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New York State Department of Transportation

Prepared in cooperation with the
New York State Department of Transportation

Flood Investigations in New York

Timely evacuation of people from flood-threatened areas in advance of approaching hurricanes and nor'easters (northeast coastal storms) requires adequate flood-warning time.

Problem

Flooding can be a serious problem in many parts of New York State. Information on floods and analyses of flood data are needed to aid in the design of bridges, culverts, dams, highways, and buildings, and for the prudent management of flood-prone areas. Documentation of floods and a more thorough understanding of flood hydrology and hydraulics will result in more effective management of flood plains and design of structures.

Objectives

(1) To provide information on the magnitude and frequency of floods to agencies and individuals involved in flood-protection, planning, and design. (2) To develop regional flood-frequency relations for streams in New York to allow flood-frequency determinations at locations without stream gages. (3) To conduct local site studies using hydrologic and hydraulic analyses.

Approach

(1) Collect flood data at crest-stage gage stations and publish annual peak discharges. (2) Document notable floods through flood-discharge calculations at miscellaneous measurement sites, by determination of flood profiles, and from flood data collected at long-term continuous record gaging stations. Prepare reports detailing individual floods. (3) Periodically update flood-frequencies at individual stream gaging stations. Use these values in conjunction with GIS-based basin characteristics for each gage to develop regional flood-frequency relations for rural, unregulated streams in New York.

Flood Damage

Figure 1. Collapse of Interstate 88 over Carrs Creek near Unadilla, NY

Documentation

A B

Figure 2. (A) Delaware St. in Walton, NY (B) Documentation of Peak water-surface elevation

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These relations can be used to estimate the magnitude and frequency of floods at any ungaged stream location in the State. (4) Study other factors affected by or which affect floods such as bridge scour, channel roughness coefficients, rainfall-runoff analyses, ice jams at bridges, and several other hydrologic and hydraulic processes.

Related Publications

Szabo, C.O., Coon, W.F., and Niziol, T.A., 2010, Flash floods of August 10, 2009, in the Villages of Gowanda and Silver Creek, New York: U.S. Geological Survey Scientific Investigations Report 2010-5259, 23 p.
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Suro, T.P. and Firda, G.D., 2007, Flood of April 2-3, 2005, Esopus Creek basin, New York: U.S. Geological Survey Open-File Report 2007-1036, 85 p.
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Lumia, Richard, Freehafer, D.A., and Smith, M.J., 2006, Magnitude and frequency of floods in New York: U.S. Geological Survey Scientific Investigations Report 2006-5112, 152 p.
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http://pubs.usgs.gov/sir/2006/5112/

Brooks, L.T., 2005, Flood of September 18-19, 2004 in the Upper Delaware River Basin, New York: U.S. Geological Survey Open-File Report 2005-1166, 123 p.
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http://ny.water.usgs.gov/pubs/wri/wri974252/

Lumia, Richard and Murray, P.M., 1993, Maximum known stages and discharges of New York streams, 1865-1989, with descriptions of five selected floods, 1913-85: U.S. Geological Survey Water-Resources Investigations Report 92-4042, 123 p., 2 pls.
http://pubs.er.usgs.gov/usgspubs/wri/wri924042

Embree, W.N., 1993, Water level control in the New York State Canal System within the Oswego River basin -- Description of control points and guidelines to their operation: New York State Thruway Authority Canal Corporation Technical Manual 900-0-02, 35 p.

Lumia, Richard, 1991, Regionalization of flood discharges for rural, unregulated streams in New York, excluding Long Island: U.S. Geological Survey Water-Resources Investigations Report 90-4197, 119 p.
http://ny.water.usgs.gov/pubs/wri/wri904197/

Zembrzuski, T.J., Jr. and Evans, M.L., 1989, Flood of April 4-5, 1987, in southeastern New York state, with flood profiles of Schoharie Creek: U.S. Geological Survey Water-Resources Investigations Report 89-4084, 43 p.
http://pubs.er.usgs.gov/usgspubs/wri/wri894084

Lumia, Richard, Burke, P.M., and Johnston, W.H., 1987, Flooding of December 29, 1984 through January 2, 1985, in northern New York state, with flood profiles of the Black and Salmon Rivers: U.S. Geological Survey Water-Resources Investigations Report 86-4191, 53 p.
http://pubs.er.usgs.gov/usgspubs/wri/wri864191

Sauer, V.B., Thomas, W.O. Jr., Stricker, V.A., and Wilson, K.V., 1983, Flood Characteristics of Urban Watersheds in the United States: U.S. Geological Survey Water-Supply Paper 2207, 63 p.

Magnitude and Frequency of Floods

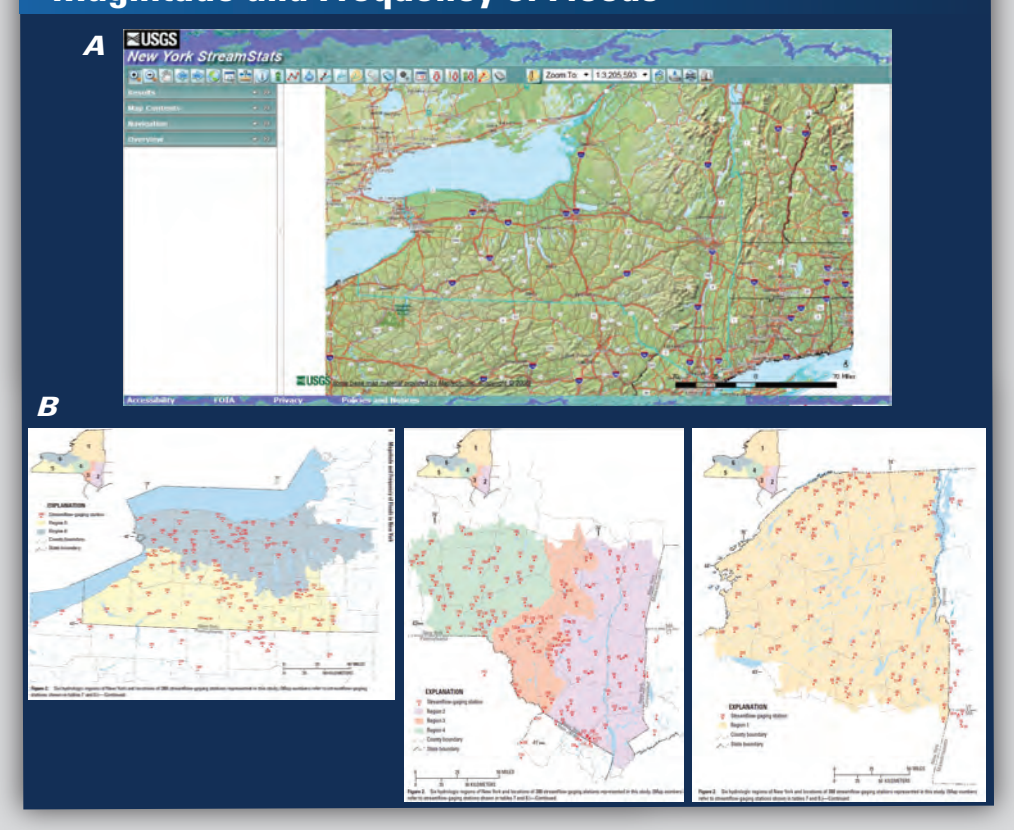

Figure 3. (A) StreamStats for New York can be used to estimate (1) instantaneous flood discharges for ungaged, unregulated, rural streams throughout New York, low flows for ungaged streams in the lower Hudson River Basin, and bankfull discharge and channel characteristics of streams throughout New York. (B) Six hydrologic regions of New York and locations of 388 stream-gaging stations.

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