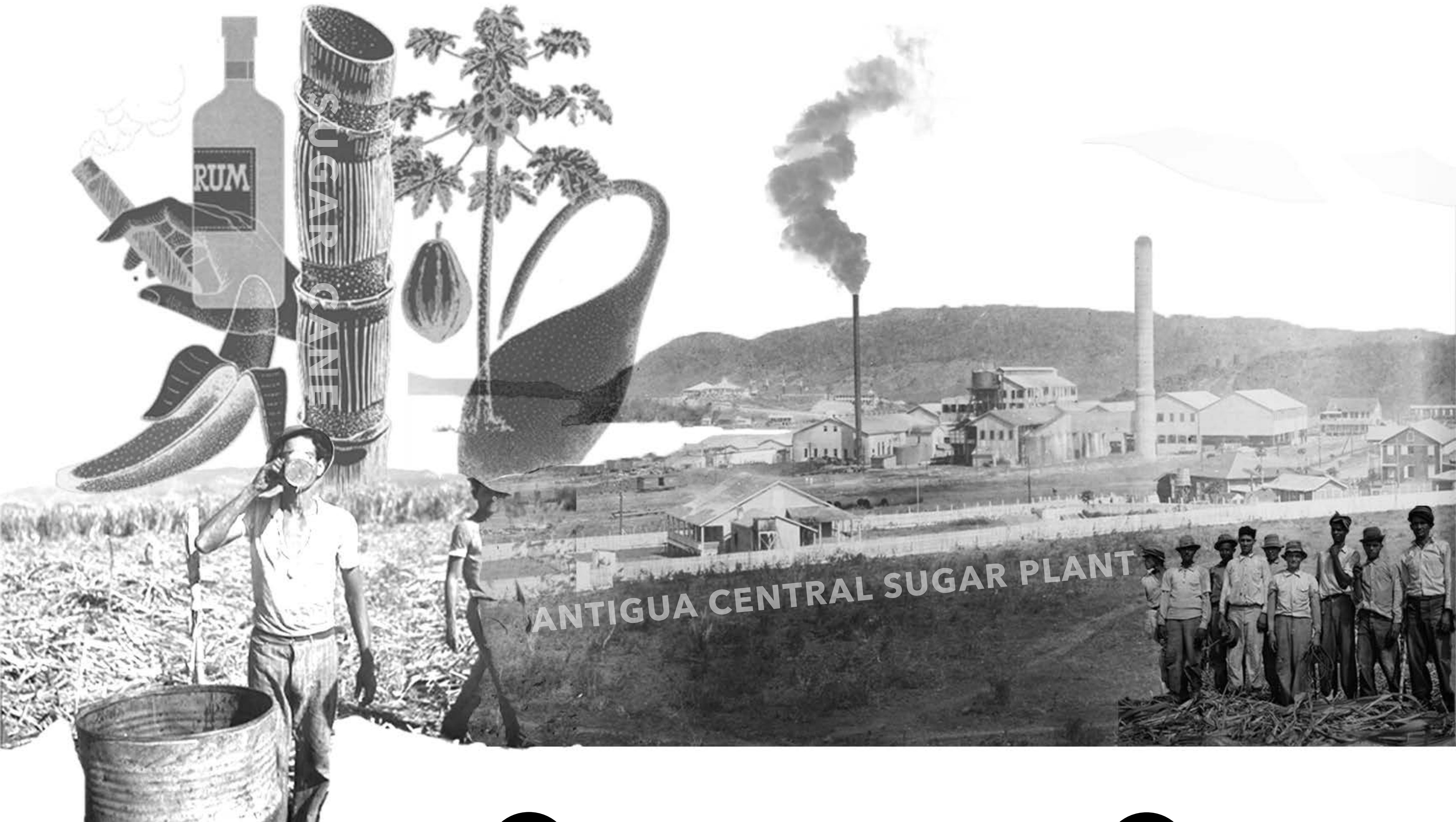


ENVIRONMENTAL INJUSTICE





1910

DEPENDENT ON SUGAR

The island had a monocultural plantation economy focused around sugar. It accounted for 60% of total agricultural export. It's been the major contributor to the island's progress and that of its workers, whose wages tripled.

1935

RUIN OF SUGAR INDUSTRY

The local Puerto Rican government enacted policies to stifle the growth of large cane-farms. Eventually this led to less farms and the sugar industry's productivity declined until the industry collapsed.



1940

OPERATION BOOTSTRAP

Transitioning from agriculture to an industry based economy was set. A series of industrialization tactics were enforced by the government to promote the economic status of the island.

1960

Migration

450,000 Puerto Ricans migrated to the United States following the industrialization and economic growth of Puerto Rico.

Now Puerto Rico Offers 100% Tax Exemption to New Industry

by BEARDSLEY RUMFORD

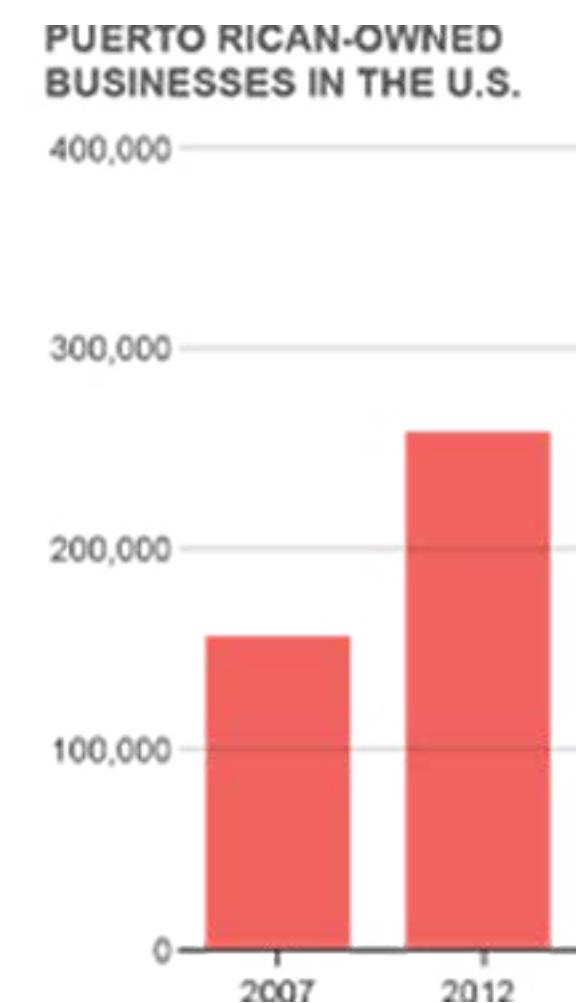
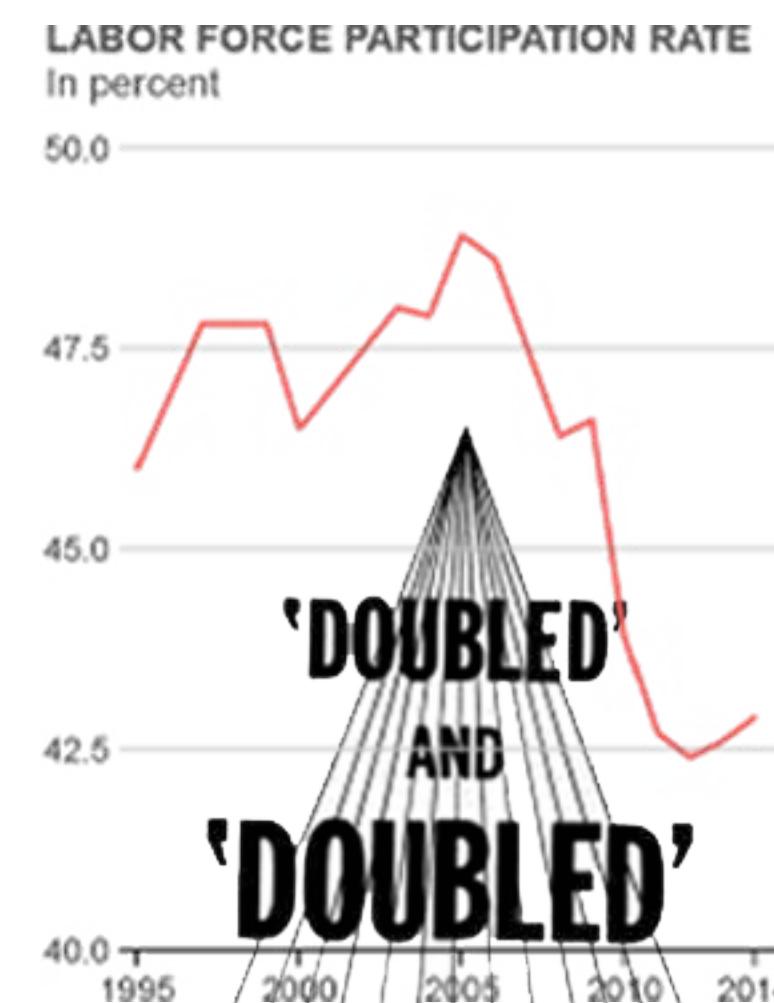
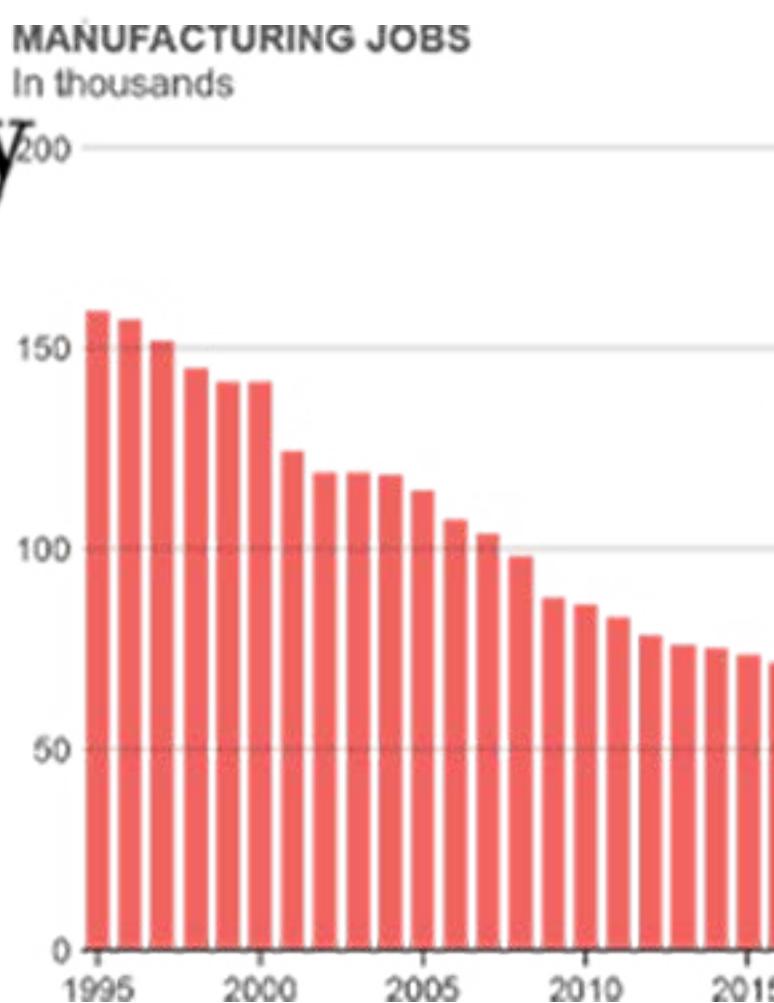
"We don't want runaway industries" says Governor Muñoz. "But we do seek new and expanding industries." Federal taxes do not apply in Puerto Rico, and the Commonwealth also offers full exemption from local taxes. That is why 300 new plants have been located in Puerto Rico, protected by all the guarantees of the U.S. Constitution.



1970

TAX INCENTIVES

Mainland U.S companies lured to build factories in the southern part of the island by a generous corporate tax incentive, PREPA expanded its power generation and transmission infrastructure to service those facilities.



'DOUBLED'
AND
'DOUBLED'
AND
**'DOUBLED'
AGAIN**
*...power production in
industrialized
PUERTO RICO*

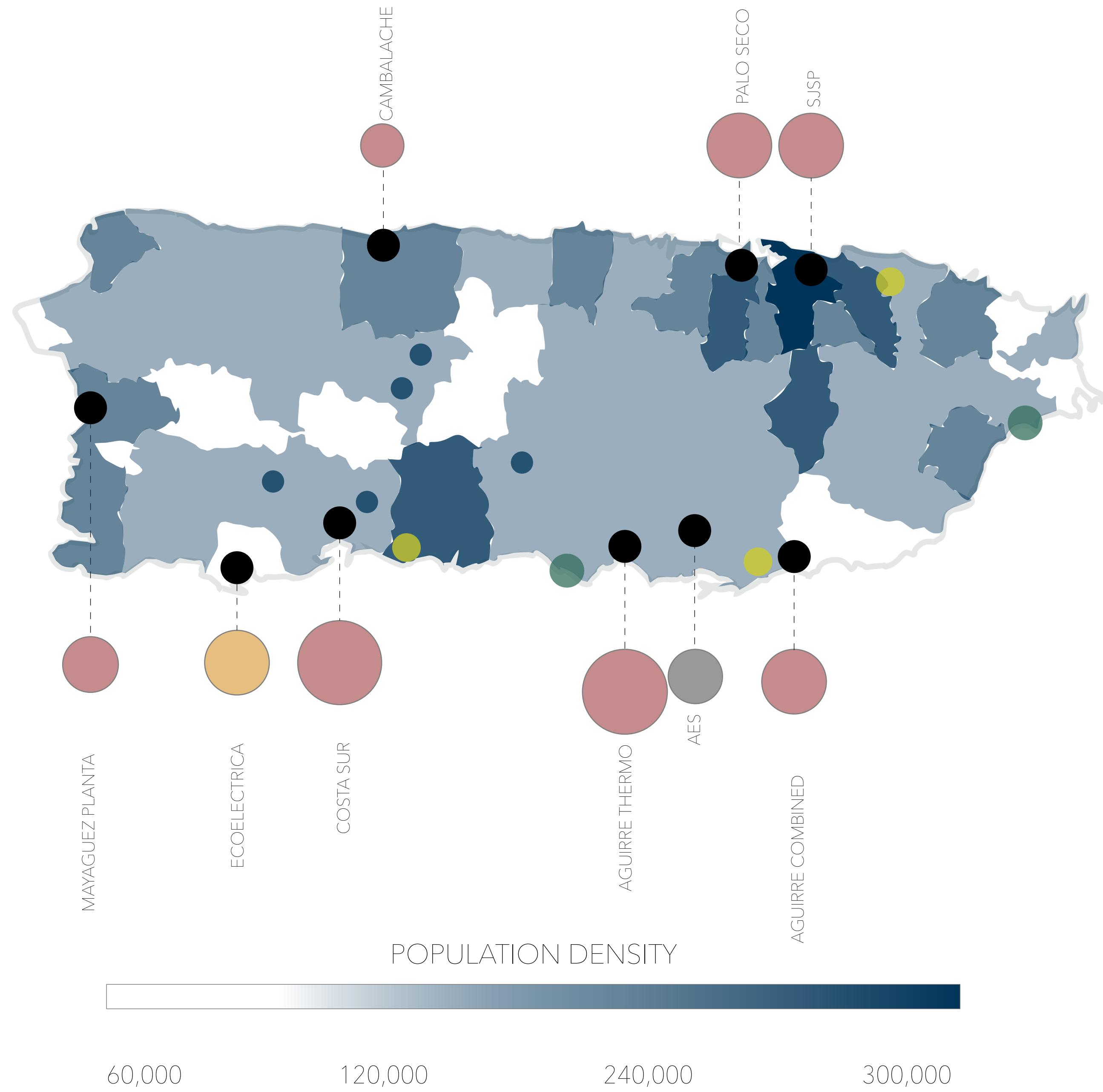
1996

TAX BREAK - ECONOMY STRUGGLE

Section 936 was passed which exempted federal income tax profits earned by U.S. companies in Puerto Rico. Soon corporations were quick to set up subsidiaries in Puerto Rico leading to financial crisis on the Island.

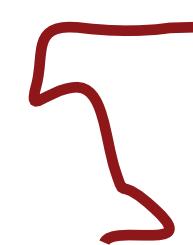
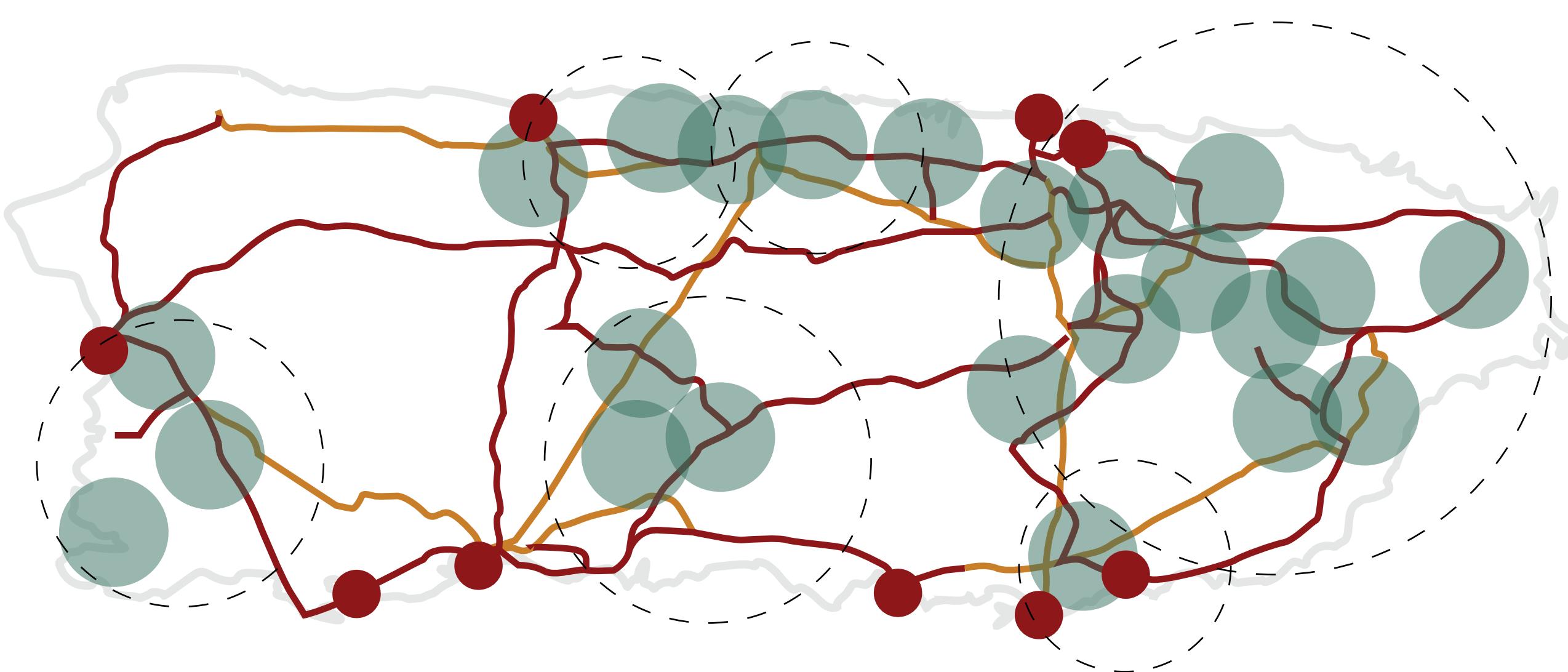
SOUTH-HEAVY DISTRIBUTION REVEALS WEAK GRID

98% of Puerto Rico's electricity comes from heavy reliance of fossil fuels such as oil, natural gas and coal. Leaving only 2% of renewable energy sources. The current grid produces 79% of energy generation in the south leaving the north in a fragile state during disasters.

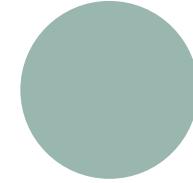


NORTHEAST ACCOUNTS FOR 70% OF THE SYSTEM'S ENERGY DEMAND

Manufacturing in Puerto Rico is one of the largest contributors to the island's economy, primarily being pharmaceuticals and medical devices, with many major plants located in the northeast part of the island.



115 kV LINES



MANUFACTURING CENTERS



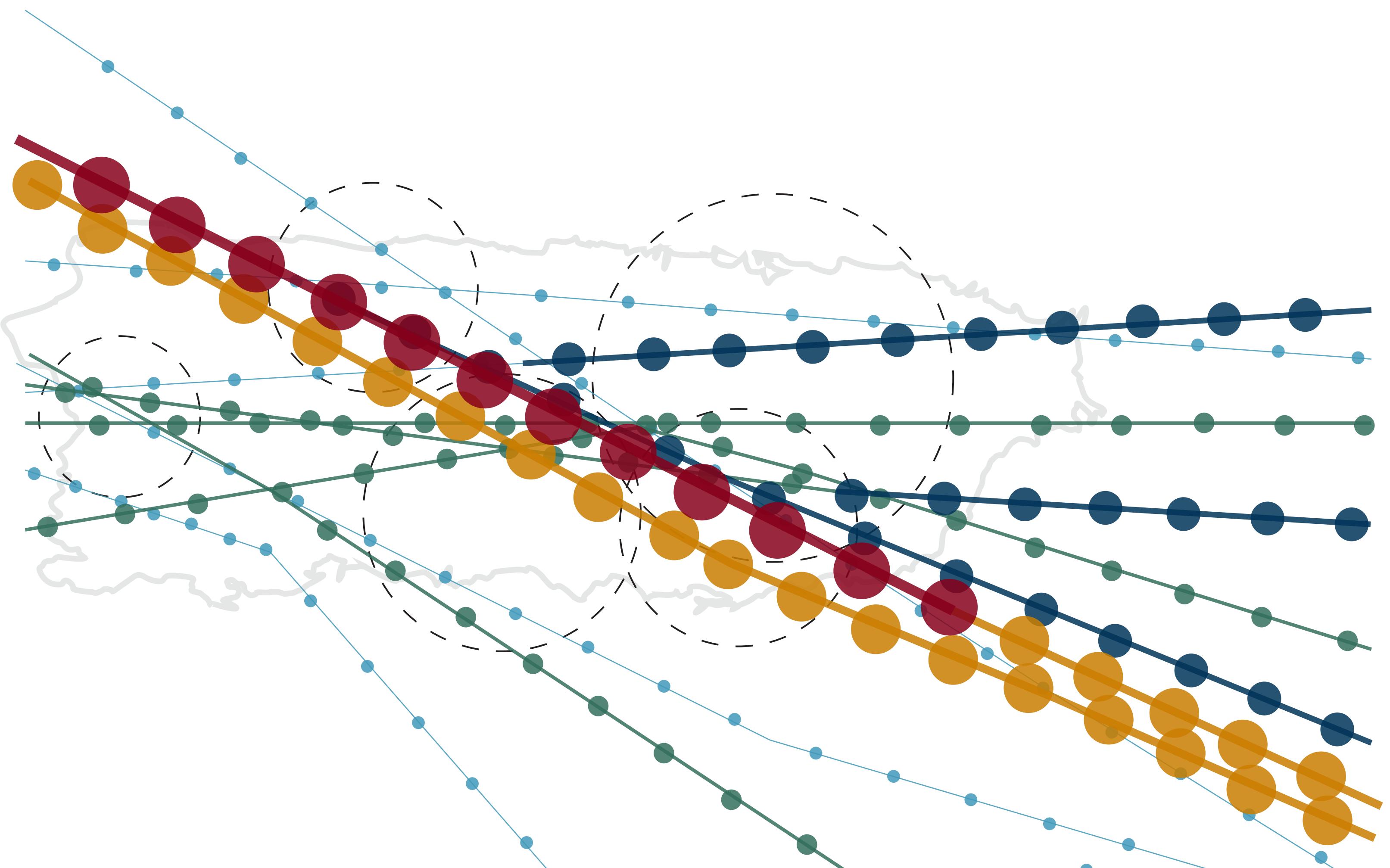
POWER PLANTS



225 kV LINES

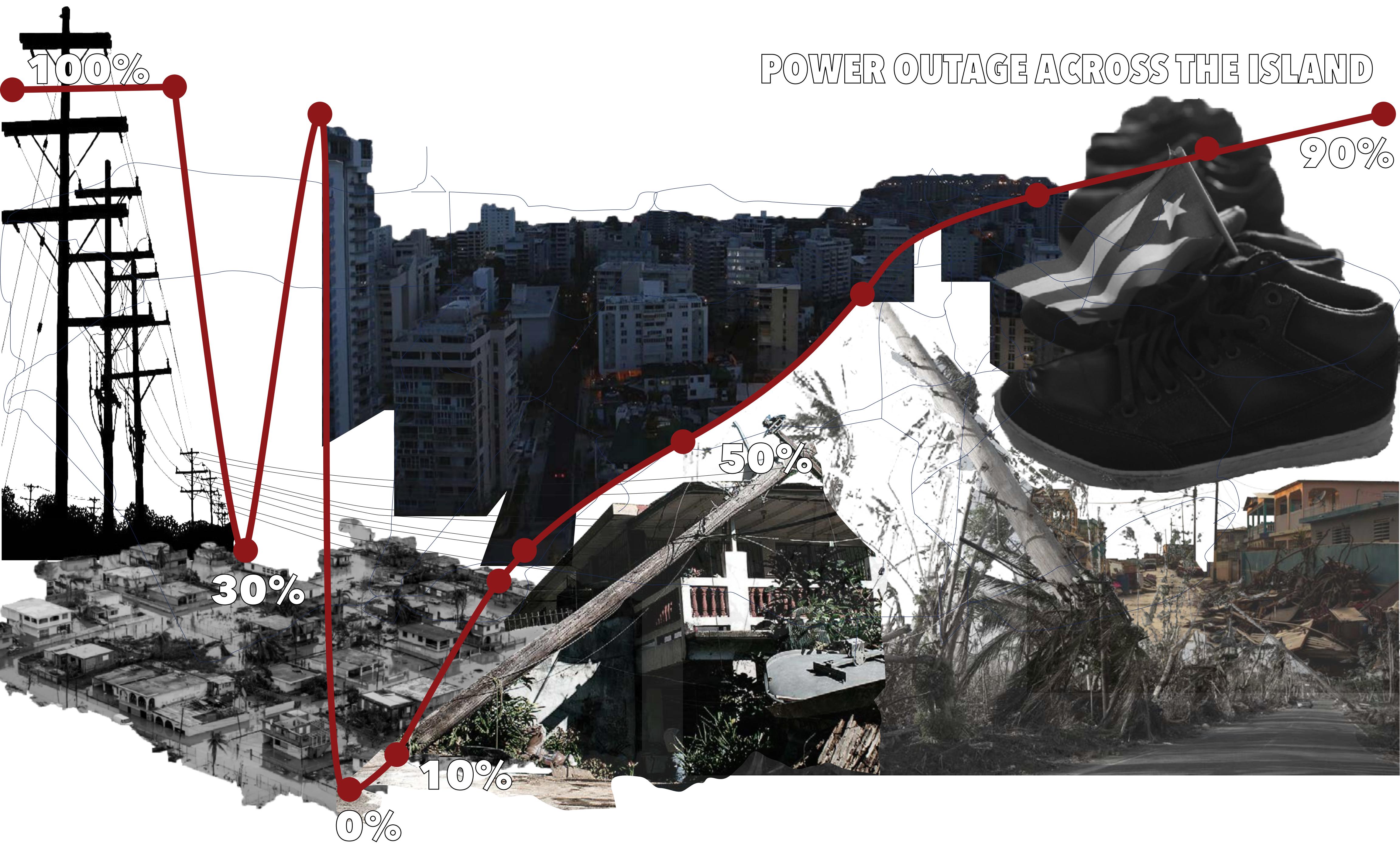
VULNERABILITY LIES AHEAD

The southeast area of the island is particularly vulnerable to hurricanes, as the most destructive storms typically sweep through this part of the Caribbean on a northwest trajectory.



CATEGORY OF HURRICANE : 1 - 5

POWER OUTAGE ACROSS THE ISLAND



AUGUST

SEPTEMBER

OCTOBER

NOVEMBER

DECEMBER

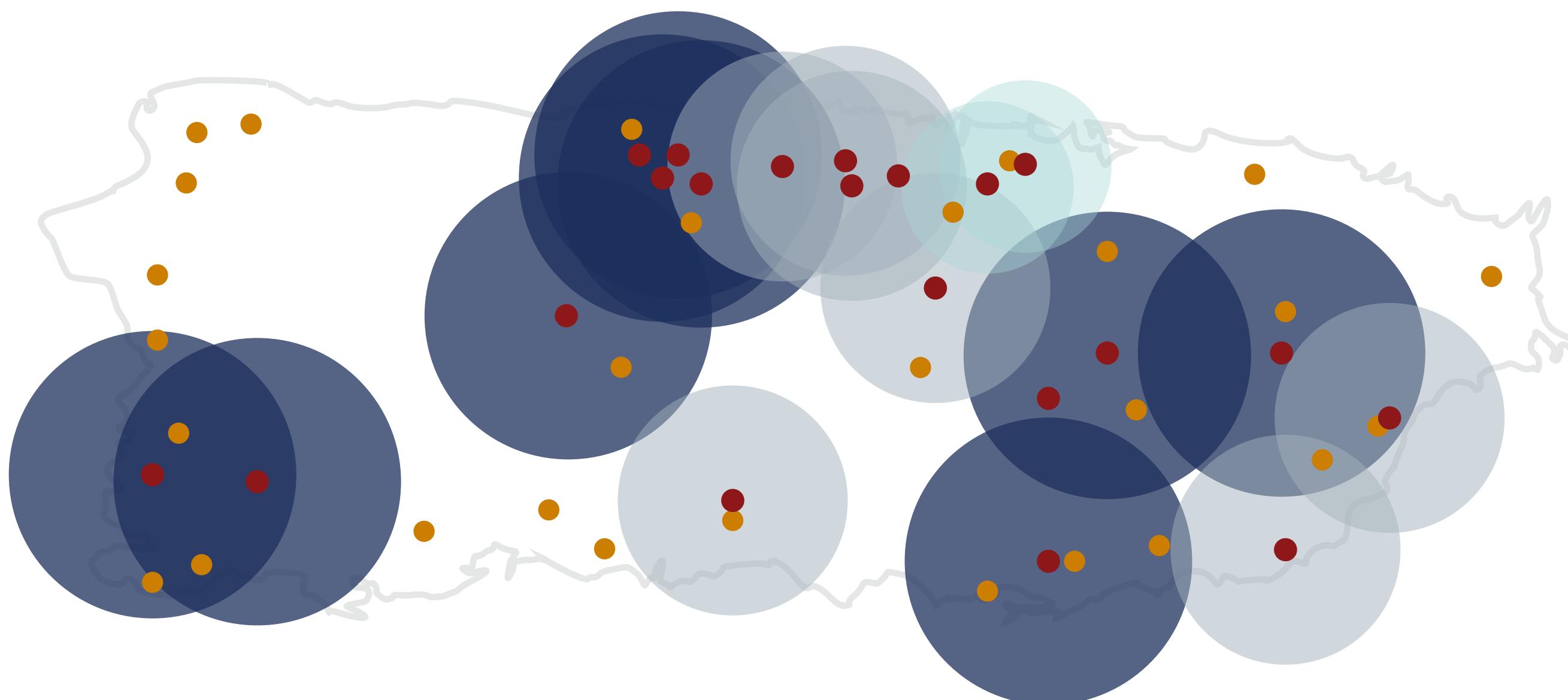
JANUARY

FEBRUARY

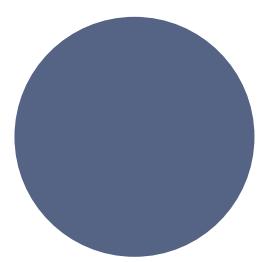
MARCH

CONTAMINATED WATER IN 23 SUPERFUND SITES

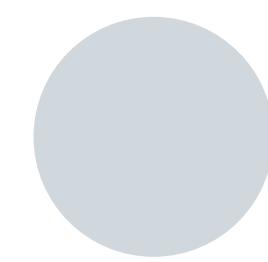
Superfund sites and landfills contains toxins typically left over from polluting industries nearby. In this case, it's nearby low-income communities that are suffering from chemicals in their only source of clean water.



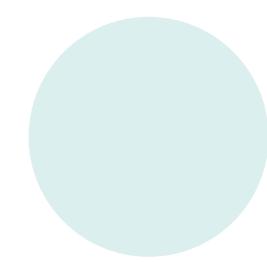
PERCENT OF PEOPLE IN POVERTY



50-60%



40-50%



30-40%

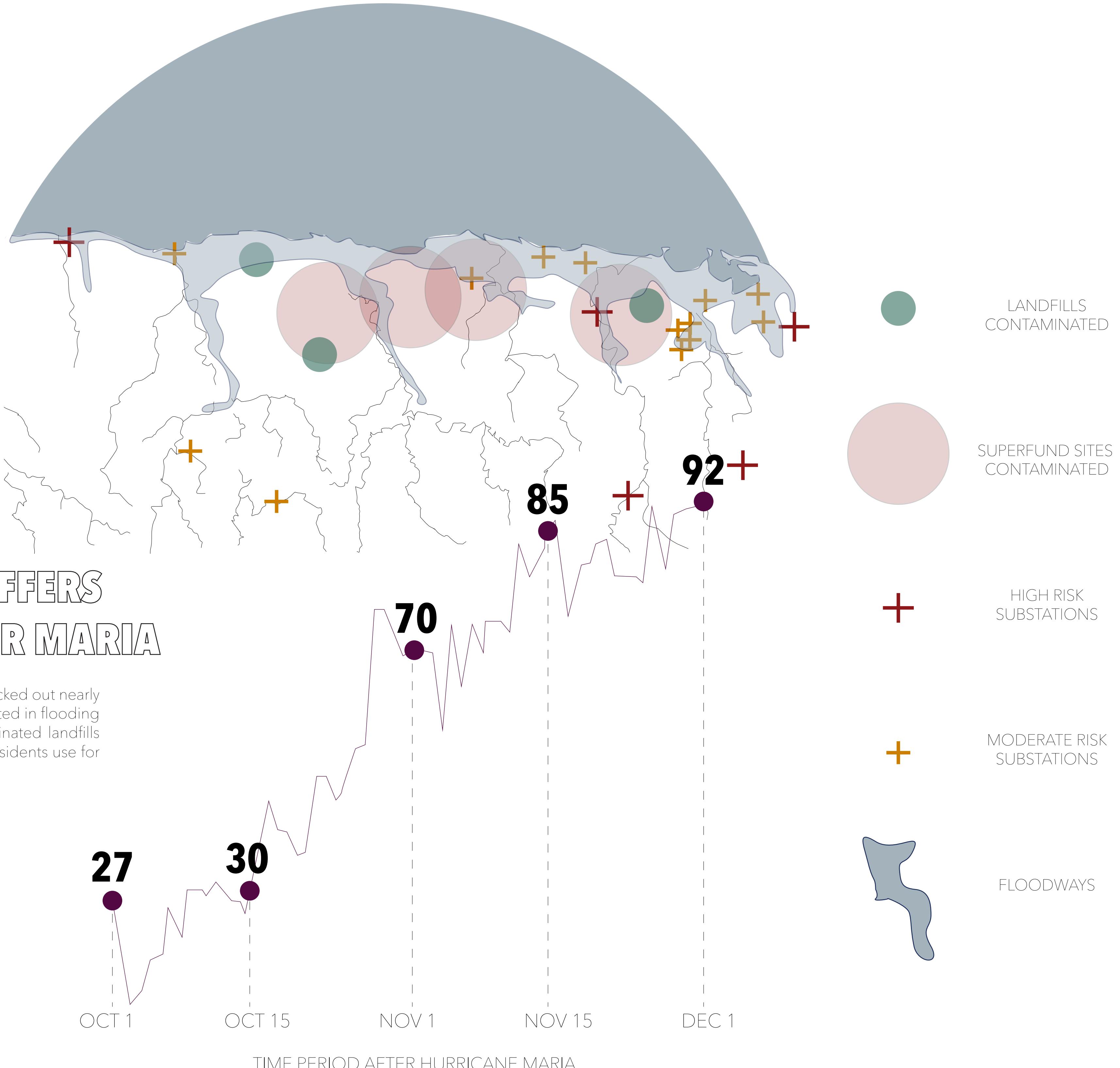
HAZARDOUS WASTE SITE LOCATIONS



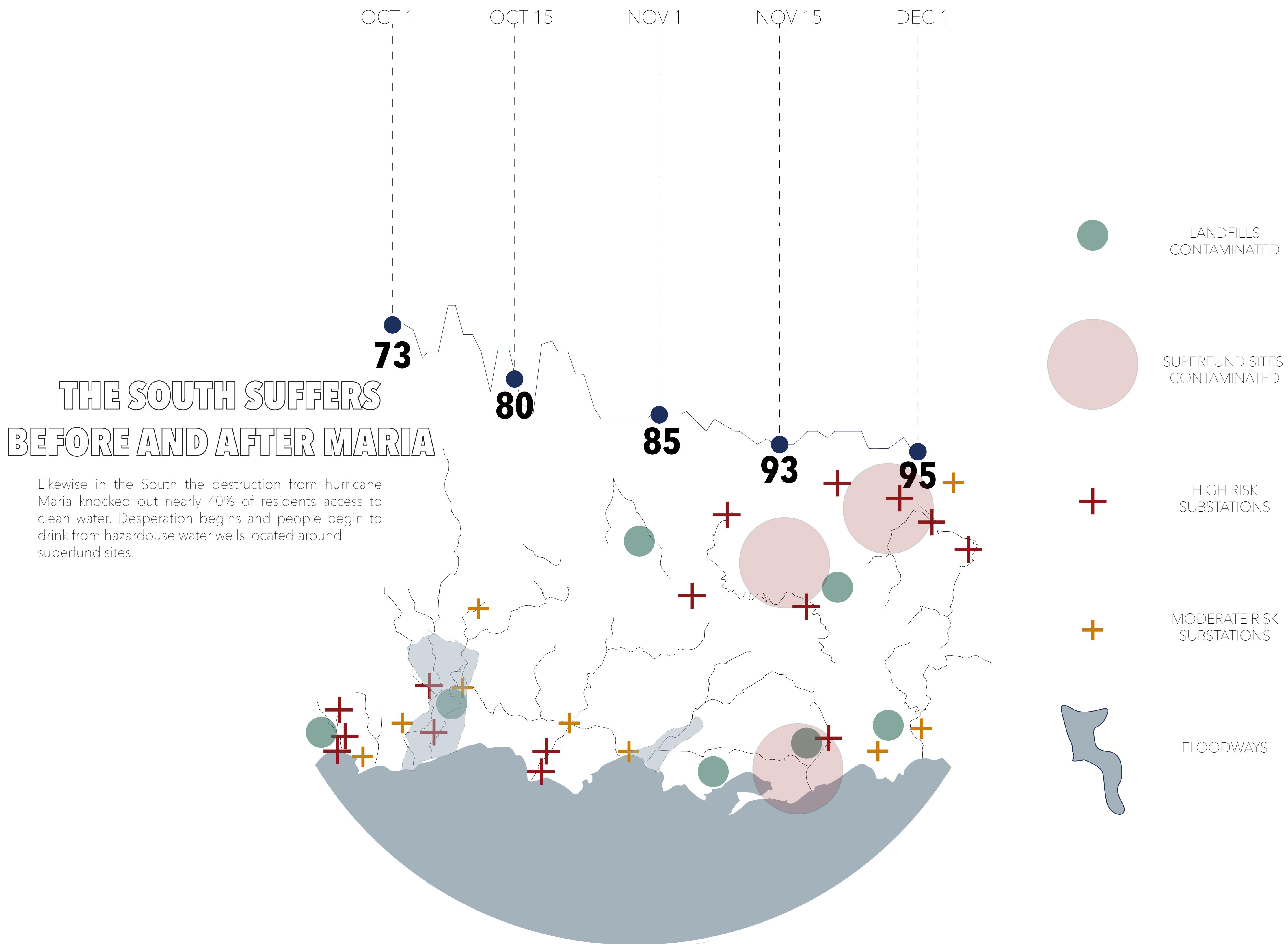
LANDFILLS



SUPERFUND SITES



TIME PERIOD AFTER HURRICANE MARIA



HEART OF THE ISLAND LIVING IN CONSTANT FEAR

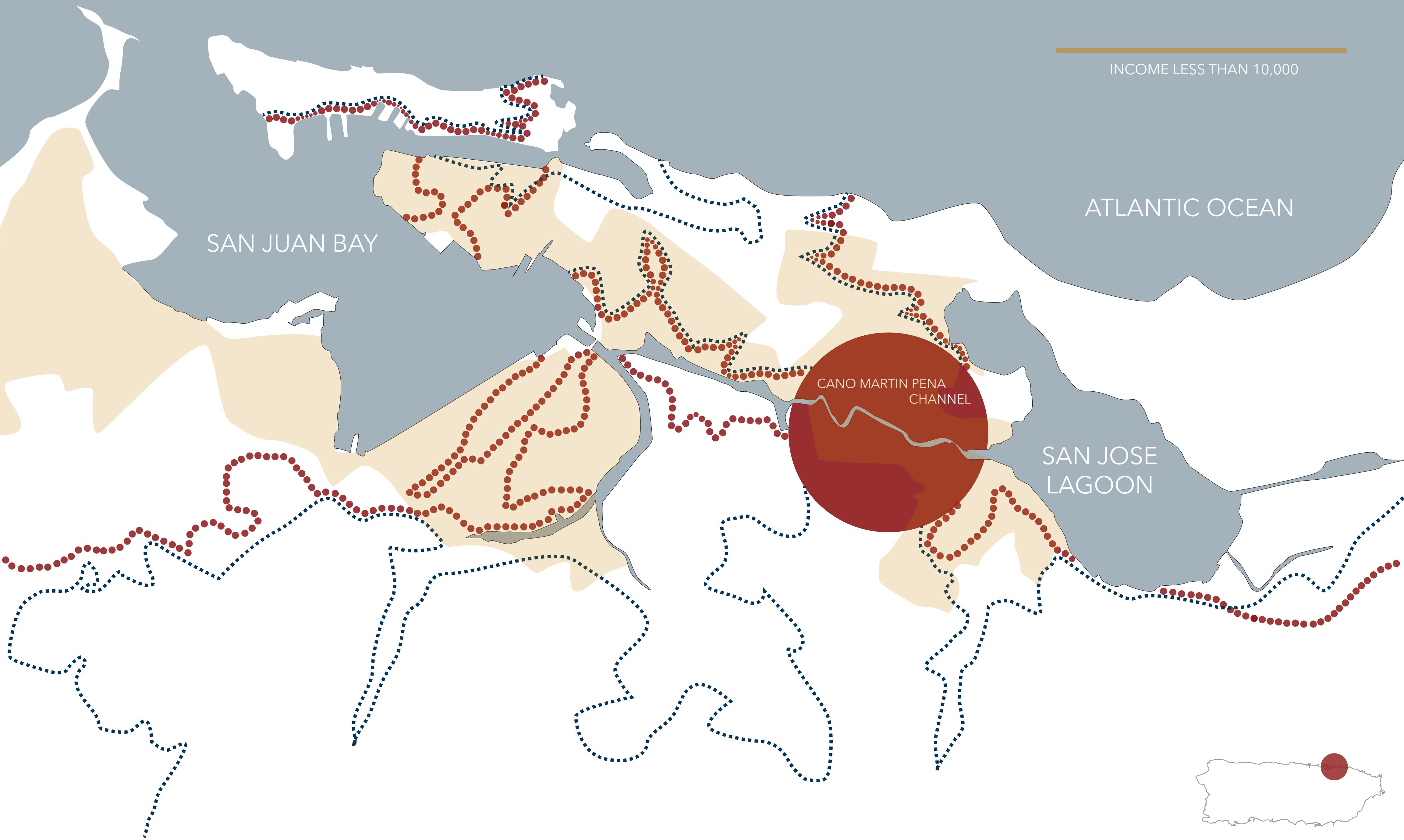
Largest portion of the island's electric energy demand is concentrated in San Juan due to the highly dense population. Being along the North Coast line, the heart of the island is more susceptible to flooding and storm damage which in return leaves 1 million people at risk.

FLOOD HAZARD ZONES



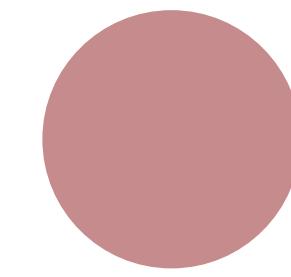
STORM SURGE ZONES

INCOME LESS THAN 10,000

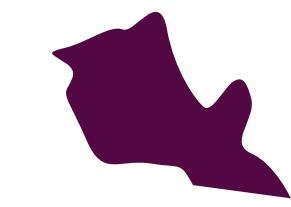


RAW SEWAGE DISRUPTING FLOW FOR DECADES

Once a flowing channel between the Suan Juan Bay and San José Lagoon is now a stagnate tidal channel. Stretching nearly 4 miles lies trash and sediment to surrounding poverty communities. The houses were built on a flood plain without government permits, which has caused decades of flooding waste for nearly 30,000 residents.



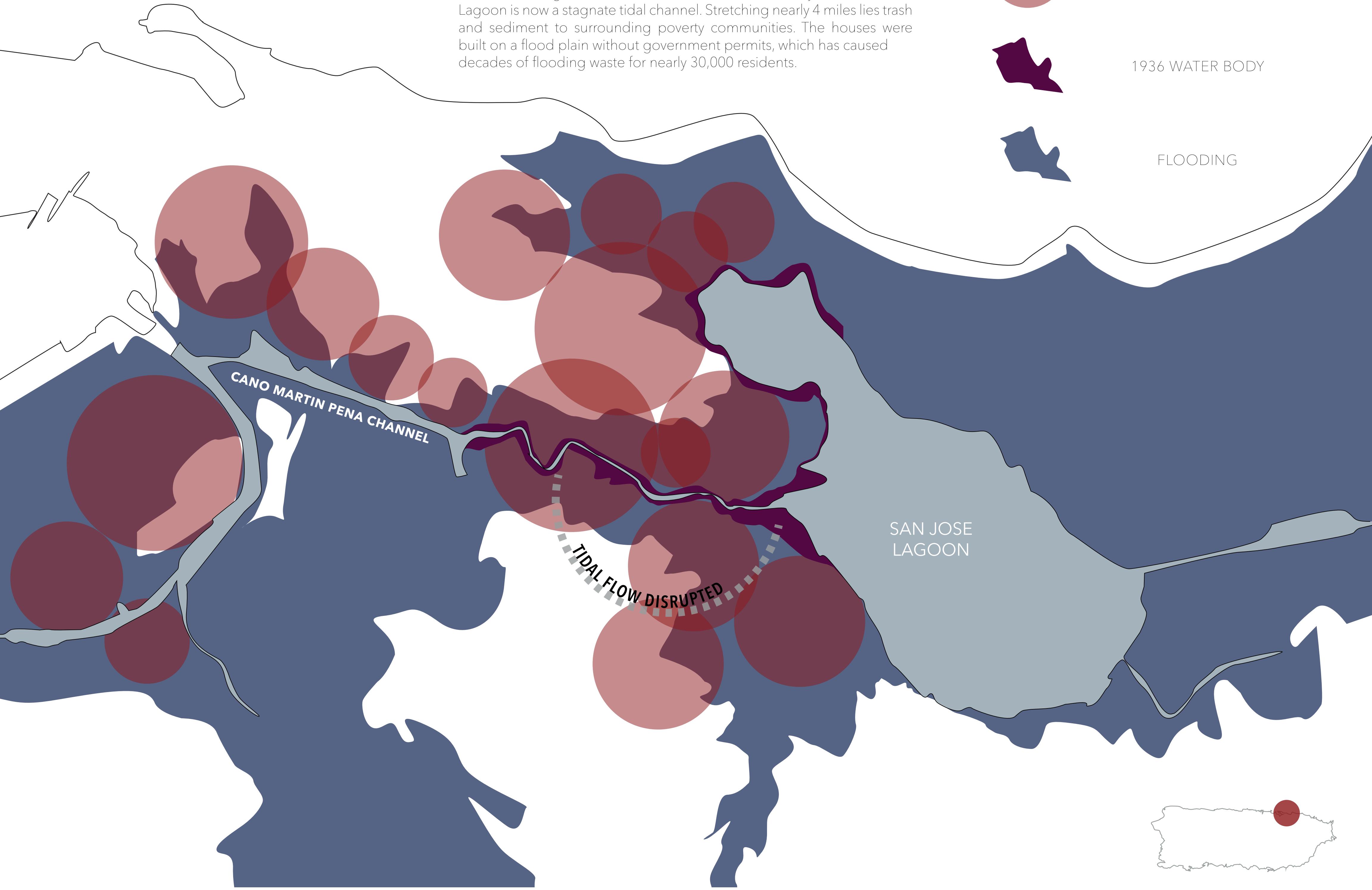
LOW INCOME COMMUNITIES

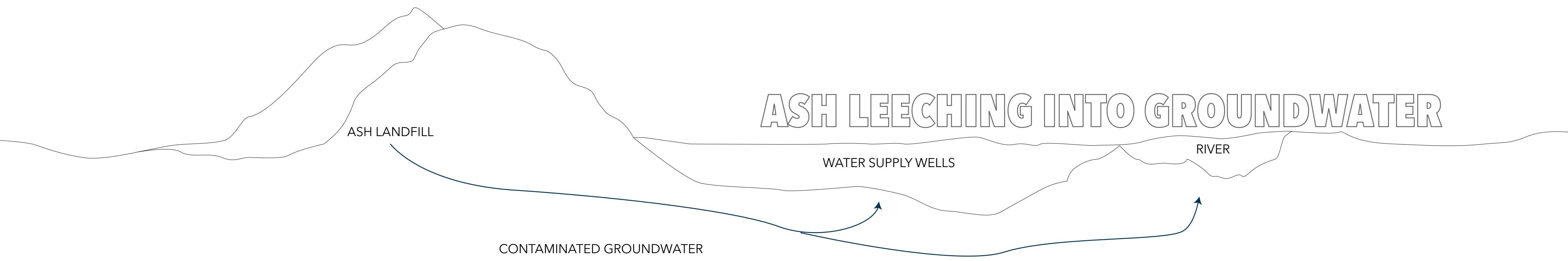


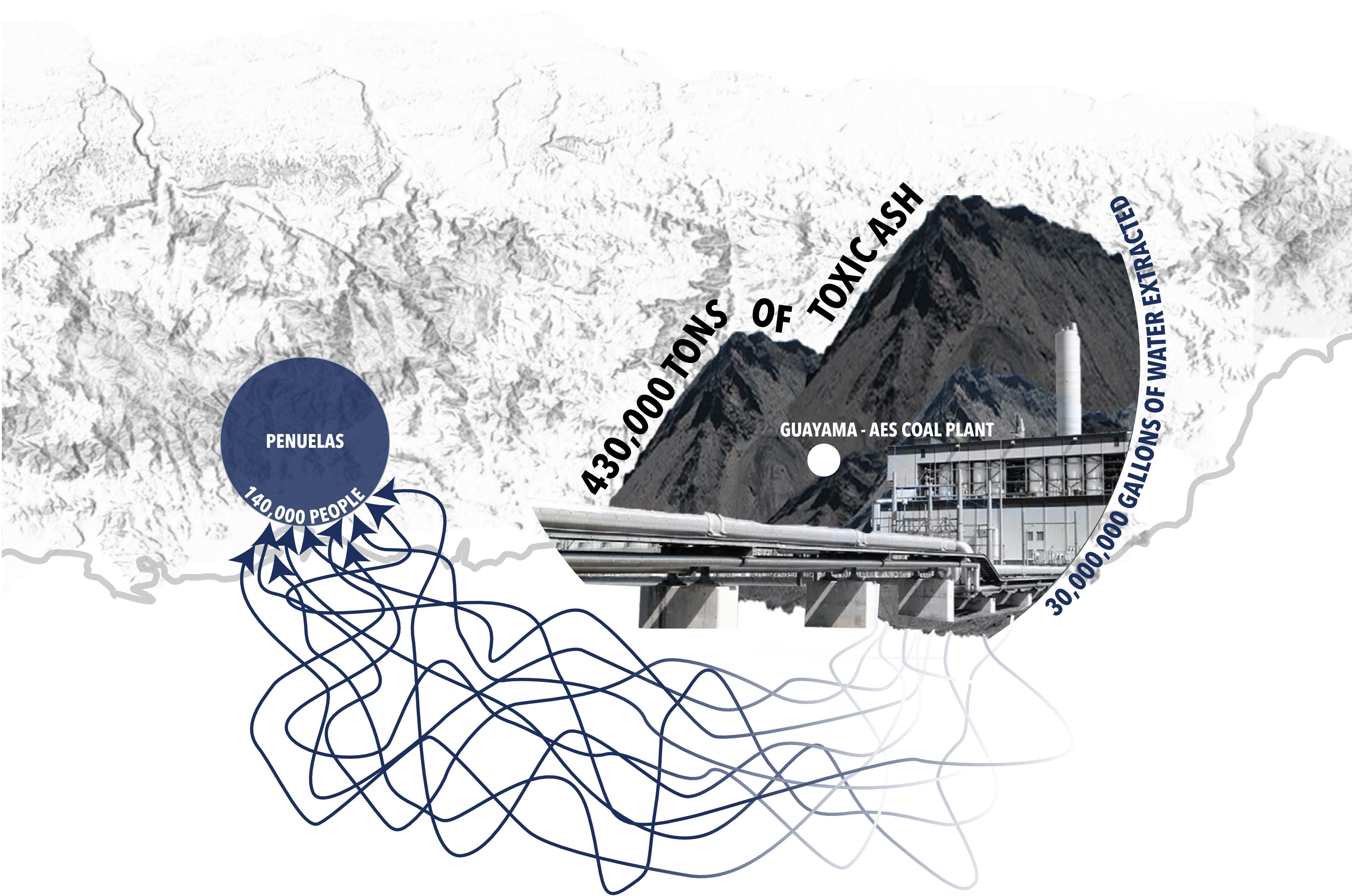
1936 WATER BODY

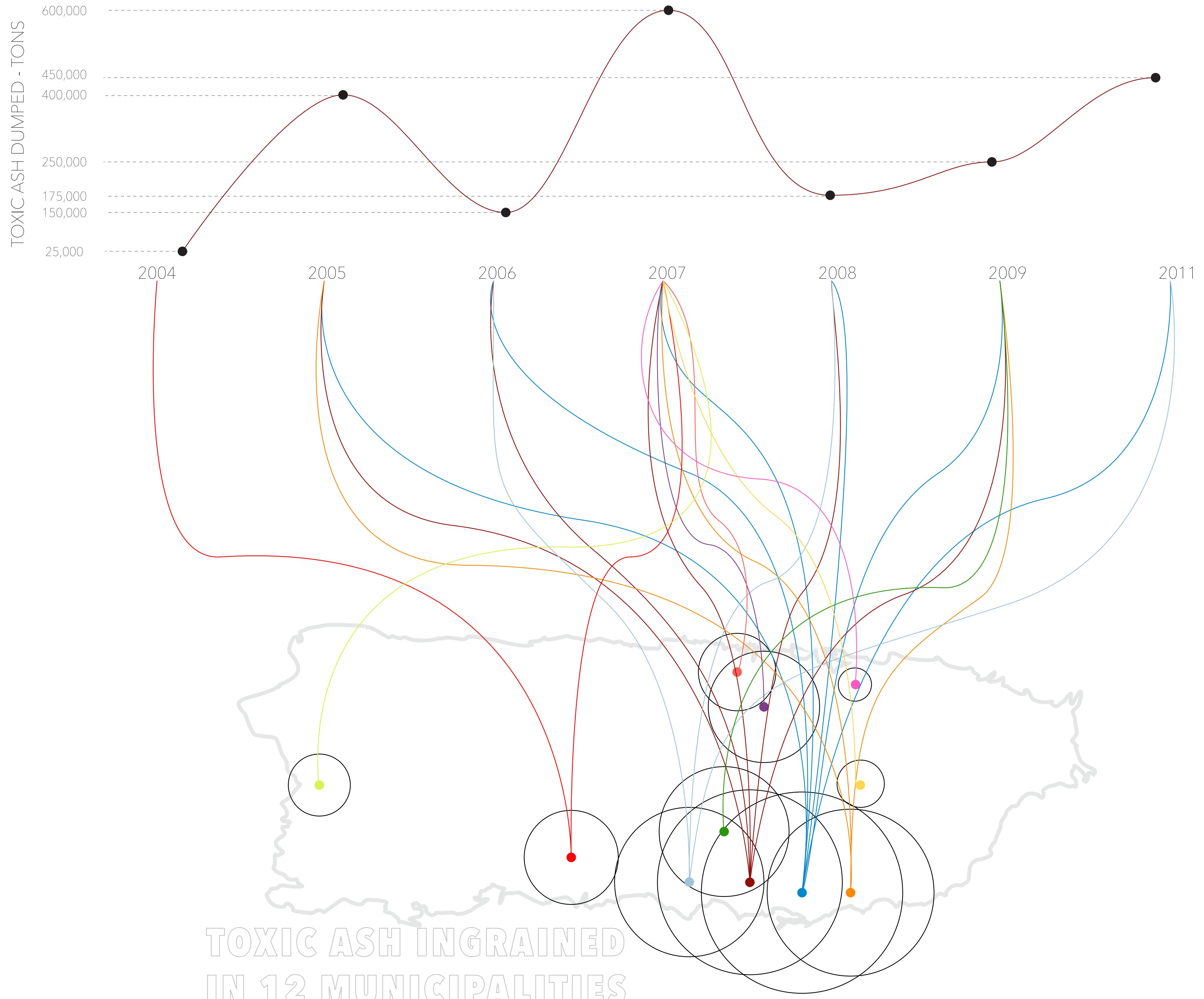


FLOODING

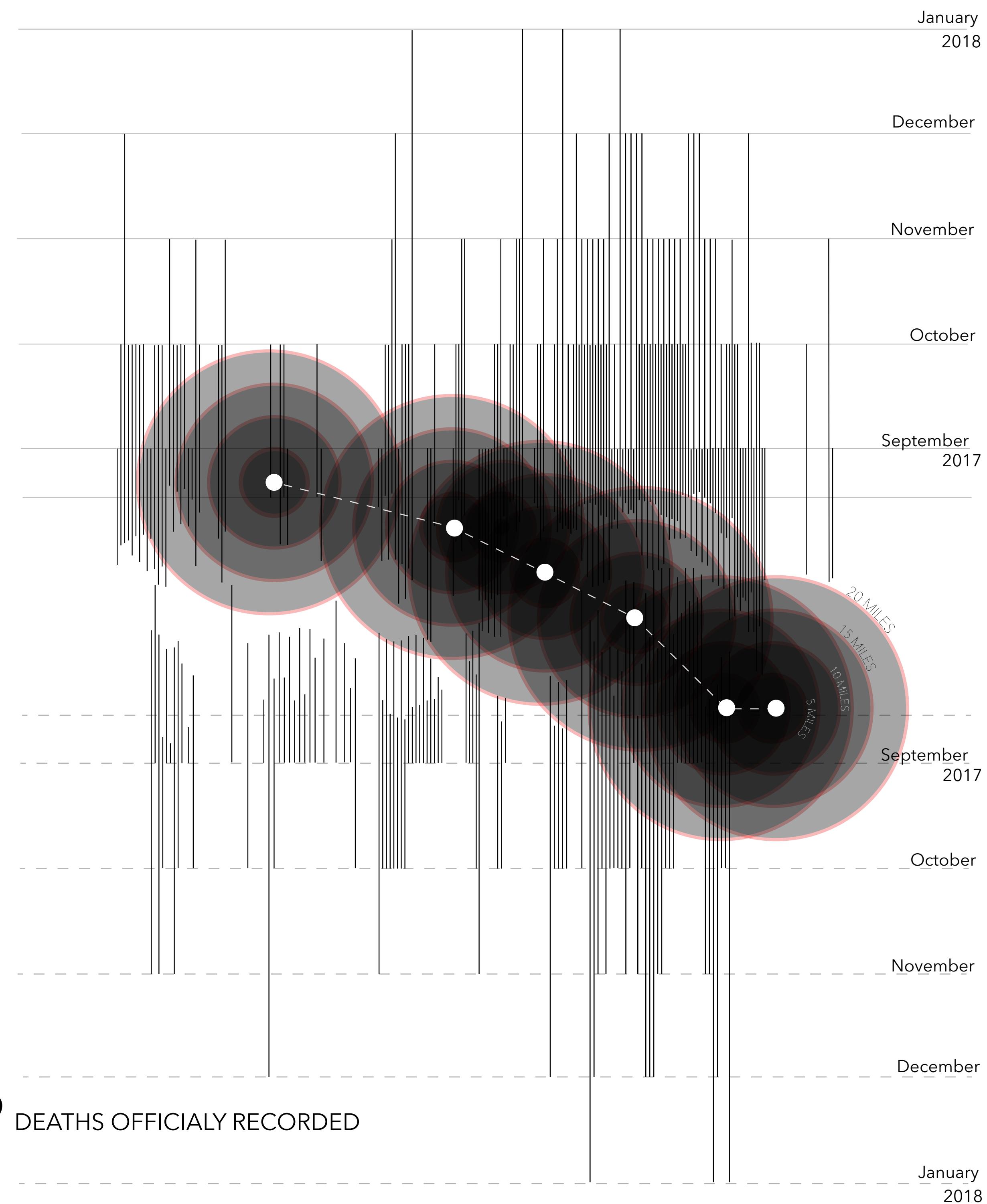




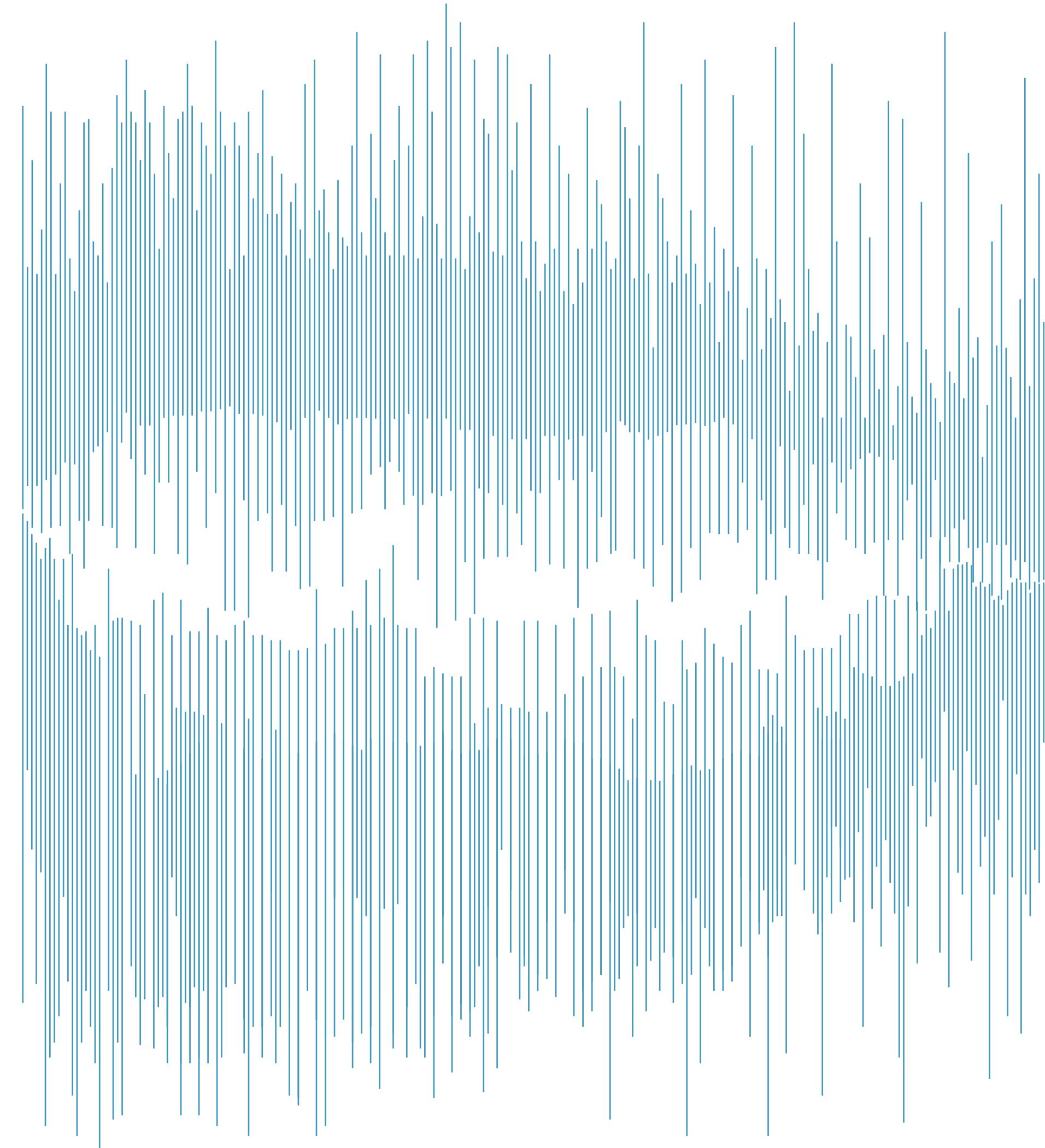




OFFICIAL DEATH TOLL



COLLAPSE OF OFFICIAL SYSTEM REVEALED IN DEATHS

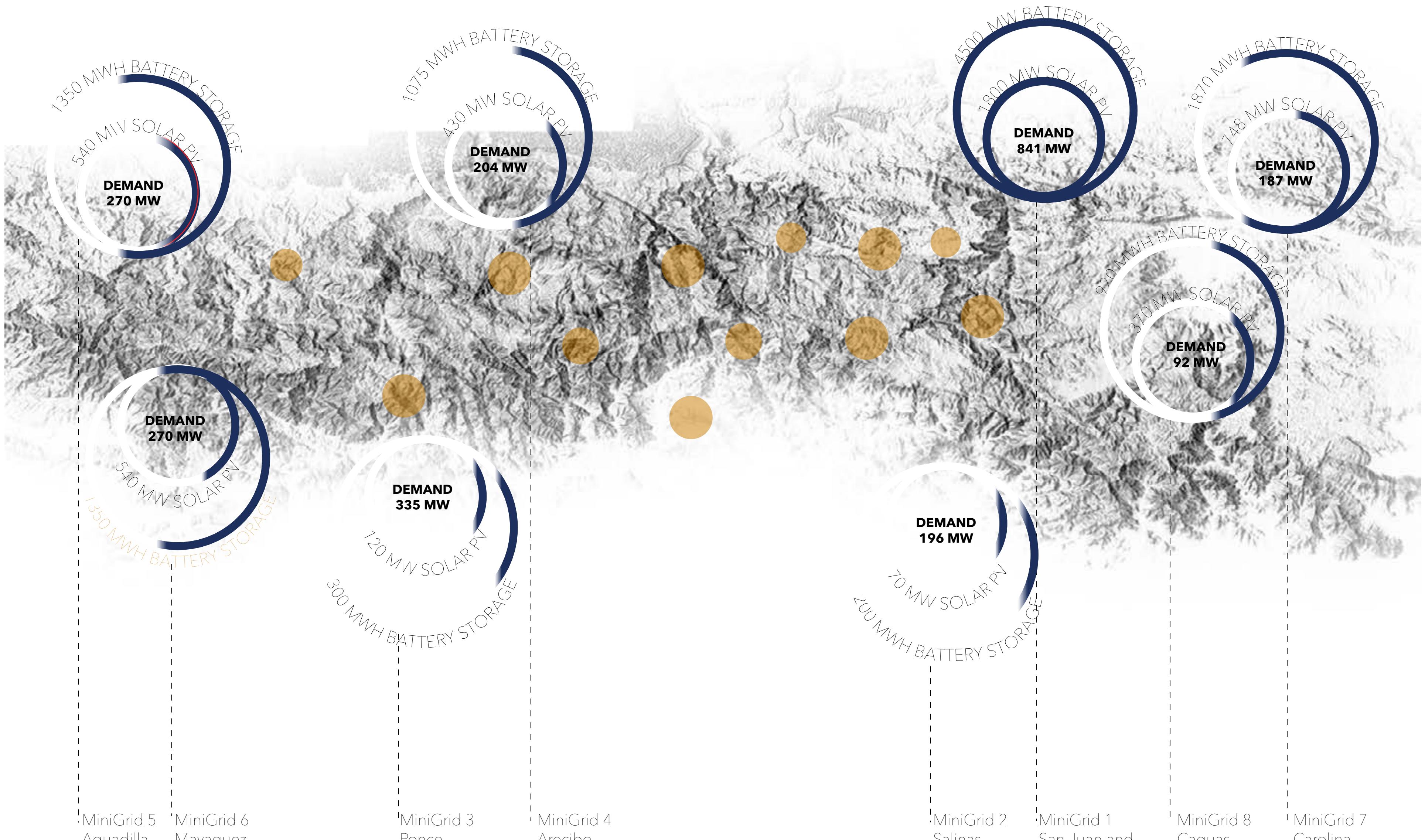


3,000 DEATHS NOT RECORDED BY PUERTO RICO'S GOVERNMENT

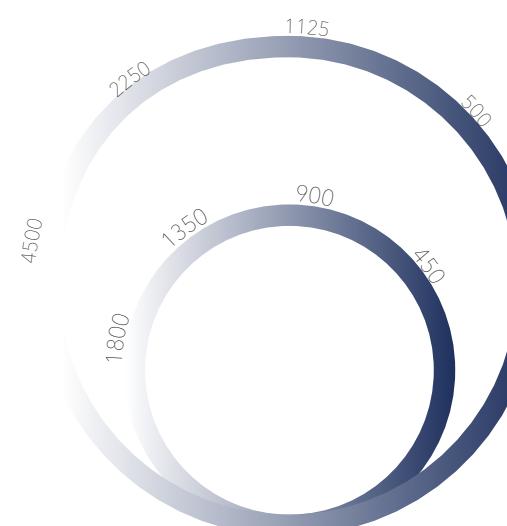
SHIFTING TO A STRENGTHENED GRID



PROPOSED DISTRIBUTED MINIGRID LOCATIONS



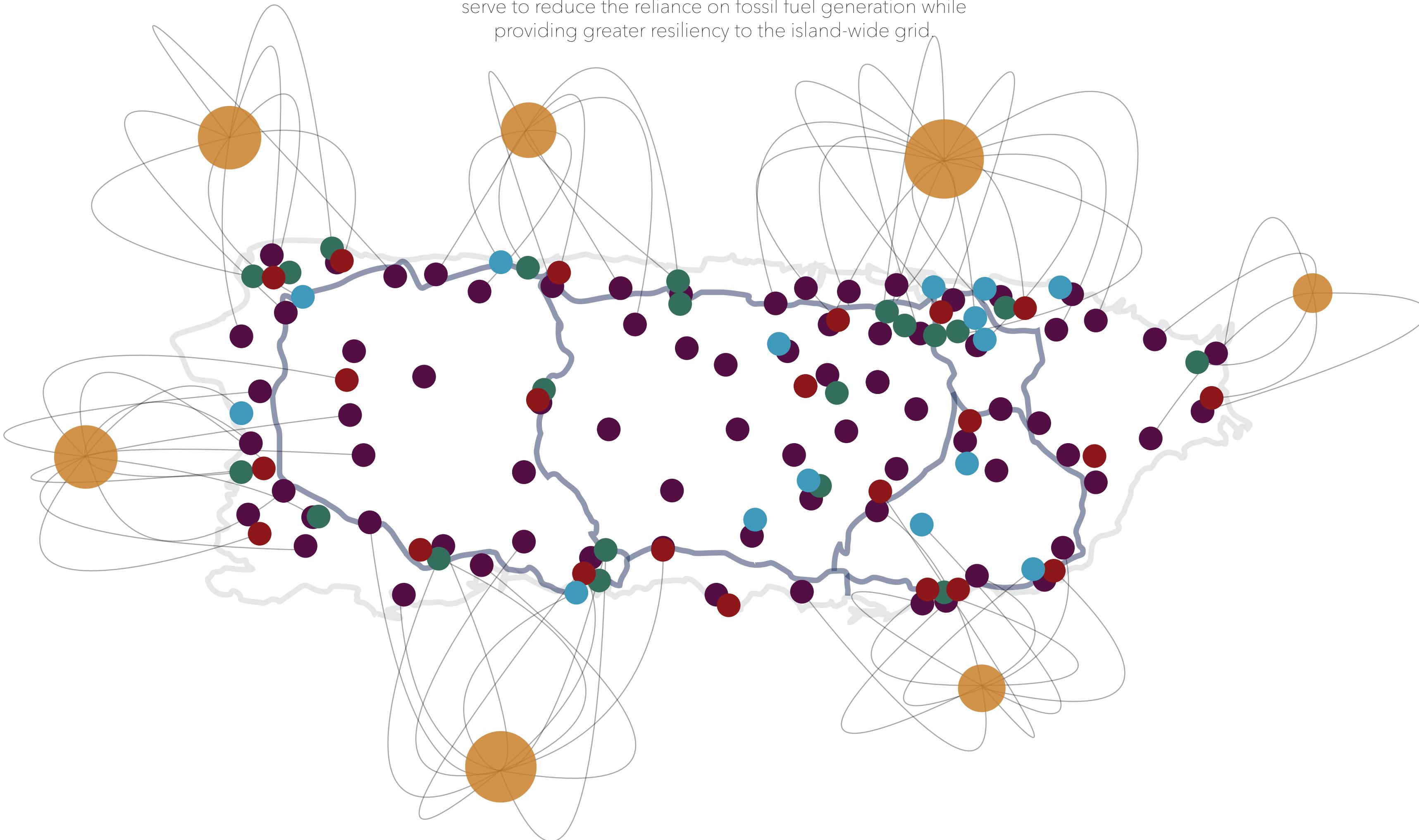
Microgrids



Minigrid power distribution in Megawatts (MW)

MICROGRIDS CABABLE OF "ISLANDING" ITSELF FROM THE GRID

Microgrid deployment serving the critical infrastructures allow communities to flourish in the wake of future natural disasters. Relocating the upgraded transmission system lines along roadside locations allow for easy accessibility to repair. Which further enables integration of large renewables and smaller microgrids. This would serve to reduce the reliance on fossil fuel generation while providing greater resiliency to the island-wide grid.



EMERGENCY SHELTERS



FIRE STATIONS



WATER TREATMENT FACILITIES



HOSPITALS



UPGRADED TRANSMISSION LINES

STORAGE SYSTEMS AND BIOREFINERIES PROVIDE BACKUP

Battery storage uses large variable renewable energy production sources to allow for fast response distributed amongst solar and wind. Water pumped storage is also critical in emergency situations allowing energy to be stored and released through hydraulic turbines. They add capacity in an intermittent way by storing excess energy produced by other sources and reliability in backup needs. Being located on a Tropical Island, there is a high capacity for biomass production. With that being said, the single largest source of energy will be from biomass harvesting and its use through biorefineries.

