



2018 Water Quality Monitoring Report



Photo: Restoration crews installing willow cuttings along McCarthy Creek in early 2018 (Credit: WMSWCD)

Introduction:

Since 2009, West Multnomah Soil & Water Conservation District (WMSWCD) water quality monitoring efforts have been focused on perennial streams in the rural part of western Multnomah County that flow directly into the Multnomah Channel. This report focuses on WMSWCD's 2018 continuous temperature monitoring. Data was collected between May 18th, 2018 and October 10th, 2018. Due to the standard for instream temperatures of 7 day, daily average maximum, as well as to be consistent with past monitoring years, data presented here cover the period of May 22nd, 2018 through October 7th, 2018. For more information on the water quality monitoring program, methods used and the watersheds in the study area – please refer to the WMSWCD website:

<https://wmswcd.org/programs/water-quality-monitoring/>.

2018 weather summary:

The summer of 2018 has another hot and dry one – marking the second such summer in a row. Air temperature was above the average for the study period; including 29 days over 90 degrees Fahrenheit (U.S. Climate Data, 2018: Weather Underground, 2018) – average is 11 (NWS, 2016).

Precipitation was below normal for the study period. Only 22 out of the 139 testing days reported a precipitation event, totaling only 2.89 inches of rainfall throughout the study period (Weather Underground, 2018).

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Results and Discussion:

In 2018 most instream observation sites reported a higher than average number of days exceeding the seven-day average maximum (7 dAM) criteria of 18°C (Table 1). The probes at Crabapple Creek, Upper McCarthy Creek, Sheltered Nook, and the McCarthy Creek-Metro site all registered well above their averages (Table 1). Meanwhile, the probes at NW 8th and Folkenburg on McCarthy were relatively close to their averages. The probe at Miller Creek, which has never exceeded the 7 dAM criteria of 18°C, continued that trend in 2018 (Table 1). Miller Creek continued to be the coolest of the three creeks while Crabapple Creek continued to be the warmest (Figure 2).

Table 1: Summary by location of number of days the seven-day average maximum was greater than 18°C between May 22, 2018 and October 7, 2018. Averages include all data since 2009.

Gauge Site	Days over Rearing Criteria (18°C)	
	2018	Average
Crabapple (CRD)	74	68.3
Miller (MILL)	0	0.0
Upper McCarthy (McU)	15	4.9
Sheltered Nook (McSH)	42	15.7
McCarthy @ Folkenburg (McF1)	2	4.0
McCarthy @ NW 8th (McF2)	47	57.4
McCarthy @ Metro (McL1)	52	37.6

Upper McCarthy, positioned highest in the McCarthy Creek watershed, registered 15 days over the rearing criteria, while its average has been only 4.9 days above rearing criteria for the last 7 years (Table 1). Raw temperature readings to the Upper McCarthy Probe being out of the water from approximately 8/7/2019 until 8/24/2018. The data during that period for Upper McCarthy Creek was removed from the analysis however it is likely that the data may still be skewed by the probe being submerged in stagnate water. Both 2017 and 2018 saw relatively low rainfall in late spring and early summer rainfall resulting in streams reaching summertime low flows earlier than previous sampling years. This may explain why the data for Upper

McCarthy Creek has shown significant increases in total days over 7 dAM for those years despite being placed in the same location.

Conclusion:

The warm air temperature and lack of precipitation from just prior to May through October of 2018 likely resulted in higher water temperature in McCarthy and Crabapple Creeks. The water temperature is directly correlated to precipitation events; the water temperature plummets at times when there is precipitation to cool the stream down (Figure 1). Data continues to point towards relatively cool water in the headwaters for McCarthy while the mid-section (from the McF1 down to McL1) of McCarthy Creek is a major source of heating for the stream – likely from inadequate riparian vegetation. Temperatures in the lower sections of McCarthy are likely heavily influenced from a change in stream character – from a higher-gradient pool-rifle stream; to a low-velocity, meandering stream with high a ratio of pools.

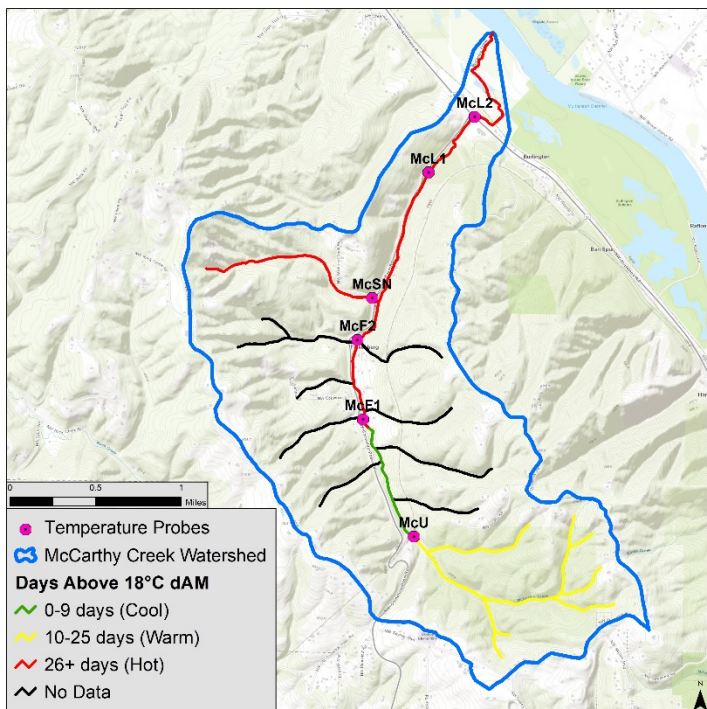


Figure 1: Map of McCarthy Creek showing number of days in 2018 above the seven-day average daily maximum temperature rearing standard for reaches and tributaries of McCarthy Creek upstream data collection locations.

Table 2: Number of days over the salmonid rearing criteria (18°C Seven-day average maximum) as established by Oregon Department of Environmental Quality for all observation locations between 2009 and 2018.

Gauge Site (site code)	Days over Rearing Criteria (18°C)									
	2009	2011	2012	2013	2014	2015	2016	2017	2018	Average
Crabapple (CRB)	NA	NA	52	58	67	NA	72	87	74	68.3
Miller (MIL)	NA	0	0	NA	NA	0	0	0	0	0.0
Upper McCarthy (McU)	NA	NA	3	0	0	0	1	15	15	4.9
Sheltered Nook (McSH)	NA	NA	4	0	3	18	16	27	42	15.7
McCarthy @ Folkenburg (McF1)	NA	NA	NA	16	0	6	0	0	2	4.0
McCarthy @ NW 8th (McF2)	NA	NA	NA	NA	62	79	37	62	47	57.4
McCarthy @ Metro (McL1)	NA	NA	NA	14	43	NA	0	79	52	37.6
McCarthy @ Highway 30 (McL2)	45	52	57	84	60	75	71	98	103	71.7

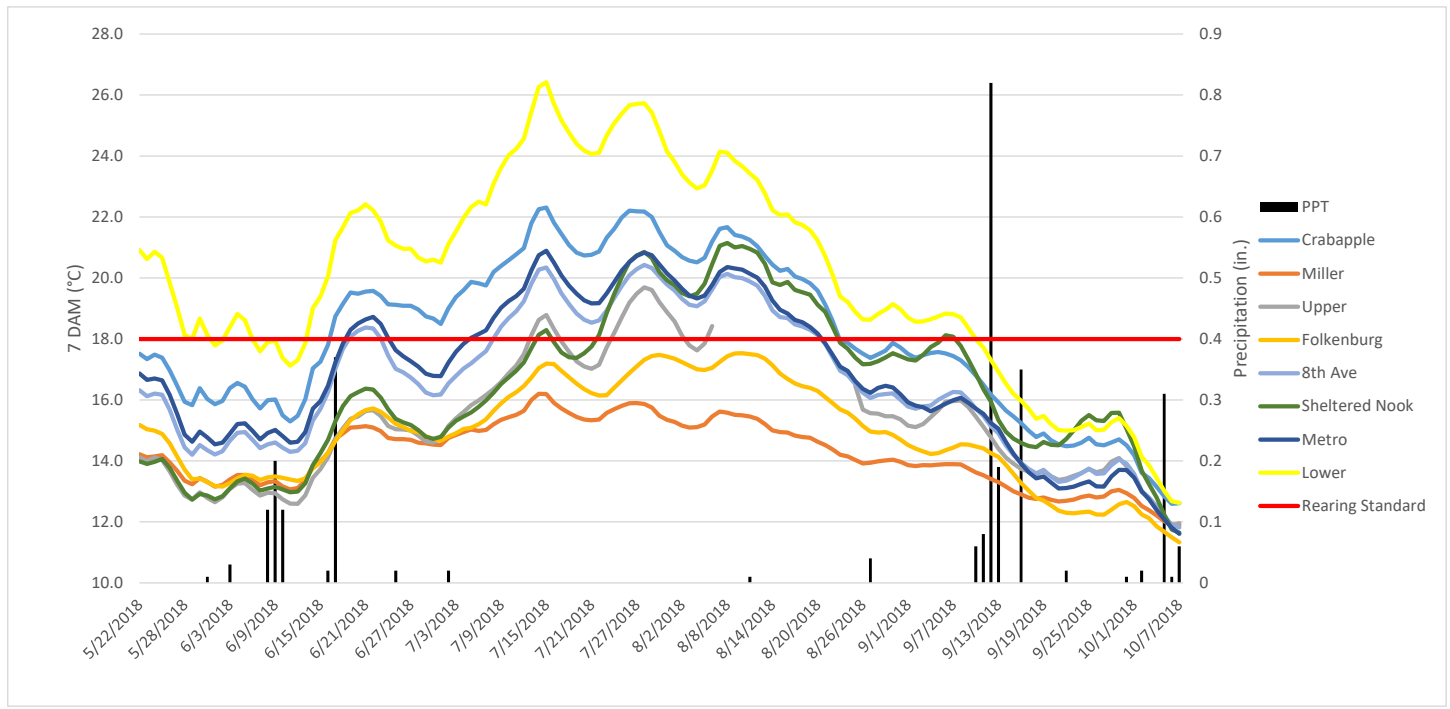


Figure 1: Seven-day average maximum summer temperatures for all sites between May 22nd and October 7th, 2018.

References:

Portland, OR Weather History. (2018.). Retrieved April 11, 2019, from <https://www.wunderground.com/history/monthly/us/or/portland/KPDX/date/2018-10>

US Climate Data: Data for Portland, OR. (2016). Retrieved April 11, 2018, from <http://www.usclimatedata.com/climate/portland/oregon/united-states/usor0275>

National Weather Service (2015, November). Local Climate Data from Portland Airport. Retrieved October, 2018, from <https://www.wrh.noaa.gov/pqr/pdxclimate/>

➤ For more information please contact WMSWCD Rural Conservationist Scott Gall (scott@wmswcd.org).