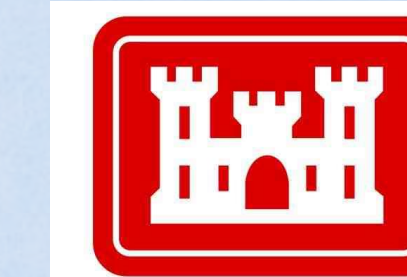




The Washington DC Flood Inundation Mapping Project: Development and Use of Mapping in a High-Profile, Multiple-Threat Area



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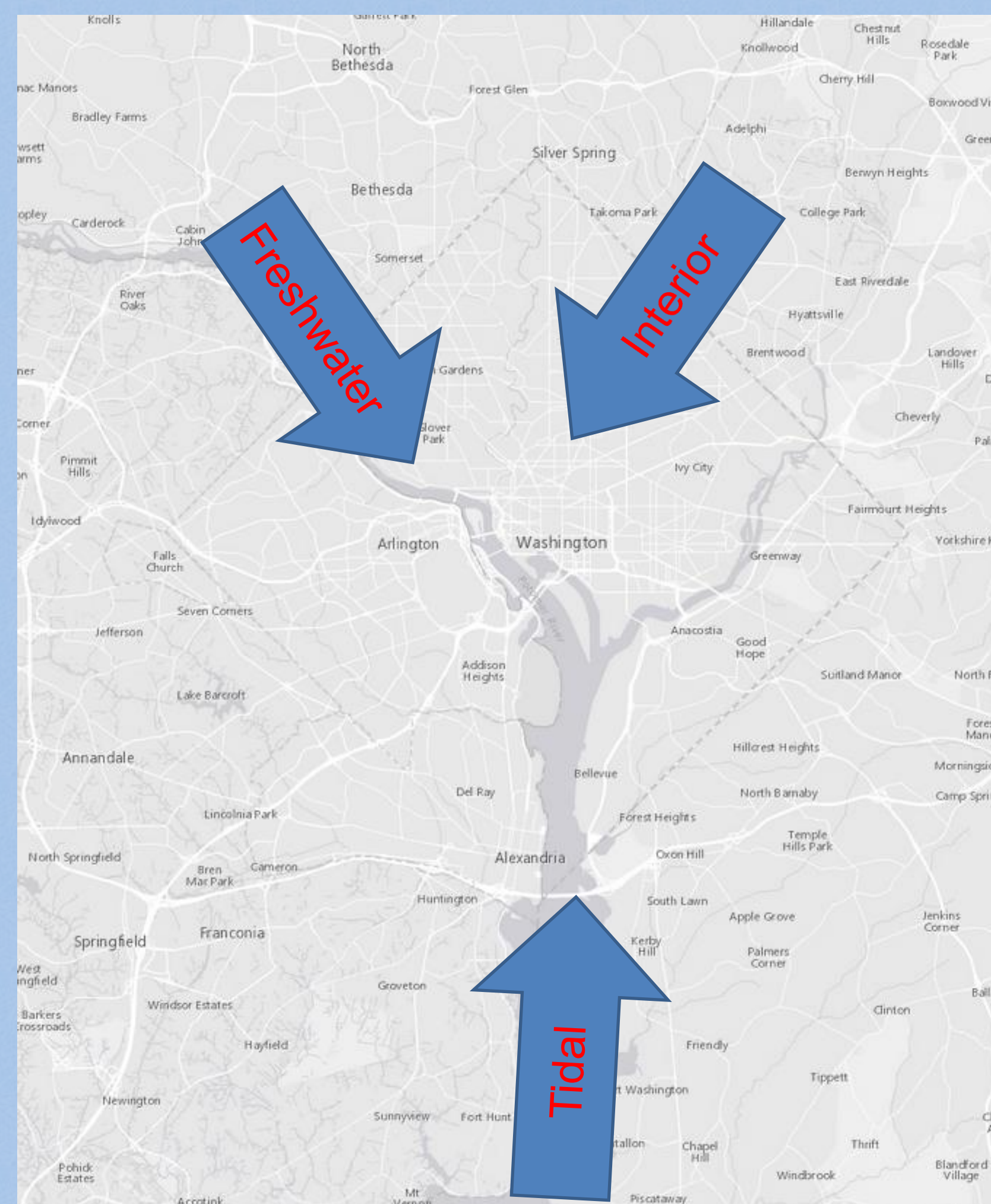
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The Risk to DC

Washington, DC can be threatened by three different types of flooding: freshwater Potomac flooding, tidal flooding, and interior urban/small stream flooding. Historic buildings and monuments fill much of the floodplain.

Freshwater floods can originate from dozens of miles upstream, and take 2-3 days to reach DC



Interior floods occur due to local heavy rainfall

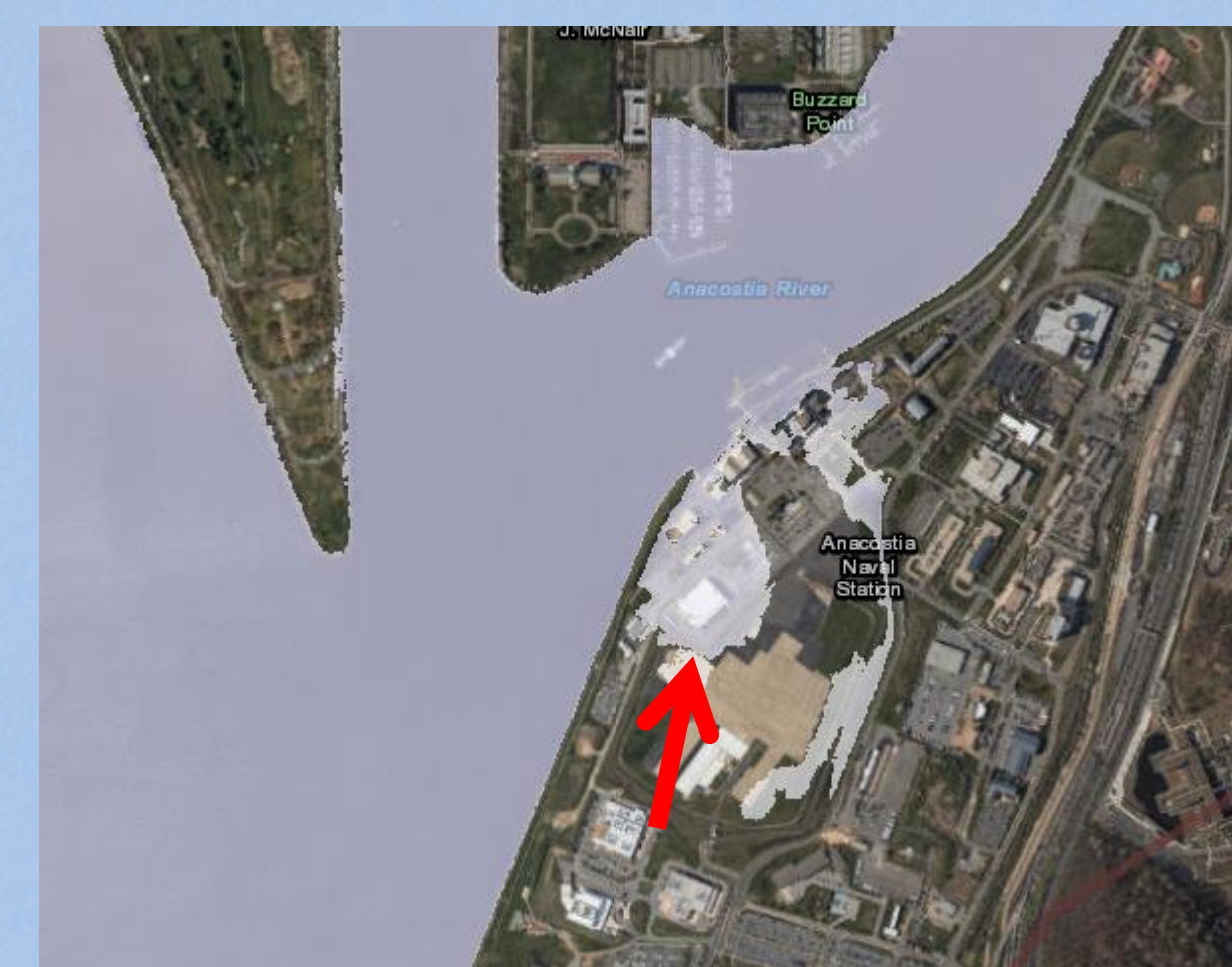
Tidal floods occur due to surge up the tidal Potomac and local effects

Project Background

- The District of Columbia Silver Jackets Team, an interagency effort led by the US Army Corps of Engineers, the National Park Service, and the District of Columbia Department of Energy & Environment, developed the vision and scope for this project.
- Funding was obtained, in part, through a USACE flood risk management project grant in 2014. Numerous agencies also provided in-kind services. The District of Columbia and the City of Alexandria also provided funding to place the mapping on the National Weather Service Advanced Hydrologic Prediction Service (AHPS) website.

Unique Challenges

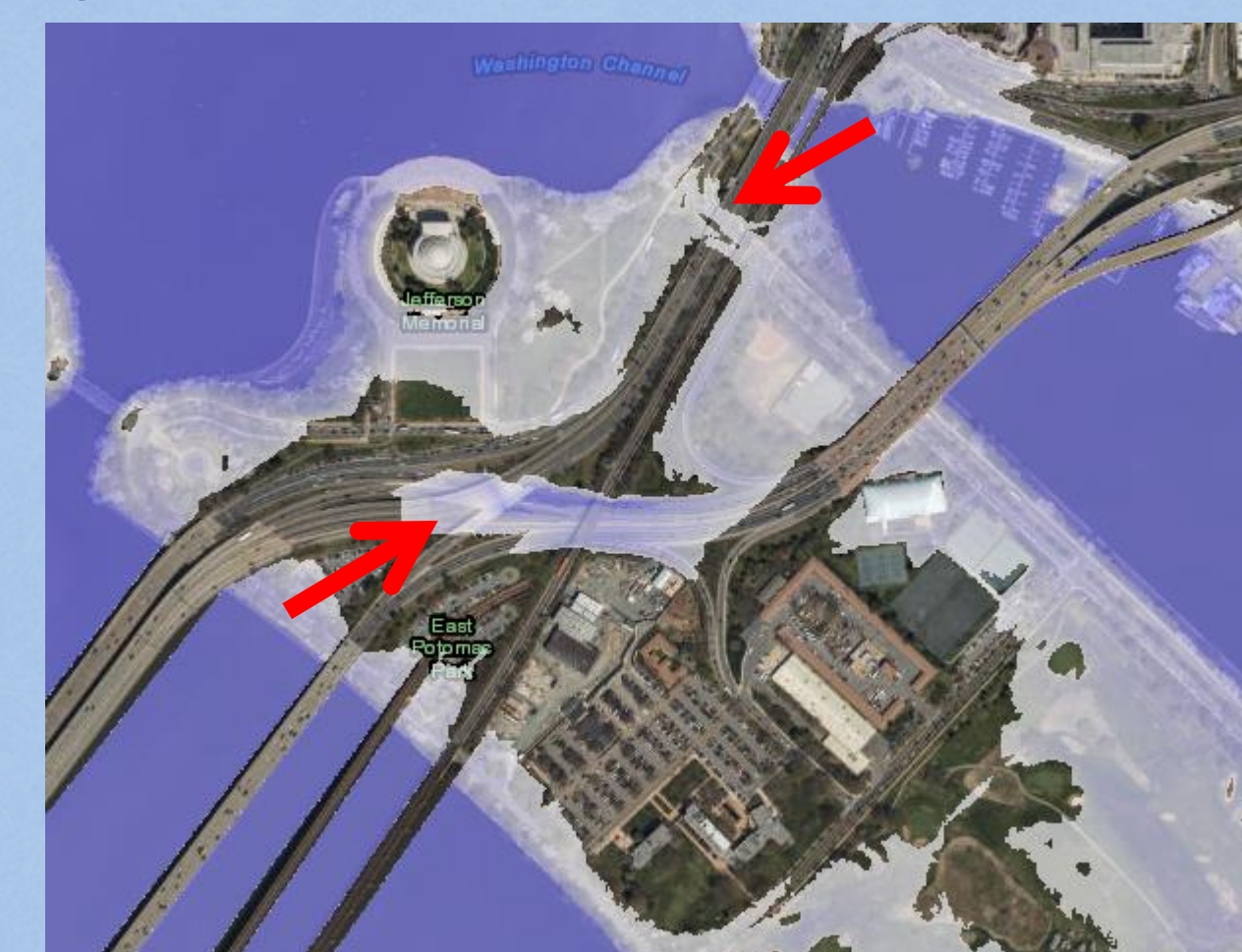
- The maps do not include several of the flood walls in place, since they cannot be certified to be effective during floods. This means that some areas are shown as inundated that will likely not be, even below the flood stage.



Map = 4.1 ft MLLW; flood = 4.2 ft

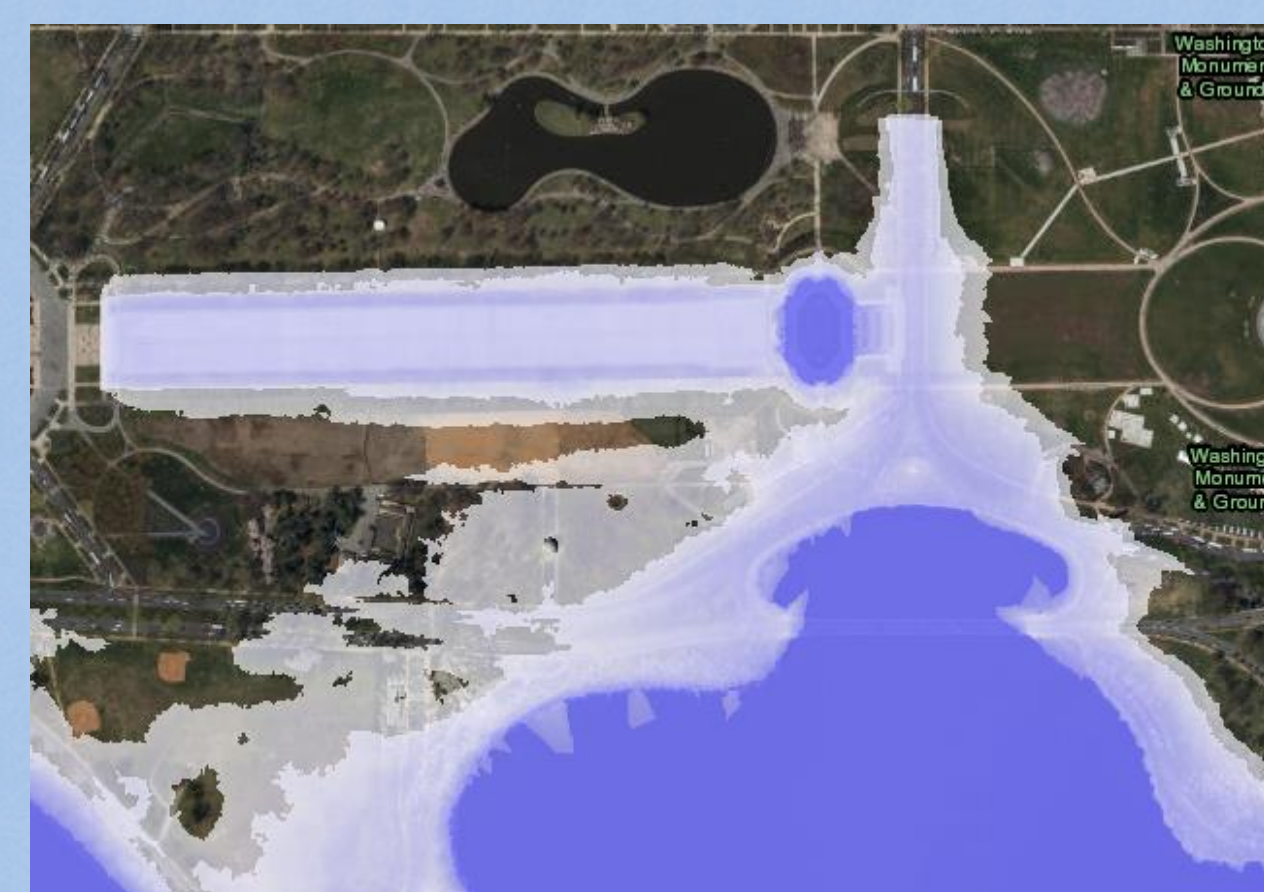
- Ground elevation was used, so elevated roadways which are atop land or other roadways may show as flooded when they will not be. (Bridges over water were clipped out.)

In the example at right, the surface streets are flooded, but the elevated roadways above them are not. There is no way to show or indicate this in these maps.



Map = 10.3 ft MLLW

- Maps reflect either only freshwater flooding or only tidal flooding, not a combination of the two. The NWS forecast for this reach uses a coupled model that does account for both; however, the flood extent could be slightly different depending on the flood source and tidal factors.



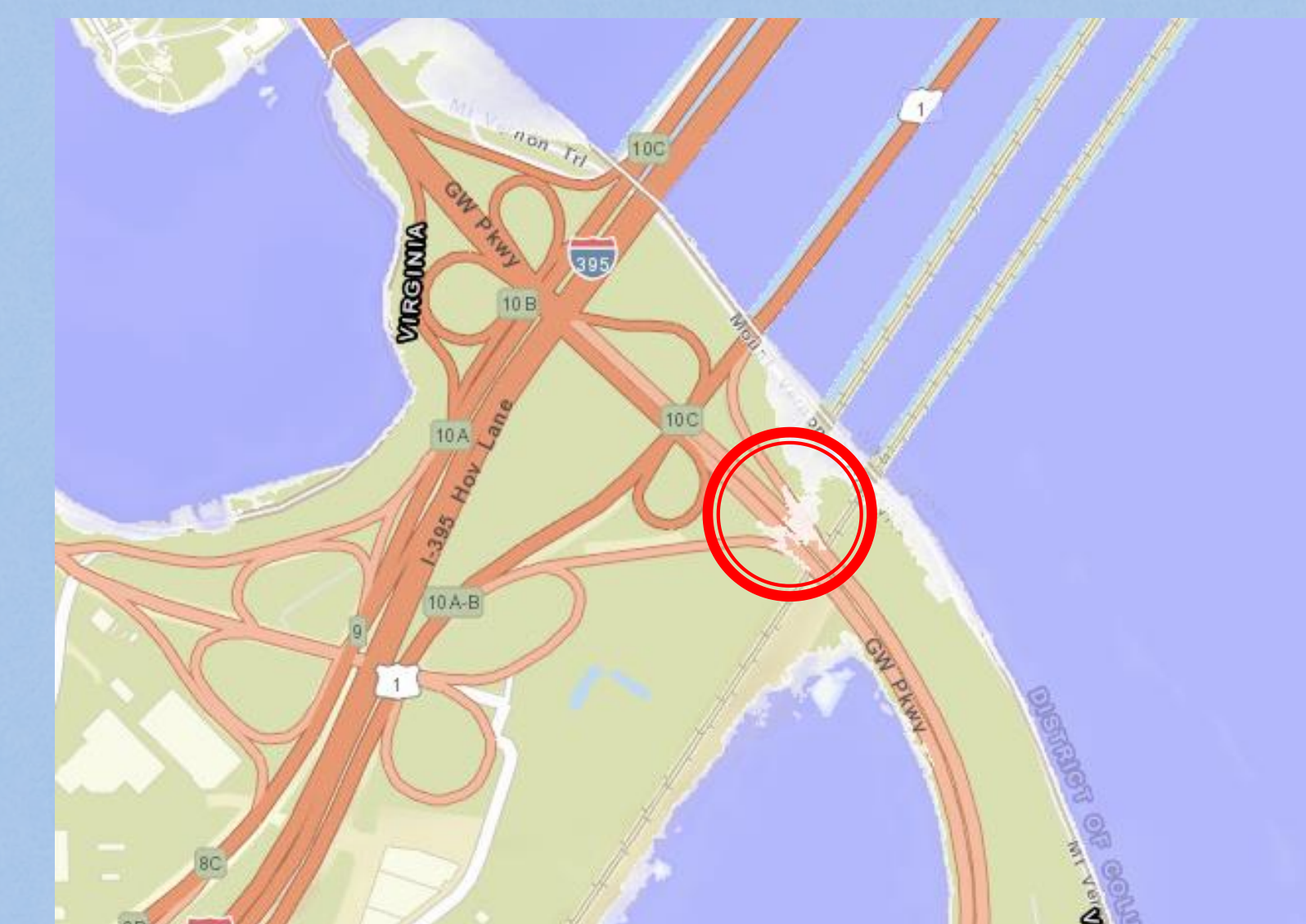
Map = 11.3 ft MLLW freshwater + 11.4 ft MLLW tidal
(tidal has greater extent in this case)

Methodology

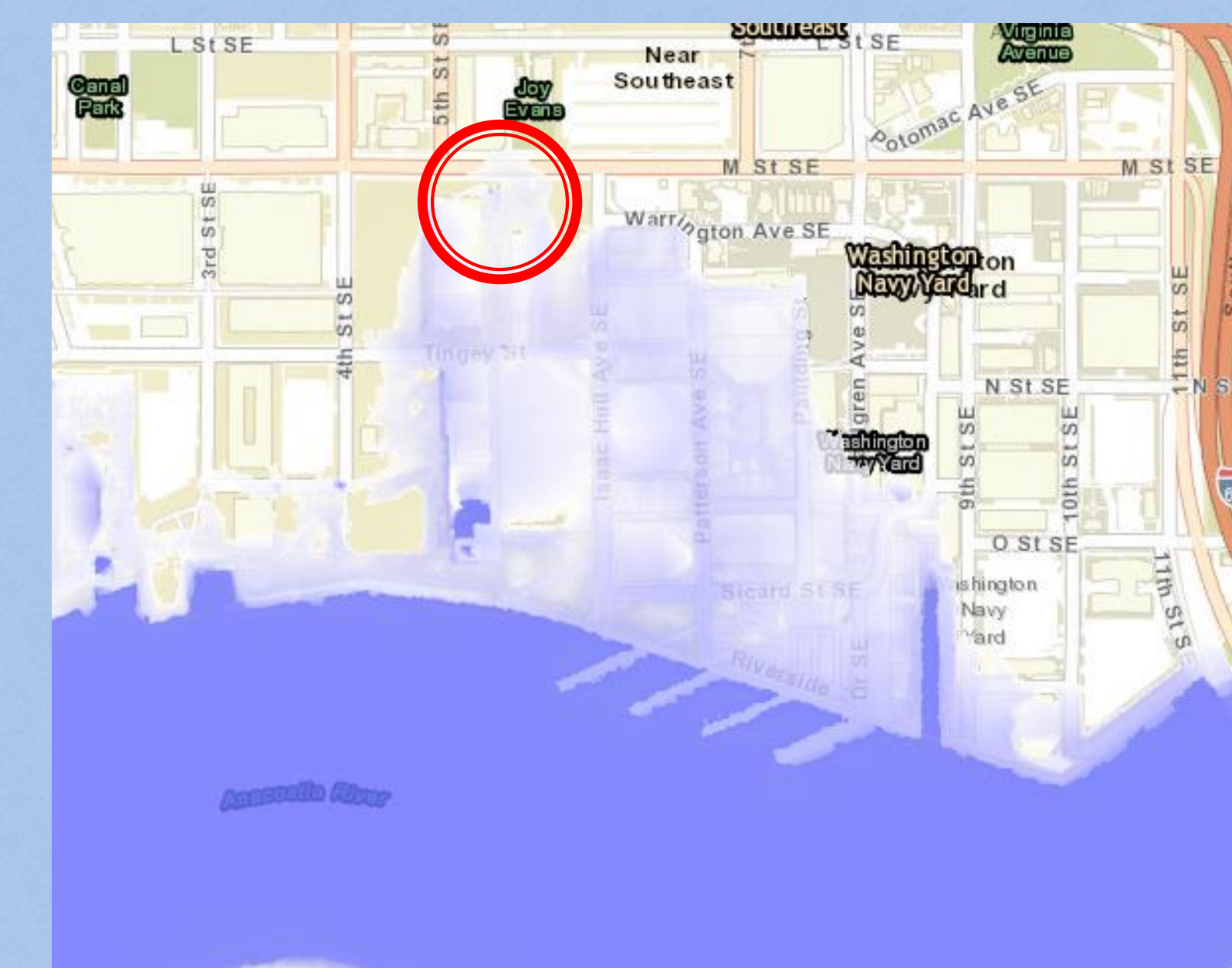
- FEMA previously developed a steady-state HEC-RAS model for this stretch of the river. USGS collected data for bridges which were incomplete or missing in the prior model, as well as data at other cross-sections.
- The improved model with refined geometry was calibrated and combined with topographic data from a 1-meter DEM to develop flood inundation maps and depth grids using the standard procedure.
- The primary difference between this and many other inundation mapping efforts is the need to provide maps for two different flood sources (freshwater and tidal).

Benefits: Words to Pictures

“At 7.5 feet MLLW, floodwaters begin to approach the George Washington Memorial Parkway near the 14th Street Bridge.”

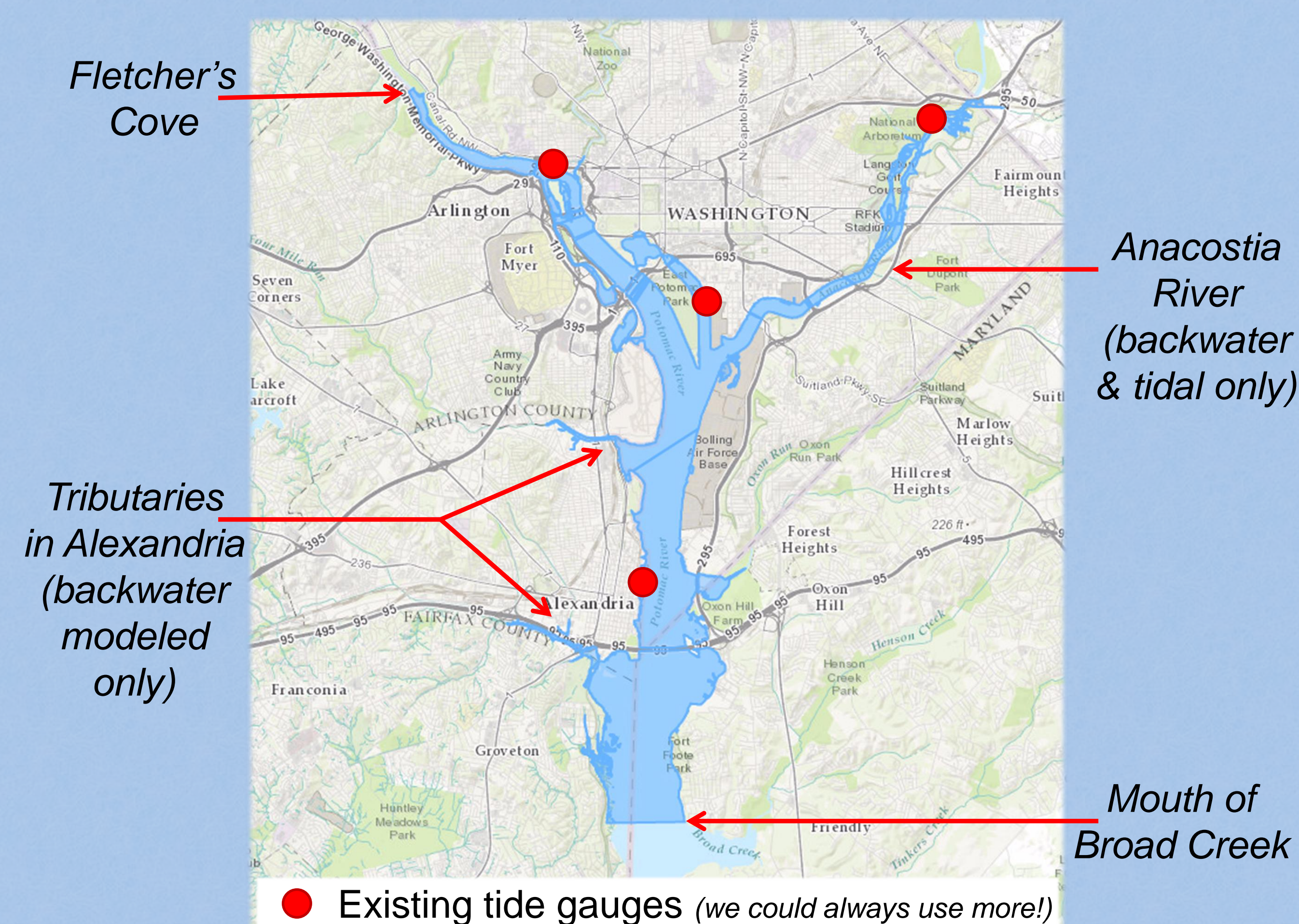


“At 12.0 feet MLLW, floodwaters cover much of the Navy Yard, up to and beginning to include M Street SE.”



Study / Mapping Area

The mapped area encompasses the Potomac River from Fletcher's Cove, DC to the mouth of Broad Creek, Maryland and includes all of the Anacostia River within DC, as well as other small tributary streams.



● Existing tide gauges (we could always use more!)

Acknowledgments

Special thanks to the DC Department of Environment and Energy, the United States Geological Survey, the National Capital Planning Commission, and all partner agencies of the DC Silver Jackets Team for their assistance and leadership in this effort.

To view the maps:

<http://weather.gov/washington/PotomacInundationMaps>