



MONTEREY COUNTY WATER RESOURCES AGENCY

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SPECIAL BOARD OF DIRECTORS MEETING INTERLAKE TUNNEL PROJECT WORKSHOP

Wednesday, November 19, 2014
9:00 A.M. – 12:00 P.M.

AGRICULTURAL BUSINESS CONFERENCE CENTER
1428 ABBOTT STREET, SALINAS

Staff reports relative to the agenda items listed below will be available for public review on the Agency's website by 3:00 PM on Friday, November 14, 2014 and at the Monterey County Water Resources Agency (Agency), 893 Blanco Circle, Salinas. If additional documents are produced by the Agency and provided to a majority of the Board regarding any item on the agenda after staff reports have been distributed, they will be available at the Agency during normal business hours and posted on the Agency website at http://www.mcwra.co.monterey.ca.us/BOD/BOD/AgendaCurrent_n.htm. For additional information, please contact Wini Chambliss, Clerk to the Board, at (831) 755-4896.

1. CALL TO ORDER/ESTABLISH QUORUM – 9:00 AM.
2. PLEDGE OF ALLEGIANCE
3. INTRODUCTION OF PROJECT TEAM
4. PROJECT BACKGROUND AND HISTORY

5. **PROJECT DESCRIPTION AND FUNCTION**
6. **EVALUATION OF TECHNICAL FEASIBILITY**
7. **EVALUATION OF ENVIRONMENTAL CLEARANCE AND PERMITTING FEASIBILITY**
8. **EVALUATION OF COST AND FINANCIAL FEASIBILITY**
9. **PROJECT DEVELOPMENT PLAN AND SCHEDULE**
10. **NEXT STEPS**
11. **QUESTIONS AND ANSWERS**
12. **PUBLIC COMMENTS**
(Limited to three minutes per speaker on matters within Monterey County Water Resources Agency jurisdiction and not listed on the agenda. Members of the Public will have the opportunity to ask questions or make statements on agenda items as they are considered by the Board.)
13. **BOARD OF DIRECTORS' COMMENTS**
14. **ADJOURNMENT**

**Reservoir Operational Criteria Assumptions used to
develop a Baseline Condition Model for Feasibility
Assessment of the Interlake Tunnel Project**



Monterey County Water Resources Agency
893 Blanco Circle
Salinas, CA 93901

November 2014

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Introduction

The purpose of this document is to describe reservoir operational constraints provided to ECORP Consulting, Inc. (ECORP) by the Monterey County Water Resources Agency (MCWRA) and other data used to develop a Baseline computer model to determine the potential benefits of reservoir operations with an interlake tunnel diverting water from Nacimiento Reservoir to San Antonio Reservoir. This Baseline model was developed on historical inflows, but is not a historical baseline model. As described below, reservoir conservation releases for the model period (1967 – 2013) were developed to support Salinas River Diversion Facility operations during “Dry”, “Normal” and “Wet” years.

This document supplements a series of technical memorandums being written by ECORP to document the results obtained from a reservoir operations simulation model (OASIA) used during feasibility analysis of the Nacimiento-San Antonio Interlake tunnel.

Reservoir Releases/Water Demands

MCWRA staff developed daily release schedules to meet water demands resulting from the operation of the Salinas River Diversion Facility (SRDF) and daily release schedules to meet environmental requirements consisting of minimum fish and block-flow releases. Other demands included in the model are Nacimiento lakeside uses and Nacimiento Water Project (NWP) water orders.

- **NWP Water Orders and Lakeside Use**

The NWP and lakeside use demands used in the computer model are shown in Table 1. These correspond to the Water Year (WY) 2014 water orders submitted to the MCWRA by the San Luis Obispo Department of Public Works on October 16, 2013.

- **Reservoir Conservation Releases**

MCWRA developed daily conservation release schedules after examining historical reservoir releases. Three different daily release schedules were developed for operation of the SRDF during “Dry”, “Normal”, and “Wet” years. A brief explanation of the method to determine a year type is included later in this document.

The assumption used for this analysis is that WY 2013 represents the normal volume of water required for successful SRDF operation. Model release schedules for "Wet" and "Dry" year types were adapted from "Normal" to more closely resemble the start of operations under wet and dry conditions.

For this analysis, the trigger for SRDF operation is having at least 115,000 acre-feet (approximately 2 months of operation) of combined reservoir storage on March 15th.

Table 2 shows monthly average combined reservoir releases meeting SRDF demands and minimum fisheries requirements during a “Dry”, “Normal”, and “Wet” year type. Tables in Appendix A contain the daily releases used to calculate the average daily values by month that are presented in Table 2.

Table 1. Monthly NWP Water Orders and Lakeside Use

Month	NWP Order (acre-ft)	Lakeside Use (acre-ft)
October	1,390.05	141
November	1,153.30	128
December	744.00	118
January	755.25	120
February	1,037.30	121
March	1,033.05	130
April	1,133.30	145
May	1,165.05	157
June	1,707.30	166
July	1,907.05	175
August	1,966.05	169
September	1,758.30	180
Total	15,750.00	1,750

Table 2. Monthly Average Minimum and Conservation Combined Releases

Month	Average Daily Minimum and Conservation Releases by Month (cfs)		
	“Dry” year type	“Normal” year type	“Wet” year type
January	70	70	70
February	70	70	70
March	371	279	70
April	472	463	135
May	529	529	272
June	598	598	598
July	627	627	627
August	668	668	668
September	608	608	608
October	344	344	344
November	70	70	70
December	70	70	70

- **Environmental Releases**

Minimum daily fisheries releases during any year type are 60 cfs from Nacimiento and 10 cfs from San Antonio. Minimum fisheries releases will be made from each reservoir as long as that reservoir remains above minimum pool.

When a block flow is triggered, the higher of the scheduled or block flow releases should be used. To facilitate the downstream migration of smolts and rearing juvenile steelhead in the Salinas River, block-flow releases will be triggered beginning March 15th and ending May 31st of each year when the following conditions are met:

1. Current year is a Normal water year type
2. Combined reservoir storage is 150,00 acre-feet or more
3. Streamflow of 125 cfs or higher at the Nacimiento River below Sapaque USGS stream gage or streamflow of 70 cfs or higher at the Arroyo Seco below Reliz USGS stream gage.

Appendix B shows the block-flow release schedule if the above triggers were met on March 15th.

- **Reservoir Operational Priority**

Operational priority was given to Nacimiento with releases being made up to the hydroelectric plant capacity. Additional releases were made from San Antonio to meet the total demand. The following assumptions were used to simulate Nacimiento releases:

1. Maximum Releases from the Nacimiento hydroelectric facility based on reservoir elevation. These releases were interpolated from observed releases at several reservoir elevations (see Table 3).
2. Assume low-head runner installation at elevation of 735 ft.
3. Assume no releases below the elevation of 687.8 ft. (minimum pool) although releases are possible to dead pool.

Table 3 shows the maximum Nacimiento hydroelectric release capacity using the above assumptions.

Table 3. Maximum Nacimiento Hydroelectric Plant Release Capacity

Reservoir Elevation (ft.)	Maximum Nacimiento Hydroelectric Plant Release Capacity with low-head runner (cfs)	Reservoir Elevation (ft.)	Maximum Nacimiento Hydroelectric Plant Release Capacity with high-head runner (cfs)
668 - 687.75	0	735.05 - 735.5	350
687.8 - 705.7	300	735.55 - 736.5	355
705.75 - 707.2	305	736.55 - 737.5	360
707.25 - 708.7	310	737.55 - 738.5	365
708.75 - 710.2	315	738.55 - 739.5	370
710.25 - 711.7	320	739.55 - 740.5	375
711.75 - 713.2	325	740.55 - 741.5	380
713.25 - 714.7	330	741.55 - 742.5	385
714.75 - 716.2	335	742.55 - 743.5	390
716.25 - 717.7	340	743.55 - 744.5	395
717.75 - 719.2	345	744.55 - 746.5	400
719.25 - 720.7	350	746.55 - 749.5	405
720.75 - 722.2	355	749.55 - 752.5	410
722.25 - 723.7	360	752.55 - 755.45	415
723.75 - 725.2	365	755.5 - 758.45	420
725.25 - 726.7	370	758.5 - 825	425
726.75 - 728.2	375		
728.25 - 729.7	380		
729.75 - 731.2	385		
731.25 - 732.7	390		
732.75 - 734.2	395		
734.25 - 735	400		

Water Year Type

Year types are calculated based on unimpaired annual mean flow at the Arroyo Seco near Soledad USGS gage as developed for Salinas Valley Water Project Flow Prescription. The year types used for this analysis were defined with annual mean flow data from WY 1902 through WY 2012. Appendix C shows the flow criteria used to classify water years. There are 13 “Dry”, 19 “Normal”, and 15 “Wet” year types in the 47-year period going from WY 1967 to WY 2013.

Reservoir Operational Pools

Tables 4 and 5 show the operational reservoir pools for Nacimiento and San Antonio reservoirs, respectively.

Table 4. Nacimiento Reservoir Operational Pools

Operational Pool	Top of Pool Elevation (ft.)	Storage (acre-ft)	Pool Storage (acre-ft)
Dead Pool	670	10,300	10,300
Minimum Pool	687.8	22,300	12,000
Conservation Pool	787.75	311,313	289,013
Flood Pool	800	377,900	66,587

The spillway crest at Nacimiento is at elevation 787.75 ft. with inflatable gates that can be raised to an elevation of 800 ft.

Table 5. San Antonio Reservoir Operational Pools

Operational Pool	Top of Pool Elevation (ft.)	Storage (acre-ft)	Pool Storage (acre-ft)
Dead Pool	645	10,000	10,000
Minimum Pool	666	23,000	13,000
Conservation Pool	774.5	305,000	282,000
Flood Pool	780	335,000	30,000

Reservoir Capacity Curves

The storage capacities and water surface areas at one foot elevation intervals used for reservoir operation simulations are shown in Appendix D.

Reservoir Operational Rule Curves

The following operational rule curves were provided to ECORP. These rules were used to simulate Baseline reservoir operations/conditions, and do not constrain interlake tunnel operations.

- **Nacimiento Rule Curve:** Nacimiento Reservoir was filled with the inflatable gates raised to an elevation of 800 ft.
- **San Antonio Rule Curve:** The rule curve shown in Table 6 was adapted from the “Initial Study and Negative Declaration for the San Antonio Dam and Reservoir Revised Operation Rule Curve” document produced by the MCWRA in April of 2000.

Table 6. MCWRA San Antonio Operational Rule Curve

Beginning of Month		
Month	Elevation (ft.)	Storage (acre-ft)
Jan	774.45	305,000
Feb	774.45	305,000
Mar	777.1	319,000
Apr	780	335,000
May	780	335,000
Jun	780	335,000
Jul	780	335,000
Aug	780	335,000
Sep	778.55	327,000
Oct	776.9	318,000
Nov	775.6	311,000
Dec	774.65	306,000

Reservoir Inflow

ECORP developed daily unimpaired reservoir inflow estimates as documented on their August 29, 2014, “Updated Interlake Tunnel Project Simulation Modeling” Technical Memorandum.

Reservoir Evaporation

Reservoir evaporation data was developed using monthly pan evaporation coefficients developed for Lake Elsinore (DWR Bulletin 73-79, Evaporation from Water Surfaces in California, 1979) and average pan evaporation numbers. The daily volume evaporated from each reservoir was calculated using the average daily evaporation and the reservoir surface area.

Table 7. Pan Evaporation Coefficients and Average Pan Evaporation

Month	Lake Elsinore Pan Evaporation Coefficients	Average Daily Evaporation by month (inches)	
		Nacimiento Reservoir	San Antonio Reservoir
Jan	0.82	0.04	0.05
Feb	0.63	0.05	0.05
Mar	0.68	0.08	0.09
Apr	0.66	0.13	0.13
May	0.68	0.18	0.19
Jun	0.77	0.26	0.26
Jul	0.74	0.27	0.28
Aug	0.78	0.26	0.26
Sep	0.87	0.22	0.22
Oct	0.93	0.16	0.15
Nov	0.97	0.08	0.09
Dec	0.95	0.05	0.05

Appendices

APPENDIX A

Appendix A - Release Schedule meeting SRDF Operation Demands and Minimum Fisheries Requirements

"Dry" Year Daily Combined Reservoir Releases in cfs

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	550	70	70	70	70	70	410	500	540	625	650	650
2	500	70	70	70	70	70	410	500	540	625	650	650
3	500	70	70	70	70	70	410	500	575	625	675	675
4	500	70	70	70	70	70	410	500	575	625	700	700
5	500	70	70	70	70	70	410	500	575	650	700	700
6	475	70	70	70	70	70	410	525	575	650	675	675
7	475	70	70	70	70	135	410	525	600	650	675	675
8	475	70	70	70	70	135	410	525	600	650	675	675
9	475	70	70	70	70	210	410	525	600	650	675	675
10	450	70	70	70	70	310	410	525	600	650	675	650
11	450	70	70	70	70	450	450	525	575	650	675	650
12	450	70	70	70	70	500	450	525	575	625	675	650
13	450	70	70	70	70	500	500	525	575	625	675	625
14	450	70	70	70	70	500	500	525	600	625	675	625
15	425	70	70	70	70	500	500	525	600	600	675	600
16	410	70	70	70	70	500	500	540	600	600	675	600
17	385	70	70	70	70	500	525	540	600	600	650	600
18	360	70	70	70	70	500	525	540	575	600	650	575
19	360	70	70	70	70	500	525	540	575	600	650	550
20	310	70	70	70	70	500	525	540	575	600	650	550
21	310	70	70	70	70	500	525	540	600	600	650	550
22	260	70	70	70	70	500	525	540	600	600	650	550
23	210	70	70	70	70	500	500	540	625	600	650	550
24	160	70	70	70	70	500	500	540	625	600	675	550
25	160	70	70	70	70	500	500	540	625	625	675	550
26	160	70	70	70	70	500	500	540	625	650	700	550
27	160	70	70	70	70	500	500	540	650	650	700	550
28	70	70	70	70	70	500	500	540	650	650	650	550
29	70	70	70	70	70	450	500	540	650	650	650	550
30	70	70	70	70	70	450	500	540	650	650	650	550
31	70		70	70		450		540		650	650	

Appendix A - Release Schedule meeting SRDF Operation Demands and Minimum Fisheries Requirements

"Normal" Year Daily Combined Reservoir Releases in cfs

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	550	70	70	70	70	70	360	500	540	625	650	650
2	500	70	70	70	70	70	385	500	540	625	650	650
3	500	70	70	70	70	70	385	500	575	625	675	675
4	500	70	70	70	70	70	385	500	575	625	700	700
5	500	70	70	70	70	70	385	500	575	650	700	700
6	475	70	70	70	70	70	385	525	575	650	675	675
7	475	70	70	70	70	70	385	525	600	650	675	675
8	475	70	70	70	70	70	385	525	600	650	675	675
9	475	70	70	70	70	70	385	525	600	650	675	675
10	450	70	70	70	70	70	410	525	600	650	675	650
11	450	70	70	70	70	70	450	525	575	650	675	650
12	450	70	70	70	70	70	450	525	575	625	675	650
13	450	70	70	70	70	135	500	525	575	625	675	625
14	450	70	70	70	70	135	500	525	600	625	675	625
15	425	70	70	70	70	210	500	525	600	600	675	600
16	410	70	70	70	70	310	500	540	600	600	675	600
17	385	70	70	70	70	450	525	540	600	600	650	600
18	360	70	70	70	70	500	525	540	575	600	650	575
19	360	70	70	70	70	500	525	540	575	600	650	550
20	310	70	70	70	70	500	525	540	575	600	650	550
21	310	70	70	70	70	500	525	540	600	600	650	550
22	260	70	70	70	70	500	525	540	600	600	650	550
23	210	70	70	70	70	500	500	540	625	600	650	550
24	160	70	70	70	70	500	500	540	625	600	675	550
25	160	70	70	70	70	500	500	540	625	625	675	550
26	160	70	70	70	70	500	500	540	625	650	700	550
27	160	70	70	70	70	500	500	540	650	650	700	550
28	70	70	70	70	70	450	500	540	650	650	650	550
29	70	70	70	70	70	410	500	540	650	650	650	550
30	70	70	70	70	70	360	500	540	650	650	650	550
31	70		70	70	70	360		540		650	650	

Appendix A - Release Schedule meeting SRDF Operation Demands and Minimum Fisheries Requirements

"Wet" Year Daily Combined Reservoir Releases in cfs

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	550	70	70	70	70	70	135	135	540	625	650	650
2	500	70	70	70	70	70	135	135	540	625	650	650
3	500	70	70	70	70	70	135	135	575	625	675	675
4	500	70	70	70	70	70	135	135	575	625	700	700
5	500	70	70	70	70	70	135	135	575	650	700	700
6	475	70	70	70	70	70	135	135	575	650	675	675
7	475	70	70	70	70	70	135	135	600	650	675	675
8	475	70	70	70	70	70	135	135	600	650	675	675
9	475	70	70	70	70	70	135	210	600	650	675	675
10	450	70	70	70	70	70	135	210	600	650	675	650
11	450	70	70	70	70	70	135	210	575	650	675	650
12	450	70	70	70	70	70	135	210	575	625	675	650
13	450	70	70	70	70	70	135	210	575	625	675	625
14	450	70	70	70	70	70	135	260	600	625	675	625
15	425	70	70	70	70	70	135	260	600	600	675	600
16	410	70	70	70	70	70	135	260	600	600	675	600
17	385	70	70	70	70	70	135	260	600	600	650	600
18	360	70	70	70	70	70	135	260	575	600	650	575
19	360	70	70	70	70	70	135	310	575	600	650	550
20	310	70	70	70	70	70	135	310	575	600	650	550
21	310	70	70	70	70	70	135	310	600	600	650	550
22	260	70	70	70	70	70	135	310	600	600	650	550
23	210	70	70	70	70	70	135	310	625	600	650	550
24	160	70	70	70	70	70	135	410	625	600	675	550
25	160	70	70	70	70	70	135	410	625	625	675	550
26	160	70	70	70	70	70	135	410	625	650	700	550
27	160	70	70	70	70	70	135	410	650	650	700	550
28	70	70	70	70	70	70	135	410	650	650	650	550
29	70	70	70	70		70	135	450	650	650	650	550
30	70	70	70	70		70	135	450	650	650	650	550
31	70		70	70		70		500		650	650	

APPENDIX B

Appendix B - Block-Flow Release Schedule if Steelhead Outmigration Triggers are Met on March 15th.

Daily Combined Reservoir Releases in cfs

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1							300					
2							300					
3							300					
4							300					
5							300					
6							300					
7							300					
8							300					
9							300					
10							300					
11							300					
12							300					
13							300					
14							300					
15						700	300					
16						700	300					
17						700	300					
18						700	300					
19						700	300					
20						300	300					
21						300						
22						300						
23						300						
24						300						
25						300						
26						300						
27						300						
28						300						
29						300						
30						300						
31						300						

APPENDIX C

Appendix C - Water Year Type

Year types are calculated based on unimpaired annual mean flow (Q) at the Arroyo Seco near Soledad USGS stream gage as developed for the Salinas Valley Water Project Flow Prescription. Year type definitions using data from WY 1902 through WY 2012 as follows were used for this analysis.

Dry: $Q < 69 \text{ cfs}$
Normal: $69 \text{ cfs} \leq Q < 260 \text{ cfs}$
Wet: $Q \geq 260 \text{ cfs}$

<u>Water Year</u>	<u>Year Type</u>	<u>Water Year</u>	<u>Year Type</u>
1967	Wet	1996	Normal
1968	Dry	1997	Normal
1969	Wet	1998	Wet
1970	Normal	1999	Normal
1971	Normal	2000	Normal
1972	Dry	2001	Normal
1973	Wet	2002	Normal
1974	Normal	2003	Normal
1975	Normal	2004	Normal
1976	Dry	2005	Wet
1977	Dry	2006	Wet
1978	Wet	2007	Dry
1979	Normal	2008	Normal
1980	Wet	2009	Normal
1981	Normal	2010	Wet
1982	Wet	2011	Wet
1983	Wet	2012	Dry
1984	Normal	2013	Normal
1985	Dry		
1986	Wet		
1987	Dry		
1988	Dry		
1989	Dry		
1990	Dry		
1991	Dry		
1992	Normal		
1993	Wet		
1994	Dry		
1995	Wet		

APPENDIX D

Appendix D - Reservoir Capacity Curves

Nacimiento Reservoir Elevation - Storage - Surface Area

Extrapolated below 668.0 ft

Elevation (ft)	Storage (acre-ft)	Surface Area (acres)	Elevation (ft)	Storage (acre-ft)	Surface Area (acres)
650	1,430	90	684	19,150	872
651	1,870	110	685	19,950	882
652	2,310	130	686	20,800	891
653	2,750	150	687	21,650	899
654	3,190	170	688	22,500	907
655	3,630	190	689	23,400	913
656	4,070	210	690	24,300	960
657	4,510	230	691	25,250	998
658	4,950	250	692	26,250	1,035
659	5,390	270	693	27,250	1,073
660	5,830	290	694	28,300	1,100
661	6,270	310	695	29,350	1,148
662	6,710	330	696	30,500	1,177
663	7,150	350	697	31,700	1,206
664	7,590	370	698	32,950	1,234
665	8,030	390	699	34,200	1,263
666	8,470	410	700	35,450	1,292
667	8,910	430	701	36,750	1,325
668	9,350	450	702	38,100	1,358
669	9,800	475	703	39,500	1,391
670	10,300	520	704	40,900	1,424
671	10,800	588	705	42,350	1,457
672	11,350	630	706	43,850	1,500
673	11,900	641	707	45,350	1,542
674	12,450	646	708	46,900	1,585
675	13,000	650	709	48,500	1,627
676	13,600	654	710	50,150	1,670
677	14,200	657	711	51,900	1,713
678	14,850	660	712	53,650	1,755
679	15,500	662	713	55,400	1,798
680	16,150	680	714	57,200	1,840
681	16,850	776	715	59,050	1,883
682	17,600	838	716	60,950	1,928
683	18,350	859	717	62,850	1,973

Appendix D - Reservoir Capacity Curves

Nacimiento Reservoir Elevation - Storage - Surface Area

Extrapolated below 668.0 ft

Elevation (ft)	Storage (acre-ft)	Surface Area (acres)	Elevation (ft)	Storage (acre-ft)	Surface Area (acres)
718	64,850	2,018	752	157,850	3,458
719	66,900	2,063	753	161,300	3,505
720	69,000	2,108	754	164,910	3,553
721	71,150	2,148	755	168,520	3,601
722	73,300	2,189	756	172,130	3,647
723	75,500	2,229	757	175,740	3,692
724	77,750	2,270	758	179,350	3,738
725	80,050	2,310	759	183,100	3,783
726	82,400	2,352	760	186,950	3,829
727	84,800	2,394	761	190,850	3,874
728	87,250	2,436	762	194,800	3,919
729	89,700	2,478	763	198,750	3,964
730	92,150	2,520	764	202,740	4,008
731	94,650	2,562	765	206,650	4,053
732	97,250	2,605	766	210,650	4,100
733	99,900	2,647	767	214,750	4,147
734	102,550	2,690	768	218,950	4,195
735	105,250	2,732	769	223,200	4,242
736	108,000	2,773	770	227,500	4,289
737	110,750	2,815	771	231,850	4,339
738	113,600	2,856	772	236,200	4,389
739	116,500	2,898	773	240,600	4,440
740	119,450	2,939	774	245,050	4,490
741	122,450	2,981	775	249,550	4,545
742	125,500	3,023	776	254,150	4,589
743	128,550	3,065	777	258,800	4,638
744	131,600	3,107	778	263,450	4,688
745	134,650	3,149	779	268,150	4,737
746	137,750	3,192	780	272,900	4,786
747	140,900	3,234	781	277,700	4,833
748	144,200	3,277	782	282,600	4,880
749	147,550	3,319	783	287,500	4,926
750	150,950	3,362	784	292,450	4,973
751	154,400	3,410	785	297,400	5,020

Appendix D - Reservoir Capacity Curves

Nacimiento Reservoir Elevation - Storage - Surface Area

Extrapolated below 668.0 ft

<u>Elevation (ft)</u>	<u>Storage (acre-ft)</u>	<u>Surface Area (acres)</u>	<u>Elevation (ft)</u>	<u>Storage (acre-ft)</u>	<u>Surface Area (acres)</u>
786	302,400	5,065	820	503,250	6,933
787	307,450	5,110	821	510,200	6,966
788	312,600	5,154	822	517,150	7,000
789	317,800	5,199	823	524,150	7,050
790	323,050	5,244	824	531,150	7,100
791	328,350	5,291	825	538,250	7,150
792	333,700	5,339			
793	339,050	5,386			
794	344,450	5,435			
795	349,850	5,481			
796	355,300	5,530			
797	360,850	5,579			
798	366,500	5,629			
799	372,200	5,678			
800	377,900	5,727			
801	383,700	5,800			
802	389,500	5,850			
803	395,350	5,900			
804	401,250	5,950			
805	407,200	6,050			
806	413,250	6,075			
807	419,350	6,100			
808	425,450	6,150			
809	431,600	6,200			
810	437,800	6,300			
811	444,100	6,400			
812	450,500	6,425			
813	456,950	6,450			
814	463,400	6,475			
815	469,850	6,500			
816	476,300	6,550			
817	482,850	6,700			
818	489,550	6,800			
819	496,350	6,900			

Appendix D - Reservoir Capacity Curves

San Antonio Reservoir Elevation - Storage - Surface Area

Extrapolated below 652.0 ft

Elevation (ft)	Storage (acre-ft)	Surface Area (acres)	Elevation (ft)	Storage (acre-ft)	Surface Area (acres)
630	2,422	132	665	22,350	768
631	2,925	152	666	23,150	785
632	3,429	172	667	23,950	804
633	3,932	192	668	24,750	823
634	4,436	212	669	25,600	843
635	4,939	232	670	26,500	868
636	5,443	252	671	27,350	891
637	5,946	272	672	28,300	911
638	6,450	292	673	29,200	928
639	6,954	312	674	30,150	947
640	7,457	332	675	31,100	969
641	7,961	352	676	32,100	995
642	8,464	372	677	33,150	1,023
643	8,968	392	678	34,200	1,047
644	9,471	412	679	35,250	1,073
645	9,975	432	680	36,350	1,100
646	10,504	453	681	37,500	1,126
647	11,007	473	682	38,650	1,151
648	11,511	493	683	39,800	1,177
649	12,014	513	684	41,000	1,202
650	12,518	533	685	42,250	1,226
651	13,021	553	686	43,500	1,252
652	13,525	573	687	44,750	1,279
653	14,150	588	688	46,000	1,303
654	14,750	602	689	47,350	1,330
655	15,350	618	690	48,750	1,360
656	16,000	632	691	50,150	1,398
657	16,650	645	692	51,600	1,427
658	17,300	660	693	53,050	1,446
659	18,000	677	694	54,500	1,465
660	18,650	691	695	56,000	1,488
661	19,400	706	696	57,500	1,513
662	20,100	721	697	59,050	1,539
663	20,850	736	698	60,600	1,562
664	21,600	757	699	62,200	1,582

Appendix D - Reservoir Capacity Curves

San Antonio Reservoir Elevation - Storage - Surface Area

Extrapolated below 652.0 ft

Elevation (ft)	Storage (acre-ft)	Surface Area (acres)	Elevation (ft)	Storage (acre-ft)	Surface Area (acres)
700	63,800	1,605	735	145,250	3,058
701	65,450	1,636	736	148,350	3,100
702	67,100	1,662	737	151,500	3,143
703	68,750	1,687	738	154,650	3,183
704	70,500	1,714	739	157,900	3,221
705	72,250	1,752	740	161,150	3,268
706	74,050	1,802	741	164,500	3,334
707	75,900	1,840	742	167,850	3,379
708	77,750	1,875	743	171,300	3,419
709	79,650	1,915	744	174,750	3,456
710	81,650	1,964	745	178,250	3,493
711	83,650	2,020	746	181,800	3,543
712	85,700	2,068	747	185,350	3,584
713	87,850	2,107	748	189,000	3,617
714	90,000	2,148	749	192,650	3,650
715	92,200	2,198	750	196,350	3,693
716	94,450	2,255	751	200,100	3,752
717	96,750	2,300	752	203,900	3,800
718	99,050	2,338	753	207,700	3,843
719	101,450	2,372	754	211,600	3,883
720	103,850	2,413	755	215,550	3,932
721	106,300	2,463	756	219,550	4,024
722	108,800	2,495	757	223,650	4,079
723	111,350	2,533	758	227,750	4,128
724	113,900	2,578	759	231,950	4,181
725	116,550	2,624	760	236,200	4,241
726	119,250	2,684	761	240,500	4,318
727	121,950	2,727	762	244,900	4,379
728	124,700	2,765	763	249,300	4,434
729	127,550	2,806	764	253,800	4,489
730	130,400	2,847	765	258,350	4,555
731	133,250	2,891	766	263,000	4,646
732	136,200	2,932	767	267,700	4,709
733	139,200	2,975	768	272,500	4,762
734	142,200	3,014	769	277,300	4,816

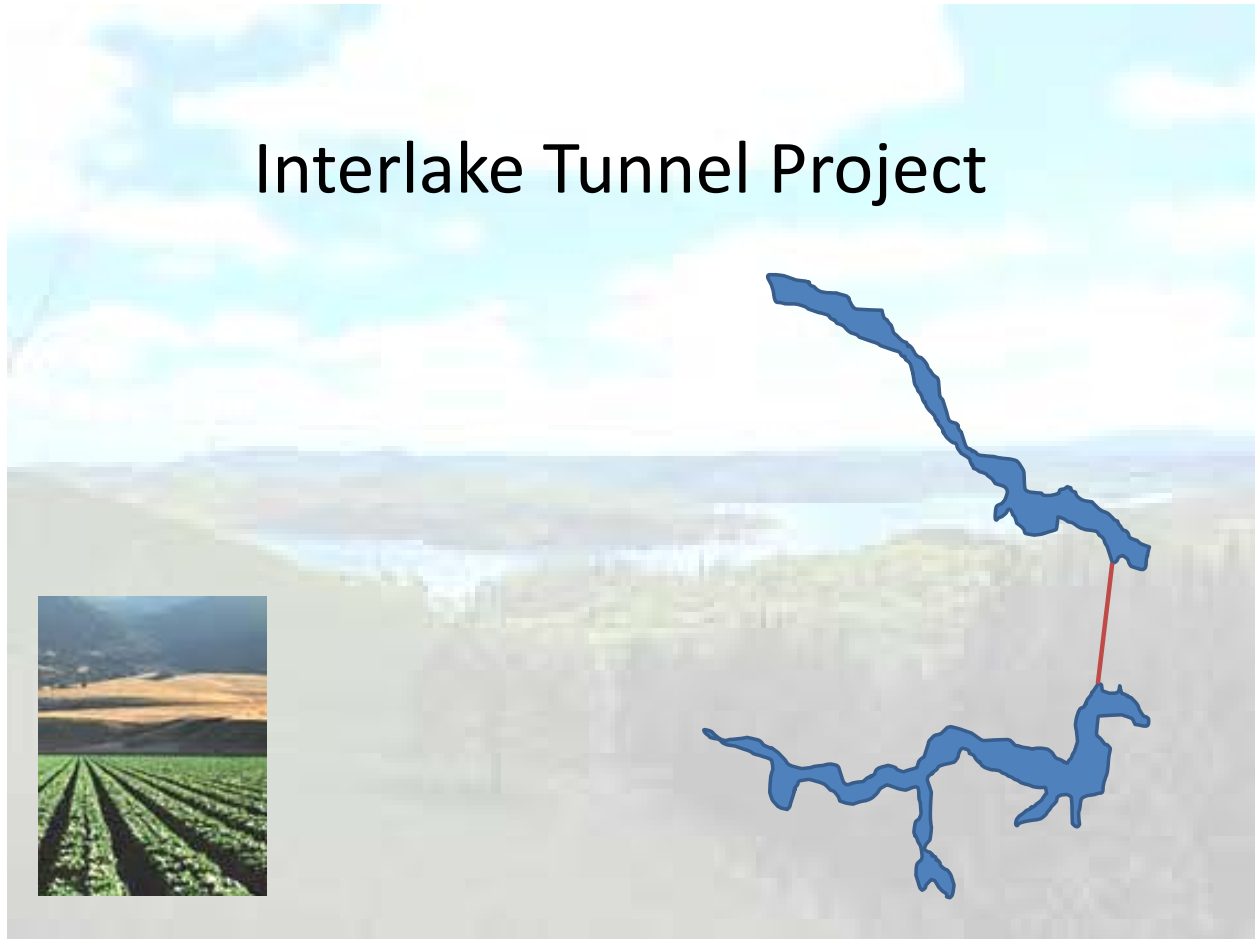
Appendix D - Reservoir Capacity Curves

San Antonio Reservoir Elevation - Storage - Surface Area

Extrapolated below 652.0 ft

Elevation (ft)	Storage (acre-ft)	Surface Area (acres)
770	282,200	4,880
771	287,150	4,969
772	292,200	5,034
773	297,250	5,092
774	302,400	5,148
775	307,650	5,223
776	312,950	5,319
777	318,350	5,384
778	323,800	5,448
779	329,300	5,523
780	335,000	5,602
781	340,700	5,711
782	346,450	5,781
783	352,250	5,838
784	358,150	5,894
785	364,100	5,958
786	370,150	6,029
787	376,200	6,092
788	382,400	6,156
789	388,600	6,223
790	394,900	6,295
791	401,300	6,378
792	407,750	6,450
793	420,800	6,581
794	420,800	6,581
795	434,250	6,753

Interlake Tunnel Project



Interlake Tunnel Status Report October 28, 2014

Presented to:

**Joint Meeting of the Monterey County Water Resources Agency Board
of Directors
and
Monterey County Board of Supervisors**



November 9, 2014

TO: Monterey County Water Resources Agency

FROM: Ron Drake, P.E.
EPC Consultants, Inc.

SUBJECT: Technical Memorandum No. 14-01 – Interlake Tunnel Status Report, October 28, 2014
Rev 2

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2. Executive Summary

This memorandum documents an Interlake Tunnel project status report presented to a joint meeting of the Monterey County Water Resources Agency (MCWRA) Board of Directors and the Monterey County Board of Supervisors on October 28, 2014.

The tunnel project's benefits of additional flood control and increased conservation releases from the Nacimiento and San Antonio reservoirs were revealed through results of hydrologic modeling which simulated the tunnel operation over the 47 year operating history of the reservoirs. The economic feasibility of the project was demonstrated through value comparisons of the project's benefits with current water delivery costs and flood damage impacts in the Salinas River basin.

The presentation included a project development plan describing the steps, interim financing requirements and critical path activities to obtain Proposition 218 tax assessment approval.

3. Project Background

The Interlake Tunnel has been under consideration since 1978 as a means to manage flood control releases from the Nacimiento Reservoir. The project has continued to be a top regional priority and was identified in the Monterey County Water Resource Agency Capital Facilities Plan prepared by Boyle Engineering in July 1991. No definitive action was taken to advance the project until May, 2014 when a group of farmers lead by Bob Antle revitalized the urgency for the tunnel project due to the heightened awareness from the multi-year drought. The project, as originally conceived, will provide additional flood control and increased conservation releases by conveying excess inflows through the tunnel from Nacimiento Reservoir to the San Antonio Reservoir which fills at 1/3 the rate as Nacimiento. The project provides reduced flood releases and additional storage for conservation releases.

3.1. Existing Surface Water Supply

Figure 1 summarizes the existing surface water supply to the Salinas Valley from the Salinas River and the two upstream reservoirs, Nacimiento built in 1957, and San Antonio, built in 1966. The average annual controlled releases from these reservoirs to the Salinas River is approximately 200,000 acre feet based on hydrologic modeling.

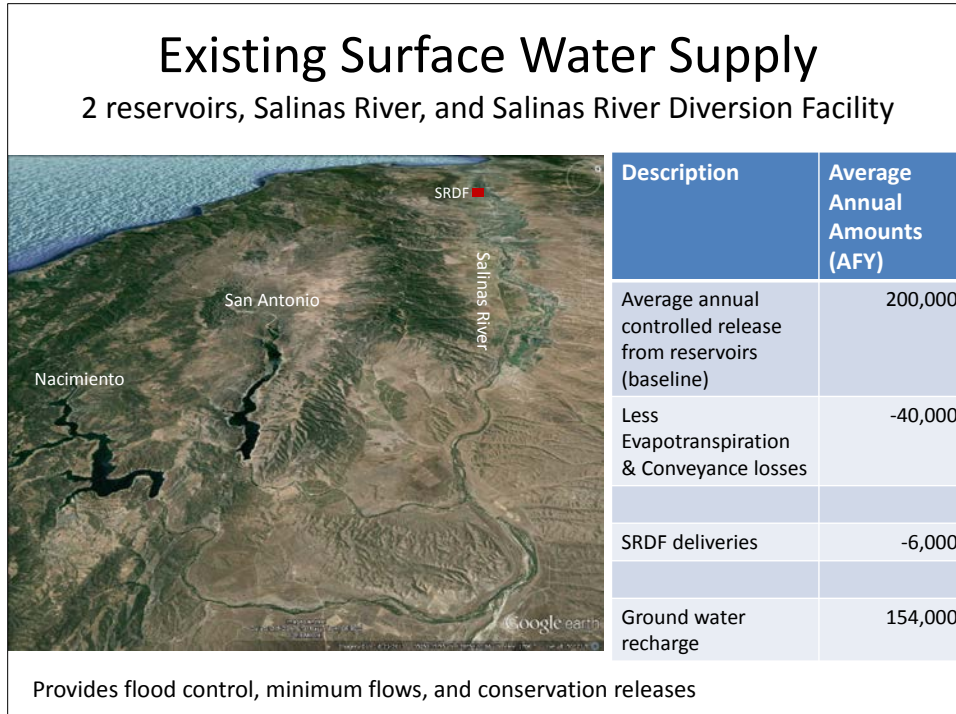


Figure 1 - Existing surface water supply

Losses associated with evapotranspiration and conveyance are estimated to be approximately 40,000 acre feet per year based on a 1997 extensive evaluation of the evapotranspiration losses within the Salinas river riparian corridor performed by MCWRA staff. That work was performed to update the 1978 approximation of 25,100 acre\ feet per year of consumptive water use of phreatophytes within the Salinas river riparian corridor. The 1997 analysis concluded a total consumptive water use by phreatophytes within the Salinas river riparian corridor of approximately 31,232 acre feet per year. More recently, MCWRA staff have reflected upon the previous work with regard to current conditions within the riparian corridor and have approximated consumptive water use by phreatophytes based on general assumptions to be in excess of 40,000 acre feet per year.

In 2008, the Salinas Valley Water Project (SVWP) constructed the Salinas River Diversion Facility (SRDF) near Marina to divert up to 12,800 acre feet from the Salinas River to be pumped into the Castroville Seawater Intrusion Project (CSIP) pipeline.¹ The maximum water diverted to date from the Salinas River through the SRDF is approximately 6,000 acre feet per year.

The resulting surface water supply available in the Salinas River for ground water recharge is approximately 154,000 acre feet per year.

4. Project Description – Conceptual Design

The proposed Interlake Tunnel is a gravity flow water conveyance tunnel approximately 12,000 feet long connecting Nacimiento and San Antonio reservoirs in San Luis Obispo and Monterey Counties respectively (Figures 2 and 3). Conceptual design of the tunnel project envisions a reinforced concrete lined tunnel with an inside finished diameter of 10 feet and a slope from Nacimiento to San Antonio of -

¹ Salinas Valley Water Project Engineer’s Report, January 2003

0.4%. The tunnel will have an invert elevation in Nacimiento Reservoir at approximately 745' MSL with an inlet structure equipped with debris racks and stop logs to facilitate tunnel maintenance. The outlet structures in San Antonio will include a valve facility housing a spherical valve for operation of the tunnel. The outlet structure will terminate in San Antonio reservoir with an energy dissipation structure.

The tunnel will be constructed through the Monterey Formation consisting of fractured shales and claystones with some massive sandstone reaches. Geotechnical examinations will be performed to facilitate final design of the tunnel to address ground loading, ground conditions during construction, and identify any occurrences of ground water, geologic faults, or unusual site conditions. The tunnel will be designed to accommodate internal pressures and potential seismic activity in the region. The design and construction of tunnels to address seismic risks is well developed and proven in California.



Figure 2 - Interlake Tunnel project description

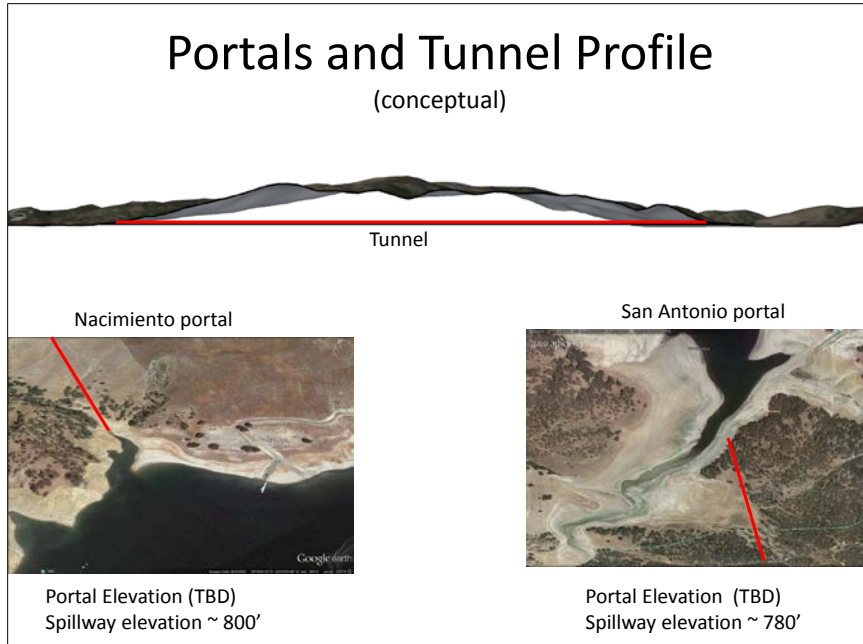


Figure 3 - Interlake Tunnel project description - portals / profile

4.1. Tunnel Operating Fundamentals

The tunnel operating fundamentals are simply the conveyance of water from Nacimiento Reservoir to San Antonio Reservoir. The Nacimiento Reservoir fills three times faster than San Antonio resulting in unused storage in San Antonio when Nacimiento is at capacity and releasing flood spills (Figure 4). The tunnel connection provides the conveyance means to transfer water from Nacimiento to San Antonio before it is spilled in a flood release. Additionally, water can be transferred from Nacimiento at appropriate times to maximize the net storage of the combined reservoirs (Figure 5).

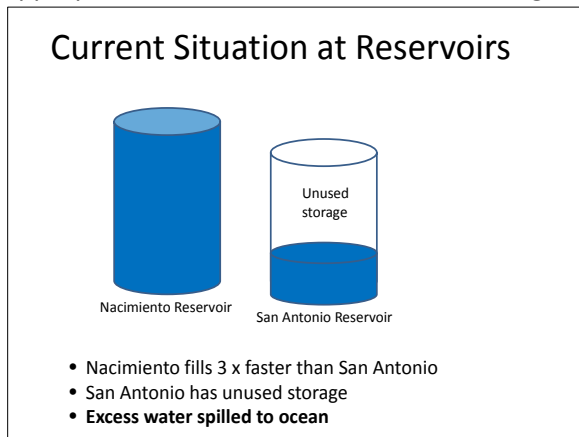


Figure 4 - Tunnel operating fundamentals - current situation

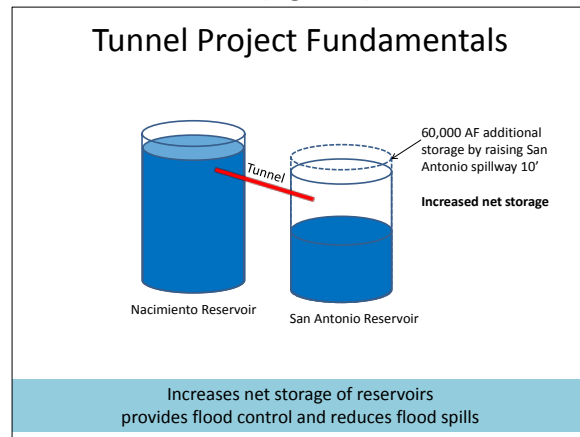


Figure 5 - Tunnel project fundamentals

Figure 6 is a hydrograph from a hydrologic model depicting the fluctuation in storage in both reservoirs from inflows and releases in acre feet over a typical wet year. This hydrograph portrays the effects of the tunnel compared to the baseline condition. The dashed blue and red lines depict the storage of Nacimiento and San Antonio reservoirs respectively without any tunnel transfers. In this example year, the Nacimiento reservoir fills to capacity and spills flood releases. The solid blue and red lines represent the storage in both reservoirs including tunnel transfers demonstrating that the Nacimiento Reservoir

did not reach flood capacity and the San Antonio storage was increased dramatically as a result of transfers through the tunnel.

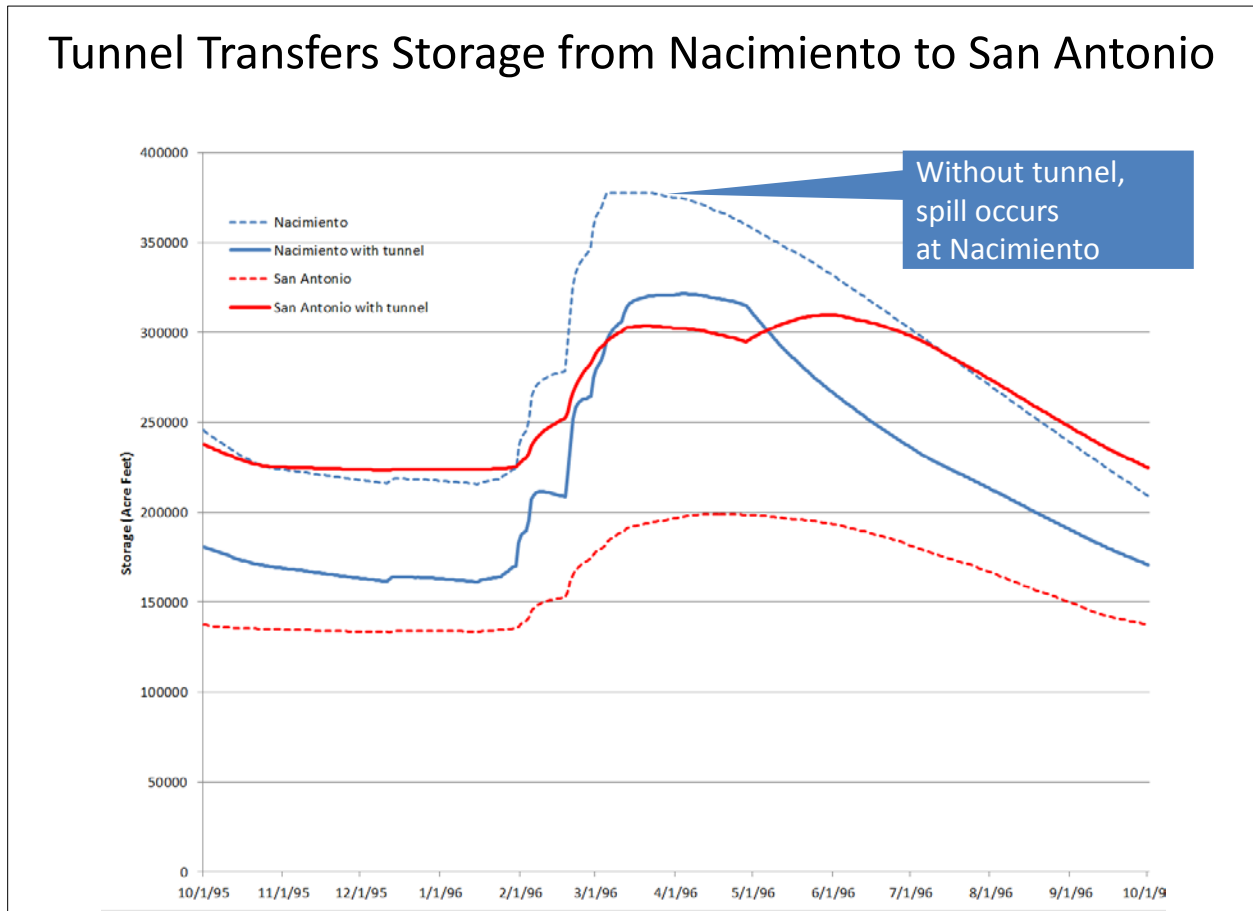


Figure 6 - Tunnel operating fundamentals hydrograph

4.2. Additional Reservoir Storage

There is a possible opportunity to increase storage capacity in the San Antonio reservoir by modifying the spillway with a crest control device. This concept has the effect of “raising the dam” to increase storage. It is estimated that a 10 feet rise could increase the storage capacity of San Antonio reservoir by 60,000 acre feet. This potential added storage increases the benefits of the tunnel by providing additional storage for flood control and conservation releases. Figure 5 references the added storage potential of the spillway modification at San Antonio.

The feasibility of the spillway modification at San Antonio has not been determined. There are issues relative to minimum freeboard, requirements for meeting Probable Maximum Flood (PMF) controls, and approval from the Department of Water Resources, Division of Safety of Dams.

For the purpose of evaluating the benefits of the tunnel, reservoir simulation modeling scenarios were run assuming the additional storage at San Antonio is available. This assumption is noted throughout the modeling results as the “San Antonio dam raise” or “SA Raise”.

5. Hydrologic Modeling

The evaluation of the tunnel project feasibility required the development of a hydrologic computer model which could perform various simulation runs of the reservoirs operations with and without a tunnel.

5.1. Development of the Baseline Model

MCWRA's hydrologic computer model did not have the capability to simulate the operation of the reservoirs with a tunnel. A decision was made to develop a baseline hydrologic model to accurately simulate the reservoir operations from historical inflow and outflow data. ECORP Consulting developed a daily time-step OASIS computer model which performs operational simulations providing quantitative output to estimate project water supply yields. The development of the baseline model is described in Interlake Tunnel and San Antonio Enlargement Project Simulation Modeling, 11 November 2014 prepared by ECORP Consulting, Inc.

5.2. Hydrologic data evaluation

The baseline model uses hydrologic data from the two reservoirs collected by MCWRA from 1967 to 2013. The historical data collected on a daily basis was utilized to develop a mass balance approach to determine mean daily unimpaired inflow to Nacimiento and San Antonio Reservoirs. Figure 7 represents the historical average annual inflows to the reservoirs and identifies the mix of dry, normal and wet years, as defined by MCWRA, over the period of record.

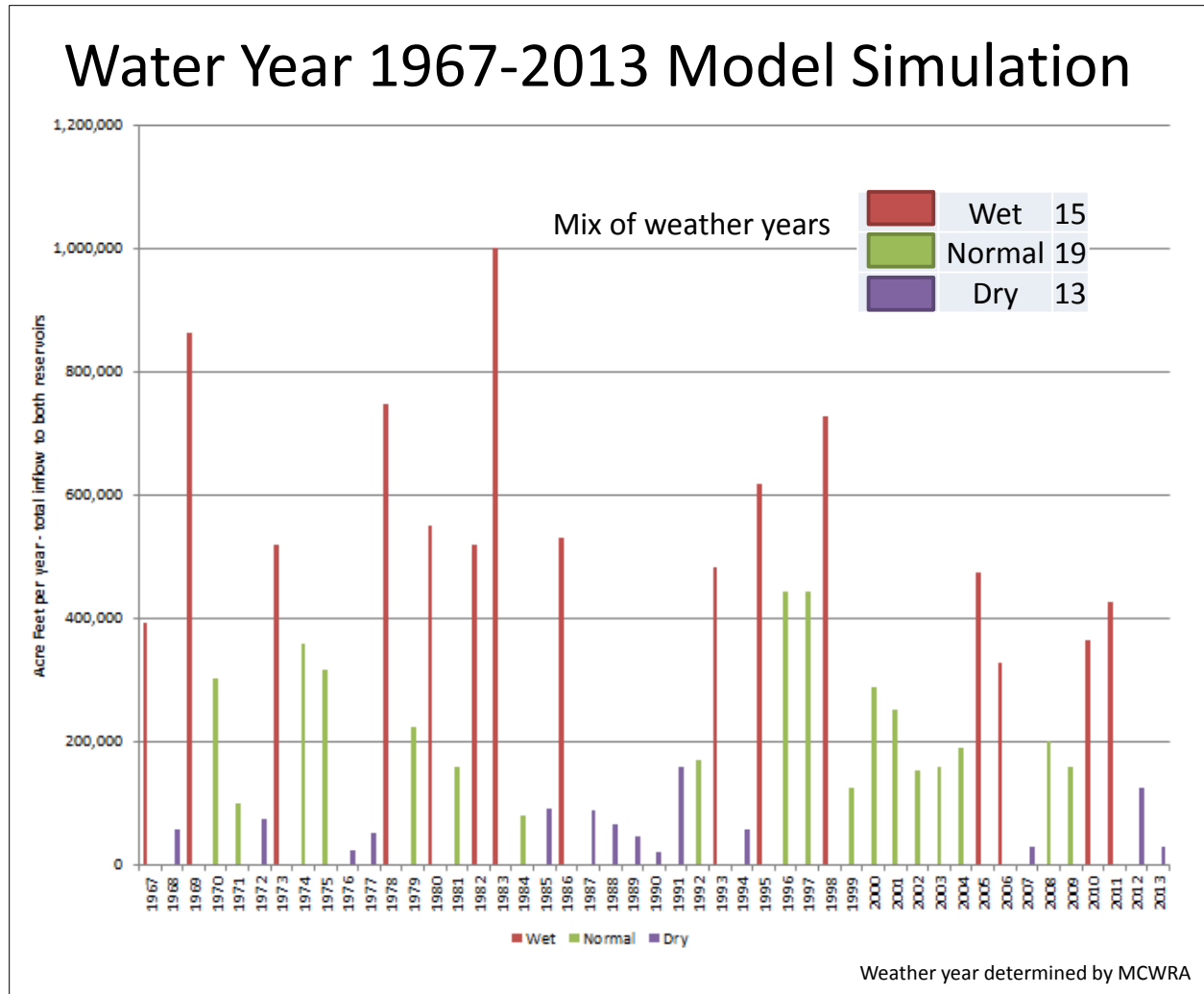


Figure 7 - Historical Reservoir Inflow

The approach utilized by ECORP Consulting to estimate the mean daily unimpaired reservoir inflow data set for the baseline model is as follows:

- Reservoir inflow is not measured directly and must be estimated.
- Mean daily inflow is historic impaired flow adjusted to reflect impacts of reservoir operation.
- A paired basin approach is used with the gaged unimpaired watersheds located upstream of each reservoir (Nacimientto (USGS No. 11148900) and San Antonio (USGS No. 11149900) are used.
- Monthly unimpaired reservoir inflow is calculated using a mass balance technique including an estimate of evaporation using historical evaporation pan data.
- Streamflow information from the upstream gages is then adjusted based on the ratio of monthly unimpaired streamflow at the stream gages and at the study site being estimated.
- Monthly adjustments are then modified, when necessary, to provide an adequate estimate of mean daily streamflow.
- Monthly adjustments are converted into daily adjustments to provide continuous daily adjustment factors.

- The upstream gage unimpaired data are adjusted by the daily adjustment factors to estimate mean daily unimpaired streamflow at the study sites.

5.3. Reservoir operating procedures and water supply requirements

The operating procedures for the reservoirs to meet water supply requirements, reservoir operating rules, and water rights limitations are incorporated into the model. The operations summary for the reservoirs is as follows:

Nacimiento Reservoir

- Nacimiento has two outlets: spillway and hydroelectric unit
 - The hydroelectric plant accommodates minimum flow of 60 cfs releases and conservation releases above minimum flows.
 - During flood spills, the hydroelectric unit releases a maximum of 425 cfs or 365 cfs above minimum flow requirements.
- The annual summary of spills from Nacimiento includes the flood spills through the hydroelectric unit above the 60 cfs minimum flow plus the spillway releases.

The Nacimiento Reservoir has a water right of 180,000 acre foot per year (afy) of maximum withdrawal. From that water right there are reservations for 1,750 afy lakeside uses and 15,750 afy for the Nacimiento Water Project leaving a net of 162,500 afy available for release in the downstream channel (minimum flows plus conservation releases). When the water right limit is reached, conservation releases are stopped but minimum flows are maintained. Conservation releases are stopped to preserve minimum flow releases within the 180,000 afy water right.

San Antonio Reservoir

- The Agency uses a self-imposed rule curve for the management of San Antonio reservoir.
- The minimum flow releases from San Antonio through the low level outlet are 10 cfs and all conservation releases are above the 10 cfs minimum.
- During a flood spill, both the low level outlet works and the spillway will be used.
- The San Antonio Reservoir has a water right limiting the maximum release to 210,000 afy and a maximum storage limit of 220,000 afy.

The hydrologic model incorporates the water supply requirements and water rights limitations and generally operates as follows.

- Each reservoir is operated within its water rights.
- There are 5 water year types in the model (Dry, Dry Normal, Normal, Wet Normal, and Wet). Water Year types are used for setting conservation releases and block flow requirements. Block Flows are released when called for (700 cfs for 5 days followed by 300 cfs for 32 days).
- There are two consumptive demands that divert directly from Lake Nacimiento in the total amount of 17,500 afy.
- Minimum Flow Requirements are met from each reservoir and at Salinas River below the confluence with Nacimiento and San Antonio Rivers.
- Salinas River Diversion Facility (SRDF) is operated on Water Year type based release patterns, provided by MCWRA. Reservoir Balancing to meet SRDF demands is achieved through releases from Nacimiento, up to capacity of Nacimiento hydroelectric plant and remaining releases required, if any, to meet SRDF demands are made from San Antonio Reservoir. When storage in Nacimiento Reservoir reaches minimum pool, all releases to meet SRDF demands are made from San Antonio Reservoir.

- During spill events, Nacimiento maximizes releases through the hydroelectric unit and passes the remaining flow through the spillway. The model attempts to keep spillway flows less than 25,000 cfs through pre-releases. During San Antonio spill events flow releases are through the low-level outlet and the remaining outflow through the spillway.

The hydrologic modeling was conducted within the parameters of the water rights.

For the model, it is assumed that 2013 represents the normal volume of water required for successful SRDF operation. Model release schedules for Wet and Dry year types were adapted from Normal to more closely resemble the start of operations under wet and dry conditions.

5.4. Interpretation of the hydrologic model data

The hydrologic model generates data that can be analyzed in hydrographs which represent inflows, outflows and reservoir storage over time. Figures 8 and 9 are hydrographs from the model for a typical year which shows the changes in the water stored in the reservoirs in acre feet and the releases from the reservoir in cubic feet per second. These hydrographs for Nacimiento and San Antonio respectively show the maximum capacity of the reservoirs in acre feet. The hydrographs provide a graphical interpretation and understanding of the water inflows and outflows for every year in the historical period of record.

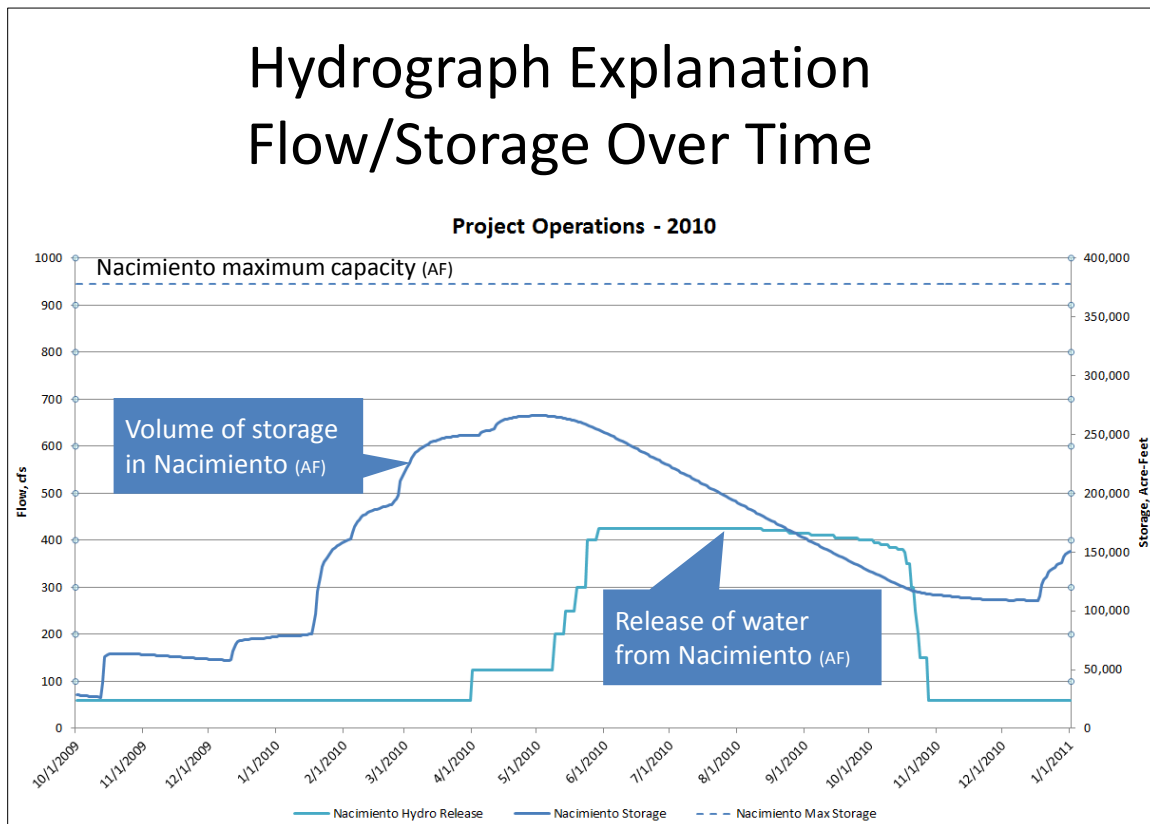


Figure 8 - Hydrograph explanation – Nacimiento

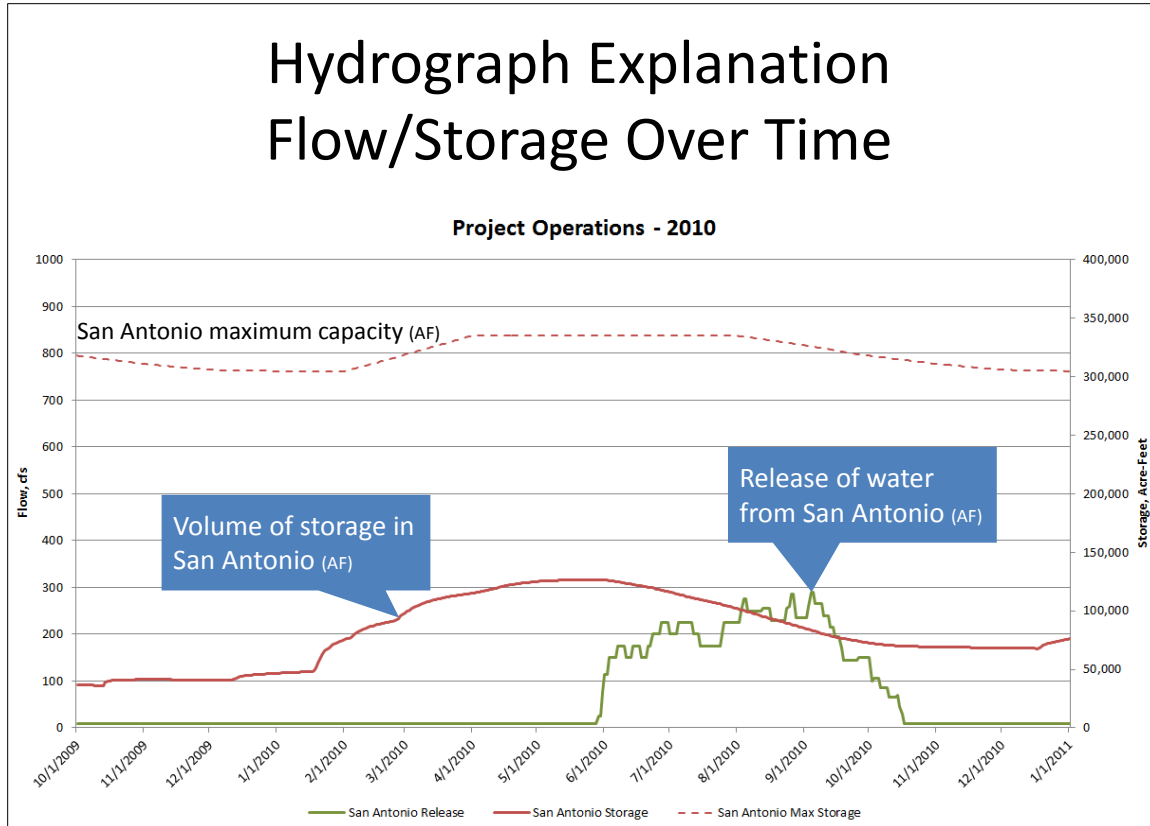


Figure 9- Hydrograph explanation - San Antonio

Figure 10 is a hydrograph combining data from the Nacimiento and San Antonio reservoirs and is a useful tool to analyze the hydrologic activity over time for both reservoirs. These hydrographs present the data from the reservoir operations baseline model.

Hydrograph Explanation Combined Flow/Storage Over Time

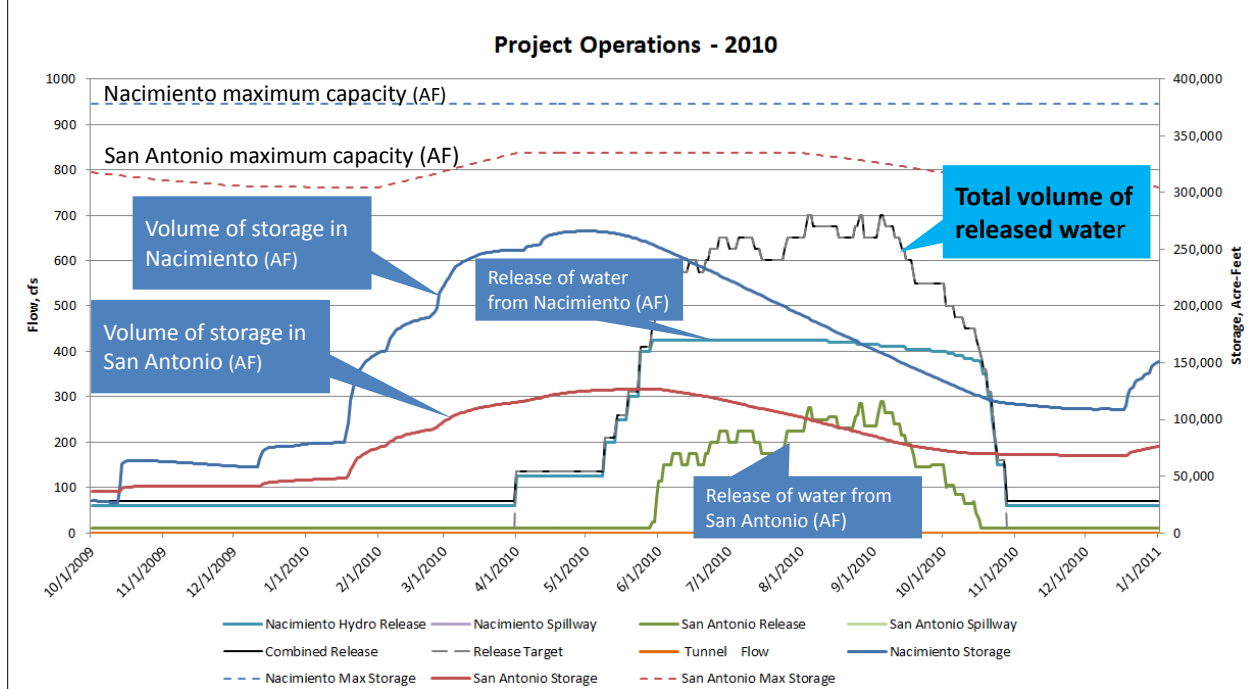


Figure 10 - Hydrograph explanation for combined reservoirs

5.5. Tunnel scenarios and hydraulic design

After the baseline model was developed and tested, the data sets were analyzed and approved by MCWRA. The hydraulic characteristics of various tunnel configurations were developed and used in many reservoir simulation scenario runs to identify an optimum tunnel configuration for conveying water from Nacimiento to San Antonio. Table 1 is an example of some of the various scenarios which included different tunnel configurations and the application of rule curves at San Antonio Reservoir and the analysis of raising the San Antonio spillway by 10' to add capacity to the reservoir.

Tunnel Configuration
10 foot diameter
8 foot diameter
6 foot diameter
10 foot diameter - No SA Rule Curve
8 foot diameter - No SA Rule Curve
12 foot diameter - SA Raise
10 foot diameter - SA Raise

Table 1- Scenario modeling example results

5.5.1. Proposed tunnel operating concepts

A 10' tunnel has been used as the optimum tunnel configuration. The proposed operating concepts for the tunnel are as follows:

- The proposed tunnel will have an invert elevation of 745 feet above mean sea level (msl). The tunnel is designed to operate on head relationships between inflow and outflow and to operate in a pressure flow mode. A minimum 15 foot head at the intake above the invert is required before water conveyance through the tunnel will occur or when the Nacimineto surface water elevation is 760 feet or higher.
- When the San Antonio reservoir storage approaches the spillway elevation, transfer of water through the tunnel will be stopped. There will be no water conveyance through the tunnel when San Antonio is spilling.

5.5.2. Reservoirs and tunnel simulation modeling

To communicate the effects of the tunnel project from the model runs over the 47 year historical period, the last three years of record were selected (2011, 2012, and 2013) because those water years are familiar to the constituents of the Salinas Valley and because they represent wet, normal and dry years respectively.

Figure 11 is the hydrograph from the hydrologic model for water year 2011 from October 2010 through December 2011. It demonstrates that Naciminto Reservoir filled to capacity in April 2011 and flood spills were released. The San Antonio Reservoir was filled to approximately 50% of its capacity. Conservation releases from both reservoirs in addition to minimum flow releases occurred over the conservation period from May through October.

Figure 12 is the hydrograph for water year 2011 simulating the effect of the tunnel between the reservoirs. The tunnel transferred water (represented by the orange line on the hydrograph) from Naciminto to San Antonio beginning in March and continued through July. Flood spills from Naciminto were avoided and the water stored in San Antonio was substantially increased.

Figures 11 and 12 demonstrate the benefits of the tunnel for a wet year by avoiding flood spills and transferring the water that would have been spilled to the San Antonio Reservoir. Additionally, the net storage of both reservoirs is increased by approximately 20,000 acre feet. This added storage is available for additional conservation releases.

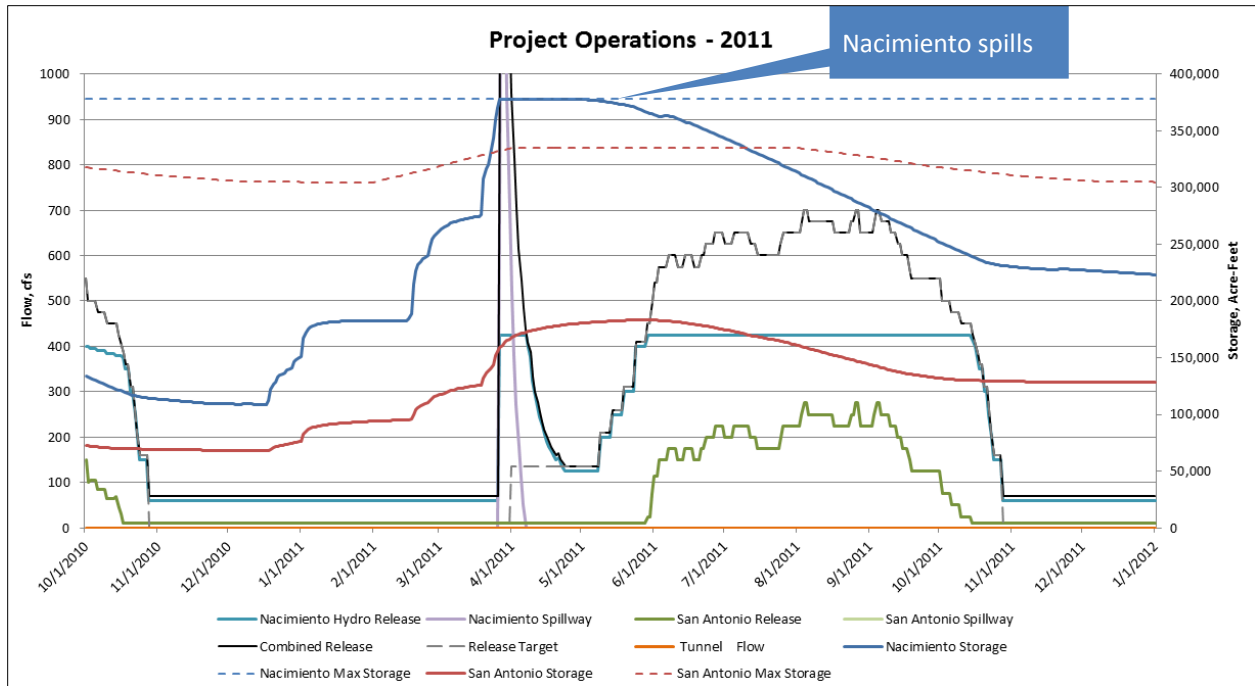


Figure 11 - 2011 (wet year) hydrograph of baseline operations

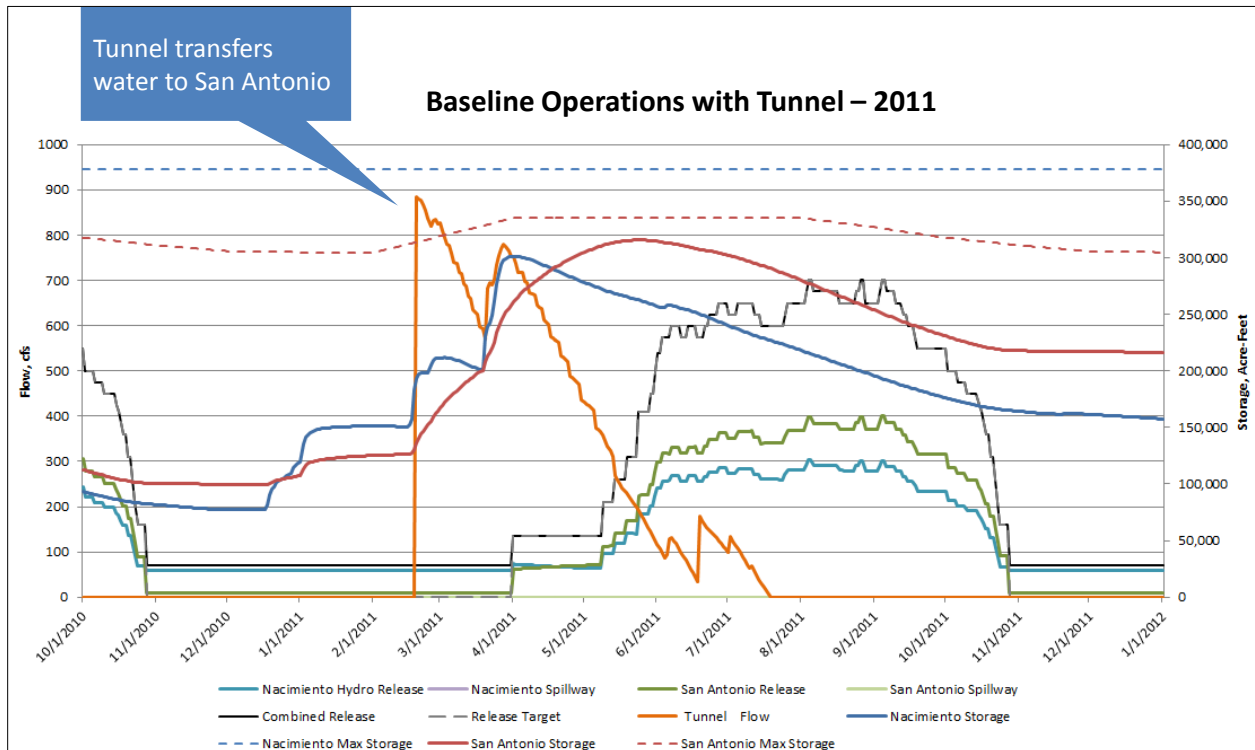


Figure 12 - 2011 (wet year) hydrograph of baseline operations with tunnel

Figure 13 is the hydrograph of the baseline operations for a normal weather year following the wet year of 2011. It demonstrates slight inflows to the reservoirs and the reservoir storage is reduced as minimum and conservation flow releases are met.

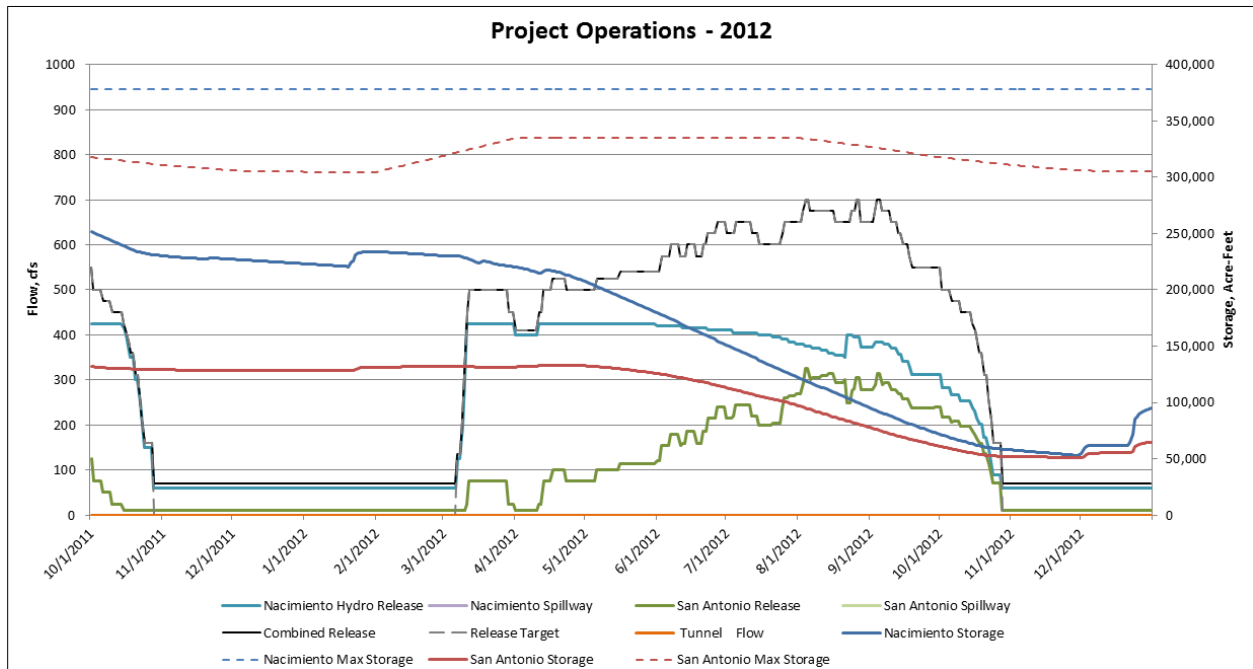


Figure 13 - 2012 (normal year) hydrograph of baseline operations

Figure 14 is the hydrograph for 2012 in the normal year following the wet year including the tunnel operation. No tunnel transfers occur in 2012 but because of the increased storage in San Antonio from the previous wet year transfers through the tunnel, the storage in San Antonio is more than it would have been without the tunnel.

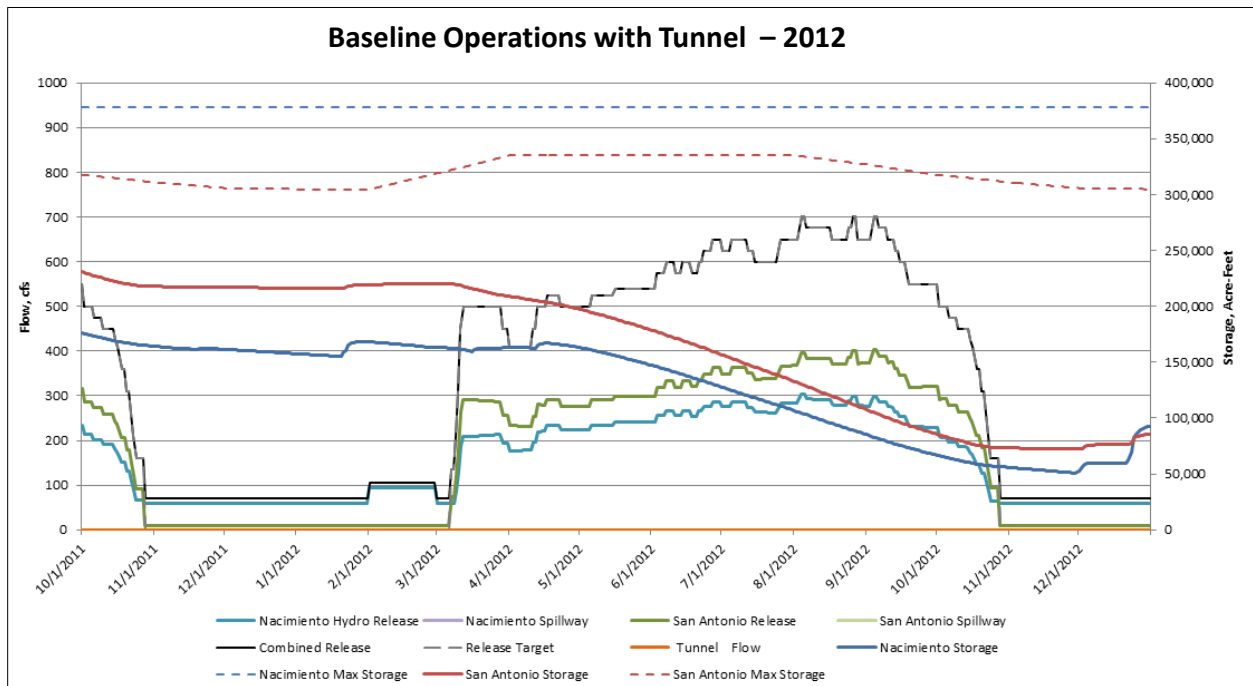


Figure 14 - 2012 (normal year) hydrograph of baseline operations with tunnel

Figure 15 represents the hydrograph from the baseline reservoir operations for a dry year (2013). It shows that conservation releases were stopped in June because the storage in both reservoirs had reached their minimum limit (minimum pool).

Figure 16 is a hydrograph representing the 2013 dry year with the tunnel in operation. Because of increased storage created in San Antonio from transfer through the tunnel in the wet year 2011, the added storage permitted an additional month of conservation releases before the reservoirs reached their minimum pool limits.

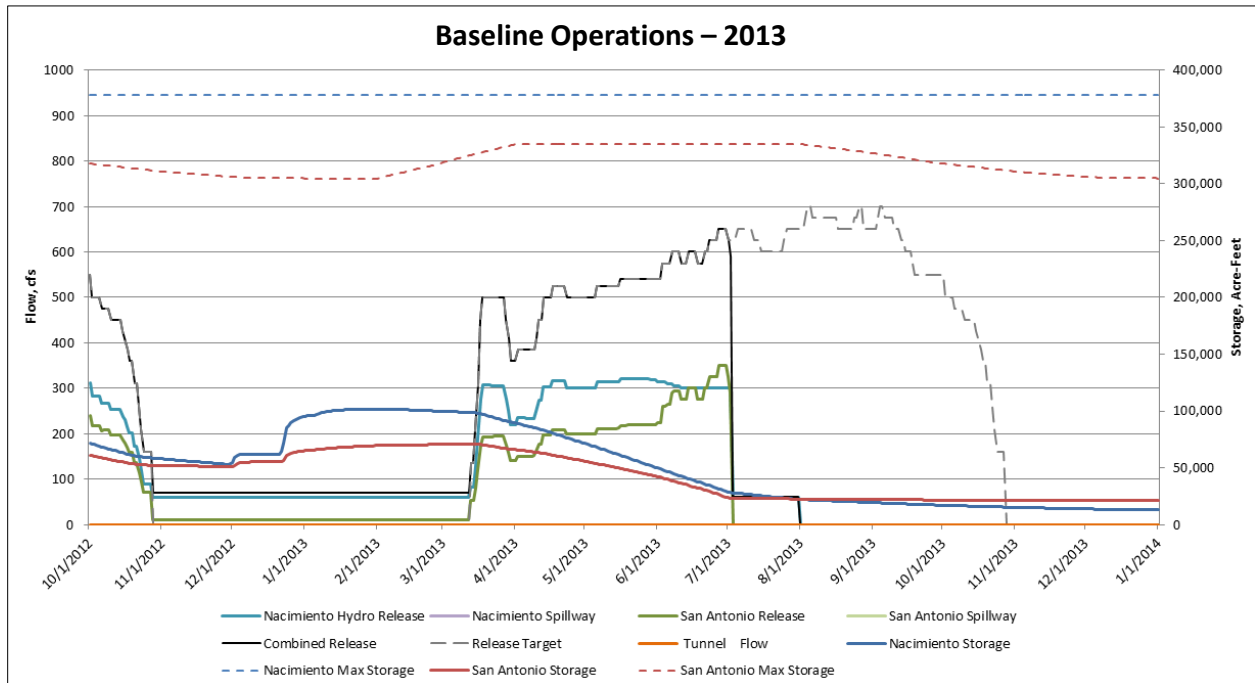


Figure 15 - 2013 hydrograph of baseline operations

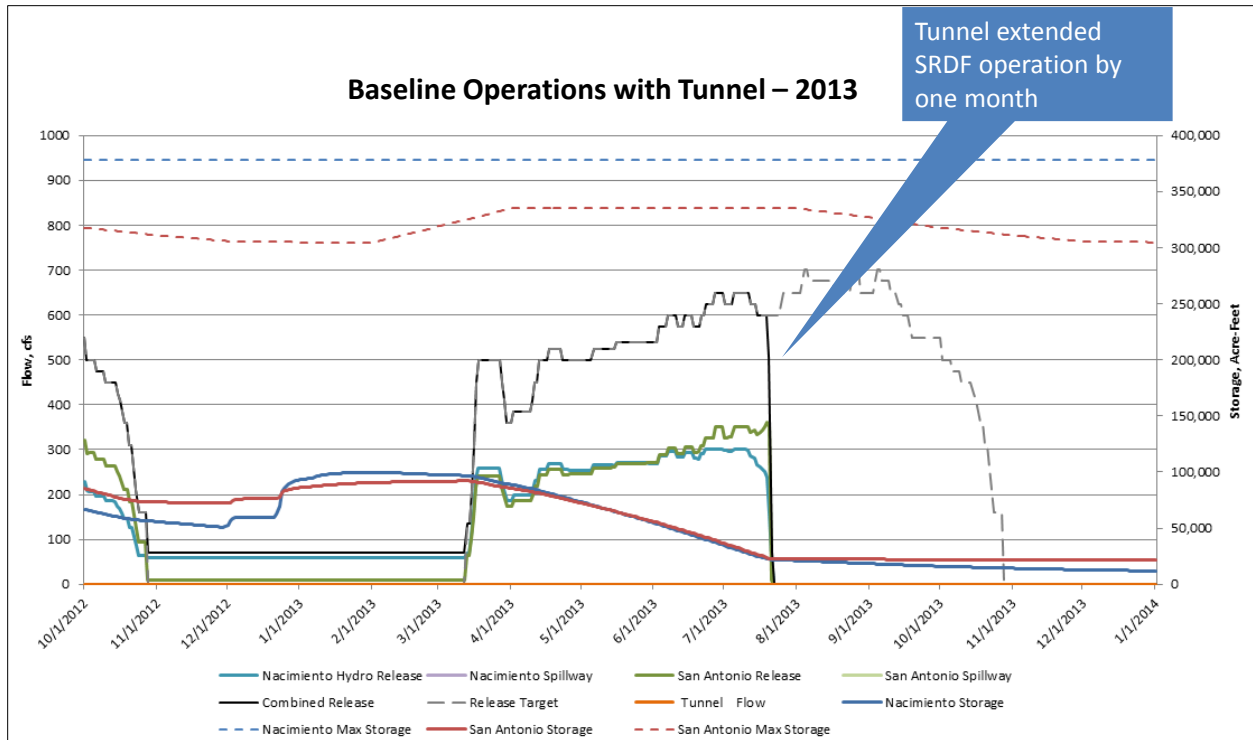


Figure 16 - 2013 hydrograph of baseline operations with tunnel

5.5.3. Optimum simulation modeling - findings and results

Table 2 describes the results of the operational modeling of the reservoirs with a 10’ diameter tunnel and with a tunnel project that includes modification to the San Antonio spillway to increase capacity by 60,000 acre feet referred to as “10’ Tunnel with SA raise”. The modeling simulated the operation of the reservoirs and tunnel project as if it had been in operation over the 47 year period of record. The results demonstrate that the tunnel project would have reduced flood spills by an average of 7,736 afy and increased conservation releases by 5,390 afy. With the San Antonio reservoir storage capacity increased, the reduction in flood spills would be an average of 11,857 afy and the increase in conservation releases would be 8,101 afy. In dry years, the tunnel and tunnel plus San Antonio raise would increase conservation releases by 14,805 and 20,949 afy respectively. For both project configurations, the flow through the tunnel would average 50,493 and 53,840 afy with maximum flows of approximately 750 cfs. The 10’ tunnel has a maximum flow capacity of about 1,700 cfs.

Interlake Tunnel Operational Modeling Results

(for water years 1967 - 2013)
(Average Acre Feet/Year)

Project description	Reduction in Spills		Increase in Conservation Releases			Increase in Dry Year Conservation Releases	Tunnel Transfers
10' Tunnel	7,736		5,390			14,805	50,493
10' Tunnel with SA Raise*	11,857		8,101			20,949	53,840

* (adds 60,000 AF of reservoir storage to San Antonio)

Table 2- Operational Modeling Results

5.5.4. Increase in conservation and controlled releases from reservoirs

During the reservoir and tunnel simulation model runs, new operating procedures were identified to optimize the flood control benefits and increased conservation releases of the reservoirs. The initial model supported conservation releases to the Salinas River Diversion Facility (SRDF) and evaluated the increase in conservation releases available for the SRDF (Table 2). Because serving the SRDF was the only factor used in evaluating additional conservation releases, it was determined that an opportunity was missed to put more water to beneficial use when the SRDF limits are met. This additional water in storage as a result of the tunnel was identified as water for “additional beneficial use”.

The additional beneficial water is characterized as follows: In wet years the project meets the conservation and SRDF release patterns and creates additional net storage in the reservoirs. The additional storage could be released to recharge groundwater aquifers such that the supplemental water from the tunnel operation was fully released. This operating approach puts more water to beneficial use by recharging the ground water aquifers. By keeping the aquifers more full, more water can reach the SRDF or a smaller release is needed to meet SRDF demands. In wet years when the aquifer is full following a wet winter, releases from the reservoirs can be delayed until fall and winter (Dec – Mar) to recharge the groundwater aquifers putting the water to beneficial use and creating capacity in the reservoirs for the next wet year. The additional beneficial water provides water supply sustainability for the Salinas River valley. Some of the water release opportunities for the additional water are presented in Table 3.

Year	Operation	Benefit
Normal	Release additional water during and after conservation period.	<ul style="list-style-type: none"> - Recharges aquifer - Surface supply to future projects - Augments supply to SRDF - Enhances aquatic environment
Dry	Release additional water during conservation period and later if water available	<ul style="list-style-type: none"> - Recharges aquifer in driest season - Surface supply to future projects - Possible augmentation of supply to SRDF - Enhances aquatic environment
Wet	Hold water to release in the fall (Oct. – Dec.)	<ul style="list-style-type: none"> - Recharges upper aquifer after irrigation and summer season - Surface supply to future projects - Contributes to recharging lower aquifer. - Extends supply and operation of SRDF.

Table 3- Additional beneficial water release opportunities

Table 4 presents the operational results of the modeling considering the additional beneficial use operating scenarios for the two project options: 10’ tunnel and 10’ tunnel with San Antonio increased capacity. The reduction in flood spills increases dramatically to 17,132 afy and 22,198 afy respectively. The additional beneficial use water has averages of 15,372 afy and 15,774 afy respectively which added to conservation releases, provides an increase of total controlled releases of 16,327 afy for the 10’ tunnel project and 20,686 afy if the San Antonio storage capacity is increased. The increases in dry year conservation releases are lower because the additional beneficial use water was released to recharge the aquifers or made available to future infrastructure projects. Similarly, the increase in conservation release is lower because the operating procedure releases more water for aquifer recharge and supply to future infrastructure projects.

Extra water to supply future infrastructure (releases December through March)							
	Reduction in Spills	Additional Beneficial Use (DEC - MAR)	Increase in Conservation Releases	Increase in Total Controlled Releases	Increase in Dry Year Total Controlled Releases	Increase in Dry Year Conservation Releases	Tunnel Transfers
10’ Tunnel	17,132	15,372	955	16,327	5,020	4,406	46,527
10’ Tunnel with SA Raise*	22,198	15,774	4,912	20,686	5,262	4,429	50,179

Total Controlled Releases are total releases to the river through the outlets
Conservation Releases are in addition to Minimum Flow Releases

Table 4 - Operational modeling results with additional beneficial use

Figure 17 and Table 5 summarizes the opportunities for utilization of the additional water available from the project to enhance water supply sustainability in the Salinas River valley.

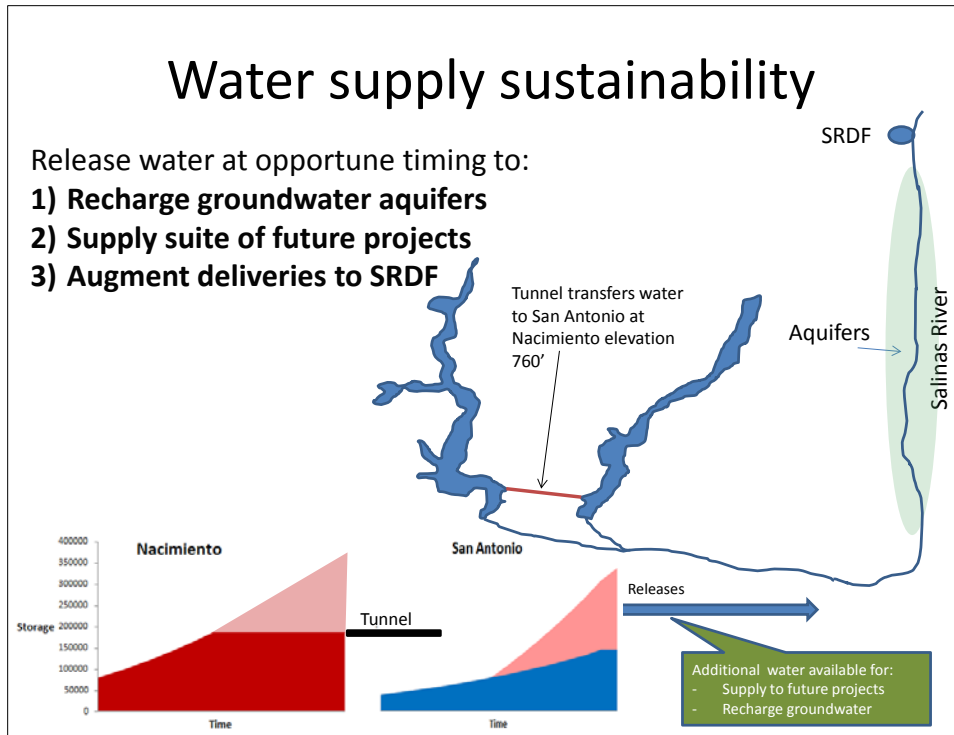


Figure 17- Water supply sustainability

Description	Average annual controlled releases (AFY)
Baseline (current)	201,408
With tunnel	217,735
Increase volume over baseline of conservation release made available by the tunnel	16,327
SRDF additional release	5,390
Remaining water available for suite of future projects	10,937

Table 5 – Additional Beneficial Water Supply

5.6. Project Benefits

The hydrologic modeling of the reservoirs with the tunnel operations demonstrates the following benefits of the project:

- Significant increase in flood control storage, thus a reduction in flood damage downstream
- Additional surface water available to serve current and future suite of infrastructure projects

- Provides a supply of surface water to help sustain ground water supply by offsetting pumping
- Provides environmental benefits through increased flows in the Salinas River

Reservoir operations can develop a “sweet spot” to maintain lake levels for recreation by relying on San Antonio for releases. The tunnel project benefits Nacimiento recreation in dry years by reducing the demand to serve conservation releases.

Figure 18 describes the flood control benefit provided by the operation of the tunnel. The red bars represent the acre feet of spill from both reservoirs over the 47 year period of record (baseline) which had 15 years with flood spills which averaged 46,000 afy. The incorporation of the tunnel project represented by the green bars demonstrates that the number of flood events was reduced from 15 to 6, a 60% reduction, and the average flood volume was reduced to 25,000 afy, a 46% reduction from baseline. If the San Antonio spillway modification is included, the total reduction in average flood volume is reduced to 22,000 afy or a 52% reduction from baseline conditions.

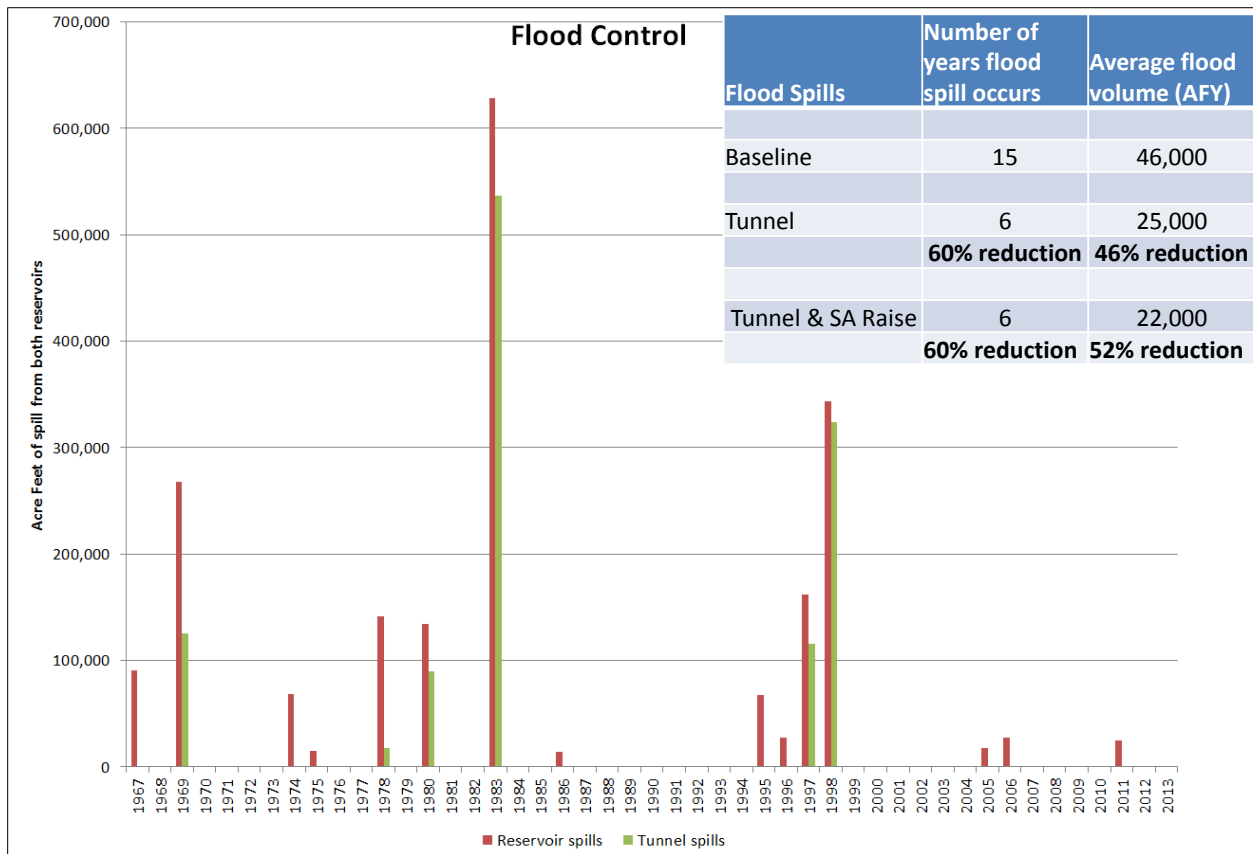


Figure 18 - Flood control benefit

6. Project Development Plan

The Interlake Tunnel project development plan has six major phases:

- Phase 1 - preliminary engineering
- Phase 2 – environmental clearance and permit applications
- Phase 3 - geotechnical investigations and final design

- Phase 4 – Right-of-Way acquisition and water rights verification
- Phase 5 – financing
- Phase 6 – construction

The logic for implementing the development plan follows a critical path of activities described as follows:

- 1) Project feasibility determination conducted through conceptual tunnel design and reservoir simulation modeling based on historical data. (Phase 1)
- 2) Preliminary engineering of the tunnel project to define minimum hydraulic performance criteria, project layout and functional components, and operating requirements from which a project description is prepared as the basis for environmental permitting and final design. (Phase 1)
- 3) Confirm the feasibility of right-of-way acquisition and any water diversion modifications. (Phase 4)
- 4) Concurrently perform final design and environmental permitting in order to develop a detailed scope of the project and define project costs. (Phase 2 and 3)
- 5) Prepare engineering reports as the basis for a Proposition 218 tax assessment financing plan followed by a vote of the project beneficiaries to approve the plan. Secure Proposition 218 bond financing. (Phase 5)
- 6) Procure construction services and build the project. (Phase 6)

6.1. Project development schedule

Figure 19 represents a summary schedule of the project development plan.



Figure 19 - Project development schedule

6.2. Cost Estimate

Preliminary cost estimates for the Interlake Tunnel project have been prepared based on the conceptual design and estimated level of effort to accomplish the project development tasks. Table 6 represents the current cost estimate for the project which includes a contingency approximating 30% of construction costs to accommodate costs of possible additional activities, facilities, or requirements identified during final design and permitting.



INTERLAKE TUNNEL PROJECT
Technical Memorandum

Interlake Tunnel Project Preliminary Cost Estimate						
10/20/2014						
Category	Description	Unit/Measure	Quantity	Unit Cost	Total Cost (\$000)	Subtotals (\$000)
Phase 1 - Preliminary Engineering	Preliminary tunnel desing	Hours	924	\$198	\$183	
	Modeling	Hours	660	\$200	\$132	\$315
Phase 2 - Permit Applications	Environmental / Permitting	Hours	4,280	\$280	\$1,198	\$1,198
Phase 3 - Geotechnical and Final Design	Surveying	Hours	240	\$120	\$29	
	Geotechnical Engineering	Hours	960	\$250	\$240	
	Tunnel final design	Hours	3,260	\$300	\$978	\$1,247
Phase 4 - Right of Way and Legal	ROW costs	LS	1	\$100,000	\$100	
	Legal Consultant	Hours	520	\$400	\$208	\$308
Phase 5 - Financing	Proposition 218 financing process	LS	1	\$250,000	\$250	
	Grant/Financing/Public Relations	Hours	460	\$200	\$92	\$342
Phase 6 - Construction	Mobilization/Demobilization	LS	1	\$1,500,000	\$1,500	
	Portal Construction	LS	2	\$550,000	\$1,100	
	Tunnel Excavation and Support	LF	12,000	\$2,270	\$27,240	
	Intake Structure	LS	1	\$100,000	\$100	
	Outlet control valve structure	LS	1	\$1,250,000	\$1,250	
	Mechanical Systems	LS	1	\$816,000	\$816	
	Testing and Startup	LS	1	\$200,000	\$200	\$32,206
Program Management	Program Management and Project Controls	LS	5,136	\$270	\$1,387	\$1,387
Construction Management	Construction Management	Hours	6,000	\$200	\$1,200	\$1,200
Expenses	Travel and related expenses	LS	1	\$300,000	\$300	\$300
Project Contingency	30% of construction cost estimate	LS	1	\$9,500,000	\$9,500	\$9,500
Total					\$48,003	\$48,003

Table 6 - Preliminary cost estimate

This cost estimate does not include any costs related to modifying the spillway at the San Antonio reservoir.

6.2.5. Value comparison

The economic feasibility of the project was evaluated by comparing the value of the project's benefits with current water delivery costs and flood damage impacts. To evaluate the cost per acre foot of water generated by the tunnel project, a comparison was performed of the cost of water generated by the two reservoirs. The analysis is represented in Table 7 which escalates the original cost of the two dams for Nacimiento and San Antonio respectively to a current year value and then divides that cost by the average annual controlled releases from the respective reservoirs. The same calculation is applied to the tunnel project and the combined tunnel and San Antonio dam modification project using the average annual controlled releases from the hydrologic model. The results show the cost per acre foot per year range from \$800 to \$2,200 for the existing reservoirs and approximately \$3,000 per acre feet for the tunnel project. This comparison suggests that Interlake Tunnel project and reservoir reoperation plan provides water at a high but acceptable cost per acre foot per year.

Avoidance of flood damage resulting from the tunnel project cannot be definitively determined. However, reports of flood damage in 1995 averaged \$25,000 per acre. The tunnel provides benefits of reducing the frequency of flood events and a reduction in flood volume providing a significant value of flood control.

Project	Original Cost	Current year cost @ 5% escalation	Average Annual Controlled Releases (AFY)	Cost AFY
Nacimiento Dam (1957)	\$7 mil	\$113 mil	140,444	\$800
San Antonio Dam (1966)	\$12.9 mil	\$134 mil	60,964	\$2,200
Interlake Tunnel		\$48 mil	16,237	\$2,956
Interlake Tunnel with SA Raise		\$63 mil	20,686	\$3,046

Table 7 – Capital Cost Comparison per acre foot of controlled release

6.2.6. Cost Growth

The Interlake Tunnel project had an initial rough order magnitude cost estimate of \$25 million for a 10,000 foot tunnel in May, 2014. This estimate was based on the concept of constructing the project as quickly and as cheaply as possible using drought relief funding and negotiations with a tunnel contractor having equipment and personnel available for a fast-track project commencing construction in the 2nd Quarter, 2015. The fast track project assumed minimal permitting requirements through acceptance of a Mitigated Negative Declaration under CEQA. Project sponsors held the cost estimate at \$25 million to facilitate the expansion of support for the project.

As the project development progressed through conceptual design, hydrologic modeling and public presentations, the project scope increased to include an additional 2,000 feet of tunnel and more sophisticated inlet, outlet and control features. Additional costs were identified for conventional low bid procurement, completion of a full EIR under CEQA with possible NEPA requirements and related permitting costs, and added management costs for the extended duration of the project. A revised cost estimate was prepared as indicated above including a more adequate contingency.

6.3. Environmental Clearance and Permitting

Preliminary analysis of the environmental impacts and environmental issues that need to be addressed in the project design and permitting phase are summarized as follows:

- **Surface impacts:** minimal grading at portal sites, intake structure at Lake Nacimiento, and outlet structures at Lake San Antonio. Tunnel muck disposed at site near San Antonio Dam.
- **Noise impacts:** Minimal at receptors adjacent to the tunnel construction portal at San Antonio and the intake structure at Lake Nacimiento.
- **Biological impacts:** TBD. Related to water diversion from Lake Nacimiento to Lake San Antonio. Preliminary biologic impacts identified are:
 - White bass – predator sport fish prohibited from export (alive) from Lake Nacimiento
 - Quagga and Zebra Mussels transfer from Nacimiento to San Antonio
 - Mercury in the sediments of Lake Nacimiento
 - Bald eagle habitat
 - Downstream releases to maintain steelhead migration (NOAA Fisheries)
- **Paleontological impacts:** TBD. Impact zone at tunnel portals only.
- **Geologic/Seismic Hazards:** TBD
- **Water resources/Flooding impacts:** TBD. All water rights and water discharge agreements will not be affected. Project assists with flood control.

- **Recreational /Public Facilities impacts:** TBD

No environmental impacts are expected relative to:

- Aesthetics/visual resources
- Agricultural resources
- Air Quality
- Cultural resources
- Energy
- Fire Protection
- Hazardous materials
- Historic resources

A decision has been made to utilize a focused EIR process for environmental clearance in order to address any issues that may be difficult to mitigate and to provide public involvement in the development of the project.

7. Project Financing Plan

Several options were considered for financing the project as summarized below:

- Proposition 218 tax assessment on beneficiaries to service the operating costs and debt service on long term bonds. This is the most viable option with a proven history of success financing the Salinas Valley Water Project in 2008.
- Grant funding from the US Department of Agriculture Regional Conservation Partnership Program (“RCPP”). A \$30 million grant application for the Interlake Tunnel project was submitted on July 14, 2014 and subsequently denied.
- Department of Water Resources Integrated Regional Water Management Grant for drought related projects. This \$200 million source of grant funds was earmarked for drought related projects that were shovel ready by April, 2015.
- California Infrastructure Financing Act – California Government Code Section 5956 (Public Private Partnership). Provides the means to develop an infrastructure project involving private financing if a revenue stream can be identified to pay the debt service.
- Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Water Bond). Grant funding for water projects contingent on benefits proven to benefit the Sacramento Bay Delta.

7.1. Proposition 218 financing

The most viable means of financing for the Interlake Tunnel project is a Proposition 218 tax levy on the project’s beneficiaries. The implementation of this financing program would be similar to the 218 financing for the \$38.8 million Salinas Valley Water Project in 2008 which assessed a total of 424,786 acres in an area identified as Zone 2C. Through a sophisticated process of assessment formulas based on proportional weighting of how acreage was benefited by the project based on its active or passive use, the equivalent acreage for assessment in Zone 2C was 283,837 acres. Based on the assessment

factors developed for the acreage in Zone 2C, annual tax assessments were developed to pay for the operating costs and debt service for the Salinas Valley Water Project. See Figure 20.

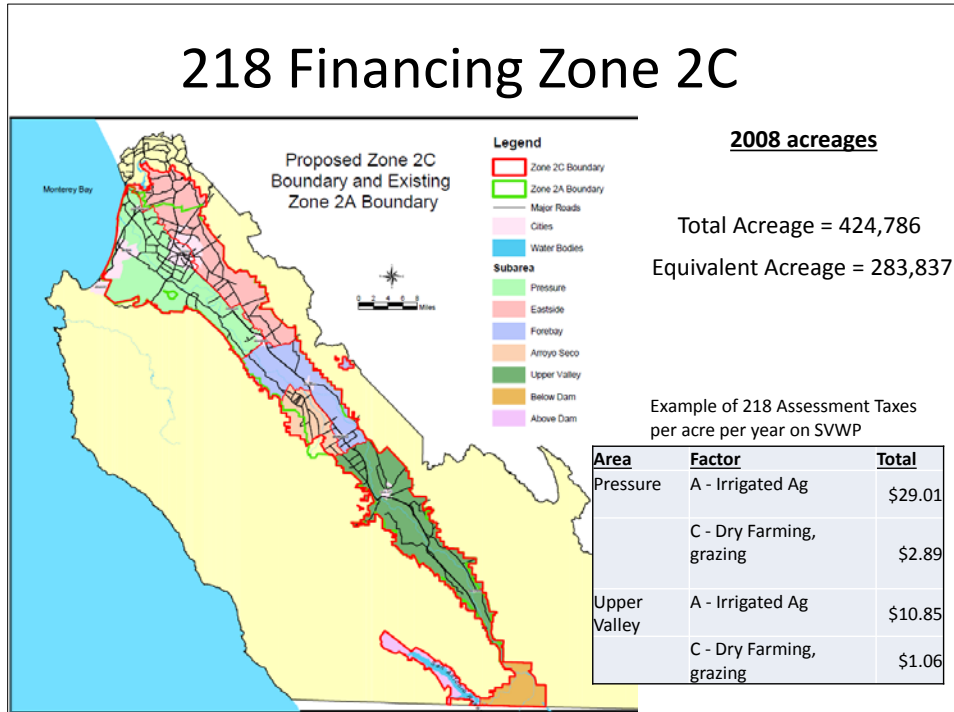


Figure 20 – Example from Proposition 218 tax assessment for the Salinas Valley Water Project

7.2. Financial feasibility of Proposition 218 financing

A comparative analysis of the proposed Proposition 218 financing for the Interlake Tunnel project with the 218 financing for the Salinas Valley Water Project (SVWP) was performed to determine if the financing for the Interlake Tunnel is financially viable. Table 8 presents that comparisons using cost per acre foot per year of water for the SVWP, 10’ Tunnel, and the 10’ Tunnel with the San Antonio spillway modifications (SA Raise). The SVWP has a design capacity of 12,800 acre feet per year of delivered water however to date the best performance of the SVWP is 6,000 acre feet per year, The actual delivery of SVWP water was used as the basis for comparison to the average increase in releases from the modeling results of the tunnel project and reoperation of the reservoirs. This comparison assumes that the releases from the reservoir are equivalent to delivered water at SVWP which is not completely valid, however, the comparison provides a means of evaluating the financial feasibility of the tunnel project in broad terms.

The annual capital debt service for all the projects in the comparison is that required to service 5%, 30 year bonds. The average 218 capital assessment for debt service and operating costs utilizes the equivalent acreage from the SVWP Zone 2C as the basis for the average assessments. The SVWP has an average annual assessment of \$12.81 per acre and the tunnel project using this comparative analysis has a projected assessment of \$11.71 per acre suggesting that the project may be feasible to finance using the Proposition 218 tax assessment financing plan. An assumed cost of \$15 million was used for modification to the San Antonio reservoir for a combined capital cost of \$63 million for the 10’ tunnel and San Antonio spillway modification resulting in an average assessment of \$15.14 per acre for the combined project.

Project	Annual Average increase in releases AF/Y	Capital costs	Annual Capital debt service \$/AF/Year	Average 218 Capital Assessment \$/Acre Zone 2C	Average Operating Cost Assessment \$/Acre	Total Average Assessment \$/Acre Zone 2C
SVWP	6,094*	\$38.8 mil	\$334	\$7.17	\$5.64	\$12.81
10' Tunnel	16,237	\$48 mil	\$192	\$11.00	\$0.70	\$11.71
10' Tunnel with SA Raise	20,098	\$63 mil	\$195	\$14.44	\$0.70	\$15.14

* - Delivered water
Zone 2C = 283,837 equivalent acres

Table 8- Proposition 218 Cost Comparison of Salinas Valley Water project with Interlake Tunnel

7.3. Implementation of Proposition 218 financing plan

Implementation of a Proposition 218 financing requires the development of detailed capital costs, including environmental mitigation costs, and operating costs as the basis for the bond financing. Development of these costs requires approximately 75% - 80% completion of final design and permitting in order to define the project costs accurately. An Engineer’s Report detailing the facts describing the project supported by scientific data, model findings, and cost-benefits analysis is needed to support the 218 financing presentation to the public. The use of a Cost Advisory Committee is recommended to help determine the appropriate boundaries for zones of benefit and to determine the assessment formulas for acreages based on land use and how the acreage is benefited by the project. Some complications include evaluation of factors related to irrigated acres for additional releases and assessment for flood control benefits. After all of the detailed reports and assessment formulas are developed, the 218 process requires a vote of property owners within the assessment zones which involves formal notices, hearings, protest procedures, and a final adoption of a resolution by MCWRA.

7.4. Interim Project Financing

To complete the prerequisite tasks of design, permitting and preparation of an Engineer’s Report for a Proposition 218 financing, interim financing is required to pay for the engineering, environmental, and program management costs.

Interim financing was provided to MCWRA in a financing arrangement with Monterey County in July 2014. The agreement identified \$2.5 million of interim financing, \$500,000 of which was made available to MCWRA.

The project accomplishments to date have expended approximately \$180,000 and include:

- Conceptual / preliminary engineering
- Development of baseline hydrologic model
- Reservoir and tunnel simulation modeling
- Preliminary assessment of environmental and permitting requirements
- Project update presentations

The balance of the current funds, \$320,000 will be used as follows:

- Complete Preliminary Engineering
- Prepare Project Description for permitting and final design scope
- Prepare RFP’s for Design and Environmental consultants



An updated assessment of the work required to advance the project to the point of 218 financing is \$2.3 million after the initial \$500,000 is expended. The additional interim financing needed is summarized in Table 9.

Final design & geotechnical engineering (75%)	\$900,000
Permitting and environmental approval (75%)	\$800,000
Financing plan implementation	\$350,000
<u>Program Management</u>	<u>\$250,000</u>
Total	\$2,300,000

Table 9- Interim Financing Requirements

8. Procurement of Design, Permitting, and Construction Services

MCWRA is the project owner and bound by the Monterey County procurement regulations and the California Public Contract Code. Procurement of professional services for engineering, environmental permitting, construction management and other professional services will be quality based selections based on demonstrated competence and professional qualifications necessary for the satisfactory performance of the services required in accordance with California Government Code, Title 1, Division 5, Chapter 10, Contracts with Private Architects, Engineering, Land Surveying and Construction Project Management Firms. Procurement of construction contract services will be in accordance with the California Public Contract Code.

8.1. Procurement history

MCWRA has procured the services of a program management consultant, EPC Consultants, Inc., using the quality based selection process noted above.

8.2. Proposed Procurement Plan

The project will require the services of engineering and environmental consulting firms to complete the geotechnical investigations, final design, environmental clearance processing and permitting. These services will be procured as noted above in a public solicitation for professional services and requests for proposals. MCWRA, with the assistance of its program management consultant, will prepare the RFP documents and manage the solicitation of the professional services. RFP's for final design consultants and environmental consultants are scheduled to be ready for release in January, 2015.

Construction contract services will be procured in accordance with the requirements of the Public Contract Code following the completion of final design, permitting, and the placement of project financing.

Project: Interlake Tunnel Project
Subject: Tunnel Rating Curve

Project No: 2014-003
Date: September 21, 2014

TO: Ron Drake, Vice President
EPC Consultants, Inc.

FROM: John R. Hollenbeck, P.E.
Hollenbeck Consulting

SUBJECT: Technical Memorandum No. 02 – Tunnel Rating Curve
REV00 – Initial Issue (DRAFT)

This memorandum describes the development of a spreadsheet computation for calculating the tunnel rating curves for various water levels within both reservoirs.

Rating Curve Model Development and Assumptions

The Tunnel Rating Curve (TRC) Model was developed to compute flow through the tunnel versus the head across the tunnel, with the head being the difference in Nacimiento and San Antonio water surface elevations. Attachment A presents the input data fields and a plot of the rating information. The spreadsheet has all of the rating information for one-foot increments of San Antonio and five-foot increments of Nacimiento.

The following is a discussion of the input assumptions.

- Tunnel Diameter (cell G17): user enters the value in feet.
- Tunnel Length (cell G18): user enters the value in feet.
- Upstream Tunnel Invert Elevation (cell G19): user enters value in ft-NGVD29.
- Minimum Tunnel Slope (cell G21): This value is a user-input; however, it should be left unchanged. This value is the least slope of the tunnel, and is based on what is needed to promote drainage during construction or maintenance. The spreadsheet reflects the reference used for establishing this value. The spreadsheet would use this slope to compute invert within San Antonio if the upstream elevation was nearly the same as the exit elevation.
- Desired Tunnel Slope (cell G22): user enters the value in feet per foot.
- Desired Minimum Downstream Invert Elevation (cell G24): user enters the value in ft-NGVD29. The computed downstream elevation equals the upstream invert elevation less the tunnel length times the desired slope. If the resulting elevation is greater than the desired minimum invert elevation, then the computed value is recorded in Cell G27; otherwise, this minimum is recorded. The minimum will be recorded in Cell G27 unless the upstream elevation is lowered to be near EL 690, at which case the

downstream tunnel invert elevation is equal to the bottom of the San Antonio reservoir, the elevation input into Cell G25.

If the computed slope is less than the minimum slope, then a warning message is presented within Cell G28.

- Nacimiento Storage (Cell 13): This value is user input in acre-feet. Entering a value within this cell is not all that important. The value should not be less than 22,300 acre-feet, nor greater than 377,900 acre-feet. The computed reservoir elevation (cell G14) is used in the rating computation at this elevation (see cell range B181 to F314).
- Tunnel Friction Loss Characteristics (cells N12, N13 and N14): The upper design velocity is used in the computation of the Darcy “f”. Rugosity is the sidewall tunnel roughness, in feet. The value presented is from the US Bureau of Reclamation’s “Large Conduits” manual. The kinematic viscosity in Cell N15 is used in the computation of Darcy’s “f”.
- Darcy’s “f” (cells P17 to Q37): Darcy’s “f” typically is looked up in a Moody’s Diagram. The “f” is a function of the Rugosity, diameter, and the Reynolds’ number. Reynolds number is a function of velocity and kinematic viscosity. An equation to compute “f” was presented in college hydraulic courses (information can be presented upon request). The upper velocity in cell N13 is used to develop approximate values of “f” for varying diameters. This table is then used as a lookup table in computing the friction loss through the tunnel when flowing full (pressurized flow).
- Minor Loss Coefficients (cells F29 to J42): User input for the various form losses for computing minor losses when the tunnel is flowing full.
- Open Channel Flow Characterizes: NOTE: it is not recommended that the tunnel be allowed to flow as an open channel conveyance. The changes in flow regime from subcritical to supercritical and back may damage the tunnel liner. The surging of air through the tunnel as it changes from partial flow to full-flow also may damage the tunnel liner. Nonetheless, the rating computation does have an open channel flow calculation and the resulting rating curves are presented.

Cell N30 is Manning’s ‘n’, and is a user input.

Cell N33 is the user defined value of how much higher than the tunnel crown elevation would the static water level in the lake be when the flow regime changes from open channel to full-flow.

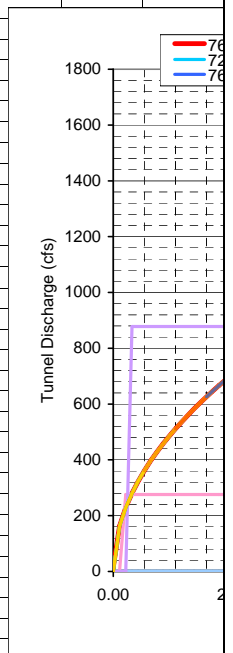
Cell N35 is a user input for the height of the velocity head above the hydraulic grade line (i.e., the distance between the hydraulic grade line and the energy grade line) expressed as a ratio of the total energy grade line height above the tunnel invert.

cc: Mark Benson, EPC

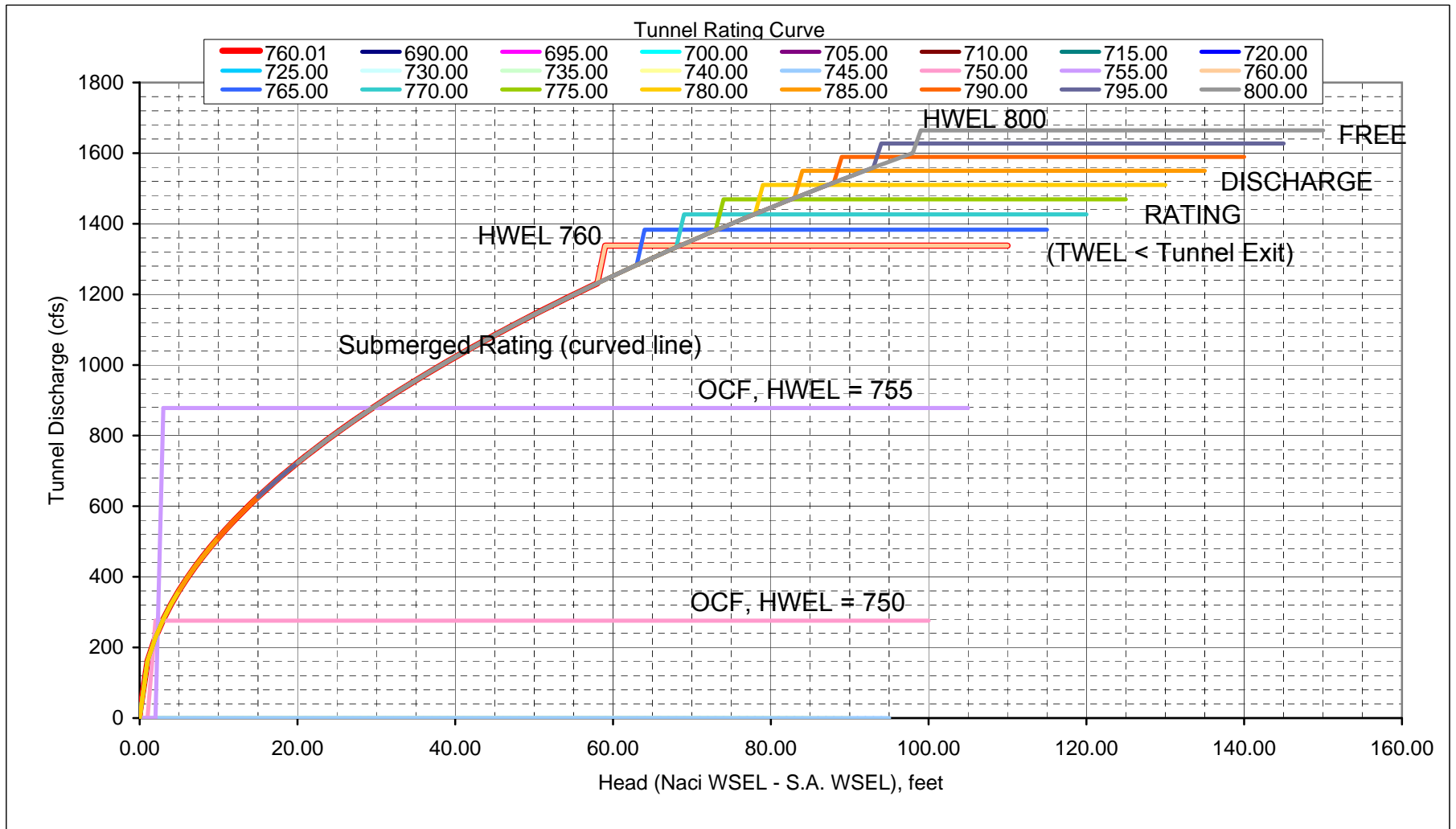
Attachments

Attachment A – Rating Curve Sample (10’ tunnel, $S=0.004’/’$, $U/SInvEL=745$)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T							
1	NACIMIENTO-SAN ANTONIO INTERLAKE TUNNEL PROJECT						PRELIMINARY DESIGN - HYDRAULICS AND HYDROLOGY ROUTING						COMPUTED BY: JOHN R. HOLLENBECK, P.E.				Rev 00 - Sep 17, 2014										
2	Hydraulics of Proposed Tunnel												HOLLENBECK CONSULTING														
3	This rating computation will analyze open channel flow within tunnel for shallow Nacimiento levels relative to tunnel invert. OPEN CHANNEL OPERATION IS NOT RECOMMENDED.																										
4	Assumptions						Values in BLUE are for user input.														Tunnel Rating Curve:						
5	1 Open Channel Flow: User Input for approximate height between Hydraulic Grade Line (HGL) and Energy Grade Line (EGL). User input for Manning's "n". User input where OCF stops (as % of tunnel dia.)																										
6	2 User input for desired values for: Tunnel slope, Tunnel Invert EL @ Nacimiento, & minimum tunnel invert elevation at Lake San Antonio.																										
7	3 User input for a minimum tunnel slope. Maximum tunnel slope will be computed based on user inputs for S.A. Tunnel invert elevation																										
8	4 User inputs for tunnel length, and diameter.																										
9	5 Use Darcy-Weisbach method for computing friction loss. Approx. values for Darcy's 'f' are presented in a "Lookup" array for an upper design velocity (also a user input).																										
10	6 User input for Rugosity (feet).																										
11	7 User inputs for minor losses (see tabular description).																										
12	Tunnel Friction Loss Characteristics																										
13	Nacimiento Storage =						180,000 AF			Upper Design V (approx) =						20 fps (used to approx Darcy "f")											
14	WSEL of Nacimiento =						760.01 ft-NGVD29 (computed using regression eqn.)			Rugosity =						0.00100 ft (assume steel lined, light rust)											
15							Kinematic Viscosity =						1.407E-05 ft^2/s (for water temp. = 50F)														
16	Tunnel Physical Characteristics																										
17	Tunnel Dia =						10 ft			u/s Crown EL=						755.00 ft-NGVD29			Dia (ft)			Darcy 'f'					
18	Tunnel L =						12,000 ft			u/s CL EL =						750.00 ft-NGVD29			1			0.020					
19	Nacimiento Inlet: u/s Inv EL						745.00 ft-NGVD29												2			0.017					
20																			4			0.015					
21	Min Slope =						0.0001 ft/ft (per COE EM1110-2-2901, Engineering & Design Tunnels and Shafts in Rock)												5			0.014					
22	Desired Slope =						0.004 ft/ft												6			0.013					
23																			8			0.013					
24	Desired Min d/s InvEL=						690.00 ft-NGVD29 (Inv. EL in Lake San Antonio selected to be minimum)												9			0.012					
25	Min Physical d/s InvEL=						650.00 ft-NGVD29 (based on estimate of the bottom of the lake)												10			0.012					
26	San Antonio Outlet: d/s Inv EL =						697.00 ft-NGVD29			d/s CL EL =			702.00 ft-NGVD29						12			0.012					
27	Computed S =						0.00400 ft/ft			Delta EL =			48.00 ft						13			0.012					
28																			14			0.011					
29	Accounting of Minor Loss Coefficients (aka, Form Losses)																										
30	Description						Km			Open Channel Flow Characteristics						16			0.011								
31	Intake Trashrack						0.1			Manning's "n" =						0.013			18			0.011					
32	Entrance Shape						0.2			Amount static HGL above crown									20			0.011					
33	Reducer						0.1			tunnel begins to flow full, as ratio of									22			0.011					
34	Stoplog Slots						0.05			tunnel diameter:						33%			23			0.010					
35	Gate Slots						0.05			HGL to EGL:						30% of Htot			26			0.010					
36	Enlarger						0.3			Thus, depth to Static HGL:						70% of Htot			28			0.010					
37																			30			0.010					
38																											
39																											
40																											
41																											
42							TOTAL			0.8																	



Tunnel Rating Curve: D = 10. u/s InvEL = 745.00 d/s InvEL= 697.00 Slope =0.00400 ft/ft



OCF = Open Channel Flow
 HWEL = Headwater Elevation (Nacimiento)
 WSEL = Water surface elevation
 TWEL = Tailwater Elevation (San Antonio)



MEMORANDUM

TO: Ron Drake / Monterey County Water Resources Agency

FROM: Michael J. Preszler / ECORP Consulting, Inc.

DATE: 12 November 2014

RE: Interlake Tunnel and San Antonio Enlargement Project Simulation Modeling

EXECUTIVE SUMMARY

A computer simulation model was developed to investigate the supplemental water supply made available from the proposed Interlake Tunnel and the enlargement of the San Antonio Reservoir. Results indicate that the average annual additional water made available to meet conservation release demands, to allow for downstream Salinas River Diversion Facility diversions, is 5,390 acre-feet and 14,805 acre-feet in dry year types. Additionally, an analysis was conducted to investigate how to operate the proposed tunnel to put additional supplemental water to beneficial use over and above releases to meet conservation release demands. Results indicate that there is an additional 10,937 acre-feet on average available to meet future project water demands.

This analysis also included an investigation of the water supply benefits of the proposed tunnel and a 60,000 acre-feet storage enlargement of San Antonio Reservoir. An average annual increase in conservation releases of 8,101 acre-feet and 20,949 acre-feet in dry year types is expected with the tunnel operation and an enlarged reservoir. Results indicate that there is an additional 12,585 acre-feet on average available to meet future project water demands with the enlargement of San Antonio Reservoir, over and above conservation releases to meet Salinas River Diversion Facility diversions.

1.0 INTRODUCTION AND BACKGROUND

Monterey County Water Resources Agency (Agency) is seeking information on the increase in water supply that could be realized with operation of the proposed Interlake Tunnel. The Interlake Tunnel would be configured to convey water from Nacimiento Reservoir to San Antonio Reservoir. The information presented here is intended to provide information to the Agency in its evaluation of the Interlake Tunnel project feasibility. Information is also included on the expected water supply benefits of enlarging the storage capacity of San Antonio Reservoir. This information is expected to be utilized to help determine the potential benefits of the tunnel project and provide an operational feasibility level analysis based on reservoir operational scenarios.

2.0 EVALUATION APPROACH

The general approach to this evaluation was as follows:

- Obtain basic information from the Agency describing Nacimiento and San Antonio River watershed hydrology, downstream water demands and, Nacimiento Reservoir and San Antonio Reservoir operational capacities and constraints.
- Estimate mean daily unimpaired reservoir inflow for the period of water year 1959 through 2013 for Nacimiento Reservoir and the period of 1967 through 2013 for San Antonio Reservoir.
- Develop an OASIS computer model to simulate operation of reservoirs, proposed Interlake Tunnel, and downstream demands.
- Investigate a range of tunnel diameters and tunnel inlet invert elevations.
- Perform a water supply yield analysis of baseline conditions (without tunnel) and with the proposed Interlake Tunnel for the purpose of quantifying the potential water supply benefits of the tunnel and reservoir operations. An increase in San Antonio Reservoir storage capacity was also evaluated.

3.0 APPROACH TO ESTIMATE UNIMPAIRED RESERVOIR INFLOW

It is important to have an understanding of watershed performance. In terms of water supply planning, including the proposed Interlake Tunnel, this means understanding watershed basin unimpaired runoff characteristics including timing, magnitude and frequency. Unimpaired flow information is the primary basic data used to evaluate water supply operations. Unimpaired inflow to Nacimiento and San Antonio Reservoirs are not measured directly and therefore must be estimated. This information is helpful to understand existing reservoir performance over a range of hydrology conditions. Mean daily unimpaired reservoir inflow was estimated for the period of water year 1959 through 2013 for Nacimiento Reservoir and the period of 1967 through 2013 for San Antonio Reservoir. This information is used to estimate the expected operation of the reservoirs and the proposed tunnel.

The principal objective of this evaluation was to provide hydrologic information representing the unimpaired mean daily historic inflow of Nacimiento and San Antonio Reservoirs. Analysis is based upon historic streamflow and reservoir data of the San Antonio and Nacimiento Rivers. Available streamflow records are published by the U.S. Geological Survey (USGS) and reservoir storage, evaporation, and outflow data is available from the Agency.

The mean daily unimpaired streamflow is the historic impaired streamflow adjusted to reflect impacts of upstream reservoir operation and diversions. Unimpaired streamflow is not measured directly and must be estimated. Theoretically, mean daily unimpaired streamflow can be calculated using a mass-balance approach. Because of normal data measurement error, incomplete and missing data, and data inconsistencies, this approach does not provide

adequate results for the intended use of this streamflow information. To better estimate the mean daily unimpaired inflow to each reservoir, a paired-basin approach is used. The gaged unimpaired watersheds located upstream of each reservoir are used to estimate streamflow at the study sites (i.e., inflow to the reservoirs). The streamflow gages located upstream of each reservoir are ideal for use in estimating streamflow at in the watersheds. The Nacimiento River stream gage (USGS No. 11148900) and San Antonio River stream gage (USGS No. 11149900) are used.

On a monthly basis, a mass-balance approach provides an accurate method to estimate unimpaired streamflow. Data errors associated with streamflow and reservoir storage measurement on a daily basis are dissipated when considered on a monthly basis. Monthly unimpaired flow is calculated using a mass-balance technique including an estimate of evaporation using historical evaporation pan data. Streamflow information from the upstream gages is then adjusted based on the ratio of monthly unimpaired streamflow at the stream gages and at the study site being estimated. Monthly adjustments are then modified, when necessary, to provide an adequate estimate of mean daily streamflow. Monthly adjustments are converted into daily adjustments to provide continuous daily adjustment factors. The upstream gage unimpaired data are adjusted by the daily adjustment factors to estimate mean daily inflow to the reservoirs. Detailed methodology used to develop mean daily unimpaired inflow to both Nacimiento and San Antonio Reservoirs is presented below.

Monthly unimpaired streamflow is estimated using historic reservoir release, estimate of evaporation and data describing reservoir storage. This streamflow represents the total unimpaired inflow into the reservoir. The following equation is used to estimate the monthly unimpaired inflow to Nacimiento and San Antonio Reservoirs.

$$\text{Reservoir Unimpaired Inflow} = \text{Outflow} + \text{Change in storage} + \text{Evaporation}$$

Where;

Outflow = For Nacimiento, USGS No. 11149400, plus San Luis Obispo releases, provided by the Agency.

For San Antonio, provided by the Agency.

Change in storage = Difference in end of month storage and first of month storage, provided by the Agency.

Evaporation = Evaporation estimated using historic evaporation pan data from each reservoir and calculated reservoir surface area.

Reservoir mean daily unimpaired inflow is estimated using the upstream gages adjusted using reservoir daily adjustment factors determined as described above. The monthly summation of mean daily streamflow is set to equal the monthly calculation of unimpaired flow from the

equation above. This process developed a high quality mean daily reservoir inflow data set for which all project simulation modeling was carried out. Detailed unimpaired mean daily reservoir inflow has been estimated at each Nacimiento and San Antonio Reservoirs and is tabulated in Appendix A. Annual plots for the study period illustrating the unimpaired mean daily inflow for each reservoir is also included.

4.0 PROJECT SIMULATION MODELING

Once adequate mean daily inflow information was determined as described in Section 3.0, a water supply yield analysis was conducted for three scenarios; 1) baseline conditions (without Interlake Tunnel), 2) project conditions (with Interlake Tunnel), and 3) project conditions with an enlarged San Antonio Reservoir. The computer simulation model was used to investigate operational parameters and quantify the water supply yield available under each scenario.

Operation of San Antonio Reservoir, Nacimiento Reservoir and the proposed Interlake Tunnel was simulated using a daily time-step OASIS computer model. The OASIS simulation model is a deterministic computer tool that runs on a daily time step. The OASIS model is capable of simulating minimum flow requirements, reservoir operations, power operations, and water supply demands. Used comparatively, it is capable of estimating the affects to water supply and power generation due to various operating proposals and project configurations.

4.1 PROJECT OPERATIONAL SIMULATION ANALYSIS ASSUMPTIONS

Some of the assumptions used in the proposed Interlake Tunnel operational analysis and San Antonio Reservoir enlargement are as follows:

4.1.1 Nacimiento and San Antonio Reservoir Inflow:

Mean daily reservoir inflow hydrology estimated as described in Section 3.0 for the period of record.

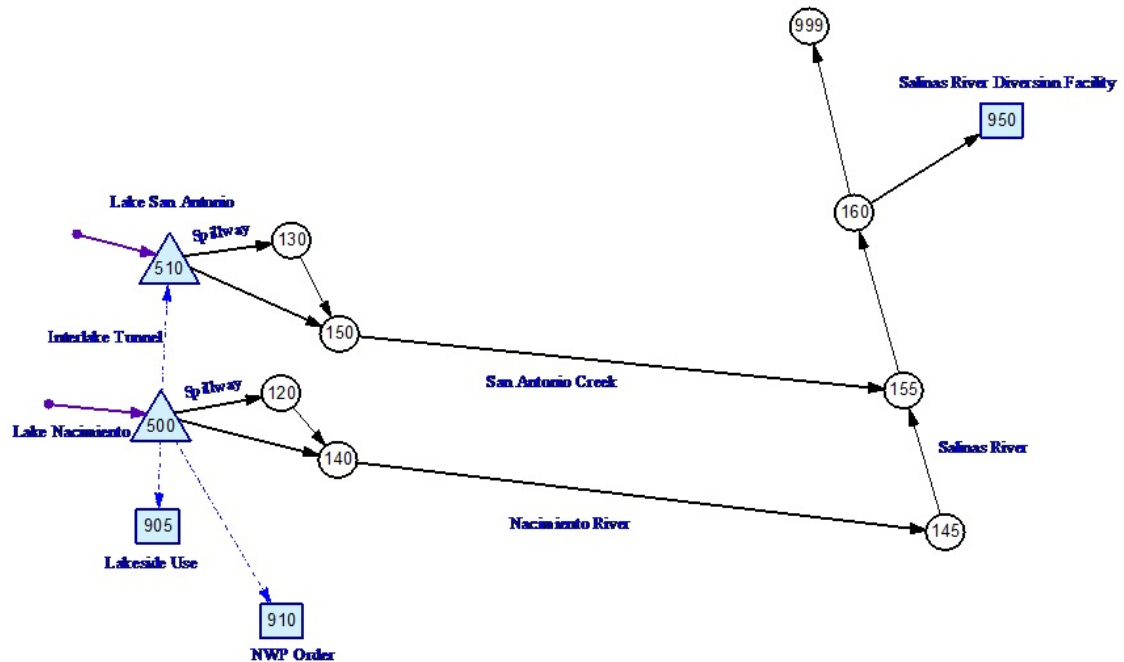
4.1.2 Salinas River Diversion Facility (SRDF) Operations:

No releases for SRDF when combined reservoir storage is less than 115,000 acre-feet on March 7. Water year type based release patterns, provided by Agency.

4.1.3 Reservoir Balancing:

Releases to meet SRDF demands are made from Nacimiento Reservoir, up to capacity of Nacimiento hydroelectric plant. Remaining releases required, if any, to meet SRDF demands are made from San Antonio Reservoir. When storage in Nacimiento Reservoir reaches minimum pool, all releases to meet SRDF demands are made from San Antonio Reservoir.

4.1.4 OASIS Computer Operational Simulation Model Schematic:



4.1.5 Simulation Period Initial Storage:

The initial storage used in the simulation modeling is 78,900 acre-feet for Nacimiento Reservoir and 23,000 for San Antonio Reservoir. At Nacimiento Reservoir, the initial storage used is the historic storage at Nacimiento Reservoir on September 30, 1966. This value is used in the model as the previous day's storage on the first day of the simulation period, October 1, 1966. There are historical storage records at San Antonio Reservoir on September 30, 1966, however at this time San Antonio Reservoir is in the initial filling stage after construction and something more representative would be appropriate. San Antonio Reservoir fills and draws down over multiple years, so we used the three year wetness sequence leading up to water year 1967 (dry-normal, normal, normal) and chose a similar year-type sequence from the study period, 1999 - 2001. After these three dry-normal and normal years, San Antonio is near minimum pool. This indicates that we would expect San Antonio Reservoir to be near minimum pool at the start of the study period. The San Antonio Reservoir minimum pool, 23,000 Acre-Feet, is used as the initial storage in the simulation modeling.

4.1.6 Nacimiento and San Antonio Reservoir Characteristics:

Table 1: Nacimiento and San Antonio Reservoir Characteristics, Acre-Feet				
Reservoir	Dead Pool	Minimum Pool	Maximum Storage	Initial Storage
Nacimiento	10,300	22,300	377,900	78,900
San Antonio	10,000	23,000	335,000	23,000

Reservoirs will stop releasing for minimum flows when storage drops below minimum pool, and will stop delivering to Nacimiento Water Project and Lakeside Uses when storage drops below dead pool.

4.1.7 Water Year Types:

There are five (5) water year types in the simulation model. These are used for setting conservation releases and block flow requirements. They are also used in model output post-processing for averaging results by year type. These water year types were provided by the Agency and are based on unimpaired mean annual flow at Arroyo Seco near Soledad.

Table 2: Water Year Types	
Water Year Type	Mean Annual Flow at Arroyo Seco at Soledad, cfs
Dry	0 – 68
Dry-Normal	69 – 102
Normal	103 – 152
Wet-Normal	153 – 259
Wet	>= 260

4.1.8 Consumptive Water Demands at Nacimiento Reservoir:

There are two consumptive demands met directly from Nacimiento Reservoir. Nacimiento Water Project demands are 15,750 Acre-Feet Annually (AFA). Lakeside Use demands are 1,750 AFA respectively. Monthly Demands are shown in Appendix B.

4.1.9 Minimum Flows:

Minimum flows are imposed on each reservoir when the reservoir's storage is greater than or equal to that reservoir's minimum pool. Minimum flows are 60 cfs at Nacimiento and 10 cfs at San Antonio.

4.1.10 Conservation Release Targets:

The simulation model makes conservation releases to meet downstream diversion demands at the SRDF. These release targets are combined release from both reservoirs and do not account for downstream losses. There are three year-type based release schedules, shown in Appendix C.

When one reservoir reaches minimum pool and is unable to continue making conservation releases, the conservation release is canceled for the season, and any reservoir still above minimum pool reverts to releasing only minimum flows.

4.1.11 Block Flows:

The model initiates a block flow release when the following conditions are met:

- Normal water year type
- Total project storage is above 150,000 AF
- Nacimiento River below Sapaque (USGS No. 11148900) flows greater than 124 cfs or Arroyo Seco below Reliz (USGS No. 11152050) flows greater than 69 cfs.
- Date is between March 15 and May 31

When a block flow release is initiated, the model has a combined release requirement of 700 cfs for 5 days, followed by 300 cfs for 32 days.

4.1.12 Additional Beneficial Releases:

Under the proposed tunnel simulation modeling, additional beneficial releases over and above conservation releases are used. These beneficial uses are not tied to a particular project, and illustrate water that would be available to meet water demands for future projects. The amount of water available to meet additional beneficial use beyond minimum flow and SRDF deliveries is estimated by considering the first day of the month, December through February, and calculated as Nacimiento Reservoir storage minus 140,000 AF. This operational rule was developed to assure that the water released from storage to meet additional beneficial uses did not reduce the total number of days that conservation release demands are met under baseline conditions. This calculated water volume is released on a December through April pattern, shown in Table 3 below. This release schedule was selected as a representative example of how demands could be met with additional beneficial release made available from the project.

Table 3: Additional Beneficial Releases from Nacimiento and San Antonio Reservoirs Under Tunnel Operation, Acre-Feet	
Month	Fraction of Total Release
December	0.0507
January	0.2174
February	0.4638
March	0.2174
April	0.0507

4.1.13 Water Right Release Limitations:

Nacimiento and San Antonio Reservoirs have limitations on total releases included in their water rights. These limitations are on releases to the river in excess of minimum flows, on a water year basis. Nacimiento Reservoir is not allowed to release more than 180,000 AF, and San Antonio Reservoir is not allowed to release more than 210,000 AF, per year.

4.1.14 Spill Operations:

During spill events Nacimiento Reservoir maximizes release through the hydro unit, and passes the remaining inflow through the spillway. The simulation model attempts to keep spillway flows less than 25,000 cfs through pre-releases. During spill events San Antonio Reservoir is operated to release the minimum flow through the low-level outlet, and pass the remaining inflow through the spillway.

4.1.15 Tunnel Operations Assumptions:

The tunnel simulation model includes all the assumptions of the baseline model. Water right limitations for allowable inflow storage and total outflow of each reservoir were not exceeded in the tunnel operations for the study period.

4.1.16 Tunnel Characteristics:

The proposed tunnel is 10-foot in diameter with an inlet invert elevation of 745 feet in Nacimiento Reservoir. The maximum capacity of the proposed tunnel at maximum head is 1,665 cfs. For other information about the assumptions used in the development of the tunnel rating curve, see Hollenbeck Consulting's Technical Memorandum No. 140921.

4.1.17 Reservoir Releases with Proposed Interlake Tunnel:

While the baseline maximizes Nacimiento Reservoir hydro generation when determining how much each reservoir will contribute to conservation releases, the proposed tunnel operation results in significantly additional water storage at San Antonio Reservoir and San Antonio subsequently contributes more to meet conservation demands in order to make use of the water developed through tunnel operation. To achieve this, the simulation model considers each reservoir's proportion of total storage, and assigns each reservoir to release that same proportion to meet conservation demands. For example, if San Antonio Reservoir storage is half of its total storage capacity, then San Antonio Reservoir will release half of the conservation demands, and if San Antonio Reservoir storage is 25% of its storage capacity, then San Antonio Reservoir will release 25% of the water to meet conservation demands.

4.1.18 Interlake Tunnel Transfers:

An attempt was made to minimize the amount of information needed to determine proposed Interlake Tunnel operational decisions. A basic operation would be to allow reservoir elevations to dictate tunnel flow, with no operational interaction. When allowed to function in this manner there were instances where tunnel transfers would cause San Antonio Reservoir to spill while Nacimiento did not spill, causing a decrease in supplemental water supply benefits. To prevent occurrences of this situation, a simple rule was implemented that shuts off tunnel flows when the project is in an "Imbalanced Storage" condition. This is generally defined as San Antonio Reservoir

elevation being near its spillway while Nacimiento Reservoir is not near its spillway, and in the simulation model is defined by the following table, where Flood Control Space is defined as the reservoir's maximum storage capacity minus its current storage. For the simulation model, these rules were defined in terms of storage to facilitate implementation of San Antonio Reservoir storage increase scenarios, but these would likely be implemented in terms of reservoir surface elevations.

Table 4: Interlake Tunnel Operational Simulation Definition of Imbalanced Storage, Acre-Feet		
Season	San Antonio Flood Control Space	Nacimiento Flood Control Space
Oct-Dec	< 50,000	>= 25,000
Jan-Apr	< 30,000	>= 25,000
May-Sep	< 10,000	> 0

5.0 OPERATIONAL SIMULATION MODELING RUNS

In addition to evaluating Baseline conditions (existing condition, without the proposed Interlake Tunnel), there were many Interlake Tunnel scenarios investigating a range of tunnel size (diameter) and tunnel invert elevations to determine how these parameters affect development of supplemental water supply. The results presented here include the following operational simulation modeling scenarios.

Baseline

The Baseline condition describes existing conditions without the Interlake Tunnel or San Antonio enlargement. This simulation modeling information is used to calibrate the model and provide for quantitative comparisons to the other operational scenarios.

10 Foot Diameter Interlake Tunnel

The 10 foot diameter Interlake Tunnel condition simulates operation of the existing reservoirs and the proposed tunnel. This is used to estimate the supplemental water developed through development and operation of the proposed tunnel.

10 Foot Diameter Interlake Tunnel and San Antonio Reservoir Enlargement

The 10 foot diameter Interlake Tunnel and San Antonio Reservoir Enlargement condition simulates operation of an increase in San Antonio Reservoir storage of 60,000 acre-feet and the proposed tunnel. This is used to estimate the supplemental water developed through development and operation of the proposed tunnel and the reservoir enlargement.

6.0 RESULTS AND CONCLUSIONS

Baseline modeling was conducted to understand the performance of the existing reservoir system. This allowed a comparative analysis with the proposed Interlake Tunnel and enlarged San Antonio Reservoir operational scenarios. The baseline simulation model was developed to describe the water availability of the existing system using the existing operational parameters. Once the baseline simulation modeling was complete, different tunnel configurations were evaluated to investigate how tunnel diameter and tunnel invert elevations influence performance (i.e., developed supplemental water supply yield). Results concluded the use of a tunnel diameter of 10 feet with an inlet invert elevation in Nacimiento Reservoir of 745 feet. A larger tunnel diameter, conveying a higher rate of flow, did not offer a significant increase in additional water supply yield. A smaller diameter tunnel, with a lower flow rate, offered a significantly less water supply benefit. Because inflow to Nacimiento Reservoir is typically very high, causing the reservoir to fill relatively quickly, the tunnel invert elevation isn't significantly sensitive to availability to transfer water through the tunnel. Additionally, San Antonio Reservoir storage enlargement was also evaluated. Summary results of this evaluation are summarized in Tables 5 and 6 below. Monthly detailed results are included in Appendix D.

Description	Average Annual Controlled Release
Baseline (existing condition)	201,408
10' Dia. Tunnel	217,735
10' Dia. Tunnel, Increased Conservation Release Over Baseline	16,327
SRDF Additional Release	5,390
Remaining Water Available for Additional Future Projects	10,937

Under baseline (existing) conditions, the average annual controlled release (releases that are not spill) is 201,408 acre-feet. Under operation of the proposed Interlake Tunnel, the average annual controlled release is 217,735 acre-feet, a 16,327 acre-feet increase. The additional water made available to meet conservation release demands, to allow for downstream SRDF diversions, is 5,390 acre-feet under the tunnel operation. The proposed Interlake Tunnel and enlarged San Antonio Reservoir develops significantly more supplemental water in many years that isn't put to full use because conservation release demands are often fully met under baseline conditions and therefore, developing additional water during that year type isn't put to use. If there is no need for additional water to meet conservation release demands, then the simulation model doesn't make additional releases from storage even when additional water is developed by the tunnel operation. That additional water can be carried over to the following year and potentially lost through spill. An analysis was conducted to investigate how to operate the proposed tunnel and the enlarged reservoir to put additional supplemental water to beneficial use over and above releases to meet conservation release demands. There is an additional 10,937 acre-feet on average available to meet future project water demands. This modeling effort assumed that this water would be released during the December through March

period. Care was taken to be sure that the total number of days that conservation release demands are met under baseline conditions are maintained under all of the proposed project operational simulations to be sure that reported water supply benefits are not simply originating from a reoperation of the existing system.

Table 6: Interlake Tunnel Operational Results, Acre-Feet							
Tunnel Configuration	Spill Reduction		Increased Conservation Releases			Increase in Dry Year Conservation Releases	Tunnel Transfers
10' Dia. Tunnel	7,736		5,390			14,805	50,493
10' Dia. Tunnel with San Antonio Enlargement	11,857		8,101			20,949	53,840
Additional Supplemental Water to Supply Future Infrastructure (releases December through March)							
Tunnel Configuration	Spill Reduction	Additional Beneficial Use	Increase in Conservation Releases	Increase in Total Controlled Releases	Increase in Total Dry Year Controlled Releases	Increase in Dry Year Conservation Releases	Tunnel Transfers
10' Dia. Tunnel	17,132	15,372	955	16,327	5,020	4,406	46,527
10' Dia. Tunnel with San Antonio Enlargement	22,198	15,774	4,912	20,686	5,262	4,429	50,179

The supplemental water made available by the proposed Interlake Tunnel is developed by reducing spill at the reservoirs. As such, estimating spill under operational conditions provides information on the potential water available. As can be seen in Table 6, Nacimiento and San Antonio Reservoirs spill an average of 7,736 acre-feet per year less with operation of the tunnel. An average annual increase in conservation releases of 5,390 acre-feet and 14,805 acre-feet in dry year types. Additionally, enlarging the storage capacity at San Antonio Reservoir by 60,000 acre-feet would further reduce spill and provide additional water supply. Nacimiento and San Antonio Reservoirs spill an average of 11,857 acre-feet per year less with operation of the tunnel and an enlarged reservoir. An average annual increase in conservation releases of 8,101 acre-feet and 20,949 acre-feet in dry year types is expected with the tunnel operation and an enlarged reservoir. Results indicate that there is an additional 12,585 acre-feet on average available to meet future project water demands with the enlargement of San Antonio Reservoir, over and above conservation releases to meet Salinas River Diversion Facility diversions.



Appendix A

Station Name **NACIMIENTO RIVER AT NACIMIENTO RESERVOIR**

Param **UNIMPAIRED**
Statistic **Mean**

		WATER YEAR																								
Day	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9	0.0	0.2	0.0	0.0	0.0	0.0	32.2
2-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	0.0	0.2	0.0	0.0	0.0	0.0	26.4
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.4	0.0	0.2	0.0	0.0	0.0	0.0	20.6
4-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	0.0	0.2	0.0	0.0	0.0	0.0	16.5
5-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.0	0.2	0.0	0.0	0.0	0.0	13.6
6-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.2	0.0	0.0	0.0	0.0	11.2
7-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.2	0.0	0.0	0.0	0.0	10.5
8-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.1	0.0	0.0	0.0	0.0	9.4
9-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.1	0.0	0.0	0.0	0.0	9.7
10-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.1	0.0	0.0	0.0	0.0	9.3
11-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.1	0.0	0.0	0.0	0.0	9.5
12-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.1	0.0	0.0	0.0	0.0	9.5
13-Oct	0.0	0.0	0.0	0.0	1010.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.1	0.0	0.0	0.0	0.0	9.1
14-Oct	0.0	0.0	0.0	0.0	2526.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0	0.0	9.0
15-Oct	0.0	0.0	0.0	0.0	365.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	8.9
16-Oct	0.0	0.0	0.0	0.0	165.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	9.6
17-Oct	0.0	0.0	0.0	0.0	102.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	353.6	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	9.7
18-Oct	0.0	0.0	0.0	0.0	75.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	417.9	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	9.8
19-Oct	0.0	0.0	0.0	0.0	57.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	310.8	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	9.9
20-Oct	0.0	0.0	0.0	0.0	45.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	9.7
21-Oct	0.0	0.0	0.0	0.0	40.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.3	0.0	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	9.8
22-Oct	0.0	0.0	0.0	0.0	32.5	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.6	0.0	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	9.3
23-Oct	0.0	0.0	0.0	0.0	30.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.6	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	9.1
24-Oct	0.0	0.0	0.0	0.0	27.5	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.9	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	8.7
25-Oct	0.0	0.0	0.0	0.0	27.5	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.3	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	8.5
26-Oct	0.0	0.0	0.0	0.0	25.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.7	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	8.3
27-Oct	0.0	0.0	0.0	0.0	24.5	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.4	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	8.1
28-Oct	0.0	0.0	0.0	0.0	23.5	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.1	0.0	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	7.4
29-Oct	0.0	0.0	0.0	0.0	22.5	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9	0.0	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	7.0
30-Oct	0.0	0.0	0.0	0.0	21.5	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7	0.0	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	8.1
31-Oct	0.0	0.0	0.0	0.0	19.8	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	11.8
1-Nov	0.0	0.0	0.0	0.0	18.8	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.7	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	16.3
2-Nov	0.0	0.0	0.0	0.0	18.1	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.7	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	20.9
3-Nov	0.0	0.0	0.0	0.0	18.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.9	0.6	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	22.7
4-Nov	0.0	0.0	0.0	0.0	17.2	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	2.8	0.6	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	17.5
5-Nov	0.0	0.0	0.0	0.0	17.2	110.2	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.0	18.9	3.2	0.6	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	15.5
6-Nov	0.0	0.0	0.0	0.0	16.2	1129.8	0.0	0.0	0.0	0.0	0.0	0.0	68.6	0.0	16.2	3.4	0.7	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	14.1
7-Nov	0.0	0.0	0.0	0.0	15.3	140.1	0.0	0.0	0.0	0.0	0.0	0.0	35.6	0.0	13.5	4.1	0.7	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	13.3
8-Nov	0.0	0.0	0.0	0.0	16.3	67.1	0.0	0.0	0.0	0.0	0.0	0.0	25.4	0.0	12.5	4.8	0.7	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	11.6
9-Nov	0.0	0.0	0.0	0.0	15.3	40.9	895.7	0.0	0.0	0.0	0.0	0.0	14.0	0.0	12.5	5.2	0.6	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	11.4
10-Nov	0.0	0.0	0.0	0.0	15.4	30.4	1453.7	0.0	0.0	0.0	0.0	0.0	9.9	0.0	72.8	6.5	0.6	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	24.4
11-Nov	0.0	0.0	0.0	0.0	15.4	26.4	357.9	0.0	0.0	0.0	0.0	6.6	7.5	0.0	518.0	6.9	0.6	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	3221.2
12-Nov	0.0	0.0	0.0	0.0	15.5	23.6	1269.7	0.0	0.0	0.0	0.0	7.5	7.0	0.0	178.1	106.3	0.6	0.0	0.5	0.0	0.2	0.0	0.0	0.0	0.0	374.1
13-Nov	0.0	0.0	44.3	0.0	15.5	21.7	463.0	0.0	0.0	0.0	0.0	6.4	5.1	0.0	449.2	78.3	0.7	0.0	0.5	0.0	0.4	0.0	0.0	0.0	0.0	338.1
14-Nov	0.0	0.0	35.5	0.0	15.5	764.3	234.5	120.6	0.0	0.0	0.0	5.7	4.7	0.0	6002.7	55.9	0.6	0.0	1.0	0.0	0.4	0.0	0.0	966.2	0.0	404.0
15-Nov	0.0	0.0	16.2	0.0	15.6	1303.5	157.7	70.3	0.0	0.0	0.0	5.3	4.4	0.0	2670.9	37.3	0.6	0.0	1.4	0.0	0.4	0.0	0.0	602.0	0.0	223.5
16-Nov	0.0	0.0	3.0	0.0	14.8	355.2	121.3	2210.7	0.0	0.0	0.0	4.4	3.9	0.0	2252.7	46.6	0.6	0.0	1.5	0.0	0.4	0.0	0.0	329.4	0.0	168.5
17-Nov	0.0	0.0	2.1	0.0	13.8	183.6	89.0	3336.2	0.0	0.0	0.0	4.3	4.1	0.0	1848.0	1521.7	0.6	0.0	1.4	0.0	2.6	0.0	0.0	874.7	0.0	212.6
18-Nov	0.0	0.0	1.2	0.0	13.8	125.3	74.8	4421.5	0.0	0.0	0.0	4.1	4.1	0.0	725.7	1262.5	0.6	0.0	1.4	0.0	4.0	0.0	0.0	508.7	0.0	383.1
19-Nov	0.0	0.0	0.6	0.0	13.8	2029.0	62.7	924.5	0.0	0.0	0.0	3.7	3.6	0.0	433.0	326.3	0.7	0.0	1.3	0.0	4.2	0.0	0.0	261.7	1876.9	238.8

Station Name **NACIMIENTO RIVER AT NACIMIENTO RESERVOIR**

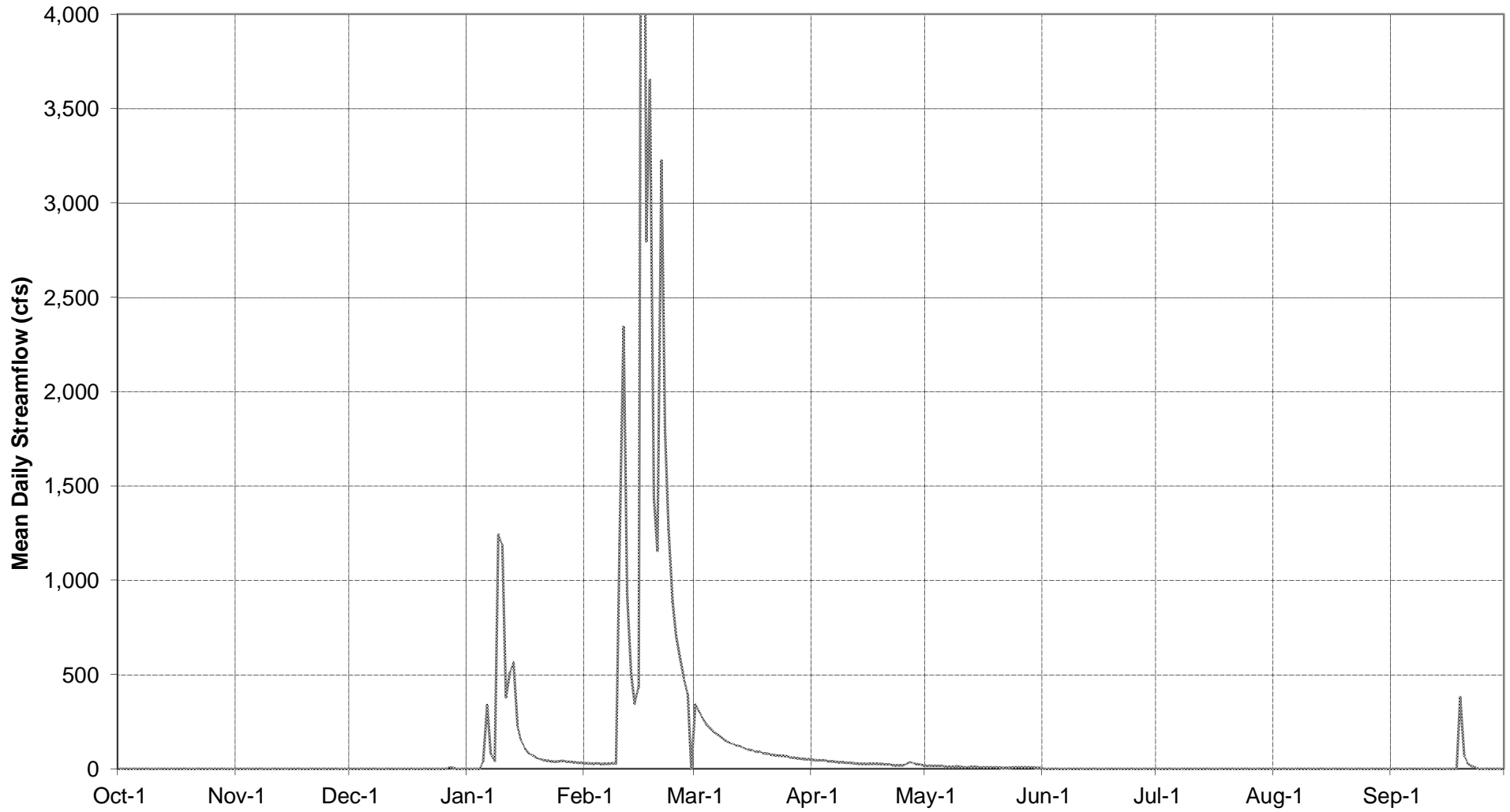
Param **UNIMPAIRED**

Statistic **Mean**

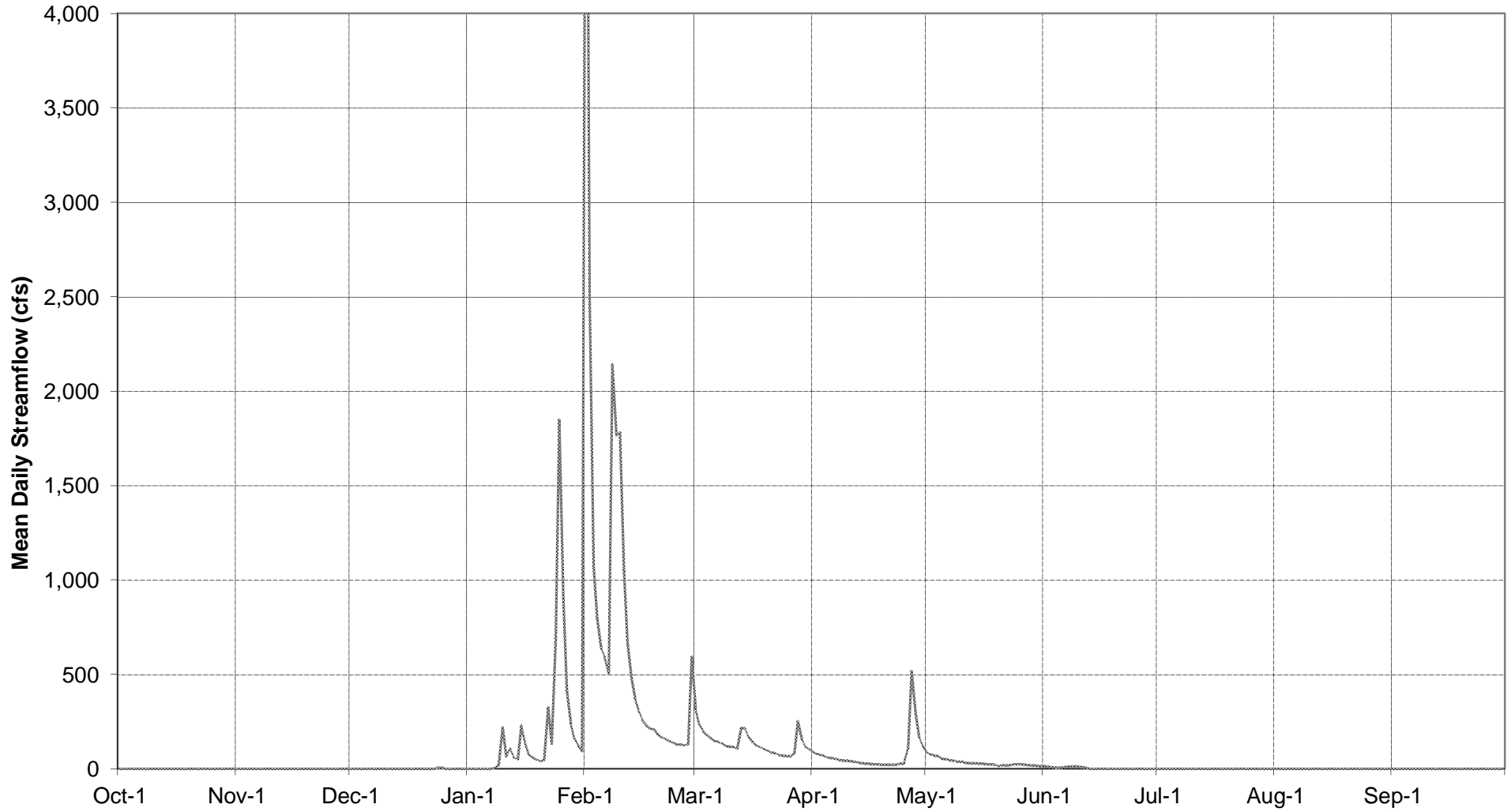
WATER YEAR

Day	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
22-Sep	14.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.8	0.0
23-Sep	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.7	0.0
24-Sep	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.8	0.0
25-Sep	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.7	0.0
26-Sep	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.9	0.0
27-Sep	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.8	0.0
28-Sep	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	2.0	0.0
29-Sep	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	2.1	0.0
30-Sep	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	8.1	0.0

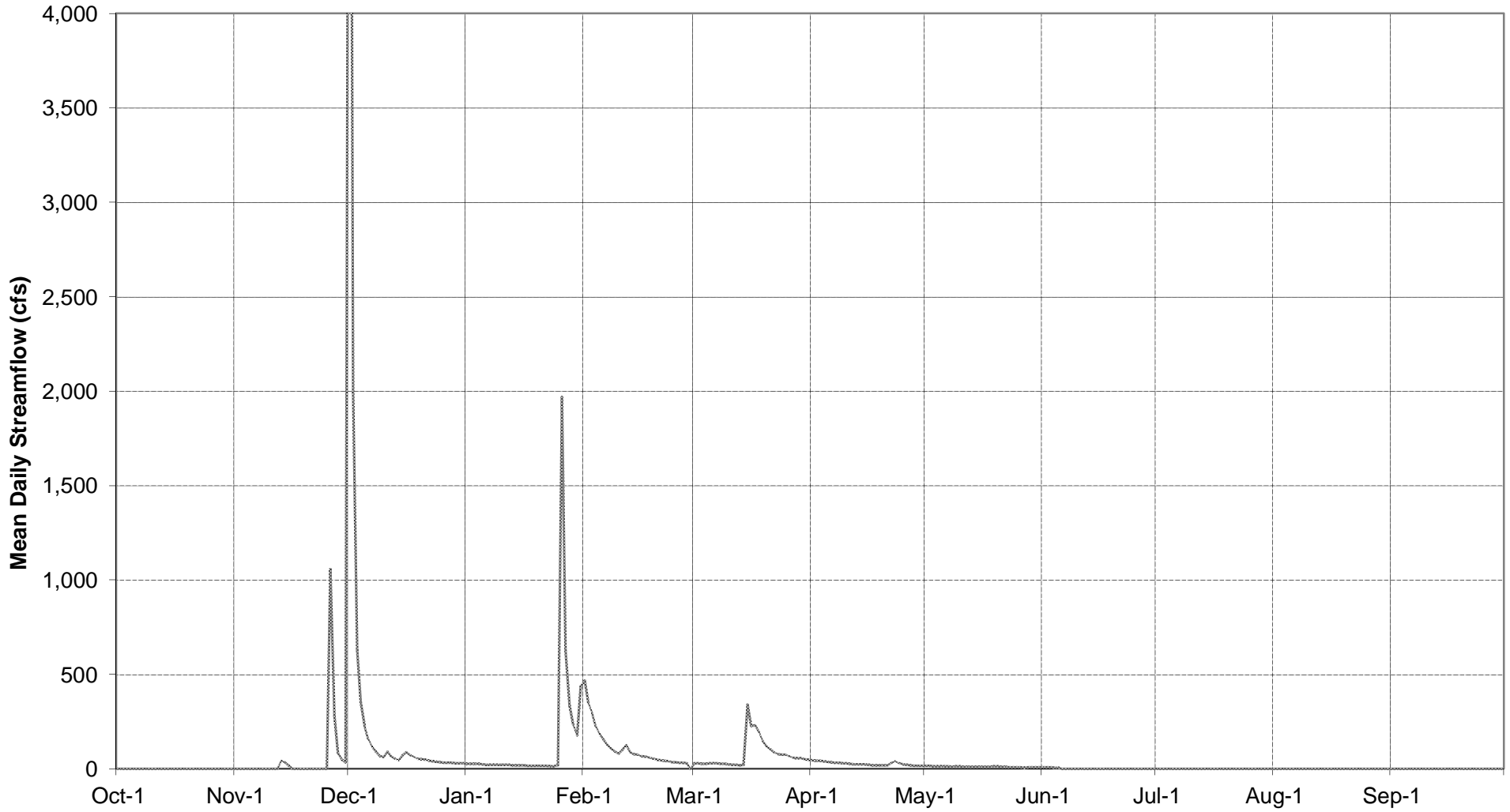
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1959



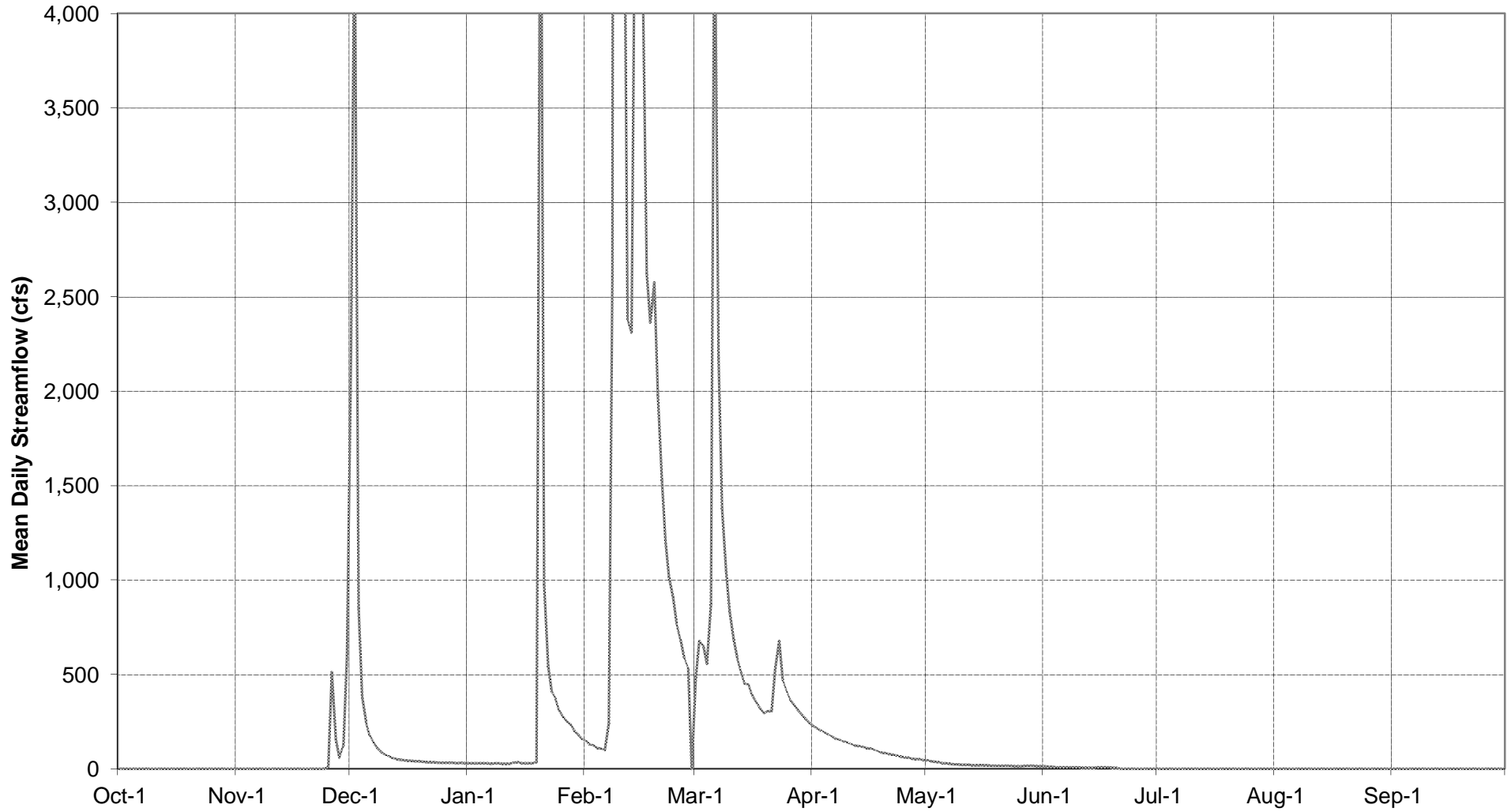
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1960



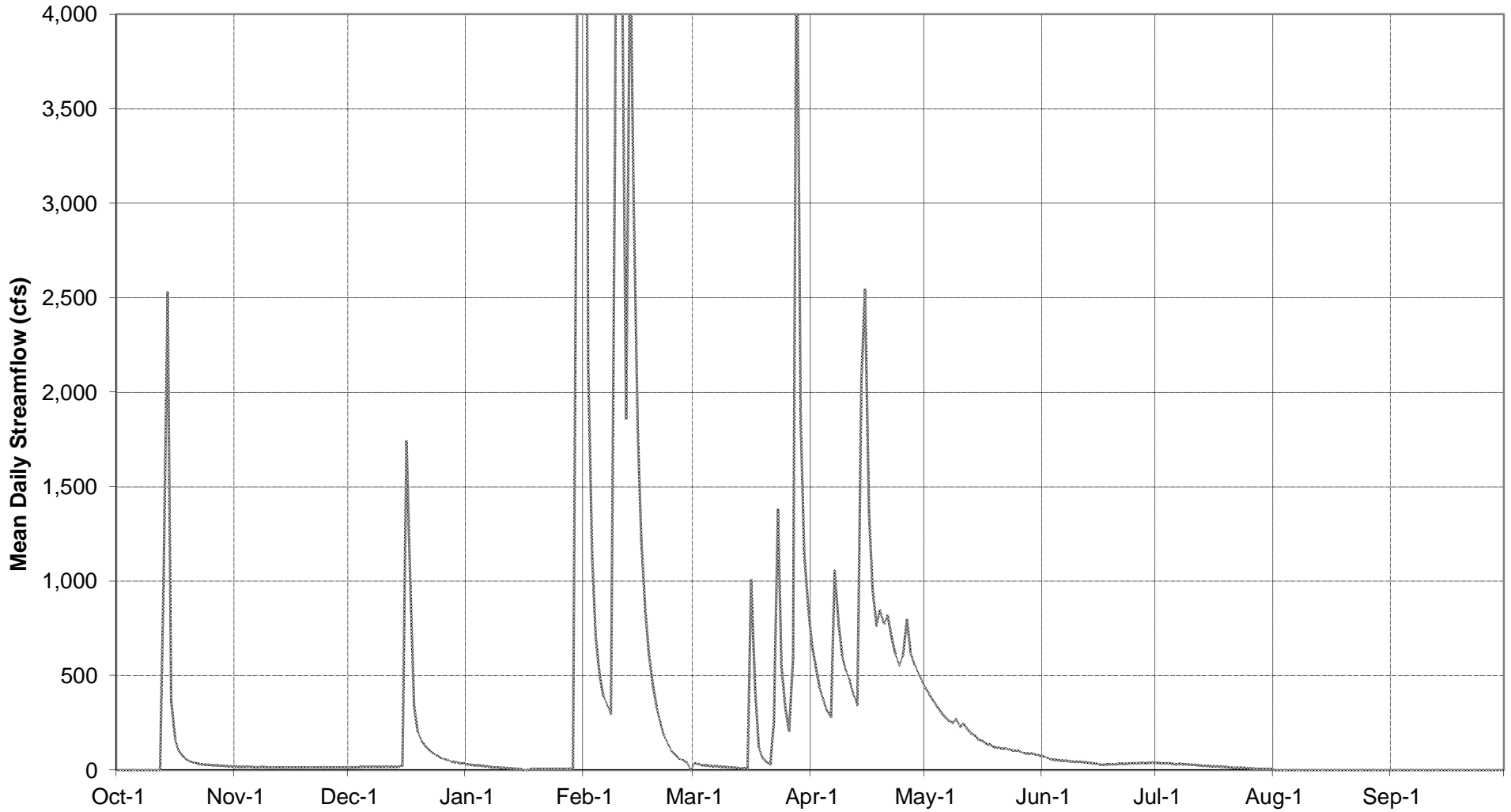
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1961



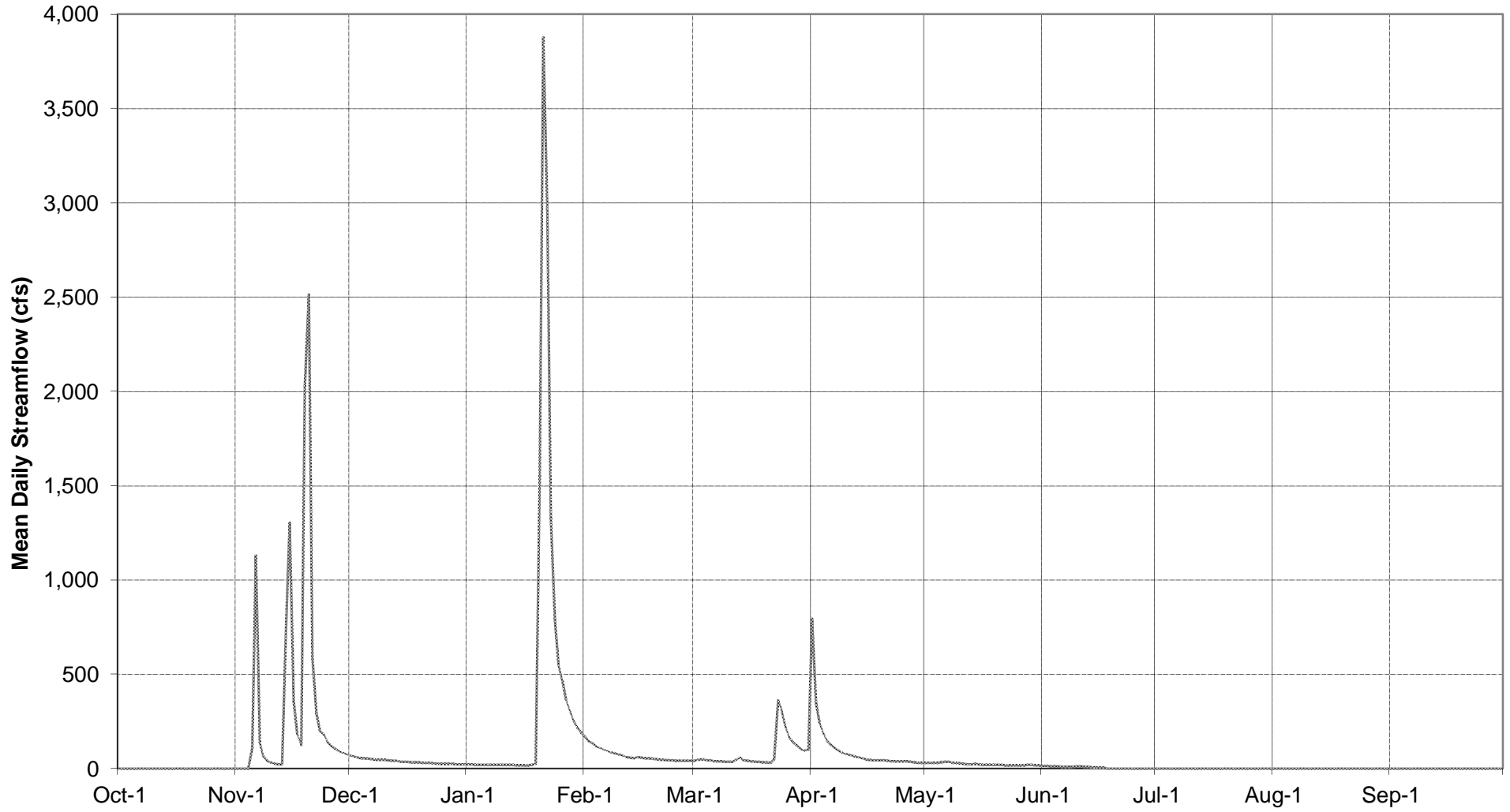
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1962



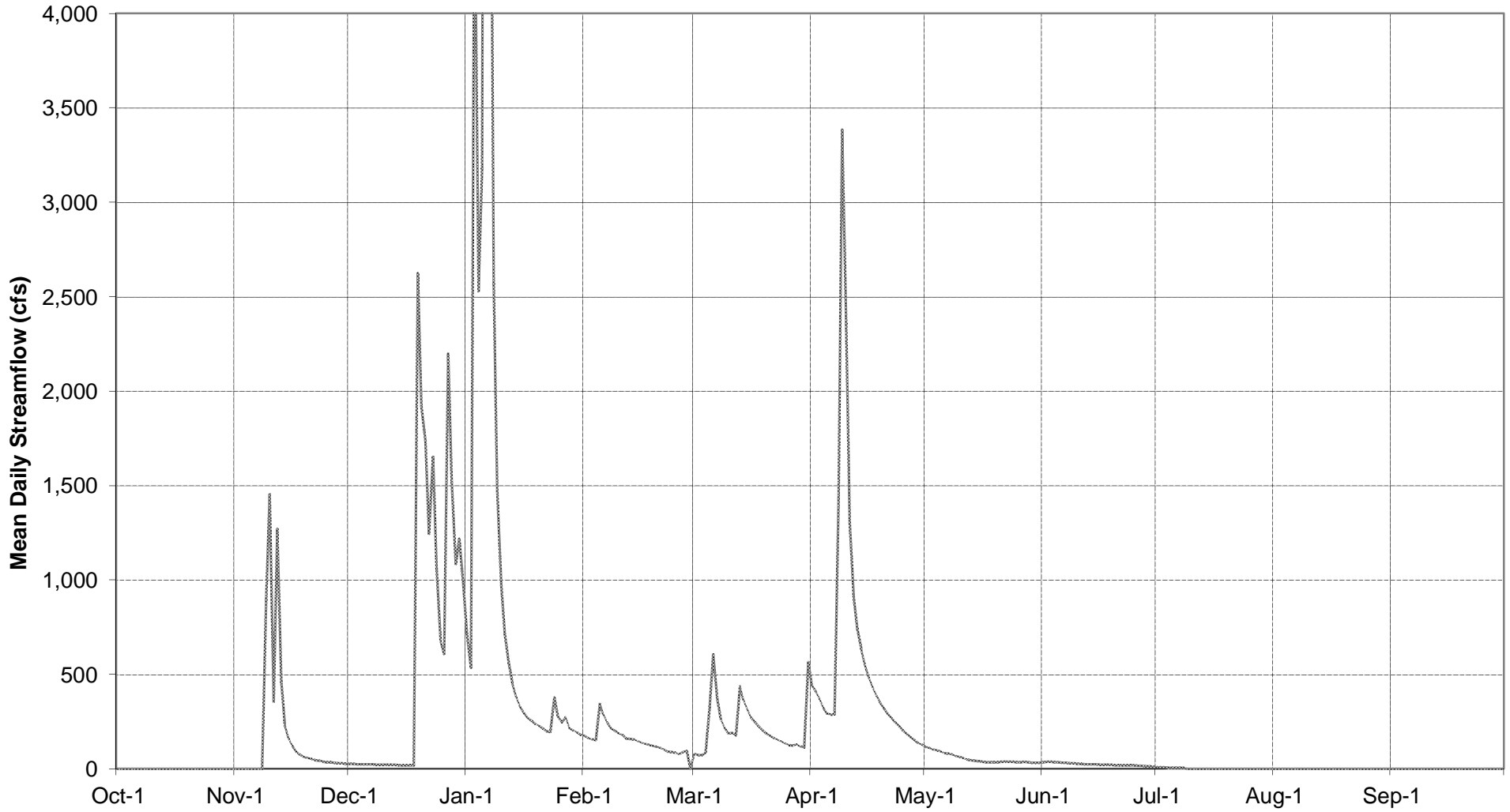
**NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1963**



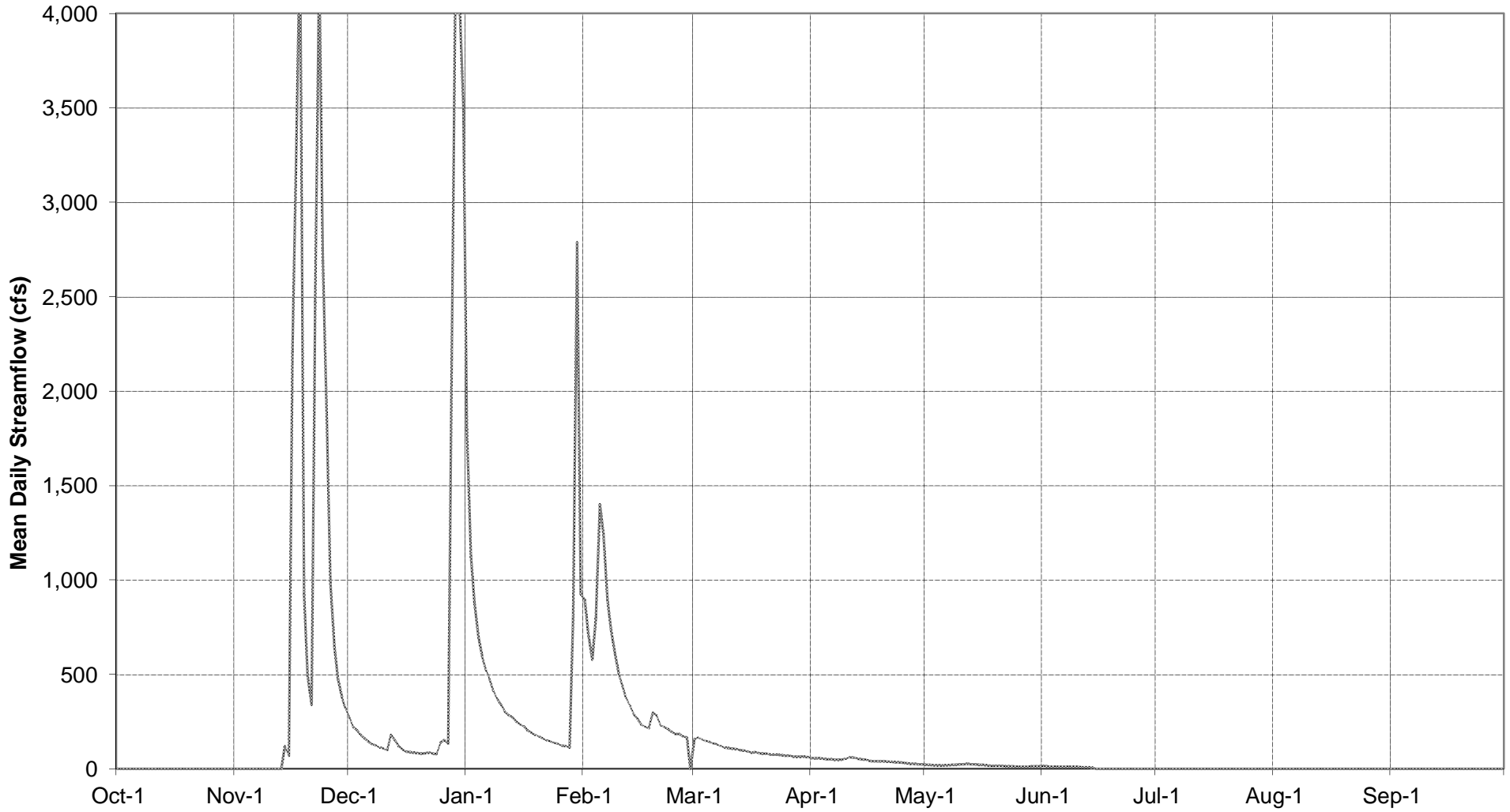
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1964



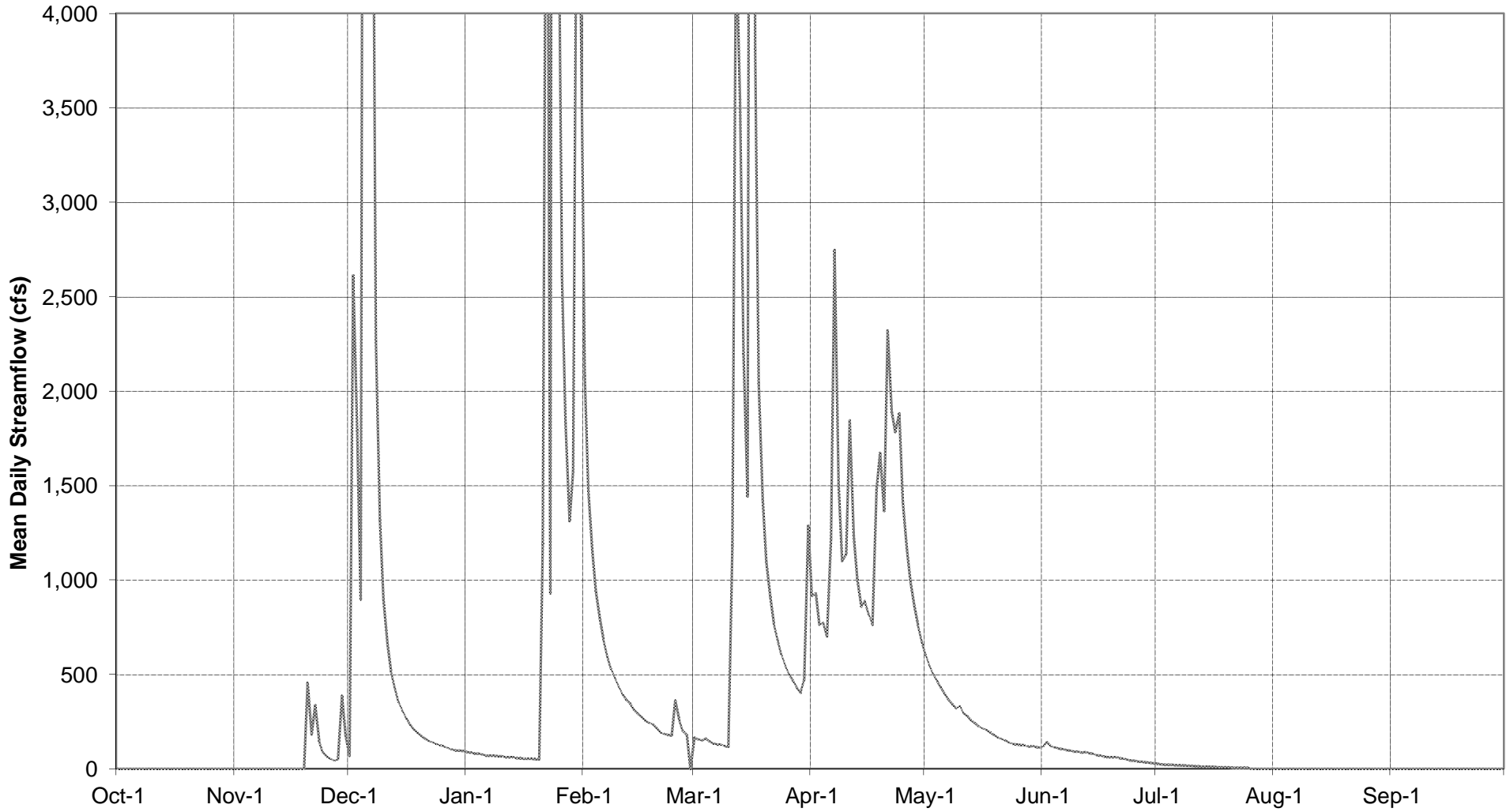
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1965



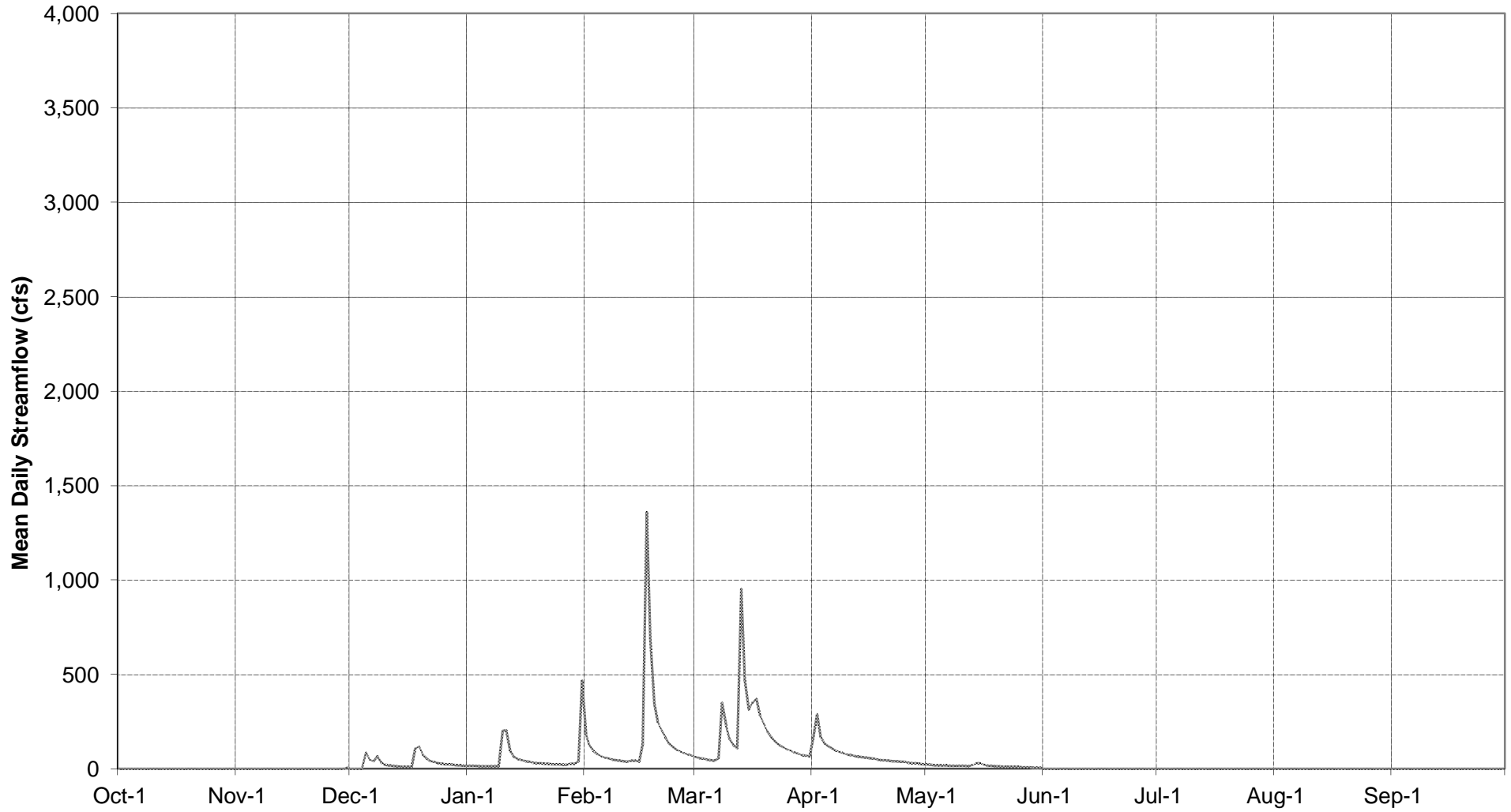
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1966



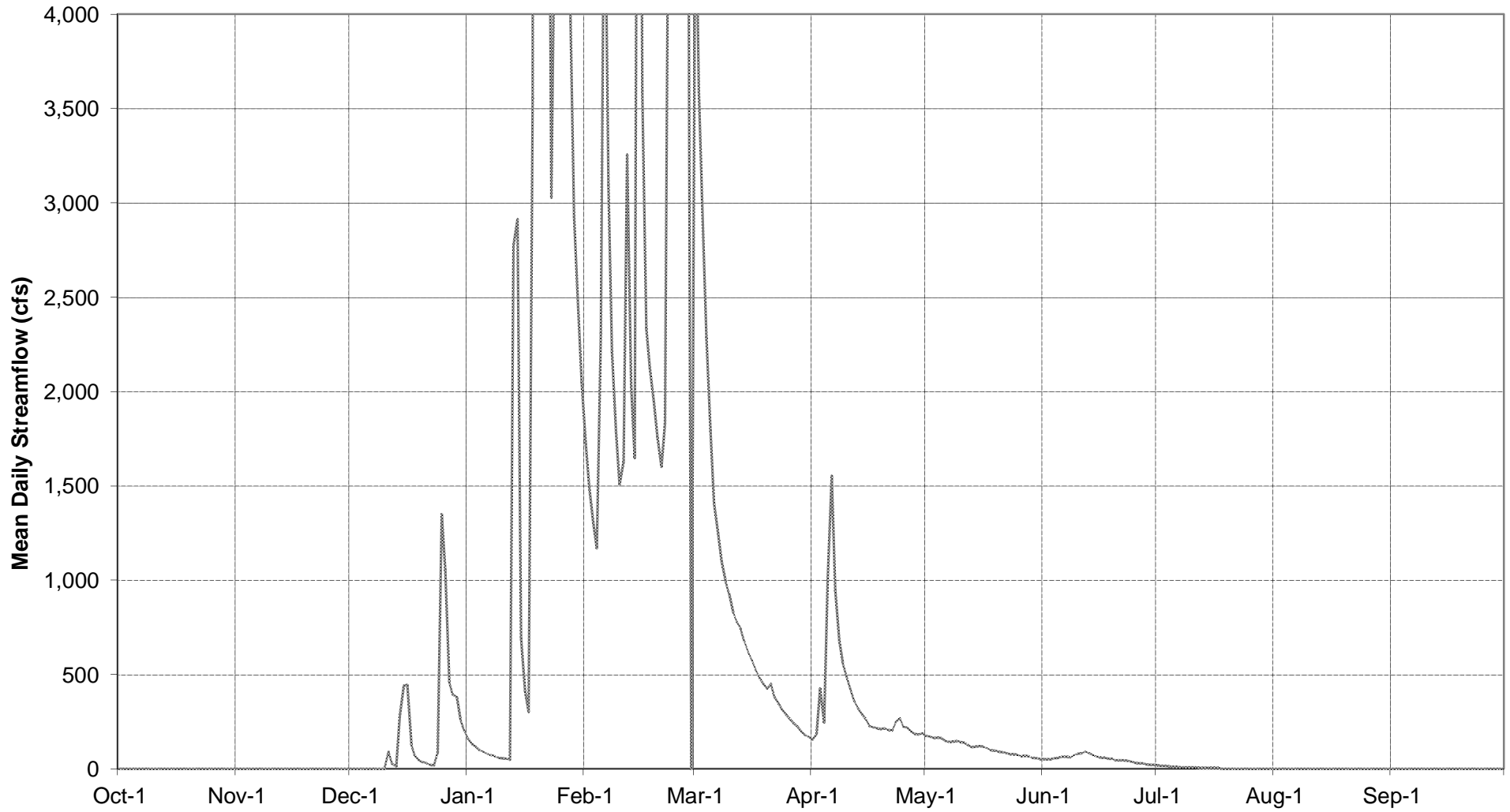
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1967



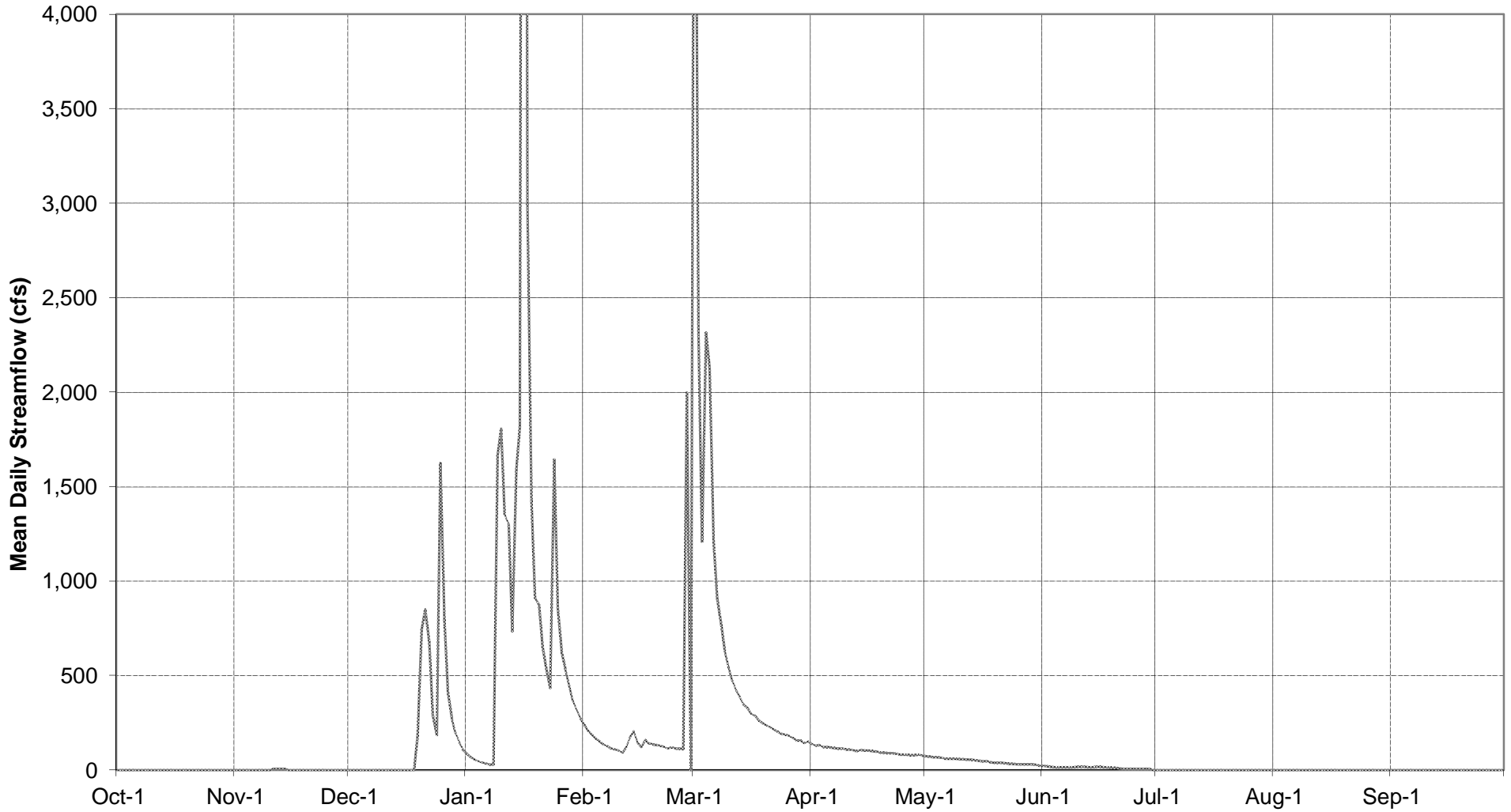
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1968



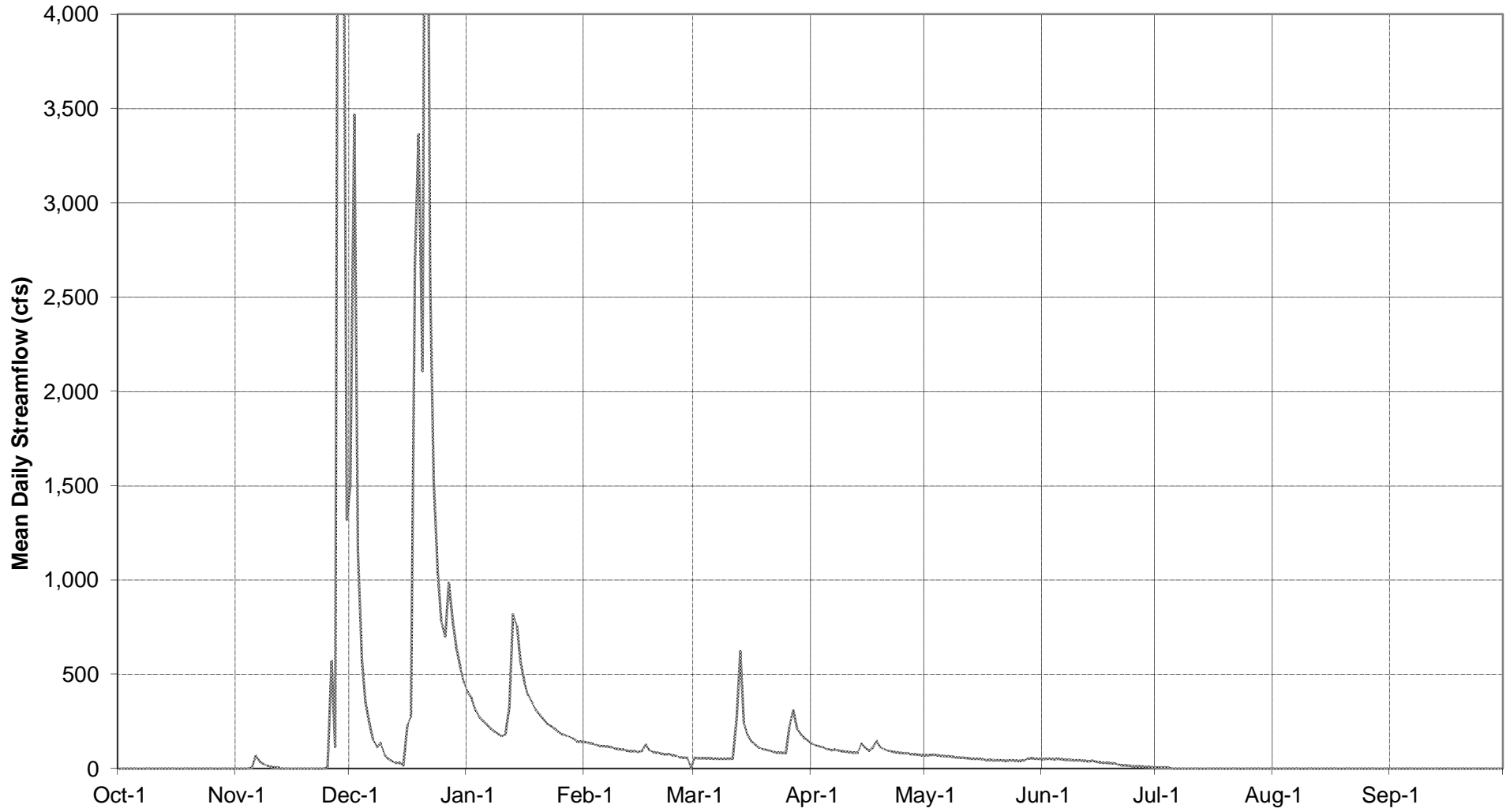
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1969



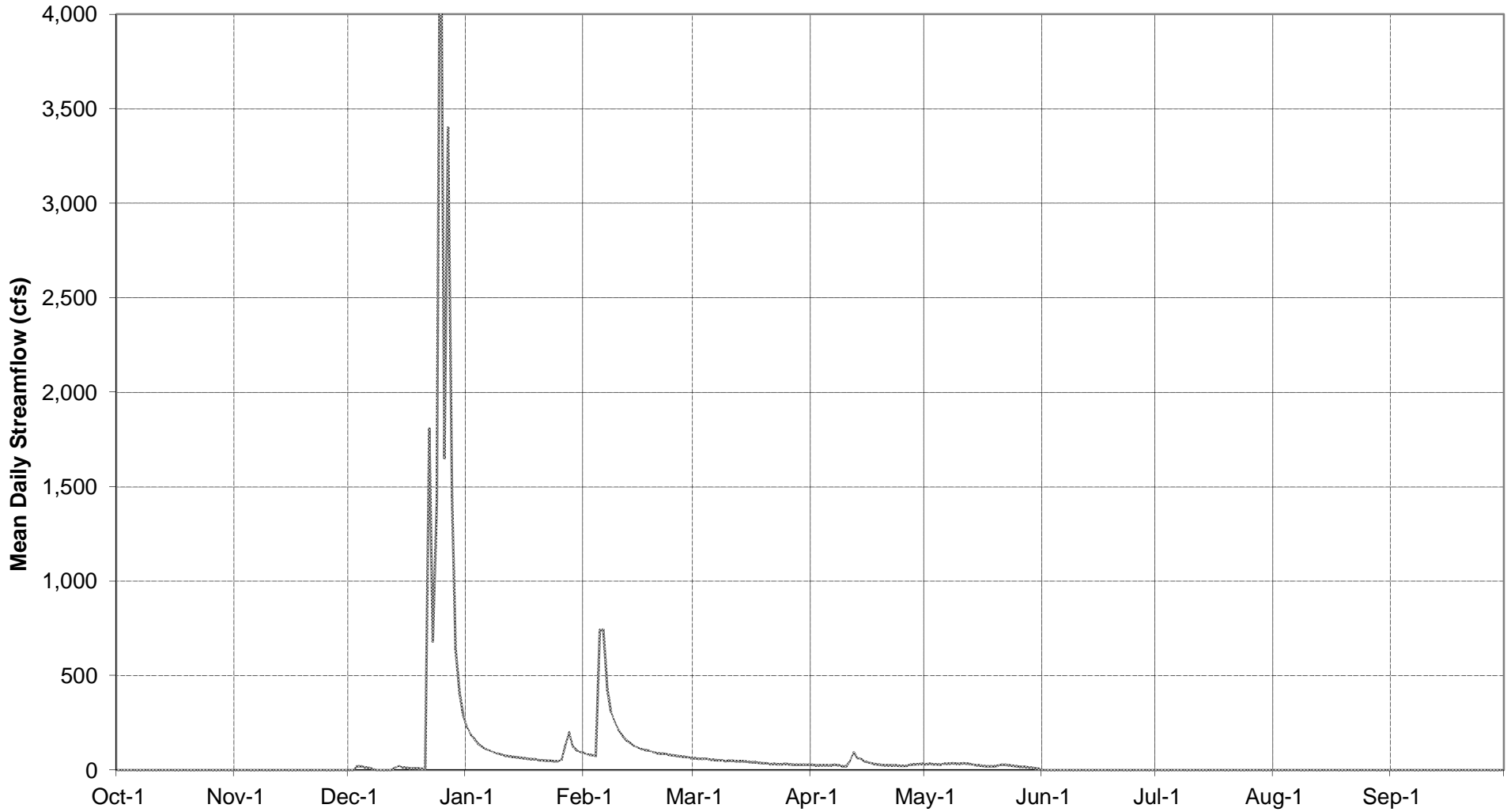
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1970



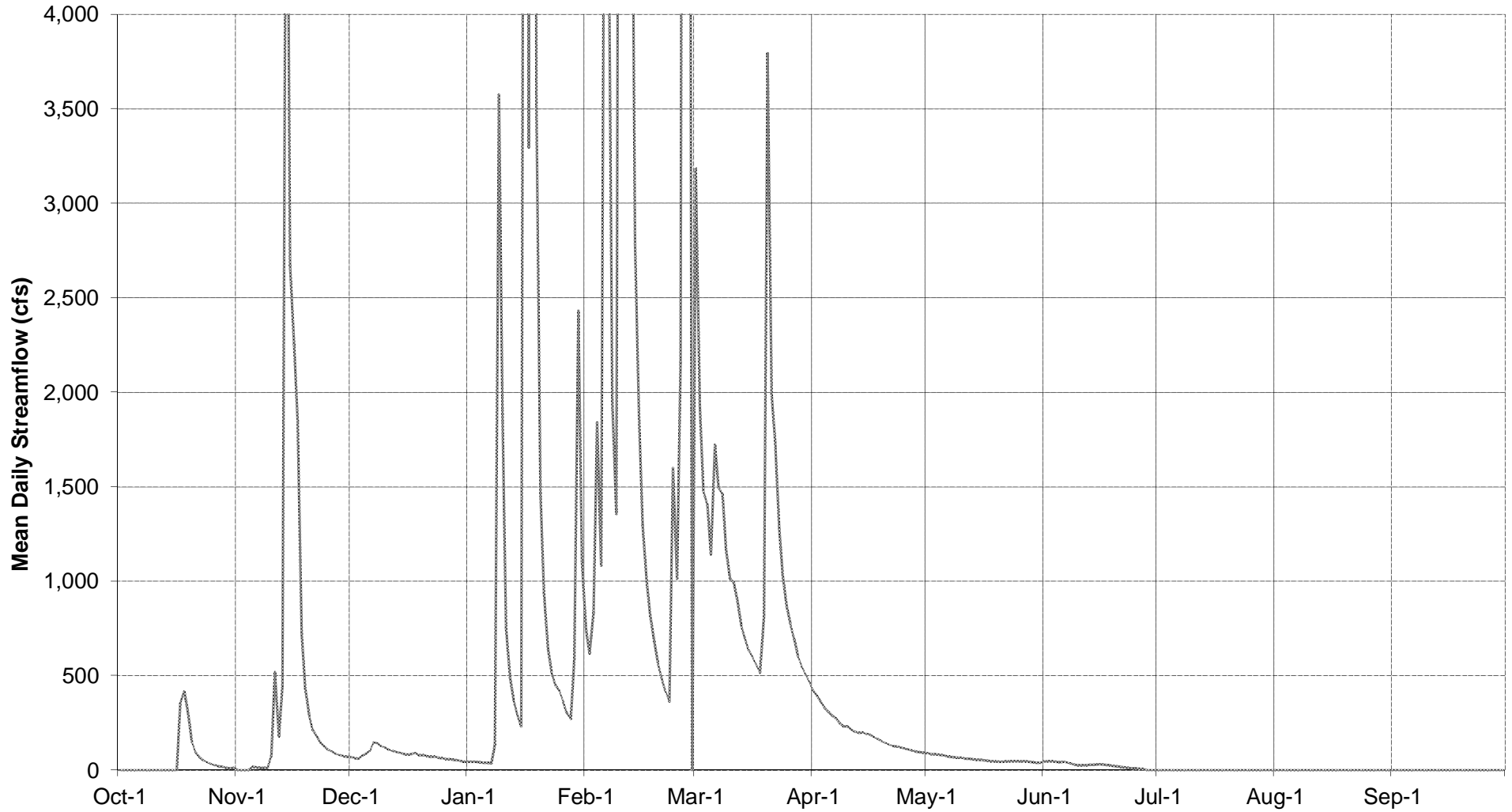
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1971



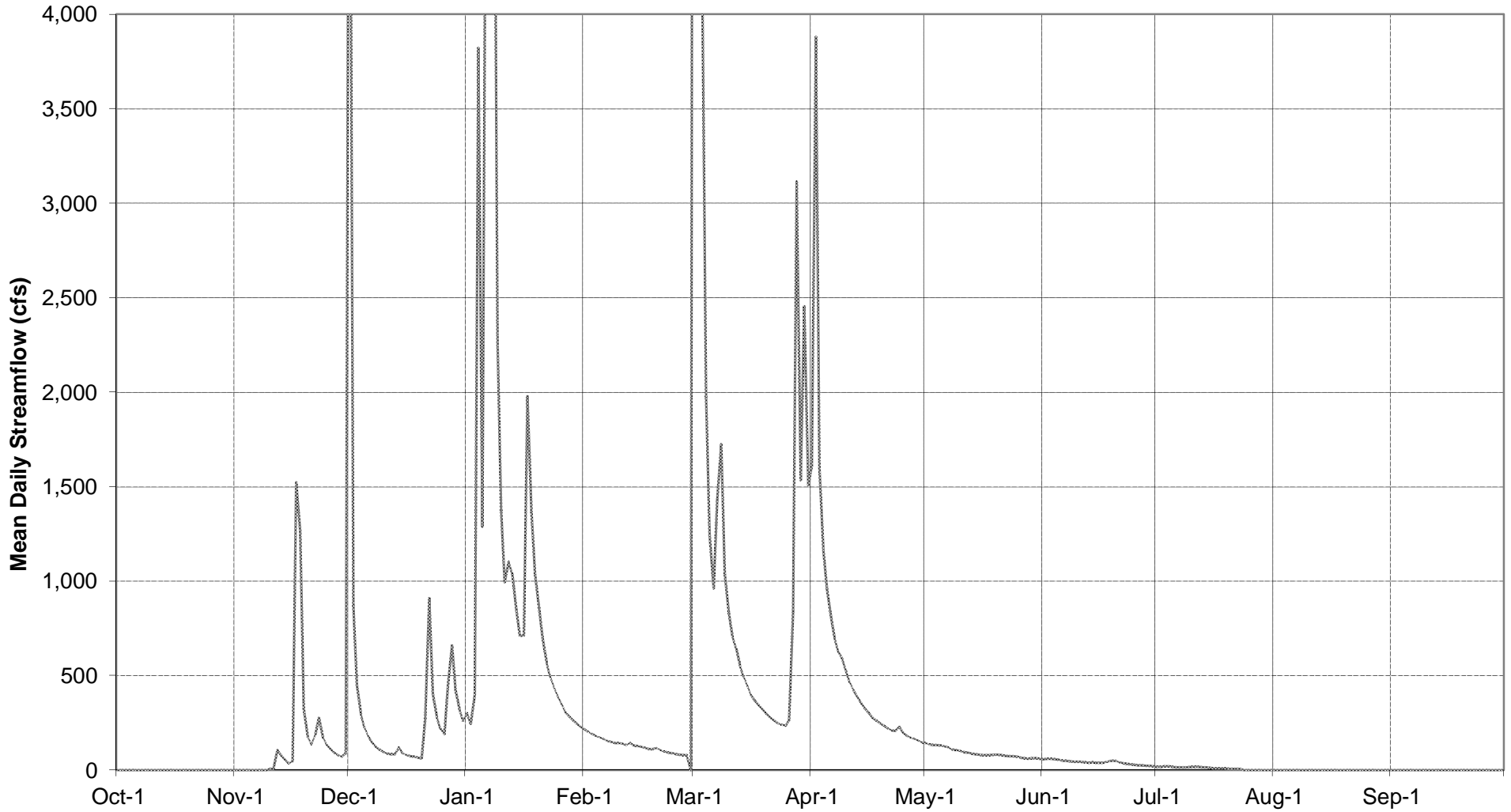
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1972



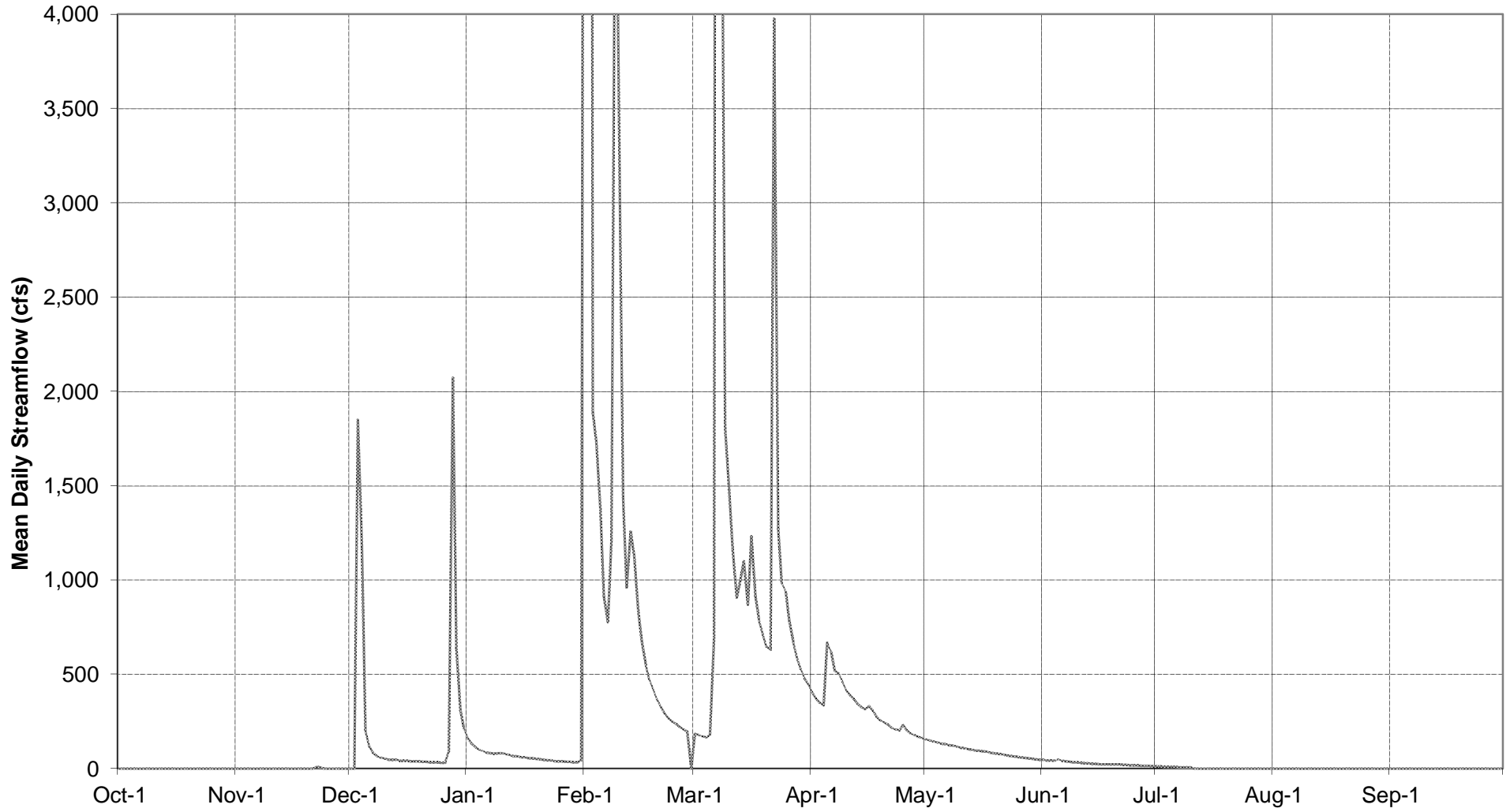
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1973



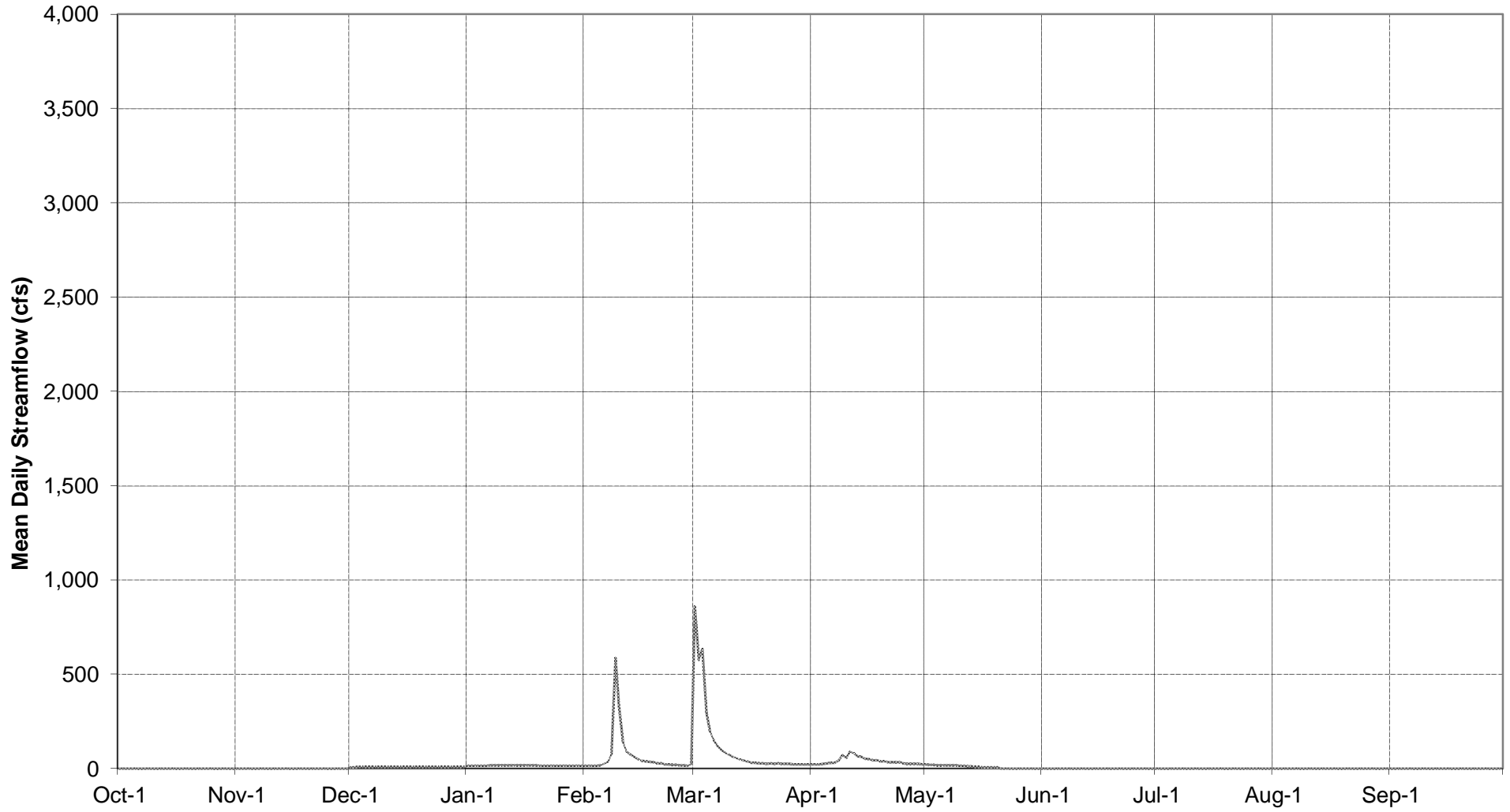
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1974



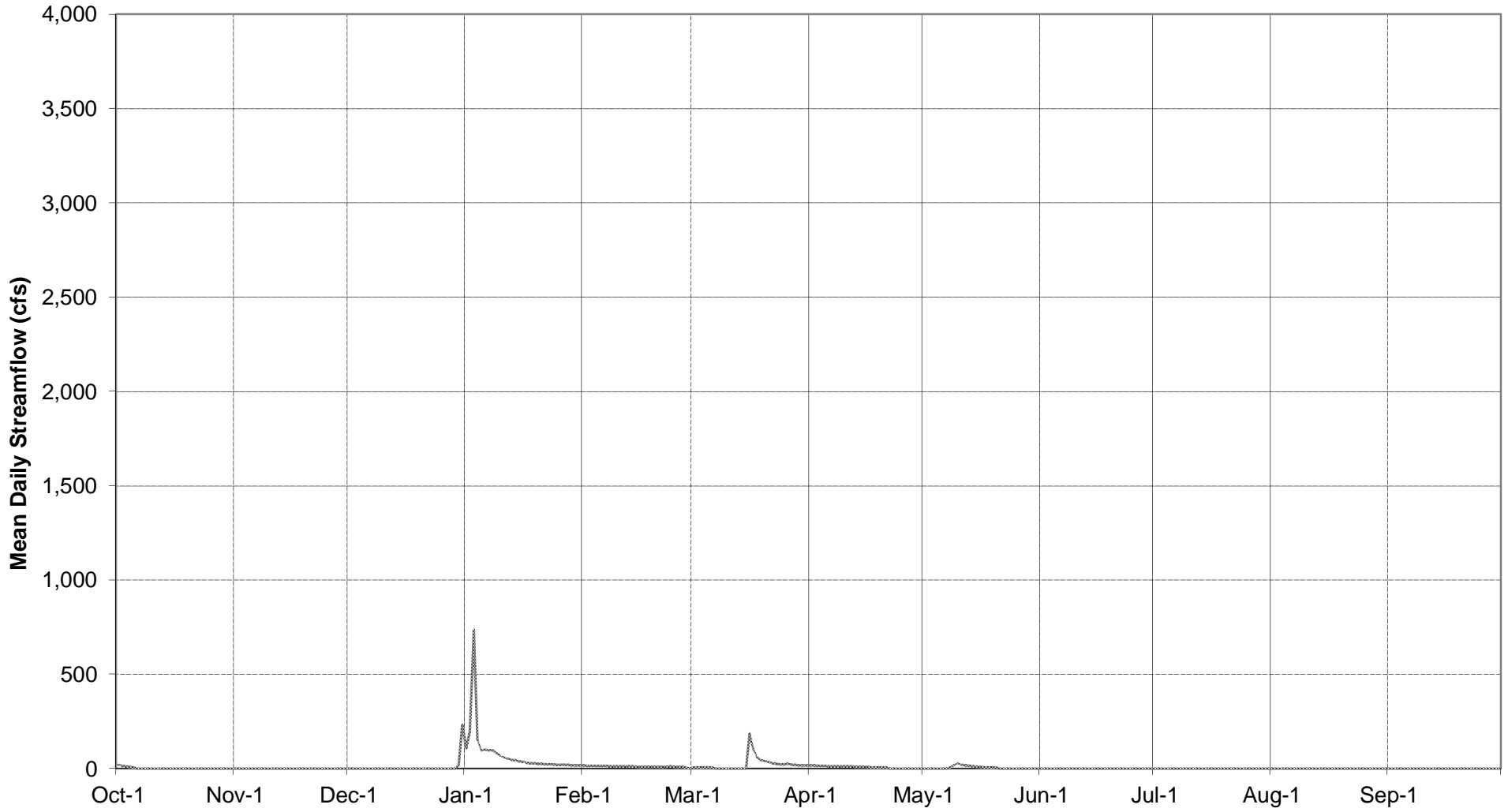
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1975



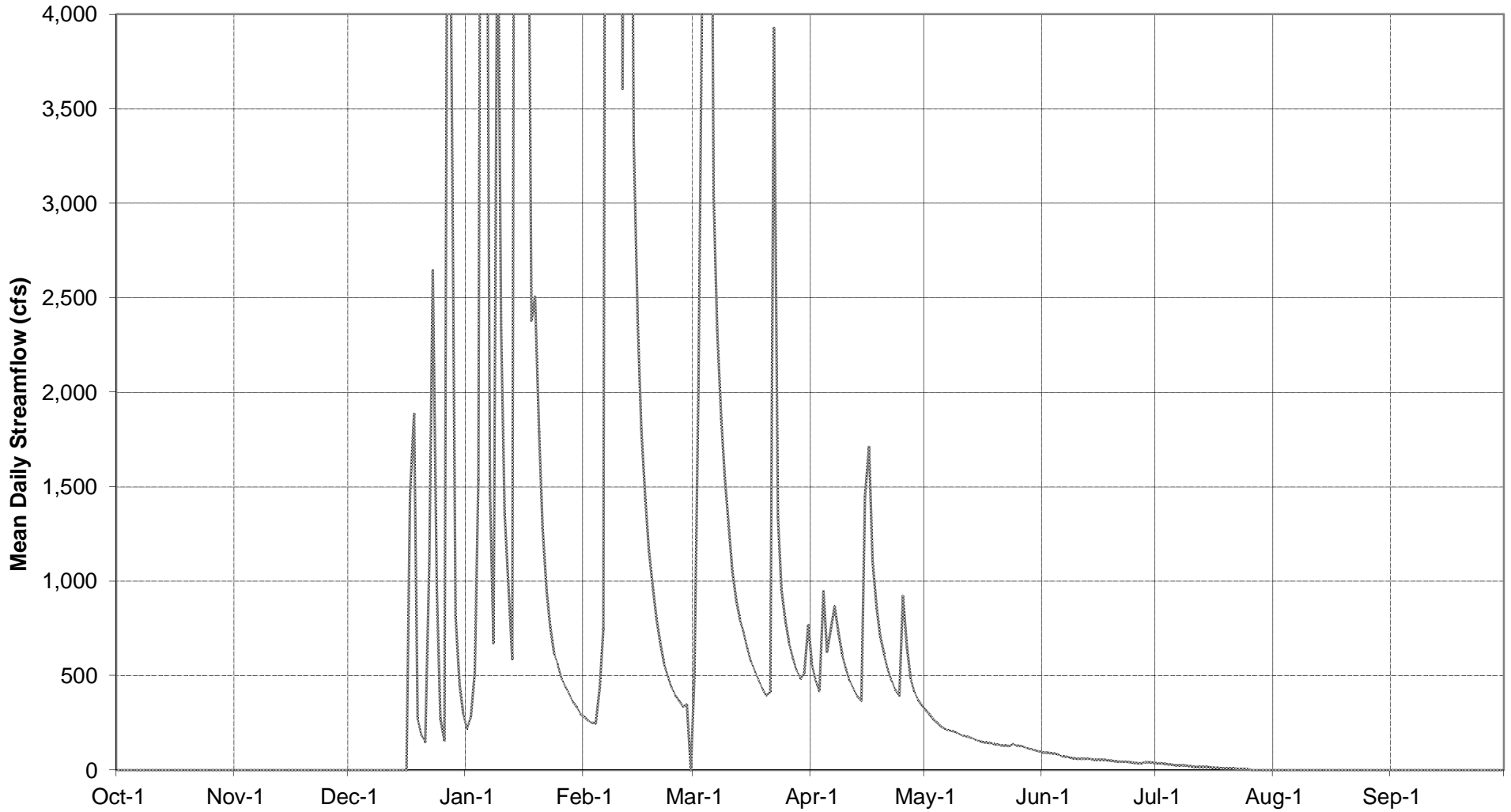
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1976



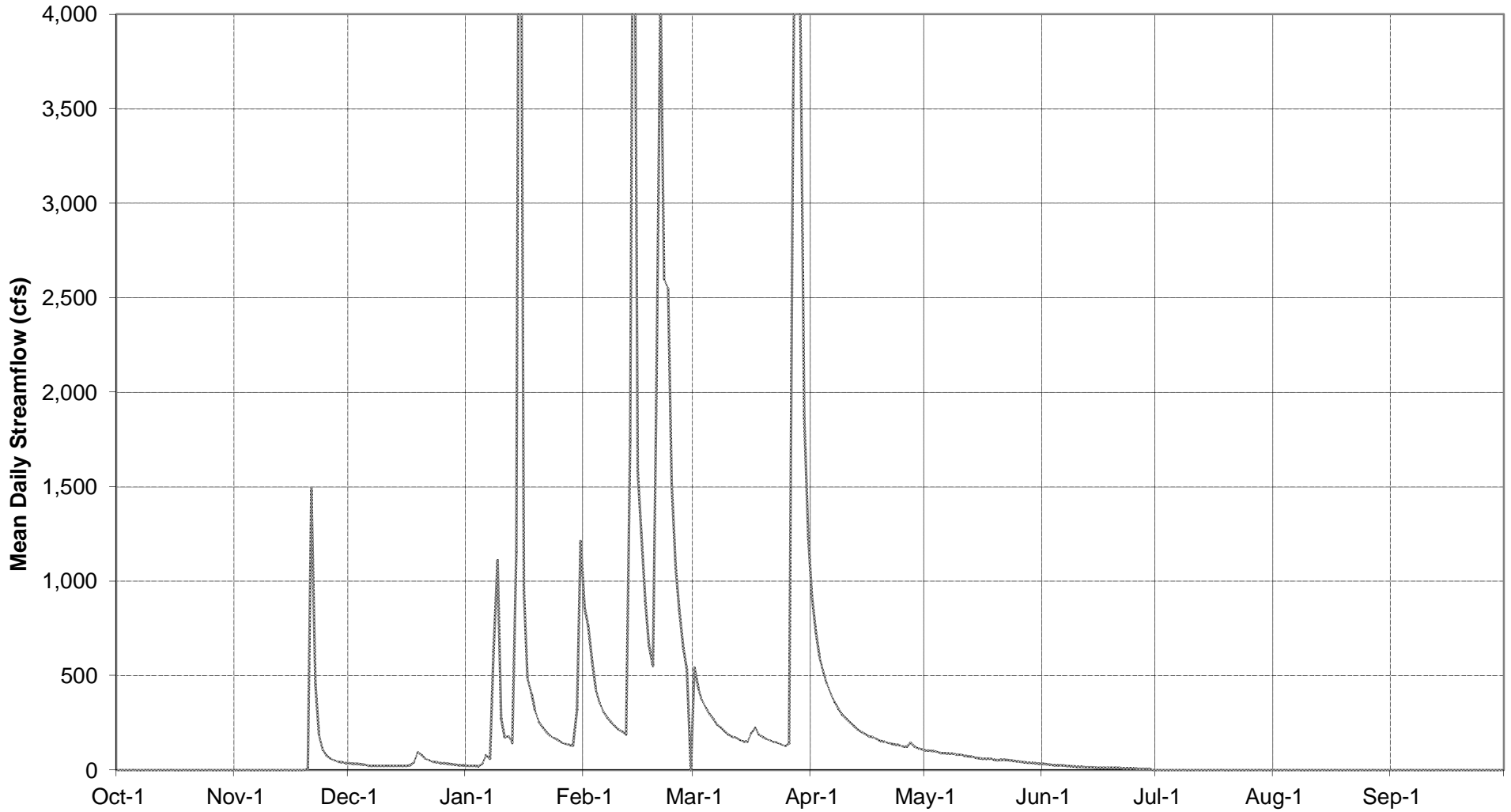
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1977



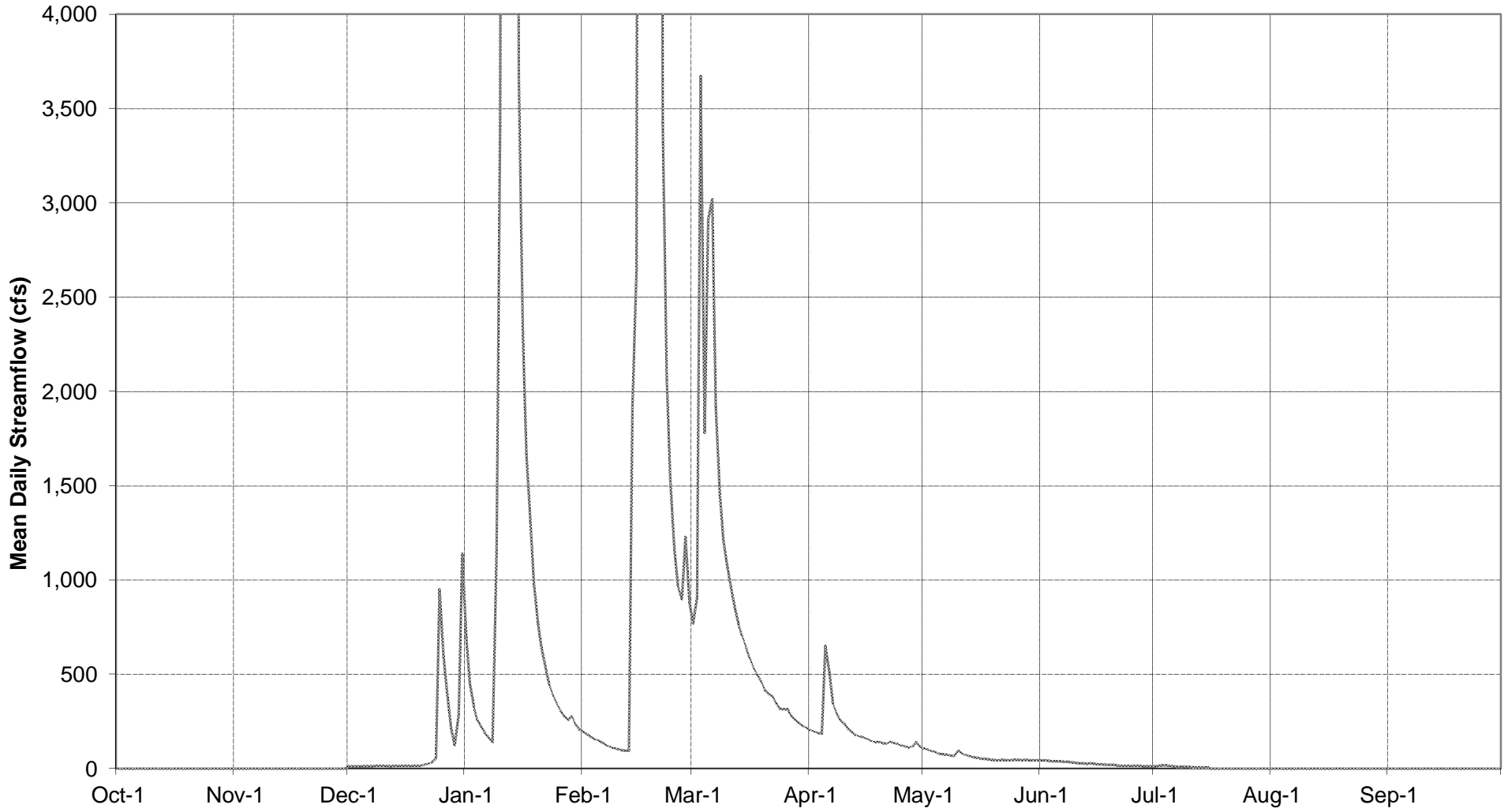
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1978



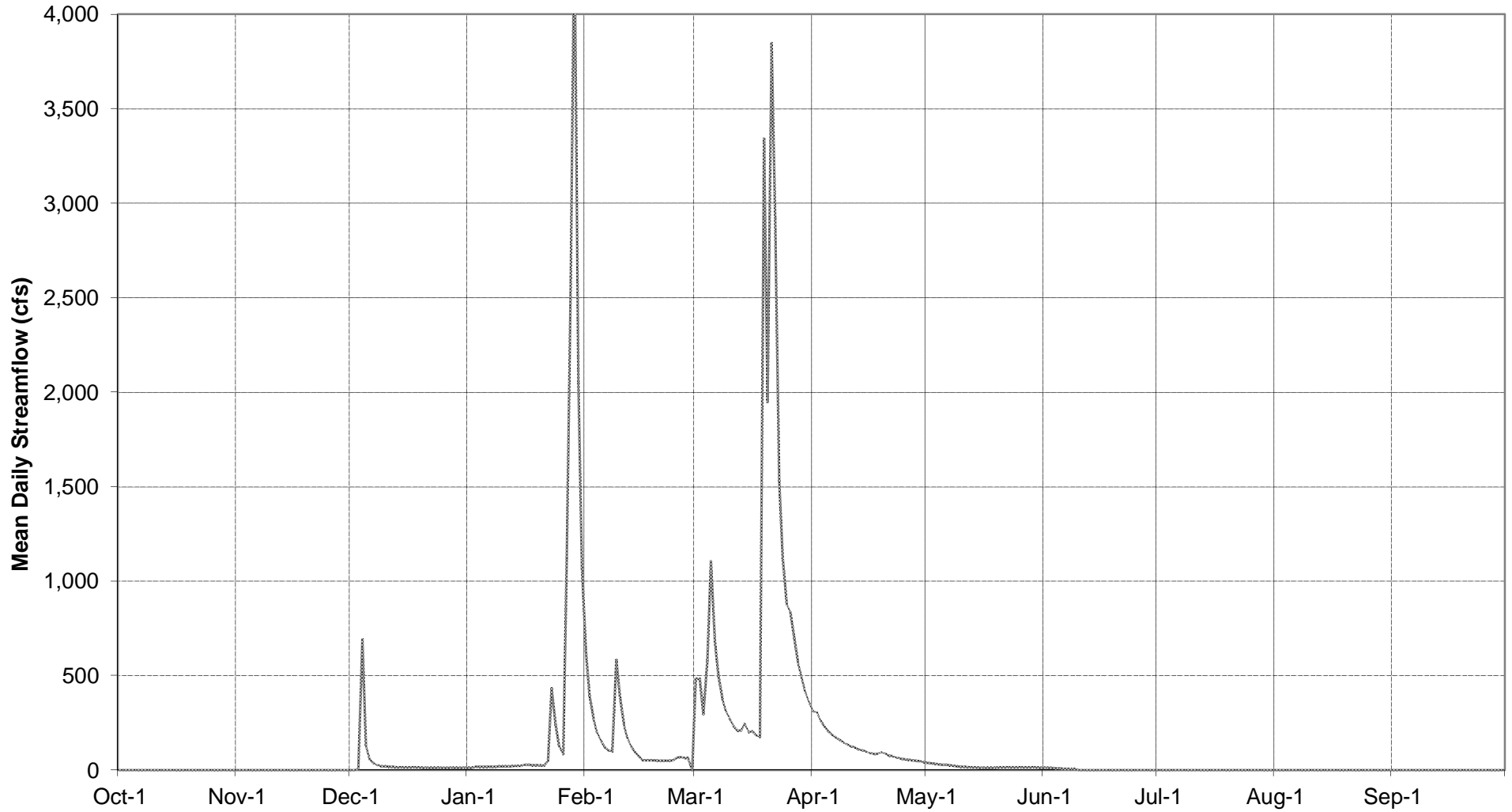
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1979



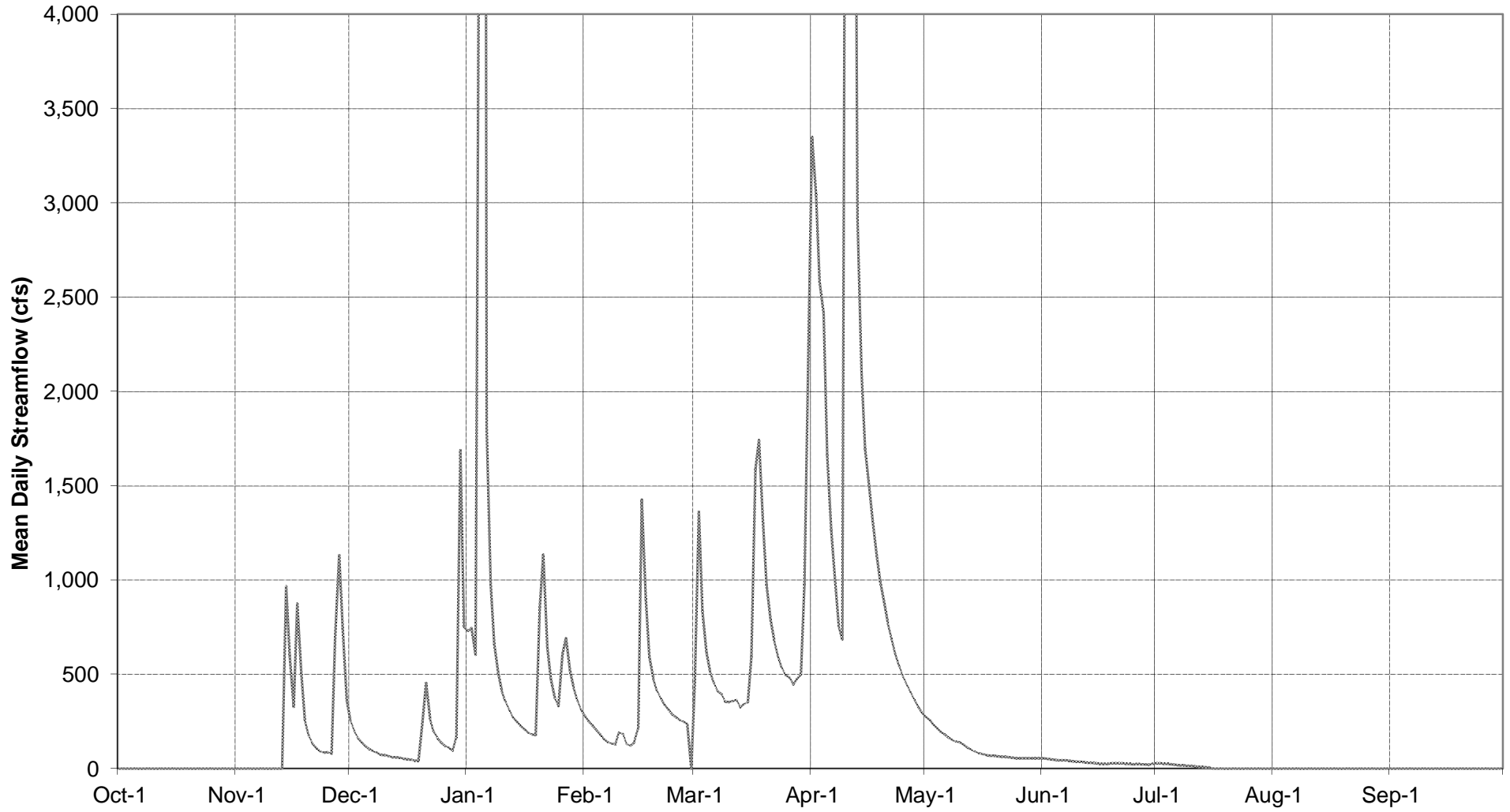
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1980



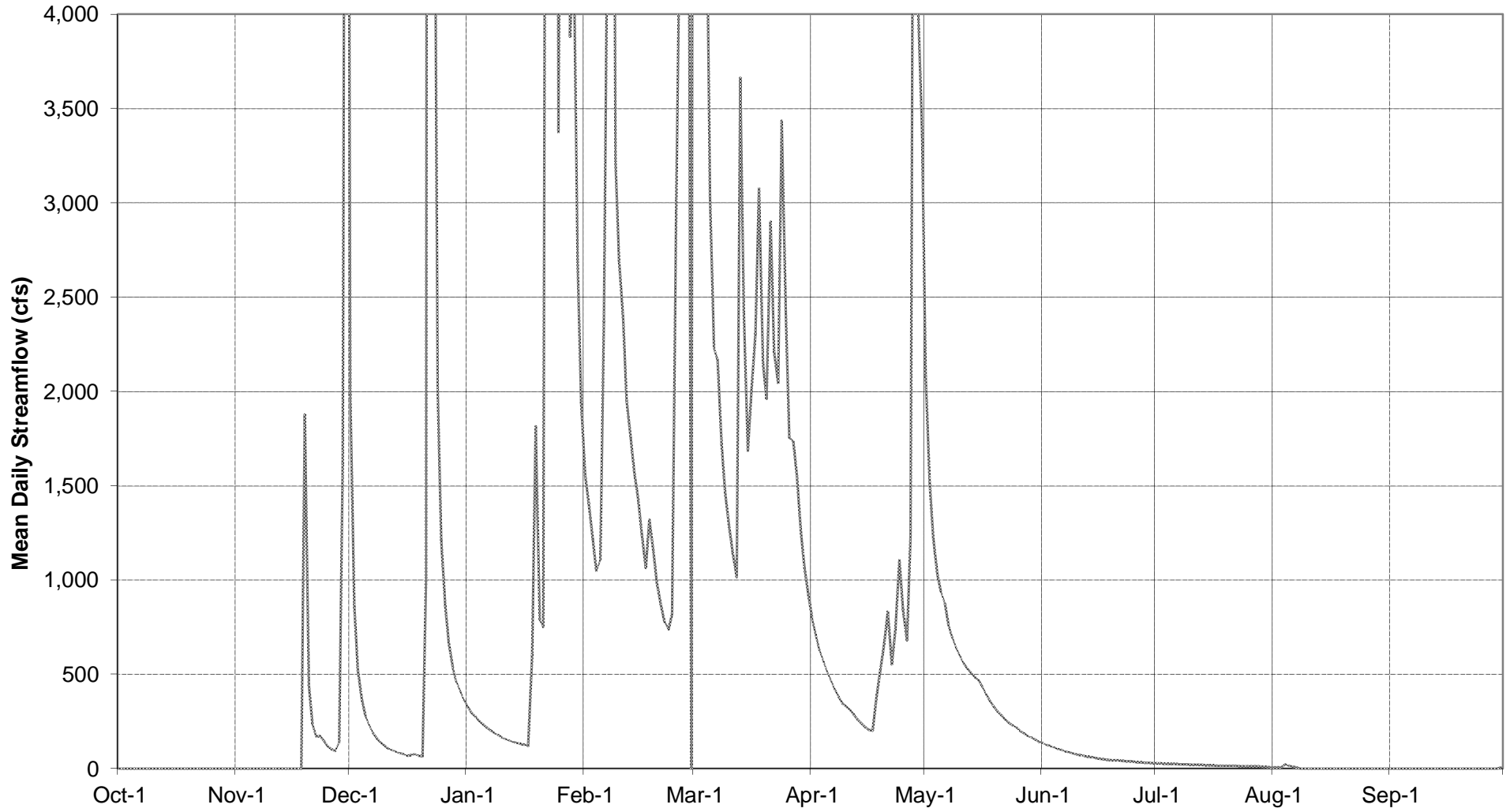
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1981



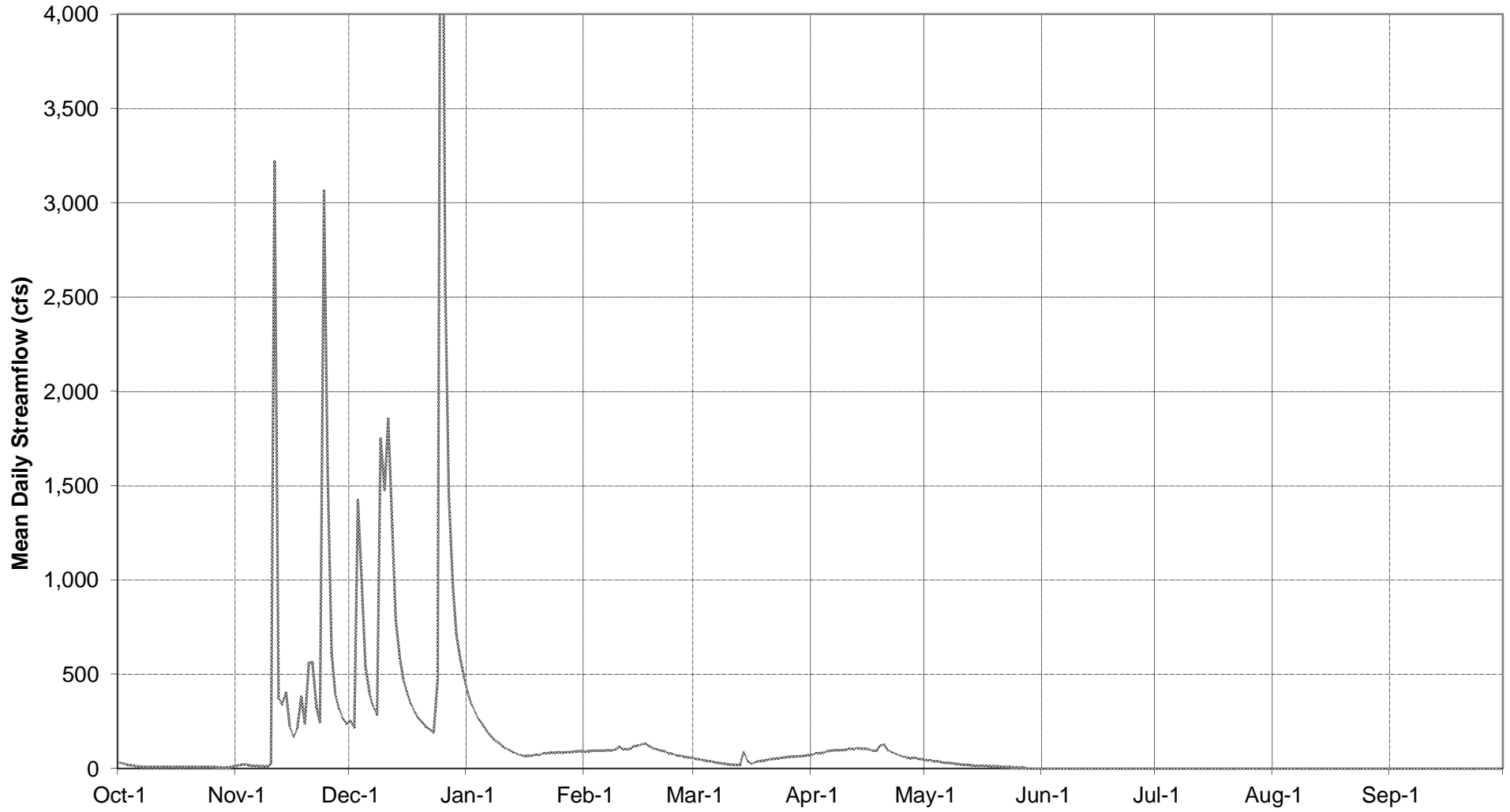
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1982



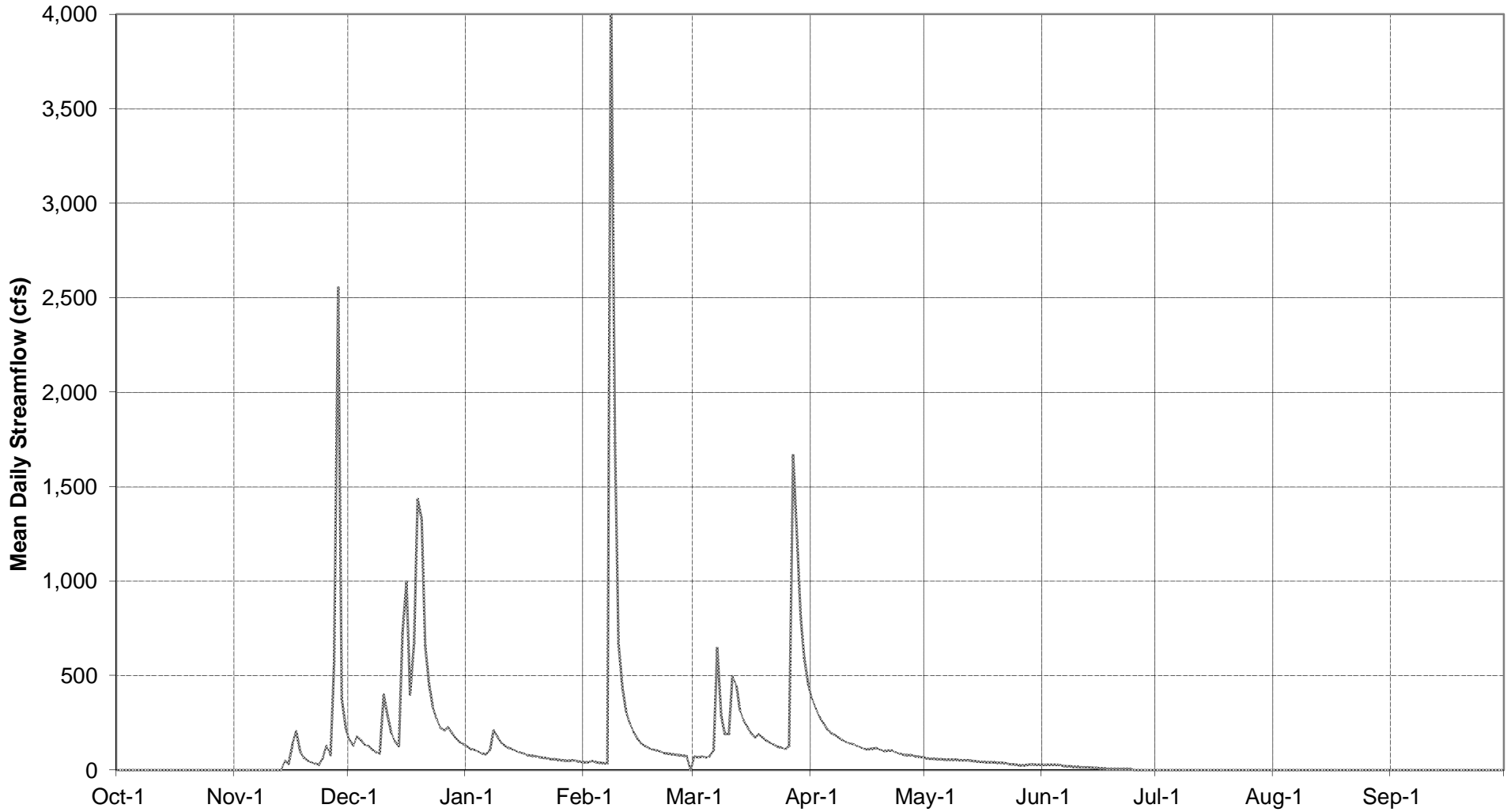
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1983



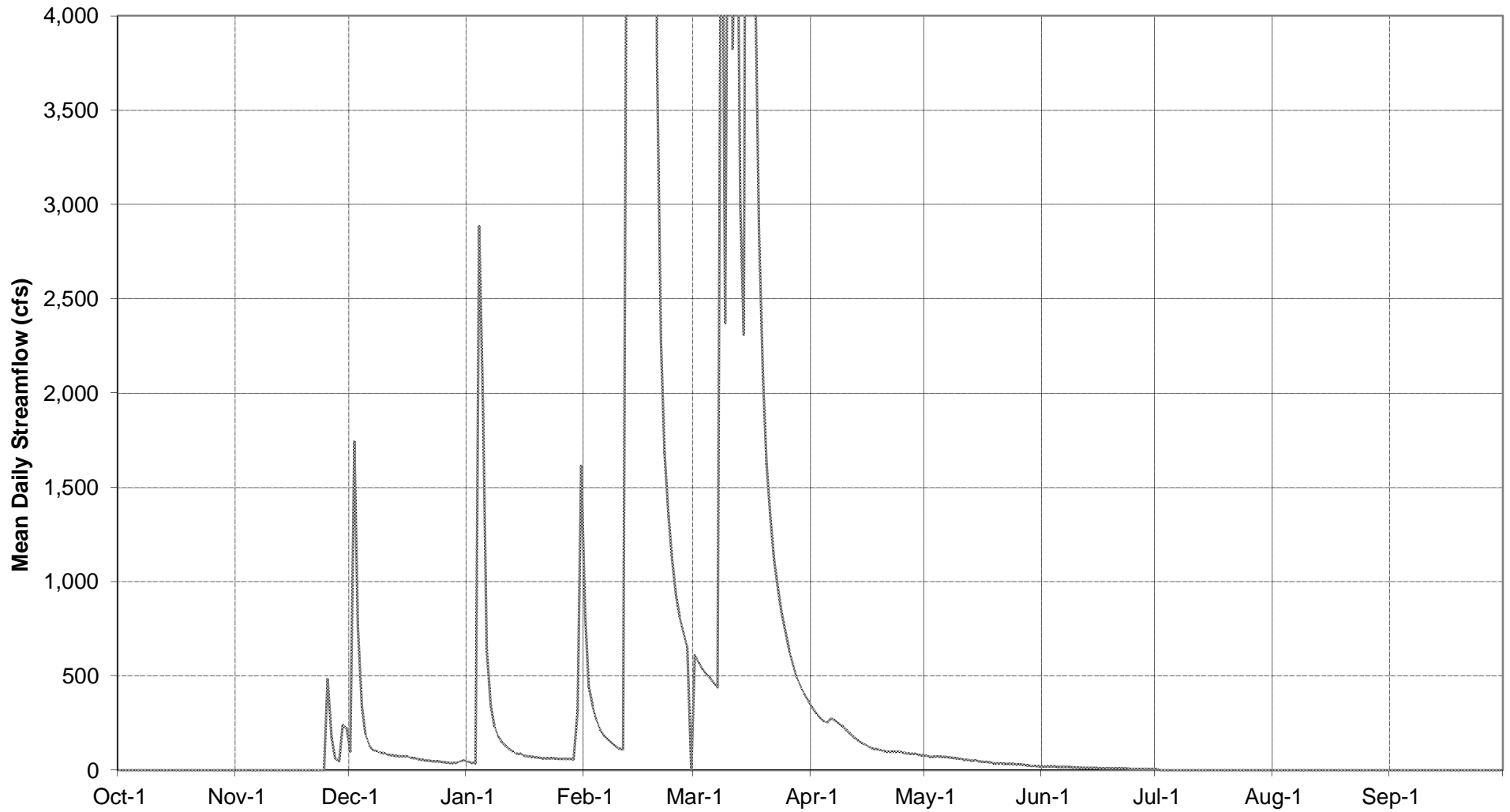
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1984



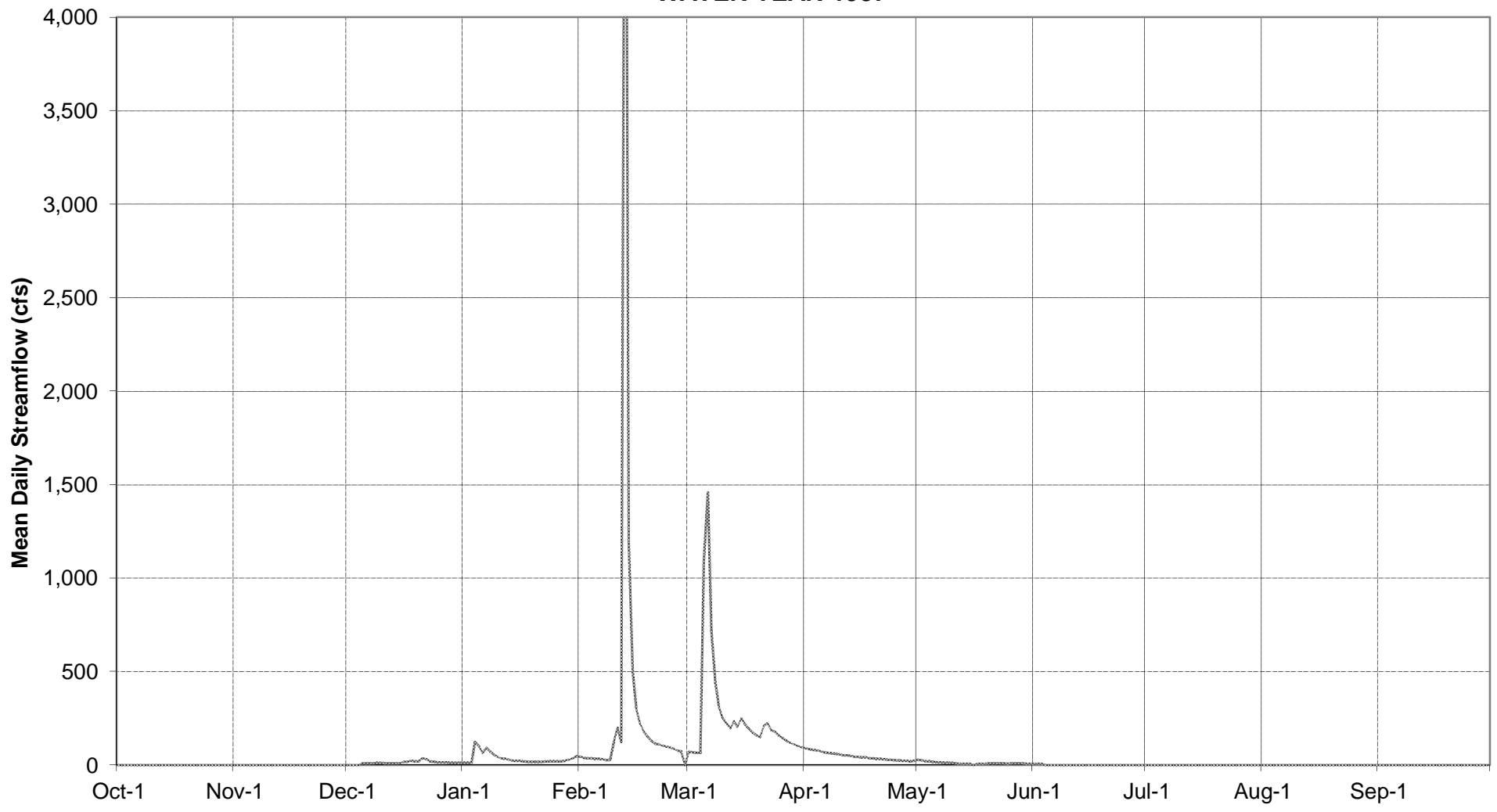
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1985



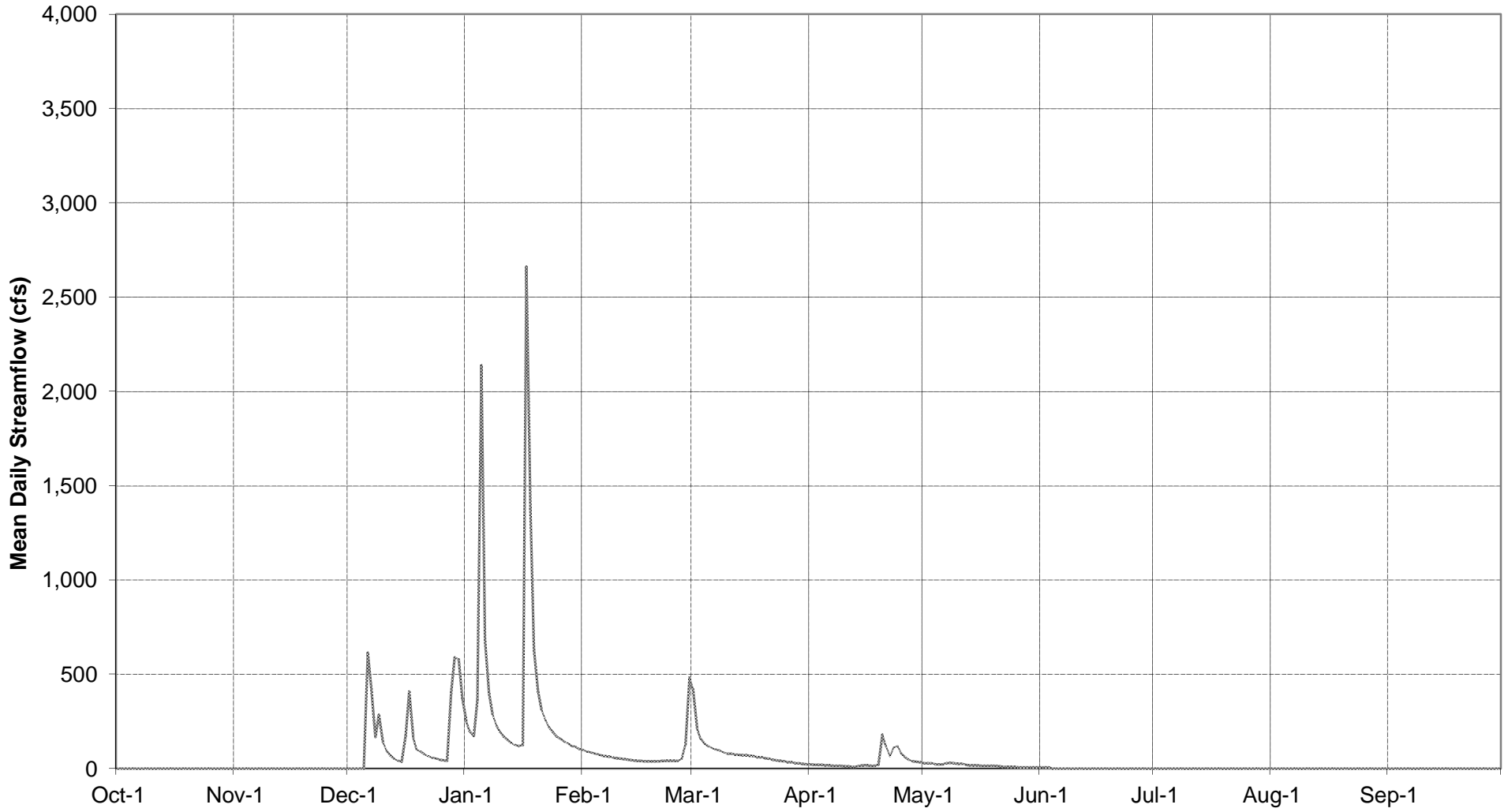
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1986



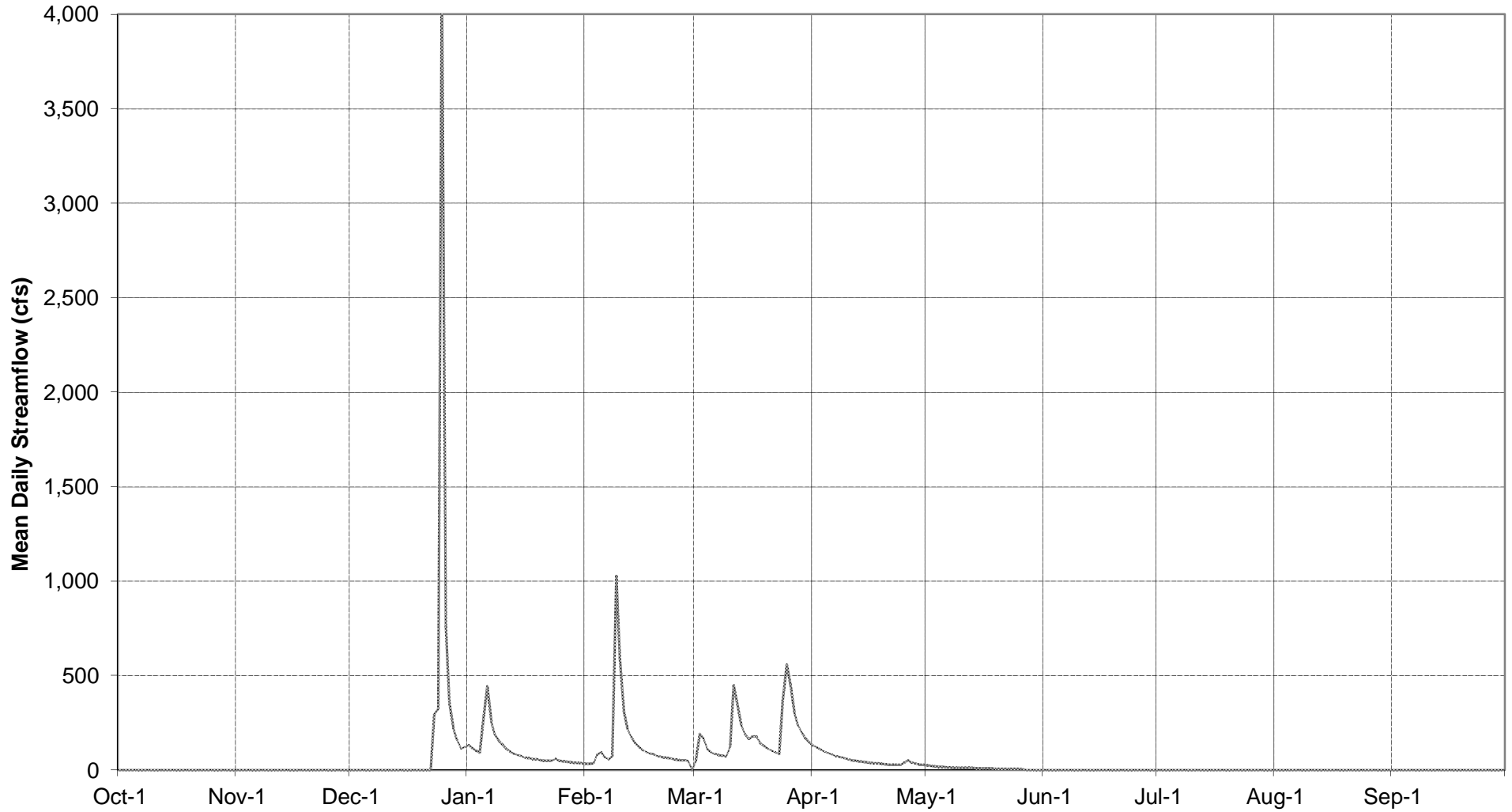
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1987



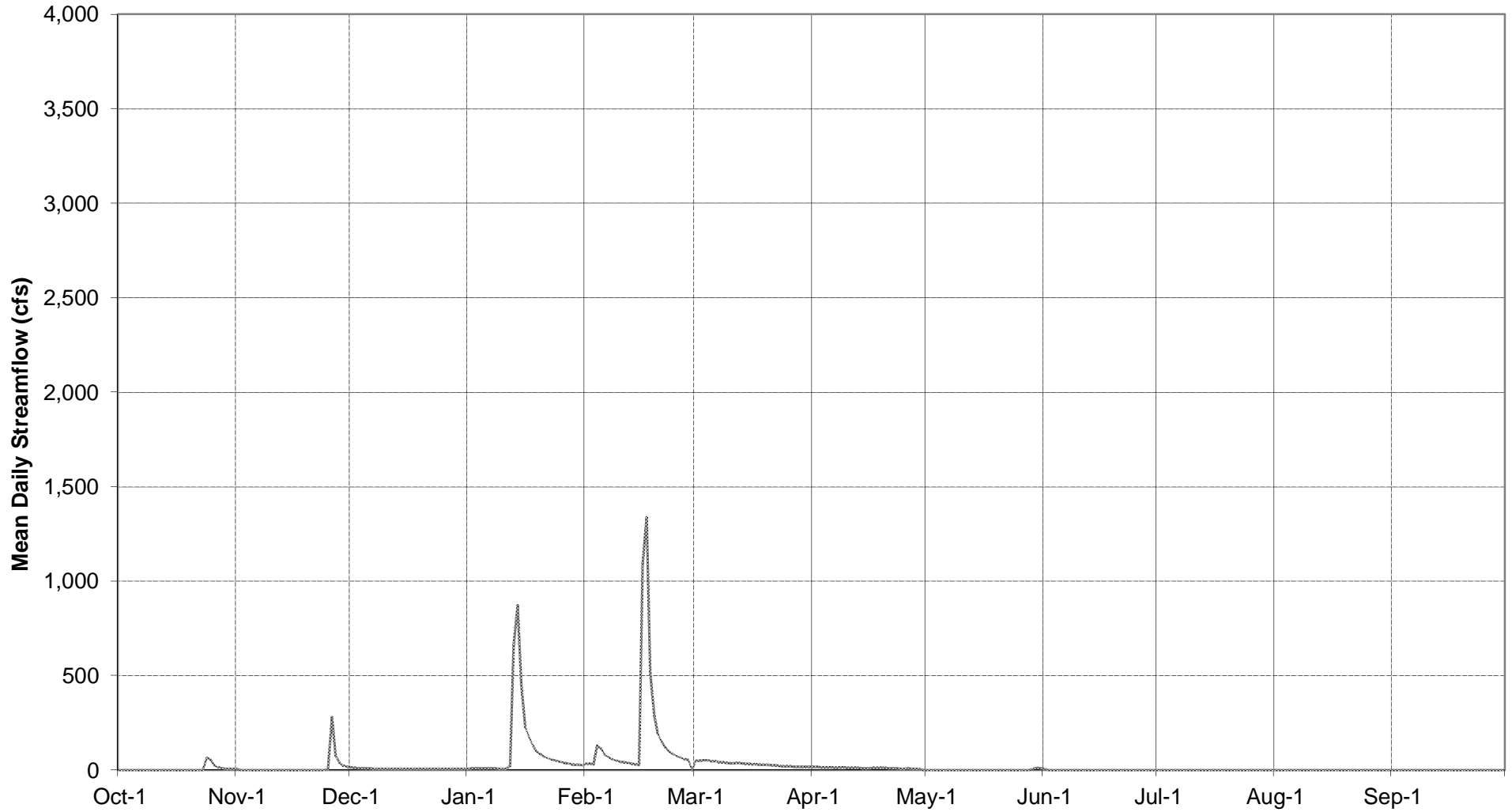
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1988



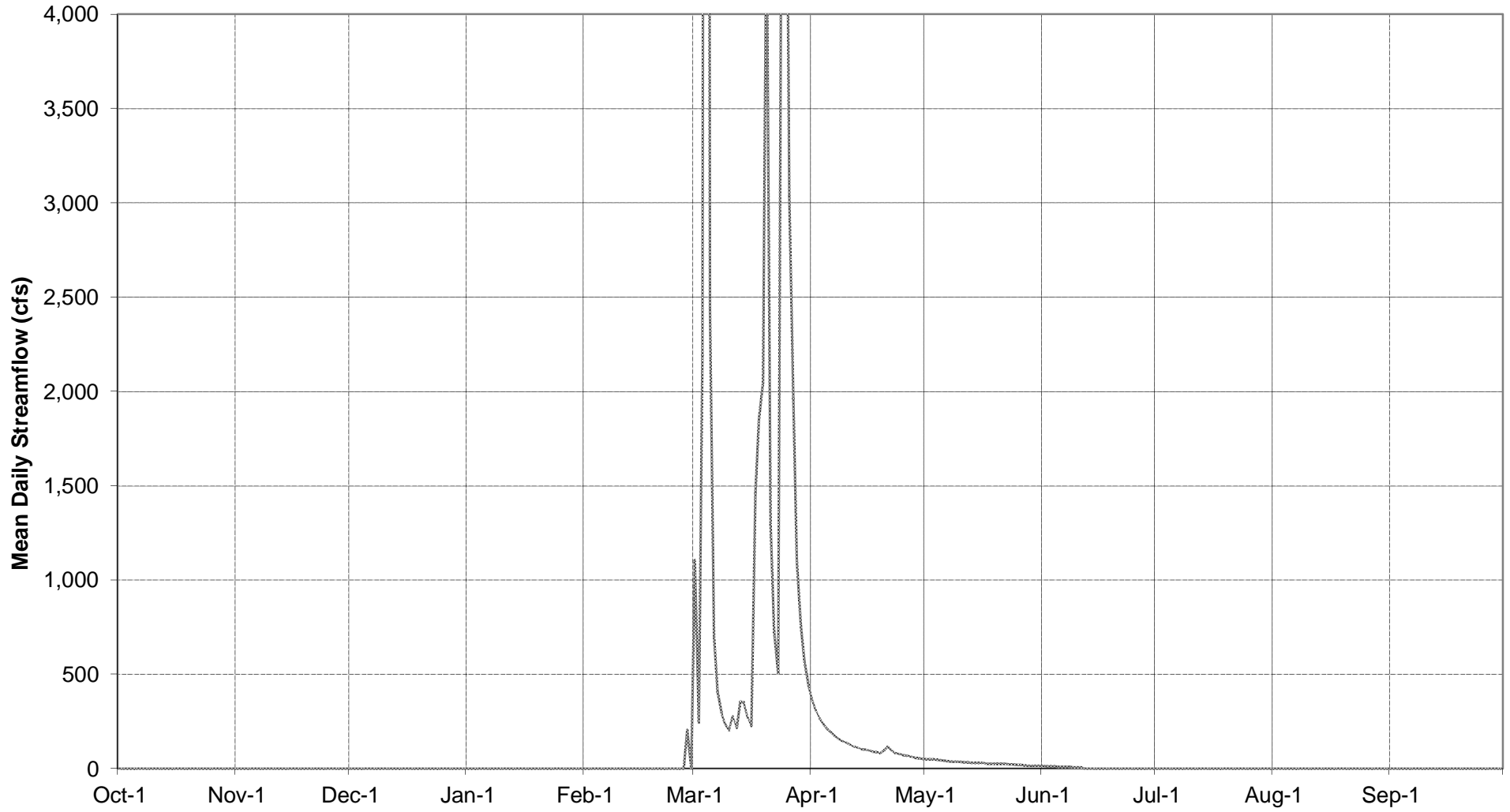
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1989



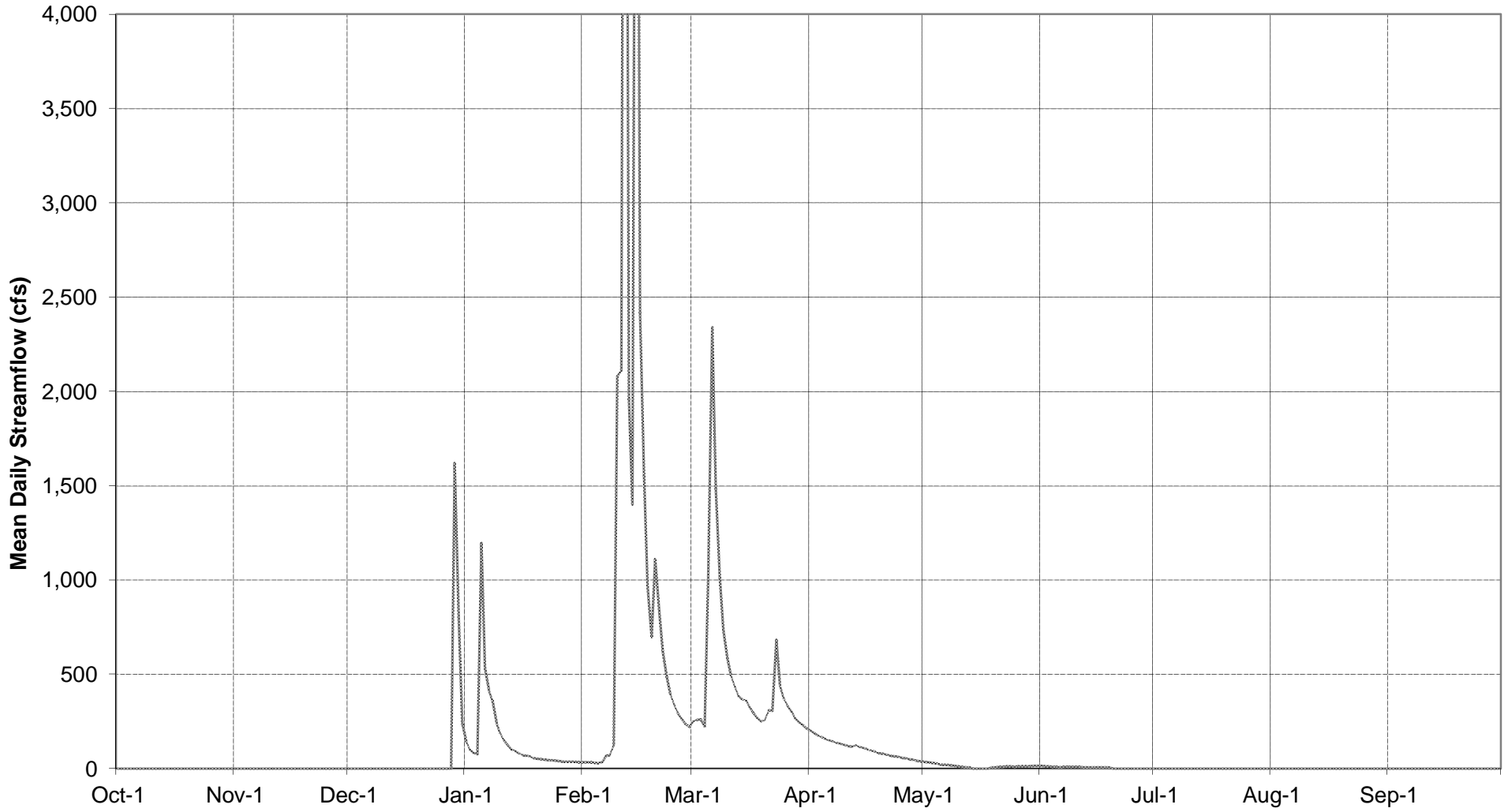
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1990



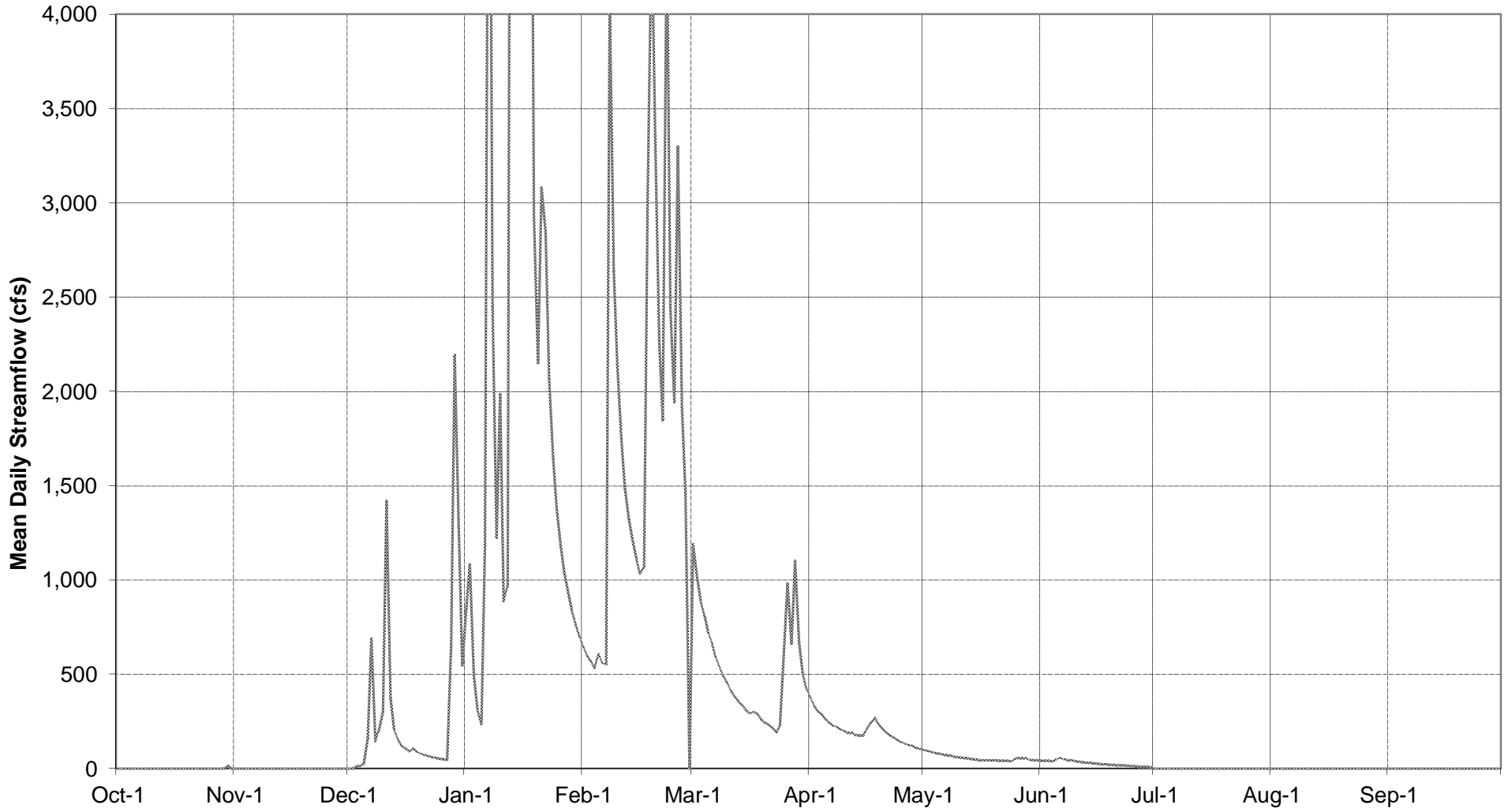
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1991



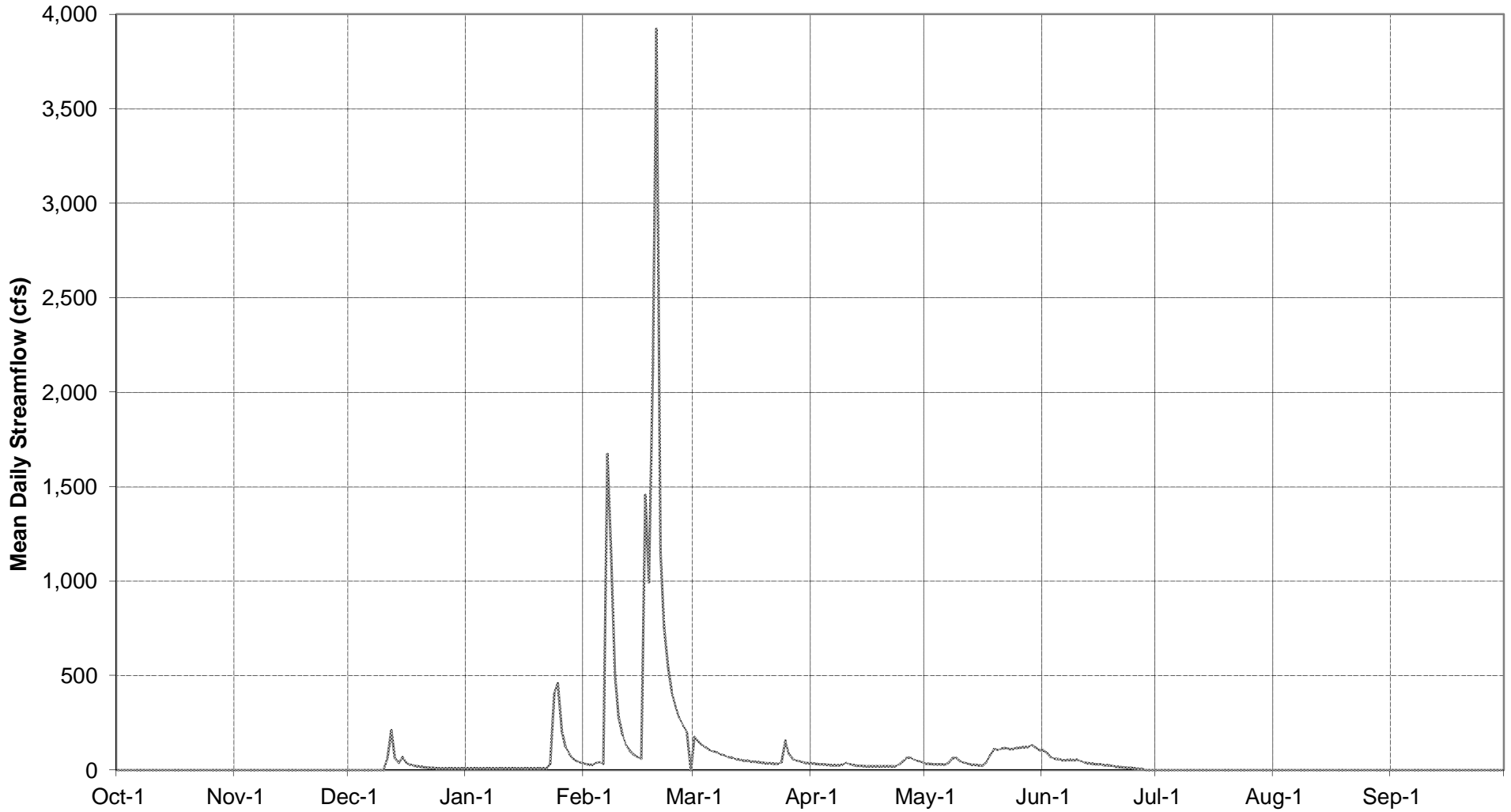
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1992



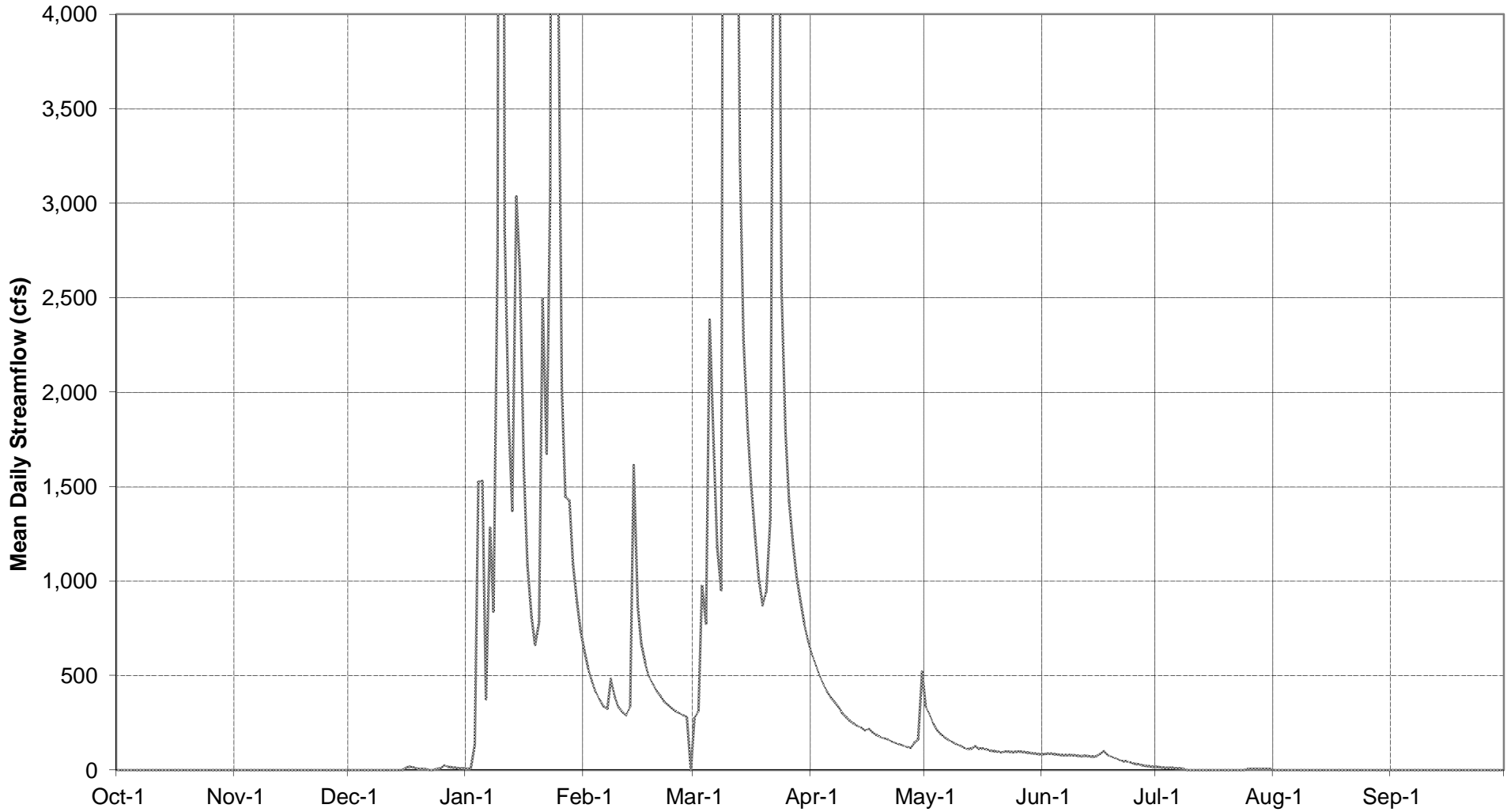
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1993



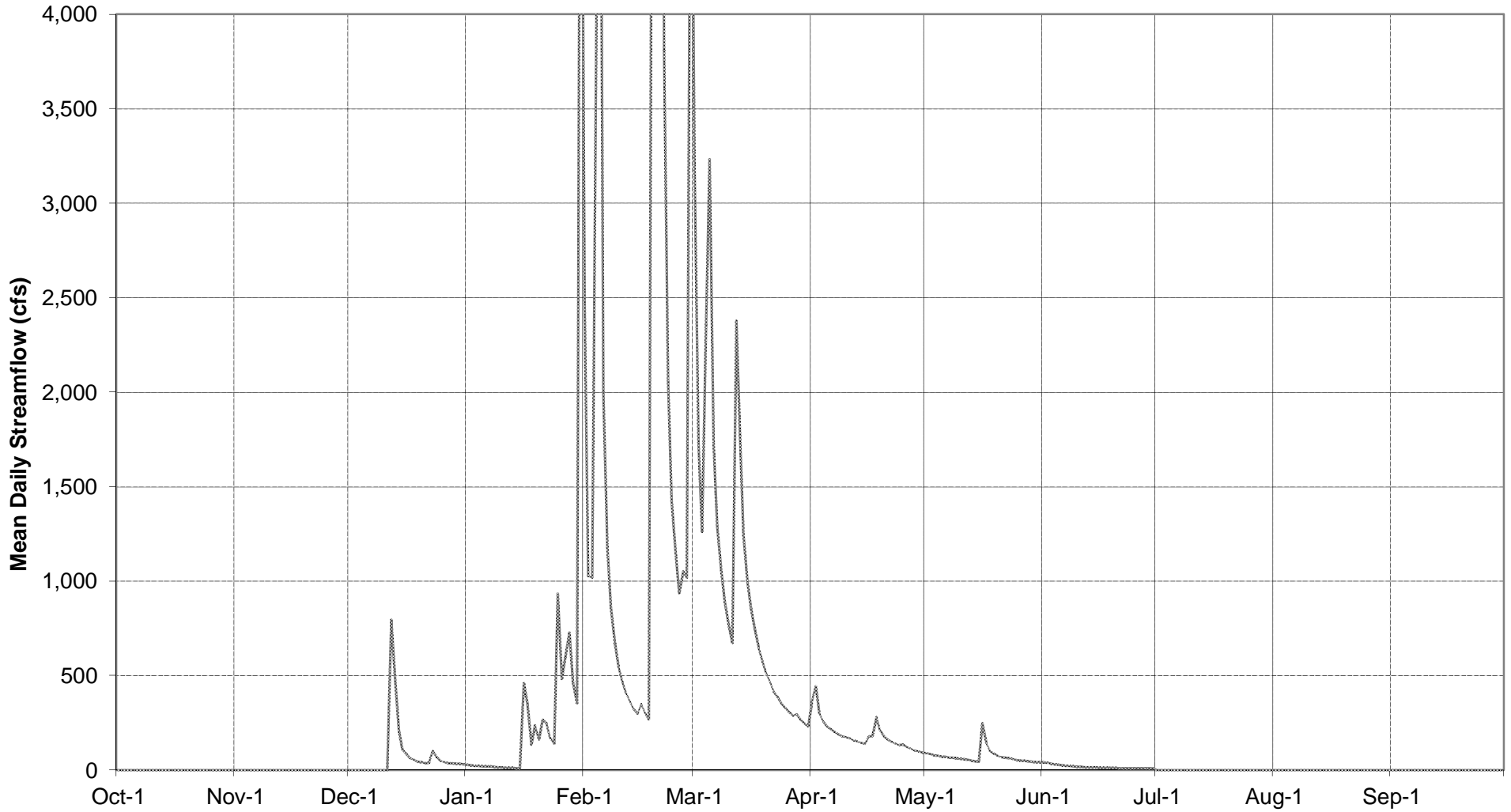
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1994



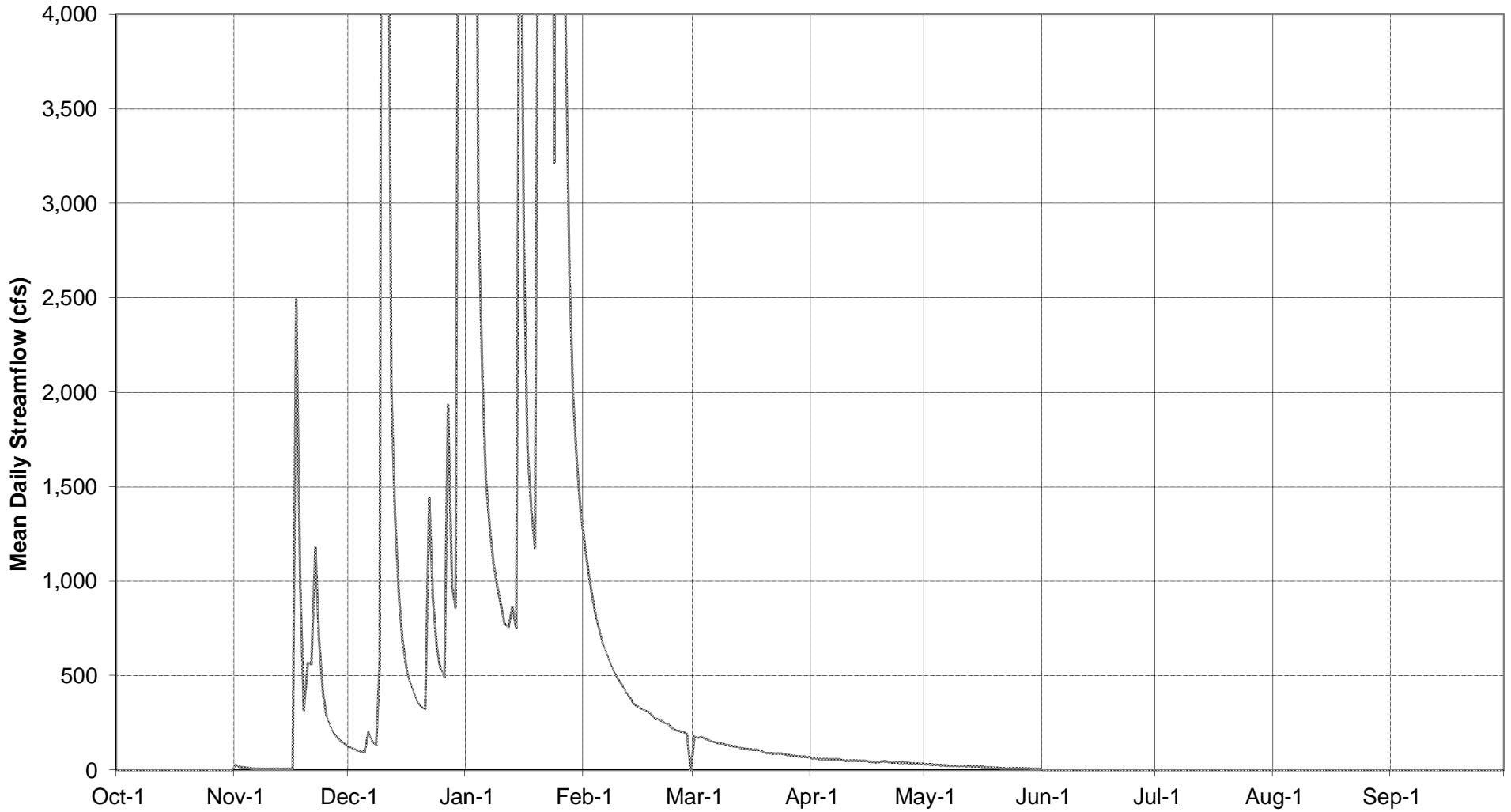
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1995



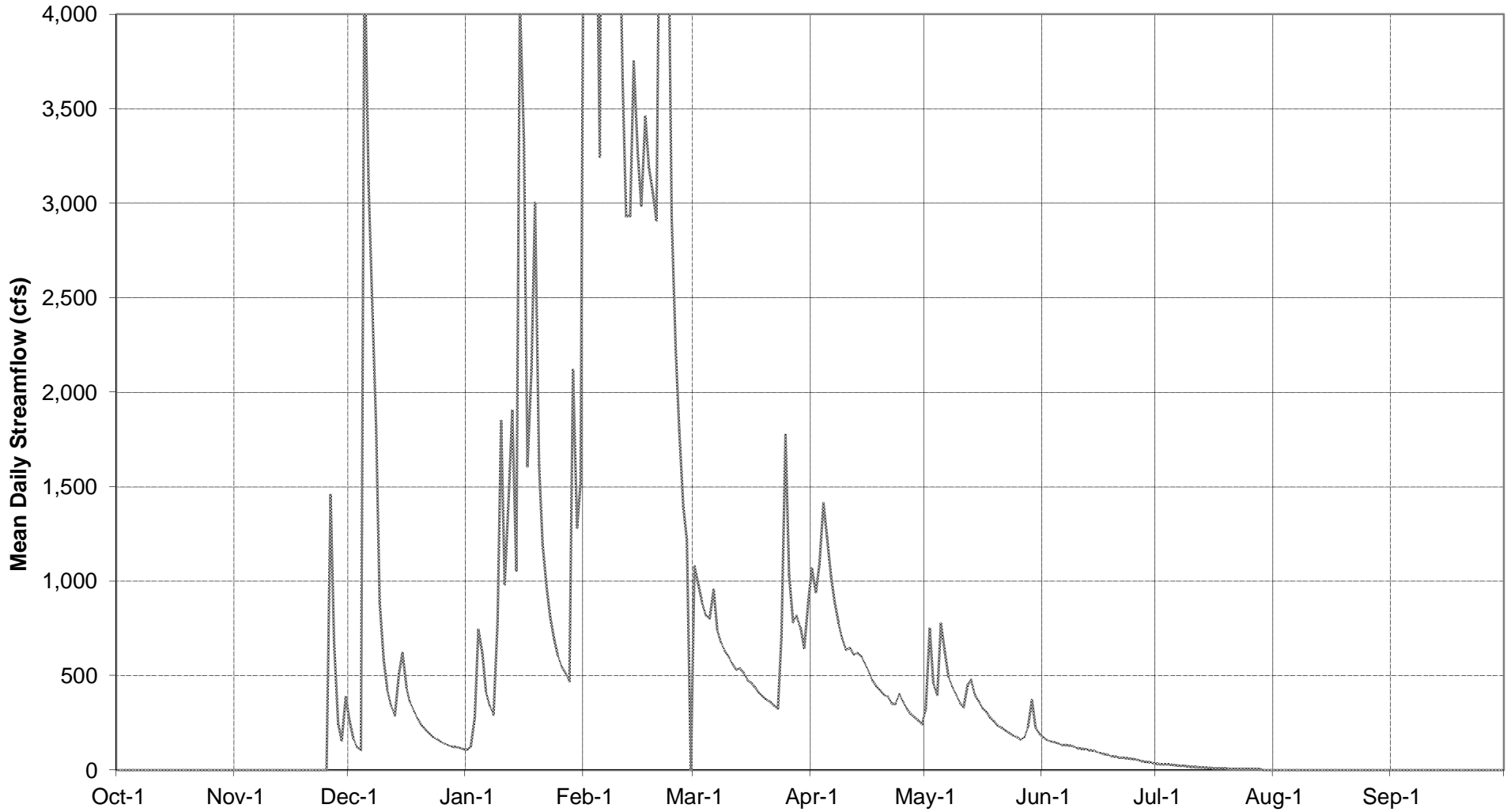
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1996



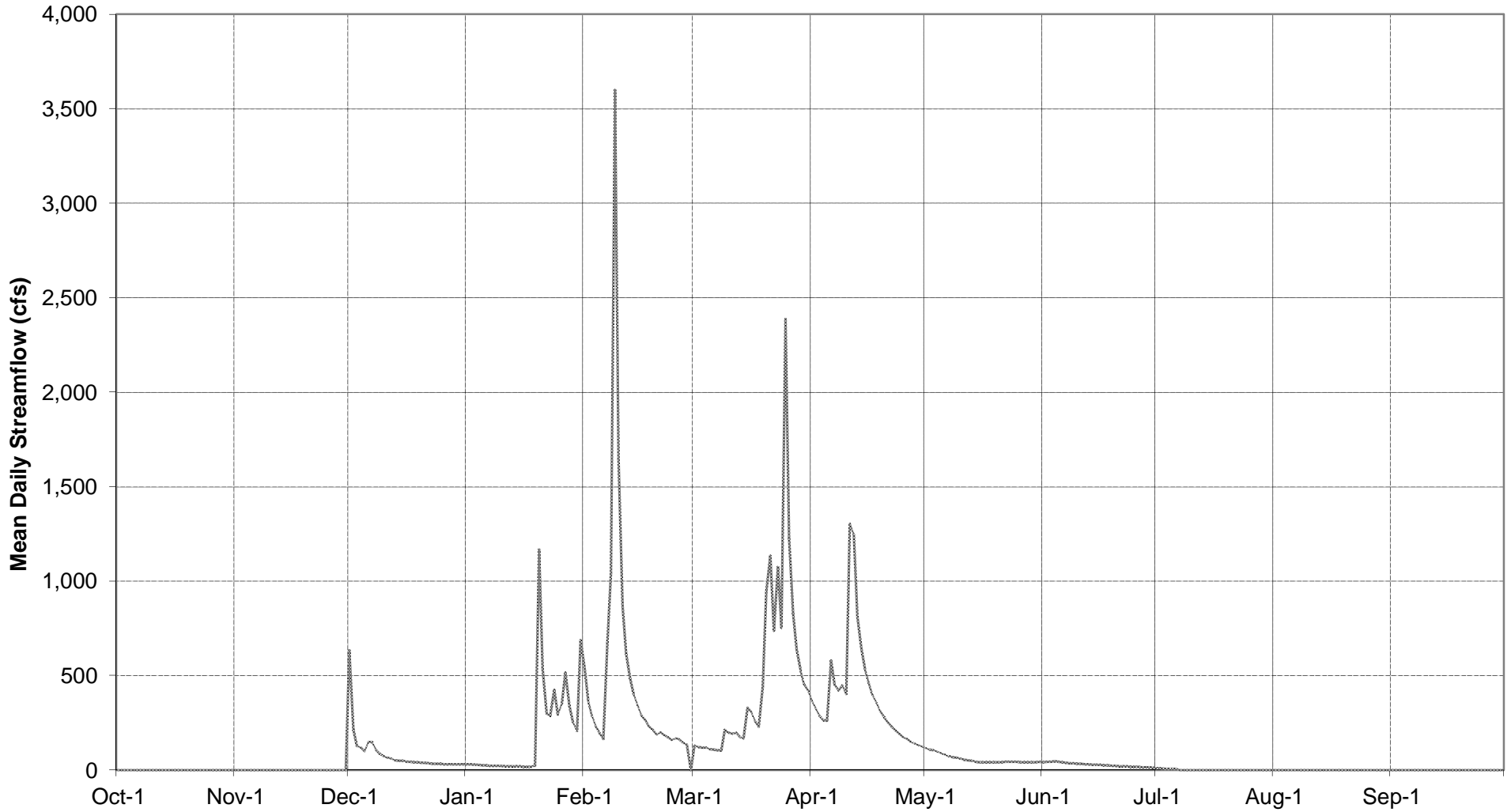
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1997



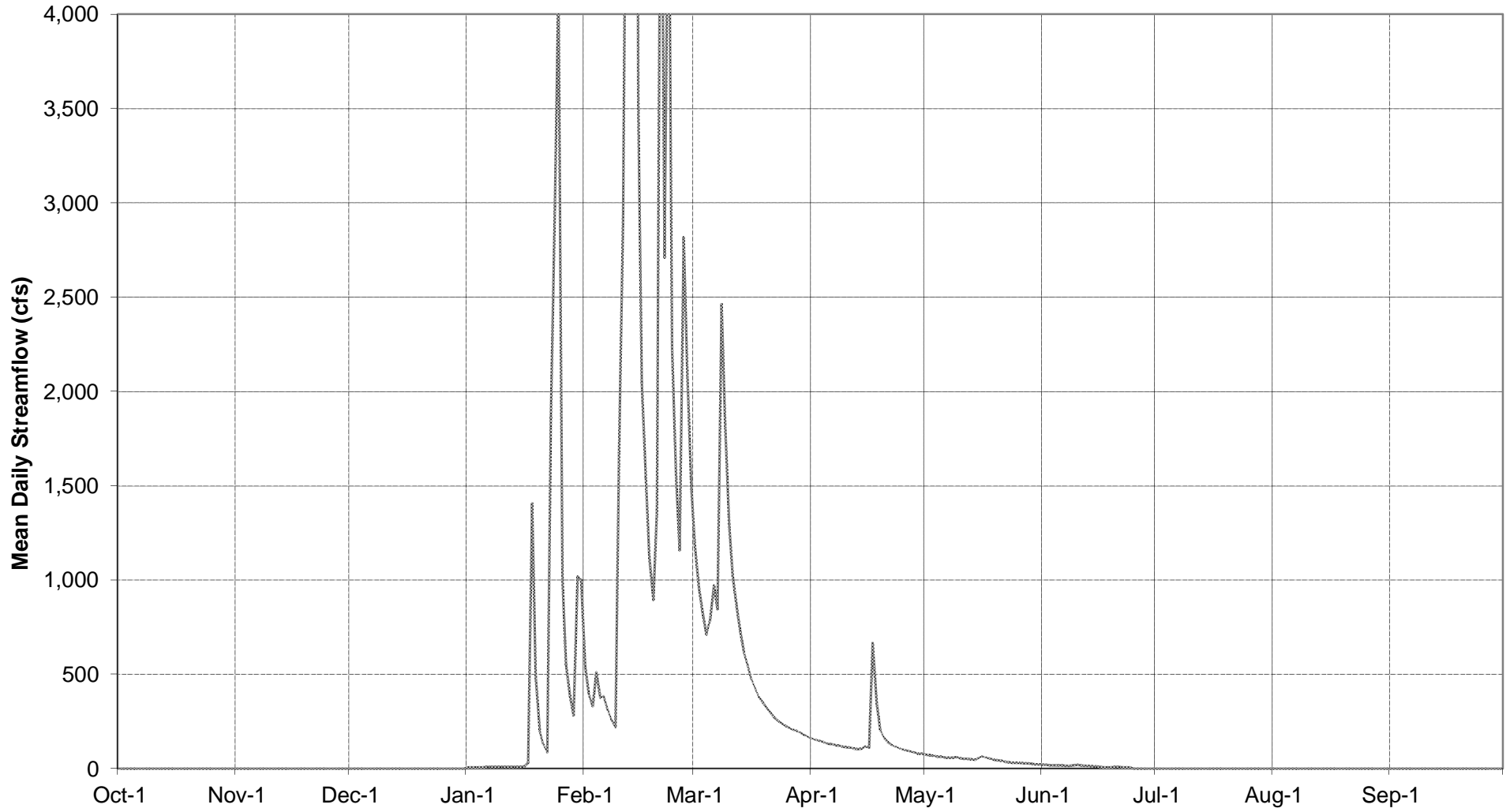
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1998



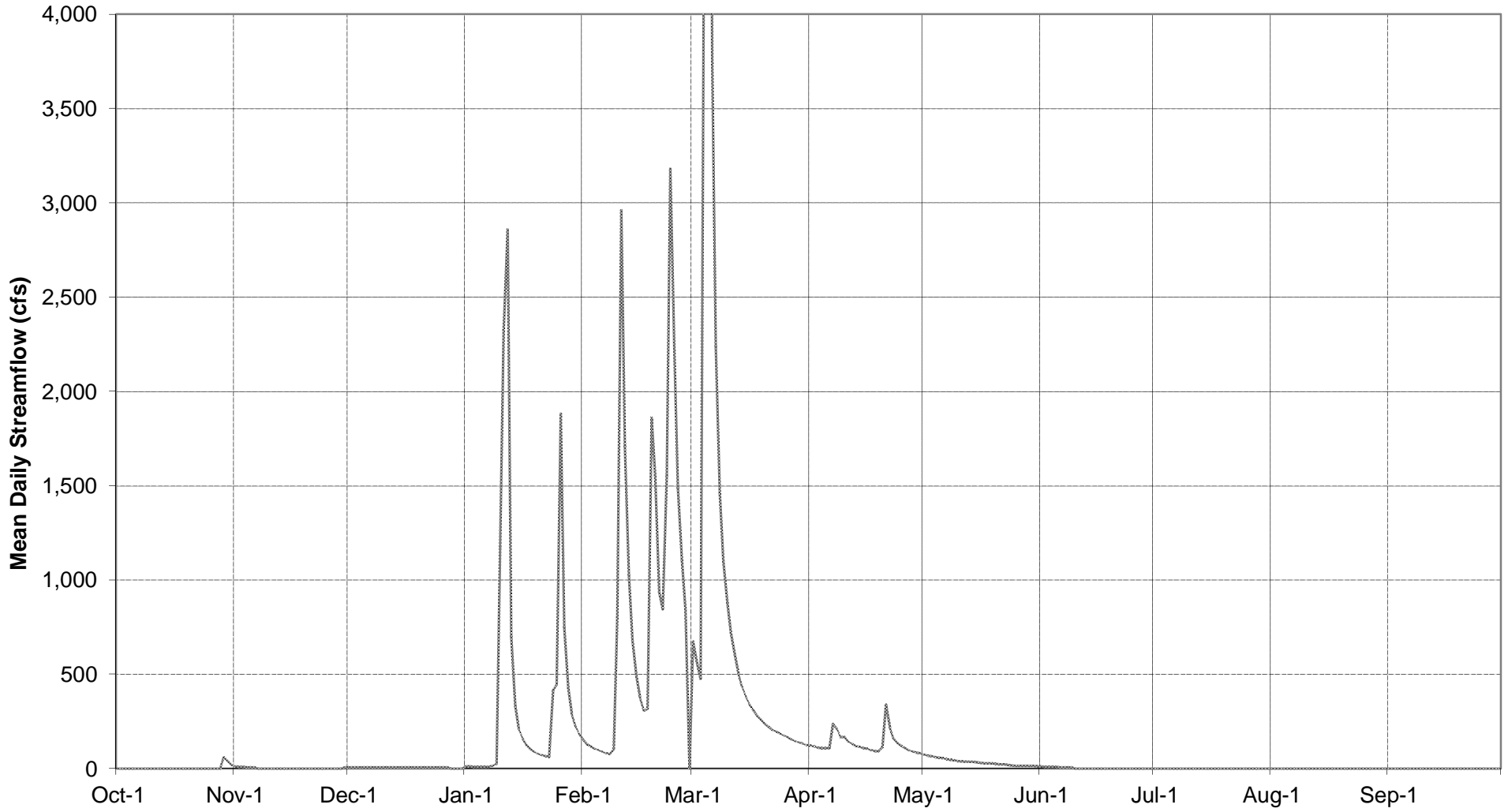
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1999



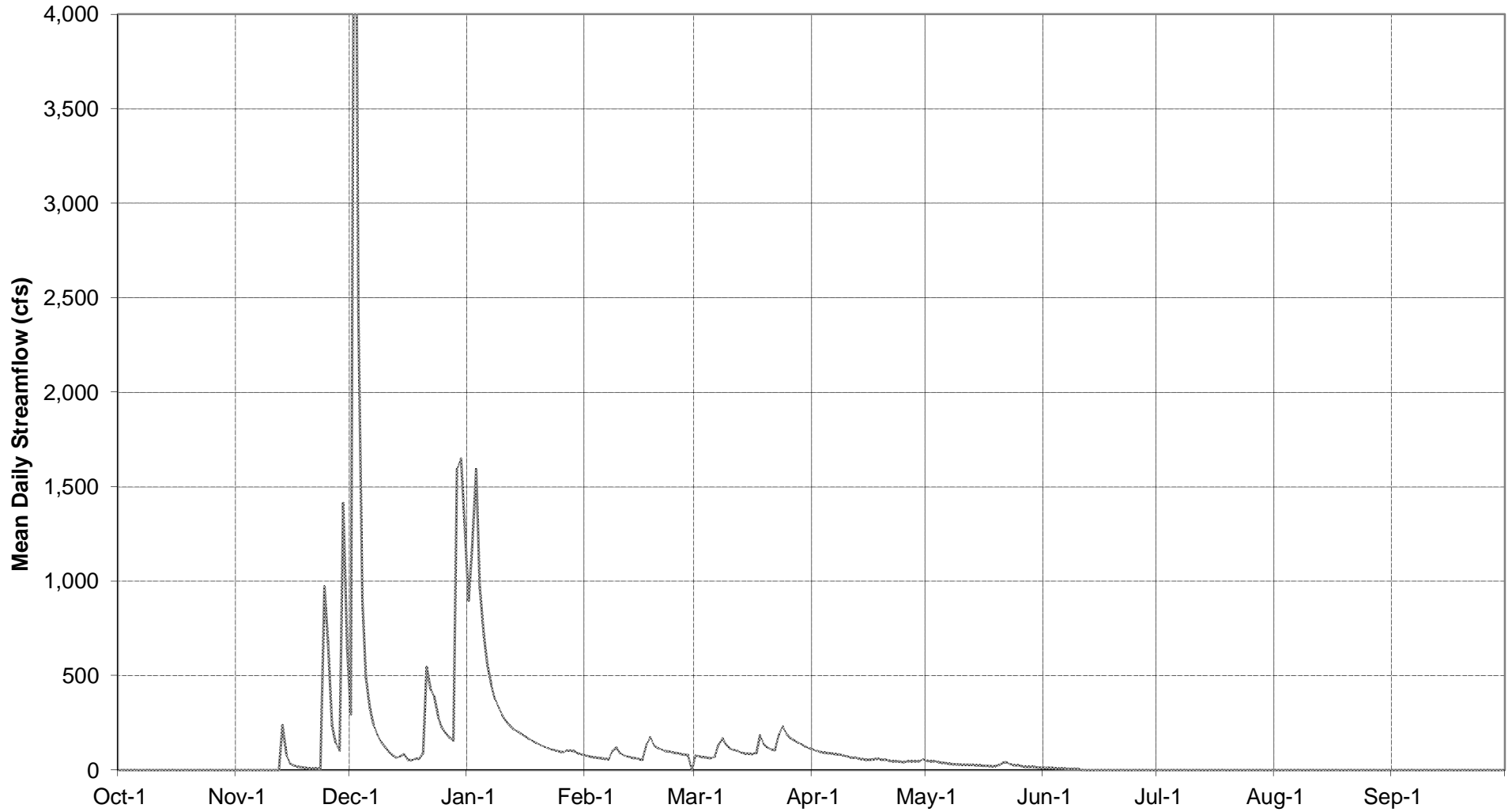
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2000



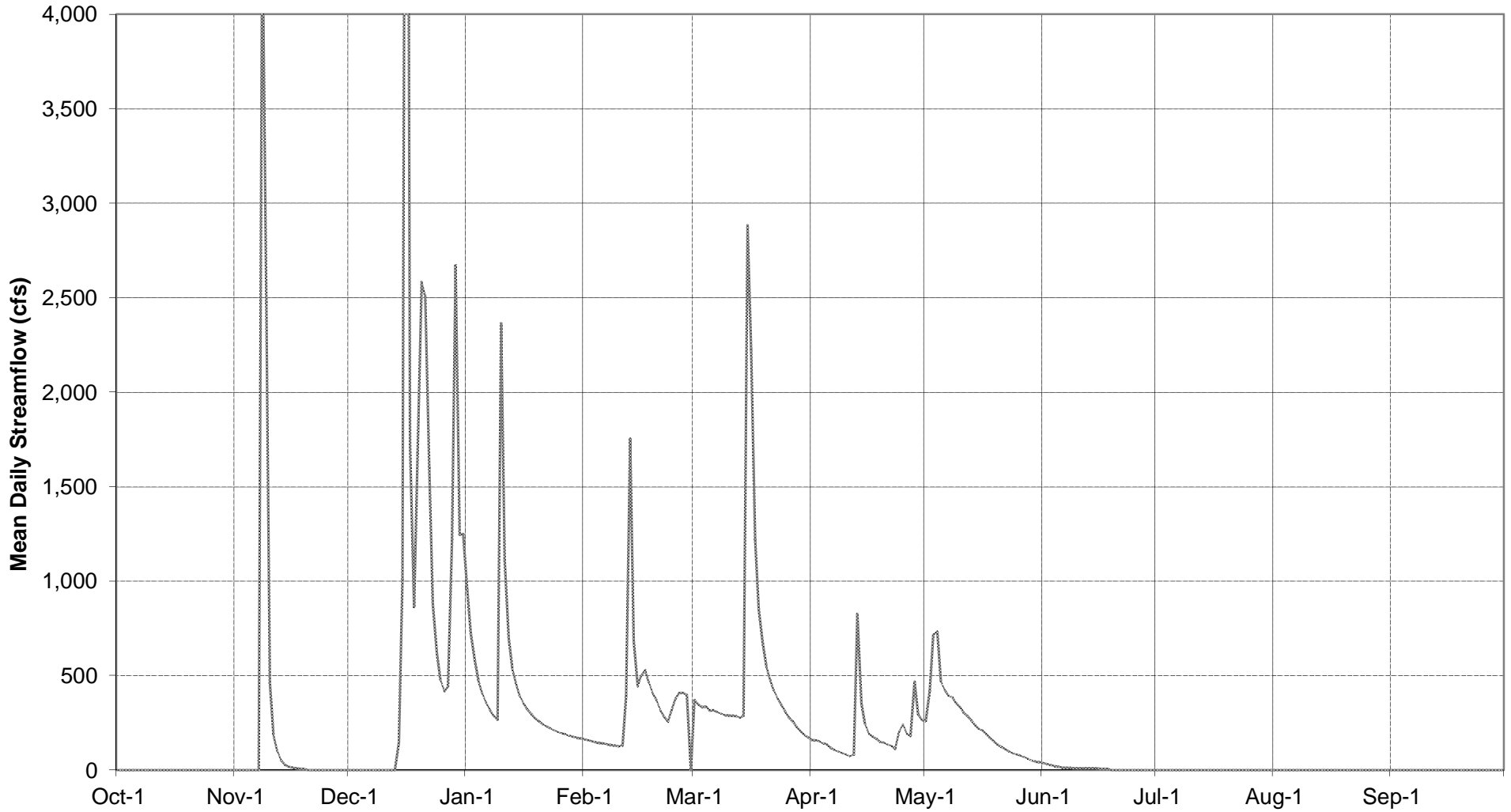
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2001



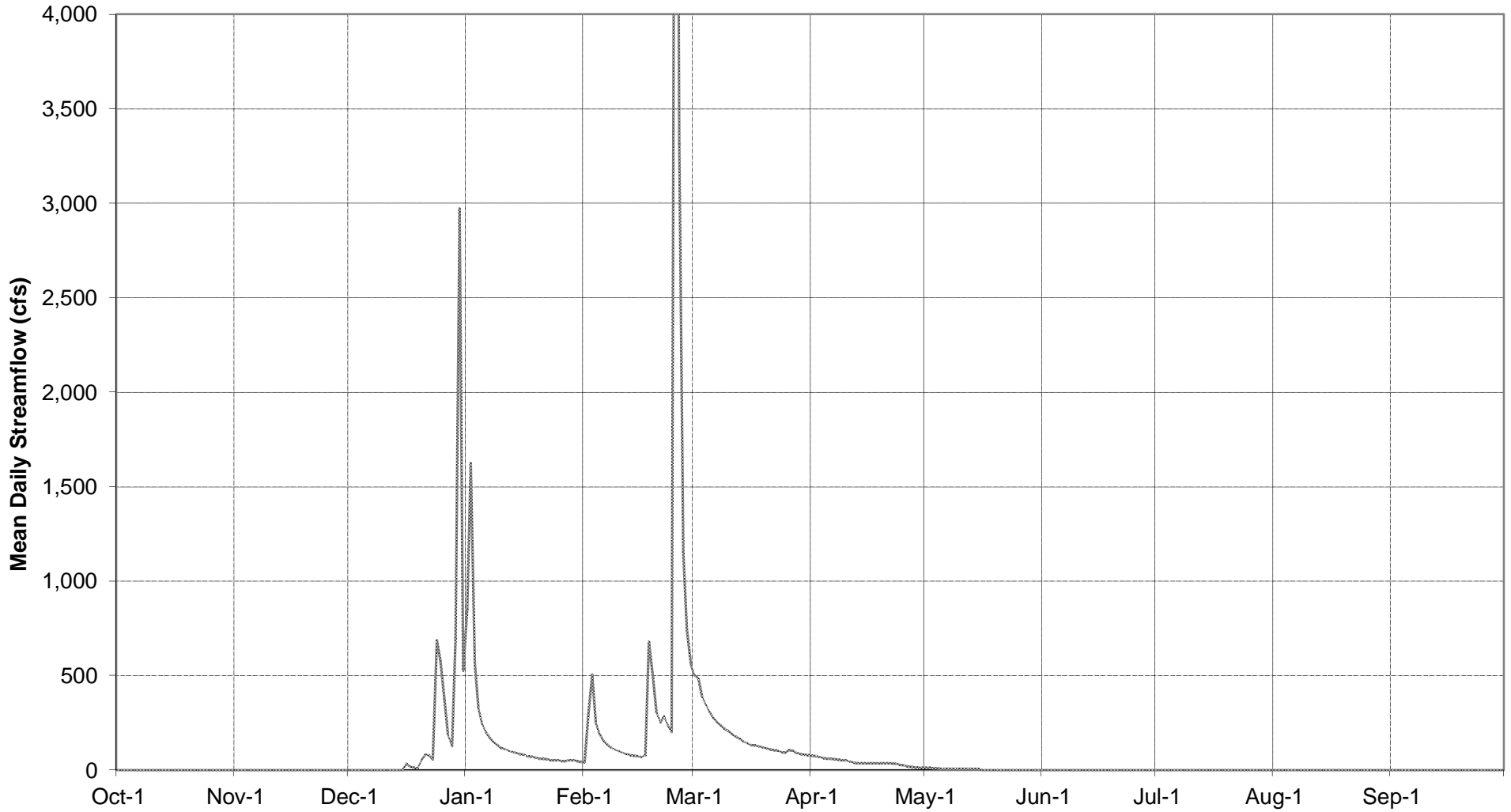
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2002



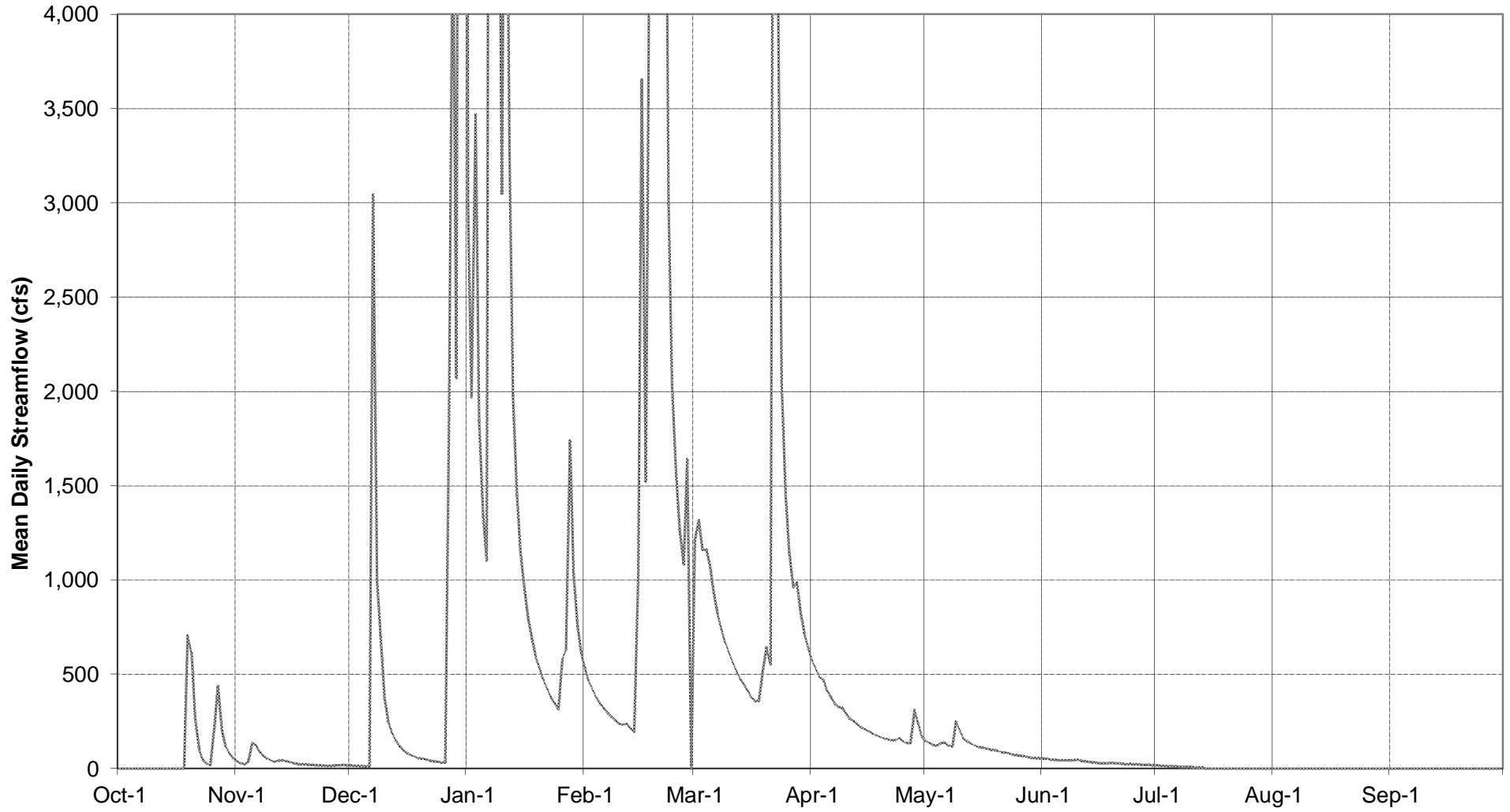
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2003



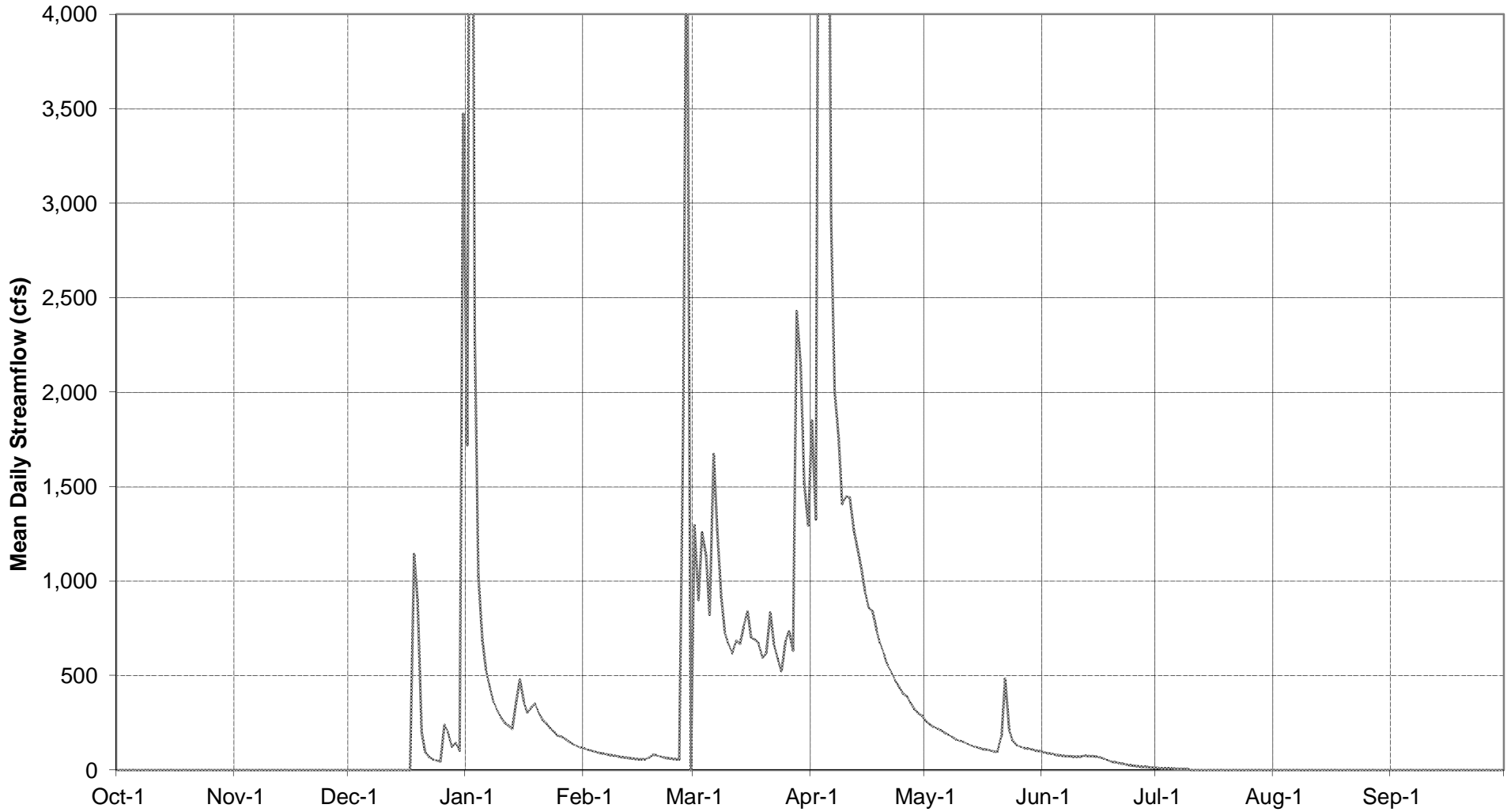
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2004



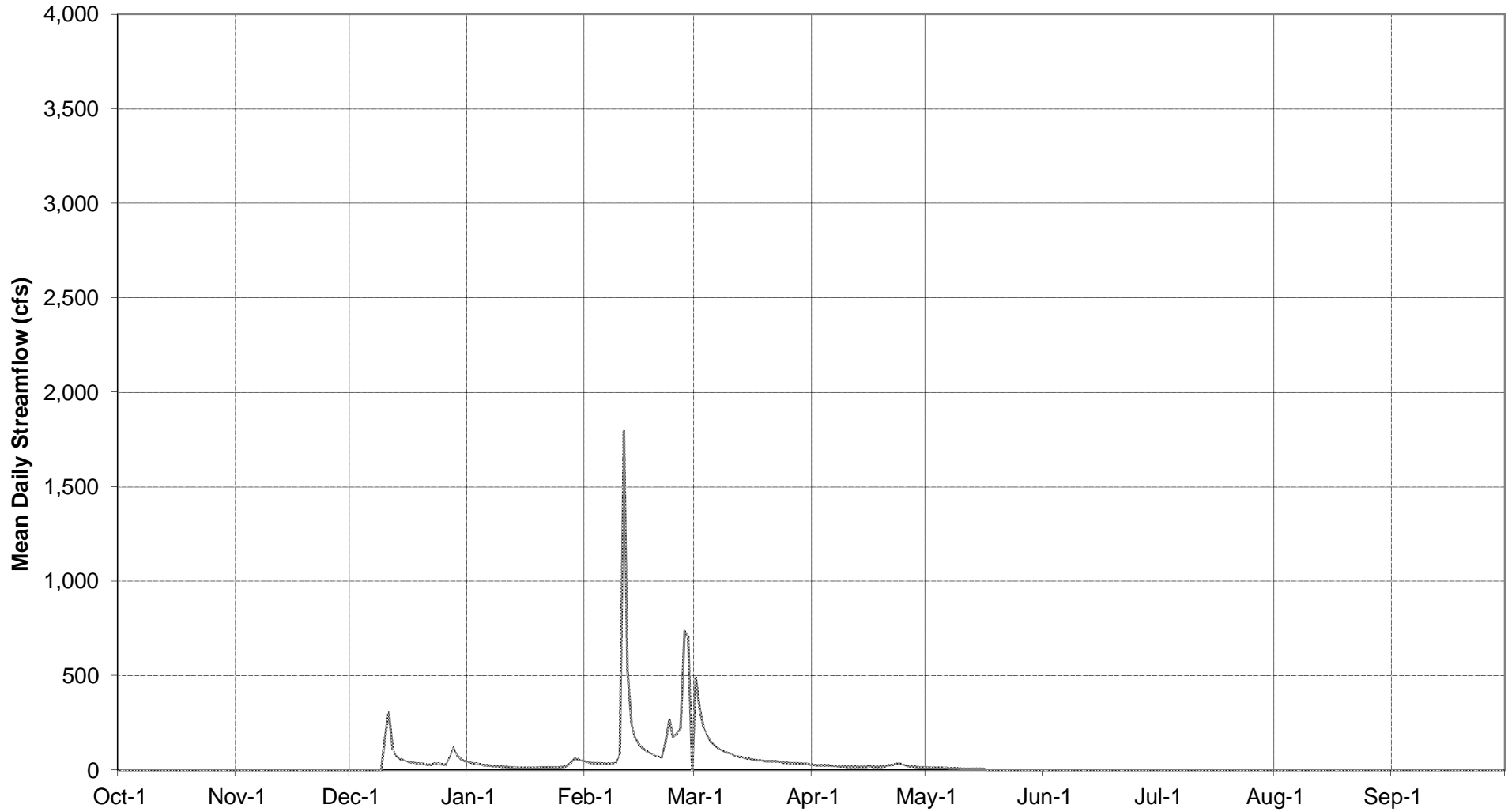
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2005



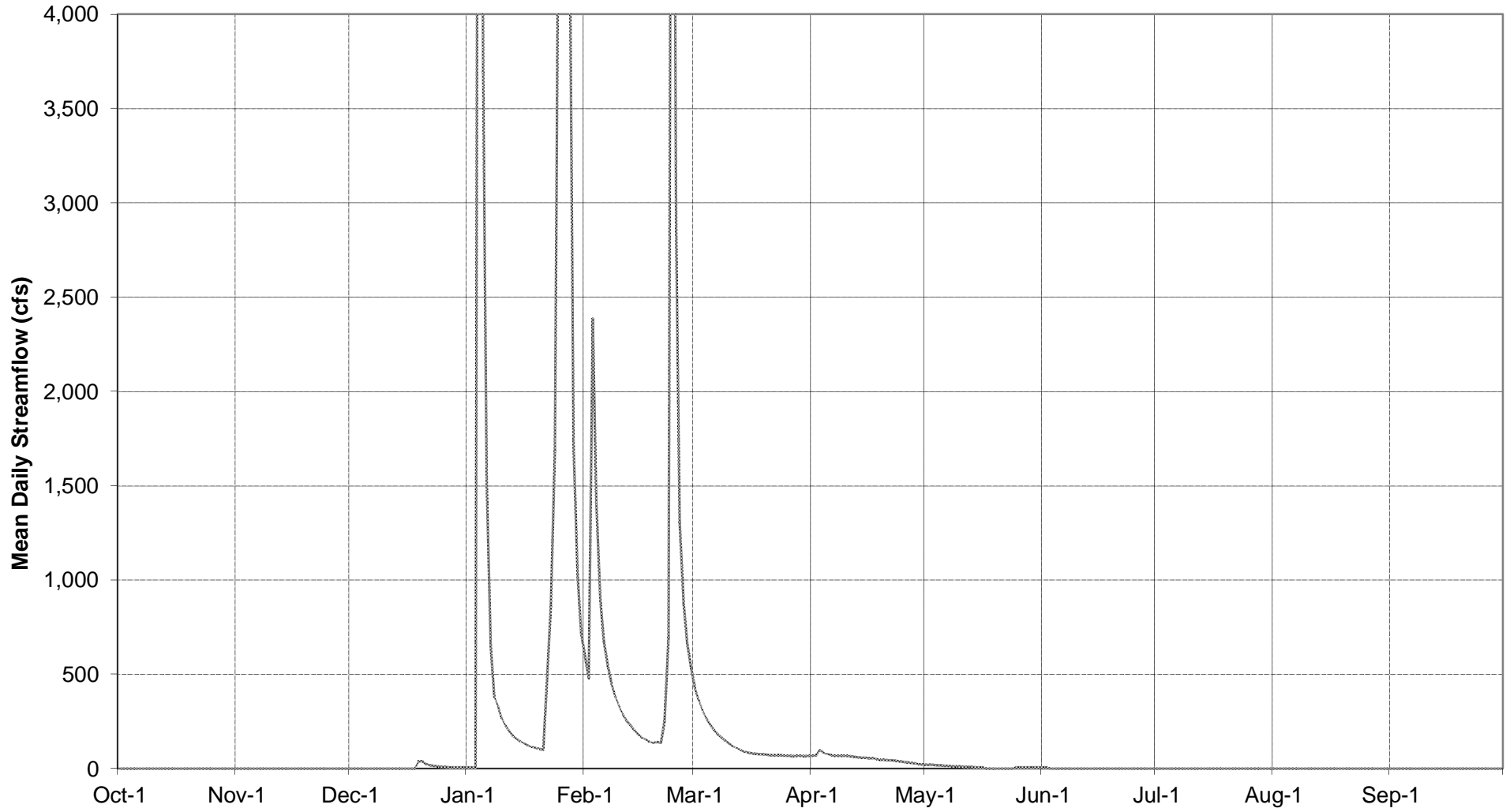
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2006



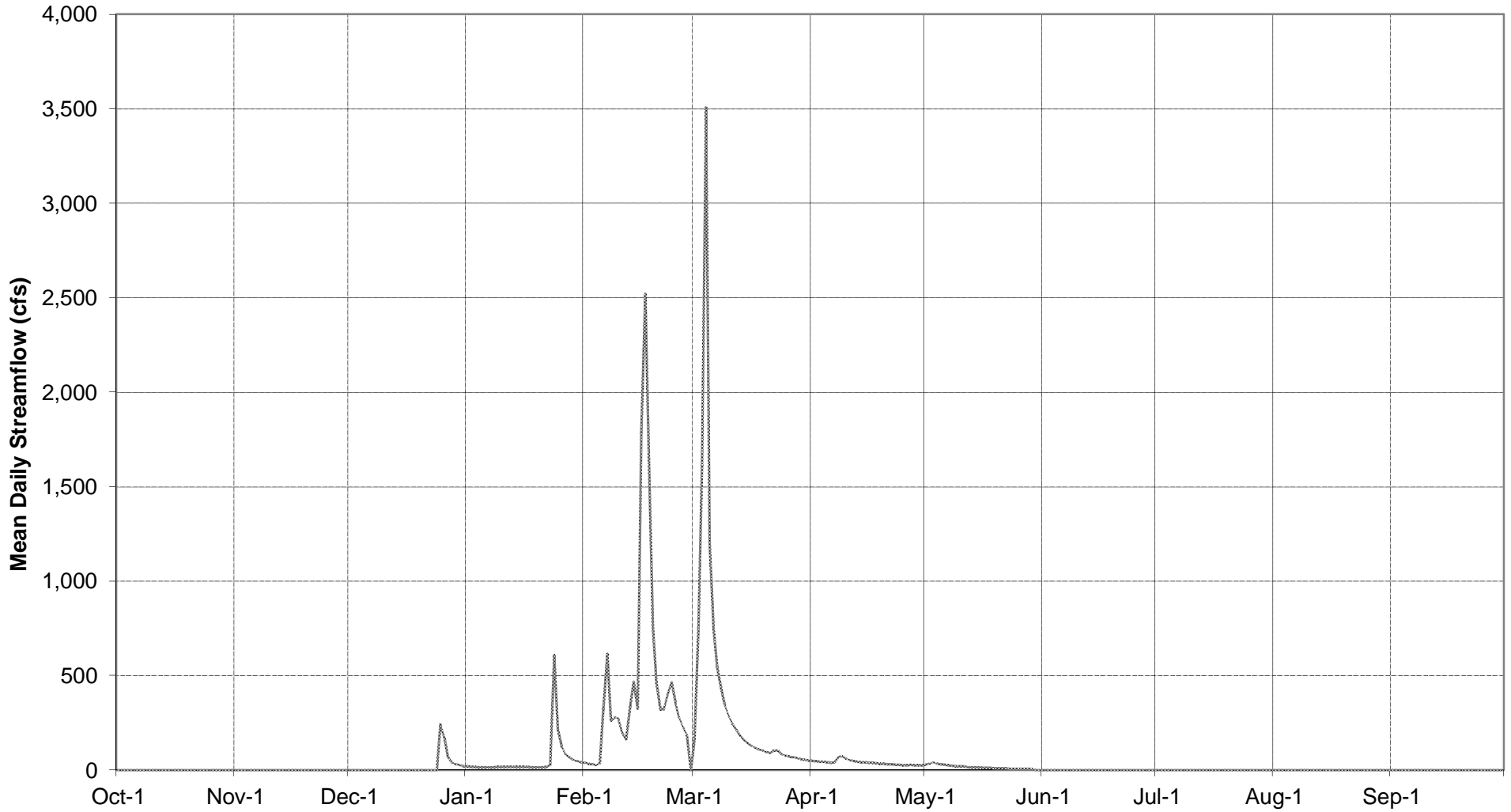
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2007



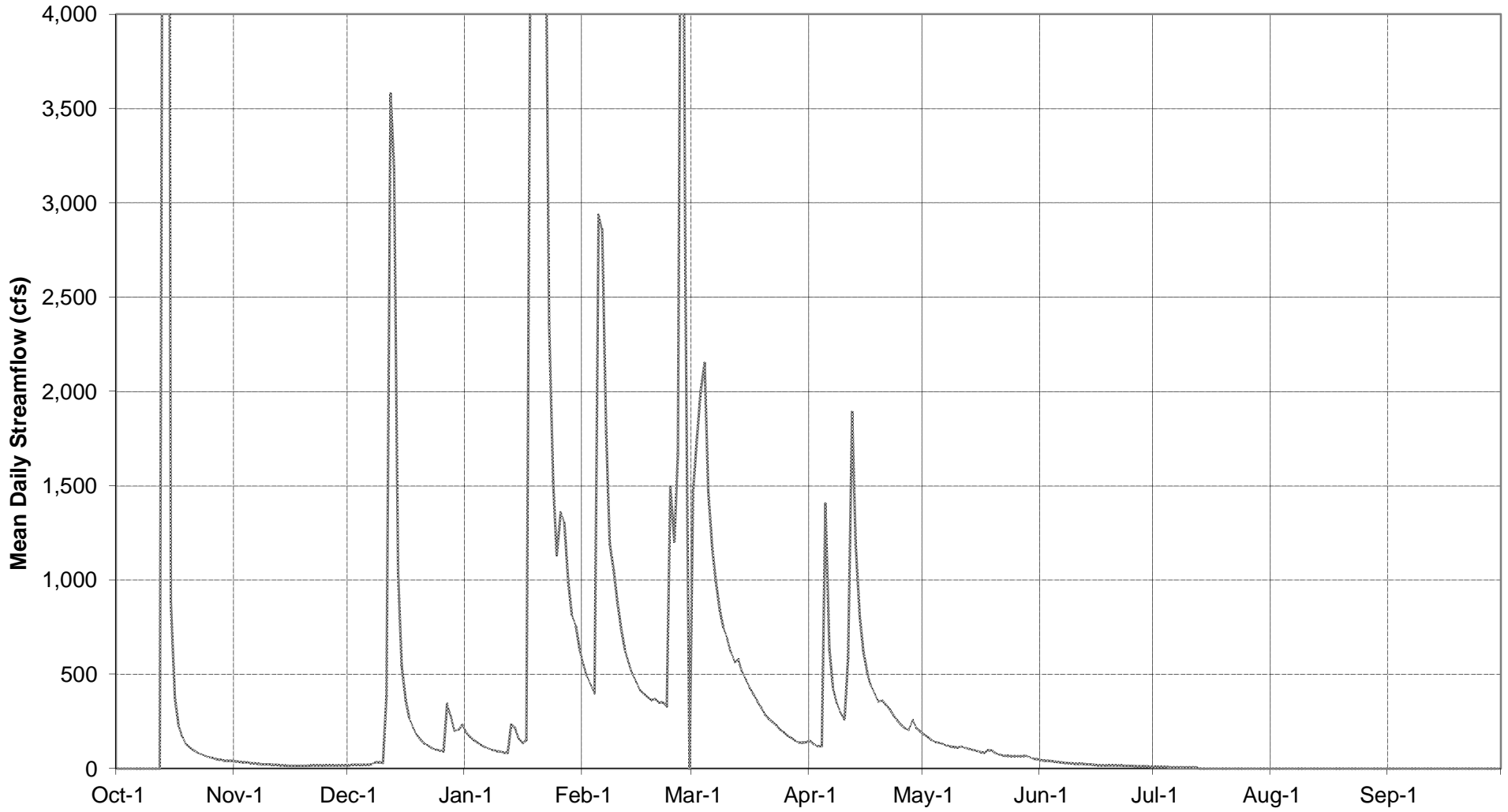
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2008



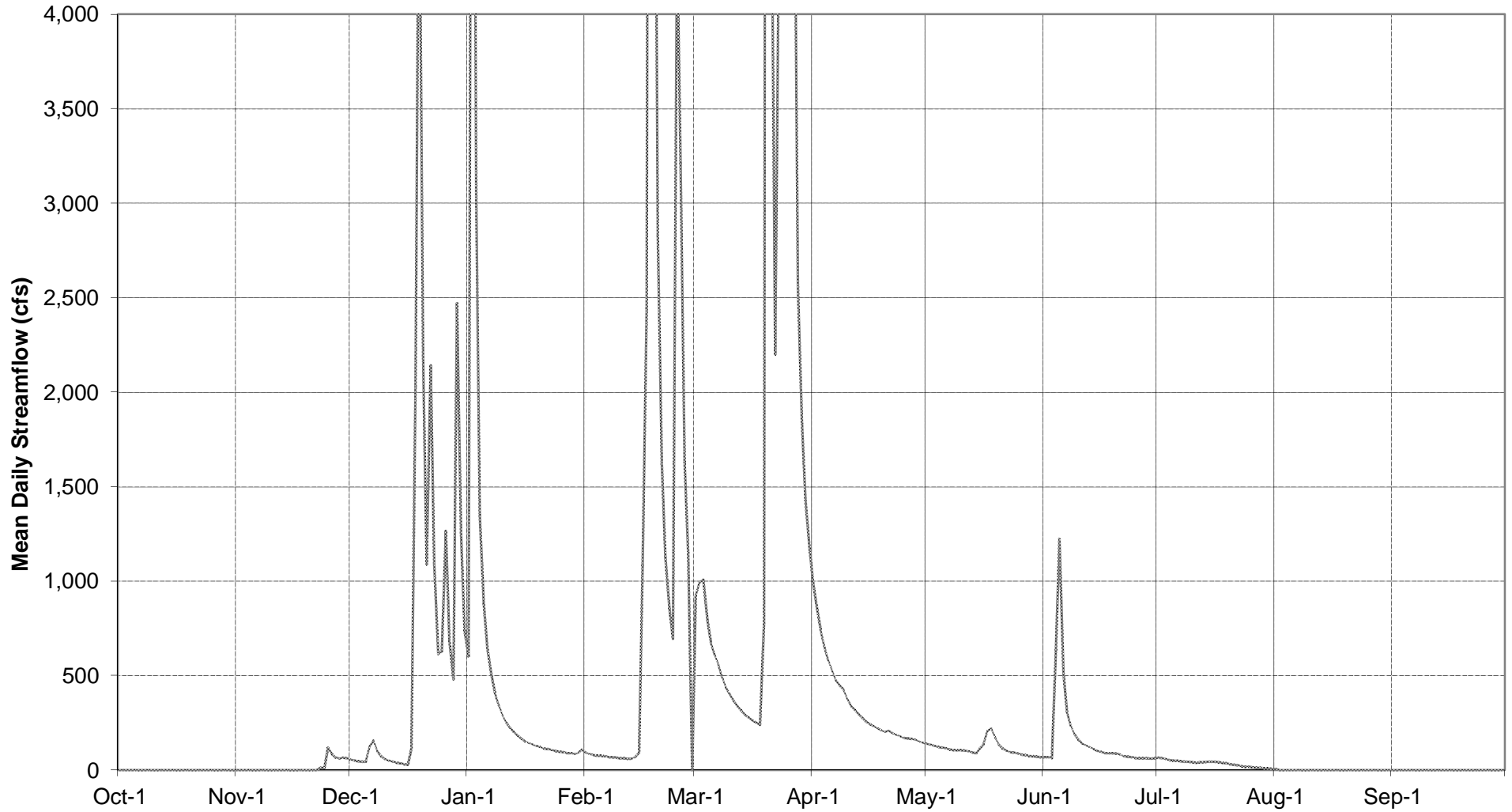
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2009



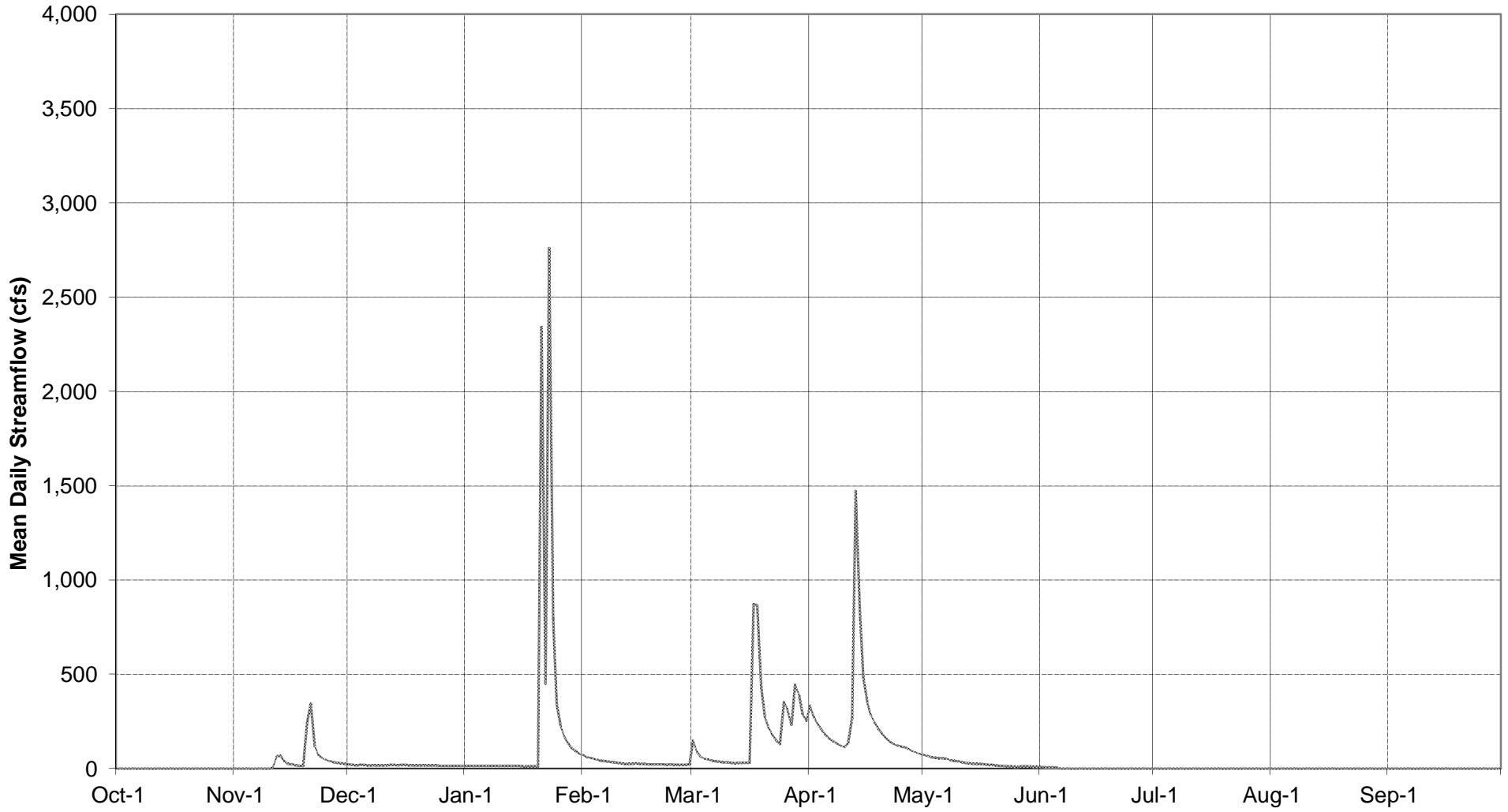
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2010



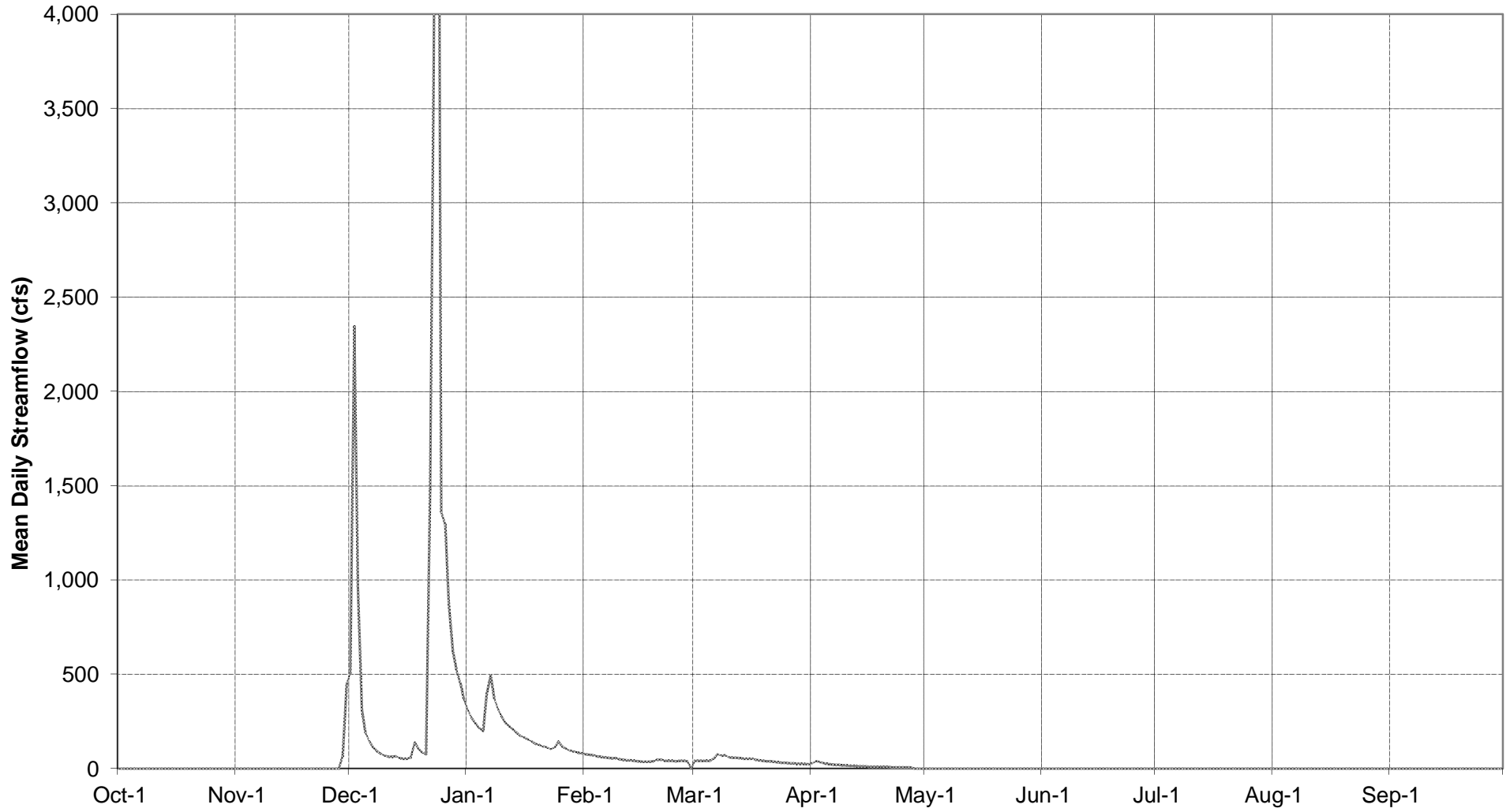
NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2011



NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2012



NACIMIENTO RIVER AT NACIMIENTO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2013



Station Name **SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR**

Param **UNIMPAIRED**
Statistic **Mean**

WATER YEAR

Day	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.1
2-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.8
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.1
4-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.2
5-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.9
6-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3
7-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0
8-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.7
9-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3
10-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4
11-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8
12-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2
13-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2
14-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9
15-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8
16-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8
17-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9
18-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1
19-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0
20-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8
21-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5
22-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2
23-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6
24-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6
25-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9
26-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8
27-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6
28-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1
29-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6
30-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6
31-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5
1-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.8
2-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.5
3-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.4
4-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6
5-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.6
6-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9
7-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8
8-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7
9-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.1
10-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.1
11-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	265.1
12-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	140.2
13-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.7
14-Nov	0.0	0.0	0.0	0.0	0.0	0.0	328.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	178.1	0.0	160.0
15-Nov	0.0	0.0	0.0	0.0	0.0	0.0	351.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.6	0.0	92.3

Station Name **SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR**

Param **UNIMPAIRED**
Statistic Mean

WATER YEAR

Day	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
16-Nov	0.0	0.0	0.0	0.0	0.0	0.0	370.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.1	0.0	71.1
17-Nov	0.0	0.0	0.0	0.0	0.0	0.0	218.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	109.3	0.0	60.4
18-Nov	0.0	0.0	0.0	0.0	0.0	0.0	128.1	227.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	121.3	1.4	73.6
19-Nov	0.0	0.0	0.0	0.0	0.0	0.0	86.3	72.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	102.7	423.5	69.1
20-Nov	0.0	0.0	0.0	0.0	0.0	0.0	67.5	39.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	73.2	118.1	64.4
21-Nov	0.0	0.0	0.0	0.0	0.0	0.0	56.4	28.0	0.0	0.0	0.0	0.0	110.0	0.0	0.0	53.5	81.4	88.6
22-Nov	0.0	0.0	0.0	0.0	0.0	0.0	46.1	28.0	0.0	0.0	0.0	0.0	252.9	0.0	0.0	44.8	60.5	76.7
23-Nov	0.0	0.0	0.0	0.0	0.0	0.0	39.3	25.6	0.0	0.0	0.0	0.0	171.4	0.0	0.0	41.5	53.3	59.3
24-Nov	0.0	0.0	0.0	0.0	0.0	0.0	31.6	24.0	0.0	0.0	0.0	0.0	102.9	0.0	0.0	38.2	43.9	174.6
25-Nov	0.0	0.0	0.0	0.0	0.0	0.0	28.2	21.6	0.0	0.0	0.0	0.0	60.0	0.0	0.0	37.1	34.6	352.4
26-Nov	0.0	0.0	0.0	0.0	0.0	0.0	26.5	21.6	0.0	0.0	0.0	0.0	45.7	0.0	0.0	42.6	25.9	195.2
27-Nov	0.0	0.0	0.0	0.0	0.0	0.0	23.1	20.0	0.0	0.0	0.0	0.0	35.7	0.0	0.0	60.1	21.6	150.9
28-Nov	0.0	0.0	0.0	0.0	91.1	0.0	21.4	20.0	0.0	0.0	0.0	0.0	31.4	0.0	0.0	135.5	25.9	119.3
29-Nov	0.0	0.0	0.0	0.0	446.6	0.0	20.5	20.0	0.0	0.0	0.0	0.0	28.6	0.0	0.0	100.5	110.9	103.0
30-Nov	0.0	0.0	0.0	0.0	130.2	0.0	17.1	21.6	0.0	0.0	0.0	0.0	25.7	0.0	0.0	67.7	965.2	103.8
1-Dec	0.0	0.0	0.0	0.0	70.7	0.0	13.8	456.0	0.0	0.0	0.0	0.0	21.1	0.0	0.0	52.0	547.9	104.2
2-Dec	0.0	0.0	0.0	0.0	574.3	0.0	12.3	244.0	0.0	0.0	0.0	0.0	18.1	0.0	0.0	43.3	363.6	103.7
3-Dec	502.2	0.0	0.0	0.0	344.5	0.0	13.1	125.2	206.4	0.0	0.0	0.0	15.1	0.0	0.0	50.0	262.5	266.4
4-Dec	677.8	0.0	0.0	0.0	161.6	0.0	13.8	90.0	439.5	0.0	0.0	0.0	17.6	0.0	30.4	43.6	205.5	360.3
5-Dec	2552.2	0.0	0.0	0.0	106.2	0.0	15.5	74.0	160.0	0.0	0.0	0.0	13.3	0.0	42.1	37.5	186.2	218.2
6-Dec	8090.5	0.0	0.0	0.0	75.8	0.0	16.4	58.1	103.7	0.0	0.0	0.0	11.5	0.0	19.9	33.6	173.2	167.4
7-Dec	1239.9	0.0	0.0	0.0	64.2	0.0	17.5	48.5	77.0	0.0	0.0	0.0	10.5	0.0	15.2	30.7	154.4	146.0
8-Dec	585.9	0.0	0.0	0.0	62.2	0.0	16.8	39.8	59.3	0.0	0.0	0.0	9.7	0.0	14.0	27.9	133.7	127.1
9-Dec	571.4	0.0	0.0	0.0	61.1	0.0	13.5	35.7	44.4	0.0	0.0	0.0	8.8	0.0	12.9	25.2	119.5	233.1
10-Dec	469.1	0.0	0.0	0.0	67.6	0.0	12.4	31.8	35.6	1.3	0.0	0.0	10.1	0.0	11.3	22.7	96.2	563.7
11-Dec	407.1	0.0	0.0	0.0	81.3	0.0	11.2	30.1	25.7	2.1	0.0	0.0	10.3	0.0	11.1	22.6	88.1	443.9
12-Dec	363.7	0.0	0.0	0.0	78.7	0.0	9.0	27.7	21.7	3.3	0.0	0.0	10.1	0.0	12.9	19.5	80.4	496.6
13-Dec	320.3	0.0	0.0	0.0	74.2	0.0	6.7	28.4	20.7	3.0	0.0	0.0	9.2	0.0	16.4	17.9	72.0	343.6
14-Dec	303.8	0.0	0.0	0.0	70.7	0.0	5.2	29.8	17.8	2.6	0.0	0.0	10.9	0.0	17.5	17.8	63.0	282.1
15-Dec	281.0	0.0	0.0	0.0	65.2	0.0	4.0	27.4	15.8	2.8	0.0	0.0	12.5	0.0	12.9	25.1	62.3	237.1
16-Dec	264.5	0.0	0.0	0.0	69.0	0.0	2.9	25.8	15.8	3.3	0.0	0.0	12.3	0.0	12.9	22.7	54.8	196.7
17-Dec	248.0	0.0	11.1	0.0	99.9	0.0	4.4	26.1	17.8	3.7	0.0	0.0	15.6	0.0	12.9	21.4	60.3	174.6
18-Dec	232.5	0.0	12.0	0.0	153.3	0.0	5.6	24.8	15.8	4.1	0.0	0.0	22.3	0.0	14.0	23.1	59.1	153.7
19-Dec	227.3	4.0	12.0	0.0	455.7	0.0	6.6	23.5	13.8	4.6	0.0	0.0	32.3	0.0	12.9	20.4	55.3	137.4
20-Dec	216.0	20.1	10.2	16.4	267.4	0.0	7.4	22.1	13.8	4.6	0.0	0.0	33.3	0.0	12.9	21.5	50.5	125.7
21-Dec	121.9	25.1	11.1	71.0	1578.1	0.0	7.4	27.9	10.9	5.7	0.0	0.0	33.3	0.0	15.2	36.0	54.2	114.1
22-Dec	99.2	25.1	10.2	150.9	802.0	0.0	8.6	103.8	10.9	5.7	0.0	0.0	32.2	0.0	12.9	37.4	5931.4	113.7
23-Dec	87.8	22.6	10.2	71.0	472.5	0.0	9.3	91.7	10.9	5.7	0.0	747.6	25.5	0.0	14.0	45.1	2213.7	113.2
24-Dec	87.8	22.6	12.0	42.2	393.9	0.0	9.1	62.3	9.3	5.7	0.0	203.5	24.3	160.3	14.0	43.8	873.2	178.4
25-Dec	71.3	20.1	102.4	79.9	319.7	250.3	9.8	43.0	9.3	5.9	0.0	122.5	23.2	482.3	14.0	41.1	788.0	2692.9
26-Dec	74.4	20.1	201.4	170.9	304.5	304.0	9.9	36.7	9.9	5.9	0.0	90.2	21.0	238.9	15.2	41.8	527.5	1118.3
27-Dec	65.1	18.8	112.7	86.5	498.4	439.1	10.6	36.2	13.8	5.9	0.0	131.0	21.0	134.6	14.0	38.9	370.0	794.7
28-Dec	55.8	18.8	82.8	51.0	392.4	331.6	11.8	58.6	114.6	6.5	0.0	224.3	20.9	86.2	15.2	47.2	286.1	568.5
29-Dec	58.9	18.8	82.8	33.3	283.5	193.5	11.8	60.0	111.6	7.2	0.0	173.4	19.8	55.9	14.0	48.1	238.9	466.4
30-Dec	44.4	17.6	68.3	24.4	230.4	133.6	12.5	48.4	81.0	7.6	0.0	130.2	19.8	234.4	15.2	100.2	203.6	411.1
31-Dec	47.5	15.1	60.6	19.1	203.3	98.3	13.1	48.8	64.2	9.1	0.0	103.3	19.8	561.0	15.2	86.7	169.8	386.0

Station Name **SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR**

Param **UNIMPAIRED**
Statistic Mean

WATER YEAR

Day	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1-Jan	46.8	13.3	54.6	14.8	183.6	78.4	13.6	49.2	37.9	9.5	0.0	83.8	17.6	295.7	15.4	75.9	157.0	332.1
2-Jan	48.1	13.9	49.3	13.3	165.7	65.1	14.9	52.3	33.5	10.0	0.0	79.1	16.4	183.1	14.4	81.2	135.7	300.8
3-Jan	45.3	13.4	44.7	9.9	168.4	59.6	15.5	57.2	26.4	8.3	0.0	297.3	16.4	145.9	15.9	77.6	123.9	276.2
4-Jan	34.9	11.8	39.9	7.9	174.2	54.2	15.2	182.9	26.0	6.4	0.0	343.0	14.2	118.7	14.9	483.0	112.6	252.8
5-Jan	37.2	12.3	38.7	6.8	139.7	48.9	14.8	151.6	25.5	6.3	0.0	753.4	19.7	102.0	15.1	2007.4	101.6	219.4
6-Jan	36.5	10.8	37.4	6.4	128.6	45.2	13.5	284.7	25.1	5.9	0.0	1140.4	22.9	87.4	15.3	757.7	91.0	206.8
7-Jan	34.1	10.2	36.0	5.9	106.4	41.6	13.9	1577.5	22.9	5.5	0.0	459.4	24.0	66.2	15.5	485.5	80.8	191.4
8-Jan	30.8	9.7	33.7	5.0	104.4	36.8	19.1	976.2	21.7	5.2	0.0	304.6	29.4	61.6	15.7	357.1	76.5	177.1
9-Jan	28.4	10.1	32.2	19.2	133.5	34.8	441.0	580.9	19.6	4.9	0.0	796.3	305.7	117.9	15.9	293.2	69.2	162.9
10-Jan	27.9	11.9	30.7	417.5	95.4	31.5	658.7	424.9	20.1	4.5	0.0	665.9	189.1	526.4	14.8	252.4	62.2	149.9
11-Jan	29.1	47.1	31.1	220.0	93.5	29.6	280.3	570.8	18.1	3.7	0.0	437.4	137.9	1243.4	16.3	225.6	58.5	137.1
12-Jan	26.9	32.3	29.5	276.5	136.9	26.5	200.5	642.2	14.5	3.5	0.0	332.4	117.1	1839.5	16.5	220.0	53.3	128.3
13-Jan	26.4	21.0	478.9	100.5	195.9	24.7	145.6	598.8	12.6	3.0	0.0	288.1	102.9	1648.2	15.3	203.0	50.5	121.7
14-Jan	29.1	16.4	1064.3	134.3	246.8	20.7	121.2	506.0	12.4	2.4	0.0	2026.3	106.1	1842.9	15.5	191.1	47.1	114.1
15-Jan	26.9	14.1	428.1	263.7	197.2	20.2	103.6	431.3	13.7	2.1	0.0	2877.0	755.9	1115.3	15.7	171.2	43.8	110.5
16-Jan	24.8	9.3	277.3	1433.3	152.1	19.7	1720.8	464.1	13.4	1.7	0.0	5843.7	393.2	842.2	17.4	156.3	41.2	103.0
17-Jan	25.5	8.8	195.9	1114.3	137.8	20.0	1294.0	1161.4	13.6	2.1	0.0	4715.0	243.4	664.9	15.8	144.0	40.0	101.9
18-Jan	26.2	8.2	539.9	818.9	132.1	19.1	1983.0	843.7	14.6	2.6	0.0	1904.2	194.3	561.4	15.6	134.1	39.3	98.7
19-Jan	28.5	8.6	5981.4	599.0	125.3	19.4	1254.1	635.7	14.8	3.1	0.0	1686.9	162.6	469.1	18.2	123.3	250.7	94.3
20-Jan	29.2	9.1	3552.8	542.3	108.5	18.5	753.0	526.4	15.1	3.1	0.0	1156.8	132.3	411.7	18.0	180.5	93.2	93.9
21-Jan	31.7	9.6	5768.8	403.5	98.6	18.7	537.1	408.1	14.5	3.5	0.0	819.3	111.6	377.3	19.2	326.9	63.8	89.1
22-Jan	792.5	10.0	2849.5	313.5	88.5	18.9	392.2	339.0	14.7	4.4	0.0	642.6	106.0	353.8	21.7	259.7	3758.6	85.2
23-Jan	313.2	10.5	1509.8	279.0	89.3	19.2	301.6	289.6	14.9	4.8	0.0	503.3	100.3	327.1	34.9	221.9	1977.8	86.6
24-Jan	2449.2	9.4	1952.6	671.4	87.3	18.2	248.5	255.0	15.1	5.2	0.0	421.8	92.7	301.0	37.2	191.0	5303.5	88.0
25-Jan	1309.3	11.4	9027.4	474.8	90.9	19.7	210.5	225.4	15.4	5.0	0.0	380.4	86.1	278.9	27.5	176.3	1308.6	89.4
26-Jan	826.1	11.9	8824.9	330.7	103.0	19.9	169.1	200.7	16.4	5.4	0.0	323.5	78.5	256.8	22.0	167.1	2285.8	85.1
27-Jan	688.9	10.6	3194.2	281.1	103.9	25.2	136.9	176.2	16.7	5.8	0.0	288.9	67.8	237.9	156.3	177.3	5981.4	84.1
28-Jan	581.2	9.2	2401.9	221.0	65.4	73.8	113.7	161.4	16.0	7.0	0.0	258.6	59.2	224.7	1187.9	176.4	1516.0	83.0
29-Jan	614.9	13.3	1498.6	163.8	60.1	59.3	124.4	146.7	17.1	8.2	0.0	240.2	57.0	215.4	1501.6	175.4	1767.2	81.8
30-Jan	1258.4	17.7	1161.2	138.3	75.3	50.8	357.6	136.8	17.4	7.8	0.0	226.7	134.2	196.5	604.5	156.4	1245.8	79.4
31-Jan	1206.8	156.5	965.8	117.2	75.9	42.2	286.9	128.8	24.1	9.2	0.0	183.0	555.6	187.2	312.6	145.8	789.0	84.2
1-Feb	808.3	92.6	777.3	107.9	72.0	41.2	206.5	122.1	366.2	10.6	0.0	177.7	317.2	181.9	230.8	134.1	664.8	85.6
2-Feb	634.8	67.1	620.2	97.3	72.0	36.1	159.3	112.7	2786.7	11.1	0.0	173.5	264.6	175.2	179.3	124.2	571.6	80.6
3-Feb	559.8	52.3	476.4	81.8	79.0	33.7	152.3	108.0	825.8	10.5	0.0	166.1	212.5	170.6	144.3	115.1	485.7	79.3
4-Feb	507.3	47.8	404.1	82.8	63.3	34.0	252.4	98.5	713.3	10.9	0.0	155.6	161.0	164.5	128.7	105.0	455.3	77.9
5-Feb	437.9	38.7	482.2	83.9	54.4	87.6	226.7	93.8	577.3	12.5	0.0	360.3	130.1	159.4	130.8	95.7	440.6	76.5
6-Feb	380.1	34.8	1925.7	76.9	56.4	242.7	788.8	90.0	322.7	16.1	0.0	1222.1	105.5	156.7	129.3	92.2	1205.4	77.6
7-Feb	326.1	29.6	1349.9	77.8	47.5	133.4	1251.4	84.3	149.6	16.7	0.0	3216.0	107.8	151.2	114.3	91.7	2015.0	78.8
8-Feb	299.0	27.8	1105.3	81.2	61.5	96.6	926.4	82.4	146.2	38.8	0.0	2499.8	97.4	149.4	113.0	90.1	3718.8	77.2
9-Feb	285.0	25.9	990.9	75.0	61.5	77.5	694.7	74.0	950.9	88.3	0.0	6223.8	82.1	148.9	200.2	85.6	2027.2	78.3
10-Feb	262.4	26.4	884.2	78.3	65.5	68.2	1358.2	70.2	1110.8	118.9	0.0	3335.8	74.9	148.2	170.6	80.0	1464.0	79.4
11-Feb	249.6	23.1	811.5	76.8	61.6	62.9	2350.6	68.3	788.1	91.3	0.0	2077.9	61.9	146.2	127.5	77.4	1142.0	80.5
12-Feb	234.8	20.9	1349.8	77.7	43.7	56.2	1398.8	73.9	589.8	79.4	0.0	2900.1	51.9	142.6	106.8	74.7	981.8	81.7
13-Feb	206.8	23.9	890.6	107.8	49.7	53.7	1556.1	64.5	596.1	69.7	0.0	2913.4	173.9	144.5	88.6	73.0	820.6	79.8
14-Feb	115.7	21.7	742.8	202.7	36.8	54.0	1234.5	68.2	594.7	65.5	0.0	2061.4	1025.6	195.6	77.1	76.4	724.3	80.9
15-Feb	86.1	20.7	2080.3	128.5	40.8	51.5	1189.1	62.6	501.3	61.0	0.0	1609.3	499.3	460.4	80.3	83.9	660.4	85.0

Station Name **SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR**

Param **UNIMPAIRED**
Statistic Mean

WATER YEAR

Day	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
16-Feb	70.0	29.5	1641.4	109.0	41.9	54.8	1092.3	56.9	414.7	59.4	0.0	1321.5	409.1	2800.0	66.1	260.1	563.8	86.2
17-Feb	61.4	363.1	1339.4	118.3	50.0	50.1	974.5	56.4	344.0	48.2	0.0	1071.3	359.6	3901.3	68.8	254.5	484.8	94.3
18-Feb	50.3	383.4	1249.3	113.3	41.2	46.9	859.7	57.7	300.9	43.9	0.0	832.8	346.5	5410.4	66.4	205.5	521.4	80.8
19-Feb	41.0	216.0	1076.4	102.0	53.4	42.2	691.1	62.5	269.4	36.6	0.0	656.4	325.7	5145.0	69.2	187.3	499.1	79.7
20-Feb	33.4	135.5	880.2	97.2	55.6	34.8	629.9	56.5	241.7	38.6	0.0	539.8	331.4	3826.9	69.9	164.9	452.2	75.6
21-Feb	27.4	104.7	724.4	93.7	33.5	30.3	569.5	55.0	223.0	37.5	0.0	423.7	1024.1	4284.5	69.5	147.6	406.9	77.4
22-Feb	26.7	91.8	720.6	90.2	39.7	31.5	505.2	56.2	198.6	27.7	0.0	390.5	689.0	2946.6	70.2	136.5	372.1	73.4
23-Feb	19.9	80.4	1118.4	85.6	54.2	35.6	456.0	43.5	185.8	24.5	0.0	403.6	672.4	2346.2	70.9	129.5	356.0	68.1
24-Feb	19.4	70.6	5157.5	82.3	49.3	34.0	672.5	42.2	170.4	23.7	0.0	416.6	492.4	1867.9	67.1	122.4	385.1	74.1
25-Feb	23.6	62.1	3562.3	79.1	35.0	32.4	685.1	44.3	159.2	20.9	0.0	349.3	417.1	1445.6	67.8	114.3	779.7	66.1
26-Feb	16.1	57.7	2581.7	75.8	34.1	30.8	714.5	43.0	141.5	20.3	0.0	335.1	381.7	1096.3	68.4	107.2	1424.3	66.4
27-Feb	12.3	52.1	1813.2	75.0	31.1	29.2	1710.9	41.7	134.7	17.7	0.0	312.1	338.9	769.9	70.2	100.1	1610.6	61.4
28-Feb	10.9	49.1	2150.0	197.1	42.7	27.7	2091.6	45.3	127.1	18.9	0.0	312.5	305.6	849.2	67.4	98.2	2326.1	57.8
29-Feb		44.9				27.5				20.0				655.9				62.0
1-Mar	10.7	37.3	1842.8	1869.2	42.9	26.1	1222.3	1861.3	120.4	115.7	0.0	311.4	303.8	554.0	86.2	105.7	6038.5	64.6
2-Mar	10.5	39.7	1393.0	1216.9	38.9	26.0	924.4	2308.2	114.7	111.3	0.0	433.1	280.8	520.7	136.5	272.1	7890.9	60.9
3-Mar	8.3	33.4	1084.0	669.3	39.1	26.0	855.3	1651.3	110.9	101.1	0.0	1069.4	254.5	1267.5	83.8	309.7	5090.2	56.1
4-Mar	6.5	37.0	955.8	798.9	41.4	24.6	913.8	1035.8	108.0	85.6	0.0	3715.3	231.0	955.1	81.9	236.9	3048.8	58.5
5-Mar	5.2	28.3	814.7	1017.6	46.9	24.5	794.8	844.2	107.0	67.4	0.0	3367.4	210.4	1036.1	308.4	177.7	2305.7	53.9
6-Mar	5.1	25.7	730.3	600.7	31.1	23.1	638.8	730.4	147.0	55.7	0.0	2306.9	198.9	1072.5	209.6	172.7	1927.0	48.2
7-Mar	5.0	30.6	606.6	402.9	26.9	21.7	639.0	656.9	1544.8	46.5	0.0	1842.8	198.7	798.6	169.1	163.3	1823.2	47.1
8-Mar	4.9	117.1	549.3	311.7	32.4	20.3	598.6	727.6	1678.8	41.1	0.0	1580.7	187.0	657.8	150.9	151.8	1504.5	48.3
9-Mar	3.5	130.1	487.9	265.8	25.0	20.3	509.8	535.8	1134.4	34.5	0.0	1763.7	171.1	560.5	137.3	130.7	1250.0	45.1
10-Mar	3.2	88.5	438.6	233.5	36.0	17.6	461.1	450.6	891.9	32.7	0.0	1400.2	160.3	485.6	118.7	130.9	1080.8	44.1
11-Mar	17.9	66.5	398.3	198.3	32.9	17.5	474.7	362.3	738.8	28.1	0.0	1133.0	150.4	437.9	103.6	136.4	988.5	43.1
12-Mar	228.1	57.9	381.8	177.7	39.6	18.9	465.2	301.4	716.4	23.9	0.0	989.0	148.9	392.2	96.8	152.8	898.9	41.1
13-Mar	469.3	163.5	356.8	162.6	194.6	18.8	409.7	253.8	625.2	21.2	0.0	890.6	142.1	346.4	96.1	133.6	1380.5	38.1
14-Mar	321.6	152.3	329.0	147.8	147.7	18.8	406.9	234.2	652.7	19.8	0.0	836.4	134.1	313.5	104.1	131.7	1157.2	89.6
15-Mar	233.3	110.0	300.3	138.4	101.5	18.8	355.7	202.8	464.1	15.3	0.0	785.3	137.9	282.7	94.7	131.9	1042.6	75.2
16-Mar	1726.5	97.8	275.8	129.1	81.8	18.7	297.7	180.0	513.4	13.1	1.0	721.8	154.5	247.5	95.2	134.3	975.4	57.0
17-Mar	1253.5	141.3	274.9	121.0	75.9	18.4	301.3	156.0	421.3	14.0	0.4	683.5	157.9	233.8	93.2	231.9	1120.4	52.2
18-Mar	862.2	107.1	266.6	109.6	73.4	15.5	274.3	131.4	347.4	15.8	0.2	625.2	155.9	229.5	88.7	346.9	1304.2	50.6
19-Mar	722.2	100.3	251.3	104.6	65.4	15.2	247.9	126.9	301.2	14.8	0.1	572.8	153.9	221.7	382.4	290.4	1049.8	49.8
20-Mar	578.9	83.7	253.4	98.4	65.1	13.7	646.1	117.5	261.8	14.7	0.1	542.2	145.7	213.0	359.7	248.8	1050.1	51.9
21-Mar	589.8	70.7	251.6	95.5	50.6	13.4	503.1	109.2	244.5	14.6	0.3	513.2	152.1	208.8	1046.0	232.3	1336.0	51.8
22-Mar	541.3	63.6	246.6	92.6	51.5	13.2	488.8	103.5	718.4	15.8	0.4	1209.5	158.5	204.2	752.4	221.2	1183.5	48.0
23-Mar	449.9	56.5	244.0	92.9	45.8	10.9	386.7	99.8	472.1	14.0	0.5	798.8	158.5	196.6	462.6	215.6	1061.4	49.8
24-Mar	356.0	50.6	238.1	93.2	57.6	10.7	370.0	95.9	386.5	15.0	0.4	519.2	153.5	190.0	331.1	195.3	1888.6	49.1
25-Mar	338.0	45.9	231.7	93.5	59.5	10.5	378.2	93.3	369.4	16.0	0.2	435.9	164.8	189.6	252.8	186.1	1470.6	48.2
26-Mar	309.2	38.6	229.1	91.6	45.3	10.3	367.8	92.1	316.5	17.1	0.1	437.4	153.7	186.3	232.1	177.9	1225.9	49.8
27-Mar	279.8	40.0	233.7	88.6	56.9	10.1	337.2	121.2	304.7	16.4	0.1	411.5	316.5	177.4	209.5	171.9	1195.6	48.7
28-Mar	242.8	42.7	238.2	85.6	51.3	9.1	303.6	479.4	298.0	19.1	0.0	357.6	589.1	171.5	185.1	167.0	1124.5	45.9
29-Mar	202.4	41.6	231.7	83.6	44.7	8.3	278.9	541.5	292.1	20.1	0.2	317.0	631.1	168.8	210.2	200.3	1009.3	50.3
30-Mar	176.9	40.5	228.1	73.8	50.9	8.1	254.8	680.5	276.2	21.1	0.2	299.8	381.6	164.9	197.2	393.2	864.4	48.7
31-Mar	294.3	33.0	224.2	69.6	44.4	7.3	226.5	618.8	253.9	20.0	0.1	342.6	292.0	159.7	176.7	643.0	763.3	53.3
1-Apr	244.2	37.1	215.2	74.3	48.0	7.6	224.4	481.4	224.4	21.0	0.2	287.4	249.0	154.6	166.2	969.3	717.5	56.6

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2-Apr	219.7	76.1	210.5	69.9	38.1	6.7	226.7	754.4	204.6	21.9	0.1	258.9	224.8	151.1	153.6	872.4	673.7	53.3
3-Apr	196.0	54.6	217.6	66.7	30.4	5.9	215.6	565.2	192.8	25.3	0.0	237.1	219.2	147.5	133.9	973.7	619.6	54.9
4-Apr	187.0	45.8	189.1	70.3	34.0	5.6	202.5	485.7	193.7	26.3	0.0	334.4	202.1	150.9	119.9	972.0	576.8	56.5
5-Apr	187.1	43.5	261.2	70.4	35.5	5.8	183.1	417.0	267.9	24.8	0.0	272.4	183.1	327.5	114.4	791.1	542.1	61.7
6-Apr	208.4	42.5	380.2	67.2	32.1	5.4	168.3	367.9	269.1	25.7	0.0	299.2	169.9	314.4	102.9	627.3	513.6	59.7
7-Apr	697.1	41.4	325.2	62.8	31.7	4.7	162.3	329.1	258.3	26.7	0.0	343.1	158.8	238.1	93.6	488.9	483.0	55.5
8-Apr	514.7	40.4	315.7	58.4	34.0	4.4	148.0	296.3	239.0	40.9	0.0	300.9	148.8	217.5	89.5	444.3	459.5	58.9
9-Apr	470.0	37.9	267.1	63.1	28.0	4.1	131.8	274.1	218.6	51.2	0.0	249.7	152.0	203.2	86.5	401.3	432.0	58.4
10-Apr	373.7	36.8	230.4	58.6	29.4	3.5	137.7	246.3	201.7	75.0	0.0	250.3	147.7	190.0	81.6	584.6	419.8	59.8
11-Apr	444.9	35.7	206.3	53.0	28.9	4.2	130.1	222.2	193.2	77.4	0.0	232.5	136.8	180.2	74.8	3805.1	410.7	63.3
12-Apr	407.4	34.6	181.4	55.4	26.7	5.3	123.7	208.1	190.2	89.2	0.0	224.2	133.5	169.2	70.1	2120.2	394.4	62.7
13-Apr	352.3	33.4	169.9	53.3	25.4	7.1	112.3	185.3	165.4	87.1	0.0	223.4	125.6	160.4	65.4	1605.7	374.0	61.9
14-Apr	313.8	30.8	165.1	55.7	33.6	5.6	98.2	160.8	160.4	74.7	0.0	232.5	117.7	157.1	59.9	1405.1	356.6	63.3
15-Apr	271.5	31.1	160.1	53.5	34.8	4.3	88.3	156.6	158.2	66.6	0.0	409.4	116.3	157.1	53.7	1186.8	344.4	60.0
16-Apr	271.7	29.8	154.9	49.0	25.9	3.1	85.4	153.9	161.8	63.2	0.0	642.8	113.1	152.7	49.3	1010.8	329.1	59.0
17-Apr	248.4	28.0	145.5	48.8	26.2	3.1	83.4	142.7	155.3	50.7	0.0	475.5	106.3	150.6	48.2	891.6	333.8	50.7
18-Apr	355.9	26.3	137.7	53.3	28.3	3.2	70.4	129.1	134.5	44.9	0.0	448.5	101.4	142.9	53.7	746.1	405.1	45.0
19-Apr	416.8	24.5	130.1	50.8	25.7	3.3	76.2	122.5	125.3	39.7	0.0	478.1	102.0	137.5	56.4	645.4	443.6	61.4
20-Apr	408.1	24.2	122.6	47.1	26.8	3.0	83.1	107.8	121.9	38.6	0.0	418.1	93.4	134.2	53.3	537.1	477.9	68.4
21-Apr	601.9	22.5	116.7	44.7	28.9	3.1	85.0	97.9	113.8	33.7	0.0	351.7	98.6	131.0	51.1	462.4	527.3	52.1
22-Apr	619.3	22.2	113.6	41.1	22.5	3.0	82.8	85.4	107.7	29.6	0.0	311.7	99.2	140.9	45.9	510.5	459.0	48.6
23-Apr	563.3	20.6	119.9	46.7	24.4	3.2	74.3	89.0	102.5	28.7	0.0	323.5	90.7	134.4	43.5	447.9	456.7	41.4
24-Apr	740.3	19.0	124.6	44.2	26.5	3.2	79.3	102.4	124.3	24.8	0.0	338.1	86.8	130.0	45.1	401.7	625.9	47.9
25-Apr	610.8	18.7	118.8	47.5	27.4	3.1	82.3	106.9	138.4	21.6	0.0	359.6	83.8	123.5	42.6	354.4	550.6	40.9
26-Apr	559.4	18.4	108.0	41.7	27.0	3.0	74.5	93.4	126.7	18.9	0.0	333.9	81.7	119.1	44.2	317.9	514.4	37.9
27-Apr	480.5	16.9	100.0	40.4	34.3	2.9	77.4	93.8	117.0	18.2	0.0	323.8	85.1	113.6	41.6	282.4	587.1	35.0
28-Apr	423.6	16.7	93.5	41.4	34.0	2.7	76.0	87.6	109.1	15.7	0.0	270.9	78.5	124.7	41.1	250.3	2253.7	37.3
29-Apr	402.1	15.2	91.9	37.9	31.0	2.5	71.2	84.6	105.0	13.4	0.0	218.0	75.6	151.3	37.2	222.4	1260.2	32.8
30-Apr	325.7	15.0	92.7	40.0	34.7	2.3	73.0	75.0	97.3	11.5	0.0	211.0	78.0	127.0	35.5	178.9	1336.3	25.3
1-May	271.5	13.6	95.6	37.5	38.4	2.4	73.3	75.3	93.3	10.0	0.0	232.4	76.0	118.2	34.7	165.9	983.0	23.2
2-May	251.5	13.4	97.3	40.6	32.1	2.2	70.2	73.0	88.6	8.6	0.0	229.4	70.5	109.4	36.1	153.3	800.8	24.1
3-May	246.7	12.1	96.6	44.8	32.9	1.7	72.7	75.8	83.9	6.6	0.0	198.4	60.9	102.8	37.6	143.1	680.4	26.4
4-May	242.8	11.9	92.4	36.9	35.2	1.4	63.9	71.0	81.0	5.5	0.0	161.1	54.9	96.2	36.8	140.4	679.2	25.7
5-May	228.6	10.6	83.7	34.6	36.1	1.4	72.2	76.3	77.4	5.4	0.0	158.4	47.4	90.7	38.3	156.5	602.5	20.9
6-May	229.8	10.4	74.0	32.2	48.1	1.4	69.0	80.0	73.8	6.2	0.0	161.4	45.0	88.6	36.3	162.2	564.8	21.7
7-May	231.0	10.3	66.7	29.9	62.3	1.2	63.5	74.3	71.9	5.2	0.0	161.6	43.5	84.2	35.4	145.4	504.9	21.0
8-May	215.3	10.1	65.0	30.8	50.3	1.1	63.7	72.0	70.9	4.5	0.0	159.9	39.6	82.0	33.3	126.4	464.4	19.2
9-May	153.8	9.5	66.8	26.4	47.9	0.8	61.6	66.2	65.1	3.9	0.0	155.4	35.9	85.3	28.8	136.6	423.9	14.9
10-May	154.6	9.0	69.6	22.0	43.7	0.4	60.7	66.5	58.6	3.0	0.0	146.2	30.7	118.6	26.6	132.7	411.2	16.8
11-May	136.1	8.6	69.0	20.9	48.2	0.2	56.3	69.3	60.0	2.1	0.0	140.0	27.2	108.7	24.4	126.2	382.5	16.3
12-May	127.1	8.4	71.8	20.7	40.1	0.0	57.6	61.7	54.6	1.2	0.0	132.8	26.7	93.2	24.6	117.3	332.3	13.5
13-May	127.7	9.2	80.9	20.6	42.7	0.0	53.1	61.9	55.9	0.6	0.0	124.8	24.8	87.7	23.6	107.8	327.4	10.8
14-May	148.0	9.9	83.5	22.6	39.8	0.0	53.3	62.1	50.6	0.1	0.0	116.0	26.4	82.1	22.5	102.0	299.0	9.4
15-May	148.7	10.6	79.7	22.4	40.5	0.0	52.3	59.7	49.8	0.0	0.0	108.1	24.5	80.0	21.4	95.5	288.1	9.1
16-May	145.1	8.7	74.8	20.3	35.4	0.0	49.0	54.6	46.2	0.0	0.0	102.2	24.0	80.0	19.1	90.0	276.7	9.4
17-May	140.7	8.2	68.3	19.5	25.3	0.0	46.5	52.1	48.1	0.0	0.0	100.8	22.4	79.0	19.0	90.2	246.2	8.9

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18-May	127.3	7.6	64.0	15.5	21.2	0.0	42.7	57.6	55.5	0.0	0.0	96.8	20.5	73.5	17.6	81.2	171.0	6.8
19-May	123.8	7.0	62.7	12.6	24.8	0.0	38.6	60.4	52.0	0.0	0.0	94.6	20.7	69.1	17.6	71.6	229.9	6.9
20-May	121.3	6.5	59.5	11.6	26.4	0.0	36.9	55.2	57.3	0.0	0.0	88.0	24.8	64.7	20.0	72.7	222.6	7.8
21-May	125.7	6.3	58.3	12.8	29.8	0.0	36.4	55.4	49.0	0.0	0.0	83.2	33.3	59.2	19.9	71.9	220.1	5.9
22-May	126.6	6.2	55.0	13.0	25.8	0.0	37.2	52.8	50.7	0.0	0.0	83.7	24.3	60.4	17.3	70.0	212.4	6.7
23-May	124.1	5.9	51.8	14.2	25.6	0.0	38.0	50.3	46.0	0.0	0.0	81.6	16.2	55.9	14.8	69.9	204.5	6.1
24-May	107.5	5.6	50.6	13.2	23.5	0.0	36.0	45.9	50.4	0.0	0.0	78.7	14.0	54.9	13.5	69.7	198.9	5.6
25-May	88.3	5.5	50.5	12.3	21.4	0.0	35.2	46.1	49.0	0.0	0.0	74.0	14.5	58.3	12.2	72.3	190.6	4.2
26-May	85.4	6.5	46.2	11.2	22.9	0.0	34.5	41.7	44.4	0.0	0.0	72.8	16.0	58.4	12.2	69.9	182.0	4.2
27-May	82.4	6.2	45.1	11.4	20.9	0.0	36.7	41.8	48.9	0.0	0.0	72.5	18.6	59.5	10.9	69.5	175.8	3.4
28-May	80.6	5.3	45.0	11.2	19.0	0.0	34.3	41.9	39.6	0.0	0.0	70.4	17.1	64.1	10.6	68.9	172.2	2.0
29-May	80.0	4.2	43.8	11.4	18.8	0.0	33.4	40.2	40.7	0.0	0.0	71.0	14.3	59.7	9.5	69.3	165.8	1.5
30-May	79.4	3.6	42.7	11.7	16.8	0.0	34.0	40.3	36.2	0.0	0.0	65.6	15.9	58.6	8.1	70.8	161.9	1.2
31-May	78.7	3.2	39.5	11.6	16.3	0.0	28.1	37.6	37.1	0.0	0.0	63.6	14.0	54.1	6.5	68.9	160.8	0.9
1-Jun	79.2	3.4	34.3	10.4	16.3	0.0	32.3	36.0	31.1	0.0	0.0	61.1	10.4	55.3	5.8	66.2	161.8	0.7
2-Jun	79.8	2.9	35.1	9.8	14.2	0.0	29.7	36.2	36.9	0.0	0.0	60.3	9.5	53.1	5.2	66.8	159.7	0.5
3-Jun	79.0	2.0	33.9	9.5	14.2	0.0	32.3	32.6	37.9	0.0	0.0	59.6	12.7	45.2	3.8	70.9	160.3	0.3
4-Jun	79.5	1.0	31.8	8.9	13.2	0.0	31.3	34.7	33.7	0.0	0.0	54.0	11.8	55.5	2.6	63.5	157.7	0.2
5-Jun	78.8	0.2	30.6	6.7	13.1	0.0	30.2	33.0	37.3	0.0	0.0	49.3	12.0	48.7	1.8	62.9	154.9	0.1
6-Jun	78.0	0.0	29.5	7.4	13.1	0.0	29.0	28.4	35.5	0.0	0.0	44.7	10.0	51.0	1.4	61.1	148.5	0.1
7-Jun	77.2	0.0	30.3	7.5	12.4	0.0	25.8	26.7	39.2	0.0	0.0	48.7	8.7	45.4	1.2	58.1	148.3	0.0
8-Jun	77.7	0.0	27.2	6.6	11.4	0.0	24.4	25.9	40.2	0.0	0.0	54.9	9.2	42.1	0.5	55.0	148.0	0.0
9-Jun	70.4	0.0	27.0	6.7	12.3	0.0	24.9	26.0	32.3	0.0	0.0	56.4	8.2	39.8	0.4	51.9	147.6	0.0
10-Jun	70.8	0.0	27.9	5.7	10.7	0.0	25.5	26.1	31.6	0.0	0.0	54.2	7.0	37.6	0.5	49.9	147.0	0.0
11-Jun	71.3	0.0	25.8	5.7	10.6	0.0	23.9	27.2	29.2	0.0	0.0	49.7	7.3	37.6	0.3	47.9	142.7	0.0
12-Jun	71.7	0.0	25.7	5.3	9.6	0.0	22.2	26.4	29.9	0.0	0.0	44.7	7.7	37.6	0.0	47.1	141.8	0.0
13-Jun	72.1	0.0	27.4	4.0	9.6	0.0	22.7	22.6	28.9	0.0	0.0	41.9	7.2	35.4	0.0	45.0	140.7	0.0
14-Jun	68.6	0.0	24.4	4.1	8.3	0.0	22.9	24.7	29.5	0.0	0.0	41.3	5.1	35.4	0.0	42.9	139.5	0.0
15-Jun	69.0	0.0	23.4	4.6	7.0	0.0	22.4	24.8	26.8	0.0	0.0	43.4	4.8	30.9	0.0	40.7	138.2	0.0
16-Jun	62.6	0.0	22.3	4.2	5.2	0.0	24.1	25.0	25.6	0.0	0.0	38.7	5.4	26.3	0.0	38.5	136.8	0.0
17-Jun	63.2	0.0	20.6	4.1	4.3	0.0	20.5	24.8	26.8	0.0	0.0	35.6	4.9	21.8	0.0	37.3	129.2	0.0
18-Jun	54.0	0.0	19.8	4.1	2.7	0.0	17.5	26.6	26.2	0.0	0.0	30.2	4.7	20.6	0.0	36.0	121.8	0.0
19-Jun	54.5	0.0	20.9	4.0	2.1	0.0	15.9	29.3	24.1	0.0	0.0	30.3	4.8	19.5	0.0	38.8	114.7	0.0
20-Jun	57.8	0.0	19.2	3.2	0.6	0.0	14.4	31.1	25.1	0.0	0.0	29.6	5.2	20.6	0.0	40.1	107.7	0.0
21-Jun	51.2	0.0	18.4	2.2	0.4	0.0	13.3	28.9	29.2	0.0	0.0	30.4	3.1	14.9	0.0	40.0	107.7	0.0
22-Jun	48.8	0.0	18.5	1.2	0.2	0.0	11.6	25.8	28.5	0.0	0.0	26.4	1.2	12.6	0.0	38.1	107.5	0.0
23-Jun	46.3	0.0	17.7	0.6	0.2	0.0	10.6	25.7	26.4	0.0	0.0	23.7	1.5	12.6	0.0	36.1	100.8	0.0
24-Jun	39.4	0.0	16.8	0.2	0.1	0.0	9.4	21.7	25.7	0.0	0.0	28.5	1.0	10.9	0.0	35.5	94.3	0.0
25-Jun	44.1	0.0	15.0	0.0	0.1	0.0	8.0	21.5	22.3	0.0	0.0	27.5	0.8	9.7	0.0	34.8	88.0	0.0
26-Jun	40.0	0.0	14.1	0.0	0.0	0.0	6.8	18.6	20.4	0.0	0.0	28.1	0.9	9.0	0.0	34.1	82.0	0.0
27-Jun	46.7	0.0	14.2	0.0	0.0	0.0	5.6	18.5	21.2	0.0	0.0	28.8	0.9	8.1	0.0	33.2	81.6	0.0
28-Jun	49.4	0.0	14.3	0.0	0.0	0.0	4.3	16.5	18.1	0.0	0.0	32.2	0.6	7.8	0.0	32.2	78.3	0.0
29-Jun	55.5	0.0	14.4	0.0	0.0	0.0	3.0	15.5	13.8	0.0	0.0	29.1	0.5	7.3	0.0	31.1	72.6	0.0
30-Jun	61.7	0.0	14.5	0.0	0.0	0.0	1.3	13.5	11.5	0.0	0.0	28.8	0.2	7.8	0.0	34.0	74.2	0.0
1-Jul	64.0	0.0	14.7	0.0	0.0	0.0	0.0	12.6	11.3	0.0	0.0	29.5	0.0	8.1	0.0	39.7	66.8	0.0
2-Jul	55.6	0.0	13.7	0.0	0.0	0.0	0.0	9.8	10.1	0.0	0.0	28.1	0.0	10.0	0.0	39.3	61.9	0.0
3-Jul	54.8	0.0	13.8	0.0	0.0	0.0	0.0	9.7	9.1	0.0	0.0	27.7	0.0	16.0	0.0	38.7	57.3	0.0

Station Name **SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR**

Param **UNIMPAIRED**
 Statistic Mean

WATER YEAR

Day	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
4-Jul	56.6	0.0	13.9	0.0	0.0	0.0	0.0	8.8	9.0	0.0	0.0	27.3	0.0	18.3	0.0	35.6	58.9	0.0
5-Jul	46.7	0.0	12.9	0.0	0.0	0.0	0.0	8.7	8.1	0.0	0.0	24.7	0.0	12.6	0.0	34.5	58.1	0.0
6-Jul	42.1	0.0	11.8	0.0	0.0	0.0	0.0	6.9	7.3	0.0	0.0	24.1	0.0	9.6	0.0	33.2	57.3	0.0
7-Jul	18.0	0.0	12.9	0.0	0.0	0.0	0.0	6.9	7.2	0.0	0.0	22.4	0.0	8.0	0.0	29.2	52.7	0.0
8-Jul	15.3	0.0	12.9	0.0	0.0	0.0	0.0	6.8	7.1	0.0	0.0	21.7	0.0	7.3	0.0	27.4	46.6	0.0
9-Jul	15.8	0.0	11.8	0.0	0.0	0.0	0.0	6.8	7.7	0.0	0.0	21.0	0.0	7.7	0.0	24.1	42.5	0.0
10-Jul	16.2	0.0	11.8	0.0	0.0	0.0	0.0	7.7	5.7	0.0	0.0	19.0	0.0	7.9	0.0	21.4	38.5	0.0
11-Jul	9.0	0.0	11.8	0.0	0.0	0.0	0.0	9.4	4.3	0.0	0.0	20.6	0.0	8.7	0.0	19.4	34.8	0.0
12-Jul	9.2	0.0	10.7	0.0	0.0	0.0	0.0	9.4	4.2	0.0	0.0	27.1	0.0	4.6	0.0	17.5	32.5	0.0
13-Jul	9.5	0.0	10.6	0.0	0.0	0.0	0.0	7.7	4.1	0.0	0.0	21.4	0.0	4.5	0.0	15.4	29.0	0.0
14-Jul	8.6	0.0	10.1	0.0	0.0	0.0	0.0	6.8	4.1	0.0	0.0	21.7	0.0	4.6	0.0	12.6	25.7	0.0
15-Jul	7.6	0.0	9.5	0.0	0.0	0.0	0.0	5.3	4.0	0.0	0.0	24.7	0.0	4.6	0.0	10.9	23.6	0.0
16-Jul	3.1	0.0	8.8	0.0	0.0	0.0	0.0	5.3	3.6	0.0	0.0	22.5	0.0	3.1	0.0	9.1	21.5	0.0
17-Jul	2.7	0.0	8.4	0.0	0.0	0.0	0.0	4.5	3.0	0.0	0.0	21.0	0.0	2.7	0.0	6.1	22.9	0.0
18-Jul	2.3	0.0	7.6	0.0	0.0	0.0	0.0	3.3	3.3	0.0	0.0	18.2	0.0	2.4	0.0	6.6	24.3	0.0
19-Jul	1.9	0.0	7.2	0.0	0.0	0.0	0.0	2.7	3.3	0.0	0.0	16.7	0.0	2.1	0.0	7.0	24.6	0.0
20-Jul	1.5	0.0	6.4	0.0	0.0	0.0	0.0	2.2	3.3	0.0	0.0	15.3	0.0	2.1	0.0	5.5	26.0	0.0
21-Jul	0.0	0.0	5.6	0.0	0.0	0.0	0.0	1.4	3.0	0.0	0.0	13.8	0.0	3.2	0.0	4.1	27.3	0.0
22-Jul	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.9	2.8	0.0	0.0	13.7	0.0	1.6	0.0	3.4	27.4	0.0
23-Jul	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.5	2.4	0.0	0.0	14.8	0.0	1.1	0.0	2.5	26.0	0.0
24-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.0	0.0	0.0	11.3	0.0	0.7	0.0	2.0	25.7	0.0
25-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	13.3	0.0	0.4	0.0	1.6	29.8	0.0
26-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	17.9	0.0	0.2	0.0	1.3	31.0	0.0
27-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	10.3	0.0	0.1	0.0	1.0	29.0	0.0
28-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	7.3	0.0	0.1	0.0	0.8	28.5	0.0
29-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	5.2	0.0	0.0	0.0	0.6	24.3	0.0
30-Jul	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	2.1	0.0	0.0	0.0	0.5	23.4	0.0
31-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.3	20.5	0.0
1-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	19.0	0.0
2-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	18.8	0.0
3-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	18.5	0.0
4-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70.9	0.0
5-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.4	0.0
6-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.7	0.0
7-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.8	0.0
8-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.7	0.0
9-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6	0.0
10-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.7	0.0
11-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9	0.0
12-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4	0.0
13-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	0.0
14-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1	0.0
15-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0
16-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	0.0
17-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	0.0
18-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.0
19-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	0.0
20-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.0
21-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4	0.0
22-Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.6	0.0

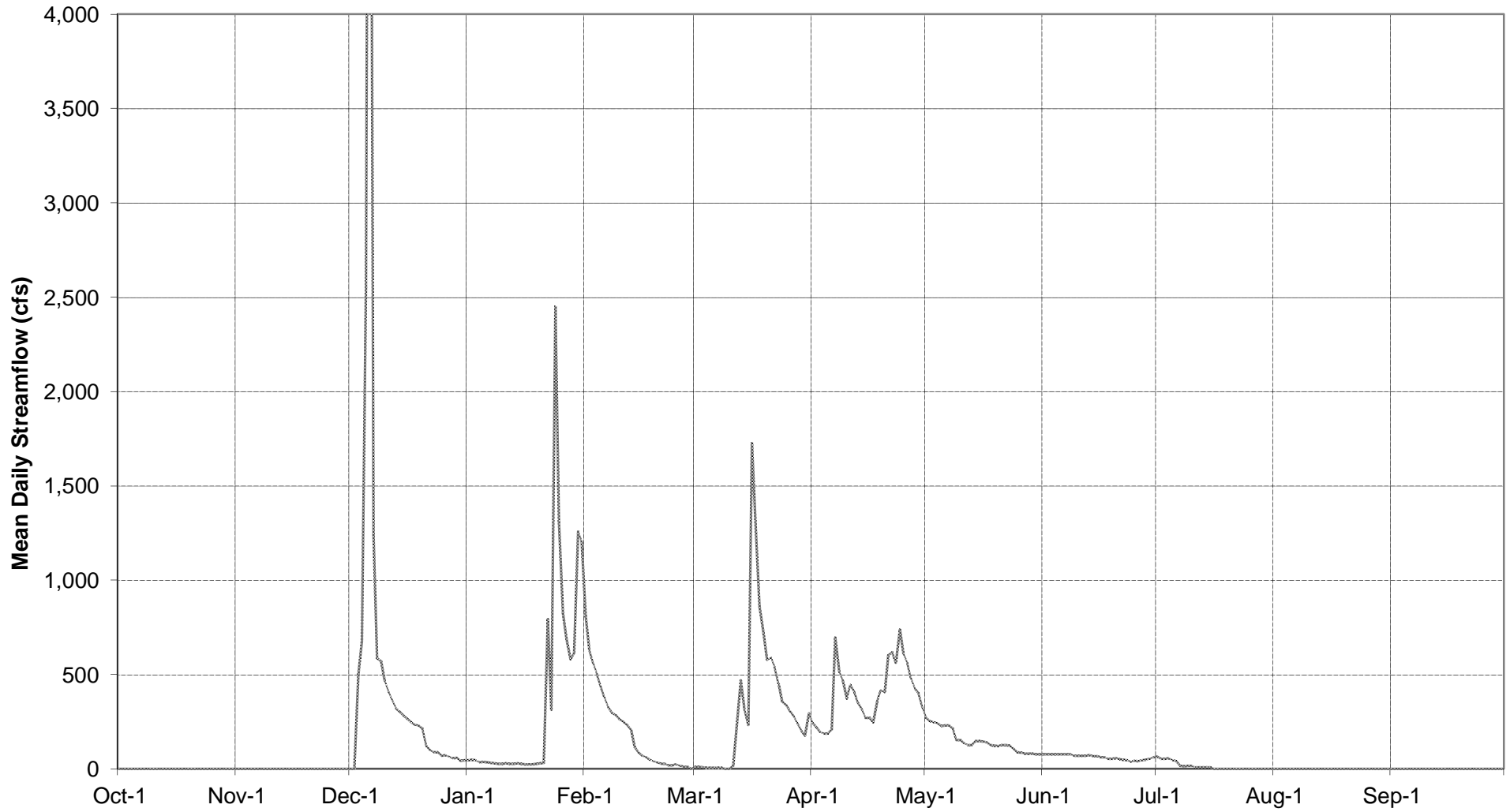
Station N Station Name SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR

Param Param UNIMPAIRED
Statistic Statistic Mean

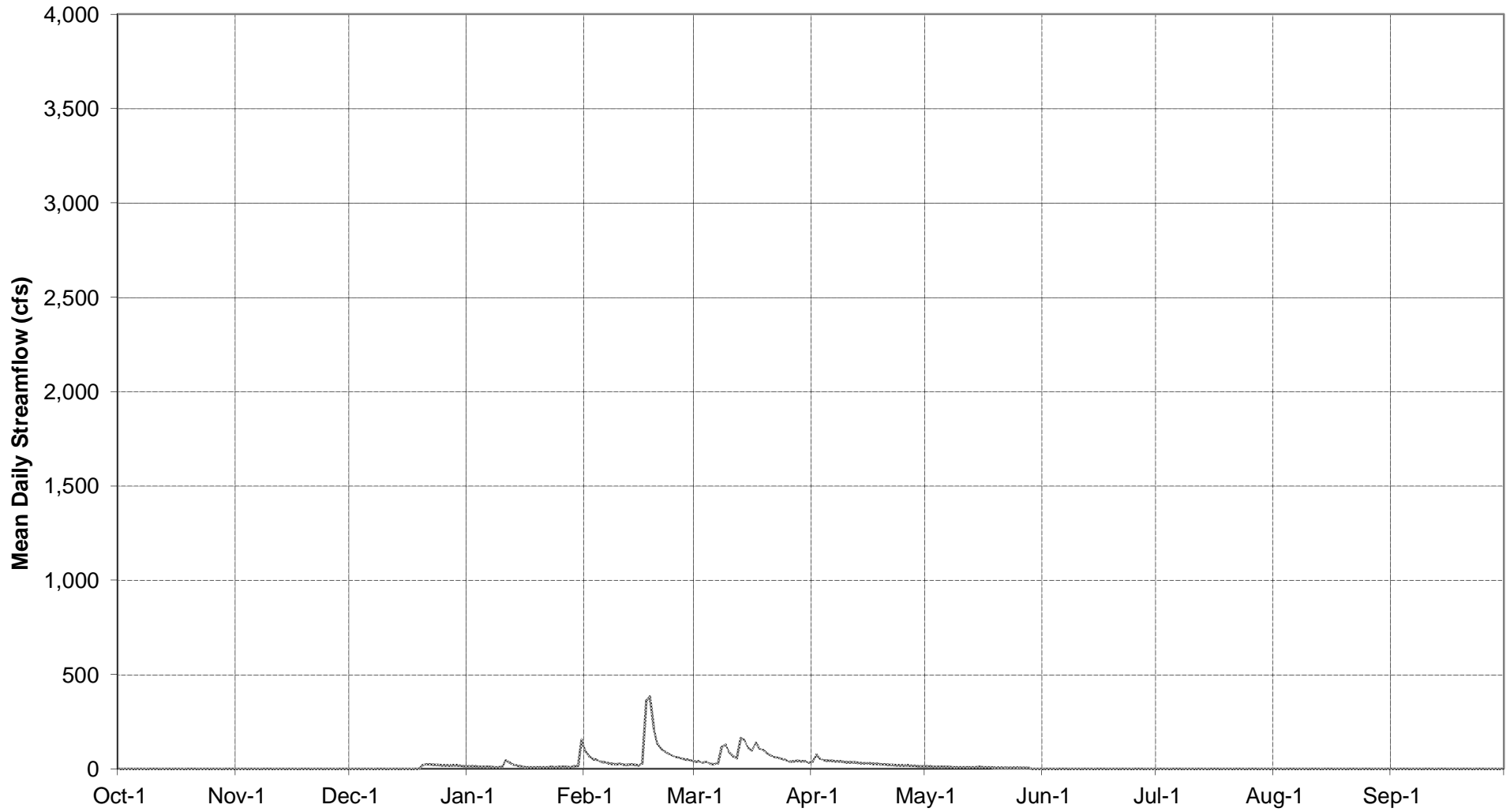
WATER YEAR

Table with columns: Day, 1985-2013 and rows: 6-Jan, 7-Jan, 8-Jan, 9-Jan, 10-Jan, 11-Jan, 12-Jan, 13-Jan, 14-Jan, 15-Jan, 16-Jan, 17-Jan, 18-Jan, 19-Jan, 20-Jan, 21-Jan, 22-Jan, 23-Jan, 24-Jan, 25-Jan, 26-Jan, 27-Jan, 28-Jan, 29-Jan, 30-Jan, 31-Jan, 1-Feb, 2-Feb, 3-Feb, 4-Feb, 5-Feb, 6-Feb, 7-Feb, 8-Feb, 9-Feb, 10-Feb, 11-Feb, 12-Feb, 13-Feb, 14-Feb, 15-Feb, 16-Feb, 17-Feb, 18-Feb, 19-Feb, 20-Feb, 21-Feb, 22-Feb, 23-Feb. Each cell contains a numerical value representing the mean for that specific day and year.

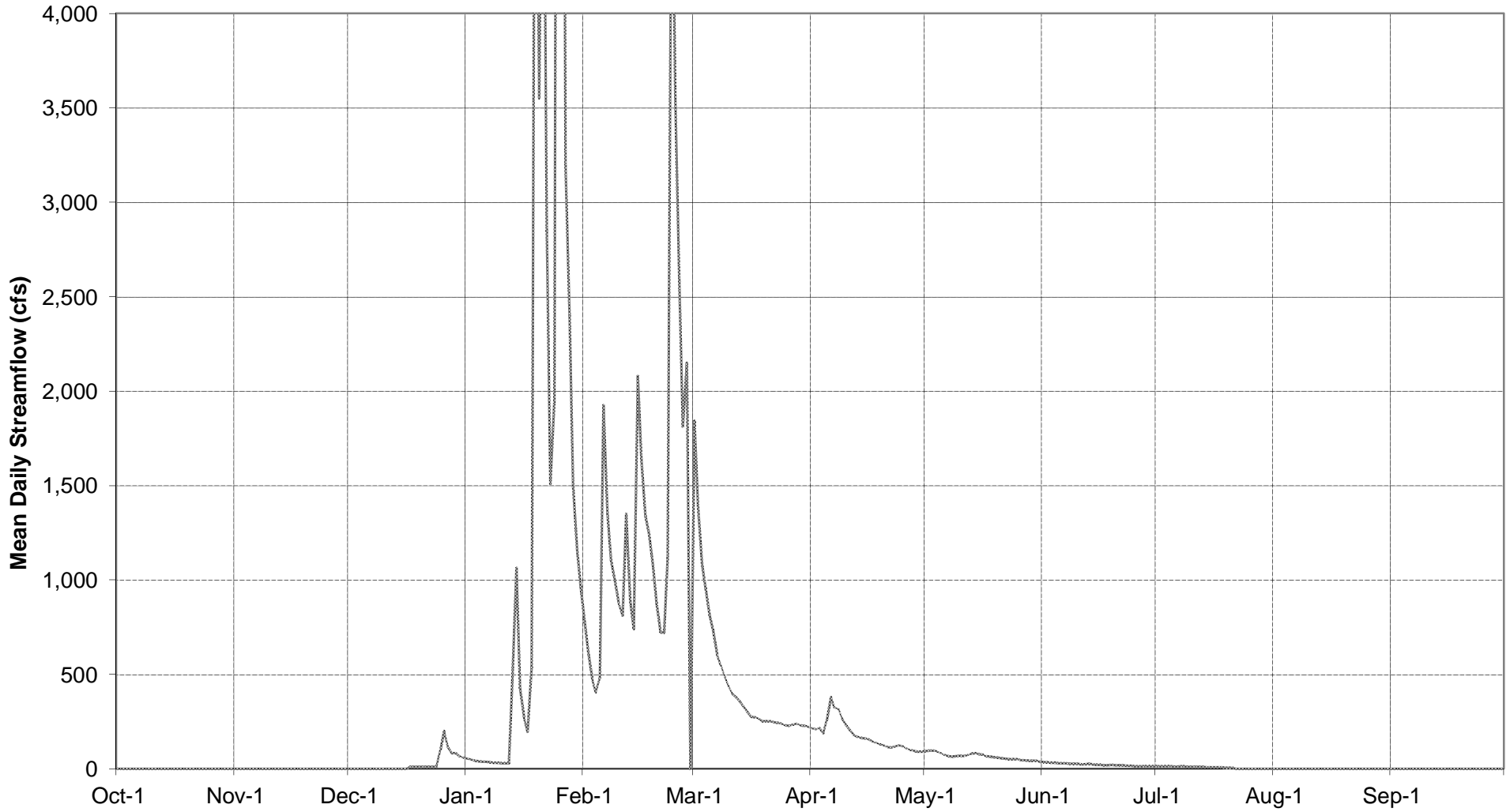
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1967



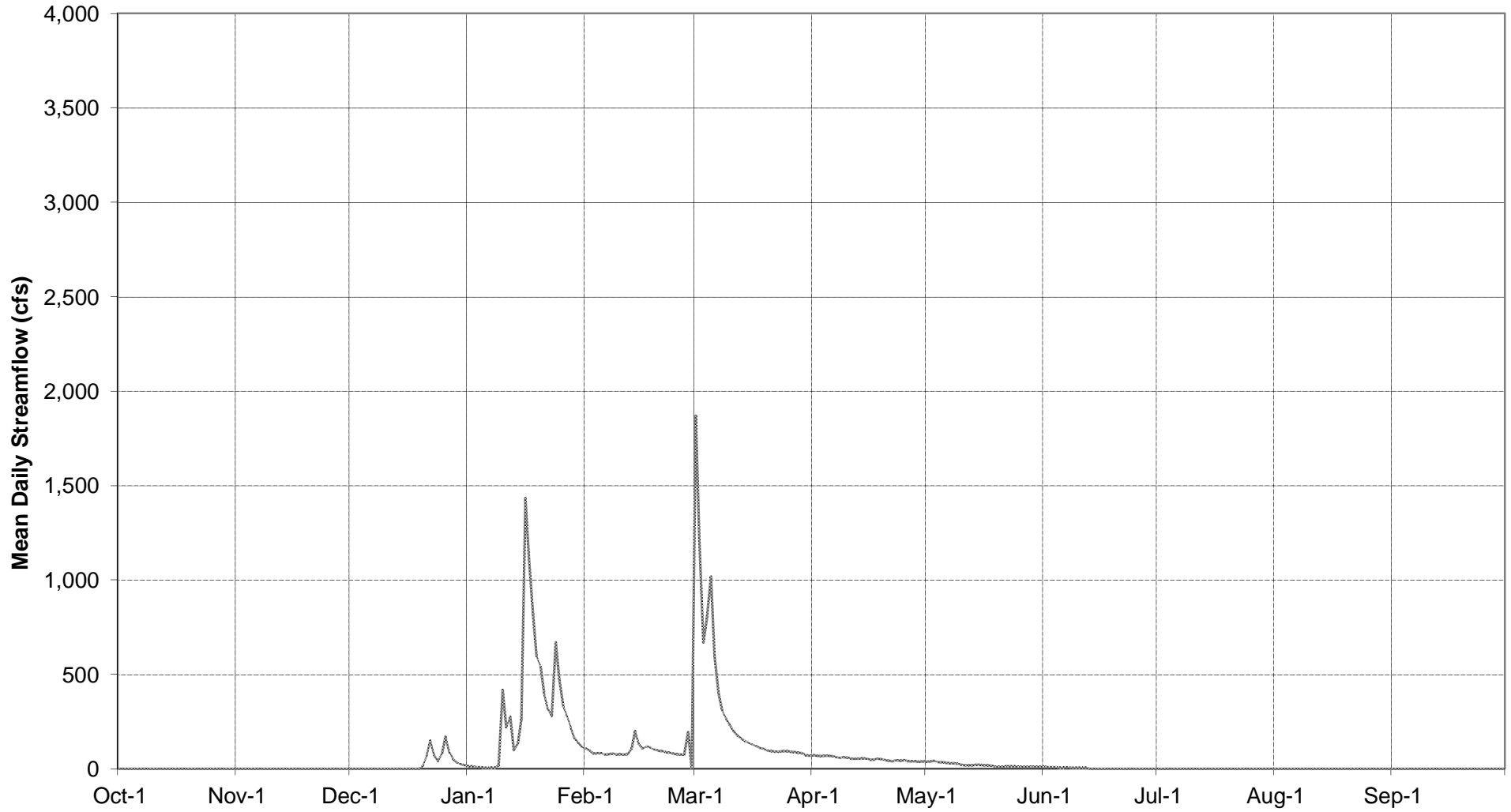
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1968



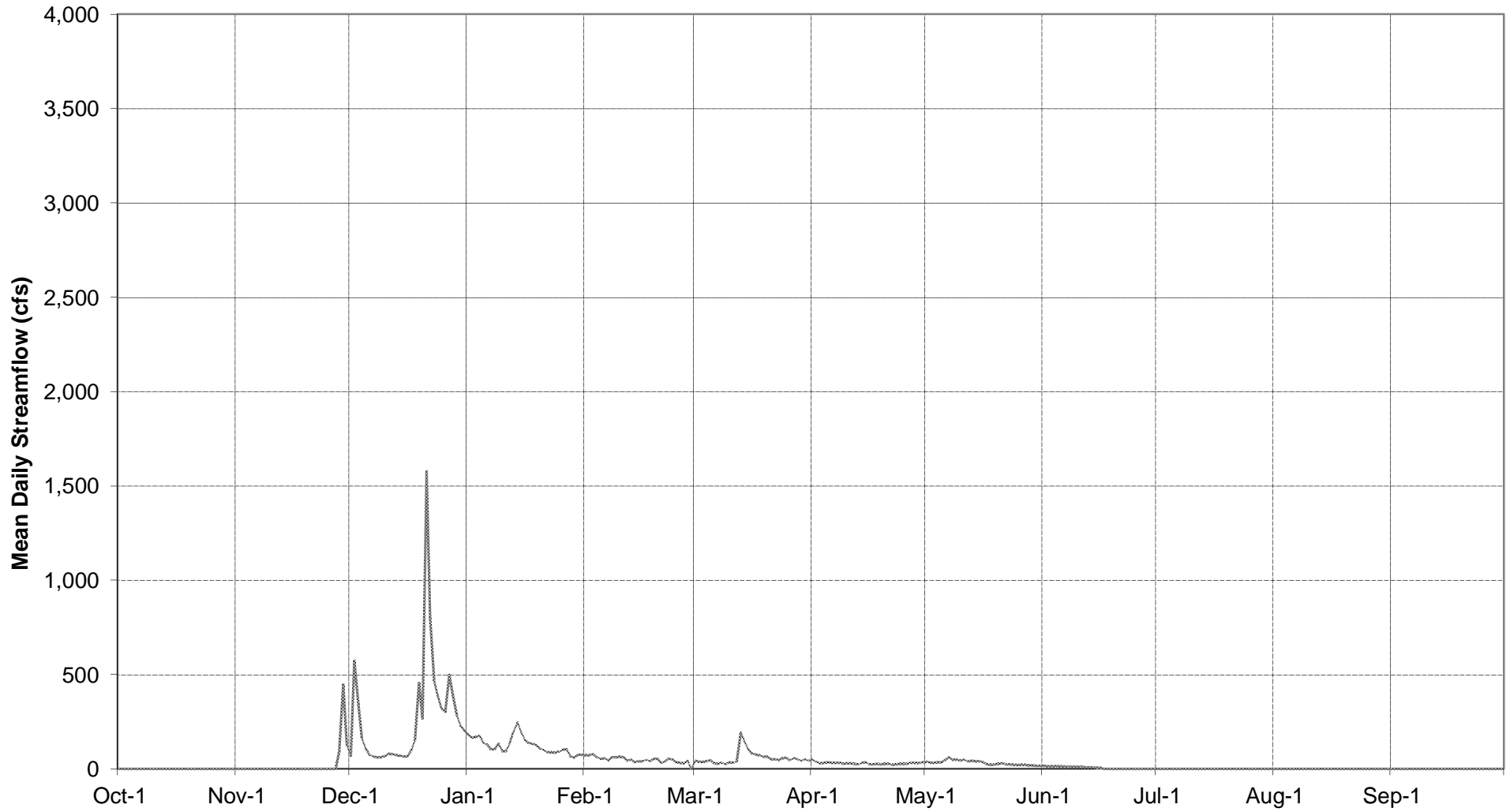
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1969



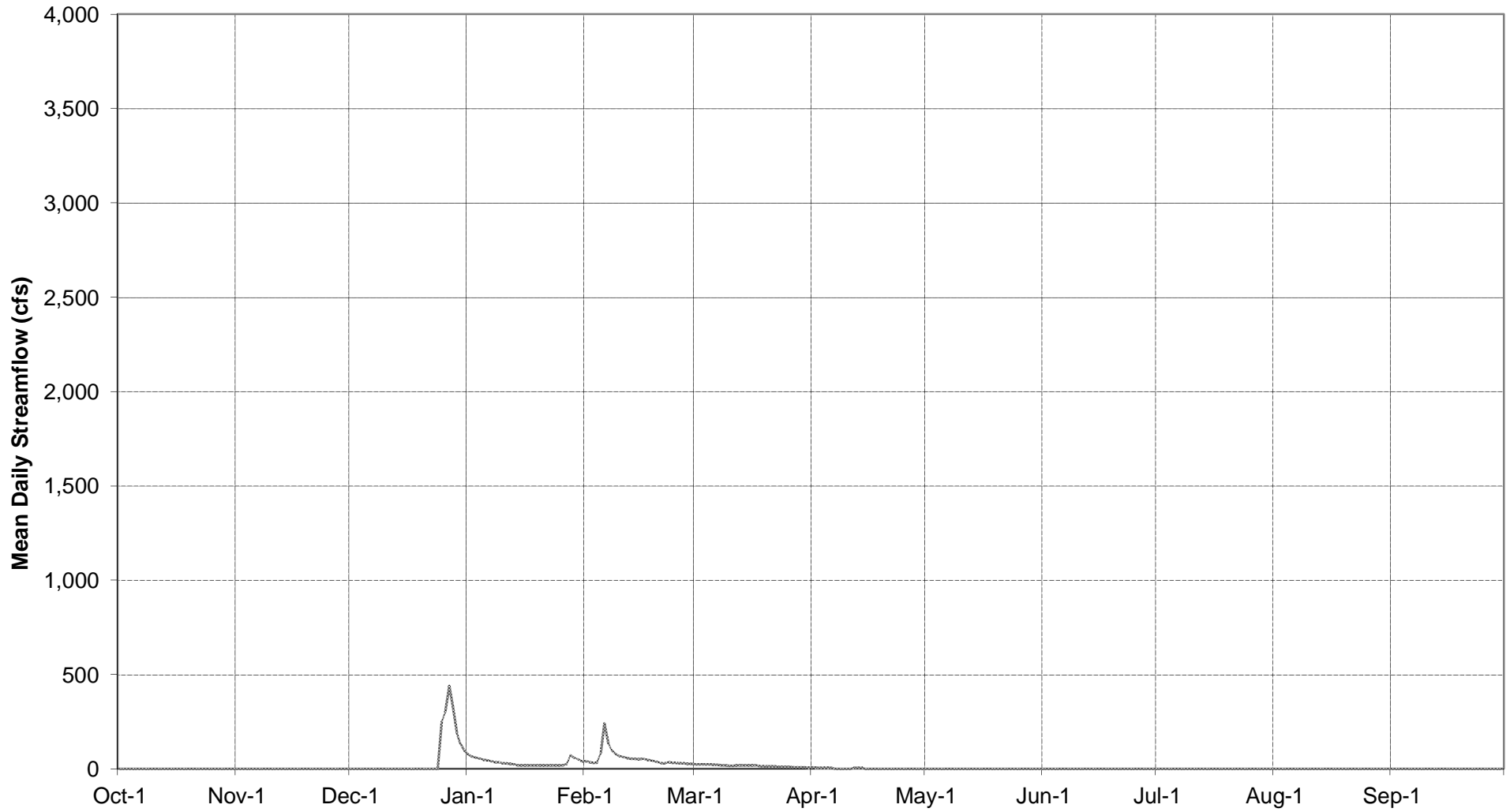
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1970**



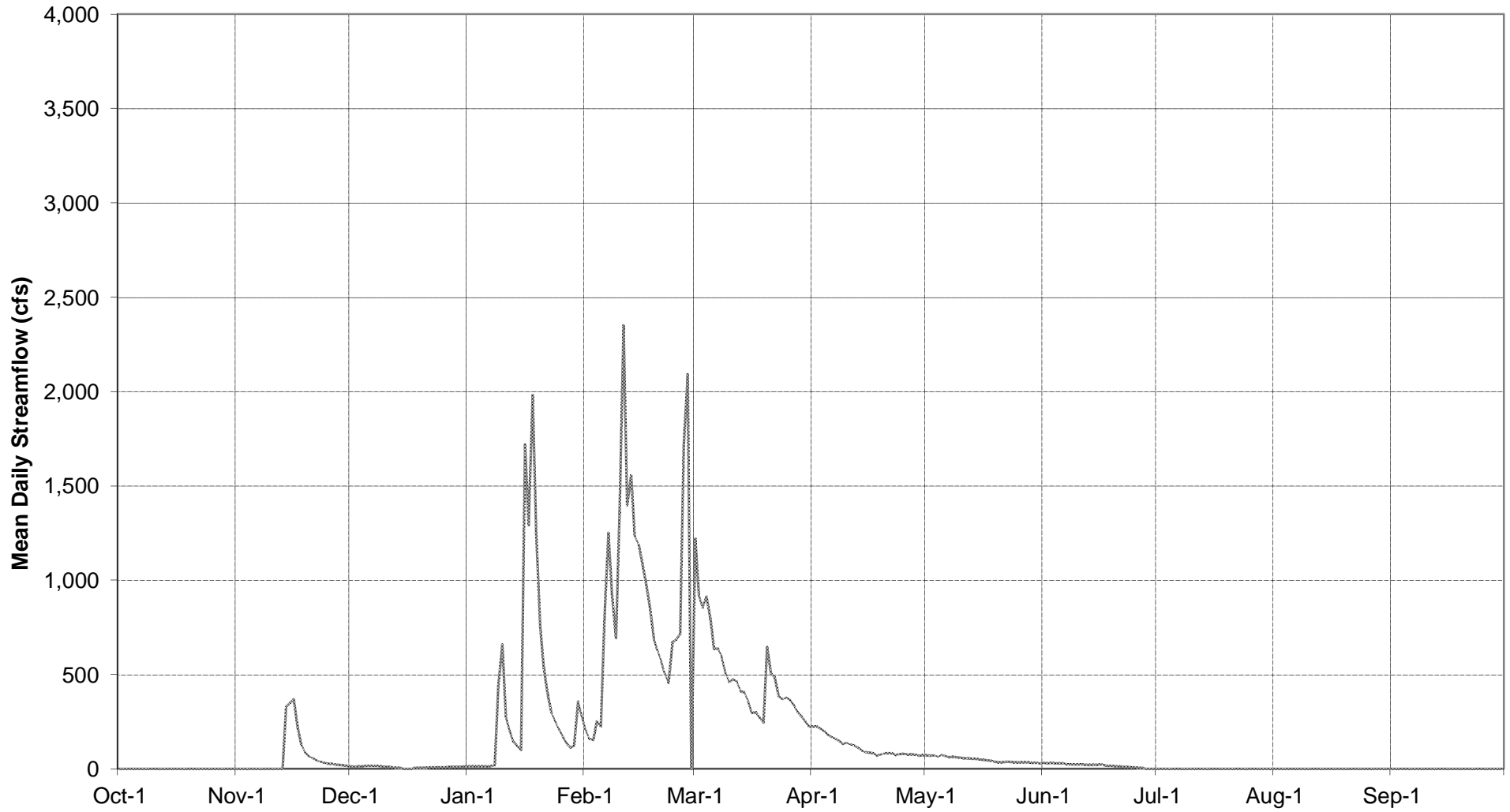
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1971**



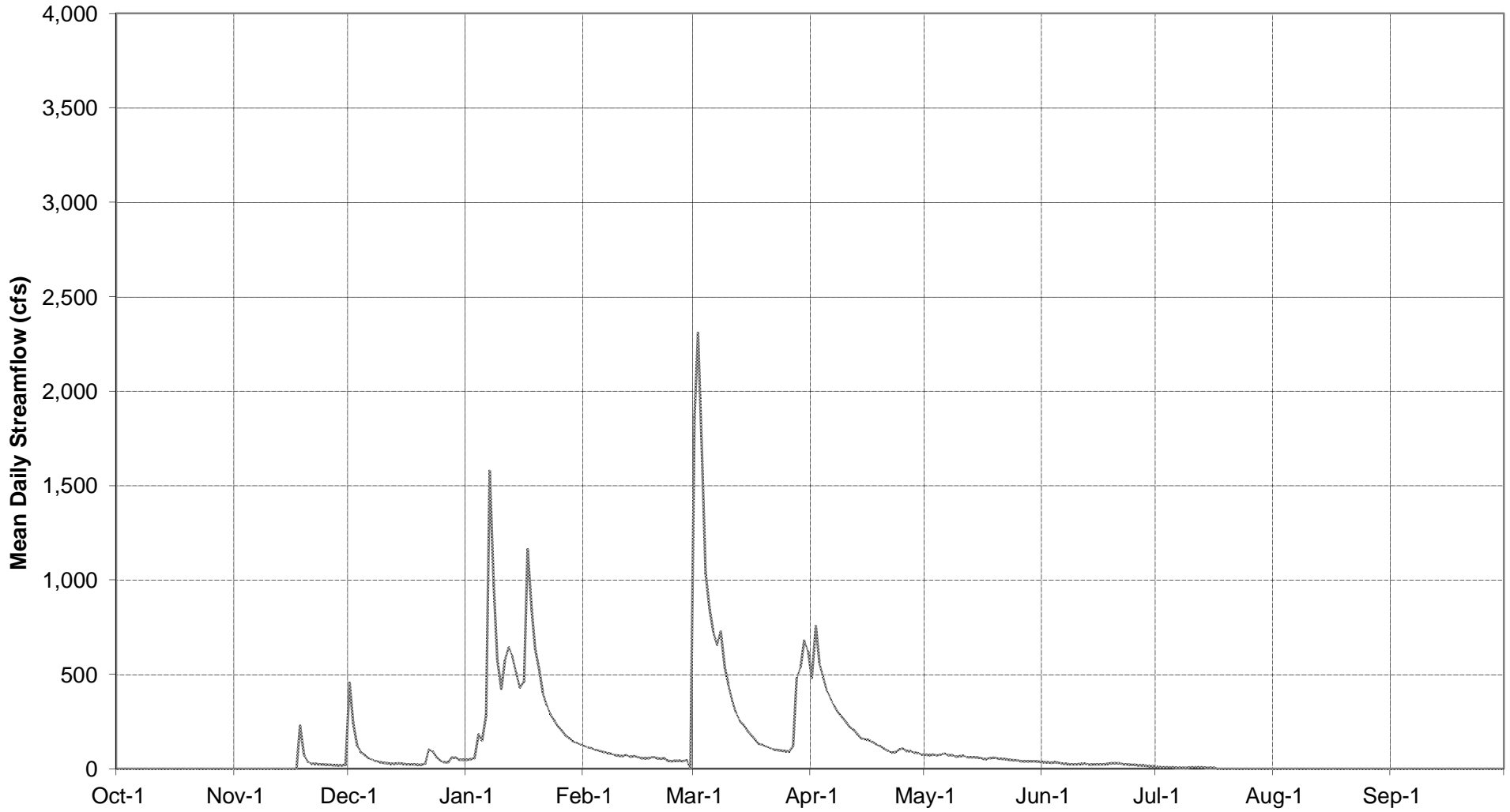
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1972**



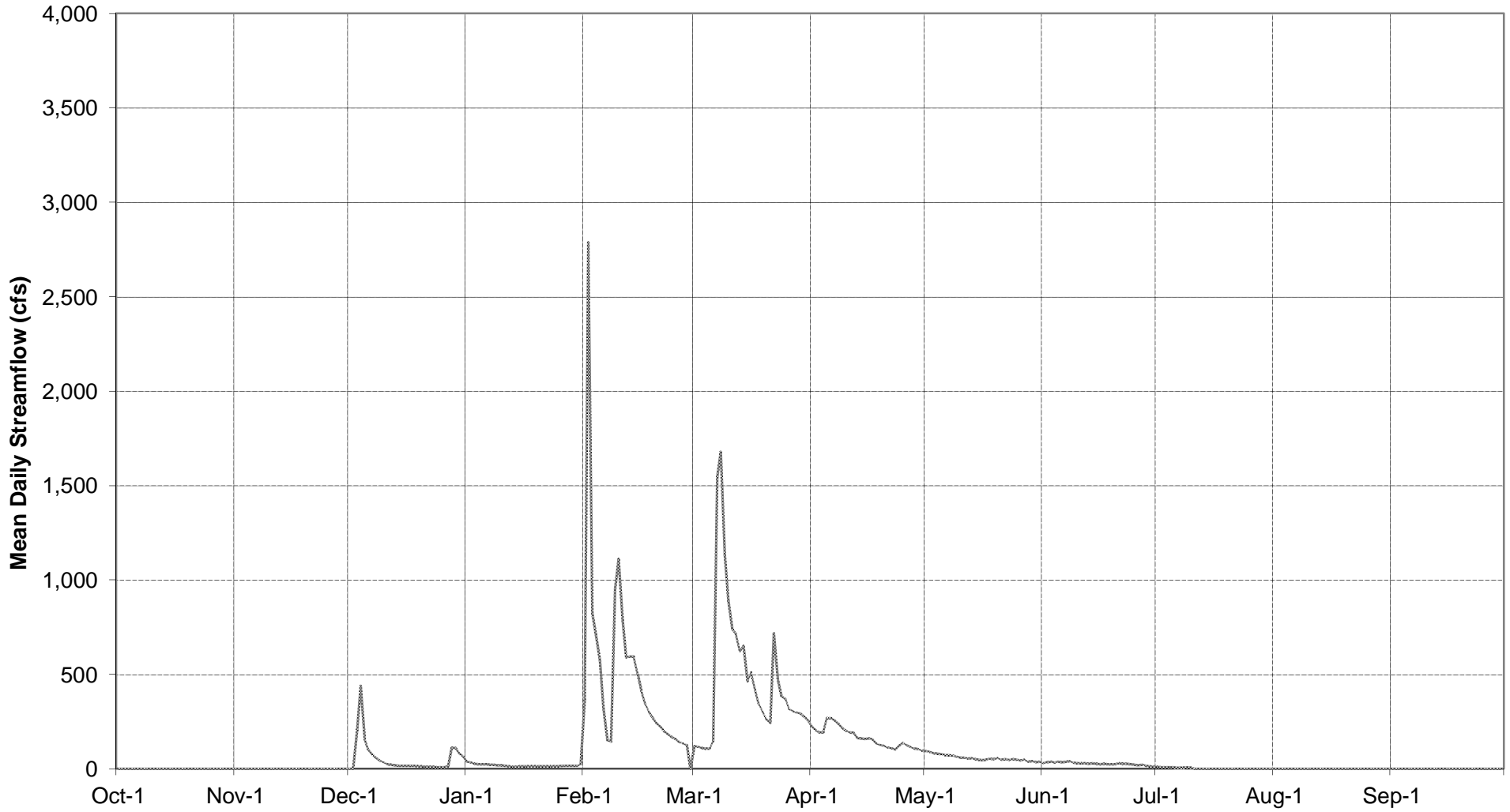
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1973



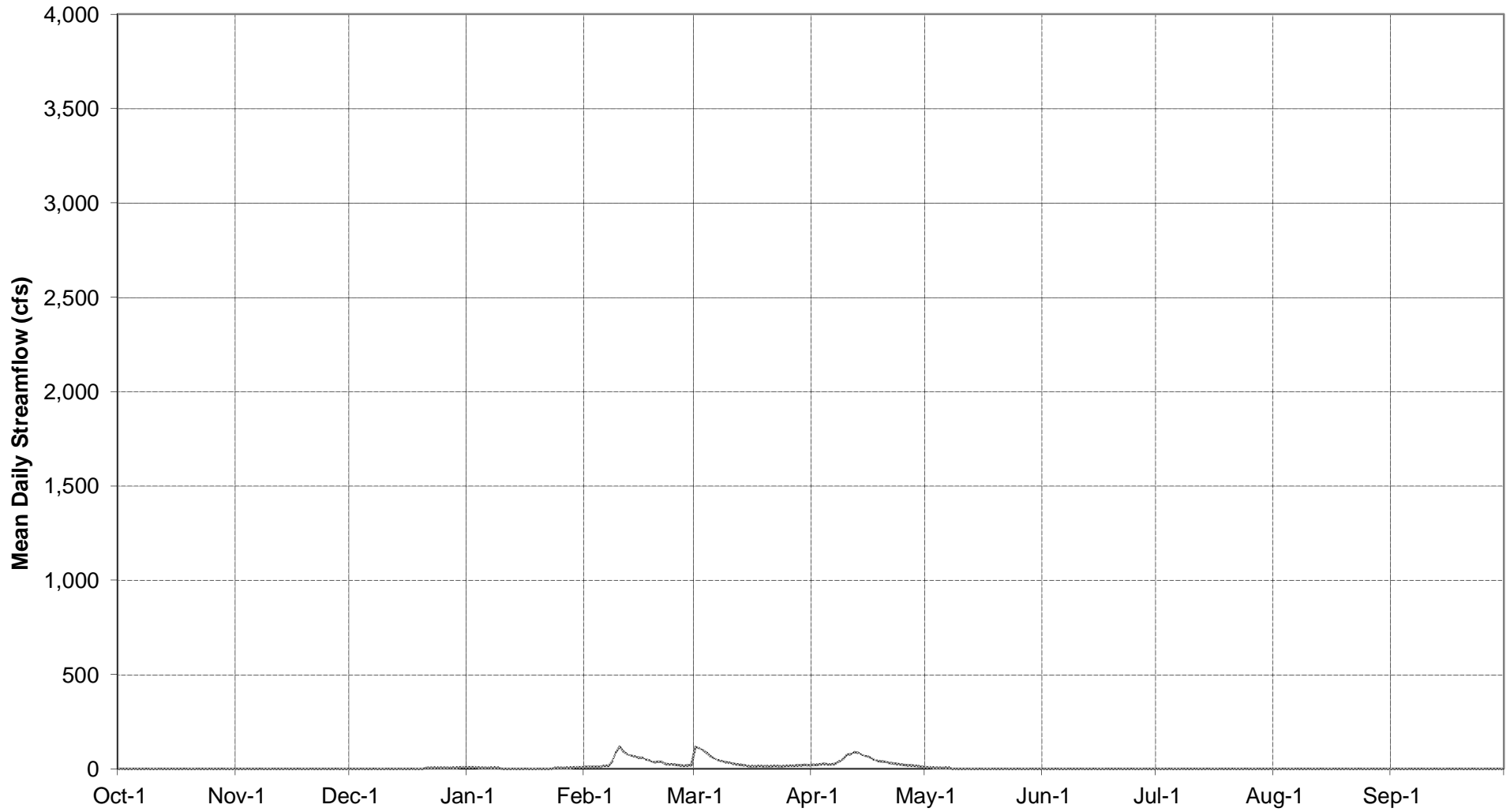
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1974**



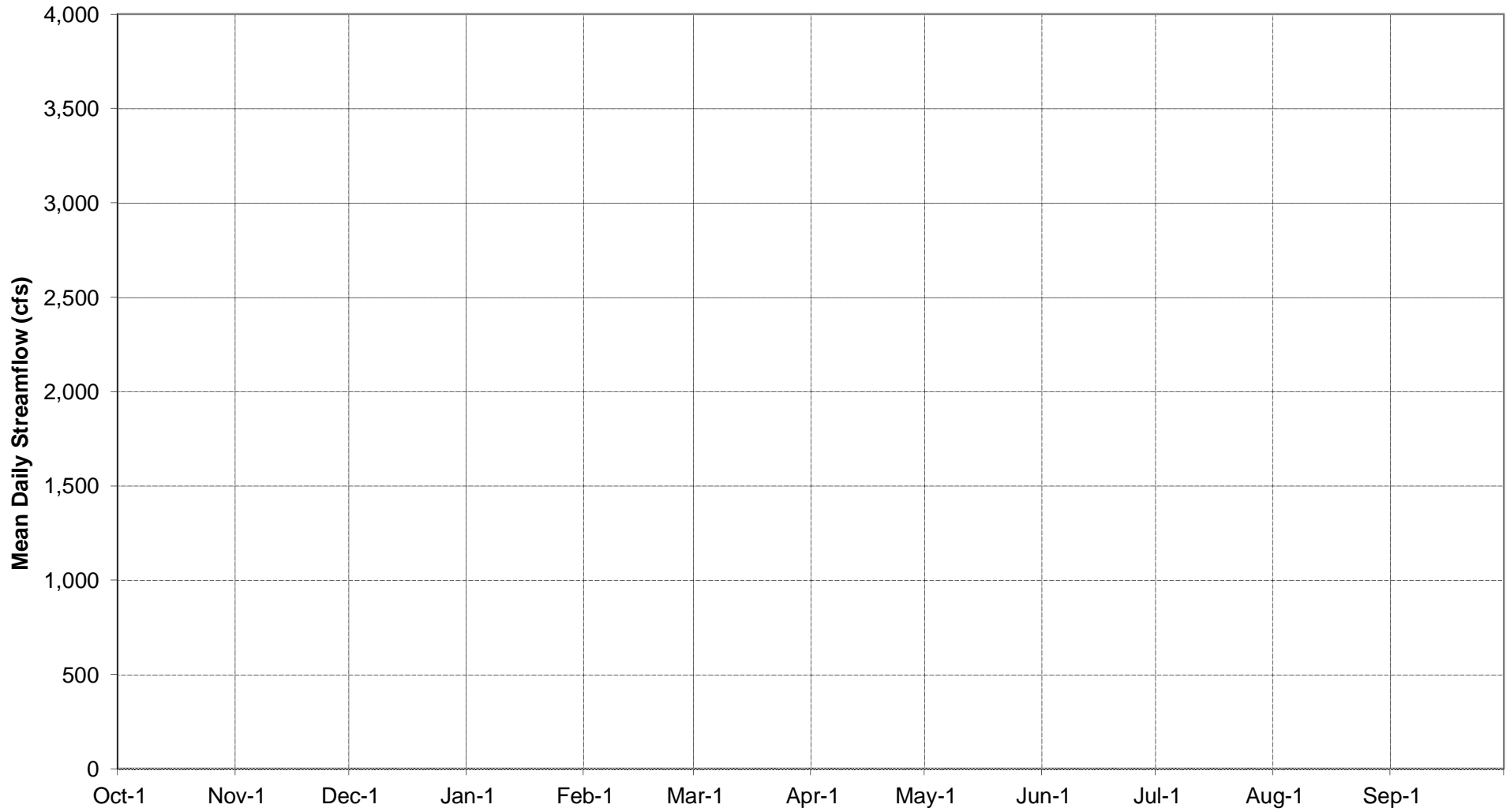
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1975



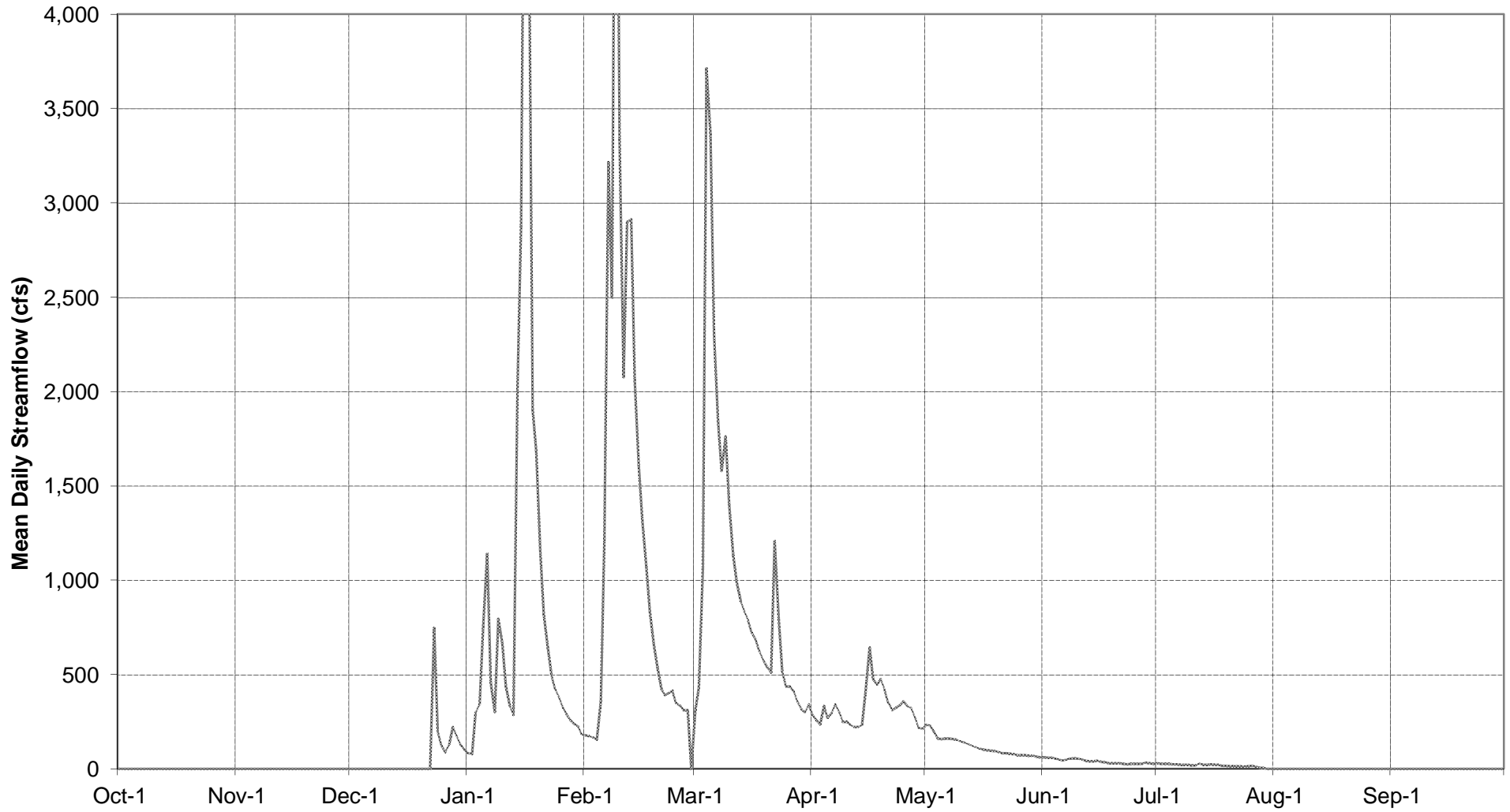
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1976**



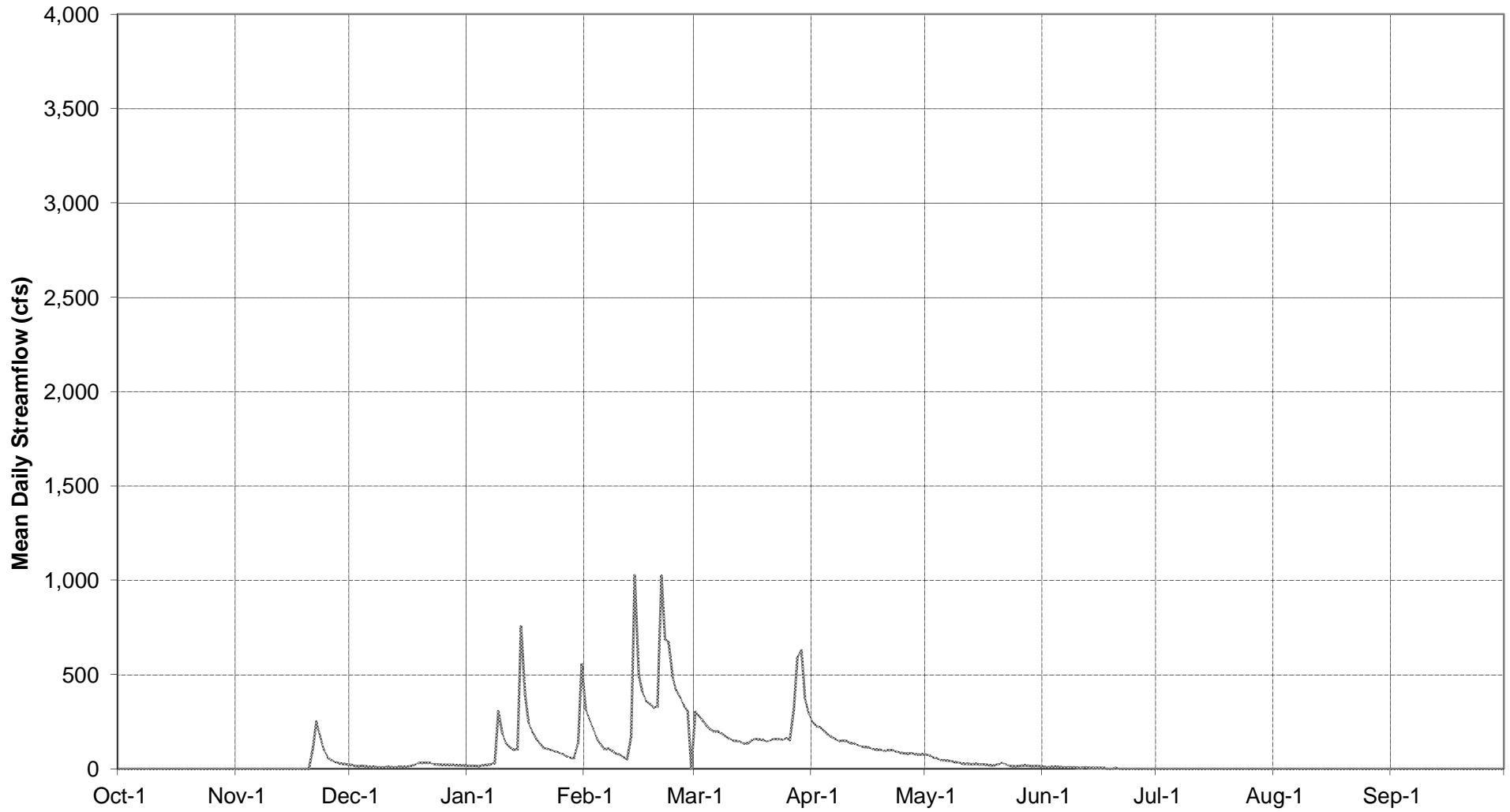
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1977**



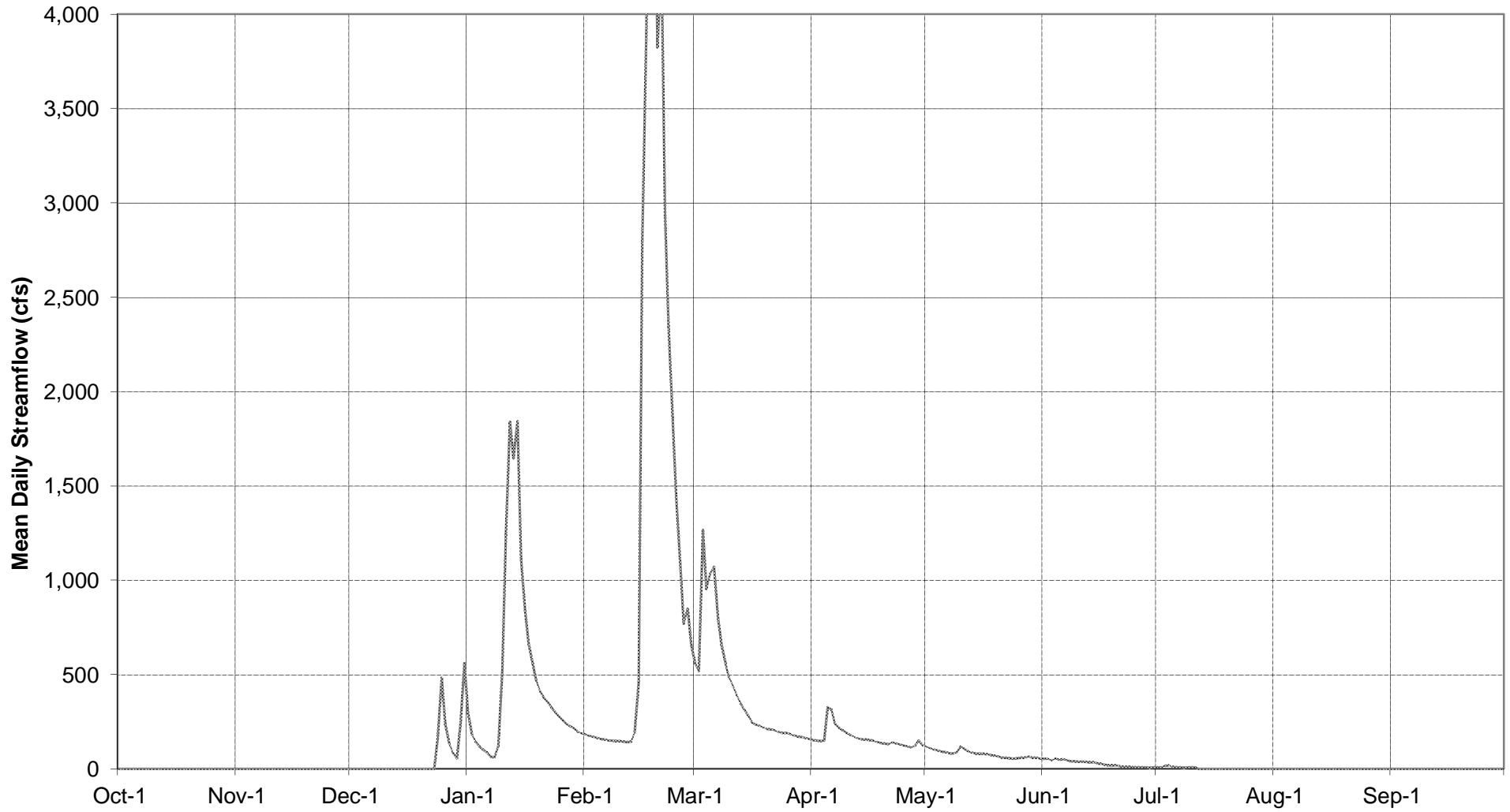
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1978



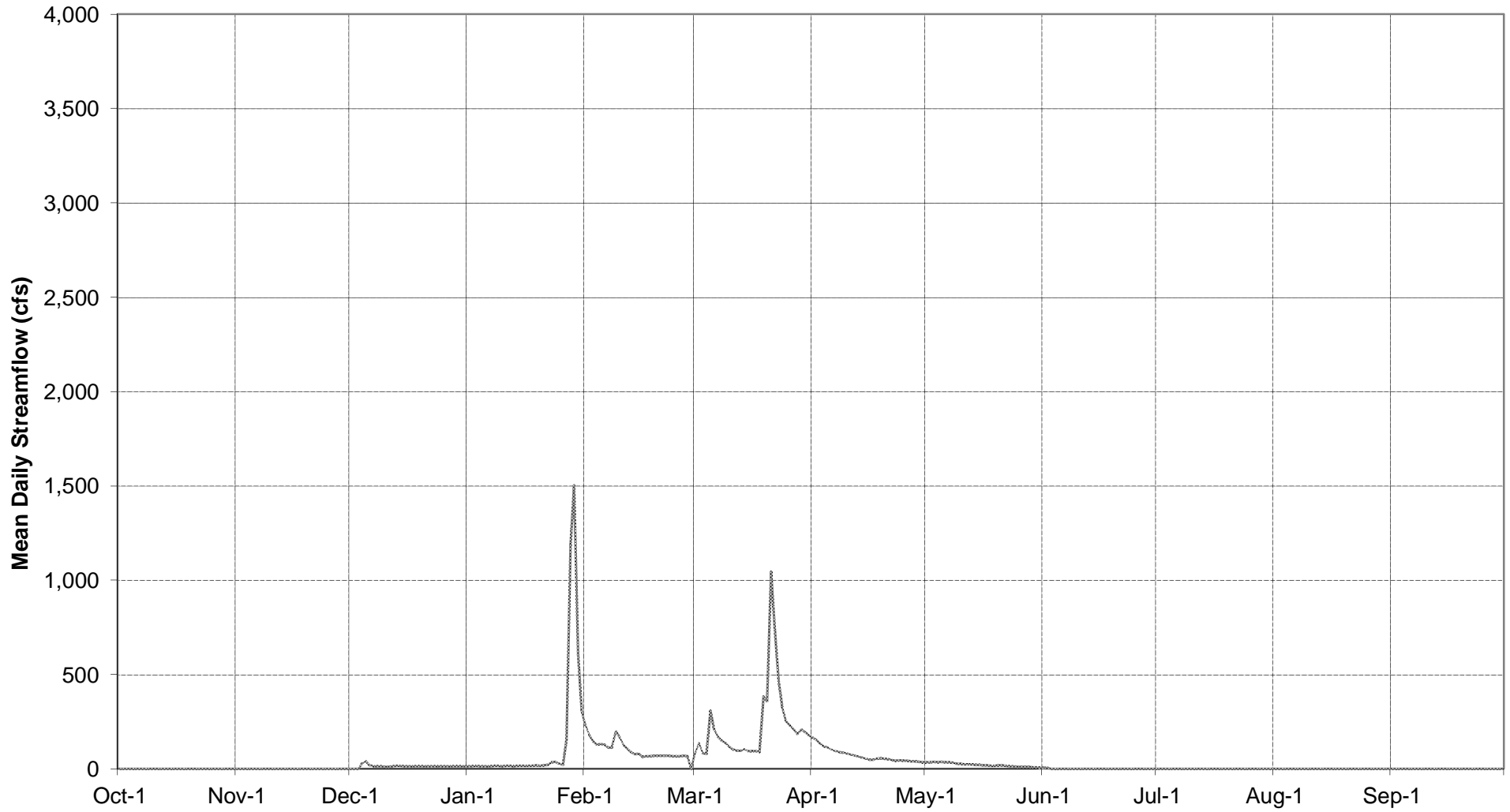
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1979



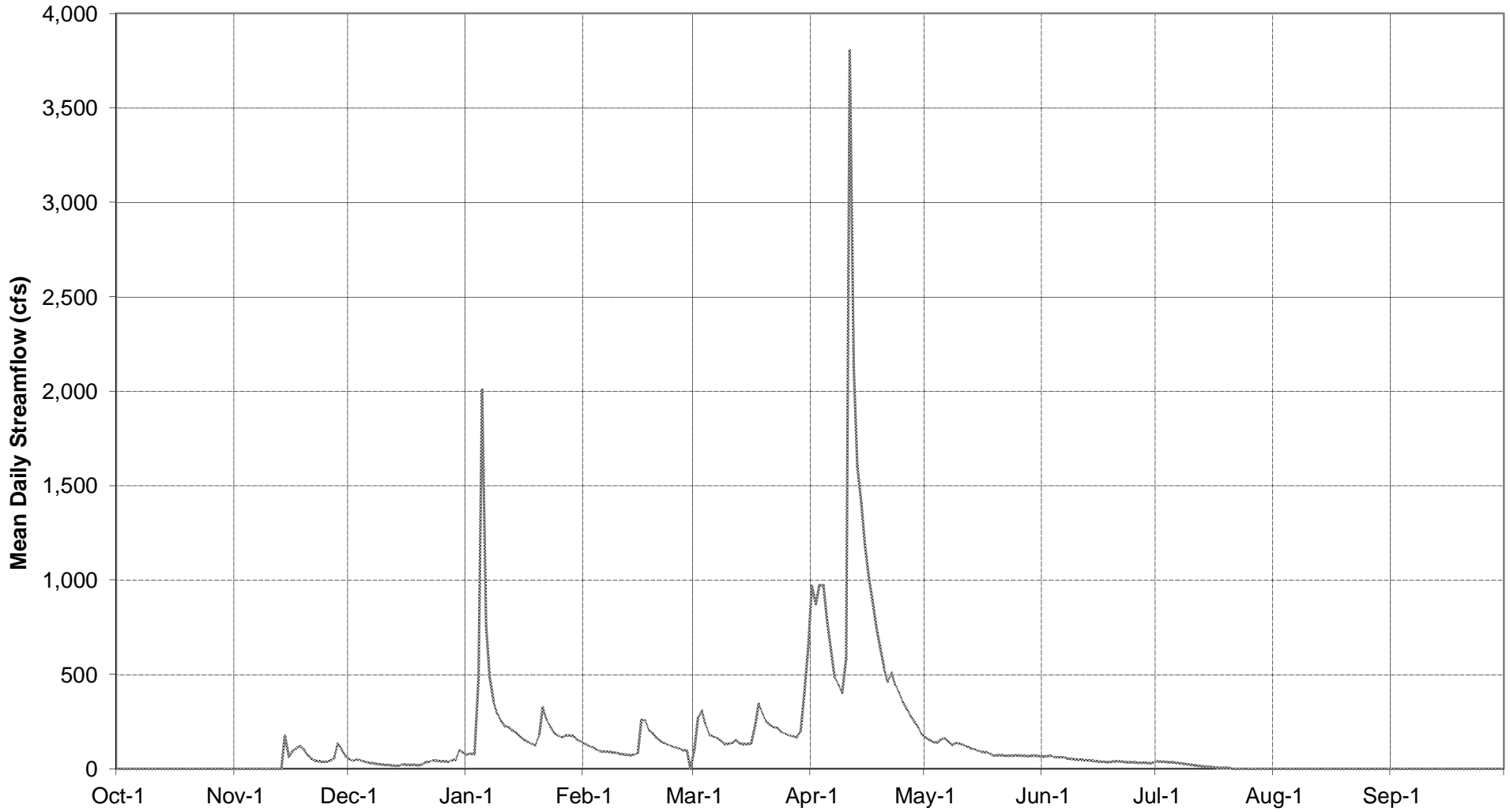
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1980**



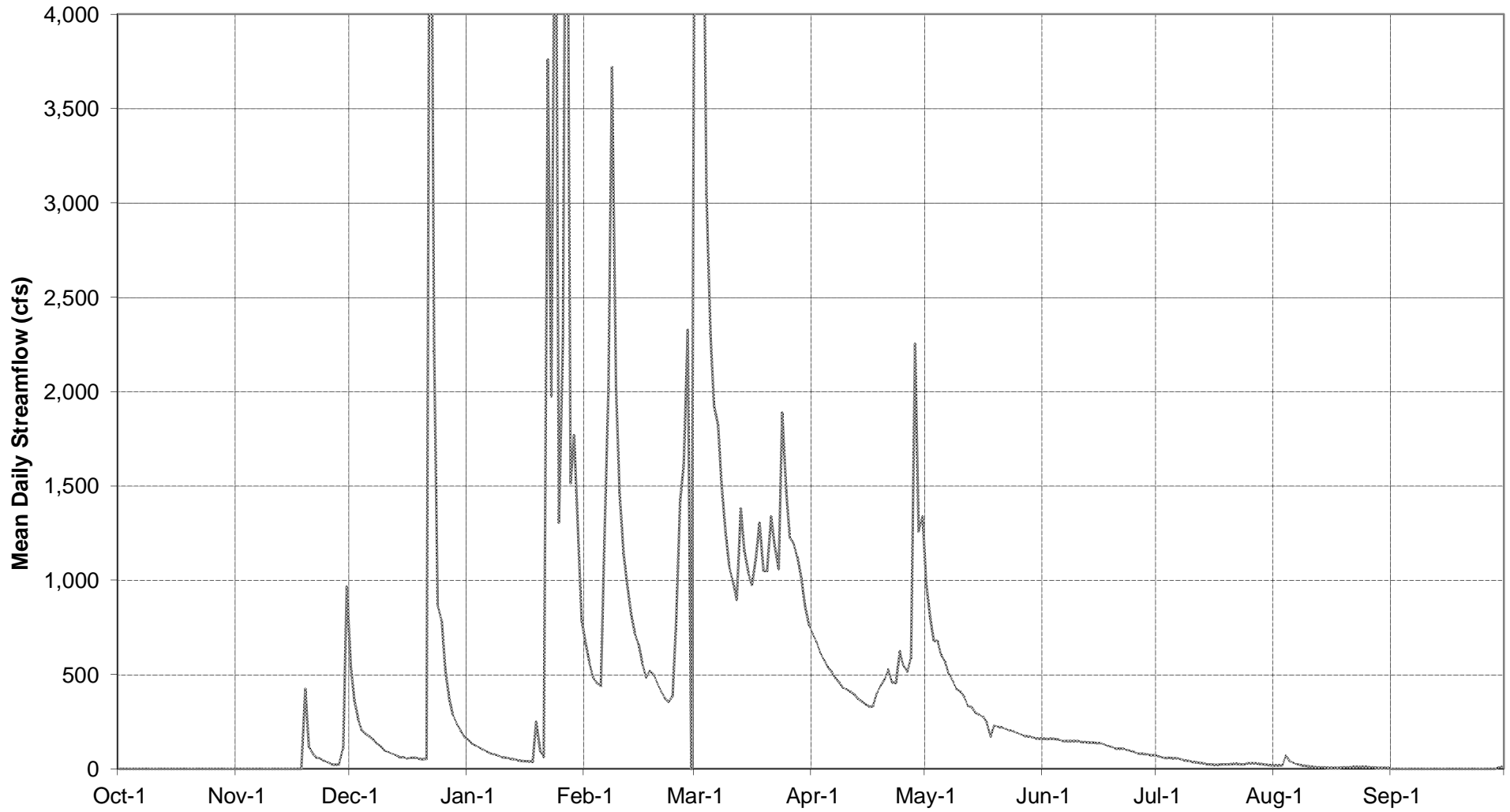
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1981



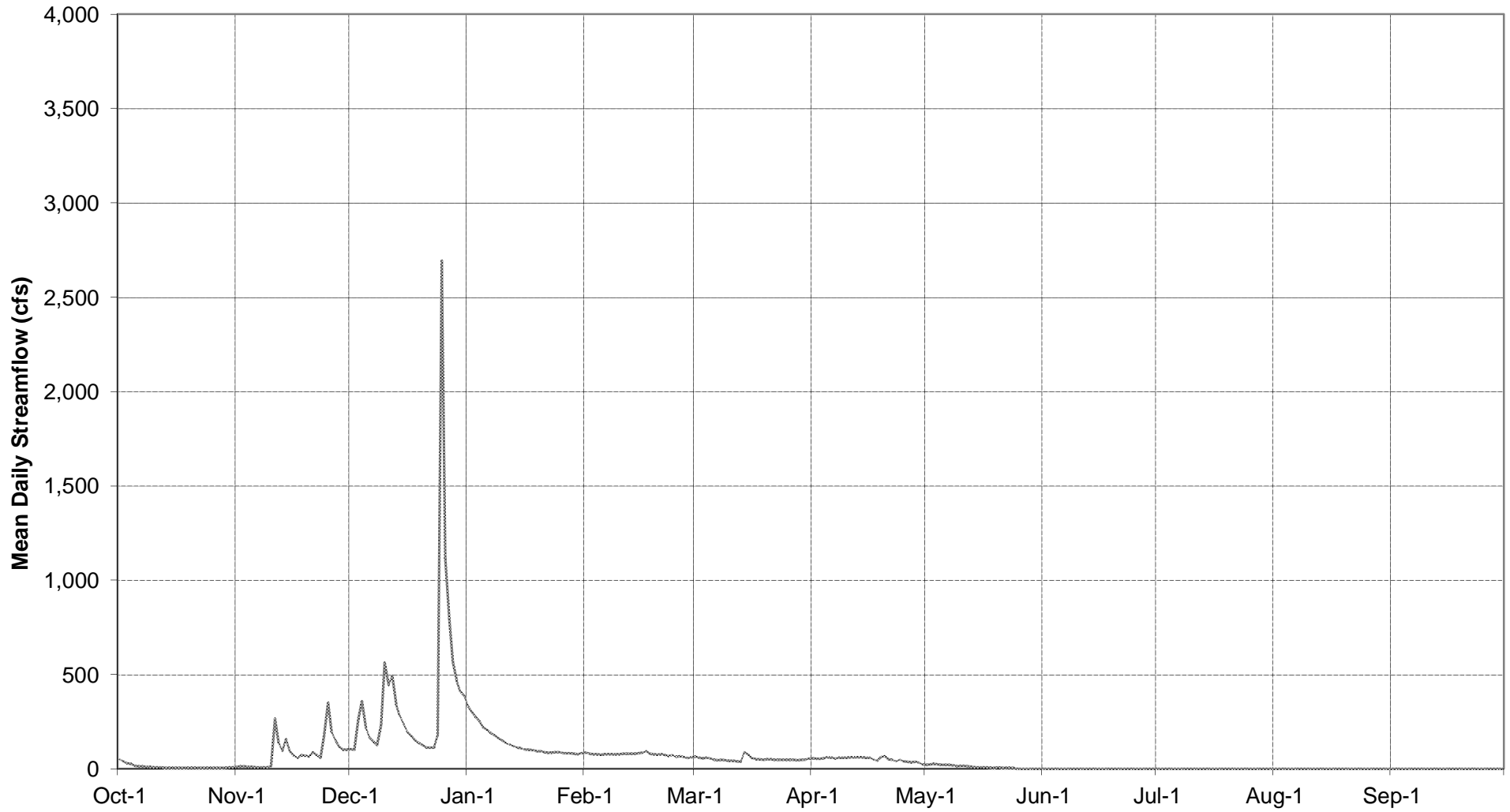
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1982**



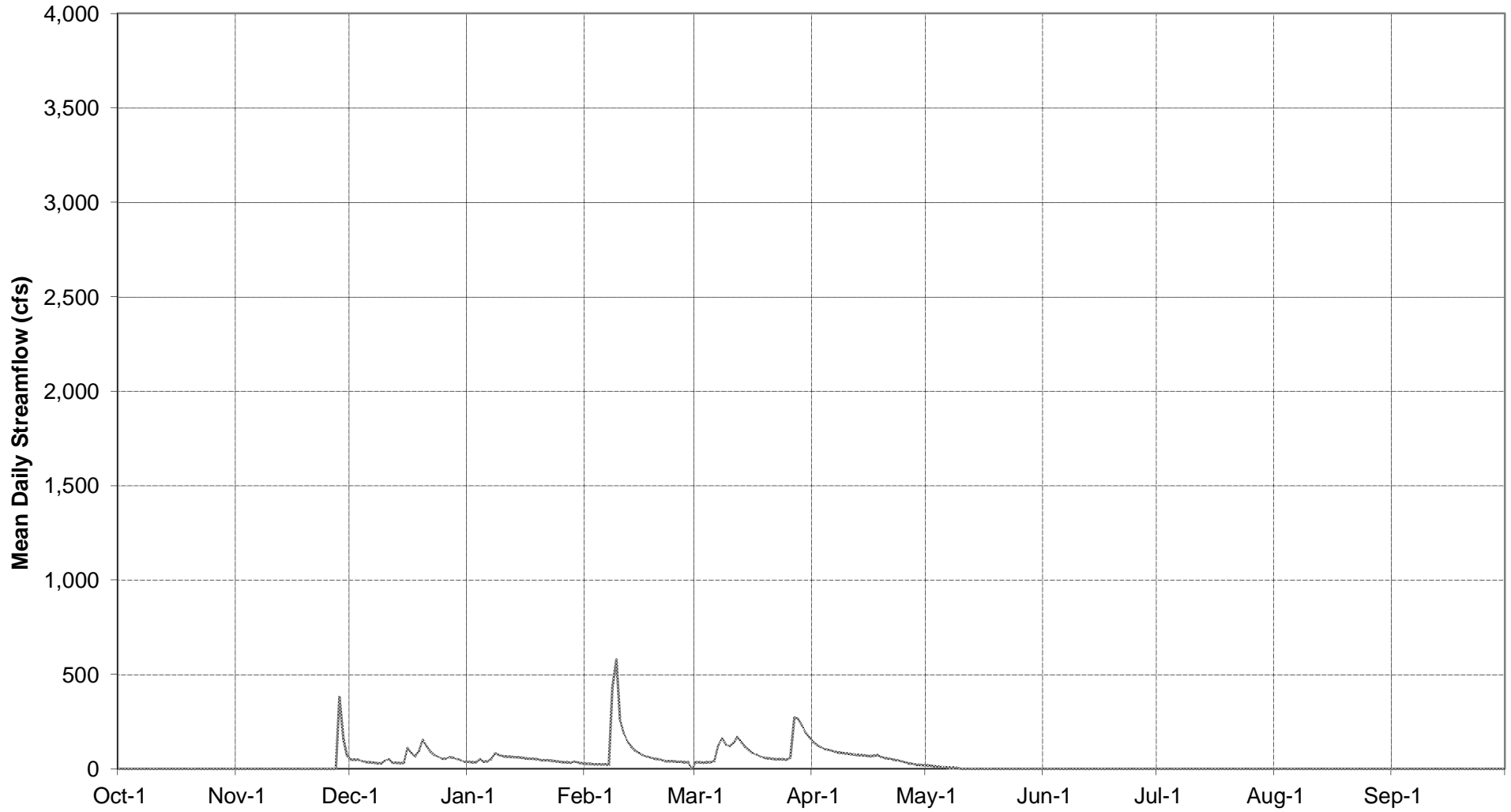
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1983



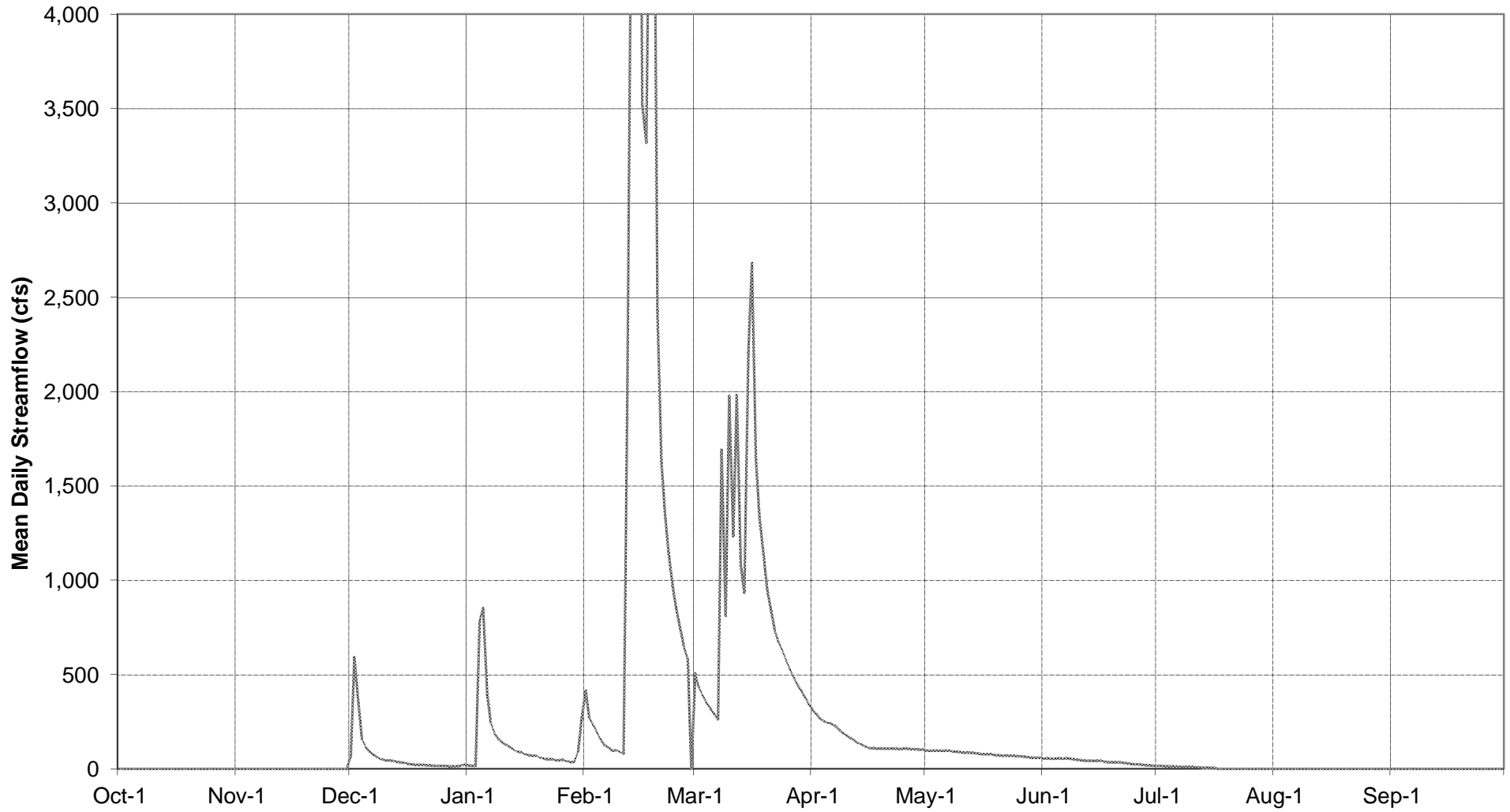
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1984



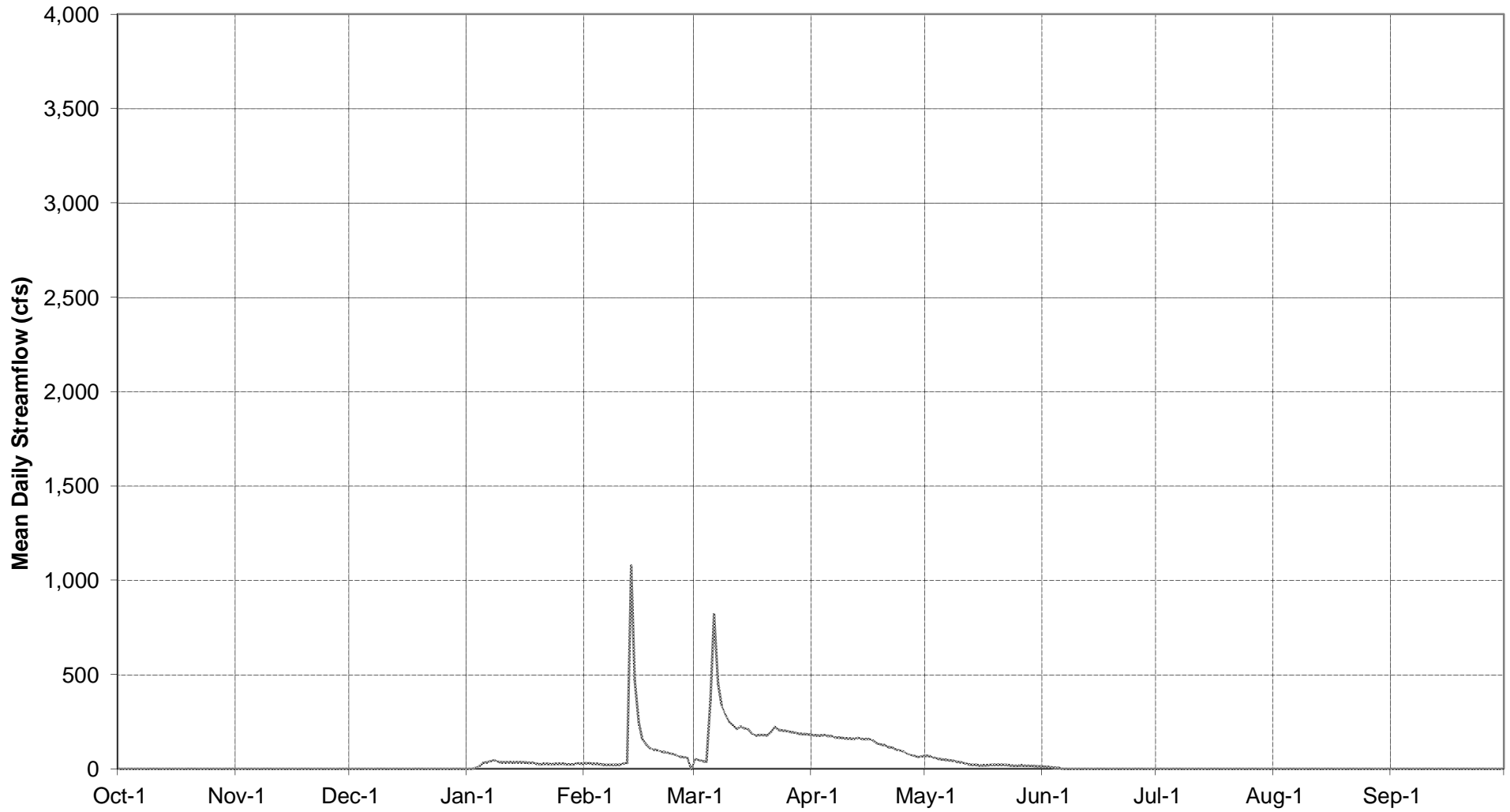
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1985



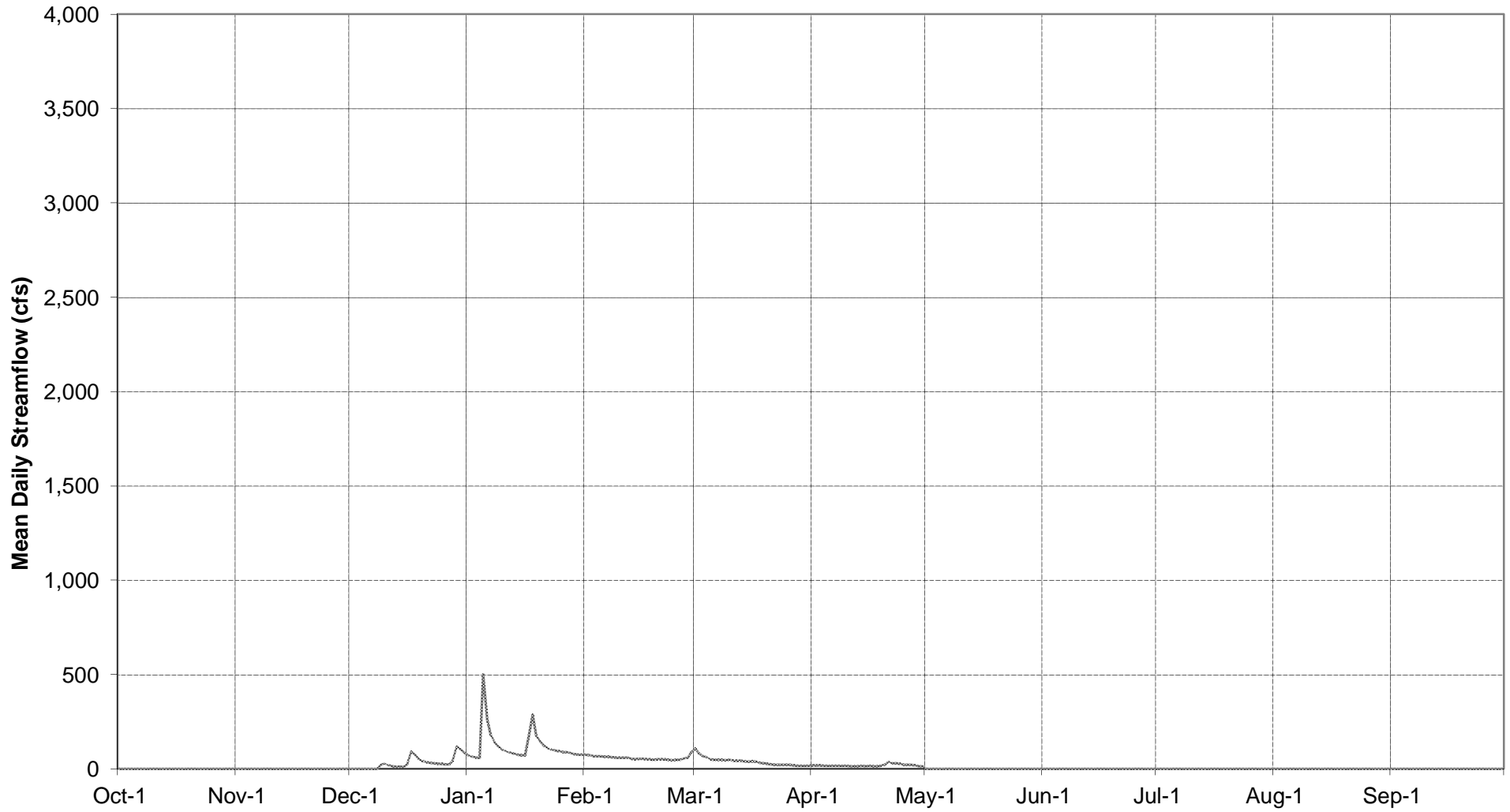
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1986**



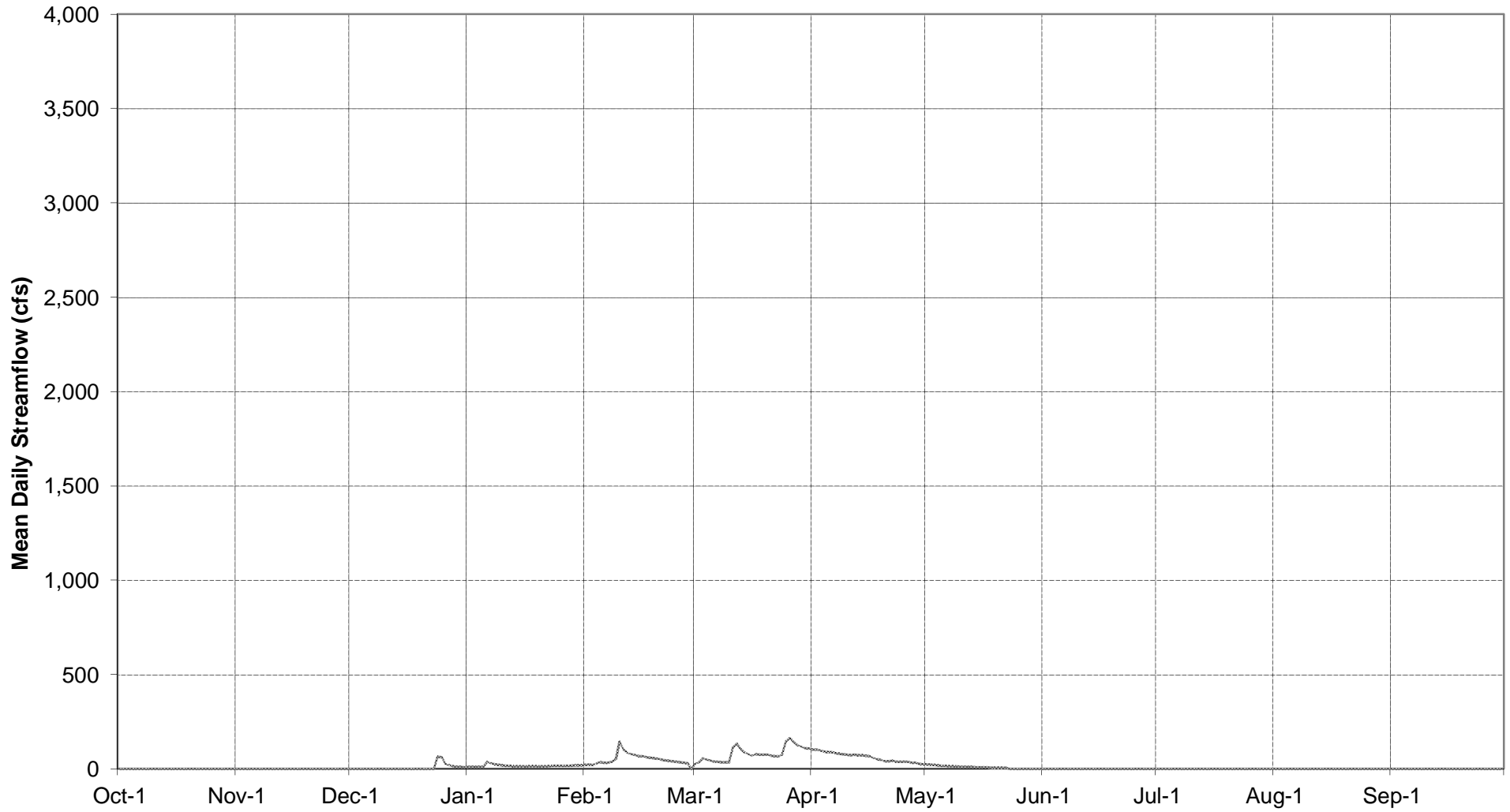
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1987**



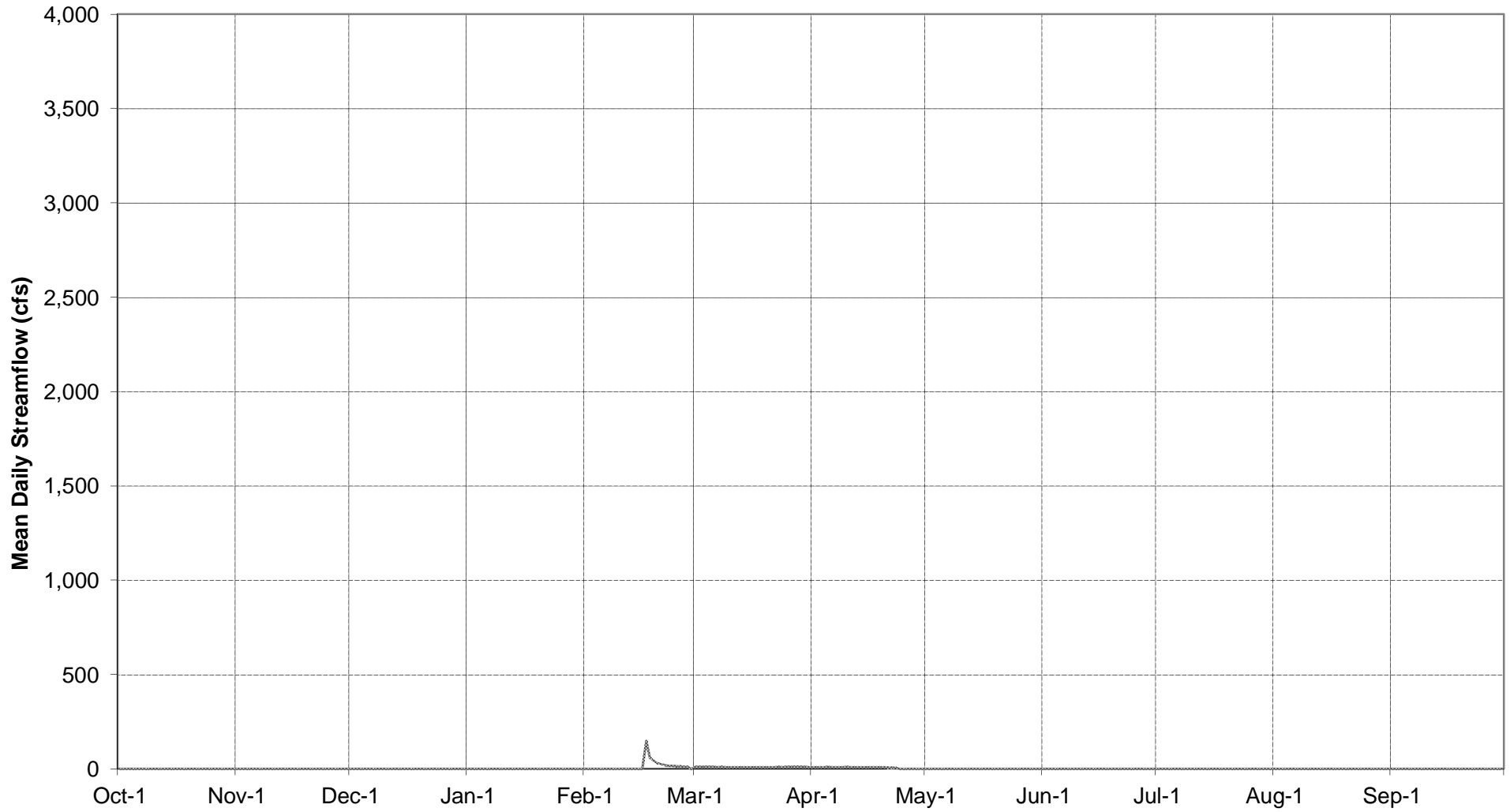
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1988



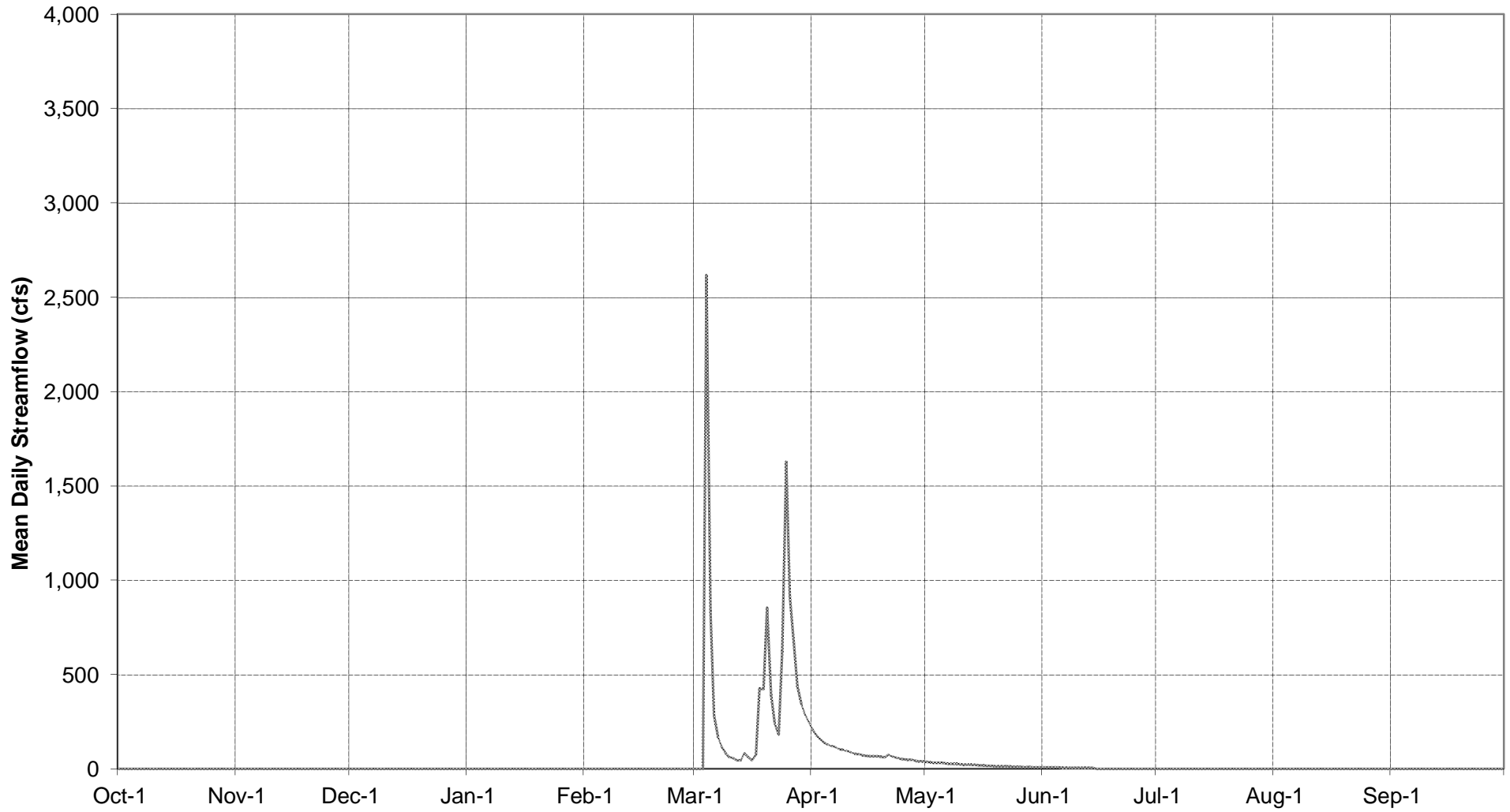
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1989**



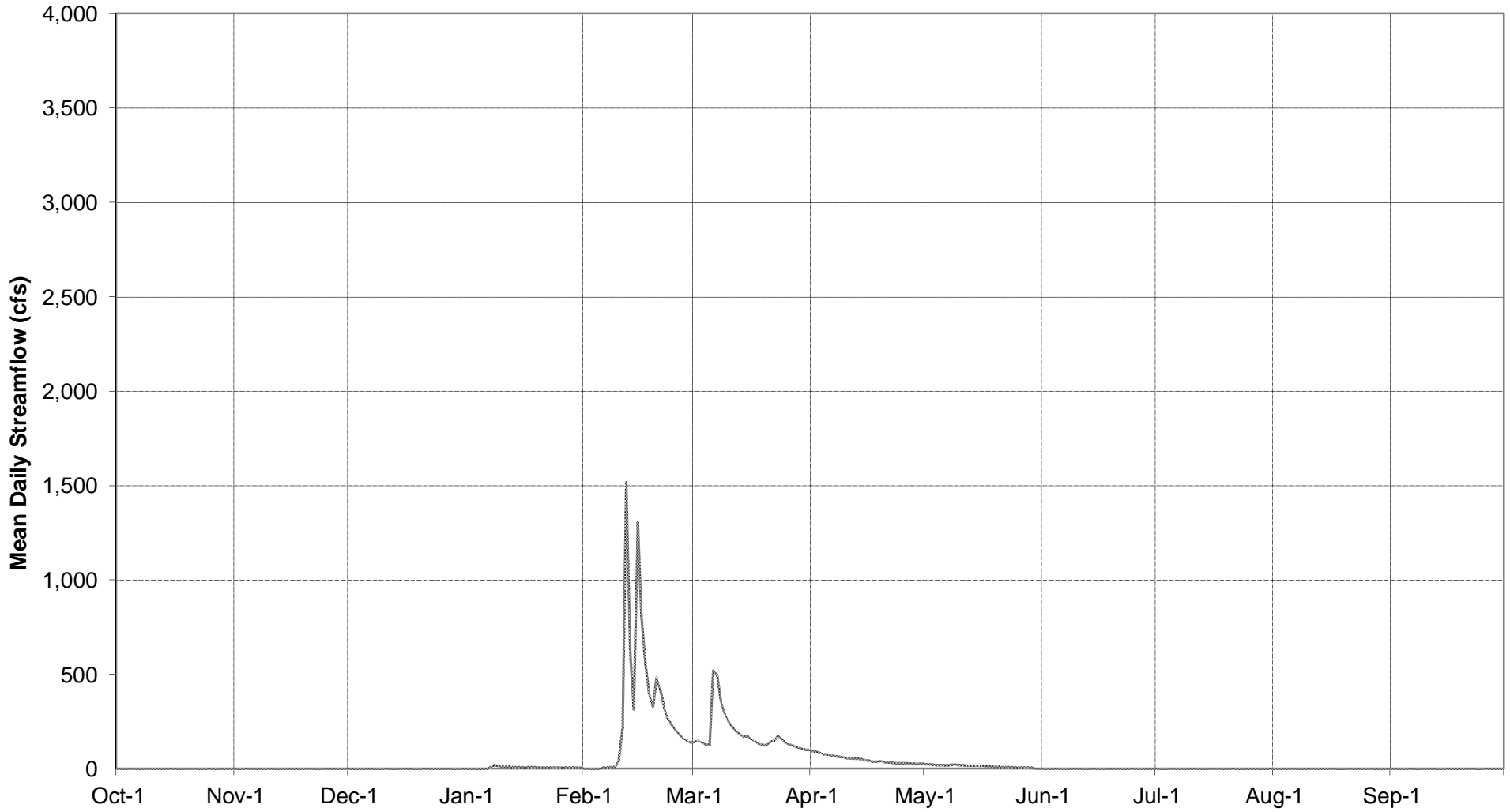
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1990**



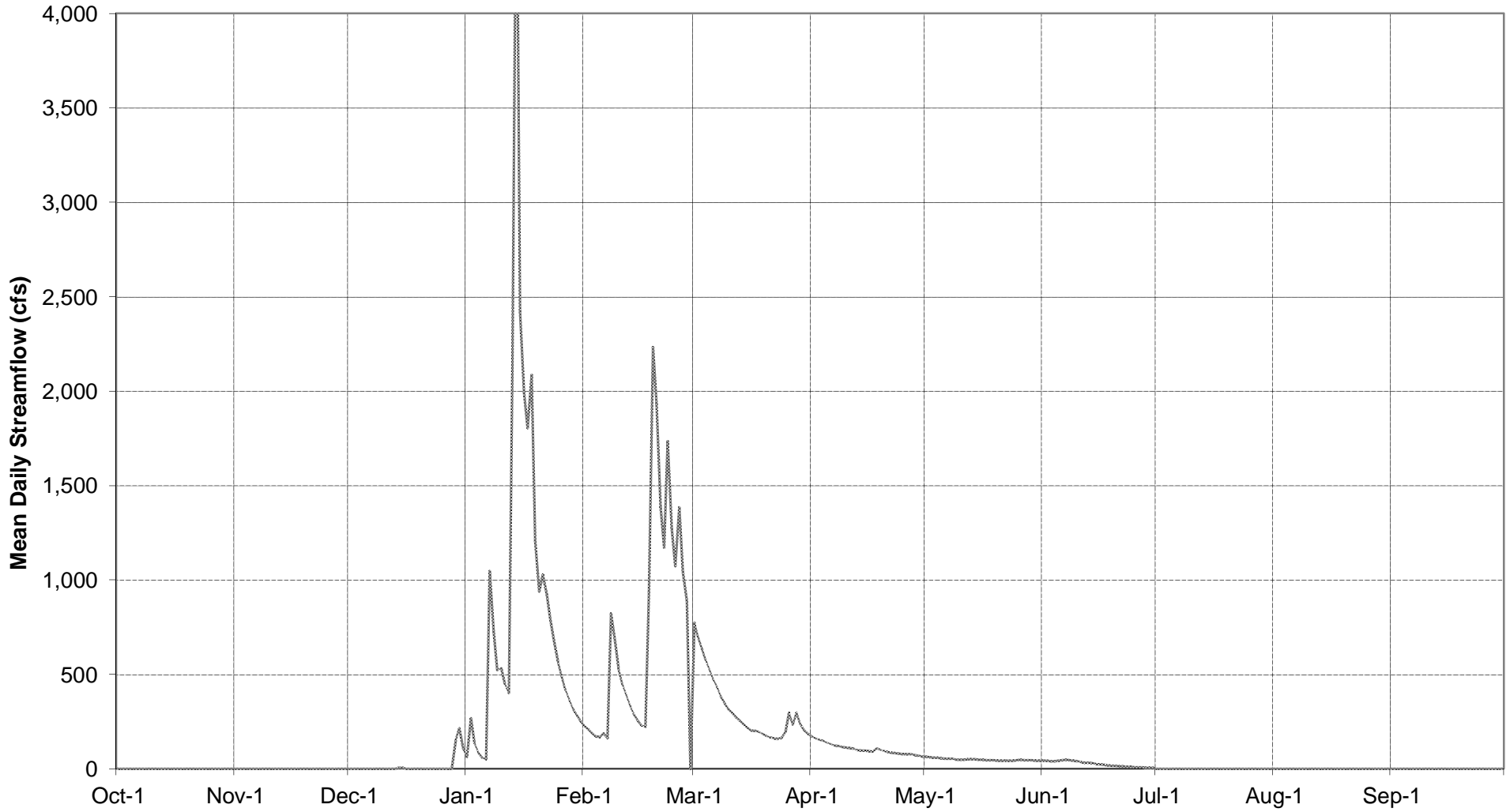
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1991



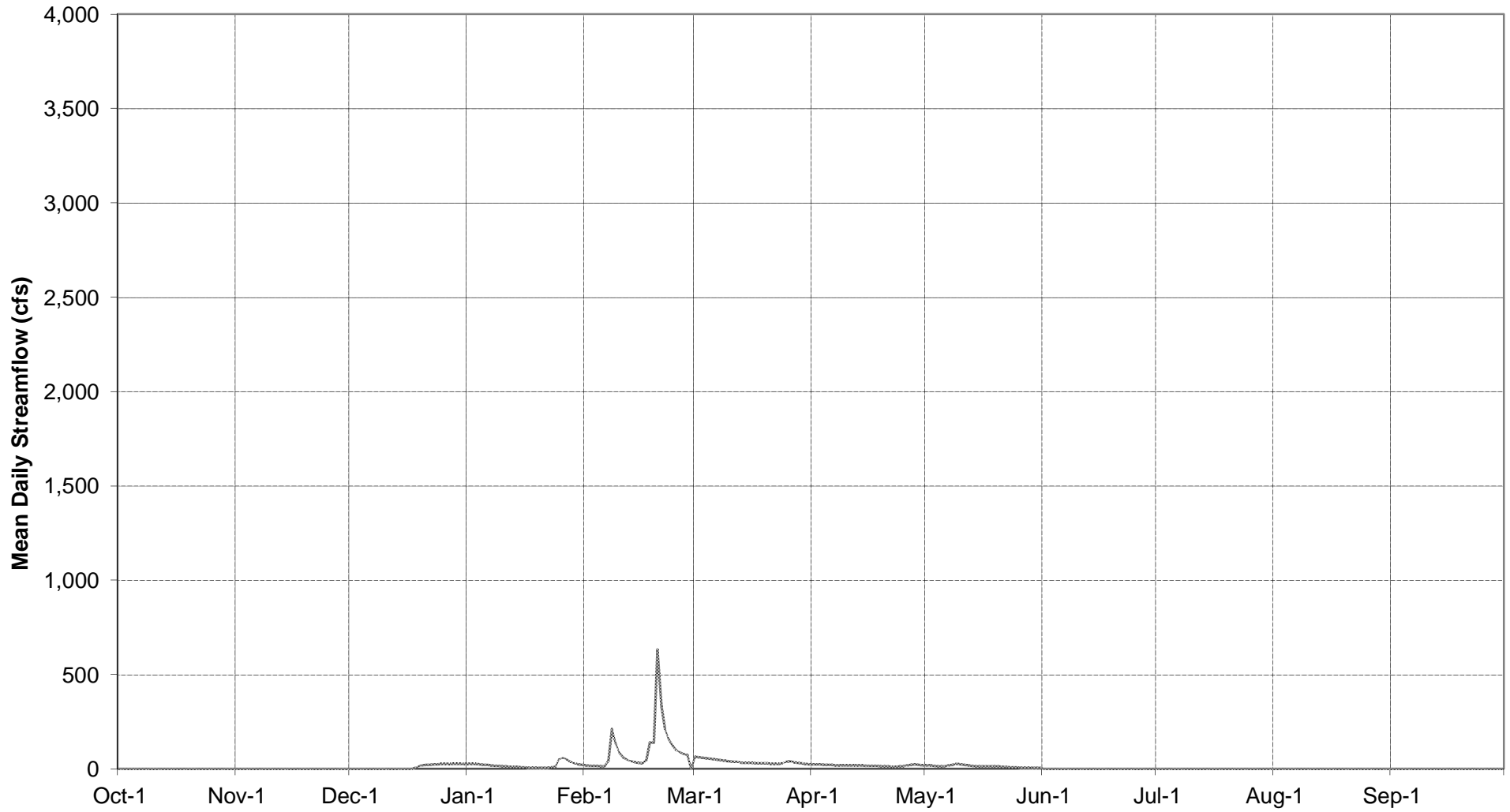
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1992



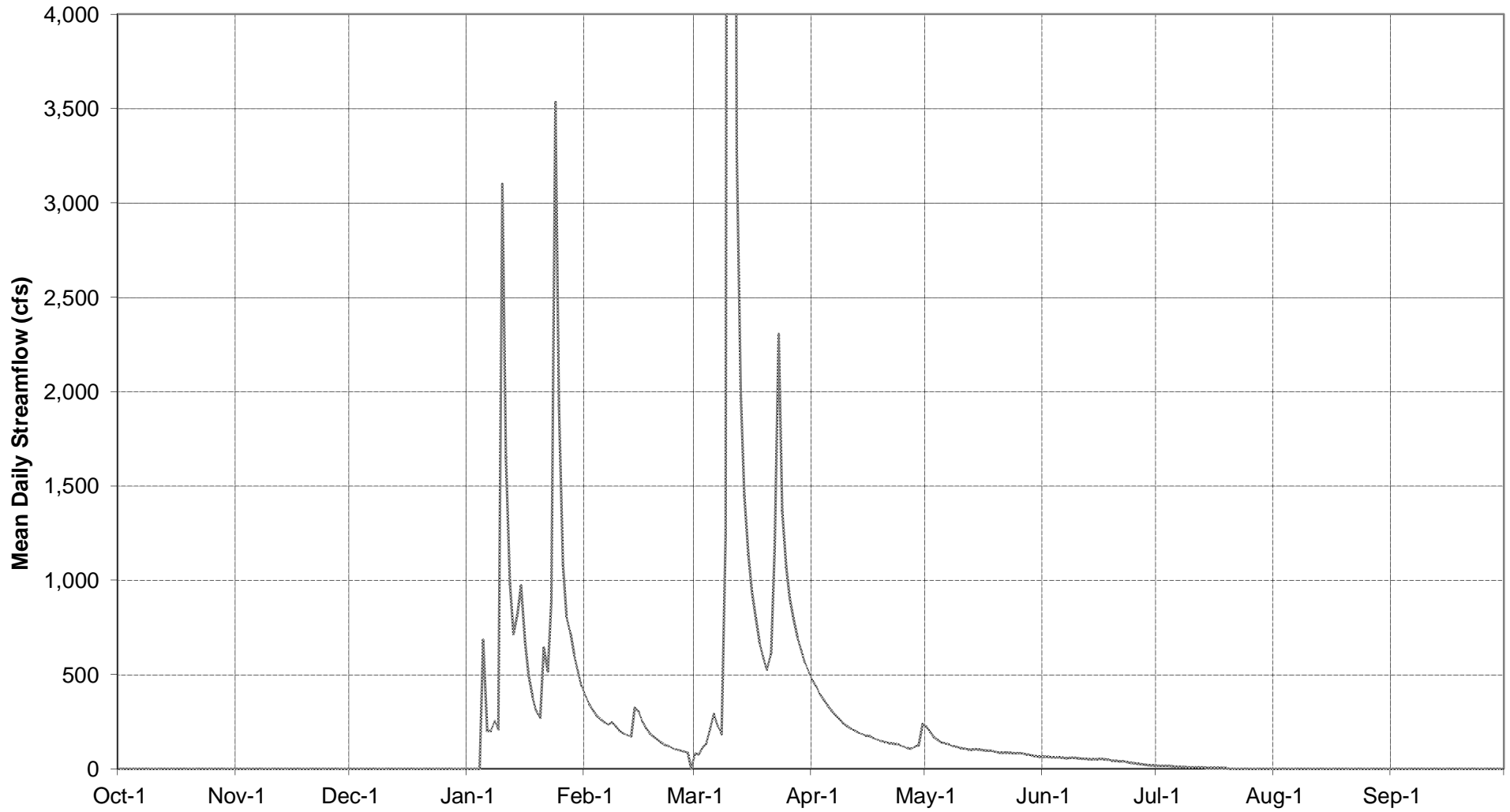
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1993



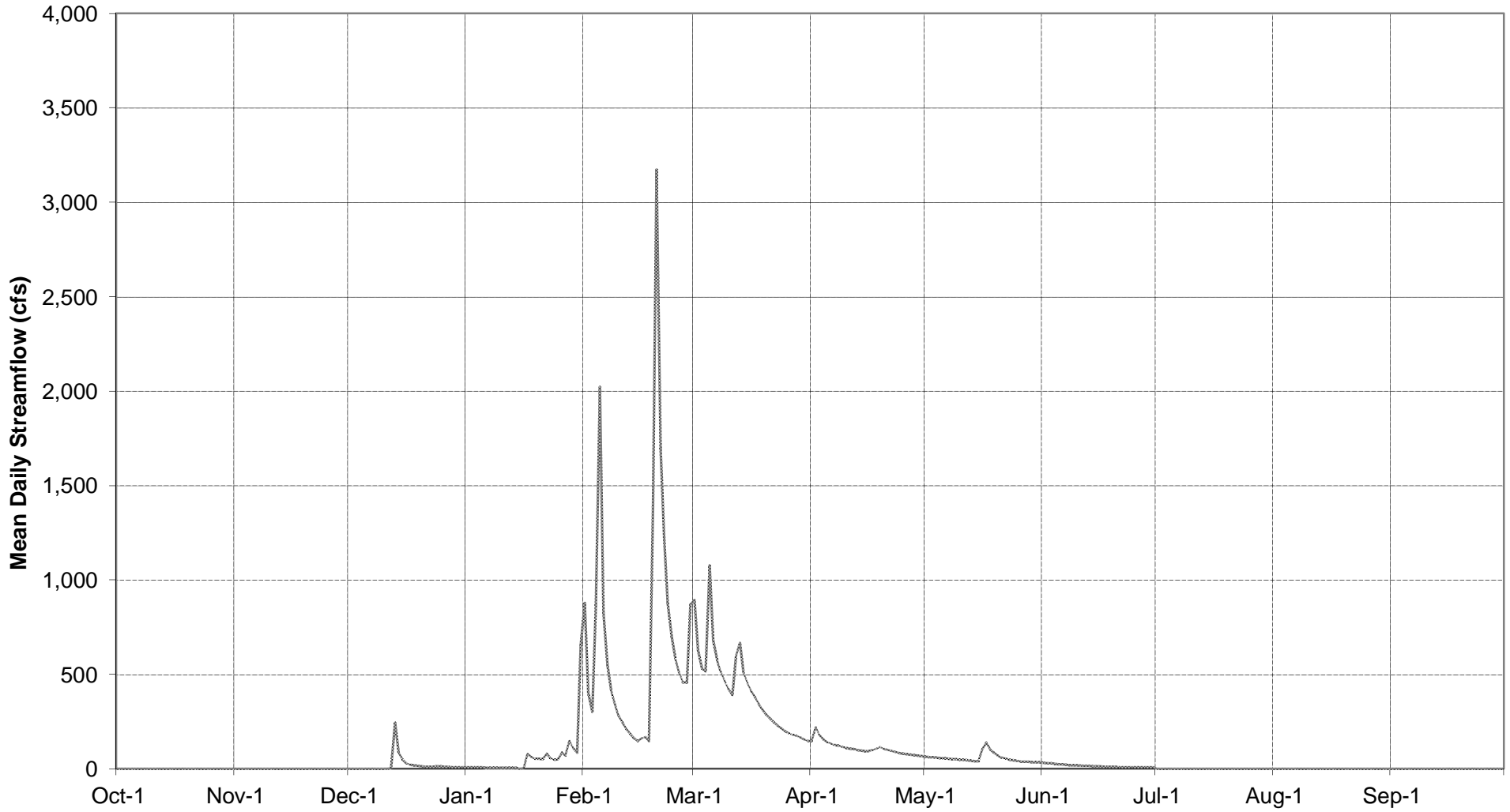
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1994



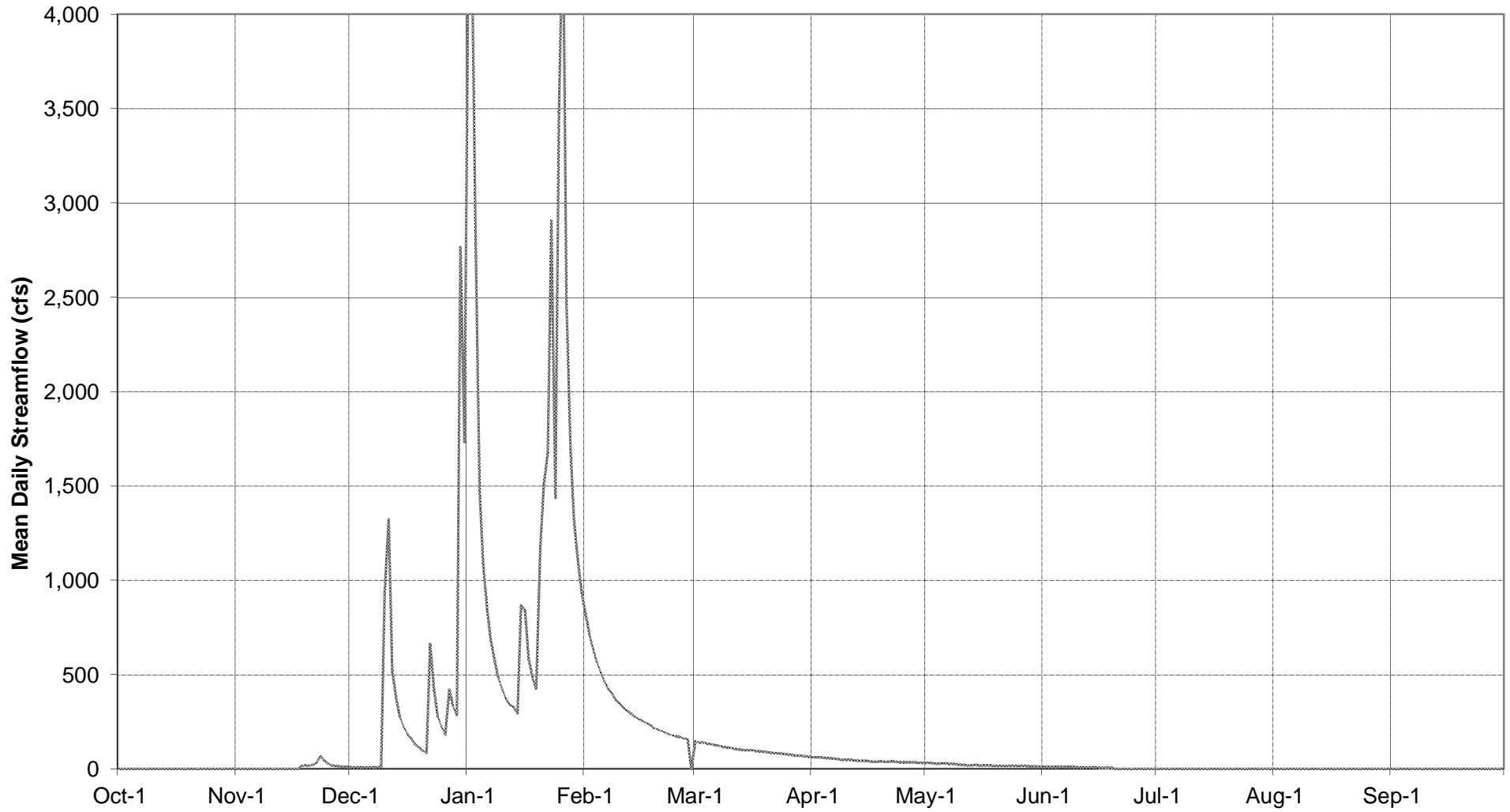
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1995**



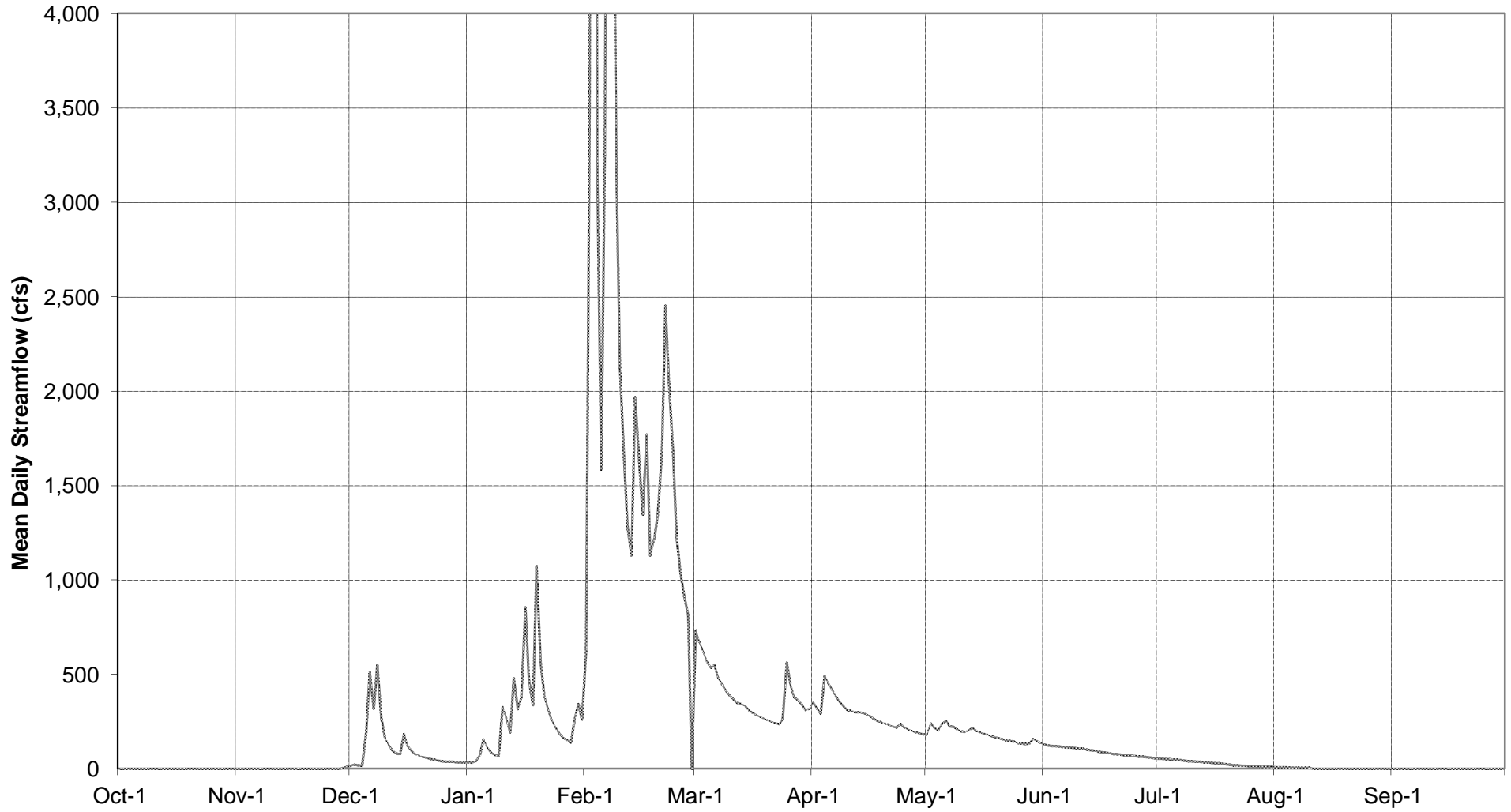
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1996



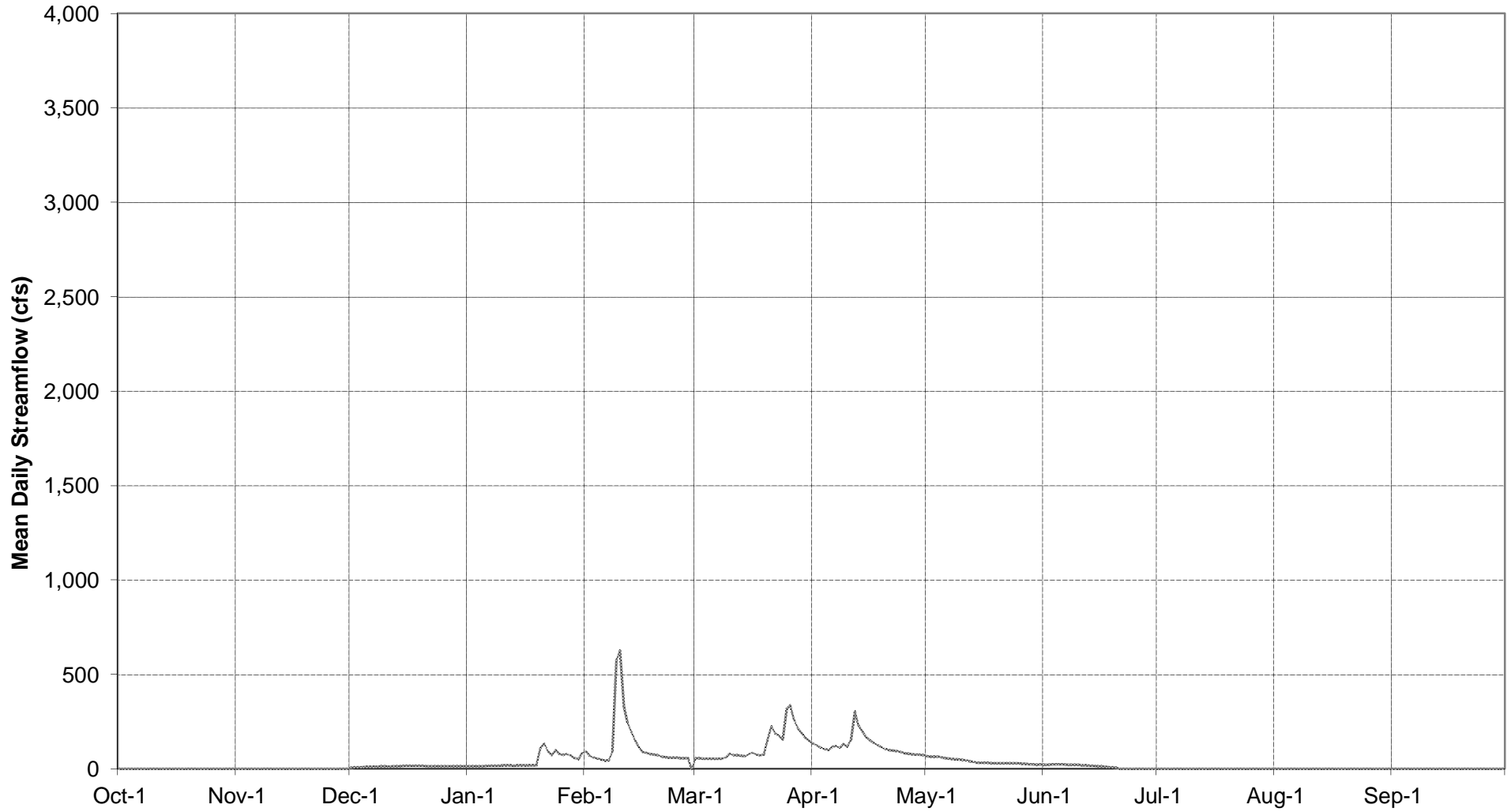
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1997**



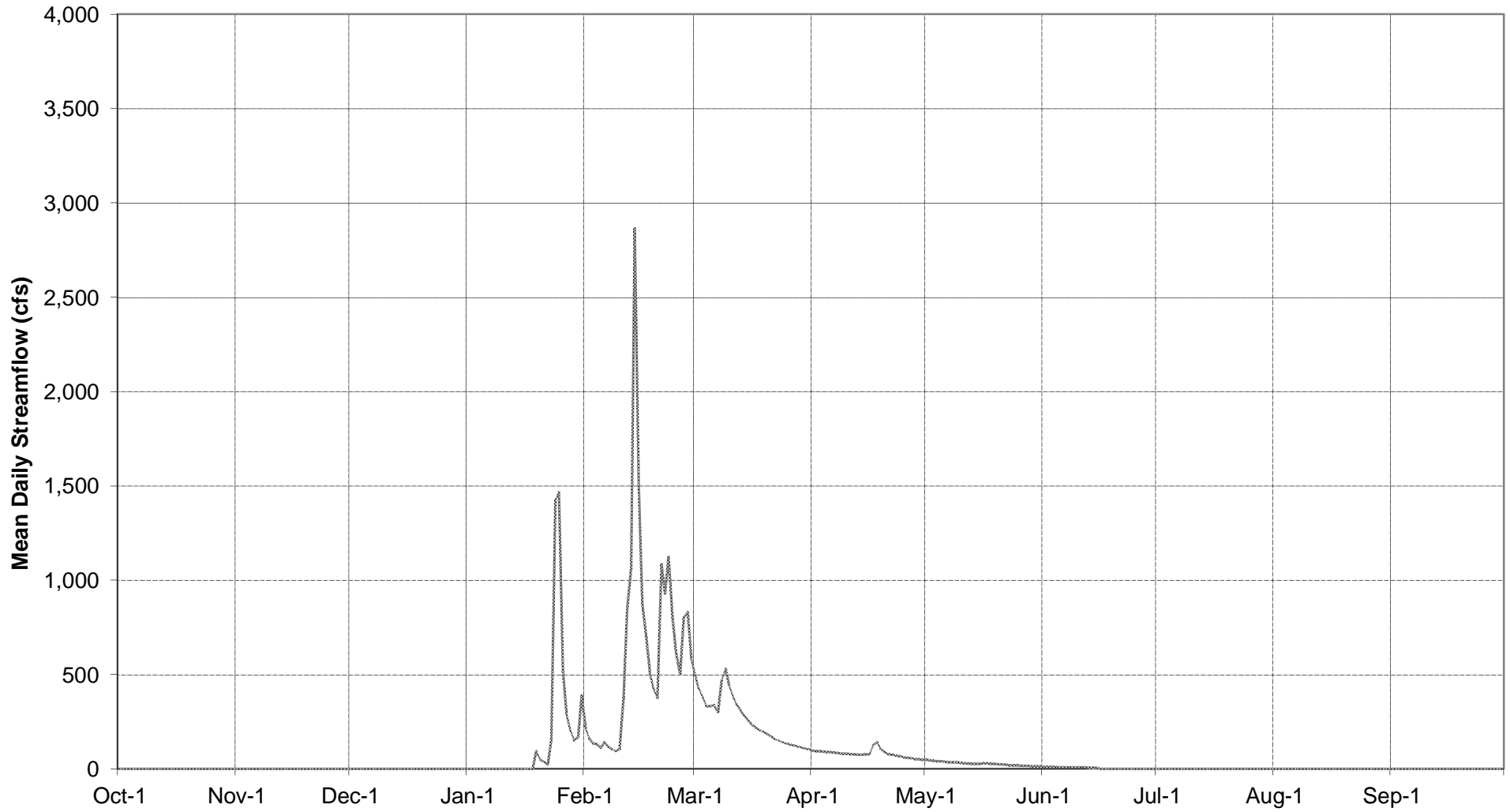
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1998



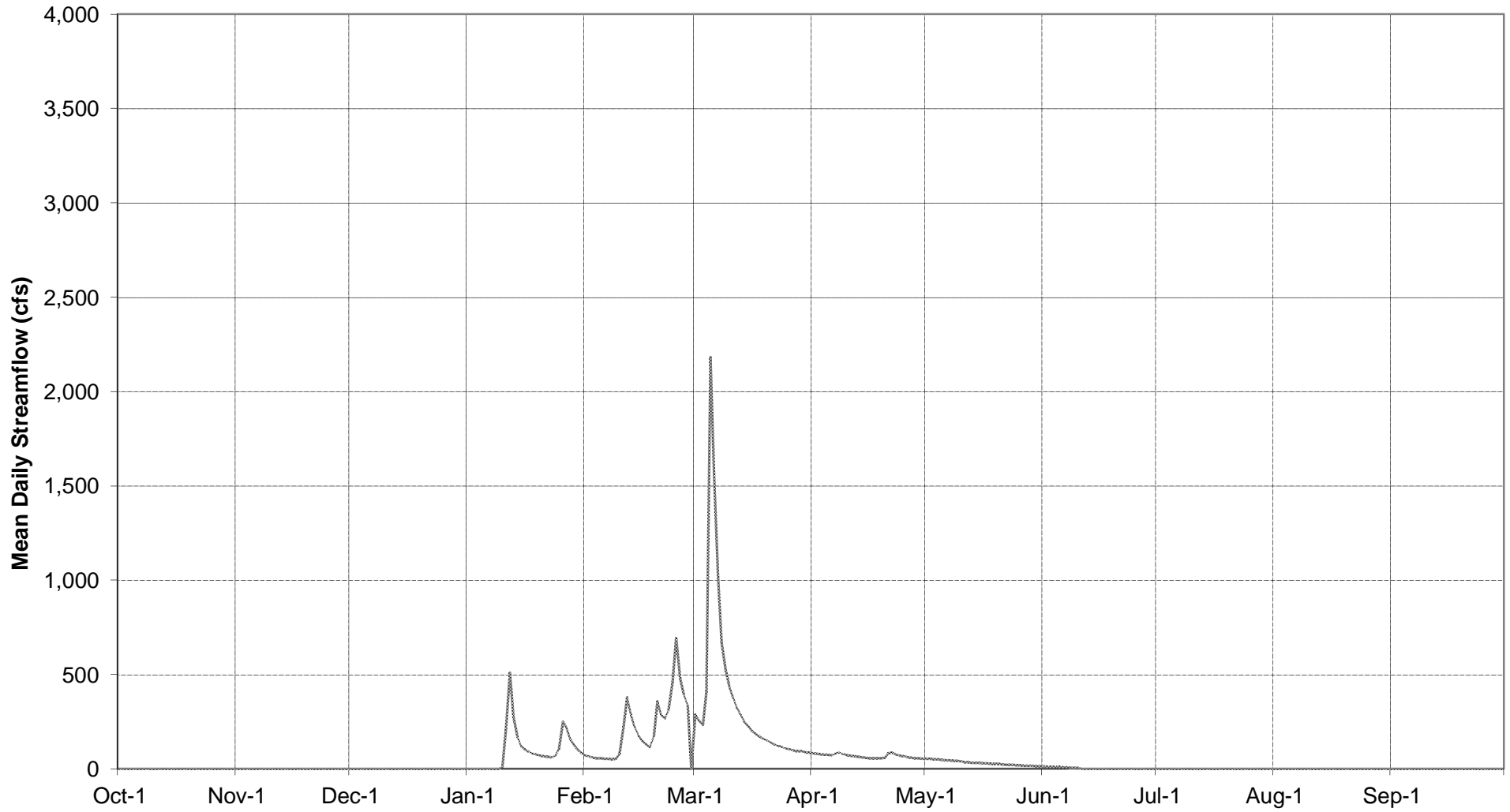
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 1999



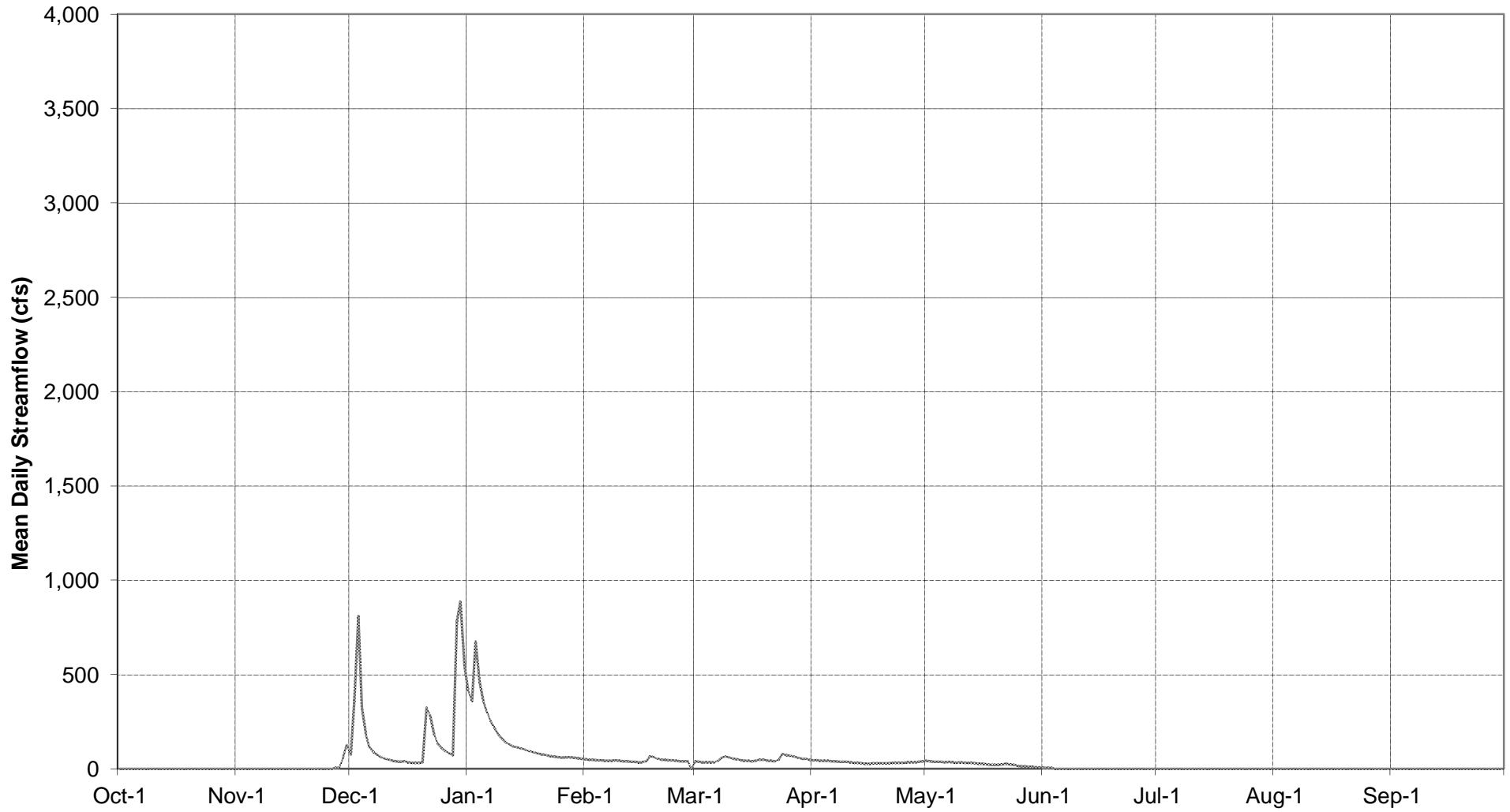
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2000



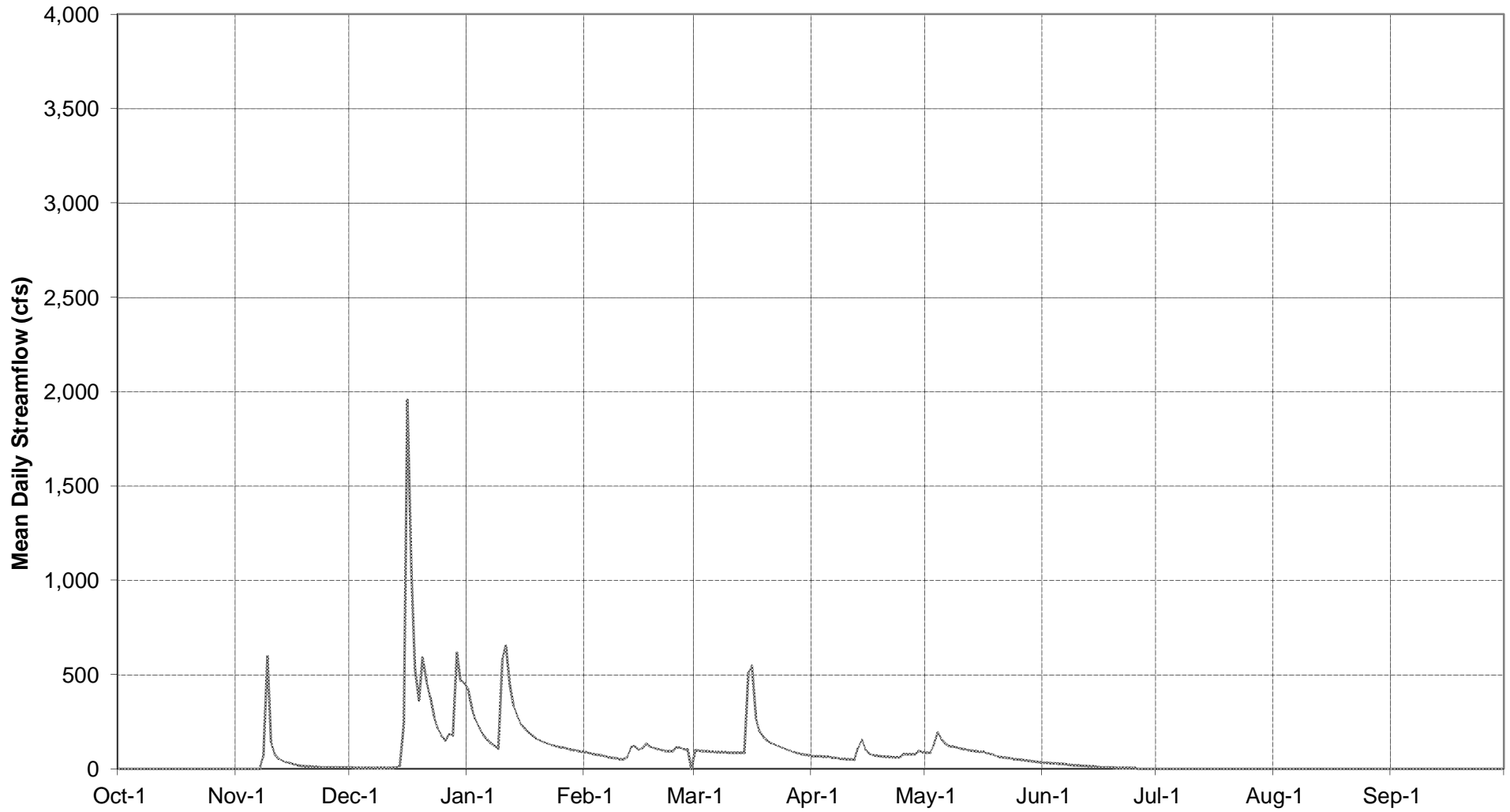
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2001



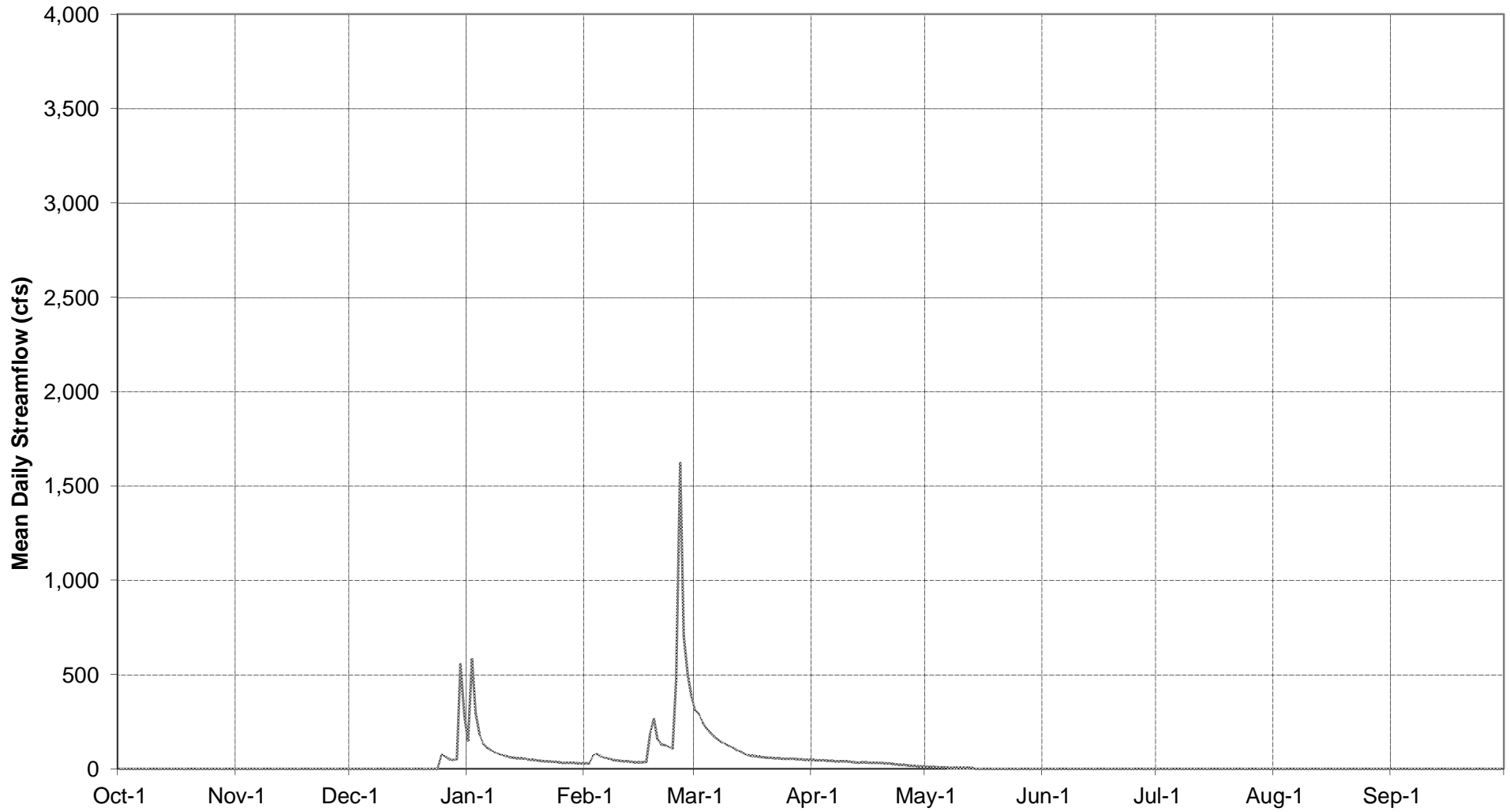
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2002



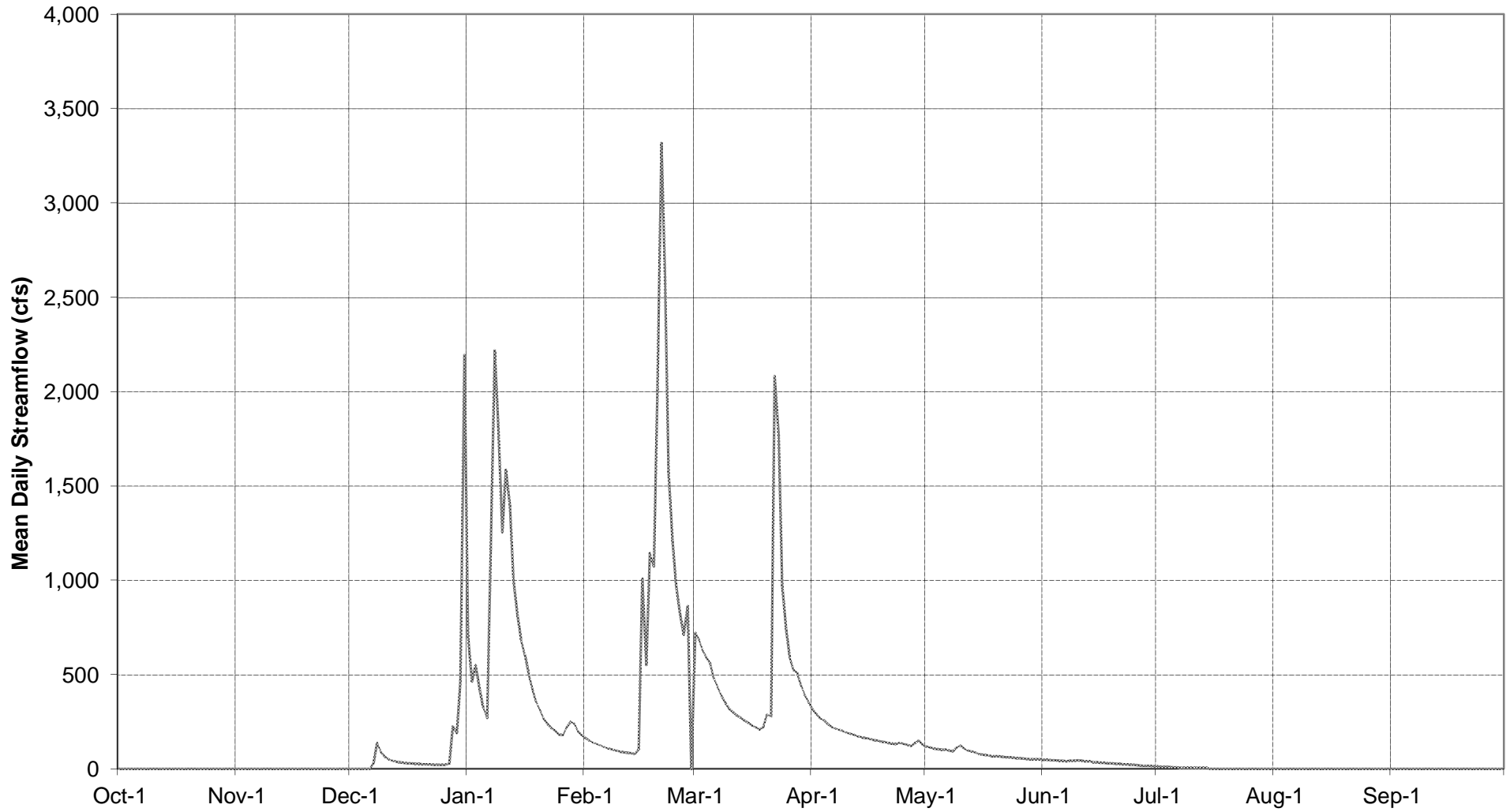
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2003



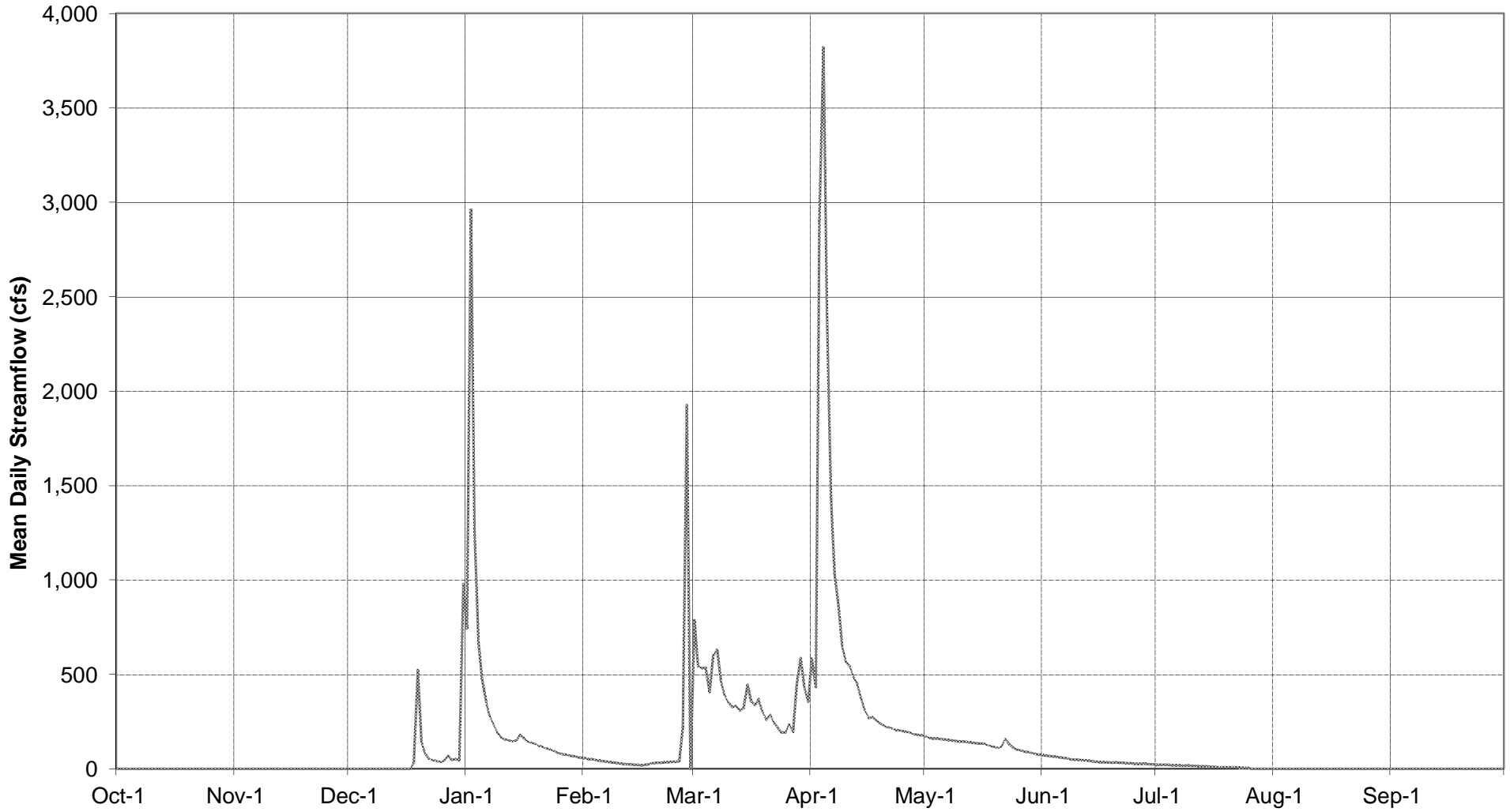
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2004**



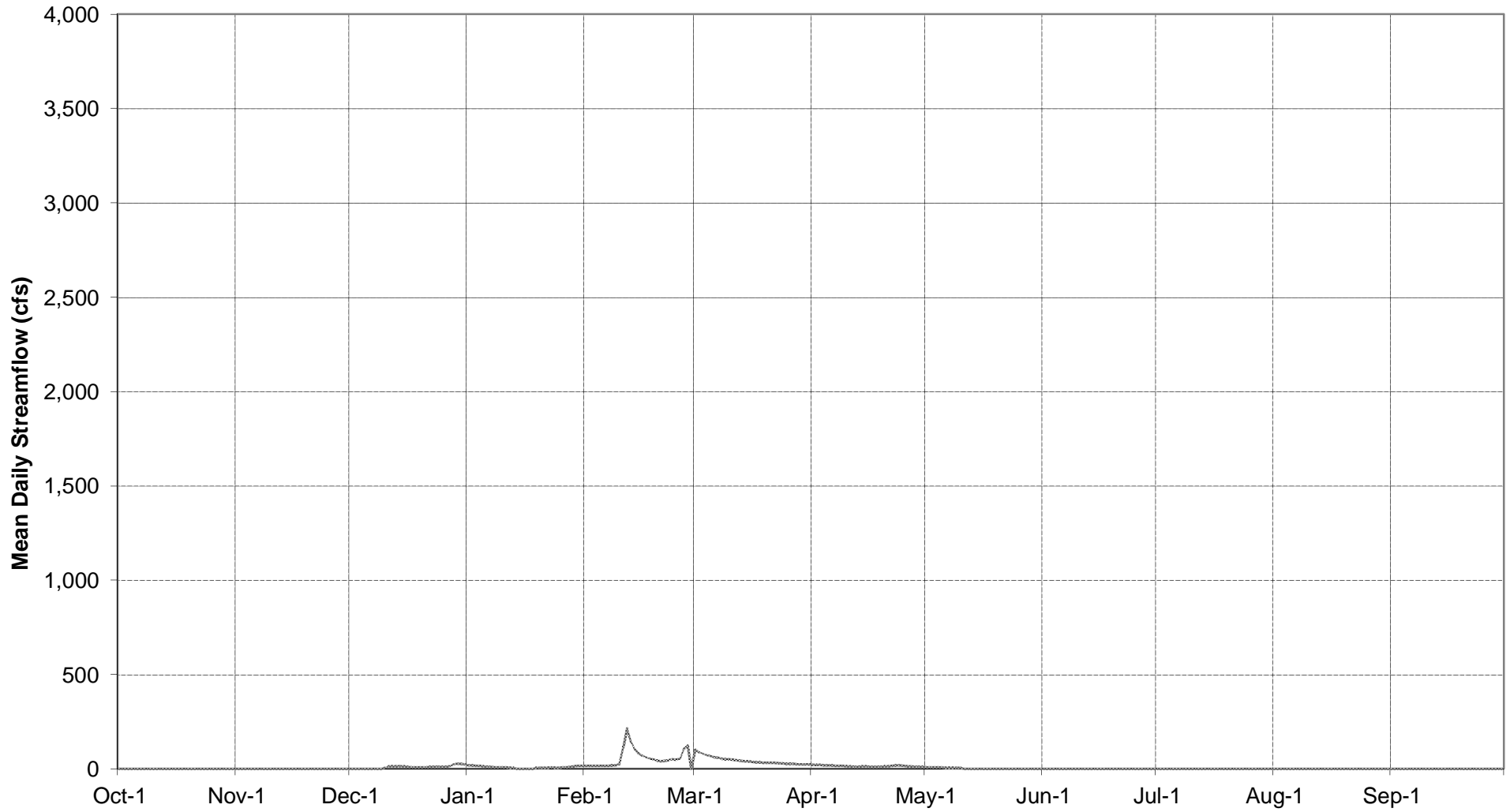
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2005



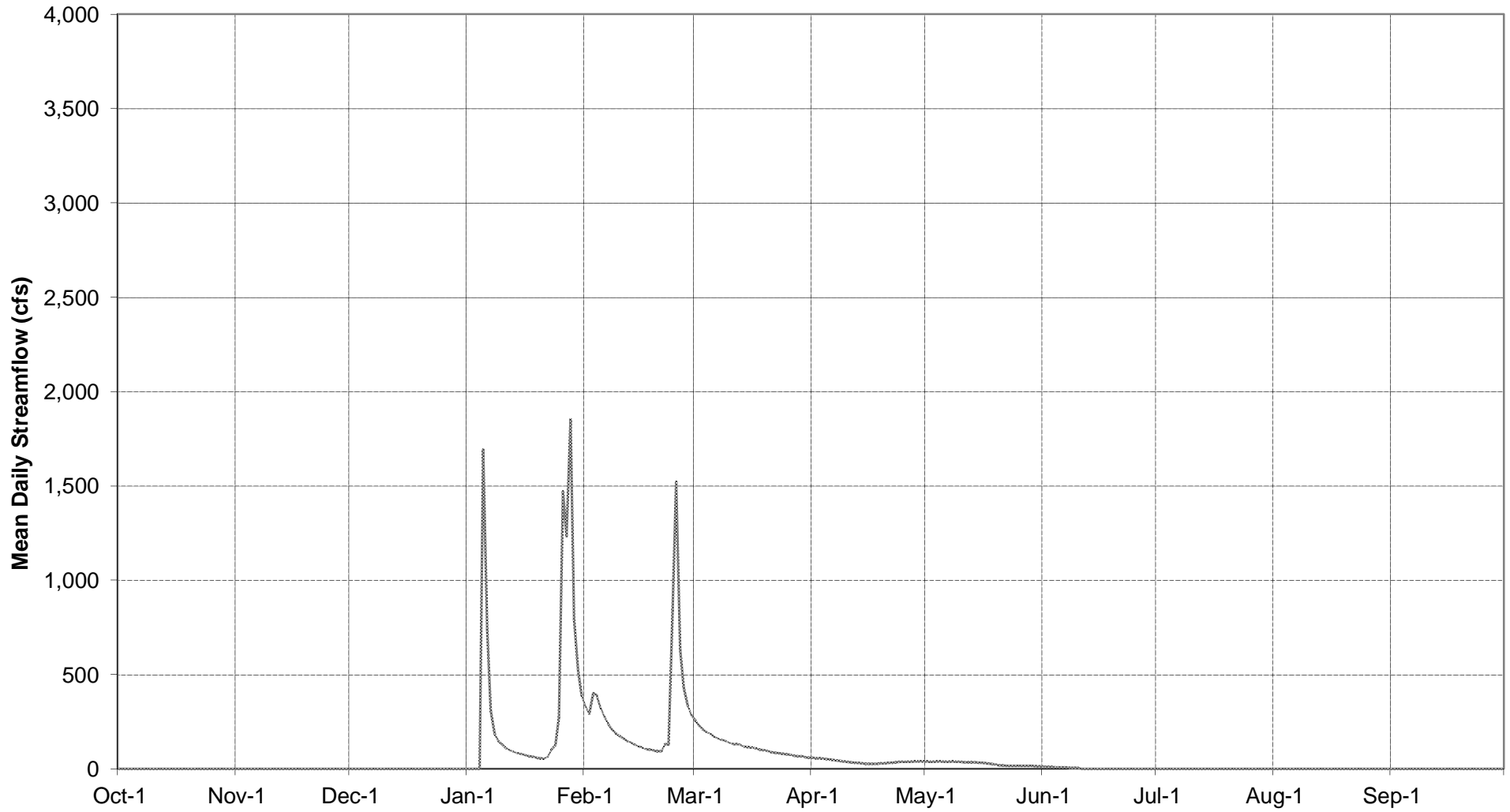
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2006



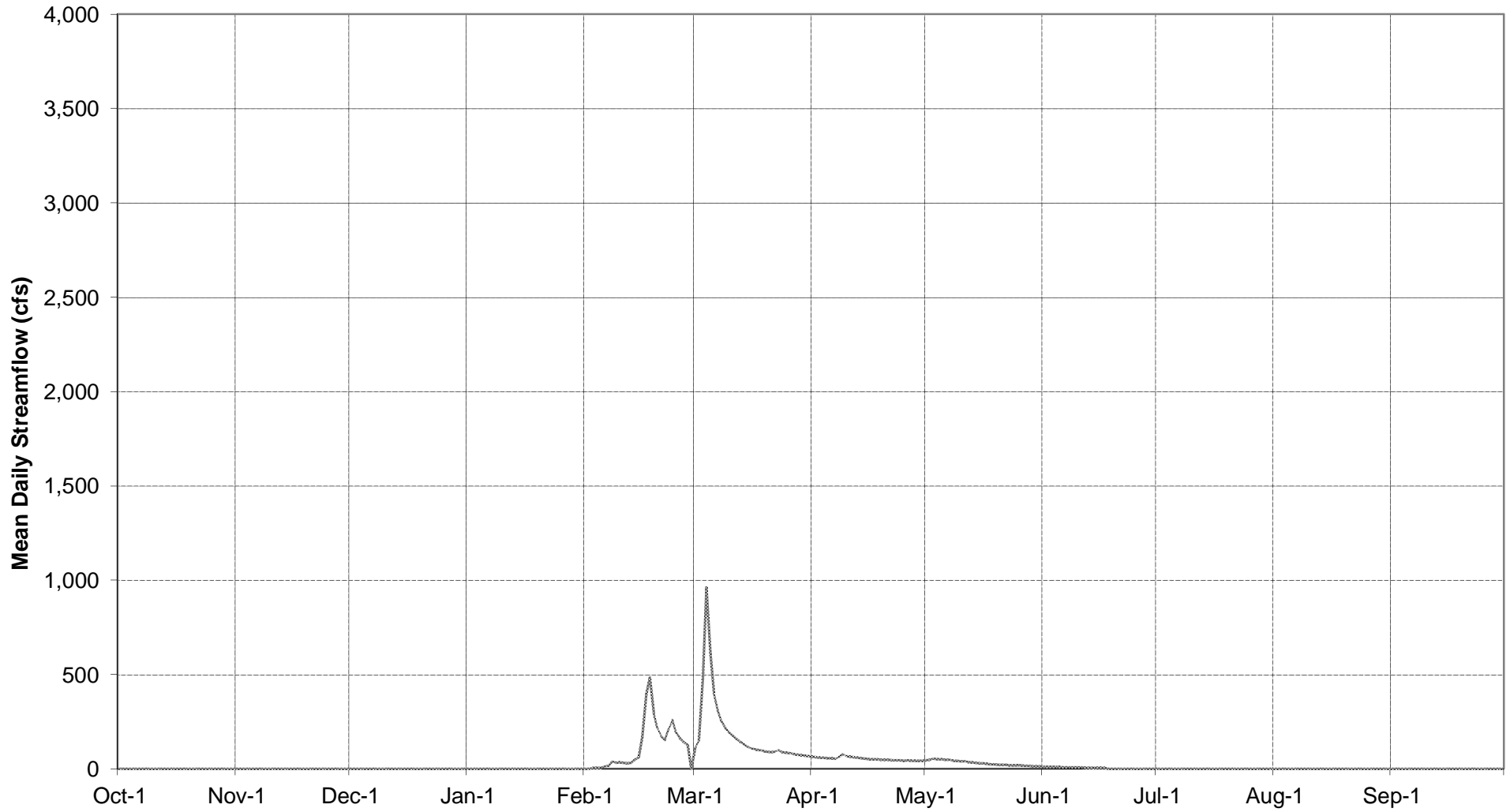
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2007**



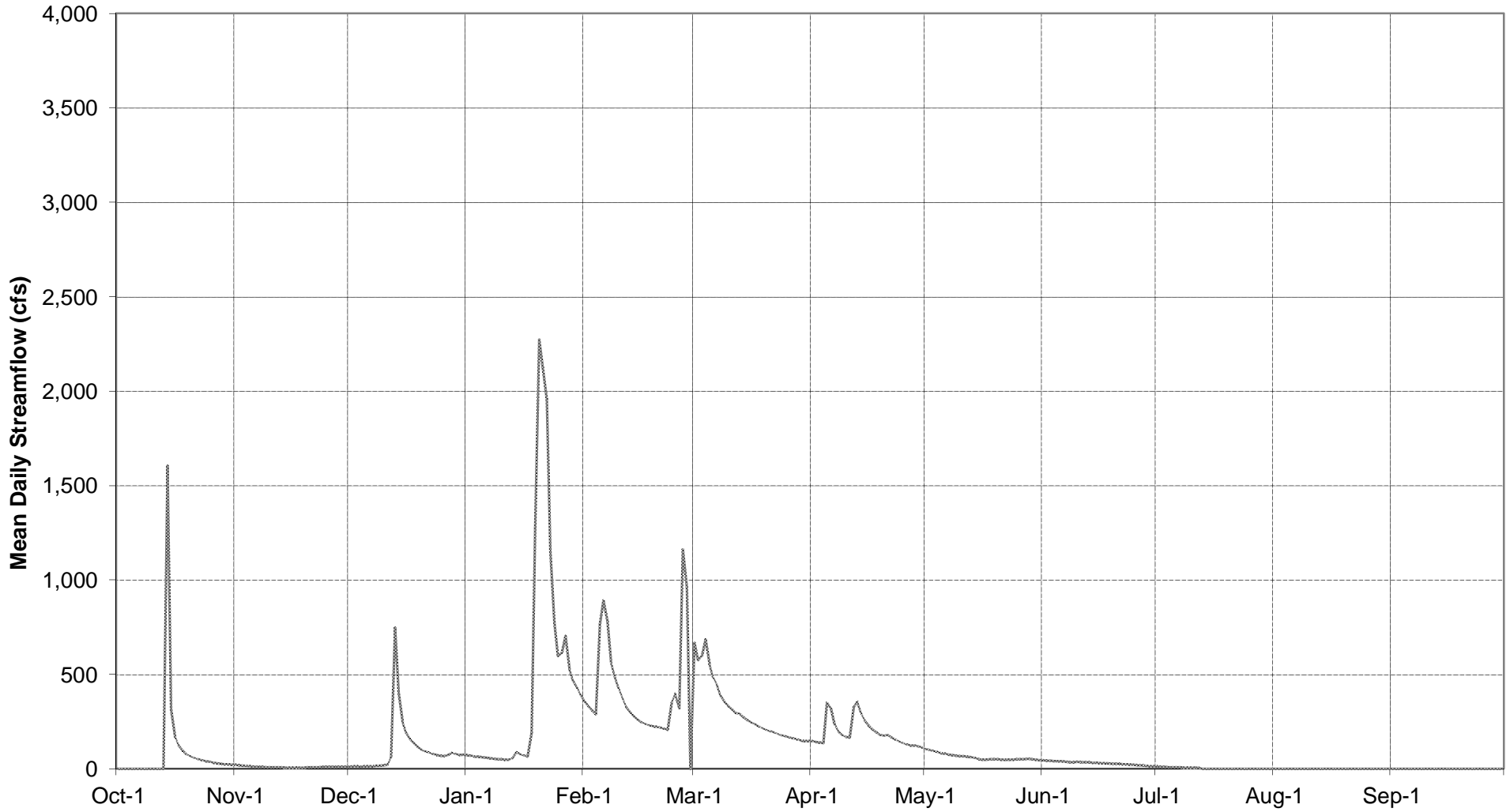
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2008



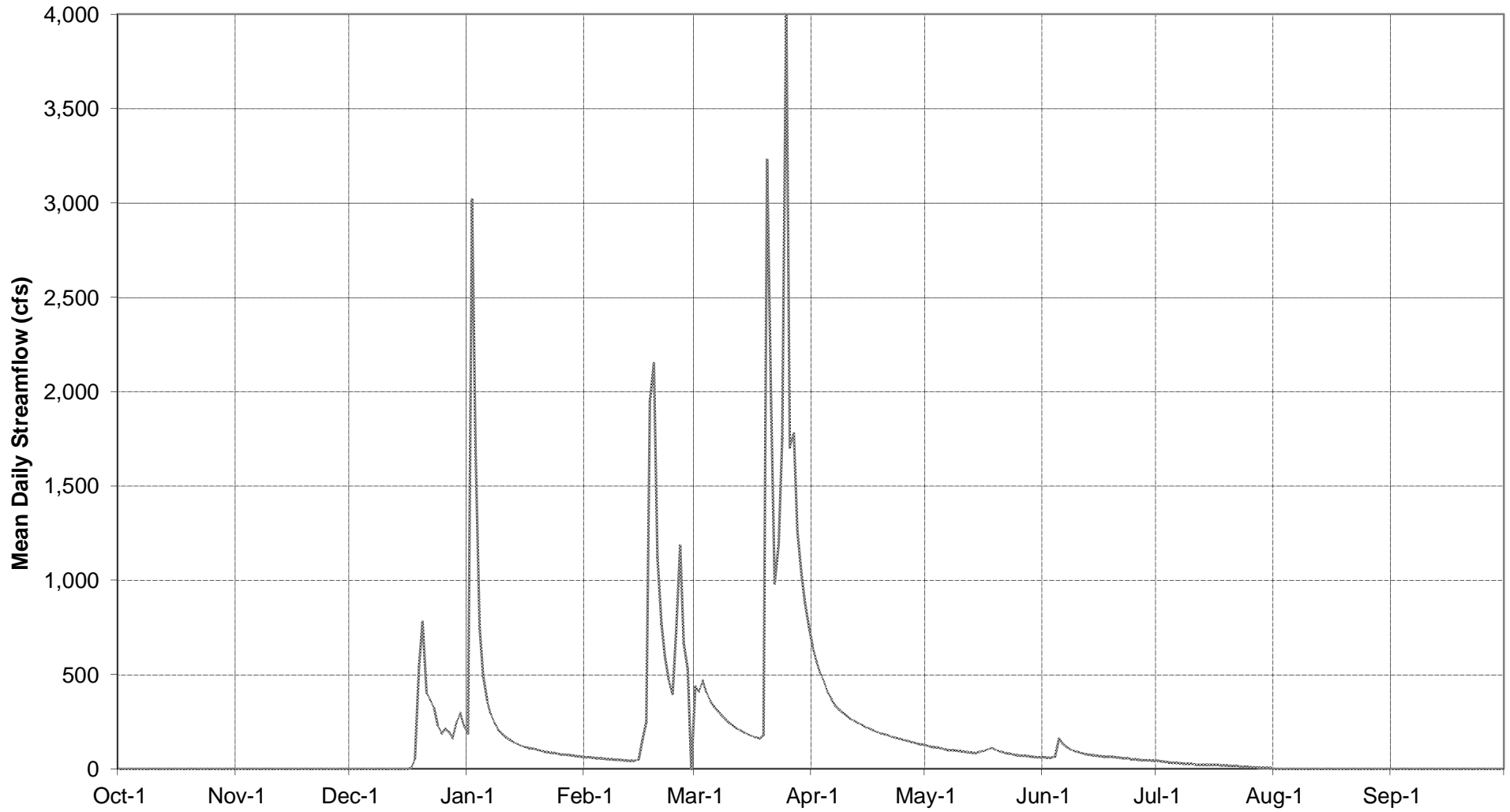
**SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2009**



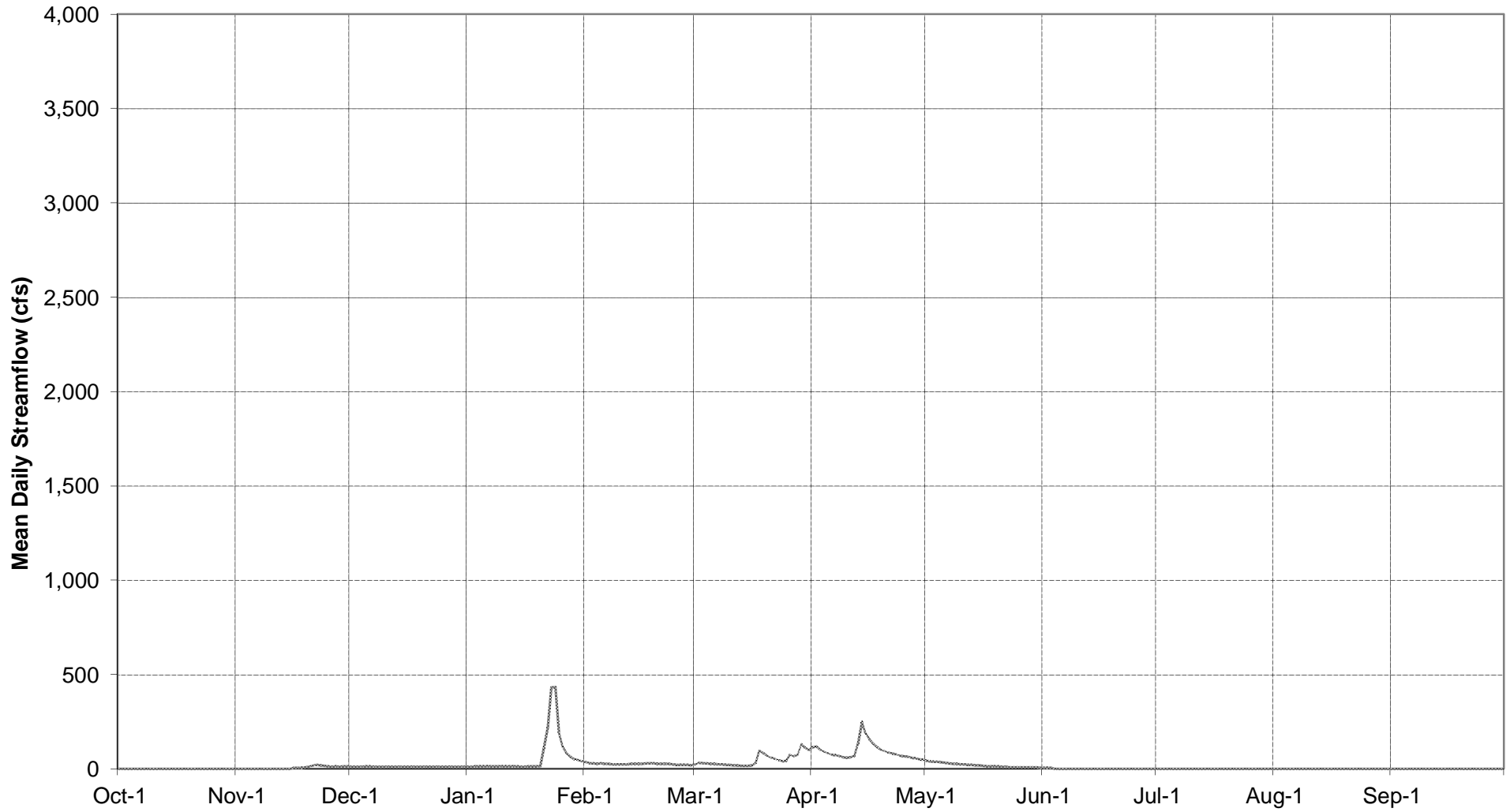
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2010



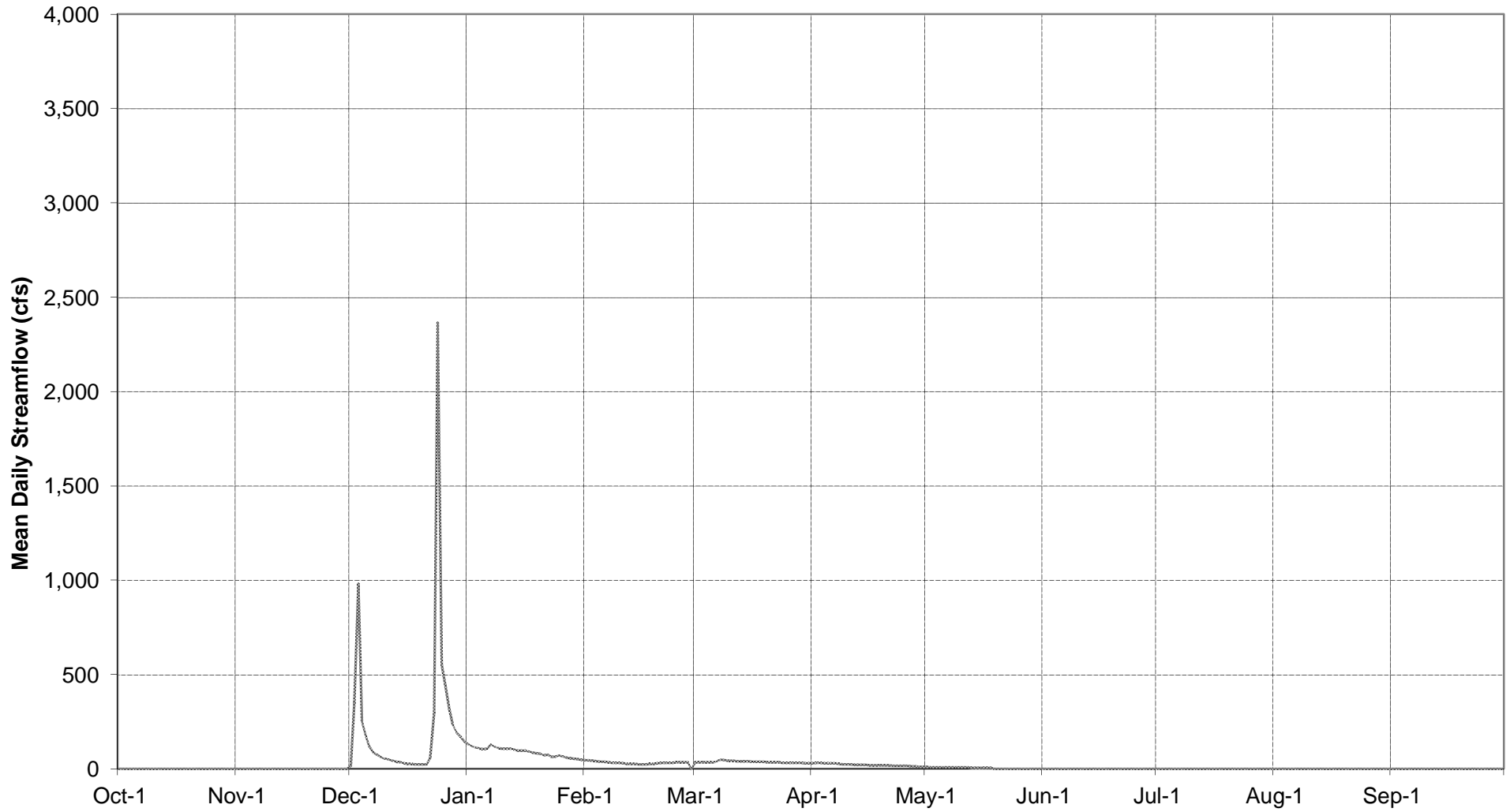
SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2011



SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2012



SAN ANTONIO RIVER AT SAN ANTONIO RESERVOIR
ESTIMATED MEAN DAILY UNIMPAIRED STREAMFLOW
WATER YEAR 2013





Appendix B



APPENDIX B – MONTHLY CONSUMPTIVE DEMANDS, ACRE-FEET

Month	Lakeside Use	Nacimiento Water Project
10	141	1,390
11	128	1,153
12	118	744
1	120	755
2	121	1,037
3	130	1,033
4	145	1,133
5	157	1,165
6	166	1,707
7	175	1,907
8	169	1,966
9	180	1,758
Total Annual	1,750	15,750



Appendix C

APPENDIX C – CONSERVATION RELEASE SCHEDULE, CFS

Day	Dry	Normal	Wet
3/1	0	0	0
3/2	0	0	0
3/3	0	0	0
3/4	0	0	0
3/5	0	0	0
3/6	0	0	0
3/7	135	0	0
3/8	135	0	0
3/9	210	0	0
3/10	310	0	0
3/11	450	0	0
3/12	500	0	0
3/13	500	135	0
3/14	500	135	0
3/15	500	210	0
3/16	500	310	0
3/17	500	450	0
3/18	500	500	0
3/19	500	500	0
3/20	500	500	0
3/21	500	500	0
3/22	500	500	0
3/23	500	500	0
3/24	500	500	0
3/25	500	500	0
3/26	500	500	0
3/27	500	500	0
3/28	500	450	0
3/29	450	410	0
3/30	450	360	0
3/31	450	360	0
4/1	410	360	135



Day	Dry	Normal	Wet
4/2	410	385	135
4/3	410	385	135
4/4	410	385	135
4/5	410	385	135
4/6	410	385	135
4/7	410	385	135
4/8	410	385	135
4/9	410	385	135
4/10	410	410	135
4/11	450	450	135
4/12	450	450	135
4/13	500	500	135
4/14	500	500	135
4/15	500	500	135
4/16	500	500	135
4/17	525	525	135
4/18	525	525	135
4/19	525	525	135
4/20	525	525	135
4/21	525	525	135
4/22	525	525	135
4/23	500	500	135
4/24	500	500	135
4/25	500	500	135
4/26	500	500	135
4/27	500	500	135
4/28	500	500	135
4/29	500	500	135
4/30	500	500	135
5/1	500	500	135
5/2	500	500	135
5/3	500	500	135
5/4	500	500	135
5/5	500	500	135



Day	Dry	Normal	Wet
5/6	525	525	135
5/7	525	525	135
5/8	525	525	135
5/9	525	525	210
5/10	525	525	210
5/11	525	525	210
5/12	525	525	210
5/13	525	525	210
5/14	525	525	260
5/15	525	525	260
5/16	540	540	260
5/17	540	540	260
5/18	540	540	260
5/19	540	540	310
5/20	540	540	310
5/21	540	540	310
5/22	540	540	310
5/23	540	540	310
5/24	540	540	410
5/25	540	540	410
5/26	540	540	410
5/27	540	540	410
5/28	540	540	410
5/29	540	540	450
5/30	540	540	450
5/31	540	540	500
6/1	540	540	540
6/2	540	540	540
6/3	575	575	575
6/4	575	575	575
6/5	575	575	575
6/6	575	575	575
6/7	600	600	600
6/8	600	600	600



Day	Dry	Normal	Wet
6/9	600	600	600
6/10	600	600	600
6/11	575	575	575
6/12	575	575	575
6/13	575	575	575
6/14	600	600	600
6/15	600	600	600
6/16	600	600	600
6/17	600	600	600
6/18	575	575	575
6/19	575	575	575
6/20	575	575	575
6/21	600	600	600
6/22	600	600	600
6/23	625	625	625
6/24	625	625	625
6/25	625	625	625
6/26	625	625	625
6/27	650	650	650
6/28	650	650	650
6/29	650	650	650
6/30	650	650	650
7/1	625	625	625
7/2	625	625	625
7/3	625	625	625
7/4	625	625	625
7/5	650	650	650
7/6	650	650	650
7/7	650	650	650
7/8	650	650	650
7/9	650	650	650
7/10	650	650	650
7/11	650	650	650
7/12	625	625	625



Day	Dry	Normal	Wet
7/13	625	625	625
7/14	625	625	625
7/15	600	600	600
7/16	600	600	600
7/17	600	600	600
7/18	600	600	600
7/19	600	600	600
7/20	600	600	600
7/21	600	600	600
7/22	600	600	600
7/23	600	600	600
7/24	600	600	600
7/25	625	625	625
7/26	650	650	650
7/27	650	650	650
7/28	650	650	650
7/29	650	650	650
7/30	650	650	650
7/31	650	650	650
8/1	650	650	650
8/2	650	650	650
8/3	675	675	675
8/4	700	700	700
8/5	700	700	700
8/6	675	675	675
8/7	675	675	675
8/8	675	675	675
8/9	675	675	675
8/10	675	675	675
8/11	675	675	675
8/12	675	675	675
8/13	675	675	675
8/14	675	675	675
8/15	675	675	675



Day	Dry	Normal	Wet
8/16	675	675	675
8/17	650	650	650
8/18	650	650	650
8/19	650	650	650
8/20	650	650	650
8/21	650	650	650
8/22	650	650	650
8/23	650	650	650
8/24	675	675	675
8/25	675	675	675
8/26	700	700	700
8/27	700	700	700
8/28	650	650	650
8/29	650	650	650
8/30	650	650	650
8/31	650	650	650
9/1	650	650	650
9/2	650	650	650
9/3	675	675	675
9/4	700	700	700
9/5	700	700	700
9/6	675	675	675
9/7	675	675	675
9/8	675	675	675
9/9	675	675	675
9/10	650	650	650
9/11	650	650	650
9/12	650	650	650
9/13	625	625	625
9/14	625	625	625
9/15	600	600	600
9/16	600	600	600
9/17	600	600	600
9/18	575	575	575



Day	Dry	Normal	Wet
9/19	550	550	550
9/20	550	550	550
9/21	550	550	550
9/22	550	550	550
9/23	550	550	550
9/24	550	550	550
9/25	550	550	550
9/26	550	550	550
9/27	550	550	550
9/28	550	550	550
9/29	550	550	550
9/30	550	550	550
10/1	550	550	550
10/2	500	500	500
10/3	500	500	500
10/4	500	500	500
10/5	500	500	500
10/6	475	475	475
10/7	475	475	475
10/8	475	475	475
10/9	475	475	475
10/10	450	450	450
10/11	450	450	450
10/12	450	450	450
10/13	450	450	450
10/14	450	450	450
10/15	425	425	425
10/16	410	410	410
10/17	385	385	385
10/18	360	360	360
10/19	360	360	360
10/20	310	310	310
10/21	310	310	310
10/22	260	260	260



Day	Dry	Normal	Wet
10/23	210	210	210
10/24	160	160	160
10/25	160	160	160
10/26	160	160	160
10/27	160	160	160
10/28	0	0	0
10/29	0	0	0
10/30	0	0	0
10/31	0	0	0



Appendix D

BASELINE: Nacimiento Reservoir End of Month Storage, AF

WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1967	72,645	71,323	212,167	303,593	326,089	377,900	377,900	369,257	343,465	312,334	280,553	251,008
1968	228,322	222,738	219,817	218,213	222,705	211,889	188,838	160,915	132,638	105,402	78,035	64,221
1969	58,367	53,250	60,132	356,395	377,900	377,900	377,900	364,863	338,034	306,652	274,921	244,975
1970	222,532	216,970	224,798	291,052	297,429	326,530	305,250	278,090	248,746	217,640	186,788	157,780
1971	138,717	163,783	225,317	238,585	239,017	229,895	208,930	183,248	156,031	126,910	101,708	80,352
1972	67,313	61,911	90,669	91,517	96,307	79,051	61,774	44,672	24,714	19,812	17,104	14,800
1973	16,286	46,062	46,398	138,046	305,090	372,236	373,812	357,561	328,328	296,865	265,663	236,236
1974	213,868	218,241	241,296	336,937	339,015	377,900	369,124	344,719	316,606	285,677	254,465	224,654
1975	202,378	196,760	206,702	205,572	314,629	377,900	369,346	344,992	316,145	284,944	253,375	223,469
1976	201,018	195,123	190,341	185,876	184,527	170,020	145,784	119,246	92,979	66,591	49,284	43,036
1977	37,495	32,438	28,319	28,308	24,320	22,244	21,140	19,953	17,519	14,902	12,322	10,279
1978	10,037	9,904	48,367	213,362	377,114	377,900	377,900	367,410	340,339	309,369	277,622	247,888
1979	225,027	224,407	221,378	247,812	308,229	333,796	322,722	297,026	267,195	235,447	204,187	174,731
1980	152,864	147,376	150,471	272,597	377,900	377,900	376,619	361,082	332,360	301,306	269,877	240,144
1981	221,789	215,829	213,191	233,307	236,918	270,525	250,821	228,207	205,836	181,714	156,872	135,289
1982	122,186	131,246	138,624	200,171	212,759	250,971	376,698	363,805	335,489	304,538	273,050	243,507
1983	221,087	244,953	328,036	377,900	377,900	377,900	377,900	373,858	347,361	316,838	290,711	268,238
1984	255,062	277,102	328,418	331,352	331,456	316,364	294,233	274,028	251,254	226,647	201,363	178,997
1985	165,548	169,379	186,210	186,790	200,605	198,472	182,588	165,277	143,876	120,268	96,115	75,540
1986	62,934	60,164	64,964	79,581	261,182	377,900	375,317	358,181	328,215	296,883	265,346	235,922
1987	213,635	207,589	203,219	200,302	216,579	210,937	189,628	171,127	149,569	126,616	102,823	82,242
1988	69,782	64,587	70,065	90,450	89,540	79,532	65,930	48,470	28,732	20,298	17,564	15,174
1989	13,360	11,928	23,554	25,199	28,478	35,017	32,857	27,885	22,137	19,382	16,669	14,338
1990	12,949	12,578	12,122	17,715	24,966	22,270	21,308	19,787	17,371	14,743	12,163	10,259
1991	9,969	9,796	9,715	9,635	9,948	117,672	119,657	115,182	108,421	100,773	93,501	86,625
1992	80,244	74,775	75,193	79,606	144,162	157,809	138,070	112,419	86,785	64,660	57,550	51,000
1993	45,131	40,025	53,922	248,196	347,340	373,906	375,449	359,100	330,064	298,402	266,917	236,983
1994	214,464	208,564	204,855	203,031	231,637	213,871	188,364	161,758	133,447	106,312	79,000	64,696
1995	58,703	53,521	49,121	180,476	201,251	377,900	377,900	366,040	339,505	308,135	276,366	246,506
1996	223,790	217,916	217,562	237,217	357,772	375,065	358,505	332,563	302,926	271,110	239,601	209,890
1997	187,385	198,984	287,317	377,900	376,245	365,265	340,293	310,897	280,487	249,176	218,080	192,854
1998	178,981	179,274	212,727	281,985	377,900	377,900	377,900	373,909	349,755	318,905	290,488	268,012
1999	254,092	248,437	248,437	254,781	277,444	289,329	285,875	261,590	240,861	216,814	191,931	170,125
2000	156,581	151,055	145,968	172,288	301,279	323,450	304,946	278,054	248,556	217,698	186,803	158,029
2001	142,305	137,238	132,634	153,648	198,835	241,726	222,852	195,184	165,751	138,006	113,404	92,127
2002	79,239	83,208	115,675	131,395	131,346	122,559	102,209	84,249	63,605	41,826	22,006	19,494
2003	17,621	29,257	83,624	105,814	120,620	135,791	122,571	111,636	86,077	60,510	52,957	46,436
2004	40,470	35,370	43,591	50,320	82,139	77,734	57,368	36,386	29,657	23,158	19,823	17,318
2005	21,203	21,976	103,570	228,431	326,226	377,900	377,738	364,642	335,953	304,449	272,864	243,035
2006	220,449	214,729	223,229	257,537	270,048	322,744	377,900	367,496	340,065	308,397	276,788	246,936
2007	224,332	218,642	216,606	213,032	220,506	204,308	178,325	150,210	122,629	95,570	69,102	46,703
2008	33,910	28,809	24,526	106,959	152,197	143,604	121,650	96,581	71,147	47,260	34,699	28,515
2009	22,879	21,036	21,286	22,729	44,214	62,559	59,475	54,588	48,153	41,316	34,581	28,399
2010	62,638	58,655	77,758	157,426	215,298	248,921	265,652	252,256	223,637	192,874	162,383	134,352
2011	113,389	108,938	149,315	182,230	259,285	377,900	377,623	364,650	344,217	314,473	282,910	253,023
2012	230,391	227,278	223,274	233,703	230,371	220,617	208,177	180,727	152,008	123,165	96,059	70,689
2013	54,171	49,988	90,879	97,918	95,876	82,766	63,312	45,316	26,009	20,083	17,370	15,030
2014	13,233	11,817	10,875	10,279	11,030	15,165	16,099	14,625	12,332	10,241	9,903	9,634

Min =	9,969	9,796	9,715	9,635	9,948	15,165	16,099	14,625	12,332	10,241	9,903	9,634
Max =	255,062	277,102	328,418	377,900	377,900	377,900	377,900	373,909	349,755	318,905	290,711	268,238
Avg =	122,724	122,603	140,755	184,733	224,034	244,988	238,796	221,536	198,479	174,689	152,576	133,531

BASELINE: San Antonio Reservoir End of Month Storage, AF

WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1967	22,591	22,420	58,213	78,638	89,329	108,617	131,678	138,755	130,557	116,671	99,658	87,453
1968	84,610	83,568	83,156	83,397	87,141	87,995	85,701	78,378	65,640	48,872	30,532	22,778
1969	22,487	22,322	23,754	126,497	202,984	230,218	238,837	239,913	228,658	213,424	195,753	182,778
1970	179,546	178,163	178,744	196,397	200,761	213,975	212,313	205,076	192,507	177,307	159,932	146,544
1971	140,394	140,516	156,433	163,087	164,859	162,603	160,016	154,285	141,862	125,848	103,747	84,014
1972	72,481	71,446	74,032	75,327	77,745	73,231	61,975	45,123	26,049	22,543	21,965	21,545
1973	21,303	24,550	24,485	47,486	97,092	126,331	131,746	132,497	121,497	107,200	90,641	78,627
1974	76,021	76,168	79,455	104,695	107,598	134,365	143,479	139,193	128,308	114,104	97,490	85,261
1975	82,662	81,613	84,116	84,250	110,948	135,116	140,941	136,792	126,282	112,311	95,829	83,667
1976	81,049	79,904	79,182	78,533	79,979	78,510	76,408	67,237	52,914	35,918	22,909	22,556
1977	22,322	22,177	22,068	21,976	21,863	21,659	21,349	21,017	20,530	19,940	19,415	18,999
1978	18,653	18,363	21,987	81,660	153,074	213,475	230,979	235,467	224,805	210,600	193,066	180,144
1979	176,822	177,289	177,312	185,118	202,919	211,389	214,449	207,984	195,338	180,273	163,061	150,124
1980	146,849	145,636	148,436	177,808	256,213	279,913	287,591	289,478	277,784	262,486	244,780	231,692
1981	223,397	221,742	221,383	228,671	233,394	242,661	242,244	229,605	208,755	186,753	163,689	143,412
1982	131,643	133,270	134,579	151,086	156,960	168,919	215,884	219,576	209,765	195,690	178,446	165,839
1983	162,760	165,591	193,452	247,420	301,046	334,481	335,000	335,000	328,690	314,971	292,903	272,302
1984	261,028	264,835	287,139	294,551	297,693	293,812	291,857	274,679	253,654	230,906	207,431	186,609
1985	174,667	174,629	177,344	179,369	183,721	186,421	182,775	165,579	145,409	123,773	101,080	81,335
1986	69,787	68,851	72,188	80,217	172,790	227,475	234,940	236,897	226,330	211,601	194,235	181,684
1987	178,570	176,941	175,984	176,707	182,224	192,099	192,019	175,647	155,392	133,680	110,558	90,300
1988	78,583	77,646	78,694	85,449	87,926	80,140	66,574	49,543	30,420	22,662	22,136	21,697
1989	21,404	21,242	21,549	22,511	24,935	29,059	31,806	31,261	30,004	28,638	27,376	26,301
1990	25,334	24,563	23,860	23,156	23,609	23,418	23,032	22,644	22,082	21,490	20,964	20,549
1991	20,185	19,974	19,858	19,758	19,624	43,262	47,367	47,350	46,226	44,725	43,334	41,985
1992	40,824	39,900	39,088	38,775	55,369	60,459	58,921	50,150	36,389	22,953	22,393	21,942
1993	21,614	21,416	22,364	77,421	117,591	135,650	140,340	141,083	130,330	115,990	99,419	87,296
1994	84,702	83,688	83,508	83,875	88,972	87,917	85,153	78,490	65,899	49,362	30,858	22,856
1995	22,556	22,420	22,344	68,615	79,298	174,747	186,044	190,627	181,101	166,916	150,048	137,657
1996	134,806	133,683	133,973	136,680	176,111	196,361	198,405	193,673	182,080	167,194	150,184	137,791
1997	134,899	134,546	157,037	246,334	263,689	266,793	264,466	256,993	244,466	229,335	211,837	194,393
1998	182,618	181,424	187,472	203,738	317,942	334,481	335,000	335,000	327,483	313,453	292,176	271,706
1999	259,638	258,366	258,138	259,683	265,804	267,483	270,189	262,293	242,499	220,265	197,336	177,181
2000	165,263	163,982	162,797	171,697	206,657	216,235	216,561	209,955	197,461	182,752	165,571	152,749
2001	144,052	143,053	142,065	147,101	158,214	174,491	174,344	168,135	155,770	138,997	116,681	97,102
2002	85,628	85,036	96,064	105,394	107,086	104,691	100,492	85,699	66,513	45,330	23,043	22,649
2003	22,393	24,280	40,237	52,548	56,910	59,422	58,580	53,811	40,941	23,599	22,656	22,258
2004	21,949	21,807	23,937	28,656	39,053	42,109	36,747	23,193	22,609	22,116	21,694	21,296
2005	21,003	20,845	28,450	65,882	103,844	134,979	144,057	146,743	136,495	122,323	105,683	93,506
2006	90,820	89,766	93,235	111,656	116,862	139,428	177,612	183,047	173,019	158,910	141,911	129,419
2007	126,491	125,304	124,943	124,599	126,972	126,188	122,911	114,832	101,319	84,191	64,676	47,084
2008	36,182	35,355	34,601	55,421	71,389	76,203	73,309	64,753	50,575	31,623	22,770	22,350
2009	22,048	21,886	21,786	21,698	28,028	38,701	40,965	41,712	40,670	39,215	37,839	36,637
2010	41,241	41,028	46,589	74,667	97,187	114,876	124,894	126,611	116,388	102,420	85,756	72,741
2011	69,160	68,206	75,810	93,880	116,366	166,276	180,282	183,344	175,049	161,498	144,560	132,049
2012	129,105	128,323	128,101	131,230	131,848	131,198	132,579	126,033	113,525	97,737	78,365	63,321
2013	55,793	54,883	68,554	73,278	74,360	73,182	64,655	47,614	27,911	22,643	22,132	21,718
2014	21,421	21,261	21,163	21,076	20,989	21,444	21,484	21,130	20,646	20,127	19,652	19,268

Min =	18,653	18,363	19,858	19,758	19,624	21,444	21,349	21,017	20,530	19,940	19,415	18,999
Max =	261,028	264,835	287,139	294,551	317,942	334,481	335,000	335,000	328,690	314,971	292,903	272,302
Avg =	92,278	91,956	96,451	112,660	132,437	146,718	150,186	145,498	134,137	120,861	106,837	96,524

10' TUNNEL WITH ADDITIONAL BENEFICIAL USES: Nacimiento Reservoir End of Month Storage, AF

WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1967	72,645	71,323	188,832	255,222	206,255	222,639	263,650	249,436	227,110	206,189	183,634	164,423
1968	152,227	146,804	143,969	142,461	147,050	146,417	136,497	120,871	102,133	82,219	62,032	44,977
1969	34,850	29,819	36,759	317,132	377,900	373,891	377,900	370,575	339,333	314,213	287,489	264,234
1970	250,035	228,301	235,939	274,498	261,191	284,484	261,846	233,556	210,936	189,344	167,374	148,144
1971	136,273	161,345	208,712	191,927	172,169	165,478	157,803	145,163	128,505	108,721	88,247	70,754
1972	59,953	54,597	83,392	84,259	89,066	78,212	64,316	47,564	27,845	20,250	17,535	15,217
1973	16,697	46,469	46,804	138,451	263,818	273,665	242,029	217,716	195,486	173,486	151,952	133,358
1974	121,751	126,319	149,502	214,363	184,555	251,983	251,258	230,509	210,593	189,715	167,871	148,693
1975	136,966	131,525	141,570	140,570	220,212	271,913	258,045	235,233	214,657	192,822	170,696	151,470
1976	139,618	133,928	129,305	125,018	123,775	119,910	109,136	94,474	77,249	59,278	41,586	27,385
1977	21,442	20,042	19,663	22,298	21,659	21,777	20,675	19,490	17,065	14,466	11,888	10,225
1978	9,985	9,853	48,317	188,342	297,730	366,159	377,900	372,240	341,872	317,027	290,158	267,002
1979	252,295	235,134	231,569	231,579	272,311	295,438	286,296	250,857	224,770	202,769	180,233	160,731
1980	148,804	143,325	146,429	244,972	377,900	375,581	377,896	369,158	336,240	311,546	285,230	262,290
1981	247,641	226,025	223,313	223,228	202,720	234,096	220,407	201,540	180,492	159,522	138,036	119,421
1982	108,020	117,110	124,508	186,073	181,207	196,380	288,632	258,443	231,699	210,483	188,156	168,963
1983	156,980	180,945	251,700	366,935	377,900	377,900	377,900	375,596	355,501	330,751	304,280	280,868
1984	267,147	278,506	327,103	308,223	287,949	263,264	237,931	217,628	196,117	174,760	152,913	133,679
1985	122,030	125,982	142,860	143,494	157,382	164,073	156,198	139,791	118,759	95,594	71,988	52,024
1986	39,984	37,326	42,202	56,872	221,869	301,911	272,270	251,982	227,959	206,782	184,489	165,464
1987	153,623	147,799	143,548	140,732	157,099	161,384	149,789	134,106	115,729	96,252	76,251	59,146
1988	48,772	43,664	49,217	69,662	68,810	61,351	49,038	33,103	21,323	18,559	15,881	13,534
1989	11,724	10,304	22,797	24,443	27,725	34,270	32,118	27,157	21,889	19,136	16,432	14,105
1990	12,717	12,347	11,891	17,484	24,737	22,255	21,293	19,772	17,356	14,728	12,148	10,252
1991	9,961	9,789	9,709	9,628	9,942	117,665	119,650	115,176	108,415	100,766	93,494	86,618
1992	80,237	74,769	75,186	79,600	144,155	157,813	138,074	112,423	86,789	64,100	56,999	50,456
1993	44,593	39,490	53,389	214,101	242,999	223,270	215,609	204,973	184,528	163,711	142,183	123,452
1994	111,894	106,330	102,793	101,166	129,911	121,896	109,127	94,405	75,381	55,484	35,534	21,864
1995	19,980	18,540	17,929	149,919	170,018	358,534	315,927	279,287	249,768	223,447	200,735	181,153
1996	168,840	163,124	162,861	181,938	267,974	311,751	300,724	259,952	231,211	209,077	186,528	167,031
1997	154,865	166,511	235,352	377,900	372,100	356,086	340,703	286,366	251,717	229,507	206,601	186,567
1998	174,037	174,342	195,003	240,243	377,900	377,900	377,900	375,969	358,177	332,968	305,595	282,067
1999	267,536	248,766	247,556	219,639	222,647	230,373	230,150	209,186	189,544	168,656	147,282	128,631
2000	116,961	111,541	106,541	132,912	242,294	235,384	213,526	194,158	174,401	153,912	132,510	114,093
2001	103,037	98,069	93,542	114,620	159,856	184,255	176,290	159,014	137,582	114,963	91,373	71,085
2002	58,851	62,897	95,398	111,144	111,134	105,672	91,429	72,085	49,721	28,012	21,551	19,043
2003	17,175	28,815	83,184	105,375	120,181	135,354	122,155	111,263	85,727	60,233	52,686	46,169
2004	40,206	35,107	43,328	50,059	81,878	77,494	57,150	36,200	29,474	22,980	19,764	17,261
2005	21,148	21,920	103,515	188,198	242,417	254,863	236,763	223,157	201,838	180,950	159,031	140,072
2006	128,268	122,788	131,439	165,863	170,389	206,267	266,264	253,219	229,203	207,695	185,343	165,971
2007	153,889	148,377	146,453	142,972	150,542	144,551	131,907	116,143	98,012	78,784	59,263	42,860
2008	32,995	27,899	23,620	106,055	151,295	143,755	126,461	103,080	77,467	52,843	38,055	31,825
2009	26,145	21,967	22,215	23,656	45,080	63,420	60,330	55,433	48,985	42,132	35,384	29,190
2010	63,420	59,434	78,535	158,201	200,903	186,192	187,328	182,140	162,122	139,510	115,868	95,455
2011	82,947	78,598	119,037	151,995	211,627	299,912	277,103	256,170	237,572	216,298	193,836	174,289
2012	162,091	159,146	155,248	165,765	154,182	154,513	155,020	139,785	120,680	100,135	79,096	61,137
2013	50,205	46,043	86,946	93,992	91,957	83,475	68,179	49,709	29,731	20,522	17,803	15,446
2014	13,647	12,231	11,286	10,348	11,054	15,189	16,122	14,648	12,355	10,242	9,904	9,635

Min =	9,961	9,789	9,709	9,628	9,942	15,189	16,122	14,648	12,355	10,242	9,904	9,635
Max =	267,536	278,506	327,103	377,900	377,900	377,900	377,900	375,969	358,177	332,968	305,595	282,067
Avg =	100,523	99,068	115,624	154,240	183,446	200,209	194,265	177,498	157,729	139,282	121,936	107,244

10' TUNNEL WITH ADDITIONAL BENEFICIAL USES: San Antonio Reservoir End of Month Storage, AF

WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1967	22,591	22,420	81,545	120,660	183,042	238,550	285,394	302,502	290,212	265,133	237,993	214,865
1968	201,063	199,640	198,978	198,997	202,549	193,018	177,239	157,125	134,173	109,442	83,392	60,219
1969	46,701	45,826	46,672	165,307	297,188	329,024	335,000	329,402	321,848	299,330	275,751	255,388
1970	243,457	257,984	258,437	287,108	291,287	300,164	299,512	292,954	273,152	247,899	221,208	197,684
1971	184,123	184,128	214,160	240,154	242,439	234,765	218,801	199,979	176,947	151,509	124,598	100,928
1972	87,081	85,962	88,495	89,751	92,124	81,150	66,461	49,185	29,755	22,622	22,043	21,622
1973	21,380	24,626	24,560	47,562	138,821	225,259	263,663	272,104	253,797	229,666	203,101	179,991
1974	166,402	166,229	169,331	225,247	240,245	284,950	302,089	293,602	273,740	248,773	222,210	198,873
1975	185,405	183,990	186,213	186,035	241,981	291,449	303,329	297,192	277,672	253,666	227,207	203,858
1976	190,271	188,648	187,644	186,682	187,919	175,570	159,737	138,134	114,136	88,088	60,542	35,380
1977	22,982	22,835	22,724	22,631	22,516	22,308	21,993	21,655	21,158	20,556	20,022	19,598
1978	19,246	18,951	22,571	107,170	222,398	312,679	328,907	327,925	319,685	298,413	275,117	254,927
1979	242,936	259,715	259,586	278,077	295,737	299,454	300,279	303,094	286,125	260,798	234,428	211,151
1980	197,706	196,365	199,070	251,958	318,430	331,250	335,000	329,734	321,852	299,796	276,609	256,413
1981	244,136	257,975	257,539	271,147	280,233	285,567	279,074	262,588	240,280	215,061	188,641	165,369
1982	151,875	153,454	154,730	171,207	177,049	206,335	286,724	307,588	296,080	272,149	245,742	222,839
1983	209,382	212,132	252,332	304,774	317,942	334,481	335,000	334,396	321,691	302,219	280,528	260,882
1984	250,165	264,653	286,957	294,370	297,512	294,042	295,471	278,651	256,748	231,191	204,703	181,190
1985	167,703	167,680	170,401	172,434	176,798	170,801	159,387	141,625	121,585	100,056	77,386	57,489
1986	45,743	44,889	48,285	56,365	165,607	269,009	305,530	310,596	294,106	269,247	242,778	219,982
1987	206,542	204,817	203,819	204,505	209,979	210,006	200,354	181,358	158,197	133,290	106,686	83,263
1988	69,693	68,790	69,863	76,645	79,154	69,001	54,345	36,117	22,900	22,299	21,778	21,343
1989	21,053	20,893	21,202	22,165	24,629	28,754	31,504	30,963	29,711	28,350	27,093	26,021
1990	25,058	24,288	23,585	23,045	23,586	23,395	23,023	22,635	22,073	21,481	20,955	20,540
1991	20,177	19,965	19,850	19,749	19,616	43,254	47,359	47,342	46,218	44,717	43,326	41,978
1992	40,816	39,893	39,081	38,768	55,362	60,442	58,904	50,133	36,372	22,933	22,374	21,923
1993	21,595	21,397	22,345	110,953	201,671	254,174	268,026	262,920	243,483	218,304	191,871	168,684
1994	155,215	153,964	153,652	153,866	158,855	148,100	132,686	114,242	92,560	69,088	43,675	23,008
1995	22,707	22,571	22,494	68,766	79,448	224,451	283,975	313,780	306,742	287,043	260,799	237,889
1996	224,501	223,159	223,313	225,916	283,713	301,604	297,839	307,503	294,519	269,462	243,113	220,268
1997	206,873	206,394	248,309	304,774	316,104	313,566	301,461	318,644	310,000	285,412	259,371	236,430
1998	223,133	221,847	240,643	273,241	317,942	334,481	335,000	334,046	320,173	300,523	278,229	258,821
1999	247,380	259,219	258,990	275,730	281,829	282,139	281,755	270,756	250,165	225,093	198,972	175,972
2000	162,422	161,151	159,973	168,879	223,496	262,211	265,964	251,956	229,943	205,152	178,829	155,940
2001	142,762	141,765	140,779	145,817	156,932	191,809	180,889	164,562	144,561	122,983	100,034	79,819
2002	67,982	67,464	78,556	87,922	89,653	84,067	73,978	60,928	43,930	23,241	22,613	22,223
2003	21,969	23,858	39,816	52,129	56,491	59,004	58,144	53,339	40,454	23,073	22,618	22,220
2004	21,911	21,769	23,899	28,618	39,015	42,052	36,670	23,087	22,590	22,098	21,675	21,278
2005	20,985	20,827	28,432	106,024	169,063	245,717	277,983	280,938	263,052	238,043	211,626	188,534
2006	175,023	173,694	176,993	195,279	200,352	238,405	299,399	307,648	293,821	269,200	242,705	219,599
2007	206,080	204,674	204,177	203,712	205,964	194,934	178,264	157,749	134,669	109,580	82,978	59,339
2008	45,449	44,581	43,800	64,599	80,547	84,263	76,660	66,352	52,265	33,928	22,800	22,380
2009	22,078	21,915	21,816	21,727	28,058	38,730	40,994	41,740	40,699	39,243	37,867	36,664
2010	41,268	41,055	46,615	74,693	107,831	173,828	199,400	192,856	173,974	151,783	128,221	107,519
2011	95,444	94,368	101,897	119,912	158,137	253,236	299,900	310,549	299,964	277,509	251,149	228,098
2012	214,601	213,583	213,218	216,218	216,701	205,674	194,054	175,215	152,990	128,775	103,213	80,648
2013	67,496	66,548	80,193	84,887	85,937	80,090	67,357	50,714	31,566	22,714	22,202	21,788
2014	21,490	21,330	21,232	21,145	21,057	21,512	21,551	21,197	20,711	20,191	19,716	19,331

Min =	19,246	18,951	19,850	19,749	19,616	21,512	21,551	21,197	20,711	20,191	19,716	19,331
Max =	250,165	264,653	286,957	304,774	318,430	334,481	335,000	334,396	321,852	302,219	280,528	260,882
Avg =	119,001	120,081	126,224	147,236	172,561	194,765	200,959	195,819	181,313	162,523	143,968	127,920

10' TUNNEL WITH ADDITIONAL BU w/SAN ANTONIO RAISE: San Antonio Reservoir End of Month Storage, AF

WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1967	72,645	71,323	188,832	255,222	204,751	220,227	259,933	244,696	223,954	202,976	180,362	161,099
1968	148,884	143,467	140,636	139,134	143,727	143,067	133,111	117,448	98,685	78,760	58,590	41,610
1969	31,576	26,558	33,509	315,742	377,900	345,803	343,713	317,111	281,268	258,816	236,403	216,962
1970	204,959	199,439	207,296	256,177	238,876	256,190	245,652	227,155	206,765	185,690	163,882	144,801
1971	133,018	158,097	206,524	189,515	170,712	164,260	156,549	143,868	127,170	107,345	86,833	69,316
1972	58,513	53,167	81,970	82,840	87,650	76,718	62,722	45,859	26,091	20,030	17,317	15,007
1973	16,490	46,264	46,600	138,247	263,610	273,492	241,900	217,643	195,442	173,447	151,906	133,306
1974	121,696	126,264	149,448	214,320	181,811	248,018	246,720	227,319	206,339	185,793	163,962	144,802
1975	133,088	127,659	137,711	136,719	216,093	267,566	251,010	230,280	209,657	188,662	166,604	147,443
1976	135,633	129,958	125,346	121,071	119,835	116,025	105,323	90,756	73,662	55,867	38,426	24,704
1977	20,966	19,568	19,189	22,298	21,659	21,777	20,675	19,490	17,065	14,466	11,888	10,225
1978	9,985	9,853	48,317	188,342	297,730	348,052	354,949	338,821	300,650	269,795	247,210	227,820
1979	215,327	214,730	211,716	226,878	264,106	280,487	268,857	249,707	227,981	206,133	183,774	164,422
1980	152,576	147,088	150,183	248,943	376,396	375,948	377,900	369,739	335,541	312,630	288,206	266,926
1981	253,206	237,311	230,792	235,315	218,668	250,082	239,263	221,051	199,868	178,588	156,758	137,817
1982	126,206	135,257	142,629	189,578	180,485	201,177	300,282	274,524	249,386	228,297	205,699	186,270
1983	174,122	198,058	262,060	366,336	377,900	377,900	377,900	375,662	357,104	333,995	309,259	287,368
1984	274,502	276,900	313,755	294,273	267,773	246,017	237,035	221,327	202,057	181,284	160,047	141,331
1985	129,968	133,898	150,766	151,391	163,871	171,015	163,712	147,961	127,620	105,183	82,309	62,912
1986	51,072	48,358	53,194	67,837	231,810	313,345	284,290	261,429	239,849	218,536	196,077	176,907
1987	164,965	159,094	154,819	151,984	166,664	170,941	159,312	143,574	125,102	105,505	85,334	68,014
1988	57,462	52,316	57,836	78,255	77,378	70,090	57,982	42,256	24,638	19,939	17,210	14,835
1989	13,022	11,591	23,338	24,983	28,263	34,804	32,646	27,677	22,055	19,300	16,590	14,261
1990	12,872	12,502	12,045	17,638	24,890	22,270	21,308	19,787	17,371	14,743	12,163	10,259
1991	9,969	9,796	9,715	9,635	9,948	117,672	119,657	115,182	108,421	100,773	93,501	86,625
1992	80,244	74,775	75,193	79,606	144,162	157,809	138,070	112,419	86,785	64,096	56,995	50,453
1993	44,590	39,487	53,386	214,098	241,543	220,143	212,493	201,418	180,608	159,816	138,317	119,619
1994	108,087	102,537	99,009	97,390	126,142	118,114	105,331	90,598	71,591	51,751	31,982	21,249
1995	19,367	17,929	17,321	149,311	169,693	358,216	315,624	278,991	249,607	223,327	200,612	181,027
1996	168,713	162,996	162,734	181,839	267,894	286,891	268,837	249,446	228,324	206,662	184,345	165,055
1997	153,009	164,658	234,146	377,900	371,902	352,074	338,254	292,214	266,481	245,188	223,115	203,798
1998	191,647	191,914	218,995	264,124	377,900	377,900	377,900	376,100	357,221	324,407	299,602	278,330
1999	265,081	251,959	248,983	235,949	238,381	247,823	250,203	229,785	210,044	188,786	167,088	148,122
2000	136,230	130,756	125,713	152,059	259,931	254,305	233,723	213,010	192,008	170,911	149,334	130,748
2001	119,570	114,559	109,997	131,047	176,262	194,138	181,105	165,116	145,066	123,941	101,897	82,908
2002	71,346	75,341	107,821	123,550	123,516	118,278	105,238	87,199	65,523	42,802	22,848	19,975
2003	18,099	29,731	84,097	106,287	121,092	136,261	123,010	112,052	86,548	60,964	52,867	46,347
2004	40,382	35,283	43,503	50,234	82,052	77,657	57,292	36,321	29,125	22,638	19,662	17,160
2005	21,050	21,823	103,418	188,110	242,374	254,846	236,752	223,151	201,834	180,945	159,025	140,065
2006	128,260	122,780	131,431	165,855	170,385	206,266	266,263	253,218	229,201	207,693	185,340	165,968
2007	153,885	148,372	146,449	142,968	150,537	144,546	131,901	116,137	98,005	78,776	59,254	42,852
2008	32,986	27,890	23,611	106,047	151,286	143,746	126,451	103,068	77,455	52,831	38,044	31,814
2009	26,134	21,967	22,215	23,656	45,080	63,420	60,330	55,433	48,985	42,132	35,384	29,190
2010	63,420	59,434	78,535	158,201	200,903	186,192	187,328	182,140	162,122	139,510	115,868	95,455
2011	82,947	78,598	119,037	151,995	211,627	299,912	277,103	256,170	237,572	216,298	193,836	174,289
2012	162,091	159,146	155,248	165,765	154,182	154,513	155,020	139,785	120,680	100,135	79,096	61,137
2013	50,205	46,043	86,946	93,992	91,957	83,475	68,179	49,709	29,731	20,522	17,803	15,446
2014	13,647	12,231	11,286	10,348	11,054	15,189	16,122	14,648	12,355	10,242	9,904	9,635

Min =	9,969	9,796	9,715	9,635	9,948	15,189	16,122	14,648	12,355	10,242	9,904	9,635
Max =	274,502	276,900	313,755	377,900	377,900	377,900	377,900	376,100	357,221	333,995	309,259	287,368
Avg =	101,536	100,807	117,027	156,104	184,216	199,264	193,644	177,676	158,138	139,603	122,344	108,035

10' TUNNEL WITH ADDITIONAL BU w/SAN ANTONIO RAISE: San Antonio Reservoir End of Month Storage, AF

WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1967	22,591	22,420	81,545	120,660	174,836	231,273	279,438	297,617	283,810	258,883	231,904	208,897
1968	195,173	193,767	193,115	193,143	196,704	187,227	171,528	151,517	128,686	104,078	78,129	54,990
1969	41,442	40,590	41,446	158,228	282,651	345,348	366,606	380,511	377,449	352,061	324,043	299,820
1970	285,647	283,946	284,357	308,924	307,368	322,690	309,916	293,593	271,602	245,883	219,079	195,454
1971	181,832	181,842	210,819	237,522	239,379	231,720	215,811	197,053	174,095	148,741	121,913	98,310
1972	84,505	83,400	85,944	87,205	89,586	78,716	64,156	47,032	27,716	22,577	21,998	21,578
1973	21,336	24,582	24,517	47,519	138,783	225,186	263,547	271,933	253,599	229,466	202,910	179,808
1974	166,224	166,051	169,153	225,058	233,048	278,998	296,746	286,966	268,256	243,048	216,557	193,280
1975	179,840	178,439	180,673	180,507	236,738	286,461	301,056	292,886	273,489	248,720	222,273	198,930
1976	185,345	183,737	182,741	181,788	183,031	170,658	154,794	133,165	109,143	83,045	55,354	29,796
1977	22,898	22,751	22,640	22,547	22,433	22,225	21,911	21,574	21,078	20,477	19,944	19,521
1978	19,170	18,876	22,496	107,095	222,324	330,705	369,973	380,338	379,640	364,084	336,220	312,054
1979	297,720	297,885	297,685	305,305	316,722	327,671	330,888	317,303	295,847	270,245	243,580	220,047
1980	206,456	205,092	207,779	260,434	359,638	394,900	394,900	388,797	381,740	357,406	331,841	309,592
1981	296,029	303,952	306,636	313,921	309,345	313,207	303,666	286,279	263,696	238,384	211,928	188,688
1982	175,197	176,722	177,961	209,001	217,389	240,314	313,716	329,937	316,550	292,181	265,738	242,828
1983	229,348	232,056	278,955	356,219	394,900	394,900	394,900	394,140	379,468	357,888	333,990	312,422
1984	300,593	323,913	357,942	355,120	354,340	342,967	327,886	306,211	281,790	255,325	227,939	203,650
1985	189,740	189,669	192,372	194,381	198,712	192,193	180,069	161,455	140,437	117,856	94,114	73,383
1986	61,236	60,327	63,685	71,736	181,964	283,814	319,655	327,139	307,991	283,059	256,544	233,737
1987	220,273	218,488	217,466	218,129	223,577	223,540	213,793	194,712	171,450	146,457	119,787	96,351
1988	82,783	81,828	82,863	89,605	92,069	81,603	66,595	47,925	26,808	22,543	22,019	21,581
1989	21,289	21,127	21,435	22,398	24,842	28,966	31,714	31,170	29,915	28,550	27,290	26,215
1990	25,250	24,479	23,776	23,073	23,614	23,423	23,032	22,645	22,083	21,490	20,964	20,549
1991	20,185	19,974	19,859	19,758	19,625	43,262	47,368	47,350	46,227	44,725	43,334	41,986
1992	40,824	39,901	39,089	38,776	55,370	60,460	58,921	50,150	36,389	22,933	22,374	21,923
1993	21,595	21,397	22,345	110,953	193,407	247,609	261,495	256,891	237,906	212,790	186,408	163,254
1994	149,809	148,573	148,269	148,492	153,488	142,775	127,416	109,046	87,461	64,061	38,596	22,926
1995	22,626	22,489	22,413	68,685	79,367	224,364	283,875	313,673	306,504	286,766	260,528	237,625
1996	224,240	222,898	223,053	225,656	283,482	326,152	329,378	317,629	297,019	271,491	244,910	221,862
1997	208,350	207,869	249,136	377,268	391,003	382,909	368,936	377,406	359,381	333,348	305,950	281,815
1998	267,813	266,412	278,704	306,137	394,900	394,900	394,900	393,716	380,585	368,053	342,684	320,644
1999	307,638	313,713	315,013	316,475	313,357	310,236	307,074	295,272	274,433	249,334	223,186	200,210
2000	186,661	185,327	184,096	192,965	247,267	284,586	286,903	273,988	252,866	228,342	201,852	178,883
2001	165,656	164,616	163,592	168,593	179,672	220,961	214,966	197,105	175,397	152,015	127,167	105,326
2002	92,534	91,915	102,919	112,237	113,916	107,975	96,470	81,769	63,632	43,395	22,994	22,601
2003	22,345	24,232	40,189	52,501	56,862	59,374	58,562	53,814	40,885	23,553	22,637	22,239
2004	21,930	21,788	23,918	28,637	39,034	42,080	36,718	23,155	22,590	22,097	21,674	21,277
2005	20,984	20,827	28,432	106,015	169,049	245,697	277,957	280,906	263,019	238,012	211,596	188,506
2006	174,996	173,667	176,966	195,251	200,324	238,377	299,370	307,620	293,792	269,173	242,679	219,574
2007	206,056	204,649	204,153	203,688	205,940	194,910	178,242	157,727	134,648	109,560	82,960	59,321
2008	45,431	44,563	43,783	64,581	80,530	84,246	76,645	66,338	52,252	33,915	22,800	22,380
2009	22,078	21,915	21,816	21,727	28,058	38,730	40,994	41,740	40,699	39,243	37,867	36,664
2010	41,268	41,055	46,615	74,693	107,831	173,828	199,400	192,856	173,974	151,783	128,221	107,519
2011	95,444	94,368	101,897	119,912	158,137	253,236	299,900	310,549	299,964	277,509	251,149	228,098
2012	214,601	213,583	213,218	216,218	216,701	205,674	194,054	175,215	152,990	128,775	103,213	80,648
2013	67,496	66,548	80,193	84,887	85,937	80,090	67,357	50,714	31,566	22,714	22,202	21,788
2014	21,490	21,330	21,232	21,145	21,057	21,512	21,551	21,197	20,711	20,191	19,716	19,331

Min =	19,170	18,876	19,859	19,758	19,625	21,512	21,551	21,197	20,711	20,191	19,716	19,331
Max =	307,638	323,913	357,942	377,268	394,900	394,900	394,900	394,140	381,740	368,053	342,684	320,644
Avg =	128,624	128,949	135,394	157,599	183,715	207,139	213,432	207,453	192,317	173,463	154,016	137,664

BASELINE: Nacimiento Reservoir Spill, AF

WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1967	0	0	0	0	0	21,630	64,317	4,741	0	0	0	0	90,689
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	202,769	53,913	11,320	0	0	0	0	0	268,002
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	52,265	16,207	0	0	0	0	0	68,472
1975	0	0	0	0	0	14,225	946	0	0	0	0	0	15,172
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	8,018	103,985	28,483	881	0	0	0	0	141,367
1979	0	0	0	0	0	288	0	0	0	0	0	0	288
1980	0	0	0	0	81,559	50,350	2,503	0	0	0	0	0	134,411
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	100,040	129,378	205,909	47,208	19,111	0	0	0	0	501,646
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	11,988	1,795	0	0	0	0	0	13,783
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	61,425	5,399	631	0	0	0	0	67,455
1996	0	0	0	0	0	27,370	0	0	0	0	0	0	27,370
1997	0	0	0	140,204	21,855	0	0	0	0	0	0	0	162,059
1998	0	0	0	0	222,988	36,465	25,514	7,372	0	0	0	0	292,339
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	12,509	5,065	0	0	0	0	0	17,574
2006	0	0	0	0	0	0	27,344	383	0	0	0	0	27,727
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	14,897	9,887	0	0	0	0	0	24,785
2012	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0

Min =	0	0	0	0	0	0	0	0	0	0	0	0	0
Max =	0	0	0	140,204	222,988	205,909	64,317	19,111	0	0	0	0	501,646
Avg =	0	0	0	5,005	13,887	13,900	5,125	690	0	0	0	0	38,607

BASELINE: San Antonio Reservoir Spill, AF

WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1967	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	76,212	32,995	17,042	0	0	0	0	126,249
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	23,208	6,158	14,444	7,326	0	0	0	0	51,137
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0

Min =	0	0	0	0	0	0	0	0	0	0	0	0	0
Max =	0	0	0	0	23,208	76,212	32,995	17,042	0	0	0	0	126,249
Avg =	0	0	0	0	484	1,716	988	508	0	0	0	0	3,696

10' TUNNEL WITH ADDITIONAL BENEFICIAL USES: Nacimiento Reservoir Spill, AF

WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1967	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	88,256	30,771	4,197	0	0	0	0	0	123,225
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	16,434	881	0	0	0	0	17,315
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	19,559	31,713	85	0	0	0	0	0	51,357
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	100,343	183,466	37,531	19,110	0	0	0	0	340,450
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	65,854	5,928	0	0	0	0	0	0	0	71,781
1998	0	0	0	0	162,378	15,464	20,535	7,373	0	0	0	0	205,750
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0

Min =	0	0	0	0	0	0	0	0	0	0	0	0	0
Max =	0	0	0	65,854	162,378	183,466	37,531	19,110	0	0	0	0	340,450
Avg =	0	0	0	1,372	7,843	5,446	1,641	570	0	0	0	0	16,872

10' TUNNEL WITH ADDITIONAL BENEFICIAL USES: San Antonio Reservoir Spill, AF

WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1967	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	1,630	300	0	0	0	0	1,931
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	25,619	10,707	2,021	84	0	0	0	0	38,432
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	16,162	38,288	93,108	32,878	15,908	0	0	0	0	196,343
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	37,456	5,941	0	0	0	0	0	0	0	43,397
1998	0	0	0	0	91,398	6,158	14,444	6,219	0	0	0	0	118,219
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0

Min =	0	0	0	0	0	0	0	0	0	0	0	0	0
Max =	0	0	0	37,456	91,398	93,108	32,878	15,908	0	0	0	0	196,343
Avg =	0	0	0	1,117	3,359	2,291	1,062	469	0	0	0	0	8,298

10' TUNNEL WITH ADDITIONAL BENEFICIAL USES w/SAN ANTONIO RAISE: Nacimiento Reservoir Spill, AF

WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1967	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	84,731	17,611	0	0	0	0	0	0	102,342
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	8,009	17,500	402	0	0	0	0	0	25,911
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	85,116	183,466	37,551	19,110	0	0	0	0	325,243
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	30,954	192	0	0	0	0	0	0	0	31,146
1998	0	0	0	0	175,837	14,022	19,440	7,373	0	0	0	0	216,671
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0

Min =	0	0	0	0	0	0	0	0	0	0	0	0	0
Max =	0	0	0	30,954	175,837	183,466	37,551	19,110	0	0	0	0	325,243
Avg =	0	0	0	645	7,373	4,846	1,196	552	0	0	0	0	14,611

10' TUNNEL WITH ADDITIONAL BENEFICIAL USES w/SAN ANTONIO RAISE: San Antonio Reservoir Spill, AF

WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1967	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	318	5,384	46	0	0	0	0	5,748
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	18,068	99,369	33,233	15,699	0	0	0	0	166,369
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	48,380	22,325	14,777	6,108	0	0	0	0	91,590
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0

Min =	0	0	0	0	0	0	0	0	0	0	0	0	0
Max =	0	0	0	0	48,380	99,369	33,233	15,699	0	0	0	0	166,369
Avg =	0	0	0	0	1,384	2,542	1,112	455	0	0	0	0	5,494

10' TUNNEL WITH ADDITIONAL BENEFICIAL USES: Interlake Tunnel Diversion, AF

WY	10' TUNNEL WITH ADDITIONAL BENEFICIAL USES: Interlake Tunnel Diversion, AF												CY	WY
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	TOTAL
1967	0	0	23,351	18,758	51,834	36,529	27,629	19,235	6,827	0	0	0	160,811	184,162
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	15,914	55,428	4,967	0	0	10,939	0	0	0	103,380	87,247
1970	0	16,134	0	11,148	0	0	12,524	12,887	3,368	365	0	0	54,463	56,426
1971	0	0	14,171	19,451	665	0	0	0	0	0	0	0	20,116	34,287
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	41,694	57,415	36,842	17,034	3,757	1,152	0	0	157,893	157,893
1974	0	0	0	30,881	12,370	23,164	20,201	8,647	2,391	320	0	0	97,974	97,974
1975	0	0	0	0	29,506	30,623	18,080	10,593	2,240	961	0	0	92,003	92,003
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	24,981	43,890	30,184	0	0	9,770	0	0	0	125,325	108,825
1979	0	16,500	0	10,824	0	0	8,663	20,912	6,246	0	0	0	46,644	63,144
1980	0	0	0	23,596	13,805	0	0	0	10,776	0	0	0	63,787	48,177
1981	0	15,610	0	6,394	4,440	1,281	6,190	2,953	1,520	0	0	0	22,776	38,387
1982	0	0	0	0	0	17,374	36,960	25,740	8,560	372	0	0	101,411	89,006
1983	0	0	12,405	17,963	0	0	0	0	0	0	0	0	28,638	30,368
1984	0	10,675	0	0	0	4,146	15,190	3,814	1,666	0	0	0	24,815	35,490
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	16,638	48,769	32,740	12,016	4,427	12	0	0	114,601	114,601
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	33,575	50,593	34,727	13,537	3,656	2,467	0	0	0	138,555	138,555
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	49,603	51,298	33,484	12,580	4,803	0	0	151,768	151,768
1996	0	0	0	0	18,459	2,953	4,866	25,785	9,098	273	0	0	80,967	61,435
1997	0	0	19,533	4,740	0	0	0	34,865	13,519	127	0	0	66,057	72,784
1998	0	0	12,806	16,394	1,538	0	0	0	0	0	0	0	31,039	30,738
1999	0	13,107	0	15,210	0	3,235	8,874	7,045	1,812	150	0	0	36,327	49,434
2000	0	0	0	0	19,660	34,130	15,483	4,892	993	0	0	0	75,158	75,158
2001	0	0	0	0	0	23,171	0	0	0	0	0	0	23,171	23,171
2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	40,196	25,178	45,792	27,299	9,630	3,459	0	0	0	151,554	151,554
2006	0	0	0	0	0	15,751	26,877	11,982	6,935	76	0	0	61,620	61,620
2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	10,620	48,444	19,177	0	0	0	0	0	78,241	78,241
2011	0	0	0	0	15,794	45,385	36,447	16,685	8,276	1,627	0	0	124,214	124,214
2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Min =	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max =	0	16,500	23,351	40,196	55,428	57,415	51,298	34,865	13,519	4,803	0	0	160,811	184,162
Avg =	0	1,501	1,714	6,042	8,586	11,618	8,727	5,872	2,742	213	0	0	46,527	47,014

10' TUNNEL WITH ADDITIONAL BENEFICIAL USES w/SAN ANTONIO RAISE: Interlake Tunnel Diversion, AF													CY	WY
WY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	TOTAL
1967	0	0	23,351	18,758	52,784	37,439	28,909	20,270	5,253	0	0	0	163,415	186,766
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	14,056	57,128	45,978	16,662	22,012	19,071	1,350	0	0	176,257	176,257
1970	0	0	0	7,070	3,466	7,071	1,712	3,660	1,396	2	0	0	37,492	24,378
1971	0	0	13,114	20,154	231	0	0	0	0	0	0	0	20,385	33,499
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	41,699	57,379	36,799	16,977	3,724	1,140	0	0	157,719	157,719
1974	0	0	0	30,869	14,517	24,375	20,771	7,302	3,478	0	0	0	101,312	101,312
1975	0	0	0	0	29,779	30,862	20,791	8,687	2,364	190	0	0	92,673	92,673
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	24,981	43,890	48,297	25,682	14,839	20,486	9,835	0	0	188,008	188,008
1979	0	0	0	0	2,955	7,701	12,532	5,526	2,090	12	0	0	30,815	30,815
1980	0	0	0	23,376	29,382	12,906	0	0	13,642	0	0	0	92,381	79,306
1981	0	9,856	3,218	144	0	5	3,326	2,159	1,396	0	0	0	7,031	20,105
1982	0	0	0	14,598	2,602	11,093	30,266	21,366	6,862	0	0	0	105,930	86,786
1983	0	0	19,144	23,440	12,428	0	0	0	0	0	0	0	67,322	55,012
1984	0	19,625	11,830	0	5,481	0	0	0	0	0	0	0	5,481	36,936
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	17,648	47,259	32,140	14,558	1,990	0	0	0	113,595	113,595
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	33,575	51,492	36,403	13,529	4,049	2,896	0	0	0	141,945	141,945
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	49,597	51,284	33,479	12,450	4,760	0	0	151,570	151,570
1996	0	0	0	0	17,850	28,187	13,560	5,734	1,892	23	0	0	86,136	67,248
1997	0	0	18,888	38,976	5,736	0	0	28,095	5,639	0	0	0	84,805	97,334
1998	0	0	6,359	11,264	9,021	0	0	0	2,629	9,942	0	0	41,910	39,215
1999	0	7,453	1,601	0	0	0	6,243	6,351	1,663	225	0	0	14,481	23,536
2000	0	0	0	0	18,713	32,583	14,084	6,020	1,980	462	0	0	73,843	73,843
2001	0	0	0	0	0	29,791	6,129	0	0	0	0	0	35,920	35,920
2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	40,188	25,174	45,784	27,294	9,624	3,457	0	0	0	151,521	151,521
2006	0	0	0	0	0	15,751	26,876	11,981	6,934	75	0	0	61,617	61,617
2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	10,620	48,444	19,177	0	0	0	0	0	78,241	78,241
2011	0	0	0	0	15,794	45,385	36,447	16,685	8,276	1,627	0	0	124,214	124,214
2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min =	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max =	0	19,625	23,351	40,188	57,128	57,379	51,284	33,479	20,486	9,942	0	0	188,008	188,008
Avg =	0	769	2,031	6,280	9,758	13,798	9,254	5,404	2,699	618	0	0	50,125	50,612