INDUSTRIAL AREA IM/IRA SURFACE WATER MONITORING

MONTHLY STATUS REPORT

JUNE 1995

U.S. DEPARTMENT OF ENERGY

Rocky Flats Environmental Technology Site

Golden, Colorado

ROCKY MOUNTAIN REMEDIATION SERVICES, L.L.C.

SURFACE WATER GROUP

August 2, 1995

ADMIN RECORD

1/57

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1. INTRODUCTION

The Interim Measure/Interim Remedial Action/Decision Document (IM/IRA/DD) for the Industrial Area at the Rocky Flats Environmental Technology Site (RFETS) was prepared in accordance with the Rocky Flats Plant Interagency Agreement (IAG), dated January 22, 1991, and applicable regulatory guidance documents. The objective of the Industrial Area IM/IRA/DD is to ensure that environmental monitoring is adequate to support decontamination and decommisioning (D&D), Transition, and other nonroutine activities within the Industrial Area at RFETS. To achieve this objective, a monitoring safety net approach is used around the RFETS Industrial Area to monitor for, protect against, and respond to any actual or potential contaminant releases.

The following elements relating to surface water monitoring are detailed in the IM/IRA/DD:

- Surface water monitoring in areas of concern, which previously focused on the terminal ponds (and other sites in the Buffer Zone), will be expanded to include the Industrial Area.

- Surface water quality and hydraulic flow conditions will be studied in the Industrial Area to establish baseline conditions.

- Monitoring systems for air and surface water use state-of-the-art technologies to accomplish plant transition monitoring objectives. Technical improvements for monitoring building D&D and Transition activities will be reviewed regularly in an attempt to improve air and surface water monitoring capabilities.

- Verification monitoring for D&D and Transition activities is the second and outer layer of environmental surveillance that will verify that contaminant pathway protection procedures and site-specific monitoring activities are effective.

- The type and extent of verification monitoring will depend on the type of activity being performed and the assessed environmental hazard associated with that activity.

- A statistically based methodology has been identified to develop site-specific baseline conditions for environmental media at activity locations and to determine when pre-programmed response actions are needed.

EG&G, Environmental Protection Department, Surface Water is responsible for the implementation of surface water monitoring activities required by the Industrial Area IM/IRA/DD. The report contained herein provides a monthly summary of the highlights and analytical results of this activity for the month of June 1995. Figure 1-1 shows the location surface water monitoring sites discussed in this report. Figure 1-2 shows the Industrial Area subbasins and hydrologic routing. Figure 1-3 shows a close-up of gaging stations GS27 and GS28 which support D&D and Transition operations at Building 889 and the Industrial Area IM/IRA Pilot Project.

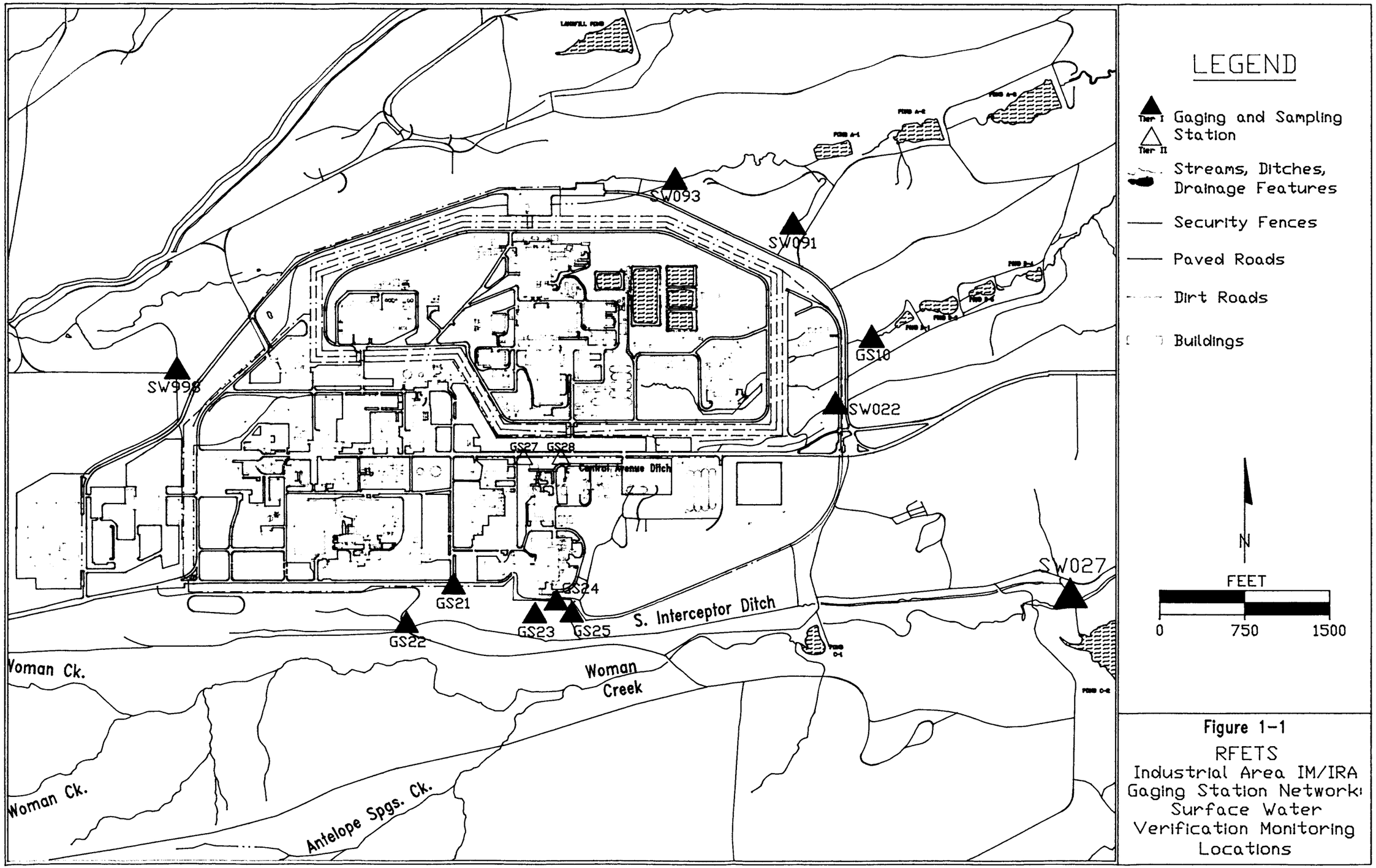


Figure 1-1
RFETS
Industrial Area IM/IRA
Gaging Station Network:
Surface Water
Verification Monitoring
Locations

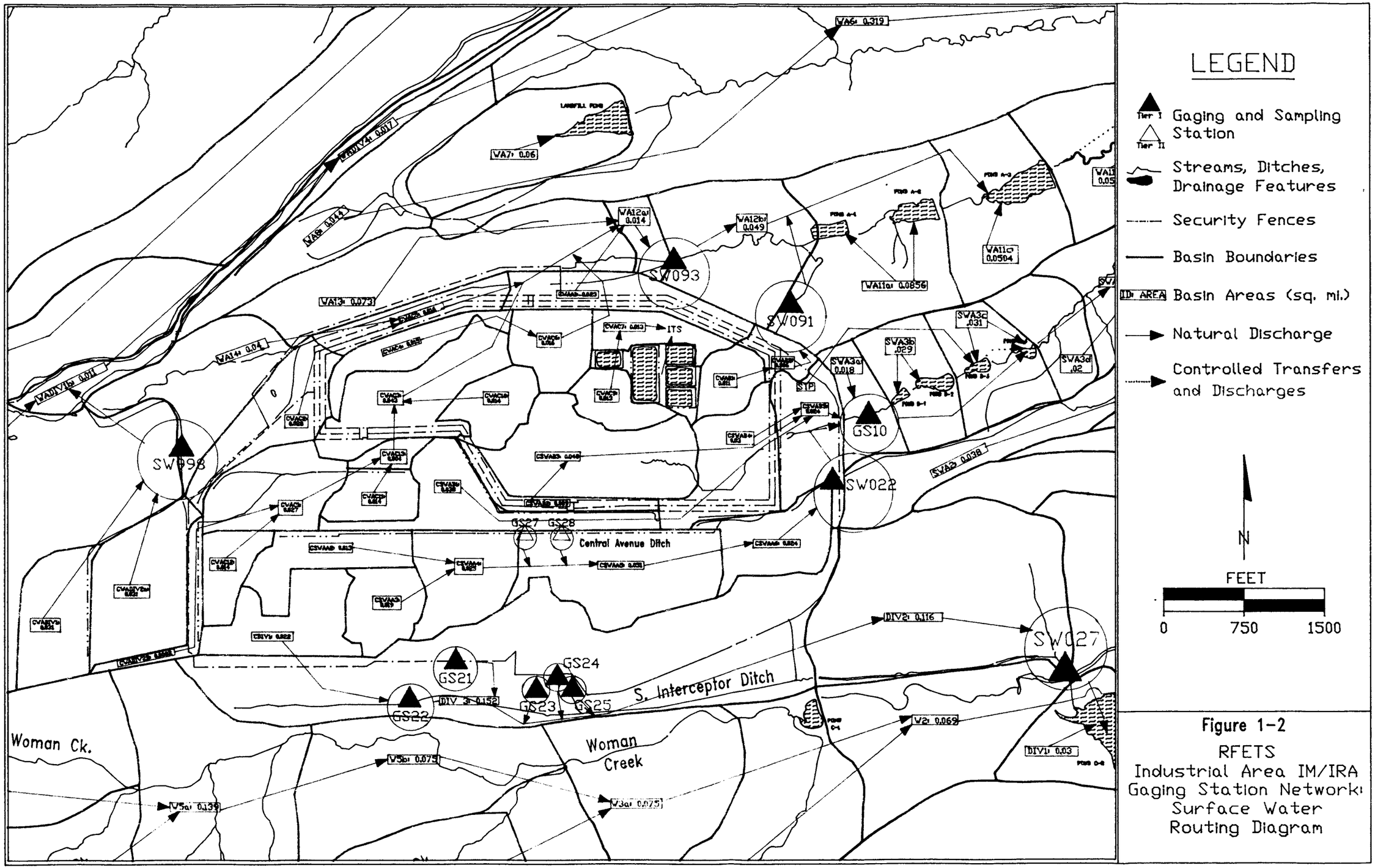


Figure 1-2

RFETS
Industrial Area IM/IRA
Gaging Station Network:
Surface Water
Routing Diagram

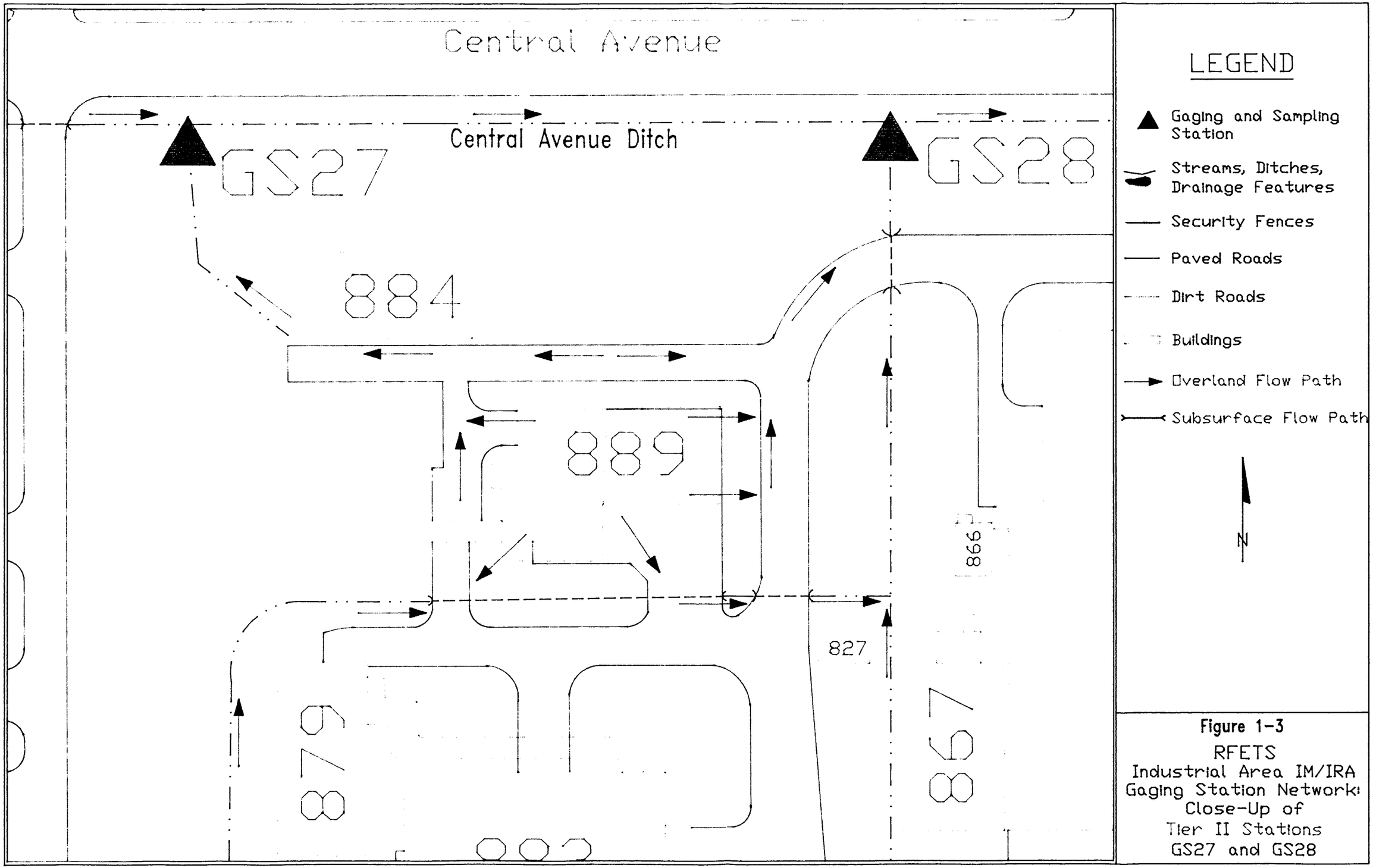


Figure 1-3
RFETS
Industrial Area IM/IRA
Gaging Station Network:
Close-Up of
Tier II Stations
GS27 and GS28

2. HIGHLIGHTS

The following activities occurred during the period from June 1, 1995 to June 30, 1995:

- On June 17th, a discharge sample was collected at gaging station GS23, the suspected overflow pipe from the 881 septic lift station. The automatic sampler was enabled by the discharge of approximately 549 ft^3 (4107 gallons) of liquid from 7:15am on June 17th to 16:30 on June 17th. Fecal coliform results indicated that this liquid was essentially raw sewage. This information, coupled with a dye test on July 12, confirms that GS23 is the outfall for the 881 septic lift overflow. Surface Water and Building 881 personnel have instigated administrative controls to prevent any further discharge of this liquid to the 881 Hillside.

- On June 28, 1995 the Site received approximately 0.3" of precipitation was received in 25 minutes. This event appears to be the most intense storm of the year. Stormwater samples were successfully collected at all but one site (SW998: ac line power failure).

- A Hydrolab® Recorder™ water quality probe was installed at gaging station GS28. Troubleshooting is ongoing, and the probe is expected to be up and running in July 1995.

- A large storm event on June 8-9, 1995 (1.2") resulted in large flows which damaged equipment at gaging stations SW022 and SW093. Repairs were completed by June 12, 1995.

3. DATA SUMMARY

All discharge data provided in Monthly Status Reports are **preliminary and subject to revision.** Final data will be delivered in the Annual Report.

3.1 Tier 1: Industrial Area Outfalls

The objective of the Tier I Industrial Area gaging stations is to monitor and characterize surface water leaving the Industrial Area and determine if D&D and Transition activities have impacted surface water. These gaging stations monitor six (6) of the seven (7) major pathways discussed in the Industrial Area IM/IRA/DD and 5 culverts on the 81 Hillside.

3.1.1 Gaging Station GS10

Location:

- 39° 53' 35.11"N 105° 11' 26.6"W
- South Walnut Creek, above the Pond B-1 Bypass; co-located with SW023

Drainage Characteristics:

- Pathway 2
- Total and Effective Area: 0.281 mi.^{2} = 179.8 ac (approximately 78% impervious)
- Sub-basins: CSWAB1, CSWAB2, CSWAB3, CSWAB4, CSWAB5, CSWAA2, CSWAA3, CSWAA4, CSWAA5, CSWAA6 (Figure 1-2)
- Description: GS10 lies on South Walnut Creek just above the B-1 Bypass. The basin consists of the central and southern area of the Industrial Area (total of 140ac 100% impervious).
- Areas draining to this site: 900, 800, 700, 600, 500, 400, 300, 100

Hardware Configuration:

- Primary Device: 9½" Parshall flume
- Flow Meter: ISCO® Model 3230 (bubbler)
- Sampler: ISCO® Model 3700R Refrigerated
  ISCO® Model 6000 VOC
- Radio Telemetry: No
- Power: DC solar power system
- Water Quality Parameters: None

Discharge Data

Table 3-1. GS10 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	*0.333*	*0.231*	*0.647*	*28750*
6/2/95	*0.713*	*0.216*	*6.443*	*61626*
6/3/95	*0.757*	*0.350*	*6.599*	*65435*
6/4/95	0.675	0.310	4.484	58345
6/5/95	0.364	0.290	1.119	31426
6/6/95	0.283	0.247	0.346	24466
6/7/95	0.239	0.172	0.379	20626
6/8/95	1.314	0.199	4.640	113568
6/9/95	*1.786*	*0.332*	*11.090*	*154271*
6/10/95	0.296	0.266	0.333	25548
6/11/95	0.247	0.223	0.308	21346
6/12/95	0.264	0.222	0.773	22805
6/13/95	0.225	0.197	0.316	19472
6/14/95	0.256	0.193	0.557	22137
6/15/95	0.248	0.194	0.294	21465
6/16/95	0.229	0.168	0.279	19809
6/17/95	0.455	0.212	2.945	39290
6/18/95	0.273	0.239	0.399	23555
6/19/95	0.230	0.173	0.454	19913
6/20/95	0.219	0.186	0.466	18964
6/21/95	0.196	0.168	0.296	16914
6/22/95	0.185	0.164	0.278	15957
6/23/95	0.210	0.155	1.025	18109
6/24/95	0.203	0.165	1.001	17574
6/25/95	0.170	0.157	0.184	14717
6/26/95	0.171	0.142	0.308	14787
6/27/95	0.164	0.145	0.365	14140
6/28/95	*0.990*	*0.155*	*15.096*	*85545*
6/29/95	*1.965*	*0.264*	*7.068*	*169740*
6/30/95	0.241	0.209	0.457	20817
Monthly Values				
Mean	0.463	0.212	2.298	40037
Min.	0.164	0.142	0.184	14140
Max.	1.965	0.350	15.096	169740

Total Discharge: 1201118 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-1. GS10 Monthly Discharge

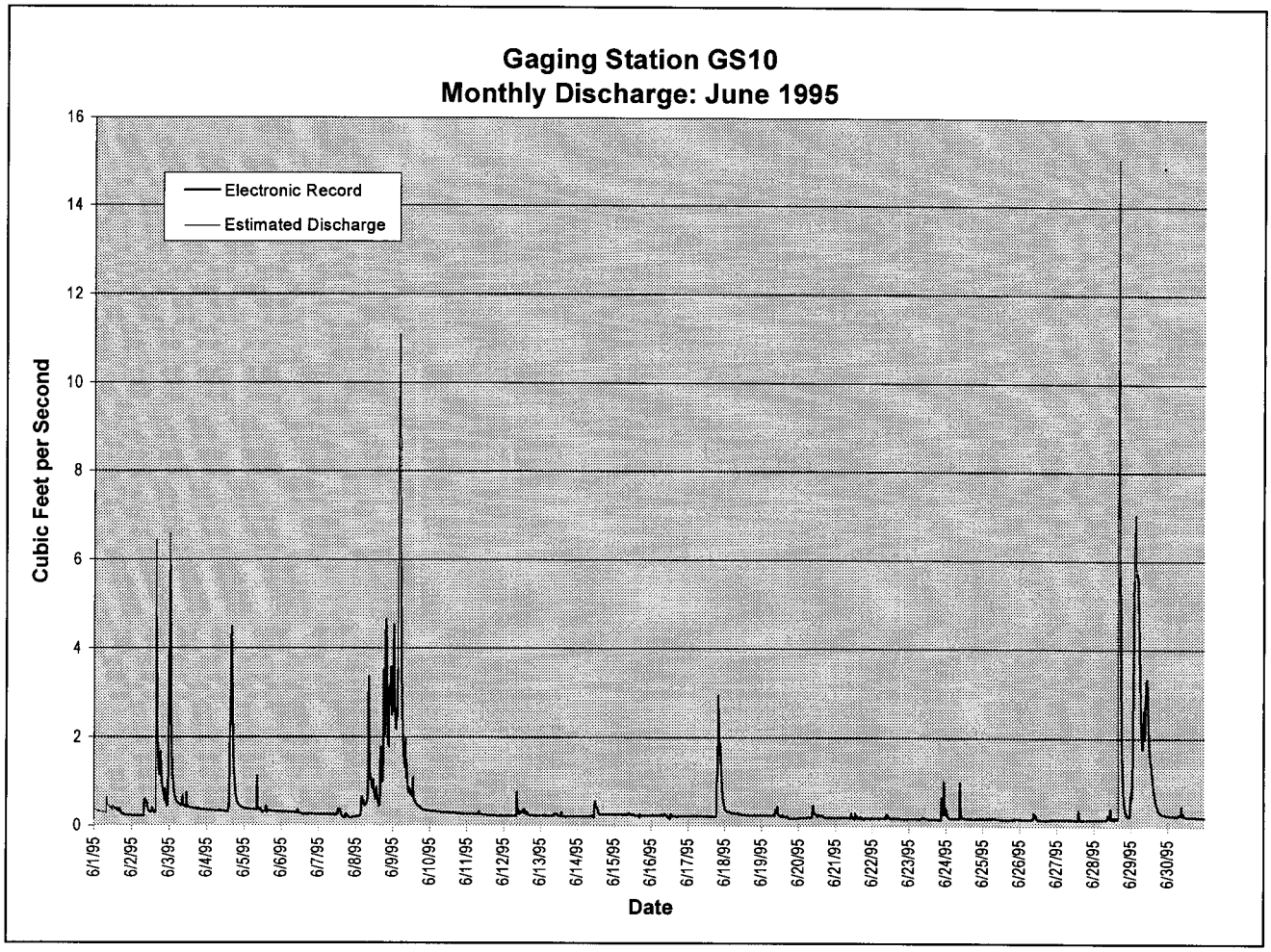
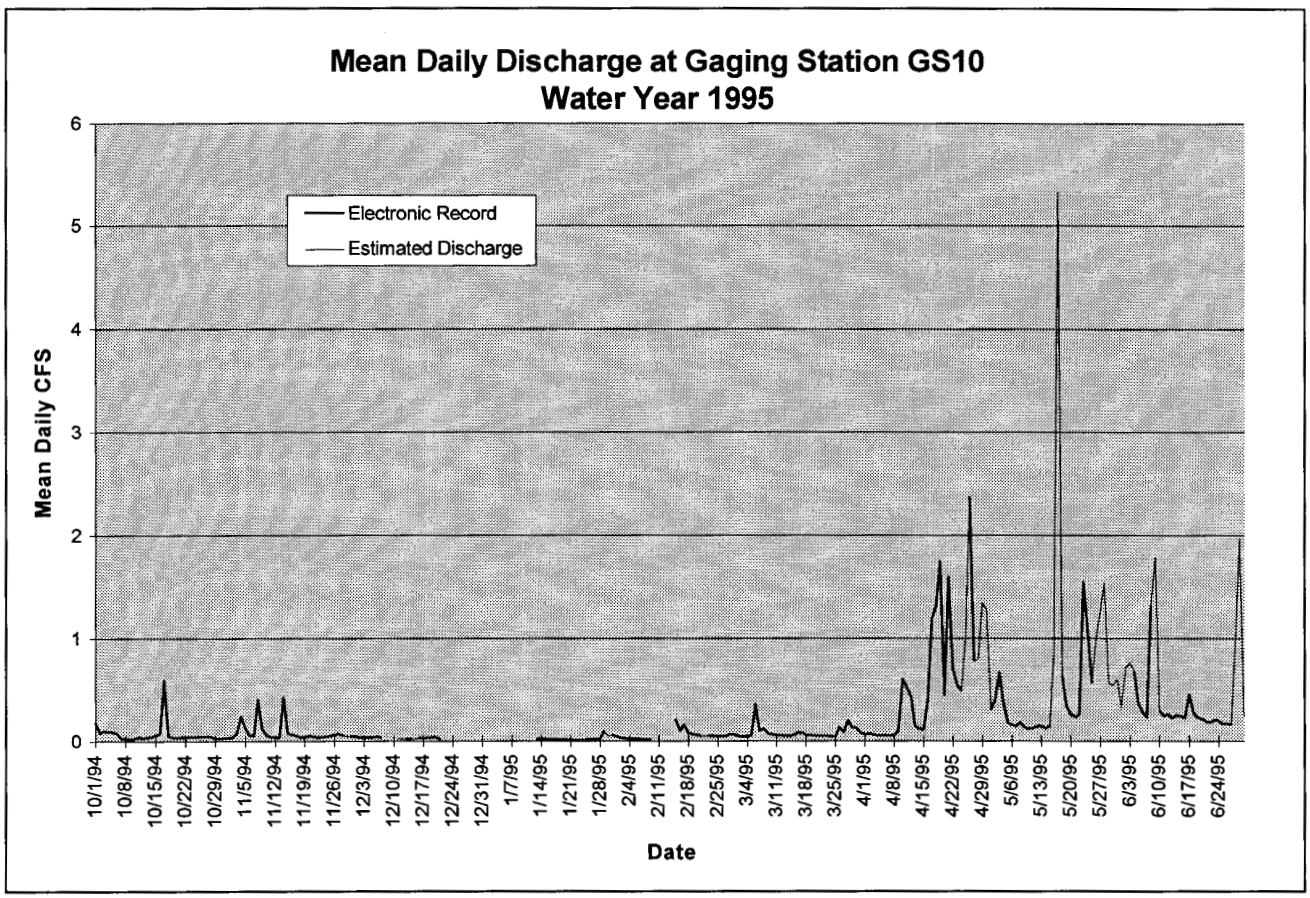


Figure 3-2. GS10 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 4/26/95; 5/16; 5/26; 5/31; 6/28

No analytical results compiled to date.

3.1.2 Gaging Station GS21

Location:

- State Plane: 2083061; 748147
- concrete spillway near intersection of Seventh St. and Cactus Avenue

Drainage Characteristics:

- Pathway 5
- Buildings: T664A, 664
- Sub-basins: DIV3 (Figure 1-2)
- Description: GS21 lies on the concrete spillway near intersection of Seventh St. and Cactus Avenue, at the southwest corner of the 850 parking lot. This basin receives Industrial Area runoff principally from the roads, parking lots and storage area south of Building 664.

Hardware Configuration:

- Primary Device: 4" cutthroat flume (Beta Sue)
- Flow Meter: ISCO® 4230 bubbler
- Sampler: ISCO® 3710 Automatic
  ISCO® 6000 Automatic VOC
- Radio Telemetry: Yes
- Power: DC solar power system
- Precipitation: ISCO® Rain Gage
- Water Quality Parameters: None

Discharge Data

Table 3-2. GS21 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	0.001	0.001	0.003	99
6/2/95	0.014	0.000	0.318	1200
6/3/95	0.018	0.001	0.520	1532
6/4/95	0.017	0.000	0.301	1507
6/5/95	0.001	0.000	0.002	75
6/6/95	0.000	0.000	0.000	11
6/7/95	0.000	0.000	0.001	5
6/8/95	0.045	0.000	0.222	3930
6/9/95	0.053	0.001	0.699	4588
6/10/95	0.001	0.000	0.001	55
6/11/95	0.000	0.000	0.000	4
6/12/95	0.000	0.000	0.000	0
6/13/95	0.000	0.000	0.000	0
6/14/95	0.000	0.000	0.000	0
6/15/95	0.000	0.000	0.000	0
6/16/95	0.000	0.000	0.000	0
6/17/95	0.006	0.000	0.113	487
6/18/95	0.001	0.000	0.003	47
6/19/95	0.000	0.000	0.000	0
6/20/95	0.000	0.000	0.000	0
6/21/95	0.000	0.000	0.000	0
6/22/95	0.000	0.000	0.000	0
6/23/95	0.003	0.000	0.143	263
6/24/95	0.001	0.000	0.003	51
6/25/95	0.000	0.000	0.000	0
6/26/95	0.000	0.000	0.000	0
6/27/95	0.000	0.000	0.000	0
6/28/95	0.011	0.000	0.410	933
6/29/95	0.033	0.001	0.162	2872
6/30/95	0.001	0.000	0.001	49
Monthly Values				
Mean	0.007	0.000	0.097	590
Min.	0.000	0.000	0.000	0
Max.	0.053	0.001	0.699	4588

Total Discharge: 17708 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-3. GS21 Monthly Discharge

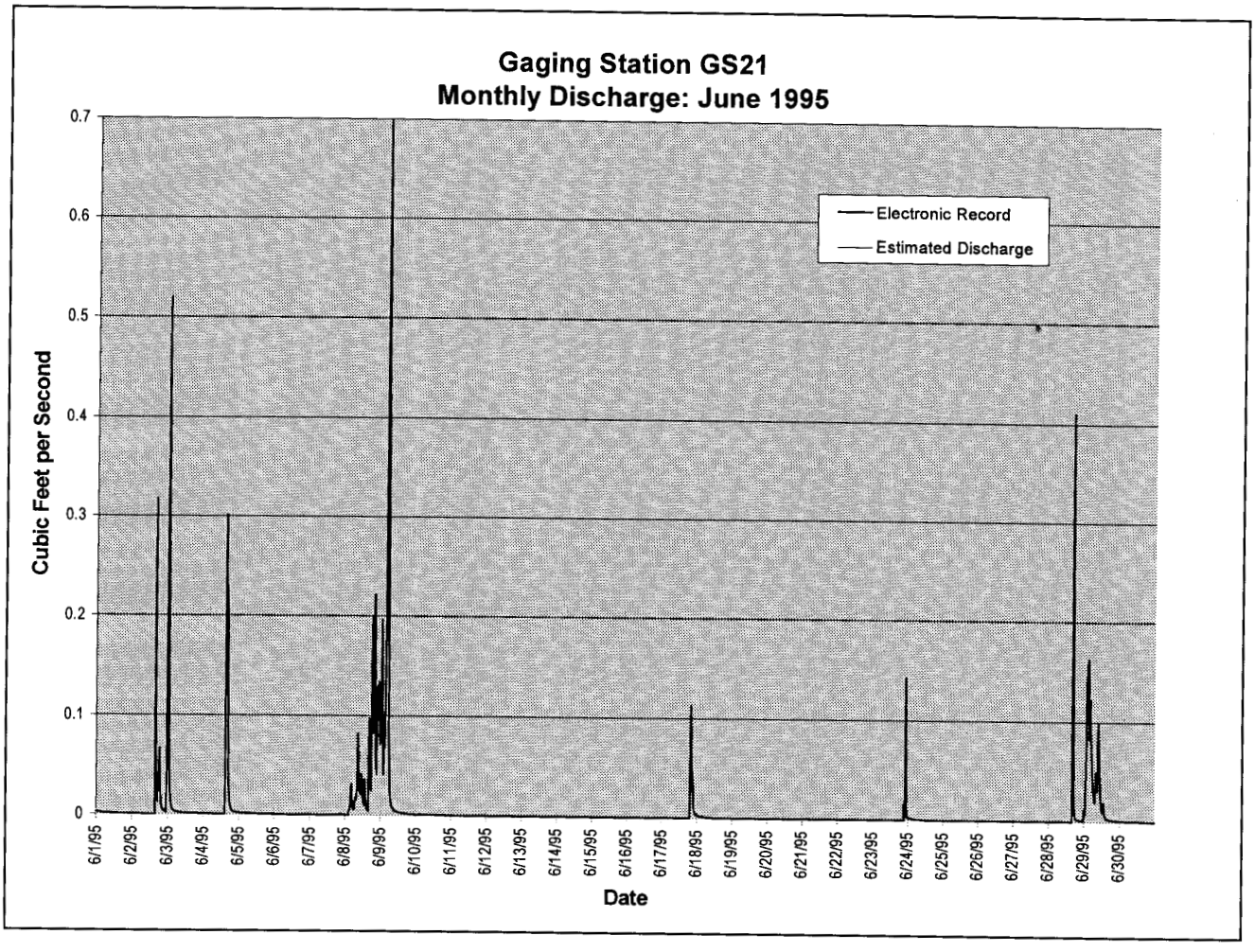
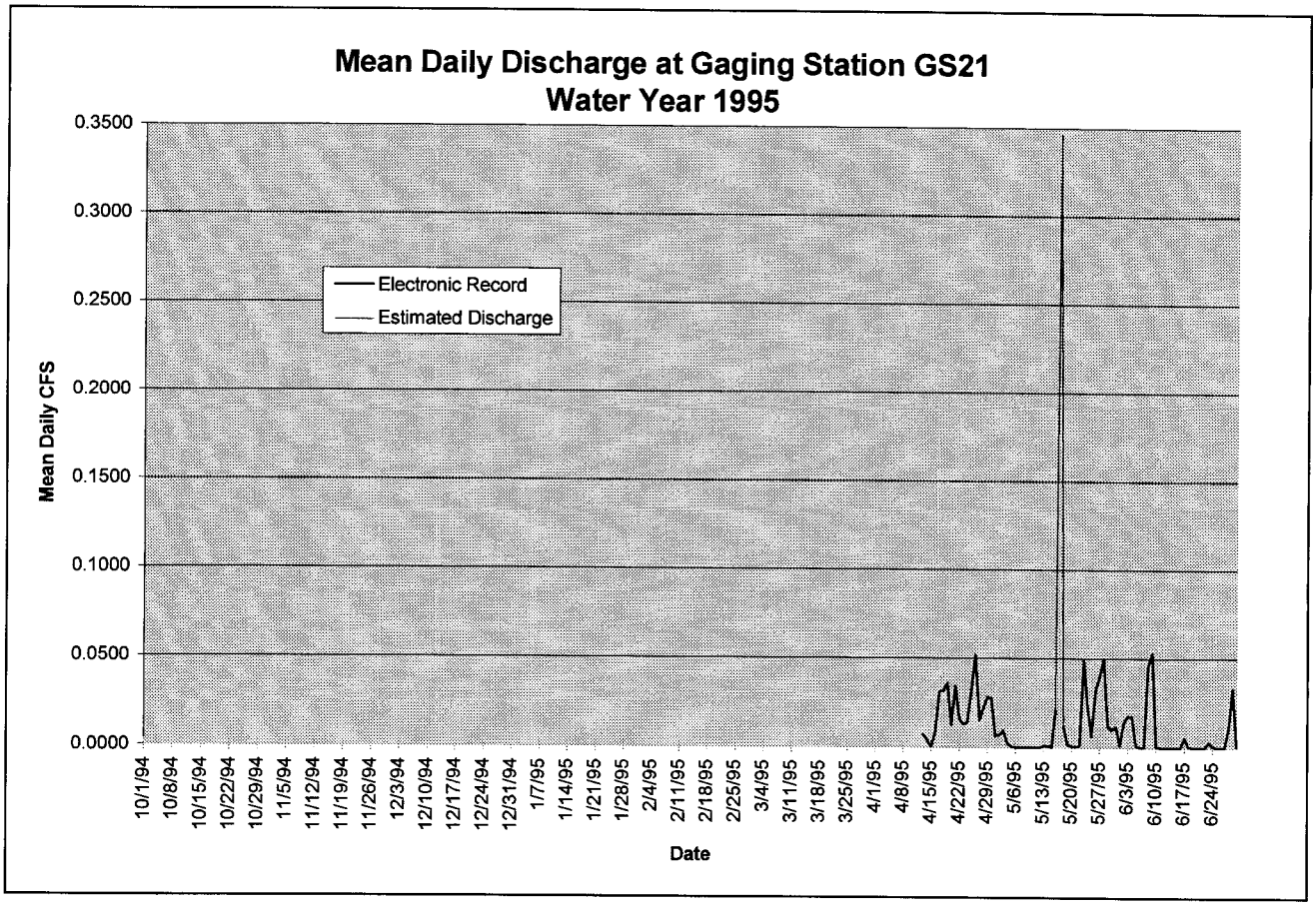


Figure 3-4. GS21 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 5/3/95; 5/16; 5/31; 6/28

No analytical results compiled to date.

3.1.3 Gaging Station GS22

Location:

- State Plane: 2082646; 747799
- concrete apron at 400 Area outfall to SID

Drainage Characteristics:

- Pathway 5
- Buildings: T124A, 440, 444, T444A, 447, 451, 457, 460, 461, 462
- Sub-basins: CDIV1 (Figure 1-2)
- Description: GS22 lies at the concrete apron at the 400 Area outfall to the SID. This basin receives Industrial Area runoff principally from the roads, parking lots and buildings of the 400 Area.

Hardware Configuration:

- Primary Device: 1.5 foot H flume
- Flow Meter: ISCO® 4230 bubbler
- Sampler: ISCO® 3710 Automatic
  ISCO® 6000 Automatic VOC
- Radio Telemetry: No
- Power: DC solar power system
- Water Quality Parameters: None

Discharge Data

Table 3-3. GS22 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	0.042	0.039	0.064	3626
6/2/95	0.234	0.037	4.028	20241
6/3/95	0.197	0.052	4.718	17016
6/4/95	0.211	0.047	3.654	18217
6/5/95	0.051	0.039	0.091	4430
6/6/95	0.042	0.035	0.076	3609
6/7/95	0.042	0.032	0.185	3624
6/8/95	0.460	0.033	1.761	39757
6/9/95	0.423	0.042	4.621	36513
6/10/95	0.043	0.039	0.103	3701
6/11/95	0.038	0.036	0.059	3284
6/12/95	0.037	0.035	0.061	3189
6/13/95	0.035	0.033	0.054	3043
6/14/95	0.033	0.030	0.055	2846
6/15/95	0.033	0.028	0.051	2821
6/16/95	0.030	0.027	0.052	2582
6/17/95	0.159	0.026	2.230	13766
6/18/95	0.030	0.025	0.051	2564
6/19/95	0.027	0.024	0.046	2304
6/20/95	0.026	0.024	0.043	2232
6/21/95	0.026	0.023	0.038	2213
6/22/95	0.026	0.023	0.127	2254
6/23/95	0.113	0.022	3.107	9778
6/24/95	0.027	0.022	0.079	2350
6/25/95	0.026	0.022	0.113	2231
6/26/95	0.022	0.020	0.032	1920
6/27/95	0.023	0.019	0.070	1961
6/28/95	0.151	0.019	4.266	13038
6/29/95	0.369	0.023	1.680	31862
6/30/95	0.032	0.022	0.108	2745
Monthly Values				
Mean	0.100	0.030	1.054	8657
Min.	0.022	0.019	0.032	1920
Max.	0.460	0.052	4.718	39757

Total Discharge: 259718 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-5. GS22 Monthly Discharge

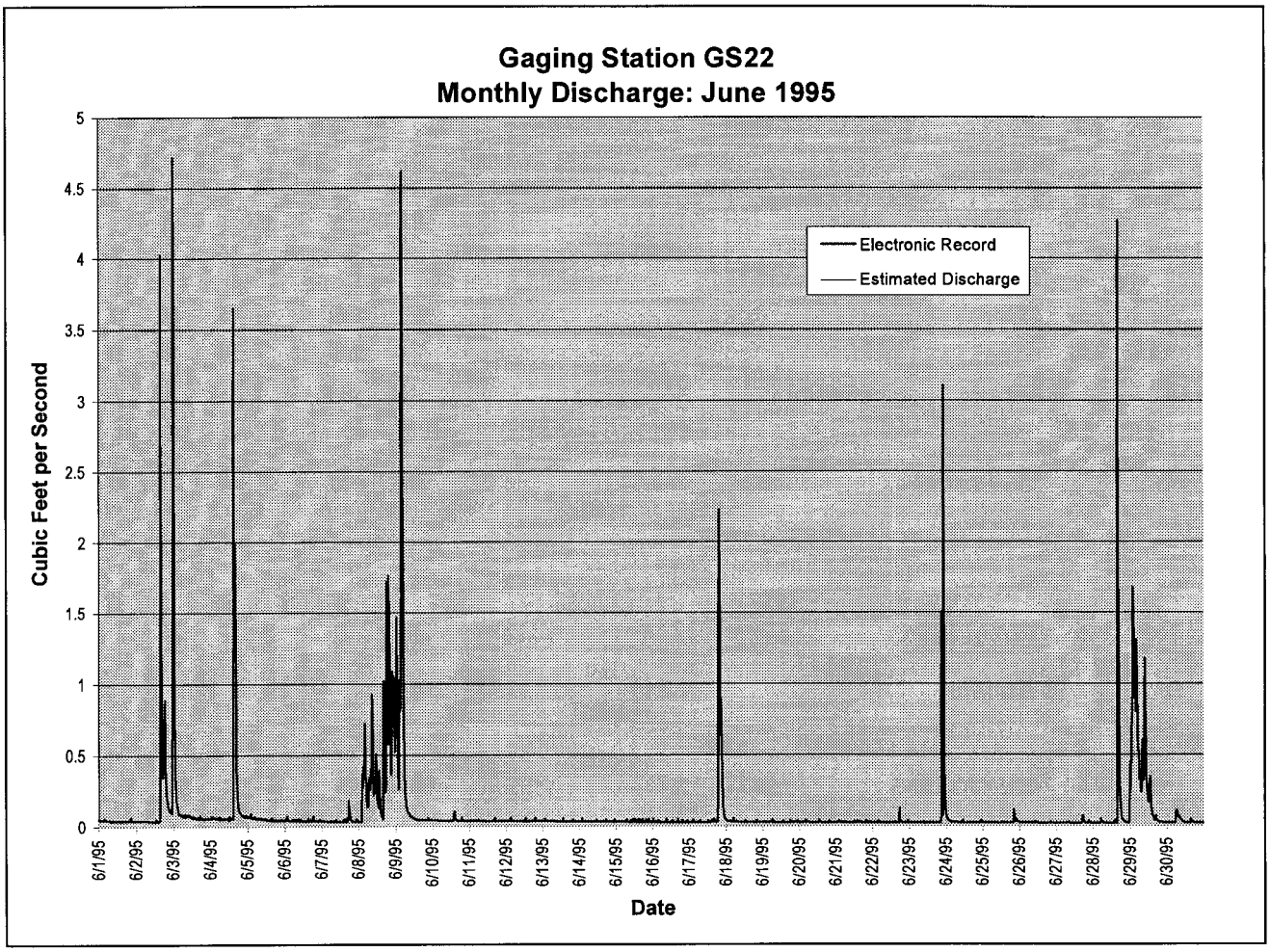
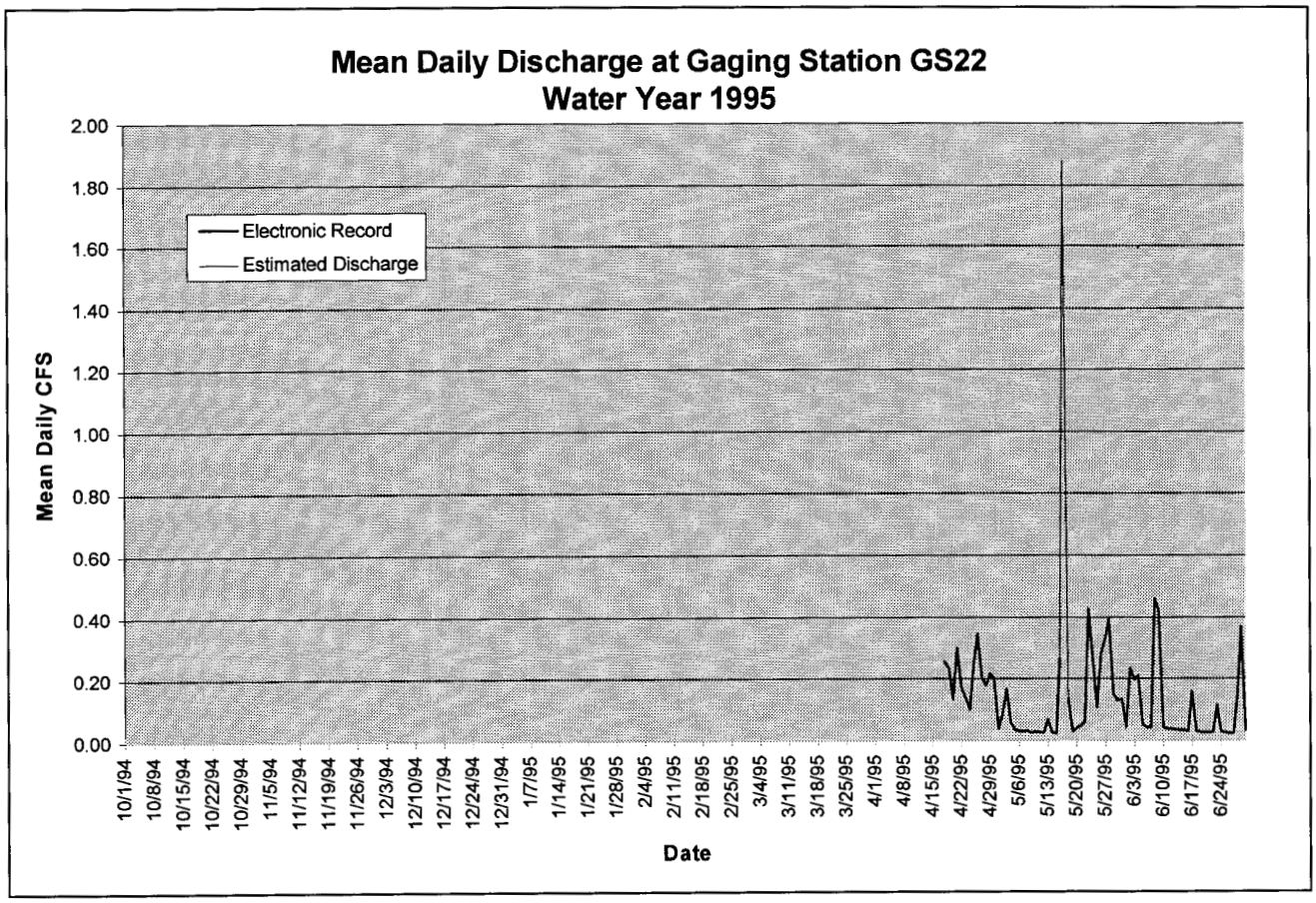


Figure 3-6. GS22 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 5/3/95; 5/16; 5/31; 6/28

No analytical results compiled to date.

3.1.4 Gaging Station GS23

Location:

- State Plane: 2083781; 747885
- Building 881 septic lift overflow outfall south of 881

Drainage Characteristics:

- Pathway 5
- Buildings: 881
- Sub-basins: no known surface water contributions; potential infiltration to outfall pipe (Figure 1-2)
- Description: GS23 monitors a 5.5" metal pipe which outfalls on the hillside south of the southwest corner of Building 881. The pipe is the outfall for the overflow from the Bldg. 881 septic lift station. The sources of any surface water seen at this site are unknown.

Hardware Configuration:

- Primary Device: .6 foot HS flume
- Flow Meter: ISCO® 4230 bubbler
- Sampler: ISCO® 3710 Automatic
  ISCO® 6000 Automatic VOC
- Radio Telemetry: No
- Power: DC solar power system
- Water Quality Parameters: None

Discharge Data

Table 3-4. GS23 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	0.000	0.000	0.000	0
6/2/95	0.000	0.000	0.000	0
6/3/95	0.000	0.000	0.000	0
6/4/95	0.000	0.000	0.000	0
6/5/95	0.000	0.000	0.000	0
6/6/95	0.000	0.000	0.000	0
6/7/95	0.000	0.000	0.000	0
6/8/95	0.000	0.000	0.000	0
6/9/95	0.000	0.000	0.000	0
6/10/95	0.000	0.000	0.000	0
6/11/95	0.000	0.000	0.000	0
6/12/95	0.000	0.000	0.000	0
6/13/95	0.000	0.000	0.000	0
6/14/95	0.000	0.000	0.000	0
6/15/95	0.000	0.000	0.000	0
6/16/95	0.000	0.000	0.000	0
6/17/95	0.006	0.000	0.021	549
6/18/95	0.000	0.000	0.000	0
6/19/95	0.000	0.000	0.000	0
6/20/95	0.000	0.000	0.000	0
6/21/95	*0.001*	*0.000*	*0.027*	*83*
6/22/95	*0.000*	*0.000*	*0.000*	*0*
6/23/95	*0.000*	*0.000*	*0.000*	*0*
6/24/95	*0.000*	*0.000*	*0.000*	*0*
6/25/95	*0.000*	*0.000*	*0.000*	*0*
6/26/95	*0.000*	*0.000*	*0.000*	*0*
6/27/95	0.000	0.000	0.000	0
6/28/95	0.000	0.000	0.000	0
6/29/95	0.000	0.000	0.000	0
6/30/95	0.000	0.000	0.000	0
Monthly Values				
Mean	0.000	0.000	0.002	21
Min.	0.000	0.000	0.000	0
Max.	0.006	0.000	0.027	549

Total Discharge: 632 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-7. GS23 Monthly Discharge

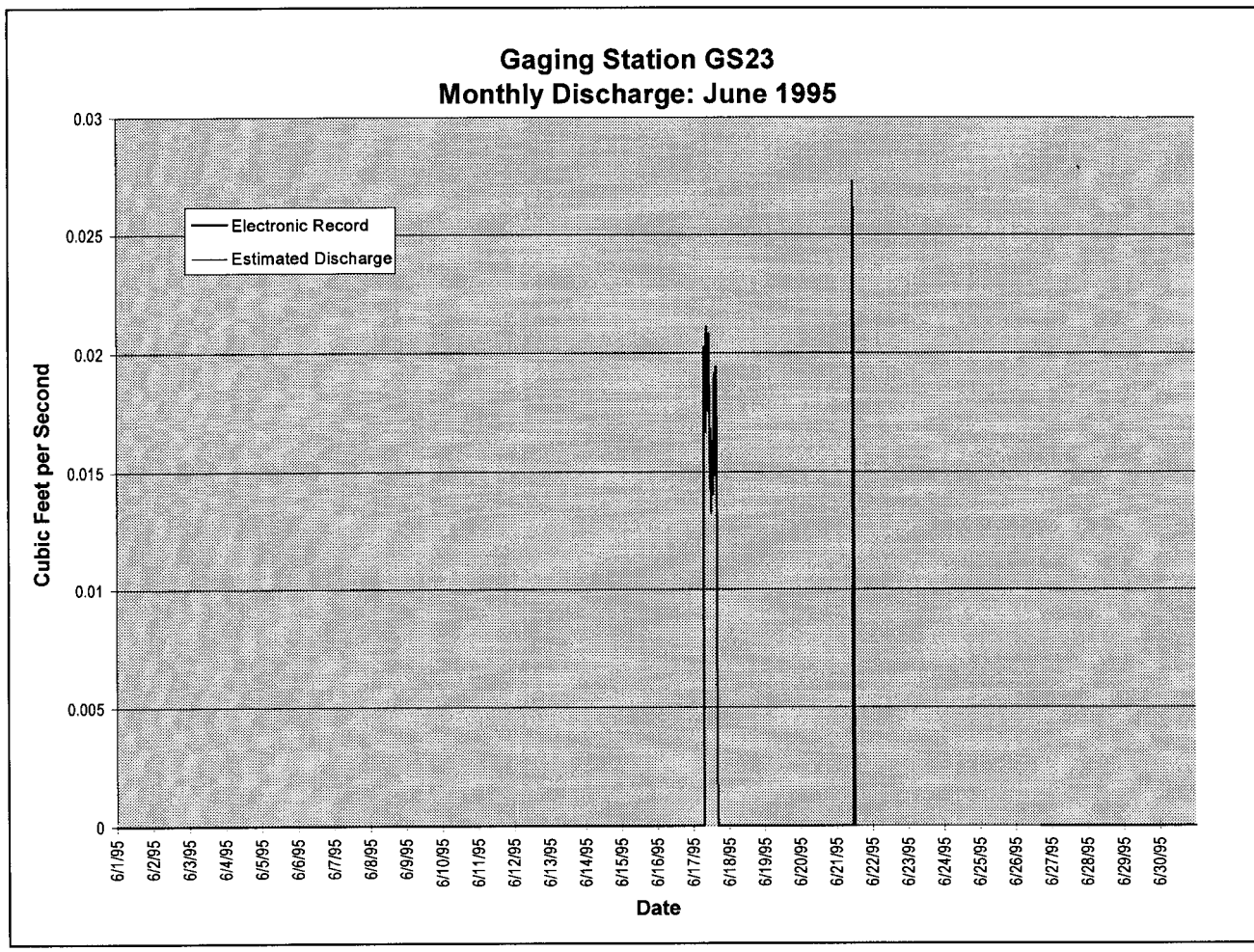
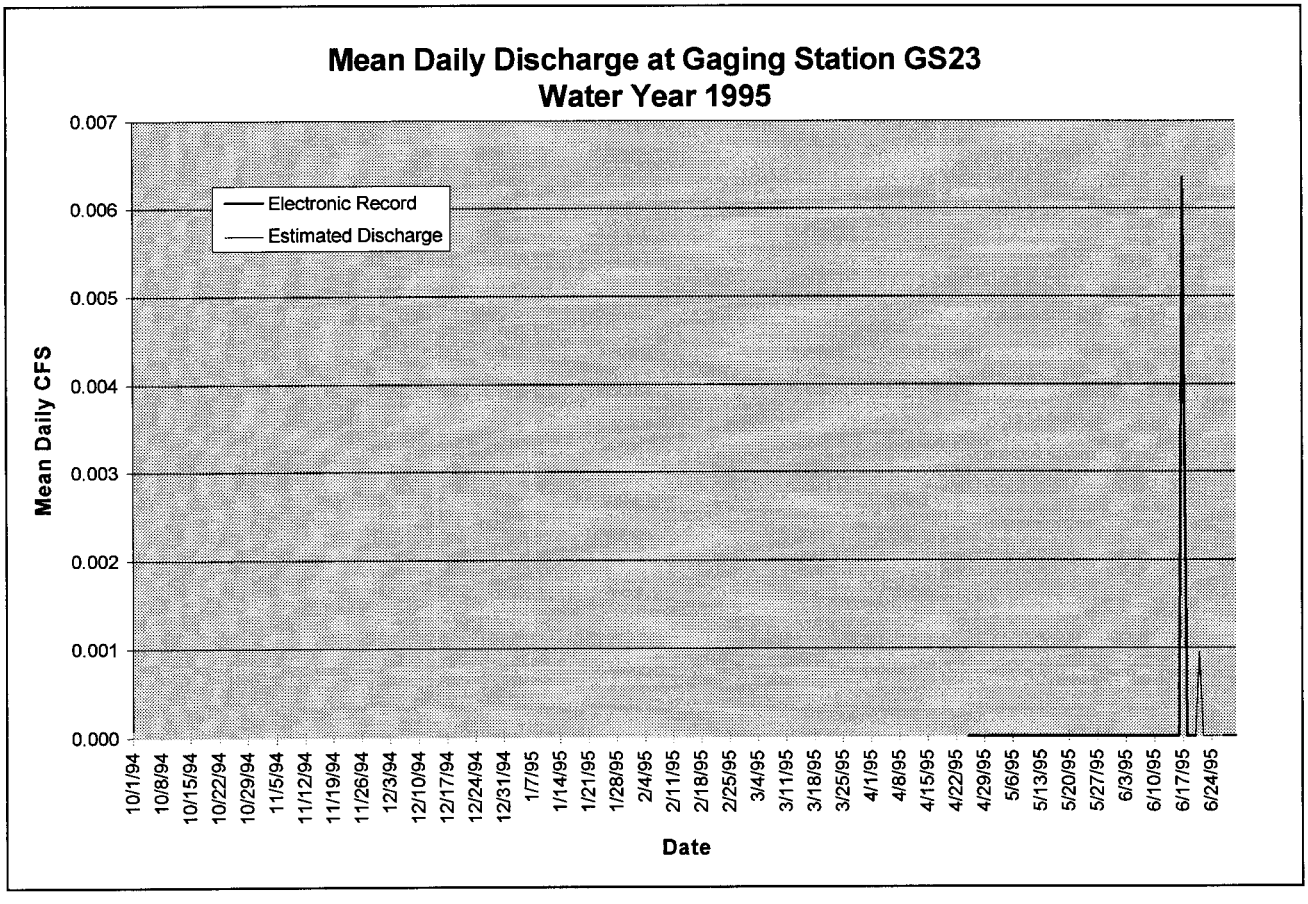


Figure 3-8. GS23 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 6/17/95

No analytical results compiled to date.

3.1.5 Gaging Station GS24

Location:

- State Plane: 2083973; 747999
- 12" cmp south of 881

Drainage Characteristics:

- Pathway 5
- Buildings: 869, 881, T881G, 887, 885
- Sub-basins: DIV3 (Figure 1-2)
- Description: GS24 monitors a 12" cmp which outfalls on the hillside south of Building 881. Surface water originates as runoff from the areas south and west of Building 881.

Hardware Configuration:

- Primary Device: 0.5' H flume
- Flow Meter: ISCO® 4230 bubbler
- Sampler: ISCO® 3710 Automatic
  ISCO® 6000 Automatic VOC
- Radio Telemetry: No
- Power: DC solar power system
- Water Quality Parameters: None

Discharge Data

Table 3-5. GS24 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	0.000	0.000	0.000	4
6/2/95	0.006	0.000	0.169	553
6/3/95	0.007	0.000	0.223	573
6/4/95	0.007	0.000	0.150	622
6/5/95	0.000	0.000	0.000	7
6/6/95	0.000	0.000	0.000	0
6/7/95	0.000	0.000	0.000	0
6/8/95	0.018	0.000	0.094	1558
6/9/95	*0.027*	*0.000*	*0.336*	*2342*
6/10/95	0.000	0.000	0.000	0
6/11/95	0.000	0.000	0.000	2
6/12/95	0.000	0.000	0.000	0
6/13/95	0.000	0.000	0.000	0
6/14/95	0.000	0.000	0.000	0
6/15/95	0.000	0.000	0.000	0
6/16/95	0.000	0.000	0.000	0
6/17/95	0.004	0.000	0.091	348
6/18/95	0.000	0.000	0.000	0
6/19/95	0.000	0.000	0.000	0
6/20/95	0.000	0.000	0.000	0
6/21/95	0.000	0.000	0.000	0
6/22/95	0.000	0.000	0.000	0
6/23/95	0.000	0.000	0.017	32
6/24/95	0.000	0.000	0.000	0
6/25/95	0.000	0.000	0.000	0
6/26/95	0.000	0.000	0.000	0
6/27/95	0.000	0.000	0.000	0
6/28/95	0.009	0.000	0.324	747
6/29/95	0.022	0.000	0.129	1928
6/30/95	0.000	0.000	0.000	0
Monthly Values				
Mean	0.003	0.000	0.051	291
Min.	0.000	0.000	0.000	0
Max.	0.027	0.000	0.336	2342

Total Discharge: 8716 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-9. GS24 Monthly Discharge

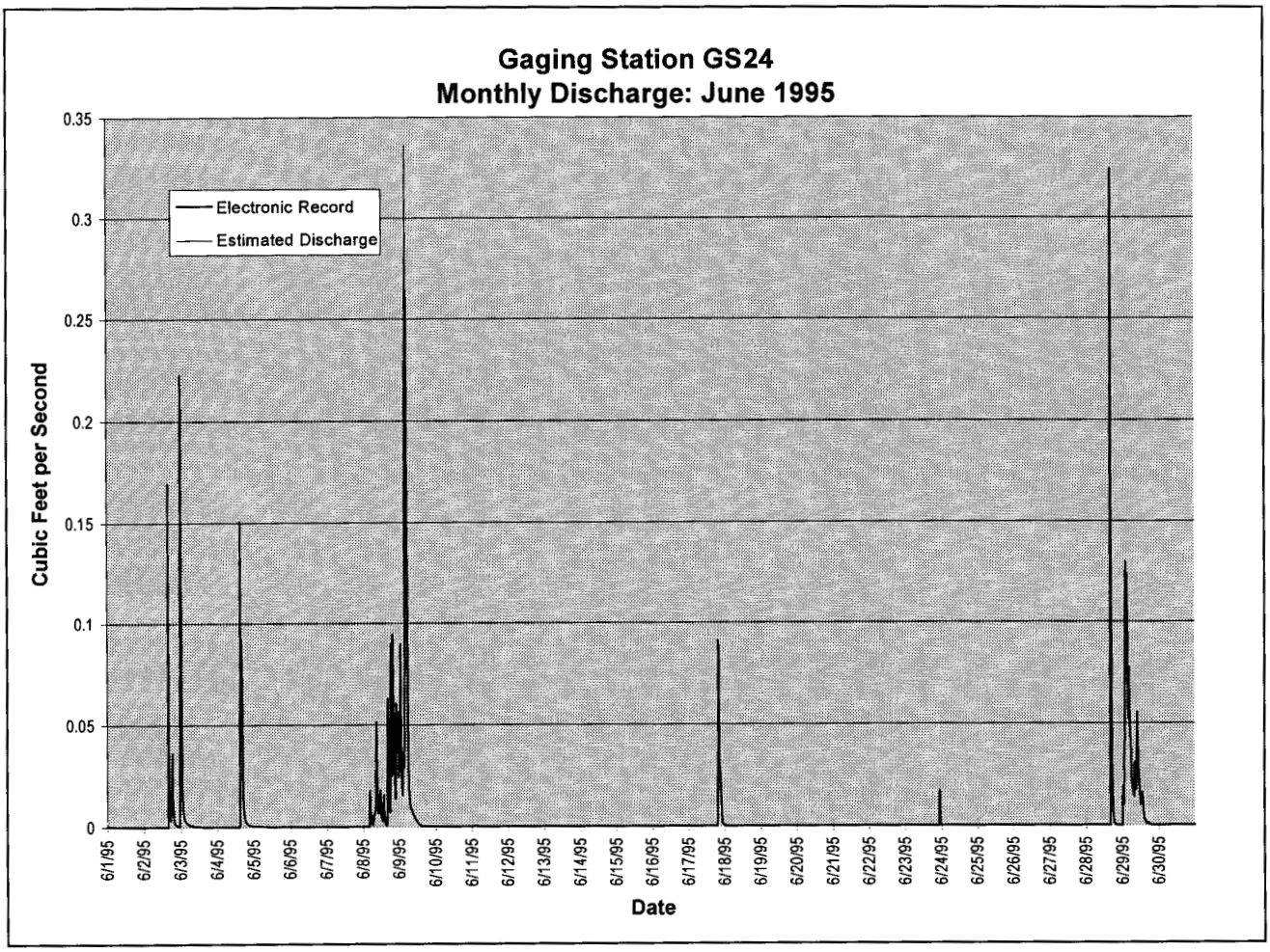
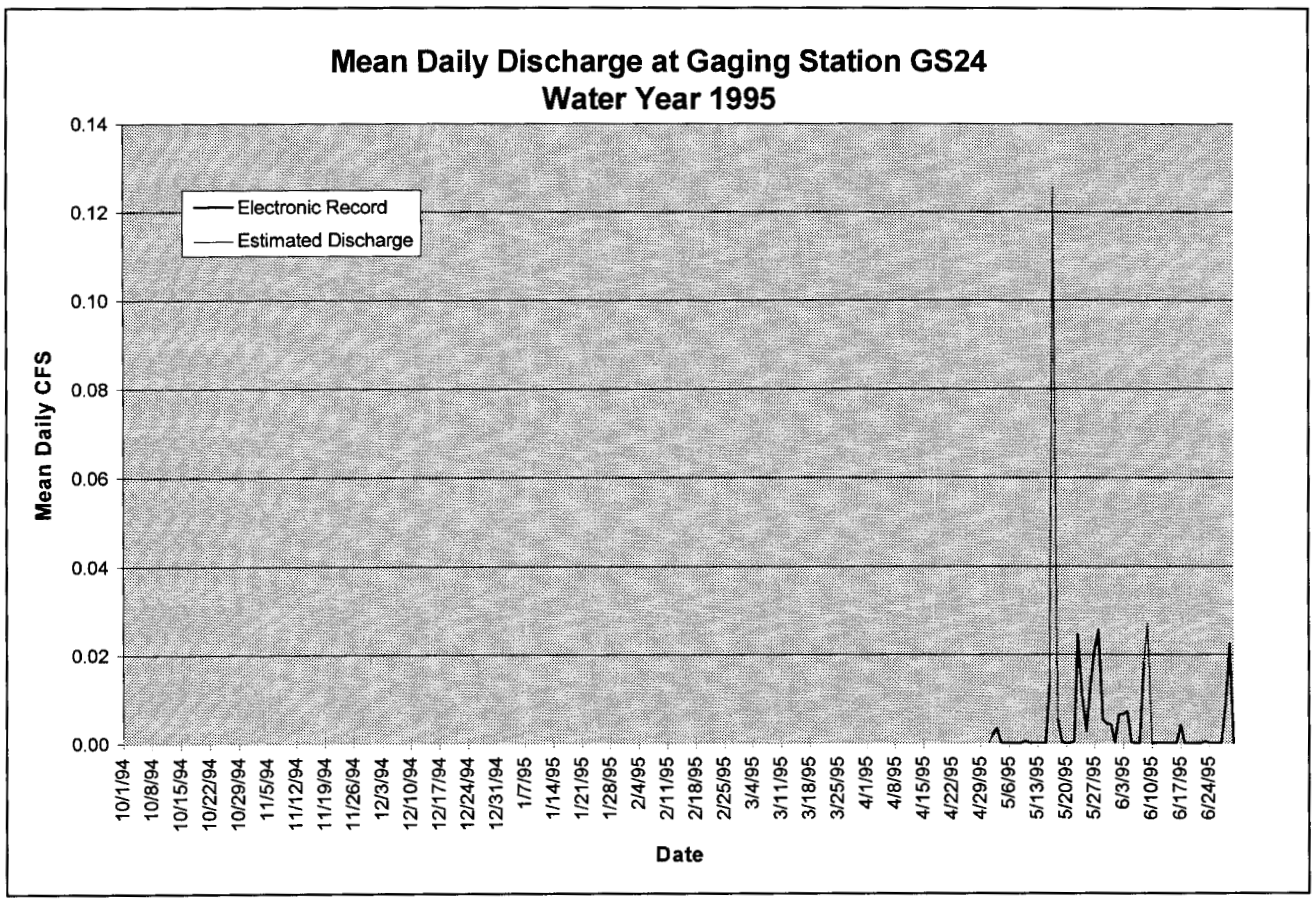


Figure 3-10. GS24 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 5/2/95; 5/16; 6/28

No analytical results compiled to date.

3.1.6 Gaging Station GS25

Location:

- State Plane: 2084114; 747891
- 18.5" cmp southeast of 881

Drainage Characteristics:

- Pathway 5
- Buildings: 883, T883, T881A, -B, 890, 881, 881F, 882, 830, T881G, 887, 885
- Sub-basins: DIV3 (Figure 1-2)
- Description: GS25 monitors a 18.5" cmp which outfalls on the hillside southeast of Building 881. Surface water at this site originates as runoff from the areas east, north, and northeast of 881.

Hardware Configuration:

- Primary Device: 1 foot H flume
- Flow Meter: ISCO® 4230 bubbler
- Sampler: ISCO® 3710 Automatic
  ISCO® 6000 Automatic VOC
- Radio Telemetry: No
- Power: DC solar power system
- Water Quality Parameters: None

Discharge Data

Table 3-6. GS25 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	0.0058	0.0030	0.0118	500
6/2/95	0.0276	0.0022	0.3961	2383
6/3/95	0.0287	0.0053	0.6066	2476
6/4/95	0.0284	0.0034	0.3347	2457
6/5/95	0.0049	0.0024	0.0090	422
6/6/95	0.0023	0.0009	0.0055	200
6/7/95	0.0016	0.0009	0.0028	141
6/8/95	0.0639	0.0016	0.2656	5524
6/9/95	0.0720	0.0083	0.7773	6218
6/10/95	0.0067	0.0052	0.0085	580
6/11/95	0.0035	0.0017	0.0052	305
6/12/95	0.0017	0.0003	0.0029	144
6/13/95	0.0009	0.0001	0.0016	75
6/14/95	0.0005	0.0002	0.0013	42
6/15/95	0.0004	0.0002	0.0006	33
6/16/95	0.0002	0.0001	0.0005	20
6/17/95	0.0208	0.0001	0.3157	1798
6/18/95	0.0016	0.0001	0.0092	136
6/19/95	0.0001	0.0001	0.0004	7
6/20/95	0.0001	0.0000	0.0001	6
6/21/95	0.0001	0.0000	0.0001	6
6/22/95	0.0001	0.0001	0.0002	8
6/23/95	0.0066	0.0001	0.1314	574
6/24/95	0.0014	0.0001	0.0167	121
6/25/95	0.0002	0.0001	0.0017	16
6/26/95	0.0001	0.0001	0.0003	9
6/27/95	0.0001	0.0001	0.0001	8
6/28/95	0.0330	0.0000	1.0638	2849
6/29/95	0.0682	0.0024	0.3461	5889
6/30/95	0.0026	0.0006	0.0088	222
Monthly Values				
Mean	0.0128	0.0013	0.1442	1106
Min.	0.0001	0.0000	0.0001	6
Max.	0.0720	0.0083	1.0638	6218

Total Discharge: 33171 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-11. GS25 Monthly Discharge

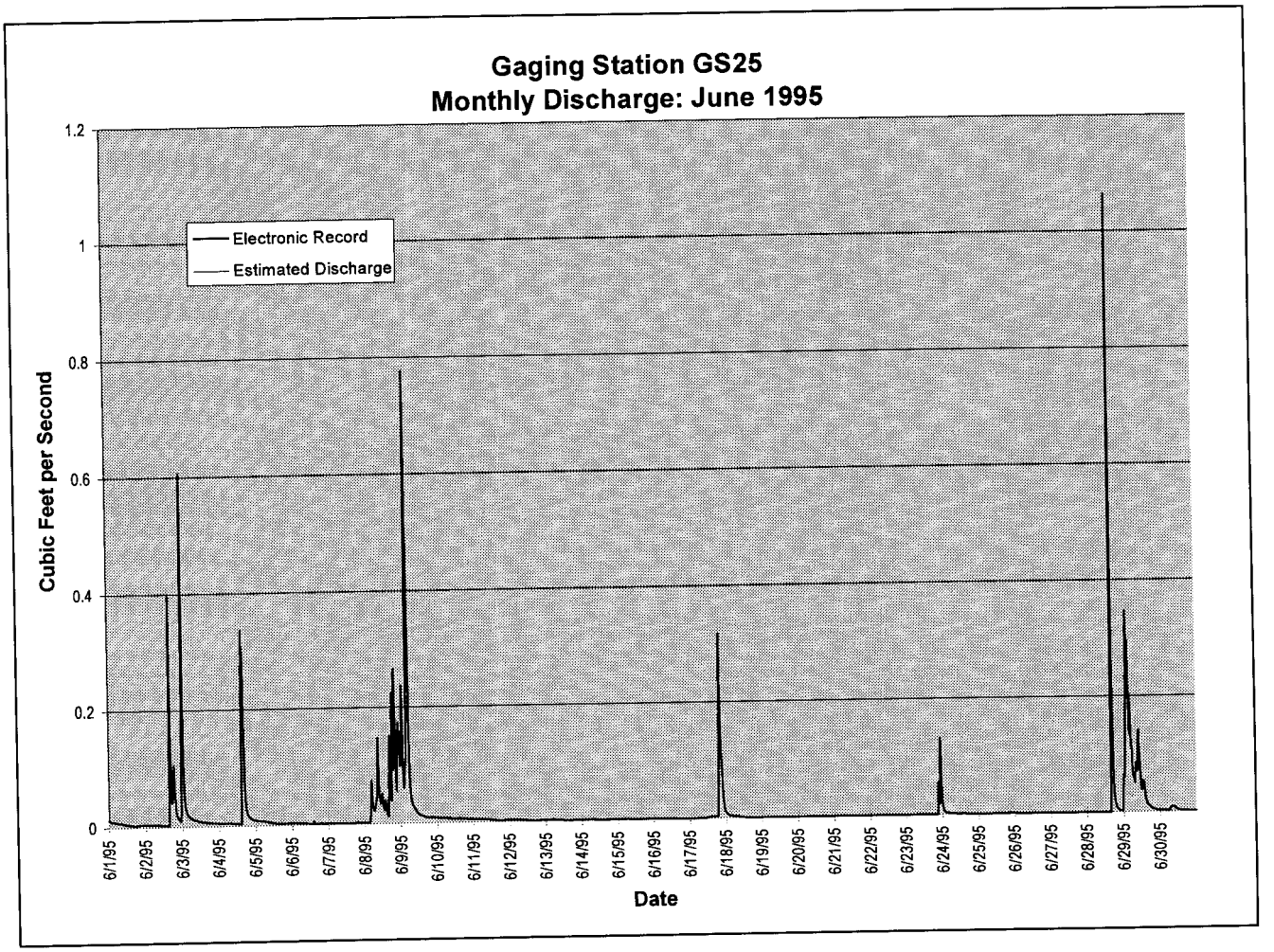
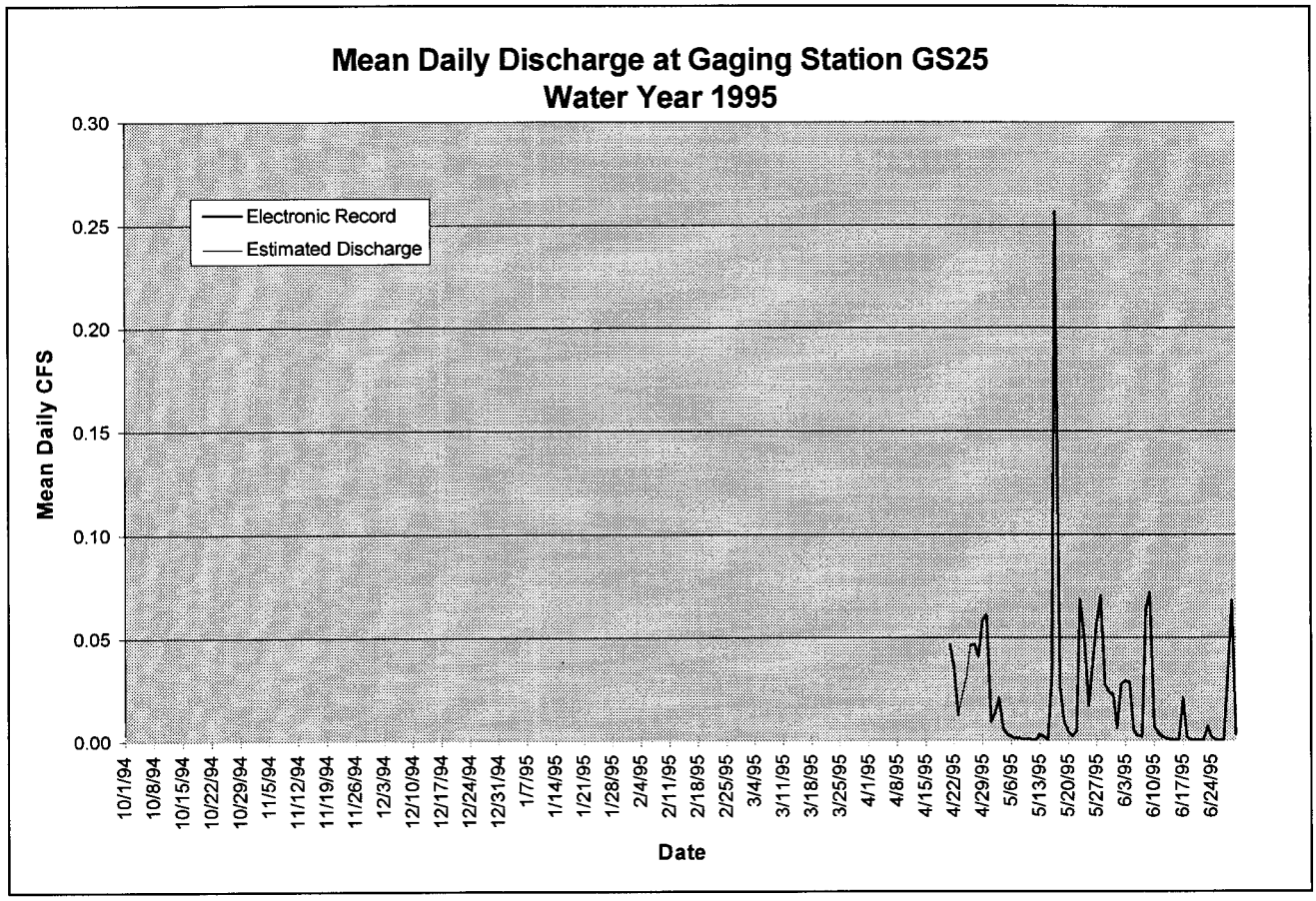


Figure 3-12. GS25 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 5/2/95; 5/16; 6/28

No analytical results compiled to date.

3.1.7 Gaging Station SW022

Location:

- State Plane: 2086443.2; 749757.8
- Central Avenue Ditch at the splitter box near T903A, Inner East Gate

Drainage Characteristics:

- Pathway 1
- Total and Effective Area: 0.132 $mi.^2$ = 84.5 ac (approximately 75% impervious)
- Sub-basins: CSWAA2, CSWAA3, CSWAA4, CSWAA5, CSWAA6 (Figure 1-2)
- Description: SW022 lies on the Central Avenue Ditch at the splitter box near T903A, Inner East Gate. The basin consists of the southern area of the Industrial Area.
- Areas draining to this site: 900, 800, 600, 400, 300, 100

Hardware Configuration:

- Primary Device: 9 ½" Parshall flume
- Flow Meter: ISCO® Model 4230 (bubbler)
- Sampler: ISCO® Model 3700R Refrigerated
  ISCO® Model 6000 Automatic VOC
- Radio Telemetry: No
- Power: DC solar power system
- Water Quality Parameters: None

Discharge Data

Table 3-7. SW022 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	0.023	0.005	0.113	1954
6/2/95	*0.257*	*0.003*	*3.717*	*22238*
6/3/95	*0.313*	*0.009*	*4.410*	*27010*
6/4/95	*0.370*	*0.006*	*4.214*	*31945*
6/5/95	0.017	0.003	0.149	1435
6/6/95	0.003	0.000	0.006	228
6/7/95	0.001	0.000	0.014	121
6/8/95	*0.780*	*0.000*	*3.632*	*67370*
6/9/95	*0.907*	*0.019*	*4.594*	*78341*
6/10/95	0.006	0.002	0.019	562
6/11/95	0.000	0.000	0.002	26
6/12/95	0.000	0.000	0.000	0
6/13/95	0.000	0.000	0.000	0
6/14/95	0.000	0.000	0.000	0
6/15/95	0.000	0.000	0.000	0
6/16/95	0.000	0.000	0.000	0
6/17/95	0.122	0.000	1.569	10550
6/18/95	0.007	0.000	0.142	645
6/19/95	0.000	0.000	0.000	0
6/20/95	0.000	0.000	0.000	0
6/21/95	0.000	0.000	0.000	0
6/22/95	0.000	0.000	0.000	0
6/23/95	0.000	0.000	0.000	0
6/24/95	0.017	0.000	0.310	1439
6/25/95	0.000	0.000	0.000	0
6/26/95	0.000	0.000	0.000	0
6/27/95	0.000	0.000	0.000	0
6/28/95	*0.269*	*0.000*	*4.118*	*23216*
6/29/95	*0.786*	*0.003*	*3.759*	*67937*
6/30/95	0.001	0.000	0.005	48
Monthly Values				
Mean	0.129	0.002	1.026	11169
Min.	0.000	0.000	0.000	0
Max.	0.907	0.019	4.594	78341

Total Discharge: 335065 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-13. SW022 Monthly Discharge

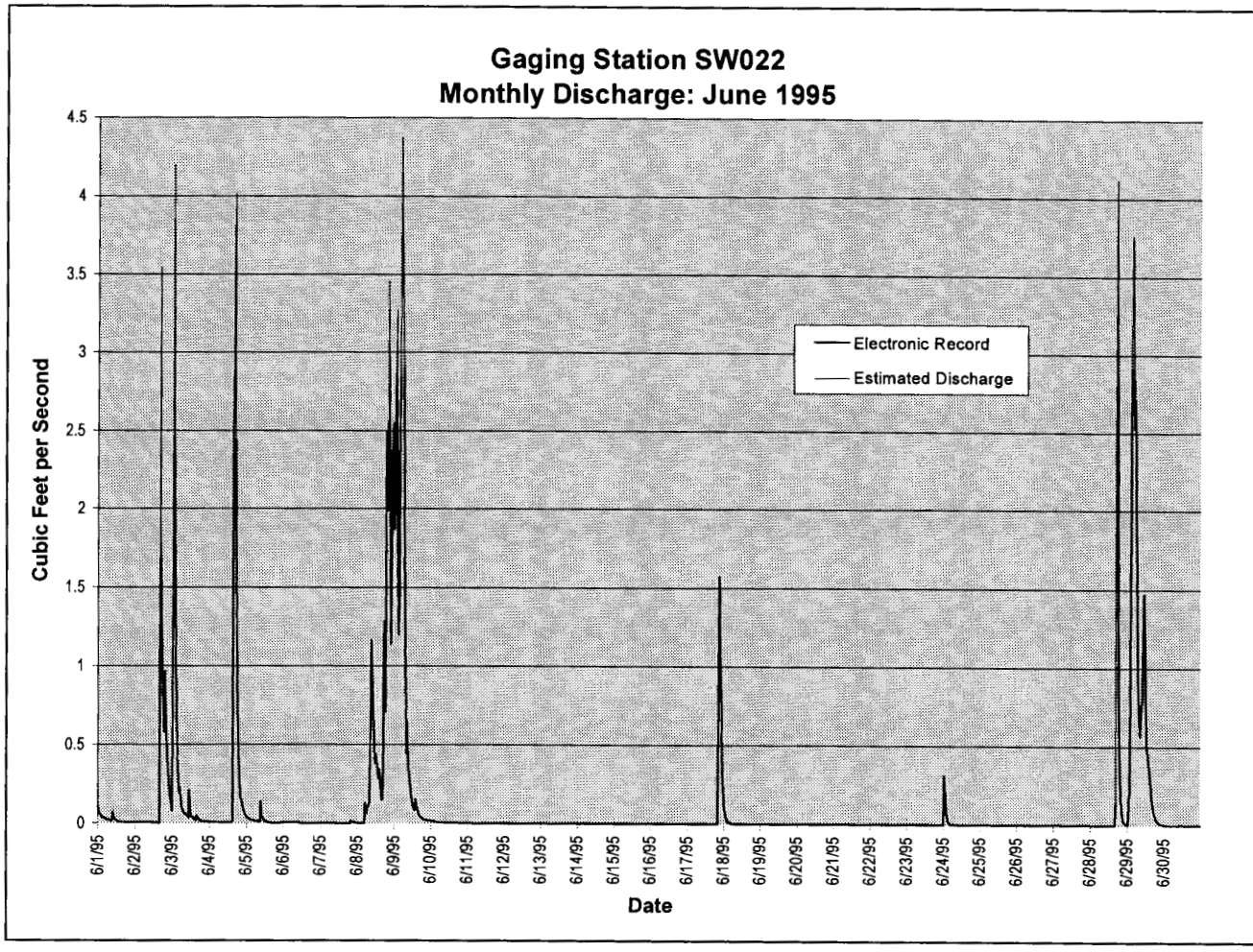
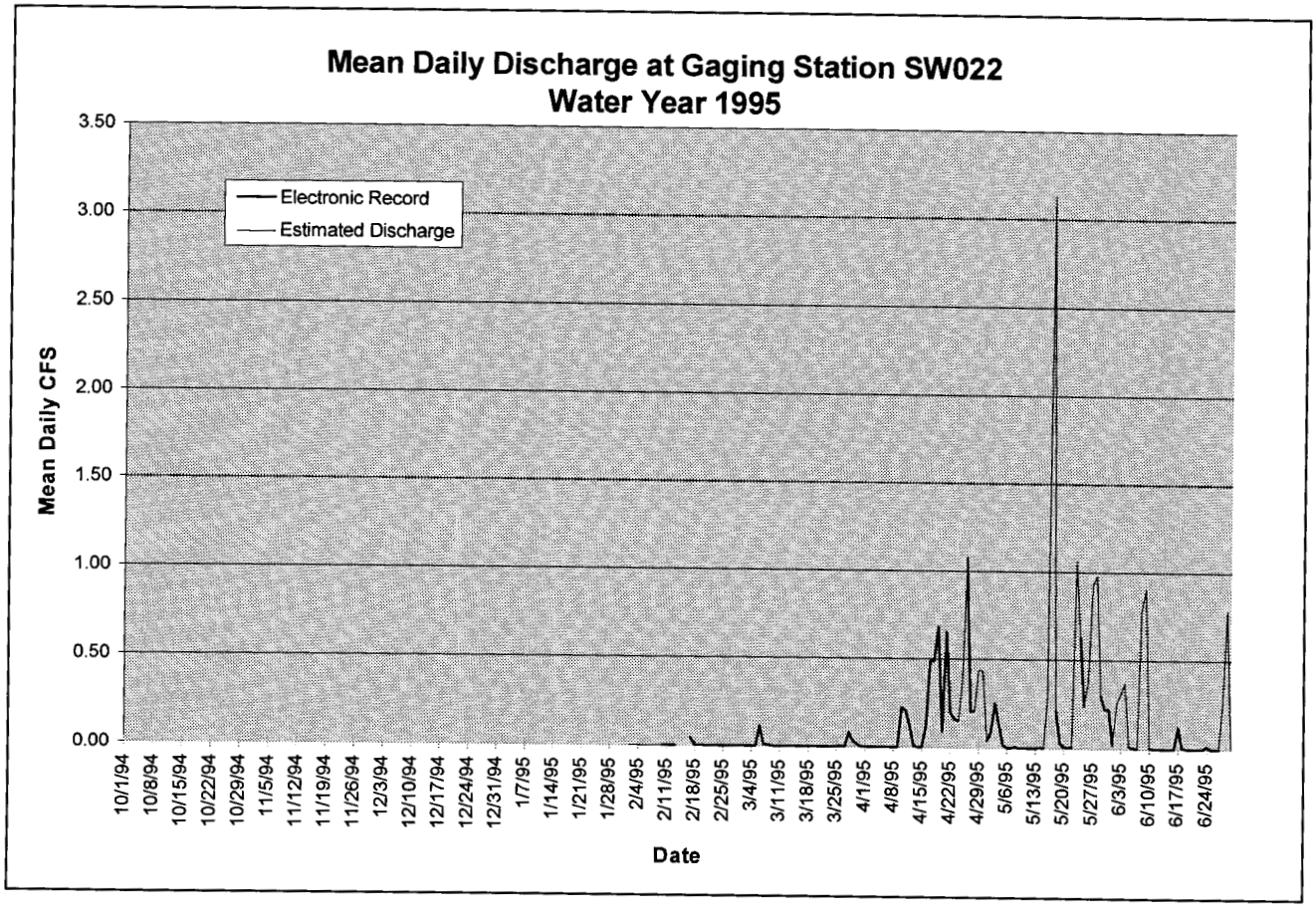


Figure 3-14. SW022 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 5/2/95; 5/16; 5/31; 6/28

No analytical results compiled to date.

3.1.8 Gaging Station SW027

Location:

- 39° 53' 11.5"N 105° 11' 4.3"W
- SID Culvert Number 4; outlet of SID to Pond C-2 prior to crossing under Woman Creek

Drainage Characteristics:

- Pathway 5
- Area: 0.29 $mi.^2$ = 185.6 ac (approximately 15% impervious)
- Sub-basins: DIV2, DIV3, CDIV1 (Figure 1-2)
- Description: SW027 lies on the South Interceptor Ditch at the upstream end of dual 66" cmps which convey SID water under Woman Creek and into Pond C-2. The basin consists of the sloping, vegetated area immediately south of the Industrial Area. This basin receives Industrial Area runoff primarily from the 800 and 400 Areas.

Hardware Configuration:

- Primary Device: Dual 120° V-notch weirs
- Flow Meter: ISCO® Model 3230 (bubbler)
- Sampler: ISCO® Model 3700R Refrigerated
  ISCO® Model 6000 VOC
- Radio Telemetry: No
- Power: DC solar power system
- Water Quality Parameters: None

Discharge Data

Table 3-8. SW027 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	0.308	0.089	1.105	26607
6/2/95	0.333	0.075	1.603	28744
6/3/95	0.819	0.164	3.473	70795
6/4/95	0.438	0.112	2.159	37840
6/5/95	0.195	0.067	0.628	16856
6/6/95	0.057	0.030	0.076	4956
6/7/95	0.029	0.024	0.035	2517
6/8/95	0.642	0.024	3.081	55454
6/9/95	2.550	0.294	9.899	220331
6/10/95	0.217	0.154	0.289	18760
6/11/95	0.146	0.081	0.239	12577
6/12/95	0.071	0.040	0.090	6155
6/13/95	0.042	0.034	0.053	3597
6/14/95	0.027	0.020	0.036	2325
6/15/95	0.013	0.008	0.022	1165
6/16/95	0.010	0.006	0.015	905
6/17/95	0.015	0.012	0.024	1267
6/18/95	0.202	0.012	0.954	17464
6/19/95	0.011	0.006	0.018	910
6/20/95	0.005	0.003	0.007	393
6/21/95	0.004	0.002	0.006	323
6/22/95	0.005	0.003	0.007	444
6/23/95	0.004	0.002	0.007	345
6/24/95	0.022	0.003	0.110	1913
6/25/95	0.008	0.003	0.011	668
6/26/95	0.002	0.001	0.003	192
6/27/95	0.002	0.000	0.002	131
6/28/95	0.131	0.001	1.271	11314
6/29/95	0.835	0.202	1.991	72173
6/30/95	0.082	0.046	0.194	7115
Monthly Values				
Mean	0.241	0.051	0.914	20808
Min.	0.002	0.000	0.002	131
Max.	2.550	0.294	9.899	220331

Total Discharge: 624240 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-15. SW027 Monthly Discharge

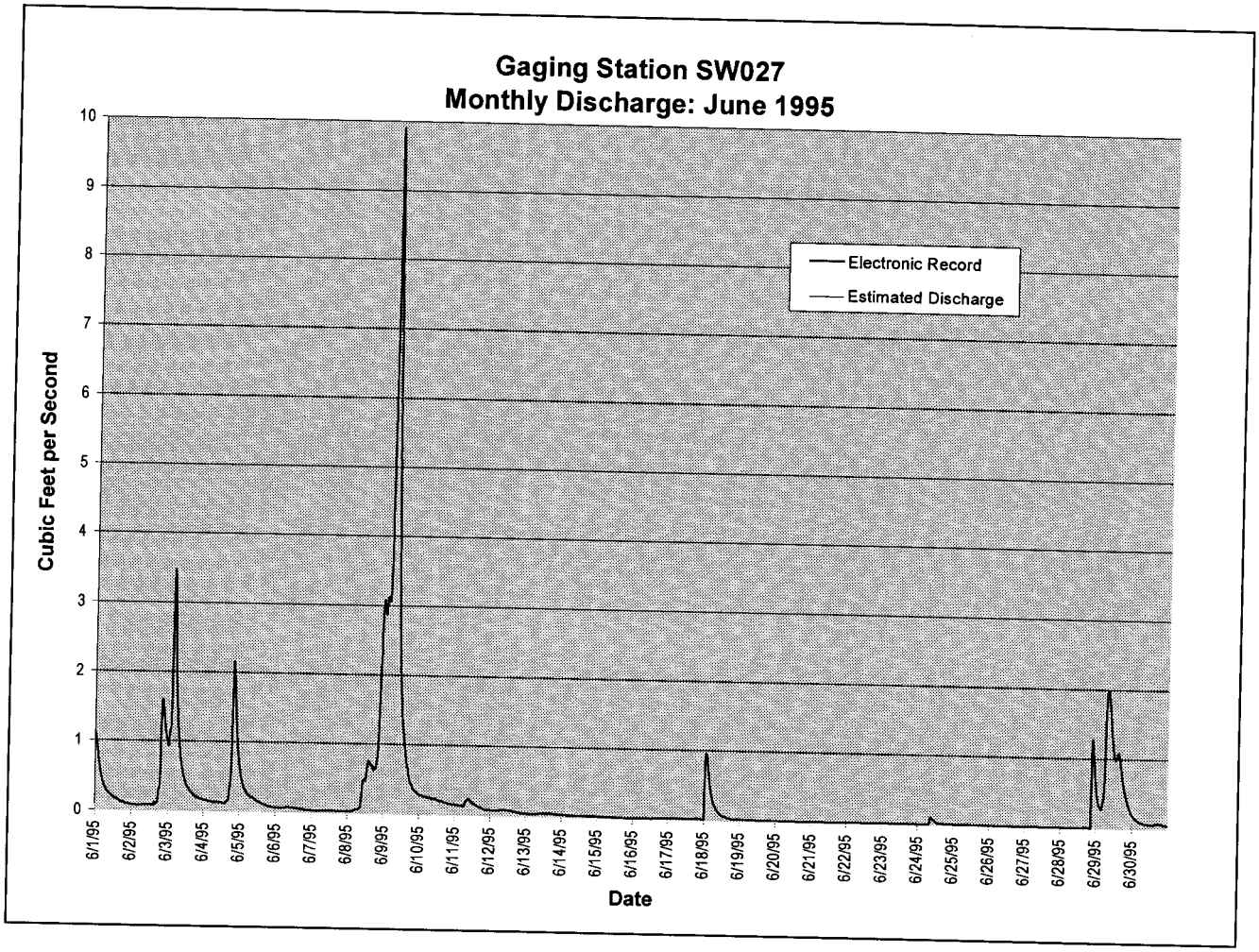
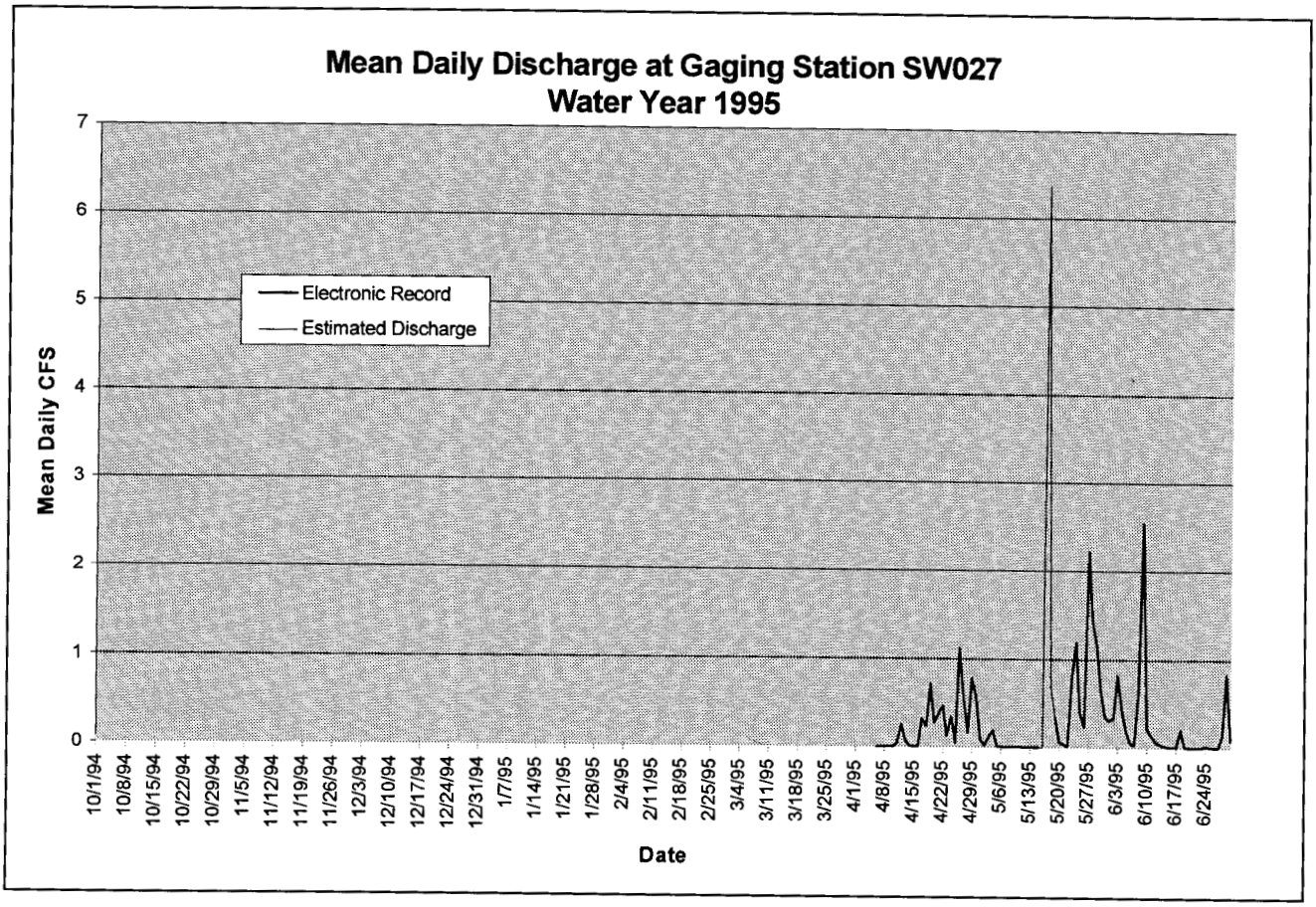


Figure 3-16. SW027 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 4/26/95; 5/17; 5/27; 6/28

No analytical results compiled to date.

3.1.9 Gaging Station SW091

Location:

- State Plane: 2086064; 751322
- small tributary of North Walnut Creek, which drains the northeast corner of Industrial Area near the Solar Ponds

Drainage Characteristics:

- Pathway 6
- Area: 0.019 $mi.^2$ = 12.2 ac (approximately 45% impervious)
- Sub-basins: CWAB1, CWAB2, portion of WA11 (Figure 1-2)
- Description: SW091 lies on a small tributary of North Walnut Creek, which drains the northeast corner of Industrial Area near the Solar Ponds. The basin consists of 10.9 acres of the Industrial Area. This basin receives Industrial Area runoff primarily from the open area immediately east of the Solar Ponds.

Hardware Configuration:

- Primary Device: 1' H Flume
- Flow Meter: ISCO® Model 4230 (bubbler)
- Sampler: ISCO® Model 3710 Automatic
  ISCO® Model 6000 Automatic VOC
- Radio Telemetry: No
- Power: DC solar power system
- Water Quality Parameters: None

Discharge Data

Table 3-9. SW091 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	0.007	0.005	0.014	627
6/2/95	0.009	0.004	0.025	784
6/3/95	0.018	0.006	0.259	1598
6/4/95	0.009	0.004	0.049	810
6/5/95	0.006	0.004	0.020	516
6/6/95	0.004	0.003	0.005	316
6/7/95	0.003	0.002	0.003	245
6/8/95	0.024	0.003	0.136	2090
6/9/95	0.132	0.013	1.475	11383
6/10/95	0.010	0.008	0.015	892
6/11/95	0.006	0.005	0.008	554
6/12/95	0.008	0.003	0.035	675
6/13/95	0.003	0.003	0.004	281
6/14/95	0.003	0.002	0.003	218
6/15/95	0.002	0.002	0.003	178
6/16/95	0.002	0.001	0.003	140
6/17/95	0.002	0.001	0.004	155
6/18/95	0.002	0.001	0.003	149
6/19/95	0.001	0.001	0.002	93
6/20/95	0.001	0.000	0.001	73
6/21/95	0.001	0.000	0.003	71
6/22/95	0.002	0.000	0.005	166
6/23/95	0.001	0.000	0.003	60
6/24/95	0.001	0.001	0.002	75
6/25/95	0.001	0.001	0.003	102
6/26/95	0.001	0.000	0.002	68
6/27/95	0.000	0.000	0.001	24
6/28/95	0.054	0.000	1.852	4689
6/29/95	0.048	0.004	0.228	4172
6/30/95	0.003	0.002	0.006	286
Monthly Values				
Mean	0.012	0.003	0.139	1050
Min.	0.000	0.000	0.001	24
Max.	0.132	0.013	1.852	11383

Total Discharge: 31491 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-17. SW091 Monthly Discharge

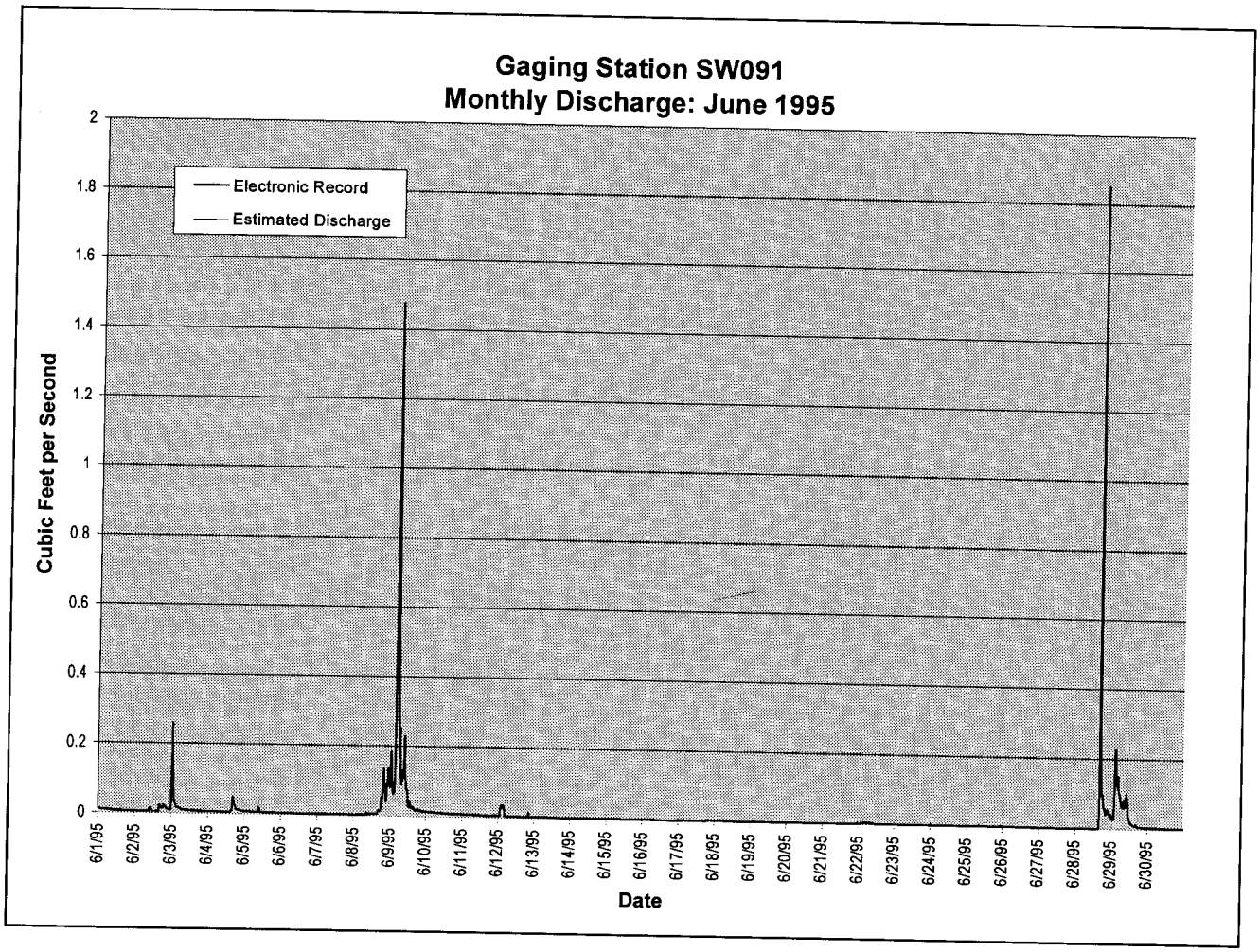
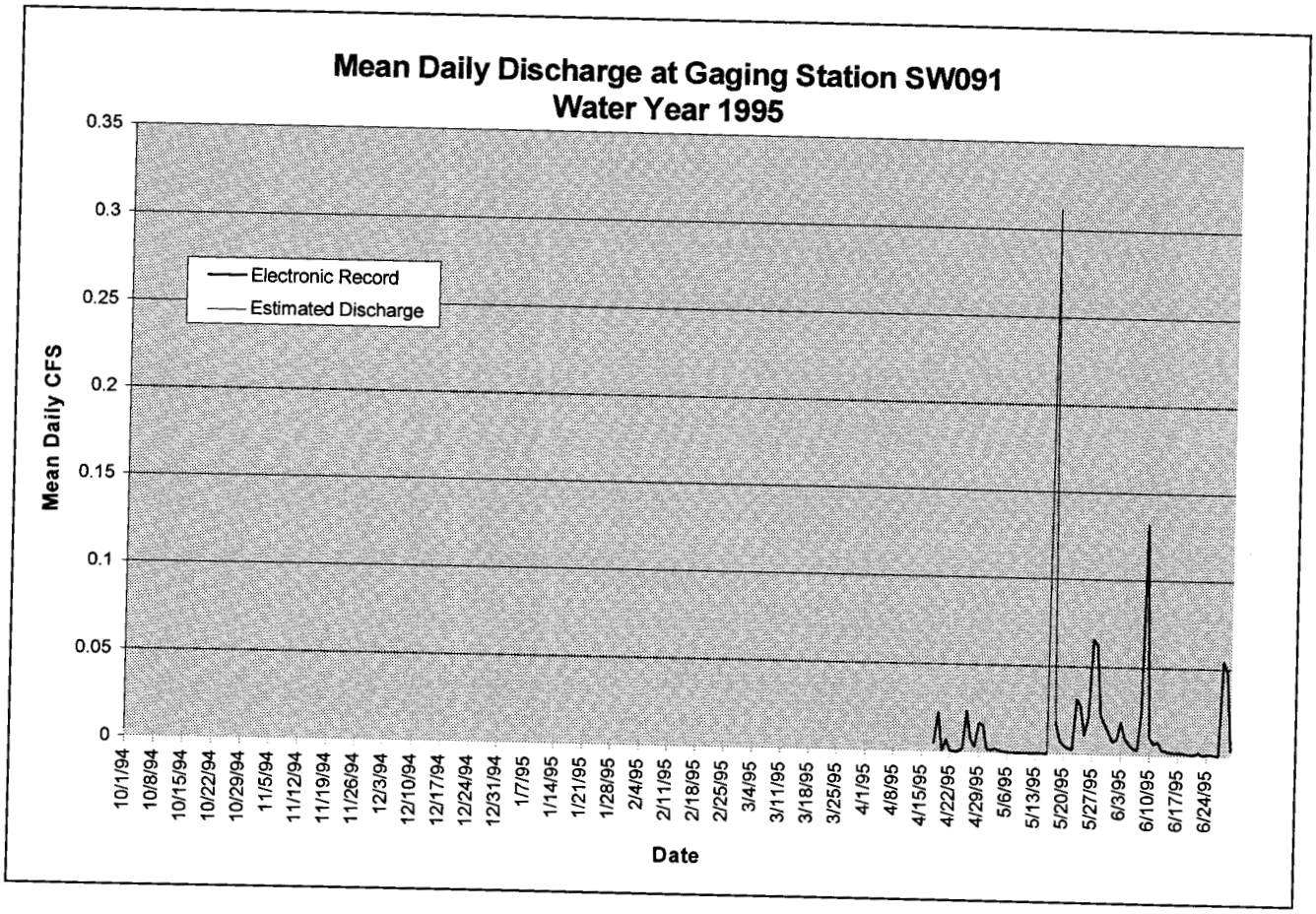


Figure 3-18. SW091 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 5/17/95; 5/26; 6/27

No analytical results compiled to date.

3.1.10 Gaging Station SW093

Location:

- State Plane: 2085008.5; 751710.2
- North Walnut Creek below 6' cmp draining Industrial Area; directly north of Solar Pond C

Drainage Characteristics:

- Pathway 3
- Area: 0.362 $mi.^2$ = 231.7 ac (approximately 46% impervious)
- Sub-basins: WA12a, WA13, WA14, CWAA1, CWAC6, CWAC5, CWAC2, CWAC4, CWAC3, CWAC10, CWAC13, CWAC11, CWAC1, CWAC12, CWADIV2b (Figure 1-2)
- Description: SW093 lies on North Walnut Creek, which drains the north and northwest areas of Industrial Area. The basin consists of 150.4 acres of the Industrial Area. This basin receives Industrial Area runoff from the 700, 500, 300, and 100 Areas.

Hardware Configuration:

- Primary Device: 36" Parshall Flume w/ a 36" Rectangular Weir
- Flow Meter: ISCO® Model 3230 (bubbler)
- Sampler: ISCO® Model 3700R Refrigerated
  ISCO® Model 6000 VOC
- Radio Telemetry: Yes
- Power: DC solar power system
- Water Quality Parameters: None

Discharge Data

Table 3-10. SW093 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	0.497	0.341	0.848	42956
6/2/95	1.077	0.354	5.853	93026
6/3/95	1.483	0.457	13.486	128103
6/4/95	1.079	0.444	6.481	93236
6/5/95	0.450	0.321	0.630	38866
6/6/95	0.349	0.254	1.824	30158
6/7/95	0.267	0.224	0.311	23060
6/8/95	2.324	0.262	8.086	200781
6/9/95	*3.779*	*0.693*	*21.266*	*326532*
6/10/95	*0.612*	*0.457*	*0.732*	*52892*
6/11/95	*0.446*	*0.354*	*0.541*	*38571*
6/12/95	*0.333*	*0.254*	*0.431*	*28753*
6/13/95	*0.278*	*0.226*	*0.347*	*24007*
6/14/95	*0.248*	*0.193*	*0.328*	*21468*
6/15/95	*0.221*	*0.173*	*0.406*	*19084*
6/16/95	*0.162*	*0.108*	*0.312*	*14011*
6/17/95	*0.441*	*0.107*	*3.294*	*38068*
6/18/95	*0.221*	*0.127*	*0.515*	*19116*
6/19/95	*0.129*	*0.069*	*0.187*	*11133*
6/20/95	*0.101*	*0.052*	*0.208*	*8768*
6/21/95	*0.083*	*0.040*	*0.131*	*7129*
6/22/95	*0.072*	*0.040*	*0.110*	*6240*
6/23/95	*0.171*	*0.021*	*2.547*	*14755*
6/24/95	*0.143*	*0.049*	*0.910*	*12374*
6/25/95	*0.067*	*0.023*	*0.155*	*5784*
6/26/95	*0.052*	*0.014*	*0.109*	*4473*
6/27/95	*0.053*	*0.013*	*0.096*	*4608*
6/28/95	*0.742*	*0.057*	*10.848*	*64151*
6/29/95	*2.413*	*0.395*	*7.596*	*208488*
6/30/95	*0.314*	*0.221*	*0.416*	*27113*
Monthly Values				
Mean	0.620	0.212	2.967	53590
Min.	0.052	0.013	0.096	4473
Max.	3.779	0.693	21.266	326532

Total Discharge: 1607708 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-19. SW093 Monthly Discharge

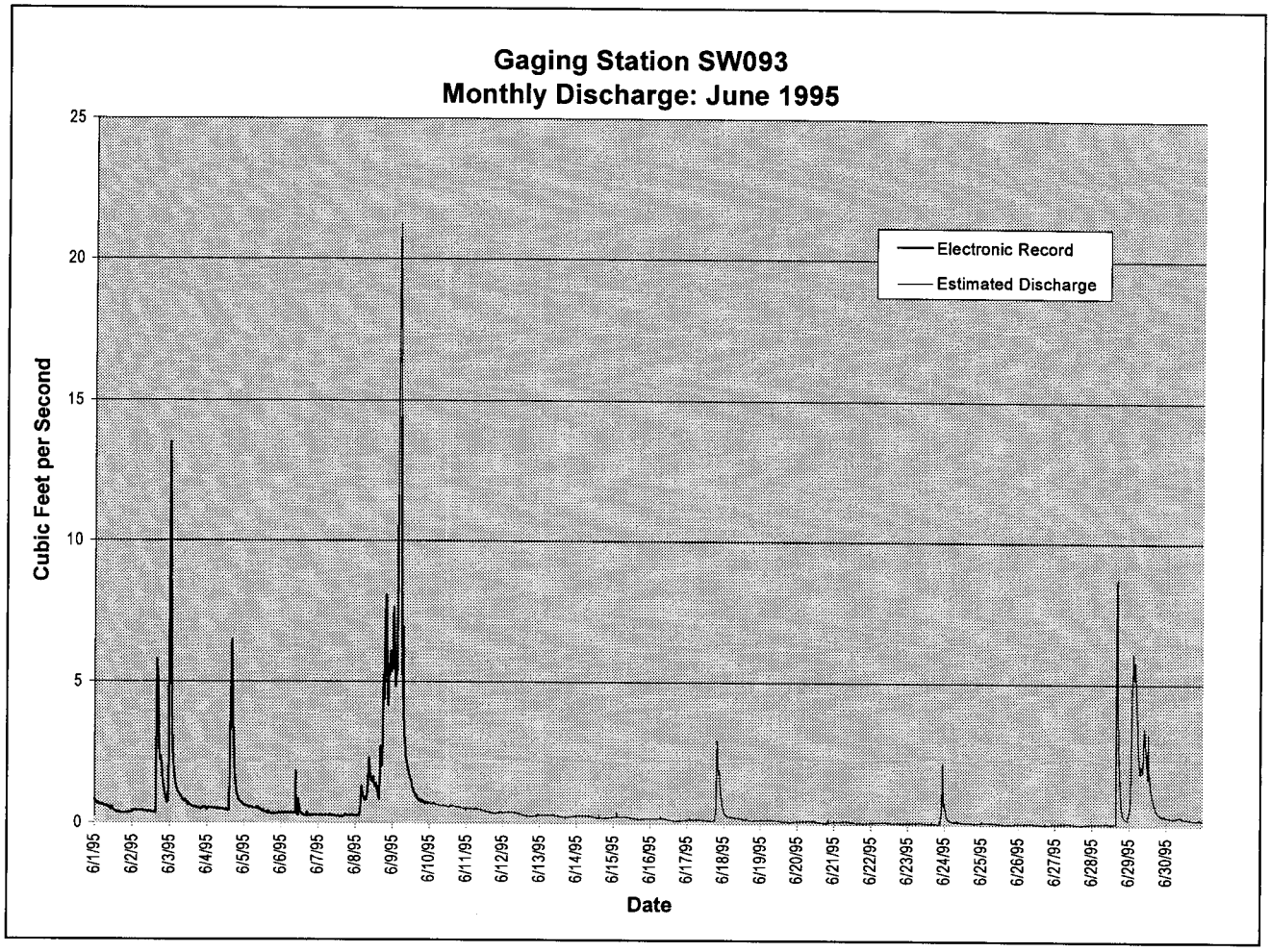
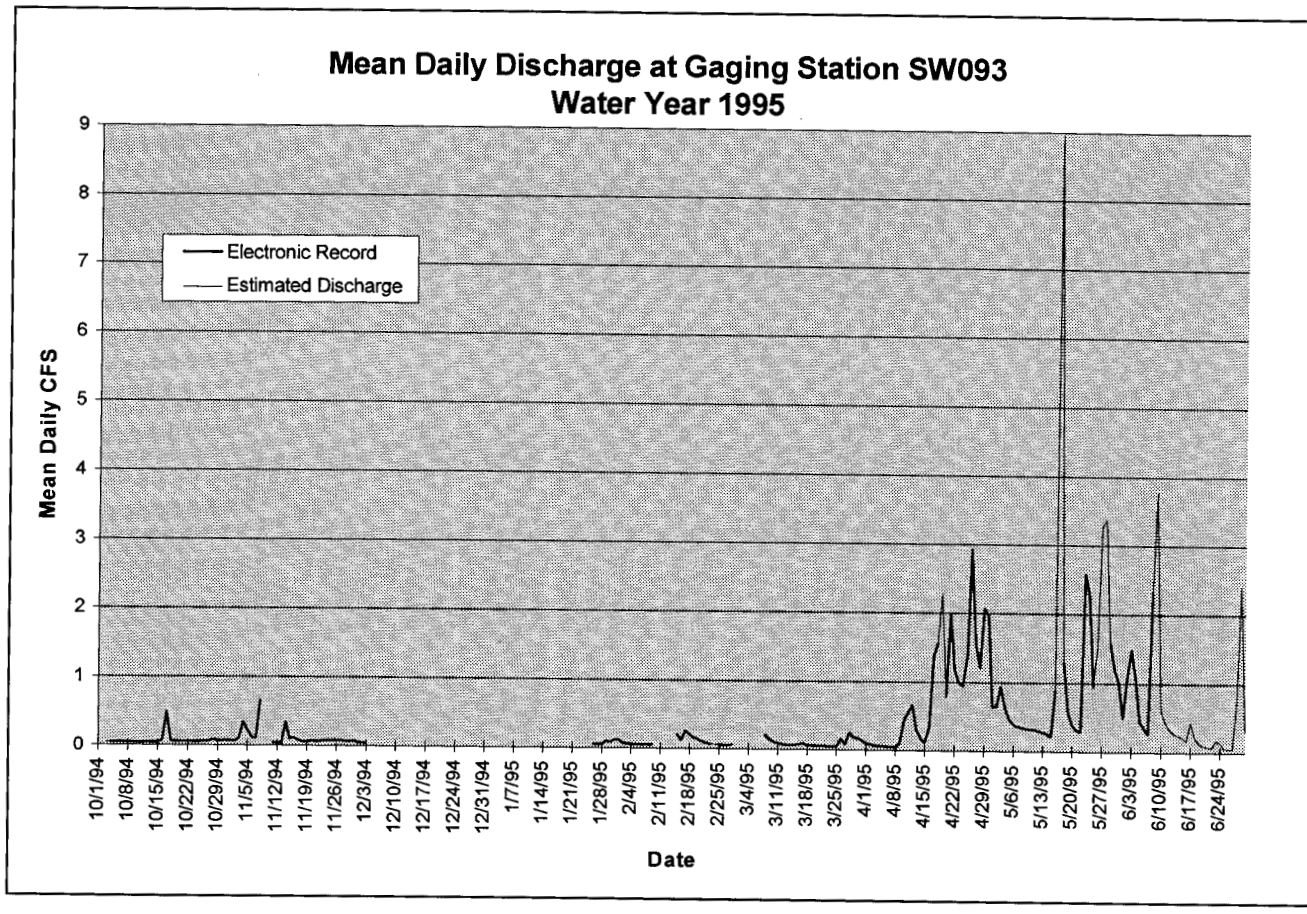


Figure 3-20. SW093 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 4/26/95; 5/16; 5/26; 6/28

No analytical results compiled to date.

3.1.11 Gaging Station SW998

Location:

- State Plane: 2080607.8; 749862.5
- West Diversion Ditch north of 130 buildings

Drainage Characteristics:

- Pathway 4
- Area: 0.069 $mi.^2$ = 44.2 ac (approximately 90% impervious)
- Sub-basins: CWADIV1, CWADIV2a, WADIV2b (Figure 1-2)
- Description: SW998 lies on the West Diversion Ditch north of the 130 area. This basin receives Industrial Area runoff from the 130 areas only.

Hardware Configuration:

- Primary Device: 9.5" Parshall Flume
- Flow Meter: ISCO® Model 3230 (bubbler)
- Sampler: ISCO® Model 3700 Portable
  ISCO® Model 6000 VOC
- Radio Telemetry: No
- Power: AC line power; DC battery backup
- Water Quality Parameters: None

Discharge Data

Table 3-11. SW998 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	0.149	0.054	0.347	12876
6/2/95	*0.631*	*0.034*	*9.240*	*54486*
6/3/95	*1.410*	*0.166*	*8.400*	*121810*
6/4/95	0.711	0.111	3.498	61406
6/5/95	0.237	0.074	0.593	20499
6/6/95	0.055	0.042	0.073	4765
6/7/95	0.037	0.023	0.062	3188
6/8/95	*1.290*	*0.034*	*3.996*	*111493*
6/9/95	*2.654*	*0.156*	*11.200*	*229274*
6/10/95	0.105	0.085	0.153	9053
6/11/95	0.057	0.033	0.085	4966
6/12/95	0.024	0.016	0.033	2113
6/13/95	0.012	0.004	0.016	1033
6/14/95	0.007	0.005	0.008	595
6/15/95	0.006	0.002	0.009	477
6/16/95	0.003	0.003	0.003	235
6/17/95	0.171	0.003	2.480	14775
6/18/95	0.017	0.004	0.080	1470
6/19/95	0.004	0.003	0.004	310
6/20/95	0.002	0.002	0.003	171
6/21/95	0.002	0.002	0.002	151
6/22/95	0.002	0.002	0.002	151
6/23/95	*0.159*	*0.002*	*6.250*	*13761*
6/24/95	*0.027*	*0.004*	*0.246*	*2367*
6/25/95	*0.006*	*0.003*	*0.083*	*530*
6/26/95	*0.002*	*0.002*	*0.003*	*200*
6/27/95	*0.003*	*0.001*	*0.081*	*247*
6/28/95	*0.202*	*0.000*	*6.000*	*17432*
6/29/95	0.614	0.033	2.330	53031
6/30/95	0.032	0.014	0.086	2738
Monthly Values				
Mean	0.288	0.031	1.845	24853
Min.	0.002	0.000	0.002	151
Max.	2.654	0.166	11.200	229274

Total Discharge: 745600 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-21. SW998 Monthly Discharge

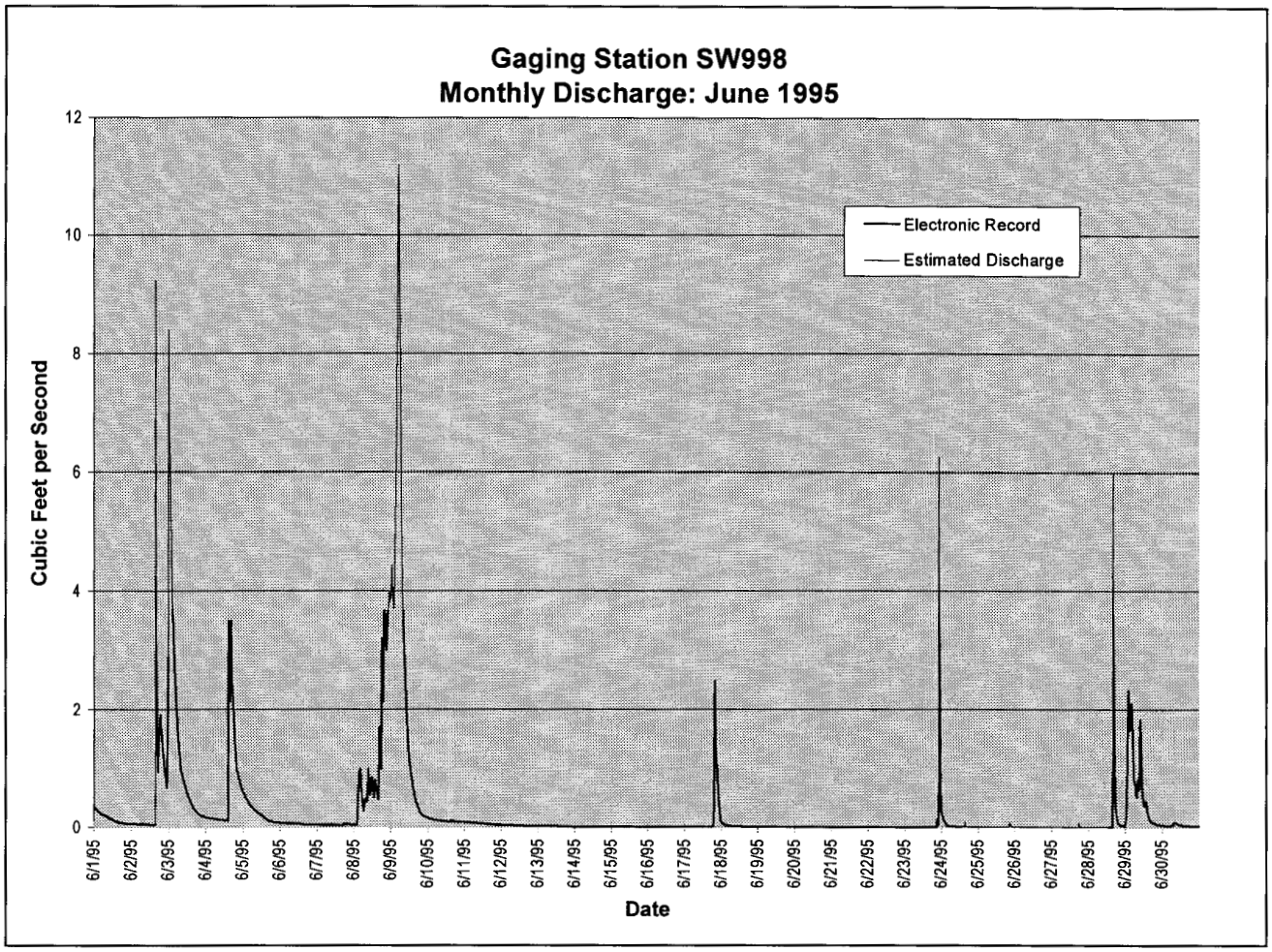
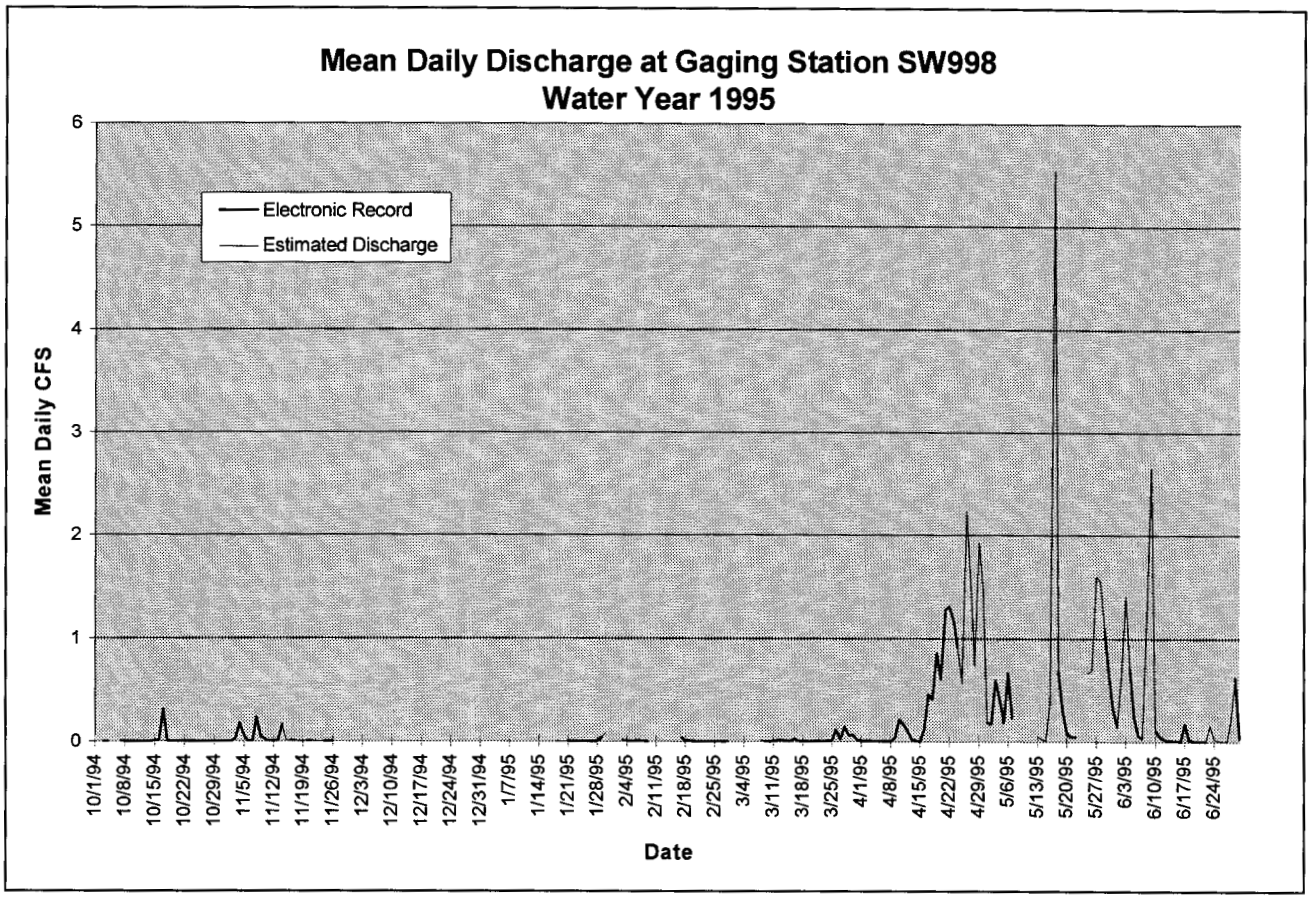


Figure 3-22. SW998 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 5/3/95; 5/16

No analytical results compiled to date.

3.2 Tier II: D&D Subbasin Outfalls

The objective of the Tier II Industrial Area gaging stations is to monitor surface water at the outlet of the subbasins where D&D and Transition activities are located. This tier provides a more detailed monitoring approach to identify potential releases and to evaluate the effectiveness of the engineering controls being employed at the specific D&D/Transition location.

3.2.1 Gaging Station GS27

Location:

- State Plane: 2083680; 749282
- small drainage ditch NW of Building 884 (see Figure 1-3)

Drainage Characteristics:

- Pathway 1
- Buildings: 889, T889A, 884
- Sub-basins: CSWAA5 (Figure 1-2)
- Description: GS27 monitors a small ditch which outfalls to the Central Avenue Ditch northwest of Building 884. Surface water at this site originates as runoff from the areas north and west of 889 and surrounding 884.

Hardware Configuration:

- Primary Device: 2" cutthroat flume (Delta Blue)
- Flow Meter: ISCO® Model 4230 (bubbler)
- Sampler: ISCO® Model 3710 Portable
  ISCO® Model 6000 VOC
- Radio Telemetry: Yes
- Power: DC solar power system
- Water Quality Parameters: Hydrolab® Recorder™ Multiprobe: pH, temperature, conductivity

Discharge Data

The large amount of estimated record at GS27 was due to an elusive power problem.

Table 3-12. GS27 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	0.000	0.000	0.000	0
6/2/95	*0.006*	*0.000*	*0.312*	*495*
6/3/95	*0.004*	*0.000*	*0.296*	*355*
6/4/95	*0.004*	*0.000*	*0.108*	*338*
6/5/95	*0.000*	*0.000*	*0.000*	*0*
6/6/95	*0.000*	*0.000*	*0.000*	*0*
6/7/95	*0.000*	*0.000*	*0.000*	*0*
6/8/95	*0.007*	*0.000*	*0.060*	*571*
6/9/95	*0.022*	*0.000*	*0.559*	*1888*
6/10/95	*0.000*	*0.000*	*0.000*	*0*
6/11/95	*0.000*	*0.000*	*0.000*	*0*
6/12/95	*0.000*	*0.000*	*0.000*	*0*
6/13/95	*0.000*	*0.000*	*0.000*	*0*
6/14/95	*0.000*	*0.000*	*0.000*	*0*
6/15/95	*0.000*	*0.000*	*0.000*	*0*
6/16/95	*0.000*	*0.000*	*0.000*	*0*
6/17/95	*0.001*	*0.000*	*0.023*	*81*
6/18/95	*0.000*	*0.000*	*0.000*	*0*
6/19/95	*0.000*	*0.000*	*0.000*	*0*
6/20/95	*0.000*	*0.000*	*0.000*	*0*
6/21/95	*0.000*	*0.000*	*0.000*	*0*
6/22/95	*0.000*	*0.000*	*0.000*	*0*
6/23/95	*0.001*	*0.000*	*0.031*	*47*
6/24/95	*0.000*	*0.000*	*0.000*	*0*
6/25/95	*0.000*	*0.000*	*0.000*	*0*
6/26/95	*0.000*	*0.000*	*0.000*	*0*
6/27/95	*0.000*	*0.000*	*0.000*	*0*
6/28/95	*0.003*	*0.000*	*0.118*	*231*
6/29/95	0.005	0.000	0.038	471
6/30/95	*0.000*	*0.000*	*0.000*	*0*
Monthly Values				
Mean	0.002	0.000	0.051	149
Min.	0.000	0.000	0.000	0
Max.	0.022	0.000	0.559	1888

Total Discharge: 4477 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-23. GS27 Monthly Discharge

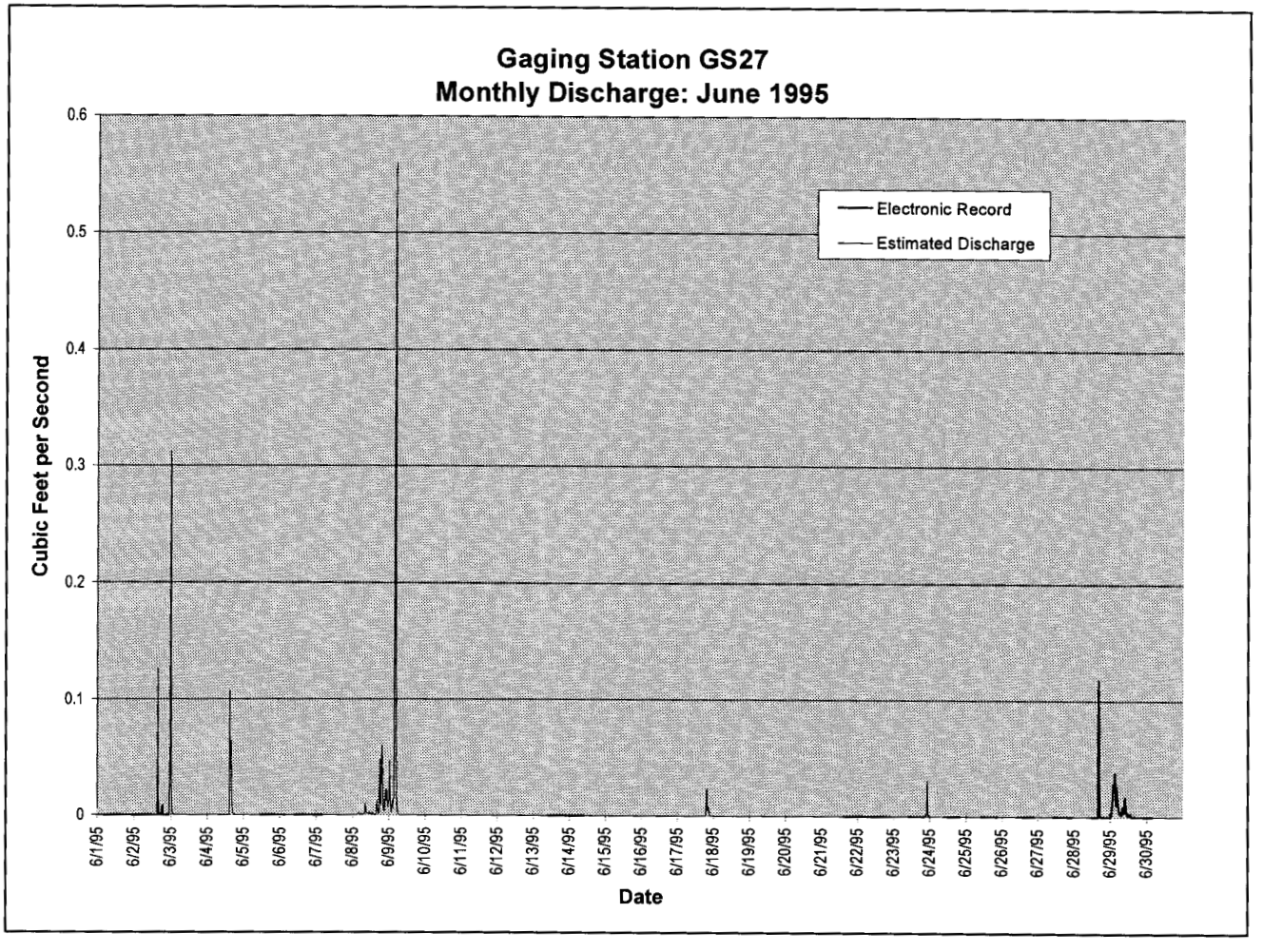
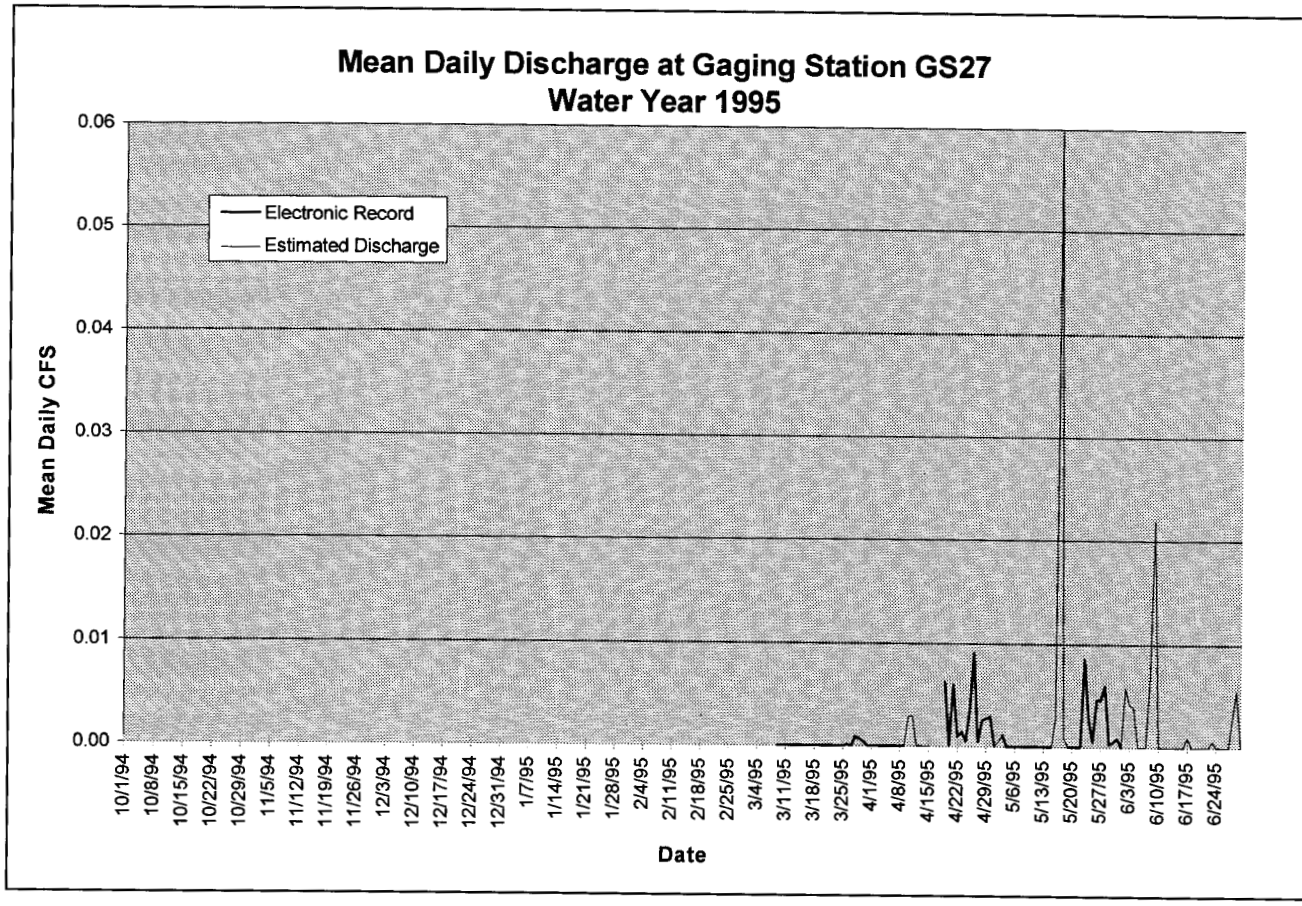


Figure 3-24. GS27 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 5/23/95; 5/31; 6/28

No analytical results compiled to date.

3.2.2 Gaging Station GS28

Location:

- State Plane: 2084010; 749282
- concrete drainage channel northwest of Building 865 (see Figure 1-3)

Drainage Characteristics:

- Pathway 1
- Buildings: 889, T889A, 879, 883, 866, 827, 867, 865
- Sub-basins: CSWAA5 (Figure 1-2)
- Description: GS28 monitors a concrete drainage channel which outfalls to the Central Avenue Ditch northeast of Building 889. Surface water at this site originates as runoff from the northern portion of the 800 Area.

Hardware Configuration:

- Primary Device: 4" cutthroat flume (Alpha Lou)
- Flow Meter: ISCO® Model 4230 (bubbler)
- Sampler: ISCO® Model 3710 Portable
  ISCO® Model 6000 VOC
- Radio Telemetry: Yes
- Power: DC solar power system
- Water Quality Parameters: Hydrolab® Recorder™ Multiprobe: pH, temperature, conductivity

Discharge Data

Table 3-13. GS28 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge Cubic Feet
6/1/95	0.000	0.000	0.000	0
6/2/95	0.001	0.000	0.017	113
6/3/95	0.016	0.000	0.392	1388
6/4/95	0.004	0.000	0.093	357
6/5/95	0.000	0.000	0.000	0
6/6/95	0.000	0.000	0.000	0
6/7/95	0.000	0.000	0.000	0
6/8/95	0.021	0.000	0.179	1815
6/9/95	*0.058*	*0.000*	*1.006*	*5047*
6/10/95	0.000	0.000	0.000	0
6/11/95	0.000	0.000	0.000	0
6/12/95	0.000	0.000	0.000	0
6/13/95	0.000	0.000	0.000	0
6/14/95	0.000	0.000	0.000	0
6/15/95	0.000	0.000	0.000	0
6/16/95	0.000	0.000	0.000	0
6/17/95	0.000	0.000	0.000	0
6/18/95	0.000	0.000	0.000	0
6/19/95	0.000	0.000	0.000	0
6/20/95	0.000	0.000	0.000	0
6/21/95	0.000	0.000	0.000	0
6/22/95	0.000	0.000	0.000	0
6/23/95	0.000	0.000	0.000	0
6/24/95	0.000	0.000	0.000	0
6/25/95	0.000	0.000	0.000	0
6/26/95	0.000	0.000	0.000	0
6/27/95	0.000	0.000	0.000	0
6/28/95	0.010	0.000	0.317	850
6/29/95	0.028	0.000	0.198	2406
6/30/95	0.000	0.000	0.000	0
Monthly Values				
Mean	0.005	0.000	0.073	399
Min.	0.000	0.000	0.000	0
Max.	0.058	0.000	1.006	5047

Total Discharge: 11975 Cubic Feet

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Estimated data is usually required due to a malfunctioning, damaged, or overtopped flow control device.

Figure 3-25. GS28 Monthly Discharge

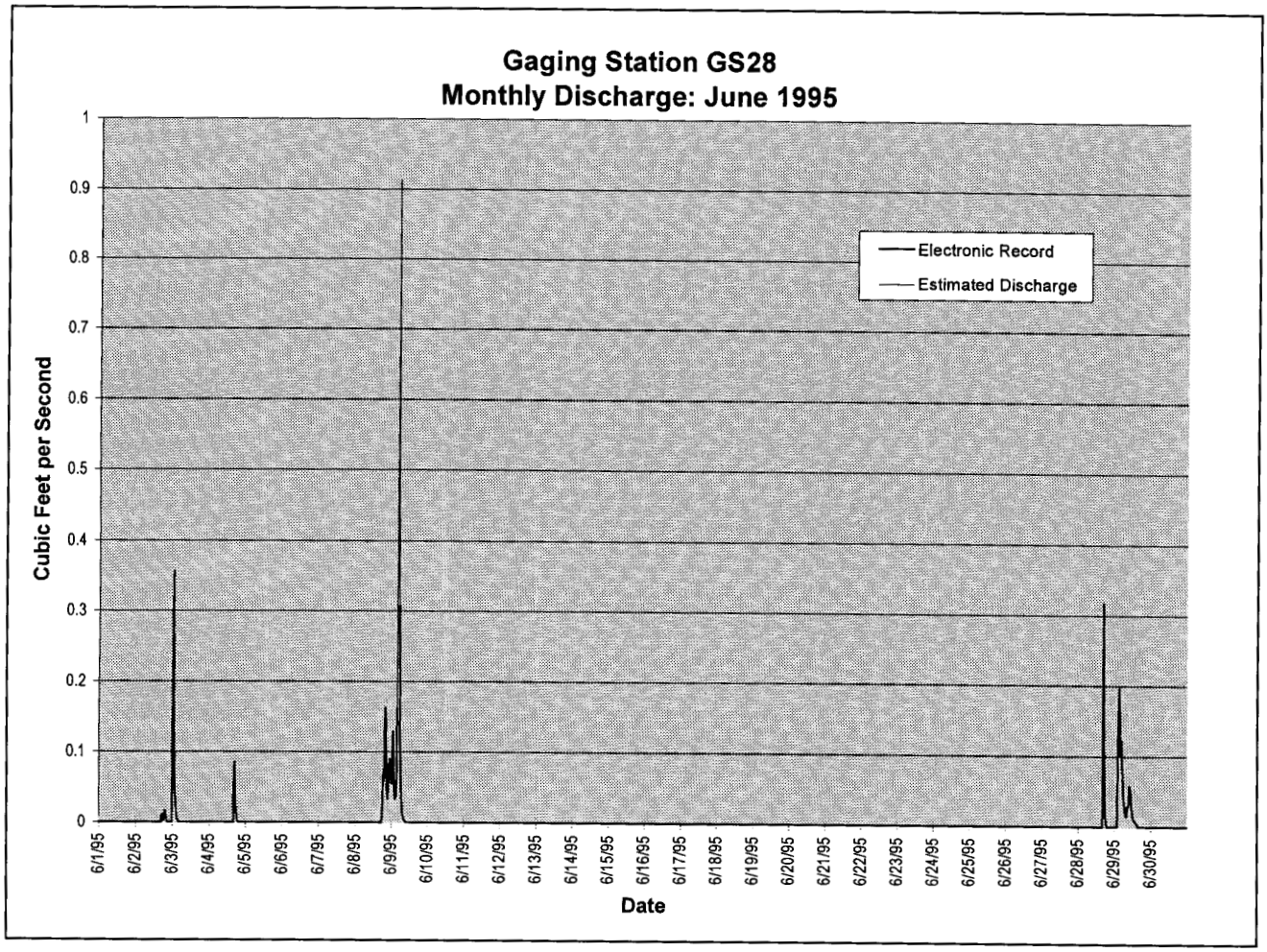
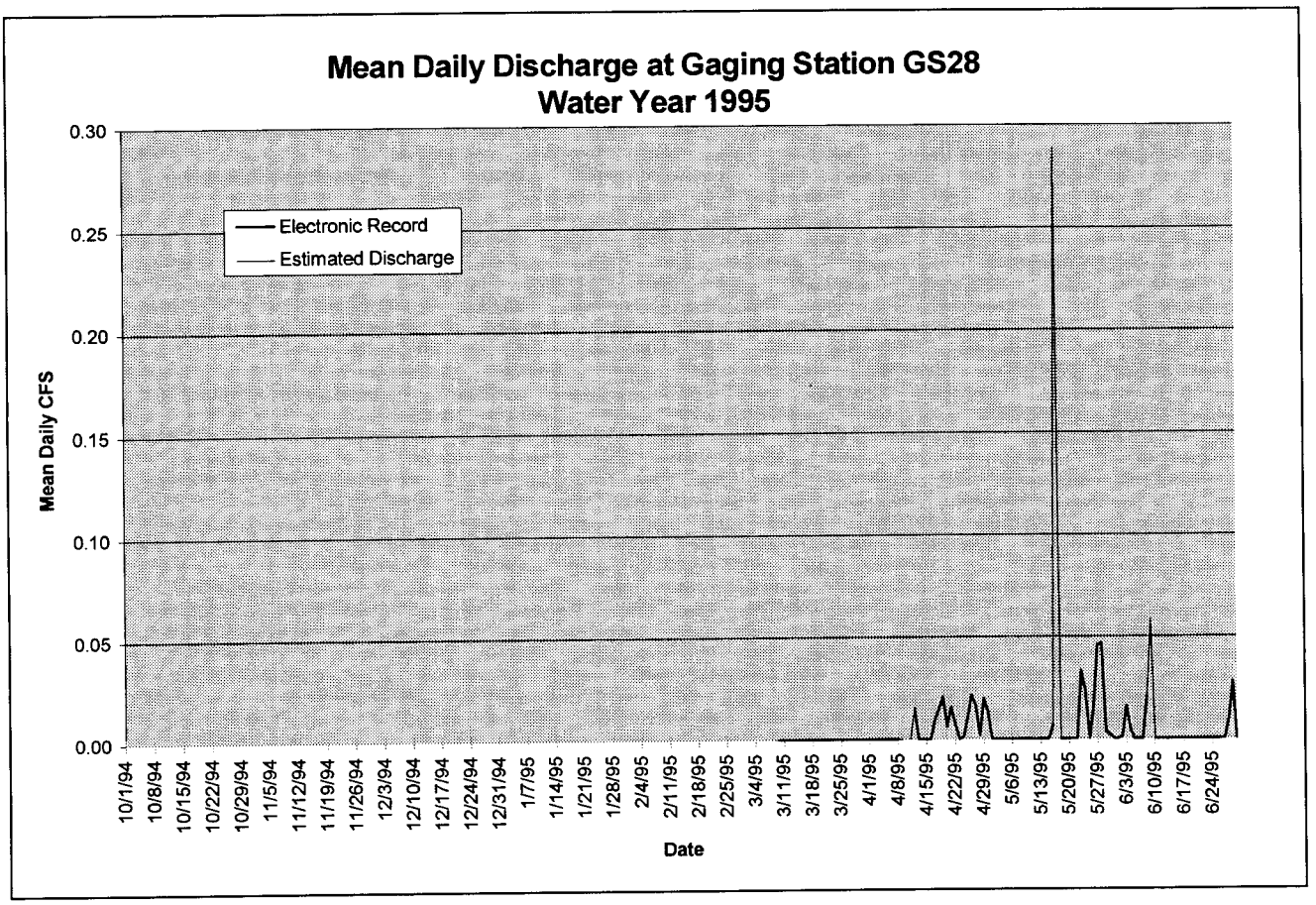


Figure 3-26. GS28 Mean Daily Discharge, Water Year 1995



Analytical Results

Sample Dates: 5/16/95; 6/28

No analytical results compiled to date.