
MEMORANDUM

**Subject: Bear River Basin Plan
Key Structures and Diversions
HILLIARD WEST SIDE DIVERSION**

Date: August 7, 2000

Diversion Description: The diversion gate structure consists of a concrete headwall with a single 5 foot steel slide gate. Water is diverted from the Bear River approximately 150 yards upstream of the gate structure.



Hilliard West Side diversion structure

Diversion Location: Diversion is on the East Fork of the Upper Bear in Wyoming. Irrigated lands are located in Wyoming as shown in the location map hereafter.

Latitude N 40° 59' 45.3"
Longitude W 110° 52' 10.3"

Conveyance Description: Open Channel Canal, approximately 31,680 feet in length.¹

Direct Flow Water Rights:²

Priority Date	Permit Number	Permitted Use	Permitted Acres	Flow (CFS)	Cumulative (CFS)	Comments
11-27-1891	6276	Irrigation	160	2.28	2.28	
11-27-1891	6276	Irrigation	160	2.28	4.56	
11-27-1891	6276	Irrigation	160	2.28	6.84	
11-27-1891	6276	Irrigation	160	2.28	9.12	
11-27-1891	6276	Irrigation	120	1.71	10.83	
11-27-1891	6276	Irrigation	160	2.28	13.11	
11-27-1891	6276	Irrigation	160	2.28	15.39	
11-27-1891	6276	Irrigation	160	2.28	17.67	
11-27-1891	6276	Irrigation	160	2.28	19.95	
11-27-1891	6276	Irrigation	40	0.57	20.52	
11-27-1891	6276	Irrigation	40	0.57	21.09	

11-27-1891	6276	Irrigation	120	1.71	22.80	
11-27-1891	6276	Irrigation	140	2.00	24.80	
11-27-1891	6276	Irrigation	150	2.14	26.94	
11-27-1891	6276	Irrigation	80	1.14	28.08	
11-27-1891	6276	Irrigation	160	2.28	30.36	
11-27-1891	6276	Irrigation	155	2.21	32.57	

Bear River Compact: Although the Hilliard West Side Diversion is located in Utah, the Bear River Compact acknowledges Wyoming’s right to administer Hilliard West Side Canal water rights. Article X, Paragraph “B” of the Compact specifically states:

*“B. All interstate rights shall be administered by the state in which the point of diversion is located and during times of water emergency, such rights shall be filled from the allocations specified in article IV hereof for the section in which the point of diversion is located, with the exception that the diversion of water into the Hilliard East Fork Canal, Lannon Canal, Lone Mountain Ditch, and **Hilliard West Side Canal** shall be under the administration of Wyoming. During times of water emergency these canals and the Lone Mountain Ditch shall be supplied from the allocation specified in article IV for the Upper Wyoming section diversions.”*

Associated Storage Rights:

Reservoir	Shareholder	Volume (Acre-ft)	Est. % of Shares Used this Diversion ³	Comments
Whitney	Hilliard West Side	508.4	100%	

Irrigation Practices: Land is all flood irrigated.³

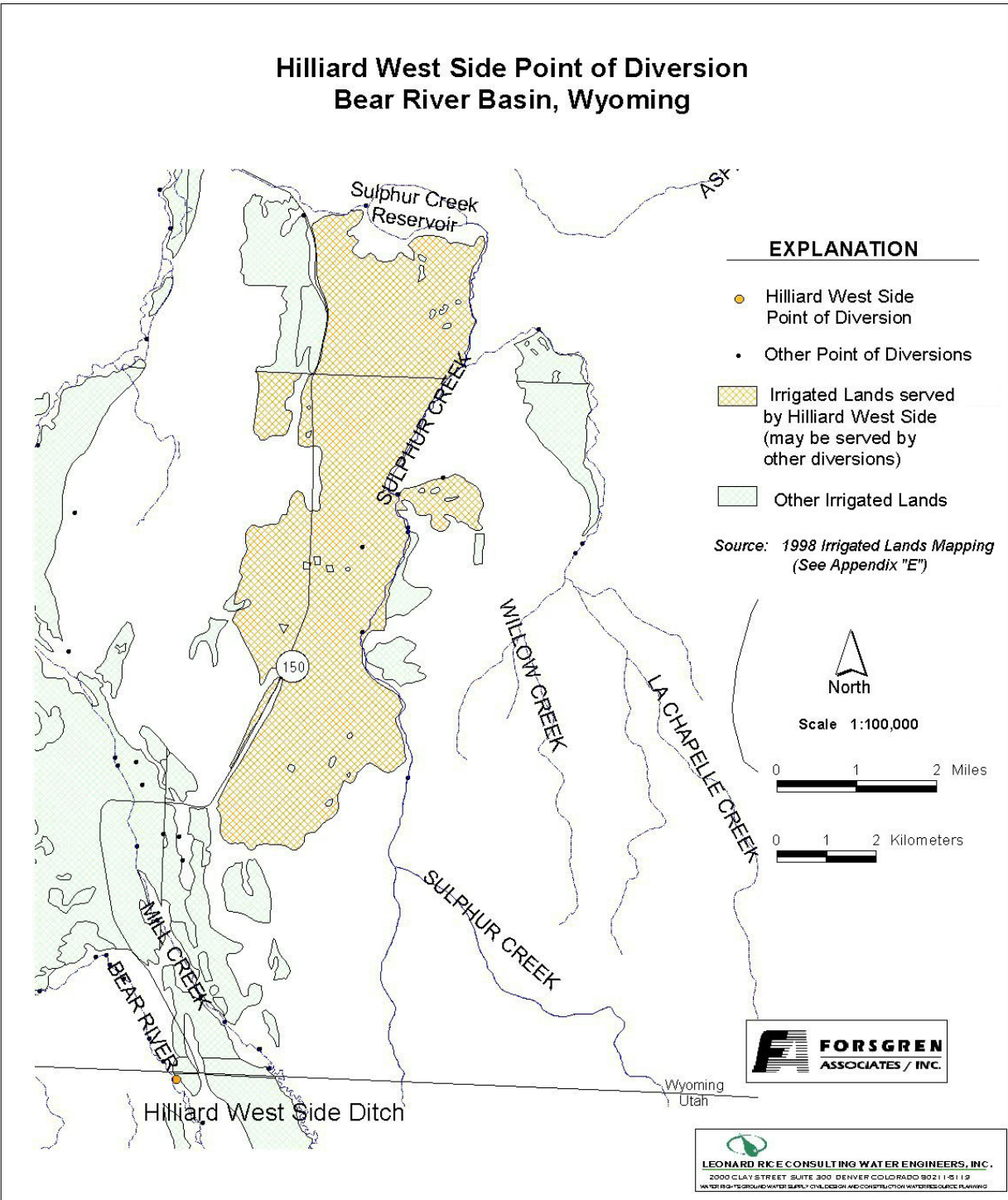
Estimated Diversion Efficiency: Canal losses are relatively high due to porous nature of soils in the higher reaches of the Upper Bear.

Calculated Diversion Efficiency = Conveyance Efficiency X Application Efficiency:

Conveyance Efficiency:	40%
Application Efficiency:	<u>55%</u>
Overall Diversion Efficiency:	22%

Conveyance efficiency is estimated by total length of main canal. Application efficiency for flood irrigation and sprinkler irrigation is estimated at 55% and 85% respectively.

Hilliard West Side Point of Diversion Bear River Basin, Wyoming



Crop Types / Consumptive Use: Water is used entirely to irrigate meadow grasses, primarily Timothy, Meadow Foxtail, etc.³

Return Flows: Excess return flow is primarily captured in Sulphur Creek Reservoir.

The following return flow pattern was adopted for modeling in this study are as follows:

<u>Month (after initial Diversion)</u>	<u>Percent of Return</u>
0	50%
1	25%
2	15%
3	<u>10%</u>
	100%

Other Operational Information: Hilliard's growing system is typically mid-June to mid-August.³

References:

- 1) *USDA -Soil Conservation Service Economic Research Service-Forest Service in Cooperation with the States of Idaho, Utah, Wyoming, Irrigation Conveyance Systems, Working Paper for the Bear River Basin Type IV Study, Idaho-Utah-Wyoming, April 1976*
- 2) *Water rights summary obtained from State Engineer Interstate Reglist – revised April 14, 1999*
- 3) *Irrigation practices based on field investigation and interview with Mr. Don Shoemaker, Water Hydrographer-Commissioner – November 6, 1999.*
- 4) *State of Utah Natural Resources, Water Budget Studies – Utah, Bear River Study Area, September 1994*

**BEAR RIVER WYOMING DIVERSIONS
MONTHLY DIVERSION RECORDS**

HILLIARD WEST SIDE

YEAR	MAY			JUNE			JULY			AUGUST			SEPTEMBER		
	Total of Daily Ave for Month	Average CFS	Monthly Total Ac-Ft	Total of Daily Ave for Month	Average CFS	Monthly Total Ac-Ft	Total of Daily Ave for Month	Average CFS	Monthly Total Ac-Ft	Total of Daily Ave for Month	Average CFS	Monthly Total Ac-Ft	Total of Daily Ave for Month	Average CFS	Monthly Total Ac-Ft
*1970															
1971	74	2.4	146.8	794	26.5	1574.9	1059	34.2	2100.5	249	8.0	493.9	605	20.2	1200.0
1972	153	4.9	303.5	872	29.1	1729.6	553	17.8	1096.9	145	4.7	287.6	375	12.5	743.8
1973	0	0.0	0.0	595	19.8	1180.2	942	30.4	1868.4	414	13.4	821.2	296	9.9	587.1
1974	71	2.3	140.8	789	26.3	1565.0	712	23.0	1412.2	204	6.6	404.6	181	6.0	359.0
1975	69	2.2	136.9	385	12.8	763.6	704	22.7	1396.4	364	11.7	722.0	399	13.3	791.4
1976	108	3.5	214.2	747	24.9	1481.7	770	24.8	1527.3	219	7.1	434.4	136	4.5	269.8
1977	307	9.9	608.9	548	18.3	1086.9	74	2.4	146.8	125	4.0	247.9	121	4.0	240.0
1978	17	0.5	33.7	651	21.7	1291.2	874	28.2	1733.6	227	7.3	450.2	228	7.6	452.2
1979	358	11.5	710.1	815	27.2	1616.5	684	22.1	1356.7	59	1.9	117.0	80	2.7	158.7
1980	27	0.9	53.6	534	17.8	1059.2	912	29.4	1808.9	150	4.8	297.5	441	14.7	874.7
1981	70	2.3	138.8	690	23.0	1368.6	808	26.1	1602.6	114	3.7	226.1	47	1.6	93.2
1982	106	3.4	210.2	844	28.1	1674.0	794	25.6	1574.9	80	2.6	158.7	531	17.7	1053.2
1983	531	17.1	1053.2	257	8.6	509.8	119	3.8	236.0	1049	33.8	2080.7	200	6.7	396.7
1984	0	0.0	0.0	224	7.5	444.3	715	23.1	1418.2	79	2.5	156.7	30	1.0	59.5
1985	83	2.7	164.6	832	27.7	1650.2	780	25.2	1547.1	374	12.1	741.8	222	7.4	440.3
1986	48	1.5	95.2	1113	37.1	2207.6	922	29.7	1828.8	100	3.2	198.3	434	14.5	860.8
1987	454	14.6	900.5	926	30.9	1836.7	548	17.7	1086.9	103	3.3	204.3	57	1.9	113.1
1988	884	28.5	1753.4	944	31.5	1872.4	508	16.4	1007.6	168	5.4	333.2	201	6.7	398.7
1989	494	15.9	979.8	960	32.0	1904.1	836	27.0	1658.2	92	3.0	182.5	81	2.7	160.7
1990	494	15.9	979.8	968	32.3	1920.0	836	27.0	1658.2	92	3.0	182.5	61	2.0	121.0
1991	91	2.9	180.5	672	22.4	1332.9	904	29.2	1793.1	76	2.5	150.7	423	14.1	839.0
1992	673	21.7	1334.9	902	30.1	1789.1	326	10.5	646.6	160	5.2	317.4	61	2.0	121.0
1993	87	2.8	172.6	732	24.4	1451.9	860	27.7	1705.8	202	6.5	400.7	609	20.3	1207.9
1994	232	7.5	460.2	1027	34.2	2037.0	329	10.6	652.6	4	0.1	7.9	32	1.1	63.5
1995	59	1.9	117.0	610	20.3	1209.9	983	31.7	1949.8	280	9.0	555.4	636	21.2	1261.5
1996	237	7.6	470.1	791	26.4	1568.9	1017	32.8	2017.2	82	2.6	162.6	319	10.6	632.7
1997	131.8	4.3	261.4	847.6	28.3	1681.2	1136	36.6	2253.2	335.6	10.8	665.7	755	25.2	1497.5
1998	8.5	0.3	16.9	779.6	26.0	1546.3	1074.7	34.7	2131.6	55.8	1.8	110.7	370.2	12.3	734.3
1999	30	1.0	59.5	640	21.3	1269.4	909	29.3	1803.0	255	8.2	505.8	175	5.8	347.1

AVERAGES

6.6 403.3

24.7 1469.8

24.1 1483.4

6.5 400.6

9.3 554.4

Notes: *1. No published records are available for this diversion for 1970