Sea Level Scenario Sketch Planning Tool

GIS Data: Roads Characteristics Inventory (RCI) Roads - Current and Future Flood Exposure

University of Florida GeoPlan Center, 2017

Contents

Description

This dataset contains analyses of roadways exposed to current flooding and future flooding under various sea level rise (SLR) scenarios. Roadways analyzed in this dataset include on-system and off-system roads from the July 2016 version of the Florida Department of Transportation Roads Characteristics inventory (RCI) dataset. The FDOT GIS On-systems Roads feature class provides spatial information on active main-line roads maintained by Florida DOT. Off-System roads consist of roads not maintained by Florida DOT that are city or county owned. This dataset was created for the Sea Level Scenario Sketch Planning Tool.

Each download contains a zipped ArcGIS 10.4.1 ESRI File Geodatabase (FGDB) with one RCI data layer that includes analyses of road segment exposure under five SLR projections. SLR scenarios were mapped by county using local tide gauge data and sea level trends. Inundation surfaces were created by the University of Florida GeoPlan Center using the United States Army Corps of Engineers (USACE) Sea-Level Change Curve Calculator (2015.46), USACE SLR projections (2013), National Oceanic and Atmospheric Administration (NOAA) SLR projections (2012), NOAA tide gauge data, NOAA tidal surfaces, and a 5-meter horizontal resolution Digital Elevation Model (DEM). A hydrologic connectivity filter was applied to the inundation surfaces to remove isolated inundated areas not connected to a major waterway.

RCI data was intersected against the hydro-connectivity inundation model outputs. Fields were added to the RCI data to indicate the feet and % of road segment potentially affected under each SLR scenario.

For more information and full technical methods, please see the metadata included with the feature classes, as well as the project website: http://sls.geoplan.ufl.edu

SLR Projections Mapped

Five SLR projection curves from the USACE (2013) and NOAA (2012) were used for mapping inundation (listed below). SLR inundation models (which can be downloaded separately) and transportation analysis fields are named with a "C1" through "C5" to indicate the SLR curve used.

SLR Curve	SLR Curve Description	Amount of SLR (relative to mean sea level) by 2100
C5	NOAA High Rate (2012)	~ 6.6 feet (or 2.0 m)
C4	USACE High Rate (2013)	~ 5.0 feet (or 1.5 m)
C3	NOAA Intermediate High Rate (2012)	~ 3.9 feet (or 1.2 m)
C2	USACE Intermediate Rate (2013) / NOAA Intermediate Low Rate (2012)	~ 1.6 feet (or 0.5 m)
C1	USACE Low Rate (2013)/ NOAA Low Rate (2012)	~ 8 inches (or 0.2m)

For more information on the SLR models, please see the document: "Guide to GIS Data: SLR Models": https://sls.geoplan.ufl.edu/download-data/

Base RCI Data Used in Analysis

The base RCI data was created by merging RCI On-system and RCI Off-System Roads. Attributes were added to represent Average Daily Traffic, Number of Lanes, Functional Classification, Federal Aid, and Evacuation route status.

Transportation Analyses and SLR Scenario Fields

The base RCI data was intersected against 35 SLR inundation layers, each representing a different amount of SLR and time period. 35 scenarios = 5 SLR Projection Curves x 7 decades (2040, 2050, 2060, 2070, 2080, 2090, 2100).

For each roadway segment that intersected a SLR inundation layer, the number of feet intersecting was calculated. Individual intersecting segments were then joined back to the base RCI data to calculate the total feet and percentage of roadway segment affected. Fields were added back to the base RCI data to summarize the impacts per road segment.

Each scenario analysis field represents either the feet or percentage of the road segment that is affected under a particular SLR scenario. The SLR scenario is indicated in the field name. For road segments with no affects (no intersecting SLR scenarios), a null value is listed.

Example SLR Scenario Fields for Five SLR Projections for One Decade (2090):

Field Name	Description
C1MHHW90FT	Feet of Road Segment Affected 2040 USACE Low/NOAA Low, MHHW
C1MHHW90PC	% of Road Segment Affected 2040 USACE Low/NOAA Low, MHHW
C2MHHW90FT	Feet of Road Segment Affected 2040 USACE Int/NOAA Int Low, MHHW
C2MHHW90PC	% of Road Segment Affected 2040 USACE Int/NOAA Int Low, MHHW
C3MHHW90FT	Feet of Road Segment Affected 2040 NOAA Int High, MHHW
C3MHHW90PC	% of Road Segment Affected 2040 NOAA Int High, MHHW
C4MHHW90FT	Feet of Road Segment Affected 2040 USACE High, MHHW
C4MHHW90PC	% of Road Segment Affected 2040 USACE High, MHHW
C5MHHW90FT	Feet of Road Segment Affected 2040 NOAA High, MHHW
C5MHHW90PC	% of Road Segment Affected 2040 NOAA High, MHHW

Current Flood Risk Fields

The base RCI data was also intersected with current flood risk layers to analyze each road segment's exposure to current flood risks. Layers analyzed include: 100-year and 500-year floodplains from Federal Emergency Management Agency (FEMA) Digital Flood Rate Insurance Maps (DFIRM) and Storm Surge Zones from the Florida Division of Emergency Management and Florida's Regional Planning Councils. The current flood risk fields follow the same naming convention as the SLR Scenario fields.

Bridge Data Corrections

It is a known issue that some bridge approaches are incorrectly identified as affected by SLR. Because the Lidar elevation data is a bare earth model, the elevation of the bridge approach reported in the DEM is the ground elevation under the bridge. UF GeoPlan attempted to correct for this issue by using source Lidar to create Digital Surface Models to represent the elevation of the bridge decks.

This process was only completed for areas with breakline data for overpasses, including the following counties: Bay*, Brevard, Broward, Calhoun*, Charlotte, Clay, Collier*, Dixie, Duval*, Escambia, Flagler*, Franklin*, Gilchrist, Glades, Gulf*, Hendry, Highlands, Hillsborough, Indian River, Jefferson, Lafayette, Lee*, Leon, Levy, Liberty, Manatee*, Martin, Miami-Dade*, Monroe, Nassau, Okaloosa, Okeechobee, Palm Beach*, Pasco, Pinellas, Putnam, Santa Rosa, Sarasota*, St. Johns*, St. Lucie, Taylor, Wakulla, Walton*, and Washington*.

* *Indicates that only part of county was corrected, due to data availability*