COLORADO
Colorado Water Conservation Board
Department of Natural Resources

1313 Sherman Street, Room 718
Denver, CO 80203

P (303) 866-3441
F (303) 866-4474

Jared Polis, Governor
Dan Gibbs, DNR Executive Director
Rebecca Mitchell, CWCB Director

TO: Colorado Water Conservation Board Members

FROM: Pete Conovitz, Water Resource Specialist
Stream and Lake Protection Section

DATE: November 17, 2022

AGENDA ITEM: #19a. Proposed Renewable Temporary Lease of Direct Flow Water Rights for Instream Flow Use on Tomichi Creek, Water Division 4 (Gunnison County) (1st Meeting)

Staff Recommendation

No formal action is required at this time.

Pursuant to 37-83-105(2) C.R.S. and ISF Rule 6k(2), the Board will use a two-Board meeting process to review, consider public comment and approve or reject a proposal for a temporary renewable lease of water. The Board's consideration of the lease at this meeting will initiate this process and begin a twenty day period in which any person may request the Board to hold a hearing on the proposed lease. The initial presentation of this proposal provides an opportunity for the Board and the public to identify questions or concerns that Staff will address at this or a subsequent meeting. After the second CWCB meeting, the Board may direct Staff to "move forward" with the proposal, after which the applicant shall file a request for approval of the lease with the Division of Water Resources ("DWR"), which will initiate a 60-day comment period for DWR's review.

Introduction and Background

The owners of the Peterson and Razor Creek Ranches ("Peterson Ranch") and the Colorado Water Trust ("CWT") have proposed a renewable temporary instream flow lease of water rights in four irrigation ditches located on Tomichi Creek in Gunnison County, Colorado. The leased water would be used to help meet existing decreed instream flow ("ISF") rates on Tomichi Creek to preserve the natural environment to a reasonable degree. Peterson Ranch's offer letter is attached as **Exhibit A**.

Under this proposal the lease would be renewable for up to 5 years in a 10-year period pursuant to section 37-83-105(2), C.R.S. The source of water for the ISF lease has been historically used to irrigate the Peterson Ranch. The lease is proposed as a "split-season" arrangement where the irrigation schedule on the ranch would be changed from one in which water is generally available for diversion during the entire irrigation season to one in which irrigation is curtailed for certain defined periods. This will allow for ISF benefits during periods of low flows and high water temperatures but still allow for irrigation use and continued agricultural production at times when the stream is less impacted by

low flows. When the proposed lease is in operation, irrigation diversions will be curtailed and the water will be used to meet all or part of the Tomichi Creek ISF amount. When the water is not being used for ISF purposes, irrigation diversions will resume to maintain agricultural production on the Peterson Ranch.

This lease proposal was first introduced to the Board at the January 2022 CWCB meeting. CWCB Staff, CWT and the Peterson Ranch subsequently decided to take additional time to refine aspects of the hydrologic analysis, further consult with DWR staff to more clearly identify any issues of concern, and develop a draft request for DWR approval of the lease. The presentation of the lease proposal at this November 2022 meeting will restart the Board's review process and opportunity for public comment.

Discussion

ISF Rules 6e and 6f describe the Board's evaluation process, including specific factors that the Board must consider in determining the appropriateness of an acquisition. Additional information that the Board may use to evaluate the proposed loan is included below:

Amount and Source of Water Proposed for Lease

The water proposed for lease includes water rights decreed in four irrigation ditches that have historically irrigated the Peterson Ranch. Each water right has several priorities associated with it and the cumulative decreed amounts are shown in **Table 1** below.

Table 1. Water Rights Proposed for Lease

Water Right Name	Cumulative Decreed Amount (cfs)	Decree(s)
Louis Ditch	10.0	CA1602, CA2079 02CW2054A
Cain Borsum Ditch	22.0 cfs	CA1266 CA2079
McGowan Irrig. Ditch and McGowan Irrig. Ditch Alt. Pt.	11.5 cfs	CA1266 CA2079 99CW0052 02CW0254

Historically these ditches have irrigated approximately 220 acres on the Peterson Ranch and the combined diversion amount for all ditches equals 43.5 cfs. The Peterson Ranch owns 100% of the water rights proposed for use in this lease.

Location of Use

The leased water would be used on Tomichi Creek, from the headgate of the Louis Ditch (the uppermost irrigation ditch located on the Peterson Ranch) downstream to the confluence with Quartz Creek. The total length of creek that would benefit from the proposed lease is 7.25 river miles. A Location Map is attached as **Exhibit B.**

Existing ISF Water Rights

The existing ISF water rights on Tomichi Creek are described in **Table 2** below. The proposed lease would benefit the Tomichi Creek ISF segment that extends from the Tomichi Creek confluence with Marshall Creek downstream to the Quartz Creek confluence and has a decreed flow rate of 18 cfs year-round.

Table 2. Tomichi Creek ISF Water Rights

CWCB Case No.	Stream	Segment	Approp. Date	Segment Length	Amount (cfs)
80CW132	Tomichi Creek	Triano Creek to Marshall Creek	3/17/1980	10.5	9 cfs
80CW132	Tomichi Creek	Marshall Creek to Quartz Creek	3/17/1980	25.2 miles	18 cfs

Existing Flow Regime and Natural Environment

Tomichi Creek originates on the west side of the Continental Divide in the Collegiate Peak Mountains. From its source, the creek extends south and west approximately 72 miles to its confluence with the Gunnison River in Gunnison, CO. Major tributaries include Agate Creek, Marshall Creek, Razor Creek, Quartz Creek and Cochetopa Creek. Upland areas within the drainage basin are largely sagebrush and forested lands while bottomlands along the creek are largely a patchwork of irrigated hay meadows, wetlands and riparian areas. The creek supports a wild trout fishery and fish sampling records document the presence of rainbow and brown trout, Rio Grande chub, longnose sucker, longnose dace, brook stickleback, fathead minnow, and white sucker.

Peak streamflow typically occurs towards the end of May and decreases down to baseflow conditions by July. There is limited storage in the Tomichi Creek watershed and significant agricultural water diversions occur throughout the irrigation season. Irrigation demand, primarily for hay and pasture grass cultivation, typically peaks in July which corresponds with very low flows and dry stream locations below a number of diversions. Streamflow typically rebounds in August with seasonal monsoon moisture and when most irrigation is temporarily shut off for haying. Low flows can again become an issue in September once irrigation diversions resume, particularly during warm and dry years.

The combination of summer low flows and high water temperatures negatively impact the aquatic habitat in Tomichi Creek. In extremely dry years these adverse conditions have been shown to have a noticeable impact on fish populations and some recent macroinvertebrate surveys have fallen short of state standards for aquatic life. The exceedance of chronic temperature standards are common even in non-drought years and, in July 2018, acute temperature standards were observed to be exceeded on Tomichi Creek both above and below the confluence with Quartz Creek.

Proposed Method of Acquisition and Use of Leased Water

Peterson Ranch and the CWT are proposing entering into a “5-in-10” lease agreement with CWCB where water could be made available for ISF use for a total of five years within a ten-year period. As proposed,

CWT and the Peterson Ranch will enter into a Water Lease Agreement for the temporary use of the subject water rights. This agreement will provide the terms under which the leased water may be used and how compensation will be determined. CWT will subsequently sublease these rights to the CWCB for ISF use during years in which the lease is implemented. Operation of the lease will be consistent with the terms of an existing conservation easement on the Peterson Ranch held by the Colorado Cattlemen's Agricultural Land Trust (CCALT). CCALT supports the proposed lease on the condition it be initially operated no more than three years during the ten year approval period. CCALT would permit an additional two years of lease operation subject to reviewing data on any impacts to agricultural operations as well as benefits to the stream (**Exhibit C**). A draft Water Lease Agreement between CWT and the Peterson Ranch is attached as **Exhibit D**. A draft sublease between CWT and CWCB is attached as **Exhibit E**.

The proposed split-season schedule is designed to target specific periods when Tomichi Creek is impacted by low flows and high water temperatures. Under the proposed split-season schedule, diversions on the Peterson Ranch would be shut off and the water would be kept in the stream for ISF use during one or both of the following periods ("Operational Windows"): June 25 through July 31 and from September 1 through September 30. These dates may be shifted up to a week depending on conditions. Diversions for irrigation would resume in August and, if the lease is operated during the September Operational Window, in October to maintain agricultural production and to facilitate fall pasture regrowth.

As currently proposed, The Petersons, CWT and CWCB will mutually decide no later than May 1 whether to operate the proposed lease in a given calendar year. During implementation years, CWT and the Peterson Ranch will decide no fewer than 14 days before the commencement of a specific Operative Window whether to implement the lease during that period. The intent is to operate the lease in below average water years when the stream is likely to experience low flows and high water temperatures, and the decreed ISF rate on Tomichi Creek is unlikely to be met. The lease is not likely to be implemented in extremely dry years such as 2012 as the subject water rights may not be able to divert due to a lack of physical and/or legal water availability.

Historical Use and Return Flows

The historic irrigation season on the Peterson Ranch extends from April through October and is typically divided into two periods. The first irrigation period typically begins in the spring and continues until late July or early August prior to a single annual cutting of hay. During hay harvest, diversions are curtailed and the fields are dried out for several weeks. The second irrigation period occurs after cutting and extends through the fall for pasture regrowth.

An engineering analysis commissioned by CWT used a period of record from 1970 through 2021 to evaluate the historic consumptive use and return flows following the diversion of the subject water rights (**Exhibit F**). Irrigation return flows, both in the form of direct surface and groundwater returns (which accrue back to Tomichi Creek in the same month following diversion) and lagged groundwater returns (which accrue to the creek in the months following diversion) occur at various locations along Tomichi Creek both within and downstream of the Peterson Ranch Property. All return flows from the Peterson Ranch water rights return to Tomichi Creek above the Hannah J. Winters No. 2 Ditch which is the next downstream diversion below the Peterson Ranch.

Location of Other Water Rights and Injury Potential

Various water rights divert downstream of the Peterson Ranch and calls from downstream senior rights are possible in dry years. Calls from the Gunnison Tunnel and South Canal and Redlands Power Canal were active in 2002 and 2003. Local calls on Tomichi Creek are also possible. In 2002, calls were active from the Biebel Ditches Nos. 1 and 2 as well as the McCann Ditches Nos 1, 2 and 3. Other water rights of note that are located in the Tomichi Creek ISF segment include the Louis Sarrasin and Hanna J. Winters No. 2 Ditches. All return flows from the Peterson Ranch water rights accrue back to Tomichi Creek upstream of the Hannah J Winters No. 2 Ditch.

The curtailment of historic diversions under a split-season schedule may result in new depletions to Tomichi Creek in the months following implementation during the Operational Windows. This is primarily due to a reduction in the lagged groundwater return flow component that would otherwise accrue to the stream under a normal irrigation schedule. Net depletions due to operation of the lease within the June/July Operational Window primarily occur in August, while depletions resulting from the September Operational Window primarily occur in October. Therefore water rights downstream of the subject water rights have the potential to be affected by the proposed instream flow lease during these time periods. However, CWT's engineering analysis and modeling results suggest that the timing, location and amount of depletions limits any potential injury to downstream water users.

The potential for injury is limited in that the depletions that would occur in August and October coincides with periods of increased streamflow and decreased irrigation demand. As previously mentioned, most irrigators curtail diversions during the month of August for haying operations. October typically also sees less irrigation demand as most users have concluded irrigation for the season or are diverting smaller amounts for stock water and pasture regrowth. Diversion records indicate reduced irrigation demand in August and October and show that diversion rates are often significantly less than the maximum decreed rates. Stream gage records also reflect the rebound in stream conditions in August and October. Inflows from Quartz and Cocheptopa Creeks are significant inputs to Tomichi Creek and provide additional flows that are likely to satisfy any downstream irrigation demands despite any deficits that would occur due to the operation of the lease. Data from the Tomichi Creek at Gunnison, CO gage show median flows increase by approximately 70 cfs from late July into August, and 30 cfs in October.

Finally call records suggest that should a call be placed, it would be senior to the subject water rights resulting in their curtailment. The curtailment of these rights would contribute flows in an amount greater than the modeled depletions. One exception to this could be the CWCB instream flow right which is junior to the subject water rights. For the reasons described above, the decreed ISF flow rate is typically exceeded in August through October by an amount in excess of the modeled depletions. CWCB and CWT staff intend to monitor any effects to the existing ISF water rights, including the installation of a temporary stream gage if needed.

More detail on CWT's analysis showing a limited potential for downstream injury can be found in their draft request to DWR for approval of the lease **(Exhibit G)**. CWT and CWCB staff have met with DWR staff to present these findings. While DWR has yet to conduct a formal review of the request, staff have indicated that no major "red flags" or fatal flaws have been preliminarily identified with respect to proposed lease operations and injury potential. If DWR approves the proposed lease it would include terms and conditions to prevent injury to downstream water rights.

Effect of Proposed Acquisition on Any Relevant Interstate Compact Issue

The proposed lease would not negatively affect any interstate compact. The water rights will be used for instream flow purposes and will be available for use by others downstream of the instream flow reach.

Effect on Maximum Utilization of Waters of the State and Availability for Downstream Use

The leased water will promote maximum utilization of waters of the State by 1) being beneficially used for ISF purposes to better preserve the natural environment to a reasonable degree throughout the decreed ISF reach on Tomichi Creek, and 2) being made available for downstream use including diversion for consumptive use on Tomichi Creek below Quartz Creek (lower terminus of ISF segment) and on the Gunnison River.

Administration

Initial consultations with DWR staff have not identified any "fatal flaws" or "red flag" issues with respect to administration of the proposed lease. DWR will confirm that the lease will be administrable as part of its formal review of any application to approve the temporary lease.

Cost of Proposed Lease

Staff will recommend that the CWCB compensate Peterson Ranches (via the sublease with CWT) for the leased water using funds from the Construction Fund as authorized by section 37-60-123.7, C.R.S. CWCB Financial Policy 19, adopted by the Board in January 2009, governs expenditures of those funds, and expressly includes temporary leases in the list of items for which these funds can be spent.

Policy 19 requires staff to provide the Board with information on the financial aspects of the proposal. CWCB and CWT engaged WestWater Research, LLC to determine a valuation of the leased water. WestWater's valuation report is included as **Exhibit H** and recommends value of $236 per acre-feet of consumptive use and a total value of $27,500 for the leased water rights. Staff intends to make a separate annual funding request to the Board at a later date and in years where the parties desire to implement an annual lease (after DWR approval and after the parties have executed their respective water lease and sublease agreements).

Also required under Policy 19 is additional biological information from CPW pertaining to the benefits to the natural environment. This information is included in CPW's biological analysis and letter of support for the proposed lease **(Exhibit I)**. In general, this information substantiates the benefit of the proposed lease with respect to an increase in useable habitat for fish and macroinvertebrates, and establishes that that the acquired water will not result in any cause any detriment other aspects of the natural environment.

Potential Benefits of the Proposed Lease

Under the proposed split season irrigation schedule, an increase in streamflow within the Tomichi Creek ISF segment would occur during the June/July and September Operational Windows. Streamflow increases would be greatest in the June/July Operational Window as the Peterson Ranch water rights historically diverted the highest amounts during this period. This also corresponds with the time period when low streamflow and high water temperatures are of the greatest concern.

The length of the benefiting ISF segment on Tomichi Creek is approximately 7.25 miles, extending from the headgate of the Louis Ditch (uppermost irrigation ditch headgate on the Peterson Ranch) downstream to the confluence with Quartz Creek (downstream terminus of the ISF reach). Projected changes in streamflow at various locations within the benefitting ISF segment are shown in Table 2. The amount of water added to the stream in any given month will vary by location due to the variable locations of where the subject water rights and corresponding return flows divert and accrue to the creek.

Table 2. Change in Streamflow Due to Split Season Irrigation Schedule (cfs)*

Location	June 24-30	July 1-31	August	September	October
Below Louis Ditch	5	3.1	0	0.9	0
Below Cain Borsum Ditch	16.4	9.2	-0.1	2.0	0
Below McGowan Irr Ditch	15.8	8.4	-0.8	2.2	-0.3
Below McGowan Alt Pt. Ditch	18.9	10.1	-0.8	2.7	-0.3
Below all return flows	6.7	1.8	-1.5	0.7	-0.6
*Assumes ISF use during both operational windows.					

Conceptually, the benefiting ISF segment can be divided up into two reaches **(Exhibit J)**. The upper reach (Reach 1 or Diversion Reach) extends from the Louis Ditch headgate downstream to the point where all return flows from the Peterson Property have returned to Tomichi Creek, and the ISF benefit includes the combined historic consumptive use and return flow components of the subject water rights. In July, operation of the lease is projected to increase flows between 3 and 10 cfs in Reach 1, depending on location. The lower reach (Reach 2 or Return Flow Reach) extends from the location where all return flow from the Peterson Property return to Tomichi Creek downstream to the lower ISF terminus at the Quartz Creek confluence. The ISF benefit in Reach 2 (1.8 cfs in July) will be solely from the historic consumptive use portion of the water rights as the streamflow in this reach has historically included the return flow component.

As previously mentioned, curtailment of irrigation diversions during the June/July and September Operational Windows will reduce the amount of return flows back to the stream in later months. The largest depletion (1.5 cfs) would occur in August. Because July has historically been the most critical month for low flows and high stream temperature, CPW's assessment is that the ISF benefits from additional water in June and July will outweigh any negative potential depletion effect to the ISF reach in August and October when flows typically rebound and temperatures are less of a concern.

Procedure and Timeline for Temporary Lease Acquisition

ISF Rule 6k governs the Board's procedures for acquiring water for ISF use under a temporary lease and requires a minimum of two Board meetings to allow for public input prior to taking final action on a proposed acquisition. The initial consideration of the proposal at this November meeting will initiate a 120-day period for the Board to consider the terms and conditions of the proposed acquisition. ISF Rule 6m(4) provides that any person may request the Board to hold a hearing on the proposed acquisition, and that such request must be filed within twenty days of the first meeting of the two-meeting process.

CWCB staff have provided written notice of this request for consideration and approval of a temporary lease to the substitute water supply plan ("SWSP") and ISF notification lists for the Water Division 4. Although not explicitly required until an application is filed with DWR pursuant to 37-83-105(2)(b)(II) and ISF Rule 6k(2), Staff has also provided notice to "a registered agent of any ditch company, irrigation district, water users' association, or other water supply or delivery entity within whose system the water rights fall." A public notice for the lease proposal was placed in the Gunnison Country Times to "make best efforts to publish notice in an appropriate legal newspaper of general circulation" pursuant to Rule 6k(2)(f)iv.

At the January 2023 CWCB meeting (the 2nd meeting of the two-Board meeting process), if no hearing has been requested, Staff may recommend that the Board take action on this proposed lease. Specifically, the action would be to direct staff to move forward with the proposed renewable lease including authorizing staff to execute an agreement for the lease of water and to take any administrative action necessary to put the leased water to ISF use. This would include working with CWT to file the request with DWR to approve the lease which would initiate a separate 60-day review and public comment period.

Attachments:
Exhibit A – Peterson Ranch Offer Letter
Exhibit B – Location Map
Exhibit C – Letter from CCALT
Exhibit D – Draft CWT / Peterson Ranch Agreement
Exhibit E – Draft CWT / CWCB Sublease
Exhibit F – Engineering Report prepared by Tyler Martineau
Exhibit G – Draft DWR Request for Lease Approval
Exhibit H – WestWater Research, LLC Valuation Report
Exhibit I - CPW Letter of Recommendation and Biological Analysis
Exhibit J – Benefiting ISF Segment Map

Exhibit A
Agenda Item 19a
November 17, 2022

January 12, 2021

Rebecca Mitchell, Director
Colorado Water Conservation Board
1313 Sherman Street, Room 718
Denver, CO 80203

RE: Offer of Temporary Loan of Water for Instream Flow Use

Dear Director Mitchell:

The Peterson Ranch owns surface water rights on Tomichi Creek, tributary to the Gunnison River, in Water Division 4. Peterson Ranch would like to seek approval from the Colorado Division of Water Resources (DWR) of a temporary, renewable loan of water to the Colorado Water Conservation Board (CWCB) pursuant to section 37-83-105(2),C.R.S. (2020) to help maintain the CWCB's decreed instream flow water rights on Tomichi Creek. The proposed loan will provide water to the CWCB for instream flow use to preserve the natural environment to a reasonable degree. This letter serves as Peterson Ranch's formal offer of a loan of water to the CWCB pursuant to Instream Flow Rule 6(k) (2) (2021).

Foregoing diversions to the Louis Ditch (2800628), Cain Borsum Ditch (2800520), McGowan Irrigating Ditch (2801630) McGowan Irrigating Ditch Alternate Point (2801638) will supplement or meet the CWCB's instream flow rights on Tomichi Creek when flows are below the decreed instream flow rates. The temporary loan will mitigate low flow impacts to Tomichi Creek, including high water temperatures, low dissolved oxygen, loss of habitat and connectivity, particularly in dry years.

Upon receiving your response to this offer, Peterson Ranch, the Colorado Water Trust (CWT) and CWCB staff will coordinate to request approval of a renewable loan from DWR and provide all required written notices. We are currently preparing the necessary information to submit this request to DWR. We look forward to working together to finalize and implement this loan benefitting the aquatic habitat in Tomichi Creek.

If you have any questions or concerns regarding this offer, please do not hesitate to reach out to Tony LaGreca, Project Manager for CWT, at

Sincerely,

Greg Peterson + Kathleen Curry

Greg Peterson and Kathleen Curry

Owners, Razor Creek and Peterson Ranch

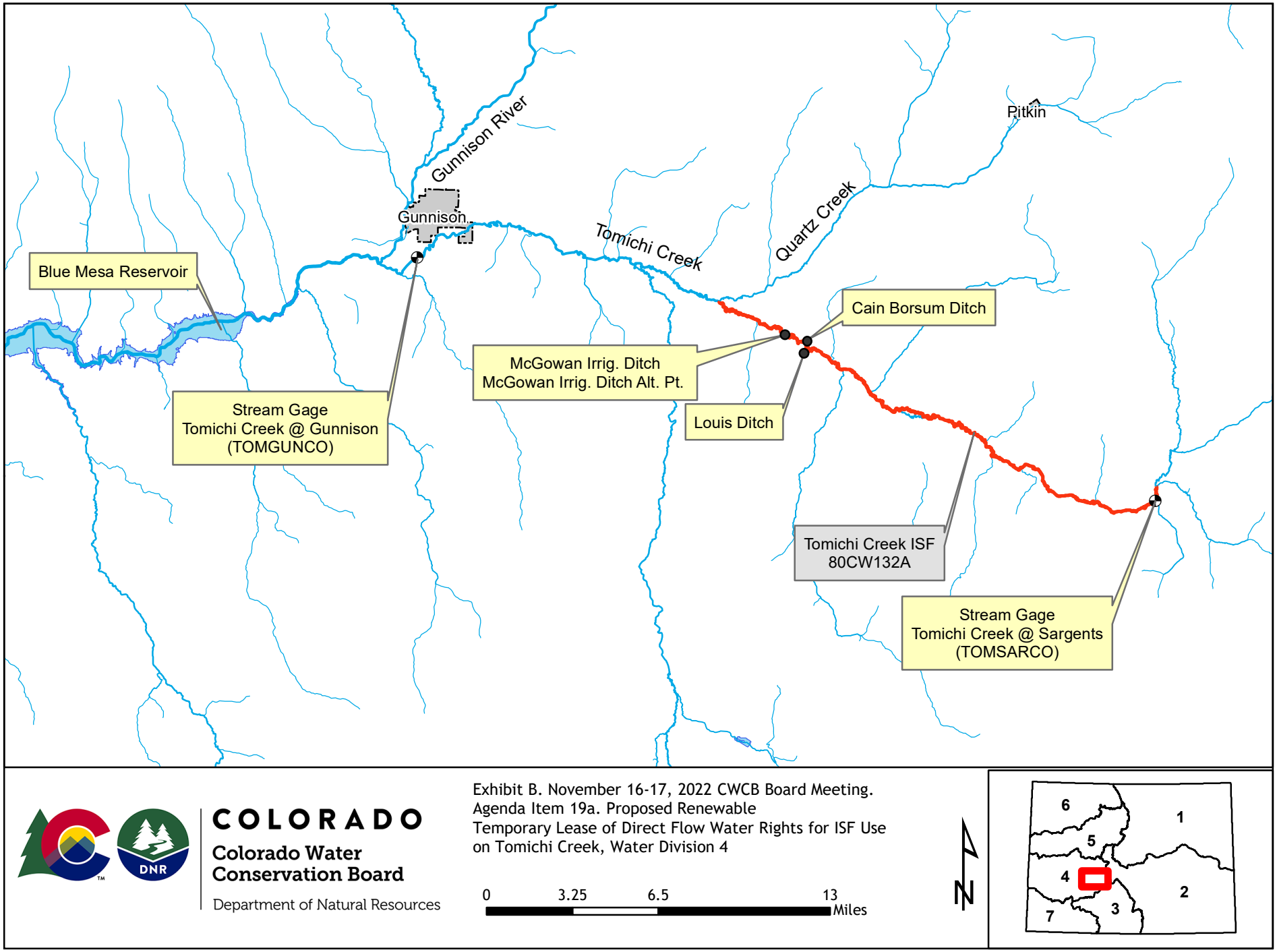

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Exhibit B. November 16-17, 2022 CWCB Board Meeting.
Agenda Item 19a. Proposed Renewable
Temporary Lease of Direct Flow Water Rights for ISF Use
on Tomichi Creek, Water Division 4

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COLORADO CATTLEMEN'S AGRICULTURAL LAND TRUST

January 21, 2022

Peterson Ranch, Inc.
Razor Creek Ranch, LLC
53466 East Highway 50
Gunnison, CO 81230

RE: Peterson Ranch Water Sharing Project

Thank you for contacting the Colorado Cattlemen's Agricultural Land Trust (CCALT) in regards to leasing a proposed water sharing project designed with the goals of benefitting instream flows on Tomichi Creek during times of need and maintaining sustainable agricultural productivity on Peterson Ranches subject to conservation easements[1]. The Conservation Easements were purchased in part using grant funding from Great Outdoors Colorado (GOCO) with the cooperation of the Natural Resources Conservation Service (NRCS). The primary purpose of the Conservation Easements is to protect the agricultural values, the scenic pastoral landscape, and wildlife habitat for a variety of species dependent on the sagebrush rangeland, irrigated meadows, and riparian corridors along Tomichi Creek.

It is CCALT's understanding that through a partnership between the Colorado Water Trust, you would like change the irrigation patterns on the Peterson Ranches to help fill the "July Hole", a period of time in mid-summer when flows in Tomichi Creek are very low. Under the contemplated project, a short-term lease would be enacted pursuant to C.R.S. § 37-83-105, where irrigation on the Peterson Ranches will cease on or around June 25th through the end of July, thus allowing water that would have been diverted in those periods to remain instream. Irrigation will then resume in August to stimulate regrowth for fall grazing and to replenish soil moisture. The project design also contemplates an optional September shutoff to target low flows with irrigation resuming in October. The proposed short-term lease will be for the water rights listed on attachment 1 to this letter, which have historically been used to irrigate 221 acres of the Peterson Ranches. The short-term lease would be for a period of 3 out of 10 years, with an option to request additional years.

[1] CCALT is the holder of a conservation easement, which was recorded on January 6, 1999 at reception number 490030 in the land record of Gunnison County, Colorado (the "Peterson Conservation Easement") which encumbers 520 acres of the Peterson Ranch (the "Peterson Ranch Property"). CCALT is the holder of a conservation easement, which was recorded on December 28, 1998 at reception number 489414 in the land record of Gunnison County, Colorado (the "Razor Creek Conservation Easement") which encumbers 117 acres of the Razor Creek Ranch (the "Razor Creek Ranch Property"). Collectively, the Peterson Conservation Easement and Razor Creek Conservation Easement are referred to as the Conservation Easements and the Razor Creek Ranch Property and the Peterson Ranch Property are referred to as the Peterson Ranches.

Paragraph 14 of both the Conservation Easements addresses water rights in identical language which states the following:

> *"…Grantor shall retain and reserve the right to use water rights sufficient for use in present or future agricultural production on the Property, and shall not transfer, encumber, lease, sell, or otherwise separate such quantity of water rights from title to the Property itself".*

It is CCALT's interpretation that this language would allow the leasing of water rights so long as certain conditions are met. Primarily, those conditions are that the water rights sufficient for use in present or future agricultural production on the Property remain in use on the Property. Secondarily, we will want to ensure the lease does not negatively impact the conservation values of the Peterson Ranches.

The benefits of the proposed short-term lease are anticipated to provide flow benefits to a minimum of 4.5 miles of Tomichi Creek with some benefits likely reaching an additional two miles of stream to Parlin and the end of the Colorado Water Conservation Board's decreed instream flow reach. the project has the potential to protect up to 18.9 cfs instream within certain reaches of the Peterson Ranch and up to 6.7 cfs downstream of the ranch. This will benefit aquatic species found in Tomichi Creek, supporting the conservation values as protected by the Conservation Easements.

The more difficult questions surround the requirement that the water rights sufficient for use in present or future agricultural production on the Property remain in use on the Property. The project is designed to still allow agricultural use of the Property as water can be applied at critical times of vegetation growth. And, as the project is only contemplating 3 out of 10 years, long-term impacts to the soil and vegetation should be minimized. That being said, the success of the agricultural operation is also dependent on climate conditions and the operator successfully applying the irrigation water at critical times. CCALT is willing to take a wait and see approach with this project. We will want to see summarized data on hay production, water usage, and animal unit months over the ten-year period. Data will help inform if this is simply a key timing of water application exercise or if we are actually trading water and agricultural production for dollars, recognizing too that agricultural income still helps support the agricultural conservation values.

This letter serves as approval and notice that CCALT has reviewed the proposed water sharing project as present to us on December 2, 2021. CCALT will permit the proposed short-term lease for 3 out of 10 years with an option to request CCALT approval of any additional years of operation in any term. In order to permit additional years above the 3-year term, CCALT will want to see the summarized data on the impacts to the agricultural operation as well as on the benefits to the stream. Any changes to the project as described on December 2, 2021 must have CCALT

approval. Renewing a lease for another 10-year term requires a new application to the CWCB and any new term will also require a new approval from CCALT. CCALT's approval of the short-term lease is also conditioned on authorization being obtained from the Division of Water Resources pursuant to C.R.S. § 37-83-105 by the Peterson Ranch, Colorado Water Trust, and/or the CWCB.

Thank you for your cooperation and for keeping CCALT informed on this project. Please let us know if you have any questions or concerns. We look forward to seeing the results of this project.

Sincerely,

Megan Knott
Director of Stewardship

CC:
Tony LaGreca, Project Manager
Colorado Water Trust
3264 Larimer St, Suite D
Denver, Colorado 80205
Sent via email: tlagreca@coloradowatertrust.org

Attachment 1 WATER RIGHTS PROPOSED FOR INSTREAM FLOW LEASE							
NAME SOURCE	**PRIORITY NO. ADMIN NO.**	**DECREED AMOUNT**	**ADJUD DATE**	**APPROP DATE**	**DECREE**	**RIVER MILE**	**ACREAGE CITED IN DECREE**
Louis Ditch	#185 24227.00000	1.6 cfs	1918-09-03	1916-05-01	CA1602	27.36	80
Louis Ditch	#307 28311.24025	7.5 cfs	1943-04-19	1915-10-12	CA2079		none
Louis Ditch	#na 55517.41412	0.9 cfs	2002-12-31	1963-05-20	02CW0254A		80 Supp
Subtotal		10.0 cfs					
Cain Borsum Ditch	#49 16192.11110	2.44 cfs	1904-04-29	1880-06-01	CA1266	26.64	182
Cain Borsum Ditch	#94 16192.13666	1.2 cfs	1904-04-29	1887-06-01	CA1266		182
Cain Borsum Ditch	#217 28311.11110	9.76 cfs	1943-04-19	1880-06-01	CA2079		220
Cain Borsum Ditch	#252 28311.13666	8.6 cfs	1943-04-19	1887-06-01	CA2079		220
Subtotal		22.0 cfs					
McGowan Irrig Ditch and McGowan Irrig Ditch Alt Pt	#60 16192.11809	2.2 cfs	1904-04-29	1882-05-01	CA1266 99CW52	McG 24.82 McG Alt Pt 24.83	110 Acres South Side
McGowan Irrig Ditch and McGowan Irrig Ditch Alt Pt	#224 28311.11809	8.8 cfs	1943-04-19	1882-05-01	CA2079 99CW52		110 Acres South Side
McGowan Irrig Ditch and McGowan Irrig Ditch Alt Pt	#na 55517.41412	0.5 cfs	2002-12-31	1963-05-20	02CW0254		115 Supp
Subtotal		11.5 cfs					
Total		43.5 cfs					

[DRAFT] TEMPORARY WATER LEASE AGREEMENT

This Temporary Water Lease Agreement ("Agreement") is entered into **_____ __, 202_** by and between **Peterson Ranch, Inc.**, a Colorado corporation; **Razor Creek Ranch, LLC**, a Colorado limited liability company; and the **Colorado Water Trust** ("CWT"), a registered 501(c)(3) nonprofit organization ("CWT") (individually, "Party"; together, "Parties").

RECITALS

A. Peterson Ranch, Inc. and Razor Creek Ranch, LLC (together, "Peterson Ranch") own and operate a working cattle ranch and hay operation located in Gunnison County, Colorado. Peterson Ranch owns and beneficially uses certain water rights identified in the table below and more fully described in the attached **Exhibit A** (collectively, "Water Rights"):

Structure	Associated Water Rights	Source
Louis Ditch	Case Nos. 1602, CA079 & 02CW0254A	Tomichi Creek, tributary to the Gunnison River
Cain Borsum Ditch	Case Nos. CA1266 & CA2079	Tomichi Creek, tributary to the Gunnison River
McGowan Irrigation Ditch	Case Nos. 1266, CA2079 & CW0254	Tomichi Creek, tributary to the Gunnison River
McGowan Irrigation Ditch Alternate Point of Diversion	Case Nos. 1266, CA2079 & CW0254	Tomichi Creek, tributary to the Gunnison River

B. The Colorado Water Conservation Board ("CWCB") holds an appropriated instream flow right on Tomichi Creek decreed in Case No. 80CW132 attached hereto as **EXHIBIT B**. The Tomichi ISF Decree contains two segments. The downstream segment, Stream Segment 2, begins at the confluence of Marshall Creek and ends at the confluence of Quartz Creek, being a distance of approximately 25.2 miles ("Tomichi ISF Reach"). The Tomichi ISF Reach has a flow rate of 18.0 cfs to maintain the minimum flows required to preserve the natural environment to reasonable degree ("Tomichi ISF Flow Rate");

C. The Water Rights' points of diversion fall within the Tomichi ISF Reach. Historically, during certain times of the year and under certain hydrologic conditions, streamflow in Tomichi Creek falls below the Tomichi Creek ISF Flow Rate. At such times, Peterson Ranch is desirous of the ability to temporarily lease its Water Rights to help boost streamflow in the Tomichi ISF Reach up to the Tomichi ISF Flow Rate;

D. Pursuant to C.R.S. § 37-92-102(3) the CWCB may acquire water by contractual agreement for the purpose of preserving or improving the natural environment to a reasonable degree. Further, pursuant to C.R.S. § 37-83-105, the CWCB may accept a temporary loan or lease of water for same

said purposes ("Temporary ISF Lease Program") subject to certain statutory and regulatory conditions and procedures;

E. CWT is a Colorado nonprofit organization dedicated to improving streamflow in Colorado's rivers when and where they are in need through voluntary, market-based efforts. CWT is desirous of assisting Peterson Ranch in gaining approval of use of its Water Rights in the a Temporary ISF Lease Program, and upon such approval, collaborate and compensate Peterson Ranch with regard to such use as set forth in this Agreement;

F. Peterson Ranch's real property and Water Rights are subject to two conservation easements held by the Colorado Cattlemen's Agricultural Land Trust ("CCALT") recorded with the Gunnison County Clerk and recorded at Reception Numbers 490030 and 489414 (together, "Conservation Easements"). Peterson Ranch and CWT consulted CCALT in regard to the arrangement sought by this Agreement and CCALT reviewed and approved the project as more fully set forth in the letter ("CCALT Approval Letter") attached hereto as **EXHIBIT C** and consistent with the limitations contained in this Agreement;

NOW THEREFORE, in consideration of the mutual written agreements contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

AGREEMENT

1. **Incorporation**. The Parties hereby incorporate by this reference the recitals set forth above.

2. **Term, Renewal & Project Agreement Year.**
   2.1. Term. This Agreement shall become effective upon the State Engineer's determination approving use of the Water Rights in the Temporary ISF Lease Program ("State Engineer's Determination"), as required by C.R.S. § 37-83-105(2)(b)(VIII) ("Effective Date"). Unless otherwise earlier terminated pursuant to the terms set forth herein, this Agreement shall automatically expire ten (10) years ("Term") following the Effective Date, that date being **[_____ __, 20__]** ("Expiration Date"), which date shall coincide with expiration of the State Engineer's Determination approval period set forth in C.R.S. § 37-83-105(2)(a)(IV)(A).
   2.2. Renewal. This Agreement may be renewed for up to two (2) additional Terms, consistent with C.R.S. § 37-83-105(2)(a)(IV)(A), upon mutual agreement of the Parties and approval of CCALT as set forth in the CCALT Approval Letter.

3. **Source of Supply, Delivery & Use.**
   3.1. Source. The source of water that will be used in the Temporary ISF Lease Program in the Tomichi ISF Reach is water from the Water Rights that could otherwise be diverted and consumptively used outside of the natural channel by Peterson Ranch ("Lease Water").
   3.2. Points of Delivery. Peterson Ranch will deliver the Lease Water into Tomichi Creek at the decreed points of diversion for each of the Water Rights ("Point(s) of Delivery"). Peterson

Ranch shall have no responsibility to transport or deliver Lease Water at any other point aside from the Point(s) of Delivery under this Agreement.

3.3. Use. Lease Water shall be used for instream flow purposes exclusively within the Tomichi ISF Reach.

3.4. Downstream Reuse. CWT shall be entitled to use, successively reuse, and use to extinction any and all Lease Water following use in the Tomichi ISF Reach. As reasonably requested by the CWT, Peterson Ranch will cooperate with CWT in regard to possible downstream use and reuse.

3.5. Rates of Flow for ISF Use. Lease Water shall be protected for instream flow use in combination with any natural or other existing flow in the Tomichi ISF Reach up to the Tomichi ISF Flow Rate as measured at the location of the United States Geological Survey's gaging site "Tomichi Creek at Parlin" or as determined by an alternative measurement method acceptable to the Division 4 Engineer.

4. **Ownership & Operation**.

4.1. Ownership. It is expressly acknowledged that Peterson Ranch is the owner of the Water Rights. Nothing in this Agreement is or shall be construed as a conveyance of the Water Rights or any other real property interest associated therewith.

4.2. Operation. Peterson Ranch shall be solely responsible for operating, repairing, maintaining, enlarging, permitting, changing, renovating, or modifying all infrastructure associated with the Water Rights and necessary for performance under this Agreement.

4.3. Disclaimer. In no event shall CWT be liable for any direct, indirect, special, incidental, or consequential damages arising out of or attributable to Peterson Ranch's ownership of the Water Rights or activities or interests associated therewith.

5. **Operation of ISF Lease within Term.**

5.1. Frequency of Lease to ISF Use within Term.

5.1.1. Use of Lease Water in the Tomichi ISF Reach is limited to three (3) calendar years within the ten (10) year Term. The Lease Water may be used in the Tomichi ISF Reach for an additional two (2) calendar years within the Term upon mutual written agreement of the Parties and prior written approval of CCALT as set forth in the CCALT Approval Letter.

5.1.2. Calendar years in which Lease Water is used in the Temporary ISF Lease Program must be dispersed within the ten (10) year Term such that no more than three (3) of such years are consecutive with one another.

5.2. Decision to Operate ISF Lease. No later than **[April 1]** of each year within the Term, the Parties shall meet and confer regarding whether to use Lease Water in the Tomichi ISF Reach. No later than **[May 1]** the Parties shall mutually agree in writing whether Lease Water will be used for instream flow purposes in the Tomichi ISF Reach for that calendar year ("Operative Year").

6. **Operation of ISF Lease in Operative Years.**

6.1. Split Season Operation. In an Operative Year, Lease Water may be used for instream flow purposes in the Tomichi ISF Reach in one or both of the following time periods: (a) **[June 25 – July 31]** ("June/July Window"), and/or (b) [**September 1 – September 30]** ("September

Window") (together, "Operative Windows"; separately, "Operative Window").

6.2. Coordination of Operation.

6.2.1. In Operative Years, the Parties shall confer no fewer than [**fourteen (14) calendar days**] prior to the commencement of each the June/July Window and September Window, respectively, to determine whether Lease Water will be used in the Tomichi ISF Reach during the upcoming Operative Window. During such conferral, the Parties shall mutually agree to operate during the upcoming Operative Window. If the Parties are unable to agree, there shall be no operation during the upcoming Operative Window.

6.2.2. The determination made by the Parties shall be recorded in a written notice sent by CWT to Peterson Ranch and CWT shall provide appropriate notice to the CWCB and Division 4 Engineer.

6.2.3. In the event the Parties agreed to an Operative Year pursuant to paragraph 5.2, but the Parties decided not to use the Lease Water during either the June/July Window or September Window pursuant to paragraph 6.2.1, then that calendar year shall not count towards the limits in paragraph 5.1.

6.3. Adjustment of Operative Windows. By mutual written agreement of the Parties, the Operative Windows maybe shifted to an earlier or later date no more than **seven (7) days** from the dates set forth in paragraph 6.1, above, so long as the Operative Windows are of the same duration; that is, thirty-seven days (37) days for the June/July Window and thirty (30) days for the September Window. In the event of adjustment of the Operative Window(s), CWT shall provide appropriate notice to the CWCB and Division 4 Engineer.

6.4. Operation. If Leased Water is being used for instream flow purposes in the Tomichi ISF Reach during an Operative Window, Peterson Ranch shall be responsible for closing the Water Rights' headgates or otherwise operating the structure(s) associated with the Water Rights to ensure that the Lease Water remains in the natural channel of the Tomichi ISF Reach during the entirety of the Operative Window. Upon request by CWT, Peterson Ranch shall provide verification of operation consistent with the requirements of this paragraph 6.4.

7. **Payment Amount & Payment Schedule.**

7.1. Payment Amount. CWT shall compensate Peterson Ranch for Leased Water used in the Tomichi ISF Reach as set forth in paragraph 6, above, in the amounts set forth in the following table (individually, "Payment Amount"; together, "Payment Amounts") and subject to the escalator set forth in paragraph 7.4, below:

Operative Window	**Compensation Amount**
June/July Window (only)	[$24,999.00]
September Window (only)	[$2,500.00]
June/July Window and September Window (both)	[$30,000.00]

7.2. Payment Amounts Limited to Current Context. The Parties recognize and agree that the Payment Amount(s) were derived from an appraisal conducted by WestWater Research, LLC dated November 2, 2021 that was specifically premised upon operation pursuant to the terms

and conditions of this Agreement. Accordingly, the Parties recognize and agree that the Payment Amount(s) are limited to the context of this Agreement and are not intended to be used as a basis to inform the value of the Water Rights in any other context.

7.3. Payment Schedule. CWT Shall make payment to Peterson Ranch for the full Payment Amount, as applicable, no later than [**December 1**] of each Operative Year within the Term.

7.4. Payment Escalator. The total payment due to Peterson Ranch for use of Leased Water in the Tomichi ISF Reach under the terms of this Agreement shall be equal to the greater of: (a) the applicable Payment Amount, or (b) the applicable Payment Amount multiplied by [100% + agricultural market-based index with a base date of ___ __, ____] reported annually on [date before April 1] for the current calendar year within the Term of this Agreement. By way of example, if the [agricultural market-based index] is 5% on [date before April 1], 2025, then the total payment that shall be due to Peterson Ranch for operation in 2025 shall be 105% of the applicable Payment Amount. In the event the [agricultural market-based index] becomes unavailable or otherwise unusable, the Parties shall mutually agree upon a replacement index in writing, with notification thereof promptly provided to the CWCB by CWT.

8. **State Agency Approvals & Requirements.**

8.1. CWCB's Final Decision. The CWCB's Final Decision imposed the following limitations on the Temporary ISF Lease: **[insert if/as necessary or incorporate CWCB's Final Decision by reference, as appropriate].**

8.2. State Engineer's Determination. The State Engineer's Determination imposed the following terms and conditions on the Temporary ISF Lease: **[insert if/as necessary or incorporate State Engineer's Determination by reference, as appropriate].**

[**NOTE**: Should limitations imposed by CWCB or terms and conditions imposed by State Engineer conflict with any of the other provisions of this Agreement, revise the terms of the Agreement accordingly and add Conflict of Provisions clause.]

9. **Possibility of Injury to Downstream Junior Diverters.**

9.1. No Foreseeable Injury. The Parties represent that it is their understanding that operation under the terms of this Agreement will not result in injury to downstream junior diverters' use of their vested water rights based on historic practices.

9.2. Conferral if Alleged Injury. In the unforeseen and unlikely event that a junior downstream diverter alleges injury to their vested water rights due to operation under the terms of this Agreement, the Parties shall promptly confer with the CWCB and Division 4 Engineer. Such conferral shall include confirmation of the alleged injury, the possible link of any confirmed injury to operation under the terms of this Agreement, and whether modification to the terms of this Agreement would prevent any confirmed injury from recurring in the future.

9.3. Termination or Amendment. Should modification to the terms of this Agreement be proposed as a result of the conferral described in paragraph 9.2, above, one of the following may occur: (a) either Party may reject, in its sole discretion, such modification and instead elect to unilaterally terminate this Agreement as a whole; or (b) the Parties may amend the Agreement to affect the modification pursuant to paragraph 15.6, below.

10. **Records, Accounting & Inspection.**
    10.1. Peterson Ranch shall maintain records of all diversions of water from the Water Rights. CWT shall be entitled to inspect such records and copies shall be furnished to CWT upon written request. The Parties agree to communicate, coordinate, and cooperate, if needed, on any required or desired water use accounting.
    10.2. No later than **[October 1]** of each Project Year, Peterson Ranch shall provide CWT a written accounting of all diversions of its Water Rights as well as full and complete answers to the monitoring questions set forth in **EXHIBIT D** hereto.
    10.3. Peterson Ranch and CWT shall coordinate and cooperate in the submission of annual accounting to ensure that the Lease Water used in the Tomichi ISF Reach is properly accounted for in the Division of Water Resources' records.
    10.4. Peterson Ranch grants to CWT's staff and any of its professional consultants access to the Peterson Ranch and infrastructure related to the Water Rights at reasonable times and under reasonably protective terms and conditions.

11. **Termination**.
    11.1. This Agreement may be terminated at any time prior to the Expiration Date upon mutual written agreement of the Parties or as set forth below:
        11.1.1. Either Party may terminate this Agreement for a material breach of the terms of this Agreement by the other Party; provided that the terminating Party has first given at least sixty (60) days prior written notice specifying in detail the alleged material breach and giving the other Party the right within such sixty (60) day period to cure and remedy the alleged material breach.
        11.1.2. Either Party may terminate this Agreement if the legal ability to deliver Lease Water is materially impaired or is eliminated because of the termination or adverse modification of permits, decrees, or other authorizations or legal or administrative findings that are necessary to deliver the Lease Water pursuant to this Agreement; provided that the terminating Party has first given at least sixty (60) days prior written notice to the other Party specifying the issue and steps taken to resolve the issue.
    11.2. Notice of Termination. Either Party may notify the CWCB and Division 4 Engineer and any other appropriate governmental officials of any termination of this Agreement. Such notice will be provided in writing and will include a contemporaneous copy to the other Party.

12. **Force Majeure**. In the event either Party is unable to perform its obligations under the terms of this Agreement because of acts of God; natural disasters; pandemics, actions or omissions by governmental authorities; unavailability of supplies or equipment critical to perform; major equipment or facility breakdown; and changes in Colorado or federal law, including, without limitation, changes in any permit or other causes reasonably beyond that Party's control, such Party shall not be liable to the other Party for any damages resulting from such failure to perform or otherwise from such causes.

13. **Remedies**.

13.1. Notice of Breach. Prior to commencing any action for enforcement of this Agreement, the Party alleging a material breach of this Agreement shall give the other Party no less than sixty (60) days prior written notice specifying in detail such material breach and giving the other Party the right within such sixty (60) day period the opportunity to cure and remedy such material breach.

13.2. Available Relief. Specific performance, restraining order(s) and/or injunctive relief shall be the exclusive remedy or remedies for the violation or default by a Party in any provision of this Agreement.

13.3. Award of Attorney's Fees & Costs. In the event of litigation between the Parties with respect to this Agreement, each party shall bear its own attorney's fees and costs.

14. **Notice**. Any notice required or permitted to be given by a Party under or in connection with this Agreement shall be in writing and shall be deemed duly given when personally delivered or sent by: (a) registered or certified mail, return receipt requested, postage prepaid, (b) expedited courier service, or (c) email with confirmation of receipt, to the following addresses:

If to Peterson Ranch, Inc.:
Gregory N. Peterson
[President]
53466 E. Highway 50
Gunnison, Colorado 81230
Email: gretpeterson@montrose.net

If to Peterson Ranch:
Gregory N. Peterson
[Managing Member]
53466 E. Highway 50
Gunnison, Colorado 81230
Email: gretpeterson@montrose.net

If to CWT:
Colorado Water Trust
Attention: Program Manager
3264 Larimer St., Suite D
Denver, CO 80205
Email: tlagreca@coloradowatertrust.org

With a copy to:
Colorado Water Trust
Attention: Staff Attorney
3264 Larimer St., Suite D
Denver, CO 80205
Email: agould@coloradowatertrust.org

Each Party may change its address or contact information for notices under this Agreement upon written notice to the other Party in accordance with this paragraph.

15. **Miscellaneous.**

15.1. Choice of Law. This Agreement shall be construed in accordance with the laws of the State of Colorado, without reference to conflicts of laws.

15.2. No Joint Venture. Notwithstanding any language in this Agreement or any representation or warranty to the contrary, none of the Parties shall be deemed or constitute a partner, joint venturer, or agent of the other Parties. Any actions taken by the Parties pursuant to this Agreement shall be deemed actions as an independent Agreement or of the other.

15.3. No Third-Party Beneficiaries. This Agreement does not and is not intended to confer any rights or remedies upon any person or entity other than the Parties. It is expressly understood and agreed that enforcement of the terms and conditions of this Agreement and all rights of action relating to such enforcement shall be strictly reserved to the Parties.

15.4. Assignment**.** This Agreement may be assigned by either party upon the prior written consent of the other Party.

15.5. Heirs & Assigns. This Agreement shall inure to and be binding on the heirs, executors, administrators, successors, and permitted assigns of the Parties.

15.6. Amendment. No amendment, modification, or novation of this Agreement or its provisions and implementation shall be effective unless subsequently documented in writing that is approved and executed by both Parties with the same formality as they have approved and executed the original Agreement.

15.7. Waiver. No waiver of any of the provisions of this Agreement shall be deemed to constitute a waiver of any other of the provisions of this Agreement, nor shall such waiver constitute a continuing waiver unless otherwise expressly provided herein, nor shall the waiver of any default hereunder be deemed a waiver of any subsequent default hereunder.

15.8. Severability. If any provision of this Agreement is held illegal or unenforceable in a judicial proceeding, such provision shall be severed and shall be inoperative, and the remainder of this Agreement shall remain operative and binding on the Parties.

15.9. Merger. This Agreement constitutes the entire agreement between the Parties and sets forth the rights, duties, and obligations of each to the other as of the Effective Date. Any prior Agreements, promises, negotiations, or representations not expressly set forth in this Agreement are of no force and effect.

15.10. Headings. The headings contained in this Agreement are for reference purposes only and shall not affect in any way the meaning or interpretation of this Agreement.

15.11. Authority. Each Party represents that it has obtained all necessary approvals, consents, and authorizations to enter into this Agreement and to perform its duties under this Agreement; the person executing this Agreement on its behalf has the authority to do so; upon execution and delivery of this Agreement by the Parties, it is a valid and binding Agreement, enforceable in accordance with its terms; and the execution, delivery, and performance of this Agreement does not violate any bylaw, charter, regulation, law or any other governing authority of the Party.

[Remainder of page intentionally blank. Signatures to follow.]

PETERSON RANCH, INC.

By: _____ Date: _____

Gregory N. Peterson, [President]

RAZOR CREEK RANCH, LLC

By: _____ Date: _____

Gregory N. Peterson, [Managing Member]

COLORADO WATER TRUST, INC.

By: _____ Date: _____

Andy Schultheiss, Executive Director

[Remainder of page intentionally blank. Exhibits to follow.]

LIST OF EXHIBITS

Exhibit A Table of Peterson Ranch Water Rights

Exhibit B Tomichi Creek Instream Flow Decree in Case No. 80CW132

Exhibit C Colorado Cattlemen's Agricultural Land Trust Approval Letter dated [January __, 2022]

Exhibit D Annual Agricultural Productivity Monitoring Questions

[PLACEHOLDER: Exhibits A – C]

EXHIBIT D

Peterson Ranches Annual Water Monitoring Questions

- Will water application shift to earlier in the season, when more water is available, on years the lease is enacted? Note: to answer this question we can look at diversion records prior to exercise of the short term lease (March through June).
- How much hay was harvested? Tons/per acre
    - When was hay normally harvested? Did that shift to earlier or later?
        - Harvest date(s)
    - What was the quality of hay?
    - Did the grass go to seed prior to harvest?
- What was the stubble height post-harvest?
- Was the property grazed in the fall?
- What was the quality/amount of residual vegetative matter going into the winter?
- Describe climate conditions for this year and how those impacted the water sharing project.

Exhibit E
Agenda Item 19a
November 17, 2022

[DRAFT] TEMPORARY WATER LEASE FOR INSTREAM FLOW USE

This Temporary Lease for Instream Flow Use Water Delivery Agreement ("Agreement") is entered into on [_____ ___, _____] by and between the **Colorado Water Conservation Board**, an agency of the State of Colorado ("CWCB"), and the **Colorado Water Trust**, a Colorado nonprofit corporation ("CWT"), (individually, "Party"; together, "Parties").

RECITALS

A. The CWCB is an agency of the State of Colorado whose mission is to conserve, develop, protect, and manage Colorado's water for present and future generations;

B. Pursuant to C.R.S. § 37-92-102(3) the CWCB may acquire water by contractual agreement for the purpose of preserving or improving the natural environment to a reasonable degree. Further, pursuant to C.R.S. § 37-83-105, the CWCB may accept a temporary loan or lease of water for same said purposes ("ISF Lease Program") subject to certain statutory and regulatory conditions and procedures;

C. CWT is a Colorado nonprofit organization dedicated to restoring streamflow to Colorado's rivers when and where in need through voluntary, market-based efforts;

D. CWT is party to a water supply contract with Peterson Ranch Inc. and Razor Creek Ranch, LLC (together, "Peterson Ranch") dated [_____ __, ____] ("Peterson Ranch Agreement"; attached hereto as **EXHIBIT A**), providing for temporary use of the water rights set forth in the table below ("Lease Water");

Structure	Associated Water Rights	Source
Louis Ditch	Case Nos. 1602, CA079 & 02CW0254A	Tomichi Creek, tributary to the Gunnison River
Cain Borsum Ditch	Case Nos. CA1266 & CA2079	Tomichi Creek, tributary to the Gunnison River
McGowan Irrigation Ditch	Case Nos. 1266, CA2079 & CW0254	Tomichi Creek, tributary to the Gunnison River
McGowan Irrigation Ditch Alternate Point of Diversion	Case Nos. 1266, CA2079 & CW0254	Tomichi Creek, tributary to the Gunnison River

E. The Peterson Ranch Agreement provides that the Lease Water may be used for instream flow purposes under certain circumstances and may then be put to subsequent downstream use and reuse to extinction;

F. The Colorado Water Conservation Board ("CWCB") holds an appropriated instream flow right on

Tomichi Creek decreed in Case No. 80CW132 attached hereto as **EXHIBIT B**. The Tomichi ISF Decree contains two segments. The downstream segment, Stream Segment 2, begins at the confluence of Marshall Creek and ends at the confluence of Quartz Creek, being a distance of approximately 25.2 miles ("Tomichi ISF Reach"). The Tomichi ISF Reach has a flow rate of 18.0 cfs to maintain the minimum flows required to preserve the natural environment to reasonable degree ("Tomichi ISF Flow Rate");

G. CWT desires to temporarily lease Lease Water to the CWCB's ISF Lease Program for use in the Tomichi ISF Reach and CWCB desires to accept a temporary lease of the Lease Water for use in the Tomichi ISF Reach subject to the terms of this Agreement ("Temporary ISF Lease");

H. Pursuant to C.R.S. §§ 37-92-102(3) and 37-83-105 and 2 C.C.R. 408-2 Rule 6b, the CWCB is required to consider and decide whether to accept a proposed lease of water rights for instream flow use. In so doing, the CWCB is required to undertake certain procedures, consider particular matters, and make specific findings. The CWCB completed these requirements and on [_____ __, ___] directed CWCB staff to move forward with the Temporary ISF Lease; and

I. Pursuant to C.R.S. § 37-83-105(2), the State Engineer is required to consider whether a proposed lease of water rights to instream flow use would cause injury to other water rights, decreed exchanges, and undecreed exchanges administratively approved before the date the request was filed. In so doing, the State Engineer is required to undertake certain procedures and make certain findings after a 60-day comment period. The State Engineer's Determination, was issued [_____ __, ___] ("State Engineer's Determination"; attached hereto as **EXHIBIT C**);

NOW THEREFORE, in consideration of the mutual agreements contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, CWCB and CWT agree as follows:

AGREEMENT

1. **Incorporation**. The Parties hereby incorporate by this reference the recitals set forth above.

2. **Term.**
   2.1. Effective Date. This Agreement shall become effective on [_____ __, ____], which is the date of the State Engineer's Determination, as required by C.R.S. § 37-83-105(2)(a)(IV)(A) ("Effective Date").
   2.2. Expiration Date. Unless otherwise terminated pursuant to the terms set forth herein, this Agreement shall automatically expire ten (10) years ("Term") following the Effective Date, that

date being [_____ __, ____] ("Expiration Date"), which date shall coincide with expiration of the allowed Temporary ISF Lease approval period set forth in C.R.S. § 37-83-105(2)(a)(IV)(A).

3. **Source of Water & Use of Water.**
   3.1. Source. The source of the water to be used in the Temporary ISF Lease shall be Lease Water available for use in the ISF Lease Program pursuant to the Peterson Ranch Agreement.
   3.2. Use. Lease Water shall be used for instream flow purposes exclusively within the Tomichi ISF Reach.
   3.3. Downstream Reuse. The CWCB recognizes and agrees that Lease Water may be used for other downstream beneficial uses following use in the Tomichi ISF Reach consistent with the Peterson Ranch Agreement and C.R.S. § 37-92-102(3). CWT shall have sole authority and responsibility for any downstream beneficial uses, consistent with the Peterson Ranch Agreement, administration by the Division Engineer for Water Division 4 ("Division 4 Engineer"), and other subcontracts and legal requirements, if any.
   3.4. Rates of Flow for ISF Use. Lease Water shall be protected for instream flow use in combination with any natural or other existing flow in the Tomichi ISF Reach up to the Tomichi ISF Flow Rate.
   3.5. Stacking. Lease Water may be protected in combination with any other water appropriated or acquired by the CWCB for use in the Tomichi ISF Reach, alone or in combination, up to the Tomichi ISF Flow Rate.

4. **Operation of ISF Lease within Term.**
   4.1. Frequency of Lease to ISF Use within Term.
      4.1.1. Use of Lease Water in the ISF Lease Program is limited to five (5) calendar years within the ten (10) year Term. Calendar years in which Lease Water is used in the ISF Lease Program must be dispersed within the ten (10) year Term such that no more than three (3) of such years are consecutive with one another.
      4.1.2. An additional limitation on operation is set forth in paragraph 5.1.1 of the Peterson Ranch Agreement, wherein use of Lease Water in the ISF Lease Program for more than three (3) calendar years within the Term is subject to prior written approval of the Colorado Cattlemen's Agricultural Land Trust.
   4.2. Decision to Operate ISF Lease. No later than [**April 15]** of each year within the Term, CWCB and CWT shall meet and determine whether to use Lease Water in the ISF Lease Program. At such time, CWT and CWCB will coordinate the appropriate public notice requirements.
   4.3. Operation Contingent on Peterson Ranch Contract. The CWCB recognizes and agrees that any Lease Water that may be used in the ISF Lease Program pursuant to this Agreement shall be subject to and conditioned upon the terms and conditions of the Peterson Ranch Agreement.

5. **Operation of ISF Lease in Operative Years.**
   5.1. Duration of ISF Use in Operative Years. In years during which Lease Water is being leased to the ISF Lease Program, such water may be used for ISF purposes for a total duration of no more than one-hundred and twenty (120) days in a calendar year.

6. **Measuring Devices, Records & Accounting.**

6.1. Measuring Devices. Pursuant to C.R.S. § 37-92-102(3), the CWCB shall install or use existing measuring devices, or utilize an alternative measurement method as required by the Division 4 Engineer. CWT and CWCB will coordinate on this requirement.

6.2. Records. The CWCB shall maintain records of: (a) the amount of Lease Water legally available and capable of being used each year for instream flow purposes in the Tomichi ISF Reach, and (b) the amount of Lease Water actually used each year for instream flow purposes in the Tomichi ISF Reach. Such records shall be provided to the Colorado Division of Water Resources on an annual basis. CWT and CWCB will coordinate to gather the needed data for this record keeping requirement.

6.3. Accounting. The Parties agree to communicate, coordinate, and cooperate, if needed, on any other required or desired water use record keeping or accounting.

7. **State Agency Approvals & Requirements.**

7.1. Division Engineer Confirmation. As a condition of this Agreement pursuant to C.R.S. § 37-92-102(3), the CWCB must obtain confirmation from the Division 4 Engineer that the proposal set forth in this Agreement is administrable and capable of meeting statutory requirements. Such confirmation has been secured from the Division 4 Engineer upon issuance of the State Engineer's Determination approving the Temporary ISF Lease.

7.2. State Engineer's Determination. The State Engineer's Determination (see, **Exhibit C**) imposed Conditions of Approval on the Temporary ISF Lease, which are hereby incorporated herein by this reference.

8. **Payments**.

8.1. Payment Amount.

8.1.1. CWCB shall make payment to CWT in the same amount that CWT pays Peterson Ranch under the Peterson Ranch Agreement. The relevant amount(s) are set forth in the table, below, and are subject to [an escalator], as provided in paragraph 7.3 of the Peterson Ranch Agreement.

Operative Window	**Compensation Amount**
June/July Window (only)	[$24,999.00]
September Window (only)	[$2,500.00]
June/July Window and September Window (both)	[$30,000.00]

8.2. Payment Procedure.

8.2.1. In years when CWT and CWCB staff determine that Lease Water will be used in the ISF Lease Program, as provided in paragraph 4.2, above, CWCB Staff will request approval for the full amount that would be paid to Peterson Ranch for both the June/July Window and September Window under the Peterson Ranch Agreement ("Funding Request").

8.2.2. No later than [**October 15**] in years when the Lease Water is used in the ISF Lease Program, CWT shall invoice CWCB for the full amount CWT is obligated to remit to

Peterson Ranch under the Peterson Ranch Agreement.

8.2.3. CWCB shall remit payment to CWT for the full amount invoiced by CWT no later than [**November 1**].

9. **Termination**.
   9.1. This Agreement may be terminated upon mutual agreement of the Parties or as described herein.
   9.2. Material Breach. Either Party may terminate this Agreement for a material breach of the terms of this Agreement by the other Party; provided that the terminating Party has first given at least sixty (60) days prior written notice specifying in detail such alleged material breach and giving the other Party the right within such sixty (60) day period to cure and remedy such alleged material breach.
   9.3. Ability to Perform Impaired. Either Party may terminate this Agreement if its legal ability to operate under the terms of this Agreement is materially impaired or is eliminated because of the termination or adverse modification of the Peterson Ranch Agreement, permits, decrees, or other authorizations or legal or administrative findings that are necessary to operate under the terms of this Agreement; provided that the terminating Party has first given at least sixty (60) days prior written notice to the other Party specifying the issue and steps taken to resolve the issue.
   9.4. Notice of Breach. Prior to commencing any action for enforcement of this Agreement, the Party seeking enforcement shall give the other Party no less than sixty (60) days prior written notice specifying in detail the basis for the enforcement action and the desired outcome that would resolve the perceived need for enforcement.

10. **Remedies**.
   10.1. Available Remedies. Remedies under this Agreement are limited to remedies available under Colorado law.
   10.2. Costs and Fees. In the event of a dispute under this Agreement, each Party shall bear its own costs and fees, including attorney's fees.

11. **Force Majeure**. In the event either Party is unable to perform its obligations under the terms of this Agreement because of acts of God; natural disasters; epidemics; actions or omissions by governmental authorities; unavailability of supplies or equipment critical to perform; major equipment or facility breakdown; changes in Colorado or federal law, including, without limitation, changes in any permit; or other causes reasonably beyond that Party's control, such Party shall not be liable to the other Party for any damages resulting from such failure to perform or otherwise from such causes.

12. **Notices.** Any notice required or permitted to be given by a Party under or in connection with this Agreement shall be in writing and shall be deemed duly given when personally delivered or sent by:

(a) registered or certified mail, return receipt requested, postage prepaid, (b) expedited courier service, or (c) email with confirmation of receipt, to the following:

If to CWCB: Colorado Water Conservation Board
Attention: Chief, Stream and Lake Protection Section
1313 Sherman Street, Room 718
Denver, CO 80203
Email: dnr_cwcbisf@state.co.us

With a copy to: CWCB ISF Program
Attention: Pete Conovitz
1313 Sherman St., Room 718
Denver, CO 80203
Email: pete.conovitz@state.co.us

If to CWT: Colorado Water Trust
Attention: Director of Programs
1312 17th Street #766
Denver, CO 80202
Email: kryan@coloradowatertrust.org

With a copy to: Colorado Water Trust
Attention: Staff Attorney
1312 17th Street #766
Denver, CO 80202
Email: agould@coloradowatertrust.org

Each Party may change its address or contact information for notices under this Agreement upon written notice to the other Party in accordance with this paragraph.

13. **Miscellaneous.**

13.1. No Agency. Nothing in this Agreement will be construed as creating any agency, partnership, joint venture or other form of joint enterprise between the Parties. Notwithstanding the foregoing, the CWCB or CWT may elect to designate an agent to undertake specific responsibilities under this Agreement. Should the CWCB or CWT elect to do so, it shall provide written notice to the other Party of such designation including the identity of such agent; contact information for such agent, including a principle point of contact; and clearly defined description(s) of the responsibilities such agent shall undertake on behalf of the CWCB or CWT.

13.2. Heirs and Assigns. This Agreement shall inure to and be binding on the heirs, executors, administrators, successors, and permitted assigns of the Parties.

13.3. Choice of Law. This Agreement shall be construed in accordance with the laws of the State of Colorado, as amended, without reference to conflicts of laws.

13.4. No Waiver of Immunities. No term or condition of this Agreement shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protections, or other provisions, of the Colorado Governmental Immunity Act, C.R.S. § 24-10-101 et seq.

13.5. No Waiver. No waiver of any of the provisions of this Agreement shall be deemed to constitute a waiver of any other of the provisions of this Agreement, nor shall such waiver constitute a continuing waiver unless otherwise expressly provided herein, nor shall the waiver of any default or breach hereunder be deemed a waiver of any subsequent default or breach hereunder.

13.6. Assignment. This Agreement may be assigned by either Party upon the prior written consent of the other Party.

13.7. Amendment. No amendment, modification, or novation of this Agreement or its provisions and implementation shall be effective unless subsequently documented in writing that is approved and executed by both Parties with the same formality as they have approved and executed the original Agreement.

13.8. Severability. If any provision of this Agreement is held illegal or unenforceable in a judicial proceeding, such provision shall be severed and shall be inoperative, and the remainder of this Agreement shall remain operative and binding on the Parties.

13.9. Merger. This Agreement constitutes the entire Agreement between the Parties and sets forth the rights, duties, and obligations of each to the other as of the Effective Date. Any prior Agreements, promises, negotiations, or representations not expressly set forth in this Agreement are of no force and effect.

13.10. No Third-Party Beneficiaries. This Agreement does not and is not intended to confer any rights or remedies upon any person or entity other than the Parties. It is expressly understood and agreed that enforcement of the terms and conditions of this Agreement and all rights of action relating to such enforcement shall be strictly reserved to the Parties.

13.11. Headings. The headings contained in this Agreement are for reference purposes only and shall not affect the meaning or interpretation of this Agreement.

13.12. Non-Discrimination. The Parties will fulfill their obligations under this Agreement without discriminating, harassing, or retaliating on the basis of race, color, national origin, ancestry, sex, age, pregnancy status, religion, creed, disability sexual orientation, genetic information, spousal or civil union status, veteran status, or any other status projected by applicable law.

13.13. Authority. Each Party represents that it has obtained all necessary approvals, consents, and authorizations to enter into this Agreement and to perform its duties under this Agreement; the person executing this Agreement on its behalf has the authority to do so; upon execution and delivery of this Agreement by the Parties, it is a valid and binding Agreement, enforceable in accordance with its terms; and the execution, delivery, and performance of this Agreement does not violate any bylaw, charter, regulation, law, or any other governing authority of that Party.

[signatures to follow]

IN WITNESS WHEREOF, CWCB and CWT execute this Agreement on the dates set forth below.

COLORADO WATER CONSERVATION BOARD, an agency of the State of Colorado:

Date: _____

Name: Rebecca Mitchell
Title: Director

COLORADO WATER TRUST, a Colorado non-profit corporation:

Date: _____

Name: Andy Schultheiss
Title: Executive Director

TABLE OF EXHIBITS

EXHIBIT A Water Supply Contract between _____ and _____ dated _____ __, ___

EXHIBIT B _____ Instream Flow Decree; Case No. _____ issued _____ __, ___

EXHIBIT C State Engineer Determination dated _____ __, ___

Tyler Martineau
Water Resource Engineer

Water Supply Planning
Water Rights Engineering
Water Research for Real Estate Transactions
Project Permitting and Regulatory Compliance

M E M O R A N D U M

TO: Tony LaGreca and Alyson Gould, Colorado Water Trust

FROM: Tyler Martineau, P.E.

DATE: September 9, 2021

SUBJECT: Stream Depletion Estimates for Peterson Ranch Project

Executive Summary

The Colorado Water Trust is proposing a Renewable Instream Flow Lease to the Colorado Water Conservation Board of water rights decreed in four irrigation ditches located on Tomichi Creek in Gunnison County, Colorado. The four ditches include the Louis Ditch, the Cain Borsum Ditch, the McGowan Irrigating Ditch and the McGowan Irrigating Ditch Alternate Point (collectively referred to in this report as the subject ditches). The leased water will be used to benefit Segment 2 of the CWCB's instream flow water right decreed in Tomichi Creek in Case No. 80CW132. Tomichi Creek is located in southwestern Colorado near the City of Gunnison in Gunnison and Saguache Counties in Water Division 4, Water District 28. The portion of Tomichi Creek that this segment of the instream flow is decreed in is located between the confluence with Marshall Creek and the confluence with Quartz Creek. The purpose of this report is to provide a reasonable estimate of the historical consumptive use required pursuant to CRS 37-83-105(2) as a part of the approval process for the instream flow lease.

Included in this report are estimates of the historical consumptive use and stream depletions associated with water rights decreed in the subject ditches considering a fifty-one-year diversion record from 1970-2020 (except for 2000-2020 for the McGowan Irrigating Ditch Alt Pt). The water rights that are proposed to be leased are listed in Table 1. The water proposed to be leased has historically irrigated 221 acres of land owned by Peterson Ranch, Inc. and Razor Creek Ranch, LLC. These properties are collectively referred to in this report as the Peterson Ranch.

The source of water for the instream flow lease would be water that has been historically used to irrigate the Paterson Ranch. The irrigation schedule on the ranch would be changed from one in which water is generally available throughout the full irrigation season to one in which irrigation is shut-off for a portion of the season, thus splitting the irrigation season into several parts. A summary of the benefits to instream flows in Tomichi Creek as a result of instituting a split-season irrigation schedule with the subject water rights is presented in Tables 2 and 3. Table 2 presents the summary in acre-feet (af). Table 3 presents the same summary in cubic feet per second (cfs). Under the proposed split-season irrigation schedule, diversions by the subject ditches would occur as they have historically from the beginning of the irrigation season until June 23, then from August 1 until

TABLE 1
WATER RIGHTS PROPOSED FOR INSTREAM FLOW LEASE

NAME SOURCE	PRIORITY NO. ADMIN NO.	DECREED AMOUNT	ADJUD DATE	APPROP DATE	DECREE	RIVER MILE	ACREAGE CITED IN DECREE
Louis Ditch	#185 24227.00000	1.6 cfs	1918-09-03	1916-05-01	CA1602	27.36	80
Louis Ditch	#307 28311.24025	7.5 cfs	1943-04-19	1915-10-12	CA2079		none
Louis Ditch	#na 55517.41412	0.9 cfs	2002-12-31	1963-05-20	02CW0254A		80 Supp
Subtotal		10.0 cfs					
Cain Borsum Ditch	#49 16192.11110	2.44 cfs	1904-04-29	1880-06-01	CA1266	26.64	182
Cain Borsum Ditch	#94 16192.13666	1.2 cfs	1904-04-29	1887-06-01	CA1266		182
Cain Borsum Ditch	#217 28311.11110	9.76 cfs	1943-04-19	1880-06-01	CA2079		220
Cain Borsum Ditch	#252 28311.13666	8.6 cfs	1943-04-19	1887-06-01	CA2079		220
Subtotal		22.0 cfs					
McGowan Irrig Ditch and McGowan Irrig Ditch Alt Pt	#60 16192.11809	2.2 cfs	1904-04-29	1882-05-01	CA1266 99CW52	McG 24.82 McG Alt Pt 24.83	110 Acres South Side
McGowan Irrig Ditch and McGowan Irrig Ditch Alt Pt	#224 28311.11809	8.8 cfs	1943-04-19	1882-05-01	CA2079 99CW52		110 Acres South Side
McGowan Irrig Ditch and McGowan Irrig Ditch Alt Pt	#na 55517.41412	0.5 cfs	2002-12-31	1963-05-20	02CW0254		115 Supp
Subtotal		11.5 cfs					
Total		43.5 cfs					

TABLE 2
BENEFITS TO TOMICHI CREEK
FALLOWING JUNE 24 - JULY 31 AND SEPT 1 - SEPT 30
Averages for Years 1970-2020 (2000-2020 for McGowan Irrigating Ditch Alt Pt)

	Apr	May	Jun 1-23	Jun 24-30	Jul	Aug	Sep	Oct	Annual
Individual Ditches (acre-feet)									
Reduction in Stream Depletion Due to Fallowing									
Louis Ditch									
Immediately Below Louis Headgate	0	0	0	69	190	0	55	0	315
Immediately Above CB Headgate	0	0	0	56	148	-5	43	-2	241
Downstream of All Returns	0	0	0	18	22	-20	8	-8	20
Cain Borsum Ditch									
Immediately Below CB Headgate	0	0	0	172	419	0	78	0	669
Immediately Above McG Headgate	0	0	0	86	175	-29	39	-9	262
Downstream of All Returns	0	0	0	44	55	-44	19	-13	61
McGowan Irrigating Ditch									
Immediately Below McG Headgate	0	0	0	116	319	0	87	0	522
Immediately Abv McG Alt Pt Headgate	0	0	0	115	316	0	87	0	517
Downstream of All Returns	0	0	0	25	33	-22	12	-14	33
McGowan Irrigating Ditch Alt Pt									
Immediately Blw McG Alt Pt Headgate	0	0	0	44	106	0	27	0	177
Downstream of All Returns	0	0	0	6	2	-6	1	-1	2
Combined Benefit from All Ditches (acre-feet)									
Reduction in Stream Depletion Due to Fallowing									
Immediately Below Louis Headgate	0	0	0	69	190	0	55	0	315
Immediately Above CB Headgate	0	0	0	56	148	-5	43	-2	241
Immediately Below CB Headgate	0	0	0	228	567	-5	122	-2	910
Immediately Above McG Headgate	0	0	0	104	197	-50	46	-16	281
Immediately Below McG Headgate	0	0	0	220	516	-50	134	-16	803
Immediately Abv McG Alt Pt Headgate	0	0	0	219	513	-50	133	-16	799
Immediately Blw McG Alt Pt Headgate	0	0	0	263	619	-50	160	-16	975
Downstream of All Returns	0	0	0	93	111	-92	40	-36	116

TABLE 3
BENEFITS TO TOMICHI CREEK
FALLOWING JUNE 24 - JULY 31 AND SEPT 1 - SEPT 30
Averages for Years 1970-2020 (2000-2020 for McGowan Irrigating Ditch Alt Pt)

	Apr	May	Jun 1-23	Jun 24-30	Jul	Aug	Sep	Oct
Individual Ditches (cubic feet per second)								
Reduction in Stream Depletion Due to Fallowing								
Louis Ditch								
Immediately Below Louis Headgate	0.0	0.0	0.0	5.0	3.1	0.0	0.9	0.0
Immediately Above CB Headgate	0.0	0.0	0.0	4.0	2.4	-0.1	0.7	0.0
Downstream of All Returns	0.0	0.0	0.0	1.3	0.4	-0.3	0.1	-0.1
Cain Borsum Ditch								
Immediately Below CB Headgate	0.0	0.0	0.0	12.4	6.8	0.0	1.3	0.0
Immediately Above McG Headgate	0.0	0.0	0.0	6.2	2.8	-0.5	0.6	-0.1
Downstream of All Returns	0.0	0.0	0.0	3.2	0.9	-0.7	0.3	-0.2
McGowan Irrigating Ditch								
Immediately Below McG Headgate	0.0	0.0	0.0	8.4	5.2	0.0	1.5	0.0
Immediately Abv McG Alt Pt Headgate	0.0	0.0	0.0	8.3	5.1	0.0	1.5	0.0
Downstream of All Returns	0.0	0.0	0.0	1.8	0.5	-0.4	0.2	-0.2
McGowan Irrigating Ditch Alt Pt								
Immediately Blw McG Alt Pt Headgate	0.0	0.0	0.0	3.1	1.7	0.0	0.4	0.0
Downstream of All Returns	0.0	0.0	0.0	0.4	0.0	-0.1	0.0	0.0
Combined Benefit from All Ditches (cubic feet per second)								
Reduction in Stream Depletion Due to Fallowing								
Immediately Below Louis Headgate	0.0	0.0	0.0	5.0	3.1	0.0	0.9	0.0
Immediately Above CB Headgate	0.0	0.0	0.0	4.0	2.4	-0.1	0.7	0.0
Immediately Below CB Headgate	0.0	0.0	0.0	16.4	9.2	-0.1	2.0	0.0
Immediately Above McG Headgate	0.0	0.0	0.0	7.5	3.2	-0.8	0.8	-0.3
Immediately Below McG Headgate	0.0	0.0	0.0	15.8	8.4	-0.8	2.2	-0.3
Immediately Abv McG Alt Pt Headgate	0.0	0.0	0.0	15.8	8.3	-0.8	2.2	-0.3
Immediately Blw McG Alt Pt Headgate	0.0	0.0	0.0	18.9	10.1	-0.8	2.7	-0.3
Downstream of All Returns	0.0	0.0	0.0	6.7	1.8	-1.5	0.7	-0.6

August 31, and from October 1 until the end of the irrigation season. Diversions would be shut off from June 24 through July 31 and from September 1 through 30. In order to estimate the benefits to instream flows, two irrigation scenarios have been investigated. The first is an analysis of the historical stream depletions associated with the full irrigation season which runs annually from April through October. The second is an analysis of the stream depletions associated with diversions under the split-season irrigation schedule described above. The difference in stream depletions between these two scenarios represents the benefit shown in Tables 2 and 3 that could accrue to instream flows in Tomichi Creek if the Peterson Ranch water rights were operated under the split-season irrigation plan.

The greatest benefit to instream flows in Tomichi Creek would occur in average to moderately dry years. In very dry years such as 2012, the existence of a split season irrigation program would provide limited benefit to instream flows. In such years, most of the subject ditches would either be curtailed due to a downstream call or unable to divert due to a lack of physical water at the headgates. Therefore, little water would be available for an instream flow lease. A summary of diversions and depletions in 2012 is provided in the report. In a drought year such as 2002, it would not be possible to make any historical depletions available for instream flow use because in such years the subject ditches would be completely curtailed either due to a downstream call or unable to divert due to a lack of physical water at the headgates.

Estimates of the average historical consumptive use and stream depletions for each ditch throughout the period of record are included in the report. The assumptions and methodology employed in the analysis are described in Appendices A and B. The results of an analysis of the benefits to stream flow in Tomichi Creek if June 24 – July 31 fallowing was implemented by itself or if only September 1 – 30 fallowing was implemented is provided in Appendix C.

System Description

Introduction

The Colorado Water Trust is proposing an instream flow lease to the Colorado Water Conservation Board of water rights decreed in four irrigation ditches located on Tomichi Creek in Gunnison County, Colorado. The four ditches include: the Louis Ditch, the Cain Borsum Ditch, the McGowan Irrigating Ditch and the McGowan Irrigating Ditch Alternate Point. The leased water will be used to benefit the CWCB's instream flow water right in Tomichi Creek. The following report provides a reasonable estimate of the historical consumptive use required pursuant to CRS 37-83-105(2) as a part of the approval process for the instream flow lease.

Tomichi Creek is located in southwestern Colorado in Gunnison and Saguache Counties. The headwaters of Tomichi Creek are located on the west side of the Continental Divide in the Collegiate Peaks Mountains. From its headwaters, the creek extends approximately 72 river miles, first southwards and then westwards, to its downstream terminus, which is located at the confluence with the Gunnison River at Gunnison, Colorado. The Tomichi Creek drainage basin encompasses 1,061 square miles. The creek is included within Water Division 4, Water District 28 of the Colorado Division of Water Resources. Major tributaries to Tomichi Creek include Agate Creek, Marshall Creek, Razor Creek, Quartz Creek and Cochetopa Creek.

The Tomichi Creek basin is made up largely of sagebrush and forested lands managed by the U. S. Bureau of Land Management and U. S. Forest Service. According to the Upper Gunnison River Water Conservancy District, the bottomlands along Tomichi Creek include approximately 27,800 acres of privately owned irrigated native grass hay meadows as well as wetlands and riparian areas. The principal benefits that Tomichi Creek provides to the Tomichi Valley include providing water for irrigation, livestock, and terrestrial and aquatic wildlife habit, as well as meeting relatively small domestic requirements.

Annual spring runoff from the Tomichi Creek Basin typically occurs very quickly. Streamflows peak at the end of May, and reach summertime lows in July. There is limited reservoir storage constructed in the basin to smooth out peaks and troughs in streamflows. Flood irrigation, however, results in water that is diverted from Tomichi Creek entering groundwater, which then makes its way slowly back to Tomichi Creek, resulting in some short-term storage of water that aids streamflows in the summer and fall.

The principal diversion structures on Tomichi Creek are ditches decreed for irrigation. The largest ditch by far on Tomichi Creek is the Arch Ditch, which is decreed for a total of 147.2 cfs. The Peterson Ranch is located downstream of the Arch Ditch and is affected by both the ditch's diversions and return flows.

Measurement Devices and Available Streamflow data

The U.S. Geological Survey has collected streamflow data on Tomichi Creek for many years. Listed below are the locations, station ID, and water years when streamflow data was collected.

USGS Streamflow Gaging Sites on Tomichi Creek		
Location	Station ID	Water Years in Operation
Tomichi Creek at Sargents, CO	09115500	1917-2021
Tomichi Creek at Doyleville, CO	09116000	1945-1950
Tomichi Creek at Parlin, CO	09117000	1945-1951, 1964-1970
Tomichi Creek at Gunnison, Co	09119000	1938-2021

The USGS stream gaging site, Tomichi Creek at Sargents, CO (09115500), is currently active and is located within the CWCB instream flow segment. The gaging site is located on Tomichi Creek 0.5 miles downstream of the confluence with Marshall Creek. The USGS stream gaging site, Tomichi Creek at Parlin, CO (09117000) is also located within the CWCB instream flow segment, just upstream of the confluence of Tomichi Creek with Quartz Creek, however, it is not currently active. Additional recent streamflow measurements on Tomichi Creek include:

- Whetstone Associates collected streamflow measurements for Trout Unlimited at Tomichi Creek at Doyleville from 6/25/14 through 11/12/2014
- The CWCB made streamflow measurements from 5/25/18 through 11/1/18 in Tomichi Creek at the Coats Bros Ditch

Instream Water Rights

The CWCB holds instream flow water rights on Tomichi Creek that extend from the headwaters down to the confluence with Quartz Creek. In Case No. 80CW132 instream rights were decreed in two segments of Tomichi Creek. The first segment extends from the confluence with Triano Creek to the confluence with Marshall Creek and is decreed for 9 cfs. The second segment extends from the confluence with Marshall Creek to the confluence with Quartz Creek. The second segment of the instream flow right, which is decreed for 18 cfs year-round, would benefit from the proposed lease.

Description of Water Rights Proposed for Lease

The subject ditches divert from Tomichi Creek. The decreed locations of the headgates for the subject ditches are shown in Table 4. The general location of lands irrigated by the subject ditches in relation to the segment of Tomichi Creek in which the instream flow is decreed is shown in Figure 1. The portion of the instream flow segment that would benefit from the instream flow lease is shown in Figure 2. An aerial image of the headgates and the fields irrigated by the subject ditches that are under Peterson Ranch ownership is provided in Figure 3. The water rights decreed in the ditches are shown in Table 1. The Ranch property boundaries as mapped by the Gunnison County Assessor's Office are shown in Figure 4. The subject water rights are decreed absolute for irrigation. A small amount of water (0.5 cfs) in the McGown Irrigating Ditch and the McGowan Irrigating Ditch Alt Pt is decreed absolute for both irrigation and stock water.

TABLE 4
DECREED HEADGATE LOCATIONS

Irrigation Ditch	Location As Described in Water Court Decree	
Louis Ditch	SE1/4SE1/4SW1/4 of Section 29, Township 49 North, Range 3 East, N.M.P.M. at a point 534 feet from the north line and 2280 feet from the west section line of said Section 29.	
Cain Borsum Ditch	Cain Ditch - North bank of Tomichi Creek at a point whence the NE comer of Section 30, Township 49 North, Range 3 East, N.M.P.M. bears North 31° West 3,432 feet. Borsum Ditch – At a point whence the NE corner of Section 30, Township 49 North, Range 3 East bears North 35° East 1,650 feet. The headgates are connected as one ditch.	
McGowan Irrigating Ditch	South bank of Tomichi Creek at a point whence the NE comer of Section 30, Township 49 North, Range 3 East, N.M.P.M. bears North 62°12' East 3,157 feet.	
McGowan Irrigating Ditch Alt Pt	North bank of Tomichi Creek at a point in the SW1/4SW1/4NE1/4 Section 30, Township 49 North, Range 3 East, N.M.P.M. at a point approximately 1250 feet from the north line and 2,400 feet from the east line of said Section 30	

The Colorado Water Trust is proposing including all of the water rights listed in Table 1 in the instream flow lease program. During the period from June 24 through July 31 and from September 1 through September 30 (the periods being considered for the instream flow lease), the diversion record indicates that diversions have been made under all priorities in the ditches. This study evaluates the historical consumptive use and stream depletions associated with decreed diversions only. This was accomplished by excluding daily diversions in excess of decreed amounts from the analysis.

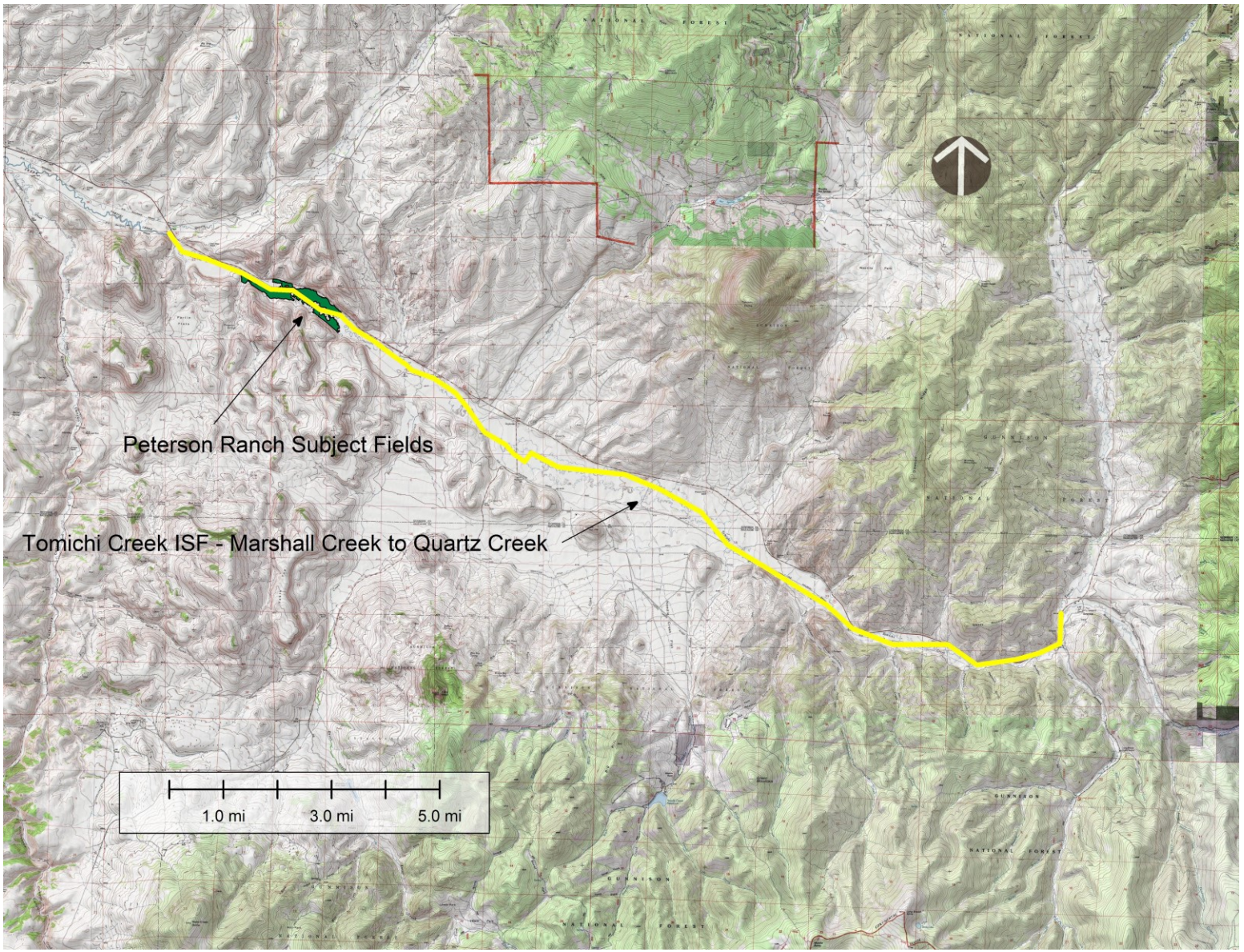

Peterson Ranch Subject Fields
Tomichi Creek ISF - Marshall Creek to Quartz Creek
1.0 mi
3.0 mi
5.0 mi

FIGURE 1

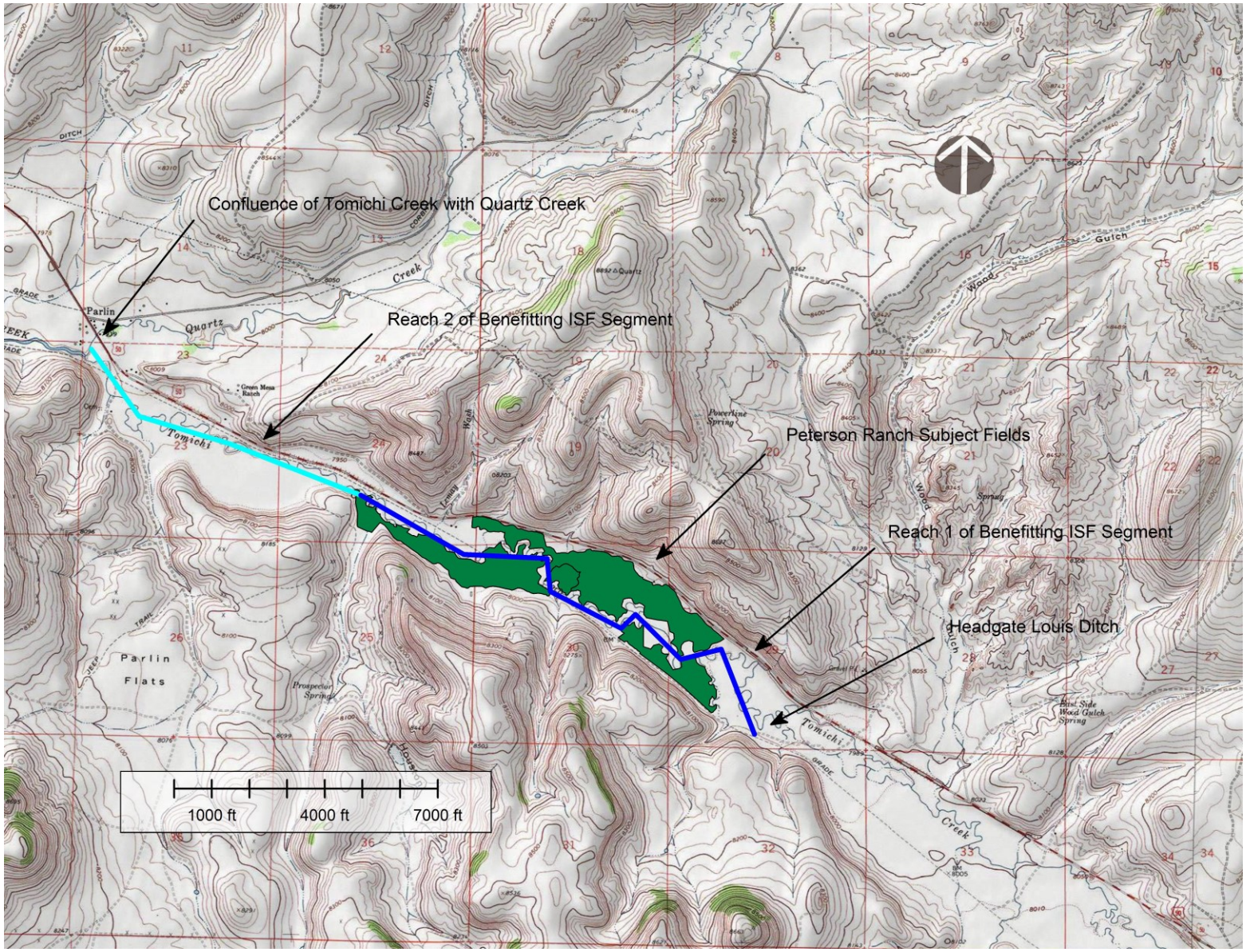
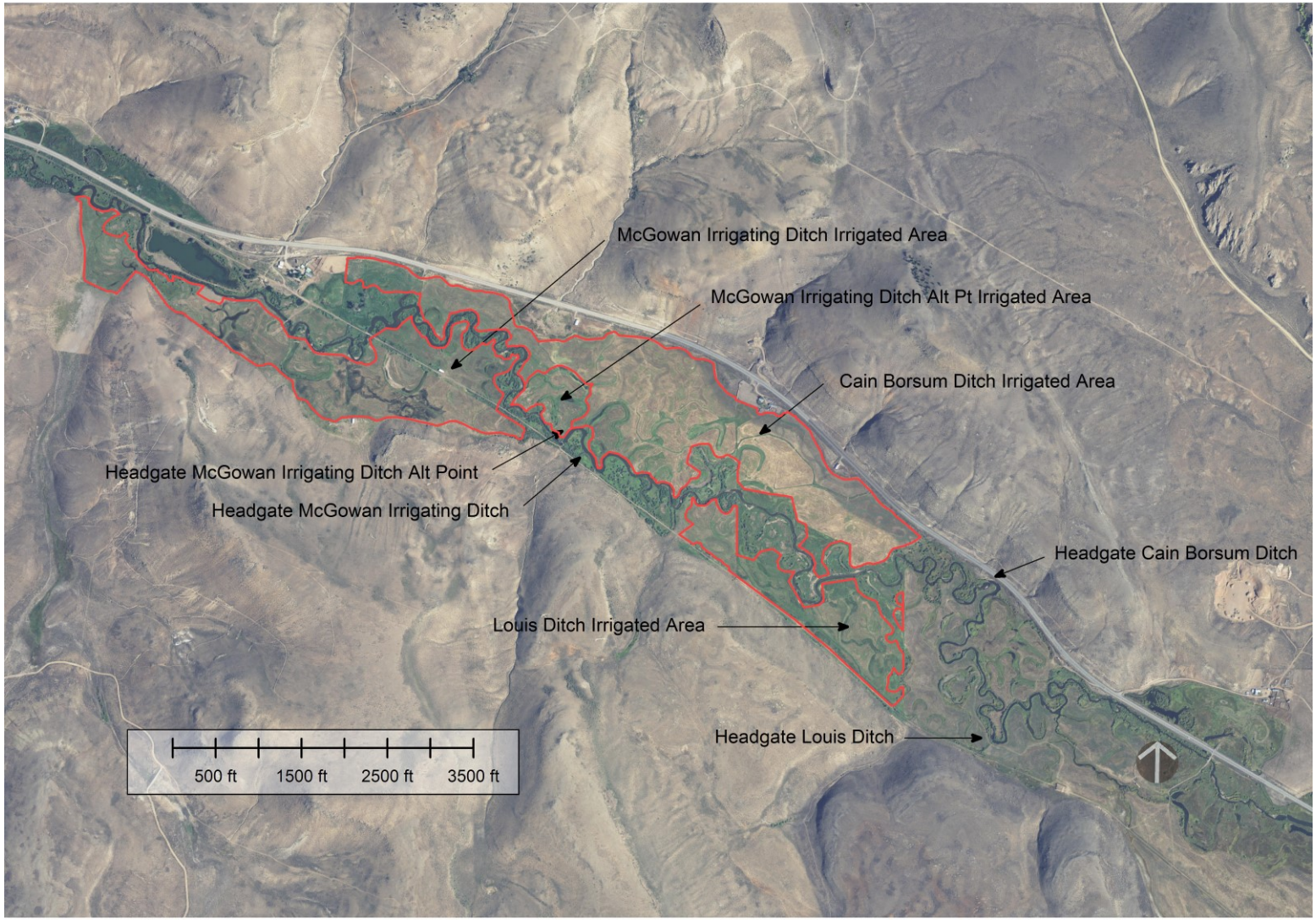

Confluence of Tomichi Creek with Quartz Creek
Reach 2 of Benefitting ISF Segment
Peterson Ranch Subject Fields
Reach 1 of Benefitting ISF Segment
Headgate Louis Ditch
Parlin
Flats
Tomichi
Quartz
Creek
1000 ft
4000 ft
7000 ft

FIGURE 2

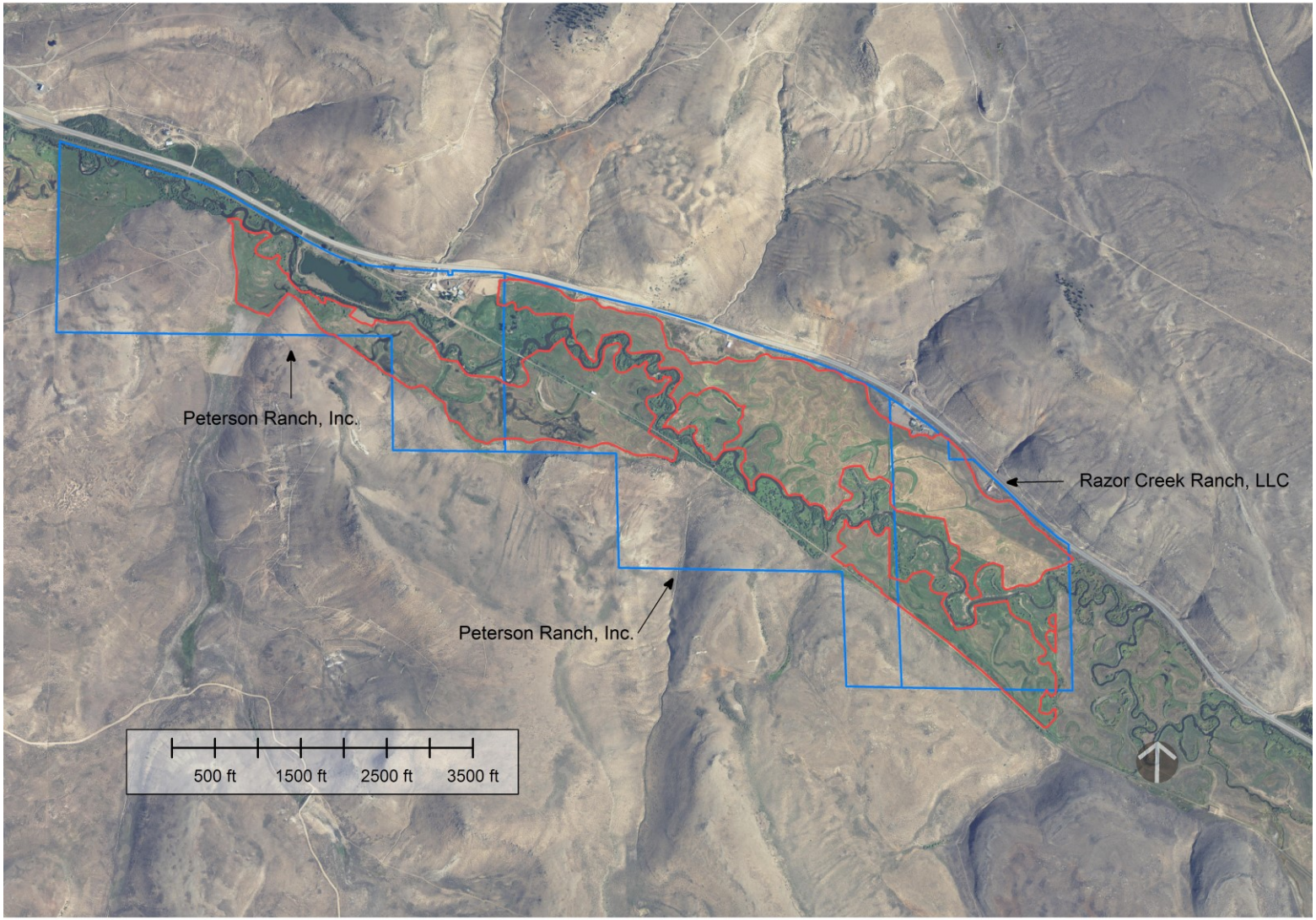
Outline of Irrigated Areas



Louis Ditch, Cain Borsum Ditch, McGowan Irrigating Ditch, and McGowan Irrigating Ditch Alt Pt

FIGURE 3

Peterson Ranch Irrigated Area Property Boundaries



Louis Ditch, Cain Borsum Ditch, McGowan Irrigating Ditch, McGowan Irrigating Ditch Alt Pt

FIGURE 4

Relative priority of the Subject Water Rights in the Tomichi Creek System

Calls from the Gunnison Tunnel and South Canal (Admin. No. 20393.18779) are possible between April 1 and October 31. In 2002, a call from the Gunnison Tunnel and South Canal was active from April 18 through October 1 (but not administered continuously), and in 2003 from July 10 through September 8. Calls from the Redlands Power Canal (Admin. No. 22283.20300) are possible any time of year. In 2002, the Redlands Power Canal called from April 22 through June 1. A call from these downstream rights could curtail a portion of the diversions in the subject ditches which would reduce the amount of water available to the instream flow lease.

Local calls from irrigation water rights on Tomichi Creek downstream of the Coats Bros Ditch are possible during the irrigation season from May 1 – October 31. In 2002, The Biebel Ditches Nos. 1 & 2 called between June 5 and August 25, and the McCann No. 1, No. 2 and No. 3 Ditches called between June 21 and September 25. Replacement to these water rights could potentially need to be provided locally.

A summary of the call record from the State Engineer's Office for 2000-2020 for Tomichi Creek and the Gunnison River is provided in Appendix A.

Two nearby water rights which are decreed on Tomichi Creek just downstream of the Water Rights are listed in Table 5. All returns from diversions by the subject water rights return to Tomichi Creek upstream of the Hannah J Winters No. 2 Ditch.

TABLE 5
NEARBY DOWNSTREAM WATER RIGHTS

NAME SOURCE	PRIORITY NO. ADMIN NO.	DECREED AMOUNT	ADJUD DATE	APPROP DATE	DECREE	RIVER MILE
Louis Sarrasin	#113 16192.16192	0.6 cfs	1904	1894	CA1266	23.71
Louis Sarrasin	265 28311.16192	2.4 cfs	1943	1894	CA2079	
Louis Sarrasin	#na 55517.41412	1.5 cfs	2002	1963	02CW0254A	
Subtotal		4.5 cfs				
Hannah J Winters No. 2	#56 16192.11505	3.8	1904	1881	CA1266	22.86
Hannah J Winters No. 2	#223 23811.11505	8.29	1943	1881	CA2079	
Subtotal		12.09				

Historic Use of Subject Water Rights

Description of Historically Irrigated Property

The Peterson Ranch is located on Tomichi Creek approximately 14 highway miles east of the City of Gunnison, in Gunnison County, Colorado. The ranch fields irrigated under the subject ditches are located in Sections 19, 29 and 30, Township 49N, Range 3E, NMPM and Sections 24 and 25, Township 49N, Range 2E, NMPM.

The irrigation season on the ranch extends from April through October and takes place principally during two periods of time. The first period starts in the spring and ends within a few weeks before or after August 1st prior to the single annual cutting of hay. The second period occurs after the cutting of hay and lasts into the fall for the purpose of regrowing hay for use as pasture in the fall and winter. During the time that the single cutting of hay is occurring diversions are shut off and the fields are dried out for a period of 2 to 4 weeks. According to the diversion records for the subject ditches, diversions were not turned back on after haying in some years.

The amount of land located within the perimeter boundary of the Peterson irrigated area under the subject ditches totals 244.7 acres. Within that area there are approximately 24.0 acres of old stream meanders and dry areas that do not receive irrigation. Therefore, the net amount of irrigated acreage is 220.7 acres. A breakdown of the irrigated acreage under each ditch is provided in Table 6. The Peterson Ranch owns 100% of the water in the subject ditches.

Upstream Return Flows and Subirrigation

The configuration of Tomichi Creek is such that essentially all return flows from irrigation upstream of the Peterson Ranch return to the stream prior to reaching the ranch. Therefore, irrigation of the ranch occurs principally by water that is diverted by the subject ditches and from subirrigation.

It is likely that subirrigation of the native hay crop occurs at times when the water table is high on the Peterson Ranch. When subirrigation occurs, some or all of the consumptive irrigation water requirement of the hay crop is satisfied from groundwater instead of from irrigation. This reduces the amount of stream depletion resulting from irrigation diversions. Subirrigation occurs principally during the spring runoff, especially in wet years. It is assumed in this analysis that the water table drops after the spring runoff is over and that subirrigation is minimal in average to dry years after June 23 when the instream flow lease is planned to begin. Further information regarding subirrigation is provided in Appendix A.

TABLE 6
ACREAGE IRRIGATED BY THE DITCHES

Irrigated Areas (Acres)	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
Gross Irrigated Area (i.e., Outline of Irrigated Field)	36.1	118.6	80.2	9.8
Non-irrigated Areas: Old Stream Meanders, High Spots, etc. within the Gross Irrigated Area	0.0	9.9	10.5	3.6
Net Irrigated Area	36.1	108.7	69.7	6.2
Hayed Area	31.7	105.5	50.4	6.2

Historical Consumptive Use and Stream Depletion Analysis

This report presents information on a monthly basis concerning historical diversions, consumptive use and stream depletions by the subject water rights in Tomichi Creek for a 51-year time span from 1970 – 2020. The analysis of stream depletions includes provisions for soil moisture accounting and for lagging of subsurface return flows. Because the instream flow lease is proposed to commence on June 24, the month of June has been divided into two time periods in this analysis: June 1-23 and June 24-30. Daily diversions have been summed to provide a total diversion amount for each of the two periods. Soil moisture accounting and lagging of subsurface return flows have been carried out separately for each time period. The monthly consumptive irrigation water requirement for the month of June has been proportionally divided between the two time periods.

A monthly time step (with the exception of splitting the month of June) has been used for the analysis because the historical diversion record does not show much day-to-day variation. It does not appear that running the analysis on a daily or weekly time step would materially increase the level of detail in the results.

A detailed description of the methodology used in the consumptive use and stream depletion analysis is provided in Appendix B.

Proposed Project Operation

When the proposed instream flow lease is in effect, diversions by the subject ditches would be shut off and the water would be used for instream flow purposes for one or both of the following periods: June 24 through July 31, and September 1 through September 30. During the remainder of the irrigation season, diversions would continue to occur as they have historically. The instream flow use of water would be limited to five years during of the 10-year term of the lease. The lease would most likely be implemented in drier than average years when the stream habitat

would most benefit from additional stream flows. It would not likely be implemented in very dry years when the subject ditches are not diverting, either for lack of physical water at the headgate or due to a downstream call.

Estimated Stream Depletions under Historical and under Proposed Split Season Conditions

A summary of average historical diversions, consumptive use and depletions at the stream which have taken place on the Peterson Ranch under irrigation by each of the subject ditches during the period of record from 1970 – 2020 is provided in Tables 7, 8, 9 and 10. Presented first are the results of an analysis of the historical depletions associated with the full irrigation season which runs annually from April – October. Second is an analysis of the depletions associated with diversions under a split season irrigation schedule where historical diversions are discontinued from June 24 through July 31 and from September 1 through September 30, but remain unchanged for the remainder of the irrigation season. The reason for preparing these estimates is to quantify the benefit to stream flows in Tomichi Creek that would occur if diversions by the above irrigation ditches were changed from their historic pattern to a split season pattern. The benefit that would accrue to the stream by changing from one irrigation regime to the other is equal to the difference in estimated stream depletions between the historical and the split-season operations. The results of an analysis of the benefits to streamflow in Tomichi Creek if fallowing was implemented solely from June 24 – July 31 or solely from September 1 – 30 are provided in Appendix C.

Description of Instream Benefits Resulting from Project Operation

Description of ISF Water Rights

The water leased in the subject ditches is proposed to be used to benefit the CWCB's instream flow right decreed in Segment 2 in Tomichi Creek in Case No. 80CW132. Information concerning the water rights is provided in Table 11. The location of the instream flow segment is shown in Figure 1.

Upstream and Downstream terminus and length of benefitting ISF segment

The length of the benefitting ISF segment is 7.25 river miles or 4.0 highway miles. The benefitting ISF segment is divided into two reaches. Reach 1 has its upstream terminus at the point of diversion for the Louis Ditch and its downstream terminus at the point where all return flows from the Peterson irrigated property have returned to Tomichi Creek. Reach 2 has its upstream terminus at the point where all return flows from the Peterson irrigated property have returned to Tomichi Creek and its downstream terminus at the confluence with Quartz Creek. Reach 1 is 4.5 river miles in length and Reach 2 is 2.75 river miles in length. The locations of the benefitting segment and Reaches 1 and 2 are shown in Figure 2.

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TABLE 7
SUMMARY OF STREAM DEPLETION ANALYSIS
LOUIS DITCH
Averages for Years 1970-2020

	Units	Apr	May	Jun 1-23	Jun 24-30	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
Louis Ditch Historical Diversions															
Recorded Headgate Diversions	AF	9	176	282	75	210	79	64	30	-	-	-	-	-	926
Recorded Headgate Diversions	CFS	0.15	2.87	6.19	5.44	3.41	1.28	1.08	0.49	-	-	-	-	-	
Louis Ditch with Historical Decreed Diversions Throughout Irrigation Season															
Decreed Headgate Diversions	AF	9	164	249	69	190	65	55	30	-	-	-	-	-	832
Decreed Headgate Diversions	CFS	0.15	2.67	5.47	4.96	3.09	1.06	0.93	0.49	-	-	-	-	-	
Field Headgate Delivery	AF	9	159	242	67	185	63	54	29	-	-	-	-	-	807
Consumptive Irrig. Water Req.	AF	1.9	15.0	17.1	5.2	19.9	10.7	9.0	2.8	-	-	-	-	-	81.5
Historical Crop CU	AF	0.3	11.6	16.4	5.0	18.3	9.0	5.8	1.3	-	-	-	-	-	67.6
Historical Crop CU	CFS	0.00	0.19	0.36	0.36	0.30	0.15	0.10	0.02	-	-	-	-	-	
Historical Stream Depletion															
Just Above Cain Borsum Headgate	AF	7	132	197	52	144	47	42	22	-3	0	0	0	0	640
Just Above Cain Borsum Headgate	CFS	0.12	2.14	4.31	3.78	2.35	0.76	0.71	0.36	-0.05	0.00	0.00	0.00	0.00	
Downstream of All Returns	AF	2.2	34.5	37.9	3.0	6.6	-8.5	2.2	-1.5	-3.1	-0.3	0.0	0.0	0.0	73.0
Downstream of All Returns	CFS	0.04	0.56	0.83	0.22	0.11	-0.14	0.04	-0.02	-0.05	0.00	0.00	0.00	0.00	
Louis Ditch with Historical Decreed Diversions Modified to Include June 24 - July 31 and Sept 1 - 30 Fallowing															
Decreed Headgate Diversions	AF	9	164	249	0	0	65	0	30	-	-	-	-	-	
Decreed Headgate Diversions	CFS	0.15	2.67	5.47	0.00	0.00	1.06	0.00	0.49	-	-	-	-	-	
Field Headgate Delivery	AF	9	159	242	0	0	63	0	29	-	-	-	-	-	502
Consumptive Irrig. Water Req.	AF	1.9	15.0	17.1	5.2	19.9	10.7	9.0	2.8	-	-	-	-	-	81.5
Crop CU	AF	0.3	11.6	16.4	4.9	9.5	3.4	2.7	1.1	-	-	-	-	-	49.8
Crop CU	CFS	0.00	0.19	0.36	0.35	0.15	0.06	0.04	0.02	-	-	-	-	-	
Modified Stream Depletion															
Just Above Cain Borsum Headgate	AF	7	132	197	-4	-4	52	-1	24	-2	0	0	0	0	400
Just Above Cain Borsum Headgate	CFS	0.12	2.14	4.31	-0.27	-0.06	0.85	-0.02	0.39	-0.04	0.00	0.00	0.00	0.00	
Downstream of All Returns	AF	2.2	34.5	37.9	-15.0	-15.4	11.8	-5.3	6.0	-2.4	-0.2	0.0	0.0	0.0	54.1
Downstream of All Returns	CFS	0.04	0.56	0.83	-1.08	-0.25	0.19	-0.09	0.10	-0.04	0.00	0.00	0.00	0.00	
Benefit to Stream of Shutting Off Louis Ditch Diversions between June 24 - July 31 and Sept 1 - 30[1]															
Reduction in Stream Depletion															
Immediately below Louis Headgate	AF	0	0	0	69	190	0	55	0	-	-	-	-	-	315
Immediately below Louis Headgate	CFS	0.00	0.00	0.00	4.96	3.09	0.00	0.93	0.00	-	-	-	-	-	
Just Above Cain Borsum Headgate	AF	0	0	0	56	148	-5	43	-2	-1	0	0	0	0	240
Just Above Cain Borsum Headgate	CFS	0.00	0.00	0.00	4.05	2.41	-0.08	0.73	-0.03	-0.01	0.00	0.00	0.00	0.00	
Downstream of All Returns	AF	0.0	0.0	0.0	18.0	22.0	-20.3	7.6	-7.5	-0.7	-0.1	0.0	0.0	0.0	18.9
Downstream of All Returns	CFS	0.00	0.00	0.00	1.30	0.36	-0.33	0.13	-0.12	-0.01	0.00	0.00	0.00	0.00	

[1]Equals historical stream depletion minus modified stream depletion

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TABLE 8
SUMMARY OF STREAM DEPLETION ANALYSIS
CAIN BORSUM DITCH
Averages for Years 1970-2020

	Units	Apr	May	Jun 1-23	Jun 24-30	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
Cain Borsum Ditch Historical Diversions															
Recorded Headgate Diversions	AF	17	386	611	184	434	113	78	89	-	-	-	-	-	1913
Recorded Headgate Diversions	CFS	0.28	6.28	13.40	13.25	7.06	1.84	1.32	1.45	-	-	-	-	-	
Cain Borsum Ditch with Historical Decreed Diversions Throughout Irrigation Season															
Decreed Headgate Diversions	AF	17	372	596	172	419	113	78	74	-	-	-	-	-	1841
Decreed Headgate Diversions	CFS	0.28	6.05	13.07	12.36	6.81	1.84	1.32	1.21	-	-	-	-	-	
Field Headgate Delivery	AF	16	364	584	168	411	111	77	73	-	-	-	-	-	1805
Consumptive Irrig. Water Req.	AF	5.6	45.1	51.4	15.6	60.0	32.3	27.2	8.3	-	-	-	-	-	245.5
Historical Crop CU	AF	1.5	34.7	50.4	15.4	56.3	28.6	21.9	5.5	-	-	-	-	-	214.4
Historical Crop CU	CFS	0.03	0.56	1.10	1.11	0.92	0.47	0.37	0.09	-	-	-	-	-	
Historical Stream Depletion															
Just Above McGowan Headgates	AF	11	184	263	64	156	31	34	30	-6	0	0	0	0	767
Just Above McGowan Headgates	CFS	0.18	2.99	5.77	4.62	2.54	0.51	0.57	0.49	-0.09	-0.01	0.00	0.00	0.00	
Downstream of All Returns	AF	7.5	91.1	99.0	11.3	26.4	-9.1	12.2	8.2	-5.5	-0.3	0.0	0.0	0.0	240.9
Downstream of All Returns	CFS	0.13	1.48	2.17	0.82	0.43	-0.15	0.21	0.13	-0.09	-0.01	0.00	0.00	0.00	
Cain Borsum Ditch with Historical Decreed Diversions Modified to Include June 24 - July 31 and Sept 1 - 30 Fallowing															
Decreed Headgate Diversions	AF	17	372	596	0	0	113	0	74	-	-	-	-	-	
Decreed Headgate Diversions	CFS	0.28	6.05	13.07	0.00	0.00	1.84	0.00	1.21	-	-	-	-	-	
Field Headgate Delivery	AF	16	364	584	0	0	111	0	73	-	-	-	-	-	1149
Consumptive Irrig. Water Req.	AF	5.6	45.1	51.4	15.6	60.0	32.3	27.2	8.3	-	-	-	-	-	245.5
Crop CU	AF	1.5	34.7	50.4	15.3	32.9	13.9	8.8	4.7	-	-	-	-	-	162.3
Crop CU	CFS	0.03	0.56	1.10	1.10	0.54	0.23	0.15	0.08	-	-	-	-	-	
Modified Stream Depletion															
Just Above McGowan Headgates	AF	11	184	263	-22	-19	61	-5	39	-5	0	0	0	0	507
Just Above McGowan Headgates	CFS	0.18	2.99	5.77	-1.58	-0.31	0.99	-0.08	0.63	-0.08	0.00	0.00	0.00	0.00	
Downstream of All Returns	AF	7.5	91.1	99.0	-32.7	-28.3	34.6	-6.8	21.4	-4.6	-0.3	0.0	0.0	0.0	181.0
Downstream of All Returns	CFS	0.13	1.48	2.17	-2.35	-0.46	0.56	-0.11	0.35	-0.08	0.00	0.00	0.00	0.00	
Benefit to Stream of Shutting Off Cain Borsum Ditch Diversions between June 24 - July 31 and Sept 1 - 30[1]															
Reduction in Stream Depletion															
Immediately below CB Headgate	AF	0	0	0	172	419	0	78	0	-	-	-	-	-	669
Immediately below CB Headgate	CFS	0.00	0.00	0.00	12.36	6.81	0.00	1.32	0.00	-	-	-	-	-	
Just Above McGowan Headgates	AF	0	0	0	86	175	-29	39	-9	-1	0	0	0	0	262
Just Above McGowan Headgates	CFS	0.00	0.00	0.00	6.20	2.84	-0.48	0.65	-0.14	-0.02	0.00	0.00	0.00	0.00	
Downstream of All Returns	AF	0.0	0.0	0.0	44.0	54.7	-43.7	19.0	-13.1	-0.9	-0.1	0.0	0.0	0.0	60.9
Downstream of All Returns	CFS	0.00	0.00	0.00	3.17	0.89	-0.71	0.32	-0.21	-0.02	0.00	0.00	0.00	0.00	

[1]Equals historical stream depletion minus modified stream depletion

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TABLE 9
SUMMARY OF STREAM DEPLETION ANALYSIS
MCGOWAN IRRIGATING DITCH
Averages for Years 1970-2020

	Units	Apr	May	Jun 1-23	Jun 24-30	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
McGowan Irrigating Ditch Historical Diversions															
Recorded Headgate Diversions	AF	7	322	522	150	407	118	112	50	-	-	-	-	-	1688
Recorded Headgate Diversions	CFS	0.11	5.23	11.43	10.83	6.63	1.92	1.88	0.82	-	-	-	-	-	
McGowan Irrigating Ditch with Historical Decreed Diversions Throughout Irrigation Season															
Decreed Headgate Diversions	AF	6	236	373	116	319	78	87	128	-	-	-	-	-	1343
Decreed Headgate Diversions	CFS	0.10	3.84	8.17	8.35	5.19	1.26	1.47	2.08	-	-	-	-	-	
Field Headgate Delivery	AF	6	232	365	114	312	76	86	126	-	-	-	-	-	1316
Consumptive Irrig. Water Req.	AF	3.6	28.9	33.0	10.0	38.5	20.7	17.4	5.3	-	-	-	-	-	157.4
Historical Crop CU	AF	0.3	22.8	31.7	9.8	36.9	18.5	15.1	4.6	-	-	-	-	-	139.6
Historical Crop CU	CFS	0.01	0.37	0.69	0.71	0.60	0.30	0.25	0.08	-	-	-	-	-	
Historical Stream Depletion															
Just Above McGowan Alt Pt Headga	AF	6	235	370	115	316	77	87	127	-5	0	0	0	0	1326
Just Above McGowan Alt Pt Headga	CFS	0.10	3.82	8.10	8.27	5.14	1.25	1.45	2.07	-0.09	0.00	0.00	0.00	0.00	
Downstream of All Returns	AF	2.4	60.0	53.9	8.9	26.5	-1.7	8.9	16.7	-5.3	0.0	0.0	0.0	0.0	170.2
Downstream of All Returns	CFS	0.04	0.98	1.18	0.64	0.43	-0.03	0.15	0.27	-0.09	0.00	0.00	0.00	0.00	
McGowan Irrigating Ditch with Historical Decreed Diversions Modified to Include June 24 - July 31 and Sept 1 - 30 Fallowing															
Decreed Headgate Diversions	AF	6	236	373	0	0	78	0	128	-	-	-	-	-	
Decreed Headgate Diversions	CFS	0.10	3.84	8.17	0.00	0.00	1.26	0.00	2.08	-	-	-	-	-	
Field Headgate Delivery	AF	6	232	365	0	0	76	0	126	-	-	-	-	-	805
Consumptive Irrig. Water Req.	AF	3.6	28.9	33.0	10.0	38.5	20.7	17.4	5.3	-	-	-	-	-	157.4
Crop CU	AF	0.3	22.8	31.7	9.6	29.2	7.8	4.9	4.3	-	-	-	-	-	110.6
Crop CU	CFS	0.01	0.37	0.69	0.69	0.47	0.13	0.08	0.07	-	-	-	-	-	
Modified Stream Depletion															
Just Above McGowan Alt Pt Headga	AF	6	235	370	0	0	77	0	127	-5	0	0	0	0	809
Just Above McGowan Alt Pt Headga	CFS	0.10	3.82	8.10	-0.01	0.00	1.25	0.00	2.07	-0.08	0.00	0.00	0.00	0.00	
Downstream of All Returns	AF	2.4	60.0	53.9	-16.5	-6.0	20.7	-2.8	30.7	-4.8	0.0	0.0	0.0	0.0	137.5
Downstream of All Returns	CFS	0.04	0.98	1.18	-1.19	-0.10	0.34	-0.05	0.50	-0.08	0.00	0.00	0.00	0.00	
Benefit to Stream of Shutting Off McGowan Irrigating Ditch Diversions between June 24 - July 31 and Sept 1 - 30[1]															
Reduction in Stream Depletion															
Immediately below McG Headgate	AF	0	0	0	116	319	0	87	0	-	-	-	-	-	522
Immediately below McG Headgate	CFS	0.00	0.00	0.00	8.35	5.19	0.00	1.47	0.00	-	-	-	-	-	
Just Above McGowan Alt Pt Headga	AF	0	0	0	115	316	0	87	0	0	0	0	0	0	517
Just Above McGowan Alt Pt Headga	CFS	0.00	0.00	0.00	8.29	5.14	0.00	1.46	0.00	-0.01	0.00	0.00	0.00	0.00	
Downstream of All Returns	AF	0.0	0.0	0.0	25.4	32.5	-22.4	11.7	-14.0	-0.5	0.0	0.0	0.0	0.0	32.7
Downstream of All Returns	CFS	0.00	0.00	0.00	1.83	0.53	-0.36	0.20	-0.23	-0.01	0.00	0.00	0.00	0.00	

[1]Equals historical stream depletion minus modified stream depletion

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TABLE 10
SUMMARY OF STREAM DEPLETION ANALYSIS
MCGOWAN IRRIGATING DITCH ALT PT
Averages for Years 2000-2020

	Units	Apr	May	Jun 1-23	Jun 24-30	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
McGowan Irrigating Ditch Alt Pt Historical Diversions															
Recorded Headgate Diversions	AF	1	140	255	65	138	56	27	11	-	-	-	-	-	693
Recorded Headgate Diversions	CFS	0.01	2.28	5.59	4.68	2.25	0.91	0.45	0.19	-	-	-	-	-	
McGowan Irrigating Ditch Alt Pt with Historical Decreed Diversions Throughout Irrigation Season															
Decreed Headgate Diversions	AF	1	100	159	44	106	51	27	11	-	-	-	-	-	499
Decreed Headgate Diversions	CFS	0.01	1.63	3.48	3.14	1.73	0.84	0.45	0.19	-	-	-	-	-	
Field Headgate Delivery	AF	1	100	159	44	106	51	27	11	-	-	-	-	-	499
Consumptive Irrig. Water Req.	AF	0.4	2.6	3.0	0.9	3.5	2.0	1.6	0.5	-	-	-	-	-	14.5
Historical Crop CU	AF	0.0	2.3	3.0	0.9	3.0	1.3	0.8	0.3	-	-	-	-	-	11.5
Historical Crop CU	CFS	0.00	0.04	0.07	0.06	0.05	0.02	0.01	0.00	-	-	-	-	-	
Historical Stream Depletion															
Downstream of All Returns	AF	0.2	8.7	9.0	-0.3	-1.6	-1.7	-0.9	-0.3	-0.5	0.0	0.0	0.0	0.0	12.4
Downstream of All Returns	CFS	0.00	0.14	0.20	-0.02	-0.03	-0.03	-0.01	-0.01	-0.01	0.00	0.00	0.00	0.00	
McGowan Irrigating Ditch Alt Pt with Historical Decreed Diversions Modified to Include June 24 - July 31 and Sept 1 - 30 Fallowing															
Decreed Headgate Diversions	AF	1	100	159	0	0	51	0	11	-	-	-	-	-	
Decreed Headgate Diversions	CFS	0.01	1.63	3.48	0.00	0.00	0.84	0.00	0.19	-	-	-	-	-	
Field Headgate Delivery	AF	1	100	159	0	0	51	0	11	-	-	-	-	-	323
Consumptive Irrig. Water Req.	AF	0.4	2.6	3.0	0.9	3.5	2.0	1.6	0.5	-	-	-	-	-	14.5
Crop CU	AF	0.0	2.3	3.0	0.9	1.6	0.8	0.6	0.3	-	-	-	-	-	9.4
Crop CU	CFS	0.00	0.04	0.07	0.06	0.03	0.01	0.01	0.00	-	-	-	-	-	
Modified Stream Depletion															
Downstream of All Returns	AF	0.2	8.7	9.0	-6.2	-3.8	4.0	-2.2	1.0	-0.5	0.0	0.0	0.0	0.0	10.2
Downstream of All Returns	CFS	0.00	0.14	0.20	-0.44	-0.06	0.06	-0.04	0.02	-0.01	0.00	0.00	0.00	0.00	
Benefit to Stream of Shutting Off McGowan Irrigating Ditch Alt Pt Diversions between June 24 - July 31 and Sept 1 - 30[1]															
Reduction in Stream Depletion															
Immed below Headgate McG Alt Pt	AF	0	0	0	44	106	0	27	0	-	-	-	-	-	177
Immed below Headgate McG Alt Pt	CFS	0.00	0.00	0.00	3.14	1.73	0.00	0.45	0.00	-	-	-	-	-	
Downstream of All Returns	AF	0.0	0.0	0.0	5.8	2.2	-5.7	1.3	-1.3	0.0	0.0	0.0	0.0	0.0	2.3
Downstream of All Returns	CFS	0.00	0.00	0.00	0.42	0.04	-0.09	0.02	-0.02	0.00	0.00	0.00	0.00	0.00	

[1]Equals historical stream depletion minus modified stream depletion

TABLE 11 TOMICHI CREEK INSTREAM FLOW SEGMENT – MARSHALL CREEK TO QUARTZ CREEK					
CASE NO.	**STREAM**	**SEGMENT**	**APPROP DATE**	**SEGMENT LENGTH**	**AMOUNT**
80CW132	Tomichi Creek	Segment 2 - Marshall Creek to Quartz Creek	3-17-1980	25.2	18 CFS (1/1 – 12/31)

Proposed Amount of Water Claimed for Instream Use

The cumulative amount of water that would be made available in Reach 1 immediately below each point of diversion for the subject ditches for temporary instream use under the Peterson Ranch instream flow lease program are as shown in Tables 2 and 3 under the heading, "Combined Benefit from All Ditches". The cumulative amount of water available below all points of return is the water that would be available for instream use in Reach 2.

Proposed Duration and/or Season of Use

The duration of the instream flow lease would run from June 24 through July 31 and September 1 through September 30. Estimates of the amounts of water that may be claimed for instream use are provided in Tables 2 and 3.

Dry-Year Operations

During very dry years such as 2002 and 2012 the subject ditches were not generally able to divert historically either due to physical shortage of water at the headgates or downstream calls which require water to bypass the headgates. One exception was the Cain Borsum Ditch in the dry year of 2012. The recorded diversions for the subject ditches in 2002 and 2012 are shown in Table 12.

During such years, the existence of a split season irrigation program would provide a much less than normal benefit to instream flows since most of the subject ditches would not be diverting regardless of the existence of a short-term instream flow lease.

A Summary of historical stream depletions that would be made available for instream flow use in a dry year such as 2012 is provided in Table 13.

TABLE 12 RECORDED DIVERSIONS FOR DRY YEARS 2002 & 2012				
Average Diversion Rate (cfs)	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
2002				
June 24-30	0	0	0	0
July	0	0	0	0
September	0	0.4	0	0
2012				
June 24-30	0	0.5	0	0
July	0	4.4	0	0
September	0	1.0	0	0

Replacement of Historical Return Flows

Implementation of the instream flow lease would reduce historical return flows to Tomichi Creek from the Peterson Ranch. Return flows would be reduced during the irrigation season when the lease is in effect, and until as long as November. The reduction in return flows would be more than offset, however, by the increase in stream flows resulting from reduced diversions at the headgate of the subject ditches in months during the irrigation season when the instream flow lease is operating. The net effect on Tomichi Creek streamflows of the reduction in diversions and return flows is presented in Tables 2 and 3. A positive number indicates a month in which streamflows below the point of return flows from the subject ditches will be increased as a result of the lease. A negative number indicates a month in which streamflows will be reduced below the point of returns as a result of the lease.

In months where a downstream water right holder would experience a water shortage as a result of a reduction in historical return flows, replacement of the historical return flow amounts may be required. The months in which replacement of historical return flows may be required in connection with the June 24 – July 31 lease are August, September and October. The months in which replacement of historical return flows may be required in connection with the September 1 – September 30 lease are October and November.

Tomichi Creek Downstream of the subject ditches and Mainstem Gunnison River

Water rights downstream of the subject ditches on Tomichi Creek and on the Gunnison River downstream of the Aspinall Unit have the potential to be affected by the proposed instream flow

lease. Replacement for shortages to these water rights could possibly be provided locally in the Tomichi Creek drainage, however, the potential for such replacement has not been investigated.

TABLE 13
BENEFITS TO TOMICHI CREEK
FALLOWING JUNE 24 - JULY 31 AND SEPT 1 - SEPT 30
DRY YEAR 2012

	Apr	May	Jun 1-23	Jun 24-30	Jul	Aug	Sep	Oct
Individual Ditches (cubic feet per second)								
Reduction in Stream Depletion Due to Fallowing								
Louis Ditch								
Immediately Below Louis Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Immediately Above CB Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Downstream of All Returns	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cain Borsum Ditch								
Immediately Below CB Headgate	0.0	0.0	0.0	0.5	4.4	0.0	1.0	0.0
Immediately Above McG Headgate	0.0	0.0	0.0	0.3	2.9	-0.5	0.6	-0.2
Downstream of All Returns	0.0	0.0	0.0	0.3	2.1	-0.8	0.4	-0.3
McGowan Irrigating Ditch								
Immediately Below McG Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Immediately Abv McG Alt Pt Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Downstream of All Returns	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McGowan Irrigating Ditch Alt Pt								
Immediately Blw McG Alt Pt Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Downstream of All Returns	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combined Benefit from All Ditches (cubic feet per second)								
Reduction in Stream Depletion Due to Fallowing								
Immediately Below Louis Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Immediately Above CB Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Immediately Below CB Headgate	0.0	0.0	0.0	0.5	4.4	0.0	1.0	0.0
Immediately Above McG Headgate	0.0	0.0	0.0	0.3	2.9	-0.5	0.6	-0.2
Immediately Below McG Headgate	0.0	0.0	0.0	0.3	2.9	-0.5	0.6	-0.2
Immediately Abv McG Alt Pt Headgate	0.0	0.0	0.0	0.3	2.9	-0.5	0.6	-0.2
Immediately Blw McG Alt Pt Headgate	0.0	0.0	0.0	0.3	2.9	-0.5	0.6	-0.2
Downstream of All Returns	0.0	0.0	0.0	0.3	2.1	-0.8	0.4	-0.3

Replacement for shortages to water rights downstream of the Aspinall Unit could be obtained by leasing water in Blue Mesa Reservoir.

Tomichi Creek Instream Flow Water Right

The Colorado Water Conservation Board's instream flow water right in Tomichi Creek would be affected by the instream flow lease. During the non-irrigation season, a depletion to the ISF water right is not expected to occur. During the month of August under a split-year lease, the

maximum depletion to the ISF is estimated to be 1.5 cfs. This amount is 8.3% of the 18 cfs ISF right. During the remaining months of the year, the ISF would be a direct beneficiary of the instream flow lease.

During the non-irrigation season, no shortages are expected to occur to water rights on Tomichi Creek or downstream.

Annual Stream Depletions

Implementation of the instream flow lease of water decreed in the subject ditches will not result in any increase in total annual stream depletions by the subject ditches. Under the instream flow lease, annual depletions to Tomichi Creek and the Gunnison River by the subject ditches will be reduced by an average of 96 acre-feet for the June 24 through July 31 lease and an average of 14 acre-feet for the September 1 through September 30 lease, which will provide a benefit to the Tomichi Creek ISF as well as to users downstream of the ISF segment.

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APPENDIX A

Stream Depletion Analysis for the
Peterson Ranch, Parlin, CO

Modeling Assumptions

September 9, 2021

Tyler Martineau, P.E. 427 Belleview Ave., Suite 206 Crested Butte, CO 81224 (970)275-8802

Modeling Assumptions

The following modeling assumptions were made in estimating the historical consumptive use and stream depletions for four irrigation ditches, the Louis Ditch, Cain Borsum Ditch, McGowan Irrigating Ditch and McGowan Irrigating Ditch Alternate Point.

- Number of irrigated acres modeled under each ditch:

Irrigated Areas (Acres)	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
Gross Irrigated Area (i.e., Outline of Irrigated Field)	36.1	118.6	80.2	9.8
Non-irrigated Areas: Old Stream Meanders, High Spots, etc. within the Gross Irrigated Area	0.0	9.9	10.5	3.6
Net Irrigated Area	36.1	108.7	69.7	6.2
Hayed Area	31.7	105.5	50.4	6.2

- NRCS soil series data:

Percent of Irrigated Field Area	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
Big Blue Loam	0%	6.4%	58.5%	1.6%
Gas Creek Sandy Loam	46.0%	18.8%	25.1%	32.7%
Gold Creek Silty Clay Loam	26.9%	6.6%	0%	0%
Irim Loam	27.1%	51.0%	12.5%	65.7%
Parlin-Hopkins Channery Loams	0%	14.7%	3.6%	0%
Gravel Pits	0%	2.5%	0%	0%
Stony Rock Land	0%	0%	0.2%	0%

- Soil Parameters for Individual Soils:

	Big Blue Loam	Gas Creek Sandy Loam	Gold Creek Silty Clay Loam	Irim Loam	Parlin Hopkins Channery Loams
Max Root Depth[1]	60 in	60 in	60 in	60 in	60 in
Depth to Water Table - Range during growing season[1]	0-36 in	0-36 in	12-24 in	0-36 in	Not available
Depth to Water Table Month of June[2]	25 cm	46 cm	46 cm	31 cm	200+ cm
Depth to Water Table Month of July[2]	25 cm	46 cm	46 cm	200+ cm	200+ cm
Depth to Water Table Month of August[2]	25 cm	46 cm	46 cm	200+ cm	200+ cm
Depth to Water Table Month of Sept[2]	25 cm	46 cm	46 cm	200+ cm	200+ cm
Depth to Water Table Month of Oct[2]	200+ cm	200+ cm	200+ cm	200+ cm	200+ cm
Soil Available Water Capacity. Average for soil depth of 60 inches[2]	0.16 in/in	0.05 in/in	0.13 in/in	0.10 in/in	0.10 in/in

[1]USDA Soil Conservation Service. Soil Survey of Gunnison Area, Colorado (1975)
[2]NRCS Web Soil Survey

- Average Soil Available Water Capacity: Estimated using the weighted average of soil available water capacities for the soil types present under each ditch:

Average Soil Available Water Capacity	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
60-inch Soil Depth	0.085 in/in	0.094 in/in	0.122 in/in	0.085 in/in

- Subirrigation from high water table: 0% of field area after June 23 in dry years. Soil survey reports from the USDA Soil Conservation Service (1975) indicate that the water table lies 12" to 24" below the surface for Gold Creek soils and 36" below the surface for Big Blue, Gas Creek and Irim soils for much of the irrigation season. However, the ranch owner indicates that his fields can be fully dried up in the summer. It is assumed in this analysis that the water table drops after spring stream flows have receded, and that after June 23 in dry years the water table will have dropped below the root zone.

- Annual Beginning Soil Moisture: At the beginning of irrigation each spring there is assumed to be no significant available soil moisture in the root zone. This is based upon

observations made by the ranch owner that the fields are dry at that time. Whatever soil moisture was carried over from the previous irrigation season or from winter precipitation appears to have been consumed or otherwise left the root zone by that time.

- Climate data: Gunnison 3SW weather station. Gaps in data for individual months were filled with long term average monthly data for the period 1970-2020.
- Gunnison weather station elevation: 7622 feet
- Mean temperature to begin growing season: 42°F
- Mean temperature to end growing season: 42°F
- Crop type: Grass pasture
- Consumptive use modeling method: Original Blaney-Criddle
- Blaney-Criddle crop coefficients: Denver Water High Altitude
- Effective precipitation: SCS TR-21 method
- Source of on-line diversion records: Colorado Decision Support System – CDSS Data & Tools – Structures – Diversion Records
- Period of record evaluated: 1970-2020 (except 2000-2020 for the McGowan Irrigating Ditch Alt Pt). No older record exists for the McGowan Irrigating Ditch Alt Pt.
- Conveyance Efficiency: Conveyance efficiency has been estimated using a weighted average of conveyance efficiencies for the soil types present in the ditches based upon conveyance efficiency curves as published by the USDA Soil Conservation Service in the Farm Irrigation Rating Index, Figure 8 (1991). This methodology was implemented in the South Platte Decision Support System (Leonard Rice Engineers, Inc., 2008).

Ditch Information	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
Ditch Length to Head of Field (feet)	1200	900	800	0
Soil Type	Irim Loam	Irim Loam	Gas Creek Sandy Loam	Gas Creek Sandy Loam
Conveyance Efficiency	97%	98%	98%	100%

- Method of irrigation: Flood
- Maximum irrigation application efficiency: 50%. Maximum irrigation application efficiency has been estimated based upon the potential efficiency for uncontrolled flood irrigation as published by the USDA Soil Conservation Service in the Farm Irrigation Rating Index, Table 3 (1991).
- Start and end irrigation dates: Start date is at the beginning of the irrigation season and shut off date is at the end of the season as recorded for each year in the diversion records of the Division of Water Resources.
- Short-term curtailment of irrigation while haying is underway has the potential to reduce crop consumptive use during the time of curtailment. This is taken into account in the model through use of the historical diversion record for the ditch, which includes periods of irrigation being shut off, which in turn reduces consumptive use. In the case of flood

irrigation with fallowing, the historical diversion record is used, except that all diversions between June 24 and July 31 and September 1 and September 30 are set to zero.

- Return flows from other irrigated lands and other sources of water which irrigate the subject lands – None
- Return flows to other irrigated lands (other than return flows which return to the stream and are rediverted) – None
- Modeling time step: Monthly except June 1 – 23 and June 24-30. A monthly time step has been used for the analysis because the historical diversion record does not show much day-to-day variation. It does not appear that running the analysis on a daily or weekly time step would materially increase the level of detail in the results. Recorded daily diversions have been reviewed to ensure that diversions are limited to decreed amounts for every day of the month and then summed to equal a monthly decreed diversion amount.
- Irrigation returns: 75% surface flow, 25% subsurface flow, based upon landowner's observations. Alternatively, the percentage of irrigation returns estimated to return to the stream as surface flow and as subsurface flow (deep percolation) for medium intake loam soils loam is 50% surface and 50% subsurface based upon information published by the USDA Soil Conservation Service in the Farm Irrigation Rating Index, Table 9 (1991).
- Modeling of delayed subsurface return flows: IDS AWAS "Glover" analysis. Model inputs: For all fields, transmissivity = 50,000 gpd/ft, specific yield = 0.15.

IDS AWAS Model Inputs	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
Average Distance from Middle of Field to the River - X (feet)	600	550	400	300
Alluvial Aquifer Width – W (feet)	1200	1100	800	1000

IDS AWAS Model Results: Lagged Return Flow Factors	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
Month 1	0.640	0.686	0.824	0.818
Month 2	0.326	0.295	0.175	0.176
Month 3	0.031	0.018	0.001	0.006
Month 4	0.003	0.001	0	0
Month 5	0	0	0	0

Lagged return flow factors for diversions made between June 1-23 and between June 24 – 30 were estimated running the IDS AWAS Model on a daily time step. The daily return flow factors were accumulated into return flow factors for the June 1-23 period and subsequent time steps, and into return flow factors for the June 24-30 time period and

subsequent time steps. The resulting return flow factors are presented in the tables below.

IDS AWAS Model Results: Lagged Return Flow Factors for Diversions Made Between June 1-23	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
June 1-23	0.562	0.611	0.770	0.770
June 24-30	0.190	0.190	0.163	0.133
July	0.225	0.188	0.067	0.094
August	0.021	0.011	0	0.003
September	0.002	0.001	0	0

IDS AWAS Model Results: Lagged Return Flow Factors for Diversions Made Between June 24-30	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
June 24-30	0.256	0.295	0.456	0.530
July	0.678	0.665	0.542	0.456
August	0.059	0.037	0.003	0.013
September	0.006	0.002	0	0
October	0.001	0	0	0

- Return flow percentages estimated at various points along Tomichi Creek:

Estimated Quantity of Returns Reaching the Stream above the Downstream Headgate	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
Returns from Louis Ditch	-	25%	100%	100%
Returns from Cain Borsum Ditch	-	-	67%	67%
Returns from McGowan Irrigating Ditch	-	-	-	1%

- The call record for the years 2000-2020 for Tomichi Creek and the Gunnison River maintained by the State Engineers Office is presented below. It can be found at: https://dwr.state.co.us/Tools/AdministrativeCalls/Historical

Call Record for 2000-2020 for Structures Upstream of Peterson Ranch on Tomichi Creek

Date Call Was Set	Date Call Was Released	Structure Name	Net Amount of Calling Right (cfs)	Other Abs Rights in Struct (cfs)	River Miles from confl Gunnison River	Admin Number	Priority Date	Ditch Priority Number
6/23/2012	8/12/2012	GOODRICH DITCH	5.2	26.79	29.64	11474	05/31/1881	17
6/20/2012	7/23/2012	COATS BROS DITCH	5	12.85	32.32	16192.10713	05/01/1894	40
6/8/2012	7/16/2012	S DAVIDSON AND CO DITCH	15.46	40	40.5	11110	06/01/1880	14
1/3/2008	1/3/2008	ARCH IRRIGATING DITCH	14.35	132.85	42.31	13879	12/31/1887	24
5/24/2002	8/1/2002	ARCH IRRIGATING DITCH	14.35	132.85	42.31	13879	12/31/1887	24
5/24/2002	9/12/2002	S DAVIDSON AND CO DITCH	15.46	40	40.5	11110	06/01/1880	14

Call Record for 2000-2020 for Structures Downstream of Peterson Ranch on Tomichi Creek

6/21/2012	6/27/2012	HANNAH J WINTERS NO 2D	3.8	8.29	22.86	16192.11505	05/01/1894	56
6/21/2002	9/25/2002	MCCANNE NO 1 DITCH	8.336	20.63	13.87	10957	12/31/1879	11
6/21/2002	9/25/2002	MCCANNE 2 DITCH	0	7.314	12.85	10957	12/31/1879	11
6/21/2002	9/25/2002	MCCANNE 3 DITCH	0	8.864	12	10957	12/31/1879	11
6/5/2002	8/25/2002	BIEBEL DITCHES NOS 1&2	8.94	37.054	9.77	9770	09/30/1876	1
6/5/2002	7/26/2002	GULLETT TOMICHI IRG D	8.3	30.7	8.11	11823	05/15/1882	19

Call Record for 2000-2020 for Structures Downstream of Peterson Ranch on Gunnison River								
4/11/2015	6/4/2015	HAGEN SPRING PIPELINE	0.05	0		46751.44299	12/31/1977	
7/10/2003	9/8/2003	GUNNISON TUNNEL & S CANAL	1175	0		20393.1875	11/1/1905	
4/22/2002	6/1/2002	REDLANDS POWER CANAL	670	180		22283.20313	1/4/1911	
4/18/2002	10/1/2002	GUNNISON TUNNEL & S CANAL	1175	0		20393.1875	11/1/1905	

APPENDIX B

Stream Depletion Analysis for the
Peterson Ranch, Parlin, CO

Explanation of Methodology, Terms and Calculations

September 9, 2021

Tyler Martineau, P.E. 427 Belleview Ave., Suite 206 Crested Butte, CO 81224 (970)275-8802

Explanation of Methodology, Terms and Calculations

Methodology

Historical Diversions

Monthly recorded diversions are presented as downloaded from the Colorado Division of Water Resources on-line database. Monthly diversions that fall within the limits of the water right decrees for each ditch have been estimated by reviewing daily recorded diversions, limiting them to decreed amounts for each day of the month, and then then summing the daily amounts to equal a monthly decreed diversion amount. Total diversions for June 1 – 23 and for June 24 -30 were obtained by summing up daily diversions separately for each of those time periods.

Historical Consumptive Use

Historical consumptive use for any given month has been estimated in this study by taking the lesser of the consumptive irrigation water requirement (the demand of the crop under a full water supply) or the amount of water historically available to the crop. Water available to the crop has been included from two sources: field headgate deliveries and water carried over in the root zone of the soil from previous months. Precipitation has also been taken into account, and has been done in a manner which reduces the consumptive irrigation water requirement as explained below.

The consumptive irrigation water requirement for the Peterson ditches was estimated using the StateCU consumptive use model developed as part of the Colorado Decision Support System by the State of Colorado. The model was operated on a monthly time step using the Original Blaney-Criddle method. The model provides a standard option for estimating irrigation water requirements for grass pasture above 6500 feet in elevation throughout the State using high altitude consumptive use coefficients recommended by Walter *et al.* (1990) for use by the Denver Water Board in South Park, Colorado. These are identified in the model as the Denver Water High Altitude Calibration Coefficients. These coefficients are very similar to coefficients developed for the Upper Gunnison Basin during local lysimeter studies carried out between 1999 and 2003 (Smith, Brummer and Temple, 2006 and Smith, 2008) and are, therefore, used in this evaluation.

The StateCU model calculates the crop potential evapotranspiration and then subtracts effective precipitation using historical precipitation records in order to estimate the consumptive irrigation water requirement. The method used by StateCU for estimating effective precipitation was the SCS TR-21 Method.

Consumptive use for June 1 -23 and June 24 – 30 was estimated by dividing the monthly consumptive use between the two time periods on a proportional basis.

Historical Depletions at the Field

In any given month, water supplied to a field is depleted for two purposes. First, water is used to meet as much as possible of the consumptive irrigation water requirement. Second, if any water is left over, it is used to fill the soil moisture reservoir in the crop root zone for use in a subsequent month. These field depletions reduce the amount of water that can return to the stream.

Soil Moisture Accounting

An evaluation of soil moisture storage is necessary because diversions into the soil moisture reservoir act as a depletion of the water supply delivered to the crop root zone and ultimately cause a depletion of water at the stream. It is also important because subsequent withdrawals from the soil moisture reservoir provide a portion of the water supply needed to satisfy the consumptive irrigation water requirement of the crop.

If the amount of diversions delivered to the root zone exceeds the amount going directly to crop consumptive use, the excess is treated as a diversion into the soil moisture reservoir for use in a later month (to the extent that unused capacity is available in the soil moisture reservoir). If the amount of diversions delivered to the root zone is less than the consumptive irrigation water requirement, the shortfall is made up from the soil moisture reservoir to the extent that water is available in the soil moisture reservoir from a prior month.

The capacity of the soil moisture reservoir was estimated based upon the number of irrigated acres on the field and upon data obtained from the Natural Resources Conservation Service including the average depth of the root zone and the soil moisture capacity of the soil.

Historical Depletions at the Stream

Diversions of water by the subject ditches have historically caused a depletion of the flow in Tomichi Creek downstream of the points of diversion. In the stretch of stream immediately below each point of diversion, the historical stream depletion is equal to the amount of water historically diverted at the headgate.

When water is diverted for irrigation, not all of the water is consumed. If the field is near the stream, some water returns to the stream as surface flow and some as subsurface flow. Downstream of the point of diversion, these return flows begin to come back to the stream. As one proceeds downstream of the headgate and the amounts of return flows increase until a point on the stream is reached where all return flows from the ditch have returned. In the case of the Peterson Ranch, there are multiple ditches diverting and subsequently providing return flows to the stream. The portion of the stream where diversions and return flows are taking place is identified in Figure 2 as Reach 1.

Below the point where all returns from irrigation come back to the stream there is some water that does not return. Included is water that is consumptively used by the plants being irrigated, and some that gets added to soil moisture storage. The stream depletion below the point of all

returns is equal to the amount diverted from the stream at the headgate less the surface and subsurface returns that flow back to the stream. The portion of the stream that lies downstream of all returns is identified in Figure 2 as Reach 2.

The irrigated fields are situated on an alluvial aquifer which is hydraulically connected to Tomichi Creek. Return flows from irrigation are estimated to return to Tomichi Creek as approximately 75% surface flow and 25% subsurface flow. Surface returns are assumed to return to Tomichi Creek in the same month in which the water was diverted. A portion of subsurface returns is delayed for a period of weeks or months due to the time it takes for water to flow through the aquifer underlying the field to reach the stream. The length of this delay depends on the distance of the field from the stream and the characteristics of the aquifer through which the water is flowing.

The delayed return flows have been estimated using the Integrated Decision Support Group's Alluvial Water Accounting System Model in modified mode. The modified mode of IDS AWAS incorporates the Analytical Stream Depletion Model developed by Dewayne R. Schroeder in 1987, which in turn implemented the modeling methodology commonly referred to as a "Glover" analysis. Model inputs are shown below: For the entire property Transmissivity = 50,000 gpd/ft. Specific yield = 0.15. No data as to site-specific transmissivity and specific yield is available for the Peterson Ranch. Therefore, basin-wide figures developed for use in the Upper Gunnison River Water Conservancy District's Aspinall Plan for Augmentation, which were approved in Case No. 03CW49 have been used.

"GLOVER" MODEL INPUTS				
IDS AWAS Model Inputs for Individual Fields	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
Average Distance from Middle of Field to the Stream - X (feet)	600	550	400	300
Alluvial Aquifer Width – W (feet)	1200	1100	800	1000

The lagged return flow factors obtained from the Glover Analysis carried out using a monthly time step for the subject ditches are shown below.

LAGGED RETURN FLOW FACTORS – PETERSON RANCH				
IDS AWAS Model Output for Individual Fields: Lagged Return Flow Factors	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
Month 1	0.640	0.686	0.824	0.818
Month 2	0.326	0.295	0.175	0.176
Month 3	0.031	0.018	0.001	0.006
Month 4	0.003	0.001	0	0
Month 5	0	0	0	0

The results for the Louis Ditch indicate, for example, that if one acre-foot of water enters the aquifer in month one, 0.640 acre-feet of water will return to the stream in that same month, 0.326 acre-feet will return to the stream in month two, 0.013 acre-feet will return in month three, and so forth. This is indicative of a relatively short lag time and a relatively rapid return of water to the stream.

Subsurface return flow factors were developed for June 1-23 and June 24-30 by conducting the Glover analysis using a daily time step. The daily return flow factors for returns entering the ground between June 1 and June 23 were then added to create a single return flow factor for June 1 – June 23, a single return flow factor for June 24 – 30, a single return flow factor for July, and so on. The daily return flow factors for returns entering the ground between June 24 and June 30 were then added to create a single return flow factor for June 24 – June 30, a single return flow factor for July, a single return flow factor for August, and so on.

Stream depletions below the point of return flow are equal to the diversion at the headgate less the surface returns and subsurface returns (some of which may be delayed). In a month in which diversions at the headgate are zero or near zero, it is possible that significant subsurface returns may come back to the stream from a prior month's irrigation. In this case, the depletion to the stream is negative, which is to say that the flow in the stream is higher downstream of the point of return than it is above the point of diversion. If downstream water users are dependent on this increased flow, then any change in water right which would cause an historical increase in stream flows to cease could cause injury to downstream water rights. In order to prevent injury to downstream rights, where the depletion to the stream has historically been negative, the delayed return flows may need to be replaced from some other water source.

Terms and Calculations

- Recorded Diversions: Diversion records downloaded as monthly volumes in acre-feet from the Colorado Division of Water Resources on-line diversion records database. Throughout this report where amounts are presented in tables in units of both acre-feet and cubic feet per second (cfs), the amounts in cfs have been computed by converting the monthly volume in acre-feet to an average monthly flow. This analysis does not supply output regarding flow rates on individual days of the month.
- Decreed diversions: Recorded daily diversions have been reviewed to ensure that diversions are limited to decreed amounts for every day of the month. Daily decreed diversions have then been then summed to equal a monthly decreed diversion amount.

Daily Limits on Decreed Diversions	Louis Ditch	Cain Borsum Ditch	McGowan Irrigating Ditch	McGowan Irrigating Ditch Alt Pt
Flow Rate in Cubic feet per second (cfs)	10.0	22.0	11.5	11.5
Volume accumulated (af) over 24 hours	19.835	43.637	22.81	22.81

- Farm Headgate Delivery. Decreed diversions x % ownership of ditch x conveyance efficiency.
- Field Headgate Delivery: Farm headgate delivery x % of owned water being used on fields to be fallowed.
- Root Zone Delivery: Field headgate delivery x irrigation application efficiency. Root zone delivery is the amount of water that reaches the root zone of the field and is entirely available to the crop or the soil moisture reservoir.
- Consumptive Irrigation Water Requirement: Estimated using the StateCU consumptive use model developed as part of the Colorado Decision Support System by the State of Colorado. Runs were made on a monthly time step. For the month of June, 23/30 of the monthly consumptive irrigation water requirement was allocated to the June 1-23 time step, and 7/30 of the June consumptive irrigation water requirement was allocated to the June 24-30 time step,
- Diversions Direct to Crop Consumptive Use: Lesser of consumptive irrigation water requirement or root zone delivery. Root zone delivery is used first to satisfy the consumptive irrigation water requirement prior to any being used to fill the soil moisture reservoir.
- Diversions to Soil Moisture Reservoir: Root zone delivery minus diversions direct to crop consumptive use up to a limit of the prior month's end of month unfilled soil moisture reservoir capacity. Occurs only if root zone delivery is greater than consumptive irrigation water requirement.
- Withdrawals from Soil Moisture Reservoir: Consumptive irrigation water requirement minus diversions direct to crop consumptive use up to a limit of the prior month's end-of-month storage in the soil moisture reservoir. Occurs only if root zone delivery is less than consumptive irrigation water requirement.

- End of Month Soil Moisture Storage: The prior month's end-of-month storage in the soil moisture reservoir + current month diversions to soil moisture reservoir – current month withdrawals from the soil moisture reservoir.
- Historical Crop Consumptive Use: Diversions direct to crop consumptive use + withdrawals from soil moisture reservoir.
- Field Depletion: Diversions direct to crop consumptive use + diversions to soil moisture reservoir.
- Returns from the Field: Field headgate delivery - field depletion.
- Surface Returns to Stream: % surface return flow x returns from the field. The % surface return flow is estimated based upon irrigator experience.
- Returns to Subsurface: % subsurface flow x return from the field + decreed diversions x % ditch loss x % of ditch loss returning to the stream. % Subsurface return flow is estimated based upon irrigator experience.
- Lagged Subsurface Returns to Stream: Returns to subsurface x lagged return flow factors.
- Historical Stream Depletion (downstream of all returns): (Field headgate delivery/ditch conveyance efficiency) - (surface returns to stream + lagged subsurface returns to stream).
- Historical Stream Depletion (at intermediate points on the stream): (Field headgate delivery/ditch conveyance efficiency) - (surface returns to stream + lagged subsurface returns to stream) x percent of surface and subsurface return flows that return above the intermediate point.

APPENDIX C

Stream Depletion Analysis for the
Peterson Ranch, Parlin, CO

Benefits to Tomichi Creek from June 24 – July 31 Fallowing
and from September 1 – 30 Fallowing when Implemented Separately

September 9, 2021

Tyler Martineau, P.E. 427 Belleview Ave., Suite 206 Crested Butte, CO 81224 (970)275-8802

TABLE C-1
BENEFITS TO TOMICHI CREEK
FALLOWING JUNE 24 - JULY 31
Averages for Years 1970-2020 (2000-2020 for McGowan Irrigating Ditch Alt Pt)

	Apr	May	Jun 1-23	Jun 24-30	Jul	Aug	Sep	Oct	Annual
Individual Ditches (acre-feet)									
Reduction in Stream Depletion Due to Fallowing									
Louis Ditch									
Immediately Below Louis Headgate	0	0	0	69	190	0	0	0	259
Immediately Above CB Headgate	0	0	0	56	148	-5	-1	0	199
Downstream of All Returns	0	0	0	18	22	-20	-3	0	17
Cain Borsum Ditch									
Immediately Below CB Headgate	0	0	0	178	419	0	0	0	597
Immediately Above McG Headgate	0	0	0	89	174	-29	-4	-1	229
Downstream of All Returns	0	0	0	45	54	-44	-6	-1	48
McGowan Irrigating Ditch									
Immediately Below McG Headgate	0	0	0	116	319	0	0	0	435
Immediately Abv McG Alt Pt Headgate	0	0	0	115	316	0	0	0	431
Downstream of All Returns	0	0	0	25	33	-22	-3	-3	29
McGowan Irrigating Ditch Alt Pt									
Immediately Blw McG Alt Pt Headgate	0	0	0	44	106	0	0	0	150
Downstream of All Returns	0	0	0	6	2	-6	0	0	2
Combined Benefit from All Ditches (acre-feet)									
Reduction in Stream Depletion Due to Fallowing									
Immediately Below Louis Headgate	0	0	0	69	190	0	0	0	259
Immediately Above CB Headgate	0	0	0	56	148	-5	-1	0	199
Immediately Below CB Headgate	0	0	0	234	567	-5	-1	0	795
Immediately Above McG Headgate	0	0	0	107	196	-50	-7	-1	246
Immediately Below McG Headgate	0	0	0	223	515	-50	-7	-1	681
Immediately Abv McG Alt Pt Headgate	0	0	0	222	512	-50	-7	-1	677
Immediately Blw McG Alt Pt Headgate	0	0	0	266	618	-50	-7	-1	826
Downstream of All Returns	0	0	0	95	110	-92	-12	-5	96

TABLE C-2
BENEFITS TO TOMICHI CREEK
FALLOWING JUNE 24 - JULY 31
Averages for Years 1970-2020 (2000-2020 for McGowan Irrigating Ditch Alt Pt)

	Apr	May	Jun 1-23	Jun 24-30	Jul	Aug	Sep	Oct
Individual Ditches (cubic feet per second)								
Reduction in Stream Depletion Due to Fallowing								
Louis Ditch								
Immediately Below Louis Headgate	0.0	0.0	0.0	5.0	3.1	0.0	0.0	0.0
Immediately Above CB Headgate	0.0	0.0	0.0	4.0	2.4	-0.1	0.0	0.0
Downstream of All Returns	0.0	0.0	0.0	1.3	0.4	-0.3	0.0	0.0
Cain Borsum Ditch								
Immediately Below CB Headgate	0.0	0.0	0.0	12.8	6.8	0.0	0.0	0.0
Immediately Above McG Headgate	0.0	0.0	0.0	6.4	2.8	-0.5	-0.1	0.0
Downstream of All Returns	0.0	0.0	0.0	3.3	0.9	-0.7	-0.1	0.0
McGowan Irrigating Ditch								
Immediately Below McG Headgate	0.0	0.0	0.0	8.4	5.2	0.0	0.0	0.0
Immediately Abv McG Alt Pt Headgate	0.0	0.0	0.0	8.3	5.1	0.0	0.0	0.0
Downstream of All Returns	0.0	0.0	0.0	1.8	0.5	-0.4	-0.1	-0.1
McGowan Irrigating Ditch Alt Pt								
Immediately Blw McG Alt Pt Headgate	0.0	0.0	0.0	3.1	1.7	0.0	0.0	0.0
Downstream of All Returns	0.0	0.0	0.0	0.4	0.0	-0.1	0.0	0.0
Combined Benefit from All Ditches (cubic feet per second)								
Reduction in Stream Depletion Due to Fallowing								
Immediately Below Louis Headgate	0.0	0.0	0.0	5.0	3.1	0.0	0.0	0.0
Immediately Above CB Headgate	0.0	0.0	0.0	4.0	2.4	-0.1	0.0	0.0
Immediately Below CB Headgate	0.0	0.0	0.0	16.8	9.2	-0.1	0.0	0.0
Immediately Above McG Headgate	0.0	0.0	0.0	7.7	3.2	-0.8	-0.1	0.0
Immediately Below McG Headgate	0.0	0.0	0.0	16.1	8.4	-0.8	-0.1	0.0
Immediately Abv McG Alt Pt Headgate	0.0	0.0	0.0	16.0	8.3	-0.8	-0.1	0.0
Immediately Blw McG Alt Pt Headgate	0.0	0.0	0.0	19.1	10.1	-0.8	-0.1	0.0
Downstream of All Returns	0.0	0.0	0.0	6.8	1.8	-1.5	-0.2	-0.1

TABLE C-3
BENEFITS TO TOMICHI CREEK
FALLOWING SEPT 1 - SEPT 30
Averages for Years 1970-2020 (2000-2020 for McGowan Irrigating Ditch Alt Pt)

	Apr	May	Jun 1-23	Jun 24-30	Jul	Aug	Sep	Oct	Annual
Individual Ditches (acre-feet)									
Reduction in Stream Depletion Due to Fallowing									
Louis Ditch									
Immediately Below Louis Headgate	0	0	0	0	0	0	55	0	55
Immediately Above CB Headgate	0	0	0	0	0	0	44	-2	42
Downstream of All Returns	0	0	0	0	0	0	9	-7	2
Cain Borsum Ditch									
Immediately Below CB Headgate	0	0	0	0	0	0	78	0	78
Immediately Above McG Headgate	0	0	0	0	0	0	41	-8	32
Downstream of All Returns	0	0	0	0	0	0	22	-12	10
McGowan Irrigating Ditch									
Immediately Below McG Headgate	0	0	0	0	0	0	87	0	87
Immediately Abv McG Alt Pt Headgate	0	0	0	0	0	0	87	0	87
Downstream of All Returns	0	0	0	0	0	0	12	-10	2
McGowan Irrigating Ditch Alt Pt									
Immediately Blw McG Alt Pt Headgate	0	0	0	0	0	0	27	0	27
Downstream of All Returns	0	0	0	0	0	0	2	-1	0
Combined Benefit from All Ditches (acre-feet)									
Reduction in Stream Depletion Due to Fallowing									
Immediately Below Louis Headgate	0	0	0	0	0	0	55	0	55
Immediately Above CB Headgate	0	0	0	0	0	0	44	-2	42
Immediately Below CB Headgate	0	0	0	0	0	0	122	-2	121
Immediately Above McG Headgate	0	0	0	0	0	0	50	-15	35
Immediately Below McG Headgate	0	0	0	0	0	0	137	-15	122
Immediately Abv McG Alt Pt Headgate	0	0	0	0	0	0	137	-16	121
Immediately Blw McG Alt Pt Headgate	0	0	0	0	0	0	163	-16	148
Downstream of All Returns	0	0	0	0	0	0	45	-31	14

TABLE C-4
BENEFITS TO TOMICHI CREEK
FALLOWING SEPT 1 - SEPT 30
Averages for Years 1970-2020 (2000-2020 for McGowan Irrigating Ditch Alt Pt)

	Apr	May	Jun 1-23	Jun 24-30	Jul	Aug	Sep	Oct
Individual Ditches (cubic feet per second)								
Reduction in Stream Depletion Due to Fallowing								
Louis Ditch								
Immediately Below Louis Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Immediately Above CB Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0
Downstream of All Returns	0.0	0.0	0.0	0.0	0.0	0.0	0.2	-0.1
Cain Borsum Ditch								
Immediately Below CB Headgate	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0
Immediately Above McG Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.7	-0.1
Downstream of All Returns	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-0.2
McGowan Irrigating Ditch								
Immediately Below McG Headgate	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0
Immediately Abv McG Alt Pt Headgate	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0
Downstream of All Returns	0.0	0.0	0.0	0.0	0.0	0.0	0.2	-0.2
McGowan Irrigating Ditch Alt Pt								
Immediately Blw McG Alt Pt Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
Downstream of All Returns	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combined Benefit from All Ditches (cubic feet per second)								
Reduction in Stream Depletion Due to Fallowing								
Immediately Below Louis Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Immediately Above CB Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0
Immediately Below CB Headgate	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0
Immediately Above McG Headgate	0.0	0.0	0.0	0.0	0.0	0.0	0.8	-0.3
Immediately Below McG Headgate	0.0	0.0	0.0	0.0	0.0	0.0	2.3	-0.3
Immediately Abv McG Alt Pt Headgate	0.0	0.0	0.0	0.0	0.0	0.0	2.3	-0.3
Immediately Blw McG Alt Pt Headgate	0.0	0.0	0.0	0.0	0.0	0.0	2.7	-0.3
Downstream of All Returns	0.0	0.0	0.0	0.0	0.0	0.0	0.8	-0.5

Exhibit G
Agenda Item 19a
November 17, 2022

DRAFT DATE: 10/26/2022

[_____ ___, ____]

Kevin Rein
State Engineer
Colorado Division of Water Resources
1313 Sherman Street, Room 718
Denver, CO 80203
DWRpermitsonline@state.co.us
Kevin.Rein@state.co.us

Bob Hurford
Division Engineer, Water Division 4
Colorado Division of Water Resources
P.O. Box 456
Montrose, CO 81402
Bob.Hurford@state.co.us

Sent via email to Kevin.Rein@state.co.us, DWRpermitsonline@state.co.us & Bob.Hurford@state.co.us

RE: Request for Approval of Temporary Lease of Water Rights to the CWCB for Instream Flow Use on Tomichi Creek, Division 4, Gunnison County.

Dear State Engineer Rein and Division Engineer Hurford:

Peterson Ranch, Inc. and Razor Creek Ranch, LLC (together, "Peterson Ranch") in collaboration with the Colorado Water Trust (CWT) hereby request approval of a temporary lease of water to the Colorado Water Conservation Board (CWCB) for instream flow purposes pursuant to § C.R.S. 37-83-105.

1. Overview of Proposed Lease

Peterson Ranch and CWT (together, "Applicants") request approval to temporarily lease water decreed for irrigation and stock uses from four ditches diverting from Tomichi Creek, tributary to the Gunnison River in Gunnison County, Colorado. The ditches are the Louis Ditch, Cain Borsum Ditch, McGowan Irrigating Ditch, and the McGowan Irrigating Ditch Alternate Point and each ditch is decreed multiple water rights (individually, "Water Rights"; collectively, "Water Rights"). The Water Rights are described in more detail in Table 1, below, and relevant Decrees attached hereto as Exhibits A - C.

Draft date: 10/26/22

NAME SOURCE	PRIORITY NO. ADMIN NO.	DECREED AMOUNT	ADJUD DATE	APPROP DATE	DECREE	RIVER MILE	ACREAGE CITED IN DECREE
Louis Ditch	#185 24227.00000	1.6 cfs	1918-09-03	1916-05-01	CA1602	27.36	80
Louis Ditch	#307 28311.24025	7.5 cfs	1943-04-19	1915-10-12	CA2079		none
Louis Ditch	#na 55517.41412	0.9 cfs	2002-12-31	1963-05-20	02CW0254A		80 Supp
Subtotal		10.0 cfs					
(**Exhibit A**)							
Cain Borsum Ditch	#49 16192.11110	2.44 cfs	1904-04-29	1880-06-01	CA1266	26.64	182
Cain Borsum Ditch	#94 16192.13666	1.2 cfs	1904-04-29	1887-06-01	CA1266		182
Cain Borsum Ditch	#217 28311.11110	9.76 cfs	1943-04-19	1880-06-01	CA2079		220
Cain Borsum Ditch	#252 28311.13666	8.6 cfs	1943-04-19	1887-06-01	CA2079		220
Subtotal		22.0 cfs					
(**Exhibit B**)							
McGowan Irrig Ditch and McGowan Irrig Ditch Alt Pt	#60 16192.11809	2.2 cfs	1904-04-29	1882-05-01	CA1266 99CW52	McG 24.82 McG Alt Pt 24.83	110 Acres South Side
McGowan Irrig Ditch and McGowan Irrig Ditch Alt Pt	#224 28311.11809	8.8 cfs	1943-04-19	1882-05-01	CA2079 99CW52		110 Acres South Side
McGowan Irrig Ditch and McGowan Irrig Ditch Alt Pt	#na 55517.41412	0.5 cfs	2002-12-31	1963-05-20	02CW254		115 Supp
Subtotal		11.5 cfs					
(**Exhibit C**)							
Total		43.5 cfs					

Table 1. Water Rights Proposed for Instream Flow Lease.

The Water Rights are proposed to be leased ("Proposed Lease") to the CWCB to supplement the instream flow water right on Tomichi Creek decreed in Case No. 80CW132 ("Tomichi Creek ISF"). The Tomichi Creek ISF Decree is attached hereto as **Exhibit D**. The Water Rights are proposed to supplement flow in the Tomichi Creek ISF up to the flow rate necessary to preserve the natural environment to a reasonable degree. See, C.R.S. § 37-83-105(1)(b)(I). The Tomichi Creek ISF is more specifically described in Table 2 and the decreed reaches are shown in Figure 1, both set forth below.

Case No.	Stream	Segment	Appropriation Date	Segment Length	Amount
80CW132	Tomichi Creek	Segment 2 - Marshall Creek to Quartz Creek	3-17-1980	25.2	18 CFS (1/1 – 12/31)

Table 2. Tomichi Creek Instream Flow Segment-Marshall Creek to Quartz Creek.

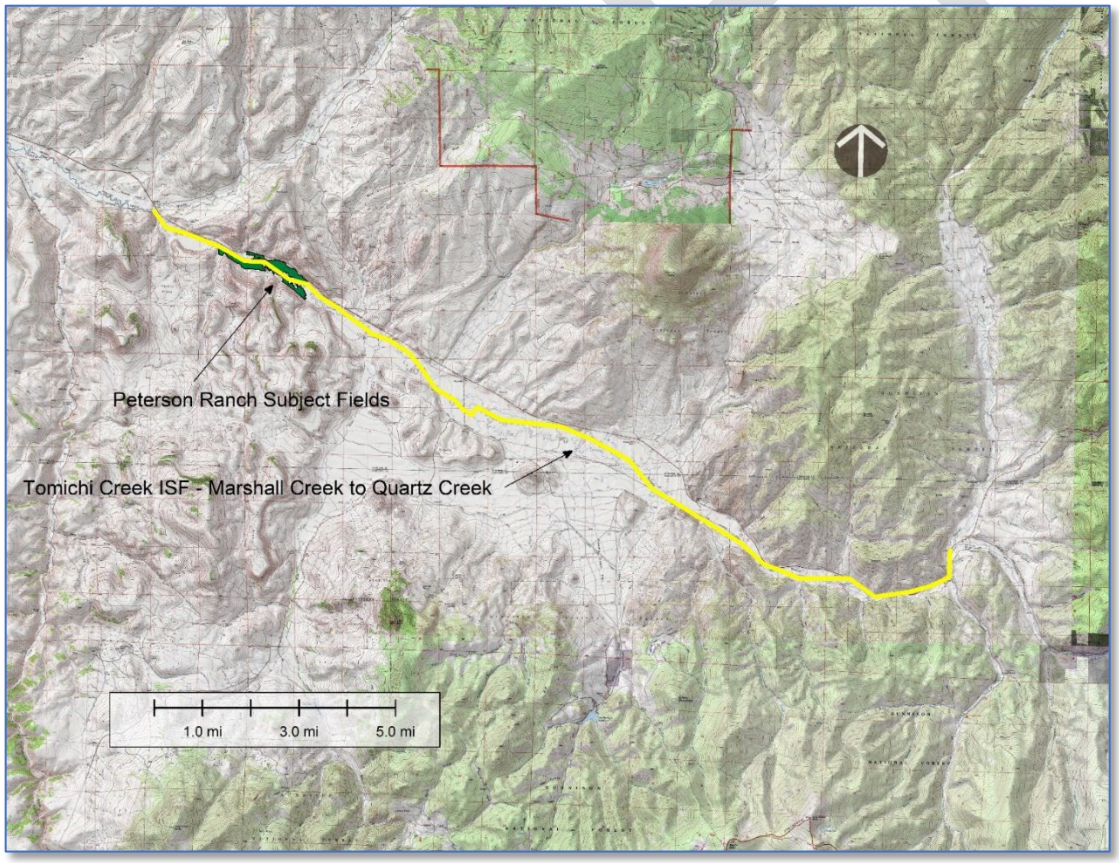

Figure 1. General Project Location and Tomichi Creek ISF Reach.

Annual spring runoff from the Tomichi Creek basin typically occurs quickly. Streamflow peaks at the end of May and reaches summertime lows in July. Flood irrigation typically peaks in July before irrigators shut-off in August to dry their fields for haying. Limited irrigation resumes in September once the hay crop has been harvested.

The combination of low summer flows and peak irrigation withdrawals during dry years can lead to extremely low flows and dry-up locations in Tomichi Creek, particularly through the Petersons Ranch's property, which sits downstream from several large diversions. High temperatures, low dissolved oxygen, and loss of habitat associated with low flows and dry-ups, negatively impact aquatic habitat in Tomichi Creek, including the sport trout fishery.

Typically, by late July or early August, most water users have turned off their irrigation to dry the fields for hay cutting, which helps flows to rebound to healthier levels throughout the length of Tomichi Creek and its tributaries. Typically, summer monsoon moisture is also increasing during this period to further boost flows in August.

The Proposed Lease will utilize split season operations, designed to boost flows in Tomichi Creek ISF at times when Tomichi Creek is most impacted by low flows, but still allow irrigation use when the stream is less impacted. When the Proposed Lease is operated, diversions by the Water Rights will be shut off and the water will be used to meet all or part of the Tomichi Creek ISF during one or both of the following periods: June 25 through July 31, and/or September 1 through September 30. When the water is not being used for instream flow, irrigation diversions will resume use to preserve agricultural production.

Water Resource Engineer, Tyler Martineau, prepared a report dated September 9, 2021 ("Engineering Report") that summarizes the historic diversions, historic consumptive use, and return flow patterns associated with the Water Rights and operation of the Proposed Lease. The Engineering Report is attached hereto as **Exhibit E**. This application utilizes the tables, figures, and text from the Engineering Report and should be referenced for greater detail on the content of this request.

2. Legal Right to Use Water

Peterson Ranch owns the Water Rights, and as such, possess the legal right to use the water subject to the Water Rights pursuant to their Decrees (see, **Exhibits A - C**).

Peterson Ranch and CWT have negotiated a Draft Temporary Water Lease Agreement ("Draft Peterson Ranch-CWT Agreement") providing terms under which the Water Rights may be leased for use in the Tomichi Creek ISF and for Peterson Ranch to receive compensation from CWT for such use. In addition, CWT and CWCB have negotiated a corresponding Draft Temporary Water Lease Subcontract ("Draft CWT-CWCB Agreement") providing the terms under which the Water Rights will be used in the Tomichi Creek ISF by the CWCB and payments remitted to CWT to fully offset payments made by CWT to Peterson Ranch. The Draft Peterson Ranch-CWT Agreement and Draft CWT-CWCB Agreement are attached hereto as Exhibits F and G, respectively.

The Water Rights are also subject to two Conservation Easements held by the Colorado Cattleman's Agricultural Land Trust (CCALT). CCALT has reviewed the Proposed Lease and considers operation of the Proposed Lease to be consistent with the terms of the Conservation Easements provided that it be operated in no more than 3 years out of the total 10-year approval period, with an option to permit an additional 2 years of operation upon review of the impacts on the conservation values from operation in the prior 3 years of operation. A letter from CCALT dated January 21, 2022 is attached hereto as Exhibit H.

3. Duration of Lease

Pursuant to C.R.S. § 37-83-105(2)(a)(IV)(A), the Proposed Lease will become effective for a period of 10-years beginning upon the State Engineer's approval thereof. Within the 10-year approval period, the Proposed Lease may be operated for no more than 5-years ("Operational Years") and no more than 3 of such Operational Years may be consecutive. C.R.S. § 37-83-105(2)(a)(IV)(A). During Operational Years, the Proposed Lease will be limited to a total of no more 120-days in a single calendar year. C.R.S. § 37-83-105(2)(a).

This Proposed Lease shall also be subject to the limitations set forth In Section 2, above, relative to the CCALT Conservation Easement and Section 5, below, pertaining to operation pursuant to the Draft Peterson Ranch-CWT Agreement.

4. Description of Subject Water Rights

The Water Rights are decreed for irrigation and stock uses. Historically, these rights irrigated approximately 220-acres of grass hay pastures located on the right and left banks of Tomichi

Creek. Points of diversion locations and irrigated lands are set forth in Table 3 and identified in Figure 2, both below.

4.1. Original Point of Diversion

The original points of diversion are the Water Rights' decreed headgate locations, which are set forth in Table 3, below.

Irrigation Ditch	Location as Described in Decree
Louis Ditch	SE1/4SE1/4SW1/4 of Section 29, Township 49 North, Range 3 East, N.M.P.M. at a point 534 feet from the north line and 2280 feet from the west section line of said Section 29.
Cain Borsum Ditch	Cain Ditch - North bank of Tomichi Creek at a point whence the NE comer of Section 30, Township 49 North, Range 3 East, N.M.P.M. bears North 31° West 3,432 feet. Borsum Ditch – At a point whence the NE corner of Section 30, Township 49 North, Range 3 East bears North 35° East 1,650 feet. The headgates are connected as one ditch.
McGowan Irrigating Ditch	South bank of Tomichi Creek at a point whence the NE comer of Section 30, Township 49 North, Range 3 East, N.M.P.M. bears North 62°12' East 3,157 feet.
McGowan Irrigating Ditch Alt Pt	North bank of Tomichi Creek at a point in the SW1/4SW1/4NE1/4 Section 30, Township 49 North, Range 3 East, N.M.P.M. at a point approximately 1250 feet from the north line and 2,400 feet from the east line of said Section 30

Table 3. Water Rights' Decreed Headgate Locations.

The location of the original points of diversion for the Water Rights is also depicted in Figure 2, below.

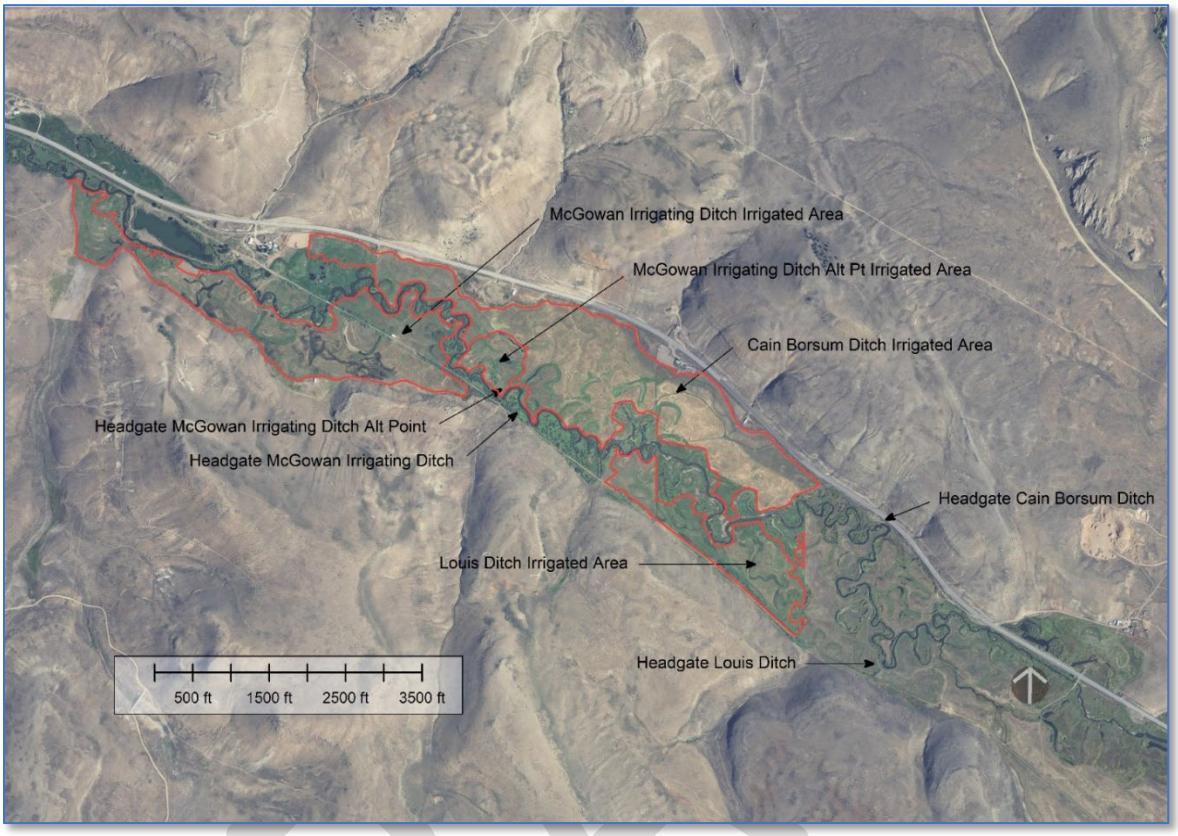

Figure 2. Water Rights' points of diversion headgate locations and irrigated acres.

4.2. Time, Place, and Types of Use of the Leased Water Right

The land irrigated by the Water Rights is located on Tomichi Creek approximately 14 highway miles east of the City of Gunnison, in Gunnison County, Colorado. More specifically, the irrigated land is located in Sections 19, 29, and 30, Township 49N, Range 3E, NMPM and Sections 24 and 25, Township 49N, Range 2E, NMPM.

On an annual basis, the Water Rights are used for irrigation between April and October and diversions are generally most active during two periods. The first period starts in the Spring and ends within a few weeks before or after the first of August, which is prior to the single annual cutting of hay. The second period occurs after the cutting of hay and lasts into the fall for the purpose of regrowing hay for use as pasture in the fall and winter. During hay harvest, diversions are shut off and the fields are dried out for a period of 2 to 4 weeks.

The acreage located within the perimeter boundary of the parcels irrigated by the Water Rights totals 244.7 acres. However, within this acreage there are approximately 24.0 acres of old stream meanders and dry areas that do not receive active irrigation by the Water Rights. Accordingly, the net number of acres irrigated by the Water Rights is calculated to be 220.7 acres.

4.3. Return Flow Pattern

Under historic use conditions, irrigation water that is not consumed returns as either surface runoff or subsurface return flow, which return in the same month as diversion or as lagged groundwater return flows that accrue to Tomichi Creek in the months following the diversion. All return flows from the irrigated acres return to Tomichi Creek downstream of the diversion point. It is important to note that all return flows accrue upstream of the location of the Hannah J. Winters No. 2 Ditch ("Hannah J. Ditch"; RM 22.86), which is the next diversion downstream of Peterson Ranch's property.

5. Description of Use of Leased Water Right: New Points of Diversion, Return Flow Pattern, Stream Reach, and Time, Place, and Types of Use of the Loaned Water Right

In Operative Years, the Water Rights will be used with split season operations to allow for both irrigation and use in the Tomichi Creek ISF. The procedure governing operation of the split season arrangement is set forth in the Draft Peterson Ranch-CWT Agreement (**Exhibit F**) and Draft CWT-CWCB Agreement (**Exhibit G**).

In general, operation of the Proposed Lease will proceed as follows:

- No later than [**April 15**], the CWCB will determine whether the Water Rights may be used in the Tomichi Creek ISF that coming season and by [**May 1**], Peterson Ranch will decide whether to operate the Proposed Lease. If the parties decide to proceed with operation, that year shall be considered an Operative Year subject to the limitations set forth in Section 3, above.
- In an Operative Year, irrigation may be suspended for 37-days in or around June and July and/or 30-days in or around September, which are referred to as "Operative Windows."

- Within the Operative Windows, the Water Rights will be used in the Tomichi Creek ISF up to the decreed flow rate of 18 cfs. Outside of the Operative Windows, the Water Rights will be used consistent with their decrees.

The Engineering Report analyzed the full diversion record from 1970 to 2021 to compute the historic diversion rates of the Water Rights. Table 4, below, summarizes the average historic diversions for each Water Right.

	June 24-30	July	Aug	Sep	Oct
Louis Ditch	5.0	3.1	1.1	0.9	0.49
Cain Borsum Ditch	12.4	6.8	1.8	1.3	1.2
McGowan Irrigating Ditch	8.4	5.2	1.3	1.5	2.1
McGowan Irrigating Ditch Alt Pt	3.1	1.7	0.8	0.5	0.2
* Adapted from Tables 6, 7, 8, and 9 of the Engineering Report.					

Table 4. Average Historical Diversions of the Water Rights.

Because there are multiple diversions and return flow points associated with the Proposed Lease, there are two reaches where the Proposed Lease will benefit the Tomichi Creek ISF.

The first reach is the "Diversion Reach," which benefits from a combination of the Water Rights historically diverted and the conserved consumptive use. More specifically, when the proposed Lease is being operated, for each of the Water Rights, the Tomichi Creek ISF will benefit from the historic diversion amount between the historic point of diversion and the historic point of return flow. The Diversion Reach begins at the Louis Ditch headgate (RM 27.36) and extends 4.5 miles downstream to the point of historic return flow for the McGowan Ditch, which is immediately upstream of the Hannah J. Ditch (RM 22.86).

The second reach, or the "Return Flow Reach," is downstream of accrual of the historic return flow of all four Water Rights. The Return Flow reach benefits from the historic consumptive use (HCU) generated by the Water Rights when the Proposed Lease is operated. The Return Flow Reach extends from above the Hannah J. Ditch downstream 2.4 miles to the end of the Tomichi Creek ISF at the confluence of Quartz Creek near the town of Parlin. Figure 3, below, shows the location of the two Reaches.

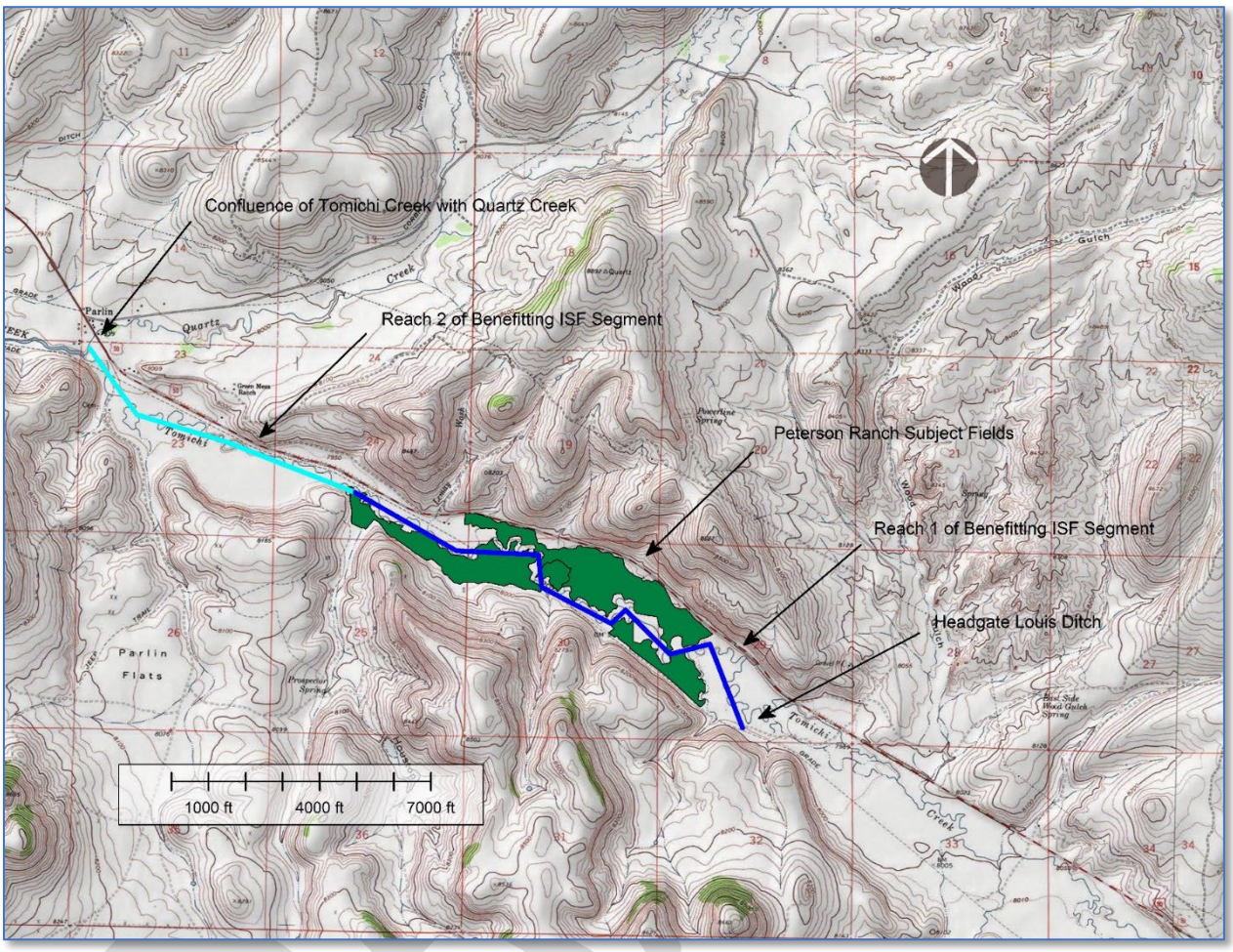

Figure 3. Location of reaches benefitting from the Proposed Lease. The "Diversion Reach" is in dark blue and the "Return Flow Reach" is in light blue.

6. Historic Consumptive Use

Using standard methods and practices, Water Engineer, Tyler Martineau, P.E., analyzed historic diversions and modeled HCU by the Water Rights over the period of record from 1970 - 2021. Mr. Martineau also modeled the amount, timing, and location of return flows to Tomichi Creek. Using this data, Mr. Martineau was able to compute both the historic net stream depletions and the potential streamflow benefits of the Proposed Lease's operational scenarios. The results of Mr. Martineau's analysis are set forth in the Engineering Report (**Exhibit E**).

Results in the Engineering Report compare the historical stream depletions associated with full season irrigation and the stream depletions associated with the Proposed Lease's operations. The difference between these two scenarios is the average potential streamflow benefit available to the Tomichi Creek ISF due to operation of the Proposed Lease. The combined benefit of all four of the Water Rights, downstream of all historic return flow locations, is the HCU available for instream flow use in Return Flow Reach. These results are set forth in Table 5, below.

In addition to the flow increases in the Diversion Reach noted above, Proposed Lease operations provide benefit to instream flows in the 2.4-mile Return Flow Reach. While not legally protected in-channel, flow benefits will likely continue further downstream when irrigation use is at its highest and the stream is most impacted by low flows. Downstream of the end of the Return Flow Reach at the confluence of Tomichi Creek with Quartz Creek, the HCU is available for reuse by other water users or may continue to the confluence with the Gunnison River.

	Jun 1-23	June 24-30	July	Aug	Sep	Oct
July and Sept Operational Windows	0	6.7	1.8	-1.5	0.7	-0.6
July Window Only	0	6.7	1.8	-1.5	-0.2	-0.1
September Window Only	0	0	0	0	0.8	-0.5
* Adapted from Tables 3, C2, and C4 of the Engineering Report.						

Table 5. Historical Net Stream Depletions Available for ISF use (cfs).

Modeling results show that Proposed Lease's operations may cause changes to the return flow patterns in the months following the Operational Windows after the Water Rights may resume irrigation (i.e., August and October). This is caused by a reduction in lagged return flows that would typically accrue under historic irrigation patterns in July and September. Potential injury to each category of downstream water right is discussed in more detail below.

6.1. Potential Injury to Senior Water Rights' Diversions

This project is designed to operate within the prior appropriation system. As such, any downstream senior water rights' diversion that experiences a shortage can place a call that will cause administration of some or all of the Water Rights. A list of the diversion structures and

average use downstream from the Peterson Ranch to the confluence with Cochetopa Creek is provided in Table 6. Examination of Table 4 shows that administration of the Water Rights by downstream senior diverters could yield an average of 3.2 to 5.0 cfs during August and 2.8 to 3.3 cfs in October. Due to their ability to place a non-futile call, operation of the Proposed Lease should not result in injury to downstream senior water rights diverters.

Water Right Name	Priority	River Mile	Distance DS	Decreed Amount (cfs)	Average Aug Diversion (cfs)	Years with August Irrigation	Average # of Days	Average October Diversion (cfs)	Years with October Irrigation	Average # of Days
Hannah J Winters No 2	56	22.86	0.04	3.8	3.6	47%	7.5	1.6	22%	8
	223			8.29						
Quartz Creek					28			20		
Lobdell No 2	173	19.9	3	0.7	1.5	39%	9	1.2	25%	6
	296			0.8						
Elsen Vader	34	18.26	4.64	5.5	4.4	56%	9	1.5	21%	5
	202			10.25						
Vader Rausis	33	16.88	6.02	2	3.4	47%	8	2.6	40%	8
	201			3.75						
Jennings Elsen	22	16.12	6.78	3.09	0.54	19%	4	1.9	14%	3
	82			0.1						
	128+			3.6						
			Total Average Diversion		9.8			7.2		

Table 6. Downstream diversion structures and average diversions during August and October. Quartz Creek and its average dry year inflows is shown in blue downstream of the Hannah J. Ditch.

6.2. Potential Injury to Junior Water Rights' Diversions

Consistent with operation under the prior appropriation system, downstream junior water rights' diversions do not have the ability to place a call upon the Water Rights. However, decreased demand and increased flow during the deficit periods and the and location of downstream diversions limits the potential for injury to junior diverters. First, the timing limits potential injury because of decreased demand and increased streamflow on the Tomichi Creek system during the months of August and October. Typically, most irrigators on Tomichi Creek turn off irrigation in late July or early August to dry the fields enough to run heavy equipment for mowing/bailing. Moreover, records show that use October use is rare, short, and the diversion rates are low because users have either finished irrigation for the season or are running small amounts of stock water (see, Table 6).

Second, system-wide increases in streamflow minimize the risk of potential injury to downstream junior diverters. The system-wide dry-out in in August greatly reduces irrigation demand while also increasing flows. When headgates are turned off, the previously diverted water along with lagged return flows from June/July irrigation accrue to the stream, sharply boosting streamflow throughout the system. In addition, monsoon moisture in late summer and fall precipitation in October can also significantly boost flows (see, Figure 4, below).

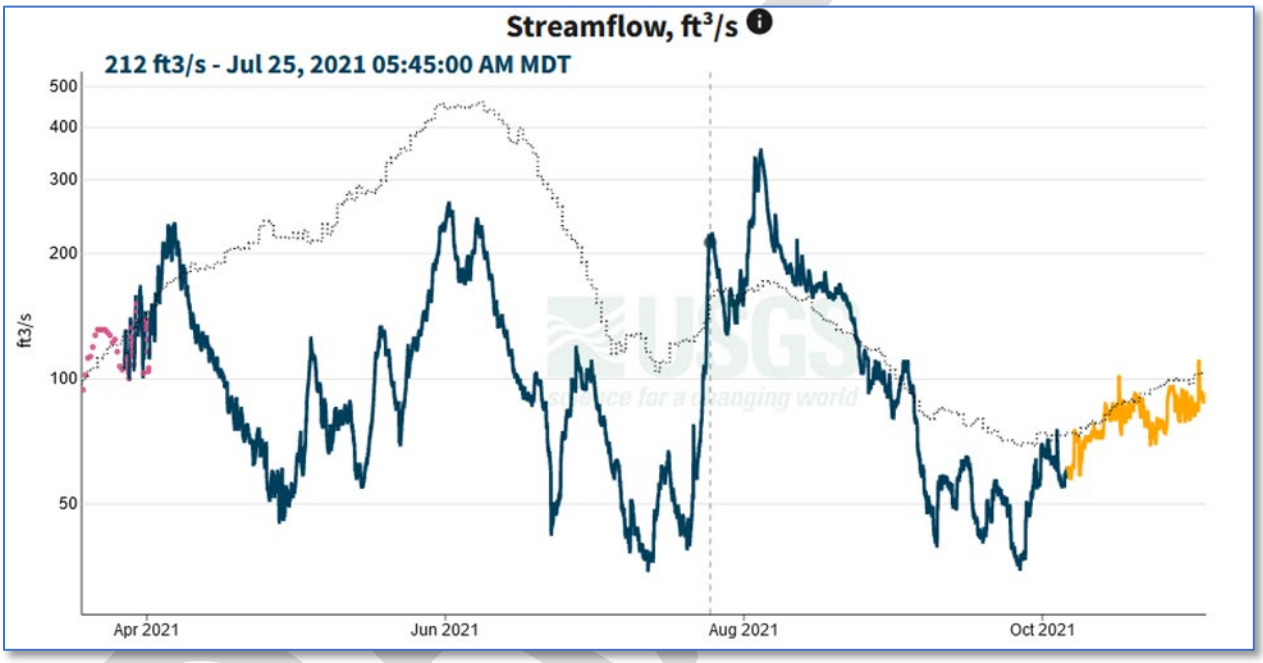

Figure 4. 2021 hydrograph for Tomichi at Gunnison. Note the significant flow increases (both in 2021 and in the median data) during August and October due to reduced irrigation and increased precipitation.

Finally, inflows from Quartz and Cochetopa Creeks downstream of the project limit the downstream range of any potential injury to downstream junior diverters. Quartz Creek joins Tomichi Creek at the end of the Tomichi Creek ISF reach and can contribute an average of 28 cfs in August and 20 cfs in October during low water years (see, Table 7, below). Dry-year inflows from Quartz creek are more than double the average August and October diversion rates for the four diversions downstream of the Quartz Creek confluence and can easily provide sufficient supplies despite any temporary changes caused by operation of the Proposed Lease. Late season Cochetopa Creek inflows average 15 cfs in dry-years. These sizable tributary inflows effectively limit the reach of potential injury to the Quartz Creek Confluence.

	June	July	Aug	Sept	Oct
Average Low Flow	89	30	28	19	20
Record Low	55	20	20	13	15

Table 7. Average monthly discharge of the Quartz Creek gage for the six driest years on record. Data from USGS Gage 09118000 Quartz Creek Near Ohio City, which has a 24-year record (1938-1950, 1960-1970).

In sum, injury to downstream junior water rights diversions are not anticipated. However, in the event allegations of injury to downstream junior diverters do arise, the Draft Peterson Ranch-CWT Agreement provides a process to address such issues (see, Draft Peterson Ranch-CWT Agreement, ¶ 9).

6.3. Potential Injury to the ISF

Separate from potential injury to downstream diverters, changes in the return flow pattern also has the potential to impact the Tomichi Creek ISF, which is decreed for 18 cfs year-round. However, importantly, changes in return flow patterns are temporary and during Operational Years, the Proposed Lease will provide a net streamflow benefits of 116 acre-feet. The considerable flow increases in late June and July, will benefit the ISF at the time of year when low flows in the ISF are the most common and the most impactful. CWT analysis shows that the July is the month with the lowest flows, highest temperatures and highest likelihood of dry-up at in the Diversion and Return Reaches. Meanwhile, deficits are less frequent and typically have a smaller magnitude from August through October. Accordingly, the Proposed Lease presents the opportunity for significant net benefit to the Tomichi Creek ISF when it is most in need.

This net environmental benefit to Tomichi Creek created by operation of the Proposed Lease is supported by the letter provided by Colorado Parks and Wildlife (CPW) dated [_____ __, ___] (**Exhibit I**). This letter concludes that the benefits to aquatic species from this project will be significant by avoiding dry-ups and mitigating high temperatures during the heavy irrigation season of late June and July before flows recover in August.

7. Administration

The Proposed Lease will operate during one or both of the Operative Windows with a total maximum duration of 67 days during one-calendar-year, which duration is well below the 120-day maximum allowed under statute. See C.R.S. § 37-83-105(2)(a). The Petersons will be responsible for opening and closing the headgates associated with the Water Rights at the beginning and end of an Operational Window. CWT will verify and document delivery of the Water Rights to the Tomichi Creek ISF and work with Peterson Ranch to submit accurate records of instream flow use to the Division of Water Resources (DWR).

The Proposed Lease is located near the end of the Tomichi Creek ISF reach and two diversion structures may be subject to administration during implementation.

First, the Louis Sarrasin Ditch (Admin No. 2800629) is located at River Mile 23.71 which is 1.1 miles downstream of the McGowan Irrigating Ditch Alternate Point. The Louis Sarrasin has two decreed rights with two different priorities, Nos. 113 and 265. These priorities are senior to the Tomichi Creek ISF, and as such, can divert flow from Tomichi Creek during Proposed Lease operations. However, some of the Louis Sarrasin rights are junior to some of the Water Rights. The Louis Sarrasin Ditch is in the Diversion Reach and lies downstream of the historic return flow points of the Louis, Cain Borsum, and McGowan Alternate Ditches, but above the return flow location of the McGowan Irrigating Ditch. Only the HCU attributable to senior rights in the Proposed Lease and the senior McGowan diversion amount, can be administered past the Louis Sarrasin. Given the generally small diversion rates of the Louis Sarrassin, it appears unlikely that it would be capable of affecting the stream enough during operational windows to require administration.

Second, the Hannah J. Ditch (Admin. No. 2800577) is located at River Mile 22.86, which is in the Return Flow Reach, downstream of all historic return flows. In the Return Flow Reach, only HCU may be protected as instream flow and shepherded past any other users in priority. The Hannah J. Ditch has two decreed rights with two different priorities: Nos. 56 and 223. These priorities are senior to the Tomichi Creek ISF, but not the Water Rights. As such, the Hannah J. Ditch can divert flow from Tomichi Creek during operation of the Proposed Lease, provided the portion of the water attributable the HCU from the Water Rights is maintained in-channel.

8. Notices

Concurrent with this transmittal, as required by C.R.S. § 37-83-105(2)(b)(II), written notice [has been provided] to all parties on the substitute water supply plan notification list for Water Division 4 and to registered agents and water user contacts provided by the Water Commissioner (if any). In accordance with 2 CCR 408-2:6(k)(2)(f), Applicants and the CWCB [have coordinated] to provide notice to all persons on the instream flow subscription mailing list for Water Division 4 and to make the best efforts to publish notice in the local newspaper in Gunnison County. Proof of notices are attached hereto as **Exhibit J.**

9. Filing Fee

Applicants [will pay] the $300.00 filing fee as required under C.R.S. § 37-83-105(2)(b)(I) via the DWR online payment system.

Should any questions arise regarding the above, please contact Tony LaGreca, Project Manager, at 720.570.2897, Ext. 5, or tlagreca@coloradowatertrust.org .

Thank you for your prompt consideration of this request.

Sincerely,

DRAFT

_____

Tony LaGreca
Project Manager
Colorado Water Trust

Encl. (see, List of Exhibits)
cc *all via email*:
Rob Viehl, Stream and Lake Protection Section
Kaylea White, Stream and Lake Protection Section
Pete Conovitz, Stream and Lake Protection Section
Katie Birch, Colorado Parks and Wildlife

Draft date: 10/26/22

Ed Perkins, Colorado Parks and Wildlife
Tarn Udall, Assistant Attorney General

LIST OF EXHIBITS

EXHIBIT A Louis Ditch Water Rights Decrees Case Nos. CA1602, CA2079, and 02CW0254A

EXHIBIT B Cain Borsum Ditch Water Rights Decrees Case Nos. CA1266 and CA2079

EXHIBIT C McGowan Ditch and Alternate Point of Diversion Water Rights Decrees Case Nos. CA1266, 99CW52, CA2079, and 02CW254

EXHIBIT D Tomichi Creek ISF Decree Case No. 80CW132

EXHIBIT E Engineering Report prepared by Tyler Martineau dated September 9, 2021

EXHIBIT F [Draft] Temporary Water Lease Agreement by and between Peterson Ranch and Colorado Water Trust dated [10/20/2022]

EXHIBIT G [Draft] Temporary Water Lease Agreement by and between Colorado Water Trust and the Colorado Water Conservation Board dated [10/25/2022]

EXHIBIT H Letter from Colorado Cattlemen's Agricultural Land Trust dated January 21, 2022

EXHIBIT I Letter from Colorado Parks and Wildlife dated [_____ __, ___]

EXHIBIT J Proof of Notice(s) dated [_____ __, ___]

Valuation of Split Season Lease of Peterson Ranch Water Rights

Prepared for:

Colorado Water Conservation Board
1313 Sherman Street
Denver, CO 80203

Colorado Water Trust
3264 Larimer Street, Suite D
Denver, CO 80205

By

WestWater Research
320 E Vine Drive, Suite 223
Fort Collins, CO 80524

November 2, 2021

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Introduction

Background & Purpose

The Colorado Water Conservation Board (CWCB) in partnership with the Colorado Water Trust (CWT) is considering a split season lease of water rights appurtenant to four ditches on the Peterson Ranch near Parlin, Colorado ("subject property"). These four ditches divert from Tomichi Creek and are named the Louis Ditch, the Cain Borsum Ditch, the McGowan Ditch and the McGowan Alternate Ditch. The flows of Tomichi Creek are influenced by upstream irrigation practices. Irrigators upstream tend to irrigate in July, shut off in August and irrigate again in late August into September. This pattern of irrigation use creates low streamflow periods in Tomichi Creek in July & September. Irrigation on the subject property has historically occurred under the same pattern. Under the proposed lease, irrigation on the subject property will cease on June 24th through the end of July, and again during the month of September, thus allowing water that would have been diverted in those periods to remain instream. It is expected that this retiming of irrigation diversions will result in the subject property losing around one month of hay production. The retiming and reduction in hay production generate increased streamflow in Tomichi Creek. This increased flow is the subject of this report and is referred to throughout this report as the subject rights.

WestWater Research LLC (WestWater) was approached by CWT to provide a valuation analysis of the proposed split-season water lease to inform CWCB & CWT discussions regarding fair compensation for the lease. This report provides an analysis of the characteristics of the subject water rights under the proposed split season lease, including their transferability, marketability, transferable volume, and estimated value.

Report Organization

The content of the report is organized as follows:

- **Water Rights Description:** This section provides a summary of the legal characteristics of the subject water rights.
- **Water Rights Assessment:** This section describes the important determinants of value such as the marketable volume of the water rights, the transferability of the rights, and considerations related to water quality and physical reliability. This information is used to assess the highest and best use of the subject water rights - an important consideration in determining the water rights' market value.
- **Water Market Assessment:** This section characterizes the water supply and demand conditions within the transferable region of the water rights and provides a market overview of the overall regional water rights market.
- **Water Rights Valuation:** This section identifies the available methods for valuing the subject water rights and selects the preferred approaches based upon the market conditions and water supply opportunities relevant to local end users, as well as the availability and quality of information to support an analysis.
- **Summary and Final Opinion of Value:** Key findings of the analysis are summarized and reconciled to provide an opinion of fair market value for the subject water rights.

Water Rights Description

Water rights involved in the proposed lease include five water right decrees associated with four headgates and ditches on the Peterson Ranch in Gunnison County, CO near the hamlet of Parlin, CO. The decrees are detailed below in **Table 1** and the appurtenant structures are detailed below in **Table 2**. In aggregate, these ditches irrigated around 220 acres of grass hay, with limited stock water uses. These 220 acres are referred to throughout this report as the "subject property." The actual boundaries of the Peterson Ranch include other adjacent acreage and several thousand acres further upstream. Peterson Ranch operates a cow calf operation across their land holdings. The implementation of the proposed lease will require operational changes that will impact their cattle operation, however no other water rights or ditches are included in the proposed lease.

Maps of the subject property and the region can be seen in **Appendix A**. The ditch headgates and irrigated fields are all located closely together, with diversions from all four points of diversion occurring within about 2.5 river miles or just over 1-mile straight line distance. Irrigation occurs on both sides of Tomichi Creek, with the Louis & McGowan fields located on the southern banks and the Cain Borsum fields located on the northern banks. A shift in Tomichi Creek moved a portion of the McGowan fields from the south bank to north bank of the creek. In order to continue irrigating this portion, the Petersons filed for an alternate point of diversion in 1999 in case 99CW0052. The water rights for this alternate point of diversion are the same as the original, but in practice the alternate point of diversion is treated as a separate ditch/structure.

Table 1: Description of Subject Water Right Decrees

Ditch Name	Water Right Decree No.	Priority	Max Flow (cfs)	Appropriation Date	Adjudication Date	Admin No.	Uses
Louis	CA1602	185	1.6	1916	1918	24227	Irrigation
	CA2079	307	7.5	1915	1943	28311.24025	Irrigation
	02CW0254A	n/a	0.9	1963	2001	55517.41412	Irrigation, Stock
Cain Borsum	CA1266	49	2.44	1880	1904	16192.1111	Irrigation
	CA1266	94	1.2	1887	1904	1612.13666	Irrigation
	CA2079	217	9.76	1880	1943	28311.1111	Irrigation
	CA2079	252	8.6	1887	1943	28311.13666	Irrigation
McGowan & McGowan Alt[1]	CA1266	60	2.2	1882	1904	16193.11809	Irrigation
	CA2079	224	8.8	1882	1943	28311.11809	Irrigation
	02CW0254		0.5	1963	2002	55517.41412	Irrigation, Stock

The water rights allow for the diversion of up to 43.5 cfs, although in an average year, an average of 36.6 cfs is diverted during June, the month with the highest diversions. Due to the location of the fields and headgates relative to Tomichi Creek, a significant portion of the diversion in the Cain Borsum and McGowan ditches is re-diversion of return flows from the upstream Peterson ditches. Diversion volumes are typical of high elevation pasture irrigation, with a significant volume of water diverted for limited acreage, with the vast majority of diverted water returning to the creek via tailwater and return flows. All irrigation on the subject property is accomplished through flood irrigation, with irrigation historically beginning in April or May and continuing through the end of July. Fields are allowed to dry out in August with hay cutting occurring in late August. Irrigation may be restarted in September to replenish the fields for the next season, typically occurring

[1] An additional point of diversion known as the McGowan Irrigating Ditch Alternate was decreed in case 99CW0052

into late October. Cattle are often moved to the pastures for winter and in the fall when irrigation is not occurring.

Table 2: Description of Subject Water Right Structures

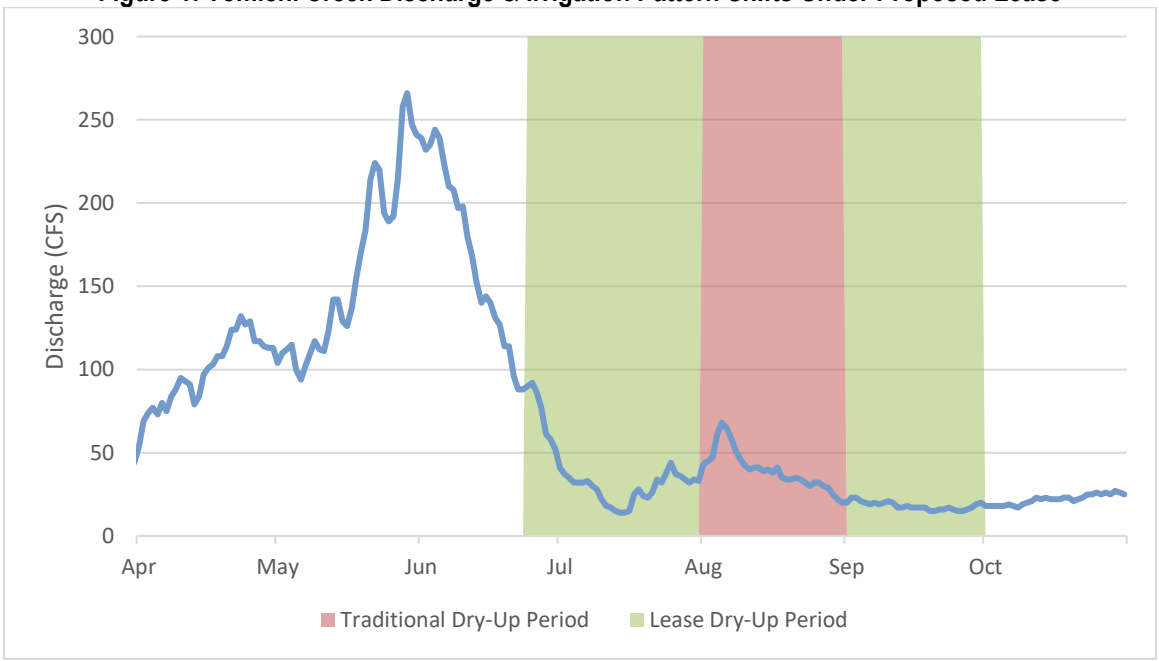
Ditch	WWID	River Mile	Max Legal Rate (cfs)	Average June Flow (cfs)	Average Annual Diversion (AF)	Irrigated Acres	Crop
Louis	2800628	27.36	10	6.19	926	36.1	Grass Hay
Cain Borsum	2800520	26.64	22	13.4	1,913	108.7	
McGowan	2800638	24.83	11.5	11.43	1,688	69.7	
McGowan Alternate	2801630	24.82		5.59	693	6.2	
		TOTAL	**43.5**	**36.61**	**5,220**	**220.7**	

Adapted from a draft engineering memorandum from Tyler Martineau Engineering dated 7/13/2021

Proposed Split Season Lease

The CWT and CWCB are proposing to alter the timing of irrigation on the subject property as detailed in **Figure 1**. Under the lease, the Petersons would irrigate as normal through June 23rd. At this point irrigation operations on the subject property would operate as the inverse of irrigation operations in the rest of the Upper Tomichi Creek Basin. Irrigation on the subject property would cease for the month of July, allowing water that would normally be available at their headgates to continue within the creek channel, supplying water during a time of critically low flows when historically runoff has ceased, but irrigation is normally ongoing. Irrigation would then resume on the subject property in August when the rest of the Basin typically ceases irrigation. Finally, irrigation on the subject property would cease again in September while it resumes in the rest of the basin, supplying water during another critical period of low flows. This split season lease in effect leads to one less month of crop growth and increases the volume of water in Tomichi Creek in between June 24th and July 31st and in the month of September.

Figure 1: Tomichi Creek Discharge & Irrigation Pattern Shifts Under Proposed Lease



Source: 50% Exceedance Discharge from Tomichi Creek at Parlin, CO (USGS 09117000)
Note: Data only for 1944-1970

Water Rights Assessment

The following sections describe important determinants of market value for the subject water rights, such as the transferable volume, reliability, season of use and transferability.

Tomichi Creek Basin

Tomichi Creek is a 72-mile-long tributary of the Gunnison River located east of the City of Gunnison in Gunnison County. The creek rises near the continental divide, just north of the ghost town of White Pine and flows south to where it meets Hwy 50 on the west side of Monarch Pass. At this point Tomichi Creek turns west and runs adjacent to Hwy 50. At around river mile 23, Quartz Creek drains into Tomichi Creek at the hamlet of Parlin, CO. From there Tomichi Creek continues just south of the City of Gunnison before entering the Gunnison River about five miles upstream of Blue Mesa Reservoir. The Basin is high elevation, with the subject water rights located at around 8,000 ft and the mouth of Tomichi Creek near Gunnison at about 7,600 ft.

Water use in the Basin is predominated by the irrigation of grass pasture. The most common irrigation pattern mirrors that of the Peterson Ranch discussed in the previous section. Grass pasture is irrigated up through the end of July, followed by a period of no irrigation in August as the fields dry out and hay is cut and finally a limited resumption of irrigation in September and October to replenish water in the soils for next season. The confluence of Quartz Creek at Parlin marks a significant inflection point for water scarcity in the Basin. Upstream of Parlin, water supplies are relatively limited, with periods of low flow in Tomichi Creek in July and September after runoff has past, but when pasture is still being irrigated. Quartz Creek replenishes Tomichi Creek and with limited water uses downstream of Parlin, there is typically little to no relative water scarcity. Downstream of the mouth of Tomichi Creek there is little to no water use as the Gunnison River flows primarily through National Park Service property before entering Blue Mesa Reservoir which has significant volumes of surplus water available.

Transferable Volume

The volume of the water rights available for transfer to a new use is known as the transferrable volume. CWT and CWCB have engaged Tyler Martineau Engineering (Martineau) to conduct a detailed stream depletion investigation for the subject water rights. This valuation report utilizes preliminary findings from a draft Martineau engineering report dated July 13, 2021. Any future updates to the engineering report that alter the volume conclusions will require the transferable volume and total value conclusions in this report to be updated accordingly.

In order to conceptualize the benefits to Tomichi Creek from the proposed lease, the concept of primary and secondary reach can be utilized. The reach between a headgate and the point of all return flows is known as the “primary reach.” In the primary reach, instream flow benefits are comprised of water that would normally have been consumed by crops and water that would normally have returned to stream system but was left instream. The reach below the point of all return flows is known as the “secondary reach.” The instream flow benefits in the secondary reach are comprised solely of water that would have been consumed by the crop.

The annual benefits to Tomichi Creek from the proposed lease are detailed in **Table 3**. For each ditch, a significant volume of water remains in the primary reach immediately below the headgate as a result of the proposed lease. However, historic return flow patterns mean that this benefit declines downstream as more

and more of this water would have returned to the stream normally. After the point of all return flows – the secondary reach – the only remaining benefit to Tomichi Creek is water that was not consumed by crops as a result of the proposed lease.

Table 3: Peterson Ranch Split Season Lease Annual Benefit to Tomichi Creek

Location	River Mile	Stream Benefit by Ditch (AF)				Total Stream Benefit (AF)	Reach
		Louis	Cain Borsum	McGowan	McGowan Alt		
Louis Ditch Headgate	27.36	315				315	Primary
Cain Borsum Ditch Headgate	26.64	241	675			915	
McGowan Ditch Headgate	24.83	18	264	522		804	
McGowan Ditch Alt Headgate	24.82		281	517	177	975	
Downstream of All Returns		**19.7**	**61.2**	**33.2**	**2.3**	**116.4**	Secondary

Adapted from a draft engineering memorandum from Tyler Martineau Engineering dated 7/13/2021

The benefit of the proposed lease in the primary reach ranges between 315 AF and 975 AF. The benefit in the secondary reach after the point of all return flows is 116.4 AF. The increased instream flow in both the primary and secondary reaches generate significant ecological benefits. In order to provide a meaningful basis for valuation and comparison to other split season leases and water right transactions, one volume must be utilized. As seen, the volume of the primary reach can vary significantly, whereas there is only one volume for the secondary reach. As well, in Colorado most water right transactions are denoted in Consumptive Use (CU) volumes, which is equivalent to the volume remaining in the secondary reach. As such, this report continues utilizing the CU volume of the subject rights of **116.4 AF CU**.[2]

Of note is that the Martineau report contains two measures of the reduction in CU from the proposed lease that are not equivalent. The first is the volume of added instream flow in the secondary reach of 116.4 AF CU. The second is the difference in crop consumptive use. Under baseline conditions, Marineau estimates that the consumptive use of 220 acres of pasture in an average year is 433.4 AF CU. Under the proposed lease, Martineau estimates that this volume will fall to 332.1 AF CU, a reduction of 101.3 AF CU. The CU estimate is approximately 15 AF CU less than the additional volume added to the secondary reach. As stated, the added volume in the secondary reach – below the point of all return flows – should only be the volume that was consumptively utilized on the farm. This discrepancy may be explained by on-farm evaporation losses and/or unaccounted for groundwater return flows. So as to ensure all CU volumes are included, this report continues utilizing the secondary reach estimate of 116.4 AF CU.

Table 4: Consumptive Use Estimates for Proposed Lease

Ditch	Crop CU Estimate			Secondary Reach CU Estimate
	Baseline Avg Crop CU	CU Under Lease	Difference in Crop CU	
Louis	67.6	49.8	17.8	19.7
Cain Borsum	214.7	162.3	52.4	61.2
McGowan	139.6	110.6	29	33.2
McGowan Alternate	11.5	9.4	2.1	2.3
TOTAL	**433.4**	**332.1**	**101.3**	**116.4**

[2] Utilizing the CU volume as the transferable volume does not discount the ecological benefits of the increased flows in the primary reach nor lead to a lower value. Instead, CU volumes and primary reach volumes are simply two different ways of measuring the same benefit. Water right transactions can at times be interchangeably denoted in either volume, with the total value exactly the same.

Reliability

The subject water rights are senior and do not have reliability concerns in even the driest years. Over the past decade[3], the 1916 water rights were called out 0.16% of the time by the immediately downstream Hannah J Winters No. 2 Ditch which is part owned by the Petersons. The 1963 water rights were called out only 1.64% of the time, again in part by the Hannah J Winters No. 2 Ditch, but also by the Hagen Spring Pipeline far downstream in Delta. In practice, the subject rights have never been impacted by a priority call[4] and it is unlikely that they will face any curtailment in the near future. On occasion, the subject rights will not receive the full volume needed for irrigation operations and the Petersons will place a call on upstream ditches. As such, the water rights are considered to be legally and physically fully reliable.

Season of Use

The season of use of a water right can have a significant impact on its marketability. Few water users are able to utilize water rights that are not available during portions of the year when water is scarce. While the senior decreed water rights appurtenant to the subject property provide a full agricultural season of use from April through October, the subject rights to be created by the proposed lease would only provide water sporadically in July and September. As well, there are no apparent storage reservoirs upstream of Blue Mesa Reservoir that could be utilized to store the CU from the subject rights for later use. The narrow season of use of the subject rights limits the marketability of the subject rights.

Transferability

The subject rights may be utilized at any point downstream of the subject property and any point upstream with exchange potential. As the subject water rights are considered very senior and have placed calls on other upstream water rights, it is expected that the subject rights could be exchanged upstream either through an informal agreement in which the Petersons agree to not call an upstream water right, or through a formally decreed exchange. Water rights senior to the subject rights and dry-up points may limit upstream transferability. Determining the exact upstream transferability of the subject rights is beyond the scope of this report, however it is expected that based on history of past calls placed by the Petersons and the senior nature of the subject rights, upstream transferability to other users is possible.

The subject rights are transferable to any point downstream. Two water court cases filed by the Upper Gunnison Water Conservancy District (UGWCD) to create augmentation programs elucidate the downstream transferability of the subject rights. In cases 03CW0108 and 03CW0049 the Court held that water in Lake San Cristobal and Blue Mesa Reservoir could be exchanged upstream along the Gunnison River to near Crested Butte and Taylor Park and up Tomichi Creek about 10 miles. The augmentation plans were created utilizing excess water supplies and are not fully subscribed. Prices for water under these augmentation plans are low at around $55 per AF annually (discussed in more detail in the Water Rights Valuation chapter). In effect, surplus water is available for nearly all areas downstream of the subject rights, with the exception of Tomichi Creek upstream of the river mile 9.77. While the subject rights are legally and physically transferable to these areas, the existence of surplus water supplies in effect limits the marketable region for the subject rights to all areas upstream of the subject property to which water can be exchanged and downstream along Tomichi Creek to river mile 9.77.

[3] 11/1/2011 to 10/31/2021

[4] In person and email communication with Kathleen Curry. September 2021.

Water Market Assessment

The availability and relative abundance of alternative water supplies in the market area is an important value consideration. Water right values tend to be lower in areas where there are numerous alternative water supplies available for development and use and/or minimal demand for new water supplies. In contrast, water values are often higher in local areas that have few alternatives, costly alternatives, and/or strong competitive demand for available water supplies.

This section describes local water supply and demand conditions to assess the marketability and potential end uses of the subject water rights. Regional economic and regulatory conditions can influence the value of water by stressing available supplies and affecting the ease and cost with which new water supplies can be developed. The current and projected demand for water in the market area must be considered in conjunction with an analysis of available water supplies.

Tomichi Creek Water Right Supply

The market region for the subject rights is expected to be any where the water rights can be exchanged upstream and downstream along Tomichi Creek until river mile 9.77. Water supply in Tomichi Creek follows a typical snow dominated pattern as can be seen in **Figure 2**. The creek is impacted heavily by local irrigation patterns. As discussed previously, most irrigators in the area irrigate until around the middle to end of July, well after runoff has finished. This causes steep declines and critical low flows in July. As irrigators shut off to dry their fields and cut hay in August flow recovers, before falling back to critical low flow levels in September as irrigators resume irrigation to recharge soils for next season. A slight recovery can be seen into October, with flows fairly constant through the winter.

Figure 2: Flow of Tomichi Creek at Parlin (50% Exceedance)

Source: Tomichi Creek at Parlin, CO (USGS 09117000)
Note: Data only for 1944-1970

As Tomichi Creek is dominated by agricultural water use and there are few water rights that include winter time uses, water from Blue Mesa can augment uses throughout the Tomichi Creek Basin during the winter months. During spring runoff there is typically sufficient water to satisfy all water users, with no scarcity. Water scarcity in the Basin thus only occurs in the mid to late summer months of July through October.

Tomichi Creek Water Right Demand

In order to better understand water demand in the Tomichi Creek Basin, water right records for all water rights within the marketable area for the subject rights – upstream of the subject property and downstream along Tomichi Creek to river mile 9.77 – were analyzed. **Figure 3** and **Table 5** show the approved diversion of all water right decrees in the market area by water use type.[5] Irrigation is by far the most dominant water use in the area. There is 1,325.9 cfs of legally allowable diversion within the market region, 95.6% of which includes irrigation use. Other notable uses include recreation, augmentation and stock water.

Figure 3: Cumulative Water Rights in Tomichi Creek Basin above Parlin by Decreed Use

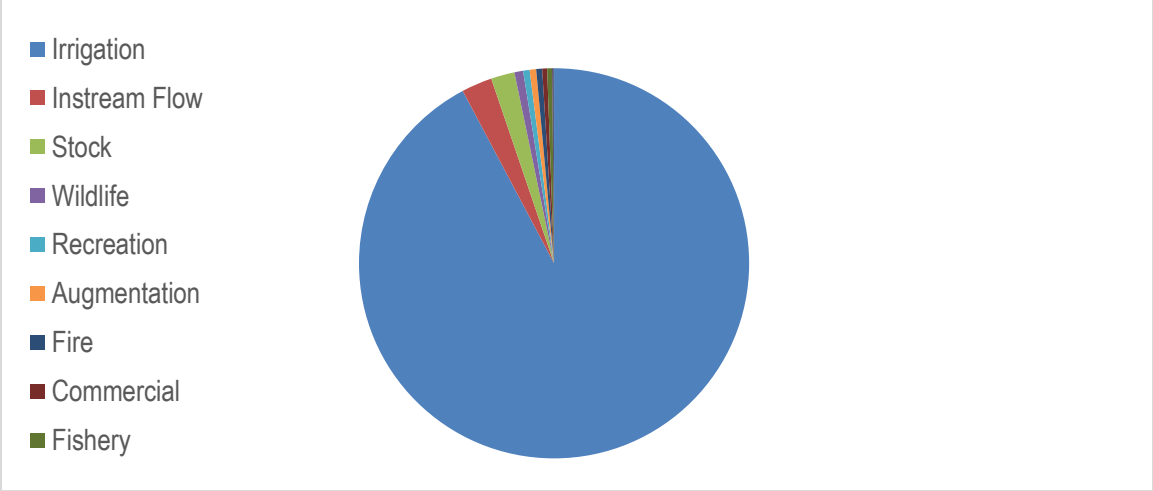


Table 5: Cumulative Water Rights in Tomichi Creek Basin above Parlin by Decreed Use

Decreed Use	Total Available CFS	% of Total
Irrigation	1325.9	95.6%
Recreation	46.0	3.3%
Augmentation	33.8	2.4%
Stock	31.0	2.2%
Wildlife	19.6	1.4%
Instream Flow	16.2	1.2%
Domestic	12.2	0.9%
Commercial	6.0	0.4%
Fishery	5.0	0.4%
Fire	1.6	0.1%
Municipal	0.9	0.1%

[5] There are a number of water rights that share diversion rates between different uses and as such the relative proportion of the smaller use types is somewhat overstated while the relative proportion of irrigation is somewhat understated.

Augmentation

In places where water is over-allocated, such as in the Tomichi Creek Basin during the summer and fall, new water users must either directly transfer a water right to their new use or utilize a senior water right to mitigate the new use through an augmentation method. Areas with significant growth often see a corresponding growth in site-specific augmentation plans, or have a least one approved augmentation plan that covers a wide area. In the Tomichi Creek Basin, there are no large augmentation plans and only eight approved site-specific augmentation plans (see **Table 6**), with no new plans since 2005. Most of the augmentation plans were approved through retiring small amounts of historically irrigated acreage, although one plan allows pond releases for augmentation and another was approved by retiring an older augmentation plan.

Table 6: Augmentation Plans in Subject Right Market Region

Augmentation Case Number	Augmentation Method
96CW0060	Cessation of Irrigation
91CW0037	Pond Releases
82CW0112	Cessation of Irrigation
91CW0006	Cessation of Irrigation
00CW0131	Conversion of Augmentation Plan in 91CW0006
05CW0036	Cessation of Irrigation, Blue Mesa water in Winter
01CW0014	Cessation of Irrigation
01CW0084	Cessation of Irrigation

Of the handful of augmentation plans that have been approved, most were for indoor water use at hospitality facilities or for the addition of amenities such as a pond. The lack of recently approved augmentation plans indicates a general lack of demand for new water uses in the Tomichi Creek Basin.

Environmental

The CWCB has established an instream flow water right on Tomichi Creek of 18cfs year-round from case 80CW0132. **Figure 4** shows average Tomichi Creek discharge, the instream flow water right and periods where flow is less than the instream flow right. In an average year, discharge is less than the instream flow water right thirty days out the year, in July, September and early October. It is expected that the CWCB and environmental groups would acquire or lease senior water rights to increase flows during these months.

Figure 4: Tomichi Creek Discharge & Instream Flow Rights

Source: Tomichi Creek at Parlin, CO (USGS 09117000), Note: Data only for 1944-1970

Water Rights Valuation

Highest and Best Use

The estimation of market value is based upon a determination of the highest and best use for the subject water rights. Highest and best use is defined as the highest and most profitable use for which the property is adapted and needed or likely to be needed in the near future. Standard criteria that are commonly used to determine highest and best use include:

- **Legally Permissible**: Under Colorado law, the subject water rights may be legally transferred to any alternative use so long as the transfer is not injurious to other users. The permissible alternative uses for the subject water rights include a variety of consumptive and non-consumptive uses (e.g. municipal, irrigation, industrial, environmental).

- **Physically Possible**: The subject water rights have historically been utilized for the irrigation of grass hay. It is physically possible to utilize the subject rights at any point downstream of the Peterson property, with exchange potential back up the Gunnison River towards Crested Butte and Taylor Park and exchange potential back up Tomichi Creek. There are a number of water rights associated with the four ditches. Some of the water rights are relatively junior and are subject to downstream calls. In practice, however, water use is limited by physical water availability and the junior rights are only utilized in times of high flows. The landowners have attested that there have been no downstream priority calls that have impacted their operations in recent memory. As such, there are no concerns that the subject water rights can be exercised in all years.

- **Financially Feasible**: To be financially feasible, a use or transfer of the subject rights typically must generate net revenues sufficient to satisfy the return on investment in improvements as well as generate a positive return on the water. The unique nature of the subject rights, whereby water is only available in specific quantities in July and September limits the transferability of the rights. Few water users would find the subject rights to be a useable water supply. As such, use of the subject water rights in any use other than the historic agricultural use or the proposed environmental uses is not considered feasible.

- **Maximum Productive Use**: The maximum productive use is that which produces the highest rate of financial return. No uses other than the historic agricultural uses or environmental use to ensure that the CWCB's instream flow water right is satisfied will be financially feasible. Between these two uses, the maximum productive use of the subject rights is that for which there is the highest willingness to pay. There are examples of similar transfers of water from agriculture to environmental uses around Colorado that indicate that in specific circumstances, the maximum productive use of similar water assets is environmental.

The highest and best use identifies the most likely use of the subject water rights that generates the highest value. With the limited transferability of the subject rights, potential uses are limited to only the historic agricultural use and environmental uses that can help ensure that the CWCB's instream water right on Tomichi Creek is satisfied. The highest and best use of the subject rights is considered to be environmental, provided that compensation can be provided that is adequate to cover any lost agricultural profits.

Valuation Approaches

The selection of appropriate valuation technique(s) is determined by the characteristics and nature of the subject water rights as well as the availability and quality of information. There are a variety of approaches available to estimate the value of a specific water right. The methods used in this report to value water rights are briefly described below:

- **Comparable Sales Approach:** The Comparable Sales Approach is the preferred method when sufficient transactional information is available. WestWater maintains the largest, highest-quality database of water right transactions in the Western U.S., including Colorado. This database provides a useful basis for the sales comparison approach. In order to augment the database, WestWater completed a search of county recorded documents, Substitute Water Supply Plans and Water Court filings and local public entity minutes & agendas. A small number transactions and transaction programs were identified that provide a general indication of the value of water rights in the Upper Gunnison River Basin. However, due to the split season nature of the proposed lease and the unique transferability characteristics, it was necessary to supplement the available sales information with alternative valuation approaches.

- **Land Price Differential Approach:** This method compares sale prices of agricultural land with water rights to agricultural lands without water rights. The price differential represents the value that can be attributed to the water rights. The method requires information on recent land sales which is used to filter the land sales to the most applicable agricultural sales and also used to evaluate irrigated acres. This approach was not utilized in favor of the Comparable Sales and Income Capitalization Approaches.

- **Income Capitalization Approach:** The Income Capitalization Approach estimates the value of a water source according to the contribution that water provides to net income for a business. The subject rights are presently utilized to irrigate grass pasture on the Peterson property. Utilizing the subject rights in a split season lease will reduce the irrigation season, which will reduce hay yields and financial returns from the Peterson property. A crop enterprise budget analysis is utilized to estimate the financial returns to the Peterson property under both no lease and split season lease scenarios.

- **Replacement Cost Approach:** The Replacement Cost Approach estimates the value of the subject rights by considering the costs of developing alternative water supplies similar to that provided by the subject water rights can be used to establish value. This approach requires specific knowledge about the range of opportunities and costs associated with water development in a region. WestWater investigated potential alternative water sources for the subject property. While there are several small reservoirs upstream of the subject property, all the water is presently utilized for irrigation of grass pasture and there is no surplus water available. Any replacement water on the subject property would necessitate transfer of the water from other agricultural users, the pricing of which is covered in the previous methodologies. As such, the Replacement Cost Approach is not utilized.

Comparable Sales Approach

Comparable sales are the preferred valuation method when sufficient data are available. This section presents:

- A review of split season leases in the System Conservation Pilot Program (SCPP).
- An overview of the major augmentation providers in Gunnison County.
- Western Slope environmental split season leases & purchases.

System Conservation Pilot Program Leases

There have been active discussions over the last decade on future water supply risks in the Colorado River Basin. These discussions have prompted both technical analyses to quantify and understand the risks[6] and policy analysis of how to manage or mitigate such risks[7]. The 2019 Drought Contingency Plan (DCP)[8] for the Colorado River Basin called for investigations of demand management and created a dedicated 500,000 AF demand management storage pool in Lake Powell for storing conserved water.

To investigate the feasibility of demand management, a pilot program was operated between 2015 and 2018 in the upper Colorado River Basin states known as the System Conservation Pilot Program (SCPP). A total of 46,900 AF CU was conserved across 74 individual projects over the 4-year program, through a variety of methods, such as permanent fallowing, split-season fallowing, and switching crop types. In order to provide a comparison to the subject rights, SCPP split season leases are considered here and are shown in **Table 7** with pricing updated to 2021 dollars.

Table 7: SCPP Split Season Leases (2015-2018)

State	Year	Acres	CU (AF)	Unit CU (AF/acre)	Cost (2021 $s)	$per AF (2021 $s)	Cutoff Date	Crop
Wyoming	2016	40	105	2.63	$23,792	$227	7/1	Grass
	2015	1,736	1,202	0.69	$280,013	$233	7/1	Grass
	2016	726	482	0.66	$109,215	$227	7/1	Grass
	2018	543	360	0.66	$57,602	$160	7/15	Grass
	2016	1,631	1,143	0.70	$258,988	$227	7/15	Grass
	2018	540	355	0.66	$56,764	$160	7/15	Grass
	2018	941	659	0.70	$105,442	$160	6/15	Grass
	2018	324	252	0.78	$40,268	$160	7/15	Grass
	2015	221	248	1.12	$57,751	$233	7/1	Grass
	2016	381	466	1.22	$105,589	$227	7/1	Grass
	2018	512	530	1.03	$84,746	$160	6/20	Grass
	2018	776	1,020	1.31	$163,204	$160	6/20	Grass
	2018	696	737	1.06	$117,923	$160	6/20	Grass
	2018	717	803	1.12	$128,484	$160	6/20	Grass
	2017	2,386	2,744	1.15	$571,318	$208	7/1	Grass
	2018	1,057	678	0.64	$108,483	$160	7/20	Grass
	2016	292	395	1.35	$89,501	$227	7/1	Grass
	2016	1,103	1,226	1.11	$277,794	$227	7/1	Grass
	2018	832	900	1.08	$144,055	$160	7/5	Grass
	2018	151	127	0.84	$20,320	$160	7/15	Grass

[6] Colorado River District. Colorado River Risk Study. Phases 1-3.

[7] Colorado River Water Bank Working Group efforts since 2012.

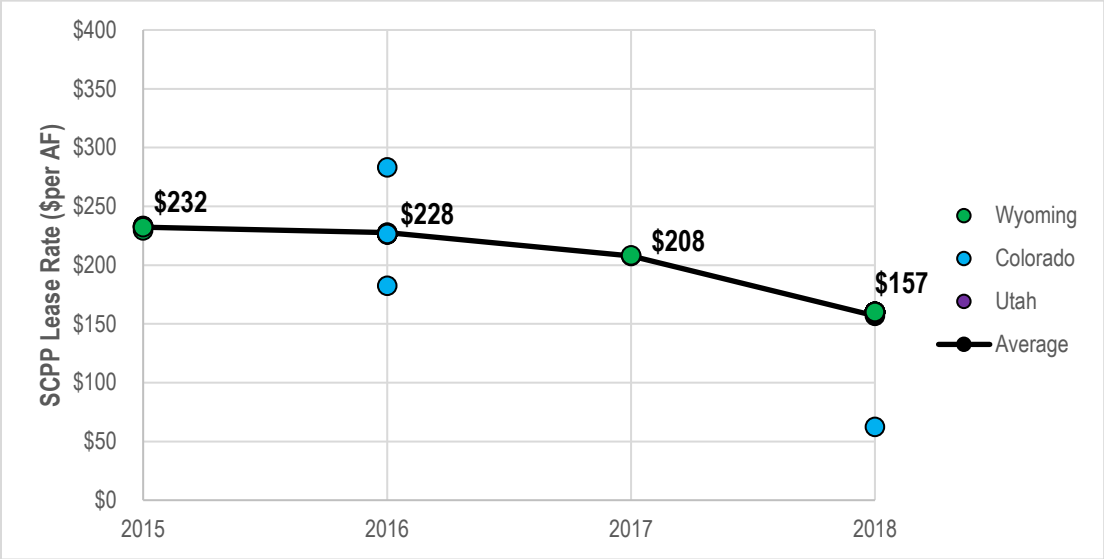
[8] The DCP refers to the Colorado River Drought Contingency Plan Authority Act and the Agreement Concerning Colorado River Drought Contingency Management and Operations. The Agreement includes 3 sub-agreements: (1) Agreement for Drought Response Operations at the Initial Units of the CRSP Act, (2) Agreement Regarding Storage at CRSP Act Reservoirs under an Upper Basin Demand Management Program, and (3) Lower Basin Drought Contingency Plan Agreement.

State	Year	Acres	CU (AF)	Unit CU (AF/acre)	Cost (2021 $s)	$per AF (2021 $s)	Cutoff Date	Crop
	2015	81	74	0.91	$17,269	$233	7/1	Grass
	2016	82	70	0.85	$15,861	$227	7/1	Grass
	2015	40	32	0.80	$7,350	$230	7/1	Grass
	2016	1,240	1,135	0.92	$257,175	$227	7/1	Grass
	2018	157	145	0.92	$23,201	$160	7/1	Grass
	2015	101	88	0.87	$20,450	$232	7/1	Grass
	2016	184	178	0.97	$40,332	$227	7/1	Grass
	2018	184	189	1.03	$30,204	$160	7/1	Grass
	2018	389	260	0.67	$41,601	$160	7/1	Grass
	2018	151	198	1.31	$31,681	$160	7/1	Grass
	2018	411	274	0.67	$43,841	$160	7/1	Grass
	2018	650	698	1.07	$111,683	$160	7/1	Grass
	2018	803	759	0.95	$121,443	$160	7/1	Grass
	2018	619	639	1.03	$102,266	$160	7/1	Grass
	2018	444	382	0.86	$61,130	$160	7/1	Grass
	2018	911	997	1.09	$159,524	$160	7/1	Grass
	2018	433	419	0.97	$67,042	$160	7/1	Grass
	2018	648	603	0.93	$96,483	$160	7/1	Grass
	2018	640	734	1.15	$117,459	$160	7/1	Grass
	2018	644	734	1.14	$117,444	$160	7/1	Grass
	2018	184	134	0.73	$21,440	$160	7/1	Grass
	2018	430	438	1.02	$70,081	$160	7/1	Grass
	2018	637	597	0.94	$95,523	$160	7/1	Grass
Colorado	2016	106	98	0.92	$22,289	$227	7/1	Grass
	2016	195	170	0.87	$31,014	$182	7/1	Grass
	2016	94	84	0.89	$18,988	$226	7/1	Grass/Alfalfa
	2016	67	125	1.87	$35,404	$283	6/10	Alfalfa
	2016	165	100	0.61	$22,659	$227	7/1	Grass
	2018	214	193	0.90	$53,335	$62	7/1	Grass
	2018	139	125	0.90			7/1	Grass
	2018	131	97	0.74			7/1	Grass
	2018	33	30	0.91			7/1	Grass/Alfalfa
	2018	209	209	1.00			7/1	Grass
	2018	283	200	0.71			7/1	Grass
Utah	2018	33	39	1.17	$6,228	$160	7/1	Pasture
	2017	159	229	1.45	$47,494	$207	7/1	Alfalfa
	2018	78	91	1.17	$14,623	$161	7/1	Alfalfa

Annual enrollment volumes in the SCPP increased each year it was operated and annual compensation rates fell. Annual SCPP lease rates are shown in **Figure 5**. The first year the program operated in 2015 saw an average lease price of $232 AF CU, followed by a small decline of $4 AF CU then steeper declines in the proceeding two years. The most recent 2018 SCPP lease rates had an average value of approximately $157 per AF CU in 2021 dollars.

The pricing of SCPP leasing had a large premium over agricultural net revenues (profits) in 2015 at the start of the program. At this point the program was untested, with relatively few water users willing to participate due to the perceived risks involved. Over time this premium decreased as more agricultural water users were willing to participate and comfort levels with the program increased. The average price for all split season leases in the SCPP is **$185 per AF CU** and provides an apt comparison to the subject rights. As well, the average price in the first year of the program in 2015 of **$232 per AF CU** can also be considered comparable to the subject rights as there are few to no alternative participants in the proposed lease and there is relatively high risk to the forage stand and cattle operations perceived by local landowners.

Figure 5: SCPP Average Lease Price by Year



Local Augmentation Sales

Throughout Western Colorado specifically decreed water rights are sold in small portions to provide augmentation to new water uses and are often the most expensive water assets in an area. There is not presently a large augmentation plan that covers most of the Tomichi Creek Basin including the subject property. However as discussed above, only two location specific augmentation plans have been developed in the Upper Tomichi Creek Basin, indicating a lack of demand. Still, under narrow circumstances the subject rights may be used for augmentation and local augmentation water prices can still provide a useful indication of value for the subject rights.

The Upper Gunnison Water Conservancy District (UGWCD) provides augmentation in the Upper Gunnison River Basin via three augmentation plans which are detailed in **Table 8**. Water from Lake San Cristobal is sold in units of 0.05 AF for $55 per unit or $1,100 per AF CU. The application of a discount rate is necessary to develop an equivalent annual value. This analysis applies a discount rate of 5%,[9] generating an annual value of $55 per AF CU. Water is also sold annually and under long term contracts for augmentation from the US Bureau of Reclamation's Aspinall Unit via UGWCD at the BOR's current Municipal & Industrial rate, which stands at $57.17 per AF CU in 2021. Water from both of these plans can be used for augmentation downstream of Lake San Cristobal and exchanged upstream of Blue Mesa Reservoir around Gunnison and up some distance into the East River towards Crested Butte and the Taylor Reservoir towards Taylor Park. Water from these plans can only be used on the lower reaches of Tomichi Creek up to the headgate of Biebel Ditches No 1&2 just east of Gunnison.[10]

The third augmentation plan offered by the UGWCD can exclusively supply water in the Crested Butte area via releases from Meridian Lake Reservoir north of Crested Butte. The Lake was purchased and improved by UGWCD in 2003 at a cost of $1.4 Million. The high amenity value of the area and high cost of the Lake has led to Meridian Lake Reservoir augmentation having some of the highest costs for augmentation water in the

[9] Using a 5% real discount rate. This discount rate was selected based on USDA cash rent to value ratios and NCREIF farmland values quarterly reports (5-year average).

[10] Case 03CW0108 (Lake San Cristobal), Case 03CW0049 (Aspinall Unit)

state. Water from Meridian Lake Reservoir is sold in units of 0.05 AF CU for $3,500 per unit or $70,000 per AF CU. Applying the same 5% discount rate as above yields an annual value of $3,500 per AF CU.

Table 8: Upper Gunnison River Basin Augmentation Plans

Augmentation Source	$per AF	$per AF/Year
Lake San Cristobal (Lake City)	$1,100	$55
Aspinall Unit (Blue Mesa Reservoir)	-	$57.17
Meridian Lake Reservoir (Crested Butte)	$70,000	$3,500

The cost of augmentation in the Upper Gunnison River Basin varies widely, from an annualized value of $55 per AF CU in many areas of Gunnison County to $3,500 per AF CU in the Crested Butte area. Neither of these values are relevant to the subject rights. The first two, lower cost augmentation plans are supplied using surplus water from water sources that have never been fully utilized. The third augmentation plan serves an expensive water supply in a high value area to which the subject rights cannot be exchanged.

Western Slope Environmental Split Season Leases

Several split season leases for environmental purposed have operated on Colorado's Western Slope over the past decade where payment was made to a lessor and are detailed in **Table 9** The first two leases in the table both occurred in Grand County at the headwaters of the Colorado River. The first lease was signed in 2012 and provided for increased flows in Willow Creek in Grand County below Willow Creek Reservoir as well as the Colorado River through the fallowing of land under the Bunte Highline Ditch. The lease was for ten years and could be operated in any three of those years. In 2012, the lessor was paid $83,452 which resulted in 401 AF[11] CU remaining in stream for a unit price of $208 per AF or $243 in 2021 dollars. The lease was triggered for a second year in 2013 at a unit price of $102 per AF ($117 in 2021 dollars), however no water was delivered.[12] The second lease was also a three in ten year lease from the Winter Park Ranch Water & Sanitation District (WPRWSD). The first year of the lease was in 2013 and supplied 40.6 AF at a cost of $2,460 or $61 per AF ($70 per AF in 2021 dollars).

The second lease is not considered a fair indication of market value as the price was not negotiated in a way that would represent market value.[13] The first lease is considered a fair indication of market value, however it is expected that the first year bore some upfront costs, which resulted in the higher unit price. In order to determine an average unit price, the lease prices from 2012 and 2013 are averaged, resulting in a price of **$176 per AF CU**.

Table 9: CWT & CWCB Environmental Split Season Leases

Lease #	Lessor	Asset	Water Source	Year	Total $	AF CU	$/AF CU	$/AF CU (2021 $s)
1	Aspen Shorefox LLC	Bunte Highline Ditch	Willow Creek	2012	$83,452	401	$208	$243
				2013	*$0*	*0*	*$102*	*$117*
2	Winter Park Ranch Water & San. District	Hammond # 2 Ditch	Saint Louis Creek	2013	$2,460	40.6	$61	$70
3	CO Water Trust and Trout Unlimited	Coats Brothers Ditch	Tomichi Creek	2018	$14,600	60.1	$243	$265

The third lease was for the Coats Brothers Ditch, just upstream of the subject property along Tomichi Creek. This lease was signed in 2015 and is a traditional split season lease with fallowing beginning either July 1 or

[11] This volume is based upon the July through October average HCU as detailed in the original SWSP filing.
[12] Conversation with Kate Ryan, CWT, 3/3/2021
[13] Conversation with Kate Ryan, CWT 3/3/2021.

August 1, with pricing set at $14,600 for a July 1 start and $5,000 for an August 1 start. The lease can be triggered in any three out of the ten years between 2015 and 2024 and was last triggered in 2018. This generated a net stream benefit of 60.1 AF CU, at a unit price of $243 per AF CU or $265 per AF CU in 2021 dollars. This lease is directly comparable to the subject rights. With the cooperation of the landowner, this lease could be triggered in any two of the next three years at the set price of $14,600 if started in July or $5,000 if started in August. The July start date is considered the most applicable to the subject rights, resulting in a comparable unit price of **$243 per AF CU**.

McKinley Ditch Split Season Purchase

In 2014, the Colorado Water Trust purchased 1.5 of the 8 shares in the McKinley Ditch for $145,640 and subsequently worked with the CWCB to convert the water right to include instream flow uses. The water is now shared between agriculture, which uses the water right to irrigate almost 200 acres in the spring and early summer, and environmental uses when the water is left in the stream during late summer and early fall providing an average of 111.9 AF CU annually, resulting in a unit value of approximately $1,300 per AF CU or $1,530 in 2021 dollars. Utilizing the same discount rate as above of 5% yields an annual value of $77 per AF CU. The shares were purchased from the Western Rivers Conservancy (WRC) who had previously purchased the land and water in 2012 out of foreclosure with a stated purpose of moving the water to instream flows. WRC also provided the CWT and CWCB a no cost lease of the shares in 2013. The relationship between WRC and CWT is not considered arm's length and as such this transaction is not utilized to value the subject rights

Income Capitalization Approach

The value of the subject water right can be evaluated based upon the additional income it provides to the existing cow-calf operation of the Petersen Ranches. The subject water rights provide for irrigation of grass hay and pasture, which reduces the quantity of supplemental hay that needs to be purchased and acquired from outside the operation. A comparison of annual crop enterprise budgets under a fully irrigated (baseline) condition and a reduced irrigation condition for the split-season water lease is used to represent the additional benefit value of irrigation on the existing ranch operation. This section describes the application of the income approach.

Estimated Ranch Income under Baseline Conditions

The ranch income under baseline conditions without a split-season lease agreement is estimated based on crop enterprise budgets[14] for grass hay on the Colorado Western Slope produced by Colorado State University (CSU) Extension office for the years 2017 to 2019. These crop budgets are summarized in **Table 10**. The three years of budgets indicate a net income over operating costs of approximately $300 to $400 per acre, and an average of approximately $130 per ton of grass hay yield.

An interview with the landowner[15] was used to modify the CSU crop budgets to reflect conditions on the Petersen Ranches property. The following modifications were applied:

[14] https://abm.extension.colostate.edu/enterprise-budgets-crop/

[15] In person and email communication with Kathleen Curry. September 2021.

- The crop budget was modified to remove input costs such as fertilizer and herbicide. According to the landowner, the only input applied to the fields is manure. For this analysis, the manure is estimated to be sourced from the ranch operation.

- The sale price of hay was set at $225 per ton based on recent hay sales by the landowner. This price falls within the range of expected hay sale prices for high elevation, high quality grass hay.

- The hay yields were modified to reflect two different data points and harvest costs were scaled to reflect the estimated yield under each scenario:

    - The engineering analysis completed by Tyler Martineau Engineering estimated a baseline consumptive use (CU) of approximately 434 acre-feet (AF). This quantity of CU by a grass hay forage crop is estimated to produce approximately 2.64 tons of hay based on a schedule of Water Use Efficiency (WUE) values relating crop yield to crop ET. Additional discussion of the CU analysis and WUE values is provided in the section below. This yield was estimated to require two cuttings over the growing season.

    - The landowner stated that a typical yield on the property is 1.5 tons per acre with a harvest in late August. This yield was estimated to require a single cutting. Importantly, this yield does not include consumption by cattle which are ran on the property after cutting. The landowner estimated that operation of the split season lease would necessitate moving 100 head to a separate field for 30 days at a cost of $1.05/AUM/day or $3,150 annually. This cost is the value of lost production under this scenario.

- Operation of the split season lease would necessitate increased movement of cattle between pastures to accommodate the adjusted irrigation timing. The landowner estimated that an additional 30 hours of labor for a three-person team, or 90 total hours would be needed. The value of this labor was estimated at $17/hour[16] or $1,530 annually. This expense is additive to the value of lost production.

Table 11 summarizes the baseline ranch income estimates based on the above data inputs and modifications. As shown, baseline net income over operating costs was estimated to range from $280 to $487 per acre depending on assumed yield production from the ranch.

[16] National Agricultural Statistical Service, Farm Labor Survey, Mountain II Region (Nevada, Utah, Colorado) for April 2021. $16.42/hour, but rounded up to $17/hr to account for inflation upon the start of the split season lease.

Table 10: Summary of CSU Crop Enterprise Budgets for Western Colorado Grass Hay

		2019					2018					2017				
		$/acre	$/ton	Units	Quantity	Unit Cost	$/acre	$/ton	Units	Quantity	Unit Cost	$/acre	$/ton	Units	Quantity	Unit Cost
Pre-Harvest	Fertilizer	$63.00	$22.66	lbs	150	$0.42	$52.50	$20.59	lbs	150	$0.35	$25.60	$8.98	lbs	80	$0.32
	Custom Application	$12.00	$4.32	acre	1	$12.00	$12.00	$4.71	acre	1	$12.00	$10.00	$3.51	acre	1	$10.00
	Herbicide	$30.00	$10.79	times	2	$15.00	$16.00	$6.27	times	2	$8.00	$0.00	$0.00	-	-	-
	Custom Application	$24.00	$8.63	times	2	$12.00	$24.00	$9.41	times	2	$12.00	$0.00	$0.00	-	-	-
	Interest Expense	$4.84	$1.74	6 months @ 7.5%			$3.92	$1.54	6 months @ 7.5%			$1.34	$0.47	6 months @ 7.5%		
Harvest	Swath	$30.00	$10.79	cuttings	2	$15.00	$30.00	$11.76	cuttings	2	$15.00	$30.00	$10.53	cuttings	2	$15.00
	Rake	$18.00	$6.47	cuttings	2	$9.00	$14.00	$5.49	cuttings	2	$7.00	$14.00	$4.91	cuttings	2	$7.00
	Bale	$41.70	$15.00	bale	4.63	$9.00	$38.25	$15.00	bale	4.25	$9.00	$42.75	$15.00	bales	4.75	$9.00
	Hauling	$20.85	$7.50	bale	4.63	$4.50	$19.13	$7.50	bale	4.25	$4.50	$21.38	$7.50	bales	4.75	$4.50
Total Operating Cost		**$244.39**	**$87.90**				**$209.80**	**$82.27**				**$145.07**	**$50.90**			
Revenue	Sale Receipts	$645.00	$232.00	ton	2.78	$232.00	$523.00	$205.00	ton	2.55	$205.00	$482.00	$169.00		2.85	$169.00
Net Revenue over Operating Costs		**$400.61**	**$144.10**				**$313.20**	**$122.73**				**$336.93**	**$118.10**			

Table 11: Estimated Net Income Change under Split-Season Irrigation Lease

(a) Engineering Estimate of Production / Yield Scenario

		Baseline / Historic					Reduced Irrigation				
		$/acre	$/ton	Units	Quantity	Unit Cost	$/acre	$/ton	Units	Quantity	Unit Cost
Pre-Harvest	Fertilizer	$0.00	$0.00	lbs	0	$0.42	$0.00	$0.00	lbs	0	$0.42
	Application	$0.00	$0.00	acre	0	$12.00	$0.00	$0.00	acre	0	$12.00
	Herbicide	$0.00	$0.00	times	0	$15.00	$0.00	$0.00	times	0	$15.00
	Application	$0.00	$0.00	times	0	$12.00	$0.00	$0.00	times	0	$12.00
Harvest	Swath	$30.00	$10.79	cuttings	2	$15.00	$30.00	$10.79	cuttings	2	$15.00
	Rake	$18.00	$6.47	cuttings	2	$9.00	$18.00	$6.47	cuttings	2	$9.00
	Bale	$39.60	$15.00	bale	4.4	$9.00	$31.20	$15.00	bale	3.47	$9.00
	Hauling	$19.80	$7.50	bale	4.4	$4.50	$15.60	$7.50	bale	3.47	$4.50
Total Operating Cost		**$107.40**	**$39.76**				**$94.80**	**$39.76**			
Revenue	Sale Receipts	$594.00	$225.00	ton	2.64	$250.00	$468.00	$225.00	ton	2.08	$250.00
Net Revenue over Operating Costs		**$486.60**	**$185.24**				**$373.20**	**$185.24**			
Net Revenue Decline							**$113.40**				

(b) Landowner Estimate of Production / Yield Scenario

		Baseline / Historic					Reduced Irrigation				
		$/acre	$/ton	Units	Quantity	Unit Cost	$/acre	$/ton	Units	Quantity	Unit Cost
Pre-Harvest	Fertilizer	$0.00	$0.00	lbs	0	$0.42	$0.00	$0.00	lbs	0	$0.42
	Application	$0.00	$0.00	acre	0	$12.00	$0.00	$0.00	acre	0	$12.00
	Herbicide	$0.00	$0.00	times	0	$15.00	$0.00	$0.00	times	0	$15.00
	Application	$0.00	$0.00	times	0	$12.00	$0.00	$0.00	times	0	$12.00
Harvest	Swath	$15.00	$10.79	cuttings	1	$15.00	$15.00	$10.79	cuttings	1	$15.00
	Rake	$9.00	$6.47	cuttings	1	$9.00	$9.00	$6.47	cuttings	1	$9.00
	Bale	$22.50	$15.00	bale	2.5	$9.00	$16.88	$15.00	bale	1.88	$9.00
	Hauling	$11.25	$7.50	bale	2.5	$4.50	$8.44	$7.50	bale	1.88	$4.50
Total Operating Cost		**$57.75**	**$39.76**				**$49.31**	**$39.76**			
Revenue	Sale Receipts	$337.50	$225.00	ton	1.5	$250.00	$253.13	$225.00	ton	1.125	$250.00
Net Revenue over Operating Costs		**$279.75**	**$185.24**				**$203.81**	**$185.24**			
Net Revenue Decline							**$75.94**				

Estimated Yield Impact of Reduced Irrigation

The agricultural income impact of reduced irrigation is captured in the reduced hay yield that is expected to occur. An engineering analysis of changes in crop consumptive use of water (CU) due to a split season lease of water was completed by Martineau. The results of this analysis were used to estimate hay yields under baseline and reduced irrigation conditions as summarized in **Table 12**. The Water Use Efficiency (WUE) values are used to convert crop evapotranspiration (ET) into crop yield and were adopted from a deficit irrigation study on alfalfa[17]. The engineering analysis indicates a baseline yield of 2.64 tons and a split-season lease yield of 2.08 tons, equal to a yield reduction of 0.57 tons or 21% of the baseline yield.

Table 12: Summary of Hay Yield Analysis based on Consumptive Water Use

		Calculated Crop Consumptive Use (AF)								
Ditch	Scenario	Apr	May	Jun 1-23	Jun 24-30	Jul	Aug	Sep	Oct	Annual
Louis Ditch	Historic	0.3	11.6	16.4	5	18.3	9	5.8	1.3	**67.7**
	Split Season	0.3	11.6	16.4	4.9	9.5	3.4	2.7	1.1	**49.9**
Cain Borsum Ditch	Historic	1.5	34.7	50.4	15.4	56.6	28.6	21.9	5.5	**214.6**
	Split Season	1.5	34.7	50.4	15.3	32.9	13.9	8.8	4.7	**162.2**
McGowan Ditch	Historic	0.3	22.8	31.7	9.8	36.9	18.5	15.1	4.6	**139.7**
	Split Season	0.3	22.8	31.7	9.6	29.2	7.8	4.9	4.3	**110.6**
McGowan Ditch Alt. Point	Historic	0	2.3	3	0.9	3	1.3	0.8	0.3	**11.6**
	Split Season	0	2.3	3	0.9	1.6	0.8	0.6	0.3	**9.5**
Combined CU (AF)	Historic	2.1	71.4	101.5	31.1	114.8	57.4	43.6	11.7	**433.6**
	Split Season	2.1	71.4	101.5	30.7	73.2	25.9	17	10.4	**332.2**
	Reduction	0	0	0	0.4	41.6	31.5	26.6	1.3	**101.4**
Yield (tons per acre)	**WUE**	**0.16**	**0.13**	**0.12**	**0.11**	**0.1**	**0.1**	**0.11**	**0.12**	
	Historic	0.02	0.50	0.66	0.19	0.62	0.31	0.26	0.08	**2.64**
	Split Season	0.02	0.50	0.66	0.18	0.40	0.14	0.10	0.07	**2.08**
	Reduction	0.00	0.00	0.00	0.00	0.23	0.17	0.16	0.01	**0.57**

The landowner stated that typical hay yields on the ranch property are 1.5 tons per acre. This stated yield is significantly lower than the yield indicated by the engineering CU analysis. The landowner also stated that the expected yield reduction due to the split season lease is approximately 25%, resulting in a revised yield of 1.125 tons per acre.

Agricultural Value of Subject Water Rights

The value of the subject water rights are estimated using the income approach by estimated the decline in net revenue due to reduced hay yields. The information reviewed in this study indicates two potential values for hay yield reduction, summarized below:

[17] D.H. Putnam et al. Deficit irrigation strategies: why alfalfa is the best crop to have in a drought. Proceedings of the Second World Alfalfa Congress. 2018.

- The engineering CU analysis of reduced ranch income is summarized in **Table 11a**. The yield reduction is estimated to be 21% of baseline production resulting in lost net revenue of approximately $113 per acre. The engineering CU analysis modeled 220.7 acres as participating in the split-season lease program resulting in a lost net revenue of approximately $25,000 per year. In order to incorporate the additional $1,500 in labor costs and any additional costs from the implementation of the lease, a 10% premium of $2,500 is added, resulting in a value of **$27,500** or **$236 per AF CU**.

- The reduced ranch income based on the landowner stated hay yield is summarized in **Table 11b**. The yield reduction is estimated as 25% of the baseline production, resulting in lost net revenue of approximately $76 per acre. Applying this value to the modeled 220.7 acres results in a lost net revenue of approximately $16,800 per year. As this model only took into account the lost value from marketable hay, the additional cost of pasturing 100 head on an additional field of $3,150 is added, for a total value of approximately $20,000 per year. In order to incorporate the additional $1,500 in labor costs and any additional costs from the implementation of the lease, a 10% premium of $2,000 is added, resulting in a value of **$22,000** or **$189 per AF CU**.

Summary & Final Opinion of Value

This analysis estimated the value of water generated by proposed a split season lease of five water right decrees appurtenant to 220 irrigated acres on the Peterson Ranch east of Gunnison, CO that are irrigated by four ditches that divert out of Tomichi Creek. The following provides a summary of the key conclusions:

- **Transferable Volume** – Tyler Martineau Engineering estimated the instream flow benefits of the proposed split season lease. Fallowing the subject property between June 24 and July 31 and September 1 – 30 would result in a net benefit to Tomichi Creek of **116.4 AF CU**.
- **Transferability** – The subject water rights have a limited season of use, only providing water between June 24 and July 31 and in the month of September. As such, the subject rights are considered to be only transferable to agricultural and environmental users. The spatial transferability of the subject rights is further limited to the Tomichi Creek Basin upstream of river mile 10 due to the availability of surplus water in all areas in which the subject rights are legally transferable.
- **Water Right Supply & Demand** – Water Use in the Tomichi Creek Basin upstream of river mile ten is nearly all agricultural. A review of the supply of water in Tomichi Creek shows that water is not available for new uses between July and October of an average year. A review of all augmentation plans in the marketable area reveals that only eight plans have been in the area, with the most recent one approved in 2005, indicating a lack of growth and demand for new water use in the area.
- **Highest and Best Use** – Due to the limited transferability of the subject rights, the highest and best use of the rights was determined to be in either the historic, agricultural use of the rights or in environmental uses under the proposed lease if approved and executed.
- **Valuation Conclusions** – This report utilized a review of local and statewide comparable sales and transaction programs as well as a modeled farm income capitalization model to provide several distinct valuations of the subject rights. **Table 13** provides a summary of each valuation method utilized. Three of the methods are greyed out as they were determined to be applicable to the subject rights. The remaining methods show a range from $180 per AF CU to $243 per AF CU. This range is somewhat large and is bounded by rates from environmental leases negotiated over five years ago. A narrower and more up to date range can be provided by the results from the Income Capitalization Model, which utilizes two different estimates of yield, one from Martineau, the other from the landowner. This yield s range of $189 per AF CU and $236 per AF CU, resulting in a total value range of $22,000 and $27,500 for 116.4 AF CU. Due to the unique nature of the proposed lease and, the increase operational costs of the sellers and perceived risk to leases such as these from rural agricultural communities, the upper end of this range is recommended, resulting in a valuation of **$236 per AF CU** and a total value of **$27,500**. A higher value may be justified if there are increased costs to the sellers not incorporated into this report.

Opinion of Value:

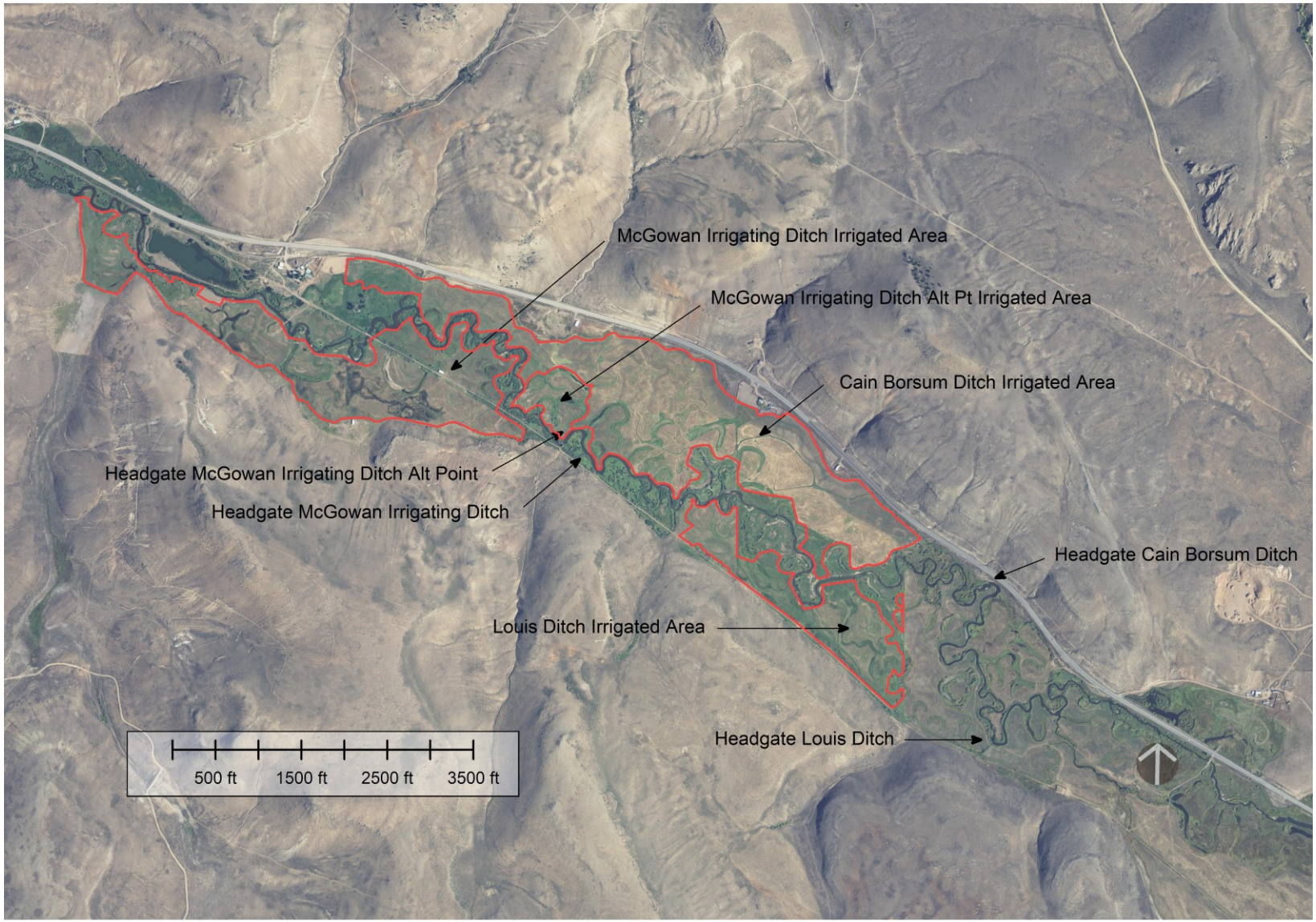
$236 per AF CU
$27,500 Annual Total

Table 13: Valuation Method Summary

Type	Sub-Type	Unit Value ($/AF/Year)	Total Value ($)
Comparable Sales	Grand County Split Season Lease	$180	$20,952
	Coats Brothers Lease	$243	$28,300
	McKinley Ditch Split Season Purchase	*$77*	*N/A*
	SCPP Split Season Leases (Program Avg.)	$185	$21,534
	SCPP Split Season Leases (First Year Avg.)	$232	$27,005
	Local Augmentation Costs - Low	*$57*	*N/A*
	Local Augmentation Costs – High	*$3,500*	*N/A*
Income Capitalization	Martineau Hay Yield	$236	$27,500
	Landowner Hay Yield	$189	$22,000

Appendix A: Maps

Outline of Irrigated Areas



Louis Ditch, Cain Borsum Ditch, McGowan Irrigating Ditch, and McGowan Irrigating Ditch Alt Pt

Map Created By: Tyler Martineau, P.E. 427 Belleview Ave., Suite 206 Crested Butte, CO 81224 (970)275-8802

Regional Overview

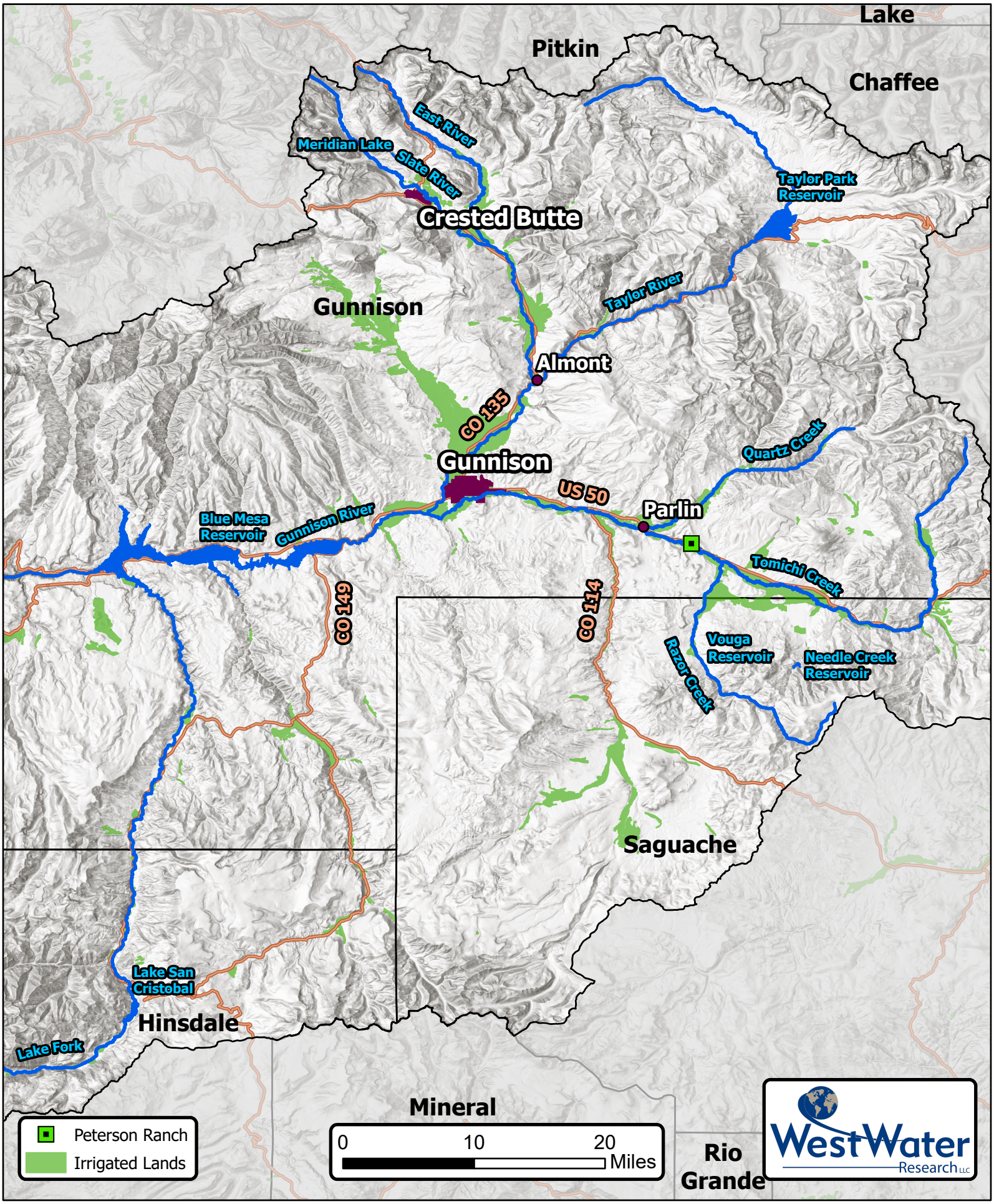


Exhibit I
Agenda Item 19a
November 17, 2022

COLORADO
Parks and Wildlife
Department of Natural Resources

Water Resources Section – Aquatic, Terrestrial, and Natural Resources Branch

November 4, 2022

Mr. Rob Viehl
Mr. Pete Conovitz
Colorado Water Conservation Board
Stream and Lake Protection Section
1313 Sherman Street, 7th Floor
Denver, CO 80203

Subject: Proposed Renewable Lease of Peterson Ranch Direct Flow Rights for Instream Flow Use on Tomichi Creek

Dear Rob and Pete:

The purpose of this letter is to provide Colorado Water Conservation Board (CWCB) staff with Colorado Parks and Wildlife's (CPW) evaluation and recommendation regarding the proposed renewable lease of water to supplement streamflow conditions in Tomichi Creek. The Colorado Water Trust (CWT) and the Peterson and Razor Creek Ranches (Petersons) are proposing a renewable lease of water rights associated with four irrigation ditches owned and operated by the Petersons. The Petersons can elect to lease water to the CWCB to help meet shortfalls in the decreed instream flow (ISF) reach on Tomichi Creek. The proposal involves a split-season leasing arrangement, in which irrigation will be shut-off for a portion of the season and the water will be used by the CWCB for ISF use up to the flow rate necessary to preserve the natural environment to a reasonable degree. Split-season operations under the proposed renewable lease can be used up to five years in a 10-year period, pursuant to section 37-83-105(2) C.R.S. (2020). This lease proposal will be presented to the CWCB at their November 2022 meeting as part of a two-Board meeting approval process. The following represents CPW's final opinions and recommendations on the proposal.

General Information

The CWCB requested that CPW evaluate the proposed renewable lease of water from the Petersons and CWT. The proposal is to utilize the Louis, Cain Borsum, and McGowan Irrigating Ditches for a split-season operation to benefit streamflow conditions in late June through July and September. The CWCB holds a decreed ISF water right in the reach of Tomichi Creek intervening the Peterson's diversions. The instream flow right was decreed in Case No. 80CW132:

Decreed ISF Water Right on the Proposed Lease Reach of Tomichi Creek			
Upper Terminus	**Lower Terminus**	**Flow Rate (cfs)**	**Priority Date**
Marshall Creek Confluence	Quartz Creek Confluence	18 cfs year-round	3/17/1980

Natural Environment

Tomichi Creek is a major tributary of the Gunnison River draining portions of the southernmost Sawatch Range and Cochetopa Hills. From the Continental Divide, Tomichi Creek flows westerly to its confluence with the Gunnison River near the town of Gunnison. Tomichi Creek supports a wild trout fishery. Sampling records indicate rainbow and brown trout, Rio Grande chub, longnose sucker, longnose dace, brook stickleback, fathead minnow, and white sucker are present. Northern leopard frog, a Tier 1 Species of Greatest Conservation Need in the State Wildlife Action Plan, are known to exist in the lower Tomichi Valley. Quality trout (greater than 14" in length) can be found throughout Tomichi Creek.

Tomichi Creek is heavily utilized for flood irrigation, primarily for hay and pasture grass cultivation. Low flow conditions are common throughout the Tomichi Creek Valley, especially in the lower reaches east of Gunnison. In dry and below average years, flows in Tomichi Creek gets extremely low with full and partial dry-up conditions below a number of diversions. Dewatered conditions improve as irrigation return flows accrue to the creek, but high stream temperatures are still common. High stream temperatures and degradation of habitat in Tomichi Creek have been a concern of CPW's in recent years, with some macroinvertebrate surveys falling short of the standards for aquatic life. Exceedances of the Colorado Water Quality Control Commission's (WQCC) chronic temperature standard (65-66 degrees Fahrenheit) are common and not limited to drought years.

In extremely dry years such as 2012 and 2013, very low streamflow conditions had a noticeable impact on fish populations, particularly on portions of CPW's Tomichi Creek State Wildlife Area (SWA) which experienced little or no streamflow. In 2018 and 2019, CPW conducted an investigation focused on evaluating drought impacts and fish movement through the Tomichi and Cochetopa Creek Basins. Flow and temperature monitoring was conducted as part of this study to assess potential drought impacts to trout and the relationship between fish movement, flow, and stream temperature. CPW found that although stream flows were low and temperatures were high within lower Tomichi Creek in 2018, fish sampling results indicate that brown trout may be able to weather these warmer, low flow events if some streamflow can be maintained in Tomichi Creek. As part of this study, CPW observed exceedances of WQCC's acute temperature standards (75.7 degrees Fahrenheit) in July 2018 on Tomichi Creek above Quartz Creek, as well as lower portions of the creek near the Tomichi Creek SWA.

Evaluation of the Proposed Renewable Lease

The proposed lease would include four water rights which have historically irrigated the Peterson and Razor Creek Ranches. The proposal includes multiple priorities under the Louis Ditch (cumulatively decreed for 10 cfs), the Cain Borsum Ditch (cumulatively decreed for 22 cfs), and the McGowan Irrigating Ditch and its alternate point of diversion (cumulatively decreed for 11.5 cfs). The lease will utilize split-season operations to supplement flows in Tomichi Creek when the creek suffers from low flow and high temperature conditions.

The lease is structured in a manner where diversions will occur as they have historically from the beginning of the irrigation season through June 24, then again from August 1 through August 31 and from October 1 through the end of the irrigation season. Diversions will be shut-off from June 25 through July 31 and potentially from September 1 through September 31. Exact implementation dates may be shifted by approximately a week as conditions necessitate. Foregone diversions will be used to preserve the natural environment to a reasonable degree by helping meet shortfalls to the decreed instream flow water right when flows are below 18 cfs and the right is not fully satisfied. Decisions about whether to implement the lease annually will be made by Petersons no later than May 1.

Benefits to the Tomichi Creek Instream Flow Reach

After spring runoff recedes, streamflow in Tomichi Creek drops substantially from a combination of natural conditions and anthropogenic influences. Historically in July, flood irrigation is at its peak before irrigators shut-off in August to dry their fields before haying operations. Flow conditions typically improve in August with this system-wide operation and into the late-summer and fall with monsoonal moisture. The proposed lease will involve the Petersons shutting off a month earlier than they would have historically to lease their water rights to the CWCB for ISF use in late June through July and potentially September. This operation will increase flows in the lower portion of the Tomichi Creek ISF reach by at least 1.8 cfs in July, and up to 6.7 cfs in June, below all return flow obligations. Flow restoration benefits will be greater, up to 19 cfs, between the historic points of diversion and return flows.

As noted above, CPW has observed exceedances of WQCC's chronic and acute temperature standards on Tomichi Creek above Quartz Creek, as well as lower reaches of Tomichi Creek. CPW expects that this additional stream flow will provide benefits by mitigating high temperatures during the period that has historically been afflicted by low flows and high stream temperatures. The split-season proposal will likely provide colder-water refuge for trout residing in the lower portion of the Tomichi Creek ISF reach on the Peterson's property. Although this lease may result in stream depletions during the months of August and October due to reduced lagged return flows from the periods of non-diversion, CPW is of the opinion that aquatic benefits provided in July far outweigh these relatively small reductions in streamflow. While the reach benefiting from the proposed lease is on private lands, flow restoration benefits will be provided to the fishery by mitigating high temperature conditions in late June and July. This may provide benefits to the fishery overall and may result in indirect downstream benefits.

CWCB Policy 19 Considerations

Since this proposal will be funded with monies authorized by 37-60-123.7 to acquire water to improve the natural environment to a reasonable degree, CWCB Policy 19 must be followed. Specifically, Policy 19 asks CPW to provide data and information to the Board that addresses the following:

a. The degree to which the acquired water will add useable habitat to riffles, pools and runs within the subject ISF reach;
b. The amount of additional useable area for fish and macroinvertebrates that the acquired water will provide;
c. Where applicable, the amount of protection from high temperatures and low oxygen levels in hot summer months that the acquired water will provide;
d. An analysis of the degree to which the additional water resulting from the acquisition: (1) benefits the natural environment, and (2) does not result in hydraulic conditions that are detrimental to the aspects of the natural environment intended to be benefited by the acquired water, such as habitat requirements for a particular life stage of a fish species; and
e. Where applicable, an estimate of the degree to which the acquired water will increase moisture levels in the alluvial aquifer to support the riparian vegetation in the subject stream reach.

This lease proposal will help supplement flows to bring streamflow conditions up to the decreed flow rate of 18 cfs. The CWCB has made the determination that 18 cfs is the flow rate necessary to preserve the natural environment to a reasonable degree. Per the Board's determination relying on R2Cross, 18 cfs supports fish habitat maintenance across riffles. In maintaining suitable hydraulic conditions across riffle areas, habitat types such as pools and runs will also have adequate protection of flow conditions for most life stages of fish and aquatic invertebrates. Additionally, water dedicated instream from the lease will likely provide stream temperature mitigation and refuge for fish in July.

Conclusions and Recommendations

CPW is of the opinion that the proposed lease of water from the Petersons and CWT will result in additional habitat and colder-water refuge for the resident trout in the lower 7.25 miles of the Tomichi Creek ISF reach. CPW believes that accepting this water will preserve the natural environment by helping to fully satisfy the existing ISF water right on Tomichi Creek more often. CPW recommends the CWCB accept the proposed renewable lease of water from CWT and the Petersons. We also recommend continued coordination and discussions with CPW about providing the most benefits to the fishery in implementing this lease. CPW staff will be available at the November 2022 CWCB meeting to answer any questions that the Board might have relating to this agenda item. Thank you for the opportunity to assist in this matter.

Sincerely,

Katie Birch

Instream Flow Program Specialist

Exhibit J. Benefiting ISF Segment on Tomichi Creek