



2016 Water Quality Monitoring Report

Photo: Lower McCarthy Creek, 2016 (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 2016 continuous temperature monitoring. Data was collected between June 13th, 2016 and October 12th, 2016. Due to the standard for instream temperatures of 7 day, daily average maximum – data presented here was for June 17th, 2016 to October 7th, 2016. 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/>.

2016 weather summary:

While the average air temperatures were not significantly above average for the study period, the late winter and spring months were warmer than normal (US Climate Data, 2017). However, the summer of 2016 saw higher than average extreme temperature events for the Portland area. Most areas in the Pacific Northwest set records, or nearly so, for days over 90 degrees Fahrenheit (US Climate Data, 2017).

Precipitation was at or above normal for the spring months but mostly below normal during the summer (US Climate Data, 2017). Summer low flow conditions occurred at most observation sites beginning in mid-August, which is average for these streams. The uppermost McCarthy Creek temperature probe was above the water line beginning on around August 12th, 2016.

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Results and Discussion:

Following two relatively hot, dry summers most instream observation sites followed the typical seasonal fluctuations in temperature. Miller Creek, which has never exceeded the seven-day average maximum (7 dAM) criteria of 18°C, continued that trend in 2016 (Table 1). The probes at Crabapple Creek and the lowest point on McCarthy registered consistently close to their averages throughout the previous 5 years with averages of 62 and 59 days above the standard respectively. However, the second lowest probe, (McCarthy @ Metro) saw no days above the rearing standard – which averages 19 days per year. This runs contrary to the data from the probes above and below (Figure 1). However, the probe location was lost in 2015 after a flood event and while staff tried to reestablish in the same location the probe may have been placed where colder water could persist. Additionally, averages for the site are not statistically significant and yearly data has varied considerably (table 2).

Table 1: Summary by location of number of days the seven-day average maximum was greater than 18°C between June 17 and October 8, 2016. Averages include all data since 2009.

Gauge Site	Days over Rearing Criteria (18°C)	
	2016	Average
Crabapple	60	62.3
Miller	0	0.0
Upper McCarthy	1	0.8
Sheltered Nook	16	8.2
McCarthy @ Folkenburg	0	7.3
McCarthy @ NW 8th	37	59.3
McCarthy @ Metro	0	19.0
McCarthy @ Highway 30	71	59.6

The probe placed at NW 8th Avenue continued to be relatively warm, following a similar pattern over the last three years (Table 2). This location is below most of the developed areas and is thought to be the largest contributor to elevated temperatures in McCarthy Creek. The Sheltered Nook tributary showed warming similar to 2015 (Table 2). During the first three years of data it averaged less than three days per year above the criteria. However, 2015 and 2016 saw 18 days over and 16 days over respectively. This tributary may be more sensitive to warm, dry years than the main stem.

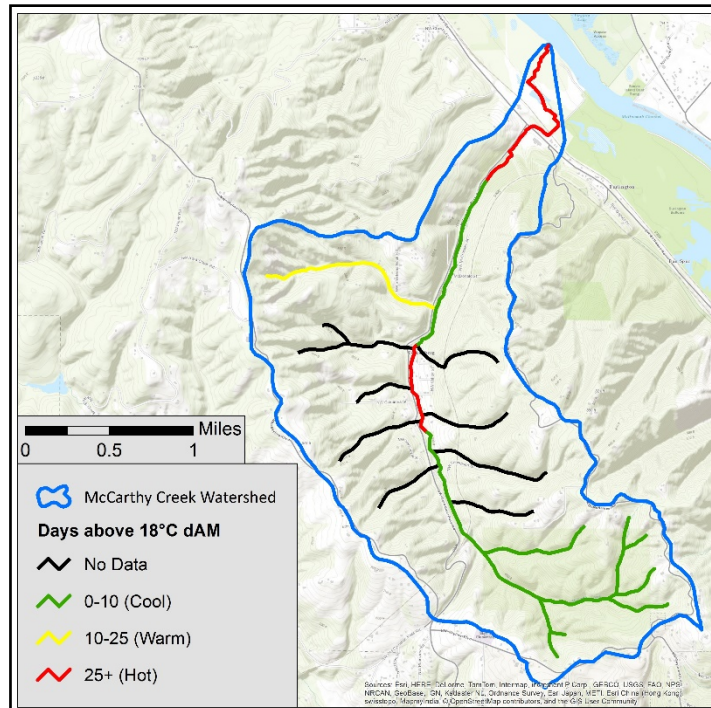


Figure 1: Map of McCarthy Creek showing number of days in 2016 above the seven-day average daily maximum temperature rearing standard for reaches and tributaries of McCarthy Creek upstream data collection locations.

While the headwater portions of McCarthy Creek remained relatively cool, the uppermost probe was out of the water from approximately August 12th to August 31st. This followed the driest part of the summer after which a series of rain events began on August 31st and cooled the instream water throughout the watershed (Figure 2).

Conclusion: Despite a relatively warm weather year, most observation sites continued more or less at average. The majority of land within the study watersheds is well forested and therefore reduces solar impacts to streams. Data continue to point at the mid-section of McCarthy Creek as a major source of heating for that stream. The lowest monitoring sites at both McCarthy and Crabapple are a different stream geomorphology and therefore more subject to heating under any scenario. More data is needed on Crabapple Creek to determine if there are heating issues in the watershed.

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 2016.

Gauge Site	Days over Rearing Criteria (18°C)								
	Year	2009	2011	2012	2013	2014	2015	2016	Average
Crabapple		NA	NA	52	58	67	NA	72	62.3
Miller		NA	0	0	NA	NA	0	0	0.0
Upper McCarthy		NA	NA	3	0	0	0	1	0.8
Sheltered Nook (McSH)		NA	NA	4	0	3	18	16	8.2
McCarthy @ Folkenburg		NA	NA	NA	16	0	6	0	7.3
McCarthy @ NW 8th		NA	NA	NA	NA	62	79	37	59.3
McCarthy @ Metro		NA	NA	NA	14	43	NA	0	19.0
McCarthy @ Highway 30		45	52	57	84	60	75	71	59.6

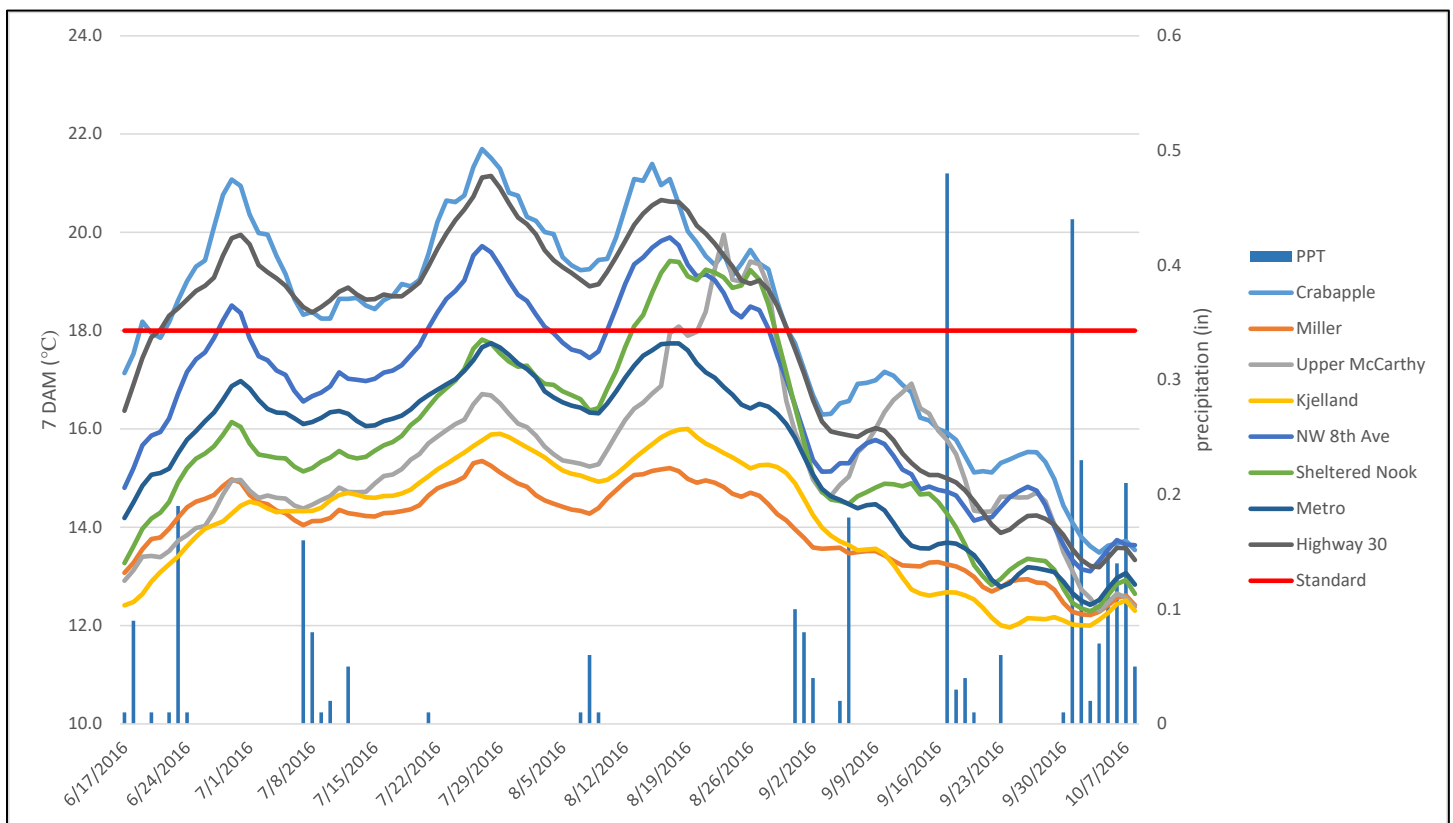


Figure 2: Seven-day average maximum summer temperatures for all sites between June 17 and October 7th, 2016.

References:

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

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