

# Does Restoration Improve the Substrate and Habitat for Macro Invertebrate Insect Life in Pike Creek?

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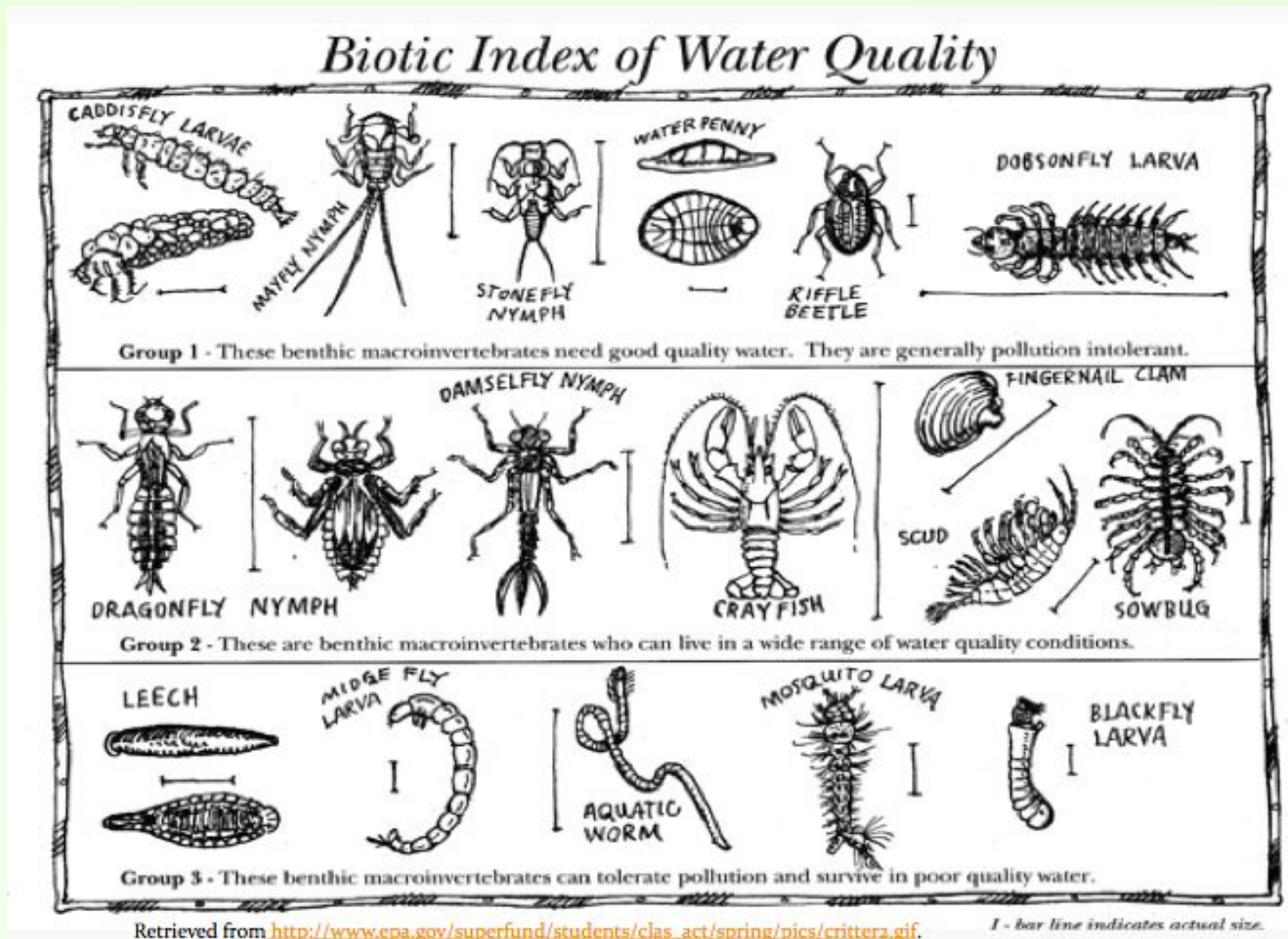
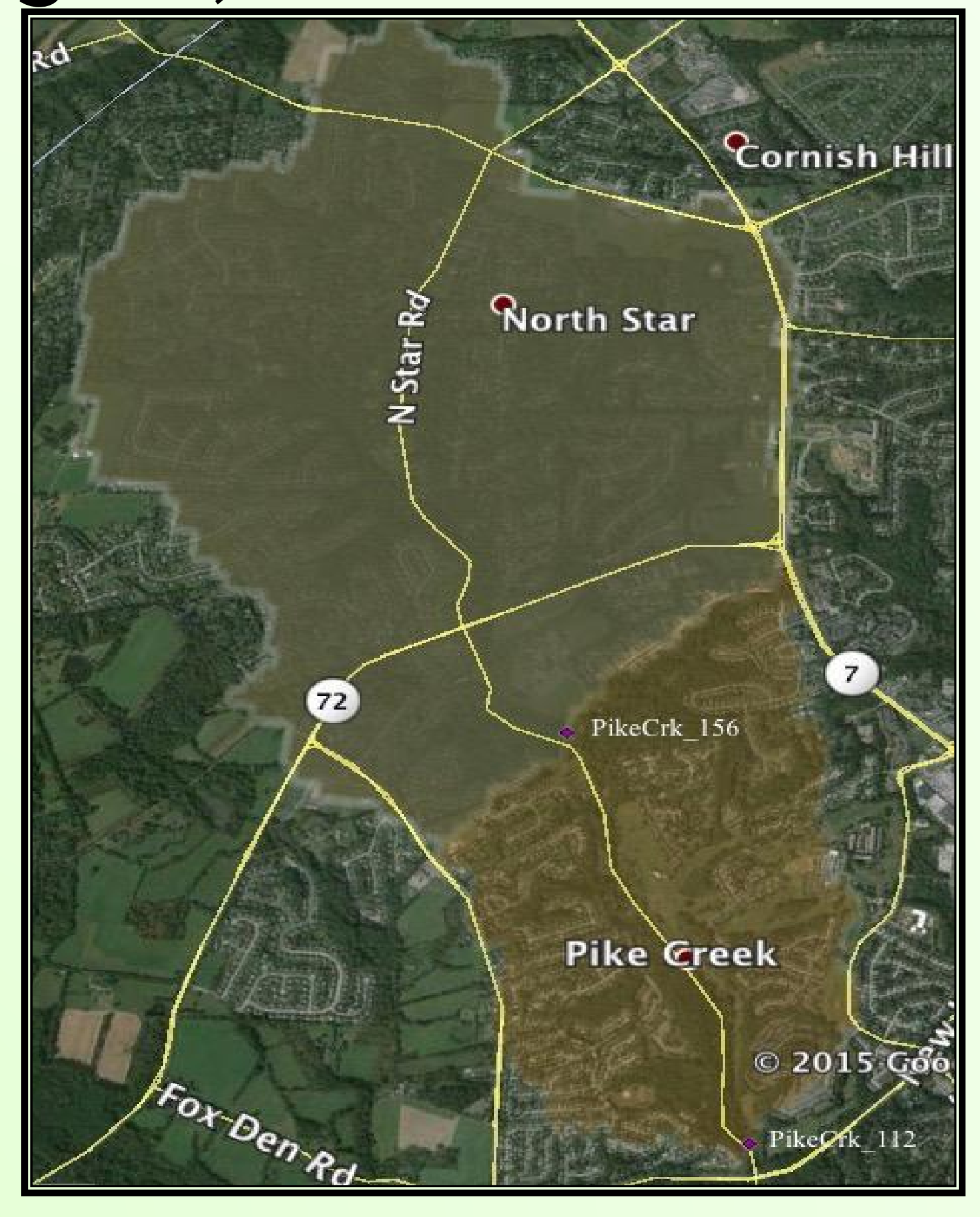
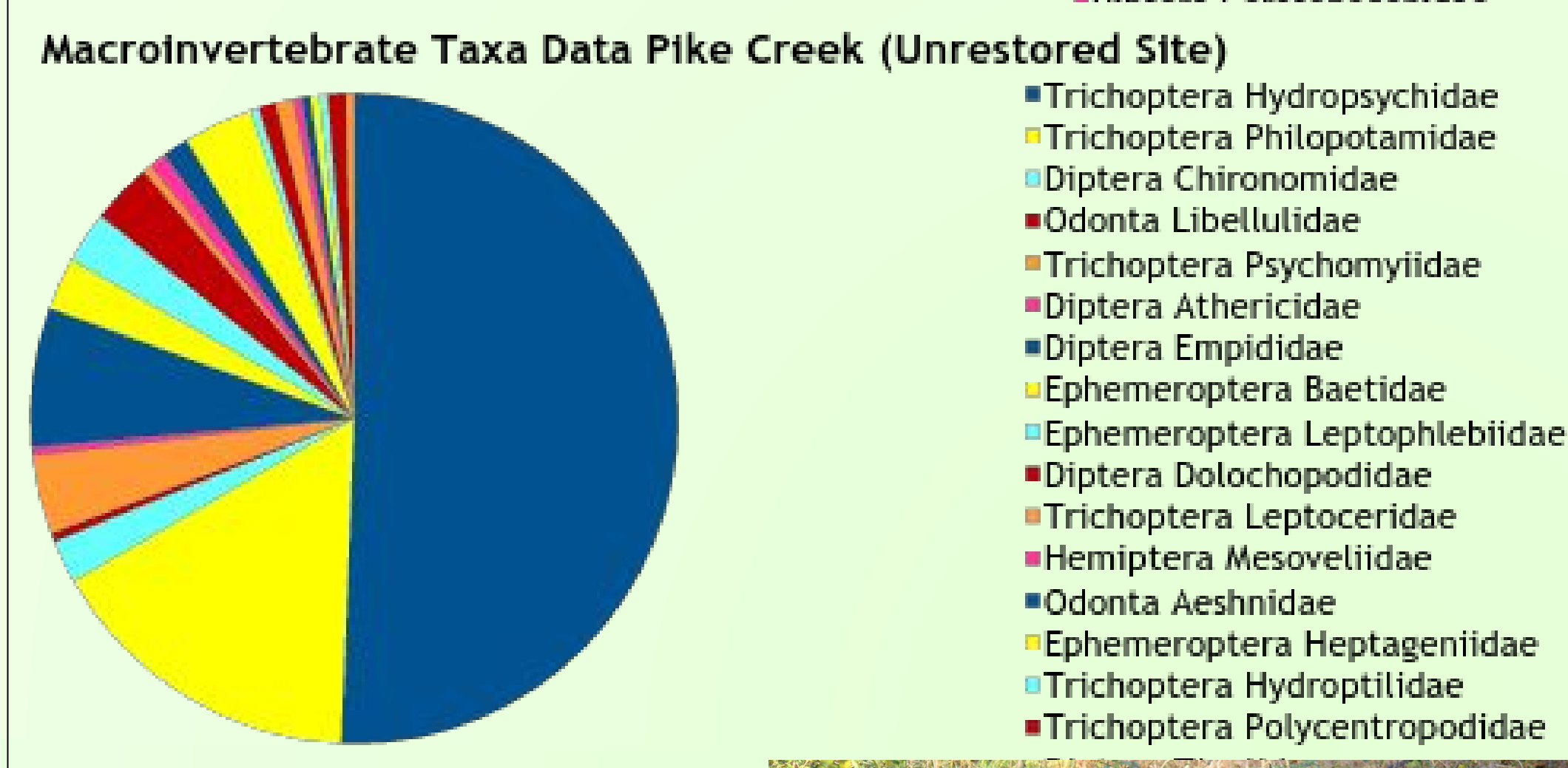
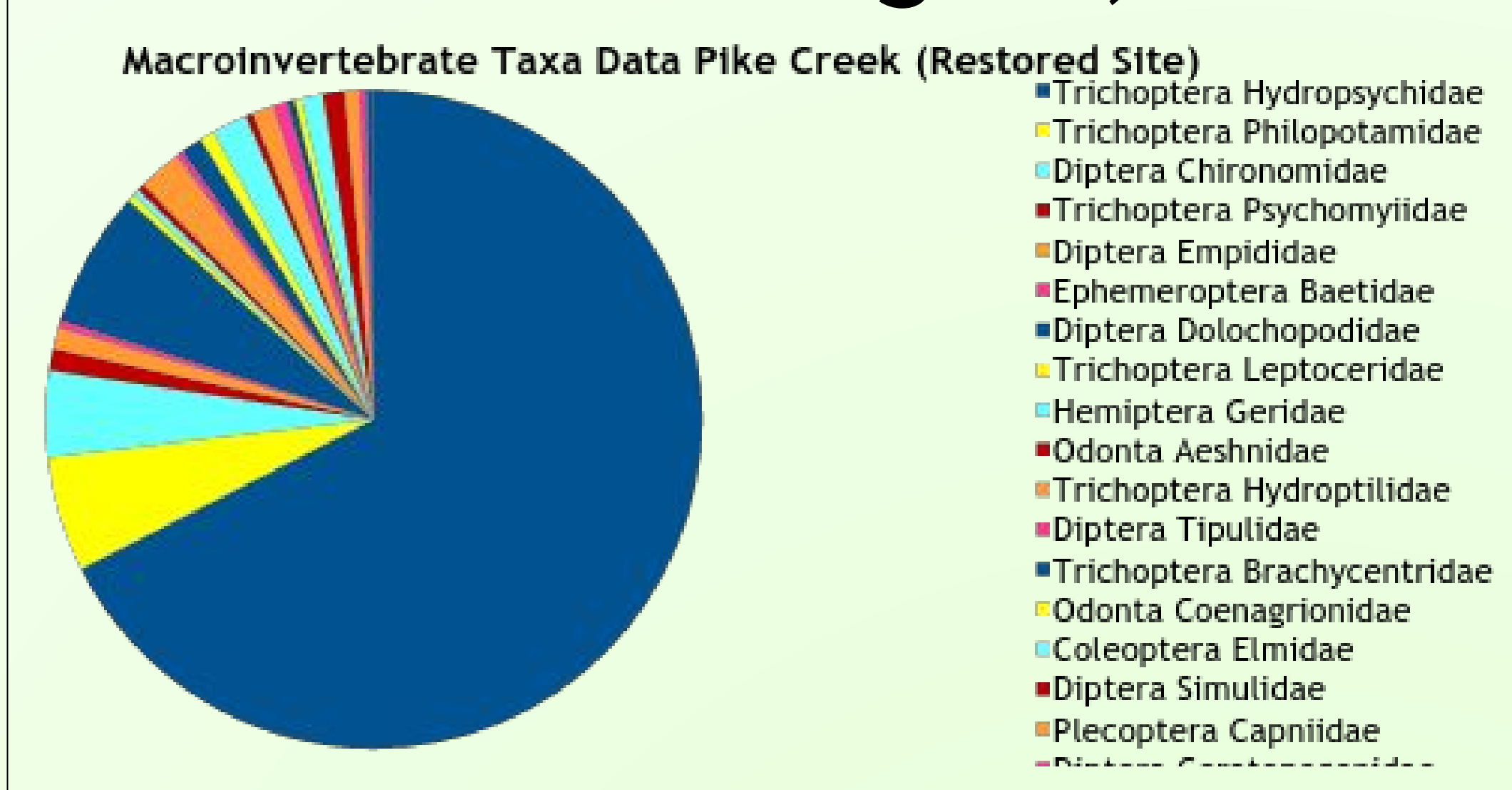
## Introduction/Background

In the spring of 2005 a unique restoration project began on a 5,000 foot section of Pike Creek, a tributary of White Clay Creek in the Delaware Bay watershed of northern New Castle County, Delaware. The need for restoration was caused by the fact that the stream was impaired by significant bank erosion, heavy sediment loads and a degraded aquatic habitat. Federal, state, and county agencies and private landowner allocated a total budget of \$633,930.00 to be spent on the restoration project. The restoration project that took place in 2007 was overseen by the Delaware Natural Resources and Environmental Control. Through the comparison of the macroinvertebrates and the substrate of the two separate study sites on the stream, we focused on determining the long term success of the restoration effort. The stream that we are researching was channelized before this project and one study site was restored through the DNREC project while the other was left in its previously-channelized state.

Using a host of restoration techniques, Delaware Natural Resources and Environmental Control restored the stream channel and adjacent banksplanted approximately five acres of vegetation within the riparian zone, and created three acres of wetlands.

## Materials and Methods

Invertebrates were collected during early August of 2015 at riffle sites using the RACC (Research on Adaptation to Climate Change) Reference Manual field method protocols. Four samples were collected at two sites. One site is located in a restored section of Pike Creek and the second site is located downstream in an unrestored section of Pike Creek. The collected macro invertebrates were identified to the taxonomic level of order and family. Biometric comparisons were made between the two stream site locations.



Metric	Unrestored Site WCC_PKCrk_112	Restored Site WCC_PKCrk_156
Density	398 animals	426 animals
Richness	11.5	9.75
EPT Index	6.5	3.75
EPT/EPT & Chironomidae Index	6.096	8.222
Hilsenhoff Biotic Index	4.574	4.011

HBI Value	Water Quality	Degree of Organic Pollution
0.00-3.50	Excellent	No apparent organic pollution
3.51-4.50	Very Good	Slight organic pollution
4.51-5.50	Good	Some organic pollution
5.51-6.50	Fair	Fairly significant organic pollution
6.51-7.50	Fairly Poor	Significant organic pollution
7.51-8.50	Poor	Very significant organic pollution
8.51-10.00	Very Poor	Severe organic pollution

## Results

Overall, the unrestored site had a higher species richness, and EPT Index compared to the restored site. The restored site had a higher measured density of 426 animals, while the unrestored site had a measured density of 398 animals. The restored site had a higher EPT/EPT & Chironomidae Index of 8.222, while the unrestored site had an EPT/EPT & Chironomidae Index of only 6.096. The Hilsenhoff Biotic Index of the restored site is 4.011 indicating that it's water quality is very good. The Hilsenhoff Biotic Index of the unrestored site is 4.574 indicating that it's water quality is good. Based on the species richness, the EPT Index and the EPT/EPT & Chironomidae Index, there is a difference in the two sites; however, due to the HBI value, the difference is not extremely significant.

## Conclusion

The two study sites explored through this project are located along Pike Creek, which is a tributary of White Clay Creek in the Delaware Bay watershed in New Castle County, Delaware. One of the sites had been restored in 2005 and the other had not. To examine the degree of success of this restoration project, this project compared the substrate and benthic macroinvertebrate collections of the two study sites. Our initial hypothesis was that the restored site would be the healthier than the unrestored site. However, our data collection and analysis indicated that although the HBI values of the two sites are similar, the unrestored site may be the higher quality site. The similarity in quality may be due to the fact that the two sites are only about a mile apart. Any future study might want to chose an unrestored site further downstream from the restored site.

## References

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