Title:

100-year Floodplain Expansion Due to Potential Sea Level Rise (filename-SeaLevelRise_Potential_100yrFloodplain.tif)

Tags:

Sea Level Rise, Floodplain, LIDAR, Hudson River, Scenic Hudson

Summary:

This is a raster dataset of the extent of potential expansion of the 100-year floodplain due to sea level rise in the Hudson River Estuary. The 100-year floodplain is defined by the Federal Emergency Management Agency (FEMA) as areas with a 1% annual chance of flooding. Sea level rise is calculated in one-inch increments, from 0 up to 120” of sea level rise.

Description:

Scenic Hudson’s 100-year Floodplain Expansion Due to Potential Sea Level Rise raster dataset is a model of current and potential future 100-year floodplains (1% annual flood risk zones) driven by sea level rise in the Hudson River Estuary. The model uses FEMA base flood elevations (BFEs) published in the National Flood Hazard Layer (NFHL) and high-resolution LIDAR bare-earth digital elevation data to identify the current extent of the 100-year floodplain. The extent of the floodplain for each vertical 1” increase in sea level is modeled up to 120”.

The 100-year floodplain expansion raster dataset was created using the following steps: 1. Create a continuous surface for current 100-year floodplain elevation by extrapolating FEMA BFEs to the extent of LIDAR elevation data; 2. Overlay the current 100-year floodplain surface with high resolution LIDAR bare-earth elevation data to create a continuous surface of elevation difference between the current 100-year floodplain and current dry land, used to map the extent of floodplain expansion due to increments of sea level rise.

Scenic Hudson created a continuous surface of current 100-year floodplain elevation generated from BFEs derived from FEMA’s National Flood Hazard Layer (downloaded through the Data.gov website, https://catalog.data.gov/dataset/national-flood-hazard-layer-nfhl). BFE centroids were generated from the S_BFE line features and S_Fld_haz_Ar polygon features associated with the river main stem floodplain. The continuous surface was generated by extrapolating the BFE point features to the extent of the LIDAR digital elevation model using Trend analysis technique.

We then calculated the difference between the floodplain elevation surface and 2012 LIDAR digital elevation model (DEM) data provided by NYS Department of Environmental Conservation (downloaded through the NYS GIS Clearinghouse, https://gis.ny.gov/gisdata/inventories/details.cfm?DSID=841). The result is a continuous model of the height, in integer inches, of current dry land above the current 100-year floodplain elevation surface. This result allows mapping of the extent of floodplain expansion due to sea level rise for any increment up to 120”. The dummy value of 254 was used for any calculated values <= 0. This represents the extent of current 100-year floodplains. Spurious values in the LIDAR DEM resulted in some positive values showing as speckle in the current floodplain and main channel of the river. To reduce the visual impact of these data collection errors, some areas within the current extent of river inundation were manually masked and calculated to the dummy value of 254.

Because the model is based on bare-earth elevation, there is the possibility for low-lying areas that are not contiguous with the river to be identified as floodplains. If areas do not become connected to the larger river, however, they may not be flooded as the result of high water levels during flooding events, and should not be considered floodplain in the model. LIDAR data provides excellent high-resolution elevation data, but it does not account for culverts and underground water connections. If there is a culvert connecting the larger river to a seemingly non-contiguous adjacent area, then that area would be inundated, and thus flood in the same way as the larger river. While Scenic Hudson recognizes these inaccuracies in our current model, it was infeasible to conduct a thorough analysis to identify hydrologic connections/disconnections not represented in the data. Future efforts to identify, verify, and incorporate hydrologic connectivity in the model would improve the accuracy and usability of the results.

Credits:

2018, Scenic Hudson, Inc., Poughkeepsie, NY

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From FEMA's National Flood Hazard Layer (NFHL) metadata- "The hardcopy FIRM and FIRM Database and the accompanying FIS are the official designation of SFHAs and Base Flood Elevations (BFEs) for the NFIP. For the purposes of the NFIP, changes to the flood risk information published by FEMA may only be performed by FEMA and through the mechanisms established in the NFIP regulations (44 CFR Parts 59-78)." The data provided in this release cannot be relied on as a definitive statement and should not be substituted for on-site surveys or analysis that may be required for environmental assessment or conservation planning.

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Online Resource:

Linkage:

http://www.scenichudson.org/sealevelrise

Name:

Scenic Hudson's Sea Level Rise webpage

Description:

Information on Scenic Hudson's sea level rise work. Includes link to online Sea Level Rise Mapper and downloadable data package.

Attributes:

Field:

Value

Description:

Increment of potential sea level rise, calculated as the difference between LIDAR dry-land elevation values and 100-year floodplain elevation surface, reported in 1” integer values from 0 to 120. A dummy value of 254 indicates current 100-year floodplains. This field can be used to map 100-year floodplain extent due to potential sea level rise.

Citation:

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