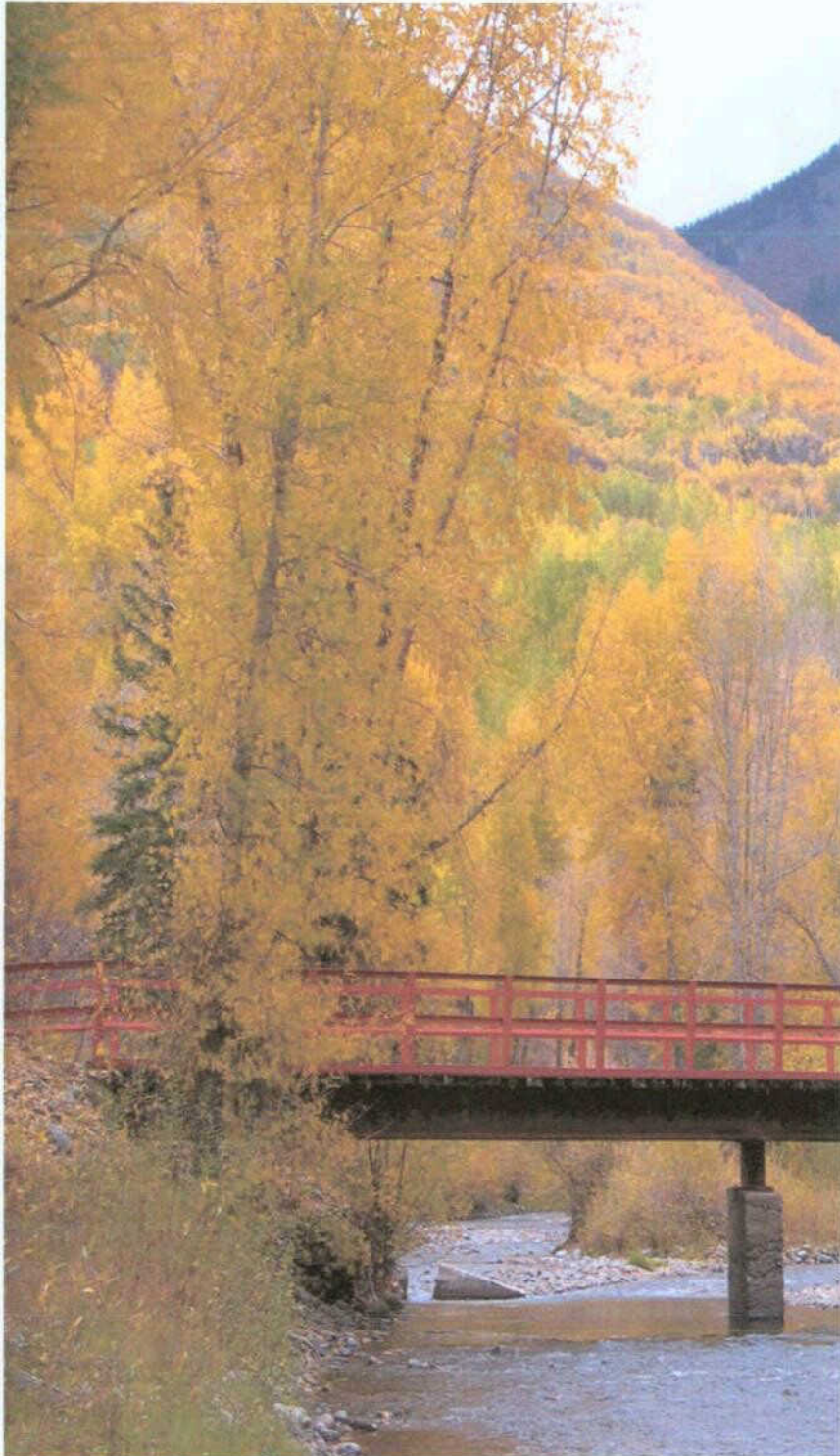
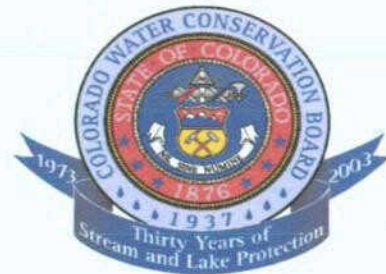


FLOODPLAIN INFORMATION REPORT:
CRYSTAL RIVER
TOWN OF MARBLE & VICINITY
GUNNISON COUNTY, COLORADO



Prepared for:
Department of
Natural Resources
Colorado Water
Conservation Board
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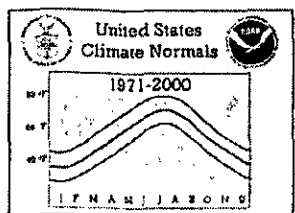
**FLOODPLAIN INFORMATION REPORT:
CRYSTAL RIVER
TOWN OF MARBLE & VICINTIY
GUNNISON COUNTY, COLORADO**

TECHNICAL APPENDIX

- APPENDIX A: Background Information**
- APPENDIX B: Hydrologic Data**
- APPENDIX C: Hydraulic Data (HEC-RAS)**
- APPENDIX D: Bridge Documentation**

TECHNICAL APPENDIX

APPENDIX A: Background Information



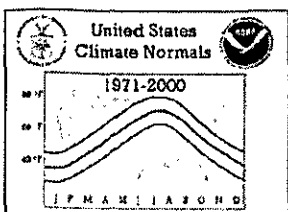
CLIMATOGRAPHY OF THE UNITED STATES NO. 81

Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1971-2000

COLORADO

Page 8

No.	Station Name	Element	TEMPERATURE NORMALS (Degrees Fahrenheit)												ANNUAL
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
002	AKRON 4 E	MAX	38.2	43.9	51.7	60.4	70.0	81.8	88.7	86.8	78.1	65.6	49.2	40.4	62.9
		MEAN	25.1	30.5	37.8	46.0	55.9	66.4	72.7	70.9	61.9	49.6	35.5	27.1	48.3
		MIN	11.9	17.1	23.8	31.6	41.7	51.0	56.7	55.0	45.7	33.5	21.7	13.7	33.6
003	AKRON 1 N	MAX	38.3	43.8	51.7	60.2	69.9	81.8	88.0	86.5	77.3	64.9	48.8	40.1	62.6
		MEAN	27.1	32.2	39.0	47.1	57.0	67.8	73.7	72.3	63.1	51.0	36.7	28.7	49.6
		MIN	15.8	20.6	26.2	34.0	44.1	53.7	59.3	58.0	48.9	37.0	24.6	17.3	36.6
004	ALAMOSA BERGMAN FIELD	MAX	33.1	40.2	49.6	58.7	68.3	78.4	81.7	78.9	72.5	61.7	45.7	34.8	58.6
		MEAN	14.7	22.5	32.7	40.8	50.4	59.4	64.1	62.1	54.5	42.8	28.4	17.1	40.8
		MIN	-3.7	4.7	15.8	22.8	32.4	40.4	46.4	45.2	36.5	23.9	11.1	-0.7	22.9
005	ALTENBERN	MAX	35.8	42.8	52.9	62.0	71.7	83.3	88.8	85.9	77.4	65.0	48.4	37.5	62.6
		MEAN	23.3	30.0	38.7	45.8	54.5	63.2	69.3	67.4	59.3	48.3	34.8	24.9	46.6
		MIN	10.7	17.2	24.4	29.5	37.2	43.1	49.8	48.8	41.1	31.5	21.1	12.2	30.6
007	ANTERO RESERVOIR	MAX	32.3	35.6	41.5	48.0	58.0	70.0	75.4	73.1	66.6	55.9	41.0	32.6	52.6
		MEAN	14.6	17.4	26.3	33.2	43.3	52.3	57.8	56.1	48.8	37.6	24.4	15.0	35.6
		MIN	-3.1	-0.8	11.0	18.4	27.8	34.5	40.1	39.1	31.0	19.3	7.7	-2.7	18.5
008	ASPEN 1 SW	MAX	34.0	38.9	44.6	51.0	61.3	72.1	77.3	75.4	68.5	57.7	42.5	34.8	54.8
		MEAN	20.7	25.1	31.7	37.9	47.4	56.4	62.7	60.5	53.6	43.4	29.8	21.7	40.8
		MIN	7.4	11.2	18.8	24.8	33.5	40.6	46.2	45.6	38.6	29.1	17.0	8.6	26.8
009	BAILEY	MAX	37.8	41.3	46.3	52.5	61.8	73.1	77.7	75.6	68.9	58.8	45.0	37.9	56.4
		MEAN	22.7	25.8	31.6	37.6	46.3	55.4	60.5	58.9	51.5	41.4	30.2	23.3	40.4
		MIN	7.6	10.3	16.9	22.7	30.8	37.6	43.3	42.2	34.1	24.0	15.3	8.6	24.5
010	BERTHOUD PASS	MAX	21.8	25.2	31.0	36.9	45.7	55.4	61.4	60.3	53.1	42.4	29.7	23.4	40.5
		MEAN	12.1	14.4	19.3	25.6	34.6	44.2	50.2	49.6	42.4	31.8	19.6	13.3	29.8
		MIN	2.4	3.6	7.6	14.2	23.5	33.0	38.9	38.8	31.6	21.1	9.5	3.2	19.0
011	BLANCA	MAX	34.2	40.2	48.5	57.0	66.5	77.2	81.1	78.8	72.3	61.6	46.3	35.8	58.3
		MEAN	17.9	24.7	33.8	41.5	50.6	60.0	64.7	62.6	55.0	43.9	30.1	19.6	42.0
		MIN	1.5	9.2	19.0	25.9	34.7	42.8	48.2	46.4	37.7	26.2	13.9	3.4	25.7
012	BLUE MESA LAKE	MAX	27.4	31.9	42.7	54.9	65.5	76.9	82.4	80.6	72.8	61.1	43.8	30.0	55.8
		MEAN	13.6	17.7	29.6	40.1	49.2	58.8	64.8	63.6	55.8	44.8	30.8	17.4	40.5
		MIN	-0.3	3.5	16.5	25.2	32.9	40.6	47.2	46.6	38.7	28.4	17.7	4.8	25.2
014	BONNY DAM 2 NE	MAX	40.0	46.1	54.1	63.6	72.6	83.7	89.2	86.9	77.9	66.2	50.3	41.7	64.4
		MEAN	26.9	32.3	39.4	48.3	58.1	68.6	74.2	72.2	62.9	50.7	37.1	29.0	50.0
		MIN	13.7	18.5	24.6	33.0	43.6	53.5	59.2	57.5	47.9	35.1	23.9	16.2	35.6
015	BOULDER	MAX	45.7	49.1	55.8	62.7	71.7	82.2	87.2	85.0	77.4	66.7	52.6	46.1	65.2
		MEAN	32.5	35.8	41.8	48.3	56.9	66.4	71.6	70.0	62.1	51.9	39.7	33.4	50.9
		MIN	19.2	22.5	27.7	33.9	42.0	50.5	55.9	55.0	46.8	37.1	26.8	20.6	36.5
018	BRIGGSDALE	MAX	40.8	46.6	54.4	63.2	72.5	83.1	89.2	86.9	78.3	66.4	50.0	41.6	64.4
		MEAN	25.8	31.3	38.9	47.3	57.1	67.0	72.9	70.9	61.7	49.8	35.1	26.7	48.7
		MIN	10.7	16.0	23.4	31.3	41.7	50.8	56.5	54.8	45.1	33.1	20.2	11.7	32.9
019	BRIGHTON 3 SE	MAX	41.4	46.8	54.3	62.0	71.6	82.6	87.9	85.9	77.5	66.6	50.1	42.6	64.1
		MEAN	26.8	31.8	39.2	47.3	57.0	66.9	72.1	70.3	61.2	50.0	35.5	28.1	48.9
		MIN	12.2	16.8	24.1	32.5	42.3	51.2	56.3	54.6	44.9	33.3	20.9	13.5	33.6
020	BROWNS PARK REFUGE	MAX	37.3	43.2	51.5	59.8	70.6	82.3	88.8	87.2	77.8	66.0	48.2	38.7	62.6
		MEAN	21.6	27.4	36.3	43.5	53.2	62.0	67.9	66.1	57.0	46.2	32.3	23.2	44.7
		MIN	5.9	11.5	21.1	27.2	35.7	41.6	46.9	44.9	36.1	26.4	16.4	7.7	26.8
021	BUCKHORN MTN 1 E	MAX	38.9	41.5	46.5	52.7	61.6	72.5	79.6	78.5	69.9	59.1	46.3	40.6	57.3
		MEAN	28.0	29.9	35.3	40.8	49.9	59.8	66.7	66.1	57.3	46.9	35.2	29.7	45.5
		MIN	17.1	18.3	24.0	28.8	38.2	47.0	53.8	53.6	44.7	34.6	24.0	18.8	33.6
022	BUENA VISTA 2 S	MAX	39.2	42.6	47.9	54.7	64.8	76.1	80.8	78.3	71.4	61.1	47.0	39.6	58.6
		MEAN	24.7	28.1	34.2	40.3	49.5	59.1	64.0	62.1	54.6	44.2	32.4	24.9	43.2
		MIN	10.1	13.6	20.4	25.8	34.2	42.0	47.2	45.8	37.7	27.2	17.8	10.1	27.7
023	BURLINGTON 4 S	MAX	39.9	45.3	52.8	61.9	71.2	82.9	88.5	86.0	77.8	66.1	49.7	41.4	63.6
		MEAN	27.4	32.1	38.6	47.7	57.6	68.9	74.0	72.1	63.4	51.3	36.9	29.0	49.9
		MIN	14.8	18.8	24.4	33.4	44.0	54.8	59.5	58.2	49.0	36.4	24.1	16.6	36.2
024	BYERS 5 ENE	MAX	40.2	45.3	53.1	61.4	70.9	82.9	89.0	86.9	78.1	66.7	50.2	41.7	63.9
		MEAN	26.1	31.0	38.4	46.6	56.4	67.3	73.1	71.5	62.1	50.4	35.8	27.9	48.9
		MIN	12.0	16.6	23.6	31.8	41.8	51.6	57.2	56.0	46.0	34.1	21.3	14.0	33.8
025	CABIN CREEK	MAX	30.2	32.4	36.6	42.5	52.1	63.4	68.3	66.5	60.0	50.0	37.1	31.9	47.6
		MEAN	18.5	20.4	24.6	31.0	40.6	50.3	55.1	53.6	46.9	37.7	25.4	20.5	35.4
		MIN	6.8	8.4	12.5	19.5	29.0	37.2	41.8	40.6	33.8	25.4	13.7	9.0	23.1
026	CAMPO 7 S	MAX	47.6	53.0	60.2	68.3	77.2	87.8	92.3	89.7	82.2	71.6	57.0	48.5	69.6
		MEAN	31.9	36.6	43.6	52.1	61.8	71.8	76.6	74.5	66.2	54.6	41.2	33.1	53.7
		MIN	16.2	20.2	26.9	35.9	46.3	55.8	60.9	59.3	50.2	37.6	25.3	17.7	37.7
027	CANON CITY	MAX	48.5	52.4	57.8	64.6	73.4	84.3	89.6	87.1	79.1	68.7	55.6	49.0	67.5
		MEAN	34.1	37.7	42.7	49.7	58.8	68.7	74.3	72.6	63.8	53.4	41.7	35.1	52.7
		MIN	19.7	22.9	27.6	34.7	44.2	53.1	59.0	58.0	48.4	38.1	27.7	21.1	37.9
028	CASTLE ROCK	MAX	43.9	46.6	51.9	58.3	67.4	78.2	84.0	81.9	74.4	65.0	51.2	45.0	62.3
		MEAN	28.8	32.0	37.7	44.3	53.5	62.9	68.6	66.7	58.7	48.4	36.2	29.9	47.3
		MIN	13.6	17.4	23.4	30.2	39.5	47.6	53.1	51.4	43.0	31.8	21.2	14.8	32.3



CLIMATOGRAPHY OF THE UNITED STATES NO. 81

Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days

1971-2000

COLORADO

Page 16

No.	Station Name	PRECIPITATION NORMALS (Total in Inches)												ANNUAL
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
001	AGUILAR 1 SE	.37	.54	1.61	1.96	2.91	1.66	2.82	3.04	1.53	1.08	.95	.71	19.18
002	AKRON 4 E	.36	.37	1.06	1.42	3.00	2.28	2.95	2.26	.98	.85	.70	.36	16.59
003	AKRON 1 N	.33	.36	1.04	1.58	3.15	2.32	2.93	2.00	.92	.90	.69	.40	16.62
004	ALAMOSA BERGMAN FIELD	.25	.21	.46	.54	.70	.59	.94	1.19	.89	.67	.48	.33	7.25
005	ALTENBERN	1.13	1.29	1.65	1.51	1.81	.97	1.35	1.36	1.64	1.82	1.41	1.06	17.00
006	AMES	1.68	1.79	2.43	1.87	1.99	1.37	2.71	3.24	2.74	2.29	1.87	1.59	25.57
007	ANTERO RESERVOIR	.21	.25	.52	.73	1.02	1.18	1.89	1.97	.93	.64	.37	.26	9.97
008	ASPEN 1 SW	1.72	2.05	2.74	2.56	2.10	1.26	1.76	1.37	1.65	2.06	2.24	1.25	23.26
009	BAILEY	.40	.54	1.28	1.92	2.10	1.76	2.55	2.68	1.25	1.15	.89	.58	17.10
010	BERTHOUD PASS	3.09	2.60	3.65	4.49	3.99	2.11	2.25	2.75	2.24	2.30	3.37	2.68	35.52
011	BLANCA	.32	.31	.58	.64	1.00	.73	1.44	1.50	1.01	.79	.58	.33	9.23
012	BLUE MESA LAKE	.91	.67	.53	.51	.55	.59	1.16	1.31	.83	.77	.64	.79	9.26
013	BONHAM RESERVOIR	3.23	3.27	4.26	3.19	2.69	1.31	2.26	2.37	2.23	2.66	3.39	3.03	33.89
014	BONNY DAM 2 NE	.46	.45	1.22	1.83	3.48	2.70	2.81	2.17	1.39	1.00	.75	.36	18.62
015	BOULDER	.70	.75	1.78	2.88	3.05	1.99	1.88	1.63	1.79	1.28	1.42	.78	19.93
016	BRANDON	.19	.21	.65	1.13	2.37	2.14	2.43	2.06	.83	.89	.48	.19	13.57
017	BRECKENRIDGE	1.43	1.41	1.81	1.90	1.87	1.40	2.29	2.18	1.55	1.20	1.38	1.31	19.73
018	BRIGSDALE	.30	.19	.78	1.28	1.94	2.07	2.51	1.81	1.28	.66	.45	.26	13.53
019	BRIGHTON 3 SE	.45	.38	1.19	1.74	2.44	1.68	1.63	1.50	1.08	.85	.88	.52	14.34
020	BROWNS PARK REFUGE	.39	.45	.74	.81	1.16	.69	.68	.66	1.00	1.16	.56	.37	8.67
021	BUCKHORN MTN 1 E	.87	.57	2.05	2.86	3.37	2.50	2.48	2.08	2.03	1.07	1.18	.56	21.62
022	BUENA VISTA 2 S	.28	.40	.69	.94	1.09	.86	1.45	1.67	.94	.82	.53	.36	10.03
023	BURLINGTON 4 S	.33	.42	1.05	1.35	2.88	2.50	2.77	2.28	1.04	.94	.58	.34	16.48
024	BYERS 5 ENE	.43	.35	1.04	1.57	2.76	1.86	2.33	1.81	1.13	.82	.81	.43	25.34
025	CABIN CREEK	.68	.84	1.62	2.49	2.09	1.78	2.53	2.74	1.59	1.19	1.10	.78	19.43
026	CAMPO 7 S	.31	.34	.99	1.51	2.59	2.49	2.91	2.53	1.47	1.19	.54	.34	17.21
027	CANON CITY	.46	.38	1.06	1.47	1.64	1.24	1.78	2.05	1.21	.72	.80	.49	13.30
028	CASTLE ROCK	.55	.53	1.50	1.87	2.42	1.92	2.37	2.16	1.24	1.09	.98	.71	17.34
029	CEDAREIDGE	1.19	.88	1.34	.97	1.22	.59	.91	1.19	1.10	1.65	1.24	.97	13.25
030	CENTER 4 SSW	.16	.17	.37	.39	.62	.67	1.11	1.30	.91	.57	.46	.25	6.98
031	CHEESMAN	.42	.56	1.41	1.78	2.04	1.92	2.57	2.75	1.20	1.08	.86	.66	17.25
032	CHERRY CREEK DAM	.49	.47	1.50	2.08	2.85	2.00	2.46	2.05	1.44	1.03	1.18	.65	18.20
033	CHEYENNE WELLS	.25	.34	.86	1.29	2.80	2.41	2.63	2.45	1.31	.81	.60	.25	16.00
034	CIMARRON	.92	.75	1.02	1.12	1.20	.84	1.28	1.36	1.41	1.38	1.12	.76	13.16
035	CLIMAX	2.04	1.75	2.35	2.38	2.10	1.13	2.24	2.09	1.49	1.42	1.96	1.84	22.79
036	COCHETOPA CREEK	.74	.67	.82	.91	1.01	.71	1.52	1.81	1.14	.82	.73	.79	11.67
037	COLLBRAN	.87	.89	1.54	1.52	1.56	.76	1.09	1.18	1.16	1.59	1.22	.96	14.34
038	COLORADO NATL MONUMENT	.71	.67	1.14	.93	1.21	.68	.86	1.02	.93	1.29	.95	.78	11.17
039	COLORADO SPRINGS MNPL A	.28	.35	1.06	1.62	2.39	2.34	2.85	3.48	1.23	.86	.52	.42	17.40
040	CORTEZ	1.01	.95	1.37	.90	1.01	.43	1.23	1.37	1.31	1.55	1.18	.90	13.21
041	CRAIG 4 SW	1.05	1.12	1.39	1.63	1.52	1.11	1.34	1.15	1.39	1.82	1.38	.97	15.87
042	CREEDE	.46	.60	.65	.76	.85	.79	1.48	2.40	1.52	1.37	.99	.58	12.45
043	CRESTED BUTTE	2.58	2.44	2.36	1.82	1.63	1.17	1.90	2.00	1.97	1.76	2.09	2.15	23.87
044	CRESTONE 1 SE	.64	.37	.93	1.00	1.09	.86	2.44	2.03	1.25	1.03	.75	.53	12.92
045	DEL NORTE 2 E	.31	.34	.83	.71	.89	.77	1.59	1.94	1.13	.83	.65	.47	10.46
046	DELTA	.37	.39	.66	.53	.69	.40	.72	.79	.90	1.07	.67	.42	7.61
047	DENVER INTL AP (DNR)	.51	.49	1.28	1.93	2.32	1.56	2.16	1.82	1.14	.99	.98	.63	15.81
048	DENVER STAPELTON	.51	.49	1.28	1.93	2.32	1.56	2.16	1.82	1.14	.99	.98	.63	15.81
049	DILLON 1 E	.86	.95	1.13	1.22	1.45	1.21	1.75	1.66	1.32	.78	.87	.83	14.03
050	DINOSAUR NATL MONUMNT	.72	.62	1.01	1.21	1.41	.85	1.00	.85	1.21	1.48	.80	.57	11.73
051	DOLORES	1.71	1.63	2.16	1.46	1.40	.66	1.43	1.77	1.64	2.12	2.03	1.36	19.37
052	DURANGO	1.65	1.44	1.71	1.30	1.17	.61	1.64	2.58	1.94	2.10	1.82	1.37	19.33
053	EADS	.30	.34	.97	1.31	2.47	2.07	2.80	2.24	1.06	.89	.64	.34	15.43
054	EAGLE AP	.75	.61	.80	.79	.92	.84	1.44	.93	1.08	1.09	.67	.80	10.72
055	EASTONVILLE 2 NNW	.45	.45	1.40	2.19	2.91	2.16	3.01	3.35	1.34	1.05	.91	.54	19.76
056	ESTES PARK	.32	.47	.90	1.42	2.11	1.43	2.16	1.98	1.23	.93	.63	.37	13.95
057	EVERGREEN	.54	.68	1.69	2.53	2.60	2.05	2.29	2.38	1.45	1.26	1.05	.78	19.30
058	FLAGLER 1 S	.35	.36	.98	1.48	2.79	2.65	2.72	2.31	1.11	.79	.67	.35	16.56
059	FLEMING	.34	.37	1.02	1.54	3.08	2.70	2.83	1.94	1.33	.74	.58	.34	16.81
060	FLORISSANT FOSSIL BED	.29	.30	.81	1.06	1.61	1.41	2.73	3.02	1.47	.84	.61	.27	14.42
061	FORT CARSON	.28	.19	.79	1.18	2.19	1.74	2.89	3.13	.97	.69	.39	.31	14.75
062	FORT COLLINS	.42	.38	1.42	2.09	2.60	1.99	1.87	1.40	1.38	.98	.82	.49	15.84
063	FORT LEWIS	1.65	1.40	1.78	1.05	1.23	.62	2.14	2.45	1.90	1.98	1.71	1.23	19.14
064	FORT MORGAN	.21	.18	.74	1.33	2.41	1.98	1.93	1.58	1.21	.81	.49	.26	13.13
065	FOUNTAIN	.31	.31	.82	1.51	2.26	2.19	3.23	3.54	1.20	.79	.51	.38	17.05
066	FOWLER 1 SE	.20	.19	.71	1.13	1.78	1.35	1.77	1.99	.77	.64	.48	.28	11.29
067	FRASER	1.66	1.56	1.58	1.99	1.94	1.16	1.49	1.43	1.15	.96	1.51	1.70	18.13
068	FRUITA 1 W	.65	.57	.96	.77	1.04	.51	.77	.73	.78	1.01	.74	.65	9.18
069	GATEWAY 1 SE	.78	.63	1.17	1.08	1.13	.53	1.07	1.26	1.05	1.23	1.03	.64	11.60

[Home](#)[Lodging](#)[Upper](#)[Crystal](#)[River](#)[Caucus](#)[Local](#)[Arts,](#)[Crafts,](#)[Businesses](#)

Walking Tour

SELF GUIDED WALKING TOUR OF MARBLE, COLORADO

This is an update and revision of the tour guide prepared by Duncan McCollum for the Marble Historical Society. It begins at the museum at 412 West Main, and proceeds east to West 1st St, then south to State St, then west to West 2nd St, then south to Park St, then west to West 3rd St, and finally south to the mill site. The route requires about 1 hour to complete. You may obtain a copy of this guide at the museum (hours are generally 2-4 PM on Saturday and Sunday), or you may print this page using your browser.

WELCOME TO MARBLE! Have you ever seen the Lincoln Memorial in Washington DC, or the Denver Post Office, or the Tomb of the Unknown Soldier, and wondered where the beautiful white stone came from? You are standing in the town which produced that stone, as well as marble for the New York City Municipal Building, the Montana State Capital, and hundreds of other buildings.

This tour guide will take you on a short tour of Marble Colorado. As you follow the route you will see some of the buildings which were a part of this once thriving quarry town. For each numbered point of interest on the map there is a brief description in this guide. While you walk the tour please stay on the roadsides, as all of the buildings are located on private property. For their safety, children should be accompanied by an adult. You are welcome to wander through and picnic at the Mill Site, which is a town park.

WARNING! All of the marble that you see is privately owned, and is valuable (about \$1/lb, and a cubic foot of marble weighs 170 lbs). Do not attempt to steal the marble!

THE PURE WHITE STONE. Marble was a unique type of boom town. Instead of gold or silver mining, its economy was based on an entire mountainside of the finest marble found anywhere in the world.

The marble deposits were discovered in 1873 by a geological survey expedition when the Crystal River Valley was still part of the Ute Indian Reservation. Soon after, the Utes were removed farther west, and prospectors and settlers entered the area, founding Marble in 1881. Eighteen years later the Town was officially incorporated and began its forty year cycle of boom and bust. The peak period in Marble's history was the five years preceding the United States' entry into World War I in 1917, when the town supported a population of 1400.

The marble quarries are located four miles south of the town in rugged terrain. Quarried blocks of stone were transported down in a variety of ways. The earliest method was to haul them behind teams of horses. The horses were soon replaced by a huge steam tractor and four wagons. Finally, an electric railroad, called a tram or trolley, was constructed which ran directly into the finishing mill located along the Crystal River. Today specially equipped large trucks bring the stone down the mountain.

At the finishing mill in Marble dozens (or hundreds) of skilled stoneworkers cut and carved the stone, readying it for uses as varied as tombstones and courthouses.

1) MARBLE HIGH SCHOOL. The Marble High School was built in 1910 when Marble had 200 school age children. About three-fourths of these children regularly attended school. In later years, as the town's population dwindled, all twelve grades met in this building. In the 1940's the school was closed. In 1996, after extensive renovation, it was reopened as the Marble Charter School. The building also houses the museum of the Marble Historical Society.

Originally the winters in Marble were much more severe than they are now, and the school year was April thru October, thus bypassing the winter months. The school was built without indoor plumbing, and some of the students were charged with bringing water from the river each morning. The outhouse in the back of the school is original.

2) TOWN HALL. Across the street from the High School is one of Marble's former private homes. Most of the original homes in Marble have been lost due to fire, mud slides, and removal of buildings (generally to Grand Junction, where they remain to this day). The building stands on the site of the old Marble Grade School. This house was originally located at West 2nd and Park Streets where it was used as a schoolhouse during the 1940's. It was moved to its present location after the Marble Grade School building was demolished in 1942. Today it houses the Marble Town Offices.

3) CONCRETE VAULT. Approximately 200 yards east of the High School on the right hand side of the road stands a concrete vault. Next to it is the foundation of the offices of the Colorado Yule Marble Company to which the vault was attached. The office building was occupied only until 1908 when the company moved its offices to the newly completed finishing mill. This vault was used to protect valuable papers from theft or fire, and is all that remains of the original office building.

4) THE OLD PERRY HOUSE. One block east on Main Street is the former residence of William D. Perry, one of the founders of Marble. Perry and William Woods founded the town in 1881. The house, as well as most others in town, was furnished with 'outside plumbing'. To this day there is no sewer system in Marble.

5) MARBLE CITY STATE BANK. At the end of the same block is the building which housed the Marble City State Bank from 1912 to 1917. These years were Marble's greatest boom period and the only time the town had a bank (though it had up to 3 newspapers). Inside the building is concrete vault complete with door and lock. The construction is unusual: the walls are solid wood, to deter thieves.

6) HOUSE. One block north of the bank building is one of the few houses in Marble still in its original condition and location. It was one of the large private residences in the town.

7) RESTORED HOUSE. Across the street is another private home. It was swept off its foundation by the 1941 flash flood of Carbonate Creek which damaged much of the center of the town. You may notice that all of Marble is on mudflow, and mudflows occur nearly every year, sometimes blocking traffic for hours. The 1941 mudflow was particularly large. In 1975 this house was returned to its rebuilt foundation and restored by the great-grandson of Horace Williams, the original owner. The building was moved over 30 feet by the mudflow.

8) FLOOD DAMAGED HOUSE. Two blocks south, on West 1st St is the remains of house which was damaged during flash floods in 1941 and 1945. The house is now buried in 3 to 4 feet of once swiftly flowing mud and stone. Both of these floods occurred after Marble had virtually ceased to exist as a functioning town (at one point the population was reputedly one) and neither caused any serious personal injuries. Little remains of the many other buildings damaged by these two very destructive floods.

9) JAIL. A small building a foul balls distance from third base at the baseball field is an old two cell jail. The cells are still there.

10) HOUSE. West on State Street are three original buildings. The first is a private residence which has been maintained since the early days of Marble.

11) SMALL HOUSE. Next door is a little house which started as a tent on a board floor that reportedly rented for \$40 per month. Later, board walls and finally a wood roof were added. From about 1905 to 1915 Marble grew rapidly and experienced a housing shortage so that many residents lived in tent houses.

12) ST. PAUL'S EPISCOPAL CHURCH. This church was moved to Marble from Aspen in 1908. The steeple was added two years later. Inside is an operating pump organ which has been used during services since the church was moved to Marble. There is a separate page which gives much more detail about the church.

13) COLUMBUS CATHOLIC CHURCH FOUNDATION. One block south of the church, on Park Street, is a marble foundation constructed in 1912 for the Columbus Catholic Church. The stone building never progressed beyond the point seen here.

The marble for its construction had been donated by the Colorado Yule Marble Company until the company president, Colonel Channing F. Meek, was killed by a runaway train on the electric tram. After his death in 1912 donations of marble ceased, and the building was never completed.

14) FINISHING MILL SITE. Beginning at the south end of West 3rd St (basically where the bridge crosses the Crystal River), and running west for 1500 feet is the site of what was formerly the world's largest marble finishing mill. It was here that marble from the quarries was brought to be cut, carved, and polished before shipment to building sites around the country. Today there are few remnants of the vast building, but because of its unique nature the site has been entered on the National Register of Historic Sites. Because it is a federally protected area it must be stressed that nothing in the Mill Site be disturbed, including the scraps of marble scattered about. It is also a town park that you are welcome to explore.

In the finishing mill site are two rows of marble pillars. Each of these rows supported one end of an overhead crane. These cranes unloaded rough marble blocks from the electric trolley and moved them into the mill for processing. They had capacities of 15 and 25 tons. Also note the two high standing marble walls. They were firewalls, built between major shops in the mill and intended to help slow the spread of a blaze should a fire start.

In 1942 the mill was disassembled and marble production ceased because of increasing costs and a dwindling market.

Near the mill site (immediately east, across the street) is a sixty foot diameter, marble lined hole. This was the railroad turntable where locomotives were turned around by hand for the trip out of Marble.

The bridge across the Crystal River near the turntable was built in 1976, financed in part with federal grant money as a Bicentennial Project. A few yards downstream are some of the pilings from the original bridge over which the trolley carried marble to the finishing mill.

[Return to Marble Colorado Home Page](#)

[Home](#)[Crystal Mill](#)[Search Page](#)[Pictures](#)

About the Crystal Valley

[Lodging](#)[Upper](#)[Crystal](#)[River](#)[Caucus](#)[Local Arts,](#)[Crafts,](#)[Businesses](#)

The Crystal Valley (or the Upper Crystal Valley, for some folks) extends from the intersection of Route 133 and Country Road 3 (where the main road turns off to Marble) up to Scholfield Park, a total distance of about 15 miles. About half of that (say, 8 miles) is either paved or at least maintained. The other half is four wheel drive only. The valley includes two ghost towns: Marble and Crystal. Crystal is about 6 miles east of Marble, and is inhabited only in the summer. Marble is inhabited the year around, although the year around population is probably less than one hundred, and the main road through town is unpaved. There are no street lights, stop lights, or any other trappings of civilization.

The valley is traversed by the Crystal River, which has its origin above Scholfield Park. The river is very scenic, and lives up to its name: the water is so pure that native fish populations have a hard time surviving due to the lack of nutrients. Fishing ranges from mediocre to excellent - you have to know where to go, and we ain't telling here.

The forests consist of both Aspen groves, and evergreens. Legend has it that the Ute Indians, upon being driven out of the valley by the early prospectors and settlers, set fire to the valley. For good measure they also put a curse on it. At any rate, if the legend be true, the fire gave the Aspen groves a chance to get started - Aspens are just big weeds, and will repopulate a burn first. The evergreens take longer. At any rate, for whatever reason, there is a large population of Aspen. Many years the best fall colors in all of Colorado are in the Crystal Valley, causing a huge influx of tourists during the end of September, and the beginning of October. The combination of evergreens and Aspens is mind boggling. As an aside (whatever were we talking about anyway?), it is said that Aspen groves are the largest and oldest living organisms - the contention being that a grove is a single plant, and some groves are tens of thousands of years old. Go figure.

We should also mention, while talking about plants in the valley, that you can find morel mushrooms. But ya gotta know where, and we ain't telling here.

Wildlife includes deer, elk, cougar, bear, raccoon, fox, marmot, chipmunk, squirrel, rabbit, skunk, grouse, mice, big horn sheep, mountain goats, eagles, and tourists. A are harmless, except the mice (hantavirus) and the tourists.

Insects include ticks and glow worms. Honest to God. Residents devise ingenious methods of killing ticks (pulling off all the legs, and letting it loose to starve is a favorite). The little blood suckers don't get any more mercy than lawyers. Incidentally, to the best of our knowledge there are no lawyers in the valley, which

is why they are not listed under wildlife, above. The glow worms may be found in July on south facing slopes. They are about 3/8's of an inch long, and emit a greenish glow continuously from one end. Which end I haven't the faintest. Of course there are all the other usual suspects, but nothing to write home about. In particular, the mosquitoes are not bad, but they are there.

Mines. Lots of mines. Two old prospectors still come into the valley every year, and work a claim on the top of Treasure Mountain. There's a jeep track up the mountain and they will meet you if you try to cross their claim. With rifles. Anyway, there are mines or exploratory shafts everywhere. Most have been sealed, but it is still possible to come across a few dozen mines in an afternoon of exploring. Try Sheep Mountain, which is riddled with shafts.

But it was marble that could be converted to gold. One of the world's largest concentrations of marble is in the mountains immediately south of the town of Marble. Originally, the marble formed a cap about 8 miles in diameter, and several hundred feet thick. Over time erosion caused it to be exposed in places. In the very early 1900's, a couple of quarries (actually, they are mines, since the marble is extracted from within the mountain) began operation. A finishing mill was established in Marble (aptly named, don't you think?), and the rest, as they say, was history. The Yule Marble Quarry produced some of the finest marble in the world (still does), and the finishing mill was the world's largest. Marble from Marble was used in hundreds of buildings, including the Lincoln Memorial and the Tomb of the Unknown Soldier. Declining use as a building material, and World War II finally did in the quarry, and the town of Marble. By 1945 the population of Marble was down to one hearty or crazy soul. The quarry was reopened in 1990, and continues operation today, though the finishing of the stone is done elsewhere.

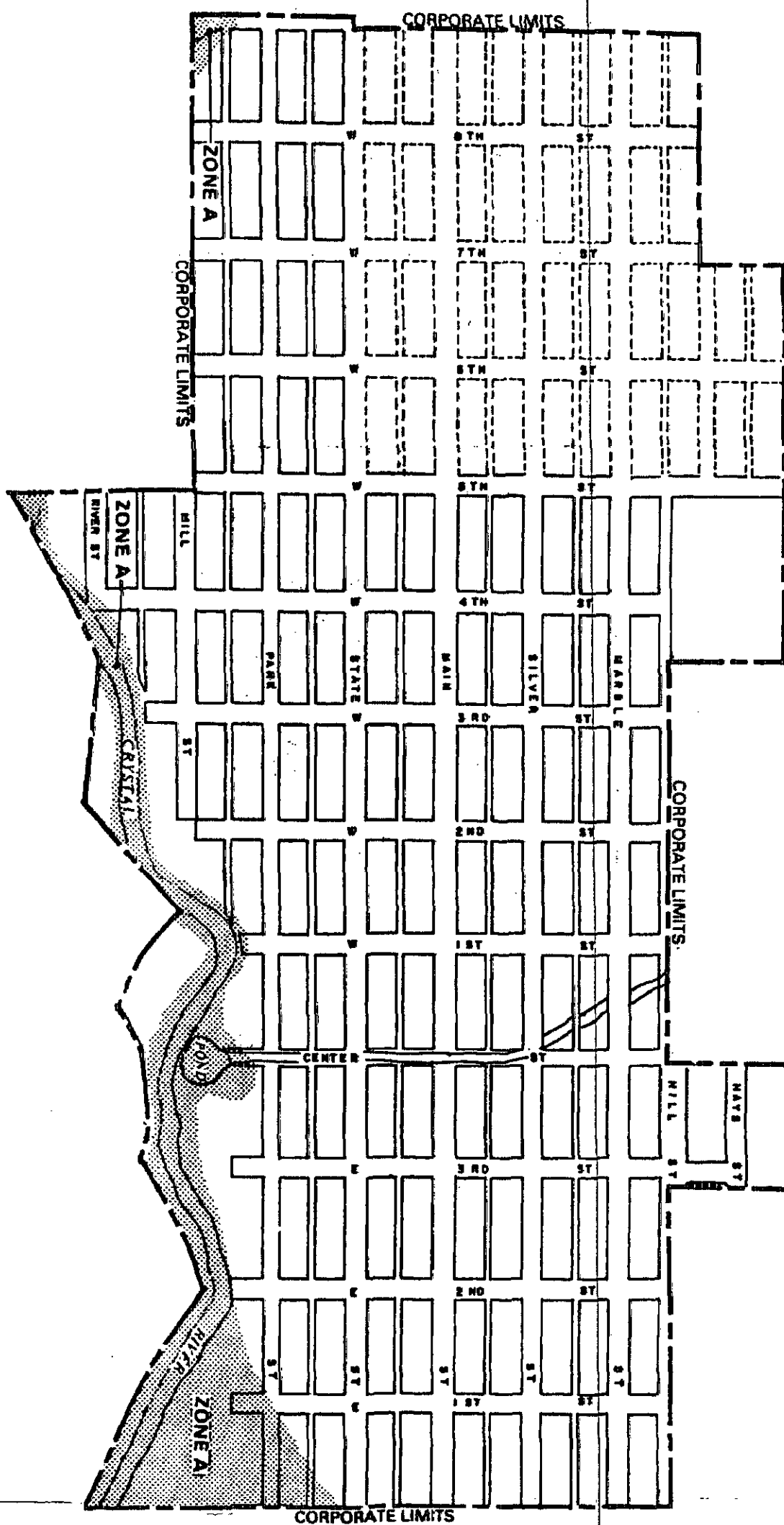
The population of the Crystal Valley is probably about 300 hearty souls, all of them rugged self-sufficient individualists. You have to be self-sufficient to survive in the valley - we roar with laughter when visitors ask 'don't you have trouble getting tradesmen?'. Since almost anything can happen at any time, ya gotta be prepared, and able to cope.

There are no bars, and only one church. The church was built in Aspen, and brought over on the back of a railcar. It is a classically white little church which inspires lots of people to get married. The pastor is Linda Arocha, who is a real hoot - you have to go at least once. It is a rare combination of magic and religion.

There is also a school - the Marble Charter School. Housed in the renovated old High School building of Marble, the school is parent-run and enrolls students from kindergarten thru 8th grade. It is one of those rare little gems that are almost impossible to find anymore. As a charter school (one of the first in Colorado) MCS is part of the public school system, but is quite independent of the rules and restrictions of the typical and traditional public school. With two truly gifted

teachers and about 20 students, the school is a dream come true.

[Return to Home Page](#)



01	DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT Federal Insurance Administration		
	TOWN OF MARBLE, CO (GUNNISON CO.)		EFFECTIVE DATE 6/17/77

FLOOD HAZARD BOUNDARY MAP

TECHNICAL APPENDIX

APPENDIX B: Hydrologic Data

1.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the geographic area of the Town of Marble, Colorado.

Discharges along the Crystal River were calculated using the PEAKFQ computer program (Reference 1) which uses a log-Pearson Type III frequency analysis. The analysis is based on USGS gage information, totaling over 45 years of record, along the Crystal River, just downstream of the Town of Marble. Peak discharges from the USGS gaging stations were adjusted along the study reach based on the guidelines provided in the Manual for Estimating Characteristics of Natural-Flow Streams in Colorado, Technical Manual No. 1 (Reference 2).

Peak discharge-drainage area relationships for the streams studied by detailed methods are shown in Table 1.

Table 1. Summary of Discharges

<u>Flooding Source and Location</u>	<u>Drainage Area (Square Miles)</u>	<u>Peak Discharge (cfs)</u>			
		<u>10-Year</u>	<u>50-Year</u>	<u>100-Year</u>	<u>500-Year</u>
Crystal River					
Confluence with Rapid Creek	93.05	1994	2445	2625	3028
Confluence with Milton Creek	83.65	1833	2248	2413	2783
Town of Marble	73.59	1657	2031	2181	2515
Upstream Limit of Study	53.32	1284	1575	1691	1950

9.0 BIBLIOGRAPHY AND REFERENCES

1. U.S. Geological Survey, Computer Program PEAKFQ Version 4.0, Annual Flood Frequency Analysis Using Bulletin 17B Guidelines, December 2000.
2. Colorado Water Conservation Board, Colorado Department of Natural Resources, Manual for Estimating Flood Characteristics of Natural-Flow Streams in Colorado, Technical Manual No. 1, 1976

Preliminary Hydrology Section, sent to Tom Banning CWCB on 10/8/03.
CDS discussed w/ Tom on 10/9/03. Tom said he felt comfortable w/ Hydrology based on assumptions. CDS also said he was comfortable. Any other adjustments would not yield significantly different results. This analysis incorporates major storms that occurred outside of the Placita Gage years of record.

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
Following Bulletin 17-B Guidelines
Program peakfq
(Version 4.0, December, 2000)

--- PROCESSING DATE/TIME ---

2003 OCT 7 10:29:09

--- PROCESSING OPTIONS ---

Plot option = Graphics & Printer
Basin char output = None
Print option = Yes
Debug print = No
Input peaks listing = Long
Input peaks format = WATSTORE peak file

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
Following Bulletin 17-B Guidelines
Program peakfq
(Version 4.0, December, 2000)

Station - 09081550 CRYSTAL RIVER AT PLACITA, CO.
2003 OCT 7 10:29:09

INPUT DATA SUMMARY

Number of peaks in record = 45
Peaks not used in analysis = 0
Systematic peaks in analysis = 45
Historic peaks in analysis = 0
Years of historic record = 0
Generalized skew = -0.300
Standard error of generalized skew = 0.550
Skew option = WEIGHTED
Gage base discharge = 0.0
User supplied high outlier threshold = --
User supplied low outlier criterion = --
Plotting position parameter = 0.00

***** NOTICE -- Preliminary machine computations. *****
***** User responsible for assessment and interpretation. *****

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
WCF195I-NO LOW OUTLIERS WERE DETECTED BELOW CRITERION. 743.7
WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 3317.8

Station - 09081550 CRYSTAL RIVER AT PLACITA, CO.
2003 OCT 7 10:29:09

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE		LOGARITHMIC		
	DISCHARGE	EXCEEDANCE PROBABILITY	MEAN	STANDARD DEVIATION	SKEW
SYSTEMATIC RECORD	0.0	1.0000	3.1961	0.1191	0.022
BULL.17B ESTIMATE	0.0	1.0000	3.1961	0.1191	-0.067

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	95-PCT CONFIDENCE LIMITS FOR BULL. 17B ESTIMATES	
				LOWER	UPPER
0.9950	762.0	779.6	730.1	642.5	863.2
0.9900	819.0	833.8	792.1	700.1	919.3
0.9500	995.4	1002.0	980.1	881.5	1092.0
0.9000	1103.0	1106.0	1093.0	993.5	1198.0
0.8000	1248.0	1247.0	1242.0	1144.0	1342.0
0.5000	1576.0	1569.0	1576.0	1472.0	1687.0
0.2000	1980.0	1978.0	1989.0	1841.0	2161.0
0.1000	2228.0	2234.0	2248.0	2052.0	2472.0
0.0400	2523.0	2544.0	2564.0	2295.0	2857.0
0.0200	2732.0	2768.0	2794.0	2463.0	3138.0
0.0100	2933.0	2986.0	3022.0	2622.0	3414.0
0.0050	3129.0	3202.0	3250.0	2774.0	3687.0
0.0020	3383.0	3484.0	3555.0	2969.0	4046.0
0.6667	1399.4	(1.50-year flood)			
0.4292	1654.5	(2.33-year flood)			

Station - 09081550 CRYSTAL RIVER AT PLACITA, CO.
2003 OCT 7 10:29:09

INPUT DATA LISTING

PLACITAF.OUT

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1956	1687.0		1979	1849.0	
1957	2797.0		1980	2038.0	
1958	2031.0		1981	1364.0	
1959	1476.0		1982	1483.0	
1960	1430.0		1983	2938.0	
1961	1500.0		1984	2165.0	
1962	1680.0		1985	2249.0	
1963	1260.0		1986	2038.0	
1964	1490.0		1987	1174.0	
1965	1710.0		1989	949.0	
1966	940.0		1990	1195.0	
1967	1670.0		1991	1596.0	
1968	1880.0		1992	998.0	
1969	1460.0		1993	2151.0	
1970	1690.0		1994	1350.0	
1971	1940.0		1995	2411.0	
1972	1630.0		1996	1244.0	
1973	1930.0		1997	1722.0	
1974	1300.0		1998	1343.0	
1975	1820.0		1999	1230.0	
1976	1540.0		2000	1413.0	
1977	929.0		2001	1005.0	
1978	1638.0				

Explanation of peak discharge qualification codes

PEAKFQ CODE	WATSTORE CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
H	7	Historic peak

1

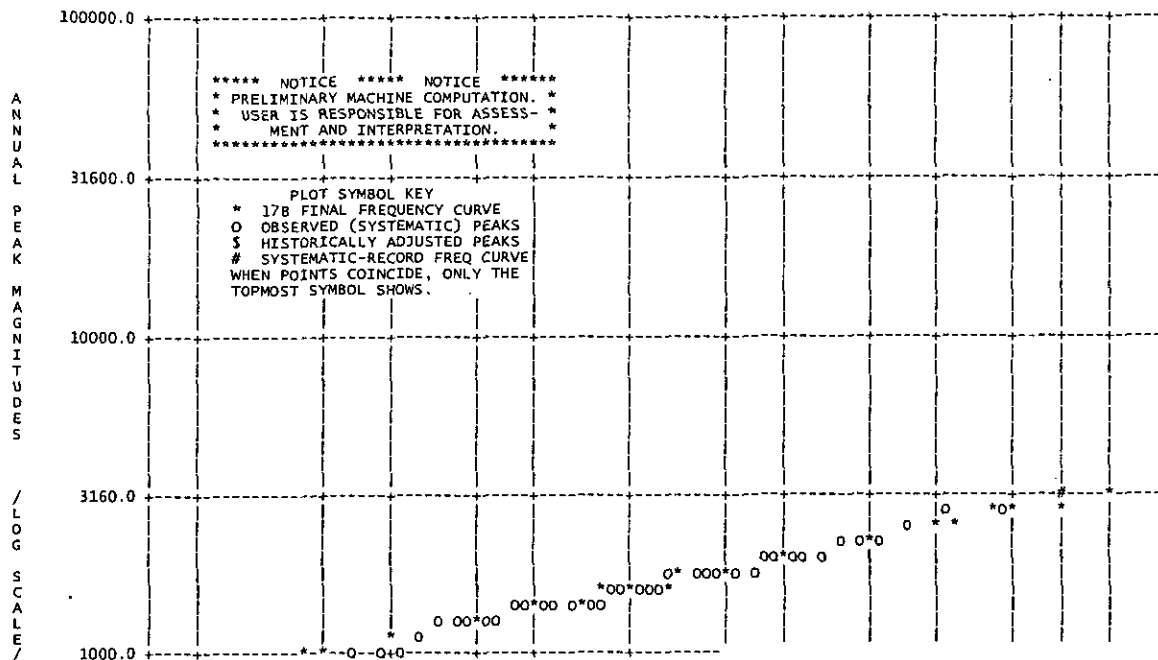
Station - 09081550 CRYSTAL RIVER AT PLACITA, CO.
2003 OCT 7 10:29:09

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL. 17B ESTIMATE
1983	2938.0	0.0217	0.0217
1957	2797.0	0.0435	0.0435
1995	2411.0	0.0652	0.0652
1985	2249.0	0.0870	0.0870
1984	2165.0	0.1087	0.1087
1993	2151.0	0.1304	0.1304
1980	2038.0	0.1522	0.1522
1986	2038.0	0.1739	0.1739
1958	2031.0	0.1957	0.1957
1971	1940.0	0.2174	0.2174
1973	1930.0	0.2391	0.2391
1968	1880.0	0.2609	0.2609
1979	1849.0	0.2826	0.2826
1975	1820.0	0.3043	0.3043
1997	1722.0	0.3261	0.3261
1965	1710.0	0.3478	0.3478
1970	1690.0	0.3696	0.3696
1956	1687.0	0.3913	0.3913
1962	1680.0	0.4130	0.4130
1967	1670.0	0.4348	0.4348
1978	1638.0	0.4565	0.4565
1972	1630.0	0.4783	0.4783
1991	1596.0	0.5000	0.5000
1976	1540.0	0.5217	0.5217
1961	1500.0	0.5435	0.5435
1964	1490.0	0.5652	0.5652
1982	1483.0	0.5870	0.5870
1959	1476.0	0.6087	0.6087
1969	1460.0	0.6304	0.6304
1960	1430.0	0.6522	0.6522
2000	1413.0	0.6739	0.6739
1981	1364.0	0.6957	0.6957
1994	1350.0	0.7174	0.7174
1998	1343.0	0.7391	0.7391
1974	1300.0	0.7609	0.7609
1963	1260.0	0.7826	0.7826
1996	1244.0	0.8043	0.8043
1999	1230.0	0.8261	0.8261
1990	1195.0	0.8478	0.8478
1987	1174.0	0.8696	0.8696
2001	1005.0	0.8913	0.8913
1992	998.0	0.9130	0.9130
1989	949.0	0.9348	0.9348
1966	940.0	0.9565	0.9565
1977	929.0	0.9783	0.9783

1

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 (Version 4.0, December, 2000)
 2003 OCT 7 10:29:09
 Station - 09081550 CRYSTAL RIVER AT PLACITA, CO.



Year	Peak flow Avalanche Gage	Peak flow Placita Gage	Avalanche Gage Adjusted* to Placita drainage area	% difference
1961	2270	1500	1596	6
1962	2620	1680	1842	10
1963	1410	1260	991	-21
1964	2240	1490	1574	6
1965	2780	1710	1954	14
1966	1250	940	879	-7
1967	2580	1670	1813	9
1968	2690	1880	1891	1
1969	1930	1460	1357	-7
1970	1980	1690	1392	-18
1971	2140	1940	1504	-22
1972	2080	1630	1462	-10
1973	2980	1930	2095	9
1975	2580	1820	1813	0
1976	1910	1540	1343	-13
1977	1730	929	1216	31
			avg. =	-0.88 over 16 years
			avg. =	11.50% each year

Drainage Area Avalanche Gage = 167 square miles

Drainage Area Placita Gage = 107 square miles

*Adjustment based on TM-1, CWCB : $Qt(u) = (Au/Ag)^{.79}Qt(g)$

The results indicate that over the 16-year period of record, the Avalanche Creek Gage adjusted to the Placita Gage exceeded the Placita Gage discharge 9 times and was lower than the Placita Gage discharge 7 times, averaging a percent difference each year of 11.5 %. However, comparing the entire 16-year period, the average peak discharge varied less than 1% from the determined gage records at Placita. Therefore it was determined that the comparison was reasonable and the Placita Gage records could be extended using the Avalanche Creek gage records adjusted to the Placita Gage.

Year	Peak flow Avalanche Gage	Peak flow Placita Gage	Avalanche Gage Adjusted* to Placita drainage area	Peak flow Placita Gage Fabricated
1956	2400		1687	1687
1957	3980		2797	2797
1958	2890		2031	2031
1959	2100		1476	1476
1960	1760	1430	1237	1430
1961	2270	1500	1596	1500
1962	2620	1680	1842	1680
1963	1410	1260	991	1260
1964	2240	1490	1574	1490
1965	2780	1710	1954	1710
1966	1250	940	879	940
1967	2580	1670	1813	1670
1968	2690	1880	1891	1880
1969	1930	1460	1357	1460
1970	1980	1690	1392	1690
1971	2140	1940	1504	1940
1972	2080	1630	1462	1630
1973	2980	1930	2095	1930
1974	1850		1300	1300
1975	2580	1820	1813	1820
1976	1910	1540	1343	1540
1977	1730	929	1216	929
1978	2330		1638	1638
1979	2630		1849	1849
1980	2900		2038	2038
1981	1940		1364	1364
1982	2110		1483	1483
1983	4180		2938	2938
1984	3080		2165	2165
1985	3200		2249	2249
1986	2900		2038	2038
1987	1670		1174	1174
1988	--	--	--	--
1989	1350		949	949
1990	1700		1195	1195
1991	2270		1596	1596
1992	1420		998	998
1993	3060		2151	2151
1994	1920		1350	1350
1995	3430		2411	2411
1996	1770		1244	1244
1997	2450		1722	1722
1998	1910		1343	1343
1999	1750		1230	1230
2000	2010		1413	1413
2001	1430		1005	1005

Summary of Discharges

Location	DA	(DA/DAG)	(DA/DAG)^0.79	Q10	Q50	Q100	Q500
Upstream Limit of Study	53.32	0.50	0.58	1284	1575	1691	1950
Town of Marble	73.59	0.69	0.74	1657	2031	2181	2515
Confluence with Milton Creek	83.65	0.78	0.82	1833	2248	2413	2783
Confluence with Rapid Creek	93.05	0.87	0.89	1994	2445	2625	3028

@ Placita Gage Q500= 3383
 Q100= 2933
 Q50= 2732
 Q10= 2228

COLORADO WATER CONSERVATION BOARD
COLORADO DEPARTMENT OF NATURAL RESOURCES

TECHNICAL MANUAL NO. 16

MANUAL FOR ESTIMATING FLOOD CHARACTERISTICS
OF NATURAL FLOW STREAMS IN COLORADO

*Prepared in cooperation with the
U.S. GEOLOGICAL SURVEY*



DURANGO

Colorado Water Conservation Board
1845 Sherman Street
Denver, Colorado 80203

FLOOD INFORMATION NEAR GAGED SITES ON THE SAME STREAM

Peak discharges at sites near gaging stations on the same stream can be computed by the following equation:

$$Q_{T(U)} = \left(\frac{A_U}{A_G} \right)^X Q_{T(G)}$$

where

$Q_{T(U)}$ = peak discharge at ungaged site for recurrence interval T ,

$Q_{T(G)}$ = weighted average discharge at gaged site for recurrence interval T ,

A_U = drainage area at ungaged site,

A_G = drainage area at gaged site, and

X = exponent for each flood region as follows:

<u>Flood Region</u>	<u>Exponent, X</u>
Plains	0.48
Mountains	.79
Northern Plateau	.50
Southern Plateau	.71

The above procedure is applicable for ungaged sites where the drainage area ratio lies between 0.5 and 2.0.

SITES NEAR GAGED SITES ON THE SAME STREAM

Peak discharge information for study sites near gaged sites on the same stream can be computed using the method described on page 4. The first step is to determine the drainage area ratio of ungaged site to gaged site. If that ratio lies between 0.5 and 2.0, the equation given on page 4 should be used to compute the required peak discharges. If the drainage area ratio lies outside the range, the method for "Ungaged Sites" should be used.

Flood depth information for study sites near gaged sites on the same stream should be computed from the flood depth regression equations for the region in which the study site lies. The method is illustrated in Example 2.

Example 2.--Flood Frequency near a Gaged Site

Determine the Q_{10} -, Q_{50} -, Q_{100} -, and Q_{500} -year recurrence-interval floods for Cherry Creek at State Route 83, 4.5 mi south of Franktown, Colo. (lat $39^{\circ}19'41''$, long $104^{\circ}44'02''$, NW $\frac{1}{4}$ sec. 25, T. 8 S., R. 66 W.).

Map coverage: Russellville Gulch quadrangle, scale = 1:24,000
Denver quadrangle, scale = 1:250,000.

From table 5, note that station 06712000 Cherry Creek near Franktown, Colo. ($A_{\text{Gage}} = 169 \text{ mi}^2$), is located downstream.

Determine the contributing drainage area at the site ($A_U = 132 \text{ mi}^2$).

Check that A_U is either more than half A_G or less than twice A_G :

$$A_U \div A_G = 132 \text{ mi}^2 \div 169 \text{ mi}^2 = 0.78.$$

This meets the drainage-area requirement, and the following relation is used:

$$Q_{T(U)} = (A_U \div A_G)^X Q_{T(G)}$$

where $X=0.48$ for the Plains Region, and $Q_{T(G)}$ is the weighted discharge from table 5.

Obtain the weighted discharges at the gage:

$$Q_{10} = 5,070 \text{ ft}^3/\text{s}$$

$$Q_{50} = 13,100 \text{ ft}^3/\text{s}$$

$$Q_{100} = 18,400 \text{ ft}^3/\text{s}$$

$$Q_{500} = 36,000 \text{ ft}^3/\text{s}$$

Compute discharges at ungaged site:

$$Q_{10} = (132 \div 169)^{0.48} (5,070 \text{ ft}^3/\text{s}) = 0.89 (5,070) = 4,510 \text{ ft}^3/\text{s}$$

$$Q_{50} = (132 \div 169)^{0.48} (13,100 \text{ ft}^3/\text{s}) = 0.89 (13,100) = 11,700 \text{ ft}^3/\text{s}$$

$$Q_{100} = (132 \div 169)^{0.48} (18,400 \text{ ft}^3/\text{s}) = 0.89 (18,400) = 16,400 \text{ ft}^3/\text{s}$$

$$Q_{500} = (132 \div 169)^{0.48} (36,000 \text{ ft}^3/\text{s}) = 0.89 (36,000) = 32,000 \text{ ft}^3/\text{s}$$

Table 8.--Selected basin and climatic parameters and flood characteristics for gaging stations in the Southern Plateau Region--Continued

Station number	Station name	Period of record, in years	Drainage area, in square miles	Gage datum, in feet above mean sea level	Basin slope, in feet per mile	Streambed slope, in feet per mile	Mean annual precipitation, in inches	10-Year flood discharge, in cubic ft per second	50-Year flood discharge, in cubic ft per second	100-Year flood discharge, in cubic ft per second	500-Year flood discharge, in cubic ft per second	100-Year flood depth, in feet
RIO GRANDE RIVER BASIN - CONTINUED												
08284000	RITO DE TIERRA AMARILLA AT TIERRA AMARILLA, N. MEX. LAT 36 41 55 LONG 106 33 25	12	49.7	7520	138	77	21	733 833	1130 1260	1320 1470	1810 2000	-
08284500	WILLOW CREEK NEAR PARK VIEW, N. MEX. ✓ LAT 36 40 05 LONG 106 42 15	+33	193	6945	48	38	18	2460 2470	4070 3990	4900 4770	7260 6930	-
COLORADO RIVER BASIN												
09059500	PINEY RIVER NEAR STATE BRIDGE, COLO. LAT 38 48 00 LONG 106 35 00	29	86.2	7272	210	87	28	944 1060	1130 1380	1190 1510	1300 1810	4.4
09067500	EAGLE RIVER AT EAGLE, COLO. LAT 39 39 24 LONG 106 49 29	14	628	6560	-	36	29	6630 6260	7940 8210	8420 9070	9450 11200	6.2
09068000	BRUSH CREEK NEAR EAGLE, COLO. LAT 39 33 26 LONG 106 45 45	22	69.7	7450	350	101	28	551 757	842 1140	984 1330	1370 1830	3.7
09070000	EAGLE RIVER BELOW GYPSUM, COLO. LAT 39 38 58 LONG 106 57 11	*24	944	6275	64	24	27	5930 6440	7360 8570	7880 9490	8960 11700	7.6
09081550	CRYSTAL RIVER AT PLACITA, COLO. LAT 39 08 34 LONG 107 15 26	+13	107	7372	-	63	34	1900 1790	2060 2230	2120 2430	2230 2930	4.7
09081600	CRYSTAL RIVER ABOVE AVALANCHE CREEK NEAR REDSTONE, COLO. LAT 39 13 56 LONG 107 13 36	18	167	6905	140	59	33	3170 2840	3780 3630	4000 3960	4470 4750	5.3
09082500	CRYSTAL RIVER NEAR REDSTONE, COLO. LAT 39 17 55 LONG 107 12 49	29	229	6484	-	70	34	3880 3610	4540 4450	4770 4800	5220 5570	6.6
09083000	THOMPSON CREEK NEAR CARBONDALE, COLO. LAT 39 19 50 LONG 107 13 26	14	75.7	6450	220	132	34	823 1020	1170 1480	1310 1690	1640 2210	3.3
09085000	ROARING FORK RIVER AT GLENWOOD SPRINGS, COLO. LAT 39 32 37 LONG 107 19 44	*59	1451	5721	-	26	28	13900 13400	17400 17100	18700 18600	21500 22000	8.4
09096500	PLATEAU CREEK NEAR COLLEBRAN, COLO. LAT 39 15 02 LONG 107 50 24	*35	80.4	7130	170	176	30	1820 1710	2440 2340	2740 2650	3540 3450	5.9
09097500	BUZZARD CREEK NEAR COLLEBRAN, COLO. LAT 39 16 20 LONG 107 51 00	52	143	6955	-	46	28	1140 1280	1670 1890	1890 2150	2390 2770	7.2

TECHNICAL APPENDIX

APPENDIX C: Hydraulic Data (HEC-RAS)

HEC-RAS Version 3.1.1 May 2003
 U.S. Army Corp of Engineers
 Hydrologic Engineering Center
 609 Second Street, Suite D
 Davis, California 95616-4687
 (916) 756-1104

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PROJECT DATA

Project Title: Crystal River Flood Study
 Project File: CrystalRiver.prj
 Run Date and Time: 5/3/2004 11:51:54 AM

Project in English units

Project Description:

Crystal River Flood Study
 Prepared by: ICON Engineering, Inc. May 2004
 (03-023-CRY-415)

Prepared for: Colorado Water Conservation Board
 Study

Location: From approximately 3 miles downstream of the Town of Marble,
 CO

(Prospect Ranch) to approximately 1 mile upstream of the Town
 of Marble
 (Snowshoe Ranch)

PLAN DATA

Plan Title: Crystal River Flood Study

Plan File: p:\P\03023cry\Hydraulics\CrystalRiver.p04

Geometry Title: Crystal River Flood Study

Geometry File: p:\P\03023cry\Hydraulics\CrystalRiver.g04

Flow Title: Crystal River Flood Study

Flow File: p:\P\03023cry\Hydraulics\CrystalRiver.f02

Plan Summary Information:

Number of: Cross Sections = 53 Multiple Openings = 0
 Culverts = 0 Inline Structures = 0
 Bridges = 4 Lateral Structures = 0

Computational Information

Water surface calculation tolerance = 0.01
 Critical depth calculation tolerance = 0.01
 Maximum number of iterations = 20
 Maximum difference tolerance = 0.3
 Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary
 Conveyance Calculation Method: At breaks in n values only
 Friction Slope Method: Average Conveyance
 Computational Flow Regime: Subcritical Flow

Encroachment Data

Equal Conveyance = True
 Left Offset = 0
 Right Offset = 0

River = Crystal	Reach = Marble	Method	Value1	Value2
RS	Profile			
23576	Floodway	1	211.48	310
23230	Floodway	1	676.46	728.44
23204	Floodway	1	700.15	754.87
22774	Floodway	1	481	800
21874	Floodway	1	550	735
21304	Floodway	1	475	650
20771	Floodway	1	569.53	660.48
19905	Floodway	1	280.63	369.18
19361	Floodway	1	357	460
18783	Floodway	1	115	210
14921	Floodway	1	260	346.96
14378	Floodway	1	135.94	180
12820	Floodway	1	284.18	330.48
12347	Floodway	1	565.78	648.12
11815	Floodway	1	624.09	734.4
11147	Floodway	1	822.42	1009.38
10584	Floodway	1	1058	1139
10063	Floodway	1	675	820
9536	Floodway	1	530	670
9086	Floodway	1	638.81	729.71
8612	Floodway	1	625	735
8077	Floodway	1	471.25	536.63
8048	Floodway	1	462.73	711.12
7560	Floodway	1	775.5	830.52
7123	Floodway	1	828.7	891.99
6674	Floodway	1	410	490.99
6179	Floodway	1	567.14	635
5216	Floodway	1	51.93	108.63
2242	Floodway	1	410.63	456.53
1750	Floodway	1	375.56	425.1
1241	Floodway	1	640	720.1
746	Floodway	1	375	430.01
329	Floodway	1	190	245.29
0	Floodway	1	46.77	84.38

FLOW DATA

Flow Title: Crystal River Flood Study

Flow File: p:\P\03023cry\Hydraulics\CrystalRiver.f02

Flow Data (cfs)

River	Reach	RS	100-year	Floodway	10-year	50-year	500-year
Crystal	Marble	24407	1691	1691	1284	1375	1950
Crystal	Marble	19361	2181	2181	1637	2031	2515
Crystal	Marble	8077	2413	2413	1833	2248	2783
Crystal	Marble	746	2625	2625	1994	2445	3028

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Crystal	Marble	100-year		Normal S = 0.013
Crystal	Marble	Floodway		Normal S = 0.013
Crystal	Marble	10-year		Normal S = 0.013
Crystal	Marble	50-year		Normal S = 0.013
Crystal	Marble	500-year		Normal S = 0.013

GEOMETRY DATA

Geometry Title: Crystal River Flood Study
 Geometry File : p:\03023cry\hydraulics\CrystalRiver.g04

CROSS SECTION

RIVER: Crystal

REACH: Marble RS: 24407

INPUT

Description:

Station	Elevation	Data	num=	36	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7966	2.6	7965.01	8.34	7962.45	10.66	7961.58	18.61	7958.47			
18.73	7958.43	18.94	7958.35	29.97	7954.11	31.68	7953.47	45.99	7953.44			
51.06	7953.44	57.24	7954.89	60.43	7953.58	60.68	7953.64	64.51	7956.47			
68.24	7956.92	70.85	7957.24	75.17	7957.81	81.26	7958.63	83.23	7958.9			
89.98	7959.71	91.3	7959.87	91.68	7959.92	92.05	7959.96	99.85	7960.99			
100.95	7962.04	102.1	7963.14	107.42	7968.22	112.52	7973.08	115.49	7975.92			
122.93	7983.05	123.55	7983.58	125.67	7985.67	131.61	7992.22	132.37	7992.84			
132.72	7993.27											

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	31.68	.035	51.06	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	31.68	51.06		773.34	831.57	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7960.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.81	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7958.71	Reach Len. (ft)	773.34	831.57	855.60
Crit W.S. (ft)	7958.71	Flow Area (sq ft)	35.87	101.82	69.86
E.G. Slope (ft/ft)	0.009191	Area (sq ft)	35.87	101.82	69.86
Q Total (cfs)	1691.00	Flow (cfs)	154.81	1252.49	283.70
Top Width (ft)	63.80	Top Width (ft)	13.67	19.38	30.75
Vel Total (ft/s)	8.15	Avg. Vel. (ft/s)	4.32	12.30	4.06
Max Chl Dpth (ft)	5.27	Hydr. Depth (ft)	2.62	5.25	2.27
Conv. Total (cfs)	17638.5	Conv. (cfs)	1614.8	13064.5	2959.2
Length wtd. (ft)	833.07	Wetted Per. (ft)	14.64	19.38	31.23
Min Ch El (ft)	7953.44	Shear (lb/sq ft)	1.41	3.01	1.28
Alpha	1.76	Stream Power (lb/ft s)	6.07	37.08	5.21
Frctn Loss (ft)	7.43	Cum Volume (acre-ft)	105.07	102.62	185.73
C & E Loss (ft)	0.29	Cum SA (acres)	49.85	26.60	67.93

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7960.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.81	wt. n-val.	0.060	0.035	0.060
W.S. Elev (ft)	7958.71	Reach Len. (ft)	773.34	831.57	855.60
Crit W.S. (ft)	7958.71	Flow Area (sq ft)	35.87	101.82	69.86
E.G. Slope (ft/ft)	0.009191	Area (sq ft)	35.87	101.82	69.86
Q Total (cfs)	1691.00	Flow (cfs)	154.81	1252.49	283.70
Top width (ft)	63.80	Top width (ft)	13.67	19.38	30.75
Vel Total (ft/s)	8.15	Avg. Vel. (ft/s)	4.32	12.30	4.06
Max Chl Depth (ft)	5.27	Hydr. Depth (ft)	2.62	5.25	2.27
Conv. Total (cfs)	17638.5	Conv. (cfs)	1614.8	13064.5	2959.2
Length wtd. (ft)	835.90	Wetted Per. (ft)	14.64	19.38	31.23
Min Ch El (ft)	7953.44	Shear (lb/sq ft)	1.41	3.01	1.28
Alpha	1.76	Stream Power (lb/ft s)	6.07	37.08	5.21
Frctn Loss (ft)	8.47	Cum Volume (acre-ft)	30.77	112.79	25.39
C & E Loss (ft)	0.23	Cum SA (acres)	12.33	26.60	9.56

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7959.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.64	Wt. n-val.	0.060	0.035	0.060
W.S. Elev (ft)	7957.93	Reach Len. (ft)	773.34	831.57	855.60
Crit W.S. (ft)	7957.93	Flow Area (sq ft)	26.09	86.85	48.32
E.G. Slope (ft/ft)	0.009886	Area (sq ft)	26.09	86.85	48.32
Q Total (cfs)	1284.00	Flow (cfs)	105.04	996.54	182.42
Top Width (ft)	56.05	Top Width (ft)	11.65	19.38	25.02
Vel Total (ft/s)	7.96	Avg. Vel. (ft/s)	4.03	11.47	3.78
Max Chl Dpth (ft)	4.49	Hydr. Depth (ft)	2.24	4.48	1.93
Conv. Total (cfs)	12913.8	Conv. (cfs)	1056.5	10022.7	1834.6
Length wtd. (ft)	833.02	Wetted Per. (ft)	12.48	19.38	25.45
Min Ch El (ft)	7953.44	Shear (lb/sq ft)	1.29	2.77	1.17
Alpha	1.66	Stream Power (lb/ft s)	5.20	31.74	4.42
Frctn Loss (ft)	11.06	Cum Volume (acre-ft)	81.45	86.84	155.22
C & E Loss (ft)	0.09	Cum SA (acres)	43.93	26.60	60.57

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-year

CrystalRiver.rep

E.G. Elev (ft)	7960.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	77	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7958.50	Reach Len. (ft)	773.34	831.57	855.60
Crit W.S. (ft)	7958.50	Flow Area (sq ft)	33.05	97.74	63.55
E.G. Slope (ft/ft)	0.009375	Area (sq ft)	33.05	97.74	63.55
Q Total (cfs)	1575.00	Flow (cfs)	140.11	1181.63	253.26
Top Width (ft)	61.71	Top width (ft)	13.13	19.38	29.20
Vel Total (ft/s)	8.10	Avg. Vel. (ft/s)	4.24	12.09	3.69
Max Chl Dpth (ft)	5.05	Hydr. Depth (ft)	2.52	5.04	2.18
Conv. Total (cfs)	16266.8	Conv. (cfs)	1447.1	12204.0	2615.7
Length Wtd. (ft)	833.51	Wetted Per. (ft)	14.06	19.38	29.66
Min Ch El (ft)	7953.44	Shear (lb/sq ft)	1.38	2.95	1.25
Alpha	1.73	Stream Power (lb/ft s)	5.83	35.68	5.00
Frctn Loss (ft)	8.09	Cum Volume (acre-ft)	98.03	98.41	177.12
C & E Loss (ft)	0.25	Cum SA (acres)	48.55	26.60	66.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7961.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.94 <td>Wt. n-Val.</td> <td>0.060</td> <td>0.035</td> <td>0.060</td>	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7959.10 <td>Reach Len. (ft)</td> <td>773.34</td> <td>831.57</td> <td>855.60</td>	Reach Len. (ft)	773.34	831.57	855.60
Crit W.S. (ft)	7959.10 <td>Flow Area (sq ft)</td> <td>41.53</td> <td>109.55</td> <td>82.73</td>	Flow Area (sq ft)	41.53	109.55	82.73
E.G. Slope (ft/ft)	0.009135 <td>Area (sq ft)</td> <td>41.53</td> <td>109.55</td> <td>82.73</td>	Area (sq ft)	41.53	109.55	82.73
Q Total (cfs)	1950.00 <td>Flow (cfs)</td> <td>187.74</td> <td>1410.62</td> <td>351.64</td>	Flow (cfs)	187.74	1410.62	351.64
Top Width (ft)	67.94 <td>Top width (ft)</td> <td>14.69</td> <td>19.38</td> <td>33.87</td>	Top width (ft)	14.69	19.38	33.87
Vel Total (ft/s)	8.34 <td>Avg. Vel. (ft/s)</td> <td>4.52</td> <td>12.88</td> <td>4.25</td>	Avg. Vel. (ft/s)	4.52	12.88	4.25
Max Chl Dpth (ft)	5.66 <td>Hydr. Depth (ft)</td> <td>2.83</td> <td>5.63</td> <td>2.44</td>	Hydr. Depth (ft)	2.83	5.63	2.44
Conv. Total (cfs)	20402.8 <td>Conv. (cfs)</td> <td>1964.3</td> <td>14759.2</td> <td>3679.2</td>	Conv. (cfs)	1964.3	14759.2	3679.2
Length Wtd. (ft)	832.89 <td>Wetted Per. (ft)</td> <td>15.73</td> <td>19.38</td> <td>34.38</td>	Wetted Per. (ft)	15.73	19.38	34.38
Min Ch El (ft)	7953.44 <td>Shear (lb/sq ft)</td> <td>1.51</td> <td>3.12</td> <td>1.37</td>	Shear (lb/sq ft)	1.51	3.12	1.37
Alpha	1.80 <td>Stream Power (lb/ft s)</td> <td>6.80</td> <td>41.51</td> <td>5.83</td>	Stream Power (lb/ft s)	6.80	41.51	5.83
Frctn Loss (ft)	7.61 <td>Cum Volume (acre-ft)</td> <td>120.31</td> <td>111.15</td> <td>204.42</td>	Cum Volume (acre-ft)	120.31	111.15	204.42
C & E Loss (ft)	0.31 <td>Cum SA (acres)</td> <td>53.47</td> <td>26.60</td> <td>72.34</td>	Cum SA (acres)	53.47	26.60	72.34

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal
REACH: Marble RS: 23576

INPUT

Description:

Station	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7970.49	2.04	7969.54	3.66	7968.86	13.71	7964.12
15.44	7963.35	25.07	7959.07	31.02	7956.52	35.78	7954.43
45.9	7949.88	46.49	7949.58	49.27	7949.56	57.18	7949.48
67.89	7949.45	71.52	7949.45	78.59	7949.36	82.96	7949.4
96.8	7949.58	98.45	7949.65	103.88	7949.68	106.47	7949.68
114.74	7947.71	115.78	7947.37	118.61	7947.98	122.57	7949.14
140.16	7949.23	142.19	7949.07	150.84	7948.22	153.74	7947.9
158.49	7947.73	185.63	7947.31	198.22	7947.09	200.14	7946.65
209.69	7944.68	211.48	7944.39	211.9	7944.33	237.65	7944.53
241.84	7944.83	250.36	7946.61	251.33	7945.61	254.05	7947.13
267.8	7947.32	271.26	7947.39	278.21	7947.92	279.37	7947.58
284.39	7945.42	312.75	7945.38	313.69	7945.6	323.88	7947.88
328.14	7949.87	335.48	7955.21	340.02	7959.11	345.1	7963.7

Manning's n	Val	Sta	n	Val	Sta	n	Val
0	.06	211.48	.035	237.65	.05	312.75	.06

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	211.48	237.65		321.73	345.98	365.58	.1	.3	

Ineffective Flow	num	Sta	R	Elev	Permanent
0	125.02	7949.82	T		

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7948.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.83 <td>Wt. n-Val.</td> <td>0.060</td> <td>0.035</td> <td>0.051</td>	Wt. n-Val.	0.060	0.035	0.051
W.S. Elev (ft)	7948.09 <td>Reach Len. (ft)</td> <td>321.73</td> <td>345.98</td> <td>365.58</td>	Reach Len. (ft)	321.73	345.98	365.58
Crit W.S. (ft)	7948.09 <td>Flow Area (sq ft)</td> <td>61.10</td> <td>95.91</td> <td>159.34</td>	Flow Area (sq ft)	61.10	95.91	159.34
E.G. Slope (ft/ft)	0.008648 <td>Area (sq ft)</td> <td>61.10</td> <td>95.91</td> <td>159.34</td>	Area (sq ft)	61.10	95.91	159.34
Q Total (cfs)	1691.00 <td>Flow (cfs)</td> <td>142.75</td> <td>900.00</td> <td>648.25</td>	Flow (cfs)	142.75	900.00	648.25
Top Width (ft)	178.73 <td>Top width (ft)</td> <td>65.34</td> <td>26.17</td> <td>87.22</td>	Top width (ft)	65.34	26.17	87.22
Vel Total (ft/s)	5.35 <td>Avg. Vel. (ft/s)</td> <td>2.34</td> <td>9.38</td> <td>4.07</td>	Avg. Vel. (ft/s)	2.34	9.38	4.07
Max Chl Dpth (ft)	3.76 <td>Hydr. Depth (ft)</td> <td>1.03</td> <td>3.66</td> <td>1.83</td>	Hydr. Depth (ft)	1.03	3.66	1.83
Conv. Total (cfs)	18183.9 <td>Conv. (cfs)</td> <td>1535.0</td> <td>9678.0</td> <td>6970.8</td>	Conv. (cfs)	1535.0	9678.0	6970.8
Length Wtd. (ft)	348.36 <td>Wetted Per. (ft)</td> <td>59.80</td> <td>26.18</td> <td>88.27</td>	Wetted Per. (ft)	59.80	26.18	88.27
Min Ch El (ft)	7944.33 <td>Shear (lb/sq ft)</td> <td>0.55</td> <td>1.98</td> <td>0.97</td>	Shear (lb/sq ft)	0.55	1.98	0.97
Alpha	1.88 <td>Stream Power (lb/ft s)</td> <td>1.29</td> <td>18.56</td> <td>3.96</td>	Stream Power (lb/ft s)	1.29	18.56	3.96
Frctn Loss (ft)	1.33 <td>Cum Volume (acre-ft)</td> <td>104.19</td> <td>100.74</td> <td>183.47</td>	Cum Volume (acre-ft)	104.19	100.74	183.47
C & E Loss (ft)	0.05 <td>Cum SA (acres)</td> <td>49.14</td> <td>26.16</td> <td>66.77</td>	Cum SA (acres)	49.14	26.16	66.77

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7949.28	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>1.06 <td>Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.050</td> </td></td>	1.06 <td>Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.050</td> </td>	Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.050</td>	0.060	0.035	0.050
W.S. Elev (ft) <td>7948.22 <td>Reach Len. (ft) <td>321.73</td> <td>345.98</td> <td>365.58</td> </td></td>	7948.22 <td>Reach Len. (ft) <td>321.73</td> <td>345.98</td> <td>365.58</td> </td>	Reach Len. (ft) <td>321.73</td> <td>345.98</td> <td>365.58</td>	321.73	345.98	365.58
Crit W.S. (ft) <td>7948.22 <td>Flow Area (sq ft) <td></td> <td>99.21</td> <td>144.65</td> </td></td>	7948.22 <td>Flow Area (sq ft) <td></td> <td>99.21</td> <td>144.65</td> </td>	Flow Area (sq ft) <td></td> <td>99.21</td> <td>144.65</td>		99.21	144.65
E.G. Slope (ft/ft) <td>0.01236 <td>Area (sq ft) <td></td> <td>99.21</td> <td>144.65</td> </td></td>	0.01236 <td>Area (sq ft) <td></td> <td>99.21</td> <td>144.65</td> </td>	Area (sq ft) <td></td> <td>99.21</td> <td>144.65</td>		99.21	144.65
Q Total (cfs) <td>1691.00 <td>Flow (cfs) <td></td> <td>990.86</td> <td>700.14</td> </td></td>	1691.00 <td>Flow (cfs) <td></td> <td>990.86</td> <td>700.14</td> </td>	Flow (cfs) <td></td> <td>990.86</td> <td>700.14</td>		990.86	700.14

Top width (ft)	98.52	Top width (ft)	26.17	72.35
Vel Total (ft/s)	6.93	Avg. Vel. (ft/s)	9.99	4.84
Max chl dpth (ft)	3.89	Hydr. Depth (ft)	3.79	2.00
Conv. Total (cfs)	15953.2	Conv. (cfs)	9347.9	6605.3
Length wtd. (ft)	349.67	Wetted Per. (ft)	30.00	75.94
Min ch El (ft)	7944.33	Shear (lb/sq ft)	2.32	1.34
Alpha	1.42	Stream Power (lb/ft s)	23.16	6.47
Frctn Loss (ft)	1.37	Cum Volume (acre-ft)	110.87	23.28
C & E Loss (ft)	0.12	Cum SA (acres)	12.20	8.55

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7948.41	Element	Left 08	Channel	Right 08
Vel Head (ft)	1.33	Wt. n-Val.	0.060	0.035	0.050
W.S. Elev (ft)	7947.09	Reach Len. (ft)	321.73	345.98	365.58
Crit W.S. (ft)	7947.09	Flow Area (sq ft)	19.19	69.51	81.66
E.G. Slope (ft/ft)	0.018770	Area (sq ft)	19.19	69.51	81.66
Q Total (cfs)	1284.00	Flow (cfs)	82.25	775.34	428.40
Top width (ft)	95.54	Top width (ft)	13.24	26.17	56.13
Vel Total (ft/s)	7.54	Avg. Vel. (ft/s)	4.29	11.15	5.22
Max chl Dpth (ft)	2.75	Hydr. Depth (ft)	1.45	2.66	1.45
Conv. Total (cfs)	9372.0	Conv. (cfs)	600.4	5659.3	3112.4
Length wtd. (ft)	348.15	Wetted Per. (ft)	13.52	26.18	56.89
Min ch El (ft)	7944.33	Shear (lb/sq ft)	1.66	3.11	1.68
Alpha	1.50	Stream Power (lb/ft s)	7.13	34.71	8.78
Frctn Loss (ft)	1.45	Cum Volume (acre-ft)	81.05	85.35	153.94
C & E Loss (ft)	0.25	Cum SA (acres)	43.71	26.16	59.78

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7948.79	Element	Left 08	Channel	Right 08
Vel Head (ft)	0.92	Wt. n-Val.	0.060	0.035	0.051
W.S. Elev (ft)	7947.87	Reach Len. (ft)	321.73	345.98	365.58
Crit W.S. (ft)	7947.87	Flow Area (sq ft)	47.99	90.05	139.93
E.G. Slope (ft/ft)	0.030051	Area (sq ft)	48.97	90.05	139.93
Q Total (cfs)	1575.90	Flow (cfs)	105.30	873.39	596.31
Top width (ft)	173.05	Top width (ft)	61.50	26.17	85.38
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)	2.19	9.70	4.26
Max chl Dpth (ft)	3.54	Hydr. Depth (ft)	0.83	3.44	1.64
Conv. Total (cfs)	15710.2	Conv. (cfs)	1050.4	8711.9	5948.0
Length wtd. (ft)	348.54	Wetted Per. (ft)	57.77	26.18	86.40
Min ch El (ft)	7944.33	Shear (lb/sq ft)	0.52	2.16	1.02
Alpha	1.85	Stream Power (lb/ft s)	1.14	20.94	4.33
Frctn Loss (ft)	1.36	Cum Volume (acre-ft)	97.30	96.62	175.12
C & E Loss (ft)	0.09	Cum SA (acres)	47.89	26.16	65.02

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7949.17	Element	Left 08	Channel	Right 08
Vel Head (ft)	0.91	Wt. n-Val.	0.060	0.035	0.051
W.S. Elev (ft)	7948.26	Reach Len. (ft)	321.73	345.98	365.58
Crit W.S. (ft)	7948.26	Flow Area (sq ft)	71.19	100.29	174.01
E.G. Slope (ft/ft)	0.009132	Area (sq ft)	74.36	100.29	174.01
Q Total (cfs)	1950.00	Flow (cfs)	186.01	996.31	767.66
Top width (ft)	182.34	Top width (ft)	68.17	26.17	88.00
Vel Total (ft/s)	5.64	Avg. Vel. (ft/s)	2.61	9.93	4.41
Max chl Dpth (ft)	3.93	Hydr. Depth (ft)	1.17	3.83	1.98
Conv. Total (cfs)	20406.1	Conv. (cfs)	1946.5	10426.3	8033.3
Length wtd. (ft)	348.28	Wetted Per. (ft)	61.37	26.18	89.07
Min ch El (ft)	7944.33	Shear (lb/sq ft)	0.66	2.18	1.11
Alpha	1.84	Stream Power (lb/ft s)	1.73	21.70	4.91
Frctn Loss (ft)	1.41	Cum Volume (acre-ft)	119.29	109.15	201.90
C & E Loss (ft)	0.04	Cum SA (acres)	52.74	26.16	71.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal
REACH: Marble

RS: 23230

INPUT

Description:
Station Elevation Data num= 155

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7968.74	4.74	7968.52	7.34	7968.33	14.97	7967.78	20.23	7967.31
21.75	7967.17	34.67	7966.31	35.92	7966.22	46.28	7965.53	48.44	7965.18
63.6	7964.37	64.46	7964.31	75.01	7963.6	76.76	7963.47	89.57	7962.45
91.9	7962.27	107.89	7961.01	117.4	7960.31	123.24	7959.85	131.14	7959.27

CrystalRiver.rep

139.53	7958.6	247.25	7958.03	148.41	7957.93	156.92	7957.16	164.14	7956.54
172.61	7955.77	180.86	7955.03	184.79	7954.68	187.57	7954.44	193.67	7954
209.58	7952.82	211.53	7952.68	213.77	7952.51	215.75	7952.37	221.72	7953.93
224.95	7951.71	226.63	7951.58	234.37	7951.15	235.71	7951.08	248.25	7950.39
251.61	7950.19	256.98	7949.9	259.63	7949.85	297.48	7949.4	306.96	7949.38
310.32	7949.38	314.43	7949.37	318.81	7949.35	328.41	7949.33	341.75	7949.2
353.58	7949.11	362.37	7949.2	365.11	7949.22	368.96	7949.18	371.46	7949.17
372.14	7949.08	373.75	7948.75	378.37	7947.76	379.03	7947.58	380.18	7947.37
390.86	7947.37	393.2	7947.56	398.85	7948.12	406.45	7949	412.19	7949.46
412.43	7949.55	414.96	7949.54	433.6	7949.2	446.23	7949.16	449.1	7949.12
461.67	7949.11	466.45	7948.82	474.56	7948.29	482.25	7948.59	484.02	7948.64
494.65	7948.96	502.27	7949.03	513.12	7949.25	526.15	7949.32	536.9	7949.5
543.24	7949.46	560.96	7949.25	567.81	7949.29	578.71	7949.49	579.81	7949.44
580.98	7949.52	592.25	7949.94	595.89	7949.9	599.09	7950.03	609.5	7950.68
610.33	7950.78	610.37	7950.84	612.07	7950.89	621.07	7950.96	631.67	7951.12
639.02	7951.33	643.71	7951.45	645.73	7951.41	650.7	7951.3	654.1	7951.09
657.84	7950.93	664.55	7949.42	664.82	7949.34	666.66	7949.22	669.28	7948.14
674.64	7944.88	687	7938	705	7937.25	723	7938	728.01	7943.62
733.02	7946.54	736.35	7948.78	737.57	7949	742.51	7950.69	744.62	7951.33
745.21	7951.49	746.02	7951.6	746.31	7951.66	746.8	7951.75	749.11	7952.24
756.7	7953.56	763.33	7953.35	764.69	7953.19	767.85	7953.25	771.36	7953.33
775.44	7953.45	776.04	7953.18	776.43	7953.1	779.37	7953.08	784.73	7953.75
786.47	7953.91	796.48	7955.34	806.49	7955.85	816.5	7956.55	826.51	7956.48
828.56	7956.46	836.51	7956.47	842.95	7956.6	845.8	7956.64	847.2	7957
858.74	7957.78	856.2	7958.83	856.53	7958.89	859.88	7959.74	866.54	7961.49
872.89	7963.29	874.35	7963.65	874.74	7964.02	886.12	7964.02	896.57	7963.85
896.57	7963.9	901.64	7963.85	906.57	7963.88	912.08	7963.85	913.09	7963.85

Manning's n values

Sta	n Val	Sta	n Val	num=	3	Sta	n Val
Q	.06	687	.035	723		723	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

687	723	24.46	25.9	26.29	.3	.5
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Ineffective Flow

Sta L	Sta R	num=	1
Q	676	7947.37	T

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7944.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7944.10	Reach Len. (ft)	4.70	4.70	4.70
Crit W.S. (ft)	7941.65	Flow Area (sq ft)	33.40	233.03	16.67
E.G. Slope (ft/ft)	0.002137	Area (sq ft)	33.40	233.03	16.67
Q Total (cfs)	1691.00	Flow (cfs)	73.49	1587.56	29.95
Top Width (ft)	52.79	Top Width (ft)	10.96	36.00	5.83
Vel Total (ft/s)	5.97	Avg. Vel. (ft/s)	2.20	6.81	1.80
Max Chl Dpth (ft)	6.85	Hydr. Depth (ft)	3.05	6.47	2.86
Conv. Total (cfs)	36580.7	Conv. (cfs)	1589.8	34342.9	647.9
Length Wtd. (ft)	4.70	Wetted Per. (ft)	12.54	36.03	8.48
Min Ch El (ft)	7937.25	Shear (lb/sq ft)	0.36	0.86	0.26
Alpha	1.23	Stream Power (lb/ft s)	0.78	5.88	0.47
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	103.83	99.43	182.74
C & E Loss (ft)	0.02	Cum SA (acres)	48.86	25.91	66.38

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7944.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7944.24	Reach Len. (ft)	4.70	4.70	4.70
Crit W.S. (ft)	7941.65	Flow Area (sq ft)	34.82	238.03	17.38
E.G. Slope (ft/ft)	0.001981	Area (sq ft)	34.82	238.03	17.38
Q Total (cfs)	1691.00	Flow (cfs)	76.26	1583.62	31.12
Top Width (ft)	51.98	Top Width (ft)	10.54	36.00	5.44
Vel Total (ft/s)	5.83	Avg. Vel. (ft/s)	2.19	6.61	1.79
Max Chl Dpth (ft)	6.85	Hydr. Depth (ft)	3.30	6.81	3.19
Conv. Total (cfs)	37990.3	Conv. (cfs)	1713.2	35577.9	699.2
Length Wtd. (ft)	4.70	Wetted Per. (ft)	12.43	36.03	8.39
Min Ch El (ft)	7937.25	Shear (lb/sq ft)	0.35	0.82	0.26
Alpha	1.23	Stream Power (lb/ft s)	0.76	5.44	0.46
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	36.32	109.53	22.60
C & E Loss (ft)	0.02	Cum SA (acres)	12.17	25.91	8.22

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7943.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7943.45	Reach Len. (ft)	4.70	4.70	4.70
Crit W.S. (ft)	7940.98	Flow Area (sq ft)	26.69	209.74	13.24
E.G. Slope (ft/ft)	0.001774	Area (sq ft)	26.69	209.74	13.24
Q Total (cfs)	1284.00	Flow (cfs)	49.66	1213.79	20.55
Top Width (ft)	50.65	Top Width (ft)	9.79	36.00	4.86
Vel Total (ft/s)	5.14	Avg. Vel. (ft/s)	1.86	5.79	1.55
Max Chl Dpth (ft)	6.20	Hydr. Depth (ft)	2.73	5.83	2.73
Conv. Total (cfs)	30481.6	Conv. (cfs)	1178.9	28814.9	487.8
Length Wtd. (ft)	4.70	Wetted Per. (ft)	11.21	36.03	7.30
Min Ch El (ft)	7937.25	Shear (lb/sq ft)	0.26	0.64	0.20
Alpha	1.20	Stream Power (lb/ft s)	0.49	3.73	0.31
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	80.88	84.24	153.54
C & E Loss (ft)	0.02	Cum SA (acres)	43.63	25.91	59.52

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7944.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7943.90	Reach Len. (ft)	4.70	4.70	4.70
Crit W.S. (ft)	7941.46	Flow Area (sq ft)	31.28	225.93	15.55
E.G. Slope (ft/ft)	0.002064	Area (sq ft)	31.28	225.93	15.55
Q Total (cfs)	1575.00	Flow (cfs)	66.16	1481.78	27.06
Top Width (ft)	52.09	Top Width (ft)	10.60	36.00	5.49
Vel Total (ft/s)	5.77	Avg. Vel. (ft/s)	2.12	6.56	1.74
Max Chl Dpth (ft)	6.65	Hydr. Depth (ft)	2.95	6.28	2.83
Conv. Total (cfs)	34668.4	Conv. (cfs)	1456.4	32616.4	595.7
Length Wtd. (ft)	4.70	Wetted Per. (ft)	12.13	36.03	8.09
Min Ch El (ft)	7937.25	Shear (lb/sq ft)	0.35	0.81	0.25
Alpha	1.22	Stream Power (lb/ft s)	0.70	5.30	0.43
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	97.00	95.36	174.46
C & E Loss (ft)	0.02	Cum SA (acres)	47.62	25.91	64.64

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7945.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7944.52	Reach Len. (ft)	4.70	4.70	4.70
Crit W.S. (ft)	7942.05	Flow Area (sq ft)	37.98	248.03	19.25
E.G. Slope (ft/ft)	0.002280	Area (sq ft)	38.12	248.03	19.25
Q Total (cfs)	1950.00	Flow (cfs)	93.78	1819.28	36.94
Top Width (ft)	54.25	Top Width (ft)	11.70	36.00	6.54
Vel Total (ft/s)	6.39	Avg. Vel. (ft/s)	2.47	7.33	1.92
Max Chl Dpth (ft)	7.26	Hydr. Depth (ft)	3.45	6.89	2.94
Conv. Total (cfs)	40842.7	Conv. (cfs)	1964.2	38104.3	773.8
Length Wtd. (ft)	4.70	Wetted Per. (ft)	12.59	36.03	9.31
Min Ch El (ft)	7937.25	Shear (lb/sq ft)	0.43	0.98	0.29
Alpha	1.24	Stream Power (lb/ft s)	1.06	7.19	0.56

Frctn Loss (ft) 0.01 Cum Volume (acre-ft) 118.87 CrystalRiver.rep
C & E Loss (ft) 0.03 Cum SA (acres) 52.44 107.77 201.09
25.91 70.75

BRIDGE

RIVER: Crystal
REACH: Marble RS: 23225

INPUT
Description: BRIDGE NO. 4 - SNOWSHOE RANCH
Distance From Upstream XS = 4.7
Deck/Roadway Width = 14.25
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates

num=	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
6	550	7951				676	7951				800	7951			
	744	7951	7948.25			744	7951								

Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	155					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7968.74	4.74	7968.51	7.34	7968.33	14.97	7967.78	20.23	7967.31
21.75	7967.17	34.67	7966.31	35.92	7966.22	46.28	7965.33	48.44	7965.38
63.6	7964.37	64.46	7964.31	75.01	7963.6	76.76	7963.47	89.57	7962.45
91.9	7962.27	107.89	7961.01	117.4	7960.31	123.24	7959.85	131.14	7959.27
139.53	7958.6	147.25	7958.03	148.41	7957.93	156.92	7957.16	164.14	7956.54
172.61	7955.77	180.96	7955.03	184.79	7954.68	187.57	7954.44	193.67	7954
209.58	7952.82	211.53	7952.68	213.77	7952.51	215.75	7952.37	221.77	7951.93
224.95	7951.79	226.63	7951.58	234.37	7951.15	235.71	7951.08	248.25	7950.39
251.61	7950.19	256.98	7949.9	259.63	7949.85	297.48	7949.4	306.96	7949.38
310.32	7949.38	314.43	7949.37	318.81	7949.35	328.41	7949.33	341.75	7949.2
353.58	7949.11	362.37	7949.2	365.11	7949.22	368.96	7949.18	371.46	7949.17
372.14	7949.08	373.75	7948.75	378.37	7947.76	379.03	7947.58	380.18	7947.37
390.86	7947.37	393.2	7947.56	398.85	7948.12	406.45	7949	412.19	7949.46
412.43	7949.55	414.96	7949.54	433.6	7949.2	446.23	7949.16	449.1	7949.12
461.67	7949.11	466.45	7948.82	474.56	7948.29	482.25	7948.59	484.02	7948.64
494.65	7948.96	502.27	7949.03	513.12	7949.25	516.15	7949.32	536.9	7949.5
543.24	7949.46	560.96	7949.25	567.81	7949.29	578.71	7949.49	579.81	7949.44
580.99	7949.52	594.25	7949.54	595.89	7949.9	599.09	7950.03	609.5	7950.68
610.23	7950.78	610.37	7950.84	610.07	7950.89	621.07	7950.96	631.67	7951.12
639.02	7951.33	643.71	7951.45	645.73	7951.41	650.7	7951.3	654.1	7951.09
657.84	7950.93	664.55	7949.42	664.82	7949.34	666.66	7949.22	669.28	7948.14
674.64	7944.88	687	7938	705	7937.25	723	7938	728.01	7943.62
733.02	7946.54	736.35	7948.78	737.57	7949	742.51	7950.69	744.62	7951.33
745.21	7951.1	746.02	7951.8	746.8	7951.66	749.11	7951.75	749.11	7951.74
756.7	7953.56	763.33	7953.35	764.69	7953.19	767.85	7953.25	771.36	7953.33
775.44	7953.45	776.04	7953.18	776.43	7953.1	779.37	7953.08	784.73	7953.75
786.47	7953.91	796.48	7955.34	806.49	7955.85	816.5	7956.55	826.51	7956.48
828.16	7956.46	836.51	7956.47	842.95	7956.6	845.8	7956.64	847.2	7957
850.74	7957.58	856.2	7958.83	856.53	7958.89	859.88	7959.74	866.54	7961.49
872.89	7963.29	874.35	7963.65	875.47	7964.02	880.24	7964.02	886.12	7963.97
896.57	7963.9	901.64	7963.85	906.57	7963.88	912.08	7963.85	913.09	7963.85

Manning's n Values num= 3
Sta n Val Sta n Val
0 .06 687 .035 723 .06

Bank Sta: Left Right Coeff Contr. Expan.
687 723 .3 .5

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
0 676 7947.37 T

Downstream Deck/Roadway Coordinates

num=	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
680	7951					694	7951				804	7951	7948.25		
762	7951	7948.25				762	7951								

Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	182					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7967.08	.48	7966.93	7.71	7966.36	8.43	7966.24	10.2	7966.16
20.04	7964.89	28.37	7964.04	32.02	7963.63	36.94	7963.14	43.77	7962.18
45.33	7962.07	46.54	7961.35	55.97	7961.35	58.72	7961.17	67.95	7960.75
74.23	7960.38	79.93	7960.39	82.87	7960.19	91.91	7959.69	101.04	7959.01
103.88	7958.81	117.72	7957.92	119.21	7957.85	127.84	7957.42	131.31	7957.17
137.38	7956.82	139.06	7956.72	146.44	7956.25	153.77	7955.76	155.55	7955.7
163.77	7955.53	173.72	7955.01	174.97	7954.95	175.75	7954.9	181.84	7954.57
186.64	7954.19	192.76	7953.94	197.06	7953.93	199.8	7953.79	211.18	7953.29
217.35	7952.98	220.46	7952.8	226.2	7952.53	233.6	7951.56	236.32	7951.14
238.25	7950.95	247	7950.33	258.31	7950.03	266.35	7949.73	269.07	7949.62
273.21	7949.49	288.9	7949.18	293.91	7949.07	295.64	7948.67	298.14	7948.42
301.35	7947.72	303.52	7947.59	306.87	7947.18	312.98	7947.13	316.87	7946.81
322.88	7946.95	327.45	7947	331.69	7947.07	334.15	7947	339.22	7946.87
346.33	7946.66	348.99	7946.66	354.12	7946.83	364.95	7947.13	367.36	7947.27
372.05	7947.45	376.39	7947.72	380.86	7948.02	381.7	7948.08	386.17	7948.38
387.41	7948.47	393.24	7948.88	395.6	7948.5	399.32	7948.15	400.8	7947.9
407.32	7947.08	408.24	7946.98	410.4	7946.81	413.39	7946.54	420.49	7945.95
450.19	7945.95	455.85	7946.25	458.47	7946.52	463.93	7946.95	472.56	7948.27
476.23	7948.04	479.78	7947.8	482.63	7947.62	484.67	7947.53	487.86	7947.37
491.06	7946.28	499.31	7946.91	505.41	7946.72	513.45	7946.5	515.99	7946.63
524.31	7947.02	528.66	7947.25	531.21	7947.42	535.58	7947.72	537.24	7947.81
542.76	7948.1	544.94	7948.27	551.63	7948.6	554.85	7948.66	560.83	7948.71
565.59	7948.86	570.89	7948.99	588.08	7949.36	589.74	7949.41	596.88	7949.55
606.7	7949.84	608.06	7949.89	617.9	7950.17	619.36	7950.24	623.98	7950.44
628.47	7950.3	632.11	7950.2	640.19	7950.29	647.38	7950.32	651.54	7950.29
659.68	7950.56	662.89	7950.65	672.28	7951.13	675.95	7951.31	683.95	7951.72
685.78	7950.71	696.54	7945.57	697.43	7945.06	701.51	7943.16	706	7938
727	7937.25	749	7938	755.27	7944.19	755.8	7944.36	758.33	7945.54
764.06	7948.51	767.16	7949.71	769.7	7949.97	771.88	7950.11	775.3	7950.72
777.36	7951.15	780.29	7951.68	785.87	7951.67	791.32	7951.6	794.65	7951.76
800.05	7951.95	805.3	7952.07	809.87	7952.19	815.31	7952.25	817.48	7952.37
821.96	7952.89	825.31	7953.07	829.49	7953.2	835.31	7953.56	839.11	7953.46
845.31	7953.46	849.12	7953.52	855.31	7953.75	858.94	7953.85	868.75	7954.14
875.32	7954.11	888.38	7954.19	895.32	7954.31	898.19	7954.34	905.32	7954.4
912.15	7954.44	914.07	7954.78	916.95	7955.54	922.93	7957.18	925.53	7957.8
935.33	7960.4	942	7961.75	944.11	7962.2	946.58	7962.69	947.48	7962.93
948.06	7963.11	954.17	7963.17						

Manning's n Values num= 3
Sta n Val Sta n Val
0 .06 706 .035 749 .06

Bank Sta: Left Right Coeff Contr. Expan.
706 749 .3 .5

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
0 694 7945.95 T
762 954.17 7951 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 7947.37
Energy head used in spillway design =

Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 1

Pier Data
Pier Station upstream= 702 downstream= 720

Upstream	num=	2	Width	Elev	Downstream	num=	2	Width	Elev
2	0	2	7948.5		2	0	2	7948.5	

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

Additional Bridge Parameters

Add Friction component to Momentum
Do not add Weight component to Momentum
Class 3 flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #100-year

E.G. US. (ft)	7944.78	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	7944.10	E.G. Elev (ft)	7944.74	7944.61
Q Total (cfs)	1691.00	W.S. Elev (ft)	7943.99	7944.04
Q Bridge (cfs)	1691.00	Crit W.S. (ft)	7941.85	7941.39
Q Weir (cfs)		Max Chl Dpth (ft)	6.74	6.78
Weir Sta Lft (ft)		Vel Total (ft/s)	6.41	6.69
Weir Sta Rgt (ft)		Flow Area (sq ft)	263.98	297.32
Weir Submerg		Froude # Chl	0.51	0.43
Weir Max Depth (ft)		Specif Force (cu ft)	1142.71	1276.09
Min El Weir Flow (ft)	7947.38	Hydr Depth (ft)	5.24	5.56
Min El Prs (ft)	7948.25	W.P. Total (ft)	67.81	71.60
Delta EG (ft)	0.21	Conv. Total (cfs)	27343.6	33318.1
Delta WS (ft)	0.06	Top Width (ft)	50.39	53.48
BR Open Area (sq ft)	493.15	Frctn Loss (ft)	0.04	0.01
BR Open Vel (ft/s)	6.41	C & E Loss (ft)	0.09	0.02
Coef of Q		Shear Total (lb/sq ft)	0.93	0.67
Br Sel Method	Energy only	Power Total (lb/ft s)	5.95	3.80

BRIDGE OUTPUT Profile #Floodway

E.G. US. (ft)	7944.89	Element	Inside BR US	Inside BR DS
W.S. US. (ft) <td>7944.24</td> <td>E.G. Elev (ft) <td>7944.86</td> <td>7944.73</td> </td>	7944.24	E.G. Elev (ft) <td>7944.86</td> <td>7944.73</td>	7944.86	7944.73
Q Total (cfs)	1691.00	W.S. Elev (ft) <td>7944.15</td> <td>7944.19</td>	7944.15	7944.19
Q Bridge (cfs)	1691.00	Crit W.S. (ft) <td>7941.85</td> <td>7941.39</td>	7941.85	7941.39
Q Weir (cfs)		Max Chl Dpth (ft) <td>6.90</td> <td>6.94</td>	6.90	6.94
Weir Sta Lft (ft)		Vel Total (ft/s) <td>6.23</td> <td>6.54</td>	6.23	6.54
Weir Sta Rgt (ft)		Flow Area (sq ft) <td>271.34</td> <td>305.47</td>	271.34	305.47
Weir Submerg		Froude # Chl <td>0.48</td> <td>0.41</td>	0.48	0.41
Weir Max Depth (ft)		Specif Force (cu ft) <td>1173.88</td> <td>1264.18</td>	1173.88	1264.18
Min El Weir Flow (ft) <td>7951.01</td> <td>Hydr Depth (ft) <td>5.11</td> <td>5.79</td> </td>	7951.01	Hydr Depth (ft) <td>5.11</td> <td>5.79</td>	5.11	5.79
Min El Prs (ft) <td>7948.25</td> <td>W.P. Total (ft) <td>66.85</td> <td>71.00</td> </td>	7948.25	W.P. Total (ft) <td>66.85</td> <td>71.00</td>	66.85	71.00
Delta EG (ft) <td>0.19</td> <td>Conv. Total (cfs) <td>28575.7</td> <td>34668.4</td> </td>	0.19	Conv. Total (cfs) <td>28575.7</td> <td>34668.4</td>	28575.7	34668.4
Delta WS (ft) <td>0.04</td> <td>Top Width (ft) <td>49.26</td> <td>52.72</td> </td>	0.04	Top Width (ft) <td>49.26</td> <td>52.72</td>	49.26	52.72
BR Open Area (sq ft) <td>484.17</td> <td>Frctn Loss (ft) <td>0.04</td> <td>0.01</td> </td>	484.17	Frctn Loss (ft) <td>0.04</td> <td>0.01</td>	0.04	0.01
BR Open Vel (ft/s) <td>6.23</td> <td>C & E Loss (ft) <td>0.08</td> <td>0.02</td> </td>	6.23	C & E Loss (ft) <td>0.08</td> <td>0.02</td>	0.08	0.02
Coef of Q		Shear Total (lb/sq ft) <td>0.89</td> <td>0.64</td>	0.89	0.64
Br Sel Method	Energy only	Power Total (lb/ft s) <td>5.53</td> <td>3.54</td>	5.53	3.54

BRIDGE OUTPUT Profile #10-year

E.G. US. (ft)	7943.95	Element	Inside BR US	Inside BR DS
W.S. US. (ft) <td>7943.45</td> <td>E.G. Elev (ft) <td>7943.92</td> <td>7943.81</td> </td>	7943.45	E.G. Elev (ft) <td>7943.92</td> <td>7943.81</td>	7943.92	7943.81
Q Total (cfs) <td>1284.00</td> <td>W.S. Elev (ft) <td>7943.37</td> <td>7943.40</td> </td>	1284.00	W.S. Elev (ft) <td>7943.37</td> <td>7943.40</td>	7943.37	7943.40
Q Bridge (cfs) <td>1284.00</td> <td>Crit W.S. (ft) <td>7941.15</td> <td>7940.76</td> </td>	1284.00	Crit W.S. (ft) <td>7941.15</td> <td>7940.76</td>	7941.15	7940.76
Q Weir (cfs) <td></td> <td>Max Chl Dpth (ft) <td>6.12</td> <td>6.15</td> </td>		Max Chl Dpth (ft) <td>6.12</td> <td>6.15</td>	6.12	6.15
Weir Sta Lft (ft) <td></td> <td>Vel Total (ft/s) <td>5.50</td> <td>4.86</td> </td>		Vel Total (ft/s) <td>5.50</td> <td>4.86</td>	5.50	4.86
Weir Sta Rgt (ft) <td></td> <td>Flow Area (sq ft) <td>233.42</td> <td>264.06</td> </td>		Flow Area (sq ft) <td>233.42</td> <td>264.06</td>	233.42	264.06
Weir Submerg <td></td> <td>Froude # Chl <td>0.45</td> <td>0.38</td> </td>		Froude # Chl <td>0.45</td> <td>0.38</td>	0.45	0.38
Weir Max Depth (ft) <td></td> <td>Specif Force (cu ft) <td>861.89</td> <td>936.43</td> </td>		Specif Force (cu ft) <td>861.89</td> <td>936.43</td>	861.89	936.43
Min El Weir Flow (ft) <td>7947.38</td> <td>Hydr Depth (ft) <td>4.82</td> <td>5.13</td> </td>	7947.38	Hydr Depth (ft) <td>4.82</td> <td>5.13</td>	4.82	5.13
Min El Prs (ft) <td>7948.25</td> <td>W.P. Total (ft) <td>64.24</td> <td>67.02</td> </td>	7948.25	W.P. Total (ft) <td>64.24</td> <td>67.02</td>	64.24	67.02
Delta EG (ft) <td>0.16</td> <td>Conv. Total (cfs) <td>23226.3</td> <td>28302.7</td> </td>	0.16	Conv. Total (cfs) <td>23226.3</td> <td>28302.7</td>	23226.3	28302.7
Delta WS (ft) <td>0.05</td> <td>Top Width (ft) <td>48.43</td> <td>51.48</td> </td>	0.05	Top Width (ft) <td>48.43</td> <td>51.48</td>	48.43	51.48
BR Open Area (sq ft) <td>493.15</td> <td>Frctn Loss (ft) <td>0.04</td> <td>0.01</td> </td>	493.15	Frctn Loss (ft) <td>0.04</td> <td>0.01</td>	0.04	0.01
BR Open Vel (ft/s) <td>5.50</td> <td>C & E Loss (ft) <td>0.07</td> <td>0.02</td> </td>	5.50	C & E Loss (ft) <td>0.07</td> <td>0.02</td>	0.07	0.02
Coef of Q <td></td> <td>Shear Total (lb/sq ft) <td>0.69</td> <td>0.50</td> </td>		Shear Total (lb/sq ft) <td>0.69</td> <td>0.50</td>	0.69	0.50
Br Sel Method <td>Energy only</td> <td>Power Total (lb/ft s) <td>3.81</td> <td>2.43</td> </td>	Energy only	Power Total (lb/ft s) <td>3.81</td> <td>2.43</td>	3.81	2.43

BRIDGE OUTPUT Profile #50-year

E.G. US. (ft)	7944.53	Element	Inside BR US	Inside BR DS
W.S. US. (ft) <td>7943.90</td> <td>E.G. Elev (ft) <td>7944.50</td> <td>7944.37</td> </td>	7943.90	E.G. Elev (ft) <td>7944.50</td> <td>7944.37</td>	7944.50	7944.37
Q Total (cfs) <td>1575.00</td> <td>W.S. Elev (ft) <td>7943.80</td> <td>7943.84</td> </td>	1575.00	W.S. Elev (ft) <td>7943.80</td> <td>7943.84</td>	7943.80	7943.84
Q Bridge (cfs) <td>1575.00</td> <td>Crit W.S. (ft) <td>7941.66</td> <td>7941.21</td> </td>	1575.00	Crit W.S. (ft) <td>7941.66</td> <td>7941.21</td>	7941.66	7941.21
Q Weir (cfs) <td></td> <td>Max Chl Dpth (ft) <td>6.54</td> <td>6.59</td> </td>		Max Chl Dpth (ft) <td>6.54</td> <td>6.59</td>	6.54	6.59
Weir Sta Lft (ft) <td></td> <td>Vel Total (ft/s) <td>6.19</td> <td>5.49</td> </td>		Vel Total (ft/s) <td>6.19</td> <td>5.49</td>	6.19	5.49
Weir Sta Rgt (ft) <td></td> <td>Flow Area (sq ft) <td>254.42</td> <td>286.96</td> </td>		Flow Area (sq ft) <td>254.42</td> <td>286.96</td>	254.42	286.96
Weir Submerg <td></td> <td>Froude # Chl <td>0.49</td> <td>0.42</td> </td>		Froude # Chl <td>0.49</td> <td>0.42</td>	0.49	0.42
Weir Max Depth (ft) <td></td> <td>Specif Force (cu ft) <td>1056.60</td> <td>1136.78</td> </td>		Specif Force (cu ft) <td>1056.60</td> <td>1136.78</td>	1056.60	1136.78
Min El Weir Flow (ft) <td>7947.38</td> <td>Hydr Depth (ft) <td>5.12</td> <td>5.43</td> </td>	7947.38	Hydr Depth (ft) <td>5.12</td> <td>5.43</td>	5.12	5.43
Min El Prs (ft) <td>7948.25</td> <td>W.P. Total (ft) <td>66.66</td> <td>70.47</td> </td>	7948.25	W.P. Total (ft) <td>66.66</td> <td>70.47</td>	66.66	70.47
Delta EG (ft) <td>0.20</td> <td>Conv. Total (cfs) <td>26048.7</td> <td>31744.2</td> </td>	0.20	Conv. Total (cfs) <td>26048.7</td> <td>31744.2</td>	26048.7	31744.2
Delta WS (ft) <td>0.06</td> <td>Top Width (ft) <td>49.72</td> <td>52.86</td> </td>	0.06	Top Width (ft) <td>49.72</td> <td>52.86</td>	49.72	52.86
BR Open Area (sq ft) <td>493.15</td> <td>Frctn Loss (ft) <td>0.04</td> <td>0.01</td> </td>	493.15	Frctn Loss (ft) <td>0.04</td> <td>0.01</td>	0.04	0.01
BR Open Vel (ft/s) <td>6.19</td> <td>C & E Loss (ft) <td>0.09</td> <td>0.02</td> </td>	6.19	C & E Loss (ft) <td>0.09</td> <td>0.02</td>	0.09	0.02
Coef of Q <td></td> <td>Shear Total (lb/sq ft) <td>0.87</td> <td>0.63</td> </td>		Shear Total (lb/sq ft) <td>0.87</td> <td>0.63</td>	0.87	0.63
Br Sel Method <td>Energy only</td> <td>Power Total (lb/ft s) <td>5.39</td> <td>3.43</td> </td>	Energy only	Power Total (lb/ft s) <td>5.39</td> <td>3.43</td>	5.39	3.43

BRIDGE OUTPUT Profile #500-year

E.G. US. (ft)	7945.30	Element	Inside BR US	Inside BR DS
W.S. US. (ft) <td>7944.52 <td>E.G. Elev (ft) <td>7945.26</td> <td>7945.11</td> </td></td>	7944.52 <td>E.G. Elev (ft) <td>7945.26</td> <td>7945.11</td> </td>	E.G. Elev (ft) <td>7945.26</td> <td>7945.11</td>	7945.26	7945.11
Q Total (cfs) <td>1950.00</td> <td>W.S. Elev (ft) <td>7944.39</td> <td>7944.45</td> </td>	1950.00	W.S. Elev (ft) <td>7944.39</td> <td>7944.45</td>	7944.39	7944.45
Q Bridge (cfs) <td>1950.00</td> <td>Crit W.S. (ft) <td>7942.26</td> <td>7941.73</td> </td>	1950.00	Crit W.S. (ft) <td>7942.26</td> <td>7941.73</td>	7942.26	7941.73
Q Weir (cfs) <td></td> <td>Max Chl Dpth (ft) <td>7.14</td> <td>7.19</td> </td>		Max Chl Dpth (ft) <td>7.14</td> <td>7.19</td>	7.14	7.19
Weir Sta Lft (ft) <td></td> <td>Vel Total (ft/s) <td>6.85</td> <td>6.10</td> </td>		Vel Total (ft/s) <td>6.85</td> <td>6.10</td>	6.85	6.10
Weir Sta Rgt (ft) <td></td> <td>Flow Area (sq ft) <td>284.57</td> <td>319.59</td> </td>		Flow Area (sq ft) <td>284.57</td> <td>319.59</td>	284.57	319.59
Weir Submerg <td></td> <td>Froude # Chl <td>0.53</td> <td>0.45</td> </td>		Froude # Chl <td>0.53</td> <td>0.45</td>	0.53	0.45
Weir Max Depth (ft) <td></td> <td>Specif Force (cu ft) <td>1338.58</td> <td>1429.14</td> </td>		Specif Force (cu ft) <td>1338.58</td> <td>1429.14</td>	1338.58	1429.14
Min El Weir Flow (ft) <td>7947.38</td> <td>Hydr Depth (ft) <td>5.54</td> <td>5.79</td> </td>	7947.38	Hydr Depth (ft) <td>5.54</td> <td>5.79</td>	5.54	5.79
Min El Prs (ft) <td>7948.25</td> <td>W.P. Total (ft) <td>69.71</td> <td>74.37</td> </td>	7948.25	W.P. Total (ft) <td>69.71</td> <td>74.37</td>	69.71	74.37
Delta EG (ft) <td>0.23</td> <td>Conv. Total (cfs) <td>30213.7</td> <td>36702.5</td> </td>	0.23	Conv. Total (cfs) <td>30213.7</td> <td>36702.5</td>	30213.7	36702.5
Delta WS (ft) <td>0.06</td> <td>Top Width (ft) <td>51.33</td> <td>55.23</td> </td>	0.06	Top Width (ft) <td>51.33</td> <td>55.23</td>	51.33	55.23

BR Open Area (sq ft)	495.15	Frctn Loss (ft)	0.05	0.02
BR Open Vel (ft/s)	6.85	C & E Loss (ft)	0.10	0.02
Coef of Q		Shear Total (lb/sq ft)	1.06	0.76
Br Sel Method	Energy only	Power Total (lb/ft s)	7.27	4.62

CrystalRiver.rep

CROSS SECTION

RIVER: Crystal
 REACH: Marble RS: 23204

INPUT

Description:

Station	Elevation	Data	num=	182	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7967.08	28.37	7964.04	32.02	7963.63	36.94	7963.14	43.77	7962.18				
20.04	7964.89	28.37	7964.04	32.02	7963.63	36.94	7963.14	43.77	7962.18				
45.33	7962.07	46.54	7961.99	55.97	7961.35	58.72	7961.17	67.95	7960.75				
74.23	7960.58	79.93	7960.39	82.87	7960.19	91.91	7959.69	101.04	7959.01				
103.88	7958.81	117.72	7957.92	119.21	7957.85	127.84	7957.42	131.31	7957.17				
137.38	7956.82	139.06	7956.72	146.44	7956.25	153.77	7955.76	155.55	7955.5				
163.77	7955.53	173.72	7955.01	174.97	7954.95	175.75	7954.9	181.84	7954.57				
186.64	7954.19	192.76	7953.94	197.06	7953.93	199.8	7953.79	211.18	7953.29				
217.35	7952.98	220.46	7952.8	226.2	7952.53	233.6	7951.56	236.32	7951.14				
238.75	7950.95	247	7950.33	258.31	7950.03	266.35	7949.73	269.07	7949.62				
273.21	7949.49	288.9	7949.18	293.91	7949.07	295.64	7948.67	298.14	7948.42				
301.35	7947.72	303.52	7947.59	306.87	7947.18	312.98	7947.13	316.87	7946.81				
322.86	7946.95	327.45	7947	331.69	7947.07	334.15	7947	339.22	7946.87				
346.33	7946.62	348.99	7946.66	354.61	7946.83	362.95	7947.13	367.36	7947.27				
372.05	7947.45	376.39	7947.72	380.86	7948.02	381.7	7948.08	386.17	7948.38				
387.41	7948.47	393.24	7948.88	395.6	7948.5	399.32	7948.15	400.8	7947.9				
407.32	7947.08	408.24	7946.98	410.4	7946.81	413.39	7946.54	420.49	7945.95				
450.19	7945.95	455.85	7946.25	458.47	7946.52	463.93	7946.95	472.56	7948.27				
476.23	7948.04	479.78	7947.8	482.63	7947.62	484.67	7947.53	487.86	7947.37				
491.06	7947.28	499.31	7946.91	505.41	7946.72	513.45	7946.5	515.99	7946.63				
524.31	7947.02	528.66	7947.25	531.21	7947.42	535.58	7947.72	537.24	7947.81				
542.76	7948.1	544.94	7948.27	551.63	7948.6	554.85	7948.66	560.83	7948.71				
565.59	7948.86	570.89	7948.99	588.08	7949.36	589.74	7949.41	596.88	7949.55				
606.7	7949.84	608.06	7949.89	617.9	7950.17	619.36	7950.24	623.98	7950.44				
628.47	7950.3	632.11	7950.2	640.19	7950.29	647.38	7950.32	651.54	7950.29				
659.68	7950.56	662.89	7950.65	672.28	7951.13	675.95	7951.31	683.95	7951.72				
685.78	7950.5	696.54	7945.5	701.51	7943.16	705.8	7944.36	758.33	7945.54				
727	7937.25	749	7938	755.27	7944.19	755.8	7944.36	758.33	7945.54				
764.06	7948.51	767.16	7949.71	769.7	7949.97	771.88	7950.11	775.3	7950.72				
777.36	7951.15	780.29	7951.68	785.87	7951.67	791.32	7951.6	794.65	7951.76				
800.05	7951.95	805.3	7952.07	809.87	7952.19	815.31	7952.25	817.48	7952.37				
821.96	7952.85	825.31	7953.07	829.31	7953.2	835.31	7953.56	839.31	7953.66				
845.31	7953.46	849.12	7953.52	853.31	7953.75	858.94	7953.85	868.75	7954.14				
875.32	7954.11	888.38	7954.19	895.32	7954.31	898.19	7954.34	905.32	7954.4				
912.16	7954.44	914.07	7954.78	916.95	7955.54	922.93	7957.18	925.33	7957.88				
935.33	7960.4	942	7961.75	944.11	7962.2	946.58	7962.69	947.48	7962.93				
948.06	7963.11	954.17	7963.17										

Manning's n values	num=	3	
Sta	n val	Sta	n val
0	.06	706	.035
		749	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
706	749	467.46	479.73	474.53	.3		.5

Ineffective Flow	num=	2	
Sta L	Sta R	Elev	Permanent
0	694	7945.95	T
762	954.17	7951	T

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7944.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7944.04	Reach Len. (ft)	467.46	479.73	474.53
Crit W.S. (ft)		Flow Area (sq ft)	16.37	275.87	18.48
E.G. Slope (ft/ft)	0.001637	Area (sq ft)	16.37	275.87	18.48
Q Total (cfs)	1691.00	Flow (cfs)	24.58	1635.58	30.84
Top Width (ft)	55.50	Top Width (ft)	6.18	43.00	6.12
Vel Total (ft/s)	5.44	Avg. Vel. (ft/s)	1.50	5.93	1.67
Max Chl Dpth (ft)	6.79	Hydr. Depth (ft)	2.57	6.42	3.02
Conv. Total (cfs)	41790.6	Conv. (cfs)	607.4	40421.0	762.2
Length wtd. (ft)	478.85	Wetted Per. (ft)	8.93	43.03	8.60
Min Ch El (ft)	7937.25	Shear (lb/sq ft)	0.19	0.66	0.22
Alpha	1.15	Stream Power (lb/ft s)	0.28	3.89	0.37
Frctn Loss (ft)	1.52	Cum Volume (acre-ft)	103.82	99.28	182.73
C & E Loss (ft)	0.19	Cum SA (acres)	48.86	25.89	66.38

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7944.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7944.20	Reach Len. (ft)	467.46	479.73	474.53
Crit W.S. (ft)		Flow Area (sq ft)	17.21	282.52	19.36
E.G. Slope (ft/ft)	0.001508	Area (sq ft)	17.21	282.52	19.36
Q Total (cfs)	1691.00	Flow (cfs)	25.99	1633.15	31.85
Top Width (ft)	54.72	Top Width (ft)	5.85	43.00	5.87
Vel Total (ft/s)	5.30	Avg. Vel. (ft/s)	1.51	5.78	1.65
Max Chl Dpth (ft)	6.95	Hydr. Depth (ft)	2.94	6.57	3.30
Conv. Total (cfs)	43549.1	Conv. (cfs)	669.4	42059.4	820.3
Length wtd. (ft)	478.92	Wetted Per. (ft)	8.74	43.03	8.65
Min Ch El (ft)	7937.25	Shear (lb/sq ft)	0.29	0.62	0.21
Alpha	1.15	Stream Power (lb/ft s)	0.28	3.7	0.35
Frctn Loss (ft)	1.47	Cum Volume (acre-ft)	30.31	109.38	22.59
C & E Loss (ft)	0.23	Cum SA (acres)	12.16	25.89	8.22

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7943.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7943.40	Reach Len. (ft)	467.46	479.73	474.53
Crit W.S. (ft)		Flow Area (sq ft)	12.74	248.51	14.79
E.G. Slope (ft/ft)	0.001347	Area (sq ft)	12.74	248.51	14.79
Q Total (cfs)	1284.00	Flow (cfs)	16.62	1246.59	20.79
Top Width (ft)	53.49	Top Width (ft)	5.01	43.00	5.47
Vel Total (ft/s)	4.65	Avg. Vel. (ft/s)	1.30	5.02	1.41
Max Chl Dpth (ft)	6.15	Hydr. Depth (ft)	2.54	5.78	2.70
Conv. Total (cfs)	34982.6	Conv. (cfs)	452.7	33963.4	566.5

		CrystalRiver.rep	
Length Wtd. (ft)	479.14	Wetted Per. (ft)	7.42
Min Ch El (ft)	7937.25	Shear (lb/sq ft)	0.14
Alpha	1.13	Stream Power (lb/ft s)	0.19
Frcn Loss (ft)	1.32	Cum Volume (acre-ft)	80.87
C & E Loss (ft)	0.18	Cum SA (acres)	43.62
			25.89
			59.52

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-year

Element	Left 08	Channel	Right 08
E.G. Elev (ft)	7944.34		
Vel Head (ft)	0.49		
W.S. Elev (ft)	7943.85		
Crit W.S. (ft)			
E.G. Slope (ft/ft)	0.001578		
Q Total (cfs)	1575.00		
Top Width (ft)	54.88		
Vel Total (ft/s)	5.25		
Max Chl Dpth (ft)	6.60		
Conv. Total (cfs)	3964.2		
Length Wtd. (ft)	478.90		
Min Ch El (ft)	7937.25		
Alpha	1.14		
Frcn Loss (ft)	1.46		
C & E Loss (ft)	0.17		
Element			
Wt. n-val.	0.060		
Reach Len. (ft)	467.46		
Flow Area (sq ft)	15.16		
Area (sq ft)	15.16		
Flow (cfs)	22.01		
Top width (ft)	5.96		
Avg. Vel. (ft/s)	1.45		
Hydr. Depth (ft)	2.54		
Conv. (cfs)	38390.9		
Wetted Per. (ft)	8.46		
Shear (lb/sq ft)	0.18		
Stream Power (lb/ft s)	0.26		
Cum Volume (acre-ft)	96.99		
Cum SA (acres)	47.61		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500-year

Element	Left 08	Channel	Right 08
E.G. Elev (ft)	7945.07		
Vel Head (ft)	0.62		
W.S. Elev (ft)	7944.45		
Crit W.S. (ft)			
E.G. Slope (ft/ft)	0.001761		
Q Total (cfs)	1950.00		
Top Width (ft)	57.27		
Vel Total (ft/s)	5.84		
Max Chl Dpth (ft)	7.20		
Conv. Total (cfs)	46472.4		
Length Wtd. (ft)	478.76		
Min Ch El (ft)	7937.25		
Alpha	1.17		
Frcn Loss (ft)	1.65		
C & E Loss (ft)	0.21		
Element			
Wt. n-val.	0.060		
Reach Len. (ft)	467.46		
Flow Area (sq ft)	15.18		
Area (sq ft)	15.18		
Flow (cfs)	30.88		
Top width (ft)	7.27		
Avg. Vel. (ft/s)	1.61		
Hydr. Depth (ft)	2.64		
Conv. (cfs)	738.4		
Wetted Per. (ft)	9.90		
Shear (lb/sq ft)	0.21		
Stream Power (lb/ft s)	0.34		
Cum Volume (acre-ft)	118.85		
Cum SA (acres)	52.44		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Crystal
REACH: Marble
RS: 22724

INPUT

Description:

Station	Elevation	Data	num	261
Sta	Elev	Sta	Elev	Sta
0	7990.68	12.11	7992.24	13.09
27.82	7989.48	18.83	7986.54	43.53
64.49	7977.77	85.06	7977.57	70.5
103.67	7964.97	106.37	7964.1	116.63
123.45	7956.83	129.08	7950.55	132.84
147.67	7945.14	153.5	7945.33	155.53
176.29	7945.3	181.45	7945.184	184.48
204.36	7945.22	207.8	7945.22	216.14
232.05	7945.27	240.25	7945.35	246.14
263.47	7945.37	272.22	7945.22	277.05
298.16	7945.26	310.6	7945.46	326.31
342.02	7945.76	350.02	7945.87	357.73
375.95	7946.03	387.83	7945.56	389.02
413.48	7946.16	414.85	7946.35	420.57
435.44	7947.38	441.38	7947.58	450.99
479.65	7946.91	483.49	7946.9	491.54
513.84	7946.87	518.05	7946.94	523.38
553.14	7947.2	533.2	7947.07	537
567.94	7940.53	569.53	7940.72	574.02
595.62	7942.42	607.57	7942.4	611.92
632.9	7941.98	649.26	7941.88	658.23
677.1	7941.49	683.57	7941.15	693.4
708.9	7940.76	721.56	7940.83	725.99
747.36	7939.97	751.36	7939	754.45
798.66	7938.22	805.2	7940.02	807.47
821.72	7943.78	823.77	7943.74	835.55
848.21	7941.86	856.36	7940.36	860.88
881.87	7940.73	887.71	7940.35	892.73
906.96	7939.98	911.69	7940.14	914.71
930.22	7940.95	932.8	7941.01	934.7
954.86	7940.94	957.44	7941.11	963.01
974.02	7940.76	981.06	7940.69	988.56
1003.97	7940.25	1011.62	7940.12	1016.01
1034.16	7940.37	1036.95	7940.35	1035.09
1050.74	7939.94	1053.79	7939.91	1061.92
1076.28	7939.63	1079.3	7939.58	1084.26
1096.35	7938.98	1101.55	7938.96	1107.39
1126.35	7938.83	1120.78	7938.74	1122.23
1151.14	7938.34	1156.35	7938.45	1161.14
1176.35	7938.73	1186.35	7938.62	1196.35
1211.14	7938.72	1216.35	7938.75	1221.14
1246.35	7938.75	1266.35	7938.6	1271.14
1296.35	7938.44	1306.35	7938.18	1311.14
1331.14	7938.13	1341.14	7937.9	1346.35
1371.14	7937.7	1376.35	7937.81	1386.35
1411.14	7937.37	1416.35	7937.28	1426.35
1459.83	7936.32	1540.15	7936.39	1546.35
1568.96	7939.92	1574.4	7939.92	1581.14
1590.23	7944.33	1596.35	7945.53	1601.14
1626.35	7952.7	1631.14	7953.39	1636.35
1642.08	7956.31	1646.35	7957.46	1661.14
1676.64	7966.83			

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .06 754.77 .035 798.32 .06

Bank Sta: Left Right Lengths: Left Channel Right
754.77 798.32 894.82 849.72 700.27
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
0 583.89 7942.6 T
818.55 2676.64 7943.85 T

CROSS SECTION OUTPUT Profile #100-year

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7942.86		
Vel Head (ft)	1.15	0.060	0.035
W.S. Elev (ft)	7941.71	894.82	700.27
Crit W.S. (ft)	7941.71	78.10	155.85
E.G. Slope (ft/ft)	0.008683	86.05	155.85
Q Total (cfs)	1691.00	171.30	1442.45
Top Width (ft)	1886.08	97.98	43.55
Vel Total (ft/s)	6.58	2.20	9.26
Max Chl Dpth (ft)	5.39	0.93	3.58
Conv. Total (cfs)	18147.5	1840.5	15480.1
Length Wtd. (ft)	849.75	84.13	43.55
Min Ch El (ft)	7938.13	0.50	1.94
Alpha	1.71	1.10	17.95
Frctn Loss (ft)	4.81	103.27	96.91
C & E Loss (ft)	0.26	48.30	25.42

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7942.99		
Vel Head (ft)	1.18	0.060	0.060
W.S. Elev (ft)	7941.71	894.82	700.27
Crit W.S. (ft)	7941.71	77.77	155.68
E.G. Slope (ft/ft)	0.009407	85.67	155.68
Q Total (cfs)	1691.00	177.42	1498.69
Top Width (ft)	143.04	97.81	43.55
Vel Total (ft/s)	7.07	2.28	9.63
Max Chl Dpth (ft)	3.57	0.93	3.57
Conv. Total (cfs)	17434.7	1829.3	15451.9
Length Wtd. (ft)	851.19	84.02	43.55
Min Ch El (ft)	7938.13	0.54	2.10
Alpha	1.65	1.24	20.21
Frctn Loss (ft)	3.24	29.76	106.97
C & E Loss (ft)	0.32	11.60	25.42

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7942.28		
Vel Head (ft)	0.99	0.060	0.035
W.S. Elev (ft)	7941.29	894.82	700.27
Crit W.S. (ft)	7941.29	45.41	137.69
E.G. Slope (ft/ft)	0.008413	48.70	137.69
Q Total (cfs)	12184.0	74.37	1154.98
Top Width (ft)	1864.09	82.32	43.55
Vel Total (ft/s)	6.38	1.64	8.39
Max Chl Dpth (ft)	4.97	0.61	3.16
Conv. Total (cfs)	13998.8	810.8	12592.1
Length Wtd. (ft)	849.66	74.19	43.55
Min Ch El (ft)	7938.13	0.32	1.66
Alpha	1.57	0.53	13.93
Frctn Loss (ft)	5.07	80.54	81.98
C & E Loss (ft)	0.22	43.16	25.42

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-year

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7942.70		
Vel Head (ft)	1.06	0.060	0.060
W.S. Elev (ft)	7941.64	894.82	700.27
Crit W.S. (ft)	7941.64	72.27	152.79
E.G. Slope (ft/ft)	0.008189	79.26	152.79
Q Total (cfs)	1575.00	148.72	1355.28
Top Width (ft)	1882.20	94.99	43.55
Vel Total (ft/s)	5.37	2.06	8.87
Max Chl Dpth (ft)	5.32	0.88	3.51
Conv. Total (cfs)	17404.5	1643.4	14976.5
Length Wtd. (ft)	849.57	82.15	43.55
Min Ch El (ft)	7938.13	0.45	1.79
Alpha	1.69	0.93	15.91
Frctn Loss (ft)	4.53	96.49	92.81
C & E Loss (ft)	0.24	47.07	25.42

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

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additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7943.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.32	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7941.88	Reach Len. (ft)	894.82	849.72	700.27
Crit W.S. (ft)	7941.86	Flow Area (sq ft)	93.89	163.48	25.37
E.G. Slope (ft/ft)	0.009519	Area (sq ft)	104.54	163.48	7875.52
Q Total (cfs)	1950.00	Flow (cfs)	222.82	1635.62	91.56
Top Width (ft)	1907.11	Top width (ft)	116.85	43.55	1746.71
Vel Total (ft/s)	6.90	Avg. Vel. (ft/s)	2.37	10.00	3.61
Max Chl Dpth (ft)	5.56	Hydr. Depth (ft)	0.94	3.75	1.90
Conv. Total (cfs)	1986.7	Conv. (cfs)	2283.8	16764.4	938.5
Length wtd. (ft)	849.80	wetted Per. (ft)	100.49	43.55	13.89
Min Ch El (ft)	7938.13	Shear (lb/sq ft)	0.56	2.23	1.09
Alpha	1.79	Stream Power (lb/ft s)	1.32	22.32	3.92
Frctn Loss (ft)	6.50	Cum Volume (acre-ft)	118.19	105.09	158.07
C & E Loss (ft)	0.27	Cum SA (acres)	51.77	25.42	61.19

Warning: Divided flow computed for this cross-section.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Crystal

REACH: Marble

RS: 21874

INPUT

Description:

Station	Elevation	Data	num=	161	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7970.81				2.32	7969.79	6.03	7968.12	12.5	7965.22		
13.27	7964.88				21.19	7961.39	22.68	7960.75	32.86	7956.43		
51.73	7948.3				53.71	7947.21	53.83	7947.13	62.51	7941.77		
63.4	7941.67				72.04	7938.65	76.88	7937.93	83.76	7936.48		
84.99	7936.14				89.56	7935.81	102.02	7936.23	104.12	7936.33		
113.04	7936.62				127.16	7936.62	134.65	7936.5	155.01	7936.52		
175.37	7936.15				195.73	7936.16	205.91	7936.23	215.16	7936.19		
226.27	7936.25				241.16	7935.79	245.35	7935.65	248.5	7935.64		
256.82	7935.12				260.92	7935.18	267.12	7934.86	273.11	7934.69		
326.74	7934.69				333.24	7935.78	336.13	7935.78	338.24	7935.73		
340.87	7935.7				356.21	7935.65	358.66	7935.63	362.47	7935.73		
369.11	7935.84				386.55	7936.06	389.99	7936.04	394.57	7936.07		
400.44	7936.02				409.8	7936.08	418.66	7936.17	421.32	7936.17		
431.77	7936.19				442.21	7936.38	458.79	7936.68	463.1	7936.75		
466.82	7937.73				476.83	7936.44	479.54	7936.37	481.79	7935.9		
483.17	7935.59				487.64	7934.69	496.69	7934.69	503.47	7935.47		
504.87	7935.56				507.98	7935.86	514.65	7935.98	524.38	7935.64		
526.45	7935.58				534.73	7934.86	536.43	7934.68	544.29	7935.13		
546.64	7935.26				557.8	7934.29	575.87	7934.15	602.66	7934		
635	7934				733.2	7935.79	734.25	7936	735.45	7936.39		
737.84	7936.16				746.26	7936.03	752.46	7935.85	757.05	7935.65		
764.25	7935.64				775.22	7936.25	778.66	7936.23	786.57	7936.17		
790.18	7936.31				799.76	7936.66	809.16	7936.98	811.41	7937.16		
817.57	7936.12				824.04	7937.13	831.91	7937.14	842.4	7937.28		
847.26	7937.3				853	7942.49	951	7939.44	1052	7938.3		
1155	7938.43				1257	7938.24	1362	7938.13	1466	7937.96		
1568	7938.25				1623.9	7937.55	1647.7	7937.58	1650.5	7940.01		
1668	7939.49				1874	7939.29	1975	7939.21	2083.52	7939.24		
2086.38	7939.28				2136.28	7939.45	2188.6	7939.23	2211.39	7939.33		
2128.01	7939.51				2132.18	7939.76	2134.05	7939.86	2140.94	7940.3		
2160.4	7939.89				2174.05	7947.69	2177.37	7949.69	2183.46	7953.23		
2184.54	7954.12				2188.8	7957.51	2194.05	7961.86	2200.6	7965.88		
2204.32	7968.26											

Manning's n Values	num=	5	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	87.34	.05	557.8	.035	728.69	.05	1257		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
557.8	728.69	552.36	570.84	551.05	.1	.3

Ineffective Flow	num=	2	Sta L	Sta R	Elev	Permanent
0	463.1	7937				
735	2204.32	7941.72				

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7936.40	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>0.28 <td>Wt. n-Val. <td>0.050 <td>0.035 <td>0.050</td> </td></td></td></td>	0.28 <td>Wt. n-Val. <td>0.050 <td>0.035 <td>0.050</td> </td></td></td>	Wt. n-Val. <td>0.050 <td>0.035 <td>0.050</td> </td></td>	0.050 <td>0.035 <td>0.050</td> </td>	0.035 <td>0.050</td>	0.050
W.S. Elev (ft) <td>7936.12 <td>Reach Len. (ft) <td>552.36</td> <td>570.84</td> <td>551.05</td> </td></td>	7936.12 <td>Reach Len. (ft) <td>552.36</td> <td>570.84</td> <td>551.05</td> </td>	Reach Len. (ft) <td>552.36</td> <td>570.84</td> <td>551.05</td>	552.36	570.84	551.05
Crit W.S. (ft) <td>7936.12 <td>Flow Area (sq ft) <td>69.17</td> <td>356.57</td> <td>5.72</td> </td></td>	7936.12 <td>Flow Area (sq ft) <td>69.17</td> <td>356.57</td> <td>5.72</td> </td>	Flow Area (sq ft) <td>69.17</td> <td>356.57</td> <td>5.72</td>	69.17	356.57	5.72
E.G. Slope (ft/ft) <td>0.003984 <td>Area (sq ft) <td>201.13</td> <td>356.57</td> <td>13.94</td> </td></td>	0.003984 <td>Area (sq ft) <td>201.13</td> <td>356.57</td> <td>13.94</td> </td>	Area (sq ft) <td>201.13</td> <td>356.57</td> <td>13.94</td>	201.13	356.57	13.94
Q Total (cfs) <td>1691.00 <td>Flow (cfs) <td>120.39</td> <td>1560.27</td> <td>10.34</td> </td></td>	1691.00 <td>Flow (cfs) <td>120.39</td> <td>1560.27</td> <td>10.34</td> </td>	Flow (cfs) <td>120.39</td> <td>1560.27</td> <td>10.34</td>	120.39	1560.27	10.34
Top Width (ft) <td>481.53 <td>Top width (ft) <td>273.90</td> <td>170.89</td> <td>36.74</td> </td></td>	481.53 <td>Top width (ft) <td>273.90</td> <td>170.89</td> <td>36.74</td> </td>	Top width (ft) <td>273.90</td> <td>170.89</td> <td>36.74</td>	273.90	170.89	36.74
Vel Total (ft/s) <td>3.92 <td>Avg. Vel. (ft/s) <td>1.74</td> <td>4.38</td> <td>1.81</td> </td></td>	3.92 <td>Avg. Vel. (ft/s) <td>1.74</td> <td>4.38</td> <td>1.81</td> </td>	Avg. Vel. (ft/s) <td>1.74</td> <td>4.38</td> <td>1.81</td>	1.74	4.38	1.81
Max Chl Dpth (ft) <td>2.12 <td>Hydr. Depth (ft) <td>0.90</td> <td>2.09</td> <td>1.01</td> </td></td>	2.12 <td>Hydr. Depth (ft) <td>0.90</td> <td>2.09</td> <td>1.01</td> </td>	Hydr. Depth (ft) <td>0.90</td> <td>2.09</td> <td>1.01</td>	0.90	2.09	1.01
Conv. Total (cfs) <td>26790.2</td> <td>Conv. (cfs) <td>1907.3</td> <td>24719.0</td> <td>163.9</td> </td>	26790.2	Conv. (cfs) <td>1907.3</td> <td>24719.0</td> <td>163.9</td>	1907.3	24719.0	163.9
Length wtd. (ft) <td>563.24</td> <td>wetted Per. (ft) <td>77.39</td> <td>170.89</td> <td>6.04</td> </td>	563.24	wetted Per. (ft) <td>77.39</td> <td>170.89</td> <td>6.04</td>	77.39	170.89	6.04
Min Ch El (ft) <td>7934.00</td> <td>Shear (lb/sq ft) <td>0.22</td> <td>0.52</td> <td>0.24</td> </td>	7934.00	Shear (lb/sq ft) <td>0.22</td> <td>0.52</td> <td>0.24</td>	0.22	0.52	0.24
Alpha	1.17	Stream Power (lb/ft s) <td>0.39</td> <td>2.27</td> <td>0.43</td>	0.39	2.27	0.43
Frctn Loss (ft)	1.91	Cum Volume (acre-ft) <td>100.32</td> <td>91.91</td> <td>80.44</td>	100.32	91.91	80.44
C & E Loss (ft) <td>0.03</td> <td>Cum SA (acres) <td>44.48</td> <td>23.32</td> <td>42.53</td> </td>	0.03	Cum SA (acres) <td>44.48</td> <td>23.32</td> <td>42.53</td>	44.48	23.32	42.53

Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7936.87	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>0.20 <td>Wt. n-Val. <td>0.050 <td>0.035 <td>0.050</td> </td></td></td></td>	0.20 <td>Wt. n-Val. <td>0.050 <td>0.035 <td>0.050</td> </td></td></td>	Wt. n-Val. <td>0.050 <td>0.035 <td>0.050</td> </td></td>	0.050 <td>0.035 <td>0.050</td> </td>	0.035 <td>0.050</td>	0.050
W.S. Elev (ft) <td>7936.67 <td>Reach Len. (ft) <td>552.36</td> <td>570.84</td> <td>551.05</td> </td></td>	7936.67 <td>Reach Len. (ft) <td>552.36</td> <td>570.84</td> <td>551.05</td> </td>	Reach Len. (ft) <td>552.36</td> <td>570.84</td> <td>551.05</td>	552.36	570.84	551.05
Crit W.S. (ft) <td>7936.67 <td>Flow Area (sq ft) <td>15.84</td> <td>449.78</td> <td>9.11</td> </td></td>	7936.67 <td>Flow Area (sq ft) <td>15.84</td> <td>449.78</td> <td>9.11</td> </td>	Flow Area (sq ft) <td>15.84</td> <td>449.78</td> <td>9.11</td>	15.84	449.78	9.11
E.G. Slope (ft/ft) <td>0.002046 <td>Area (sq ft) <td>15.84</td> <td>449.78</td> <td>9.11</td> </td></td>	0.002046 <td>Area (sq ft) <td>15.84</td> <td>449.78</td> <td>9.11</td> </td>	Area (sq ft) <td>15.84</td> <td>449.78</td> <td>9.11</td>	15.84	449.78	9.11
Q Total (cfs) <td>1691.00 <td>Flow (cfs) <td>29.92</td> <td>1646.64</td> <td>14.45</td> </td></td>	1691.00 <td>Flow (cfs) <td>29.92</td> <td>1646.64</td> <td>14.45</td> </td>	Flow (cfs) <td>29.92</td> <td>1646.64</td> <td>14.45</td>	29.92	1646.64	14.45
Top Width (ft) <td>185.00 <td>Top width (ft) <td>7.80</td> <td>170.89</td> <td>6.31</td> </td></td>	185.00 <td>Top width (ft) <td>7.80</td> <td>170.89</td> <td>6.31</td> </td>	Top width (ft) <td>7.80</td> <td>170.89</td> <td>6.31</td>	7.80	170.89	6.31
Vel Total (ft/s) <td>3.56 <td>Avg. Vel. (ft/s) <td>1.89</td> <td>4.66</td> <td>1.59</td> </td></td>	3.56 <td>Avg. Vel. (ft/s) <td>1.89</td> <td>4.66</td> <td>1.59</td> </td>	Avg. Vel. (ft/s) <td>1.89</td> <td>4.66</td> <td>1.59</td>	1.89	4.66	1.59
Max Chl Dpth (ft) <td>2.67 <td>Hydr. Depth (ft) <td>2.03</td> <td>2.63</td> <td>1.44</td> </td></td>	2.67 <td>Hydr. Depth (ft) <td>2.03</td> <td>2.63</td> <td>1.44</td> </td>	Hydr. Depth (ft) <td>2.03</td> <td>2.63</td> <td>1.44</td>	2.03	2.63	1.44
Conv. Total (cfs) <td>37381.7</td> <td>Conv. (cfs) <td>661.3</td> <td>36401.0</td> <td>319.4</td> </td>	37381.7	Conv. (cfs) <td>661.3</td> <td>36401.0</td> <td>319.4</td>	661.3	36401.0	319.4
Length wtd. (ft) <td>564.92</td> <td>wetted Per. (ft) <td>9.52</td> <td>170.89</td> <td>7.10</td> </td>	564.92	wetted Per. (ft) <td>9.52</td> <td>170.89</td> <td>7.10</td>	9.52	170.89	7.10
Min Ch El (ft) <td>7934.00</td> <td>Shear (lb/sq ft) <td>0.22</td> <td>0.34</td> <td>0.16</td> </td>	7934.00	Shear (lb/sq ft) <td>0.22</td> <td>0.34</td> <td>0.16</td>	0.22	0.34	0.16
Alpha	1.04	Stream Power (lb/ft s) <td>0.40</td> <td>1.23</td> <td>0.26</td>	0.40	1.23	0.26
Frctn Loss (ft) <td>1.32</td> <td>Cum Volume (acre-ft) <td>28.72</td> <td>101.06</td> <td>22.34</td> </td>	1.32	Cum Volume (acre-ft) <td>28.72</td> <td>101.06</td> <td>22.34</td>	28.72	101.06	22.34
C & E Loss (ft) <td>0.01</td> <td>Cum SA (acres) <td>10.52</td> <td>23.32</td> <td>8.11</td> </td>	0.01	Cum SA (acres) <td>10.52</td> <td>23.32</td> <td>8.11</td>	10.52	23.32	8.11

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-year

Vel. Elev (ft)	7936.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7935.77	Reach Len. (ft)	552.36	570.84	552.05
Crit W.S. (ft)		Flow Area (sq ft)	43.71	295.58	3.92
Ch. Slope (ft/ft)	0.004466	Area (sq ft)	128.04	5.22	5.22
Q Total (cfs)	1284.00	Flow (cfs)	65.86	1208.92	6.83
Top Width (ft)	368.85	Top Width (ft)	182.27	170.89	15.69
Vel Total (ft/s)	3.74	Avg. Vel. (ft/s)	1.58	4.09	1.74
Vel Ch Depth (ft)	1.76	Hydr. Depth (ft)	0.71	1.73	0.88
Conv. Total (cfs)	19214.1	Conv. (cfs)	1030.4	18081.3	20.8
Length Wd. (ft)	563.59	Wetted Per. (ft)	61.87	170.89	4.78
Min Ch Vel (ft)	7934.00	Shear (lb/sq ft)	0.20	0.48	0.23
Alpha		Stream Power (lb-ft/s)	0.31	1.97	0.40
Prcn Loss (ft)	1.13	Cum Volume (cfs-ft)	70.79	61.79	61.79
C & E Loss (ft)	0.03	Cum SA (acres)	40.44	23.32	35.92

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7936.33	Element	Left 08	channel	Right 08
Vel Head (ft)	0.25	wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7936.08	Reach Len. (ft)	552.36	570.84	551.05
Crit W.S. (ft)		Flow Area (sq ft)	65.64	348.73	5.46
Top Slope (ft/ft)	0.003748	Area (sq ft)	496.75	32.29	32.29
Q Total (cfs)	1575.00	Flow (cfs)	107.21	1458.30	9.88
Top width (ft)	469.83	Top width (ft)	263.81	170.89	35.13
Vel Total (ft/s)	3.75	Avg. Vel. (ft/s)	1.63	4.18	1.74
Max Ch Depth (ft)	0.08	Hydr. Depth (ft)	1.85	4.04	1.00
Conv. Total (cfs)	25725.5	Conv. Total (cfs)	1751.2	23819.3	157.9
Length Wet. (ft)	563.45	Wetted Per. (ft)	77.16	170.89	5.86
Min Ch E2 (ft)	7934.00	Shear (lb/sq ft)	0.20	0.48	0.22
Alpha	1.16	Stream Power (lb/ft s)	0.33	2.00	0.38
C & E Loss (ft)	93.3	Cum Volume (cu ft)	893.02	73.02	73.02
C & E Loss (ft)	0.02	Cum SA (acres)	43.39	23.32	40.81

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7936.44	Element	Left 08	Channel	Right 08
Vel Head (ft)	0.41	wt. n-val.	0.050	0.035	0.050
W.S. Elev (ft)	7936.03	Reach Len. (ft)	552.36	570.84	551.05
Crit W.S. (ft)		Flow Area (sq ft)	61.85	340.30	5.20
Slope (ft/ft)	0.006282	Area (sq ft)	176.63	340.30	10.60
Q Total (cfs)	1950.00	Flow (cfs)	125.98	181.49	11.53
Top Width (ft)	433.67	Top Width (ft)	231.44	170.89	31.34
Vel Total (ft/s)	4.79	Avg. Vel. (ft/s)	2.04	5.33	2.22
Wet Chl Depth (ft)	2460.03	Hydr. Depth (ft)	1.81	2.99	0.98
Conc. Total (cfs)	2460.03	Conc. (cfs)	158.99	228.99	34.5
Length Wet. (ft)	562.70	Wetted Per. (ft)	76.92	170.89	5.69
Min Chl Ed. (ft)	7934.00	Shear (lb/sq ft)	0.32	0.78	0.36
Alpha	1.16	Stream Power (lb/ft s)	0.64	4.16	0.80
F	10.85	Unit Volume (a-cu ft)	1.00	1.00	94.18
C & E Loss (ft)	0.09	Cum SA (acres)	48.20	23.32	46.90

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Crystal
REACH: Marble

RS: 21304

INPUT

Description:

Station		Elevation		Data		num=		180		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8015.76	1.09	8014.18	5.12	8009.26	8.97	8004.58	14.39	7998.12								
19.69	7991.7	28.44	7981.48	29.86	7979.83	30.41	7979.19	32.27	7977.02								
39.86	7968.67	44.67	7967.65	45.16	7965.45	46.19	7964.15	51.84	7956.22								
73.25	7935.82	66.21	7934.66	67.96	7933.39	69.26	7934.78	66.86	7934.12								
73.25	7935.89	74.62	7934.66	78.44	7934.65	81.5	7934.65	84.3	7933.87								
91.73	7931.93	94.72	7931.21	99.46	7930.37	105.44	7930.22	111.75	7930.23								
114.94	7930.24	123.3	7930.25	130.34	7930.39	132.8	7930.43	136.54	7930.54								
393.93	7930.54	395.25	7931.12	399.12	7932.81	400.19	7931.27	405.58	7931.06								
408.82	7931.66	416.13	7932.43	426.69	7933.15	432.92	7933.23	437.44	7933.88								
443.93	7933.62	446.13	7933.5	450.19	7933.66	452.92	7933.66	459.30	7933.66								
459.98	7930.65	465.06	7931.16	473.73	7932.11	477.36	7931.93	481.42	7931.66								
488.41	7930.78	497.24	7931.04	499.74	7931.45	501.54	7931.88	503.51	7932.36								
505.56	7932.89	506.01	7932.95	508.82	7933.15	524.26	7933.5	526.29	7933.54								
528.27	7933.64	532.56	7933.78	534.21	7933.89	537.01	7934.03	541.79	7934.42								
543.93	7933.62	548.6	7934.15	555.58	7932.97	557.7	7932.6	561.94	7932.55								
569.98	7933.62	572.93	7933.66	574.67	7933.66	578.93	7933.66	584.79	7933.66								
579.98	7933.43	584.38	7933.41	587.2	7933.39	589.84	7933.77	594.77	7933.52								
597.83	7932.75	599.04	7932.36	609.24	7932.72	615.07	7932.78	618.06	7932.39								
619.96	7931.73	623.67	7930.48	624.63	7930.15	627.22	7930.38	627.42	7932.31								
649.82	7934.16	652.12	7934.25	656.3	7934.16	664.03	7934.16	667.11	7934.18								
671.76	7934.66	679.5	7934.05	687.23	7933.92	694.03	7933.92	702.7	7933.87								
709.93	7933.92	713.93	7933.88	717.93	7933.88	724.93	7933.92	727.93	7933.92								
792.8	7932.08	798.68	7931.85	799	7931.8	819.23	7931.8	823.14									

Manning's n Values		num=		5							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	99.46	.05	624.63	.035	645.27	.05	1412.09	.06		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. CrystalRiver.rep
 624.63 645.27 522.08 532.15 493.21 .1 .3
 Ineffective Flow num= 4
 Sta L Sta R Elev Permanent T
 0 425 7933.57 T
 425 544.93 7934.3 F
 664.03 900 7934.18 F
 900 2005.4 8000 T

CROSS SECTION OUTPUT Profile #100-year

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7934.46		
Vel Head (ft)	0.18	0.050	0.050
W.S. Elev (ft)	7934.28	522.08	532.15
Crit W.S. (ft)	7934.19	350.76	82.79
E.G. Slope (ft/ft)	0.002926	1501.73	82.79
Q Total (cfs)	1691.00	523.77	479.95
Top Width (ft)	1437.89	540.93	20.64
Vel Total (ft/s)	2.16	1.49	5.80
Max Chl Dpth (ft)	4.13	0.83	4.01
Conv. Total (cfs)	31259.5	9682.3	8872.3
Length Wtd. (ft)	511.98	423.27	20.64
Min Ch El (ft)	7930.15		
Alpha	2.53		
Frctn Loss (ft)	1.41		
C & E Loss (ft)	0.00		

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Flowway

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7935.54		
Vel Head (ft)	0.32	0.050	0.050
W.S. Elev (ft)	7935.23	522.08	532.15
Crit W.S. (ft)	7934.41	366.58	102.43
E.G. Slope (ft/ft)	0.002678	366.58	102.43
Q Total (cfs)	1691.00	1005.34	654.69
Top Width (ft)	175.00	149.63	20.64
Vel Total (ft/s)	3.51	2.74	6.39
Max Chl Dpth (ft)	5.08	2.45	4.96
Conv. Total (cfs)	32677.5	19427.6	12651.5
Length Wtd. (ft)	519.30	153.93	20.64
Min Ch El (ft)	7930.15		
Alpha	1.66		
Frctn Loss (ft)	1.44		
C & E Loss (ft)	0.01		

Warning: The cross section had to be extended vertically during the critical depth calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-year

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7934.32		
Vel Head (ft)	0.13	0.050	0.050
W.S. Elev (ft)	7934.19	522.08	532.15
Crit W.S. (ft)	7934.19	314.03	80.98
E.G. Slope (ft/ft)	0.002079	314.03	80.98
Q Total (cfs)	1284.00	375.24	389.92
Top Width (ft)	1416.83	536.98	20.64
Vel Total (ft/s)	1.78	1.19	4.81
Max Chl Dpth (ft)	4.04	0.75	1.92
Conv. Total (cfs)	28163.4	8230.5	8552.5
Length Wtd. (ft)	512.24	420.83	20.64
Min Ch El (ft)	7930.15		
Alpha	2.67		
Frctn Loss (ft)	1.12		
C & E Loss (ft)	0.00		

Warning: The energy equation could not be balanced within the specified number of iterations. The

program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-year

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7934.39		
Vel Head (ft)	0.20	0.050	0.050
W.S. Elev (ft)	7934.19	522.08	532.15
Crit W.S. (ft)	7934.19	314.03	80.98
E.G. Slope (ft/ft)	0.003127	314.03	80.98
Q Total (cfs)	1575.00	460.28	478.28
Top Width (ft)	1416.83	536.98	20.64
Vel Total (ft/s)	2.18	1.47	5.91
Max Chl Dpth (ft)	4.04	0.75	3.92
Conv. Total (cfs)	28163.4	8230.5	8552.5
Length Wtd. (ft)	512.11	420.83	20.64
Min Ch El (ft)	7930.15		
Alpha	2.67		
Frctn Loss (ft)	1.44		
C & E Loss (ft)	0.00		

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-year

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7934.50		
Vel Head (ft)	0.11	0.050	0.050
W.S. Elev (ft)	7934.39	522.08	532.15
Crit W.S. (ft)	7934.19	621.39	85.08
E.G. Slope (ft/ft)	0.002020	1562.07	85.08
Q Total (cfs)	1950.00	882.07	417.37
Top Width (ft)	1460.88	542.29	20.64
Vel Total (ft/s)	1.82	1.44	4.91
Max Chl Dpth (ft)	4.24	1.13	4.12
Conv. Total (cfs)	43888.2	19626.4	9286.5
Length Wtd. (ft)	512.69	545.21	20.64
Min Ch El (ft)	7930.15		
Alpha			
Frctn Loss (ft)			
C & E Loss (ft)			

Alpha	2.15	Stream Power (lb/ft s)	0.20	CrystalRiver.rep
Frictn Loss (ft)	1.12	Cum Volume (acre-ft)	104.28	2.55 0.32
C & E Loss (ft)	0.01	Cum SA (acres)	43.29	97.39 83.49
				22.07 41.02

Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 This may indicate the need for additional cross sections.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Crystal
 REACH: Marble RS: 20771

INPUT									
Description:									
Station	Elevation	Data	num=	332					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7966.81	2.24	7966.53	6.87	7965.86	8.55	7965.35	14.3	7963.78
18.27	7962.94	21.49	7962.3	26.14	7961.65	28.68	7961.35	30.43	7960.95
42.59	7958.19	43.05	7958.1	43.73	7957.88	50.24	7955.52	54.74	7953.9
57.43	7952.92	64.62	7950.91	66.9	7950.28	71.81	7948.75	78.91	7946.38
79.2	7946.3	88.78	7943.69	89.87	7943.4	96.5	7939.81	108.56	7933.55
101.36	7935.8	104.06	7935.39	107.35	7933.44	115.92	7933.33	123.59	7933.29
127.59	7931.65	130.56	7930.39	136.54	7928.2	166.81	7928.2	170.96	7928.54
176.3	7929	182.96	7929.51	184.65	7929.67	129.11	7929.67	332.56	7930.06
334.25	7930.22	342.75	7931.06	344.95	7931.27	358.63	7931.33	373.7	7931.28
377.93	7931.11	380.89	7931.32	382.94	7931.33	402.46	7931.32	407.25	7931.31
409.65	7931.31	413.11	7931.39	426.83	7931.44	419.41	7931.48	424.02	7931.49
430.69	7931.64	445.59	7931.73	459.96	7931.67	465.87	7931.76	480.19	7932.23
483.46	7932.4	488.71	7932.66	497.69	7932.52	499.85	7932.48	502.37	7931.75
504.73	7931.19	509.49	7930.11	516.32	7930.18	518.64	7930.22	528.1	7930.36
530.08	7930.48	532.63	7931.06	534.44	7931.55	538.25	7931.47	540.97	7931.42
546.22	7931.49	560.59	7931.58	565.28	7931.59	567.78	7931.59	571.41	7931.57
576.64	7931.4	578.15	7931.25	588.57	7929	589	7928.9	590.45	7928.65
605.82	7928.71	611.92	7928.72	613.29	7928.99	616.71	7930.43	621.72	7930.43
624.6	7930.42	629.09	7930.38	631.12	7930.35	634.62	7930.32	641.78	7928.99
642.42	7928.87	643.68	7928.64	655.31	7928.68	665.91	7928.67	666.99	7928.18
669.31	7930.27	671.22	7931.16	673.92	7930.89	676.59	7930.65	680.72	7930.26
684.09	7930.25	686.59	7930.33	693.8	7930.5	696.59	7930.63	704.27	7930.83
706.23	7931.58	707.15	7931.94	713.27	7934.52	714.07	7934.33	715.66	7933.87
720.07	7933	722.12	7932.6	723.79	7932.05	725.33	7931.64	726.42	7931.17
732.87	7931.23	743.8	7931.66	746.59	7931.71	749.21	7931.75	754.34	7931.46
756.59	7931.3	761.42	7930.83	762.3	7930.77	766.63	7931.25	773.03	7932.81
774.19	7933.03	776.82	7933.66	781.35	7935.12	783.69	7935.57	784.36	7935.44
786.59	7934.95	793.8	7933.78	796.59	7933.31	797.05	7933.23	798.68	7933.07
806.74	7933.08	807.45	7932.99	813.15	7931.01	815.86	7931.4	816.59	7931.52
823.99	7932.59	824.67	7932.68	833.8	7932.75	836.59	7932.78	843.8	7933.03
846.59	7933.1	851.8	7933.15	856.59	7933.22	859.39	7933.28	865.7	7933.67
893.8	7933.7	896.59	7933.7	903.8	7933.75	913.8	7933.75	916.59	7933.77
923.8	7933.81	926.59	7933.83	933.8	7933.98	936.59	7934.03	943.8	7934.17
946.59	7934.23	956.59	7934.56	963.8	7934.7	966.59	7934.79	973.8	7934.94
976.59	7934.99	983.8	7935.04	986.59	7935.09	993.8	7935.29	1006.59	7935.62
1020.44	7935.92	1026.72	7936.09	1030.05	7936.31	1032.87	7936.93	1033.82	7937.15
1036.6	7937.6	1039.96	7938.22	1041.48	7938.12	1043.72	7938.11	1048.44	7938
1049.22	7938.06	1055.25	7937.88	1055.74	7938.02	1056.44	7938.17	1057.29	7938.36
1059.41	7938.78	1063.82	7939.66	1069.61	7939.9	1070.93	7939.96	1071.34	7939.84
1076.59	7938.23	1079.03	7937.49	1079.64	7937.3	1086.59	7937.5	1093.8	7937.67
1086.59	7937.74	1103.8	7937.83	1106.59	7937.9	1108.13	7937.95	1111.52	7937.9
1118.64	7938.9	1130.7	7938.44	1136.59	7938.58	1143.8	7938.9	1146.59	7938.95
1153.8	7939.38	1166.59	7939.88	1170.2	7939.98	1173.8	7940.07	1186.59	7940.75
1193.4	7940.88	1196.59	7940.9	1209.39	7941.07	1216.59	7941.29	1223.8	7941.48
1226.59	7941.59	1233.8	7942.11	1236.59	7942.18	1240.47	7942.64	1246.45	7942.85
1252.42	7942.96	1263.8	7942.8	1266.59	7942.77	1273.8	7943.05	1283.8	7943.12
1286.59	7943.15	1296.59	7943.53	1303.8	7943.67	1306.59	7943.78	1313.8	7943.92
1323.8	7944.06	1326.59	7944.09	1346.59	7944.23	1353.8	7944.37	1366.86	7945.08
1368.85	7944.87	1375.69	7944.31	1383.8	7944.35	1386.59	7944.4	1391.47	7944.68
1392.57	7944.74	1403.43	7944.71	1404.45	7944.78	1416.59	7945.64	1420.85	7945.91
1426.59	7946.07	1436.59	7946.54	1443.8	7946.68	1456.59	7947.27	1463.8	7947.46
1466.59	7947.59	1473.8	7947.82	1486.59	7947.91	1503.8	7948.14	1506.59	7948.17
1513.8	7948.27	1516.59	7948.29	1523.8	7948.33	1526.59	7948.35	1533.8	7948.69
1536.59	7948.81	1543.8	7948.96	1546.59	7949.08	1553.8	7949.46	1563.8	7949.6
1566.59	7949.63	1576.59	7950.23	1583.8	7950.46	1586.59	7950.63	1593.8	7950.92
1596.59	7950.95	1603.8	7951.05	1606.59	7951.08	1646.59	7951.08	1653.8	7950.99
1656.59	7950.5	1663.8	7950.95	1666.59	7950.92	1673.8	7950.55	1676.59	7950.5
1681.68	7950.42	1692.79	7950.14	1701.05	7950.03	1705.18	7950.65	1706.59	7950.81
1712.29	7951.75	1716.59	7951.8	1726.59	7951.95	1733.8	7952.31	1736.59	7952.38
1743.8	7952.6	1746.59	7952.67	1753.8	7953.04	1756.59	7953.29	1763.72	7953.76
1764.63	7953.92	1766.59	7954.47	1773.8	7954.59	1776.59	7956.88	1778.77	7957.45
1781.94	7958.12	1787.8	7957.83	1793.8	7957.87	1796.59	7957.88	1796.59	7957.59
1798.8	7957.66	1803.83	7957.66	1806.59	7957.87	1816.59	7957.94	1823.8	7957.79
1826.59	7957.81	1833.8	7957.62	1846.59	7957.2	1863.8	7957.65	1866.59	7957.73
1873.8	7957.95	1876.59	7958.06	1878.86	7958.12	1882.39	7958.17	1883.7	7958.34
1886.59	7958.72	1893.8	7959.74	1896.59	7960.22	1903.8	7961.55	1906.59	7962.1
1913.8	7964	1919.77	7966.61						

Manning's n Values									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	115.92	.05	590.45	.035	611.92	.05	714.07	.06
Bank Sta: Left Right Lengths: Left Channel Right									
590.45	611.92	739.92	866.01	800.58	Coeff	Contr.	Expan.		
Ineffective Flow num= 2									
Sta L	Sta R	Elev	Permanent						
0	485.01	7935.76	F						
714.2	1919.77	7934.67	F						

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7933.05	Element	Left 08	Channel	Right 08
Vel Head (ft)	0.22	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7932.82	Reach Len. (ft)	739.92	866.01	800.58
Crit W.S. (ft)	7931.82	Flow Area (sq ft)	172.85	88.73	277.55
E.G. Slope (ft/ft)	0.002589	Area (sq ft)	1082.59	88.73	362.90
Q Total (cfs)	1691.00	Flow (cfs)	361.76	493.62	835.62
Top Width (ft)	666.53	Top Width (ft)	465.72	21.47	179.34
Vel Total (ft/s)	3.14	Avg Vel. (ft/s)	2.09	5.56	3.01
Max Chl Dpth (ft)	4.62	Hydr. Depth (ft)	1.64	4.13	2.85
Conv. Total (cfs)	33234.2	Conv. (cfs)	7109.8	9701.5	16423.0
Length Wtd. (ft)	827.08	Wetted Per. (ft)	106.16	21.47	98.79
Min Ch El (ft)	7928.65	Shear (lb/sq ft)	0.26	0.67	0.45
Alpha	1.47	Stream Power (lb/ft s)	0.55	3.72	1.37
Frictn Loss (ft)	1.58	Cum Volume (acre-ft)	74.03	87.98	58.40
C & E Loss (ft)	0.01	Cum SA (acres)	33.28	21.81	30.77

Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 This may indicate the need for additional cross sections.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7934.10	Element	Left 08	Channel	Right 08
Vel Head (ft)	0.41	Wt. n-Val.	0.050	0.035	0.050

CrystalRiver.rep	
W.S. Elev (ft)	7933.68
Crit W.S. (ft)	7932.10
E.G. Slope (ft/ft)	0.002873
Q Total (cfs)	1691.46
Top Width (ft)	90.95
Vel Total (ft/s)	4.52
Max Chl Dpth (ft)	5.04
Conv. Total (cfs)	31548.6
Length wtd. (ft)	843.38
Min Ch El (ft)	7928.65
Alpha	1.30
Frctn Loss (ft)	1.56
C & E Loss (ft)	0.06
Reach Len. (ft)	739.92
Flow Area (sq ft)	65.26
Area (sq ft)	206.51
Top Width (ft)	20.92
Avg. Vel. (ft/s)	3.16
Hydr. Depth (ft)	3.12
Conv. (cfs)	3852.7
Wetted Per. (ft)	23.31
Shear (lb/sq ft)	0.50
Stream Power (lb/ft s)	1.59
Cum Volume (acre-ft)	23.70
Cum SA (acres)	8.50
866.01	800.58
107.21	201.49
107.21	201.49
712.78	771.72
21.47	48.56
6.65	3.83
4.99	4.15
13298.1	14397.8
21.47	54.04
0.90	0.67
5.95	2.56
96.16	20.98
21.81	7.74

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-year

Profile #10-year	
E.G. Elev (ft)	7932.64
Vel Head (ft)	0.18
W.S. Elev (ft)	7932.46
Crit W.S. (ft)	7931.39
E.G. Slope (ft/ft)	0.002312
Q Total (cfs)	1284.00
Top Width (ft)	630.44
Vel Total (ft/s)	2.80
Max Chl Dpth (ft)	4.25
Conv. Total (cfs)	26706.5
Length wtd. (ft)	835.32
Min Ch El (ft)	7928.65
Alpha	1.48
Frctn Loss (ft)	2.34
C & E Loss (ft)	0.01
Element	Left 08
Wt. n-Val.	0.050
Reach Len. (ft)	739.92
Flow Area (sq ft)	135.77
Area (sq ft)	913.03
Flow (cfs)	252.89
Top Width (ft)	449.45
Avg. Vel. (ft/s)	1.86
Hydr. Depth (ft)	1.50
Conv. (cfs)	5260.0
Wetted Per. (ft)	91.22
Shear (lb/sq ft)	0.21
Stream Power (lb/ft s)	0.40
Cum Volume (acre-ft)	54.60
Cum SA (acres)	29.97
Channel	Right 08
Wt. n-Val.	0.050
Reach Len. (ft)	866.01
Flow Area (sq ft)	80.83
Area (sq ft)	80.83
Flow (cfs)	399.25
Top Width (ft)	21.47
Avg. Vel. (ft/s)	4.94
Hydr. Depth (ft)	3.76
Conv. (cfs)	8304.3
Wetted Per. (ft)	21.47
Shear (lb/sq ft)	0.54
Stream Power (lb/ft s)	2.68
Cum Volume (acre-ft)	74.30
Cum SA (acres)	21.81
800.58	201.49
241.88	301.69
631.86	159.52
2.51	2.51
13142.3	97.84
0.36	0.93
40.41	24.62

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-year

Profile #50-year	
E.G. Elev (ft)	7932.94
Vel Head (ft)	0.21
W.S. Elev (ft)	7932.73
Crit W.S. (ft)	7931.75
E.G. Slope (ft/ft)	0.002528
Q Total (cfs)	1575.00
Top Width (ft)	658.01
Vel Total (ft/s)	3.04
Max Chl Dpth (ft)	4.51
Conv. Total (cfs)	31322.6
Length wtd. (ft)	830.53
Min Ch El (ft)	7928.65
Alpha	1.49
Frctn Loss (ft)	1.83
C & E Loss (ft)	0.00
Element	Left 08
Wt. n-Val.	0.050
Reach Len. (ft)	739.92
Flow Area (sq ft)	208.22
Area (sq ft)	1038.48
Flow (cfs)	323.74
Top Width (ft)	465.49
Avg. Vel. (ft/s)	1.99
Hydr. Depth (ft)	1.54
Conv. (cfs)	6438.4
Wetted Per. (ft)	106.16
Shear (lb/sq ft)	0.24
Stream Power (lb/ft s)	0.48
Cum Volume (acre-ft)	68.37
Cum SA (acres)	32.30
Channel	Right 08
Wt. n-Val.	0.050
Reach Len. (ft)	866.01
Flow Area (sq ft)	86.70
Area (sq ft)	86.70
Flow (cfs)	469.33
Top Width (ft)	21.47
Avg. Vel. (ft/s)	5.41
Hydr. Depth (ft)	4.04
Conv. (cfs)	9331.7
Wetted Per. (ft)	21.47
Shear (lb/sq ft)	0.64
Stream Power (lb/ft s)	3.45
Cum Volume (acre-ft)	84.18
Cum SA (acres)	21.81
800.58	201.49
308.34	1550.5
422.59	98.54
2.76	0.43
15550.5	1.25
52.82	29.32

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-year

Profile #500-year	
E.G. Elev (ft)	7933.36
Vel Head (ft)	0.22
W.S. Elev (ft)	7933.14
Crit W.S. (ft)	7931.98
E.G. Slope (ft/ft)	0.002378
Q Total (cfs)	1950.00
Top Width (ft)	695.55
Vel Total (ft/s)	3.20
Max Chl Dpth (ft)	4.94
Conv. Total (cfs)	39988.3
Length wtd. (ft)	820.64
Min Ch El (ft)	7928.65
Alpha	1.41
Frctn Loss (ft)	1.14
C & E Loss (ft)	0.03
Element	Left 08
Wt. n-Val.	0.050
Reach Len. (ft)	739.92
Flow Area (sq ft)	208.22
Area (sq ft)	1230.06
Flow (cfs)	465.26
Top Width (ft)	466.49
Avg. Vel. (ft/s)	2.26
Hydr. Depth (ft)	1.96
Conv. (cfs)	9541.1
Wetted Per. (ft)	106.16
Shear (lb/sq ft)	0.29
Stream Power (lb/ft s)	0.65
Cum Volume (acre-ft)	87.55
Cum SA (acres)	37.24
Channel	Right 08
Wt. n-Val.	0.050
Reach Len. (ft)	866.01
Flow Area (sq ft)	95.53
Area (sq ft)	95.53
Flow (cfs)	534.98
Top Width (ft)	21.47
Avg. Vel. (ft/s)	5.60
Hydr. Depth (ft)	4.45
Conv. (cfs)	10970.7
Wetted Per. (ft)	21.47
Shear (lb/sq ft)	0.66
Stream Power (lb/ft s)	3.70
Cum Volume (acre-ft)	96.29
Cum SA (acres)	21.81
800.58	201.49
308.46	19476.5
422.59	99.60
3.08	0.46
3.15	1.42
19476.5	71.14
34.76	

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Crystal
REACH: Marble RS: 19905

INPUT

Description:

Station	Elevation	Data	num	188	Sta	Elev	Sta	Elev
0	7962.75	3.66	7961.82	4.62	7961.51	6.79	7960.87	13.62
14.62	7957.19	23.66	7954.48	24.62	7954.16	32.35	7952.68	33.64
34.63	7951.69	35.35	7951.45	42.58	7948.51	53.66	7947.69	54.63
55.61	7947.57	64.58	7947.17	67.04	7947.08	70.48	7946.3	74.63
83.66	7943.6	84.63	7943.41	87.09	7943.3	95.04	7942.69	97.47
104.62	7937.41	104.95	7937.17	109.56	7933.88	113.8	7933.66	114.62
124.62	7933.1	133.66	7932.74	134.62	7928.69	139.6	7932.5	141.03
144.45	7931.53	151.9	7929.6	154.07	7929.48	163.66	7928.93	173.66
184.62	7928.89	193.66	7929.13	203.66	7929.36	213.66	7929.51	220.54
222.9	7929.59	225.01	7929.61	238.05	7929.62	253.2	7929.49	257.84
260.78	7929.45	267.38	7929.6	268.99	7929.67	273.96	7930.1	278.61
280.63	7925.95	292.53	7926.08	310.6	7926.27	315.13	7926.46	316.59
321.38	7926.03	323.51	7927.03	328.96	7927.22	334.46	7927.54	336.53
341.2	7927.59	344.37	7927.67	350.82	7927.56	355	7927.37	359.3
365.8	7927.51	369.18	7927.46	378.23	7929.81	379.52	7930.18	380.51
388.28	7930.56	390.41	7930.55	397.13	7930.44	400.12	7930.5	404.71
406.86	7930.67	410.71	7930.72	414.02	7930.88	420.71	7930.97	424.02
430.71	7931.49	434.02	7931.58	440.71	7931.93	444.02	7932.17	460.71
464.02	7933.18	470.71	7933.54	480.71	7934.06	484.02	7934.17	500.71
504.02	7935.36	520.71	7935.91	524.02	7936.06	540.71	7936.28	544.02

554.02	7936.63	560.71	7936.77	564.02	7936.85	590.71	7937.56	594.02	7937.64
600.71	7937.82	604.02	7937.88	620.71	7938.28	624.02	7938.31	630.71	7938.39
634.02	7938.44	640.71	7938.52	644.02	7938.63	650.71	7938.99	660.71	7939.51
670.71	7939.84	674.02	7940	680.71	7940.22	684.02	7940.26	700.71	7940.7
704.02	7940.77	720.71	7940.88	724.02	7941.01	740.71	7941.35	744.02	7941.52
750.71	7942.01	754.02	7942.24	760.71	7942.73	764.02	7942.85	770.71	7942.99
780.71	7943.18	784.02	7943.34	790.71	7943.6	794.02	7943.74	800.71	7944
804.02	7944.7	810.71	7944.59	814.02	7944.68	820.71	7945.07	824.02	7945.29
840.71	7945.73	850.71	7945.86	854.02	7945.91	864.02	7946.04	880.71	7946.35
884.02	7946.28	900.71	7946.83	910.71	7947.23	914.02	7947.29	920.71	7947.55
924.02	7947.73	940.71	7948.39	944.02	7948.42	954.02	7948.61	960.71	7948.75
964.02	7948.83	972.38	7949.1	977.61	7949.51	980.71	7949.78	984.02	7949.94
990.71	7950.19	994.02	7950.42	1000.71	7950.62	1004.02	7950.71	1010.71	7951.11
1014.02	7951.23	1020.71	7951.62	1030.71	7951.89	1034.02	7952	1040.71	7952.17
1044.02	7952.31	1054.02	7952.83	1060.71	7953.19	1064.02	7953.27	1070.71	7953.45
1074.02	7953.67	1084.02	7953.94	1090.71	7954.46	1094.02	7954.73	1100.71	7955.25
1104.02	7955.32	1110.71	7955.45	1114.02	7955.6	1120.71	7955.73	1124.02	7955.86
1140.71	7956.42	1144.02	7956.52	1145.91	7956.65				

Manning's n values		num=		Sta		Sta		Sta		Sta	
Sta	n val	Sta	n val	Sta	n val	Sta	n val	Sta	n val	Sta	n val
0	.06	139.6	.05	280.63	.035	310.6	.05	369.18	.06		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	280.63	369.18		533.84	544.56	485.44	
Ineffective Flow			num=	1			
Sta L	Sta R	Elev	Permanent				
0	273.96	7930.1	T				

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7931.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.050	0.042	0.060
W.S. Elev (ft)	7931.28	Reach Len. (ft)	533.84	544.56	485.44
Crit W.S. (ft)		Flow Area (sq ft)	169.80	387.70	53.39
E.G. Slope (ft/ft)	0.001472	Area (sq ft)	262.51	387.70	53.39
Q Total (cfs)	1691.00	Flow (cfs)	223.77	1419.10	48.12
Top Width (ft)	281.10	Top Width (ft)	135.18	88.55	57.37
Vel Total (ft/s)	2.77	Avg. Vel. (ft/s)	1.32	3.66	0.90
Max Chl Dpth (ft)	5.33	Hydr. Depth (ft)	1.26	4.38	0.93
Conv. Total (cfs)	4407.83	Conv. (cfs)	5832.9	3693.5	1254.4
Length Wtd. (ft)	531.63	Wetted Per. (ft)	136.63	88.60	57.79
Min Ch El (ft)	7925.95	Shear (lb/sq ft)	0.11	0.40	0.08
Alpha	1.50	Stream Power (lb/ft s)	0.15	1.47	0.08
Frcn Loss (ft)	0.15	Cum Volume (acre-ft)	62.61	83.25	54.58
C & E Loss (ft)	0.05	Cum SA (acres)	28.18	20.72	28.60

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7932.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.050	0.042	0.060
W.S. Elev (ft)	7932.27	Reach Len. (ft)	533.84	544.56	485.44
Crit W.S. (ft)		Flow Area (sq ft)	169.80	387.70	53.39
E.G. Slope (ft/ft)	0.001292	Area (sq ft)	262.51	387.70	53.39
Q Total (cfs)	1691.00	Flow (cfs)	223.77	1419.10	48.12
Top Width (ft)	88.55	Top Width (ft)	135.18	88.55	57.37
Vel Total (ft/s)	3.56	Avg. Vel. (ft/s)	1.32	3.66	0.90
Max Chl Dpth (ft)	6.32	Hydr. Depth (ft)	1.26	4.38	0.93
Conv. Total (cfs)	47044.7	Conv. (cfs)	5832.9	3693.5	1254.4
Length Wtd. (ft)	535.00	Wetted Per. (ft)	136.63	88.60	57.79
Min Ch El (ft)	7925.95	Shear (lb/sq ft)	0.11	0.40	0.08
Alpha	1.00	Stream Power (lb/ft s)	0.15	1.47	0.08
Frcn Loss (ft)	0.63	Cum Volume (acre-ft)	23.15	94.37	19.13
C & E Loss (ft)	0.01	Cum SA (acres)	8.32	20.72	7.30

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7930.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.050	0.042	0.060
W.S. Elev (ft)	7929.96	Reach Len. (ft)	533.84	544.56	485.44
Crit W.S. (ft)		Flow Area (sq ft)	11.34	270.83	12.02
E.G. Slope (ft/ft)	0.003475	Area (sq ft)	87.58	270.83	12.02
Q Total (cfs)	1284.00	Flow (cfs)	34.00	1230.02	19.99
Top Width (ft)	226.38	Top Width (ft)	128.26	88.55	9.57
Vel Total (ft/s)	4.34	Avg. Vel. (ft/s)	2.55	4.54	1.66
Max Chl Dpth (ft)	4.01	Hydr. Depth (ft)	2.07	3.06	1.26
Conv. Total (cfs)	21780.5	Conv. (cfs)	576.7	20864.7	339.0
Length Wtd. (ft)	533.14	Wetted Per. (ft)	7.60	88.60	9.89
Min Ch El (ft)	7925.95	Shear (lb/sq ft)	0.38	0.66	0.26
Alpha	1.06	Stream Power (lb/ft s)	0.97	3.01	0.44
Frcn Loss (ft)	0.27	Cum Volume (acre-ft)	46.10	70.80	37.53
C & E Loss (ft)	0.08	Cum SA (acres)	25.06	20.72	23.07

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7931.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.050	0.042	0.060
W.S. Elev (ft)	7930.90	Reach Len. (ft)	533.84	544.56	485.44
Crit W.S. (ft)		Flow Area (sq ft)	118.57	353.72	32.94
E.G. Slope (ft/ft)	0.001936	Area (sq ft)	210.91	353.72	32.94
Q Total (cfs)	1575.00	Flow (cfs)	142.11	1404.31	28.58
Top width (ft)	268.21	Top width (ft)	133.70	88.55	45.96
Vel Total (ft/s)	3.12	Avg. Vel. (ft/s)	1.20	3.97	0.87
Max Chl Dpth (ft)	4.94	Hydr. Depth (ft)	0.89	3.99	0.72
Conv. Total (cfs)	35796.8	Conv. (cfs)	3230.0	32917.4	649.5
Length wtd. (ft)	532.28	Wetted Per. (ft)	135.11	88.60	46.37
Min Ch El (ft)	7925.95	Shear (lb/sq ft)	0.11	0.48	0.09
Alpha	1.46	Stream Power (lb/ft s)	0.13	1.92	0.07
Frcn Loss (ft)	0.18	Cum Volume (acre-ft)	57.76	79.80	49.33
C & E Loss (ft)	0.06	Cum SA (acres)	27.21	20.72	27.33

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7932.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.050	0.042	0.060
W.S. Elev (ft)	7932.07	Reach Len. (ft)	533.84	544.56	485.44
Crit W.S. (ft)		Flow Area (sq ft)	277.15	457.40	105.35
E.G. Slope (ft/ft)	0.000910	Area (sq ft)	370.10	457.40	105.35
Q Total (cfs)	1950.00	Flow (cfs)	392.21	1458.03	99.76
Top Width (ft)	300.18	Top Width (ft)	138.22	88.55	73.40
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)	1.42	3.19	0.95
Max Chl Dpth (ft)	6.32	Hydr. Depth (ft)	2.01	5.17	1.44
Conv. Total (cfs)	64631.5	Conv. (cfs)	12999.6	48325.4	3306.1
Length Wtd. (ft)	530.32	Wetted Per. (ft)	139.78	88.60	73.84
Min Chl El (ft)	7925.95	Shear (lb/sq ft)	0.11	0.29	0.08

Alpha	1.49	Stream Power (lb/ft s)	0.16	0.94	0.08
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	73.96	90.79	66.29
C & E Loss (ft)	0.03	Cum SA (acres)	32.11	20.72	32.18

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Crystal
REACH: Marble RS: 19361

INPUT

Description:

Station	Elevation	Data	num	201	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7965.19	6.12	7960.84	6.9	7960.38	7.09	7960.17	7.18	7960.17				
8.22	7960.15	17.42	7959.92	20.38	7959.88	21.01	7959.86	21.64	7959.53				
27.42	7956.29	34.19	7952.89	37.32	7951.36	38.12	7950.97	38.2	7950.97				
44.19	7951.12	47.42	7951.18	51.2	7951.29	54.08	7951.38	55.86	7950.35				
57.42	7949.4	60.52	7947.58	67.43	7943.57	70.52	7941.75	77.43	7937.72				
80.52	7935.89	87.43	7931.83	91.21	7929.6	97.35	7925.99	97.65	7925.99				
104.09	7926.08	107.43	7926.1	127.43	7926.1	140.52	7926.53	147.43	7926.62				
167.43	7926.75	190.52	7926.75	197.43	7926.71	227.43	7926.71	230.52	7926.62				
240.52	7926.36	247.43	7926.31	260.52	7926.31	267.43	7926.27	280.52	7926.1				
286	7925.99	287.69	7925.95	289.17	7925.95	291.74	7925.89	299.57	7925.77				
303.75	7925.77	310.29	7925.85	311.88	7925.91	313.4	7926	323.31	7928.21				
328.32	7929.29	335.18	7929.23	339.95	7929.23	347.06	7929.02	347.19	7929.02				
347.4	7929.01	356.88	7928.92	357.52	7928.92	363.22	7925.76	365.16	7924.69				
406.27	7924.3	407.12	7924.29	407.32	7924.31	420.78	7926.14	421.54	7926.24				
422.34	7926.52	423.83	7926.96	428.8	7928.42	429.8	7928.4	440.15	7928.29				
441.3	7928.28	442.04	7928.28	446.61	7928.44	448.61	7928.48	451.49	7926.98				
452.65	7926.38	453.09	7926.36	458.7	7926.28	460.49	7926.26	461.85	7926.24				
465.78	7926.11	470.26	7916.02	477.25	7925.94	477.66	7925.94	484.74	7925.83				
489.53	7925.9	491.98	7925.93	495.8	7925.97	499.22	7926.02	501.4	7926.04				
506.46	7926.21	511.27	7926.37	513.88	7926.39	517.64	7926.5	521.85	7927.48				
525.15	7928.15	527.06	7928.57	529.99	7929.26	532.45	7929.69	536.81	7929.76				
537.43	7929.77	543.34	7929.76	547.08	7929.71	554.64	7929.91	557.08	7929.95				
564.64	7930.15	567.08	7930.24	574.64	7930.34	577.08	7930.44	587.08	7930.57				
594.64	7930.77	597.08	7930.84	604.64	7931.04	607.08	7931.1	614.64	7931.3				
617.08	7931.36	624.64	7931.56	627.08	7931.64	647.08	7932.56	654.64	7932.66				
647.08	7932.7	664.64	7932.79	674.64	7932.9	677.08	7933.01	687.08	7933.01				
687.08	7933.14	694.64	7933.44	697.08	7933.52	704.64	7933.83	707.08	7933.92				
714.64	7934.12	717.08	7934.18	724.64	7934.38	727.08	7934.41	734.64	7934.61				
737.08	7934.67	744.64	7934.87	747.08	7934.89	764.64	7935.12	784.64	7935.52				
787.08	7935.56	794.64	7935.96	797.08	7936.06	807.08	7936.59	814.64	7936.79				
817.08	7936.98	824.64	7937.18	827.08	7937.25	834.64	7937.84	837.08	7938.04				
844.64	7938.63	847.08	7938.68	864.64	7939.84	867.08	7939.92	884.64	7940.15				
887.08	7940.28	907.08	7941.2	914.64	7941.6	917.08	7941.75	924.64	7942.15				
927.08	7942.27	934.64	7942.67	937.08	7942.83	947.08	7943.36	964.64	7944.17				
967.08	7944.27	974.64	7944.72	977.08	7944.85	984.64	7945.29	987.08	7945.44				
994.64	7945.64	997.08	7945.69	1004.64	7945.89	1007.08	7945.95	1014.64	7946.5				
1017.08	7946.53	1027.08	7947.36	1034.64	7947.85	1037.08	7948.16	1047.08	7948.82				
1054.64	7949.22	1057.08	7949.22	1064.64	7949.62	1067.08	7949.74	1074.64	7949.84				
1077.08	7949.88	1084.64	7949.98	1104.64	7950.9	1107.08	7951.08	1124.64	7952.01				
1147.08	7953.04	1154.64	7953.44	1157.08	7953.56	1174.64	7954.49	1177.08	7954.6				
1179.3	7954.72												

Manning's n Values	num	5	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	97.35	.05	365.16	.035	406.27	.05	517.64	.06		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
365.16	406.27	461.26	577.52	747.59	
Ineffective Flow	num	2			
Sta L	Sta R	Elev	Permanent		
0	328.32	7929.29	F		
446.61	1179.3	7928.44	F		

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7931.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.050	0.035	0.051
W.S. Elev (ft)	7931.24	Reach Len. (ft)	461.26	577.52	747.59
Crit W.S. (ft)	7928.40	Flow Area (sq ft)	1222.97	277.28	645.33
E.G. Slope (ft/ft)	0.000136	Area (sq ft)	1222.97	277.28	645.33
Q Total (cfs)	2181.00	Flow (cfs)	1138.41	490.61	551.99
Top Width (ft)	522.94	Top Width (ft)	27.73	41.11	206.10
Vel Total (ft/s)	1.02	Avg. Vel. (ft/s)	0.93	1.77	0.86
Max Chl Dpth (ft)	6.95	Hydr. Depth (ft)	4.42	6.74	3.13
Conv. Total (cfs)	186813.2	Conv. (cfs)	97509.9	42022.7	47280.5
Length Wtd. (ft)	547.95	Wetted Per. (ft)	279.64	41.11	207.44
Min Ch El (ft)	794.24	Shear (lb/sq ft)	0.04	0.06	0.03
Alpha	1.30	Stream Power (lb/ft s)	0.03	0.10	0.02
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	53.51	79.09	50.68
C & E Loss (ft)	0.00	Cum SA (acres)	25.65	19.91	27.13

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7931.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7931.51	Reach Len. (ft)	461.26	577.52	747.59
Crit W.S. (ft)	7928.40	Flow Area (sq ft)	37.33	288.50	243.68
E.G. Slope (ft/ft)	0.001101	Area (sq ft)	37.33	288.50	243.68
Q Total (cfs)	2181.00	Flow (cfs)	79.14	1489.78	612.08
Top Width (ft)	103.00	Top Width (ft)	8.16	41.11	53.73
Vel Total (ft/s)	3.83	Avg. Vel. (ft/s)	2.12	5.16	2.51
Max Chl Dpth (ft)	7.22	Hydr. Depth (ft)	4.57	7.02	4.54
Conv. Total (cfs)	65725.2	Conv. (cfs)	2384.8	44895.1	18445.3
Length Wtd. (ft)	576.90	Wetted Per. (ft)	11.85	41.11	59.95
Min Ch El (ft)	794.30	Shear (lb/sq ft)	0.22	0.48	0.28
Alpha	1.37	Stream Power (lb/ft s)	0.46	2.49	0.70
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	22.92	85.59	17.77
C & E Loss (ft)	0.03	Cum SA (acres)	8.27	19.91	7.00

Warning: The cross section had to be extended vertically during the critical depth calculations.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7929.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7929.88	Reach Len. (ft)	461.26	577.52	747.59
Crit W.S. (ft)	7927.80	Flow Area (sq ft)	848.89	221.48	404.19
E.G. Slope (ft/ft)	0.000236	Area (sq ft)	848.89	221.48	404.19
Q Total (cfs)	1657.00	Flow (cfs)	819.63	444.16	393.21
Top Width (ft)	462.86	Top Width (ft)	274.43	41.11	147.32
Vel Total (ft/s)	1.12	Avg. Vel. (ft/s)	0.97	2.01	0.97
Max Chl Dpth (ft)	5.59	Hydr. Depth (ft)	3.09	5.39	2.74
Conv. Total (cfs)	107799.6	Conv. (cfs)	53323.1	28895.7	25580.8
Length Wtd. (ft)	544.75	Wetted Per. (ft)	276.97	41.11	148.65

Min Ch El (ft)	7924.30	Shear (lb/sq ft)	0.05	CrystalRiver.rep
Alpha	1.40	Stream Power (lb/ft s)	0.04	0.08 0.04
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	67.73	35.21
C & E Loss (ft)	0.00	Cum SA (acres)	22.59	19.91 22.19

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7930.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.050	0.035	0.051
W.S. Elev (ft)	7930.86	Reach Len. (ft)	461.26	577.52	747.59
Crit W.S. (ft)	7928.26	Flow Area (sq ft)	1117.29	261.56	569.34
E.G. Slope (ft/ft)	0.000156	Area (sq ft)	1117.29	261.56	569.34
Q Total (cfs)	2031.00	Flow (cfs)	1050.15	476.72	504.13
Top Width (ft)	508.67	Top Width (ft)	276.08	41.11	191.47
Vel Total (ft/s)	1.04	Avg. Vel. (ft/s)	0.94	1.82	0.89
Max Chl Dpth (ft)	6.57	Hydr. Depth (ft)	4.05	6.36	2.97
Conv. Total (cfs)	162441.1	Conv. (cfs)	83992.0	38128.2	40320.8
Length wtd. (ft)	546.97	Wetted Per. (ft)	278.88	41.11	192.82
Min Ch El (ft)	7924.30	Shear (lb/sq ft)	0.04	0.06	0.03
Alpha	1.32	Stream Power (lb/ft s)	0.04	0.11	0.03
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	49.62	75.95	45.98
C & E Loss (ft)	0.00	Cum SA (acres)	24.70	19.91	26.00

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7932.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.050	0.035	0.051
W.S. Elev (ft)	7932.03	Reach Len. (ft)	461.26	577.52	747.59
Crit W.S. (ft)	7928.40	Flow Area (sq ft)	1441.58	309.68	818.15
E.G. Slope (ft/ft)	0.000108	Area (sq ft)	1441.58	309.68	818.15
Q Total (cfs)	2515.00	Flow (cfs)	1327.05	524.22	663.74
Top Width (ft)	548.42	Top Width (ft)	278.07	41.11	229.24
Vel Total (ft/s)	0.98	Avg. Vel. (ft/s)	0.92	1.69	0.81
Max Chl Dpth (ft)	7.74	Hydr. Depth (ft)	5.18	7.93	3.57
Conv. Total (cfs)	242379.6	Conv. (cfs)	127892.1	50520.9	63966.6
Length wtd. (ft)	550.05	Wetted Per. (ft)	281.19	41.11	230.60
Min Ch El (ft)	7924.30	Shear (lb/sq ft)	0.03	0.05	0.02
Alpha	1.27	Stream Power (lb/ft s)	0.03	0.09	0.02
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	62.85	86.00	61.14
C & E Loss (ft)	0.00	Cum SA (acres)	29.56	19.91	30.50

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Crystal
REACH: Marble RS: 18783

INPUT

Description:

Station	Elevation	Data	num=	158	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7957.48	5.96	7951.66	6.21	7951.41	12.94	7944.83	27.94	7944.72			
31.99	7941.75	36.4	7938.85	40.75	7935.78	46.55	7931.34	49.41	7930.02			
56.7	7927.03	58.5	7926.53	58.63	7926.47	59.16	7926.32	65.33	7924.67			
66.73	7924.3	66.85	7924.27	67.26	7924.15	72.27	7922.75	74.49	7922.83			
82.61	7922.9	85.88	7922.92	86.6	7922.96	89.1	7922.98	91.18	7922.91			
97.29	7923.39	100.9	7923.58	107.13	7923.88	107.67	7923.91	110.69	7924.04			
116.15	7924.29	116.77	7924.32	118.24	7924.33	119.18	7924.33	124.6	7924.35			
127.41	7924.37	127.91	7924.37	131.81	7924.42	139.9	7924.51	147.77	7924.56			
152.72	7924.5	154.46	7924.46	159.66	7924.28	163.86	7923.64	165.74	7923.37			
170.61	7923.63	200.89	7922.63	202.79	7924.06	207.4	7927.47	208.2	7928.06			
212.14	7927.44	216.86	7926.64	223.06	7925.65	224.05	7925.45	228.04	7926.23			
229.5	7926.49	233.14	7927.19	233.28	7927.13	239.5	7927.08	242.52	7927.03			
243.56	7927.05	254.97	7927.55	255.26	7927.56	259.07	7927.44	264.73	7927.17			
265.83	7927.12	265.93	7927.11	266.43	7927.74	273.44	7932.91	276.1	7933.36			
278.76	7933.71	292.73	7933.81	294.08	7934.1	295.13	7934.12	297.53	7934.17			
308.59	7934.56	308.66	7934.56	309.26	7934.63	316.35	7934.56	317.93	7934.62			
330.43	7934.58	333.44	7934.6	335.26	7934.23	339.98	7933.32	340.41	7933.26			
340.93	7933.25	348.32	7932.98	352	7932.92	353.52	7933.17	356.7	7933.87			
360.11	7934.48	363.55	7934.3	365.26	7934.17	372.36	7933.9	375.26	7933.69			
395.26	7933.95	402.35	7934	405.26	7934.01	415.26	7934.08	431.68	7934.26			
432.37	7934.79	432.58	7934.82	437.4	7935.54	442.02	7936.21	445.26	7936.23			
452.34	7936.26	455.26	7936.28	462.33	7936.66	465.26	7936.81	472.33	7937.46			
475.26	7937.61	482.32	7937.89	485.26	7938.08	492.32	7938.76	495.26	7938.96			
497.63	7939.24	498.55	7939.33	501.93	7940.07	509.14	7941.67	511.66	7942.12			
511.81	7942.13	535.26	7942.35	542.3	7942.53	555.26	7942.62	562.3	7943.04			
565.26	7943.21	572.29	7943.58	575.26	7943.76	582.29	7944.22	585.26	7944.48			
592.28	7945.08	595.26	7945.33	602.28	7945.84	605.26	7946.04	612.28	7946.5			
615.26	7946.7	622.27	7947.21	625.26	7947.42	635.26	7948.15	642.27	7948.84			
645.26	7949.06	652.26	7949.56	655.26	7949.78	662.26	7950.24	672.25	7950.71			
675.26	7950.86	682.23	7951.64	683.25	7951.75	683.36	7951.78	683.97	7952			
686.71	7952.74	689.59	7953.63	693.31	7953.44	695.26	7953.35	697.35	7953.01			
698.29	7952.86	702.28	7953.09	708.77	7953.39							

Manning's n	Values	num=	5
Sta	n Val	Sta	n Val
0	.06	72.27	.05
170.61	200.89	216.69	205.74
Bank Sta: Left	Right	Lengths: Left	Channel Right
170.61	200.89	216.69	205.74
Ineffective Flow	num=	1	
Sta L	Sta R	Elev	Permanent
272	708.77	7953.88	T

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7931.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.051	0.035	0.050
W.S. Elev (ft)	7931.12	Reach Len. (ft)	216.69	205.74	150.30
Crit W.S. (ft)		Flow Area (sq ft)	832.54	257.04	290.96
E.G. Slope (ft/ft)	0.000198	Area (sq ft)	832.54	257.04	290.96
Q Total (cfs)	2181.00	Flow (cfs)	1232.91	639.23	309.86
Top Width (ft)	223.98	Top Width (ft)	123.58	30.28	70.12
Vel Total (ft/s)	1.58	Avg. Vel. (ft/s)	1.48	2.49	1.06
Max Chl Dpth (ft)	8.49	Hydr. Depth (ft)	6.74	8.49	4.15
Conv. Total (cfs)	154936.2	Conv. (cfs)	87513.7	45410.6	22011.9
Length wtd. (ft)	203.79	Wetted Per. (ft)	125.16	30.28	73.75
Min Ch El (ft)	7922.63	Shear (lb/sq ft)	0.08	0.11	0.05
Alpha	1.29	Stream Power (lb/ft s)	0.12	0.26	0.03
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	42.62	75.55	42.65
C & E Loss (ft)	0.17	Cum SA (acres)	23.53	19.43	24.76

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7931.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7931.11	Reach Len. (ft)	216.69	205.74	150.30
Crit W.S. (ft)		Flow Area (sq ft)	382.38	256.91	47.85
E.G. Slope (ft/ft)	0.000635	Area (sq ft)	382.38	256.91	47.85
Q Total (cfs)	2181.00	Flow (cfs)	916.99	114.90	80.33
Top Width (ft)	95.00	Top Width (ft)	55.61	30.28	9.11
Vel Total (ft/s)	1.17	Avg. Vel. (ft/s)	2.50	4.45	1.68
Max chl Dpth (ft)	8.48	Hydr. Depth (ft)	6.88	8.48	5.25
Conv. Total (cfs)	86523.2	Conv. (cfs)	37965.1	45371.5	3186.7
Length wtd. (ft)	205.01	Wetted Per. (ft)	62.62	30.28	14.27
Min Ch El (ft)	7922.63	Shear (lb/sq ft)	0.24	0.34	0.13
Alpha	1.31	Stream Power (lb/ft s)	0.61	1.50	0.22
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	20.70	81.98	15.27
C & E Loss (ft)	0.15	Cum SA (acres)	7.93	19.43	6.46

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7929.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	wt. n-Val.	0.051	0.035	0.050
W.S. Elev (ft)	7929.73	Reach Len. (ft)	216.69	205.74	150.30
Crit W.S. (ft)		Flow Area (sq ft)	662.68	214.90	194.69
E.G. Slope (ft/ft)	0.000244	Area (sq ft)	662.68	214.90	194.69
Q Total (cfs)	1657.00	Flow (cfs)	951.43	526.60	178.97
Top Width (ft)	219.00	Top Width (ft)	120.49	30.28	68.23
Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)	1.44	2.45	0.92
Max chl Dpth (ft)	7.10	Hydr. Depth (ft)	5.50	7.10	2.85
Conv. Total (cfs)	106022.2	Conv. (cfs)	60876.7	33694.4	11451.1
Length wtd. (ft)	205.02	Wetted Per. (ft)	121.76	30.28	71.40
Min Ch El (ft)	7922.63	Shear (lb/sq ft)	0.08	0.11	0.04
Alpha	1.33	Stream Power (lb/ft s)	0.12	0.27	0.04
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	32.36	64.83	30.07
C & E Loss (ft)	0.14	Cum SA (acres)	20.50	19.43	20.34

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7930.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	wt. n-Val.	0.051	0.035	0.050
W.S. Elev (ft)	7930.73	Reach Len. (ft)	216.69	205.74	150.30
Crit W.S. (ft)		Flow Area (sq ft)	784.49	245.23	263.70
E.G. Slope (ft/ft)	0.000209	Area (sq ft)	784.49	245.23	263.70
Q Total (cfs)	2031.00	Flow (cfs)	1152.07	607.40	271.53
Top Width (ft)	222.61	Top Width (ft)	122.74	30.28	69.59
Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)	1.47	2.48	1.03
Max chl Dpth (ft)	8.10	Hydr. Depth (ft)	6.39	8.10	3.79
Conv. Total (cfs)	140389.5	Conv. (cfs)	79634.6	41985.8	18769.2
Length wtd. (ft)	204.10	Wetted Per. (ft)	124.22	30.28	73.09
Min Ch El (ft)	7922.63	Shear (lb/sq ft)	0.08	0.11	0.05
Alpha	1.30	Stream Power (lb/ft s)	0.12	0.26	0.05
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	39.55	72.60	38.83
C & E Loss (ft)	0.16	Cum SA (acres)	22.59	19.43	23.76

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7931.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	wt. n-Val.	0.051	0.035	0.050
W.S. Elev (ft)	7931.92	Reach Len. (ft)	216.69	205.74	150.30
Crit W.S. (ft)		Flow Area (sq ft)	931.75	281.21	347.37
E.G. Slope (ft/ft)	0.000181	Area (sq ft)	931.75	281.21	347.37
Q Total (cfs)	2515.00	Flow (cfs)	1409.91	710.41	394.68
Top Width (ft)	226.30	Top Width (ft)	124.81	30.28	71.20
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)	1.51	2.53	1.14
Max chl Dpth (ft)	9.29	Hydr. Depth (ft)	7.47	9.29	4.88
Conv. Total (cfs)	186742.8	Conv. (cfs)	104688.1	52749.4	29205.3
Length wtd. (ft)	203.17	Wetted Per. (ft)	126.63	30.28	74.98
Min Ch El (ft)	7922.63	Shear (lb/sq ft)	0.08	0.11	0.05
Alpha	1.27	Stream Power (lb/ft s)	0.13	0.27	0.06
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	50.29	82.08	51.14
C & E Loss (ft)	0.18	Cum SA (acres)	27.42	19.43	27.92

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Crystal
REACH: Marble RS: 18578

INPUT

Description:

Station	Elevation	Data	num=	119	Sta	Elev	Sta	Elev	Sta	Elev
0	7980.61	6.36	7972.61	7.67	7970.89	7.83	7970.71	14.73	7963.34	
15.59	7961.98	18.03	7961.39	18.2	7957.89	20.54	7954.78	23.65	7950.58	
23.75	7947.87	26.34	7947.01	27.57	7945.19	28.1	7944.77	35.17	7938.35	
42.58	7938.22	57.97	7937.87	61.69	7937.81	83.13	7937.4	89.83	7936.21	
95.11	7935.77	100.25	7935.4	107.51	7934.48	114.8	7934.37	121.07	7934	
121.88	7934.1	125.5	7933.83	130.32	7933.81	132.7	7932.8	153.7	7922.8	
163.8	7919.92	175.8	7922.8	193	7932.8	195.67	7934.27	197.92	7935.42	
188.77	7915.71	200.38	7935.92	206.68	7934.75	207.92	7934.55	208.13	7934.49	
210.38	7933.91	213.2	7933.81	218.82	7933.73	226.3	7933.51	235.65	7933.18	
246.08	7933.02	249.24	7933.04	256.96	7932.85	259.01	7932.84	267.1	7932.81	
277.92	7932.81	285.67	7932.94	287.92	7932.97	289.85	7933.03	297.49	7933.23	
299.75	7933.34	304.96	7933.46	308.76	7933.75	309.35	7933.81	316.72	7934.53	
318.96	7934.64	324.38	7934.83	324.58	7934.77	326.7	7934.12	327.92	7933.75	
330.14	7933.64	332.98	7933.37	337.92	7933.33	347.11	7934.69	347.6	7934.75	
349.74	7934.8	357.92	7934.89	365.67	7934.96	367.92	7935	375.67	7935.17	
377.92	7935.21	387.92	7936.01	395.67	7936.57	397.92	7936.75	405.67	7937.31	
417.92	7938.35	425.67	7938.61	427.92	7938.68	435.67	7939.25	437.92	7939.32	
445.67	7939.99	447.92	7940.13	455.67	7940.65	457.92	7940.79	465.67	7941.35	
475.67	7942.15	477.92	7942.32	485.67	7942.88	487.92	7943.05	495.67	7943.46	
497.92	7943.62	505.67	7944.21	507.92	7944.41	515.67	7945.02	517.92	7945.2	
525.67	7945.66	527.92	7945.79	535.67	7946.36	537.92	7946.49	547.92	7947.29	
555.67	7948.26	557.92	7948.44	565.67	7949.04	567.92	7949.22	575.67	7949.73	

577.92 7949.91 585.67 7950.47 587.92 7950.63 595.67 7951.3 597.92 7951.46
605.67 7952.18 607.92 7952.41 610.16 7952.61 614.16 7952.88

Manning's n values num= 3
Sta n Val Sta n Val
0 .06 153.7 .035 175.8 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
153.7 175.8 34.24 35.06 .3 .5

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
0 132.1 7936.2 T
187.4 614.16 7935.88 T

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7930.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.70	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7929.19	Reach Len. (ft)	5.25	5.25	5.25
Crit W.S. (ft)	7927.89	Flow Area (sq ft)	42.89	173.07	35.13
E.G. Slope (ft/ft)	0.004585	Area (sq ft)	42.89	173.07	35.13
Q Total (cfs)	2181.00	Flow (cfs)	145.77	1919.25	115.98
Top Width (ft)	46.51	Top width (ft)	13.42	22.10	10.99
Vel Total (ft/s)	8.69	Avg. Vel. (ft/s)	3.40	11.09	3.30
Max Chl Dpth (ft)	9.27	Hydr. Depth (ft)	3.20	7.83	3.20
Conv. Total (cfs)	32208.2	Conv. (cfs)	2152.6	28342.8	1712.8
Length wtd. (ft)	5.25	Wetted Per. (ft)	14.87	22.84	12.72
Min Ch El (ft)	7919.92	Shear (lb/sq ft)	0.83	2.17	0.79
Alpha	1.45	Stream Power (lb/ft s)	2.81	24.05	2.61
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	40.45	74.53	42.09
C & E Loss (ft)	0.28	Cum SA (acres)	23.19	19.31	24.62

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7930.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.70	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7929.19	Reach Len. (ft)	5.25	5.25	5.25
Crit W.S. (ft)	7927.89	Flow Area (sq ft)	42.89	173.07	35.13
E.G. Slope (ft/ft)	0.004585	Area (sq ft)	42.89	173.07	35.13
Q Total (cfs)	2181.00	Flow (cfs)	145.77	1919.25	115.98
Top Width (ft)	46.51	Top width (ft)	13.42	22.10	10.99
Vel Total (ft/s)	8.69	Avg. Vel. (ft/s)	3.40	11.09	3.30
Max Chl Dpth (ft)	9.27	Hydr. Depth (ft)	3.20	7.83	3.20
Conv. Total (cfs)	32208.2	Conv. (cfs)	2152.6	28342.8	1712.8
Length wtd. (ft)	5.25	Wetted Per. (ft)	14.87	22.84	12.72
Min Ch El (ft)	7919.92	Shear (lb/sq ft)	0.83	2.17	0.79
Alpha	1.45	Stream Power (lb/ft s)	2.81	24.05	2.61
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	19.64	80.96	15.13
C & E Loss (ft)	0.28	Cum SA (acres)	7.76	19.31	6.42

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7929.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.47	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7928.03	Reach Len. (ft)	5.25	5.25	5.25
Crit W.S. (ft)	7926.87	Flow Area (sq ft)	28.76	147.49	23.56
E.G. Slope (ft/ft)	0.004774	Area (sq ft)	28.76	147.49	23.56
Q Total (cfs)	1657.00	Flow (cfs)	87.31	1500.21	69.47
Top Width (ft)	42.09	Top width (ft)	10.99	22.10	9.00
Vel Total (ft/s)	8.29	Avg. Vel. (ft/s)	3.04	10.17	2.95
Max Chl Dpth (ft)	8.11	Hydr. Depth (ft)	2.62	6.67	2.62
Conv. Total (cfs)	23981.1	Conv. (cfs)	1263.6	21732.0	1005.5
Length wtd. (ft)	5.25	Wetted Per. (ft)	12.17	22.84	10.41
Min Ch El (ft)	7919.92	Shear (lb/sq ft)	0.70	1.92	0.67
Alpha	1.37	Stream Power (lb/ft s)	2.14	19.57	1.99
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	30.64	63.98	29.69
C & E Loss (ft)	0.25	Cum SA (acres)	20.17	19.31	20.21

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7930.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.65	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7928.85	Reach Len. (ft)	5.25	5.25	5.25
Crit W.S. (ft)	7927.61	Flow Area (sq ft)	38.42	165.50	31.47
E.G. Slope (ft/ft)	0.004693	Area (sq ft)	38.42	165.50	31.47
Q Total (cfs)	2031.00	Flow (cfs)	127.34	1802.34	101.32
Top Width (ft)	45.21	Top width (ft)	12.70	22.10	10.40
Vel Total (ft/s)	8.63	Avg. Vel. (ft/s)	3.31	10.89	3.22
Max Chl Dpth (ft)	8.93	Hydr. Depth (ft)	3.02	7.49	3.02
Conv. Total (cfs)	29646.0	Conv. (cfs)	1858.7	26308.3	1479.0
Length wtd. (ft)	5.25	Wetted Per. (ft)	14.07	22.84	12.03
Min Ch El (ft)	7919.92	Shear (lb/sq ft)	0.80	2.12	0.77
Alpha	1.43	Stream Power (lb/ft s)	2.65	23.12	2.47
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	37.51	71.63	38.32
C & E Loss (ft)	0.26	Cum SA (acres)	22.25	19.31	23.62

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7931.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.82	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7929.87	Reach Len. (ft)	5.25	5.25	5.25
Crit W.S. (ft)	7928.49	Flow Area (sq ft)	52.53	188.13	42.93
E.G. Slope (ft/ft)	0.004450	Area (sq ft)	52.53	188.13	42.93
Q Total (cfs)	2515.00	Flow (cfs)	188.15	2172.87	153.98
Top Width (ft)	49.12	Top width (ft)	14.85	22.10	12.17
Vel Total (ft/s)	8.87	Avg. Vel. (ft/s)	3.58	11.55	3.59
Max Chl Dpth (ft)	9.95	Hydr. Depth (ft)	3.54	8.51	3.70
Conv. Total (cfs)	37701.5	Conv. (cfs)	2820.5	32572.7	2308.3
Length wtd. (ft)	5.25	Wetted Per. (ft)	16.45	22.84	13.42
Min Ch El (ft)	7919.92	Shear (lb/sq ft)	0.89	2.29	0.89
Alpha	1.49	Stream Power (lb/ft s)	3.18	26.43	3.19
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	47.84	80.97	50.47
C & E Loss (ft)	0.30	Cum SA (acres)	27.08	19.31	27.77

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

BRIDGE

RIVER: Crystal
 REACH: Marble RS: 18573

INPUT

Description: BRIDGE NO. 3 - TOWN OF MARBLE
 Distance from Upstream XS = 5.25
 Deck/Roadway Width = 25
 Weir Coefficient = 2.6
 Upstream Deck/Roadway Coordinates

num	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
20	36.2	7938.2		109	7936.2		132.1	7937.14	
	132.1	7939.14	7933.14	187.4	7938.7	7932.7	187.4	7936.7	
	211	7936.52		241	7936.26		270	7935.9	
	304	7935.88		326	7936.24		358	7937.03	
	387	7938.29		413	7939.82		438	7941.63	
	474	7944.11		505	7946.57		532	7948.72	
	559	7951.02		600	7951.02				

Upstream Bridge Cross Section Data

Station	Elevation	Data	num	119	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	7980.61				6.36	7972.61			7.67	7970.89		7.83	7970.71
15.59	7961.98				16.03	7961.39			18.2	7957.89		20.54	7954.78
25.75	7947.87				26.34	7947.01			27.57	7945.19		28.1	7944.77
42.58	7938.22				57.97	7927.87			61.69	7937.81		83.13	7937.4
95.11	7935.77				100.25	7935.4			107.51	7934.48		114.8	7934.37
121.88	7934.1				125.5	7933.83			130.32	7933.81		132.7	7932.8
163.8	7919.92				175.8	7922.8			193	7932.8		195.67	7934.27
198.77	7935.71				200.38	7935.92			206.68	7934.75		207.92	7934.55
210.38	7933.91				213.2	7933.81			218.82	7933.73		226.3	7933.51
246.08	7931.02				249.24	7933.04			256.96	7932.85		259.01	7932.84
277.92	7932.81				285.67	7932.94			287.92	7932.97		289.85	7933.03
299.75	7933.34				304.96	7933.46			308.76	7933.75		309.35	7933.81
318.96	7934.64				324.38	7934.83			324.58	7934.77		326.7	7934.12
330.14	7933.64				332.98	7933.37			337.92	7933.33		347.11	7934.69
349.74	7934.8				357.92	7934.89			365.67	7934.96		367.92	7935
377.92	7935.1				387.92	7936.01			395.67	7936.57		397.92	7936.75
417.92	7938.35				425.67	7938.61			427.92	7938.68		435.67	7939.25
445.67	7939.99				447.92	7940.13			455.67	7940.65		457.92	7940.79
475.67	7942.15				477.92	7942.32			485.67	7942.88		487.92	7943.05
497.92	7944.62				505.67	7944.62			507.92	7944.62		515.67	7945.02
525.67	7945.66				527.92	7945.79			535.67	7946.36		537.92	7946.49
555.67	7948.26				557.92	7948.44			565.67	7949.04		567.92	7949.22
577.92	7949.91				585.67	7950.47			587.92	7950.63		595.67	7951.3
605.67	7952.18				607.92	7952.41			610.16	7952.61		614.16	7952.88

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	153.7	.035	175.8	.06

Bank Sta: Left Right

Left	Right	Coeff Contr.	Expan.
153.7	175.8	.3	.5

Ineffective Flow

Sta L	Sta R	Elev	Permanent
0	132.1	7936.2	T
187.4	614.16	7935.88	T

Downstream Deck/Roadway Coordinates

num	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
19	35	7936.8		58	7937.14		58	7939.14	7933.14
	113.3	7938.7	7932.7	113.3	7936.7		137.8	7936.52	
	168	7936.26		193	7935.9		236	7935.88	
	266	7936.24		299	7937.03		326	7938.29	
	355	7939.82		381	7941.63		413	7944.11	
	441	7946.57		468	7948.72		497	7951.02	
	510	7951.02							

Downstream Bridge Cross Section Data

Station	Elevation	Data	num	70	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	7938.47				2.87	7956.9			3.11	7956.83		4.28	7955.96
14.86	7948.23				15.37	7947.87			16.14	7947.35		23.43	7942.93
27.51	7940.31				31.83	7937.87			35.08	7936.75		38.8	7935.46
45.52	7935.38				47.83	7935.38			53.32	7934.88		55.4	7934.8
89.4	7919.92				101.2	7920.8			113.3	7928.8		123.73	7932.69
128.34	7932.37				133.71	7933.01			135.05	7933.18		136.57	7933.43
151.95	7934.76				153.68	7935			170.63	7934.92		204.23	7934.22
215.79	7934.19				219.04	7934.22			225.62	7934.24		233.06	7934.4
240.38	7934.48				257.64	7934.99			261.67	7935.03		289.72	7935.72
310.95	7936.58				314.19	7936.7			320.03	7936.85		327.65	7937.27
344.58	7937.89				392.14	7941.29			394.8	7941.47		398.9	7941.8
418.86	7943.38				425.8	7943.92			440.25	7945.08		445.34	7945.48
448.85	7945.74				454.21	7946.13			458.14	7946.47		463.4	7946.85
472.32	7947.55				476.7	7947.93			482.72	7948.37		505.74	7950.36
												510.04	7950.79

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	78.2	.035	101.2	.06

Bank Sta: Left Right

Left	Right	Coeff Contr.	Expan.
78.2	101.2	.3	.5

Ineffective Flow

Sta L	Sta R	Elev	Permanent
0	58	7936.8	T
113.3	510.04	7935.88	T

Upstream Embankment side slope

Downstream Embankment side slope	=	0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow	=	.95
Elevation at which weir flow begins	=	7935.88
Energy head used in spillway design	=	
Spillway height used in design	=	
Weir crest shape	=	Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Energy Only

Additional Bridge Parameters

Add Friction component to Momentum
 Do not add Weight component to Momentum
 Class 8 flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #100-year

E.G. US. (ft)	7930.89	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	7929.19	E.G. Elev (ft)	7930.57	7929.52
Q Total (cfs)	2181.00	W.S. Elev (ft)	7927.93	7927.80
Q Bridge (cfs)	2181.00	Crit W.S. (ft)	7927.93	7926.58
Q Weir (cfs)		Max Chl Dpth (ft)	8.01	7.88

CrystalRiver.rep

Weir Sta Lft (ft)		Vel Total (ft/s)	11.17	8.79
Weir Sta Rgt (ft)		Flow Area (sq ft)	195.29	248.19
Weir Submerg		Froude # Chl	0.94	0.72
Weir Max Depth (ft)		Specif Force (cu ft)	1433.75	1508.87
Min El Weir Flow (ft)	7935.89	Hydr Depth (ft)	4.69	5.52
Min El Prs (ft)	7933.14	W.P. Total (ft)	44.96	49.15
Delta EG (ft)	1.68	Conv. Total (cfs)	23276.6	31573.7
Delta WS (ft)	2.62	Top Width (ft)	41.68	45.00
BR Open Area (sq ft)	441.29	Frctn Loss (ft)	0.16	0.03
BR Open Vel (ft/s)	11.17	C & E Loss (ft)	0.47	0.28
Coef of Q		Shear Total (lb/sq ft)	2.38	1.50
Br Sel Method	Energy only	Power Total (lb/ft s)	26.59	13.22

warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

BRIDGE OUTPUT Profile #Floodway

		Element	Inside BR US	Inside BR DS
E.G. US. (ft)	7930.89	E.G. Elev (ft)	7930.57	7929.52
W.S. US. (ft)	7929.19	W.S. Elev (ft)	7927.93	7927.80
Q Total (cfs)	2181.00	Crit W.S. (ft)	7927.93	7926.58
Q Bridge (cfs)	2181.00	Max Chl Dpth (ft)	8.01	7.88
Q Weir (cfs)		Vel Total (ft/s)	11.17	8.79
Weir Sta Lft (ft)		Flow Area (sq ft)	195.29	248.19
Weir Sta Rgt (ft)		Froude # Chl	0.94	0.72
Weir Submerg		Specif Forc (cu ft)	1433.75	1508.87
Weir Max Depth (ft)		Hydr Depth (ft)	4.69	5.52
Min El Weir Flow (ft)	7935.89	W.P. Total (ft)	44.96	49.15
Min El Prs (ft)	7933.14	Conv. Total (cfs)	23276.6	31573.7
Delta EG (ft)	1.68	Top Width (ft)	41.68	45.00
Delta WS (ft)	2.62	Frctn Loss (ft)	0.16	0.03
BR Open Area (sq ft)	441.29	C & E Loss (ft)	0.47	0.28
BR Open Vel (ft/s)	11.17	Shear Total (lb/sq ft)	2.38	1.50
Coef of Q		Power Total (lb/ft s)	26.59	13.22
Br Sel Method	Energy only			

warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

BRIDGE OUTPUT Profile #10-year

		Element	Inside BR US	Inside BR DS
E.G. US. (ft)	7929.50	E.G. Elev (ft)	7928.21	7928.14
W.S. US. (ft)	7928.03	W.S. Elev (ft)	7926.90	7926.68
Q Total (cfs)	1657.00	Crit W.S. (ft)	7926.90	7925.61
Q Bridge (cfs)	1657.00	Max Chl Dpth (ft)	6.98	6.75
Q Weir (cfs)		Vel Total (ft/s)	10.73	8.31
Weir Sta Lft (ft)		Flow Area (sq ft)	154.36	199.45
Weir Sta Rgt (ft)		Froude # Chl	0.94	0.72
Weir Submerg		Specif Force (cu ft)	1006.70	1053.34
Weir Max Depth (ft)		Hydr Depth (ft)	4.09	4.81
Min El Weir Flow (ft)	7935.89	W.P. Total (ft)	40.52	44.95
Min El Prs (ft)	7933.14	Conv. Total (cfs)	17075.7	23484.3
Delta EG (ft)	1.63	Top Width (ft)	37.74	41.45
Delta WS (ft)	2.46	Frctn Loss (ft)	0.17	0.03
BR Open Area (sq ft)	441.29	C & E Loss (ft)	0.42	0.25
BR Open Vel (ft/s)	10.73	Shear Total (lb/sq ft)	2.24	1.38
Coef of Q		Power Total (lb/ft s)	24.04	11.46
Br Sel Method	Energy only			

warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

BRIDGE OUTPUT Profile #50-year

		Element	Inside BR US	Inside BR DS
E.G. US. (ft)	7930.50	E.G. Elev (ft)	7930.20	7929.15
W.S. US. (ft)	7928.85	W.S. Elev (ft)	7927.67	7927.52
Q Total (cfs)	2031.00	Crit W.S. (ft)	7927.67	7926.33
Q Bridge (cfs)	2031.00	Max Chl Dpth (ft)	7.75	7.60
Q Weir (cfs)		Vel Total (ft/s)	11.00	8.62
Weir Sta Lft (ft)		Flow Area (sq ft)	184.65	235.50
Weir Sta Rgt (ft)		Froude # Chl	0.93	0.72
Weir Submerg		Specif Force (cu ft)	1308.83	1377.77
Weir Max Depth (ft)		Hydr Depth (ft)	4.54	5.34
Min El Weir Flow (ft)	7935.89	W.P. Total (ft)	43.85	48.09
Min El Prs (ft)	7933.14	Conv. Total (cfs)	21632.9	29422.5
Delta EG (ft)	1.66	Top Width (ft)	40.69	44.10
Delta WS (ft)	2.54	Frctn Loss (ft)	0.16	0.03
BR Open Area (sq ft)	441.29	C & E Loss (ft)	0.45	0.27
BR Open Vel (ft/s)	11.00	Shear Total (lb/sq ft)	2.32	1.46
Coef of Q		Power Total (lb/ft s)	25.49	12.56
Br Sel Method	Energy only			

warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

BRIDGE OUTPUT Profile #500-year

		CrystalRiver.rep	
		Inside BR US	Inside BR DS
E.G. US. (ft)	7931.69	Element	
W.S. US. (ft)	7929.87	E.G. Elev (ft)	7931.36
Q Total (cfs)	2515.00	W.S. Elev (ft)	7928.54
Q Bridge (cfs)	2515.00	Crit W.S. (ft)	7928.54
Q Weir (cfs)		Max Chl Dpth (ft)	8.62
Weir Sta Lft (ft)		Vel Total (ft/s)	11.35
Weir Sta Rgt (ft)		Flow Area (sq ft)	221.62
Weir Submerg		Froude # Chl	0.93
Weir Max Depth (ft)		Specific Force (cu ft)	1722.48
Min El Weir Flow (ft)	7935.89	Hydr Depth (ft)	5.03
Min El Prs (ft)	7933.14	W.P. Total (ft)	47.62
Delta EG (ft)	1.69	Conv. Total (cfs)	27429.1
Delta WS (ft)	2.75	Top Width (ft)	44.03
BR Open Area (sq ft)	441.29	Frctn Loss (ft)	0.49
BR Open Vel (ft/s)	11.35	C & E Loss (ft)	0.11
Coef of Q		Shear Total (lb/sq ft)	2.44
Br Sel Method	Energy only	Power Total (lb/ft s)	27.72
			13.91

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Crystal
REACH: Marble RS: 18542

INPUT

Description:

Station	Elevation	Data	num=	70			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7958.47	2.97	7956.9	3.11	7956.83	4.28	7955.96
14.86	7948.23	15.37	7947.87	16.14	7947.35	23.43	7942.93
27.51	7940.31	31.83	7937.87	35.08	7936.75	38.8	7935.46
45.52	7935.38	47.83	7935.38	53.32	7934.88	55.4	7934.8
89.4	7919.92	101.2	7920.8	113.1	7928.8	123.73	7932.69
128.34	7919.92	133.71	7933.1	135.03	7931.18	137.57	7933.43
151.95	7934.76	153.68	7935	170.63	7934.92	204.23	7934.22
215.79	7934.19	219.04	7934.22	225.62	7934.24	233.06	7934.4
240.38	7934.48	257.64	7934.99	261.67	7935.03	289.72	7935.72
310.95	7936.58	314.19	7936.7	320.03	7936.85	327.65	7937.27
344.58	7937.89	392.14	7941.29	394.8	7941.47	398.9	7941.8
418.86	7943.38	425.8	7943.92	440.25	7945.08	445.34	7945.48
448.85	7945.74	454.21	7946.13	458.14	7946.47	463.4	7946.85
472.32	7947.55	476.7	7947.93	482.72	7948.37	505.74	7950.36
						510.04	7950.79

Manning's n values

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	78.2	.035	101.2	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

78.2	101.2	466.19	475.1	491.64	.3	.5
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Ineffective flow

Sta L	Sta R	Elev	Permanent
0	58	7936.8	T
113.3	510.04	7935.88	T

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7929.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.64	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7926.57	Reach Len. (ft)	466.19	475.10	491.64
Crit W.S. (ft)	7926.57	Flow Area (sq ft)	27.11	142.82	25.17
E.G. Slope (ft/ft)	0.009161	Area (sq ft)	27.11	142.82	25.17
Q Total (cfs)	2181.00	Flow (cfs)	117.03	1956.81	107.16
Top Width (ft)	41.12	Top Width (ft)	9.40	23.00	8.73
Vel Total (ft/s)	11.18	Avg. Vel. (ft/s)	4.32	13.70	4.26
Max Chl Dpth (ft)	6.65	Hydr. Depth (ft)	2.88	6.21	2.88
Conv. Total (cfs)	22786.3	Conv. (cfs)	1222.7	20444.1	1119.5
Length wtd. (ft)	476.16	Wetted Per. (ft)	11.03	23.07	10.46
Min Ch El (ft)	7919.92	Shear (lb/sq ft)	1.41	3.54	1.38
Alpha	1.36	Stream Power (lb/ft s)	6.07	48.52	5.86
Frctn Loss (ft)	4.53	Cum Volume (acre-ft)	40.42	74.40	42.06
C & E Loss (ft)	0.43	Cum SA (acres)	23.18	19.29	24.61

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7929.21	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>2.64</td> <td>Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.060</td> </td>	2.64	Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.060</td>	0.060	0.035	0.060
W.S. Elev (ft) <td>7926.57</td> <td>Reach Len. (ft) <td>466.19</td> <td>475.10</td> <td>491.64</td> </td>	7926.57	Reach Len. (ft) <td>466.19</td> <td>475.10</td> <td>491.64</td>	466.19	475.10	491.64
Crit W.S. (ft) <td>7926.57</td> <td>Flow Area (sq ft) <td>27.11</td> <td>142.82</td> <td>25.17</td> </td>	7926.57	Flow Area (sq ft) <td>27.11</td> <td>142.82</td> <td>25.17</td>	27.11	142.82	25.17
E.G. Slope (ft/ft) <td>0.009161</td> <td>Area (sq ft) <td>27.11</td> <td>142.82</td> <td>25.17</td> </td>	0.009161	Area (sq ft) <td>27.11</td> <td>142.82</td> <td>25.17</td>	27.11	142.82	25.17
Q Total (cfs) <td>2181.00</td> <td>Flow (cfs) <td>117.03</td> <td>1956.81</td> <td>107.16</td> </td>	2181.00	Flow (cfs) <td>117.03</td> <td>1956.81</td> <td>107.16</td>	117.03	1956.81	107.16
Top Width (ft) <td>41.12</td> <td>Top Width (ft) <td>9.40</td> <td>23.00</td> <td>8.73</td> </td>	41.12	Top Width (ft) <td>9.40</td> <td>23.00</td> <td>8.73</td>	9.40	23.00	8.73
Vel Total (ft/s) <td>11.18</td> <td>Avg. Vel. (ft/s) <td>4.32</td> <td>13.70</td> <td>4.26</td> </td>	11.18	Avg. Vel. (ft/s) <td>4.32</td> <td>13.70</td> <td>4.26</td>	4.32	13.70	4.26
Max Chl Dpth (ft) <td>6.65</td> <td>Hydr. Depth (ft) <td>2.88</td> <td>6.21</td> <td>2.88</td> </td>	6.65	Hydr. Depth (ft) <td>2.88</td> <td>6.21</td> <td>2.88</td>	2.88	6.21	2.88
Conv. Total (cfs) <td>22786.3</td> <td>Conv. (cfs) <td>1222.7</td> <td>20444.1</td> <td>1119.5</td> </td>	22786.3	Conv. (cfs) <td>1222.7</td> <td>20444.1</td> <td>1119.5</td>	1222.7	20444.1	1119.5
Length wtd. (ft) <td>476.16</td> <td>Wetted Per. (ft) <td>11.03</td> <td>23.07</td> <td>10.46</td> </td>	476.16	Wetted Per. (ft) <td>11.03</td> <td>23.07</td> <td>10.46</td>	11.03	23.07	10.46
Min Ch El (ft) <td>7919.92</td> <td>Shear (lb/sq ft) <td>1.41</td> <td>3.54</td> <td>1.38</td> </td>	7919.92	Shear (lb/sq ft) <td>1.41</td> <td>3.54</td> <td>1.38</td>	1.41	3.54	1.38
Alpha	1.36	Stream Power (lb/ft s) <td>6.07</td> <td>48.52</td> <td>5.86</td>	6.07	48.52	5.86
Frctn Loss (ft) <td>4.53</td> <td>Cum Volume (acre-ft) <td>19.61</td> <td>80.84</td> <td>15.20</td> </td>	4.53	Cum Volume (acre-ft) <td>19.61</td> <td>80.84</td> <td>15.20</td>	19.61	80.84	15.20
C & E Loss (ft) <td>0.43</td> <td>Cum SA (acres) <td>7.75</td> <td>19.29</td> <td>6.41</td> </td>	0.43	Cum SA (acres) <td>7.75</td> <td>19.29</td> <td>6.41</td>	7.75	19.29	6.41

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7927.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.29	Wt. n-Val.	0.060	0.035	0.060

		CrystalRiver.rep	
W.S. Elev (ft)	7925.58	Reach Len. (ft)	466.19
Crit W.S. (ft)	7925.58	Flow Area (sq ft)	18.57
E.G. Slope (ft/ft)	0.009842	Area (sq ft)	18.57
Q Total (cfs)	1637.00	Flow (cfs)	73.28
Top Width (ft)	18.00	Top Width (ft)	7.78
Vel Total (ft/s)	10.64	Avg. Vel. (ft/s)	3.95
Max Chl Dpth (ft)	5.66	Hydr. Depth (ft)	2.39
Conv. Total (cfs)	16702.8	Conv. (cfs)	738.6
Length Wtd. (ft)	476.07	Wetted Per. (ft)	9.13
Min Ch El (ft)	7919.92	Shear (lb/sq ft)	1.25
Alpha	1.30	Stream Power (lb/ft s)	4.93
Frctn Loss (ft)	4.98	Cum Volume (acre-ft)	30.62
C & E Loss (ft)	0.34	Cum SA (acres)	20.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-year

		Left OB		Channel		Right OB	
E.G. Elev (ft)	7928.85	Element	0.060	0.035	0.060		
Vel Head (ft)	2.54	Wt. n-Val.	466.19	475.10	491.64		
W.S. Elev (ft)	7926.30	Reach Len. (ft)	24.67	136.71	22.91		
Crit W.S. (ft)	7926.30	Flow Area (sq ft)	24.67	136.71	22.91		
E.G. Slope (ft/ft)	0.009289	Area (sq ft)	103.93	1831.92	95.15		
Q Total (cfs)	2031.00	Flow (cfs)	8.96	23.00	8.32		
Top Width (ft)	40.29	Top Width (ft)	4.21	13.40	4.15		
Vel Total (ft/s)	11.02	Avg. Vel. (ft/s)	2.75	5.94	2.75		
Max Chl Dpth (ft)	6.38	Hydr. Depth (ft)	1078.3	19007.4	987.3		
Conv. Total (cfs)	21073.0	Conv. (cfs)	10.52	23.07	9.98		
Length Wtd. (ft)	476.14	Wetted Per. (ft)	1.36	3.44	1.33		
Min Ch El (ft)	7919.92	Shear (lb/sq ft)	5.73	46.05	5.53		
Alpha	1.35	Stream Power (lb/ft s)	37.48	71.50	38.30		
Frctn Loss (ft)	4.71	Cum Volume (acre-ft)	22.25	19.29	23.62		
C & E Loss (ft)	0.38	Cum SA (acres)					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

		Left OB		Channel		Right OB	
E.G. Elev (ft)	7930.00	Element	0.060	0.035	0.060		
Vel Head (ft)	2.87	Wt. n-Val.	466.19	475.10	491.64		
W.S. Elev (ft)	7927.13	Reach Len. (ft)	32.59	155.62	30.27		
Crit W.S. (ft)	7927.13	Flow Area (sq ft)	32.59	155.62	30.27		
E.G. Slope (ft/ft)	0.008951	Area (sq ft)	147.89	2231.71	135.40		
Q Total (cfs)	2515.00	Flow (cfs)	10.30	23.00	9.57		
Top Width (ft)	42.87	Top Width (ft)	4.54	14.34	4.47		
Vel Total (ft/s)	11.51	Avg. Vel. (ft/s)	3.16	6.77	3.16		
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)	1563.1	23588.9	1431.2		
Conv. Total (cfs)	26583.3	Conv. (cfs)	12.09	23.07	11.47		
Length Wtd. (ft)	476.17	Wetted Per. (ft)	1.51	3.77	1.47		
Min Ch El (ft)	7919.92	Shear (lb/sq ft)	6.84	54.06	6.60		
Alpha	1.39	Stream Power (lb/ft s)	47.81	80.83	50.44		
Frctn Loss (ft)	4.36	Cum Volume (acre-ft)	27.07	19.29	27.77		
C & E Loss (ft)	0.50	Cum SA (acres)					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal
REACH: Marble
RS: 18067

INPUT

Description:
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7950.32	8.87	7946.63	9.85	7946.25	10.26	7946.05
24.5	7939.41	29.89	7936.64	44.98	7935.37	46.55	7935.17
71.02	7931.59	79.71	7930.41	95.48	7928.81	96.22	7928.72
106.51	7927.39	107.29	7927.31	108.41	7926.96	112.45	7925.66
117.56	7924.18	119.95	7923.85	131.79	7923.11	133.11	7922.94
149.15	7920.92	168.88	7919.57	174.52	7919.31	181.11	7918.99
191.02	7918.79	192.47	7918.73	194.53	7918.01	201.24	7915.65
205.71	7914.25	216.3	7914.25	239.25	7914.74	242.28	7915.26
249.43	7916.62	252.84	7918.36	254.51	7919.25	266.74	7925.8
278.98	7932.52	282.92	7934.83	284.5	7935.76	287.02	7935.68
298.76	7935.27	303.44	7935.09	305.41	7935.01	315.68	7934.55
338.02	7934.16	339.75	7934.11	351.74	7934.23	359.12	7934.19
369.29	7936.38	370.58	7936.39	378.71	7938.87	379.57	7939.08
385.05	7941.42	387.68	7941.43	389.75	7941.4	398.54	7941.33
428.54	7941.22	438.54	7941.15	448.54	7941.03	479.75	7941.03
499.75	7941.09	508.54	7941.07	521.39	7940.88	521.47	7940.94
527.79	7945.25	530.68	7945.94	531.43	7946.34	534.1	7946.47
540.16	7946.59	546.31	7947.74	549.89	7948.09	561.52	7948.78

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	192.47	.05	205.71	.035	236.3	.05
						249.43	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
205.71 236.3 658.53 592.77 538.05 .1 .3

CROSS SECTION OUTPUT Profile #100-year

		Left OB		Channel		Right OB	
E.G. Elev (ft)	7920.70	Element	0.050	0.035	0.050		
Vel Head (ft)	1.79	Wt. n-Val.	658.53	592.77	538.05		
W.S. Elev (ft)	7918.91	Reach Len. (ft)	33.52	142.54	51.59		
Crit W.S. (ft)	7918.91	Flow Area (sq ft)	33.52	142.54	51.59		
E.G. Slope (ft/ft)	0.009905	Area (sq ft)	172.22	1680.21	328.57		
Q Total (cfs)	2181.00	Flow (cfs)	21.81	30.59	17.37		
Top Width (ft)	60.96	Top Width (ft)	5.14	11.79	6.37		
Vel Total (ft/s)	9.58	Avg. Vel. (ft/s)					

				Crystalline.rep	
Max Chl Dpth (ft)	4.66	Hydr. Depth (ft)	1.54	4.66	2.94
Conv. Total (cfs)	21914.1	Conv. (cfs)	1730.4	16882.3	3301.4
Length Wtd. (ft)	590.11	Wetted Per. (ft)	22.24	30.59	18.34
Min Ch El (ft)	7914.25	Shear (lb/sq ft)	0.92	2.88	1.74
Alpha	1.26	Stream Power (lb/ft s)	4.72	33.97	11.08
Frctn Loss (ft)	5.76	Cum Volume (acre-ft)	40.09	72.85	41.63
C & E Loss (ft)	0.05	Cum SA (acres)	23.02	19.00	24.46

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7920.70	wt. n-val.	0.050	0.035	0.050
Vel Head (ft)	1.79	Reach Len. (ft)	658.53	592.77	538.05
W.S. Elev (ft)	7918.91	Flow Area (sq ft)	33.52	142.54	51.59
Crit W.S. (ft)	7918.91	Area (sq ft)	33.52	142.54	51.59
E.G. Slope (ft/ft)	0.009905	Flow (cfs)	172.22	1689.21	318.57
Q Total (cfs)	2181.00	Top Width (ft)	21.80	30.59	17.37
Top Width (ft)	69.96	Avg. Vel. (ft/s)	5.14	11.79	6.37
Vel Total (ft/s)	9.58	Hydr. Depth (ft)	1.54	4.66	2.94
Max Chl Dpth (ft)	4.66	Conv. (cfs)	1730.4	16882.3	3301.4
Conv. Total (cfs)	21914.1	Wetted Per. (ft)	22.24	30.59	18.34
Length Wtd. (ft)	590.11	Shear (lb/sq ft)	0.92	2.88	1.74
Min Ch El (ft)	7914.25	Stream Power (lb/ft s)	4.72	33.97	11.08
Alpha	1.26	Cum Volume (acre-ft)	19.29	79.28	14.67
Frctn Loss (ft)	5.76	Cum SA (acres)	7.59	19.00	6.27
C & E Loss (ft)	0.05				

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7919.75	wt. n-val.	0.050	0.035	0.050
Vel Head (ft)	1.61	Reach Len. (ft)	658.53	592.77	538.05
W.S. Elev (ft)	7918.14	Flow Area (sq ft)	23.19	119.01	38.64
Crit W.S. (ft)	7918.14	Area (sq ft)	23.19	119.01	38.64
E.G. Slope (ft/ft)	0.01127	Flow (cfs)	111.57	1318.42	227.00
Q Total (cfs)	1657.00	Top Width (ft)	11.55	30.59	16.11
Top Width (ft)	58.25	Avg. Vel. (ft/s)	4.81	11.08	5.88
Vel Total (ft/s)	9.16	Hydr. Depth (ft)	2.01	3.89	2.40
Max Chl Dpth (ft)	3.89	Conv. (cfs)	1057.7	12498.9	2152.0
Conv. Total (cfs)	15708.7	Wetted Per. (ft)	12.19	30.59	16.69
Length Wtd. (ft)	590.04	Shear (lb/sq ft)	1.32	2.70	1.61
Min Ch El (ft)	7914.25	Stream Power (lb/ft s)	6.36	29.94	9.45
Alpha	1.24	Cum Volume (acre-ft)	30.40	62.57	29.36
Frctn Loss (ft)	5.89	Cum SA (acres)	20.06	19.00	20.07
C & E Loss (ft)	0.10				

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-year

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7920.45	wt. n-val.	0.050	0.035	0.050
Vel Head (ft)	1.79	Reach Len. (ft)	658.53	592.77	538.05
W.S. Elev (ft)	7918.66	Flow Area (sq ft)	29.56	134.88	47.25
Crit W.S. (ft)	7918.66	Area (sq ft)	29.56	134.88	47.25
E.G. Slope (ft/ft)	0.010563	Flow (cfs)	150.32	1582.45	298.23
Q Total (cfs)	2031.00	Top Width (ft)	13.04	30.59	17.10
Top Width (ft)	60.73	Avg. Vel. (ft/s)	5.08	11.73	6.31
Vel Total (ft/s)	8.59	Hydr. Depth (ft)	2.27	4.41	2.76
Max Chl Dpth (ft)	4.41	Conv. (cfs)	1462.6	15397.0	2901.8
Conv. Total (cfs)	19761.4	Wetted Per. (ft)	13.77	30.59	17.81
Length Wtd. (ft)	590.04	Shear (lb/sq ft)	1.42	2.91	1.75
Min Ch El (ft)	7914.25	Stream Power (lb/ft s)	7.20	34.11	11.04
Alpha	1.25	Cum Volume (acre-ft)	37.19	70.02	37.90
Frctn Loss (ft)	5.87	Cum SA (acres)	22.13	19.00	23.47
C & E Loss (ft)	0.08				

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7921.22	wt. n-val.	0.050	0.035	0.051
Vel Head (ft)	1.87	Reach Len. (ft)	658.53	592.77	538.05
W.S. Elev (ft)	7919.35	Flow Area (sq ft)	45.42	155.86	59.42
Crit W.S. (ft)	7919.35	Area (sq ft)	45.42	155.86	59.42
E.G. Slope (ft/ft)	0.009361	Flow (cfs)	225.06	1895.69	392.25
Q Total (cfs)	2515.00	Top Width (ft)	21.95	30.59	18.39
Top Width (ft)	80.93	Avg. Vel. (ft/s)	5.00	12.16	6.60
Vel Total (ft/s)	9.65	Hydr. Depth (ft)	1.42	5.10	3.23
Max Chl Dpth (ft)	5.10	Conv. (cfs)	2346.9	19593.4	4054.2
Conv. Total (cfs)	25994.5	Wetted Per. (ft)	32.71	30.59	19.27
Length Wtd. (ft)	590.38	Shear (lb/sq ft)	1.81	2.98	1.80
Min Ch El (ft)	7914.25	Stream Power (lb/ft s)	4.06	36.22	11.90
Alpha	1.30	Cum Volume (acre-ft)	47.39	79.14	49.93
Frctn Loss (ft)	5.73	Cum SA (acres)	26.84	19.00	27.61
C & E Loss (ft)	0.00				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal
 REACH: Marble RS: 17475

INPUT

Description:

Station	Elevation	Data	num=	83	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7942.33	6.23	7940.88	10.71	7939.38	13.82	7938.56	20.93	7936.19			
21.41	7936.05	21.62	7935.98	29	7934.19	32.54	7932.98	36.6	7931.87			
43.46	7929.73	44.84	7929.34	49.83	7927.92	51.93	7927.35	54.37	7926.05			
59.37	7923.1	65.29	7919.02	66.97	7917.74	70.8	7916.01	74.56	7914.46			
76.2	7913.62	87.99	7908.41	126.36	7908.17	130.65	7908.15	131.71	7908.21			
139.84	7909.29	141.65	7910.77	145.62	7914.19	152.67	7920.24	155.64	7922.86			
156.14	7923.29	160.66	7923.12	163.53	7923.06	164.82	7923.19	168.16	7923.7			
170.56	7924	173.26	7924.41	174.45	7924.49	178.01	7924.93	181.28	7923.43			
183.88	7922.61	185.4	7923.04	190.52	7924.26	193.85	7925.03	196.06	7925.58			
198.37	7925.69	203.56	7925.92	207.7	7926.04	211.23	7926.26	218.11	7926.84			
219.35	7927.01	224.5	7927.75	225.86	7928.18	229.03	7929.09	233.34	7930.57			
237.94	7932.05	238.56	7932.25	249.19	7932.16	256.78	7932.28	261.78	7932.37			
264.37	7932.39	272.14	7932.41	273.81	7932.36	282.14	7932.36	283.81	7932.29			
292.14	7931.9	302.14	7931.55	303.81	7931.6	312.14	7931.88	313.81	7931.93			
322.14	7932.21	323.81	7932.28	332.14	7932.76	342.14	7933.11	345.06	7933.14			
345.24	7933.24	352.14	7938.52	355.92	7941.27	360.92	7941.48	362.14	7941.54			
420.86	7941.62	427.69	7941.64	435.61	7940.77							

Manning's n values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .06 87.99 .035 131.71 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 87.99 131.71 515.18 591.49 626.76 .1 .3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7914.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.63	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7912.42	Reach Len. (ft)	515.18	591.49	626.76
Crit W.S. (ft)	7912.20	Flow Area (sq ft)	18.17	181.11	35.71
E.G. Slope (ft/ft)	0.009623	Area (sq ft)	18.17	181.11	35.71
Q Total (cfs)	2181.00	Flow (cfs)	66.09	1945.33	169.59
Top Width (ft)	64.64	Top Width (ft)	9.07	43.72	11.85
Vel Total (ft/s)	9.28	Avg. Vel. (ft/s)	3.64	10.74	4.75
Max Chl Dpth (ft)	4.27	Hydr. Depth (ft)	2.00	4.14	3.01
Conv. Total (cfs)	22233.4	Conv. (cfs)	673.7	19830.9	1728.8
Length Wtd. (ft)	589.20	Wetted Per. (ft)	9.91	43.72	13.06
Min Ch El (ft)	7908.15	Shear (lb/sq ft)	1.10	2.49	1.64
Alpha	1.22	Stream Power (lb/ft s)	4.00	26.73	7.80
Frctn Loss (ft)	5.95	Cum Volume (acre-ft)	39.70	70.65	41.09
C & E Loss (ft)	0.01	Cum SA (acres)	22.78	18.49	24.28

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7914.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.63	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7912.42	Reach Len. (ft)	515.18	591.49	626.76
Crit W.S. (ft)	7912.20	Flow Area (sq ft)	18.17	181.11	35.71
E.G. Slope (ft/ft)	0.009623	Area (sq ft)	18.17	181.11	35.71
Q Total (cfs)	2181.00	Flow (cfs)	66.09	1945.33	169.59
Top Width (ft)	64.64	Top Width (ft)	9.07	43.72	11.85
Vel Total (ft/s)	9.28	Avg. Vel. (ft/s)	3.64	10.74	4.75
Max Chl Dpth (ft)	4.27	Hydr. Depth (ft)	2.00	4.14	3.01
Conv. Total (cfs)	22233.4	Conv. (cfs)	673.7	19830.9	1728.8
Length Wtd. (ft)	589.20	Wetted Per. (ft)	9.91	43.72	13.06
Min Ch El (ft)	7908.15	Shear (lb/sq ft)	1.10	2.49	1.64
Alpha	1.22	Stream Power (lb/ft s)	4.00	26.73	7.80
Frctn Loss (ft)	5.95	Cum Volume (acre-ft)	18.90	77.08	14.13
C & E Loss (ft)	0.01	Cum SA (acres)	7.35	18.49	6.08

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7913.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.28	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7911.87	Reach Len. (ft)	515.18	591.49	626.76
Crit W.S. (ft)	7911.57	Flow Area (sq ft)	13.57	157.35	29.44
E.G. Slope (ft/ft)	0.009013	Area (sq ft)	13.57	157.35	29.44
Q Total (cfs)	1657.00	Flow (cfs)	43.36	1489.33	124.31
Top Width (ft)	62.78	Top Width (ft)	7.84	43.72	11.22
Vel Total (ft/s)	8.27	Avg. Vel. (ft/s)	3.19	9.97	4.22
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)	2.73	3.60	2.62
Conv. Total (cfs)	17453.4	Conv. (cfs)	456.7	15687.3	1309.4
Length Wtd. (ft)	589.50	Wetted Per. (ft)	8.57	43.72	12.23
Min Ch El (ft)	7908.15	Shear (lb/sq ft)	0.89	2.03	1.35
Alpha	1.20	Stream Power (lb/ft s)	2.85	19.17	5.72
Frctn Loss (ft)	5.86	Cum Volume (acre-ft)	30.12	60.69	28.94
C & E Loss (ft)	0.01	Cum SA (acres)	19.92	18.49	19.90

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7913.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7912.28	Reach Len. (ft)	515.18	591.49	626.76
Crit W.S. (ft)	7912.02	Flow Area (sq ft)	16.94	175.11	34.09
E.G. Slope (ft/ft)	0.009371	Area (sq ft)	16.94	175.11	34.09
Q Total (cfs)	2031.00	Flow (cfs)	59.43	1814.95	156.62
Top Width (ft)	61.17	Top Width (ft)	8.76	43.72	11.69
Vel Total (ft/s)	8.98	Avg. Vel. (ft/s)	3.51	10.36	4.59
Max Chl Dpth (ft)	4.13	Hydr. Depth (ft)	1.93	4.01	2.92
Conv. Total (cfs)	20980.1	Conv. (cfs)	613.9	18748.3	1617.9
Length Wtd. (ft)	589.29	Wetted Per. (ft)	9.57	43.72	12.85
Min Ch El (ft)	7908.15	Shear (lb/sq ft)	1.04	2.34	2.13
Alpha	1.21	Stream Power (lb/ft s)	3.63	24.29	7.13
Frctn Loss (ft)	5.93	Cum Volume (acre-ft)	36.84	67.91	37.40
C & E Loss (ft)	0.00	Cum SA (acres)	21.96	18.49	23.30

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7914.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.87	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7912.72	Reach Len. (ft)	515.18	591.49	626.76
Crit W.S. (ft)	7912.57	Flow Area (sq ft)	20.97	194.13	39.29

E.G. Slope (ft/ft)	0.010071	Area (sq ft)	20.97	CrystalRiver.rep
Q Total (cfs)	2515.00	Flow (cfs)	81.85	194.13 39.29
Top Width (ft)	65.66	Top Width (ft)	9.74	2234.29 198.85
Vel Total (ft/s)	9.89	Avg. Vel. (ft/s)	3.90	43.72 12.20
Max Chl Dpth (ft)	4.56	Hydr. Depth (ft)	2.15	11.51 5.06
Conv. Total (cfs)	25051.1	Conv. (cfs)	815.6	4.44 3.22
Length Wtd. (ft)	588.91	Wetted Per. (ft)	10.65	22263.9 1981.5
Min Ch El (ft)	7908.15	Shear (lb/sq ft)	1.24	43.72 13.52
Alpha	1.23	Stream Power (lb/ft s)	4.83	2.79 1.83
Frcn Loss (ft)	5.98	Cum Volume (acre-ft)	4.89	32.13 9.25
C & E Loss (ft)	0.05	Cum SA (acres)	26.53	76.75 49.32
				18.49 27.42

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Crystal
REACH: Marble RS: 16883

INPUT

Description:

Station	Elevation	Data	num=	78	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7932.77				2	7931.77			13.89	7925.51		
18.89	7923.21	27.02	7919.39	34.32	7916.05	40.16	7913.36	54.42	7906.71			
54.82	7906.52	57.94	7906	66.42	7904.57	79.56	7902.58	80.23	7902.49			
80.88	7902.41	96.6	7902.43	120.65	7902.6	121.86	7902.83	126.87	7903.65			
132.09	7904.62	138.12	7905.45	138.98	7905.63	142.7	7907.34	145.23	7908.44			
157.72	7914.22	158.27	7914.47	163.01	7916.67	163.65	7916.97	171.38	7918.29			
173.14	7918.46	184.63	7918.98	188.57	7919.12	197.76	7919.42	203.99	7919.39			
210.9	7919.6	214.33	7919.71	221.81	7919.71	242.06	7920.25	252.18	7920.45			
257.1	7920.54	261.6	7920.64	270.33	7921.12	279.07	7921.62	282.56	7921.76			
296.55	7922.62	302.81	7923.09	305.29	7923.17	312.93	7923.4	320.91	7924.11			
322.77	7924.29	331.5	7924.55	340.24	7925.06	343.31	7925.12	353.43	7925.66			
457.72	7925.81	363.56	7926.22	366.46	7926.44	373.69	7927.01	375.2	7927.1			
383.81	7927.8	384.72	7927.86	392.67	7928.37	393.94	7928.46	401.41	7928.94			
404.06	7929.12	410.15	7929.44	414.19	7929.55	424.31	7930.05	434.44	7930.42			
436.37	7930.48	444.56	7931.52	445.1	7931.6	448.53	7932.01	453.84	7932.67			
454.69	7932.77	455.75	7932.89	455.99	7932.92							

Manning's n values num= 3
Sta n Val Sta n Val Sta n Val
0 .06 80.88 .035 120.65 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
80.88 120.65 535.61 475.86 425.77 .1 .3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7908.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.59	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7906.50	Reach Len. (ft)	535.61	475.86	425.77
Crit W.S. (ft)	7906.50	Flow Area (sq ft)	54.74	159.91	43.71
E.G. Slope (ft/ft)	0.010621	Area (sq ft)	54.74	159.91	43.71
Q Total (cfs)	2181.00	Flow (cfs)	228.02	1769.15	183.83
Top Width (ft)	85.92	Top Width (ft)	25.93	39.77	20.22
Vel Total (ft/s)	8.44	Avg. Vel. (ft/s)	4.17	11.06	4.21
Max Chl Dpth (ft)	4.09	Hydr. Depth (ft)	2.11	4.02	2.16
Conv. Total (cfs)	21163.3	Conv. (cfs)	2212.6	17166.9	1783.8
Length Wtd. (ft)	476.20	Wetted Per. (ft)	26.25	39.77	20.66
Min Ch El (ft)	7902.41	Shear (lb/sq ft)	1.38	2.67	1.40
Alpha	1.44	Stream Power (lb/ft s)	5.76	29.49	5.90
Frcn Loss (ft)	5.14	Cum Volume (acre-ft)	39.27	68.33	40.52
C & E Loss (ft)	0.03	Cum SA (acres)	22.58	17.93	24.05

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7908.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.59	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7906.50	Reach Len. (ft)	535.61	475.86	425.77
Crit W.S. (ft)	7906.50	Flow Area (sq ft)	54.74	159.91	43.71
E.G. Slope (ft/ft)	0.010621	Area (sq ft)	54.74	159.91	43.71
Q Total (cfs)	2181.00	Flow (cfs)	228.02	1769.15	183.83
Top Width (ft)	85.92	Top Width (ft)	25.93	39.77	20.22
Vel Total (ft/s)	8.44	Avg. Vel. (ft/s)	4.17	11.06	4.21
Max Chl Dpth (ft)	4.09	Hydr. Depth (ft)	2.11	4.02	2.16
Conv. Total (cfs)	21163.3	Conv. (cfs)	2212.6	17166.9	1783.8
Length Wtd. (ft)	476.20	Wetted Per. (ft)	26.25	39.77	20.66
Min Ch El (ft)	7902.41	Shear (lb/sq ft)	1.38	2.67	1.40
Alpha	1.44	Stream Power (lb/ft s)	5.76	29.49	5.90
Frcn Loss (ft)	5.14	Cum Volume (acre-ft)	39.27	68.33	40.52
C & E Loss (ft)	0.03	Cum SA (acres)	22.58	17.93	24.05

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7907.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.37	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7905.91	Reach Len. (ft)	535.61	475.86	425.77
Crit W.S. (ft)	7905.91	Flow Area (sq ft)	40.52	136.51	32.19
E.G. Slope (ft/ft)	0.011015	Area (sq ft)	40.52	136.51	32.19
Q Total (cfs)	1657.00	Flow (cfs)	155.07	1384.08	117.85
Top Width (ft)	81.12	Top Width (ft)	22.41	39.77	18.94
Vel Total (ft/s)	7.92	Avg. Vel. (ft/s)	3.83	10.14	3.66
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)	1.81	3.43	1.70
Conv. Total (cfs)	15788.4	Conv. (cfs)	1477.6	13187.9	1122.9
Length Wtd. (ft)	476.27	Wetted Per. (ft)	22.68	39.77	19.25
Min Ch El (ft)	7902.41	Shear (lb/sq ft)	1.23	2.36	1.15
Alpha	1.41	Stream Power (lb/ft s)	4.70	23.93	4.21
Frcn Loss (ft)	5.40	Cum Volume (acre-ft)	29.80	58.69	28.50
C & E Loss (ft)	0.03	Cum SA (acres)	19.74	17.93	19.68

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-year

CrystalRiver.rep

		Element	Left 08	Channel	Right 08
E.G. Elev (ft)	7907.87	Wt. n-Val.	0.060	0.035	0.060
Vel Head (ft)	1.54	Reach Len. (ft)	535.61	475.86	425.77
W.S. Elev (ft)	7906.33	Flow Area (sq ft)	50.37	153.08	40.27
Crit W.S. (ft)	7906.33	Area (sq ft)	50.37	153.08	40.27
E.G. Slope (ft/ft)	0.010829	Flow (cfs)	205.95	1660.96	164.09
Q Total (cfs)	2031.00	Top Width (ft)	24.00	39.77	19.85
Top Width (ft)	84.52	Avg. Vel. (ft/s)	4.09	10.85	4.08
Vel Total (ft/s)	8.33	Hydr. Depth (ft)	2.02	39.85	2.03
Max Chl Dpth (ft)	3.92	Conv. (cfs)	1979.1	15961.4	1576.8
Conv. Total (cfs)	19517.3	Wetted Per. (ft)	25.21	39.77	20.25
Length Wtd. (ft)	476.21	Shear (lb/sq ft)	1.35	2.60	1.34
Min Ch El (ft)	7902.41	Stream Power (lb/ft s)	5.52	28.23	5.48
Alpha	1.43	Cum Volume (acre-ft)	36.44	65.68	36.87
Frcn Loss (ft)	5.23	Cum SA (acres)	21.76	17.93	23.07
C & E Loss (ft)	0.03				

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

		Element	Left 08	Channel	Right 08
E.G. Elev (ft)	7908.55	Wt. n-Val.	0.060	0.035	0.060
Vel Head (ft)	1.70	Reach Len. (ft)	535.61	475.86	425.77
W.S. Elev (ft)	7906.86	Flow Area (sq ft)	64.17	174.13	51.08
Crit W.S. (ft)	7906.86	Area (sq ft)	64.17	174.13	51.08
E.G. Slope (ft/ft)	0.010240	Flow (cfs)	285.20	2002.04	227.76
Q Total (cfs)	2515.00	Top Width (ft)	26.77	39.77	21.00
Top Width (ft)	87.54	Avg. Vel. (ft/s)	4.44	11.50	4.46
Vel Total (ft/s)	8.69	Hydr. Depth (ft)	2.40	4.38	2.43
Max Chl Dpth (ft)	4.45	Conv. (cfs)	2818.4	19784.8	2250.8
Conv. Total (cfs)	24854.0	Wetted Per. (ft)	27.17	39.77	21.52
Length Wtd. (ft)	476.29	Shear (lb/sq ft)	1.51	2.80	1.52
Min Ch El (ft)	7902.41	Stream Power (lb/ft s)	6.71	32.18	6.77
Alpha	1.45	Cum Volume (acre-ft)	46.38	74.25	48.67
Frcn Loss (ft)	4.98	Cum SA (acres)	26.31	17.93	27.18
C & E Loss (ft)	0.04				

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal
REACH: Marble RS: 16407

INPUT

Description:

Station	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7983.88	1.17	7982.34	2.11	7979.86	2.73	7978.2	4.86	7964.85
7.16	7956.01	10.12	7944.01	13.09	7932.71	13.63	7932.13	18.93	7925.25
21.92	7921.59	24.76	7918.02	32.87	7907.57	34.19	7905.86	35.9	7904.62
38.57	7902.66	45.49	7898.31	48.16	7896.69	89.91	7896.69	91.52	7897.08
93.9	7897.44	99.73	7898.9	105.9	7903.42	107.61	7904.67	113.87	7909.41
120.48	7914.63	121.43	7915.42	127.67	7920.77	134.9	7921.15	142.16	7921.43
161.14	7922.58	162.42	7922.64	163.68	7922.79	167.79	7922.89	171.69	7923.07
172.88	7923.12	179.69	7923.74	183.34	7924.06	187.7	7924.45	193.8	7924.79
195.71	7924.96	201.94	7925.58	203.71	7925.75	211.72	7926.47	214.71	7926.78
219.73	7927.59	235.63	7930.43	236.09	7930.51	243.75	7931.67	246.09	7931.99
250.37	7932.82	250.76	7932.88						

Manning's n Values	num	Sta	n Val	Sta	n Val
0	0.06	48.16	0.035	89.91	0.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
48.16	89.91	493.09	498.06	503.19	1	3	

CROSS SECTION OUTPUT Profile #100-year

		Element	Left 08	Channel	Right 08
E.G. Elev (ft)	7902.77	Wt. n-Val.	0.060	0.035	0.060
Vel Head (ft)	1.92	Reach Len. (ft)	493.09	498.06	503.19
W.S. Elev (ft)	7900.86	Flow Area (sq ft)	14.14	174.05	27.57
Crit W.S. (ft)	7900.86	Area (sq ft)	14.14	174.05	27.57
E.G. Slope (ft/ft)	0.010967	Flow (cfs)	53.98	2004.51	122.52
Q Total (cfs)	2181.00	Top Width (ft)	6.72	41.75	11.51
Top Width (ft)	59.99	Avg. Vel. (ft/s)	3.82	11.52	4.44
Vel Total (ft/s)	10.11	Hydr. Depth (ft)	2.10	4.17	2.39
Max Chl Dpth (ft)	4.17	Conv. (cfs)	515.4	19140.8	1169.9
Conv. Total (cfs)	20826.2	Wetted Per. (ft)	7.91	41.75	12.30
Length Wtd. (ft)	498.43	Shear (lb/sq ft)	1.22	2.85	1.54
Min Ch El (ft)	7896.69	Stream Power (lb/ft s)	4.67	32.87	6.82
Alpha	1.21	Cum Volume (acre-ft)	38.85	66.51	40.17
Frcn Loss (ft)	4.98	Cum SA (acres)	22.37	17.48	23.90
C & E Loss (ft)	0.02				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

		Element	Left 08	Channel	Right 08
E.G. Elev (ft)	7902.77	Wt. n-Val.	0.060	0.035	0.060
Vel Head (ft)	1.92	Reach Len. (ft)	493.09	498.06	503.19
W.S. Elev (ft)	7900.86	Flow Area (sq ft)	14.14	174.05	27.57
Crit W.S. (ft)	7900.86	Area (sq ft)	14.14	174.05	27.57
E.G. Slope (ft/ft)	0.010967	Flow (cfs)	53.98	2004.51	122.52
Q Total (cfs)	2181.00	Top Width (ft)	6.72	41.75	11.51
Top Width (ft)	59.99	Avg. Vel. (ft/s)	3.82	11.52	4.44
Vel Total (ft/s)	10.11	Hydr. Depth (ft)	2.10	4.17	2.39
Max Chl Dpth (ft)	4.17	Conv. (cfs)	515.4	19140.8	1169.9
Conv. Total (cfs)	20826.2	Wetted Per. (ft)	7.91	41.75	12.30
Length Wtd. (ft)	498.43	Shear (lb/sq ft)	1.22	2.85	1.54
Min Ch El (ft)	7896.69	Stream Power (lb/ft s)	4.67	32.87	6.82
Alpha	1.21	Cum Volume (acre-ft)	18.04	72.94	13.21
Frcn Loss (ft)	4.98	Cum SA (acres)	6.95	17.48	5.70
C & E Loss (ft)	0.02				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical

CrystalRiver.rep
depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7901.81	0.060	0.035
Vel Head (ft)	1.63	0.060	0.060
W.S. Elev (ft)	7900.19	493.09	498.06
Crit W.S. (ft)	7900.19	493.09	503.19
E.G. Slope (ft/ft)	0.011654	9.97	145.94
Q Total (cfs)	1657.00	34.92	1540.61
Top width (ft)	57.73	5.65	41.75
Vel Total (ft/s)	9.41	3.50	10.56
Max Chl Dpth (ft)	3.50	12.90	166.23
Conv. Total (cfs)	15349.2	323.4	14271.0
Length Wtd. (ft)	498.37	6.65	41.75
Min Ch El (ft)	7896.69	1.09	2.54
Alpha	1.18	3.82	26.85
Frctn Loss (ft)	5.14	29.49	57.15
C & E Loss (ft)	0.02	19.57	17.48

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-year

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7902.51	0.060	0.035
Vel Head (ft)	1.84	0.060	0.060
W.S. Elev (ft)	7900.67	493.09	498.06
Crit W.S. (ft)	7900.67	493.09	503.19
E.G. Slope (ft/ft)	0.01156	12.90	166.23
Q Total (cfs)	2031.00	48.20	1872.42
Top width (ft)	59.36	6.43	41.75
Vel Total (ft/s)	9.93	3.74	11.26
Max Chl Dpth (ft)	3.98	2.01	3.98
Conv. Total (cfs)	19229.0	456.3	17727.7
Length Wtd. (ft)	498.41	7.56	41.75
Min Ch El (ft)	7896.69	1.19	2.77
Alpha	1.20	4.44	31.24
Frctn Loss (ft)	5.04	36.05	63.94
C & E Loss (ft)	0.02	21.57	17.48

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7903.34	0.060	0.035
Vel Head (ft)	2.09	0.060	0.060
W.S. Elev (ft)	7901.25	493.09	498.06
Crit W.S. (ft)	7901.25	493.09	503.19
E.G. Slope (ft/ft)	0.010670	16.90	190.44
Q Total (cfs)	2515.00	67.55	2297.13
Top width (ft)	61.31	7.35	41.75
Vel Total (ft/s)	10.50	4.00	12.06
Max Chl Dpth (ft)	4.56	2.30	4.56
Conv. Total (cfs)	24347.4	654.0	22238.2
Length Wtd. (ft)	498.45	8.65	41.75
Min Ch El (ft)	7896.69	1.30	3.04
Alpha	1.22	5.20	36.65
Frctn Loss (ft)	4.90	41.89	72.26
C & E Loss (ft)	0.02	26.10	17.48

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal
REACH: Marble RS: 15909

INPUT

Description:

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7936.08	9.31	7926.67	11.31	7924.92	14.43	7922.25
19.6	7917.8	21.48	7916.72	32.94	7910.22	33.07	7910.15
40.97	7905.49	44.96	7902.95	47.5	7901.47	51.45	7899.37
56.84	7896.4	61.97	7893.36	68.73	7889.79	69.4	7889.41
73.32	7887.28	95.76	7887.24	99.3	7888.85	100.64	7889.61
116.03	7890.23	117.68	7891.04	120.25	7892.13	126.28	7894.99
140.03	7891.76	141.58	7895.83	143.98	7895.98	149.44	7896.23
161.05	7896.81	162.49	7896.98	163.8	7897.38	170.53	7899.61
177.76	7902.73	181	7905.05	192.24	7913.84	199.46	7918.82
211.34	7925.83	213.38	7927.14	213.81	7927.35	218.24	7927.14
226.59	7926.76					223.22	7926.92

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	73.32	.035	95.76	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
73.32	95.76		479.98	486.68	492.59	.1	.3

CROSS SECTION OUTPUT Profile #100-year

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7895.10	0.060	0.035
Vel Head (ft)	2.10	0.060	0.060
W.S. Elev (ft)	7893.00	479.98	486.68
Crit W.S. (ft)	7893.00	479.98	492.59
E.G. Slope (ft/ft)	0.009127	30.32	128.90
Q Total (cfs)	2183.00	30.32	138.90
Top width (ft)	59.45	132.26	1676.97
Vel Total (ft/s)	9.18	10.68	22.44
Max Chl Dpth (ft)	5.76	4.36	13.01
Conv. Total (cfs)	22828.9	2.84	5.74
Length Wtd. (ft)	487.15	1384.4	17553.2
Min Ch El (ft)	7887.24	12.12	22.44
Alpha	1.60	1.43	3.27
Frctn Loss (ft)	4.87	6.22	42.58
		38.60	64.77

C & E Loss (ft) 0.05 Cum SA (acres) 22.28 CrystalRiver.rep 17.12 23.68

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7895.10	Element	Left 08	Channel	Right 08
Vel Head (ft)	2.10	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7893.00	Reach Len. (ft)	479.98	486.68	492.59
Crit W.S. (ft)	7893.00	Flow Area (sq ft)	30.32	128.90	78.25
E.G. Slope (ft/ft)	0.009127	Area (sq ft)	30.32	128.90	78.25
Q Total (cfs)	2181.00	Flow (cfs)	132.26	1676.97	371.77
Top Width (ft)	59.45	Top width (ft)	10.68	22.44	26.33
Vel Total (ft/s)	9.18	Avg. Vel. (ft/s)	4.36	13.01	4.75
Max Chl Dpth (ft)	5.76	Hydr. Depth (ft)	2.84	5.74	2.97
Conv. Total (cfs)	22828.9	Conv. (cfs)	1384.4	17553.2	3891.4
Length Wtd. (ft)	487.15	Wetted Per. (ft)	12.12	22.44	27.50
Min Ch El (ft)	7887.24	Shear (lb/sq ft)	1.43	3.27	1.62
Alpha	1.60	Stream Power (lb/ft s)	6.22	42.58	7.70
Frctn Loss (ft)	4.87	Cum Volume (acre-ft)	17.79	71.21	12.60
C & E Loss (ft)	0.05	Cum SA (acres)	6.85	17.12	5.48

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7894.04	Element	Left 08	Channel	Right 08
Vel Head (ft)	1.80	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7892.24	Reach Len. (ft)	479.98	486.68	492.59
Crit W.S. (ft)	7892.24	Flow Area (sq ft)	22.71	111.75	58.73
E.G. Slope (ft/ft)	0.009175	Area (sq ft)	22.71	111.75	58.73
Q Total (cfs)	1637.00	Flow (cfs)	90.25	1325.14	241.62
Top Width (ft)	56.19	Top width (ft)	9.23	22.44	24.72
Vel Total (ft/s)	8.58	Avg. Vel. (ft/s)	3.07	12.66	4.11
Max Chl Dpth (ft)	5.00	Hydr. Depth (ft)	2.46	4.98	2.38
Conv. Total (cfs)	17299.0	Conv. (cfs)	942.2	13834.4	2522.5
Length Wtd. (ft)	487.11	Wetted Per. (ft)	10.48	22.44	25.72
Min Ch El (ft)	7887.24	Shear (lb/sq ft)	1.24	2.85	1.31
Alpha	1.57	Stream Power (lb/ft s)	4.93	33.82	5.38
Frctn Loss (ft)	4.99	Cum Volume (acre-ft)	29.31	55.68	27.78
C & E Loss (ft)	0.04	Cum SA (acres)	19.48	17.12	19.34

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7894.81	Element	Left 08	Channel	Right 08
Vel Head (ft)	2.03	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7892.79	Reach Len. (ft)	479.98	486.68	492.59
Crit W.S. (ft)	7892.79	Flow Area (sq ft)	28.02	123.97	72.52
E.G. Slope (ft/ft)	0.009208	Area (sq ft)	28.02	123.97	72.52
Q Total (cfs)	2031.00	Flow (cfs)	119.59	1578.34	333.07
Top Width (ft)	58.57	Top width (ft)	10.26	22.44	25.87
Vel Total (ft/s)	9.05	Avg. Vel. (ft/s)	4.27	12.73	4.59
Max Chl Dpth (ft)	5.54	Hydr. Depth (ft)	2.73	5.52	2.80
Conv. Total (cfs)	21365.8	Conv. (cfs)	1246.3	16448.5	3471.0
Length Wtd. (ft)	487.44	Wetted Per. (ft)	11.64	22.44	26.99
Min Ch El (ft)	7887.24	Shear (lb/sq ft)	1.38	3.18	1.54
Alpha	1.59	Stream Power (lb/ft s)	5.90	40.43	7.09
Frctn Loss (ft)	4.90	Cum Volume (acre-ft)	35.82	62.28	35.98
C & E Loss (ft)	0.06	Cum SA (acres)	21.48	17.12	22.70

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7895.72	Element	Left 08	Channel	Right 08
Vel Head (ft)	2.27	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7893.45	Reach Len. (ft)	479.98	486.68	492.59
Crit W.S. (ft)	7893.45	Flow Area (sq ft)	35.26	138.89	90.18
E.G. Slope (ft/ft)	0.009090	Area (sq ft)	35.26	138.89	90.18
Q Total (cfs)	2515.00	Flow (cfs)	161.49	1895.05	458.46
Top Width (ft)	61.21	Top width (ft)	11.50	22.44	27.27
Vel Total (ft/s)	9.51	Avg. Vel. (ft/s)	4.58	13.64	5.08
Max Chl Dpth (ft)	5.21	Hydr. Depth (ft)	3.07	6.19	3.31
Conv. Total (cfs)	26379.0	Conv. (cfs)	1693.8	19876.6	4808.6
Length Wtd. (ft)	487.16	Wetted Per. (ft)	13.05	22.44	28.54
Min Ch El (ft)	7887.24	Shear (lb/sq ft)	1.53	3.51	1.79
Alpha	1.62	Stream Power (lb/ft s)	7.02	47.92	9.12
Frctn Loss (ft)	4.84	Cum Volume (acre-ft)	45.59	70.38	47.56
C & E Loss (ft)	0.05	Cum SA (acres)	25.99	17.12	26.79

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal
REACH: Marble RS: 15423

INPUT

Description:
Station Elevation Data num= 62
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

CrystalRiver.rep

0	7916.59	4.93	7914.78	8.8	7913.32	11.01	7911.74	19.21	7909.49
21.1	7908.78	27.68	7906.48	29.18	7905.94	29.61	7905.77	37.26	7902.87
40.01	7908.89	45.35	7899.89	50.42	7898.15	60.82	7894.32	61.52	7894.07
63.95	7893.17	69.6	7891.05	71.22	7890.48	77.69	7888.1	81.63	7886.67
89.68	7883.71	91.83	7883.34	100.21	7882.21	101.94	7882.03	112.84	7881.18
114.85	7881	118.98	7881.08	119.71	7880.91	123.24	7880.01	126.19	7879.31
133.64	7877.45	134.41	7877.27	139.92	7875.85	168.26	7875.81	174.13	7876.53
175.26	7876	182.15	7877.52	183.18	7877.73	185.44	7879.2	185.66	7879.31
190.87	7882.46	196.06	7884.62	198.95	7886.22	206.47	7890.28	207.51	7890.94
214.67	7894.58	216.51	7894.72	217.77	7894.82	224.77	7897.86	227.27	7899.17
231.29	7901.29	237.68	7904.01	242.46	7904.58	246.46	7905.05	247.49	7905.89
248.08	7906.4	249.7	7907.7	257.87	7914.24	260.14	7915.94	261.44	7915.78
266.25	7914.91	266.87	7914.8						

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .06 139.92 .035 168.26 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
139.92 168.26 520.6 502.01 487 .1 .3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7882.42	Element	Left DB	Channel	Right DB
Vel Head (ft)	1.92	wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7880.50	Reach Len. (ft)	520.60	502.01	487.00
Crit W.S. (ft)	7880.50	Flow Area (sq ft)	42.89	132.37	62.27
E.G. Slope (ft/ft)	0.011020	Area (sq ft)	42.89	132.37	62.27
Q Total (cfs)	2181.00	Flow (cfs)	190.66	1648.47	341.87
Top Width (ft)	66.32	Top Width (ft)	18.61	28.34	19.37
Vel Total (ft/s)	9.18	Avg. Vel. (ft/s)	4.45	12.45	5.49
Max Chl Dpth (ft)	4.69	Hydr. Depth (ft)	2.31	4.67	3.21
Conv. Total (cfs)	20776.3	Conv. (cfs)	1816.3	15703.4	3256.6
Length Wtd. (ft)	506.33	wetted Per. (ft)	19.18	28.34	20.29
Min Ch El (ft)	7875.81	Shear (lb/sq ft)	1.54	3.21	2.11
Alpha	1.47	Stream Power (lb/ft s)	6.84	40.02	11.59
Frctn Loss (ft)	6.79	cum Volume (acre-ft)	38.19	63.32	38.76
C & E Loss (ft)	0.22	cum SA (acres)	22.11	16.83	23.42

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7882.42	Element	Left DB	Channel	Right DB
Vel Head (ft)	1.92	wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7880.50	Reach Len. (ft)	520.60	502.01	487.00
Crit W.S. (ft)	7880.50	Flow Area (sq ft)	42.89	132.37	62.27
E.G. Slope (ft/ft)	0.011020	Area (sq ft)	42.89	132.37	62.27
Q Total (cfs)	2181.00	Flow (cfs)	190.66	1648.47	341.87
Top Width (ft)	66.32	Top Width (ft)	18.61	28.34	19.37
Vel Total (ft/s)	9.18	Avg. Vel. (ft/s)	4.45	12.45	5.49
Max Chl Dpth (ft)	4.69	Hydr. Depth (ft)	2.31	4.67	3.21
Conv. Total (cfs)	20776.3	Conv. (cfs)	1816.3	15703.4	3256.6
Length Wtd. (ft)	507.90	wetted Per. (ft)	19.18	28.34	20.29
Min Ch El (ft)	7875.81	Shear (lb/sq ft)	1.54	3.21	2.11
Alpha	1.47	Stream Power (lb/ft s)	6.84	40.02	11.59
Frctn Loss (ft)	7.20	cum Volume (acre-ft)	17.39	69.75	11.80
C & E Loss (ft)	0.17	cum SA (acres)	6.69	16.83	5.22

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7881.45	Element	Left DB	Channel	Right DB
Vel Head (ft)	1.65	wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7879.80	Reach Len. (ft)	520.60	502.01	487.00
Crit W.S. (ft)	7879.80	Flow Area (sq ft)	30.80	112.49	49.08
E.G. Slope (ft/ft)	0.011527	Area (sq ft)	30.80	112.49	49.08
Q Total (cfs)	1657.00	Flow (cfs)	125.30	1285.40	246.30
Top Width (ft)	62.34	Top Width (ft)	15.79	28.34	18.21
Vel Total (ft/s)	8.61	Avg. Vel. (ft/s)	4.07	11.43	5.02
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)	1.95	3.97	2.70
Conv. Total (cfs)	15433.2	Conv. (cfs)	1167.1	11972.1	2294.0
Length Wtd. (ft)	506.21	wetted Per. (ft)	16.28	28.34	18.93
Min Ch El (ft)	7875.81	Shear (lb/sq ft)	1.36	2.86	1.87
Alpha	1.43	Stream Power (lb/ft s)	5.34	32.64	9.36
Frctn Loss (ft)	6.94	cum Volume (acre-ft)	29.01	54.42	27.17
C & E Loss (ft)	0.20	cum SA (acres)	19.34	16.83	19.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7882.16	Element	Left DB	Channel	Right DB
Vel Head (ft)	1.83	wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7880.32	Reach Len. (ft)	520.60	502.01	487.00
Crit W.S. (ft)	7880.32	Flow Area (sq ft)	39.60	127.27	58.81
E.G. Slope (ft/ft)	0.011036	Area (sq ft)	39.60	127.27	58.81
Q Total (cfs)	2031.00	Flow (cfs)	171.42	1544.98	314.60
Top Width (ft)	65.31	Top Width (ft)	17.90	28.34	19.07
Vel Total (ft/s)	9.00	Avg. Vel. (ft/s)	4.33	12.14	5.35
Max Chl Dpth (ft)	4.51	Hydr. Depth (ft)	2.21	4.49	3.08
Conv. Total (cfs)	19333.4	Conv. (cfs)	1631.7	14706.9	2994.8
Length Wtd. (ft)	506.30	wetted Per. (ft)	18.45	28.34	19.94
Min Ch El (ft)	7875.81	Shear (lb/sq ft)	1.48	3.09	2.03
Alpha	1.46	Stream Power (lb/ft s)	6.40	37.56	10.87
Frctn Loss (ft)	6.78	cum Volume (acre-ft)	35.45	60.88	35.24
C & E Loss (ft)	0.21	cum SA (acres)	21.32	16.83	22.45

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7882.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.09	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7880.89	Reach Len. (ft)	520.60	502.01	487.00
Crit W.S. (ft)	7880.89	Flow Area (sq ft)	50.49	143.50	70.00
E.G. Slope (ft/ft)	0.010901	Area (sq ft)	50.49	143.50	70.00
Q Total (cfs)	2515.00	Flow (cfs)	236.08	1875.65	403.27
Top width (ft)	68.50	Top width (ft)	20.14	28.34	20.02
Vel Total (ft/s)	9.53	Avg. Vel. (ft/s)	4.68	13.07	5.76
Max Chl Dpth (ft)	5.08	Hydr. depth (ft)	2.51	5.06	3.50
Conv. Total (cfs)	24087.7	Conv. (cfs)	2261.1	17964.2	3862.4
Length wtd. (ft)	506.40	Wetted Per. (ft)	20.77	28.34	21.05
Min Ch El (ft)	7875.81	Shear (lb/sq ft)	1.65	3.45	2.26
Alpha	1.49	Stream Power (lb/ft s)	7.74	45.04	13.04
Frctn Loss (ft)	6.64	Cum Volume (acre-ft)	45.12	68.80	46.65
C & E Loss (ft)	0.25	Cum SA (acres)	25.82	16.83	26.52

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal
REACH: Marble

AS: 14921

INPUT

Description:

Station	Elevation	Data	num=	80	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7910.52	2.49	7908.55	6.08	7905.79	12.85	7900.37	14.4	7899.14			
20.8	7894.01	21.57	7893.81	23.21	7893.37	30.54	7891.39	43.93	7887.8			
46.85	7887.01	54.29	7885.02	55.01	7884.83	57.67	7884.11	63.16	7882.64			
64.64	7882.24	75	7879.49	79.47	7878.27	95.72	7873.91	96.01	7873.85			
103.94	7872.77	106.08	7871.77	121.56	7869.88	126.44	7869.22	136.36	7868.8			
144.71	7868.66	147.51	7868.6	157.87	7868.42	161.02	7868.35	168.23	7868.3			
172.68	7868.21	177.33	7868.1	185.49	7868.04	199.31	7866.97	209.67	7866.55			
218.11	7866.29	223.25	7866.25	225.87	7866.26	232.24	7866.11	242.7	7865.93			
245.35	7865.7	249.4	7864.98	256.65	7863.59	260.43	7862.89	287.96	7862.81			
307.91	7862.42	310.24	7863	311.44	7863.09	316.28	7863.27	323.62	7862.88			
325.25	7862.78	326.49	7862.6	329.54	7862.3	344.21	7861.98	344.88	7862.06			
346.96	7862.28	349.73	7862.61	353.64	7863.06	358.3	7863.53	360.15	7863.73			
363.03	7864.76	373.85	7870	374.93	7870.38	375.84	7870.89	382.03	7874.77			
388.89	7881.02	389.41	7881.41	396.23	7885.69	401.95	7890.88	403.32	7891.84			
404.97	7892.84	410.42	7895.47	415	7897.18	417.52	7898.55	420.52	7900.09			
426.32	7902.87	427.19	7903.36	430.05	7902.69	433.75	7900.92	435.98	7900.58			

Warning's n values

num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	245.35	.05	329.54	.035	346.96	.05	360.15	.06

Bank Sta: Left 329.54 Right 346.96 Lengths: Left Channel 552.68 Right 542.09 Coeff Contr. .1 Expan. .3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7866.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.17	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7865.39	Reach Len. (ft)	552.68	542.09	587.67
Crit W.S. (ft)	7865.39	Flow Area (sq ft)	190.73	56.65	34.89
E.G. Slope (ft/ft)	0.016687	Area (sq ft)	190.73	56.65	34.89
Q Total (cfs)	2181.00	Flow (cfs)	1277.73	681.33	221.94
Top width (ft)	117.24	Top width (ft)	82.45	17.42	17.37
Vel Total (ft/s)	7.73	Avg. Vel. (ft/s)	6.70	12.03	6.36
Max Chl Dpth (ft)	3.61	Hydr. depth (ft)	2.31	3.22	2.01
Conv. Total (cfs)	16883.9	Conv. (cfs)	9891.4	5274.4	1718.1
Length wtd. (ft)	554.68	Wetted Per. (ft)	82.74	17.44	17.78
Min Ch El (ft)	7861.98	Shear (lb/sq ft)	2.40	3.38	2.04
Alpha	1.27	Stream Power (lb/ft s)	16.09	40.70	13.01
Frctn Loss (ft)	6.53	Cum Volume (acre-ft)	36.80	62.23	38.22
C & E Loss (ft)	0.10	Cum SA (acres)	21.51	16.57	23.21

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7866.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.35	Wt. n-Val.	0.050	0.035	
W.S. Elev (ft) <td>7865.59</td> <td>Reach Len. (ft)</td> <td>552.68</td> <td>542.09</td> <td>587.67</td>	7865.59	Reach Len. (ft)	552.68	542.09	587.67
Crit W.S. (ft) <td>7865.59</td> <td>Flow Area (sq ft)</td> <td>189.02</td> <td>60.12</td> <td></td>	7865.59	Flow Area (sq ft)	189.02	60.12	
E.G. Slope (ft/ft) <td>0.018922</td> <td>Area (sq ft)</td> <td>189.02</td> <td>60.12</td> <td></td>	0.018922	Area (sq ft)	189.02	60.12	
Q Total (cfs) <td>2181.00</td> <td>Flow (cfs)</td> <td>1467.51</td> <td>713.49</td> <td></td>	2181.00	Flow (cfs)	1467.51	713.49	
Top width (ft) <td>86.96</td> <td>Top width (ft)</td> <td>69.54</td> <td>17.42</td> <td></td>	86.96	Top width (ft)	69.54	17.42	
Vel Total (ft/s) <td>8.75</td> <td>Avg. Vel. (ft/s)</td> <td>7.76</td> <td>11.87</td> <td></td>	8.75	Avg. Vel. (ft/s)	7.76	11.87	
Max Chl Dpth (ft) <td>3.61</td> <td>Hydr. depth (ft)</td> <td>2.72</td> <td>3.45</td> <td></td>	3.61	Hydr. depth (ft)	2.72	3.45	
Conv. Total (cfs) <td>15855.1</td> <td>Conv. (cfs) <td>10668.3</td> <td>5186.8</td> <td></td> </td>	15855.1	Conv. (cfs) <td>10668.3</td> <td>5186.8</td> <td></td>	10668.3	5186.8	
Length wtd. (ft) <td>548.65</td> <td>Wetted Per. (ft)</td> <td>72.22</td> <td>20.75</td> <td></td>	548.65	Wetted Per. (ft)	72.22	20.75	
Min Ch El (ft) <td>7861.98</td> <td>Shear (lb/sq ft)</td> <td>3.09</td> <td>3.42</td> <td></td>	7861.98	Shear (lb/sq ft)	3.09	3.42	
Alpha <td>1.13</td> <td>Stream Power (lb/ft s)</td> <td>24.00</td> <td>40.62</td> <td></td>	1.13	Stream Power (lb/ft s)	24.00	40.62	
Frctn Loss (ft) <td>8.559</td> <td>Cum Volume (acre-ft)</td> <td>16.00</td> <td>68.64</td> <td>11.46</td>	8.559	Cum Volume (acre-ft)	16.00	68.64	11.46
C & E Loss (ft) <td>0.08</td> <td>Cum SA (acres)</td> <td>8.16</td> <td>16.57</td> <td>5.11</td>	0.08	Cum SA (acres)	8.16	16.57	5.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

CrystalRiver.rep		Left OB		Channel		Right OB	
E.G. Elev (ft)	7865.98	Element	0.050	0.035	0.050		
Vel Head (ft)	0.99	Wt. n-Val.	552.68	542.09	587.67		
W.S. Elev (ft)	7864.99	Reach Len. (ft)	158.32	49.70	28.13		
Crit W.S. (ft)	7864.99	Flow Area (sq ft)	158.32	49.70	28.13		
E.G. Slope (ft/ft)	0.016567	Area (sq ft)	950.99	545.99	160.02		
Q Total (cfs)	1657.00	Flow (cfs)	80.21	17.42	16.55		
Top Width (ft)	114.18	Top Width (ft)	6.01	10.98	5.69		
Vel Total (ft/s)	7.02	Avg. Vel. (ft/s)	1.97	2.85	1.70		
Max Chl Dpth (ft)	3.01	Hydr. Depth (ft)	7388.4	4241.9	1243.2		
Conv. Total (cfs)	12873.6	Conv. (cfs)	80.46	17.44	16.86		
Length Wtd. (ft)	550.62	Wetted Per. (ft)	2.04	2.95	1.73		
Min Ch El (ft)	7861.98	Shear (lb/sq ft)	12.22	32.38	9.82		
Alpha	1.29	Stream Power (lb/ft s)	27.88	53.49	26.74		
Frctn Loss (ft)	7.56	Cum Volume (acre-ft)	18.77	16.57	18.90		
C & E Loss (ft)	0.02	Cum SA (acres)					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-year

CrystalRiver.rep		Left OB		Channel		Right OB	
E.G. Elev (ft)	7866.40	Element	0.050	0.035	0.050		
Vel Head (ft)	1.12	Wt. n-Val.	552.68	542.09	587.67		
W.S. Elev (ft)	7865.29	Reach Len. (ft)	182.02	54.80	33.06		
Crit W.S. (ft)	7865.19	Flow Area (sq ft)	182.02	54.80	33.06		
E.G. Slope (ft/ft)	0.016583	Area (sq ft)	1184.15	642.74	204.12		
Q Total (cfs)	2031.00	Flow (cfs)	81.85	17.42	17.15		
Top Width (ft)	116.43	Top Width (ft)	6.51	11.73	6.17		
Vel Total (ft/s)	7.53	Avg. Vel. (ft/s)	2.22	3.15	1.93		
Max Chl Dpth (ft)	3.90	Hydr. Depth (ft)	9195.4	4991.1	1585.0		
Conv. Total (cfs)	15771.5	Conv. (cfs)	82.13	17.44	17.53		
Length Wtd. (ft)	554.35	Wetted Per. (ft)	2.29	3.25	1.95		
Min Ch El (ft)	7861.98	Shear (lb/sq ft)	14.93	38.16	12.05		
Alpha	1.27	Stream Power (lb/ft s)	34.12	59.83	34.72		
Frctn Loss (ft)	6.49	Cum Volume (acre-ft)	20.73	16.57	22.25		
C & E Loss (ft)	0.09	Cum SA (acres)					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

CrystalRiver.rep		Left OB		Channel		Right OB	
E.G. Elev (ft)	7866.91	Element	0.050	0.035	0.051		
Vel Head (ft)	1.25	Wt. n-Val.	552.68	542.09	587.67		
W.S. Elev (ft)	7865.66	Reach Len. (ft)	212.99	61.31	39.61		
Crit W.S. (ft)	7865.66	Flow Area (sq ft)	212.99	61.31	39.61		
E.G. Slope (ft/ft)	0.016071	Area (sq ft)	1488.99	762.85	263.16		
Q Total (cfs)	2515.00	Flow (cfs)	83.95	17.42	17.93		
Top Width (ft)	119.30	Top Width (ft)	6.99	12.44	6.64		
Vel Total (ft/s)	8.01	Avg. Vel. (ft/s)	2.52	3.52	2.21		
Max Chl Dpth (ft)	3.68	Hydr. Depth (ft)	11745.4	6017.5	2075.8		
Conv. Total (cfs)	19838.7	Conv. (cfs)	84.26	17.44	18.39		
Length Wtd. (ft)	555.31	Wetted Per. (ft)	2.54	3.53	2.16		
Min Ch El (ft)	7861.98	Shear (lb/sq ft)	17.73	43.89	14.36		
Alpha	1.25	Stream Power (lb/ft s)	67.62	146.04			
Frctn Loss (ft)	6.55	Cum Volume (acre-ft)	25.20	16.57	26.31		
C & E Loss (ft)	0.10	Cum SA (acres)					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal
REACH: Marble RS: 14378

INPUT Description:

Station	Elevation	Data	num=	125	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	7902.98				3.14	7901.6			6.65	7900.24		9.11	7899.3
17.65	7895.05	18.7	7895.56		18.87	7895.5			19.07	7895.43		29.73	7890.6
35.05	7888.51	36.19	7888.02		39.72	7887			44.13	7885.75		47.12	7885.02
51.33	7883.6	57.55	7881.74		58.93	7881.35			61.74	7880.61		71.27	7875.23
72.94	7874.14	75.39	7872.5		80.14	7869.33			83.35	7866		93.23	7855.72
94.54	7854.44	95.42	7853.81		97.15	7852.9			104.32	7849.11		110.5	7848.98
117.37	7850.87	117.73	7850.97		118.43	7850.92			120.77	7850.73		125.87	7850.68
129.69	7850.41	130.19	7850.26		132.33	7849.92			135.94	7848.9		165.06	7849
168.87	7849	172.58	7849.6		180.36	7850.87			181.05	7850.98		185.63	7851.85
188.24	7852.35	191.33	7852.32		198.92	7852.21			201.6	7852.19		207.23	7851.92
222.15	7852.01	240.48	7851.55		242.7	7851.5			247.55	7851.48		248.88	7851.21
252.98	7850.4	257.52	7849.46		262.42	7848.96			265.83	7849.05		273	7850.37
273.53	7850.48	274.59	7850.69		284.51	7852.56			286.81	7852.98		289.01	7852.92
294.08	7852.83	304.35	7852.58		306.98	7852.57			314.63	7852.66		324.9	7852.81
311.5	7851.96	331.06	7851.81		335.18	7852.18			340.23	7852.98		345.45	7853.66
348.48	7853.86	348.96	7853.94		349.24	7853.93			365.17	7853.84		373.48	7853.93
376.28	7853.93	381.79	7853.9		386.55	7853.9			390.11	7853.85		396.83	7853.92
400.85	7853.92	405.99	7853.48		407.1	7855.81			415.05	7859.45		417.37	7860.77
423.36	7865.65	427.65	7868.99		430.78	7871.54			433.53	7873.73		439.98	7873.67
448.2	7873.71	456.61	7874.3		458.47	7874.44			464.92	7875.08		468.75	7875.54
473.22	7876.14	475.36	7876.42		476.41	7876.26			478.14	7875.98		482.77	7875.21
488.32	7875.38	489.86	7875.44		492.23	7875.62			498.17	7876.04		499.57	7876.13
506.48	7876.6	509.85	7876.84		515.77	7877.77			519.92	7878.26		521.26	7878.48
530.4	7882.94	531.18	7883.38		531.39	7883.5			535.78	7881.59		539.04	7879.87
546.86	7880.21	547.78	7880.33		570.08	7880.07			571.46	7880.5		578	7881.92

Manning's n values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	104.32	.05	135.94	.035	168.87	.05
286.81	.06						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Sta L	Sta R	Elev	Permanent
188.24	578	7852.35	F

CROSS SECTION OUTPUT Profile #100-year

CrystalRiver.rep		Left OB		Channel		Right OB	
E.G. Elev (ft)	7853.47	Element	0.051	0.035	0.050		
Vel Head (ft)	0.85	Wt. n-Val.					

		Crystalline River.rep	
W.S. Elev (ft)	7852.62	Reach Len. (ft)	535.21
Crit W.S. (ft)	7852.62	Flow Area (sq ft)	94.03
E.G. Slope (ft/ft)	0.008738	Area (sq ft)	94.03
Q Total (cfs)	2181.00	Flow (cfs)	465.17
Top Width (ft)	207.06	Top width (ft)	38.26
Vel Total (ft/s)	5.68	Avg. Vel. (ft/s)	4.95
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)	2.46
Conv. Total (cfs)	23331.7	Conv. (cfs)	4976.3
Length Wtd. (ft)	575.59	Wetted Per. (ft)	39.61
Min Ch El (ft)	7848.90	Shear (lb/sq ft)	1.30
Alpha	1.69	Stream Power (lb/ft s)	6.41
Frctn Loss (ft)	5.35	Cum Volume (acre-ft)	34.99
C & E Loss (ft)	0.10	Cum SA (acres)	20.75

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7855.77	wt. n-Val.		0.035	0.050
Vel Head (ft)	2.17	Reach Len. (ft)	535.21	599.19	522.70
W.S. Elev (ft)	7853.60	Flow Area (sq ft)		152.83	41.10
Crit W.S. (ft)	7853.60	Area (sq ft)		152.83	41.10
E.G. Slope (ft/ft)	0.013158	Flow (cfs)		1894.58	286.42
Q Total (cfs)	2181.00	Top Width (ft)		32.93	11.13
Top Width (ft)	44.06	Avg. Vel. (ft/s)		12.40	6.97
Vel Total (ft/s)	11.25	Hydr. Depth (ft)		4.64	3.69
Max Chl Dpth (ft)	4.70	Conv. (cfs)		16516.7	2497.0
Conv. Total (cfs)	19013.7	Wetted Per. (ft)		37.63	14.06
Length Wtd. (ft)	587.53	Shear (lb/sq ft)		3.34	2.40
Min Ch El (ft)	7848.90	Stream Power (lb/ft s)		41.36	16.73
Alpha	1.21	Cum Volume (acre-ft)	14.80	67.31	11.18
Frctn Loss (ft)	6.67	Cum SA (acres)	5.72	16.26	5.04
C & E Loss (ft)	0.09				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The cross section had to be extended vertically during the critical depth calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7853.44	wt. n-Val.		0.035	0.050
Vel Head (ft)	1.18	Reach Len. (ft)	535.21	599.19	522.70
W.S. Elev (ft)	7852.26	Flow Area (sq ft)		80.24	31.87
Crit W.S. (ft)	7852.26	Area (sq ft)		80.24	124.26
E.G. Slope (ft/ft)	0.011559	Flow (cfs)		415.10	142.97
Q Total (cfs)	1657.00	Top Width (ft)		37.57	112.39
Top Width (ft)	182.89	Avg. Vel. (ft/s)		5.17	4.49
Vel Total (ft/s)	7.51	Hydr. Depth (ft)		2.14	1.69
Max Chl Dpth (ft)	3.35	Conv. (cfs)		3861.0	1329.8
Conv. Total (cfs)	15412.4	Wetted Per. (ft)		38.83	19.15
Length Wtd. (ft)	582.10	Shear (lb/sq ft)		1.48	1.70
Min Ch El (ft)	7848.90	Stream Power (lb/ft s)		7.71	5.39
Alpha	1.35	Cum Volume (acre-ft)		26.37	25.71
Frctn Loss (ft)	6.52	Cum SA (acres)		18.02	18.03
C & E Loss (ft)	0.05				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-year

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7853.35	wt. n-Val.		0.035	0.050
Vel Head (ft)	0.83	Reach Len. (ft)	535.21	599.19	522.70
W.S. Elev (ft)	7852.52	Flow Area (sq ft)		90.27	156.46
Crit W.S. (ft)	7852.52	Area (sq ft)		90.27	156.46
E.G. Slope (ft/ft)	0.008695	Flow (cfs)		434.71	512.12
Q Total (cfs)	2031.00	Top Width (ft)		38.07	125.60
Top Width (ft)	196.60	Avg. Vel. (ft/s)		4.82	3.27
Vel Total (ft/s)	5.58	Hydr. Depth (ft)		2.37	1.25
Max Chl Dpth (ft)	3.62	Conv. (cfs)		4662.1	5492.2
Conv. Total (cfs)	21781.4	Wetted Per. (ft)		39.40	126.56
Length Wtd. (ft)	576.31	Shear (lb/sq ft)		1.24	0.67
Min Ch El (ft)	7848.90	Stream Power (lb/ft s)		5.99	2.20
Alpha	1.71	Cum Volume (acre-ft)		32.40	33.44
Frctn Loss (ft)	5.42	Cum SA (acres)		19.97	21.28
C & E Loss (ft)	0.10				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	7853.72	wt. n-Val.		0.035	0.050
Vel Head (ft)	0.91	Reach Len. (ft)	535.21	599.19	522.70
W.S. Elev (ft)	7852.81	Flow Area (sq ft)		101.26	197.13
Crit W.S. (ft)	7852.81	Area (sq ft)		101.26	197.13
E.G. Slope (ft/ft)	0.009034	Flow (cfs)		532.19	725.62
Q Total (cfs)	2515.00	Top Width (ft)		38.61	160.82
Top Width (ft)	232.37	Avg. Vel. (ft/s)		5.26	3.68
Vel Total (ft/s)	5.91	Hydr. Depth (ft)		2.62	1.23
Max Chl Dpth (ft)	3.91	Conv. (cfs)		5599.1	7634.2
Conv. Total (cfs)	26460.0	Wetted Per. (ft)		40.01	161.85
Length Wtd. (ft)	574.48	Shear (lb/sq ft)		1.43	0.69
Min Ch El (ft)	7848.90	Stream Power (lb/ft s)		7.50	2.53
Alpha	1.68				

Frctn Loss (ft)	5.68	Cum Volume (acre-ft)	41.55	CrystalRiver.rep
C & E Loss (ft)	0.13	Cum SA (acres)	24.42	66.45 44.44 16.26 25.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: Divided flow computed for this cross-section.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal
 REACH: Marble

RS: 13779

INPUT

Description:

Station Elevation Data	num=	164
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 7872.16 1.22 7871.76 8.96 7868.7 11.76 7866.82 16.53 7863.65		
21.56 7863.06 28.96 7857.51 31.73 7856.61 38.97 7854.18 48.97 7850.93		
52.07 7850 58.97 7848.33 62.74 7847.35 68.97 7844.93 72.69 7843.16		
73.46 7843.13 78.97 7843.1 82.58 7843.11 88.97 7843.08 98.97 7842.81		
102.92 7842.71 113.09 7842.68 118.98 7842.71 138.98 7842.71 143.6 7842.7		
153.77 7842.7 158.98 7842.54 163.94 7842.47 168.98 7842.38 171.71 7842.22		
175.46 7840.45 178.99 7838.98 186.23 7836.05 188.64 7834.89 220.09 7834.89		
221.61 7835.21 228.99 7836.68 235.12 7838.34 238.99 7839.22 240.36 7839.61		
242 7840.01 247.27 7839.93 255.46 7839.88 259 7839.91 265.63 7839.9		
269 7840.01 276.84 7839.93 277.36 7840.06 285.6 7843.07 287.91 7843.21		
292.49 7841.28 296.78 7843.41 299 7843.51 306.31 7843.62 309 7843.29		
326.65 7841.42 329.01 7843.56 346.99 7843.56 349.01 7843.55 369.01 7843.68		
387.67 7843.91 428.34 7844.65 446.95 7845.1 449.23 7845.15 460.22 7845.25		
463.93 7845.27 470.11 7845.33 478.42 7845.54 482.22 7845.66 485.96 7845.79		
493.21 7846.03 500.26 7846.15 502.59 7846.17 509.15 7846.2 516.72 7846.21		
524.32 7847.25 525.67 7847.43 531.07 7847.49 537.19 7847.43 538.78 7847.5		
542.26 7847.58 546.33 7847.71 548.19 7847.78 553.87 7847.96 559.19 7848.25		
561.42 7848.42 566.3 7848.67 568.97 7848.84 570.18 7848.9 577.07 7849.38		
582.71 7849.57 585.33 7849.94 590.4 7850.71 592.17 7851.02 594.43 7851.33		
596.98 7851.72 603.17 7851.78 606.69 7851.79 621.87 7851.88 624.83 7851.91		
630.24 7852.12 632.42 7852.13 636.26 7852.13 638.45 7852.12 643.52 7852.17		
648.45 7852.24 651.22 7852.2 661.25 7852.38 663.24 7852.68 668.39 7853.73		
674.97 7854.42 677.43 7854.9 677.85 7855 681.11 7855.02 684.41 7855.53		
686.54 7855.89 689.86 7856.13 691.14 7856.27 694.11 7856.81 695.87 7857.46		
700.94 7858.13 704.13 7858.32 704.79 7858.73 710.59 7859.44 711.9 7859.62		
713.13 7859.86 714.1 7860.19 722.07 7862.52 724.65 7863.45 728 7863.87		
729.37 7864.03 753.28 7863.61 754.14 7863.44 769.03 7860.65 771.65 7860.18		
778.08 7860.08 780.24 7860.1 782.74 7860.24 787.79 7860.7 790.1 7860.87		
795.33 7861.36 801.09 7861.88 802.88 7862.08 806.78 7862.43 810.42 7862.79		
812.09 7862.96 817.97 7863.85 823.09 7864.8 825.73 7864.79 830.83 7865.23		
834.11 7865.53 840.43 7865.55 845.08 7865.84 848.15 7866.17 854.88 7866.97		
855.46 7867.03 855.92 7867.1 858.48 7867.42 867.03 7868.46 868.16 7868.53		
869.38 7868.28 874.06 7867.85 877.96 7869.14 879.38 7869.55		

Manning's n values	num=	5
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val		
0 .06 175.96 .05 188.64 .035 220.09 .05 276.84 .06		

Bank Sta: Left Right	Lengths: Left Channel Right	Coeff Contr.	Expan.
188.64 220.09	465.25 464.83 465.06	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7841.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.88	wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7839.64	Reach Len. (ft)	465.25	464.83	465.06
Crit W.S. (ft)	7839.64	Flow Area (sq ft)	25.84	149.26	50.86
E.G. Slope (ft/ft)	0.009909	Area (sq ft)	25.84	149.26	50.86
Q Total (cfs)	2181.00	Flow (cfs)	127.57	1781.48	271.94
Top Width (ft)	62.83	Top Width (ft)	11.00	31.45	20.38
Vel Total (ft/s)	9.65	Avg. Vel. (ft/s)	4.94	11.94	5.35
Max chl Dpth (ft)	4.75	Hydr. Depth (ft)	2.35	4.75	2.50
Conv. Total (cfs)	21910.4	Conv. (cfs)	1281.6	17896.8	2732.0
Length wtd. (ft)	464.93	Wetted Per. (ft)	11.99	31.45	20.93
Min ch El (ft)	7834.89	Shear (lb/sq ft)	1.33	2.94	1.50
Alpha	1.30	Stream Power (lb/ft s)	6.58	35.04	8.04
Frctn Loss (ft)	5.19	Cum Volume (acre-ft)	14.64	65.23	10.63
C & E Loss (ft)	0.03	Cum SA (acres)	5.65	15.81	4.85

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7841.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.88	wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7839.64	Reach Len. (ft)	465.25	464.83	465.06
Crit W.S. (ft)	7839.64	Flow Area (sq ft)	25.84	149.26	50.86
E.G. Slope (ft/ft)	0.009909	Area (sq ft)	25.84	149.26	50.86
Q Total (cfs)	2181.00	Flow (cfs)	127.57	1781.48	271.94
Top Width (ft)	62.83	Top Width (ft)	11.00	31.45	20.38
Vel Total (ft/s)	9.65	Avg. Vel. (ft/s)	4.94	11.94	5.35
Max chl Dpth (ft)	4.75	Hydr. Depth (ft)	2.35	4.75	2.50
Conv. Total (cfs)	21910.4	Conv. (cfs)	1281.6	17896.8	2732.0
Length wtd. (ft)	464.93	Wetted Per. (ft)	11.99	31.45	20.93
Min ch El (ft)	7834.89	Shear (lb/sq ft)	1.33	2.94	1.50
Alpha	1.30	Stream Power (lb/ft s)	6.58	35.04	8.04
Frctn Loss (ft)	5.19	Cum Volume (acre-ft)	14.64	65.23	10.63
C & E Loss (ft)	0.03	Cum SA (acres)	5.65	15.81	4.85

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7840.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.67	wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7838.88	Reach Len. (ft)	465.25	464.83	465.06
Crit W.S. (ft)	7838.88	Flow Area (sq ft)	18.06	125.31	36.43
E.G. Slope (ft/ft)	0.010863	Area (sq ft)	18.06	125.31	36.43
Q Total (cfs)	1657.00	Flow (cfs)	81.87	1393.55	181.59
Top Width (ft)	58.22	Top Width (ft)	9.39	31.45	17.38

Vel Total (ft/s)	9.22	Avg. Vel. (ft/s)	4.53	CrystalRiver.rep	
Max Chl Dpth (ft)	3.98	Hydr. Depth (ft)	1.92	11.12	4.99
Conv. Total (cfs)	15898.2	Conv. (cfs)	785.3	3.98	2.10
Length wtd. (ft)	464.92	Wetted Per. (ft)	10.20	13370.5	1742.2
Min Ch El (ft)	7834.89	Shear (lb/sq ft)	1.20	31.45	17.84
Alpha	1.27	Stream Power (lb/ft s)	5.44	2.70	1.38
Frctn Loss (ft)	5.27	Cum Volume (acre-ft)	25.76	30.05	6.90
C & E Loss (ft)	0.07	Cum SA (acres)	17.73	50.90	24.75
				15.81	17.25

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7841.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7839.42	Reach Len. (ft)	465.25	464.83	465.06
Crit W.S. (ft)	7839.42	Flow Area (sq ft)	23.52	142.48	46.55
E.G. Slope (ft/ft)	0.010203	Area (sq ft)	23.52	142.48	46.55
Q Total (cfs)	2031.00	Flow (cfs)	13.77	1672.86	244.37
Top Width (ft)	61.61	Top Width (ft)	10.56	31.45	19.60
Vel Total (ft/s)	9.56	Avg. Vel. (ft/s)	4.84	11.74	5.25
Max Chl Dpth (ft)	4.53	Hydr. Depth (ft)	2.23	4.53	2.37
Conv. Total (cfs)	20106.6	Conv. (cfs)	1126.3	16561.1	2419.2
Length wtd. (ft)	464.92	Wetted Per. (ft)	11.49	31.45	20.13
Min Ch El (ft)	7834.89	Shear (lb/sq ft)	1.30	2.89	1.47
Alpha	1.29	Stream Power (lb/ft s)	6.31	33.88	7.73
Frctn Loss (ft)	5.27	Cum Volume (acre-ft)	31.70	56.97	32.23
C & E Loss (ft)	0.04	Cum SA (acres)	19.67	15.81	20.41

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7842.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.20	wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7839.89	Reach Len. (ft)	465.25	464.83	465.06
Crit W.S. (ft)	7839.89	Flow Area (sq ft)	28.71	157.27	56.20
E.G. Slope (ft/ft)	0.010870	Area (sq ft)	28.71	157.27	56.20
Q Total (cfs)	2515.00	Flow (cfs)	154.26	2035.59	325.15
Top Width (ft)	67.40	Top Width (ft)	11.53	31.45	24.43
Vel Total (ft/s)	10.39	Avg. Vel. (ft/s)	5.37	12.94	5.79
Max Chl Dpth (ft)	5.00	Hydr. Depth (ft)	2.49	5.00	2.30
Conv. Total (cfs)	24122.1	Conv. (cfs)	1479.6	19524.0	3118.6
Length wtd. (ft)	464.93	Wetted Per. (ft)	12.57	31.45	21.01
Min Ch El (ft)	7834.89	Shear (lb/sq ft)	1.55	3.39	1.52
Alpha	1.31	Stream Power (lb/ft s)	8.33	43.92	8.82
Frctn Loss (ft)	5.38	Cum Volume (acre-ft)	40.75	64.50	42.92
C & E Loss (ft)	0.08	Cum SA (acres)	24.11	15.81	23.99

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal
 REACH: Marble RS: 13314

INPUT

Description:
 Station Elevation Data num= 92

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7853.18	17	7848.99	37	7843.34	57	7837.68
49.22	7838.74	50.69	7838.63	67	7837.68	77	7837.18
97	7836.93	117	7835.79	127	7835.71	137	7835.41
146.85	7832.06	147	7831.99	147.12	7831.94	153.45	7829.3
167	7828.77	177	7828.67	183.81	7827.81	209.18	7827.75
217	7830.27	217.95	7830.46	226.42	7832.3	227	7832.65
237.01	7832.94	238.2	7833.02	246.34	7834.62	246.72	7834.71
266.7	7833.9	277	7833.75	297	7833.62	317	7832.99
377	7831.97	397	7831.59	417	7831.84	437	7831.97
477	7832.48	497	7832.73	517	7833.36	537.16	7833.36
577	7834	597.26	7834.01	617	7834.26	627	7834.19
657	7834.64	677	7835.4	697	7835.65	717	7835.53
757	7835.3	760.95	7835.29	763.6	7835.82	764.66	7836.04
777	7836.39	787	7836.54	797	7836.67	817	7837.05
857.16	7837.31	877	7837.94	887.44	7838.17	891.47	7838.23
897	7840.88	897.16	7840.96	907	7845.27	907.14	7845.36
916.92	7850.16	920.83	7850.71	941.39	7850.46	943.62	7850.31
947.96	7849.44	948.49	7849.77	955.48	7856.42	956.96	7858.07
957.25	7858.38	964.42	7865.49				

Manning's n Values num= 3

Sta	n Val	Sta	n Val
0	.06	183.81	.035
		209.18	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 183.81 209.18 514.62 494.08 474.87 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 246.72 964.42 7834.71 F

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7833.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.79	wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7832.13	Reach Len. (ft)	514.62	494.08	474.87
Crit W.S. (ft)	7832.13	Flow Area (sq ft)	112.56	110.36	29.67
E.G. Slope (ft/ft)	0.012684	Area (sq ft)	112.56	110.36	51.11
Q Total (cfs)	2181.00	Flow (cfs)	649.75	1404.96	126.29
Top Width (ft)	158.23	Top Width (ft)	37.22	25.37	93.73
Vel Total (ft/s)	8.63	Avg. Vel. (ft/s)	5.77	12.73	4.26
Max Chl Dpth (ft)	4.38	Hydr. Depth (ft)	3.03	4.35	1.97
Conv. Total (cfs)	19380.4	Conv. (cfs)	5773.7	12484.5	1122.2
Length wtd. (ft)	495.86	Wetted Per. (ft)	37.76	25.37	15.71
Min Ch El (ft)	7827.75	Shear (lb/sq ft)	2.36	3.44	1.49
Alpha	1.55	Stream Power (lb/ft s)	13.61	43.78	6.35
Frctn Loss (ft)	5.92	Cum Volume (acre-ft)	33.52	57.88	34.98

C & E Loss (ft) 0.06 Cum SA (acres) 20.19 CrystalRiver.rep 15.51 20.62

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7833.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.79	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7832.13	Reach Len. (ft)	514.62	494.08	474.87
Crit W.S. (ft)	7832.13	Flow Area (sq ft)	112.56	110.36	29.67
E.G. Slope (ft/ft)	0.012664	Area (sq ft)	112.56	110.36	51.11
Q Total (cfs)	2181.00	Flow (cfs)	649.75	1404.96	126.29
Top width (ft)	158.23	Top width (ft)	37.12	25.37	95.73
Vel Total (ft/s)	8.63	Avg. Vel. (ft/s)	5.77	12.73	4.26
Max chl Dpth (ft)	4.38	Hydr. Depth (ft)	3.03	4.35	1.97
Conv. Total (cfs)	19380.4	Conv. (cfs)	5773.7	12484.5	1122.2
Length wtd. (ft)	495.58	Wetted Per. (ft)	37.76	25.37	15.71
Min Ch El (ft)	7827.75	Shear (lb/sq ft)	3.44	3.44	1.49
Alpha	1.55	Stream Power (lb/ft s)	13.61	43.78	6.35
Frctn Loss (ft)	6.53	Cum Volume (acre-ft)	13.91	63.85	10.08
C & E Loss (ft)	0.02	Cum SA (acres)	5.39	15.51	4.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7833.03	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>1.43 <td>Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.060</td> </td></td>	1.43 <td>Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.060</td> </td>	Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.060</td>	0.060	0.035	0.060
W.S. Elev (ft) <td>7831.60 <td>Reach Len. (ft) <td>514.62</td> <td>494.08</td> <td>474.87</td> </td></td>	7831.60 <td>Reach Len. (ft) <td>514.62</td> <td>494.08</td> <td>474.87</td> </td>	Reach Len. (ft) <td>514.62</td> <td>494.08</td> <td>474.87</td>	514.62	494.08	474.87
Crit W.S. (ft) <td>7831.60 <td>Flow Area (sq ft) <td>93.20</td> <td>96.90</td> <td>22.87</td> </td></td>	7831.60 <td>Flow Area (sq ft) <td>93.20</td> <td>96.90</td> <td>22.87</td> </td>	Flow Area (sq ft) <td>93.20</td> <td>96.90</td> <td>22.87</td>	93.20	96.90	22.87
E.G. Slope (ft/ft) <td>0.011845 <td>Area (sq ft) <td>93.20</td> <td>96.90</td> <td>22.88</td> </td></td>	0.011845 <td>Area (sq ft) <td>93.20</td> <td>96.90</td> <td>22.88</td> </td>	Area (sq ft) <td>93.20</td> <td>96.90</td> <td>22.88</td>	93.20	96.90	22.88
Q Total (cfs) <td>1657.00 <td>Flow (cfs) <td>470.13</td> <td>1094.04</td> <td>92.83</td> </td></td>	1657.00 <td>Flow (cfs) <td>470.13</td> <td>1094.04</td> <td>92.83</td> </td>	Flow (cfs) <td>470.13</td> <td>1094.04</td> <td>92.83</td>	470.13	1094.04	92.83
Top width (ft) <td>74.30 <td>Top width (ft) <td>35.87</td> <td>25.37</td> <td>13.05</td> </td></td>	74.30 <td>Top width (ft) <td>35.87</td> <td>25.37</td> <td>13.05</td> </td>	Top width (ft) <td>35.87</td> <td>25.37</td> <td>13.05</td>	35.87	25.37	13.05
Vel Total (ft/s) <td>7.78 <td>Avg. Vel. (ft/s) <td>11.29</td> <td>11.29</td> <td>4.06</td> </td></td>	7.78 <td>Avg. Vel. (ft/s) <td>11.29</td> <td>11.29</td> <td>4.06</td> </td>	Avg. Vel. (ft/s) <td>11.29</td> <td>11.29</td> <td>4.06</td>	11.29	11.29	4.06
Max chl Dpth (ft) <td>3.85 <td>Hydr. Depth (ft) <td>2.60</td> <td>3.82</td> <td>1.94</td> </td></td>	3.85 <td>Hydr. Depth (ft) <td>2.60</td> <td>3.82</td> <td>1.94</td> </td>	Hydr. Depth (ft) <td>2.60</td> <td>3.82</td> <td>1.94</td>	2.60	3.82	1.94
Conv. Total (cfs) <td>15225.2</td> <td>Conv. (cfs) <td>4319.8</td> <td>10052.5</td> <td>853.0</td> </td>	15225.2	Conv. (cfs) <td>4319.8</td> <td>10052.5</td> <td>853.0</td>	4319.8	10052.5	853.0
Length wtd. (ft) <td>495.89 <td>Wetted Per. (ft) <td>36.40</td> <td>25.37</td> <td>12.37</td> </td></td>	495.89 <td>Wetted Per. (ft) <td>36.40</td> <td>25.37</td> <td>12.37</td> </td>	Wetted Per. (ft) <td>36.40</td> <td>25.37</td> <td>12.37</td>	36.40	25.37	12.37
Min Ch El (ft) <td>7827.75 <td>Shear (lb/sq ft) <td>1.89</td> <td>2.82</td> <td>1.37</td> </td></td>	7827.75 <td>Shear (lb/sq ft) <td>1.89</td> <td>2.82</td> <td>1.37</td> </td>	Shear (lb/sq ft) <td>1.89</td> <td>2.82</td> <td>1.37</td>	1.89	2.82	1.37
Alpha	1.52 <td>Stream Power (lb/ft s) <td>9.55</td> <td>31.89</td> <td>5.55</td> </td>	Stream Power (lb/ft s) <td>9.55</td> <td>31.89</td> <td>5.55</td>	9.55	31.89	5.55
Frctn Loss (ft) <td>5.78 <td>Cum Volume (acre-ft) <td>25.17</td> <td>49.71</td> <td>24.43</td> </td></td>	5.78 <td>Cum Volume (acre-ft) <td>25.17</td> <td>49.71</td> <td>24.43</td> </td>	Cum Volume (acre-ft) <td>25.17</td> <td>49.71</td> <td>24.43</td>	25.17	49.71	24.43
C & E Loss (ft) <td>0.03 <td>Cum SA (acres) <td>17.49</td> <td>15.51</td> <td>17.09</td> </td></td>	0.03 <td>Cum SA (acres) <td>17.49</td> <td>15.51</td> <td>17.09</td> </td>	Cum SA (acres) <td>17.49</td> <td>15.51</td> <td>17.09</td>	17.49	15.51	17.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7833.67	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>1.71 <td>Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.060</td> </td></td>	1.71 <td>Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.060</td> </td>	Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.060</td>	0.060	0.035	0.060
W.S. Elev (ft) <td>7831.96 <td>Reach Len. (ft) <td>514.62</td> <td>494.08</td> <td>474.87</td> </td></td>	7831.96 <td>Reach Len. (ft) <td>514.62</td> <td>494.08</td> <td>474.87</td> </td>	Reach Len. (ft) <td>514.62</td> <td>494.08</td> <td>474.87</td>	514.62	494.08	474.87
Crit W.S. (ft) <td>7831.96 <td>Flow Area (sq ft) <td>106.19</td> <td>105.98</td> <td>27.27</td> </td></td>	7831.96 <td>Flow Area (sq ft) <td>106.19</td> <td>105.98</td> <td>27.27</td> </td>	Flow Area (sq ft) <td>106.19</td> <td>105.98</td> <td>27.27</td>	106.19	105.98	27.27
E.G. Slope (ft/ft) <td>0.012689 <td>Area (sq ft) <td>106.19</td> <td>105.98</td> <td>36.74</td> </td></td>	0.012689 <td>Area (sq ft) <td>106.19</td> <td>105.98</td> <td>36.74</td> </td>	Area (sq ft) <td>106.19</td> <td>105.98</td> <td>36.74</td>	106.19	105.98	36.74
Q Total (cfs) <td>2031.00 <td>Flow (cfs) <td>594.76</td> <td>1314.67</td> <td>121.58</td> </td></td>	2031.00 <td>Flow (cfs) <td>594.76</td> <td>1314.67</td> <td>121.58</td> </td>	Flow (cfs) <td>594.76</td> <td>1314.67</td> <td>121.58</td>	594.76	1314.67	121.58
Top width (ft) <td>132.31 <td>Top width (ft) <td>36.73</td> <td>25.37</td> <td>70.21</td> </td></td>	132.31 <td>Top width (ft) <td>36.73</td> <td>25.37</td> <td>70.21</td> </td>	Top width (ft) <td>36.73</td> <td>25.37</td> <td>70.21</td>	36.73	25.37	70.21
Vel Total (ft/s) <td>8.48 <td>Avg. Vel. (ft/s) <td>5.60</td> <td>12.40</td> <td>4.46</td> </td></td>	8.48 <td>Avg. Vel. (ft/s) <td>5.60</td> <td>12.40</td> <td>4.46</td> </td>	Avg. Vel. (ft/s) <td>5.60</td> <td>12.40</td> <td>4.46</td>	5.60	12.40	4.46
Max chl Dpth (ft) <td>4.21 <td>Hydr. Depth (ft) <td>2.88</td> <td>4.18</td> <td>2.13</td> </td></td>	4.21 <td>Hydr. Depth (ft) <td>2.88</td> <td>4.18</td> <td>2.13</td> </td>	Hydr. Depth (ft) <td>2.88</td> <td>4.18</td> <td>2.13</td>	2.88	4.18	2.13
Conv. Total (cfs) <td>18030.1 <td>Conv. (cfs) <td>5279.9</td> <td>11670.9</td> <td>1079.3</td> </td></td>	18030.1 <td>Conv. (cfs) <td>5279.9</td> <td>11670.9</td> <td>1079.3</td> </td>	Conv. (cfs) <td>5279.9</td> <td>11670.9</td> <td>1079.3</td>	5279.9	11670.9	1079.3
Length wtd. (ft) <td>495.88 <td>Wetted Per. (ft) <td>37.33</td> <td>25.37</td> <td>13.50</td> </td></td>	495.88 <td>Wetted Per. (ft) <td>37.33</td> <td>25.37</td> <td>13.50</td> </td>	Wetted Per. (ft) <td>37.33</td> <td>25.37</td> <td>13.50</td>	37.33	25.37	13.50
Min Ch El (ft) <td>7827.75 <td>Shear (lb/sq ft) <td>2.25</td> <td>3.31</td> <td>1.60</td> </td></td>	7827.75 <td>Shear (lb/sq ft) <td>2.25</td> <td>3.31</td> <td>1.60</td> </td>	Shear (lb/sq ft) <td>2.25</td> <td>3.31</td> <td>1.60</td>	2.25	3.31	1.60
Alpha	1.53 <td>Stream Power (lb/ft s) <td>12.62</td> <td>41.05</td> <td>7.14</td> </td>	Stream Power (lb/ft s) <td>12.62</td> <td>41.05</td> <td>7.14</td>	12.62	41.05	7.14
Frctn Loss (ft) <td>6.26 <td>Cum Volume (acre-ft) <td>31.01</td> <td>55.64</td> <td>31.78</td> </td></td>	6.26 <td>Cum Volume (acre-ft) <td>31.01</td> <td>55.64</td> <td>31.78</td> </td>	Cum Volume (acre-ft) <td>31.01</td> <td>55.64</td> <td>31.78</td>	31.01	55.64	31.78
C & E Loss (ft) <td>0.03 <td>Cum SA (acres) <td>19.41</td> <td>15.51</td> <td>19.93</td> </td></td>	0.03 <td>Cum SA (acres) <td>19.41</td> <td>15.51</td> <td>19.93</td> </td>	Cum SA (acres) <td>19.41</td> <td>15.51</td> <td>19.93</td>	19.41	15.51	19.93

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7834.46	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>1.94 <td>Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.060</td> </td></td>	1.94 <td>Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.060</td> </td>	Wt. n-Val. <td>0.060</td> <td>0.035</td> <td>0.060</td>	0.060	0.035	0.060
W.S. Elev (ft) <td>7832.52 <td>Reach Len. (ft) <td>514.62</td> <td>494.08</td> <td>474.87</td> </td></td>	7832.52 <td>Reach Len. (ft) <td>514.62</td> <td>494.08</td> <td>474.87</td> </td>	Reach Len. (ft) <td>514.62</td> <td>494.08</td> <td>474.87</td>	514.62	494.08	474.87
Crit W.S. (ft) <td>7832.52 <td>Flow Area (sq ft) <td>127.16</td> <td>120.22</td> <td>36.53</td> </td></td>	7832.52 <td>Flow Area (sq ft) <td>127.16</td> <td>120.22</td> <td>36.53</td> </td>	Flow Area (sq ft) <td>127.16</td> <td>120.22</td> <td>36.53</td>	127.16	120.22	36.53
E.G. Slope (ft/ft) <td>0.012334 <td>Area (sq ft) <td>127.16</td> <td>120.22</td> <td>89.53</td> </td></td>	0.012334 <td>Area (sq ft) <td>127.16</td> <td>120.22</td> <td>89.53</td> </td>	Area (sq ft) <td>127.16</td> <td>120.22</td> <td>89.53</td>	127.16	120.22	89.53
Q Total (cfs) <td>2515.00 <td>Flow (cfs) <td>772.29</td> <td>1599.06</td> <td>143.65</td> </td></td>	2515.00 <td>Flow (cfs) <td>772.29</td> <td>1599.06</td> <td>143.65</td> </td>	Flow (cfs) <td>772.29</td> <td>1599.06</td> <td>143.65</td>	772.29	1599.06	143.65
Top width (ft) <td>222.36 <td>Top width (ft) <td>38.04</td> <td>25.37</td> <td>158.95</td> </td></td>	222.36 <td>Top width (ft) <td>38.04</td> <td>25.37</td> <td>158.95</td> </td>	Top width (ft) <td>38.04</td> <td>25.37</td> <td>158.95</td>	38.04	25.37	158.95
Vel Total (ft/s) <td>8.86 <td>Avg. Vel. (ft/s) <td>6.07</td> <td>13.30</td> <td>3.93</td> </td></td>	8.86 <td>Avg. Vel. (ft/s) <td>6.07</td> <td>13.30</td> <td>3.93</td> </td>	Avg. Vel. (ft/s) <td>6.07</td> <td>13.30</td> <td>3.93</td>	6.07	13.30	3.93
Max chl Dpth (ft) <td>4.77 <td>Hydr. Depth (ft) <td>3.34</td> <td>4.74</td> <td>1.77</td> </td></td>	4.77 <td>Hydr. Depth (ft) <td>3.34</td> <td>4.74</td> <td>1.77</td> </td>	Hydr. Depth (ft) <td>3.34</td> <td>4.74</td> <td>1.77</td>	3.34	4.74	1.77
Conv. Total (cfs) <td>22646.0 <td>Conv. (cfs) <td>6954.0</td> <td>14398.6</td> <td>1293.5</td> </td></td>	22646.0 <td>Conv. (cfs) <td>6954.0</td> <td>14398.6</td> <td>1293.5</td> </td>	Conv. (cfs) <td>6954.0</td> <td>14398.6</td> <td>1293.5</td>	6954.0	14398.6	1293.5
Length wtd. (ft) <td>495.31 <td>Wetted Per. (ft) <td>38.76</td> <td>25.37</td> <td>21.37</td> </td></td>	495.31 <td>Wetted Per. (ft) <td>38.76</td> <td>25.37</td> <td>21.37</td> </td>	Wetted Per. (ft) <td>38.76</td> <td>25.37</td> <td>21.37</td>	38.76	25.37	21.37
Min Ch El (ft) <td>7827.75 <td>Shear (lb/sq ft) <td>3.65</td> <td>3.65</td> <td>1.32</td> </td></td>	7827.75 <td>Shear (lb/sq ft) <td>3.65</td> <td>3.65</td> <td>1.32</td> </td>	Shear (lb/sq ft) <td>3.65</td> <td>3.65</td> <td>1.32</td>	3.65	3.65	1.32
Alpha	1.59 <td>Stream Power (lb/ft s) <td>15.34</td> <td>48.53</td> <td>5.18</td> </td>	Stream Power (lb/ft s) <td>15.34</td> <td>48.53</td> <td>5.18</td>	15.34	48.53	5.18
Frctn Loss (ft) <td>5.33 <td>Cum Volume (acre-ft) <td>39.92</td> <td>63.02</td> <td>42.09</td> </td></td>	5.33 <td>Cum Volume (acre-ft) <td>39.92</td> <td>63.02</td> <td>42.09</td> </td>	Cum Volume (acre-ft) <td>39.92</td> <td>63.02</td> <td>42.09</td>	39.92	63.02	42.09
C & E Loss (ft) <td>0.16 <td>Cum SA (acres) <td>23.85</td> <td>15.51</td> <td>23.01</td> </td></td>	0.16 <td>Cum SA (acres) <td>23.85</td> <td>15.51</td> <td>23.01</td> </td>	Cum SA (acres) <td>23.85</td> <td>15.51</td> <td>23.01</td>	23.85	15.51	23.01

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: Divided flow computed for this cross-section.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

Warning: This may indicate the need for additional cross sections.
During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Crystal
REACH: Marble

RS: 12820

INPUT

Description:

Station	Elevation	Data	num=	184	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7852.37	3.62	7850.66	8.43	7848.34	13.61	7846.53	23.61	7841.71			
28.43	7840	33.61	7838.3	43.61	7834.77	48.43	7833.56	53.61	7831.62			
63.61	7829.11	68.66	7828.37	73.62	7827.73	74.36	7827.62	79.31	7827.13			
83.61	7826.36	98.43	7826.18	103.61	7826.04	108.43	7826.08	123.61	7826.17			
128.43	7826.28	133.61	7826.31	138.43	7826.42	143.61	7826.56	148.43	7826.67			
153.61	7826.77	158.43	7826.88	163.61	7826.98	168.43	7827.05	173.61	7827.31			
178.43	7827.39	183.61	7827.59	193.99	7827.75	197.84	7827.82	199.46	7827.67			
204.17	7827.16	205.05	7827.06	211.37	7826.45	216.1	7825.88	218.89	7825.53			
224.79	7824.83	226.4	7824.73	233.91	7824.88	241.43	7825.09	248.24	7824.64			
249.27	7824.57	256.45	7824.81	263.97	7824.19	271.38	7823.74	274.17	7823.59			
276.81	7822.63	282.44	7820.57	284.18	7820.14	300.33	7820.14	330.48	7820.27			
332.72	7820.54	337.72	7821.09	339.29	7821.27	342.77	7821.66	344.71	7821.56			
348.78	7822.2	360.03	7821.95	360.91	7824.08	365.1	7823.45	365.6	7823.37			
368.27	7823.01	370.89	7823.07	378.85	7823.09	379.73	7823.01	382.93	7822.64			
389.25	7821.95	391.18	7821.73	392.14	7821.85	395	7821.95	395.72	7822.24			
402.87	7823.3	404.06	7823.37	406.72	7824.17	412.35	7824.37	414.83	7824.5			
421.88	7825.42	426.07	7825.9	429.15	7826.14	430.17	7826.29	437.01	7825.96			
444.28	7825.55	451.79	7825.3	459.24	7825.38	480.51	7824.96	485.24	7824.86			
490.51	7824.8	495.24	7824.73	505.24	7824.61	510.51	7824.5	515.24	7824.44			
520.51	7824.44	530.51	7824.31	535.24	7824.31	540.51	7824.35	550.51	7824.35			
559.24	7824.38	560.51	7824.38	570.51	7824.44	575.24	7824.44	580.51	7824.58			
590.51	7824.58	595.24	7824.64	600.51	7824.67	610.51	7824.8	615.24	7824.99			
620.51	7825.43	630.51	7825.81	635.24	7825.94	640.51	7825.94	650.51	7826.19			
665.24	7826.38	690.51	7826.38	705.24	7826.29	715.24	7826.29	720.51	7826.22			
730.51	7826.22	745.24	7826.31	750.51	7826.31	755.24	7826.37	760.51	7826.34			
770.51	7826.27	785.24	7826.67	790.51	7826.47	800.51	7826.37	805.51	7826.44			
810.51	7826.44	815.24	7826.31	825.24	7826.06	830.51	7826.06	835.24	7826.02			
840.51	7825.89	850.51	7825.83	855.24	7825.55	860.51	7825.38	870.51	7824.8			
885.24	7824.71	890.51	7824.67	895.24	7824.67	900.51	7824.64	910.51	7824.64			
915.24	7824.7	920.51	7824.84	930.51	7824.96	935.24	7825.09	940.51	7825.16			
950.51	7825.41	960.51	7825.44	965.24	7825.44	975.24	7825.44	985.24	7825.7			
1005.24	7825.61	1015.24	7825.42	1020.51	7825.38	1030.51	7825.19	1035.24	7825.17			
1040.51	7824.94	1041.13	7824.87	1044.3	7824.67	1049.08	7827	1050.51	7827.7			
1055.24	7830.01	1060.51	7832.55	1065.24	7834.46	1070.51	7836.56	1073.67	7837.86			
1080.51	7838.19	1083.82	7838.66	1090.45	7838.57	1110.2	7838.2	1112.29	7837.71			
1115.24	7837.03	1119.88	7838.91	1126.6	7840.06	1135.24	7845.52	1140.51	7848.8			
1149.91	7854.68	1152.43	7856.29	1154.41	7856.64	1157.69	7856.93					

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .06 284.18 .035 330.48 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
284.18 330.48 450.77 472.93 503.15 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
360.91 1157.69 7824.08 F

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7825.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-val.	0.060	0.035	0.060
W.S. Elev (ft)	7823.91	Reach Len. (ft)	450.77	472.93	503.15
Crit W.S. (ft)	7823.91	Flow Area (sq ft)	22.20	172.50	58.19
E.G. Slope (ft/ft)	0.011270	Area (sq ft)	22.20	172.50	106.32
Q Total (cfs)	2181.00	Flow (cfs)	72.10	1868.52	240.38
Top Width (ft)	134.94	Top Width (ft)	15.57	46.30	73.08
Vel Total (ft/s)	8.62	Avg. Vel. (ft/s)	3.25	10.83	4.13
Max chl Dpth (ft)	3.77	Hydr. Depth (ft)	1.43	3.73	1.99
Conv. Total (cfs)	20544.4	Conv. (cfs)	679.2	17600.9	2264.3
Length Wtd. (ft)	471.21	Wetted Per. (ft)	16.6	46.30	29.54
Min Ch El (ft)	7820.14	Shear (lb/sq ft)	0.97	2.62	1.39
Alpha	1.38	Stream Power (lb/ft s)	3.14	28.39	5.72
Frctn Loss (ft)	5.58	Cum Volume (acre-ft)	32.72	56.28	34.12
C & E Loss (ft)	0.28	Cum SA (acres)	19.87	15.10	19.70

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7826.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.03	Wt. n-val.		0.035	
W.S. Elev (ft)	7824.30	Reach Len. (ft)	450.77	472.93	503.15
Crit W.S. (ft)	7824.30	Flow Area (sq ft)		190.68	
E.G. Slope (ft/ft)	0.013663	Area (sq ft)		190.68	
Q Total (cfs)	2181.00	Flow (cfs)		2181.00	
Top Width (ft)	46.30	Top Width (ft)		46.30	
Vel Total (ft/s)	11.44	Avg. Vel. (ft/s)		11.44	
Max chl Dpth (ft)	4.16	Hydr. Depth (ft)		4.12	
Conv. Total (cfs)	18658.7	Conv. (cfs)		18658.7	
Length Wtd. (ft)	472.93	Wetted Per. (ft)		54.49	
Min Ch El (ft)	7820.14	Shear (lb/sq ft)		2.98	
Alpha	1.00	Stream Power (lb/ft s)		34.14	
Frctn Loss (ft)	6.45	Cum Volume (acre-ft)	13.24	62.14	9.80
C & E Loss (ft)	0.20	Cum SA (acres)	5.17	15.10	3.71

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

CrystalRiver.rep		Channel		Right 08	
E.G. Elev (ft)	7824.68	Element	Left 08	Channel	Right 08
Vel Head (ft)	1.33	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7823.35	Reach Len. (ft)	450.77	472.93	503.15
Crit W.S. (ft)	7823.35	Flow Area (sq ft)	15.81	146.82	42.94
E.G. Slope (ft/ft)	0.011462	Area (sq ft)	15.81	146.82	68.31
Q Total (cfs)	1657.00	Flow (cfs)	57.26	1440.42	159.32
Top Width (ft)	119.43	Top Width (ft)	9.36	46.30	63.77
Vel Total (ft/s)	8.06	Avg. Vel. (ft/s)	3.62	9.81	3.71
Max Chl Dpth (ft)	3.21	Hydr. Depth (ft)	1.69	134.11	1.67
Conv. Total (cfs)	15477.0	Conv. (cfs)	534.8	1488.1	1488.1
Length Wtd. (ft)	471.13	Wetted Per. (ft)	9.90	46.30	25.93
Min Ch El (ft)	7820.14	Shear (lb/sq ft)	1.14	2.27	1.18
Alpha	1.32	Stream Power (lb/ft s)	4.14	22.26	4.40
Frctn Loss (ft)	5.36	Cum Volume (acre-ft)	24.52	48.33	23.94
C & E Loss (ft)	0.23	Cum SA (acres)	17.23	15.10	16.67

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-year

Profile #50-year		Channel		Right 08	
E.G. Elev (ft)	7825.27	Element	Left 08	Channel	Right 08
Vel Head (ft)	1.62	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7823.65	Reach Len. (ft)	450.77	472.93	503.15
Crit W.S. (ft)	7823.65	Flow Area (sq ft)	18.74	160.57	50.85
E.G. Slope (ft/ft)	0.012545	Area (sq ft)	18.74	160.57	88.03
Q Total (cfs)	2031.00	Flow (cfs)	71.07	1749.28	210.65
Top Width (ft)	126.28	Top Width (ft)	11.13	46.30	68.85
Vel Total (ft/s)	8.82	Avg. Vel. (ft/s)	3.79	10.89	4.14
Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)	1.68	3.47	1.84
Conv. Total (cfs)	18133.5	Conv. (cfs)	634.5	15618.2	1880.7
Length Wtd. (ft)	471.12	Wetted Per. (ft)	11.72	46.30	27.87
Min Ch El (ft)	7820.14	Shear (lb/sq ft)	1.25	2.22	1.43
Alpha	1.34	Stream Power (lb/ft s)	4.75	29.59	5.92
Frctn Loss (ft)	5.86	Cum Volume (acre-ft)	30.27	54.13	31.10
C & E Loss (ft)	0.29	Cum SA (acres)	19.13	15.10	19.18

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-year

Profile #500-year		Channel		Right 08	
E.G. Elev (ft)	7825.65	Element	Left 08	Channel	Right 08
Vel Head (ft)	1.40	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	7824.25	Reach Len. (ft)	450.77	472.93	503.15
Crit W.S. (ft)	7824.25	Flow Area (sq ft)	28.46	188.31	132.12
E.G. Slope (ft/ft)	0.009485	Area (sq ft)	28.46	188.31	132.12
Q Total (cfs)	2515.00	Flow (cfs)	82.67	1983.85	448.48
Top Width (ft)	145.71	Top Width (ft)	20.93	46.30	78.48
Vel Total (ft/s)	7.21	Avg. Vel. (ft/s)	2.90	10.54	3.39
Max Chl Dpth (ft)	1.11	Hydr. Depth (ft)	1.36	4.07	1.68
Conv. Total (cfs)	25823.1	Conv. (cfs)	848.8	20369.4	4604.9
Length Wtd. (ft)	472.09	Wetted Per. (ft)	21.54	46.30	79.14
Min Ch El (ft)	7820.14	Shear (lb/sq ft)	0.78	2.41	0.99
Alpha	1.73	Stream Power (lb/ft s)	2.27	25.37	3.36
Frctn Loss (ft)	4.78	Cum Volume (acre-ft)	39.00	61.27	40.83
C & E Loss (ft)	0.23	Cum SA (acres)	23.50	15.10	21.72

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal

REACH: Marble

RS: 12347

INPUT

Description:

Station	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7834.32	9.67	7831.45	11.38	7830.94	19.67	7828.48	21.38	7827.95
29.67	7826.49	31.38	7825.97	40.21	7825	42.23	7824.77	43.62	7824.62
48.78	7824.05	52.21	7823.71	55.37	7823.47	61.38	7823.07	71.03	7822.39
121.38	7822.42	146.67	7822.51	159.67	7822.51	189.67	7822.23	199.67	7822.35
202.86	7822.47	204.96	7822.57	209.48	7821.66	211.38	7821.21	219.67	7821.06
231.38	7821.13	239.67	7820.97	241.38	7820.9	249.67	7820.59	251.38	7820.52
269.67	7820.17	279.67	7820.09	289.67	7819.92	299.67	7819.7	301.38	7819.65
309.67	7819.43	311.38	7819.38	319.67	7819.17	321.38	7819.04	329.67	7818.4
331.38	7818.27	339.67	7817.79	351.38	7817.18	359.67	7816.44	371.38	7815.42
372.1	7815.87	376.3	7814.89	381.38	7814.95	383.67	7814.96	399.67	7814.83
411.38	7814.76	421.38	7814.82	429.67	7814.77	439.67	7814.17	441.38	7814.04
447.69	7813.57	451.38	7814.02	453.31	7814.27	461.07	7815.26	464.79	7815.74
468.07	7815.73	471.38	7815.75	479.67	7815.62	481.38	7815.52	489.67	7815.15
497.21	7815.02	510.18	7814.83	512.23	7814.81	519.41	7814.02	525	7813.81
526.11	7813.06	530.44	7813.97	532.92	7813.93	536.56	7813.88	539.17	7813.88
547.35	7813.85	548.47	7814.08	552.62	7814.92	555.6	7815.51	557.24	7815.05
559.07	7814.52	561.52	7813.85	562.73	7813.51	565.78	7812.6	572.78	7812.84
581.82	7813.06	585.48	7813.32	592.37	7813.47	607.25	7814.01	611.56	7813.92
643.89	7813.9	648.12	7813.88	650.38	7814.42	654.38	7815.17	657.43	7815.2
660.72	7815.03	673.57	7814.52	682	7815.47	685.78	7815.79	690.46	7817.47
694.13	7818.88	695.89	7818.47	697.02	7819.88	698.84	7819.23	704.29	7817.02
712.44	7817.16	716.64	7817.25	720.29	7817.27	726.86	7817.29	728.92	7817.27
737.01	7817.31	740.63	7817.38	746.19	7817.47	754.82	7817.54	757.32	7817.57
763.45	7817.56	767.47	7817.68	777.63	7817.71	780.71	7817.73	787.78	7818.01
797.93	7818.1	815.24	7818.37	818.24	7818.41	823.88	7818.5	828.4	7818.53
832.51	7818.37	855.83	7818.75	864.3	7818.65	869.32	7818.64	872.94	7818.72
899.48	7818.6	901.67	7818.56	909.63	7818.38	913.43	7818.36	940.09	7818.36
944.73	7818.33	950.25	7818.34	953.36	7818.34	1028.62	7818.49	1031.05	7818.5

CrystalRiver.rep

Sta	n	Val	Sta	n	Val	Sta	n	Val	Sta	n	Val
1041.64	7818.44	1051.79	7818.58	1056.95	7818.59	1061.94	7818.67	1065.58	7818.68		
1082.25	7818.98	1086.22	7819.06	1100.11	7819.25	1102.56	7819.28	1108.74	7819.29		
1112.72	7819.29	1117.38	7819.3	1122.87	7819.35	1126.01	7819.29	1133.02	7819.17		
1143.18	7819.13	1151.91	7819.17	1157.82	7818.96	1164.54	7818.69	1168.59	7818.07		
1173.29	7817.03	1173.87	7816.87	1183.79	7817.03	1186.43	7817.04	1203.7	7817.21		
1212.69	7816.84	1214.26	7817	1223.69	7817.99	1225.04	7818.15	1230.3	7818.22		
1238.23	7818.35	1244.72	7818.27	1249.21	7818.06	1253.14	7817.6	1255.05	7817.18		
1258.48	7816.88	1263.04	7816.41	1265.03	7816.35	1267.63	7816.26	1275.51	7815.96		
1277.48	7815.87	1290.02	7823.05	1295.49	7825.96	1298.66	7827.26	1301.65	7829.15		
1306.96	7829.48	1310.38	7820.33	1313.54	7820.68	1315.59	7830.45	1316.11	7830.4		
1341.54	7829.99	1342.42	7829.92	1346.26	7827.54	1351.29	7823.16	1355.22	7820.88		
1364.38	7820.8	1366.57	7820.79	1369.37	7820.76						

Manning's n	Values	num	Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.06	376.3	.05	565.78	.035	648.12	.05	685.78	.06		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
565.78	648.12	523.49	532.79	600.34	.1	.3		

Ineffective Flow num= 2

Sta	L	Sta	R	Elev	Permanent
0	555.6	7815.51	F		
657.43	1369.37	7815.2	F		

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7816.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7815.73	Reach Len. (ft)	523.49	532.79	600.34
Crit W.S. (ft)	7815.73	Flow Area (sq ft)	203.78	175.71	30.34
E.G. Slope (ft/ft)	0.012455	Area (sq ft)	203.78	175.71	30.34
Q Total (cfs)	2181.00	Flow (cfs)	713.66	1379.65	87.69
Top Width (ft)	311.38	Top Width (ft)	191.95	82.34	37.09
Vel Total (ft/s)	5.32	Avg. Vel. (ft/s)	3.50	7.85	2.89
Max Chl Dpth (ft)	3.13	Hydr. Depth (ft)	1.06	2.13	0.82
Conv. Total (cfs)	19542.4	Conv. (cfs)	6394.6	12362.1	785.8
Length Wtd. (ft)	540.46	Wetted Per. (ft)	192.81	82.37	37.30
Min Ch El (ft)	7812.60	Shear (lb/sq ft)	0.82	1.66	0.63
Alpha	1.53	Stream Power (lb/ft s)	2.88	13.02	1.83
Frctn Loss (ft)	5.44	Cum Volume (acre-ft)	31.55	54.39	33.33
C & E Loss (ft)	0.00	Cum SA (acres)	18.80	14.40	19.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7817.79	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>1.37 <td>Wt. n-Val. <td>0.035</td> <td>0.035</td> <td>0.050</td> </td></td>	1.37 <td>Wt. n-Val. <td>0.035</td> <td>0.035</td> <td>0.050</td> </td>	Wt. n-Val. <td>0.035</td> <td>0.035</td> <td>0.050</td>	0.035	0.035	0.050
W.S. Elev (ft) <td>7816.42 <td>Reach Len. (ft) <td>523.49</td> <td>532.79</td> <td>600.34</td> </td></td>	7816.42 <td>Reach Len. (ft) <td>523.49</td> <td>532.79</td> <td>600.34</td> </td>	Reach Len. (ft) <td>523.49</td> <td>532.79</td> <td>600.34</td>	523.49	532.79	600.34
Crit W.S. (ft) <td>7816.42 <td>Flow Area (sq ft) <td>232.00</td> <td>232.00</td> <td>232.00</td> </td></td>	7816.42 <td>Flow Area (sq ft) <td>232.00</td> <td>232.00</td> <td>232.00</td> </td>	Flow Area (sq ft) <td>232.00</td> <td>232.00</td> <td>232.00</td>	232.00	232.00	232.00
E.G. Slope (ft/ft) <td>0.013611 <td>Area (sq ft) <td>232.00</td> <td>232.00</td> <td>232.00</td> </td></td>	0.013611 <td>Area (sq ft) <td>232.00</td> <td>232.00</td> <td>232.00</td> </td>	Area (sq ft) <td>232.00</td> <td>232.00</td> <td>232.00</td>	232.00	232.00	232.00
Q Total (cfs) <td>2181.00 <td>Flow (cfs) <td>2181.00</td> <td>2181.00</td> <td>2181.00</td> </td></td>	2181.00 <td>Flow (cfs) <td>2181.00</td> <td>2181.00</td> <td>2181.00</td> </td>	Flow (cfs) <td>2181.00</td> <td>2181.00</td> <td>2181.00</td>	2181.00	2181.00	2181.00
Top Width (ft) <td>82.34 <td>Top Width (ft) <td>82.34</td> <td>82.34</td> <td>82.34</td> </td></td>	82.34 <td>Top Width (ft) <td>82.34</td> <td>82.34</td> <td>82.34</td> </td>	Top Width (ft) <td>82.34</td> <td>82.34</td> <td>82.34</td>	82.34	82.34	82.34
Vel Total (ft/s) <td>9.40 <td>Avg. Vel. (ft/s) <td>9.40</td> <td>9.40</td> <td>9.40</td> </td></td>	9.40 <td>Avg. Vel. (ft/s) <td>9.40</td> <td>9.40</td> <td>9.40</td> </td>	Avg. Vel. (ft/s) <td>9.40</td> <td>9.40</td> <td>9.40</td>	9.40	9.40	9.40
Max Chl Dpth (ft) <td>3.82 <td>Hydr. Depth (ft) <td>2.82</td> <td>2.82</td> <td>2.82</td> </td></td>	3.82 <td>Hydr. Depth (ft) <td>2.82</td> <td>2.82</td> <td>2.82</td> </td>	Hydr. Depth (ft) <td>2.82</td> <td>2.82</td> <td>2.82</td>	2.82	2.82	2.82
Conv. Total (cfs) <td>18694.6</td> <td>Conv. (cfs) <td>18694.6</td> <td>18694.6</td> <td>18694.6</td> </td>	18694.6	Conv. (cfs) <td>18694.6</td> <td>18694.6</td> <td>18694.6</td>	18694.6	18694.6	18694.6
Length Wtd. (ft) <td>530.94 <td>Wetted Per. (ft) <td>88.72</td> <td>88.72</td> <td>88.72</td> </td></td>	530.94 <td>Wetted Per. (ft) <td>88.72</td> <td>88.72</td> <td>88.72</td> </td>	Wetted Per. (ft) <td>88.72</td> <td>88.72</td> <td>88.72</td>	88.72	88.72	88.72
Min Ch El (ft) <td>7812.60 <td>Shear (lb/sq ft) <td>2.22</td> <td>2.22</td> <td>2.22</td> </td></td>	7812.60 <td>Shear (lb/sq ft) <td>2.22</td> <td>2.22</td> <td>2.22</td> </td>	Shear (lb/sq ft) <td>2.22</td> <td>2.22</td> <td>2.22</td>	2.22	2.22	2.22
Alpha <td>1.00 <td>Stream Power (lb/ft s) <td>20.89</td> <td>20.89</td> <td>20.89</td> </td></td>	1.00 <td>Stream Power (lb/ft s) <td>20.89</td> <td>20.89</td> <td>20.89</td> </td>	Stream Power (lb/ft s) <td>20.89</td> <td>20.89</td> <td>20.89</td>	20.89	20.89	20.89
Frctn Loss (ft) <td>5.70 <td>Cum Volume (acre-ft) <td>13.24</td> <td>59.85</td> <td>9.80</td> </td></td>	5.70 <td>Cum Volume (acre-ft) <td>13.24</td> <td>59.85</td> <td>9.80</td> </td>	Cum Volume (acre-ft) <td>13.24</td> <td>59.85</td> <td>9.80</td>	13.24	59.85	9.80
C & E Loss (ft) <td>0.05 <td>Cum SA (acres) <td>5.17</td> <td>14.40</td> <td>3.71</td> </td></td>	0.05 <td>Cum SA (acres) <td>5.17</td> <td>14.40</td> <td>3.71</td> </td>	Cum SA (acres) <td>5.17</td> <td>14.40</td> <td>3.71</td>	5.17	14.40	3.71

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The cross section had to be extended vertically during the critical depth calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7816.07	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>0.55 <td>Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td> </td></td>	0.55 <td>Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td> </td>	Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td>	0.050	0.035	0.050
W.S. Elev (ft) <td>7815.52 <td>Reach Len. (ft) <td>523.49</td> <td>532.79</td> <td>600.34</td> </td></td>	7815.52 <td>Reach Len. (ft) <td>523.49</td> <td>532.79</td> <td>600.34</td> </td>	Reach Len. (ft) <td>523.49</td> <td>532.79</td> <td>600.34</td>	523.49	532.79	600.34
Crit W.S. (ft) <td>7815.52 <td>Flow Area (sq ft) <td>164.74</td> <td>158.10</td> <td>22.64</td> </td></td>	7815.52 <td>Flow Area (sq ft) <td>164.74</td> <td>158.10</td> <td>22.64</td> </td>	Flow Area (sq ft) <td>164.74</td> <td>158.10</td> <td>22.64</td>	164.74	158.10	22.64
E.G. Slope (ft/ft) <td>0.011294 <td>Area (sq ft) <td>164.74</td> <td>158.10</td> <td>22.64</td> </td></td>	0.011294 <td>Area (sq ft) <td>164.74</td> <td>158.10</td> <td>22.64</td> </td>	Area (sq ft) <td>164.74</td> <td>158.10</td> <td>22.64</td>	164.74	158.10	22.64
Q Total (cfs) <td>1657.00 <td>Flow (cfs) <td>501.91</td> <td>1101.75</td> <td>33.34</td> </td></td>	1657.00 <td>Flow (cfs) <td>501.91</td> <td>1101.75</td> <td>33.34</td> </td>	Flow (cfs) <td>501.91</td> <td>1101.75</td> <td>33.34</td>	501.91	1101.75	33.34
Top Width (ft) <td>294.51 <td>Top Width (ft) <td>177.23</td> <td>82.34</td> <td>34.94</td> </td></td>	294.51 <td>Top Width (ft) <td>177.23</td> <td>82.34</td> <td>34.94</td> </td>	Top Width (ft) <td>177.23</td> <td>82.34</td> <td>34.94</td>	177.23	82.34	34.94
Vel Total (ft/s) <td>4.80 <td>Avg. Vel. (ft/s) <td>3.05</td> <td>6.97</td> <td>2.36</td> </td></td>	4.80 <td>Avg. Vel. (ft/s) <td>3.05</td> <td>6.97</td> <td>2.36</td> </td>	Avg. Vel. (ft/s) <td>3.05</td> <td>6.97</td> <td>2.36</td>	3.05	6.97	2.36
Max Chl Dpth (ft) <td>2.92 <td>Hydr. Depth (ft) <td>0.93</td> <td>1.92</td> <td>0.65</td> </td></td>	2.92 <td>Hydr. Depth (ft) <td>0.93</td> <td>1.92</td> <td>0.65</td> </td>	Hydr. Depth (ft) <td>0.93</td> <td>1.92</td> <td>0.65</td>	0.93	1.92	0.65
Conv. Total (cfs) <td>15591.7 <td>Conv. (cfs) <td>4722.7</td> <td>10367.0</td> <td>501.9</td> </td></td>	15591.7 <td>Conv. (cfs) <td>4722.7</td> <td>10367.0</td> <td>501.9</td> </td>	Conv. (cfs) <td>4722.7</td> <td>10367.0</td> <td>501.9</td>	4722.7	10367.0	501.9
Length Wtd. (ft) <td>540.94 <td>Wetted Per. (ft) <td>178.06</td> <td>82.37</td> <td>35.14</td> </td></td>	540.94 <td>Wetted Per. (ft) <td>178.06</td> <td>82.37</td> <td>35.14</td> </td>	Wetted Per. (ft) <td>178.06</td> <td>82.37</td> <td>35.14</td>	178.06	82.37	35.14
Min Ch El (ft) <td>7812.60 <td>Shear (lb/sq ft) <td>0.65</td> <td>1.35</td> <td>0.45</td> </td></td>	7812.60 <td>Shear (lb/sq ft) <td>0.65</td> <td>1.35</td> <td>0.45</td> </td>	Shear (lb/sq ft) <td>0.65</td> <td>1.35</td> <td>0.45</td>	0.65	1.35	0.45
Alpha <td>1.53 <td>Stream Power (lb/ft s) <td>1.99</td> <td>9.43</td> <td>1.07</td> </td></td>	1.53 <td>Stream Power (lb/ft s) <td>1.99</td> <td>9.43</td> <td>1.07</td> </td>	Stream Power (lb/ft s) <td>1.99</td> <td>9.43</td> <td>1.07</td>	1.99	9.43	1.07
Frctn Loss (ft) <td>4.83 <td>Cum Volume (acre-ft) <td>23.59</td> <td>46.67</td> <td>23.41</td> </td></td>	4.83 <td>Cum Volume (acre-ft) <td>23.59</td> <td>46.67</td> <td>23.41</td> </td>	Cum Volume (acre-ft) <td>23.59</td> <td>46.67</td> <td>23.41</td>	23.59	46.67	23.41
C & E Loss (ft) <td>0.00 <td>Cum SA (acres) <td>16.26</td> <td>14.40</td> <td>16.10</td> </td></td>	0.00 <td>Cum SA (acres) <td>16.26</td> <td>14.40</td> <td>16.10</td> </td>	Cum SA (acres) <td>16.26</td> <td>14.40</td> <td>16.10</td>	16.26	14.40	16.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7816.31	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>0.64 <td>Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td> </td></td>	0.64 <td>Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td> </td>	Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td>	0.050	0.035	0.050
W.S. Elev (ft) <td>7815.67 <td>Reach Len. (ft) <td>523.49</td> <td>532.79</td> <td>600.34</td> </td></td>	7815.67 <td>Reach Len. (ft) <td>523.49</td> <td>532.79</td> <td>600.34</td> </td>	Reach Len. (ft) <td>523.49</td> <td>532.79</td> <td>600.34</td>	523.49	532.79	600.34
Crit W.S. (ft) <td>7815.67 <td>Flow Area (sq ft) <td>191.32</td> <td>170.24</td> <td>27.90</td> </td></td>	7815.67 <td>Flow Area (sq ft) <td>191.32</td> <td>170.24</td> <td>27.90</td> </td>	Flow Area (sq ft) <td>191.32</td> <td>170.24</td> <td>27.90</td>	191.32	170.24	27.90
E.G. Slope (ft/ft) <td>0.012319 <td>Area (sq ft) <td>191.32</td> <td>170.24</td> <td>27.90</td> </td></td>	0.012319 <td>Area (sq ft) <td>191.32</td> <td>170.24</td> <td>27.90</td> </td>	Area (sq ft) <td>191.32</td> <td>170.24</td> <td>27.90</td>	191.32	170.24	27.90
Q Total (cfs) <td>2031.00 <td>Flow (cfs) <td>652.57</td> <td>1301.67</td> <td>76.76</td> </td></td>	2031.00 <td>Flow (cfs) <td>652.57</td> <td>1301.67</td> <td>76.76</td> </td>	Flow (cfs) <td>652.57</td> <td>1301.67</td> <td>76.76</td>	652.57	1301.67	76.76
Top Width (ft) <td>303.54 <td>Top Width (ft) <td>184.78</td> <td>82.34</td> <td>36.42</td> </td></td>	303.54 <td>Top Width (ft) <td>184.78</td> <td>82.34</td> <td>36.42</td> </td>	Top Width (ft) <td>184.78</td> <td>82.34</td> <td>36.42</td>	184.78	82.34	36.42
Vel Total (ft/s) <td>5.21 <td>Avg. Vel. (ft/s) <td>3.41</td> <td>7.65</td> <td>2.75</td> </td></td>	5.21 <td>Avg. Vel. (ft/s) <td>3.41</td> <td>7.65</td> <td>2.75</td> </td>	Avg. Vel. (ft/s) <td>3.41</td> <td>7.65</td> <td>2.75</td>	3.41	7.65	2.75
Max Chl Dpth (ft) <td>3.07 <td>Hydr. Depth (ft) <td>1.04</td> <td>2.07</td> <td>0.77</td> </td></td>	3.07 <td>Hydr. Depth (ft) <td>1.04</td> <td>2.07</td> <td>0.77</td> </td>	Hydr. Depth (ft) <td>1.04</td> <td>2.07</td> <td>0.77</td>	1.04	2.07	0.77
Conv. Total (cfs) <td>18298.7 <td>Conv. (cfs) <td>5879.5</td> <td>11727.6</td> <td>691.6</td> </td></td>	18298.7 <td>Conv. (cfs) <td>5879.5</td> <td>11727.6</td> <td>691.6</td> </td>	Conv. (cfs) <td>5879.5</td> <td>11727.6</td> <td>691.6</td>	5879.5	11727.6	691.6
Length Wtd. (ft) <td>540.58 <td>Wetted Per. (ft) <td>185.62</td> <td>82.37</td> <td>36.63</td> </td></td>	540.58 <td>Wetted Per. (ft) <td>185.62</td> <td>82.37</td> <td>36.63</td> </td>	Wetted Per. (ft) <td>185.62</td> <td>82.37</td> <td>36.63</td>	185.62	82.37	36.63
Min Ch El (ft) <td>7812.60 <td>Shear (lb/sq ft) <td>0.79</td> <td>1.59</td> <td>0.59</td> </td></td>	7812.60 <td>Shear (lb/sq ft) <td>0.79</td> <td>1.59</td> <td>0.59</td> </td>	Shear (lb/sq ft) <td>0.79</td> <td>1.59</td> <td>0.59</td>	0.79	1.59	0.59
Alpha <td>1.53 <td>Stream Power (lb/ft s) <td>2.70</td> <td>12.15</td> <td>1.61</td> </td></td>	1.53 <td>Stream Power (lb/ft s) <td>2.70</td> <td>12.15</td> <td>1.61</td> </td>	Stream Power (lb/ft s) <td>2.70</td> <td>12.15</td> <td>1.61</td>	2.70	12.15	1.61
Frctn Loss (ft) <td>5.33 <td>Cum Volume (acre-ft) <td>29.18</td> <td>52.34</td> <td>30.43</td> </td></td>	5.33 <td>Cum Volume (acre-ft) <td>29.18</td> <td>52.34</td> <td>30.43</td> </td>	Cum Volume (acre-ft) <td>29.18</td> <td>52.34</td> <td>30.43</td>	29.18	52.34	30.43
C & E Loss (ft) <td>0.00 <td>Cum SA (acres) <td>18.12</td> <td>14.40</td> <td>18.57</td> </td></td>	0.00 <td>Cum SA (acres) <td>18.12</td> <td>14.40</td> <td>18.57</td> </td>	Cum SA (acres) <td>18.12</td> <td>14.40</td> <td>18.57</td>	18.12	14.40	18.57

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7816.60	Element	Left 08	Channel	Right 08
Vel Head (ft) <td>0.05 <td>Wt. n-Val. <td>0.050 <td>0.035 <td>0.050</td> </td></td></td></td>	0.05 <td>Wt. n-Val. <td>0.050 <td>0.035 <td>0.050</td> </td></td></td>	Wt. n-Val. <td>0.050 <td>0.035 <td>0.050</td> </td></td>	0.050 <td>0.035 <td>0.050</td> </td>	0.035 <td>0.050</td>	0.050
W.S. Elev (ft) <td>7815.95 <td>Reach Len. (ft) <td>523.49 <td>532.79 <td>600.34</td> </td></td></td></td>	7815.95 <td>Reach Len. (ft) <td>523.49 <td>532.79 <td>600.34</td> </td></td></td>	Reach Len. (ft) <td>523.49 <td>532.79 <td>600.34</td> </td></td>	523.49 <td>532.79 <td>600.34</td> </td>	532.79 <td>600.34</td>	600.34
Crit W.S. (ft) <td>7815.95 <td>Flow Area (sq ft) <td>246.83 <td>193.52 <td>38.58</td> </td></td></td></td>	7815.95 <td>Flow Area (sq ft) <td>246.83 <td>193.52 <td>38.58</td> </td></td></td>	Flow Area (sq ft) <td>246.83 <td>193.52 <td>38.58</td> </td></td>	246.83 <td>193.52 <td>38.58</td> </td>	193.52 <td>38.58</td>	38.58
E.G. Slope (ft/ft) <td>0.010826 <td>Area (sq ft) <td>246.83 <td>193.52 <td>38.58</td> </td></td></td></td>	0.010826 <td>Area (sq ft) <td>246.83 <td>193.52 <td>38.58</td> </td></td></td>	Area (sq ft) <td>246.83 <td>193.52 <td>38.58</td> </td></td>	246.83 <td>193.52 <td>38.58</td> </td>	193.52 <td>38.58</td>	38.58
Q Total (cfs) <td>2515.00 <td>Flow (cfs) <td>883.98 <td>1510.78 <td>120.25</td> </td></td></td></td>	2515.00 <td>Flow (cfs) <td>883.98 <td>1510.78 <td>120.25</td> </td></td></td>	Flow (cfs) <td>883.98 <td>1510.78 <td>120.25</td> </td></td>	883.98 <td>1510.78 <td>120.25</td> </td>	1510.78 <td>120.25</td>	120.25
Top Width (ft) <td>322.81 <td>Top Width (ft) <td>200.48 <td>82.34</td> <td>39.99</td> </td></td></td>	322.81 <td>Top Width (ft) <td>200.48 <td>82.34</td> <td>39.99</td> </td></td>	Top Width (ft) <td>200.48 <td>82.34</td> <td>39.99</td> </td>	200.48 <td>82.34</td> <td>39.99</td>	82.34	39.99
Vel Total (ft/s) <td>5.25 <td>Avg. Vel. (ft/s) <td>3.58</td> <td>7.81</td> <td>3.12</td> </td></td>	5.25 <td>Avg. Vel. (ft/s) <td>3.58</td> <td>7.81</td> <td>3.12</td> </td>	Avg. Vel. (ft/s) <td>3.58</td> <td>7.81</td> <td>3.12</td>	3.58	7.81	3.12
Max Chl Dpth (ft) <td>3.35 <td>Hydr. Depth (ft) <td>1.23</td> <td>2.35</td> <td>0.96</td> </td></td>	3.35 <td>Hydr. Depth (ft) <td>1.23</td> <td>2.35</td> <td>0.96</td> </td>	Hydr. Depth (ft) <td>1.23</td> <td>2.35</td> <td>0.96</td>	1.23	2.35	0.96
Conv. Total (cfs) <td>24172.1 <td>Conv. (cfs) <td>8496.0 <td>14520.3</td> <td>1155.7</td> </td></td></td>	24172.1 <td>Conv. (cfs) <td>8496.0 <td>14520.3</td> <td>1155.7</td> </td></td>	Conv. (cfs) <td>8496.0 <td>14520.3</td> <td>1155.7</td> </td>	8496.0 <td>14520.3</td> <td>1155.7</td>	14520.3	1155.7
Length Wtd. (ft) <td>540.29 <td>Wetted Per. (ft) <td>201.34 <td>82.37</td> <td>40.25</td> </td></td></td>	540.29 <td>Wetted Per. (ft) <td>201.34 <td>82.37</td> <td>40.25</td> </td></td>	Wetted Per. (ft) <td>201.34 <td>82.37</td> <td>40.25</td> </td>	201.34 <td>82.37</td> <td>40.25</td>	82.37	40.25
Min Ch El (ft) <td>7812.60 <td>Shear (lb/sq ft) <td>0.83</td> <td>1.59</td> <td>0.65</td> </td></td>	7812.60 <td>Shear (lb/sq ft) <td>0.83</td> <td>1.59</td> <td>0.65</td> </td>	Shear (lb/sq ft) <td>0.83</td> <td>1.59</td> <td>0.65</td>	0.83	1.59	0.65
Alpha <td>1.54 <td>Stream Power (lb/ft s) <td>2.97</td> <td>232.40</td> <td>2.02</td> </td></td>	1.54 <td>Stream Power (lb/ft s) <td>2.97</td> <td>232.40</td> <td>2.02</td> </td>	Stream Power (lb/ft s) <td>2.97</td> <td>232.40</td> <td>2.02</td>	2.97	232.40	2.02
Frcn Loss (ft) <td>5.29 <td>Cum Volume (acre-ft) <td>37.58</td> <td>59.20</td> <td>39.84</td> </td></td>	5.29 <td>Cum Volume (acre-ft) <td>37.58</td> <td>59.20</td> <td>39.84</td> </td>	Cum Volume (acre-ft) <td>37.58</td> <td>59.20</td> <td>39.84</td>	37.58	59.20	39.84
C & E Loss (ft) <td>0.01 <td>Cum SA (acres) <td>22.35</td> <td>14.40</td> <td>21.04</td> </td></td>	0.01 <td>Cum SA (acres) <td>22.35</td> <td>14.40</td> <td>21.04</td> </td>	Cum SA (acres) <td>22.35</td> <td>14.40</td> <td>21.04</td>	22.35	14.40	21.04

Warning: The energy equation could not be balanced within the specified number of iterations. The

program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical

depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Crystal

REACH: Marble

RS: 11815

INPUT

Description:

Station	Elevation	Data	num=	259	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7828.83	6.52	7827.84	10.46	7827.73	14.75	7827.51	20.46	7827.28			
30.46	7826.51	34.75	7826.17	40.46	7825.73	44.75	7825.39	53.67	7824.7			
54.41	7824.64	57.51	7824.69	60.46	7824.56	100.46	7819.64	104.75	7819.04			
110.46	7818.37	117.27	7817.52	120.15	7817.06	263.34	7814.7	265.45	7814.5			
270.46	7813.8	274.75	7813.59	280.46	7812.98	284.75	7812.99	290.46	7813.02			
294.75	7811.03	300.46	7813.03	314.75	7813.29	320.46	7813.29	324.75	7813.15			
330.46	7813.11	334.75	7812.98	340.46	7812.79	360.46	7812.79	364.75	7812.77			
374.75	7812.7	380.46	7812.63	384.75	7812.63	390.46	7812.59	400.46	7812.59			
414.75	7812.5	420.46	7812.5	424.75	7812.47	430.46	7812.47	434.75	7812.44			
440.46	7812.4	446.75	7812.41	454.75	7812.29	460.46	7812.08	464.75	7811.88			
500.46	7811.52	503.11	7810.93	505.1	7810.48	507.52	7810.18	510.46	7809.77			
514.75	7809.16	520.46	7808.41	525.28	7807.74	527.26	7807.46	530.46	7807.5			
534.75	7807.58	540.52	7807.66	545.49	7807.76	550.71	7807.57	551.66	7807.5			
553.98	7807.37	559.69	7807.02	561.41	7806.96	567.71	7806.59	571.86	7806.38			
579.88	7806.22	585.12	7804.75	588.5	7803.8	605.19	7803.8	605.35	7803.86			
607.45	7804.62	608.82	7805.1	613.89	7806.91	614.99	7807.28	622.9	7807.69			
624.09	7807.75	631.9	7807.92	634.53	7807.94	639.92	7807.96	644.98	7807.99			
647.95	7807.96	655.42	7807.84	660.53	7807.82	662.3	7807.57	665.74	7807.06			
668.21	7806.68	670.47	7807.03	676.29	7807.85	682.8	7807.83	686.76	7807.83			
682.39	7807.91	696.09	7807.97	699.73	7808.07	703.25	7808.13	704.02	7807.94			
707.65	7806.98	712.48	7805.78	715.74	7804.94	732.31	7805.03	735.65	7805.5			
738.99	7805.85	744.05	7806.41	745.12	7806.52	746.82	7806.58	749.43	7806.66			
752.25	7806.76	759.88	7807.13	763.77	7807.02	769.95	7806.68	773.94	7806.14			
774.82	7806.38	780.77	7808.01	789.47	7810.44	791.96	7811.03	797.72	7810.58			
801.66	7810.22	804.78	7810.03	810.4	7809.7	812.61	7809.77	819.59	7810.33			
822.55	7810.49	824.47	7810.59	830.8	7810.49	833	7810.45	848.54	7810.39			
853.89	7810.36	864.34	7810.13	874.78	7809.94	877.51	7809.96	881.15	7809.97			
884.92	7809.92	890.5	7809.93	894.94	7809.93	899.86	7809.89	904.97	7809.77			
913.2	7809.69	914.73	7809.93	918.58	7810.67	919.14	7810.75	922.67	7811.59			
924.94	7811.43	931.9	7810.95	935.05	7810.78	943.52	7810.15	944.11	7810.38			
955.1	7810.09	965.12	7809.94	968.53	7809.93	974.71	7809.94	984.06	7809.88			
995.2	7809.89	1005.22	7809.77	1012.13	7809.78	1015.25	7809.74	1021.48	7809.63			
1025.28	7809.62	1031.72	7809.94	1035.34	7810.08	1038.78	7810.36	1049.35	7811.09			
1052.22	7811.1	1055.35	7811.12	1058.91	7811.05	1065.38	7810.94	1068.26	7810.99			
1075.4	7810.14	1077.62	7810.94	1085.43	7811.31	1095.46	7811.75	1105.48	7811.78			
1115.52	7811.66	1123.79	7810.39	1124.9	7810.19	1133.75	7810.05	1143.11	7810.01			
1145.58	7810.05	1152.46	7810.06	1155.61	7810.06	1165.63	7810.08	1171.17	7810.08			
1180.53	7810.1	1185.69	7810.1	1195.71	7810.12	1205.74	7810	1208.6	7809.97			
1215.76	7809.94	1217.95	7809.92	1225.79	7809.77	1235.81	7809.66	1245.84	7809.61			
1264.73	7808.4	1277.75	7809.33	1283.4	7809.32	1287.28	7809.44	1288.88	7810.12			
1295.97	7812.86	1302.15	7815.26	1305.99	7816.53	1313.42	7819.47	1315.53	7820.2			
1330.36	7819.91	1338.64	7819.69	1341.55	7818.97	1346.1	7817.77	1347.44	7817.47			
1348.63	7817.21	1354.78	7817.33	1358.29	7817.27	1366.15	7817.73	1367.64	7817.82			
1376.17	7818.37	1386.2	7819.35	1390.77	7819.81	1392.49	7820.05	1400.49	7820.94			
1402.69	7821.29	1409.05	7822.29	1414.74	7822.75	1418.52	7821.25	1423.45	7823.91			
1426.73	7824.23	1430.66	7824.64	1436.55	7825.2	1437.87	7825.33	1438.75	7825.39			
1445.08	7825.68	1450.77	7826.02	1454.58	7826.22	1459.5	7826.45	1462.75	7826.65			
1466.72	7826.62	1472.62	7827.21	1473.91	7827.3	1481.14	7827.7	1486.82	7827.98			
1490.65	7828.18	1495.56	7828.58	1498.84	7828.83	1506.97	7829.72	1511.08	7829.13			
1513.96	7828.68	1522.35	7828.59	1530.16	7828.54	1531.88	7828.69	1534.89	7829.06			
1538.83	7829.49	1544.74	7830.2	1546.04	7830.35	1546.91	7830.46	1553.25	7831.22			
1558.92	7832.3	1567.67	7833.55	1582.96	7837.09	1593.47	7838.86					

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	525.28	.05	715.74	.035	732.31	.05	789.47	.06
Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.		
715.74	732.31	655.25	667.3	694.85	.1	.3			
Ineffective Flow	num=	2							
Sta L	Sta R	Elev	Permanent						
0	644.98	7807.99	F						
791.96	1593.47	7811.03	F						

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7809.84	Element	Left 08	Channel	Right 08
Vel Head (ft) <td>0.67 <td>Wt. n-Val. <td>0.050 <td>0.035 <td>0.050</td> </td></td></td></td>	0.67 <td>Wt. n-Val. <td>0.050 <td>0.035 <td>0.050</td> </td></td></td>	Wt. n-Val. <td>0.050 <td>0.035 <td>0.050</td> </td></td>	0.050 <td>0.035 <td>0.050</td> </td>	0.035 <td>0.050</td>	0.050
W.S. Elev (ft) <td>7809.17</td> <td>Reach Len. (ft) <td>655.25</td> <td>667.30</td> <td>694.85</td> </td>	7809.17	Reach Len. (ft) <td>655.25</td> <td>667.30</td> <td>694.85</td>	655.25	667.30	694.85
Crit W.S. (ft) <td>7809.17</td> <td>Flow Area (sq ft) <td>264.70</td> <td>69.35</td> <td>128.23</td> </td>	7809.17	Flow Area (sq ft) <td>264.70</td> <td>69.35</td> <td>128.23</td>	264.70	69.35	128.23
E.G. Slope (ft/ft) <td>0.008292</td> <td>Area (sq ft) <td>435.55</td> <td>69.35</td> <td>128.23</td> </td>	0.008292	Area (sq ft) <td>435.55</td> <td>69.35</td> <td>128.23</td>	435.55	69.35	128.23
Q Total (cfs) <td>2181.00</td> <td>Flow (cfs) <td>860.69</td> <td>696.22</td> <td>624.08</td> </td>	2181.00	Flow (cfs) <td>860.69</td> <td>696.22</td> <td>624.08</td>	860.69	696.22	624.08
Top Width (ft) <td>270.24</td> <td>Top Width (ft) <td>201.06</td> <td>16.57</td> <td>52.61</td> </td>	270.24	Top Width (ft) <td>201.06</td> <td>16.57</td> <td>52.61</td>	201.06	16.57	52.61
Vel Total (ft/s) <td>4.72</td> <td>Avg. Vel. (ft/s) <td>3.25</td> <td>10.04</td> <td>4.87</td> </td>	4.72	Avg. Vel. (ft/s) <td>3.25</td> <td>10.04</td> <td>4.87</td>	3.25	10.04	4.87
Max Chl Dpth (ft) <td>5.37</td> <td>Hydr. Depth (ft) <td>1.32</td> <td>4.19</td> <td>2.44</td> </td>	5.37	Hydr. Depth (ft) <td>1.32</td> <td>4.19</td> <td>2.44</td>	1.32	4.19	2.44
Conv. Total (cfs) <td>23950.9</td> <td>Conv. (cfs) <td>9451.8</td> <td>7645.7</td> <td>6853.5</td> </td>	23950.9	Conv. (cfs) <td>9451.8</td> <td>7645.7</td> <td>6853.5</td>	9451.8	7645.7	6853.5
Length Wtd. (ft) <td>668.88</td> <td>Wetted Per. (ft) <td>202.74</td> <td>16.57</td> <td>53.17</td> </td>	668.88	Wetted Per. (ft) <td>202.74</td> <td>16.57</td> <td>53.17</td>	202.74	16.57	53.17
Min Ch El (ft) <td>7804.94</td> <td>Shear (lb/sq ft) <td>0.68</td> <td>2.17</td> <td>1.25</td> </td>	7804.94	Shear (lb/sq ft) <td>0.68</td> <td>2.17</td> <td>1.25</td>	0.68	2.17	1.25
Alpha <td>1.94</td> <td>Stream Power (lb/ft s) <td>2.20</td> <td>21.75</td> <td>6.08</td> </td>	1.94	Stream Power (lb/ft s) <td>2.20</td> <td>21.75</td> <td>6.08</td>	2.20	21.75	6.08
Frcn Loss (ft) <td>5.05</td> <td>Cum Volume (acre-ft) <td>27.71</td> <td>52.89</td> <td>32.24</td> </td>	5.05	Cum Volume (acre-ft) <td>27.71</td> <td>52.89</td> <td>32.24</td>	27.71	52.89	32.24
C & E Loss (ft) <td>0.05</td> <td>Cum SA (acres) <td>16.44</td> <td>13.80</td> <td>18.45</td> </td>	0.05	Cum SA (acres) <td>16.44</td> <td>13.80</td> <td>18.45</td>	16.44	13.80	18.45

Warning: The energy equation could not be balanced within the specified number of iterations. The

Warning: program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 Warning: This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7811.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.20	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7810.12	Reach Len. (ft)	655.25	667.30	694.85
Crit W.S. (ft)	7810.12	Flow Area (sq ft)	228.62	85.14	10.34
E.G. Slope (ft/ft)	0.008687	Area (sq ft)	230.29	85.14	10.34
Q Total (cfs)	2181.00	Flow (cfs)	1140.41	1003.14	37.46
Top Width (ft)	110.31	Top Width (ft)	91.65	16.57	2.09
Vel Total (ft/s)	6.73	Avg. Vel. (ft/s)	4.99	11.78	3.62
Max Chl Dpth (ft)	5.18	Hydr. Depth (ft)	2.49	5.14	4.95
Conv. Total (cfs)	23400.4	Conv. (cfs)	12235.6	10762.9	401.9
Length Wtd. (ft)	664.39	Wetted Per. (ft)	94.60	16.57	6.91
Min Ch El (ft)	7804.94	Shear (lb/sq ft)	1.31	2.79	0.81
Alpha	1.70	Stream Power (lb/ft s)	6.54	32.83	2.94
Frcn Loss (ft)	3.65	Cum Volume (acre-ft)	11.86	57.91	9.73
C & E Loss (ft)	0.26	Cum SA (acres)	4.62	13.80	3.69

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The cross section had to be extended vertically during the critical depth calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 Warning: This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7809.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7808.93	Reach Len. (ft)	655.25	667.30	694.85
Crit W.S. (ft)	7808.93	Flow Area (sq ft)	215.65	65.28	115.44
E.G. Slope (ft/ft)	0.007229	Area (sq ft)	386.50	65.28	115.44
Q Total (cfs)	1657.00	Flow (cfs)	574.38	587.85	494.77
Top Width (ft)	267.50	Top Width (ft)	199.20	16.57	51.74
Vel Total (ft/s)	4.18	Avg. Vel. (ft/s)	2.86	4.29	4.29
Max Chl Dpth (ft)	5.13	Hydr. Depth (ft)	2.08	3.94	2.23
Conv. Total (cfs)	19488.9	Conv. (cfs)	6755.6	6914.0	5819.3
Length Wtd. (ft)	669.33	Wetted Per. (ft)	200.86	16.57	52.26
Min Ch El (ft)	7804.94	Shear (lb/sq ft)	0.48	1.78	1.00
Alpha	2.10	Stream Power (lb/ft s)	1.29	16.01	4.27
Frcn Loss (ft)	4.67	Cum Volume (acre-ft)	20.28	45.31	27.46
C & E Loss (ft)	0.05	Cum SA (acres)	14.00	13.80	15.51

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 Warning: This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7809.75	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>0.65</td> <td>Wt. n-Val.</td> <td>0.050</td> <td>0.035</td> <td>0.050</td>	0.65	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft) <td>7809.10</td> <td>Reach Len. (ft)</td> <td>655.25</td> <td>667.30</td> <td>694.85</td>	7809.10	Reach Len. (ft)	655.25	667.30	694.85
Crit W.S. (ft) <td>7809.10</td> <td>Flow Area (sq ft)</td> <td>250.29</td> <td>68.16</td> <td>124.47</td>	7809.10	Flow Area (sq ft)	250.29	68.16	124.47
E.G. Slope (ft/ft) <td>0.008079</td> <td>Area (sq ft)</td> <td>421.14</td> <td>68.16</td> <td>124.47</td>	0.008079	Area (sq ft)	421.14	68.16	124.47
Q Total (cfs) <td>2031.00</td> <td>Flow (cfs) <td>775.18</td> <td>667.70</td> <td>588.12</td> </td>	2031.00	Flow (cfs) <td>775.18</td> <td>667.70</td> <td>588.12</td>	775.18	667.70	588.12
Top Width (ft) <td>269.44</td> <td>Top Width (ft) <td>200.52</td> <td>16.57</td> <td>52.36</td> </td>	269.44	Top Width (ft) <td>200.52</td> <td>16.57</td> <td>52.36</td>	200.52	16.57	52.36
Vel Total (ft/s) <td>4.59</td> <td>Avg. Vel. (ft/s) <td>3.10</td> <td>9.80</td> <td>4.73</td> </td>	4.59	Avg. Vel. (ft/s) <td>3.10</td> <td>9.80</td> <td>4.73</td>	3.10	9.80	4.73
Max Chl Dpth (ft) <td>5.30</td> <td>Hydr. Depth (ft) <td>1.25</td> <td>4.11</td> <td>2.38</td> </td>	5.30	Hydr. Depth (ft) <td>1.25</td> <td>4.11</td> <td>2.38</td>	1.25	4.11	2.38
Conv. Total (cfs) <td>22596.6</td> <td>Conv. (cfs) <td>8624.1</td> <td>7428.4</td> <td>6543.1</td> </td>	22596.6	Conv. (cfs) <td>8624.1</td> <td>7428.4</td> <td>6543.1</td>	8624.1	7428.4	6543.1
Length Wtd. (ft) <td>669.00</td> <td>Wetted Per. (ft) <td>202.19</td> <td>16.57</td> <td>52.90</td> </td>	669.00	Wetted Per. (ft) <td>202.19</td> <td>16.57</td> <td>52.90</td>	202.19	16.57	52.90
Min Ch El (ft) <td>7804.94</td> <td>Shear (lb/sq ft) <td>0.62</td> <td>2.07</td> <td>1.19</td> </td>	7804.94	Shear (lb/sq ft) <td>0.62</td> <td>2.07</td> <td>1.19</td>	0.62	2.07	1.19
Alpha <td>1.98</td> <td>Stream Power (lb/ft s) <td>1.93</td> <td>20.32</td> <td>5.61</td> </td>	1.98	Stream Power (lb/ft s) <td>1.93</td> <td>20.32</td> <td>5.61</td>	1.93	20.32	5.61
Frcn Loss (ft) <td>4.88</td> <td>Cum Volume (acre-ft) <td>25.50</td> <td>50.88</td> <td>29.38</td> </td>	4.88	Cum Volume (acre-ft) <td>25.50</td> <td>50.88</td> <td>29.38</td>	25.50	50.88	29.38
C & E Loss (ft) <td>0.06</td> <td>Cum SA (acres) <td>15.80</td> <td>13.80</td> <td>17.96</td> </td>	0.06	Cum SA (acres) <td>15.80</td> <td>13.80</td> <td>17.96</td>	15.80	13.80	17.96

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 Warning: This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7810.04	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>0.73</td> <td>Wt. n-Val.</td> <td>0.050</td> <td>0.035</td> <td>0.050</td>	0.73	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft) <td>7809.31</td> <td>Reach Len. (ft) <td>655.25</td> <td>667.30</td> <td>694.85</td> </td>	7809.31	Reach Len. (ft) <td>655.25</td> <td>667.30</td> <td>694.85</td>	655.25	667.30	694.85
Crit W.S. (ft) <td>7809.31</td> <td>Flow Area (sq ft) <td>292.26</td> <td>71.61</td> <td>135.46</td> </td>	7809.31	Flow Area (sq ft) <td>292.26</td> <td>71.61</td> <td>135.46</td>	292.26	71.61	135.46
E.G. Slope (ft/ft) <td>0.008911</td> <td>Area (sq ft) <td>463.11</td> <td>71.61</td> <td>135.46</td> </td>	0.008911	Area (sq ft) <td>463.11</td> <td>71.61</td> <td>135.46</td>	463.11	71.61	135.46
Q Total (cfs) <td>2515.00</td> <td>Flow (cfs) <td>1049.13</td> <td>761.48</td> <td>704.39</td> </td>	2515.00	Flow (cfs) <td>1049.13</td> <td>761.48</td> <td>704.39</td>	1049.13	761.48	704.39
Top Width (ft) <td>271.69</td> <td>Top Width (ft) <td>202.02</td> <td>16.57</td> <td>53.10</td> </td>	271.69	Top Width (ft) <td>202.02</td> <td>16.57</td> <td>53.10</td>	202.02	16.57	53.10
Vel Total (ft/s) <td>5.04</td> <td>Avg. Vel. (ft/s) <td>3.19</td> <td>10.63</td> <td>5.20</td> </td>	5.04	Avg. Vel. (ft/s) <td>3.19</td> <td>10.63</td> <td>5.20</td>	3.19	10.63	5.20
Max Chl Dpth (ft) <td>5.51</td> <td>Hydr. Depth (ft) <td>1.45</td> <td>4.32</td> <td>2.55</td> </td>	5.51	Hydr. Depth (ft) <td>1.45</td> <td>4.32</td> <td>2.55</td>	1.45	4.32	2.55
Conv. Total (cfs) <td>26641.8</td> <td>Conv. (cfs) <td>11113.6</td> <td>8066.5</td> <td>7461.7</td> </td>	26641.8	Conv. (cfs) <td>11113.6</td> <td>8066.5</td> <td>7461.7</td>	11113.6	8066.5	7461.7
Length Wtd. (ft) <td>668.66</td> <td>Wetted Per. (ft) <td>203.71</td> <td>16.57</td> <td>53.68</td> </td>	668.66	Wetted Per. (ft) <td>203.71</td> <td>16.57</td> <td>53.68</td>	203.71	16.57	53.68
Min Ch El (ft) <td>7804.94</td> <td>Shear (lb/sq ft) <td>0.80</td> <td>2.40</td> <td>1.40</td> </td>	7804.94	Shear (lb/sq ft) <td>0.80</td> <td>2.40</td> <td>1.40</td>	0.80	2.40	1.40
Alpha <td>1.86</td> <td>Stream Power (lb/ft s) <td>2.87</td> <td>25.57</td> <td>7.30</td> </td>	1.86	Stream Power (lb/ft s) <td>2.87</td> <td>25.57</td> <td>7.30</td>	2.87	25.57	7.30
Frcn Loss (ft) <td>5.06</td> <td>Cum Volume (acre-ft) <td>33.31</td> <td>57.37</td> <td>38.64</td> </td>	5.06	Cum Volume (acre-ft) <td>33.31</td> <td>57.37</td> <td>38.64</td>	33.31	57.37	38.64
C & E Loss (ft) <td>0.06</td> <td>Cum SA (acres) <td>19.93</td> <td>13.80</td> <td>20.39</td> </td>	0.06	Cum SA (acres) <td>19.93</td> <td>13.80</td> <td>20.39</td>	19.93	13.80	20.39

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 Warning: This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Crystal
 REACH: Marble RS: 11147

INPUT

Description:

Station	Elevation	Data	num=	234	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7826.66	2.28	7826.33	4.9	7825.97	6.73	7825.73	11.8	7824.98			
16.96	7824.23	68.12	7816.72	70.68	7816.34	78.35	7815.22	79.09	7815.11			
95.92	7812.64	98.81	7812.21	119.27	7809.21	121.15	7808.93	129.5	7807.71			
131.24	7807.77	139.74	7807.53	146.38	7807.57	149.97	7807.56	160.2	7807.62			
163.23	7807.63	170.43	7807.67	177.12	7807.57	180.66	7807.51	188.44	7807.18			
190.89	7807.07	196.85	7807	201.12	7806.78	205.27	7806.53	221.59	7806.26			
224.41	7806.15	230.5	7805.9	238.91	7805.66	247.32	7805.37	252.28	7805.39			
255.73	7805.3	262.51	7805.11	289.38	7805.22	303.44	7805.49	306.2	7805.53			
318.98	7805.6	344.36	7805.56	348.26	7805.56	373.49	7805.52	381.91	7805.47			
390.32	7805.47	395.52	7805.43	398.73	7805.4	405.75	7805.35	413.36	7805.34			
423.96	7805.29	426.21	7805.29	432.37	7805.22	436.45	7805.26	446.68	7805.19			
449.2	7805.18	456.91	7805.12	466.02	7805.09	477.37	7805.08	482.84	7804.91			
487.6	7804.94	491.25	7804.97	508.07	7804.7	516.49	7804.73	524.9	7804.74			
533.31	7804.77	538.76	7804.78	541.72	7804.79	548.99	7804.59	558.55	7804.56			
566.96	7804.39	569.45	7804.4	575.37	7804.4	579.68	7804.41	589.92	7804.42			
592.19	7804.4	609.02	7804.2	630.84	7804.13	650	7804.18	659.48	7804.26			
671.77	7804.09	676.31	7804.11	692.23	7804.07	697.29	7804.09	712.69	7804.22			
733.16	7804.28	735.19	7804.29	746.82	7804.18	751.75	7803.91	753.62	7803.79			
757.02	7803.62	764.37	7804.24	769.25	7804.32	774.08	7804.38	777.24	7804.36			
791.87	7804.22	794.07	7804.19	802.48	7804.29	804.78	7804.34	809.28	7804.41			
810.68	7803.69	815.01	7801.63	816.32	7801.36	822.42	7798.13	860.45	7798.34			
853.06	7798.36	866.16	7798.57	869.77	7798.77	876.39	7799.25	882.82	7799.7			
885.85	7798.9	895.01	7799.5	903.42	7799.45	907.09	7799.41	917.32	7799.38			
918.61	7799.3	925.44	7798.52	926.83	7798.43	928.91	7798.51	937.06	7798.87			
945.47	7799.19	948.01	7799.21	951.46	7799.4	953.74	7799.35	958.25	7799.2			
962.7	7799.14	968.48	7799.01	970.71	7799.04	978.71	7798.81	980.86	7798.77			
983.96	7798.73	1009.38	7798.6	1010.01	7799.02	1016.05	7802.96	1017.19	7803.7			
1018.21	7798.43	1027.76	7800.9	1029.67	7800.66	1030.19	7800.61	1039.17	7799.51			
1040.01	7799.4	1044.23	7799.28	1050.33	7799.17	1054.82	7799.1	1060.56	7798.8			
1063.23	7798.74	1070.79	7798.77	1075.6	7798.78	1080.06	7798.8	1120.18	7798.53			
1141.01	7798.52	1155.73	7798.48	1159.64	7799.11	1161.02	7799.34	1161.67	7799.44			
1169.98	7800.68	1180.53	7800.59	1220.76	7801.35	1261	7801.09	1281.02	7801.22			
1291.17	7801.32	1301.02	7801.18	1303.17	7801.17	1310.82	7799.41	1311.02	7799.36			
1311.29	7799.29	1314.78	7798.4	1324.31	7798.4	1330.95	7799.19	1332.17	7799.54			
1339.99	7801.52	1349.01	7801.27	1351.02	7801.22	1361.02	7800.95	1381.02	7801.6			
1401.02	7801.59	1411.02	7801.66	1431.02	7801.76	1442.05	7801.76	1461.02	7802			
1471.02	7802.09	1477.87	7802.66	1479.96	7802.7	1481.25	7802.8	1489.56	7804.3			
1494.89	7803.37	1495.15	7805.37	1500.91	7807.28	1502.41	7807.71	1511.02	7809.7			
1512.47	7810.3	1513.09	7810.07	1519.05	7811.19	1544.55	7811.1	1550.8	7810.05			
1558.55	7808.63	1558.95	7808.55	1561.12	7808.81	1569.35	7809.81	1571.02	7810.05			
1572.82	7810.35	1581.02	7811.59	1582.88	7811.86	1591.02	7813.12	1595.27	7814.22			
1601.12	7815.11	1602.1	7815.73	1606.83	7815.52	1611.02	7815.4	1613.05	7815.35			
1621.02	7815.01	1623.11	7815.13	1631.17	7815.16	1633.17	7814.97	1641.02	7814.97			
1651.02	7815.42	1653.29	7815.69	1661.02	7816.04	1663.35	7816.38	1671.02	7817.67			
1673.4	7817.96	1681.02	7819.24	1683.46	7819.31	1686.18	7819.45	1688.78	7819.81			
1690.59	7820	1701.51	7821.1	1702.75	7821.23	1707.54	7821.71	1709.09	7821.84			
1711.02	7822.04	1718.8	7822.68	1724.44	7823.1	1724.87	7823.14					

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	822.42	.035	1009.38	.05	1381.02	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 822.42 1009.38 397.52 563.66 336.93 .1 .3

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 809.28 7804.41 F
 1017.19 1724.87 7803.7 F

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7801.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.060	0.035	0.050
W.S. Elev (ft)	7800.92	Reach Len. (ft)	397.52	563.66	336.93
Crit W.S. (ft)	7800.49	Flow Area (sq ft)	7.34	380.32	4.09
E.G. Slope (ft/ft)	0.006910	Area (sq ft)	7.34	380.32	348.34
Q Total (cfs)	2181.00	Flow (cfs)	17.37	2153.76	9.87
Top Width (ft)	398.84	Top Width (ft)	5.27	186.96	206.62
Vel Total (ft/s)	5.27	Avg. Vel. (ft/s)	2.37	5.66	2.41
Max Chl Dpth (ft)	2.79	Hydr. Depth (ft)	1.39	2.03	1.16
Conv. Total (cfs)	26236.6	Conv. (cfs)	208.9	25908.9	118.8
Length Wtd. (ft)	515.30	Wetted Per. (ft)	5.96	187.10	4.23
Min Ch El (ft)	7798.13	Shear (lb/sq ft)	0.53	0.88	0.42
Alpha	1.02	Stream Power (lb/ft s)	1.26	4.97	1.01
Frcn Loss (ft)	3.57	Cum Volume (acre-ft)	24.38	49.44	28.44
C & E Loss (ft)	0.04	Cum SA (acres)	14.89	12.24	16.38

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

Note: This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7801.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	wt. n-Val.		0.035	
W.S. Elev (ft)	7801.37	Reach Len. (ft)	397.52	563.66	336.93
Crit W.S. (ft)	7800.52	Flow Area (sq ft)		464.67	
E.G. Slope (ft/ft)	0.003791	Area (sq ft)		464.67	
Q Total (cfs)	2181.00	Flow (cfs)		2181.00	
Top width (ft)	186.96	Top width (ft)		186.96	
Vel Total (ft/s)	4.69	Avg. vel. (ft/s)		4.69	
Max Chl Dpth (ft)	3.24	Hydr. Depth (ft)		2.49	
Conv. Total (cfs)	35423.6	Conv. (cfs)		35423.6	
Length Wtd. (ft)	524.71	wetted Per. (ft)		193.11	
Min Ch El (ft)	7798.13	Shear (lb/sq ft)		0.57	
Alpha	1.00	Stream Power (lb/ft s)		2.67	
Frcn Loss (ft)	3.03	Cum Volume (acre-ft)	10.12	53.70	9.65
C & E Loss (ft)	0.12	Cum SA (acres)	3.93	12.24	3.68

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (Upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

Note: This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7801.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	wt. n-Val.	0.060	0.035	0.050
W.S. Elev (ft)	7800.62	Reach Len. (ft)	397.52	563.66	336.93
Crit W.S. (ft)	7800.23	Flow Area (sq ft)	5.87	325.09	3.11

		CrystalRiver.rep	
E.G. Slope (ft/ft)	0.006739	Area (sq ft)	5.87
Q Total (cfs)	1657.00	Flow (cfs)	12.72
Top Width (ft)	370.36	Top Width (ft)	4.71
Vel Total (ft/s)	4.49	Avg. Vel. (ft/s)	2.17
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)	1.25
Conv. Total (cfs)	20184.2	Conv. (cfs)	155.0
Length Wtd. (ft)	520.32	Wetted Per. (ft)	5.33
Min Ch El (ft)	7798.13	Shear (lb/sq ft)	0.46
Alpha	1.02	Stream Power (lb/ft s)	1.00
Frctn Loss (ft)	3.67	Cum Volume (acre-ft)	17.33
C & E Loss (ft)	0.05	Cum SA (acres)	12.46

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section.

This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-year

		Left 08		Channel		Right 08	
E.G. Elev (ft)	7801.31	Element	0.060	0.035	0.050		
Vel Head (ft)	0.45	Wt. n-Val.	397.52	563.66	336.93		
W.S. Elev (ft)	7800.86	Reach Len. (ft)	7.03	369.18	336.15		
Crit W.S. (ft)	7800.42	Flow Area (sq ft)	16.04	2005.94	9.01		
E.G. Slope (ft/ft)	0.006619	Area (sq ft)	5.15	186.96	202.50		
Q Total (cfs)	2011.00	Flow (cfs)	2.28	5.43	2.32		
Top Width (ft)	394.61	Top Width (ft)	1.36	1.97	1.13		
Vel Total (ft/s)	5.34	Avg. Vel. (ft/s)	197.2	24656.7	110.8		
Max Chl Dpth (ft)	2.73	Hydr. Depth (ft)	5.83	187.10	4.12		
Conv. Total (cfs)	24964.7	Conv. (cfs)	0.50	0.82	0.39		
Length Wtd. (ft)	106.81	Wetted Per. (ft)	1.14	4.43	0.90		
Min Ch El (ft)	7798.13	Shear (lb/sq ft)	22.28	47.53	25.71		
Alpha	1.02	Stream Power (lb/ft s)	14.26	12.24	15.92		
Frctn Loss (ft)	3.60	Cum Volume (acre-ft)					
C & E Loss (ft)	0.04	Cum SA (acres)					

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section.

This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-year

		Left 08		Channel		Right 08	
E.G. Elev (ft)	7801.67	Element	0.060	0.035	0.050		
Vel Head (ft)	0.45	Wt. n-Val.	397.52	563.66	336.93		
W.S. Elev (ft)	7801.14	Reach Len. (ft)	8.55	421.58	4.91		
Crit W.S. (ft)	7800.66	Flow Area (sq ft)	8.55	421.58	397.12		
E.G. Slope (ft/ft)	0.006511	Area (sq ft)	20.65	2482.12	12.23		
Q Total (cfs)	2515.00	Flow (cfs)	5.68	186.96	249.06		
Top Width (ft)	441.70	Top Width (ft)	2.42	5.89	2.49		
Vel Total (ft/s)	5.78	Avg. Vel. (ft/s)	1.50	2.25	1.27		
Max Chl Dpth (ft)	3.01	Hydr. Depth (ft)	256.0	30761.4	151.5		
Conv. Total (cfs)	31188.8	Conv. (cfs)	6.43	187.10	4.63		
Length Wtd. (ft)	513.54	Wetted Per. (ft)	0.34	0.92	0.43		
Min Ch El (ft)	7798.13	Shear (lb/sq ft)	1.31	5.39	1.07		
Alpha	1.03	Stream Power (lb/ft s)	29.76	53.80	34.40		
Frctn Loss (ft)	3.53	Cum Volume (acre-ft)	18.37	12.24	17.98		
C & E Loss (ft)	0.04	Cum SA (acres)					

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section.

This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Crystal
REACH: Marble RS: 10584

INPUT

Description:

Station	Elevation	Data	num	298	Sta	Elev	Sta	Elev	Sta	Elev
0	7836.57	3.31	7835.67	4.05	7835.47	6.81	7834.91	12.21	7833.77	
13.66	7833.55	20.38	7832.71	28.54	7831.35	36.7	7829.95	44.73	7828.62	
45.36	7828.55	53.02	7827.68	55.08	7827.45	61.19	7826.76	65.44	7826.29	
69.35	7825.85	75.79	7825.09	77.51	7824.89	93.84	7822.86	96.5	7822.5	
102	7821.81	106.85	7821.08	120.16	7819.77	117.21	7819.77	118.32	7819.63	
122.47	7819.29	127.56	7818.86	137.92	7818.01	142.81	7817.72	148.27	7817.23	
150.97	7817.12	158.63	7816.34	161.02	7816.21	167.3	7815.98	168.98	7815.82	
175.46	7815.51	179.33	7815.2	189.69	7814.62	191.78	7814.55	199.58	7814.3	
208.11	7814.01	210.4	7813.94	216.27	7813.49	229.88	7811.61	231.23	7811.43	
238.42	7811.5	241.46	7811.5	248.92	7811.65	251.82	7811.57	257.08	7811.06	
262.17	7810.82	265.24	7810.55	272.52	7809.93	271.4	7809.88	276.68	7809.67	
281.57	7809.38	289.73	7808.94	293.23	7808.76	303.59	7808.4	306.05	7808.24	
313.94	7808.04	315.24	7807.96	322.38	7807.46	324.3	7807.33	329.19	7806.91	
333.59	7806.58	338.67	7806.08	342.04	7810.89	344.83	7812.4	345.35	7812.11	
351.79	7807.35	355.33	7806.51	355.76	7806.25	356.93	7805.42	359.21	7805.34	
365.71	7805.13	371.35	7804.98	376.07	7804.98	379.51	7805	392.35	7804.68	
396.78	7804.63	404	7804.68	407.13	7804.73	417.48	7804.82	428.49	7804.98	
436.65	7804.91	444.81	7804.76	448.55	7804.68	452.97	7804.73	458.9	7804.55	
461.14	7804.54	469.26	7804.31	477.46	7804.17	479.61	7804.12	485.62	7804.16	
489.97	7804.09	493.79	7804.1	500.37	7804.1	508.01	7804.31	510.11	7804.36	
520.9	7804.58	522.25	7804.77	531.38	7806.66	534.6	7807.31	541.74	7808.63	
543.19	7808.36	545.95	7809.4	549.5	7809.98	550.68	7810.17	552.11	7809.78	
558.89	7808.37	562.45	7807.4	567.25	7806.37	572.8	7805.21	576.14	7804.58	
582.96	7803.64	585.12	7803.61	589.31	7803.56	593.51	7803.45	599.89	7803.36	
603.86	7803.41	632.54	7803.04	634.93	7802.98	640.71	7802.88	645.28	7802.81	
655.64	7802.44	665.19	7802.24	673.35	7802.04	686.7	7801.6	700.78	7801.22	
728.12	7800.66	738.47	7800.52	746.81	7800.33	748.82	7800.29	754.98	7800.15	
759.18	7800	769.53	7799.61	771.3	7799.53	784.68	7799.38	787.55	7798.89	
790.24	7798.26	795.83	7797.19	800.13	7796.44	801.03	7796.26	809.97	7797.76	
810.95	7797.92	812.9	7798.29	815.29	7798.72	820.05	7798.78	828.44	7798.93	
831.66	7798.96	836.6	7798.94	842.01	7798.93	844.76	7798.97	852.37	7798.91	
869.26	7798.91	873.06	7798.95	877.47	7798.96	883.39	7799.08	885.69	7799.1	
893.71	7799.15	904.04	7799.05	910.32	7799.13	914.36	7799.07	918.53	7799.12	
924.69	7799.18	926.75	7799.16	934.73	7799.29	943.17	7799.59	945.34	7799.7	
953.3	7800.09	956.04	7799.83	962.1	7799.27	965.99	7798.92	967.81	7798.76	
974.85	7798.29	976.02	7798.21	980.18	7797.75	982.52	7796.76	981.89	7796.13	
987.05	7794.7	987.76	7794.36	997.57	7794.5	1001.07	7794.6	1002.06	7794.78	
1007.3	7795.46	1009.45	7795.75	1011.26	7795.98	1012.06	7795.49	1012.62	7795.44	
1025.29	7795.28	1027.95	7795.25	1033.5	7795.1	1038.28	7795.03	1041.72	7795.22	
1048.6	7795.57	1050.8	7795.67	1055.08	7795.76	1058.14	7795.84	1060.19	7795.62	
1069.07	7795.5	1071.68	7794.95	1077.41	7793.85	1079.58	7793.83	1082.78	7793.76	
1089.91	7793.73	1095.2	7793.66	1100.14	7793.58	1101.74	7793.49	1108.86	7792.09	
1128.66	7792.09	1131.18	7793.34	1133.67	7794.58	1139.26	7797.77	1140.8	7797.35	
1141.54	7797.15	1148.47	7796.42	1151.86	7795.36	1152.81	7795.24	1157.8	7794.88	
1168.6	7795.85	1170.23	7795.97	1172.51	7796.16	1181.32	7797	1182.84	7797.2	
1189.81	7797.92	1191.35	7797.99	1197.75	7798.27	1203.49	7798.44	1205.96	7798.49	
1213.82	7798.58	1222.38	7798.76	1230.6	7798.82	1234.47	7798.84	1238.81	7798.84	
1244.65	7798.89	1254.78	7798.82	1257.34	7798.81	1264.79	7798.76	1267.54	7798.54	
1274.79	7797.87	1275.68	7797.87	1282.34	7798.57	1284.79	7798.88	1289.34	7799.03	
1288.29	7799.23	1293.16	7799.03	1294.79	7798.97	1296.5	7798.9	1298.22	7798.81	

1303.13 7797.5 1304.19 7797.24 1305.65 7796.87 1306.58 7796.64 1314.79 7795.79
 1317.54 7795.5 1324.79 7794.75 1330.87 7794.1 1548.13 7794.1 1549.53 7794.3
 1554.79 7795.02 1557.54 7795.42 1564.79 7796.46 1567.54 7796.92 1574.79 7798.37
 1582.56 7795.99 1583.97 7800.34 1591.26 7801.52 1594.79 7802.08 1597.54 7802.45
 1604.79 7803.58 1612.7 7804.48 1613.81 7804.1 1623.02 7806.31 1624.79 7806.58
 1627.66 7807.05 1631.39 7807.54 1636.13 7807.73 1654.91 7808.29 1661.28 7808.54
 1662.54 7806.2 1664.74 7806.83 1673.15 7810.27 1675.05 7811.02 1675.58 7811.26
 1681.52 7812.8 1684.79 7813.46 1687.54 7814.21 1694.79 7816.06 1697.54 7816.75
 1704.79 7818.6 1714.79 7820.82 1717.54 7821.27 1724.79 7822.88 1734.79 7824.92
 1737.54 7825.63 1741.28 7827.02 1747.41 7828.96

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .06 784.68 .05 1108.86 .035 1128.66 .05 1574.79 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1108.86 1128.66 503.03 520.29 498.09 .1 .3

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 953.3 7800.09 F
 1139.26 1747.41 7797.77 F

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7797.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7796.95	Reach Len. (ft)	503.03	520.29	498.09
Crit W.S. (ft)	7796.84	Flow Area (sq ft)	270.76	96.26	23.05
E.G. Slope (ft/ft)	0.006947	Area (sq ft)	273.48	96.26	749.84
Q Total (cfs)	2181.00	Flow (cfs)	1106.23	977.56	97.21
Top width (ft)	463.48	Top width (ft)	134.75	19.80	308.93
Vel Total (ft/s)	5.59	Avg. Vel. (ft/s)	4.09	10.15	4.22
Max Chl Dpth (ft)	4.86	Hydr. Depth (ft)	2.14	4.86	2.52
Conv. Total (cfs)	26167.9	Conv. (cfs)	13272.7	11728.9	1166.3
Length Wtd. (ft)	510.55	Wetted Per. (ft)	127.81	19.80	10.38
Min Ch El (ft)	7792.09	Shear (lb/sq ft)	0.92	2.11	0.96
Alpha	1.77	Stream Power (lb/ft s)	3.75	21.41	4.06
Frctn Loss (ft)	4.18	Cum Volume (acre-ft)	23.10	46.36	24.19
C & E Loss (ft)	0.03	Cum SA (acres)	14.25	10.90	14.39

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7798.56	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>1.52 <td>Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td> </td></td>	1.52 <td>Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td> </td>	Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td>	0.050	0.035	0.050
W.S. Elev (ft) <td>7797.04 <td>Reach Len. (ft) <td>503.03</td> <td>520.29</td> <td>498.09</td> </td></td>	7797.04 <td>Reach Len. (ft) <td>503.03</td> <td>520.29</td> <td>498.09</td> </td>	Reach Len. (ft) <td>503.03</td> <td>520.29</td> <td>498.09</td>	503.03	520.29	498.09
Crit W.S. (ft) <td>7797.04 <td>Flow Area (sq ft) <td>146.25</td> <td>98.09</td> <td>23.91</td> </td></td>	7797.04 <td>Flow Area (sq ft) <td>146.25</td> <td>98.09</td> <td>23.91</td> </td>	Flow Area (sq ft) <td>146.25</td> <td>98.09</td> <td>23.91</td>	146.25	98.09	23.91
E.G. Slope (ft/ft) <td>0.009877 <td>Area (sq ft) <td>146.25</td> <td>98.09</td> <td>23.91</td> </td></td>	0.009877 <td>Area (sq ft) <td>146.25</td> <td>98.09</td> <td>23.91</td> </td>	Area (sq ft) <td>146.25</td> <td>98.09</td> <td>23.91</td>	146.25	98.09	23.91
Q Total (cfs) <td>2181.00 <td>Flow (cfs) <td>856.51</td> <td>1202.79</td> <td>121.70</td> </td></td>	2181.00 <td>Flow (cfs) <td>856.51</td> <td>1202.79</td> <td>121.70</td> </td>	Flow (cfs) <td>856.51</td> <td>1202.79</td> <td>121.70</td>	856.51	1202.79	121.70
Top width (ft) <td>79.99 <td>Top width (ft) <td>50.86</td> <td>19.80</td> <td>9.33</td> </td></td>	79.99 <td>Top width (ft) <td>50.86</td> <td>19.80</td> <td>9.33</td> </td>	Top width (ft) <td>50.86</td> <td>19.80</td> <td>9.33</td>	50.86	19.80	9.33
Vel Total (ft/s) <td>8.13 <td>Avg. Vel. (ft/s) <td>5.86</td> <td>12.26</td> <td>5.09</td> </td></td>	8.13 <td>Avg. Vel. (ft/s) <td>5.86</td> <td>12.26</td> <td>5.09</td> </td>	Avg. Vel. (ft/s) <td>5.86</td> <td>12.26</td> <td>5.09</td>	5.86	12.26	5.09
Max Chl Dpth (ft) <td>4.95 <td>Hydr. Depth (ft) <td>2.88</td> <td>4.95</td> <td>2.56</td> </td></td>	4.95 <td>Hydr. Depth (ft) <td>2.88</td> <td>4.95</td> <td>2.56</td> </td>	Hydr. Depth (ft) <td>2.88</td> <td>4.95</td> <td>2.56</td>	2.88	4.95	2.56
Conv. Total (cfs) <td>21944.9 <td>Conv. (cfs) <td>8618.1</td> <td>12102.3</td> <td>1224.6</td> </td></td>	21944.9 <td>Conv. (cfs) <td>8618.1</td> <td>12102.3</td> <td>1224.6</td> </td>	Conv. (cfs) <td>8618.1</td> <td>12102.3</td> <td>1224.6</td>	8618.1	12102.3	1224.6
Length Wtd. (ft) <td>510.96 <td>Wetted Per. (ft) <td>52.38</td> <td>19.80</td> <td>10.57</td> </td></td>	510.96 <td>Wetted Per. (ft) <td>52.38</td> <td>19.80</td> <td>10.57</td> </td>	Wetted Per. (ft) <td>52.38</td> <td>19.80</td> <td>10.57</td>	52.38	19.80	10.57
Min Ch El (ft) <td>7792.09 <td>Shear (lb/sq ft) <td>1.72</td> <td>3.05</td> <td>1.40</td> </td></td>	7792.09 <td>Shear (lb/sq ft) <td>1.72</td> <td>3.05</td> <td>1.40</td> </td>	Shear (lb/sq ft) <td>1.72</td> <td>3.05</td> <td>1.40</td>	1.72	3.05	1.40
Alpha <td>1.48 <td>Stream Power (lb/ft s) <td>10.08</td> <td>37.46</td> <td>7.10</td> </td></td>	1.48 <td>Stream Power (lb/ft s) <td>10.08</td> <td>37.46</td> <td>7.10</td> </td>	Stream Power (lb/ft s) <td>10.08</td> <td>37.46</td> <td>7.10</td>	10.08	37.46	7.10
Frctn Loss (ft) <td>3.60 <td>Cum Volume (acre-ft) <td>9.46</td> <td>50.06</td> <td>9.56</td> </td></td>	3.60 <td>Cum Volume (acre-ft) <td>9.46</td> <td>50.06</td> <td>9.56</td> </td>	Cum Volume (acre-ft) <td>9.46</td> <td>50.06</td> <td>9.56</td>	9.46	50.06	9.56
C & E Loss (ft) <td>0.23 <td>Cum SA (acres) <td>3.70</td> <td>10.90</td> <td>3.64</td> </td></td>	0.23 <td>Cum SA (acres) <td>3.70</td> <td>10.90</td> <td>3.64</td> </td>	Cum SA (acres) <td>3.70</td> <td>10.90</td> <td>3.64</td>	3.70	10.90	3.64

Warning: The energy equation could not be balanced within the specified number of iterations. The

program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical

depth, the calculated water surface came back below critical depth. This indicates that there is

not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7797.30	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>0.85 <td>Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td> </td></td>	0.85 <td>Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td> </td>	Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td>	0.050	0.035	0.050
W.S. Elev (ft) <td>7796.45 <td>Reach Len. (ft) <td>503.03</td> <td>520.29</td> <td>498.09</td> </td></td>	7796.45 <td>Reach Len. (ft) <td>503.03</td> <td>520.29</td> <td>498.09</td> </td>	Reach Len. (ft) <td>503.03</td> <td>520.29</td> <td>498.09</td>	503.03	520.29	498.09
Crit W.S. (ft) <td>7796.45 <td>Flow Area (sq ft) <td>207.83</td> <td>86.39</td> <td>18.70</td> </td></td>	7796.45 <td>Flow Area (sq ft) <td>207.83</td> <td>86.39</td> <td>18.70</td> </td>	Flow Area (sq ft) <td>207.83</td> <td>86.39</td> <td>18.70</td>	207.83	86.39	18.70
E.G. Slope (ft/ft) <td>0.007293 <td>Area (sq ft) <td>208.04</td> <td>86.39</td> <td>599.86</td> </td></td>	0.007293 <td>Area (sq ft) <td>208.04</td> <td>86.39</td> <td>599.86</td> </td>	Area (sq ft) <td>208.04</td> <td>86.39</td> <td>599.86</td>	208.04	86.39	599.86
Q Total (cfs) <td>1657.00 <td>Flow (cfs) <td>739.14</td> <td>842.12</td> <td>75.74</td> </td></td>	1657.00 <td>Flow (cfs) <td>739.14</td> <td>842.12</td> <td>75.74</td> </td>	Flow (cfs) <td>739.14</td> <td>842.12</td> <td>75.74</td>	739.14	842.12	75.74
Top width (ft) <td>439.68 <td>Top width (ft) <td>127.80</td> <td>19.80</td> <td>292.08</td> </td></td>	439.68 <td>Top width (ft) <td>127.80</td> <td>19.80</td> <td>292.08</td> </td>	Top width (ft) <td>127.80</td> <td>19.80</td> <td>292.08</td>	127.80	19.80	292.08
Vel Total (ft/s) <td>5.30 <td>Avg. Vel. (ft/s) <td>3.56</td> <td>9.75</td> <td>4.05</td> </td></td>	5.30 <td>Avg. Vel. (ft/s) <td>3.56</td> <td>9.75</td> <td>4.05</td> </td>	Avg. Vel. (ft/s) <td>3.56</td> <td>9.75</td> <td>4.05</td>	3.56	9.75	4.05
Max Chl Dpth (ft) <td>4.36 <td>Hydr. Depth (ft) <td>1.65</td> <td>4.36</td> <td>2.76</td> </td></td>	4.36 <td>Hydr. Depth (ft) <td>1.65</td> <td>4.36</td> <td>2.76</td> </td>	Hydr. Depth (ft) <td>1.65</td> <td>4.36</td> <td>2.76</td>	1.65	4.36	2.76
Conv. Total (cfs) <td>19270.7 <td>Conv. (cfs) <td>8596.1</td> <td>9793.7</td> <td>880.9</td> </td></td>	19270.7 <td>Conv. (cfs) <td>8596.1</td> <td>9793.7</td> <td>880.9</td> </td>	Conv. (cfs) <td>8596.1</td> <td>9793.7</td> <td>880.9</td>	8596.1	9793.7	880.9
Length Wtd. (ft) <td>7792.09 <td>Wetted Per. (ft) <td>126.58</td> <td>19.80</td> <td>9.37</td> </td></td>	7792.09 <td>Wetted Per. (ft) <td>126.58</td> <td>19.80</td> <td>9.37</td> </td>	Wetted Per. (ft) <td>126.58</td> <td>19.80</td> <td>9.37</td>	126.58	19.80	9.37
Min Ch El (ft) <td>7792.09 <td>Shear (lb/sq ft) <td>0.76</td> <td>2.01</td> <td>0.92</td> </td></td>	7792.09 <td>Shear (lb/sq ft) <td>0.76</td> <td>2.01</td> <td>0.92</td> </td>	Shear (lb/sq ft) <td>0.76</td> <td>2.01</td> <td>0.92</td>	0.76	2.01	0.92
Alpha <td>1.95 <td>Stream Power (lb/ft s) <td>2.70</td> <td>19.63</td> <td>3.73</td> </td></td>	1.95 <td>Stream Power (lb/ft s) <td>2.70</td> <td>19.63</td> <td>3.73</td> </td>	Stream Power (lb/ft s) <td>2.70</td> <td>19.63</td> <td>3.73</td>	2.70	19.63	3.73
Frctn Loss (ft) <td> <td>Cum Volume (acre-ft) <td>16.35</td> <td>39.65</td> <td>15.78</td> </td></td>	<td>Cum Volume (acre-ft) <td>16.35</td> <td>39.65</td> <td>15.78</td> </td>	Cum Volume (acre-ft) <td>16.35</td> <td>39.65</td> <td>15.78</td>	16.35	39.65	15.78
C & E Loss (ft) <td> <td>Cum SA (acres) <td>11.86</td> <td>10.90</td> <td>11.85</td> </td></td>	<td>Cum SA (acres) <td>11.86</td> <td>10.90</td> <td>11.85</td> </td>	Cum SA (acres) <td>11.86</td> <td>10.90</td> <td>11.85</td>	11.86	10.90	11.85

Warning: The energy equation could not be balanced within the specified number of iterations. The

program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7797.67	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>0.89 <td>Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td> </td></td>	0.89 <td>Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td> </td>	Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td>	0.050	0.035	0.050
W.S. Elev (ft) <td>7796.78 <td>Reach Len. (ft) <td>503.03</td> <td>520.29</td> <td>498.09</td> </td></td>	7796.78 <td>Reach Len. (ft) <td>503.03</td> <td>520.29</td> <td>498.09</td> </td>	Reach Len. (ft) <td>503.03</td> <td>520.29</td> <td>498.09</td>	503.03	520.29	498.09
Crit W.S. (ft) <td>7796.78 <td>Flow Area (sq ft) <td>249.19</td> <td>92.89</td> <td>21.52</td> </td></td>	7796.78 <td>Flow Area (sq ft) <td>249.19</td> <td>92.89</td> <td>21.52</td> </td>	Flow Area (sq ft) <td>249.19</td> <td>92.89</td> <td>21.52</td>	249.19	92.89	21.52
E.G. Slope (ft/ft) <td>0.007345 <td>Area (sq ft) <td>250.72</td> <td>92.89</td> <td>697.65</td> </td></td>	0.007345 <td>Area (sq ft) <td>250.72</td> <td>92.89</td> <td>697.65</td> </td>	Area (sq ft) <td>250.72</td> <td>92.89</td> <td>697.65</td>	250.72	92.89	697.65
Q Total (cfs) <td>2031.00 <td>Flow (cfs) <td>922.74</td> <td>947.14</td> <td>91.12</td> </td></td>	2031.00 <td>Flow (cfs) <td>922.74</td> <td>947.14</td> <td>91.12</td> </td>	Flow (cfs) <td>922.74</td> <td>947.14</td> <td>91.12</td>	922.74	947.14	91.12
Top width (ft) <td>455.71 <td>Top width (ft) <td>132.36</td> <td>19.80</td> <td>303.55</td> </td></td>	455.71 <td>Top width (ft) <td>132.36</td> <td>19.80</td> <td>303.55</td> </td>	Top width (ft) <td>132.36</td> <td>19.80</td> <td>303.55</td>	132.36	19.80	303.55
Vel Total (ft/s) <td>5.59 <td>Avg. Vel. (ft/s) <td>3.98</td> <td>10.20</td> <td>4.23</td> </td></td>	5.59 <td>Avg. Vel. (ft/s) <td>3.98</td> <td>10.20</td> <td>4.23</td> </td>	Avg. Vel. (ft/s) <td>3.98</td> <td>10.20</td> <td>4.23</td>	3.98	10.20	4.23
Max Chl Dpth (ft) <td>4.69 <td>Hydr. Depth (ft) <td>1.97</td> <td>4.69</td> <td>2.43</td> </td></td>	4.69 <td>Hydr. Depth (ft) <td>1.97</td> <td>4.69</td> <td>2.43</td> </td>	Hydr. Depth (ft) <td>1.97</td> <td>4.69</td> <td>2.43</td>	1.97	4.69	2.43
Conv. Total (cfs) <td>23698.9 <td>Conv. (cfs) <td>11583.9</td> <td>11051.8</td> <td>1063.3</td> </td></td>	23698.9 <td>Conv. (cfs) <td>11583.9</td> <td>11051.8</td> <td>1063.3</td> </td>	Conv. (cfs) <td>11583.9</td> <td>11051.8</td> <td>1063.3</td>	11583.9	11051.8	1063.3
Length Wtd. (ft) <td>510.78 <td>Wetted Per. (ft) <td>127.37</td> <td>19.80</td> <td>10.04</td> </td></td>	510.78 <td>Wetted Per. (ft) <td>127.37</td> <td>19.80</td> <td>10.04</td> </td>	Wetted Per. (ft) <td>127.37</td> <td>19.80</td> <td>10.04</td>	127.37	19.80	10.04
Min Ch El (ft) <td>7792.09 <td>Shear (lb/sq ft) <td>0.90</td> <td>2.15</td> <td>0.98</td> </td></td>	7792.09 <td>Shear (lb/sq ft) <td>0.90</td> <td>2.15</td> <td>0.98</td> </td>	Shear (lb/sq ft) <td>0.90</td> <td>2.15</td> <td>0.98</td>	0.90	2.15	0.98
Alpha <td>1.83 <td>Stream Power (lb/ft s) <td>3.57</td> <td>21.93</td> <td>4.16</td> </td></td>	1.83 <td>Stream Power (lb/ft s) <td>3.57</td> <td>21.93</td> <td>4.16</td> </td>	Stream Power (lb/ft s) <td>3.57</td> <td>21.93</td> <td>4.16</td>	3.57	21.93	4.16
Frctn Loss (ft) <td>4.22 <td>Cum Volume (acre-ft) <td>21.10</td> <td>44.54</td> <td>21.71</td> </td></td>	4.22 <td>Cum Volume (acre-ft) <td>21.10</td> <td>44.54</td> <td>21.71</td> </td>	Cum Volume (acre-ft) <td>21.10</td> <td>44.54</td> <td>21.71</td>	21.10	44.54	21.71
C & E Loss (ft) <td>0.02 <td>Cum SA (acres) <td>13.63</td> <td>10.90</td> <td>13.97</td> </td></td>	0.02 <td>Cum SA (acres) <td>13.63</td> <td>10.90</td> <td>13.97</td> </td>	Cum SA (acres) <td>13.63</td> <td>10.90</td> <td>13.97</td>	13.63	10.90	13.97

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7798.11	Element	Left 08	Channel	Right 08
Vel Head (ft)	5.93	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7797.17	Reach Len. (ft)	503.03	520.29	498.09
Crit W.S. (ft)	7797.04	Flow Area (sq ft)	298.74	100.62	25.12
E.G. Slope (ft/ft)	0.007255	Area (sq ft)	303.49	100.62	818.57
Q Total (cfs)	2515.00	Flow (cfs)	1327.98	1075.60	111.43
Top Width (ft)	472.70	Top Width (ft)	137.85	19.80	315.06
Vel Total (ft/s)	5.92	Avg. Vel. (ft/s)	4.45	10.69	4.44
Max ch Dpth (ft)	5.08	Hydr. Depth (ft)	2.35	5.08	2.63
Conv. Total (cfs)	29526.3	Conv. (cfs)	15590.6	12627.6	1308.2
Length Wtd. (ft)	510.11	Wetted Per. (ft)	128.37	19.80	10.82
Min ch El (ft)	7792.09	Shear (lb/sq ft)	1.05	2.30	1.05
Alpha	1.71	Stream Power (lb/ft s)	4.69	24.61	4.66
Frctn Loss (ft)	1.13	Cum Volume (acre-ft)	28.34	50.42	29.69
C & E Loss (ft)	0.03	Cum SA (acres)	17.72	10.90	15.80

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Crystal

REACH: Marble

RS: 10063

INPUT

Description:

Station	Elevation	Data	num=	277	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7824.46	2.97	7823.4	5.65	7822.3	9.66	7820.98	11.51	7820.31			
16.2	7820.28	18.76	7820.1	34.55	7818.94	37.3	7818.75	42.45	7818.13			
47.85	7817.49	50.35	7817.19	57.77	7816.06	58.24	7815.99	66.14	7814.79			
68.85	7814.35	74.03	7813.64	79.5	7812.79	81.93	7812.5	89.14	7811.57			
89.82	7811.48	97.72	7810.5	100.6	7810.13	105.61	7809.63	111.15	7809.11			
120.52	7808.19	121.7	7808.07	132.25	7807.22	137.19	7806.64	142.8	7806.26			
151.9	7806.03	160.88	7805.75	163.9	7805.66	176.67	7804.16	183.27	7803.44			
184.57	7803.3	192.46	7802.35	195.55	7801.97	200.36	7801.53	206.1	7800.78			
208.25	7800.46	214.65	7799.72	216.13	7799.56	216.65	7799.5	227.4	7799.4			
222.51	7798.83	225.75	7797.91	231.59	7796.2	231.79	7796.14	232.06	7796.06			
243.34	7796.06	248.3	7795.98	255.63	7795.97	258.85	7795.98	263.52	7795.78			
269.4	7795.88	271.42	7795.83	277.41	7795.77	287.21	7795.62	290.5	7795.6			
295.1	7795.55	301.05	7795.41	309.11	7795.09	310.41	7795.02	311.54	7794.66			
315.74	7793.53	318.18	7792.86	319.24	7792.58	320.14	7792.35	320.81	7792.17			
325.05	7791.98	331.29	7791.69	342.48	7791.31	344.89	7791.22	350.24	7791.11			
353.76	7792.06	357.1	7793.07	361.54	7794.4	362.74	7794.79	364.99	7794.83			
371.54	7794.92	374.06	7794.98	381.95	7795.06	387.67	7795.18	396	7795.17			
402.91	7795.02	413.53	7794.67	417.11	7794.67	421.43	7794.64	427.66	7794.45			
434.29	7794.37	437.22	7794.35	445.12	7794.23	448.76	7794.19	453.01	7793.95			
459.31	7793.96	460.91	7793.9	465.67	7793.7	469.86	7793.5	476.7	7793.16			
480.41	7793.22	490.96	7793.72	492.49	7793.79	497.04	7793.75	500.38	7793.71			
508.28	7793.76	512.06	7793.79	516.17	7793.93	528.42	7793.93	531.97	7793.94			
533.16	7793.84	539.86	7793.72	543.71	7793.69	547.76	7793.63	554.26	7793.87			
559.8	7793.86	563.85	7793.8	564.81	7793.85	575.6	7794.15	579.34	7794.23			
585.91	7794.44	591.18	7794.48	603.02	7794.26	607.01	7794.41	610.92	7794.18			
617.56	7794.17	618.81	7794.11	622.55	7793.94	626.71	7793.69	634.61	7793.43			
638.66	7793.38	642.5	7793.32	649.21	7793.23	653.93	7793.21	658.29	7793.13			
666.19	7793.04	670.31	7792.98	674.08	7792.71	680.86	7792.36	681.83	7792.3			
687.96	7793.68	688.3	7793.2	691.41	7791.22	692.4	7791.01	696.7	7790.22			
698.9	7790.5	701.96	7790.98	708.17	7792.12	710.08	7792.4	712.8	7791.22			
719.29	7788.2	719.49	7788.11	744.6	7788.18	747.55	7788.51	754.71	7789.36			
759.22	7789.85	760.86	7789.91	765.26	7789.98	767.93	7789.96	769.89	7789.78			
775.33	7789.23	775.64	7789.29	779.44	7790.06	780.88	7790.32	784.87	7791.1			
786.29	7791.3	790.41	7790.94	797.19	7790.33	798.67	7790.2	804.28	7789.67			
807.25	7790.59	807.46	7790.66	808.3	7790.92	816.2	7793.31	818.01	7793.89			
820.98	7794.87	821.42	7795.04	824.4	7795.1	828.56	7795.12	831.99	7794.88			
839.11	7794.47	840.39	7794.38	846.01	7793.9	848.87	7793.11	853.05	7791.85			
855.85	7791.14	856.71	7791.27	867.6	7793.01	869.39	7793.3	870.26	7793.38			
879.36	7794.15	881.31	7794.3	891.86	7794.5	895.15	7794.58	902.41	7794.7			
922.58	7794.74	942.7	7794.58	947.87	7794.34	952.75	7793.93	958.06	7792.95			
962.81	7793.66	970.4	7795.37	972.87	7796.26	973.71	7796.46	982.2	7797.65			
983.37	7797.81	990.84	7798.86	992.88	7798.92	1003.12	7799.31	1010.45	7799.47			
1012.47	7799.54	1015.15	7799.58	1018.66	7799.67	1023.38	7799.68	1028.41	7799.68			
1030.77	7799.76	1045.04	7799.93	1048.92	7799.75	1052.37	7799.77	1073.58	7799.81			
1075.4	7799.93	1093.56	7800.02	1103.61	7799.96	1113.67	7800.06	1118.84	7800.19			
1123.73	7800.37	1133.78	7800.85	1150.64	7801.69	1153.9	7801.86	1155.11	7801.93			
1157.25	7802.05	1173.61	7801.82	1179.54	7801.75	1180.14	7801.65	1183.17	7801.19			
1183.61	7801.13	1184.02	7801.07	1189.23	7803.59	1194.13	7806.03	1195.39	7806.69			
1203.24	7810.6	1205.56	7810.66	1204.19	7810.75	1206.96	7811.23	1214.24	7812.37			
1218.12	7811.24	1219.3	7811.77	1227.6	7812.15	1234.16	7815.93	1238.53	7816.94			
1241	7816.22	1242.75	7816.61	1244.41	7816.97	1248.51	7817.82	1253.83	7819.18			
1254.64	7819.29	1262.86	7820.46	1264.53	7820.72	1265.42	7820.88	1267.2	7821.44			
1274.59	7823.03	1277.51	7823.6	1281.49	7823.59	1285.16	7823.64	1292.56	7823.78			
1294.7	7823.75	1297.07	7823.76	1304.76	7823.86	1309.7	7823.95	1313.3	7824.15			
1314.6	7824.19	1320.83	7825.1	1325.25	7825.3	1327.39	7825.74	1333.01	7826.28			
1334.93	7826.46	1335.19	7826.49									

Manning's n	Values	num=	5	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	232.06	.05	719.29	.035	744.6	.05	962.81	.06		
Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.					
719.29	744.6	453.78	527.62	576.04	.1	.3					
Ineffective Flow	num=	2									
Sta L	Sta R	Elev	Permanent								
0	387.51	7795.2	F								
828.56	1335.19	7795.12	F								

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7793.60	Element	Left 08	Channel	Right 08
Vel Head (ft)	1.20	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7792.40	Reach Len. (ft)	453.78	527.62	576.04
Crit W.S. (ft)	7792.40	Flow Area (sq ft)	47.81	107.61	160.58
E.G. Slope (ft/ft)	0.009808	Area (sq ft)	75.18	107.61	168.60
Q Total (cfs)	2181.00	Flow (cfs)	167.27	1186.91	826.82
Top Width (ft)	180.46	Top Width (ft)	74.04	25.31	81.11
Vel Total (ft/s)	6.30	Avg. Vel. (ft/s)	3.50	11.03	5.15
Max ch Dpth (ft)	4.29	Hydr. Depth (ft)	1.22	4.25	2.34
Conv. Total (cfs)	22022.6	Conv. (cfs)	1689.0	11984.8	8348.8
Length Wtd. (ft)		Wetted Per. (ft)	40.39	25.33	69.39
Min ch El (ft)	7788.11	Shear (lb/sq ft)	0.71	2.60	1.42
Alpha	1.62	Stream Power (lb/ft s)	2.54	28.69	7.30
Frctn Loss (ft)		Cum Volume (acre-ft)	21.08	45.14	18.94
C & E Loss (ft)		Cum SA (acres)	13.04	10.61	12.16

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than

0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 This may indicate the need for additional cross sections.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7793.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7793.00	Reach Len. (ft)	453.78	527.62	576.04
Crit W.S. (ft)	7792.40	Flow Area (sq ft)	73.75	122.83	202.40
E.G. Slope (ft/ft)	0.005290	Area (sq ft)	73.75	122.83	202.40
Q Total (cfs)	2181.00	Flow (cfs)	218.69	1086.61	875.71
Top Width (ft)	140.17	Top Width (ft)	44.29	25.31	70.57
Vel Total (ft/s)	5.47	Avg. Vel. (ft/s)	2.97	8.85	4.33
Max Chl Dpth (ft)	4.89	Hydr. Depth (ft)	1.67	4.85	2.87
Conv. Total (cfs)	29986.3	Conv. (cfs)	3006.7	14939.6	12040.0
Length Wtd. (ft)	538.84	Wetted Per. (ft)	45.90	25.33	71.47
Min Ch El (ft)	7788.11	Shear (lb/sq ft)	0.53	1.60	0.94
Alpha	1.59	Stream Power (lb/ft s)	1.57	14.17	4.05
Frctn Loss (ft)	2.62	Cum Volume (acre-ft)	8.19	48.74	8.26
C & E Loss (ft)	0.00	Cum SA (acres)	3.15	10.63	3.18

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 This may indicate the need for additional cross sections.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7793.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7792.09	Reach Len. (ft)	453.78	527.62	576.04
Crit W.S. (ft)	7791.96	Flow Area (sq ft)	37.08	99.90	139.84
E.G. Slope (ft/ft)	0.007970	Area (sq ft)	54.20	99.90	144.48
Q Total (cfs)	1657.00	Flow (cfs)	133.78	945.26	597.96
Top Width (ft)	165.33	Top Width (ft)	62.83	25.31	77.19
Vel Total (ft/s)	5.99	Avg. Vel. (ft/s)	3.07	9.46	4.28
Max Chl Dpth (ft)	3.98	Hydr. Depth (ft)	1.18	3.95	2.07
Conv. Total (cfs)	18560.1	Conv. (cfs)	1274.4	10587.9	6697.8
Length Wtd. (ft)	544.17	Wetted Per. (ft)	32.68	25.33	68.34
Min Ch El (ft)	7788.11	Shear (lb/sq ft)	0.56	1.96	1.02
Alpha	1.63	Stream Power (lb/ft s)	1.73	18.57	4.35
Frctn Loss (ft)	3.01	Cum Volume (acre-ft)	14.84	38.54	11.52
C & E Loss (ft)	0.15	Cum SA (acres)	10.76	10.63	9.74

Warning: Divided flow computed for this cross-section.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
 This may indicate the need for additional cross sections.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-year

E.G. Elev (ft)	7793.43	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>1.12</td> <td>Wt. n-Val.</td> <td>0.050</td> <td>0.035</td> <td>0.050</td>	1.12	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft) <td>7792.11</td> <td>Reach Len. (ft)</td> <td>453.78</td> <td>527.62</td> <td>576.04</td>	7792.11	Reach Len. (ft)	453.78	527.62	576.04
Crit W.S. (ft) <td>7792.31</td> <td>Flow Area (sq ft)</td> <td>44.50</td> <td>105.40</td> <td>154.60</td>	7792.31	Flow Area (sq ft)	44.50	105.40	154.60
E.G. Slope (ft/ft) <td>0.009357</td> <td>Area (sq ft)</td> <td>68.84</td> <td>105.40</td> <td>161.56</td>	0.009357	Area (sq ft)	68.84	105.40	161.56
Q Total (cfs) <td>2031.00</td> <td>Flow (cfs) <td>150.90</td> <td>1119.83</td> <td>760.27</td> </td>	2031.00	Flow (cfs) <td>150.90</td> <td>1119.83</td> <td>760.27</td>	150.90	1119.83	760.27
Top Width (ft) <td>176.38</td> <td>Top Width (ft) <td>71.09</td> <td>25.31</td> <td>79.98</td> </td>	176.38	Top Width (ft) <td>71.09</td> <td>25.31</td> <td>79.98</td>	71.09	25.31	79.98
Vel Total (ft/s) <td>6.67</td> <td>Avg. Vel. (ft/s) <td>3.39</td> <td>10.62</td> <td>4.92</td> </td>	6.67	Avg. Vel. (ft/s) <td>3.39</td> <td>10.62</td> <td>4.92</td>	3.39	10.62	4.92
Max Chl Dpth (ft) <td>4.20</td> <td>Hydr. Depth (ft) <td>1.21</td> <td>4.16</td> <td>2.26</td> </td>	4.20	Hydr. Depth (ft) <td>1.21</td> <td>4.16</td> <td>2.26</td>	1.21	4.16	2.26
Conv. Total (cfs) <td>20996.8</td> <td>Conv. (cfs) <td>1560.0</td> <td>11577.0</td> <td>7859.7</td> </td>	20996.8	Conv. (cfs) <td>1560.0</td> <td>11577.0</td> <td>7859.7</td>	1560.0	11577.0	7859.7
Length Wtd. (ft) <td></td> <td>Wetted Per. (ft) <td>38.03</td> <td>25.33</td> <td>69.09</td> </td>		Wetted Per. (ft) <td>38.03</td> <td>25.33</td> <td>69.09</td>	38.03	25.33	69.09
Min Ch El (ft) <td>7788.11</td> <td>Shear (lb/sq ft) <td>0.68</td> <td>2.43</td> <td>1.11</td> </td>	7788.11	Shear (lb/sq ft) <td>0.68</td> <td>2.43</td> <td>1.11</td>	0.68	2.43	1.11
Alpha <td>1.62</td> <td>Stream Power (lb/ft s) <td>2.32</td> <td>25.82</td> <td>6.43</td> </td>	1.62	Stream Power (lb/ft s) <td>2.32</td> <td>25.82</td> <td>6.43</td>	2.32	25.82	6.43
Frctn Loss (ft) <td></td> <td>Cum Volume (acre-ft) <td>19.26</td> <td>43.36</td> <td>16.80</td> </td>		Cum Volume (acre-ft) <td>19.26</td> <td>43.36</td> <td>16.80</td>	19.26	43.36	16.80
C & E Loss (ft) <td></td> <td>Cum SA (acres) <td>12.45</td> <td>10.63</td> <td>11.77</td> </td>		Cum SA (acres) <td>12.45</td> <td>10.63</td> <td>11.77</td>	12.45	10.63	11.77

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: Divided flow computed for this cross-section.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-year

E.G. Elev (ft)	7793.95	Element	Left OB	Channel	Right OB
Vel Head (ft) <td>1.20</td> <td>Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td> </td>	1.20	Wt. n-Val. <td>0.050</td> <td>0.035</td> <td>0.050</td>	0.050	0.035	0.050
W.S. Elev (ft) <td>7792.75</td> <td>Reach Len. (ft) <td>453.78</td> <td>527.62</td> <td>576.04</td> </td>	7792.75	Reach Len. (ft) <td>453.78</td> <td>527.62</td> <td>576.04</td>	453.78	527.62	576.04
Crit W.S. (ft) <td>7792.75</td> <td>Flow Area (sq ft) <td>62.84</td> <td>116.55</td> <td>185.00</td> </td>	7792.75	Flow Area (sq ft) <td>62.84</td> <td>116.55</td> <td>185.00</td>	62.84	116.55	185.00
E.G. Slope (ft/ft) <td>0.009074</td> <td>Area (sq ft) <td>102.98</td> <td>116.55</td> <td>198.04</td> </td>	0.009074	Area (sq ft) <td>102.98</td> <td>116.55</td> <td>198.04</td>	102.98	116.55	198.04
Q Total (cfs) <td>2515.00</td> <td>Flow (cfs) <td>215.74</td> <td>1303.98</td> <td>995.29</td> </td>	2515.00	Flow (cfs) <td>215.74</td> <td>1303.98</td> <td>995.29</td>	215.74	1303.98	995.29
Top Width (ft) <td>194.18</td> <td>Top Width (ft) <td>83.21</td> <td>25.31</td> <td>85.66</td> </td>	194.18	Top Width (ft) <td>83.21</td> <td>25.31</td> <td>85.66</td>	83.21	25.31	85.66
Vel Total (ft/s) <td>6.90</td> <td>Avg. Vel. (ft/s) <td>3.43</td> <td>11.19</td> <td>5.38</td> </td>	6.90	Avg. Vel. (ft/s) <td>3.43</td> <td>11.19</td> <td>5.38</td>	3.43	11.19	5.38
Max Chl Dpth (ft) <td>4.64</td> <td>Hydr. Depth (ft) <td>1.37</td> <td>4.60</td> <td>2.65</td> </td>	4.64	Hydr. Depth (ft) <td>1.37</td> <td>4.60</td> <td>2.65</td>	1.37	4.60	2.65
Conv. Total (cfs) <td>26401.6</td> <td>Conv. (cfs) <td>2264.7</td> <td>13688.7</td> <td>10448.2</td> </td>	26401.6	Conv. (cfs) <td>2264.7</td> <td>13688.7</td> <td>10448.2</td>	2264.7	13688.7	10448.2
Length Wtd. (ft) <td>527.18</td> <td>Wetted Per. (ft) <td>47.05</td> <td>25.33</td> <td>70.61</td> </td>	527.18	Wetted Per. (ft) <td>47.05</td> <td>25.33</td> <td>70.61</td>	47.05	25.33	70.61
Min Ch El (ft) <td>7788.11</td> <td>Shear (lb/sq ft) <td>0.76</td> <td>2.61</td> <td>1.48</td> </td>	7788.11	Shear (lb/sq ft) <td>0.76</td> <td>2.61</td> <td>1.48</td>	0.76	2.61	1.48
Alpha <td>1.60</td> <td>Stream Power (lb/ft s) <td>2.60</td> <td>29.16</td> <td>7.99</td> </td>	1.60	Stream Power (lb/ft s) <td>2.60</td> <td>29.16</td> <td>7.99</td>	2.60	29.16	7.99
Frctn Loss (ft) <td>2.14</td> <td>Cum Volume (acre-ft) <td>25.99</td> <td>49.12</td> <td>23.88</td> </td>	2.14	Cum Volume (acre-ft) <td>25.99</td> <td>49.12</td> <td>23.88</td>	25.99	49.12	23.88
C & E Loss (ft) <td>0.30</td> <td>Cum SA (acres) <td>16.44</td> <td>10.63</td> <td>13.51</td> </td>	0.30	Cum SA (acres) <td>16.44</td> <td>10.63</td> <td>13.51</td>	16.44	10.63	13.51

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: Divided flow computed for this cross-section.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Crystal
 REACH: Marble
 RS: 9536
 INPUT
 Description:
 Station Elevation Data num= 223

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7820.69	6.17	7819.61	8.13	7819.53	16.24	7818.45	18.49	7818.1
47.43	7816.35	56.49	7815.29	62.4	7814.5	66.53	7814.66	71.44	7814.94
76.62	7814.89	82.02	7815.43	83.04	7815.24	86.68	7812.65	89.53	7812.04
96.74	7807.4	106.81	7805.36	107.47	7804.95	112.78	7802.58	116.51	7802.79
126.93	7801.43	134.75	7800.46	147.06	7799.36	152.84	7798.78	167.19	7797.01
170.93	7796.58	187.31	7795.37	190.8	7794.9	195.49	7794.16	197.31	7793.97
199.85	7793.66	203.32	7793.19	209.05	7793.25	212.57	7793.49	216.35	7793.85
216.64	7791.79	217.5	7793.64	225.2	7792.31	227.57	7791.96	234.24	7791.54
237.63	7791.35	243.28	7790.97	247.65	7790.77	252.41	7790.62	256.4	7790.45
262.19	7790.44	270.19	7789.58	277.51	7789.18	278.05	7789.13	287.33	7788.32
288.51	7788.22	296.47	7787.2	297.93	7786.98	300.64	7787	304.59	7788.62
307.97	7789.08	312.96	7788.95	321.23	7788.92	327.43	7788.54	331.56	7786.96
331.69	7786.9	334.87	7786.9	338.59	7787.87	339.8	7787.96	345.6	7788.82
348.18	7789.58	348.45	7789.65	358.39	7789.82	360.86	7789.92	368.19	7789.77
397.33	7789.57	401.26	7789.47	403.98	7789.37	405.47	7788.81	409.06	7787.44
415.51	7785.76	432.16	7785.8	435.18	7786.65	438.89	7787.58	448.06	7789.92
448.86	7790.12	452.42	7790.08	459.02	7789.93	460.35	7789.88	469.08	7789.65
478.44	7788.76	479.15	7788.68	482.56	7788.36	482.89	7788.3	489.44	7786.17
490.59	7785.8	502.13	7785.76	505.06	7786.91	509.34	7788.47	511.85	7789.21
512.74	7789.54	519.4	7789.45	523.66	7789.41	529.46	7789.38	531.76	7789.38
540.43	7789.42	546.39	7789.36	551.67	7789.25	557.24	7789.25	566.06	7789.2
566.5	7788.94	570.6	7785.61	607.78	7785.68	608.6	7785.76	612.11	7786.07
619.11	7786.67	626.55	7787.13	629.28	7787.31	631.13	7787.48	634.02	7787.81
638.92	7788.36	641.71	7788.68	645.74	7788.55	652.83	7788.25	668.84	7788.74
674.6	7788.29	679.81	7788.36	684.62	7788.39	689.23	7788.59	694.65	7788.78
697.45	7788.87	698.04	7788.46	704.9	7786.84	706.21	7786.52	709.39	7786.92
714.69	7787.24	716.02	7787.69	719.08	7788.12	724.71	7788.25	734.73	7788.26
744.75	7788.29	764.79	7788.29	773.78	7787.93	775.64	7787.88	779.16	7787.16
783.41	7786.3	784.94	7785.92	785.66	7786.09	789.92	7787.56	790.9	7787.96
792.18	7788.47	796.58	7790.24	798.29	7790.35	804.33	7790.77	811.68	7790.89
814.89	7790.87	821.1	7790.96	824.91	7790.93	830.52	7790.93	834.93	7790.96
839.93	7790.97	844.95	7790.97	849.35	7790.98	858.77	7790.98	864.99	7791.03
868.19	7791.03	875.01	7791.09	877.61	7791.09	905.07	7791.15	915.09	7791.04
924.71	7791.1	943.54	7791.35	952.96	7791.17	955.17	7791.11	962.38	7790.97
965.19	7790.9	971.8	7790.86	975.22	7790.83	981.22	7790.76	985.24	7790.73
990.64	7790.59	1005.28	7790.32	1009.48	7790.21	1015.3	7790.07	1018.9	7790
1025.32	7789.83	1028.31	7789.78	1035.34	7789.64	1037.73	7789.61	1045.36	7789.47
1053.38	7789.65	1075.28	7790.05	1084.83	7790.26	1086.44	7790.31	1096.45	7790.7
1102.9	7792.24	1105.48	7792.92	1113.09	7794.91	1115.5	7795.55	1119.34	7796.54
1120.77	7796.93	1121.57	7797.17	1143.21	7797.45	1154.67	7796.77	1157.75	7796.66
1166.23	7796.12	1174.34	7796.24	1177.38	7796.29	1178.33	7796.43	1194.04	7798.63
1213.08	7800.98	1218.71	7801.58	1223.51	7802.17	1231.42	7803.02	1245.81	7804.94
1254.38	7806.19	1264.14	7807.56	1278.24	7808.81	1283.82	7809.49	1300.11	7811.31
1301.73	7811.95	1304.9	7812.67	1305.89	7812.95	1310.89	7815.98	1315.91	7819.13
1320.31	7820.75	1323.03	7822.56	1325.68	7824.69				

Manning's n	Val	Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.06	262.19	.05	570.6	.035	607.78	.05	1096.45	.06	

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Frict	Expan.
	570.6	607.78		442.6	450.16	233.01		.1	.3
Ineffective Flow	num=3								
Sta L	Sta R	Elev	Permanent						
0	512.74	7790.12	F						
699.11	900	7788.84	T						
943.54	1200	7791.35	F						

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	7790.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7789.96	Reach Len. (ft)	442.60	450.16	233.01
Crit W.S. (ft)	7788.65	Flow Area (sq ft)	43.60	160.48	388.18
E.G. Slope (ft/ft)	0.003343	Area (sq ft)	421.48	160.48	401.20
Q Total (cfs)	2181.00	Flow (cfs)	61.15	1044.40	1075.45
Top Width (ft)	570.35	Top Width (ft)	294.54	37.18	238.63
Vel total (ft/s)	2.68	Avg Vel. (ft/s)	1.40	6.51	2.77
Max chl Dpth (ft)	4.38	Hydr. Depth (ft)	0.75	4.32	2.06
Conv. Total (cfs)	37719.2	Conv. (cfs)	1057.6	18062.3	18599.3
Length Wtd. (ft)	394.35	Wetted Per. (ft)	59.12	37.18	189.67
Min ch EI (ft)	7785.61	Shear (lb/sq ft)	0.15	0.90	0.43
Alpha	1.78	Stream Power (lb/ft s)	0.22	5.86	1.18
Frictn Loss (ft)	1.97	Cum Volume (acre-ft)	18.50	43.52	15.17
C & E Loss (ft)	0.04	Cum SA (acres)	11.12	10.25	10.04

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	7791.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7790.39	Reach Len. (ft)	442.60	450.16	233.01
Crit W.S. (ft)	7789.84	Flow Area (sq ft)	51.90	176.30	170.17
E.G. Slope (ft/ft)	0.004494	Area (sq ft)	51.90	176.30	170.17
Q Total (cfs)	2181.00	Flow (cfs)	117.45	1416.23	647.32
Top Width (ft)	140.00	Top Width (ft)	40.60	37.18	62.22
Vel total (ft/s)	4.47	Avg Vel. (ft/s)	2.26	8.03	3.80
Max chl Dpth (ft)	4.78	Hydr. Depth (ft)	1.28	4.74	2.73
Conv. Total (cfs)	32532.3	Conv. (cfs)	1752.0	21124.8	9655.5
Length Wtd. (ft)	417.73	Wetted Per. (ft)	42.86	37.18	64.50
Min ch EI (ft)	7785.61	Shear (lb/sq ft)	0.34	1.33	0.74
Alpha	1.55	Stream Power (lb/ft s)	0.77	10.69	2.82
Frictn Loss (ft)	1.97	Cum Volume (acre-ft)	7.53	46.92	5.80
C & E Loss (ft)	0.01	Cum SA (acres)	2.71	10.25	2.31

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-year

E.G. Elev (ft)	7789.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	7789.43	Reach Len. (ft)	442.60	450.16	233.01
Crit W.S. (ft)	7788.65	Flow Area (sq ft)	11.15	140.61	287.96
E.G. Slope (ft/ft)	0.004057	Area (sq ft)	289.45	140.61	287.96
Q Total (cfs)	1657.00	Flow (cfs)	10.22	922.94	723.84
Top Width (ft)	432.02	Top Width (ft)	208.06	37.18	186.78
Vel total (ft/s)	3.75	Avg Vel. (ft/s)	0.78	6.56	2.51
Max chl Dpth (ft)	1.82	Hydr. Depth (ft)	0.27	1.78	1.54
Conv. Total (cfs)	26033.9	Conv. (cfs)	150.4	14469.6	11363.9
Length Wtd. (ft)	400.47	Wetted Per. (ft)	49.96	37.18	188.19
Min ch EI (ft)	7785.61	Shear (lb/sq ft)	0.07	0.96	0.39
Alpha	1.90	Stream Power (lb/ft s)	0.05	6.29	0.97
Frictn Loss (ft)	1.96	Cum Volume (acre-ft)	13.05	37.08	8.66
C & E Loss (ft)	0.01	Cum SA (acres)	9.35	10.25	7.99