White River Integrated Water Initiative

Reach Report Lower White River

Spring 2022

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

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

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

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

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.

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.

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.

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

Lower Reach of the White River

For the purposes of the White River Integrated Water Initiative, we have defined the Lower Reach as just west of Powell Park to the Utah border.

Physical Characteristics: by Mario Sullivan, PhD

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.

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

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

Unique Features of the Lower 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. Rangely's active water rights are: (White River Basin Information, CDSS, 2009)

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 early CDSS development. (White River Basin Information, CDSS, 2009)

Diversion Assessments

The White River Integrated Water Initiative Diversion Assessment team conducted seven assessments on the Lower White River. The largest diversion structures were prioritized and then volunteered diversions were assessed. Most of the diversions on this reach are pumps.

In general, the ditches assessed in this reach are very functional, in good condition, and are environmentally healthy. One diversion is heavily impacted by severe erosion along a bank of the White River. Because of the pump diversions, this reach is negatively impacted by algae blooms in the White River. A complete scoring summary follows.

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

Score 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.

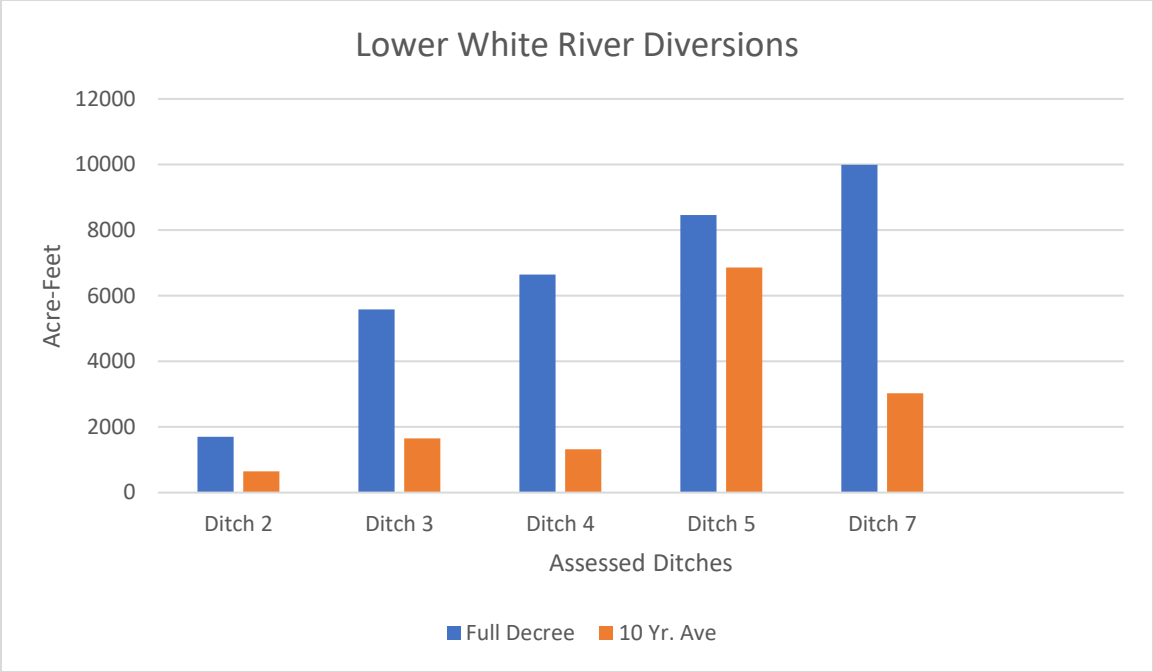
Infrastructure Information

Category	Ditch 1	Ditch 2	Ditch 3	Ditch 4	Ditch 5	Ditch 6	Ditch 7	Total	Average
In-Stream Diversion	N/A	N/A	3	4	4	2	2	**15**	**3**
Control Structure	4	4	3	3	3	3	2	**22**	**3.1**
Wastegate	N/A	3	3	3	3	3	N/A	**15**	**3**
Measuring Device	1	2	4	3	2	3	3	**18**	**2.6**
Total	**5/8**	**9/12**	**13/16**	**13/16**	**12/16**	**11/16**	**8/12**	**-----**	**2.9**

Environmental Health Information

Category	Ditch 1	Ditch 2	Ditch 3	Ditch 4	Ditch 5	Ditch 6	Ditch 7	Total	Average
Vegetation	3	4	4	4	3	4	3	**25**	**3.6**
Fish Entrainment	4	3	3	3	3	3	3	**22**	**3.1**
Fish Passage	4	4	4	4	4	4	3	**27**	**3.9**
Erosion	3	3	3	4	3	3	2	**21**	**3**
Geomorphology	3	3	4	4	4	3	3	**24**	**3.4**
Total	**17/20**	**17/20**	**18/20**	**19/20**	**17/20**	**17/20**	**14/20**	**17/20**	**3.4**

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



Source: CDSS Structure Report

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.

Blue line – Total absolute water right in AF for a 213 day irrigation season (April 1st to October 31st)

Orange Line – Amount of water reported as diverted to State CDSS Site from 2012 – 2021 shown as yearly average. (Sum of diversion from 2012-2021 divided by reported number of diversion years)

Summary and Recommendations

Ditch 1

Identified Issue	Recommendations
No measuring device present on system	Install a flow meter or other type of measuring device on the pump system.
Signs of possible erosion near pump	Monitor the area for more stability issues and increase bank stability with rip/rap and/or vegetation.

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

Ditch 2

Identified Issue	Recommendations
Tarp dam over wastegate entrance	Replace tarp with radial or slide gate to better control the water flow
Undersize Parshall flume	Replace the Parshall flume with an 18-inch flume
Pump maintenance	Consider pulling the pump over winter to prevent freezing and allow for routine maintenance
Pump intake	Consider protecting pump intake by reinforcing the rip/rap present on the White River
Fish entrainment	Consider screening the pump intake to prevent eggs, larvae, and small fish entering the system

Ditch 3

Identified Issue	Recommendations
High maintenance man-made side channel	Consider changing the angle of the push of 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
Erosion at discharge of Parshall flume	Consider placing rocks or other material to stabilize the bank.

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

Ditch 4

Identified Issue	Recommendations
Pump size/water right	Consider finding a project partner to convert to a vertical pump
Mesh size at pump	Consider using a smaller mesh, while also considering the balance between algae accumulation and fish entrainment
Pump output	Calibrate the pump curve vs. the flow readings to confirm the maximum output and pump efficiency

Ditch 5

Identified Issue	Recommendations
Pump does not handle entire water decree	Consider finding a funding partner to upgrade the pump and install pivots upland
Pump output	Calibrate the pump curve vs. the flow readings to confirm the maximum output and pump efficiency.
Fish entrainment	Consider installing smaller mesh to prevent entrainment
Culvert placement by Parshall flume	Separate the culvert and flume to allow for lower velocities and a more laminar water flow in the flume
Erosion at flume	Separate flume and culvert and then stabilize the area around the flume
Invasive/noxious plants	Consider developing and implementing a noxious weed control program

Ditch 6

Identified Issue	Recommendations
Partially rebuilt in-stream diversion is not capable of diverting the full decree in low water.	Build a more permanent in-stream structure that allows diversion of the necessary water amount while allowing for fish passage.

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

There is significant erosion on the White River's bank above the diversion point.	Consider working with the adjacent landowners for planting vegetation (willows) or placing rock work to armor the bank and decrease erosion.
The ditch between the in-stream diversion and the headgate is laid out in an "S" shape.	Consider straightening the channel to assist with water pressure, water control, and erosion issues. The headgate could also be moved closer to the diversion for better placement and functionality
The ditch between the diversion and the headgate is shallow and filling with sediment.	Clean out the ditch to allow higher water flows when necessary.
The ranch manager noted some concern with the headgate within the wastegate system.	Consider replacing or conducting long-term improvements on the structure to increase efficiency.
The Parshall flume is not in a level setting.	Install the measuring device in a level environment with consideration for the drop at the exit to allow a good laminar flow and improved measurement accuracy.
The Parshall flume is very new and recently installed, leading to less site stability in the surrounding area.	Consider adding vegetation, rock work, or compacting the ground around the structure to mitigate future erosion issues.
There are significant issues from beavers with this system, including ground stability.	Consider piping more of the ditch to prevent blow-outs or beavers from becoming a bigger problem.
There are several invasive or noxious plant species present	Continue weed mitigation program, spray and/or otherwise remove the nuisance plant species present.

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

Ditch 7

Identified Issue	Recommendations
Cut bank on White River upstream from point of diversion	Stabilize bank with rip/rap. Consider planting riparian vegetation to help with long term stability
Sediment and debris in front of and in control structure	Clean sediment and debris
Bent angle iron on headgate	Fully open and close headgate to ensure it is 100% functional.
Angle of headgate to river	Consider changing the angle of the headgate to correspond to the angle change of the river.
No wastegate	There is room to place a wastegate structure that will return excess flows to the White River. The suggested site is just prior to the culvert upstream from the Parshall flume.
Erosion on recently repaired ditch bank	Stabilize bank with rip/rap and appropriate vegetation
Debris and sediment in and around the Parshall flume	Clean the ditch and flume to ensure laminar water flow
Erosion at outlet of Parshall flume	Rock work and vegetation as needed to stabilize the area
Undersize culvert under State Highway 64	Work with CDOT to replace culvert with one that will convey the entire water decree
Invasive/noxious weeds	Consider developing and implementing a noxious weed control program

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

Riparian Assessments

Definitions of Riparian Conditions

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.

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.

- 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)

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)

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.

Lower White River Riparian Summary

The Riparian Assessment Team performed five riparian assessments in the lower reach of the White River. All areas were found to be in proper functioning condition (PFC). One site was assessed to be in

the middle to lower range of PFC. This riparian area is slightly impaired from its historical management legacy that did not prioritize riparian health. The current management does prioritize riparian health.

Score Summary: Lower White River Riparian Areas

	Area 1	Area 2	Area 3	Area 4	Area 5
PFC	YES	YES	YES	YES	YES
FAR	-----	-----	-----	-----	-----
NF	-----	-----	-----	-----	-----

Summary and Recommendations

Area 1

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 3. Sinuosity, gradient, and width/depth ratio are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region.	Yes
Vegetation 11. An adequate amount of stabilizing riparian vegetation is present to protect banks and dissipate energy during moderately high flows.	Yes
Erosion/Deposition 16. Stream system is vertically stable (not incising).	Yes

Risk for Outside Factors

Are factors contributing to unacceptable conditions outside the land manager's control or management?	Yes
If yes, what are those factors?	
Upstream channel conditions	X

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

Other (specify)	Previous grazing and management strategies have made riparian management particularly challenging.

Recommendations

Identified Issue	Recommendations
Some erosional areas and channel straightening.	Where possible, replant willows and lay bank back. Upstream, adjacent neighbor has armored the bank.

Assessment Summary:

This site was assessed to be in the middle to lower range of PFC. The riparian area still shows signs of a historical management legacy that did not prioritize riparian health. Some signs of old cutting are evident, and it is clear the riparian area is in a recovery phase. While the overall riparian cover is low, outside of some small problematic areas, there exists enough vegetation as to have largely stabilized the banks laterally and vertically. Given the landowners commitment to management strategies that favor riparian area recovery and protection, this site is expected to improve through time.

Plant Species List:

Older willows and cottonwoods along upper terraces; younger willows filling in the banks. Buffalo berry is also prevalent within the woody riparian community. Herbaceous component primarily composed of sedges, rushes, grasses, american licorice, and yarrow. Wild rose and water birch also noted.

Area 2

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 3. Sinuosity, gradient, and width/depth ratio are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region.	Yes
Vegetation	Yes

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

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

Assessment Summary:

This site was assessed to be in the middle range of PFC. The site encompasses a relatively large stretch of river (over two miles) and is characterized by a well-developed, woody riparian area although there are some banks that are beginning to actively cut. The straightness of the river channel through this site is likely a legacy of previous management decisions, but it is also influenced by the natural confinement of the river along the upper two thirds.

Plant Species List:

The riparian area in the upper reaches of this site is primarily herbaceous, dominated by grasses, mullein, sedges, and horsetail. Some willows and cottonwoods also present.

In the middle of the site, herbaceous species include american licorice and common reed grass. Woody species include water birch, willows, some cottonwoods, and hawthorn.

The lower portion is more heavily wooded, consisting of willows and cottonwoods. The cottonwoods appear to be of a younger age class on south side of river.

Area 3

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 3. Sinuosity, gradient, and width/depth ratio are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region.	Yes
Vegetation 11. An adequate amount of stabilizing riparian vegetation is present to protect banks and dissipate energy during moderately high flows.	Yes

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

Erosion/Deposition 16. Stream system is vertically stable (not incising).	Yes

Recommendations

Identified Issue	Recommendations
Some minor nicks occurring on lower end of reach particularly where the river channel is straightened.	To extent possible, south bank could be laid back to either allow more access to floodplain or to attempt to recover willows. The latter might be a better option in terms of not putting fields and ditches in danger of flooding.

Assessment Summary:

This site was assessed to be on lower end of PFC. The impingement from the highway roadbed and the protective berm are leading to channel straightening that is beginning to cause some undesirable erosion on the lateral banks. Overall, there is sufficient riparian vegetation as to be functional.

Plant Species List:

Willows and some cottonwoods. Silver leaf buffalo berry on both banks. Grasses, rushes, and equisetum dominate the herbaceous component of the riparian vegetation.

Area 4

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 3. Sinuosity, gradient, and width/depth ratio are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region.	Yes
Vegetation 11. An adequate amount of stabilizing riparian vegetation is present to protect banks and dissipate energy during moderately high flows.	Yes

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

Erosion/Deposition 16. Stream system is vertically stable (not incising).	Yes

Recommendations

Identified Issue	Recommendations
None reported.	None given other than to continue to manage banks as needed with the natural woody riprap currently being employed.

Assessment Summary:

This site was assessed as in the middle to high range of PFC. The channel is sinuous and the width to depth ratio is very near expected for the channel type. There exists a vigorous and dense riparian area that is primarily composed of woody species with multiple age classes. The landowner's usage of natural riprap to armor banks has likely contributed to the recovery and maintenance of this riparian area. Additionally, there is wise management of non-native species in that landowner is removing tamarisks but leaving russian olive groves where they are providing critical bank stabilization.

Plant Species List:

Willows and mature cottonwoods dominate the woody riparian species along with hawthorn trees. Russian olives present in riparian area are preserved for critical bank stabilization. Rabbitbrush and common reed grass dominate the herbaceous component along with sedges and rushes on the point bars.

Area 5

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 3. Sinuosity, gradient, and width/depth ratio are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region.	Yes
Vegetation	Yes

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

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

Recommendations

Identified Issue	Recommendations
None reported.	No recommendations given.

Assessment Summary:

This reach was found to be in the middle to high range of PFC. While the width to depth ratio is perhaps high, there is a well vegetated and stable point bar and overflow channel along with dense, woody riparian species upon the first terrace. While floodplain expansion on south bank would be ideal, it is likely not practical given that infrastructure is being protected.

Plant Species List:

Cottonwoods, boxelder, coyote willow, hawthorn, and buffalo berry dominate the woody component of riparian vegetation. Equisetum, rushes, sedges are all present and in good abundance to make up the herbaceous component.

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