Stream: North Cheyenne Creek

Executive Summary
Water Division: 2
Water District: 10
CDOW#: 29395
CWCB ID: 08/2/A-007

Segment: Stratton Reservoir to above North Cheyenne Creek Pipeline
Upper Terminus: STRATTON RESERVOIR OUTLET AT
(Latitude: 38° 46' 44.24"N) (Longitude: 104° 59' 17.55"W)

Lower Terminus: ABOVE NORTH CHEYENNE CREEK PIPELINE AT
(Latitude: 38° 47' 12.26"N) (Longitude: 104° 54' 52.31"W)

Watershed: Upper Arkansas (HUC #: 11020002)
Counties: El Paso and Teller
Length: 7.5 miles
USGS Quad(s): Manitou Springs SW and SE, Colorado Springs SW
Flow Recommendation: 2.5 cfs (April 1 – April 30)
3.5 cfs (May 1 – October 15)
1.0 cfs (October 16- March 31)

Staff Analysis and Recommendation

Summary

The information contained in this report and the associated instream flow appendices (see CD entitled 2008 Instream Flow Recommendations) forms the basis for staff's instream flow recommendation to be considered by the Board. It is staff's opinion that the information contained in this report is sufficient to support the findings required in Rule 5.40.

Colorado's Instream Flow Program was created in 1973 when the Colorado State Legislature recognized "the need to correlate the activities of mankind with some reasonable preservation of the natural environment" (see 37-92-102 (3) C.R.S.). The statute vests the CWCB with the exclusive authority to appropriate and acquire instream flow and natural lake level water rights. In order to encourage other entities to participate in Colorado's Instream Flow Program, the statute directs the CWCB to request instream flow recommendations from other state and federal agencies. Trout Unlimited (TU) and the Colorado Division of Wildlife (CDOW) recommended this segment of North Cheyenne Creek to the CWCB for inclusion into the Instream Flow Program. North Cheyenne Creek is being considered for inclusion into the Instream Flow Program because it has a natural environment that can be preserved to a reasonable degree with an instream flow water right.

North Cheyenne Creek originates at 12,000 feet at the outlet of Stratton Reservoir. From there, it flows generally eastward towards its confluence with Fountain Creek. The total drainage area of the creek is approximately 11.19 square miles. This recommendation covers a 7.5 mile reach stretching from the headwaters to a point just above the North Cheyenne Creek Pipeline diversion at 6,400 feet. The top 5.1 miles (68%) of the reach flows across U.S. Forest Service land while the lower 2.3 miles runs through the City of Colorado Springs' North Cheyenne Cañon Park (31%) (Table 1). Approximately one tenth of a mile (1%) is on private land.

Land Status Review

Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership		
			% Private	% USFS	% Park
Stratton Reservoir	Above Diversion	7.5	1%	68%	31%

Instream Flow Recommendations

TU and CDOW are recommending instream flow appropriations of 3.5 cfs during the summer (5/1 – 10/15), 1.1 cfs during the winter (10/16 – 3/31), and 2.5 cfs during the early spring (4/1 – 4/30). These recommendations are based on the physical and biological data collected to date and incorporate water availability constraints. An R2CROSS analysis of cross-sectional data collected on 8/10/06 was relied on to develop these recommendations (Table 1).

Biological Data

The CDOW has documented the occurrence of greenback cutthroat trout in North Cheyenne Creek above the waterfalls. This population has been shown to be genetically pure. This is significant because greenback cutthroat trout have been identified by the CDOW and federal agencies as "species of greatest conservation need" and are currently listed as "threatened" under the Endangered Species Act. The waterfalls act as fish barriers, further protecting the greenback cutthroat trout populations from competition by brook trout.

Field Survey Data & Biological Flow Quantification

CDOW staff used the R2Cross methodology to quantify the amount of water required to preserve the natural environment to a reasonable degree. The R2Cross method requires that stream discharge and channel profile data be collected in a riffle stream habitat type. Riffles are most easily visualized, as the stream habitat types that would dry up first should streamflow cease. This type of hydraulic data collection consists of setting up a transect, surveying the stream channel geometry, and measuring the stream discharge.

Three instream flow hydraulic parameters, average depth, percent wetted perimeter, and average velocity, are used to develop biologic instream flow recommendations. The CDOW has determined that by maintaining these three hydraulic parameters at adequate levels across riffle habitat types, aquatic habitat in pools and runs will also be maintained for most life stages of fish and aquatic invertebrates (Nehring 1979; Espegren 1996). Although most of the modeling results from this effort were within the confidence interval produced by the R2CROSS model, the estimate of minimum instream winter flow from the first cross section was below the lower confidence interval and was therefore set to the value of the lower confidence interval.

For this segment of stream, two data sets were collected with the results shown in Table 1 below. Table 1 shows who collected the data (Party), the date the data was collected (Date), the measured discharge at the time of the survey (Q), the accuracy range of the predicted flows based on Manning's Equation (240% and 40% of Q), the summer flow recommendation based on meeting 3 of 3 hydraulic criteria and the winter flow recommendation based upon 2 of 3 hydraulic criteria.

Table 1: North Cheyenne Creek R2Cross Summary

			Confidence Interval (cfs)	**Recommended Flows * (cfs)**	
Party	**Date**	**Q (cfs)**	**250%-40%**	**Summer 3/3**	**Winter 2/3**
TU	8/10/2006	2.56	6.4 - 1.0	1.93	1.0**
TU	8/10/2006	2.5	6.3 - 1.0	5.02	1.1

*Recommendations based on meeting specified number of hydrologic criteria (average depth, percent wetted perimeter and average velocity)

** Estimate of 0.85 cfs below Lower Confidence Interval, so it was assigned minimum value of 1 cfs.

Hydrologic Data and Analysis

After receiving the cooperating agency's biologic recommendation, the CWCB staff conducted an evaluation of the stream hydrology to determine if water was physically available for an instream flow appropriation. This evaluation was done through a computation that is, in essence, a "water balance". In concept a "water balance" computation can be viewed as an accounting exercise. When done in its most rigorous form, the water balance parses precipitation into all the avenues water pursues after it is deposited as rain, snow, or ice. In other words, given a specified amount of water deposition (input), the balance tries to account for all water depletions (losses) until a selected end point is reached. Water losses include depletions due to evaporation and transpiration, deliveries into ground water storage, temporary surface storage, incorporations into plant and animal tissue and so forth. These losses are individually or collectively subtracted from the input to reveal the net amount of stream runoff as represented by the discharge measured by stream gages. Of course, the measured stream flow need not be the end point of interest; indeed, when looking at issues of water use to extinction stream flow measurements may only describe intermediate steps in the complex accounting process that is a water balance carried out to a net value of zero.

In its analysis, CWCB staff has attempted to use this idea of balancing inputs and losses to determine if water is available for the recommended Instream Flow Appropriation. Of course, this analysis must be a practical exercise rather than a lengthy, and costly, scientific investigation. As a result, staff has simplified the process by lumping some variables and employing certain rational and scientifically supportable assumptions. The process may be described through the following description of the steps used to complete the evaluation for this particular stream.

The first step required in determining water availability is a determination of the hydrologic regime at the Lower Terminus (LT) of the recommended ISF reach. In the best case this means looking at the data from a gage at the LT. Further, this data, in the best case, has been collected for a long period of time (the longer the better) including wet and dry periods. In the case of **North Cheyenne Creek** such a gage is available. The gage station is owned and operated by Colorado Springs Utilities. The gage has an available 23 year period of record (POR) collected between 1983 and 2006. The gage is at an approximate elevation of 8830 ft above mean sea level (amsl) and has a drainage area of 11.19 mi^2. The hydrograph (plot of discharge over time) produced by this gage was used directly in the evaluation of water availability. No adjustments for losses to diversions were needed in this case allowing for a direct computation of the hydrograph.

The following hydrograph depicts the mean monthly discharge of North Cheyenne Creek. Included in the hydrograph are the recommended ISF values. The data used in the creation of this hydrograph are displayed in Table #1.

Fig 1 - N Cheyenne Cr Mean Monthly Discharge & Recommended ISFs

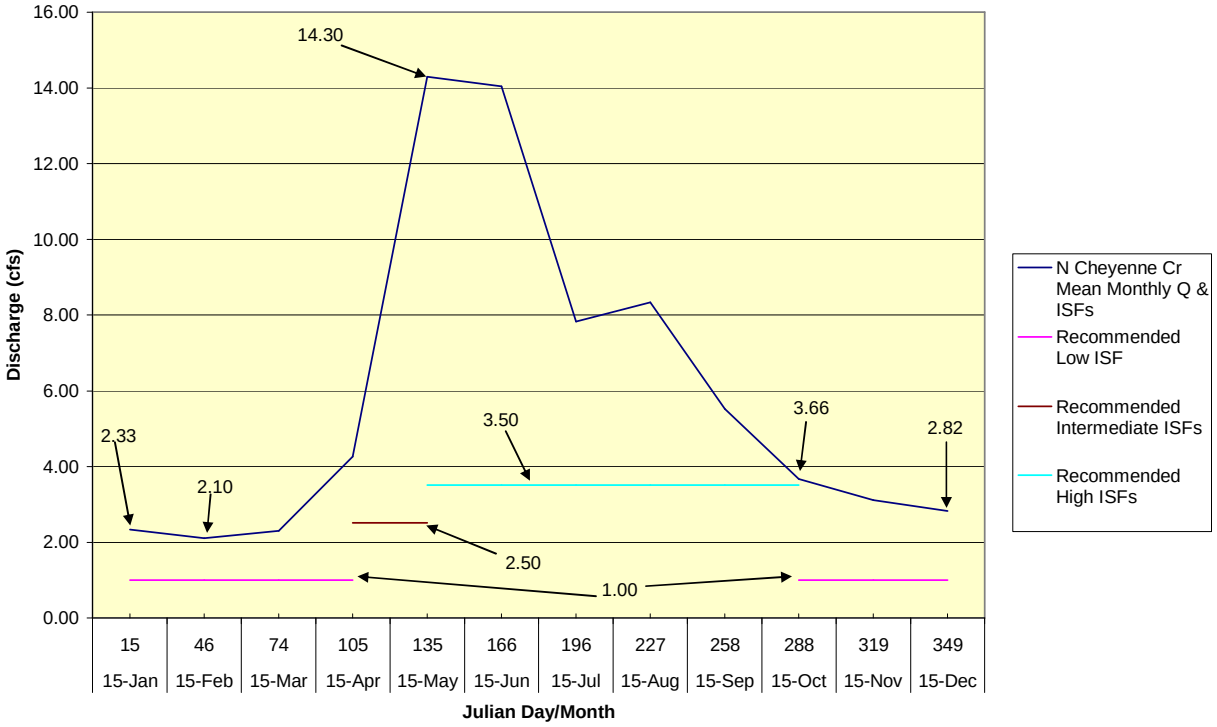


Table 2 – Mean Monthly Discharge and Recommended Instream Flows – N Cheyenne Cr.

	Julian Day	N Cheyenne Cr (cfs))	Recommended ISFs (cfs)
15-Jan	15	2.33	1.00
15-Feb	46	2.10	1.00
15-Mar	74	2.29	1.00
31-Mar	90	2.29	1.00
1-Apr	91	4.26	2.50
15-Apr	105	4.26	2.50
30-Apr	120	4.26	2.50
1-May	121	14.30	3.50
15-May	135	14.30	3.50
15-Jun	166	14.04	3.50
15-Jul	196	7.82	3.50
15-Aug	227	8.33	3.50
15-Sep	258	5.52	3.50
15-Oct	288	3.66	3.50
16-Oct	289	3.66	1.00
15-Nov	319	3.11	1.00
15-Dec	349	2.82	1.00

Existing Water Right Information

Staff has analyzed the water rights tabulation to identify any potential water availability problems. The North Cheyenne Pipeline lies just below the proposed reach. This structure is operated by Colorado Springs Utilities in tandem with the South Cheyenne Pipeline. Colorado Springs Utilities has been kept informed of this instream flow proposal. The terminus for the protected reach has been located above their intakes to ensure there will be no conflicts with their water rights. Based on this analysis staff has determined that water is available for appropriation on North Cheyenne Creek, from the outlet of Stratton Reservoir to just above North Cheyenne Creek Pipeline, to preserve the natural environment to a reasonable degree without limiting or foreclosing the exercise of valid existing water rights.

CWCB Staff's Instream Flow Recommendation

Staff recommends the Board form its intent to appropriate on the following stream reach:

Segment: Stratton Reservoir to above North Cheyenne Creek Pipeline

Upper Terminus: STRATTON RESERVOIR OUTLET AT

(Latitude: 38° 46' 44.24"N) (Longitude: 104° 59' 17.55"W)
UTM = 4292247.6 N UTM = 501024.1 E
SE NW S3 T15S R68W 6PM
1430' South of the North Section Line; 1700' East of West Section Line

Lower Terminus: ABOVE NORTH CHEYENNE CREEK PIPELINE AT

(Latitude: 38° 47' 12.26"N) (Longitude: 104° 54' 52.31"W)
UTM = 4293114.6 N UTM = 507423.1 E
NE SW S32 T14S R67W 6PM
170' North of the South Section Line; 2065 East of the West Section Line

Watershed: Upper Arkansas (HUC #: 11020002)
Counties: El Paso and Teller
Length: 7.5 miles
USGS Quad(s): Manitou Springs SW and SE, Colorado Springs SW
Flow Recommendation: 2.5 cfs (April 1 – April 30)
3.5 cfs (May 1 – October 15)
1.0 cfs (October 16- March 31)

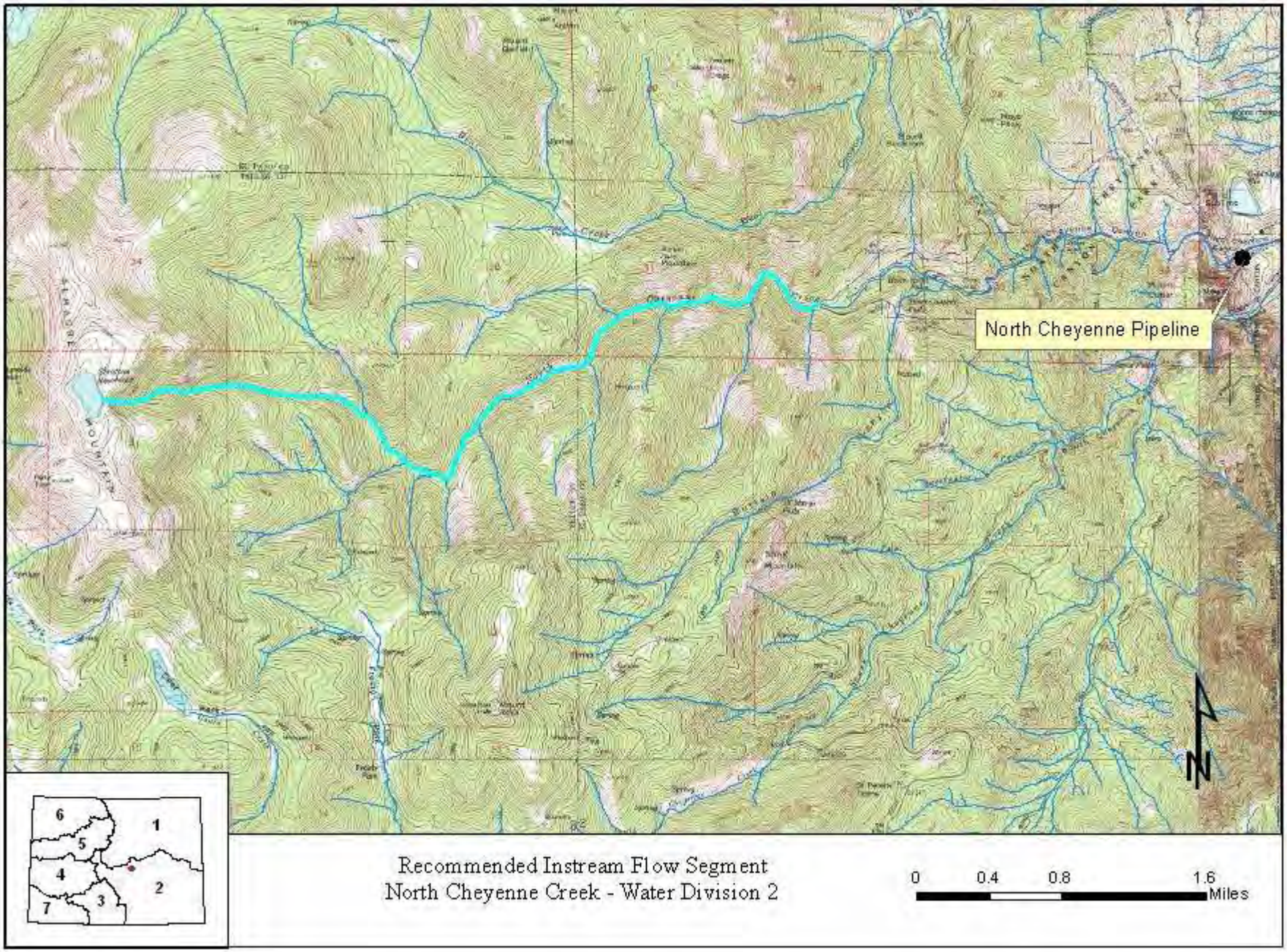
Vicinity Map

Recommended Instream Flow Segment
North Cheyenne Creek - Water Division 2

Land Use Map


U.S. Forest Service
6
1
5
4
2
3
7
N
Recommended Instream Flow Segment
North Cheyenne Creek - Water Division 2
0
0.2
0.4
0.8
Miles

Topographic & Water Rights Map



John Roach, Ph.D.
Aquatics Specialist
Colorado Water Project
1320 Pearl Street, Suite 320
Boulder, CO 80302
303.440.2937

February 21, 2007

Mr. Jeff Baessler and Mr. Todd Doherty
Stream and Lake Protection Section
Colorado Water Conservation Board
1313 Sherman Street, Room 723
Denver, Colorado 80203

Re: Trout Unlimited Instream Flow Recommendations for North Cheyenne Creek.

Dear Mr. Baessler and Mr. Doherty,

Trout Unlimited (TU) in conjunction with the Colorado Division of Wildlife (CDOW) is formally submitting this instream flow recommendation for North Cheyenne Creek, which flows through El Paso and Teller Counties. It is located in Water Division 2.

Location and Land Status. North Cheyenne Creek originates at 12,000 feet at the outlet of Stratton Reservoir. From there it flows generally eastward towards its confluence with Fountain Creek. This recommendation covers a 7.5 mile reach stretching from the headwaters to a point just above the North Cheyenne Creek Pipeline diversion at 6,400 feet. The top 5.1 miles (68%) of the reach flows across U.S. Forest Service land while the lower 2.3 miles runs through the City of Colorado Springs' North Cheyenne Cañon Park (31%). Approximately one tenth of a mile (1%) is on private land.

Biological Summary and R2CROSS Analysis. In August of 2006, TU and CDOW collected stream cross sectional data, natural environment data, and other data needed to quantify Instream Flow needs. Greenback cutthroat trout had previously been stocked in this stream by the CDOW and were sampled in 1994. The upper potion now supports a self-sustaining population of genetically pure greenback cutthroat trout. This population lies above a series of waterfalls that acts as a fish barrier and prevents brook trout, an effective competitor, from invading the reach and displacing the greenback cutthroat trout. Because these greenbacks are so well protected from competition with other trout, this stream provides important habitat for this threatened species.

Stream cross sectional data were analyzed using the R2CROSS program, and the output was evaluated using the methods described in Nehring (1979) and Espegren (1996). Data were collected from two transects on North Cheyenne Creek. Based on the average results from the two R2CROSS analyses and the available biological data Trout Unlimited and CDOW recommend that the CWCB appropriate the following flow

amounts to preserve the natural environment of North Cheyenne Creek to a reasonable degree:

- From **May 1 to October 15**, the R2CROSS analysis indicates and the water availability analysis supports an instream flow appropriation of **3.5 cfs** to maintain the three principal criteria of average depth, average velocity and percent wetted perimeter;

- From **October 16 to March 31**, the R2CROSS analysis indicates and the water availability analysis supports an instream flow appropriation of **1.0 cfs** to maintain the three principal criteria of average depth, average velocity and percent wetted perimeter;

- Based on the R2CROSS and water availability analyses instream flows from **April 1 to April 30** should be set at **2.5 cfs**. This flow comes close to ensuring the three principal criteria while reflecting that variability associated with the onset of spring runoff.

Water Availability. Colorado Springs Utilities (CSU) has maintained a gage on North Cheyenne Creek since 1949 (IPN# 1291) just above the North Cheyenne Creek Pipeline diversion. Trout Unlimited used data from this gage to evaluate water availability in North Cheyenne Creek. With the exception of some isolated missing dates, daily discharge data were available for complete water years (10/1 – 9/30) for the years 1983 – 2006. An analysis of these data showed that throughout the year the average daily flows exceeded the recommended flows. During the winter months, 50% of flows exceeded the recommend flow of 1.0 cfs and, with the exception of April, 50% of summer flows were greater than instream flow recommendations. Flows tend to increase during April, raising from an average daily flow of 2.53 cfs on April 1 to 9.76 cfs on April 30. Although the timing of this increase can be somewhat variable, 50% of flows in April exceeded 3.09 cfs. Because greenback cutthroat trout are spring spawners, Trout Unlimited and CDOW recommend maintaining flows of at least 2.5 cfs for this month. This will ensure that for much of the month the three principal criteria evaluated by the R2CROSS are met.

Relationship to Existing State Policy. TU and the CDOW are forwarding this instream flow recommendation to the CWCB to meet the State of Colorado's policy "that the wildlife and their environment are to be protected, preserved, enhanced, and managed for the use, benefit, and enjoyment of the people of this state and its visitors … and that, to carry out such program and policy, there shall be a continuous operation of planning, acquisition, and development of wildlife habitats and facilities for wildlife-related opportunities." C.R.S. 33-1-101(1). Further, the CDOW Strategic Plan states "Healthy aquatic environments are essential to maintain healthy and viable fisheries, and critical for self-sustaining populations. The Division desires to protect and enhance the quality and quantity of aquatic habitats." TU and CDOW recommend that North Cheyenne Creek be considered for inclusion in the Instream Flow Program because doing so would help meet these stated policies. Specifically, establishing minimum flows through this

reach would preserve the natural environment of the stream, including the native greenback cutthroat trout, to a reasonable degree.

Attached in Appendix B, please find copies of the field data sheets, the R2CROSS modeling runs, fishery survey information, and stream photographs. Attached in Appendix C, please find copies of the water availability analysis as well as precipitation data from Colorado Springs for the years 1948 – 2006. Diversion records are attached in Appendix D. If you have any questions regarding the attached information or the instream flow recommendations, please feel free to contact me at (303) 440-2937.

Trout Unlimited thanks Colorado Springs Utilities, Colorado Division of Wildlife and the Colorado Water Conservation Board Staff for their support in preparing this recommendation.

Sincerely,

W. John Roach, Ph.D.
Trout Unlimited
Aquatic Specialist

Cc: Gary Dowler, CDOW Aquatic Biologist – w/o attachments
Doug Krieger, CDOW Aquatic Biologist – w/o attachments
Abby Ortega, Colorado Springs Utilities Project Engineer
Kirsta Scherff-Norris, Colorado Springs Utilities
Kurt Schroeder, Colorado Springs Parks – w/o attachments
Jay Skinner, CDOW Water Unit Program Manager – w/o attachments
Mark Uppendahl, CDOW Instream Flow Program Coordinator
Melissa Walker, Colorado Springs Parks – w/o attachments

March 20, 2007

Mr. Jeff Baessler and Mr. Todd Doherty
Stream and Lake Protection Section
Colorado Water Conservation Board
1313 Sherman Street, Room 723
Denver, Colorado 80203

RE: Instream flow recommendations for Bear Creek, Severy Creek, and North Cheyenne Creek.

Dear Mr. Baessler and Mr. Doherty,

I am writing to suggest that the lower termini of the proposed instream flow reaches on Bear Creek and North Cheyenne Creek be moved upstream from the locations initially proposed by Trout Unlimited and Colorado Division of Wildlife (CDOW). Colorado Springs Utilities (CSU) has expressed a desire to move the termini on these two streams in order to reduce the potential for future conflicts. On Bear Creek, CSU would like to see the lower terminus moved approximately one mile upstream to where High Drive crosses the creek. On North Cheyenne Creek CSU would prefer the lower terminus be moved upstream to where Gold Camp Road crosses the creek. They have not raised any objections to the Severy Creek instream flow proposals. Because the greenback cutthroat trout in both Bear Creek and North Cheyenne Creek are in the upper reaches, moving the termini as requested would still provide adequate protection for these populations.

Because moving the termini upstream would address the concerns expressed by CSU and because the greenback cutthroat trout would still be protected, both Trout Unlimited and CDOW support modifying the proposed instream flow reaches as suggested. We believe that adopting these changes will significantly reduce the likelihood that any objections to these instream flow proposals will be raised. The attached map identifies the extent of the new instream flow reaches and associated watersheds for both streams, the portion of each watershed that is now excluded, as well as the relevant diversion and sampling points.

Please do not hesitate to contact me with any questions at 303-440-2937, ext 103.

Sincerely,

W. John Roach, Ph.D.
Trout Unlimited
Aquatic Specialist

Cc: Gary Dowler, CDOW Aquatic Biologist
Scott Howell, Colorado Springs Utilities
Doug Krieger, CDOW Aquatic Biologist
Abby Ortega, Colorado Springs Utilities
Kirsta Schereff-Norris, Colorado Springs Utilities
Kurt Schroeder, City of Colorado Springs, Parks Recreation & Cultural Services
Mark Shae, Colorado Springs Utilities
Jay Skinner, CDOW Water Unit Program Manager
Mark Uppendahl, CDOW Instream Flow Program Coordinator
Melissa Walker, City of Colorado Springs, Starsmore Discovery Center

APPENDIX – B

Field Data

COLORADO WATER CONSERVATION BOARD
INSTREAM FLOW / NATURAL LAKE LEVEL PROGRAM
STREAM CROSS-SECTION AND FLOW ANALYSIS

LOCATION INFORMATION

STREAM NAME:	North Fork Cheyenne Creek
XS LOCATION:	N 38 47.216 W 104 55.341
XS NUMBER:	1
DATE:	10-Aug-06
OBSERVERS:	A. Todd, K. Kirkeby
1/4 SEC:	0
SECTION:	31
TWP:	14S
RANGE:	67W
PM:	0
COUNTY:	El Paso
WATERSHED:	Arkansas
DIVISION:	2
DOW CODE:	0
USGS MAP:	0
USFS MAP:	0

SUPPLEMENTAL DATA

TAPE WT:	0.0106
TENSION:	99999

*** NOTE ***
Leave TAPE WT and TENSION at defaults for data collected with a survey level and rod

CHANNEL PROFILE DATA

SLOPE:	0.010784

INPUT DATA CHECKED BY: .....DATE.....

ASSIGNED TO: ….....……..…….....DATE.....

STREAM NAME: North Fork Cheyenne Creek
XS LOCATION: N 38 47.216 W 104 55.341
XS NUMBER: 1

DATA POINTS= 28

VALUES COMPUTED FROM RAW FIELD DATA

	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
	S	0.00	7.35			0.00		0.00	0.00	0.0%
1	G	1.50	7.81			0.00		0.00	0.00	0.0%
	W	3.50	8.22	0.00	0.00	0.00		0.00	0.00	0.0%
		3.80	8.35	0.20	0.05	0.33	0.20	0.06	0.00	0.1%
		4.10	8.42	0.20	0.11	0.31	0.20	0.06	0.01	0.3%
		4.40	8.56	0.30	0.24	0.33	0.30	0.09	0.02	0.8%
		4.70	8.52	0.30	0.38	0.30	0.30	0.09	0.03	1.3%
		5.00	8.61	0.40	0.50	0.31	0.40	0.12	0.06	2.3%
		5.30	8.65	0.45	0.89	0.30	0.45	0.14	0.12	4.7%
		5.60	8.60	0.45	1.23	0.30	0.45	0.14	0.17	6.5%
		5.90	8.68	0.50	1.45	0.31	0.50	0.15	0.22	8.5%
		6.20	8.36	0.10	1.44	0.44	0.10	0.03	0.04	1.7%
		6.50	8.36	0.10	1.14	0.30	0.10	0.03	0.03	1.3%
		6.80	8.57	0.40	0.72	0.37	0.40	0.12	0.09	3.4%
		7.10	8.67	0.50	0.88	0.32	0.50	0.15	0.13	5.2%
		7.40	8.70	0.60	1.66	0.30	0.60	0.18	0.30	11.7%
		7.70	8.72	0.50	1.44	0.30	0.50	0.15	0.22	8.4%
		8.00	8.66	0.50	1.50	0.31	0.50	0.15	0.23	8.8%
		8.30	8.66	0.50	1.71	0.30	0.50	0.15	0.26	10.0%
		8.60	8.62	0.50	1.57	0.30	0.50	0.15	0.24	9.2%
		8.90	8.65	0.50	1.18	0.30	0.50	0.15	0.18	6.9%
		9.20	8.16	0.00	0.00	0.57		0.00	0.00	0.0%
		9.50	8.21	0.00	0.00	0.00		0.00	0.00	0.0%
		9.80	8.49	0.30	1.31	0.41	0.30	0.09	0.12	4.6%
		10.10	8.46	0.30	0.90	0.30	0.30	0.12	0.11	4.2%
	W	10.60	8.23	0.00	0.00	0.55		0.00	0.00	0.0%
1	G	11.60	7.45			0.00		0.00	0.00	0.0%
	S	12.20	7.31			0.00		0.00	0.00	0.0%
	TOTALS ----------					7.57	0.6 (Max.)	2.31	2.56	100.0%

Manning's n = 0.0631
Hydraulic Radius= 0.305180311

STREAM NAME: North Fork Cheyenne Creek
XS LOCATION: N 38 47.216 W 104 55.341
XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	2.31	2.06	-11.0%
7.98	2.31	4.01	73.4%
8.00	2.31	3.83	66.0%
8.02	2.31	3.67	58.7%
8.04	2.31	3.50	51.5%
8.06	2.31	3.34	44.4%
8.08	2.31	3.17	37.4%
8.10	2.31	3.02	30.6%
8.12	2.31	2.86	23.8%
8.14	2.31	2.71	17.1%
8.16	2.31	2.55	10.6%
8.18	2.31	2.41	4.1%
8.19	2.31	2.33	1.0%
8.20	2.31	2.26	-2.1%
8.21	2.31	2.19	-5.1%
8.22	2.31	2.12	-8.0%
8.23	2.31	2.06	-11.0%
8.24	2.31	1.99	-13.9%
8.25	2.31	1.92	-16.8%
8.26	2.31	1.86	-19.6%
8.27	2.31	1.79	-22.4%
8.28	2.31	1.73	-25.2%
8.30	2.31	1.60	-30.8%
8.32	2.31	1.47	-36.2%
8.34	2.31	1.35	-41.5%
8.36	2.31	1.23	-46.7%
8.38	2.31	1.12	-51.5%
8.40	2.31	1.01	-56.1%
8.42	2.31	0.91	-60.6%
8.44	2.31	0.81	-64.8%
8.46	2.31	0.72	-68.9%
8.48	2.31	0.63	-72.9%

WATERLINE AT ZERO
AREA ERROR = 8.188

STREAM NAME: North Fork Cheyenne Creek
XS LOCATION: N 38 47.216 W 104 55.341
XS NUMBER: 1

Constant Manning's n

GL = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	7.81	9.64	0.57	0.91	5.51	10.60	100.0%	0.52	8.72	1.58
	7.84	9.46	0.55	0.88	5.24	10.41	98.2%	0.50	8.11	1.55
	7.89	9.16	0.52	0.83	4.78	10.08	95.1%	0.47	7.10	1.49
	7.94	8.85	0.49	0.78	4.33	9.75	92.0%	0.44	6.15	1.42
	7.99	8.54	0.46	0.73	3.89	9.42	88.9%	0.41	5.28	1.36
	8.04	8.23	0.42	0.68	3.47	9.09	85.8%	0.38	4.47	1.29
	8.09	7.92	0.39	0.63	3.07	8.76	82.7%	0.35	3.73	1.21
	8.14	7.62	0.35	0.58	2.68	8.43	79.5%	0.32	3.05	1.14
WL	8.19	7.12	0.32	0.53	2.31	7.89	74.5%	0.29	2.49	1.08
	8.24	6.66	0.30	0.48	1.97	7.37	69.5%	0.27	1.99	1.01
	8.29	6.35	0.26	0.43	1.64	6.99	66.0%	0.23	1.53	0.93
	8.34	6.05	0.22	0.38	1.33	6.62	62.4%	0.20	1.12	0.84
	8.39	5.29	0.20	0.33	1.05	5.78	54.5%	0.18	0.82	0.78
	8.44	4.81	0.17	0.28	0.80	5.19	49.0%	0.15	0.56	0.70
	8.49	4.17	0.14	0.23	0.57	4.45	41.9%	0.13	0.35	0.62
	8.54	3.69	0.10	0.18	0.37	3.89	36.7%	0.10	0.19	0.51
	8.59	3.14	0.06	0.13	0.20	3.26	30.8%	0.06	0.08	0.38
	8.64	1.94	0.03	0.08	0.07	1.98	18.7%	0.03	0.02	0.25
	8.69	0.58	0.02	0.03	0.01	0.58	5.5%	0.02	0.00	0.16

Calculate Flow recommendations based on Average Depth (0.2 ft), Percent Wetted Perimeter (50%), and Average Velocity (1 ft/s).

2 of 3
Greater of Average Depth and Percent Wetted Perimeter

Average depth is controlling. When Average depth is 0.20 ft, x = 0.82 cfs
However, because 0.82 is less than Lower Confidence Interval, flow assigned minimum value of 1.0 cfs.

3 of 3
(x - 1.53)/(1.0 - 0.93) = (1.99 - 1.53)/(1.01 - 0.93)
x = 1.93 cfs

STREAM NAME: North Fork Cheyenne Creek
XS LOCATION: N 38 47.216 W 104 55.341
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)=	2.56	cfs
CALCULATED FLOW (Qc)=	2.49	cfs
(Qm-Qc)/Qm * 100 =	2.8	%
MEASURED WATERLINE (WLm)=	8.23	ft
CALCULATED WATERLINE (WLc)=	8.19	ft
(WLm-WLc)/WLm * 100 =	0.4	%
MAX MEASURED DEPTH (Dm)=	0.60	ft
MAX CALCULATED DEPTH (Dc)=	0.53	ft
(Dm-Dc)/Dm * 100	11.4	%
MEAN VELOCITY=	1.08	ft/sec
MANNING'S N=	0.063	
SLOPE=	0.010784	ft/ft
.4 * Qm =	1.0	cfs
2.5 * Qm=	6.4	cfs

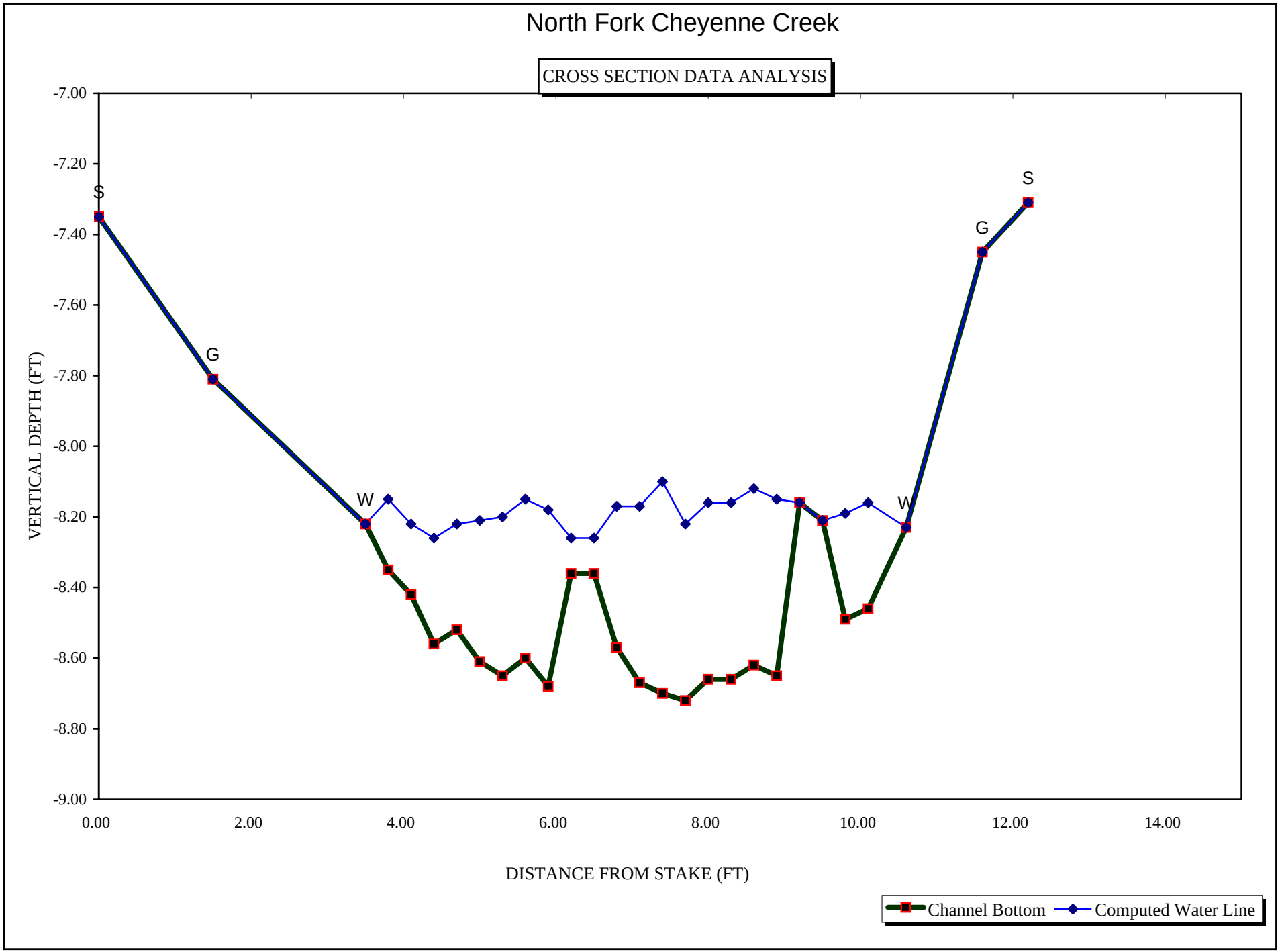
RECOMMENDED INSTREAM FLOW:
============================

FLOW (CFS)	PERIOD
===========	========
____________________	____________________
____________________	____________________
____________________	____________________
____________________	____________________

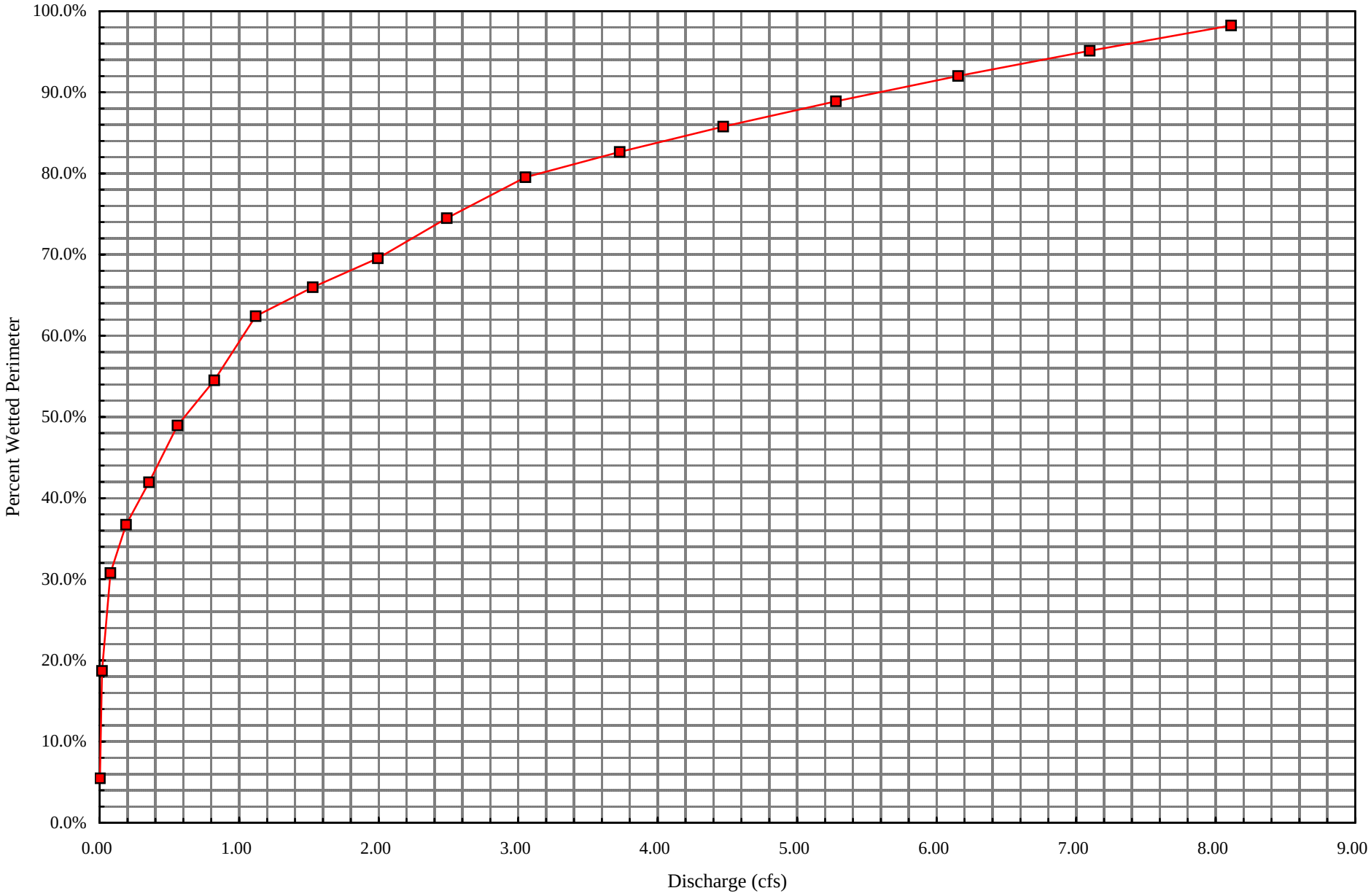
RATIONALE FOR RECOMMENDATION:
============================

RECOMMENDATION BY: ……………………...………..……................................ AGENCY..……………………….....……...…...……....... DATE:.......…...…......……………

CWCB REVIEW BY: ..……………………………...……………………………………………………...…............. DATE:..................……………...….


North Fork Cheyenne Creek
CROSS SECTION DATA ANALYSIS
-7.00
-7.20
-7.40
-7.60
-7.80
-8.00
-8.20
-8.40
-8.60
-8.80
-9.00
VERTICAL DEPTH (FT)
S
G
W
W
G
S
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line

Percent Wetted Perimeter vs. Discharge



Data Input & Proofing

STREAM NAME:	North Fork Cheyenne Creek
XS LOCATION:	N 38 47.216 W 104 55.341
XS NUMBER:	1
DATE:	8/10/06
OBSERVERS:	A. Todd, K. Kirkeby
1/4 SEC:	
SECTION:	31
TWP:	14S
RANGE:	67W
PM:	
COUNTY:	El Paso
WATERSHED:	Arkansas
DIVISION:	2
DOW CODE:	
USGS MAP:	
USFS MAP:	
	Level and Rod Survey
TAPE WT:	0.0106 lbs / ft
TENSION:	99999 lbs
SLOPE:	0.010784 ft / ft

CHECKED BY:.....DATE.....

ASSIGNED TO: .....DATE.....

Total Data Points = 28

GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
	S	0.00	7.35			0.00	0.00	0.00
1	G	1.50	7.81			0.00	0.00	0.00
	W	3.50	8.22	0.00	0.00	0.00	0.00	0.00
		3.80	8.35	0.20	0.05	0.06	0.00	8.15
		4.10	8.42	0.20	0.11	0.06	0.01	8.22
		4.40	8.56	0.30	0.24	0.09	0.02	8.26
		4.70	8.52	0.30	0.38	0.09	0.03	8.22
		5.00	8.61	0.40	0.50	0.12	0.06	8.21
		5.30	8.65	0.45	0.89	0.14	0.12	8.20
		5.60	8.60	0.45	1.23	0.14	0.17	8.15
		5.90	8.68	0.50	1.45	0.15	0.22	8.18
		6.20	8.36	0.10	1.44	0.03	0.04	8.26
		6.50	8.36	0.10	1.14	0.03	0.03	8.26
		6.80	8.57	0.40	0.72	0.12	0.09	8.17
		7.10	8.67	0.50	0.88	0.15	0.13	8.17
		7.40	8.70	0.60	1.66	0.18	0.30	8.10
		7.70	8.72	0.50	1.44	0.15	0.22	8.22
		8.00	8.66	0.50	1.50	0.15	0.23	8.16
		8.30	8.66	0.50	1.71	0.15	0.26	8.16
		8.60	8.62	0.50	1.57	0.15	0.24	8.12
		8.90	8.65	0.50	1.18	0.15	0.18	8.15
		9.20	8.16	0.00	0.00	0.00	0.00	0.00
		9.50	8.21	0.00	0.00	0.00	0.00	0.00
		9.80	8.49	0.30	1.31	0.09	0.12	8.19
		10.10	8.46	0.30	0.90	0.12	0.11	8.16
	W	10.60	8.23	0.00	0.00	0.00	0.00	0.00
1	G	11.60	7.45			0.00	0.00	0.00
	S	12.20	7.31			0.00	0.00	0.00
					Totals	2.31	2.56	

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: N. Fork Cheyenne Creek				CROSS-SECTION NO.: 1
CROSS-SECTION LOCATION: N 4293135 E 506743	38° 47.216 N 104° 55.341 W	7802		
DATE: 8/10/06	OBSERVERS: A. Todd, K. Kirkeby			
LEGAL DESCRIPTION	¼ SECTION:	SECTION: 31	TOWNSHIP: 14 N(S)	RANGE: 67 E(W) PM:
COUNTY: El Paso	WATERSHED: Arkansas	WATER DIVISION: 2	DOW WATER CODE:	
MAP(S):	USGS:			
	USFS:			

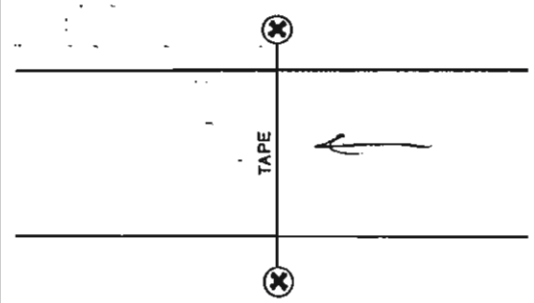
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE: Flo-Mate			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: ____ lbs/foot	TAPE TENSION: ____ lbs
CHANNEL BED MATERIAL SIZE RANGE: gravel to large cobble	PHOTOGRAPHS TAKEN: YES/NO	NUMBER OF PHOTOGRAPHS: (4)		

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	
⊗ Tape @ Stake RB	0.0	
① WS @ Tape LB/RB	0.0	8.22/8.23
② WS Upstream	8	8.14
③ WS Downstream	2.2	8.25
SLOPE	.11/10.2 = .010784	

SKETCH



LEGEND:
- Stake ⊗
- Station ①
- Photo ◇1
- Direction of Flow ← →

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/(NO)	DISTANCE ELECTROFISHED: ____ ft	FISH CAUGHT: YES/~~NO~~	WATER CHEMISTRY SAMPLED: YES/~~NO~~

LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)

SPECIES (FILL IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15	TOTAL

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:

COMMENTS

3-4 fish spotted 4" fish

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: N. CHEYENNE CREEK	CROSS-SECTION NO: ~~1~~ 1	DATE: 8/10/06	SHEET 1 OF 1
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (LEFT) RIGHT (0.0 AT STAKE)	Gage Reading: _____ ft	TIME: 12:00

Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
Top	0		7.41								
S	0		~~7~~.35								
G	1.5		7.81								
W	3.5		8.22		Ø			Ø			
	3.8		8.35		.2			.65			
	4.1		8.~~47~~		.2			.11			
	4.4		8.56		.3			.24			
	4.7		8.52		.3			.38			
	5.0		8.61		.4			.50			
	5.3		8.65		.45			.89			
	5.6		8.60		.45			1.23			
	5.9		8.68		.5			1.45			
	6.2		8.~~3~~6		.1			1.44			
	6.5		8.36		.1			1.14			
	6.8		8.57		.4			.72			
	7.1		8.67		.5			.88			
	7.4		8.70		.6			1.66			
	7.7		8.72		.5			1.44			
	8.0		8.66		.5			1.50			
	8.3		8.66		.5			1.71			
	8.6		8.62		.5			1.57			
	8.9		8.65		.5			1.18			~~ok~~
	9.2		8.16		Ø			Ø			on rock
	9.5		8.21		Ø			Ø			on rock
	9.8		8.49		.3			1.31			
	10.1		8.46		.3			.90			
	~~10.4~~				Ø			Ø			
W	10.6		8.23		Ø			Ø			
G	11.6		7.45								
S	12.2		7.31								
Top			7.25								
TOTALS:											

End of Measurement	Time:	Gage Reading: _____ ft	CALCULATIONS PERFORMED BY:	CALCULATIONS CHECKED BY:

North Fork Cheyenne Creek, Cross Section 1 looking downstream 8/10/06.

North Fork Cheyenne Creek, Cross Section 1 looking upstream 8/10/06.

North Fork Cheyenne Creek, Cross Section 1 looking from right bank 8/10/06.

North Fork Cheyenne Creek, Cross Section 1 looking from left bank 8/10/06.

COLORADO WATER CONSERVATION BOARD
INSTREAM FLOW / NATURAL LAKE LEVEL PROGRAM
STREAM CROSS-SECTION AND FLOW ANALYSIS

LOCATION INFORMATION

STREAM NAME:	North Fork Cheyenne Creek
XS LOCATION:	N 38 47.298 W 104 55.010
XS NUMBER:	2
DATE:	10-Aug-06
OBSERVERS:	A. Todd, K. Kirkeby
1/4 SEC:	0
SECTION:	32
TWP:	14S
RANGE:	67W
PM:	0
COUNTY:	El Paso
WATERSHED:	Arkansas
DIVISION:	2
DOW CODE:	0
USGS MAP:	0
USFS MAP:	0

SUPPLEMENTAL DATA

TAPE WT:	0.0106
TENSION:	99999

*** NOTE ***
Leave TAPE WT and TENSION at defaults for data collected with a survey level and rod

CHANNEL PROFILE DATA

SLOPE:	0.008

INPUT DATA CHECKED BY: .....DATE.....

ASSIGNED TO: ….....……..…….....DATE.....

STREAM NAME: North Fork Cheyenne Creek
XS LOCATION: N 38 47.298 W 104 55.010
XS NUMBER: 2

DATA POINTS= 27

VALUES COMPUTED FROM RAW FIELD DATA

	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
	S	0.00	6.80			0.00		0.00	0.00	0.0%
1	G	1.80	8.22			0.00		0.00	0.00	0.0%
		3.00	8.35			0.00		0.00	0.00	0.0%
		5.00	8.57			0.00		0.00	0.00	0.0%
	W	5.50	8.64	0.00	0.00	0.00		0.00	0.00	0.0%
		6.00	8.76	0.12	0.28	0.51	0.12	0.06	0.02	0.7%
		6.50	8.75	0.20	1.87	0.50	0.20	0.10	0.19	7.5%
		7.00	8.79	0.20	0.77	0.50	0.20	0.10	0.08	3.1%
		7.50	8.88	0.20	0.04	0.51	0.20	0.10	0.00	0.2%
		8.00	8.85	0.25	1.70	0.50	0.25	0.13	0.21	8.5%
		8.50	8.73	0.15	0.97	0.51	0.15	0.08	0.07	2.9%
		9.00	9.06	0.35	0.00	0.60	0.35	0.18	0.00	0.0%
		9.50	9.07	0.50	0.20	0.50	0.50	0.25	0.05	2.0%
		10.00	9.33	0.55	2.05	0.56	0.55	0.28	0.56	22.5%
		10.50	9.23	0.70	1.03	0.51	0.70	0.35	0.36	14.4%
		11.00	9.23	0.60	1.02	0.50	0.60	0.30	0.31	12.2%
		11.50	9.17	0.50	0.58	0.50	0.50	0.25	0.15	5.8%
		12.00	9.10	0.50	0.43	0.50	0.50	0.25	0.11	4.3%
		12.50	8.98	0.40	0.77	0.51	0.40	0.20	0.15	6.2%
		13.00	8.90	0.25	1.05	0.51	0.25	0.13	0.13	5.2%
		13.50	8.85	0.20	0.00	0.50	0.20	0.10	0.00	0.0%
		14.00	8.79	0.20	0.38	0.50	0.20	0.10	0.04	1.5%
		14.50	8.79	0.15	0.79	0.50	0.15	0.10	0.08	3.1%
	W	15.30	8.62	0.00	0.00	0.82		0.00	0.00	0.0%
		16.60	8.30			0.00		0.00	0.00	0.0%
1	G	17.40	7.80			0.00		0.00	0.00	0.0%
	S	18.60	7.54			0.00		0.00	0.00	0.0%
	TOTALS ----------					10.06	0.7	3.03	2.50	100.0%
							(Max.)			

Manning's n = 0.0724
Hydraulic Radius= 0.301302416

STREAM NAME: North Fork Cheyenne Creek
XS LOCATION: N 38 47.298 W 104 55.010
XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	3.03	2.98	-1.6%
8.38	3.03	5.83	92.1%
8.40	3.03	5.57	83.6%
8.42	3.03	5.32	75.3%
8.44	3.03	5.07	67.2%
8.46	3.03	4.83	59.2%
8.48	3.03	4.59	51.4%
8.50	3.03	4.36	43.8%
8.52	3.03	4.13	36.3%
8.54	3.03	3.91	29.1%
8.56	3.03	3.70	22.0%
8.58	3.03	3.49	15.0%
8.59	3.03	3.39	11.6%
8.60	3.03	3.28	8.3%
8.61	3.03	3.18	4.9%
8.62	3.03	3.08	1.6%
8.63	3.03	2.98	-1.6%
8.64	3.03	2.89	-4.8%
8.65	3.03	2.79	-8.0%
8.66	3.03	2.69	-11.2%
8.67	3.03	2.60	-14.3%
8.68	3.03	2.50	-17.4%
8.70	3.03	2.32	-23.5%
8.72	3.03	2.14	-29.5%
8.74	3.03	1.96	-35.4%
8.76	3.03	1.79	-41.0%
8.78	3.03	1.64	-46.0%
8.80	3.03	1.50	-50.5%
8.82	3.03	1.37	-54.7%
8.84	3.03	1.26	-58.6%
8.86	3.03	1.15	-62.2%
8.88	3.03	1.05	-65.3%

WATERLINE AT ZERO
AREA ERROR = 8.625

STREAM NAME: North Fork Cheyenne Creek
XS LOCATION: N 38 47.298 W 104 55.010
XS NUMBER: 2

Constant Manning's n

GL = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	8.22	14.93	0.54	1.11	8.07	15.28	100.0%	0.53	9.68	1.20
	8.23	14.87	0.54	1.10	7.99	15.22	99.6%	0.53	9.56	1.20
	8.28	14.33	0.51	1.05	7.26	14.66	96.0%	0.50	8.35	1.15
	8.33	13.73	0.48	1.00	6.56	14.05	91.9%	0.47	7.25	1.11
	8.38	13.07	0.45	0.95	5.89	13.38	87.6%	0.44	6.26	1.06
	8.43	12.41	0.42	0.90	5.25	12.71	83.2%	0.41	5.35	1.02
	8.48	11.75	0.40	0.85	4.65	12.04	78.8%	0.39	4.53	0.97
	8.53	11.10	0.37	0.80	4.08	11.38	74.5%	0.36	3.78	0.93
	8.58	10.45	0.34	0.75	3.54	10.72	70.2%	0.33	3.11	0.88
WL	8.63	9.88	0.31	0.70	3.03	10.15	66.4%	0.30	2.49	0.82
	8.68	9.40	0.27	0.65	2.55	9.65	63.2%	0.26	1.93	0.76
	8.73	8.95	0.23	0.60	2.09	9.20	60.2%	0.23	1.43	0.68
	8.78	7.50	0.22	0.55	1.68	7.72	50.5%	0.22	1.11	0.66
	8.83	5.97	0.22	0.50	1.34	6.16	40.3%	0.22	0.89	0.67
	8.88	4.64	0.23	0.45	1.07	4.80	31.4%	0.22	0.73	0.68
	8.93	4.05	0.21	0.40	0.86	4.19	27.4%	0.21	0.55	0.64
	8.98	3.66	0.18	0.35	0.67	3.78	24.8%	0.18	0.39	0.58
	9.03	3.37	0.15	0.30	0.49	3.47	22.7%	0.14	0.25	0.50
	9.08	2.59	0.13	0.25	0.34	2.68	17.5%	0.13	0.15	0.46
	9.13	2.22	0.10	0.20	0.22	2.28	14.9%	0.09	0.08	0.38
	9.18	1.76	0.07	0.15	0.12	1.81	11.8%	0.06	0.03	0.29
	9.23	1.24	0.03	0.10	0.04	1.28	8.4%	0.03	0.01	0.18
	9.28	0.38	0.03	0.05	0.01	0.40	2.6%	0.03	0.00	0.16
	9.33	0.03	0.00	0.00	0.00	0.04	0.2%	0.00	0.00	0.03

Calculate Flow recommendations based on Average Depth (0.2 ft), Percent Wetted Perimeter (50%), and Average Velocity (1 ft/s).

2 of 3
Greater of Average Depth and Percent Wetted Perimeter; Wetted Perimeter is controlling

(x - 0.89)/(50 - 40.3) = (1.11 - 0.89)/(50.5 - 40.3)
x = 1.10 cfs

3 of 3
(x - 4.53)/(1.0 - 0.97) = (5.35 - 4.53)/(1.02 - 0.97)
x = 5.02 cfs

So, average winter flow recommendation from XS1 & XS 2 is 1.1 cfs
and average summer flow recommendation from XS1 & XS2 is 3.5 cfs.

STREAM NAME: North Fork Cheyenne Creek
XS LOCATION: N 38 47.298 W 104 55.010
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)=	2.50	cfs
CALCULATED FLOW (Qc)=	2.49	cfs
(Qm-Qc)/Qm * 100 =	0.6	%
MEASURED WATERLINE (WLm)=	8.63	ft
CALCULATED WATERLINE (WLc)=	8.63	ft
(WLm-WLc)/WLm * 100 =	0.1	%
MAX MEASURED DEPTH (Dm)=	0.70	ft
MAX CALCULATED DEPTH (Dc)=	0.70	ft
(Dm-Dc)/Dm * 100	-0.7	%
MEAN VELOCITY=	0.82	ft/sec
MANNING'S N=	0.072	
SLOPE=	0.008	ft/ft
.4 * Qm =	1.0	cfs
2.5 * Qm=	6.3	cfs

RECOMMENDED INSTREAM FLOW:
============================

FLOW (CFS)	PERIOD
___________________	___________________
___________________	___________________
___________________	___________________
___________________	___________________

RATIONALE FOR RECOMMENDATION:
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RECOMMENDATION BY: ……………………………………………… AGENCY……………………………………………… DATE:………………………

CWCB REVIEW BY: ……………………………………………………………………………………………… DATE:………………………

Data Input & Proofing

STREAM NAME:	North Fork Cheyenne Creek
XS LOCATION:	N 38 47.298 W 104 55.010
XS NUMBER:	2
DATE:	8/10/06
OBSERVERS:	A. Todd, K. Kirkeby
1/4 SEC:	
SECTION:	32
TWP:	14S
RANGE:	67W
PM:	
COUNTY:	El Paso
WATERSHED:	Arkansas
DIVISION:	2
DOW CODE:	
USGS MAP:	
USFS MAP:	
	Level and Rod Survey
TAPE WT:	0.0106 lbs / ft
TENSION:	99999 lbs
SLOPE:	0.008 ft / ft

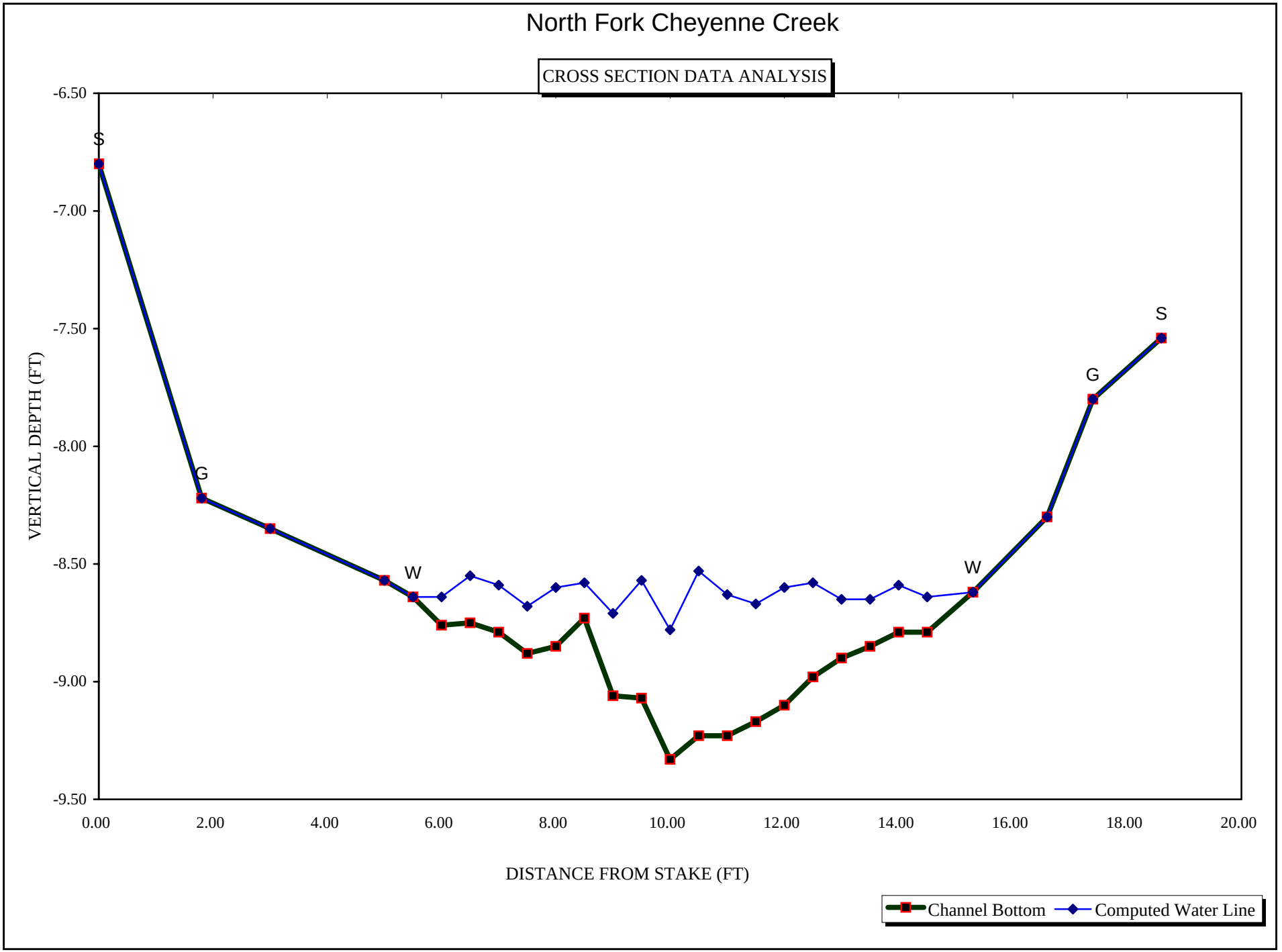
CHECKED BY:.....DATE.....

ASSIGNED TO: .....DATE.....

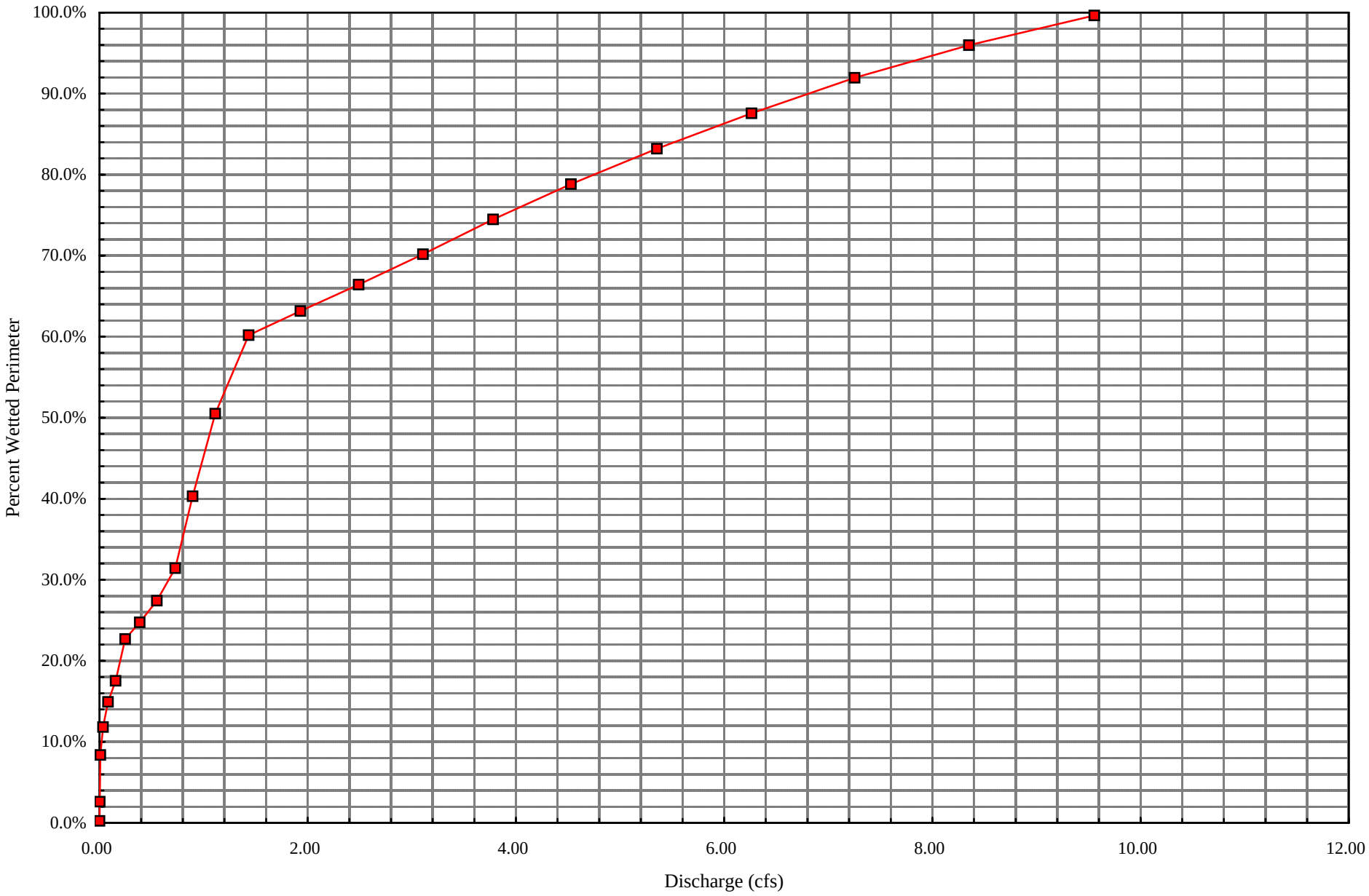
Total Data Points = 27

GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
	S	0.00	6.80			0.00	0.00	0.00
1	G	1.80	8.22			0.00	0.00	0.00
		3.00	8.35			0.00	0.00	0.00
		5.00	8.57			0.00	0.00	0.00
	W	5.50	8.64	0.00	0.00	0.00	0.00	0.00
		6.00	8.76	0.12	0.28	0.06	0.02	8.64
		6.50	8.75	0.20	1.87	0.10	0.19	8.55
		7.00	8.79	0.20	0.77	0.10	0.08	8.59
		7.50	8.88	0.20	0.04	0.10	0.00	8.68
		8.00	8.85	0.25	1.70	0.13	0.21	8.60
		8.50	8.73	0.15	0.97	0.08	0.07	8.58
		9.00	9.06	0.35	0.00	0.18	0.00	8.71
		9.50	9.07	0.50	0.20	0.25	0.05	8.57
		10.00	9.33	0.55	2.05	0.28	0.56	8.78
		10.50	9.23	0.70	1.03	0.35	0.36	8.53
		11.00	9.23	0.60	1.02	0.30	0.31	8.63
		11.50	9.17	0.50	0.58	0.25	0.15	8.67
		12.00	9.10	0.50	0.43	0.25	0.11	8.60
		12.50	8.98	0.40	0.77	0.20	0.15	8.58
		13.00	8.90	0.25	1.05	0.13	0.13	8.65
		13.50	8.85	0.20	0.00	0.10	0.00	8.65
		14.00	8.79	0.20	0.38	0.10	0.04	8.59
		14.50	8.79	0.15	0.79	0.10	0.08	8.64
	W	15.30	8.62	0.00	0.00	0.00	0.00	0.00
		16.60	8.30			0.00	0.00	0.00
1	G	17.40	7.80			0.00	0.00	0.00
	S	18.60	7.54			0.00	0.00	0.00

Totals	3.03	2.50


North Fork Cheyenne Creek
CROSS SECTION DATA ANALYSIS
-6.50
-7.00
-7.50
-8.00
-8.50
-9.00
-9.50
VERTICAL DEPTH (FT)
S
G
W
W
G
S
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line

Percent Wetted Perimeter vs. Discharge



COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

LOCATION INFORMATION

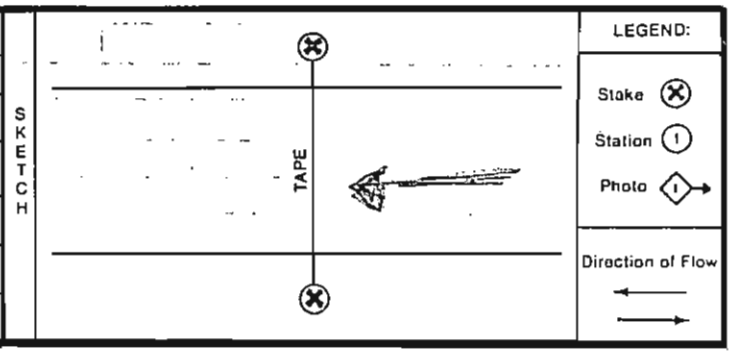
STREAM NAME: N. FORK CHEYENNE CREEK					CROSS-SECTION NO.: 2
CROSS-SECTION LOCATION: N 4293287	38° 47.298 N				
E 507222	-104° 55.010 W			Elevation 7779	
DATE: 8/10/06	OBSERVERS: A. TODD, K. KIRKEBY				
LEGAL DESCRIPTION	¼ SECTION:	SECTION: 32	TOWNSHIP: 14 N(S)	RANGE: 67 E(W)	PM:
COUNTY: EL PASO	WATERSHED: ARKANSAS	WATER DIVISION: 2	DOW WATER CODE:		
MAP(S):	USGS:				
	USFS:				

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE: FLO MATE			
METER NUMBER:	DATE RATED:	CALIB/SPIN: _____ sec	TAPE WEIGHT: _____ lbs/foot	TAPE TENSION: _____ lbs
CHANNEL BED MATERIAL SIZE RANGE: gravel to small boulder	PHOTOGRAPHS TAKEN: YES/NO	NUMBER OF PHOTOGRAPHS: 4		

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	
⊗ Tape @ Stake RB	0.0	
① WS @ Tape LB/RB	0.0	8.62/8.64
② WS Upstream	1.5	8.60
③ WS Downstream	6.0	8.66/E
SLOPE	.06/7.5	



AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/NO	DISTANCE ELECTROFISHED: _____ft	FISH CAUGHT: YES/NO	WATER CHEMISTRY SAMPLED: YES/NO

LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)

SPECIES (FILL IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15	TOTAL

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:

COMMENTS

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: N. Fork Cheyenne Creek	CROSS-SECTION NO.: 2	DATE: 8/10/06	SHEET 1 OF 1
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) (LEFT) / RIGHT	Gage Reading: _____ ft	TIME: 10:15 am

Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec): At Point	Velocity (ft/sec): Mean in Vertical	Area (ft^2)	Discharge (cfs)
	Top	0	6.485								
S	Next	0	6.80								
G		.8	8.22								
		3	8.35								
~~W~~		5.0	8.57								
W		5.5	8.64		0			0			
		6.0	8.76		.12			.28			
		6.5	8.75		.2			1.87			
		7.0	8.79		.2			.77			
		7.5	8.88		.2			.04			
		8.0	8.85		.25			1.70			
		8.5	8.73		.15			.97			
		9.0	9.06		.35			0			
		9.5	9.07		.5			0.2			
		10	9.33		.55			2.05			
		10.5	9.23		.7			1.03			
		11	9.23		.6			1.02			
		11.5	9.17		.5			.58			
		12	9.10		.5			.43			
		12.5	8.98		.4			.77			
		13	8.90		.25			1.05			
		13.5	8.85		.2			0			
		14	8.79		.2			.38			
		14.5	8.79		.15			.79			
W		15.3	8.62		0			0			
		16.6	8.30								
G		17.4	7.80								
S		18.6	7.54								
Top			7.49								
TOTALS:											

End of Measurement	Time:	Gage Reading: _____ ft	CALCULATIONS PERFORMED BY:	CALCULATIONS CHECKED BY:

North Fork Cheyenne Creek, Cross Section 2 looking downstream 8/10/06.

North Fork Cheyenne Creek, Cross Section 2 looking upstream 8/10/06.

North Fork Cheyenne Creek, Cross Section 2 looking from right bank 8/10/06.

North Fork Cheyenne Creek, Cross Section 2 looking from left bank 8/10/06.

Biological Data

Greenback Cutthroat Trout Data for North Cheyenne Creek

North Cheyenne Creek: Sampled in July 1994 with the following results:

Station #1 (300 Ft.), Fence line at road switchback

Number of fish sampled	15
Weight of fish sampled	1.2 lbs
Biomass LB/Acre	21.6
#/Mile	270
#/Acre	279

Station #2 (300Ft.), Exit gate fence

Number of fish sampled	2
Weight of fish sampled	0.1 lbs
Biomass LB/Acre	0.6
#/Mile	35
#/Acre	36

Informal surveys/monitoring have revealed natural reproduction

Gary Dowler, an Area Aquatic Biologist with the Division of Wildlife, has documented that the greenback cutthroat trout population in North Cheyenne Creek is genetically pure. This is significant as hybridization has diluted the gene pool of many greenback cutthroat trout populations elsewhere in the state and makes the protection of this population all the more imperative.

APPENDIX – C

Water Availability Analysis

Discharge in North Cheyenne Creek (Fig. 1) was estimated from gage data on daily discharge collected by Colorado Springs Utilities (CSU). The water availability analysis used a water year beginning on 10/1 of the previous year and ending on 9/30 of the year of record. Only complete water years were included in the analysis, though the occasional missing data point was not considered a cause for concern. Data from these years were used to calculate the average discharge for each day of the year (Fig 2) as well as the average, minimum and maximum daily discharge rate for each month (Table 1).

The R2CROSS analyses indicated that between October 16 and March 31 flows should be at least 1.0 cfs while between April 1 and October 15 flows should be at least 3.5 cfs. According to the water availability analysis, estimated average daily flows just above the diversion point (Fig. 2) were always higher than the flows recommended by the R2CROSS analyses. Similarly, with the exception of April, 50% of monthly flows were greater than instream flow recommendations (Table 2). While only 50% of flows in April exceeded 3.09 cfs, this was because flows tended to rise through the month. In the first two weeks, 50% of flows exceeded just 2.75 cfs while in the last two weeks, 50% of flows exceeded 4.07 cfs, well above the recommendation of 3.48 cfs for that period. Because of this, TU and CDOW recommend setting an instream flow approapriation for April of 2.5 cfs. Maintaining higher flows in the spring is particularly important for greenback cutthroat trout which are spring spawners.

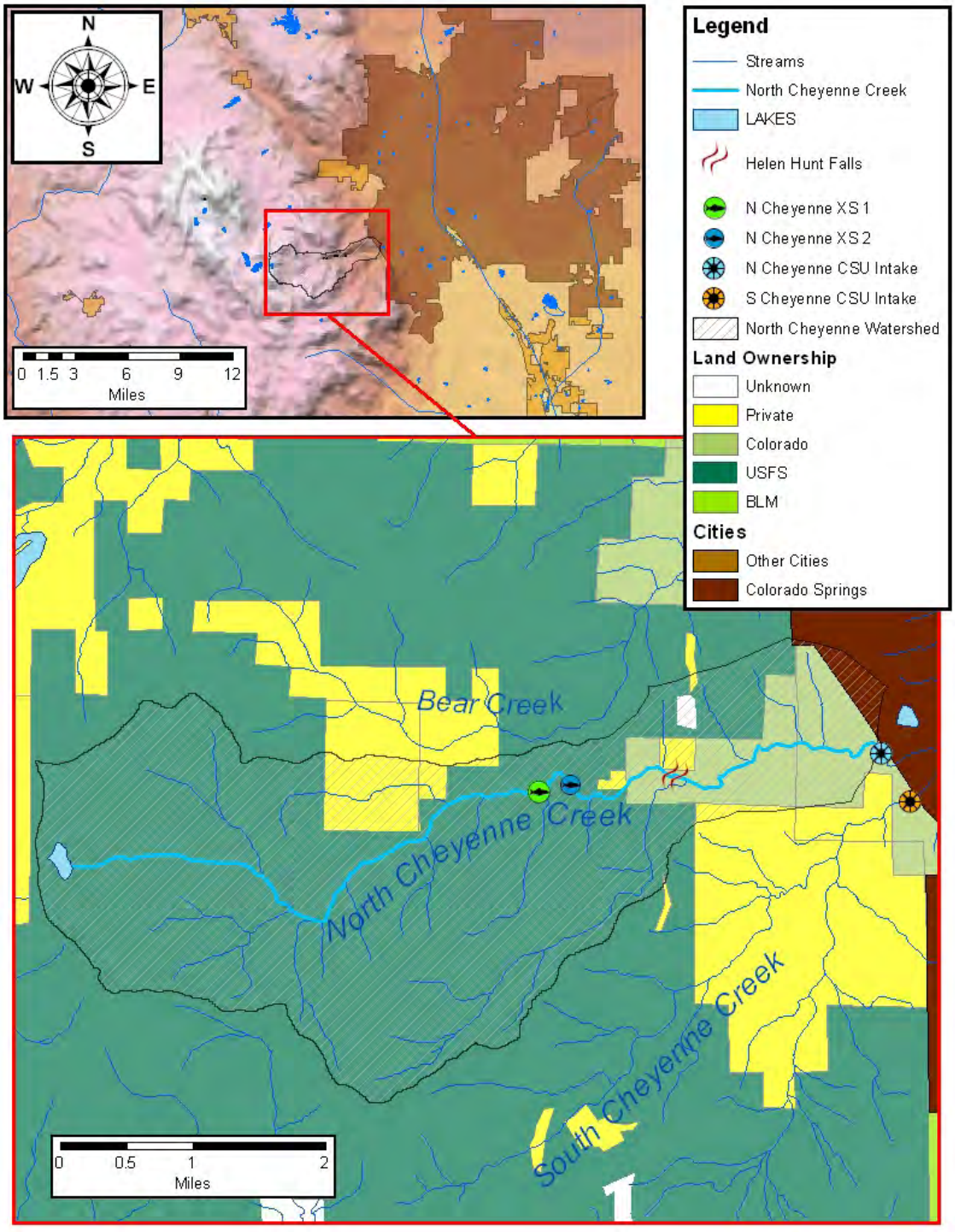


Fig 1. Map of Colorado Springs region with detail of North Cheyenne Creek watershed. The locations of the North Cheyenne Creek Pipeline, the Colorado Springs Utilities gage and withdrawal site, are shown as are the approximate locations of North Cheyenne Creek cross-sections. The proposed instream flow reach is shown in light blue.

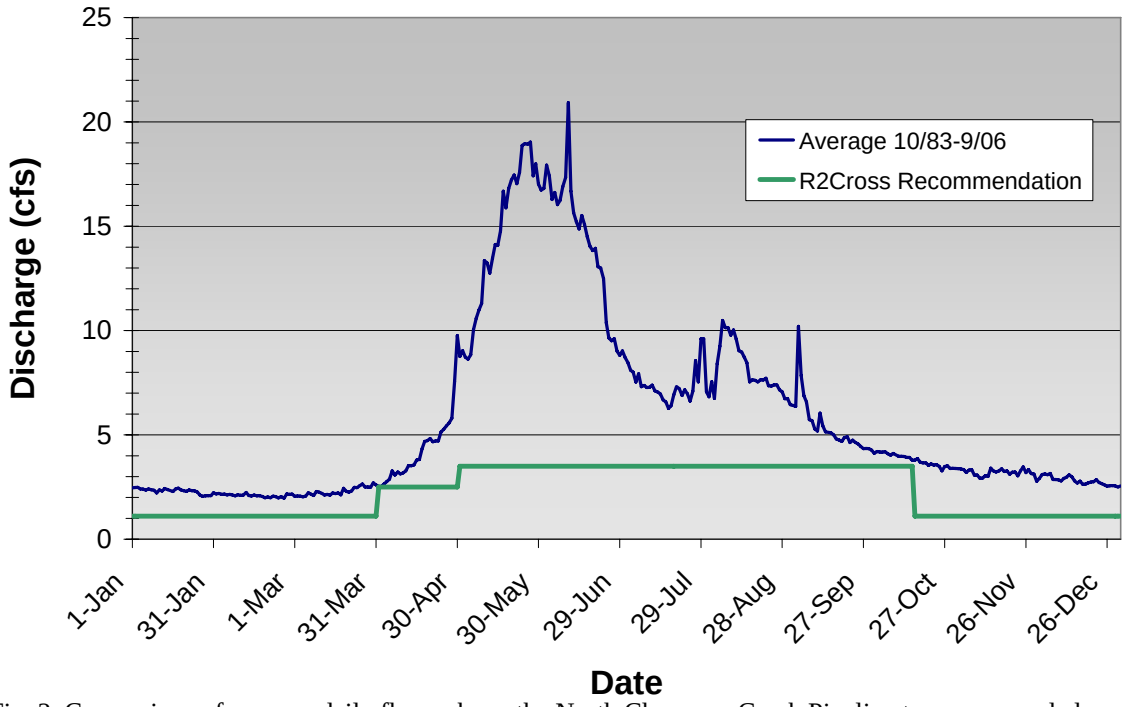


Fig. 2. Comparison of average daily flows above the North Cheyenne Creek Pipeline to recommended flows.

Table 1. Summary statistics of mean daily discharge through North Cheyenne Creek. For each month, the discharge that 50% of flows were equal to or greater than is highlighted. Green indicates early summer, yellow indicates summer and blue indicates winter months.

Station: N. Cheyenne Creek above CSU diversion
Prameter: Discahrge
Year: 10/1/83 - 9/30/06
State: Colorado
County: El Paso

ID: CSU gage 1117
Statistic: Mean Daily Discharge
Latitude: 38: 47: 28
Longitude: 104: 52: 25
Elevation: ~6280 ft
Drainage Area: 11.28 mi^2

Monthly Statistics

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
# days	713	645	707	688	705	683	711	701	687	671	670	709	**8290**
Avg Day	2.32	2.10	2.29	4.26	14.35	14.19	7.45	8.08	5.42	3.79	3.20	2.79	**5.85**
Max Day	5	4	6	67	76	149	64	50	106	8	12	13	**149**
Min Day	0.82	0.75	0.89	0.97	0.82	0.97	0.75	0.08	0.33	1.12	0.07	0.09	**0.07**
# months	23	21	23	22	23	22	23	23	22	22	22	23	**21**
Sdev Month	0.62	0.50	0.54	2.05	12.51	14.01	4.21	5.99	2.62	1.28	1.71	1.20	
Skew Month	0.60	0.96	0.90	0.75	1.12	1.95	1.20	1.66	0.77	0.22	3.31	2.84	
Min Month	1.08	1.35	1.48	1.72	1.44	1.25	1.22	0.98	1.55	1.56	1.40	1.24	
Max Month	4.02	3.37	3.41	8.77	40.83	55.62	19.68	25.74	11.25	6.27	10.35	7.50	
Percentiles*													
1%	4.68	3.77	5.11	13.54	67.07	67.07	26.90	36.09	12.38	7.22	10.80	7.72	47.28
5%	3.62	3.29	3.64	10.18	45.14	56.53	16.39	22.64	9.48	6.26	4.71	4.95	17.66
10%	3.18	2.86	3.32	8.30	31.35	30.77	13.54	15.55	8.13	5.39	4.31	3.68	11.63
20%	2.77	2.42	2.75	5.39	21.71	18.54	10.18	11.08	6.87	4.98	3.80	3.32	6.96
50%	2.27	2.02	2.11	3.09	10.53	8.71	6.26	5.82	4.84	3.80	3.09	2.64	**3.32**
80%	1.73	1.63	1.82	2.22	3.76	4.84	3.80	3.56	2.97	2.42	2.22	2.02	2.11
90%	1.54	1.46	1.54	1.92	2.11	2.75	2.75	2.86	2.53	2.22	1.82	1.63	1.73
95%	1.28	1.37	1.37	1.73	1.75	1.28	2.22	2.32	1.85	1.82	1.46	1.37	1.46
99%	0.97	1.04	1.12	1.37	1.28	1.04	0.97	0.82	0.97	1.46	1.12	1.04	1.04

* Percentiles estimate the value (discharge) in the record associated with a given percentile. They provide an estimate of the percentage of days on which a given flow is exceeded. Percentiles were calculated using the PERCENTILE function in MicroSoft Excel.

Local Precipitation Data for the period 1948 to 2006.

COLORADO SPRINGS WSO AP, COLORADO

Period of Record General Climate Summary - Precipitation

Station:(051778) COLORADO SPRINGS WSO AP														
From Year=1948 To Year=2006														
	Precipitation											Total Snowfall		
	Mean	High	Year	Low	Year	1 Day Max.		>= 0.01 in.	>= 0.10 in.	>= 0.50 in.	>= 1.00 in.	Mean	High	Year
	in.	in.	-	in.	-	in.	dd/yyyy or yyyymmdd	# Days	# Days	# Days	# Days	in.	in.	-
January	0.30	1.17	1987	0.00	1953	0.77	15/1987	4	1	0	0	5.1	28.7	1987
February	0.32	2.45	1987	0.00	1991	1.49	26/1987	4	1	0	0	4.7	23.2	1987
March	0.90	2.42	1998	0.01	1966	1.63	18/1998	7	3	0	0	8.7	23.2	1984
April	1.38	7.50	1999	0.01	1964	2.63	30/1999	8	3	1	0	6.5	42.7	1957
May	2.18	5.67	1957	0.33	1970	2.23	18/1955	10	5	1	0	1.3	19.4	1978
June	2.38	8.00	1965	0.13	1990	2.65	20/1970	10	5	1	0	0.0	1.1	1975
July	2.91	5.27	1968	0.67	1987	3.63	29/1997	13	7	2	0	0.0	0.0	1949
August	2.93	7.04	1999	0.15	1962	3.98	04/1999	12	6	2	0	0.0	0.2	1952
September	1.21	4.28	1976	0.00	1953	1.38	29/1959	7	3	1	0	0.9	27.9	1959
October	0.80	5.01	1984	0.01	1955	1.54	18/1960	5	2	0	0	3.1	25.9	1984
November	0.47	2.21	1957	0.00	1949	0.81	19/1979	4	1	0	0	5.2	26.3	1991
December	0.32	1.05	1988	0.00	1970	0.66	21/1981	4	1	0	0	5.1	18.2	1983
Annual	16.10	27.58	1999	7.85	2002	3.98	19990804	90	39	8	2	40.7	96.4	1957
Winter	0.94	3.90	1987	0.16	1997	1.49	19870226	13	3	0	0	15.0	56.3	1987
Spring	4.47	12.13	1957	1.41	1963	2.63	19990430	26	11	2	1	16.6	63.1	1957
Summer	8.22	16.85	1965	2.70	1964	3.98	19990804	35	18	5	1	0.0	1.1	1975
Fall	2.48	6.55	1972	0.54	1948	1.54	19601018	16	7	1	0	9.2	37.7	1959

Table updated on Jul 28, 2006
For monthly and annual means, thresholds, and sums:
Months with 5 or more missing days are not considered
Years with 1 or more missing months are not considered
Seasons are climatological not calendar seasons

Winter = Dec., Jan., and Feb. Spring = Mar., Apr., and May

Summer = Jun., Jul., and Aug. Fall = Sep., Oct., and Nov.

Western Regional Climate Center, wrcc@dri.edu

COLORADO SPRINGS WSO AP, COLORADO

Monthly Total Precipitation (inches)

(051778)

File last updated on Jul 24, 2006

*** Note *** Provisional Data *** After Year/Month 200603

a = 1 day missing, b = 2 days missing, c = 3 days, ..etc..,

z = 26 or more days missing, A = Accumulations present

Long-term means based on columns; thus, the monthly row may not sum (or average) to the long-term annual value.

MAXIMUM ALLOWABLE NUMBER OF MISSING DAYS : 5

Individual Months not used for annual or monthly statistics if more than 5 days are missing.

Individual Years not used for annual statistics if any month in that year has more than 5 days missing.

YEAR(S)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1948	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	4.62	0.40	0.12	0.02	0.29	5.45
1949	0.32	0.13	0.67	0.68	1.14	4.22	3.59	0.54	0.26	0.98	0.00	0.08	12.61
1950	0.32	0.03	0.33	0.42	1.00	1.59	4.50	0.84	2.82	0.12	0.14	0.06	12.17
1951	0.59	0.22	0.36	0.31	1.54	1.38	4.42	4.31	0.85	1.52	0.53	0.11	16.14
1952	0.04	0.10	1.13	1.36	2.21	0.37	1.19	3.79	0.37	0.04	0.23	0.13	10.96
1953	0.00	0.13	0.21	1.58	1.33	1.30	2.19	1.88	0.00	0.74	0.57	0.23	10.16
1954	0.22	0.06	0.59	0.62	2.57	3.69	3.13	1.98	1.91	0.22	0.23	0.21	15.43
1955	0.29	0.57	0.32	0.33	4.88	0.43	2.34	2.46	1.35	0.01	0.30	0.08	13.36
1956	1.12	0.19	0.84	1.10	0.88	0.41	3.03	1.42	0.59	0.14	0.91	0.30	10.93
1957	0.45	0.48	0.56	5.90	5.67	1.08	3.65	1.78	1.25	2.02	2.21	0.02	25.07
1958	0.09	0.28	1.29	0.99	4.79	3.01	4.42	1.20	1.38	0.58	0.22	0.20	18.45
1959	0.43	0.47	1.19	2.03	3.48	1.61	0.94	2.63	3.58	0.97	0.05	0.03	17.41
1960	0.11	0.73	0.95	0.59	1.61	0.93	2.22	0.78	0.61	1.97	0.23	0.54	11.27
1961	0.14	0.65	1.21	0.56	0.84	3.86	2.14	2.26	1.91	0.98	0.44	0.43	15.42
1962	0.42	0.34	0.88	0.44	0.63	3.36	1.60	0.15	0.41	0.97	0.89	0.03	10.12
1963	0.53	0.20	0.62	0.02	0.77	1.22	1.35	5.22	1.84	0.39	0.46	0.62	13.24
1964	0.00	0.22	1.08	0.01	2.54	0.96	1.14	0.60	1.33	0.03	0.46	0.22	8.59
1965	0.14	0.72	1.12	1.61	1.81	8.00	5.02	3.83	2.24	0.49	0.00	0.45	25.43
1966	0.39	0.49	0.01	0.79	0.95	2.56	2.91	2.00	2.12	0.36	0.16	0.17	12.91
1967	0.31	0.15	0.18	2.04	2.18	2.74	5.26	3.09	0.73	1.68	0.25	0.67	19.28
1968	0.10	0.22	0.37	0.54	0.62	0.15	5.27	2.12	1.03	0.43	1.32	0.24	12.41
1969	0.11	0.12	0.77	1.83	4.46	2.72	3.90	2.38	1.13	2.86	0.39	0.32	20.99
1970	0.05	0.17	1.06	0.91	0.33	3.63	3.79	4.24	1.09	0.95	0.27	0.00	16.49
1971	0.34	0.53	0.34	1.36	2.24	0.39	2.82	1.99	1.36	0.23	0.03	0.23	11.86
1972	0.27	0.25	0.55	0.42	1.46	2.07	4.08	3.55	4.13	1.34	1.08	0.83	20.03
1973	0.06	0.06	1.16	1.72	4.27	0.47	3.31	0.89	1.03	0.35	0.15	0.64	14.11
1974	0.26	0.18	0.52	1.92	0.33	1.29	1.42	1.14	0.43	1.36	0.23	0.42	9.50
1975	0.13	0.29	0.24	0.68	1.00	2.97	2.65	2.06	0.16	0.52	1.00	0.07	11.77
1976	0.32	0.23	0.63	1.63	2.09	2.46	1.75	5.94	4.28	0.49	0.40	0.12	20.34
1977	0.29	0.20	1.18	2.57	1.12	3.87	3.02	5.11	0.45	0.19	0.60	0.18	18.78
1978	0.25	0.38	0.40	1.15	3.58	0.54	2.14	2.51	0.05	0.90	0.37	1.01	13.28
1979	0.53	0.04	2.38	1.83	3.13	1.58	2.73	2.50	0.92	0.55	1.82	1.02	19.03
1980	0.25	0.54	1.30	3.64	4.99	1.60	1.69	4.59	0.65	0.01	0.35	0.05	19.66
1981	0.07	0.12	0.93	0.13	3.14	1.98	3.64	5.24	0.52	0.37	0.03	0.82	16.99
1982	0.25	0.27	0.73	0.76	3.07	3.81	3.64	5.37	3.02	0.22	0.10	0.70	21.94
1983	0.43	0.09	1.79	0.97	3.08	2.41	0.99	2.59	0.37	0.28	1.09	0.70	14.79
1984	0.32	0.09	1.93	1.66	0.74	1.54	3.97	4.03	0.93	5.01	0.14	0.64	21.00
1985	0.42	0.24	1.68	2.07	3.36	0.78	4.92	1.56	1.49	0.52	0.42	0.55	18.01
1986	0.01	0.30	0.31	0.65	1.89	2.47	1.63	6.06	0.61	1.41	0.64	0.28	16.26
1987	1.17	2.45	1.79	0.50	3.82	2.89	0.67	2.77	0.55	0.54	0.44	0.64	18.23
1988	0.43	0.68	0.90	0.27	1.01	1.69	2.07	2.88	1.19	0.08	0.36	1.05	12.61
1989	0.23	1.23	0.49	1.06	1.11	3.42	2.26	2.63	2.30	0.28	0.02	0.41	15.44
1990	0.53	0.59	1.77	2.04	3.90	0.13	5.13	1.45	1.50	1.46	0.30	0.27	19.07
1991	0.09	0.00	0.42	1.76	0.80	3.07	2.87	4.57	0.56	0.88	2.05	0.45	17.52
1992	0.06	0.02	2.36	0.92	2.07	3.91	0.76	3.37	0.13	0.30	0.75	0.11	14.76
1993	0.52	0.21	0.79	1.02	1.60	1.27	2.38	2.17	1.44	0.90	0.97	0.11	13.38

YEAR(S)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1994	0.18	0.28	0.77 a	1.54	4.10	4.34	1.29	3.92	1.54	2.68	0.36	0.18 a	21.18
1995	0.00 b	0.21	0.71 a	3.05	4.82	7.79	2.02	1.77	1.87	0.02	0.00	0.00	22.26
1996	0.16	0.34	0.82	0.39	2.22	1.58	4.46	3.46	2.04	0.89	0.17	0.04	16.57
1997	0.11	0.01	0.34	3.30	1.16	5.44	4.63	4.70	1.78	0.98	0.22	0.10	22.77
1998	0.03	0.34	2.42	1.38	0.72	1.27	5.26	2.75	0.51	0.93	0.44	0.15	16.20
1999	0.12	0.05	0.41	7.50	3.57	1.36	4.70	7.04	0.52	1.10	1.01	0.20	27.58
2000	0.68	0.23	1.97	0.62	1.27	1.73	2.72	5.82	0.55	0.86	0.19	0.25	16.89
2001	0.82	0.26	1.38	0.98	3.21	2.14	3.25	1.47	1.01	0.02	0.37	0.09	15.00
2002	0.25	0.11	0.29	0.02	1.12	1.17	1.62	0.43	1.31	1.33	0.09	0.11	7.85
2003	0.03	0.63	1.02	0.97	0.90	5.07	1.14	1.89	0.58	0.09	0.04	0.06	12.42
2004	0.52	0.39	0.38	2.68	0.61	6.01	4.13	4.84	0.50	0.18	0.65	0.24	21.13
2005	0.78	0.04	1.03	1.08	0.73	2.10	1.91	2.65	0.68	0.48	0.08	0.30	11.86
2006	0.24	0.04	0.24	0.09	0.85	0.83	3.96 j	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	2.29
Period of Record Statistics													
MEAN	0.30	0.32	0.90	1.36	2.16	2.36	2.91	2.93	1.21	0.80	0.47	0.32	16.12
S.D.	0.26	0.37	0.59	1.32	1.44	1.74	1.34	1.64	0.95	0.86	0.49	0.28	4.44
SKEW	1.41	3.69	0.93	2.55	0.69	1.29	0.18	0.45	1.42	2.52	1.84	1.05	0.38
MAX	1.17	2.45	2.42	7.50	5.67	8.00	5.27	7.04	4.28	5.01	2.21	1.05	27.58
MIN	0.00	0.00	0.01	0.01	0.33	0.13	0.67	0.15	0.00	0.01	0.00	0.00	7.85
NO YRS	58	58	58	58	58	58	57	58	58	58	58	58	57

http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?cocspr

APPENDIX – D

Diversion Records

The North Cheyenne Pipeline lies just below the proposed reach. This structure is operated by Colorado Springs Utilities in tandem with the South Cheyenne Pipeline. Colorado Springs Utilities has been kept informed of this instream flow proposal. The terminus for the protected reach has been located above their intakes to ensure there will be no conflicts with their water rights.

For reference, copies of the Structure Summary Reports and Water Rights Reports associated with these two structures have been attached.

Structure Summary Report

State of Colorado

HydroBase

Structure Name: NORTH CHEYENNE PIPELINE **Water District:** 10 **Structure ID Number:** 608

Source: N FORK CHEYENNE CREEK

Location:	Q10	Q40	Q160	Section	Twnshp	Range	PM
		SE	NE	34	14S	67W	S

Distance From Section From N/S Line: From E/W Line:

UTM Coordinates (NAD 83): Northing (UTM 4293509 Easting (UTM x): 511216.4 Spotted from PLSS distances from section lines

Latitude/Longitude (decimal degrees): 38.790251 -104.870848

Water Rights Summary:						
Total Decreed Rate(s) (CFS):	Absolute: 0.9000	Conditional: 0.0000	AP/EX: 0.0000
Total Decreed Volume(s) (AF):	Absolute: 0.0000	Conditional: 0.0000	AP/EX: 0.0000

Water Rights -- Transactions

Case Number	Adjudication Date	Appropriation Date	Administration Number	Order Number	Priority Number	Decreed Amount	Adjudication Type	Uses	Action Comment
CA13801	1882-02-15	1860-09-01	3897.00000	0		1.9000 C	O,TF	1	TT MESA PIPELINE (CHEYENNE DITCH RT) LTD 378
CA16307	1882-02-15	1860-09-01	3897.00000	0		1.9000 C	O,TT	1	TF CHEYENNE DITCH; LTD 378 AF/YR (AKA MESA
CA13801	1882-02-15	1862-12-31	4748.00000	0		1.2500 C	O,TF	1	TT MESA PIPELINE (CHEYENNE DITCH ENL RT) LTD
CA16307	1882-02-15	1862-12-31	4748.00000	0		1.2500 C	O,TT	1	TF CHEYENNE DITCH ENL; LTD 252 AF/YR (AKA?
CA13801	1882-02-15	1872-06-21	8208.00000	0		0.9000 C	O,TF	1	TT MESA PIPELINE (HARLAN RT) LTD 427 AF/YR
CA16306	1882-02-15	1872-06-21	8208.00000	0		0.9000 C	O,TT	1	TF HARLAN DITCH LTD 427 AF/YR (AKA? MESA P/L ID
CA10146	1919-06-02	1890-03-01	14670.00000	0	151	0.9000 C	S	1	ORIGINAL RIGHT LTD 320 AF/YR LOCATION FROM

Water Rights -- Net Amounts

Adjudication Date	Appropriation Date	Administration Number	Order Number	Priority/Case Number	Rate (CFS) Absolute	Rate (CFS) Conditional	Rate (CFS) AP/EX	Volume (Acre-Feet) Absolute	Volume (Acre-Feet) Conditional	Volume (Acre-Feet) AP/EX
1919-06-02	1890-03-01	14670.00000	0	151	0.9000	0	0	0	0	0

Irrigated Acres Summary -- Totals From Various Sources

GIS Total (Acres): Reported:

Diversion Comments Total (Acres): 0 Reported: 2005

Structure Total (Acres): 0 Reported:

Irrigated Acres From GIS Data

Year	Land Use	Acres Flood	Acres Furrow	Acres Sprinkler	Acres Drip	Acres	Acres Total

No data available for this report

Diversion Summary in Acre-Feet - Total Water Through Structure

Year	FDU	LDU	DWC	Maxq & Day	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Total
1950	1950-05-03	1950-10-31	182	6 07-28	0	0	0	0	0	0	143	123	145	230	139	135	915
1954 *					99	86	77	62	72	90	122	110	135	152	128	132	1267
			Minimum	6	0	0	0	0	0	0	122	110	135	152	128	132	915
			Maximum:	6	99	86	77	62	72	90	143	123	145	230	139	135	1267
			Average	6	49	43	39	31	36	45	133	117	140	191	133	134	1091

2.00 years with diversion records

Notes: The average considers all years with diversion records, even if no water is diverted.

The above summary lists total monthly diversions.

* = Infrequent Diversion Record. All other values are derived from daily records.

Average values include infrequent data if infrequent data are the only data for the year.

Diversion Comments

IYR	NUC Code	Acres Irrigated	Comment
1950		96012	FROM MESA RESERVOIR TRANS. FROM PRIORITIES 1-3-4 ON CHEYENNE CRK.
1966			
1967			
1969			
1974			THIS IS PART OF MESA P L
1975			THIS IS COVERED BY MESA P/L 609 THIS IS COVERED BY MESA P/L (609)
1977			NOT KNOWN UNABLE TO LOCATE
1978			NOT LISTED-UNABLE TO LOCATE
1990		0	USE SHOWN UNDER S. CHEYENE CRK PL
1991		0	USE SHOWN UNDER S. CHEYENE CRK PL
1999		0	MUNICIPAL, CITY OF COLORADO SPRINGS. REPORTED UNDR ID 537, SOUTH CHEYENNE CREEK PIPELINE
2000		0	MUNICIPAL, CITY OF COLORADO SPRINGS. REPORTED UNDR ID 537, SOUTH CHEYENNE CREEK PIPELINE
2001		0	MUNICIPAL, CITY OF COLORADO SPRINGS. REPORTED UNDR ID 537, SOUTH CHEYENNE CREEK PIPELINE
2002		0	MUNICIPAL, CITY OF COLORADO SPRINGS. REPORTED UNDR ID 537, SOUTH CHEYENNE CREEK PIPELINE
2003		0	MUNICIPAL, CITY OF COLORADO SPRINGS. REPORTED UNDR ID 537, SOUTH CHEYENNE CREEK PIPELINE
2004		0	MUNICIPAL, CITY OF COLORADO SPRINGS. REPORTED UNDR ID 537, SOUTH CHEYENNE CREEK PIPELINE
2005		0	MUNICIPAL, CITY OF COLORADO SPRINGS. REPORTED UNDR ID 537, SOUTH CHEYENNE CREEK PIPELINE

Note: Diversion comments and reservoir comments may be shown for a structure, if both are available.

Structure Summary Report

State of Colorado

HydroBase

Structure Name: SOUTH CHEYENNE PIPELINE **Water District:** 10 **Structure ID Number:** 537

Source: S FORK CHEYENNE CREEK

Location:	Q10	Q40	Q160	Section	Twnshp	Range	PM
		NE	SE	34	14S	67W	S

Distance From Section From N/S Line: From E/W Line:

UTM Coordinates (NAD 83): Northing (UTM 4293109 Easting (UTM x): 511217.4 Spotted from PLSS distances from section lines

Latitude/Longitude (decimal degrees): 38.786647 -104.870842

Water Rights Summary:						
Total Decreed Rate(s) (CFS):	Absolute:	23.8500	Conditional:	0.0000	AP/EX:	0.0000
Total Decreed Volume(s) (AF):	Absolute:	0.0000	Conditional:	0.0000	AP/EX:	0.0000

Water Rights -- Transactions

Case Number	Adjudication Date	Appropriation Date	Administration Number	Order Number	Priority Number	Decreed Amount	Adjudication Type	Uses	Action Comment
CA16307	1882-02-15	1860-09-01	3897.00000	0		1.2500 C	O,TT	28	TF CHEYENNE DITCH LTD 252 AF/YR
CA13801	1882-02-15	1861-09-21	4282.00000	0		3.0000 C	O,TT	28	TF LOWRY DITCH
CA16307	1882-02-15	1862-12-31	4748.00000	0		0.8500 C	O,TT	28	TF CHEYENNE DITCH; LTD 168 AF/YR
CA13801	1882-02-15	1863-03-01	4808.00000	0		6.3500 C	O,TT	28	TF HARRIS DITCH
CA13801	1882-02-15	1863-03-21	4828.00000	0		6.0000 C	O,TT	28	TF WOLF DITCH
CA13801	1882-02-15	1863-12-31	5113.00000	0		3.0000 C	O,TT	28	TF LOWRY DITCH ENLARGEMENT
CA16305	1882-02-15	1865-09-21	5743.00000	0		1.5500 C	O,TT	28	TF DIXON DITCH; LTD 450 AF/YR
CA16306	1882-02-15	1872-06-21	8208.00000	0		0.6000 C	O,TT	28	TF HARLAN DITCH; LTD 285 AF/YR
CA10146	1919-06-02	1898-05-10	17662.00000	0	161	1.2500 C	S	1	ORIGINAL RIGHT LTD 400 AF/YR

Water Rights -- Net Amounts

Adjudication Date	Appropriation Date	Administration Number	Order Number	Priority/Case Number	Rate (CFS)			Volume (Acre-Feet)		
					Absolute	Conditional	AP/EX	Absolute	Conditional	AP/EX
1882-02-15	1865-09-21	5743.00000	0	CA16305	1.5500	0	0	0	0	0
1882-02-15	1872-06-21	8208.00000	0	CA16306	0.6000	0	0	0	0	0
1919-06-02	1898-05-10	17662.00000	0	161	1.2500	0	0	0	0	0
1882-02-15	1863-03-01	4808.00000	0	CA13801	6.3500	0	0	0	0	0
1882-02-15	1863-03-21	4828.00000	0	CA13801	6.0000	0	0	0	0	0
1882-02-15	1863-12-31	5113.00000	0	CA13801	3.0000	0	0	0	0	0
1882-02-15	1860-09-01	3897.00000	0	CA16307	1.2500	0	0	0	0	0
1882-02-15	1861-09-21	4282.00000	0	CA13801	3.0000	0	0	0	0	0
1882-02-15	1862-12-31	4748.00000	0	CA16307	0.8500	0	0	0	0	0

Irrigated Acres Summary -- Totals From Various Sources

GIS Total (Acres):		Reported:	
Diversion Comments Total (Acres):	0	Reported:	2005
Structure Total (Acres):	0	Reported:	

Irrigated Acres From GIS Data

Year	Land Use	Acres Flood	Acres Furrow	Acres Sprinkler	Acres Drip	Acres	Acres Total

No data available for this report

Diversion Summary in Acre-Feet - Total Water Through Structure

Year	FDU	LDU	DWC	Maxq & Day	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Total
1934	1934-01-03	1934-10-31	280	3 04-27	0	0	82	52	44	81	132	60	28	20	20	20	538
1935	1935-01-25	1935-10-31	262	3 05-21	0	0	9	36	40	39	105	166	43	66	55	52	611
1936	1935-11-05	1936-10-31	309	3 05-25	16	0	52	66	55	69	100	75	25	117	104	104	784
1937	1937-03-08	1937-10-31	238	5 04-12	0	0	0	0	42	197	152	66	44	42	41	26	609
1938	1938-01-08	1938-10-31	297	9 05-13	0	0	21	23	30	109	387	142	90	56	172	268	1299
1939	1939-03-01	1939-10-31	241	5 04-24	0	0	0	0	135	202	183	112	57	59	49	64	861
1940	1940-03-04	1940-10-31	208	4 04-27	0	0	0	0	84	161	205	58	97	63	62	82	812
1941	1940-11-01	1941-10-24	243	6 08-02	24	0	56	65	87	137	61	159	247	219	122	117	1295
1942	1941-11-02	1942-10-31	62	10 10-17	21	0	0	0	21	47	20	97	0	0	0	243	449
1943	1942-11-01	1943-10-31	170	8 08-08	36	0	0	0	23	145	136	90	136	84	41	73	762
1944	1943-11-01	1944-10-31	174	7 06-03	22	0	0	0	0	89	82	260	133	130	65	88	869
1945	1944-11-01	1945-10-31	207	6 08-02	24	0	0	0	62	133	143	141	115	72	146	101	937
1946	1945-11-01	1946-10-18	188	3 09-03	25	0	0	0	57	41	71	83	71	43	75	32	499
1947	1947-04-19	1947-10-31	98	16 06-12	0	0	0	0	0	104	166	111	80	214	161	21	856
1948	1947-11-01	1948-10-31	146	9 05-03	17	0	0	0	0	174	390	0	88	113	35	59	876
1949	1948-11-01	1949-10-31	130	3 07-08	7	0	0	0	40	70	90	9	24	34	51	77	403
1950	1950-02-18	1950-10-31	241	2 10-13	0	0	0	9	22	17	70	44	70	94	84	100	510
1951	1950-11-06	1951-10-31	217	8 05-21	12	0	0	0	0	91	177	135	83	174	90	72	834
1954 *					57	59	55	46	52	55	63	32	64	43	28	29	584
1959	1959-05-22	1959-10-06	110	7 05-26	0	0	0	0	0	0	82	97	43	75	44	45	385
1960	1960-06-26	1960-10-31	122	2 10-18	0	0	0	0	0	0	0	12	53	31	27	51	173
1961	1960-11-01	1961-10-31	277	16 08-17	43	42	49	20	33	67	133	73	73	352	41	48	974
1962	1961-11-01	1962-10-26	232	5 04-30	95	77	0	0	0	24	162	35	65	30	32	21	541
1963	1962-11-01	1963-10-31	299	4 08-09	44	45	15	16	29	66	37	23	18	70	159	77	598
1964	1963-11-01	1964-10-31	321	7 06-08	61	26	59	8	72	143	110	83	49	40	12	30	693
1965	1964-11-01	1965-07-21	234	5 05-14	29	40	30	35	40	127	131	89	87	0	0	0	608
1966	1965-11-25	1966-09-30	272	3 09-29	3	30	26	57	91	111	132	54	47	31	58	0	640
1967	1966-11-01	1967-10-09	225	9 06-05	58	50	63	52	53	94	71	53	0	12	5	14	526
1968	1967-11-13	1968-10-31	70	2 04-22	19	0	21	32	0	49	14	12	8	0	0	15	170
1969	1968-11-04	1969-10-19	173	5 10-15	48	45	58	56	53	60	10	0	0	26	7	38	401
1970	1969-12-08	1970-05-31	120	2 12-08	0	79	72	67	66	0	21	0	0	0	0	0	306
1971	1970-11-04	1971-10-24	66	1 06-27	11	0	0	2	6	4	6	19	0	2	4	14	67
1972	1971-12-15	1972-10-31	273	4 09-05	0	37	60	54	61	68	81	62	43	40	98	3	606
1973	1972-11-01	1973-10-14	180	2 04-09	59	58	53	53	60	52	0	32	0	0	0	12	378
1974	1973-11-12	1974-10-27	224	3 10-14	11	0	0	0	23	68	34	62	48	42	49	86	423
1975	1974-12-23	1975-10-31	237	3 04-28	0	7	34	51	86	37	114	10	153	114	32	21	658
1976	1975-11-01	1976-10-31	331	7 08-02	25	21	50	69	58	40	90	61	31	110	28	18	602
1977	1976-11-29	1977-10-31	323	4 05-23	4	60	52	43	42	40	170	58	76	137	60	35	777
1978	1977-11-01	1978-10-31	288	2 05-15	44	42	39	41	58	62	90	78	32	14	0	20	521
1979	1978-11-01	1979-10-31	267	5 04-16	35	50	54	47	75	106	0	0	117	59	68	63	675
1980	1979-11-01	1980-10-31	310	4 06-30	71	77	63	66	86	66	0	100	189	79	65	38	900
1981	1980-11-01	1981-10-11	282	6 06-08	28	34	25	19	41	35	29	122	52	22	21	15	442
1982	1981-12-21	1982-10-31	112	8 08-02	0	3	4	6	9	0	0	33	67	119	0	8	250
1983	1982-11-01	1983-07-24	189	9 05-16	12	12	36	46	36	10	153	103	47	0	0	0	455
1984	1983-11-14	1984-10-07	168	5 05-07	6	23	11	9	8	53	89	10	0	0	0	4	214
1985	1985-03-25	1985-09-10	65	2 07-01	0	0	0	0	26	30	0	52	72	0	38	0	219
1986	1985-11-04	1986-10-26	315	2 11-04	61	29	65	40	58	79	86	15	50	74	31	13	602
1987	1986-11-03	1987-10-31	314	6 06-01	45	55	117	46	51	71	29	178	112	99	87	69	958
1988	1987-11-01	1988-10-31	297	3 02-29	65	29	0	105	153	123	127	44	50	39	33	23	791
1989	1988-11-01	1989-10-31	353	2 06-18	30	41	55	43	82	68	102	86	23	48	28	29	634
1990 *					140	127	136	118	148	204	363	545	465	476	295	128	3144
1991	1990-11-01	1991-10-30	312	20 08-18	113	176	213	168	134	182	316	302	350	320	270	168	2713
1992	1991-11-02	1992-10-31	345	21 04-23	126	222	243	234	253	291	288	368	529	314	358	272	3496

1993	1992-11-01	1993-10-31	351	12	06-01	207	253	228	139	236	328	444	461	242	200	181	92	3010
1994	1993-11-02	1994-10-25	211	30	05-22	24	25	9	30	24	32	273	235	57	61	23	36	830
1995	1994-11-11	1995-10-31	233	7	06-02	25	22	40	23	10	49	29	56	21	32	25	30	362
1996	1995-11-01	1996-10-29	280	6	07-07	17	32	52	31	38	24	17	46	29	56	35	44	421
1997	1996-11-07	1997-10-31	232	58		28	26	18	7	16	39	50	269	101	37	41	16	648
1998	1997-11-01	1998-10-31	199	24	05-19	1	21	5	0	64	15	205	92	55	46	27	17	548
1999	1998-11-01	1999-10-31	299	25		8	39	49	36	61	117	117	247	359	1037	367	323	2761
2000	1999-11-01	2000-10-31	361	32	07-20	138	161	187	218	290	328	599	412	362	270	231	216	3411
2001	2000-11-01	2001-10-31	361	12	07-23	165	170	159	123	178	197	369	325	224	188	154	164	2416
2002	2001-11-01	2002-10-31	361	10	01-02	140	70	83	52	61	54	80	51	84	50	96	73	893
2003	2002-11-01	2003-10-31	355	14	06-05	51	70	70	93	190	314	234	365	288	222	149	109	2155
2004	2003-11-01	2004-10-31	318	10	05-03	99	98	84	80	104	147	172	200	152	109	150	109	1502
2005	2004-11-01	2005-10-31	303	7	05-16	125	72	97	86	89	61	68	63	206	146	126	115	1255
		Minimum	1			0	0	0	0	0	0	0	0	0	0	0	0	67
		Maximum:	58			207	253	243	234	290	328	599	545	529	1037	367	323	3496
		Average	8			39	40	46	43	63	92	128	114	100	104	75	66	911

66.00 years with diversion records

Notes: The average considers all years with diversion records, even if no water is diverted.

The above summary lists total monthly diversions.

* = Infrequent Diversion Record. All other values are derived from daily records.

Average values include infrequent data if infrequent data are the only data for the year.

Diversion Comments

IYR	NUC Code	Acres Irrigated	Comment
1950		53392	WATER USED FOR DOMESTIC PURPOSES NO WATER USED BALANCE OF YR.
1953		0	
1959		0	
1960		160	
1961		160	
1963		0	DOM
1964		0	DOM
1965			DOM
1966			DOM
1967			DOM
1968			DOM
1969			DOM
1970		0	DOM
1971			DOM
1972		0	DOM
1974			DOMESTIC DUPLICATE
1975			MUNICIPAL
1976			MUNICIPAL
1978			MUNICIPAL
1979			MUNICIPAL
1980			MUNICIPAL
1981			MUNICIPAL
1982			MUNICIPAL
1988		0	
1989		0	MUNICIPAL, CITY OF COLORADO SPRINGS
1990		0	MUNICIPAL, CITY OF COLORADO SPRINGS
1991		0	MUNICIPAL, CITY OF COLORADO SPRINGS; USE SHOWN FOR BOTH N & S CHEYENE CRK DIVERSIONS
1992		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
1993		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
1994		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
1995		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
1996		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
1997		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
1998		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
1999		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
2000		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
2001		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
2002		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
2003		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
2004		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS
2005		0	MUNICIPAL, CITY OF COLORADO SPRINGS; INCLUDES BOTH NORTH & SOUTH CHEYENE CREEK DIVERSIONS

Note: Diversion comments and reservoir comments may be shown for a structure, if both are available.

Water Rights Report by Structure Name

State of Colorado

HydroBase

WD	ID	Water Right Name	Struct Type	Stream Information #	Stream Information Name	Cty	Legal Location Q10 Q40 Q160 sec ts rng pm	Use	Decreed Amt	U	Adj. Type	Adj. Date	Padj Date	Apro Date	Admin No	O #	Priority No.	Court Case	Seq #	P/A	Alter ID	Comment
10	608	NORTH CHEYENNE PIPELINE	7	36	N FORK CHEYENNE	ELP	SE NE 34 14 S 67 W S	1	1.9000	A	O,TT	1882-02-15		1860-09-01	3897.00000	0		CA16307				TF CHEYENNE DITCH; LTD 378 AF/YR (AKA MESA P/L? ID 609)
10	608	NORTH CHEYENNE PIPELINE	7	36	N FORK CHEYENNE	ELP	SE NE 34 14 S 67 W S	1	1.9000	A	O,TF	1882-02-15		1860-09-01	3897.00000	0		CA13801				TT MESA PIPELINE (CHEYENNE DITCH RT) LTD 378 AF/YR
10	608	NORTH CHEYENNE PIPELINE	7	36	N FORK CHEYENNE	ELP	SE NE 34 14 S 67 W S	1	1.2500	A	O,TT	1882-02-15		1862-12-31	4748.00000	0		CA16307				TF CHEYENNE DITCH ENL; LTD 252 AF/YR (AKA? MESA P/L ID 609)
10	608	NORTH CHEYENNE PIPELINE	7	36	N FORK CHEYENNE	ELP	SE NE 34 14 S 67 W S	1	1.2500	A	O,TF	1882-02-15		1862-12-31	4748.00000	0		CA13801				TT MESA PIPELINE (CHEYENNE DITCH ENL RT) LTD 252 AF/YR
10	608	NORTH CHEYENNE PIPELINE	7	36	N FORK CHEYENNE	ELP	SE NE 34 14 S 67 W S	1	0.9000	A	O,TF	1882-02-15		1872-06-21	8208.00000	0		CA13801				TT MESA PIPELINE (HARLAN RT) LTD 427 AF/YR
10	608	NORTH CHEYENNE PIPELINE	7	36	N FORK CHEYENNE	ELP	SE NE 34 14 S 67 W S	1	0.9000	A	O,TT	1882-02-15		1872-06-21	8208.00000	0		CA16306				TF HARLAN DITCH LTD 427 AF/YR (AKA? MESA P/L ID 609)
10	608	NORTH CHEYENNE PIPELINE	7	36	N FORK CHEYENNE	ELP	SE NE 34 14 S 67 W S	1	0.9000	A	S	1919-06-02	1883-04-12	1890-03-01	14670.00000	0	151	CA10146				ORIGINAL RIGHT LTD 320 AF/YR LOCATION FROM CA16307 (AKA MESA P/)

Explanation of Codes:

Struct Type: 0 - other, 1 - ditch, 2 - well, 3 - reservoir, 4 - spring, 5 - seep, 6 - mine, 7 - pipeline, 8 - pump, 9 - power plant

Use Codes: 0 - storage, 1 - irrigation, 2 - municipal, 3 - commercial, 4 - industrial, 5 - recreation, 6 - fishery, 7 - fire, 8 - domestic, 9 - stock, A - augmentation, B - export from basin, C - cumulative accretion to river, D - cumulative depletion from river, E - evaporation, F - federal reserve, G - geothermal, H - household use only, K - snow making, M - minimum streamflow, N - net effect of river, P - power generation, Q - other, R - recharge, S - export from state, T - transmountain export, W - wildlife, X - all beneficial use

Adj Type: AB - abandoned, AP - alternate point, C - conditional, CA - conditional made absolute, EX - exchange, O - original, S - supplemental, TF - transfer from, TT - transfer to

Admin Number is a number developed by DWR to provide a simple and efficient method of ranking decrees in order of seniority.

Water Rights Report by Structure Name

State of Colorado

HydroBase

WD	ID	Water Right Name	Struct Type	Stream Information #	Stream Information Name	Cty	Legal Location Q10 Q40 Q160 sec ts rng pm	Use	Decreed Amt	U	Adj. Type	Adj. Date	Padj Date	Apro Date	Admin No	O #	Priority No.	Court Case	Seq #	P/A	Alter ID	Comment
10	8098	COTTAGE CORP WELL NO 1	2	150	EXEMPT WELLS	ELP	NE SE 34 14 S 67 W S	8	0.0330	A	O	1971-12-31		1930-12-31	29584.00000	0		W0497				49795 15 GPM DOMESTIC
10	537	SOUTH CHEYENNE PIPELINE	7	52	S FORK CHEYENNE	ELP	NE SE 34 14 S 67 W S	28	1.2500	A	O,TT	1882-02-15		1860-09-01	3897.00000	0		CA16307				TF CHEYENNE DITCH LTD 252 AF/YR
10	537	SOUTH CHEYENNE PIPELINE	7	52	S FORK CHEYENNE	ELP	NE SE 34 14 S 67 W S	28	3.0000	A	O,TT	1882-02-15		1861-09-21	4282.00000	0		CA13801				TF LOWRY DITCH
10	537	SOUTH CHEYENNE PIPELINE	7	52	S FORK CHEYENNE	ELP	NE SE 34 14 S 67 W S	28	0.8500	A	O,TT	1882-02-15		1862-12-31	4748.00000	0		CA16307				TF CHEYENNE DITCH; LTD 168 AF/YR
10	537	SOUTH CHEYENNE PIPELINE	7	52	S FORK CHEYENNE	ELP	NE SE 34 14 S 67 W S	28	6.3500	A	O,TT	1882-02-15		1863-03-01	4808.00000	0		CA13801				TF HARRIS DITCH
10	537	SOUTH CHEYENNE PIPELINE	7	52	S FORK CHEYENNE	ELP	NE SE 34 14 S 67 W S	28	6.0000	A	O,TT	1882-02-15		1863-03-21	4828.00000	0		CA13801				TF WOLF DITCH
10	537	SOUTH CHEYENNE PIPELINE	7	52	S FORK CHEYENNE	ELP	NE SE 34 14 S 67 W S	28	3.0000	A	O,TT	1882-02-15		1863-12-31	5113.00000	0		CA13801				TF LOWRY DITCH ENLARGEMENT
10	537	SOUTH CHEYENNE PIPELINE	7	52	S FORK CHEYENNE	ELP	NE SE 34 14 S 67 W S	28	1.5500	A	O,TT	1882-02-15		1865-09-21	5743.00000	0		CA16305				TF DIXON DITCH; LTD 450 AF/YR
10	537	SOUTH CHEYENNE PIPELINE	7	52	S FORK CHEYENNE	ELP	NE SE 34 14 S 67 W S	28	0.6000	A	O,TT	1882-02-15		1872-06-21	8208.00000	0		CA16306				TF HARLAN DITCH; LTD 285 AF/YR
10	537	SOUTH CHEYENNE PIPELINE	7	52	S FORK CHEYENNE	ELP	NE SE 34 14 S 67 W S	1	1.2500	A	S	1919-06-02	1883-04-12	1898-05-10	17662.00000	0	161	CA10146				ORIGINAL RIGHT LTD 400 AF/YR

Explanation of Codes:

Struct Type: 0 - other, 1 - ditch, 2 - well, 3 - reservoir, 4 - spring, 5 - seep, 6 - mine, 7 - pipeline, 8 - pump, 9 - power plant

Use Codes: 0 - storage, 1 - irrigation, 2 - municipal, 3 - commercial, 4 - industrial, 5 - recreation, 6 - fishery, 7 - fire, 8 - domestic, 9 - stock, A - augmentation, B - export from basin, C - cumulative accretion to river, D - cumulative depletion from river, E - evaporation, F - federal reserve, G - geothermal, H - household use only, K - snow making, M - minimum streamflow, N - net effect of river, P - power generation, Q - other, R - recharge, S - export from state, T - transmountain export, W - wildlife, X - all beneficial use

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