Mapping the Historical Landscapes of the Underground Railroad

Jeremy Mennis[a]*

[a] Department of Geography and Urban Studies, Temple University, Philadelphia, USA
* jeremy.mennis@temple.edu

Keywords: digital humanities, geography, GIS, history, spatial humanities, Underground Railroad

Introduction

The Underground Railroad is a rich and meaningful subject for cartographic representation and analysis. The Underground Railroad refers broadly to the informal network of people, landmarks, and transportation systems that served to facilitate African American escape from slavery from the US South northwards prior to the Civil War. The most prominent name associated with the Underground Railroad is Harriet Tubman, who, after escaping slavery herself in the late 1840s, led numerous expeditions to lead many others out of slavery.

While much has been written about Harriet Tubman and the Underground Railroad, there has been surprisingly little focus on geographic perspectives, particularly the use of cartography and geographic information science (GIScience) as a methodology for investigation. This may be because the illicit nature of escapes has lent an ambiguity to the precise routes, physical features, and landmarks that played a key role in the Underground Railroad, making geographic analysis challenging. This research seeks to fill that gap by developing a GIS database of the historical natural, built, and social environmental features germane to the Underground Railroad. Here, I present a prototype application of this broader project by focusing on the digitization and analysis of geospatial data gathered from an historic map of the Eastern Shore of the Chesapeake Bay, Maryland – the birthplace of Harriet Tubman.

This historical map is used here to capture certain features in the landscape that confer either risk of apprehension and return to slavery, or, conversely, protection from capture by way of concealment, sanctuary, or by providing other resources. The approach is inspired and influenced by related GIScience research on the geographic aspects of historical sites of oppression, such as recent research on the geography of the Holocaust (Giordano and Cole, 2020). Ultimately, the goal is to integrate the geographic representations of risk and protection with geo-narratives of actual escapes from slavery gathered from other historical documents. As such, this research draws from my own previous public health-oriented work on the use of geospatial technologies for representing and analysing individual's exposures to places of risk and protection for behavioural health analysis (Mennis and Mason, 2011) as well as research on the use of qualitative GIScience for the representation of geo-narratives (Kwan and Ding, 2008; Mennis et al., 2013). This research aims to leverage this prior GIScience research for understanding and remembering the legacy of slavery in the US through a geographic

lens (LaRoche, 2014; Alderman et al., 2021), and, more broadly, to advance the use of cartography and GIScience for spatial history (Gregory et al., 2018).

Data and Methods

Data

This research used a digital version of the historical Atlas of Maryland (Martenet, 1866). The atlas was created by Simon Martenet, primarily by original surveys, under the auspices of the State of Maryland. It was first released as a map in 1865, then released in 1866 as a color atlas with counties on separate pages (Figure 1). Digital and georeferenced map images for Dorchester, Talbot, and Caroline counties were downloaded from David Rumsey Map Collection (https://www.davidrumsey.com/) as a set of geoTIFs.

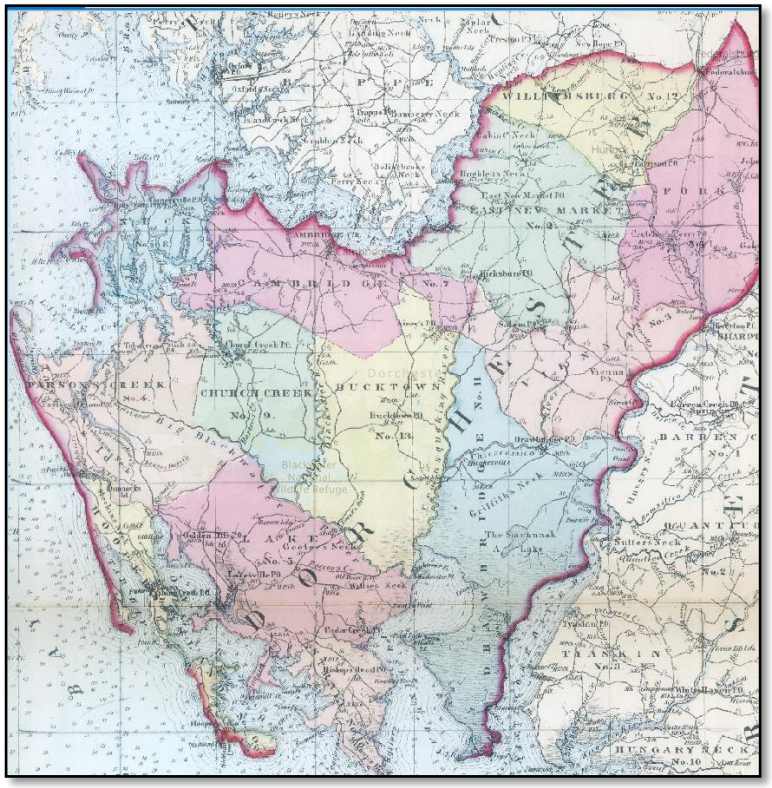

Figure 1: Close-up view of Simon J. Martenet's (1866) Atlas of Maryland, Dorchester County, where Harriet Tubman was born and spent her childhood.

A shapefile of street centerlines for the entirety of Maryland was downloaded from the Maryland Department of Transportation through Maryland's GIS Data Catalog (https://data.imap.maryland.gov/). The historic map images were then registered and overlain with the street centreline data in ArcGIS Pro (ESRI, Inc) in the Maryland State Plane coordinate reference system.

Digitizing historical features

I began the digitizing process by focusing on historic roads. I made two assumptions: First, that the positional accuracy of the historic maps was not as accurate as the current street centreline shapefile, and second, that the historic roads comprised a subset of the current road network. Given these assumptions, I visually identified the individual lines in the street centerline shapefile that comprised the analogous roads on the historic map. Once all of these lines were selected from the street centerlines shapefile, they were exported to a separate shapefile. The new historic roads shapefile was then edited while reviewing the historic maps to ensure accuracy, add any historic roads not included in the contemporary street centreline shapefile, remove pseudonodes, and maintain topological integrity regarding road network connectivity (e.g. bridges over waterways in the current street centerlines shapefile may not have been present historically).

Points of interest were then digitized via heads-up digitizing from the historic maps, using the new historic roads shapefile as a guide for placement. For example, if a point occurred just northwest of a street intersection on the historic map, it would digitized in the analogous position in relation to that intersection using the new historic roads shapefile (Figure 2). Types of points included:

- Churches and denomination
- Shops
- Mills
- Schools
- Post offices
- Minor towns (without a post office)
- Major towns (with court house)
- Landings, bridges, ferries
- Road intersections

Generating a risk surface

Next, I created a series of raster risk surfaces where places of development represented increased risk, essentially locations where an escapee might encounter others and hence there was greater potential for capture. African American churches and Quaker Meeting Houses represented places of protection, as they often served as ‘stations’ on the Underground Railroad where escapees could find refuge (Anadolu-Okur, 1995). Euclidean distance surfaces were created for each of the following features: churches (with the exception of those which were identified as African American or Quaker Meeting Houses), shops, mills, schools, post offices, landings, bridges, ferries, minor towns, and major towns.

These surfaces were reclassified to represent ordinal levels of risk using thresholds of 1000 feet from the nearest feature, up to a maximum of 5000 feet, using a geometric progression from far (risk=1) to near (16). Distance to roads and road intersections were similarly ranked using a threshold of 500 feet, up to a maximum of 2500 feet, using the same ordinal ranking strategy. A weighted raster overlay was then employed to generate a single risk surface, where distance surfaces for major towns were weighted 5x, post offices 3x, and minor towns 2x; All other surfaces were weighted 1x. A hillshade of the weighted risk surface was then employed for visualization.

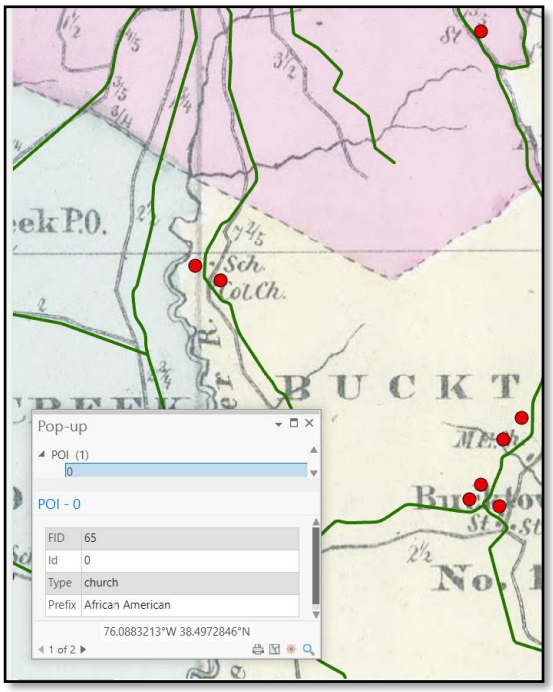

Figure 2: Close-up view of the historic roads shapefile and digitized point features, with associated attribute editing window, overlain on the historic map image of Dorchester County. The Bucktown store and post office, shown in the southeast of the figure, was the site of a key event in the life of Harriet Tubman, where she was struck in the head by a heavy object as a young girl.

As an example of how such a risk surface could be used and integrated with narrative data on individual paths taken during escape, a least cost path on the risk surface was generated, beginning at a hypothetical position in northwestern Dorchester County nearby present-day Church Creek, stopping at two African American churches and a Quaker Meeting House, before ending at an African American church in central Caroline County near the present-day town of Harmony.

Results

Figure 3 shows the hillshade of the risk surface overlain with the least cost path. The risk surface clearly illustrates the areas of greatest risk, colored in red and orange, where towns, stores, mills, and other built features concentrate. Green represents safer areas, comprised of vegetation cover, bisected by corridors of yellow surrounding isolated roads. The least cost path naturally heads through the greener areas, cutting across isolated road corridors, though to get to each of the specified stops of refuge along the path of escape, the path must pass closer to areas of higher risk.

Discussion and Conclusion

This work provides an example of how historical map resources may be leveraged to generate a GIS database of landscape features of risk and protection related to the Underground Railroad. It further shows how GIS analysis may be used to relate such risky and protective landscape features to potential pathways of escape from slavery.

The present work is limited in scope to the features found on this particular historic map, and does not take into account the risks or transportation opportunities presented by waterways, which played a highly important role in the Underground Railroad in the study area. Nonetheless, this research demonstrates the great potential for cartographic and GIScience approaches to the study of the Underground Railroad. Future research will expand the study area, incorporate other historical map resources, and integrate geo-narrative accounts of escape from slavery gathered from historical documents into the GIS database representation.

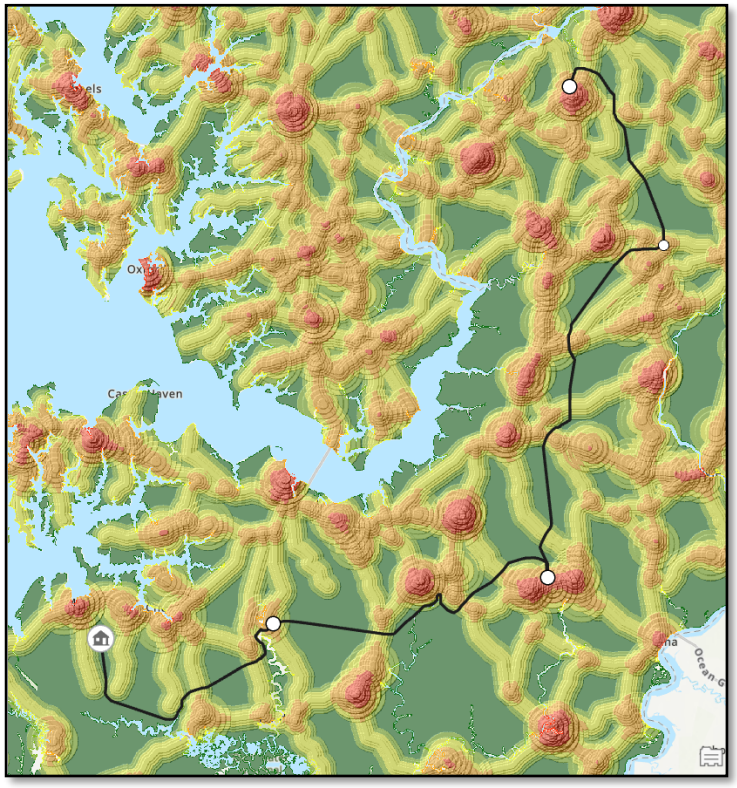

Figure 3: Hillshade of the risk surface with the least cost path overlain, beginning in the southwest of the map and stopping at African American churches and a Quaker Meeting House, denoted by open point symbols, along the way northwards.

Acknowledgements:

This work benefitted from helpful discussions with Nilgun Anadolu-Okur, Celeste Winston, Alberto Giordano, and Synatra Smith, to each of whom I am grateful.

References

Alderman, D. H., Inwood, J. F., and Battone, E. (2021). The mapping behind the movement: On recovering the critical cartographies of the African American Freedom Struggle. Annals of the American Association of Geographers, 120, 67-78.

Anadolu-Okur, N. (1995). Underground Railroad in Philadelphia, 1830-1860. Journal of Black Studies, 25, 537-557.

Giordano, A., and Cole, T. (2020). Places of the Holocaust: Towards a model of GIS of place. Transactions in GIS, 24, 842-857.

Gregory, I., DeBats, D., and LaFreniere, D. (2018). *The Routledge Companion to Spatial History*. London: Routledge.

Kwan, M.- P. and Ding, G. (2008) Geo-narrative: Extending geographic information systems for narrative analysis in qualitative and mixed-method research. *The Professional Geographer* 60, 443-465.

LaRoche, C. J. (2014). Free Black Communities and the Underground Railroad: A Geography of Resistance. Champaign, IL: University of Illinois Press.

Martenet, S. J. (1866). The Atlas of Maryland. Baltimore: S.J. Martenet.

Mennis, J. and Mason, M. J. (2011) People, places, and adolescent substance use: Integrating activity space and social network data for analyzing health behaviour. Annals of the Association of American Geographers, 101, 272-291.

Mennis, J., Mason, M. J., and Cao, Y. (2013) Qualitative GIS and the visualization of narrative activity space data. International Journal of Geographical Information Science, 27, 267-291.