White River Integrated Water Initiative

Reach Report Middle 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

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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.

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.

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Middle Reach of the White River

For the purposes of the White River Integrated Water Initiative, we have defined the Middle Reach as downstream from the confluence of the White River and Miller Creek to the west end of Powell Park.

Physical Characteristics: by Mario Sullivan, PhD

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.

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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.

References:

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

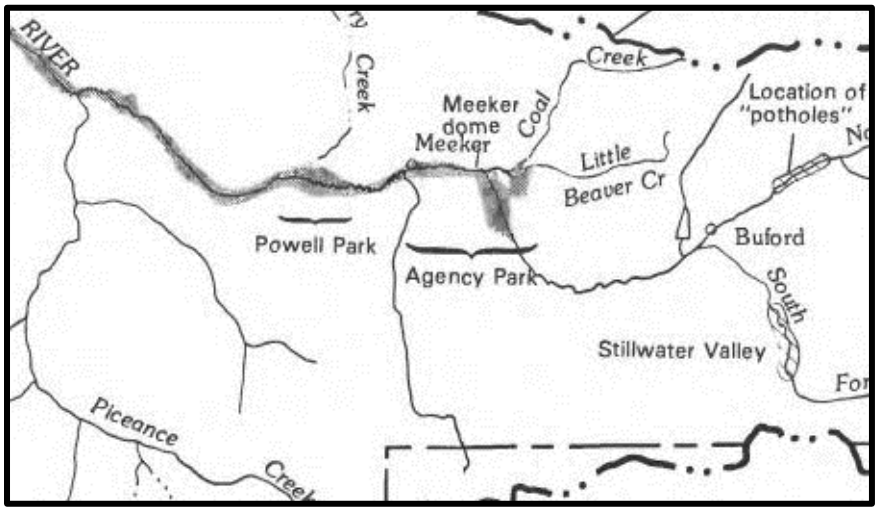
Tobin, R. L., H.E. Stranathan, and K.J. Covay. 1985. Water-quality characteristics of streams in the Piceance Creek and Yellow Creek drainage basins, Northwestern Colorado, water years 1977-81. USGS Report 84-4261

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 if the Middle 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

- 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).

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- 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.

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Diversion Assessments

The White River Integrated Water Initiative Diversion Assessment team conducted six assessments on the Middle White River. The largest diversion structures were prioritized.

In general, the ditches assessed in this reach are very functional, in good condition, and are environmentally healthy. One in-stream diversion is negatively impacted by lateral movement and erosion of the White River. Fish passage and entrainment both need to be considered when the in-stream diversions are reconstructed on an annual basis. A complete scoring summary follows.

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	Total	Average
In-Stream Diversion	4	2	3	3	1	3	**16**	**2.7**
Control Structure	4	3	3	3	4	3	**20**	**3.3**
Wastegate	3	3	4	3	2	2	**17**	**2.8**
Measuring Device	2	4	3	3	3	3	**18**	**3**
Total	**13/16**	**12/16**	**13/16**	**12/16**	**10/16**	**11/16**	**11.8/16**	**2.95**

Environmental Health Information

Category	Ditch 1	Ditch 2	Ditch 3	Ditch 4	Ditch 5	Ditch 6	Total	Average
Vegetation	3	3	3	3	4	3	**19**	**3.2**
Fish Entrainment	2	1	2	3	3	2	**13**	**2.2**
Fish Passage	1	3	3	4	4	4	**19**	**3.2**
Erosion	3	3	2	3	3	3	**17**	**2.8**
Geomorphology	3	3	3	3	3	3	**18**	**3**
Total	**12/20**	**13/20**	**13/20**	**16/20**	**17/20**	**15/20**	**14.3/20**	**2.9**

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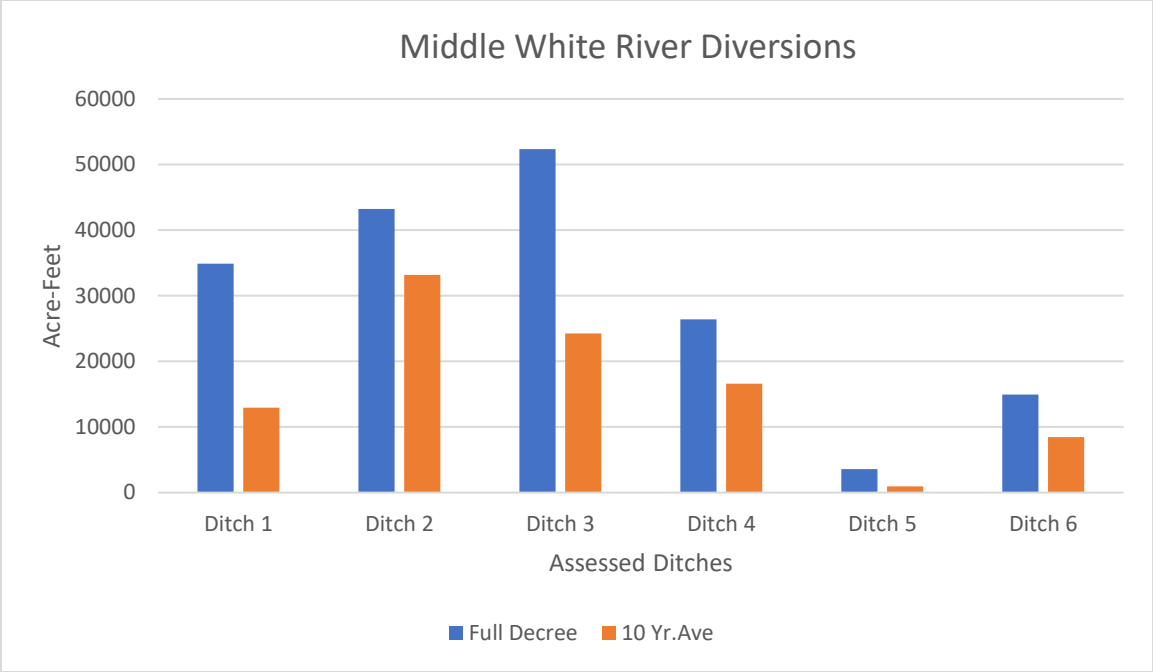

Source: CDSS Structure Report

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
Large tree pressed against in-stream rock wall.	Remove unnecessary debris build-up from the in-stream diversion and continue annual maintenance.
The north bank of the White River south of the flume is showing signs of heavy active erosion.	Monitor for changes and add in-channel stability measures as needed to the riverbank

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The concrete wastegate structure is full of cattails and other vegetation.	Remove vegetation build-up from the cement structure of the wastegate system.
Erosion around control structures noted during the assessment.	Monitor for changes and add stability measures as necessary.
When measured with a level and hand-held staff gauge, the Parshall flume was slightly off-level, with the north side being slightly higher.	Re-level flume
The discharge section of the Parshall flume is bulging and causing an inaccurate reading of the water flow.	Consider replacing flume or straightening and reinforcing the discharge section of the current flume.
The active erosion on the entrance of the flume is creating a back eddy.	Add stability measures as necessary to decrease active erosion and prevent the back-eddy from forming and offsetting the water reading.
Fish entrainment and passage	Consider removing the large pieces of driftwood and a few rocks from the in-stream diversion. Consider adding screens, or other entrainment prevention measures.

Ditch 2

Identified Issue	**Recommendations**
Vegetation growth at the entrance of the measuring device	Trim trees and clear other vegetation to ensure accuracy of gauge readings.
The in-stream diversion is built and removed every year.	The current schedule is working to assist the functionality of the system, but a permanent system could be implemented for maintenance ease and less impact to the river.
Wastegate maintenance at the outlet is needed due to the hole noted at the back of the chute and the need for added damming.	Complete all necessary maintenance requirements to ensure complete functionality of all diversion system structures.
Control structure leaks when the structure is turned closed.	Update and maintain the headgate slides to improve seals.

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Noxious plant species observed during the assessment	Consider implementing a noxious plant program or continue to remove nuisance species when present.
Fish entrainment	Consider implementing screens or other entrainment mitigation practices on the diversion system.
Fish passage	Keep fish passage in mind when constructing the in-stream diversion. Consider constructing a riffle or stair step system.

Ditch 3

Identified Issue	**Recommendations**
Fish entrainment	Screens could be added to the diversion system to minimize entrainment potential.
Fish passage	During annual maintenance, consider fish passage and design the diversion to allow passage for all age classes of fish
There is noted erosion at the diversion's headgate	Continue to install structures/walls to mitigate erosion and provide added ground stability.
Some noxious plant species (thistle and mullein) were observed on-site during the assessment.	Implement or continue with nuisance plant species removal.
Headgate leaking	Perform maintenance as needed to prevent leakage
Parshall flume bulging	Monitor hillside and install measures to prevent future sloughing and pressure on flume walls.
Parshall flume bulging	Closely monitor the pipe braces for signs of increased pressure or breakage.
Erosion around the wastegate and Parshall flume	Perform erosion control measures to re-enforce the surrounding area of the wastegate and flume to prevent further damage or erosion.

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Ditch 4

Identified Issue	Recommendations
In-stream diversion structure is showing signs of wash out potential in high water.	Reinforce and add rock to diversion while allowing for fish passage.
Control structure showing signs of erosion near back walls of structure	Consider extending structure walls at the back and against the channel banks to increase stability and avoid erosion.
Wastegate has some minimal erosion around the entrance.	Monitor for changes and add stability as needed in the future.
Parshall flume has some grasses growing at the entrance and could be affecting water reading accuracy.	Clear grasses from weir entry.
Parshall flume was checked and found to be off-level	Re-set flume to level
Fish entrainment	Consider installing some screens to the intake of the headgates to prevent fish entrainment.
River encroachment between wastegate and flume	Consider doing some bank stabilization and possible rip-rap to prevent further incision and encroachment of the river towards the ditch.

Ditch 5

Identified Issue	Recommendations
There is no in-stream diversion associated with this diversion system and the headgate is above the low flow water level.	Install an in-stream diversion structure to assist with receiving full allocation of water right during low flows.

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Willow patch encroaching on the measuring device	Burn, cut, trim, or otherwise remove the willows from the area to ensure flume functionality, accurate gauge readings, and ease of access.
At assessment time, fish entrainment are not issues at this diversion.	Consider adding screens to the headgate structure to ensure minimization of fish entrainment during high flows.
Wastegate system structural repairs needed and erosion in surrounding area.	Consider repairing or addressing the exposed rebar, the piece of the back of the structure that's broken off, and the minor erosion present.
There is major erosion and riverbank sloughing upriver of the diversion point on the northeast side of the White River.	Install erosion mitigation measures to decrease erosion severity, such as rock work or vegetative coverings. Consider channeling the water so the main energy force of the current does not impact the eroded bank.

Ditch 6

Identified Issue	**Recommendations**
Fish entrainment	Entrainment can be decreased by adding prevention measures to the diversion system such as screens covering the headgate opening.
One of the bearings on the outlet side of the control structure is broken.	Consider repairing the broken piece to ensure continued functionality.
Maintenance projects needed on the wastegate structures.	Consider repairing or addressing the exposed rebar, the piece of the back of the structure that's broken off, and the minor erosion present on the wastegate. Install a concrete structure at the second wastegate location down this ditch to help control water flow and allow all water in the ditch to enter the wastegate when it is fully open.
Invasive or noxious plant species	Implement plant control measures to decrease or eradicate nuisance plants.
Beavers and other rodents can be problematic to this diversion system and others in the area.	Consider placing mitigation practices on the diversion system, such as piping water where appropriate, installing screens or other blockages to the ends of culverts, or removing beavers from the system.

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There is woody debris build-up and sediment/ rock build-up in the measuring device.	Clean the flume for ensured continuation of reading accuracy and functionality.
Small amount of active erosion observed at the exit of the flume.	Install erosion mitigation practices around system structures to decrease active erosion and prevent future erosion.

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.

Middle Reach Riparian Summary

The Riparian Assessment Team performed five assessments on the middle reach of the White River. Two of the sites were in proper functioning condition and three were rated as functional-at-risk. The predominant factor in the rating was upstream conditions that were impacting the riparian area being assessed, but were out of the land manager's control. An example is channelization of the river that is increasing the depth and velocity of water being presented to the assessed riparian area.

Score Summary: Middle Reach Riparian Areas

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

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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

Recommendations

Identified Issue	Recommendations
Erosion on outside bend where vegetation was mowed for aesthetics.	To the extent possible, replant willows using the trench method.
Sedimentation from upstream erosion.	None given but noted.

Assessment Summary:

This site was assessed to be in the middle of the PFC range. In general, the riparian area has desirable, riparian species. There are healthy stands of willows and multiple age classes of Cottonwoods were noted. The cutbank of primary concern is a very small length and it might be possible to rehabilitate willows to stabilize this area. The concerns over sedimentation and upstream channel conditions are important to note as the beaver dams along the side channels have created a wetland that has great potential to dissipate energy during high flows. If this is lost due to sedimentation, this could alter downstream conditions and could indeed begin to put this riparian area and the associated wetlands at risk.

Plant Species List:

Cottonwoods and coyote willow dominate the woody riparian species with some alder trees. Several species of grasses and sedges make up the herbaceous component. Thistle and leafy spurge are noted but the landowners are currently seeking out management tools for noxious weeds.

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 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

Assessment Summary:

This site was assessed to be in the middle of the PFC range. In general, the riparian area has desirable, riparian species. There are healthy stands of willows and multiple age classes of Cottonwoods were noted. The cutbank of primary concern is a very small length and it might be possible to rehabilitate willows to stabilize this area. The concerns over sedimentation and upstream channel conditions are important to note as the beaver dams along the side channels have created a wetland that has great potential to dissipate energy during high flows. If this is lost due to sedimentation, this could alter downstream conditions and could indeed begin to put this riparian area and the associated wetlands at risk.

Recommendations

Identified Issue	**Recommendations**
An appx. 60 ft. section of raw bank on south side.	Monitor: sloping bank where it is raw to allow for some natural vegetation to recover might be an option.

Assessment Summary:

This site was assessed as being on the lower end of PFC. By and large, there is abundant, desirable riparian vegetation along both the side channel and mainstem White River. There is some room for

improvement in terms of addressing the raw banks on the south side of the river but since there does not appear to be active cutting along these banks, perhaps some monitoring and minor work toward some willow rehabilitation will ensure that it does not slip into functional at risk in the future.

Plant Species List:

Coyote willow and buffalo berry are noted as primary members of the woody community component. Grasses and rushes dominate the herbaceous component. Some tamarisk, canada and bull thistle, and possible russian olive noted on upper end.

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.	No
Vegetation 11. An adequate amount of stabilizing riparian vegetation is present to protect banks and dissipate energy during moderately high flows.	No
Erosion/Deposition 16. Stream system is vertically stable (not incising).	Yes

Trend (Only Applicable to Functional-At Risk Rating)

Trend	Rating
Not Apparent	X

Recommendations

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Identified Issue	Recommendations
Active erosion on lateral banks causing landowner to annually move or replace fence.	While the fencing is protecting the riparian area, the rate of erosion along cutbanks is quicker than more desirable species (like willows) can establish. To the extent possible, in the areas that are especially unstable, consider sloping bank and planting willows.

Assessment Summary:

Due to the active erosion on lateral banks and the general lack of desirable, stabilizing riparian vegetation in critical areas, this site was assessed to be in the upper range of FAR. Continued bank erosion will continue to cause channel straightening and loss of bank and fence. Most of this riparian area is quite functional but there are critical areas that are should be mitigated to prevent further loss and increases in width to depth ratios.

Plant Species List:

Cottonwoods, willows, alder and hawthorn dominate the woody riparian species. Rushes dominate the herbaceous component, particularly on point bars. Iris was also noted. Canada and bull thistle as well as houndstongue were noted.

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.	No
Vegetation	No

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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

Trend (Only Applicable to Functional-At Risk Rating)

Trend	**Rating**
Upward	X

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?	
Flow regulation	X (large diversions upstream)
Mining activities	
Upstream channel conditions	
Channelization	X (historic management)
Road encroachment	
Oil field water discharge	
Augmented flows	
Other (specify)	

Recommendations

Identified Issue	**Recommendations**

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Lack of riparian vegetation and erosion on north bank where berm had been built up.	To extent possible, lay berm back and replant with willows. In any case, protect that specific stretch of riverbank as much as possible as there are some desirable riparian species that are currently growing. To extent possible, time grazing so it has the least impact on young vegetation. Consider the use of water gaps as well.

Assessment Summary:

This site was assessed to be on the upper end of FAR. The south bank has a very vigorous and well-developed riparian area, and the north bank has potential for recovery. While the sinuosity is low and the width to depth ratio is high, replanting the north bank will tend to stabilize that bank and keep the width to depth ratio from increasing. Ideally, laying the berm back and allowing the river to access that floodplain would be ideal but presence of the leach field is an issue.

Plant Species List:

Cottonwoods and coyote willows dominate the woody component of the riparian vegetation; vigorous and dense on western banks but largely lacking on eastern banks although it was noted that willows on eastern banks are recovering. Other woody species noted include alder, rose, and hawthorn. Herbaceous components primarily baltic rush and sedges. Bull thistle, scotch thistle, russian thistle and cheat grass are noted.

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.	No
Vegetation 11. An adequate amount of stabilizing riparian vegetation is present to protect banks and dissipate energy during moderately high flows.	No

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

Trend (Only Applicable to Functional-At Risk Rating)

Trend	**Rating**
Not Apparent	X

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
Channelization	X
Other (specify)	Oxbow and accessory channels dry up

Recommendations

Identified Issue	**Recommendations**
Erosion and scalloping on lateral banks.	To the extent possible, protect these banks with fencing and provide water gaps. Any willow planting and bank sloping would also be beneficial.
Upstream sediment transport that closes off the side channels.	Protecting the bank that is suffering from the bulk of the erosion will serve to slow down or mitigate the channel straightening which will tend to stabilize upstream dynamics and could eventually create a situation where the upstream side channels hold water longer or the river picks a more permanent, stable path.

Assessment Summary:

The site was found to be in the middle to upper range of FAR primarily due to the high width to depth ratio and the active erosion on lateral banks. Upstream conditions that are contributing to these and

other unfavorable conditions (e.g., side channel sedimentation) are considered in this determination to the extent that these factors are putting this area at risk, even if indirectly. Protection of the actively eroding lateral banks would be a top priority in terms of moving this riparian area toward properly functioning condition. As of now, the riparian area is at risk of further loss due to bank erosion which is contributing to the increase in the width to depth ration and sinuosity which in turn, at least in part, is causing an imbalance upstream.

Plant Species List:

Coyote willow, cottonwoods, and alder dominate the woody component of the riparian vegetation. Herbaceous members include mullein, thistle, rye grass and common reed grass.

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