

MEMO

State of Idaho

Department of Water Resources

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Date: August 1, 2007

To: Dave Tuthill

From: Steve Burrell and Liz Cresto

Subject: 2007 water supply update

This memorandum describes the water supply situation projected for the remainder of the 2007 irrigation season for the three largest Surface Water Coalition (SWC) members. These three coalition members are the Twin Falls Canal Company (TFCC), American Falls Reservoir District #2 (AFRD#2) and North Side Canal Company (NSCC). In the *Sixth Supplemental Order Amending Replacement Water Requirements And Order Approving IGWA's 2007 Replacement Water Plan - July 11, 2007*, TFCC was predicted to experience a shortfall of supply during the 2007 irrigation season, and AFRD#2 was predicted to have a shortage of carryover storage going into 2008. Although NSCC was not expected to experience a shortage, their water supply is analyzed here per the request of the canal manager.

This analysis incorporates preliminary water rights accounting data for 2007. These data are updated through July 29, and are in addition to what were used in the *Sixth Supplemental Order*, which were only updated through July 9. Accounting data from previous years were also reviewed and used to develop a more complete picture of the anticipated supply situation for the remainder of 2007.

2007 Water Supply Conditions

At the beginning of the 2007 irrigation season, the water supplies available to SWC members were estimated using the best data available at the time. The water supply was calculated based on the Heise natural flow forecast and the predicted storage allocation. While the Heise natural flow is our best indicator of the water supply in April, it is no longer the best method to use later in the Blackfoot to Milner reach when the natural flow is no longer influenced by snow melt and is instead dependent on spring discharge and reach gains. To get a better picture of the water supply in 2007, crop evapotranspiration rates, spring discharge, reach gains, and historical canal diversion rates were all examined.

Evapotranspiration

Total water use by alfalfa hay at Aberdeen is used to evaluate historical water demand on the Eastern Snake Plain (Figure 1). Crops require more water in hot, dry weather. The rate of alfalfa water use for 2007 appears very similar to 2003.

Spring Discharge

Spring Creek at Sheepskin Road is one of the springs that contribute to the reach gains in the Blackfoot to Neely reach (Figure 2). The pattern of discharge thus far in 2007 is similar to 2003 and 2006.

Reach Gains

The reach gains between Blackfoot and Milner typically are the lowest in late June and early July and increase starting in the middle of July due to increased return flows (Figure 3). It appears that the reach gains this year are beginning to recover and the minimum is similar in magnitude reach gain in 1992. However, the reach gains in 1992 recovered at a faster rate than in 2003, 2005, or 2006. In terms of timing, the 2007 reach gains are more similar to those measured in 2003, 2005, and 2006 than to those measured in 1992.

Twin Falls Canal Company

The *Sixth Supplemental Order* used 1992 as surrogate for estimating the natural flow diversions for the remainder of the irrigation season (Table 1 and Figure 4). After the information meeting on July 23, 2007, IDWR further analyzed the natural flow diverted by TFCC. The updated analysis (Table 2) uses the same methodologies as were used in the *Sixth Supplemental Order* to predict the natural flow diversion by TFCC for the remainder of the irrigation season. The updated monthly analysis includes three weeks of additional preliminary water rights accounting data. Twin Falls South Side diverted the least amount of natural flow in 1992. Table 3 presents historical natural flow data for TFCC for the years considered. The minimum natural flow diversion for July and August both occurred in 2003 and the minimum for September occurred in 1992. However, 1992's natural flow numbers were influenced by a late August frost. October is more difficult to analyze than other months due to the fact that the canal shuts off at a different times each year.

The storage remaining in the TFCC account as of July 29, 2007 was compared to the historical storage use for the remainder of the irrigation season (Table 4). On July 29, 2007 TFCC had 119,216 acre-feet remaining in storage, which includes 40,000 acre-feet of rental water. There have been only two years since 1992 (2003 and 1995) when TFCC used more storage water during the remainder of the season than what is currently available in their account. Assuming 2003 rates of diversion and natural flow usage, TFCC will run out of storage water on September 15, 2007 (Figure 5). The year 2003 was chosen because of the similar water supply conditions as well as having a similar total diversion trend as 2007

(Figure 6). TFCC would still be able to divert any natural flow that is available for diversion under its water right.

Figure 7 shows that TFCC will receive the 1995 minimum full supply on October 20, 2007 assuming the 2003 diversion rate trend for the remainder of the season. However, if the natural flow and subsequent storage demand are similar to 2003, TFCC will run out of storage water prior to meeting the 1995 minimum full supply. They would need 4,935 AF to meet the storage demand. This amount added to the 40,000 acre-feet of rental water the TFCC compares favorably to the 46,929 acre-feet shortfall predicted in the *Sixth Supplemental Order* for the 2007 irrigation season.

American Falls Reservoir District #2

Concern was expressed at the July 23, 2007 informational meeting regarding the *Sixth Supplemental Order* that American Falls Reservoir District #2 (AFRD #2) would run out of storage water by the end of the season. As of July 29, 2007, AFRD #2 had 144,966 acre-feet in its storage account. There have been ten years since 1992 where AFRD #2 has used more storage water than what is currently remaining in its storage account (Table 5). If AFRD #2 diverts at the same rate as during the hot, dry season of 2003 (Figure 8), it will run out of storage on September 30, 2007 (Figure 9). Note that in order to make this determination, the diversion line trend prior to running out of storage was extended resulting in five more days in 2007 than what AFRD #2 received in 2003 when they stopped diverting on September 25.

Figure 10 shows that AFRD #2 will have received its 1995 minimum full supply on September 18, 2007, assuming the 2003 diversion rate trend for the remainder of the season.

North Side Canal Company

Remaining natural flow available for the North Side Canal Company (NSCC) was determined in the same fashion as for the TFCC in the *Sixth Supplemental Order*, using 1992 as a surrogate (Table 6). After the information meeting on July 23, 2007, further analysis was done using preliminary water rights accounting data for 2007 (Table 7), and to show a monthly breakdown (Table 8) of natural flow use for recent low water years. Figure 11 and Figure 12 show the historic daily natural flow use and the cumulative seasonal diversions, respectively for these same years shown in Tables 6, 7, and 8.

As can be seen in Figure 12, 2007 total diversions are tracking close to 1992 and 1994, but diversions in 1992 tapered off at the end of August due to abnormally cool weather. Inspection of

Table 7 and Table 8 show that the natural flow portion of the total diversion after July 31 was uncharacteristically high in 1992 compared to the other recent low water years, probably due to reduced demand from the cool August and September weather. Natural flow was lowest in 2003 for the period from July 31 and through October 31, with 40,475 acre-feet used. Thus, 2003 is also selected [as was done for Twin Falls Canal Company] as

a reasonable comparative year to analyze the draw on remaining 2007 storage supplies for NSCC.

Figure 13 shows the projected use of the remaining storage supply of 352,798 acre-feet available using 2003 natural flow and total diversion rates after July 29 to estimate of demand for the rest of the 2007 season. The remaining storage has been adjusted for Palisades Power Head water, but not for transfers related to conversion acres. As the graph shows, the current storage supply would sustain irrigation through October 12, assuming water use is the same as 2003 from July 29 through the end of the season. Carryover volume would be 17,835 acre-feet.

Figure 14 shows the cumulative 2007 seasonal diversions, assuming 2003 rates after July 29, plotted along with the 1995 minimum full supply volume. If diversions continue at the 2003 rate for the remainder of the 2007 season, NSCC will exceed the 1995 minimum full supply on about September 24. Thus, the minimum full supply is projected to be reached before the storage supply is depleted for NSCC.

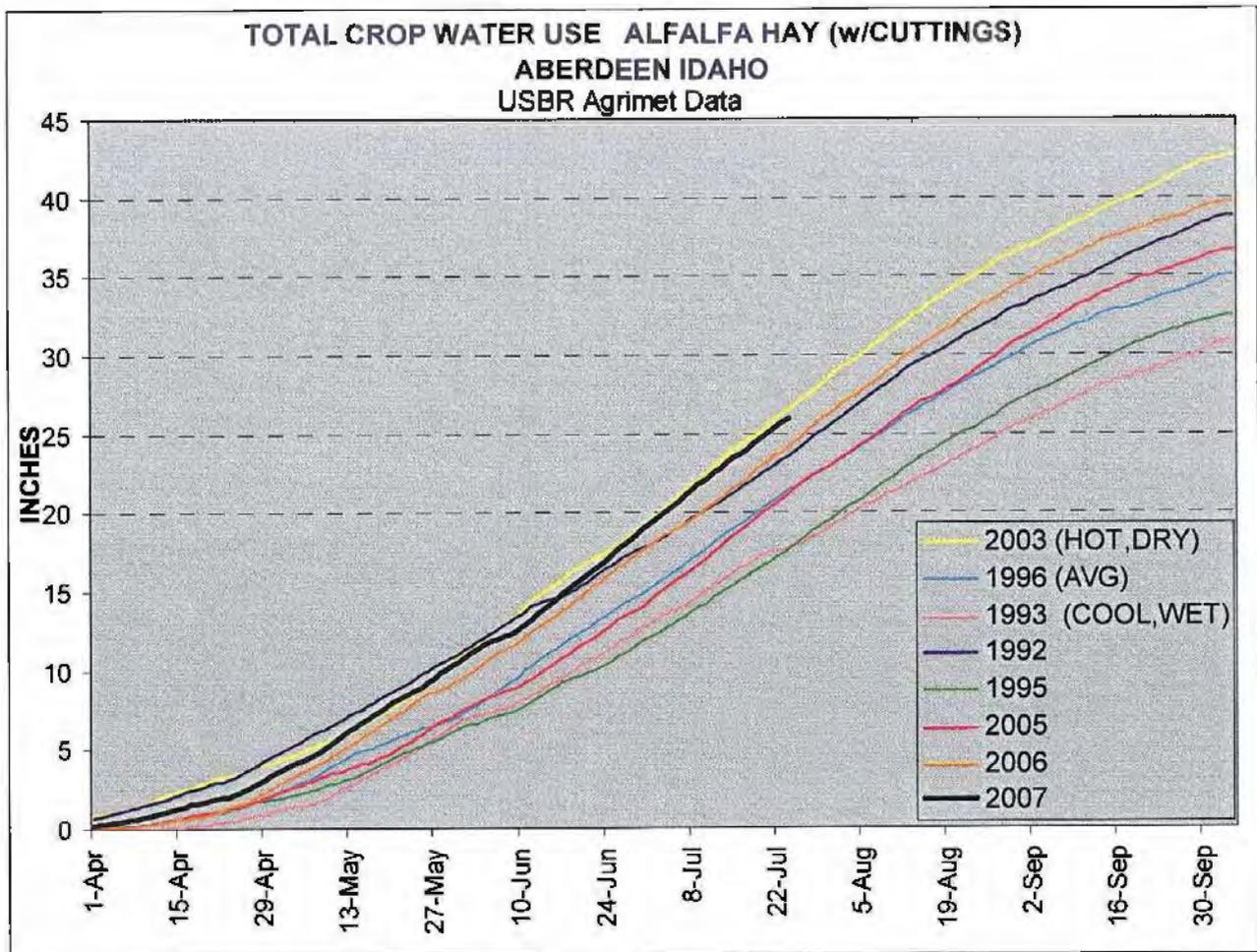


Figure 1: Total crop water use for alfalfa hay at Aberdeen, Idaho.

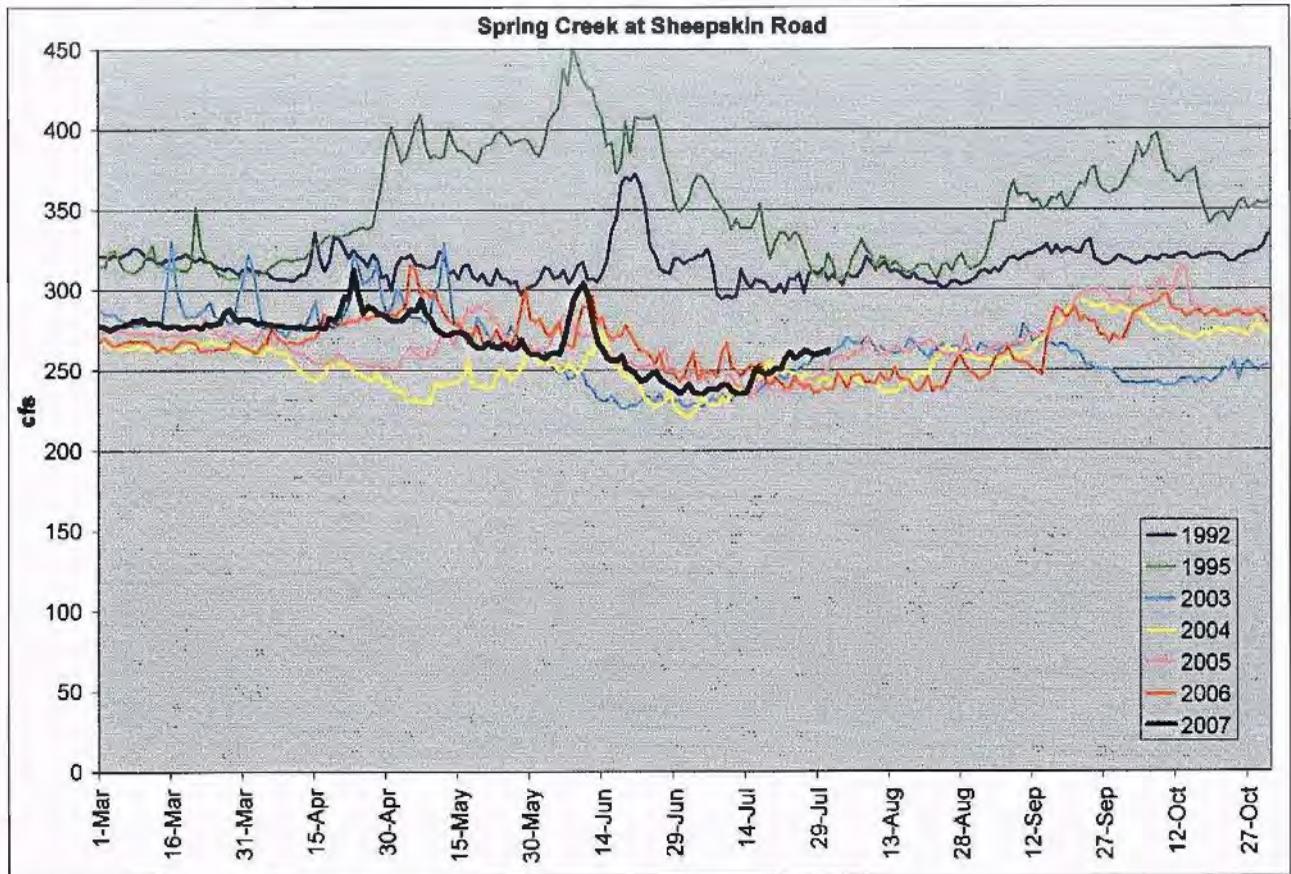


Figure 2: Hydrograph of Spring Creek at Sheepskin Road.

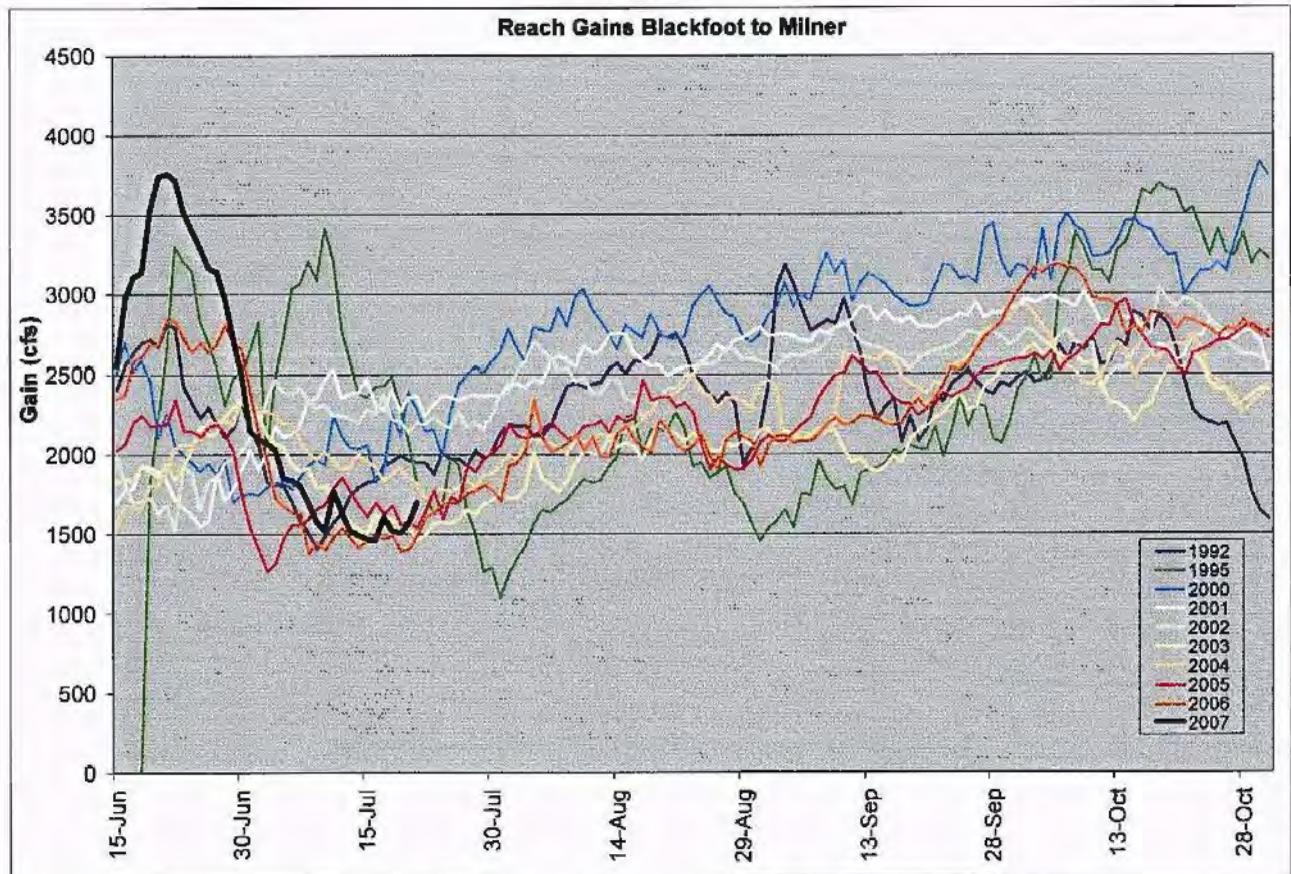


Figure 3: Reach gains in the near Blackfoot to Milner reach of the Snake River.

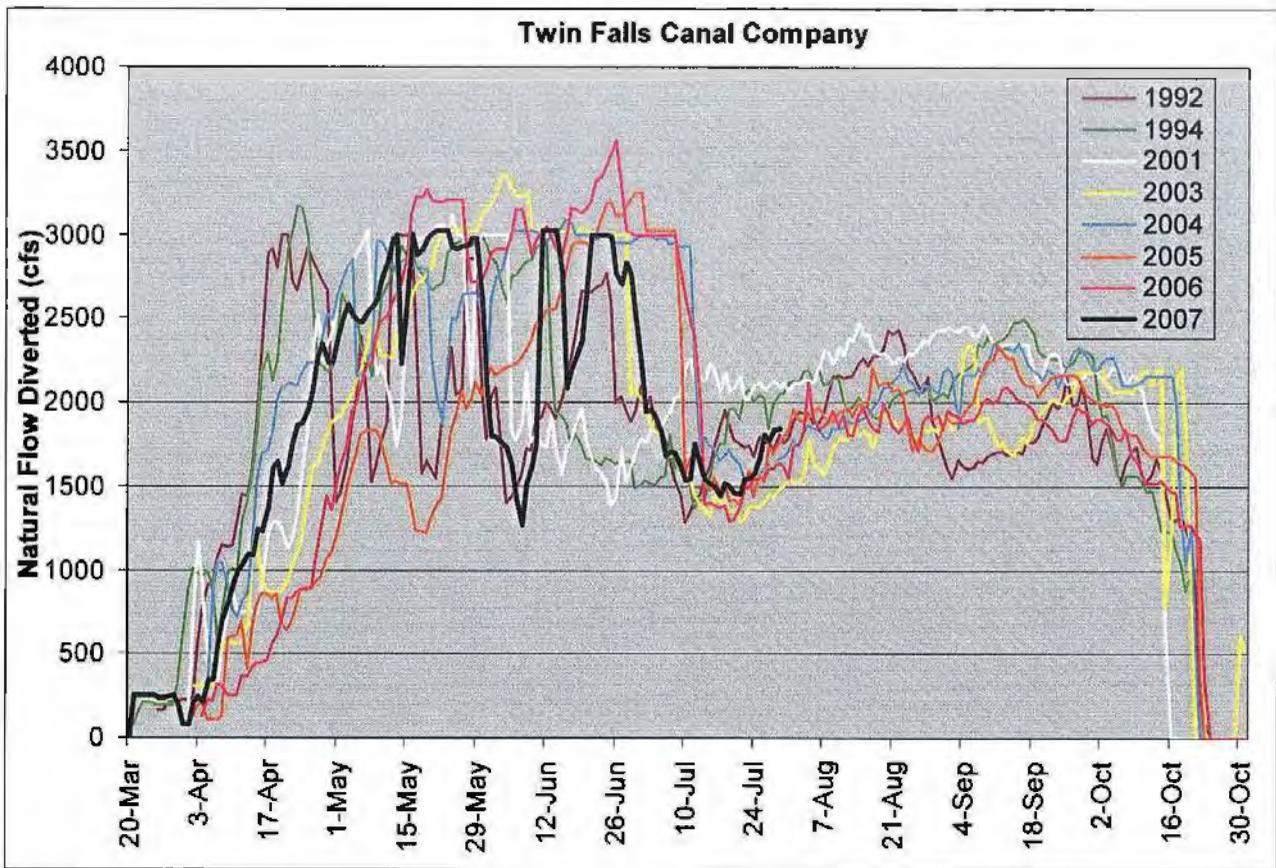


Figure 4: Natural flow diverted by TFCC.

Table 1: 2007 and historical natural flow diverted by TFCC. The table contains the data used to predict the natural flow diversion for Twin Falls from July 9 through October 31.

Original Analysis	Summary								
	2007	2006	2005	2004	2003	2001	1995	1994	1992
Natural Flow Until 7-8	422,376	428,893	347,317	465,467	421,374	378,033	409,934	433,818	399,235
Natural Flow 7-9 to 10-31	375,639	377,393	393,134	417,886	370,000	432,969	485,190	404,418	375,639
Total	798,015	806,286	740,451	883,352	791,374	811,003	895,124	838,236	774,874

Table 2: 2007 and historical natural flow diverted by TFCC. Updated natural flow analysis that includes additional days through July 29 of preliminary water rights accounting data in the 2007.

Updated Analysis	2007	2006	2005	2004	2003	2001	1995	1994	1992
Natural Flow Until 7-29	485,954	499,751	414,075	543,130	480,294	466,370	554,877	508,398	468,860
Natural Flow 7-30 to 10-31	306,014	306,535	326,376	340,223	311,080	344,633	340,248	329,838	306,014
Total	791,967	806,286	740,451	883,352	791,374	811,003	895,124	838,236	774,874

Table 3: Natural flow diverted by TFCC by month from June through October.

Monthly Break Out

Natural Flow Diverted	2007	2006	2005	2004	2003	2001	1995	1994	1992
June	141,384	184,183	161,336	176,600	179,454	112,547	160,418	129,081	123,402
July	103,580	124,732	122,399	131,535	94,043	126,363	211,685	107,773	105,933
August		115,591	118,926	120,868	109,077	141,029	118,125	126,171	129,948
September		115,391	125,877	131,787	116,652	136,691	113,395	136,795	106,061
October		69,283	74,353	80,863	79,282	58,620	96,827	58,622	62,966
August and September		230,982	244,803	252,655	225,729	277,720	231,520	262,966	236,009
August to October		300,265	319,156	333,518	305,010	336,340	328,347	321,588	298,975

Note: July 2007 includes estimated natural flow for July 30 and July 31.

Table 4: Historical storage use from TFCC from July 29, 2007 and the relative evapotranspiration rate.

	Historical Storage Use from 7/30 to 10/31 (AF)	Climatic Conditions Relative Evapotranspiration
1992	45,089	Cool Wet
1993	83,890	
1994	86,073	
1995	172,703	Average
1996	117,990	
1997	15,808	
1998	79,847	High Dry
1999	35,611	
2000	66,168	
2001	39,664	
2002	70,347	
2003	124,150	
2004	63,717	
2005	100,670	
2006	106,055	

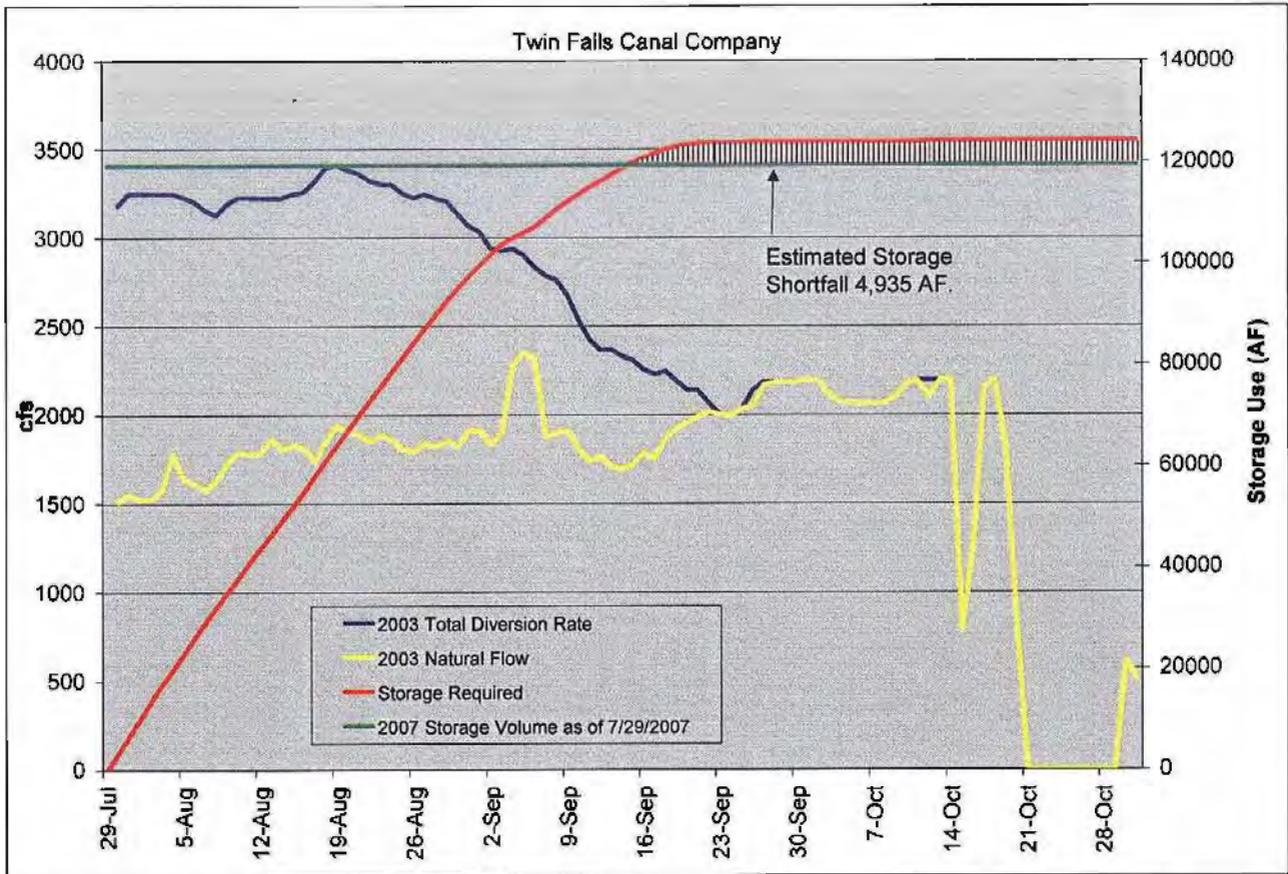


Figure 5: Projected storage and natural flow diversions for TFCC for remainder of the 2007 irrigation season.

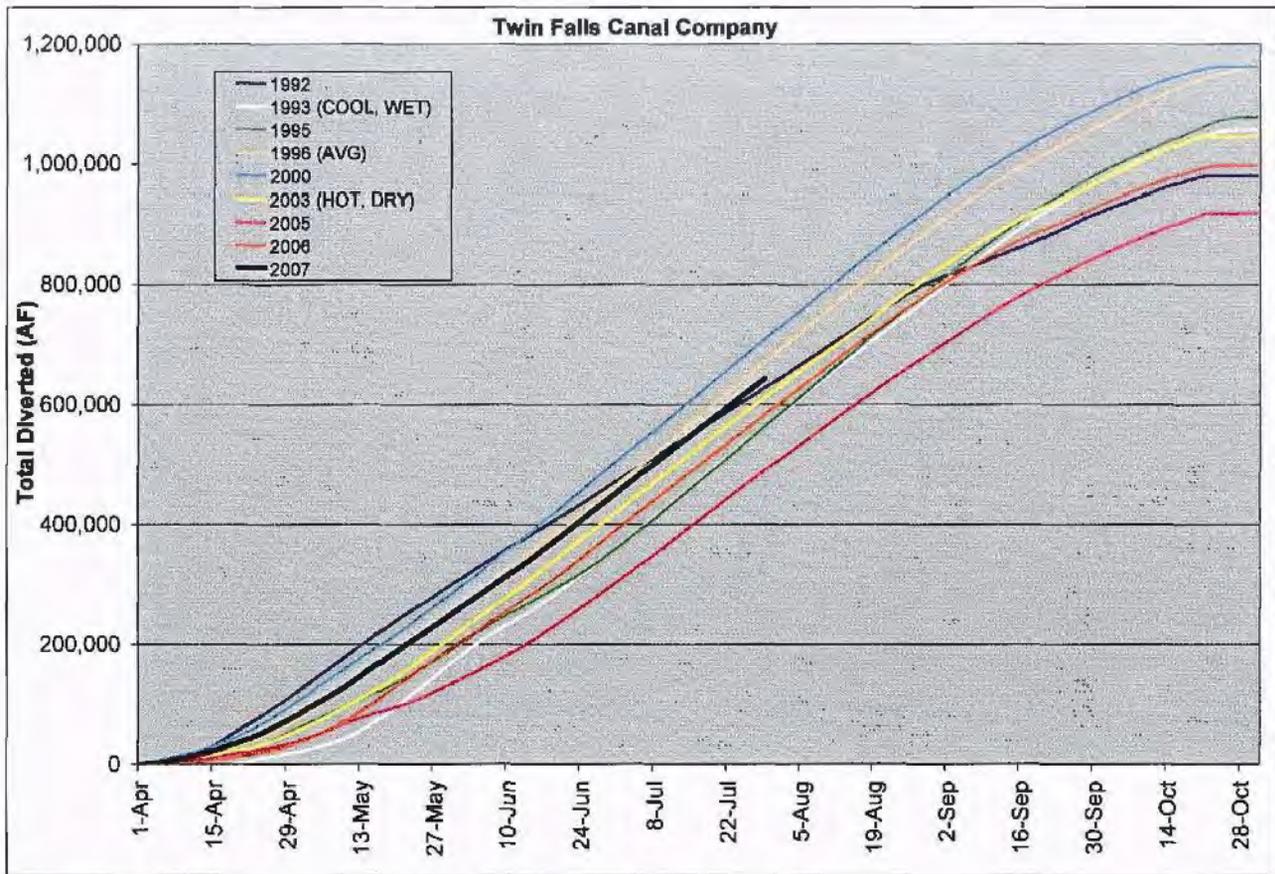


Figure 6: Total diversions by TFCC from April 1 through October 31.

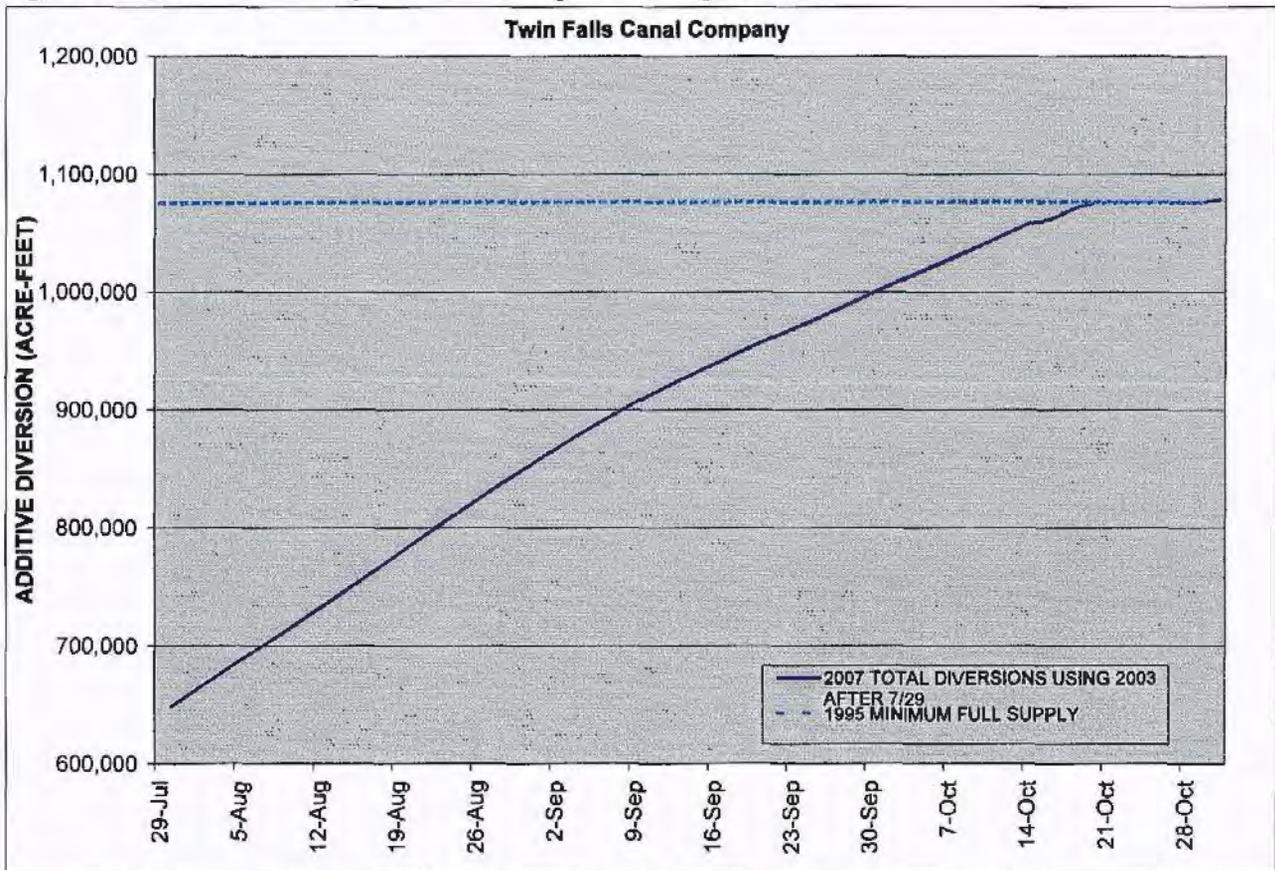


Figure 7: 2007 total diversions for TFCC assuming 2003 rate of diversion after July 29, 2007.

Table 5: Historical storage use from AFRD #2 from July 30, 2007 and the relative evapotranspiration rate.

	Historical Storage Use from 7/30 to 10/31 (AF)	Relative Evapotranspiration
1992	101,262	Low ET
1993	182,108	
1994	148,338	
1995	194,854	Average ET
1996	217,007	
1997	155,838	
1998	213,850	
1999	220,007	High ET
2000	205,194	
2001	141,376	
2002	131,338	
2003	135,402	
2004	66,291	
2005	173,477	
2006	170,468	

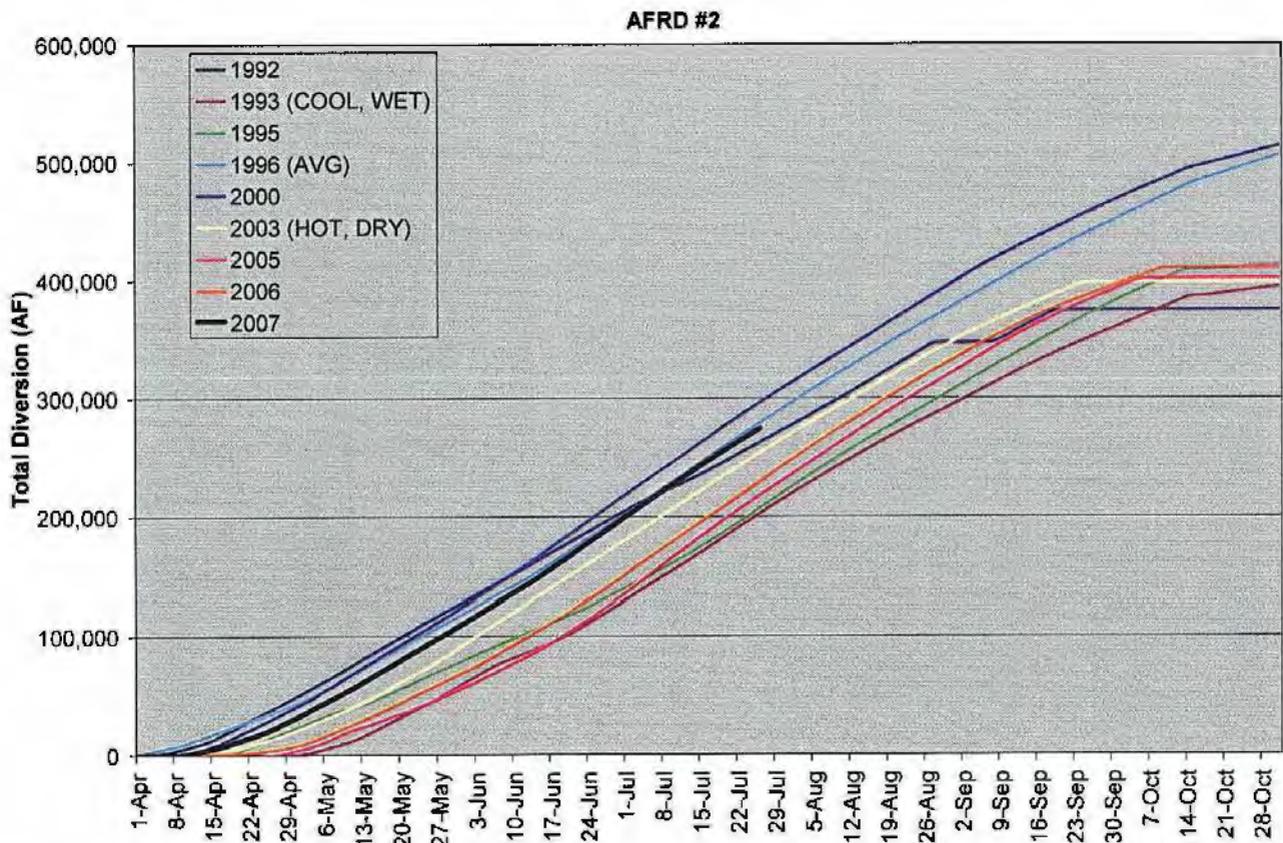


Figure 8: Total diversions by American Falls Reservoir District #2.

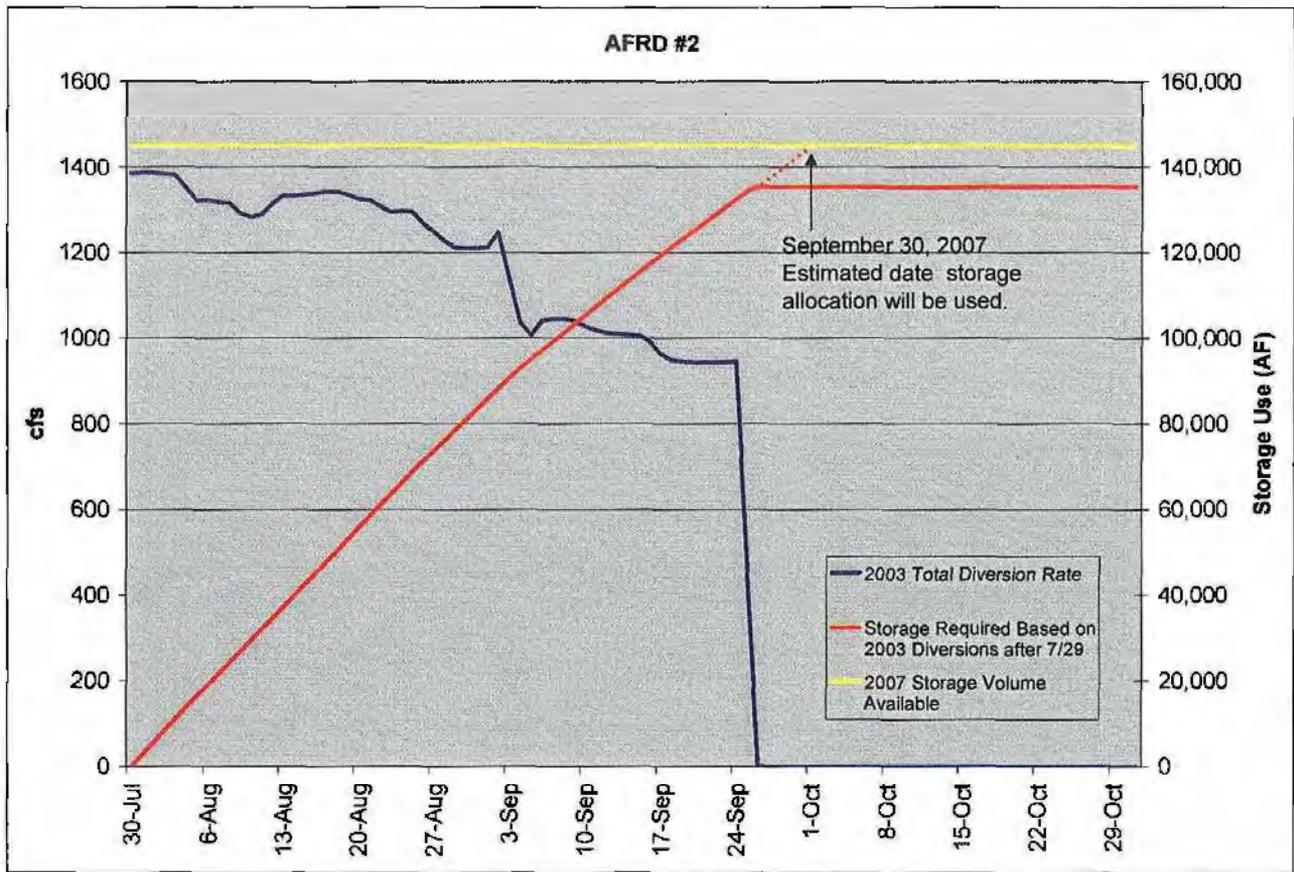


Figure 9: Projected storage use for AFRD #2 for the remainder of the 2007 irrigation season.

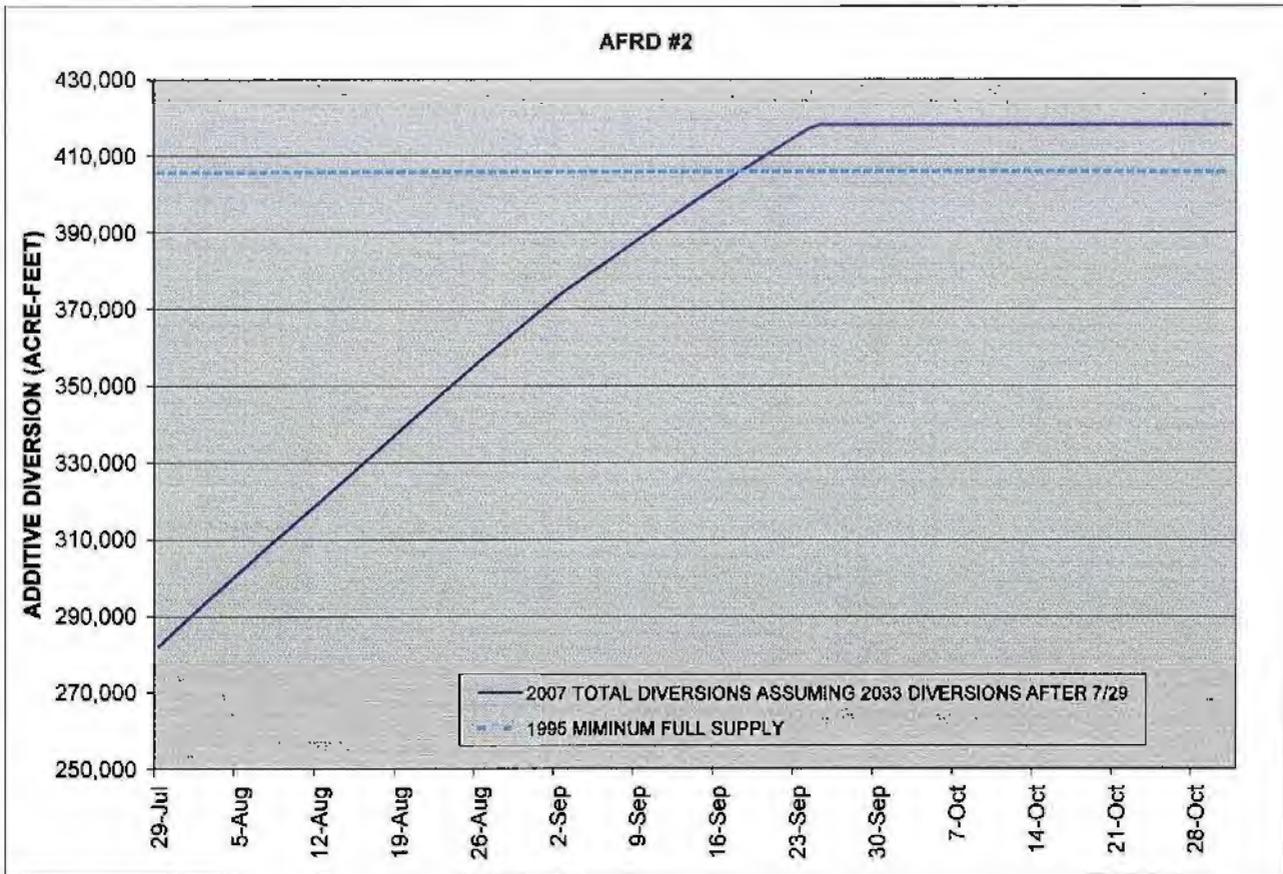


Figure 10: 2007 total diversion for AFRD#2 assuming 2003 rate of diversion after July 29, 2007.

Table 6: 2007 and historical natural flow diverted by North Side Canal Company. The table contains the data used to estimate the natural flow diversion from July 9 through October 31.

Original Analysis	Summary									
	2007	2006	2005	2004	2003	2001	1995	1994	1992	
Natural Flow Until 7-8	233,490	387,029	313,908	254,694	297,297	168,334	384,087	310,583	132,038	
Natural Flow 7-9 to 10-31	68,496	101,695	69,706	57,034	46,707	69,355	229,837	95,784	68,496	
Total	301,986	488,724	383,615	311,728	344,004	237,689	613,924	406,367	200,535	

Table 7: 2007 and historical natural flow diverted by North Side Canal Company. Updated natural flow analysis that includes additional days of preliminary water rights accounting data for 2007 (note: July 2007 amount is estimated for July 30 and 31).

Updated Analysis	Summary									
	2007	2006	2005	2004	2003	2001	1995	1994	1992	
Natural Flow Until 7-31	240,980	396,199	320,988	263,399	303,530	178,441	494,029	318,459	139,388	
Natural Flow 7-31 to 10-31	40,475	92,525	62,627	48,329	40,475	59,248	119,895	87,909	61,147	
Total	281,454	488,724	383,615	311,728	344,004	237,689	613,924	406,367	200,535	

Table 8: Natural flow diverted by North Side Canal by month from June through October.

Monthly Break Out

Natural Flow Diverted	2007	2006	2005	2004	2003	2001	1995	1994	1992
June	21,877	187,241	168,046	109,831	136,548	19,286	142,633	61,510	22,566
July	12,955	21,935	26,470	24,767	11,744	16,837	178,001	13,483	13,194
August		13,319	15,143	15,547	13,745	18,814	14,980	15,923	17,158
September		36,006	17,606	18,198	15,761	22,402	14,396	20,064	26,457
October		41,099	27,657	12,574	9,131	15,259	73,717	49,414	15,349
August and September		49,325	32,749	33,745	29,506	41,216	29,376	35,987	43,615
August to October		90,424	60,406	46,319	38,637	56,475	103,093	85,400	58,964

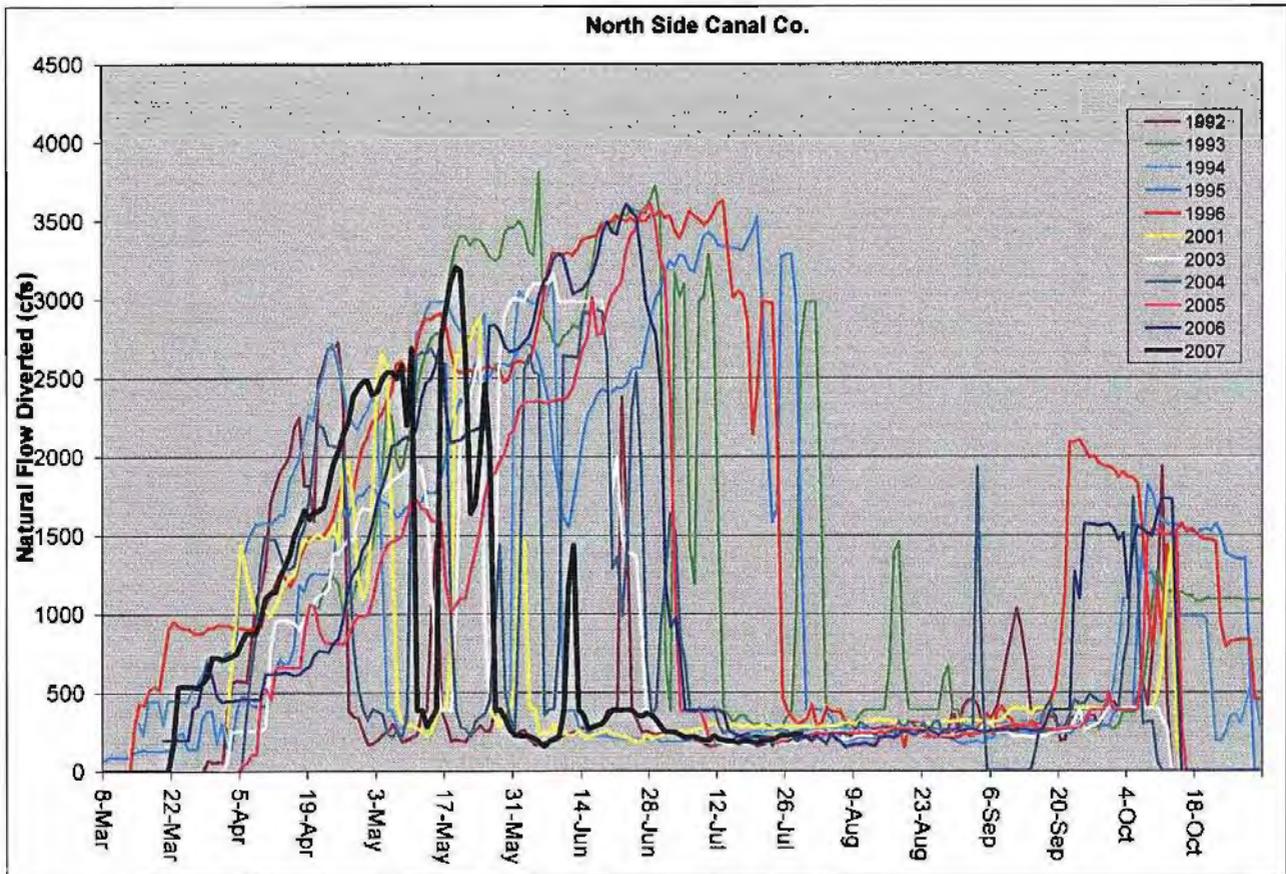


Figure 11: Natural flow diversions by North Side Canal Company.

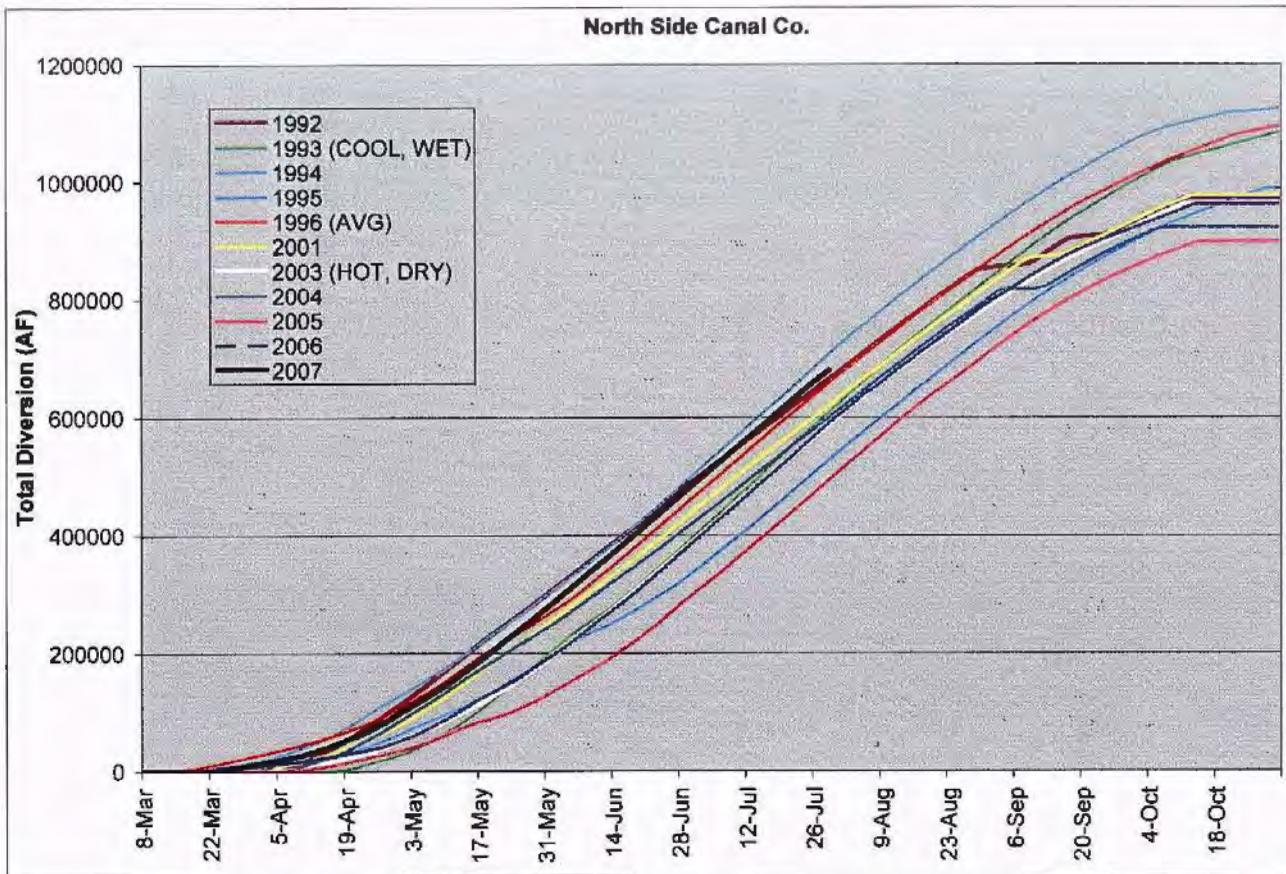


Figure 12: Total acre-feet diverted by North Side Canal Company for irrigation season.

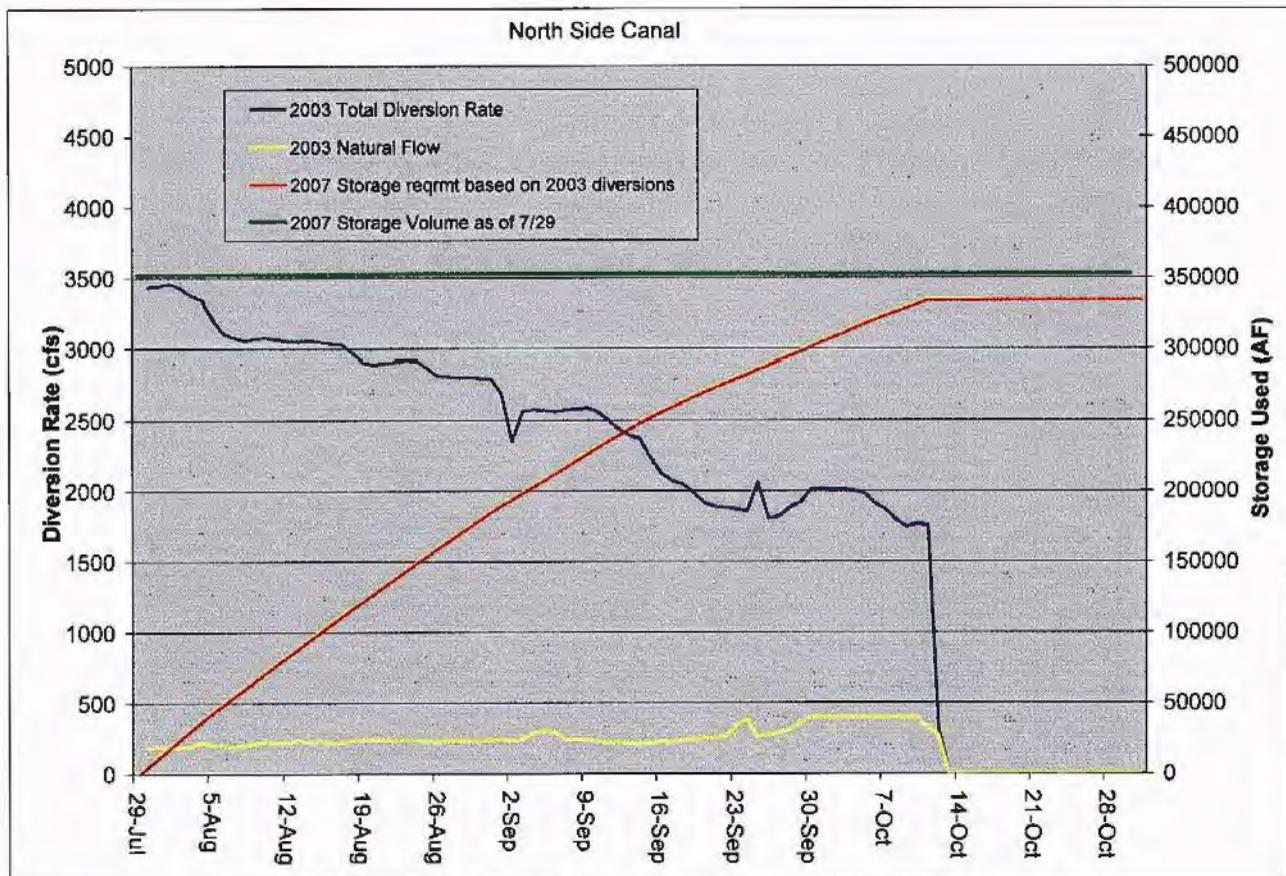


Figure 13: Projected storage use for NSCC for remainder the of 2007 irrigation season.

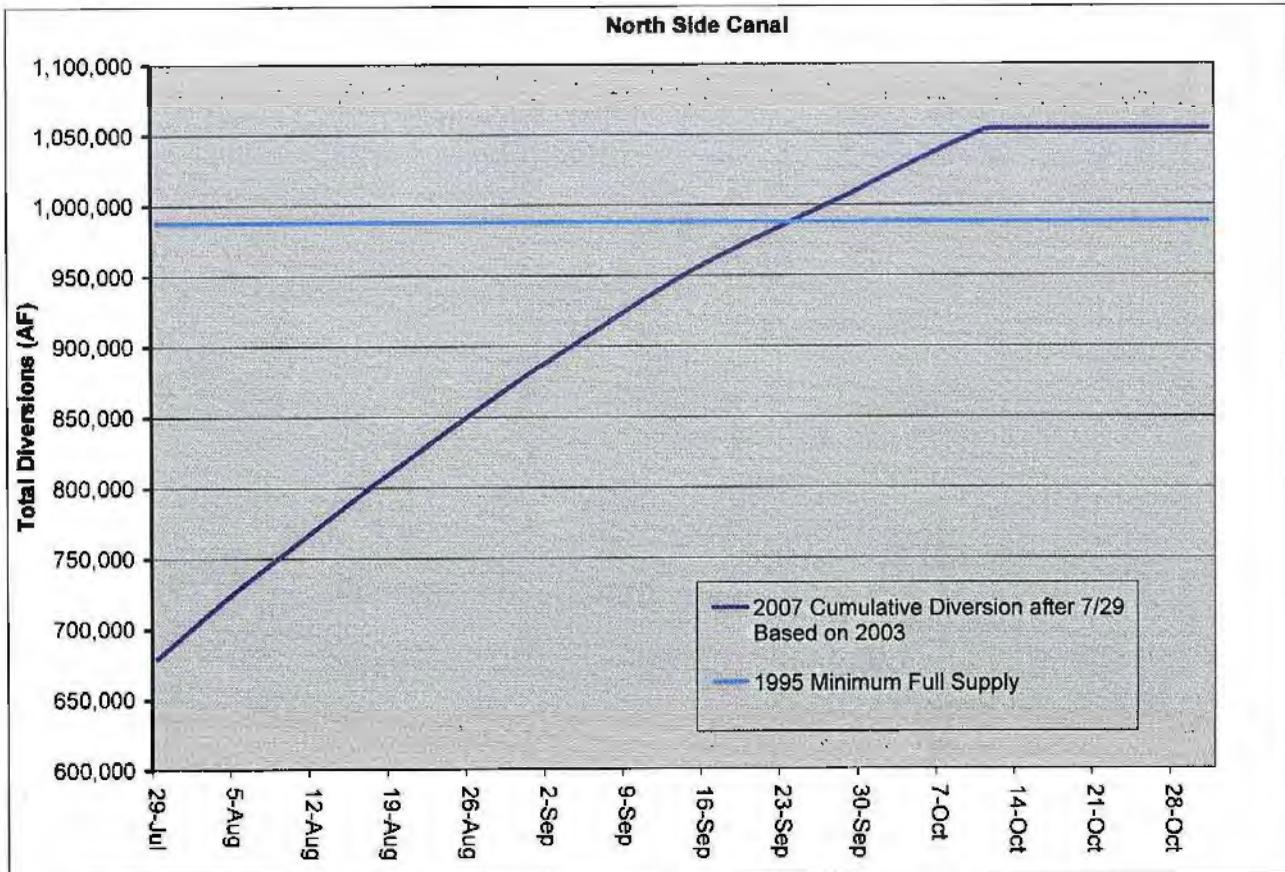


Figure 14: Predicted 2007 Diversions with 1995 minimum full supply requirements.