Determination of the Natural Resiliency of Critical Infrastructure in Response to Flooding Events in the Gunpowder, Patapsco, and Patuxent River Watersheds, Maryland, 2014

Start Date: Anticipated Fall 2014

End Date: Anticipated Spring 2016

Partners: National Fish and Wildlife Foundation (NFWF)

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Background: The National Fish and Wildlife Foundation (NFWF) seeks to enable local and State government to reduce risks of harm to person, property, and environment for the majority of Marylanders--those who live, travel, and/or work in the State's populous center--posed by major coastal storms by assessing how natural features and associated best management and governance practices and structures can contribute to increased regional protection. A primary goal is to identify where key investments in such green infrastructure will provide the greatest return on the public dollar in terms of resiliency, and to the effects of coastal storms and climate change for the community, and benefit fish, wildlife, and plants as well.

Station 01594440, Patuxent River near Bowie, MD, looking downstream at channel from US-50 bridge during Tropical Storm Lee, September 9, 2011.

Objectives: Key project objectives include (1) map and assess existing green infrastructure in the greater Baltimore region that provides resiliency from intensified coastal storms, rising relative sea levels, and flooding, (2) Identify key watershed-scale natural ecosystem protection and enhancement opportunities to reduce the vulnerability of human populations and community infrastructure, (3) Evaluate existing governance and organizational structures to recommend an institutional framework for the Baltimore region to promote green infrastructure for coastal resiliency, (4) Cultivate a network of institutional partners and practitioners to implement regional coastal resiliency green infrastructure solutions through targeted tools and resources, (5) Disseminate findings and lessons learned for application elsewhere in the Sandy-impacted area.

Approach: The scope of the USGS effort on the project is based primarily on Objective 1 above, as USGS streamflow data and associated historical information from 14 streamflow gages in the

Gunpowder, Patapsco, and Patuxent watersheds will provide a basis for evaluating potential vulnerability of existing green infrastructure to intensified coastal storms, rising sea levels, and flooding.

The scope of the USGS work will include a data and information summary on historical flooding for the 14 streamflow gages. The summary will include the following elements: (1) peak gage heights for the top five floods of record, referenced to the North American Vertical Datum of 1988 (NAVD 1988); (2) flood-frequency estimates (50-percent-chance to 0.2-percent-chance) from the Moglen/Thomas regional flood regression equations (Maryland Hydrology Panel, 2010); (3) a summary of peak stage, discharge, and flood-profile information from any indirect discharge measurements that have been made at streamflow gages in the study area; (4) a summary of any rainfall estimates, and any information on storm damage and loss of life related to any of the top five floods of record; and (5) any paleo-flood information that is available for the study area.

Static flood maps that show inundation levels for the peak of record, and for the 0.2 percent-chance flood event will be produced for the reach immediately upstream of each streamflow gage. Comparing the two inundated areas will give an idea of the additional extent of floodplain inundation above the known peak of record that is likely to occur during a 0.2-percent-chance flood event. This information can be used by the other project partners to determine if critical infrastructure in the vicinity of the investigated stream reaches may be at risk for flood damage during such an extreme event that would exceed that experienced during the flood of record.

Streamflow gages from which data will be used for the investigation will include:

01581810, Gunpowder Falls at Hoffmanville, MD (2000—present)
01581920, Gunpowder Falls near Parkton, MD (2000—present)
01582000, Little Falls at Blue Mount, MD (1944-present)
01582500, Gunpowder Falls at Glencoe, MD (1978-80, 83-present)
01583500, Western Run at Western Run, MD (1944-present)
01584500, Little Gunpowder Falls at Laurel Brook, MD (1927-70, 1971-86 (CSG); 1999-present)
01586000, NB Patapsco River at Cedarhurst, MD (1945—present)
01587500, SB Patapsco River at Henryton, MD (1948-1980)
01589000, Patapsco River at Hollofield, MD (1944-92, 1994-95, 2000-04, 2010-present)
01589300, Gwynns Falls at Villa Nova, MD (1957-88, 1997-present)
01591000, Patuxent River near Unity, MD (1944-present)
01593500, Little Patuxent River at Guilford, MD (1932-present)
01594000, Little Patuxent River at Savage, MD (1940-58, 1976-80, 1985-present)
01594440, Patuxent River near Bowie, MD (1977-present)

Results: None as of fall 2014

Publications: None as of fall 2014