



# Characterization of York Town Storm Water System

Elizabeth Mitchell<sup>1</sup>, Amy Carlson<sup>1,2</sup>, Brett Horr<sup>3</sup>, Sue Bickford<sup>4</sup>

<sup>1</sup>Department of Environmental Studies, <sup>2</sup>Department of Biology  
University of New England, 11 Hills Beach Rd., Biddeford, ME 04005,  
<sup>3</sup>Town of York, <sup>4</sup>Wells National Estuarine Research Reserve



## Introduction:

The purpose of this experimental project was to gain experience with GPS systems in an academic and field based representation. In collaboration with the Wells National Estuarine Research Reserve and the Town of York, Maine, this project was set up for two students, Elizabeth and Amy, at the University of New England studying GPS.

The goal of our project was to locate and mark with a GPS the storm water system on Route 1 in York, including features such as culverts, catch basins, and storm pipes on an approximate ten mile stretch of roadway, both northbound and southbound, which had previously not been completely classified.

This project applies to real world situations in which GPS can be utilized. Through this project, we were able to learn first hand the technicalities of creating a new dataset of spatial points. This is a useful skill, as it can be applied to many career fields particularly those of interest to us, being biological and environmental sciences.

## Methods:

Equipment used includes:

1. GPS unit- HP iPaq hand held using ArcPad with Trimble GPS Pathfinder XC receiver and charger
2. Safety vests
3. External hard drive and SD card/reader
4. ArcMap 9.2 software

Our first trip out established our efficiency with the GPS unit, what we felt was an appropriate way to traverse the field, what other equipment might be needed, how we were going to manage the shortened battery life of the GPS unit, and how far we could traverse on a given day.

Spatial data collected was synthesized into a dynamic \*.mxd using Arc Map 9.2 software.

## Results:

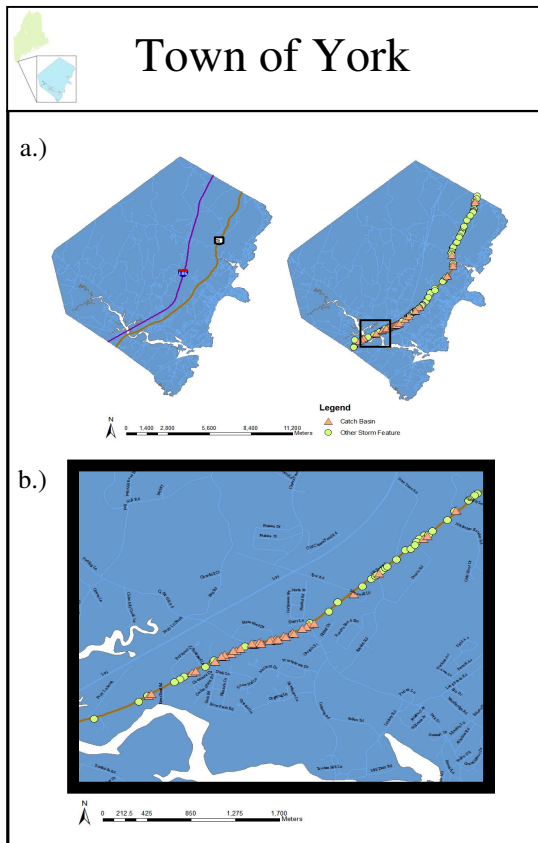
We found that the GPS unit needed greater than 15% charge to work the satellite card, and about 20% to effectively collect points. Our estimate for how long a fully charged unit could last was roughly 3 to 3.5 hours before needing to charge. The total length we had to traverse was 20 miles (ten miles of road on both sides).

Originally we started on foot, but found biking to be more efficient, and just as effective. As a result of the shortened battery life, we needed to bring the car charger for the GPS unit with us into the field. We split the route into mile long segments, parked the car at the end of the first mile, biked back to the starting point on one side of the road, back to the car on the other side, and repeated this same pattern in the other direction, effectively making a "figure 8" trip. (cont.)

## Results cont.:

Each leg of the trip, averaging ~30 points to collect, took 40-45 minutes.

Upon completion of the data acquisition, 158 point features were collected, which included their spatial data, comments about the location or feature itself, and which category the feature actually fell into, such as culvert, storm pipe, etc (See Fig.1.).



**Figure 1. a.)** A map containing all 158 point features collected in-field in the Town of York, Maine, along U.S. Route 1. Point features are classified as either catch basin Or other storm feature, as the Town of York was most interested in the locations of their catch basins. b.) A closer view of collected point along U.S. Route 1 in the Town of York, Maine.

## Discussion:

Problems with Equipment:

The Trimble GPS Pathfinder XC receiver in conjunction with the HP iPaq hand held proved useful for shorter expeditions. However, since most of our field days were several hours long, the constant need to recharge the HP iPaq (internal battery) because of Trimble GPS receiver detracted from the time that should have been spent collecting data. As a result, we needed to take the car charger on field trips, and needed to keep the unit constantly plugged in with its AC adapter when not in use.

The Data:

The point features collected showed an abundance of storm features along U.S. Route 1 in York, Maine. The subject of interest for the Town of York, catch basins, were clustered on the southern end of the Route, near where much of the downtown businesses are located (pers. obs.).

## Conclusions:

- \*HP iPaq is not an ideal instrument for extensive in-field data collection
- \*Data collected will aid the Town of York in assessing and maintaining their storm water system, showing the importance of GPS/GIS in a real-world context.
- \*The work conceived and conducted by Amy and Elizabeth is a model example for the GPS course to be offered for the University of New England's pilot GIS minor.



Figure 2. Student collecting data point.

## Acknowledgments

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