

Flow Over Cipolletti Weir

Worksheet prepared by D. Tuthill, IDWR, June 9, 1993; modified by Cindy Hodges, August, 1993.

Formula $\text{Flow} = (3.247 * L * H^{1.48}) - ((0.556 * L^{1.8}) / (1 + 2 * L^{1.8}) * H^{1.9}) + (0.609 * H^{2.5})$
 Cone's formula, from Water Measurement Bulletin No. 552,
 February 1976, Dorrell C. Larsen, U of I Ext. Svc.

Note: Head depths shallower than 0.10 feet (1 3/16 inches) should not be measured with a weir.
 If low flow conditions occur, consider shortening the crest length with a temporary
 clamped wooden brace that is tapered at the same angle as the weir. Thus, a wide weir
 can be temporarily shortened and read as a smaller weir.

RATING TABLE FOR MURPHY MUTUAL CANAL WEIR (Head reading includes shift adjustment of 0.09 feet)

Crest Length = 10 Feet

Staff Reading	Head (ft)	Flow (cfs)	Staff Reading	Head (ft)	Flow (cfs)	Staff Reading	Head (ft)	Flow (cfs)	Staff Reading	Head (ft)	Flow (cfs)
4.21	0.10	1.07	4.69	0.58	14.56	5.17	1.06	35.79	5.65	1.54	62.69
4.22	0.11	1.24	4.70	0.59	14.93	5.18	1.07	36.30	5.66	1.55	63.30
4.23	0.12	1.41	4.71	0.60	15.31	5.19	1.08	36.81	5.67	1.56	63.91
4.24	0.13	1.58	4.72	0.61	15.69	5.20	1.09	37.32	5.68	1.57	64.53
4.25	0.14	1.77	4.73	0.62	16.08	5.21	1.10	37.83	5.69	1.58	65.15
4.26	0.15	1.96	4.74	0.63	16.46	5.22	1.11	38.35	5.70	1.59	65.77
4.27	0.16	2.15	4.75	0.64	16.86	5.23	1.12	38.87	5.71	1.60	66.40
4.28	0.17	2.36	4.76	0.65	17.25	5.24	1.13	39.39	5.72	1.61	67.02
4.29	0.18	2.56	4.77	0.66	17.65	5.25	1.14	39.91	5.73	1.62	67.65
4.30	0.19	2.78	4.78	0.67	18.05	5.26	1.15	40.44	5.74	1.63	68.28
4.31	0.20	3.00	4.79	0.68	18.45	5.27	1.16	40.96	5.75	1.64	68.91
4.32	0.21	3.22	4.80	0.69	18.85	5.28	1.17	41.49	5.76	1.65	69.55
4.33	0.22	3.45	4.81	0.70	19.26	5.29	1.18	42.03	5.77	1.66	70.18
4.34	0.23	3.69	4.82	0.71	19.67	5.30	1.19	42.56	5.78	1.67	70.82
4.35	0.24	3.93	4.83	0.72	20.09	5.31	1.20	43.10	5.79	1.68	71.46
4.36	0.25	4.17	4.84	0.73	20.51	5.32	1.21	43.64	5.80	1.69	72.11
4.37	0.26	4.42	4.85	0.74	20.93	5.33	1.22	44.18	5.81	1.70	72.75
4.38	0.27	4.68	4.86	0.75	21.35	5.34	1.23	44.72	5.82	1.71	73.40
4.39	0.28	4.94	4.87	0.76	21.77	5.35	1.24	45.27	5.83	1.72	74.04
4.40	0.29	5.20	4.88	0.77	22.20	5.36	1.25	45.82	5.84	1.73	74.69
4.41	0.30	5.47	4.89	0.78	22.63	5.37	1.26	46.37	5.85	1.74	75.35
4.42	0.31	5.74	4.90	0.79	23.07	5.38	1.27	46.92	5.86	1.75	76.00
4.43	0.32	6.02	4.91	0.80	23.51	5.39	1.28	47.48	5.87	1.76	76.66
4.44	0.33	6.30	4.92	0.81	23.95	5.40	1.29	48.04	5.88	1.77	77.32
4.45	0.34	6.58	4.93	0.82	24.39	5.41	1.30	48.60	5.89	1.78	77.98
4.46	0.35	6.87	4.94	0.83	24.83	5.42	1.31	49.16	5.90	1.79	78.64
4.47	0.36	7.17	4.95	0.84	25.28	5.43	1.32	49.72	5.91	1.80	79.30
4.48	0.37	7.46	4.96	0.85	25.73	5.44	1.33	50.29	5.92	1.81	79.97
4.49	0.38	7.76	4.97	0.86	26.18	5.45	1.34	50.86	5.93	1.82	80.64
4.50	0.39	8.07	4.98	0.87	26.64	5.46	1.35	51.43	5.94	1.83	81.31
4.51	0.40	8.38	4.99	0.88	27.10	5.47	1.36	52.00	5.95	1.84	81.98
4.52	0.41	8.69	5.00	0.89	27.56	5.48	1.37	52.58	5.96	1.85	82.65
4.53	0.42	9.01	5.01	0.90	28.02	5.49	1.38	53.15	5.97	1.86	83.33
4.54	0.43	9.33	5.02	0.91	28.49	5.50	1.39	53.73	5.98	1.87	84.01
4.55	0.44	9.65	5.03	0.92	28.96	5.51	1.40	54.32	5.99	1.88	84.68
4.56	0.45	9.98	5.04	0.93	29.43	5.52	1.41	54.90	6.00	1.89	85.37
4.57	0.46	10.31	5.05	0.94	29.91	5.53	1.42	55.49	6.01	1.90	86.05
4.58	0.47	10.65	5.06	0.95	30.38	5.54	1.43	56.07	6.02	1.91	86.74
4.59	0.48	10.99	5.07	0.96	30.86	5.55	1.44	56.66	6.03	1.92	87.42
4.60	0.49	11.33	5.08	0.97	31.34	5.56	1.45	57.26	6.04	1.93	88.11
4.61	0.50	11.67	5.09	0.98	31.83	5.57	1.46	57.85	6.05	1.94	88.80
4.62	0.51	12.02	5.10	0.99	32.31	5.58	1.47	58.45	6.06	1.95	89.50
4.63	0.52	12.37	5.11	1.00	32.80	5.59	1.48	59.05	6.07	1.96	90.19
4.64	0.53	12.73	5.12	1.01	33.29	5.60	1.49	59.65	6.08	1.97	90.89
4.65	0.54	13.09	5.13	1.02	33.79	5.61	1.50	60.25	6.09	1.98	91.59
4.66	0.55	13.45	5.14	1.03	34.29	5.62	1.51	60.86	6.10	1.99	92.29
4.67	0.56	13.82	5.15	1.04	34.79	5.63	1.52	61.46	6.11	2.00	92.99
4.68	0.57	14.19	5.16	1.05	35.29	5.64	1.53	62.07			

** TABLE IS ONLY ACCURATE AT HIGH RANGES IF WEIR IS NOT OPERATING UNDER SUBMERGED CONDITIONS **

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 clamped wooden brace that is tapered at the same angle as the weir. Thus, a wide weir
 can be temporarily shortened and read as a smaller weir.

RATING TABLE FOR MURPHY MUTUAL CANAL LOWER WEIR (Located at Doughty's)

Crest Length = 8 Feet

Staff Reading	Head (ft)	Flow (cfs)	Staff Reading	Head (ft)	Flow (cfs)	Staff Reading	Head (ft)	Flow (cfs)	Staff Reading	Head (ft)	Flow (cfs)
	0.10	0.86		0.58	11.66		1.06	28.71		1.54	50.38
	0.11	0.99		0.59	11.96		1.07	29.12		1.55	50.88
	0.12	1.12		0.60	12.26		1.08	29.53		1.56	51.38
	0.13	1.27		0.61	12.57		1.09	29.94		1.57	51.87
	0.14	1.41		0.62	12.88		1.10	30.35		1.58	52.38
	0.15	1.57		0.63	13.19		1.11	30.77		1.59	52.88
	0.16	1.72		0.64	13.50		1.12	31.19		1.60	53.38
	0.17	1.88		0.65	13.82		1.13	31.61		1.61	53.89
	0.18	2.05		0.66	14.13		1.14	32.03		1.62	54.39
	0.19	2.22		0.67	14.46		1.15	32.45		1.63	54.90
	0.20	2.40		0.68	14.78		1.16	32.88		1.64	55.41
	0.21	2.58		0.69	15.10		1.17	33.30		1.65	55.92
	0.22	2.76		0.70	15.43		1.18	33.73		1.66	56.44
	0.23	2.95		0.71	15.76		1.19	34.16		1.67	56.95
	0.24	3.14		0.72	16.10		1.20	34.59		1.68	57.47
	0.25	3.34		0.73	16.43		1.21	35.03		1.69	57.99
	0.26	3.54		0.74	16.77		1.22	35.46		1.70	58.51
	0.27	3.74		0.75	17.11		1.23	35.90		1.71	59.03
	0.28	3.95		0.76	17.45		1.24	36.34		1.72	59.56
	0.29	4.16		0.77	17.79		1.25	36.78		1.73	60.08
	0.30	4.37		0.78	18.14		1.26	37.23		1.74	60.61
	0.31	4.59		0.79	18.49		1.27	37.67		1.75	61.14
	0.32	4.81		0.80	18.84		1.28	38.12		1.76	61.67
	0.33	5.04		0.81	19.19		1.29	38.57		1.77	62.20
	0.34	5.27		0.82	19.55		1.30	39.02		1.78	62.73
	0.35	5.50		0.83	19.90		1.31	39.47		1.79	63.27
	0.36	5.73		0.84	20.26		1.32	39.93		1.80	63.81
	0.37	5.97		0.85	20.63		1.33	40.39		1.81	64.34
	0.38	6.21		0.86	20.99		1.34	40.84		1.82	64.88
	0.39	6.46		0.87	21.36		1.35	41.30		1.83	65.43
	0.40	6.71		0.88	21.73		1.36	41.77		1.84	65.97
	0.41	6.96		0.89	22.10		1.37	42.23		1.85	66.51
	0.42	7.21		0.90	22.47		1.38	42.70		1.86	67.06
	0.43	7.47		0.91	22.84		1.39	43.16		1.87	67.61
	0.44	7.73		0.92	23.22		1.40	43.63		1.88	68.16
	0.45	7.99		0.93	23.60		1.41	44.10		1.89	68.71
	0.46	8.26		0.94	23.98		1.42	44.58		1.90	69.26
	0.47	8.52		0.95	24.36		1.43	45.05		1.91	69.82
	0.48	8.80		0.96	24.75		1.44	45.53		1.92	70.37
	0.49	9.07		0.97	25.14		1.45	46.00		1.93	70.93
	0.50	9.35		0.98	25.53		1.46	46.48		1.94	71.49
	0.51	9.63		0.99	25.92		1.47	46.97		1.95	72.05
	0.52	9.91		1.00	26.31		1.48	47.45		1.96	72.61
	0.53	10.19		1.01	26.71		1.49	47.93		1.97	73.18
	0.54	10.48		1.02	27.10		1.50	48.42		1.98	73.74
	0.55	10.77		1.03	27.50		1.51	48.91		1.99	74.31
	0.56	11.06		1.04	27.90		1.52	49.40		2.00	74.88
	0.57	11.36		1.05	28.31		1.53	49.89			

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REQUIRED INFLOWS FOR NETTLETON DIVERSIONS
FROM MURPHY MUTUAL CANAL @ 5.5% LOSS PER MILE

(USE FOR 1994 ONLY) Cyt

MMC Diversion	Requested diversion (cfs)	Distance fr. MMC head (miles)	Total Loss (%)	Req'd Inflow Sinker Ck (cfs)	Distance fr. GW pump (miles)	Total Loss (%)	Req'd Inflow Ground water (cfs)
Bench field	variable*	2.3	13	$\frac{\quad}{*} \times 1.13$	1.5	8	$\frac{\quad}{*} \times 1.08$
Small pump	0.7	7.6	42	0.99	6.9	38	0.97
Large pump	1.8	8.2	45	2.6	7.5	41	2.5

* variable requested diversion, in cfs, multiplied by shown factors to obtain required inflow