ALLOCATING DISASTER RECOVERY CENTERS

BACKGROUND

Disaster Recovery Centers (DRCs) provide important services for individuals in counties impacted by natural disasters. For those who survive tornados, hurricanes, floods, or other disasters, these pop-up shops provide information about Federal Emergency Management Agency (FEMA) programs, access to resources from volunteer organizations or other agencies, and a source of hope.
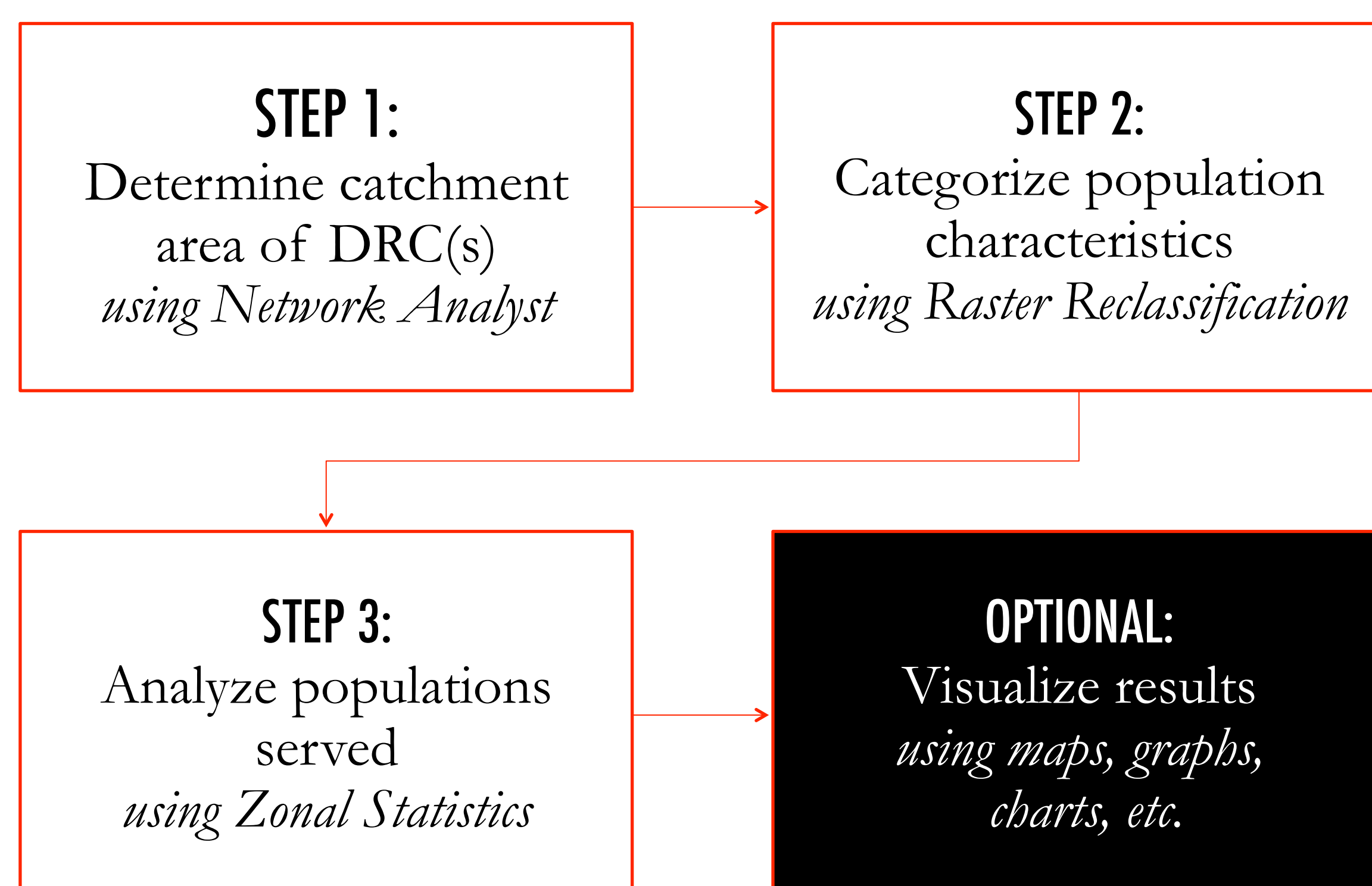
THE CHALLENGE

This research aims to build a model that will:
- Take into account infrastructure damage when calculating travel drive time to facilities.
- Analyze distribution of vulnerable populations using the CDC's Social Vulnerability Index (SVI).
- Determine quality of DRC location based on vulnerable populations served.
- Create rigorous, replicable processes that can be deployed quickly for any disaster.

METHODOLOGY

This project was scripted in Python 2.7 for use with ArcMap Desktop 10.2.2. It combines static and REST service data to provide up-to-date analysis.

STEP 1:
Determine catchment area of DRC(s)
using Network Analyst

STEP 2:
Categorize population characteristics
using Raster Reclassification

STEP 3:
Analyze populations served
using Zonal Statistics

OPTIONAL:
Visualize results
using maps, graphs, charts, etc.

CASE STUDY MAPS

The following maps and charts are for DR-4223: Texas Severe Storms, Tornado, Straight Line Winds, Flooding (Incident period 4 May - 23 June 2015).

STEP 1: CATCHMENT AREAS

STEP 2: POPULATION CHARACTERISTICS
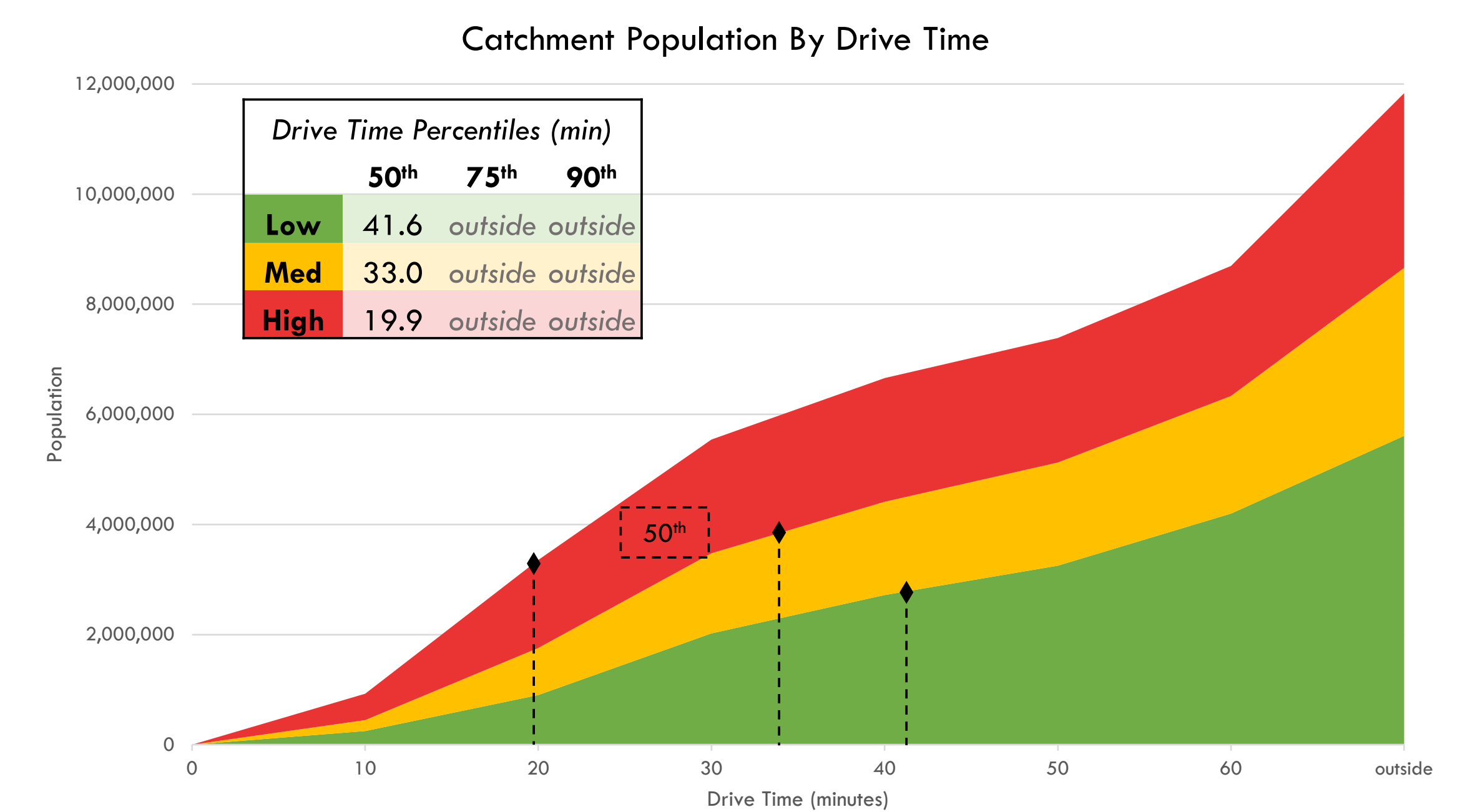

STEP 3: ANALYZE POPULATIONS SERVED
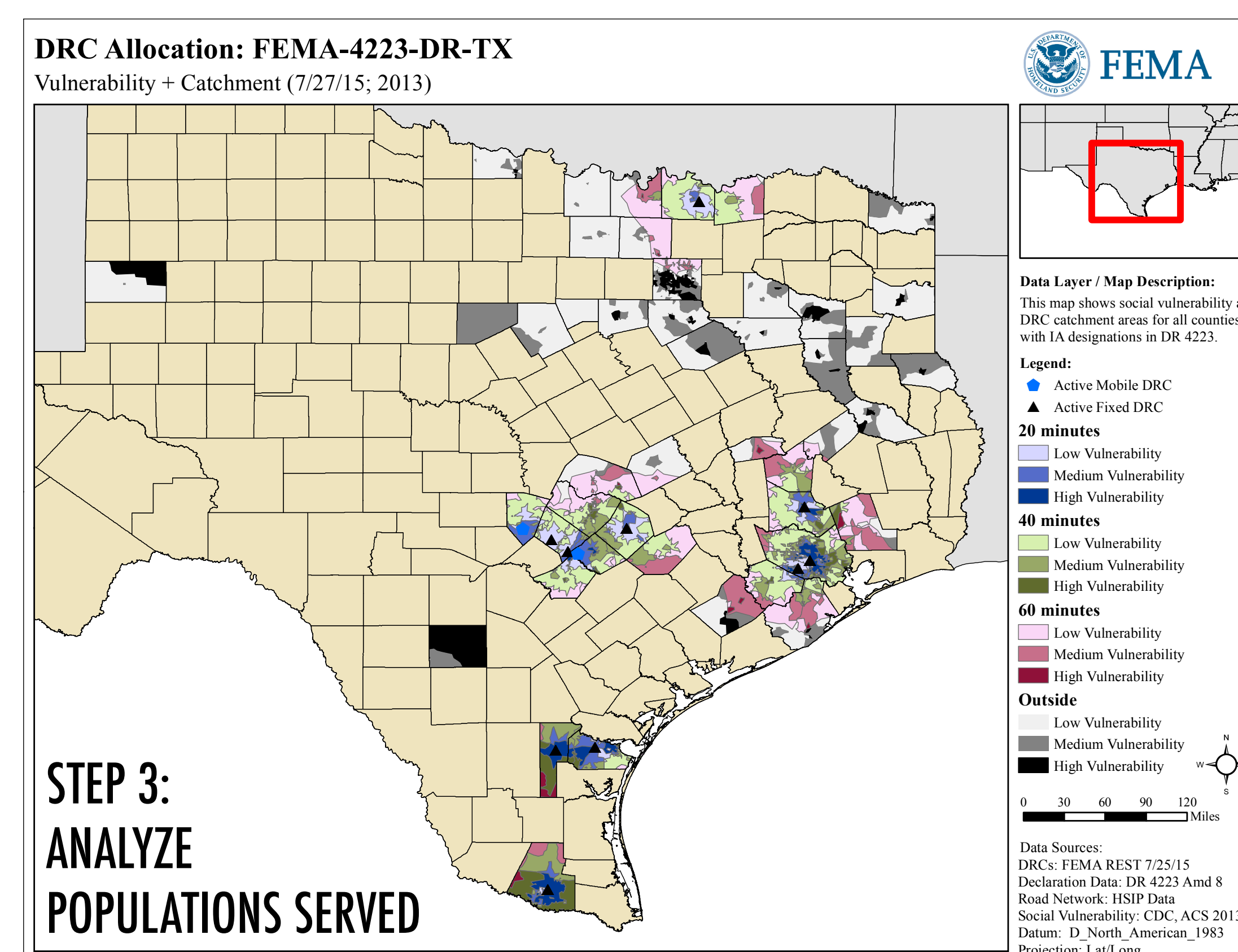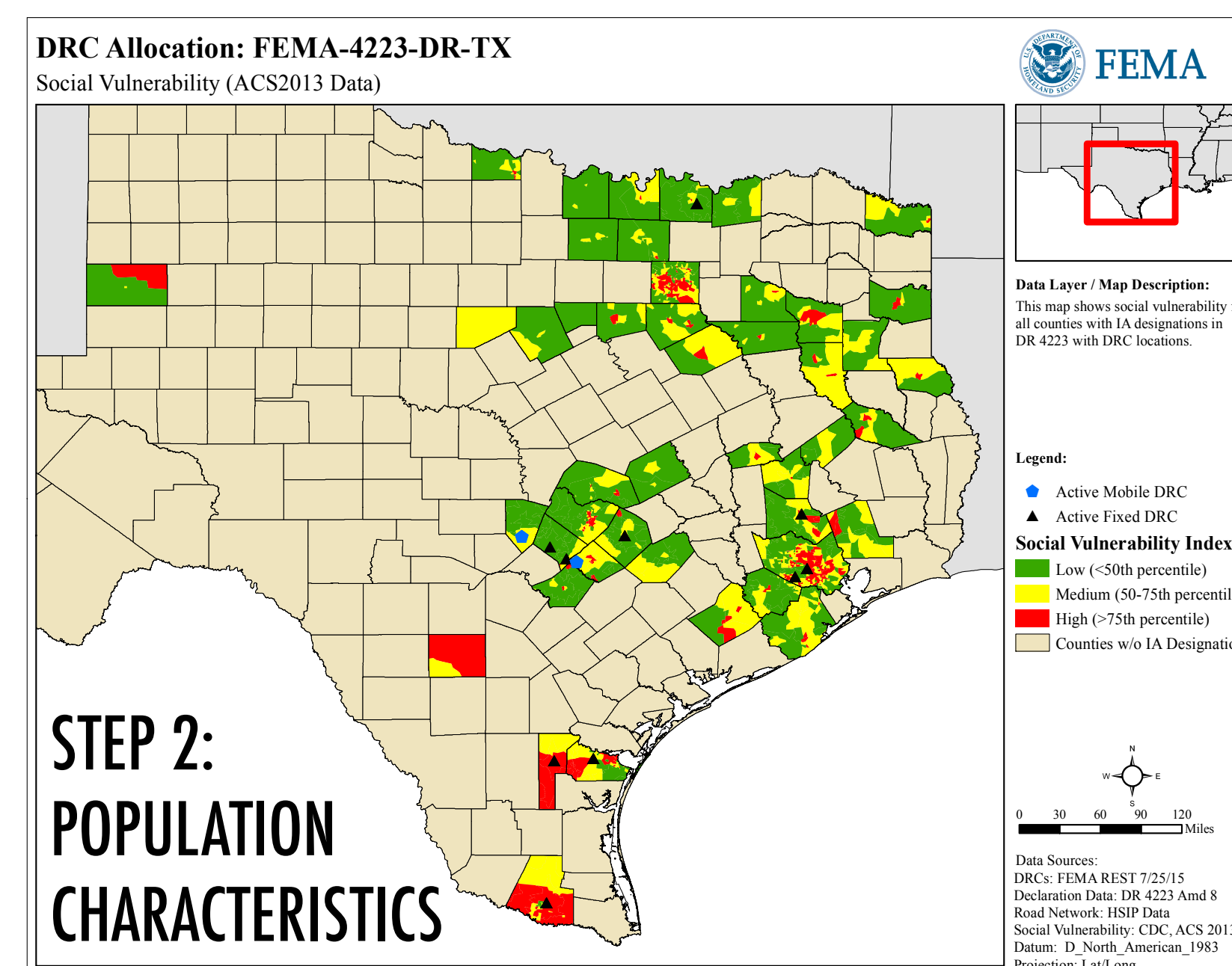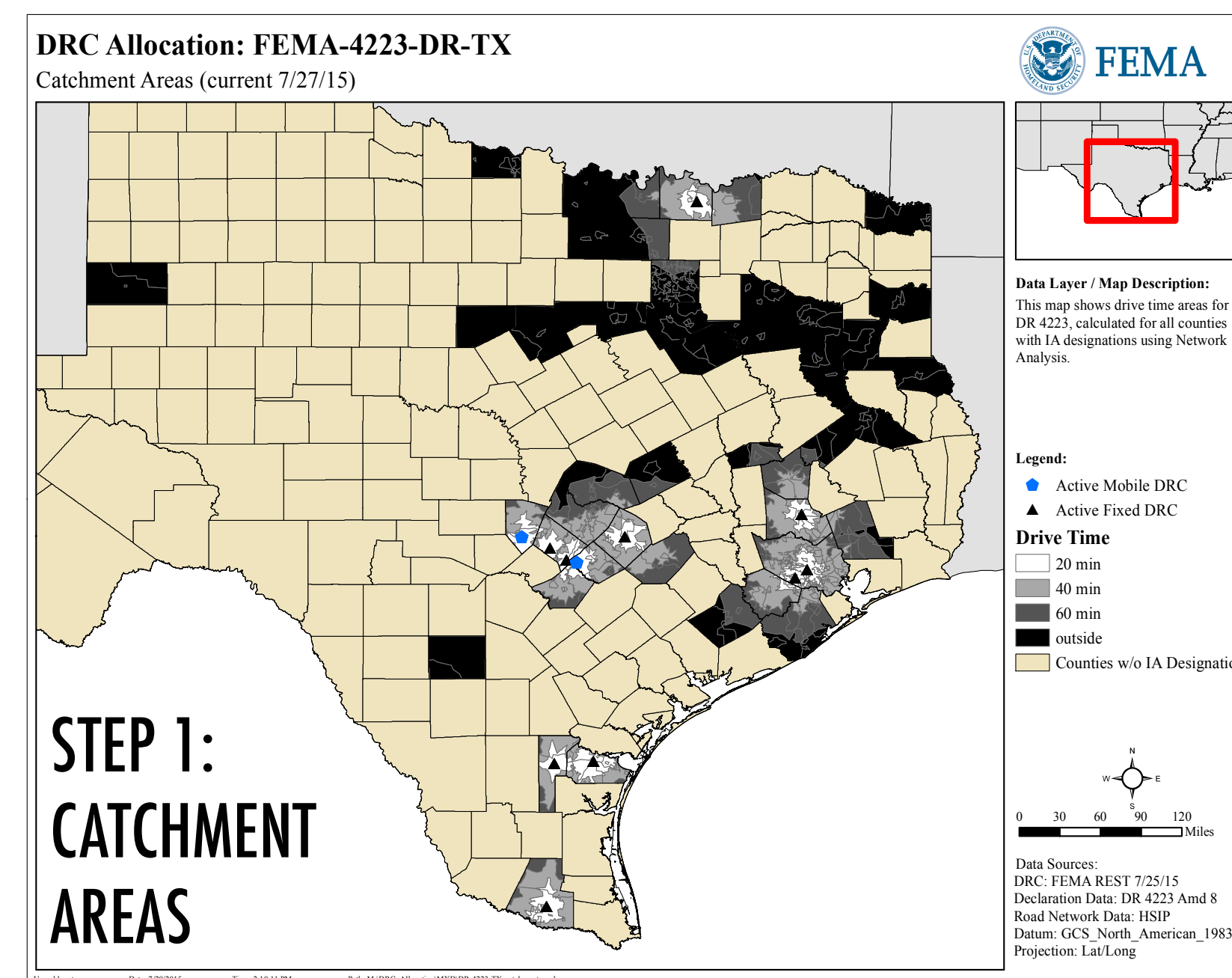
CASE STUDY CHARTS

Pie charts show differences between vulnerability groups. Over half of high vulnerability individuals are within a 20 minute drive of a DRC. Not bad!
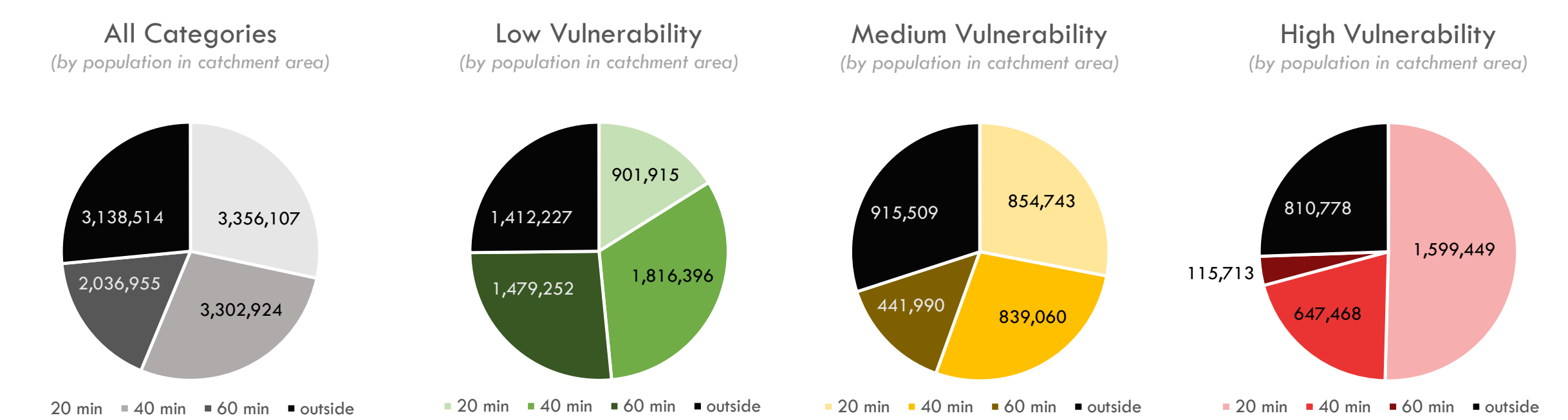
Approximating the 75th and 90th percentile drive times, below, allows us to decide if more DRCs are needed.

We can also use this data to look at breakdown by individual DRC, county, etc. allowing for multiple levels of utilization and optimization.

CONCLUSION

This research creates a baseline methodology for analyzing populations served by one or more DRCs. Spatial analysis is an important first step towards developing a rigorous, data-driven process for selecting DRC locations. Ultimately, the goal of this tool is to better serve survivors of any disaster. By taking full advantage of Python scripting for ArcGIS, FEMA can decrease response time and optimize use of resources, helping survivors and communities recover and thrive.