
MEMORANDUM

**Subject: Bear River Basin Plan
Key Structures and Diversions
FRANCIS LEE DIVERSION**

Date: May 6, 2002

Diversion Description: The headgate structure consists of a concrete headwall with two 4-foot steel slide gates.



Francis Lee headgate

Diversion Location: Diversion is located on the Upper Bear in Wyoming downstream of the Woodruff Narrows Reservoir as shown in the location map hereafter. Irrigated lands include Utah and Wyoming.

Latitude N 41° 31' 19.5"
Longitude W 111° 01' 38.3"

Conveyance Description: Open channel canal, approximately 15,840 feet in length.¹

Direct Flow Water Rights:²

Priority Date	Permit Number	Permitted Use	Permitted Acres	Flow (CFS)	Cumulative (CFS)	Comments
-1879	TERR	Irrigation	154	2.20	2.20	<i>Wyoming Lands</i>
-1879	(UTAH)	Irrigation	519	7.41	9.61	<i>Utah Lands</i>

Bear River Compact: The Amended Bear River Compact specifically references water rights in the Francis Lee Canal. Article X of the Compact states:

ARTICLE X

A. The following rights to the use of Bear River water carried in interstate canals are recognized and confirmed.

Name of Canal	Date of Priority	Primary Right (Second-feet)	Lands Irrigated (Acres)	State
<i>Hilliard East Fork</i>	1914	28.00	2644	<i>Wyoming</i>
<i>Chapman</i>	8-13-86	16.46	1155	<i>Wyoming</i>
	8-13-86	98.46	6892	<i>Wyoming</i>
	4-12-12	0.57	40	<i>Wyoming</i>
	5-3-12	4.07	285	<i>Utah</i>
	5-12-12	10.17	712	<i>Utah</i>
	2-6-13	0.79	55	<i>Wyoming</i>
	8-28-05	134.00*		
Francis Lee	1879	2.20	154	Wyoming
	1879	7.41	519	Utah

- Under the right as herein confirmed not to exceed 134 second-feet may be carried across the Wyoming-Utah state line in the Chapman Canal at any time for filling the Neponset Reservoir, for irrigation of land in Utah and for other purposes. The storage right in Neponset Reservoir is for 6,900 acre-feet which is a component part of the irrigation right for the Utah lands listed above.

Associated Wyoming Storage Rights: None

Irrigation Practices: Flood Irrigated. ³

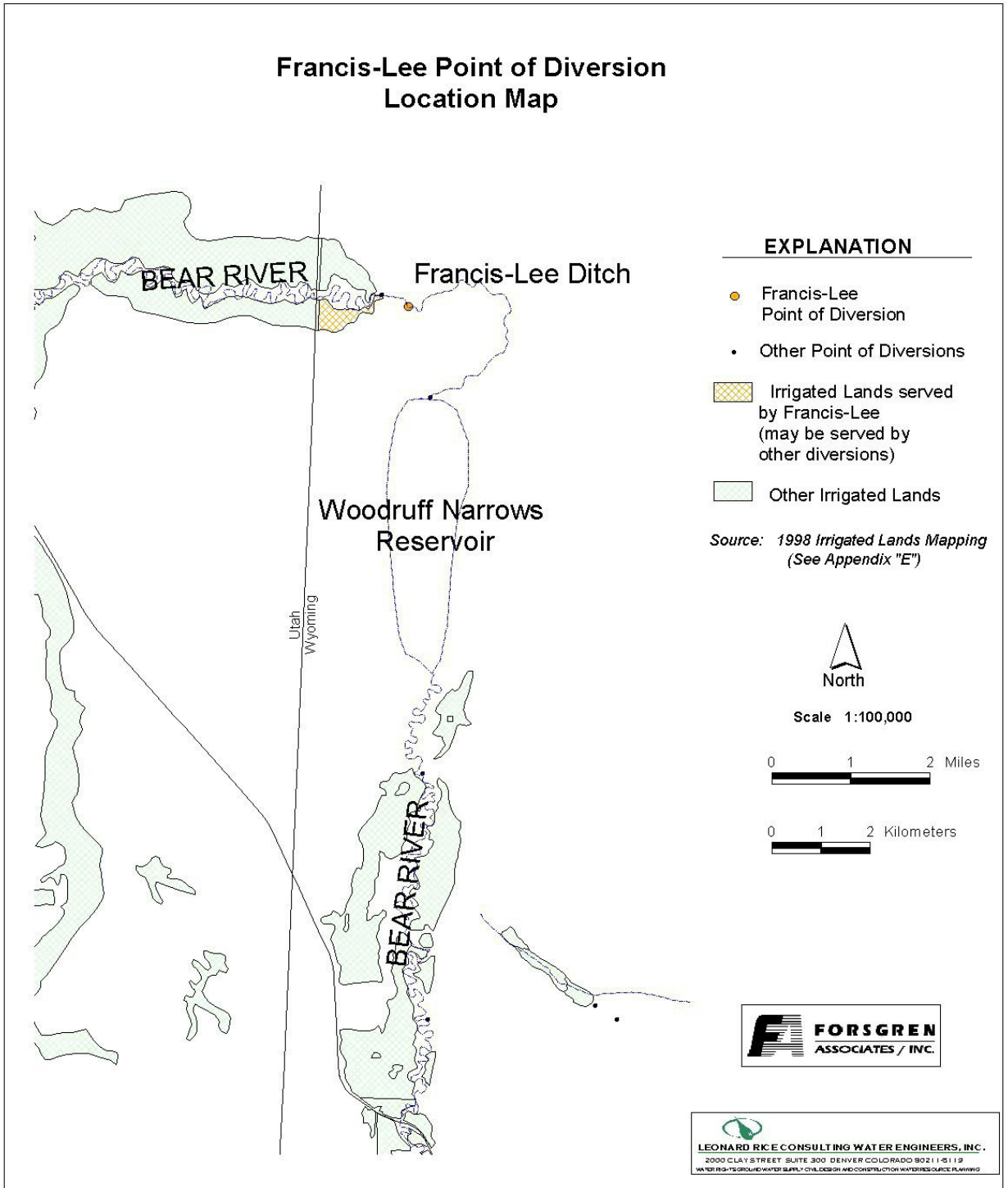
Estimated Diversion Efficiency:

Calculated Diversion Efficiency = Conveyance Efficiency X Application Efficiency:

Conveyance Efficiency:	60%
Application Efficiency:	<u>55%</u>
Overall Diversion Efficiency:	33%

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

Francis-Lee Point of Diversion Location Map



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

Return Flows: Return flow is intercepted in Utah.

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	10%
	100%

Other Operational Information: The Francis Lee Ditch is regulated by the Utah Commissioner as a matter of practicality. Most of the irrigated lands (77%) are in Utah.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 – October 29, 1999.*
- 4) *State of Utah Natural Resources, Water Budget Studies – Utah, Bear River Study Area, September 1994*

**BEAR RIVER WYOMING DIVERSIONS
MONTHLY DIVERSION RECORDS**

FRANCIS LEE

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	468	15.1	928.3	1902	63.4	3772.6	682	22.0	1352.7	324	10.5	642.6	296	9.9	587.1
1972	395	12.7	783.5	1188	39.6	2356.4	718	23.2	1424.1	337	10.9	668.4	249	8.3	493.9
1973	284	9.2	563.3	1301	43.4	2580.5	810	26.1	1606.6	785	25.3	1557.0	171	5.7	339.2
1974	456	14.7	904.5	1502	50.1	2979.2	741	23.9	1469.8	788	25.4	1563.0	605	20.2	1200.0
1975	338	10.9	670.4	1758	58.6	3486.9	1360	43.9	2697.5	733	23.6	1453.9	81	2.7	160.7
1976	510	16.5	1011.6	1468	48.9	2911.7	552	17.8	1094.9	0	0.0	0.0	0	0.0	0.0
1977	359	11.6	712.1	816	27.2	1618.5	327	10.5	648.6	296	9.5	587.1	188	6.3	372.9
1978	694	22.4	1376.5	1518	50.6	3010.9	960	31.0	1904.1	405	13.1	803.3	299	10.0	593.1
1979	1609	51.9	3191.4	1790	59.7	3550.4	357	11.5	708.1	0	0.0	0.0	0	0.0	0.0
1980	457	14.7	906.4	1634	54.5	3241.0	761	24.5	1509.4	141	4.5	279.7	49	1.6	97.2
1981	905	29.2	1795.0	1054	35.1	2090.6	539	17.4	1069.1	251	8.1	497.9	73	2.4	144.8
1982	766	24.7	1519.3	1179	39.3	2338.5	640	20.6	1269.4	114	3.7	226.1	137	4.6	271.7
1983	295	9.5	585.1	1655	55.2	3282.6	430	13.9	852.9	10	0.3	19.8	0	0.0	0.0
1984	524	16.9	1039.3	1495	49.8	2965.3	889	28.7	1763.3	46	1.5	91.2	0	0.0	0.0
1985	613	19.8	1215.9	1565	52.2	3104.1	705	22.7	1398.3	0	0.0	0.0	0	0.0	0.0
1986	831	26.8	1648.3	1132	37.7	2245.3	551	17.8	1092.9	0	0.0	0.0	456	15.2	904.5
1987	1327	42.8	2632.1	1693	56.4	3358.0	691	22.3	1370.6	0	0.0	0.0	0	0.0	0.0
1988	1170	37.7	2320.7	1329	44.3	2636.0	141	4.5	279.7	0	0.0	0.0	0	0.0	0.0
1989	706	22.8	1400.3	1467	48.9	2909.8	470	15.2	932.2	176	5.7	349.1	12	0.4	23.8
1990	275	8.9	545.5	1375	45.8	2727.3	293	9.5	581.2	211	6.8	418.5	78	2.6	154.7
1991	418	13.5	829.1	1437	47.9	2850.2	744	24.0	1475.7	208	6.7	412.6	315	10.5	624.8
1992	1036	33.4	2054.9	1369	45.6	2715.4	308	9.9	610.9	0	0.0	0.0	0	0.0	0.0
1993	1264	40.8	2507.1	1795	59.8	3560.3	691	22.3	1370.6	256	8.3	507.8	531	17.7	1053.2
1994	1369	44.2	2715.4	1782	59.4	3534.5	253	8.2	501.8	0	0.0	0.0	27	0.9	53.6
1995	836	27.0	1658.2	1653	55.1	3278.7	1007	32.5	1997.4	411	13.3	815.2	370	12.3	733.9
1996	1319	42.5	2616.2	1509	50.3	2993.1	888	28.6	1761.3	151	4.9	299.5	327	10.9	648.6
1997	1096.8	35.4	2175.5	1588.5	53.0	3150.7	638.2	20.6	1265.9	0	0.0	0.0	75	2.5	148.8
1998	1749.3	56.4	3469.7	1515	50.5	3005.0	613.5	19.8	1216.9	134.7	4.3	267.2	582.3	19.4	1155.0
1999	1069	34.5	2120.3	1590	53.0	3153.7	715	23.1	1418.2	0	0.0	0.0	354	11.8	702.1

AVERAGES

25.7 1582.6

49.5 2945.1

20.6 1263.6

6.4 395.2

6.1 360.8

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