Prepared in cooperation with the City of Atlanta, Georgia

Flood-Inundation Maps for Peachtree Creek from the Norfolk Southern Railway Bridge to the Moores Mill Road NW Bridge, Atlanta, Georgia

Pamphlet to accompany

Scientific Investigations Map 3189

U.S. Department of the Interior
U.S. Geological Survey

Cover. Surveying a Peachtree Creek cross section at the Howell Mill Road NW bridge (photograph by Paul D. Ankcorn, U.S. Geological Survey).

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KEN SALAZAR, Secretary

U.S. Geological Survey
Marcia K. McNutt, Director

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Sheets (Each sheet has individual pdf and jpg files available for download. For links, see *http://pubs.usgs.gov/sim/3189/*.)

Conversion Factors and Datums

Multiply	By	To obtain
	Length	
inch	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square foot (ft^2)	0.0929	square meter (m^2)
square mile (mi^2)	2.590	square kilometer (km^2)
	Flow rate	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
	Hydraulic gradient	
foot per mile (ft/mi)	0.1894	meter per kilometer (m/km)

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Elevation, as used in this report, refers to the distance above the vertical datum.

Stage, as used in this report, is the elevation of the water surface above an arbitrary datum established at the gage (gage datum).

Acronyms and Additional Abbreviations

AHPS	Advanced Hydrologic Prediction Service
DFIRM	Digital Flood Insurance Rate Map
FEMA	Federal Emergency Management Agency
GIS	geographic information system
LiDAR	Light Detection and Ranging
MARTA	Metropolitan Atlanta Rapid Transit Authority
NE	northeast
NW	northwest
NWS	National Weather Service
USGS	U.S. Geological Survey

Acknowledgments

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Flood-Inundation Maps for Peachtree Creek from the Norfolk Southern Railway Bridge to the Moores Mill Road NW Bridge, Atlanta, Georgia

By Jonathan W. Musser

Abstract

Digital flood-inundation maps for a 5.5-mile reach of the Peachtree Creek from the Norfolk Southern Railway bridge to the Moores Mill Road NW bridge, were developed by the U.S. Geological Survey (USGS) in cooperation with the City of Atlanta, Georgia. The inundation maps, which can be accessed through the USGS Flood Inundation Mapping Science Web site at *http://water.usgs.gov/osw/flood_inundation/,* depict estimates of the areal extent and depth of flooding corresponding to selected water levels (stages) at the USGS streamgage at Peachtree Creek at Atlanta, Georgia (02336300) and the USGS streamgage at Chattahoochee River at Georgia 280, near Atlanta, Georgia (02336490). Current water level (stage) at these USGS streamgages may be obtained at *http://waterdata.usgs.gov/* and can be used in conjunction with these maps to estimate near real-time areas of inundation. The National Weather Service (NWS) is incorporating results from this study into the Advanced Hydrologic Prediction Service (AHPS) flood warning system (*http:/water.weather.gov/ahps/*). The NWS forecasts flood hydrographs at many places that commonly are collocated at USGS streamgages. The forecasted peak-stage information for the USGS streamgage at Peachtree Creek, which is available through the AHPS Web site, may be used in conjunction with the maps developed in this study to show predicted areas of flood inundation.

A one-dimensional step-backwater model was developed using the U.S. Army Corps of Engineers HEC–RAS software for a 6.5-mile reach of Peachtree Creek and was used to compute flood profiles for a 5.5-mile reach of the creek. The model was calibrated using the most current stage-discharge relations at the Peachtree Creek at Atlanta, Georgia, streamgage (02336300), and the Chattahoochee River at Georgia 280, near Atlanta, Georgia, streamgage (02336490) as well as high water marks collected during the 2010 annual peak flow event. The hydraulic model was then used to determine 50 water-surface profiles. The profiles are for 10 flood stages at the Peachtree Creek streamgage at 1-foot intervals referenced to the streamgage datum and ranging from just above bankfull stage (15.0 feet) to approximately the highest recorded water level at the streamgage (24.0 feet). At each stage on Peachtree Creek, five stages at the Chattahoochee River streamgage, from 26.4 feet to 38.4 feet in 3-foot intervals, were used to determine backwater effects. The simulated water-surface profiles were then combined with a geographic information system digital elevation model—derived from Light Detection and Ranging (LiDAR) data having a 0.3-foot vertical and 16.4-foot horizontal resolution—to delineate the area flooded for each 1-foot increment of stream stage.

The availability of these maps, when combined with real-time information regarding current stage from USGS streamgages and forecasted stream stages from the NWS, provide emergency management personnel and residents with critical information during flood response activities, such as evacuations and road closures as well as for postflood-recovery efforts.

Introduction

The City of Atlanta, Georgia (Ga.) (fig. 1), is a large urban community with an estimated population of 486,411 in 2006 (U.S. Bureau of Census, 2011). Flood plains within the city are highly developed with a mix of residential, recreational, and commercial structures. In recent years, Atlanta has experienced severe flooding that has caused substantial damage along Peachtree Creek. The floods of September 2004 and September 2009 are two such notable events.

Prior to this study, Atlanta officials have relied on several information sources (available on the Internet) to make decisions on the best way to alert the public and to mitigate flood damages along Peachtree Creek. One source of information is the Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Map (DFIRM) (Federal Emergency Management Agency, 2010). A second source of information is the U.S. Geological Survey (USGS) streamgage—Peachtree Creek at Atlanta, Georgia (02336300)—from which current or historical water levels (stage) can be obtained. Stage is the elevation of the water surface above an arbitrary datum established at the gage (gage datum). A third source is the National Weather Service (NWS) forecast of peak stage at the USGS Peachtree Creek at Atlanta streamgage (forecast site AANG1) through the Advanced Hydrologic Prediction Service (AHPS) Web site at *http:/water.weather.gov/ahps/*.

Although USGS current stage and NWS forecast stage information is particularly useful for residents in the immediate vicinity of a streamgage, it is of limited use to residents farther upstream or downstream, because the water-surface elevation is not constant along the entire stream channel. Also, FEMA and State emergency management mitigation teams or property owners typically lack information related to water depth at locations other than locations near the USGS streamgages or the NWS flood-forecast points.

Purpose and Scope

The purpose of this report is to describe the development of a series of estimated flood-inundation maps for Peachtree Creek in Atlanta, Ga. The maps and other useful flood information are available on the USGS Flood Inundation Mapping Science Web site at *http://water.usgs.gov/osw/flood_inundation/* and the NWS AHPS Web site. Internet users can select estimated inundation maps that correspond to (1) current stages at the USGS streamgages, (2) the NWS forecasted peak stage, or (3) other desired stream stages.

The scope of the study was limited to a 6.5-mile (mi) reach of Peachtree Creek between the junction of North Fork Peachtree Creek and South Fork Peachtree Creek to about 2,100 feet (ft) downstream of the Moores Mill Road NW bridge (fig. 2). Results are presented for a 5.5-mi subsection of this stream reach extending from the Norfolk Southern Railway bridge to the Moores Mill Road NW bridge. Tasks specific to development of the flood-inundation maps were (1) analysis of the flow and stage data collected at two streamgages, one on Peachtree Creek and one on the Chattahoochee River (table 1); (2) collection of topographic data and geometric data (for structures, bridges, and the stream channel) throughout the study reach; (3) determination of energy-loss factors (roughness coefficients) in the stream channel and flood plain; (4) computation of water-surface profiles using the U.S. Army Corps of Engineers HEC–RAS computer program (U.S. Army Corps of Engineers, 2010); (5) production of estimated flood-inundation maps at various stream stages using the U.S. Army Corps of Engineers HEC–GeoRAS computer program (U.S. Army Corps of Engineers, 2009) and a geographic information system (GIS); and (6) development of an online interface that links to USGS real-time streamgage information and (or) NWS forecasted peak stage to facilitate the display of user-selected flood-inundation maps on the Internet.

Table 1. U.S. Geological Survey streamgage and miscellaneous site information for study basin, Peachtree Creek at Atlanta, Georgia (02336300), and Chattahoochee River at Georgia 280 (02336490).

Station name	Station number	Drainage area, in square miles	Latitude	Longitude	Period of record	Maximum recorded water-surface elevation (stage) at gage and date
Peachtree Creek at Atlanta, Georgia	02336300	86.8	33°49'10"	84°24'28"	1956 to current year	23.70 feet September 21, 2009
Chattahoochee River at Georgia 280	02336490	1,590	33°49'01"	84°28'48"	1973 to current year	35.98 feet September 21, 2009

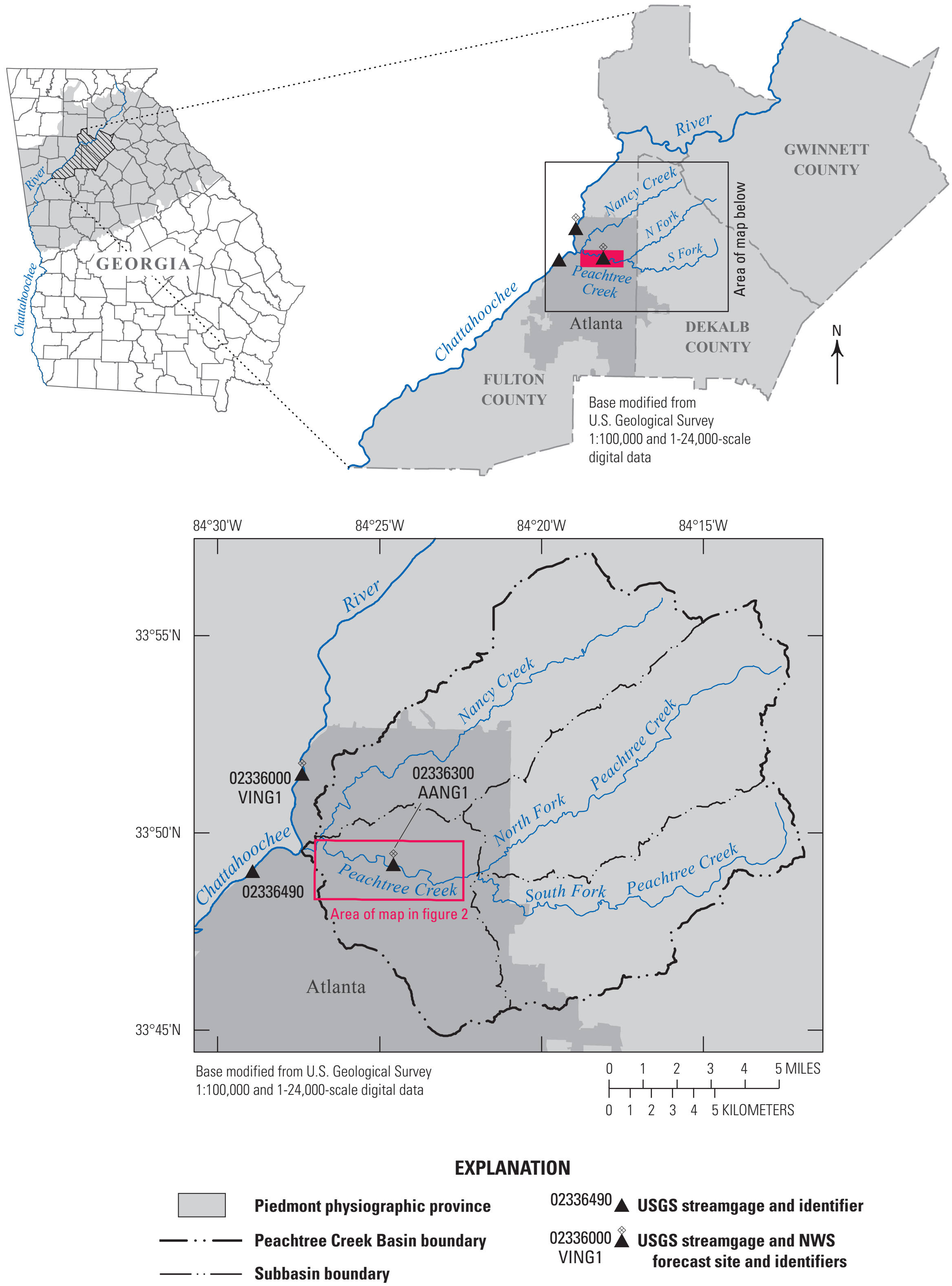

Figure 1. Locations of study reach for Peachtree Creek, U.S. Geological Survey streamgages, and National Weather Service forecast site.

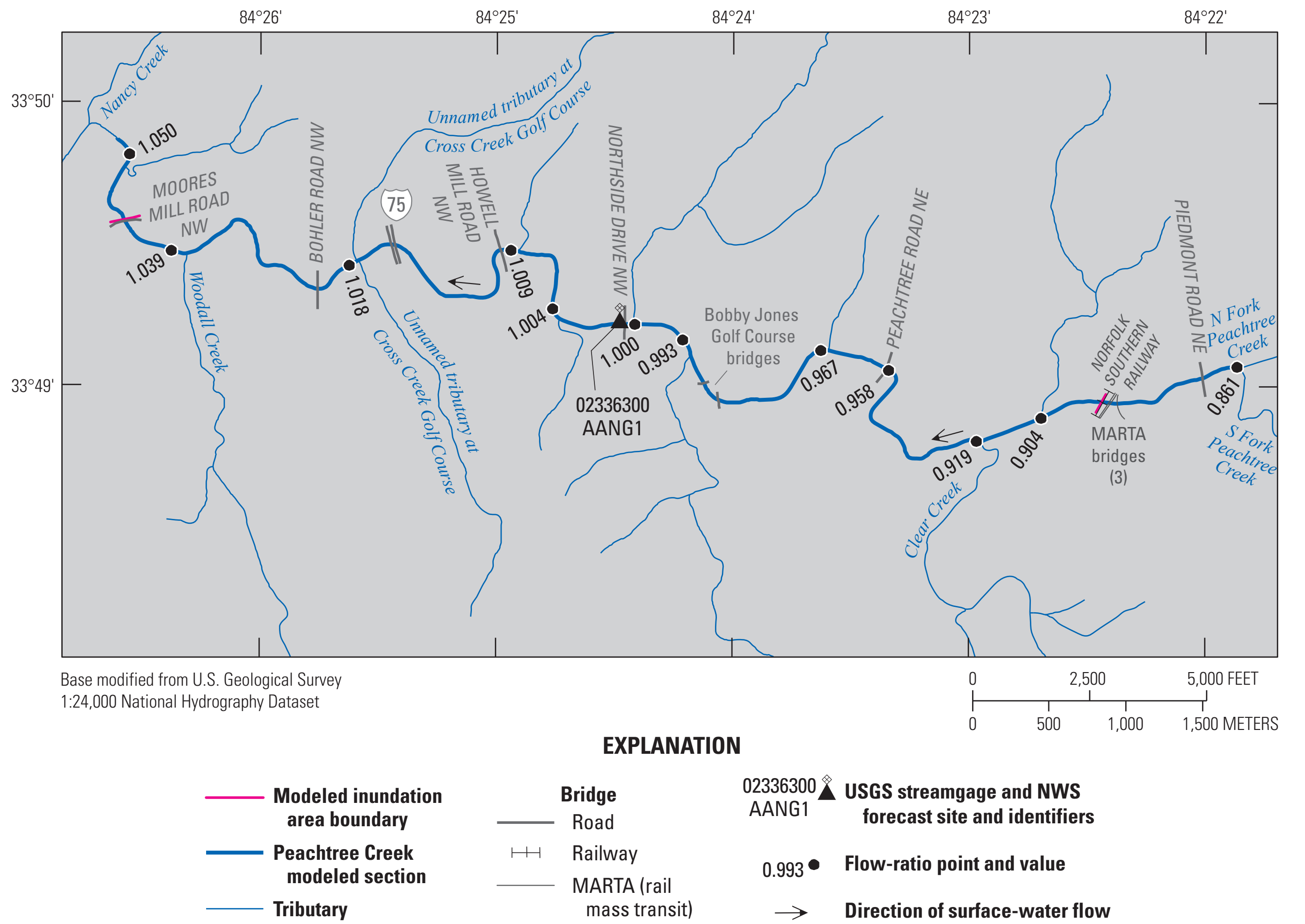

Figure 2. Peachtree Creek modeled section with model extent, flow-ratios, and bridge crossings.

Methods used generally are cited from previously published reports (Bales and others, 2007; Whitehead and Ostheimer, 2009). If techniques varied substantially from previously documented methods because of local hydrologic conditions or available data, they are described in detail in this report. Maps were produced for water levels referenced to the water-surface elevation (stage) at Peachtree Creek at Atlanta (02336300) and ranged from approximately bankfull (15.0 ft) to the maximum observed water level at the streamgage (24.0 ft). The stage at Chattahoochee River at Georgia 280 (GA 280), near Atlanta (02336490) was used as a downstream boundary condition to simulate backwater effect on Peachtree Creek from the Chattahoochee River. The stage at the Chattahoochee River streamgage ranged from 26.4 to 38.4 ft in 3.0 ft intervals.

Study Area Description

Peachtree Creek is in northern Georgia in the Piedmont physiographic province (Clark and Zisa, 1976). The drainage area ranges from 68.9 square miles (mi^2) at the junction of North Fork Peachtree Creek and South Fork Peachtree Creek to 86.8 mi^2 at the Peachtree Creek at Atlanta streamgage (02336300) to 92.6 mi^2 downstream of the Moores Mill Road NW bridge, the downstream extent of the study reach (fig. 2). The headwaters of North Fork Peachtree Creek originate in Gwinnett County, and the headwaters for South Fork Peachtree Creek originate in DeKalb County (fig. 1). The two forks generally flow westward before entering the Atlanta city limits and join to form the main stem of Peachtree Creek. The basin terrain is gently rolling with stream valleys that are fairly deep and narrow and lie 100 to 200 ft below the narrow, rounded stream divides (Clark and Zisa, 1976). The study reach is about 6.5-mi long, with an average channel slope of 4.8 feet per mile (ft/mi). The land contiguous to the study reach is mostly classified as urban or developed, with some small areas classified as forest (Fry and others, 2011). The main channel within the study reach has seven major road bridges, four rail bridges, and two small golf cart bridges that cross the channel and the adjacent flood plain.

Previous Studies

The current DFIRM for Atlanta was published June 18, 2010 (Federal Emergency Management Agency, 2010), and was used to help select the location and length of cross sections in the HEC-RAS model developed for this study. A similar study was completed in Albany, Ga., that provides flood-inundation maps for a range of streamgage stages on the Flint River (Musser and Dyar, 2007). The methods used for the Albany model differed from that of Peachtree Creek because a finite-element two-dimensional model was used. Publication products are similar to those of this study, including this pamphlet and publication to the NWS AHPS Web site.

Constructing Water-Surface Profiles

The water-surface profiles used to produce the 50 flood-inundation maps in this study were computed using HEC–RAS, version 4.1.0 (U.S. Army Corps of Engineers, 2010). HEC–RAS is a one-dimensional step-backwater model for simulation of water-surface profiles with steady-state (gradually varied) or unsteady-state flow computation options. For this study the HEC–RAS analysis was steady-state.

Hydrologic and Steady Flow Data

The study area hydrologic network consists of one streamgage on the study reach and one streamgage on the Chattahoochee River used for modeling backwater effects (fig. 1; table 1). Water level (stage) is measured continuously at all of the sites and continuous records of streamflow are computed at both sites. All water-surface elevations are referenced to North American Vertical Datum of 1988 (NAVD 88). The gages are equipped with satellite radio transmitters that allow data to be transmitted routinely and made available on the Internet within an hour of collection. One of the sites also is equipped with a recording rain gage. Longitudinal water-surface profiles from high-water marks along the main channel were documented following floods in 2010 and also were used for model calibration.

Steady-flow data consisted of flow regime, boundary conditions (either normal depth, or a backwater elevation value), and peak discharge information. Steady-flow data for the study reach were obtained from previous storm events and from the stage-discharge relation at the Peachtree Creek at Atlanta streamgage (02336300).

Topographic and Bathymetric Data

Channel cross sections were developed from USGS field surveys that were conducted in May and June of 2010. These cross sections provide detailed elevation data in the channel below the water surface, on the stream banks, and up into the edge of the flood plain. The distance surveyed into the flood plain varied and depended on the steepness and the amount of undergrowth. The survey data were collected using a Topcon GTS-210 Total Station and a survey rod. Light Detection and Ranging (LiDAR) data with vertical resolution of 0.3 ft were used to provide digital elevation data for the parts of the cross sections that were beyond the surveyed areas. The LiDAR data were collected in 2006, by 3001 Inc., The Geospatial Company, and postprocessing was completed in November 2007 (3001 Inc., The Geospatial Company, 2007). Benchmarks and reference points at the streamgage were used for vertical control when available. At bridge sites where no vertical control points were available, multiple points were selected from aerial photography, and the elevations at these points were extracted from the LiDAR data. The survey elevations were adjusted to NAVD 88 by minimizing the differences between the elevations from the LiDAR data and the adjusted elevation of the corresponding survey points. The differences in elevation between the survey and the LiDAR values at each matching location were averaged. This average offset difference was then applied to all survey points to register the survey elevations to NAVD 88.

Various drainage structures (bridges, culverts, roadway embankments, levees, and dams) in and along the stream affect or have the potential to affect water-surface elevations during floods along the stream. To properly account for these features in the model, structural dimensions for 13 bridges were measured and surveyed in the field concurrently with the stream channel surveys. The bridges from upstream to downstream were Piedmont Road NE, three Metropolitan Atlanta Rapid Transit Authority (MARTA) bridges, Norfolk Southern Railway, Peachtree Road NE, two golf cart bridges on the Bobby Jones Golf Course, Northside Drive NW, Howell Mill Road NW, Interstate 75, Bohler Road NW, and Moores Mill Road NW (fig. 2). Two of the MARTA bridges were adjacent to each other and treated as one bridge in the model. A detailed description of the methods used to acquire and process the topographic and bathymetric data can be found in Bales and others (2007).

Energy Loss Factors

Field observations and high-resolution aerial photographs were used to select initial (precalibration) Manning's roughness coefficients ("*n*" values) for energy (friction) loss calculations. The final Manning's *n* values ranged from 0.029 to 0.054 for the main channel, except for two cross sections where the model became unstable at high flows and the channel Manning's *n* value was increased to 0.07 or 0.09 to smooth the flow profile. In addition, at one location the Manning's *n* value was 0.08 where a large concrete bridge pier remnant was directly in the flow path downstream of the Norfolk Southern Railway bridge, causing turbulence that was accounted for by way of an increased *n* value. The Manning's *n* values ranged from 0.029 (golf courses) to 0.14 (forested areas with heavy undergrowth) for the overbank areas modeled in this analysis.

Model Calibration and Performance

The hydraulic model was calibrated to the most current stage-discharge relation at the Peachtree Creek at Atlanta streamgage (02336300) along with high water marks collected during the 2010 annual peak flow event. The estimated peak discharge for the 2010 flood was 8,050 cubic feet per second (ft^3/s) at an estimated stage of about 19.17 ft at the gage. Model calibration was accomplished by adjusting Manning's *n* values until the results of the hydraulic computations closely agreed with the known flood discharge and stage values. Differences between measured and simulated water levels for models calibrated to gage heights were between –0.09 and +0 .07 ft (table 2). High water marks located upstream of Peachtree Road NE and the Norfolk Southern Railway bridge were about 0.2 ft higher than the modeled elevation from the 2010 flood. During the field investigation, debris was noted at the Peachtree Road NE bridge, which could account for this difference in water-surface elevation. The model assumes no debris in the stream channel. The boundaries of the DFIRM flood zones were similar to the modeled inundated areas for the 22- and 23-ft Peachtree Creek gage height inundation model at all gage heights at the Chattahoochee River gage. In some areas, the DFIRM extended beyond the modeled inundated area. In these areas, the base-flood elevation from the DFIRM was lower than the ground surface from the LiDAR elevation data. These discrepancies can be attributed to the use of different sources and different resolutions for the ground-surface elevation. The results demonstrate that the model is capable of simulating accurate water levels over a wide range of flows in the basin. Details on techniques used in model development and calibration can be found in Bales and others (2007).

Table 2. Comparison of hydraulic-model output and water-surface elevations at Peachtree Creek at Atlanta, Georgia, streamgage (02336300).

[Values listed in feet]

Gage height	Actual water-surface elevations	Modeled water-surface elevations	Elevation difference
15.00	779.23	779.30	+0.07
16.00	780.23	780.27	+0.04
17.00	781.23	781.26	+0.03
18.00	782.23	782.22	–0.01
19.00	783.23	783.24	+0.01
20.00	784.23	784.24	+0.01
21.00	785.23	785.23	0.00
22.00	786.23	786.25	+0.02
23.00	787.23	787.14	–0.09
24.00	788.23	788.28	+0.05

Development of Water-Surface Profiles

Profiles were developed for a total of 10 stages at 1.0-ft intervals between 15.0 and 24.0 ft as referenced to the Peachtree Creek at Atlanta streamgage (02336300). Discharges corresponding to the various stages were obtained from the most current stage-discharge relation (rating no. 25.0).

Discharges for all profiles (table 3) were calculated based on the gage discharges and on observations during three historical flood events in 1964, 1966, and 1976. During those events, peak discharges were estimated at all of the road bridges along Peachtree Creek. An average flow ratio for the three events was calculated between the discharge at each bridge and the discharge at the gage. If a tributary joined Peachtree Creek just upstream of a bridge, then the flow ratio at that bridge was assigned to the first cross section downstream from the tributary. For tributaries not located near a bridge, the flow ratio was determined by a linear interpolation based on cross-section distance along the creek between the previously assigned upstream and downstream near-bridge cross sections (fig. 2). Flow ratios were determined at the upstream end of the model and below each tributary. Model flows for each gage height were determined by multiplying the computed flow ratio at each location by the flow at the Peachtree Creek streamgage. Using the ratio of the historical flows along Peachtree Creek resulted in higher flows upstream of the gage and lower flows downstream of the gage than using a direct drainage area to flow calculation.

Backwater effects from the Chattahoochee River were accounted for in the model by adjusting the downstream boundary condition based on the stage of the Chattahoochee River at the GA 280 near Atlanta streamgage (02336490). The five backwater stages ranged from 26.4 to 38.4 ft in 3.0-ft intervals. Combining the 5 backwater stages with each of the 10 stages on Peachtree Creek produced a total of 50 flood-inundation maps. The backwater effect on Peachtree Creek from the Chattahoochee River at GA 280, near Atlanta streamgage (02336490) was calculated by measuring the water-surface slope upstream to the Chattahoochee River at Atlanta streamgage (02336000).

Inundation Mapping

Flood-inundation maps were created based on the Peachtree Creek at Atlanta streamgage (02336300), which has been designated a NWS flood-forecast point (AANG1). The maps were created in a GIS by combining the water-surface profiles and digital elevation model data. The digital elevation model data were derived from 16.4-ft horizontal resolution LiDAR data with a vertical resolution of 0.3 ft obtained from Fulton County (3001 Inc., The Geospatial Company, 2007). Estimated flood-inundation boundaries for each simulated profile were developed with HEC–GeoRAS software (U.S. Army Corps of Engineers, 2009). HEC–GeoRAS is a set of procedures, tools, and utilities for processing geospatial data in ArcGIS (ESRI) by using a graphical user interface (Whitehead and Ostheimer, 2009). The interface allows the preparation of geometric data for import into HEC–RAS and processes simulation results exported from HEC–RAS (U.S. Army Corps of Engineers, 2010). HEC– GeoRAS results were modified to ensure a hydraulically reasonable transition of the boundary between modeled cross sections relative to the contour data for the land surface (Whitehead and Ostheimer, 2009). The resulting inundation maps have a vertical accuracy of about 0.4 ft. The maps show estimated flood-inundated areas overlaid on high-resolution, georeferenced, aerial photographs of the study area for each of the water-surface profiles that were generated by the hydraulic model. The bed slope of Peachtree Creek is fairly consistent throughout the study reach, except where the slope increases upstream of the Norfolk Southern Railway bridge. Because of the increase in bed slope, the inundation maps were discontinued at this bridge (fig. 2). At the downstream end of the model, inundation maps discontinued just downstream of Moores Mill Road NW because of the lack of verification data for the model and the backwater effects from the Chattahoochee River. The reach of Peachtree Creek included in the inundation maps is about 5.5-mi long from the 6.5-mi reach that was modeled. The sheet numbers corresponding to each gage height at the Peachtree Creek and Chattahoochee River streamgages are shown in table 4.

Table 3. Stages (water-surface elevations) with corresponding discharge estimates for selected simulated water-surface profiles at selected locations for the Peachtree Creek at Atlanta, Georgia, streamgage (02336300).

[Values 15.0–24.0 represent stage heights, in feet above gage datum. Values in parentheses (779.2–788.2) represent elevation in feet above North American Vertical Datum of 1988]

Location	Water-surface elevations and discharge estimates									
	Stage, in feet									
Peachtree Creek at Atlanta, Georgia	15.0 (779.2)	16.0 (780.2)	17.0 (781.2)	18.0 (782.2)	19.0 (783.2)	20.0 (784.2)	21.0 (785.2)	22.0 (786.2)	23.0 (787.2)	24.0 (788.2)
	Discharge, in cubic feet per second									
Upstream end of the model	4,300	4,880	5,490	6,140	6,820	7,530	8,610	10,300	14,200	18,100
Below Clear Creek	4,590	5,210	5,860	6,550	7,280	8,030	9,190	11,000	15,200	19,300
Peachtree Creek at Atlanta,	5,000	5,670	6,380	7,130	7,920	8,740	10,000	12,000	16,500	21,000
Below two unnamed tributaries at Cross Creek Golf Course	5,090	5,770	6,500	7,260	8,070	8,900	10,200	12,200	16,800	21,400
Below Woodall Creek	5,200	5,890	6,630	7,400	8,230	9,080	10,400	12,500	17,100	21,800

Table 4. Sheet number reference based on stages (water-surface elevations) at Peachtree Creek at Atlanta, Georgia, streamgage (02336300) and Chattahoochee River at Georgia 280, near Atlanta, Georgia, streamgage (02336490).

[Values 15.0–24.0 represent stage heights, in feet above gage datum. Values in parentheses (779.2–788.2) represent elevation in feet above North American Vertical Datum of 1988]

Chattahoochee River at Georgia 280	Peachtree Creek at Atlanta, Georgia									
	15.0 (779.2)	**16.0 (780.2)**	**17.0 (781.2)**	**18.0 (782.2)**	**19.0 (783.2)**	**20.0 (784.2)**	**21.0 (785.2)**	**22.0 (786.2)**	**23.0 (787.2)**	**24.0 (788.2)**
26.4 (763.0)	1	2	3	4	5	6	7	8	9	10
29.4 (766.0)	11	12	13	14	15	16	17	18	19	20
32.4 (769.0)	21	22	23	24	25	26	27	28	29	30
35.4 (772.0)	31	32	33	34	35	36	37	38	39	40
38.4 (775.0)	41	42	43	44	45	46	47	48	49	50

Peachtree Creek, Georgia Flood-Inundation Maps on the Internet

A USGS Flood Inundation Mapping Science World Wide Web portal was established by the USGS to provide estimated flood-inundation information to the public. The maps from this study are available in several commonly used electronic file formats that can be downloaded from that portal. The Web portal URL is *http://water.usgs.gov/osw/flood_inundation/*. Each stream reach displayed on the Web site contains links to the USGS National Water Information System Web graphs of the current stage and streamflow at the USGS streamgage Peachtree Creek at Atlanta (02336300), to which the inundation maps are referenced. A link also is provided to the NWS AHPS site (*http:/water.weather.gov/ahps/*) so that the user can obtain applicable information on forecasted peak stage. The estimated flood-inundation maps are displayed in sufficient detail to note the extent of flooding with respect to individual structures so that preparations for flooding and decisions for emergency response can be performed efficiently.

Uncertainties and Limitations Regarding Use of Flood Inundation Maps

Although the flood-inundation maps represent the boundaries of inundated areas with a distinct line, some uncertainty is associated with these maps. The flood boundaries shown were estimated based on water stages (water-surface elevations) and streamflows at selected USGS streamgages. Water-surface elevations along the stream reaches were estimated by steady-state hydraulic modeling, assuming unobstructed flow, and using streamflows and hydrologic conditions anticipated at the USGS streamgage(s). The hydraulic model reflects the land-cover characteristics and any bridge, dam, levee, or other hydraulic structures existing as of March 2011. Unique meteorological factors (timing and distribution of precipitation) may cause actual streamflows along the modeled reach to vary from those assumed during a flood, which may lead to deviations in the water-surface elevations and inundation boundaries shown. Additional areas may be flooded due to unanticipated conditions such as: changes in the streambed elevation or roughness, backwater into major tributaries along a main stem river, or backwater from localized debris or ice jams. The accuracy of the floodwater extent portrayed on these maps will vary with the accuracy of the digital elevation model used to simulate the land surface. Additional uncertainties and limitations pertinent to this study are described in the document accompanying this set of flood inundation map sheets.

If this series of flood-inundation maps will be used in conjunction with NWS river forecasts, the user should be aware of additional uncertainties that may be inherent or factored into NWS forecast procedures. The NWS uses forecast models to estimate the quantity and timing of water flowing through selected stream reaches in the United States. These forecast models (1) estimate the amount of runoff generated by precipitation and snowmelt, (2) simulate the movement of floodwater as it proceeds downstream, and (3) predict the flow and stage (water-surface elevation) for the stream at a given location (AHPS forecast point) throughout the forecast period (every 6 hours and 3 to 5 days out in many locations). For more information on AHPS forecasts, please see *http://water.weather.gov/ahps/pcpn_and_river_forecasting.pdf*.

Disclaimer for Flood Inundation Maps

Inundated areas shown should not be used for navigation, regulatory, permitting, or other legal purposes. The USGS provides these maps "as-is" for a quick reference, emergency planning tool but assumes no legal liability or responsibility resulting from the use of this information.

Summary

A series of estimated flood-inundation maps were developed in cooperation with the City of Atlanta for a 5.5-mile reach of Peachtree Creek between the Norfolk Southern Railway bridge and the Moores Mill Road NW bridge. These maps, available at a U.S. Geological Survey (USGS) Web portal, in conjunction with the real-time stage data from the USGS streamgage at Peachtree Creek at Atlanta, Georgia (02336300), real-time stage data from the Chattahoochee River at Georgia 280, near Atlanta, Georgia (02336490), and National Weather Service flood-stage forecasts, will help to guide the general public in taking individual safety precautions and will provide local officials with a tool to efficiently manage emergency flood operations and flood mitigation efforts.

The maps were developed using the U.S. Army Corps of Engineers HEC–RAS and HEC–GeoRAS programs to compute water-surface profiles and to delineate estimated flood-inundation areas for selected stream stages. The maps show estimated flood-inundation areas overlaid on high-resolution, georeferenced, aerial photographs of the study area for stream stages between 15.0 and 24.0 feet (gage datum) at the Peachtree Creek at Atlanta, Georgia, streamgage (02336300) and stream stages between 26.4 and 38.4 feet (gage datum) at the Chattahoochee River at Georgia 280, near Atlanta, Georgia, streamgage (02336490).

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