

# COLUMBUS CREEK DRAINAGE INTRODUCTION

#### **BACKGROUND**

Columbus Creek flows out of the east slope of the Bighorn Mountains, between Piney Creek drainage to the south and the East Fork of the Big Goose to the north. Its flows consist primarily of snow pack melt generated in the eastern side of the Bighorn Mountains and as a result, tend to increase to 20-30 cfs in May and June, then decrease to 4-5 cfs by September. Columbus joins the Tongue River just upstream of Ranchester, Wyoming. The Tongue leaves Wyoming north of Acme, Wyoming, to fill the Tongue River Reservoir in Montana.

#### **CHARACTERISTICS**

Columbus Creek works its way through cobble and gravel bars from old river channels, driving up the instream losses. Its passage near shallow subdivision wells probably also increase its losses.

#### **USAGE**

Columbus Creek's diversions are devoted almost entirely to agricultural irrigation.

### Regulation

Columbus Creek typically does not go into regulation. Return flows are enough to replenish creek flow to satisfy downstream demand even though the creek is entirely diverted at Five Mile Ditch.

## Agriculture

See irrigation and crop planting practices in the memorandum below.

The typical irrigation season runs from April 15-May 1 (depending on whether the spring runoff is delayed by colder weather) to mid/early October (depending on when the first snows fall and the ground freezes). All of the irrigators using Columbus Creek water practice post-season irrigation, using their full rights to do so.

#### **Double Appropriation**

Irrigation water rights with priority dates of March 1, 1945 or earlier are entitled to an additional 1cfs per 70 acres under Wyoming's surplus water statutes. Whenever the supply in a stream exceeds the amount required to satisfy all existing appropriations established prior to March 1, 1985, the stream is said to be in an excess flow condition and water right holders with priorities between March 2, 1945 and March 1, 1985 may use an additional 1 cfs for each 70 acres irrigated.

In Columbus Creek, this practice is limited by the flow in Columbus Creek (less than 30 cfs in the past few years) and the condition of the ditches, none of which is estimated to carry double appropriation.

#### **Permitted Uses**

Permits granted for water appropriation are granted for specific uses. The following pages contain tables of permits and their associated uses. The following table provides a key to those uses:

Code	Use
Chem	Chemical
Com	Commercial
Cul	Culinary
D	Domestic
Drl	Drilling
Eng	Steam Engines
Fire	Fire Protection
Fish	Fish Propogation
F.C.	Flood Control
I	Irrigation
Ind	Industrial
I.F.	Instream Flow
Mech	Mechanical
Mfg	Manufacturing
Mil	Milling

Code	Use					
Min	Mining					
Misc	Miscellaneous					
Mun	Municipal					
Oil	Oil Refining or					
	Production					
P.C.	Pollution Control					
Power	Power Development					
R.R.	Railroad					
Rec	Recreational					
Ref	Refining					
Res.	Supply Facility for a					
Supply	Reservoir					
S	Stock					
Т	T Transportation					

# **WATER RIGHTS**

Two water rights summary tables are provided for each diversion serving irrigation referenced here. The first, included in the body of the diversion synopsis, refers to the rights on record with the State Engineer's Office and is derived from that office's *Tabulation of Adjudicated Surface Water Rights of the State of Wyoming, Water Division Number Two* (Oct. 1999).

Because this rights summary is pulled directly from the SEO *Tab*, the rights cited follow the SEO's priority order:

Hierarchy	Format of right	Example		
1	Day, Month, Year	05-15-1884		
2	Month and Year	05-00-1884		
3	Specified Season and Year	Spring 1884		
4	Year Only	1884		
5	Before Year	Before 1884		

Board orders or court orders may also establish a specific priority.

# **Irrigated Lands Water Rights Database**

The second table, which follows the diversion synopsis, is taken from the irrigated lands water rights database developed for the basin plan. It can be used as a reference with the following caveats: It only lists water rights associated with the irrigated lands polygons mapped by HKM. The table does not include nonirrigation rights devoted to reservoir supply, municipal, fish propagation, etc. The rights on this table are associated only with those irrigated lands identified through the course of this study, both actively irrigated and currently idle.

#### Column Heading Key

PerNo Permit Number "Terr" denotes a territorial right.

PerSfx Permit Suffix D = direct flow

E = enlargementR = reservoir

Facility Name Parentheses denote the former means of conveyance for the

water right.

Unit Flow or volume CFS = cubic feet per second

AF = acre-feet

GPM = gallons per minute

SupTyp Supply Type OS = original supply

SS = supplement supply, for lands having an original supply

from another source

Sec = secondary supply, for water stored in a reservoir

Status of adjudication Adj = adjudicated

Una = unadjudicated

Source Source water Parentheses denote the permit number of the related storage

right.

#### **KEY DIVERSIONS**

**Diversion:** FIVE MILE DITCH DIVERSION

Date: 9/12/2000

**Diversion Location:** 

**Conveyance Description:** 

Note: The Five Mile Ditch diverts all the flows of

Columbus Creek. Thus, the recorded ditch data from the Five Mile recorder doubles as the

Columbus Creek recorder.

**Diversion Description:** Headgate consists of a single 4.0 x 4.0-foot

square wood-and-steel gate in steel slides operated with a Waterman-type screw, mounted in a steel throat. The area surrounding the headgate can be marshy and is significantly

overgrown.



The Five Mile Ditch diversion is located on the main stem of

Columbus Creek.

Headgate:

Lat.

Lat. Long.

N 44° 55' 1.2" W 107° 22' 15.4"

Stream gage/recorder:

N 44° 55' 1.4" W 107° 22' 14.1"

Long.

Open channel canal, approx. 8.5 mi. long. The conveyance includes a number of flumes and includes Wagner and Five Mile reservoir in its

flow path.

**Direct Flow Water Rights:** The summary for direct flow rights follows:

Permit	Priority Date	Permitted Use	Acres	Flow (cfs)	Cumulative (cfs)
Terr.	08-16-1882	D,I,S	7.0	0.20	0.20
Terr.	08-16-1882	D,I,S	7.0	0.20	0.40
Terr.	08-16-1882	I	10.0	0.25	0.65
Terr.	08-16-1882	D,I,S	16.0	0.34	0.99
Terr.	08-16-1882	I	40.0	0.67	1.66
Terr.	08-16-1882	D,I,S	60.0	0.96	2.62
Terr.	08-16-1882	D,I,S	70.0	1.10	3.72
Terr.	08-16-1882	D,I,S	70.0	1.10	4.82
Terr.	08-16-1882	D,I,S	85.0	1.31	6.31
Terr. (Sec)	08-16-1882	D,I,S	90.0	1.38	7.51
Terr.	08-16-1882	D,I,S	90.0	1.38	8.89
Terr.	08-16-1882	D,I,S	100.0	1.53	10.42
Terr.	08-16-1882	D,I	120.0	1.81	12.23
Terr.	08-16-1882	D,I,S	160.0	2.39	14.62
Terr.	08-16-1882	D,I,S	300.0	4.38	19.00
Terr.	08-16-1882	D,I,S	385.0	5.60	24.60
Terr.	06-00-1886		6	0.19	24.79
Terr.	12-31-1890	D,I,S	10.0	0.24	25.03
Terr.	12-31-1890		10.0	0.24	25.27



Five-Mile Ditch headgate



Five-Mile Ditch stream gage/recorder

Direct flow rights cont'd:

Permit	Priority Date	Permitted Use		Flow (cfs)	Cumulative (cfs)
Terr.	12-31-1890	D,I,S	160.0	2.39	27.66
1521E	08-26-1903		50.0	0.71	28.37
4423E	11-12-1924		437.1	6.24	34.61

Note: "Sec" denotes secondary supply, or water stored in a reservoir.

**Associated Storage Rights:** Rights associated with Wagner and Five Mile reservoirs.

**Irrigation Practices:** Approx. 50 percent pivot and siderolls, 50 percent ditch-flood. Irrigators

tend to plant approx. 35 percent corn, 40 percent alfalfa, and 25 percent

hay.

**Return Flows:** Return flows were not known.

**Losses:** 20 percent by the end of the ditch

**References:** Bill Knapp, water commissioner, State Engineer's Office, interview, 9

Feb. 2001

Pat Boyd, water commissioner, State Engineer's Office, interview, 12

Sept. 2000

Irrigated Lands Water Rights Database

PerNo	PerSfx	Facility Name	Priority	Acres	Amount	Unit	SupTyp	Status	Source
Terr	D	Wyoming & Five Mile	Aug. 16, 1882	1730	26.41	CFS	OS	Adj	Columbus Creek
Terr	D	Wyoming & Five Mile 2nd App	Dec. 31, 1890	180	2.87	CFS	os	Adj	Columbus Creek
5441	D	Wagner (Enl. Wyoming & Five Mile)	April 29, 1903	32	0.45	CFS	Sec	Adj	Columbus Creek (397R)
4423	E	Enl. Wyoming & Five Mile	Nov. 12, 1924	437.1	6.24	<b>CFS</b>	OS	Adj	Columbus Creek

Name	Five Mile D	itch Diversio	m										
Source	Colombus C	Creek											
District	5												
Data	Total month	ly flow in Al	F										
Water													
Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1970													
1971													
1972													
1973							0.00	0.00	0.00	0.00	241.42	0.00	241.42
1974 1975							0.00	0.00	0.00	0.00	341.43	0.00	341.43
1975													
1970													
1978													
1979													
1980													
1981							0.00	287.92	309.72	393.42	215.56	0.00	1206.62
1982													
1983													
1984													
1985													
1986													
1987													
1988													
1989							0.00	584.82	429.37	275.81	263.31	226.24	1779.55
1990							508.50	786.10	888.90	394.70	287.00	241.80	3107.00
1991							439.20	1087.60	887.10	446.30	303.50	288.30	3452.00
1992							358.90	673.70	609.00	695.50	381.90	291.70	3010.70
1993							329.50	1299.80	1127.00	765.30	466.10	349.80	4337.50
1994							817.20	1058.50	625.80	376.40	290.50	292.00	3460.40
1995							308.80	638.90 1147.20	1360.20 904.40	782.00 507.60	400.90 291.20	316.40 219.90	3807.20 3487.80
1996 1997							417.50 0.00	913.00	1118.20	535.90	386.90	280.30	3487.80
1997							0.00	1002.50	842.50	442.40	355.70	280.30	2924.60
1999							0.00	952.00	1018.00	514.00	323.00	267.00	3074.00
Mean							244.58	802.46	778.48	471.49	331.31	235.00	2863.32
Max							817.20	1299.80	1360.20	782.00	466.10	349.80	4337.50
Min							0.00	0.00	0.00	0.00	215.56	0.00	341.43
47.45.5				1			0.00	0.00	0.00	0.00	213.30	0.00	UT1.17

Notes:

- 1. Monthly data is from Hydrographers' Annual Reports for years 1980 and later, and from WRDS for years prior to 1980
- 2. Zero flow is assumed prior to the first and after the last measurement
- 3. Monthly data for 1981 is derived from spot measurements in the Hydrographers' Annual Reports.

Name Source District Data	Five Mile Ditch Diversion Columbus Creek 5 First & Last Dates, Max. Days								
Water	First Date of Last Date of Maximum								
Year	Measurement	Measurement	Days Missing						
1970									
1971									
1972									
1973									
1974	1-Aug	31-Aug	0						
1975									
1976									
1977									
1978									
1979									
1980									
1981	4-May	19-Aug	33						
1982									
1983									
1984									
1985									
1986									
1987									
1988									
1989	11-May	26-Sep	0						
1990	3-Apr	30-Sep	0						
1991	1-Apr	30-Sep	0						
1992	1-Apr	30-Sep	0						
1993	7-Apr	30-Sep	0						
1994	1-Apr	30-Sep	0						
1995	1-Apr	30-Sep	0						
1996	17-Apr	30-Sep	0						
1997	7-May	30-Sep	0						
1998	1-May	30-Sep	0						
1999	6-May	30-Sep	0						
Avg.	25-Apr	24-Sep	3						
Earliest	1-Apr	19-Aug	0						
Latest	1-Aug	30-Sep	33						

Notes: 1. Data is from Hydrographers' Annual Reports for years 1980 and later, and from WRDS for years prior to 1980.