



2017 Water Quality Monitoring Report

Photo: Culvert Removal in lower McCarthy Creek, 2017 (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 2017 continuous temperature monitoring. Data was collected between May 17th, 2017 and October 11th, 2017. Due to the standard for instream temperatures of 7 day, daily average maximum – data presented here was for May 22nd, 2017 and October 7th, 2017. 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/>.

2017 weather summary:

Summer 2017 was a hot and dry one. Air temperature was above the average for the study period; 82 out of the 147 testing days reported a higher than normal high air temperature (U.S. Climate Data, 2017: Weather Underground, 2017). While not a record, Portland had 20 days at or above 90 degrees – average is 11 (NWS, 2017).

Precipitation was below normal for the study period. Only 32 out of the 147 testing days reported a precipitation event, totaling only 3.12 inches of rainfall throughout the study period (Weather Underground, 2017).

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Results and Discussion:

In 2017 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 Folkenburg probe in McCarthy Creek registered 0 days above 18°C, though the average for that probe since 2009 is 4.4 days. The McCarthy at NW 8th probe registered relatively close to its average throughout the previous 4 years with an average of 60 days over the rearing standard (Table 1). The probe at Miller Creek, which has never exceeded the 7 dAM criteria of 18°C, continued that trend in 2017 (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, 2017 and October 7, 2017. Averages include all data since 2009.

Gauge Site	Days over Rearing Criteria (18°C)	
	2017	Average
Crabapple	87	67.2
Miller	0	0.0
Upper McCarthy	15	3.2
Sheltered Nook	27	11.3
McCarthy @ Folkenburg	0	4.4
McCarthy @ NW 8th	62	60.0
McCarthy @ Metro	79	34.0

Miller Creek continued to be the coolest of the three creeks while Crabapple Creek continued to be the warmest (Figure 2).

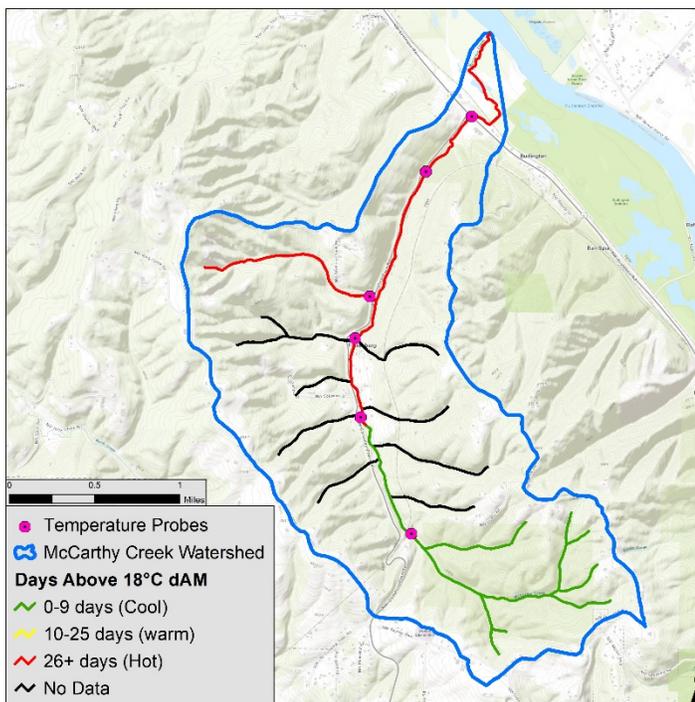


Figure 1: Map of McCarthy Creek showing number of days in 2017 above the seven-day average daily maximum temperature rearing standard for reaches and tributaries of McCarthy Creek upstream data collection locations.

Upper McCarthy, positioned highest in the McCarthy Creek watershed, registered 15 days over the rearing criteria, while its average has been only 3.2 days above rearing criteria for the last 6 years (Table 1). Oddly enough, McCarthy @ Folkenburg, the second highest probe in the watershed, registered no days over rearing temperature in 2017. The average for the Folkenburg site 4.4 days; that probe recorded the warmest water temperature in 2013 when it registered 16 days above rearing criteria (Table 2). Just below the Folkenburg probe, the McCarthy at NW 8th probe registered an average of 60 days above the rearing criteria. Since the probes above and below the Folkenburg site had higher than average readings, it is possible that the probe in the McCarthy at Folkenburg was placed in a deeper area where it would stay cooler throughout the summer. It is not surprising that the McCarthy at Metro probe had the most number of days over the rearing criteria because it is the lowest site monitored in 2017.

While the headwaters of McCarthy Creek remained relatively cool, the probe at Upper McCarthy Creek did not have the fewest number of days above the rearing criteria. The site with the fewest number of

days over rearing temperature was McCarthy at Folkenburg, followed by Upper McCarthy. Also, while we were not surprised to see that in 2017 the lowest probe in McCarthy Creek had the most number of days over rearing criteria (not including the probe in Crabapple Creek), it is interesting that the site with the highest average number of days over rearing temperature is McCarthy at NW 8th (Table 1).

Conclusion:

The warm air temperature and lack of precipitation from May-October of 2017 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). The water temperature in Crabapple Creek, as well as the Metro and NW 8th Ave sites remained almost consistently warmer than the 7 dAM criteria from approximately mid-June until early-September (Figure 1). Data continues to point at the mid-section of McCarthy Creek as a major source of heating for the stream.

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 2017.

Gauge Site	Days over Rearing Criteria (18°C)								
	2009	2011	2012	2013	2014	2015	2016	2017	Average
Crabapple	NA	NA	52	58	67	NA	72	87	67.2
Miller	NA	0	0	NA	NA	0	0	0	0.0
Upper McCarthy	NA	NA	3	0	0	0	1	15	3.2
Sheltered Nook (McSH)	NA	NA	4	0	3	18	16	27	11.3
McCarthy @ Folkenburg	NA	NA	NA	16	0	6	0	0	4.4
McCarthy @ NW 8th	NA	NA	NA	NA	62	79	37	62	60.0
McCarthy @ Metro	NA	NA	NA	14	43	NA	0	79	34.0
McCarthy @ Highway 30	45	52	57	84	60	75	71	N/A	63.4

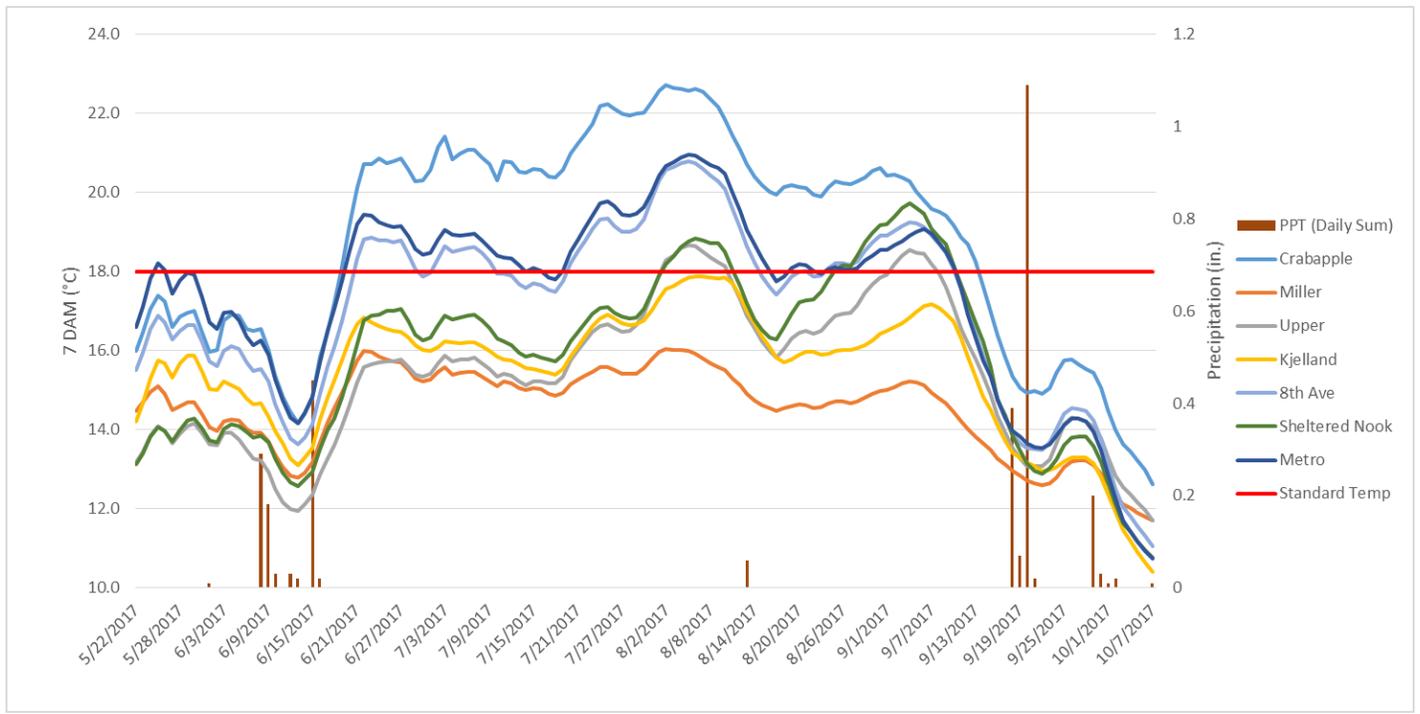


Figure 1: *Seven-day average maximum summer temperatures for all sites between May 22nd and October 7th, 2017.*

References:

US Climate Data: Data for Portland, OR. (2016). Retrieved April 10, 2017, from <http://www.usclimatedata.com/climate/portland/oregon/united-states/usor0275>

National Weather Service (2015, November). Local Climate Data from Portland Airport. Retrieved October, 2017, from <https://www.wrh.noaa.gov/pqr/pdxclimate/>

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