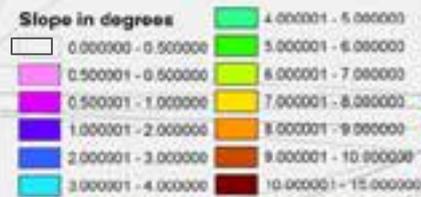# Visualizing Historic Baltimore

Joshua Cole | Dan Bailey

Sponsors and Acknowledgements

Dan Bailey – Project Director

Claire Welty – CUERE, Director

Ryan Zuber - IRC Technical Director

Burt Kummerow – Maryland Historical Society, President

Lance Humphries and Mary Ellen Hayward – History Consultants

Thomas Hervey, Natalie Cheetoo, Cameron Smith - GIS Undergraduates

Robyn Lott - 3D Modeling Undergraduate Research Assistant
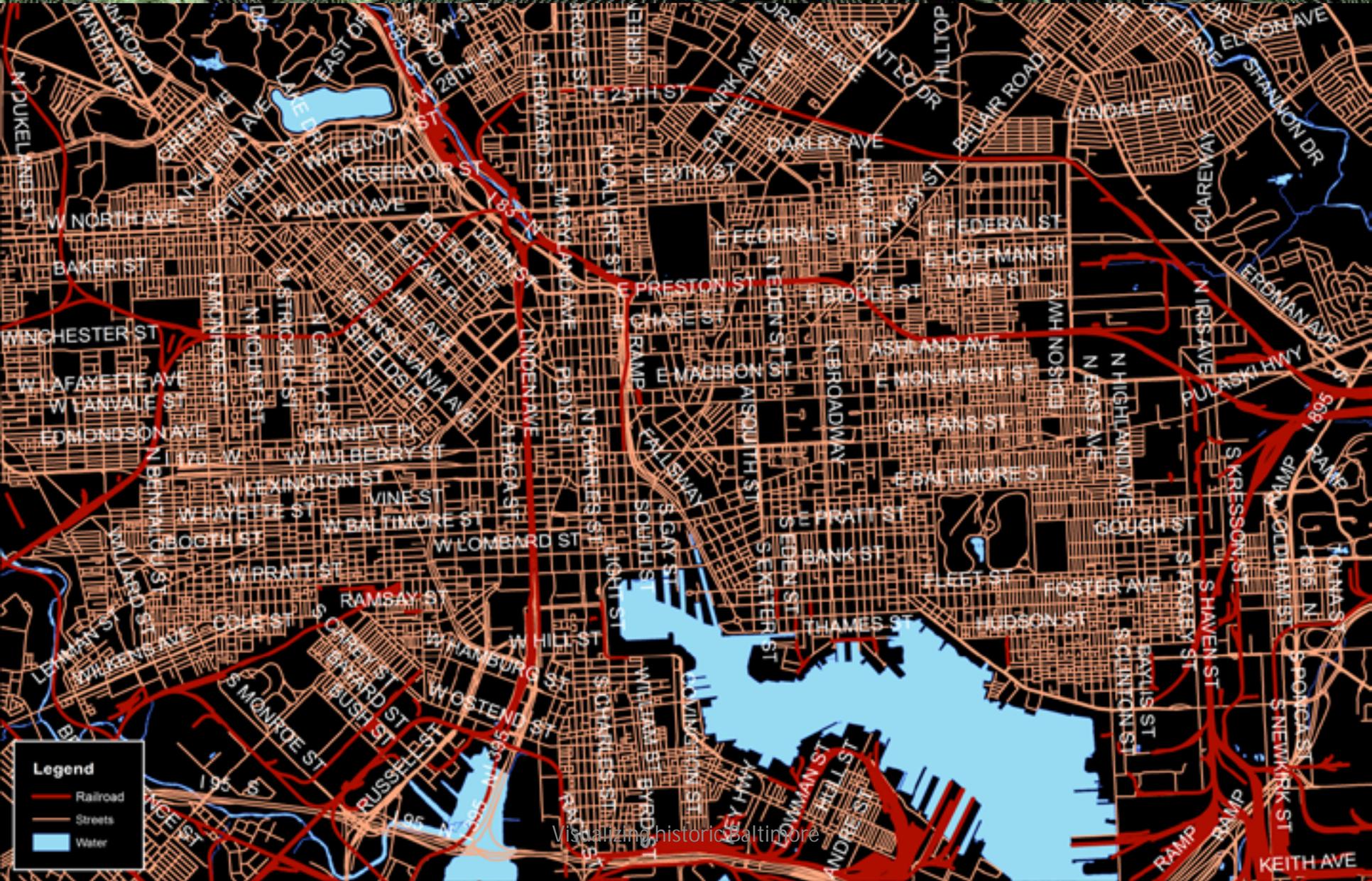
Visualizing historic Baltimore

Impetus

- Digitally traced five foot elevation contours from historical maps
- Create an impression of 18th Century Baltimore terrain based on historic archival evidence
- Create TINs, DEMs, meshes

- For short film shown during Baltimore City's 2014 celebration of the War of 1812
- Common GIS coverage for Baltimore historians' use
- Historical DEMs for academic classroom or research use

Visualizing historic Baltimore

- Baltimore Atlas 5 foot elevation contours
- USGS Topographic maps 20 foot elevation contours

Modern day Data

Legend
- Railroad
- Streets
- Water
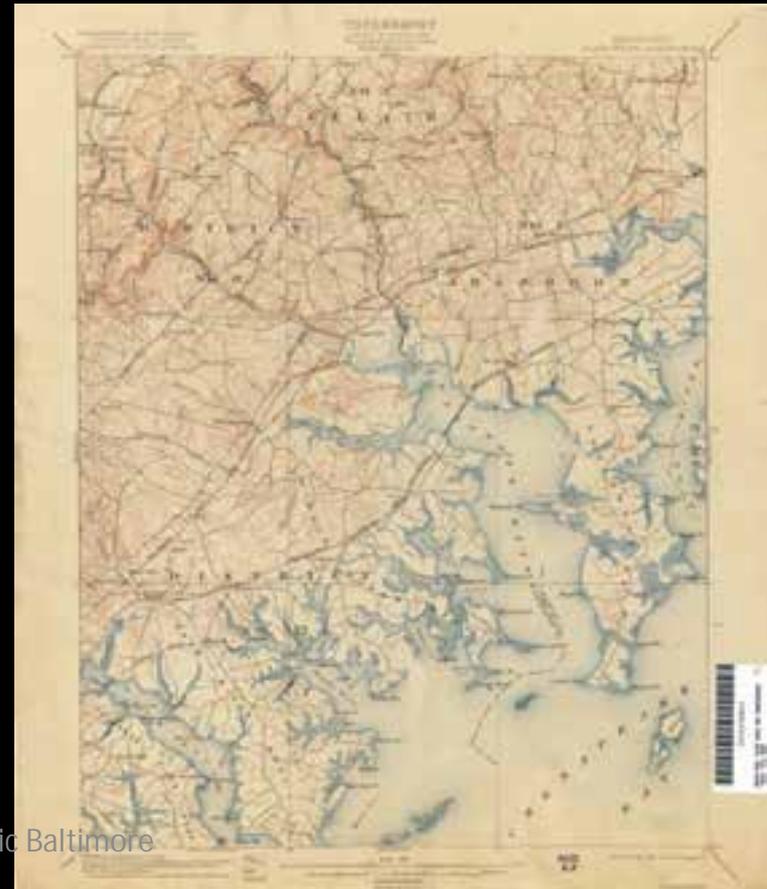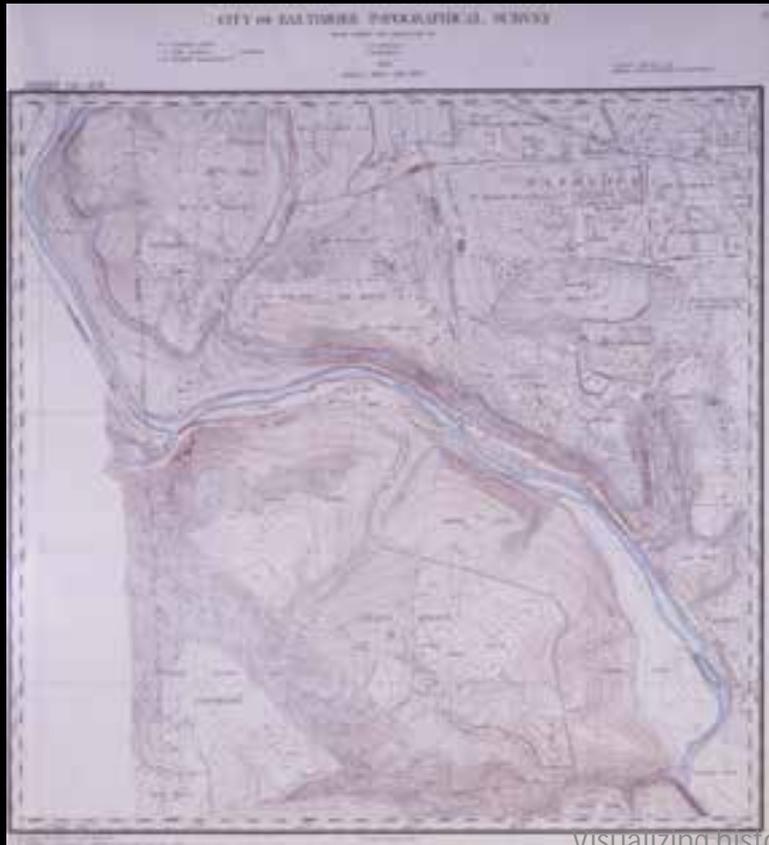
Visualizing historic Baltimore

Additional Historical Maps

- A.P. Folie (1792)
- Warner Hanna (1801)
- Winder (1814)
- Poppleton (1829)
- Civil War (1865)

Visualizing historic Baltimore

Archival Evidence

Visualizing historic Baltimore

Sources of Error

- Everybody who saw it is dead
- Paintings or maps may have been political tools
- Wool in the summer
- Incorrect surveying measurements
- Preservation and scanning
- Incorrect tracing

- Lambert Conformal Conic
  - Central Meridian is the Washington Monument in Baltimore City
  - Allows best fit
- North American 1983
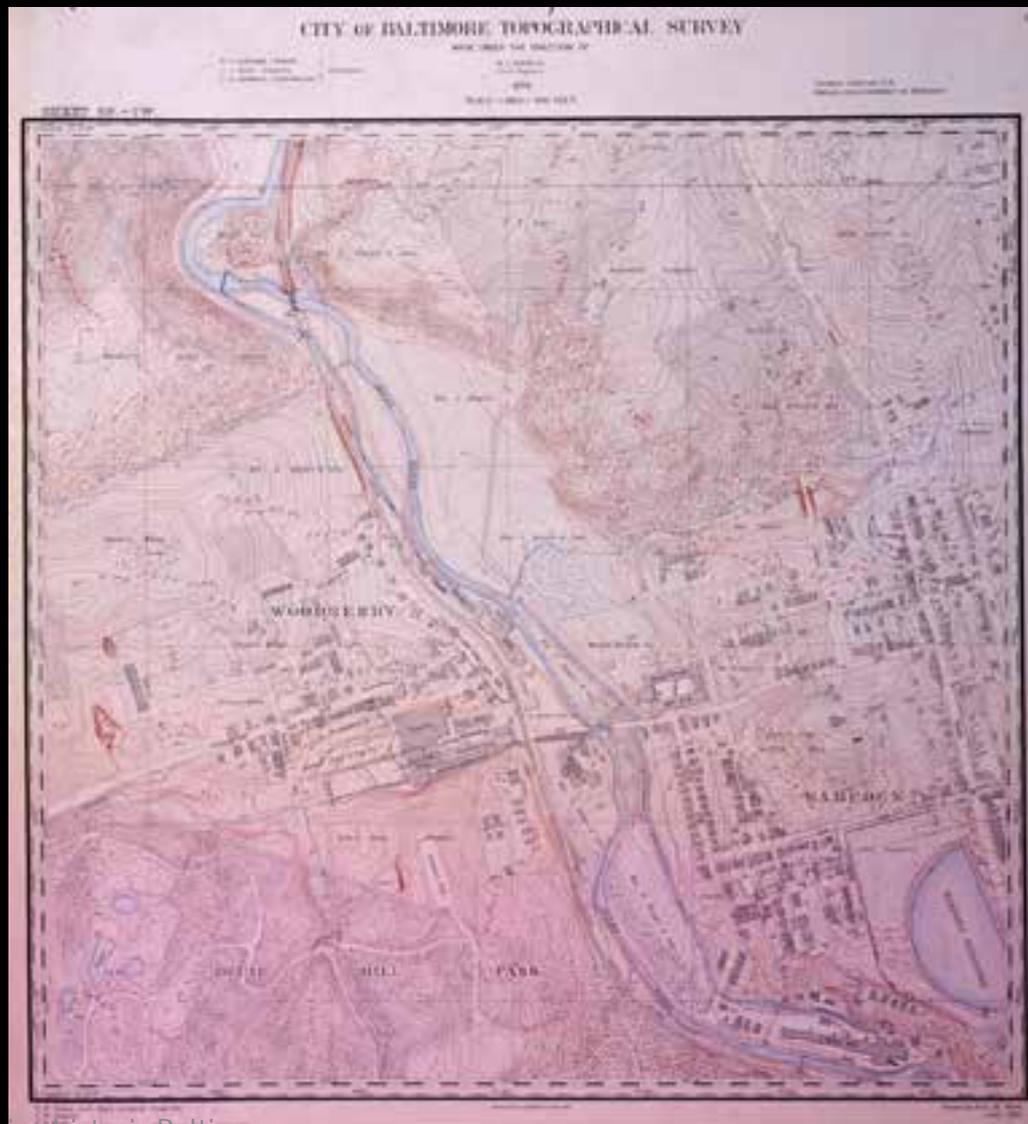 - No noticeable difference
  - User friendly

Map image processing

Materials

- 38 Atlas pages
- 5 Historic maps
- 7 USGS Topographic grids

Correction types

- Color
- Rotation
- Clip

Visualizing Historic Baltimore

Georeferencing

Atlas → Modern plan metric layer

USGS Topos → Latitude and Longitude

Historic Maps → 1897 Atlas

1. Street name must be the same
2. Streets must line up for several blocks
3. Streets that were near a corner of an atlas page were preferred

Tracing

1. Erase man made area
2. Create undisturbed lands
3. Capture streams and drainage

Visualizing historic Baltimore

Communicating by map

Keep interval steady.

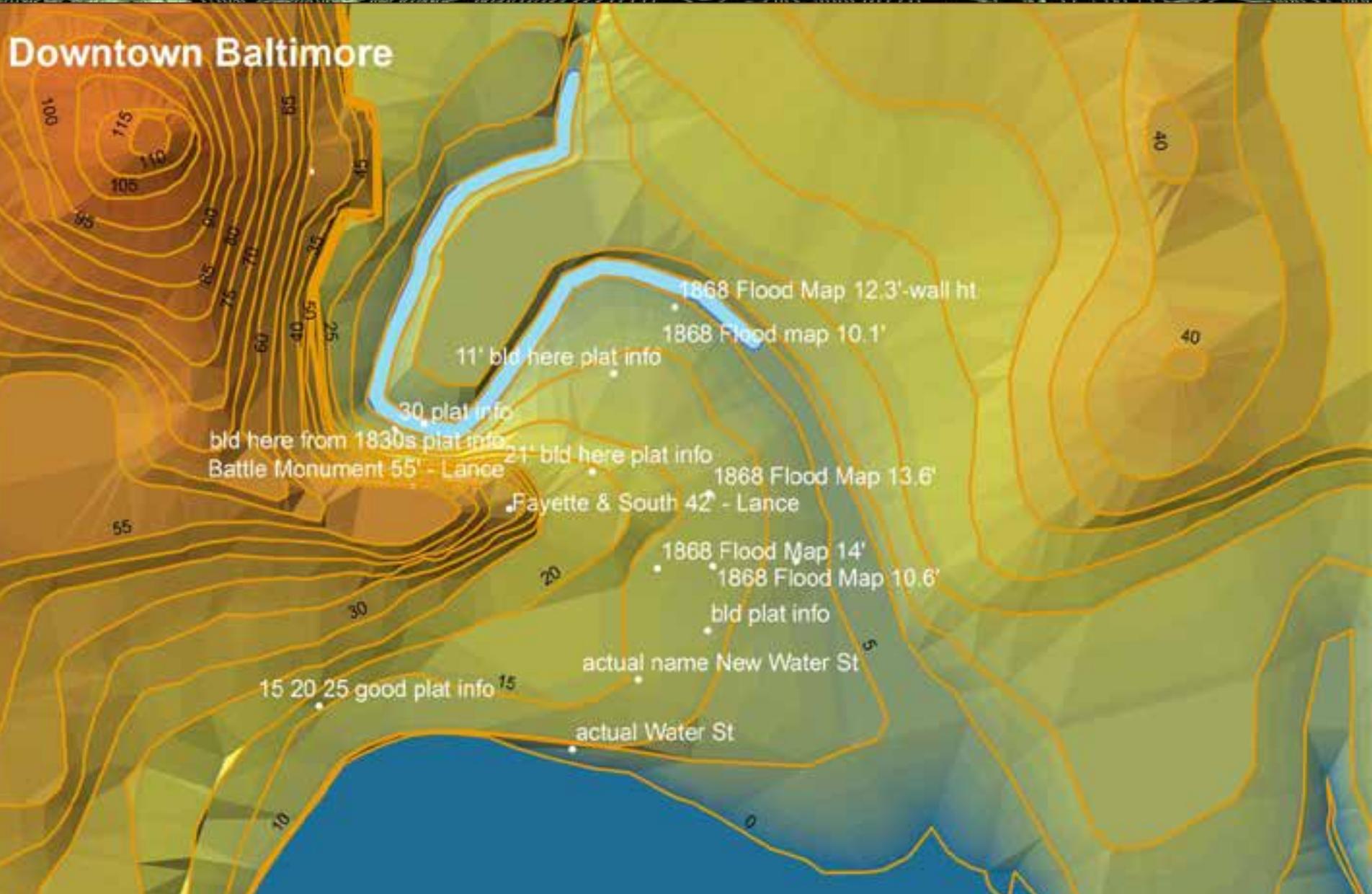Don't cross bank

JF channelled. Street car. confusing lines.

Will bring this line North to Water st.

Notes

FID	Shape *	Id	Notes	Student	Date
7	Point	0	Add a couple more pts to round this out	Thomas	4/20/2012
8	Point	0	This is good.	Thomas	4/20/2012
9	Point	0	Round this out, please	Thomas	4/20/2012
10	Point	0	Stay on the line, make this rounder	Thomas	4/20/2012
11	Point	0	NC, 355 crosses the road please redo.	Natalie	4/20/2012
12	Point	0	Please erase	Thomas	5/8/2012
13	Point	0	Along with the ice pond add the little stream	Thomas	5/8/2012
14	Point	0	Looks like 195 crosses the stream 3 times	Thomas	5/8/2012
15	Point	0	280ft probably joins somewhere in the middle	Thomas	5/8/2012
16	Point	0	Could you arch these contours to be more natural?	Thomas	5/8/2012
17	Point	0	240-250 can be more of a gentle slope	Thomas	5/8/2012
18	Point	0	no hill on stream	Natalie	12:00:00 AM
19	Point	0	follow 285	Natalie	12:00:00 AM

Ageing and Documenting

Downtown Baltimore

1868 Flood Map 12.3'-wall ht

1868 Flood map 10.1'

11' bld here plat info

30 plat info

bld here from 1830s plat info
Battle Monument 55' - Lance

21' bld here plat info

1868 Flood Map 13.6'

Fayette & South 42' - Lance

1868 Flood Map 14'
1868 Flood Map 10.6'

bld plat info

actual name New Water St

15 20 25 good plat info

actual Water St

Ageing and Documenting

Legend
— Aged contours
— 1897
▬ Jones Falls oxbow

Visualizing historic Baltimore
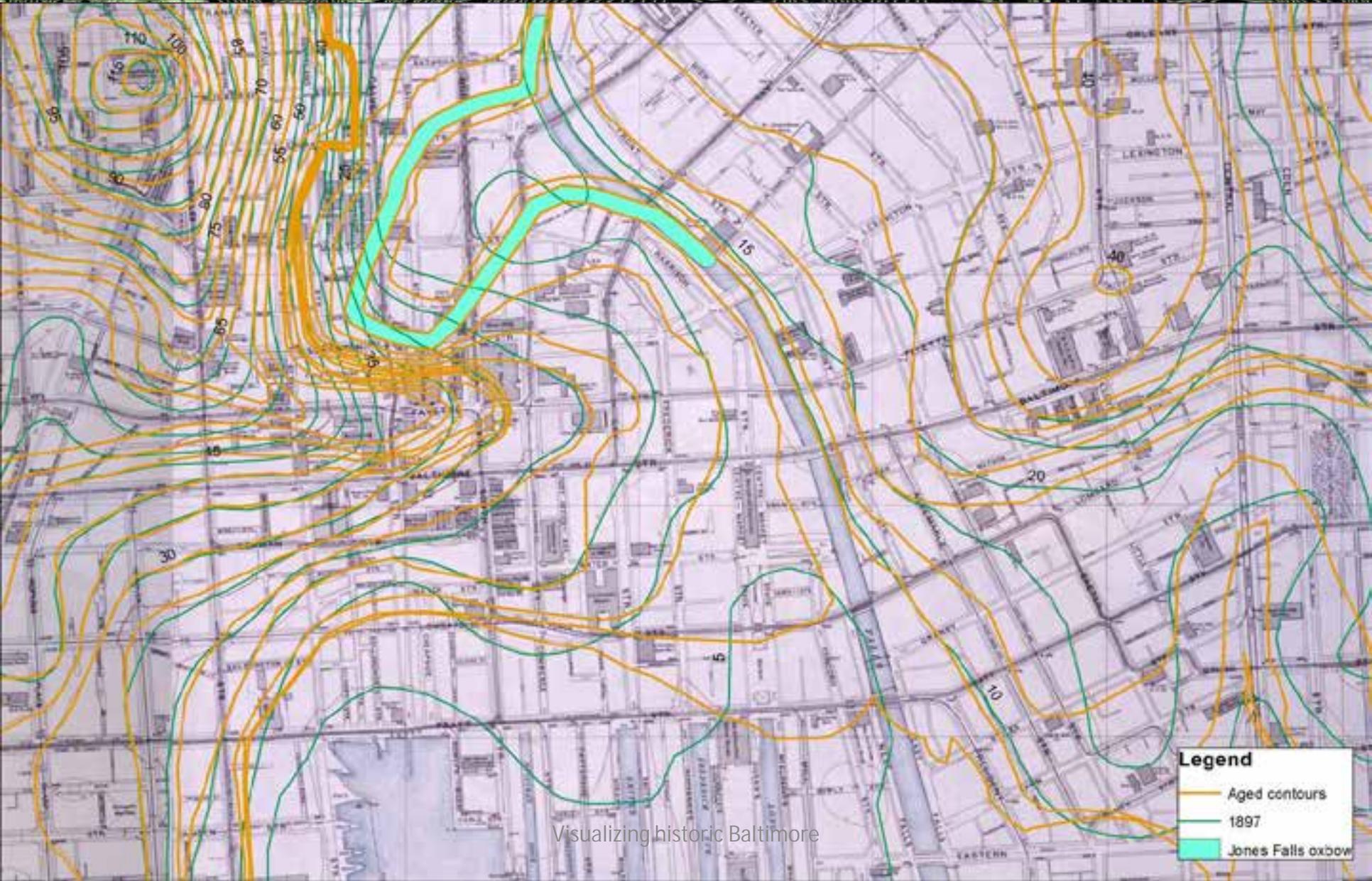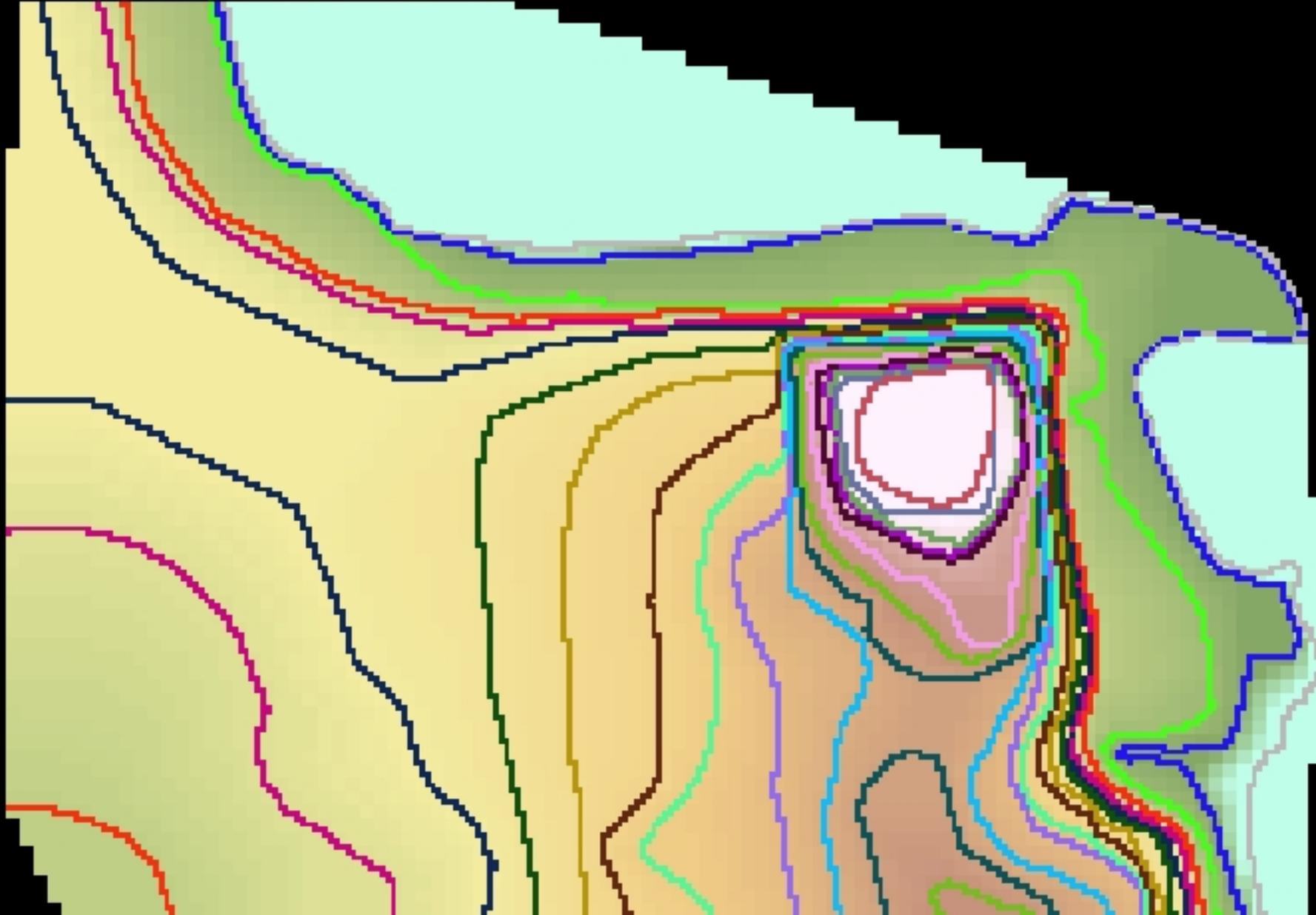
Rapid Prototyping
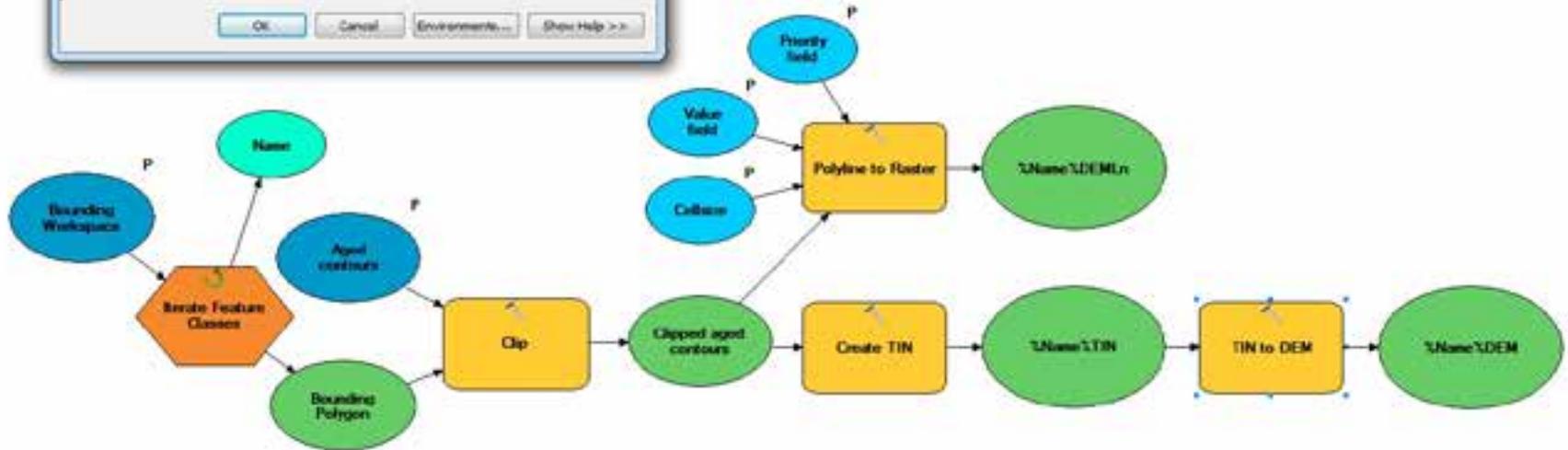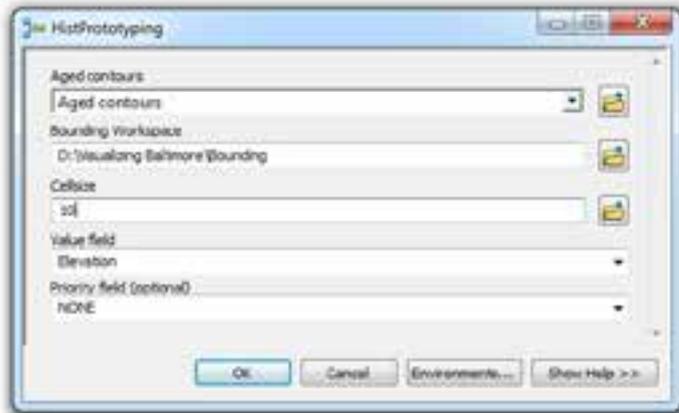
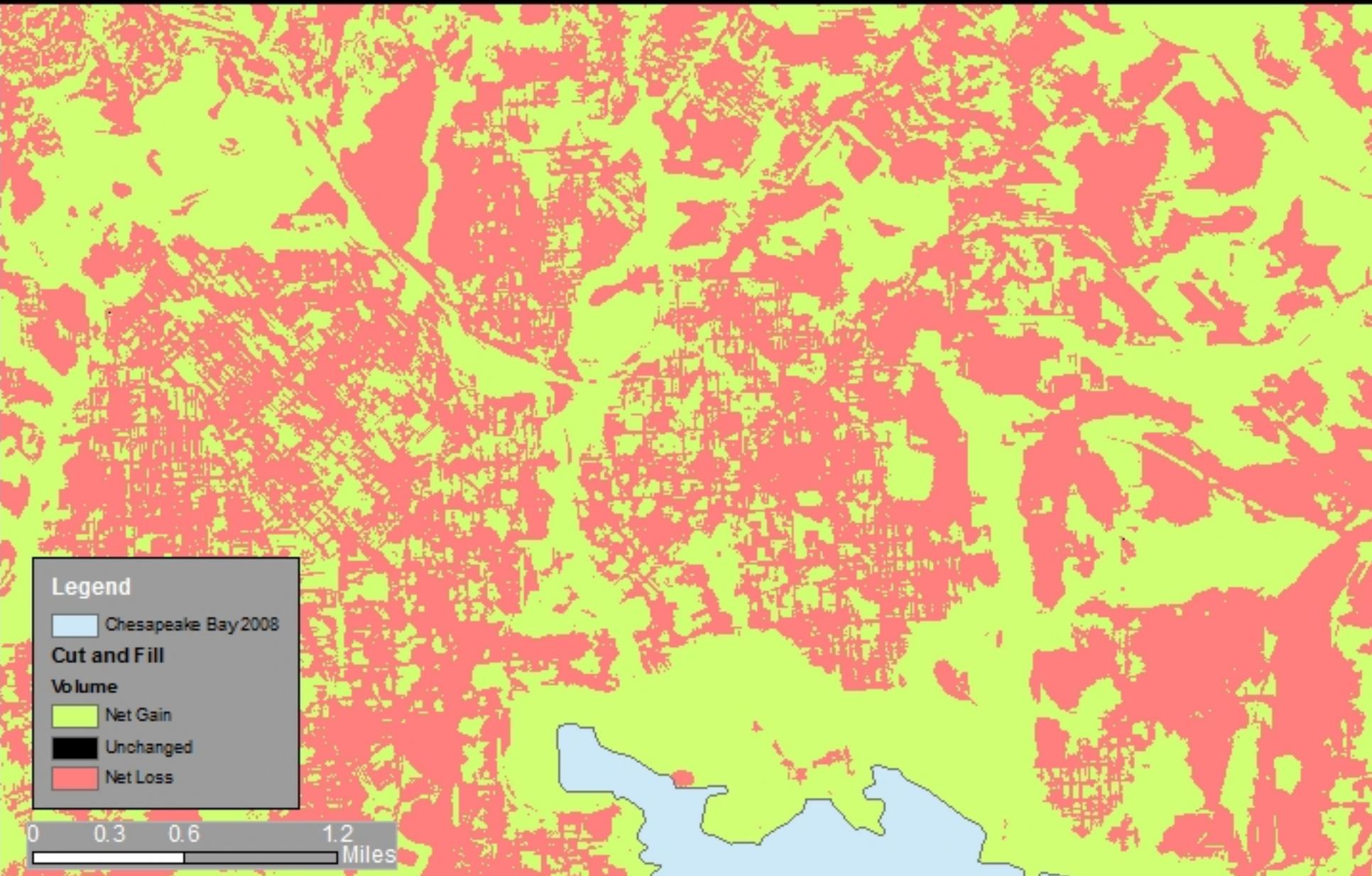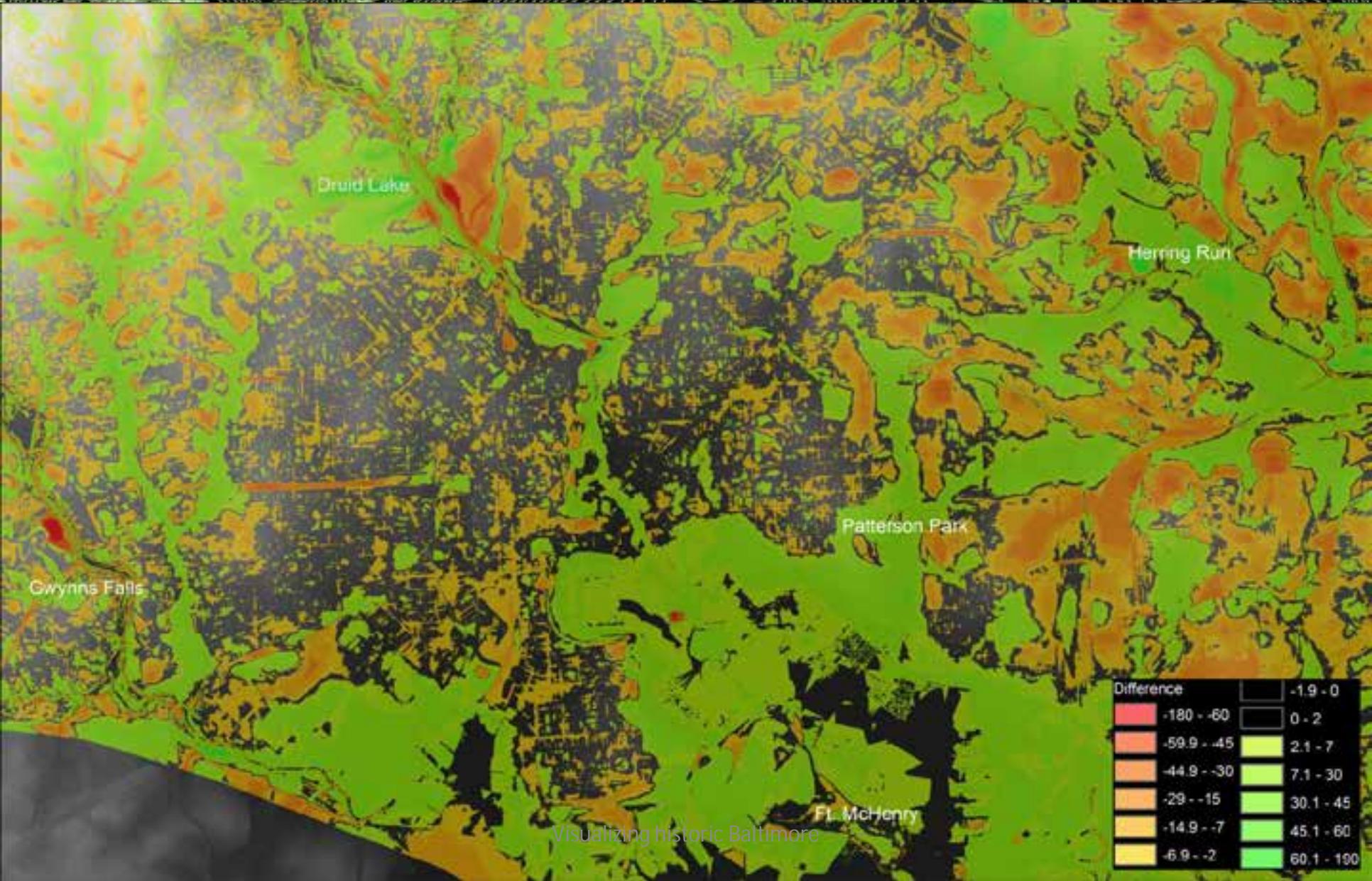# Druid Park (TIN)
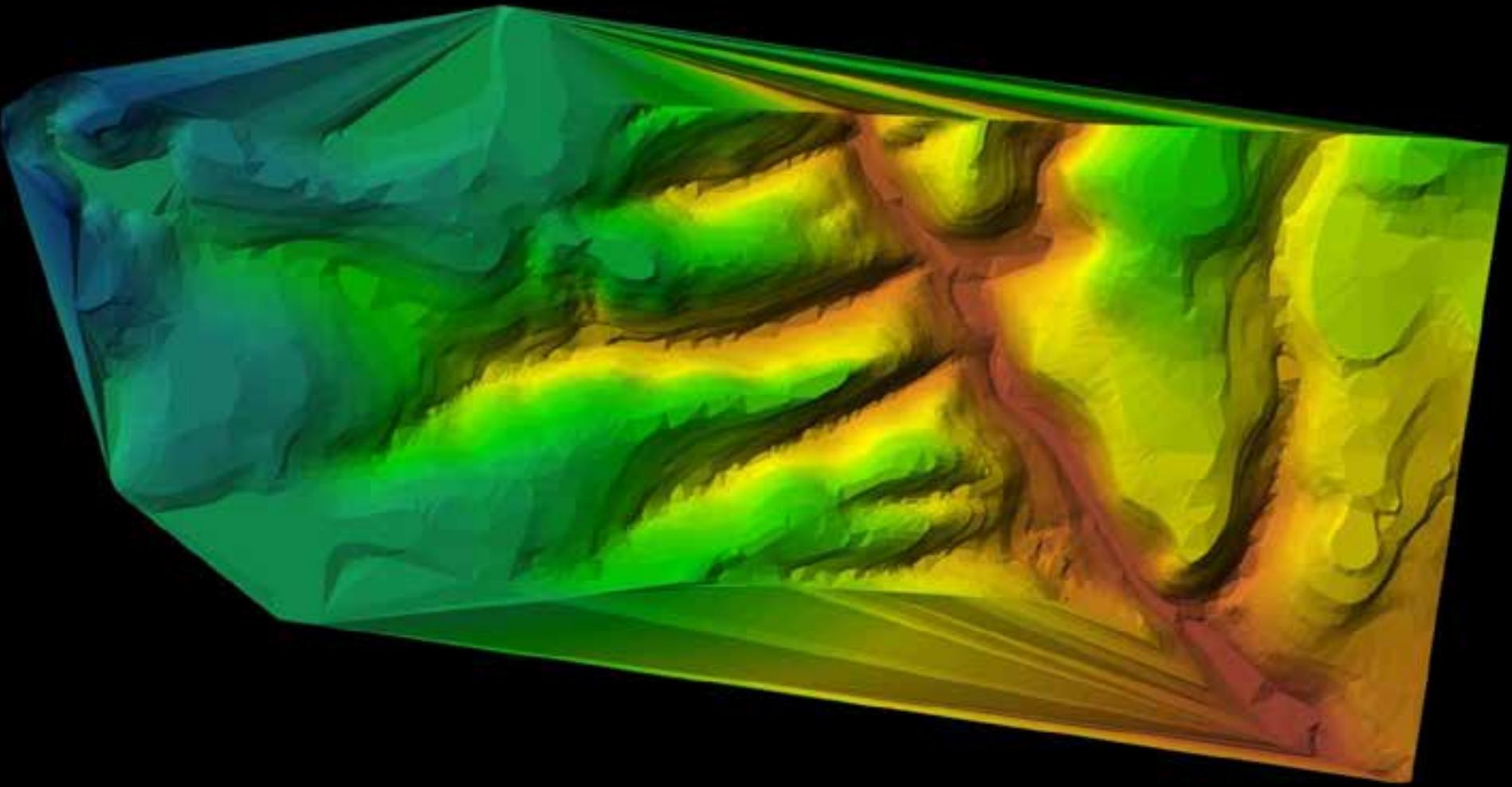
Federal Hill DEM

18th century findings

- The Bay was within 60′ of Water St.
- Charles St. was a wharf
- Ox bow at the Battle Monument
- With a bluff to the west
- Jones Falls emptied directly into the Bay
- Patterson Park was a hill and Harris Cr. estuary
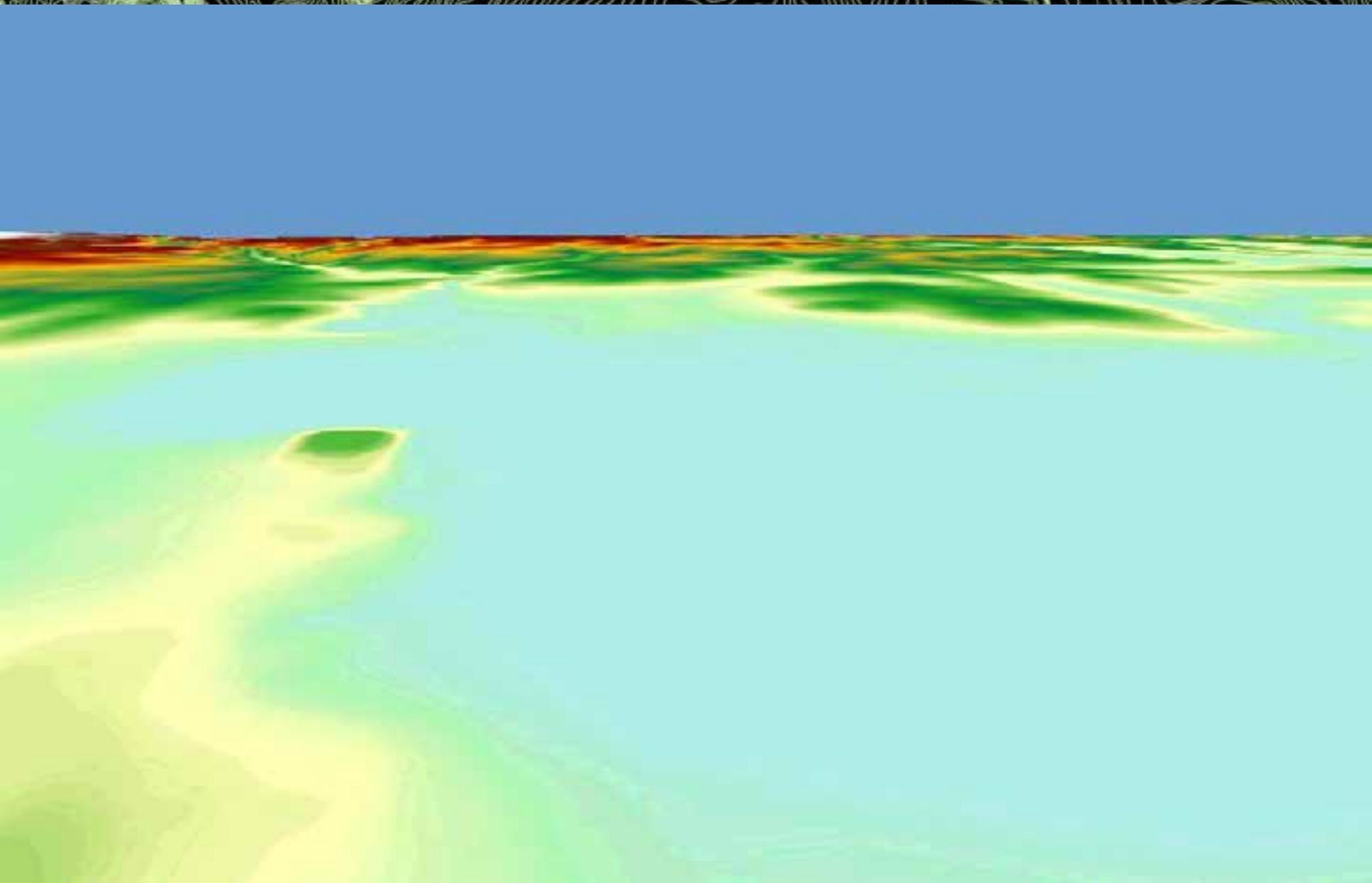- Druid Lake was Druid Creek

Cut n Fill

Raster math

Visualizing historic Baltimore

Difference	
-180 - -60	-1.9 - 0
-59.9 - -45	0 - 2
-44.9 - -30	2.1 - 7
-29 - -15	7.1 - 30
-14.9 - -7	30.1 - 45
-6.9 - -2	45.1 - 60
	60.1 - 190

3D visualization

3D visualization

Outcomes

- Integrated historic maps
- Integrated historic archival evidence
- Provides a common terrain for historian's use
- Provides impetus for further environmental research
  - Shoreline change
  - Stream change