Honeoye Lake Tributary Testing in 2004
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Introduction

Honeoye Lake has historically had high levels of rooted macrophytes and experiences annual algae blooms in late summer. In the summer of 2002, which was very hot and dry, the lake experienced severe blue-green algae blooms where algae densities reached levels never before observed in the lake.

As a result of these severe conditions the Honeoye Valley Association (HVA) hired a consultant, Princeton Hydro, to evaluate the condition of Honeoye Lake and determine the technical feasibility of various lake restoration alternatives. Princeton Hydro will develop a *"Watershed Model"* that will be able to predict nutrient flow into the lake from all tributaries based on known sub-watershed boundaries, land cover (forest, farm, etc.), slope, tributary hydraulics, and weather conditions. This *"Watershed Model"* along with other in-lake tests are necessary to prescribe any remedial action, such as application of alum to reduce algae. To verify and set parameters required by the *"Watershed Model"*, actual measurements of the flow and nutrient levels from a few representative tributaries is needed. The model will also account for internally generated nutrients, and hence be able to predict source of nutrients and the lakes eutrophic condition.

In the summer of 2003 the seven largest of the 30 tributaries that flow into Honeoye Lake were monitored to measure flow every two weeks and on four separate occasion samples were taken and analyzed for nutrient levels. These results were reported in Reference 1.

For the summer of 2004 three of the tributaries, Afolter, Bray, and Briggs were monitored for flow once a month. There were no samples taken for nutrient analysis. The results of this monitoring program are summarized in this report.

Results

Figure 1 shows that there are over 30 tributaries that flow into Honeoye Lake. The flow from the southern Honeoye Inlet is by far the largest input to the lake, but its flow could not be measured since the large wetlands to the south are spread out, and no major entry point could be chosen to measure flow. Figure 2 summarizes the flow for Afolter Gully, Bray Gully, and Briggs Gully for both 2003 and 2004.

It is evident from Figure 2 that at most times during the summer the flow is very low, but during a few storm events the flow increases dramatically.

Methods and Measurement Techniques

Flow was measured on the downstream side of the tributary where it crossed either East or West Lake Road. In 2003 the tributary cross-sectional area needed to calculate flow was determined by measuring the depth of water in the circular Afolter culvert. For Bray and Briggs the stream height was measured relative to the height stakes installed on the edge of the stream and from this the cross-sectional area was calculated. Using measured stream velocity the flow was calculated. These reference stakes were washed out in late fall of 2003. As a result the cross-sectional area was calculated using a linear relationship between area and velocity determined from 2003 monitoring. Using a linear relationship between velocity and stream cross-sectional area is commonly used to infer velocity from depth, but in our case we did the inverse and measured velocity and inferred cross-sectional area. Figure 3 shows this assumed linear relationship for the three tributaries determined from 2003 monitoring. In Figure 2 the 2003 flow measurement were recalculated using the linear relationship discussed in the previous paragraph, resulting in somewhat different flows than those reported in Reference 1.

Acknowledgment

I would like to thank Steve Souza for specifying the types of measurement that were made and Dave Beckwith for assisting in the data collection.

References

Starke, Jack, "Honeoye Lake Tributary Testing in 2003", March 31, 2004

Figure 1
Honeoye Lake Tributaries

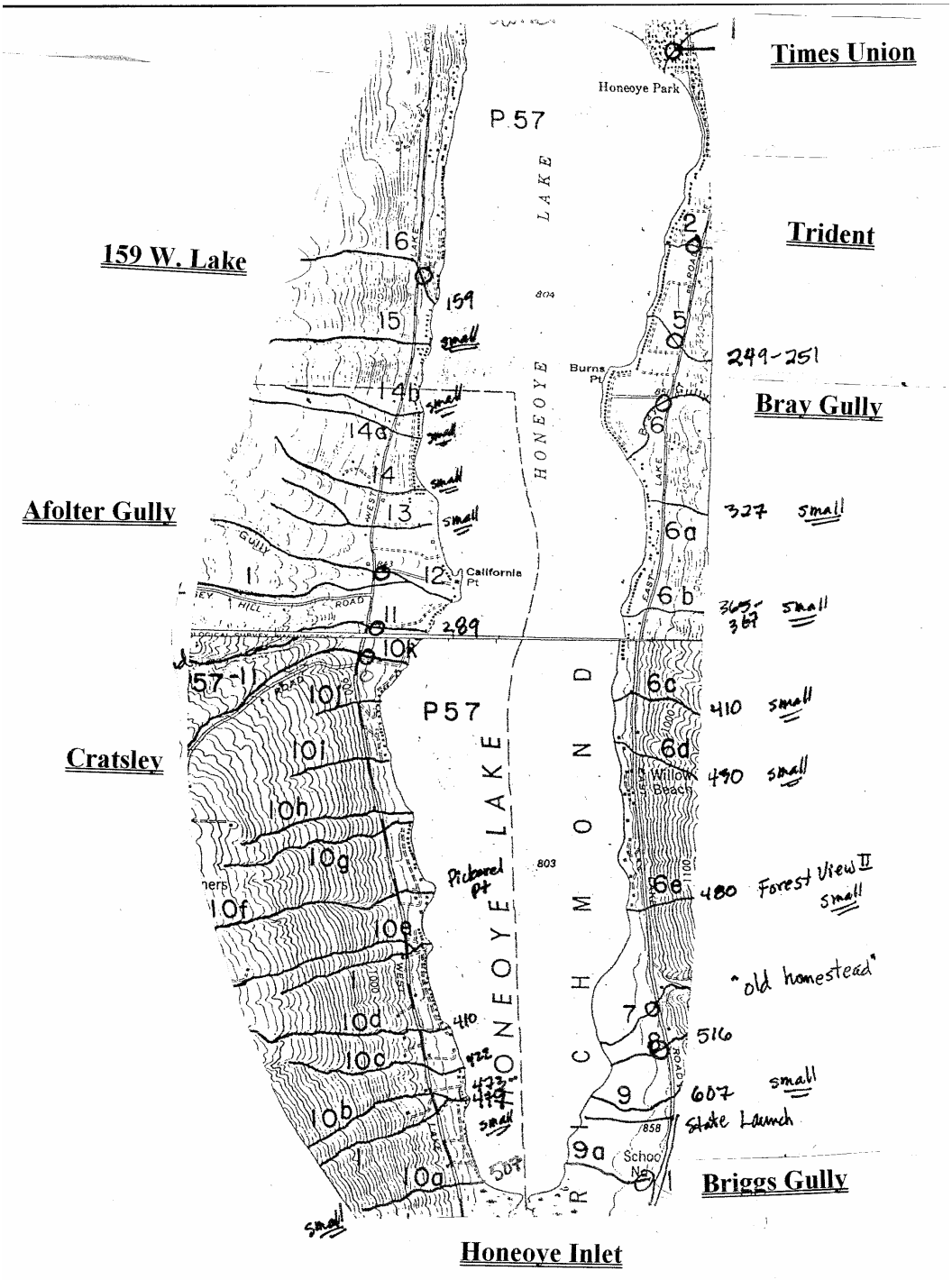


Figure 2

Tributary Flow 2003 & 2004

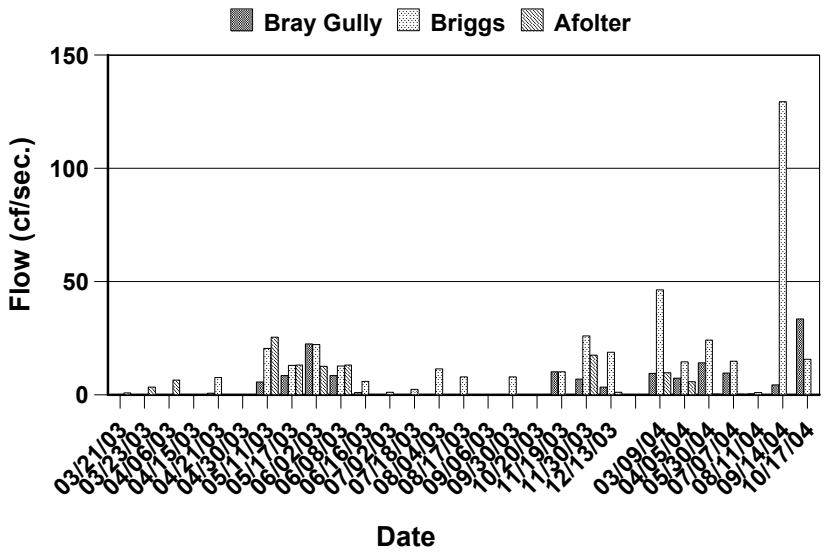
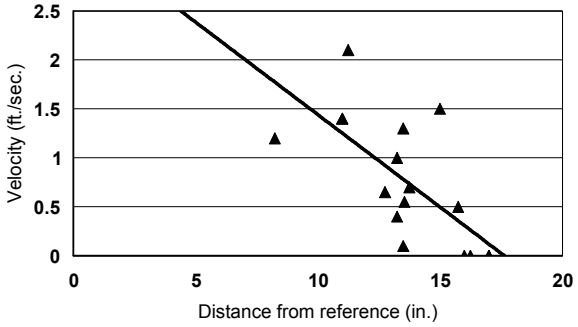


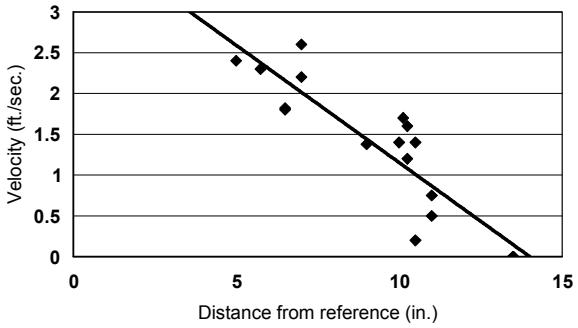
Figure 3

Bray



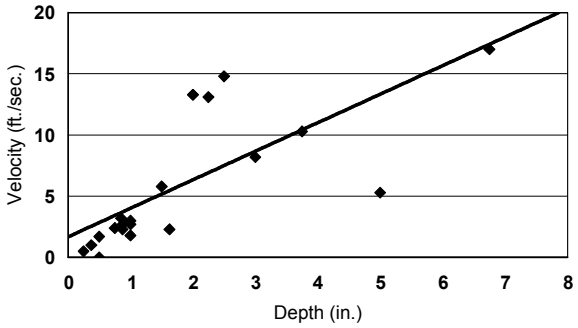
R-square = 0.484 # pts = 17
y = 3.33 + -0.189x

Briggs



R-square = 0.786 # pts = 17
y = 4.03 + -0.288x

Afolter



R-square = 0.504 # pts = 21
y = 1.68 + 2.33x