deficits

Spring Peak Flow (2003 - 2021)



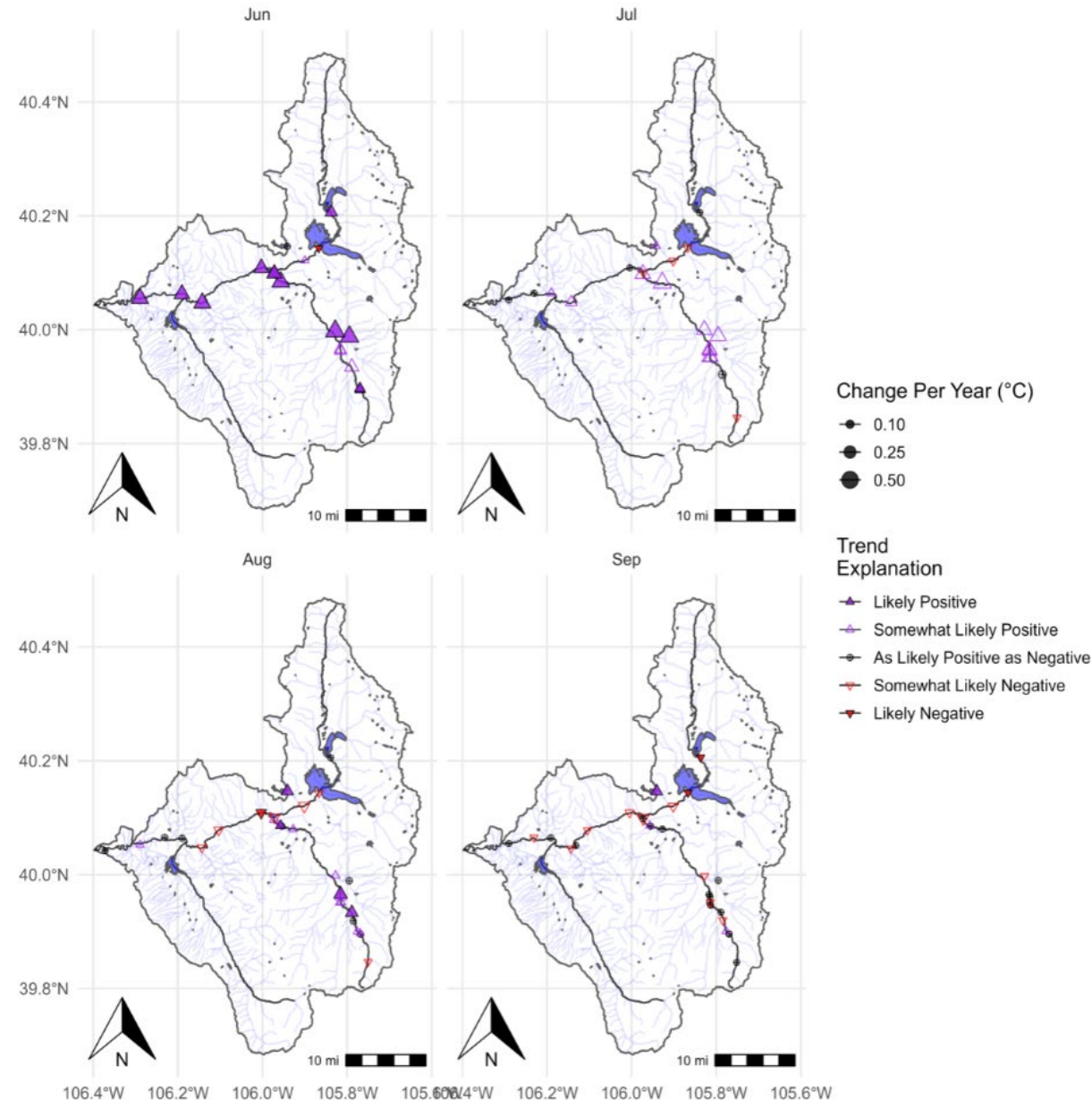
Late Summer Minimum Flow (2003 - 2021)



Data Analysis: Stream Temperature

- **Stream temperature analysis across the CEA spatially and temporally (~2008-2021)**
- **Comparison of stream temperature observations against water quality standards set by the State of Colorado for aquatic life protection:**
 - Maximum weekly average temperature (MWAT)
 - Daily maximum (DM) temperature
- **Weekly stream temperature quantiles (e.g. 25th, 50th, 75th, 95th percentiles)**

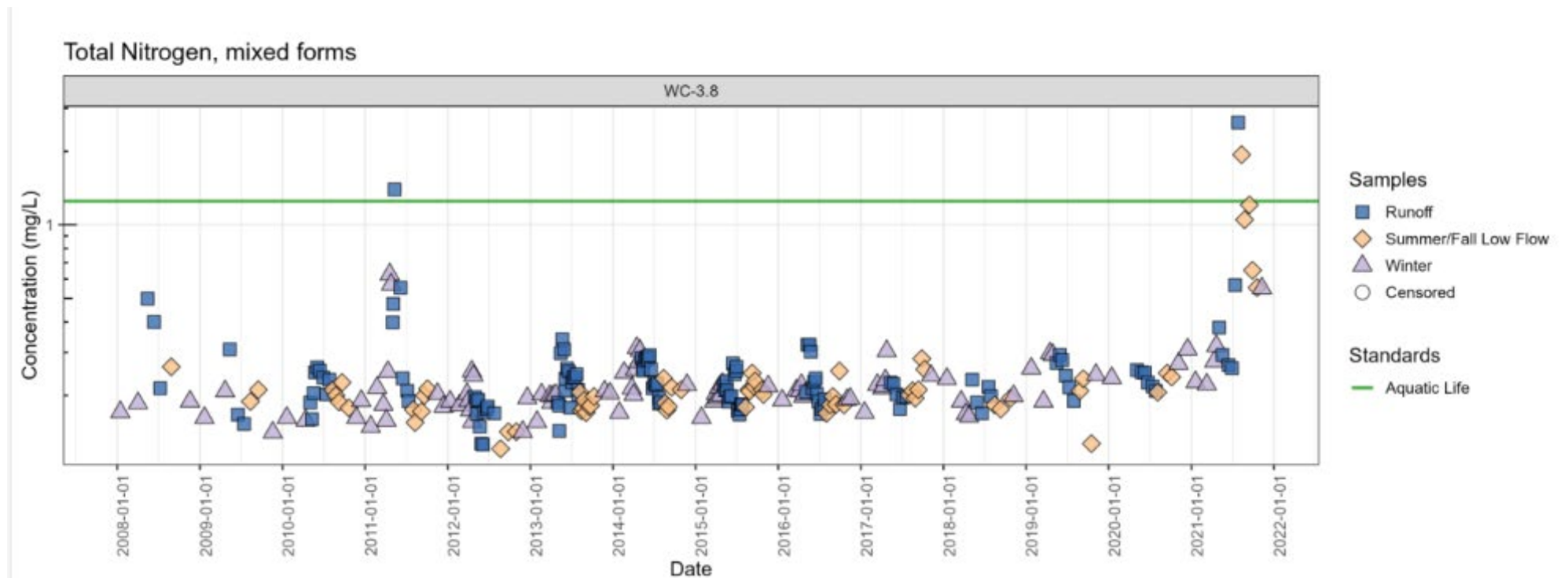
Trends in MWAT (2008-2021)



Data Assessment: Water Quality

- Summary of WQ statistics for the full historical data set for each parameter and site
- Significant **temporal** trends identified
- Also looking at **spatial** trends
- Parameter concentrations assessed against Colorado WQ standards for aquatic life health

- WQ Parameters:
 - Nutrients
 - pH
 - Hardness
 - Dissolved oxygen
 - Metals



Watershed Assessment: Next Steps

- Lotic will provide stakeholder presentations on Watershed Assessment
 - ~3 meetings from Lotic to stakeholder group
 - First meeting in the next couple of months
- Final report & completion of Watershed Assessment – Winter '23/24
- Phase 2 of the SMP Update will use the assessment to prioritize:
 - Areas in the CEA that need the most improvement
 - What types of improvements will be most effective