

## Introduction

- Water quality in rivers and streams is an important issue because contamination in streams indicates contamination in larger bodies of water. Turbidity, or the clarity of the stream, is easily seen from the banks. In the lab, turbidity can be measured in terms of TSS.
- Total suspended solids (TSS) is a measure of how much sediment there is in the water column. Storm events play a large part in water quality because when there is a storm, more sediment (and nutrients) are stirred up into the water. In addition to churning the benthic environment, storm events are also responsible for bringing with them a high volume of runoff from the surrounding landscape.
- Two main VT rivers that ultimately drain into Lake Champlain are the Winooski and the Missisquoi Rivers. Since 2012, Vermont EPSCoR has been collecting data from automated water samplers (ISCOs) located at different sites in both rivers. Storm water and base water samples are tested for TSS and phosphorus and nitrogen concentrations. In this study, I will be looking at Total Suspended Solids (TSS) in the Missisquoi River in North Troy, Vermont (a forested site) and Highgate, Vermont (an agricultural site) to see how precipitation volume effects the turbidity of the water. It should be noted that the Highgate site is actually the Hungerford Brook, a tributary of the Missisquoi River.

## Materials & Methods

- Water samples were collected by ISCOs (automated water samplers) located in North Troy and Highgate, Vermont. Each ISCO houses 24 bottles, which were filled two at a time when it received a pulse from the USGS. The pulse was sent when the river reached a set elevated level, and if it remained at that level or higher the ISCO would continue to take samples at designated intervals until the water receded below that initial stage.
- Aluminum weigh pans and glass microfiber filters were weighed separately. The filter was then placed on a filter funnel, wet with deionized water, and 300 mL of water was filtered through. This process was repeated until the whole sample had been filtered through a through a vacuum filtration system.
- After the sample had been completely run, the filter was placed back in the pan and then dried using a VWR1350G drying oven overnight to be weighed the next morning.
- All rain data was obtained from noaa.gov.

## Results

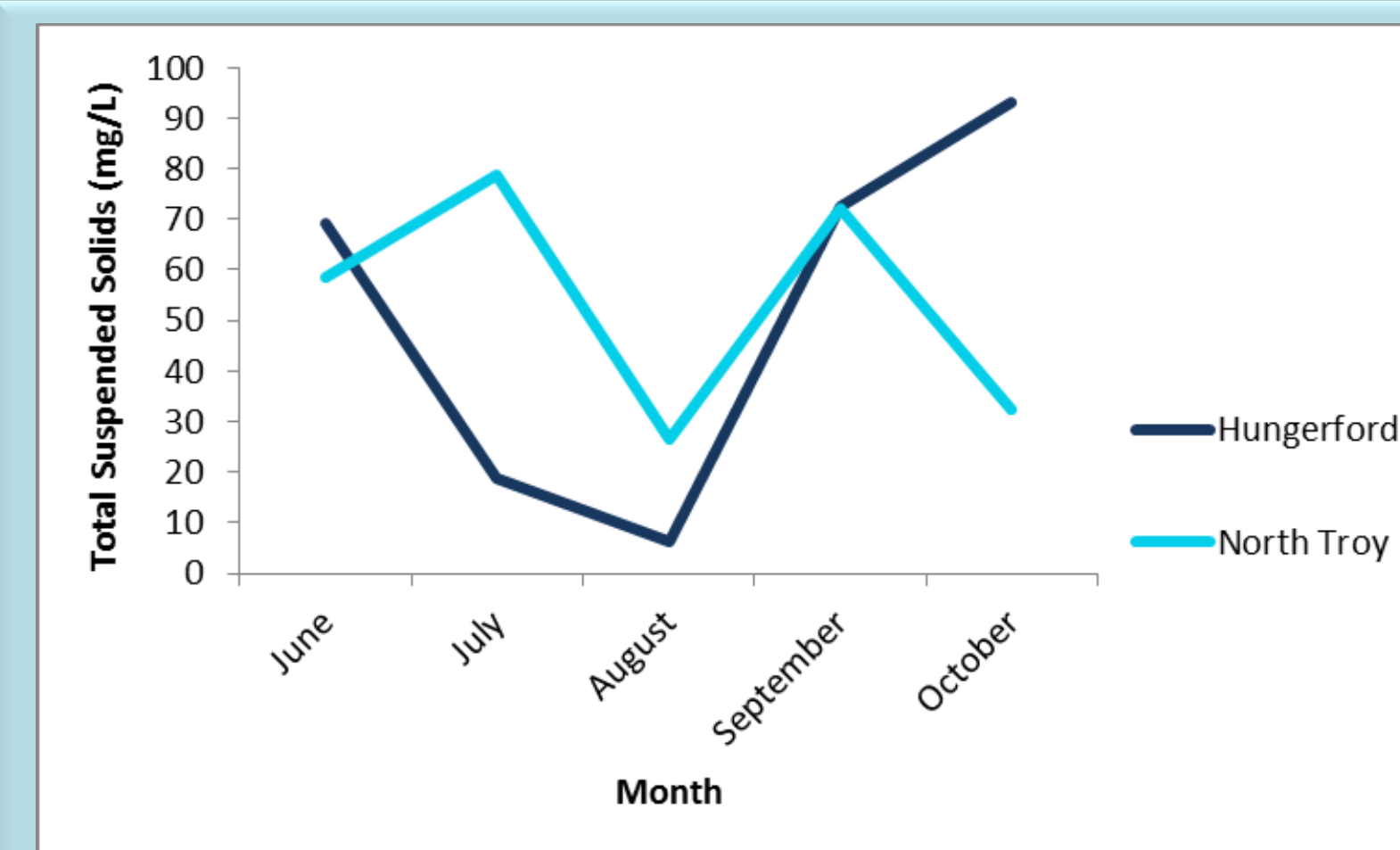


Figure 1. Average Total Suspended Solids (mg/L) Over Five Months in North Troy and Highgate, Vermont in 2013

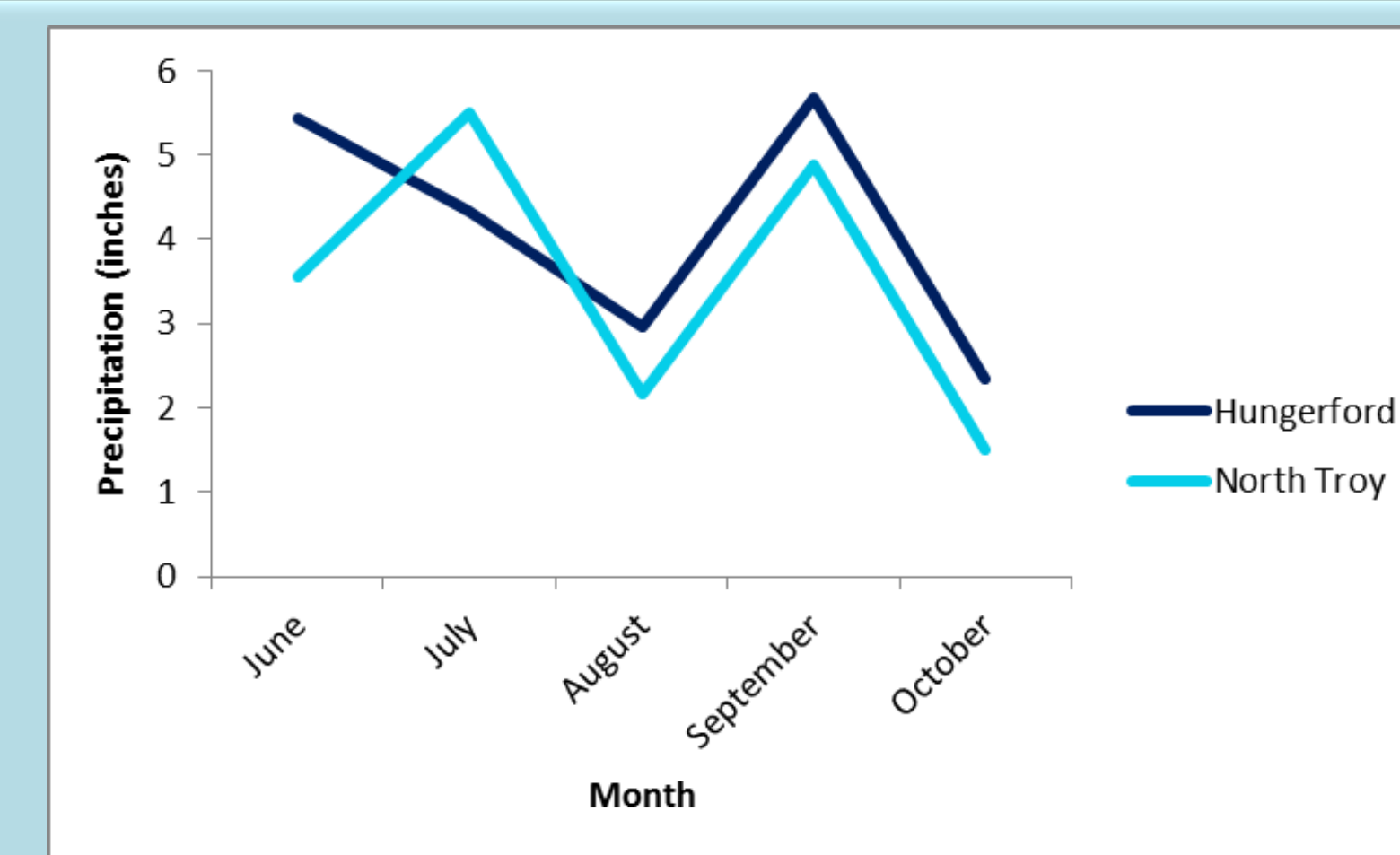


Figure 2. Total Precipitation (inches) Over 5 Months in North Troy and Highgate, Vermont in 2013

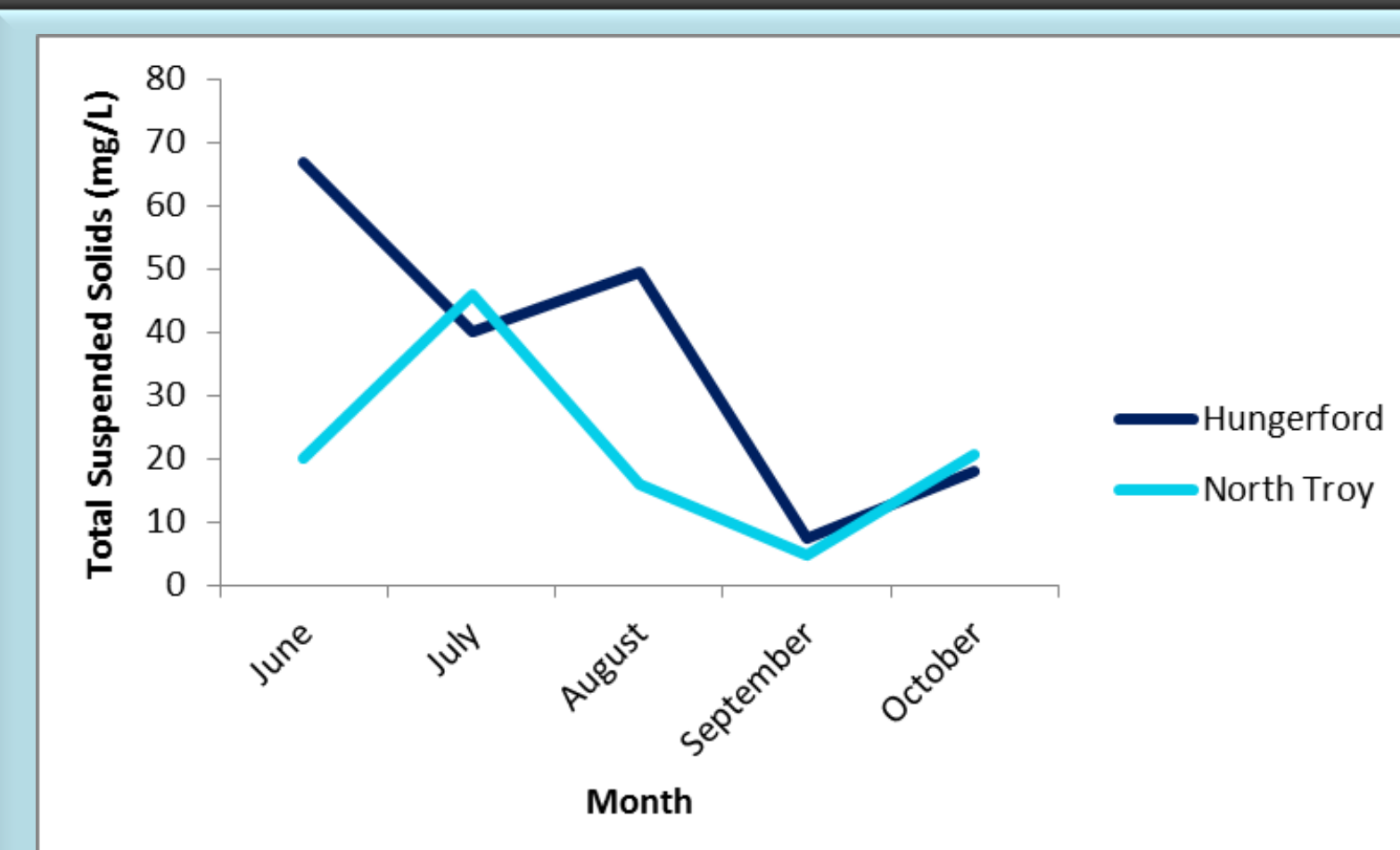


Figure 3. Average Total Suspended Solids (mg/L) Over Five Months in North Troy and Highgate, Vermont in 2014

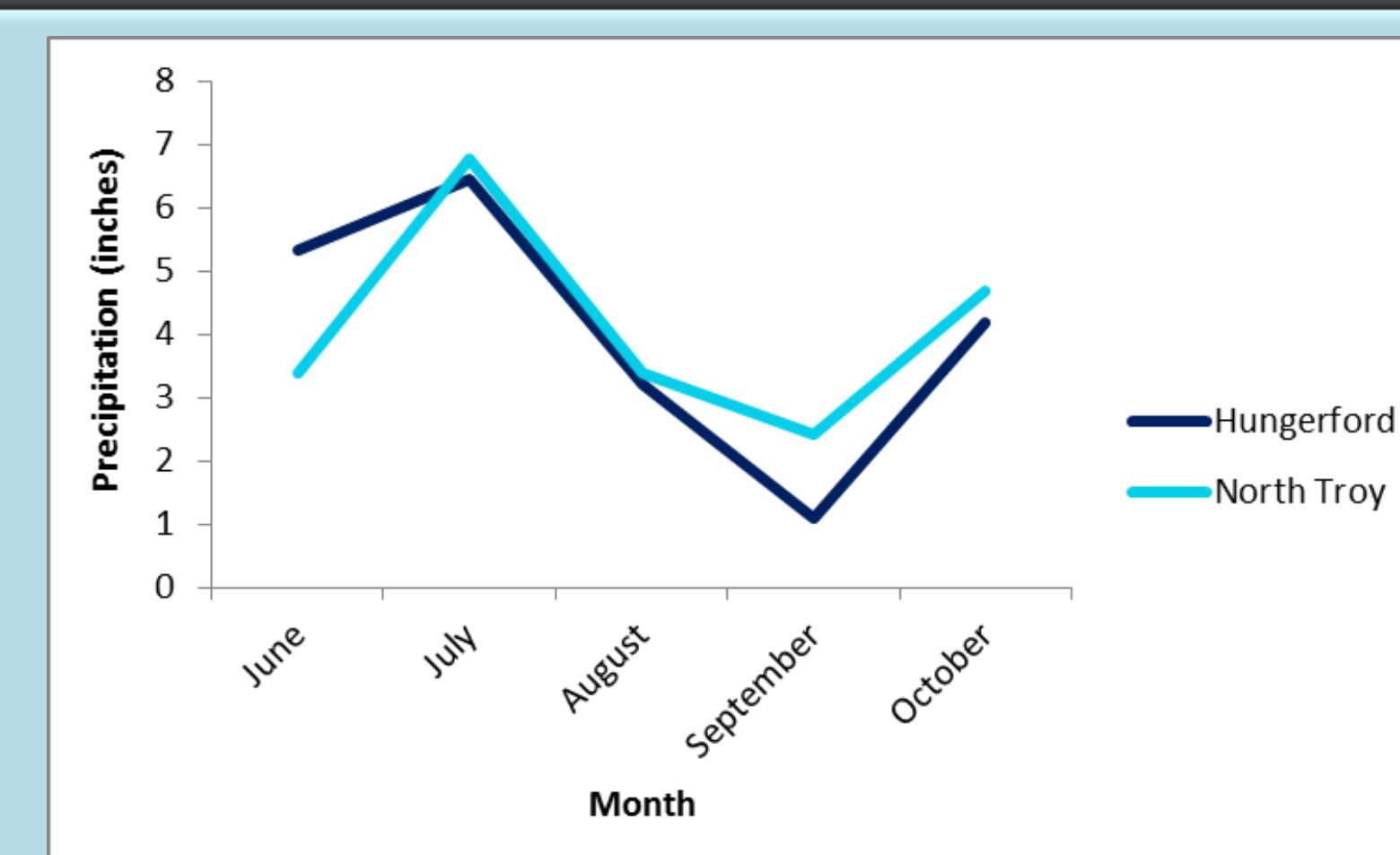


Figure 4. Total Precipitation (inches) Over 5 Months in North Troy and Highgate, Vermont in 2014

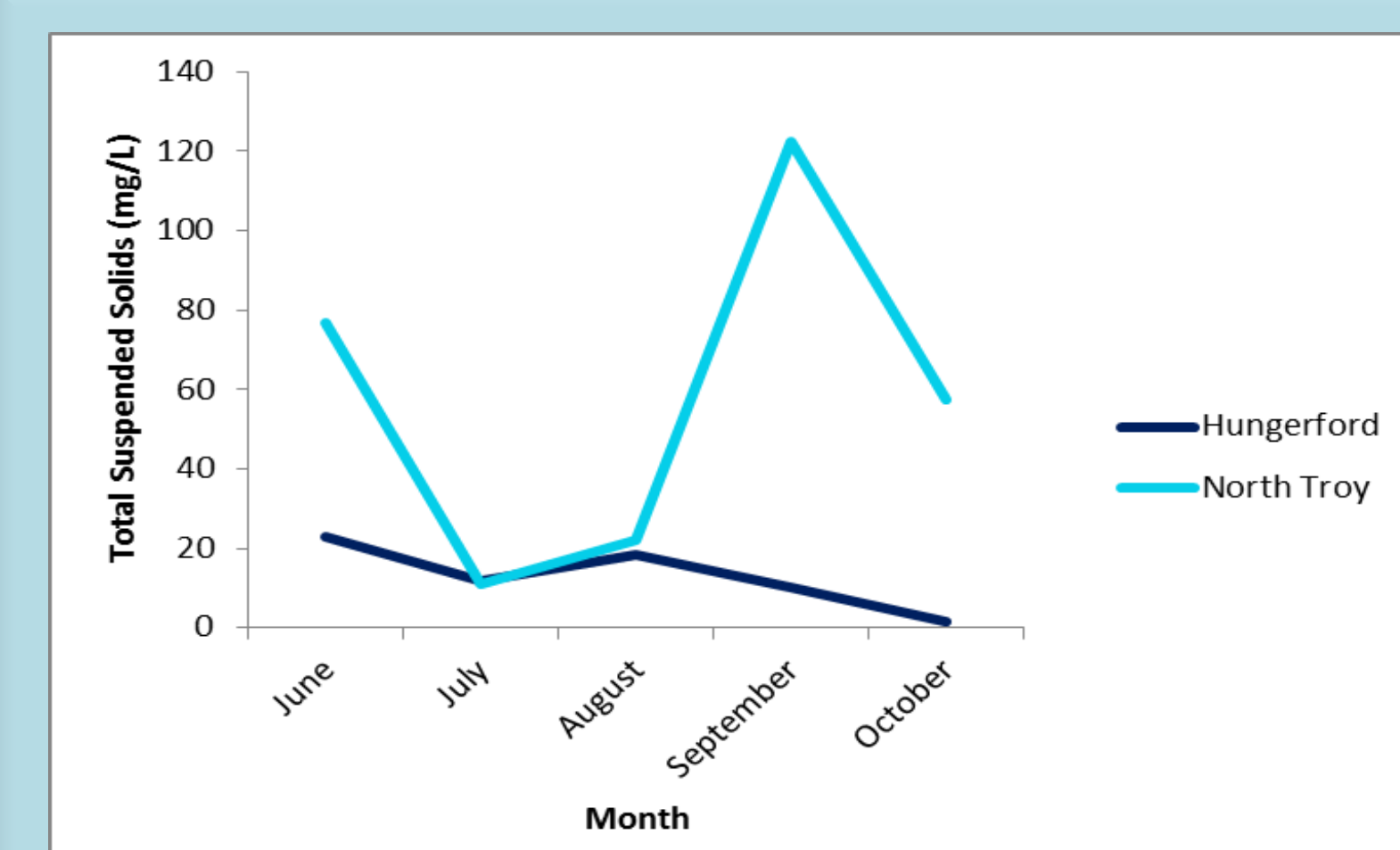


Figure 5. Average Total Suspended Solids (mg/L) Over Five Months in North Troy and Highgate, Vermont in 2015

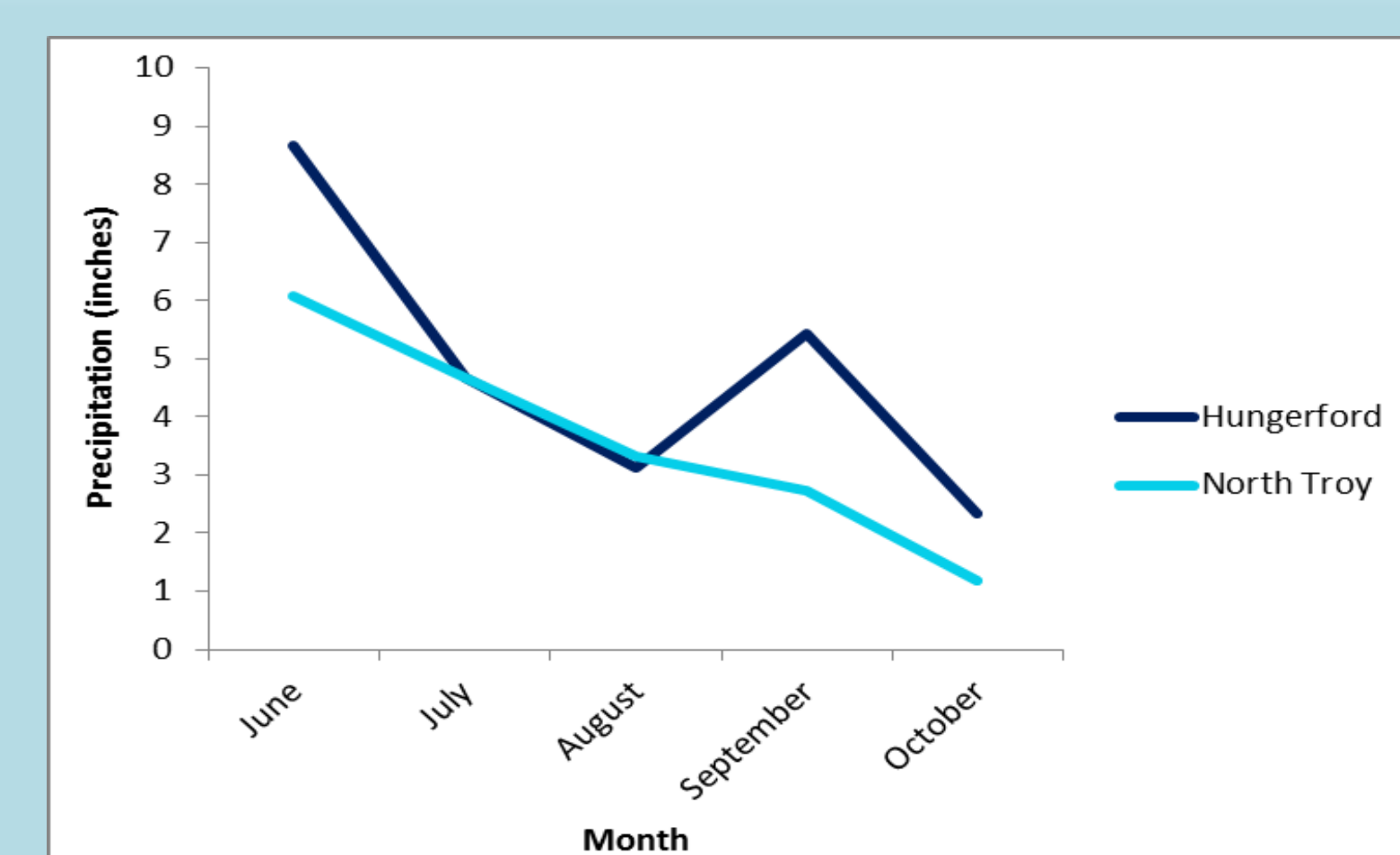


Figure 6. Total Precipitation (inches) Over 5 Months in North Troy and Highgate, Vermont in 2015

## Discussion

- Overall, I found several trends between the amount of rainfall and Total Suspended Solids (TSS). I found that the amount of TSS at North Troy almost exactly corresponded with the rainfall trend for both 2013 and 2014. Hungerford was not as good of a fit, but TSS for that site followed precipitation values fairly closely.
- I did not find that the type of site (agricultural or forested) had a strong impact in TSS values.
- My hypothesis was supported in that TSS was higher when precipitation was higher, but I was incorrect in thinking that the agricultural site would have higher TSS values. One interesting trend that I saw that I did not expect was that TSS increased for Highgate in September/October in both years (despite rainfall decreasing in 2013), and I would hypothesize that this is due to crops being harvested.

## Acknowledgements

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## References

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