

**Scott River Flow Measurements & Report –
Evaluation of gaining and losing reaches
of the Scott River**

COMPLETED BY

THE SISKIYOU RESOURCE CONSERVATION DISTRICT

FOR THE

NORTH COAST REGIONAL WATER QUALITY CONTROL
BOARD

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Summary:

Stream discharge measurements were taken at nine locations on the Scott River a total of 8 times in 2006 and 7 times in 2007. 2006 was an above average water year and 2007 was a below average water year. Effort was made to perform this work in 2007 in order to capture and characterize this low base flow.

In 2006, no discharge measurements were taken in June due to high spring runoff. The river was not safely wadeable until after the fourth of July and only one measurement was taken in October of 2006.

In 2007 measurements were taken from the beginning of June through the end of October. Several efforts to measure portions of the nine sites were made in the low flow period of late September and early October of 2007.

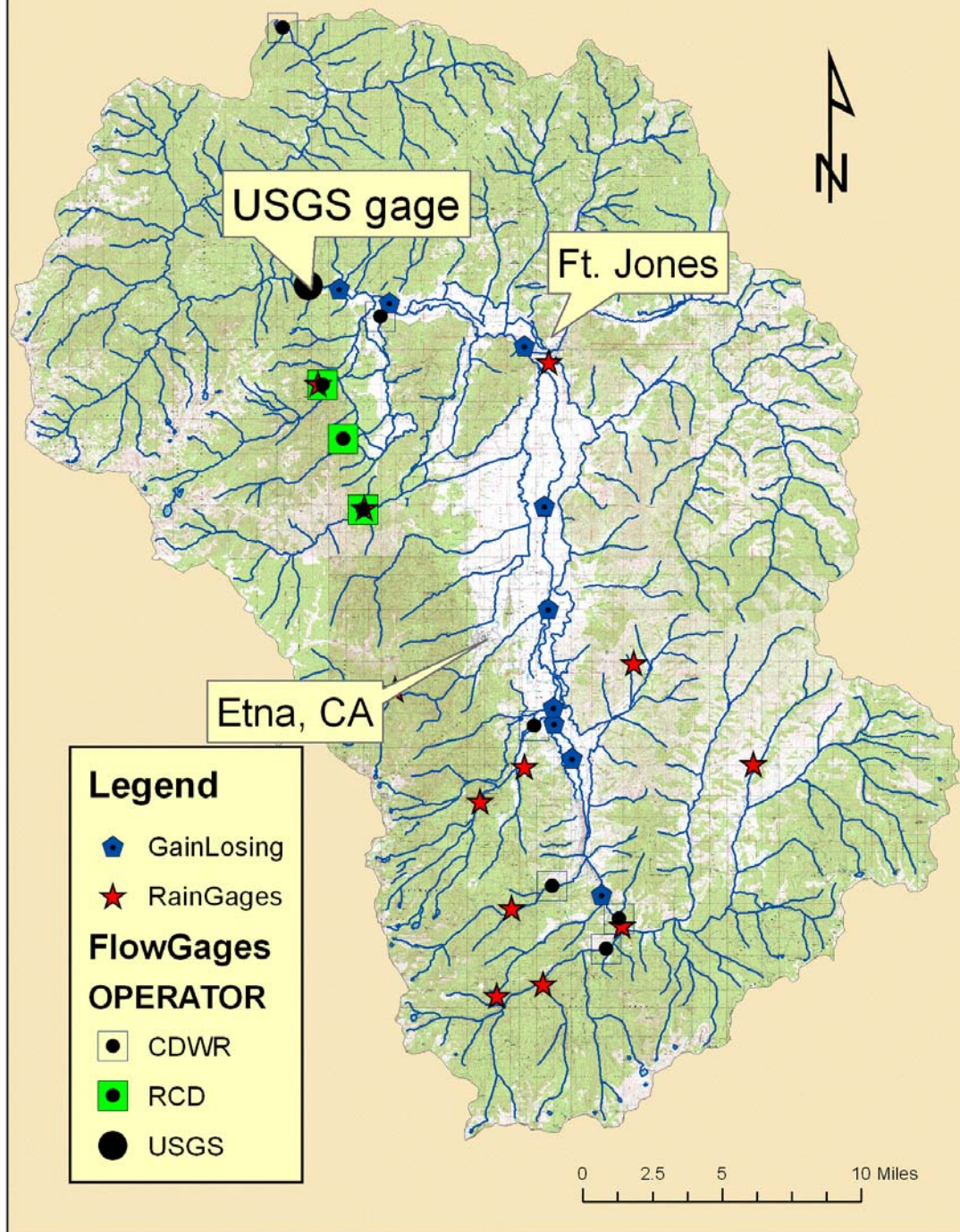
The major limitation to analysis of the collected data is the ignorance of the magnitude of any instream diversions and/or tail water return that exist between the measured sites. This is obviously apparent in the two consistently “losing” reaches (Red Bridge to Above Fay Lane and Below French Creek to Above Etna Creek) that bracket two large diversions in the Scott River (Farmers Ditch and the Scott Valley Irrigation District, respectively).

Location:

All work was completed in the Scott River Watershed, Siskiyou County California. See **Map #1 and Map #2** for discharge measurement locations. Discharge measurements were taken at the following sites on the mainstem Scott River. Coordinates are in UTM 10N - NAD 27.

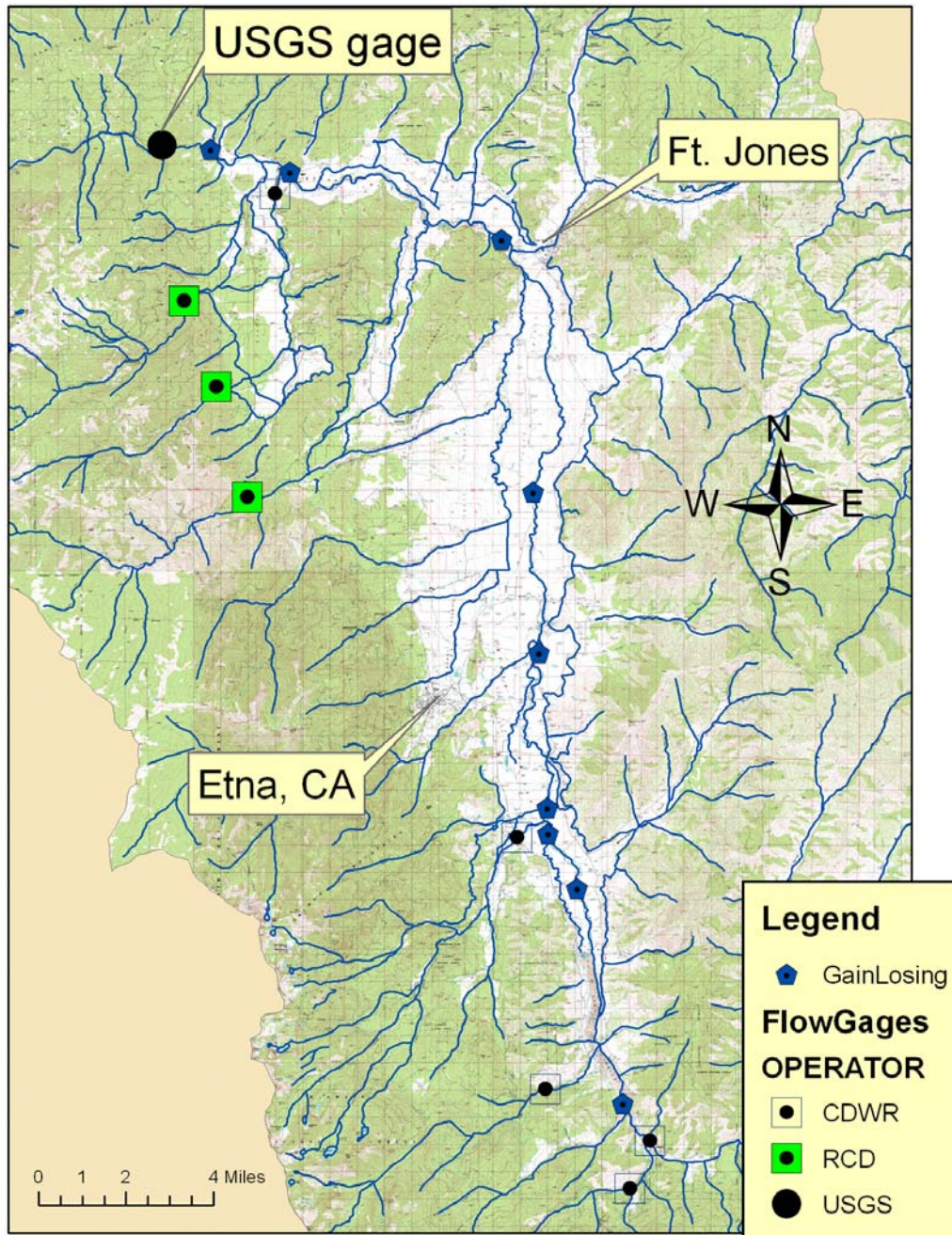
Location	Description	Easting	Northing
Red Bridge	Just downstream from the County Bridge	515767	4574498
Fay Lane	300 yards upstream of Fay Lane	514083	4582392
Above French Creek	~ ¼ mile upstream	513124	4584681
Below French Creek	~1/8 mile downstream (at low water crossing)	513031	4585321
Horn Lane	Downstream from Horn, ~ 1/8 mile upstream from Etna Creek.	512469	4590669
Eller Lane	~1/4 mile downstream from bridge	512537	4597282
Old SVID	At old SVID site	511683	4605912
Meamber Bridge	~1/8 mile downstream (above Shackleford Creek)	503584	4608798
Meamber Creek	~300 yard downstream from Meamber Creek.(Below Shackleford)	500769	4609485

Gaging Sites in the Scott River



Map1 – Flow and Precipitation data collected in Scott Watershed.

Gaining and Losing Evaluation Sites in the Scott River



Map 2 – Larger scale map of the sites measured for the evaluation of gaining and losing reaches in the Scott River.

Materials and methods:

Equipment:

All stream discharge measurements were taken using a Schwoffer 2100 Flow Meter. The exception is on 8/25/06 an Aquacalc Pro and Price AA flow meter was used. The meter was just back from being repaired by Rickley Hydrologic, and still had difficulty taking the measurements at such low flows (low velocity). All discharge measurements performed in 2006 were taken by Danielle Yokel – Project Coordinator. All discharge measurements performed in 2007 were taken by Erich Yokel – Project Coordinator.

Method:

The USGS methodology was used. A minimum of 20-30 measurements were taken at each location. A goal of having no individual cell's discharge (q) be no greater than 10% of the total discharge (Q) ($q/Q < 10\%$) was pursued. When possible $q/Q < 5\%$ was desired, but this was not always possible due to time restrictions and difficulty of achieving this criteria at some sites at low flow.

USGS data:

USGS data for the gaging station on the Scott River below Fort Jones was downloaded from the website: http://waterdata.usgs.gov/ca/nwis/uv/?site_no=11519500. It must be noted that this data is preliminary at the time of access. The historical data for this USGS gaging station can be downloaded at the California Data Exchange Center (CDEC) webpage (cdec.water.ca.gov). The code for the gage is SFJ. Inspection of the data downloaded from CDEC for 2006 (Figure 5) reveals significant problems in the quality of the available data for this gaging site during this time period. For this reason, the veracity of the documented and reported discharge for the USGS gage in 2006 is questioned.

Results:

Discharge measurements were originally meant to be taken three times a month (approximately every 10 days) from June – October of 2006. However, several factors contributed to measurements being taken less frequently during this water year.

- 1.) The mainstem Scott River flows were too high through June of 2006 for safe wading or the performance of quality discharge measurements. The river was barely wadeable on July 6th when the first measurement was collected.
- 2.) 2006 proved to be a good water year, and flows were not changing very rapidly, so the timeline was pushed to every two weeks. The last measurement was taken in the first week of October, because with the exception of the site above Fay Lane (downstream of the tailings) the river was gaining in all reaches at this time.

Left over funding from the initial contract was utilized to continue this effort into the “dry” water year of 2007. Flow measurements were performed from the beginning of June to the end of October in 2007.

2006 Scott River Mainstem Discharge

Location	7/6/06	7/18/06	7/31/06	8/14/06	8/25/06	9/8/06	9/20/06	10/4/06
Red Bridge	NDC	81.8	47.39	28.9	19.56	14.88	15.53	12.47
Fay Lane	176.8	54.7	25.79	18.4	9.9	7.37	6.16	7.04
Above French	186	77	38.76	25.7	NDC	10.92	10.14	15.01
Below French	NDC	77.3	44.53	31.3	18.39	15.51	13.35	16.48
Above Etna	NDC	64.9	24.25	19.8	13.12	10.72	13.72	18.65
Eller Lane	230	86.5	41.11	29.2	13.75	17.88	19.19	24.01
Old SVID	251.5	93.8	46.87	33.6	equip failed	22.98	26.98	30.35
Above Shackleford (Meamber Bridge)	NDC	116.4	62.26	34.4	equip failed	24.46	34.15	40.3
Below Shack (Meamber Gulch)	283.2	132.2	68.32	35.5	equip failed	32.82	42.33	49.81
USGS gauge	289	174	64	42	31	40	56	64

NDC = no data collected

Note: Prior to the July 6th measurement, flows were too high to wade.

Table 1 – Scott River discharge measurements collected in 2006.

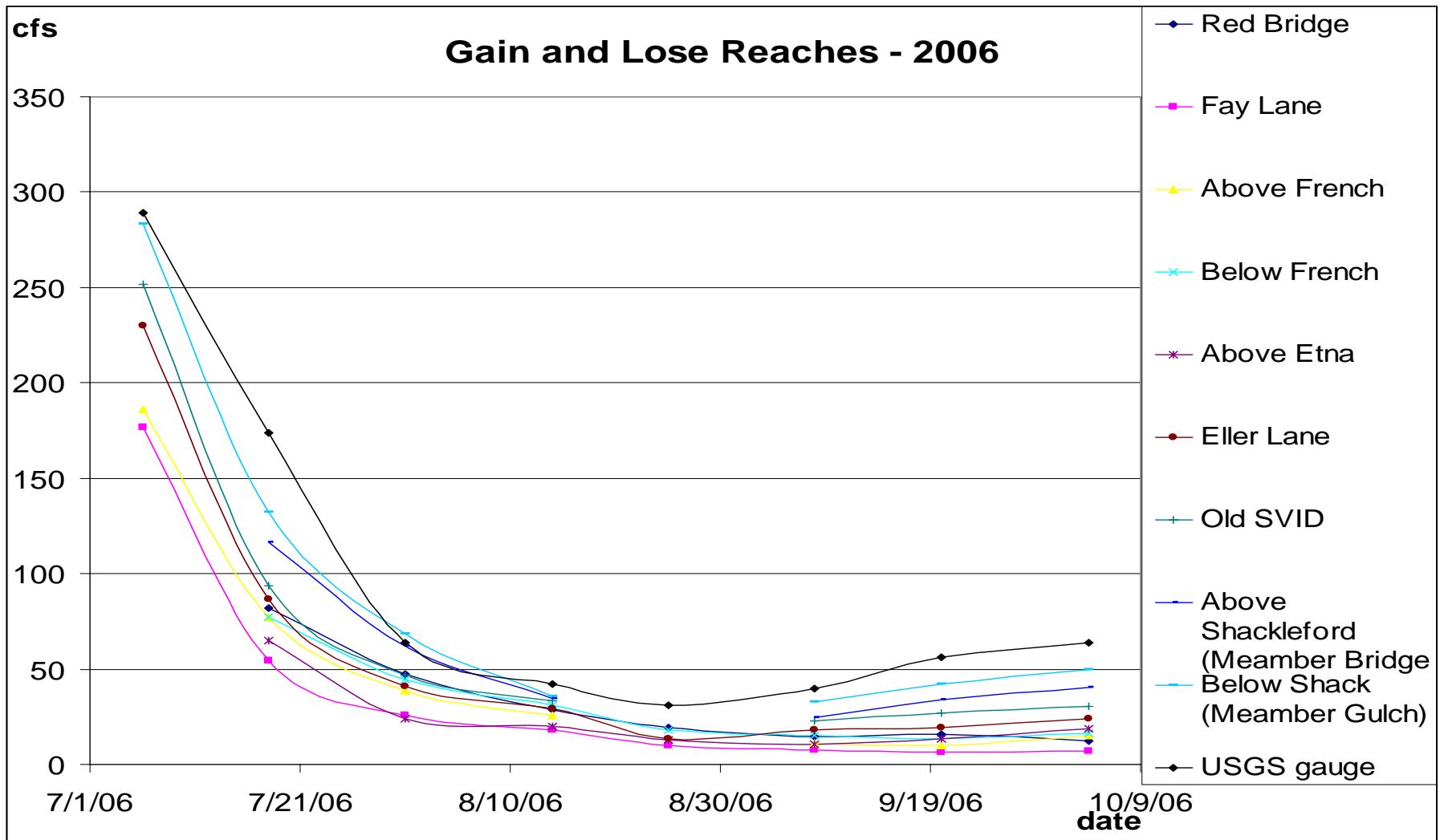


Figure 1 – All discharge measurements recorded in 2006.

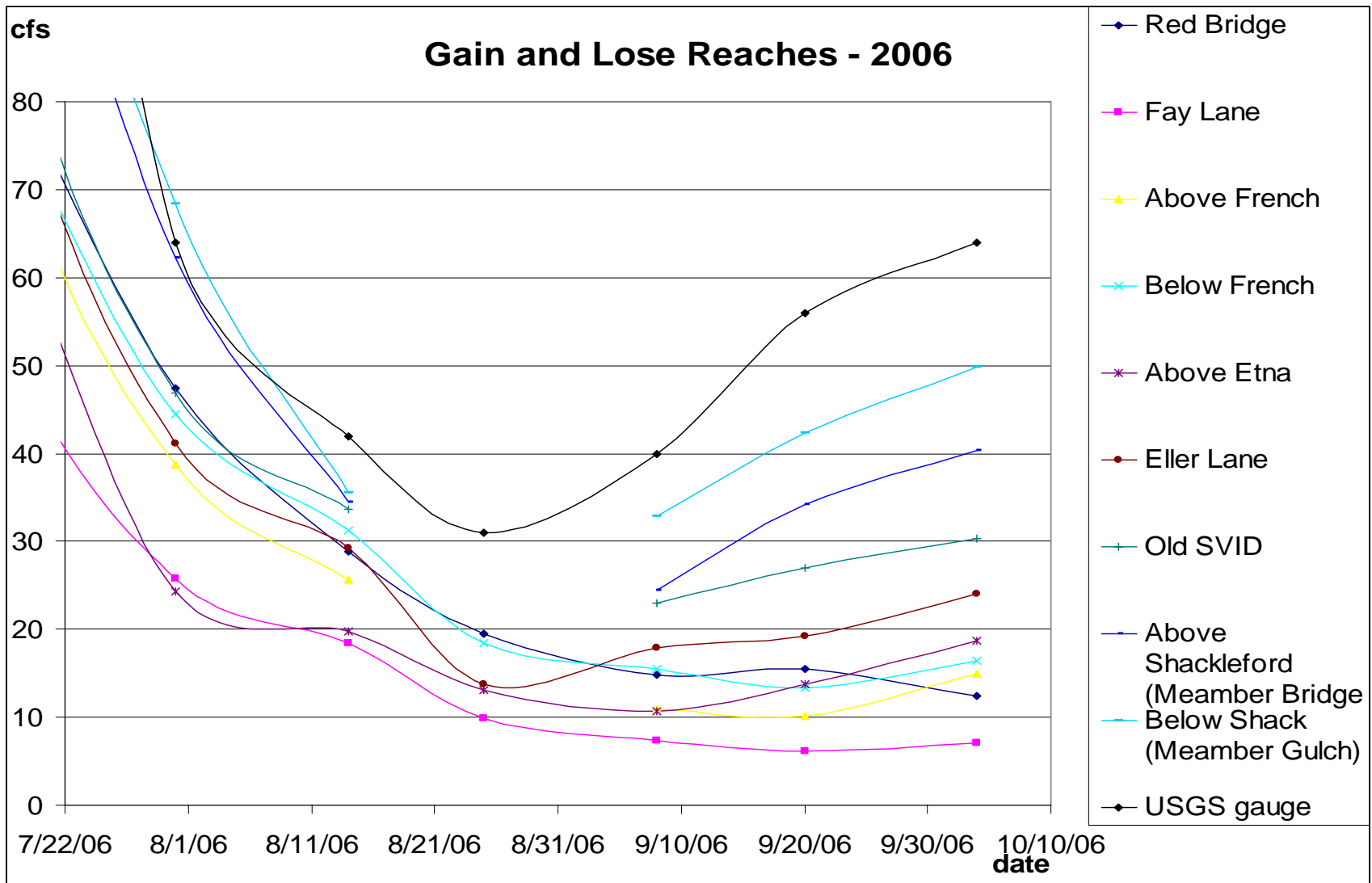


Figure 2 – Discharge measurements recorded during low flow period of 2006.

Location	7/6/06	7/18/06	7/31/06	8/14/06	8/25/06	9/8/06	9/20/06	10/4/06
Red Bridge to Fay Lane		-27.1	-21.6	-10.5	-9.7	-7.5	-9.4	-5.4
Fay Lane to Above French	9.2	22.3	13.0	7.3		3.6	4.0	8.0
Above French to Below French		0.3	5.8	5.6		4.6	3.2	1.5
Below French to Above Etna		-12.4	-20.3	-11.5	-5.3	-4.8	0.4	2.2
Above Etna to Eller Lane		21.6	16.9	9.4	0.6	7.2	5.5	5.4
Eller Lane to Old SMD	21.5	7.3	5.8	4.4		5.1	7.8	6.3
Old SMD to Above Shackleford		22.6	15.4	0.8		1.5	7.2	10.0
Above Shackleford to Below Shackleford		15.8	6.1	1.1		8.4	8.2	9.5
Below Shackleford to USGS	5.8	41.8	-4.3	6.5		7.2	13.7	14.2

Table 2 – The measured difference in discharge (expressed in cfs) between adjacent sites in 2006.

Location	7/6/06	7/18/06	7/31/06	8/14/06	8/25/06	9/8/06	9/20/06	10/4/06
Red Bridge to Fay Lane		-33%	-46%	-36%	-49%	-50%	-60%	-44%
Fay Lane to Above French	5%	41%	50%	40%		48%	65%	113%
Above French to Below French		0%	15%	22%		42%	32%	10%
Below French to Above Etna		-16%	-46%	-37%	-29%	-31%	3%	13%
Above Etna to Eller Lane		33%	70%	47%	5%	67%	40%	29%
Eller Lane to Old SMD	9%	8%	14%	15%		29%	41%	26%
Old SMD to Above Shackleford		24%	33%	2%		6%	27%	33%
Above Shackleford to Below Shackleford		14%	10%	3%		34%	24%	24%
Below Shackleford to USGS	2%	32%	-6%	18%		22%	32%	28%

Table 3 – The percent change in discharge between adjacent discharge measurement sites in 2006.

2007 Scott River Mainstem Discharge

Location	6/1/07	6/18/07	7/9/07	7/24/07	8/9/07	9/20/07	10/10/2007	10/11/2007	10/12/2007	10/30/2007
Red Bridge	107	36	11	7	5	4		26		60
Fay Lane	105	28	6	6	4			16		59
Above French	126	44	12	7	4			17		69
Below French	161	59	23	13	7		15	23	28	76
Above Etna	143	52	14	7	3		7		20	67
Eller Lane	150	59	12	7	<.5		4.5		14	64
Old SVID		76	18	10	<.5			6	12	
Above Shackelford (Meamber Bridge)	207	98	28	21	4			5		76
Below Shack (Meamber Gulch)	245	116	32	26	5	7		10		79
USGS gauge	290	148	42	35	7	7	14	14	14	79

Table 4 – Scott River discharge measurements collected in 2007.

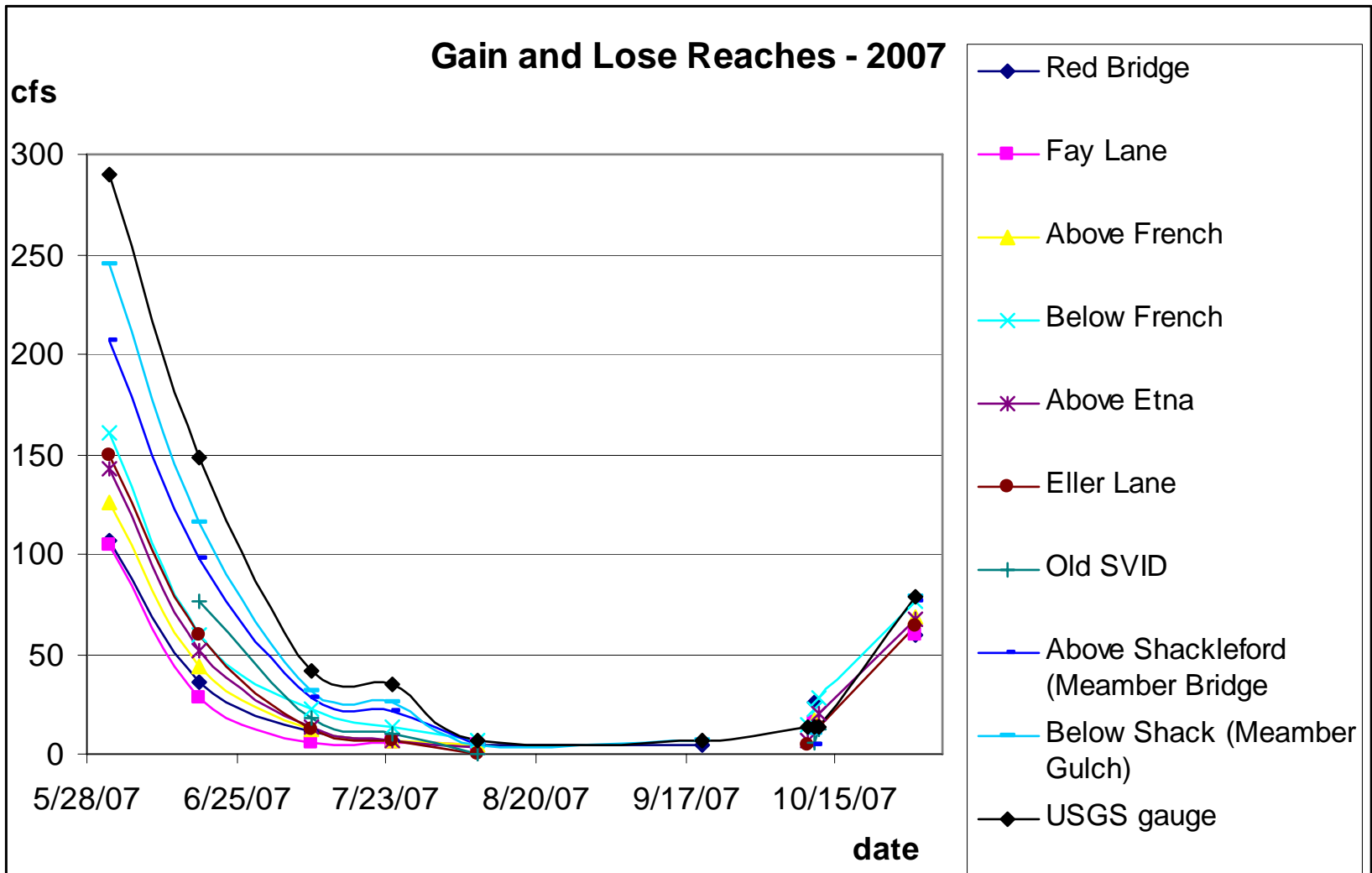


Figure 3 - All discharge measurements recorded in 2007.

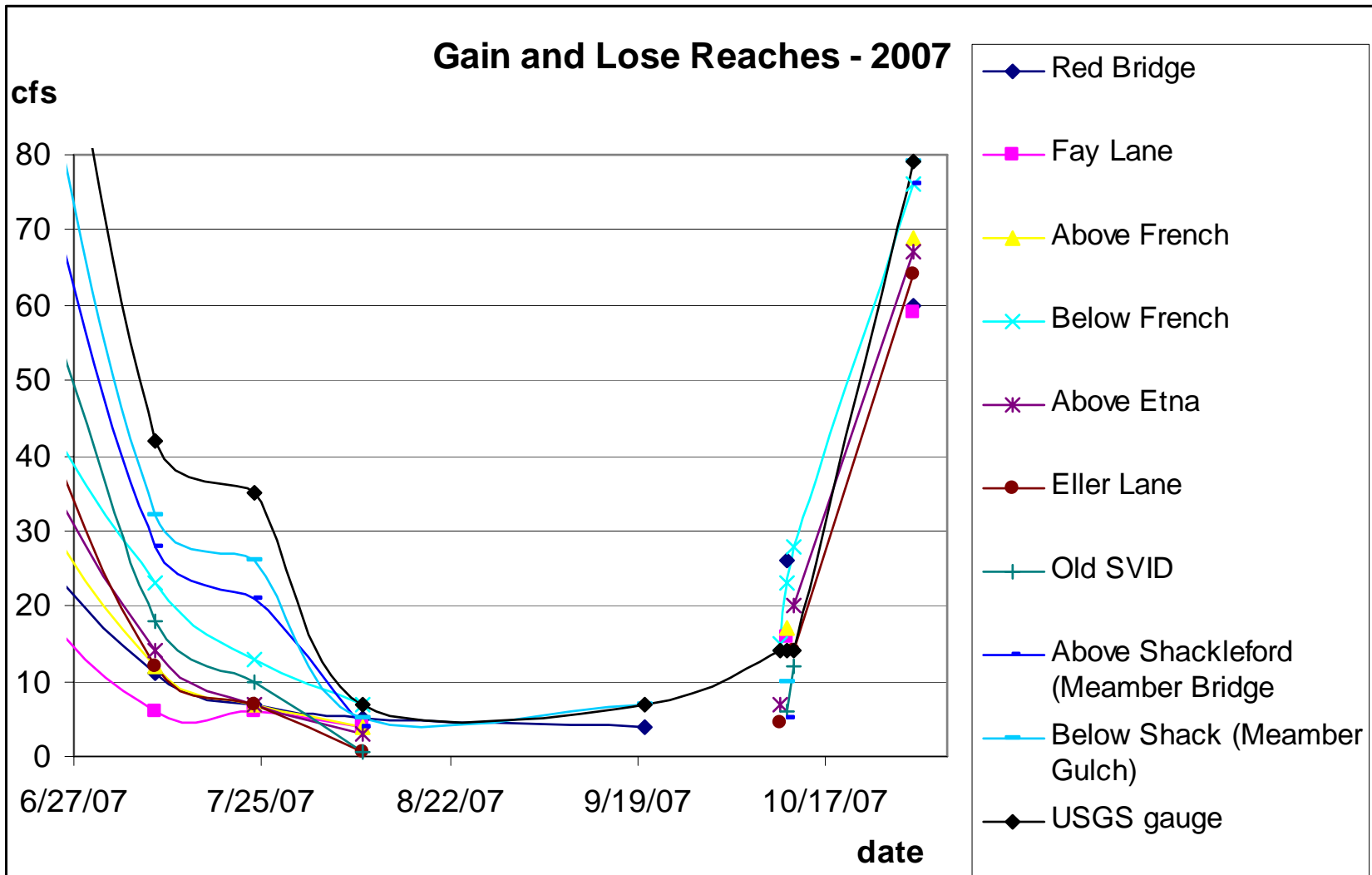


Figure 4 - Discharge measurements recorded during low flow period of 2007.

Location	6/1/07	6/18/07	7/9/07	7/24/07	8/9/07	9/20/07	10/10/2007	10/11/2007	10/12/2007	10/30/2007
Red Bridge to Fay Lane	-2	-8	-5	-1	-1			-10		-1
Fay Lane to Above French	21	16	6	1	0			1		10
Above French to Below French	35	15	11	6	3			6		7
Below French to Above Etna	-18	-7	-9	-6	-4		-8		-8	-9
Above Etna to Eller Lane	7	7	-2	0	-3		-3		-6	-3
Eller Lane to Old SVID		17	6	3	0				-2	
Old SVID to Above Shackleford		22	10	11	4			-1		
Above Shackleford to Below Shackleford	38	18	4	5	1			5		3
Below Shackleford to USGS	45	32	10	9	2	0		4		0

Table 5– The measured difference in discharge (expressed in cfs) between adjacent sites in 2007.

Location	6/1/07	6/18/07	7/9/07	7/24/07	8/9/07	9/20/07	10/10/2007	10/11/2007	10/12/2007	10/30/2007
Red Bridge to Fay Lane	-2%	-22%	-45%	-14%	-20%			-38%		-2%
Fay Lane to Above French	20%	57%	100%	17%	0%			6%		17%
Above French to Below French	28%	34%	92%	86%	75%			35%		10%
Below French to Above Etna	-11%	-12%	-39%	-46%	-57%		-53%		-29%	-12%
Above Etna to Eller Lane	5%	13%	-14%	0%	-83%		-36%		-30%	-4%
Eller Lane to Old SVID		29%	50%	43%	0%				-14%	
Old SVID to Above Shackleford		29%	56%	110%	700%			-17%		
Above Shackleford to Below Shackleford	18%	18%	14%	24%	25%			100%		4%
Below Shackleford to USGS	18%	28%	31%	35%	40%	0%		40%		0%

Table 6 – The percent change in discharge between adjacent discharge measurement sites in 2007.

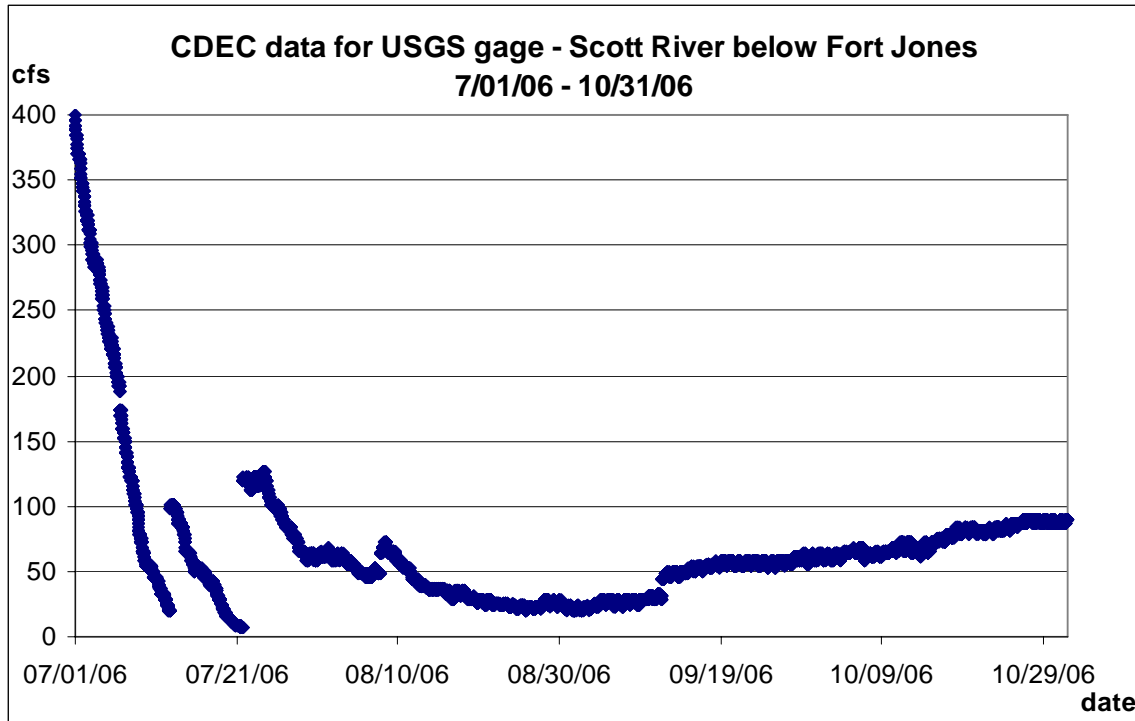


Figure 5 – Discharge data recorded at the USGS gage – Scott River below Fort Jones on 7/01/06 – 10/31/06 as accessed at CDEC (cdec.water.ca.gov) on 11/06/07.

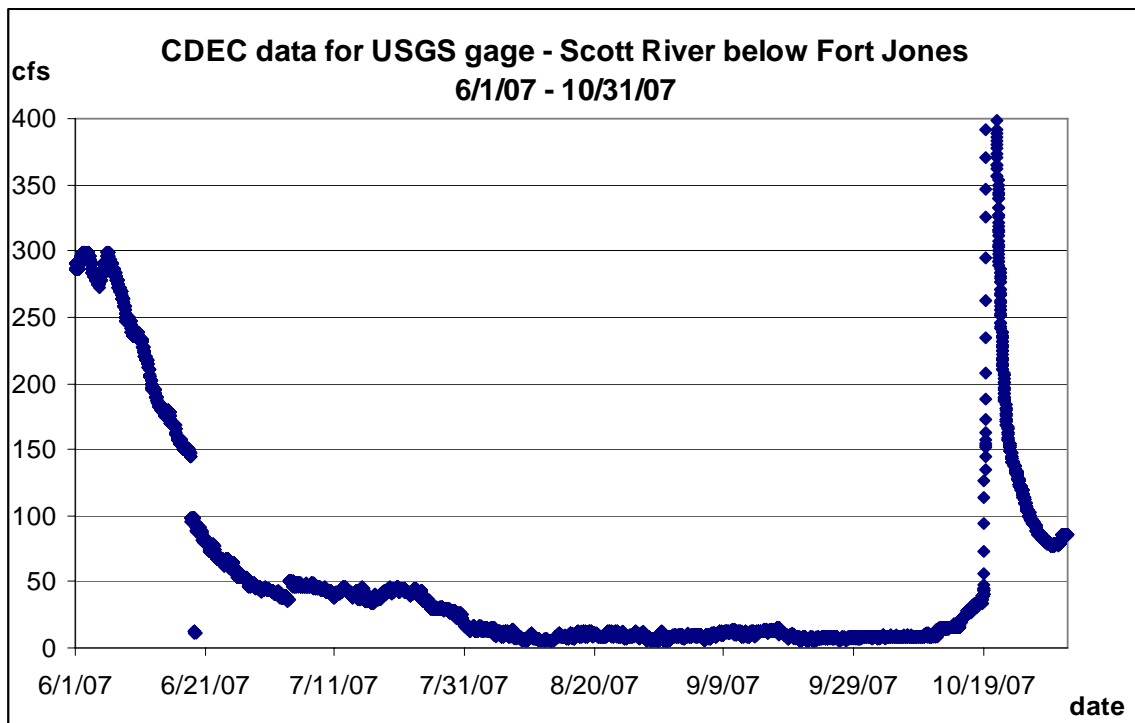


Figure 6 – Discharge data recorded at the USGS gage – Scott River below Fort Jones on 6/01/07 – 10/31/07 as accessed at CDEC (cdec.water.ca.gov) on 11/06/07.