

## Attendees:

Alden Vanden Brink - RBWCD  
Dave Kanzer – CO River District  
Ken Leib – USGS  
Travis Day – Meeker & Meeker Sanitation  
Brian Hodge – Trout Unlimited  
Tiffany Jehorek – NRCS  
Wade Cox - DCCD  
Niki Turner – Herald Times  
Kurt Nielsen – Meeker Sanitation Dist.  
Callie Hendrickson – Facilitator

Bailey Franklin – CPW  
Keith Sauter – BLM  
Si Woodruff – County  
Jocelyn Mullen – Rangely  
Jeff Rector - County  
Clay Ramey – USFS  
Tory Eyre – CPW  
Patrick Krause – Westlands Ranch  
Mike Stevens – USGS

**Meeting Expectations and Structure:** Callie reviewed the structure of the meeting and the agenda noting the green table-tents are for the specific agencies/groups that are members of the Technical Committee and will be used should there be a need for a vote. There is a public comment period early on the agenda for anyone else attending who wishes to comment. Members of the public are welcome to comment throughout the meeting if time permits on each of the agenda items but Committee members will have first opportunity to provide input and ask questions. She reminded the group the purpose of this is to get as much information as efficiently as possible while staying on time.

**October Meeting Review:** Notes were handed out from previous meeting. They are also available on the Districts Website.

**Public comment:** No public comment requested

## USGS Presentation:

### Objectives

- 1) Utilize existing data and historical literature to understand water quality in the study area
- 2) Document and understand benthic algal occurrence, characteristics, and biomass at multiple locations within the White River area of interest
- 3) Assess hydrology, water-quality, and streambed factors that may affect algal growth
- 4) Using continuous monitoring of selected water-quality parameters and streamflow to help in the assessment of algal productivity
- 5) Use nutrient loading analysis to identify sources potentially contributing to nuisance algal productivity

### Work Element Plans:

- 1) Historical analysis of data
- 2) Seasonal reconnaissance sampling (field parameters, nutrients, major ions, suspended sediment, pesticides, and isotopes)
- 3) Continuous monitoring (water temperature, dissolved oxygen, and nitrate)
- 4) Algal biomass and identification
- 5) Streambed disturbance (particle-size, potential bed-material transport)

### Historical Analysis of Data

- Description: analysis of existing literature and data for study area and nearby areas
- Importance: May provide additional temporal and spatial perspective using existing data sets

### Seasonal reconnaissance sampling

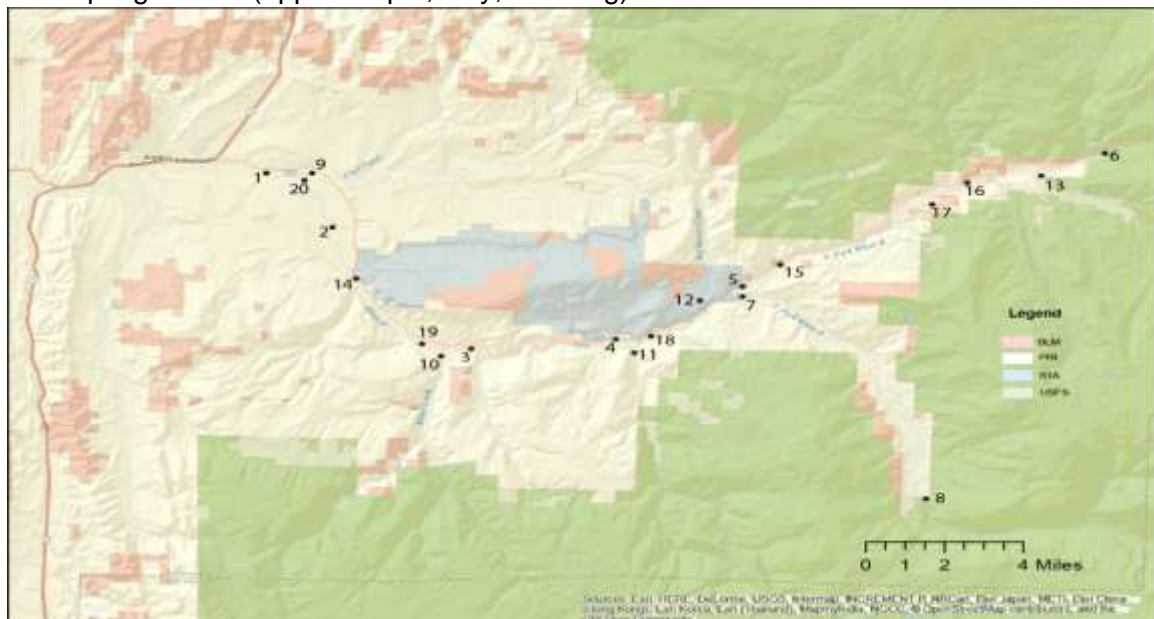
- Historical analysis of data
- Seasonal reconnaissance sampling (field parameters, nutrients, major ions, suspended sediment, pesticides, and isotopes)
- Continuous monitoring (water temperature, dissolved oxygen, and nitrate)
- Algal biomass and identification
- Streambed disturbance (particle-size, potential bed-material transport)

### Continuous monitoring

- Description: Three reconnaissance stream samplings for determination of concentrations and loads of nutrients (total N and P and component chemical compounds), and suspended sediment concentrations. Additional: recon pesticide and N-isotope samples (very limited), and use thermal imaging and a nitrate probe to provide additional information about groundwater contributions of nutrients.
- Importance: Loading, spatial, temporal, sources; apportion source contributions to various input streams and perhaps diffuse groundwater inputs to specific reaches

### Sampling program

- Preliminary, dependent on landowner permissions
- 8 primary mainstem sites (streamflow, full suite of nutrient analyses, algal work, streambed size characterization)
- 12 additional Tributary/White River sites (limited to streamflow and nitrate probe measurements)
- 3 sampling events (approx. April, July, and Aug)



## Nutrient Sampling

- Algal growth can be limited by either N or P or both; N to P ratios can indicate which is limiting; recent CPW work indicated N limitation
- Apportion nutrient-source contributions from tributary streams and diffuse groundwater inflows to streams.
- Nutrient speciation helps to identify more and less bioavailable forms of N and P, and can indicate transformations of nutrient compounds as they are transported downstream

## Sediment

- Sources: tributary inflow, resuspension
- Ease of transport and suspension in water column depends on particle size
- Removed from water column by deposition or transported downstream

## **Work Plan Element 3**

- Description: Measurement of continuous streamflow, water temperature, and dissolved oxygen for at least one location. A nitrate probe also will be operated.
- Importance: The continuous data will facilitate better analysis of short-term changes to water quality and fill in information gaps between discrete water-quality sampling events, and characterize temporal hydrologic and water-quality conditions.
- Helps in understanding algal productivity rates and timing

## Continuous Nitrate Concentrations/Loads

- Because nitrate can be measured easily, it is a common form of nitrogen in streams, and is bioavailable, we propose to use nitrate as a surrogate to understand dissolved, bioavailable nitrogen dynamics in the White River.
- Other nutrient species are difficult or impossible to measure using a probe in a stream, and must use laboratory methods to determine concentrations.

## **Work Plan Element 4**

- Description: Characterize seasonal distribution of species and abundance of algae on native bed material and artificial substrate
- Importance: spatial characteristics of the algae problem and seasonal changes, and response to hydrologic and water-quality conditions.

## Algae

- Several major groups: Diatoms, Green, Cyanobacteria, etc
- Nutrient limitation (14:1 N to P ratio in algae)
- macroinvertebrate grazing

## Factors Algal Species

- Example of factors in an algae bloom
  - Water temperature
  - Soluble Phosphate concentration
  - Nitrate concentration
  - Algal species

## Benthic Algae Colorado Standard

- Chlorophyll Concentration: 150 milligrams per square meter
- CPW found that 4 of 5 locations on White exceeded the 150 mg standard

**Work Plan Element 5**

- Description: Characterize substrate conditions and determine critical flows for incipient motion of streambed particles
- Importance: Annual disturbance of the streambed by high flows can affect algal dynamics and productivity

Streambed Sediment

- Pebble Count Method
- Size classification of bed sediments

Streambed Disturbance/Incipient Motion Analysis

- A concept of what peak flows are necessary to move rocks on the streambed
- Determine size distribution of bed material using pebble-count methods
- Use estimates or measurements of velocity, where possible, to compute shear stress at the streambed
- Incipient motion: Using streamflow and estimates of velocity, determine what flows necessary to move major classes of particles (ie. D50)

**Deliverable Products**

- Analyze historic data in the White River Area
- Publicly available data for all work plan elements and interpretive analysis
- USGS Scientific Investigations Report
- Presentations to White River Group

**Cost**

Budget detail:

Salary: \$159,000  
Travel: \$18,000  
Overtime: \$7,000  
Field supplies: \$5,000  
Lab cost: \$22,000  
Fleet cost: \$6,400  
Equipment (rent wq sondes): \$11,000  
Equipment (nitrate probe): \$32,000  
Total: \$260,400

Timeline:

Tasks	FY-2018	FY-2019	FY-2020	FY-2021
Literature review	x			
Data retrievals	x			
Historic analysis	x			
Recon sampling trip #1	x			
Data entry	x			
Recon sampling trip #2		x		
Data entry		x		
Recon trip #3		x		
Data entry		x		
Report preparation		x x x		
Report review and approval			x	
Final presentation			x	

Discussion throughout and after presentation:

- Discussion has taken place with CRWCD regarding the need to do a reconnaissance trip this fall. It is estimated to cost \$2,100. The CRWCD is willing to contribute \$1,500 with USGS contributing \$700.
- The reconnaissance and testing will take place quarterly but different months within the quarter on different years.
- USGS will need written landowner permissions to enter and test on private lands. Callie volunteered to work with USGS and landowners to get those permissions.
- Concerns were brought up regarding the stretch of the river to be tested. USGS had reduced the number of test sites to keep the cost within the original proposal. **The group requested USGS to provide another proposal that would include test sites that will include all the way down the river to the Green Bridge in Rangely.**
- Concerns were brought up regarding the collection of data all being done in 2018. Two specific reasons: 1) If 2018 is not a normal year, the data may be skewed, 2) A good portion of the funding for the project will be by grants and we don't expect to be able to get grants early enough to cover all in 2018. **The group requested USGS to include two years' worth of data collection in the updated proposal.** If after the first year it is determined we don't need the second year of collections, we can then make that call but need to plan for two years.
- Additional requests of USGS:
  - List of what can others provide to help with "in-kind"
  - Site names and distribution of sample sites
- Visual Inspections – Utilize River watch, or consider utilizing drones. Contact CNCC and CFB to see if we can utilize their drones.

**Funding contributions from participants:**

Agency/Entity	Cash Contribution	Possibly	Inkind	Notes
BLM		\$ 50,000	x	
CPW- Meeker			x	Previous research. May be able to continue some research.
CRWCD - River District	\$ 20,000			
DCCD - Douglas Creek CD			x	
Meeker Sanitation	\$ 3,500			
NRCS				Could make Proposal for 2019 but not likely for research
RBC County	\$ 6,000			Covering the Administration cost of this agreement. (currently considered \$6,000 for 2018 based on original proposal.)
<b>RBWCD</b>	<b>\$ 2,000</b>			
Town of Meeker	\$ 8,000			
Town of Rangely	?			Will reconsider at next meeting.
Trout Unlimited	\$ 5,000			
USFS			x	
USGS			\$ 54,800	
WRCD - White River CD	\$ 2,000		x	
Other			\$ 100,000	FYI: Ongoing WR Water Quality Monitoring is a part of this study and is covered by a variety of partners. Because some of the monitoring stations in this project will also be used for the Algae project we may be able to shown this as a match. <b>However, this is not a contribution to the Algae project itself.</b>
The Rob and Melani Walton Foundation	\$ 20,000			
Other				
<b>Total Contributions as of 11/22/17</b>	<b>\$ 66,500</b>			Original estimate for first year for external cooperators was \$60,000. USGS is revising their proposal based on input from 11/22 meeting.

**Funding opportunities (grants, donations, etc.)**

- Discussions regarding once we have an agreed upon scope of work, we will submit applications for grants. First submission will be to the Round Table.
- Callie noted the District is working with landowners at this time on funding as a follow-up to the landowner and CPW meeting earlier in the month.
- Al provided a list of potential grant opportunities through different organizations. Callie requested that each organization review that and consider requesting funds through their own granting processes.

**Refining our scope** – discussion was in the above notes following USGS presentation

- Extend research down river to Green Bridge in Rangely
- Plan for two years' worth of data collection

**BLM Tributary data collected in 2017**

- Keith provided a brief overview of the data that he has collected in tributaries below Meeker with charts
  - Measured parameters:
    - Optical Dissolved Oxygen
    - pH
    - Conductivity
    - Water Temperature
  - Calculated Parameters:
    - Specific Conductance (SPC)
    - Total Dissolved Solids (TDS)
  - Locations:
    - East Douglas Creek above Brush Creek
    - Piceance Creek above Cow Creek
    - Cathedral Creek at E. Douglas Confluence
    - E. Douglas Creek
- BLM may be able to provide equipment and some in-kind contribution through data collection in the tributaries, specifically below Meeker.

**Committee to develop known BMPs to address Algae:**

**This committee will convene in December**

Jeff Rector	Brian Hodge	Bailey Franklin
Tory Eyre	Dave Kanzer	Alden Vanden Brink
Clay Ramey	Tiffany Jehorek	Jocelyn Mullen
Kurt Nielsen		

**Committee to develop Stakeholder/Landowner Survey:**

**This Committee will convene in December**

Bailey Franklin	Alden Vanden Brink	Tiffany Jehorek
Jocelyn Mullen	Kurt Nielsen	Travis Day

**Next Meeting Agenda Items:**

1. Subgroups – Technical working group
2. USGS update
3. CPW research