

# AGENDA

## UPPER YAMPA WATER CONSERVANCY DISTRICT BOARD OF DIRECTORS SPECIAL MEETING WEDNESDAY, FEBRUARY 16, 2022 (10:00 AM)

### ONLINE MEETING:

[HTTPS://US06WEB.ZOOM.US/J/88580218395?PWD=BKLCVTRBZCtDAWhCSWURtG44SU42Zz09](https://us06web.zoom.us/j/88580218395?pwd=BKLCVTRBZCtDAWhCSWURtG44SU42Zz09)

#### INSTRUCTIONS ON HOW TO JOIN A ZOOM MEETING FOLLOW THE AGENDA

A Board of Directors meeting packet is available for public review on our website at <https://upperyampawater.com/agendas-and-meeting-documents/> by the Friday before the meeting. Amendments to the Agenda and new documents that are generated or submitted after the original posting of the meeting materials will be posted under "Additional Documents" on the website for the relevant meeting.

**QUESTIONS ON AGENDA AND/OR BOARD MATERIALS:** Members of the public or Board of Directors with questions on the agenda or meeting materials, including the consent agenda, are welcome to contact the General Manager at the District offices prior to the meeting. You may reach the General Manager at: [arossi@upperyampawater.com](mailto:arossi@upperyampawater.com) or (970) 871-1035 Ext. 2.

**MEETING PROCEDURE:** Comments from the Public are welcome at two different times during the course of the meeting: 1) Comments no longer than three (3) minutes on items **not** scheduled on the Agenda will be heard under Public Input and Comment; and 2) Comments no longer than three (3) minutes on all scheduled public hearing items will be heard following the presentation. Please wait until you are recognized by the President. With the exception of subjects brought up during Public Input and Comment, on which no action will be taken or a decision made, the Board may take action on, and may make a decision regarding, ANY item referred to in this agenda, including, without limitation, any item referenced for "review", "update", "report", or "discussion" whether or not listed as an "Action Item."

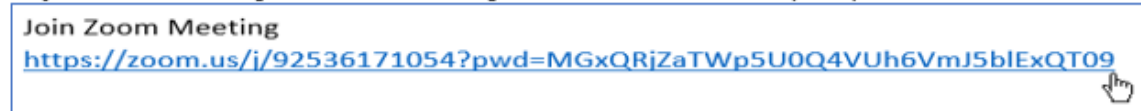
- (1) **10:00 AM** Establishment of Quorum and Call to Order
- (2) **10:00 AM** Approval of Agenda for Meeting **Action item**
- (3) **10:05 AM** Public Input and Comment  
The Board will make no decision nor take action, except to direct the General Manager. Those addressing the Board are requested to identify themselves by name, organization, if any, and address. Comments shall not exceed three (3) minutes.
- (4) **10:10 AM** Report of General, Special Counsel
  - a. Status of Water Cases
- (5) **10:30 AM** Executive Session:
  - a. Executive session under CRS § 24-6-402(4)(b) to discuss legal issues on Water Resumes, Water Cases, Contract Negotiations and \_\_\_\_\_ (insert description). Mere presence or participation of an attorney at an executive session is not sufficient to satisfy the requirements of CRS § 24-6-402(4)(b). Executive sessions to discuss legal matters are not recorded.
- (6) **11:00 AM** Report of General Manager
  - a. Coal Creek Diversion Project Update
- (7) **12:00 PM** New Business (Limited to emergency matters that came up **Action item**  
During the course of the meeting)

- (8) **12:05 PM** Executive Sessions:
- a. Executive session under CRS § 24-6-402(4)(b) to discuss legal issues on Water Resumes, Water Cases, Contract Negotiations and \_\_\_\_\_(insert description). Mere presence or participation of an attorney at an executive session is not sufficient to satisfy the requirements of CRS § 24-6-402(4)(b). Executive sessions to discuss legal matters are not recorded.
  - b. Executive session under CRS § 24-6-402(4)(e)(I) for the purpose of determining positions relative to matters that may be subject to negotiations; developing strategy for negotiations; and instructing negotiators with respect to \_\_\_\_\_(insert brief description). This session will be recorded, and a copy of the recording maintained for not less than 90 days.
- (9) **12:35 PM** Board Actions in Regard to Executive Session
- (10) **1:35 PM** Adjournment.

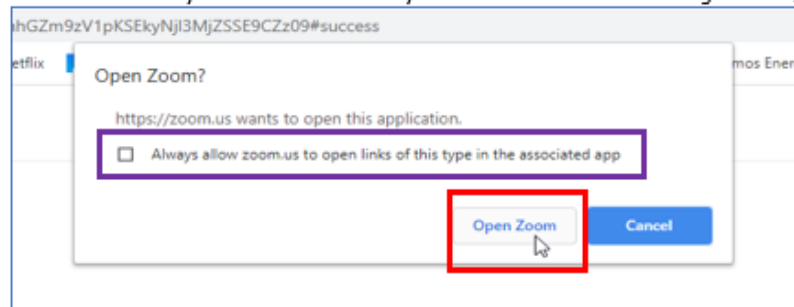
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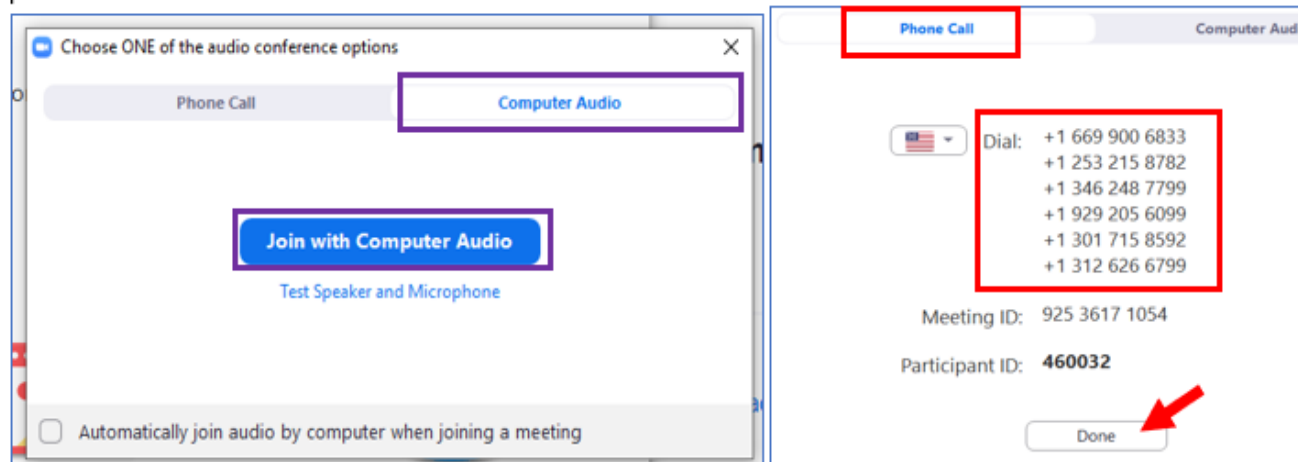


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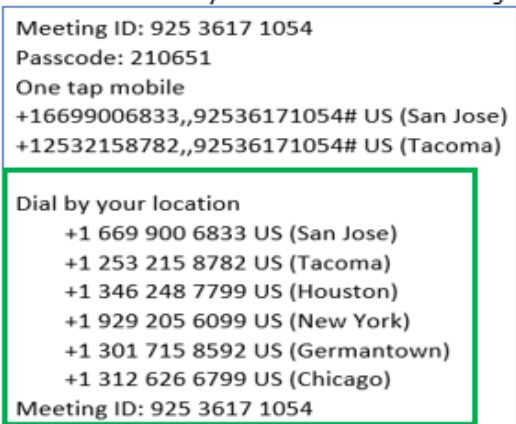
If you will be joining a Zoom meeting via your cell phone, click one of the "One tap mobile" links. Then click on "Call +1...". You will hear a request to "enter your Meeting ID followed by pound (#)". You **do not** need to enter the ID as the link will do this automatically for you.

You will be asked if you are a participant and to "Please press pound (#) to continue". You **must** press the pound key (#). Then you will be asked to "Enter your Participant ID followed by pound (#) or just press pound (#) to continue". If you **do not** enter anything, you will be automatically connected to the meeting.



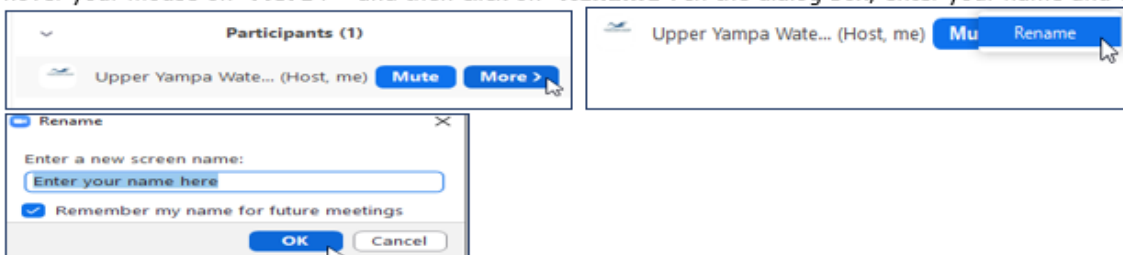
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**Be sure you are identified properly:**

Once in Zoom, be sure that you are identified properly. If you need to change, in "Participants" click on your ID and hover your mouse on "More >" and then click on "Rename". In the dialog box, enter your name and click "OK".



Contact Deb Bastian for any questions

- Email: [dbastian@upperyampawater.com](mailto:dbastian@upperyampawater.com)

- Phone: 970-819-0189

## **PUBLIC INPUT AND COMMENT**

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The Board will make no decision nor take action, except to direct the General Manager. Those addressing the Board are requested to identify themselves by name, organization, if any, and address. Comments shall not exceed three (3) minutes.



## **EXECUTIVE SESSION – 4B**

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Executive session under CRS § 24-6-402(4)(b) to discuss legal issues on Water Resumes, Water Cases, Contract Negotiations and \_\_\_\_\_. Mere presence or participation of an attorney at an executive session is not sufficient to satisfy the requirements of CRS § 24-6-402(4)(b). Executive sessions to discuss legal matters are not recorded.







## BOARD COMMUNICATION FORM

**From:** Andy Rossi, General Manager

**Date:** 02/07/22

**Item:** Coal Creek Diversion Project

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<input type="checkbox"/>	DIRECTION
<input checked="" type="checkbox"/>	INFORMATION
<input type="checkbox"/>	MOTION
<input type="checkbox"/>	RESOLUTION

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### I. Request/Issue and Background Information:

The Upper Yampa Water Conservancy District's (UYWCD) Coal Creek Diversion is conditionally decreed to divert 100.0 cfs from Coal Creek, a tributary of the Bear River (Yampa River). The Coal Creek confluence with the Bear River is located approximately ½ mile downstream from the outlet of Yamcolo Reservoir. The water supply diverted by this direct flow right is to be delivered through a pipeline to Yamcolo Reservoir, upstream of this confluence for subsequent storage and/or for the reregulation of flows in Coal Creek. The contemplated diversion is located on United States National Forest Lands near the Yamcolo Dam Spillway. Background materials for the Coal Creek Diversion were presented at the March 17, 2021 UYWCD Board of Directors (BOD) meeting. All materials presented at the March 17th meeting are posted to the UYWCD Website:

<https://upperyampawater.com/wp-content/uploads/2021/07/0519-2021-BOD-Meeting-Packet.pdf>

As originally contemplated, the primary purpose of the Coal Creek Diversion was to divert up to 100 cfs from Coal Creek during the spring runoff and then subsequently release that supply through Yamcolo Reservoir to stabilize daily streamflow fluctuations. This flow stabilization would benefit water use practices and Colorado Division of Water Resources (CDWR) administration of the Bear River section of the Yampa River.

The second original purpose of the Coal Creek Diversion was to improve the overall yield of Yamcolo Reservoir. Yamcolo Reservoir successfully filled 66% of the 33 total years of reservoir operations. Yamcolo Reservoir did not fill again in 2021, due to agricultural water storage releases in 2020 and 2021, drought conditions, and the early onset of river administration. The operation of the Coal Creek Diversion for storage purposes, however, would be limited in many years to a period during the early spring, at the onset of snowmelt runoff and



in the late summer, early fall when the Bear River (Yampa River) is no longer under administration.

Additional benefits from the Coal Creek Diversion may be realized by the UYWCD in the use of water diverted to Yamcolo Reservoir from Coal Creek, and later released for the decreed use of power production at the UYWCD owned and operated Stagecoach Dam Hydro-Electric Power generating facility. Other benefits may be possible for UYWCD facilities as the Coal Creek Diversion is decreed for the following beneficial uses:

*Municipal, industrial, domestic, irrigation, stock watering, power production, recreational, fishery, reservoir evaporation, aesthetic purpose and for use by exchange for appropriative rights of exchange and substitution, and for augmentation and exchange for replacement purposes, including diversion from Coal Creek for such uses and storage in Yamcolo Reservoir for such uses, including later releases from storage for such uses.*

Coal Creek was, at different times, also included as a named source for other Yamcolo Reservoir storage rights. The UYWCD Special Counsel has reviewed the documented history of Coal Creek as a named source for Yamcolo Reservoir water rights as part of diligence and abandonment proceedings.

The UYWCD completed studies of the Coal Creek Diversion project in 2003 and 2015. The 2003 consideration of Coal Creek was in the form of a proposed engineering design and Engineer's Estimated Cost of Construction of the project. The Engineer's Estimated Cost of Construction was updated by the UYWCD in 2020 with the inclusion of new information and is included as an attachment to this communication.

The 2015 consideration of the Coal Creek Project was included in the UYWCD Water Supply and Water Rights Master Plan. The conclusions of this 2015 analysis were:

- 1. The full diversion amount associated with the Coal Creek Diversion water right should be maintained: 100 cfs. This diversion project has the potential to help stabilize streamflow conditions in the Bear River, during the spring runoff when diurnal fluctuations can cause flows to change significantly throughout the day. Moreover, this diversion project has the potential to improve the yield of Yamcolo Reservoir.*
- 2. Additional hydrologic studies are recommended to better quantify the potential benefits associated with the Coal Creek Diversion. This process would be helpful to the District in its continuing discussions with the U.S. Forest Service regarding reservoir operations, flushing flows, and required bypass flows.*

The analysis and conclusions of the UYWCD Water Supply and Water Rights Master Plan were accepted by the State Engineer and Division Engineer, Water Division 6.



In 2021, the UYWCD staff began work on the two recommendations included in the UYWCD Water Supply and Water Rights Master Plan. The StateMod model used for the 2015 UYWCD Master Plan analysis was updated in 2021 to include new information for a baseline water use model for the Yampa River system. The UYWCD hired Wilson Water Group to use the updated StateMod configuration to complete a Coal Creek flow and reservoir operations analysis for Yamcolo Reservoir. The Wilson Water Group's StateMod analysis was coupled with an evaluation of potential storable flows under experienced historical river administration practices. A copy of the Wilson Water Group analysis of Coal Creek Supply for Yamcolo Modeling is attached with this communication for review and discussion.

The UYWCD planned to install a flow monitoring sensor in Coal Creek at the proposed project location in 2022. The UYWCD staff applied for United States Forest Service (USFS) authorization to complete the installation in 2021. The USFS denied the UYWCD request for authorization to install the flow monitoring sensor in Coal Creek at the proposed project on January 31, 2022. The January 31, 2022, response letter from the USFS is attached with this communication for review and discussion.

## **II. Staff Recommendation:**

Discuss the findings of the technical analysis and engineer's cost estimate of the Coal Creek Diversion Project with the full UYWCD BOD. Discuss the project permitting process with the full UYWCD BOD. The UYWCD staff requests that a portion of these discussions be conducted in executive session, if appropriate.

## **III. Legal Issues:**

Development of UYWCD Conditional Water Rights.

## **IV. Consistency with Board Goals and Policies:**

UYWCD SP Objective 9.

### **Attachments:**

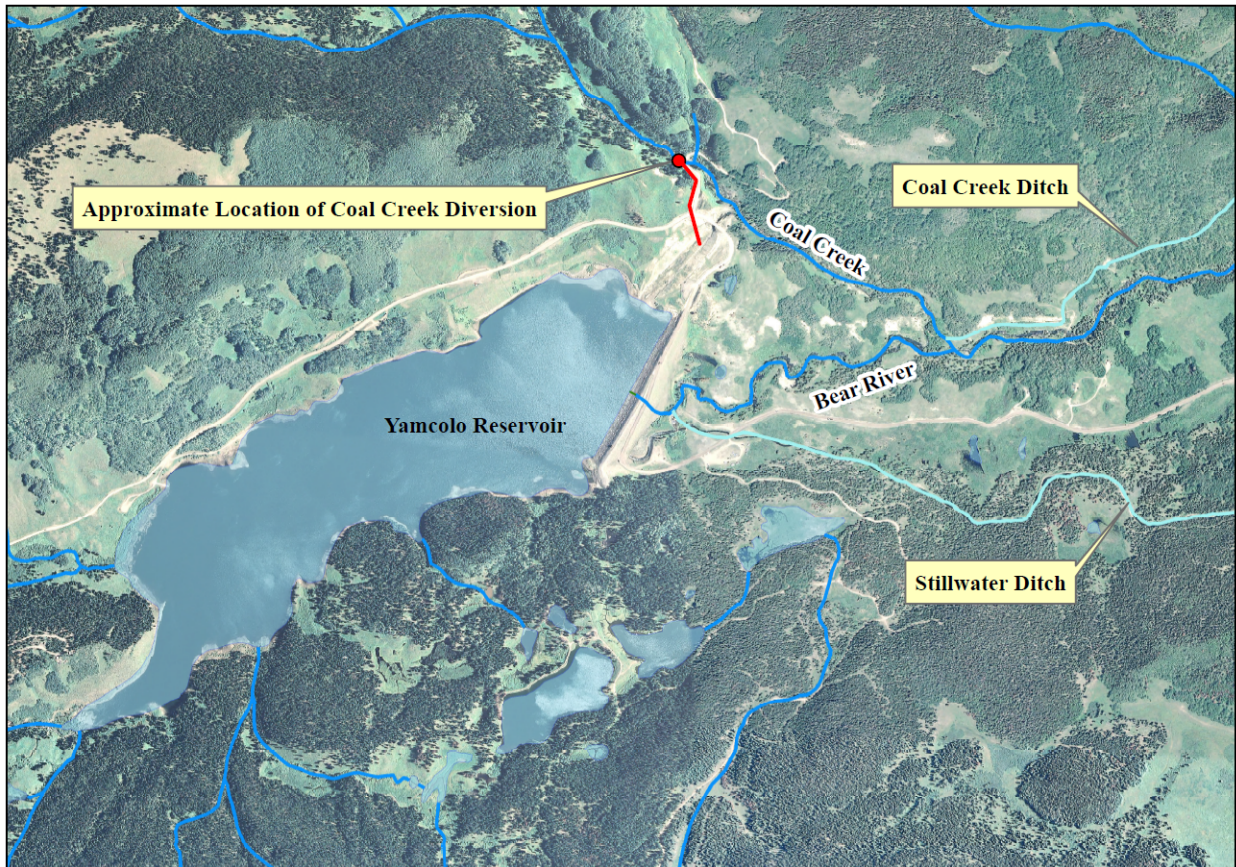
Wilson Water Group Analysis

CDC Project Cost Estimate

January 31, 2022 Letter from USFS

# Coal Creek Supply for Yamcolo Modeling

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Report prepared by Wilson Water Group for Upper Yampa Water Conservancy District

January 10, 2022

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## Introduction

Upper Yampa Water Conservancy District (UYWCD) is considering the feasibility of constructing a pipeline from Coal Creek to Yamcolo Reservoir. The Coal Creek Diversion to Yamcolo Reservoir project is intended to address three goals:

1. Stabilize daily streamflow by dampening the diurnal fluctuations
2. Enable water stored in Yamcolo Reservoir to be released to produce hydropower at Stagecoach Reservoir
3. Provide supplemental supply to Yamcolo Reservoir.

This project did not evaluate Goal 1: Stabilizing daily streamflow or Goal 2: Hydropower production. UYWCD requested that Wilson Water Group (WWG) evaluate Goal 3: Supplemental supply to Yamcolo Reservoir. Specifically, WWG used the daily Yampa Basin StateMod model to investigate the volume, timing, and frequency of supplemental supply to Yamcolo Reservoir and a spreadsheet model to determine the amount of supplemental supply that could have been stored in Yamcolo Reservoir. The results from this modeling analysis are presented below.

## Background

The State of Colorado provides water users with the Colorado Decision Support System (CDSS) planning tools. The monthly Yampa Basin water allocation (StateMod) model was last updated in 2015. From 2016 through 2018, the Yampa-White-Green Basin Roundtable funded the Basin Implementation Plan Modeling Phase 3 Effort (WWG 2018), which included converting the monthly Yampa Basin model to a daily time step. In 2021, UYWCD partnered with the River District and Tri-State to jointly fund the extension of the daily model. The daily model is now available from water year 1975 through 2020. UYWCD determined that the recently updated daily Yampa Basin model is the right tool to quantify the supplemental supply from the conditional Coal Creek Diversion.

UYWCD had previously studied the physical water availability on Coal Creek (Landmark Consultants 2003). However, the methodology to estimate physical water availability on Coal Creek needed to be updated and the legal availability of the water considered. Additionally, the potential supply needs to be combined with a reservoir operation model to show how the new supply could be used. Implementing the future operations of the Coal Creek Diversion in StateMod combined with a historical reservoir operations spreadsheet model meets these needs.

In 2003, UYWCD filed for 100 cfs conditional water right on Coal Creek for storage in Yamcolo Reservoir (03CW58) and was assigned WDID 5802431. The conditional water right is junior to an existing diversion (Coal Creek Ditch - 5800589) and CWCB instream flow reaches. The instream flow on Coal Creek will prevent UYWCD's conditional water right from diverting when flows are below 5 cfs. Additionally, the CWCB instream flow reach on the Bear River for 12 cfs will prevent the conditional water right from diverting when flows are low on the Bear River. It is anticipated that impacts to peak flows and related geomorphic processes will be raised as an environmental concern for the project. Therefore, UYWCD

needs an understanding of the current conditions and potential impacts. This report presents estimates of natural flow on Coal Creek, legally available flow for the Coal Creek Diversion, and flow stored in Yamcolo Reservoir.

## Model Approach

A two-prong modeling approach is taken:

- StateMod to estimate natural flow on Coal Creek and legally available flow for the Coal Creek Diversion (5802431)
- Spreadsheet model to maintain historical Yamcolo Reservoir operations while considering the additional supply from Coal Creek Diversion and evaluate the impact of the historical call regime.

StateMod offers the advantages of a standardized approach to estimating monthly and daily natural flows. WWG followed this standard approach in order to develop defensible daily natural flow estimates at an ungaged location due to the scarcity of observed flow records for Coal Creek. Additionally, StateMod represents strict administration under the prior appropriation water rights system. This is a conservative assumption and removes dependency on the historical call record. While the Bear River has experienced administration historically, the call regime is expected to become more restrictive in the future due to increased scrutiny. StateMod provides a good approximation of more active administration.

As described in the section below, the StateMod model was refined in order to produce the best estimate of monthly and daily natural flows on Coal Creek. The model provides a daily time series of the legally available water for the Coal Creek Diversion. This output is provided to the spreadsheet model.

While StateMod includes reservoir operations, it is limited to following general operating rules. For more details on how Yamcolo Reservoir is represented in StateMod, refer to Appendix A. The spreadsheet model maintains the historical variations in Yamcolo Reservoir filling while also incorporating additional supply from Coal Creek Diversion.

Additionally, the spreadsheet model is used to compare the legally available flow from StateMod and an estimate of legally available flow under the historical call regime. UYWCD provided the first day of the call starting in 1991. The end of the call was estimated using daily Yamcolo Reservoir storage values. When Yamcolo contents began to increase at the end of the irrigation season or early fall, it was assumed that the call was off. A daily call record is available from CDSS online starting in 2002. The CDSS call record includes the end date of the call. The daily natural flow on Coal Creek from StateMod is reduced by the historical diversions by the Coal Creek Ditch and then an additional 5 cfs (representing the Coal Creek instream flow right) is subtracted. Flows are considered legally available when the historical calls on the Bear River are off.

## StateMod Model Refinements

The daily Yampa Basin StateMod model is used to estimate physical and legal flow for the Coal Creek Diversion. Therefore, the best possible estimate of physical flow on Coal Creek and along the Bear River is required. WWG verified and improved the historical calibration of the StateMod model for the region upstream of Stagecoach Reservoir. This section discusses the general CDSS approach, required data, and the specific steps taken by WWG to refine the model.

The CDSS general modeling approach uses StateMod to create natural flows, which serve as the hydrologic input to the subsequent model scenarios. The natural flow time series represents monthly flow volume and timing absent the impacts of man. Consumptive use, impacts of delayed return flows, reservoir operations and reservoir evaporation are removed from the observed streamflow record.

Estimating natural flow on ungaged tributaries such as Coal Creek is a three-step process:

1. Create monthly natural flows at gaged locations
2. Distribute monthly natural flow to ungaged locations
3. Disaggregate monthly natural flow to daily

Specific to the Yampa Basin model, monthly natural flows are calculated at the Bear River near Toponas (USGS 09236000 and DWR BRBBLCO) gage and the Yampa River below Stagecoach Reservoir (09237500). The monthly local gains in natural flow between the Bear River near Toponas and Yampa River below Stagecoach Reservoir are distributed to ungaged locations. A daily pattern gage is then used to disaggregate the monthly natural flow to daily.

After the natural flow time series are generated, a historical calibration scenario is used to check the various input parameters to the model, such as return flow location and timing and reservoir operations. The historical calibration compares simulated to measured streamflow at gaged locations, headgate diversions, and reservoir contents. In order to have confidence in the daily Yampa Basin model's estimate of physical flow for Coal Creek, WWG made refinements to the following StateMod inputs in order to improve the daily streamflow calibration. The refinements are categorized based on the general CDSS approach.

- Create monthly natural flow at gages
  - Refine irrigated acreage upstream of Stagecoach Reservoir
  - Revise approach for estimating missing reservoir contents for Stillwater, Yamcolo, and Stagecoach
  - Revise approach for filling missing measurements at the USGS gage Bear River near Toponas (09236000). Original gage active data collection period = 1953 – 1986. Gage restarted in 2012 as Bear River below Bear Lake (CDWR BERBBLCO).
- Distribute monthly natural flow to ungaged locations
  - Determine upstream watershed average annual precipitation and drainage area for ungaged tributaries upstream of Stagecoach Reservoir
- Disaggregate monthly natural flow to daily



- Revise daily pattern gage selection for the Bear River and ungaged tributaries
- Historical model calibration
  - Refine return flow locations

The following sub-sections briefly discuss the refinements made to the daily Yampa Basin model.

### **Irrigated acreage**

In order to have the best possible estimate of natural flows, the correct historical consumptive use is needed. WWG and UYWCD met with the Andi Schaffner (former Water District 58 water commissioner) on September 16, 2021 to review the irrigated acreage assignments for ditches located upstream of Stagecoach Reservoir. This meeting resulted in relatively minor modifications, as shown in Figure 1. The red parcels have been removed from the acreage assessment because they are no longer actively irrigated. The orange parcels indicate a new parcel or a change in extent or ditch assignment for an existing parcel. The majority of the parcels are green, indicating no change in either extent or ditch assignment. Correct irrigated acreage and water source assignments provide confidence that the model accurately reflects historical consumptive use and depletions used to estimate natural flow. In addition, WWG reviewed the return flow locations for the updated irrigated acreage, and minor adjustments were made based on the updated ditch assignments.

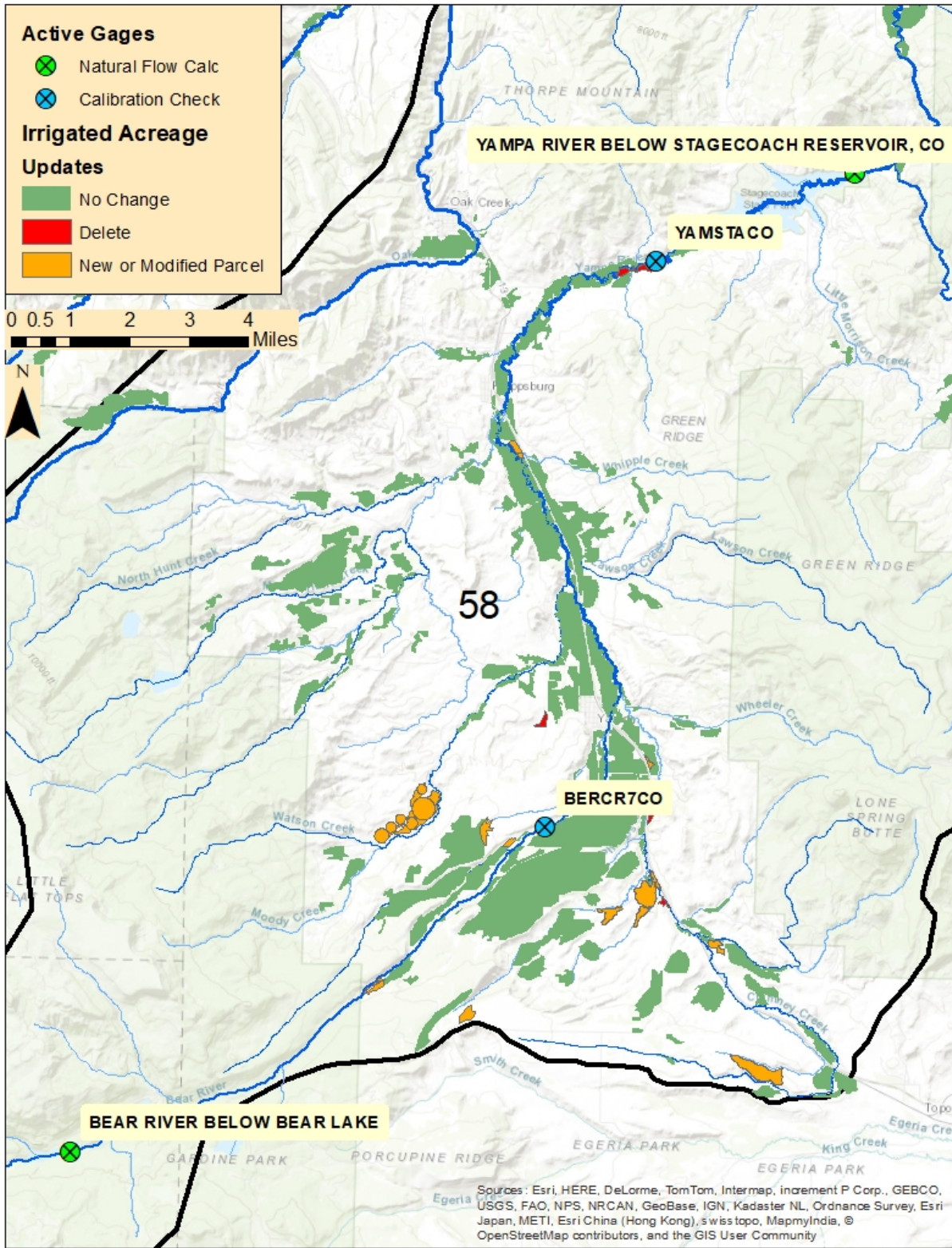


Figure 1: Yampa Basin upstream of Stagecoach Reservoir, refined irrigated acreage

## Missing Reservoir Content

UYWCD provided WWG with complete reservoir content records for Yamcolo Reservoir from November 1, 1987 through November 1, 2019 and for Stagecoach Reservoir from March 1, 2014 through February 20, 2021. Values outside of these dates were queried from HydroBase. Missing reservoir content data were filled using the standard CDSS approach, with good results. The one exception was during the summer of 1989, when Stagecoach Reservoir was filling. Values from HydroBase during this period are sparse, but the model is very sensitive to the timing of reservoir storage. WWG set the contents for June 1989 based on engineering judgement. This created a complete time-series of reservoir contents used to generate natural flows for the daily model period.

The Bear River near Toponas (09236000) gage has measured data from 1953 through 1986 from the USGS, then was restarted by DWR in 2012 as the Bear River below Bear Lake (BERBBLCO) gage. Natural flow values during the missing period are filled using a regression technique discussed below. In order to create reliable natural flow estimates, reservoir contents for Stillwater Reservoir are needed during the periods of observed streamflow data. Stillwater Reservoir contents are generally available during the irrigation season from 1953 through 1986, but many of the values during the winter months are missing. Previously, the winter content values were being filled using a monthly average approach, resulting in unrealistic changes in reservoir contents from month to month. WWG set missing winter content values from this period using a standard fill-forward approach.

## Filling Bear River near Toponas

The Bear River near Toponas (09236000) gage has year-round observed data from October 1, 1952 through September 30, 1986, with the exception of water year 1966. The gage was restarted by DWR on May 11, 2012 as the Bear River below Bear Lake (BERBBLCO) gage. Daily observed streamflow is available during the runoff and irrigation season. The two gage records are combined in StateMod to produce the longest period possible.

Because this gage is directly below Stillwater Reservoir, it is not appropriate to fill the observed streamflow time series. Instead, the monthly natural flow time series is filled. Previously, the standard Mixed Station Model approach was used to fill the record. However, the filled winter values for the most recent period were not always congruent with the observed summer values. WWG tested several different gages for the best regression fit. The Yampa River at Steamboat (09239500) with a log-transform was selected. This improved the continuity of the filled winter natural flow values.

## Precipitation and Area

The previous three refinements improved the natural flow estimates at gaged locations. The next step of the process is to distribute to ungaged locations. The standard CDSS approach is to start with the watershed average annual precipitation and drainage area from USGS StreamStats (<https://streamstats.usgs.gov/ss/>). Figure 2 shows the ungaged watersheds that are represented in the model. It is important to consider the ungaged watersheds upstream of Stagecoach Reservoir to ensure that a maximum of 100 percent of the local gains are distributed. Currently, 88 percent of the local gains are distributed, which is reasonable given the amount of ungaged area that is not explicitly represented

in the model. It is also important to check that the relative contributions of the various unaged tributaries are reasonable.

StateMod calculates the area-precipitation ratio for the unaged locations to find a percent of the local gains between gages to distribute. Based on previous modeling calibration efforts, the percent of local gains frequently needs to be refined. Two metrics are used to adjust the percentages:

- Shortages to historical diversions on unaged tributaries
- Distributing a maximum of 100 percent of the local gains

The percent distribution to Coal Creek was increased based on the daily historical diversion records for the Coal Creek Ditch (5800589). Adjustments were also made to:

- Dome Creek using the Dome Creek Ditch diversion records
- South Hunt Creek based on the total shortages to diversions on the tributary
- Middle Hunt Creek based on the total shortages to diversions on the tributary
- Brinker Creek based on the total shortages to diversions on the tributary

Note that for Brinker Creek, additional data processing was performed on the diversion records for Pony Creek Ditch and Just Ditch based on Andi Schaffner's comments that both of those structures re-divert water carried from the Buckingham-Mandell Ditch. WWG used the diversion coding to identify the diversions of native Brinker Creek water. The natural flow distribution was adjusted to enable the native flow diversions, which are a small portion of the total diversions.

One additional refinement to the model was distributing local inflows to Fix Ditch. At the September 16, 2021 meeting, Andi Schaffner confirmed that river levels tend to increase at the Fix Ditch due to return flows from upstream irrigated acreage and tributary inflow.

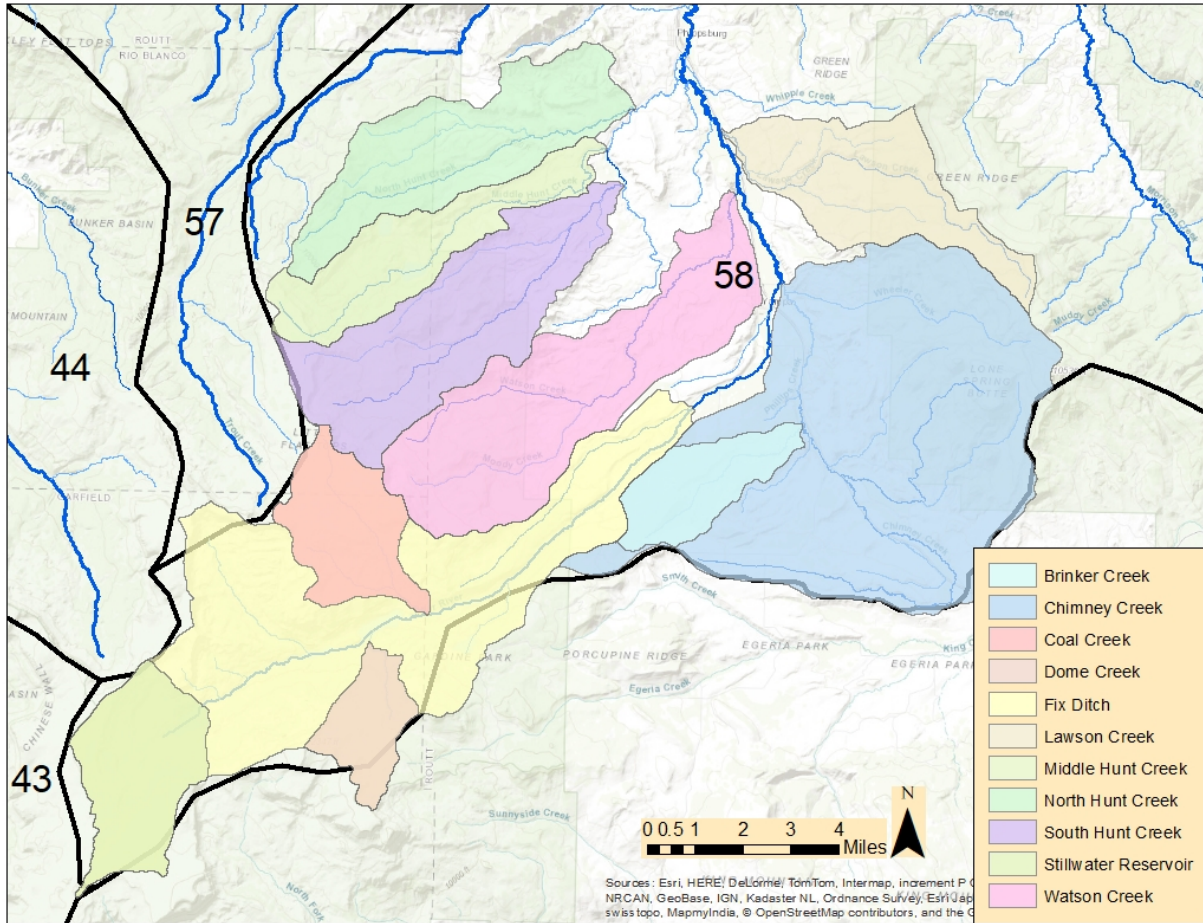


Figure 2: Ungaged watershed represented in the model

### Daily Pattern Gage

In the daily Yampa Basin model, the monthly natural flows are distributed to daily using a pattern gage. StateMod calculates the daily percent of flow for each month from the pattern gage, then uses the daily percent to disaggregate the monthly natural flow volume. Previously, all monthly natural flows for the watershed upstream of Stagecoach Reservoir were disaggregated using the Yampa River at Steamboat gage as the pattern gage. This gage was used because of the long term, continuous record available. While this gage is downstream of several reservoirs, the hydrograph generally preserves a relatively natural signature. However, on closer examination, the shape of the monthly hydrograph does not always align with the monthly natural flow hydrograph for Coal Creek. This mis-match causes “jumps” or a stair-step appearance on the first day of the month. WWG tested six other daily pattern gages to find the best over-all match in hydrograph shape by examining the percent change in streamflow on the first of the month.

Figure 3 compares the daily streamflow for Coal Creek for four different pattern gages in 2020. These four gages produced the most realistic streamflow results. The White River gage was selected as the

pattern gage for the modeling effort, as it results in a smoother, more realistic change in daily natural flow compared to the other gages reviewed.

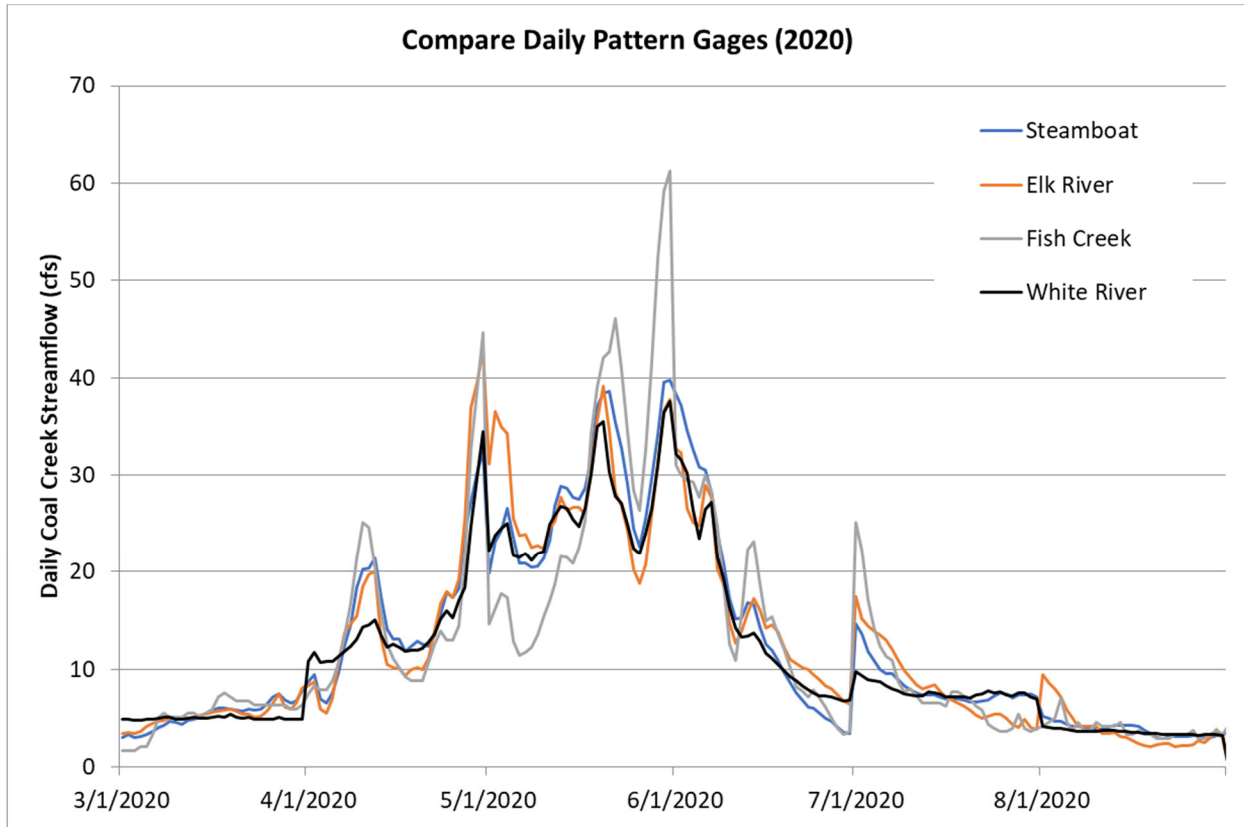


Figure 3: Comparison of daily Coal Creek streamflow using different pattern gages (2020)

The White River gage is a compilation of three streamflow gages. To create a complete time series from October 1, 1974 through September 30, 2020, WWG added the North Fork White River at Buford (09303000) to the South Fork White River at Buford (09304000) from October 1, 1974 through February 28, 2002. The White River Below North Elk Creek near Buford (09304115) is used from March 1, 2002 through September 30, 2020. Daily streamflow values were collected from the USGS and DWR.

The conditional Coal Creek diversion structure has an upstream contributing area of 6.95 square miles and an elevation of approximately 9,600 feet while the White River Below North Elk Creek near Buford gage has an upstream contributing area of 530 square miles and an elevation of 6,776 feet. However, this watershed produced the best over-all match in hydrograph shape, as determined by the smallest percent change in streamflow on the first of the month. WWG examined other nearby tributaries, but none of the gages had a long enough period of record to be used as the daily pattern gage.

## Natural Flow Calibration Results

Confidence in the natural flow estimates for Coal Creek are critical to using the model to estimate physical and legal flow available to the Coal Creek diversion. Several metrics were used to calibrate the distribution of natural flow to Coal Creek:

- Daily Coal Creek Ditch (5800589) diversions, from HydroBase
- Daily streamflow measurements from 1989 and 1990, provided by UYWCD
- Spot measurements taken by the U.S. Forest Service during winter months in 1997, 1998, and 1999, which concluded that the average daily flow for Coal Creek during the winter is about 4 cfs.
- Spot measurements taken by UYWCD in 2012

The graphs below compare the estimated daily natural flow on Coal Creek to the metrics.

Figure 4 compares the estimated daily Coal Creek streamflow to the daily Coal Creek Ditch (5800589) diversions from HydroBase. The daily diversion record provides an assumed minimum streamflow value. It is WWG’s understanding that the Coal Creek Ditch can physically sweep the river. The ditch has an 8 cfs water right and daily diversions are generally 8 cfs or less. However, the maximum daily diversion was about 12 cfs in 1982. The natural flow distribution to Coal Creek was increased so that the historical diversion could be met in the majority of years. There are 12 years in the 46 year model run that have at least one day of insufficient flow to meet the historical diversions at Coal Creek Ditch.

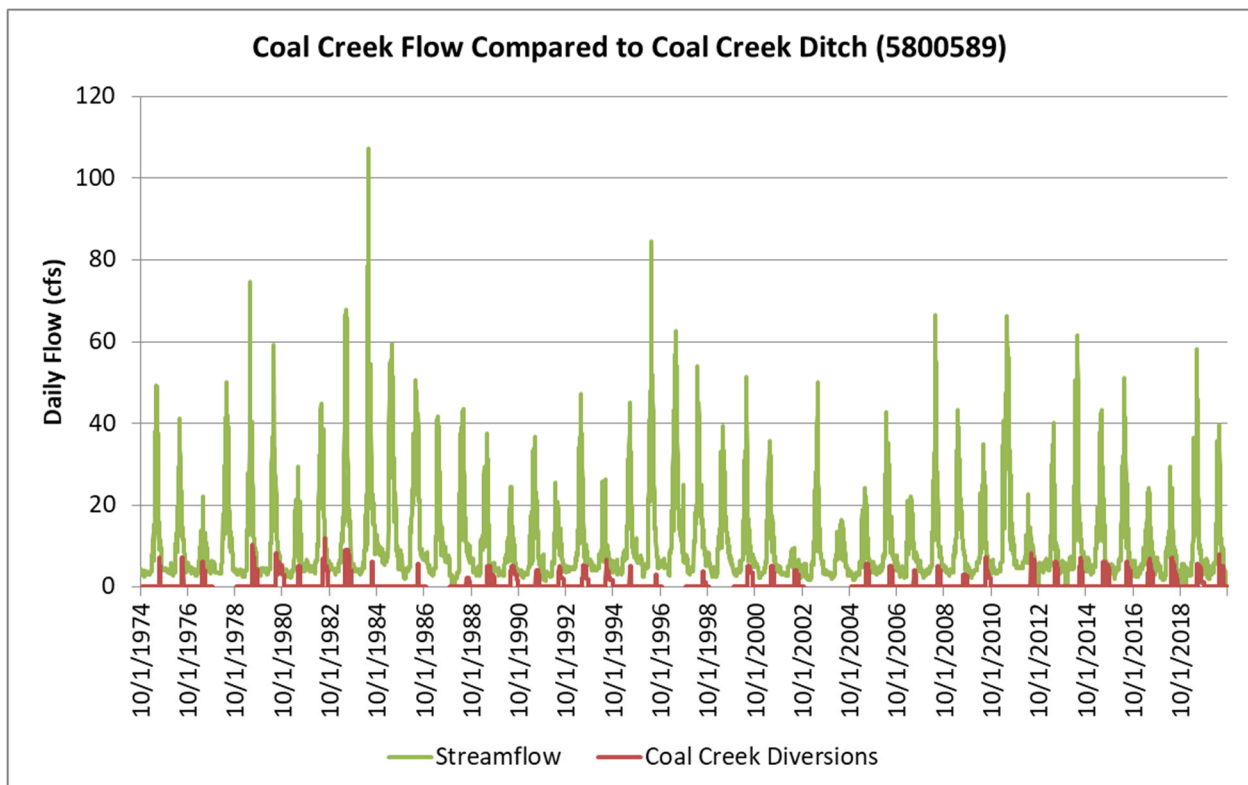


Figure 4: Daily Coal Creek streamflow compared to daily Coal Creek Ditch (5800589) diversions, full POR

Figure 5 focuses on the most recent years (2015 through 2020). This highlights how close the streamflow estimates in 2015 are to the recorded diversions; the estimated streamflow generally follows the shape of the historical diversions.

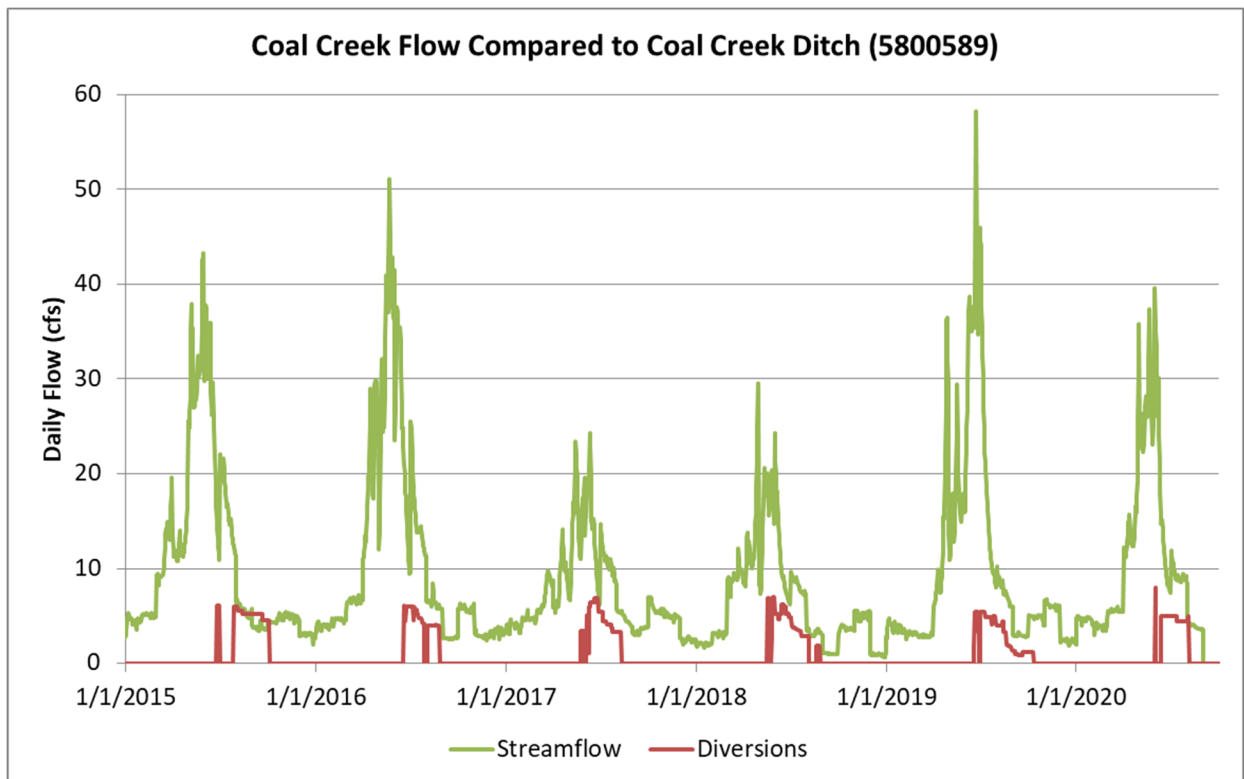


Figure 5: Daily Coal Creek streamflow compared to daily Coal Creek Ditch (5800589) diversions, 2015 - 2020

UYWCD provided WVG with daily streamflow records for Coal Creek from 1989 and 1990. It is assumed that the flow record is representative of the natural flow at the conditional Coal Creek Diversion location. Figure 6 compares estimated natural flow to measured flow in 1989 and Figure 7 compares estimated to measured flow in 1990. Key observations from the two figures are:

- The general shape of the hydrograph is well matched.
- There are periods when the model matches the observed daily flow
  - June through September in 1989
  - June 1990
- There are periods when the model over-simulates and under-simulates compared to the observed.



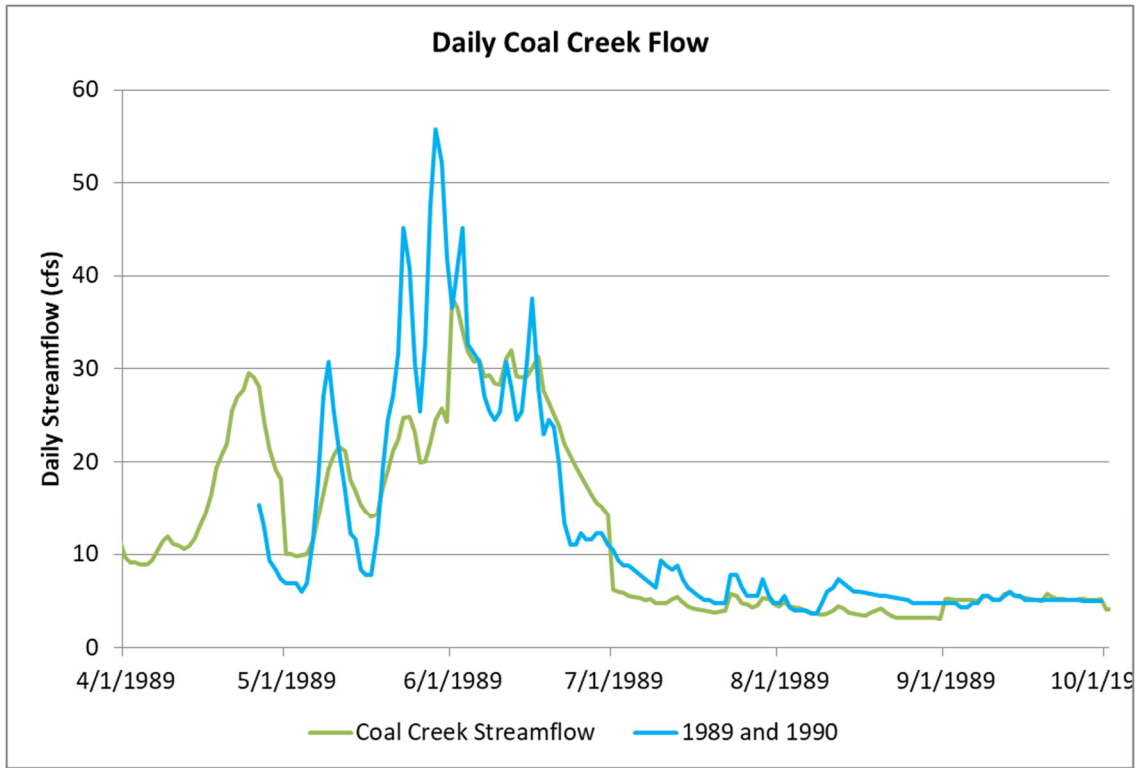


Figure 6: Compare estimated daily Coal Creek streamflow with observed (1989)

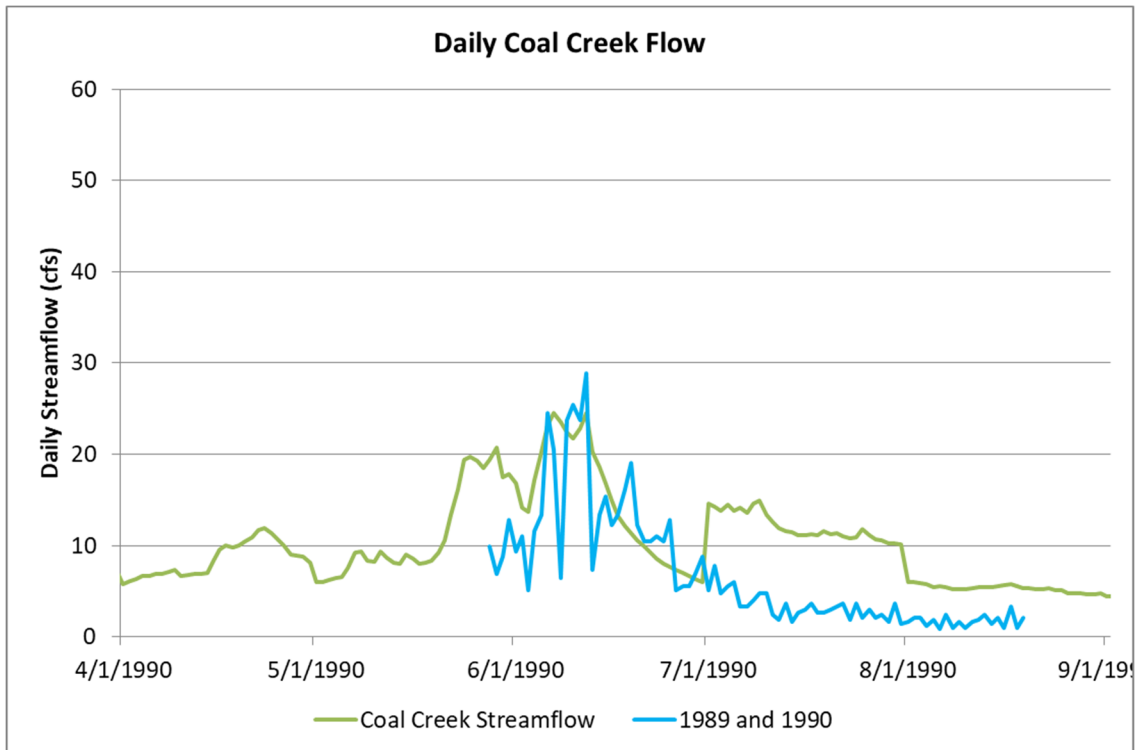


Figure 7: Compare estimated daily Coal Creek streamflow with observed (1990)

The U.S. Forest Service took spot measurements of Coal Creek during the winters of 1997, 1998, and 1999. Figure 8 shows the estimated daily natural flow and the USFS spot measurements. As shown the natural flow estimates correspond well with the measured flows.

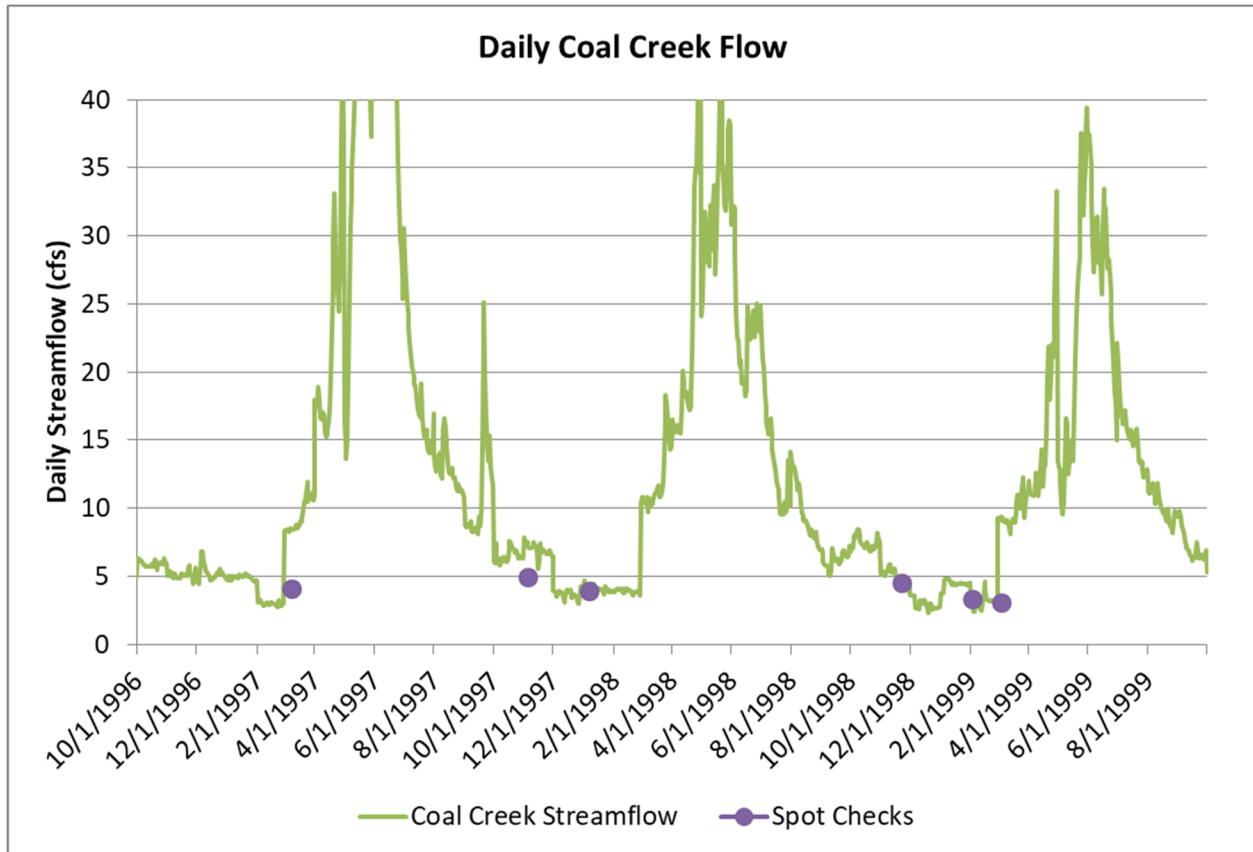


Figure 8: Daily Coal Creek flow compared to USFS spot measurements

Based on these spot flow measurements and input from knowledgeable individuals, the U.S. Forest Service determined that it was appropriate to assume that Coal Creek flows are about 4 cfs during the winter (November through March). Table 1 presents the average daily estimated Coal Creek streamflow by month. The natural flow distribution was adjusted so that the winter average for the modeled period is 4.4 cfs.

Table 1: Average Daily Estimated Coal Creek Streamflow by Month

Month	Average Daily Streamflow (cfs)
Jan	3.8
Feb	3.7
Mar	6.6
Apr	16.1
May	24.5
Jun	23.7
Jul	14.3

Aug	7.6
Sep	4.5
Oct	5.2
Nov	4.4
Dec	3.5
<b>Winter Average</b>	<b>4.4</b>

UYWCD performed spot measurements in 2012. These are compared to the estimated natural flows in Figure 9. The natural flows generally represent the spot measurements for this dry year.

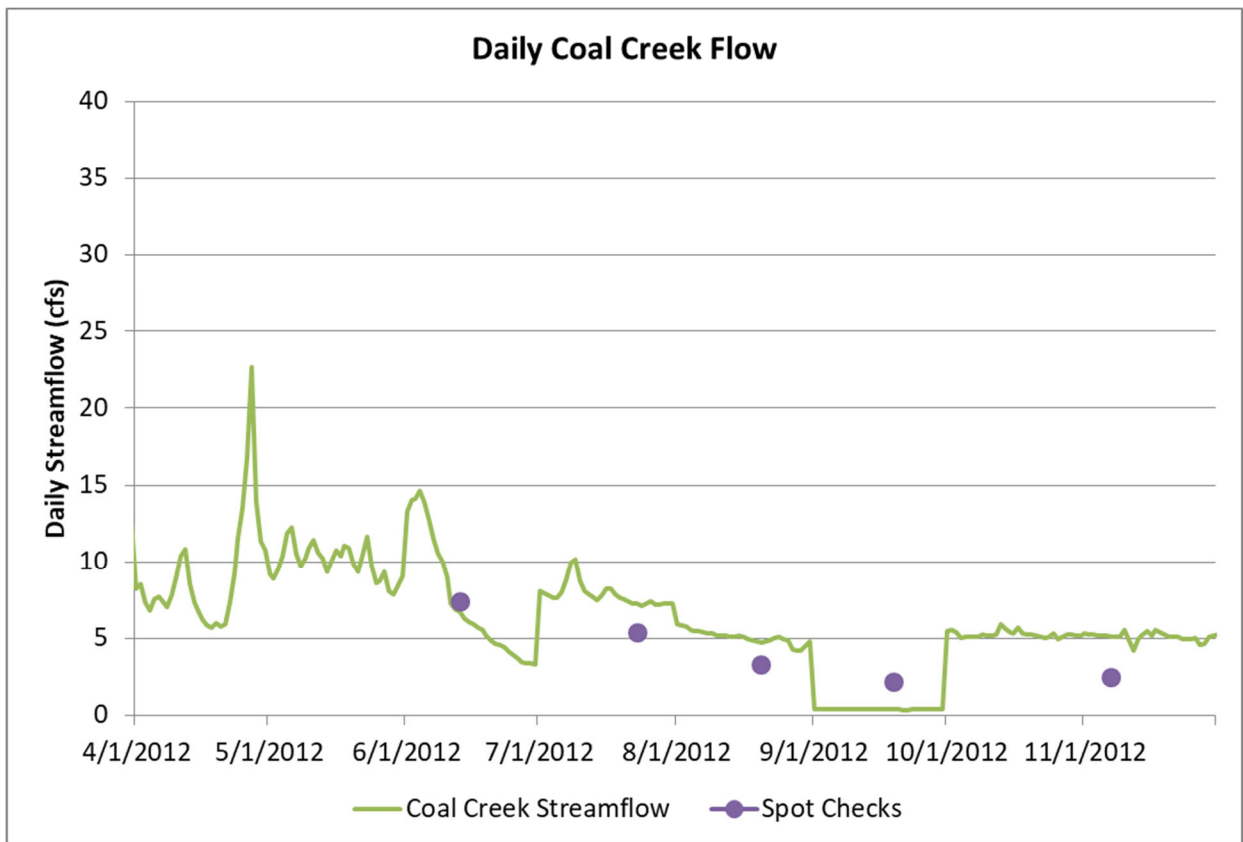


Figure 9: Estimated daily Coal Creek streamflow compared to 2012 spot measurements

As an additional point of reference, the estimated daily natural flows for Coal Creek and the inflow to Yamcolo Reservoir are shown in Figure 10.

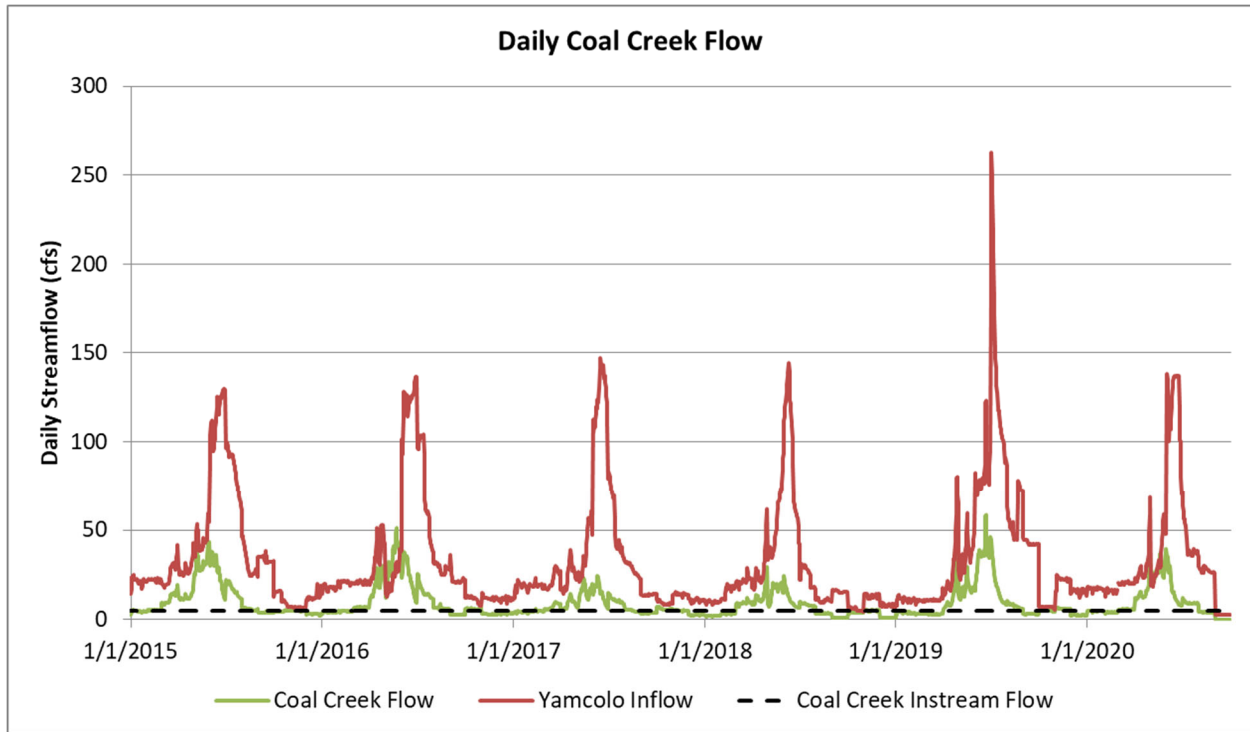


Figure 10: Coal Creek natural flow and Yamcolo Reservoir inflow

Table 2 presents two sets of daily statistics for Coal Creek streamflow. The first is the start of the historical call on the Bear River compared to the start of the call on Coal Creek as estimated by StateMod. The StateMod Days of Available Flow columns show the period during which Coal Creek flows can be diverted to Yamcolo Reservoir. The second is the date of Coal Creek annual peak flow and Coal Creek peak flow rate. The average peak flow rate is 45 cfs, with values ranging from a minimum of 9 cfs on May 31, 2002 to a maximum of 107 cfs on May 25, 1984. The earliest peak day is April 27, 2012, with a flow rate of 23 cfs. The average day of peak flow for Coal Creek is May 26. This aligns with UYWCD’s experience with the Bear River.

Table 2: Daily statistics for Coal Creek

Year	Historical First Day of Call*	StateMod First Day of Call	StateMod First Day of Available Flow	StateMod Day Available Flow Ends	Peak Flow Date	Peak Flow (cfs)
1975		1/1/1975	4/14/1975	7/14/1975	6/8/1975	49
1976		1/1/1976	4/4/1976	6/11/1976	6/4/1976	41
1977		1/1/1977			6/1/1977	22
1978		1/1/1978	7/1/1978	8/27/1978	5/30/1978	50
1979		1/1/1979	4/8/1979	7/7/1978	5/29/1979	75
1980		1/1/1980	4/16/1980	6/23/1980	5/23/1980	59
1981		1/1/1981	4/10/1981	5/5/1981	6/9/1981	30

<b>1982</b>		1/1/1982	6/17/1982	7/16/1982	5/28/1982	45
<b>1983</b>		1/1/1983	4/18/1983	8/31/1983	6/25/1983	68
<b>1984</b>		1/1/1984	4/6/1984		5/25/1984	107
<b>1985</b>			1/1/1985	6/23/1985	5/29/1985	59
<b>1986</b>		1/1/1986	3/1/1986	12/20/1986	5/29/1986	51
<b>1987</b>		1/1/1987	4/7/1987	5/1/1987	4/30/1987	42
<b>1988</b>		1/1/1988			6/6/1988	44
<b>1989</b>		1/1/1989	3/28/1989	5/1/1989	6/1/1989	38
<b>1990</b>		1/1/1990			6/12/1990	25
<b>1991</b>	5/13	1/1/1991			6/15/1991	37
<b>1992</b>	4/29	1/1/1992	4/18/1992	5/1/1992	4/30/1992	26
<b>1993</b>	5/19	1/1/1993			5/22/1993	47
<b>1994</b>	5/22	1/1/1994	3/1/1994	5/1/1994	6/1/1994	26
<b>1995</b>	5/24	1/1/1995	7/5/1995	12/31/1995	6/17/1995	45
<b>1996</b>	7/1	1/1/1996	3/30/1996	6/25/1996	5/17/1996	85
<b>1997</b>	7/5	1/1/1997	3/1/1997	11/30/1997	6/6/1997	63
<b>1998</b>	5/29	1/1/1998	3/1/1998	6/5/1998	4/30/1998	54
<b>1999</b>	6/2	1/1/1999	3/1/1999	6/5/1999	5/31/1999	39
<b>2000</b>	5/15	1/1/2000	3/1/2000	6/5/2000	5/31/2000	51
<b>2001</b>	5/10	1/1/2001			5/16/2001	36
<b>2002</b>	4/19	1/1/2002			5/31/2002	9
<b>2003</b>	5/15	1/1/2003			5/31/2003	50
<b>2004</b>	4/5	1/1/2004			6/8/2004	16
<b>2005</b>	5/4	1/1/2005			5/24/2005	24
<b>2006</b>	5/28	1/1/2006	4/6/2006	5/1/2006	4/28/2006	43
<b>2007</b>	6/5	1/1/2007	3/1/2007	5/1/2007	5/15/2007	22
<b>2008</b>	6/16	1/1/2008	7/2/2008	7/6/2008	5/21/2008	67
<b>2009</b>	6/1	1/1/2009	3/1/2009	6/8/2009	4/30/2009	43
<b>2010</b>	6/17	1/1/2010	3/1/2010	6/14/2010	6/8/2010	35
<b>2011</b>	No Call	1/1/2011	3/1/2011	11/1/2011	6/7/2011	66
<b>2012</b>	5/1	1/1/2012	2/1/2012	5/1/2012	4/27/2012	23
<b>2013</b>	5/23	1/1/2013			5/27/2013	40
<b>2014</b>	6/25	1/1/2014	6/1/2014	6/17/2014	5/31/2014	62
<b>2015</b>	7/1	1/1/2015	3/1/2015	6/7/2015	5/31/2015	43
<b>2016</b>	6/18	1/1/2016	3/1/2016	6/12/2016	5/22/2016	51
<b>2017</b>	6/16	1/1/2017	4/17/2017	4/30/2017	6/10/2017	24
<b>2018</b>	5/23	1/1/2018			4/29/2018	30
<b>2019</b>	6/6	1/1/2019			6/22/2019	58
<b>2020</b>	5/24	1/1/2020	3/1/2020	6/8/2020	5/31/2020	40

\* Provided by UYWCD. First day of a Bear River call impacting Yamcolo Reservoir storage. Data starts in 1991.

## Model Results

The Baseline Yampa Basin model was updated to include the Coal Creek Diversion (5802431). The structure is represented with the 2003 conditional water right for 100 cfs. The StateMod model reports the flow legally available at the diversion point. Water is generally available during the rising limb and peak of the hydrograph. The average first day of available flow is March 28.

Results using the StateMod available flow results for Coal Creek are presented first. Results using the historical call regime to estimate available flow are presented second.

## StateMod Available Flow

As described in the “Modeling Approach” section above, the legally available flow results from StateMod are entered into the spreadsheet model in order to estimate the amount of flow that could have been stored in Yamcolo, assuming the same historical operations of existing water supplies. The spreadsheet model stores up to 100 cfs per day of available flow from Coal Creek when there is storage space in Yamcolo Reservoir, based on the historical contents. The reservoir cannot be filled beyond the historical capacity (either 9,096 acre-feet from 1981 through 1997, or 9,621 acre-feet from 1998 to present). The spreadsheet model is re-set to historical values on November 1 to prevent carry-over during the winter.

Figure 11 shows the results of the Yamcolo Reservoir spreadsheet analysis. The orange line shows the historical Yamcolo contents. The green line shows the modified contents. The blue line shows the legally available flow on Coal Creek. The key observation from the graph is that Yamcolo contents are not substantially changed by the additional supplemental supply from Coal Creek.

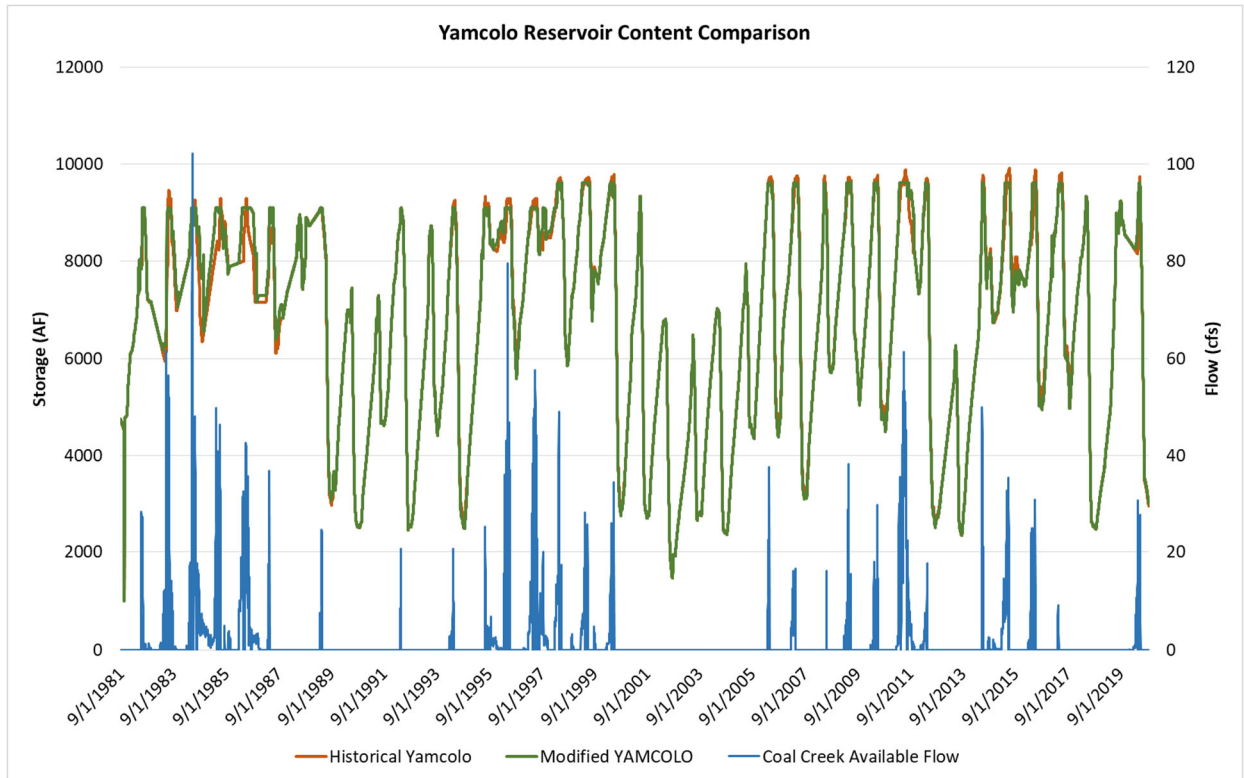


Figure 11: Yamcolo Reservoir content comparison using StateMod Coal Creek available flow results

Figure 12 shows the annual volume (from November 1 through October 31) of legally available flow from StateMod compared to the amount of water that can be stored considering storage capacity determined by the spreadsheet model. The red stars indicate whether Yamcolo Reservoir filled historically, with a star at the top of the graph indicating that the reservoir filled to capacity and a star at the bottom indicating that the reservoir did not fill to capacity. Table 3 shows available Coal Creek volume compared to the stored volume by year. Key observations from the graph and table are:

- When there is legally available flow from Coal Creek, the volume is much greater than the stored volume. This is due to the limited reservoir capacity.
- Legally available flow does not occur every year. It primarily occurs during wet or average years.
- In years when Yamcolo did not fill historically, there is no available flow from Coal Creek.

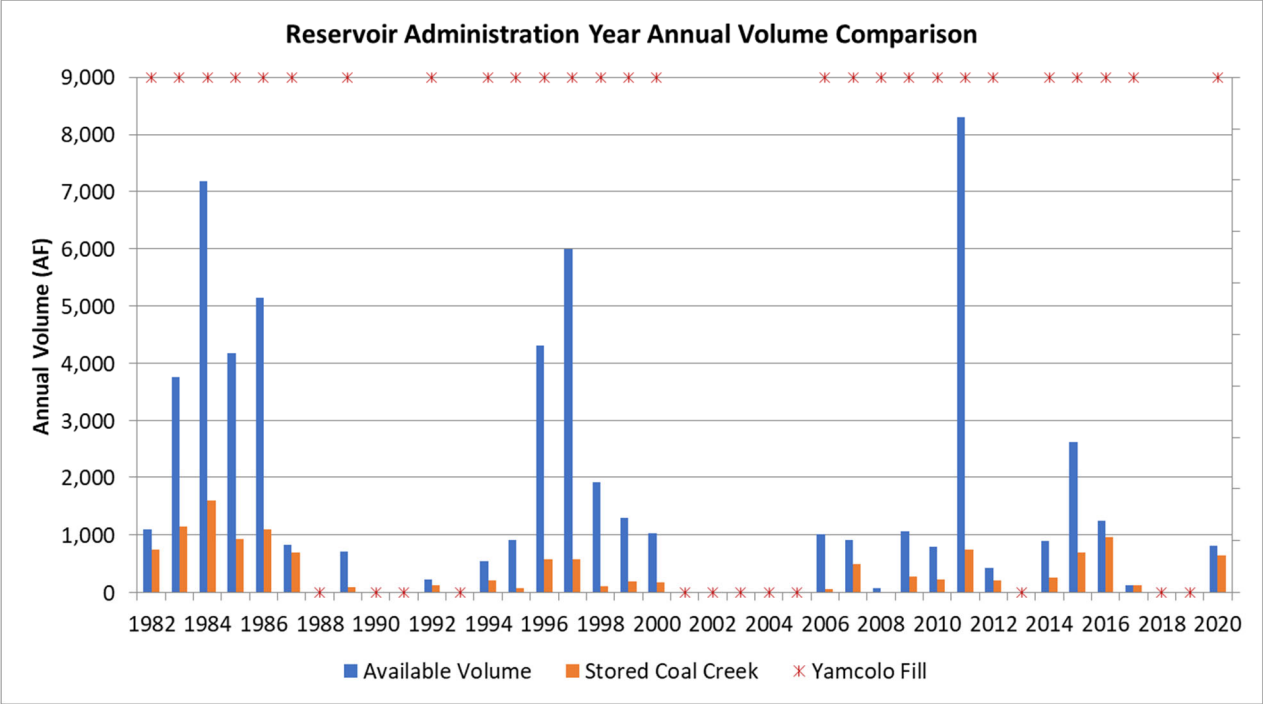


Figure 12: Comparison of legally available flow (StateMod) and stored flow from Coal Creek

The median available flow is about 820 acre-feet, while the median stored volume is about 190 acre-feet. As noted above, there is no available flow in years when Yamcolo Reservoir did not fill historically. This means, as represented by the described StateMod configuration, that the supply from Coal Creek helps Yamcolo Reservoir fill earlier in the year than historically, but does not increase the Yamcolo Reservoir supply during dry years.

Table 3: StateMod available Coal Creek volume compared to stored Coal Creek volume in Yamcolo, and historical Yamcolo fill status

Year	Available Coal Creek Volume (AF)	Stored Coal Creek Volume (AF)	Yamcolo Fill
1982	1,093	745	Yes
1983	3,761	1,154	Yes
1984	7,186	1,591	Yes
1985	4,179	933	Yes
1986	5,145	1,105	Yes
1987	828	703	Yes
1988	0	0	No
1989	711	104	Yes
1990	0	0	No
1991	0	0	No
1992	228	123	Yes
1993	0	0	No
1994	552	213	Yes



1995	917	83	Yes
1996	4,318	585	Yes
1997	6,002	588	Yes
1998	1,915	111	Yes
1999	1,290	197	Yes
2000	1,023	186	Yes
2001	0	0	No
2002	0	0	No
2003	0	0	No
2004	0	0	No
2005	0	0	No
2006	1,018	67	Yes
2007	912	502	Yes
2008	87	0	Yes
2009	1,065	282	Yes
2010	791	228	Yes
2011	8,301	750	Yes
2012	427	220	Yes
2013	0	0	No
2014	890	265	Yes
2015	2,634	689	Yes
2016	1,240	967	Yes
2017	129	129	Yes
2018	0	0	No
2019	0	0	No
2020	819	650	Yes
<b>Min</b>	0	0	
<b>Max</b>	8,301	1,591	
<b>Mean</b>	1,473	338	
<b>Median</b>	819	186	

### Historical Call Regime Available Flow

As described in the “Model Approach” section above, the StateMod natural flow results for Coal Creek in combination with the historical call record are used to estimate the legally available flow. This analysis assumes that the call regime remains the same as historical and results in more days of legally available flow from Coal Creek. The call record is available starting in 1991.

Figure 13 shows the results of the Yamcolo Reservoir spreadsheet analysis using the historical call approach to estimating legally available flow on Coal Creek. The key observations from the graph is that the historical call approach finds days with available flow in every year from 1991 through 2020. Therefore, Yamcolo Reservoir is able to store flow from Coal Creek in dry years. There are four more

years in which the modified Yamcolo Reservoir is able to fill than historically (1993, 2001, 2018, and 2019).

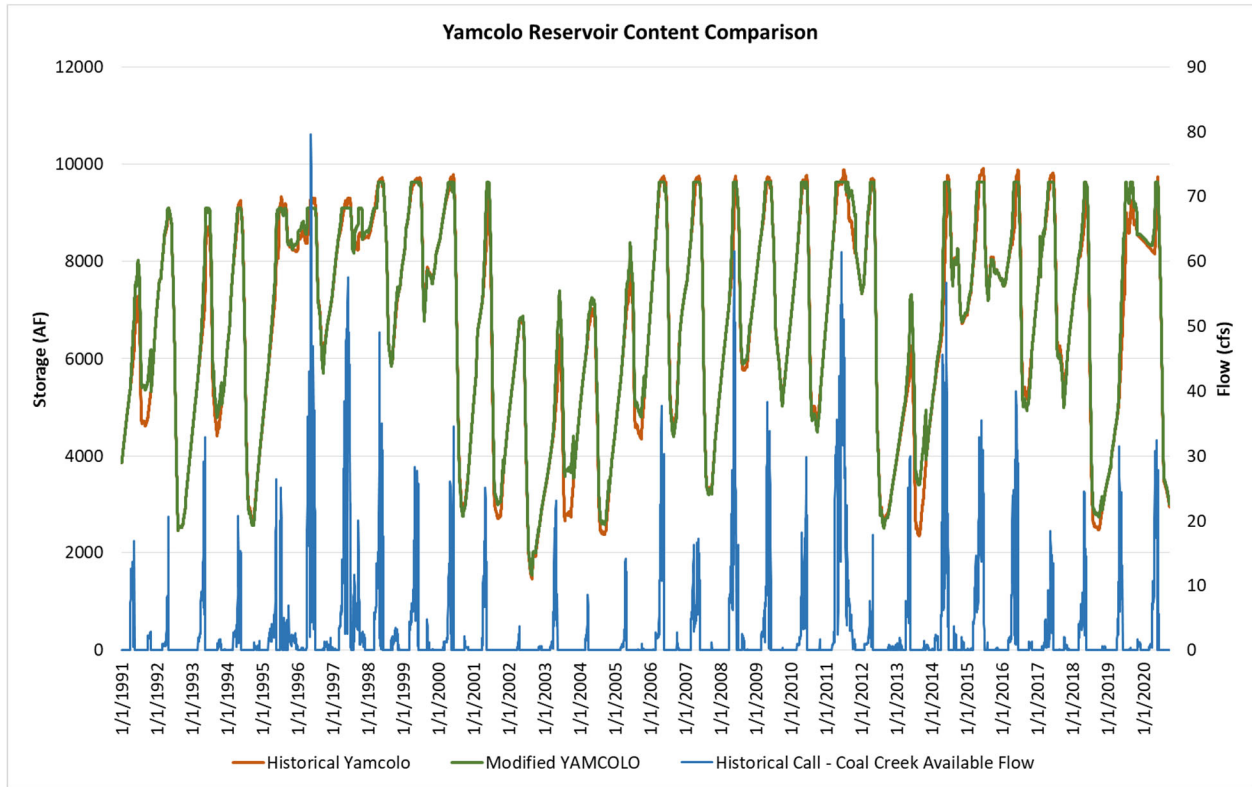


Figure 13: Yamcolo Reservoir content comparison using historical call analysis Coal Creek available flow results

Figure 14 shows a comparison of the monthly available flow volume from Coal Creek. StateMod results are the dashed blue line. Historical call results are the grey line. The historical call approach identifies more days with legally available flow, especially in dry years. This is because the historical call comes on later in the runoff season than the StateMod “call”. Additionally, there are years when the historical call record shows a very small amount of available flow in the fall. StateMod does not find available flow outside of the runoff.

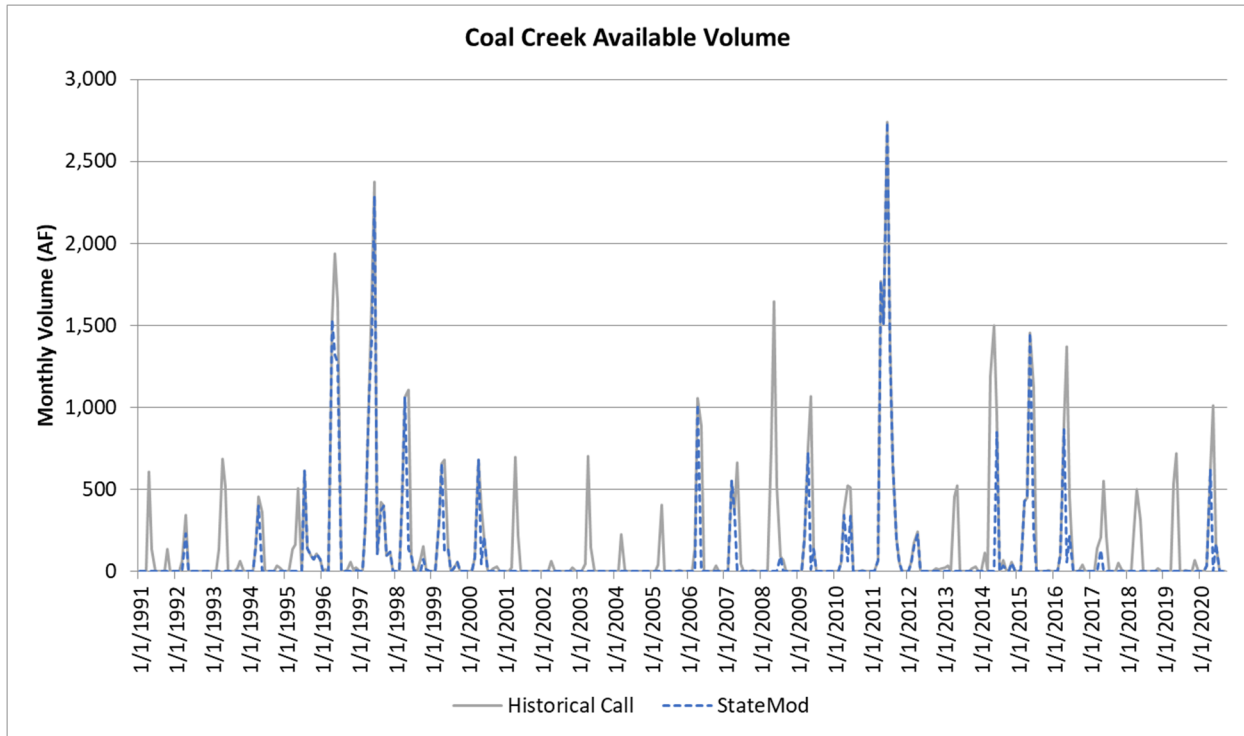


Figure 14: Comparison of monthly Coal Creek available volume from the StateMod and historical call approaches

Figure 15 shows a comparison of the Coal Creek legally available annual volume. Figure 16 shows a comparison of the volume of water stored in Yamcolo for the two approaches. The red stars indicate whether Yamcolo Reservoir filled historically, with a star at the top of the graph indicating that the reservoir filled to capacity and a star at the bottom indicating that the reservoir did not fill to capacity. Note that with the additional supply from Coal Creek, the spreadsheet model is able to fill Yamcolo Reservoir in 1993, 2001, 2018, and 2019. Note the difference in scales from Figure 15 to Figure 16. The difference between the two approaches is largest in dry years because StateMod determined there is no legally available flow while the historical call approach identifies days with legally available flow.

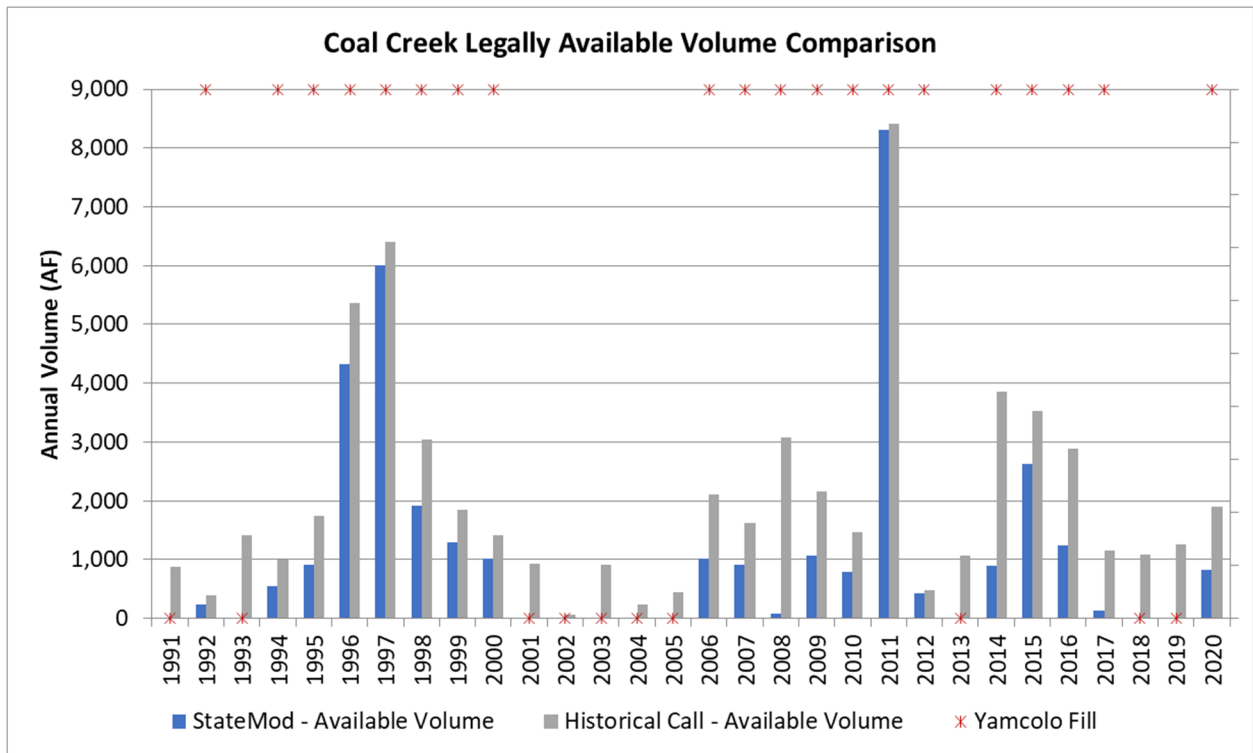


Figure 15: Comparison of Coal Creek legally available flow

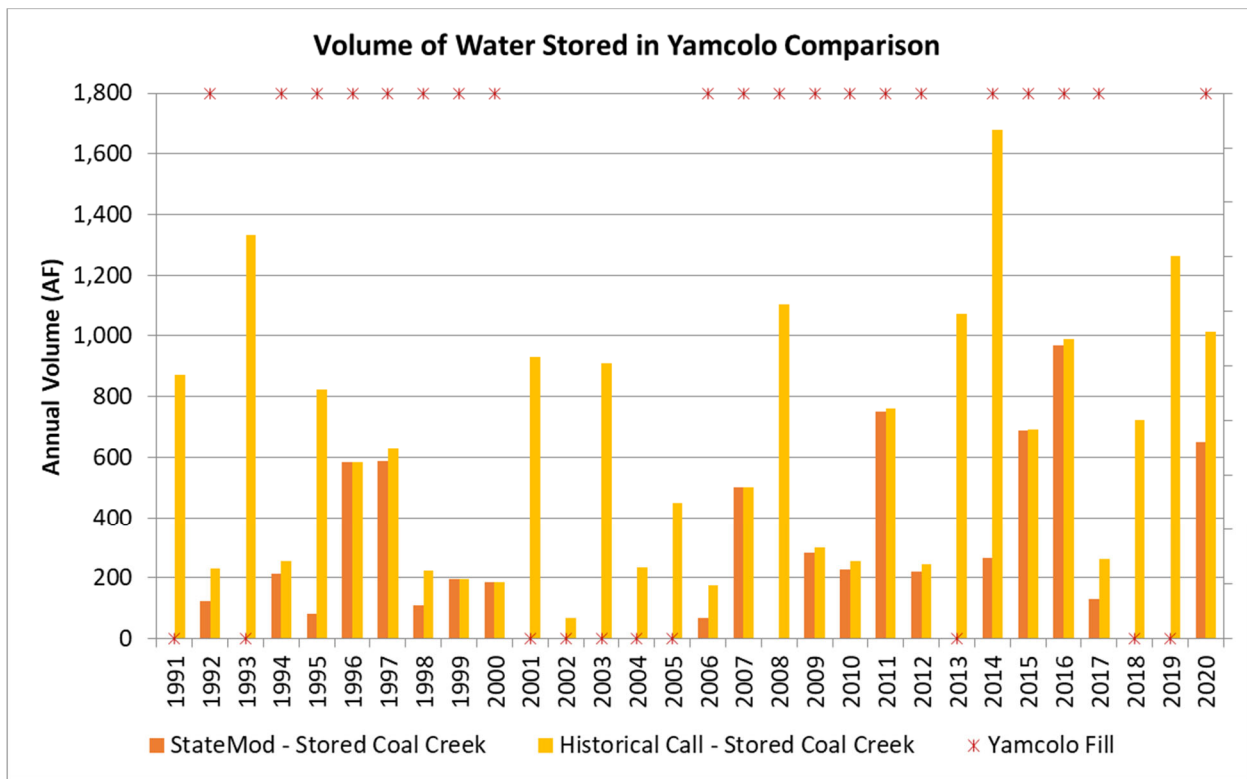


Figure 16: Comparison of Coal Creek stored in Yamcolo Reservoir

Table 4 reports the StateMod and historical call results for the annual available Coal Creek volume and the stored Coal Creek volume in Yamcolo Reservoir. The median stored volume increased from 186 acre-feet to 607 acre-feet and the mean stored volume increased from 338 acre-feet to 632 acre-feet. The total stored volume is computed as the difference between the storage in Yamcolo Reservoir on November 1 to the maximum volume during the reservoir administration year.

**Table 4: StateMod and historical call results for annual available Coal Creek volume and stored volume in Yamcolo Reservoir**

Year	StateMod Approach			Historical Call Approach		
	Available Coal Creek Volume (AF)	Stored Coal Creek Volume (AF)	Total Stored (Bear River + Coal Creek) (AF)	Available Coal Creek Volume (AF)	Stored Coal Creek Volume (AF)	Total Stored (Bear River + Coal Creek) (AF)
1991	0	0	4,646	871	871	5,385
1992	228	123	3,773	398	231	3,773
1993	0	0	5,481	1,412	1,333	5,853
1994	552	213	4,042	1,002	256	4,042
1995	917	83	5,706	1,742	825	5,706
1996	4,318	585	841	5,358	585	841
1997	6,002	588	2,404	6,405	628	2,404
1998	1,915	111	1,171	3,045	223	1,171
1999	1,290	197	2,372	1,844	197	2,372
2000	1,023	186	2,017	1,413	186	2,017
2001	0	0	5,743	932	932	6,030
2002	0	0	3,175	68	68	3,243
2003	0	0	4,070	910	909	4,979
2004	0	0	3,483	233	233	3,716
2005	0	0	4,684	449	449	5,126
2006	1,018	67	4,393	2,113	175	4,393
2007	912	502	3,238	1,621	502	3,238
2008	87	0	5,415	3,083	1,104	5,415
2009	1,065	282	3,028	2,155	299	3,028
2010	791	228	3,953	1,460	254	3,953
2011	8,301	750	4,278	8,415	761	4,278
2012	427	220	1,419	483	243	1,419
2013	0	0	3,101	1,072	1,072	4,155
2014	890	265	5,699	3,855	1,680	5,699
2015	2,634	689	2,809	3,522	691	2,809
2016	1,240	967	1,804	2,879	990	1,804
2017	129	129	3,466	1,162	261	3,466
2018	0	0	3,407	1,079	723	3,692
2019	0	0	6,354	1,266	1,262	6,729
2020	819	650	1,075	1,893	1,012	1,075

<b>Min</b>	0	0	841	68	68	841
<b>Max</b>	8,301	1,591	6,354	8,415	1,680	6,729
<b>Mean</b>	1,473	338	3,568	2,071	632	3,727
<b>Median</b>	819	186	3,475	1,436	607	3,745

## Conclusion

The StateMod analysis provides an estimate of daily physical and legally available flow on Coal Creek. The legally available flow was used in a reservoir operation spreadsheet model, reflecting historical reservoir operations from 1982 through 2020, to determine the volume of supplemental supply for Yamcolo Reservoir. As represented by the described StateMod configuration, Coal Creek Diversion provides an annual maximum supplemental supply of about 1,590 acre-feet and a median supply of 190 acre-feet. Given the StateMod determined first day of river administration of January 1<sup>st</sup> in every year considered, in years when Yamcolo Reservoir did not fill, there is no legally available flow on Coal Creek. The StateMod determined river administration is artificially aggressive in this case for the Bear River reach of the Yampa system when compared to historical river administration.

As an alternative approach, the historical call record from 1991 through 2020 was used to determine the legally available flow on Coal Creek and was used in the same reservoir operations spreadsheet model. This approach finds that the Coal Creek Diversion can provide an annual maximum supplemental supply of about 1,680 acre-feet and a median supply of about 610 acre-feet. Available flow was identified in every year, with 2002 being the smallest volume of 68 acre-feet.

This analysis does not address the goals of smoothing the daily diurnals or providing a supplemental supply for hydropower production at Stagecoach Reservoir.

## Appendix A: Yamcolo Representation in StateMod

Yamcolo Reservoir is operated by Upper Yampa Water Conservancy District for irrigation, municipal, and augmentation water supply.

Table 5: Yamcolo Reservoir Storage Contents and Surface Area

Storage Contents (ACFT)	Surface Acre (Acre)
0	0
606	58
1,305	81
1,644	87
2,007	93
2,394	96
2,805	105
3,243	113
3,711	120
4,210	123
4,738	135
5,295	142
5,883	150
6,500	156
7,149	165
7,829	173
8,541	181
9,284	188
9,621	202

Yamcolo Reservoir is represented by the State’s identifier 5804240 in the model. It is an on-channel reservoir located on the Bear River. The reservoir capacity is 9,621 acre-feet and it is modeled with five accounts listed in Table 6.

Table 6: Yamcolo Reservoir Accounts

Fill Order	Account	Storage Amount (af)
1	Conservation	1,086
2	Yamcolo M&I	1,010
3	Yamcolo Irrigators Association	3,000
4	Stagecoach Exchange	4,000
5	Raise	525
	<b>Total</b>	<b>9,621</b>

The reservoir is filled with its current water rights portfolio, listed in Table 7. The accounts in the reservoir are filled in the order listed in Table 6. Note that the Yamcolo storage rights have different decreed uses. A simplified approach is taken in the model. After stored water is distributed to the accounts, it is no longer tracked by water right.

**Table 7: Yamcolo Water Rights**

<b>Admin Number</b>	<b>Priority Date</b>	<b>Volume (af)</b>	<b>1<sup>st</sup> or 2<sup>nd</sup> Fill</b>
41329.00000	02/26/1963	6,532	1
41727.39991	06/29/1959	2,500	1
47481.37136	09/04/1951	1,000	1
47905.00000	02/27/1981	914	2
50769.50653	09/06/1988	525	1

The current operations of Yamcolo Reservoir represent typical operations as of 2021:

- Fill accounts with in-priority water rights in the order listed in Table 6.
- Release to diversion structures. Many of the structures receive water from multiple accounts. The order in which the accounts release to the diversions is listed in Table 8.
- For Mt. Werner, total annual releases are limited to 300 acre-feet. This release occurs after a release from Stagecoach Reservoir to Mt. Werner.

**Table 8: Yamcolo Releases**

<b>Destination WDID</b>	<b>Destination Name</b>	<b>1<sup>st</sup> Account</b>	<b>2<sup>nd</sup> Account</b>	<b>3<sup>rd</sup> Account</b>
5804685_D	Stillwater Ditch	Yamcolo Irrigators	Exchange	Raise
5800564	Buckingham-Mandall	Exchange	Yamcolo Irrigators	Raise
5800763	Mandall	Exchange	Yamcolo Irrigators	Raise
5800500	Acton	Exchange	Yamcolo Irrigators	Raise
5800684	Hern-Kolbe	Exchange	Yamcolo Irrigators	Raise
5800622	Egeria	Exchange	Yamcolo Irrigators	Raise
5800539	Big Mesa	Yamcolo Irrigators	Raise	
5800738	Lindsey	Yamcolo Irrigators	Raise	
5800945	Wooley	Yamcolo Irrigators	Raise	
5800643	Fix	Yamcolo Irrigators	Raise	
5800777	Mill No. 1	Yamcolo Irrigators	Raise	
5800821	Pennsylvania	Yamcolo Irrigators	Raise	
5800541	Bird	Yamcolo Irrigators	Raise	
5800589	Coal Creek	Yamcolo Irrigators	Raise	
5800540	Bijou	Yamcolo Irrigators	Raise	
5800782	Moody	Yamcolo Irrigators	Raise	
5800634	Ferguson	Yamcolo Irrigators	Raise	
5800879	Stafford	Exchange	Raise	
5800731	Laughlin	Exchange	Raise	



5800933	Wipple	Exchange	Raise	
5800866	Snow Bank	Exchange	Raise	
5801074	Rossi Highline	Exchange	Raise	
5800807	Oak Dale	Exchange	Raise	
5800798	Nickell	Yamcolo M&I	Raise	
5805066	Mt. Werner	Yamcolo M&I		

# Civil Design Consultants, Inc.

Civil and Environmental Engineers

2130 Resort Drive, Suite 200  
Steamboat Springs, Colorado 80487  
(970) 879-3022 • Fax (970) 879-3028

November 18, 2020

Andy Rossi  
Upper Yampa Water Conservancy District  
2220 Curve Plaza, Ste 201  
Steamboat Springs, CO 80487

Re: Coal Creek Yamcolo Diversion – Preliminary Cost Estimate

## Cost Estimate Summary:

This cost estimate for the proposed Coal Creek Yamcolo Diversion was based on the 9/16/2003 alternatives analysis prepared by Landmark Consultants, Inc. (LCI). The recommended alternative includes a concrete diversion structure located at the upstream crossing of FS 906 and Coal Creek. The flow is conveyed via approximately 700 feet of 36" culvert (various material options proposed) to the Yamcolo spillway, where the flow discharges into a concrete channel and riprap plunge pool. The original LCI cost estimate did not include flow measurement devices located on both Coal Creek and the turn out. UYWCD has requested that the cost of these instruments be included in this estimate. Additionally, the LCI analysis included 36" pipe, which was sized for a maximum conveyance of 70 CFS. UYWCD has requested a maximum 100 CFS capacity, which upon CDC's recent hydraulic analysis will require a 48" pipe. This hydraulic analysis was based on an estimated pipe slope of 2.14%; however, at the time of this estimate, survey data is unavailable and hydraulic calculations will therefore need to be updated once an actual slope is determined. LCI had also included four (4) 5ft diameter manholes in their preliminary design, these manholes are being retained in the updated cost estimate but have been increased to 6ft diameter to accommodate the larger pipe.

This cost estimate assumes 48" HDPE dual wall bell and spigot culvert pipe material. The estimate also assumes the use of one 48" Rubicon Slipmeter for both flow control and flow measurement at the Coal Creek turn out. A Sontek submerged AV flow meter is included to measure flow within the 6ft diameter CMP conveying Coal Creek beneath FS 906. The bottom of this culvert pipe will require a concrete fill or steel plate be installed along its bottom to improve low water hydraulics and therefore the accuracy of the measuring device, these costs have been included in the estimate as well. Lastly, a dual output remote telemetry unit (RTU) has been included in the estimate, which will transmit flow data to the central SCADA computer via the control building located on top of the Yamcolo dam. In addition to the cost of the flow measurement devices and increased pipe size, construction and material costs have increased since LCI prepared the original 2003 estimate. After a comprehensive site survey has been performed and final design of the improvements has been completed, actual quantities can be confirmed, and at which time CDC can prepare a more accurate cost estimate for the proposed improvements. Please contact CDC with any questions about the attached cost estimate or to discuss the final design work for this project.

Matt Mielke  
Civil Design Consultants, Inc.

**Coal Creek Yamcolo Diversion**  
11/17/2020

Item	Description	Quantity	Unit	Unit Cost	Totals	Justification
1	Mob/Demob/Bond/Insurance/Permitting	1	LS	\$ 30,000.00	\$ 30,000.00	~10% of Construction Sub Total
2	Erosion Control	1	LS	\$ 3,500.00	\$ 3,500.00	CDC estimate based on recent and similar projects (USFS requirements)
3	Grading / Excavation / Riprap at inlet	1	LS	\$ 10,000.00	\$ 10,000.00	CDC estimate based on recent and similar projects; \$100/ton x 50 tons + Delivery + placement
4	Concrete (Material only, Incl. delivery)	40	YD	\$ 150.00	\$ 6,000.00	Based on recent and similar pricing in the Steamboat area + additional delivery estimate
5	Cast-in Place Concrete Diversion Structure w/ 48" HDPE coupler	1	EA	\$ 16,000.00	\$ 16,000.00	Incl. formwork, reinforcement, pump and placement
6	48" Rubicon Slip Meter (Incl. control pedestal, solar power and factory install)	1	EA	\$ 32,000.00	\$ 32,000.00	10/2020 Supplier Quote
7	48" HDPE - Dual Wall, Bell and Spigot (material Only)	700	LF	\$ 90.00	\$ 63,000.00	10/2020 ADS Supplier Quote
8	Trenching, Bedding and Backfill (culvert pipe)	700	LF	\$ 70.00	\$ 49,000.00	Assuming no blasting or rock excavation; ~10ft trench on upper road section
9	6' Dia Precast Manhole with Ring and Cover (Installed)	4	EA	\$ 12,000.00	\$ 48,000.00	Typical cost for material and installation
10	Concrete endwall and rundown channel	1	LS	\$ 16,000.00	\$ 16,000.00	Assume 8" thick, 40ft long; formwork, reinforcement, pump and placement (material cost included above)
11	12" Riprap (Overbanks and Plunge Pool), incl. base fabric	37	CY	\$ 150.00	\$ 5,550.00	Assume average thickness of 2 ft and 55 SY
12	Temporary Diversion	1	LS	\$ 8,000.00	\$ 8,000.00	CDC estimate based on recent and similar projects; Assume 4-5 day pump around
13	Reconstruct Gravel Road and Resurface	1100	SY	\$ 14.00	\$ 15,400.00	3" of gravel + 2" CDOT Class 6 Road Base (~150 CY material)
14	Revegetation	0.5	AC	\$ 1,800.00	\$ 900.00	Straw, seed and tackifier
15	Sontek IQ w/ logger/display, solar panel, battery and enclosure	EA	1	\$ 16,000.00	\$ 16,000.00	2019 Supplier Quote from Stillwater Ditch Improvements Project
16	Concrete pour or welded steel plate on bottom of CMP (under road)	EA	1	\$ 5,000.00	\$ 5,000.00	10ft long, full bottom width
17	Installation and calibration of AV sensor equipment	LS	1	\$ 1,500.00	\$ 1,500.00	~10% instrument cost
18	RTU w/ dual input, radio output, solar powered	LS	1	\$ 12,000.00	\$ 12,000.00	10/2020 Browns Hill Quote

**Sub-Total** \$ 337,850.00

**Construction Contingency (20%)** \$ 67,570.00 \*\*\* Construction contingencies are estimated at 20% (typ) but actual construction costs can vary depending on market conditions, unforeseen issues, final design, etc.

**Total** \$ 405,420.00 \*\*\* Does not include engineering design or bid/construction engineering services, these fees are billed T&M and typically range 20%-30% of total construction cost



---

Civil Engineering ♦ Surveying Services ♦ Land Development ♦ Construction Management

Study of Design Alternatives  
for  
Coal Creek Diversion to Yamcolo Reservoir

**DRAFT**

September 16, 2003

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141 9<sup>th</sup> Street  
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[www.Landmark-CO.com](http://www.Landmark-CO.com)

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APPENDIX A

## INTRODUCTION

The purpose of the proposed project is to divert 60-cfs to 90-cfs of spring runoff from Coal Creek to Yamcolo Reservoir while maintaining a minimum environmental flow in Coal Creek. This report presents background data and calculations to evaluate the proposed design alternatives for the partial diversion. Yamcolo reservoir is located in Garfield County approximately 12 miles southwest of the town of Yampa along County Road 7 (Forest Road 900). The project is located to the northeast of the reservoir and will consist of approximately 700 lineal feet of pipe, an inlet structure and an outlet structure. From our meeting at the site on August 1, 2003, Landmark Consultants, Inc. (LCI) assumed that the minimum flow in Coal Creek below the diversion to be around 5-cfs.

The inlet structure will be placed in Coal Creek just upstream of a large existing culvert under County Road 157. The diverted water will be conveyed through an underground closed conduit to an outlet point near the spillway of Yamcolo Reservoir. The outlet structure should safely convey the water down the steep bank of the spillway where it will flow to the main body of the reservoir.

## BASIN AND EXISTING CONDITIONS

Coal Creek is formed by the confluence of the East Coal Creek and West Coal Creek approximately 1,700-feet upstream (northwest) of the proposed diversion. Coal Creek continues flowing southeast about 3,000-feet past the proposed diversion where it meets with the controlled release of Yamcolo Reservoir and forms Bear River.

The basin behind the proposed diversion is approximately 6.33 square miles of steep terrain. Vegetation varies greatly across the basin. It ranges from bare to desert shrubs to aspen and <sup>?</sup> juniper cover in poor to fair condition. The USGS Orno Peak 7.5' quadrangle map shows the East and West Coal Creeks as perennial streams with some swampland and a few small natural ponds. The basin is undeveloped except for a trailhead and 1,000-feet of the hardpack County Road 157 to access it. The basin generally lies between 9,620-feet and 12,130-feet on the 1929 NGVD. The proposed diversion is approximately located at longitude 107°02'45" and latitude 40°03'30".

## BASIC HYDROLOGY

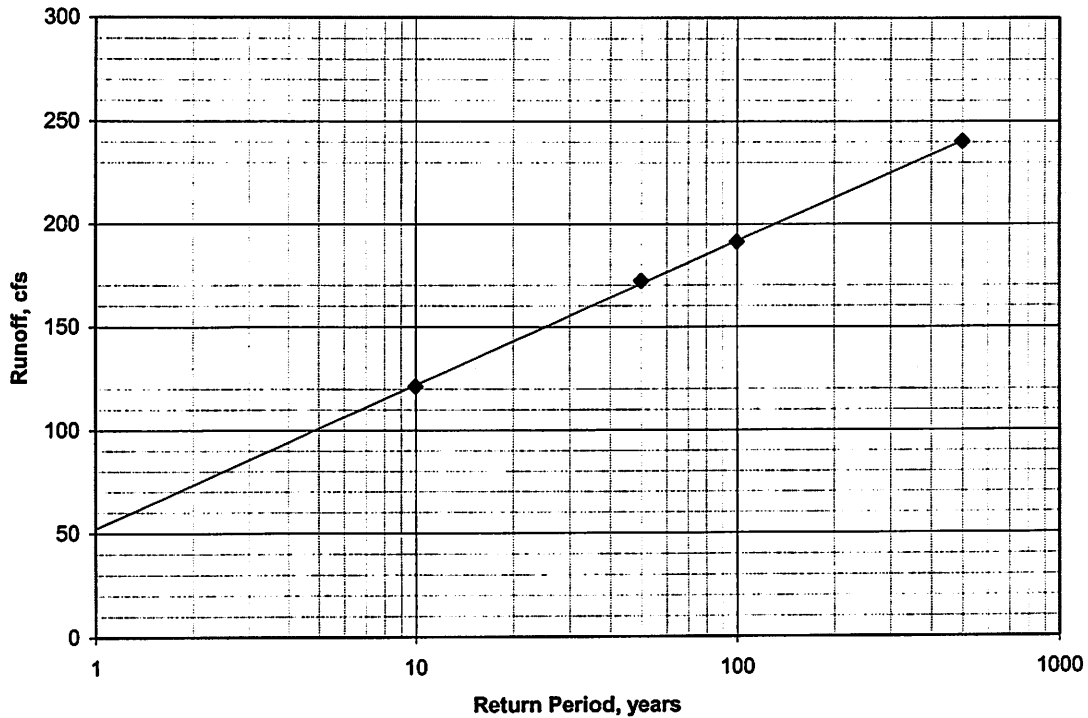
Large volumetric flows for this basin are created by spring snowmelt runoff from mid-May to early-July. There are no gauging stations on Coal Creek. The closest gauging stations are all on streams regulated by reservoirs, so correlation techniques could not be used.

Little Grizzly Creek, a gauged basin near Coalmont, Colorado, has a similar aspect, average annual precipitation, and elevation. The 10.1 square mile basin on Little Grizzly Creek was only gauged for 5-years between 1967 and 1973; however, it confirms that from a volumetric standpoint snowmelt runoff will be the dominant factor.

Snowmelt peak runoff calculations were performed using the equations contained in Figure S-1B in the 1980 NRCS publication Procedures for Determining Peak Flows in Colorado

(reference 5), included in the appendix. This empirical method required two input variables, the basin area in square miles and average annual precipitation of the basin. A map of the average annual precipitation is found at Figure S-1C also from reference 5, and included in the appendix. The map estimates the basin receives between 20-inches and 32-inches of precipitation per year. The following graph of peak runoff was generated with an average annual precipitation of 30-inches and was extrapolated to the one-year return period.

Peak Runoff from Snowmelt



According to local observations and the observed high water line inside the culvert immediately downstream of the proposed diversion the average yearly flow is most likely greater than the 50-cfs predicted by the chart.

Wear inside the 10'-3" by 6'-9" Arch CMP Culvert indicates a normal high-water flow of approximately 1.6-feet. Using data from the site-specific survey of the site and Manning's equation a flow depth of 1.6-feet correlates to a flow of 150-cfs.

**HYDRAULIC CONSIDERATIONS AND ALTERNATIVES**

This section presents several different alternatives for the system and presents conceptual unit cost data. The following section presents our recommendation with a conceptual opinion of probable cost for the recommended system, found in the appendix.

*what does "low efficiency" mean?*

**Inlet Configuration:**

The diversion structure features a low-efficiency orifice to allow the minimum flow to continue down Coal Creek. Once the level associated with the minimum flow is reached, the water starts to spill into a highly efficient inlet leading into the diversion channel. The flow orifice will be designed to pass the largest particle normally carried by the maximum velocity through the orifice to prevent clogging. The high velocities make the orifice self-cleaning, but require a concrete apron to be extended into the channel to prevent scouring. The design features will minimize maintenance; however, inspection and maintenance will be very important to the performance and service life of the structure.

An emergency overflow will be provided over the top of the concrete wall at the elevation where the maximum diversion flow is reached. The water spills over the wall and exits through the large existing culvert and continues down Coal Creek. The wall itself will be designed for the high loads associated with the water impoundment on the upstream side.

Hydraulically this design will divert the most flow above the minimum environmental flow without the need for manual or automatic control. Preliminary calculations indicate the performance of this arrangement to limit the flow in Coal Creek to under 10-cfs while a diversion flow of 70-cfs is conveyed to the reservoir. This occurs at a wall height of just over three feet. The structure also passes the minimum environmental flow of 5-cfs at a height of 1.0-feet on the wall just before the structure begins to divert flow. Other alternatives and options may be investigated upon request.

We anticipate the concrete work for the inlet to cost about \$600 per cubic yard. Sluice gates may also be incorporated into the design to allow flexible handling of the water. As an order of magnitude estimate a 24" by 24" sluice gate costs about \$10,000 installed and a 36" by 36" costs about \$15,000. A parshall flume or similar device may also be constructed in Coal Creek, if needed.

**Conveyance System:**

Several material choices exist for the closed-conduit conveyance system. The line is approximately 700-feet in length making material costs, installation costs and hydraulic efficiency the most important selection factors. Also, because little is known about the soils in the area pipe durability should be carefully evaluated. The following materials were evaluated:

- Corrugated Metal Pipe (CMP)
- Smooth wall Aluminized Steel Pipe (ASP)
- High-density Polyethylene (HDPE)
- Profile wall PVC, ASTM F794

*bank up in basin?  
risks to banks, embankment*



The following table presents a side-by-side comparison of the four materials:

	CMP	ASP	PVC	HDPE
Manning's n Value	0.024	0.013	0.011	0.012
Available Sizes (in)	18-144	18-102	18-36	18-42
Joints	Soil or Watertight	Watertight	Airtight	Soil or Watertight
Manufactured Length (ft)	20-60	20-40	13	20
Min. Bury Depth (ft)	1.0	1.0	2.0	2.0
Max. Bury Depth, (ft)	30+	30+	30+	10.0+ ?
Normal Service Life (yrs)	75+	75+	75+	75+

The following table lists the advantages and disadvantages of each material

Material	Advantages	Disadvantages
CMP	Highly available Long laying lengths	Hydraulically rough Low abrasion resistance
ASP	Long laying lengths	Low abrasion resistance
PVC	Hydraulically smooth Easy installation High chemical, corrosion, and abrasion resistance Ease of field cutting	Unavailability of diameters greater than 36" Cannot be exposed to UV light Higher Cost
HDPE	Hydraulically smooth Easy installation High chemical, corrosion, and abrasion resistance Ease of field cutting	Unavailability of diameters greater than 36" Cannot be exposed to UV light

The following table presents gravity flow performance data for several configurations:

Material	Diameter (in)	Full Flow Capacity @ 1.00% slope (cfs)
CMP	36	36.1
CMP	48	77.8
ASP	36	66.7
ASP	42	100
PVC	36	79.0
HDPE	36	72.3

72.3 cfs

Normally manholes are located at all changes in horizontal and vertical alignment and no greater than 400 to 500-feet apart. A curvilinear alignment may be investigated in final design after the material selection is narrowed because the allowable curvature depends most heavily on the manufacturer's recommendation.

The following table shows the size and estimated cost for manholes.

Pipe Size Range	Manhole Inside Diameter	Maximum Depth	Estimated Installed Cost (Each)
36" – 42"	5-ft	15-ft	\$3,100
> 42"	6-ft	15-ft	\$4,800

The construction of the conveyance system requires County Road 157 to be temporarily closed. The closure will likely last for a couple of weeks.

**Outlet Configuration:**

The conduit is proposed to outlet at the edge of the spillway. A shallow concrete channel with riprap overbanks conveys the flow down the steep spillway bank to the bottom of the spillway where it would exit the system via a riprap plunge pool. The outlet end of the pipe will require an endwall for stability and to prevent undercutting.

An alternative to the concrete and riprap rundown is an at-grade CMP with concrete grade beams with steel pipe straps. Only the metal pipes would be considered for the run-down.

It is possible to outlet the flow just past the intersection of County Road 7 and County Road 157. In this case approximately 100-feet of deep trapezoidal channel and erosion protection would be required to get to the bank of the spillway making it less economic than keeping it in the underground closed conduit.

**CONCLUSIONS AND RECOMMENDATIONS**

Landmark Consultants recommends the following basic system:

- Concrete inlet system as shown in Sheet 2 of 3 of the details following this report, with no sluice gates or controls.
- HDPE 36" in diameter with soil-tight joints for a maximum conveyance near 70-cfs, depending on inlet conditions. *why?*
- Straight run pipes with manholes at changes in alignment and grade.
- Underground pipe system that terminates at an endwall at the top of the spillway.
- A concrete channel rundown with riprap overbanks.
- A riprap plunge pool at the bottom of the spillway to sheet-flow the water to the reservoir.

We believe this system best balances performance, construction cost, maintenance, and service life.

Conceptual details and plan and profile are presented as Sheets 1 through 3.

The "Conceptual Engineer's Opinion of Probable Construction Costs" is presented in the appendix and estimates the cost of the recommended configuration at just over \$150,000, which includes a 20-percent contingency.

## LIMITATIONS

The facts and opinions expressed in this report are based on Landmark Consultants, Inc.'s (LCI's) understanding of the project and data gathered from:

- Site visits
- USGS Orno Peak 7.5' Quad (1977)
- Detailed field survey by LCI (2003)
- RS Means Cost Data (2003)

Actual conditions may vary. If any of the data is found to be inaccurate or the proposed plan is changed, LCI should be contacted to review this report and make any necessary revisions.

## REFERENCES

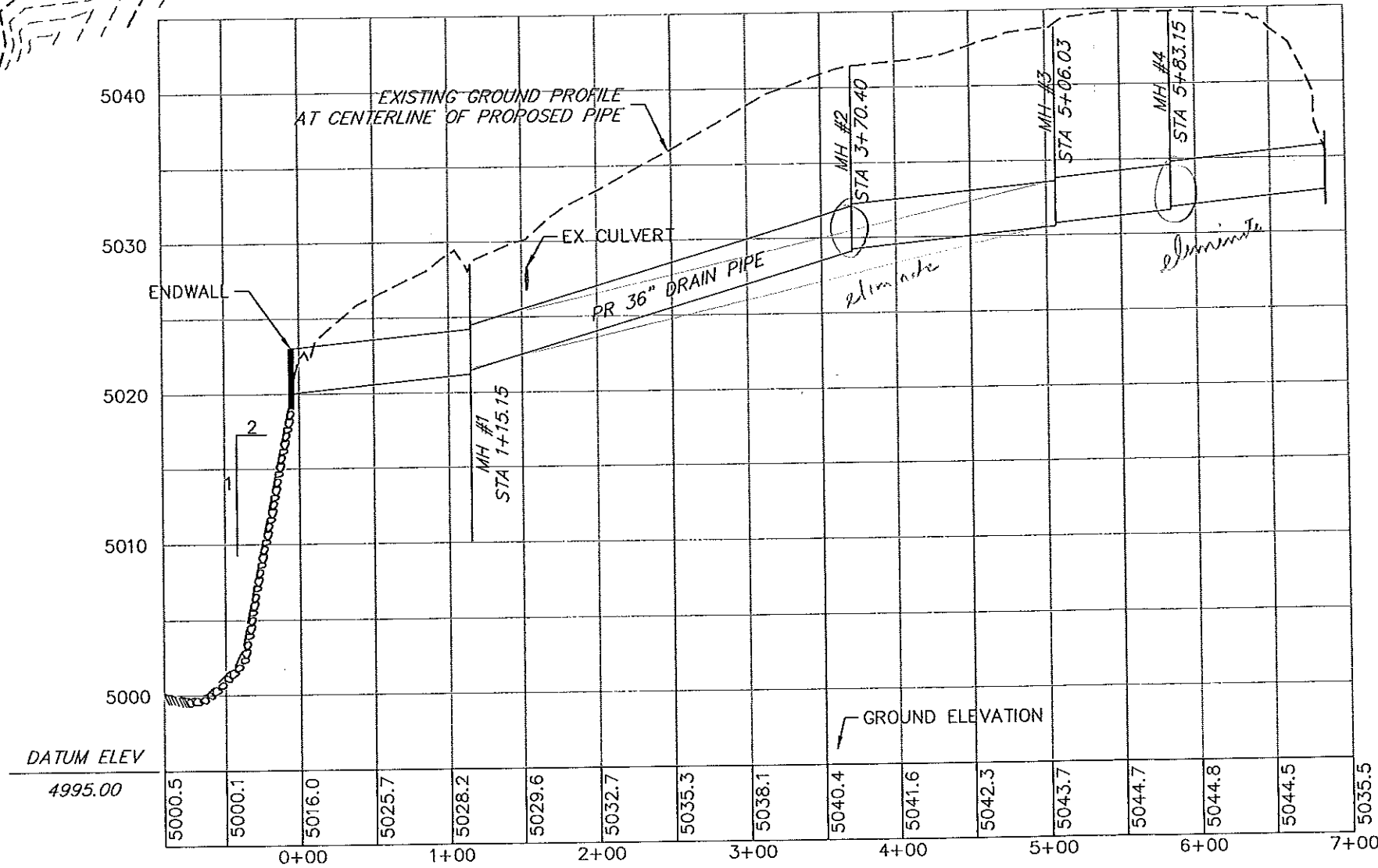
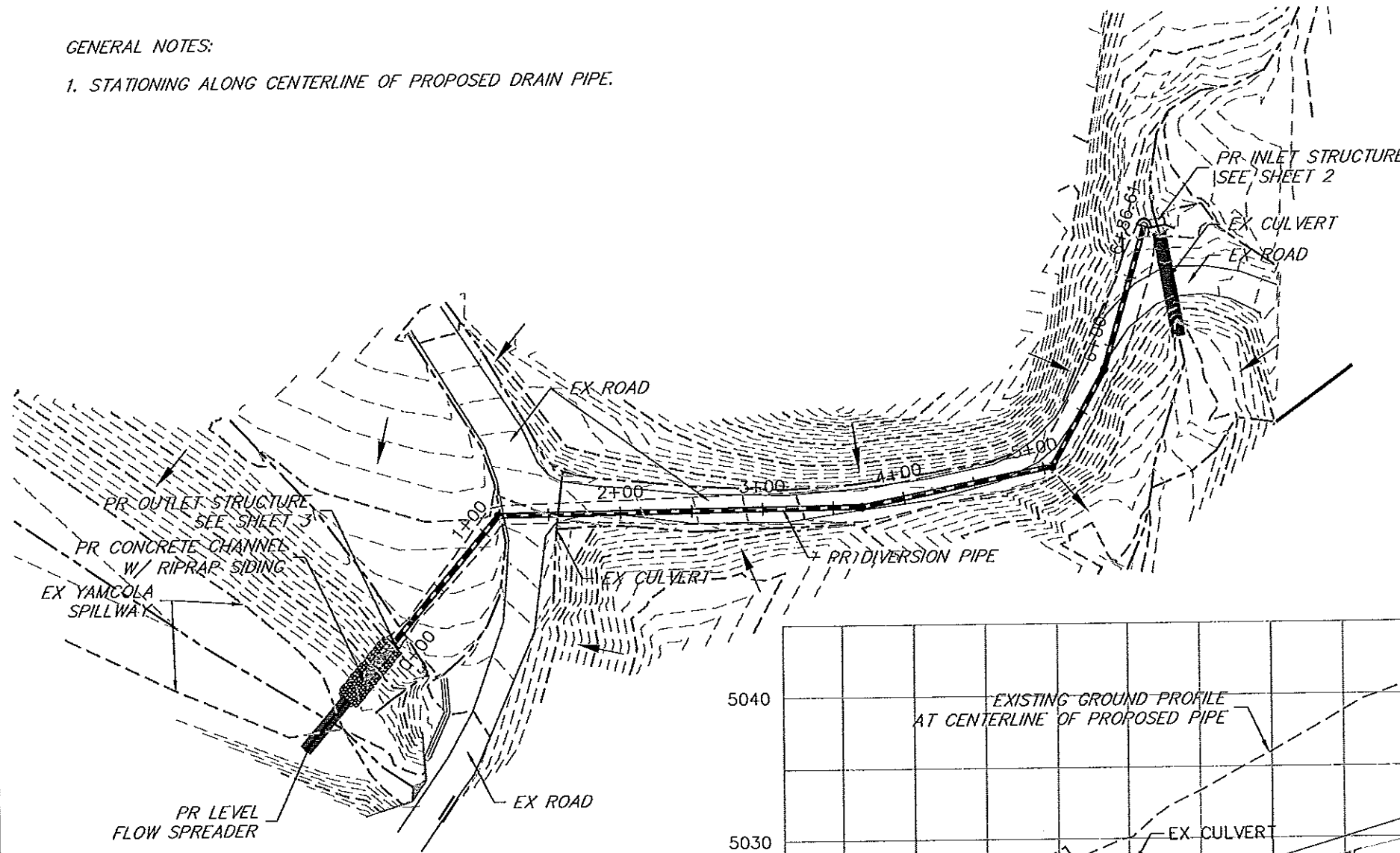
1. Hydraulic Design of Highway Culverts (HDS-5), Federal Highway Administration, September 2001
2. Urban Hydrology for Small Watersheds (TR-55), Natural Resource Conservation Service, June 1986
3. Hydraulic Design of Energy Dissipators for Culverts and Channels (HEC 14), Federal Highway Administration, September 1983
4. Hydraulic Design of Improved Inlets for Culverts (HEC 13), Federal Highway Administration, August 1972
5. Procedures for Determining Peak Flows in Colorado, Natural Resource Conservation Service, 1980
6. Update to Storm Sewer Pipe Material Technical Memorandum, Burns & McDonnell for the Urban Drainage and Flood Control District, March 1998
7. Open-Channel Hydraulics, Ven Te Chow, 1959
8. Design and Construction of Urban Stormwater Management Systems, American Society of Civil Engineers and Water Environment Federation, 1992
9. Site Work & Landscape Cost Data (22 Edition), R. S. Means Company, Inc., 2003

GENERAL NOTES:

1. STATIONING ALONG CENTERLINE OF PROPOSED DRAIN PIPE.

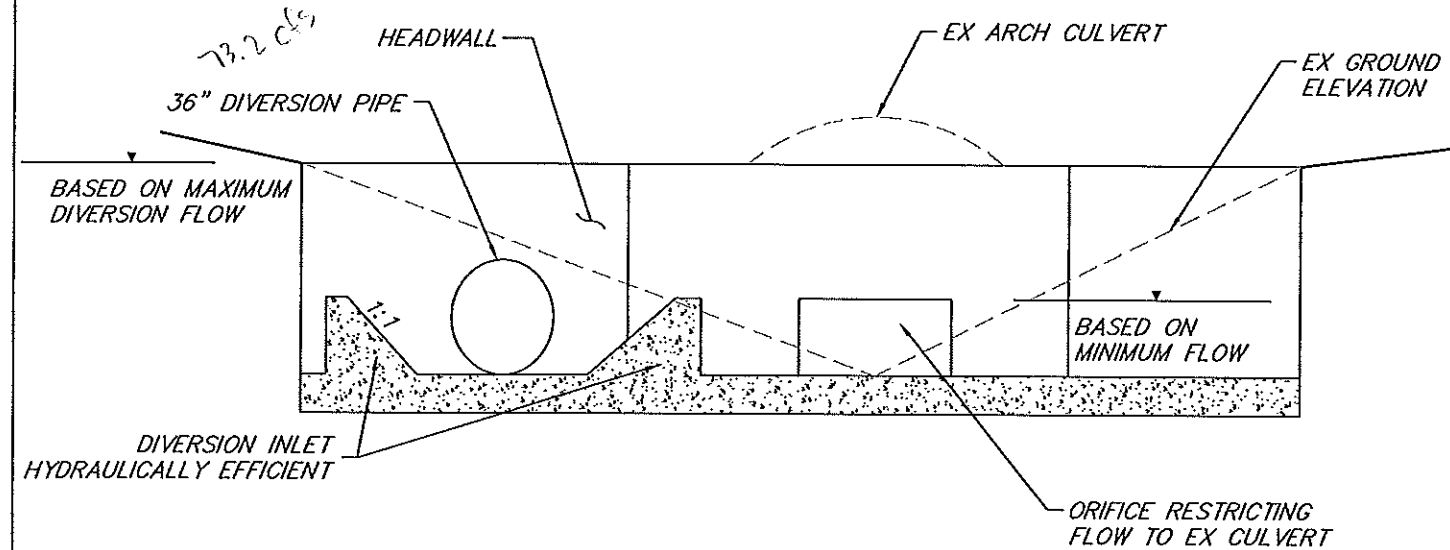
LEGEND

- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- EXISTING EDGE OF ROAD
- EXISTING CULVERT
- EXISTING STREAM CENTERLINE
- ← FLOW ARROW
- PROPOSED DRAIN PIPE
- ▨ CONCRETE CHANNEL W/ SIDING RIPRAP
- ▩ RIPRAP PLUNGE POOL
- ▬ REINFORCED TURF MAT LEVEL SPREADER
- PROPOSED LIMITS OF DISTURBANCE

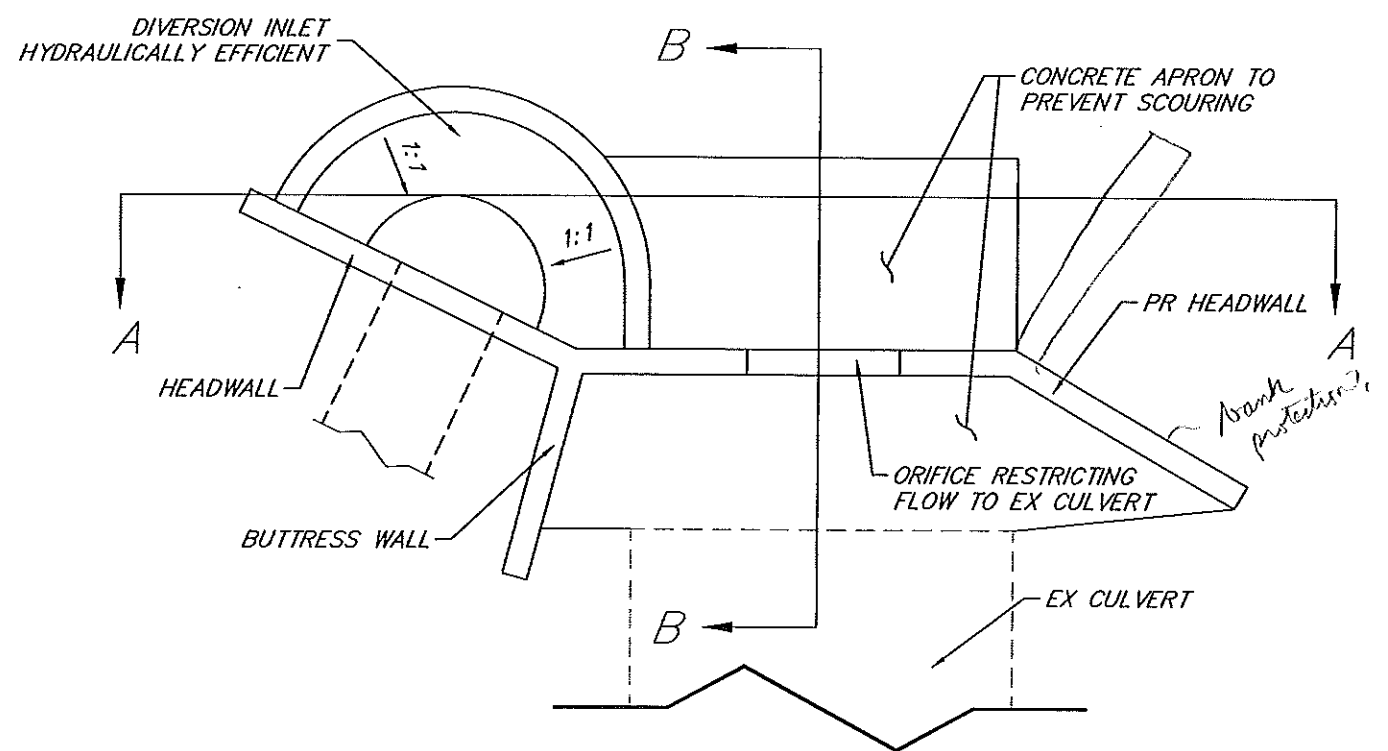
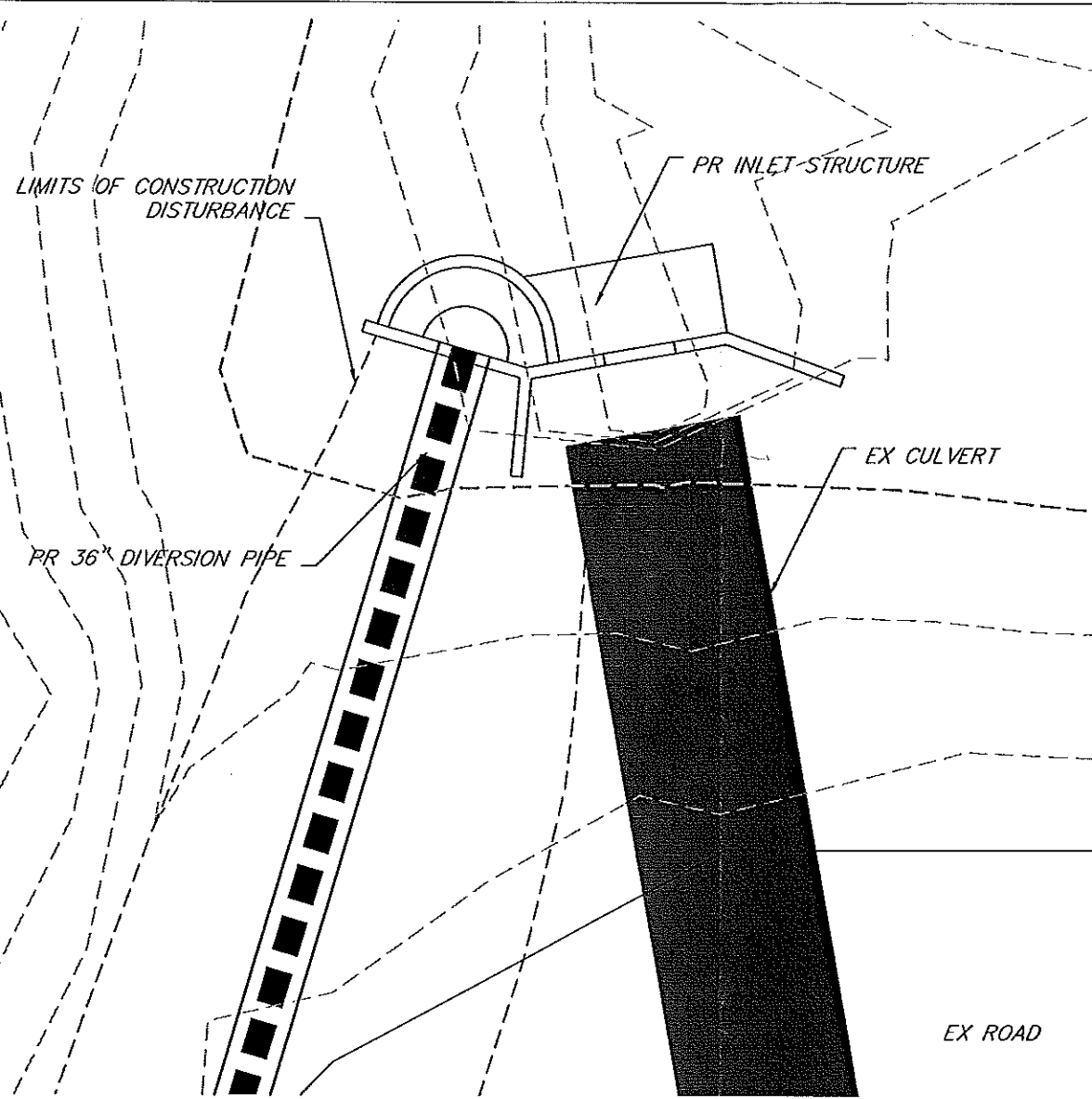


NO.	DATE	REVISIONS	DIT
UYVWCD Garfield County, CO			
Yamcolo Diversion			
<b>Plan &amp; Profile</b>			
DATE:	9-15-03	DGN BY:	CE
JOB NO.:	1378-001	DWN BY:	RS
DWG NO.:	P&P#01	SURV. BY:	AP
Vertical Scale: 1" = 10'			
Contour Interval = 2 Feet			
Horizontal Scale			
1" = 100'			
<small>141 9th Street, P.O. Box 774943 Steamboat Springs, Colorado 80477 Phone (970) 871-9494 Fax (970) 871-9299 www.LANDMARK-CO.com</small>			

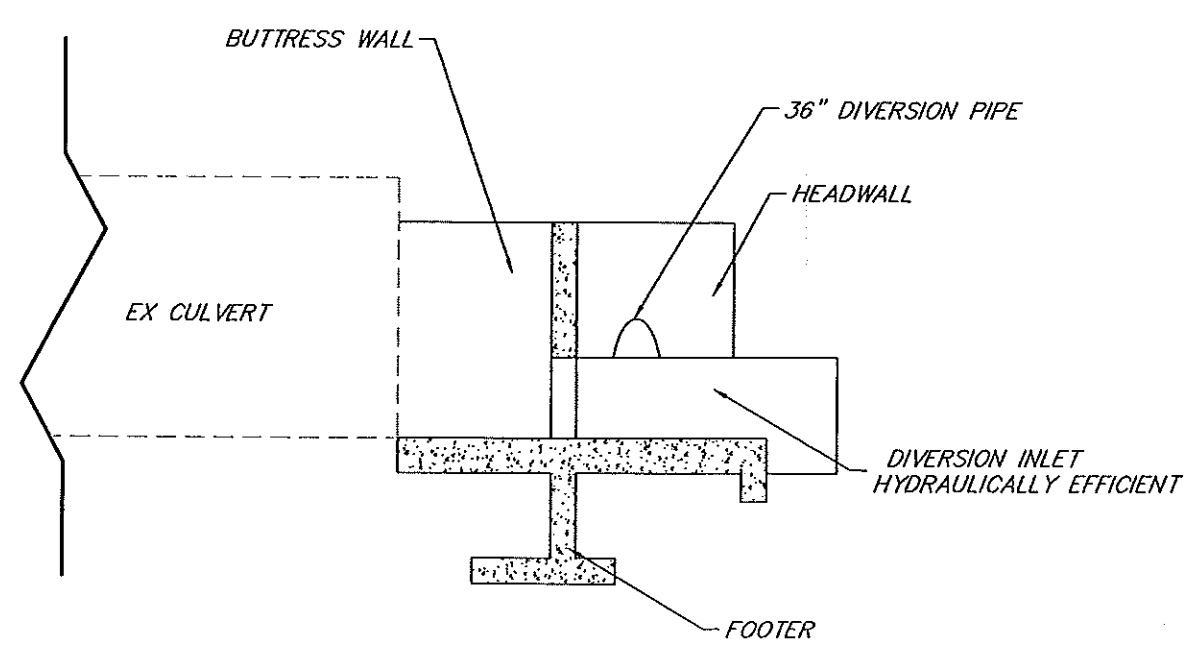
*Cost difference  
36 vs 42  
↓  
PR vs EX*




SECTION A-A

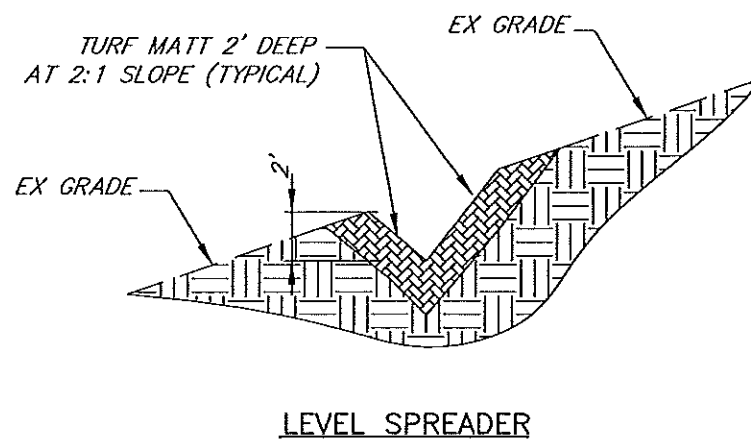
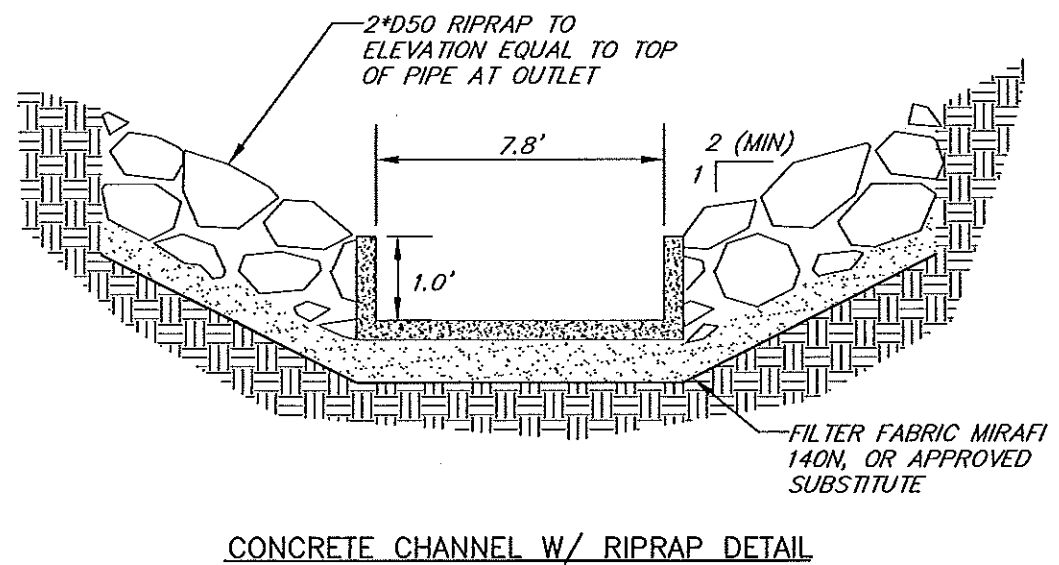
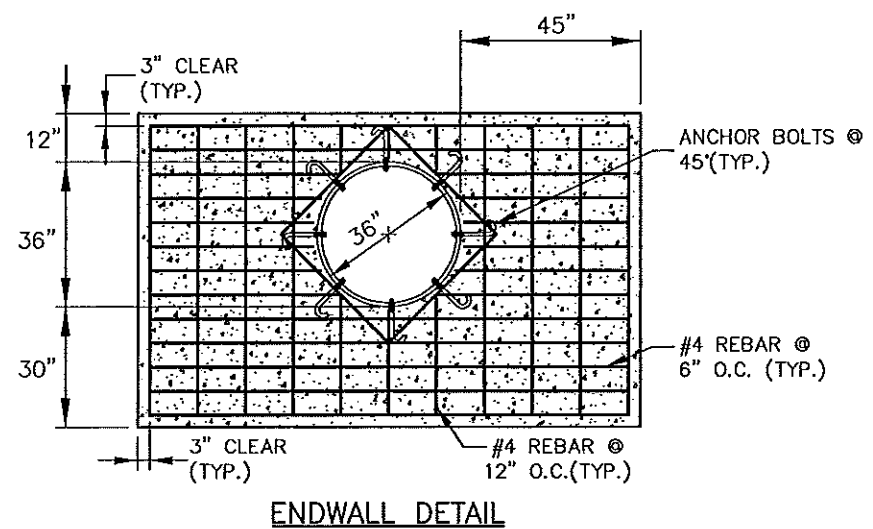
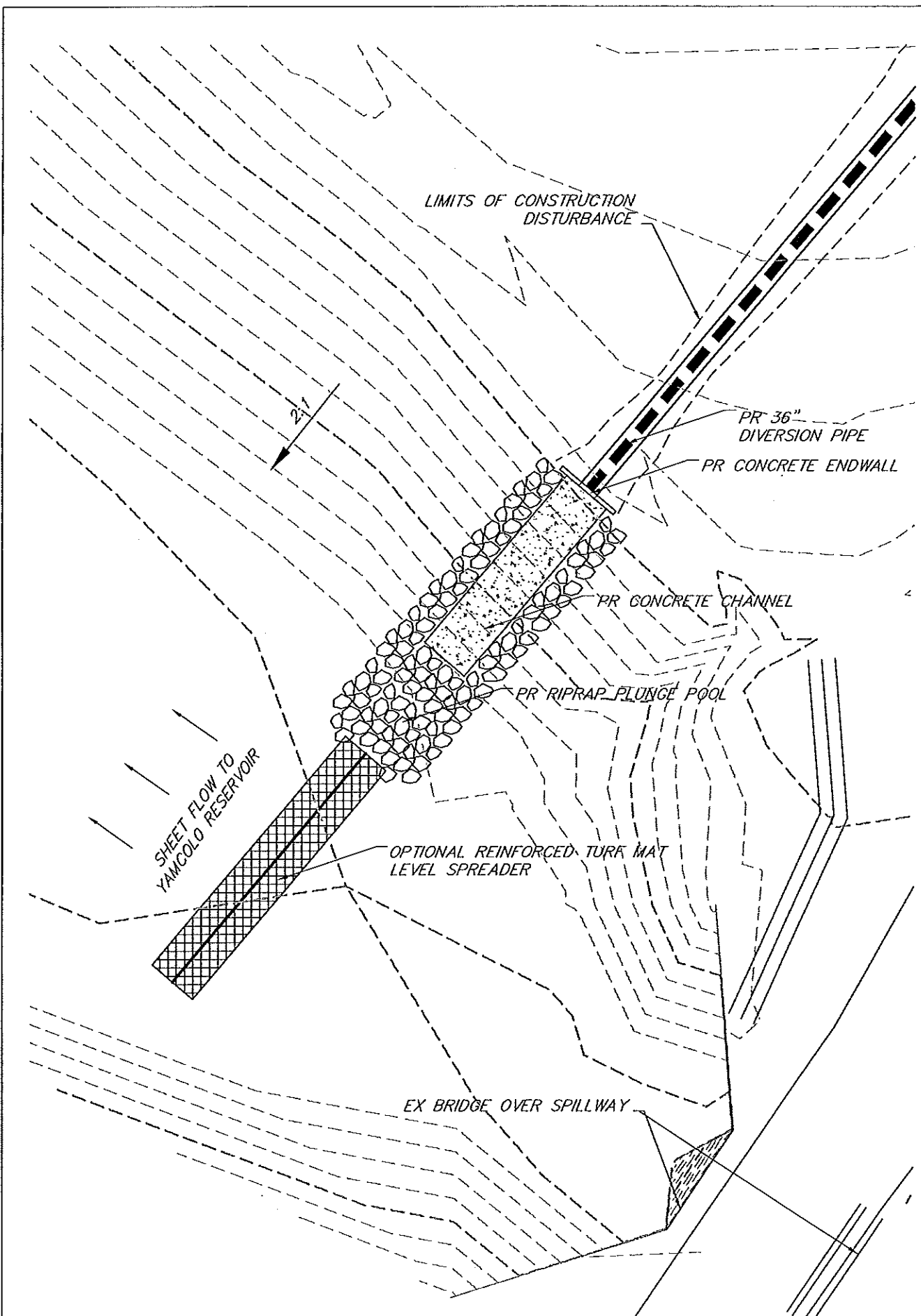


PLAN VIEW



SECTION B-B

NO.	DATE	REVISIONS	INT.
UYVWCD Garfield County, CO			
Yamola Diversion			
<b>Inlet Detail</b>			
DATE	9-15-03	DGN. BY:	CC
JOB NO.	1378-001	DRAWN BY:	RS
DWG. NO.	DETAIL-ENVG	SURV. BY:	NA
Vertical Scale: 1" = NA			
Contour Interval = 2 Feet			
Horizontal Scale			
1" = 10'			
 LANDMARK CONSULTANTS, INC.			
141 9th Street, P.O. Box 774943 Steamboat Springs, Colorado 80477 Phone (970) 871-9494 Fax (970) 871-9299 www.LANDMARK-CO.com			



NO.	DATE	REVISIONS	BY
UYVWCD Garfield County, CO			
Yamcolo Diversion			
<b>Outlet Details</b>			
DATE:	9-15-03	DGN BY:	CC
DWG NO:	137B-001	DWN BY:	RS
DWG NO:	DETAIL DWG	SURV. BY:	NA
Vertical Scale: 1" = NA			
Contour Interval = 2 Feet			
Horizontal Scale			
1" = 20'			
111 9th Street, P.O. Box 774943 Steamboat Springs, Colorado 80477 Phone (970) 871-9404 Fax (970) 871-9299 www.LANDMARK-CO.com			

**APPENDIX A**



Civil Engineering  
 Surveying Services  
 Land Development  
 Construction Management

**CONCEPTUAL ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST**

**PROJECT:** Coal Creek Diversion to Yamcolo Reservoir

**JOB NO:** 1378-001

**SCOPE:** Recommended Configuration

**DATE:** September 12, 2003

ITEM NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	TOTALS
	<b>GENERAL</b>				
1	Mobilization	1	LS	\$15,000.00	\$15,000.00
2	Diversion Structure (inlet)	20	CY	\$600.00	\$12,000.00
3	36" HDPE w/ soiltight joints (Material Only)	700	LF	\$25.00	\$17,500.00
4	Trenching, bedding and Backfill	700	LF	\$52.00	\$36,400.00
5	5' dia. Precast Manholes w/ Frame & Cover	4	EA	\$3,100.00	\$12,400.00
6	Concrete Endwall	1	EA	\$3,500.00	\$3,500.00
7	Concrete Rundown	40	LF	\$85.00	\$3,400.00
8	Riprap Overbanks	25	SY	\$60.00	\$1,500.00
9	Riprap Plunge Pool	30	SY	\$60.00	\$1,800.00
10	Temporary Diversion and Erosion Control	1	LS	\$10,000.00	\$10,000.00
11	Reconstruct Hardpack Road	1100	SY	\$15.00	\$16,500.00
12	Revegetation	0.25	AC	\$1,200.00	\$300.00
	<b>Sub-Totals</b>				<b>\$130,300.00</b>
	<b>Contingency</b>	20	%		<b>\$26,060.00</b>
	<b>Grand Total</b>				<b>\$156,360.00</b>
	<b>Alternatives</b>				
1	24 x 24 Sluicgate		EA	\$10,000.00	
2	36 x 36 Sluicgate		EA	\$15,000.00	
3	6' dia. Precast Manholes w/ Frame & Cover		EA	\$4,800.00	
4	CMP above grade Rundown w/ Grade Beams		EA	\$10,000.00	
5	36" ASP w / soiltight joints (material only)		LF	\$0.00	
6	36" HDPE w/ watertight joints (material only)		LF	\$27.00	
7	36" ASP w / watertight joints (material only)		LF	\$0.00	
8	36" PVC w/ airtight joints (material only)		LF	\$38.00	
9	36" Metal Flared End Section		EA	\$500.00	

This Conceptual Opinion of Probable Construction Cost represents Landmark Constultants' best judgment as the engineer familiar with the construction industry. However, Landmark Consultants has no control over the cost or availability of labor, equipment or materials, or over market conditions or the Contractor's method of pricing. Therefore, Landmark Consultants cannot and does not guarantee that proposals, bids, or the construction cost will not vary significantly from the Opinion of Probable Cost.



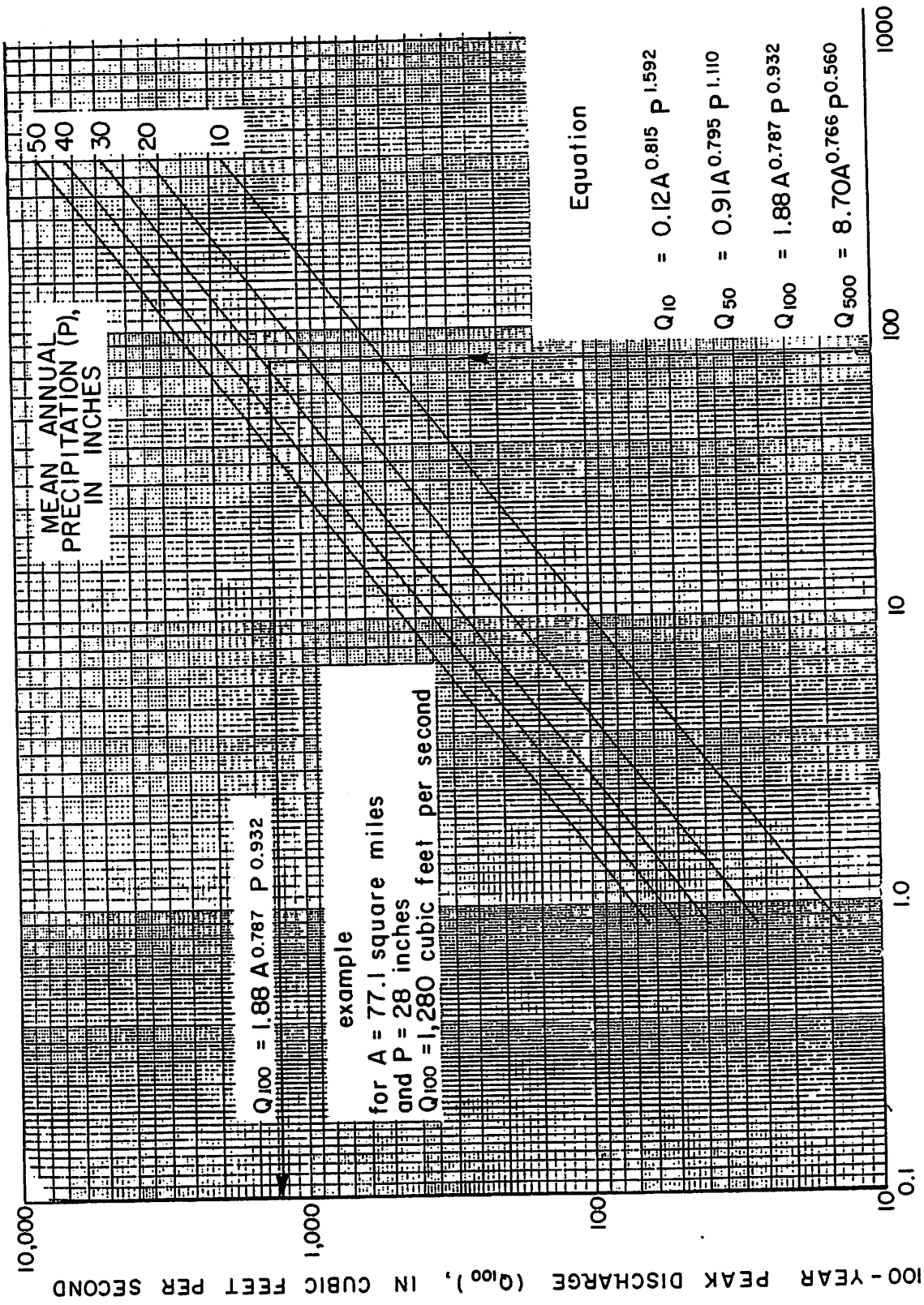
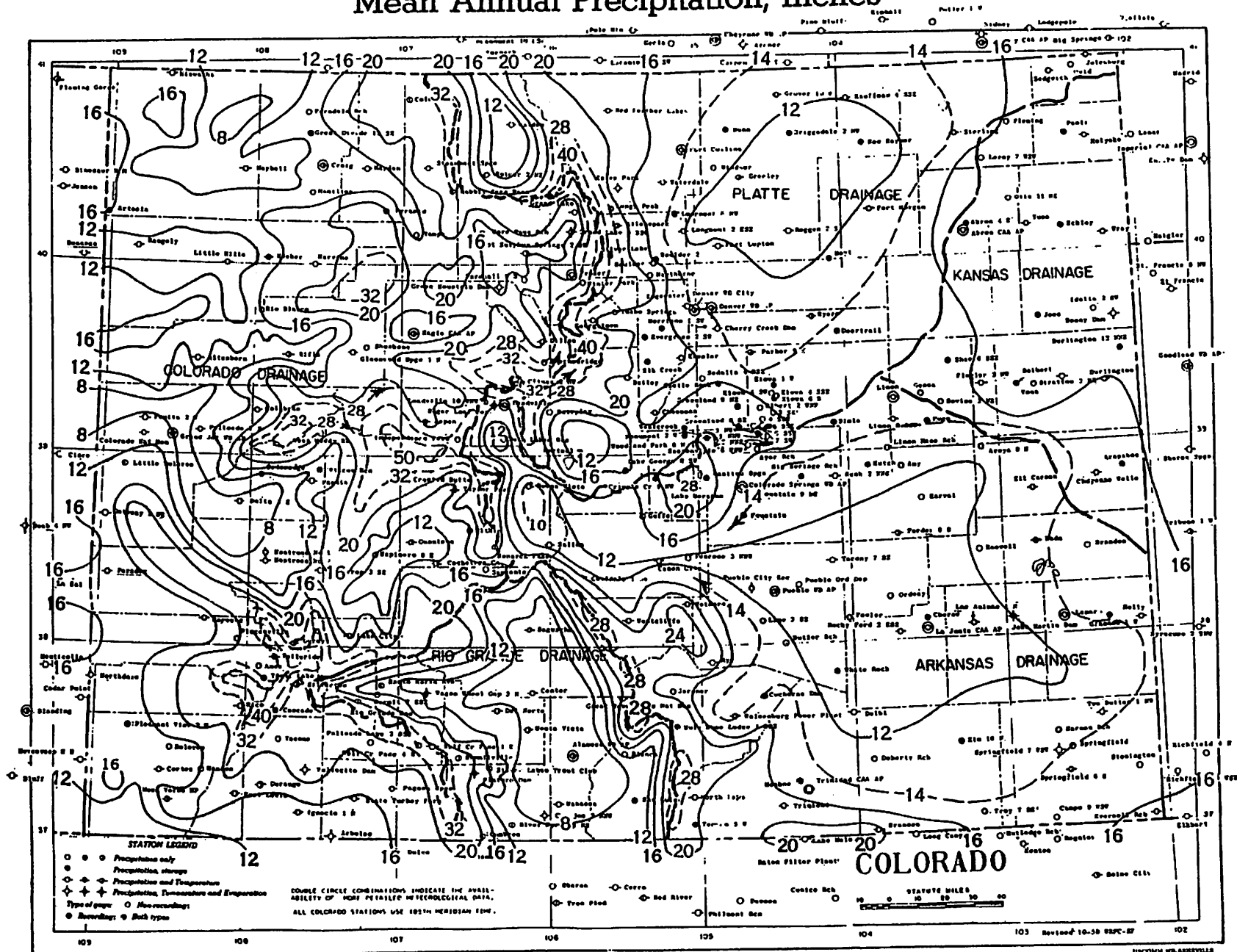


FIG. S-1B. Relation of 100-year peak discharge to contributing drainage area and mean annual precipitation for the Mountain Area Snow Melt Streams.

# Mean Annual Precipitation, Inches



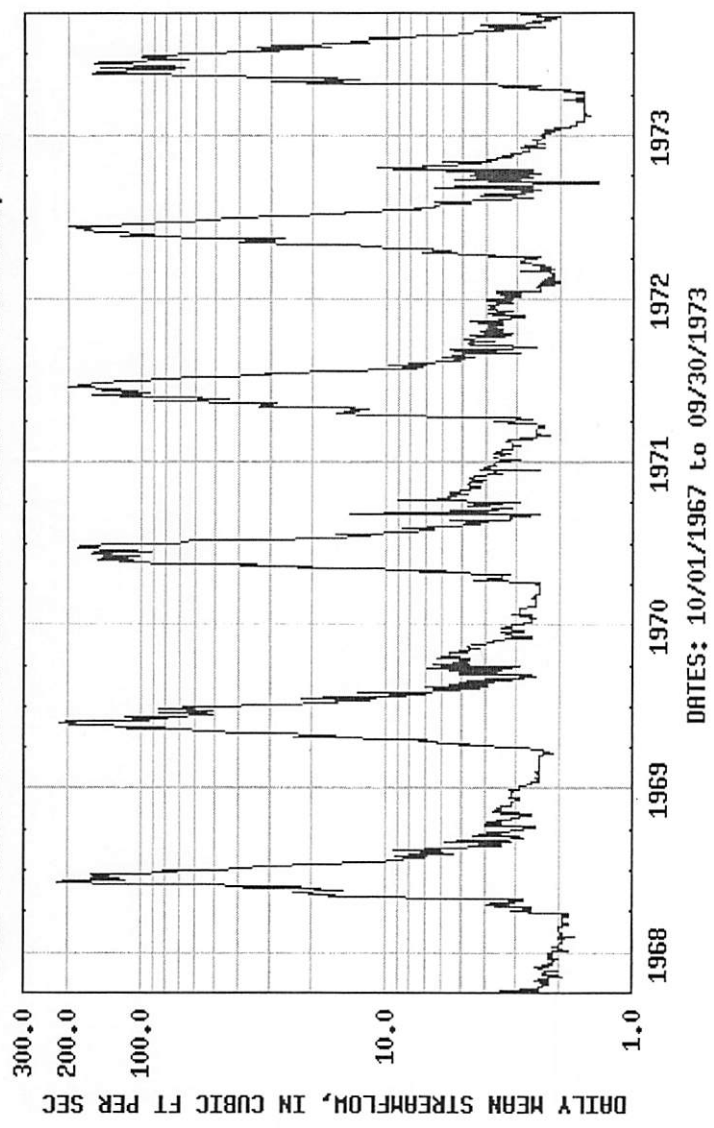
Based on period 1931-55

Isolines are drawn through points of approximately equal value. Caution should be used in interpolating on these maps, particularly in mountainous areas.

FIG. S-1C



USGS 06611700 LITTLE GRIZZLY CREEK NEAR COALMONT, CO.

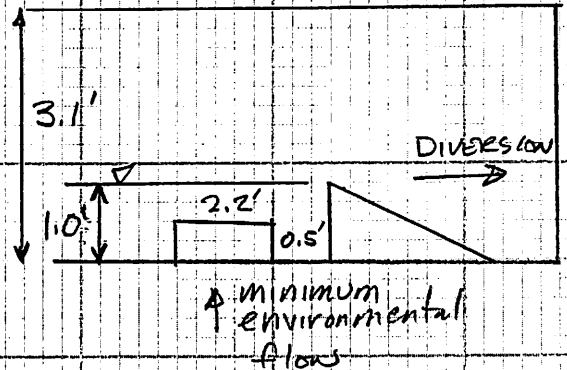


Coal Creek Orifice

$$Q = C_d A \sqrt{2gH}$$

$$Q = 0.65(2.2 \times 0.5) \sqrt{2(32.2)(0.75)}$$

$$Q = 5.0 \text{ cfs}$$



Height at which Diversion  $Q = 70 \text{ cfs}$

$$Q = C_d A \sqrt{2gH}$$

$$70 = 0.70(3^2 \pi / 4) \sqrt{2(32.2)(H)}$$

$$\sqrt{H} = 1.76$$

$$H = 3.10 \text{ ft}$$

Flow in Coal Creek at Maximum Diversion

$$Q = C_d A \sqrt{2gH}$$

$$Q = 0.65(1.1) \sqrt{2(32.2)(2.85)}$$

$$Q = 9.7 \text{ cfs}$$



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**Date:** January 31, 2022

Emily Lowell  
District Engineer  
Upper Yampa Water Conservancy District  
PO Box 775529  
Steamboat Springs, CO 80477

Dear Ms. Lowell,

I received your proposal dated December 3, 2021, regarding installation, operation, and maintenance of a flowmeter and solar panel on existing structures in Coal Creek on the Yampa Ranger District of the Routt National Forest. The type of land uses outlined in your proposal are designated as special uses and more specifically as Lands Special Uses due to their research nature.

Proposals for new special uses of National Forest System (NFS) lands are initially screened for the minimum requirements in *36 CFR 251.54(e)(1)(i)-(ix)* and *Forest Service Handbook (FSH) 2709.11 sec. 12.21*. Pursuant to *36 CFR 251.54(e)(2)*, proposed uses that do not meet all of the minimum requirements shall not receive further consideration. After initial screening of your proposal, I found that it did not meet criteria 2 of the initial screening requirements.

*FSH 2709.11 sec. 12.21 To receive further consideration at the second-level screening, proposals must meet all nine initial screening criteria requirements that the proposed use:*

*2. Is consistent or can be made consistent with standards and guidelines in the applicable Forest land and resource management plan prepared under the National Forest Management Act and 36 CFR part 219.*

Your proposal to install, operate, and maintain a flowmeter on Coal Creek is not consistent with Ch. 3 Geographic Areas - Bear River of the Routt Land and Resource Management Plan which states:

*New non recreation special-use authorizations are not allowed.*

FSH 2709.11 sec.12.22 instructs authorized officers to:

*Return any proposal that fails one or more of the initial screening criteria in the preceding section 12.21 to the proponent with notification that the proposal does not meet the minimum requirements.*



Pursuant to FSH 2709.11 sec. 12.22(1)(d), findings that a proposal fails to meet the initial screening criteria are not subject to administrative appeal. Please find your original proposal enclosed with this letter.

Future proposals will be considered and screened pursuant to the same regulations. I encourage you to consider a proposal outside the Bear River Geographic area that may meet your needs and be consistent with the Routt Land and Resource Management Plan. If you have questions or would like to discuss further, please contact me at (719)717-0116 or Katie Soulliere, Realty Specialist, at (970)819-5579.

Sincerely,

A handwritten signature in blue ink that reads "James P. Statezny". The signature is written in a cursive style with a large, sweeping initial "J".

JAMES STATEZNY  
District Ranger

Enclosure: SF-299

cc: Nathan Haynes

**STANDARD FORM 299**  
**APPLICATION FOR TRANSPORTATION, UTILITY SYSTEMS, TELECOMMUNICATIONS AND FACILITIES**  
**ON FEDERAL LANDS AND PROPERTY**

FORM APPROVED  
 OMB Control Number: 0596-0249  
 Expiration Date: 02/28/2023

FOR AGENCY USE ONLY

NOTE: Before completing and filing the application for an authorization (easement, right-of-way, lease, license or permit), the applicant should completely review this package, including instructions, and schedule a pre-application meeting with representatives of the agency responsible for processing the application. Each agency may have specific and unique requirements to be met in preparing and processing the application. Many times, with the help of the agency representative, the application can be completed at the pre-application meeting.

Application Number

Date Filed

1. Name and address of applicant

2. Name and address of authorized agent if different from item 1

3. Applicant telephone number and email:

Authorized agent telephone number and email:

4. As applicant are you? *(check one)*

- a.  Individual
- b.  Corporation\*
- c.  Partnership/Association\*
- d.  State Government/State Agency
- e.  Local Government
- f.  Federal Agency

\* If checked, complete supplemental page

5. Specify what application is for: *(check one)*

- a.  New authorization
- b.  Renewing existing authorization number
- c.  Amend existing authorization number
- d.  Assign existing authorization number
- e.  Existing use for which no authorization has been received \*
- f.  Other\*

\* If checked, provide details under item 7

6. If an individual, or partnership, are you a citizen(s) of the United States?  Yes  No

7. Project description (describe in detail): (a) Type of use or occupancy, (e.g., canal, pipeline, road, telecommunications); (b) related structures and facilities; (c) physical specifications (Length, width, grading, etc.); (d) term of days/years needed; (e) time of year of use or operation; (f) Volume or amount of product to be transported; (g) duration and timing of construction; and (h) temporary work areas needed for activity/construction (Attach additional sheets, if additional space is needed.)

8. Attach a map covering area and show location of project proposal.

9. State or Local government approval:  Attached  Applied for  Not Required

10. Nonrefundable application fee:  Attached  Not required  To be determined by agency

11. Does project cross international boundary or affect international waterways?  Yes  No (if "yes," indicate on map)

12. Give statement of your technical and financial capability to construct, operate, maintain, and terminate system for which authorization is being requested.

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13a. Describe other alternative locations considered.

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b. Why were these alternatives not selected?

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c. Give explanation as to why it is necessary to use or occupy Federal assets (lands or buildings).

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14. List authorizations and pending applications filed for similar projects which may provide information to the authorizing agency. (Specify number, date, code, or name)

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15. Provide statement of need for project, including the economic feasibility and items such as: (a) cost of proposal (construction, operation, and maintenance); (b) estimated cost of next best alternative; and (c) expected public benefits.

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16. Describe probable effects on the population in the area, including the social and economic aspects, and the rural lifestyles.

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17. Describe likely environmental effects that the proposed project will have on: (a) air quality; (b) visual impact; (c) surface and ground water quality and quantity; (d) the control or structural change on any stream or other body of water; (e) existing noise levels; and (f) the surface of the land, including vegetation, permafrost, soil, and soil stability; and, (g) historic or archaeological resources or properties.

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18. Describe the probable effects that the proposed project will have on (a) populations of fish, plant life, wildlife, and marine life, including threatened and endangered species; and (b) marine mammals, including hunting, capturing, collecting, or killing these animals.

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19. State whether any hazardous material, as defined in this paragraph, would be used, produced, transported or stored on or in a federal building or federal lands or would be used in connection with the proposed use or occupancy. "Hazardous material" shall mean (a) any hazardous substance under section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601(14); (b) any pollutant or contaminant under section 101(33) of CERCLA, 42 U.S.C. § 9601(33); (c) any petroleum product or its derivative, including fuel oil, and waste oils; and (d) any hazardous substance, extremely hazardous substance, toxic substance, hazardous waste, ignitable, reactive or corrosive materials, pollutant, contaminant, element, compound, mixture, solution or substance that may pose a present or potential hazard to human health or the environment under any applicable environmental laws. The holder shall not store any hazardous materials at the site without prior written approval from the authorized officer. This approval shall not be unreasonably withheld. If the authorized officer provides approval, this permit shall include (or in the case of approval provided after this permit is issued, shall be amended to include) specific terms addressing the storage of hazardous materials, including the specific type of materials to be stored, the volume, the type of storage, and a spill plan. Such terms shall be proposed by the holder and are subject to approval by the authorized officer.

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20. Name all the Federal Department(s)/Agency(ies) where this application is being filed.

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I HEREBY CERTIFY, That I am of legal age and authorized to do business in the State and that I have personally examined the information contained in the application and believe that the information submitted is correct to the best of my knowledge.

Signature of Applicant

*Emily Lowell*

Date

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Title 18, U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious, or fraudulent statements or representations as to any matter within its jurisdiction.

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GENERAL INFORMATION  
ALASKA NATIONAL INTEREST LANDS

This application will be used when applying for a right-of-way, permit, license, lease, or certificate for the use of Federal lands which lie within conservation system units and National Recreation or Conservation Areas as defined in the Alaska National Interest lands Conservation Act. Conservation system units include the National Park System, National Wildlife Refuge System, National Wild and Scenic Rivers System, National Trails System, National Wilderness Preservation System, and National Forest Monuments.

Transportation utility systems telecommunication installations facility uses for which the application may be used are:

1. Canals, ditches, flumes, laterals, pipes, pipelines, tunnels, and other systems for the transportation of water.
2. Pipelines and other systems for the transportation of liquids other than water, including oil, natural gas, synthetic liquid and gaseous fuels, and any refined product produced therefrom.
3. Pipelines, slurry and emulsion systems, and conveyor belts for transportation of solid materials.
4. Systems for the transmission and distribution of electric energy.
5. Wired and wireless systems for transmission or reception of radio, television, telephone, telegraph, and other electronic signals, and other means of communications.
6. Improved right-of-way for snow machines, air cushion vehicles, and all-terrain vehicles.
7. Roads, highways, railroads, tunnels, tramways, airports, landing strips, docks, and other systems of general transportation.

This application must be filed simultaneously with each Federal department or agency requiring authorization to establish and operate your proposal.

In Alaska, the following agencies will help the applicant file an application and identify the other agencies the applicant should contact and possibly file with:

Department of Agriculture  
Regional Forester, Forest Service (USFS)  
P.O. Box 21628  
Juneau, Alaska 99802-1628  
Telephone: (907) 586-7847 (or a local Forest Service Office)

Department of the Interior  
Bureau of Indian Affairs (BIA)  
Alaska Regional Office  
709 West 9th Street  
Juneau, Alaska 99802  
Telephone: (907) 586-7177

Department of the Interior  
Alaska State Office  
Bureau of Land Management  
222 West 7th Avenue #13  
Anchorage, Alaska 99513  
Public Room: 907-271-5960  
FAX: 907-271-3684  
(or a local BLM Office)

U.S. Fish & Wildlife Service (FWS)  
Office of the Regional Director 1011  
East Tudor Road Anchorage, Alaska  
99503 Telephone: (907) 786-3440

National Park Service (NPS)  
Alaska Regional Office  
240 West 5th Avenue  
Anchorage, Alaska 99501  
Telephone: (907) 644-3510

Note - Filings with any Interior agency may be filed with any office noted above or with the Office of the Secretary of the Interior, Regional Environmental Officer, P.O. Box 120, 1675 C Street, Anchorage, Alaska 99513.

Department of Transportation  
Federal Aviation Administration  
Alaska Region AAL-4, 222 West 7th Ave., Box 14  
Anchorage, Alaska 99513-7587  
Telephone: (907) 271-5285

NOTE - The Department of Transportation has established the above central filing point for agencies within that Department. Affected agencies are: Federal Aviation Administration (FAA), Coast Guard (USCG), Federal Highway Administration (FHWA), Federal Railroad Administration (FRA).

OTHER THAN ALASKA NATIONAL INTEREST LANDS

Use of this form is not limited to National Interest Conservation Lands of Alaska.

Individual department/agencies may authorize the use of this form by applicants for transportation, utility systems, telecommunication installations and facilities on other Federal lands outside those areas described above.

For proposals located outside of Alaska, applications will be filed at the local agency office or at a location specified by the responsible Federal agency.

SPECIFIC INSTRUCTIONS  
(Items not listed are self-explanatory)

- 7 Attach preliminary site and facility construction plans. The responsible agency will provide instructions whenever specific plans are required.
- 8 Generally, the map must show the section(s), township(s), and range(s) within which the project is to be located. Show the proposed location of the project on the map as accurately as possible. Some agencies require detailed survey maps. The responsible agency will provide additional instructions.
- 9, 10, and 12 The responsible agency will provide additional instructions.
- 13 Providing information on alternate locations in as much detail as possible, discussing why certain locations were rejected and why it is necessary to use Federal assets will assist the agency(ies) in processing your application and reaching a final decision. Include only reasonable alternate locations as related to current technology and economics.
- 14 The responsible agency will provide instructions.
- 15 Generally, a simple statement of the purpose of the proposal will be sufficient. However, major proposals located in critical or sensitive areas may require a full analysis with additional specific information. The responsible agency will provide additional instructions.
- 16 through 19 Providing this information with as much detail as possible will assist the Federal agency(ies) in processing the application and reaching a decision. When completing these items, you should use a sound judgment in furnishing relevant information. For example, if the project is not near a stream or other body of water, do not address this subject. The responsible agency will provide additional instructions.

Application must be signed by the applicant or applicant's authorized representative.

## **EFFECT OF NOT PROVIDING INFORMATION**

Disclosure of the information is voluntary. If all the information is not provided, the proposal or application may be rejected.

## **DATA COLLECTION STATEMENT**

The Federal agencies collect this information from proponents and applicants requesting a right-of-way, permit, license, lease, or certification for use of Federal assets. The Federal agencies use this information to evaluate a proponent's or applicant's proposal to use Federal assets.

## **BURDEN STATEMENT**

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0249. The time required to complete this information collection is estimated to average 8 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The authority to collect this information is derived from 47 U.S.C. 1455(c)(3) and 16 U.S.C. 3210.

## **USDA NONDISCRIMINATION STATEMENT**

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call toll free (866) 632-9992 (voice). TDD users can contact USDA through local relay or the Federal relay at (800) 877-8339 (TDD) or (866) 377-8642 (relay voice). USDA is an equal opportunity provider and employer.

The Privacy Act of 1974 (5 U.S.C. 552a) and the Freedom of Information Act (5 U.S.C. 552) govern the confidentiality to be provided for information received by the Forest Service.

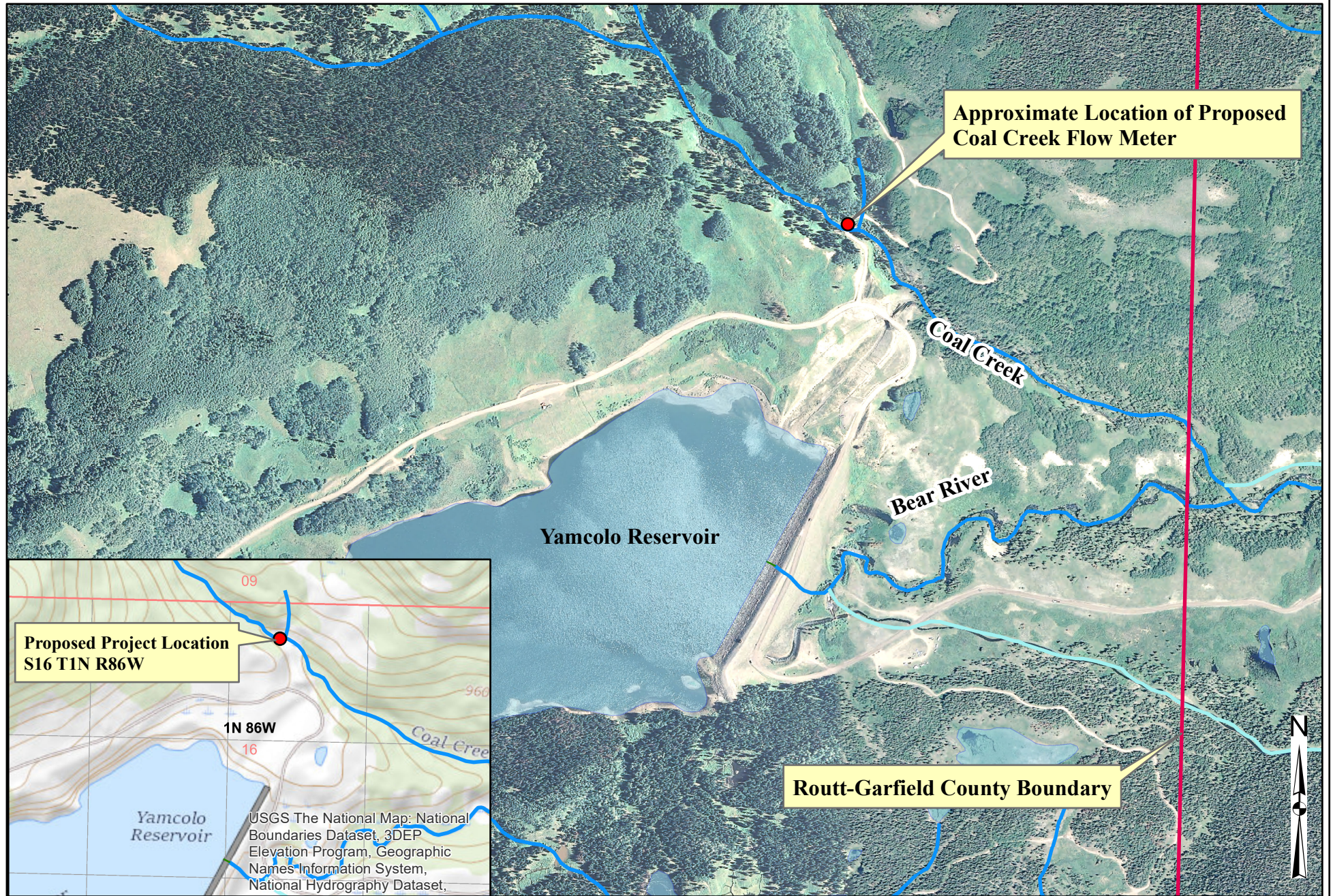
**SUPPLEMENTAL**

NOTE: The responsible agency(ies) will provide instructions	CHECK APPROPRIATE BLOCK	
<b>I - PRIVATE CORPORATIONS</b>	ATTACHED	FILED*
a. Articles of Incorporation	<input type="checkbox"/>	<input type="checkbox"/>
b. Corporation Bylaws	<input type="checkbox"/>	<input type="checkbox"/>
c. A certification from the State showing the corporation is in good standing and is entitled to operate within the State	<input type="checkbox"/>	<input type="checkbox"/>
d. Copy of resolution authorizing filing	<input type="checkbox"/>	<input type="checkbox"/>
e. The name and address of each shareholder owning 3 percent or more of the shares, together with the number and percentage of any class of voting shares of the entity which such shareholder is authorized to vote and the name and address of each affiliate of the entity together with, in the case of an affiliate controlled by the entity, the number of shares and the percentage of any class of voting stock of that affiliate owned, directly or indirectly, by that entity, and in the case of an affiliate which controls that entity, the number of shares and the percentage of any class of voting stock of that entity owned, directly or indirectly, by the affiliate.	<input type="checkbox"/>	<input type="checkbox"/>
f. If application is for an oil or gas pipeline, describe any related right-of-way or temporary use permit applications, and identify previous applications.	<input type="checkbox"/>	<input type="checkbox"/>
g. If application is for an oil and gas pipeline, identify all Federal lands by agency impacted by proposal.	<input type="checkbox"/>	<input type="checkbox"/>
<b>II - PUBLIC CORPORATIONS</b>		
a. Copy of law forming corporation	<input type="checkbox"/>	<input type="checkbox"/>
b. Proof of organization	<input type="checkbox"/>	<input type="checkbox"/>
c. Copy of Bylaws	<input type="checkbox"/>	<input type="checkbox"/>
d. Copy of resolution authorizing filing	<input type="checkbox"/>	<input type="checkbox"/>
e. If application is for an oil or gas pipeline, provide information required by item "I - f" and "I - g" above.	<input type="checkbox"/>	<input type="checkbox"/>
<b>III - PARTNERSHIP OR OTHER UNINCORPORATED ENTITY</b>		
a. Articles of association, if any	<input type="checkbox"/>	<input type="checkbox"/>
b. If one partner is authorized to sign, resolution authorizing action is	<input type="checkbox"/>	<input type="checkbox"/>
c. Name and address of each participant, partner, association, or other	<input type="checkbox"/>	<input type="checkbox"/>
d. If application is for an oil or gas pipeline, provide information required by item "I - f" and "I - g" above.	<input type="checkbox"/>	<input type="checkbox"/>

\*If the required information is already filed with the agency processing this application and is current, check block entitled "Filed." Provide the file identification information (e.g., number, date, code, name). If not on file or current, attach the requested information.

# PROPOSED COAL CREEK FLOW METER

## LOCATION AND VICINITY MAP



Coal Creek - Proposed Site Location



Example installation in corrugated metal pipe



**NEW BUSINESS**

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## EXECUTIVE SESSIONS

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Executive session under CRS § 24-6-402(4)(b) to discuss legal issues on Water Resumes, Water Cases, Contract Negotiations and \_\_\_\_\_. Mere presence or participation of an attorney at an executive session is not sufficient to satisfy the requirements of CRS § 24-6-402(4)(b). Executive sessions to discuss legal matters are not recorded.

Executive session under CRS § 24-6-402(4)(e)(I) for the purpose of determining positions relative to matters that may be subject to negotiations; developing strategy for negotiations; and instructing negotiators with respect to \_\_\_\_\_. This session will be recorded, and a copy of the recording maintained for not less than 90 days.



## BOARD ACTIONS IN REGARD TO EXECUTIVE SESSION

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