

**Analysis of available FEMA data for Port Arthur, Texas**  
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The following maps were developed using Federal Emergency Management Agency (FEMA) data from multiple sources, described in more detail below. These maps are intended to inform further efforts to support community decision-making regarding flood mitigation and residential home buyouts.

**Severe Repetitive Loss Properties**

According to the National Flood Insurance Reform Act of 2004, a severe repetitive loss property (SRLP) is “a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding \$5,000 and with cumulative amount of such claims payments exceeding \$20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.” SRLP data was obtained from the Natural Resources Defense Council and is aggregated at the zip code level. The data set does not include properties without flood insurance policies.

Figure 1 shows the mapped results from the SRLP data, including (a) the percent of residents below the poverty line, (b) the average number of losses per property, (c) the average total payment (including building and contents payments) per property, and (d) the average payment per claim on each property. Population and income data was obtained from the U.S. Census Bureau [1]. The data suggests overall trends in losses but is too coarse for neighborhood-specific analyses.

**National Flood Insurance Program Claims**

Redacted data for over 2 million National Flood Insurance Program (NFIP) claims was obtained from FEMA and the Federal Insurance and Mitigation Administration [2]. This data set is aggregated at the Census tract level and includes claims from 1978 to the present.

Figure 2 shows the mapped results from the NFIP data, including (a) the percent of residents below the poverty line, (b) the total amount paid on building claims in each Census tract, (c) the total number of claims in each Census tract, and (d) the number of claims per capita. The Census tracts highlighted in blue represent low-income areas that exhibit relatively high claims payments, number of claims, and claims per capita. These areas should be prioritized for further data collection and community outreach.

Digital elevation data at approximately 10 meter resolution was obtained from the U.S. Geological Survey’s National Map [3]. Figure 3 shows the land surface elevations in Port Arthur. The vulnerable Census tracts identified above are highlighted in blue for reference. Segments of these Census tracts are located at relatively low elevation.

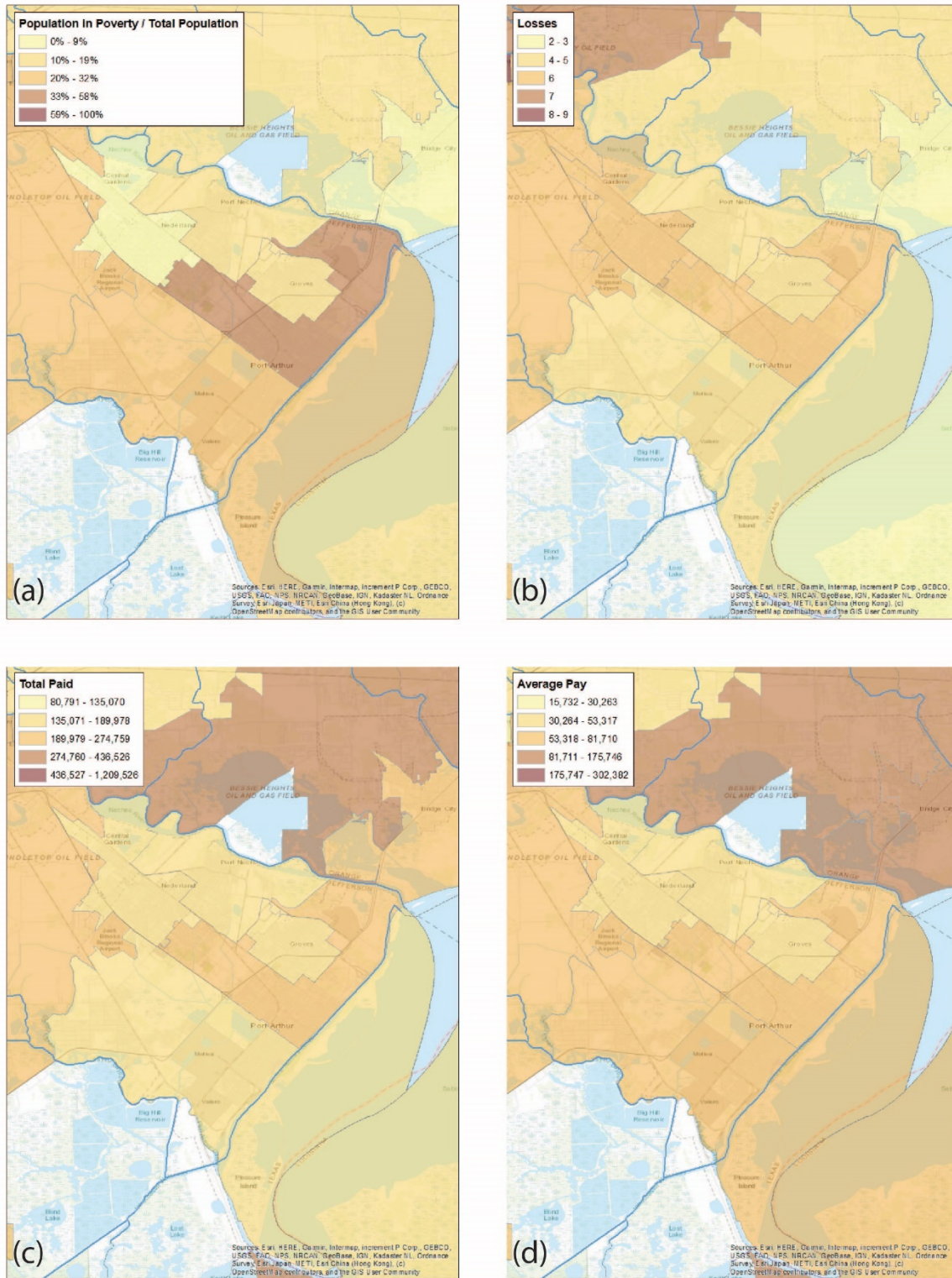


Figure 1. Maps of severe repetitive loss property data.

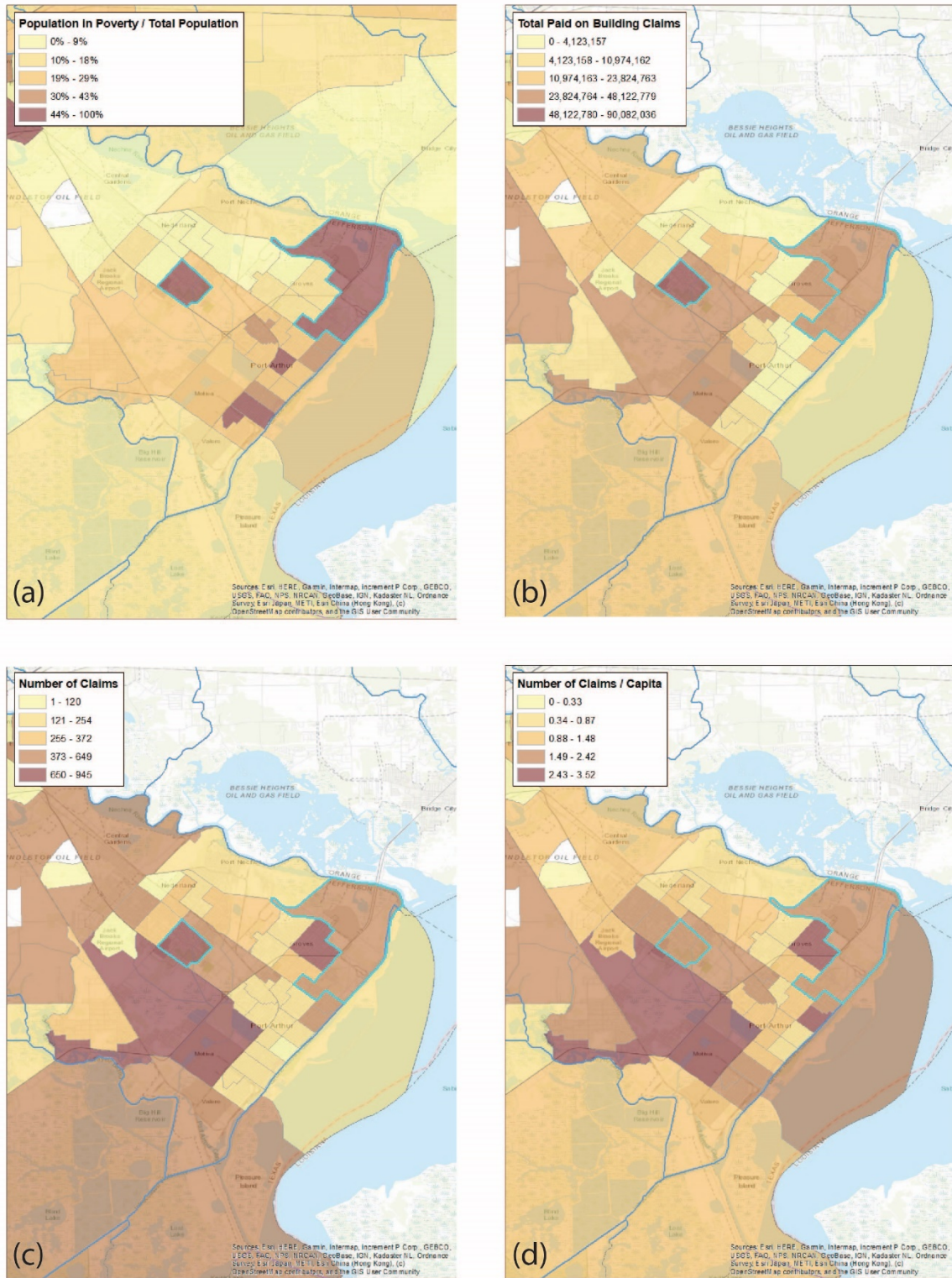
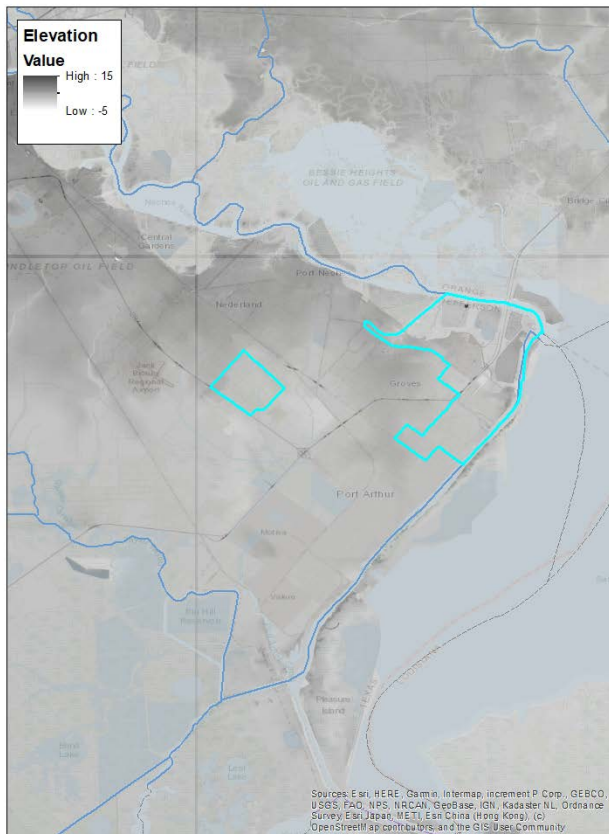


Figure 2. Maps of National Flood Insurance Program claims data.



**Figure 3.** Map of elevation data.

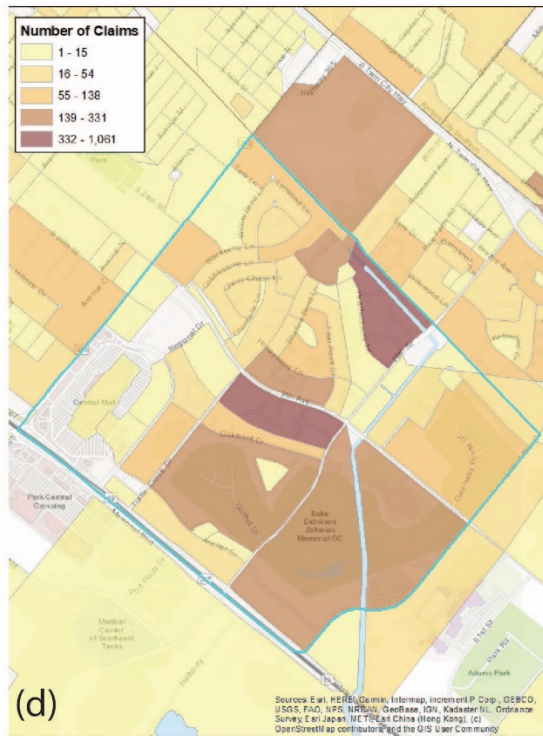
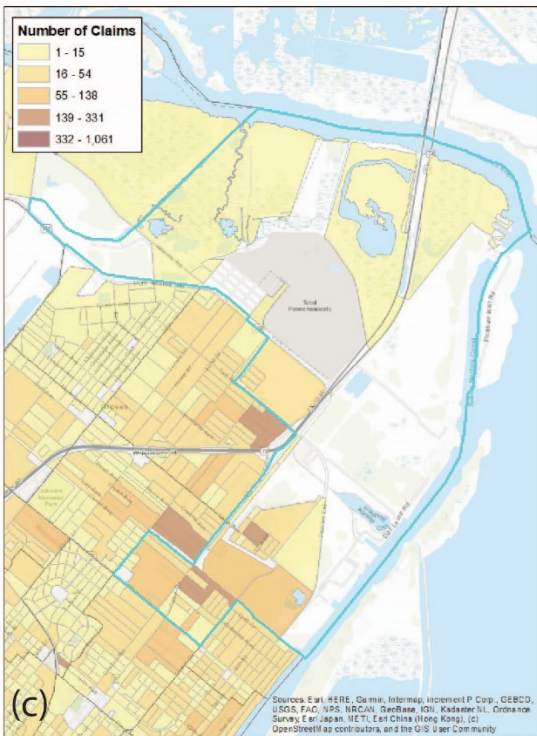
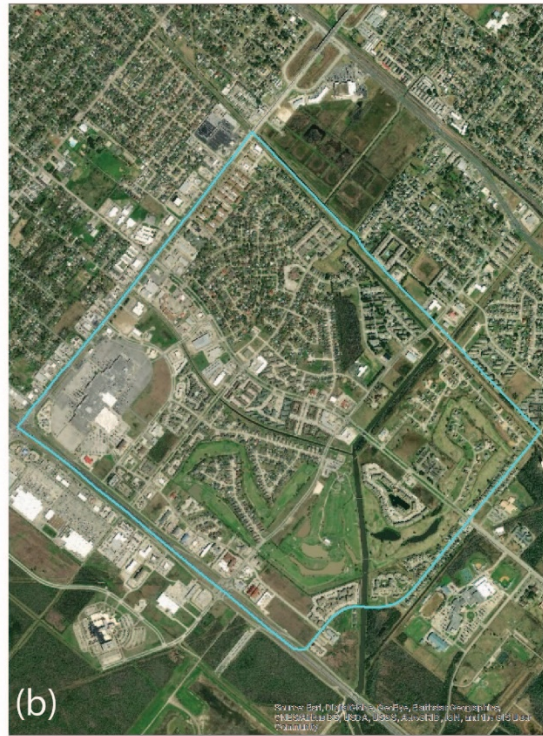
### Individual Assistance

FEMA provides Individual Assistance (IA), in the form of disaster assistance grants, to individuals and families whose homes, vehicles, personal property, businesses, or inventory have sustained damage due to a disaster. The IA data set was obtained from FEMA and is aggregated at the Census block level [4].

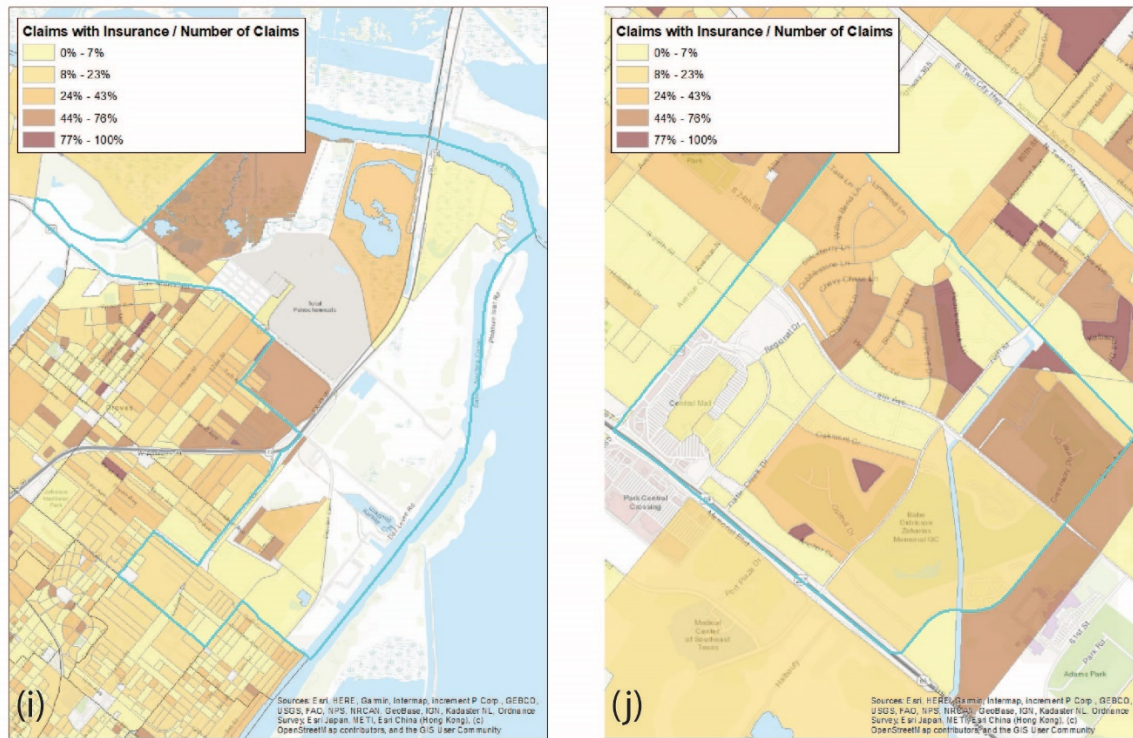
Figure 4 shows the mapped results from the IA data, including (a) the total number of claims per Census block, (b) the average gross income of residents, (c) the average reported water level of flooding (in feet), and (d) the percent of applicants with flood insurance.

Figure 5 shows the land-use characteristics of the highlighted Census tracts (5a-b) and provides more detailed maps of the IA data for these Census tracts (5c-j). The coastal Census tract (shown in the left column) consists primarily of open space and industrial uses, with residential neighborhoods in the southeast corner. Average gross incomes are generally less than \$50,000, and the number of claims and average water depth are relatively high in a few Census blocks. The inland Census tract (shown in the right column) is primarily residential, with some commercial use including a shopping center and golf course. Gross income is more variable across Census blocks, although the Census blocks with the highest number of claims also have an average gross income less than \$50,000.









**Figure 5.** Detailed maps of individual assistance data for coastal Census tract (left column) and inland Census tract (right column).

### Suggested Next Steps

The maps in this report provide an initial picture of the distribution of flood impacts on communities. To proceed with the flood mitigation and buyout effort, additional local-level information is needed, especially in areas where national data sets are not sufficient. Suggested next steps include:

- Reaching out to local governments to request any additional flood data that is available, including information about substantially damaged properties, elevation certificates, local post-flood damage assessments, and studies on nature-based retention opportunities.
- Distributing surveys to residents in candidate neighborhoods to obtain household-level information about past flood experiences and willingness to consider buyouts. The ArcCollector app could be used to record information during in-person interviews as well. It will be important to develop a framework that balances the need for high-resolution, location-specific data with residents' privacy concerns.
- Identifying funding opportunities related to relocation and buyouts and becoming familiar with application requirements, which can inform future data collection efforts.



**Data Sources**

[1] U.S. Census Bureau. (2018). TIGER/Line with Selected Demographic and Economic Data. Available: <https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-data.html>. Accessed 15 July 2019.

[2] Federal Emergency Management Agency. (2019). FIMA NFIP Redacted Claims Data Set. Available: <https://www.fema.gov/media-library/assets/documents/180374>. Accessed 14 June 2019.

[3] U.S. Geological Survey. (2019). The National Map Viewer. Available: <https://viewer.nationalmap.gov/advanced-viewer/>. Accessed 10 July 2019.

[4] Federal Emergency Management Agency. (2018). OpenFEMA Dataset: Individual Assistance Housing Registrants Large Disasters - V1. Available: <https://www.fema.gov/openfema-dataset-individual-assistance-housing-registrants-large-disasters-v1>. Accessed 5 July 2019.