

Figure 17. Discharge to Northeast Shark Slough, Year Three of Test 7

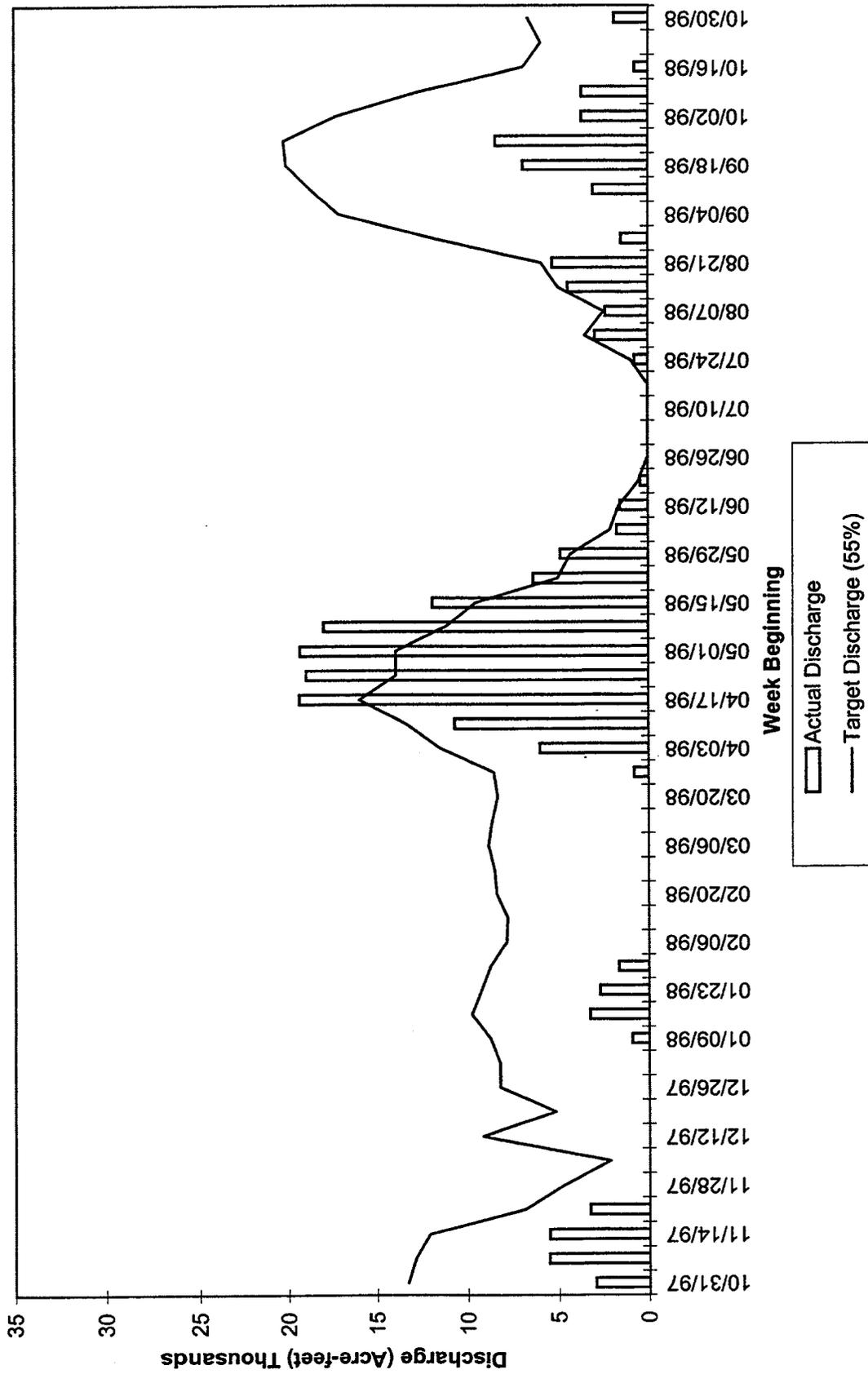


Figure 18. S-333 Headwater and Tailwater, Year Four of Test 7

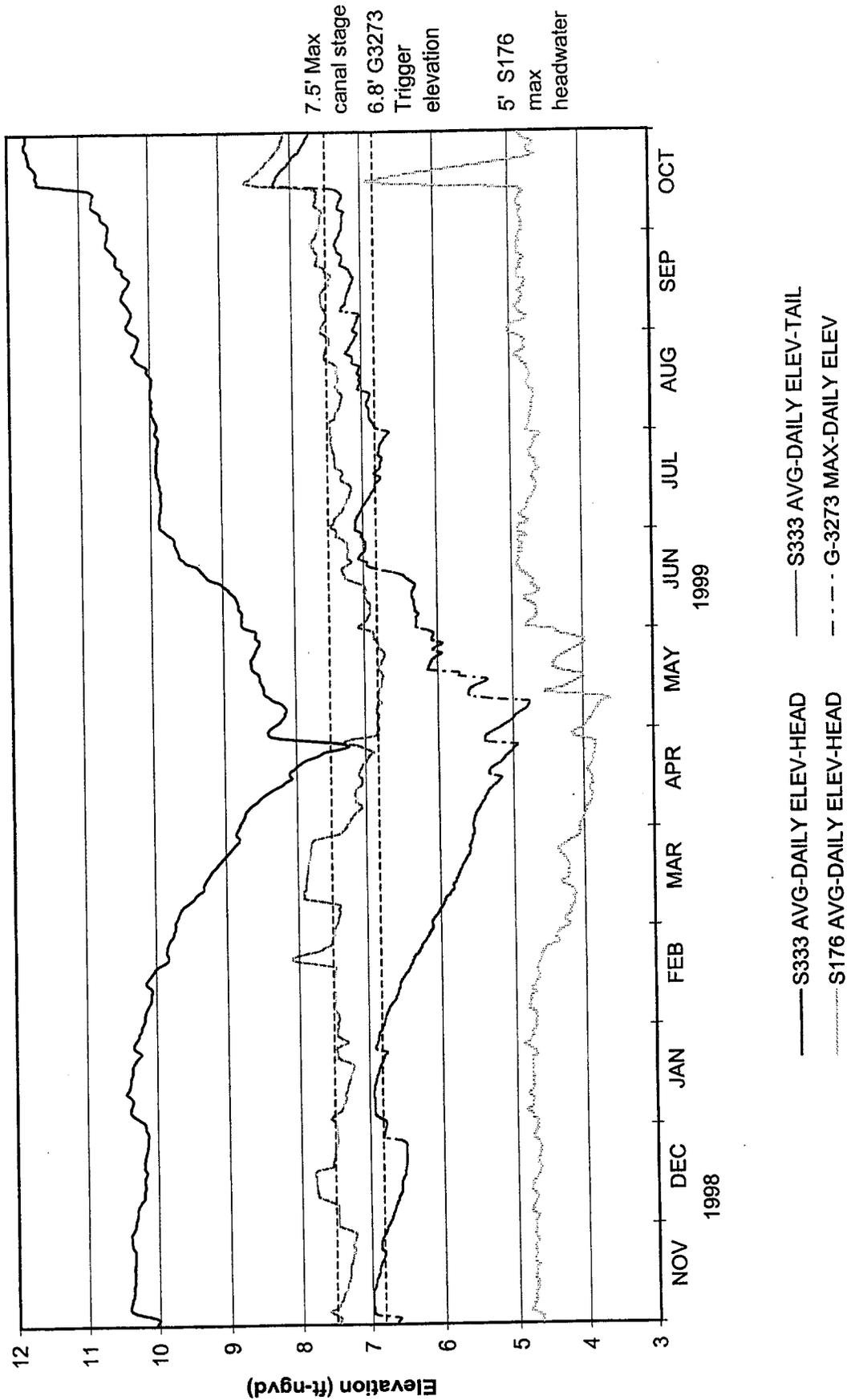


Figure 19. S-333 Flow, Year Four of Test 7

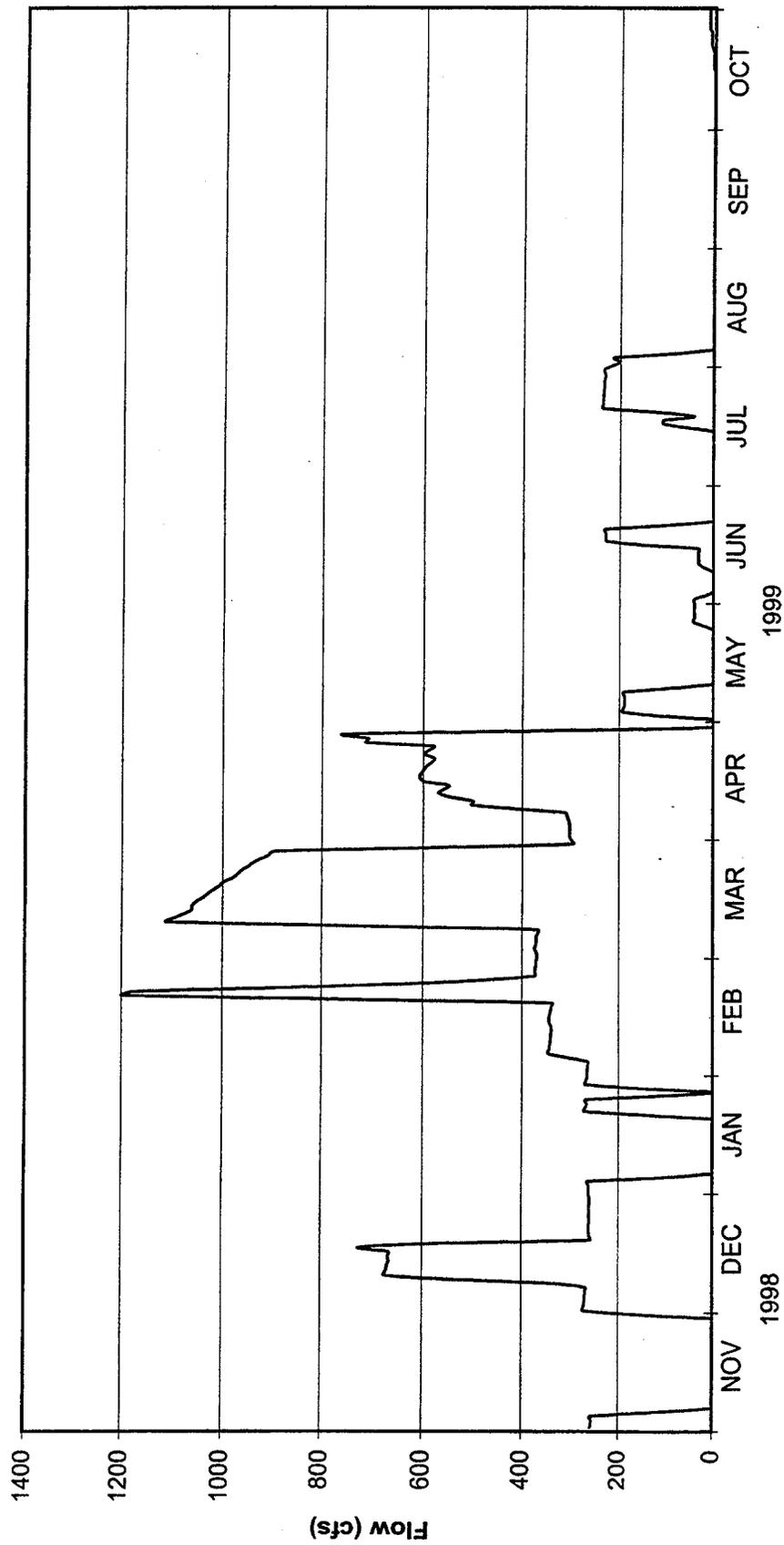


Figure 20. Discharge to Shark Slough, Year Four of Test 7

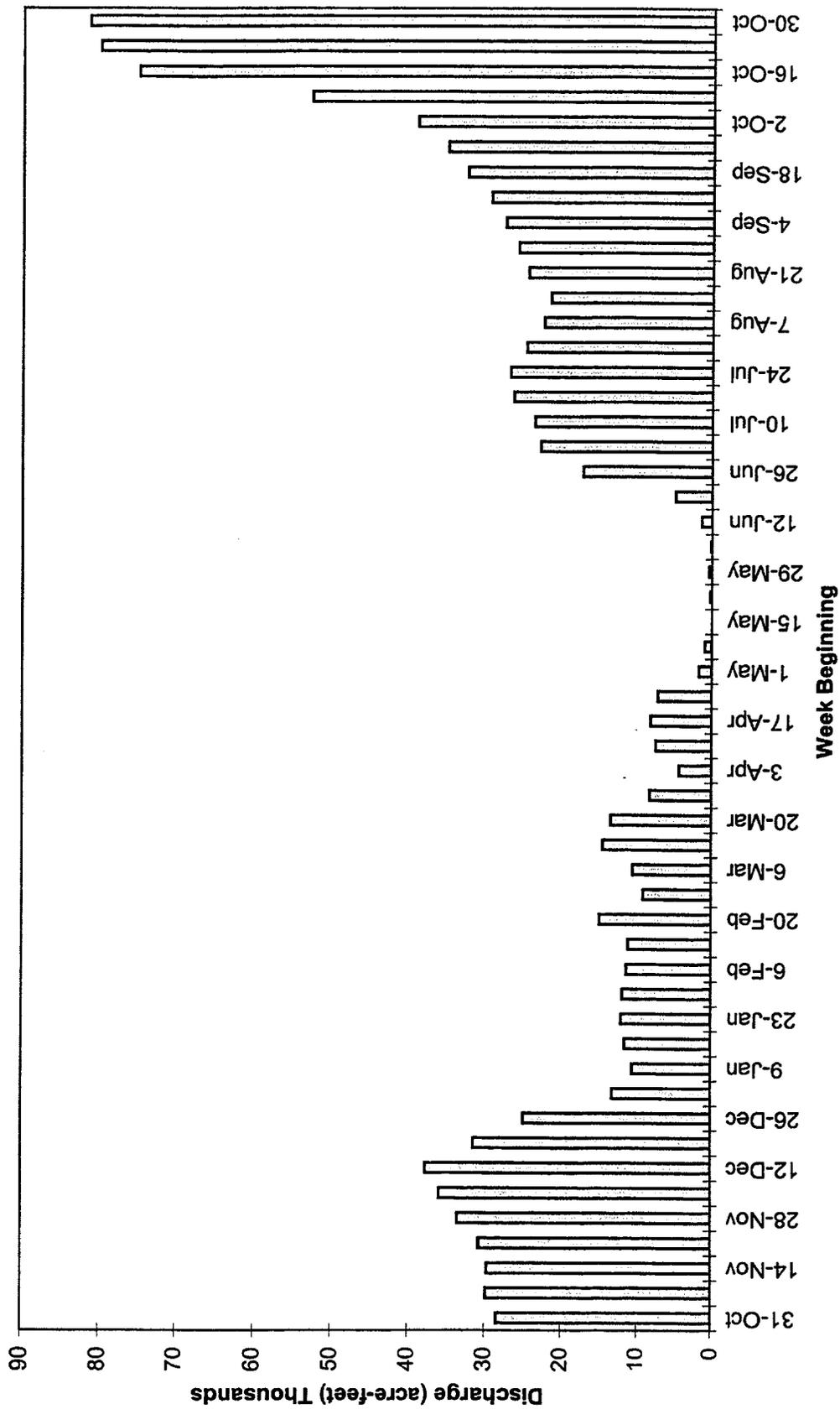


Figure 21. Discharge to West Shark Slough, Year Four of Test 7

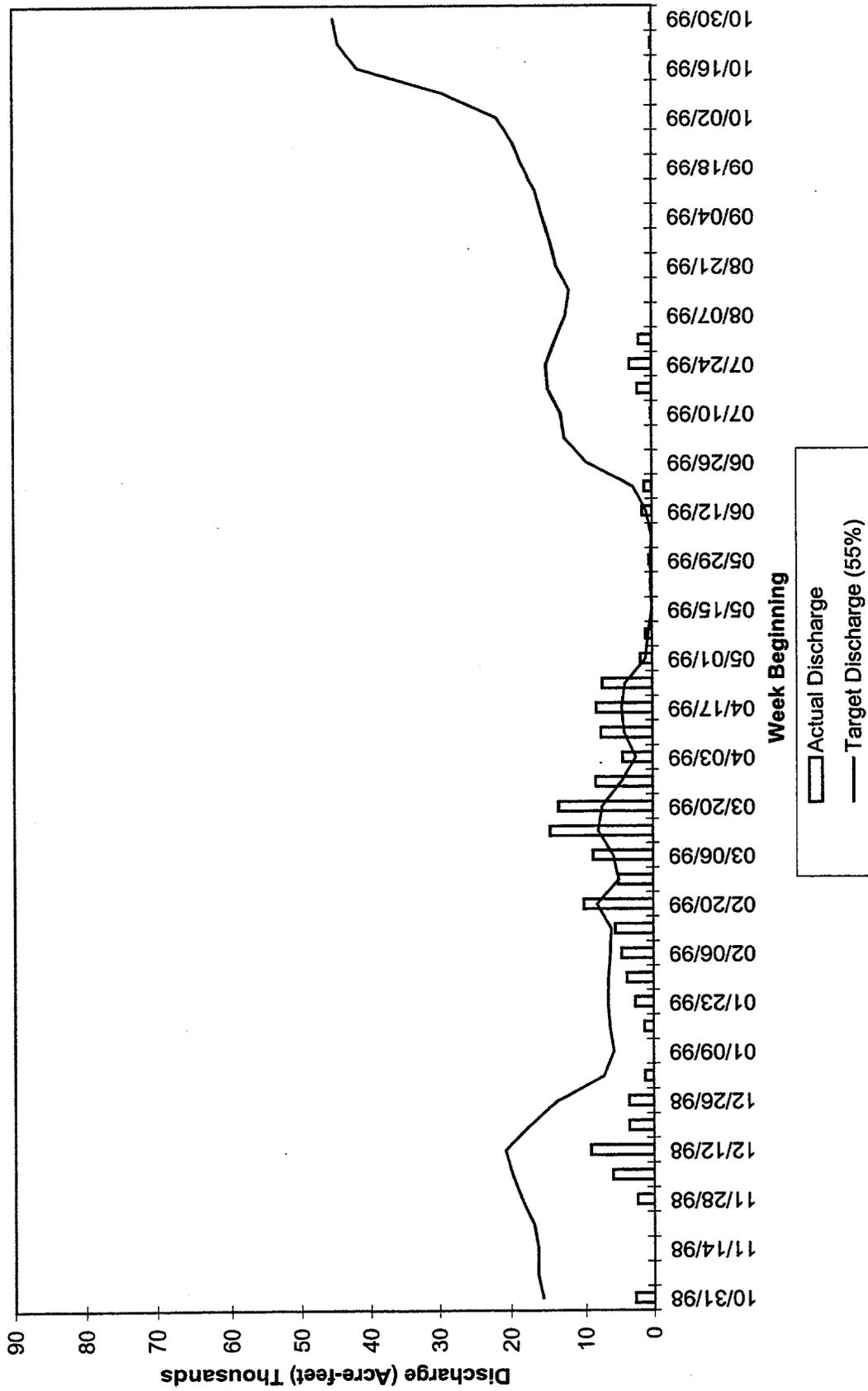


Figure 22. Discharge to Northeast Shark Slough, Year Four of Test 7

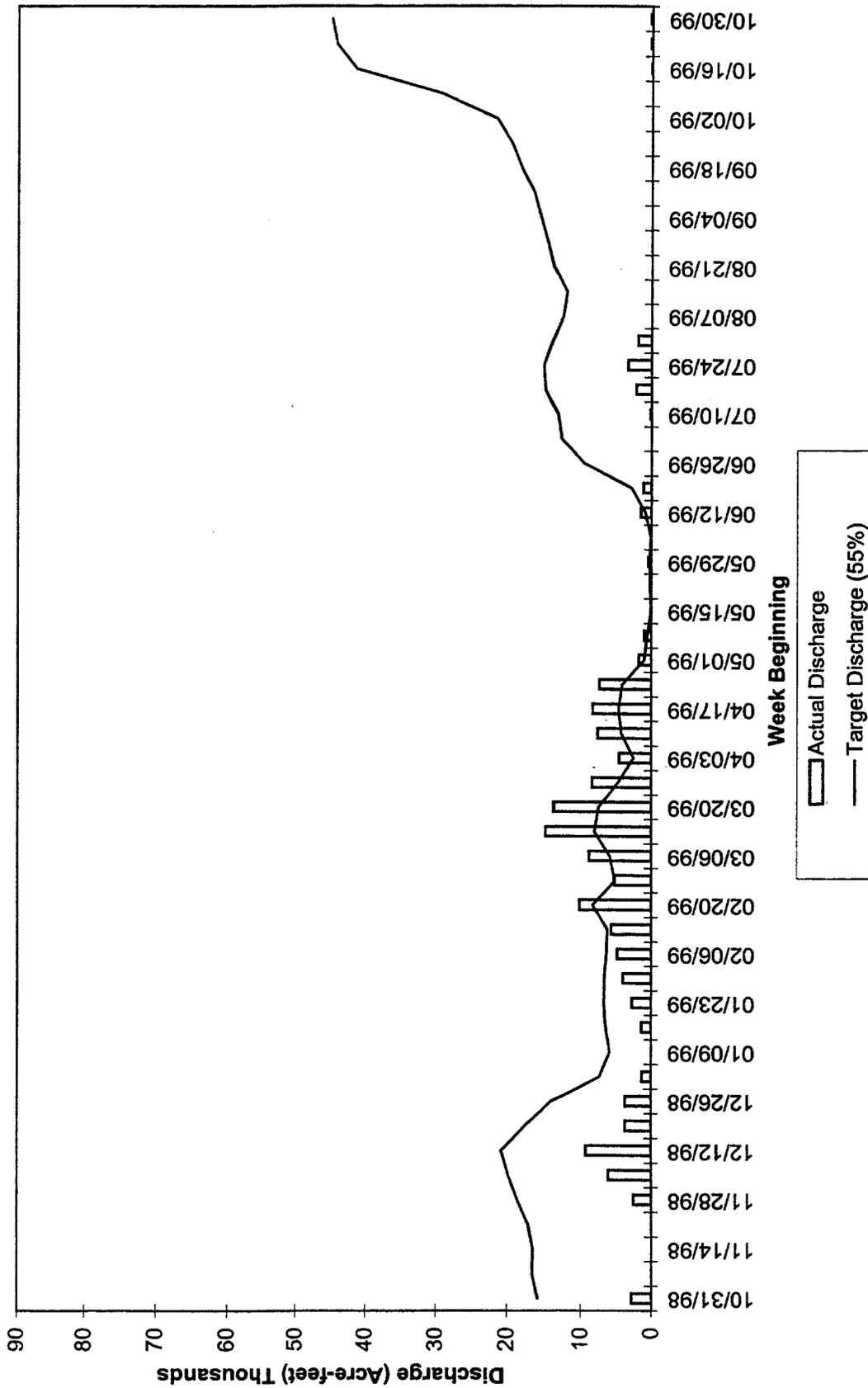


Figure 23. Stage at G-3273, Year Three of Test 7

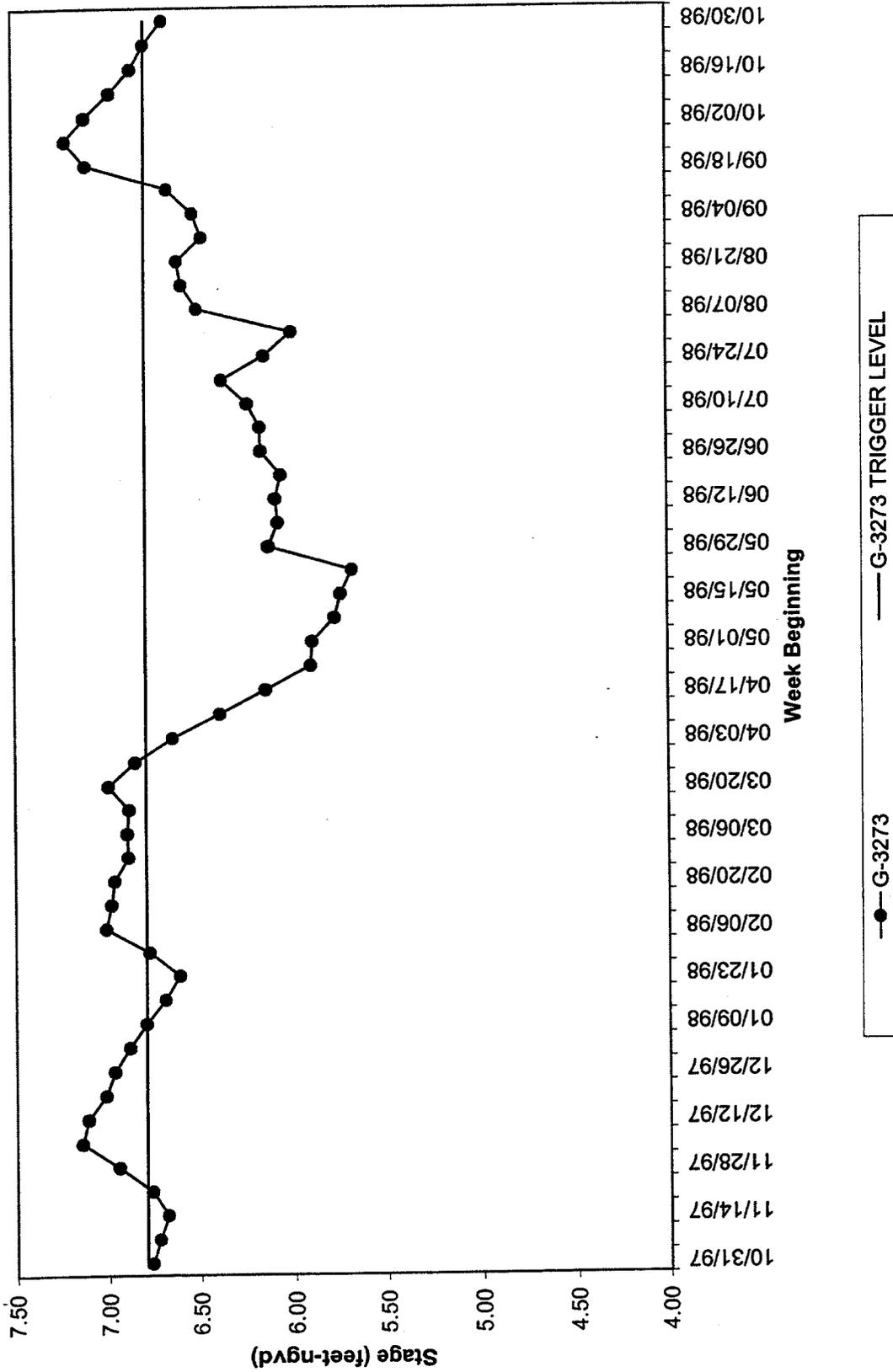
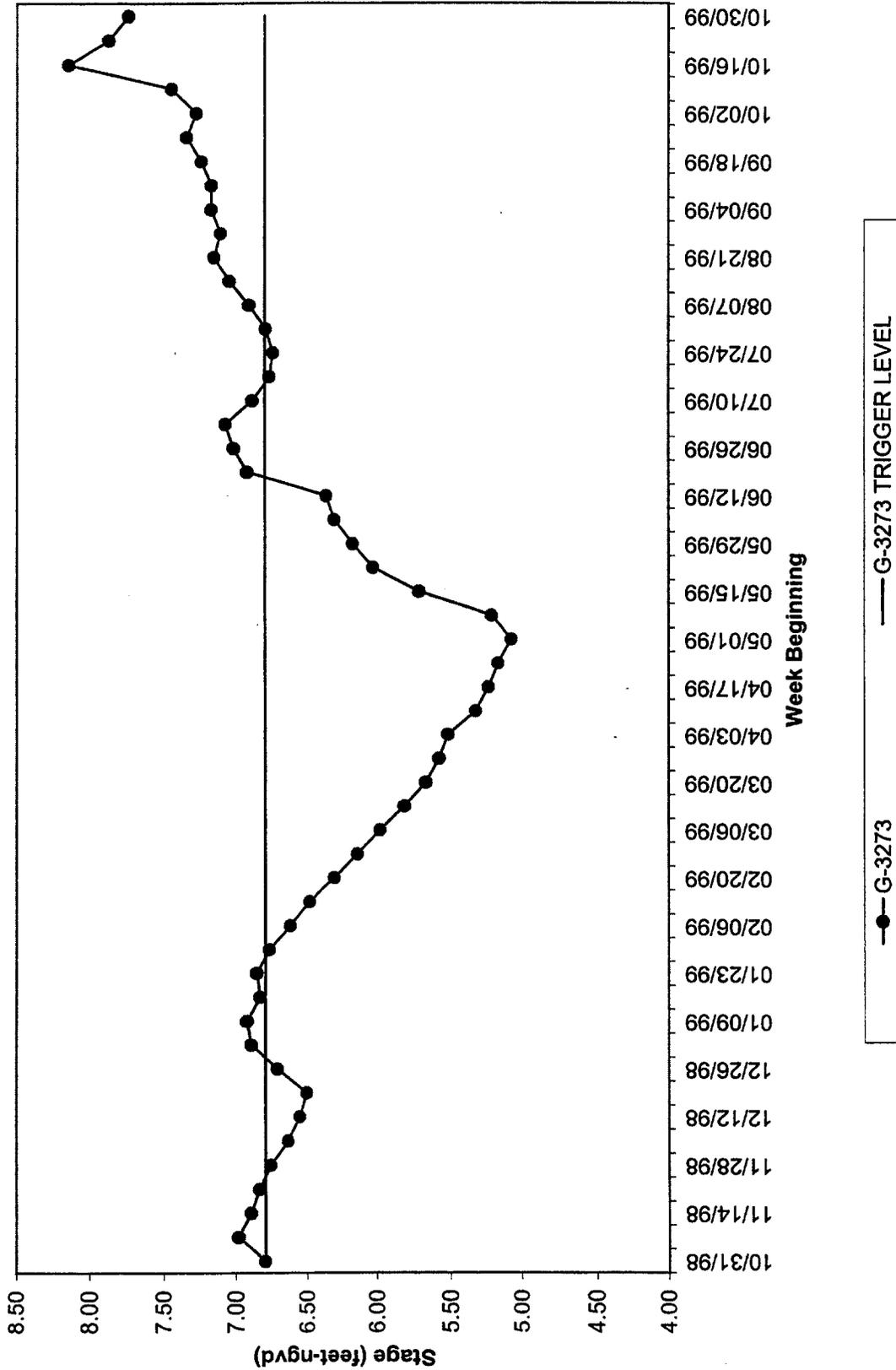


Figure 24. Stage at G-3273, Year Four of Test 7



L-31 North Canal

L-31 NORTH CANAL

L-31 North (L31-N) Canal Operational Objectives During Test 7

Canal stages between G-211 and S-335 would be maintained between 5.5 ft and 6.0 ft. The objective at S-338 is to maintain the upstream stages as high as practical and keep S-338 closed unless the headwater stage at G-211 reached 5.8 ft. Pump station S-331 south of G-211 would control the level in L-31N as function of the water levels in the Rocky Glades recorded at Angels well. S-331 can operate in either a flood control mode or a water supply mode. S-176 would open when the headwater reached 5.0 ft and remain open between 5.0 – 4.75 ft range. This maintains the reach of canal between S-331 and S-176 close to 5.0 ft.

L-31 N Operational Criteria

The operational criteria for Test 7 is outline in Table 4 (page 9). Figure 25 (page 49) shows the opening and closing criteria for G-211 and S-338. Figure 26 (page 50) shows the criteria for pumping at S-331 with the trigger well criteria of 6.0 ft at Angels well. Figure 27 (page 51) shows the opening and closing criteria for S-176 during Test 7.

Difference In Test 6 and Test 7 Criteria

Test 6 criteria for the L-31N canal required that G-211 headwater be maintained between 5.0 and 6.0 ft with no change between wet and dray seasons. G-211 was to be closed when S-331 was pumping at capacity or flood conditions existed downstream of S-331. During Test 7 canal stages between G-211 and S-335 would be maintained between 5.5 ft and 6.0 ft. Canal stages between G-211 and S-331 (S-331 Headwater) would vary depending on the level at Angels well. The Test 7 criteria for S-176 is the same as it was during Test 6, with the opening set at 5.0 and the closing set at 4.6 during flood operations and 4.75 ft. Prior to the Experimental Program, the optimum canal stage north of S-176 was 5.5 ft NVGD.

L31-N Summary of Operations

Wet Season 1995. Rainfall during June was heavy in Dade County and canals were operated according to flood control operations. Angels well rose above 6.0 ft on June 18 and remained above 6.0 ft through the entire wet season. Pumping operations at S-331 were maintained except from June 22-28 and October 18-26 when the headwater at S-176 exceeded 5.0 ft, and except when conditions allowed siphoning. During July, canal stages in L-31N were lowered in preparation of Tropical Storm *Chantal* and Hurricane *Erin*. Heavy rainfall associated with Hurricane *Erin* the first week in August and from Tropical Storm *Jerry* the last week in August resulted in flood control operations in L-31N, which included drawdown of the canals. WCA-2 and WCA-3 were all above schedule during this time and releases were made to tide when downstream capacity allowed. Lake Okeechobee and WCA-1 were above schedule during October and were declining going into the start of Test 7. Angel well reached its period of record maximum of 7.85 on October 24, 1995. S-176 remained partially open into the dry season.

Year One Test 7. Groundwater levels in the Rocky Glades residential area were above 6.0 ft as measured at Angels well until the last week of January, Figure 28 (page 52). This

required pumping at S-331 until the last week of January when siphoning through S-331 began and S-173 was open. S-176 remained partially open with the headwater between 5.0 – 4.75 ft through December 11 (see Figure 27, page 51). G-211 was open with six gates at one ft through the end of January. The stage upstream of G-211 was declining but remained above the closing stage of 5.5 ft until January 24 (see Figure 25, page 49). S-338 was also open during this time and closed when the stage at G-211 fell below 5.5 ft on January 26. S-338 should have remained closed, but was reopened for two weeks in February.

Once Angels fell below 6.0 ft, the pumping at S-331 stopped, and siphoning began with gravity flow through S-173. By the end of February, low groundwater levels in South Dade prompted water supply releases and G-211 gates were fully opened on February 19. The stage upstream of G-211 remained below the closing criteria of 5.5 ft throughout most of the month. S-338 remained closed.

In April, the downstream stage at S-176 steadily declined below the critical stage for the S-176/S-177 reach of C-111 and prompted water supply releases from WCA-3A into L-31N/C-111 to be made through S-176. Water supply continued until the third week of May when the groundwater level west of L-31N rose due to localized rainfall and pumping at S-331 began when Angels rose above 6.0 ft. Also, during the last week of May, the USACE, in coordination with ENP and USFWS, requested that the SFWMD divert water from L-31N into C-111 as much as possible instead of L-31W to facilitate the nesting of the Cape Sable Seaside Sparrow. The gate opening for S-176 was set to 4.85 instead of the 5.0 criteria.

Angels well was above 6.0 ft from the second week of June through July and from August through the end of October except for a few days in August. S-331 pumping was maintained in order to meet the criteria of 4.0 to 4.5 ft at the S-331 headwater. The S-331 headwater was at or above 4.5 the majority of the time from June through October. This was outside the criteria and may once again indicate that an electric pump at S-331 would help in the maintenance of the average daily stage between G-211 and S-331. As noted above, SFWMD continued to divert water from L-31N into C-111, as much as possible instead of L-31W in the first three weeks of the month. On May 21, the nesting season of the Cape Sable Seaside Sparrow ended, and the opening and closing perimeters for S-174 and S-176 were returned to the Test 7 criteria.

Through most of July and August, Angels remained below 6.0 ft, with siphoning at S-331 and gravity flow through S-173. Rainfall increased through August and September and pumping was resumed at S-331 during these times. October began with locally heavy rainfall and was followed by rainfall associated with Hurricane *Lili*. Operations were modified to prepare the C-111 basin for the potential of Hurricane *Lili* becoming a Category III event and hitting South Florida. On October 12, the S-176 Headwater was 4.97 ft and the gate began to open, on October 15 a temporary deviation at S-176 was made to change the opening criteria of S-176 to open at 4.5 ft. S-76 returned to its normal operating level on October 21. Groundwater level west of L-31N rose very high during the end of the wet season (see Section SFWMD Residential/Urban Areas). See Figure 29, page 53 which shows S-176 and S-174 headwater stage.

Year Two Test 7. On November 1, G-211 headwater is slightly above 6.0 ft and tailwater is 4.5 ft (see Figure 30, page 54). The structure is closed. December 1, G-211 is open and discharging flow (Figure 31, page 55). G-211 discharges flow until just past mid-March. The flow

is stopped about a week and then resumes about March 20 and continues until near the end of April. Flow is stopped again about mid-May. From that time frame through the wet season there is no flow from G-211 although the headwater stage level is above 6.0 ft from about July 10 through October 31. Heavy rainfall occurred causing a sharp rise beginning about June 7. The objective of maintaining the L-31N Canal between 5.5 and 6.0 ft was not very successful, particularly in the wet season where the G-211 headwater level stayed above 6.0 ft for most of the season.

The S-331 structure began the hydrologic year with the headwater level just under 4.5 ft (see Figure 32, page 56). Groundwater levels west of L-31N decline below critical levels and flood control pumping was stopped on November 12. About December 1 the headwater level rose rapidly above 5.0 ft and seldom fell to or below 4.5 ft for any length of time until the last half of August and through September and October. The water surface level at Angels began November at 6.6 ft but quickly receded to 6.0 ft by mid-November. There were two minor intrusions above 6.0 ft prior to a substantial rise in June (see Figure 32). From that point until virtually the last day of October the level at Angels was at or above 6.0 ft. There was very minor discharge of flow through S-331 during the dry season. Water supply releases to L-31N were made in parts of every month in the dry season. In the last of April flood control pumping occurred for two days. Obviously there was flood control pumping throughout the wet season. The objective of holding S-331 headwater between 4.5 and 4.0 ft when Angels is more than 6.0 ft was not met very well. The headwater reached 5.5 ft in December and went below 4.0 ft for a few days around the first of August but most of the time the level ranged between 5.0 ft and 5.5 ft.

The headwater at S-176 was below the open-close criteria for most of the dry season. The level began to rise in May and leveled out around 4.75 ft in June. There was a major rain event in June and the water rose dramatically but returned quickly (see Figure 33, page 57). The remainder of June and through the wet season the headwater level oscillated about the 4.75 ft level. The level did not reach 5.0 ft, which is the opening criterion. A major reason is the operating criteria of S-174, which is below the 5.0 ft level and the two structures are very close to each other. See Figure 34, page 58 for S-176 flows.

Year Three Test 7. This was a wetter year than either Year One or Year Two. The hydrologic year begins with the G-211 headwater above 6.0 ft (Figure 35, page 59). From November 1 through April the headwater level slowly recedes below the 6.0 ft level down to 5.5 ft in mid-April. The level remains there until the middle of May. Between the middle of May and October the level is between 5.5 ft and 6.0 ft. There is an event in September that causes a sharp rise and the headwater level is at or above 6.0 ft the last half of September. The effort to hold the G-211 head between 5.5 and 6.0 ft was more successful in Test 7 Year Three than in Year Two. There was flow through S-338 most of the hydrologic year. There was also flow through G-211 for a good portion of the hydrologic year (see Figure 36, page 60).

The headwater level at S-331 was between 4.0 and 5.0 ft for most of the dry season (Figure 37, page 61). The level at Angels exceeded 6.0 ft from about December 1 through April 1 with exception of the last half of January. During the wet season the headwater level of S-331 ranged between 4.5 ft and 5.5 ft most of the time. Angels well was at or above 6.0 ft for a few days on several occasions in June, July, and August. A major rainfall event in September generated a significant rise in the headwater level and also the level at Angels well. Angels well receded to 6.0 ft by the end of October. There were flows through S-331 for most of the hydrologic year. The longest

extended period of no flows was mid-May through mid-August. District performed flood control pumping at S-331 during the first week of the month. On November 13 began to allow excess water from L-31N, North of G-211 to continue down L-31N eventually into L-31W instead of into C-1W via S-338. In December flood control pumping was performed at S-331 all month. In January flood control pumping was continued at S-331 until January 18. The rest of the month, the district released water through pumps at S-331 and the gate at S-173. S-331 pumping from February 5 on. March same as February. In April, the district increased pumping at S-331 to maximize releases from WCA 3A. May, because of the dry conditions, operational guidelines returned to normal in the last part of the month. The district conducted pumping at S-331 during regulatory release mode of operation and made gravity discharge at S-331 during water supply release mode of operation. June gravity discharge at S-331 underwater supply release mode of operation same as June, August same as July. District made flood control pumping at S-331 from October 1 to October 27 according to the guidelines in the program.

The headwater stage level at S-176 did not reach or exceed 5.0 ft except for the rainfall event in September (Figure 38, page 62). Otherwise, the stage level was below 4.6 ft in November, near 4.75 ft in December and half of January. The level was between 4.6 and 4.75 ft in February and March. In April and May the level lowered to near 4.0 ft. The level increased to about 4.5 ft in June and was between 4.60 and 4.8 ft the rest of the wet season. The stage level did not change very much and stayed below the 5.0 ft criteria the entire hydrologic year. For S-176 flows see Figure 39, page 63.

Year Four Test 7. In Year Four Test 7 the dry season was dry. The headwater stage level at G-211 experienced a small spike in early November and then remained between 5.5 and 5.8 ft through May. The stage level increased to 5.8 ft in the first part of June and then increased to 6.0 ft and above for the remaining part of the wet season (see Figure 40, page 64). G-211 discharged flow for the most part of the dry season and discharged minor flows in August, September, and October. The flows in the dry season were apparently associated with water supply operations (see Figure 41, page 65).

The S-331 headwater level in Year Four Test 7 was for the most part maintained at or below 5.0 ft (see Figure 42, page 66). In March and April the stage level increased to about 5.3 ft. Angles well elevations began the hydrologic year slightly below 6.0 ft but immediately increased to almost 7.0 ft. The level then receded back to and below 6.0 ft for most of December. The level went back above 6.0 ft for January and the first half of February. The level remained below 6.0 ft until the middle of June, when the well level exceeded 6.0 ft and remained above that level the rest of Year Four. Flows through S-331 occurred in November, January, and half of February and then from the middle of June to October 31 (see Figure 43, page 67). The headwater stage level at S-176 was near the 4.75 ft level for most of the hydrologic year. From the middle of February through May the headwater receded to levels as low as 3.7 ft. The headwater level reached 5.0 ft on the first of September for one or two days. In October the major rainfall event sent the headwater stage to a level near 7.0 ft (Figure 44, page 68).

The opening criteria for S-174, 4.85 ft, seems to be controlling the stage in the reach of canal between S-331 and S-176. Table 6 (page 69) shows the monthly average headwater stage at S-176 for the four years of Test 7. The average stages for S-176 are very close to S-174 and the headwater at S-176 rose to or exceeded 5.0 ft only in times of significant events (three storm events).

The L-31N average for the dry and wet season (1995-1998 hydrologic years) stays below 5.0 ft consistently. The culprit seems to be S-174. For S-176 flows see Figure 45 (page 70).

L-31N Analysis of Operations

From November 6 through December 4, 1995, the average daily headwater at S-331 was about 3.75 ft, Angels was above 6.0 ft and G-211 had six gates open one ft. The goal at S-331, when Angels is above 6.0 ft is to operate so that the average of the 24-hour period is 4.0 to 4.5 ft. Looking at the break point data for this time period indicates that for a 16 hour shift with two units at 1,600 rpm the drawdown was as low as 3.00 ft and over the eight hour off time the stage rose to 5.1 ft which made the 24 hour average 3.7 ft. The criteria required a 24-hour average of 4.0 to 4.5 ft. In December the pumping was adjusted and the average daily stage was 4.7 ft. Again, this was outside the criteria but on the high end. Once Angels fell below 6.0 ft, the pumping at S-331 stopped, siphoning began with gravity flow through S-173. G-211 was open during this time as the headwater remained above the closing criteria of 5.5 ft. The criteria, as stated in the Test 7 EA, for G-211 reads that "G-211 would normally be closed when S-331 is operating at maximum capacity." This may need to be clarified. S-331 may not have been pumping at maximum but it was pumping to mitigate for high levels at Angels and the headwater was below the range of 4.0 ft. Angels was above 6.0 ft, November 1, 1995 through January 27, 1996, it may have helped to minimize some seepage losses from NESRS to have kept G-211 closed during this time, and cut back on pumping at S-331, thus maintaining the headwater at S-331 closer to the 4.5 ft, required by the criteria. The addition of the two small capacity (50 to 100 cfs) electric pump at S-331 originally slated for operation during Test 7 may help in this type of situation.

The use of S-333 for mitigation of the operation of S-33 should also be looked at closely. During the beginning of Test 7, when G-3273 was above the 6.8 ft trigger criteria, S-333 was closed, and S-331 was pumping. If pumping at S-331 is for flood mitigation in the East Everglades from operation of S-33, and S-333 was closed from June 21, 1995 through January 29, 1996, then the criteria may need to change to reflect the lag time between operations at S-333 and pumping at S-331. The water levels in the East Everglades were high while the L-31N canal area between S-331 and S-176 never reached the 5.0 ft stage for closing S-176 which is also a criteria for closing S-333.

The reach of canal between S-331 and S-176 was to be maintained at 5.0 ft during Test 7. It is interesting to note that headwater at S-176, average daily value, was rarely above 4.75 ft. The opening criteria for S-174, 4.85 ft, seems to be controlling the stage in the stage the reach of canal between S-331 and S-176. The opening criteria for both S-174 and S-176 may have to be adjusted if the canal is to be maintained closer to the 5.0 ft goal.

The average dry season stages (headwater and tailwater) at G-211 did not vary more than 0.2 or 0.3 ft. The average wet season headwater stages were above 6.0 ft for three of the four years. The wet season tailwater averages were less than 5.0 ft in three of the four years (Table 7, page 71). Tables 8 (page 72) shows the average monthly, dry season and wet season stage levels for S-331 headwater and tailwater. The four-year average headwater stage for the dry season was between 4.5 and 4.9 ft. The four-year average for the tailwater was between 4.3 and 4.9 ft. The four-year headwater and tailwater average stage for the wet season was between 4.6 and 5.2 ft.

The four-year average stage at Angels well for the dry season was between 5.1 and 6.1 ft. The lowest average dry season stage was 5.17 ft in Year Two. The other three years had average stages between 5.6 and 6.1 ft (Table 9, page 72). The wet season averages between 6.0 and 6.8 ft during the wet season.

The four-year average stage at S-176 for the dry season averaged between 4.1 and 4.6 ft (Table 10, page 73). In April of Year Three the average monthly stage of 5.61 ft exceeded the 5.0 ft level. The average stages for the wet season was between 4.7 and 4.9 ft with only one month exceeding the 5.0 ft level (October of Year Four). These are monthly values. Daily values do exceed the 5.0 ft level but generally it is associated with a rainfall event and there is a stage spike that goes considerably above 5.0 ft. Table 10 (page 73) compares average monthly, dry season and wet season stage levels for S-174 and S-176. The averages are almost identical. Table 11 (page 74) provides an average stage level for L-31N for each of the four years of Test 7. The table uses average headwater elevation for S-174 and S-176 (which for all practical) purposes are the same) and S-331 tailwater, dry season and wet season.

Figure 25. G-211 Headwater, Tailwater Year One Test 7

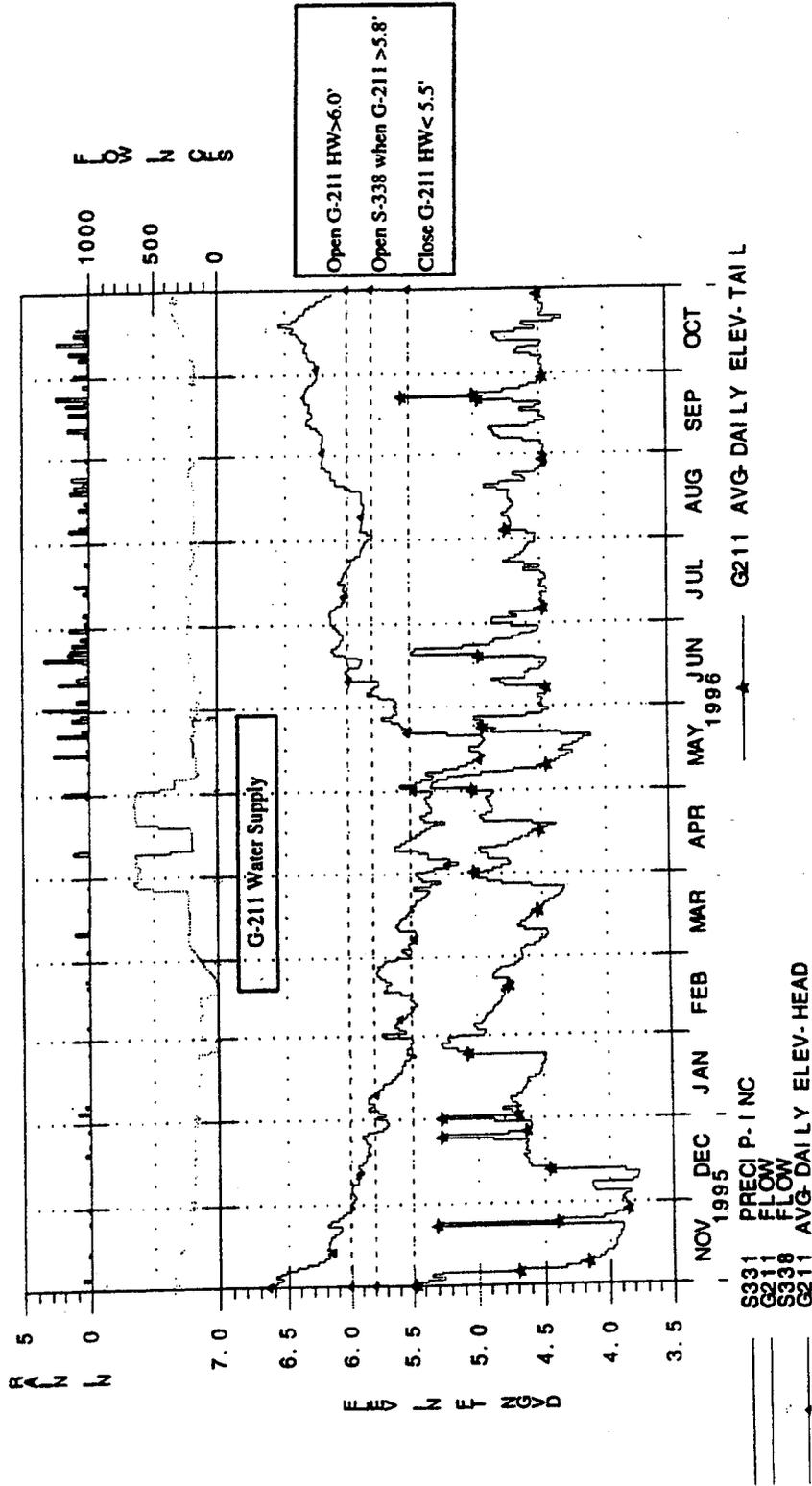


Figure 26. S-331 Pump Station, Headwater and Tailwater Elevations

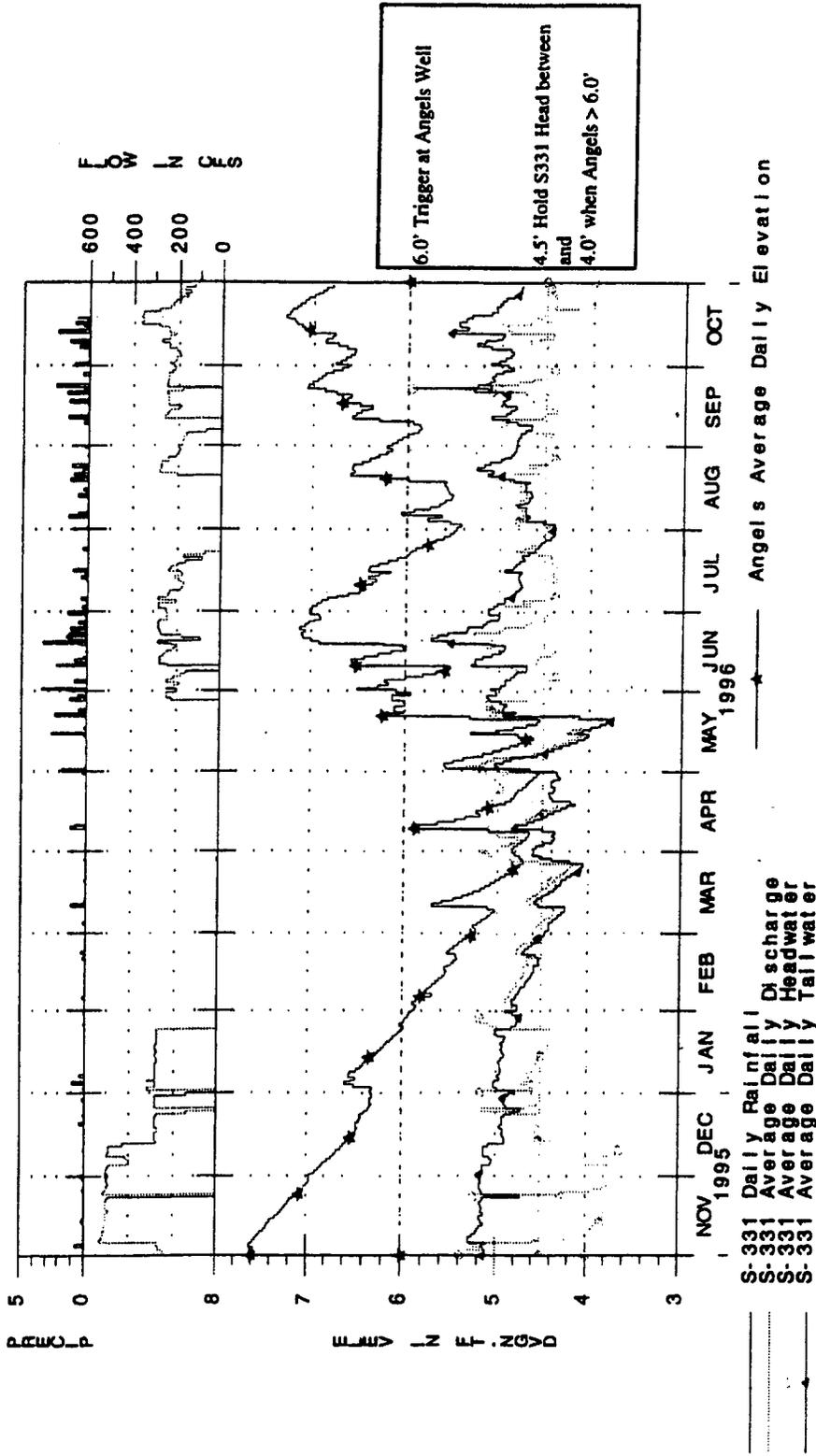


Figure 27. S-176 Average Daily Headwater and Tailwater Elevations, Year One Test 7

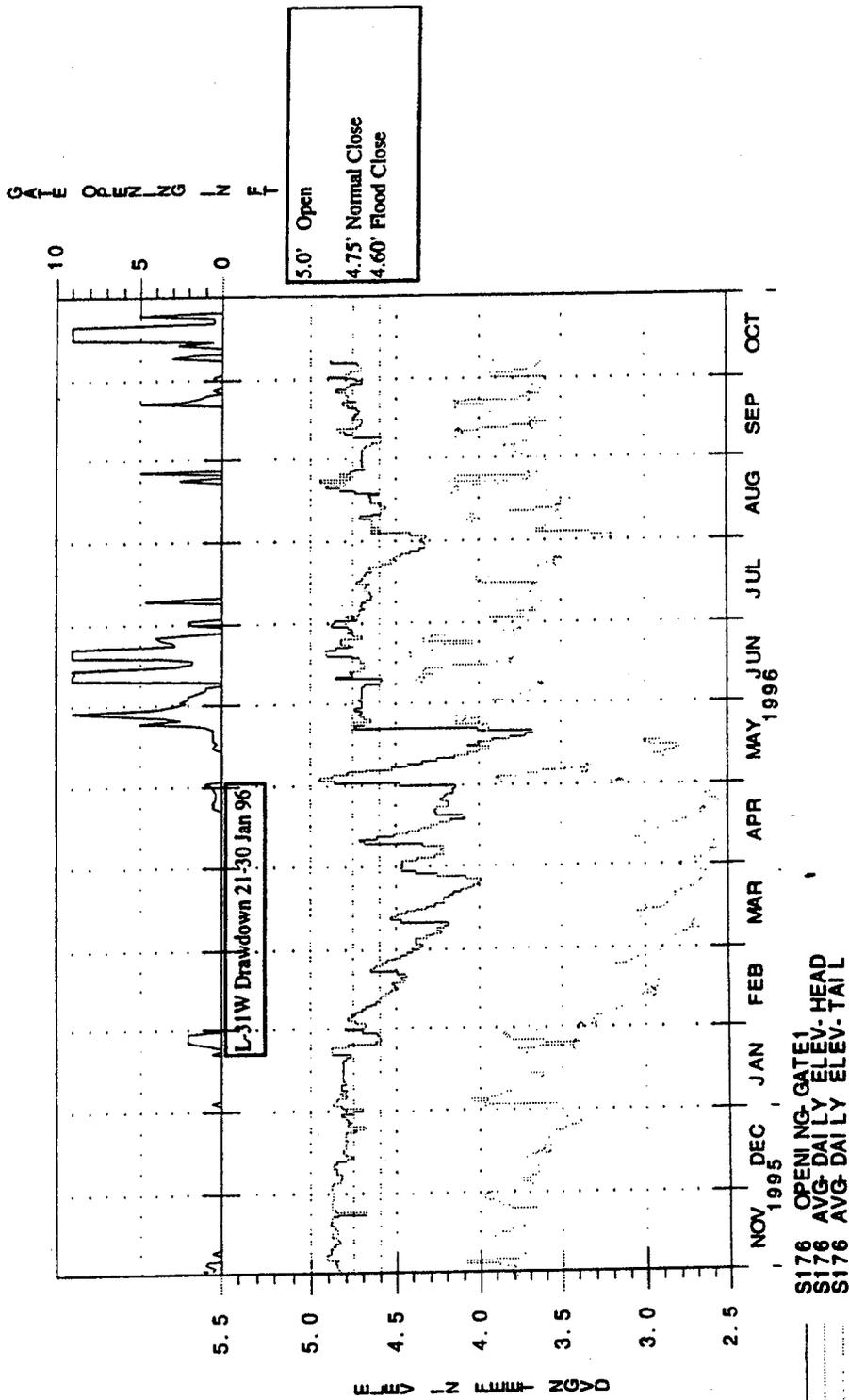


Figure 28. S-331 Pump Station, Headwater and Tailwater Elevations, Year One Test 7

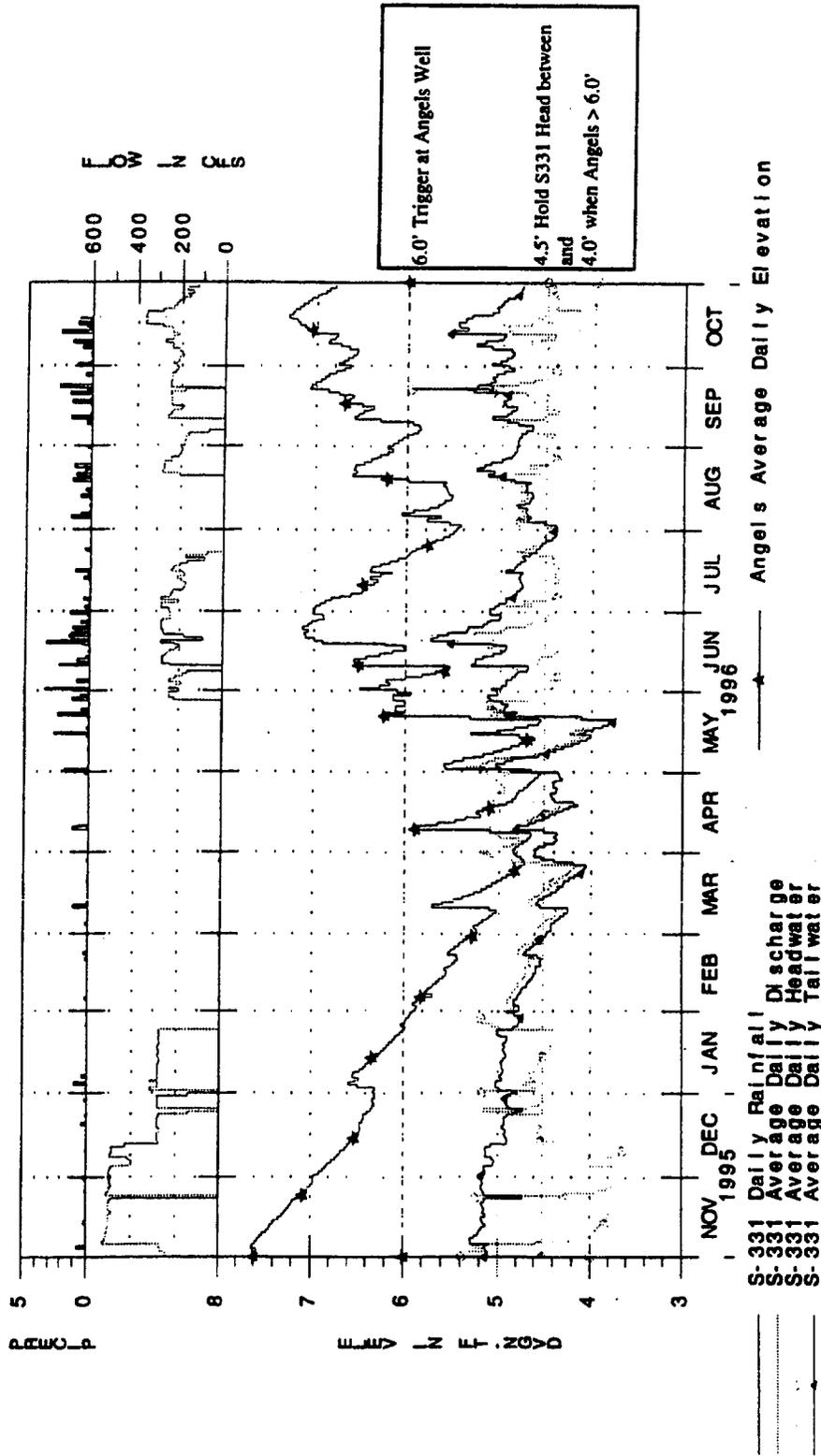


Figure 29. S-176 and S-174 Headwater Stage, Year One Test 7

L-31N

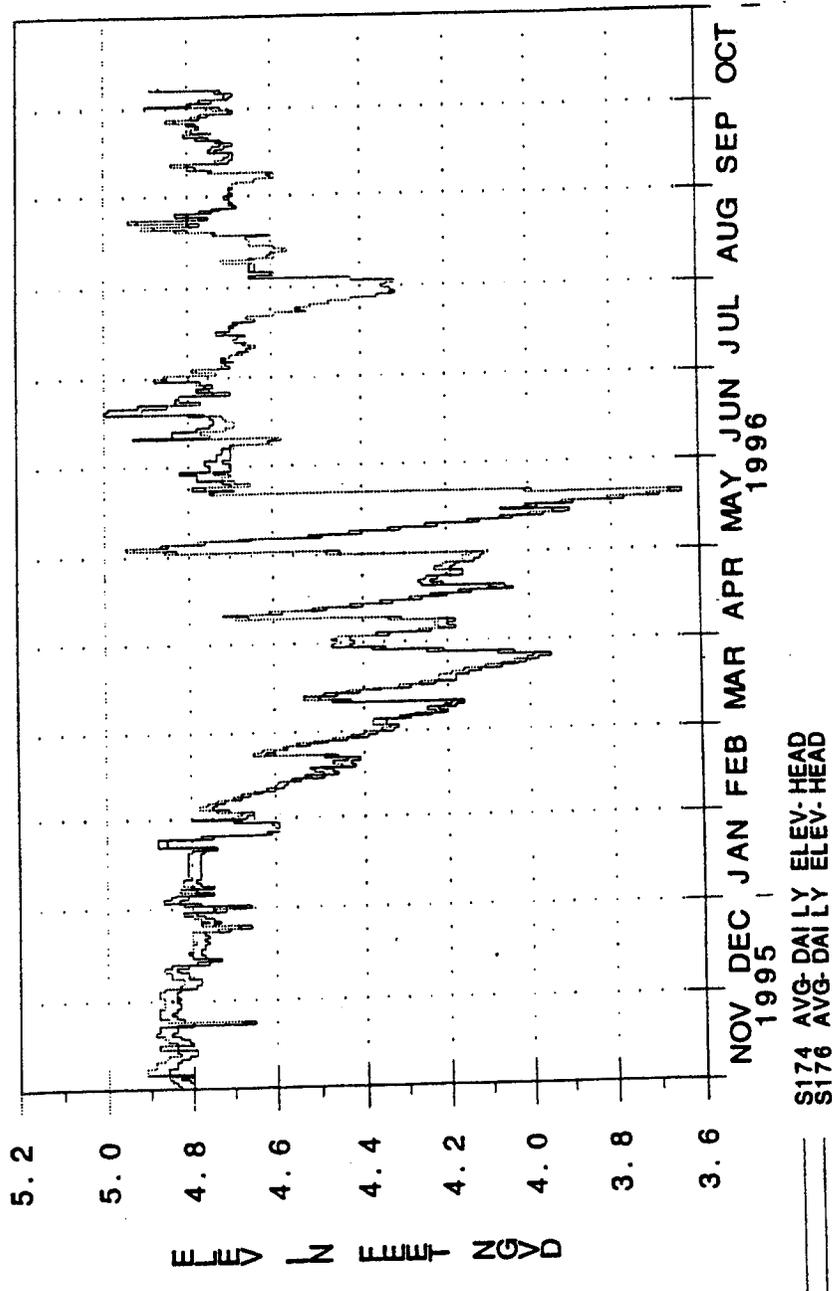


Figure 30. G-211 Headwater, Tailwater Year Two Test 7

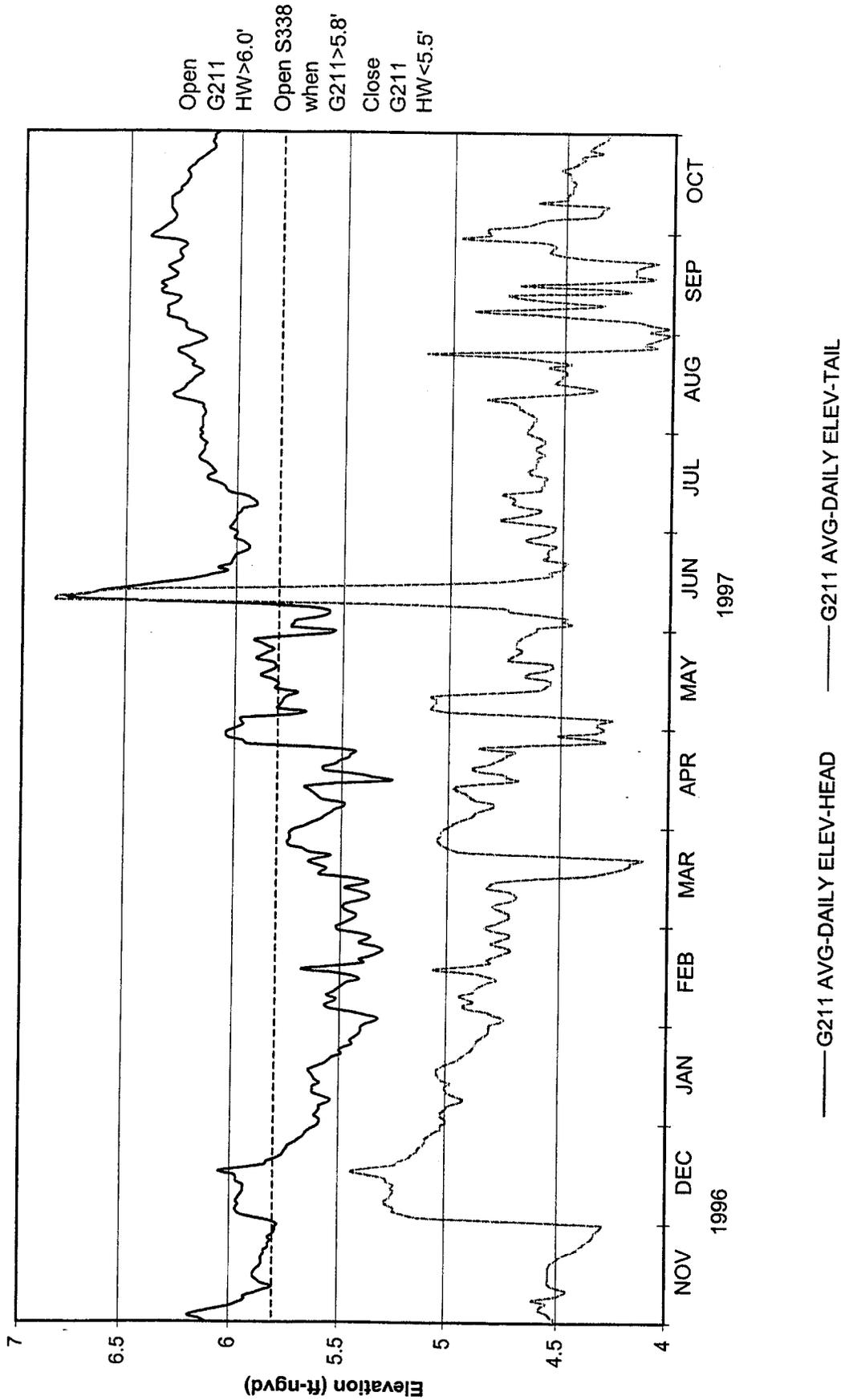


Figure 31. G-211/S-338 Flow Year Two Test 7

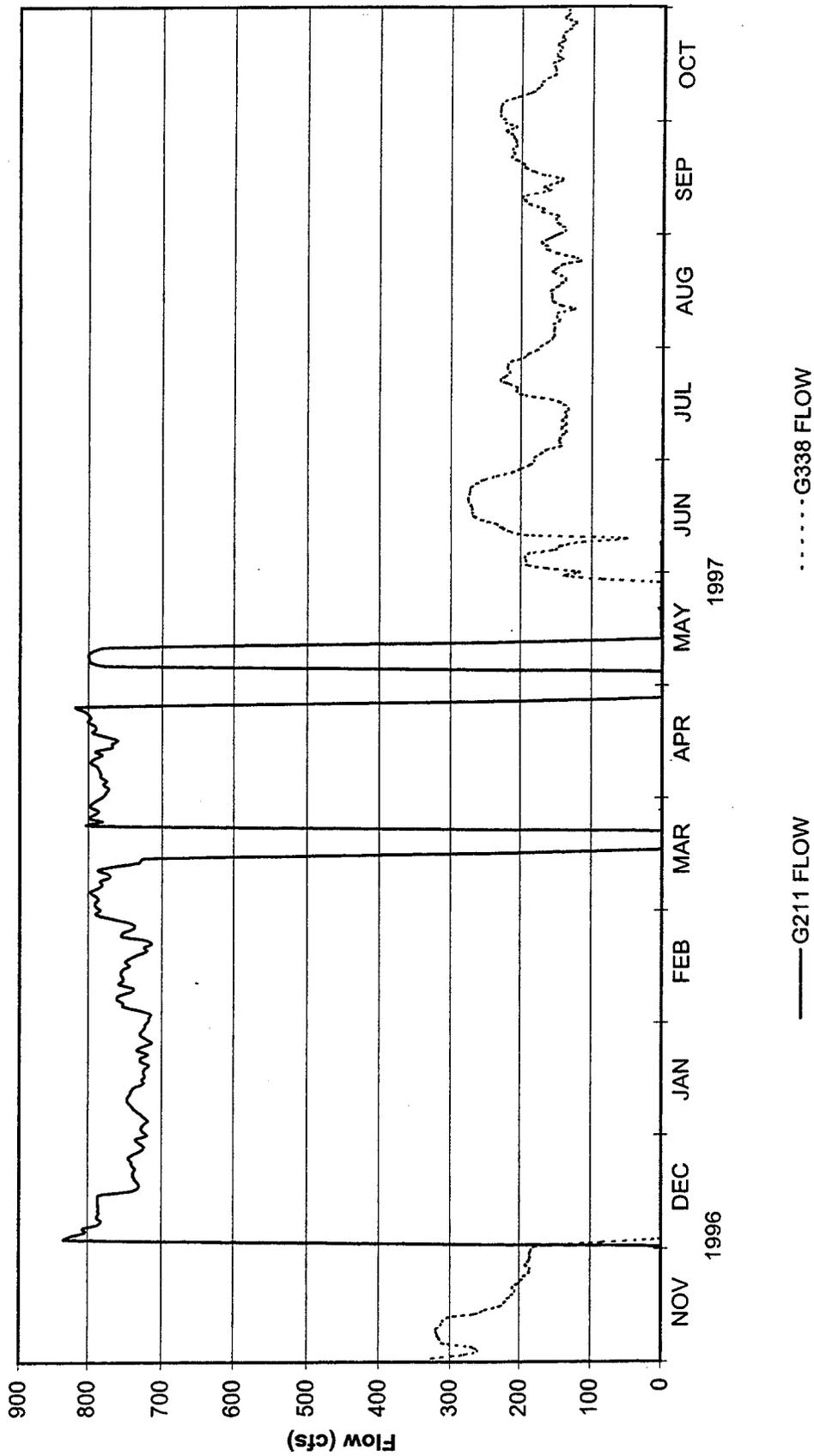


Figure 32. S-331 Pump Station, Headwater and Tailwater Elevations, Year Two Test 7

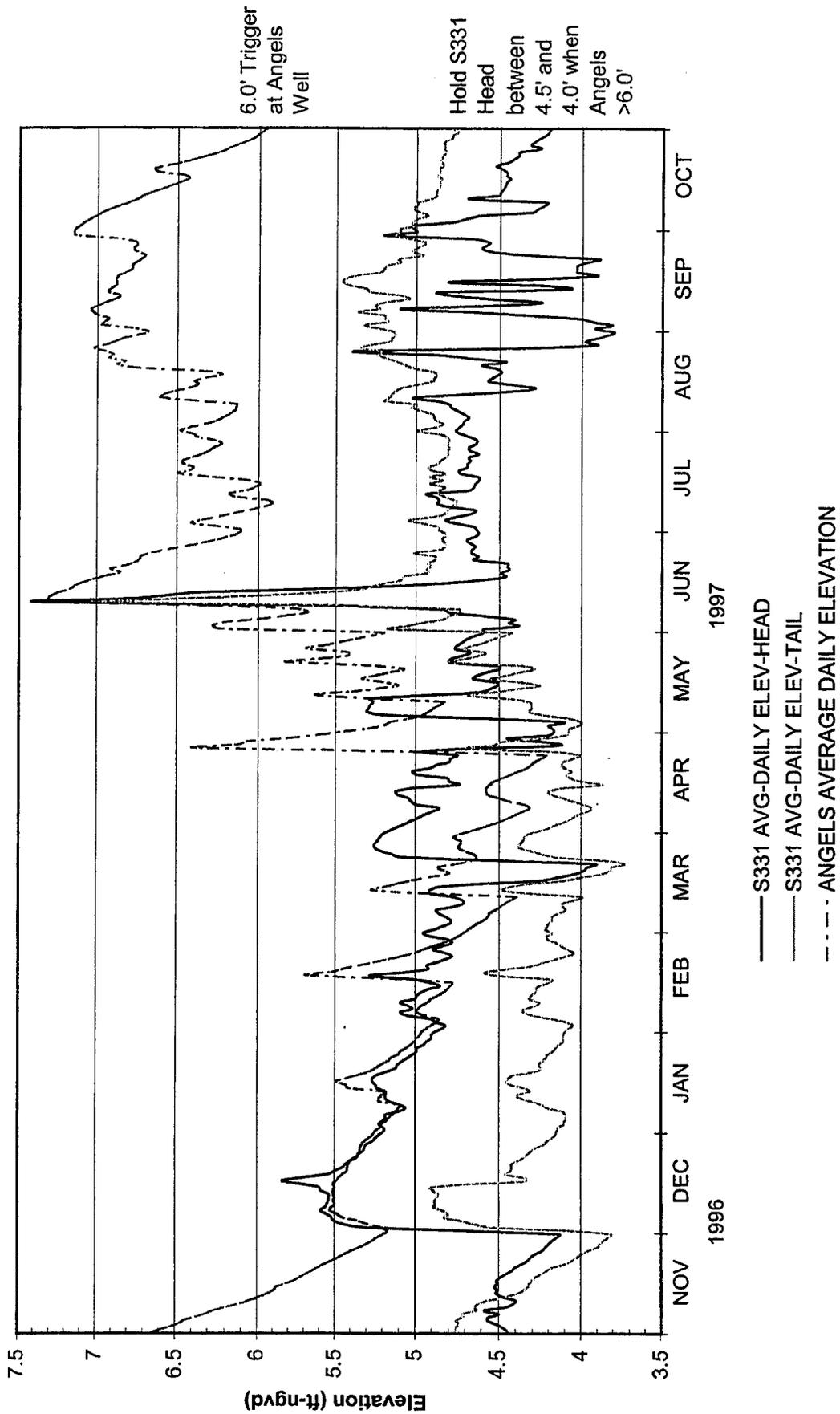


Table 33. S-176 Avenue Daily Headwater and Tailwater Level, Year Two Test 7

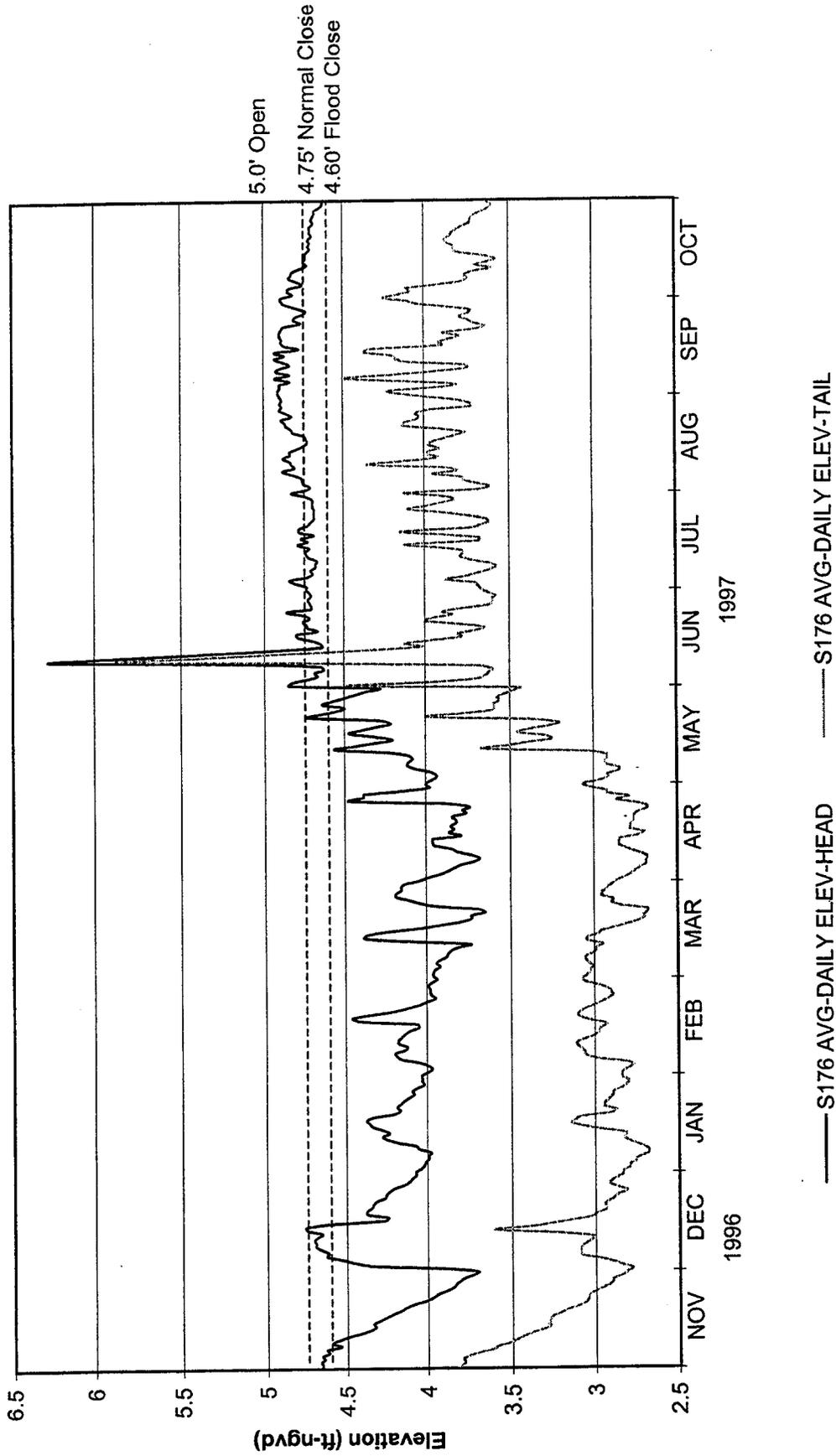


Figure 34. S-176 Flows, Year 2

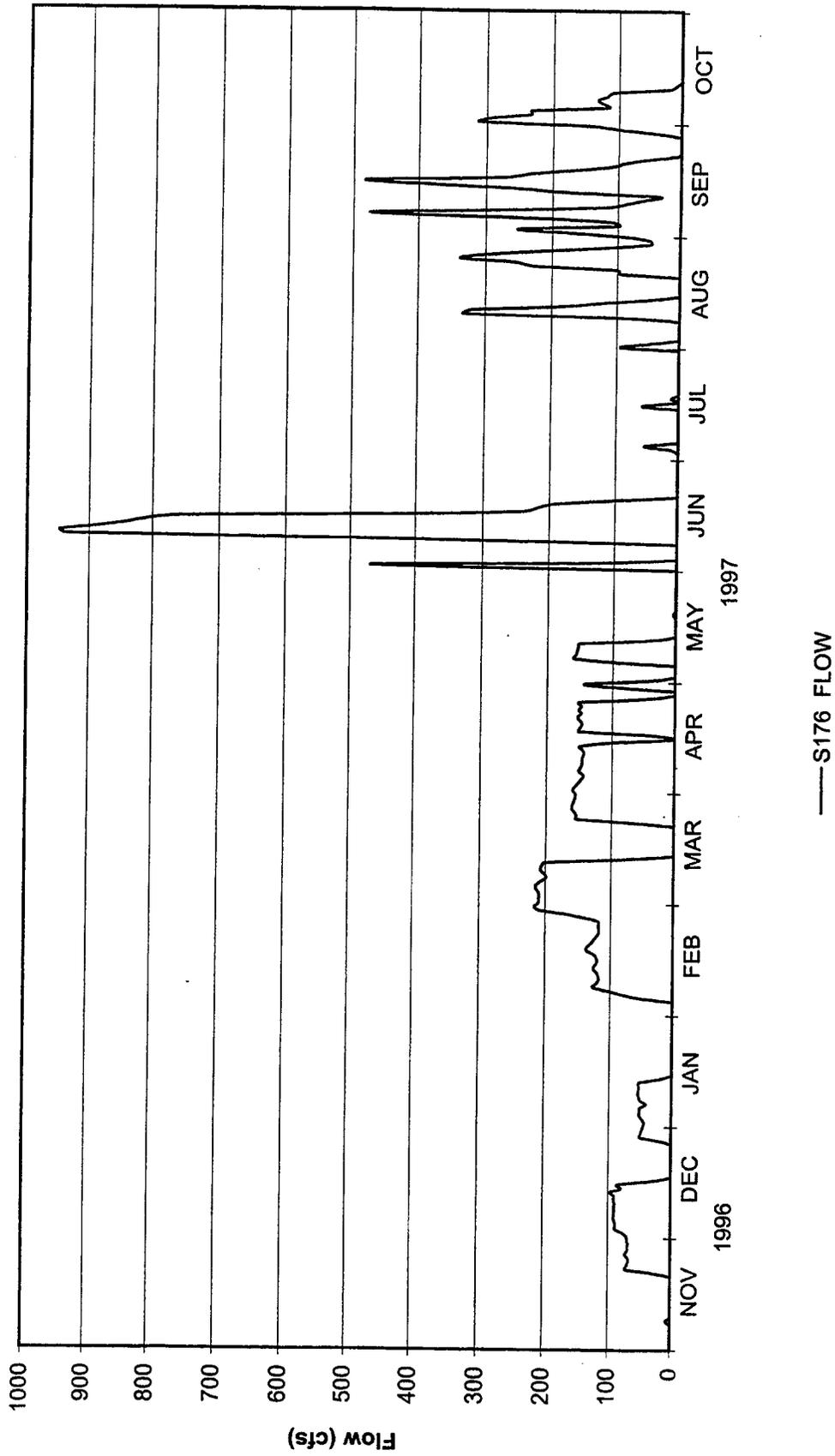


Figure 35. G-211 Headwater, Tailwater Year Three Test 7

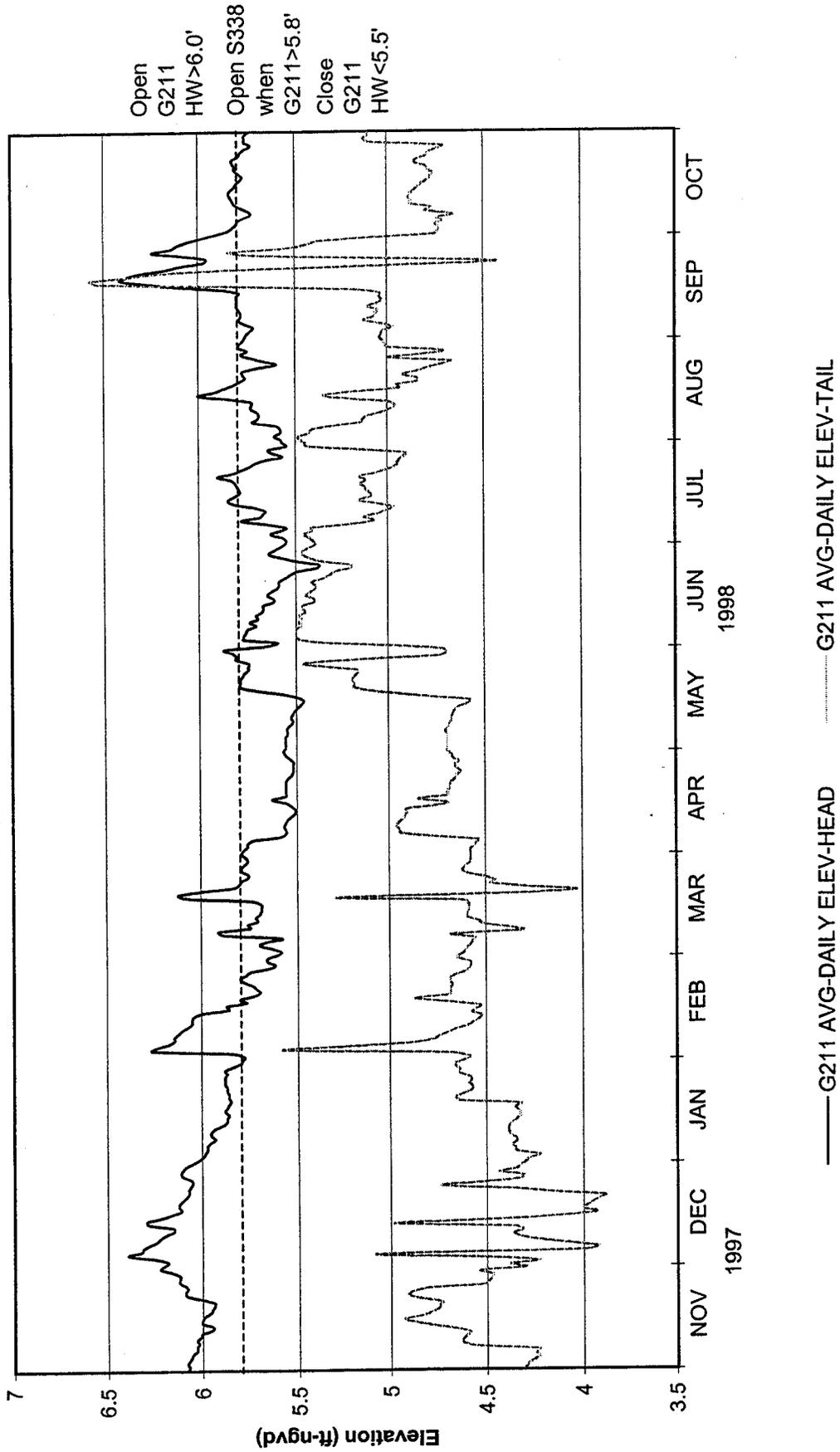


Figure 36. G-311/S-338 Flow Year Three Test 7

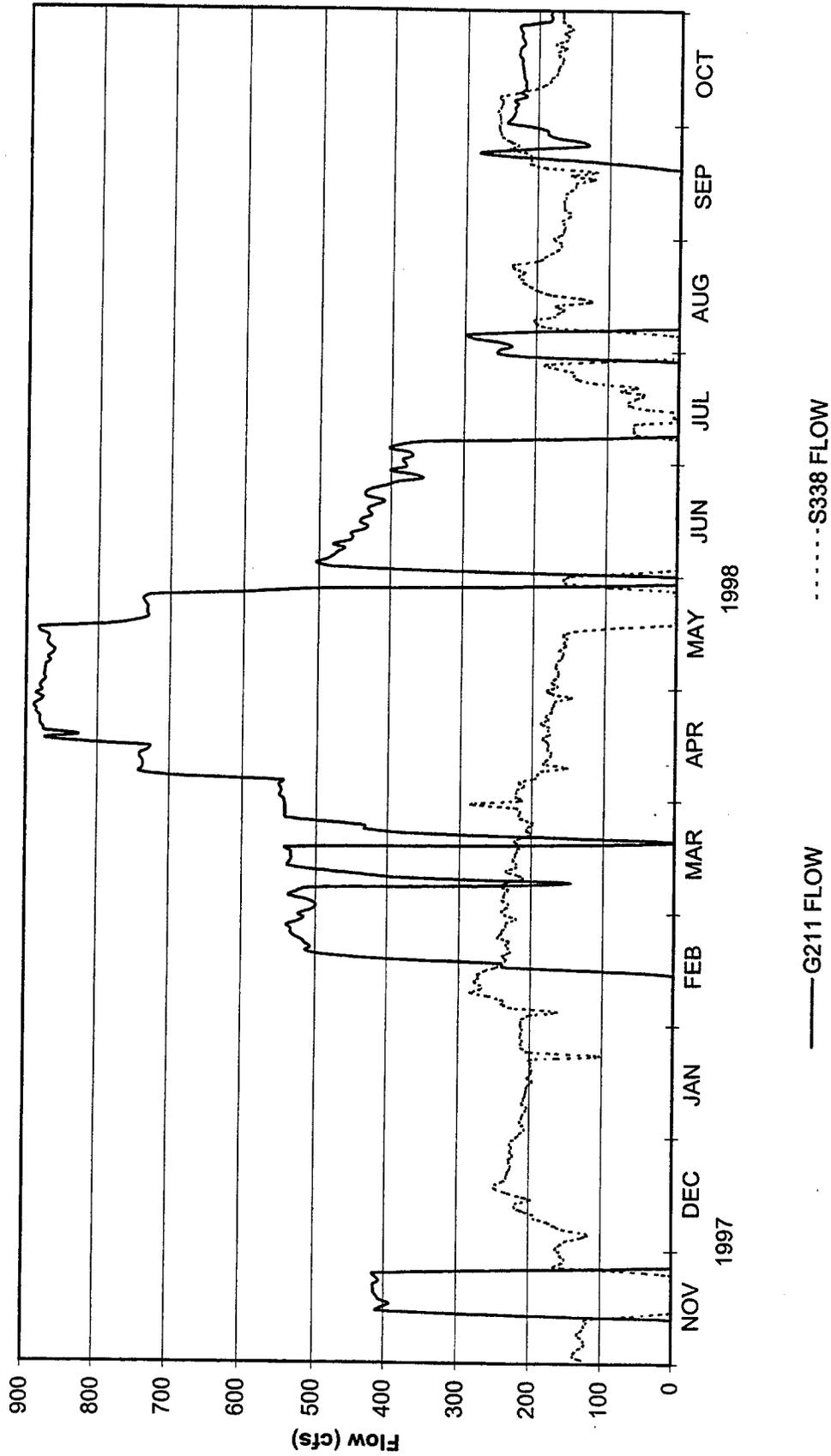


Figure 37. S-331 Pump Station, Headwater and Tailwater Elevations, Year Three Test 7

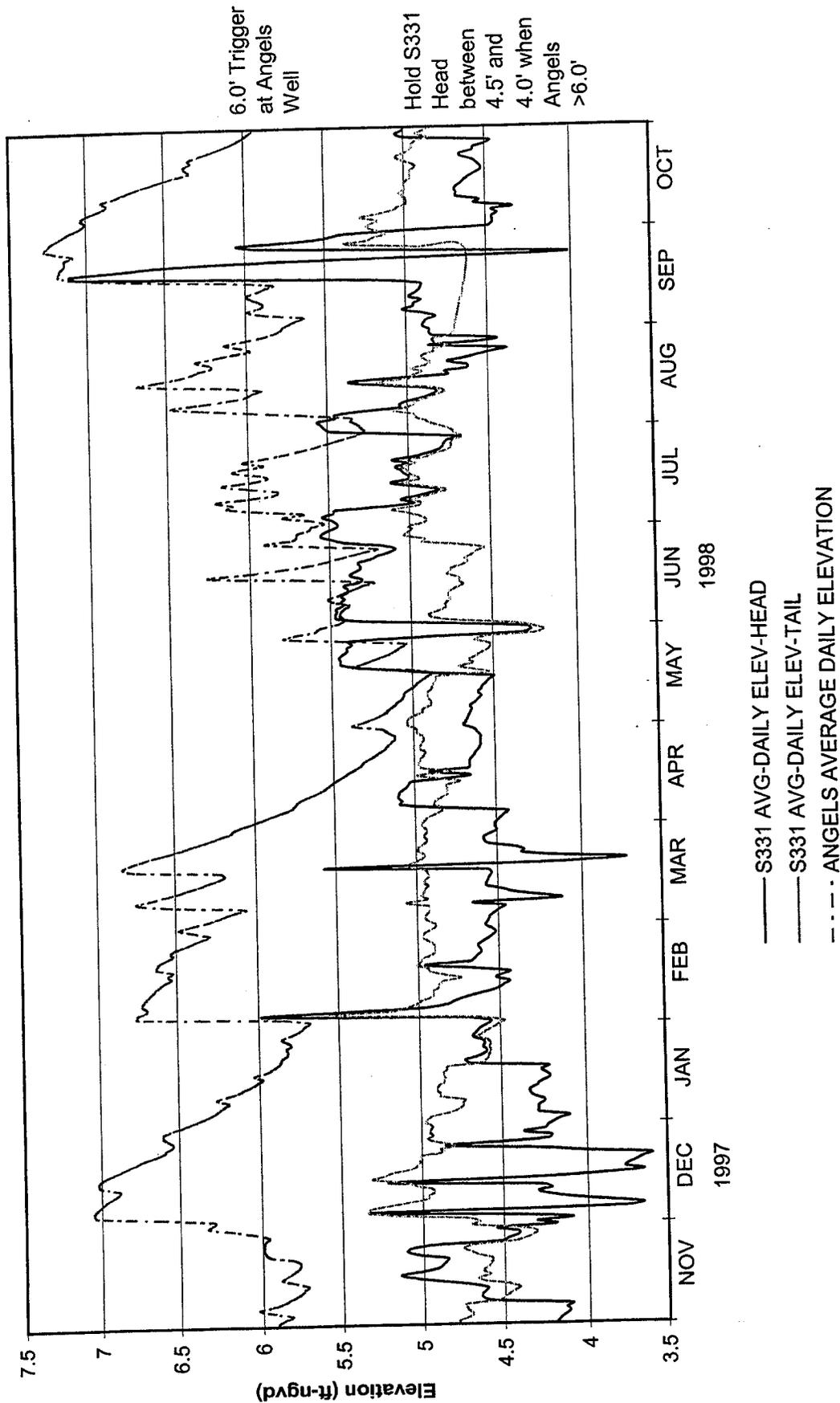


Figure 38. S-176 Daily Headwater and Tailwater Level, Year Three Test 7

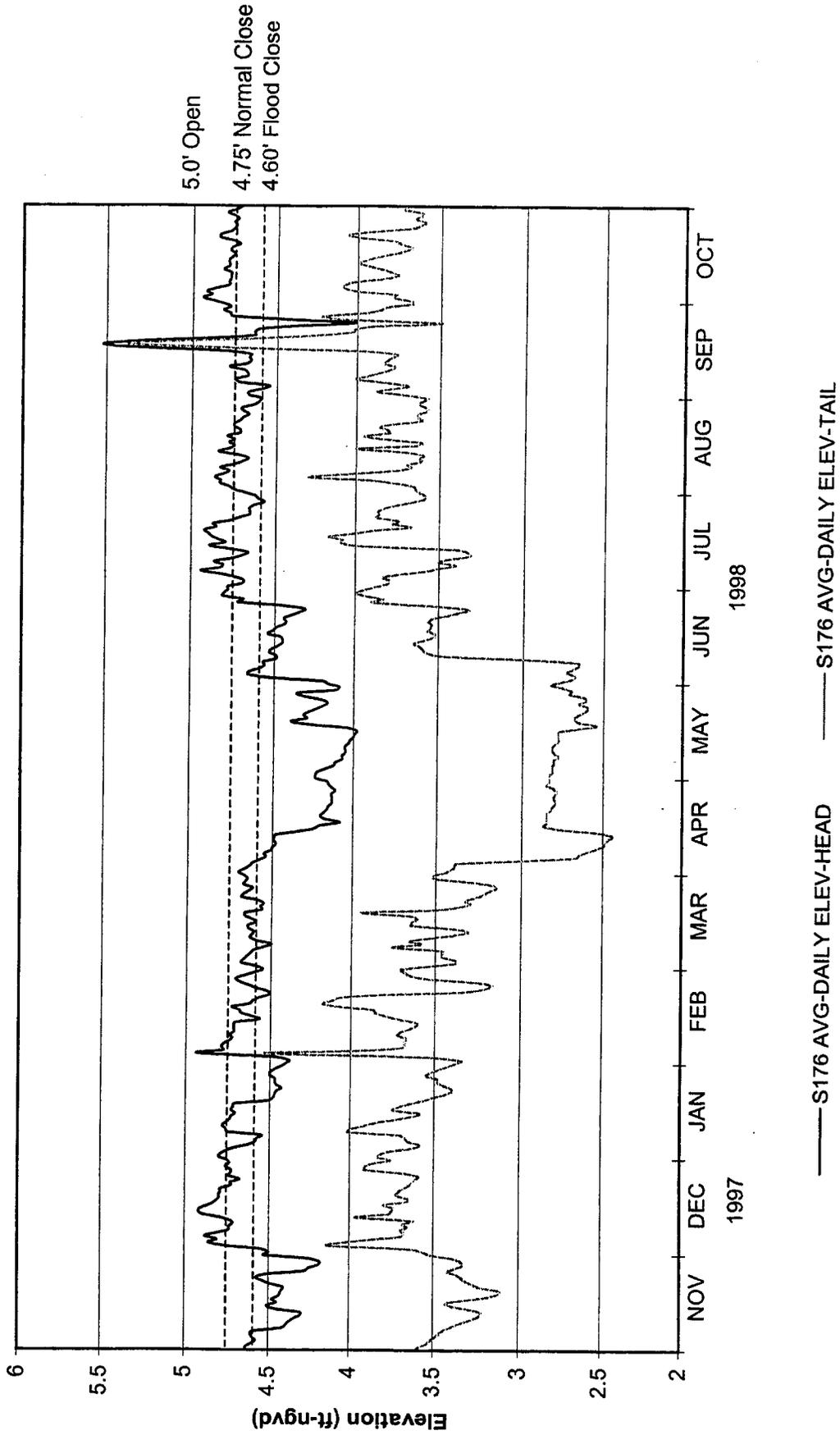


Figure 39. S-176 Flows Year Three Test 7

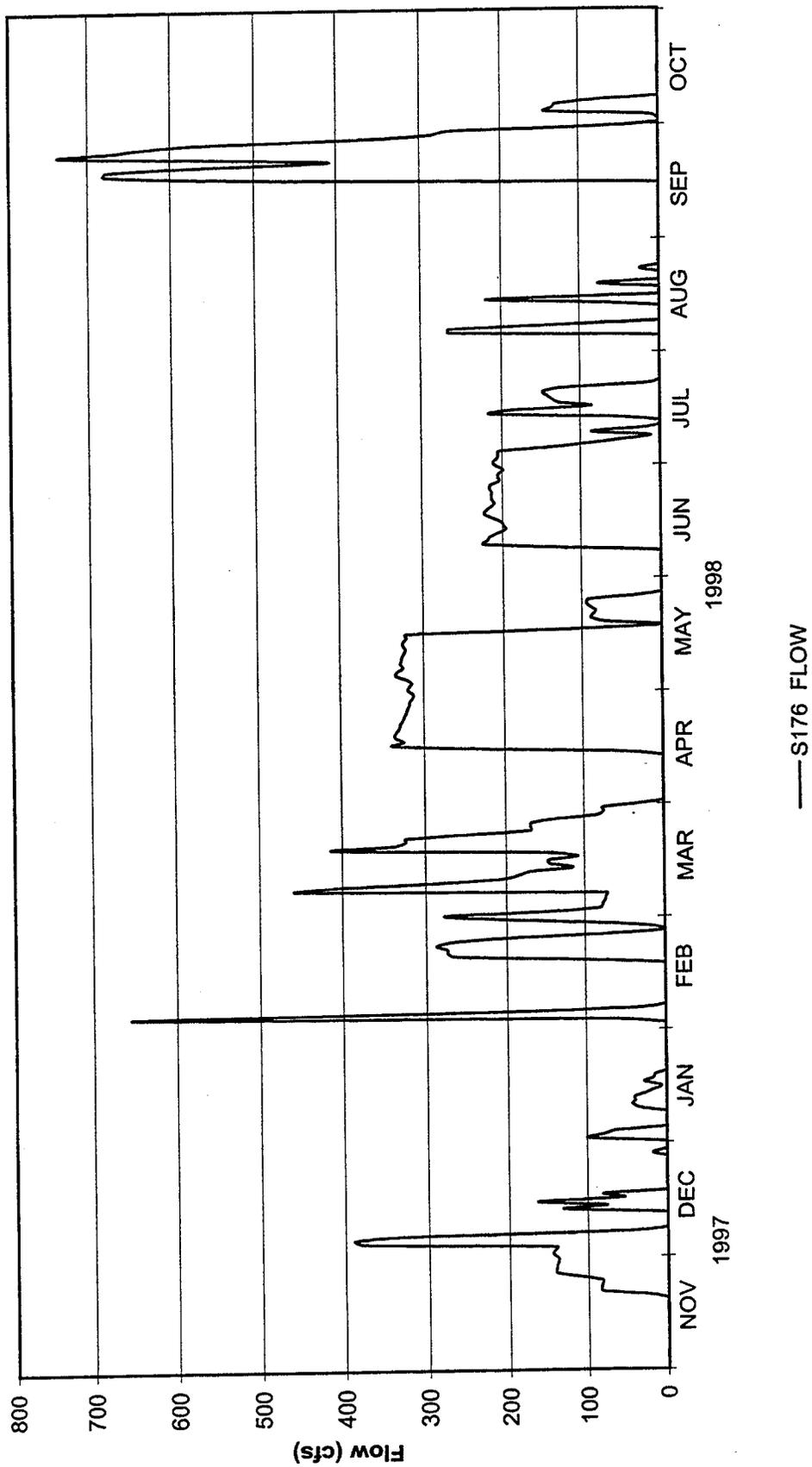


Figure 40. G-211 Headwater, Tailwater Year Four Test 7

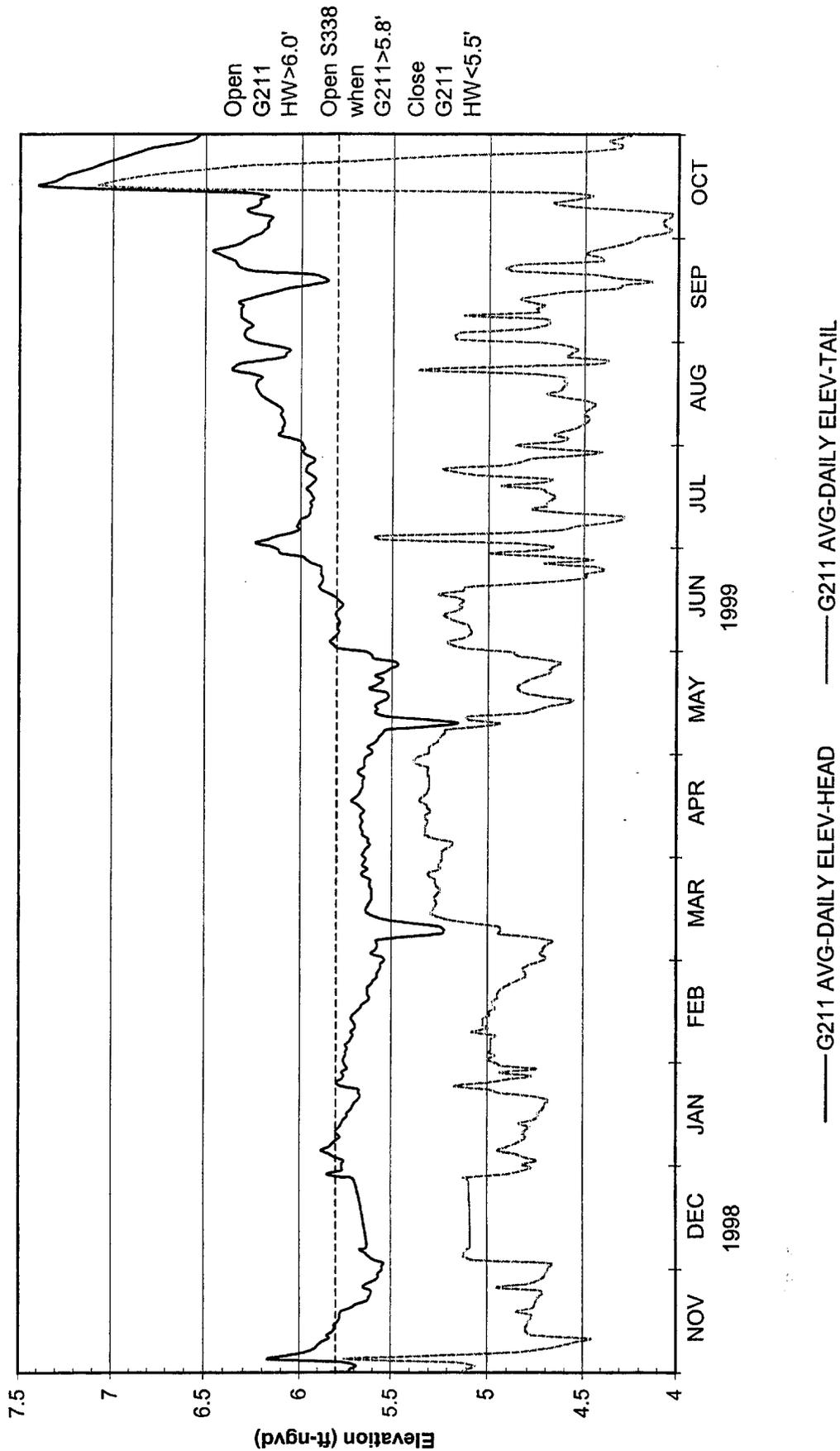


Figure 41. G-211/S-338 Flow Year Four Test 7

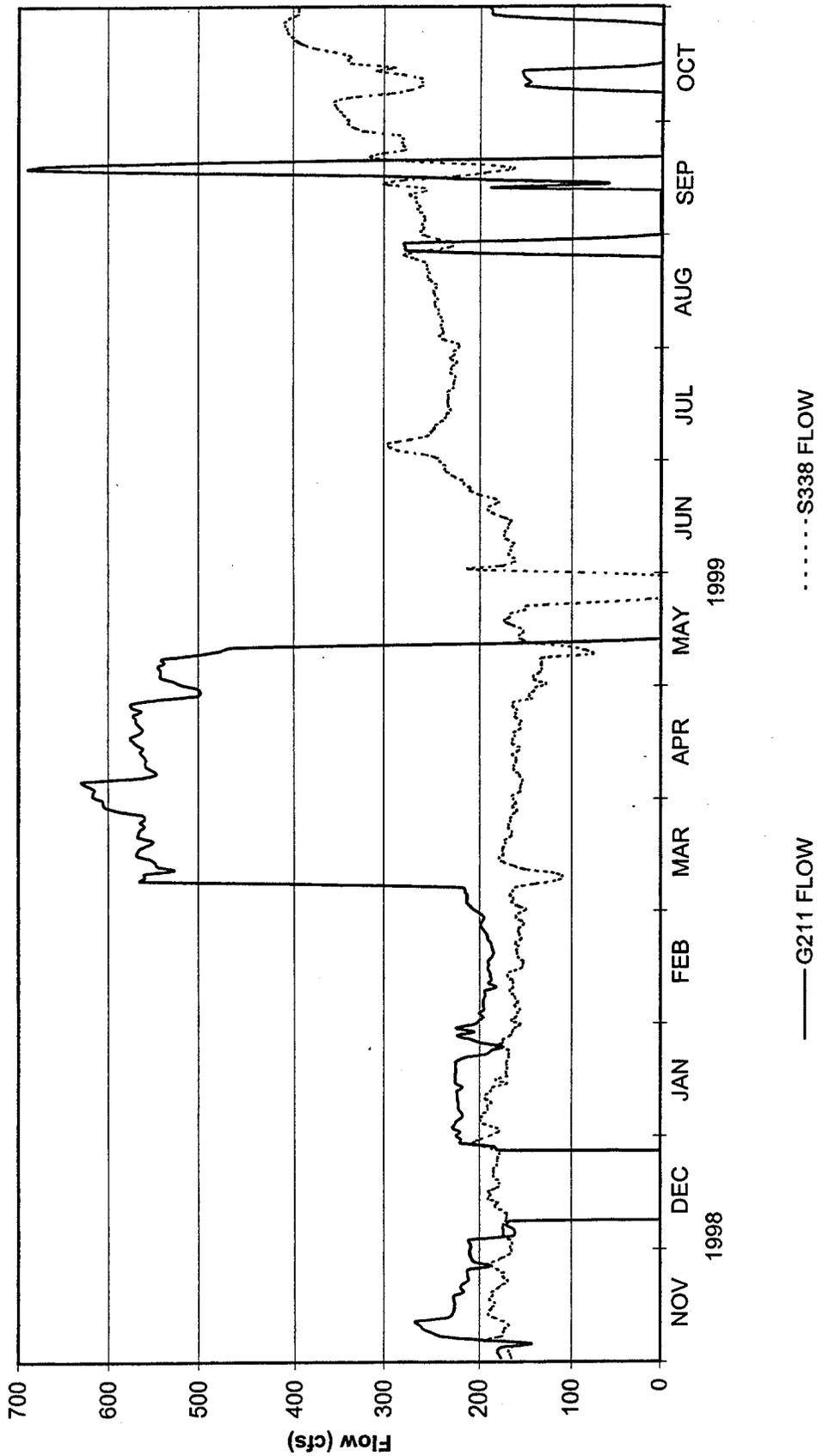


Figure 42. S-331 Pump Station, Headwater and Tailwater Elevations Year Four Test 7

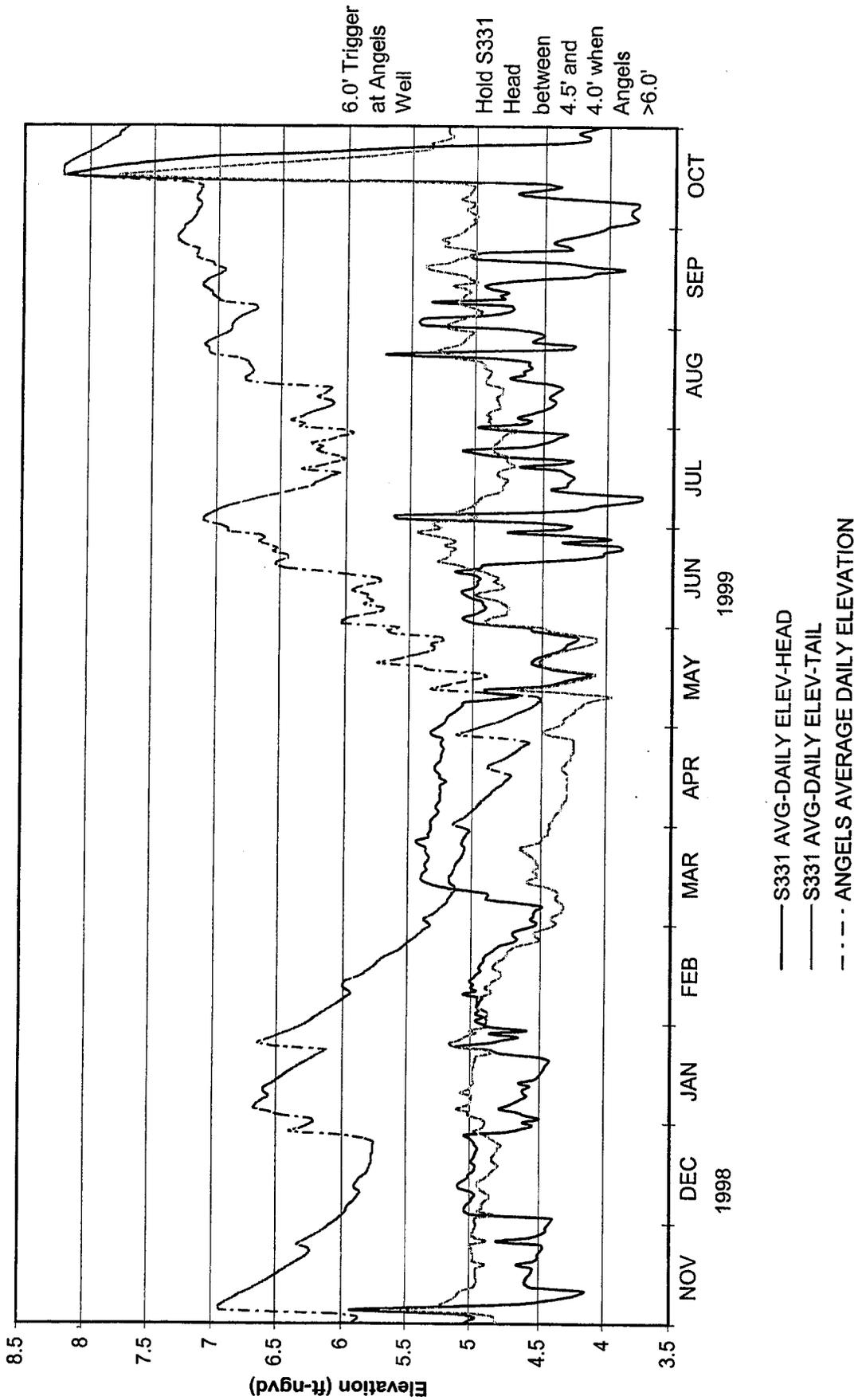


Figure 43. S-331 Flow Year Four Test 7

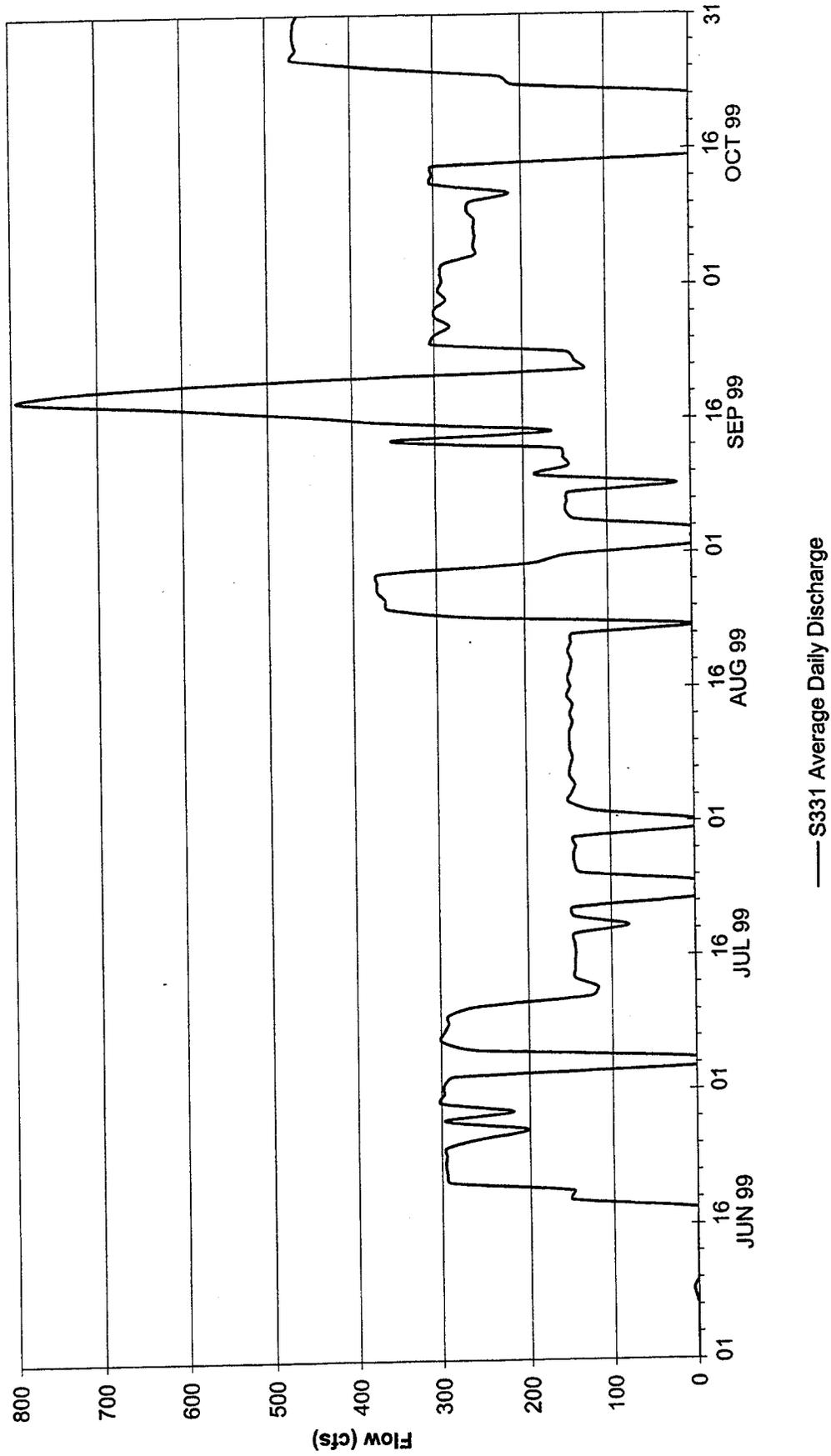


Figure 44. S-176 Average Daily Headwater and Tailwater Level, Year Four Test 7

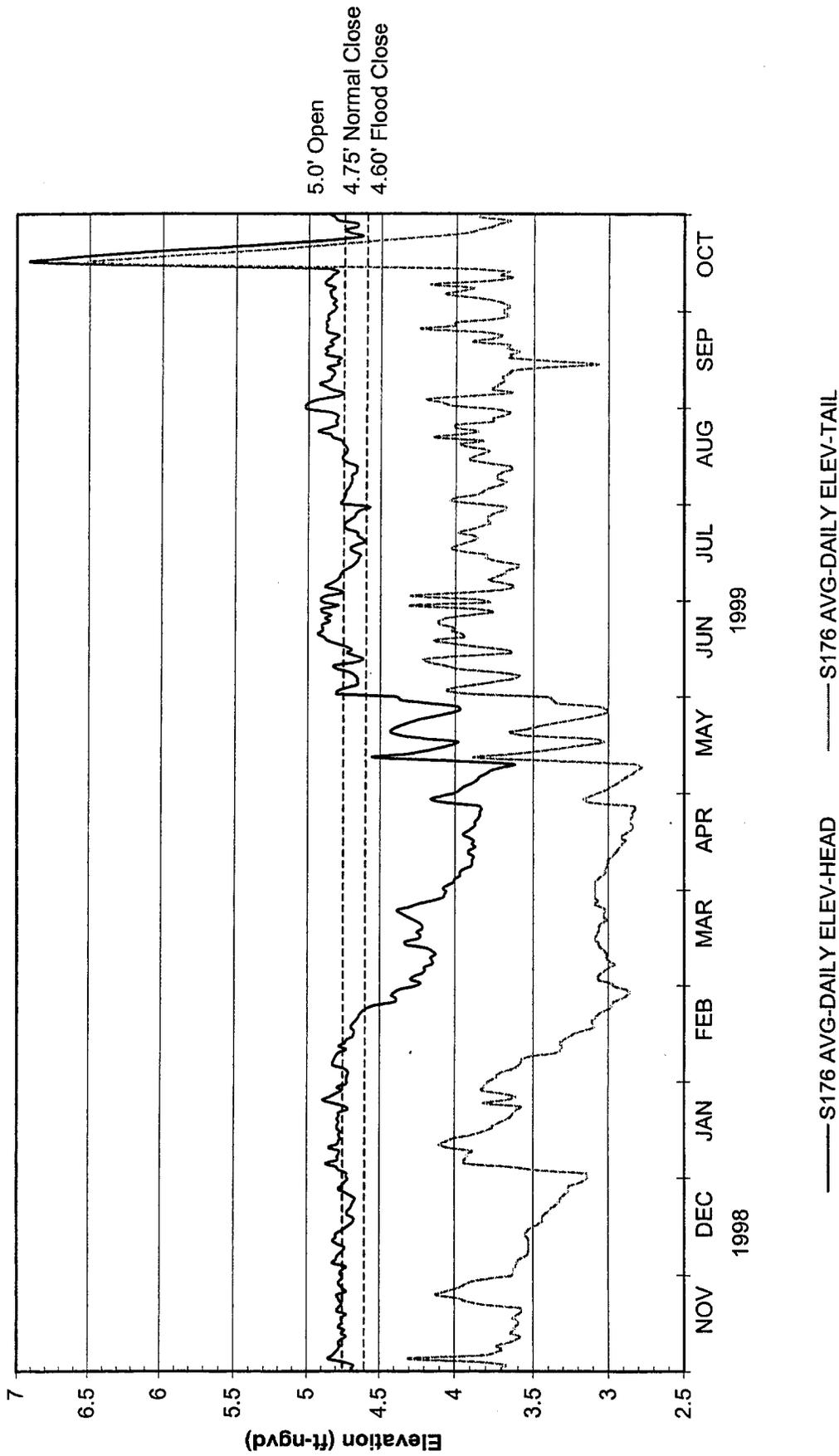


Table 6. S-176 Headwater

	November	December	January	February	March	April	May	Average	June	July	August	September	October	Average
S-176 HW														
Year One	4.85	4.82	4.8	4.6	4.3	4.35	4.3	4.57	4.75	4.62	4.70	4.75	4.8	4.72
Year Two	4.2	4.23	4.13	4.11	3.9	3.88	4.38	4.12	4.9	4.73	4.80	4.79	4.74	4.79
Year Three	4.35	4.77	4.56	4.67	5.61	4.30	4.20	4.50	4.55	4.77	4.75	4.72	4.79	4.72
Year Four	4.75	4.75	4.76	4.65	4.21	3.90	4.15	4.40	4.77	4.68	4.76	4.80	5.02	4.81

NOTE: Year One = 1996
 Year Two = 1997
 Year Three = 1998
 Year Four = 1999

Figure 45. S-176 Flows, Year Four Test 7

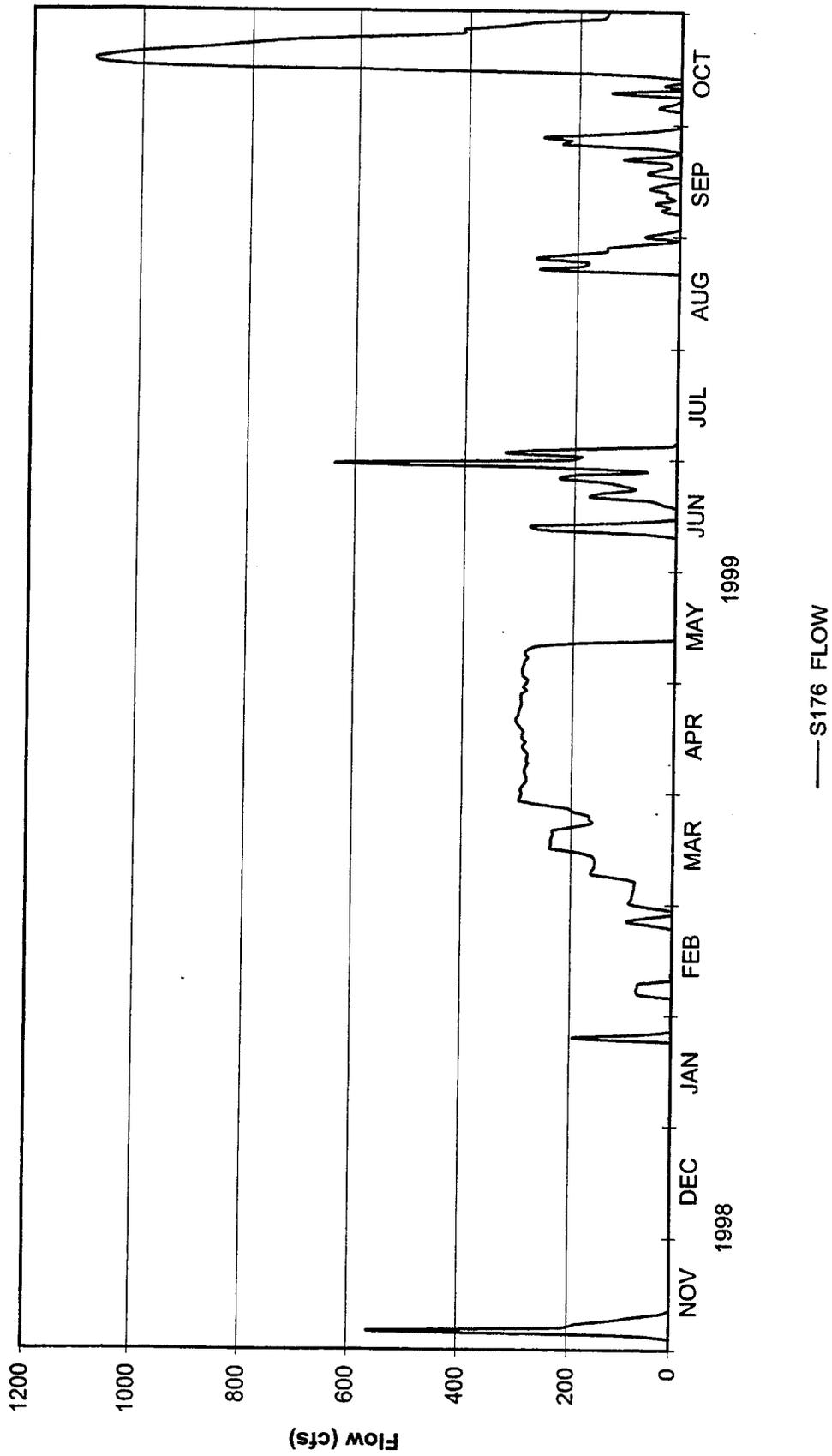


Table 7. G-211 Headwater and Tailwater

	November	December	January	February	March	April	May	Average	June	July	August	September	October	Average
S-211														
	HW													
Year One	6.25	5.9	5.7	5.63	5.5	5.4	5.3	5.67	5.95	6.0	6.0	6.3	6.32	6.11
Year Two	5.9	5.85	5.55	5.45	5.59	5.6	5.83	5.68	6.1	6.07	6.2	6.3	6.22	6.18
Year Three	6.04	6.2	5.94	5.95	5.78	5.60	5.65	5.88	5.65	5.74	5.75	5.95	5.8	5.78
Year Four	5.78	5.66	5.75	5.77	5.57	5.65	5.53	5.67	5.87	6.02	6.17	6.25	6.75	6.21
G-211														
	TW													
Year One	4.35	4.45	4.75	4.85	4.55	4.75	4.65	4.62	4.70	4.55	4.65	4.60	4.55	4.61
Year Two	4.45	5.20	4.45	4.80	4.7	4.75	4.7	4.72	5.0	4.7	4.60	4.40	4.45	4.63
Year Three	4.65	4.30	4.48	4.75	4.55	4.75	4.85	4.62	5.4	5.15	5.05	5.30	4.80	5.14
Year Four	4.85	5.0	4.85	4.90	5.07	5.30	4.90	4.98	4.9	4.75	4.60	4.65	5.25	4.83

NOTE: Year One = 1996
 Year Two = 1997
 Year Three = 1998
 Year Four = 1999

Table 8. S-331 Headwater and Tailwater

	November	December	January	February	March	April	May	Average	June	July	August	September	October	Average
S-331	HW (operate so that average 24 hour period is 4.0 to 4.5 feet)													
Year One	4.07	4.25	4.7	4.8	4.55	4.85	4.5	4.53	5.1	4.38	5.1	5.3	6.1	5.20
Year Two	4.4	5.4	5.1	4.95	4.81	4.85	4.75	4.89	4.93	4.72	4.60	4.40	4.45	4.62
Year Three	4.7	4.2	4.4	4.73	4.5	4.7	4.80	4.58	5.35	5.10	4.00	5.21	4.60	5.05
Year Four	4.55	4.9	4.7	4.9	5.06	5.25	4.65	4.86	4.78	4.55	4.52	4.60	4.90	4.67
S-331	TW													
Year One	5.20	5.0	4.95	4.70	4.40	4.43	4.50	4.72	5.1	4.75	4.8	5.0	5.1	4.94
Year Two	4.31	4.60	4.21	4.22	4.20	4.12	4.42	4.30	5.26	4.85	5.05	5.18	4.88	5.04
Year Three	4.6	5.1	4.75	5.2	4.9	4.88	4.70	4.88	4.75	4.90	4.90	4.80	5.0	4.87
Year Four	5.0	4.85	5.0	4.75	4.5	4.35	4.30	4.68	5.0	4.85	5.0	5.1	5.52	5.09

NOTE: Year One = 1996
 Year Two = 1997
 Year Three = 1998
 Year Four = 1999

Table 9. Angel Well Monthly Average and Seasonal Average Stage Level

Angels Well	November	December	January	February	March	April	May	Average	January	July	August	September	October	Average
Year One	7.3	6.55	6.2	5.62	5.1	5.0	5.5	5.90	6.6	6.3	6.0	6.5	6.97	6.47
Year Two	5.88	5.40	5.18	5.01	4.73	4.69	5.28	5.17	6.57	6.23	6.54	6.88	6.55	6.55
Year Three	5.89	6.76	6.02	6.52	6.42	5.52	5.18	6.04	5.54	5.8	6.04	6.51	6.54	6.09
Year Four	6.42	5.92	6.44	5.83	5.16	4.87	5.09	5.68	6.14	6.43	6.61	7.04	7.61	6.77

NOTE: Year One = 1996
 Year Two = 1997
 Year Three = 1998
 Year Four = 1999

Table 10. Comparison of S-174 and S-176 HW Stages

	November	December	January	February	March	April	May	Average	June	July	August	September	October	Average
S-174														
Year One	4.82	4.79	4.78	4.58	4.47	4.35	4.30	4.59	4.75	4.62	4.70	4.75	4.76	4.72
Year Two	4.20	4.35	4.10	4.12	3.98	3.90	4.35	4.12	4.90	4.75	4.83	4.85	4.75	4.79
Year Three	4.49	4.77	4.60	4.67	4.63	4.30	4.20	4.50	4.55	4.80	4.75	4.80	4.78	4.72
Year Four	4.75	4.75	4.75	4.65	4.25	3.98	4.15	4.40	4.80	4.75	4.77	4.85	5.12	4.81
S-176														
Year One	4.85	4.82	4.80	4.60	4.30	4.35	4.30	4.57	4.75	4.62	4.70	4.75	4.80	4.72
Year Two	4.20	4.23	4.13	4.11	3.90	3.88	4.38	4.12	4.90	4.73	4.80	4.79	4.74	4.79
Year Three	4.35	4.77	4.56	4.67	4.61	4.30	4.20	4.49	4.55	4.77	4.75	4.72	4.79	4.72
Year Four	4.75	4.75	4.76	4.65	4.21	3.90	4.15	4.45	4.77	4.68	4.76	4.80	5.02	4.81

NOTE: Year One = 1996
 Year Two = 1997
 Year Three = 1998
 Year Four = 1999