



*Upper Colorado River*  
Watershed Group

# WaterSMART Roadmap to a Healthier, More Resilient Upper Colorado River Watershed

A stretch of the Upper Colorado River at sunset

Photo courtesy of [Tiffany Gatesman Photography](#)

# The Upper Colorado River Watershed Group



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- The Upper Colorado River Watershed Group (UCRWG) was founded in 2016 with \$100,000 in funding from a US Bureau of Reclamation [WaterSMART grant](#).
  - ✓ A portion of funding was used to compile the UCRWG [Watershed Resiliency Plan](#), presented to the public on May 24, 2018.
- The Colorado River Headwaters face significant watershed challenges, including waters on Colorado's [303 \(d\) list](#) that do not support designated uses as outlined by the [Colorado Department of Public Health and Environment](#) (CDPHE).
  - ✓ One of UCRWG's primary goals is to improve local 303(d) listed impaired waters.
- Many local stakeholders would like to become more involved in watershed conservation efforts, but are unsure how.
  - ✓ The mission and vision of UCRWG is based on extensive public outreach from 2016 - 2017, including five community conversations held in Granby, Grand Lake, Fraser, and Kremmling.



## UCRWG community meetings

*From top to bottom:*

1. Fraser (Nov. 11, 2016)
2. Grand Lake (Oct. 25 2016)
3. Kremmling (Nov. 14, 2016)
4. Granby (Feb. 25 2017)



# UCRWG Mission and Vision



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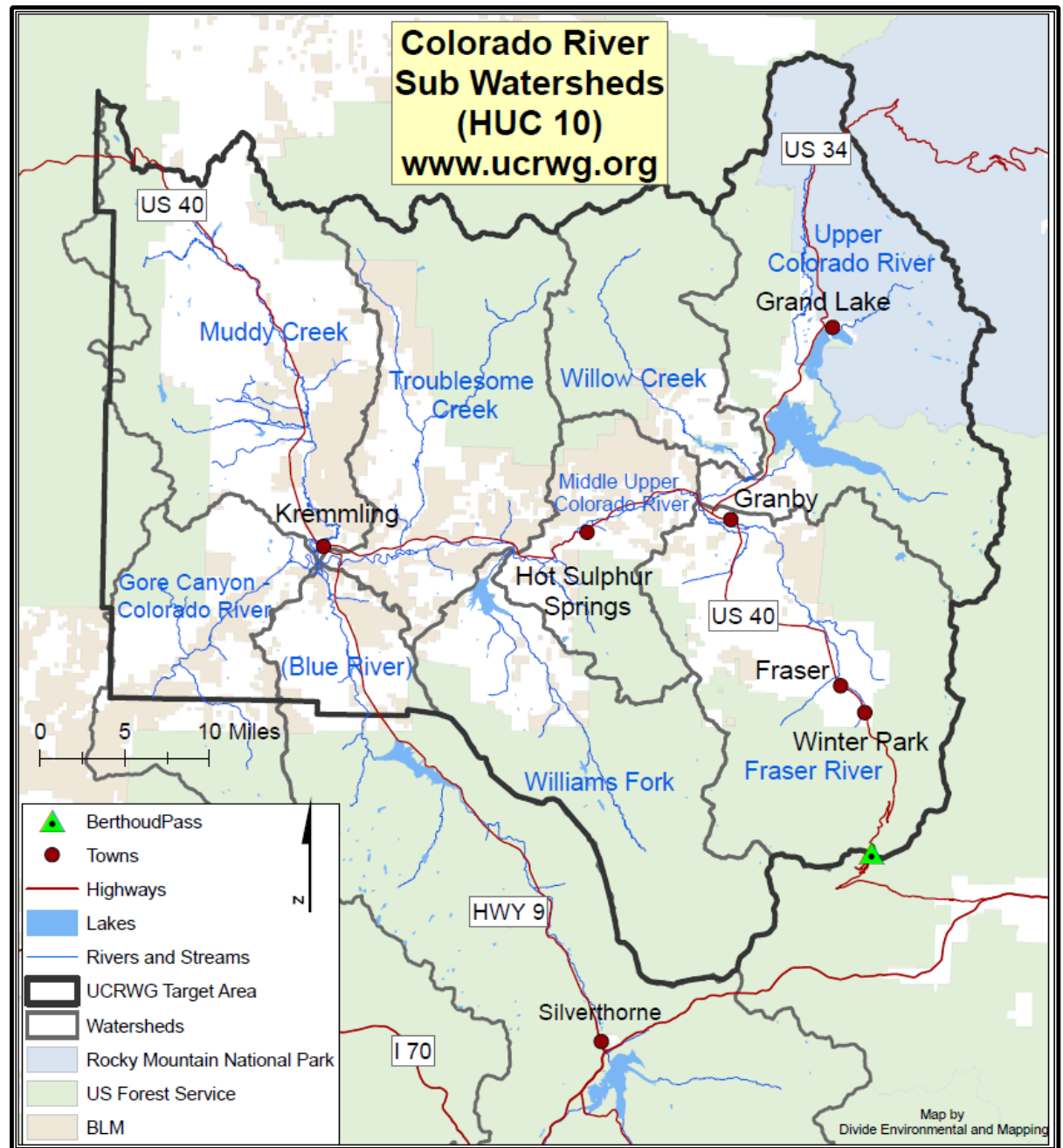
We support a non-regulatory, non-political approach to watershed restoration, with an emphasis on education, community involvement, cultural appreciation, and citizen science.

**Our vision** is a resilient, sustainable Upper Colorado River watershed.

**Our mission** is to connect communities in the Colorado River Headwaters in Grand County through science, education, and outreach.

# UCRWG Target Watershed Boundaries

- From the headwaters of the Upper Colorado River north of Grand Lake to the boundary lines between Grand County and Summit and Eagle counties.
  - Upper part of USGS Colorado Headwaters ([HUC 14010001](https://www.fws.gov/ucrwg/huc14010001)).
  - Overlap with the last 10 miles of the Blue River Valley ([HUC 14010002](https://www.fws.gov/ucrwg/huc14010002)).
- This area is further divided into nine sub-watersheds for planning purposes.
  - Upper Colorado River
  - Willow Creek
  - Middle Upper Colorado River
  - Troublesome Creek
  - Muddy Creek
  - Gore Canyon – Colorado River
  - Blue River
  - Williams Fork
  - Fraser River

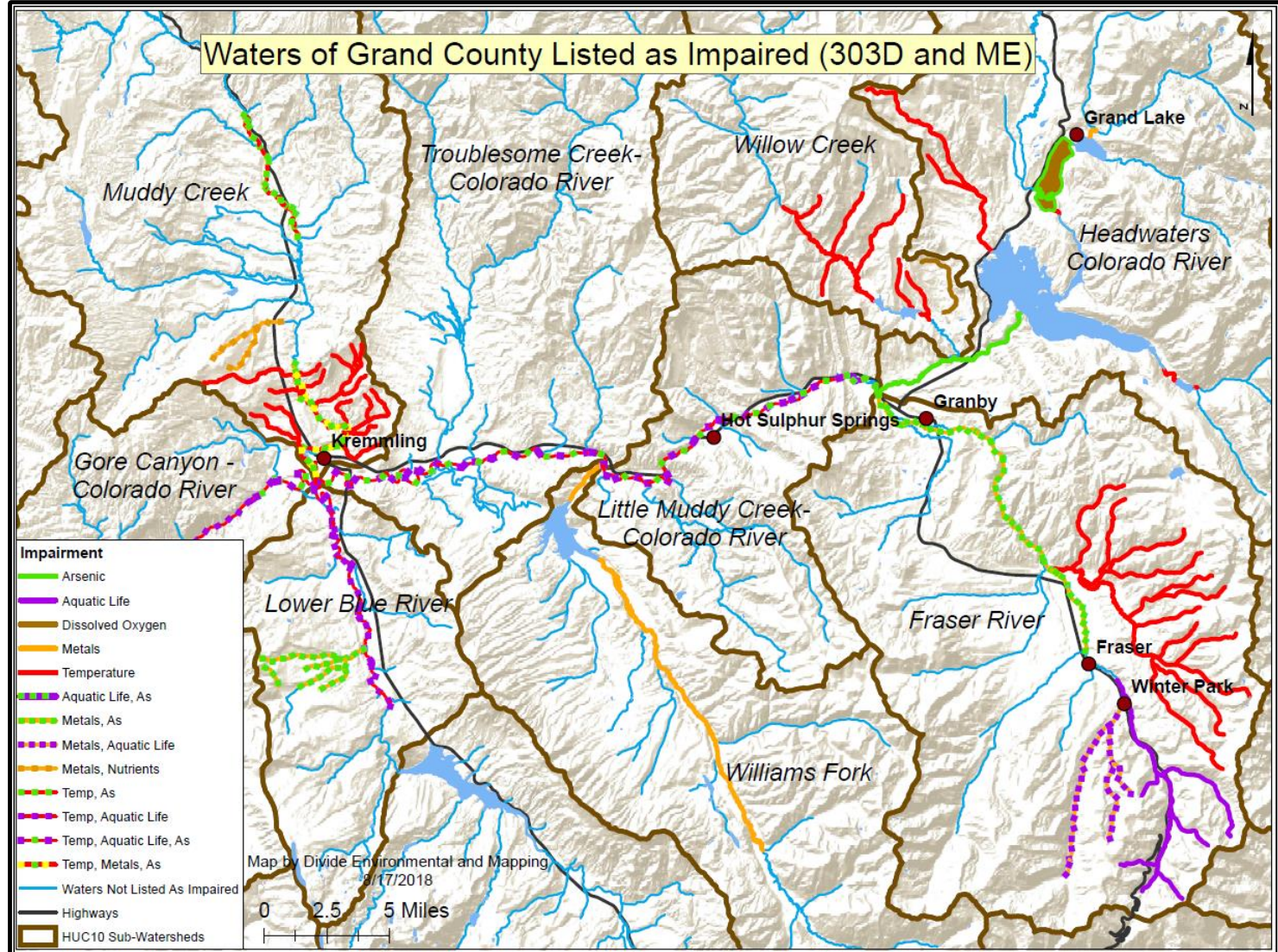




# UCRWG Watershed Map of 303(d) and ME List Impairments

Our goal is to promote resiliency in the Upper Colorado River by restoring water quality and promoting healthy watershed functioning.

- The Upper Colorado River Watershed includes waters with [303 \(d\) listings](#) that do not support designated uses, as well as waters on Colorado's [Monitoring and Evaluation \(M&E\)](#) list.
- Local conditions demonstrate general watershed degradation from the effects of unsustainable water diversions and historic land management practices, compounded by climate change.



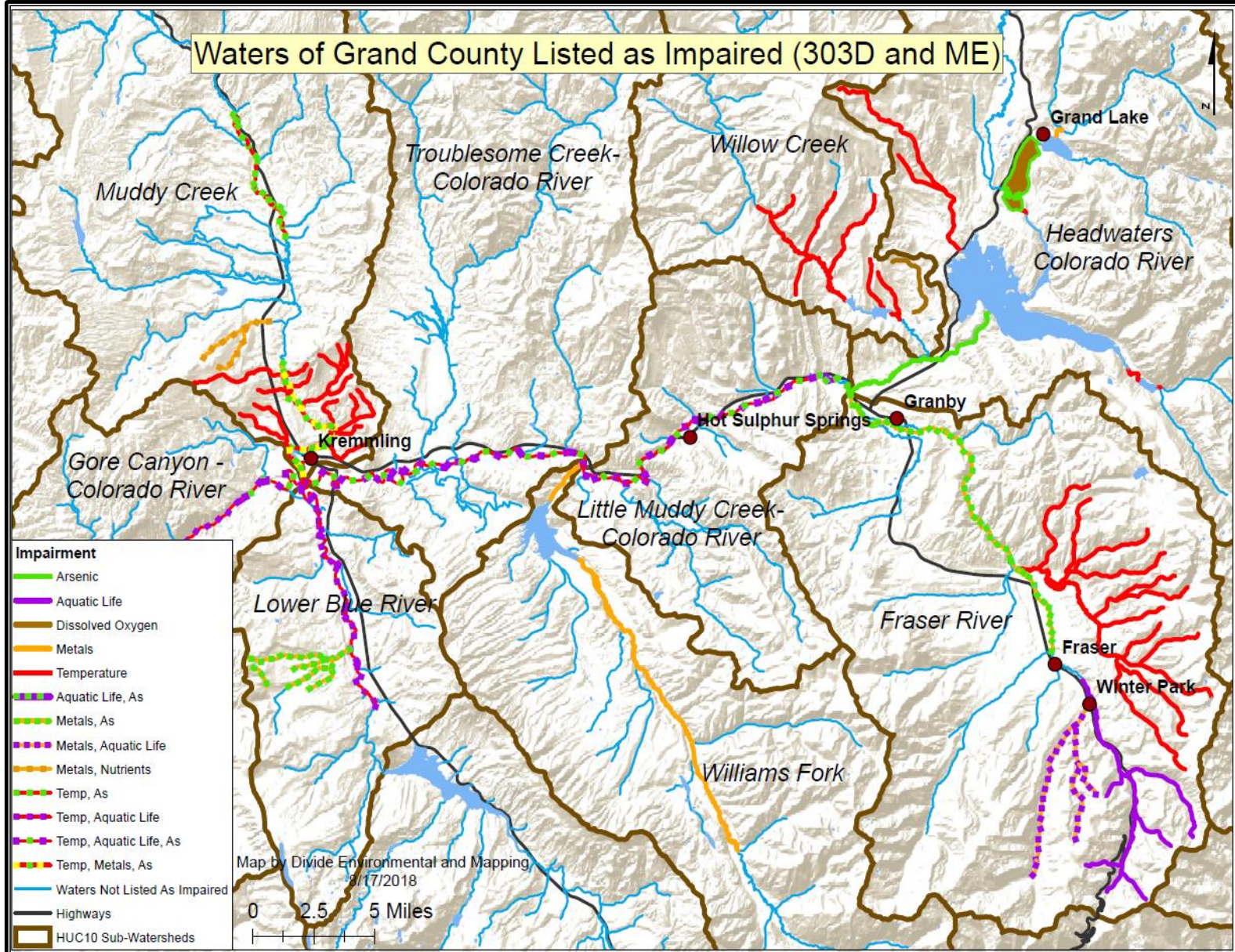


# UCRWG Watershed Map of 303(d) and ME List Impairments

Lower stream flows resulting in reduced dilution can negatively impact water chemistry concentrations and increase temperature.

Common characteristics of waters in the Upper Colorado River Watershed include:

- Elevated water temperatures that promote algal blooms, complicate municipal water treatment, and negatively impact cold-water aquatic life such as native trout.
- Elevated levels of arsenic and metals, including copper and manganese.
- Reduced levels of dissolved oxygen.





# UCRWG Watershed Restoration Strategy

*Our goal is to implement a three-pronged strategy aimed at achieving a balance between community outreach and engagement, scientific research and technological findings, and education.*

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1. Develop a holistic, community-friendly watershed model that incorporates hydrology, geochemistry, ecology, and industry and agency guidance with the implementation of appropriate assessment tools and structures for community-based decision making.
2. Promote community participation in baseline monitoring, decision making, watershed restoration, and watershed appreciation events.
3. Provide support to stakeholders working to protect, restore, and enhance their local watershed as opportunities arise that are consistent with UCRWG's [Watershed Resiliency Plan](#).



**Photos:** Students from the Middle Park High School Interact Club planted willows along a stretch of Smith Creek as part of the Adopt-a-Waterway program in May 2018. UCRWG provided assistance for this event.



# Nine Elements Terminology



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UCRWG 9 Elements	US EPA Equivalent
1.) Identifying the Problem	a.) Identify causes and sources of pollution
2.) Watershed Improvement Goals	b.) Estimate load reductions expected
3.) Suggested Management Measures and Targeted Critical Areas	c.) Describe management measures and targeted critical areas
4.) Requested Technical and Financial Aid	d.) Estimate technical and financial assistance needed
5.) Community Outreach, Support, and Education	e.) Develop an information and education component
6.) Project Timeline	f.) Develop a project schedule
7.) Program Development Milestones	g.) Describe interim, measurable milestones
8.) Benchmarks to Measure Progress	h.) Identify indicators to measure progress
9.) Monitoring Watershed Improvements	i.) Develop a monitoring component



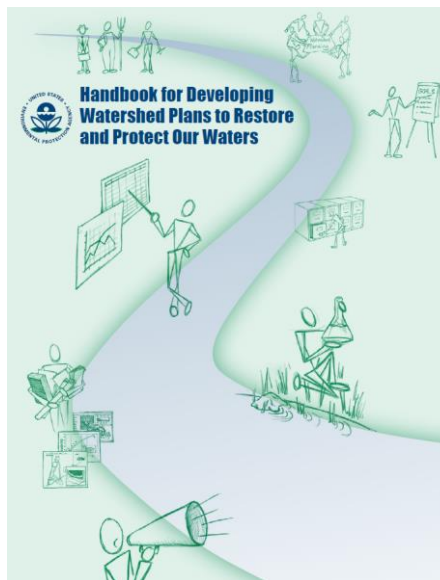
# How We Plan to Get There



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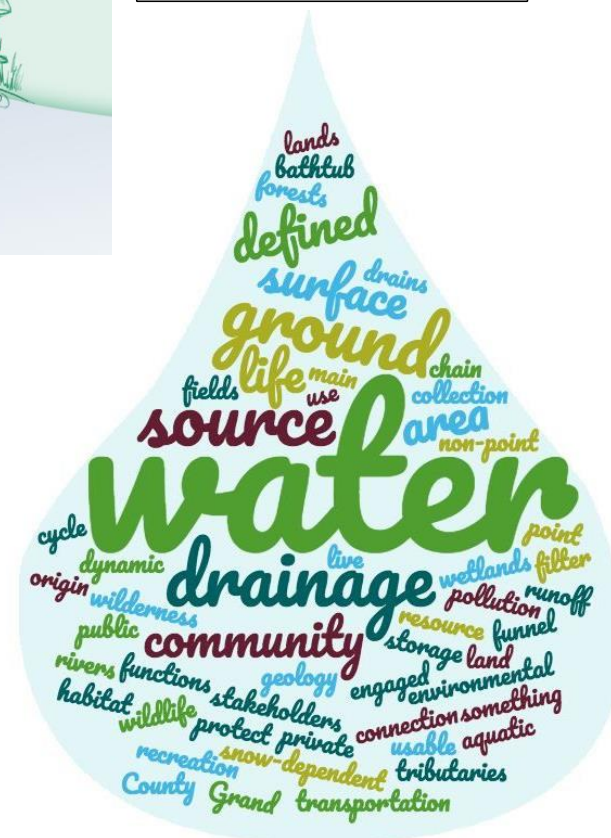
We see the development and implementation of a community-based [Nine Elements Watershed Management Plan](#) as outlined by the US EPA as a critical next step in achieving lasting improvements in local water quality.

- A Nine Elements Watershed Management Plan is required for larger scale Federal funding, including the Colorado Department of Public Health and Environment's [Watershed 319: Nonpoint Source Program](#).
- Implementing the nine project components is considered critical by resource managers for achieving lasting improvements in water quality.



Left: Front cover the US EPA [Handbook for Developing Watershed Plans to Restore and Protect Our Waters](#) (March 2008).

Below: Word bubble graphic from terms used during UCRWG 2016/17 community meetings.



# Nine Elements Plan Overview



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**Muddy Creek**

*Photo courtesy [Tiffany Gatesman Photography](#)*

Elements one through four are highly technical, essentially asking what the problems are in our watershed and how we plan on addressing them.

Elements five through nine concern our community-based approach for helping local stakeholders better understand our watershed and empowering them to successfully protect, restore, and enhance local waters.



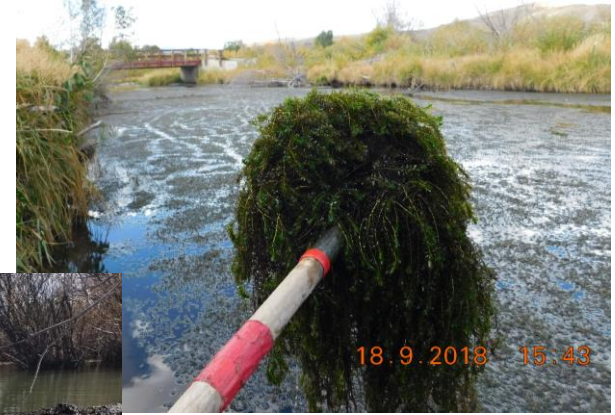
# Element 1: Identifying the Problem



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Conditions along the Upper Colorado River Watershed demonstrate the impacts of over 150 years of environmental degradation due to:

- Effects from climate change (i.e. higher summer temperatures and lower annual rainfall)
- Transmountain diversions
- Stream channelization
- Increased stormwater sedimentation and loss of riparian corridors from urbanization
- Vegetation increasingly susceptibility to wildfire due to historical land management practices.



*Photos depict impaired water conditions and bad land management practices from around the Upper Colorado River Watershed.*

## Element 2: Watershed Improvement Goals



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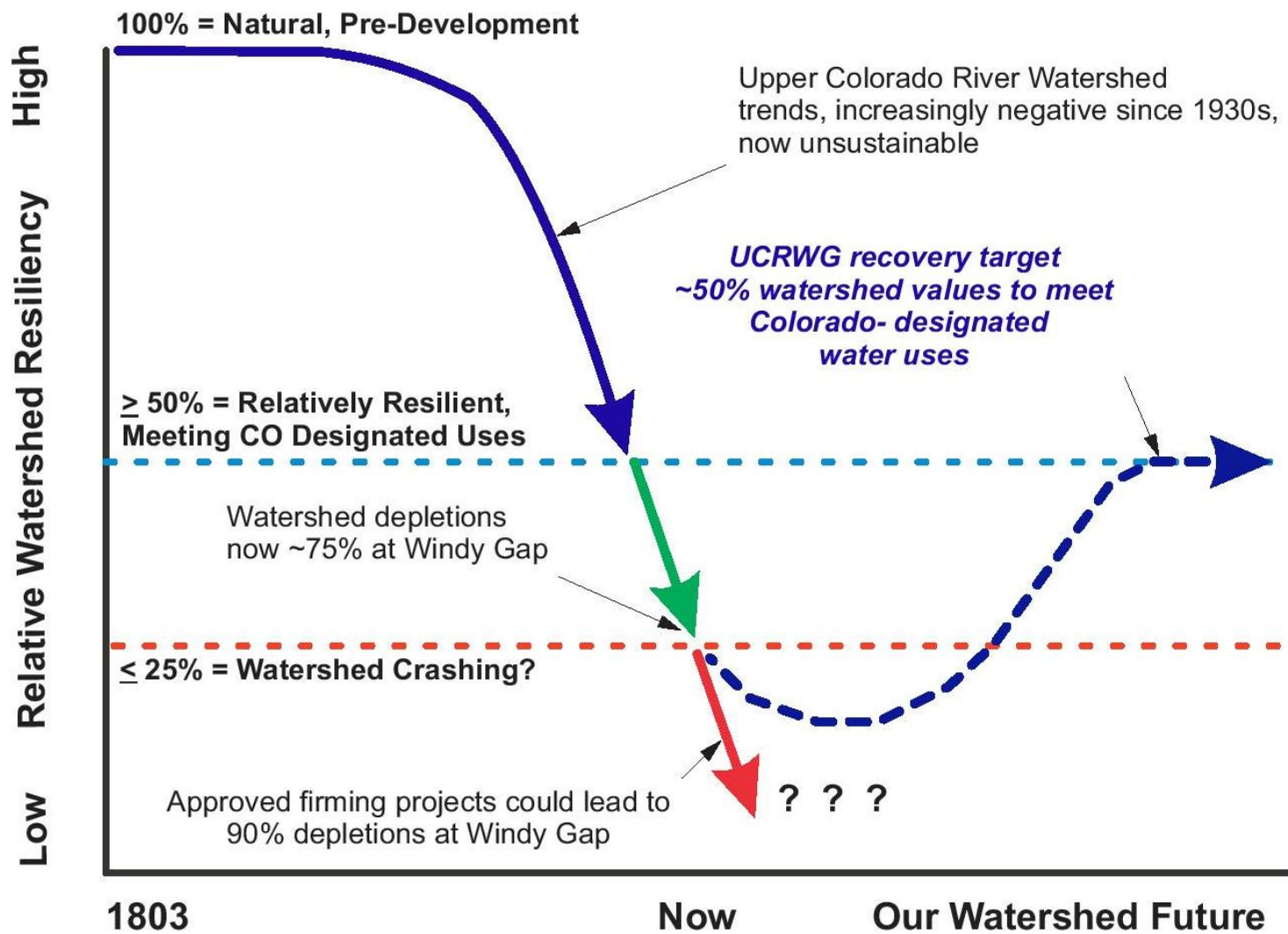
**Our goal is a 25% water quality improvement over 25 years in order to bring our watershed to more predictably healthy, resilient conditions.**

Target improvements include decreases in water temperatures throughout the watershed and a reduction in arsenic, metals, and nutrient loads.

The UCRWG “Nine Elements Watershed Management Plan” will be developed in the absence of a completed [“Total Maximum Daily Loads”](#) (TMDL) for the target project area.



# Watershed Impairment over Time with UCRWG Target Recovery



## Watershed Impairment Schematic with Projected UCRWG Recovery

Source: Graph made for UCRWG by [Grand Environmental Services](http://Grand Environmental Services)

# Element 3: Suggested Management Measures and Target Critical Areas



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We recommend that Upper Colorado River Watershed stakeholders incorporate standard [Best Management Practices \(BMPs\)](#) into local watershed land management.

## Additional goals:

- Restoring stream corridors as greenbelts per guidelines from the [USDA Natural Resources Conservation Service \(NRCS\)](#), [Center for Watershed Protection \(CWP\)](#), and [Great Outdoors Colorado](#).
- Applying stormwater BMPs along roads and in urban areas as outlined by the [Colorado Department of Transportation \(CDOT\)](#), [GreenCO](#), [International Erosion Control Association \(IECA\)](#), and CWP.
- Updating diversion projects to enhance water efficiency.
- Assisting Grand County organizations working on water quality initiatives with funding, information support, and resources.



A watershed map planning activity from the Granby community meeting on February 25, 2017.





## Element 4: Requested Technical and Financial Aid



Table art from the Granby community meeting on February 25, 2017.

### Organizational needs:

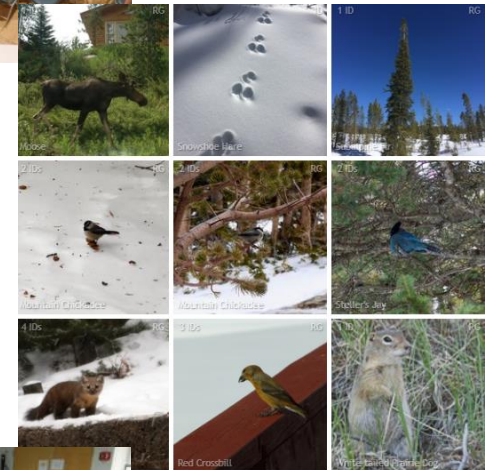
- Technical guidance and support from governmental agencies, educational institutions, and environmental contractors.
- Funding for initiatives to preserve and enhance water quality and watershed resilience, the development and implementation of community education and outreach programs, and administrative functioning.



# Element 5: Community Outreach, Support, and Education

UCRWG is proposing a grassroots, community-based watershed program to restore water quality in the Colorado River Headwaters with three foundational program elements:

- **Watershed Science:** Continue developing an open-source, interactive [watershed map](#) to inform impacted local communities, guide project planning, and monitor restoration efforts.
- **Education and Outreach:** Support local opportunities that seek to educate, engage, and enable communities in our watershed through public education in [STEAM curriculum](#) (science, technology, engineering, the arts and mathematics), the implementation of [Project WET](#), and by offering continuing education opportunities for adults. UCRWG will also provide support for social and cultural events that celebrate our watershed and help organize citizen science watershed monitoring projects.
- **Support Stakeholders:** Provide technical and financial support to local stakeholders for planning, implementing, monitoring, and reporting on restoration projects, conservation efforts, and watershed progress .



*Top:* Grand Lake community meeting (Oct 25, 2016)

*Middle:* Photo collage from the [UCRWG iNaturalist account](#).

*Lower:* Community member Joy Phelan participates in UCRWG's community meeting in Granby (Feb. 25, 2017).



# Element 6: Projected Timeline



Year	1	2	3	4	5	6-10	11-15+
A) Outreach, education, and citizen science monitoring projects	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue
B) Identify feasible pilot projects	White	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
C) Assessment, planning, permitting, and funding for larger projects	White	White	Green	Green	Green	White	White
D) Larger restoration projects	White	White	White	White	White	Green	White
E) Incorporate watershed considerations into local management programs (11-15)+	White	White	White	White	White	White	Green

# Element 7: Program Development Milestones



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Interim measurable milestones to track the implementation of UCRWG's Nine Elements Watershed Management Plan will follow:

- The promotion of watershed programs and tracking of stakeholder progress with restoration projects, such as helping ranchers to compose a timeline for implementing FACStream management plans.
- Volunteer programs that will be organized according to sub-watersheds, specific project areas and project themes.
- Project management and grant administration that will be tied to numeric standards and reviewed by community-based working groups on an annual basis.





# Element 8: Benchmarks to Measure Progress

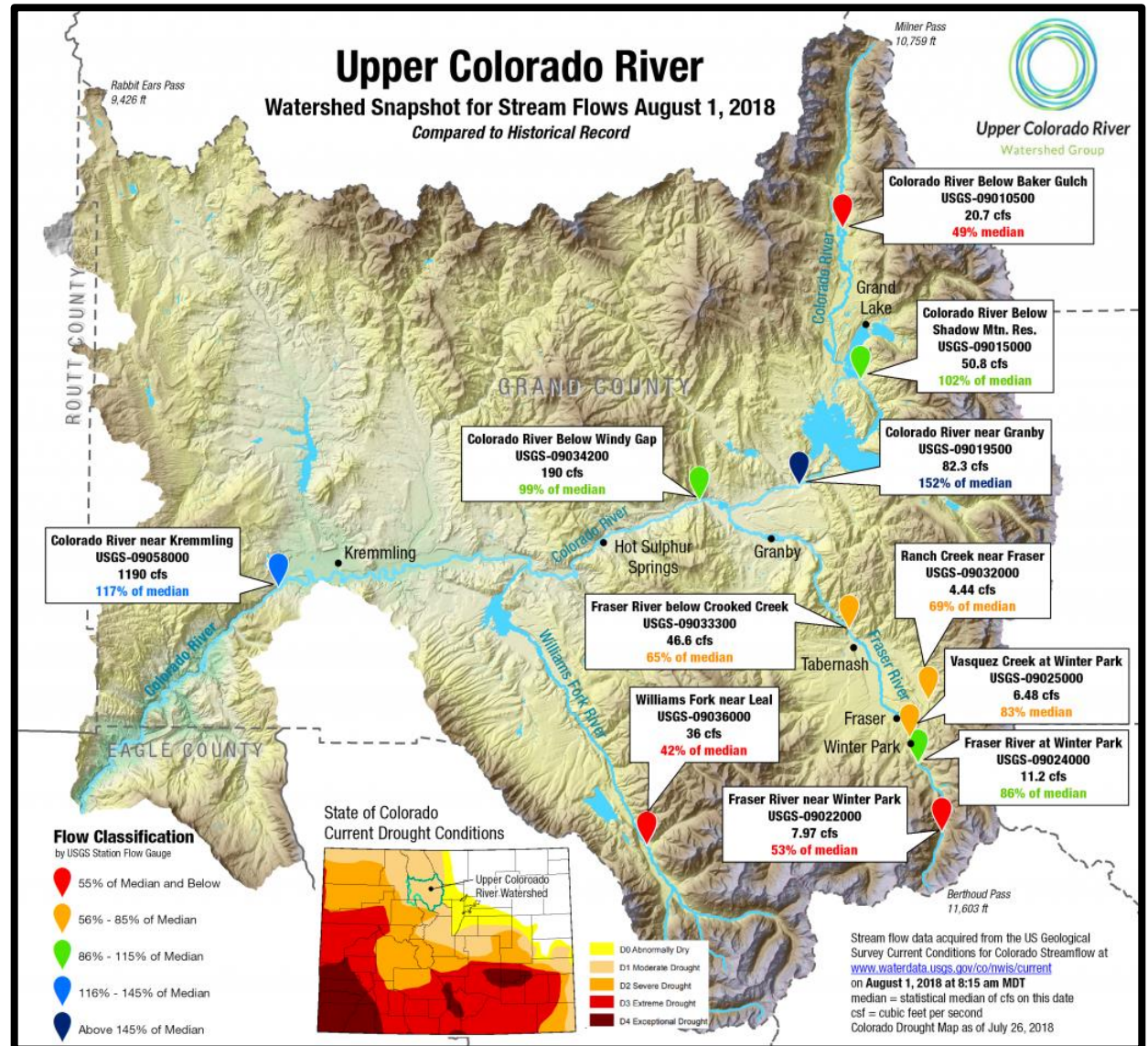


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1. Cumulative total valley lengths and areas of stream reaches meeting [FACStream](#) grades (A, B, C, D, and F) and FACStream grade patterns, including:
  - Watershed-scale variables of flow regime, sediment regime, and water quality.
  - Riparian-scale variables of floodplain connectivity, riparian vegetation, and debris supply.
  - Stream-scale variables of stream morphology, stability, physical structure, and biotic structure.
2. US EPA [Rapid Bio-Assessment Protocols](#) suitable for including in FACStream, including surveys of aquatic macroinvertebrates using the [Hilsenhoff Index](#), reaches meeting [Gold Medal fishery standards](#), and demonstratable evidence of decreased algae and macrophyte cover and increased waterway use by birds and amphibians.
3. Surveys of human watershed use and community perceptions to measure the impact of watershed festivals, awareness and appreciation initiatives, and community events.
4. Water chemistry improvements at critical nodes such as USGS gauges and water and sanitation system intakes and outfalls.
5. Decreased frequency of harmful high water temperatures (anything over 65F) and a reduction in algal and macrophyte blooms.

# Element 9: Monitoring Watershed Improvements

- UCRWG staff will coordinate efforts with volunteers conducting citizen science projects, technical contractors, and university partners.
- Monitoring results will be integrated into an interactive watershed model on the UCRWG website.
- Weekly online publication of our [“Watershed Snapshot”](#) will help keep the public informed about watershed conditions.
- Regular “State of our Watershed” community meetings will ensure all stakeholder groups are involved in the monitoring process.
- Monitoring efforts will be augmented by ongoing coordination with the [Grand County Water Information Network \(GCWIN\)](#).



UCRWG Watershed Snapshot from August 1, 2018



# Looking Downstream



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## Our goals for the near future include:

- Continuing to develop an open-source, interactive [watershed map](#) on our website with the goal of providing local communities with up-to-date information for guiding watershed project planning, monitoring restoration efforts, and engaging in responsible recreation.
- Developing a well-researched and thorough Nine Elements Watershed Management Plan for the Upper Colorado River Watershed that is grounded in current scientific data.
- Securing funding to support the ongoing administrative functions necessary for successful program implementation.

# Works Cited



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Colorado Department of Public Health and Environment: Water Quality Control Commission. "[Regulation #93 – Colorado’s Section 303\(d\) List of Impaired Waters and Monitoring and Evaluation List](#)." 5 CCR 1002-93.

Grand Environmental Services. [Upper Colorado River Watershed Resiliency Plan](#). Upper Colorado River Watershed Group, April 4<sup>th</sup>, 2018.

Johnson, Brad, et al. [FACStream 1.0: Functional Assessment of Colorado Streams](#). EcoMetrics, 2016.

Office of Water: Nonpoint Source Control Branch. [Handbook for Developing Watershed Plans to Restore and Protect Our Waters](#). Washington, D.C., United States Environmental Protection Agency, March 2008.