

Appendix A

Hydrology Calibration and Validation Graphs and Tables

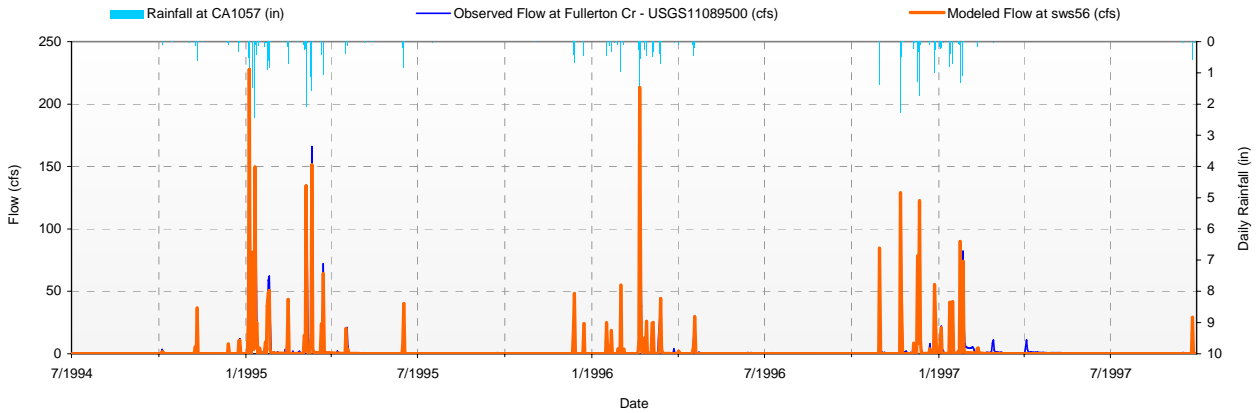
October 2005

Prepared for:
USEPA Region 9
Los Angeles Regional Water Quality Control Board

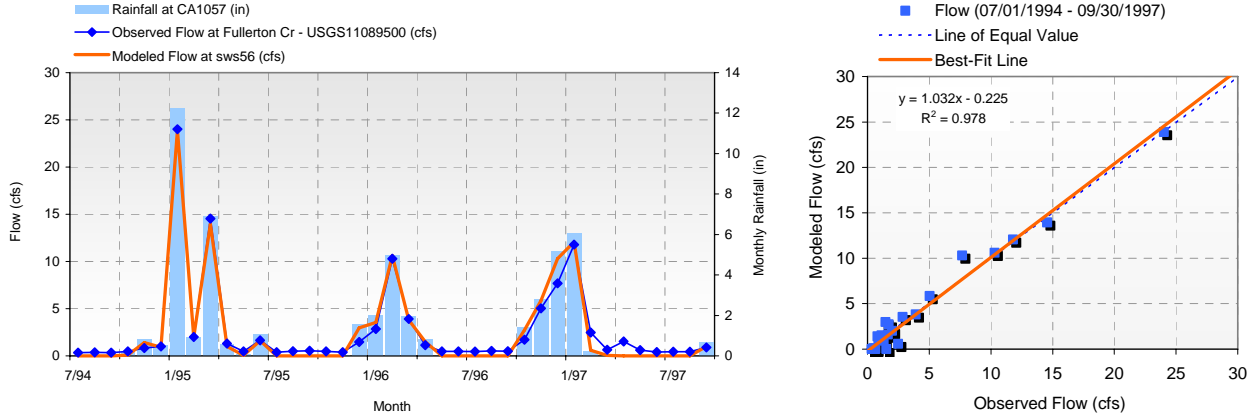
Prepared by:
Tetra Tech, Inc.

Metals TMDLs for the San Gabriel River Watershed – Draft

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

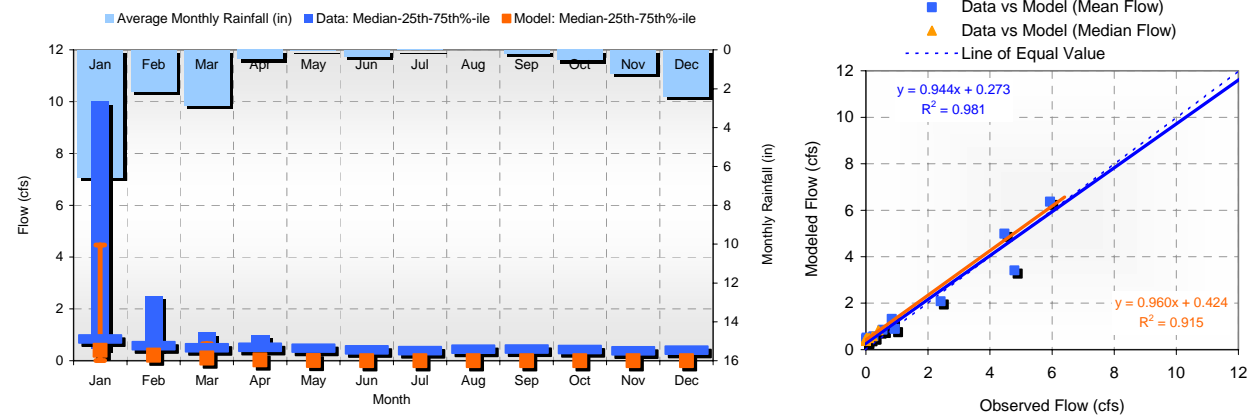
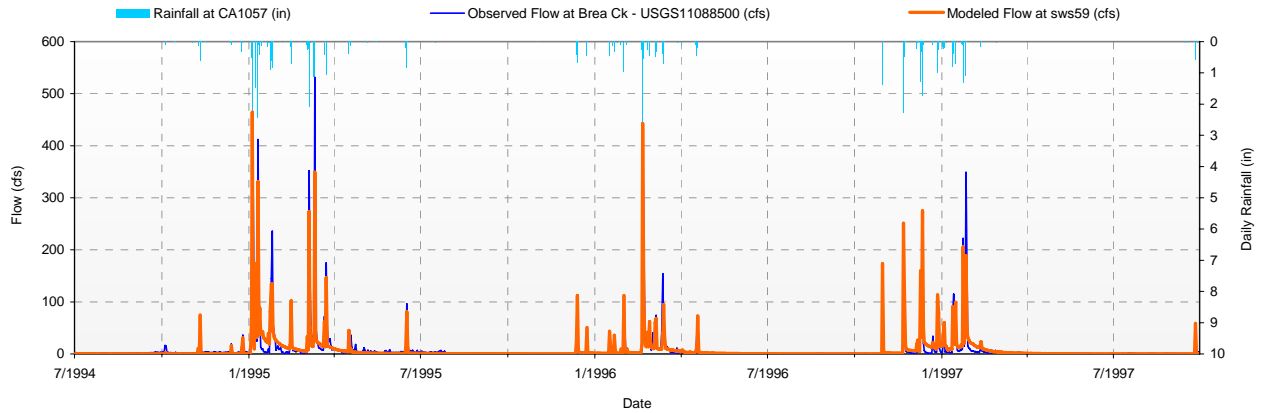


Figure A-1. Calibration Results for USGS Station 11089500 at Fullerton Creek

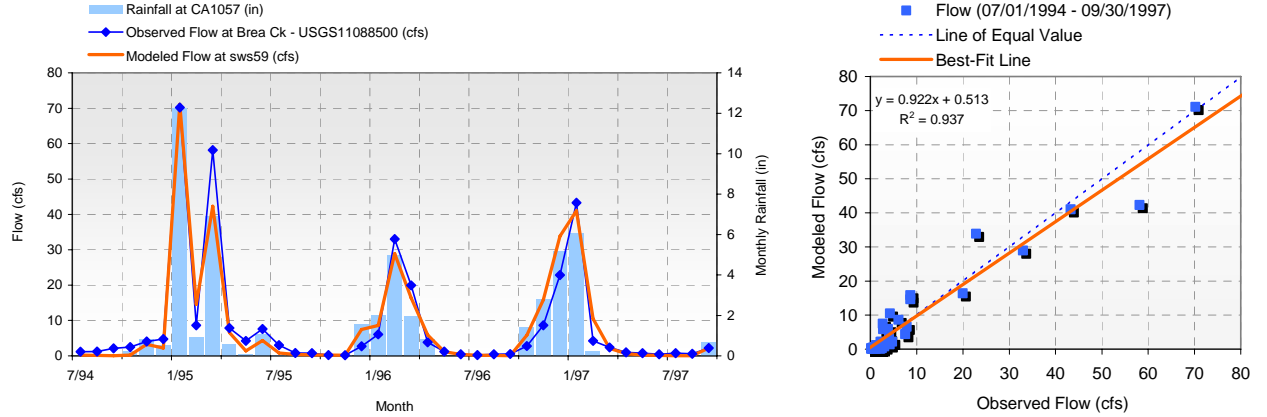
Table A-1. Calibration Error Analysis for USGS Station 11089500 at Fullerton Creek

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 56 3.25-Year Analysis Period: 7/1/1994 - 9/30/1997 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	7.07	Total Observed In-stream Flow:	7.45
Total of simulated highest 10% flows:	6.98	Total of Observed highest 10% flows:	6.29
Total of Simulated lowest 50% flows:	0.00	Total of Observed Lowest 50% flows:	0.50
Simulated Summer Flow Volume (months 7-9):	0.07	Observed Summer Flow Volume (7-9):	0.40
Simulated Fall Flow Volume (months 10-12):	1.72	Observed Fall Flow Volume (10-12):	1.35
Simulated Winter Flow Volume (months 1-3):	4.99	Observed Winter Flow Volume (1-3):	5.13
Simulated Spring Flow Volume (months 4-6):	0.29	Observed Spring Flow Volume (4-6):	0.56
Total Simulated Storm Volume:	6.92	Total Observed Storm Volume:	6.23
Simulated Summer Storm Volume (7-9):	0.07	Observed Summer Storm Volume (7-9):	0.08
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	-5.04	10	
Error in 50% lowest flows:	-99.90	10	
Error in 10% highest flows:	11.04	15	
Seasonal volume error - Summer:	-83.05	30	
Seasonal volume error - Fall:	27.40	30	
Seasonal volume error - Winter:	-2.66	30	
Seasonal volume error - Spring:	-48.62	30	
Error in storm volumes:	11.08	20	
Error in summer storm volumes:	-12.04	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

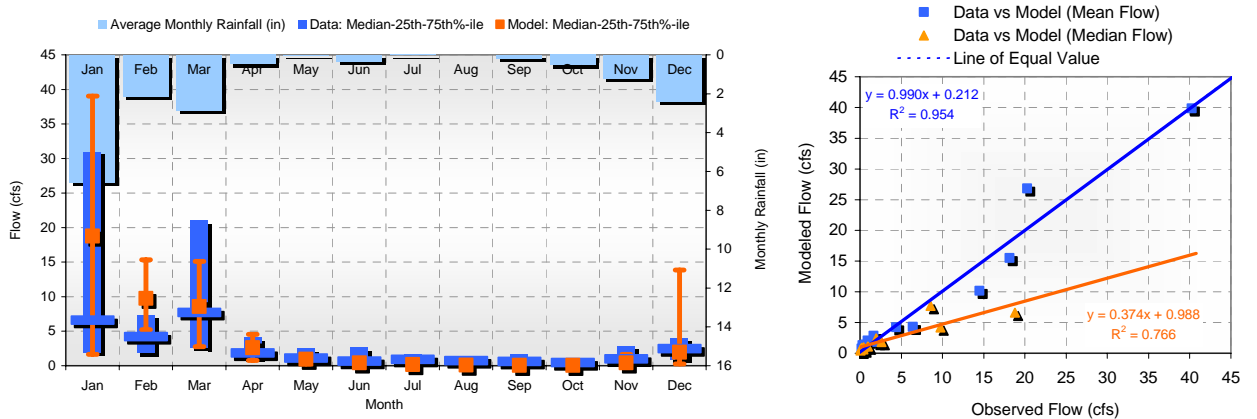
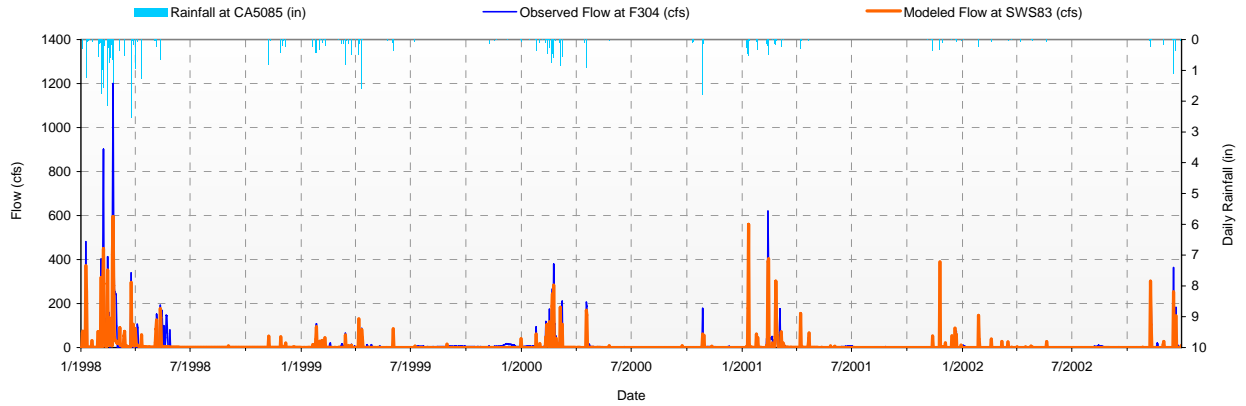


Figure A-2. Calibration Results for USGS Station 11088500 at Brea Creek

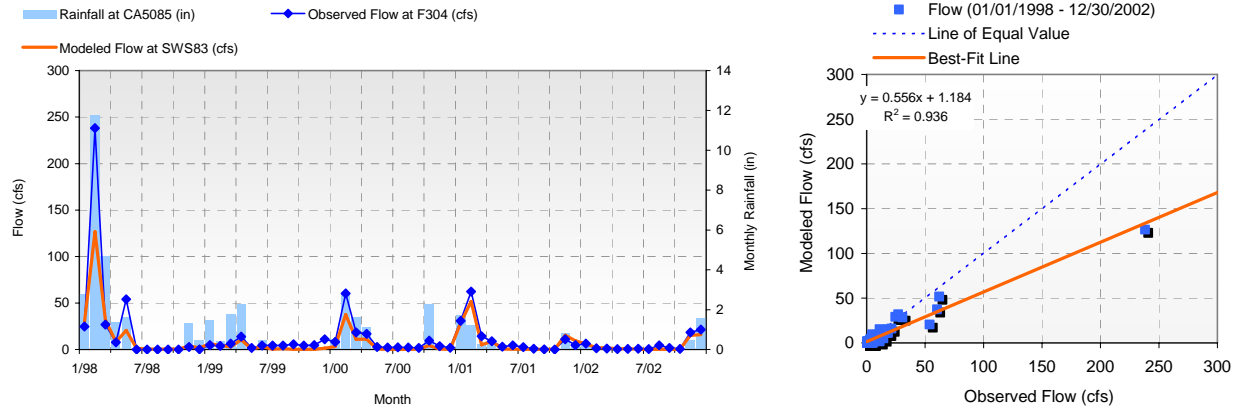
Table A-2. Calibration Error Analysis for USGS Station 11088500 at Brea Creek

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 59 3.25-Year Analysis Period: 7/1/1994 - 9/30/1997 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	40.59	Total Observed In-stream Flow:	41.48
Total of simulated highest 10% flows:	32.34	Total of Observed highest 10% flows:	33.70
Total of Simulated lowest 50% flows:	0.38	Total of Observed Lowest 50% flows:	1.42
Simulated Summer Flow Volume (months 7-9):	0.54	Observed Summer Flow Volume (7-9):	1.72
Simulated Fall Flow Volume (months 10-12):	8.56	Observed Fall Flow Volume (10-12):	6.04
Simulated Winter Flow Volume (months 1-3):	28.96	Observed Winter Flow Volume (1-3):	30.38
Simulated Spring Flow Volume (months 4-6):	2.53	Observed Spring Flow Volume (4-6):	3.35
Total Simulated Storm Volume:	27.45	Total Observed Storm Volume:	32.50
Simulated Summer Storm Volume (7-9):	0.27	Observed Summer Storm Volume (7-9):	0.55
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	-2.15	10	
Error in 50% lowest flows:	-73.13	10	
Error in 10% highest flows:	-4.04	15	
Seasonal volume error - Summer:	-68.29	30	
Seasonal volume error - Fall:	41.65	30	
Seasonal volume error - Winter:	-4.66	30	
Seasonal volume error - Spring:	-24.47	30	
Error in storm volumes:	-15.53	20	
Error in summer storm volumes:	-52.00	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

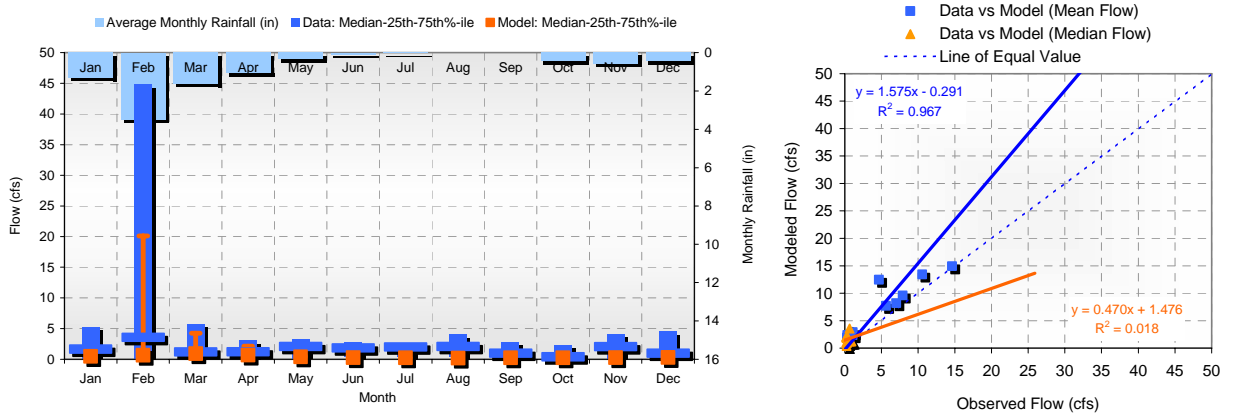
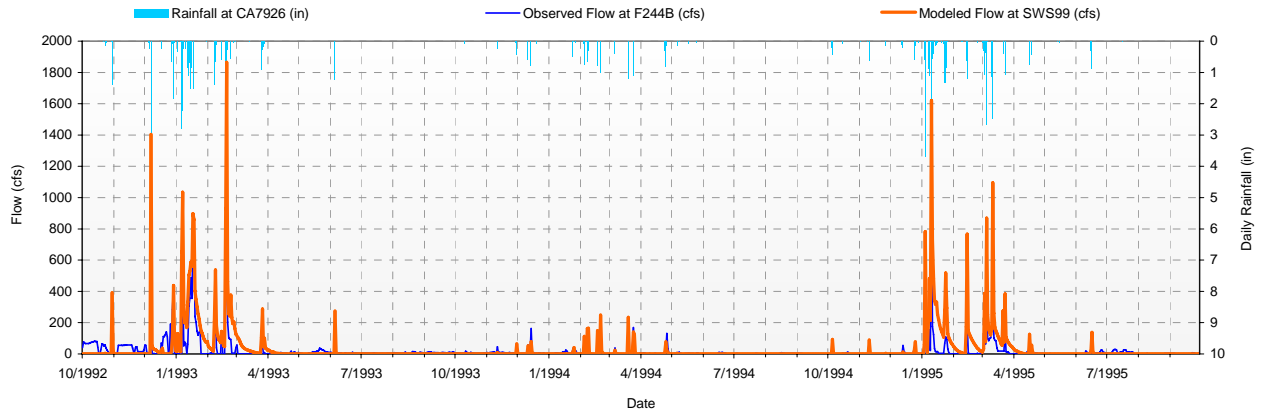


Figure A-3. Calibration Results for LADPW Station F304-R at Walnut Creek

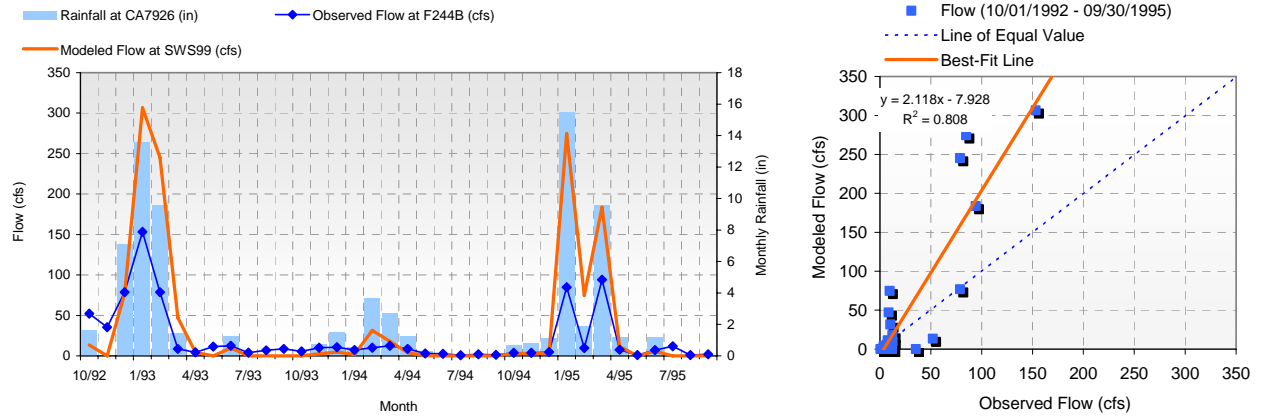
Table A-3. Calibration Error Analysis for LADPW Station F304-R at Walnut Creek

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 83 5-Year Analysis Period: 1/1/1998 - 12/31/2002 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	38.07	Total Observed In-stream Flow:	58.46
Total of simulated highest 10% flows:	35.91	Total of Observed highest 10% flows:	50.79
Total of Simulated lowest 50% flows:	0.55	Total of Observed Lowest 50% flows:	0.77
Simulated Summer Flow Volume (months 7-9):	0.44	Observed Summer Flow Volume (7-9):	2.48
Simulated Fall Flow Volume (months 10-12):	5.49	Observed Fall Flow Volume (10-12):	7.53
Simulated Winter Flow Volume (months 1-3):	26.70	Observed Winter Flow Volume (1-3):	38.65
Simulated Spring Flow Volume (months 4-6):	5.44	Observed Spring Flow Volume (4-6):	9.80
Total Simulated Storm Volume:	34.67	Total Observed Storm Volume:	48.73
Simulated Summer Storm Volume (7-9):	0.12	Observed Summer Storm Volume (7-9):	0.43
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	-34.89	10	
Error in 50% lowest flows:	-29.48	10	
Error in 10% highest flows:	-29.28	15	
Seasonal volume error - Summer:	-82.24	30	
Seasonal volume error - Fall:	-27.08	30	
Seasonal volume error - Winter:	-30.92	30	
Seasonal volume error - Spring:	-44.52	30	
Error in storm volumes:	-28.85	20	
Error in summer storm volumes:	-72.78	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

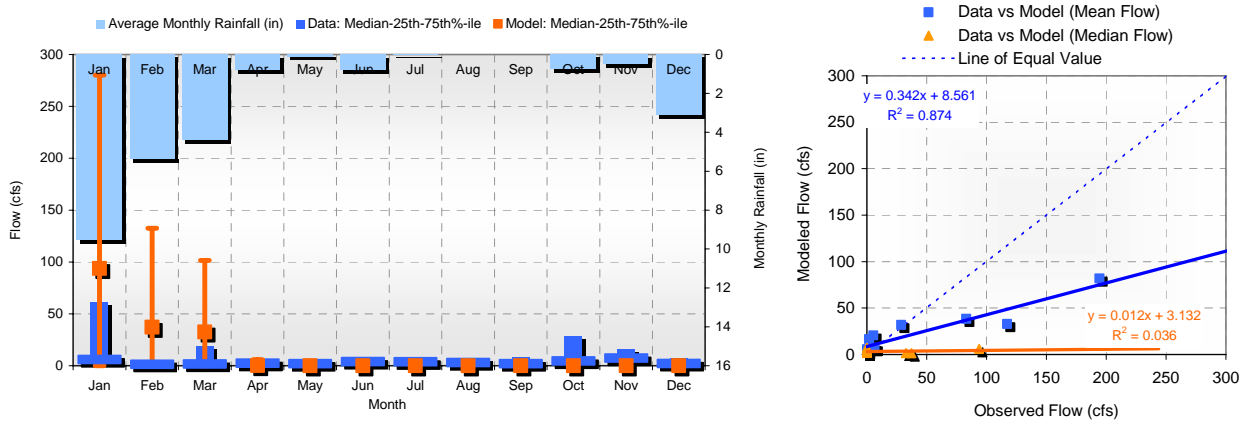
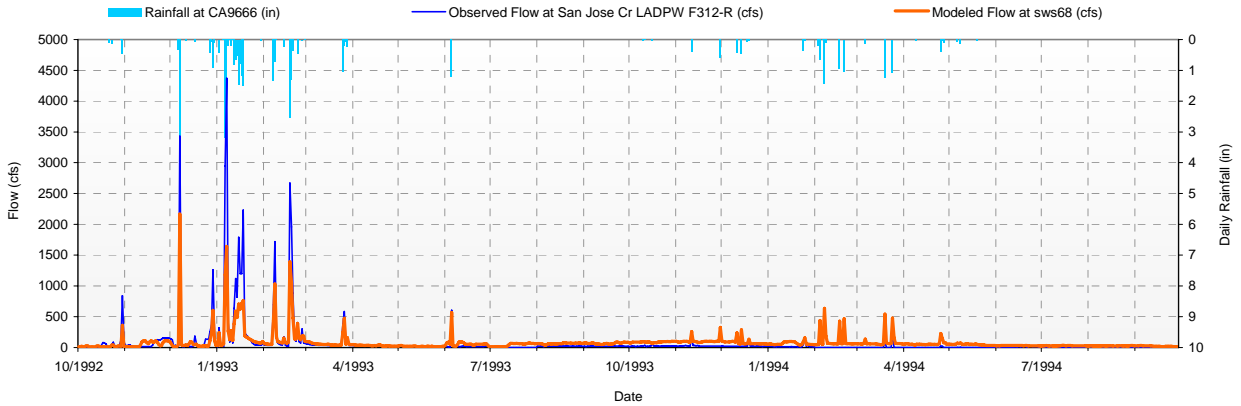


Figure A-4. Calibration Results for LADPW Station F274B-R at Dalton Wash

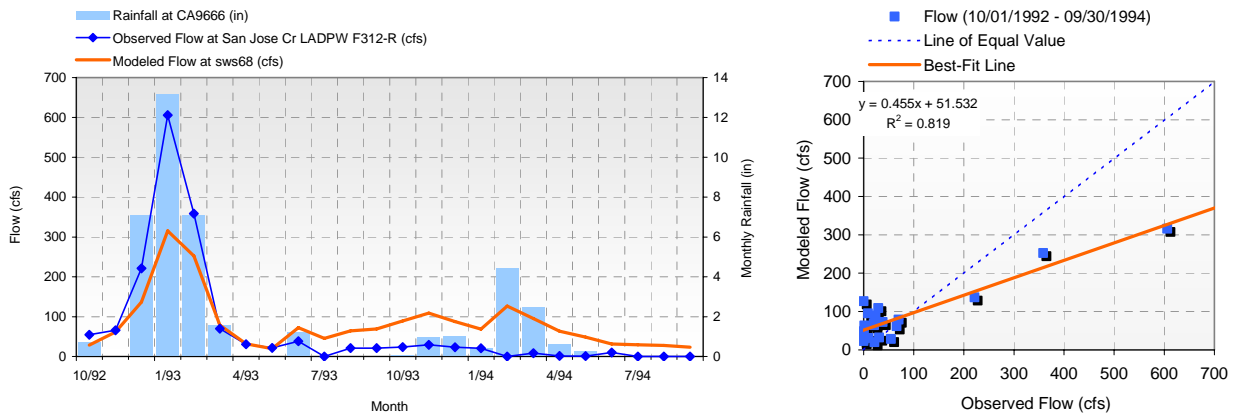
Table A-4. Calibration Error Analysis for LADPW Station F274B-R at Dalton Wash

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 99 3-Year Analysis Period: 10/1/1992 - 9/30/1995 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	175.35	Total Observed In-stream Flow:	101.65
Total of simulated highest 10% flows:	154.81	Total of Observed highest 10% flows:	80.61
Total of Simulated lowest 50% flows:	0.02	Total of Observed Lowest 50% flows:	2.41
Simulated Summer Flow Volume (months 7-9):	0.02	Observed Summer Flow Volume (7-9):	5.22
Simulated Fall Flow Volume (months 10-12):	14.52	Observed Fall Flow Volume (10-12):	27.65
Simulated Winter Flow Volume (months 1-3):	156.17	Observed Winter Flow Volume (1-3):	61.09
Simulated Spring Flow Volume (months 4-6):	4.64	Observed Spring Flow Volume (4-6):	7.69
Total Simulated Storm Volume:	115.77	Total Observed Storm Volume:	75.59
Simulated Summer Storm Volume (7-9):	0.00	Observed Summer Storm Volume (7-9):	2.16
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	72.50	10	
Error in 50% lowest flows:	-99.20	10	
Error in 10% highest flows:	92.04	15	
Seasonal volume error - Summer:	-99.70	30	
Seasonal volume error - Fall:	-47.49	30	
Seasonal volume error - Winter:	155.62	30	
Seasonal volume error - Spring:	-39.64	30	
Error in storm volumes:	53.17	20	
Error in summer storm volumes:	-99.96	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

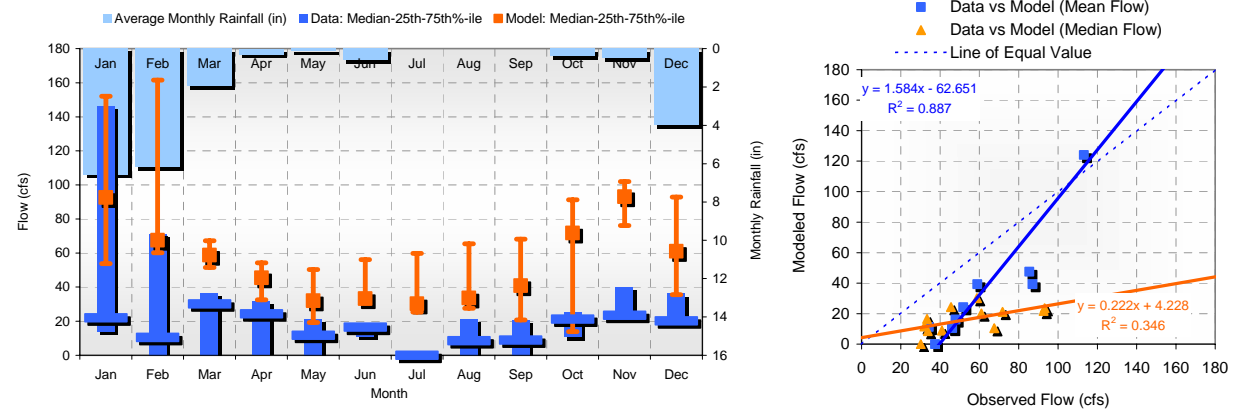
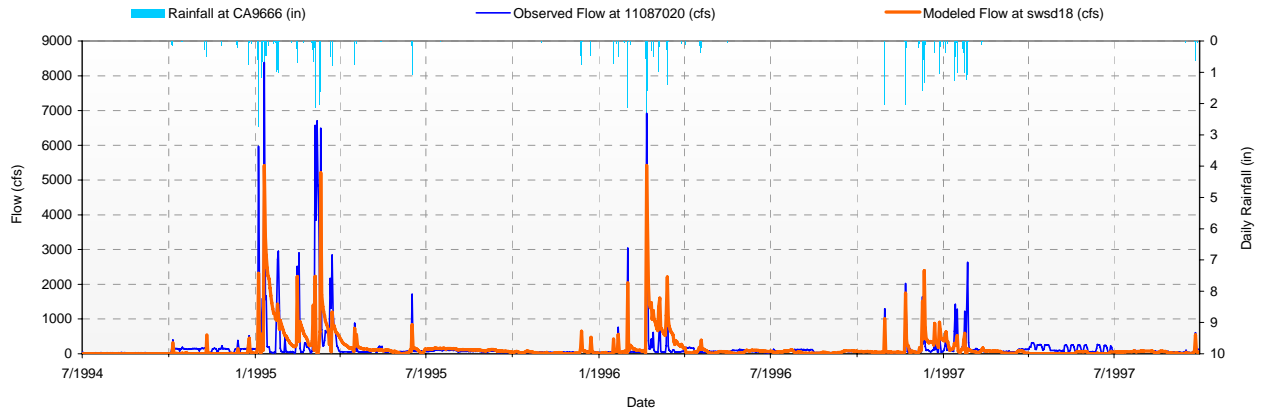


Figure A-5. Calibration Results for LADPW Station F312B-R at San Jose Channel

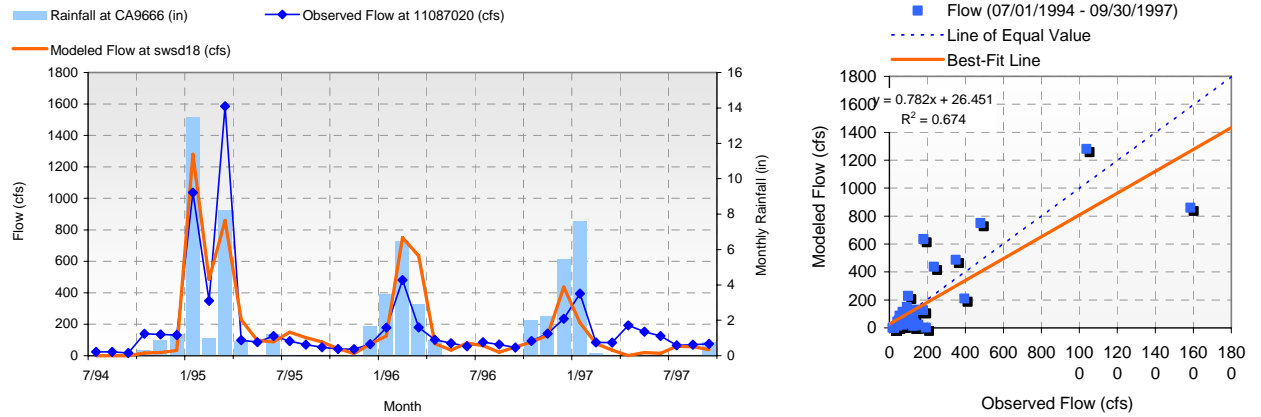
Table A-5. Calibration Error Analysis for LADPW Station F312B-R at San Jose Channel

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 68 2-Year Analysis Period: 10/1/1992 - 9/30/1994 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	392.55	Total Observed In-stream Flow:	323.42
Total of simulated highest 10% flows:	175.90	Total of Observed highest 10% flows:	260.60
Total of Simulated lowest 50% flows:	75.51	Total of Observed Lowest 50% flows:	11.61
Simulated Summer Flow Volume (months 7-9):	52.19	Observed Summer Flow Volume (7-9):	8.56
Simulated Fall Flow Volume (months 10-12):	103.46	Observed Fall Flow Volume (10-12):	84.64
Simulated Winter Flow Volume (months 1-3):	183.63	Observed Winter Flow Volume (1-3):	209.71
Simulated Spring Flow Volume (months 4-6):	53.27	Observed Spring Flow Volume (4-6):	20.51
Total Simulated Storm Volume:	166.52	Total Observed Storm Volume:	234.73
Simulated Summer Storm Volume (7-9):	6.30	Observed Summer Storm Volume (7-9):	1.16
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	21.37	10	
Error in 50% lowest flows:	550.55	10	
Error in 10% highest flows:	-32.50	15	
Seasonal volume error - Summer:	509.77	30	
Seasonal volume error - Fall:	22.24	30	
Seasonal volume error - Winter:	-12.44	30	
Seasonal volume error - Spring:	159.70	30	
Error in storm volumes:	-29.06	20	
Error in summer storm volumes:	443.94	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

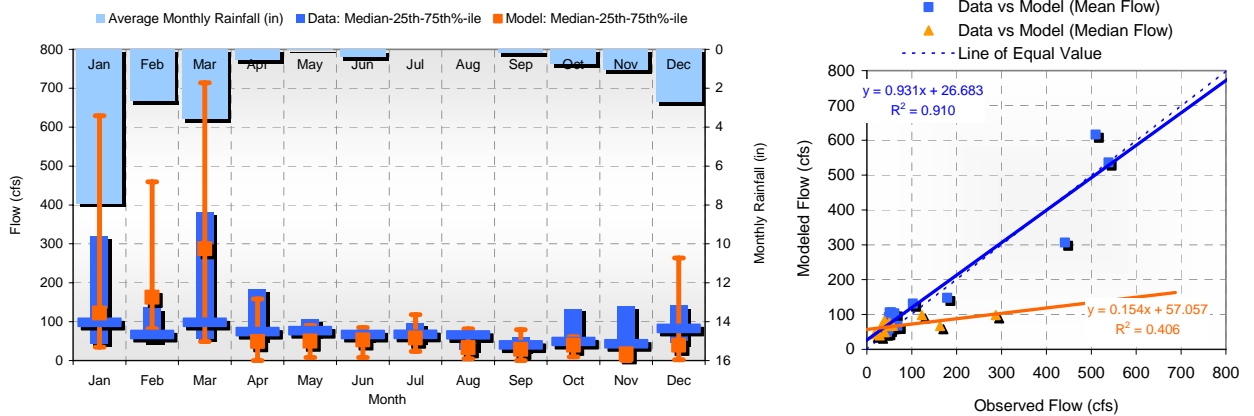
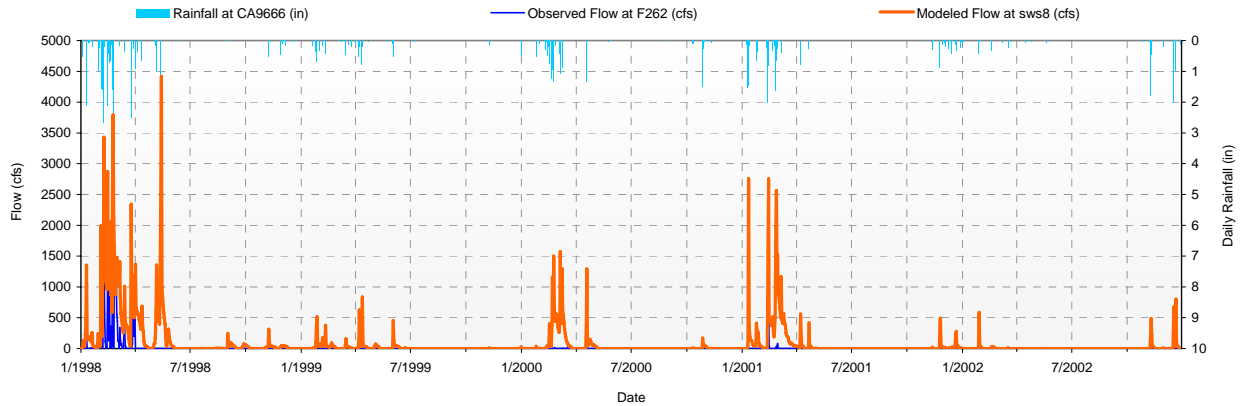


Figure A-6. Calibration Results for USGS Station 11087020 at San Gabriel River above Whittier Narrows

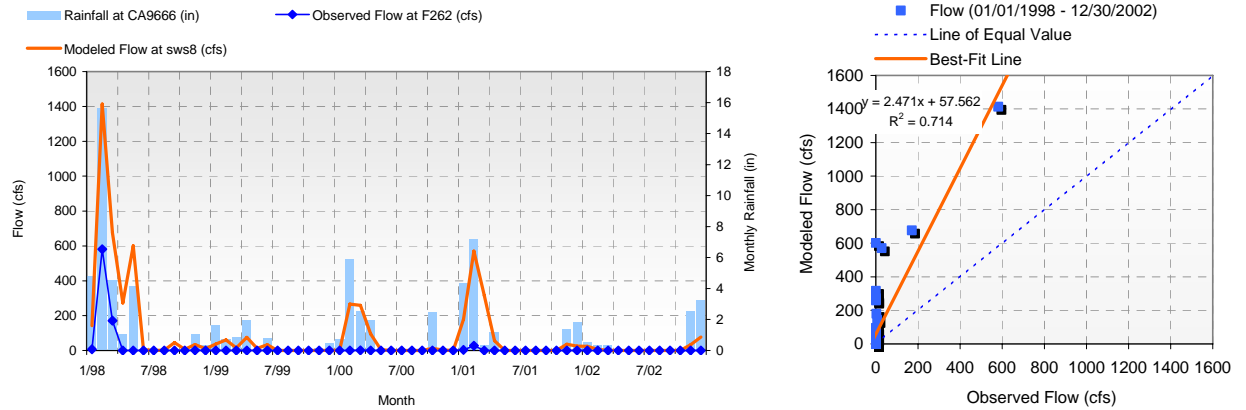
Table A-6. Calibration Error Analysis for USGS Station 11087020 at San Gabriel River above Whittier Narrows

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 18 3.25-Year Analysis Period: 7/1/1994 - 9/30/1997 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	6.50	Total Observed In-stream Flow:	7.05
Total of simulated highest 10% flows:	4.31	Total of Observed highest 10% flows:	4.58
Total of Simulated lowest 50% flows:	0.32	Total of Observed Lowest 50% flows:	0.83
Simulated Summer Flow Volume (months 7-9):	0.65	Observed Summer Flow Volume (7-9):	0.70
Simulated Fall Flow Volume (months 10-12):	0.85	Observed Fall Flow Volume (10-12):	1.03
Simulated Winter Flow Volume (months 1-3):	4.37	Observed Winter Flow Volume (1-3):	4.32
Simulated Spring Flow Volume (months 4-6):	0.63	Observed Spring Flow Volume (4-6):	1.00
Total Simulated Storm Volume:	3.64	Total Observed Storm Volume:	4.88
Simulated Summer Storm Volume (7-9):	0.14	Observed Summer Storm Volume (7-9):	0.16
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	-7.75	10	
Error in 50% lowest flows:	-61.62	10	
Error in 10% highest flows:	-5.85	15	
Seasonal volume error - Summer:	-7.97	30	
Seasonal volume error - Fall:	-17.06	30	
Seasonal volume error - Winter:	1.34	30	
Seasonal volume error - Spring:	-37.16	30	
Error in storm volumes:	-25.37	20	
Error in summer storm volumes:	-11.92	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

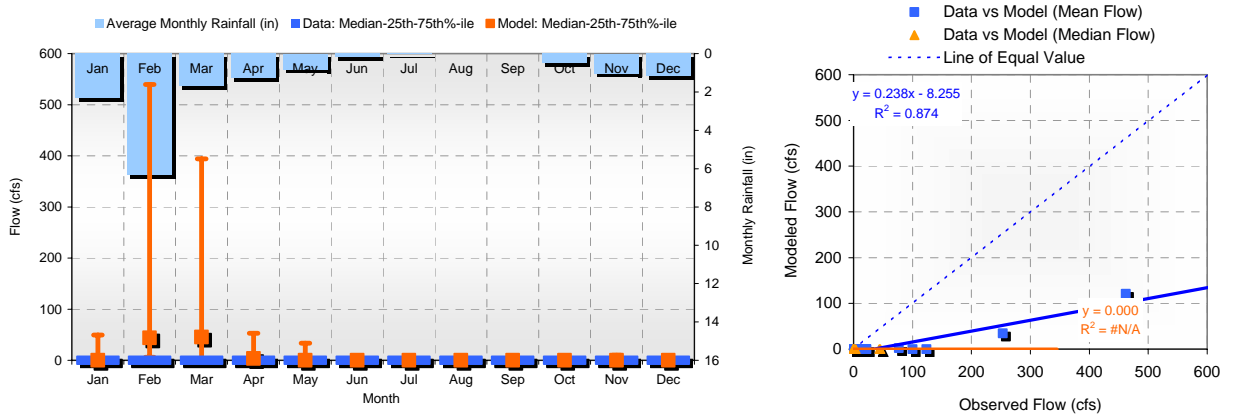
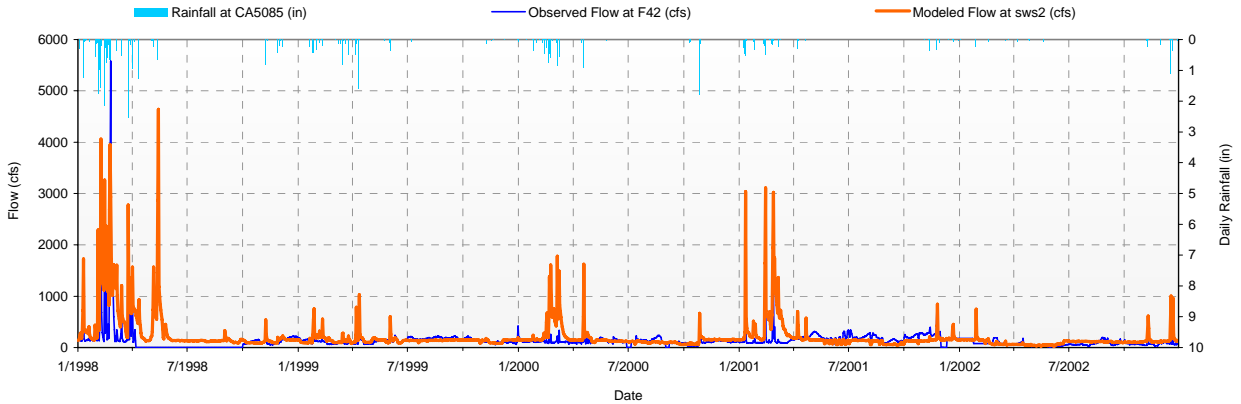


Figure A-7. Calibration Results for USGS Station F262C-R at San Gabriel River above Florence Avenue & Firestone Blvd.

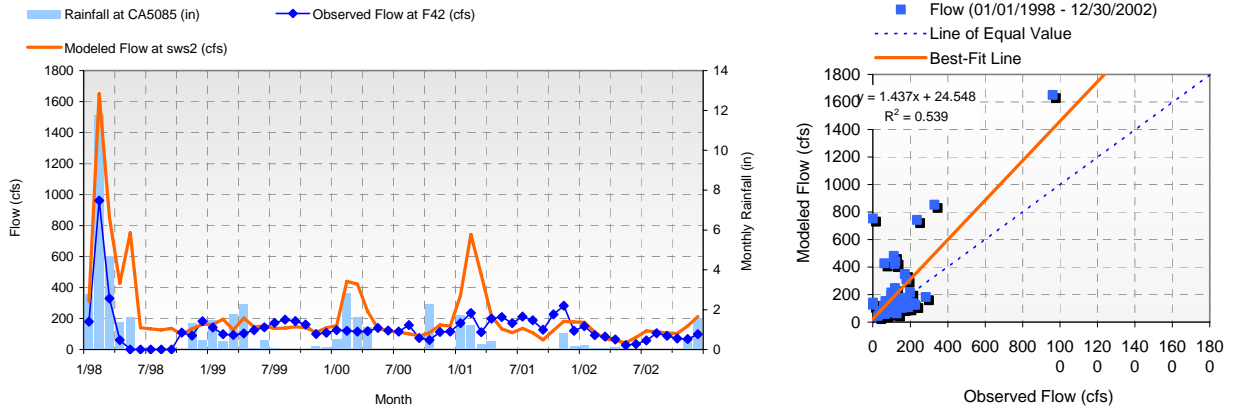
Table A-7. Calibration Error Analysis for USGS Station F262C-R at San Gabriel River above Florence Avenue & Firestone Blvd.

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 8 5-Year Analysis Period: 1/1/1998 - 12/31/2002 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	421.29	Total Observed In-stream Flow:	59.80
Total of simulated highest 10% flows:	377.86	Total of Observed highest 10% flows:	59.80
Total of Simulated lowest 50% flows:	0.00	Total of Observed Lowest 50% flows:	0.00
Simulated Summer Flow Volume (months 7-9):	3.73	Observed Summer Flow Volume (7-9):	0.00
Simulated Fall Flow Volume (months 10-12):	18.93	Observed Fall Flow Volume (10-12):	0.13
Simulated Winter Flow Volume (months 1-3):	305.74	Observed Winter Flow Volume (1-3):	59.62
Simulated Spring Flow Volume (months 4-6):	92.89	Observed Spring Flow Volume (4-6):	0.05
Total Simulated Storm Volume:	248.19	Total Observed Storm Volume:	57.68
Simulated Summer Storm Volume (7-9):	2.38	Observed Summer Storm Volume (7-9):	0.00
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	604.45	10	
Error in 50% lowest flows:	98055.44	10	
Error in 10% highest flows:	531.83	15	
Seasonal volume error - Summer:	308205886.97	30	
Seasonal volume error - Fall:	13975.33	30	
Seasonal volume error - Winter:	412.80	30	
Seasonal volume error - Spring:	198314.25	30	
Error in storm volumes:	330.31	20	
Error in summer storm volumes:	237970026.25	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

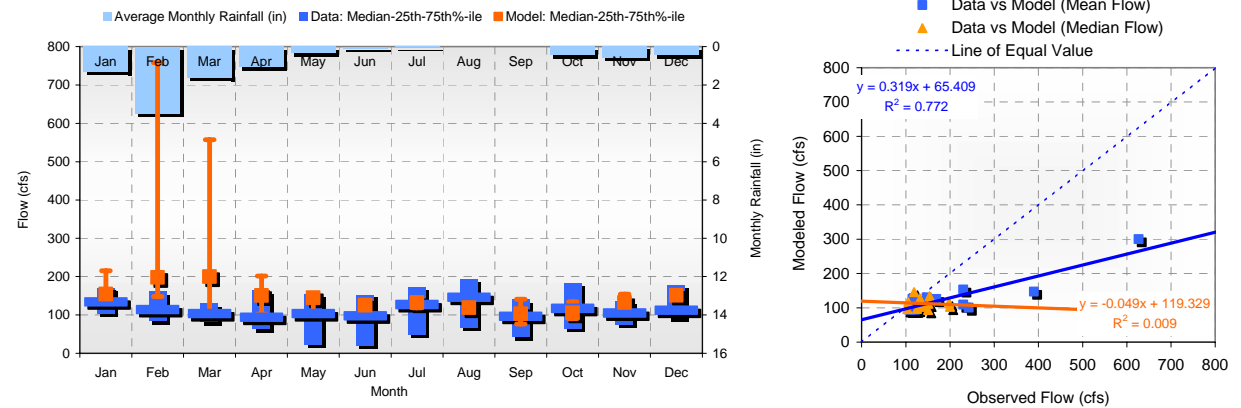
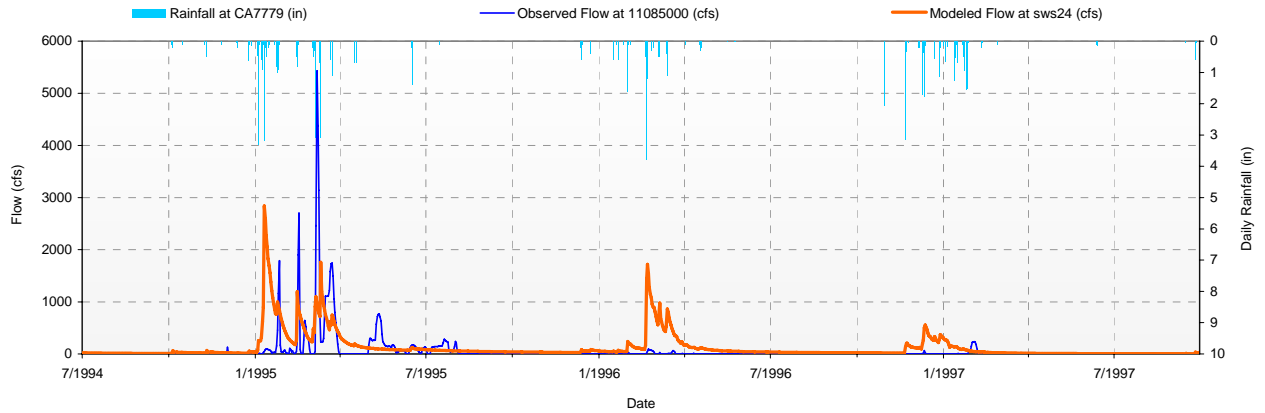


Figure A-8. Calibration Results for LADPW Station F42B-R at San Gabriel River above Spring Street

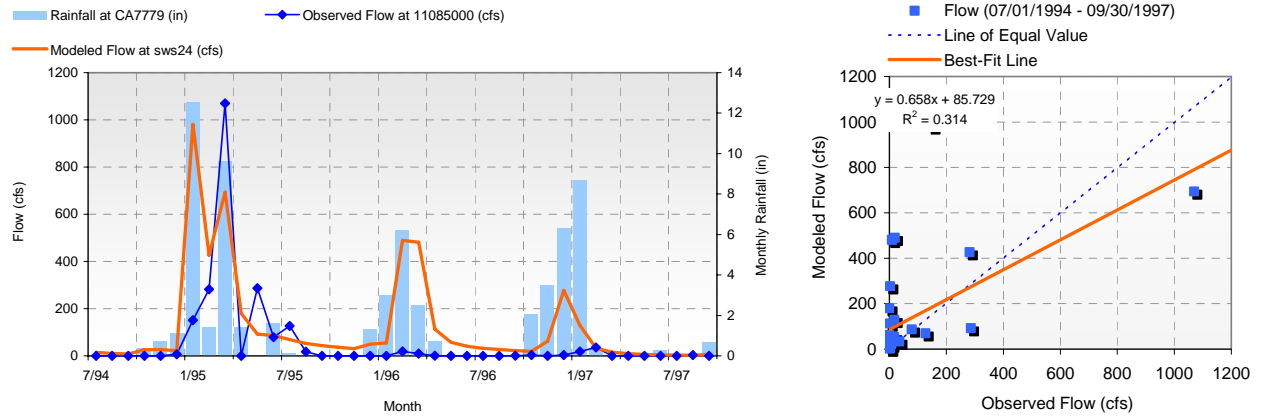
Table A-8. Calibration Error Analysis for LADPW Station F42B-R at San Gabriel River above Spring Street

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 2 5-Year Analysis Period: 1/1/1998 - 12/31/2002 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	1038.51	Total Observed In-stream Flow:	643.63
Total of simulated highest 10% flows:	469.76	Total of Observed highest 10% flows:	207.54
Total of Simulated lowest 50% flows:	245.82	Total of Observed Lowest 50% flows:	141.21
Simulated Summer Flow Volume (months 7-9):	142.58	Observed Summer Flow Volume (7-9):	134.84
Simulated Fall Flow Volume (months 10-12):	173.76	Observed Fall Flow Volume (10-12):	153.88
Simulated Winter Flow Volume (months 1-3):	485.14	Observed Winter Flow Volume (1-3):	233.66
Simulated Spring Flow Volume (months 4-6):	237.03	Observed Spring Flow Volume (4-6):	121.25
Total Simulated Storm Volume:	301.59	Total Observed Storm Volume:	186.13
Simulated Summer Storm Volume (7-9):	11.75	Observed Summer Storm Volume (7-9):	23.55
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	61.35	10	
Error in 50% lowest flows:	74.08	10	
Error in 10% highest flows:	126.34	15	
Seasonal volume error - Summer:	5.74	30	
Seasonal volume error - Fall:	12.92	30	
Seasonal volume error - Winter:	107.62	30	
Seasonal volume error - Spring:	95.49	30	
Error in storm volumes:	62.03	20	
Error in summer storm volumes:	-50.10	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

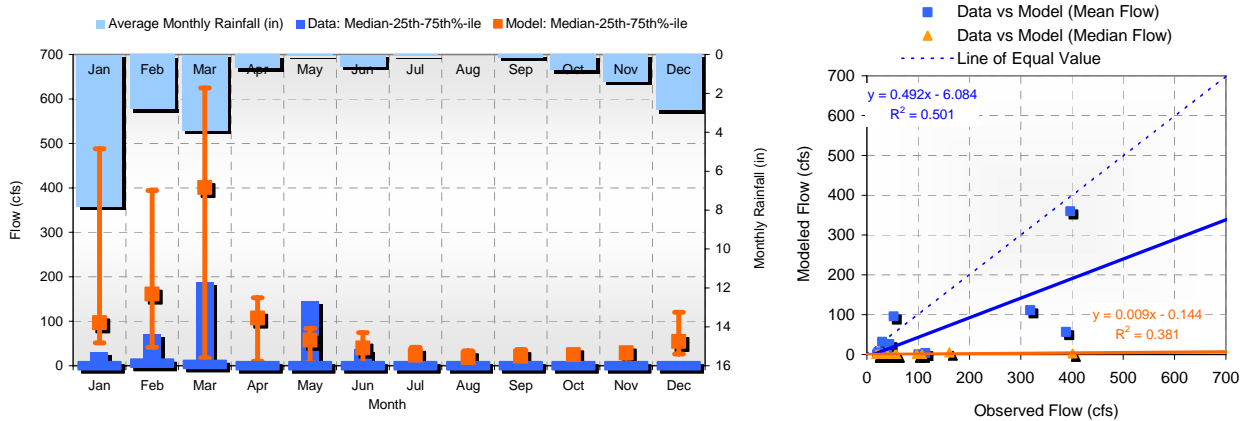
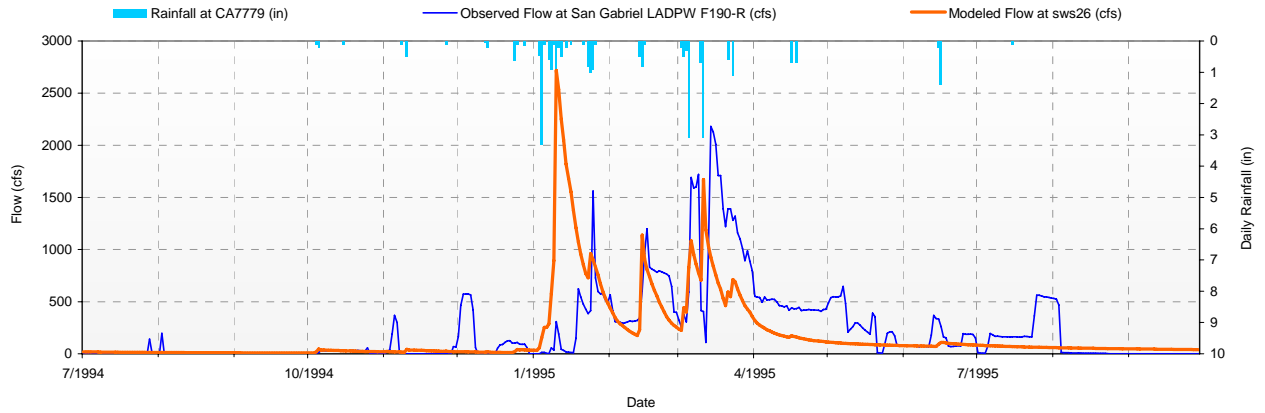


Figure A-9. Calibration Results for USGS 11085000 at San Gabriel River below Santa Fe Dam, near Baldwin Park

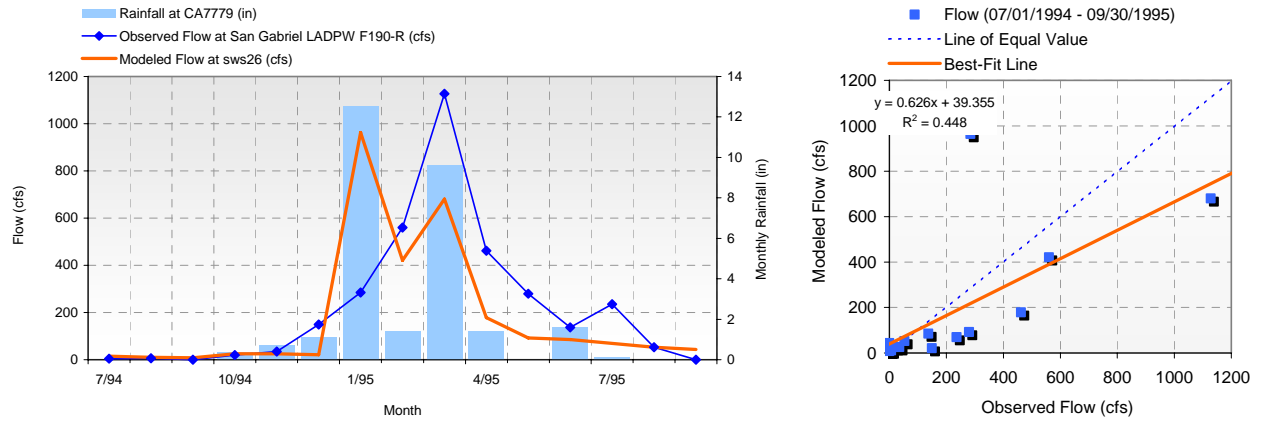
Table A-9. Calibration Error Analysis for USGS 11085000 at San Gabriel River below Santa Fe Dam, near Baldwin Park

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 24 3.25-Year Analysis Period: 7/1/1994 - 9/30/1997 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	6.97	Total Observed In-stream Flow:	3.12
Total of simulated highest 10% flows:	4.40	Total of Observed highest 10% flows:	2.95
Total of Simulated lowest 50% flows:	0.47	Total of Observed Lowest 50% flows:	0.00
Simulated Summer Flow Volume (months 7-9):	0.44	Observed Summer Flow Volume (7-9):	0.22
Simulated Fall Flow Volume (months 10-12):	0.82	Observed Fall Flow Volume (10-12):	0.02
Simulated Winter Flow Volume (months 1-3):	4.85	Observed Winter Flow Volume (1-3):	2.33
Simulated Spring Flow Volume (months 4-6):	0.86	Observed Spring Flow Volume (4-6):	0.55
Total Simulated Storm Volume:	1.77	Total Observed Storm Volume:	2.11
Simulated Summer Storm Volume (7-9):	0.01	Observed Summer Storm Volume (7-9):	0.10
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	123.02	10	
Error in 50% lowest flows:	46600877.83	10	
Error in 10% highest flows:	49.29	15	
Seasonal volume error - Summer:	95.48	30	
Seasonal volume error - Fall:	3665.13	30	
Seasonal volume error - Winter:	107.79	30	
Seasonal volume error - Spring:	58.30	30	
Error in storm volumes:	-16.26	20	
Error in summer storm volumes:	-85.72	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

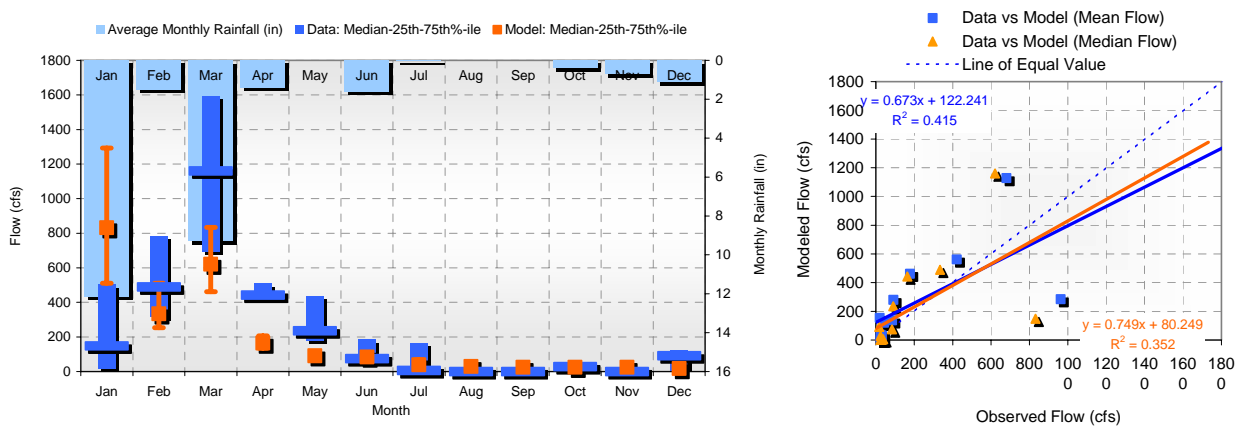
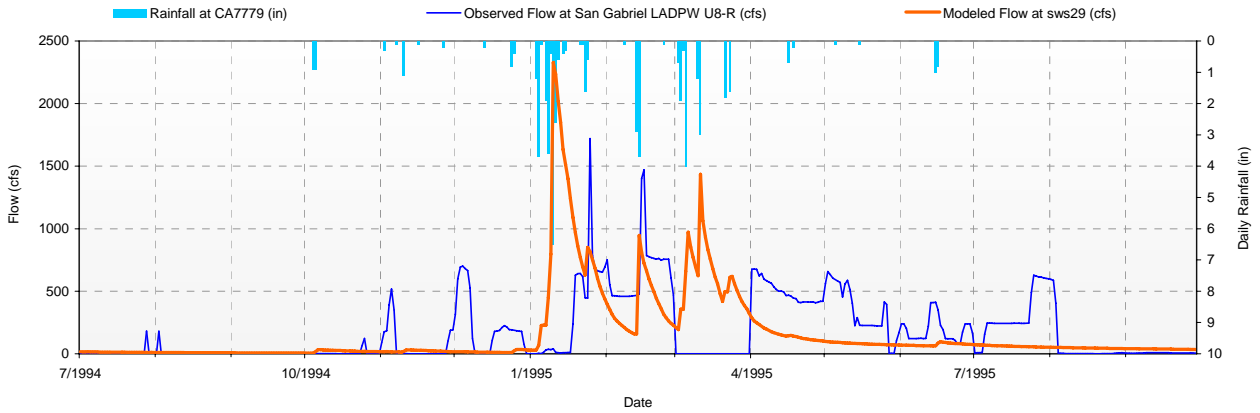


Figure A-10. Calibration Results for F190-R at San Gabriel River at Foothill Blvd

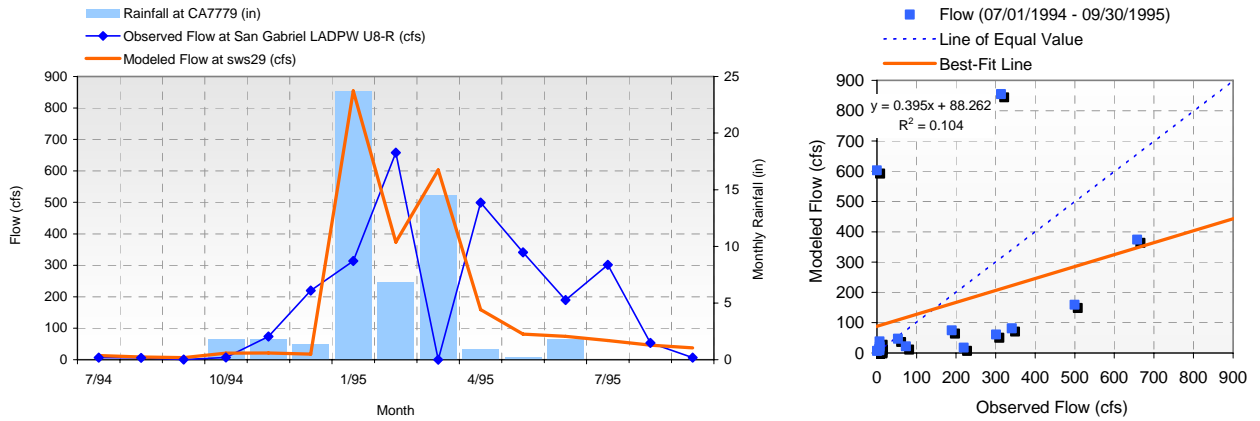
Table A-10. Calibration Error Analysis for F190-R at San Gabriel River at Foothill Blvd

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 26 1.25-Year Analysis Period: 7/1/1994 - 9/30/1995 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	859.37	Total Observed In-stream Flow:	1068.26
Total of simulated highest 10% flows:	511.85	Total of Observed highest 10% flows:	528.28
Total of Simulated lowest 50% flows:	54.93	Total of Observed Lowest 50% flows:	8.87
Simulated Summer Flow Volume (months 7-9):	64.16	Observed Summer Flow Volume (7-9):	97.72
Simulated Fall Flow Volume (months 10-12):	23.07	Observed Fall Flow Volume (10-12):	66.26
Simulated Winter Flow Volume (months 1-3):	659.17	Observed Winter Flow Volume (1-3):	624.51
Simulated Spring Flow Volume (months 4-6):	112.97	Observed Spring Flow Volume (4-6):	279.77
Total Simulated Storm Volume:	231.90	Total Observed Storm Volume:	380.19
Simulated Summer Storm Volume (7-9):	1.66	Observed Summer Storm Volume (7-9):	33.61
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	-19.55	10	
Error in 50% lowest flows:	519.48	10	
Error in 10% highest flows:	-3.11	15	
Seasonal volume error - Summer:	-34.35	30	
Seasonal volume error - Fall:	-65.18	30	
Seasonal volume error - Winter:	5.55	30	
Seasonal volume error - Spring:	-59.62	30	
Error in storm volumes:	-39.00	20	
Error in summer storm volumes:	-95.06	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

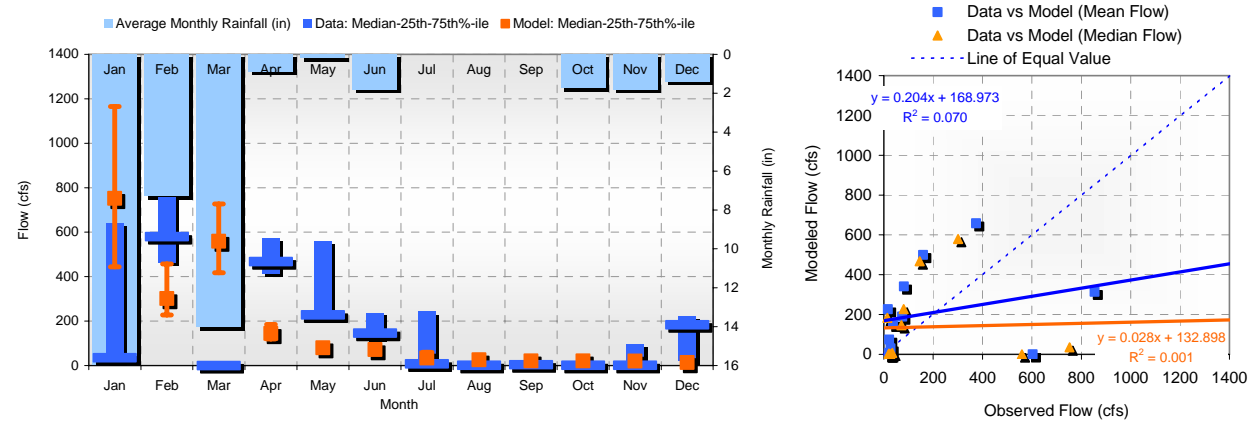


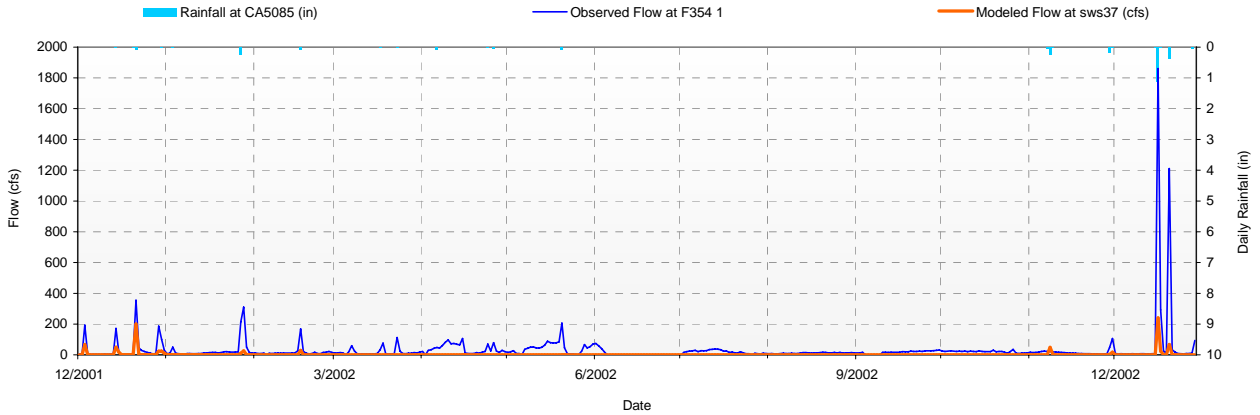
Figure A-11. Calibration Results for U8-R at San Gabriel River below Morris Dam

Table A-11. Calibration Error Analysis for U8-R at San Gabriel River below Morris Dam

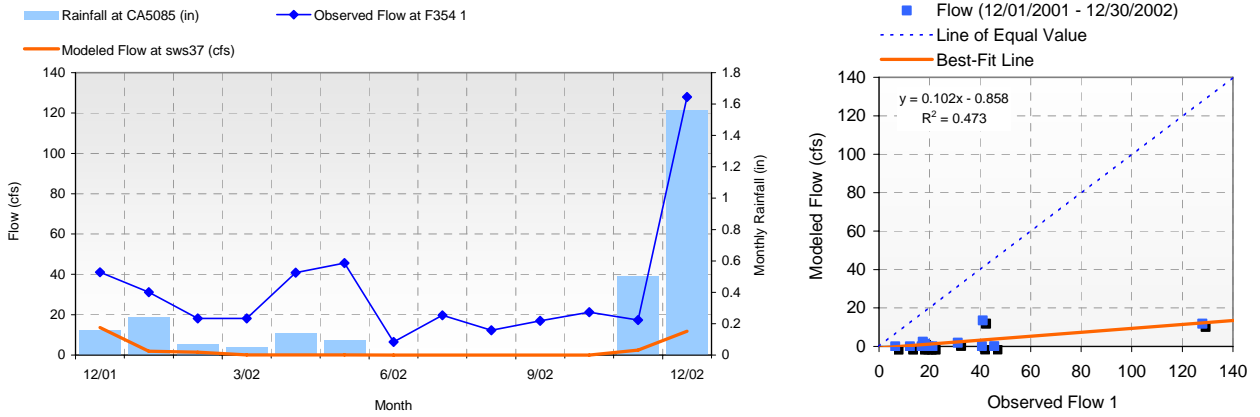
LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 29 1.25-Year Analysis Period: 7/1/1994 - 9/30/1995 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	759.79	Total Observed In-stream Flow:	842.30
Total of simulated highest 10% flows:	454.75	Total of Observed highest 10% flows:	359.48
Total of Simulated lowest 50% flows:	46.59	Total of Observed Lowest 50% flows:	2.59
Simulated Summer Flow Volume (months 7-9):	55.97	Observed Summer Flow Volume (7-9):	121.77
Simulated Fall Flow Volume (months 10-12):	19.23	Observed Fall Flow Volume (10-12):	96.89
Simulated Winter Flow Volume (months 1-3):	584.49	Observed Winter Flow Volume (1-3):	295.59
Simulated Spring Flow Volume (months 4-6):	100.11	Observed Spring Flow Volume (4-6):	328.04
Total Simulated Storm Volume:	204.62	Total Observed Storm Volume:	273.55
Simulated Summer Storm Volume (7-9):	1.48	Observed Summer Storm Volume (7-9):	36.97
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	-9.80	10	
Error in 50% lowest flows:	1697.46	10	
Error in 10% highest flows:	26.50	15	
Seasonal volume error - Summer:	-54.03	30	
Seasonal volume error - Fall:	-80.16	30	
Seasonal volume error - Winter:	97.74	30	
Seasonal volume error - Spring:	-69.48	30	
Error in storm volumes:	-25.20	20	
Error in summer storm volumes:	-95.99	50	

Metals TMDLs for the San Gabriel River Watershed – Draft

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

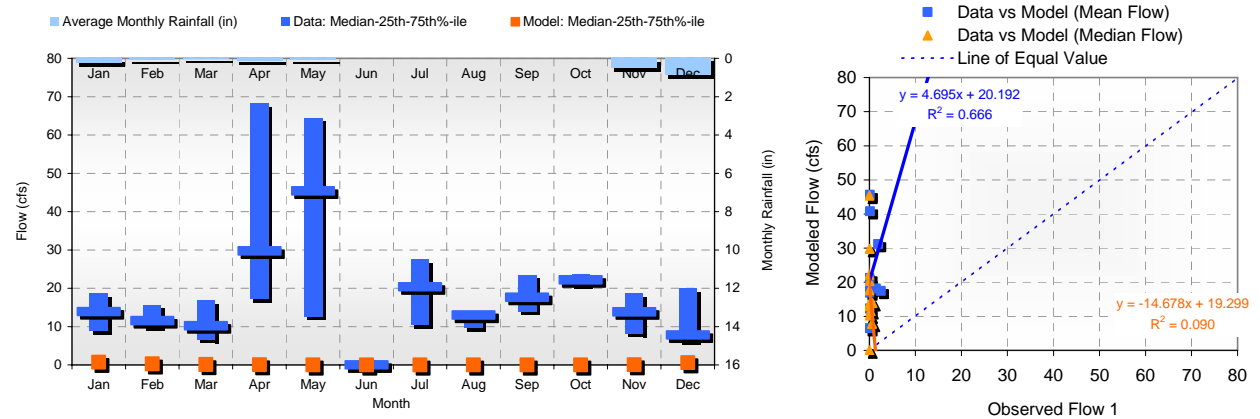
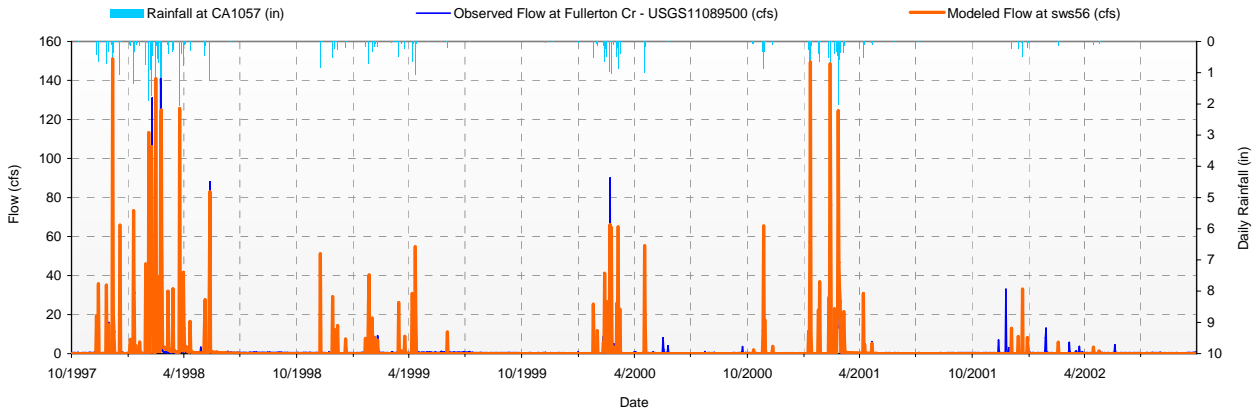


Figure A-12. Calibration Results for F354-R at Coyote Creek below Spring Street

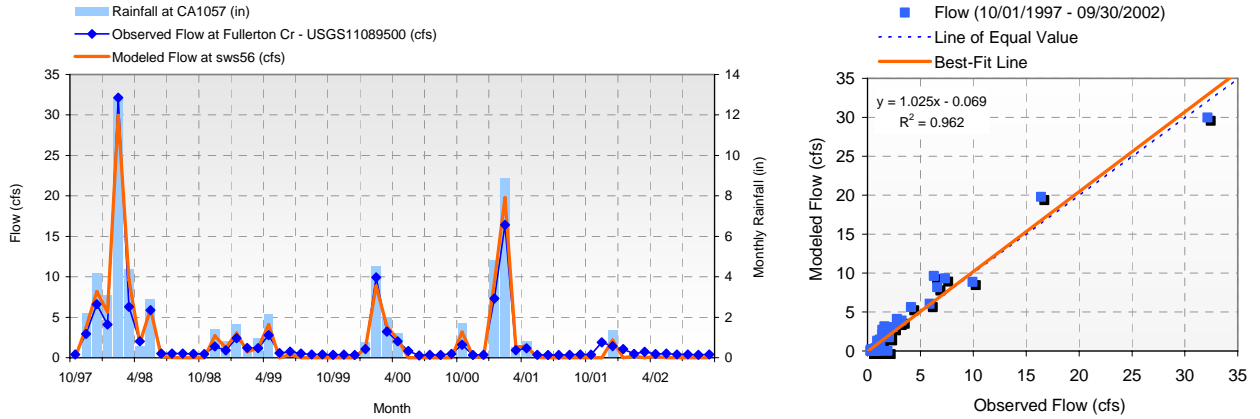
Table A-12. Calibration Error Analysis for F354-R at Coyote Creek below Spring Street

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 37 1.08-Year Analysis Period: 12/1/2001 - 12/31/2002 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	35.81	Total Observed In-stream Flow:	152.35
Total of simulated highest 10% flows:	30.73	Total of Observed highest 10% flows:	90.26
Total of Simulated lowest 50% flows:	2.29	Total of Observed Lowest 50% flows:	17.24
Simulated Summer Flow Volume (months 7-9):	1.12	Observed Summer Flow Volume (7-9):	18.16
Simulated Fall Flow Volume (months 10-12):	29.46	Observed Fall Flow Volume (10-12):	75.11
Simulated Winter Flow Volume (months 1-3):	3.45	Observed Winter Flow Volume (1-3):	24.74
Simulated Spring Flow Volume (months 4-6):	1.77	Observed Spring Flow Volume (4-6):	34.34
Total Simulated Storm Volume:	30.35	Total Observed Storm Volume:	100.53
Simulated Summer Storm Volume (7-9):	0.14	Observed Summer Storm Volume (7-9):	4.94
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	-76.50	10	
Error in 50% lowest flows:	-86.72	10	
Error in 10% highest flows:	-65.95	15	
Seasonal volume error - Summer:	-93.83	30	
Seasonal volume error - Fall:	-60.78	30	
Seasonal volume error - Winter:	-86.04	30	
Seasonal volume error - Spring:	-94.84	30	
Error in storm volumes:	-69.81	20	
Error in summer storm volumes:	-97.20	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

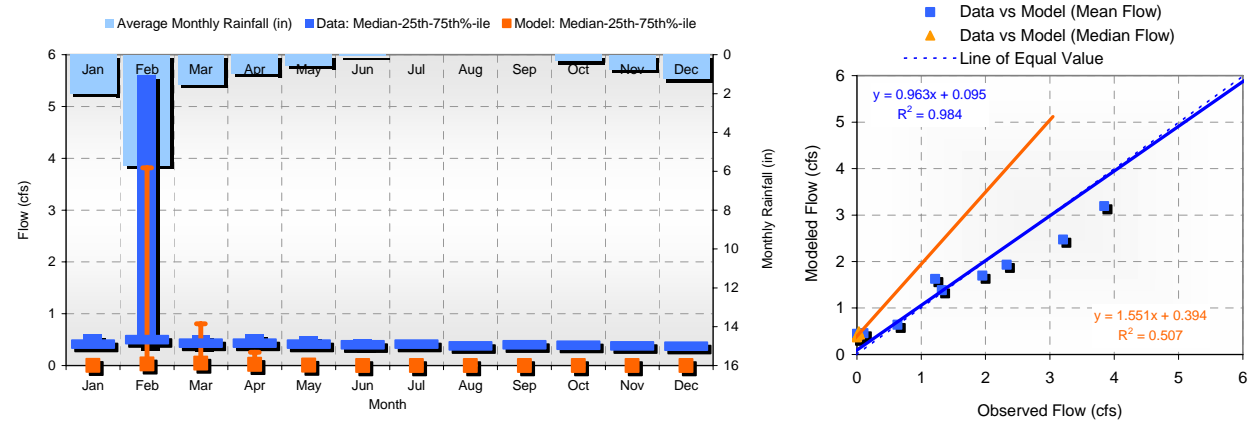
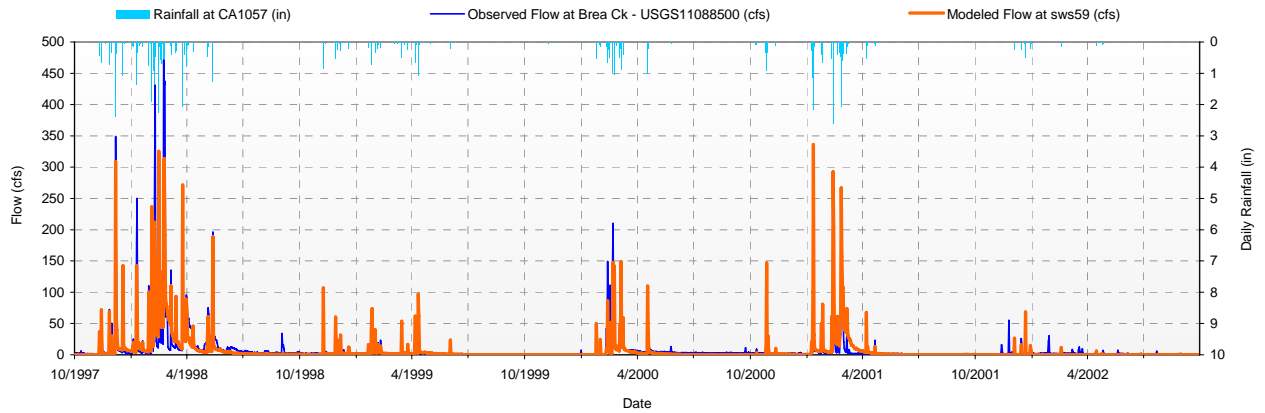


Figure A-13. Validation Results for USGS Station 11089500 at Fullerton Creek

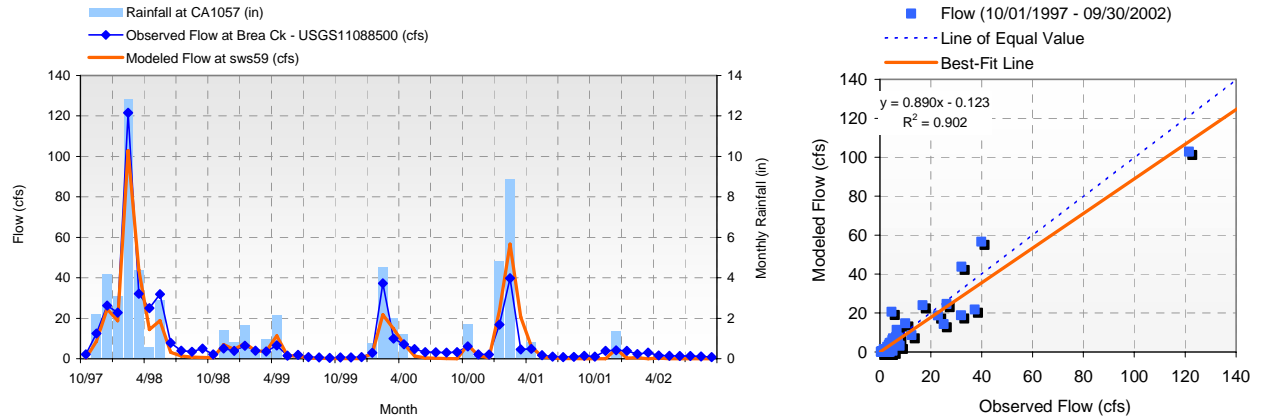
Table A-13. Validation Error Analysis for USGS Station 11089500 at Fullerton Creek

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 56 5-Year Analysis Period: 10/1/1997 - 9/30/2002 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	5.91	Total Observed In-stream Flow:	5.94
Total of simulated highest 10% flows:	5.83	Total of Observed highest 10% flows:	4.92
Total of Simulated lowest 50% flows:	0.00	Total of Observed Lowest 50% flows:	0.47
Simulated Summer Flow Volume (months 7-9):	0.00	Observed Summer Flow Volume (7-9):	0.29
Simulated Fall Flow Volume (months 10-12):	0.99	Observed Fall Flow Volume (10-12):	0.91
Simulated Winter Flow Volume (months 1-3):	4.17	Observed Winter Flow Volume (1-3):	3.87
Simulated Spring Flow Volume (months 4-6):	0.75	Observed Spring Flow Volume (4-6):	0.87
Total Simulated Storm Volume:	5.69	Total Observed Storm Volume:	4.89
Simulated Summer Storm Volume (7-9):	0.00	Observed Summer Storm Volume (7-9):	0.04
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	-0.54	10	
Error in 50% lowest flows:	-99.93	10	
Error in 10% highest flows:	18.59	15	
Seasonal volume error - Summer:	-99.46	30	
Seasonal volume error - Fall:	8.41	30	
Seasonal volume error - Winter:	7.65	30	
Seasonal volume error - Spring:	-13.58	30	
Error in storm volumes:	16.46	20	
Error in summer storm volumes:	-99.42	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

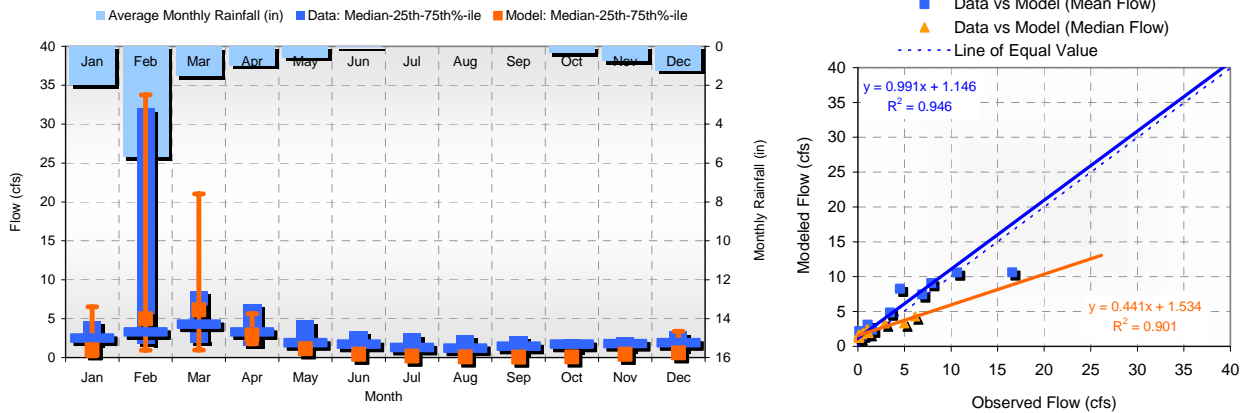
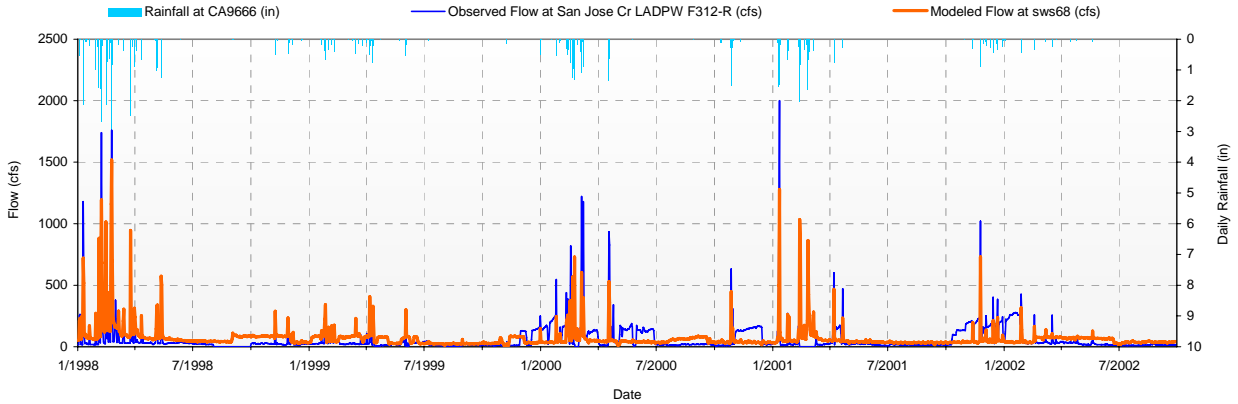


Figure A-14. Validation Results for USGS Station 11088500 at Brea Creek

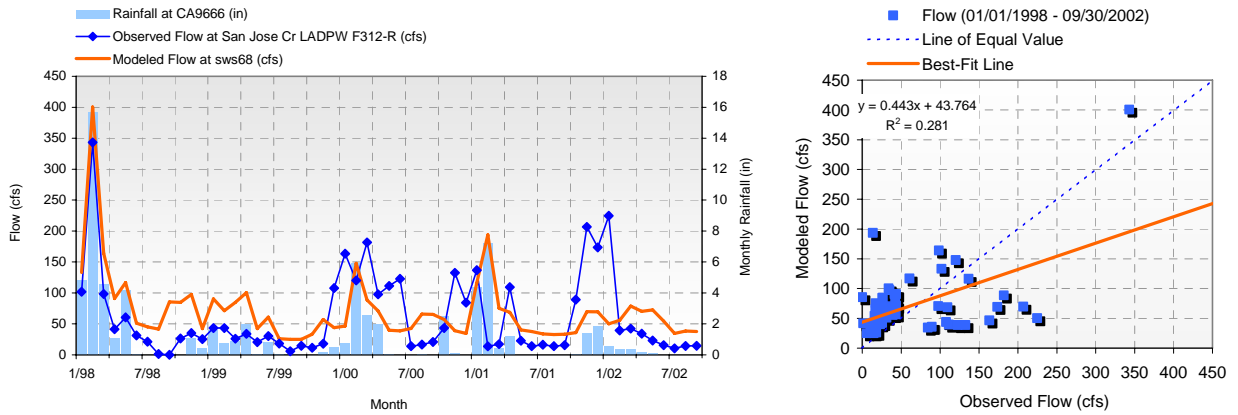
Table A-14. Validation Error Analysis for USGS Station 11088500 at Brea Creek

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 59			
5-Year Analysis Period: 10/1/1997 - 9/30/2002			
Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	35.28	Total Observed In-stream Flow:	40.32
Total of simulated highest 10% flows:	29.43	Total of Observed highest 10% flows:	29.56
Total of Simulated lowest 50% flows:	0.28	Total of Observed Lowest 50% flows:	2.88
Simulated Summer Flow Volume (months 7-9):	0.31	Observed Summer Flow Volume (7-9):	2.43
Simulated Fall Flow Volume (months 10-12):	4.79	Observed Fall Flow Volume (10-12):	5.90
Simulated Winter Flow Volume (months 1-3):	24.82	Observed Winter Flow Volume (1-3):	23.83
Simulated Spring Flow Volume (months 4-6):	5.37	Observed Spring Flow Volume (4-6):	8.17
Total Simulated Storm Volume:	23.11	Total Observed Storm Volume:	26.27
Simulated Summer Storm Volume (7-9):	0.02	Observed Summer Storm Volume (7-9):	0.61
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	-12.49	10	
Error in 50% lowest flows:	-90.32	10	
Error in 10% highest flows:	-0.44	15	
Seasonal volume error - Summer:	-87.24	30	
Seasonal volume error - Fall:	-18.88	30	
Seasonal volume error - Winter:	4.16	30	
Seasonal volume error - Spring:	-34.25	30	
Error in storm volumes:	-12.03	20	
Error in summer storm volumes:	-97.32	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

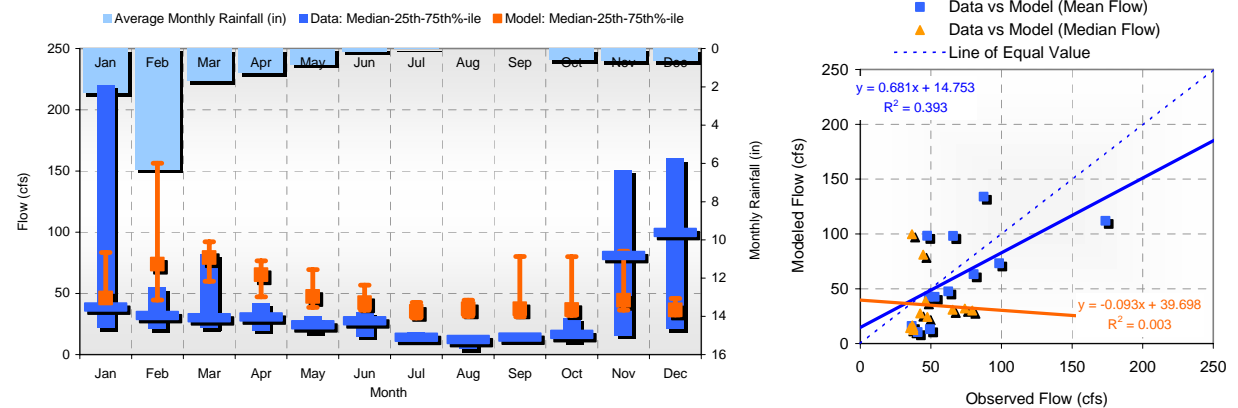
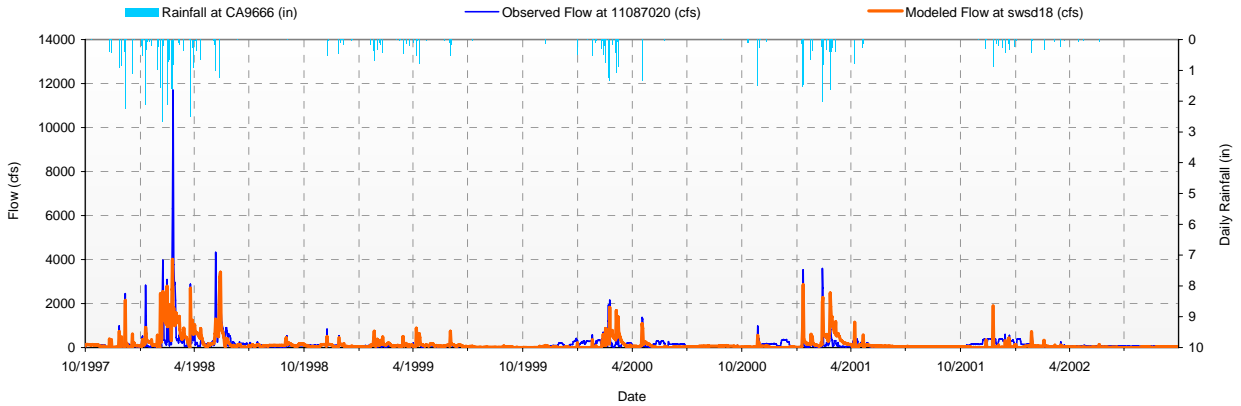


Figure A-15. Validation Results for LADPW Station F312B-R at San Jose Channel

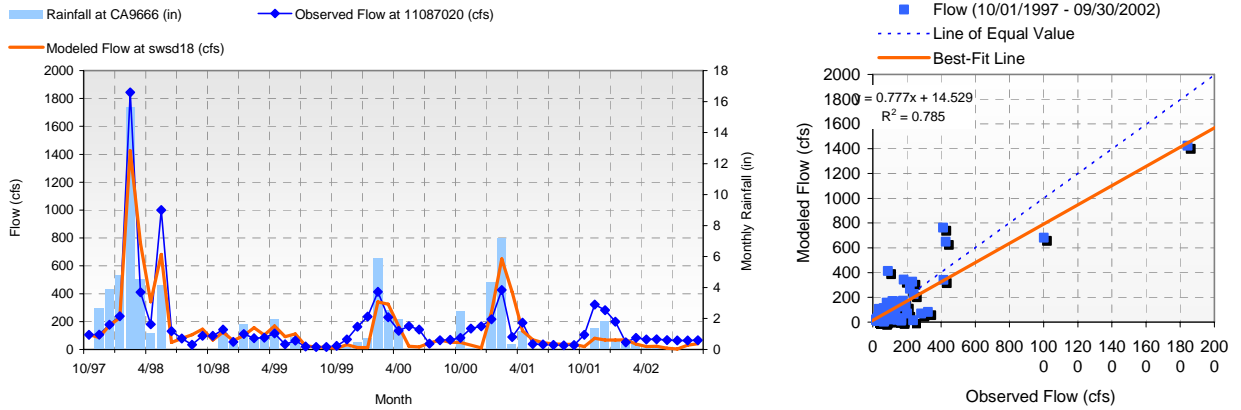
Table A-15. Validation Error Analysis for LADPW Station F312B-R at San Jose Channel

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 68 4.75-Year Analysis Period: 1/1/1998 - 9/30/2002 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	337.57	Total Observed In-stream Flow:	294.64
Total of simulated highest 10% flows:	125.31	Total of Observed highest 10% flows:	150.68
Total of Simulated lowest 50% flows:	83.01	Total of Observed Lowest 50% flows:	31.19
Simulated Summer Flow Volume (months 7-9):	53.66	Observed Summer Flow Volume (7-9):	16.78
Simulated Fall Flow Volume (months 10-12):	56.21	Observed Fall Flow Volume (10-12):	80.78
Simulated Winter Flow Volume (months 1-3):	147.45	Observed Winter Flow Volume (1-3):	132.56
Simulated Spring Flow Volume (months 4-6):	80.25	Observed Spring Flow Volume (4-6):	64.53
Total Simulated Storm Volume:	112.35	Total Observed Storm Volume:	134.79
Simulated Summer Storm Volume (7-9):	5.23	Observed Summer Storm Volume (7-9):	2.70
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	14.57	10	
Error in 50% lowest flows:	166.15	10	
Error in 10% highest flows:	-16.84	15	
Seasonal volume error - Summer:	219.85	30	
Seasonal volume error - Fall:	-30.41	30	
Seasonal volume error - Winter:	11.24	30	
Seasonal volume error - Spring:	24.37	30	
Error in storm volumes:	-16.65	20	
Error in summer storm volumes:	93.56	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

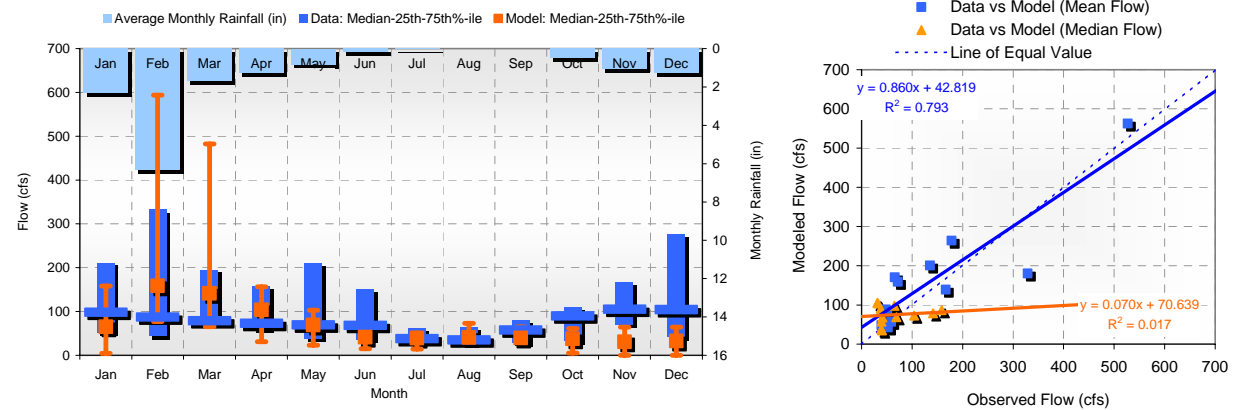
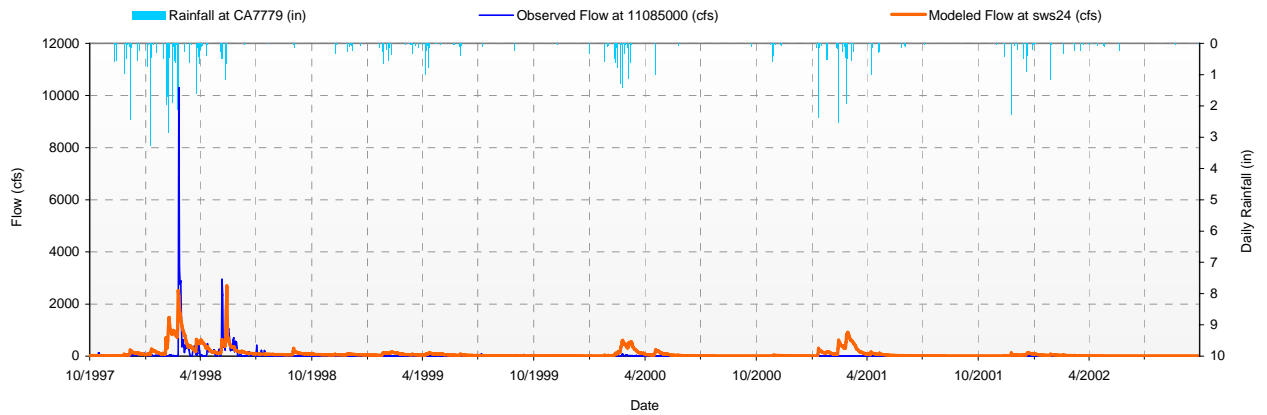


Figure A-16. Validation Results for USGS Station 11087020 at San Gabriel River above Whittier Narrows

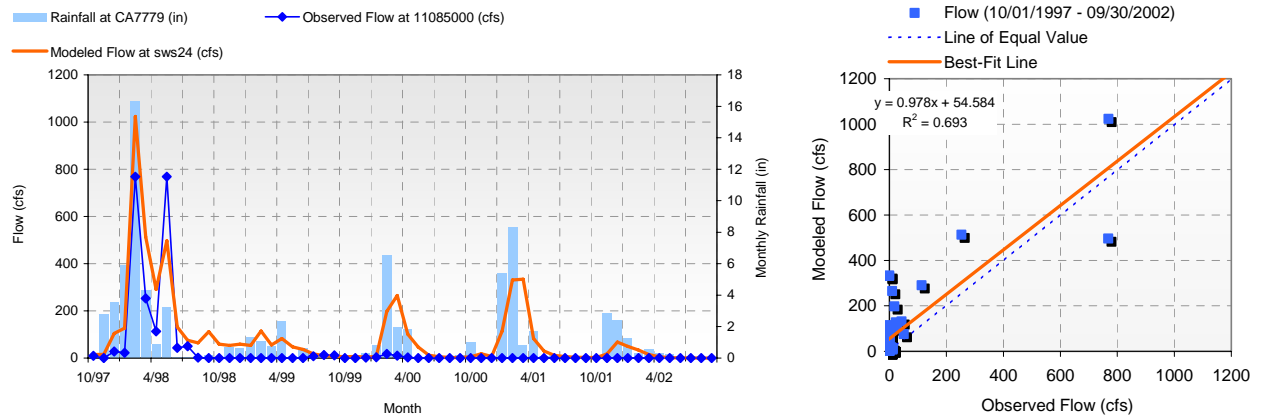
Table A-16. Validation Error Analysis for USGS Station 11087020 at San Gabriel River above Whittier Narrows

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 18			
5-Year Analysis Period: 10/1/1997 - 9/30/2002			
Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	5.44	Total Observed In-stream Flow:	6.30
Total of simulated highest 10% flows:	3.42	Total of Observed highest 10% flows:	3.52
Total of Simulated lowest 50% flows:	0.40	Total of Observed Lowest 50% flows:	0.79
Simulated Summer Flow Volume (months 7-9):	0.48	Observed Summer Flow Volume (7-9):	0.48
Simulated Fall Flow Volume (months 10-12):	0.61	Observed Fall Flow Volume (10-12):	1.33
Simulated Winter Flow Volume (months 1-3):	3.08	Observed Winter Flow Volume (1-3):	2.92
Simulated Spring Flow Volume (months 4-6):	1.26	Observed Spring Flow Volume (4-6):	1.58
Total Simulated Storm Volume:	2.95	Total Observed Storm Volume:	3.83
Simulated Summer Storm Volume (7-9):	0.13	Observed Summer Storm Volume (7-9):	0.10
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	-13.76	10	
Error in 50% lowest flows:	-49.26	10	
Error in 10% highest flows:	-2.74	15	
Seasonal volume error - Summer:	1.21	30	
Seasonal volume error - Fall:	-54.22	30	
Seasonal volume error - Winter:	5.72	30	
Seasonal volume error - Spring:	-20.18	30	
Error in storm volumes:	-22.98	20	
Error in summer storm volumes:	29.90	50	

1. Daily Time Series Comparison Graph



2. Monthly Timeseries Comparison Graphs



3. Seasonal Trends Calibration Graphs

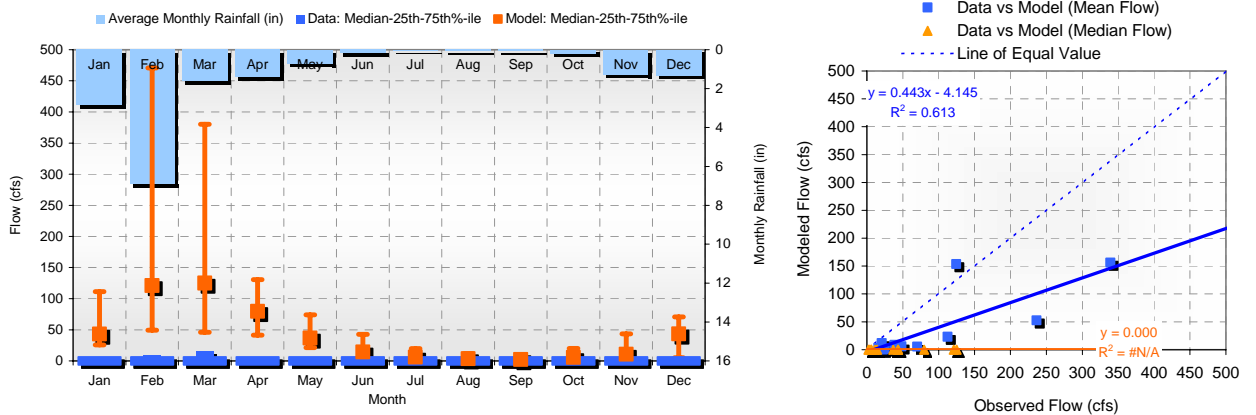


Figure A-17. Validation Results for USGS 11085000 at San Gabriel River below Santa Fe Dam, near Baldwin Park

Table A-17. Validation Error Analysis for USGS 11085000 at San Gabriel River below Santa Fe Dam, near Baldwin Park

LSPC		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 24 5-Year Analysis Period: 10/1/1997 - 9/30/2002 Flow volumes are (inches/year) for upstream drainage area			
Total Simulated In-stream Flow:	5.05	Total Observed In-stream Flow:	2.00
Total of simulated highest 10% flows:	3.12	Total of Observed highest 10% flows:	1.95
Total of Simulated lowest 50% flows:	0.19	Total of Observed Lowest 50% flows:	0.00
Simulated Summer Flow Volume (months 7-9):	0.30	Observed Summer Flow Volume (7-9):	0.08
Simulated Fall Flow Volume (months 10-12):	0.43	Observed Fall Flow Volume (10-12):	0.04
Simulated Winter Flow Volume (months 1-3):	3.00	Observed Winter Flow Volume (1-3):	0.98
Simulated Spring Flow Volume (months 4-6):	1.32	Observed Spring Flow Volume (4-6):	0.90
Total Simulated Storm Volume:	1.25	Total Observed Storm Volume:	1.59
Simulated Summer Storm Volume (7-9):	0.03	Observed Summer Storm Volume (7-9):	0.07
<i>Errors (Simulated-Observed)</i>	<i>Error Statistics</i>	<i>Recommended Criteria</i>	
Error in total volume:	152.41	10	
Error in 50% lowest flows:	19387100.82	10	
Error in 10% highest flows:	59.78	15	
Seasonal volume error - Summer:	260.07	30	
Seasonal volume error - Fall:	1006.18	30	
Seasonal volume error - Winter:	206.99	30	
Seasonal volume error - Spring:	46.68	30	
Error in storm volumes:	-21.14	20	
Error in summer storm volumes:	-62.93	50	