

**Summary of Methods Used to
Assess the Population and Housing near Levees
August 2015**

This document describes the processing steps that DisasterMap.net used for our analysis of demographics and housing in relation to the [National Levee Database](#) (NLD) and the unacceptable levee list.

National Levee Database

To start this project, we accessed the following layers on January 9, 2015 via NLD's Web Feature Service:

- Levee centerlines: "The centerline of an embankment for controlling the waters of the sea, river, or other water bodies."
- Floodwalls: "A wall, typically made of concrete or steel, that may be constructed in place of a levee or on a levee crown to increase the levee's height."
- Protected Areas: "The lands from which flood water is excluded by the levee or floodwall."

Each layer was saved in shapefile format (coordinate reference system: EPSG:4269 - NAD83) for analysis with [QGIS](#) (an open source desktop GIS program.)

Additionally, we also downloaded the "system_inspection" spreadsheet using the NLD's report generator. This provided a spreadsheet with 2535 rows, each of which is assumed to represent a levee/floodwall segment/reach, and 23 columns with the attributes of each levee reach. Attributes included the last inspection rating, the river system, the state where it is located, the levee/floodwall length and the area of protection area. This spreadsheet was then filtered for the 393 cases where the "Last Routine Inspection Rating" was "unacceptable".

Of note, the spreadsheet from the report tool did not directly include columns for geographic coordinates (latitude and longitude) for the unacceptable levees. However, it did include a URL link to view the levee in the NLD map viewer. The links contain the latitude and longitude of the corners of the map view.

At this point, it was necessary to parse the approximate latitude and longitude from the URL link to the levee segment in the NLD webmap. More specifically, this link included the coordinates for the corners of the bounding box of the map view. Using Excel, we extracted the latitude and longitude of the bounding box, and then calculated the average (midpoint). For the purposes of this analysis, it has been assumed that these coordinates provide a reasonably accurate location of the bad levee. A point shapefile was then created using the approximate latitude and longitude. A cursory consistency check was completed, and we uncovered no problems. If you find something that is inaccurate, please [contact us](#).

Census Overlay

To assess the demographic context of these levees, we used the 2010 Census Demographic Profile 1 geodatabase [<https://www.census.gov/geo/maps-data/data/tiger-data.html>] at the tract, place, and county levels. The analysis utilized the following fields: Total population (DP0010001), Total housing units (DP0180001), and Occupied housing units (DP0180002).

The spatial data analysis consisted of a series of geoprocessing steps that essentially comprised of spatially overlaying and then either clipping or joining the NLD and Census layers. For all levees, the leveed areas polygon was used to clip the Census Demographic Profile 1 at county, place, and tract geometries. This resulted in just the counties, places, and tracts that had a levee protected area inside of them. For the levees with unacceptable rating, the point layer was spatially joined to Census tracts, places, and counties. Here just records with an unacceptable levee were kept.

Webmap Processing

Additional data processing steps were completed for the layers that were uploaded to the [CartoDB](#) webmaps to reduce the size of the files and make them more web friendly. The floodwall layer was dissolved, which merged levee segments with the same system name but stored as separate features/reaches, while the protected areas was simplified, a step that reduces the number of vertices for each feature. The levees layer, which was very large with a lot of features many of which had a large number of vertices, was both dissolved and simplified. The point layer for the bad levees was uploaded to CartoDB without any processing.