# White River Integrated Water Initiative

# Phase II Report

**2022**



White River & Douglas Creek Conservation Districts P.O. Box 837 – 351 7th Street – Meeker, CO 81641 – Phone (970) 878-9838

# The White River Integrated Water Initiative wishes to thank the following people and organizations for their generous contributions to Phase II of the Water Initiative.

**Executive Director of the White River and Douglas Creek Conservation Districts -** Callie Hendrickson
**Conservation Districts Manager -**Tristan McGee
**Conservation District Office Manager -** Fayanna Seely
**White River and Douglas Creek Conservation District Boards**

| | | | |
|---|---|---|---|
| Bill Lake | Neil Brennan | Chris Collins | Ron Reich |
| Rosaly Coombs | Scott Robertson | Bill Hume | Jason Plummer |
| Marc Etchart | | | |

**Planning Advisory Committee (PAC) Members**
Colorado Parks and Wildlife – Tory Eyre
Douglas Creek Conservation District - Ron Reich, Rosaly Coombs
Fishing Representative - Colton Brown, Brett Harvey
Irrigation Representative - Stu Massey
Rio Blanco County - Gary Moyer, Ed Smercina
Rio Blanco County Farm Bureau - Forrest Nelson, Albert Krueger
Rio Blanco Stockgrowers – Jerry Oldland, Jon Hill
Rio Blanco Water Conservancy District - Alden Vanden Brink, Vince Wilczek
River's Edge West - John Leary, Rusty Lloyd
Town of Meeker - Travis Day, Chris Lockwood
Town of Rangely - Don Reed, Mike Dillon
Trout Unlimited – Ian Wilson, Brian Hodge
West Slope Colorado Oil and Gas Association – David Bowers
White River Alliance - Deirdre Macnab, Shawn Welder
White River Conservation District - Chris Collins, Neil Brennan
Yellow Jacket Water Conservancy District - Walt Proctor
**Technical Advisors to the PAC**
United States Forest Service – Curtis Keetch
Bureau of Land Management – James Roberts
Colorado State University Extension Service – Linda Masters
Colorado Northwest Community College – Mario Sullivan

**Diversion and Riparian Assessment Team Members**

| | | | |
|---|---|---|---|
| Chris Collins | Forrest Nelson | Ian Wilson | Bailey Franklin |
| Mary Taylor | Walt Proctor | John Leary | Kari Brennan |
| Mario Sullivan | Kendra Young | Phil Brink | David Graf |

**Presenters**

| | | |
|---|---|---|
| Rob Viehl – CWCB | Katie Birch – CPW | Alyson Gould – CO Water Trust |
| Kate Ryan – CO Water Trust | Roy Smith – BLM | Curits Keetch – USFS |
| Ron Cousineau – CSFS | Kamie Long – CSFS | Linda Masters – CSU Extension |
| Ian Wilson – Trout Unlimited | Mario Sullivan – CNCC | Peter Fleming – CRWCD |

| | | | |
|---|---|---|---|
| BLM Riparian Training Team | Rio Blanco Herald Times | Nakayla Lestina – NRCS | Julia Eskelson - DCT |
| Rio Blanco Fire Protection | Rio Blanco Fairgrounds | Buford School | Bob Tobin |
| Hunter Causey – CRWCD | Ryan Bailey | Colorado Northwest Community College | |



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# White River Integrated Water Initiative

# Mission Statement and Overall Goals

## Mission Statement

Community based initiative to identify actions promoting a healthy river that ensures a vibrant economic community capable of securing the future vitality of agriculture, fisheries, recreation, municipalities, and industry while protecting water rights, quantity, and quality with respect for the local customs, cultures, and property rights.

## Overall River Goals for Current and Future Generations

- Protect and preserve existing water rights and other beneficial water uses
- Protect and enhance water quantity and quality through promoting best management practices for:
  a. Agriculture Enhancements
  b. Favorable Conditions of Streamflow
  c. Forest Health
  d. Rangeland Health
  e. Riparian Health
- Identify opportunities for creation or improvement of infrastructure to support efficient consumptive and non-consumptive uses
- Support the development and maintenance of efficient and necessary long term storage solutions that will improve, enhance and ensure irrigation, river health, water quantity, water quality, and native and recreational fisheries



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# Executive Summary

There are three main components in Phase II of the White River Integrated Water Initiative: Public Outreach/Community Engagement, Diversion Assessments, and Riparian Assessments.

At its core, the Water Initiative is a community-based water planning process. Numerous public meetings were held in all areas of the White River Basin. The purpose of the meetings was to gather input, communicate assessment findings, and plan for future activities.

The Diversion Assessments team completed twenty-five assessments on the White River and Piceance Creek. Each diversion was assessed for its functionality and environmental health. In general, the infrastructure of all assessed diversions is functional. There are two assessed diversions that are being negatively impacted by erosion along the White River. The erosion is causing the in-stream diversion to lose functionality. The environmental health assessment of the assessed diversions revealed a need for improved fish passage and increased management of noxious weeds. A complete summary of the Diversion Assessment scores is found on page 28.

The Riparian Assessment Team completed twenty-one assessments on the White River and Piceance Creek. Proper Functioning Condition of Lotic areas was used as the assessment methodology. In general, Piceance Creek is having negative impacts from the ongoing drought. Paradoxically, Piceance Creek is also negatively impacted by flash floods. The White River has isolated areas of bank erosion that are impacting the river. All areas assessed were found to be either Functional-At-Risk or in Proper Functioning Condition. A complete summary of the Riparian Assessment scores is found on page 35.

Complete assessment summaries can be found on the White River and Douglas Creek Conservation District website (https://wrcd-dccd.colorado.gov/) Go to the Water Initiative tab and then click on the Reach Reports.



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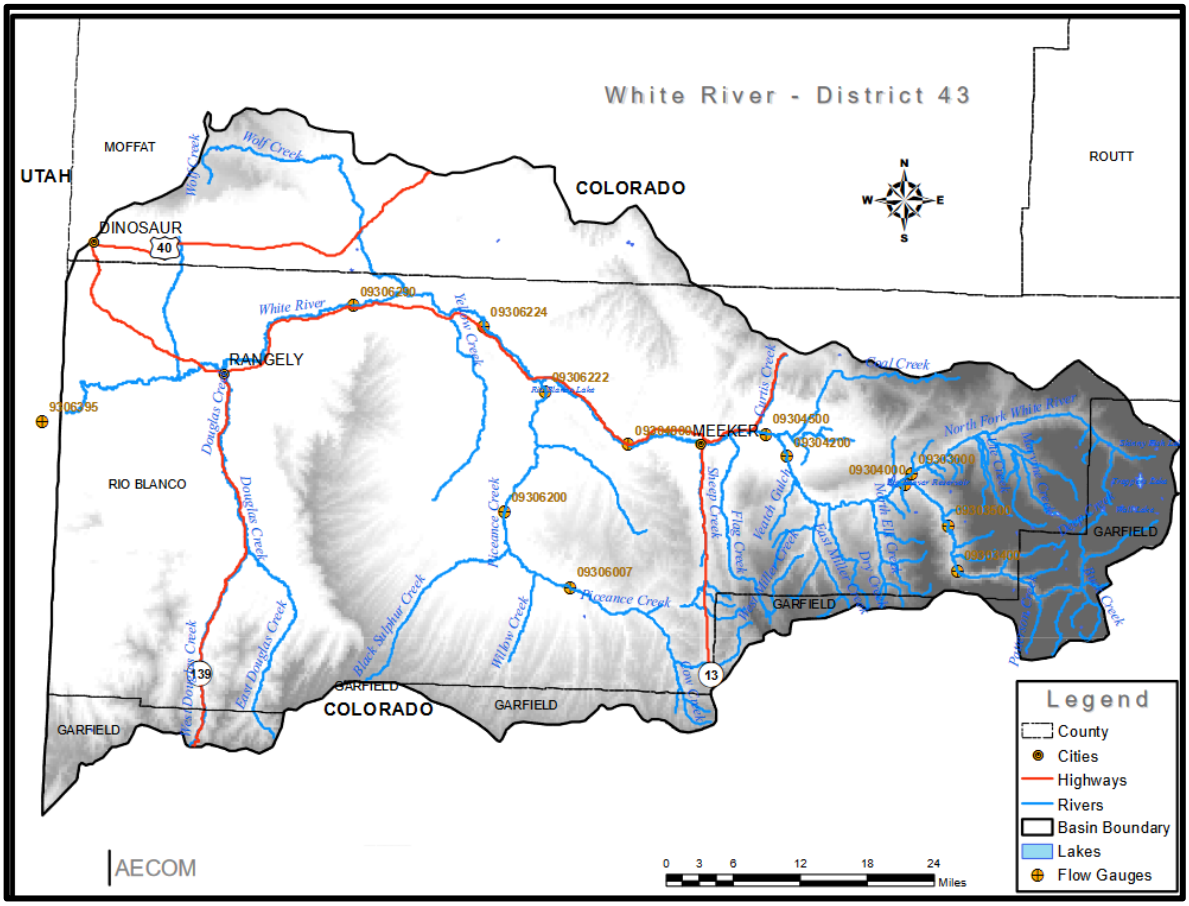
# White River Integrated Water Initiative

# Phase II Report

## White River Basin General Information

The White River is located on the western slope of Colorado between the Colorado River and the Yampa River. It flows into the Green River in Utah and ultimately is a tributary to the Colorado River. The White River basin is approximately 3,750 square miles and encompasses nearly all of Rio Blanco County. (White River Basin Information, CDSS, 2009)




According to 2019 U.S. Census information, the population of Rio Blanco was 6,384. Meeker and Rangely, the two towns served by the White River, account for 4,817 people, the remainder of the population is rural. Agriculture is the predominant economic base in the eastern part of the county. The western part of the county is economically based in mining and oil and gas extraction. Recreation is an important economic driver for the whole county with hunting and fishing as the predominant activities.



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The earliest water rights in Rio Blanco County are dated in May of 1880 (CDSS, Water Rights) and are located just west of Meeker. Several other water rights were appropriated in the early 1880's on the White River and Piceance Creek. These water rights are predominately utilized for agriculture.

## Fish Species found in the White River

**(Source Colorado Parks and Wildlife)**

The White River and Piceance Creek are home to at least 7 species of cold-water fish and 8 species of warm-water fish. There are several species of trout found alongside mountain whitefish throughout the length of the White River downstream to approximately the confluence of Yellow Creek and the White River. Yellow Creek serves as a reference point where the White River transitions to more of a warm-water fishery below the confluence and a cold-water fishery above its confluence with the White River. The true line of demarcation in the fisheries is Taylor Draw Dam. The dam presents a physical barrier that prevents all fish movement up the river. There are at least 14 different species of warm-water fish found downstream of Taylor Draw Dam, including the endangered Colorado pikeminnow. The White River is critical habitat for the recovery of the Colorado pikeminnow. Other endangered species have been found intermittently in the White River. Listed below are fish species found in the White River along with their most common location in the river system.

**Fish Species found upstream of Taylor Draw Dam**

Mountain whitefish (native) – Predominant species found
Rainbow trout
Brown trout
Brook trout
Cutthroat trout (native)
Cutbow trout (technically a hybrid of rainbow and cutthroat trout)
Bluehead sucker (native)
Flannelmouth sucker (native)
Mountain sucker (native)
White sucker (nonnative but rarely encountered)
Roundtail chub (native)
Mottled sculpin (native, small bodied)
Speckled dace (native, small bodied fish)
Common carp
Channel catfish

**Fish Species found downstream of Taylor Draw Dam**

Smallmouth bass – Predominant species found
Colorado pikeminnow - Federally Endangered
Flannelmouth sucker (native)
Bluehead sucker (native)
Roundtail chub (native)
Green sunfish
Common carp
Channel catfish
Speckled dace (native, small bodied)



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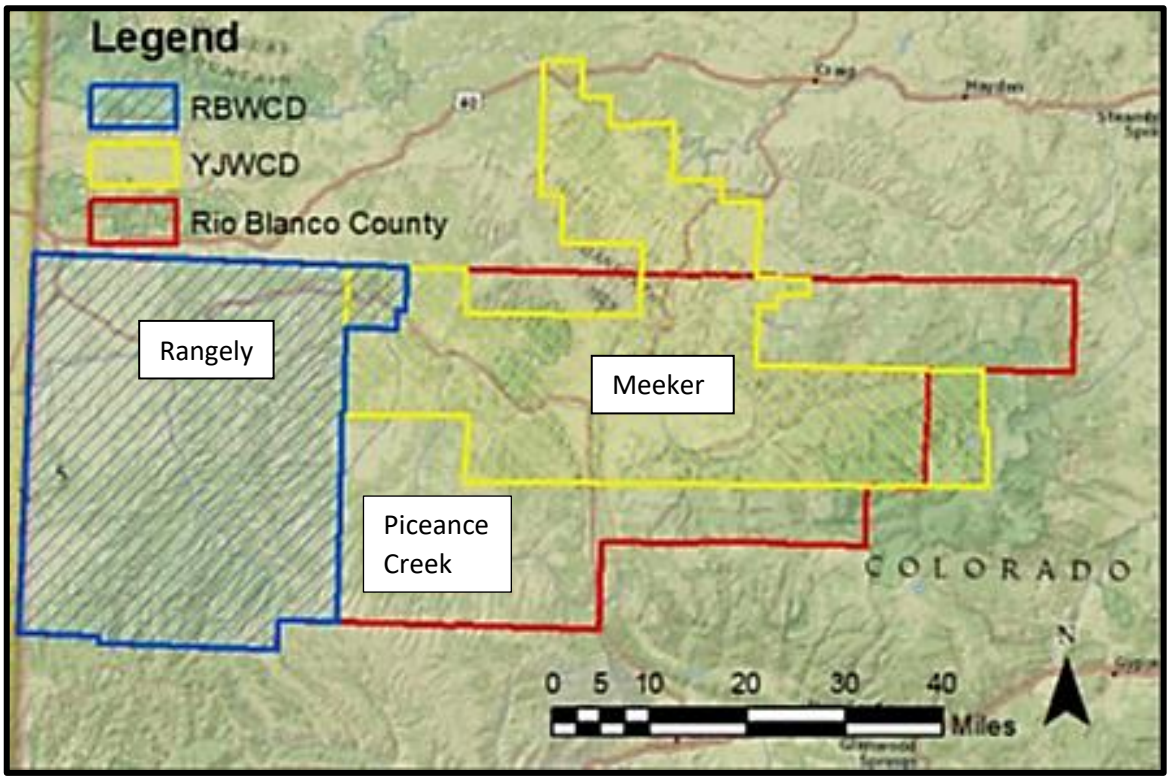
Mottled sculpin (native, small bodied)
Black crappie
Black bullhead
Bluegill
Mountain whitefish (native, only occasionally encountered below Taylor Draw Dam)

**Water Conservancy Districts**

The White River Basin contains two water conservancy districts: Yellow Jacket Water Conservancy District and Rio Blanco Water Conservancy District. Water Conservancy Districts are local government agencies created to construct, pay for, and operate water projects (Citizen's Guide to Colorado Water Law, Fifth Edition, page21). The map below delineates the boundaries of each district.




**Conservation Districts**

Two Conservation Districts encompass the majority of the White River drainage. The White River Conservation District covers most of the eastern portion of the Rio Blanco County and Douglas Creek Conservation District covers most of the western end. The districts promote the wise use of natural resources and address rangeland health, wildlife, forest health, water, and soil erosion through information, education and technical assistance. They represent and work with private landowners to facilitate their stewardship of natural resources. They also engage in federal land management planning efforts as a local government. The boundaries of the Conservation Districts are shown in the map below. (Colorado Association of Conservation District)



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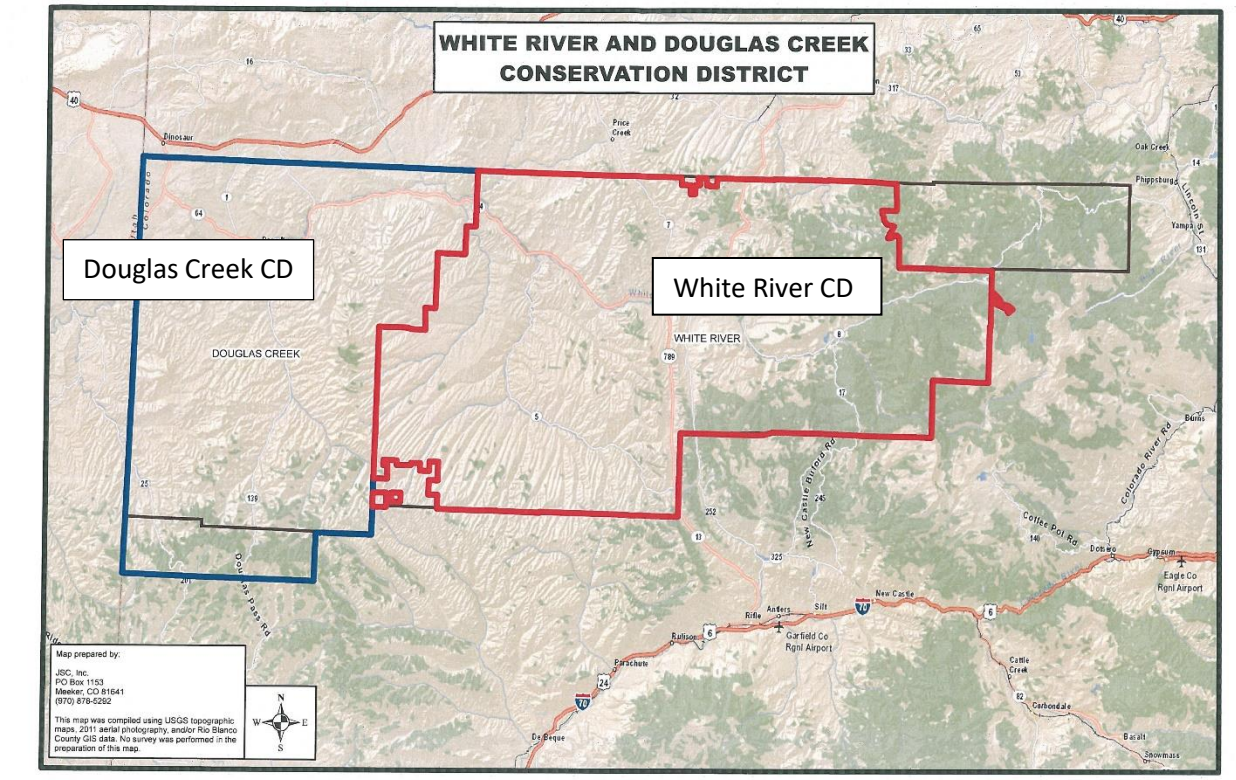



Source: White River and Douglas Creek District Office

# Unique Features of the White River Basin

### Piceance Creek

- Piceance Creek has a unique hydrology compared to the White River.
    - Based on USGS Flow Gauges at Ryan Gulch and White River, Piceance Creek does not have a consistent peak flow period.
    - The creek is prone to flash flooding and associated sediment loads.
    - Administrative calls on the water typically occur on an annual basis. Junior water rights are frequently subjected to the calls and the water rights owners have their water curtailed.
- The Piceance Creek basin holds the largest known oil shale deposit in the world. (U.S. Geological Survey Professional Paper 1310)
    - If these deposits are developed, it will likely divert water rights to an industrial use instead of agricultural use.
- The gas industry is highly developed in the Piceance Creek basin. It is a large holder of land and water rights.
- Agriculture is the predominant land use along the creek valley.

## Upper Reach of the White River

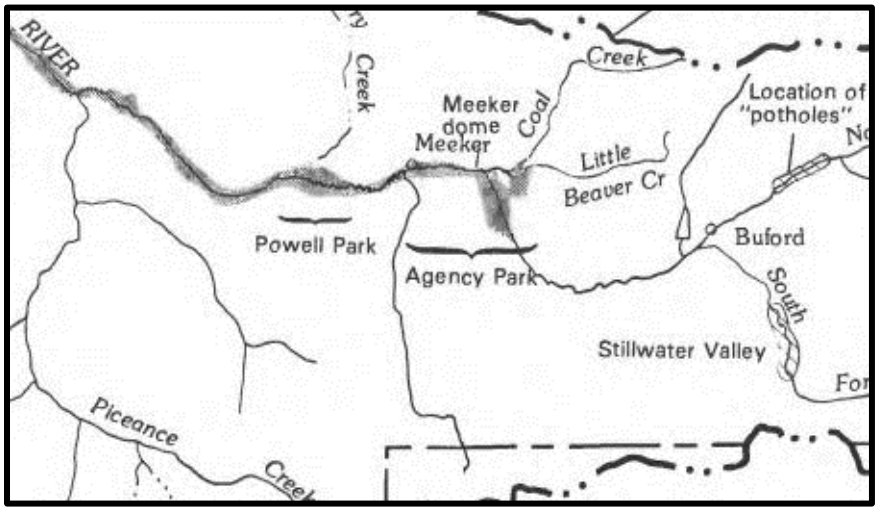
**(All Water Rights data from CDSS: https://dwr.state.co.us/Tools/WaterRights/NetAmounts)**

- Big Fish Fire (2002) - The Big Fish fire burned 17, 056 acres in the forest at the headwaters of the White River. It could be impacting the watershed and the ability of snow pack to turn into stream flow.
- Lake Avery (Big Beaver Reservoir) – Total absolute water decree is 7917.76 acre-feet and has a storage volume of 7,658 acre-feet. Water is decreed to be used for recreation, fisheries, and wildlife. The Colorado Parks and Wildlife has entered into a water loan agreement with the Colorado Water Conservation Board to lease the water a maximum of five years out of every 10 years to satisfy instream flow rights on the White River and Big Beaver Creek. The released water also helps to reduce the overall water temperature on the White River
- Fish species – Brook trout, native cutthroat trout, rainbow trout, brown trout, mottled sculpin, and mountain whitefish prefer the colder waters of the Upper Reach. They are more prevalent in this reach than other reaches of the White River.

## Middle Reach of the White River

**(All Water Rights data from CDSS: https://dwr.state.co.us/Tools/WaterRights/NetAmounts)**

- The largest agriculture water diversions on the White River are in this reach.
- Powell Park and Agency Park Aquifers –




**USGS Survey, 1985: The area of the Agency and Powell Park Aquifers and Meeker Dome**

- According to the 1985 USGS Preliminary Study of the Agency and Powell Park Aquifers, the aquifers are estimated to contain approximately 30,000 and 39,000 acre-feet of water respectively. The study estimates that 20% of the water will be released into the White River, a volume of approximately 13,800 acre-feet of water (an amount equal to the original storage volume of Kenney Reservoir).
- The USGS study estimated the saturated depth at a maximum of 44 feet.

- The USGS qualified all of its research by stating the results are preliminary and more study is needed.

- Town of Meeker – population 2,374 (2020 US Census) derives its municipal water from wells located in the Agency Aquifer. Meeker historically had two surface diversions structures, relatively close to town. Beginning as early as the 1970's, water began to be delivered from an alluvial wellfield approximately 5 miles upstream, near Coal Creek and in the Agency Aquifer. The wells (436045, 436046, and 436139) were decreed alternate points for the town's original surface diversions, and had relatively junior rights of their own. Diversions were attributed to the surface diversion structures in the State's records until 2003, despite being physically taken at the wellfield. Since 2003, the diversions have been recorded under the well structures. (White River Basin Information, CDSS, 2009)

  Meeker's active rights are listed below: (White River Basin Information, CDSS, 2009)

| WDID | Adjudication Date | Appropriation Date | Amount (CFS) |
|---|---|---|---|
| 430810 | 1958-11-26 | 1950-05-04 | 4.00 |
| 430810 | 1958-11-26 | 1957-08-20 | 3.00 |
| 430811 | 1925-08-17 | 1904-05-10 | 3.42 |
| 436045 | 1976-12-31 | 1974-08-12 | 1.22 |
| 436046 | 1976-12-31 | 1975-08-11 | 1.33 |
| 436139 | 1980-12-31 | 1980-11-03 | 1.22 |

- Meeker Dome - The site of several abandoned oil and gas exploratory wells, is a local anticlinal uplift in northwestern Colorado, 3 miles east of the town of Meeker and on the north bank of the White River. Historically, the Dome has been a significant source of salts into the White River. (https://www.usbr.gov/projects/index.php?id=356) This leakage of salts has been rectified, but likely bears monitoring to ensure the leakage does not recur.

## Lower Reach of the White River

- Endangered fish – The segment of the lower reach of the White River from Kenny Reservoir and Taylor Draw dam, downstream to the confluence with the Green River is considered to be "critical habitat" for several federally and State listed fish species. These species include the Colorado pikeminnow, bonytail chub, humpback chub, and the razorback sucker. (Trout Unlimited) This river segment is managed cooperatively by the United States Fish and Wildlife, Colorado Parks and Wildlife, and Rio Blanco Water Conservancy District through a Memorandum of Agreement signed in 1982.
- Reservoirs - **(All Water Rights data from CDSS: https://dwr.state.co.us/Tools/WaterRights/NetAmounts)**
  - Johnnie Johnson Reservoir (Rio Blanco Reservoir) – This is an off-channel reservoir with a total absolute water right of 1036 acre-feet. The water is decreed to be used for recreation, fisheries, and wildlife.
  - Taylor Draw Reservoir (Kenney Reservoir) – Absolute water right of 17,350 acre-feet and a conditional water right of 10, 300. The right is divided into a first fill and a second fill right. The first fill right of 13, 800 and the second fill right of 3,500 are absolute. The remaining second fill right of 10,300 is a conditional water right. The initial storage

volume was 13,800 acre-feet of water. (White River Basin Information, CDSS, 2009) This is an on-channel reservoir and it has experienced a significant amount of sedimentation. At present, it is estimated to store 2100 acre-feet of water (Wheeler 2022). This reservoir is operated to ensure a minimum release of 200 cfs or as a "run of the river" if the river flow is greater than 200 cfs. This is to satisfy the minimum stream flow for the endangered fish species found in the White River below Taylor Draw Dam. The decreed water uses for Taylor Draw Reservoir are: irrigation, municipal, fisheries, domestic, stock, and power generation.

- White River Storage Project – planning phase The total conditional water decree for the White River Storage Project is 66,720 acre-feet. Copied below is an excerpt from the water decree granted January 7, 2021. Case number 2014CW3043

> 13. Use or Proposed Use: municipal use (including but not limited to domestic, irrigation, commercial, and industrial uses) for the Town of Rangely, augmentation (to augment depletions through a future blanket augmentation plan for water users within the District Boundaries and within the Yellow Jacket Water Conservancy District boundaries pursuant to leases or exchanges of water under C.R.S. § 37-83-106), mitigation of environmental impacts of the Wolf Creek Reservoir project ("Mitigation"), hydroelectric power generation exercised only in conjunction with releases for other decreed beneficial uses, and in-reservoir uses for recreation, piscatorial, and wildlife habitat.

- Town of Rangely – population of 2,689 (2020 U.S. Census). Municipal water supply is directly from the White River.

| WDID | Adjudication Date | Appropriation Date | Amount (CFS) |
|---|---|---|---|
| 430889 | 1958-11-26 | 1947-06-26 | 2.60 |
| 430889 | 1958-11-26 | 1957-09-28 | 28.35 |

- Industry - Industrial use of water in the basin remains minor at this time, amounting to less than 1,000 acre-feet/year, according to estimates made during CDSS development. (White River Basin Information, CDSS, 2009)

## Current water storage on the White River

**(All Water Rights data from CDSS: https://dwr.state.co.us/Tools/WaterRights/NetAmounts)**

The mainstem of the White River has two reservoirs: Johnnie Johnson (Rio Blanco) and Taylor Draw (Kenney). In addition, Big Beaver Reservoir (Lake Avery) drains into the White River and is located on a tributary to the White River.

- Big Beaver Reservoir (Lake Avery) – Absolute water right of 7915.86 acre-feet. 267.9 acre-feet are decreed for recreation, fishery, and wildlife. 7657.86 acre-feet are decreed for recreation and fisheries. The Colorado Parks and Wildlife has entered into a lease agreement with the Colorado Water Conservation Board to lease water at most five out of every ten years to support minimum stream flows in the White River. This water also decreases the temperature of water in the White River.

- Johnnie Johnson Reservoir (Rio Blanco Reservoir) – Absolute water right of 1036 acre-feet. This is an off-channel reservoir and is not subject to sedimentation. The water is decreed for recreation, fishery, and wildlife. In addition to being a sport fishery, the reservoir provides important habitat for migrating waterfowl.
- Taylor Draw Reservoir (Kenney Reservoir) – Absolute water right of 17, 350 acre-feet and a conditional water right of 10, 300 acre-feet. The right is divided into a first fill and a second fill right. The first fill right of 13, 800 acre-feet and the second fill right of 3,500 acre-feet are absolute. The remaining second fill right of 10,300 acre-feet is a conditional water right. This is an on-channel reservoir and it has experienced a significant about of sedimentation. At present, it is estimated to store 2100 acre-feet of water (estimate from Wheeler, 2022). The water is decreed for several uses: irrigation, municipal, fisheries, domestic, stock, and power generation.

## Water Concerns in the White River Basin

There are several reasons the Rio Blanco County communities have come together to form the White River Integrated Water Initiative.

- Colorado's Water Plan places an emphasis on developing stream management plans.
    - There is a local commitment to developing a water plan that will provide a positive outcome for the communities and water users in Rio Blanco County.
- Water storage on the White River is predominantly for recreation, fisheries, and wildlife.
    - Only Taylor Draw Reservoir has a decree that includes water use for irrigation
- "Big River Issues" have the potential to negatively impact the White River and Piceance Creek.
- Declining flows have resulted in water quality and water quantity concerns.
    - The White River and Piceance Creek have both experienced lower than average flows for the last twenty years.



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# USGS Flow Gauge Data

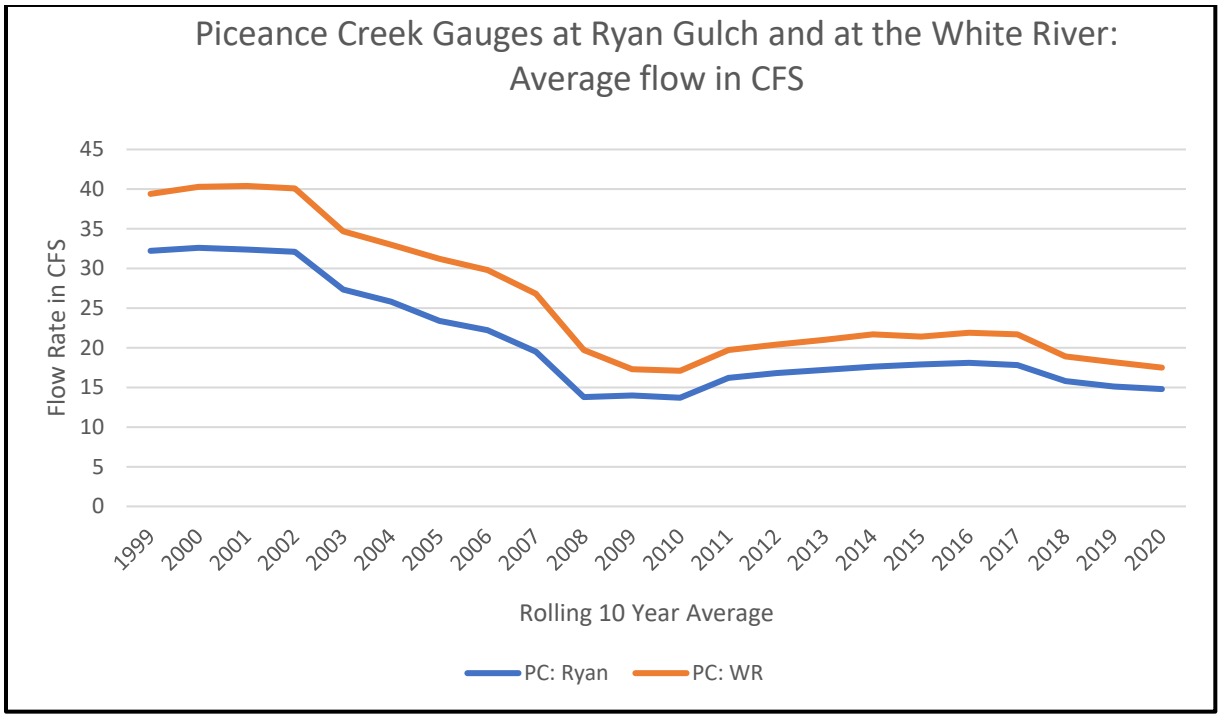
**Daily Mean Flow Data**

**Yearly Data averaged in 10 year rolling increments**

**Gauges**

**Piceance Creek below Ryan Gulch : USGS 09306200**

**Piceance Creek at White River, Colorado: USGS 09306222**




USGS National Water Information System: https://waterdata.usgs.nwis/annual



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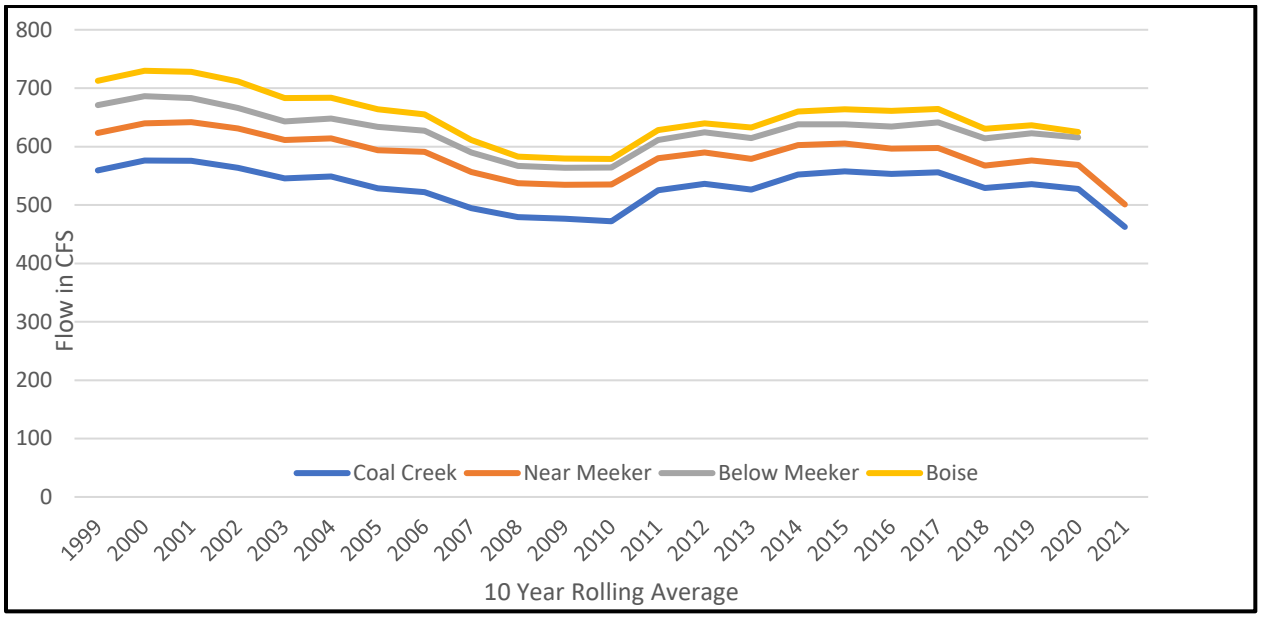
# USGS Flow Gauge Data

**Daily Mean Flow Data**

**Yearly Data averaged in 10 year rolling increments**

**Gauges:**
**Below Coal Creek: 09304200**
**WR Near Meeker: 09304500**
**WR Below Meeker: 09304800**
**Below Boise Creek: 09306290**




USGS National Water Information System: https://waterdata.usgs.nwis/annual



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# Summary of Phase I of the White River Integrated Water Initiative

As the community interest in water planning was increasing, a series of public input meetings were held to gauge the level of interest and identify the coordinating entity to convene a water planning initiative. Several interviews with long time community members and leaders were conducted along with the public meetings. The result was the designation of the White River and Douglas Creek Conservation Districts as the organizing entity for the Water Initiative. It was decided to form a Planning Advisory Committee (PAC). This committee is composed of community members from throughout Rio Blanco County and is made up of one-third municipal interests, one-third agriculture interests, and one-third environmental and industrial interests. The Planning Advisory Committee first actions were to hold public meetings to help develop the Mission Statement and Overall Goals for the water plan.

## Mission Statement

Community based initiative to identify actions promoting a healthy river that ensures a vibrant economic community capable of securing the future vitality of agriculture, fisheries, recreation, municipalities, and industry while protecting water rights, quantity, and quality with respect for the local customs, cultures, and property rights.

## Overall River Goals for Current and Future Generations

1) Protect and preserve existing water rights and other beneficial water uses
2) Protect and enhance water quantity and quality through promoting best management practices for:
   a. Agriculture Enhancements
   b. Favorable Conditions of Streamflow
   c. Forest Health
   d. Rangeland Health
   e. Riparian Health
3) Identify opportunities for creation or improvement of infrastructure to support efficient consumptive and non-consumptive uses
4) Support the development and maintenance of efficient and necessary long term storage solutions that will improve, enhance and ensure irrigation, river health, water quantity, water quality, and native and recreational fisheries

The PAC decided the best way to organize the Water Initiative was to divide the White River Basin into reaches because of the length and diversity of the White River and Piceance Creek. Each reach is defined by its geological and hydrological features. They are: Upper White River– headwaters to Miller Creek, Middle White River– Miller Creek to just west of Powell Park, Lower White River– west of Powell Park to the Utah state line, and Piceance Creek. The final item accomplished in Phase I of the water initiative was to create a plan forward and scope of work for Phase II. The PAC decided to hire a coordinator charged with accomplishing the tasks set by the PAC. The following tasks summarize the Phase II Scope of Work.



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1) Continue stakeholder engagement and community outreach through PAC meetings and public outreach meetings.
2) Research all work that has been done on the White River and Piceance Creek to determine if there are data gaps that need to be addressed.
3) Coordinate and Conduct Diversion Structure and Riparian Assessments on the White River and Piceance Creek
4) Provide a summary report of Phase II activities and develop a scope of work for the next phase.

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# Phase II of the White River Integrated Water Initiative

Two coordinators were hired to complete the Phase II scope of work. One coordinator was responsible for coordinating and conducting the diversion and riparian assessments and participating in the public meetings. The second coordinator was responsible for coordinating the PAC meetings, planning, organizing, and conducting the public outreach, writing the Phase II Report, and developing the Phase III scope of work.

## Planning Advisory Committee (PAC)

The PAC is comprised of 16 representatives from recreation, industry, environment, agriculture, and municipalities. In addition, there are technical advisors representing the US Forest Service, Colorado Northwest Community College, Bureau of Land Management, and CSU Extension. All PAC meetings are open to the public and are advertised in advance on the Conservation District website and published in the Meeker Herald. The purpose of the PAC is to assimilate the information gathered in public meetings and the presentations made to them and use that knowledge to guide the Water Initiative. The PAC is responsible for developing the priorities and scope of work, the Douglas Creek and White River Conservation District Boards are the governing body of the Water Initiative.
In order to determine the focus and needs of the White River moving forward, the PAC meetings focused on bringing in speakers to provide information on the overall goals of the Water Initiative. The speakers and meeting focus were:

- Trout Unlimited – Ian Wilson
    - The importance of river connectivity for trout passage and environmental health
- Colorado State Forest Service – Ron Cousineau
    - The importance of forest health to the watershed and to reduce fire risk.
    - Identifying areas of concern for forest treatments
    - How the Good Neighbor Authority works to accomplish forest treatments across property boundaries
- Instream Flow Discussion - Speakers
    - Colorado Water Conservation Board – Rob Viehl, Chief Stream and Lake Protection Section



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  - Bureau of Land Management – Roy Smith, Water Rights/Wild and Scenic River lead for BLM
  - Colorado Parks and Wildlife – Katie Birch, Instream Flow Program Specialist
  - Colorado Water Trust – Kate Ryan and Alyson Gould, Attorneys
  - Peter Fleming – General Counsel for the Colorado River Water Conservation District

  The purpose of the discussion was to understand how the instream program works, what its goals are, how the program differs from the Wild and Scenic program, and how water is put into the instream flow program.
- Agency and Powell Park Aquifers – Dr. Mario Sullivan
  - Obtain a basic understanding of what is known and what is uncertain concerning these unique aquifers.
- Rangeland Health -Linda Masters
  - Understand the importance of rangeland health to water quantity and quality.
  - Understand the pressures on the rangeland during prolonged drought
  - Understand the difference between upland vegetation and riparian vegetation

The PAC has used this information along with the input from public meetings to define their priorities for the Phase III Scope of Work.
The agendas and minutes from each meeting are on the Conservation District Website (https://wrcd-dccd.colorado.gov/).

## Public Outreach

The Water Initiative is a community driven plan. At every step of the process, the opportunity has been taken to engage the public in an active dialog and to keep the public updated on the planning and choices that are being made by the PAC.

- Newspaper articles were published every other month to keep the general public informed of the Water Initiative activities.
- All PAC minutes, reach meeting minutes, and public input meeting minutes posted on the conservation district website (https://wrcd-dccd.colorado.gov/)
- Reach Meetings –
  - Three meetings were held in each reach with the specific purpose of gathering input from community members on their areas of interest and what they feel are the biggest needs in their reach.
  - Speakers were provided in each reach based on the needs identified in the Phase II Public Meetings.
    - Army Corp of Engineers – permitting of projects within the river corridor
    - USFS – Forest Health
    - CSFS – Forest Health
    - Colorado River District – Hydrology studies
    - Water storage possibilities
  - The information gathered from the public at these meetings was taken to the PAC and used to define the Phase III Scope of Work
- Public Input Meetings –

- Two public input meetings were held in each reach with the specific purpose of having the public review the information coming from the PAC and make suggestions to be taken back to the PAC for consideration.
    - As a direct result of these meeting, the Mission Statement and Overall Goals were modified to reflect the needs of the community.

## Research Data Gap Findings

After reviewing existing studies, the following list is included to identify data gaps in the White River Basin.

- More study is needed to understand and define the Agency and Powell Park Aquifers and their role in the White River system.
- Return flows have been modeled, but no data has been collected to document the return flows volume or timing.
    - The models have not been verified or field tested.
- There has been no research in the White River Basin on the impact reduced natural flows may have on the Basin.
- HUC mapping of the forest assets and potential risk factors would be beneficial to developing landscape treatment of the forest.
    - Steep hillsides, critical infrastructure and ecosystems
    - Water quality risks
- Fluvial Hazard Zone mapping
    - How the river needs to move
    - Is there infrastructure that is likely to cause flooding issues (roadway that is impinging on the river, narrow bridge, retaining walls that are preventing the river from moving naturally…)
- R2Cross analysis of minimum stream flow needs
- Inventory of stock ponds and small reservoirs that need to be rehabilitated
- Up to date mapping of the location and extent of invasive species in the riparian areas along the White River and Piceance Creek needs to be done.



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## Reach Designation: by Mario Sullivan, PhD

For the purposes of the White River Integrated Water Initiative, the White River was divided into three reaches: upper, middle and lower. The upper reach extends from the headwaters of the White River to its confluence with Miller Creek, the middle reach extends from Miller Creek to just west of Powell Park, the lower reach extends just west of Powell Park to the state line. Piceance Creek was designated as its own reach.

Descriptions of each reach follow:

## Piceance Creek

### Sinuosity and Elevation Gradients:

The average sinuosity of Piceance Creek is about 1.3 and ranges from 1.1 to 1.4. The upper stretch tends to be less sinuous. While upper Piceance creek (above where it crosses highway 13) is rather steep with a nearly 3% grade. Overall, the average grade is 1.2%.

### Hydrology:

Piceance Creek appears to have unique seasonal patterns of discharge. While peak flows occur in May at 167 and 190 CFS (Station No's. 093062000 and 093062222, respectively), both the middle and lower stretches of Piceance Creek demonstrate much more variability during the winter months than other reaches in the White River. Therefore, winter time base flow might require more analysis but flows in Piceance Creek do drop in September to about 9 and 14 CFS in the middle and lower stretches respectively and then begin to rise. This pattern might be explained, at least in part, by the fact that Piceance Creek is a smaller drainage area and tends to be more sensitive (flashy) and the lower stretches might receive more precipitation in the form of rain later into the winter than some of the other reaches on the White River (particularly compared to the upper and middle reaches of the main-stem White River). Another noteworthy finding is the substantial variation in average monthly flows within Piceance Creek (CV max = 190% in lower Piceance Creek in May). This means that this stretch of Piceance Creek could be nearly dry or be flowing at double the average discharge in any given May. While flow variability decreases into the winter time, the average CV is still greater (30%-40%) than that in the White River (13%-20%).

### Geologic Transitions:

The hillslopes of Piceance Creek tend to drain relatively young Tertiary sedimentary deposits; younger Uinta formation toward the tops of the ridges and older Green River formation in the lower elevations. In addition, the lower most stretches of Piceance Creek might drain some Mancos shale. In reviewing Tobin et al. (1985), sediment loads in Piceance Creek are highly variable and sensitive to flow magnitude. For example, a tributary near the upper stretches of Piceance Creek had sediment loads that ranged from 0.0 mg/L (no flow) up to 76,000 mg/L during run-off events. Furthermore, sediment loads can be highly localized; some sites from Tobin (1985) reported maximum sediment loads in the range of 100's of mg/L.



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### Rosgen 1994 Classifications:

Due to the variation in sinuosity and slope, Piceance Creek might be classified as a type E or G stream, depending on local slope and sinuosity. A designation of E versus G will depend on local entrenchment. Because Piceance Creek's sediment load is highly variable and the geology it drains is somewhat similar to that of the middle and lower White River, there will probably some gravels (perhaps cobbles and boulders in the steeper, upper reach) but primarily gravels, sands, and silts perhaps putting this stream in G4-G6 or G4c-G6c.

## Upper Reach of the White River

### Sinuosity and Elevation Gradients:

The North Fork and South Fork of the White River are markedly steeper than the rest of the upper reach with 2.4 and 1.8% grades, respectively. The remaining upper reach is closer to a 1.0% average grade. Sinuosity (***S***) is generally low to moderate (average = 1.2) but the South Fork has a small reach that would be considered a meandering reach (***S*** = 1.6) which appears to also contain an oxbow lake.

### Hydrology:

USGS Station No. 09304115 had the most recent data within the main-stem of the upper reach but the period of record is only 2003 through 2009. During this period, the average annual CFS appears to be increasing (slope = 20.2) although a longer period would be desirable for this analysis because similar increases in flow are observed in other reaches during the same period of record. Peak discharge occurs in June with an average of about 1,487 CFS and drops to a winter base flow of about 270 CFS. In terms of average monthly flows, the upper reach is the least variable and the greatest variability in flow occurs in June (coefficient of variation = 44%).

### Geologic Transitions:

While it is true that the water quality of the North and South forks, at least in terms of clarity, is protected by more resistant geological strata in the upper segments (which includes both relatively old Cambrian to

Pennsylvanian rocks and relatively young basalt lava flows). However, both tributaries quickly begin to drain Mesozoic sedimentary strata (i.e. Chinle formation) that contain shales and mudstones with mobile sediments. Therefore, the forested areas and riparian zones around the upper reach are of particular importance with respect to sediment stability and maintaining water clarity. The riverbed and tributary of the upper reaches of the North and South Forks have some glacial influence but in general, the valley fill is of Quaternary aged gravels deposited by flowing water.

### Rosgen (1994) Classification:

Because of the relatively steep gradients along the upper reaches of the North and South Forks along with the relatively low sinuosity (with the exception of specific reaches), the top of the upper reach might be classified as A+ to A depending on the entrenchment of the segment of river being assessed. Given the gradient and geology, the substrates will likely be coarse sands to boulders (A1-A3) or B1a-

B3a depending on local steepness. The lower segments of the upper reach are likely to be primarily classified as "B" streams due to the potential for a greater width to depth ratio.

## Middle Reach of the White River

### Sinuosity and Elevation Gradients:

The middle reach of the White River is moderately sinuous to meandering; ***S*** ranges from 1.2 to 1.5 and the average = 1.2. The average steepness from the top of the middle reach to the bottom of the middle reach is 0.73% for a relatively flat elevation gradient.

**Hydrology:**

USGS Station No. 09304500 appears to have a slight decline in annual average CFS during 1902-2018. Peak discharge occurs in June at an average of 1,791 CFS and drops to a winter base flow of about 308 CFS. The greatest variability in flow is observed in July (CV = 62%).

**Geologic Transitions:**

The top of the middle reach represents an important geologic transition into even younger Mesozoic sedimentary rocks from the Triassic and Cretaceous (i.e. Dakota sandstone, Mowery shale, and Mancos shale). Some of the members of these groups are not well consolidated and produce fine sands, silts, and muds that can be highly mobile. As the middle reach heads into Agency Park (just southeast of town of Meeker), the valley broadens into Quaternary aged gravel and sand valley fill from either ancient White River deposits or ancient tributary deposits. At the top of the middle reach is also where the Meeker Dome is located and the site of several water wells. While the surface geology has changed, the sediment load is still relatively low and is perhaps buffered by the broad valley and runoff is filtered through the gravel matrix. As the White River continues to flow out of Agency Park and into Powell Park, there is another significant geologic change as the river cuts through the Grand Hogback; the Grand Hogback separates Agency Park (east of hogback) and Powell Park (west of hogback). After this point, there is a substantial increase in sediment load and changes in other water quality parameters such as increases selenium (see Tobin 1993 for further details). Much of this change in water quality is probably natural and related to the draining a different set of strata (i.e. the upper Cretaceous aged William's Fork formation) as the river passes through the hogback and picks up even more sediment and from the unconsolidated shales and mudstones and exposed coal beds. The middle reach boundary is just west of Powell Park where there exists yet another geologic transition into the lower reach.

**Rosgen 1994 Classifications:**

Because the middle reach is more consistently sinuous, presumably has a broader channel, perhaps stretches within the middle reach will be classified as G depending on entrenchment. Due to the likely increase of fine sediments in the substrate, perhaps the stretches will range from G4-G5 or G4c-G6c.

## Lower Reach of the White River

### Sinuosity and Elevation Gradients:

The lower reach is the most sinuous on average (***S*** **=** 1.3) but ranges between 1.1 and 1.7. Stretches below Kenney Reservoir tend to be more sinuous. The average elevation gradient is relatively flat (0.33%).

### Hydrology:

Between 1983 and 2019, there has been an overall decline in the average annual discharge (slope = -9.0) at USGS Station No. 09306290 in the middle of the lower reach. Perhaps some trend analysis on other major tributaries could shed some light on whether or not this trend is basin-wide or primarily in the main-stem White River. Peak discharge occurs in June at an average of 1,803 CFS and drops to a winter time base flow of about 380 CFS. The greatest variability in flow is observed in July (CV = 70%). With respect to flow variability around monthly averages, there appears to be an incredibly tight positive correlation between the middle reach and lower reach (both in the upper and middle stretches of the lower reach). This means that, for any given month, as flows in the middle reach deviate from average, there is an almost perfectly proportional response in the lower reach that also goes in the same direction. This correlation is much stronger than what we observe between flow variability in the upper reach versus the middle reach. This suggests that flow variability in the middle reach has a dominant influence on flow variability in the lower reach that appears to even swamp out variation due to the influences of Yellow Creek and Piceance Creek. Because of water withdraw from Miller Creek, we would expect a decoupling of the middle and lower reaches, particularly if there is no surface return flow from Miller Creek. However, if there is percolation through the alluvial fill in middle reach from field irrigation out of Miller Creek, then there might be a substantial amount of sub-surface return flow to the bottom of the middle reach and the top of the lower reach which could, at least in part, explain the strong hydrologic coupling between the middle and lower reach especially during a long summer (June through October).

### Geologic Transitions:

The lower reach is known for its turbid waters and that is primarily due to the unconsolidated sedimentary rocks of the Williams Fork Formation (upper stretches of lower reach) and main body of the Mancos Shale (lower stretches of lower reach). Substrates in the lower reach average about 25% clay, 45% silt, and 30% sand (Tobin 1994) which puts it in a clay dominant texture by use of the soil textural triangle. The geologic setting does not change markedly until near the state line where the river cuts through another ridge that is made of relatively young strata such as the Green River Formation. Perhaps more can be done with reconciling the water clarity and sediment 303d listings in the White River with what is naturally expected.

### Rosgen 1994 Classifications:

Because of its relatively shallow grade and increased average sinuosity, the lower reach will perhaps be classified as stream type E or G, depending on incision and local slope. Due to the low gradient and

likely increase in fine sediments (i.e. silts and clays), the lower reach might be classified in the range of F5b, F6b or F5, F6.

**References:**

Rosgen, D.L. 1994. A classification of natural rivers. Catena (22) 169 – 199.

Tobin, R. L., H.E. Stranathan, and K.J. Covay. 1985. Water-quality characteristics of streams in the piceance creek and yellow creek drainage basins, northwestern colorado, water years 1977-81. USGS Report 84-4261

Tobin, R.L. 1993. Sediment transport and water-quality characteristics and loads, White River, Northwestern Colorado, water years 1975-88. USGS Report 92-4031

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## Diversion Assessments

The Planning Advisory Committee's (PAC's) goal was to assess 20 diversion systems as part of Phase II of the Water Initiative. To accomplish this objective, they set forth criteria that were used by the Diversion Assessment Team to evaluate the diversion systems. All assessments and scoring were done using criteria approved by the PAC.

The Diversion Assessment Team was composed of people with multi-disciplinary backgrounds: Fish Biology, Watershed Science, Environmental Science, and long-time irrigators and users of water from the White River and Piceance Creek. Their diverse backgrounds allowed multi-faceted assessments to be conducted on Diversion Systems.

Each diversion was evaluated for several functional features. The team used two main categories to score the systems: Infrastructure and Environmental Health. The infrastructure assessment looked at the ability of the in-stream diversion to divert water to the control structure, the integrity and placement of the control structure, the wastegate system, and the measuring device. Environmental health was evaluated looking at the same structures. The in-stream diversion was evaluated for the ability of fish of all species and age classes to freely pass the structure and the placement of the control structure was scored based on its ability to exclude fish from the ditch. Vegetation and erosion were evaluated throughout the length of the diversion system.

The infrastructure assessment was based on objective and subjective evaluation techniques. Subjective assessments were made on the demonstrated ability of the in-stream structure to divert water to the control structure. Objective measurements were taken on the accuracy of the staff gauge, levelness of the measurement device and control structure, and the ability of the waste system to remove water from the ditch and divert it back to the river.

Environmental health was assessed subjectively. Fish passage and entrainment were estimated by the construction of the in-stream diversion and placement of the control structure, the presence or absence of screens to prevent fish entering the ditch, and the presence or absence of fish in the diversion area and/or ditch. Water rights holders were also asked if fish were seen in the ditch. Vegetation was assessed based on the several criteria: Native, non-native, or invasive species were catalogued and their respective plant numbers noted, the ability of the vegetation to mitigate erosion, and the whether the

abundance of vegetation was appropriate, excessive, or lacking. The last criteria evaluated was erosion. Erosion was evaluated around all man-made structures and around critical elements in the river.

All of these areas were scored by the Assessment Team on a scale of one to four. A score of one indicates the element has a good opportunity for improvement and a score of four indicates that element is in good working order. Below is an explanation of the scoring rubric used for the assessments.

## Ranking and Scoring System Key

| **Diversion System** | **Ranking 1-4** |
|---|---|
| Structure is not functioning at all | 1 |
| Structure is doing okay, but repairs/maintenance recommended | 2 |
| Structure is functioning well, but it could be minimally improved | 3 |
| Structure is functioning extremely well | 4 |
| **Vegetation** | |
| Unhealthy vegetation, trend unstable | 1 |
| Mostly unhealthy vegetation or trend unstable | 2 |
| Mostly healthy vegetation, trend mostly stable | 3 |
| Healthy vegetation, trend stable | 4 |
| **Plant Species and Abundance** | |
| Native plants present but sparse; Non-native plants are numerous and spreading; Invasives dominant and spreading | 1 |
| Native species found intermittently on site; Non-native plants present but not dominant; Invasives spreading but not dominant | 2 |
| Native species generally common on site; Non-natives present but sparse, minimal spreading; Invasives are present but are sparse | 3 |
| Native species abundant on site, Non-natives present but sparse, Invasives are not present or very sparse | 4 |

| **Fish Entrainment** | **Ranking 1-4** |
|---|---|
| Entrainment common and is impacting the river system | 1 |
| Entrainment occurs in some flows but not all | 2 |
| Entrainment is uncommon or unlikely | 3 |
| No entrainment present in system | 4 |



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| **Fish Passage** | **Ranking 1-4** |
|---|---|
| Passage is highly impacted or prevented by in-stream diversion | 1 |
| Passage is impacted at most flows | 2 |
| Passage by some age classes of fish is impacted | 3 |
| No obstructions to fish passage | 4 |

| **Erosion** | **Ranking 1-4** |
|---|---|
| Abundant erosion present on site, site unstable | 1 |
| Some erosion present on site | 2 |
| Little erosion present on site | 3 |
| No erosion present on site, site is stable | 4 |
| **Site Stability** | |
| Banks are unstable, <25% natural protection, 25-50% active erosion | 1 |
| Banks are moderately unstable, 25-50% protection, 5-25% active erosion | 2 |
| Banks are moderately stable, 50-75% protection, 5-25% erosion | 3 |
| Banks are stable, >75% natural protection, <5% active erosion | 4 |

## Example Diversion System Ranking Summary

**Score Description:** Each category has a maximum score of 4. The lower the score, the greater the opportunity your diversion system presents for a multi-benefit improvement project.

## Infrastructure Information

| **Category** | **Ranking 1-4** |
|---|---|
| In-Stream Structure | 3 |
| Control Structure | 3 |
| Wastegate Structure | 3 |
| Measuring Device | 4 |
| **Total/Overall Score** | **13/16** |



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## Environmental Health Information

| Category | Ranking 1-4 |
|---|---|
| Vegetation | 4 |
| Fish Entrainment | 3 |
| Fish Passage | 4 |
| Erosion | 3 |
| Geomorphology | 4 |
| **Total/Overall Score** | **18/20** |

## Summary and Recommendations

| Identified Issue | Recommendations |
|---|---|
| High maintenance man-made side channel | Consider changing the angle of the push-up rock wall to decrease maintenance |
| Check dam with erosion located at the headgate | Consider removing the check dam and creating more of a riffle structure |
| Wastegate located downstream from Parshall flume | Consider moving the wastegate structure upstream from the Parshall flume or installing a flume on the waste ditch, so the water is measured. |
| Erosion at discharge of Parshall flume | Consider placing rocks or other material to stabilize the bank. |

In this example, the water rights holder is able to understand why the in-stream diversion scored a three not four and is provided a means to improve the diversion. The same is true for all areas the diversion system received a score less than four.

These scores, summary, and recommendations were provided to all water rights holders that had an assessment performed on their diversion system. Along with the summary scores, a report was written for each diversion. The reports include a general summary of diversion information: WDID, summary of water rights, physical location of the diversion, and the flow gauge readings on the river at the time the assessment was performed. Each report also contains a recent satellite photograph of the diversion system, a drawing of the system and a narrative explaining the specifics the team found and how they scored each element. Photographs of all major elements in the diversion system conclude the report.



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# Phase II Diversion Assessments

## Diversion Criteria

The Diversion Assessment Team completed twenty-five assessments on the White River and Piceance Creek. This exceeded the PAC's stated objective for diversion assessments. Diversions were selected based on several criteria: structure size, water right date, self-nominated, and non-consumptive needs. Large structures and senior water rights were felt to have the biggest impact on the river, so they were prioritized in the assessment process. Participation was voluntary. The team's reports and evaluations were well received and the team was not able to complete assessments for all the water rights holders that self-nominated to participate.

## Score Summary: All Reaches

**Score Description:** Each category has a maximum score of 4. The lower the score, the greater the opportunity the diversion system presents for a multi-benefit improvement project.

## Infrastructure Information

| Category | Upper White | Middle White | Lower White | Piceance Creek | Total | Average |
|---|---|---|---|---|---|---|
| **In-Stream Diversion** | 3.3 | 2.7 | 3 | 3.3 | **12.3** | **3.1** |
| **Control Structure** | 2.8 | 3.3 | 3.1 | 3.7 | **12.9** | **3.2** |
| **Wastegate** | 3.7 | 2.8 | 3 | N/A | **9.5** | **3.2** |
| **Measuring Device** | 2.8 | 3 | 2.6 | 3 | **11.4** | **2.8** |

## Environmental Health Information

| Category | Upper White | Middle White | Lower White | Piceance Creek | Total | Average |
|---|---|---|---|---|---|---|
| **Vegetation** | 3.8 | 3.2 | 3.6 | 3.5 | **14.1** | **3.5** |
| **Fish Entrainment** | 3 | 2.2 | 3.1 | 3 | **11.3** | **2.8** |
| **Fish Passage** | 3.3 | 3.2 | 3.9 | 1.8 | **12.1** | **3** |
| **Erosion** | 4 | 2.8 | 3 | 3.7 | **13.5** | **3.4** |
| **Geomorphology** | 4 | 3 | 3.4 | 4 | **14.4** | **3.6** |



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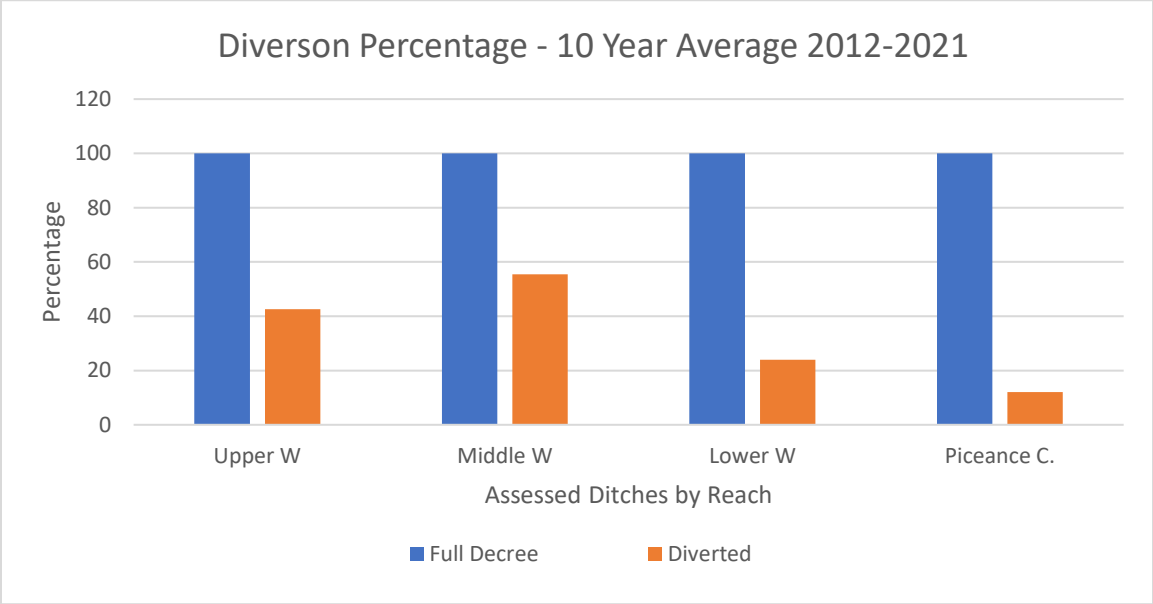
## Summary of Agricultural Diversions for assessed ditches by reach of the White River and Piceance Creek




Source: CDSS Structure Report https://dwr.state.co.us/Tools/Structures

**The difference between the full decree and actual amount of water diverted in several ditches is often due to the lack of water available to divert throughout the entire irrigation season and/or voluntary measures to maintain stream flow.**

Diversions were calculated based on a 213-day irrigation season, April 1st to October 31st. If the full absolute water right were diverted each day for the full season, that is considered 100% diversion. The percentages shown reflect the diversion history reported to the Water Commissioner and recorded in the CDSS Structure Report. The percentages shown reflect the average diversions for the ten-year period 2012 – 2021. The diversions were summed and then divided by the number of years recorded.

***For a complete listing of the diversion assessments score summary and recommendations, please log onto the White River Conservation District website (https://wrcd-dccd.colorado.gov/) and go to the Water Initiative tab.***

# Riparian Assessments

The Planning Advisory Committee's (PAC's) goal was to assess 20 riparian areas as part of Phase II of the Water Initiative. To accomplish this objective, they set forth criteria that were used by the Riparian Assessment Team to evaluate the riparian areas. All assessments and ratings were done using criteria approved by the PAC.

The Riparian Assessment Team was composed of people with multi-disciplinary backgrounds: Fish Biology, Watershed Science, Environmental Science, Rangeland Management, and long-time irrigators and users of water from the White River and Piceance Creek. Their diverse backgrounds allowed multi-faceted assessments to be conducted on the riparian areas.

In July of 2021, the BLM conducted a four-day riparian assessment training for White River Integrated Water Initiative Riparian Assessment Team. This training included two days of virtual training and two days of field training using the "Proper Functioning Condition Assessment for Lotic Areas" Handbook (BLM Technical Reference 1737-15). The reference formed the basis of the riparian area assessments and ratings.

### Definitions of Riparian Conditions

**Riparian Area:** A riparian area is the transition from the aquatic area to the upland area. Vegetation is expected to change from species adapted to wetter sites near the channel to species adapted to drier sites in the upland, with a mixture of species occurring in between. (Ref. 1) Riparian areas are key to preventing erosion and providing habitat for aquatic species and forage for land species.

**Proper Functioning Condition (PFC):** The PAC selected the Proper Functioning Condition Assessment for Lotic Areas (PFC) as the riparian assessment methodology. PFC is a qualitative method of assessing physical riparian processes based on three categories of indicators: hydrology, vegetation, and geomorphology. It provides a broad "snapshot" of the current state of riparian functionality and a riparian area's probability of withstanding and/or recovering from a moderately high flow event. PFC is also used to identify additional monitoring actions as it does not assess individual resource values such as aquatic or terrestrial habitat components. For example, the vegetation indicators do not distinguish between native and non-native/invasive vegetation.
A lotic riparian area is in PFC, or "functioning properly," when adequate vegetation, landform, or woody material is present to dissipate stream-energy associated with high waterflow, thereby reducing erosion and improving water quality.

- Capture sediment and aid floodplain development.
- Improve floodwater retention and ground-water recharge.
- Develop root masses that stabilize streambanks against erosion.
- Maintain channel characteristics.

A riparian area in PFC will, in turn, provide associated values, such as wildlife habitat or recreation opportunities. (Ref.2)



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**Functional—At Risk (FAR):** Riparian areas that are in functional condition, but an existing landform, water, or vegetation attribute makes them susceptible to impairment. (Ref.2)
**Nonfunctional (NF):** Riparian areas that clearly are not providing adequate vegetation, landform, or large woody material to dissipate stream-energy associated with high flows, and thus are not reducing erosion, improving water quality, etc. (Ref.2)

## Assessment Methodology

The assessment team used the Bureau of Land Managements' "Colorado Riparian Training Team Lotic Checklist" field sheet to evaluate the riparian areas. The field sheet has three major categories: Hydrologic, Vegetation, and Erosion/Deposition. Each category has multiple Yes, No or N/A questions that will determine if the riparian area is in proper functioning condition (PFC), functional-at risk (FAR), or non-functional (NF). For each category, one of the questions is in bold font. This question is considered the key question in each category for determining the functioning condition of the riparian area. The key question incorporates information from all of the questions in the category. If the answer to any of the key questions is "No", then the riparian area is not in proper functioning condition.

***Note:*** *References provided directly from the Bureau of Land Management/Forest Service/NRCS book titled "RIPARIAN AREA MANAGEMENT, Proper Function Condition Assessment for Lotic Areas". Technical Reference 1737-15, Second Edition, 2015.*

*Ref.1: Section I. Introduction, pg. 1.*

*Ref.2: Section I. Introduction, pg. 2.*

## Example Riparian Evaluation

## Hydrologic

| Yes | No | N/A | |
|---|---|---|---|
| X | | | 1) Floodplain is inundated in "relatively frequent" events. |
| | | X | 2) Beaver dams are stable. |
| *X | | | **3) Sinuosity, gradient, and width/depth ratio are in balance with the landscape setting (i.e. landform, geology, and bioclimatic region).** |
| X | | | 4) Riparian area is expanding or has achieved potential extent. |
| X | | | 5) Riparian impairment from the upstream or upland watershed is absent. |

**Comments:**

*Sinuosity is perhaps lower than expected; roadbed construction plus natural confinement by canyon.

## Vegetation

| Yes | No | N/A | |
|---|---|---|---|
| X | | | 6) There is adequate diversity of stabilizing riparian vegetation for recovery/maintenance. |
| X | | | 7) There are adequate age classes of stabilizing riparian vegetation for recovery/maintenance. |



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| | | | |
|---|---|---|---|
| X | | | 8) Species present indicate maintenance of riparian soil-moisture characteristics. |
| X | | | 9) Stabilizing plant communities capable of withstanding moderately high streamflow events are present along the streambank. |
| X | | | 10) Riparian plants exhibit high vigor. |
| X | | | **11) An adequate amount of stabilizing riparian vegetation is present to protect banks and dissipate energy during moderately high flows.** |
| X | | | 12) Plant communities are an adequate source of woody material for maintenance/recovery. |

**Comments:**

Dense and diverse riparian corridor.

## Erosion/Deposition

| Yes | No | N/A | |
|---|---|---|---|
| X | | | 13) Floodplain and channel characteristics (e.g. rocks, woody material, vegetation, floodplain size, overflow channels) are adequate to dissipate energy. |
| X | | | 14) Point bars are revegetating with stabilizing riparian plants. |
| X | | | 15) Streambanks are laterally stable. |
| X | | | **16) Stream system is vertically stable (not incising).** |
| X | | | 17) Stream is in balance with the water and sediment that is being supplied by the drainage basin (i.e. no excessive erosion or deposition). |

**Comments:**

Cobble-gravel stream bed; banks are stable and somewhat straightened.

## General Remarks

Overall, a vigorous riparian area. That it is a public fishing access point, some braided trails caused by foot trail erosion is occurring but nothing excessive is noted considering how heavily used the area is.

## Summary and Recommendations

## Key Question Results:

The key question is the bolded question from each major category. If any of the questions are answered "No", the riparian area is not in proper functioning condition.

| Question | Rating Yes-No-N/A |
|---|---|
| **Hydrological**<br><br>**3. Sinuosity, gradient, and width/depth ratio are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region.** | Yes |



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| | |
|---|---|
| **Vegetation**<br><br>**11. An adequate amount of stabilizing riparian vegetation is present to protect banks and dissipate energy during moderately high flows.** | Yes |
| **Erosion/Deposition**<br><br>**16. Stream system is vertically stable (not incising).** | Yes |

## Thermometer for Overall Functional Rating

**Note: The horizontal red line indicates the functional condition of this riparian area.**

| | |
|---|---|
| **Proper Functioning Condition (PFC):** A lotic riparian area is in PFC, or "functioning properly," when adequate vegetation, landform, or woody material is present to dissipate stream-energy associated with high waterflow, thereby reducing erosion and improving water quality. (Ref.2) | PFC |
| **Functional—At Risk (FAR):** Riparian areas that are in functional condition, but an existing landform, water, or vegetation attribute makes them susceptible to impairment. (Ref.2) | FAR |
| **Nonfunctional (NF):** Riparian areas that clearly are not providing adequate vegetation, landform, or large woody material to dissipate stream-energy associated with high flows, and thus are not reducing erosion, improving water quality, etc. (Ref.2) | NF |

## Trend (Only Applicable to Functional-At Risk Rating)

| **Trend** | **Rating** |
|---|---|
| Upward | N/A |
| Downward | N/A |
| Not Apparent | N/A |

## Risk for Outside Factors

| | |
|---|---|
| Are factors contributing to unacceptable conditions outside the land manager's control or management? | No |

| **If yes, what are those factors?** | |
|---|---|
| Flow regulation | N/A |
| Mining activities | N/A |
| Upstream channel conditions | N/A |
| Channelization | N/A |
| Road encroachment | N/A |
| Oil field water discharge | N/A |
| Augmented flows | N/A |
| Other (specify) | N/A |

## Recommendations

| Identified Issue | Recommendations |
|---|---|
| Only issue identified is some erosion due to foot traffic. | None given; that the erosion is not excessive suggests no major management steps should be taken other than perhaps some monitoring. |

## Assessment Summary:

This site was found to be on the upper end of proper functioning condition due to the dense, woody riparian area. Additionally, this site contains bank armor via the boulders, cobbles, and gravels that make up the river's substrate. Some erosion from foot traffic is evidenced but not negatively affecting the riparian area to any significant extent. Some monitoring is advised.

## Plant Species List:

Dominated by woody species: Willows, Wild rose, Douglas firs, Chokecherries, Oaks, Lodgepole pine, Birch, and Hawthorne. Broom grasses, Horsetail, and Sedges dominate the herbaceous species.



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# Phase II Riparian Assessments

## Riparian Site Selection

The overall goal of the PAC was to identify sites that are a scientifically meaningful representation of the entire river system. To accomplish this, the PAC approved the following:

- Three broad categories were used for the selection process:
  - Land in agricultural production
  - Land not in agricultural production
  - Sites that are used for multiple purposes (public access, fishing, agricultural production).
- Sites were prioritized by the following criteria:
  - Agricultural production
  - Access/permission for the assessment
  - Most potential for positive change - highly impacted site
- Remaining sites – if needed to complete five assessments per reach
  - Volunteer sites - land may be fallow or currently in a conservation easement or involved in a project to improve the site
  - Public access points - USFS, CPW Fishing access, River Edge West project sites
  - Existing restoration sites

Based on these criteria, the assessment team selected 5 riparian areas in each reach to be evaluated.

## Riparian Assessment Summary

Twenty-one sites were evaluated on the White River and Piceance Creek. All sites were in Proper Functioning Condition (PFC) or Functional at Risk (FAR). No sites were evaluated as Non-Functional (NF). Along Piceance Creek there were two predominant factors impacting the riparian areas: drought conditions and flash flooding. Drought conditions are reducing the riparian vegetation in areas. This also makes the area more susceptible to flash floods that are common along the creek in the summer. The Lower White River reach is impacted by invasive species, predominantly Russian Olive trees and Tamarisk. The Middle is impacted by larger river issues such as channelization and erosion. The Upper White River reach is functioning well.

## Evaluation Summary by Reach

| Reach | PFC | FAR | NF |
|---|---|---|---|
| Piceance Creek | 4 | 1 | 0 |
| Lower White River | 5 | 0 | 0 |
| Middle White River | 2 | 3 | 0 |
| Upper White River | 5 | 1 | 0 |

PFC-Proper Functioning Condition FAR-Functional-at-Risk NF-Non-Functional



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