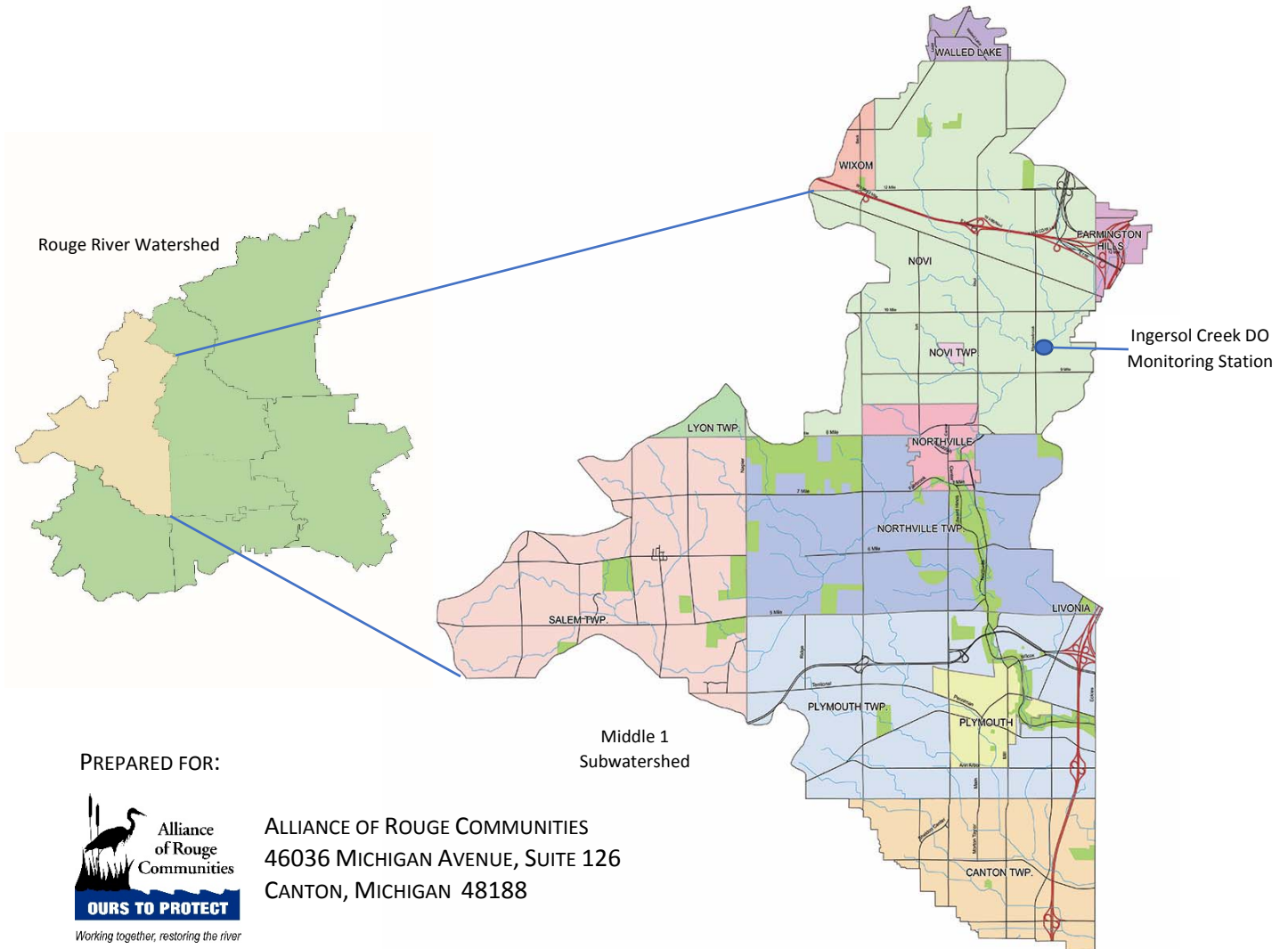


Rouge River Watershed

Ingersol Creek Dissolved Oxygen Assessment

Final Report



PREPARED FOR:



Working together, restoring the river

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Executive Summary

Dissolved oxygen (DO) values in Ingersol Creek exceeded Michigan's water quality standard of 5 mg/L 98.6% of the time as determined by 15-minute data collected between August and November 2017. This suggests that the Creek is eligible for removal from the state's 303(d) list for DO impairments.

Introduction

Ingersol Creek, a tributary to the Middle Branch of the Rouge River, is listed on the State of Michigan's 303(d) list for nonattainment of the DO water quality standard (MDEQ 2016). In 2017, the Alliance of Rouge Communities (ARC) monitored the DO concentrations in the Creek to determine compliance with the state water quality standard of 5 mg/L for warm water streams. This report summarizes the collected data.

Water Body: Ingersol Creek
HUC: 040900040203-08
Location: Novi, Michigan
Length: 18.076 miles

Methodology

Continuous DO monitoring was performed between August 22, 2017 and November 10, 2017 on Ingersol Creek as shown in **Figure 1**). A sonde with an optical DO probe (YSI 6920) was used to collect the data in 15-minute intervals. The sonde was located on the east side of Meadowbrook Road (coordinates: 42.458975, -83.454819). Photographs of the site can be found in Appendix A.

The DO probe was calibrated prior to installation. Along with downloading the data, cleaning and calibration of the probe was performed by field crew every two weeks. Additional information on the monitoring methodology can be found in the *Rouge River Dissolved Oxygen Monitoring Sampling Plan* dated August 2017.

Precipitation and air temperature data were collected to assess weather conditions during the monitoring period. This data was downloaded from gage KMINOVI10 located south of 9 Mile Road and east of Meadowbrook Road in Novi, MI (<https://www.wunderground.com/personal-weather-station/dashboard?ID=KMINOVI10#>).

During the monitoring period, stream discharge was measured at the outlet of Johnson Creek which is within 3 miles of Ingersol Creek. This data provided a relative sense of discharge conditions of Ingersol Creek during the time of the study.

Results

More than 7,600 DO readings were collected over 81 days. The majority of these measurements (98.6%) were above the water quality standard of 5 mg/L (**Figure 2**). In addition, the following observations were made:

- The daily high air temperature was over 70°F 60% of the time, and over 80°F 27% of the time.
- Between September 27th and the early morning hours of the 29th. These low readings occurred during the early morning hours when water temperature was at its lowest.
- On Sept 28th DO readings fell below 2 mg/L for 1.5 hours.
- Between October 3rd and 5th there were brief periods of time when the DO dropped below 5 mg/L. These values did not correlate with water temperature or normal diurnal fluctuations.

- Between September 16th and October 4th, stream flows on Johnson Creek were at their lowest of the summer as shown in Appendix B. This indicates that stream discharge was likely at its lowest on Ingersol Creek during the same time period.
- During the maintenance visits on 9/28, 10/4, and 10/18/17 the field crew noted mud buildup on the sonde. During the maintenance visit on 10/4/17, the field crew noted a streambank stabilization project occurring upstream of the monitoring location which was causing a higher sediment load to the creek. This stabilization project had been going on since 10/2/17.

There were several significant rainfall events (> 0.5 inches) that occurred during the monitoring period as shown in **Table 1 and Figure 3**. These events caused the daily peak DO concentrations to decrease by 0.2 to 0.4 mg/L; however, DO levels remained above the water quality standard. The rain events also dampened the diurnal fluctuations normal seen at the site. This can be seen after the August and October rain events.

Table 1. Significant Rainfall Events

Date	Rainfall (in)
08/28/2017	0.58
08/29/2017	1.12
09/04/2017	0.58
10/06/2017	0.83
10/11/2017	1.76
10/14/2017	1.09
11/02/2017	0.77

Conclusions

The following conclusions can be made based on the data collected on Ingersol Creek:

- The DO water quality standard of 5 mg/L was met 98.6% of the time.
- DO levels below the water quality standard likely occurred when stream discharge was at its lowest of the summer.
- DO levels dropped below 2 mg/L on one occasion, but only for a short period of time.
- Wet weather events > 0.5 inches dampened the diurnal fluctuation normally associated with DO values, but they did not cause DO levels to drop below the water quality standard.

References

MDEQ 2016. Water Quality and Pollution Control in Michigan 2016 Sections 303(d), 305(b), and 314 Integrated Report. Michigan Department of Environmental Quality. January 2017.

Figure 1: Monitoring Location on Ingersol Creek

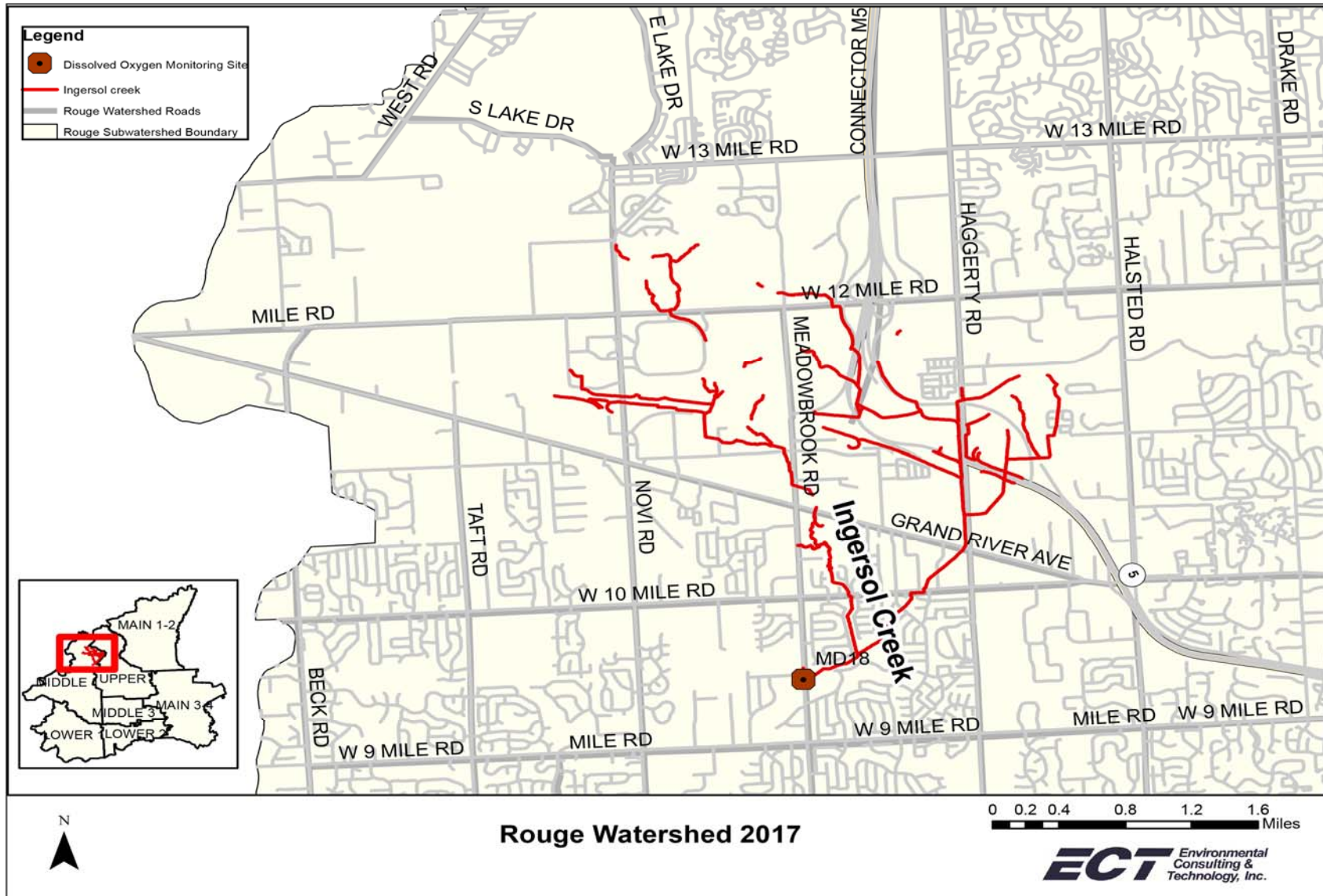


Figure 2: Dissolved Oxygen Levels and Daily Average Temperatures

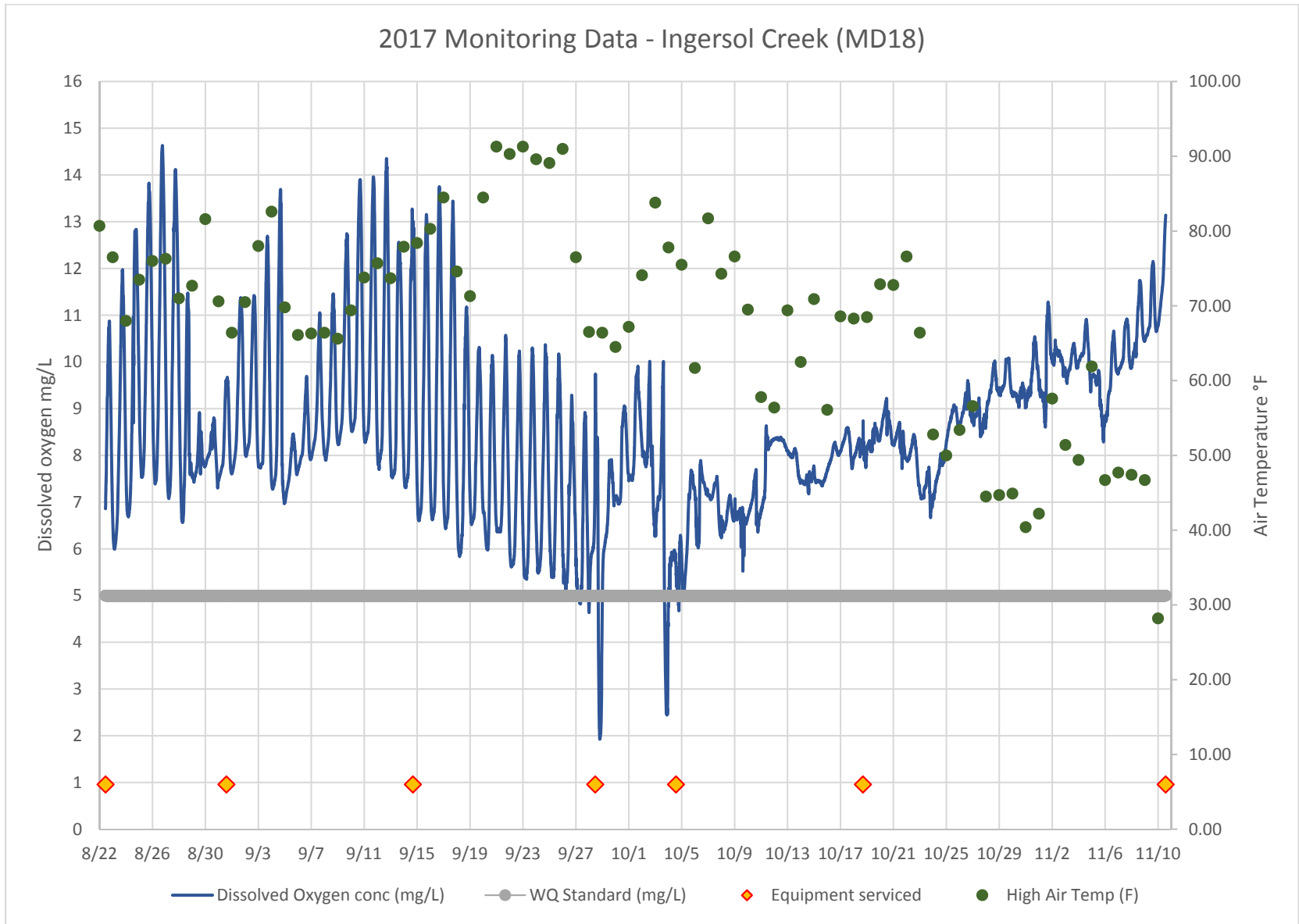
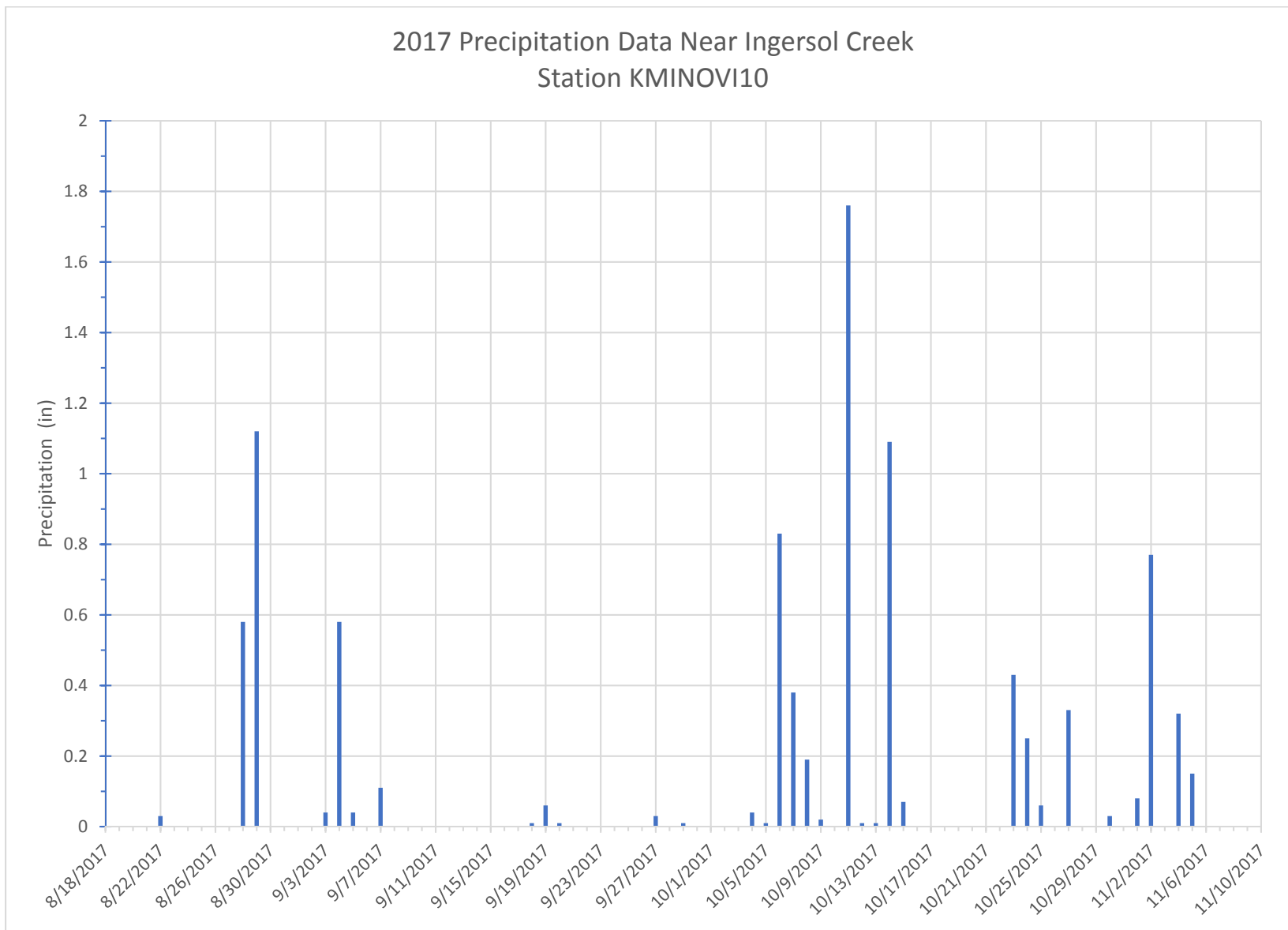


Figure 3: Precipitation Data, Novi, MI



Appendix A. Site Photographs

Monitoring Site (MD18) looking Upstream from Meadowbrook Road



Sonde Installation at MD18



Appendix B. Johnson Creek discharge data as a relative indication of stream flows on Ingersol Creek

