

Residential Suitability Modeling in Pinellas County, FL

An Evaluation of Flood Risk, Land Use, and Socioeconomic Conditions Using GIS

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Introduction

Pinellas County, Florida, faces development challenges due to flood risk, urban density, and social vulnerability. This project uses GIS to identify the most suitable areas for residential development, or property investing, by combining three key factors: flood zones, land use, and social vulnerability. Each was scored, aligned, and averaged to produce a final suitability map, supporting data-driven planning in a high-risk coastal region.

Methodology

This project used raster-based spatial analysis to identify suitable areas for residential development in Pinellas County, FL. Three factors—flood risk, land use, and social vulnerability—were each converted to rasters and reclassified on a 1–5 suitability scale.

All layers were aligned using a consistent cell size and snap raster. The Raster Calculator was used to average the three inputs, generating a Final Suitability Index. This index was classified into five categories (Very Low to Very High) and symbolized for interpretation.

Limitations

This analysis used current data and equal weights for flood risk, land use, and social vulnerability. It does not account for future zoning changes, sea level rise, or other factors like transit access or housing costs. Social data is generalized at the census tract level, which may overlook finer-scale variation.

Results & Analysis

The final suitability map shows clear spatial patterns across Pinellas County. Areas with the highest suitability are concentrated inland, where flood risk is minimal, land is zoned for residential use, and social vulnerability is lower. Least suitable zones appear along the coast and in older urban areas where flood risk and social vulnerability are elevated.

Suitability scores ranged from approximately 0.6 to 4.7, with five classifications used to simplify interpretation. The mid-county region emerged as the most balanced and development-ready zone.

Data Sources

Layer	Source
Land Use	Pinellas County eGIS 2022
Social Vulnerability	CDC/ATSDR SVI 2020
County Boundary	U.S. Census TIGER 2023
Flood Risk	FEMA SFHA 2023

Suitability Index Classification Table

Suitability	Description
Very Low	Areas with high social vulnerability, high flood risk, or restricted land use
Low	Notable social or environmental challenge
Moderate	Balanced areas, moderate conditions
High	Generally safe, low flood risk, and usable land
Very High	Ideal for development: safe, affluent, dry

0 2.1 4.2 8.4 12.6 16.8 Miles

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