

Appendix 6 – Evaporation and Riparian Evapotranspiration (ET) Rates

Introduction

This Appendix to the Lower Colorado River Mainstream Evaporation and Riparian Evapotranspiration Losses Report provides evaporation and riparian ET rates used in LCRAS. Section A6.1 provides monthly LCRAS open water evaporation rates, section A6.2 provides monthly LCRAS riparian evapotranspiration rates.

A6.1. LCRAS Open Water Evaporation Rates

Table A6-1. LCRAS Monthly Open Water Evaporation Rates by Reach and Year (inches)

Yr	Reach	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	2	60.76	2.12	2.41	4.9	6.59	7.95	7.96	7.58	6.3	4.98	4.59	2.79	2.59
2017	3	60.76	2.12	2.41	4.9	6.59	7.95	7.96	7.58	6.3	4.98	4.59	2.79	2.59
2017	4	65.78	1.58	2.16	4.64	6.83	7.69	9.29	9.08	8.04	6.17	5.31	2.78	2.21
2017	5	75.33	2.26	2.98	5.94	7.42	8.3	9.95	10.75	9.84	7.19	5.73	2.58	2.39
2018	2	63.6	2.81	2.98	4.52	7.1	8.27	8.53	7.75	7.37	5.29	4.02	3.02	1.94
2018	3	63.6	2.81	2.98	4.52	7.1	8.27	8.53	7.75	7.37	5.29	4.02	3.02	1.94
2018	4	65.16	1.95	2.4	4.43	7.06	8.04	8.86	8.52	8.53	6.48	4.33	3.03	1.53
2018	5	74.13	2.85	3.14	5.53	7.38	8.63	9.13	10.03	9.9	7.92	5.12	2.81	1.69
2019	2	59.66	2.36	2.2	4.36	6.73	7.31	8.26	7.84	6.83	5.11	4.33	2.83	1.5
2019	3	59.66	2.36	2.2	4.36	6.73	7.31	8.26	7.84	6.83	5.11	4.33	2.83	1.5
2019	4	65.25	1.59	1.98	4.33	6.82	7.38	8.94	9.15	8.81	6.54	5.33	2.96	1.42
2019	5	73.25	2.11	2.81	5.66	7.46	8.25	9.75	10.11	9.86	7.33	5.57	2.68	1.66
2020	2	64.14	2.54	3.15	4.01	6.32	9.02	8.38	8.45	7.24	5.35	4	3.18	2.5
2020	3	64.14	2.54	3.15	4.01	6.32	9.02	8.38	8.45	7.24	5.35	4	3.18	2.5
2020	4	69.21	1.97	2.73	3.7	6.3	8.42	9.05	9.92	9	7.26	5.48	3.38	2
2020	5	75.69	2.55	3.42	4.61	6.91	9.09	9.85	10.83	10.43	7.8	5.16	2.94	2.1
2021	2	64.33	2.98	3.15	4.67	7.28	8.44	8.3	8.18	7.14	5.09	3.9	3.32	1.88
2021	3	64.33	2.98	3.15	4.67	7.28	8.44	8.3	8.18	7.14	5.09	3.9	3.32	1.88
2021	4	69.93	1.94	2.68	4.43	6.96	8.44	9.63	9.44	8.72	6.84	5.18	3.56	2.11
2021	5	74.83	2.43	3.48	5.74	7.63	8.57	9.47	9.99	9.76	7.34	5.36	3.21	1.85

A6.2. LCRAS Riparian ET Rates

Table A6-2. LCRAS Monthly Riparian ET rates by reach, year, and vegetation type

Year	Reach	Vegetation Type	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	2	Cottonwood/Willow	60.32	0.79	0.93	2.69	5.24	8.44	9.53	9.52	8.43	6.94	5.33	1.73	0.76
2017	3	Cottonwood/Willow	60.32	0.79	0.93	2.69	5.24	8.44	9.53	9.52	8.43	6.94	5.33	1.73	0.76
2017	4	Cottonwood/Willow	61.4	0.77	0.99	2.71	5.51	8.35	10.16	10.04	8.89	6.74	5.01	1.55	0.68
2017	5	Cottonwood/Willow	62.78	0.88	1.03	2.77	5.37	7.97	9.82	10.52	9.62	7.17	5.26	1.62	0.75
2018	2	Cottonwood/Willow	63.38	1.05	1.15	2.47	5.61	8.8	10.2	9.73	9.86	7.37	4.65	1.92	0.57
2018	3	Cottonwood/Willow	63.38	1.05	1.15	2.47	5.61	8.8	10.2	9.73	9.86	7.37	4.65	1.92	0.57
2018	4	Cottonwood/Willow	60.87	0.95	1.11	2.55	5.69	8.74	9.69	9.42	9.43	7.09	4.02	1.72	0.47
2018	5	Cottonwood/Willow	61.77	1.11	1.08	2.57	5.34	8.28	9.01	9.8	9.68	7.89	4.68	1.8	0.52
2019	2	Cottonwood/Willow	60.43	0.88	0.85	2.39	5.35	7.74	9.89	9.84	9.14	7.12	4.99	1.82	0.42
2019	3	Cottonwood/Willow	60.43	0.88	0.85	2.39	5.35	7.74	9.89	9.84	9.14	7.12	4.99	1.82	0.42
2019	4	Cottonwood/Willow	61.59	0.77	0.91	2.49	5.53	8.01	9.77	10.12	9.74	7.15	4.98	1.7	0.42
2019	5	Cottonwood/Willow	61.5	0.82	0.97	2.62	5.38	7.92	9.63	9.89	9.64	7.31	5.09	1.73	0.51
2020	2	Cottonwood/Willow	64.14	0.94	1.21	2.18	5.1	9.62	10.04	10.63	9.7	7.43	4.63	1.93	0.73
2020	3	Cottonwood/Willow	64.14	0.94	1.21	2.18	5.1	9.62	10.04	10.63	9.7	7.43	4.63	1.93	0.73
2020	4	Cottonwood/Willow	65.01	0.96	1.24	2.13	5.21	9.17	9.9	10.96	9.95	7.93	5.1	1.87	0.61
2020	5	Cottonwood/Willow	63.64	0.99	1.18	2.15	5.09	8.75	9.72	10.59	10.2	7.78	4.73	1.82	0.65
2021	2	Cottonwood/Willow	63.58	1.11	1.21	2.6	5.74	8.96	9.94	10.27	9.55	7.09	4.51	2.05	0.56
2021	3	Cottonwood/Willow	63.58	1.11	1.21	2.6	5.74	8.96	9.94	10.27	9.55	7.09	4.51	2.05	0.56
2021	4	Cottonwood/Willow	65.03	0.94	1.23	2.55	5.6	9.15	10.53	10.43	9.64	7.49	4.82	2	0.65
2021	5	Cottonwood/Willow	61.99	0.95	1.2	2.67	5.48	8.21	9.35	9.77	9.54	7.32	4.91	2.01	0.58
2017	2	Marsh	69.35	0.62	0.73	4.44	8.25	10.17	11.14	11.13	9.86	8.04	3.39	0.79	0.8
2017	3	Marsh	69.35	0.62	0.73	4.44	8.25	10.17	11.14	11.13	9.86	8.04	3.39	0.79	0.8
2017	4	Marsh	71.23	0.61	0.78	4.52	8.73	10.05	11.88	11.74	10.39	7.82	3.3	0.71	0.72
2017	5	Marsh	72.41	0.69	0.81	4.58	8.48	9.58	11.49	12.29	11.25	8.32	3.39	0.74	0.8
2018	2	Marsh	73	0.82	0.9	4.05	8.88	10.57	11.93	11.38	11.53	8.54	2.94	0.86	0.6
2018	3	Marsh	73	0.82	0.9	4.05	8.88	10.57	11.93	11.38	11.53	8.54	2.94	0.86	0.6

Year	Reach	Vegetation Type	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	4	Marsh	70.75	0.75	0.87	4.18	9.02	10.51	11.33	11.01	11.02	8.22	2.56	0.77	0.5
2018	5	Marsh	71.2	0.87	0.85	4.25	8.44	9.96	10.53	11.46	11.32	9.16	2.98	0.81	0.56
2019	2	Marsh	69.45	0.69	0.67	3.93	8.42	9.35	11.56	11.51	10.69	8.26	3.12	0.8	0.46
2019	3	Marsh	69.45	0.69	0.67	3.93	8.42	9.35	11.56	11.51	10.69	8.26	3.12	0.8	0.46
2019	4	Marsh	71.13	0.61	0.71	4.09	8.72	9.64	11.43	11.83	11.39	8.3	3.2	0.76	0.46
2019	5	Marsh	70.89	0.64	0.76	4.3	8.53	9.52	11.26	11.56	11.27	8.48	3.23	0.77	0.56
2020	2	Marsh	73.42	0.74	0.96	3.57	7.92	11.56	11.74	12.43	11.34	8.56	2.93	0.9	0.77
2020	3	Marsh	73.42	0.74	0.96	3.57	7.92	11.56	11.74	12.43	11.34	8.56	2.93	0.9	0.77
2020	4	Marsh	74.21	0.75	0.98	3.51	8.06	11	11.57	12.82	11.63	9.16	3.21	0.87	0.65
2020	5	Marsh	72.86	0.78	0.93	3.55	7.91	10.5	11.37	12.38	11.93	8.98	3	0.85	0.7
2021	2	Marsh	73.42	0.87	0.95	4.33	9.11	10.8	11.62	12.01	11.16	8.21	2.85	0.94	0.58
2021	3	Marsh	73.42	0.87	0.95	4.33	9.11	10.8	11.62	12.01	11.16	8.21	2.85	0.94	0.58
2021	4	Marsh	74.95	0.74	0.97	4.19	8.89	11.03	12.31	12.2	11.27	8.68	3.07	0.91	0.69
2021	5	Marsh	71.43	0.74	0.94	4.43	8.73	9.89	10.93	11.43	11.15	8.48	3.17	0.92	0.62
2017	2	Mixed Veg Low	32.39	0.49	0.59	1.81	3.22	4.76	5.25	5.24	4.55	3.08	2.01	0.74	0.66
2017	3	Mixed Veg Low	32.39	0.49	0.59	1.81	3.22	4.76	5.25	5.24	4.55	3.08	2.01	0.74	0.66
2017	4	Mixed Veg Low	33.09	0.48	0.63	1.82	3.39	4.71	5.59	5.53	4.79	3.01	1.89	0.66	0.59
2017	5	Mixed Veg Low	33.77	0.55	0.65	1.86	3.3	4.49	5.41	5.79	5.18	3.2	1.99	0.69	0.65
2018	2	Mixed Veg Low	34.09	0.65	0.73	1.67	3.45	4.96	5.62	5.36	5.32	3.29	1.76	0.82	0.49
2018	3	Mixed Veg Low	34.09	0.65	0.73	1.67	3.45	4.96	5.62	5.36	5.32	3.29	1.76	0.82	0.49
2018	4	Mixed Veg Low	32.87	0.59	0.7	1.72	3.5	4.93	5.34	5.19	5.08	3.17	1.52	0.73	0.41
2018	5	Mixed Veg Low	33.16	0.69	0.69	1.73	3.28	4.67	4.96	5.4	5.22	3.53	1.77	0.77	0.46
2019	2	Mixed Veg Low	32.38	0.54	0.54	1.61	3.29	4.38	5.44	5.42	4.93	3.19	1.89	0.77	0.38
2019	3	Mixed Veg Low	32.38	0.54	0.54	1.61	3.29	4.38	5.44	5.42	4.93	3.19	1.89	0.77	0.38
2019	4	Mixed Veg Low	33.04	0.48	0.58	1.68	3.4	4.52	5.38	5.57	5.25	3.21	1.88	0.72	0.38
2019	5	Mixed Veg Low	33	0.51	0.62	1.77	3.31	4.46	5.3	5.44	5.19	3.28	1.92	0.73	0.46
2020	2	Mixed Veg Low	34.47	0.58	0.78	1.47	3.13	5.42	5.53	5.85	5.21	3.28	1.75	0.84	0.63
2020	3	Mixed Veg Low	34.47	0.58	0.78	1.47	3.13	5.42	5.53	5.85	5.21	3.28	1.75	0.84	0.63
2020	4	Mixed Veg Low	34.8	0.59	0.8	1.43	3.19	5.16	5.45	6.04	5.35	3.52	1.92	0.81	0.53
2020	5	Mixed Veg Low	34.13	0.61	0.76	1.45	3.12	4.93	5.35	5.83	5.48	3.45	1.78	0.79	0.57

Year	Reach	Vegetation Type	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021	2	Mixed Veg Low	34.29	0.69	0.78	1.74	3.53	5.06	5.47	5.66	5.15	3.15	1.7	0.88	0.48
2021	3	Mixed Veg Low	34.29	0.69	0.78	1.74	3.53	5.06	5.47	5.66	5.15	3.15	1.7	0.88	0.48
2021	4	Mixed Veg Low	35.04	0.58	0.79	1.72	3.45	5.17	5.8	5.75	5.2	3.35	1.82	0.85	0.56
2021	5	Mixed Veg Low	33.33	0.59	0.77	1.8	3.37	4.63	5.15	5.38	5.15	3.28	1.86	0.86	0.5
2017	2	Mixed Veg Medium	31.91	0.71	0.85	2.1	3.23	4.54	5	4.98	3.95	2.72	1.92	0.95	0.96
2017	3	Mixed Veg Medium	31.91	0.71	0.85	2.1	3.23	4.54	5	4.98	3.95	2.72	1.92	0.95	0.96
2017	4	Mixed Veg Medium	32.5	0.7	0.91	2.1	3.41	4.48	5.33	5.25	4.15	2.66	1.8	0.85	0.86
2017	5	Mixed Veg Medium	33.2	0.8	0.94	2.16	3.31	4.28	5.16	5.49	4.49	2.83	1.9	0.89	0.96
2018	2	Mixed Veg Medium	33.51	0.95	1.05	1.94	3.47	4.72	5.36	5.08	4.61	2.9	1.68	1.03	0.72
2018	3	Mixed Veg Medium	33.51	0.95	1.05	1.94	3.47	4.72	5.36	5.08	4.61	2.9	1.68	1.03	0.72
2018	4	Mixed Veg Medium	32.27	0.86	1.01	1.99	3.52	4.69	5.09	4.92	4.41	2.8	1.46	0.93	0.6
2018	5	Mixed Veg Medium	32.58	1.01	0.99	2.01	3.3	4.45	4.73	5.12	4.53	3.12	1.69	0.97	0.68
2019	2	Mixed Veg Medium	31.65	0.8	0.78	1.87	3.3	4.17	5.19	5.14	4.27	2.82	1.81	0.97	0.56
2019	3	Mixed Veg Medium	31.65	0.8	0.78	1.87	3.3	4.17	5.19	5.14	4.27	2.82	1.81	0.97	0.56
2019	4	Mixed Veg Medium	32.25	0.7	0.83	1.95	3.41	4.3	5.13	5.28	4.55	2.83	1.8	0.91	0.55
2019	5	Mixed Veg Medium	32.3	0.74	0.89	2.05	3.32	4.25	5.06	5.16	4.5	2.9	1.84	0.92	0.67
2020	2	Mixed Veg Medium	33.89	0.86	1.11	1.71	3.12	5.16	5.27	5.54	4.51	2.91	1.67	1.09	0.93
2020	3	Mixed Veg Medium	33.89	0.86	1.11	1.71	3.12	5.16	5.27	5.54	4.51	2.91	1.67	1.09	0.93
2020	4	Mixed Veg Medium	34.1	0.87	1.14	1.66	3.18	4.92	5.2	5.72	4.63	3.12	1.84	1.04	0.78
2020	5	Mixed Veg Medium	33.46	0.9	1.08	1.67	3.12	4.69	5.11	5.52	4.75	3.05	1.71	1.02	0.84
2021	2	Mixed Veg Medium	33.8	1.01	1.11	2.01	3.55	4.82	5.22	5.37	4.47	2.79	1.63	1.13	0.7
2021	3	Mixed Veg Medium	33.8	1.01	1.11	2.01	3.55	4.82	5.22	5.37	4.47	2.79	1.63	1.13	0.7
2021	4	Mixed Veg Medium	34.48	0.86	1.13	1.99	3.47	4.92	5.53	5.46	4.52	2.96	1.74	1.09	0.82
2021	5	Mixed Veg Medium	32.84	0.86	1.1	2.08	3.39	4.41	4.91	5.11	4.47	2.89	1.77	1.11	0.74
2017	2	Salt Cedar Dense	43.32	0.53	0.63	1.62	3.53	6.13	7.09	7.09	6.28	5.14	3.48	1.09	0.72
2017	3	Salt Cedar Dense	43.32	0.53	0.63	1.62	3.53	6.13	7.09	7.09	6.28	5.14	3.48	1.09	0.72
2017	4	Salt Cedar Dense	44.14	0.52	0.67	1.63	3.71	6.07	7.56	7.47	6.62	5	3.27	0.97	0.64
2017	5	Salt Cedar Dense	45.16	0.6	0.69	1.66	3.61	5.8	7.31	7.83	7.16	5.31	3.44	1.02	0.71
2018	2	Salt Cedar Dense	45.57	0.71	0.78	1.49	3.78	6.39	7.59	7.24	7.34	5.46	3.03	1.21	0.54
2018	3	Salt Cedar Dense	45.57	0.71	0.78	1.49	3.78	6.39	7.59	7.24	7.34	5.46	3.03	1.21	0.54

Year	Reach	Vegetation Type	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	4	Salt Cedar Dense	43.75	0.64	0.75	1.53	3.83	6.34	7.21	7.01	7.02	5.25	2.63	1.09	0.45
2018	5	Salt Cedar Dense	44.38	0.75	0.73	1.55	3.59	6.01	6.71	7.3	7.21	5.85	3.05	1.13	0.5
2019	2	Salt Cedar Dense	43.41	0.59	0.57	1.44	3.61	5.61	7.36	7.33	6.81	5.28	3.26	1.15	0.41
2019	3	Salt Cedar Dense	43.41	0.59	0.57	1.44	3.61	5.61	7.36	7.33	6.81	5.28	3.26	1.15	0.41
2019	4	Salt Cedar Dense	44.27	0.52	0.62	1.5	3.72	5.81	7.27	7.53	7.25	5.3	3.25	1.07	0.41
2019	5	Salt Cedar Dense	44.19	0.56	0.66	1.58	3.62	5.75	7.17	7.36	7.18	5.42	3.32	1.09	0.5
2020	2	Salt Cedar Dense	46.23	0.64	0.82	1.32	3.45	6.99	7.47	7.91	7.22	5.49	3.02	1.21	0.69
2020	3	Salt Cedar Dense	46.23	0.64	0.82	1.32	3.45	6.99	7.47	7.91	7.22	5.49	3.02	1.21	0.69
2020	4	Salt Cedar Dense	46.84	0.65	0.84	1.28	3.52	6.67	7.37	8.16	7.4	5.87	3.32	1.17	0.58
2020	5	Salt Cedar Dense	45.88	0.67	0.8	1.3	3.44	6.36	7.24	7.88	7.59	5.75	3.08	1.14	0.63
2021	2	Salt Cedar Dense	45.65	0.75	0.82	1.57	3.86	6.5	7.4	7.65	7.11	5.25	2.94	1.29	0.52
2021	3	Salt Cedar Dense	45.65	0.75	0.82	1.57	3.86	6.5	7.4	7.65	7.11	5.25	2.94	1.29	0.52
2021	4	Salt Cedar Dense	46.76	0.64	0.83	1.53	3.77	6.64	7.83	7.77	7.18	5.55	3.15	1.26	0.61
2021	5	Salt Cedar Dense	44.48	0.64	0.81	1.61	3.68	5.96	6.96	7.27	7.1	5.42	3.21	1.27	0.55
2017	2	USGS barren	10.53	0.48	0.5	0.79	0.94	1.16	1.27	1.27	1.13	0.93	0.85	0.57	0.64
2017	3	USGS barren	10.53	0.48	0.5	0.79	0.94	1.16	1.27	1.27	1.13	0.93	0.85	0.57	0.64
2017	4	USGS barren	10.59	0.47	0.54	0.78	1	1.15	1.36	1.34	1.19	0.9	0.78	0.51	0.57
2017	5	USGS barren	10.92	0.53	0.55	0.81	0.97	1.1	1.31	1.41	1.29	0.96	0.83	0.53	0.64
2018	2	USGS barren	11.01	0.63	0.62	0.73	1.02	1.21	1.36	1.3	1.32	0.99	0.74	0.61	0.48
2018	3	USGS barren	11.01	0.63	0.62	0.73	1.02	1.21	1.36	1.3	1.32	0.99	0.74	0.61	0.48
2018	4	USGS barren	10.51	0.57	0.6	0.75	1.03	1.2	1.3	1.26	1.26	0.95	0.64	0.55	0.4
2018	5	USGS barren	10.75	0.67	0.58	0.75	0.97	1.14	1.2	1.31	1.29	1.06	0.74	0.58	0.45
2019	2	USGS barren	10.27	0.53	0.46	0.7	0.96	1.07	1.32	1.32	1.22	0.95	0.8	0.57	0.37
2019	3	USGS barren	10.27	0.53	0.46	0.7	0.96	1.07	1.32	1.32	1.22	0.95	0.8	0.57	0.37
2019	4	USGS barren	10.4	0.47	0.49	0.73	1	1.1	1.31	1.35	1.3	0.96	0.79	0.54	0.37
2019	5	USGS barren	10.53	0.5	0.52	0.77	0.98	1.09	1.29	1.32	1.29	0.98	0.81	0.55	0.44
2020	2	USGS barren	11.16	0.57	0.65	0.65	0.91	1.32	1.34	1.42	1.3	0.99	0.73	0.66	0.62
2020	3	USGS barren	11.16	0.57	0.65	0.65	0.91	1.32	1.34	1.42	1.3	0.99	0.73	0.66	0.62
2020	4	USGS barren	11.19	0.58	0.66	0.62	0.92	1.26	1.32	1.47	1.33	1.06	0.81	0.63	0.52
2020	5	USGS barren	11.01	0.6	0.63	0.63	0.9	1.2	1.3	1.42	1.36	1.04	0.75	0.62	0.56

Year	Reach	Vegetation Type	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021	2	USGS barren	11.13	0.67	0.65	0.75	1.04	1.23	1.33	1.37	1.28	0.95	0.72	0.68	0.46
2021	3	USGS barren	11.13	0.67	0.65	0.75	1.04	1.23	1.33	1.37	1.28	0.95	0.72	0.68	0.46
2021	4	USGS barren	11.32	0.57	0.66	0.75	1.02	1.26	1.41	1.4	1.29	1	0.77	0.65	0.55
2021	5	USGS barren	10.87	0.57	0.64	0.78	1	1.13	1.25	1.31	1.28	0.98	0.77	0.66	0.49