BIENNIAL PROGRESS REPORT

INSTREAM FLOW WATER RIGHT CHANGES

2020 & 2021

EXECUTIVE SUMMARY

Montana Fish, Wildlife & Parks (FWP) temporarily and in some cases permanently changes water rights to instream flow to benefit the fishery in streams and rivers across Montana. §85-2-436 MCA provides FWP with the authority to make these changes to instream flow.

Temporary changes to instream flow typically involve FWP leasing water rights from willing partners, while in some cases water rights owned by FWP are temporarily changed. Permanent changes to instream use only involve water rights owned in fee simple by FWP that are acquired by gift, purchase or in conjunction with a land purchase.

FWP's instream flow change activities include seeking approval of new water right leases and associated authorizations to change, renewals of leases and temporary changes to instream flow, monitoring existing changes and exploration of new instream flow projects. Program highlights for 2020 and 2021 include:

- FWP completed three new temporary changes to instream flow, two on the lower Teton River and one on Cow Creek on the east flank of the Bears Paw Mountains.
- Two temporary change renewals were approved, both on Big Creek in the Upper Yellowstone Basin.
- Two temporary change renewals, one for Rock Creek near Garrison and one for Lazyman Creek south of Alder, were recently filed with DNRC.
- One application for a temporary change to instream flow is pending before DNRC for Deep Creek near Toston.
- One application for permanent change to instream flow on Bear and Pine Creeks at Jardine is pending before DNRC. A second, for Nevada Spring Creek in the Blackfoot Valley, will be submitted in December.
- Applications for permanent changes to instream flow and/or mitigation are being explored for Poindexter Slough (Beaverhead); Porcupine Creek (Gallatin); and English George, Nickerson, and Ruby creeks (upper Madison); and the Madison River East Channel (near Three Forks) for irrigation rights held by FWP.
- Water right ownership issues for Mill and Willow Creeks near Opportunity continue to be evaluated in advance of preparing applications to change the rights to instream flow.

AUTHORITY TO LEASE AND CHANGE WATER TO INSTREAM FLOW

The conversion of existing water rights to instream flow by FWP is governed by §85-2-436 MCA. The law authorizes FWP to change a water right to an instream flow purpose to protect, maintain or enhance stream flows to benefit the fishery resource by:

- leasing and temporarily changing someone else's water right.
- temporarily changing an FWP water right held in fee simple.
- permanently changing a water right held by FWP in fee simple on up to 12 stream reaches.

Colloquially, the term “instream flow leasing” is often used to collectively refer to two distinct processes: the agreement to use another party’s water right (“lease”) and the water right change in appropriation right process (“change”). The leasing of the water right is the first step in the process where FWP and a willing water right owner agree to the terms of the water use, such as limiting use when flow falls below a certain level or providing infrastructure to reduce water demand. The authority to approve the lease agreement lies with the Montana Fish and Wildlife Commission.

After approval of the lease agreement, FWP staff prepares and submits the application to temporarily change the water right(s) to instream flow to DNRC. DNRC processes the application using the same procedures used for all other changes in appropriation rights in Montana, which includes the opportunity for others to object. The change authorizations issued by DNRC include requirements for FWP to measure the flow and other conditions necessary to prevent adverse effects to other water users. Temporary changes may be for periods of up to 10 years, unless the lease involves the construction of water conservation or storage projects when the term may be up to 30 years, depending on the expected life of the project.

Renewals generally follow a similar two-part process where FWP negotiates the terms of the renewal with the water right owner and submits a Notice of Renewal to DNRC. The renewal process includes an opportunity for third parties to submit new evidence of adverse effects to their water rights. If this occurs, FWP must file a completely new change. Renewals of temporary changes are limited to a period of 10 years, but they can be renewed an indefinite number of times.

Permanent changes to instream flow of rights held in fee simple by FWP follow the same DNRC change process, including the opportunity for other parties to object.

The statute was originally approved in 1989 with a 10-year sunset. It was reauthorized in 1999, 2007 and most recently in 2019 with the enactment of SB 247. §85-2-436 MCA now sunsets on June 30, 2029.

CURRENT AND PENDING CHANGES TO INSTREAM FLOW

The following table lists the number of stream reaches where FWP has active and pending changes to instream flow as well as changes that are still in the development phase. The map in Figure 1 shows the locations of the streams. Some streams have multiple water right changes and multiple water leases. The table appended to this report gives more details on the active and pending changes as well as those changes that were terminated or were not pursued to completion.

Active Instream Flow Changes	Stream Reaches
Temporary Changes of Water Rights Leased by FWP	14
Temporary Change of Water Rights Owned by FWP	1
Permanent Change of Water Rights Owned by FWP	1[a]
[a]Cedar Creek includes both a temporary and permanent change to instream.	
Pending Instream Flow Changes	
Temporary Change of Water Rights Leased by FWP	1
Permanent Change of Water Rights Owned by FWP	1
Instream Flow Changes in Development	
Permanent Changes of Water Rights Owned by FWP	8

Table 1. Current and Pending Instream Flow Changes

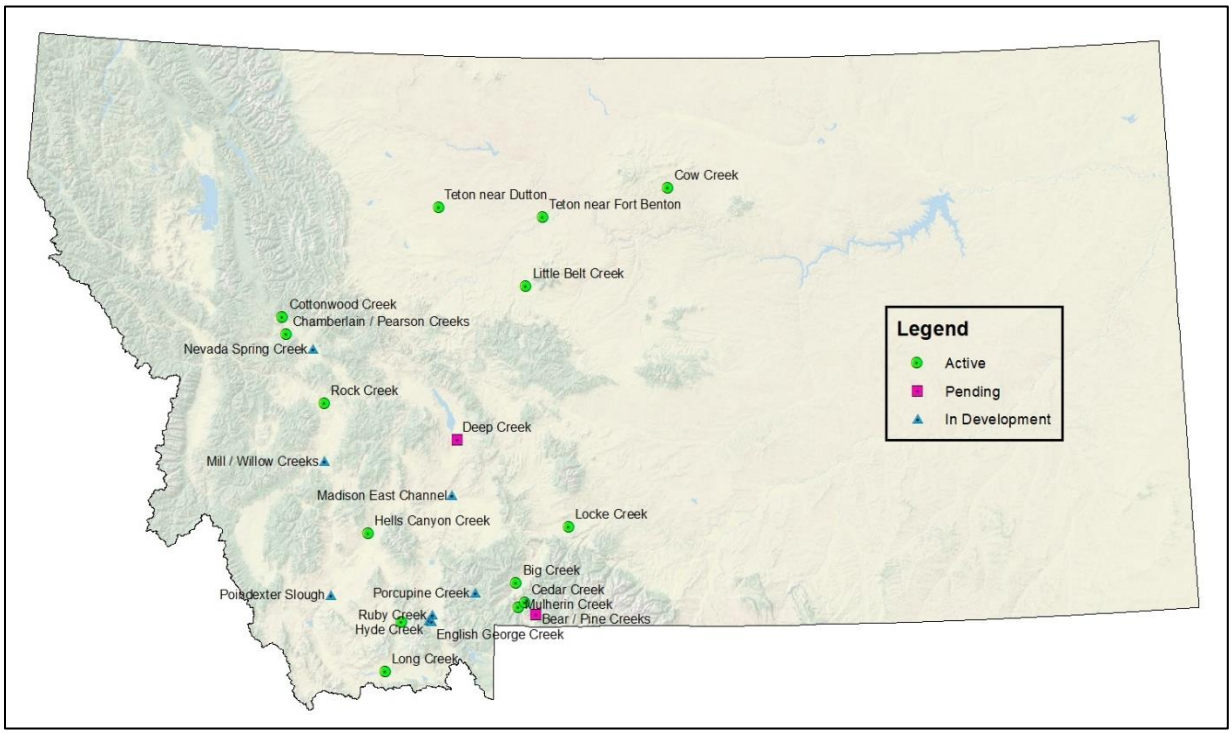

Figure 1. Locations of FWP instream flow projects.

GENERAL APPROACH

After more than three decades of leasing water rights and making changes to instream flow, FWP has learned that successful water leases and changes to instream flow not only require the commitment of the party leasing water, but an understanding and general agreement amongst all water users on the source as to how the change to instream flow is to be administered. This necessitates making clear how much water is protected and where it is measured along with providing up-to-date measurements to the water users so that the stream can be managed to

meet the instream flow requirements. FWP's most successful instream changes involve strong buy-in from all the water users on the stream.

Many of FWP's instream flow change activities focus on tributaries to larger rivers that provide important spawning habitat. Typically, these tributaries flow from the mountains onto the valley floor where they are tapped for irrigation. Some irrigation diversions cause seasonal or periodic dewatering between the diversion and the main stem river. These instream changes emphasize maintaining connectivity between the main stem and tributary to prevent dewatering and protect redds (fish spawning beds), maintain flow and habitat for emerging fry, and facilitate out-migration into the main stem river. Other changes to instream flow focus on habitat for the resident fishery.

Water conservation projects providing for instream flow are also a priority. These projects focus on improving irrigation efficiency, keeping the amount of irrigation unchanged while reducing the amount of water diverted for irrigation. The saved water is no longer diverted, thereby restoring stream flow. All changes identify specific stream reaches where the saved water is protected from being diverted by downstream users.

REPORTING REQUIREMENTS

§85-2-436 MCA requires FWP to submit a report of activities to the Legislative Water Policy Interim Committee (WPIC), the Department of Natural Resources and Conservation (DNRC) and the Montana Fish and Wildlife Commission by December 1st of odd-numbered years. The biennial report must include a summary of all appropriation rights changed to an instream-flow purpose *in the last two years*. For each change, the report must include:

- The length of the stream reach and how it is determined.
- Streamflow or volume needed to enhance or preserve fisheries.
- The amount of water available for instream flows as a result of the change in appropriation rights.
- Contractual parameters, conditions, and other steps taken to ensure that each change in appropriation right does not harm other appropriators, particularly if the stream is one that experiences natural dewatering.
- Methods and technical means used to monitor use of water under each change authorization.

2020-2021 ACTIVITY

Teton River– New Temporary Changes to Instream flow

In 2017, FWP negotiated, and the Fish and Wildlife Commission approved a water right lease involving two groups of water rights on the Teton River. In November 2017, FWP submitted two applications to DNRC to temporarily change the water rights to instream flow. The focus is to protect and restore instream flow in the lower Teton River.

The lower Teton River historically supported a diverse fish community of 28 warm-water species, including sauger, blue sucker and shovelnose sturgeon. Since the mid-1980s, dewatering of the

lower Teton River has increased resulting in a corresponding loss of species diversity in the river. USGS streamflow data for Teton River at its mouth shows that the river flow dropped to zero for extended periods, often more than a month during the late summer over the past 23 years. Relatively recently, and for the first time, the District Court appointed water commissioners to distribute water from the entire Teton River and its tributaries, ensuring that water users on the lower river will receive the water they are due and making the leasing of water rights viable.

FWP submitted the change applications to DNRC in November 2017. Due to procedural issues with processing of the applications, DNRC requested that FWP resubmit the applications which occurred in September 2019. The change authorizations were approved in February 2021.

The instream flow changes were first implemented in 2021 with water orders being made to the water commissioners for the lower Teton. The instream flow changes contributed to the maintenance of flow and connectivity in the lower Teton where it otherwise would have likely gone dry.

Figure 2 shows the monthly streamflow data from USGS Gages at Teton River below Forks near Choteau and Teton River at Loma. Minimum and median monthly flow data from 1998-2020 is displayed as this reflects more recent conditions for which data is available at both locations. The upstream gage below the forks is indicative of water flow into the system while the downstream gage and Loma shows the amount of water flowing into the Marias River.

Inflow for July 2021 stood below the median but above the minimum for the 1998-2020 period with August 2021 inflow approaching the minimum due to drought conditions. In September, inflow fell to a new minimum as the drought persisted. Historically, when inflow in August and September fell to minimum levels, outflow at Loma would fall to zero. This did not happen in 2021, likely due in large part to the distribution of water by water commissioners. However, the river would have been dry at times during September without the instream flow protection to maintain flow, albeit low flow at the Loma gage. The instream flow changes served their purpose and maintained streamflow and connectivity in the lowest reaches of the Teton River.

Three parties objected to the temporary changes to instream flow. FWP worked with the parties to resolve the objections resulting in FWP agreeing not to place call on certain water rights held by the objecting parties. It is unlikely this prohibition will impact FWP's use of the leased water rights given the relative location and priority dates of the right not being called. The settlement agreement addressed the concerns of the objectors while allowing FWP to move forward with protecting instream flow. The agreement contains further provisions regarding water measurement discussed below under each respective instream flow change. FWP provided the water commissioner a copy of the agreement so that water would be administered consistent with the agreement.

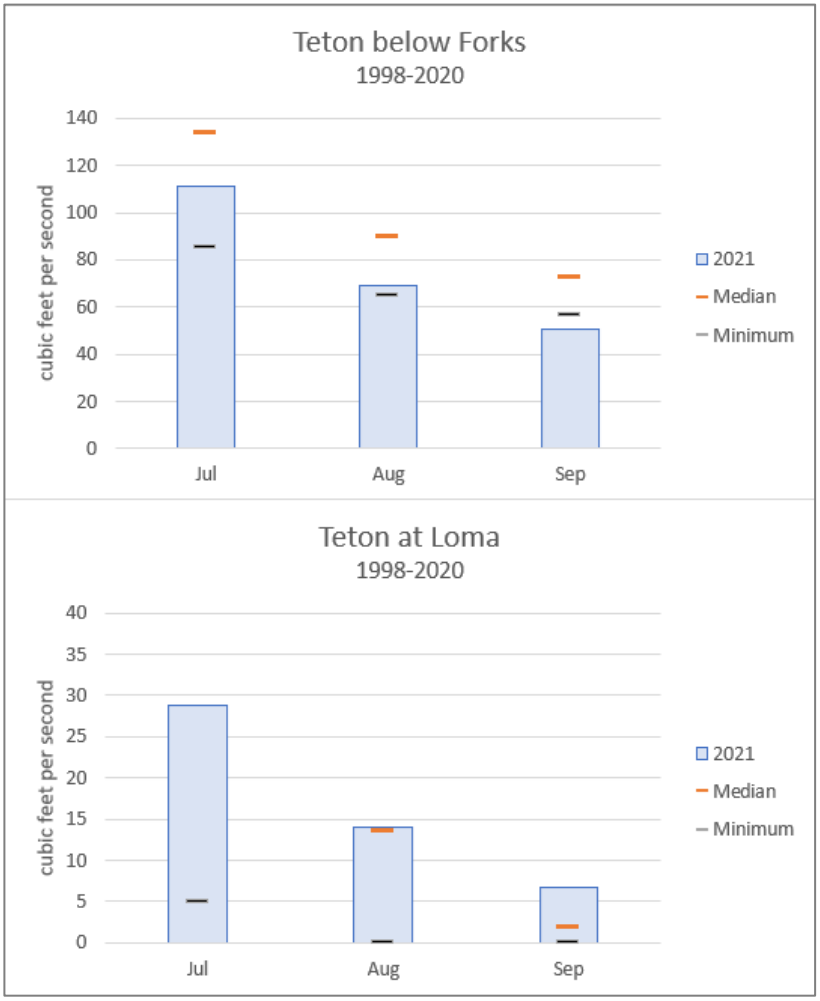

Figure 2. Inflow and outflow of Teton River for 2021 compared to monthly median and minimum values for the 1998-2020 period. (2021 data provisional)

Teton River near Dutton – New Temporary Change to Instream flow

The more upstream instream flow change is located about 1.5 miles downstream of Interstate 15 north of Dutton.

Change in Appropriation Information:

The length of the stream reach and how it is determined:

The temporary instream flow change restores and legally protects streamflow in the Teton River for approximately 17 river miles downstream from the historic irrigation point of diversion. This reach ends just below USGS Gage 06108000 Teton River near Dutton allowing this gage to be used to measure the 3.54 cubic feet per second (cfs) historically consumed by irrigation. This reach represents a reasonable distance over which the protected flow of 3.54 cfs can be managed. While the protected reach ends at this location, the downstream river benefits as it increases the available water supply in the river for both fish and irrigators.

The critical streamflow or volume needed to protect, maintain, or enhance streamflow to benefit the fishery resource:

FWP undertook an instream flow assessment (unpublished) for the lower Teton in the 2000s in response to watershed planning efforts in the basin. The study considered wetted perimeter data to determine desirable instream flow levels to keep riffles covered during natural low-flow periods (ranging from 12 to 16 cfs). The wetted perimeter methodology was widely used in Montana and is described in further detail in Figure 4.

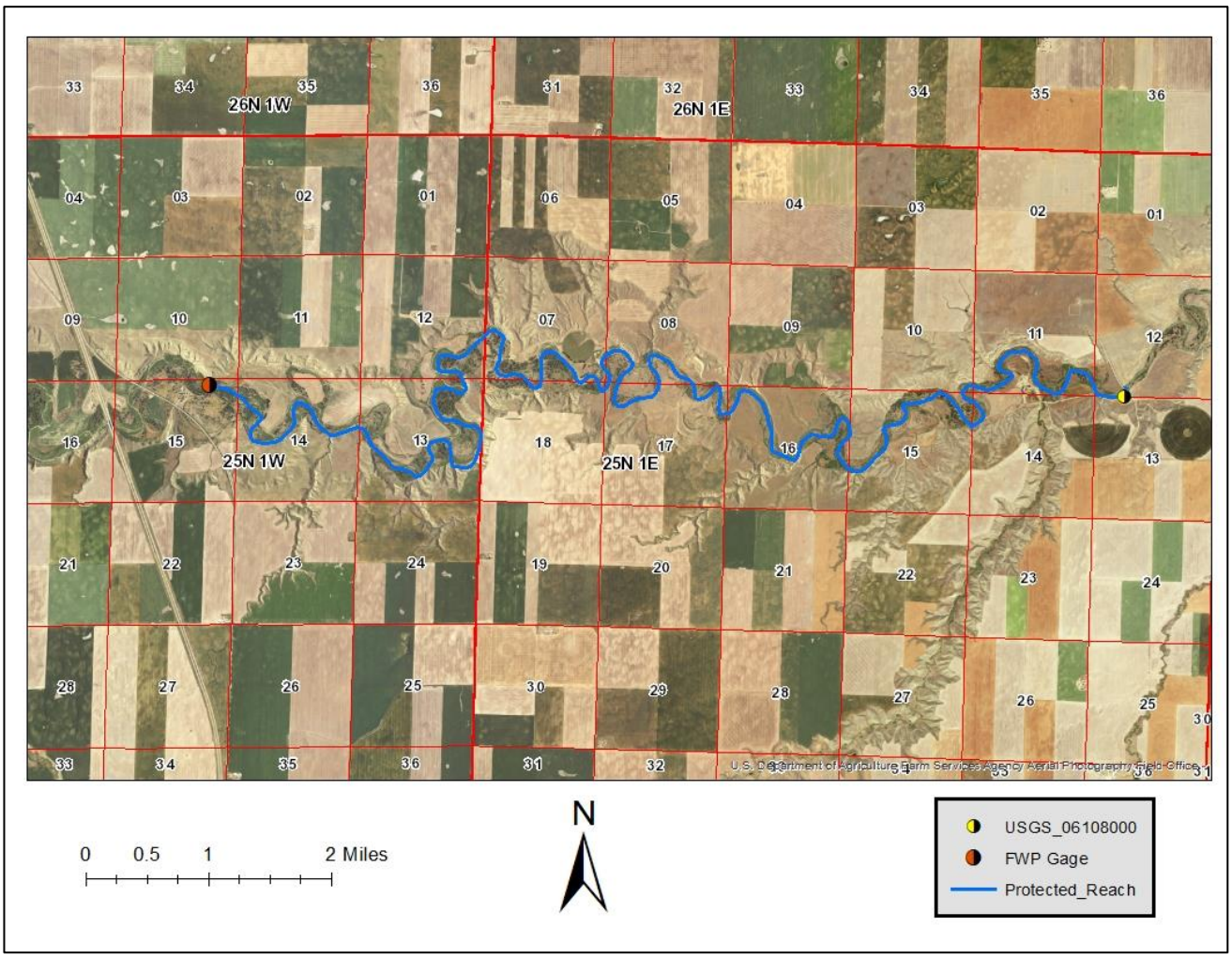

Figure 3. Measurement points and protected reach for Teton River near Dutton.

Data for pools was also collected and analyzed as slow-water habitat found in pools is critical for most of the fish species found in the lower Teton. This data was analyzed in a similar manner to the riffle wetted perimeter data. However, instead of analyzing the wetted width of a riffle, the average depth of the pool was compared to the flow. The point at which little additional pool depth was achieved with larger increases in flow was determined as the minimum prescribed flow to maintain pools (ranging from 16 to 26 cfs). Comparison of the prescribed flows to maintain pool and riffle habitat against flow data from the USGS gage near Dutton showed that the prescribed instream

flow levels are often not met, and the fishery would benefit from improved instream flow levels provided by the water lease.

The charts in Figure 2 show that the diversion of water from the Teton River greatly modifies the flow regime. The natural flow regime plays a critical role in sustaining native biodiversity and ecosystem integrity in rivers (Poff et al. 1997). During periods of elevated flows, additional water provided by the instream flow change serves to bring the stream conditions closer to natural which benefits the fishery of the lower Teton.

Wetted Perimeter Methodology

The wetted perimeter methodology is a recognized instream flow methodology for fisheries flow based on habitat for food production in the shallow, fast-moving water of a stream. The wetted perimeter is the distance across the bottom and sides of a stream channel, measured at a riffle area, that is in contact with the water. A graph of the wetted perimeter versus discharge generally yields two inflection points. The upper inflection point of the graph is the level above which large increases in discharge result in a small increase of the wetted perimeter. The lower inflection point of the graph is the level below which small decreases in discharge result in large decreases of the wetted perimeter.

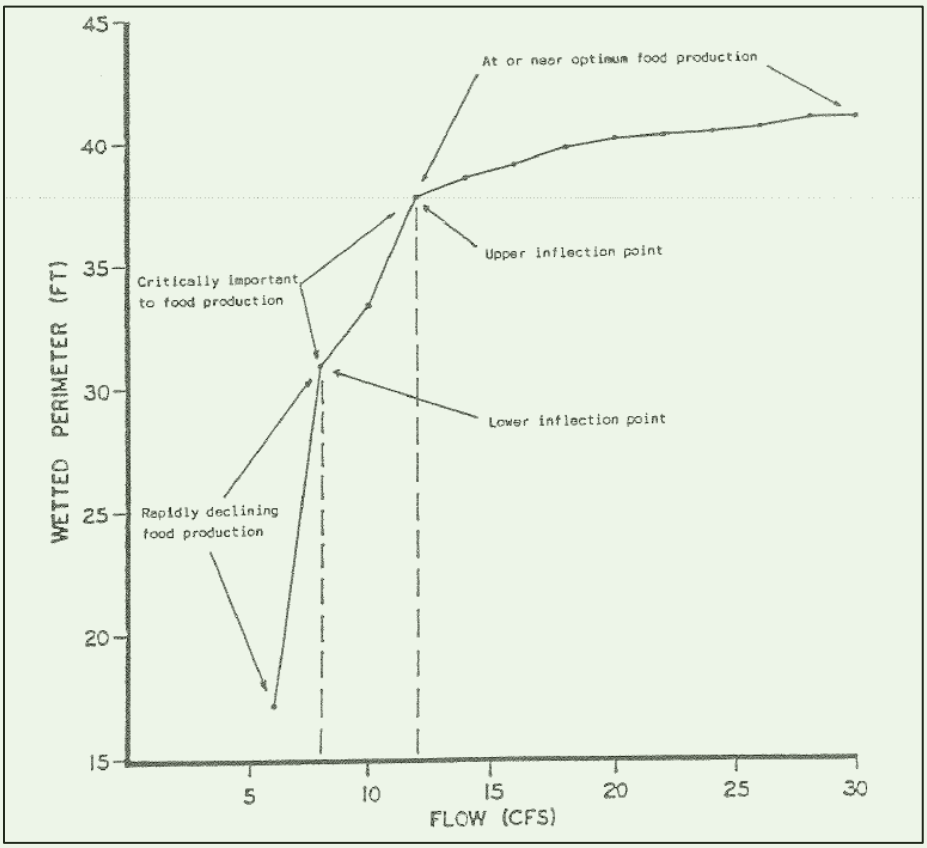

Figure 4. Explanation of Wetted Perimeter Methodology.

The amount of water available for instream flows as a result of the change in appropriation rights:

The flow rate protected for instream flow demanded against upstream junior rights is 5.9 cfs which is the historic diverted volume of 441.5 acre-feet (AF). The amount protected for instream flow through the 17-mile protected reach is 3.54 cfs up to 264.9 AF. This protected amount is less as it accounts for irrigation return flow that would have been legally available to junior rights in the protected reach.

Table 2 below reflects the distribution of water between the two overlapping water rights that have been changed.

Water Right	**Priority Date**	**Upstream Measuring Point FWP Gage**		**Downstream Measuring Point USGS 06108000 Teton near Dutton**	
410 171394-00	2-13-1901	1.96* cfs	147.0 ac-ft max.	1.18[&] cfs	88.2 ac-ft max.
41O 178054-00	10-20-1890	3.94* cfs	294.5 ac-ft max.	2.36[&] cfs	176.7 ac-ft max.
*DNRC authorized 5.90 cfs for each right, but they will be used proportionally to not exceed 5.90 cfs total. [&]Amounts may be less depending on results of loss calculation described under additional measurement requirements.					

Table 2. Water available under instream flow changes.

The contractual parameters, conditions, and other steps taken to ensure that each change in appropriation right does not harm other appropriators, particularly if the stream is one that experiences natural dewatering:

In addition to water measurement requirements, water is requested in accordance with Table 3 and is not requested during 15 days between the end of the preceding period and commencement of the subsequent period of water use. This approach reflects the intermittent water demand associated with past flood irrigation. It is intended to maintain water availability conditions similar to those other irrigators would have experienced if the rights were still being used for irrigation.

Month	May	June	July	August	September
Days of Irrigation	7	7	9	9	5.7

Table 3. Water use pattern for changed rights.

The objection settlement agreement discussed above also contained a provision requiring FWP to measure streamflow at the downstream measurement point (USGS Gage 06108000) just after measuring flow at the historic point of diversion to determine the amount of natural water loss, if any, between the two locations. The percentage of loss would be applied to reduce the amount of water protected to the downstream measurement point.

Figure 5 shows the FWP measurements taken at USGS Gage 06108000 and the USGS gage reading at the same time. The two measurements compare favorably given the inherent measurement error indicating the USGS was providing an accurate measurement of water for administering the change.

Date	FWP at 06108000	USGS 06108000
5/19/2021	59.2	60.4
7/12/2021	46.2	48.4
7/28/2021	38.0	38.5
8/17/2021	20.1	22.6
10/1/2021	25.4	25.9

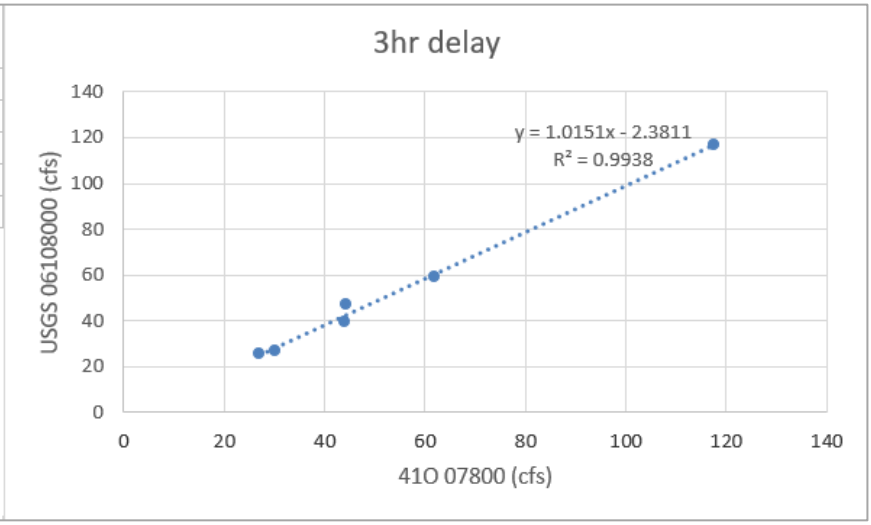

Figure 5. Concurrent FWP measurement and USGS gage readings and chart showing relationship between upstream and downstream measuring points.

The chart shows the relationship between the flow measured at the upstream FWP gage (41O 07800) and the flow recorded 3 hours later downstream at the USGS gage. The nearly one to one relationship shows that in 2021 the river did not have significant gains or losses between the two locations.

The methods used to monitor use of water under each change in appropriation right:

Streamflow is measured at the historic irrigation diversion, at the location approved by DNRC. This is the point at which the historic diverted volume is measured. At this location, a staff gage and stilling well housing an electronic water level recorder are in place.

Figure 6. Teton River 1.5 miles below Interstate 15 on March 25, 2021 flowing 107 cfs with water level logger in white plastic pipe on right side of picture. This is located at the historic point of diversion for irrigation.

A water level – streamflow relationship is being developed based on data collected in 2021. Figure 7 presents the relationship between the water level (stage) and flow for the 2021 measurements. This relationship is used with water level data recorded every half hour to develop a continuous flow record at the site. Streamflow measurements continue to be taken monthly if not more often to ensure the accuracy of the water level - streamflow relationship and adjust it as necessary. Streamflow is measured by taking incremental measurements with a velocity meter across the stream following USGS protocol.

The protected flow rate associated with the historically consumed volume, which is less than the diverted volume, is measured at USGS Gage 06108000 Teton River near Dutton.

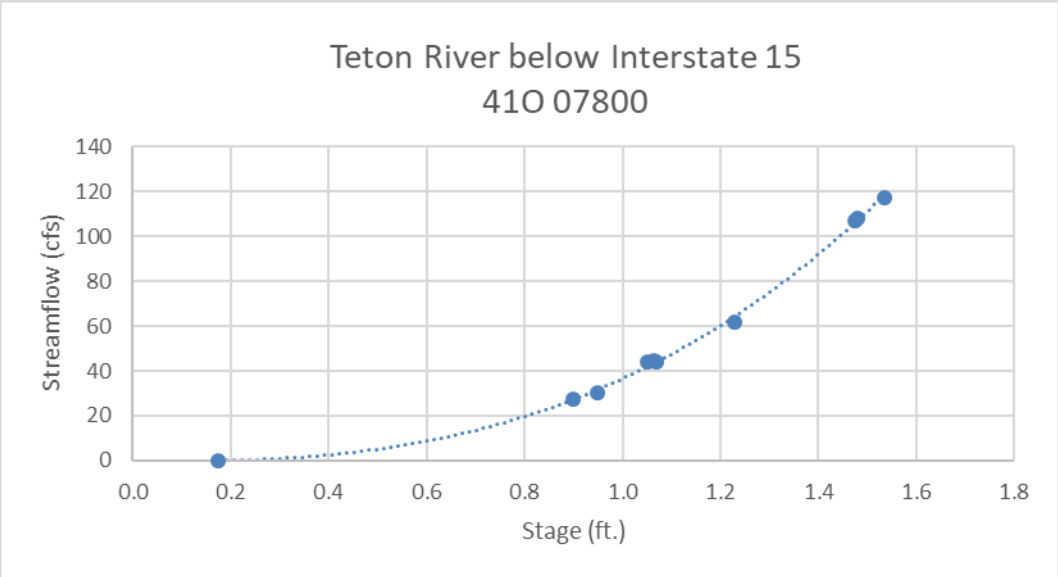

Figure 7. Teton River below Interstate 15 stage-discharge relationship for 2021 measurements.

Teton River near Fort Benton – New Temporary Change to Instream flow

The more downstream instream flow change is located about 9 miles upstream of the confluence of the Teton and Marias rivers near Fort Benton.

Change in Appropriation Information:

The length of the stream reach and how it is determined:

The temporary instream flow change restores and legally protects streamflow in the Teton River for approximately 9 river miles from the lower historic irrigation point of diversion of the two changed rights to the confluence of the Teton and Marias rivers. This reach ends just below USGS Gage 06108800 Teton River at Loma allowing this gage to be used to measure the 2.44 and 2.41 cfs historically consumed by irrigation respectively by the two water rights changed. This reach represents a reasonable distance over which the protected flow can be managed.

The same FWP instream flow assessment described previously found desirable instream flow levels to keep riffles covered during natural low-flow periods (ranging from 18 to 22 cfs). Comparison of the prescribed flows to maintain riffle habitat against flow data from the USGS gage near Loma showed that the prescribed instream flow levels are often not met, and the fishery would benefit from improved instream flow levels provided by the water lease. In fact, this reach was dry during late summer in 15 of 23 years during the 1998-2020 period.

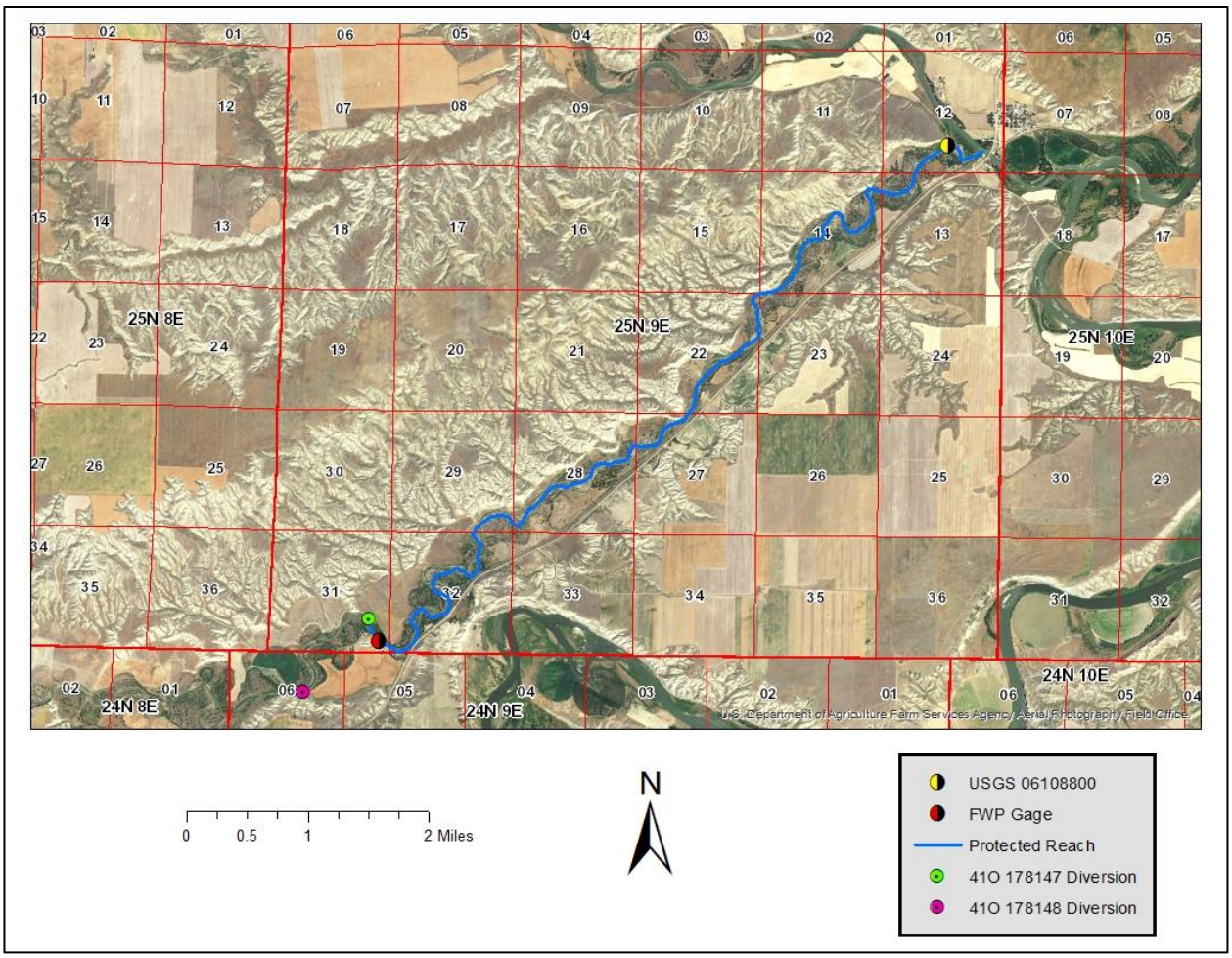

Figure 8. Measurement points and protected reach for Teton near Fort Benton.

As mentioned above, diversion of water from the Teton River greatly modifies the flow regime. The natural flow regime plays a critical role in sustaining native biodiversity and ecosystem integrity in rivers (Poff et al. 1997). During periods of elevated flows, additional water provided by the instream flow change serves to bring the stream conditions closer to natural which benefits the fishery of the lower Teton.

The amount of water available for instream flows as a result of the change in appropriation rights:

The flow rate protected for instream flow demanded against upstream junior rights is 4.47 and 4.23 cfs respectively for the two rights with the historic diverted volume of 252.2 acre-feet (AF) for each

of the rights as they both historically irrigated the same amount of land, but in slightly different locations. The amount protected for instream flow through the 9-mile protected reach is 2.24 and 2.11 cfs up to a total of 252.2 AF. This amount is one half of the diverted amount as it accounts for irrigation return flow that would have been legally available to junior rights in the protected reach. Table 4 reflects the distribution of water between the two changed water rights.

Water Right	**Priority Date**	**Upstream Measuring Point FWP Gage at Taylor's**		**Downstream Measuring Point USGS 06108800 Teton at Loma**	
410 178147-00	8-2-1897	4.47 cfs	252.2 ac-ft max.	2.24 cfs	126.1 ac-ft max.
41O 178148-00	8-3-1901	4.23 cfs	252.2 ac-ft max.	2.11[&] cfs	126.1 ac-ft max.
[&]Amount may be less depending on results of loss calculation described under additional measurement requirements.					

Table 4. Water available under instream flow changes.

The contractual parameters, conditions, and other steps taken to ensure that each change in appropriation right does not harm other appropriators, particularly if the stream is one that experiences natural dewatering:

In addition to water measurement requirements, water is requested in accordance with the following table and is not requested during 15 days between the end of the preceding period and commencement of the subsequent period of water use. This approach reflects the intermittent water demand associated with flood irrigation and is based on crop water demand. It is intended to maintain water availability conditions that other irrigators would have experienced if the rights were still being used for irrigation.

Month	May	June	July	August	September
Days of Irrigation	9 (4.4 & 4.6)*	12 (5.2 & 5.8)*	13 (6.3 & 6.7)*	13 (6.3 & 6.7)*	11.5 (5.6 & 5.9)*
*Days of irrigation apportioned between 41O 178147 and 41O 178148 respectively					

Table 5. Water use pattern for changed rights.

Date	**Upstream Diversion**	**FWP Gage 41O 08500**
7/12/2021	30.35	28.22
7/21/2021	24.38	24.30
8/12/2021	15.85	14.39
9/16/2021	9.37	9.09

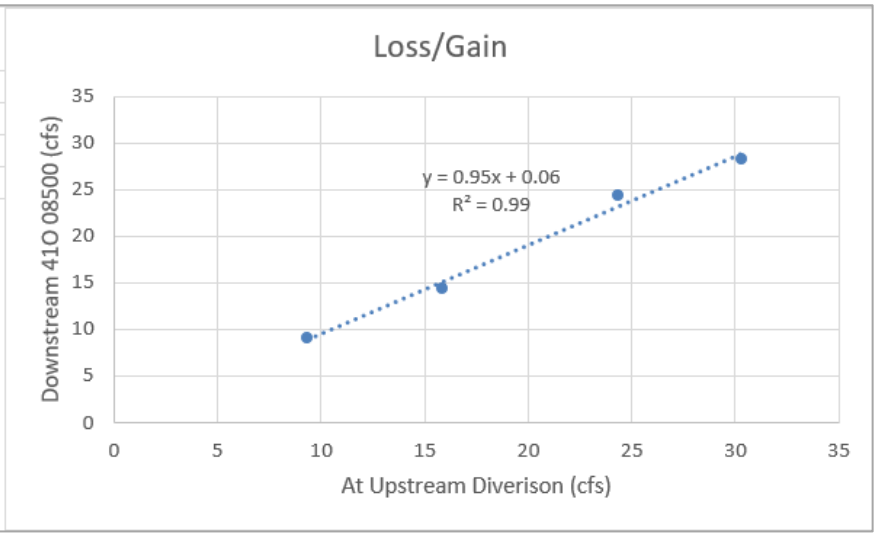

Figure 9. Concurrent upstream and downstream measurements and chart showing relationship between upstream and downstream measuring points.

The objection settlement agreement discussed previously also contained a provision requiring FWP to measure streamflow at the historic upstream point of diversion just before measuring flow at the

downstream historic point of diversion where the FWP gage is located to determine the amount of natural water loss, if any, between the two locations. The percentage of loss would be applied to reduce the amount of water that could be demanded at the measurement point. The preceding table shows the FWP measurements taken at the two locations. The relationship indicates approximately a 5% loss occurring in the reach. The measurement information was provided to the water commissioner promptly for use in administering the instream flow changes.

The methods used to monitor use of water under each change in appropriation right:
Streamflow is monitored just below at the historic downstream point of diversion, at the location approved by DNRC. This is the point at which the historically diverted amount is measured. At this location, a staff gage and stilling well housing an electronic water level recorder are in place.

Figure 10. Teton River 9 miles upstream of its mouth on April 9, 2021 flowing 89.4 cfs with water level logger in white plastic pipe with attached staff gage. This is located just below the downstream historic point of diversion for irrigation.

Like the upstream instream flow change near Dutton, a water level – streamflow relationship is being developed based on data collected in 2021. This relationship is used with the water level data recorded every half hour to develop a continuous flow record at the site. FWP takes streamflow measurements approximately monthly if not more often to ensure the accuracy of the water level -streamflow relationship and adjust it as necessary. Streamflow is measured by taking incremental measurements with a velocity meter across the stream following USGS protocol.

The flow rate associated with the historically consumed volume, which is less than the diverted amount, is measured at USGS Gage 06108800 Teton River at Loma.

Cow Creek – New Temporary Change to Instream flow

In 2014 FWP entered into a water lease agreement on Cow Creek located on the east side of the Bears Paw Mountains south of Chinook. The project involves a temporary change to fishery use in Cow Creek Reservoir by the water right owner with public access in addition to a temporary change to instream flow by FWP for Cow Creek itself which supports a resident brook trout population. FWP worked with the water right owners to negotiate a resolution of water right ownership issues with the DNRC Trust Lands Division and to address issue remarks on the water rights. In 2017 the Water Court approved the resolution of the ownership and other issues. FWP filed the application to temporarily change the water right to instream flow with DNRC in April 2019 and the change authorization was approved in March 2021.

Change in Appropriation Information:

The length of the stream reach and how it is determined:

The temporary instream flow change legally protects streamflow in Cow Creek for approximately 2 stream miles from the confluence of the North and South Forks to Cow Creek Reservoir. This is the reach of Cow Creek for which FWP holds an instream water reservation. This reach supports a brook trout fishery and is accessible to the public.

Figure 11. Measurement points and protected reach for Cow Creek.

The critical streamflow or volume needed to protect, maintain, or enhance streamflow to benefit the fishery resource:

FWP staff relied on the wetted perimeter method used in the water reservation process to establish a 4.5 cfs instream flow level to keep riffles covered during natural low-flow periods. The natural flow regime plays a critical role in sustaining native biodiversity and ecosystem integrity in rivers (Poff et al. 1997). During periods of elevated flows, additional water provided by the instream flow change serves to bring the stream conditions closer to natural which benefits the fishery of the lower Teton.

The amount of water available for instream flows as a result of the change in appropriation rights:

The flow rate protected for instream flow demanded against upstream junior rights is 0.21 cfs which is the historic diverted volume of 84 AF. This amount of water reflects the historic irrigation use in excess of amount of water needed to keep Cow Creek Reservoir full which is up to 2,065.4 AF annually as authorized by DNRC in the accompanying temporary change for fishery use in the reservoir.

The contractual parameters, conditions, and other steps taken to ensure that each change in appropriation right does not harm other appropriators, particularly if the stream is one that experiences natural dewatering:

As with all instream flow changes, the change authorization includes a condition requiring flow measurement so that the amount of water historically used and potentially demanded against upstream water users is not exceeded. To protect other water users, DNRC also closely evaluates the historical irrigation use to ensure that the amount of water changed to instream flow does not exceed the amount historically diverted and consumed by irrigation.

The methods used to monitor use of water under each change in appropriation right:

The amount of water changed to instream flow is measured in the primary spillway of Cow Creek Reservoir. This represents the water in excess of that needed to keep Cow Creek Reservoir full and is measured at the location approved by DNRC. At this location, a staff gage and stilling well housing an electronic water level recorder are in place; however, no water spilled from Cow Creek Reservoir in 2021 due to drought conditions. In the future, a water level –flow relationship will be developed. This relationship will be used with water level data recorded every half hour to develop a continuous flow record at the site. Streamflow measurements will be taken approximately monthly when the reservoir is spilling to ensure the accuracy of the water level - flow relationship and adjust it as necessary. Flow is measured by taking incremental measurements with a velocity meter across the stream using USGS protocol.

Figure 12. Staff gage with water level logger in white pipe in standing water of spillway.

RENEWALS COMPLETED

Big Creek. The existing 10-year and 20-year water leases on Big Creek, tributary to the Yellowstone River near Emigrant, expired after the 2018 and 2019 irrigation seasons respectively. The 10-year water leases were previously renewed in 2009. Like other upper Yellowstone River tributaries, change to instream flow protects flow in Big Creek to provide for the successful spawning, incubation, emergence and outmigration to the Yellowstone River of Yellowstone cutthroat trout. FWP negotiated renewals of the water leases and the renewals of the changes to instream flow were approved DNRC 2020.

RENEWALS PENDING

Rock Creek. The existing 20-year water leases on Rock Creek, tributary to the Clark Fork River near Garrison, expired at the conclusion of the 2021 irrigation season. The project involved the installation of a fish screen, pipeline and sprinkler system to reduce the diversion from Rock Creek, improving flow in the lower mile and a half of the stream. The water right owner desires to continue the lease. FWP has filed a Notice of Renewal with DNRC and is negotiating the terms of the renewal with the water right owner.

Lazyman Creek. The existing 10-year water lease on Lazyman Creek, tributary to the upper Ruby River, expired in the fall of 2021. The project involved the installation of an improved irrigation system to reduce the diversion from Lazyman Creek. This is the only irrigation on the creek. The project provides that a minimum of 1 cfs will be kept instream below the irrigation diversion and irrigation water use will be reduced or ceased when necessary to provide the 1 cfs instream flow. FWP has filed a Notice of Renewal with DNRC. No additional funding is needed for this project as the original funding for the infrastructure improvement covers 20 years.

CHANGE APPLICATIONS PENDING

Deep Creek. In 2017 FWP entered a water lease on Deep Creek, tributary to the Missouri River near Townsend. The focus of the lease is to provide adequate connectivity in lower Deep Creek to provide for the spawning and rearing of resident and migratory brown and rainbow trout. FWP submitted the change application to DNRC in January 2018 and it is currently being processed.

As compensation for this lease, FWP must provide replacement irrigation water from the Broadwater-Missouri Canal owned by DNRC and operated by the Broadwater-Missouri Water Users' Association. FWP entered an agreement with the Association to transport the water. FWP continues working with DNRC to obtain the water under DNRC's existing water right either by contract or through a mitigation agreement as part of DNRC's fishery mitigation associated with their FERC license for the Toston Project.

Pine and Bear Creeks. Trout Unlimited approached FWP offering to donate two water rights that were historically used for mining. FWP would then permanently change the water rights to an instream flow in Pine and Bear Creeks. Pine Creek is a tributary to Bear Creek at Jardine and Bear Creek is a tributary to the Yellowstone River near Gardiner. Like other streams in the upper Yellowstone where FWP leases water, the permanent change to instream flow is expected to benefit Yellowstone cutthroat trout. FWP completed an environmental assessment regarding the proposed acquisition and permanent change to instream flow in November 2017. The Fish and Wildlife Commission accepted the donation of the water rights. FWP filed an application with DNRC to permanently change the water rights to instream flow in September 2018 and it is currently being processed.

INSTREAM CHANGES IN DEVELOPMENT

Mill Creek and Willow Creek. Under a 2008 settlement agreement, the State of Montana Department of Justice accepted ownership of a number of Mill and Willow Creek water rights held by ARCO Environmental Remediation LLC. Historically these rights diverted irrigation water from Mill and Willow creeks, both tributaries to the Clark Fork River near Anaconda, MT.

Montana Department of Justice's Natural Resources Damage Program (NRDP) transferred management of these water rights to FWP. The intended fate of these rights is the conversion from an irrigation purpose to an instream flow purpose.

FWP began a due diligence evaluation of those rights in February 2013. The evaluation has revealed issues of overlapping and conflicting claims of ownership. Ownership issues must be resolved before a change to instream flow is sought through DNRC's change of use process. This resolution will likely occur as part of the Preliminary Decree process yet to come in the upper Clark Fork basin. In the meantime, FWP is evaluating how best to update water right ownership before the Preliminary Decree.

Nevada Spring Creek. FWP was offered (through donation) several water rights from Nevada Springs and Nevada Spring Creek. These water rights, for both irrigation and stock use, are located on a spring creek tributary to Nevada Creek in the Blackfoot Basin.

Public comment was collected in November and December 2012 as part of the "Nevada Spring Creek Water Right Acquisition Environmental Assessment". The Fish and Wildlife Commission authorized acceptance of the irrigation water rights in December 2012. In July 2013, the Fish and Wildlife Commission authorized acceptance of the associated stock water rights. In August 2013, the quit claim deed was recorded, and the Water Right Ownership Update was filed with DNRC.

The subject water rights were part of the Montana Water Court's ongoing Blackfoot River Basin Preliminary Decree (Basin 76F). Review of the claims defined inaccuracies in the Nevada Spring Creek water rights. Therefore, FWP objected to those water rights in the adjudication proceedings. Through amendments and withdrawals, FWP has corrected the inaccuracies of those claims. The Water Master's report was finalized in July 2015. The Water Judge adopted the Master's Report in August 2015.

From 2016 through 2021 FWP has collect operational, hydrologic, and historical use data. FWP intends to file the application with DNRC in December 2021 to permanently change these rights to instream flow.

Irrigation Rights on FWP Lands in Upper Missouri River Basin. FWP holds irrigation rights acquired with the purchase of several properties in the upper Missouri River basin, including Poindexter Slough Fishing Access Site, Wall Creek Wildlife Management Area, Gallatin Wildlife Management Area and Missouri Headwaters State Park. The water rights associated with Poindexter Slough have been evaluated while the rights associated with the other properties are in the evaluation stage. These rights are being considered for permanent changes to instream flow to benefit the fishery and are also being considered for mitigation under §85-2-420, MCA of FWP held groundwater developments that at times are creating out of priority surface-water depletions in the basin.

CONCLUSION

There continues to be strong interest from water right owners in leasing water for temporary changes to instream flow. FWP will continue to administer its existing changes to instream flow and pursue new changes where opportunities arise. In 2020 and 2021, current projects involving both temporary and permanent changes to instream flow will continue to move forward, and new projects will likely be developed.

REFERENCES

Poff, N.L., J.D. Allan, M.B. Bain, J.R. Karr, and others. 1997. The natural flow regime: A paradigm for river conservation and restoration. Bioscience 47(11):769-784

FWP Instream Flow Change History as of November 2021

Active Leases

SOURCE	RIVER BASIN	STATUS	LESSOR	LEASE TERM/EXP.	PRIORITY OF RIGHT	QUANTITY LEASED	PERIOD OF USE
Big Creek	Upper Yellowstone	Active Renewed	Land Trust	10 years April 15, 2030	March 12, 1883; June 30, 1901; May 31, 1909; May 15, 1910; May 15, 1910	1.0 – 16.0 cfs 2.0 (rights dedicated to a land trust in perpetuity)	April 15 - October 15
Big Creek	Upper Yellowstone	Active Renewed	Private Party	10 years May 1, 2029	June 30, 1873 (1st right on stream) right split between 2 parties	2.8 cfs	May 1 - November 1
Big Creek	Upper Yellowstone	Active Renewed	Private Party	10 years May 1, 2024	June 30, 1873 (1st right on stream) right split between 2 parties	7.5 cfs	May 1 - November 1
Cedar Creek	Upper Yellowstone	Active Renewed	US Forest Service	10 years September 20, 2025	April 1, 1890; April 1, 1893; April 1898; April 1, 1904; April 7, 1972 (high-water rights only)	6.77 cfs May 1-July 15 6.39 cfs July 16-July 31 9.64 cfs August 1-August 31 6.39 cfs Sept 1 - October 15	May 1-October 15
Locke Creek	Upper Yellowstone	Active	Private Party	30 years December 14, 2031	March 6, 1915	7.5 cfs	April 20 – October 24
Mulherin Creek	Upper Yellowstone	Active Renewed	Private Party	10 years December 31, 2028	July 15, 1884; May 7, 1885; June 15, 1893; January 1, 1900; March 2, 1903; June 5, 1905; August 5, 1920; April 15, 1967	5.0 cfs to 27.0 cfs	April 15 - October 19
Long Creek	Red Rock	Active	Private Party	December 31, 2026	October 7, 1915 – UT Long Creek - 41A 110697-00 October 15, 1888- Long Creek -41A 110699-00 October 15, 1888 – UT Long Creed - 41A110700-00 August 25, 1893 –Divide Creek- 41C110701-00	Month / To POD / Blw POD July / 7 cfs / 5.49 cfs Aug. / cfs / 2.77 cfs Sept. / 3 cfs / 1.8	July 1 - September 15
Lazyman Creek	Ruby	Active	Private Party	10 years November, 2021*	April 30, 1888 (only diversionary right on source)	Up to 1.0 cfs	May 15 – October 15
Hells Canyon Creek	Jefferson	Active Renewed	Private Parties	10 years Apr. 1, 2029	December 31, 1884 (1st right on stream), August 23, 1889; August 29, 1912	1.12 cfs (salvaged water)	April 1- November 4
Little Belt Creek	Belt Creek	Active	Private Party	10 years: April 17, 2029	October 3, 1891; May 27, 1895 (senior rights on source)	1.0 cfs (trigger flow)	May 15 – October 15
Cow Creek	Missouri	Pending	Private Party	10 years December 31, 2031	March 28, 1889, May 1, 1889 (most senior rights on source)	0.21 cfs	April 1 to October 31
Teton River (near Fort Benton)	Missouri	Pending	Private Party	10 years January 31, 2031*	August 2, 1897; August 3, 1901	4.47 cfs / 4.23 cfs	May 20 – September 23

FWP Instream Flow Change History as of November 2021

Teton River (near Dutton)	Missouri	Pending	Private Party	10 years January 31, 2031**	October 20, 1890; February 13, 1901	5.9 cfs	May 4 – September 30
Chamberlain Creek	Blackfoot	Active Renewed	Private Party	10 years April 1, 2027	October 10, 1911	½ the flow up to 25 cfs	April 1 - October 31
Pearson Creek	Blackfoot	Active Renewed	Private Party	10 years April 1, 2027	October 10, 1911	Up to 8 cfs	April 1 - October 31
Cottonwood Creek	Blackfoot	Active Renewed	FWP – rights acquired with Wildlife Management Area	10 years October 18, 2026	May 1, 1884	14 cfs April, 37 cfs May 1-June 30, 32 cfs July, 9 cfs August, 6 cfs September, 9 cfs October 8 cfs November (Salvaged water)	April 1- November 4
Rock Creek	Clark Fork	Active Renewal in Process	Private Party	20 years October 31, 2021*	March 23, 1881; May 15, 1881; June 1, 1892; May 1, 1898; September 29, 1904; May 10, 1907	5.0 - 27.22 cfs	April 15 - October 31

* A Notice of Renewal has been filed with DNRC.

**DNRC did not include an expiration date on Change Authorization. This date is 10 years from the date of issuance.

Permanent Changes to Instream Flow Completed

Cedar Creek	Upper Yellowstone	Active	FWP purchased right from private party – rights previously leased	Perpetuity	May 29, 1894 (4th right on stream; other high-priority rights already leased by FWP);	3.25 cfs	April 1 – November 1

Applications Pending Before DNRC

Bear and Pine Creeks	Upper Yellowstone	Pending	Rights donated to FWP	Perpetuity	December 31, 1876; July 24, 1903 (include most senior right)	10.84 – 11.34 cfs	January 1 – December 31
Deep Creek	Missouri	Pending	Private Party	10 years	May 1, 1868; March 1, 1870 (6th and 8th priority rights)	4.25 cfs	May 5 – September 23

FWP Instream Flow Change History as of November 2021

In-active leases/changes (terminated, not perfected or rescinded)

Mill Creek	Upper Yellowstone	Inactive	Mill Creek Water and Sewer District	Expired	95 rights with various priorities	41.4 cfs	48-60 hours in August Diversion shut off after 10-day notice from FWP
Mill Creek	Upper Yellowstone	Inactive	Private Party	Expired	June 30, 1880; June 1, 1903	2.0 cfs (1880) and 4.13 cfs (1903) (salvaged water)	May 1 -October 4
Mill Creek	Upper Yellowstone	Inactive	Private Party	Expired	June 1, 1891	2.64 cfs	May 1 – October 19
Blanchard Creek	Blackfoot	Inactive	Private Party	Lease rescinded	May 11, 1913 (first right on stream)	3.0 cfs	April 15 -October 15
Trail Creek	Clearwater	Inactive	Resort (and) Homeowners Association	Not perfected Lease rescinded	April 10, 1905 January 10, 1911	1.06 cfs 2.37 cfs plus, an additional 0.5 cfs during periods of low flow	April 1 - October 31.
Tin Cup Creek	Bitterroot	Inactive	Private Parties	Met statutory limit on renewals in place at that time.	August 1, 1883 (first right on stream)	2.28 cfs April 1-April 14 4.32 cfs April 15-April 30 4.72 cfs May 1-October 19	April 1- November 4
Hell Roaring Creek	Red Rock	Inactive	Private Party	Not perfected Lease rescinded – rights later withdrawn by owner.	May 26, 1900 October 25, 1901 September 24, 1915	8.0 cfs 4.0 cfs 6.0 cfs	May 1 – October 15 May 1 – October 15 May 1 – October 25
LaMarche Creek	Big Hole	Inactive	Private Party	Lease terminated at owner request due to conditions imposed by DNRC.	July 28, 1906; December 31, 1955	1.85 cfs / 2.0 cfs	May 15 – September 22
Deep Creek	Missouri	Inactive	City of Townsend	Lease terminated at owner request due to conditions imposed by DNRC.	April 1, 1866 April 2, 1866	1.88 cfs 0.16 cfs	April 1 – October 1