

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 Estimates of Twin Falls South Side Canal

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1980	15.6	9.6	4.9	2.4	0.9	0.2	3.4	10.2	14.1	18.4	21	19.4	120.1
1981	14.9	9.2	4.9	2.1	0.8	0.1	3.7	10.4	15	19.1	21.7	21.4	123.3
1982	16.2	9.8	5.2	2.4	0.7	0	0.7	7.6	13.2	17.9	20.8	20.5	115.1
1983	14.9	8.8	4.7	2	0.5	0.1	1.9	7.6	13.4	18.1	20.4	20.5	112.9
1984	16.1	9.7	5.1	2.4	0.7	0	1	6.5	11.4	16.7	19.7	20.2	109.5
1985	15.4	9.4	5	2.3	0.6	0	2	9.5	15	19.4	21.9	20.5	120.9
1986	15.8	10.1	5.5	2.5	0.9	0.2	3.6	10.3	15.3	19.3	21.6	20.6	125.7
1987	15.9	9.7	5.2	2.4	0.8	0.4	4.4	11	15.5	18.9	21.1	20.1	125.3
1988	16.2	8.7	4.6	1.9	0	0.1	3.8	10.8	14.8	18.3	18.5	14.6	112.3
1989	9.9	4.3	1.6	0.4	0	0.2	2.4	10.4	14.8	18.5	19.8	17.2	99.4
1990	12.6	5.7	2.3	0.5	0	0.5	5.5	11.9	15	18.6	19.4	17	109
1991	12.7	6.1	2.5	0.7	0	0.2	3.7	10.1	14.9	18.3	19.9	17.3	106.3
1992	12.1	5.5	2.2	0.5	0	0.1	6	11.9	14	15.5	15.6	12.5	95.8
1993	8.8	3.9	1.5	0.4	0	0	0.9	8	12.6	17.3	18.9	17.9	90.2
1994	12.8	5.9	2.4	0.5	0	0.3	5.4	10.6	14.2	17.1	17.8	15.7	102.6
1995	10.3	4.7	1.8	0.4	0	0	2.8	8	11.7	16.9	19	18	93.5
1996	13.4	6.1	2.5	0.6	0	0.7	3.8	10.8	15.2	18.7	19.6	17.2	108.6
1997	13.2	6	2.5	0.6	0.5	1.4	4.8	11.3	14.6	18.1	18.7	16.2	107.9
1998	11.7	6.5	2.7	0.9	0.2	1.8	3.5	8.4	12.2	16.8	18.9	16.7	100.2
1999	11.8	5.3	2.1	0.5	1	2.2	4.4	9.3	13.8	17.6	18.8	17	103.8
2000	13.1	6	2.5	0.6	0	0.2	5	11.5	16	19	19.6	16.8	110.3
2001	11.5	5.2	2	0.4	0	0	3.4	10.7	14.7	16.7	16.7	14.7	96
2002	9.7	4.4	1.7	0.4	0	0	1.9	9.2	13.6	17	17.9	15.6	91.6
2003	10.5	4.8	1.8	0.4	0	0	2.6	9.1	14.2	17.4	18.4	15.8	94.8
2004	11.3	5.1	2.1	0.5	0	0	4.1	10.3	13.7	15.6	15.9	14.4	92.9
2005	10.7	4.9	2.1	0.5	0	0	1.8	5.8	10.7	15.3	16.9	15.5	84.1
2006	11	5	2	0.4	0	0	1.6	8.8	13.3	17.2	18.2	15.1	92.6
2007	10.5	4.7	1.8	0.4	0	0.2	4	10.4	14.5	17.6	18	15.5	97.7
2008	10.1	4.5	1.7	0.3	0	0.3	3.1	10.4	14.3	17.8	18.6	16.7	98

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 RC-LSFC-MC-CD-DC (100 Ac-Ft)

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Estimated groundwater flow to Rock, Mud, Cedar Draw, Deep, and LSF Creeks (AF)	Estimated Kimberly to LSF groundwater contributions (AF)
1980	3329	2955	2949	2914	2696	2946	2819	3351	3279	2875	2993	3251	36357	284,300	3,920,000
1981	3240	3003	3006	2925	2548	2688	2788	2773	3062	2755	2869	3095	34752	273,867	3,749,067
1982	3210	2769	2829	2751	2576	2747	2642	2894	3002	3091	2951	3198	34660	272,000	3,738,000
1983	3252	3040	3201	3143	2537	2727	3273	3023	3067	3200	3252	3160	36875	273,233	3,960,733
1984	3212	2869	2954	2687	2781	2812	2655	2653	2509	2997	2975	3194	34298	273,233	3,703,033
1985	3166	2867	2852	2996	3102	2765	2904	2767	2810	2773	2833	3262	35097	280,700	3,790,400
1986	3423	3082	3022	3128	2875	2791	2869	2855	3074	3030	2980	3370	36499	292,467	3,942,367
1987	3448	2970	2900	2909	2472	2692	2643	2745	2751	2895	2893	3065	34383	280,967	3,719,267
1988	3164	2839	2847	2754	2526	2693	2674	2802	2735	2805	2916	3083	33838	272,100	3,655,900
1989	3176	2916	2866	2616	2383	2751	2705	2801	2676	2822	3114	3317	34143	270,000	3,684,300
1990	3558	2939	2875	2801	2447	2710	2753	2927	3048	2882	3050	3195	35185	271,300	3,789,800
1991	3494	2941	2874	2712	2431	2615	2624	2858	2762	2822	2944	3223	34300	267,533	3,697,533
1992	3244	2813	2722	2622	2414	2459	2454	2349	2282	2474	2462	2499	30794	253,233	3,332,633
1993	2754	2608	2518	2450	2322	2531	2452	2530	2713	2501	2796	2826	31001	265,300	3,365,400
1994	3054	2591	2656	2594	2224	2455	2536	2574	2395	2428	2619	2700	30826	242,800	3,325,400
1995	3068	2649	2634	2571	2254	2482	2497	2400	2722	2554	2570	2770	31171	266,000	3,383,100
1996	3022	2673	2620	2388	2306	2348	2724	2775	2579	2528	2607	2857	31427	310,167	3,452,867
1997	3026	2721	2811	2750	2672	3188	3179	3038	3041	2848	2776	3103	35153	358,633	3,873,933
1998	3313	3103	2866	2717	2462	2913	3006	3301	3174	2656	2542	2806	34859	328,700	3,814,600
1999	3015	2774	3059	2923	2616	2906	3016	3166	3106	2517	2631	2756	34485	331,400	3,779,900
2000	3011	2792	2776	2852	2606	2645	2721	2902	2609	2502	2546	2818	32780	271,133	3,549,133
2001	2908	2528	2552	2514	2288	2569	2737	2692	2498	2614	2587	2713	31200	252,433	3,372,433
2002	2956	2688	2656	2636	2310	2530	2676	2660	2460	2445	2459	2623	31099	232,600	3,342,500
2003	2834	2573	2604	2535	2220	2410	2549	2686	2302	2370	2452	2594	30129	227,700	3,240,600
2004	2804	2570	2633	2586	2422	2491	2548	2561	2263	2302	2332	2434	29946	232,500	3,227,100
2005	2649	2396	2445	2389	2105	2349	2376	2588	2344	2285	2392	2447	28765	229,600	3,106,100
2006	2757	2466	2526	2475	2164	2464	2617	2896	2397	2379	2488	2576	30205	262,067	3,282,567
2007	2810	2467	2427	2415	2113	2387	2528	2515	2252	2289	2456	2527	29186	233,067	3,151,667
2008	2787	2488	2522	2448	2267	2402	2529	2510	2422	2288	2367	2485	29515	233,800	3,185,300

Estimated groundwater flow included in RC, LSFC, MC, CD, D (AF)

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1980	26,900	28,000	28,433	28,900	26,200	26,900	19,967	19,967	21,400	15,267	16,667	25,700	284,300
1981	26,700	27,800	28,233	29,500	25,500	26,400	21,567	18,667	18,467	12,067	13,467	25,500	273,867
1982	26,433	27,533	27,967	27,900	26,400	26,300	21,367	17,267	16,667	14,367	14,567	25,233	272,000
1983	25,867	26,967	27,400	28,100	24,800	26,000	21,467	19,567	18,067	12,067	18,267	24,667	273,233
1984	25,467	26,567	27,000	27,000	24,100	26,600	21,067	19,167	19,967	14,167	17,867	24,267	273,233
1985	26,933	28,033	28,000	27,600	25,700	28,800	22,533	20,467	19,067	12,567	15,267	25,733	280,700
1986	27,933	29,033	29,467	29,500	27,400	28,200	23,533	19,667	18,367	15,467	17,167	26,733	292,467
1987	26,833	27,933	28,367	29,700	25,500	26,600	22,433	17,967	18,067	15,267	16,667	25,633	280,967
1988	26,533	27,633	28,067	29,500	25,900	25,500	22,133	19,667	17,267	11,867	12,967	25,067	272,100
1989	25,800	26,900	27,333	27,900	25,000	25,800	20,567	17,967	16,867	13,067	18,200	24,600	270,000
1990	25,633	26,733	27,167	28,500	24,800	24,900	21,233	19,333	20,133	12,867	15,567	24,433	271,300
1991	25,333	26,433	26,867	27,500	24,700	25,100	20,933	19,033	19,167	12,667	15,667	24,133	267,533
1992	25,300	26,400	26,833	28,200	24,700	24,300	20,267	14,167	14,067	12,867	13,067	23,067	253,233
1993	24,700	25,400	25,700	25,700	23,300	26,400	19,900	18,200	19,200	16,200	17,100	23,500	265,300
1994	23,833	24,933	25,833	27,700	23,700	21,400	19,433	17,533	14,133	10,433	12,333	21,533	242,800
1995	25,000	26,100	27,000	28,000	24,500	23,800	19,800	18,700	19,500	13,500	16,300	23,800	266,000
1996	29,133	29,067	28,867	29,200	27,500	32,000	24,733	22,833	20,667	17,167	21,067	27,933	310,167
1997	33,167	29,967	30,867	34,200	29,500	37,400	28,867	26,967	27,767	22,200	25,667	32,067	358,633
1998	30,800	31,900	29,767	29,300	30,900	33,500	25,933	24,500	24,933	17,733	19,833	29,600	328,700
1999	31,433	29,533	28,933	28,700	30,200	36,700	27,033	25,133	23,300	17,700	22,500	30,233	331,400
2000	25,867	26,967	27,800	29,800	25,300	23,800	21,467	19,567	16,567	13,367	15,967	24,667	271,133
2001	23,667	24,767	25,667	27,400	23,700	21,200	19,267	17,200	17,000	14,500	15,600	22,467	252,433
2002	23,167	24,267	25,167	26,500	23,300	21,000	17,767	15,167	13,367	10,067	11,467	21,367	232,600
2003	22,667	23,767	24,667	26,100	22,700	20,500	18,267	16,367	12,367	9,367	11,267	19,667	227,700
2004	23,300	24,400	25,300	26,000	23,700	21,500	17,800	15,200	12,700	9,600	10,900	22,100	232,500
2005	22,167	23,267	24,167	25,700	22,200	19,900	17,767	15,867	16,600	9,600	11,400	20,967	229,600
2006	25,067	26,100	26,700	29,000	24,200	23,300	20,667	18,767	17,767	11,967	14,667	23,867	262,067
2007	23,067	24,167	25,067	26,500	22,400	21,600	18,667	16,100	13,100	9,800	11,500	21,100	233,067
2008	22,767	23,867	24,767	25,800	23,000	20,800	18,367	16,267	16,267	9,467	10,967	21,467	233,800

Reach Gain Snake River Kimberly to Lower Salmon Falls less returns and RC-LSFC-MC-CD-DC, plus groundwater components of RC, LSFC, MC, CD, DC (AF)

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1980	359,800	323,500	323,333	320,300	295,800	321,500	301,867	355,067	349,300	302,767	315,967	350,800	3,920,000
1981	350,700	328,100	328,833	322,000	280,300	295,200	300,367	295,967	324,667	287,567	300,367	335,000	3,749,067
1982	347,433	304,433	310,867	303,000	284,000	301,000	285,567	306,667	316,867	323,467	309,667	345,033	3,738,000
1983	351,067	330,967	347,500	342,400	278,500	298,700	348,767	321,867	324,767	332,067	343,467	340,667	3,960,733
1984	346,667	313,467	322,400	295,700	302,200	307,800	286,567	284,467	270,867	313,867	315,367	343,667	3,703,033
1985	343,533	314,733	313,200	327,200	335,900	305,300	312,933	297,167	300,067	289,867	298,567	351,933	3,790,400
1986	370,233	337,233	331,667	342,300	314,900	307,300	310,433	305,167	325,767	318,467	315,167	363,733	3,942,367
1987	371,633	324,933	318,367	320,600	272,700	295,800	286,733	292,467	293,167	304,767	305,967	332,133	3,719,267
1988	342,933	311,533	312,767	304,900	278,500	294,800	289,533	299,867	290,767	292,367	304,567	333,367	3,655,900
1989	343,400	318,500	313,933	289,500	263,300	300,900	291,067	298,067	284,467	295,267	329,600	356,300	3,684,300
1990	381,433	320,633	314,667	308,600	269,500	295,900	296,533	312,033	324,933	301,067	320,567	343,933	3,789,800
1991	374,733	320,533	314,267	298,700	267,800	286,600	283,333	304,833	295,367	294,867	310,067	346,433	3,697,533
1992	349,700	307,700	299,033	290,400	266,100	270,200	265,667	249,067	242,267	260,267	259,267	272,967	3,332,633
1993	300,100	286,200	277,500	270,700	255,500	279,500	265,100	271,200	290,500	266,300	296,700	306,100	3,365,400
1994	329,233	284,033	291,433	287,100	246,100	266,900	273,033	274,933	253,633	253,233	274,233	291,533	3,325,400
1995	331,800	291,000	290,400	285,100	249,900	272,000	269,500	258,700	291,700	268,900	273,300	300,800	3,383,100
1996	331,333	296,367	290,867	268,000	258,100	266,800	297,133	300,333	278,567	269,967	281,767	313,633	3,452,867
1997	335,767	302,067	311,967	309,200	296,700	356,200	346,767	330,767	331,867	307,000	303,267	342,367	3,873,933
1998	362,100	342,200	316,367	301,000	277,100	324,800	326,533	354,600	342,333	283,333	274,033	310,200	3,814,600
1999	332,933	306,933	334,833	321,000	291,800	327,300	328,633	341,733	333,900	269,400	285,600	305,833	3,779,900
2000	326,967	306,167	305,400	315,000	285,900	288,300	293,567	309,767	277,467	263,567	270,567	306,467	3,549,133
2001	314,467	277,567	280,867	278,800	252,500	278,100	292,967	286,400	266,800	275,900	274,300	293,767	3,372,433
2002	318,767	293,067	290,767	290,100	254,300	274,000	285,367	281,167	259,367	254,567	257,367	283,667	3,342,500
2003	306,067	281,067	285,067	279,600	244,700	261,500	273,167	284,967	242,567	246,367	256,467	279,067	3,240,600
2004	303,700	281,400	288,600	284,600	265,900	270,600	272,600	271,300	239,000	239,800	244,100	265,500	3,227,100
2005	287,067	262,867	268,667	264,600	232,700	254,800	255,367	274,667	251,000	238,100	250,600	265,667	3,106,100
2006	300,767	272,700	279,300	276,500	240,600	269,700	282,367	308,367	257,467	249,867	263,467	281,467	3,282,567
2007	304,067	270,867	267,767	268,000	233,700	260,300	271,467	267,600	238,300	238,700	257,100	273,800	3,151,667
2008	301,467	272,667	276,967	270,600	249,700	261,000	271,267	267,267	258,467	238,267	247,667	269,967	3,185,300

#63 Reach Gain Snake River Milner to Kimberly (100 AF) - Kimberly gage less Milner gage (no diversions, returns, or measured inflows in this reach)

W-YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1980	223	192	190	185	158	172	197	95	223	195	218	226	2274
1981	187	82	50	32	121	120	-20	77	-67	193	216	246	1237
1982	263	232	217	173	189	5	210	143	162	131	273	331	2329
1983	65	-7	39	-47	-48	56	-85	726	160	246	220	215	1540
1984	201	246	357	543	407	103	419	899	1348	324	436	355	5638
1985	344	343	486	406	275	223	244	231	270	277	324	350	3773
1986	281	241	229	201	222	255	221	342	200	288	288	272	3040
1987	384	330	260	311	279	211	228	239	215	253	271	314	3295
1988	323	235	215	200	174	179	146	182	196	230	247	252	2579
1989	219	213	186	175	155	180	141	169	184	243	275	270	2410
1990	254	259	239	206	162	161	159	194	213	226	245	360	2678
1991	258	236	180	262	151	150	142	174	182	183	222	232	2372
1992	207	149	169	176	134	135	148	155	164	193	206	201	2037
1993	335	303	284	176	115	194	134	133	315	217	248	223	2677
1994	226	181	197	197	176	198	205	229	242	263	252	223	2589
1995	214	232	147	161	131	142	128	349	647	244	268	277	2940
1996	221	195	168	170	245	464	411	295	452	310	317	279	3527
1997	239	227	190	-147	228	-305	4	205	335	299	222	156	1653
1998	193	102	183	216	252	159	91	-46	86	311	311	307	2165
1999	282	133	-44	73	67	95	86	42	52	288	326	299	1699
2000	255	181	146	22	184	167	156	184	181	281	318	262	2337
2001	274	212	173	161	143	151	153	185	186	214	233	235	2320
2002	211	179	168	152	130	139	132	137	152	186	212	228	2026
2003	218	172	170	149	122	130	135	144	147	187	211	215	2000
2004	193	163	152	135	119	124	140	156	167	191	197	197	1934
2005	199	145	137	120	98	111	115	122	132	224	221	200	1824
2006	176	154	135	121	68	106	-87	76	152	204	271	236	1612
2007	211	172	144	146	179	166	149	148	161	259	258	242	2235
2008	212	160	137	123	107	124	135	163	162	165	279	217	1984

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	120,100						227,400			3,920,000		
1981	1,149,800	123,300	86,069	600,734	511,835	116,947	628,782	123,700	20%	358,093	3,749,067	3,390,974	9.6%
1982	1,035,700	115,100	72,042	612,885	379,758	119,352	499,109	232,900	47%	284,244	3,738,000	3,453,756	7.6%
1983	1,030,100	112,900	106,499	636,897	386,802	128,780	515,582	154,000	30%	293,625	3,960,733	3,667,108	7.4%
1984	993,400	109,500	68,037	585,103	366,834	127,318	494,152	563,800	114%	281,421	3,703,033	3,421,612	7.6%
1985	1,090,400	120,900	76,839	563,322	483,017	121,730	604,747	377,300	62%	344,405	3,790,400	3,445,995	9.1%
1986	1,148,000	125,700	70,313	594,912	497,701	118,412	616,113	304,000	49%	350,878	3,942,367	3,591,489	8.9%
1987	1,133,200	125,300	76,085	626,202	457,784	113,914	571,698	329,500	58%	325,584	3,719,267	3,393,683	8.8%
1988	1,068,100	112,300	68,283	608,033	416,049	105,970	522,020	257,900	49%	297,292	3,655,900	3,358,608	8.1%
1989	1,105,700	99,400	46,676	605,293	447,682	105,603	553,286	241,000	44%	315,098	3,684,300	3,369,202	8.6%
1990	1,183,900	109,000	70,502	598,351	547,052	106,407	653,459	267,800	41%	372,147	3,789,800	3,417,653	9.8%
1991	1,157,200	106,300	63,438	573,356	540,981	104,557	645,538	237,200	37%	367,635	3,697,533	3,329,898	9.9%
1992	1,000,500	95,800	67,444	577,173	394,971	103,356	498,327	203,700	41%	283,799	3,332,633	3,048,835	8.5%
1993	1,027,800	90,200	60,956	561,771	436,785	106,401	543,186	267,700	49%	309,346	3,365,400	3,056,054	9.2%
1994	1,096,200	102,600	71,140	573,679	491,061	108,277	599,338	258,900	43%	341,324	3,325,400	2,984,076	10.3%
1995	1,037,700	93,500	136,058	602,938	477,320	108,481	585,800	294,000	50%	333,615	3,383,100	3,049,485	9.9%
1996	1,170,600	108,600	106,299	572,367	595,932	119,820	715,752	352,700	49%	407,623	3,452,867	3,045,244	11.8%
1997	1,163,800	107,900	63,556	559,437	560,020	121,030	681,049	165,300	24%	387,859	3,873,933	3,486,074	10.0%
1998	1,095,400	100,200	110,146	586,126	519,219	121,833	641,052	216,500	34%	365,081	3,814,600	3,449,519	9.6%
1999	1,129,400	103,800	56,151	569,562	512,189	119,390	631,579	169,900	27%	359,686	3,779,900	3,420,214	9.5%
2000	1,195,900	110,300	61,644	596,998	550,246	112,978	663,224	233,700	35%	377,708	3,549,133	3,171,426	10.6%
2001	1,027,100	96,000	47,295	577,299	401,096	104,770	505,866	232,000	46%	288,092	3,372,433	3,084,341	8.5%
2002	1,003,500	91,600	74,465	564,717	421,648	102,650	524,298	202,600	39%	298,589	3,342,500	3,043,911	8.9%
2003	1,031,300	94,800	72,146	584,292	424,354	103,586	527,940	200,000	38%	300,663	3,240,600	2,939,937	9.3%
2004	1,000,500	92,900	83,541	549,851	441,290	104,229	545,519	193,400	35%	310,674	3,227,100	2,916,426	9.6%
2005	924,400	84,100	71,565	578,127	333,738	107,888	441,625	182,400	41%	251,507	3,106,100	2,854,593	8.1%
2006	1,000,900	92,600	74,433	560,850	421,883	113,291	535,173	161,200	30%	304,783	3,282,567	2,977,784	9.3%
2007	1,066,200	97,700	54,320	579,185	443,635	110,462	554,097	223,500	40%	315,560	3,151,667	2,836,107	10.0%
2008	1,076,400	98,000	72,294	540,778	509,916	101,772	611,688	198,400	32%	348,358	3,185,300	2,836,942	10.9%
Average	1,077,007	104,841	74,580	583,580	463,243	112,114	575,357	243,876	43%	327,667	3,556,401	3,215,748	9.3%

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								324,653	319,868	272,353	285,553	321,368	
1981	320,287	298,668	298,420	291,587	252,830	264,787	270,934	265,553	295,234	257,153	269,953	305,568	3,390,974
1982	323,292	281,071	286,725	278,859	262,195	276,859	262,204	282,525	293,504	299,325	285,525	321,671	3,453,756
1983	326,129	306,833	322,562	317,462	255,975	273,762	324,633	296,929	300,633	307,129	318,529	316,533	3,667,108
1984	322,830	290,399	298,564	271,864	279,902	283,964	263,499	260,630	247,799	290,030	291,530	320,599	3,421,612
1985	314,283	286,426	283,949	297,949	309,480	276,049	284,626	267,916	271,759	260,616	269,316	323,626	3,445,995
1986	340,433	308,394	301,866	312,499	287,983	277,499	281,594	275,366	296,927	288,666	285,366	334,894	3,591,489
1987	343,981	298,173	290,714	292,948	247,724	268,148	259,973	264,814	266,406	277,114	278,314	305,373	3,393,683
1988	317,753	287,165	287,586	279,720	254,944	269,620	265,165	274,686	266,398	267,186	279,386	308,998	3,358,608
1989	316,638	292,602	287,172	262,738	239,128	274,138	265,168	271,305	258,568	268,505	302,838	330,402	3,369,202
1990	349,826	290,046	283,060	276,993	240,952	264,293	265,946	280,426	294,346	269,460	288,960	313,346	3,417,653
1991	343,509	290,317	283,043	267,476	239,598	255,376	253,117	273,609	265,150	263,643	278,843	316,217	3,329,898
1992	325,662	284,438	274,996	266,362	243,613	246,162	242,404	225,029	219,004	236,229	235,229	249,704	3,048,835
1993	273,827	260,774	251,227	244,427	231,769	253,227	239,674	244,927	265,074	240,027	270,427	280,674	3,056,054
1994	300,244	255,979	262,444	258,111	219,916	237,911	244,979	245,944	225,579	224,244	245,244	263,479	2,984,076
1995	303,466	263,580	262,066	256,766	224,308	243,666	242,080	230,366	264,280	240,566	244,966	273,380	3,049,485
1996	296,808	262,955	256,341	233,475	225,802	232,275	263,722	265,808	245,155	235,441	247,241	280,222	3,045,244
1997	302,825	270,188	279,025	276,259	266,946	323,259	314,888	297,825	299,988	274,059	270,325	310,488	3,486,074
1998	331,093	312,193	285,360	269,993	249,094	293,793	296,527	323,593	312,327	252,326	243,026	280,193	3,449,519
1999	302,385	277,370	304,285	290,451	264,208	296,751	299,070	311,185	304,337	238,851	255,051	276,270	3,420,214
2000	294,975	275,207	273,408	283,008	255,972	256,308	262,607	277,775	246,507	231,575	238,575	275,507	3,171,426
2001	289,999	253,888	256,399	254,332	230,400	253,632	269,288	261,932	243,121	251,432	249,832	270,088	3,084,341
2002	293,407	268,525	265,407	264,740	231,395	248,640	260,825	255,807	234,825	229,207	232,007	259,125	3,043,911
2003	280,531	256,355	259,531	254,064	221,635	235,964	248,455	259,431	217,855	220,831	230,931	254,355	2,939,937
2004	277,386	255,935	262,286	258,286	241,284	244,286	247,135	244,986	213,535	213,486	217,786	240,035	2,916,426
2005	265,706	242,195	247,306	243,239	213,406	233,439	234,695	253,306	230,328	216,739	229,239	244,995	2,854,593
2006	274,881	247,649	253,414	250,614	217,219	243,814	257,316	282,481	232,416	223,981	237,581	256,416	2,977,784
2007	277,266	244,930	240,966	241,199	209,493	233,499	245,530	240,799	212,364	211,899	230,299	247,864	2,836,107
2008	271,961	244,113	247,461	241,094	222,098	231,494	242,713	237,761	229,913	208,761	218,161	241,413	2,836,942