Proposed Vulnerability Assessment Methodology

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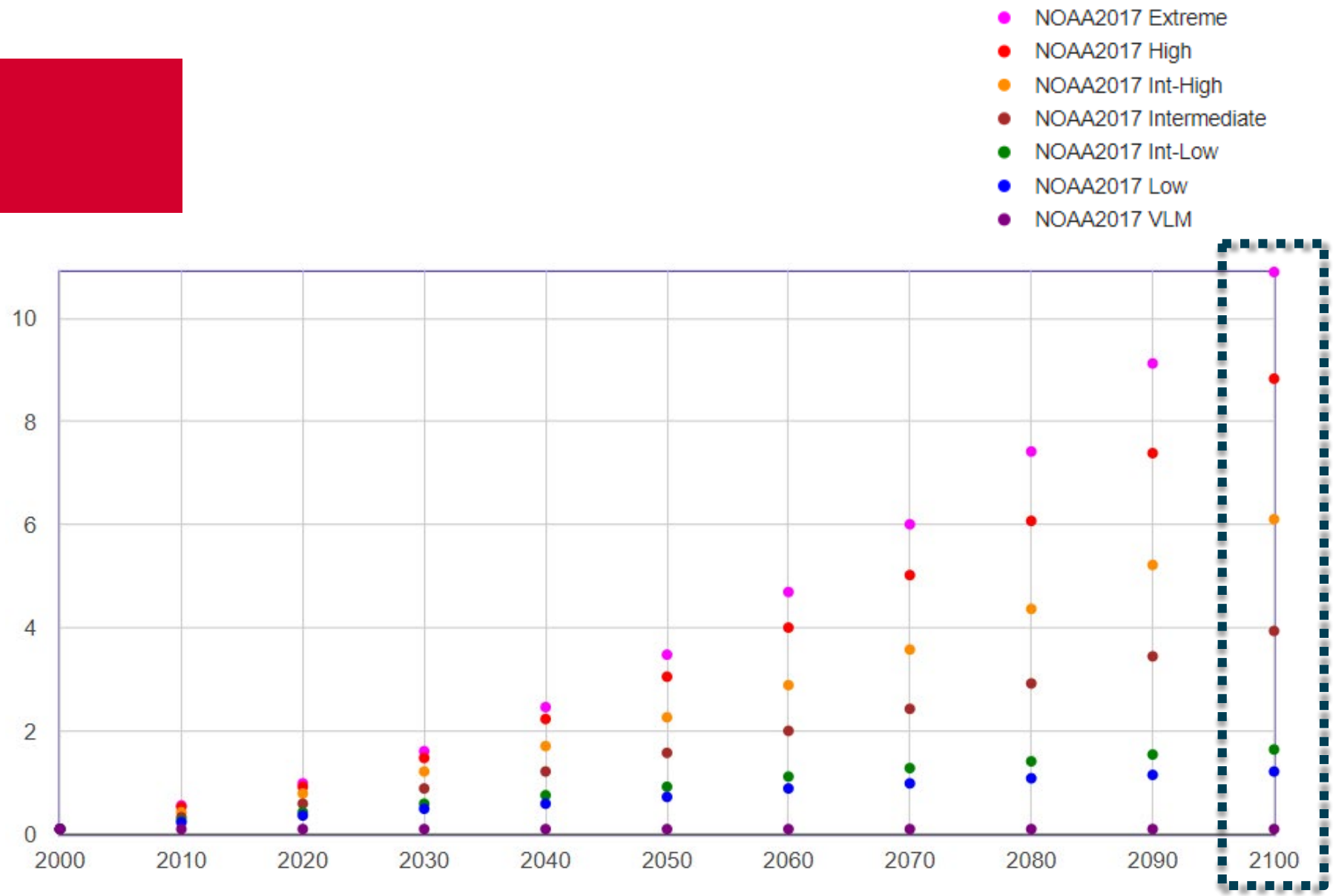
Methodology Overview

- Estimate the total assessed residential building and land values that are located within inundation polygons
- Identify populations and demographics of people located within inundation polygons
- Identify town zoning districts, assets, and roads that are located within inundation polygons

Inundation Polygons

- The inundation polygons are shapefiles developed by Maine Geological Survey
- Represent boundaries of the highest astronomical tide in the year 2100 using sea level rise amounts projected by NOAA (2017)

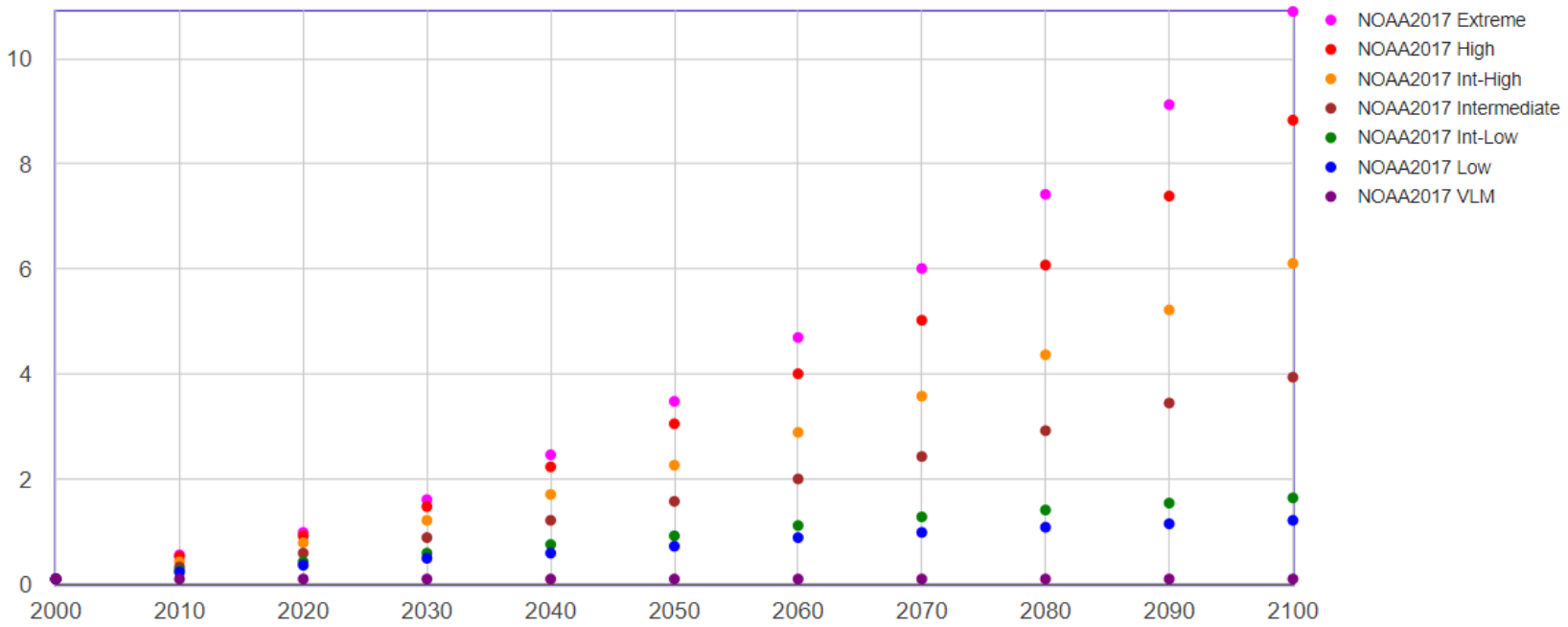


Which Inundation Polygons?

- The six sea level rise amounts are:
  - 1.2 ft – Low
  - 1.6 ft – Intermediate-Low
  - 3.9 ft – Intermediate
  - 6.1 ft – Intermediate-High
  - 8.8 ft – High
  - 10.9 ft – Extreme

Scenarios for PORTLAND
NOAA2017 VLM: 0.00000 feet/yr
All values are expressed in feet

Year	NOAA2017 VLM	NOAA2017 Low	NOAA2017 Int-Low	NOAA2017 Intermediate	NOAA2017 Int-High	NOAA2017 High	NOAA2017 Extreme
2000	0.10	0.10	0.10	0.10	0.10	0.10	0.10
2010	0.10	0.24	0.27	0.33	0.43	0.53	0.56
2020	0.10	0.37	0.43	0.60	0.79	0.93	0.99
2030	0.10	0.50	0.60	0.89	1.22	1.48	1.61
2040	0.10	0.60	0.76	1.22	1.71	2.24	2.47
2050	0.10	0.73	0.93	1.58	2.27	3.06	3.48
2060	0.10	0.89	1.12	2.01	2.89	4.01	4.70
2070	0.10	0.99	1.29	2.43	3.58	5.03	6.01
2080	0.10	1.09	1.42	2.93	4.37	6.08	7.42
2090	0.10	1.15	1.55	3.45	5.22	7.39	9.13
2100	0.10	1.22	1.65	3.94	6.11	8.83	10.90



Which Inundation Polygons?

- While there are only six different polygon shapefiles, the polygons could represent time horizons under certain scenarios…

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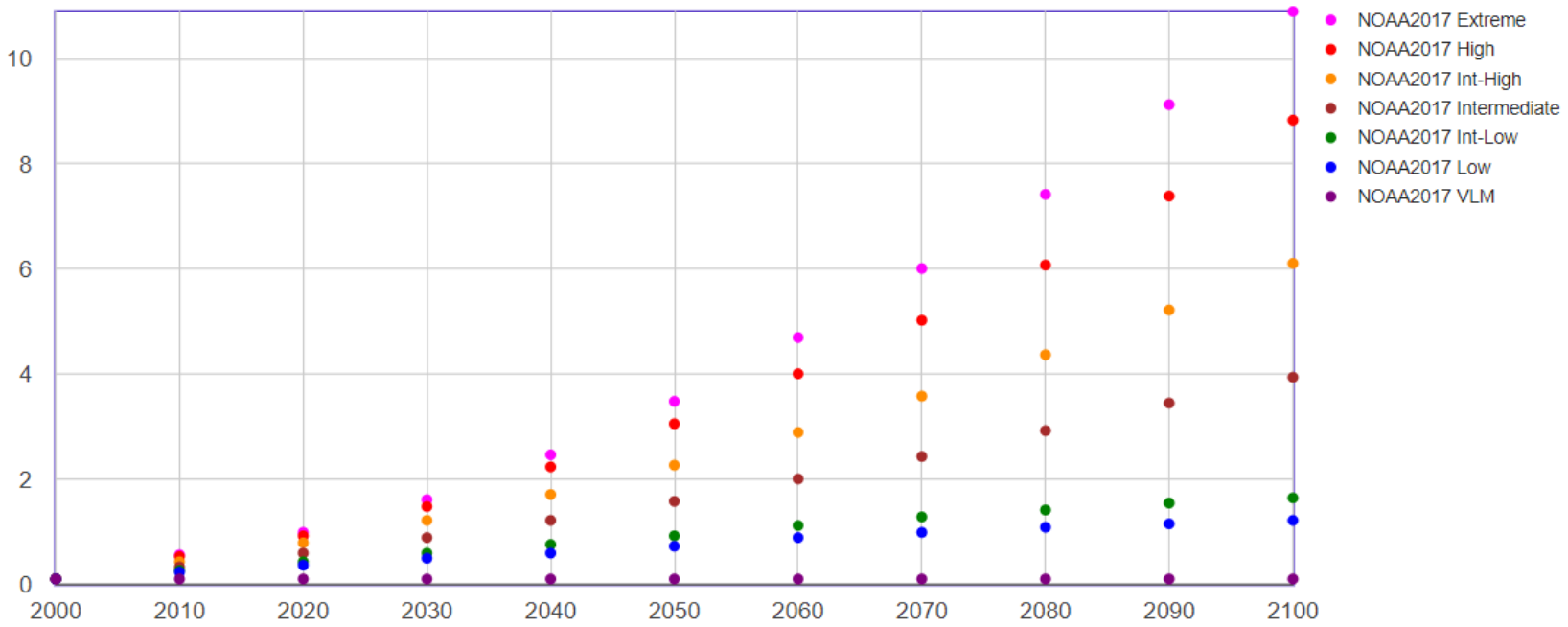

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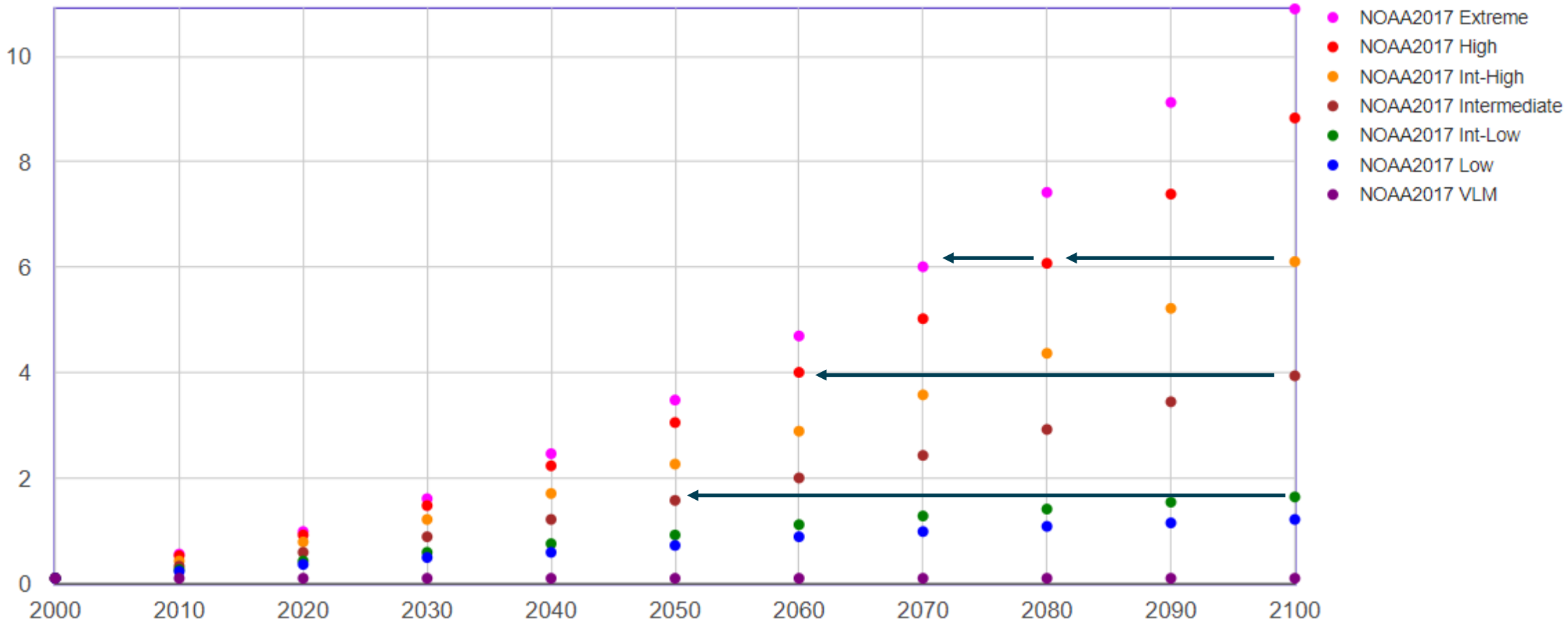

Which Inundation Polygons?

- GEI recommends using sea level rise amounts of 1.6 ft and 3.9 ft – representing the years 2050 and 2100 under the "intermediate" scenario

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Which Inundation Polygons?

- GEI recommends using sea level rise amounts of 1.6 ft and 3.9 ft – representing the years 2050 and 2100 under the “intermediate” scenario
- Assessing sea level rise impacts for both near and far time horizons allows us to understand temporal relationship of impacts and prioritization of actions
- GEI can accommodate up to three inundation boundaries for assessment

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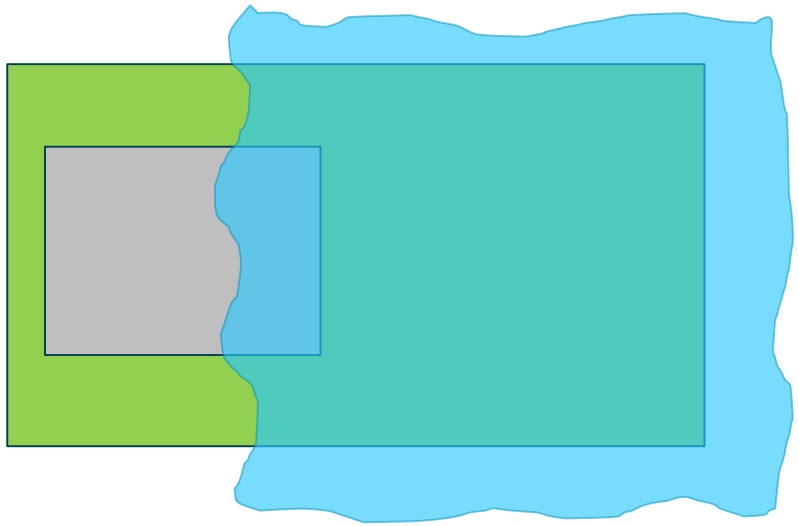
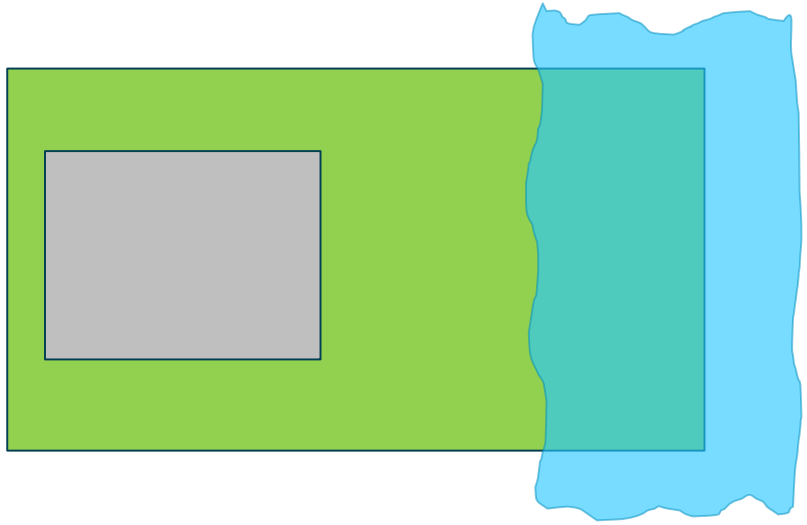
Residential Building and Land Values

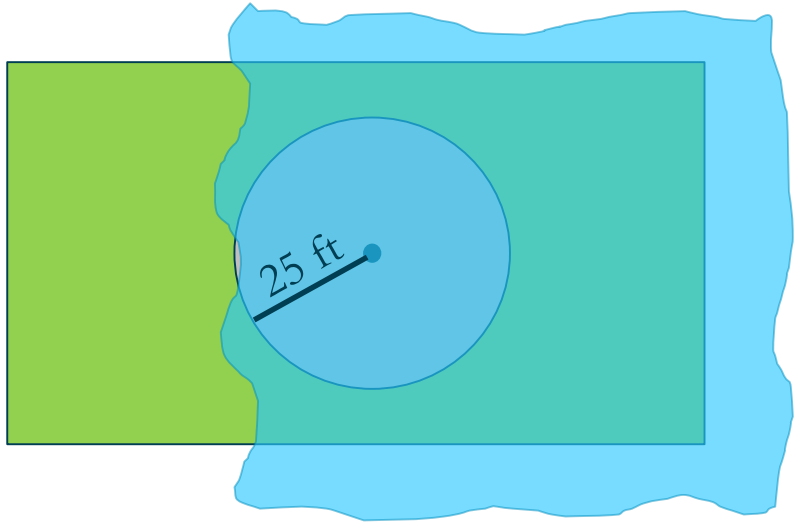
- GEI will estimate the total assessed residential building and land values that are located within inundation polygon ("impacted")
- Data would come from municipal assessor tables
- Estimating values of building and land impacted:
  - If "building" is touched by inundation polygon, count entire building value as impacted
  - If "building" is outside of polygon, do not count building value as impacted
  - If "building" is outside of polygon, but land is within polygon, calculate value impacted as a percent of total land value (i.e., if 25% of a parcel's land value is inundated, reduce the land value by 25%)
  - If "building" is touched by inundation polygon, count entire land value

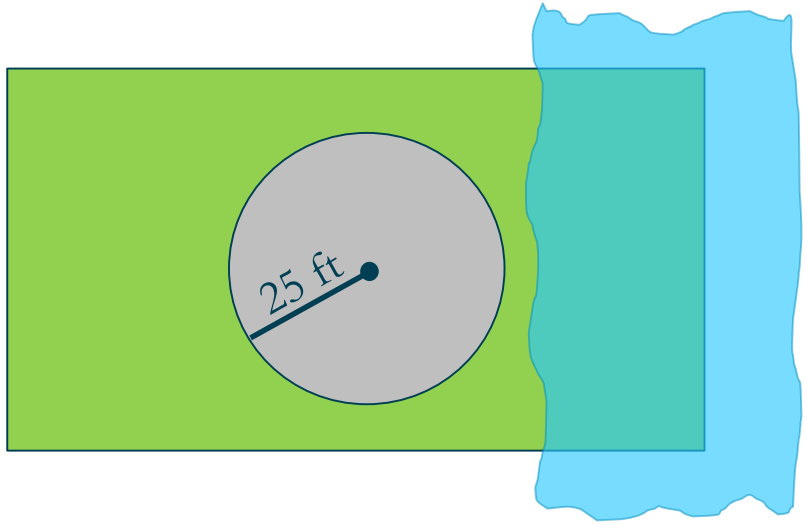




Residential Building and Land Values

- Building footprints would be preferred but if data do not exist we can use each parcel's centroid as the building location
- Buffer centroid by 25 ft to create building "footprints"

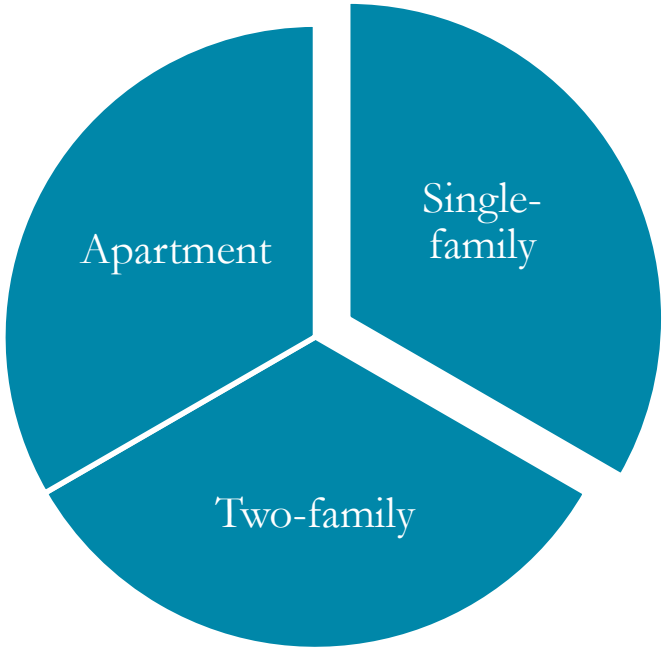




Residential Building and Land Values

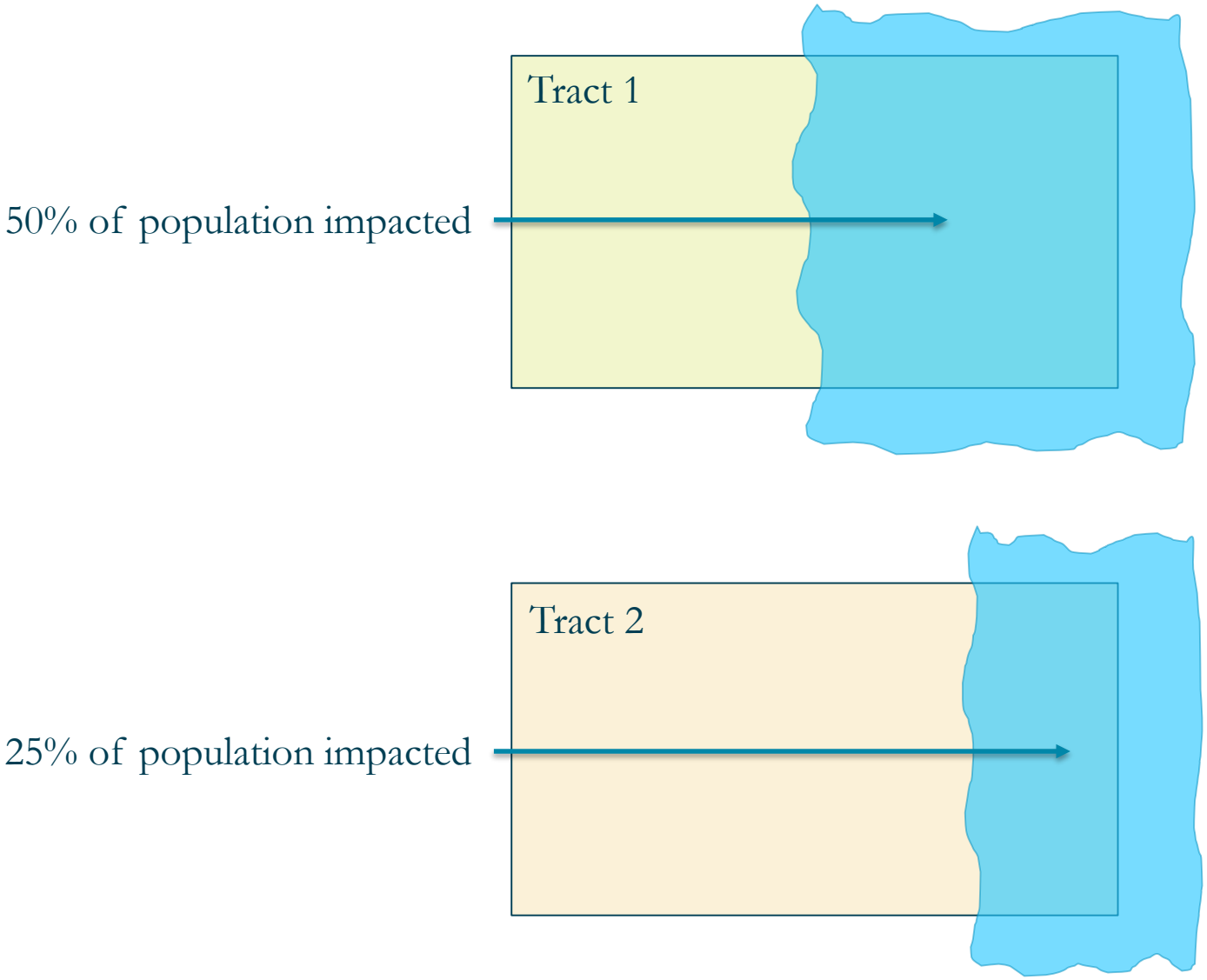
- Values across each town will be summed to estimate total value of impacted buildings and land
- Impacted values could be divided by building type (i.e., single-family home, two-family home, etc.) if data is available

Parcel	Impacted Land (2050)	Impacted Buildings (2050	Impacted Land (2100)	Impacted Buildings (2100)
1				
2				
3…				
Total				

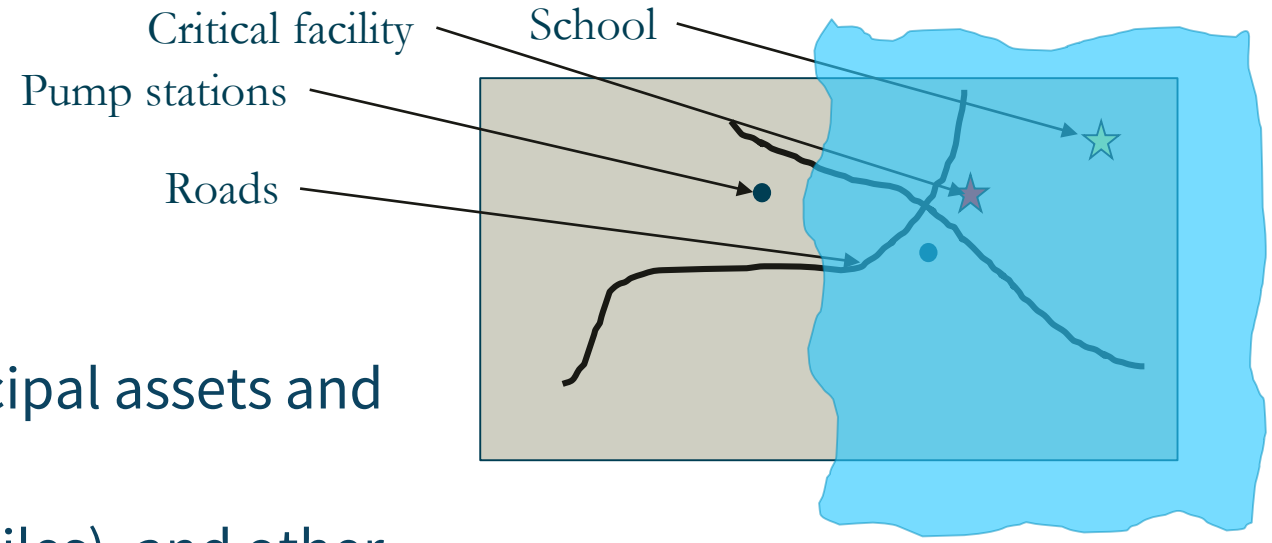


Populations at Risk

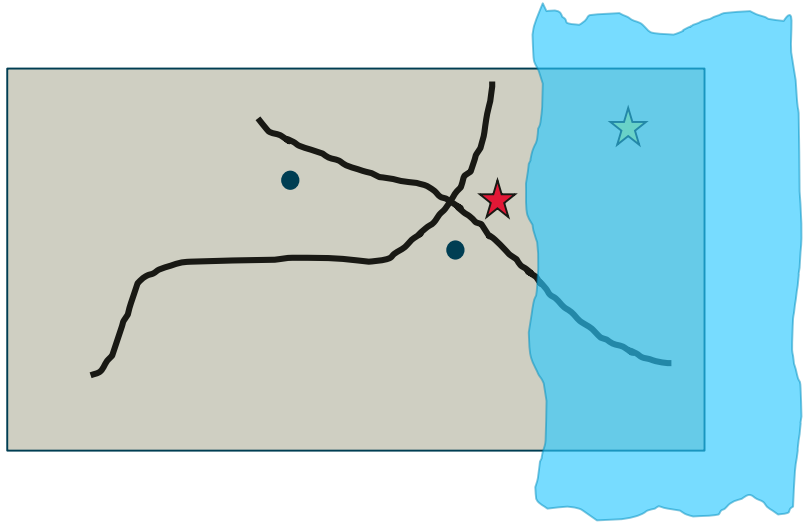
- Use US Census tracts or blocks (if available) information to determine populations and demographics of people located within inundation polygons.
- A proportion of the tract or block will be calculated based on the area covered by the inundation polygon



Assets at Risk



- Use other available GIS data identifying municipal assets and infrastructure
- Calculate number of impacted roads (linear miles), and other critical infrastructure (points), which could include:
  - Wastewater treatment facilities and pump stations
  - Septic systems
  - Critical facilities (hospitals, nursing homes, etc.)
  - Culturally and/or historically significant resources
  - Water infrastructure (facilities, pump stations, and wells)
  - Emergency Management (police, fire stations, shelters, etc.)
  - Roads (significant routes, evacuation routes, commuting patterns, etc.)
  - Public parking lots
  - Municipal buildings (government, schools, post office, etc.)



Methodology Overview Results

- Assessed residential building and land values at risk under sea level rise inundation scenarios – values, tables, and graphs
- Populations and demographics of people at risk – tables and graphs
- Important town assets, roads, and infrastructure at risk – tables and graphs

Questions

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