## **McSorley Creek Water Monitoring Results**

Attached are the year-to-date results of citizen science water monitoring conducted by the Friends of Saltwater State Park, as of August 2, 2023.



This sampling program was made possible by Friends of Saltwater State Park, Washington Parks and Recreation Commission, and GWW Sno-King Watershed Council.







## TABLE OF VALUES, WATER MONITORING RESULTS

Sample Time	15:30	10:15	10:40	10:25	11:30	10:00	10:40
Date	01/12/23	01/21/23	02/07/23	02/22/23	03/05/23	03/21/23	04/04/23
Air Temperature, Deg. C	10	9	9	4	8	10	8
Water Temperature, Deg. C	6	7	5	5	5	8	6
pH	7.5	8.0	7.5	8.5	7.5	8.0	7.5
Dissolved Oxygen, 1 mg/L	9.0	11.0	9.4	12.4	10.4	12.1	10.4
Dissolved Oxygen, 2 mg/L	9.1	11.0	9.6	12.6	10.3	11.7	10.0
Dissolved Oxygen, mg/L	9.1	11.0	9.5	12.5	10.4	11.9	10.2
% Oxygen Saturation	73	90.9	74.2	97.7	80.9	100.8	82.3
Total Alkalinity, mg/L	35	45	35	65	25	70	35
Total Hardness, mg/L	50	50	50	- 03	40	100	60
Turbidity, JTU	2	2	2	2	2	2	2
Turbidity, NTU		8		8		8	
Nitrate-N, mg/L	0.25	0.6	0.25	0.2	0.25	0.4	0.25
Orthophosphate, mg/L	0.23	0.0	0.23	0.2	0.23	0.4	0.23
Date	01/12/23	01/21/23	02/07/23	02/22/23	03/05/23	03/28/23	04/04/23
	01/12/23	01/21/23	02/07/23	02/22/23		03/26/23	04/04/23
E-coli sample volume, mL	1	1	1	1	3	1	1
E-Coli, Plate 1	0	0	0	0 1	5	0	2
Plate 2	0	0	0		3	0	3
Plate 3	0	0	0	0	122	0	1
E-Coli, #/100 mL	0	1	1	33	133	1	200
Other Coliform Plate 1	0	39	57	11	130	11	93
Plate 2	0	26	66	16	117	8	68
Plate 3	0	34	97	10	0	12	14
Total Coliform, #/100 mL	0	3301	7334	1266	4250	1034	6033
E-Coli 3 month geometric mean	46	16	6	6	10	10	10
E-Coli max single sample	320	320	320	320	320	320	320
E-Coli max 3 month mean	100	100	100	100	100	100	100
E-Coli 3-mon. Highest Single Plate	400	400	400	400	400	500	500
Comple Time	10.45	12.00	16.25	10.00	14.22	10.20	0.50
Sample Time	10:45	13;00	16:25	10:00	14:33	10:30	9:50
Date	04/18/23	05/07/23	06/07/23	06/20/23	07/03/23	07/19/23	08/02/23
Date Air Temperature, Deg. C	04/18/23 13	05/07/23 14	06/07/23 23	06/20/23 16	07/03/23 20	07/19/23 18	08/02/23 17
Date Air Temperature, Deg. C Water Temperature, Deg. C	04/18/23 13 8	05/07/23 14 11	06/07/23 23 15	06/20/23 16 12	07/03/23 20 14	07/19/23 18 15	08/02/23 17 13
Date Air Temperature, Deg. C Water Temperature, Deg. C pH	04/18/23 13 8 8.0	05/07/23 14 11 7.5	06/07/23 23 15 7.5	06/20/23 16 12 8.0	07/03/23 20 14 8.0	07/19/23 18 15 8.5	08/02/23 17 13 8.0
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L	04/18/23 13 8 8.0 11.6	05/07/23 14 11 7.5 8.6	06/07/23 23 15 7.5 6.6	06/20/23 16 12 8.0 9.0	07/03/23 20 14 8.0 7.2	07/19/23 18 15 8.5 8.4	08/02/23 17 13 8.0 7.8
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L'	04/18/23 13 8 8.0 11.6 11.0	05/07/23 14 11 7.5 8.6 8.8	06/07/23 23 15 7.5 6.6 6.8	06/20/23 16 12 8.0 9.0 8.8	07/03/23 20 14 8.0 7.2 7.4	07/19/23 18 15 8.5 8.4 8.2	08/02/23 17 13 8.0 7.8 8.0
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L	04/18/23 13 8 8.0 11.6 11.0 11.3	05/07/23 14 11 7.5 8.6 8.8 8.7	06/07/23 23 15 7.5 6.6 6.8 6.7	06/20/23 16 12 8.0 9.0 8.8 8.9	07/03/23 20 14 8.0 7.2 7.4 7.3	07/19/23 18 15 8.5 8.4 8.2 8.3	08/02/23 17 13 8.0 7.8 8.0 7.9
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation Total Alkalinity, mg/L	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8 60	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3 110	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation Total Alkalinity, mg/L Total Hardness, mg/L	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8 60	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1 35	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3 110	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4 65	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9 95 80	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2 110	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2 105
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation Total Alkalinity, mg/L Total Hardness, mg/L Turbidity, JTU	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8 60 70 2	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3 110	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4 65 50 2	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2 110 70 2	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation Total Alkalinity, mg/L Total Hardness, mg/L Turbidity, JTU Turbidity, NTU	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8 60	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1 35 50 2	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3 110 100 2	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4 65 50 2	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9 95 80 2	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2 110 70 2 8	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2 105 90 2
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation Total Alkalinity, mg/L Total Hardness, mg/L Turbidity, JTU Turbidity, NTU Nitrate-N, mg/L	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8 60 70 2	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1 35	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3 110	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4 65 50 2 8	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9 95 80	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2 110 70 2 8 0.2	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2 105
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation Total Alkalinity, mg/L Total Hardness, mg/L Turbidity, JTU Turbidity, NTU Nitrate-N, mg/L Orthophosphate, mg/L	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8 60 70 2	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1 35 50 2	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3 110 100 2	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4 65 50 2 8 0.3	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9 95 80 2	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2 110 70 2 8 0.2 0.2	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2 105 90 2
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Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation Total Alkalinity, mg/L Total Hardness, mg/L Turbidity, JTU Turbidity, NTU Nitrate-N, mg/L Orthophosphate, mg/L Date E-coli sample volume, mL	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8 60 70 2 8 04/18/23 1	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1 35 50 2 0.25	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3 110 100 2 0.5	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4 65 50 2 8 0.3 1	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9 95 80 2 0.5	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2 110 70 2 8 0.2 0.2 0.7/19/23	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2 105 90 2 0.5
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation Total Alkalinity, mg/L Total Hardness, mg/L Turbidity, JTU Turbidity, NTU Nitrate-N, mg/L Orthophosphate, mg/L Date E-coli sample volume, mL E-Coli, Plate 1	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8 60 70 2 8 04/18/23 1	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1 35 50 2 0.25	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3 110 100 2 0.5	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4 65 50 2 8 0.3 1 06/20/23	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9 95 80 2 0.5	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2 110 70 2 8 0.2 0.2 0.7/19/23 1 4	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2 105 90 2 0.5
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Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation Total Alkalinity, mg/L Total Hardness, mg/L Turbidity, JTU Turbidity, JTU Turbidity, NTU Nitrate-N, mg/L Orthophosphate, mg/L Date E-coli sample volume, mL E-Coli, Plate 1 Plate 2 Plate 3 E-Coli, #/100 mL Other Coliform Plate 1 Plate 2 Plate 2 Plate 3	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8 60 70 2 8 04/18/23 1 0 0 0 1 20 19 25	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1 35 50 2 0.25 0.25 0.5/07/23 1 0 0 5 167 56 150 155	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3 110 100 2 0.5 06/07/23 1 12 9 0 1050 172 178	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4 65 50 2 8 0.3 1 06/20/23 1 7 8 7 733 158 148	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9 95 80 2 0.5 07/03/23 1 3	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2 110 70 2 8 0.2 0.2 07/19/23 1 4 3	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2 105 90 2 0.5 08/02/23 1 31 27
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation Total Alkalinity, mg/L Total Hardness, mg/L Turbidity, JTU Turbidity, JTU Turbidity, NTU Nitrate-N, mg/L Orthophosphate, mg/L Date E-coli sample volume, mL E-Coli, Plate 1 Plate 2 Plate 3 E-Coli, #/100 mL Other Coliform Plate 1 Plate 2 Plate 3 Total Coliform, #/100 mL	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8 60 70 2 8 04/18/23 1 0 0 0 1 20 19 25 2134	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1 35 50 2 0.25 0.25 0.5/07/23 1 0 0 5 167 56 150 155 12200	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3 110 100 2 0.5 06/07/23 1 12 9 0 1050 172 178 0 18550	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4 65 50 2 8 0.3 1 06/20/23 1 7 8 7 733 158 148 156 16133	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9 95 80 2 0.5 07/03/23 1 3	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2 110 70 2 8 0.2 0.2 07/19/23 1 4 3 350 24 42	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2 105 90 2 0.5 08/02/23 1 31 27 2733 243 260
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation Total Alkalinity, mg/L Total Hardness, mg/L Turbidity, JTU Turbidity, JTU Turbidity, NTU Nitrate-N, mg/L Orthophosphate, mg/L Date E-coli sample volume, mL E-Coli, Plate 1 Plate 2 Plate 3 E-Coli, #/100 mL Other Coliform Plate 1 Plate 2 Plate 3 Total Coliform, #/100 mL E-Coli 3 month geometric mean	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8 60 70 2 8 04/18/23 1 0 0 0 1 20 19 25 2134 7	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1 35 50 2 0.25 0.25 0.5/07/23 1 0 0 5 167 56 150 155 12200 15	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3 110 100 2 0.5 06/07/23 1 12 9 0 1050 172 178 0 18550 41	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4 65 50 2 8 0.3 1 06/20/23 1 7 8 7 733 158 148 156 16133 54	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9 95 80 2 0.5 07/03/23 1 3	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2 110 70 2 8 0.2 0.2 07/19/23 1 4 3 350 24 42	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2 105 90 2 0.5 08/02/23 1 31 27 2733 243 260
Date Air Temperature, Deg. C Water Temperature, Deg. C pH Dissolved Oxygen, 1 mg/L Dissolved Oxygen, 2 mg/L' Dissolved Oxygen, mg/L % Oxygen Saturation Total Alkalinity, mg/L Total Hardness, mg/L Turbidity, JTU Turbidity, JTU Turbidity, NTU Nitrate-N, mg/L Orthophosphate, mg/L Date E-coli sample volume, mL E-Coli, Plate 1 Plate 2 Plate 3 E-Coli, #/100 mL Other Coliform Plate 1 Plate 2 Plate 3 Total Coliform, #/100 mL E-Coli 3 month geometric mean E-Coli max single sample	04/18/23 13 8 8.0 11.6 11.0 11.3 95.8 60 70 2 8 04/18/23 1 0 0 0 1 20 19 25 2134 7 320	05/07/23 14 11 7.5 8.6 8.8 8.7 79.1 35 50 2 0.25 05/07/23 1 0 0 5 167 56 150 155 12200 15 320	06/07/23 23 15 7.5 6.6 6.8 6.7 66.3 110 100 2 0.5 06/07/23 1 12 9 0 1050 172 178 0 18550 41 320	06/20/23 16 12 8.0 9.0 8.8 8.9 82.4 65 50 2 8 0.3 1 06/20/23 1 7 8 7 733 158 148 156 16133 54 320	07/03/23 20 14 8.0 7.2 7.4 7.3 70.9 95 80 2 0.5 07/03/23 1 3	07/19/23 18 15 8.5 8.4 8.2 8.3 82.2 110 70 2 8 0.2 0.2 0.7/19/23 1 4 3 350 24 42 3650 154 320	08/02/23 17 13 8.0 7.8 8.0 7.9 75.2 105 90 2 0.5 08/02/23 1 31 27 2733 243 260

The dissolved oxygen concentration and percent saturation remain low. There has been no measurable turbidity, and the hardness and alkalinity are typical. The E-Coli population has increased to a level not seen since a sewer spill in 2020. The 3-month mean has increased by a factor of 10 since June, well above the recommended level for recreational activity. Nitrate-nitrogen is above recommended limits.

Suggested water quality ranges for maximum health of aquatic life:

Alkalinity between 60 and 150 mg/L
pH between 6.5 and 9.
Hardness between 60 and 189 mg/L
Dissolved oxygen at 9.0 mg/L or above
pH between 6.5 and 9.

Turbidity below 5.0 NTU (Note: The method detection limit for the method used is 8.0 NTU. Values below 8 NTU are reported as 8.0)

E-Coli 3 month mean below 100 for recreational use

Nitrate Nitrogen 0.31 mg/L

Orthophosphate .06 mg/L