Notes about Operation Record

Hansen Dam, Los Angeles County, California

US Army Corps of Engineers

General Notes

Location	Hansen Dam is located near the northern edge of San Fernando Valley on Tujunga Wash. Hansen Dam is one of the key flood control components in the Los Angeles County Drainage Area (LACDA). The dam is 97' high and controls a drainage area of about 152 square miles.	
Outlet Facilities	The dam is equipped with eight gated outlets, each outlet is 5'(w) x 8'(h). The invert of the gated outlets is 990' NGVD. The dam has two ungated outlets that are 8'(w) x 6'(h). The invert of the ungated outlets is 1011'NGVD. Maximum capacity at spillway crest is 22,000 cfs.	
Monitoring of Reservoir Water Levels	The dam is equipped with staff boards that the dam tender uses to determine the water level by visual inspection. When the dam was built in 1941 it was equipped with a float well system and a graphic recorder to track the reservoir pool. This system was used up until the late 1970's or early 1980's. Fires in the watershed and wet winters brought in significant amounts of debris to the dam and buried the float well intake. The float well system was then replace with a bubbler system using a balanced beam manometer. The manometer was replaced with a pressure transducer in August, 1999. Because of the debris problem at the dam the bubbler orifice line terminates at a point about 4 feet above the invert of the outlet. This helps to prevent the line from getting clogged with sand/debris and ensures the instrumentation will operate properly during larger events, but it does mean there is no automatic tracking of the first 4 feet of the reservoir pool. These lower water levels can only be tracked by visual inspection. For the official operation records these lower water levels are commonly estimated using the d/s flow data.	
D/S Stream gaging	About .5 miles d/s of the dam the USGS operates a stream gage called Big Tujunga Ck blw Hansen Dam. The USGS ID number is 11097000. During large releases from the dam the flow measured at this gage represents the total outflow from the dam. But during low/moderate flow periods the Los Angeles County Department of Public Works (LACDPW) commonly diverts water from Tujunga Wash about .2 mi upstream of the USGS gage. The LACDPW operates a stream gage to monitor diverted flows. Its ID is 12BSG. Data from the USGS gage and from the LACDPW diversion records are used to help determine the reservoir outflow. SInce the late 1980's 15-minute instantaneous data has been readily available for the USGS downstream gage and since WY96 5-minute data has been available for the LACDPW diversion gage. For prior years, only daily information is readily available.	
General Data Issues & Assumptions	No. 1	We have a detailed record of water level at the dam when the water level is greater than 4 feet deep (elev. 994) but debris and sediment issues have thwarted past efforts to monitor lower water levels so now our instrumentation only senses water once it hits 994. The dam tender can take staff readings down to the invert, but generally he only takes staff readings 4 days a week during the winter and once per week during the non-flood season. Therefore reasonable estimates of the low flow records are only possible using d/s flow/diversion records. During flood events the dam tender records the water level at frequent intervals and the instrument readings usually give us a detailed record of the reservoir water level. However, a detailed record of reservoir water level and gate settings does not guarantee an accurate outflow record at Hansen because debris frequently reduces the outlet capacity. So often, especially during a recession, we need to use the d/s flow data to verify or correct our outflow estimates during flood releases. Debris can drop the outlet capacity by 50% or more.
	No. 2	Since 1995 we have been able to take advantage of detailed flow records from the USGS and LACDPW to produce an hourly average outflow record for Hansen Dam. However, it is apparent that the two flow data sources are not always in full agreement as to the amount of water in Tujunga Wash. Engineering judgment was often used to resolved these differences. Since the outflow record is commonly the result of combining 2 or 3 data sources it is difficult to judge the accuracy of the final flow estimates.
	No. 3	Reservoir storage is estimated using data from periodic surveys. However, between surveys many things can happen that can reduce the accuracy of the storage estimate. The two primary factors are sediment inflows during storm events and excavation by sand and gravel operators. Sediment inflow to Hansen Dam is a very active and constant process and during flood events the sediment inflow can be dramatic, especially following brush fires in the upstream areas. To remove excess material and restore lost storage capacity, sand and gravel operators are periodically allowed to remove material from the basin. The reservoir surveys are snapshots of storage capacity but the actual capacity of the reservoir constantly rises and falls in response to natural processes, gravel mining, and maintenance activities.
	No. 4	As a follow up issue to No. 3 it needs to be pointed out that estimated inflow to Hansen Dam is a computed value based on the estimated outflow and the change in storage at the dam. There is no way to directly measure the inflow. The accuracy of the inflow estimate is very dependant on the accuracy of the reservoir storage, which can vary quite a bit. Water can also be trapped in pits left by the gravel miner. Some of these pits are very large and water can not bypass these pits until they are full. Therefore inflow estimates should be used with some caution, especially when used to estimate the volume of water entering the reservoir. The estimated outflow, based on downstream measurements, provides a better and more reliable estimate of the volume of water moving through the dam.

Data Notes by Water Year

Water Year	Data Source			General Notes	Record Check	
	Water Level	Outflow	Elev - Stor Table		Date	Who
1990	FCBOR, graphic charts, Rescal	USGS, LACDPW SG, gate ratings	1983 Survey	There were no gate operations or significant inflows during the year. Fifteen minute data from the USGS, daily average flows from LACDPW, and dam tender observations were used to develop a record of inflow and outflow. Since there was no significant inflow during this period the record was limited to estimates of daily values. Limiting factors include: only daily diversion estimates are available from LACDPW, instrumentation at the dam cannot track water levels below elev. 994, and the tendency for debris to invalidate the gate rating curve. Except for short periods when the reservoir was dry and one day when the outflow was observed to be 35 cfs. the water surface elevation was set to 990.1 The primary record of inflow and outflow is the period average flow records but instantaneous outflow estimates (primarily dam tender observations in the morning) are included for reference when the data was available. However the instantaneous flow record is very spotty. There were numerous days in Oct, Nov, Dec, & June when both LACDPW & USGS reported zero flows. However, the dam tender recorded flow at the LACDPW diversion for all of these days. Notes in the file indicate that most of the dam's outflow was due to pumping in the reservoir. If the pumping was of short duration and only occurring in the morning when the dam tender took his readings, then the flow may be insignificant. It is hard to say without more data. The dam tender's d/s flow observations are noted in the instantaneous flow records but the daily/hourly flow estimates assume the LACDPW records are correct (i.e. pumped flow was insignificant) The time of the Rescal entries do not always agree with those recorded on the FCBOR. The FCBOR consistently shows the morning report taken at 8:00 each morning while Rescal entries show the time of the morning report varying between 0745 and 0800. Also, several of the FCBOR entries are not in Rescal. Assumed that the FCBOR records are correct.	Aug-01	GP
1991	FCBOR, graphic charts, Rescal	USGS, LACDPW SG, gate ratings	1983 Survey	Fifteen-minute data from the USGS, daily average flows from LACDPW, and dam tender observations were used to develop a record of water levels, inflows, and outflows. The inflow/outflow hydrographs during storms, except for the 01MAR91 storm, are typically not very well defined. The 2 primary periods of inflow were 01Mar91 and 26-28Mar91. Limiting factors include: only daily diversion estimates from LACDPW, instrumentation at the dam cannot track water levels below elev. 994, and the tendency for debris to invalidate the gate rating curve. The estimated outflow values for the 01Mar91 storm using the gate rating curve were judged to be reasonable so a better define inflow/outflow hydrograph was developed. The outflow estimates using the gate rating did not compare as well (likely because of debris) for the late March storm, so they were not used and only daily average flow estimates are included. The primary record of inflow and outflow is the period average flow record but instantaneous outflow estimates are included for reference when the data was available. However the instantaneous flow record is very spotty. The time of the Rescal entries do not always agree with those recorded on the FCBOR. The FCBOR consistently shows the morning report taken at 8:00 each morning while Rescal entries show the time of the morning report varying between 0745 and 0800. Also, several of the FCBOR entries are not in Rescal. Assumed that the FCBOR records are correct.	Aug-01	GP
				Fifteen-minute data from the USGS, daily average flows from LACDPW, LACDPW spreading ground field notes, and dam tender observations were used to develop a record of water levels, inflows, and outflows. Limiting factors include: mostly only daily diversion estimates from LACDPW, instrumentation at the dam cannot track water levels below elev. 994, and the tendency for debris to invalidate the gate rating curve. The main record of inflow and outflow is the period average flow record but instantaneous outflow estimates are included for reference when the data was available. During the largest storms reasonable estimates of instantaneous outflow were available but this was not the case during some smaller storms and during low flow periods.		

Data Notes by Water Year

Water Year	Data Source			General Notes	Record Check	
	Water Level	Outflow	Elev - Stor Table		Date	Who
1992	FCBOR, graphic charts, Rescal	USGS, LACDPW SG, gate ratings	1983 Survey	There is some uncertainty with the dam tender records. During the periods of large inflow in February and March, Rescal contains very detailed elevation records but apparently the dam tender did not record the staff readings on the FCBOR. Either that or the records were lost. I suspect that an inexperienced dam tender worked the night shift and neglected to write down his reports. The data in Rescal was assumed to be good. At 2130 on 2/10/92 the Rescal record showed a 4-foot jump in 30 minutes. The resulting inflow was computed to be almost 10,000 cfs. This computation looks to be unreasonable given the rest of the data and was adjusted downward to 2,000 cfs. The sudden jump in water level is suspicious but could be caused by dam tender inexperience or it could have been caused by failur of an interior dike (as happen in 1998) built by the gravel contractor. The water level instrumentation malfunctioned during this period so it could not be used to verify the data. The USGS data logger for the d/s gage failed during the 2/10-11 storm. The published data for these days has been shown to be incorrect and the USGS plans on correcting the record. Update: The flows were corrected by the USGS and the update is mentioned in their WY2001 report. More information is contained in the paper file. On April 30 the LACDPW field notes indicate that they closed the spreading grounds and didn't open up until May 11th. However, their daily average records show divert flows varying from about 4 to 12cfs.?	Aug-01	GP
1993	FCBOR, graphic charts, Rescal	USGS, LACDPW SG, gate ratings	1983 Survey	Fifteen-minute data from the USGS, daily average flows from LACDPW, LACDPW spreading ground field notes, and dam tender observations were used to develop a record of water levels, inflows, and outflows. Limiting factors include: mostly only daily diversion estimates from LACDPW, instrumentation at the dam cannot track water levels below elev. 994, and the tendency for debris to invalidate the gate rating curve. The main record of inflow and outflow is the period average flow record but instantaneous outflow estimates are included for reference when the data was available. During the largest storms reasonable estimates of instantaneous outflow were available but this was not the case during some smaller storms and during low flow periods. For a good part of the January storms that outflows estimated using the gate ratings seemed to match the d/s gages. But by early February the d/s gages were the only reliable source of outflow. On 21Feb the water level was dropping gradually, suddenly dropped 3 feet in 1 hour. The outflow dropped quickly downstream too. Not sure what happen. On 23Feb the outflow rose dramatically even though there wasn't a gate change. It appears, but no written records exist to confirm, that the gates were either flushed or the trash racks were cleaned. The instrumentation clock drifted badly most of the year making it difficult to pick off water levels of the graphic charts at the correct interval. Especially tough when the water level was rising or falling quickly.	Aug-01	GP
1994	FCBOR, graphic charts, Rescal	USGS, LACDPW SG, gate ratings	1983 Survey	Fifteen-minute data from the USGS, daily average flows from LACDPW, LACDPW spreading ground field notes, and dam tender observations were used to develop a record of water levels, inflows, and outflows. Limiting factors include: mostly only daily diversion estimates from LACDPW, instrumentation at the dam cannot track water levels below elev. 994 and there is a tendency for debris to invalidate the gate rating curve. The main record of inflow and outflow is the period average flow record but instantaneous outflow estimates are included for reference when the data was available. During the largest storms reasonable estimates of instantaneous outflow were available but this was not the case during some smaller storms and during low flow periods. The published daily record spreading ground diversions show flows from 2/10-17th but the spreading ground notes indicate that the SG was closed during this period? Assumed that the SG notes are correct and there was nom diversion during this period. The dam tender records & USGS records support this assumption. Pen chart malfunctioned on March 25th	Oct-01	GP

Data Notes by Water Year

Water Year	Data Source			General Notes	Record Check	
	Water Level	Outflow	Elev - Stor Table		Date	Who
1995	FCBOR, graphic charts, Rescal	USGS, LACDPW SG, gate ratings	1995 Survey	Fifteen-minute data from the USGS, daily average flows from LACDPW, LACDPW spreading ground field notes, and dam tender observations were used to develop a record of water levels, inflows, and outflows. Limiting factors include: mostly only daily diversion estimates from LACDPW, instrumentation at the dam cannot track water levels below elev. 994 and there is a tendency for debris to invalidate the gate rating curve. The main record of inflow and outflow is the period average flow record but instantaneous outflow estimates are included for reference when the data was available. During the largest storms reasonable estimates of instantaneous outflow were available but this was not the case during some smaller storms and during low flow periods. LACDPW published daily discharges of 15 & 250 cfs for Feb 4 & 5th. Don't seem to make sense considering the observed flows Concluded that these daily estimates are wrong. The dam tender observations typically include an observation of the diverted flows to the SG. He either used an outdated stage-discharge curve or more likely it appears that the county used an adjustment factor because the dam tender's diversion estimates do not always agree with LACDPW. Adjusted the dam tender observations to bring them in line with LACDPW estimates. Clock drifted several times during this year, especially in January when it was slow by almost 1.5 hours. Made it difficult to accurately pick off elevation data from the graphic chart.	Oct-01	GP
1996	FCBOR, graphic charts, Rescal	USGS, LACDPW SG, gate ratings	1995 Survey	Fifteen-minute data from the USGS, 5-min output from LACDPW data logger, daily average flows from LACDPW, LACDPW spreading ground field notes, and dam tender observations were used to develop a record of water levels, inflows, and outflows. Instrumentation at the dam cannot track water levels below elev. 994, and the tendency for debris to invalidate the gate rating curve. The detailed flow data from LACDPW & USGS were merged to generate a detail record of outflow. Some inconsistencies between the two data sets were resolved. Because of siltation and debris near the gates, the water levels during periods of low flow were generally estimated by reverse interpolation of the gate rating curve.	Oct-01	GP
1997	FCBOR, graphic charts, Rescal	USGS, LACDPW SG, gate ratings	1995 Survey	Fifteen-minute data from the USGS, 5-min output from LACDPW data logger, daily average flows from LACDPW, LACDPW spreading ground field notes, and dam tender observations were used to develop a record of water levels, inflows, and outflows. Instrumentation at the dam cannot track water levels below elev. 994, and the tendency for debris to invalidate the gate rating curve. The detailed flow data from LACDPW & USGS were merged to generate a detail record of outflow. Some inconsistencies between the two data sets were resolved. Because of siltation and debris near the gates, the water levels during periods of low flow were generally estimated by reverse interpolation of the gate rating curve.	Mar-02	GP
1998	FCBOR, graphic charts, Rescal	USGS, LACDPW SG, gate ratings	1995 Survey	Fifteen-minute data from the USGS, 5-min output from LACDPW data logger, daily average flows from LACDPW, and dam tender observations were used to develop a record of water levels, inflows, and outflows. Instrumentation at the dam cannot track water levels below elev. 994, and there is a tendency for debris to invalidate the gate rating curve. The detailed flow data from LACDPW & USGS were merged to generate a detail record of outflow. Some inconsistencies between the two data sets were resolved. In the 1st half of May the USGS reported large flows (up to 1000 cfs) at their d/s gage. As this was occurring the dam tender and recording instrumentation at the dam reported low water levels (max=996.25) and the gates were all at the standby setting o 1.0'. Unless the pool was higher (or the gates) than observed the d/s flows should have been much lower. Unfortunately there were only 2 staff readings taken during this period and the instrumentation didn't record much. The d/s flows as reported by the USGS were left in the database but there may be some question about their accuracy. Possible explanations: 1) the gates were flushed extensively on April 22 maybe that deposited sand/debris near the d/s gage 2) the gate indicators are known to have some problems, maybe one or more gates was open much more than recorded	Oct-01	GP

Data Notes by Water Year

Water Year	Data Source			General Notes	Record Check	
	Water Level	Outflow	Elev - Stor Table		Date	Who
1999	FCBOR, graphic charts, Rescal	USGS, LACDPW SG, gate ratings	1995 Survey	Fifteen-minute data from the USGS, 5-min output from LACDPW data logger, daily average flows from LACDPW, and dam tender observations were used to develop a detailed record of water level, inflow, and outflow. Instrumentation at the dam cannc track water levels below elev. 994, and there is a tendency for debris to invalidate the gate rating curve. The detailed flow data from LACDPW & USGS were merged to generate a detail record of outflow. Some inconsistencies between the two data sets were resolved. The outflow varied from 10 cfs to 94 cfs. All of the water levels were estimated by reverse interpolation of the gate rating curve.	Oct-01	GP
2000	FCBOR, data logger, Rescal	USGS, LACDPW SG, gate ratings	1995 Survey	Fifteen-minute data from the USGS, 5-min output from LACDPW data logger, daily average flows from LACDPW, and dam tender observations were used to develop a detailed record of water level, inflow, and outflow. Instrumentation at the dam cannc track water levels below elev. 994, and there is a tendency for debris to invalidate the gate rating curve. The detailed flow data from LACDPW & USGS were merged to generate a detail record of outflow. Some inconsistencies between the two data sets were resolved. No data logger data is available from LACDPW for Oct1-Feb14. Only daily values available for this period but there was very little flow anyway. On Feb17th an internal dike failed sending a rush of water to Hansen's gates. There were some gate changes in February but the dam tender found it difficult to tell what the gate settings were because of problems with the gate indicators. The water level instrumentation failed and was generally unreliable from mid-Feb through early March.	Nov-01	GP
2001	FCBOR, data logger, Rescal	USGS, LACDPW SG, gate ratings	1995 Survey	Fifteen-minute data from the USGS, 5-min output from LACDPW data logger, daily average flows from LACDPW, and dam tender observations were used to develop a detailed record of water level, inflow, and outflow. Instrumentation at the dam cannc track water levels below elev. 994, and there is a tendency for debris to invalidate the gate rating curve. The detailed flow data from LACDPW & USGS were merged to generate a detail record of outflow. Some inconsistencies between the two data sets were resolved.	Apr-03	GP
2002	FCBOR, data logger, Rescal	USGS, LACDPW SG, gate ratings	1995 Survey	Fifteen-minute data from the USGS, 5-min output from LACDPW data logger, daily average flows from LACDPW, and dam tender observations were used to develop a detailed record of water level, inflow, and outflow. Instrumentation at the dam cannc track water levels below elev. 994, and there is a tendency for debris to invalidate the gate rating curve. The detailed flow data from LACDPW & USGS were merged to generate a detail record of outflow. Some inconsistencies between the two data sets were resolved.	Apr-03	GP

LATEST HANSEN DAM CAPACITY

(Adjusted for dead storage up to elev. 990ft. NGVD)
JANUARY 2000 (Survey Date August 1999)
Elevation in feet vs. Storage in acre-feet

	0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
990	0.0	6.1	12.2	18.4	24.6	30.8	37.1	43.5	49.9	56.4
991	63.0	69.6	76.2	82.9	89.7	96.5	103.3	110.2	117.2	124.2
992	131.3	138.4	145.6	152.9	160.2	167.6	175.1	182.6	190.2	197.8
993	205.5	213.2	220.9	228.8	236.6	244.5	252.5	260.5	268.6	276.7
992	284.9	293.2	301.5	309.8	318.3	326.8	335.3	344.0	352.7	361.5
995	370.3	379.3	388.3	397.4	406.6	415.9	425.2	434.6	444.2	453.8
996	463.4	473.2	483.1	493.1	503.2	513.4	523.7	534.2	544.8	555.5
997	566.4	577.4	588.6	599.9	611.4	623.0	634.7	646.6	658.6	670.9
998	683.2	695.8	708.5	721.5	734.6	747.9	761.5	775.2	789.2	803.5
999	818.0	832.8	847.8	863.0	878.6	894.3	910.4	926.6	943.2	959.9
1,000	976.9	994.2	1011.7	1029.3	1047.2	1065.4	1083.7	1102.2	1121.0	1139.9
1,001	1159.1	1178.5	1198.1	1217.8	1237.8	1258.1	1278.5	1299.2	1320.1	1341.3
1,002	1362.8	1384.4	1406.4	1428.7	1451.2	1474.1	1497.3	1520.9	1544.8	1569.1
1,003	1593.5	1618.2	1643.2	1668.4	1693.8	1719.4	1745.2	1771.2	1797.5	1823.9
1,004	1850.5	1877.4	1904.4	1931.6	1959.1	1986.7	2014.6	2042.6	2070.9	2099.3
1,005	2127.8	2156.6	2185.5	2214.6	2243.8	2273.2	2302.8	2332.5	2362.4	2392.4
1,006	2422.5	2452.8	2483.3	2513.9	2544.7	2575.6	2606.7	2637.9	2669.3	2700.8
1,007	2732.5	2764.3	2796.2	2828.3	2860.5	2892.8	2925.3	2957.9	2990.6	3023.4
1,008	3056.4	3089.4	3122.6	3156.0	3189.5	3223.1	3256.8	3290.7	3324.7	3358.8
1,009	3393.1	3427.5	3462.0	3496.7	3531.5	3566.4	3601.5	3636.7	3672.0	3707.5
1,010	3743.0	3778.7	3814.5	3850.5	3886.5	3922.7	3959.0	3995.4	4031.9	4068.5
1,011	4105.3	4142.1	4179.0	4216.0	4253.1	4290.3	4327.6	4365.1	4402.6	4440.2
1,012	4477.9	4515.6	4553.5	4591.5	4629.5	4667.7	4705.9	4744.2	4782.6	4821.1
1,013	4859.7	4898.3	4937.1	4975.9	5014.8	5053.8	5092.9	5132.1	5171.4	5210.7
1,014	5250.1	5289.7	5329.3	5369.0	5408.8	5448.7	5488.8	5528.9	5569.1	5609.4
1,015	5649.9	5690.4	5731.0	5771.8	5812.6	5853.5	5894.6	5935.7	5976.9	6018.3
1,016	6059.7	6101.3	6142.9	6184.7	6226.6	6268.6	6310.7	6352.9	6395.3	6437.7
1,017	6480.3	6523.1	6565.9	6608.9	6652.0	6695.2	6738.6	6782.1	6825.7	6869.5
1,018	6913.4	6957.4	7001.5	7045.8	7090.1	7134.6	7179.2	7223.9	7268.7	7313.6
1,019	7358.6	7403.6	7448.8	7494.1	7539.4	7584.9	7630.4	7676.0	7721.8	7767.6
1,020	7813.5	7859.5	7905.6	7951.8	7998.2	8044.6	8091.1	8137.8	8184.5	8231.4
1,021	8278.4	8325.5	8372.7	8420.0	8467.4	8514.9	8562.5	8610.2	8658.0	8705.8
1,022	8753.8	8801.9	8850.0	8898.3	8946.6	8995.0	9043.5	9092.0	9140.7	9189.4
1,023	9238.2	9287.0	9336.0	9385.0	9434.0	9483.2	9532.4	9581.7	9631.1	9680.5
1,024	9730.1	9779.7	9829.3	9879.1	9929.0	9978.9	10029.0	10079.1	10129.3	10179.6
1,025	10230.0	10280.5	10331.0	10381.7	10432.4	10483.2	10534.1	10585.1	10636.1	10687.3
1,026	10738.5	10789.8	10841.2	10892.7	10944.2	10995.9	11047.6	11099.5	11151.4	11203.4
1,027	11255.5	11307.7	11360.0	11412.4	11464.9	11517.5	11570.2	11622.9	11675.8	11728.8

LATEST HANSEN DAM CAPACITY

(Adjusted for dead storage up to elev. 990ft. NGVD)
JANUARY 2000 (Survey Date August 1999)
Elevation in feet vs. Storage in acre-feet

	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
1,028	11781.8	11835.0	11888.2	11941.5	11995.0	12048.5	12102.1	12155.8	12209.6	12263.5
1,029	12317.5	12371.6	12425.8	12480.1	12534.4	12588.9	12643.5	12698.1	12752.9	12807.7
1,030	12862.6	12917.6	12972.7	13027.9	13083.2	13138.6	13194.0	13249.5	13305.2	13360.8
1,031	13416.6	13472.5	13528.4	13584.4	13640.5	13696.6	13752.9	13809.2	13865.6	13922.1
1,032	13978.6	14035.3	14092.0	14148.8	14205.6	14262.6	14319.6	14376.6	14433.8	14491.0
1,033	14548.3	14605.7	14663.1	14720.7	14778.3	14835.9	14893.7	14951.5	15009.4	15067.4
1,034	15125.4	15183.5	15241.7	15300.0	15358.3	15416.6	15475.1	15533.6	15592.2	15650.8
1,035	15709.5	15768.3	15827.2	15886.1	15945.0	16004.1	16063.2	16122.3	16181.6	16240.8
1,036	16300.2	16359.6	16419.1	16478.6	16538.2	16597.8	16657.5	16717.2	16777.1	16836.9
1,037	16896.8	16956.8	17016.8	17076.9	17137.1	17197.2	17257.5	17317.8	17378.1	17438.5
1,038	17499.0	17559.5	17620.1	17680.7	17741.4	17802.1	17862.9	17923.7	17984.6	18045.6
1,039	18106.6	18167.6	18228.7	18289.9	18351.1	18412.4	18473.7	18535.1	18596.6	18658.1
1,040	18719.6	18781.2	18842.9	18904.6	18966.4	19028.2	19090.1	19152.1	19214.1	19276.2
1,041	19338.4	19400.6	19462.9	19525.2	19587.6	19650.1	19712.6	19775.2	19837.9	19900.6
1,042	19963.5	20026.4	20089.4	20152.4	20215.6	20278.8	20342.1	20405.5	20469.0	20532.5
1,043	20596.2	20659.9	20723.7	20787.6	20851.6	20915.7	20979.9	21044.2	21108.5	21173.0
1,044	21237.6	21302.3	21367.1	21432.0	21497.0	21562.1	21627.4	21692.7	21758.1	21823.7
1,045	21889.3	21955.1	22020.9	22086.8	22152.8	22218.8	22285.0	22351.2	22417.5	22483.9
1,046	22550.4	22616.9	22683.6	22750.3	22817.1	22884.0	22950.9	23018.0	23085.2	23152.4
1,047	23219.8	23287.2	23354.7	23422.3	23490.1	23557.9	23625.7	23693.7	23761.8	23829.9
1,048	23898.2	23966.6	24035.0	24103.6	24172.3	24241.0	24309.9	24378.8	24447.9	24517.0
1,049	24586.3	24655.6	24725.0	24794.5	24864.1	24933.7	25003.5	25073.3	25143.2	25213.2
1,050	25283.3	25353.4	25423.7	25494.0	25564.4	25635.0	25705.6	25776.2	25847.0	25917.9
1,051	25988.8	26059.9	26131.0	26202.2	26273.5	26344.9	26416.4	26488.0	26559.6	26631.4
1,052	26703.2	26775.1	26847.0	26919.1	26991.3	27063.6	27135.9	27208.4	27280.9	27353.6
1,053	27426.4	27499.2	27572.2	27645.2	27718.4	27791.6	27865.0	27938.4	28012.0	28085.6
1,054	28159.4	28233.3	28307.2	28381.3	28455.4	28529.7	28604.0	28678.5	28753.0	28827.6
1,055	28902.4	28977.2	29052.1	29127.2	29202.3	29277.5	29352.9	29428.3	29503.8	29579.5
1,056	29655.2	29731.1	29807.0	29883.1	29959.3	30035.6	30112.0	30188.5	30265.2	30341.9
1,057	30418.8	30495.9	30573.0	30650.3	30727.7	30805.2	30882.8	30960.6	31038.5	31116.6
1,058	31194.8	31273.1	31351.6	31430.2	31508.9	31587.9	31666.9	31746.1	31825.5	31904.9
1,059	31984.6	32064.3	32144.2	32224.2	32304.3	32384.6	32465.1	32545.6	32626.4	32707.3
1,060	32788.3	32869.4	32950.8	33032.2	33113.8	33195.6	33277.5	33359.5	33441.7	33524.1
1,061	33606.5	33689.1	33771.9	33854.7	33937.7	34020.8	34104.1	34187.5	34271.0	34354.7
1,062	34438.5	34522.4	34606.4	34690.7	34775.0	34859.5	34944.1	35028.9	35113.8	35198.8
1,063	35283.9	35369.2	35454.5	35540.1	35625.7	35711.4	35797.3	35883.3	35969.4	36055.6
1,064	36141.9	36228.4	36314.9	36401.6	36488.4	36575.4	36662.4	36749.6	36836.9	36924.3
1,065	37011.8	37099.4	37187.2	37275.1	37363.1	37451.2	37539.4	37627.8	37716.3	37804.9

LATEST HANSEN DAM CAPACITY

(Adjusted for dead storage up to elev. 990ft. NGVD)
JANUARY 2000 (Survey Date August 1999)
Elevation in feet vs. Storage in acre-feet

	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
1,066	37893.6	37982.4	38071.3	38160.4	38249.5	38338.8	38428.2	38517.7	38607.3	38697.1
1,067	38786.9	38876.9	38967.0	39057.2	39147.6	39238.0	39328.6	39419.3	39510.1	39601.0
1,068	39692.1	39783.3	39874.6	39966.0	40057.6	40149.3	40241.1	40333.1	40425.1	40517.3
1,069	40609.6	40702.1	40794.6	40887.3	40980.1	41073.1	41166.2	41259.3	41352.7	41446.1
1,070	41539.7	41633.4	41727.3	41821.3	41915.4	42009.7	42104.1	42198.6	42293.3	42388.1
1,071	42483.0	42578.1	42673.3	42768.6	42864.0	42959.6	43055.3	43151.0	43246.9	43343.0
1,072	43439.1	43535.3	43631.7	43728.2	43824.8	43921.5	44018.3	44115.2	44212.3	44309.4
1,073	44406.7	44504.0	44601.5	44699.1	44796.8	44894.6	44992.5	45090.5	45188.7	45287.0
1,074	45385.3	45483.8	45582.4	45681.1	45779.9	45878.8	45977.8	46076.9	46176.1	46275.4
1,075	46374.9	46474.4	46574.0	46673.8	46773.6	46873.6	46973.6	47073.8	47174.1	47274.4
1,076	47374.9	47475.5	47576.2	47677.0	47777.9	47879.0	47980.1	48081.3	48182.6	48284.1
1,077	48385.6	48487.3	48589.1	48690.9	48792.9	48895.0	48997.2	49099.5	49201.9	49304.4
1,078	49407.0	49509.7	49612.5	49715.4	49818.5	49921.6	50024.9	50128.2	50231.7	50335.2
1,079	50438.9	50542.6	50646.5	50750.5	50854.5	50958.7	51063.0	51167.4	51271.9	51376.5
1,080	51481.2	51586.0	51690.9	51796.0	51901.1	52006.4	52111.8	52217.3	52322.9	52428.6
1,081	52534.4	52640.3	52746.4	52852.6	52958.8	53065.2	53171.7	53278.3	53385.0	53491.9
1,082	53598.8	53705.9	53813.1	53920.4	54027.8	54135.3	54243.0	54350.7	54458.6	54566.6
1,083	54674.7	54782.9	54891.2	54999.7	55108.2	55216.9	55325.7	55434.6	55543.6	55652.7
1,084	55761.9	55871.3	55980.8	56090.4	56200.1	56309.9	56419.8	56529.9	56640.1	56750.5
1,085	56860.9	56971.5	57082.3	57193.1	57304.2	57415.3	57526.6	57638.1	57749.7	57861.5
1,086	57973.4	58085.4	58197.6	58309.9	58422.5	58535.2	58648.2	58761.4	58875.0	58988.9
1,087	59103.0									

History of Hansen Dam Storage Capacity Surveys

Elev in Ft NGVD	Reservoir Storage in Acre-Feet										
	Aug-1999	Aug-1995	Apr-1983	Jul-1982	Oct-1978	Aug-1969	Jan-1962	Nov-1945	Oct-1943	Jul-1941	Jul-1940
Dead Stor blw 990'	419					477	1373	1529	1754	2311	2700
990	0	0	0	0	0	0	0	0	0	0	0
991	63	3	0	14	22	74	128	136	146	199	203
992	131	15	7	40	56	152	261	280	300	403	417
993	205	33	22	74	98	234	407	432	464	608	641
994	285	56	42	114	146	319	560	592	640	832	877
995	370	85	67	158	198	412	726	762	830	1,069	1,124
996	463	121	97	207	255	514	898	942	1,034	1,314	1,380
997	566	163	132	262	318	629	1,086	1,134	1,252	1,564	1,644
998	683	213	174	323	387	757	1,281	1,338	1,481	1,819	1,914
999	818	275	222	390	463	894	1,490	1,553	1,720	2,085	2,192
1,000	977	355	279	467	550	1,035	1,708	1,779	1,968	2,359	2,477
1,001	1,159	455	345	552	644	1,180	1,938	2,017	2,225	2,639	2,768
1,002	1,363	574	418	644	742	1,330	2,176	2,265	2,491	2,919	3,065
1,003	1,594	708	499	744	846	1,487	2,428	2,523	2,765	3,212	3,368
1,004	1,851	861	588	850	953	1,654	2,689	2,793	3,047	3,508	3,677
1,005	2,128	1,032	682	962	1,064	1,830	2,962	3,072	3,337	3,816	3,993
1,006	2,423	1,224	781	1,080	1,179	2,019	3,246	3,362	3,635	4,124	4,315
1,007	2,732	1,434	887	1,205	1,298	2,218	3,541	3,662	3,941	4,444	4,643
1,008	3,056	1,661	1,001	1,338	1,422	2,427	3,847	3,972	4,255	4,779	4,979
1,009	3,393	1,906	1,125	1,480	1,552	2,649	4,165	4,291	4,578	5,113	5,321
1,010	3,743	2,169	1,259	1,630	1,688	2,885	4,494	4,621	4,910	5,457	5,671
1,011	4,105	2,455	1,401	1,788	1,830	3,136	4,835	4,959	5,252	5,804	6,029
1,012	4,478	2,765	1,552	1,956	1,979	3,403	5,188	5,308	5,604	6,161	6,391
1,013	4,860	3,097	1,712	2,135	2,134	3,686	5,551	5,665	5,971	6,539	6,766
1,014	5,250	3,449	1,883	2,328	2,296	3,983	5,926	6,033	6,352	6,922	7,149
1,015	5,650	3,821	2,068	2,538	2,473	4,295	6,310	6,411	6,745	7,338	7,541
1,016	6,060	4,204	2,266	2,769	2,672	4,623	6,706	6,799	7,148	7,706	7,943
1,017	6,480	4,598	2,484	3,022	2,894	4,967	7,109	7,198	7,558	8,124	8,355
1,018	6,913	5,003	2,726	3,297	3,139	5,328	7,525	7,609	7,977	8,549	8,775
1,019	7,359	5,419	2,992	3,595	3,409	5,703	7,947	8,031	8,403	8,966	9,203
1,020	7,814	5,846	3,282	3,914	3,705	6,093	8,382	8,463	8,837	9,383	9,639
1,021	8,278	6,284	3,594	4,256	4,026	6,496	8,821	8,903	9,278	9,824	10,082
1,022	8,754	6,734	3,924	4,621	4,368	6,910	9,272	9,351	9,726	10,278	10,532
1,023	9,238	7,194	4,274	5,004	4,732	7,338	9,725	9,806	10,183	10,731	10,988
1,024	9,730	7,665	4,643	5,402	5,117	7,779	10,188	10,269	10,646	11,189	11,450

History of Hansen Dam Storage Capacity Surveys

Elev in Ft NGVD	Reservoir Storage in Acre-Feet										
	Aug-1999	Aug-1995	Apr-1983	Jul-1982	Oct-1978	Aug-1969	Jan-1962	Nov-1945	Oct-1943	Jul-1941	Jul-1940
1,025	10,230	8,147	5,029	5,819	5,522	8,230	10,655	10,739	11,118	11,700	11,920
1,026	10,739	8,641	5,430	6,256	5,945	8,689	11,131	11,217	11,595		12,395
1,027	11,256	9,144	5,846	6,710	6,385	9,154	11,610	11,702	12,080		12,879
1,028	11,782	9,659	6,276	7,173	6,839	9,626	12,100	12,194	12,571		13,371
1,029	12,318	10,185	6,721	7,649	7,305	10,106	12,596	12,693	13,068		13,869
1,030	12,863	10,721	7,180	8,136	7,782	10,593	13,101	13,199	13,571	14,100	14,375
1,031	13,417	11,267	7,651	8,633	8,269	11,090	13,521	13,711	14,081		14,900
1,032	13,979	11,821	8,133	9,140	8,763	11,595	14,132	14,231	14,597		15,400
1,033	14,548	12,383	8,626	9,654	9,267	12,109	14,656	14,757	15,120		15,900
1,034	15,125	12,952	9,129	10,175	9,781	12,631	15,191	15,290	15,649		16,400
1,035	15,710	13,530	9,641	10,702	10,302	13,161	15,729	15,830	16,185	16,800	17,000
1,036	16,300	14,116	10,161	11,233	10,831	13,698	16,276	16,376	16,729		17,500
1,037	16,897	14,710	10,687	11,771	11,366	14,242	16,827	16,928	17,282		18,100
1,038	17,499	15,312	11,218	12,317	11,906	14,793	17,386	17,485	17,844		18,600
1,039	18,107	15,923	11,755	12,870	12,453	15,350	17,948	18,048	18,416		19,200
1,040	18,720	16,541	12,298	13,430	13,007	15,914	18,519	18,616	18,995	19,500	19,800
1,041	19,338	17,169	12,849	13,999	13,567	16,485	19,095	19,190	19,580		20,400
1,042	19,963	17,804	13,407	14,576	14,135	17,064	19,680	19,772	20,172		21,000
1,043	20,596	18,448	13,974	15,161	14,711	17,651	20,271	20,361	20,768		21,600
1,044	21,238	19,101	14,552	15,754	15,296	18,248	20,871	20,958	21,371		22,100
1,045	21,889	19,762	15,141	16,357	15,891	18,853	21,479	21,565	21,979	22,500	22,700
1,046	22,550	20,431	15,743	16,968	16,495	19,469	22,095	22,180	22,595		23,400
1,047	23,220	21,109	16,357	17,589	17,109	20,093	22,721	22,806	23,221		24,000
1,048	23,898	21,796	16,982	18,220	17,734	20,727	23,355	23,442	23,856		24,600
1,049	24,586	22,492	17,620	18,862	18,369	21,371	24,002	24,088	24,502		25,000
1,050	25,283	23,197	18,270	19,516	19,014	22,027	24,658	24,746	25,158	25,700	25,950
1,051	25,989	23,911	18,933	20,182	19,669	22,693	25,328	25,415	25,827		26,600
1,052	26,703	24,637	19,608	20,860	20,334	23,370	26,006	26,096	26,506		27,150
1,053	27,426	25,373	20,295	21,550	21,011	24,059	26,700	26,789	27,197		27,950
1,054	28,159	26,121	20,993	22,252	21,699	24,760	27,402	27,494	27,901		28,600
1,055	28,902	26,880	21,704	22,964	22,400	25,473	28,120	28,211	28,617	29,200	29,300
1,056	29,655	27,650	22,427	23,688	23,112	26,198	28,848	28,941	29,346		30,100
1,057	30,419	28,431	23,163	24,422	23,836	26,935	29,591	29,683	30,088		30,800
1,058	31,195	29,224	23,911	25,167	24,574	27,685	30,344	30,438	30,844		31,600
1,059	31,985	30,029	24,671	25,924	25,324	28,448	31,114	31,205	31,612		32,300
1,060	32,788	30,845	25,446	26,694	26,087	29,223	31,892	31,985	32,394	32,900	33,100

History of Hansen Dam Storage Capacity Surveys

Elev in Ft NGVD	Reservoir Storage in Acre-Feet										
	Aug-1999	Aug-1995	Apr-1983	Jul-1982	Oct-1978	Aug-1969	Jan-1962	Nov-1945	Oct-1943	Jul-1941	Jul-1940
1,061	33,607	31,673	26,234	27,477	26,864	30,011	32,687	32,777	33,190		33,900
1,062	34,438	32,512	27,035	28,270	27,653	30,813	33,494	33,583	33,999		34,700
1,063	35,284	33,364	27,849	29,075	28,456	31,627	34,315	34,402	34,822		35,500
1,064	36,142	34,227	28,675	29,892	29,272	32,455	35,148	35,235	35,659		36,400
1,065	37,012	35,103	29,514	30,720	30,101	33,297	35,996	36,081	36,509	37,000	37,600
1,066	37,894	35,991	30,365	31,560	30,944	34,152	36,854	36,941	37,373		38,100
1,067	38,787	36,891	31,230	32,411	31,801	35,020	37,729	37,814	38,251		39,100
1,068	39,692	37,803	32,108	33,275	32,672	35,901	38,614	38,701	39,143		39,900
1,069	40,610	38,728	33,000	34,152	33,557	36,797	39,514	39,602	40,049		40,800
1,070	41,540	39,665	33,908	35,044	34,456	37,707	40,426	40,517	40,969	41,500	41,700
1,071	42,483	40,615	34,828	35,950	35,369	38,631	41,352	41,447	41,903		42,700
1,072	43,439	41,577	35,762	36,868	36,296	39,569	42,290	42,391	42,851		43,600
1,073	44,407	42,552	36,710	37,798	37,236	40,521	43,244	43,349	43,813		44,600
1,074	45,385	43,540	37,671	38,739	38,189	41,486	44,209	44,323	44,790		45,600
1,075	46,375	44,541	38,645	39,691	39,156	42,466	45,190	45,310	45,781	46,300	46,600
1,076	47,375	45,554	39,632	40,654	40,138	43,460	46,183	46,310	46,785		47,600
1,077	48,386	46,581	40,631	41,628	41,133	44,467	47,193	47,322	47,803		48,600
1,078	49,407	47,621	41,644	42,612	42,143	45,487	48,210	48,346	48,833		49,700
1,079	50,439	48,674	42,668	43,608	43,165	46,521	49,242	49,382	49,876		50,700
1,080	51,481	49,741	43,706	44,614	44,200	47,567	50,286	50,431	50,931	51,400	51,800
1,081	52,534	50,821	44,757	45,632	45,247	48,627	51,344	51,497	52,000		52,800
1,082	53,599	51,914	45,822	46,664	46,307	49,701	52,416	52,568	53,082		53,900
1,083	54,675	53,021	46,902	47,708	47,379	50,790	53,501	53,657	54,178		55,000
1,084	55,762	54,142	47,995	48,764	48,466	51,892	54,601	54,762	55,287		56,100
1,085	56,861	55,276	49,103	49,831	49,567	53,007	55,711	55,881	56,411	56,900	57,100
1,086	57,973	56,424	50,224	50,905	50,682	54,137	56,839	57,016	57,528		58,400
1,087	59,103	57,586	51,360	51,990	51,811	55,281	57,977	58,165	58,646	59,200	59,500

Rating for Big Tujunga Ck Stream Gage below Hansen Dam

USGS Gage No. 11097000

Discharge in cubic feet per second (cfs)

Gage Height (ft)	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
1	0	19	47	86	138	200	273	358	447	545
2	646	753	864	982	1,110	1,240	1,370	1,510	1,660	1,810
3	1,970	2,140	2,310	2,480	2,660	2,850	3,040	3,240	3,440	3,650
4	3,660	4,070	4,300	4,520	4,750	4,990	5,230	5,480	5,730	5,980
5	6,240	6,510	6,780	7,050	7,330	7,610	7,900	8,190	8,480	8,780
6	9,090	9,400	9,710	10,000	10,400	10,700	11,000	11,300	11,700	12,000
7	12,400	12,700	13,100	13,400	13,800	14,200	14,500	14,900	15,300	15,700
8	16,100	16,500	16,900	17,200						

Notes:

1) Located 0.5 mi d/s of Hansen Dam and 0.3 mi d/s of LACDPW Spreading Ground Diversion
2) USGS Stage-Disharge Rating No. 5 downloaded from USGS Web Site 03/28/03
3) See USGS Web Site for upates at:http://waterdata.usgs.gov/ca/nwis/uv/?site_no=11097000&PARAmeter_cd=00065,00060

Hansen Dam Gate Rating Table

Water Level	Gate Settings																
	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
991	0	8	16	22	27	30	31	31	31	31	31	31	31	31	31	31	31
994	0	35	66	89	108	122	125	125	125	125	125	125	125	125	125	125	125
998	0	52	96	135	169	199	228	252	275	295	317	339	339	339	339	339	339
1002	0	64	119	170	215	258	297	334	368	400	433	462	488	519	550	577	597
1006	0	73	138	197	253	304	352	401	446	489	529	570	609	652	690	740	809
1010	0	80	155	221	284	345	402	457	510	564	618	664	713	767	825	892	973
1014	0	90	174	244	313	379	445	506	567	627	687	745	804	868	937	1016	1110
1018	0	96	183	265	340	412	484	553	620	688	754	818	887	960	1039	1130	1237
1022	0	102	195	283	365	444	520	598	668	743	813	888	960	1040	1130	1230	1346
1026	0	110	208	300	386	470	552	635	713	793	870	949	1029	1117	1215	1323	1450
1030	0	116	219	315	410	497	584	670	755	840	924	1007	1095	1190	1294	1410	1548
1034	0	121	230	332	430	522	615	705	795	786	975	1063	1155	1257	1368	1492	1640
1038	0	125	240	348	449	546	644	739	833	928	1023	1117	1215	1320	1437	1570	1725
1042	0	130	249	361	467	570	670	771	870	968	1067	1165	1269	1380	1504	1645	1808
1046	0	135	258	374	487	591	697	802	903	1007	1109	1215	1322	1442	1570	1718	1887
1050	0	140	267	387	505	612	729	833	936	1046	1151	1270	1373	1498	1630	1785	1961
1054	0	145	276	400	523	633	751	864	969	1085	1193	1320	1423	1550	1690	1850	2035
1058	0	150	285	413	541	654	778	895	1002	1124	1235	1370	1470	1603	1747	1915	2105
1062	0	155	294	426	559	675	805	926	1035	1163	1277	1410	1515	1652	1802	1975	2173
1066	0	160	303	439	577	696	832	957	1068	1202	1319	1450	1557	1701	1855	2035	2238
1070	0	165	312	452	595	717	859	988	1101	1241	1361	1490	1599	1750	1908	2095	2303
1074	0	170	321	465	613	738	886	1019	1134	1280	1403	1530	1641	1799	1961	2155	2368
1078	0	175	330	478	631	759	913	1050	1167	1319	1445	1570	1683	1848	2014	2215	2433
1082	0	180	339	491	649	780	940	1081	1200	1358	1487	1610	1725	1897	2067	2275	2498
1086	0	185	348	504	667	801	967	1112	1233	1397	1529	1650	1767	1946	2120	2335	2563
1087	0	178	347	502	645	788	925	1066	1210	1342	1484	1630	1770	1942	2123	2324	2553

Notes:

1 **These discharges are for each gate**

2 **Sediment & debris on the trash racks or inside the outlet tunnel can significantly affect the outflow. The d/s gage commonly provides the best estimate of the total outflow from the dam**

3 **There is an ungated outlet at elevation 1011' which contributes to the total outflow from the dam. See its rating for further details.**

Hansen Dam

Elevation - Outflow when all 8 Gates are at 1.0'

Source: Original Gate Curves

G.P. 12/3/98

Outflow (cfs)

Elevation	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
990.0	0	2	4	6	8	10	12	13	15	17
990.1	19	21	23	25	27	29	31	33	35	36
990.2	38	40	42	44	46	48	50	52	54	56
990.3	58	60	61	63	65	67	69	71	73	75
990.4	77	79	81	83	84	86	88	90	92	94
990.5	96	98	100	102	104	106	108	109	111	113
990.6	115	117	119	121	123	125	127	129	131	132
990.7	134	136	138	140	142	144	146	148	150	152
990.8	154	156	157	159	161	163	165	167	169	171
990.9	173	175	177	179	180	182	184	186	188	190
991.0	192	194	196	199	201	203	205	208	210	212
991.1	214	217	219	221	223	226	228	230	232	235
991.2	237	239	241	244	246	248	250	252	255	257
991.3	259	261	264	266	268	270	273	275	277	279
991.4	282	284	286	288	291	293	295	297	300	302
991.5	304	305	307	308	309	310	312	313	314	316
991.6	317	318	319	321	322	323	324	326	327	328
991.7	330	331	332	333	335	336	337	339	340	341
991.8	342	344	345	346	348	349	350	351	353	354
991.9	355	356	358	359	360	362	363	364	365	367
992.0	368	369	370	370	371	372	373	374	374	375
992.1	376	377	378	378	379	380	381	382	382	383
992.2	384	385	386	386	387	388	389	390	390	391
992.3	392	393	394	394	395	396	397	398	398	399
992.4	400	401	402	402	403	404	405	406	406	407
992.5	408	408	408	408	408	408	408	408	408	408
992.6	408	409	410	410	411	412	413	414	414	415
992.7	416	417	418	418	419	420	421	422	422	423
992.8	424	425	426	426	427	428	429	430	430	431
992.9	432	434	435	437	438	440	442	443	445	446
993.0	448	449	450	450	451	452	453	454	454	455
993.1	456	457	458	458	459	460	461	462	462	463
993.2	464	465	466	466	467	468	469	470	470	471
993.3	472	473	474	474	475	476	477	478	478	479
993.4	480	481	482	482	483	484	485	486	486	487
993.5	488	489	490	490	491	492	493	494	494	495
993.6	496	497	498	498	499	500	501	502	502	503
993.7	504	505	506	506	507	508	509	510	510	511
993.8	512	513	514	514	515	516	517	518	518	519
993.9	520	521	522	522	523	524	525	526	526	527
994.0	528	529	529	530	531	531	532	532	533	534
994.1	534	535	536	536	537	538	538	539	540	540
994.2	541	541	542	543	543	544	545	545	546	547
994.3	547	548	548	549	550	550	551	552	552	553
994.4	554	554	555	556	556	557	557	558	559	559
994.5	560	561	561	562	563	563	564	564	565	566
994.6	566	567	568	568	569	570	570	571	572	572
994.7	573	573	574	575	575	576	577	577	578	579
994.8	579	580	580	581	582	582	583	584	584	585
994.9	586	586	587	588	588	589	589	590	591	591
995.0	592									

Hansen Dam Ungated Outlet Rating

Water Level (ft NGVD)	Discharge (cfs)	Water Level (ft NGVD)	Discharge (cfs)
1011	0	1049	4,439
1012	49	1050	4,480
1013	143	1051	4,521
1014	268	1052	4,562
1015	422	1053	4,602
1016	604	1054	4,640
1017	812	1055	4,678
1018	1,044	1056	4,716
1019	1,304	1057	4,755
1020	1,556	1058	4,793
1021	1,822	1059	4,832
1022	2,088	1060	4,870
1023	2,375	1061	4,907
1024	2,594	1062	4,944
1025	2,758	1063	4,980
1026	2,892	1064	5,017
1027	3,020	1065	5,054
1028	3,144	1066	5,089
1029	3,264	1067	5,124
1030	3,378	1068	5,160
1031	3,488	1069	5,195
1032	3,590	1070	5,230
1033	3,671	1071	5,264
1034	3,738	1072	5,299
1035	3,799	1073	5,333
1036	3,855	1074	5,368
1037	3,907	1075	5,402
1038	3,958	1076	5,435
1039	4,005	1077	5,468
1040	4,052	1078	5,502
1041	4,096	1079	5,535
1042	4,139	1080	5,568
1043	4,183	1081	5,600
1044	4,226	1082	5,630
1045	4,270	1083	5,663
1046	4,314	1084	5,696
1047	4,356	1085	5,729
1048	4,398	1086	5,761

Hansen Dam Spillway Rating

Water Level (ft NGVD)	Spillway Discharge (cfs)
1060	0
1061	880
1062	2,530
1063	4,690
1064	7,290
1065	10,300
1066	13,600
1067	17,300
1068	21,300
1069	25,700
1070	30,300
1071	35,200
1072	40,400
1073	45,900
1074	51,600
1075	57,600
1076	63,600
1077	70,100
1078	76,800
1079	83,500
1080	90,700
1081	98,100
1082	105,500
1083	113,100
1084	120,900
1085	129,200
1086	137,300