Title: Building an Application for Plaster Creek Watershed

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Introduction: Plaster Creek Watershed is one of the most polluted watersheds in West Michigan. As such, there are many significant problems that need to be rectified, including sediment loading and the unacceptable amount of E. coli. These precarious issues need to be addressed by both researchers and the community at large. We attempted to accomplish this task in two ways: by determining the placement of four new water monitoring stations and building an online application that engages the community about the problems facing the Plaster Creek Watershed and how they can help.

Research Methods: When creating our web application, we mainly considered three aspects: data acquisition, functionality implementation, and interface design. For data acquisition, we found map layers covering hydrography, ecology, geology, sociology, and land cover imagery from various sources. As we are focusing on the environment of a watershed, the hydrographic and ecological dataset are our primary concern. To provide some examples, the thematic layers we serve include National Hydrographic Dataset (NHD), EcoRegions of Kent County, Facilities that Discharge to Water, Rock Formation of Kent County, Kent Parcels, etc. Included in the acquisition process was georeferencing many images, mosaicking and redrawing certain features (such as the Kent County Drain Map). For functionality implementation and interface design, we used Microsoft Silverlight as the framework of development and ArcGIS API (Application Programming Interface) for Silverlight as our primary reference. As the most mature GIS toolset nowadays, ArcGIS provided for us numerous options of functionality and well-designed interface templates. When creating the application, we tried hard to integrate practical and aesthetic values together in order to provide a pleasing experience for users.

Results to date: We have successfully created the beta version of our online application. This contains many valuable functionalities including measurement, address locator, legend control, layer extraction/uploading, etc. Later on, in order to provide more detailed analysis, more functionalities should be added such as statistical query and raster analyses. These were not added simply because of a lack of time to do so. A preliminary placement of the four water monitoring stations has been determined.

Personal Benefits: This research project has given me an immense amount of quality research experience. I have learned not only knowledge and techniques within the discipline of geography but also in computer programming. More importantly, this research experience has shown me the innumerable potentials of GIS and helped me be confident of what I do today and in the future. It has significantly helped me clarify some directions in future study and career.