

# **APPENDIX I – SHADE TARGETS AND TARGET DEVELOPMENT DATA FOR TEMPERATURE TMDLS IN THE MADISON TMDL PLANNING AREA**

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## **I1.0 INTRODUCTION**

This appendix contains the shade targets and the data used to develop those targets for Cherry Creek, Elk Creek, and Moore Creek. Shade and solar loading were modeled using ArcGIS and the Shade Tool (Washington State Department of Ecology 2007).

## **I2.0 SHADE TARGETS**

### **I2.1 CHERRY CREEK**

**Table I-1** contains the Shade Tool model results for Cherry Creek, the data that was used for the temperature targets (shade surrogate TMDL), the modeled existing solar load, and the percent load reduction needed to meet the temperature TMDL. Vegetation-specific shade curves developed by the EPA and Idaho DEQ were used for shade target development (Shumar and de Varona 2009). Each level IV ecoregion was assigned a shade curve to represent the potential riparian vegetative community for that ecoregion. The level IV ecoregions represented in the Cherry Creek shade model are 17l - Gneissic-Schistone Forested Mountains, 17ab - Dry Gneissic-Schistone-Volcanic Hills, 17g - Mid-Elevation Sedimentary Mountains, and 17w - Townsend Basin. The shade curves selected for these ecoregions are shown in **Figure I-1** through **Figure I-6**.

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
42600	0	74.74526	6.56	E/W	17I	81	59	-22	284	131	6232986.624	2875074.82	53.66%
42550	0.03106855	57.26489	6.56	NE/SW	17I	77	64	-13	249	159	5464836.864	3489594.62	36.11%
42500	0.0621371	33.69031	6.56	NE/SW	17I	77	68	-9	222	160	4872264.192	3511541.76	28.12%
42450	0.09320565	54.46249	6.56	NE/SW	17I	77	69	-8	217	161	4762528.512	3533488.9	25.81%
42400	0.1242742	30.96403	6.56	NE/SW	17I	77	74	-3	180	159	3950484.48	3489594.62	11.54%
42350	0.15534275	40.23632	6.56	NE/SW	17I	77	62	-15	264	160	5794043.904	3511541.76	39.47%
42300	0.1864113	40.60078	6.56	NE/SW	17I	77	62	-15	265	160	5815991.04	3511541.76	39.47%
42250	0.21747985	54.46249	6.56	NE/SW	17I	77	60	-17	277	160	6079356.672	3511541.76	42.50%
42200	0.2485484	55.00769	6.56	NE/SW	17I	77	60	-17	278	160	6101303.808	3511541.76	42.50%
42150	0.27961695	41.18631	6.56	NE/SW	17I	77	62	-15	266	161	5837938.176	3533488.9	39.47%
42100	0.3106855	53.97236	6.56	NE/SW	17I	77	60	-17	277	159	6079356.672	3489594.62	42.50%
42050	0.34175405	79.8449	6.56	E/W	17I	81	53	-28	328	133	7198660.608	2918969.09	59.57%
42000	0.3728226	21.80184	6.56	N/S	17I	75	76	1	171	178	3752960.256	3906590.21	0.00%
41950	0.40389115	26.56505	6.56	NE/SW	17I	77	75	-2	173	159	3796854.528	3489594.62	8.00%
41900	0.4349597	32.47145	6.56	NE/SW	17I	77	74	-3	180	159	3950484.48	3489594.62	11.54%
41850	0.46602825	20.55605	6.56	N/S	17I	75	76	1	170	177	3731013.12	3884643.07	0.00%
41800	0.4970968	43.1655	6.56	NE/SW	17I	77	72	-5	196	161	4301638.656	3533488.9	17.86%
41750	0.52816535	63.43495	6.56	NE/SW	17I	77	87	10	93	164	2041083.648	3599330.3	0.00%
41700	0.5592339	60.64238	6.56	NE/SW	17I	77	87	10	88	156	1931347.968	3423753.22	0.00%
41650	0.59030245	47.48958	6.56	NE/SW	17I	77	71	-6	204	161	4477215.744	3533488.9	20.69%
41600	0.621371	59.0357	6.56	NE/SW	17I	77	67	-10	228	159	5003947.008	3489594.62	30.30%
41550	0.65243955	32.47145	6.56	NE/SW	17I	77	80	3	140	161	3072599.04	3533488.9	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
41500	0.6835081	30.46559	6.56	NE/SW	17I	77	81	4	136	165	2984810.496	3621277.44	0.00%
41450	0.71457665	57.52895	6.56	NE/SW	17I	77	89	12	76	160	1667982.336	3511541.76	0.00%
41400	0.7456452	52.43118	6.56	NE/SW	17I	77	88	11	84	161	1843559.424	3533488.9	0.00%
41350	0.77671375	71.5649	6.56	E/W	17I	81	91	10	60	126	1316828.16	2765339.14	0.00%
41300	0.8077823	59.42074	6.56	NE/SW	17I	77	90	13	73	168	1602140.928	3687118.85	0.00%
41250	0.83885085	41.98752	6.56	NE/SW	17I	77	87	10	89	157	1953295.104	3445700.35	0.00%
41200	0.8699194	50.19448	6.56	NE/SW	17I	77	88	11	83	159	1821612.288	3489594.62	0.00%
41150	0.90098795	50.19448	6.56	NE/SW	17I	77	88	11	83	159	1821612.288	3489594.62	0.00%
41100	0.9320565	57.52855	6.56	NE/SW	17I	77	89	12	76	159	1667982.336	3489594.62	0.00%
41050	0.96312505	45	6.56	NE/SW	17I	77	61	-16	273	161	5991568.128	3533488.9	41.03%
41000	0.9941936	21.03767	6.56	N/S	17I	75	65	-10	248	177	5442889.728	3884643.07	28.57%
40950	1.02526215	54.4622	6.56	NE/SW	17I	77	55	-22	315	161	6913347.84	3533488.9	48.89%
40900	1.0563307	65.55583	6.56	NE/SW	17I	77	49	-28	356	160	7813180.416	3511541.76	54.90%
40850	1.08739925	61.3893	6.56	NE/SW	17I	77	60	-17	277	159	6079356.672	3489594.62	42.50%
40800	1.1184678	104.0364	6.56	E/W	17I	81	40	-41	415	132	9108061.44	2897021.95	68.33%
40750	1.14953635	89.23966	6.56	E/W	17I	81	36	-45	445	132	9766475.52	2897021.95	70.31%
40700	1.1806049	79.69505	6.56	E/W	17I	81	38	-43	434	133	9525057.024	2918969.09	69.35%
40650	1.21167345	69.6978	6.56	E/W	17I	81	41	-40	415	134	9108061.44	2940916.22	67.80%
40600	1.242742	32.20848	6.56	NE/SW	17I	77	54	-23	317	159	6957242.112	3489594.62	50.00%
40550	1.27381055	81.8699	6.56	E/W	17I	81	37	-44	439	132	9634792.704	2897021.95	69.84%
40500	1.3048791	82.4053	6.56	E/W	17I	81	37	-44	439	133	9634792.704	2918969.09	69.84%
40450	1.33594765	75.96376	6.56	E/W	17I	81	39	-42	425	132	9327532.8	2897021.95	68.85%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
40400	1.3670162	129.2897	6.56	NW/SE	17I	77	51	-26	344	162	7549814.784	3555436.03	53.06%
40350	1.39808475	71.56484	6.56	E/W	17I	81	41	-40	412	133	9042220.032	2918969.09	67.80%
40300	1.4291533	60.25512	6.56	NE/SW	17I	77	47	-30	370	160	8120440.32	3511541.76	56.60%
40250	1.46022185	111.8011	6.56	E/W	17I	81	43	-38	398	133	8734960.128	2918969.09	66.67%
40200	1.4912904	52.12511	6.56	NE/SW	17I	77	50	-27	348	160	7637603.328	3511541.76	54.00%
40150	1.52235895	57.52895	6.56	NE/SW	17I	77	48	-29	361	160	7922916.096	3511541.76	55.77%
40100	1.5534275	45	6.56	NE/SW	17I	77	97	20	24	185	526731.264	4060220.16	0.00%
40050	1.58449605	32.00517	6.56	NE/SW	17I	77	97	20	23	175	504784.128	3840748.8	0.00%
40000	1.6155646	26.56487	6.56	NE/SW	17I	77	97	20	23	174	504784.128	3818801.66	0.00%
39950	1.64663315	24.44417	6.56	NE/SW	17I	77	97	20	24	187	526731.264	4104114.43	0.00%
39900	1.6777017	0	6.56	N/S	17I	75	71	-4	201	173	4411374.336	3796854.53	13.79%
39850	1.70877025	75.96357	6.56	E/W	17I	81	86	5	95	129	2084977.92	2831180.54	0.00%
39800	1.7398388	12.52895	6.56	N/S	17I	75	85	10	102	170	2238607.872	3731013.12	0.00%
39750	1.77090735	15.94563	6.56	N/S	17I	75	85	10	102	170	2238607.872	3731013.12	0.00%
39700	1.8019759	16.69942	6.56	N/S	17I	75	85	10	102	169	2238607.872	3709065.98	0.00%
39650	1.83304445	35.53768	6.56	NE/SW	17I	77	74	-3	182	161	3994378.752	3533488.9	11.54%
39600	1.864113	8.130227	6.56	N/S	17I	75	72	-3	196	175	4301638.656	3840748.8	10.71%
39550	1.89518155	314.9994	6.56	NW/SE	17I	77	62	-15	263	159	5772096.768	3489594.62	39.47%
39500	1.9262501	50.19443	6.56	NE/SW	17I	77	76	-1	171	163	3752960.256	3577383.17	4.17%
39450	1.95731865	120.9643	6.56	NW/SE	17I	77	77	0	161	161	3533488.896	3533488.9	0.00%
39400	1.9883872	345.9643	6.56	N/S	17I	75	69	-6	213	172	4674739.968	3774907.39	19.35%
39350	2.01945575	90	6.56	E/W	17I	81	83	2	120	134	2633656.32	2940916.22	0.00%

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Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
39300	2.0505243	56.31005	6.56	NE/SW	17I	77	77	0	162	162	3555436.032	3555436.03	0.00%
39250	2.08159285	60.25474	6.56	NE/SW	17I	77	77	0	159	159	3489594.624	3489594.62	0.00%
39200	2.1126614	17.10286	6.56	N/S	17I	75	73	-2	191	177	4191902.976	3884643.07	7.41%
39150	2.14372995	75.96363	6.56	E/W	17I	81	81	0	133	133	2918969.088	2918969.09	0.00%
39100	2.1747985	74.74526	6.56	E/W	17I	81	86	5	95	129	2084977.92	2831180.54	0.00%
39050	2.20586705	123.6901	6.56	NW/SE	17I	77	85	8	104	159	2282502.144	3489594.62	0.00%
39000	2.2369356	94.08565	6.56	E/W	17I	81	87	6	89	131	1953295.104	2875074.82	0.00%
38950	2.26800415	168.6898	6.56	N/S	17I	75	85	10	102	171	2238607.872	3752960.26	0.00%
38900	2.2990727	102.9947	6.56	E/W	17I	81	86	5	94	128	2063030.784	2809233.41	0.00%
38850	2.33014125	0	6.56	N/S	17I	75	85	10	102	170	2238607.872	3731013.12	0.00%
38800	2.3612098	352.8749	6.56	N/S	17I	75	85	10	102	170	2238607.872	3731013.12	0.00%
38750	2.39227835	45	6.56	NE/SW	17I	77	85	8	105	161	2304449.28	3533488.9	0.00%
38700	2.4233469	39.80552	6.56	NE/SW	17I	77	92	15	57	164	1250986.752	3599330.3	0.00%
38650	2.45441545	32.73511	6.56	NE/SW	17I	77	92	15	59	169	1294881.024	3709065.98	0.00%
38600	2.485484	82.87532	6.56	E/W	17I	81	91	10	66	140	1448510.976	3072599.04	0.00%
38550	2.51655255	79.69505	6.56	E/W	17I	81	97	16	19	122	416995.584	2677550.59	0.00%
38500	2.5476211	77.90506	6.56	E/W	17I	81	97	16	18	112	395048.448	2458079.23	0.00%
38450	2.57868965	93.17952	6.56	E/W	17I	81	97	16	20	127	438942.72	2787286.27	0.00%
38400	2.6097582	94.76368	6.56	E/W	17I	81	97	16	20	125	438942.72	2743392	0.00%
38350	2.64082675	43.02505	6.56	NE/SW	17I	77	97	20	21	159	460889.856	3489594.62	0.00%
38300	2.6718953	17.52566	6.56	N/S	17I	75	97	22	22	184	482836.992	4038273.02	0.00%
38250	2.70296385	23.96246	6.56	NE/SW	17I	77	97	20	22	172	482836.992	3774907.39	0.00%

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Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
38200	2.7340324	85.23657	6.56	E/W	17I	81	97	16	19	120	416995.584	2633656.32	0.00%
38150	2.76510095	74.745	6.56	E/W	17I	81	98	17	17	165	373101.312	3621277.44	0.00%
38100	2.7961695	29.35762	6.56	NE/SW	17I	77	97	20	23	179	504784.128	3928537.34	0.00%
38050	2.82723805	40.60126	6.56	NE/SW	17I	77	97	20	22	165	482836.992	3621277.44	0.00%
38000	2.8583066	24.22772	6.56	NE/SW	17I	77	97	20	23	175	504784.128	3840748.8	0.00%
37950	2.88937515	27.75881	6.56	NE/SW	17I	77	97	20	24	181	526731.264	3972431.62	0.00%
37900	2.9204437	81.87005	6.56	E/W	17I	81	97	16	19	122	416995.584	2677550.59	0.00%
37850	2.95151225	73.61031	6.56	E/W	17I	81	97	16	19	123	416995.584	2699497.73	0.00%
37800	2.9825808	12.09442	6.56	N/S	17I	75	97	22	23	188	504784.128	4126061.57	0.00%
37750	3.01364935	63.4347	6.56	NE/SW	17I	77	97	20	20	155	438942.72	3401806.08	0.00%
37700	3.0447179	122.0054	6.56	NW/SE	17I	77	97	20	22	166	482836.992	3643224.58	0.00%
37650	3.07578645	111.8016	6.56	E/W	17I	81	97	16	21	132	460889.856	2897021.95	0.00%
37600	3.106855	134.9996	6.56	NW/SE	17I	77	97	20	21	160	460889.856	3511541.76	0.00%
37550	3.13792355	104.0361	6.56	E/W	17I	81	97	16	19	122	416995.584	2677550.59	0.00%
37500	3.1689921	122.7356	6.56	NW/SE	17I	77	97	20	22	165	482836.992	3621277.44	0.00%
37450	3.20006065	149.0361	6.56	NW/SE	17I	77	97	20	22	168	482836.992	3687118.85	0.00%
37400	3.2311292	124.6951	6.56	NW/SE	17I	77	97	20	20	153	438942.72	3357911.81	0.00%
37350	3.26219775	103.4958	6.56	E/W	17I	81	96	15	29	139	636466.944	3050651.9	0.00%
37300	3.2932663	120.2563	6.56	NW/SE	17I	77	95	18	36	167	790096.896	3665171.71	0.00%
37250	3.32433485	120.9638	6.56	NW/SE	17I	77	95	18	37	171	812044.032	3752960.26	0.00%
37200	3.3554034	107.1029	6.56	E/W	17I	81	96	15	29	138	636466.944	3028704.77	0.00%
37150	3.38647195	108.4347	6.56	E/W	17I	81	97	16	20	126	438942.72	2765339.14	0.00%

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Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
37100	3.4175405	130.2363	6.56	NW/SE	17I	77	97	20	23	176	504784.128	3862695.94	0.00%
37050	3.44860905	63.43513	6.56	NE/SW	17I	77	97	20	20	156	438942.72	3423753.22	0.00%
37000	3.4796776	47.12089	6.56	NE/SW	17I	77	97	20	21	160	460889.856	3511541.76	0.00%
36950	3.51074615	43.02505	6.56	NE/SW	17I	77	97	20	21	161	460889.856	3533488.9	0.00%
36900	3.5418147	36.25377	6.56	NE/SW	17I	77	97	20	23	173	504784.128	3796854.53	0.00%
36850	3.57288325	53.74604	6.56	NE/SW	17I	77	97	20	23	174	504784.128	3818801.66	0.00%
36800	3.6039518	64.53643	6.56	NE/SW	17I	77	97	20	22	171	482836.992	3752960.26	0.00%
36750	3.63502035	72.64622	6.56	E/W	17I	81	97	16	20	129	438942.72	2831180.54	0.00%
36700	3.6660889	53.97273	6.56	NE/SW	17I	77	59	-18	286	160	6276880.896	3511541.76	43.90%
36650	3.69715745	84.80555	6.56	E/W	17I	81	39	-42	423	132	9283638.528	2897021.95	68.85%
36600	3.728226	51.34027	6.56	NE/SW	17I	77	58	-19	290	159	6364669.44	3489594.62	45.24%
36550	3.75929455	113.1984	6.56	NW/SE	17I	77	40	-37	419	161	9195849.984	3533488.9	61.67%
36500	3.7903631	71.5649	6.56	E/W	17I	81	40	-41	415	131	9108061.44	2875074.82	68.33%
36450	3.82143165	42.51042	6.56	NE/SW	17I	77	48	-29	361	160	7922916.096	3511541.76	55.77%
36400	3.8525002	70.34643	6.56	E/W	17I	81	38	-43	432	133	9481162.752	2918969.09	69.35%
36350	3.88356875	69.44404	6.56	E/W	17I	81	39	-42	428	133	9393374.208	2918969.09	68.85%
36300	3.9146373	24.77532	6.56	NE/SW	17I	77	51	-26	343	161	7527867.648	3533488.9	53.06%
36250	3.94570585	69.4437	6.56	E/W	17I	81	39	-42	428	133	9393374.208	2918969.09	68.85%
36200	3.9767744	69.67671	6.56	E/W	17I	81	38	-43	430	132	9437268.48	2897021.95	69.35%
36150	4.00784295	69.1456	6.56	E/W	17I	81	49	-32	358	133	7857074.688	2918969.09	62.75%
36100	4.0389115	90	6.56	E/W	17I	81	40	-41	420	133	9217797.12	2918969.09	68.33%
36050	4.06998005	74.35762	6.56	E/W	17I	81	45	-36	386	133	8471594.496	2918969.09	65.45%



**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
36000	4.1010486	82.87492	6.56	E/W	17I	81	41	-40	412	133	9042220.032	2918969.09	67.80%
35950	4.13211715	65.7724	6.56	NE/SW	17I	77	51	-26	339	159	7440079.104	3489594.62	53.06%
35900	4.1631857	90	6.56	E/W	17I	81	33	-48	470	133	10315153.92	2918969.09	71.64%
35850	4.19425425	86.42364	6.56	E/W	17I	81	33	-48	468	133	10271259.65	2918969.09	71.64%
35800	4.2253228	39.80552	6.56	NE/SW	17I	77	49	-28	356	161	7813180.416	3533488.9	54.90%
35750	4.25639135	28.07234	6.56	NE/SW	17I	77	51	-26	341	160	7483973.376	3511541.76	53.06%
35700	4.2874599	113.9619	6.56	NW/SE	17I	77	41	-36	411	160	9020272.896	3511541.76	61.02%
35650	4.31852845	83.65977	6.56	E/W	17I	81	33	-48	466	132	10227365.38	2897021.95	71.64%
35600	4.349597	34.50844	6.56	NE/SW	17I	77	50	-27	349	161	7659550.464	3533488.9	54.00%
35550	4.38066555	50.71065	6.56	NE/SW	17I	77	46	-31	376	160	8252123.136	3511541.76	57.41%
35500	4.4117341	120.9636	6.56	NW/SE	17I	77	43	-34	396	160	8691065.856	3511541.76	59.65%
35450	4.44280265	81.86977	13.12	E/W	17I	60	18	-42	570	278	25019735.04	12202607.6	51.22%
35400	4.4738712	25.30825	13.12	NE/SW	17I	57	32	-25	473	299	20761990.66	13124387.3	36.76%
35350	4.50493975	131.9875	13.12	NW/SE	17I	57	27	-30	508	300	22298290.18	13168281.6	41.10%
35300	4.5360083	79.3802	13.12	E/W	17I	60	18	-42	570	278	25019735.04	12202607.6	51.22%
35250	4.56707685	60.25507	16.4	NE/SW	17I	51	18	-33	569	340	31219800.96	18655065.6	40.24%
35200	4.5981454	45	16.4	NE/SW	17I	51	22	-29	541	340	29683501.44	18655065.6	37.18%
35150	4.62921395	87.87888	16.4	E/W	17I	52	15	-37	591	334	32426893.44	18325858.6	43.53%
35100	4.6602825	90	16.4	E/W	17I	52	17	-35	579	335	31768479.36	18380726.4	42.17%
35050	4.69135105	93.57636	13.12	E/W	17I	60	17	-43	580	280	25458677.76	12290396.2	51.81%
35000	4.7224196	109.9833	16.4	E/W	17I	52	22	-30	543	334	29793237.12	18325858.6	38.46%
34950	4.75348815	99.46241	13.12	E/W	17I	60	85	25	103	275	4521110.016	12070924.8	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
34900	4.7845567	119.0544	13.12	NW/SE	17I	57	90	33	68	291	2984810.496	12773233.2	0.00%
34850	4.81562525	132.5104	16.4	NW/SE	17I	51	88	37	82	336	4499162.88	18435594.2	0.00%
34800	4.8466938	90	9.84	E/W	17I	71	95	24	32	187	1053462.528	6156171.65	0.00%
34750	4.87776235	102.9943	16.4	E/W	17I	52	91	39	61	327	3346938.24	17941783.7	0.00%
34700	4.9088309	125.2175	13.12	NW/SE	17I	57	90	33	73	314	3204281.856	13782801.4	0.00%
34650	4.93989945	107.7446	13.12	E/W	17I	60	94	34	44	294	1931347.968	12904916	0.00%
34600	4.970968	73.61036	13.12	E/W	17I	60	94	34	41	270	1799665.152	11851453.4	0.00%
34550	5.00203655	106.9274	16.4	E/W	17I	52	89	37	75	326	4115088	17886915.8	0.00%
34500	5.0331051	105.9455	9.84	E/W	17I	71	96	25	31	227	1020541.824	7472999.81	0.00%
34450	5.06417365	87.69259	13.12	E/W	17I	60	94	34	39	259	1711876.608	11368616.4	0.00%
34400	5.0952422	85.60126	13.12	E/W	17I	60	94	34	41	272	1799665.152	11939242	0.00%
34350	5.12631075	75.46565	13.12	E/W	17I	60	92	32	58	288	2545867.776	12641550.3	0.00%
34300	5.1573793	94.08565	9.84	E/W	17I	71	95	24	32	188	1053462.528	6189092.35	0.00%
34250	5.18844785	85.91435	16.4	E/W	17I	52	81	29	130	328	7132819.2	17996651.5	0.00%
34200	5.2195164	57.99444	13.12	NE/SW	17I	57	77	20	159	297	6979189.248	13036598.8	0.00%
34150	5.25058495	64.53678	9.84	NE/SW	17I	66	95	29	35	239	1152224.64	7868048.26	0.00%
34100	5.2816535	78.11152	13.12	E/W	17I	60	94	34	39	262	1711876.608	11500299.3	0.00%
34050	5.31272205	94.63534	13.12	E/W	17I	60	94	34	40	267	1755770.88	11719770.6	0.00%
34000	5.3437906	91.36394	13.12	E/W	17I	60	94	34	43	289	1887453.696	12685444.6	0.00%
33950	5.37485915	79.11461	13.12	E/W	17I	60	94	34	45	300	1975242.24	13168281.6	0.00%
33900	5.4059277	92.20262	13.12	E/W	17I	60	95	35	37	292	1624088.064	12817127.4	0.00%
33850	5.43699625	76.42967	13.12	E/W	17I	60	94	34	39	262	1711876.608	11500299.3	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
33800	5.4680648	73.73989	9.84	E/W	17I	71	95	24	36	207	1185145.344	6814585.73	0.00%
33750	5.49913335	63.43495	9.84	NE/SW	17I	66	94	28	40	226	1316828.16	7440079.1	0.00%
33700	5.5302019	48.17985	16.4	NE/SW	17I	51	89	38	75	333	4115088	18270990.7	0.00%
33650	5.56127045	74.93161	16.4	E/W	17I	52	90	38	72	345	3950484.48	18929404.8	0.00%
33600	5.592339	75.37925	13.12	E/W	17I	60	92	32	52	262	2282502.144	11500299.3	0.00%
33550	5.62340755	85.81504	13.12	E/W	17I	60	94	34	39	260	1711876.608	11412510.7	0.00%
33500	5.6544761	50.90618	6.56	NE/SW	17I	77	96	19	25	141	548678.4	3094546.18	0.00%
33450	5.68554465	70.71013	9.84	E/W	17I	71	95	24	36	209	1185145.344	6880427.14	0.00%
33400	5.7166132	50.90618	9.84	NE/SW	17I	66	93	27	48	235	1580193.792	7736365.44	0.00%
33350	5.74768175	63.43506	13.12	NE/SW	17I	57	91	34	66	314	2897021.952	13782801.4	0.00%
33300	5.7787503	73.73966	16.4	E/W	17I	52	81	29	133	337	7297422.72	18490462.1	0.00%
33250	5.80981885	85.03048	19.68	E/W	17I	46	86	40	101	388	6649982.208	25546466.3	0.00%
33200	5.8408874	45	19.68	NE/SW	17I	46	83	37	121	385	7966810.368	25348942.1	0.00%
33150	5.87195595	53.12998	16.4	NE/SW	17I	51	76	25	169	346	9272664.96	18984272.6	0.00%
33100	5.9030245	145.4914	19.68	NW/SE	17I	46	81	35	133	379	8756907.264	24953893.6	0.00%
33050	5.93409305	104.0363	19.68	E/W	17I	46	82	36	128	385	8427700.224	25348942.1	0.00%
33000	5.9651616	101.31	19.68	E/W	17I	46	81	35	131	373	8625224.448	24558845.2	0.00%
32950	5.99623015	90	16.4	E/W	17I	52	93	41	47	323	2578788.48	17722312.3	0.00%
32900	6.0272987	90	13.12	E/W	17I	60	94	34	43	283	1887453.696	12422079	0.00%
32850	6.05836725	76.60737	22.96	E/W	17I	41	82	41	126	412	9678686.976	31647770.1	0.00%
32800	6.0894358	115.0167	22.96	NW/SE	17I	42	79	37	146	403	11214986.5	30956435.3	0.00%
32750	6.12050435	100.3044	16.4	E/W	17I	52	88	36	85	339	4663766.4	18600197.8	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
32700	6.1515729	105.9453	26.24	E/W	17l	36	65	29	248	453	21771558.91	39768210.4	0.00%
32650	6.18264145	66.37066	26.24	NE/SW	17l	39	63	24	257	424	22561655.81	37222342.7	0.00%
32600	6.21371	130.2363	26.24	NW/SE	17l	39	63	24	260	429	22825021.44	37661285.4	0.00%
32550	6.24477855	117.646	29.52	NW/SE	17l	36	61	25	271	444	26764532.35	43850377.7	0.00%
32500	6.2758471	112.9321	19.68	NW/SE	17l	46	80	34	136	368	8954431.488	24229638.1	0.00%
32450	6.30691565	108.9246	13.12	E/W	17l	60	93	33	49	281	2150819.328	12334290.4	0.00%
32400	6.3379842	103.3924	13.12	E/W	17l	60	92	32	55	275	2414184.96	12070924.8	0.00%
32350	6.36905275	92.04543	13.12	E/W	17l	60	93	33	49	282	2150819.328	12378184.7	0.00%
32300	6.4001213	83.65973	13.12	E/W	17l	60	91	31	60	265	2633656.32	11631982.1	0.00%
32250	6.43118985	117.7586	16.4	NW/SE	17l	51	84	33	113	345	6200065.92	18929404.8	0.00%
32200	6.4622584	57.99455	9.84	NE/SW	17l	66	91	25	64	243	2106925.056	7999731.07	0.00%
32150	6.49332695	24.62355	13.12	NE/SW	17l	57	83	26	117	297	5135629.824	13036598.8	0.00%
32100	6.5243955	51.34024	16.4	NE/SW	17l	51	85	34	107	349	5870858.88	19148876.2	0.00%
32050	6.55546405	109.1789	13.12	E/W	17l	60	91	31	60	266	2633656.32	11675876.4	0.00%
32000	6.5865326	59.53441	13.12	NE/SW	17l	57	87	30	92	303	4038273.024	13299964.4	0.00%
31950	6.61760115	70.70986	13.12	E/W	17l	60	87	27	90	278	3950484.48	12202607.6	0.00%
31900	6.6486697	64.53667	9.84	NE/SW	17ab	58	89	31	74	283	2436132.096	9316559.23	0.00%
31850	6.67973825	85.23632	9.84	E/W	17ab	50	92	42	58	363	1909400.832	11950215.6	0.00%
31800	6.7108068	73.81087	9.84	E/W	17ab	50	90	40	67	334	2205687.168	10995515.1	0.00%
31750	6.74187535	50.71065	9.84	NE/SW	17ab	58	87	29	88	283	2897021.952	9316559.23	0.00%
31700	6.7729439	29.05449	9.84	NE/SW	17ab	58	90	32	69	291	2271528.576	9579924.86	0.00%
31650	6.80401245	70.01696	13.12	E/W	17ab	38	86	48	97	429	4257744.384	18830642.7	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
31600	6.835081	70.71013	13.12	E/W	17ab	38	88	50	86	445	3774907.392	19532951	0.00%
31550	6.86614955	83.15717	9.84	E/W	17ab	50	90	40	68	338	2238607.872	11127198	0.00%
31500	6.8972181	61.18918	13.12	NE/SW	17ab	48	85	37	107	372	4696687.104	16328669.2	0.00%
31450	6.92828665	45	9.84	NE/SW	17ab	58	88	30	86	303	2831180.544	9974973.31	0.00%
31400	6.9593552	64.05764	13.12	NE/SW	17ab	48	87	39	93	371	4082167.296	16284774.9	0.00%
31350	6.99042375	66.80144	9.84	NE/SW	17ab	58	91	33	64	298	2106925.056	9810369.79	0.00%
31300	7.0214923	46.97474	13.12	NE/SW	17ab	48	86	38	97	361	4257744.384	15845832.2	0.00%
31250	7.05256085	47.72634	16.4	NE/SW	17ab	42	78	36	154	406	8449647.36	22276343	0.00%
31200	7.0836294	10.00804	16.4	N/S	17ab	45	80	35	142	390	7791233.28	21398457.6	0.00%
31150	7.11469795	69.94974	13.12	E/W	17ab	38	85	47	108	445	4740581.376	19532951	0.00%
31100	7.1457665	26.5649	13.12	NE/SW	17ab	48	85	37	106	366	4652792.832	16065303.6	0.00%
31050	7.17683505	66.80162	16.4	NE/SW	17ab	42	80	38	141	410	7736365.44	22495814.4	0.00%
31000	7.2079036	42.27366	13.12	NE/SW	17ab	48	82	34	122	353	5355101.184	15494678	0.00%
30950	7.23897215	332.1027	13.12	NW/SE	17ab	48	84	36	111	360	4872264.192	15801937.9	0.00%
30900	7.2700407	25.20141	16.4	NE/SW	17ab	42	81	39	134	410	7352290.56	22495814.4	0.00%
30850	7.30110925	60.25507	13.12	NE/SW	17ab	48	82	34	125	362	5486784	15889726.5	0.00%
30800	7.3321778	8.746234	16.4	N/S	17ab	45	81	36	134	388	7352290.56	21288721.9	0.00%
30750	7.36324635	345.9636	16.4	N/S	17ab	45	87	42	94	398	5157576.96	21837400.3	0.00%
30700	7.3943149	35.73609	29.52	NE/SW	17ab	26	59	33	288	519	28443488.26	51257536.1	0.00%
30650	7.42538345	66.37048	19.68	NE/SW	17ab	36	81	45	130	438	8559383.04	28838536.7	0.00%
30600	7.456452	5.19448	19.68	N/S	17ab	39	80	41	136	415	8954431.488	27324184.3	0.00%
30550	7.48752055	0	19.68	N/S	17ab	39	80	41	142	432	9349479.936	28443488.3	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
30500	7.5185891	33.68995	22.96	NE/SW	17ab	32	74	42	180	470	13826695.68	36103038.7	0.00%
30450	7.54965765	18.4347	22.96	N/S	17ab	35	76	41	166	449	12751286.02	34489924.2	0.00%
30400	7.5807262	41.6335	22.96	NE/SW	17ab	32	75	43	172	468	13212175.87	35949408.8	0.00%
30350	7.61179475	90	22.96	E/W	17ab	23	70	47	211	541	16207959.94	41556902	0.00%
30300	7.6428633	29.74474	19.68	NE/SW	17ab	36	79	43	148	451	9744528.384	29694475	0.00%
30250	7.67393185	21.03767	26.24	N/S	17ab	32	71	39	199	467	17469920.26	40997250	0.00%
30200	7.7050004	47.72634	22.96	NE/SW	17ab	32	74	42	183	478	14057140.61	36717558.5	0.00%
30150	7.73606895	9.462378	26.24	N/S	17ab	32	69	37	219	479	19225691.14	42050712.6	0.00%
30100	7.7671375	52.12511	26.24	NE/SW	17ab	29	64	35	252	497	22122713.09	43630906.4	0.00%
30050	7.79820605	32.47105	26.24	NE/SW	17ab	29	31	2	483	497	42401866.75	43630906.4	0.00%
30000	7.8292746	5.710347	29.52	N/S	17ab	29	33	4	471	499	46516954.75	49282293.9	0.00%
29950	7.86034315	330.6424	22.96	NW/SE	17ab	32	51	19	342	474	26270721.79	36410298.6	0.00%
29900	7.8914117	76.60765	26.24	E/W	17ab	20	35	15	452	556	39680421.89	48810430.5	0.00%
29850	7.92248025	33.69016	16.4	NE/SW	17ab	42	68	26	224	406	12290396.16	22276343	0.00%
29800	7.9535488	54.4622	13.12	NE/SW	17ab	48	46	-2	378	364	16592034.82	15977515	3.70%
29750	7.98461735	77.90515	19.68	E/W	17ab	27	25	-2	525	511	34566739.2	33644959.5	2.67%
29700	8.0156859	334.9833	16.4	NW/SE	17ab	42	64	22	251	405	13771827.84	22221475.2	0.00%
29650	8.04675445	28.07251	19.68	NE/SW	17ab	36	45	9	386	449	25414783.49	29562792.2	0.00%
29600	8.077823	77.47138	22.96	E/W	17ab	23	23	0	540	540	41480087.04	41480087	0.00%
29550	8.10889155	15.94551	13.12	N/S	17ab	51	56	5	305	339	13387752.96	14880158.2	0.00%
29500	8.1399601	40.60126	22.96	NE/SW	17ab	32	39	7	425	474	32646364.8	36410298.6	0.00%
29450	8.17102865	37.8751	19.68	NE/SW	17ab	36	41	5	409	444	26929135.87	29233585.2	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
29400	8.2020972	31.60737	19.68	NE/SW	17ab	36	45	9	386	449	25414783.49	29562792.2	0.00%
29350	8.23316575	57.26489	19.68	NE/SW	17ab	36	34	-2	461	447	30352889.09	29431109.4	3.03%
29300	8.2642343	355.9148	16.4	N/S	17ab	45	60	15	281	386	15417863.04	21178986.2	0.00%
29250	8.29530285	41.18631	16.4	NE/SW	17ab	42	24	-18	532	406	29189690.88	22276343	23.68%
29200	8.3263714	351.2538	19.68	N/S	17ab	39	24	-15	533	427	35093470.46	28114281.2	19.74%
29150	8.35743995	306.2056	22.96	NW/SE	17ab	32	17	-15	579	474	44475871.1	36410298.6	18.07%
29100	8.3885085	26.56484	22.96	NE/SW	17ab	32	20	-12	561	477	43093201.54	36640743.6	15.00%
29050	8.41957705	345.0685	32.8	N/S	17ab	26	15	-11	592	515	64963522.56	56513875.2	12.94%
29000	8.4506456	276.3402	16.4	E/W	17ab	31	15	-16	592	481	32481761.28	26391431	18.82%
28950	8.48171415	0	26.24	N/S	17ab	32	19	-13	567	476	49776104.45	41787346.9	16.05%
28900	8.5127827	352.4057	16.4	N/S	17ab	45	49	4	354	382	19423215.36	20959514.9	0.00%
28850	8.54385125	337.38	19.68	NW/SE	17ab	36	45	9	381	444	25085576.45	29233585.2	0.00%
28800	8.5749198	0	22.96	N/S	17ab	35	56	21	309	457	23735827.58	35104444	0.00%
28750	8.60598835	30.25666	22.96	NE/SW	17ab	32	53	21	327	473	25118497.15	36333483.6	0.00%
28700	8.6370569	38.65973	16.4	NE/SW	17ab	42	36	-6	446	404	24471056.64	22166607.4	9.37%
28650	8.66812545	3.81413	29.52	N/S	17ab	29	18	-11	571	494	56393165.95	48788483.3	13.41%
28600	8.699194	30.25666	16.4	NE/SW	17ab	42	28	-14	500	403	27433920	22111739.5	19.44%
28550	8.73026255	236.3101	16.4	NE/SW	17ab	42	30	-12	490	406	26885241.6	22276343	17.14%
28500	8.7613311	329.036	22.96	NW/SE	17ab	32	52	20	334	473	25656201.98	36333483.6	0.00%
28450	8.79239965	35.97277	16.4	NE/SW	17ab	42	63	21	257	403	14101034.88	22111739.5	0.00%
28400	8.8234682	7.125064	29.52	N/S	17ab	29	50	21	350	497	34566739.2	49084769.7	0.00%
28350	8.85453675	41.18587	26.24	NE/SW	17ab	29	46	17	380	500	33359646.72	43894272	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
28300	8.8856053	326.3095	19.68	NW/SE	17ab	36	55	19	315	449	20740043.52	29562792.2	0.00%
28250	8.91667385	37.56852	19.68	NE/SW	17ab	36	58	22	295	450	19423215.36	29628633.6	0.00%
28200	8.9477424	37.56852	19.68	NE/SW	17ab	36	55	19	312	443	20542519.3	29167743.7	0.00%
28150	8.97881095	354.2893	22.96	N/S	17ab	35	62	27	265	453	20355968.64	34797184.1	0.00%
28100	9.0098795	11.82185	26.24	N/S	17ab	32	55	23	312	472	27390025.73	41436192.8	0.00%
28050	9.04094805	0	26.24	N/S	17ab	32	52	20	338	479	29672527.87	42050712.6	0.00%
28000	9.0720166	13.2406	16.4	N/S	17ab	45	64	19	251	384	13771827.84	21069250.6	0.00%
27950	9.10308515	64.79889	16.4	NE/SW	17ab	42	55	13	313	403	17173633.92	22111739.5	0.00%
27900	9.1341537	60.25526	22.96	NE/SW	17ab	32	47	15	372	477	28575171.07	36640743.6	0.00%
27850	9.16522225	96.34027	19.68	E/W	17ab	27	44	17	390	509	25678149.12	33513276.7	0.00%
27800	9.1962908	337.38	26.24	NW/SE	17ab	29	51	22	342	495	30023682.05	43455329.3	0.00%
27750	9.22735935	0	26.24	N/S	17ab	32	34	2	462	476	40558307.33	41787346.9	0.00%
27700	9.2584279	33.69039	22.96	NE/SW	17ab	32	31	-1	480	473	36871188.48	36333483.6	1.45%
27650	9.28949645	0	26.24	N/S	17ab	32	34	2	459	473	40294941.7	41523981.3	0.00%
27600	9.320565	36.87027	26.24	NE/SW	17ab	29	27	-2	512	498	44947734.53	43718694.9	2.74%
27550	9.35163355	319.3992	26.24	NW/SE	17ab	29	38	9	431	494	37836862.46	43367540.7	0.00%
27500	9.3827021	18.4351	26.24	N/S	17ab	32	34	2	462	476	40558307.33	41787346.9	0.00%
27450	9.41377065	355.6013	22.96	N/S	17ab	35	39	4	426	454	32723179.78	34873999.1	0.00%
27400	9.4448392	339.4437	29.52	N/S	17ab	29	38	9	432	495	42665232.38	48887245.4	0.00%
27350	9.47590775	39.80557	29.52	NE/SW	17ab	26	45	19	381	512	37628364.67	50566201.3	0.00%
27300	9.5069763	23.96275	26.24	NE/SW	17ab	29	51	22	343	496	30111470.59	43543117.8	0.00%
27250	9.53804485	303.6898	26.24	NW/SE	17ab	29	45	16	381	492	33447435.26	43191963.6	0.00%



**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
27200	9.5691134	94.39874	26.24	E/W	17ab	20	29	9	495	558	43455329.28	48986007.6	0.00%
27150	9.60018195	12.09485	22.96	N/S	17ab	35	39	4	425	453	32646364.8	34797184.1	0.00%
27100	9.6312505	30.96403	22.96	NE/SW	17ab	32	40	8	420	476	32262289.92	36563928.6	0.00%
27050	9.66231905	116.5648	32.8	NW/SE	17ab	24	35	11	456	533	50039470.08	58489117.4	0.00%
27000	9.6933876	354.8055	29.52	N/S	17ab	29	46	17	373	491	36838267.78	48492197	0.00%
26950	9.72445615	47.72662	32.8	NE/SW	17ab	24	21	-3	553	532	60683831.04	58379381.8	3.80%
26900	9.7555247	30.25628	29.52	NE/SW	17ab	26	43	17	400	519	39504844.8	51257536.1	0.00%
26850	9.78659325	57.99427	42.64	NE/SW	17ab	19	15	-4	591	564	84309922.94	80458200.6	4.71%
26800	9.8176618	95.71059	49.2	E/W	17ab	11	9	-2	632	618	104029424.6	101724975	2.20%
26750	9.84873035	349.9919	26.24	N/S	17ab	32	49	17	354	472	31077144.58	41436192.8	0.00%
26700	9.8797989	30.96363	39.36	NE/SW	17ab	20	13	-7	604	555	79536420.86	73083962.9	8.05%
26650	9.91086745	12.09494	29.52	N/S	17ab	29	31	2	480	494	47405813.76	48788483.3	0.00%
26600	9.941936	326.3101	36.08	NW/SE	17ab	22	38	16	430	541	51904976.64	65303703.2	0.00%
26550	9.97300455	26.56484	13.12	NE/SW	17ab	48	66	18	238	365	10446836.74	16021409.3	0.00%
26500	10.0040731	333.4352	26.24	NW/SE	17ab	29	49	20	357	497	31340510.21	43630906.4	0.00%
26450	10.0351417	355.6013	16.4	N/S	17ab	45	63	18	257	383	14101034.88	21014382.7	0.00%
26400	10.0662102	21.03783	16.4	N/S	17ab	45	47	2	371	385	20355968.64	21124118.4	0.00%
26350	10.0972788	4.085648	13.12	N/S	17ab	51	67	16	227	337	9963999.744	14792369.7	0.00%
26300	10.1283473	6.709879	22.96	N/S	17ab	35	54	19	320	452	24580792.32	34720369.2	0.00%
26250	10.1594159	317.7263	19.68	NW/SE	17ab	36	57	21	303	451	19949946.62	29694475	0.00%
26200	10.1904844	19.98279	16.4	N/S	17ab	45	65	20	243	382	13332885.12	20959514.9	0.00%
26150	10.221553	349.6952	16.4	N/S	17ab	45	66	21	239	387	13113413.76	21233854.1	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
26100	10.2526215	296.5647	19.68	NW/SE	17ab	36	51	15	340	444	22386078.72	29233585.2	0.00%
26050	10.2836901	18.43526	22.96	N/S	17ab	35	41	6	413	455	31724585.09	34950814.1	0.00%
26000	10.3147586	332.1027	16.4	NW/SE	17ab	42	50	8	348	404	19094008.32	22166607.4	0.00%
25950	10.3458272	5.19448	16.4	N/S	17ab	45	46	1	377	384	20685175.68	21069250.6	0.00%
25900	10.3768957	0	19.68	N/S	17ab	39	41	2	413	427	27192501.5	28114281.2	0.00%
25850	10.4079643	299.0549	32.8	NW/SE	17ab	24	31	7	484	533	53112069.12	58489117.4	0.00%
25800	10.4390328	50.19504	22.96	NE/SW	17ab	32	26	-6	514	472	39482897.66	36256668.7	8.11%
25750	10.4701014	283.7982	22.96	E/W	17ab	23	33	10	467	537	35872593.79	41249642.1	0.00%
25700	10.5011699	37.87489	19.68	NE/SW	17ab	36	21	-15	551	446	36278615.81	29365268	18.99%
25650	10.5322385	331.3893	22.96	NW/SE	17ab	32	42	10	406	476	31186880.26	36563928.6	0.00%
25600	10.563307	270	16.4	E/W	17ab	31	47	16	370	481	20301100.8	26391431	0.00%
25550	10.5943756	0	22.96	N/S	17ab	35	54	19	322	455	24734422.27	34950814.1	0.00%
25500	10.6254441	24.77532	16.4	NE/SW	17ab	42	64	22	249	401	13662092.16	22002003.8	0.00%
25450	10.6565127	281.3101	42.64	E/W	17ab	13	18	5	573	608	81742108.03	86735081.5	0.00%
25400	10.6875812	325.0081	22.96	NW/SE	17ab	32	19	-13	562	472	43170016.51	36256668.7	16.05%
25350	10.7186498	0	29.52	N/S	17ab	29	19	-10	568	498	56096879.62	49183531.8	12.35%
25300	10.7497183	318.0128	22.96	NW/SE	17ab	32	18	-14	571	474	43861351.3	36410298.6	17.07%
25250	10.7807869	336.0373	32.8	NW/SE	17ab	24	31	7	483	532	53002333.44	58379381.8	0.00%
25200	10.8118554	347.471	32.8	N/S	17ab	26	31	5	482	517	52892597.76	56733346.6	0.00%
25150	10.842924	253.3006	29.52	E/W	17ab	18	27	9	512	575	50566201.34	56788214.4	0.00%
25100	10.8739925	279.4624	22.96	E/W	17ab	23	12	-11	617	540	47394840.19	41480087	12.50%
25050	10.9050611	45	22.96	NE/SW	17ab	32	27	-5	507	472	38945192.83	36256668.7	6.85%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
25000	10.9361296	347.0053	19.68	N/S	17ab	39	43	4	400	428	26336563.2	28180122.6	0.00%
24950	10.9671982	116.5646	29.52	NW/SE	17ab	26	19	-7	564	516	55701831.17	50961249.8	8.64%
24900	10.9982667	56.31041	22.96	NE/SW	17ab	32	26	-6	517	475	39713342.59	36487113.6	8.11%
24850	11.0293353	28.30058	22.96	NE/SW	17ab	32	22	-10	546	476	41940976.9	36563928.6	12.82%
24800	11.0604038	342.8971	26.24	N/S	17ab	32	33	1	468	475	41085038.59	41699558.4	0.00%
24750	11.0914724	23.19875	19.68	NE/SW	17ab	36	58	22	293	446	19291532.54	29365268	0.00%
24700	11.1225409	3.814102	16.4	N/S	17ab	45	65	20	246	387	13497488.64	21233854.1	0.00%
24650	11.1536095	55.0084	26.24	NE/SW	17ab	29	45	16	384	496	33710800.9	43543117.8	0.00%
24600	11.184678	15.94522	19.68	N/S	17ab	39	58	19	296	430	19489056.77	28311805.4	0.00%
24550	11.2157466	87.74298	19.68	E/W	17ab	27	41	14	408	505	26863294.46	33249911	0.00%
24500	11.2468151	296.0721	16.4	NW/SE	17ab	42	29	-13	497	406	27269316.48	22276343	18.31%
24450	11.2778837	341.5652	16.4	N/S	17ab	45	50	5	351	386	19258611.84	21178986.2	0.00%
24400	11.3089522	12.99427	16.4	N/S	17ab	45	30	-15	492	386	26994977.28	21178986.2	21.43%
24350	11.3400208	0	13.12	N/S	17ab	51	61	10	270	339	11851453.44	14880158.2	0.00%
24300	11.3710893	29.0549	19.68	NE/SW	17g	46	45	-1	382	375	25151417.86	24690528	1.82%
24250	11.4021579	34.69505	22.96	NE/SW	17g	42	38	-4	435	407	33414514.56	31263695.2	6.45%
24200	11.4332264	45	22.96	NE/SW	17g	42	19	-23	565	404	43400461.44	31033250.3	28.40%
24150	11.464295	348.69	16.4	N/S	17g	49	30	-19	490	357	26885241.6	19587818.9	27.14%
24100	11.4953635	19.98279	13.12	N/S	17g	55	55	0	311	311	13651118.59	13651118.6	0.00%
24050	11.5264321	335.5558	16.4	NW/SE	17g	51	65	14	248	347	13607224.32	19039140.5	0.00%
24000	11.5575006	310.6012	16.4	NW/SE	17g	51	44	-7	392	343	21508193.28	18819669.1	12.50%
23950	11.5885692	293.1986	19.68	NW/SE	17g	46	80	34	137	369	9020272.896	24295479.6	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
23900	11.6196377	256.7594	19.68	E/W	17g	46	16	-30	588	378	38714747.9	24888052.2	35.71%
23850	11.6507063	270	16.4	E/W	17g	52	16	-36	583	333	31987950.72	18270990.7	42.86%
23800	11.6817748	0	19.68	N/S	17g	44	25	-19	523	391	34435056.38	25743990.5	25.33%
23750	11.7128434	0	16.4	N/S	17g	49	31	-18	484	357	26556034.56	19587818.9	26.09%
23700	11.7439119	327.2649	16.4	NW/SE	17g	51	31	-20	482	342	26446298.88	18764801.3	28.99%
23650	11.7749805	281.8884	16.4	E/W	17g	52	20	-32	558	335	30616254.72	18380726.4	40.00%
23600	11.806049	303.6902	19.68	NW/SE	17g	46	20	-26	561	379	36937029.89	24953893.6	32.50%
23550	11.8371176	335.5563	13.12	NW/SE	17g	57	87	30	92	304	4038273.024	13343858.7	0.00%
23500	11.8681861	311.1857	13.12	NW/SE	17g	57	89	32	79	310	3467647.488	13607224.3	0.00%
23450	11.8992547	312.7094	13.12	NW/SE	17g	57	47	-10	373	303	16372563.46	13299964.4	18.87%
23400	11.9303232	296.5648	19.68	NW/SE	17g	46	18	-28	572	376	37661285.38	24756369.4	34.15%
23350	11.9613918	300.9636	22.96	NW/SE	17g	42	19	-23	566	405	43477276.42	31110065.3	28.40%
23300	11.9924603	21.03767	19.68	N/S	17g	44	30	-14	485	388	31933082.88	25546466.3	20.00%
23250	12.0235289	315	26.24	NW/SE	17g	39	26	-13	519	428	45562254.34	37573496.8	17.57%
23200	12.0545974	17.10286	22.96	N/S	17g	41	22	-19	541	409	41556902.02	31417325.2	24.36%
23150	12.085666	353.2901	26.24	N/S	17g	38	24	-14	529	431	46440139.78	37836862.5	18.42%
23100	12.1167345	349.2156	16.4	N/S	17g	49	32	-17	471	353	25842752.64	19368347.5	25.00%
23050	12.1478031	330.6421	19.68	NW/SE	17g	46	29	-17	495	376	32591496.96	24756369.4	23.94%
23000	12.1788716	297.7584	22.96	NW/SE	17g	42	21	-21	554	407	42555496.7	31263695.2	26.58%
22950	12.2099402	70.55985	26.24	E/W	17g	36	28	-8	504	448	44245426.18	39329267.7	11.11%
22900	12.2410087	0	22.96	N/S	17g	41	52	11	337	414	25886646.91	31801400.1	0.00%
22850	12.2720773	10.0081	16.4	N/S	17g	49	55	6	315	357	17283369.6	19587818.9	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
22800	12.3031458	20.8543	13.12	N/S	17g	55	59	4	289	317	12685444.61	13914484.2	0.00%
22750	12.3342144	0	16.4	N/S	17g	49	60	11	276	352	15143523.84	19313479.7	0.00%
22700	12.3652829	0	19.68	N/S	17g	44	56	12	306	390	20147470.85	25678149.1	0.00%
22650	12.3963515	19.44015	22.96	N/S	17g	41	45	4	386	414	29650580.74	31801400.1	0.00%
22600	12.42742	9.865636	22.96	N/S	17g	41	52	11	337	414	25886646.91	31801400.1	0.00%
22550	12.4584886	345.0685	26.24	N/S	17g	38	48	10	360	429	31603875.84	37661285.4	0.00%
22500	12.4895571	32.00528	29.52	NE/SW	17g	36	36	0	444	444	43850377.73	43850377.7	0.00%
22450	12.5206257	72.55282	32.8	E/W	17g	30	21	-9	552	489	60574095.36	53660747.5	11.39%
22400	12.5516942	87.51042	29.52	E/W	17g	33	22	-11	541	465	53430302.59	45924382.1	14.10%
22350	12.5827628	73.49566	26.24	E/W	17g	36	31	-5	479	445	42050712.58	39065902.1	7.25%
22300	12.6138313	33.69	29.52	NE/SW	17g	36	54	18	318	442	31406351.62	43652853.5	0.00%
22250	12.6448999	14.74372	16.4	N/S	17g	49	61	12	270	354	14814316.8	19423215.4	0.00%
22200	12.6759684	31.75918	22.96	NE/SW	17g	42	58	16	296	409	22737232.9	31417325.2	0.00%
22150	12.707037	28.61048	26.24	NE/SW	17g	39	45	6	385	427	33798589.44	37485708.3	0.00%
22100	12.7381055	81.02759	22.96	E/W	17g	41	38	-3	435	413	33414514.56	31724585.1	4.84%
22050	12.7691741	79.28678	19.68	E/W	17g	46	41	-5	411	376	27060818.69	24756369.4	8.47%
22000	12.8002426	48.36649	19.68	NE/SW	17g	46	48	2	363	377	23900431.1	24822210.8	0.00%
21950	12.8313112	31.72773	19.68	NE/SW	17g	46	47	1	367	374	24163796.74	24624686.6	0.00%
21900	12.8623797	25.55985	16.4	NE/SW	17g	51	52	1	335	342	18380726.4	18764801.3	0.00%
21850	12.8934483	46.39734	16.4	NE/SW	17g	51	52	1	332	339	18216122.88	18600197.8	0.00%
21800	12.9245168	57.26478	22.96	NE/SW	17g	42	44	2	392	406	30111470.59	31186880.3	0.00%
21750	12.9555854	64.79889	29.52	NE/SW	17g	36	33	-3	466	445	46023144.19	43949139.8	4.48%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
21700	12.9866539	59.62085	22.96	NE/SW	17g	42	45	3	383	404	29420135.81	31033250.3	0.00%
21650	13.0177225	60.52408	32.8	NE/SW	17g	33	37	4	441	469	48393434.88	51466033.9	0.00%
21600	13.048791	47.86258	32.8	NE/SW	17g	33	39	6	423	465	46418192.64	51027091.2	0.00%
21550	13.0798596	43.36341	26.24	NE/SW	17g	39	40	1	420	427	36871188.48	37485708.3	0.00%
21500	13.1109281	51.84283	32.8	NE/SW	17g	33	35	2	454	468	49819998.72	51356298.2	0.00%
21450	13.1419967	59.53441	29.52	NE/SW	17g	36	50	14	347	445	34270452.86	43949139.8	0.00%
21400	13.1730652	47.92006	26.24	NE/SW	17g	39	51	12	341	424	29935893.5	37222342.7	0.00%
21350	13.2041338	10.30495	26.24	N/S	17g	38	52	14	336	434	29496950.78	38100228.1	0.00%
21300	13.2352023	348.6899	26.24	N/S	17g	38	51	13	341	432	29935893.5	37924651	0.00%
21250	13.2662709	57.99472	22.96	NE/SW	17g	42	47	5	368	403	28267911.17	30956435.3	0.00%
21200	13.2973394	296.5648	19.68	NW/SE	17g	46	42	-4	405	377	26665770.24	24822210.8	6.90%
21150	13.328408	5.440388	29.52	N/S	17g	35	18	-17	569	451	56195641.73	44541712.5	20.73%
21100	13.3594765	0	22.96	N/S	17g	41	23	-18	540	414	41480087.04	31801400.1	23.38%
21050	13.3905451	9.462448	22.96	N/S	17g	41	37	-4	438	410	33644959.49	31494140.2	6.35%
21000	13.4216136	0	22.96	N/S	17g	41	38	-3	429	408	32953624.7	31340510.2	4.84%
20950	13.4526822	134.9996	29.52	NW/SE	17g	36	44	8	393	449	38813510.02	44344188.3	0.00%
20900	13.4837507	37.56852	29.52	NE/SW	17g	36	42	6	403	444	39801131.14	43850377.7	0.00%
20850	13.5148193	12.26489	19.68	N/S	17ab	39	58	19	292	424	19225691.14	27916757	0.00%
20800	13.5458878	341.5648	26.24	N/S	17ab	32	49	17	353	470	30989356.03	41260615.7	0.00%
20750	13.5769564	347.4714	29.52	N/S	17ab	29	48	19	363	496	35850646.66	48986007.6	0.00%
20700	13.6080249	324.4625	26.24	NW/SE	17ab	29	29	0	497	497	43630906.37	43630906.4	0.00%
20650	13.6390935	309.8055	22.96	NW/SE	17ab	32	26	-6	514	472	39482897.66	36256668.7	8.11%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
20600	13.670162	323.9727	26.24	NW/SE	17ab	29	28	-1	501	494	43982060.54	43367540.7	1.39%
20550	13.7012306	90	22.96	E/W	17ab	23	32	9	472	534	36256668.67	41019197.2	0.00%
20500	13.7322991	297.7584	22.96	NW/SE	17ab	32	23	-9	535	473	41096012.16	36333483.6	11.69%
20450	13.7633677	356.6335	19.68	N/S	17ab	39	25	-14	527	428	34698422.02	28180122.6	18.67%
20400	13.7944362	0	22.96	N/S	17ab	35	22	-13	545	454	41864161.92	34873999.1	16.67%
20350	13.8255048	25.20141	29.52	NE/SW	17ab	26	17	-9	579	516	57183262.85	50961249.8	10.84%
20300	13.8565733	0	29.52	N/S	17ab	29	18	-11	573	496	56590690.18	48986007.6	13.41%
20250	13.8876419	277.1251	29.52	E/W	17ab	18	14	-4	600	572	59257267.2	56491928.1	4.65%
20200	13.9187104	0	26.24	N/S	17ab	32	37	5	442	478	38802536.45	41962924	0.00%
20150	13.949779	17.52576	16.4	N/S	17ab	45	29	-16	498	386	27324184.32	21178986.2	22.54%
20100	13.9808475	19.65371	22.96	N/S	17ab	35	52	17	336	456	25809831.94	35027629.1	0.00%
20050	14.0119161	42.87865	22.96	NE/SW	17ab	32	52	20	332	470	25502572.03	36103038.7	0.00%
20000	14.0429846	250.0167	26.24	E/W	17ab	20	37	17	441	561	38714747.9	49249373.2	0.00%
19950	14.0740532	32.47145	16.4	NE/SW	17ab	42	48	6	364	406	19971893.76	22276343	0.00%
19900	14.1051217	300.964	26.24	NW/SE	17ab	29	43	14	396	493	34764263.42	43279752.2	0.00%
19850	14.1361903	17.10286	26.24	N/S	17ab	32	38	6	433	475	38012439.55	41699558.4	0.00%
19800	14.1672588	39.28951	26.24	NE/SW	17ab	29	27	-2	507	493	44508791.81	43279752.2	2.74%
19750	14.1983274	30.96367	36.08	NE/SW	17ab	22	24	2	530	544	63975901.44	65665830.9	0.00%
19700	14.2293959	14.93113	19.68	N/S	17ab	39	56	17	305	423	20081629.44	27850915.6	0.00%
19650	14.2604645	336.8014	26.24	NW/SE	17ab	29	32	3	477	498	41875135.49	43718694.9	0.00%
19600	14.291533	355.6013	16.4	N/S	17ab	45	44	-1	390	383	21398457.6	21014382.7	1.79%
19550	14.3226016	49.39871	22.96	NE/SW	17ab	32	42	10	407	477	31263695.23	36640743.6	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
19500	14.3536701	90	22.96	E/W	17ab	23	34	11	460	536	35334888.96	41172827.1	0.00%
19450	14.3847387	52.43148	19.68	NE/SW	17ab	36	52	16	338	451	22254395.9	29694475	0.00%
19400	14.4158072	203.1989	16.4	NE/SW	17ab	42	47	5	367	401	20136497.28	22002003.8	0.00%
19350	14.4468758	39.80557	19.68	NE/SW	17ab	36	34	-2	460	446	30287047.68	29365268	3.03%
19300	14.4779443	83.65973	29.52	E/W	17ab	18	14	-4	598	570	59059742.98	56294403.8	4.65%
19250	14.5090129	320.1945	26.24	NW/SE	17ab	29	36	7	447	496	39241479.17	43543117.8	0.00%
19200	14.5400814	0	22.96	N/S	17ab	35	54	19	323	457	24811237.25	35104444	0.00%
19150	14.57115	26.5653	26.24	NE/SW	17ab	29	33	4	470	498	41260615.68	43718694.9	0.00%
19100	14.6022185	174.8055	26.24	N/S	17ab	32	49	17	357	477	31340510.21	41875135.5	0.00%
19050	14.6332871	52.12511	26.24	NE/SW	17ab	29	44	15	391	496	34325320.7	43543117.8	0.00%
19000	14.6643556	57.52895	19.68	NE/SW	17ab	36	53	17	329	448	21661823.23	29496950.8	0.00%
18950	14.6954242	32.47105	26.24	NE/SW	17ab	29	33	4	470	498	41260615.68	43718694.9	0.00%
18900	14.7264927	0	22.96	N/S	17ab	35	38	3	429	450	32953624.7	34566739.2	0.00%
18850	14.7575613	28.81069	22.96	NE/SW	17ab	32	41	9	408	471	31340510.21	36179853.7	0.00%
18800	14.7886298	68.19838	22.96	E/W	17ab	23	40	17	421	540	32339104.9	41480087	0.00%
18750	14.8196984	68.19864	19.68	E/W	17ab	27	46	19	377	509	24822210.82	33513276.7	0.00%
18700	14.8507669	18.43516	16.4	N/S	17ab	45	56	11	308	385	16899294.72	21124118.4	0.00%
18650	14.8818355	0	13.12	N/S	17ab	51	63	12	256	339	11236933.63	14880158.2	0.00%
18600	14.912904	342.6459	13.12	N/S	17ab	51	61	10	271	340	11895347.71	14924052.5	0.00%
18550	14.9439726	356.8202	13.12	N/S	17ab	51	60	9	276	338	12114819.07	14836263.9	0.00%
18500	14.9750411	337.38	16.4	NW/SE	17ab	42	57	15	302	408	16570087.68	22386078.7	0.00%
18450	15.0061097	331.1136	19.68	NW/SE	17ab	36	55	19	315	448	20740043.52	29496950.8	0.00%



**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
18400	15.0371782	328.3925	22.96	NW/SE	17ab	32	44	12	388	472	29804210.69	36256668.7	0.00%
18350	15.0682468	331.2603	22.96	NW/SE	17ab	32	46	14	377	475	28959245.95	36487113.6	0.00%
18300	15.0993153	327.3807	19.68	NW/SE	17ab	36	47	11	373	450	24558845.18	29628633.6	0.00%
18250	15.1303839	305.8378	29.52	NW/SE	17ab	26	34	8	457	513	45134285.18	50664963.5	0.00%
18200	15.1614524	316.8478	22.96	NW/SE	17ab	32	40	8	419	475	32185474.94	36487113.6	0.00%
18150	15.192521	308.6598	26.24	NW/SE	17ab	29	36	7	448	497	39329267.71	43630906.4	0.00%
18100	15.2235895	300.9638	26.24	NW/SE	17ab	29	33	4	470	498	41260615.68	43718694.9	0.00%
18050	15.2546581	332.1029	16.4	NW/SE	17ab	42	47	5	369	404	20246232.96	22166607.4	0.00%
18000	15.2857266	25.20097	16.4	NE/SW	17ab	42	65	23	242	401	13278017.28	22002003.8	0.00%
17950	15.3167952	28.81069	16.4	NE/SW	17ab	42	71	29	200	400	10973568	21947136	0.00%
17900	15.3478637	354.5599	16.4	N/S	17ab	45	66	21	234	379	12839074.56	20794911.4	0.00%
17850	15.3789323	15.9452	19.68	N/S	17ab	39	85	46	105	428	6913347.84	28180122.6	0.00%
17800	15.4100008	9.462154	16.4	N/S	17ab	45	87	42	93	395	5102709.12	21672796.8	0.00%
17750	15.4410694	320.7107	16.4	NW/SE	17ab	42	84	42	114	414	6254933.76	22715285.8	0.00%
17700	15.4721379	308.1572	22.96	NW/SE	17ab	32	80	48	141	478	10830911.62	36717558.5	0.00%
17650	15.5032065	309.094	16.4	NW/SE	17ab	42	88	46	86	414	4718634.24	22715285.8	0.00%
17600	15.534275	0	22.96	N/S	17ab	35	83	48	117	448	8987352.192	34413109.2	0.00%
17550	15.5653436	343.6104	26.24	N/S	17ab	32	80	48	140	475	12290396.16	41699558.4	0.00%
17500	15.5964121	291.8016	29.52	E/W	17ab	18	69	51	213	564	21036329.86	55701831.2	0.00%
17450	15.6274807	295.201	26.24	NW/SE	17ab	29	78	49	154	498	13519435.78	43718694.9	0.00%
17400	15.6585492	307.5685	26.24	NW/SE	17ab	29	78	49	153	494	13431647.23	43367540.7	0.00%
17350	15.6896178	313.2643	19.68	NW/SE	17ab	36	84	48	114	457	7505920.512	30089523.5	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
17300	15.7206863	6.009074	19.68	N/S	17ab	39	83	44	122	438	8032651.776	28838536.7	0.00%
17250	15.7517549	44.99979	19.68	NE/SW	17ab	36	84	48	114	456	7505920.512	30023682	0.00%
17200	15.7828234	23.19855	19.68	NE/SW	17ab	36	86	50	101	460	6649982.208	30287047.7	0.00%
17150	15.813892	331.9277	22.96	NW/SE	17ab	32	83	51	119	476	9140982.144	36563928.6	0.00%
17100	15.8449605	318.8141	19.68	NW/SE	17ab	36	83	47	121	456	7966810.368	30023682	0.00%
17050	15.8760291	306.8698	16.4	NW/SE	17ab	42	85	43	101	392	5541651.84	21508193.3	0.00%
17000	15.9070976	280.6194	19.68	E/W	17ab	27	83	56	121	519	7966810.368	34171690.8	0.00%
16950	15.9381662	266.9872	16.4	E/W	17ab	31	92	61	55	474	3017731.2	26007356.2	0.00%
16900	15.9692347	293.9627	22.96	NW/SE	17ab	32	75	43	175	477	13442620.8	36640743.6	0.00%
16850	16.0003033	243.4349	13.12	NE/SW	17ab	48	87	39	88	351	3862695.936	15406889.5	0.00%
16800	16.0313718	241.699	29.52	NE/SW	17ab	26	70	44	208	514	20542519.3	50763725.6	0.00%
16750	16.0624404	290.5562	26.24	E/W	17ab	20	71	51	200	552	17557708.8	48459276.3	0.00%
16700	16.0935089	317.4896	16.4	NW/SE	17ab	42	80	38	136	395	7462026.24	21672796.8	0.00%
16650	16.1245775	316.6368	19.68	NW/SE	17ab	36	77	41	162	451	10666308.1	29694475	0.00%
16600	16.155646	271.975	19.68	E/W	17ab	27	85	58	106	516	6979189.248	33974166.5	0.00%
16550	16.1867146	241.3893	22.96	NE/SW	17ab	32	78	46	155	478	11906321.28	36717558.5	0.00%
16500	16.2177831	273.0128	29.52	E/W	17ab	18	75	57	176	577	17382131.71	56985738.6	0.00%
16450	16.2488517	266.9875	26.24	E/W	17ab	20	71	51	200	550	17557708.8	48283699.2	0.00%
16400	16.2799202	268.2643	32.8	E/W	17ab	17	59	42	285	577	31274668.8	63317487.4	0.00%
16350	16.3109888	272.8624	32.8	E/W	17ab	17	57	40	298	575	32701232.64	63098016	0.00%
16300	16.3420573	324.4624	42.64	NW/SE	17ab	19	48	29	360	560	51356298.24	79887575	0.00%
16250	16.3731259	25.01705	32.8	NE/SW	17ab	24	45	21	387	534	42467708.16	58598853.1	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
16200	16.4041944	14.03637	36.08	N/S	17ab	24	54	30	319	528	38506250.11	63734482.9	0.00%
16150	16.435263	35.21728	39.36	NE/SW	17ab	20	54	34	320	556	42138501.12	73215645.7	0.00%
16100	16.4663315	4.617029	32.8	N/S	17ab	26	66	40	235	512	25787884.8	56184668.2	0.00%
16050	16.4974001	349.6951	29.52	N/S	17ab	29	69	40	215	492	21233854.08	48590959.1	0.00%
16000	16.5284686	325.0079	29.52	NW/SE	17ab	26	68	42	223	515	22023950.98	50862487.7	0.00%
15950	16.5595372	319.3985	22.96	NW/SE	17ab	32	78	46	154	476	11829506.3	36563928.6	0.00%
15900	16.5906057	320.7107	22.96	NW/SE	17ab	32	77	45	160	474	12290396.16	36410298.6	0.00%
15850	16.6216743	308.6597	22.96	NW/SE	17ab	32	77	45	163	483	12520841.09	37101633.4	0.00%
15800	16.6527428	279.8659	26.24	E/W	17ab	20	72	52	198	565	17382131.71	49600527.4	0.00%
15750	16.6838114	254.0547	22.96	E/W	17ab	23	77	54	158	528	12136766.21	40558307.3	0.00%
15700	16.7148799	258.2319	19.68	E/W	17ab	27	83	56	119	509	7835127.552	33513276.7	0.00%
15650	16.7459485	270	26.24	E/W	17ab	20	75	55	172	550	15099629.57	48283699.2	0.00%
15600	16.777017	294.2277	22.96	NW/SE	17ab	32	79	47	147	476	11291801.47	36563928.6	0.00%
15550	16.8080856	309.8055	32.8	NW/SE	17ab	24	70	46	208	527	22825021.44	57830703.4	0.00%
15500	16.8391541	295.71	26.24	NW/SE	17ab	29	72	43	192	488	16855400.45	42840809.5	0.00%
15450	16.8702227	289.0934	19.68	E/W	17ab	27	79	52	145	504	9547004.16	33184069.6	0.00%
15400	16.9012912	294.7749	26.24	NW/SE	17ab	29	67	38	229	493	20103576.58	43279752.2	0.00%
15350	16.9323598	277.5947	36.08	E/W	17ab	15	66	51	234	585	28245964.03	70614910.1	0.00%
15300	16.9634283	309.2893	29.52	NW/SE	17ab	26	66	40	239	520	23604144.77	51356298.2	0.00%
15250	16.9944969	352.8749	32.8	N/S	17ab	26	58	32	291	513	31933082.88	56294403.8	0.00%
15200	17.0255654	320.7107	26.24	NW/SE	17ab	29	66	37	235	491	20630307.84	43104175.1	0.00%
15150	17.056634	305.5376	32.8	NW/SE	17ab	24	56	32	304	525	33359646.72	57611232	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
15100	17.0877025	340.346	39.36	N/S	17ab	22	61	39	275	550	36212774.4	72425548.8	0.00%
15050	17.1187711	293.1986	29.52	NW/SE	17ab	26	68	42	226	522	22320237.31	51553822.5	0.00%
15000	17.1498396	231.8428	29.52	NE/SW	17ab	26	61	35	269	511	26567008.13	50467439.2	0.00%
14950	17.1809082	231.009	49.2	NE/SW	17ab	17	44	27	389	577	64030769.28	94976231	0.00%
14900	17.2119767	277.1251	16.4	E/W	17ab	31	86	55	101	497	5541651.84	27269316.5	0.00%
14850	17.2430453	257.471	19.68	E/W	17ab	27	77	50	157	499	10337101.06	32854862.6	0.00%
14800	17.2741138	294.4439	32.8	NW/SE	17ab	24	61	37	269	525	29518897.92	57611232	0.00%
14750	17.3051824	327.0948	22.96	NW/SE	17ab	32	51	19	342	474	26270721.79	36410298.6	0.00%
14700	17.3362509	352.5771	36.08	N/S	17ab	24	42	18	406	532	49007954.69	64217319.9	0.00%
14650	17.3673195	302.0055	32.8	NW/SE	17ab	24	41	17	409	526	44881893.12	57720967.7	0.00%
14600	17.398388	254.3576	26.24	E/W	17ab	20	46	26	377	559	33096281.09	49073796.1	0.00%
14550	17.4294566	274.3987	26.24	E/W	17ab	20	48	28	360	554	31603875.84	48634853.4	0.00%
14500	17.4605251	293.1986	26.24	NW/SE	17ab	29	50	21	348	494	30550413.31	43367540.7	0.00%
14450	17.4915937	288.4349	26.24	E/W	17ab	20	49	29	359	563	31516087.3	49424950.3	0.00%
14400	17.5226622	300.3792	26.24	NW/SE	17ab	29	53	24	330	499	28970219.52	43806483.5	0.00%
14350	17.5537308	323.1299	29.52	NW/SE	17ab	26	47	21	372	519	36739505.66	51257536.1	0.00%
14300	17.5847993	267.5107	22.96	E/W	17ab	23	50	27	350	539	26885241.6	41403272.1	0.00%
14250	17.6158679	222.2737	26.24	NE/SW	17ab	29	51	22	343	497	30111470.59	43630906.4	0.00%
14200	17.6469364	205.3462	29.52	NE/SW	17ab	26	49	23	353	513	34863025.54	50664963.5	0.00%
14150	17.678005	217.8753	29.52	NE/SW	17ab	26	46	20	377	516	37233316.22	50961249.8	0.00%
14100	17.7090735	217.8749	36.08	NE/SW	17ab	22	43	21	397	543	47921571.46	65545121.7	0.00%
14050	17.7401421	329.0362	22.96	NW/SE	17ab	32	53	21	328	475	25195312.13	36487113.6	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
14000	17.7712106	243.4346	39.36	NE/SW	17ab	20	32	12	477	561	62812703.23	73874059.8	0.00%
13950	17.8022792	237.2649	22.96	NE/SW	17ab	32	47	15	370	475	28421541.12	36487113.6	0.00%
13900	17.8333477	240.2553	26.24	NE/SW	17ab	29	43	14	395	492	34676474.88	43191963.6	0.00%
13850	17.8644163	249.7749	29.52	E/W	17ab	18	34	16	459	570	45331809.41	56294403.8	0.00%
13800	17.8954848	287.3539	36.08	E/W	17ab	15	27	12	511	595	61682425.73	71822002.6	0.00%
13750	17.9265534	296.5648	36.08	NW/SE	17ab	22	31	9	480	542	57940439.04	65424412.4	0.00%
13700	17.9576219	267.2737	32.8	E/W	17ab	17	27	10	508	578	55745725.44	63427223	0.00%
13650	17.9886905	201.8016	36.08	N/S	17ab	24	39	15	428	533	51663558.14	64338029.2	0.00%
13600	18.019759	318.3661	45.92	NW/SE	17ab	18	32	14	474	572	72820597.25	87876332.5	0.00%
13550	18.0508276	0	36.08	N/S	17ab	24	41	17	410	528	49490791.68	63734482.9	0.00%
13500	18.0818961	245.2247	39.36	NE/SW	17ab	20	28	8	504	560	66368139.26	73742377	0.00%
13450	18.1129647	239.7437	36.08	NE/SW	17ab	22	31	9	480	543	57940439.04	65545121.7	0.00%
13400	18.1440332	270	36.08	E/W	17ab	15	11	-4	618	590	74598315.26	71218456.3	4.49%
13350	18.1751018	221.6339	36.08	NE/SW	17ab	22	22	0	543	543	65545121.66	65545121.7	0.00%
13300	18.2061703	298.3006	45.92	NW/SE	17ab	18	14	-4	599	571	92024341.25	87722702.6	4.65%
13250	18.2372389	3.576359	36.08	N/S	17ab	24	27	3	507	528	61199588.74	63734482.9	0.00%
13200	18.2683074	291.0377	32.8	E/W	17ab	17	15	-2	593	579	65073258.24	63536958.7	2.35%
13150	18.299376	302.7351	39.36	NW/SE	17ab	20	16	-4	585	558	77034447.36	73479011.3	4.76%
13100	18.3304445	310.2366	39.36	NW/SE	17ab	20	19	-1	565	558	74400791.04	73479011.3	1.23%
13050	18.3615131	347.9055	39.36	N/S	17ab	22	31	9	482	544	63471117.31	71635451.9	0.00%
13000	18.3925816	340.0167	39.36	N/S	17ab	22	31	9	479	541	63076068.86	71240403.5	0.00%
12950	18.4236502	6.709519	32.8	N/S	17ab	26	39	13	429	520	47076606.72	57062553.6	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
12900	18.4547187	293.1988	36.08	NW/SE	17ab	22	23	1	540	547	65182993.92	66027958.7	0.00%
12850	18.4857873	326.3097	22.96	NW/SE	17ab	32	49	17	358	477	27499761.41	36640743.6	0.00%
12800	18.5168558	315	29.52	NW/SE	17ab	26	40	14	419	517	41381324.93	51060011.9	0.00%
12750	18.5479244	292.6196	36.08	NW/SE	17ab	22	35	13	457	548	55164126.34	66148667.9	0.00%
12700	18.5789929	338.1984	36.08	N/S	17ab	24	29	5	496	531	59871787.01	64096610.7	0.00%
12650	18.6100615	344.4757	29.52	N/S	17ab	29	28	-1	502	495	49578580.22	48887245.4	1.39%
12600	18.64113	346.7597	32.8	N/S	17ab	26	31	5	485	520	53221804.8	57062553.6	0.00%
12550	18.6721986	323.7462	39.36	NW/SE	17ab	20	21	1	549	556	72293865.98	73215645.7	0.00%
12500	18.7032671	300.9633	29.52	NW/SE	17ab	26	20	-6	558	516	55109258.5	50961249.8	7.50%
12450	18.7343357	204.4442	36.08	NE/SW	17ab	22	26	4	517	545	62406681.22	65786540.2	0.00%
12400	18.7654042	295.0171	36.08	NW/SE	17ab	22	16	-6	588	546	70977037.82	65907249.4	7.14%
12350	18.7964728	337.6199	36.08	N/S	17ab	24	24	0	528	528	63734482.94	63734482.9	0.00%
12300	18.8275413	298.301	22.96	NW/SE	17ab	32	22	-10	545	475	41864161.92	36487113.6	12.82%
12250	18.8586099	0	36.08	N/S	17ab	24	27	3	507	528	61199588.74	63734482.9	0.00%
12200	18.8896784	318.8141	32.8	NW/SE	17ab	24	7	-17	651	532	71437927.68	58379381.8	18.28%
12150	18.920747	324.4619	32.8	NW/SE	17ab	24	25	1	523	530	57391760.64	58159910.4	0.00%
12100	18.9518155	48.3665	32.8	NE/SW	17ab	24	29	5	495	529	54319161.6	58050174.7	0.00%
12050	18.9828841	16.38964	45.92	N/S	17ab	20	23	3	535	556	82192024.32	85418253.3	0.00%
12000	19.0139526	270	32.8	E/W	17ab	17	12	-5	613	578	67267971.84	63427223	5.68%
11950	19.0450212	289.9833	32.8	E/W	17ab	17	10	-7	626	577	68694535.68	63317487.4	7.78%
11900	19.0760897	34.9919	26.24	NE/SW	17ab	29	17	-12	581	497	51005144.06	43630906.4	14.46%
11850	19.1071583	302.471	39.36	NW/SE	17ab	20	10	-10	630	560	82960174.08	73742377	11.11%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
11800	19.1382268	19.98329	29.52	N/S	17ab	29	29	0	493	493	48689721.22	48689721.2	0.00%
11750	19.1692954	263.991	36.08	E/W	17ab	15	25	10	524	594	63251645.95	71701293.3	0.00%
11700	19.2003639	260.5376	36.08	E/W	17ab	15	25	10	522	591	63010227.46	71339165.6	0.00%
11650	19.2314325	281.31	32.8	E/W	17ab	17	8	-9	644	581	70669777.92	63756430.1	9.78%
11600	19.262501	305.8378	52.48	NW/SE	17ab	16	14	-2	601	587	105521829.9	103063751	2.33%
11550	19.2935696	294.7753	26.24	NW/SE	17ab	29	20	-9	555	493	48722641.92	43279752.2	11.25%
11500	19.3246381	281.31	32.8	E/W	17ab	17	13	-4	605	577	66390086.4	63317487.4	4.60%
11450	19.3557067	116.5648	36.08	NW/SE	17ab	22	24	2	529	543	63855192.19	65545121.7	0.00%
11400	19.3867752	265.2363	32.8	E/W	17ab	17	13	-4	606	578	66499822.08	63427223	4.60%
11350	19.4178438	270	32.8	E/W	17ab	17	12	-5	611	576	67048500.48	63207751.7	5.68%
11300	19.4489123	281.3096	32.8	E/W	17ab	17	13	-4	606	578	66499822.08	63427223	4.60%
11250	19.4799809	309.8055	39.36	NW/SE	17ab	20	18	-2	573	559	75454253.57	73610694.1	2.44%
11200	19.5110494	252.8976	32.8	E/W	17ab	17	14	-3	599	578	65731672.32	63427223	3.49%
11150	19.542118	27.67013	39.36	NE/SW	17ab	20	26	6	515	557	67816650.24	73347328.5	0.00%
11100	19.5731865	38.66011	26.24	NE/SW	17ab	29	37	8	441	497	38714747.9	43630906.4	0.00%
11050	19.6042551	355.6013	32.8	N/S	17ab	26	30	4	488	516	53551011.84	56623610.9	0.00%
11000	19.6353236	327.5292	39.36	NW/SE	17ab	20	22	2	542	556	71372086.27	73215645.7	0.00%
10950	19.6663922	331.39	39.36	NW/SE	17ab	20	23	3	538	559	70845355.01	73610694.1	0.00%
10900	19.6974607	96.34027	39.36	E/W	17ab	14	19	5	562	596	74005742.59	78482958.3	0.00%
10850	19.7285293	250.0167	39.36	E/W	17ab	14	13	-1	605	598	79668103.68	78746324	1.15%
10800	19.7595978	333.4351	45.92	NW/SE	17ab	18	20	2	557	571	85571883.26	87722702.6	0.00%
10750	19.7906664	353.9912	39.36	N/S	17ab	22	25	3	523	544	68870112.77	71635451.9	0.00%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
10700	19.8217349	345.9636	49.2	N/S	17ab	18	20	2	556	570	91519557.12	93824006.4	0.00%
10650	19.8528035	249.4437	32.8	E/W	17ab	17	15	-2	591	577	64853786.88	63317487.4	2.35%
10600	19.883872	12.09494	29.52	N/S	17ab	29	34	5	458	493	45233047.3	48689721.2	0.00%
10550	19.9149406	336.8011	36.08	NW/SE	17ab	22	24	2	527	541	63613773.7	65303703.2	0.00%
10500	19.9460091	24.44417	45.92	NE/SW	17ab	18	24	6	529	570	81270244.61	87569072.6	0.00%
10450	19.9770777	310.6013	42.64	NW/SE	17ab	19	17	-2	580	566	82740702.72	80743513.3	2.41%
10400	20.0081462	84.80552	36.08	E/W	17ab	15	22	7	544	593	65665830.91	71580584.1	0.00%
10350	20.0392148	108.4352	45.92	E/W	17ab	12	18	6	570	611	87569072.64	93867900.7	0.00%
10300	20.0702833	29.05408	49.2	NE/SW	17ab	17	10	-7	626	578	103041803.5	95140834.6	7.78%
10250	20.1013519	278.7462	39.36	E/W	17ab	14	9	-5	631	597	83091856.9	78614641.2	5.49%
10200	20.1324204	299.6576	29.52	NW/SE	17ab	26	12	-14	612	515	60442412.54	50862487.7	15.91%
10150	20.163489	288.4352	42.64	E/W	17ab	13	9	-4	633	605	90301491.07	86307112.3	4.40%
10100	20.1945575	285.9456	45.92	E/W	17ab	12	12	0	614	614	94328790.53	94328790.5	0.00%
10050	20.2256261	4.398742	45.92	N/S	17ab	20	27	7	512	561	78658535.42	86186403.1	0.00%
10000	20.2566946	292.6196	39.36	NW/SE	17ab	20	26	6	517	559	68080015.87	73610694.1	0.00%
9950	20.2877632	28.6107	32.8	NE/SW	17ab	24	27	3	512	533	56184668.16	58489117.4	0.00%
9900	20.3188317	300.9636	29.52	NW/SE	17ab	26	34	8	459	515	45331809.41	50862487.7	0.00%
9850	20.3499003	325.0077	29.52	NW/SE	17ab	26	32	6	475	517	46912003.2	51060011.9	0.00%
9800	20.3809688	291.0377	29.52	E/W	17ab	18	28	10	501	571	49479818.11	56393166	0.00%
9750	20.4120374	273.3665	39.36	E/W	17ab	14	20	6	557	599	73347328.51	78878006.8	0.00%
9700	20.4431059	246.8011	36.08	NE/SW	17ab	22	25	3	524	545	63251645.95	65786540.2	0.00%
9650	20.4741745	201.8011	49.2	N/S	17ab	18	13	-5	604	569	99420526.08	93659402.9	5.75%



Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
9600	20.505243	294.4437	26.24	NW/SE	17ab	29	13	-16	608	496	53375434.75	43543117.8	18.39%
9550	20.5363116	334.9829	36.08	NW/SE	17ab	22	14	-8	602	546	72666967.3	65907249.4	9.30%
9500	20.5673801	270	29.52	E/W	17ab	18	9	-9	631	569	62318892.67	56195641.7	9.89%
9450	20.5984487	185.656	36.08	N/S	17ab	24	15	-9	592	529	71459874.82	63855192.2	10.59%
9400	20.6295172	247.0421	36.08	NE/SW	17ab	22	10	-12	629	545	75926116.99	65786540.2	13.33%
9350	20.6605858	190.3049	36.08	N/S	17ab	24	14	-10	599	529	72304839.55	63855192.2	11.63%
9300	20.6916543	293.1986	39.36	NW/SE	17ab	20	8	-12	640	557	84277002.24	73347328.5	13.04%
9250	20.7227229	206.5648	36.08	NE/SW	17ab	22	14	-8	601	545	72546258.05	65786540.2	9.30%
9200	20.7537914	214.9919	42.64	NE/SW	17ab	19	11	-8	622	567	88732270.85	80886169.7	8.99%
9150	20.78486	351.2542	36.08	N/S	17ab	24	14	-10	599	529	72304839.55	63855192.2	11.63%
9100	20.8159285	270	26.24	E/W	17ab	20	10	-10	629	559	55218994.18	49073796.1	11.11%
9050	20.8469971	8.745767	36.08	N/S	17ab	24	14	-10	601	531	72546258.05	64096610.7	11.63%
9000	20.8780656	258.6905	36.08	E/W	17ab	15	8	-7	641	592	77374627.97	71459874.8	7.61%
8950	20.9091342	260.5381	29.52	E/W	17ab	18	10	-8	629	573	62121368.45	56590690.2	8.89%
8900	20.9402027	50.19453	29.52	NE/SW	17ab	26	14	-12	602	518	59454791.42	51158774	13.95%
8850	20.9712713	349.0895	32.8	N/S	17ab	26	16	-10	589	519	64634315.52	56952817.9	11.90%
8800	21.0023398	318.0128	42.64	NW/SE	17ab	19	10	-9	626	564	89302896.38	80458200.6	10.00%
8750	21.0334084	285.9448	39.36	E/W	17ab	14	8	-6	643	601	84672050.69	79141372.4	6.52%
8700	21.0644769	135	32.8	NW/SE	17ab	24	14	-10	603	533	66170615.04	58489117.4	11.63%
8650	21.0955455	194.0364	36.08	N/S	17ab	24	14	-10	600	530	72425548.8	63975901.4	11.63%
8600	21.126614	270	32.8	E/W	17ab	17	9	-8	637	581	69901628.16	63756430.1	8.79%
8550	21.1576826	167.471	32.8	N/S	17ab	26	16	-10	583	514	63975901.44	56404139.5	11.90%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
8500	21.1887511	243.4347	29.52	NE/SW	17ab	26	12	-14	614	516	60639936.77	50961249.8	15.91%
8450	21.2198197	300.4424	32.8	NW/SE	17ab	13	6	-7	655	606	136566053.8	126349662	7.45%
8400	21.2508882	26.5653	32.8	NE/SW	17ab	18	11	-7	624	575	95865090.05	88337222.4	7.87%
8350	21.2819568	11.31005	39.36	N/S	17ab	22	14	-8	603	546	79404738.05	71898817.5	9.30%
8300	21.3130253	50.19453	32.8	NE/SW	17ab	24	13	-11	608	531	66719293.44	58269646.1	12.64%
8250	21.3440939	248.4487	32.8	E/W	17ab	17	10	-7	631	582	69243214.08	63866165.8	7.78%
8200	21.3751624	26.5653	29.52	NE/SW	17ab	26	16	-10	588	518	58072121.86	51158774	11.90%
8150	21.406231	277.1251	29.52	E/W	17ab	18	10	-8	629	573	62121368.45	56590690.2	8.89%
8100	21.4372995	199.9833	32.8	N/S	17ab	26	15	-11	594	517	65182993.92	56733346.6	12.94%
8050	21.4683681	229.3988	32.8	NE/SW	17ab	24	12	-12	611	528	67048500.48	57940439	13.64%
8000	21.4994366	311.9869	32.8	NW/SE	17ab	24	13	-11	608	531	66719293.44	58269646.1	12.64%
7950	21.5305052	11.31005	29.52	N/S	17ab	29	17	-12	579	495	57183262.85	48887245.4	14.46%
7900	21.5615737	246.3705	32.8	NE/SW	17ab	24	10	-14	627	530	68804271.36	58159910.4	15.56%
7850	21.5926423	274.7637	29.52	E/W	17ab	18	10	-8	630	574	62220130.56	56689452.3	8.89%
7800	21.6237108	52.43118	36.08	NE/SW	17ab	22	11	-11	618	541	74598315.26	65303703.2	12.36%
7750	21.6547794	90	29.52	E/W	17ab	18	10	-8	630	574	62220130.56	56689452.3	8.89%
7700	21.6858479	33.68997	42.64	NE/SW	17ab	19	11	-8	618	563	88161645.31	80315544.2	8.99%
7650	21.7169165	296.5654	32.8	NW/SE	17ab	24	10	-14	624	527	68475064.32	57830703.4	15.56%
7600	21.747985	261.8703	52.48	E/W	17ab	11	6	-5	659	624	115705301	109560103	5.32%
7550	21.7790536	286.6994	32.8	E/W	17ab	17	9	-8	634	579	69572421.12	63536958.7	8.79%
7500	21.8101221	175.9144	39.36	N/S	17ab	22	13	-9	605	543	79668103.68	71503769.1	10.34%
7450	21.8411907	0	52.48	N/S	17ab	17	10	-7	627	578	110086834.2	101483557	7.78%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
7400	21.8722592	0	49.2	N/S	17ab	18	11	-7	621	573	102218785.9	94317817	7.87%
7350	21.9033278	23.62919	42.64	NE/SW	17ab	19	12	-7	616	567	87876332.54	80886169.7	7.95%
7300	21.9343963	267.4769	49.2	E/W	17ab	11	6	-5	659	624	108473719.7	102712596	5.32%
7250	21.9654649	270	36.08	E/W	17ab	15	8	-7	645	596	77857464.96	71942711.8	7.61%
7200	21.9965334	315.3186	32.8	NW/SE	17ab	24	12	-12	610	527	66938764.8	57830703.4	13.64%
7150	22.027602	320.7107	36.08	NW/SE	17ab	22	12	-10	611	542	73753350.53	65424412.4	11.36%
7100	22.0586705	0	42.64	N/S	17ab	21	12	-9	613	550	87448363.39	78461011.2	10.23%
7050	22.0897391	98.1301	36.08	E/W	17ab	15	8	-7	644	595	77736755.71	71822002.6	7.61%
7000	22.1208076	345.9636	29.52	N/S	17ab	29	17	-12	580	496	57282024.96	48986007.6	14.46%
6950	22.1518762	241.39	39.36	NE/SW	17ab	20	9	-11	632	556	83223539.71	73215645.7	12.09%
6900	22.1829447	270	36.08	E/W	17ab	15	7	-8	646	591	77978174.21	71339165.6	8.60%
6850	22.2140133	4.398742	36.08	N/S	17ab	24	14	-10	600	530	72425548.8	63975901.4	11.63%
6800	22.2450818	75.96357	68.88	E/W	17ab	8	4	-4	666	639	153476322	147254309	4.17%
6750	22.2761504	8.746234	39.36	N/S	17ab	22	14	-8	603	547	79404738.05	72030500.4	9.30%
6700	22.3072189	270	29.52	E/W	17ab	18	10	-8	631	575	62318892.67	56788214.4	8.89%
6650	22.3382875	348.69	32.8	N/S	17ab	26	16	-10	587	517	64414844.16	56733346.6	11.90%
6600	22.369356	52.12468	36.08	NE/SW	17ab	22	12	-10	612	542	73874059.78	65424412.4	11.36%
6550	22.4004246	19.98329	29.52	N/S	17ab	29	16	-13	584	494	57677073.41	48788483.3	15.48%
6500	22.4314931	4.763685	42.64	N/S	17ab	21	13	-8	607	551	86592425.09	78603667.6	9.20%
6450	22.4625617	99.46249	42.64	E/W	17ab	13	7	-6	648	606	92441336.83	86449768.7	6.45%
6400	22.4936302	321.3399	39.36	NW/SE	17ab	20	12	-8	613	558	80721566.21	73479011.3	9.09%
6350	22.5246988	333.4352	36.08	NW/SE	17ab	22	14	-8	601	545	72546258.05	65786540.2	9.30%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
6300	22.5557673	29.98035	39.36	NE/SW	17ab	20	13	-7	605	556	79668103.68	73215645.7	8.05%
6250	22.5868359	39.80552	59.04	NE/SW	17ab	14	9	-5	638	603	126020454.9	119107107	5.49%
6200	22.6179044	317.7263	36.08	NW/SE	17ab	22	13	-9	607	544	73270513.54	65665830.9	10.34%
6150	22.648973	347.471	26.24	N/S	17ab	32	19	-13	567	476	49776104.45	41787346.9	16.05%
6100	22.6800415	311.9875	32.8	NW/SE	17ab	24	14	-10	600	530	65841408	58159910.4	11.63%
6050	22.7111101	312.2737	52.48	NW/SE	17ab	16	8	-8	638	583	112018182.1	102361442	8.70%
6000	22.7421786	228.3665	32.8	NE/SW	17ab	24	13	-11	610	533	66938764.8	58489117.4	12.64%
5950	22.7732472	304.9919	29.52	NW/SE	17ab	26	41	15	411	515	40591228.03	50862487.7	0.00%
5900	22.8043157	296.5648	32.8	NW/SE	17ab	24	38	14	436	534	47844756.48	58598853.1	0.00%
5850	22.8353843	0	36.08	N/S	17ab	24	18	-6	572	530	69045689.86	63975901.4	7.32%
5800	22.8664528	310.2363	42.64	NW/SE	17ab	19	11	-8	619	564	88304301.7	80458200.6	8.99%
5750	22.8975214	327.9943	29.52	NW/SE	17ab	26	19	-7	567	518	55998117.5	51158774	8.64%
5700	22.9285899	284.9315	36.08	E/W	17ab	15	9	-6	631	590	76167535.49	71218456.3	6.59%
5650	22.9596585	241.6988	29.52	NE/SW	17ab	26	12	-14	614	517	60639936.77	51060011.9	15.91%
5600	22.990727	264.5599	29.52	E/W	17ab	18	10	-8	630	574	62220130.56	56689452.3	8.89%
5550	23.0217956	301.6074	39.36	NW/SE	17ab	20	9	-11	634	557	83486905.34	73347328.5	12.09%
5500	23.0528641	270	39.36	E/W	17ab	14	7	-7	650	601	85593830.4	79141372.4	7.53%
5450	23.0839327	206.5648	36.08	NE/SW	17ab	22	14	-8	600	544	72425548.8	65665830.9	9.30%
5400	23.1150012	225	32.8	NE/SW	17ab	24	13	-11	610	533	66938764.8	58489117.4	12.64%
5350	23.1460698	80.5381	29.52	E/W	17ab	18	10	-8	628	572	62022606.34	56491928.1	8.89%
5300	23.1771383	66.03725	29.52	NE/SW	17ab	26	11	-15	620	515	61232509.44	50862487.7	16.85%
5250	23.2082069	225.0004	26.24	NE/SW	17ab	29	16	-13	583	492	51180721.15	43191963.6	15.48%

Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
5200	23.2392754	261.0273	29.52	E/W	17ab	18	9	-9	632	570	62417654.78	56294403.8	9.89%
5150	23.270344	126.027	45.92	NW/SE	17ab	18	8	-10	638	569	98015909.38	87415442.7	10.87%
5100	23.3014125	270	32.8	E/W	17ab	17	8	-9	638	576	70011363.84	63207751.7	9.78%
5050	23.3324811	343.3006	39.36	N/S	17ab	22	13	-9	609	546	80194834.94	71898817.5	10.34%
5000	23.3635496	266.4236	29.52	E/W	17ab	18	10	-8	630	574	62220130.56	56689452.3	8.89%
4950	23.3946182	255.9636	29.52	E/W	17ab	18	10	-8	627	571	61923844.22	56393166	8.89%
4900	23.4256867	327.9948	45.92	NW/SE	17ab	18	11	-7	624	575	95865090.05	88337222.4	7.87%
4850	23.4567553	170.5376	32.8	N/S	17ab	26	16	-10	588	518	64524579.84	56843082.2	11.90%
4800	23.4878238	270	29.52	E/W	17ab	18	9	-9	633	571	62516416.9	56393166	9.89%
4750	23.5188924	259.6951	29.52	E/W	17ab	18	10	-8	627	572	61923844.22	56491928.1	8.89%
4700	23.5499609	206.5654	36.08	NE/SW	17ab	22	14	-8	601	545	72546258.05	65786540.2	9.30%
4650	23.5810295	241.6988	32.8	NE/SW	17ab	24	11	-13	620	529	68036121.6	58050174.7	14.61%
4600	23.612098	275.7107	36.08	E/W	17ab	15	8	-7	644	595	77736755.71	71822002.6	7.61%
4550	23.6431666	335.5558	49.2	NW/SE	17ab	17	10	-7	625	577	102877200	94976231	7.78%
4500	23.6742351	300.964	32.8	NW/SE	17ab	24	11	-13	621	530	68145857.28	58159910.4	14.61%
4450	23.7053037	287.3542	36.08	E/W	17ab	15	9	-6	636	594	76771081.73	71701293.3	6.59%
4400	23.7363722	338.9627	22.96	N/S	17ab	35	22	-13	544	453	41787346.94	34797184.1	16.67%
4350	23.7674408	49.39922	36.08	NE/SW	17ab	22	11	-11	619	543	74719024.51	65545121.7	12.36%
4300	23.7985093	285.9456	42.64	E/W	17ab	13	6	-7	656	607	93582587.9	86592425.1	7.45%
4250	23.8295779	290.5563	32.8	E/W	17ab	17	10	-7	626	577	68694535.68	63317487.4	7.78%
4200	23.8606464	355.6017	32.8	N/S	17ab	26	16	-10	584	515	64085637.12	56513875.2	11.90%
4150	23.891715	253.3006	36.08	E/W	17ab	15	8	-7	640	591	77253918.72	71339165.6	7.61%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
4100	23.9227835	344.7447	29.52	N/S	17ab	29	16	-13	583	493	57578311.3	48689721.2	15.48%
4050	23.9538521	318.8141	29.52	NW/SE	17ab	26	15	-11	590	513	58269646.08	50664963.5	12.94%
4000	23.9849206	15.25474	29.52	N/S	17ab	29	17	-12	579	495	57183262.85	48887245.4	14.46%
3950	24.0159892	345.0684	29.52	N/S	17ab	29	17	-12	580	496	57282024.96	48986007.6	14.46%
3900	24.0470577	55.0081	36.08	NE/SW	17ab	22	11	-11	621	545	74960443.01	65786540.2	12.36%
3850	24.0781263	84.28935	19.68	E/W	17ab	27	14	-13	603	512	39702369.02	33710800.9	15.12%
3800	24.1091948	298.6107	32.8	NW/SE	17ab	24	11	-13	623	532	68365328.64	58379381.8	14.61%
3750	24.1402634	0	36.08	N/S	17ab	24	14	-10	599	529	72304839.55	63855192.2	11.63%
3700	24.1713319	213.6894	32.8	NE/SW	17ab	24	15	-9	594	531	65182993.92	58269646.1	10.59%
3650	24.2024005	20.55562	32.8	N/S	17ab	26	16	-10	587	517	64414844.16	56733346.6	11.90%
3600	24.233469	247.38	32.8	NE/SW	17ab	24	10	-14	629	531	69023742.72	58269646.1	15.56%
3550	24.2645376	180	32.8	N/S	17ab	26	16	-10	588	518	64524579.84	56843082.2	11.90%
3500	24.2956061	270	29.52	E/W	17ab	18	9	-9	633	571	62516416.9	56393166	9.89%
3450	24.3266747	255.9636	32.8	E/W	17ab	17	9	-8	632	576	69352949.76	63207751.7	8.79%
3400	24.3577432	228.0128	32.8	NE/SW	17ab	24	12	-12	613	530	67267971.84	58159910.4	13.64%
3350	24.3888118	322.1251	39.36	NW/SE	17ab	20	11	-9	619	557	81511663.1	73347328.5	10.11%
3300	24.4198803	308.6597	32.8	NW/SE	17ab	24	12	-12	614	530	67377707.52	58159910.4	13.64%
3250	24.4509489	0	36.08	N/S	17ab	24	15	-9	592	529	71459874.82	63855192.2	10.59%
3200	24.4820174	286.6994	42.64	E/W	17ab	13	7	-6	648	606	92441336.83	86449768.7	6.45%
3150	24.513086	290.5563	22.96	E/W	17w	23	14	-9	603	540	46319430.53	41480087	10.47%
3100	24.5441545	288.4346	32.8	E/W	17w	17	10	-7	630	581	69133478.4	63756430.1	7.78%
3050	24.5752231	279.4624	29.52	E/W	17w	18	10	-8	628	572	62022606.34	56491928.1	8.89%

Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
3000	24.6062916	315	36.08	NW/SE	17w	22	12	-10	614	544	74115478.27	65665830.9	11.36%
2950	24.6373602	321.3403	29.52	NW/SE	17w	26	16	-10	588	518	58072121.86	51158774	11.90%
2900	24.6684287	270	29.52	E/W	17w	18	9	-9	631	569	62318892.67	56195641.7	9.89%
2850	24.6994973	306.8694	36.08	NW/SE	17w	22	11	-11	621	544	74960443.01	65665830.9	12.36%
2800	24.7305658	0	29.52	N/S	17w	29	17	-12	576	493	56886976.51	48689721.2	14.46%
2750	24.7616344	248.9623	32.8	E/W	17w	17	10	-7	625	576	68584800	63207751.7	7.78%
2700	24.7927029	202.62	22.96	NE/SW	17w	32	23	-9	538	475	41326457.09	36487113.6	11.69%
2650	24.8237715	225	32.8	NE/SW	17w	24	13	-11	608	531	66719293.44	58269646.1	12.64%
2600	24.85484	324.4625	29.52	NW/SE	17w	26	16	-10	588	518	58072121.86	51158774	11.90%
2550	24.8859086	318.8141	32.8	NW/SE	17w	24	14	-10	599	530	65731672.32	58159910.4	11.63%
2500	24.9169771	173.6597	36.08	N/S	17w	24	15	-9	594	531	71701293.31	64096610.7	10.59%
2450	24.9480457	203.1982	42.64	NE/SW	17w	19	13	-6	610	568	87020394.24	81028826.1	6.90%
2400	24.9791142	159.4437	32.8	N/S	17w	26	16	-10	586	516	64305108.48	56623610.9	11.90%
2350	25.0101828	163.3012	29.52	N/S	17w	29	18	-11	572	495	56491928.06	48887245.4	13.41%
2300	25.0412513	237.529	39.36	NE/SW	17w	20	10	-10	625	555	82301760	73083962.9	11.11%
2250	25.0723199	318.3665	29.52	NW/SE	17w	26	16	-10	587	517	57973359.74	51060011.9	11.90%
2200	25.1033884	40.60078	32.8	NE/SW	17w	24	13	-11	605	528	66390086.4	57940439	12.64%
2150	25.134457	209.7453	22.96	NE/SW	17w	32	21	-11	552	475	42401866.75	36487113.6	13.92%
2100	25.1655255	298.0723	22.96	NW/SE	17w	32	16	-16	585	474	44936760.96	36410298.6	19.05%
2050	25.1965941	33.69039	32.8	NE/SW	17w	24	15	-9	593	530	65073258.24	58159910.4	10.59%
2000	25.2276626	63.43516	19.68	NE/SW	17w	36	18	-18	574	448	37792968.19	29496950.8	21.95%
1950	25.2587312	73.30058	22.96	E/W	17w	23	13	-10	610	540	46857135.36	41480087	11.49%

**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
1900	25.2897997	296.5647	19.68	NW/SE	17w	36	16	-20	584	445	38451382.27	29299426.6	23.81%
1850	25.3208683	309.805	36.08	NW/SE	17w	22	11	-11	619	543	74719024.51	65545121.7	12.36%
1800	25.3519368	180	29.52	N/S	17w	29	18	-11	570	494	56294403.84	48788483.3	13.41%
1750	25.3830054	260.5376	26.24	E/W	17w	20	11	-9	620	558	54428897.28	48986007.6	10.11%
1700	25.4140739	331.699	32.8	NW/SE	17w	24	15	-9	593	530	65073258.24	58159910.4	10.59%
1650	25.4451425	270	22.96	E/W	17w	23	12	-11	614	537	47164395.26	41249642.1	12.50%
1600	25.476211	296.5652	22.96	NW/SE	17w	32	15	-17	590	472	45320835.84	36256668.7	20.00%
1550	25.5072796	213.6905	22.96	NE/SW	17w	32	20	-12	560	476	43016386.56	36563928.6	15.00%
1500	25.5383481	230.1945	22.96	NE/SW	17w	32	17	-15	580	475	44552686.08	36487113.6	18.07%
1450	25.5694167	290.5556	22.96	E/W	17w	23	15	-8	595	539	45704910.72	41403272.1	9.41%
1400	25.6004852	270	26.24	E/W	17w	20	10	-10	626	556	54955628.54	48810430.5	11.11%
1350	25.6315538	251.5649	22.96	E/W	17w	23	14	-9	600	538	46088985.6	41326457.1	10.47%
1300	25.6626223	348.6907	22.96	N/S	17w	35	23	-12	534	450	41019197.18	34566739.2	15.58%
1250	25.6936909	340.0172	32.8	N/S	17w	26	16	-10	588	518	64524579.84	56843082.2	11.90%
1200	25.7247594	311.1859	26.24	NW/SE	17w	29	17	-12	582	498	51092932.61	43718694.9	14.46%
1150	25.755828	338.1984	29.52	N/S	17w	29	18	-11	575	498	56788214.4	49183531.8	13.41%
1100	25.7868965	293.9619	32.8	NW/SE	17w	24	10	-14	625	527	68584800	57830703.4	15.56%
1050	25.8179651	303.6896	29.52	NW/SE	17w	26	15	-11	591	514	58368408.19	50763725.6	12.94%
1000	25.8490336	296.5653	32.8	NW/SE	17w	24	11	-13	618	528	67816650.24	57940439	14.61%
950	25.8801022	45	26.24	NE/SW	17w	29	17	-12	579	495	50829566.98	43455329.3	14.46%
900	25.9111707	331.3893	29.52	NW/SE	17w	26	19	-7	567	518	55998117.5	51158774	8.64%
850	25.9422393	354.2893	29.52	N/S	17w	29	20	-9	557	494	55010496.38	48788483.3	11.25%



**Table I-1. Cherry Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
800	25.9733078	270	42.64	E/W	17w	13	7	-6	646	605	92156024.06	86307112.3	6.45%
750	26.0043764	180	32.8	N/S	17w	26	18	-8	574	518	62988280.32	56843082.2	9.76%
700	26.0354449	149.0364	39.36	NW/SE	17w	20	14	-6	603	561	79404738.05	73874059.8	6.98%
650	26.0665135	305.5376	36.08	NW/SE	17w	22	12	-10	616	546	74356896.77	65907249.4	11.36%
600	26.097582	348.69	32.8	N/S	17w	26	16	-10	585	515	64195372.8	56513875.2	11.90%
550	26.1286506	0	32.8	N/S	17w	26	17	-9	582	519	63866165.76	56952817.9	10.84%
500	26.1597191	0	26.24	N/S	17w	32	20	-12	560	476	49161584.64	41787346.9	15.00%
450	26.1907877	78.68995	26.24	E/W	17w	20	11	-9	624	561	54780051.46	49249373.2	10.11%
400	26.2218562	333.4349	26.24	NW/SE	17w	29	18	-11	571	495	50127258.62	43455329.3	13.41%
350	26.2529248	313.3576	32.8	NW/SE	17w	24	13	-11	607	530	66609557.76	58159910.4	12.64%
300	26.2839933	303.6899	29.52	NW/SE	17w	26	13	-13	610	519	60244888.32	51257536.1	14.94%
250	26.3150619	270	26.24	E/W	17w	20	11	-9	623	560	54692262.91	49161584.6	10.11%
200	26.3461304	299.7453	26.24	NW/SE	17w	29	14	-15	603	498	52936492.03	43718694.9	17.44%
150	26.377199	281.3101	22.96	E/W	17w	23	13	-10	609	539	46780320.38	41403272.1	11.49%
100	26.4082675	309.8055	45.92	NW/SE	17w	18	10	-8	630	574	96786869.76	88183592.4	8.89%
50	26.4393361	309.2897	32.8	NW/SE	17w	24	11	-13	621	531	68145857.28	58269646.1	14.61%
0	26.4704046	315	32.8	NW/SE	17w	24	12	-12	613	530	67267971.84	58159910.4	13.64%

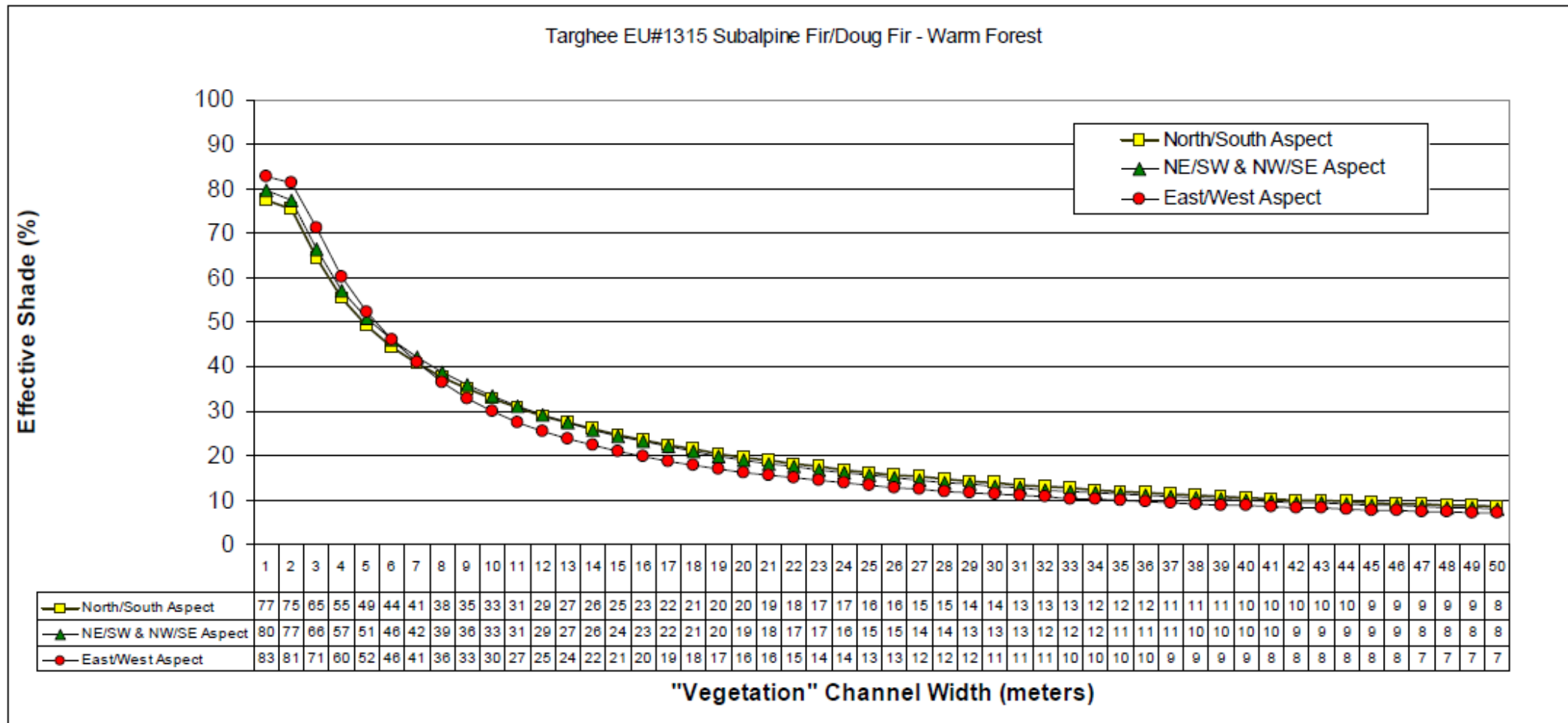


Figure I-1. Shade Curve Selected for Cherry Creek to Represent the Target Shade Conditions for Ecoregions 17l and 17g

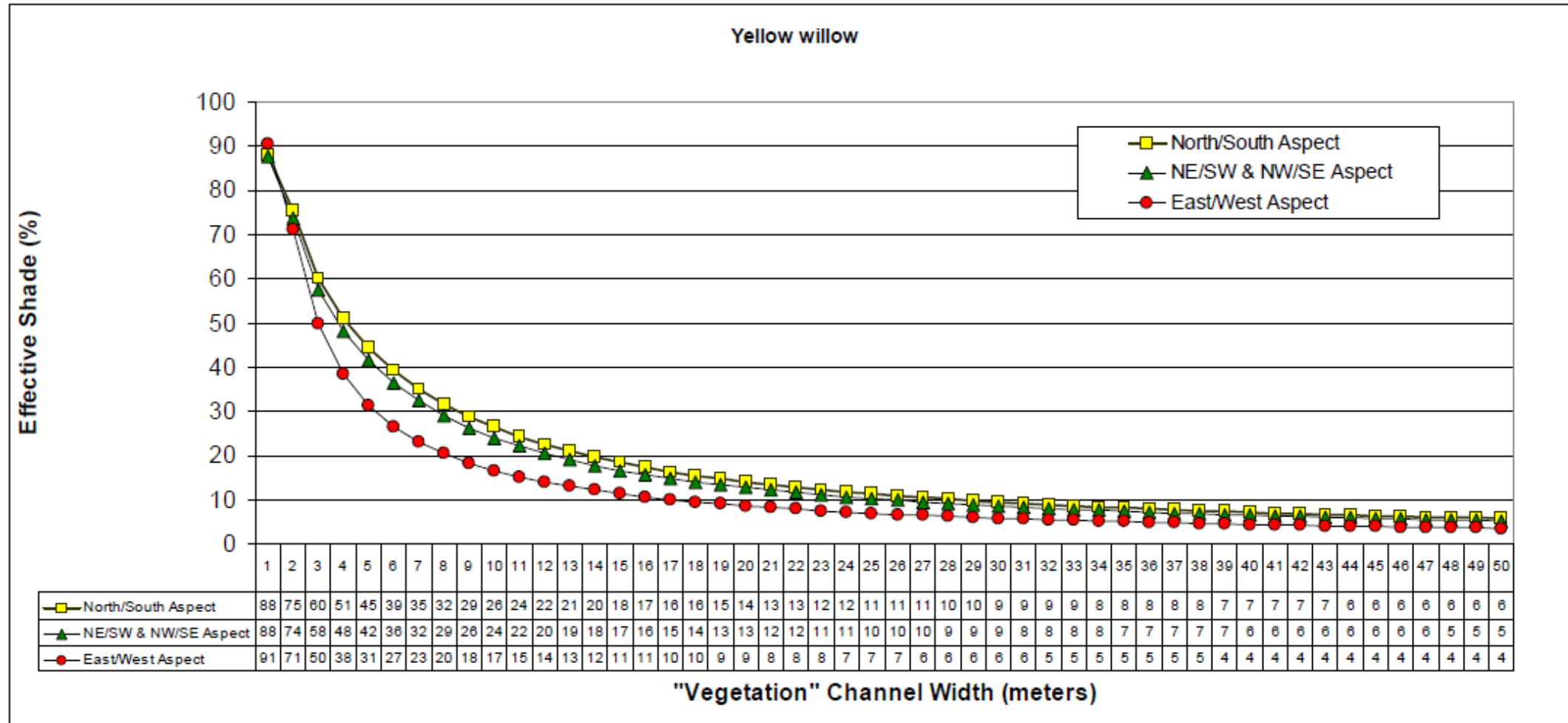


Figure I-2. Shade Curve Selected for Cherry Creek to Represent the Target Shade Conditions for Ecoregions 17ab and 17w

## 12.2 ELK CREEK

**Table I-2** contains the Shade Tool model results for Elk Creek, the data that was used for the temperature targets (shade surrogate TMDL), the modeled existing solar load, and the percent load reduction needed to meet the temperature TMDL. Vegetation-specific shade curves developed by the EPA and Idaho DEQ were used for shade target development (Shumar and de Varona 2009). Each level IV ecoregion was assigned a shade curve to represent the potential riparian vegetative community for that ecoregion. The level IV ecoregions represented in the Elk Creek shade model are 17ab - Dry Gneissic-Schistone-Volcanic Hills and 17w - Townsend Basin. The shade curve selected for these ecoregions is shown in **Figures I-3**.

**Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
0	0.00	1.55	3.28	3.28	N/S	17ab	88	100	12	0	0	0	33436	0%
50	0.03	42.20	3.28	3.28	NE/SW	17ab	88	84	-4	118	89	1297205	973265	25%
100	0.06	358.27	3.28	3.28	N/S	17ab	88	82	-6	137	92	1505890	1004300	33%
150	0.09	45.00	3.28	3.28	NE/SW	17ab	88	71	-17	214	89	2347072	971563	59%
200	0.12	49.72	3.28	3.28	NE/SW	17ab	88	78	-10	162	88	1775669	968907	45%
250	0.16	80.20	3.28	3.28	E/W	17ab	91	58	-33	310	66	3402635	729407	79%
300	0.19	106.09	3.28	3.28	E/W	17ab	91	50	-41	370	67	4058665	730831	82%
350	0.22	37.51	3.28	3.28	NE/SW	17ab	88	73	-15	202	90	2214560	984615	56%
400	0.25	66.25	6.56	6.56	NE/SW	17ab	74	47	-27	398	195	8730449	4284454	51%
450	0.28	107.10	3.28	3.28	E/W	17ab	91	49	-42	381	67	4182324	738332	82%
500	0.31	26.98	3.28	3.28	NE/SW	17ab	88	83	-5	129	91	1411055	996409	29%
550	0.34	69.18	3.28	3.28	E/W	17ab	91	99	8	8	70	85743	771973	0%
600	0.37	51.01	3.28	3.28	NE/SW	17ab	88	99	11	7	82	75228	903075	0%
650	0.40	68.66	3.28	3.28	E/W	17ab	91	99	8	5	46	55561	500235	0%
700	0.43	70.87	3.28	3.28	E/W	17ab	91	99	8	6	56	67747	609948	0%
750	0.47	74.62	3.28	3.28	E/W	17ab	91	99	8	7	66	80076	720954	0%
800	0.50	77.23	3.28	3.28	E/W	17ab	91	99	8	6	54	65952	593786	0%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
850	0.53	75.50	3.28	3.28	E/W	17ab	91	99	8	8	72	87225	785315	0%
900	0.56	77.57	3.28	3.28	E/W	17ab	91	99	8	7	61	74271	668692	0%
950	0.59	54.74	3.28	3.28	NE/SW	17ab	88	99	11	5	65	59689	716540	0%
1000	0.62	73.75	3.28	3.28	E/W	17ab	91	27	-64	546	67	5991657	738972	88%
1050	0.65	35.61	3.28	3.28	NE/SW	17ab	88	92	4	59	88	643026	964897	0%
1100	0.68	64.12	3.28	3.28	NE/SW	17ab	88	90	2	76	91	836199	1003812	0%
1150	0.71	69.81	3.28	3.28	E/W	17ab	91	58	-33	311	67	3408285	730618	79%
1200	0.75	43.60	3.28	3.28	NE/SW	17ab	88	83	-5	127	90	1398614	987624	29%
1250	0.78	50.53	3.28	3.28	NE/SW	17ab	88	41	-47	438	89	4807365	978133	80%
1300	0.81	47.50	3.28	3.28	NE/SW	17ab	88	94	6	42	84	463370	927085	0%
1350	0.84	29.67	3.28	3.28	NE/SW	17ab	88	97	9	20	78	214530	858440	0%
1400	0.87	60.72	3.28	3.28	NE/SW	17ab	88	94	6	46	93	508412	1017203	0%
1450	0.90	55.03	3.28	3.28	NE/SW	17ab	88	82	-6	133	89	1462937	975654	33%
1500	0.93	86.94	3.28	3.28	E/W	17ab	91	91	0	68	68	750920	751199	0%
1550	0.96	49.64	3.28	3.28	NE/SW	17ab	88	90	2	71	86	781771	938473	0%
1600	0.99	51.40	3.28	3.28	NE/SW	17ab	88	93	5	49	84	535184	917799	0%
1650	1.03	66.30	3.28	3.28	NE/SW	17ab	88	91	3	66	89	729411	972910	0%
1700	1.06	63.71	3.28	3.28	NE/SW	17ab	88	41	-47	443	90	4861893	989227	80%
1750	1.09	60.29	3.28	3.28	NE/SW	17ab	88	87	-1	101	93	1102933	1018471	8%
1800	1.12	25.02	3.28	3.28	NE/SW	17ab	88	75	-13	183	88	2005704	963096	52%
1850	1.15	344.49	3.28	3.28	N/S	17ab	88	92	4	60	90	659990	990353	0%
1900	1.18	340.32	3.28	3.28	N/S	17ab	88	86	-2	103	88	1130132	969044	14%
1950	1.21	351.27	3.28	3.28	N/S	17ab	88	83	-5	129	91	1416058	999942	29%
2000	1.24	40.19	6.56	6.56	NE/SW	17ab	74	56	-18	329	194	7214619	4264769	41%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
2050	1.27	359.59	6.56	6.56	N/S	17ab	75	62	-13	283	186	6203608	4082838	34%
2100	1.30	19.09	3.28	3.28	N/S	17ab	88	69	-19	234	91	2567491	994237	61%
2150	1.34	358.43	3.28	3.28	N/S	17ab	88	84	-4	122	91	1334489	1001239	25%
2200	1.37	337.64	3.28	3.28	N/S	17ab	88	73	-15	205	91	2244353	997861	56%
2250	1.40	332.20	3.28	3.28	NE/SW	17ab	88	72	-16	211	90	2312767	991554	57%
2300	1.43	346.98	3.28	3.28	N/S	17ab	88	88	0	86	86	943230	943581	0%
2350	1.46	346.41	3.28	3.28	N/S	17ab	88	94	6	42	84	461667	923677	0%
2400	1.49	337.49	3.28	3.28	NE/SW	17ab	88	74	-14	197	91	2163104	998727	54%
2450	1.52	16.45	3.28	3.28	N/S	17ab	88	78	-10	162	88	1774805	968435	45%
2500	1.55	326.09	3.28	3.28	NE/SW	17ab	88	80	-8	150	90	1648263	989326	40%
2550	1.58	356.81	3.28	3.28	N/S	17ab	88	94	6	45	91	498775	997922	0%
2600	1.62	353.20	3.28	3.28	N/S	17ab	88	93	5	53	92	586465	1005743	0%
2650	1.65	3.29	3.28	3.28	N/S	17ab	88	97	9	26	104	285399	1142021	0%
2700	1.68	6.44	3.28	3.28	N/S	17ab	88	96	8	30	89	325872	977980	0%
2750	1.71	19.94	3.28	3.28	N/S	17ab	88	71	-17	216	89	2371863	981826	59%
2800	1.74	67.26	3.28	3.28	NE/SW	17ab	88	64	-24	265	88	2906704	969261	67%
2850	1.77	95.71	3.28	3.28	E/W	17ab	91	73	-18	199	66	2183314	728042	67%
2900	1.80	57.53	3.28	3.28	NE/SW	17ab	88	89	1	79	87	870810	950327	0%
2950	1.83	63.08	3.28	3.28	NE/SW	17ab	88	89	1	84	92	925536	1010051	0%
3000	1.86	65.06	3.28	3.28	NE/SW	17ab	88	95	7	34	82	373214	896047	0%
3050	1.90	67.34	3.28	3.28	NE/SW	17ab	88	94	6	46	92	502726	1005826	0%
3100	1.93	12.43	3.28	3.28	N/S	17ab	88	93	5	51	88	561982	963755	0%
3150	1.96	62.29	3.28	3.28	NE/SW	17ab	88	69	-19	235	91	2573347	996504	61%
3200	1.99	76.22	3.28	3.28	E/W	17ab	91	90	-1	75	67	821540	739661	10%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
3250	2.02	76.42	3.28	3.28	E/W	17ab	91	87	-4	96	66	1050647	727641	31%
3300	2.05	75.26	3.28	3.28	E/W	17ab	91	35	-56	481	67	5280750	731453	86%
3350	2.08	66.60	3.28	3.28	NE/SW	17ab	88	38	-50	462	89	5071804	982004	81%
3400	2.11	64.33	3.28	3.28	NE/SW	17ab	88	95	7	36	86	392773	943005	0%
3450	2.14	64.83	3.28	3.28	NE/SW	17ab	88	95	7	41	98	445924	1070617	0%
3500	2.17	57.77	3.28	3.28	NE/SW	17ab	88	80	-8	147	88	1611282	967128	40%
3550	2.21	32.12	3.28	3.28	NE/SW	17ab	88	91	3	65	87	716247	955352	0%
3600	2.24	17.82	3.28	3.28	N/S	17ab	88	93	5	55	94	600497	1029807	0%
3650	2.27	359.59	3.28	3.28	N/S	17ab	88	94	6	43	86	470291	940932	0%
3700	2.30	13.95	3.28	3.28	N/S	17ab	88	90	2	76	91	830797	997327	0%
3750	2.33	344.26	3.28	3.28	N/S	17ab	88	94	6	42	85	465732	931810	0%
3800	2.36	319.70	3.28	3.28	NE/SW	17ab	88	90	2	73	88	805329	966754	0%
3850	2.39	353.00	3.28	3.28	N/S	17ab	88	96	8	28	83	303213	909977	0%
3900	2.42	314.27	3.28	3.28	NE/SW	17ab	88	97	9	20	78	214383	857852	0%
3950	2.45	350.48	3.28	3.28	N/S	17ab	88	89	1	85	93	931418	1016470	0%
4000	2.49	311.45	3.28	3.28	NE/SW	17ab	88	83	-5	127	90	1394412	984657	29%
4050	2.52	322.31	3.28	3.28	NE/SW	17ab	88	85	-3	114	91	1254287	1003803	20%
4100	2.55	300.10	3.28	3.28	NE/SW	17ab	88	88	0	92	92	1009524	1009900	0%
4150	2.58	304.35	3.28	3.28	NE/SW	17ab	88	43	-45	424	89	4657816	980957	79%
4200	2.61	350.69	3.28	3.28	N/S	17ab	88	45	-43	409	89	4490187	980041	78%
4250	2.64	217.37	3.28	3.28	NE/SW	17ab	88	41	-47	438	89	4809308	978528	80%
4300	2.67	293.81	3.28	3.28	NE/SW	17ab	88	38	-50	462	89	5069132	981487	81%
4350	2.70	261.07	9.84	9.84	E/W	17ab	50	7	-43	691	372	22759057	12240601	46%
4400	2.73	280.92	3.28	3.28	E/W	17ab	91	13	-78	645	67	7079125	732596	90%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
4450	2.77	307.87	3.28	3.28	NE/SW	17ab	88	21	-67	591	90	6488859	986016	85%
4500	2.80	285.26	6.56	6.56	E/W	17ab	71	7	-64	692	216	15194331	4739778	69%
4550	2.83	298.37	9.84	9.84	NE/SW	17ab	58	9	-49	679	313	22345521	10317151	54%
4600	2.86	227.12	6.56	6.56	NE/SW	17ab	74	20	-54	598	194	13125921	4267510	67%
4650	2.89	290.17	9.84	9.84	E/W	17ab	50	7	-43	695	374	22878398	12304787	46%
4700	2.92	278.97	3.28	3.28	E/W	17ab	91	9	-82	679	67	7452246	737309	90%
4750	2.95	293.43	3.28	3.28	NE/SW	17ab	88	17	-71	621	90	6815050	985675	86%
4800	2.98	335.54	9.84	9.84	NE/SW	17ab	58	15	-43	630	311	20742679	10253134	51%
4850	3.01	301.40	3.28	3.28	NE/SW	17ab	88	23	-65	578	90	6337417	988017	84%
4900	3.04	301.64	6.56	6.56	NE/SW	17ab	74	12	-62	659	195	14459993	4273859	70%
4950	3.08	276.65	6.56	6.56	E/W	17ab	71	6	-65	698	215	15324163	4729425	69%
5000	3.11	6.12	6.56	6.56	N/S	17ab	75	21	-54	588	186	12906819	4085955	68%
5050	3.14	341.29	13.12	13.12	N/S	17ab	51	9	-42	675	364	29630928	15961046	46%
5100	3.17	282.77	13.12	13.12	E/W	17ab	38	7	-31	696	464	30551225	20375055	33%
5150	3.20	18.08	6.56	6.56	N/S	17ab	75	56	-19	329	187	7216429	4101768	43%
5200	3.23	295.48	6.56	6.56	NE/SW	17ab	74	93	19	54	202	1192579	4431226	0%
5250	3.26	233.13	6.56	6.56	NE/SW	17ab	74	83	9	126	193	2767977	4234950	0%
5300	3.29	335.91	6.56	6.56	NE/SW	17ab	74	61	-13	290	193	6353786	4237432	33%
5350	3.32	352.36	6.56	6.56	N/S	17ab	75	38	-37	460	186	10103723	4075597	60%
5400	3.36	252.35	6.56	6.56	E/W	17ab	71	40	-31	444	215	9754518	4716436	52%
5450	3.39	302.15	19.68	15.00	NE/SW	17ab	36	16	-20	628	478	41323042	24006042	42%
5500	3.42	312.66	19.68	15.00	NE/SW	17ab	15	4	-11	713	632	46968154	31708724	32%
5550	3.45	299.22	19.68	15.00	NE/SW	17ab	8	2	-6	734	689	48314668	34583451	28%
5600	3.48	288.44	19.68	15.00	E/W	17ab	27	9	-18	681	546	44828721	27419870	39%



Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
5650	3.51	311.42	19.68	15.00	NE/SW	17ab	13	3	-10	720	646	47425885	32433256	32%
5700	3.54	302.84	20.00	15.00	NE/SW	17ab	32	11	-21	664	508	44456549	25484571	43%
5750	3.57	277.12	19.68	15.00	E/W	17ab	27	9	-18	680	545	44755703	27375208	39%
5800	3.60	309.01	20.00	15.00	NE/SW	17ab	32	17	-15	622	510	41600767	25571420	39%
5850	3.64	312.08	16.40	15.00	NE/SW	17ab	42	20	-22	595	431	32621452	21639644	34%
5900	3.67	294.60	9.84	9.84	NE/SW	17ab	58	34	-24	489	312	16111345	10256486	36%
5950	3.70	34.38	9.84	9.84	NE/SW	17ab	58	28	-30	536	313	17645930	10297286	42%
6000	3.73	224.28	13.12	13.12	NE/SW	17ab	48	33	-15	498	387	21855611	16968870	22%
6050	3.76	287.20	9.84	9.84	E/W	17ab	50	21	-29	591	374	19465496	12324514	37%
6100	3.79	206.15	6.56	6.56	NE/SW	17ab	74	20	-54	594	193	13041718	4240134	67%
6150	3.82	333.90	9.84	9.84	NE/SW	17ab	58	30	-28	523	314	17214083	10332289	40%
6200	3.85	272.25	9.84	9.84	E/W	17ab	50	8	-42	684	372	22503191	12234541	46%
6250	3.88	270.74	6.56	6.56	E/W	17ab	71	17	-54	617	216	13546497	4734873	65%
6300	3.91	15.21	9.84	9.84	N/S	17ab	60	34	-26	491	298	16171952	9804826	39%
6350	3.95	331.66	6.56	6.56	NE/SW	17ab	74	33	-41	502	195	11016334	4276585	61%
6400	3.98	205.77	6.56	6.56	NE/SW	17ab	74	36	-38	478	194	10486470	4261712	59%
6450	4.01	303.69	3.28	3.28	NE/SW	17ab	88	34	-54	490	89	5374682	977578	82%
6500	4.04	240.93	6.56	6.56	NE/SW	17ab	74	17	-57	617	193	13538663	4242604	69%
6550	4.07	248.43	3.28	3.28	E/W	17ab	91	15	-76	636	67	6976565	738970	89%
6600	4.10	224.09	3.28	3.28	NE/SW	17ab	88	26	-62	550	89	6034535	978937	84%
6650	4.13	139.64	6.56	6.56	NE/SW	17ab	74	19	-55	605	194	13275839	4262965	68%
6700	4.16	284.04	3.28	3.28	E/W	17ab	91	12	-79	655	67	7184513	735053	90%
6750	4.19	237.48	6.56	6.56	NE/SW	17ab	74	11	-63	662	193	14528849	4245961	71%
6800	4.23	258.23	3.28	3.28	E/W	17ab	91	54	-37	345	68	3786933	741197	80%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
6850	4.26	278.23	3.28	3.28	E/W	17ab	91	9	-82	677	67	7433847	735489	90%
6900	4.29	277	6.56	6.56	N/S	17ab	75	27	-48	546	187	11988808	4107283	66%
6950	4.32	225.94	6.56	6.56	NE/SW	17ab	74	18	-56	609	193	13374397	4242239	68%
7000	4.35	17.65	3.28	3.28	N/S	17ab	88	33	-55	502	90	5506489	986604	82%
7050	4.38	303.71	3.28	3.28	NE/SW	17ab	88	36	-52	481	90	5275676	989557	81%
7100	4.41	206.89	3.28	3.28	NE/SW	17ab	88	40	-48	449	90	4925512	985469	80%
7150	4.44	334.54	3.28	3.28	NE/SW	17ab	88	48	-40	388	89	4252358	981678	77%
7200	4.47	247.71	6.56	6.56	E/W	17ab	71	9	-62	679	216	14898760	4749722	68%
7250	4.50	225.00	3.28	3.28	NE/SW	17ab	88	56	-32	329	90	3608638	984540	73%
7300	4.54	284.44	3.28	3.28	E/W	17ab	91	67	-24	249	68	2736818	746683	73%
7350	4.57	288.03	3.28	3.28	E/W	17ab	91	17	-74	616	67	6759413	733221	89%
7400	4.60	352.87	3.28	3.28	N/S	17ab	88	51	-37	368	90	4040478	989873	76%
7450	4.63	337.72	6.56	6.56	N/S	17ab	75	32	-43	510	188	11192674	4116483	63%
7500	4.66	312.35	6.56	6.56	NE/SW	17ab	74	20	-54	599	195	13149146	4275061	67%
7550	4.69	247.66	6.56	6.56	E/W	17ab	71	9	-62	678	216	14879287	4743514	68%
7600	4.72	283.50	3.28	3.28	E/W	17ab	91	38	-53	463	67	5083506	738203	85%
7650	4.75	238.76	3.28	3.28	NE/SW	17ab	88	38	-50	462	90	5072596	982158	81%
7700	4.78	337.70	3.28	3.28	N/S	17ab	88	42	-46	433	90	4746528	982405	79%
7750	4.82	204.44	3.28	3.28	NE/SW	17ab	88	42	-46	434	90	4762650	985742	79%
7800	4.85	20.09	3.28	3.28	N/S	17ab	88	72	-16	209	90	2296931	984765	57%
7850	4.88	355.54	6.56	6.56	N/S	17ab	75	54	-21	344	187	7547252	4103292	46%
7900	4.91	237.14	3.28	3.28	NE/SW	17ab	88	50	-38	371	89	4070059	977177	76%
7950	4.94	311.19	3.28	3.28	NE/SW	17ab	88	68	-20	241	90	2639501	990181	62%
8000	4.97	293.96	3.28	3.28	NE/SW	17ab	88	96	8	30	90	330273	991189	0%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
8050	5.00	239.65	3.28	3.28	NE/SW	17ab	88	46	-42	400	89	4389102	975719	78%
8100	5.03	195.46	3.28	3.28	N/S	17ab	88	90	2	75	90	818348	982383	0%
8150	5.06	270.00	6.56	6.56	E/W	17ab	71	8	-63	684	216	15020059	4736344	68%
8200	5.10	245.07	6.56	6.56	NE/SW	17ab	74	14	-60	644	195	14142059	4277096	70%
8250	5.13	325.56	9.84	9.84	NE/SW	17ab	58	13	-45	647	313	21314385	10293528	52%
8300	5.16	298.65	6.56	6.56	NE/SW	17ab	74	50	-24	376	195	8245126	4289059	48%
8350	5.19	340.71	6.56	6.56	N/S	17ab	75	51	-24	362	185	7941112	4053094	49%
8400	5.22	331.46	3.28	3.28	NE/SW	17ab	88	66	-22	253	89	2772291	978819	65%
8450	5.25	265.95	6.56	6.56	E/W	17ab	71	9	-62	675	215	14814367	4722817	68%
8500	5.28	323.13	6.56	6.56	NE/SW	17ab	74	56	-18	328	194	7205518	4259389	41%
8550	5.31	306.77	6.56	6.56	NE/SW	17ab	74	48	-26	388	194	8510173	4256668	50%
8600	5.34	33.39	3.28	3.28	NE/SW	17ab	88	68	-20	240	90	2637011	989247	62%
8650	5.37	193.65	3.28	3.28	N/S	17ab	88	52	-36	355	89	3897507	974739	75%
8700	5.41	222.51	9.84	9.84	NE/SW	17ab	58	11	-47	667	315	21947968	10361318	53%
8750	5.44	235.56	6.56	6.56	NE/SW	17ab	74	25	-49	562	195	12339525	4279292	65%
8800	5.47	353.05	3.28	3.28	N/S	17ab	88	44	-44	421	90	4614869	989268	79%
8850	5.50	302.99	13.12	13.12	NE/SW	17ab	48	6	-42	701	388	30767605	17026705	45%
8900	5.53	265.64	9.84	9.84	E/W	17ab	50	6	-44	701	373	23075874	12278964	47%
8950	5.56	193.61	13.12	13.12	N/S	17ab	51	12	-39	657	366	28837331	16063120	44%
9000	5.59	312.97	13.12	13.12	NE/SW	17ab	48	7	-41	693	388	30432257	17022211	44%
9050	5.62	316.03	9.84	9.84	NE/SW	17ab	58	11	-47	665	314	21877733	10328161	53%
9100	5.65	293.54	6.56	6.56	NE/SW	17ab	74	13	-61	646	193	14178681	4238882	70%
9150	5.69	358.81	6.56	6.56	N/S	17ab	75	23	-52	575	187	12625442	4100693	68%
9200	5.72	71.57	6.56	6.56	E/W	17ab	71	8	-63	683	215	14981470	4724175	68%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
9250	5.75	282.23	6.56	6.56	E/W	17ab	71	9	-62	675	215	14819470	4724444	68%
9300	5.78	201.37	6.56	6.56	N/S	17ab	75	24	-51	570	188	12507679	4115898	67%
9350	5.81	43.45	6.56	6.56	NE/SW	17ab	74	18	-56	612	194	13438150	4262461	68%
9400	5.84	17.61	6.56	6.56	N/S	17ab	75	24	-51	570	187	12498917	4113014	67%
9450	5.87	237.26	6.56	6.56	NE/SW	17ab	74	16	-58	625	194	13724106	4249517	69%
9500	5.90	317.66	6.56	6.56	NE/SW	17ab	74	18	-56	612	194	13438851	4262683	68%
9550	5.93	6.54	6.56	6.56	N/S	17ab	75	24	-51	564	186	12384238	4075277	67%
9600	5.97	319.40	6.56	6.56	NE/SW	17ab	74	21	-53	591	195	12971565	4270710	67%
9650	6.00	274.69	6.56	6.56	E/W	17ab	71	7	-64	694	216	15220750	4748020	69%
9700	6.03	331.53	6.56	6.56	NE/SW	17ab	74	23	-51	577	195	12665827	4278362	66%
9750	6.06	295.20	3.28	3.28	NE/SW	17ab	88	48	-40	389	90	4266923	985040	77%
9800	6.09	298.93	9.84	9.84	NE/SW	17ab	58	8	-50	685	313	22554299	10300356	54%
9850	6.12	248.70	9.84	9.84	E/W	17ab	50	7	-43	692	372	22772579	12247873	46%
9900	6.15	268.69	6.56	6.56	E/W	17ab	71	6	-65	700	216	15359216	4740243	69%
9950	6.18	333.44	6.56	6.56	NE/SW	17ab	74	23	-51	577	195	12656500	4275212	66%
10000	6.21	302.15	6.56	6.56	NE/SW	17ab	74	12	-62	657	194	14409461	4258923	70%
10050	6.24	193.24	6.56	6.56	N/S	17ab	75	25	-50	556	186	12212972	4072504	67%
10100	6.28	295.59	13.12	13.12	NE/SW	17ab	48	6	-42	704	389	30886688	17092605	45%
10150	6.31	284.17	13.12	13.12	E/W	17ab	38	5	-33	709	463	31118159	20316243	35%
10200	6.34	289.03	6.56	6.56	E/W	17ab	71	9	-62	676	215	14828599	4727354	68%
10250	6.37	1.55	6.56	6.56	N/S	17ab	75	23	-52	575	187	12622525	4099746	68%
10300	6.40	347.73	3.28	3.28	N/S	17ab	88	45	-43	408	89	4481848	978221	78%
10350	6.43	198.43	9.84	9.84	N/S	17ab	60	48	-12	386	297	12722920	9790500	23%
10400	6.46	172.40	3.28	3.28	N/S	17ab	88	72	-16	206	89	2265905	971463	57%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
10450	6.49	319.27	6.56	6.56	NE/SW	17ab	74	60	-14	295	192	6473396	4209272	35%
10500	6.52	303.98	9.84	9.84	NE/SW	17ab	58	41	-17	440	313	14479008	10310922	29%
10550	6.56	315.00	9.84	9.84	NE/SW	17ab	58	37	-21	468	312	15405450	10274118	33%
10600	6.59	298.07	13.12	13.12	NE/SW	17ab	48	18	-30	614	390	26961169	17103683	37%
10650	6.62	311.91	13.12	13.12	NE/SW	17ab	48	34	-14	495	390	21721987	17120655	21%
10700	6.65	305.22	9.84	9.84	NE/SW	17ab	58	9	-49	678	313	22306400	10299089	54%
10750	6.68	201.80	6.56	6.56	N/S	17ab	75	24	-51	564	186	12372232	4071326	67%
10800	6.71	265.91	20.00	15.00	E/W	17ab	18	3	-15	722	610	48277834	30620521	37%
10850	6.74	237.61	6.56	6.56	NE/SW	17ab	74	55	-19	333	192	7308882	4224479	42%
10900	6.77	290.14	9.84	9.84	E/W	17ab	50	29	-21	528	372	17395024	12254571	30%
10950	6.80	303.49	9.84	9.84	NE/SW	17ab	58	37	-21	467	311	15363054	10245843	33%
11000	6.84	9.71	6.56	6.56	N/S	17ab	75	47	-28	393	186	8630274	4072397	53%
11050	6.87	266.93	6.56	6.56	E/W	17ab	17	6	-11	704	622	15454946	13651461	12%
11100	6.90	345.34	6.56	6.56	N/S	17ab	18	8	-10	688	614	15102055	13465531	11%
11150	6.93	4.09	6.56	6.56	N/S	17ab	16	4	-12	713	624	15652710	13701212	12%
11200	6.96	9.43	6.56	6.56	N/S	17ab	13	5	-8	710	651	15591915	14284220	8%
11250	6.99	334.84	6.56	6.56	NE/SW	17ab	13	4	-9	718	651	15749517	14278306	9%
11300	7.02	71.57	6.56	6.56	E/W	17ab	7	3	-4	721	692	15833176	15185905	4%
11350	7.05	353.89	6.56	6.56	N/S	17ab	13	3	-10	724	650	15893513	14260306	10%
11400	7.08	324.49	6.56	6.56	NE/SW	17ab	13	3	-10	721	647	15815435	14190251	10%
11450	7.11	6.52	6.56	6.56	N/S	17ab	13	6	-7	700	648	15358827	14220369	7%
11500	7.15	305.67	6.56	6.56	NE/SW	17ab	17	5	-12	709	620	15565125	13604059	13%
11550	7.18	353.59	9.84	9.84	N/S	17ab	60	47	-13	393	297	12930583	9762558	25%
11600	7.21	353.52	16.40	15.00	N/S	17ab	45	29	-16	526	407	28846651	20446010	29%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
11650	7.24	26.74	19.68	15.00	NE/SW	17ab	36	22	-14	583	479	38401381	24024801	37%
11700	7.27	18.44	13.12	13.12	N/S	17ab	51	27	-24	544	365	23867109	16026344	33%
11750	7.30	289.84	20.00	15.00	E/W	17ab	20	4	-16	713	595	47734279	29845015	37%
11800	7.33	0.00	19.68	15.00	N/S	17ab	39	26	-13	552	455	36322002	22829451	37%
11850	7.36	356.24	13.12	13.12	N/S	17ab	51	38	-13	459	363	20134606	15918749	21%
11900	7.39	27.00	16.40	15.00	NE/SW	17ab	42	29	-13	531	434	29113386	21760616	25%
11950	7.43	72.32	19.68	15.00	E/W	17ab	27	10	-17	670	543	44089212	27267183	38%
12000	7.46	290.04	9.84	9.84	E/W	17ab	50	13	-37	645	371	21237360	12209917	43%
12050	7.49	272.25	13.12	13.12	E/W	17ab	38	10	-28	673	464	29555606	20368098	31%
12100	7.52	334.44	9.84	9.84	NE/SW	17ab	58	49	-9	381	314	12543149	10333492	18%
12150	7.55	276.58	13.12	13.12	E/W	17ab	38	10	-28	673	464	29549647	20363991	31%
12200	7.58	266.08	9.84	9.84	E/W	17ab	50	19	-31	604	373	19887145	12280579	38%
12250	7.61	7.06	9.84	9.84	N/S	17ab	60	33	-27	501	299	16487305	9846826	40%
12300	7.64	307.46	16.40	15.00	NE/SW	17ab	42	17	-25	622	435	34115865	21812986	36%
12350	7.67	36.51	9.84	9.84	NE/SW	17ab	58	34	-24	490	312	16146663	10278969	36%
12400	7.71	261.66	6.56	6.56	E/W	17ab	71	33	-38	501	217	10990486	4758844	57%
12450	7.74	313.05	6.56	6.56	NE/SW	17ab	13	4	-9	716	649	15711428	14243775	9%
12500	7.77	2.64	6.56	6.56	N/S	17ab	12	4	-8	715	656	15692421	14390067	8%
12550	7.80	6.82	13.12	13.12	N/S	17ab	51	22	-29	580	364	25456559	15997886	37%
12600	7.83	26.47	13.12	13.12	NE/SW	17ab	48	25	-23	556	385	24383611	16912255	31%
12650	7.86	252.35	6.56	6.56	E/W	17ab	71	10	-61	669	216	14682494	4732785	68%
12700	7.89	317.12	9.84	9.84	NE/SW	17ab	58	44	-14	421	316	13858901	10398040	25%
12750	7.92	329.09	9.84	9.84	NE/SW	17ab	58	27	-31	546	314	17972397	10344127	42%
12800	7.95	295.92	3.28	3.28	NE/SW	17ab	88	62	-26	286	90	3135373	990486	68%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
12850	7.98	304.48	6.56	6.56	NE/SW	17ab	74	60	-14	298	194	6537441	4250916	35%
12900	8.02	324.50	6.56	6.56	NE/SW	17ab	74	59	-15	305	194	6697279	4248634	37%
12950	8.05	332.87	3.28	3.28	NE/SW	17ab	88	69	-19	231	90	2539183	983275	61%
13000	8.08	254.35	16.40	15.00	E/W	17ab	31	10	-21	672	515	36877177	25868609	30%
13050	8.11	306.54	9.84	9.84	NE/SW	17ab	58	32	-26	505	312	16632809	10277024	38%
13100	8.14	286.24	13.12	13.12	E/W	17ab	38	13	-25	651	464	28554221	20356550	29%
13150	8.17	41.67	19.68	15.00	NE/SW	17ab	36	20	-16	598	478	39352078	24004090	39%
13200	8.20	19.43	6.56	6.56	N/S	17ab	75	51	-24	368	188	8080157	4124062	49%
13250	8.23	68.96	9.84	9.84	E/W	17ab	50	23	-27	576	374	18957414	12314585	35%
13300	8.26	355.16	16.40	15.00	N/S	17ab	45	33	-12	502	412	27524926	20673922	25%
13350	8.30	50.91	9.84	9.84	NE/SW	17ab	58	37	-21	469	313	15447054	10301864	33%
13400	8.33	266.35	9.84	9.84	E/W	17ab	50	7	-43	695	374	22890555	12311325	46%
13450	8.36	351.67	19.68	15.00	N/S	17ab	39	17	-22	616	453	40577167	22738460	44%
13500	8.39	50.23	13.12	13.12	NE/SW	17ab	48	30	-18	522	388	22895259	17014230	26%
13550	8.42	354.81	9.84	9.84	N/S	17ab	60	50	-10	370	296	12167248	9737417	20%
13600	8.45	26.57	19.68	15.00	NE/SW	17ab	36	31	-5	518	480	34089623	24109081	29%
13650	8.48	345.11	16.40	15.00	N/S	17ab	45	38	-7	460	408	25242784	20488826	19%
13700	8.51	2.73	3.28	3.28	N/S	17ab	88	70	-18	221	88	2421843	969097	60%
13750	8.54	339.73	9.84	9.84	N/S	17ab	60	49	-11	377	296	12401198	9730046	22%
13800	8.57	12.01	6.56	6.56	N/S	17ab	75	64	-11	269	187	5907494	4103951	31%
13850	8.61	18.43	13.12	13.12	N/S	17ab	51	47	-4	392	363	17207023	15914294	8%
13900	8.64	13.06	9.84	9.84	N/S	17ab	60	47	-13	394	297	12958044	9783292	25%
13950	8.67	319.07	6.56	6.56	NE/SW	17ab	74	58	-16	311	193	6830648	4230068	38%
14000	8.70	331.47	6.56	6.56	NE/SW	17ab	74	83	9	128	195	2798396	4281491	0%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
14050	8.73	276.87	13.12	13.12	E/W	17ab	38	92	54	59	460	2606749	20209816	0%
14100	8.76	323.00	9.84	9.84	NE/SW	17ab	58	55	-3	333	311	10970176	10242637	7%
14150	8.79	280.20	9.84	9.84	E/W	17ab	50	97	47	21	356	703127	11723135	0%
14200	8.82	283.31	16.40	15.00	E/W	17ab	31	71	40	214	510	11751237	25582531	0%
14250	8.85	271.31	13.12	13.12	E/W	17ab	38	94	56	48	494	2098170	21689151	0%
14300	8.89	344.55	16.40	15.00	N/S	17ab	45	7	-38	691	409	37891216	20503458	46%
14350	8.92	318.01	13.12	13.12	NE/SW	17ab	48	10	-38	674	390	29603151	17110401	42%
14400	8.95	206.91	16.40	15.00	NE/SW	17ab	42	8	-34	686	432	37622156	21701646	42%
14450	8.98	288.66	13.12	13.12	E/W	17ab	38	11	-27	661	460	29005002	20213243	30%
14500	9.01	329.96	13.12	13.12	NE/SW	17ab	48	40	-8	446	387	19572321	16968984	13%
14550	9.04	306.87	13.12	13.12	NE/SW	17ab	48	31	-17	516	389	22628134	17059426	25%
14600	9.07	266.53	13.12	13.12	E/W	17ab	38	9	-29	678	462	29764367	20286558	32%
14650	9.10	281.31	9.84	9.84	E/W	17ab	50	20	-30	600	375	19738341	12341049	37%
14700	9.13	25.71	16.40	15.00	NE/SW	17ab	42	27	-15	547	434	29985341	21798317	27%
14750	9.17	337.43	9.84	9.84	NE/SW	17ab	58	45	-13	407	311	13398847	10235650	24%
14800	9.20	253.01	13.12	13.12	E/W	17ab	38	11	-27	661	460	28998642	20208811	30%
14850	9.23	349.22	9.84	9.84	N/S	17ab	60	49	-11	384	301	12625866	9906322	22%
14900	9.26	295.32	13.12	13.12	NE/SW	17ab	48	78	30	167	395	7341846	17359904	0%
14950	9.29	317.44	9.84	9.84	NE/SW	17ab	58	42	-16	431	312	14193612	10281953	28%
15000	9.32	321.68	13.12	13.12	NE/SW	17ab	48	22	-26	581	387	25498882	17005574	33%
15050	9.35	265.53	9.84	9.84	E/W	17ab	50	11	-39	665	374	21894268	12304723	44%
15100	9.38	66.22	9.84	9.84	NE/SW	17ab	58	21	-37	590	314	19434558	10336138	47%
15150	9.41	6.34	16.40	15.00	N/S	17ab	45	31	-14	514	410	28216092	20578764	27%
15200	9.44	300.80	9.84	9.84	NE/SW	17ab	58	36	-22	480	315	15818369	10384664	34%



Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
15250	9.48	250.13	16.40	15.00	E/W	17ab	31	12	-19	656	514	35982038	25814339	28%
15300	9.51	305.54	9.84	9.84	NE/SW	17ab	58	37	-21	468	312	15398692	10269611	33%
15350	9.54	276.86	9.84	9.84	E/W	17ab	50	11	-39	667	375	21948893	12335423	44%
15400	9.57	267.87	9.84	9.84	E/W	17ab	50	87	37	97	374	3195760	12295954	0%
15450	9.60	280.12	13.12	13.12	E/W	17ab	38	81	43	140	456	6129596	20009275	0%
15500	9.63	347.88	9.84	9.84	N/S	17ab	60	40	-20	446	298	14693993	9799637	33%
15550	9.66	274.09	20.00	15.00	E/W	17ab	23	9	-14	682	577	45601211	28949988	37%
15600	9.69	257.77	16.40	15.00	E/W	17ab	31	10	-21	669	513	36685206	25733945	30%
15650	9.72	320.06	13.12	13.12	NE/SW	17ab	48	40	-8	449	389	19691227	17072074	13%
15700	9.76	323.86	6.56	6.56	NE/SW	17ab	74	79	5	156	193	3413044	4227244	0%
15750	9.79	283.91	9.84	9.84	E/W	17ab	50	15	-35	637	375	20957953	12332791	41%
15800	9.82	289.07	13.12	13.12	E/W	17ab	38	15	-23	637	465	27966950	20407006	27%
15850	9.85	311.66	19.68	15.00	NE/SW	17ab	36	35	-1	487	480	32065536	24073138	25%
15900	9.88	347.20	6.56	6.56	N/S	17ab	75	54	-21	340	185	7451952	4051479	46%
15950	9.91	283.15	9.84	9.84	E/W	17ab	50	15	-35	635	374	20919092	12309923	41%
16000	9.94	349.89	13.12	13.12	N/S	17ab	51	44	-7	419	367	18399573	16105611	12%
16050	9.97	311.71	16.40	15.00	NE/SW	17ab	42	67	25	245	430	13429536	21596526	0%
16100	10.00	323.34	20.00	15.00	NE/SW	17ab	32	34	2	494	509	33053595	25550909	23%
16150	10.04	0.40	13.12	13.12	N/S	17ab	51	45	-6	412	367	18092013	16124330	11%
16200	10.07	331.26	6.56	6.56	NE/SW	17ab	74	63	-11	278	195	6096616	4285701	30%
16250	10.10	335.81	9.84	9.84	NE/SW	17ab	58	51	-7	363	311	11939867	10237976	14%
16300	10.13	335.63	9.84	9.84	NE/SW	17ab	58	47	-11	396	314	13026785	10326950	21%
16350	10.16	300.96	6.56	6.56	NE/SW	17ab	74	48	-26	387	194	8504287	4253724	50%
16400	10.19	293.08	6.56	6.56	NE/SW	17ab	74	41	-33	443	195	9727482	4288281	56%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
16450	10.22	338.93	13.12	13.12	N/S	17ab	51	55	4	334	364	14656710	15965461	0%
16500	10.25	298.41	20.00	15.00	NE/SW	17ab	26	23	-3	572	550	38257965	27585798	28%
16550	10.28	347.68	9.84	9.84	N/S	17ab	60	63	3	277	300	9125478	9869049	0%
16600	10.31	42.08	13.12	13.12	NE/SW	17ab	48	33	-15	501	389	21975685	17062096	22%
16650	10.35	325.20	13.12	13.12	NE/SW	17ab	48	42	-6	429	385	18850302	16906554	10%
16700	10.38	15.62	9.84	9.84	N/S	17ab	60	53	-7	348	296	11447065	9745805	15%
16750	10.41	5.42	13.12	13.12	N/S	17ab	51	63	12	278	368	12207658	16172909	0%
16800	10.44	52.52	16.40	15.00	NE/SW	17ab	42	42	0	429	430	23558650	21555556	9%
16850	10.47	40.09	13.12	13.12	NE/SW	17ab	48	65	17	258	384	11342014	16857257	0%
16900	10.50	56.38	13.12	13.12	NE/SW	17ab	48	82	34	133	384	5827663	16841729	0%
16950	10.53	47.91	13.12	13.12	NE/SW	17ab	48	89	41	80	380	3530726	16696910	0%
17000	10.56	77.03	9.84	9.84	E/W	17ab	50	91	41	65	361	2136814	11875601	0%
17050	10.59	69.88	13.12	13.12	E/W	17ab	38	78	40	165	465	7235778	20399319	0%
17100	10.63	8.97	13.12	13.12	N/S	17ab	51	57	6	322	367	14115747	16091366	0%
17150	10.66	20.70	9.84	9.84	N/S	17ab	60	74	14	191	293	6277580	9661406	0%
17200	10.69	341.81	9.84	9.84	N/S	17ab	60	53	-7	349	297	11476961	9771257	15%
17250	10.72	290.83	16.40	15.00	E/W	17ab	31	37	6	470	515	25790130	25844665	0%
17300	10.75	330.34	19.68	15.00	NE/SW	17ab	36	25	-11	561	479	36910107	24015498	35%
17350	10.78	118.75	16.40	15.00	NE/SW	17ab	42	32	-10	509	435	27944062	21808081	22%
17400	10.81	93.13	13.12	13.12	E/W	17ab	10	4	-6	715	670	31377512	29427353	6%
17450	10.84	307.87	9.84	9.84	NE/SW	17ab	58	17	-41	616	312	20285787	10268913	49%
17500	10.87	162.01	19.68	15.00	N/S	17ab	39	25	-14	558	454	36763739	22799001	38%
17550	10.91	51.01	20.00	15.00	NE/SW	17ab	32	12	-20	659	509	44077764	25554564	42%
17600	10.94	42.31	13.12	13.12	NE/SW	17ab	48	29	-19	531	389	23316558	17083264	27%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
17650	10.97	53.13	13.12	13.12	NE/SW	17ab	48	35	-13	483	387	21220357	16982596	20%
17700	11.00	340.11	9.84	9.84	N/S	17ab	60	42	-18	432	298	14219823	9810420	31%
17750	11.03	33.69	20.00	15.00	NE/SW	17ab	32	25	-7	556	504	37190590	25299002	32%
17800	11.06	11.20	13.12	13.12	N/S	17ab	51	38	-13	465	368	20403494	16131337	21%
17850	11.09	29.59	16.40	15.00	NE/SW	17ab	42	35	-7	481	429	26385720	21542317	18%
17900	11.12	316.11	13.12	13.12	NE/SW	17ab	48	33	-15	497	386	21796970	16923340	22%
17950	11.15	241.03	13.12	13.12	NE/SW	17ab	48	25	-23	562	390	24658525	17102933	31%
18000	11.18	45.13	16.40	15.00	NE/SW	17ab	42	27	-15	548	436	30064350	21855754	27%
18050	11.22	287.49	9.84	9.84	E/W	17ab	50	6	-44	698	372	22990296	12233427	47%
18100	11.25	8.60	19.68	15.00	N/S	17ab	39	6	-33	704	457	46354409	22936155	51%
18150	11.28	340.37	16.40	15.00	N/S	17ab	45	8	-37	685	410	37569717	20550463	45%
18200	11.31	303.99	13.12	13.12	NE/SW	17ab	48	6	-42	699	387	30667512	16971314	45%
18250	11.34	56.31	16.40	15.00	NE/SW	17w	42	5	-37	706	431	38722287	21630881	44%
18300	11.37	87.28	16.40	15.00	E/W	17w	31	4	-27	718	516	39391992	25905658	34%
18350	11.40	87.14	13.12	13.12	E/W	17w	38	5	-33	712	465	31247784	20400872	35%
18400	11.43	88.65	9.84	9.84	E/W	17w	50	5	-45	707	372	23268411	12251084	47%
18450	11.46	45.17	16.40	15.00	NE/SW	17w	42	6	-36	704	435	38627443	21807452	44%
18500	11.50	19.70	13.12	13.12	N/S	17w	51	11	-40	664	366	29154772	16057471	45%
18550	11.53	352.87	13.12	13.12	N/S	17w	51	24	-27	565	364	24787922	15987628	36%
18600	11.56	341.76	9.84	9.84	N/S	17w	60	25	-35	560	299	18451149	9844271	47%
18650	11.59	18.89	13.12	13.12	N/S	17w	51	28	-23	537	366	23588906	16059529	32%
18700	11.62	346.51	19.68	15.00	N/S	17w	39	15	-24	631	453	41577035	22750556	45%
18750	11.65	57.79	20.00	15.00	NE/SW	17w	32	3	-29	726	509	48572897	25547821	47%
18800	11.68	10.30	9.84	9.84	N/S	17w	60	15	-45	634	299	20878699	9828923	53%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
18850	11.71	53.19	16.40	15.00	NE/SW	17w	42	5	-37	711	434	38997352	21784537	44%
18900	11.74	322.40	13.12	13.12	NE/SW	17w	48	18	-30	610	387	26762816	16977851	37%
18950	11.77	11.03	13.12	13.12	N/S	17w	51	10	-41	667	364	29296744	15956379	46%
19000	11.81	355.12	9.84	9.84	N/S	17w	60	19	-41	605	299	19915431	9838437	51%
19050	11.84	347.73	9.84	9.84	N/S	17w	60	15	-45	636	300	20951695	9863287	53%
19100	11.87	36.23	9.84	9.84	NE/SW	17w	58	13	-45	651	314	21423551	10346249	52%
19150	11.90	342.84	6.56	6.56	N/S	17w	75	28	-47	536	186	11768340	4087748	65%
19200	11.93	33.95	19.68	15.00	NE/SW	17w	36	14	-22	640	477	42159650	23922474	43%
19250	11.96	328.71	13.12	13.12	NE/SW	17w	48	18	-30	608	386	26705292	16941359	37%
19300	11.99	10.22	16.40	15.00	N/S	17w	45	11	-34	663	410	36382750	20572025	43%
19350	12.02	62.45	19.68	15.00	NE/SW	17w	36	4	-32	717	478	47185432	23985251	49%
19400	12.05	11.17	19.68	15.00	N/S	17w	39	17	-22	617	454	40641816	22774687	44%
19450	12.09	274.29	16.40	15.00	E/W	17w	1	1	0	738	738	40496977	37053688	9%
19500	12.12	10.77	16.40	15.00	N/S	17w	45	11	-34	663	410	36374833	20567548	43%
19550	12.15	49.76	20.00	15.00	NE/SW	17w	32	9	-23	676	505	45245219	25366637	44%
19600	12.18	39.33	9.84	9.84	NE/SW	17w	58	13	-45	651	314	21422459	10345721	52%
19650	12.21	79.30	16.40	15.00	E/W	17w	31	10	-21	671	514	36791844	25808749	30%
19700	12.24	347.52	13.12	13.12	N/S	17w	51	17	-34	617	365	27098855	16004066	41%
19750	12.27	256.46	13.12	13.12	E/W	17w	38	9	-29	676	461	29674860	20225553	32%
19800	12.30	22.98	9.84	9.84	NE/SW	17w	58	16	-42	624	312	20530812	10269222	50%
19850	12.33	358.80	6.56	6.56	N/S	17w	75	58	-17	313	187	6874280	4093354	40%
19900	12.37	292.77	9.84	9.84	NE/SW	17w	58	7	-51	694	314	22855904	10325858	55%
19950	12.40	33.55	9.84	9.84	NE/SW	17w	58	37	-21	473	315	15555337	10374080	33%
20000	12.43	277.77	6.56	6.56	E/W	17w	71	10	-61	674	217	14782364	4764977	68%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
20050	12.46	273.81	16.40	15.00	E/W	17w	31	7	-24	693	514	38033793	25819309	32%
20100	12.49	327.45	9.84	9.84	NE/SW	17w	58	25	-33	560	314	18448197	10334831	44%
20150	12.52	328.59	9.84	9.84	NE/SW	17w	58	42	-16	435	315	14312112	10367796	28%
20200	12.55	45.76	9.84	9.84	NE/SW	17w	58	31	-27	514	313	16916748	10300979	39%
20250	12.58	343.04	9.84	9.84	N/S	17w	60	21	-39	590	299	19419009	9836065	49%
20300	12.61	352.75	9.84	9.84	N/S	17w	60	16	-44	628	299	20661042	9842249	52%
20350	12.64	343.30	13.12	13.12	N/S	17w	51	10	-41	671	365	29442638	16035840	46%
20400	12.68	38.51	9.84	9.84	NE/SW	17w	58	10	-48	668	312	21979020	10260689	53%
20450	12.71	279.97	19.68	15.00	E/W	17w	27	3	-24	726	546	47786278	27420913	43%
20500	12.74	349.62	19.68	15.00	N/S	17w	39	6	-33	703	457	46305664	22912036	51%
20550	12.77	13.48	19.68	15.00	N/S	17w	39	4	-35	717	456	47219513	22877454	52%
20600	12.80	27.57	9.84	9.84	NE/SW	17w	58	12	-46	653	312	21483617	10257356	52%
20650	12.83	307.22	16.40	15.00	NE/SW	17w	42	19	-23	607	435	33290693	21810953	34%
20700	12.86	297.53	3.28	3.28	NE/SW	17w	88	62	-26	284	90	3121095	985975	68%
20750	12.89	229.99	9.84	9.84	NE/SW	17w	58	10	-48	669	312	22025964	10282604	53%
20800	12.92	295.87	13.12	13.12	NE/SW	17w	48	5	-43	705	386	30926832	16934664	45%
20850	12.96	306.33	9.84	9.84	NE/SW	17w	58	10	-48	674	315	22195694	10361841	53%
20900	12.99	51.71	9.84	9.84	NE/SW	17w	58	19	-39	606	314	19947772	10347134	48%
20950	13.02	21.34	6.56	6.56	N/S	17w	75	58	-17	316	188	6927510	4125051	40%
21000	13.05	234.19	16.40	15.00	NE/SW	17w	42	19	-23	603	432	33104455	21688936	34%
21050	13.08	300.47	9.84	9.84	NE/SW	17w	58	17	-41	619	313	20363897	10308453	49%
21100	13.11	93.63	9.84	9.84	E/W	17w	50	10	-40	669	372	22013647	12234350	44%
21150	13.14	341.30	13.12	13.12	N/S	17w	51	41	-10	441	367	19365582	16089259	17%
21200	13.17	2.53	6.56	6.56	N/S	17w	75	59	-16	307	187	6735083	4108285	39%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
21250	13.20	26.57	13.12	13.12	NE/SW	17w	48	25	-23	562	390	24664373	17106989	31%
21300	13.24	272.86	9.84	9.84	E/W	17w	50	6	-44	702	374	23123665	12304394	47%
21350	13.27	330.69	16.40	15.00	NE/SW	17w	42	17	-25	619	432	33943536	21702802	36%
21400	13.30	227.32	9.84	9.84	NE/SW	17w	58	19	-39	605	314	19925495	10335579	48%
21450	13.33	216.25	9.84	9.84	NE/SW	17w	13	2	-11	731	649	24064091	21370961	11%
21500	13.36	158.11	9.84	9.84	N/S	17w	60	47	-13	395	298	13002510	9816863	25%
21550	13.39	220.60	16.40	15.00	NE/SW	17w	42	15	-27	635	433	34817340	21737695	38%
21600	13.42	334.28	20.00	15.00	NE/SW	17w	29	16	-13	624	527	41735237	26466995	37%
21650	13.45	259.33	19.68	15.00	E/W	17w	27	7	-20	693	544	45628689	27308981	40%
21700	13.48	0.38	16.40	15.00	N/S	17w	45	8	-37	688	412	37768326	20659101	45%
21750	13.51	319.24	9.84	9.84	NE/SW	17w	58	19	-39	606	314	19937223	10341662	48%
21800	13.55	301.08	6.56	6.56	NE/SW	17w	19	3	-16	725	606	15922338	13300916	16%
21850	13.58	333.08	20.00	15.00	NE/SW	17w	29	9	-20	675	527	45163439	26437881	41%
21900	13.61	284.66	19.68	15.00	E/W	17w	27	9	-18	678	544	44636695	27302416	39%
21950	13.64	274.78	13.12	13.12	E/W	17w	38	11	-27	666	464	29236813	20374790	30%
22000	13.67	229.69	13.12	13.12	NE/SW	17w	24	7	-17	691	565	30334786	24798933	18%
22050	13.70	273.53	9.84	9.84	E/W	17w	50	11	-39	662	372	21783202	12242303	44%
22100	13.73	8.13	16.40	15.00	N/S	17w	45	29	-16	530	411	29065657	20601237	29%
22150	13.76	339.59	13.12	13.12	N/S	17w	51	9	-42	679	366	29785725	16044429	46%
22200	13.79	281.91	20.00	15.00	E/W	17w	23	8	-15	683	572	45680547	28685134	37%
22250	13.83	290.25	20.00	15.00	E/W	17w	23	12	-11	654	573	43775645	28738447	34%
22300	13.86	231.82	9.84	9.84	NE/SW	17w	58	24	-34	568	314	18685686	10330139	45%
22350	13.89	322.43	13.12	13.12	NE/SW	17w	48	21	-27	591	389	25932942	17076130	34%
22400	13.92	286.41	13.12	13.12	E/W	17w	38	6	-32	699	461	30690996	20250523	34%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
22450	13.95	348.69	19.68	15.00	N/S	17w	39	23	-16	571	453	37603774	22714236	40%
22500	13.98	311.04	16.40	15.00	NE/SW	17w	1	0	-1	743	736	40748353	36910853	9%
22550	14.01	263.07	19.68	15.00	E/W	17w	27	8	-19	688	546	45288459	27399975	39%
22600	14.04	172.30	20.00	15.00	N/S	17w	35	33	-2	497	482	33224690	24183668	27%
22650	14.07	270.99	20.00	15.00	E/W	17w	23	7	-16	690	571	46142892	28663899	38%
22700	14.11	22.27	20.00	15.00	N/S	17w	35	31	-4	514	484	34370346	24292424	29%
22750	14.14	232.78	20.00	15.00	NE/SW	17w	29	11	-18	660	527	44151998	26426606	40%
22800	14.17	207.46	20.00	15.00	NE/SW	17w	17	12	-5	658	621	44018601	31149734	29%
22850	14.20	274.23	20.00	15.00	E/W	17w	11	3	-8	724	665	48468452	33365689	31%
22900	14.23	264.60	16.40	15.00	E/W	17w	10	3	-7	727	675	39873277	33850223	15%
22950	14.26	227.15	16.40	15.00	NE/SW	17w	42	33	-9	499	432	27392668	21696833	21%
23000	14.29	281.71	9.84	9.84	E/W	17w	50	25	-25	561	374	18457404	12309510	33%
23050	14.32	279.28	13.12	13.12	E/W	17w	38	17	-21	622	465	27321410	20416351	25%
23100	14.35	231.21	19.68	15.00	NE/SW	17w	36	19	-17	603	477	39720357	23929613	40%
23150	14.38	199.77	19.68	15.00	N/S	17w	39	25	-14	556	452	36599137	22696924	38%
23200	14.42	295.05	9.84	9.84	NE/SW	17w	58	14	-44	639	312	21037663	10278027	51%
23250	14.45	253.51	13.12	13.12	E/W	17w	38	18	-20	609	461	26736267	20222741	24%
23300	14.48	172.96	6.56	6.56	N/S	17w	75	58	-17	315	188	6918350	4119596	40%
23350	14.51	224.06	13.12	13.12	NE/SW	17w	48	40	-8	450	390	19753110	17125726	13%
23400	14.54	290.67	16.40	15.00	E/W	17w	31	23	-8	571	512	31319345	25679104	18%
23450	14.57	259.45	16.40	15.00	E/W	17w	31	15	-16	630	512	34573743	25679431	26%
23500	14.60	291.55	13.12	13.12	E/W	17w	38	15	-23	636	464	27909796	20365302	27%
23550	14.63	181.97	16.40	15.00	N/S	17w	45	22	-23	580	409	31823510	20531704	35%
23600	14.66	341.76	13.12	13.12	N/S	17w	51	51	0	368	368	16150085	16156088	0%

**Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
23650	14.70	339.39	13.12	13.12	N/S	17w	51	43	-8	424	365	18621907	16014257	14%
23700	14.73	243.44	16.40	15.00	NE/SW	17w	42	19	-23	607	435	33305044	21820355	34%
23750	14.76	250.58	13.12	13.12	E/W	17w	38	22	-16	584	464	25624698	20375921	20%
23800	14.79	223.55	19.68	15.00	NE/SW	17w	36	12	-24	657	478	43266166	23992378	45%
23850	14.82	305.61	9.84	9.84	NE/SW	17w	58	21	-37	586	312	19293718	10261233	47%
23900	14.85	221.26	13.12	13.12	NE/SW	17w	48	28	-20	534	386	23447609	16940680	28%
23950	14.88	190.90	13.12	13.12	N/S	17w	51	46	-5	402	365	17652965	16024386	9%
24000	14.91	166.84	13.12	13.12	N/S	17w	51	40	-11	444	363	19483646	15917559	18%
24050	14.94	213.69	19.68	15.00	NE/SW	17w	36	25	-11	561	479	36961836	24049156	35%
24100	14.98	219.61	9.84	9.84	NE/SW	17w	58	29	-29	532	315	17501027	10356569	41%
24150	15.01	202.35	9.84	9.84	N/S	17w	60	28	-32	536	298	17646301	9807145	44%
24200	15.04	210.83	16.40	15.00	NE/SW	17w	42	17	-25	619	433	33986317	21730155	36%
24250	15.07	196.09	16.40	15.00	N/S	17w	6	1	-5	740	702	40577478	35252226	13%
24300	15.10	290.95	16.40	15.00	E/W	17w	4	1	-3	740	718	40604959	36026656	11%
24350	15.13	307.38	16.40	15.00	NE/SW	17w	16	2	-14	727	623	39896810	31289614	22%
24400	15.16	307.50	16.40	15.00	NE/SW	17w	42	11	-31	661	431	36278335	21631875	40%
24450	15.19	345.82	13.12	13.12	N/S	17w	51	25	-26	556	363	24399108	15946677	35%
24500	15.22	143.23	13.12	13.12	NE/SW	17w	9	1	-8	735	676	32258981	29663218	8%
24550	15.25	284.04	13.12	13.12	E/W	17w	13	2	-11	727	646	31905631	28334916	11%
24600	15.29	228.79	13.12	13.12	NE/SW	17w	16	2	-14	728	624	31934421	27382536	14%
24650	15.32	216.96	16.40	15.00	NE/SW	17w	42	18	-24	611	433	33547635	21711252	35%
24700	15.35	317.40	13.12	13.12	NE/SW	17w	48	18	-30	611	388	26839833	17026709	37%
24750	15.38	237.01	16.40	15.00	NE/SW	17w	42	8	-34	686	433	37661651	21724428	42%
24800	15.41	222.09	16.40	15.00	NE/SW	17w	42	13	-29	648	432	35575723	21700578	39%



Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
24850	15.44	220.76	19.68	15.00	NE/SW	17w	36	11	-25	666	479	43819061	24025953	45%
24900	15.47	295.71	19.68	15.00	NE/SW	17w	36	5	-31	705	475	46443714	23856729	49%
24950	15.50	331.11	9.84	9.84	NE/SW	17w	58	29	-29	530	313	17436262	10318243	41%
25000	15.53	296.12	19.68	15.00	NE/SW	17w	36	6	-30	703	479	46301767	24036834	48%
25050	15.57	219.53	20.00	15.00	NE/SW	17w	29	7	-22	690	527	46186516	26455336	43%
25100	15.60	343.02	20.00	15.00	N/S	17w	29	8	-21	684	528	45756728	26494038	42%
25150	15.63	244.64	20.00	15.00	NE/SW	17w	24	5	-19	710	568	47511699	28517617	40%
25200	15.66	226.20	20.00	15.00	NE/SW	17w	18	3	-15	724	612	48432948	30718903	37%
25250	15.69	280.52	20.00	15.00	E/W	17w	6	1	-5	736	699	49254347	35088105	29%
25300	15.72	296.52	20.00	15.00	NE/SW	17w	14	2	-12	729	640	48769144	32109992	34%
25350	15.75	256.94	20.00	15.00	E/W	17w	13	2	-11	727	646	48667785	32415852	33%
25400	15.78	243.53	20.00	15.00	NE/SW	17w	12	2	-10	731	657	48945306	32975419	33%
25450	15.81	184.85	20.00	15.00	N/S	17w	6	1	-5	740	702	49487339	35254085	29%
25500	15.84	243.78	20.00	15.00	NE/SW	17w	16	2	-14	727	624	48656511	31290814	36%
25550	15.88	339.97	16.40	15.00	N/S	17w	45	17	-28	617	409	33877505	20540208	39%
25600	15.91	183.66	20.00	15.00	N/S	17w	35	12	-23	654	483	43772548	24258011	45%
25650	15.94	214.53	19.68	15.00	NE/SW	17w	36	11	-25	660	475	43474572	23837070	45%
25700	15.97	165.11	19.68	15.00	N/S	17w	39	14	-25	645	457	42439260	22952329	46%
25750	16.00	10.82	20.00	15.00	N/S	17w	29	8	-21	689	532	46126618	26708212	42%
25800	16.03	180.33	20.00	15.00	N/S	17w	18	4	-14	717	613	47974275	30744945	36%
25850	16.06	278.06	13.12	13.12	E/W	17w	38	5	-33	708	462	31090438	20298144	35%
25900	16.09	166.16	16.40	15.00	N/S	17w	45	20	-25	597	411	32769888	20613726	37%
25950	16.12	260.13	19.68	15.00	E/W	17w	27	6	-21	703	546	46275396	27401399	41%
26000	16.16	342.00	20.00	15.00	N/S	17w	35	10	-25	669	484	44782681	24266303	46%

**Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
26050	16.19	237.33	16.40	15.00	NE/SW	17w	17	3	-14	721	617	39567560	30978077	22%
26100	16.22	173.77	13.12	13.12	N/S	17w	51	23	-28	571	364	25075075	15962798	36%
26150	16.25	337.07	16.40	15.00	NE/SW	17w	10	2	-8	733	674	40228902	33803638	16%
26200	16.28	247.65	13.12	13.12	E/W	17w	38	7	-31	695	463	30488509	20333229	33%
26250	16.31	176.05	9.84	9.84	N/S	17w	60	29	-31	530	299	17437759	9827741	44%
26300	16.34	158.63	20.00	15.00	N/S	17w	35	10	-25	669	484	44782600	24266259	46%
26350	16.37	207.48	20.00	15.00	NE/SW	17w	29	8	-21	683	527	45695704	26458704	42%
26400	16.40	310.49	13.12	13.12	NE/SW	17w	48	18	-30	615	390	26982170	17117005	37%
26450	16.44	266.04	16.40	15.00	E/W	17w	13	3	-10	727	652	39873468	32722039	18%
26500	16.47	244.92	13.12	13.12	NE/SW	17w	48	10	-38	672	389	29514727	17059293	42%
26550	16.50	198.65	16.40	15.00	N/S	17w	22	5	-17	710	583	38948433	29259697	25%
26600	16.53	12.19	20.00	15.00	N/S	17w	16	3	-13	724	627	48422740	31461512	35%
26650	16.56	230.96	20.00	15.00	NE/SW	17w	32	6	-26	700	507	46845730	25425749	46%
26700	16.59	224.15	19.68	15.00	NE/SW	17w	1	0	-1	742	735	48866291	36886899	25%
26750	16.62	162.44	19.68	15.00	N/S	17w	39	18	-21	615	457	40470779	22955414	43%
26800	16.65	210.40	20.00	15.00	NE/SW	17w	32	12	-20	654	505	43737565	25357330	42%
26850	16.68	300.93	13.12	13.12	NE/SW	17w	48	13	-35	648	388	28462719	17018524	40%
26900	16.71	191.63	19.68	15.00	N/S	17w	39	14	-25	639	453	42059898	22747160	46%
26950	16.75	255.34	19.68	15.00	E/W	17w	27	4	-23	713	542	46922374	27205655	42%
27000	16.78	48.58	20.00	15.00	NE/SW	17w	32	8	-24	689	509	46083053	25555537	45%
27050	16.81	251.11	9.84	9.84	E/W	17w	50	12	-38	658	374	21665325	12314420	43%
27100	16.84	332.66	16.40	15.00	NE/SW	17w	42	20	-22	600	435	32926347	21841899	34%
27150	16.87	320.63	9.84	9.84	NE/SW	17w	58	32	-26	503	311	16573692	10240498	38%
27200	16.90	222.06	20.00	15.00	NE/SW	17w	32	12	-20	659	509	44096388	25565361	42%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
27250	16.93	234.09	16.40	15.00	NE/SW	17w	42	10	-32	669	431	36703502	21642221	41%
27300	16.96	287.65	13.12	13.12	E/W	17w	38	6	-32	699	461	30663773	20232561	34%
27350	16.99	24.73	19.68	15.00	NE/SW	17w	36	14	-22	641	477	42207084	23949390	43%
27400	17.03	184.72	13.12	13.12	N/S	17w	51	26	-25	554	367	24306026	16100514	34%
27450	17.06	333.08	19.68	15.00	NE/SW	17w	36	22	-14	584	480	38479459	24073648	37%
27500	17.09	35.42	16.40	15.00	NE/SW	17w	42	14	-28	644	435	35343859	21809833	38%
27550	17.12	336.92	16.40	15.00	NE/SW	17w	42	20	-22	595	431	32640951	21652579	34%
27600	17.15	298.45	9.84	9.84	NE/SW	17w	58	17	-41	620	314	20423889	10338822	49%
27650	17.18	163.64	16.40	15.00	N/S	17w	45	18	-27	610	410	33495078	20556003	39%
27700	17.21	211.83	19.68	15.00	NE/SW	17w	36	13	-23	646	475	42526957	23853527	44%
27750	17.24	292.25	16.40	15.00	E/W	17w	31	20	-11	596	514	32680095	25789994	21%
27800	17.27	318.55	19.68	15.00	NE/SW	17w	36	11	-25	665	478	43774330	24001427	45%
27850	17.31	177.68	16.40	15.00	N/S	17w	45	19	-26	603	410	33110924	20571114	38%
27900	17.34	182.18	13.12	13.12	N/S	17w	51	30	-21	525	368	23064361	16151055	30%
27950	17.37	278.49	20.00	15.00	E/W	17w	23	5	-18	705	571	47151155	28673595	39%
28000	17.40	260.12	19.68	15.00	E/W	17w	27	5	-22	705	542	46448037	27214114	41%
28050	17.43	190.17	13.12	13.12	N/S	17w	51	24	-27	568	366	24912858	16068208	36%
28100	17.46	298.74	13.12	13.12	NE/SW	17w	48	13	-35	649	388	28491281	17035602	40%
28150	17.49	231.68	16.40	15.00	NE/SW	17w	42	13	-29	649	433	35615036	21724559	39%
28200	17.52	262.33	9.84	9.84	E/W	17w	50	13	-37	649	373	21370325	12286362	43%
28250	17.55	277.77	16.40	15.00	E/W	17w	31	6	-25	698	512	38281432	25710957	33%
28300	17.58	285.70	16.40	15.00	E/W	17w	31	6	-25	700	514	38425140	25807476	33%
28350	17.62	337.50	13.12	13.12	N/S	17w	51	21	-30	591	367	25934246	16091778	38%
28400	17.65	207.55	16.40	15.00	NE/SW	17w	42	15	-27	636	434	34918904	21801105	38%

**Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
28450	17.68	9.06	16.40	15.00	N/S	17w	45	18	-27	610	409	33444837	20525169	39%
28500	17.71	225.71	20.00	15.00	NE/SW	17w	32	8	-24	689	510	46125238	25578931	45%
28550	17.74	313.81	9.84	9.84	NE/SW	17w	58	33	-25	496	311	16328458	10239555	37%
28600	17.77	254.36	16.40	15.00	E/W	17w	31	5	-26	708	514	38837323	25809739	34%
28650	17.80	346.45	9.84	9.84	N/S	17w	60	29	-31	526	296	17304381	9752571	44%
28700	17.83	301.89	13.12	13.12	NE/SW	17w	48	29	-19	532	389	23330181	17093245	27%
28750	17.86	309.36	9.84	9.84	NE/SW	17w	58	20	-38	597	314	19666932	10328978	47%
28800	17.90	56.08	16.40	15.00	NE/SW	17w	42	11	-31	666	434	36558287	21798803	40%
28850	17.93	319.56	16.40	15.00	NE/SW	17w	42	16	-26	630	435	34555404	21830994	37%
28900	17.96	316.68	19.68	15.00	NE/SW	17w	24	5	-19	710	568	46722508	28499925	39%
28950	17.99	41.31	20.00	15.00	NE/SW	17w	32	7	-25	694	507	46414350	25462493	45%
29000	18.02	322.29	13.12	13.12	NE/SW	17w	48	27	-21	546	389	23983413	17090426	29%
29050	18.05	293.28	19.68	15.00	NE/SW	17w	36	14	-22	640	477	42163010	23924381	43%
29100	18.08	282.43	13.12	13.12	E/W	17w	38	28	-10	540	465	23712362	20426569	14%
29150	18.11	29.05	9.84	9.84	NE/SW	17w	58	36	-22	480	315	15810446	10379462	34%
29200	18.14	284.04	16.40	15.00	E/W	17w	31	7	-24	690	512	37865035	25704747	32%
29250	18.18	306.07	13.12	13.12	NE/SW	17w	48	18	-30	615	390	26992730	17123704	37%
29300	18.21	305.73	13.12	13.12	NE/SW	17w	48	18	-30	613	389	26926310	17081568	37%
29350	18.24	181.10	13.12	13.12	N/S	17w	51	24	-27	564	364	24760850	15970167	36%
29400	18.27	246.59	13.12	13.12	NE/SW	17w	48	10	-38	670	387	29403651	16995092	42%
29450	18.30	229.53	19.68	15.00	NE/SW	17w	36	9	-27	681	479	44865890	24059270	46%
29500	18.33	229.59	20.00	15.00	NE/SW	17w	32	8	-24	686	507	45878025	25441838	45%
29550	18.36	307.35	13.12	13.12	NE/SW	17w	48	16	-32	628	389	27577135	17077906	38%
29600	18.39	174.24	9.84	9.84	N/S	17w	60	36	-24	474	296	15593729	9749704	37%

**Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
29650	18.42	179.36	20.00	15.00	N/S	17w	35	13	-22	649	485	43434270	24347216	44%
29700	18.45	318.69	16.40	15.00	NE/SW	17w	42	15	-27	635	433	34842063	21753130	38%
29750	18.49	46.71	16.40	15.00	NE/SW	17w	42	13	-29	647	431	35494406	21650976	39%
29800	18.52	358.68	19.68	15.00	N/S	17w	39	18	-21	611	455	40230595	22819179	43%
29850	18.55	282.76	16.40	15.00	E/W	17w	31	6	-25	700	514	38430657	25811181	33%
29900	18.58	183.91	13.12	13.12	N/S	17w	51	25	-26	558	365	24508462	16018148	35%
29950	18.61	181.97	13.12	13.12	N/S	17w	51	29	-22	530	366	23277547	16070758	31%
30000	18.64	312.15	20.00	15.00	NE/SW	17w	32	8	-24	683	505	45730947	25360275	45%
30050	18.67	313.52	19.68	15.00	NE/SW	17w	36	10	-26	671	477	44181994	23955782	46%
30100	18.70	213.89	20.00	15.00	NE/SW	17w	29	8	-21	685	529	45805933	26522529	42%
30150	18.73	263.94	16.40	15.00	E/W	17w	31	6	-25	697	512	38261949	25697872	33%
30200	18.77	40.91	16.40	15.00	NE/SW	17w	42	14	-28	638	431	35029544	21615877	38%
30250	18.80	226.61	20.00	15.00	NE/SW	17w	32	7	-25	690	504	46146408	25315502	45%
30300	18.83	176.35	16.40	15.00	N/S	17w	45	19	-26	606	412	33239270	20650852	38%
30350	18.86	297.74	16.40	15.00	NE/SW	17w	42	7	-35	691	431	37904565	21629446	43%
30400	18.89	306.59	13.12	13.12	NE/SW	17w	48	15	-33	633	387	27783629	17003363	39%
30450	18.92	330.88	13.12	13.12	NE/SW	17w	48	27	-21	545	388	23914342	17041207	29%
30500	18.95	310.38	16.40	15.00	NE/SW	17w	42	12	-30	653	430	35819922	21601245	40%
30550	18.98	280.22	13.12	13.12	E/W	17w	38	8	-30	689	464	30233935	20382617	33%
30600	19.01	192.17	16.40	15.00	N/S	17w	9	1	-8	737	678	40461794	34029860	16%
30650	19.05	305.54	20.00	15.00	NE/SW	17w	29	5	-24	710	531	47497545	26633521	44%
30700	19.08	322.59	9.84	9.84	NE/SW	17w	58	38	-20	460	312	15148084	10265420	32%
30750	19.11	335.63	16.40	15.00	NE/SW	17w	42	21	-21	589	433	32321491	21712064	33%
30800	19.14	231.67	16.40	15.00	NE/SW	17w	42	14	-28	643	434	35264280	21760726	38%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
30850	19.17	127.01	20.00	15.00	NE/SW	17w	32	6	-26	700	507	46836223	25420589	46%
30900	19.20	231.24	9.84	9.84	NE/SW	17w	58	31	-27	516	314	16978699	10338702	39%
30950	19.23	237.93	20.00	15.00	NE/SW	17w	29	5	-24	709	530	47413492	26586390	44%
31000	19.26	225.78	13.12	13.12	NE/SW	17w	48	20	-28	595	387	26129519	16990501	35%
31050	19.29	178.54	13.12	13.12	N/S	17w	51	27	-24	547	367	24009521	16121971	33%
31100	19.32	220.84	13.12	13.12	NE/SW	17w	48	19	-29	603	387	26480726	17006292	36%
31150	19.36	264.88	9.84	9.84	E/W	17w	50	8	-42	689	375	22676675	12328861	46%
31200	19.39	284.86	13.12	13.12	E/W	17w	38	7	-31	694	463	30447851	20306114	33%
31250	19.42	11.15	16.40	15.00	N/S	17w	45	18	-27	608	408	33355442	20470307	39%
31300	19.45	281.78	9.84	9.84	E/W	17w	50	10	-40	672	373	22108593	12287118	44%
31350	19.48	254.35	19.68	15.00	E/W	17w	27	6	-21	702	545	46229577	27374268	41%
31400	19.51	38.37	19.68	15.00	NE/SW	17w	36	10	-26	673	479	44304267	24022080	46%
31450	19.54	215.66	16.40	15.00	NE/SW	17w	42	17	-25	620	433	34014362	21748087	36%
31500	19.57	248.34	13.12	13.12	E/W	17w	38	9	-29	680	463	29827597	20329654	32%
31550	19.60	252.68	9.84	9.84	E/W	17w	50	10	-40	668	371	21976737	12213837	44%
31600	19.64	298.66	16.40	15.00	NE/SW	17w	42	8	-34	687	433	37709100	21751798	42%
31650	19.67	64.34	13.12	13.12	NE/SW	17w	20	4	-16	712	594	31265953	26064647	17%
31700	19.70	272.11	13.12	13.12	E/W	17w	38	5	-33	706	461	30977589	20224468	35%
31750	19.73	185.61	19.68	15.00	N/S	17w	39	13	-26	646	453	42540984	22742893	47%
31800	19.76	315.00	9.84	9.84	NE/SW	17w	58	30	-28	520	312	17110480	10270104	40%
31850	19.79	260.62	13.12	13.12	E/W	17w	38	6	-32	702	463	30813566	20331397	34%
31900	19.82	230.71	13.12	13.12	NE/SW	17w	48	20	-28	597	388	26217255	17047551	35%
31950	19.85	304.34	13.12	13.12	NE/SW	17w	48	15	-33	637	390	27953718	17107455	39%
32000	19.88	291.94	13.12	13.12	E/W	17w	38	11	-27	663	462	29083553	20267984	30%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
32050	19.91	289.63	13.12	13.12	E/W	17w	38	10	-28	674	465	29605854	20402726	31%
32100	19.95	345.96	13.12	13.12	N/S	17w	51	34	-17	488	363	21440336	15923743	26%
32150	19.98	246.56	20.00	15.00	NE/SW	17w	32	18	-14	612	508	40983460	25499188	38%
32200	20.01	188.81	16.40	15.00	N/S	17w	45	33	-12	502	412	27528245	20676415	25%
32250	20.04	275.76	13.12	13.12	E/W	17w	38	64	26	265	457	11647927	20067776	0%
32300	20.07	291.21	6.56	6.56	E/W	17w	71	90	19	77	225	1700564	4933468	0%
32350	20.10	258.44	6.56	6.56	E/W	17w	71	84	13	119	215	2605384	4724014	0%
32400	20.13	239.27	16.40	15.00	NE/SW	17w	42	52	10	355	429	19462877	21518035	0%
32450	20.16	269.41	16.40	15.00	E/W	17w	31	17	-14	618	514	33906395	25790600	24%
32500	20.19	350.91	13.12	13.12	N/S	17w	51	40	-11	450	368	19749689	16134909	18%
32550	20.23	292.07	19.68	15.00	E/W	17w	27	16	-11	623	542	41049385	27200558	34%
32600	20.26	217.30	13.12	13.12	NE/SW	17w	48	34	-14	490	386	21513526	16956352	21%
32650	20.29	263.34	9.84	9.84	E/W	17w	50	27	-23	546	374	17983586	12322104	31%
32700	20.32	309.62	13.12	13.12	NE/SW	17w	48	30	-18	521	387	22880881	17003545	26%
32750	20.35	301.28	9.84	9.84	NE/SW	17w	58	33	-25	498	312	16403078	10286349	37%
32800	20.38	275.41	16.40	15.00	E/W	17w	31	20	-11	595	513	32622580	25744605	21%
32850	20.41	333.96	16.40	15.00	NE/SW	17w	42	42	0	432	433	23723035	21705964	9%
32900	20.44	106.61	9.84	9.84	E/W	17w	50	31	-19	516	374	16994222	12319232	28%
32950	20.47	271.66	20.00	15.00	E/W	17w	20	8	-12	686	597	45925057	29962258	35%
33000	20.51	352.46	16.40	15.00	N/S	17w	45	31	-14	512	409	28116402	20506058	27%
33050	20.54	255.62	9.84	9.84	E/W	17w	50	30	-20	524	374	17243745	12321539	29%
33100	20.57	318.83	13.12	13.12	NE/SW	17w	48	37	-11	468	386	20526793	16949048	17%
33150	20.60	272.32	13.12	13.12	E/W	17w	38	21	-17	586	460	25719387	20192339	21%
33200	20.63	172.96	13.12	13.12	N/S	17w	51	48	-3	389	367	17093075	16112924	6%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
33250	20.66	234.97	16.40	15.00	NE/SW	17w	42	31	-11	512	431	28116747	21624835	23%
33300	20.69	235.06	19.68	15.00	NE/SW	17w	36	8	-28	688	479	45321665	24039509	47%
33350	20.72	188.22	20.00	15.00	N/S	17w	35	13	-22	647	483	43283557	24262734	44%
33400	20.75	293.31	16.40	15.00	NE/SW	17w	42	6	-36	699	431	38334057	21641819	44%
33450	20.78	318.50	13.12	13.12	NE/SW	17w	48	21	-27	593	390	26010193	17126998	34%
33500	20.82	222.98	13.12	13.12	NE/SW	17w	48	22	-26	581	388	25518168	17018436	33%
33550	20.85	265.91	13.12	13.12	E/W	17w	38	6	-32	702	463	30815309	20332547	34%
33600	20.88	14.41	20.00	15.00	N/S	17w	32	10	-22	668	505	44719156	25350275	43%
33650	20.91	247.40	19.68	15.00	NE/SW	17w	36	6	-30	704	480	46362994	24068619	48%
33700	20.94	244.24	19.68	15.00	NE/SW	17w	36	5	-31	707	477	46559039	23915968	49%
33750	20.97	216.43	16.40	15.00	NE/SW	17w	42	15	-27	631	431	34634945	21623819	38%
33800	21.00	249.89	20.00	15.00	E/W	17w	23	5	-18	709	574	47408401	28830031	39%
33850	21.03	254.23	16.40	15.00	E/W	17w	31	6	-25	700	514	38385246	25780682	33%
33900	21.06	279.92	16.40	15.00	E/W	17w	31	6	-25	702	515	38495383	25854653	33%
33950	21.10	227.86	13.12	13.12	NE/SW	17w	48	17	-31	620	389	27220717	17060283	37%
34000	21.13	280.52	9.84	9.84	E/W	17w	50	10	-40	674	375	22201326	12338655	44%
34050	21.16	299.39	13.12	13.12	NE/SW	17w	48	27	-21	548	390	24049647	17137624	29%
34100	21.19	301.88	9.84	9.84	NE/SW	17w	58	21	-37	590	314	19427612	10332443	47%
34150	21.22	303.69	6.56	6.56	NE/SW	17w	74	36	-38	475	193	10414737	4232560	59%
34200	21.25	316.85	13.12	13.12	NE/SW	17w	48	21	-27	587	386	25745901	16952969	34%
34250	21.28	325.35	9.84	9.84	NE/SW	17w	58	27	-31	545	314	17938175	10324431	42%
34300	21.31	313.39	9.84	9.84	NE/SW	17w	58	21	-37	591	314	19464418	10352019	47%
34350	21.34	314.54	13.12	13.12	NE/SW	17w	48	20	-28	593	386	26038959	16931615	35%
34400	21.38	307.08	16.40	15.00	NE/SW	17w	42	9	-33	678	432	37190049	21688134	42%



Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
34450	21.41	245.32	13.12	13.12	NE/SW	17w	48	9	-39	676	386	29667207	16958992	43%
34500	21.44	335.97	9.84	9.84	NE/SW	17w	58	30	-28	521	313	17165319	10303020	40%
34550	21.47	329.40	13.12	13.12	NE/SW	17w	48	19	-29	605	388	26540776	17044857	36%
34600	21.50	280.42	13.12	13.12	E/W	17w	38	7	-31	695	463	30489754	20334059	33%
34650	21.53	11.77	16.40	15.00	N/S	17w	45	18	-27	611	410	33498153	20557890	39%
34700	21.56	315.00	16.40	15.00	NE/SW	17w	42	16	-26	627	433	34398285	21731731	37%
34750	21.59	335.45	6.56	6.56	NE/SW	17w	74	41	-33	443	195	9713532	4282131	56%
34800	21.62	336.44	9.84	9.84	NE/SW	17w	58	35	-23	483	312	15899002	10277020	35%
34850	21.65	300.90	13.12	13.12	NE/SW	17w	48	10	-38	669	387	29383208	16983276	42%
34900	21.69	13.17	9.84	9.84	N/S	17w	60	36	-24	475	297	15621224	9766895	37%
34950	21.72	312.04	6.56	6.56	NE/SW	17w	74	43	-31	425	194	9320360	4252973	54%
35000	21.75	62.33	13.12	13.12	NE/SW	17w	48	9	-39	679	388	29821011	17046912	43%
35050	21.78	359.75	9.84	9.84	N/S	17w	60	30	-30	522	298	17173528	9817093	43%
35100	21.81	284.24	13.12	13.12	E/W	17w	38	6	-32	703	464	30867162	20366761	34%
35150	21.84	345.65	20.00	15.00	N/S	17w	35	13	-22	646	482	43194659	24212901	44%
35200	21.87	283.63	19.68	15.00	E/W	17w	27	5	-22	705	542	46428289	27202544	41%
35250	21.90	266.72	13.12	13.12	E/W	17w	38	6	-32	701	462	30748505	20288468	34%
35300	21.93	322.42	9.84	9.84	NE/SW	17w	58	30	-28	523	314	17204614	10326606	40%
35350	21.97	35.82	16.40	15.00	NE/SW	17w	42	14	-28	642	433	35249463	21751584	38%
35400	22.00	274.49	9.84	9.84	E/W	17w	50	8	-42	688	374	22650351	12314549	46%
35450	22.03	270.60	13.12	13.12	E/W	17w	38	5	-33	708	462	31073949	20287379	35%
35500	22.06	328.45	13.12	13.12	NE/SW	17w	48	21	-27	587	387	25766334	16966423	34%
35550	22.09	270.96	13.12	13.12	E/W	17w	38	6	-32	700	462	30738932	20282152	34%
35600	22.12	189.66	13.12	13.12	N/S	17w	51	27	-24	545	366	23932826	16070471	33%

Table I-2. Elk Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	Wetted Width (ft) TMDL	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction to Meet TMDL
35650	22.15	341.15	16.40	15.00	N/S	17w	45	20	-25	594	409	32613637	20515437	37%
35700	22.18	299.93	13.12	13.12	NE/SW	17w	48	11	-37	665	389	29205529	17070248	42%
35750	22.21	65.17	16.40	15.00	NE/SW	17w	42	7	-35	691	431	37903041	21628576	43%
35800	22.25	212.51	20.00	15.00	NE/SW	17w	32	11	-21	667	510	44627659	25582659	43%
35850	22.28	288.23	13.12	13.12	E/W	17w	38	8	-30	690	465	30268641	20406015	33%
35900	22.31	276.28	9.84	9.84	E/W	17w	50	6	-44	700	372	23031692	12255454	47%
35950	22.34	207.13	16.40	15.00	NE/SW	17w	42	20	-22	598	434	32801019	21758762	34%
36000	22.37	190.25	13.12	13.12	N/S	17w	51	21	-30	587	365	25787340	16000625	38%
36050	22.40	294.17	9.84	9.84	NE/SW	17w	58	44	-14	417	313	13727934	10304180	25%

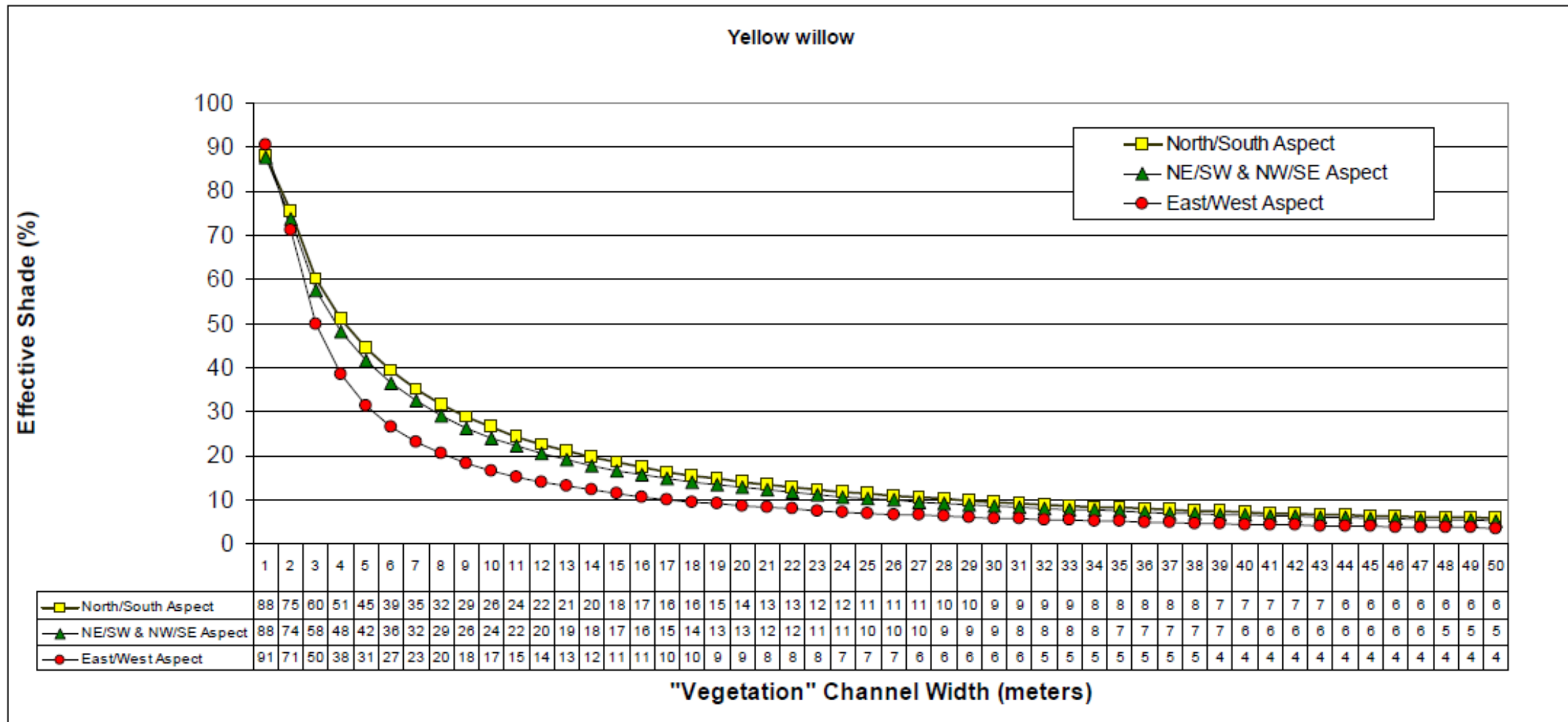


Figure I-3. Shade Curve Selected for Elk Creek to Represent the Target Shade Conditions for Ecoregions 17ab and 17w.

### 12.3 MOORE CREEK

**Table I-3** contains the Shade Tool model results for Moore Creek, the data that was used for temperature targets (shade surrogate TMDL), the modeled existing solar load, and the percent load reduction needed to meet the temperature TMDL. Vegetation-specific shade curves developed by the EPA and Idaho DEQ were used for shade target development (Shumar and de Varona 2009). Each level IV ecoregion was assigned a shade curve to represent the potential riparian vegetative community for that ecoregion. The level IV ecoregions represented in the Moore’s Creek shade model are 17z - Tobacco Root Mountains, 17ab - Dry Gneissic-Schistone-Volcanic Hills, 17aa - Dry Intermontane Sagebrush Valleys. The shade curves selected for these ecoregions are shown in **Figures I-4, I-5 and I-6**.

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
0	0	158.8556	3.28	N/S	17z	77	96	19	33.06834	190.1429	362877.64	2086546.44	0%
50	0.031069	159.8559	3.28	N/S	17z	77	94	17	43.38792	166.3204	476120.30	1825127.80	0%
100	0.062137	159.8195	3.28	N/S	17z	77	95	18	37.67391	173.3	413417.18	1901719.03	0%
150	0.093206	156.7403	3.28	NE/SW	17z	80	96	16	33.05908	165.2954	362776.04	1813880.20	0%
200	0.124274	156.7433	3.28	NE/SW	17z	80	95	15	35.58331	142.3333	390475.92	1561903.70	0%
250	0.155343	164.1749	3.28	N/S	17z	77	95	18	38.21708	175.7986	419377.76	1929137.71	0%
300	0.186411	154.0696	3.28	NE/SW	17z	80	96	16	28.87863	144.3931	316901.56	1584507.78	0%
350	0.21748	153.9405	3.28	NE/SW	17z	80	96	16	27.11792	135.5896	297580.39	1487901.94	0%
400	0.248548	159.4557	3.28	N/S	17z	77	64	-13	265.3131	169.5056	2911430.97	1860080.90	36%
450	0.279617	163.4306	3.28	N/S	17z	77	54	-23	346.3215	173.1608	3800382.91	1900191.45	50%
500	0.310686	171.1793	3.28	N/S	17z	77	71	-6	220.1271	174.5836	2415579.97	1915804.81	21%
550	0.341754	175.9918	3.28	N/S	17z	77	64	-13	265.1861	169.4245	2910037.66	1859190.73	36%
600	0.372823	188.7285	3.28	N/S	17z	77	75	-2	187.5757	172.5696	2058374.58	1893704.61	8%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
650	0.403891	200.1403	3.28	N/S	17z	77	78	1	163.603	171.0395	1795308.86	1876913.81	0%
700	0.43496	207.7464	3.28	NE/SW	17z	80	99	19	7.197937	143.9587	78987.05	1579740.95	0%
750	0.466028	153.4351	3.28	NE/SW	17z	80	99	19	8.546155	170.9231	93781.81	1875636.29	0%
800	0.497097	138.3541	6.56	NE/SW	17z	77	98	21	11.74233	135.0367	257710.41	2963669.70	0%
850	0.528165	135.8352	3.28	NE/SW	17z	80	99	19	8.815119	176.3024	96733.30	1934666.09	0%
900	0.559234	109.2899	3.28	E/W	17z	83	99	16	6.361266	108.1415	69805.79	1186698.35	0%
950	0.590302	140.6571	3.28	NE/SW	17z	80	99	19	10.00822	200.1643	109825.83	2196516.67	0%
1000	0.621371	127.3836	3.28	NE/SW	17z	80	99	19	7.891412	157.8282	86596.95	1731939.00	0%
1050	0.65244	158.4132	3.28	N/S	17z	77	72	-5	209.8862	172.4065	2303200.04	1891914.32	18%
1100	0.683508	172.4056	3.28	N/S	17z	77	71	-6	219.9767	174.4643	2413929.69	1914495.96	21%
1150	0.714577	161.857	6.56	N/S	17z	75	47	-28	397.7006	187.5946	8728390.09	4117165.14	53%
1200	0.745645	188.1147	3.28	N/S	17z	77	74	-3	194.0712	171.6784	2129653.95	1883924.65	12%
1250	0.776714	184.981	3.28	N/S	17z	77	75	-2	190.0145	174.8134	2085137.28	1918326.30	8%
1300	0.807782	193.5861	3.28	N/S	17z	77	75	-2	185.9202	171.0466	2040207.75	1876991.13	8%
1350	0.838851	183.6083	3.28	N/S	17z	77	65	-12	260.2083	170.994	2855413.46	1876414.56	34%
1400	0.869919	203.8861	6.56	NE/SW	17z	77	41	-36	439.3342	171.2659	9642127.77	3758795.57	61%
1450	0.900988	202.2669	6.56	N/S	17z	75	51	-24	366.698	187.0908	8047970.53	4106107.42	49%
1500	0.932057	182.6155	3.28	N/S	17z	77	70	-7	224.8826	172.41	2467764.01	1891952.40	23%
1550	0.963125	196.55	3.28	N/S	17z	77	97	20	25.01475	191.7798	274501.09	2104508.34	0%
1600	0.994194	184.3986	3.28	N/S	17z	77	77	0	169.2557	169.2557	1857339.33	1857339.33	0%
1650	1.025262	169.4523	3.28	N/S	17z	77	78	1	162.6673	170.0613	1785040.65	1866178.86	0%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
1700	1.056331	140.4921	3.28	NE/SW	17z	80	75	-5	189.3254	151.4603	2077574.99	1662059.99	20%
1750	1.087399	181.5906	3.28	N/S	17z	77	67	-10	244.5995	170.4784	2684128.90	1870756.50	30%
1800	1.118468	151.0108	6.56	NE/SW	17z	77	83	6	128.3865	173.6994	2817715.87	3812203.82	0%
1850	1.149536	156.5522	3.28	NE/SW	17z	80	96	16	27.20424	136.0212	298527.57	1492637.84	0%
1900	1.180605	158.3983	3.28	N/S	17z	77	97	20	23.09164	177.0359	253397.70	1942715.68	0%
1950	1.211673	141.0718	9.84	NE/SW	17ab	58	60	2	301.4068	316.4771	9922523.09	10418649.25	0%
2000	1.242742	175.6278	3.28	N/S	17ab	88	85	-3	111.2339	88.98715	1220633.16	976506.53	20%
2050	1.273811	162.2775	3.28	N/S	17ab	88	74	-14	197.325	91.07309	2165359.64	999396.76	54%
2100	1.304879	197.7929	6.56	N/S	17ab	75	52	-23	356.4989	185.6765	7824128.78	4075067.07	48%
2150	1.335948	185.4691	3.28	N/S	17ab	88	70	-18	224.374	89.74961	2462183.71	984873.49	60%
2200	1.367016	164.0125	3.28	N/S	17ab	88	70	-18	221.1623	88.46491	2426939.28	970775.71	60%
2250	1.398085	119.4156	3.28	NE/SW	17ab	88	52	-36	355.8384	88.95959	3904816.33	976204.08	75%
2300	1.429153	135.3198	3.28	NE/SW	17ab	88	64	-24	266.3323	88.77743	2922615.54	974205.18	67%
2350	1.460222	165.2778	6.56	N/S	17ab	75	98	23	14.96821	187.1027	328509.42	4106367.70	0%
2400	1.49129	184.5046	3.28	N/S	17ab	88	99	11	10.23488	122.8185	112313.13	1347757.58	0%
2450	1.522359	167.7259	6.56	N/S	17ab	75	81	6	138.8244	182.6637	3046798.47	4008945.35	0%
2500	1.553428	191.0933	6.56	N/S	17ab	75	78	3	160.8716	182.8086	3530670.41	4012125.46	0%
2550	1.584496	184.7635	3.28	N/S	17ab	88	71	-17	214.1308	88.60585	2349778.85	972322.28	59%
2600	1.615565	144.2011	3.28	NE/SW	17ab	88	83	-5	128.3852	90.62482	1408843.23	994477.58	29%
2650	1.646633	159.444	3.28	N/S	17ab	88	87	-1	95.35087	88.01619	1046339.25	965851.61	8%
2700	1.677702	136.4172	3.28	NE/SW	17ab	88	79	-9	153.5534	87.74479	1685028.45	962873.40	43%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
2750	1.70877	143.5556	3.28	NE/SW	17ab	88	99	11	7.538569	90.46283	82725.00	992700.04	0%
2800	1.739839	135.341	3.28	NE/SW	17ab	88	99	11	5.319033	63.8284	58368.78	700425.31	0%
2850	1.770907	135.4304	3.28	NE/SW	17ab	88	99	11	5.396489	64.75787	59218.74	710624.90	0%
2900	1.801976	166.6492	3.28	N/S	17ab	88	99	11	7.006519	84.07823	76886.51	922638.12	0%
2950	1.833044	125.4657	3.28	NE/SW	17ab	88	77	-11	168.1866	87.74952	1845606.80	962925.29	48%
3000	1.864113	90.48555	3.28	E/W	17ab	91	88	-3	90.36728	67.77546	991651.49	743738.62	25%
3050	1.895182	113.6944	0	NE/SW	17ab	88	97	9	19.00444	76.01775	0.00	0.00	0%
3100	1.92625	134.6043	3.28	NE/SW	17ab	88	91	3	66.0774	88.1032	725104.84	966806.45	0%
3150	1.957319	148.48	3.28	NE/SW	17ab	88	85	-3	115.4627	92.37019	1267038.26	1013630.61	20%
3200	1.988387	151.187	3.28	NE/SW	17ab	88	99	11	5.69649	68.35787	62510.82	750129.78	0%
3250	2.019456	142.2142	3.28	NE/SW	17ab	88	93	5	51.55065	88.37254	565694.55	969762.09	0%
3300	2.050524	132.646	6.56	NE/SW	17ab	74	55	-19	335.875	194.0611	7371494.62	4259085.78	42%
3350	2.081593	141.6226	3.28	NE/SW	17ab	88	79	-9	156.6518	89.51534	1719029.70	982302.69	43%
3400	2.112661	176.5191	3.28	N/S	17ab	88	93	5	53.50668	91.72574	587159.22	1006558.66	0%
3450	2.14373	172.0502	3.28	N/S	17ab	88	95	7	39.19143	94.05944	430069.85	1032167.63	0%
3500	2.174799	129.8212	3.28	NE/SW	17ab	88	79	-9	155.8896	89.07979	1710665.45	977523.12	43%
3550	2.205867	144.7911	3.28	NE/SW	17ab	88	78	-10	161.8497	88.28168	1776069.17	968765.00	45%
3600	2.236936	88.21741	3.28	E/W	17ab	91	94	3	47.90014	71.85021	525635.48	788453.22	0%
3650	2.268004	219.0943	9.84	NE/SW	17ab	58	48	-10	389.9516	314.9609	12837480.94	10368734.60	19%
3700	2.299073	179.5585	3.28	N/S	17ab	88	81	-7	143.1821	90.43079	1571218.36	992348.44	37%
3750	2.330141	121.2503	3.28	NE/SW	17ab	88	42	-46	429.3437	88.82973	4711432.47	974779.13	79%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
3800	2.36121	160.3297	3.28	N/S	17ab	88	91	3	64.9465	86.59534	712694.85	950259.80	0%
3850	2.392278	198.866	3.28	N/S	17ab	88	91	3	68.76346	91.68462	754580.53	1006107.37	0%
3900	2.423347	131.8928	3.28	NE/SW	17ab	88	92	4	59.41615	89.12422	652007.16	978010.73	0%
3950	2.454415	192.4394	3.28	N/S	17ab	88	90	2	76.23829	91.48595	836606.08	1003927.30	0%
4000	2.485484	142.8041	6.56	NE/SW	17ab	74	50	-24	376.0597	195.5511	8253433.84	4291785.60	48%
4050	2.516553	150.5928	6.56	NE/SW	17ab	74	57	-17	317.977	192.2651	6978683.54	4219669.12	40%
4100	2.547621	120.585	6.56	NE/SW	17ab	74	49	-25	377.3992	192.3996	8282832.50	4222620.49	49%
4150	2.57869	98.97263	6.56	E/W	17ab	71	41	-30	437.5418	215.0629	9602788.84	4720014.86	51%
4200	2.609758	161.3721	6.56	N/S	17ab	75	86	11	104.966	187.4393	2303703.08	4113755.50	0%
4250	2.640827	172.5308	9.84	N/S	17ab	60	64	4	268.9909	298.8788	8855369.93	9839299.93	0%
4300	2.671895	171.3939	3.28	N/S	17ab	88	93	5	53.80141	92.23098	590393.38	1012102.94	0%
4350	2.702964	140.0215	6.56	NE/SW	17ab	74	82	8	136.8966	197.7395	3004487.33	4339815.03	0%
4400	2.734032	167.3589	3.28	N/S	17ab	88	96	8	32.53343	97.60028	357007.78	1071023.33	0%
4450	2.765101	155.3915	6.56	NE/SW	17ab	74	79	5	156.3451	193.5702	3431327.66	4248310.43	0%
4500	2.79617	164.3726	9.84	N/S	17ab	60	66	6	256.2115	301.4253	8434664.06	9923134.19	0%
4550	2.827238	150.2024	3.28	NE/SW	17ab	88	95	7	38.25526	91.81262	419796.67	1007512.01	0%
4600	2.858307	151.2782	3.28	NE/SW	17ab	88	96	8	32.7902	98.37059	359825.47	1079476.41	0%
4650	2.889375	151.5044	3.28	NE/SW	17ab	88	94	6	41.4932	82.98641	455328.49	910656.98	0%
4700	2.920444	143.5995	3.28	NE/SW	17ab	88	94	6	45.42789	90.85578	498506.05	997012.09	0%
4750	2.951512	102.9946	3.28	E/W	17ab	91	91	0	64.88802	64.88802	712053.07	712053.07	0%
4800	2.982581	125.5695	3.28	NE/SW	17ab	88	92	4	59.18909	88.78363	649515.47	974273.21	0%



**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
4850	3.013649	108.7431	6.56	E/W	17ab	71	83	12	129.7555	221.3477	2847762.49	4857947.79	0%
4900	3.044718	153.8638	6.56	NE/SW	17ab	74	76	2	178.9128	193.8222	3926623.73	4253842.37	0%
4950	3.075786	170.7189	3.28	N/S	17ab	88	38	-50	460.9036	89.20716	5057757.44	978920.79	81%
5000	3.106855	128.0849	6.56	NE/SW	17ab	74	62	-12	282.453	193.2573	6199033.91	4241444.25	32%
5050	3.137924	58.49573	3.28	NE/SW	17ab	88	49	-39	377.3662	88.79205	4141053.84	974365.61	76%
5100	3.168992	154.8265	3.28	NE/SW	17ab	88	99	11	9.078605	108.9433	99624.69	1195496.32	0%
5150	3.200061	127.157	3.28	NE/SW	17ab	88	99	11	6.64477	79.73724	72916.83	875002.02	0%
5200	3.231129	57.50019	3.28	NE/SW	17ab	88	60	-28	302.1004	90.63012	3315119.15	994535.75	70%
5250	3.262198	90	6.56	E/W	17ab	71	43	-28	426.1715	216.8241	9353244.03	4758668.01	49%
5300	3.293266	73.77533	3.28	E/W	17ab	91	51	-40	362.6084	66.60154	3979107.63	730856.50	82%
5350	3.324335	163.3651	3.28	N/S	17ab	88	59	-29	302.6202	88.57177	3320823.38	971948.31	71%
5400	3.355403	197.9954	6.56	N/S	17ab	75	56	-19	332.1228	188.7061	7289143.54	4141558.83	43%
5450	3.386472	157.2401	3.28	NE/SW	17ab	88	99	11	4.308594	51.70313	47280.65	567367.81	0%
5500	3.417541	119.1612	3.28	NE/SW	17ab	88	99	11	4.26513	51.18156	46803.69	561644.33	0%
5550	3.448609	119.1144	3.28	NE/SW	17ab	88	99	11	4.994375	59.93249	54806.11	657673.30	0%
5600	3.479678	119.0803	3.28	NE/SW	17ab	88	99	11	5.743476	68.92172	63026.43	756317.15	0%
5650	3.510746	89.60486	3.28	E/W	17ab	91	99	8	6.144508	55.30057	67427.18	606844.62	0%
5700	3.541815	197.643	3.28	N/S	17ab	88	99	11	8.207975	98.4957	90070.77	1080849.21	0%
5750	3.572883	111.2995	3.28	E/W	17ab	91	99	8	5.382307	48.44076	59063.11	531568.01	0%
5800	3.603952	158.5144	3.28	N/S	17ab	88	99	11	6.712308	80.54769	73657.97	883895.59	0%
5850	3.63502	116.1982	0	NE/SW	17ab	88	99	11	4.915395	58.98474	0.00	0.00	0%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
5900	3.666089	99.51692	0	E/W	17ab	91	99	8	4.66137	41.95233	0.00	0.00	0%
5950	3.697157	114.9772	0	NE/SW	17ab	88	100	12	2.975981	#DIV/0!	0.00	0.00	0%
6000	3.728226	139.4846	0	NE/SW	17ab	88	96	8	30.2635	90.79049	0.00	0.00	0%
6050	3.759295	122.3669	3.28	NE/SW	17ab	88	94	6	47.21102	94.42204	518073.33	1036146.67	0%
6100	3.790363	65.34423	6.56	NE/SW	17ab	74	80	6	150.5542	195.7204	3304232.46	4295502.19	0%
6150	3.821432	137.9802	0	NE/SW	17ab	88	99	11	5.266356	63.19628	0.00	0.00	0%
6200	3.8525	138.8412	3.28	NE/SW	17ab	88	91	3	67.22117	89.62823	737656.07	983541.43	0%
6250	3.883569	121.0329	3.28	NE/SW	17ab	88	97	9	22.26055	89.0422	244277.65	977110.62	0%
6300	3.914637	110.1285	3.28	E/W	17ab	91	97	6	22.34274	67.02822	245179.57	735538.70	0%
6350	3.945706	109.0412	3.28	E/W	17ab	91	88	-3	92.2808	69.2106	1012649.59	759487.19	25%
6400	3.976774	92.34527	3.28	E/W	17ab	91	96	5	32.16731	72.37644	352990.14	794227.83	0%
6450	4.007843	103.8348	3.28	E/W	17ab	91	94	3	46.6474	69.9711	511888.45	767832.67	0%
6500	4.038912	77.21426	3.28	E/W	17ab	91	87	-4	97.69728	67.63658	1072087.73	742214.58	31%
6550	4.06998	105.9609	3.28	E/W	17ab	91	93	2	50.00489	64.292	548732.06	705512.65	0%
6600	4.101049	99.68177	3.28	E/W	17ab	91	92	1	62.90666	70.77	690310.55	776599.37	0%
6650	4.132117	84.19335	3.28	E/W	17ab	91	92	1	62.1926	69.96667	682474.72	767784.06	0%
6700	4.163186	133.2675	3.28	NE/SW	17ab	88	91	3	69.79836	93.06448	765937.02	1021249.36	0%
6750	4.194254	155.6126	0	NE/SW	17ab	88	99	11	9.606474	115.2777	0.00	0.00	0%
6800	4.225323	146.5182	3.28	NE/SW	17ab	88	96	8	33.05405	99.16214	362720.81	1088162.44	0%
6850	4.256391	179.9359	0	N/S	17ab	88	99	11	9.680222	116.1627	0.00	0.00	0%
6900	4.28746	153.0743	3.28	NE/SW	17ab	88	88	0	90.71148	90.71148	995428.56	995428.56	0%

Table I-3. Moore's Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
6950	4.318528	194.5705	0	N/S	17ab	88	98	10	13.77132	82.62794	0.00	0.00	0%
7000	4.349597	182.3366	3.28	N/S	17ab	88	86	-2	102.0081	87.43548	1119392.36	959479.17	14%
7050	4.380666	256.464	3.28	E/W	17ab	91	90	-1	76.44999	68.80499	838929.19	755036.27	10%
7100	4.411734	145.9342	3.28	NE/SW	17ab	88	98	10	16.92715	101.5629	185751.20	1114507.21	0%
7150	4.442803	145.222	3.28	NE/SW	17ab	88	94	6	47.02724	94.05449	516056.66	1032113.32	0%
7200	4.473871	185.3185	0	N/S	17ab	88	99	11	4.137442	49.6493	0.00	0.00	0%
7250	4.50494	169.8972	3.28	N/S	17ab	88	97	9	21.26265	85.0506	233327.13	933308.53	0%
7300	4.536008	173.7146	0	N/S	17ab	88	99	11	5.883703	70.60443	0.00	0.00	0%
7350	4.567077	213.048	3.28	NE/SW	17ab	88	95	7	38.7217	92.93208	424915.23	1019796.55	0%
7400	4.598145	175.8976	3.28	N/S	17ab	88	87	-1	97.35022	89.86175	1068279.31	986103.98	8%
7450	4.629214	141.2746	6.56	NE/SW	17ab	74	76	2	182.1314	197.309	3997262.38	4330367.58	0%
7500	4.660283	196.4214	6.56	N/S	17ab	75	71	-4	215.3926	185.6833	4727250.32	4075215.80	14%
7550	4.691351	148.5818	6.56	NE/SW	17ab	74	82	8	136.0939	196.5801	2986871.99	4314370.66	0%
7600	4.72242	217.6083	3.28	NE/SW	17ab	88	84	-4	117.3277	87.99577	1287503.49	965627.61	25%
7650	4.753488	134.5657	9.84	NE/SW	17ab	58	61	3	289.0075	311.2389	9514331.03	10246202.65	0%
7700	4.784557	108.3083	3.28	E/W	17ab	91	86	-5	104.0573	66.89401	1141880.38	734065.96	36%
7750	4.815625	89.84726	3.28	E/W	17ab	91	84	-7	121.2873	68.22411	1330954.49	748661.90	44%
7800	4.846694	139.7232	6.56	NE/SW	17ab	74	71	-3	212.872	190.8507	4671930.13	4188627.01	10%
7850	4.877762	159.7184	6.56	N/S	17ab	75	71	-4	214.698	185.0845	4712007.21	4062075.18	14%
7900	4.908831	176.0091	3.28	N/S	17ab	88	82	-6	137.3492	91.56615	1507211.10	1004807.40	33%
7950	4.939899	199.6534	3.28	N/S	17ab	88	95	7	35.75711	85.81705	392383.03	941719.28	0%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
8000	4.970968	158.5518	6.56	N/S	17ab	75	92	17	58.95988	184.2496	1294000.57	4043751.78	0%
8050	5.002037	198.1528	3.28	N/S	17ab	88	81	-7	142.5946	90.05977	1564771.96	988277.03	37%
8100	5.033105	151.3894	6.56	NE/SW	17ab	74	89	15	81.62199	192.9247	1791368.81	4234144.46	0%
8150	5.064174	95.19441	6.56	E/W	17ab	71	86	15	103.8355	215.0879	2278892.56	4720563.16	0%
8200	5.095242	116.2548	9.84	NE/SW	17ab	58	31	-27	511.4091	311.2925	16835946.60	10247967.50	39%
8250	5.126311	76.55204	9.84	E/W	17ab	50	36	-14	477.7538	373.2451	15727990.31	12287492.43	22%
8300	5.157379	150.0368	16.4	NE/SW	17ab	42	34	-8	489.3351	430.0217	26848759.01	23594363.97	12%
8350	5.188448	106.6991	9.84	E/W	17ab	50	43	-7	422.6723	370.7652	13914669.34	12205850.30	12%
8400	5.219516	218.5653	13.12	NE/SW	17ab	48	35	-13	488.0256	390.4205	21421527.34	17137221.88	20%
8450	5.250585	201.714	22.96	N/S	17ab	35	30	-5	519.4534	482.3496	39901800.14	37051671.56	7%
8500	5.281654	164.6637	13.12	N/S	17ab	51	62	11	285.6728	368.3675	12539398.25	16169224.05	0%
8550	5.312722	178.3159	9.84	N/S	17ab	60	61	1	290.2228	297.6644	9554337.28	9799320.29	0%
8600	5.343791	142.8531	13.12	NE/SW	17ab	48	27	-21	541.9463	386.044	23788339.16	16945118.31	29%
8650	5.374859	154.4858	6.56	NE/SW	17ab	74	93	19	53.90509	200.2189	1183062.29	4394231.36	0%
8700	5.405928	73.44322	9.84	E/W	17ab	50	88	38	88.69603	369.5668	2919935.62	12166398.43	0%
8750	5.436996	303.3416	6.56	NE/SW	17aa	60	62	2	286.22	301.2842	6281709.40	6612325.69	0%
8800	5.468065	150.8195	16.4	NE/SW	17aa	31	47	16	393.5419	512.3471	21592796.36	28111376.40	0%
8850	5.499133	233.6428	9.84	NE/SW	17aa	46	44	-2	420.0975	405.094	13829906.21	13335980.99	4%
8900	5.530202	169.3155	13.12	N/S	17aa	41	59	18	309.361	445.1781	13579177.22	19540767.21	0%
8950	5.56127	130.9144	6.56	NE/SW	17aa	60	58	-2	311.7772	296.9306	6842616.15	6516777.29	5%
9000	5.592339	191.4062	3.28	N/S	17aa	87	97	10	21.43516	92.88571	235220.23	1019287.68	0%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
9050	5.623408	184.303	6.56	N/S	17aa	63	96	33	27.06007	250.3056	593890.93	5493491.13	0%
9100	5.654476	122.3073	6.56	NE/SW	17aa	60	53	-7	353.0046	300.4294	7747439.15	6593565.23	15%
9150	5.685545	121.5955	6.56	NE/SW	17aa	60	85	25	113.6243	302.9981	2493727.90	6649941.08	0%
9200	5.716613	160.0428	3.28	N/S	17aa	87	99	12	10.58972	137.6664	116207.02	1510691.30	0%
9250	5.747682	160.6864	3.28	N/S	17aa	87	97	10	19.05157	82.55682	209063.74	905942.88	0%
9300	5.77875	159.2275	6.56	N/S	17aa	63	97	34	23.94753	295.3529	525579.68	6482149.34	0%
9350	5.809819	144.8658	6.56	NE/SW	17aa	60	95	35	40.80211	326.4169	895489.46	7163915.68	0%
9400	5.840887	109.6342	3.28	E/W	17aa	91	97	6	23.27942	69.83827	255458.33	766375.00	0%
9450	5.871956	142.3793	6.56	NE/SW	17aa	60	95	35	38.52247	308.1797	845457.82	6763662.56	0%
9500	5.903025	108.2557	6.56	E/W	17aa	51	96	45	28.06675	343.8177	615984.83	7545814.16	0%
9550	5.934093	140.556	6.56	NE/SW	17aa	60	93	33	53.95942	308.3396	1184254.83	6767170.48	0%
9600	5.965162	117.7497	3.28	NE/SW	17aa	87	97	10	22.81659	98.87187	250379.36	1084977.21	0%
9650	5.99623	95.9951	3.28	E/W	17aa	91	97	6	24.68878	74.06635	270924.05	812772.14	0%
9700	6.027299	91.90915	6.56	E/W	17aa	51	95	44	36.10505	353.8295	792402.38	7765543.34	0%
9750	6.058367	80.01817	3.28	E/W	17aa	91	98	7	15.2064	68.42878	166868.42	750907.88	0%
9800	6.089436	71.90951	6.56	E/W	17aa	51	93	42	54.36002	380.5201	1193046.72	8351327.07	0%
9850	6.120504	132.0183	9.84	NE/SW	17aa	46	88	42	90.96711	409.352	2994701.30	13476155.85	0%
9900	6.151573	140.7743	13.12	NE/SW	17aa	37	62	25	279.9598	464.1439	12288633.36	20373260.57	0%
9950	6.182641	166.5838	16.4	N/S	17aa	35	65	30	259.2689	481.4994	14225525.63	26418833.31	0%
10000	6.21371	210.5102	19.68	NE/SW	17aa	27	34	7	491.522	543.6532	32362503.07	35794889.76	0%
10050	6.244779	177.8184	9.84	N/S	17aa	49	84	35	116.3998	371.0243	3831962.29	12214379.81	0%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
10100	6.275847	158.6002	6.56	N/S	17aa	63	96	33	31.6212	292.4961	693994.68	6419450.83	0%
10150	6.306916	186.3816	3.28	N/S	17aa	87	98	11	11.68539	75.95503	128230.41	833497.68	0%
10200	6.337984	137.816	3.28	NE/SW	17aa	87	98	11	15.58947	101.3316	171072.11	1111968.72	0%
10250	6.369053	145.4995	3.28	NE/SW	17aa	87	97	10	23.51872	101.9145	258084.29	1118365.24	0%
10300	6.400121	157.7094	13.12	N/S	17aa	41	71	30	219.9922	447.5704	9656398.28	19645775.81	0%
10350	6.43119	108.7814	3.28	E/W	17aa	91	97	6	20.30281	60.90842	222794.24	668382.72	0%
10400	6.462258	114.8705	3.28	NE/SW	17aa	87	97	10	25.25616	109.4434	277150.19	1200984.18	0%
10450	6.493327	104.8683	3.28	E/W	17aa	91	96	5	26.42758	59.46206	290004.86	652510.94	0%
10500	6.524396	89.74191	6.56	E/W	17aa	51	95	44	34.25055	335.6554	751701.40	7366673.72	0%
10550	6.555464	73.1482	6.56	E/W	17aa	51	93	42	52.22216	365.5551	1146126.78	8022887.43	0%
10600	6.586533	76.26373	6.56	E/W	17aa	51	95	44	38.31449	375.482	840893.22	8240753.59	0%
10650	6.617601	90	6.56	E/W	17aa	51	94	43	45.45016	371.1763	997500.86	8146257.00	0%
10700	6.64867	138.2095	3.28	NE/SW	17aa	87	98	11	12.7356	82.78143	139755.02	908407.62	0%
10750	6.679738	94.4031	3.28	E/W	17aa	91	97	6	20.89407	62.68222	229282.53	687847.58	0%
10800	6.710807	186.9112	3.28	N/S	17aa	87	98	11	17.31292	112.534	189984.50	1234899.28	0%
10850	6.741875	134.0906	3.28	NE/SW	17aa	87	97	10	23.58459	102.1999	258807.14	1121497.61	0%
10900	6.772944	84.86318	9.84	E/W	17aa	35	31	-4	515.7367	485.8389	16978415.57	15994159.59	6%
10950	6.804012	42.06433	6.56	NE/SW	17aa	60	62	2	280.7402	295.516	6161444.22	6485730.76	0%
11000	6.835081	243.4349	6.56	NE/SW	17aa	60	61	1	294.6218	302.1762	6466104.53	6631902.08	0%
11050	6.86615	141.6411	3.28	NE/SW	17aa	87	92	5	63.11657	102.5644	692614.02	1125497.78	0%
11100	6.897218	130.6418	9.84	NE/SW	17aa	46	57	11	321.315	403.5119	10577917.61	13283896.54	0%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
11150	6.928287	135.5162	6.56	NE/SW	17aa	60	82	22	137.2522	305.0048	3012292.08	6693982.40	0%
11200	6.959355	53.50596	3.28	NE/SW	17aa	87	90	3	74.70936	97.12217	819828.23	1065776.70	0%
11250	6.990424	107.8562	6.56	E/W	17aa	51	78	27	163.6801	364.5601	3592308.60	8001050.96	0%
11300	7.021492	113.98	3.28	NE/SW	17aa	87	95	8	33.95153	88.27397	372569.41	968680.46	0%
11350	7.052561	155.5925	3.28	NE/SW	17aa	87	93	6	50.53367	93.84824	554534.66	1029850.08	0%
11400	7.083629	130.6792	3.28	NE/SW	17aa	87	85	-2	109.814	95.17211	1205051.04	1044377.57	13%
11450	7.114698	148.465	6.56	NE/SW	17aa	60	81	21	143.2032	301.4803	3142899.07	6616629.61	0%
11500	7.145767	95.02285	3.28	E/W	17aa	91	86	-5	106.3847	68.39017	1167419.78	750484.14	36%
11550	7.176835	144.1248	6.56	NE/SW	17aa	60	79	19	157.9685	300.8925	3466957.12	6603727.86	0%
11600	7.207904	86.42398	13.12	E/W	17aa	27	22	-5	584.389	546.9281	25651328.20	24007012.29	6%
11650	7.238972	184.4424	9.84	N/S	17aa	49	65	16	258.254	376.313	8501903.19	12388487.50	0%
11700	7.270041	106.0075	3.28	E/W	17aa	91	85	-6	113.0549	67.83296	1240616.05	744369.63	40%
11750	7.301109	145.7351	9.84	NE/SW	17aa	46	55	9	337.3802	404.8562	11106793.32	13328151.98	0%
11800	7.332178	78.33104	6.56	E/W	17aa	51	66	15	257.4354	371.0098	5649969.09	8142602.51	0%
11850	7.363246	20.57065	6.56	N/S	17aa	63	66	3	255.8616	278.4376	5615429.30	6110908.36	0%
11900	7.394315	23.34772	3.28	NE/SW	17aa	87	96	9	33.44803	108.7061	367044.23	1192893.74	0%
11950	7.425383	41.92845	6.56	NE/SW	17aa	60	72	12	206.3372	294.7674	4528510.62	6469300.88	0%
12000	7.456452	33.68953	9.84	NE/SW	17aa	46	41	-5	442.1669	404.6952	14556447.09	13322849.88	8%
12050	7.487521	48.24707	13.12	NE/SW	17aa	37	28	-9	537.1043	469.9663	23575803.07	20628827.69	13%
12100	7.518589	115.3205	6.56	NE/SW	17aa	60	62	2	284.5119	299.4862	6244221.24	6572864.46	0%
12150	7.549658	94.81429	3.28	E/W	17aa	91	48	-43	388.493	67.23917	4263153.90	737853.56	83%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
12200	7.580726	111.0968	16.4	E/W	17aa	22	11	-11	663.6358	581.6134	36412264.60	31911872.34	12%
12250	7.611795	136.3123	9.84	NE/SW	17aa	46	50	4	372.9359	402.7708	12277313.80	13259498.90	0%
12300	7.642863	126.7032	9.84	NE/SW	17aa	46	31	-15	513.5562	401.9136	16906631.75	13231277.03	22%
12350	7.673932	98.1488	9.84	E/W	17aa	35	63	28	277.8062	488.0379	9145576.13	16066552.66	0%
12400	7.705	74.0546	6.56	E/W	17aa	51	81	30	144.8905	373.665	3179931.40	8200875.72	0%
12450	7.736069	124.3923	3.28	NE/SW	17aa	87	97	10	22.59368	97.90596	247933.31	1074377.67	0%
12500	7.767138	132.969	6.56	NE/SW	17aa	60	94	34	46.91106	312.7404	1029563.51	6863756.72	0%
12550	7.798206	120.2036	6.56	NE/SW	17aa	60	97	37	25.95954	346.1272	569737.55	7596500.60	0%
12600	7.829275	115.7688	6.56	NE/SW	17aa	60	34	-26	491.6556	297.9731	10790431.28	6539655.32	39%
12650	7.860343	76.53444	3.28	E/W	17aa	91	98	7	15.26037	68.67166	167460.68	753573.08	0%
12700	7.891412	202.1098	3.28	N/S	17aa	87	97	10	23.15156	100.3234	254055.20	1100905.88	0%
12750	7.92248	136.0227	9.84	NE/SW	17aa	46	88	42	90.25062	406.1278	2971114.08	13370013.37	0%
12800	7.953549	125.3479	6.56	NE/SW	17aa	60	94	34	41.98403	279.8936	921429.28	6142861.85	0%
12850	7.984617	170.9415	6.56	N/S	17aa	63	93	30	51.28631	271.0848	1125587.56	5949534.23	0%
12900	8.015686	95.46766	3.28	E/W	17aa	91	98	7	13.341	60.0345	146398.37	658792.67	0%
12950	8.046754	115.2891	3.28	NE/SW	17aa	87	97	10	22.99635	99.65085	252352.02	1093525.42	0%
13000	8.077823	162.0218	3.28	N/S	17aa	87	84	-3	115.9883	94.24046	1272805.05	1034154.10	19%
13050	8.108892	91.84789	6.56	E/W	17aa	51	68	17	239.4009	366.5826	5254163.66	8045438.10	0%
13100	8.13996	123.793	9.84	NE/SW	17aa	46	62	16	281.4606	399.9703	9265879.71	13167302.75	0%
13150	8.171029	152.5132	3.28	NE/SW	17aa	87	87	0	99.4662	99.4662	1091499.10	1091499.10	0%
13200	8.202097	162.3844	3.28	N/S	17aa	87	89	2	79.94309	94.47819	877260.90	1036762.88	0%



**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
13250	8.233166	151.327	6.56	NE/SW	17aa	60	75	15	187.2874	299.6599	4110422.56	6576676.10	0%
13300	8.264234	130.3147	6.56	NE/SW	17aa	60	74	14	193.3835	297.5131	4244214.41	6529560.63	0%
13350	8.295303	170.1586	6.56	N/S	17aa	63	79	16	154.7029	272.5718	3395285.86	5982170.33	0%
13400	8.326371	168.2624	3.28	N/S	17aa	87	89	2	79.40143	93.83805	871316.94	1029738.20	0%
13450	8.35744	117.0028	6.56	NE/SW	17aa	60	65	5	260.1962	297.367	5710560.69	6526355.07	0%
13500	8.388509	108.5892	9.84	E/W	17aa	35	49	14	377.7564	481.4542	12436006.24	15849811.88	0%
13550	8.419577	157.7903	9.84	N/S	17aa	49	67	18	243.7125	376.6466	8023186.35	12399469.81	0%
13600	8.450646	180.5847	3.28	N/S	17aa	87	94	7	47.3263	102.5403	519338.35	1125233.09	0%
13650	8.481714	171.1041	9.84	N/S	17aa	49	67	18	246.6692	381.2161	8120525.29	12549902.72	0%
13700	8.512783	164.9816	6.56	N/S	17aa	63	81	18	145.4035	283.1542	3191190.93	6214424.43	0%
13750	8.543851	191.3099	6.56	N/S	17aa	63	74	11	194.4206	276.6755	4266975.30	6072234.09	0%
13800	8.57492	100.1657	16.4	E/W	17aa	22	48	26	389.349	584.0235	21362738.25	32044107.38	0%
13850	8.605988	69.00715	9.84	E/W	17aa	35	35	0	486.6445	486.6445	16020678.36	16020678.36	0%
13900	8.637057	109.5815	16.4	E/W	17aa	0	4	4	713.3935	743.1182	39142359.08	40773290.70	0%
13950	8.668125	78.8072	16.4	E/W	17aa	0	3	3	721.5832	743.9003	39591714.03	40816200.04	0%
14000	8.699194	83.92804	16.4	E/W	17aa	22	26	4	554.1889	584.1451	30407149.98	32050779.71	0%
14050	8.730263	148.2915	9.84	NE/SW	17aa	46	64	18	267.0719	400.6078	8792193.75	13188290.62	0%
14100	8.761331	138.6119	6.56	NE/SW	17aa	60	67	7	246.3529	298.6096	5406740.55	6553624.91	0%
14150	8.7924	143.5491	9.84	NE/SW	17aa	46	63	17	274.7198	400.9424	9043968.45	13199305.31	0%
14200	8.823468	141.4958	3.28	NE/SW	17aa	87	90	3	76.43665	99.36764	838782.73	1090417.56	0%
14250	8.854537	132.6524	6.56	NE/SW	17aa	60	70	10	224.3606	299.1474	4924071.73	6565428.98	0%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
14300	8.885605	104.6764	6.56	E/W	17aa	51	81	30	141.4345	364.752	3104081.37	8005262.47	0%
14350	8.916674	81.60707	6.56	E/W	17aa	51	82	31	133.9407	364.6164	2939615.16	8002285.70	0%
14400	8.947742	132.7559	9.84	NE/SW	17aa	46	62	16	287.08	407.9558	9450876.95	13430193.55	0%
14450	8.978811	129.7394	6.56	NE/SW	17aa	60	73	13	201.5508	298.5937	4423461.85	6553276.82	0%
14500	9.00988	99.14164	3.28	E/W	17aa	91	87	-4	94.17834	65.20039	1033472.44	715480.92	31%
14550	9.040948	80.97546	3.28	E/W	17aa	91	92	1	63.07186	70.95585	692123.38	778638.80	0%
14600	9.072017	145.424	3.28	NE/SW	17aa	87	95	8	33.59821	87.35536	368692.29	958599.95	0%
14650	9.103085	145.6084	0	NE/SW	17aa	87	99	12	5.046409	65.60331	0.00	0.00	0%
14700	9.134154	106.1684	3.28	E/W	17aa	91	91	0	67.57118	67.57118	741496.98	741496.98	0%
14750	9.165222	100.4642	6.56	E/W	17aa	51	78	27	162.4708	361.8669	3565769.47	7941941.08	0%
14800	9.196291	107.8785	3.28	E/W	17aa	91	96	5	31.74448	71.42509	348350.25	783788.05	0%
14850	9.227359	136.3552	3.28	NE/SW	17aa	87	93	6	53.95318	100.1988	592058.88	1099537.92	0%
14900	9.258428	58.21266	3.28	NE/SW	17aa	87	83	-4	129.4253	98.97228	1420257.19	1086079.03	24%
14950	9.289496	111.8015	3.28	E/W	17aa	91	83	-8	129.9736	68.80958	1426274.60	755086.55	47%
15000	9.320565	134.549	6.56	NE/SW	17aa	60	82	22	133.2863	296.1918	2925253.04	6500562.31	0%
15050	9.351634	92.15753	3.28	E/W	17aa	91	82	-9	134.2933	67.14667	1473677.04	736838.52	50%
15100	9.382702	108.2394	3.28	E/W	17aa	91	83	-8	128.5352	68.04804	1410489.59	746729.78	47%
15150	9.413771	129.3228	3.28	NE/SW	17aa	87	91	4	64.95029	93.81708	712736.38	1029508.10	0%
15200	9.444839	82.23477	3.28	E/W	17aa	91	62	-29	281.4	66.64737	3087962.13	731359.45	76%
15250	9.475908	65.82132	6.56	NE/SW	17aa	60	57	-3	319.3665	297.0851	7009179.74	6520167.20	7%
15300	9.506976	111.2179	3.28	E/W	17aa	91	92	1	60.89636	68.5084	668250.31	751781.59	0%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
15350	9.538045	120.5789	13.12	NE/SW	17aa	37	22	-15	583.4868	471.2778	25611726.65	20686394.60	19%
15400	9.569113	104.5814	6.56	E/W	17aa	51	36	-15	475.2545	363.8667	10430474.54	7985832.07	23%
15450	9.600182	119.6499	6.56	NE/SW	17aa	60	18	-42	615.6224	300.3036	13511147.76	6590803.78	51%
15500	9.631251	79.46082	9.84	E/W	17aa	35	45	10	412.2327	487.1841	13570990.89	16038443.78	0%
15550	9.662319	97.24015	22.96	E/W	17aa	16	2	-14	728.5409	624.4636	55962848.54	47968155.89	14%
15600	9.693388	97.35238	6.56	E/W	17aa	51	6	-45	702.0914	365.9838	15408895.88	8032296.79	48%
15650	9.724456	88.40886	26.24	E/W	17aa	13	4	-9	713.1025	646.2491	62602226.27	56733267.56	9%
15700	9.755525	114.444	3.28	NE/SW	17aa	87	46	-41	405.5989	97.64418	4450867.09	1071505.04	76%
15750	9.786593	79.76531	6.56	E/W	17aa	51	39	-12	455.267	365.7062	9991805.86	8026204.70	20%
15800	9.817662	43.3866	6.56	NE/SW	17aa	60	42	-18	435.8257	300.5694	9565125.46	6596638.25	31%
15850	9.84873	56.09367	6.56	NE/SW	17aa	60	40	-20	444.4559	296.304	9754534.65	6503023.10	33%
15900	9.879799	107.9036	9.84	E/W	17aa	35	28	-7	539.8947	487.4049	17773712.92	16045713.05	10%
15950	9.910867	63.61044	16.4	NE/SW	17aa	31	1	-30	740.5364	516.1314	40631632.15	28319016.34	30%
16000	9.941936	52.89606	6.56	NE/SW	17aa	60	26	-34	550.6524	297.65	12085243.93	6532564.29	46%
16050	9.973005	73.81087	9.84	E/W	17aa	35	42	7	435.977	488.5949	14352670.48	16084889.33	0%
16100	10.00407	43.45184	6.56	NE/SW	17aa	60	73	13	202.7901	300.4297	4450661.23	6593572.19	0%
16150	10.03514	84.9079	22.96	E/W	17aa	16	2	-14	734.5561	629.6195	56424911.95	48364210.24	14%
16200	10.06621	80.10611	22.96	E/W	17aa	16	12	-4	653.7835	624.066	50220362.26	47937618.51	5%
16250	10.09728	95.35583	9.84	E/W	17aa	35	43	8	423.525	482.9671	13942739.94	15899615.72	0%
16300	10.12835	46.30215	9.84	NE/SW	17aa	46	50	4	369.8161	399.4014	12174607.77	13148576.39	0%
16350	10.15942	91.36414	13.12	E/W	17aa	27	12	-15	656.1423	544.2999	28800889.20	23891646.72	17%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
16400	10.19048	34.96064	3.28	NE/SW	17aa	87	46	-41	400.5593	96.43095	4395564.84	1058191.54	76%
16450	10.22155	34.75265	3.28	NE/SW	17aa	87	66	-21	252.4206	96.51377	2769954.88	1059100.40	62%
16500	10.25262	39.54253	3.28	NE/SW	17aa	87	89	2	79.282	93.6969	870006.37	1028189.34	0%
16550	10.28369	45.47466	3.28	NE/SW	17aa	87	57	-30	318.8658	96.40127	3499095.04	1057865.94	70%
16600	10.31476	45.26992	3.28	NE/SW	17aa	87	91	4	67.12399	96.95688	736589.70	1063962.90	0%
16650	10.34583	72.44026	3.28	E/W	17aa	91	91	0	68.53908	68.53908	752118.24	752118.24	0%
16700	10.3769	72.60487	3.28	E/W	17aa	91	25	-66	556.6445	66.79733	6108375.76	733005.09	88%
16750	10.40796	38.15643	9.84	NE/SW	17aa	46	29	-17	526.9794	400.8012	17348532.87	13194658.80	24%
16800	10.43903	18.70926	6.56	N/S	17aa	63	82	19	134.3434	276.1504	2948453.56	6060710.09	0%
16850	10.4701	61.62076	9.84	NE/SW	17aa	46	18	-28	611.8453	402.9225	20142378.80	13264493.35	34%
16900	10.50117	95.55297	3.28	E/W	17aa	91	88	-3	91.61076	68.70807	1005296.95	753972.71	25%
16950	10.53224	79.1405	6.56	E/W	17aa	51	79	28	157.3808	367.2219	3454058.01	8059468.68	0%
17000	10.56331	169.0889	6.56	N/S	17aa	63	70	7	220.9781	272.5396	4849835.48	5981463.76	0%
17050	10.59438	67.17266	6.56	NE/SW	17aa	60	86	26	104.0389	297.2539	2283355.19	6523871.96	0%
17100	10.62544	32.90484	6.56	NE/SW	17aa	60	86	26	101.6268	290.3622	2230416.65	6372619.01	0%
17150	10.65651	315.0897	6.56	NE/SW	17aa	60	12	-48	655.755	298.0705	14391944.75	6541793.07	55%
17200	10.68758	41.10115	6.56	NE/SW	17aa	60	43	-17	425.8582	298.8479	9346368.34	6558854.97	30%
17250	10.71865	129.5597	6.56	NE/SW	17aa	60	47	-13	399.2031	301.2854	8761364.95	6612350.90	25%
17300	10.74972	55.61966	3.28	NE/SW	17aa	87	86	-1	106.3587	98.76168	1167134.77	1083768.00	7%
17350	10.78079	37.24672	3.28	NE/SW	17aa	87	74	-13	191.9225	95.96124	2106074.31	1053037.16	50%
17400	10.81186	34.22309	6.56	NE/SW	17aa	60	34	-26	491.5667	297.9192	10788482.18	6538474.05	39%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
17450	10.84292	356.3322	9.84	N/S	17aa	49	41	-8	438.523	379.0623	14436485.98	12478996.35	14%
17500	10.87399	66.54098	9.84	NE/SW	17aa	46	15	-31	637.6241	405.0788	20991033.95	13335480.39	36%
17550	10.90506	36.09828	6.56	NE/SW	17aa	60	26	-34	549.1265	296.8252	12051755.07	6514462.20	46%
17600	10.93613	345.1143	6.56	N/S	17aa	63	55	-8	333.8577	274.5052	7327219.99	6024603.11	18%
17650	10.9672	65.09564	6.56	NE/SW	17aa	60	8	-52	688.0649	299.1587	15101053.89	6565675.61	57%
17700	10.99827	124.6952	6.56	NE/SW	17aa	60	23	-37	574.8039	298.5994	12615298.55	6553401.84	48%
17750	11.02934	29.14855	3.28	NE/SW	17aa	87	87	0	93.73933	93.73933	1028654.91	1028654.91	0%
17800	11.0604	99.05757	9.84	E/W	17aa	35	5	-30	712.1977	487.2932	23446051.05	16042034.93	32%
17850	11.09147	51.18856	13.12	NE/SW	17aa	37	13	-24	652.9806	472.8481	28662109.92	20755320.98	28%
17900	11.12254	22.38047	6.56	N/S	17aa	63	33	-30	498.9622	275.5463	10950790.44	6047451.44	45%
17950	11.15361	28.61062	9.84	NE/SW	17aa	46	21	-25	592.6708	405.1167	19511139.06	13336727.96	32%
18000	11.18468	64.02142	6.56	NE/SW	17aa	60	41	-19	441.5116	299.3299	9689914.07	6569433.27	32%
18050	11.21575	14.80417	6.56	N/S	17aa	63	20	-43	597.0823	276.1506	13104246.01	6060713.78	54%
18100	11.24682	34.48741	3.28	NE/SW	17aa	87	44	-43	418.8222	97.22659	4595974.10	1066922.56	77%
18150	11.27788	31.67501	6.56	NE/SW	17aa	60	92	32	58.16792	290.8396	1276619.20	6383095.98	0%
18200	11.30895	17.38687	3.28	N/S	17aa	87	96	9	30.92771	100.515	339387.30	1103008.72	0%
18250	11.34002	3.098777	0	N/S	17aa	87	80	-7	148.9111	96.79221	0.00	0.00	0%
18300	11.37109	28.88473	3.28	NE/SW	17aa	87	61	-26	288.2542	96.08472	3163176.66	1054392.22	67%
18350	11.40216	4.783988	3.28	N/S	17aa	87	95	8	38.47799	100.0428	422240.87	1097826.25	0%
18400	11.43323	346.1713	3.28	N/S	17aa	87	94	7	41.62144	90.17978	456735.68	989593.98	0%
18450	11.46429	350.7333	3.28	N/S	17aa	87	94	7	42.60464	92.31006	467524.96	1012970.75	0%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
18500	11.49536	20.54671	3.28	N/S	17aa	87	95	8	40.14381	104.3739	440520.82	1145354.14	0%
18550	11.52643	331.0736	3.28	NE/SW	17aa	87	94	7	45.90432	99.45936	503734.20	1091424.09	0%
18600	11.5575	4.332227	3.28	N/S	17aa	87	94	7	43.34938	93.92366	475697.40	1030677.71	0%
18650	11.58857	4.361549	3.28	N/S	17aa	87	94	7	41.77251	90.50711	458393.52	993185.97	0%
18700	11.61964	43.22853	3.28	NE/SW	17aa	87	99	12	6.166941	80.17023	67673.34	879753.47	0%
18750	11.65071	42.77855	3.28	NE/SW	17aa	87	93	6	55.15788	102.4361	605278.71	1124089.04	0%
18800	11.68177	47.58949	3.28	NE/SW	17aa	87	75	-12	184.4698	95.92428	2024291.55	1052631.61	48%
18850	11.71284	264.3592	9.84	E/W	17aa	35	51	16	367.9973	488.1597	12114730.79	16070561.25	0%
18900	11.74391	62.52499	9.84	NE/SW	17aa	46	55	9	339.1341	406.9609	11164533.51	13397440.21	0%
18950	11.77498	42.78534	6.56	NE/SW	17aa	60	65	5	259.1944	296.2222	5688574.34	6501227.82	0%
19000	11.80605	49.57353	6.56	NE/SW	17aa	60	40	-20	445.3982	296.9321	9775215.31	6516810.21	33%
19050	11.83712	15.27764	6.56	N/S	17aa	63	22	-41	583.2825	276.6853	12801379.90	6072449.44	53%
19100	11.86819	13.7812	9.84	N/S	17aa	49	10	-39	674.4585	382.1931	22203647.66	12582067.01	43%
19150	11.89925	12.72393	3.28	N/S	17aa	87	63	-24	273.0936	95.95179	2996810.78	1052933.52	65%
19200	11.93032	321.3405	6.56	NE/SW	17aa	60	18	-42	609.7792	297.4533	13382907.04	6528247.34	51%
19250	11.96139	26.75487	3.28	NE/SW	17aa	87	38	-49	463.0326	97.08748	5081119.77	1065396.08	79%
19300	11.99246	323.2311	6.56	NE/SW	17aa	60	11	-49	663.9819	298.4188	14572500.14	6549438.26	55%
19350	12.02353	14.52251	9.84	N/S	17aa	49	12	-37	655.6022	379.9513	21582884.98	12508262.89	42%
19400	12.0546	324.1883	6.56	NE/SW	17aa	60	13	-47	649.8001	298.7587	14261251.37	6556897.18	54%
19450	12.08567	305.819	9.84	NE/SW	17aa	46	5	-41	706.5625	401.625	23260535.46	13221778.05	43%
19500	12.11673	77.17542	9.84	E/W	17aa	35	9	-26	678.4686	484.6204	22335662.57	15954044.69	29%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
19550	12.1478	15.03034	13.12	N/S	17aa	41	13	-28	650.9936	441.4784	28574888.70	19378372.80	32%
19600	12.17887	348.1499	9.84	N/S	17aa	49	18	-31	612.6016	381.0083	20167276.03	12543061.92	38%
19650	12.20994	293.6626	9.84	NE/SW	17aa	46	11	-35	666.1279	404.1675	21929398.11	13305477.50	39%
19700	12.24101	28.96763	6.56	NE/SW	17aa	60	21	-39	588.7507	298.1016	12921392.64	6542477.29	49%
19750	12.27208	10.40763	9.84	N/S	17aa	49	21	-28	592.3551	382.4065	19500746.98	12589089.82	35%
19800	12.30315	338.583	9.84	N/S	17aa	49	18	-31	611.3409	380.2242	20125771.67	12517248.23	38%
19850	12.33421	8.00468	9.84	N/S	17aa	49	17	-32	621.5369	381.9082	20461430.71	12572686.34	39%
19900	12.36528	358.3902	9.84	N/S	17aa	49	48	-1	384.556	377.1607	12659854.75	12416396.01	2%
19950	12.39635	348.8709	9.84	N/S	17aa	49	11	-38	662.6217	379.7046	21813973.22	12500141.96	43%
20000	12.42742	356.7431	6.56	N/S	17aa	63	16	-47	627.3642	276.339	13768847.68	6064849.57	56%
20050	12.45849	97.40635	6.56	E/W	17aa	51	13	-38	651.3561	366.8558	14295401.89	8051433.25	44%
20100	12.48956	337.8889	13.12	N/S	17aa	41	13	-28	646.6472	438.5308	28384107.26	19248992.28	32%
20150	12.52063	330.6651	16.4	NE/SW	17aa	31	11	-20	664.8478	515.4438	36478764.08	28281289.00	22%
20200	12.55169	60.09406	16.4	NE/SW	17aa	31	8	-23	688.2459	516.1844	37762566.72	28321925.04	25%
20250	12.58276	28.07249	13.12	NE/SW	17aa	37	16	-21	627.9042	470.9281	27561396.07	20671047.05	25%
20300	12.61383	347.7509	16.4	N/S	17aa	35	5	-30	705.6452	482.8099	38717230.48	26490736.64	32%
20350	12.6449	35.05943	9.84	NE/SW	17aa	46	17	-29	618.063	402.1133	20347068.69	13237851.92	35%
20400	12.67597	57.44195	9.84	NE/SW	17aa	46	12	-34	653.7013	401.1349	21520308.05	13205643.58	39%
20450	12.70704	358.8427	19.68	N/S	17aa	31	10	-21	674.6388	517.2231	44419171.56	34054698.19	23%
20500	12.73811	134.2468	9.84	NE/SW	17aa	46	14	-32	638.8543	401.1411	21031533.97	13205846.91	37%
20550	12.76917	72.8106	13.12	E/W	17aa	27	8	-19	688.8559	546.5922	30236827.25	23992265.10	21%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
20600	12.80024	349.5308	22.96	N/S	17aa	24	7	-17	696.1364	568.8857	53473701.91	43698939.19	18%
20650	12.83131	39.80557	19.68	NE/SW	17aa	27	8	-19	684.5242	543.1551	45070039.59	35762096.63	21%
20700	12.86238	53.72378	16.4	NE/SW	17aa	31	7	-24	690.5099	512.3138	37886784.89	28109550.08	26%
20750	12.89345	284.3227	19.68	E/W	17aa	19	5	-14	709.2694	604.7455	46699297.56	39817295.81	15%
20800	12.92452	357.553	16.4	N/S	17aa	35	12	-23	659.0272	486.7814	36159397.79	26708646.09	26%
20850	12.95559	50.40728	13.12	NE/SW	17aa	37	11	-26	660.9094	467.8348	29010137.76	20535266.05	29%
20900	12.98665	74.53878	6.56	E/W	17aa	51	19	-32	607.7782	367.6683	13338990.40	8069265.80	40%
20950	13.01772	352.4667	9.84	N/S	17aa	49	17	-32	622.6474	382.5906	20497990.97	12595151.08	39%
21000	13.04879	36.02737	3.28	NE/SW	17aa	87	40	-47	450.5184	97.61232	4943794.54	1071155.48	78%
21050	13.07986	44.43273	9.84	NE/SW	17aa	46	14	-32	642.8025	403.6202	21161511.04	13287460.42	37%
21100	13.11093	257.074	6.56	E/W	17aa	51	18	-33	612.9938	366.3011	13453457.44	8039261.15	40%
21150	13.142	42.76883	6.56	NE/SW	17aa	60	30	-30	524.0134	299.4363	11500594.41	6571768.24	43%
21200	13.17307	24.96279	9.84	NE/SW	17aa	46	16	-30	627.7088	403.5271	20664615.88	13284395.93	36%
21250	13.20413	347.5741	9.84	N/S	17aa	49	17	-32	616.3476	378.7196	20290596.74	12467716.07	39%
21300	13.2352	311.4412	9.84	NE/SW	17aa	46	17	-29	620.0971	403.4367	20414033.81	13281419.59	35%
21350	13.26627	156.1613	6.56	NE/SW	17aa	60	24	-36	570.9969	300.5247	12531746.36	6595655.98	47%
21400	13.29734	67.89726	13.12	E/W	17aa	27	19	-8	607.0877	547.1284	26647672.40	24015803.52	10%
21450	13.32841	64.71752	6.56	NE/SW	17aa	60	14	-46	644.0621	299.5638	14135318.33	6574566.66	53%
21500	13.35948	63.85823	6.56	NE/SW	17aa	60	21	-39	589.1612	298.3095	12930400.75	6547038.35	49%
21550	13.39055	65.76112	9.84	NE/SW	17aa	46	12	-34	655.6978	402.36	21586033.92	13245975.36	39%
21600	13.42161	57.13313	9.84	NE/SW	17aa	46	12	-34	658.4293	404.0362	21675956.74	13301155.27	39%



**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
21650	13.45268	60.06514	13.12	NE/SW	17aa	37	9	-28	677.6201	469.1216	29743642.41	20591752.43	31%
21700	13.48375	58.83481	13.12	NE/SW	17aa	37	9	-28	677.3887	468.9614	29733482.66	20584718.77	31%
21750	13.51482	34.343	13.12	NE/SW	17aa	37	12	-25	660.0124	472.5088	28970762.11	20740431.96	28%
21800	13.54589	17.10265	13.12	N/S	17aa	41	13	-28	648.4044	439.7225	28461240.28	19301300.88	32%
21850	13.57696	37.45046	16.4	NE/SW	17aa	31	11	-20	666.809	516.9643	36586368.62	28364712.75	22%
21900	13.60802	326.6114	16.4	NE/SW	17aa	31	10	-21	672.1031	515.2791	36876847.60	28272249.83	23%
21950	13.63909	0.734805	13.12	N/S	17aa	41	14	-27	638.2888	437.8958	28017220.02	19221116.06	31%
22000	13.67016	321.1464	13.12	NE/SW	17aa	37	12	-25	654.1606	468.3195	28713903.07	20556544.24	28%
22050	13.70123	12.99452	19.68	N/S	17aa	31	10	-21	672.9005	515.8904	44304717.70	33966950.24	23%
22100	13.7323	345.6602	9.84	N/S	17aa	49	16	-33	625.3632	379.6848	20587396.68	12499490.84	39%
22150	13.76337	356.1861	13.12	N/S	17aa	41	13	-28	650.0807	440.8594	28534821.10	19351200.51	32%
22200	13.79444	321.5819	13.12	NE/SW	17aa	37	11	-26	661.3465	468.1441	29029321.60	20548845.63	29%
22250	13.8255	2.033365	6.56	N/S	17aa	63	30	-33	520.2724	275.0011	11418489.57	6035487.35	47%
22300	13.85657	355.1563	3.28	N/S	17aa	87	38	-49	465.3423	97.57177	5106465.26	1070710.46	79%
22350	13.88764	345.1599	6.56	N/S	17aa	63	22	-41	579.3735	274.831	12715588.95	6031753.73	53%
22400	13.91871	17.28173	9.84	N/S	17aa	49	18	-31	612.2737	380.8043	20156479.77	12536347.18	38%
22450	13.94978	30.36788	9.84	NE/SW	17aa	46	18	-28	610.4651	402.0136	20096942.25	13234571.73	34%
22500	13.98085	354.7091	6.56	N/S	17aa	63	27	-36	546.9228	277.2074	12003388.71	6083909.35	49%
22550	14.01192	26.28881	16.4	NE/SW	17aa	31	11	-20	665.3338	515.8206	36505427.58	28301960.71	22%
22600	14.04298	18.43451	6.56	N/S	17aa	63	22	-41	581.3788	275.7822	12759598.96	6052630.28	53%
22650	14.07405	19.98356	9.84	N/S	17aa	49	17	-32	617.6649	379.5291	20333964.60	12494363.79	39%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
22700	14.10512	357.6146	13.12	N/S	17aa	41	15	-26	635.5465	441.144	27896849.78	19363695.73	31%
22750	14.13619	354.719	6.56	N/S	17aa	63	25	-38	562.6033	277.551	12347531.12	6091448.69	51%
22800	14.16726	322.4314	9.84	NE/SW	17aa	46	19	-27	606.7844	404.5229	19975769.70	13317179.80	33%
22850	14.19833	335.8976	9.84	NE/SW	17aa	46	19	-27	606.7617	404.5078	19975022.83	13316681.88	33%
22900	14.2294	32.8277	13.12	NE/SW	17aa	37	14	-23	645.4624	472.8388	28332104.22	20754913.56	27%
22950	14.26046	303.1299	6.56	NE/SW	17aa	60	20	-40	595.7261	297.863	13074481.57	6537240.78	50%
23000	14.29153	339.9442	9.84	N/S	17aa	49	19	-30	600.9815	378.3957	19784733.08	12457054.16	37%
23050	14.3226	9.089907	3.28	N/S	17aa	87	38	-49	464.6029	97.41673	5098351.11	1069009.10	79%
23100	14.35367	101.0701	9.84	E/W	17aa	35	11	-24	663.7188	484.7384	21850088.64	15957929.91	27%
23150	14.38474	325.0081	19.68	NE/SW	17aa	27	9	-18	679.0254	544.7126	44707985.31	35864647.56	20%
23200	14.41581	343.8865	13.12	N/S	17aa	41	13	-28	648.5458	439.8184	28467446.07	19305509.41	32%
23250	14.44688	33.8868	9.84	NE/SW	17aa	46	14	-32	640.2736	402.0322	21078256.67	13235184.42	37%
23300	14.47794	242.241	3.28	NE/SW	17aa	87	31	-56	516.9082	97.3885	5672327.21	1068699.33	81%
23350	14.50901	55.34267	13.12	NE/SW	17aa	37	10	-27	671.1914	469.834	29461457.74	20623020.42	30%
23400	14.54008	328.4381	9.84	NE/SW	17aa	46	14	-32	638.5826	400.9705	21022588.41	13200229.93	37%
23450	14.57115	12.09476	13.12	N/S	17aa	41	14	-27	645.4007	442.7749	28329391.82	19435280.43	31%
23500	14.60222	96.44092	9.84	E/W	17aa	35	10	-25	673.108	486.1336	22159189.29	16003858.93	28%
23550	14.63329	72.04421	13.12	E/W	17aa	27	9	-18	680.4272	545.8372	29866856.36	23959126.53	20%
23600	14.66436	318.0128	13.12	NE/SW	17aa	37	12	-25	659.3086	472.0051	28939873.19	20718318.31	28%
23650	14.69542	335.2607	9.84	NE/SW	17aa	46	18	-28	610.5688	402.0819	20100356.35	13236820.04	34%
23700	14.72649	312.5102	13.12	NE/SW	17aa	37	12	-25	657.6059	470.786	28865132.24	20664810.58	28%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
23750	14.75756	13.32446	9.84	N/S	17aa	49	17	-32	621.8768	382.1171	20472622.91	12579563.48	39%
23800	14.78863	20.25063	9.84	N/S	17aa	49	16	-33	627.8822	381.2142	20670324.50	12549839.88	39%
23850	14.8197	135.6585	6.56	NE/SW	17aa	60	22	-38	584.2086	299.5941	12821705.03	6575233.35	49%
23900	14.85077	71.27421	9.84	E/W	17aa	35	11	-24	667.3639	487.4006	21970089.39	16045570.91	27%
23950	14.88184	345.204	9.84	N/S	17aa	49	17	-32	616.879	379.0461	20308091.76	12478466.02	39%
24000	14.9129	265.2923	6.56	E/W	17aa	51	16	-35	625.1198	364.6532	13719588.59	8003093.34	42%
24050	14.94397	26.46339	9.84	NE/SW	17aa	46	20	-26	596.0165	402.3111	19621283.16	13244366.13	33%
24100	14.97504	306.2978	9.84	NE/SW	17aa	46	14	-32	639.4354	401.506	21050664.07	13217858.83	37%
24150	15.00611	340.2406	13.12	N/S	17aa	41	14	-27	638.7485	438.2112	28037402.54	19234962.21	31%
24200	15.03718	6.086858	13.12	N/S	17aa	41	15	-26	633.2123	439.5238	27794393.02	19292578.68	31%
24250	15.06825	320.3559	13.12	NE/SW	17aa	37	11	-26	663.4258	469.616	29120592.47	20613453.10	29%
24300	15.09932	50.33264	16.4	NE/SW	17aa	31	8	-23	685.9821	514.4866	37638358.58	28228768.94	25%
24350	15.13038	294.3053	13.12	NE/SW	17aa	37	8	-29	683.3055	467.9157	29993197.66	20538820.13	32%
24400	15.16145	327.5837	9.84	NE/SW	17aa	46	17	-29	618.0451	402.1016	20346478.35	13237467.84	35%
24450	15.19252	1.00477	9.84	N/S	17aa	49	20	-29	597.373	380.8253	19665939.07	12537036.16	36%
24500	15.22359	354.4274	16.4	N/S	17aa	35	11	-24	666.4765	486.7525	36568124.95	26707057.55	27%
24550	15.25466	59.30007	6.56	NE/SW	17aa	60	15	-45	633.5327	298.133	13904227.40	6543165.83	53%
24600	15.28573	74.34551	16.4	E/W	17aa	22	6	-16	699.907	580.7739	38402386.93	31865810.43	17%
24650	15.3168	338.1994	9.84	N/S	17aa	49	17	-32	622.7292	382.6408	20500684.31	12596806.02	39%
24700	15.34786	44.27534	13.12	NE/SW	17aa	37	11	-26	662.7559	469.1418	29091189.45	20592639.72	29%
24750	15.37893	68.38992	3.28	E/W	17aa	91	24	-67	570.6346	67.57515	6261897.22	741540.46	88%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
24800	15.41	0.56259	9.84	N/S	17aa	49	22	-27	583.1236	381.2731	19196839.98	12551779.99	35%
24850	15.44107	31.42957	6.56	NE/SW	17aa	60	24	-36	564.9393	297.3365	12398799.81	6525684.11	47%
24900	15.47214	145.3048	9.84	NE/SW	17aa	46	15	-31	631.878	401.4284	20801867.37	13215303.97	36%
24950	15.50321	123.851	6.56	NE/SW	17aa	60	18	-42	613.7547	299.3925	13470156.83	6570808.21	51%
25000	15.53428	54.78241	9.84	NE/SW	17aa	46	16	-30	630.6465	405.4156	20761325.99	13346566.71	36%
25050	15.56534	29.90808	9.84	NE/SW	17aa	46	20	-26	599.981	404.9872	19751796.70	13332462.77	33%
25100	15.59641	48.53229	6.56	NE/SW	17aa	60	26	-34	552.925	298.8784	12135119.08	6559523.83	46%
25150	15.62748	122.6806	13.12	NE/SW	17aa	37	11	-26	665.7012	471.2267	29220470.30	20684153.14	29%
25200	15.65855	71.14776	6.56	E/W	17aa	51	19	-32	607.621	367.5732	13335540.11	8067178.58	40%
25250	15.68962	13.13305	9.84	N/S	17aa	49	20	-29	598.5487	381.5748	19704642.99	12561709.91	36%
25300	15.72069	25.76883	6.56	NE/SW	17aa	60	22	-38	578.727	296.7831	12701401.08	6513539.01	49%
25350	15.75175	58.46539	9.84	NE/SW	17aa	46	14	-32	642.5892	403.4863	21154490.04	13283051.89	37%
25400	15.78282	76.38623	6.56	E/W	17aa	51	15	-36	632.1065	364.3908	13872927.12	7997334.46	42%
25450	15.81389	302.9321	3.28	NE/SW	17aa	87	24	-63	565.1791	96.67537	6202031.36	1060873.79	83%
25500	15.84496	344.8327	9.84	N/S	17aa	49	17	-32	618.3045	379.9221	20355020.88	12507301.98	39%
25550	15.87603	358.5798	6.56	N/S	17aa	63	31	-32	514.2246	275.7436	11285756.49	6051782.46	46%
25600	15.9071	332.2853	6.56	NE/SW	17aa	60	21	-39	591.7058	299.5979	12986247.02	6575314.95	49%
25650	15.93817	41.06981	9.84	NE/SW	17aa	46	18	-28	611.0649	402.4086	20116685.83	13247573.60	34%
25700	15.96923	320.0134	13.12	NE/SW	17aa	37	12	-25	658.1037	471.1424	28886981.49	20680452.66	28%
25750	16.0003	276.5192	9.84	E/W	17aa	35	9	-26	677.4	483.8571	22300484.63	15928917.59	29%
25800	16.03137	78.69066	9.84	E/W	17aa	35	11	-24	667.0452	487.1678	21959596.08	16037907.25	27%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
25850	16.06244	286.6991	13.12	E/W	17aa	27	8	-19	688.2655	546.1237	30210915.06	23971704.34	21%
25900	16.09351	340.4972	6.56	N/S	17aa	63	22	-41	583.4021	276.742	12804005.59	6073694.96	53%
25950	16.12458	302.7346	3.28	NE/SW	17aa	87	28	-59	539.1498	97.3465	5916397.44	1068238.43	82%
26000	16.15565	163.78	9.84	N/S	17aa	49	21	-28	587.7991	379.4652	19350760.07	12492262.83	35%
26050	16.18671	84.09736	6.56	E/W	17aa	51	13	-38	652.5771	367.5434	14322198.47	8066525.58	44%
26100	16.21778	345.7001	6.56	N/S	17aa	63	22	-41	579.8358	275.0503	12725735.27	6036566.73	53%
26150	16.24885	349.9202	9.84	N/S	17aa	49	18	-31	612.9016	381.1949	20177151.10	12549203.73	38%
26200	16.27992	74.05417	13.12	E/W	17aa	27	8	-19	690.2491	547.6977	30297982.57	24040790.52	21%
26250	16.31099	18.79942	19.68	N/S	17aa	31	10	-21	673.9975	516.7314	44376944.18	34022323.87	23%
26300	16.34206	7.21398	13.12	N/S	17aa	41	12	-29	660.4412	442.7958	28989586.23	19436199.86	33%
26350	16.37313	127.9418	9.84	NE/SW	17aa	46	14	-32	644.6416	404.775	21222055.51	13325476.71	37%
26400	16.40419	70.34599	9.84	E/W	17aa	35	12	-23	659.5236	487.1481	21711980.14	16037258.06	26%
26450	16.43526	25.4081	9.84	NE/SW	17aa	46	15	-31	634.5221	403.1081	20888913.18	13270603.66	36%
26500	16.46633	270	13.12	E/W	17aa	27	7	-20	692.2391	543.3705	30385330.34	23850850.69	22%
26550	16.4974	266.5664	6.56	E/W	17aa	51	14	-37	640.6684	365.032	14060836.76	8011406.99	43%
26600	16.52847	64.93241	9.84	NE/SW	17aa	46	13	-33	647.4184	401.8459	21313469.86	13229050.26	38%
26650	16.55954	23.19868	9.84	NE/SW	17aa	46	16	-30	629.2582	404.5231	20715622.18	13317185.69	36%
26700	16.59061	93.86496	16.4	E/W	17aa	22	6	-16	702.4732	582.9033	38543189.17	31982646.34	17%
26750	16.62167	33.23881	9.84	NE/SW	17aa	46	17	-29	622.9801	405.3124	20508943.35	13343167.96	35%
26800	16.65274	9.560942	6.56	N/S	17aa	63	24	-39	570.2557	277.6245	12515478.84	6093062.06	51%
26850	16.68381	99.29331	6.56	E/W	17aa	51	13	-38	651.4373	366.9015	14297184.08	8052437.01	44%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft2)	Daily Solar Flux with Potential Shade (watts/ft2)	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
26900	16.71488	48.81477	9.84	NE/SW	17aa	46	15	-31	631.0643	400.9114	20775080.69	13198286.55	36%
26950	16.74595	23.68209	6.56	NE/SW	17aa	60	25	-35	556.565	296.8347	12215007.82	6514670.83	47%
27000	16.77702	37.99873	3.28	NE/SW	17aa	87	30	-57	519.9458	96.56136	5705660.69	1059622.70	81%
27050	16.80809	7.529343	3.28	N/S	17aa	87	35	-52	482.7872	96.55744	5297897.93	1059579.59	80%
27100	16.83915	29.24883	9.84	NE/SW	17aa	46	17	-29	617.4331	401.7035	20326333.16	13224361.33	35%
27150	16.87022	129.5086	6.56	NE/SW	17aa	60	17	-43	617.6278	297.6519	13555161.17	6532607.79	52%
27200	16.90129	320.3322	6.56	NE/SW	17aa	60	20	-40	600.2819	300.141	13174469.30	6587234.65	50%
27250	16.93236	142.7652	13.12	NE/SW	17aa	37	13	-24	648.4756	469.5858	28464364.83	20612126.26	28%
27300	16.96343	81.43911	9.84	E/W	17aa	35	11	-24	666.7289	486.9368	21949183.26	16030302.38	27%
27350	16.9945	79.31529	6.56	E/W	17aa	51	11	-40	661.7731	364.347	14524025.31	7996373.49	45%
27400	17.02557	65.69475	6.56	NE/SW	17aa	60	15	-45	638.1389	300.3007	14005321.22	6590739.40	53%
27450	17.05663	70.16672	6.56	E/W	17aa	51	9	-42	678.1217	365.1425	14882829.73	8013831.39	46%
27500	17.0877	49.08553	9.84	NE/SW	17aa	46	15	-31	634.9857	403.4027	20904174.83	13280299.30	36%
27550	17.11877	73.39059	9.84	E/W	17aa	35	11	-24	663.4046	484.509	21839747.83	15950377.63	27%
27600	17.14984	343.2176	6.56	N/S	17aa	63	30	-33	525.577	277.805	11534910.08	6097023.90	47%
27650	17.18091	133.3151	9.84	NE/SW	17aa	46	15	-31	633.2779	402.3177	20847954.00	13244582.54	36%
27700	17.21198	331.5573	6.56	NE/SW	17aa	60	25	-35	562.5256	300.0137	12345826.92	6584441.02	47%
27750	17.24305	102.8357	9.84	E/W	17aa	35	11	-24	661.4598	483.0886	21775721.34	15903616.71	27%
27800	17.27411	357.7101	9.84	N/S	17aa	49	21	-28	586.4984	378.6256	19307940.60	12464619.88	35%
27850	17.30518	348.8867	6.56	N/S	17aa	63	25	-38	559.3222	275.9323	12275521.09	6055923.74	51%
27900	17.33625	0	9.84	N/S	17aa	49	22	-27	585.4223	382.7761	19272513.02	12601258.51	35%

Table I-3. Moore's Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
27950	17.36732	256.3725	9.84	E/W	17aa	35	10	-25	668.8436	483.0537	22018800.80	15902467.24	28%
28000	17.39839	343.8553	6.56	N/S	17aa	63	22	-41	582.0813	276.1155	12775017.84	6059944.36	53%
28050	17.42946	34.43875	6.56	NE/SW	17aa	60	21	-39	589.2869	298.3731	12933160.28	6548435.59	49%
28100	17.46053	352.5687	6.56	N/S	17aa	63	24	-39	568.3174	276.6808	12472938.23	6072351.51	51%
28150	17.49159	336.4309	6.56	NE/SW	17aa	60	25	-35	559.1177	298.1961	12271033.14	6544551.01	47%
28200	17.52266	336.9486	9.84	NE/SW	17aa	46	19	-27	608.2322	405.4882	20023433.41	13348955.61	33%
28250	17.55373	36.42058	9.84	NE/SW	17aa	46	17	-29	616.5698	401.1418	20297910.42	13205869.43	35%
28300	17.5848	1.432646	6.56	N/S	17aa	63	23	-40	578.027	277.7532	12686036.86	6095887.84	52%
28350	17.61587	4.236718	6.56	N/S	17aa	63	28	-35	540.6146	277.8158	11864942.44	6097262.09	49%
28400	17.64694	357.3162	6.56	N/S	17aa	63	32	-31	504.5372	274.5276	11073147.39	6025094.90	46%
28450	17.678	340.9417	6.56	N/S	17aa	63	32	-31	505.4233	275.0098	11092594.76	6035676.56	46%
28500	17.70907	75.56371	6.56	E/W	17aa	51	13	-38	648.3527	365.1641	14229483.97	8014307.06	44%
28550	17.74014	7.125016	9.84	N/S	17aa	49	20	-29	595.982	379.9385	19620146.50	12507843.39	36%
28600	17.77121	17.89965	9.84	N/S	17aa	49	21	-28	591.2394	381.6862	19464016.90	12565378.00	35%
28650	17.80228	113.7495	9.84	NE/SW	17aa	46	10	-36	670.9996	402.5997	22089778.12	13253866.87	40%
28700	17.83335	332.6575	3.28	NE/SW	17aa	87	32	-55	507.0223	96.93073	5563843.25	1063675.92	81%
28750	17.86442	309.6676	9.84	NE/SW	17aa	46	12	-34	654.848	401.8385	21558055.69	13228806.90	39%
28800	17.89548	310.7325	6.56	NE/SW	17aa	60	17	-43	617.179	297.4357	13545311.15	6527860.79	52%
28850	17.92655	104.9333	6.56	E/W	17aa	51	12	-39	654.4244	364.3954	14362742.01	7997435.89	44%
28900	17.95762	8.74538	3.28	N/S	17aa	87	37	-50	471.9105	97.37835	5178541.51	1068587.93	79%
28950	17.98869	32.47179	6.56	NE/SW	17aa	60	23	-37	577.6424	300.074	12677596.23	6585764.28	48%

**Table I-3. Moore’s Creek Shade-Related Data, TMDLs, Existing Solar Loading, and the Percent Increase in Shade Needed to Meet the TMDLs**

Longitudinal Distance (m)	River Mile (RM)	Aspect	Wetted Width (ft)-GIS	General Direction	Ecoregion	Target Shade (%)	Existing Shade (%)	Shade Difference (%)	Daily Solar Flux with Existing Shade (watts/ft <sup>2</sup> )	Daily Solar Flux with Potential Shade (watts/ft <sup>2</sup> )	Existing Load (kcal/day)	Potential Load (kcal/day)	Percent Reduction Needed to Meet TMDL
29000	18.01976	25.769	13.12	NE/SW	17aa	37	15	-22	637.7657	472.6969	27994260.83	20748687.44	26%
29050	18.05083	339.9626	16.4	N/S	17aa	35	11	-24	667.2174	487.2936	36608777.26	26736747.44	27%
29100	18.0819	73.78476	9.84	E/W	17aa	35	12	-23	654.8	483.7	21556476.98	15923744.52	26%



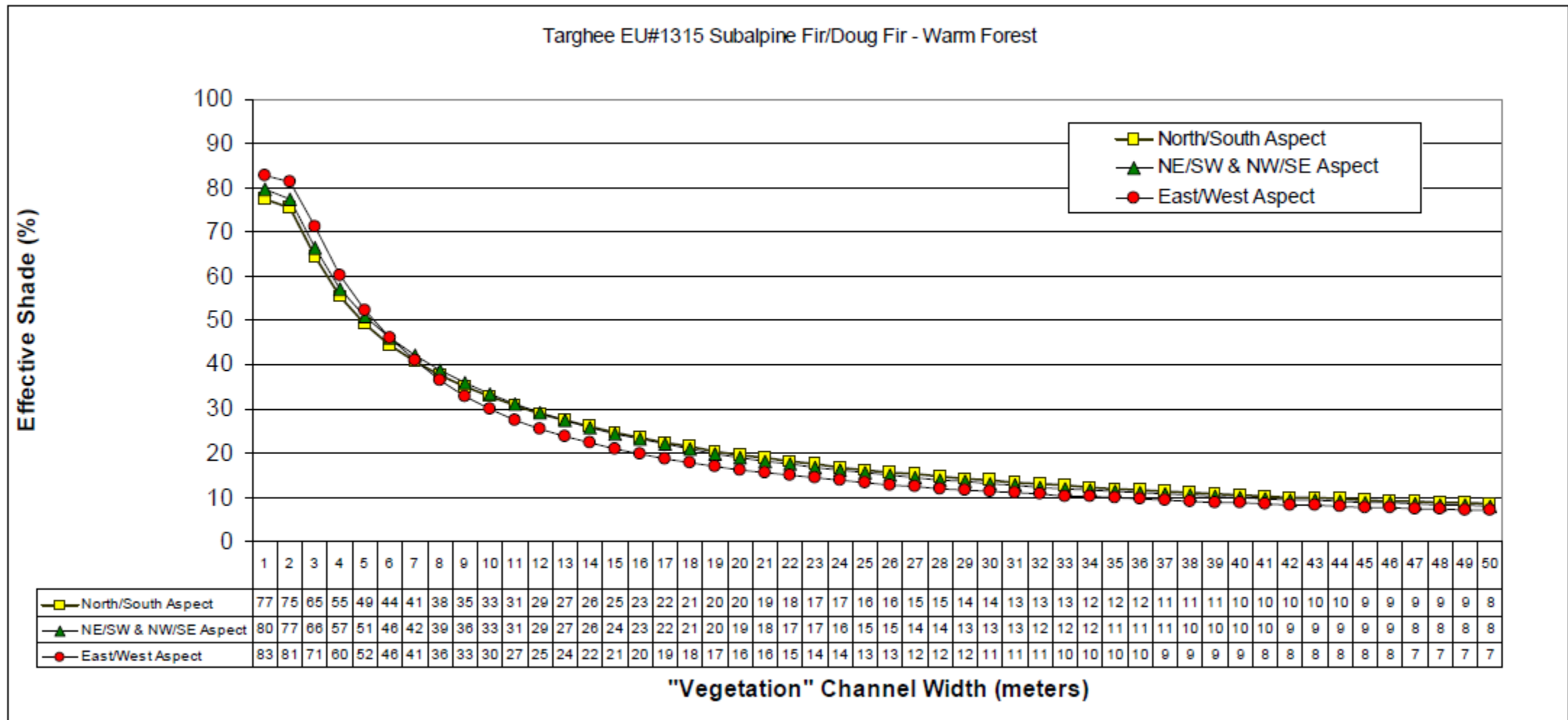


Figure I-4. Shade Curve Selected for Moore’s Creek to Represent the Target Shade Conditions for Ecoregion 17z.

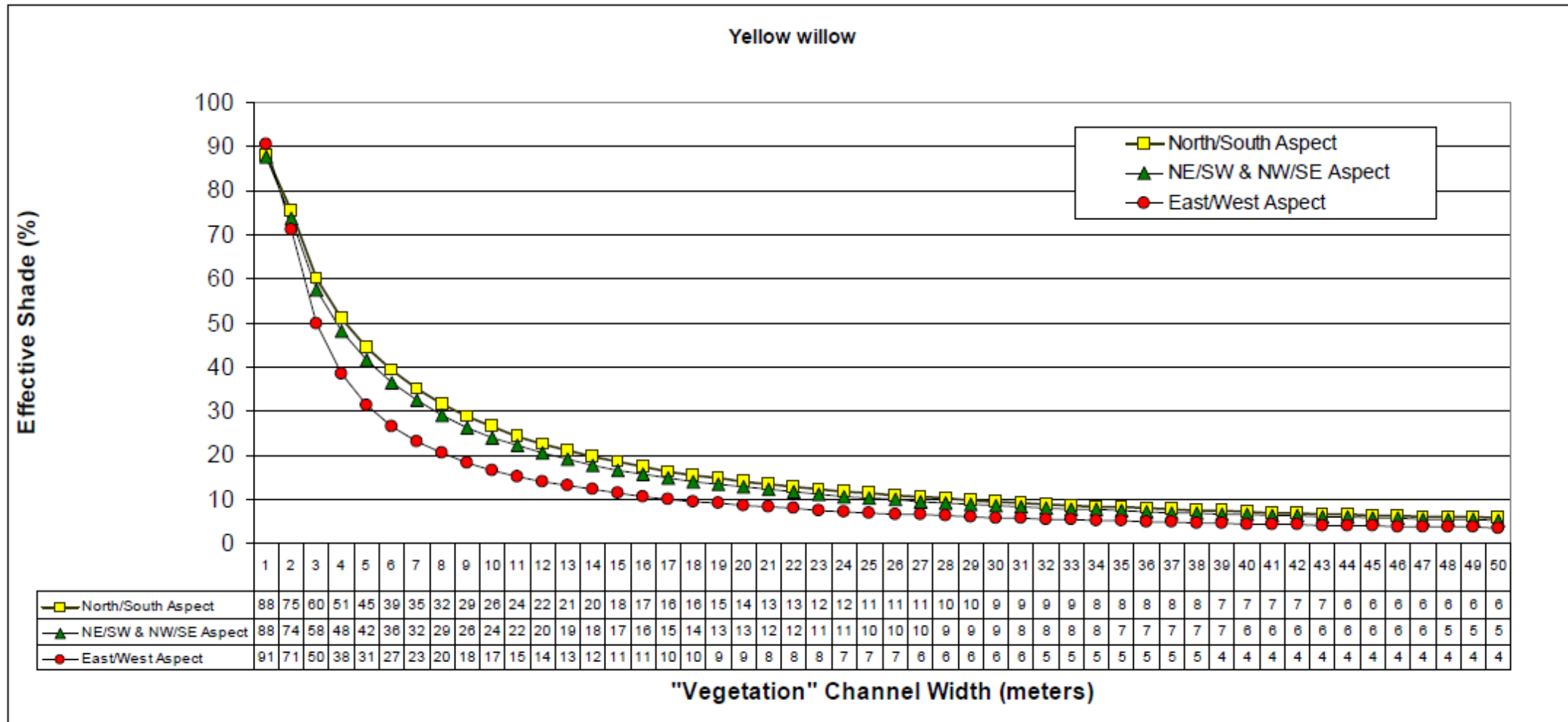


Figure I-5. Shade Curve Selected for Moore’s Creek to Represent the Target Shade Conditions for Ecoregion 17ab.

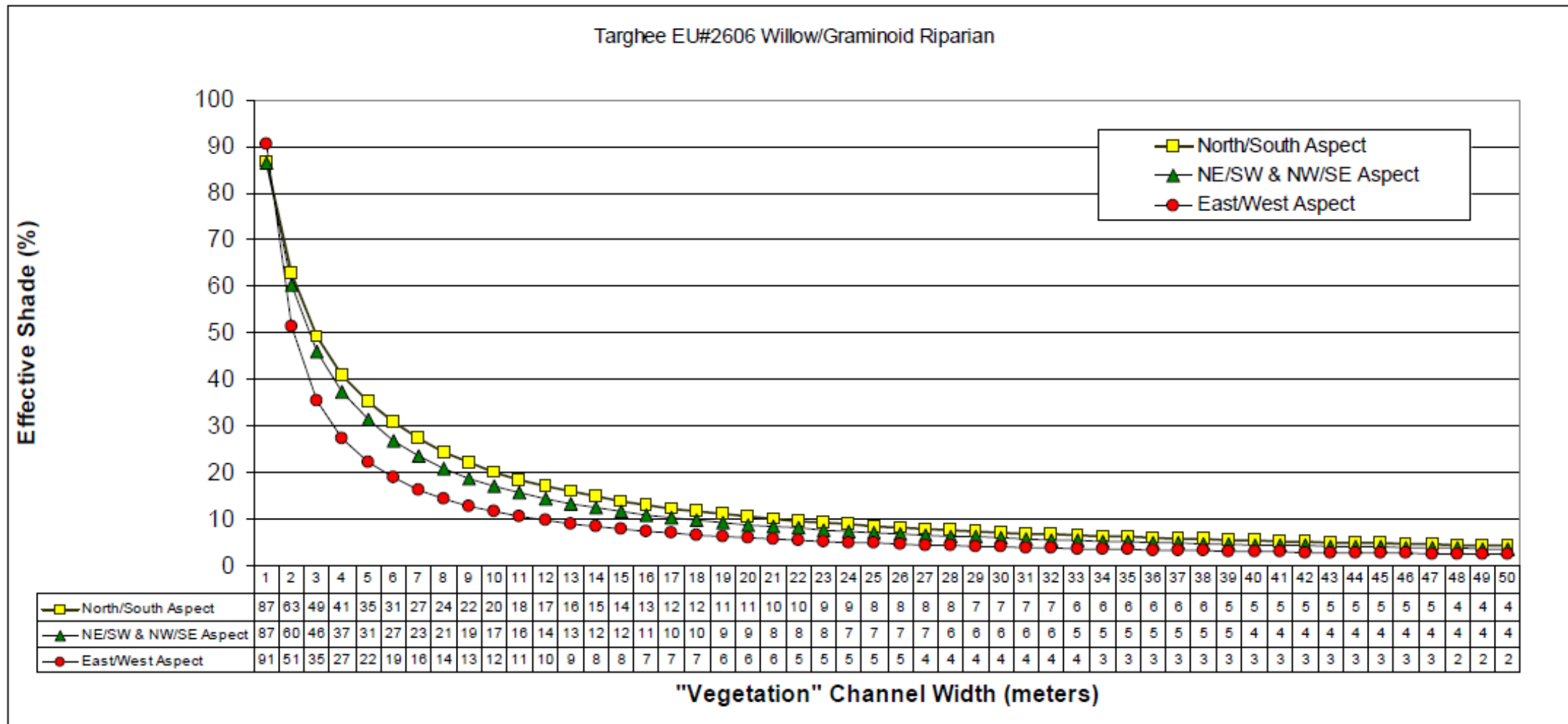


Figure I-6. Shade Curve Selected for Moore’s Creek to Represent the Target Shade Conditions for Ecoregion 17aa.

## 13.0 REFERENCES

- Shumar, M. and J. de Varona. 2009. The Potential Natural Vegetation (PNV) Temperature Total Maximum Daily Load (TMDL) Procedures Manual. Boise, ID: Idaho Department of Environmental Quality, State Technical Services Office.
- Washington State Department of Ecology. 2007. Shade (shade\_ver31b02.xls in shade.zip) in Models for Total Maximum Daily Load Studies at <http://www.ecy.wa.gov/programs/eap/models.html>. Downloaded January, 24, 2017.