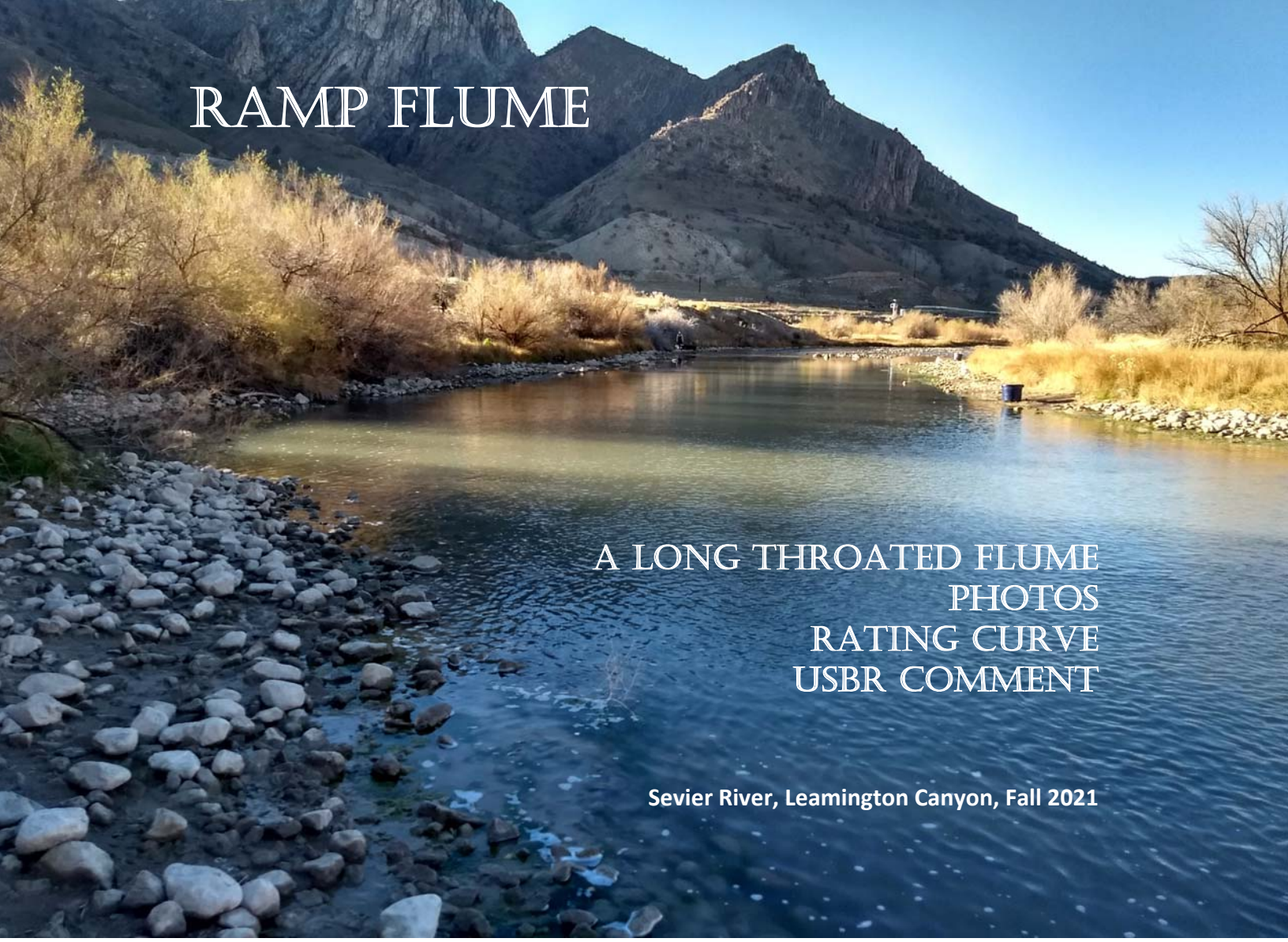


RAMP FLUME

A LONG THROATED FLUME
PHOTOS
RATING CURVE
USBR COMMENT

Sevier River, Leamington Canyon, Fall 2021

Contents

GREAT BASIN
ENVIRONMENTAL
& AQUATICS

Photos

A Great Basin ramp flume model GBERF 1875-272
This model comes with a stilling well tap

Rating Table & Graph

Ramp Flume, Model GBERF 1875-272

Best Range 0.55 cfs - 6.55 cfs

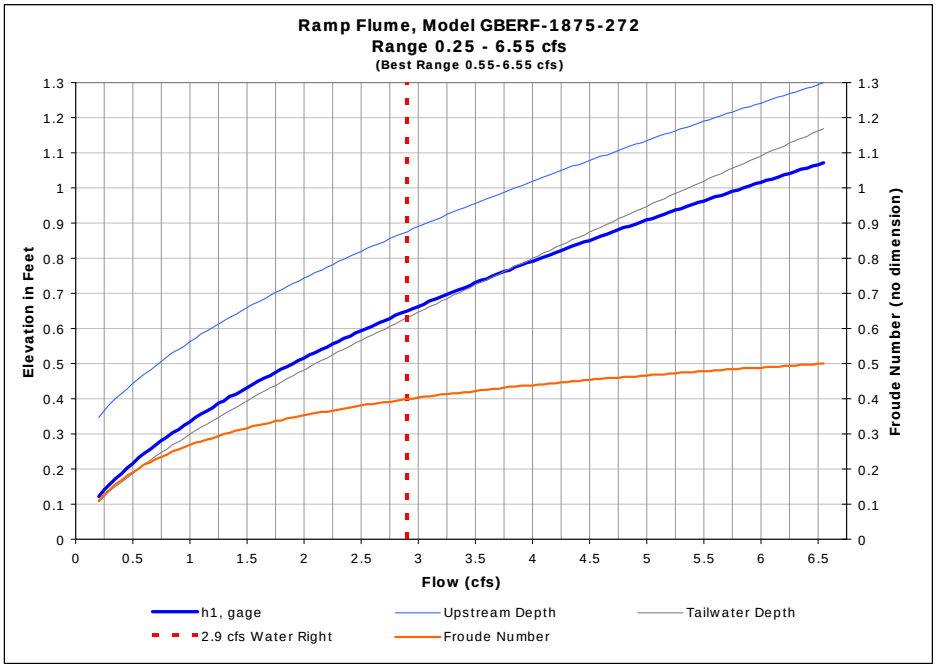
cfs = 5.763 x (h1 + 0.008709) ^ 1.64

h1	cfs	gpm	acre ft/day	h1	cfs	gpm	acre ft/day	h1	cfs	gpm	acre ft/day
0.10	0.151	67.65	0.30	0.46	1.661	745.29	3.29	0.82	4.233	1899.84	8.40
0.11	0.174	78.16	0.35	0.47	1.719	771.58	3.41	0.83	4.317	1937.63	8.56
0.12	0.199	89.26	0.39	0.48	1.779	798.22	3.53	0.84	4.402	1975.71	8.73
0.13	0.225	100.93	0.45	0.49	1.839	825.21	3.65	**0.85**	**4.488**	**2014.08**	**8.90**
0.14	0.252	113.16	0.50	**0.50**	**1.900**	**852.56**	**3.77**	0.86	4.574	2052.74	9.07
0.15	**0.281**	**125.92**	**0.56**	0.51	1.961	880.25	3.89	0.87	4.661	2091.68	9.24
0.16	0.310	139.21	0.62	0.52	2.024	908.29	4.01	0.88	4.748	2130.91	9.42
0.17	0.341	153.01	0.68	0.53	2.087	936.67	4.14	0.89	4.836	2170.42	9.59
0.18	0.373	167.32	0.74	0.54	2.151	965.39	4.27	**0.90**	**4.925**	**2210.22**	**9.77**
0.19	0.406	182.13	0.80	**0.55**	**2.216**	**994.44**	**4.39**	0.91	5.014	2250.30	9.95
0.20	**0.440**	**197.42**	**0.87**	0.56	2.281	1023.84	4.52	0.92	5.104	2290.66	10.12
0.21	0.475	213.19	0.94	0.57	2.348	1053.56	4.66	0.93	5.195	2331.30	10.30
0.22	0.511	229.43	1.01	0.58	2.414	1083.62	4.79	0.94	5.286	2372.21	10.48
0.23	0.548	246.13	1.09	0.59	2.482	1114.01	4.92	**0.95**	**5.377**	**2413.41**	**10.67**
0.24	0.587	263.29	1.16	**0.60**	**2.551**	**1144.73**	**5.06**	0.96	5.470	2454.88	10.85
0.25	**0.626**	**280.89**	**1.24**	0.61	2.620	1175.77	5.20	0.97	5.563	2496.63	11.03
0.26	0.666	298.94	1.32	0.62	2.690	1207.13	5.33	0.98	5.657	2538.66	11.22
0.27	0.707	317.42	1.40	0.63	2.760	1238.82	5.47	0.99	5.751	2580.95	11.41
0.28	0.749	336.34	1.49	0.64	2.832	1270.83	5.62	**1.00**	**5.846**	**2623.52**	**11.59**
0.29	0.793	355.68	1.57	**0.65**	**2.904**	**1303.16**	**5.76**	1.01	5.941	2666.37	11.78
0.30	**0.837**	**375.44**	**1.66**	0.66	2.976	1335.80	5.90	1.02	6.037	2709.48	11.97
0.31	0.881	395.62	1.75	0.67	3.050	1368.76	6.05	1.03	6.134	2752.86	12.17
0.32	0.927	416.20	1.84	0.68	3.124	1402.03	6.20	1.04	6.231	2796.51	12.36
0.33	0.974	437.20	1.93	0.69	3.199	1435.61	6.34	**1.05**	**6.329**	**2840.43**	**12.55**
0.34	1.022	458.59	2.03	**0.70**	**3.274**	**1469.50**	**6.49**	1.06	6.427	2884.62	12.75
0.35	**1.070**	**480.38**	**2.12**	0.71	3.350	1503.70	6.65	1.07	6.526	2929.07	12.95
0.36	1.120	502.57	2.22	0.72	3.427	1538.21	6.80	1.072	6.550	2939.64	12.99
0.37	1.170	525.15	2.32	0.73	3.505	1573.02	6.95				
0.38	1.221	548.11	2.42	0.74	3.583	1608.14	7.11				
0.39	1.273	571.45	2.53	**0.75**	**3.662**	**1643.56**	**7.26**				
0.40	**1.326**	**595.17**	**2.63**	0.76	3.742	1679.28	7.42				
0.41	1.380	619.27	2.74	0.77	3.822	1715.30	7.58				
0.42	1.434	643.74	2.85	0.78	3.903	1751.62	7.74				
0.43	1.490	668.58	2.95	0.79	3.984	1788.23	7.90				
0.44	1.546	693.79	3.07	**0.80**	**4.067**	**1825.14**	**8.07**				
0.45	**1.603**	**719.36**	**3.18**	0.81	4.150	1862.35	8.23				

cfs = cubic feet/second gpm = gallons/minute

Caution !

If h1 is greater than 1.072 ft, the values in this chart are not valid.
Cells in PINK are for reference only



USBR Ramp Flume Comments

Long Throated Flumes, Comments & Advantages - Ramp Flumes

"Long-throated flumes are coming into general use because they can be easily fitted into complex channel shapes as well as simple shapes (Replogle, 1975; Bos et al., 1991). Long-throated flumes have many advantages compared to other measuring devices, including Parshall flumes. Longthroated flumes are more accurate, cost less, have better technical performance, and can be computer designed and calibrated. Thus, long-throated flumes are preferred over Parshall flumes for new installations. However, some states may have laws or compact agreements mandating the use of Parshall flumes in certain situations."

Summary of Long-Throated Flume Advantages
The main advantages of long-throated flumes are:

(1) "Provided that critical flow occurs in the throat (not excessively submerged), a rating table can be calculated with an error less than +2 percent. This calculation can be done for any combination of a prismatic throat and an arbitrarily shaped approach channel."

(2) "Long-throated flumes can have nearly any desired cross-sectional shape and can be custom fitted into most canal-site geometries. The throat cross section can be shaped in such a way that the complete range of discharge can be measured accurately."

(3) "Long-throated flumes can be made into portable devices that fit conveniently into open channels with considerably less complicated construction forming."

(4) "The required head loss over the long-throated flume to obtain a unique relationship between the upstream sill-referenced head and the discharge is small. This head-loss requirement may be estimated with sufficient accuracy for any of these flumes placed in any channel."

(5) "Because of their gradual converging transition, these flumes have few problems with floating debris and sediment. Field observations have shown that the flume can be designed to pass sediment transported by channels with subcritical flow."

(6) "Provided that the throat is horizontal in the direction of flow, a rating table can be produced that is based on post-construction dimensions. This horizontal orientation is required to allow an accurate rating table to be made to compensate for deviations from design."

(7) "Under similar hydraulic and other boundary conditions, long-throated flumes are usually the most economical of all structures for accurately measuring flow."

(8) "Long-throated flumes are amenable to selection, design, and calibration by computer techniques."

"Although Parshall flumes are in extensive use in many western irrigation projects, they are no longer generally recommended because of the advantages of long-throated flumes..." (8.10)

References:
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