

13087500 HISTORIC DIVERSION SOUTH SIDE TWIN FALLS CANAL AT MILNER (1000 AC-FT)

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1980	87.3	1.2	0	0	0	5.2	81.3	191.2	167	216.4	210	130.5	1090.1
1981	74.9	1.3	0	0	0	2.7	91.5	189.1	186.3	218.6	216.3	169.1	1149.8
1982	69.8	0	0	0	0	0	16.3	178.2	188.7	213.2	216.3	153.2	1035.7
1983	48.5	0	0	0	0	1.3	45.9	154.8	196.6	215.3	200.9	166.8	1030.1
1984	73.6	0	0	0	0	0	23.9	144.8	163.6	216.7	207.2	163.6	993.4
1985	62.8	0	0	0	0	0	48.8	200.5	200.1	223.6	216.9	137.7	1090.4
1986	77.4	15.1	0	0	0	2	87.4	191.7	195.1	217.5	209.3	152.5	1148
1987	74.5	4.2	0	0	0	9	102.5	193.1	188.6	206.8	203.8	150.7	1133.2
1988	73.2	0	0	0	0	2.2	77.3	184.3	196.1	220.3	196.6	118.1	1068.1
1989	61.5	0	0	0	0	3.4	46.9	190.5	202.7	221.5	219.2	160	1105.7
1990	90.1	0	0	0	0	10.2	108.5	190.1	185.7	224	215.7	159.6	1183.9
1991	93.6	6.4	0	0	0	3.9	74	171.7	203.4	220.1	223.4	160.7	1157.2
1992	79.3	0	0	0	0	2.9	121.7	186.8	164.2	171.3	167.9	106.4	1000.5
1993	59.7	0	0	0	0	0	18.7	155	182	221.1	212.1	179.2	1027.8
1994	88.5	0	0	0	0	5.4	107.8	167	180.4	203.1	195.7	148.3	1096.2
1995	58.6	0	0	0	0	0	56.5	138.1	160.4	222.7	222.4	179	1037.7
1996	96.8	0	0	0	0	13.7	71.5	184.1	204.2	224.6	214.7	161	1170.6
1997	102.9	0	0	0	11.1	23.4	84.7	183.7	186.6	218.9	203.5	149	1163.8
1998	82.5	25.8	0	0	0	36.7	54	136.3	166.5	219.8	220.1	153.7	1095.4
1999	76.5	0.2	0	0	20.1	36.8	67.5	145.6	190.6	221.4	208.5	162.2	1129.4
2000	103.9	0	0	0	0	5	99.9	188.8	210.2	223.5	211.8	152.8	1195.9
2001	73.4	0	0	0	0	0	69.8	187.5	194.1	187.9	174.2	140.2	1027.1
2002	58.6	0	0	0	0	0	39.3	171.1	189	205.7	194	145.8	1003.5
2003	64.1	0	0	0	0	0	52.9	162.3	200	209	199.6	143.4	1031.3
2004	79.5	0	0	0	0	0	83.4	172.2	177.6	175.9	169.2	142.7	1000.5
2005	80.9	0	0	0	0	0	36.3	101.2	161.3	204.7	191.2	148.8	924.4
2006	74.4	0	0	0	0	0	33.1	164	188	211.6	198.5	131.3	1000.9
2007	69.3	0	0	0	0	4.9	79.3	176	193	208.1	193.4	142.2	1066.2
2008	56.9	0	0	0	0	6.8	60.8	183.7	189.4	215.4	201.7	161.7	1076.4

Return flow (AF) for Twin Falls Canal Company, return flow fractions based measured return flows (2005-2010), partial measured data scaled up (2002-2004), average return flow fraction (1980-2001)

W-YR	Annual Return Flow Fraction	Annual Returns
1980	0.205	223,471
1981	0.205	235,709
1982	0.205	212,319
1983	0.205	211,171
1984	0.205	203,647
1985	0.205	223,532
1986	0.205	235,340
1987	0.205	232,306
1988	0.205	218,961
1989	0.205	226,669
1990	0.205	242,700
1991	0.205	237,226
1992	0.205	205,103
1993	0.205	210,699
1994	0.205	224,721
1995	0.205	212,729
1996	0.205	239,973
1997	0.205	238,579
1998	0.205	224,557
1999	0.205	231,527
2000	0.205	245,160
2001	0.205	210,556
2002	0.217	217,760
2003	0.21	216,573
2004	0.2184	218,509
2005	0.19	175,636
2006	0.2217	221,900
2007	0.167	178,055
2008	0.185	199,134
2009	0.2405	
2010	0.2557	

Monthly ET (feet) for cropland in Twin Falls County (from 'ET_TO_COUNTIES_20090717_GIS1.ZIP' through 'ET_TO_COUNTIES_20090717_GIS4.ZIP')

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Water year ET (ft)	Irrigated Acres	ET (AF)
1980								0.389	0.441	0.569	0.375	0.300		213,319	
1981	0.140	0.071	0.086	0.040	0.064	0.122	0.239	0.323	0.432	0.625	0.438	0.240	2.820	213,026	600,734
1982	0.163	0.087	0.073	0.043	0.082	0.131	0.189	0.304	0.449	0.572	0.488	0.300	2.881	212,733	612,885
1983	0.133	0.084	0.053	0.072	0.111	0.166	0.219	0.378	0.442	0.599	0.456	0.285	2.998	212,441	636,897
1984	0.179	0.086	0.028	0.030	0.047	0.082	0.128	0.322	0.460	0.609	0.483	0.304	2.758	212,148	585,103
1985	0.141	0.092	0.047	0.039	0.050	0.082	0.106	0.332	0.529	0.684	0.488	0.069	2.659	211,855	563,322
1986	0.082	0.031	0.038	0.047	0.104	0.132	0.256	0.404	0.597	0.524	0.414	0.183	2.812	211,562	594,912
1987	0.189	0.053	0.013	0.051	0.097	0.150	0.254	0.396	0.515	0.601	0.414	0.231	2.964	211,269	626,202
1988	0.147	0.088	0.062	0.054	0.057	0.098	0.250	0.374	0.550	0.619	0.395	0.188	2.882	210,976	608,033
1989	0.140	0.077	0.044	0.056	0.038	0.183	0.192	0.346	0.471	0.649	0.390	0.287	2.873	210,683	605,293
1990	0.166	0.047	0.035	0.057	0.048	0.104	0.261	0.381	0.516	0.563	0.420	0.246	2.844	210,391	598,351
1991	0.104	0.039	0.024	0.060	0.048	0.133	0.183	0.348	0.396	0.634	0.481	0.279	2.729	210,098	573,356
1992	0.138	0.080	0.051	0.028	0.064	0.103	0.297	0.448	0.581	0.497	0.316	0.148	2.751	209,805	577,173
1993	0.109	0.061	0.045	0.041	0.037	0.158	0.184	0.363	0.458	0.543	0.421	0.273	2.693	208,604	561,771
1994	0.151	0.003	0.022	0.047	0.078	0.074	0.256	0.404	0.545	0.641	0.395	0.150	2.766	207,404	573,679
1995	0.163	0.060	0.036	0.065	0.081	0.183	0.203	0.393	0.433	0.577	0.464	0.266	2.924	206,203	602,938
1996	0.115	0.091	0.073	0.055	0.079	0.136	0.221	0.345	0.518	0.624	0.374	0.161	2.792	205,003	572,367
1997	0.126	0.059	0.058	0.053	0.054	0.075	0.184	0.401	0.521	0.593	0.407	0.214	2.745	203,802	559,437
1998	0.139	0.047	0.027	0.075	0.105	0.104	0.243	0.392	0.388	0.617	0.464	0.292	2.893	202,602	586,126
1999	0.139	0.081	0.055	0.053	0.095	0.077	0.169	0.349	0.417	0.649	0.462	0.282	2.828	201,401	569,562
2000	0.128	0.070	0.037	0.051	0.113	0.133	0.262	0.428	0.559	0.612	0.403	0.186	2.982	200,201	596,998
2001	0.178	0.043	0.026	0.052	0.063	0.085	0.220	0.426	0.549	0.609	0.419	0.231	2.901	199,000	577,299
2002	0.165	0.062	0.033	0.054	0.057	0.091	0.199	0.346	0.520	0.678	0.401	0.249	2.855	197,799	564,717
2003	0.116	0.057	0.037	0.074	0.064	0.126	0.242	0.403	0.538	0.716	0.401	0.198	2.972	196,599	584,292
2004	0.109	0.040	0.060	0.030	0.046	0.089	0.246	0.414	0.585	0.633	0.379	0.183	2.814	195,398	549,851
2005	0.163	0.071	0.046	0.032	0.110	0.085	0.269	0.422	0.421	0.611	0.454	0.293	2.977	194,198	578,127
2006	0.102	0.071	0.039	0.063	0.061	0.104	0.247	0.391	0.553	0.661	0.408	0.206	2.906	192,997	560,850
2007	0.183	0.083	0.049	0.049	0.041	0.096	0.281	0.432	0.599	0.629	0.365	0.194	3.001	192,997	579,185
2008	0.225	0.063	0.034	0.046	0.067	0.110	0.075	0.276	0.462	0.707	0.445	0.292	2.802	192,997	540,778

Irrigated agricultural acreage estimated within Twin Falls Canal Company service area in 1980, 1992, 2006

Year	Shapefile acres	Reduction factor	Add.Area (1980)	Add.Area (1980 red)	Add. Area (2006)	Irrigated acres
1980	248,045	0.14				213,319
1992	202,723	0.14	43,996	37,836	35,463	209,805
2006	192,997	0				192,997

Test Areas for Twin Falls reduction factors comparing hand drawn polygons (1987) to 1980 and 1992 irrigated lands shapefiles

Test Area	Hand Drawn acres	1980 shapefile	1992 shapefile	1980 reduction factor	1992 reduction factor
1	13,287.6	15,468.4	15,398.2	0.141	0.137
2	14,262.6	16,938.3	16,413.2	0.158	0.131
3	6,598.5	7,600.4	7,675.9	0.132	0.140
Average				0.144	0.136

Effective precipitation (ft) * crop mix ratio

Twin Falls	Alfalfa	Barley	DrBean	GrCorn	SilCorn	Oats	Potatoes	SugBeet	SprWht	WinWht	Annual P _{eff}		
											Sum (ft)	Sum (mm)	AF
1980	0.171	0.067	0.040	0.011	0.009	0.003	0.017	0.012	0.066	0.079	0.475	145	
1981	0.146	0.072	0.023	0.013	0.008	0.003	0.011	0.015	0.048	0.065	0.404	123	86,069
1982	0.111	0.053	0.025	0.019	0.005	0.002	0.015	0.016	0.041	0.051	0.339	103	72,042
1983	0.209	0.045	0.037	0.023	0.005	0.001	0.011	0.038	0.041	0.092	0.501	153	106,499
1984	0.138	0.068	0.023	0.010	0.004	0.002	0.010	0.014	0.020	0.032	0.321	98	68,037
1985	0.141	0.064	0.028	0.015	0.005	0.002	0.010	0.017	0.038	0.043	0.363	111	76,839
1986	0.162	0.056	0.009	0.005	0.002	0.002	0.008	0.015	0.034	0.040	0.332	101	70,313
1987	0.157	0.051	0.031	0.010	0.004	0.002	0.011	0.023	0.031	0.040	0.360	110	76,085
1988	0.120	0.054	0.032	0.009	0.005	0.003	0.012	0.022	0.030	0.036	0.324	99	68,283
1989	0.097	0.029	0.012	0.007	0.004	0.002	0.005	0.021	0.017	0.029	0.222	68	46,676
1990	0.142	0.048	0.016	0.004	0.003	0.000	0.017	0.021	0.016	0.067	0.335	102	70,502
1991	0.141	0.056	0.011	0.006	0.003	0.002	0.013	0.018	0.019	0.033	0.302	92	63,438
1992	0.090	0.051	0.052	0.006	0.003	0.001	0.011	0.022	0.031	0.055	0.321	98	67,444
1993	0.103	0.056	0.032	0.005	0.002	0.000	0.010	0.015	0.030	0.037	0.292	89	60,956
1994	0.125	0.059	0.027	0.003	0.004	0.001	0.013	0.023	0.029	0.059	0.343	105	71,140
1995	0.239	0.129	0.037	0.005	0.005	0.002	0.023	0.031	0.043	0.146	0.660	201	136,058
1996	0.162	0.080	0.035	0.005	0.007	0.001	0.019	0.029	0.064	0.117	0.519	158	106,299
1997	0.121	0.057	0.014	0.003	0.004	0.000	0.016	0.015	0.014	0.069	0.312	95	63,556
1998	0.228	0.083	0.048	0.008	0.010	0.001	0.021	0.028	0.020	0.097	0.544	166	110,146
1999	0.106	0.036	0.034	0.003	0.014	0.000	0.011	0.015	0.009	0.050	0.279	85	56,151
2000	0.131	0.069	0.008	0.007	0.009	0.001	0.009	0.011	0.015	0.049	0.308	94	61,644
2001	0.077	0.064	0.014	0.006	0.013	0.001	0.012	0.008	0.008	0.034	0.238	72	47,295
2002	0.173	0.067	0.019	0.005	0.014	0.001	0.014	0.021	0.007	0.056	0.376	115	74,465
2003	0.153	0.104	0.020	0.003	0.019	0.000	0.016	0.019	0.025	0.006	0.367	112	72,146
2004	0.172	0.136	0.014	0.004	0.022	0.000	0.017	0.024	0.033	0.006	0.428	130	83,541
2005	0.162	0.045	0.017	0.007	0.025	0.001	0.011	0.013	0.016	0.072	0.369	112	71,565
2006	0.173	0.047	0.017	0.009	0.041	0.001	0.015	0.021	0.017	0.045	0.386	118	74,433
2007	0.148	0.066	0.006	0.001	0.005	0.000	0.005	0.008	0.016	0.025	0.281	86	54,320
2008	0.158	0.091	0.024	0.005	0.021	0.001	0.009	0.012	0.022	0.032	0.375	114	72,294

Reach Gain Snake River Kimberly to Lower Salmon Falls less returns and Lower Salmon Falls Creek (100 Ac-Ft)

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Estimated groundwater flow to Lower Salmon Falls Creek (AF)	Estimated Kimberly to LSF groundwater contributions (AF)
1980	3536	3213	3180	3125	2872	3030	2829	3250	3243	2810	2968	3402	37458	104,900	3,850,700
1981	3462	3258	3239	3136	2720	2776	2786	2674	3005	2688	2842	3207	35793	93,667	3,672,967
1982	3441	3031	3062	2963	2750	2837	2721	2799	2932	3024	2917	3323	35800	92,433	3,672,433
1983	3505	3299	3431	3353	2708	2816	3319	2956	2991	3130	3237	3269	38014	93,600	3,895,000
1984	3435	3131	3188	2899	2955	2900	2728	2595	2463	2919	2946	3302	35461	93,300	3,639,400
1985	3401	3125	3085	3208	3274	2853	2950	2652	2734	2701	2806	3407	36196	100,033	3,719,633
1986	3645	3325	3257	3342	3049	2879	2872	2752	3007	2966	2961	3499	37554	113,367	3,868,767
1987	3672	3226	3133	3122	2646	2771	2631	2644	2695	2844	2879	3192	35455	100,700	3,646,200
1988	3395	3091	3074	2960	2696	2776	2693	2717	2662	2722	2880	3202	34868	91,733	3,578,533
1989	3358	3121	3058	2802	2542	2833	2755	2710	2594	2738	3056	3394	34961	90,500	3,586,600
1990	3714	3149	3070	2987	2606	2785	2743	2838	2988	2797	2995	3273	35945	91,033	3,685,533
1991	3646	3144	3070	2899	2590	2696	2646	2785	2682	2738	2882	3300	35078	87,967	3,595,767
1992	3411	3022	2917	2808	2573	2542	2431	2262	2244	2440	2451	2623	31724	72,933	3,245,333
1993	2917	2802	2707	2631	2481	2628	2525	2498	2653	2419	2762	2908	31931	83,800	3,276,900
1994	3231	2810	2852	2773	2376	2500	2493	2473	2329	2373	2590	2794	31594	81,600	3,241,000
1995	3251	2856	2829	2753	2412	2555	2510	2390	2746	2471	2517	2842	32132	92,100	3,305,300
1996	3214	2895	2829	2578	2485	2486	2799	2718	2504	2457	2565	2945	32475	97,067	3,344,567
1997	3178	2934	3024	2982	2859	3330	3280	3035	3017	2793	2756	3211	36399	120,367	3,760,267
1998	3477	3321	3065	2906	2664	3008	3081	3351	3146	2575	2486	2900	35980	115,800	3,713,800
1999	3184	2985	3253	3107	2796	3034	3062	3208	3070	2438	2600	2848	35585	111,733	3,670,233
2000	3159	3001	2973	3047	2766	2703	2775	2769	2515	2431	2513	2919	33571	95,500	3,452,600
2001	3085	2736	2744	2690	2439	2618	2717	2530	2404	2561	2553	2787	31864	92,900	3,279,300
2002	3111	2893	2842	2816	2461	2583	2697	2514	2354	2347	2404	2704	31726	71,400	3,244,000
2003	3017	2775	2797	2714	2371	2458	2530	2523	2175	2266	2405	2683	30714	68,900	3,140,300
2004	2971	2794	2828	2767	2577	2547	2505	2412	2188	2249	2293	2503	30634	68,900	3,132,300
2005	2844	2598	2644	2569	2255	2396	2405	2669	2380	2247	2397	2566	29970	71,567	3,068,567
2006	2921	2675	2722	2670	2266	2570	2299	2875	2292	2288	2429	2658	30665	83,000	3,149,500
2007	2983	2659	2542	2586	2253	2525	2592	2518	2279	2293	2494	2668	30392	66,333	3,105,533
2008	2973	2682	2706	2628	2422	2455	2598	2459	2408	2246	2366	2590	30533	75,300	3,128,600
2009	2937	2682	2666	2592	2313	2489	2682	2771	2591	2560	2412	2650	31345		

Estimated groundwater baseflow included in Lower Salmon Falls Creek (AF)

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1980	9,533	9,533	9,533	9,533	9,400	9,300	7,000	8,900	9,533	6,200	6,900	9,533	104,900
1981	9,333	9,333	9,333	9,333	8,700	8,800	8,600	7,600	6,600	3,000	3,700	9,333	93,667
1982	9,067	9,067	9,067	8,900	9,067	8,700	8,400	6,200	4,800	5,300	4,800	9,067	92,433
1983	8,500	8,500	8,500	8,500	8,000	8,400	8,500	8,500	6,200	3,000	8,500	8,500	93,600
1984	8,100	8,100	8,100	8,000	7,300	8,100	8,100	8,100	8,100	5,100	8,100	8,100	93,300
1985	9,567	9,567	9,100	8,600	8,900	9,567	9,567	9,400	7,200	3,500	5,500	9,567	100,033
1986	10,567	10,567	10,567	10,500	10,567	10,567	10,567	8,600	6,500	6,400	7,400	10,567	113,367
1987	9,467	9,467	9,467	9,467	8,700	9,000	9,467	6,900	6,200	6,200	6,900	9,467	100,700
1988	9,167	9,167	9,167	9,167	9,100	7,900	9,167	8,600	5,400	2,800	3,200	8,900	91,733
1989	8,433	8,433	8,433	8,433	8,200	8,200	7,600	6,900	5,000	4,000	8,433	8,433	90,500
1990	8,267	8,267	8,267	8,267	8,000	7,300	8,267	8,267	8,267	3,800	5,800	8,267	91,033
1991	7,967	7,967	7,967	7,967	7,900	7,500	7,967	7,967	7,300	3,600	5,900	7,967	87,967
1992	7,933	7,933	7,933	7,933	7,900	6,700	7,300	3,100	2,200	3,800	3,300	6,900	72,933
1993	7,100	7,100	7,100	7,100	6,500	7,100	6,700	6,900	7,100	6,900	7,100	7,100	83,800
1994	8,100	8,100	8,100	8,100	7,600	7,300	8,100	8,100	3,900	3,000	4,200	7,000	81,600
1995	8,200	8,200	8,200	8,200	7,800	7,400	7,400	8,200	8,200	5,000	7,100	8,200	92,100
1996	8,767	8,767	8,767	8,767	8,700	7,800	8,767	8,767	5,800	5,100	8,300	8,767	97,067
1997	10,367	10,367	10,367	10,367	8,700	10,367	10,367	10,367	10,367	8,000	10,367	10,367	120,367
1998	10,467	10,467	10,467	10,200	9,900	10,467	10,000	10,467	10,100	5,700	7,100	10,467	115,800
1999	10,133	10,133	10,133	9,900	9,300	10,133	10,133	10,133	7,500	5,300	8,800	10,133	111,733
2000	8,900	8,900	8,900	8,900	8,400	8,400	8,900	8,900	5,100	4,700	6,600	8,900	95,500
2001	8,067	8,067	8,067	8,067	7,700	7,200	8,067	7,900	6,900	7,200	7,600	8,067	92,900
2002	7,400	7,400	7,400	7,400	7,300	6,600	6,400	5,700	3,100	2,600	3,300	6,800	71,400
2003	7,100	7,100	7,100	7,100	6,700	6,600	7,100	7,100	2,300	2,100	3,300	5,300	68,900
2004	7,300	7,300	7,300	7,300	7,300	6,800	6,200	5,500	2,200	1,900	2,500	7,300	68,900
2005	6,667	6,667	6,667	6,667	6,300	6,100	6,667	6,667	6,600	2,400	3,500	6,667	71,567
2006	7,800	7,800	7,800	7,800	6,900	7,500	7,800	7,800	6,000	3,000	5,000	7,800	83,000
2007	6,867	6,867	6,867	6,867	6,300	6,200	6,867	6,200	2,400	1,900	2,900	6,100	66,333
2008	7,200	7,200	7,200	7,200	7,000	6,800	7,200	7,000	6,200	2,200	3,000	7,100	75,300

Reach Gain Snake River Kimberly to Lower Salmon Falls less returns and surface water component of Lower Salmon Falls Creek (AF)

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1980	363,133	330,833	327,533	322,033	296,600	312,300	289,900	333,900	333,833	287,200	303,700	349,733	3,850,700
1981	355,533	335,133	333,233	322,933	280,700	286,400	287,200	275,000	307,100	271,800	287,900	330,033	3,672,967
1982	353,167	312,167	315,267	305,200	284,067	292,400	280,500	286,100	298,000	307,700	296,500	341,367	3,672,433
1983	359,000	338,400	351,600	343,800	278,800	290,000	340,400	304,100	305,300	316,000	332,200	335,400	3,895,000
1984	351,600	321,200	326,900	297,900	302,800	298,100	280,900	267,600	254,400	297,000	302,700	338,300	3,639,400
1985	349,667	322,067	317,600	329,400	336,300	294,867	304,567	274,600	280,600	273,600	286,100	350,267	3,719,633
1986	375,067	343,067	336,267	344,700	315,467	298,467	297,767	283,800	307,200	303,000	303,500	360,467	3,868,767
1987	376,667	332,067	322,767	321,667	273,300	286,100	272,567	271,300	275,700	290,600	294,800	328,667	3,646,200
1988	348,667	318,267	316,567	305,167	278,700	285,500	278,467	280,300	271,600	275,000	291,200	329,100	3,578,533
1989	344,233	320,533	314,233	288,633	262,400	291,500	283,100	277,900	264,400	277,800	314,033	347,833	3,586,600
1990	379,667	323,167	315,267	306,967	268,600	285,800	282,567	292,067	307,067	283,500	305,300	335,567	3,685,533
1991	372,567	322,367	314,967	297,867	266,900	277,100	272,567	286,467	275,500	277,400	294,100	337,967	3,595,767
1992	349,033	310,133	299,633	288,733	265,200	260,900	250,400	229,300	226,600	247,800	248,400	269,200	3,245,333
1993	298,800	287,300	277,800	270,200	254,600	269,900	259,200	256,700	272,400	248,800	283,300	297,900	3,276,900
1994	331,200	289,100	293,300	285,400	245,200	257,300	257,400	255,400	236,800	240,300	263,200	286,400	3,241,000
1995	333,300	293,800	291,100	283,500	249,000	262,900	258,400	247,200	282,800	252,100	258,800	292,400	3,305,300
1996	330,167	298,267	291,667	266,567	257,200	256,400	288,667	280,567	256,200	250,800	264,800	303,267	3,344,567
1997	328,167	303,767	312,767	308,567	294,600	343,367	338,367	313,867	312,067	287,300	285,967	331,467	3,760,267
1998	358,167	342,567	316,967	300,800	276,300	311,267	318,100	345,567	324,700	263,200	255,700	300,467	3,713,800
1999	328,533	308,633	335,433	320,600	288,900	313,533	316,333	330,933	314,500	249,100	268,800	294,933	3,670,233
2000	324,800	309,000	306,200	313,600	285,000	278,700	286,400	285,800	256,600	247,800	257,900	300,800	3,452,600
2001	316,567	281,667	282,467	277,067	251,600	269,000	279,767	260,900	247,300	263,300	262,900	286,767	3,279,300
2002	318,500	296,700	291,600	289,000	253,400	264,900	276,100	257,100	238,500	237,300	243,700	277,200	3,244,000
2003	308,800	284,600	286,800	278,500	243,800	252,400	260,100	259,400	219,800	228,700	243,800	273,600	3,140,300
2004	304,400	286,700	290,100	284,000	265,000	261,500	256,700	246,700	221,000	226,800	231,800	257,600	3,132,300
2005	291,067	266,467	271,067	263,567	231,800	245,700	247,167	273,567	244,600	227,100	243,200	263,267	3,068,567
2006	299,900	275,300	280,000	274,800	233,500	264,500	237,700	295,300	235,200	231,800	247,900	273,600	3,149,500
2007	305,167	272,767	261,067	265,467	231,600	258,700	266,067	258,000	230,300	231,200	252,300	272,900	3,105,533
2008	304,500	275,400	277,800	270,000	249,200	252,300	267,000	252,900	247,000	226,800	239,600	266,100	3,128,600

#63

Reach Gain Snake River Milner to Kimberly less returns (100 AF)

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1980	205	182	185	183	158	172	193	83	207	172	193	204	2137
1981	170	72	45	30	121	120	-24	66	-83	171	191	222	1101
1982	246	222	212	172	189	5	208	133	146	110	248	308	2199
1983	49	-17	34	-49	-48	56	-88	716	144	225	196	192	1410
1984	184	235	351	541	406	103	417	890	1335	304	413	333	5512
1985	327	333	480	404	274	223	241	219	253	255	299	329	3637
1986	265	232	225	199	222	255	217	330	184	266	264	251	2910
1987	368	320	255	309	278	211	223	226	198	231	247	293	3159
1988	308	227	212	200	174	179	142	171	182	214	231	241	2481
1989	213	212	186	175	155	180	138	158	169	226	258	257	2327
1990	246	257	239	206	162	160	153	181	199	209	228	346	2586
1991	250	234	180	262	151	150	138	163	167	166	205	218	2284
1992	199	147	169	176	134	135	141	142	150	179	192	192	1956
1993	330	302	284	176	115	194	133	123	301	200	231	209	2598
1994	217	179	197	197	176	197	198	217	228	247	236	210	2499
1995	207	230	147	161	131	142	125	340	636	229	251	263	2862
1996	212	193	168	170	245	463	406	284	437	293	301	266	3438
1997	230	224	190	147	-228	-307	-1	193	321	283	206	143	1401
1998	184	99	183	216	252	157	87	-56	74	295	294	294	2079
1999	274	131	-44	73	66	94	81	32	38	271	310	286	1612
2000	246	179	146	22	184	167	151	172	165	264	301	249	2246
2001	266	210	173	161	143	151	149	173	172	199	218	224	2239
2002	206	178	168	152	130	139	130	128	140	173	199	218	1961
2003	214	171	170	149	122	130	133	136	136	175	199	206	1941
2004	189	163	152	135	119	124	136	148	158	181	187	190	1882
2005	195	144	137	120	98	111	113	117	123	212	209	190	1769
2006	170	153	135	121	68	106	-90	65	138	187	255	225	1533
2007	206	171	144	146	179	166	145	138	149	246	246	233	2169
2008	208	159	137	123	107	124	133	155	152	154	268	208	1928
2009	210	162	152	129	106	101	-66	80	35	93	213	220	1435

Monthly tributary underflow (AF) from Salmon Falls Creek drainage

Based on annual underflow of 111,000 AF (Crosthwaite, 1969) and Silver Creek time series from Trib_Underflow_V2_11_04_09.csv

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Water year underflow (AF)
1980								10,202	9,873	10,202	10,202	9,873	
1981	10,202	9,873	10,202	10,202	9,215	10,202	9,873	9,559	9,250	9,559	9,559	9,250	116,947
1982	9,559	9,250	9,559	9,559	8,634	9,559	9,250	10,937	10,585	10,937	10,937	10,585	119,352
1983	10,937	10,585	10,937	10,937	9,879	10,937	10,585	10,937	10,585	10,937	10,937	10,585	128,780
1984	10,937	10,585	10,937	10,937	10,232	10,937	10,585	10,570	10,229	10,570	10,570	10,229	127,318
1985	10,570	10,229	10,570	10,570	9,547	10,570	10,229	10,018	9,695	10,018	10,018	9,695	121,730
1986	10,018	9,695	10,018	10,018	9,049	10,018	9,695	10,110	9,784	10,110	10,110	9,784	118,412
1987	10,110	9,784	10,110	10,110	9,132	10,110	9,784	9,072	8,779	9,072	9,072	8,779	113,914
1988	9,072	8,779	9,072	9,072	8,486	9,072	8,779	8,842	8,557	8,842	8,842	8,557	105,970
1989	8,842	8,557	8,842	8,842	7,986	8,842	8,557	9,145	8,850	9,145	9,145	8,850	105,603
1990	9,145	8,850	9,145	9,145	8,260	9,145	8,850	8,888	8,601	8,888	8,888	8,601	106,407
1991	8,888	8,601	8,888	8,888	8,028	8,888	8,601	8,869	8,583	8,869	8,869	8,583	104,557
1992	8,869	8,583	8,869	8,869	8,297	8,869	8,583	8,594	8,317	8,594	8,594	8,317	103,356
1993	8,594	8,317	8,594	8,594	7,762	8,594	8,317	9,651	9,339	9,651	9,651	9,339	106,401
1994	9,651	9,339	9,651	9,651	8,717	9,651	9,339	8,566	8,290	8,566	8,566	8,290	108,277
1995	8,566	8,290	8,566	8,566	7,737	8,566	8,290	10,110	9,784	10,110	10,110	9,784	108,481
1996	10,110	9,784	10,110	10,110	9,458	10,110	9,784	10,202	9,873	10,202	10,202	9,873	119,820
1997	10,202	9,873	10,202	10,202	9,215	10,202	9,873	10,386	10,051	10,386	10,386	10,051	121,030
1998	10,386	10,051	10,386	10,386	9,381	10,386	10,051	10,294	9,962	10,294	10,294	9,962	121,833
1999	10,294	9,962	10,294	10,294	9,298	10,294	9,962	9,926	9,606	9,926	9,926	9,606	119,390
2000	9,926	9,606	9,926	9,926	9,286	9,926	9,606	9,072	8,779	9,072	9,072	8,779	112,978
2001	9,072	8,779	9,072	9,072	8,194	9,072	8,779	8,658	8,379	8,658	8,658	8,379	104,770
2002	8,658	8,379	8,658	8,658	7,820	8,658	8,379	8,802	8,518	8,802	8,802	8,518	102,650
2003	8,802	8,518	8,802	8,802	7,950	8,802	8,518	8,793	8,509	8,793	8,793	8,509	103,586
2004	8,793	8,509	8,793	8,793	8,225	8,793	8,509	8,878	8,591	8,878	8,878	8,591	104,229
2005	8,878	8,591	8,878	8,878	8,019	8,878	8,591	9,559	9,250	9,559	9,559	9,250	107,888
2006	9,559	9,250	9,559	9,559	8,634	9,559	9,250	9,710	9,397	9,710	9,710	9,397	113,291
2007	9,710	9,397	9,710	9,710	8,770	9,710	9,397	8,927	8,639	8,927	8,927	8,639	110,462
2008	8,927	8,639	8,927	8,927	8,063	8,927	8,639	8,251	7,985	8,251	8,251	7,985	101,772

Contribution to reach gains between Kimberly and Hagerman (Lower Salmon Falls) from the south side of the Snake River

Water Year	TFCC Diversions (AF)	Measured TFCC Returns (AF)	Effective precipitation on irrigated lands (AF)	ET (AF)	Recharge from TFCC irrigation - Diversions + effective precip, less returns and ET (AF)	Underflow from Salmon Falls drainage (AF)	Estimated south side groundwater contribution, Milner to LSF (AF)	Milner to Kimberly reach gain (AF)	Milner to Kimberly reach gain as fraction of South Side contribution, Milner to LSF	Estimated south side groundwater contribution, Kimberly to LSF (AF)	Kimberly to LSF, reach gain from groundwater (AF)	Reach gain less south side groundwater contribution, Kimberly to LSF (AF)	% of Kimberly to LSF reach gain
1980	1,090,100	223,471						213,700			3,850,700		
1981	1,149,800	235,709	86,069	600,734	399,426	116,947	516,373	110,100	21%	249,078	3,672,967	3,423,888	6.8%
1982	1,035,700	212,319	72,042	612,885	282,539	119,352	401,891	219,900	55%	193,857	3,672,433	3,478,577	5.3%
1983	1,030,100	211,171	106,499	636,897	288,532	128,780	417,312	141,000	34%	201,295	3,895,000	3,693,705	5.2%
1984	993,400	203,647	68,037	585,103	272,687	127,318	400,005	551,200	138%	192,947	3,639,400	3,446,453	5.3%
1985	1,090,400	223,532	76,839	563,322	380,385	121,730	502,115	363,700	72%	242,201	3,719,633	3,477,433	6.5%
1986	1,148,000	235,340	70,313	594,912	388,061	118,412	506,473	291,000	57%	244,303	3,868,767	3,624,464	6.3%
1987	1,133,200	232,306	76,085	626,202	350,778	113,914	464,692	315,900	68%	224,149	3,646,200	3,422,051	6.1%
1988	1,068,100	218,961	68,283	608,033	309,389	105,970	415,359	248,100	60%	200,353	3,578,533	3,378,180	5.6%
1989	1,105,700	226,669	46,676	605,293	320,414	105,603	426,017	232,700	55%	205,494	3,586,600	3,381,106	5.7%
1990	1,183,900	242,700	70,502	598,351	413,352	106,407	519,760	258,600	50%	250,712	3,685,533	3,434,821	6.8%
1991	1,157,200	237,226	63,438	573,356	410,055	104,557	514,612	228,400	44%	248,229	3,595,767	3,347,538	6.9%
1992	1,000,500	205,103	67,444	577,173	285,668	103,356	389,024	195,600	50%	187,650	3,245,333	3,057,683	5.8%
1993	1,027,800	210,699	60,956	561,771	316,286	106,401	422,687	259,800	61%	203,888	3,276,900	3,073,012	6.2%
1994	1,096,200	224,721	71,140	573,679	368,940	108,277	477,217	249,900	52%	230,191	3,241,000	3,010,809	7.1%
1995	1,037,700	212,729	136,058	602,938	358,091	108,481	466,572	286,200	61%	225,056	3,305,300	3,080,244	6.8%
1996	1,170,600	239,973	106,299	572,367	464,559	119,820	584,379	343,800	59%	281,882	3,344,567	3,062,685	8.4%
1997	1,163,800	238,579	63,556	559,437	429,341	121,030	550,370	140,100	25%	265,477	3,760,267	3,494,789	7.1%
1998	1,095,400	224,557	110,146	586,126	394,862	121,833	516,695	207,900	40%	249,234	3,713,800	3,464,566	6.7%
1999	1,129,400	231,527	56,151	569,562	384,462	119,390	503,852	161,200	32%	243,039	3,670,233	3,427,195	6.6%
2000	1,195,900	245,160	61,644	596,998	415,387	112,978	528,364	224,600	43%	254,863	3,452,600	3,197,737	7.4%
2001	1,027,100	210,556	47,295	577,299	286,540	104,770	391,311	223,900	57%	188,753	3,279,300	3,090,547	5.8%
2002	1,003,500	217,760	74,465	564,717	295,489	102,650	398,138	196,100	49%	192,047	3,244,000	3,051,953	5.9%
2003	1,031,300	216,573	72,146	584,292	302,581	103,586	406,167	194,100	48%	195,919	3,140,300	2,944,381	6.2%
2004	1,000,500	218,509	83,541	549,851	315,681	104,229	419,910	188,200	45%	202,548	3,132,300	2,929,752	6.5%
2005	924,400	175,636	71,565	578,127	242,202	107,888	350,089	176,900	51%	168,870	3,068,567	2,899,697	5.5%
2006	1,000,900	221,900	74,433	560,850	292,583	113,291	405,874	153,300	38%	195,778	3,149,500	2,953,722	6.2%
2007	1,066,200	178,055	54,320	579,185	363,279	110,462	473,741	216,900	46%	228,514	3,105,533	2,877,019	7.4%
2008	1,076,400	199,134	72,294	540,778	408,782	101,772	510,554	192,800	38%	246,271	3,128,600	2,882,329	7.9%
Average	1,077,007	219,801	74,580	583,580	347,870	112,114	459,984	233,986	52%	221,878	3,471,367	3,235,941	6.4%

ESPA Contribution to Reach Gain; Snake River - Kimberly to Lower Salmon Falls (AF); groundwater reach gain less south side ground water contribution

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1980								312,745	313,361	266,045	282,545	329,261	
1981	334,379	314,661	312,079	301,779	261,593	265,245	266,728	253,845	286,628	250,645	266,745	309,561	3,423,888
1982	336,702	296,233	298,802	288,735	269,195	275,935	264,567	269,635	282,067	291,235	280,035	325,433	3,478,577
1983	341,904	321,855	334,504	326,704	263,358	272,904	323,855	287,004	288,755	298,904	315,104	318,855	3,693,705
1984	335,257	305,385	310,557	281,557	287,512	281,757	265,085	251,257	238,585	280,657	286,357	322,485	3,446,453
1985	329,096	302,160	297,030	308,830	317,720	274,296	284,660	254,030	260,693	253,030	265,530	330,360	3,477,433
1986	354,318	322,987	315,518	323,951	296,726	277,718	277,687	263,051	287,120	282,251	282,751	340,387	3,624,464
1987	357,629	313,643	303,729	302,629	256,105	267,063	254,143	252,263	257,277	271,563	275,763	310,243	3,422,051
1988	331,697	301,844	299,597	288,197	262,825	268,530	262,044	263,330	255,178	258,030	274,230	312,678	3,378,180
1989	326,780	303,643	296,780	271,180	246,636	274,047	266,210	260,447	247,510	260,347	296,580	330,943	3,381,106
1990	358,373	302,560	293,973	285,673	249,367	264,507	261,960	270,773	286,460	262,207	284,007	314,960	3,434,821
1991	351,484	301,964	293,884	276,784	247,858	256,018	252,164	265,384	255,098	256,318	273,018	317,564	3,347,538
1992	333,139	294,752	283,739	272,839	250,332	245,006	235,019	213,406	211,219	231,906	232,506	253,819	3,057,683
1993	281,484	270,542	260,484	252,884	238,959	252,584	242,442	239,384	255,642	231,484	265,984	281,142	3,073,012
1994	311,650	270,180	273,750	265,850	227,542	237,750	238,480	235,850	217,880	220,750	243,650	267,480	3,010,809
1995	314,186	275,302	271,986	264,386	231,735	243,786	239,902	228,086	264,302	232,986	239,686	273,902	3,080,244
1996	306,291	275,162	267,791	242,691	234,865	232,525	265,562	256,691	233,095	226,925	240,925	280,162	3,062,685
1997	305,619	281,947	290,219	286,019	274,235	320,819	316,547	291,319	290,247	264,753	263,419	309,647	3,494,789
1998	336,999	322,082	295,799	279,632	257,181	290,099	297,615	324,399	304,215	242,032	234,532	279,982	3,464,566
1999	307,892	288,658	314,792	299,958	270,256	292,892	296,358	310,292	294,524	228,458	248,158	274,958	3,427,195
2000	303,213	288,110	284,613	292,013	264,806	257,113	265,510	264,213	235,710	226,213	236,313	279,910	3,197,737
2001	300,536	266,153	266,436	261,036	237,120	252,969	264,253	244,869	231,786	247,269	246,869	271,253	3,090,547
2002	302,189	280,915	275,289	272,689	238,668	248,589	260,315	240,789	222,715	220,989	227,389	261,415	3,051,953
2003	292,160	268,497	270,160	261,860	228,771	235,760	243,997	242,760	203,697	212,060	227,160	257,497	2,944,381
2004	287,244	270,098	272,944	266,844	248,951	244,344	240,098	229,544	204,398	209,644	214,644	240,998	2,929,752
2005	276,724	252,587	256,724	249,224	218,846	231,358	233,287	259,224	230,720	212,758	228,858	249,387	2,899,697
2006	283,272	259,209	263,372	258,172	218,481	247,872	221,609	278,672	219,109	215,172	231,272	257,509	2,953,722
2007	285,759	253,985	241,659	246,059	214,070	239,292	247,285	238,592	211,518	211,792	232,892	254,118	2,877,019
2008	283,641	255,214	256,941	249,141	229,687	231,441	246,814	232,041	226,814	205,941	218,741	245,914	2,882,329