

# FLOOD-INUNDATION MAPS FOR THE WHITE RIVER AT PETERSBURG, INDIANA

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## ABSTRACT:

Digital flood-inundation maps for a 7.7-mile reach of the White River at Petersburg, Indiana, were created by the U.S. Geological Survey (USGS) in cooperation with the Indiana Office of Community and Rural Affairs. The inundation maps, which can be accessed through the USGS Flood Inundation Mapping Science Web site at [http://water.usgs.gov/osw/flood\\_inundation/](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 White River at Petersburg, Indiana (03374000). Near-real-time stages at this streamgage may be obtained from the USGS National Water Information System at <http://waterdata.usgs.gov/> or the National Weather Service Advanced Hydrologic Prediction Service at <http://water.weather.gov/ahps/>, which also forecasts flood hydrographs at this site (PTRI3).

Flood profiles were computed for the White River at Petersburg reach by means of a one-dimensional step-backwater model developed by the U.S. Army Corps of Engineers. The hydraulic model was calibrated by using the most current stage-discharge relations at the White River at Petersburg, Ind., and the White River above Petersburg, Ind. (03373890), gages. The calibrated hydraulic model was then used to compute 18 water-surface profiles for flood stages at approximately 1-foot intervals referenced to the streamgage datum and ranging from bankfull to the highest stage of the current stage-discharge rating curve. The simulated water-surface profiles were then combined with a geographic information system digital elevation model to delineate the area flooded at each water level.

The availability of these maps along with Internet information regarding current stage from the USGS streamgage at White River at Petersburg, Ind., and forecasted stream stages from the NWS provide emergency management personnel and residents with information that is critical for flood response activities such as evacuations and road closures as well as for post-flood recovery efforts.

## DISCLAIMERS:

This database, identified as SIR 5107, has been approved for release and publication by the Director of the U.S. Geological Survey. Although this database has been subjected to rigorous review and is substantially complete, the U.S. Geological Survey reserves the right to revise the data pursuant to further analysis and review. Furthermore, it is released on condition that neither the U.S. Geological Survey nor the U.S. Government may be held liable for any damages resulting from its authorized or unauthorized use.

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#### 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.

#### Uncertainties and Limitations for 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 USGS streamgage 03374000. Water-surface elevations along the stream reach were estimated by steady-state hydraulic modeling, assuming unobstructed flow, and using discharges and hydrologic conditions anticipated at the USGS streamgage. The hydraulic model reflects the land-cover characteristics and any bridge, dam, levee, or other hydraulic structures existing as of March 2013. Unique meteorological factors (timing and distribution of precipitation) may cause actual discharges along the modeled reach to vary from those assumed during a flood and lead to deviations in the water-surface elevations and inundation boundaries shown. Additional areas may be flooded because of unanticipated conditions such as changes in the streambed elevation or roughness, backwater into 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 elsewhere in this report.

If this series of flood-inundation maps will be used in conjunction with National Weather Service (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 (and 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 in the future in many locations). For more information on AHPS forecasts, please refer to [http://water.weather.gov/ahps/pcpn\\_and\\_river\\_forecasting.pdf](http://water.weather.gov/ahps/pcpn_and_river_forecasting.pdf).

#### CONTENTS:

This report consists of a report and 17 depth grid layers. The individual metadata files pertain to all of the grids and the shapefile.

00Readme.txt

SIR5107\_.pdf

SIR5107dep\_grd\_metadata.met

SIR5107\_\_metadata.met

#### Datafiles

depth\_grids.zip

shapefile.zip

The shapefile is as follows:

shapefile.zip

whipetIN.shp (.dbf/.prj/.sbn/.sbx/.shp.xml/.shx)

#### INSTRUCTIONS AND DOCUMENTATION FOR U.S. GEOLOGICAL SURVEY SCIENTIFIC INVESTIGATIONS REPORT 5107

To access the data:

The data files can be downloaded from <http://pubs.usgs.gov/sir/5107>. The main product is a Portable Document Format (.pdf) map and pamphlet that require Adobe Acrobat for viewing. Acrobat software runs on a variety of systems and is available for download free of charge from Adobe at <http://www.adobe.com>.

References to non-U.S. Department of the Interior (DOI) products do not constitute an endorsement by the DOI. By viewing the Google Maps application programming interface (API) on this Web site, the user agrees to these terms (terms found at <http://code.google.com/apis/maps/terms.html>) of service set forth by Google.

Software preferred:

Adobe Acrobat (6.x, 7.x, or 8.x), or Adobe Acrobat Pro (6.x, 7.x, or

8.x), or the free Adobe Reader (6.x,

7.x, or 8.x), 8.x is preferred. ArcGIS 9.3 preferred, older versions may also work.

ArcReader may be downloaded free of charge from

<http://www.esri.com/software/arcgis/arcreader> for viewing additional files included in this report.