

# Thinking Differently About Community Engagement

Para La Naturaleza

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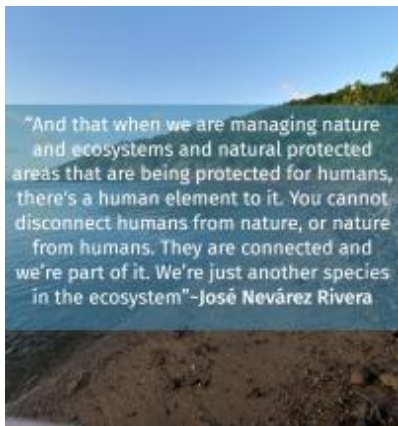
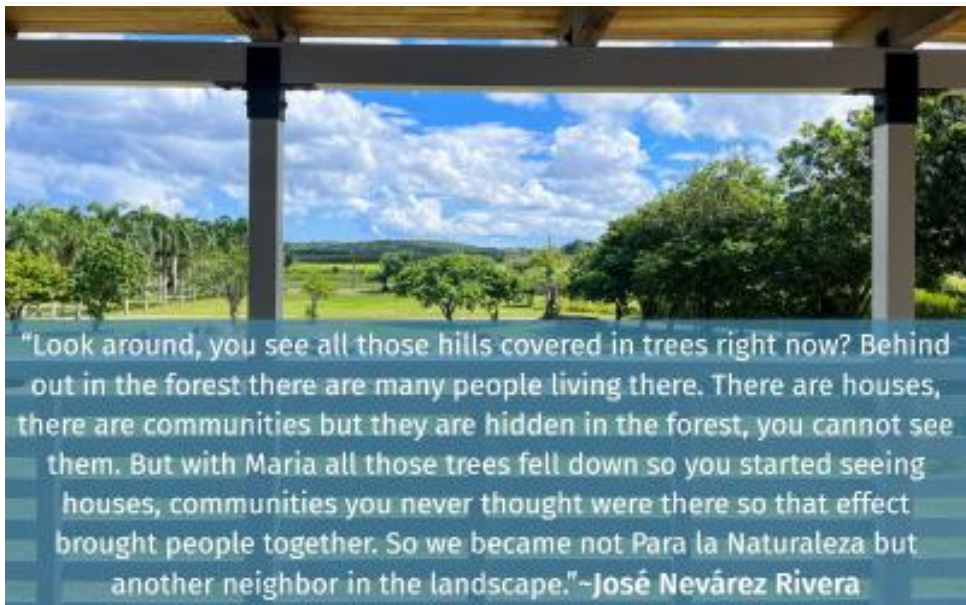
November 30, 2021

## Introduction to a New Perspective

The following quotes are meant to encourage you to think differently about community engagement. Understanding that there are multiple perspectives on topics such as resiliency, vulnerability, and community participation, is key to expanding your view of community conservation.

"It's very important that PLN knows when to introduce themselves to the community and that we are not the center, the community is. If they decide something, we help them."  
~Karina Rodriguez











“There is diversity out there, there is diversity in people, there is also in communities. We have tried to use a criteria in which we aim first to work with communities that share beliefs, goals, or ideas with us because it's easier to connect with.” -José Nevárez Rivera



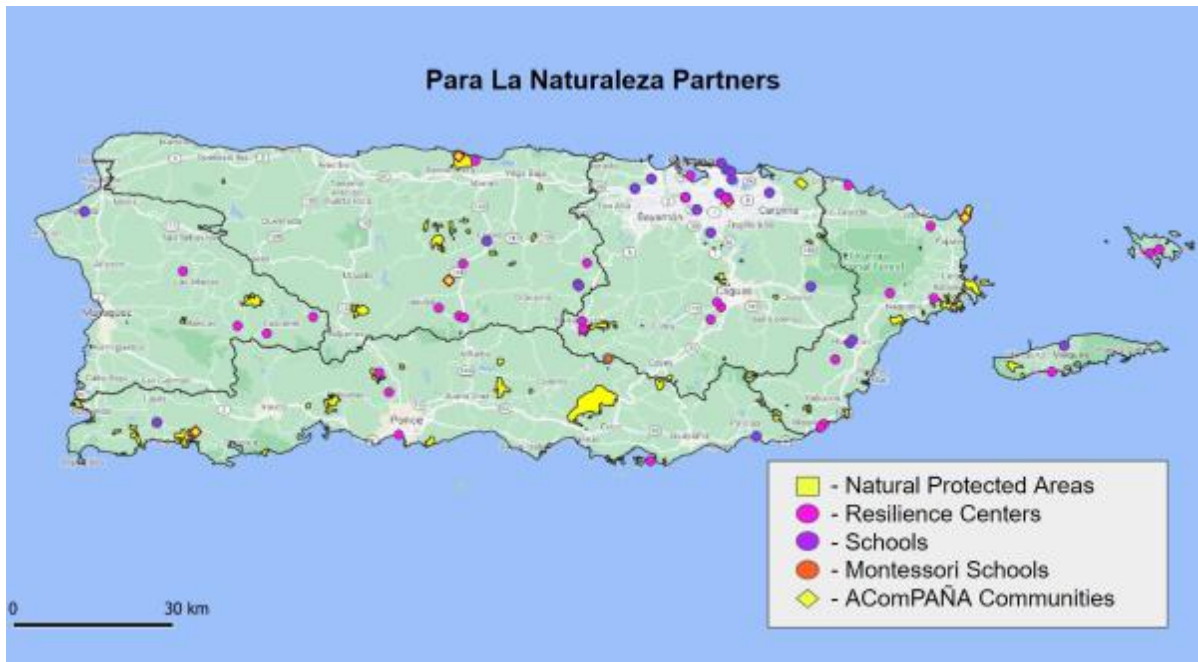
## **PLN Partners**

### **Map of RCCs & Schools**

A Resilience Community Center (RCC) is a building that is designed to prepare a group of people for the risks they may

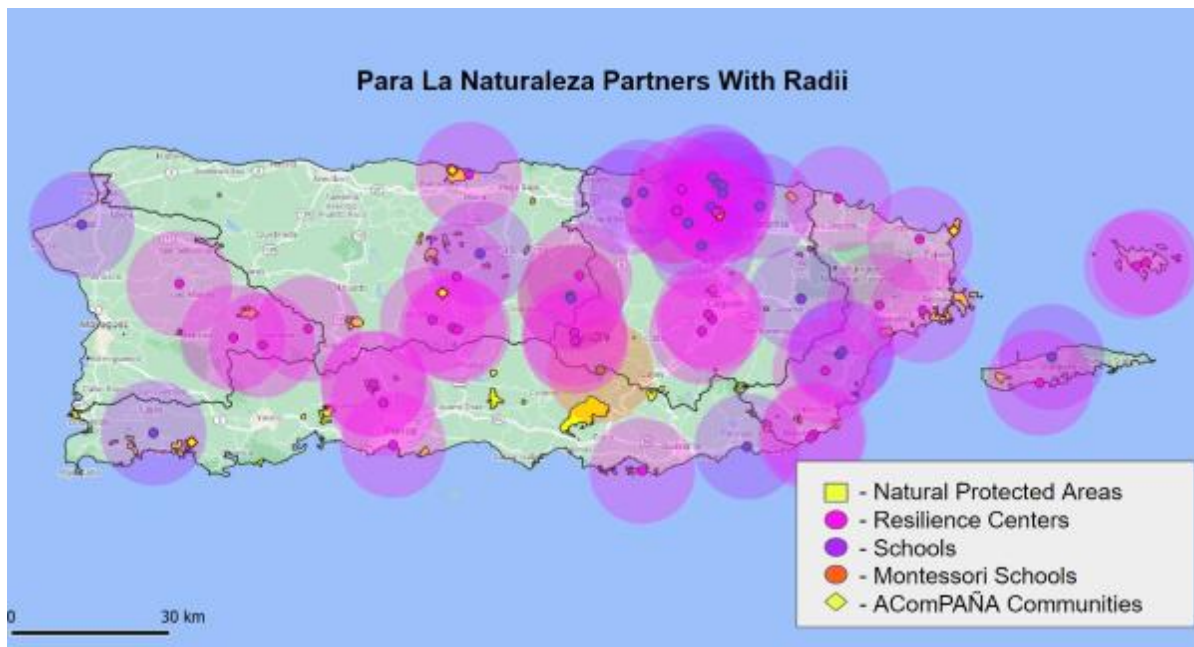


encounter. The center can include items that are needed in the events of emergency situations, most commonly natural disasters, such as: generators, stoves, and food reserves. It also can be used as a meeting and workshop center to promote education and leadership programs. The plotted RCCs are created by PLN to be managed by the community. The schools identified are Montessori and Public Schools that PLN works with to promote environmental education. Education programs can increase knowledge of conservation, sustainability, and preparedness, all of which are factors that contribute to building resilience.



*The map above shows locations that Para La Naturaleza is involved with across all of Puerto Rico.*

To visualize PLN’s influence, a radius was added around PLN’s partners. The radii of influence can be seen in the map below.



*The map above shows locations that Para La Naturaleza is involved with across all of Puerto Rico. A radius of 10 km is placed around each resilience center and school that PLN works with.*

The map highlights where their influence overlaps, and where they can improve their network. For example, in the San Juan Metropolitan area, there are many different partners in the area, as seen by the solid pink color over the city. This indicates that PLN has a strong presence in this area with many partners around the city. This could also be due to the dense population of the San Juan metropolitan area. Comparatively, in the northwest and southern central parts of the island, there is a notable lack of RCCs and partnered schools. This could indicate potential locations for PLN to get involved with more communities.



## **Analysis Across Puerto Rico**

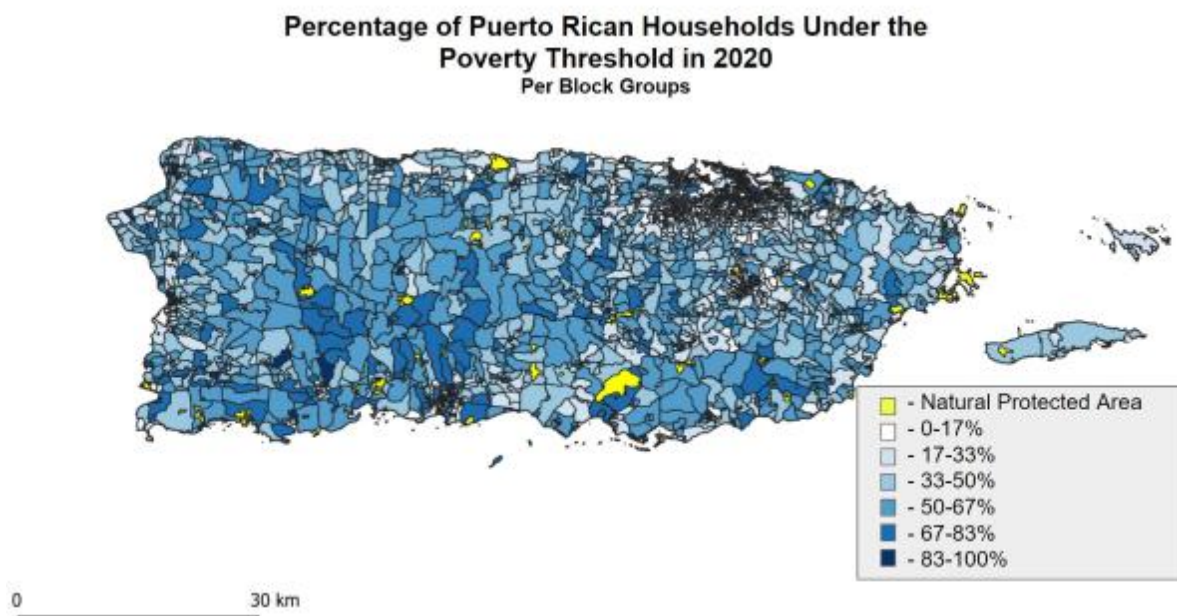
### **Vulnerability Indicators**

From our background research and interviews with PLN staff at headquarters and in the field, we identified primary factors that contribute to vulnerability in communities around NPA sites. The first relates to economic factors, primarily the percentage of people living under the poverty threshold and unemployment rates. These factors determine the ability, or lack thereof, for communities to rebuild or improve infrastructure after an extreme event, according to FEMA. The second factor is related to the social fabric of communities, more specifically population density, population change, and community age structure. These are key factors that can affect areas that struggle with school programs, retirement support, and other social structures. Using these topics, a focus on



economic and sociodemographic vulnerability factors was investigated further using maps with US Census data.

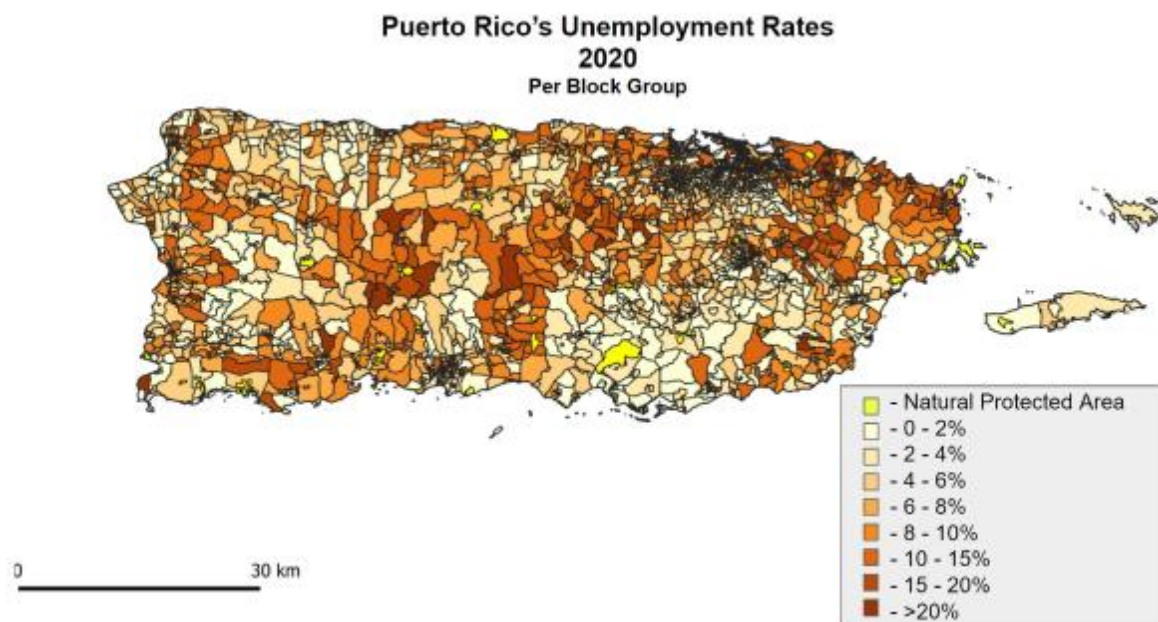
The United States Census Bureau data is collected in the form of surveys across Puerto Rico. The smallest unit of subdivision for this are block groups. This divides the municipalities into geographic areas that all contain from 240 housing units or 600 residents to 1200 housing units or 3000 residents (Census Bureau, 2018). For this reason, block groups do not coincide with community boundaries.



*The map above displays the percent of the population below the poverty threshold. The darker blues indicate a higher percentage of the population below the poverty line.*

Economic opportunity is a vulnerability measure. Having less economic opportunity hampers the resources communities can command to update infrastructure, find jobs, pursue education, and develop transportation. Poverty is a key indicator of the economic situation of an area. The poverty threshold, calculated by the US Census Bureau, is the amount of income to meet basic needs. When a household is below the poverty threshold, they do not have an income that can meet all the fundamental needs. Puerto Rico has 44.1% of the population under the poverty threshold . The map above

displays the percent of the population below the poverty threshold. Using this map, areas that have a higher rate of poverty than average can be identified, the top three groups on the legend. There are 40.9% of block groups with a poverty rate above 50%. Additionally, their relation to NPAs can be observed. There appears to be higher than average poverty levels in the central west of the island. This is surrounding several NPAs, the bright yellow.



*The map above displays the unemployment rates across Puerto Rico. The darker orange indicates a higher unemployment rate.*

The unemployment rate is another indicator of economic opportunity. High rates of unemployment are linked with the unavailability of jobs. Puerto Rico had an unemployment rate of 7.1%, at the time of the 2020 census. The map above displays the unemployment rate across the island. 26.4% of the block groups have an unemployment rate above 10% and 10.7% of block groups have an unemployment rate above 15%. There appears to be a higher rate of unemployment through the center of the island and on the northeastern coast, similar to the poverty map.

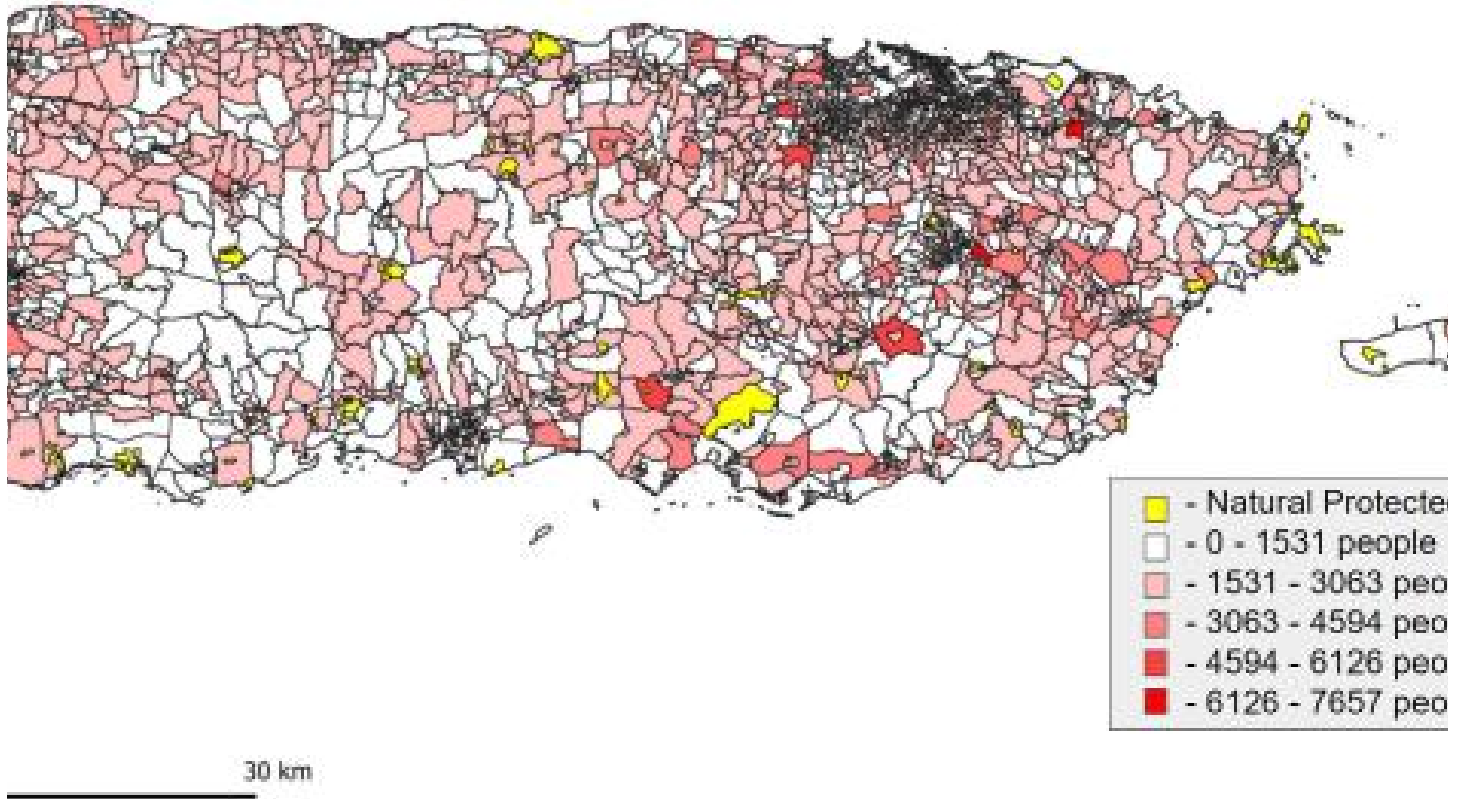
## Change Over Time

Mapping the population and age changes over a ten years identified the areas that were effected the most by the young population emigration that is predominant in Puerto Rico.

The average age of Puerto Rico has been increasing while the total population has been decreasing. Across Puerto Rico, the younger generation are leaving for the opportunities in the mainland United States. The economic, environmental, and political events in Puerto Rico have started a mass migration of young people to the mainland United States. Hurricane Maria damaged many communities leaving long lasting effects on the population, including damage to infrastructure and loss of jobs. These factors, paired with low birth rates and high death rates, are the leading reason behind this inverse relationship resulting in an increase of economic pressure and vacant buildings, such as schools. When there is a large decrease in the young populations, the areas are commonly economically and socially strained as there is a decline in workforce and social assistance.



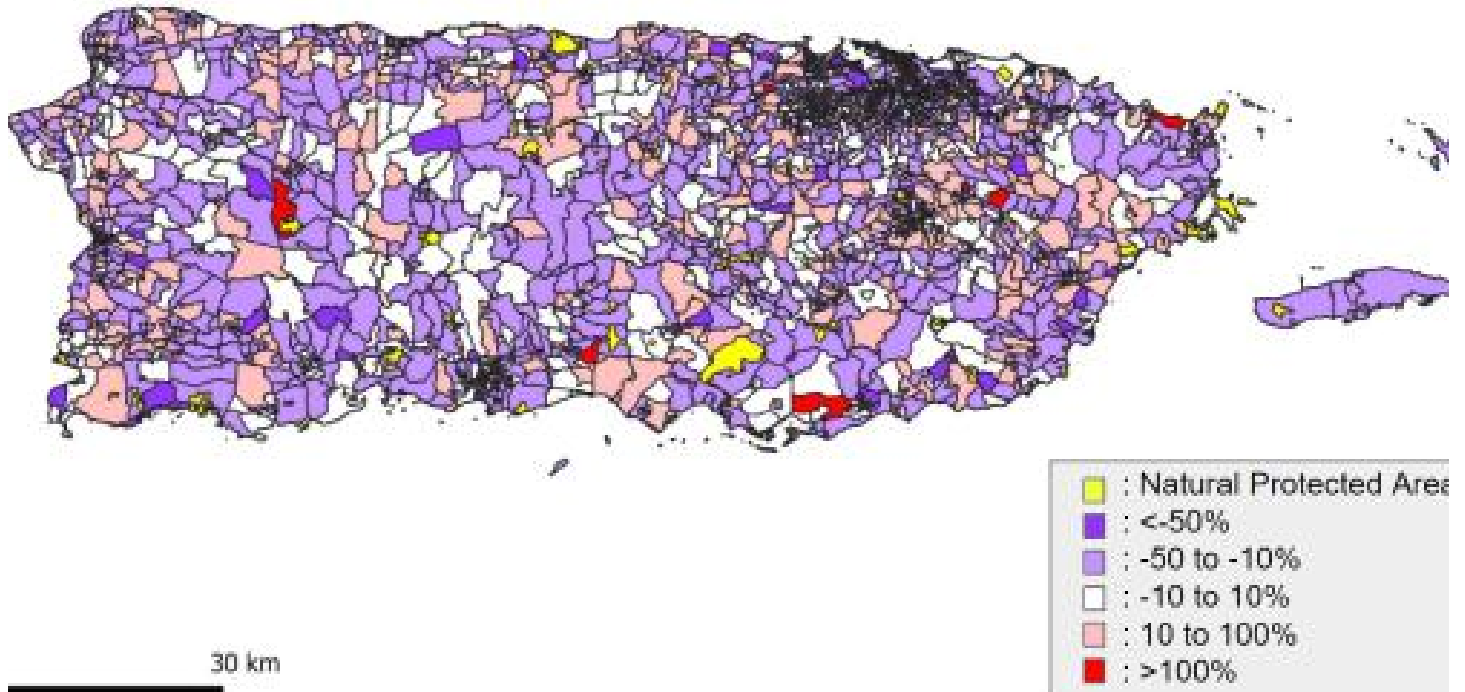
# Puerto Rico's Total Population 2020 Per Block Group



This map shows the Average Population of Puerto Rico from 2020.

Lighter colors represent lower populations while darker colors indicate areas of high population.

## Puerto Rico's Population Percent Change Between 2010 and 2020 Per Block Group

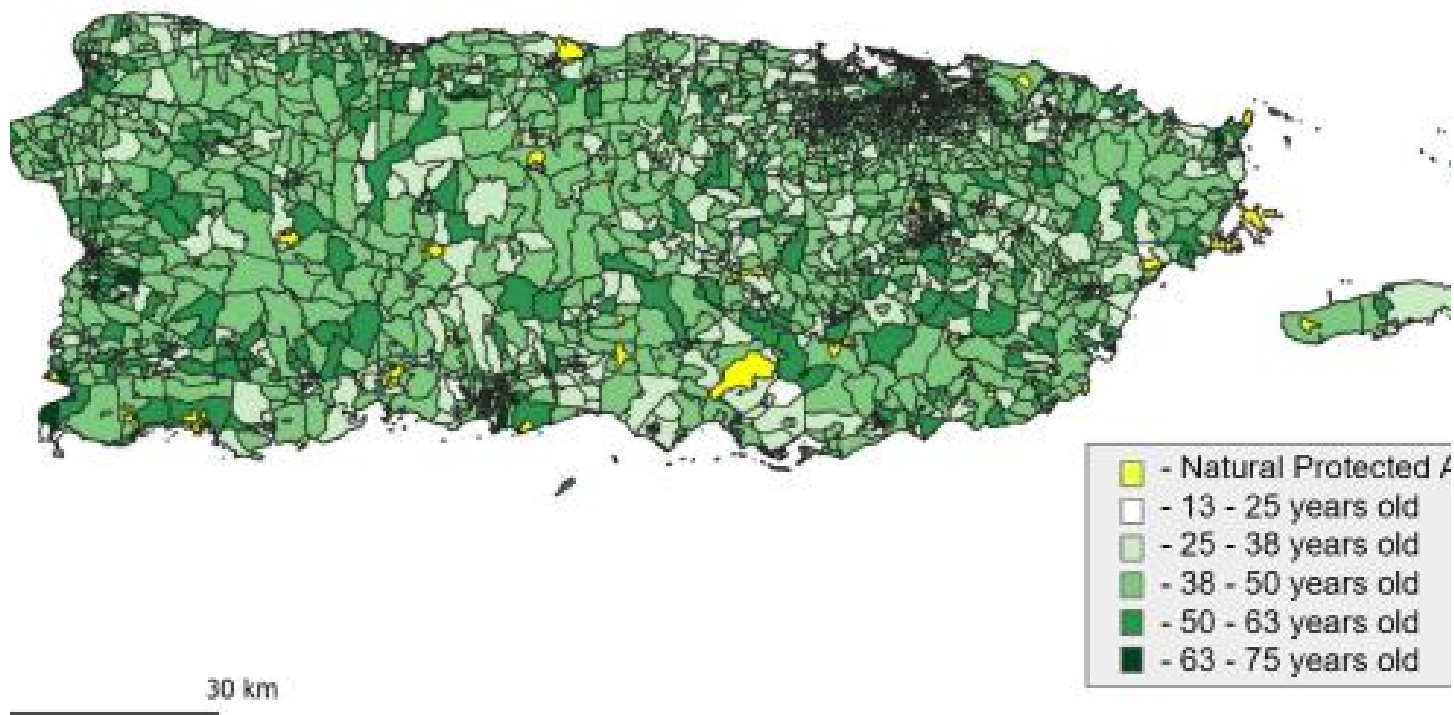


This map shows the Total Population Percent Change from 2010-2020 across Puerto Rico.

The dark purple areas experienced a decrease in population, while the red areas experienced an increase in population. The white areas roughly maintained their population.

From 2010 to 2020, there has been a 11.8% decline in total population, which is a statistically significant drop in population. As seen in the map to the right, the island has suffered an extreme decrease in population. The purple areas show at least a 10% decline in population, with 56.9% of the block groups in this category. Only 20.3% of the block groups displayed a population increase over 10%. A considerable population decline is commonly linked with economic struggles.

## Puerto Rico's Median Age 2020 Per Block Group

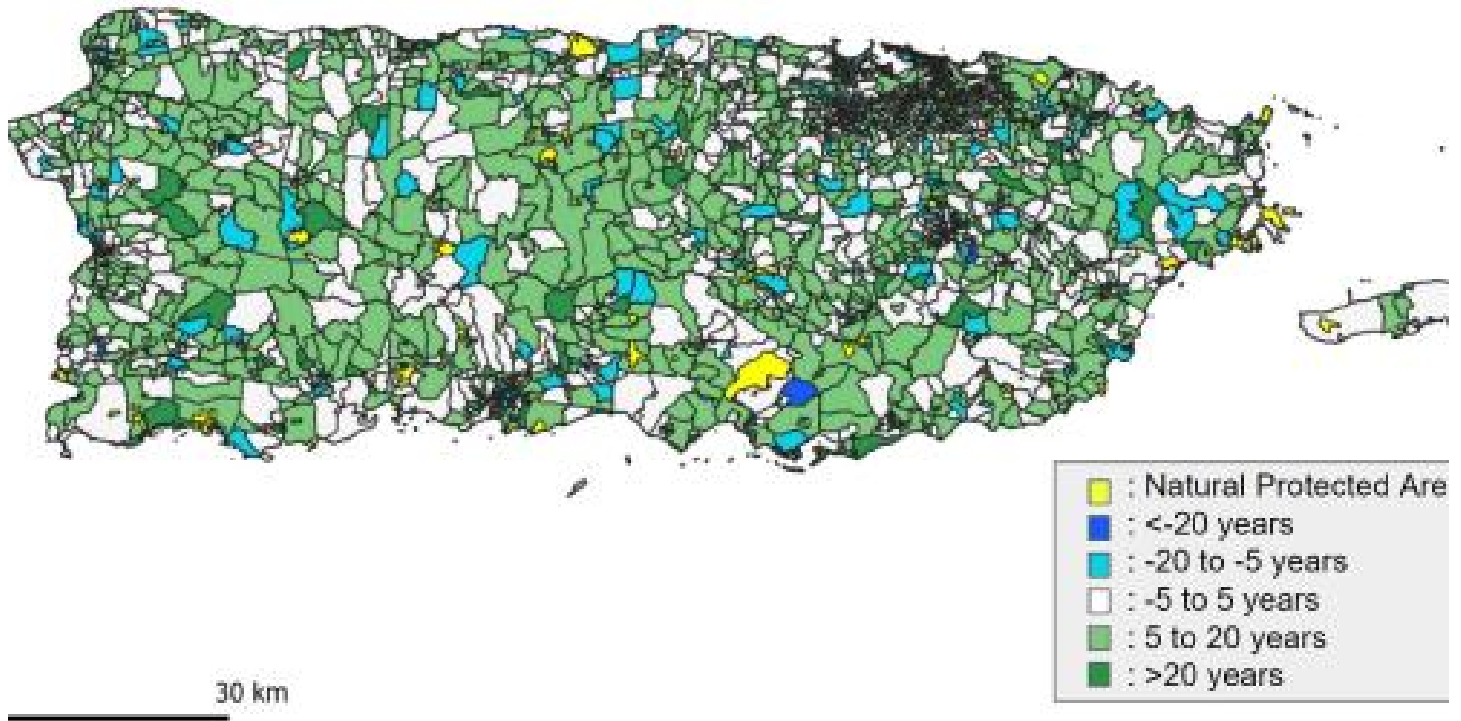


This map represents the Median Age across Puerto Rico in 2020.

The dark green areas indicate areas with older populations and the light green areas indicate locations with younger populations.



## Puerto Rico Median Age Difference Between 2010 and 2020 Per Block Group



This Map Represents the Median Age Different Across Puerto Rico between 2010 and 2020.

The blue areas indicate locations that decreased in average age and the green areas signify locations that increased in average age.

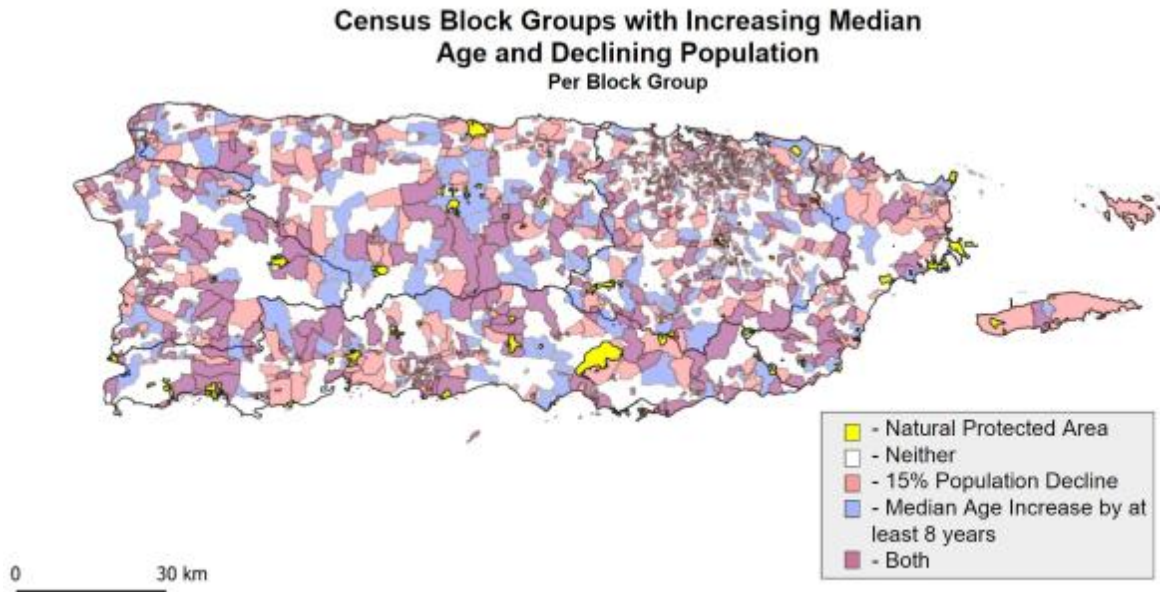
Since the predominant group that is leaving the island are young working-age individuals, the age is generally increasing. The median age has significantly increased by six years across Puerto Rico. With a growing elderly population, this puts more strain on hospitals and limits mobility in times of disasters. To the left is a map of the difference in median age over the last ten years, 53.1% of block groups had an increase in age as indicated by the green.

However, there are some where the median age decreased. 10.6% of the block groups had a median age decrease of over 5

years. This indicates areas of opportunity for PLN. As some of these areas are near NPAs, it is a chance to introduce citizen science to educate the younger population.

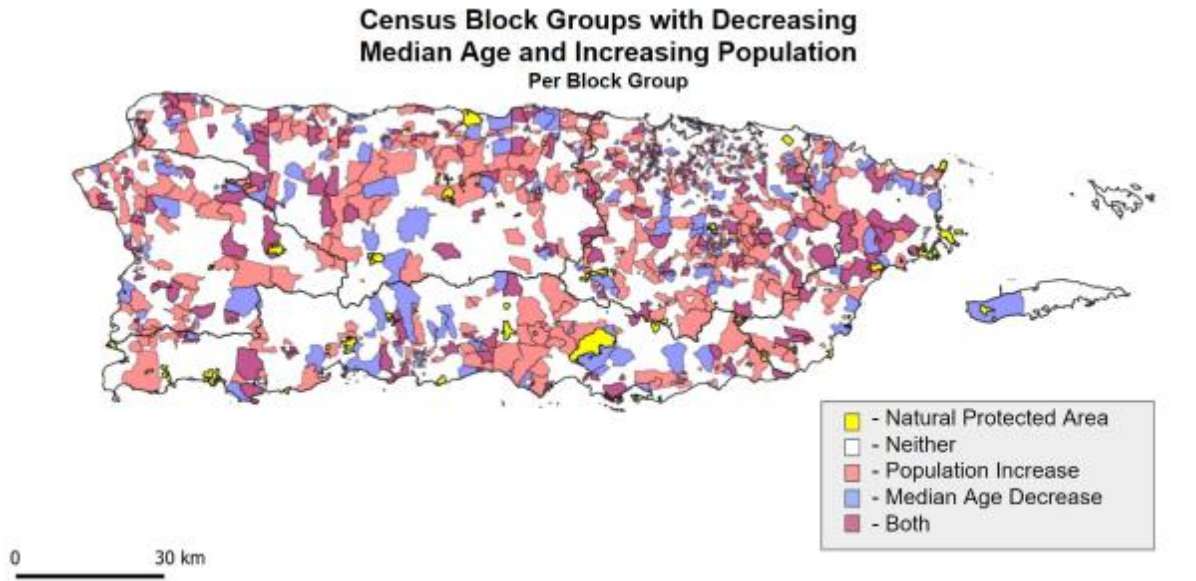
### Comparative Analysis of Vulnerability Factors

When analyzing factors of vulnerability, comparing two data sets can be very revealing. The maps that follow highlight particularly vulnerable locations by finding the intersection of two variables.



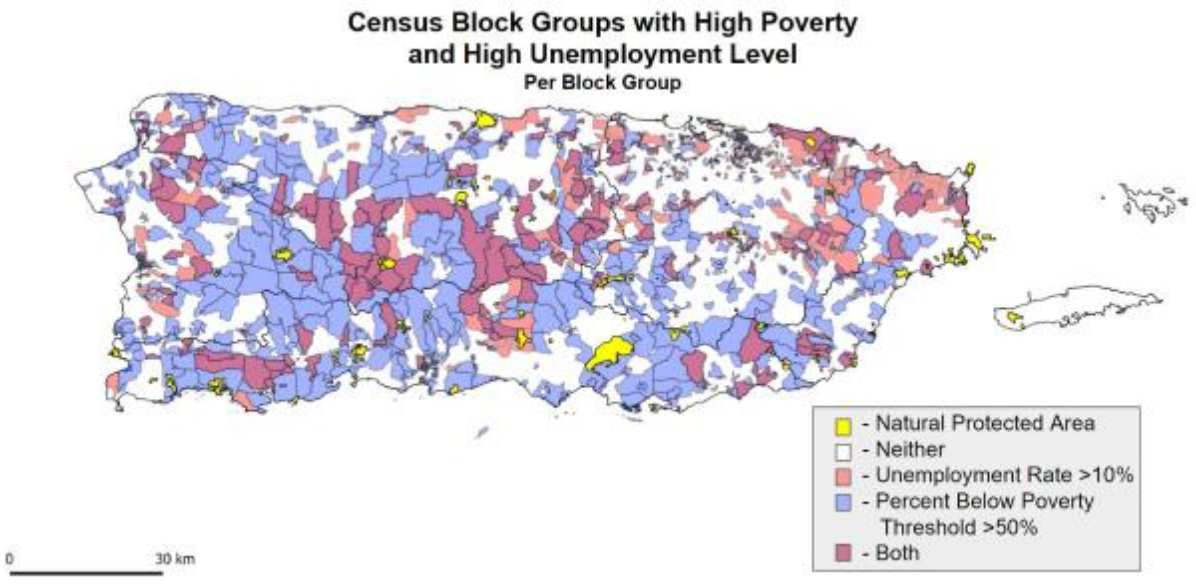
*This map shows the overlap between a declining population and an increasing median age based on 2010 and 2020 census data.*

The areas where the population decreased and the age increased indicate areas of high vulnerability. We classified a vulnerable population decline as over 15% and an age decrease as over 8 years as these are above the island average.



The map above shows the overlap of Increasing Population and Decreasing Age based on the 2010 and 2020 census.

In the map above, the block groups that the population increased the block groups for decreasing age are overlaid with each other. These areas that these variables overlap could be used for consideration regarding outreach that focuses on younger populations such as school programs. By analyzing this data in relation to the current program and school locations, new opportunities for outreach could be capitalized on.



The map above displays where high poverty rates and high unemployment overlap based on the 2020 census data.

This overlap between poverty and unemployment can indicate areas of high economic vulnerability as seen in the map above. It displays where the poverty rate is above 50% and the unemployment is above 10%. These values are considered vulnerable because they are above the island's average. The areas where they overlap would indicate a vulnerable community based on these variables. The map highlights where these overlap, for example there is a large amount of overlap in the central region. This is near multiple NPAs including Hacienda Pellajas, Los Frailes, and Ojo de Agua.



## Hacienda La Esperanza

### History of La Hacienda



Hacienda La Esperanza contains over 2,000 acres of land in Manatí. It is a restored historic site of one of the largest sugar plantations in Puerto Rico. The plantation, founded by Fernando Fernandez in the 1830's. His oldest son, José Ramón Fernández



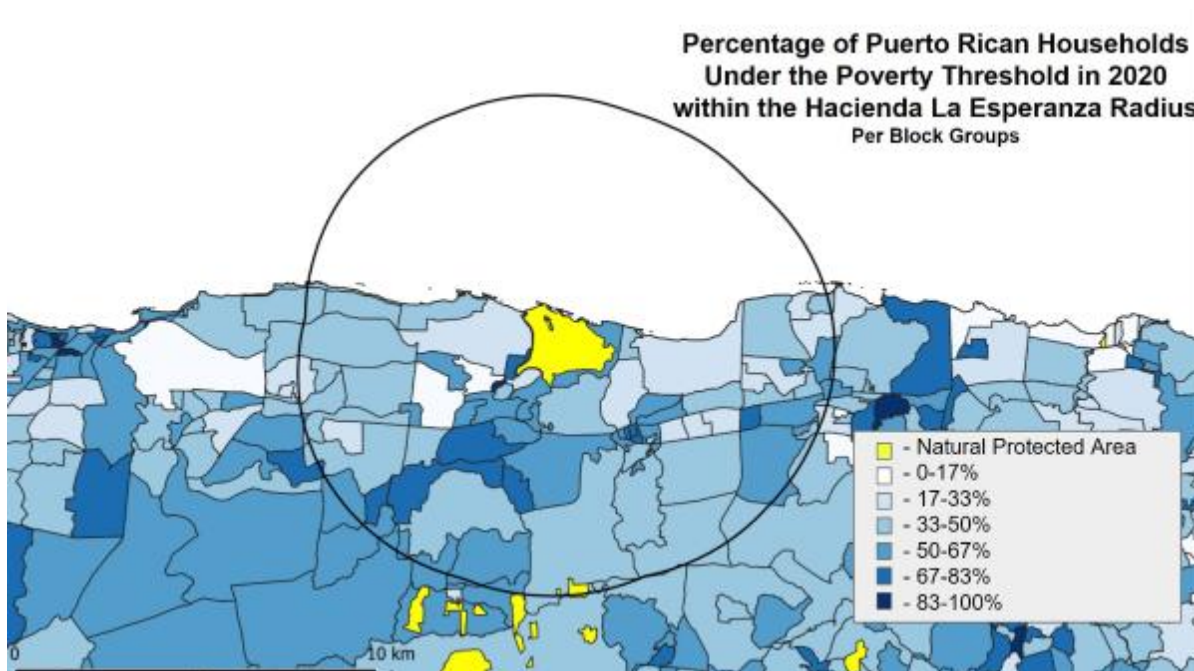
operation in 1850 and by 1860 it was one of the largest sugar plantations in Puerto Rico. The plantation was depended on slave labor for production up until its closure in 1880.

In 1975 PLN acquired the land through the Puerto Rico Conservation Trust. It includes over 10 ecosystems that are important to preserving biodiversity such as karst formations, mangrove systems, and native species habitats. At this time, the exclusion principle of conservation was followed. This resulted in the barring of locals from the land to prevent environmental and resource degradation. However, in 2010 the conservation methods changed, and the site was opened to the communities.

"For instance, if you see La Esperanza, it's a community that's within a Natural Protected Area. It was, it's a community that is almost 200 years old. The first people who established the community, were people that worked on the plantation as slave people and they have a very strong identity and rich history that is held in the memories of the old ones the live in the community. But they know what is the history of their community. They know what had happened." -José Nevárez Rivera

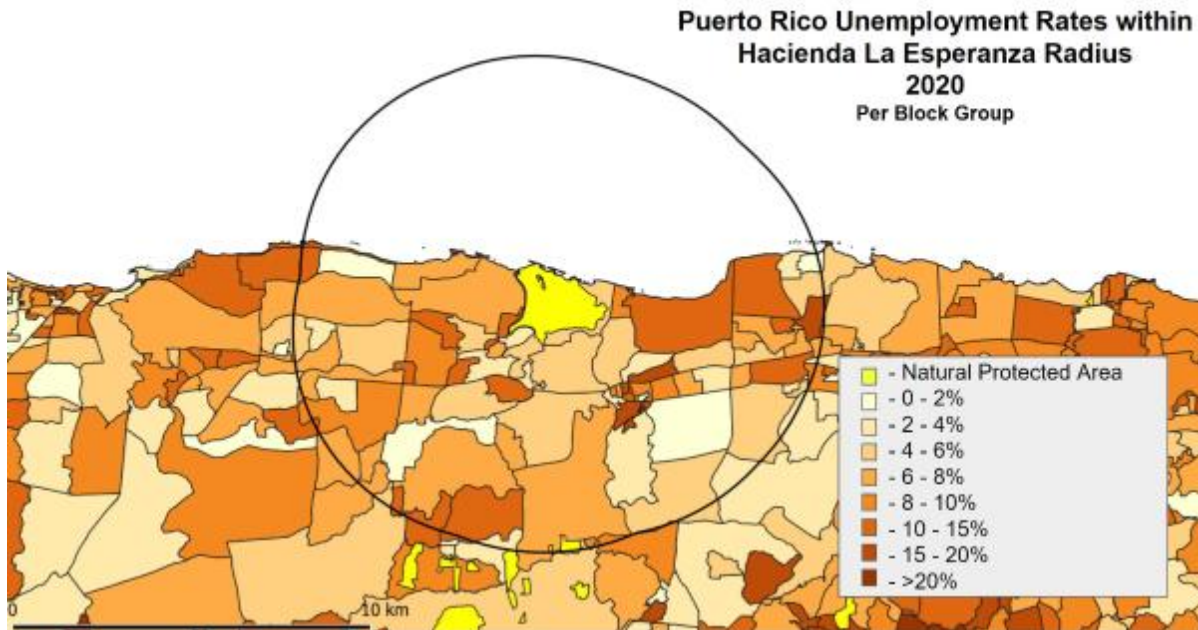
## Hacienda La Esperanza Vulnerability Maps

The same census data that was previewed for the entire island of Puerto Rico is isolated in the 10km radius around Hacienda La Esperanza. This gives a more detailed view of the vulnerabilities within the communities surrounding the Natural Protected Area.



*The map above displays the percent of the population below the poverty threshold within a 10 km radius of Hacienda la Esperanza. The darker blues indicate a higher percentage of the population below the poverty line.*

There are several areas within the radius that are above 67% under the poverty line. This could highlight areas with less ability to repair and renovate important infrastructure.



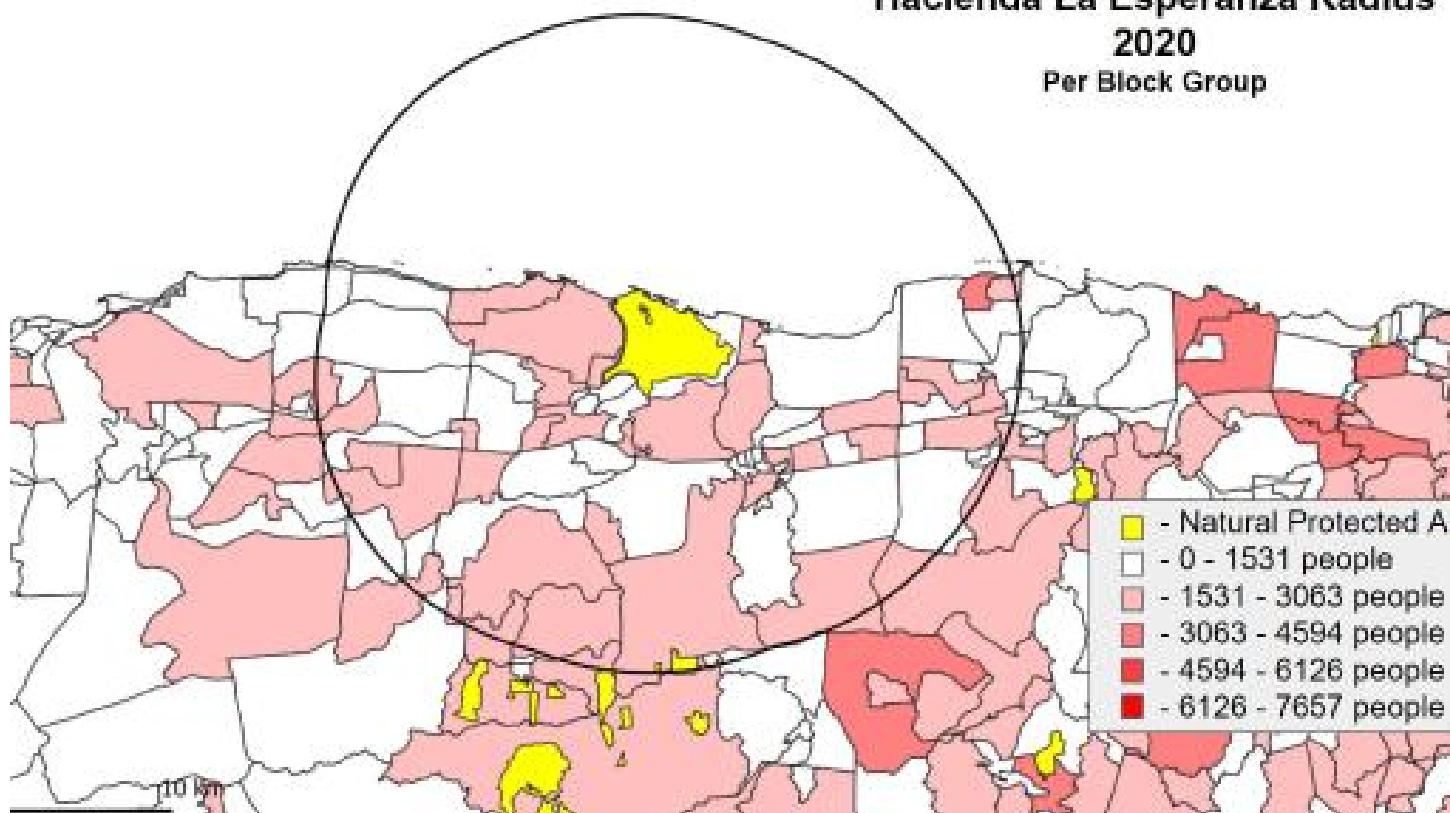
*The map above displays the unemployment rates within a 10 km radius of Hacienda la Esperanza. The darker orange indicates a higher unemployment rate.*

There are several areas within the radius experiencing unemployment above 10%, higher than the island average of 7%. The darker areas represent areas with a high rate of unemployment. This could indicate areas with less economic opportunity.

### **Changes Over Time**

Mapping the population and age changes over a ten years identified the areas that were effected the most by the young population emigration that is predominant in Puerto Rico.

## Puerto Rico Total Population with Hacienda La Esperanza Radius 2020 Per Block Group



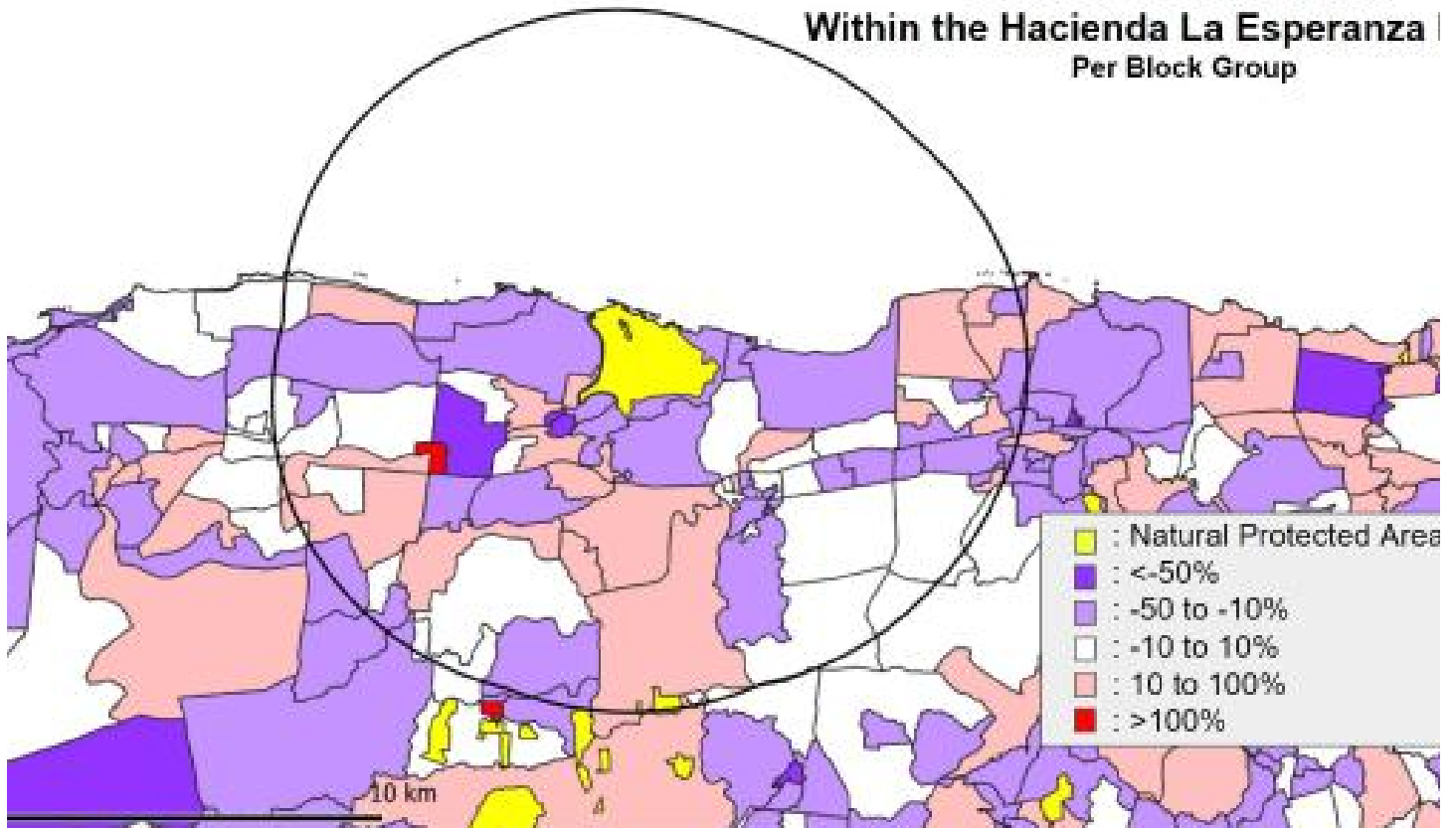
This map shows the average population of Hacienda La Esperanza from 2020.

Lighter colors represent lower populations while darker colors indicate areas of high population.

Within the radius, there are no areas of extremely high or dense population.



## Puerto Rico's Population Percent C Between 2010 and 2020 Within the Hacienda La Esperanza | Per Block Group

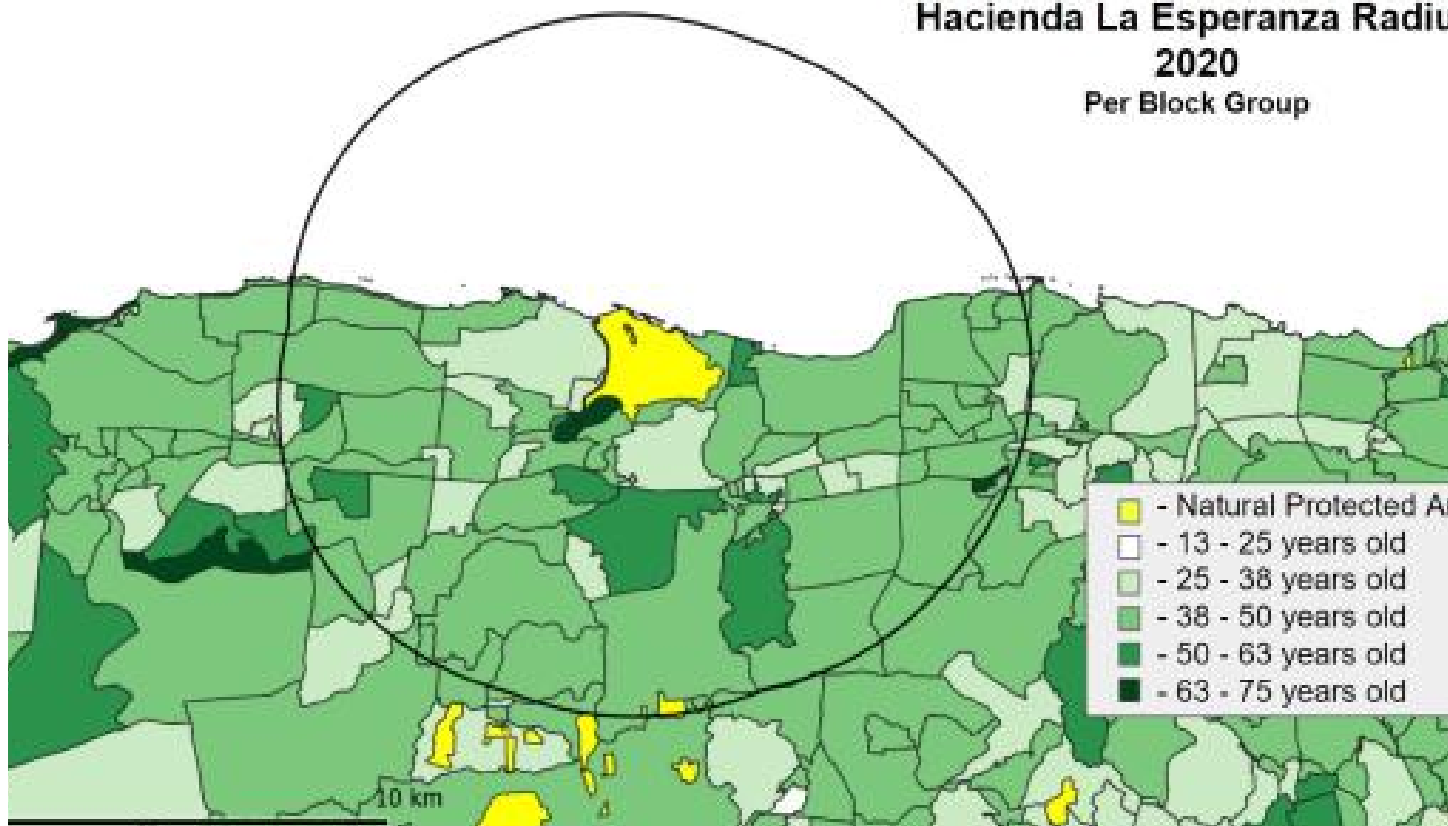


This map shows the population percent change from 2010 to 2020.

The dark purple areas experienced a decrease in population, while the red areas experienced an increase in population. The white areas roughly maintained their population.

Areas with a sharp decrease in population are considered more vulnerable because there is a strain on the local economy and workforce. Additionally, there can be more vacant buildings.

## Puerto Rico Median Age with Hacienda La Esperanza Radiu 2020 Per Block Group

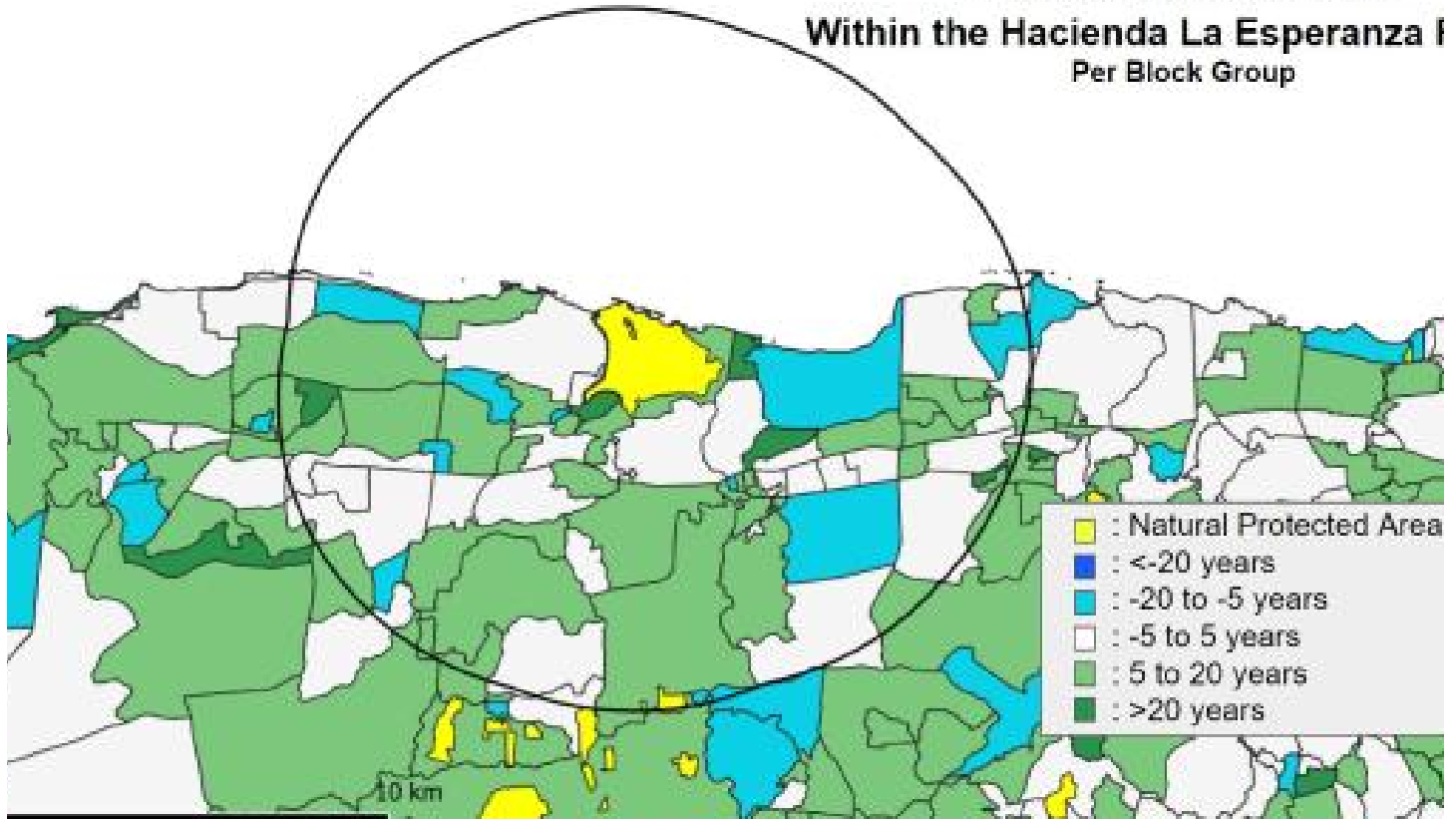


This map represents the population's median age in 2020.

The dark green areas indicate areas with older populations and the light green areas indicate locations with younger populations.

There are several areas within the radius with the median age older than the island average of 45.

**Puerto Rico Median Age Difference  
Between 2010 and 2020  
Within the Hacienda La Esperanza I  
Per Block Group**



This map represents the median age difference from 2010 to 2020.

The blue areas indicate locations that decreased in average age and the green areas signify locations that increased in average age.

Areas with an aging population, which is usually combined with a decrease in population can cause added pressure to social and economic structures. This includes higher demands on social security, hospitals, and labor force.

## **La Esperanza Comparisons**

The Population of La Esperanza is 106 as of November 2021

Because the US Census does not separate data based off of communities the information below is from the block group that La Esperanza falls under.

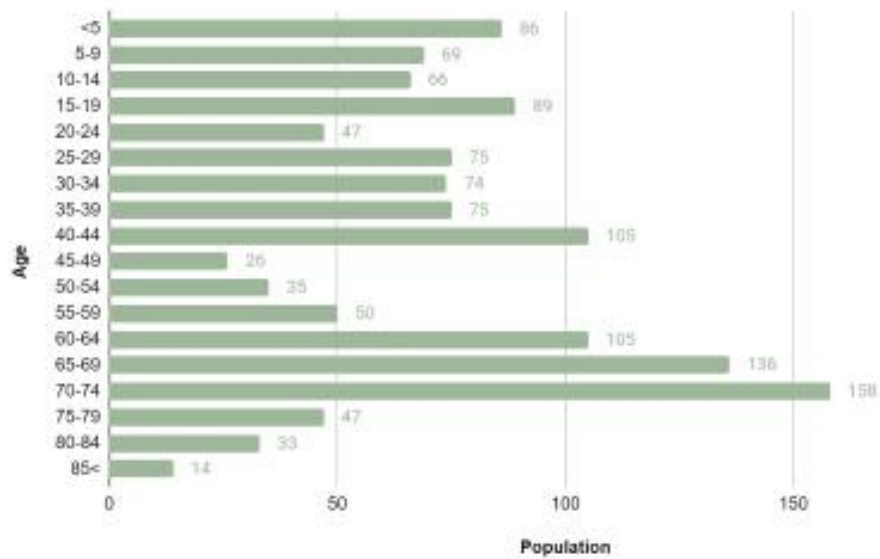
	<u>Esperanza</u>	<u>Puerto Rico</u>
Population	1290	3,285,874
Median age	42.6	43.1
Percent Under the Poverty Line	51.3	44.1
Unemployment Rate	5.1	7.1
Percent of Population with High School Diploma	32	27.9
Percent of Households With Internet	46.3	60.4
Household with One Resident Over 60	62.4	39.5
Household with One Resident under 18	29.6	37
Homes Built before 1970	33.9	-
Percent Building Occupancy	74.9	76.4

*The table above compares relevant Census data for the La Esperanza block group against the island of Puerto Rico.*

From the table above, the block group that includes La Esperanza is considered more vulnerable in the following categories based on the Puerto Rico average: Percent of people living under the poverty line, percent of households with internet, and households with at least one resident over 60.



### Population by Age of La Esperanza Block Group



*The graph above shows the age breakdown of the population within the La Esperanza block group.*



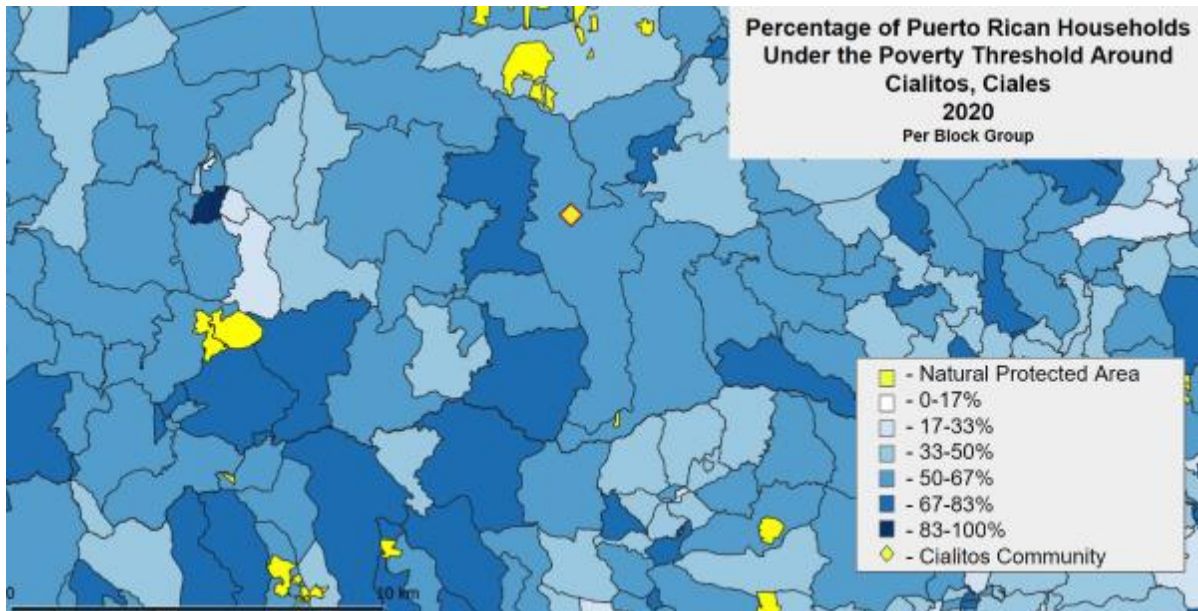
## Cialitos, Ciales

### Cialitos, Ciales

Another AComPAÑA community in the North Region is Cialitos, Ciales. This community is commonly engaged in environmental programs such as Mapa Madre. This program is an organization of 5 communities dedicated to protecting the Ciales River. They reached out to PLN to become more involved in resiliency programs and became an AComPAÑA community despite their distance from the NPA. They are located in a mountainous region about 37 km south from Hacienda La Esperanza.

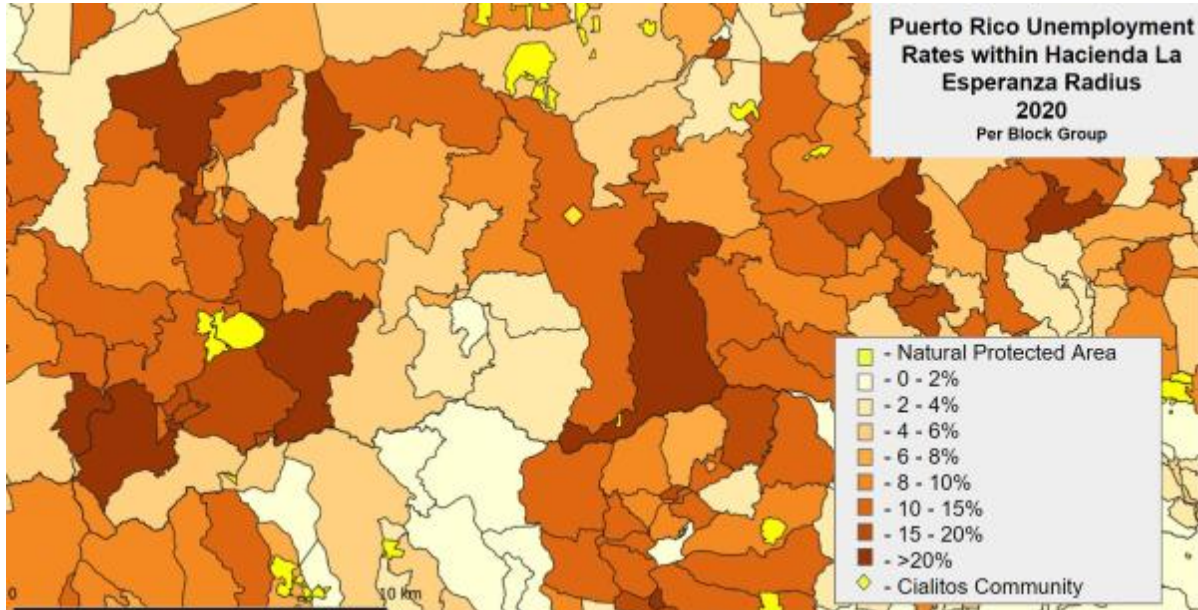
"Cialitos came to us. Some of their leaders were interested in our Citizen Science Projects. They started coming here as volunteers and they got to know us, they got interested, and they got involved. They wanted us to go to them and that relationship was nourished by the interaction the management coordinator and environmental interpreters had with them." -José Nevárez Rivera

## Cialitos Vulnerability Maps



The map above displays the percent of the population below the poverty threshold around Cialitos, Ciales. The darker blues indicate a higher percentage of the population below the poverty line.

There are several areas close to Cialitos that are above 67% under the poverty line. This could highlight areas with less ability to repair and renovate important infrastructure.



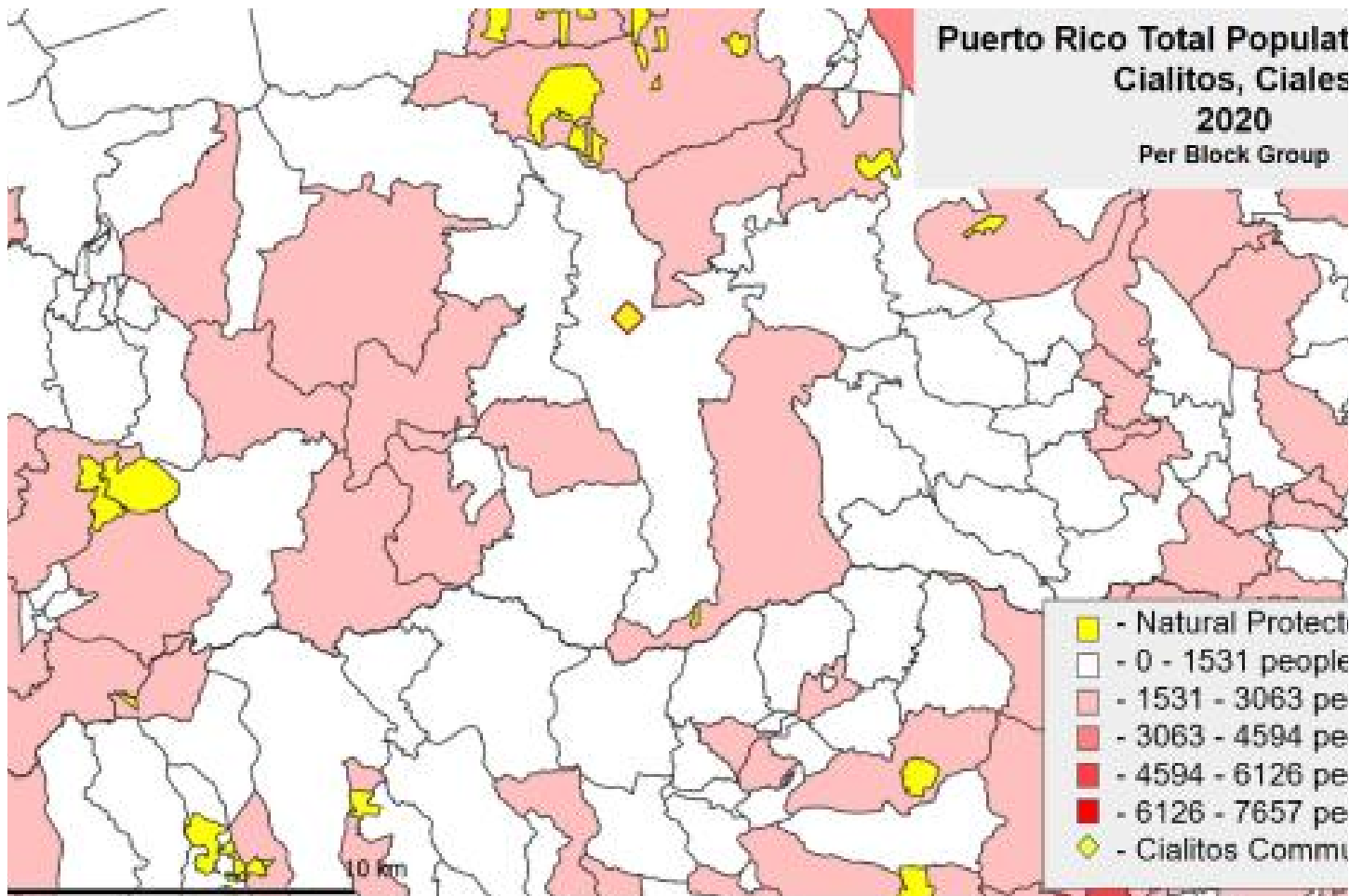
The map above displays the unemployment rates around Cialitos, Ciales. The darker orange indicates a higher unemployment rate.

There are several areas within the radius experiencing unemployment above 10%, higher than the island average of 7%. The darker areas represent areas with a high rate of

unemployment. This could indicate areas with less economic opportunity.

## Changes Over Time

Mapping the population and age changes over a ten years identified the areas that were effected the most by the young population emigration that is predominant in Puerto Rico.

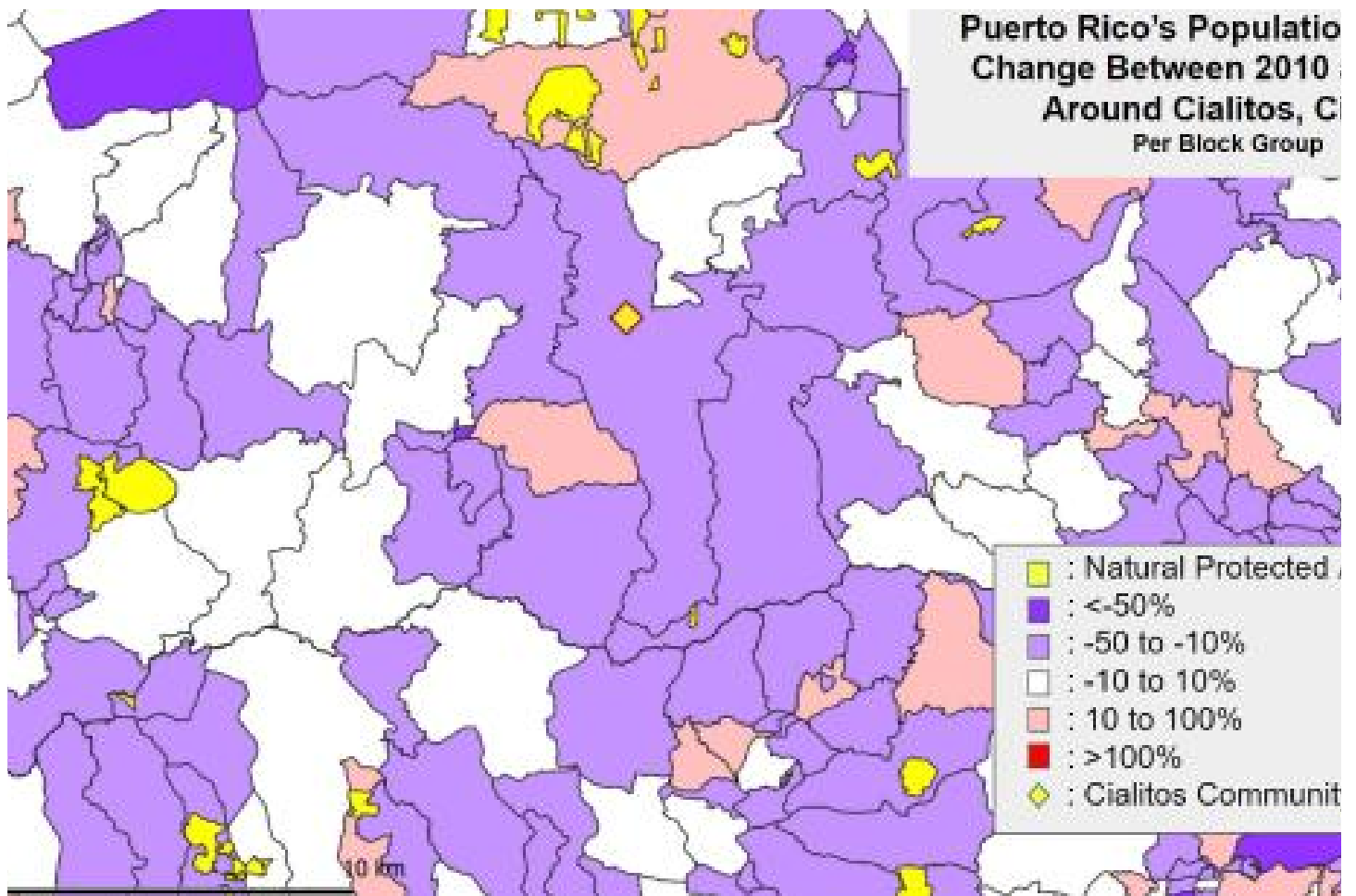


This map shows the Total Population around Cialitos in 2020.

Lighter colors represent lower populations while darker colors indicate areas of high population.

Within the radius, there are no areas of extremely high or dense population.

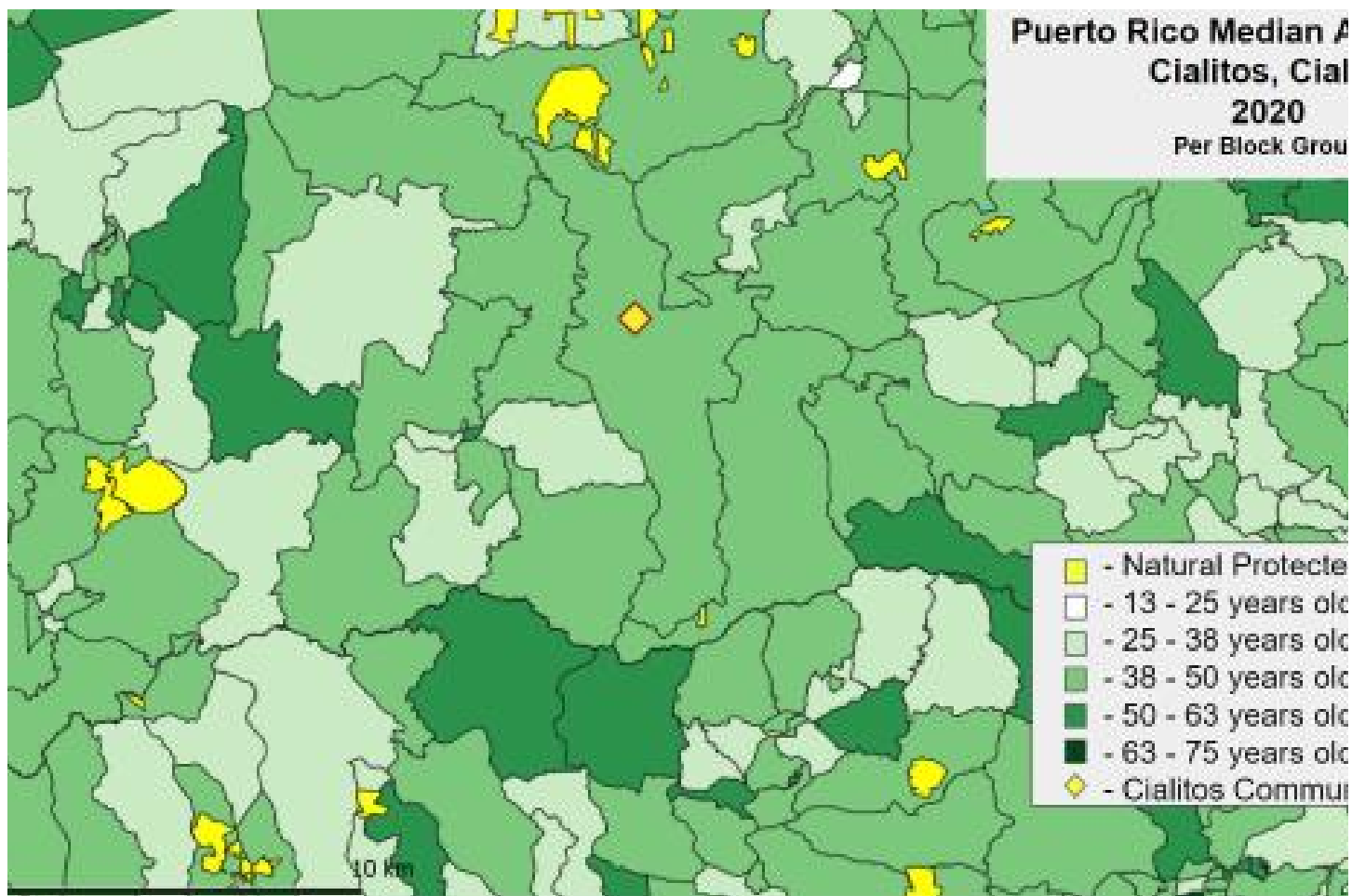




This map shows the population percent change from 2010 to 2020.

The dark purple areas experienced a decrease in population, while the red areas experienced an increase in population. The white areas roughly maintained their population.

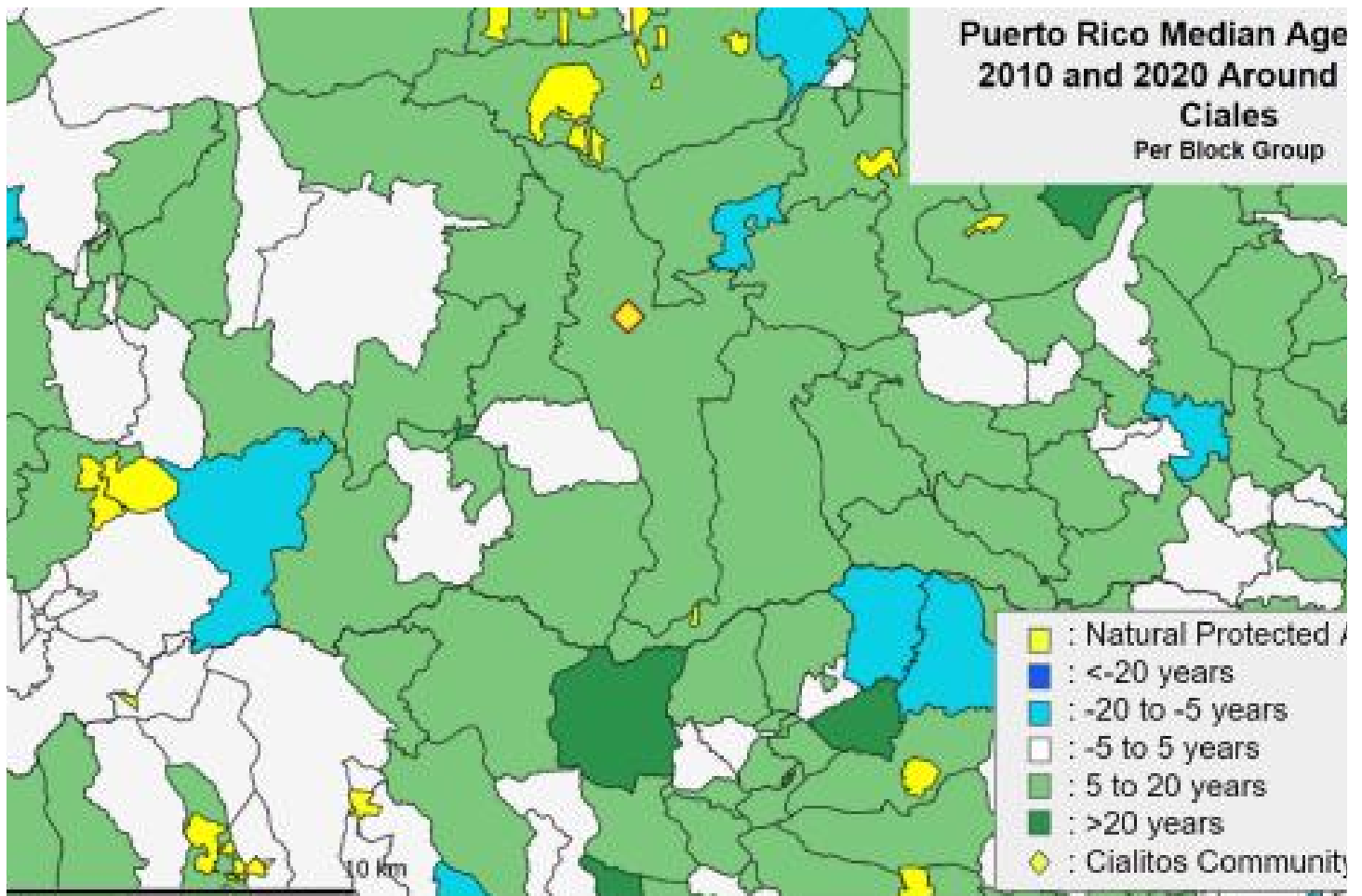
Areas with a sharp decrease in population are considered more vulnerable because there is a strain on the local economy and workforce. Additionally, there can be more vacant buildings.



This map represents the population's median age in 2020.

The dark green areas indicate areas with older populations and the light green areas indicate locations with younger populations.

There are several areas within the radius with the median age older than the island average of 45.



This map represents the median age difference from 2010 to 2020.

The blue areas indicate locations that decreased in average age and the green areas signify locations that increased in average age.

Areas with an aging population, which is usually combined with a decrease in population can cause added pressure to social and economic structures. This includes higher demands on social security, hospitals, and labor force.

## Cialitos, Ciales Comparisons

The Population of La Esperanza is 1,449 as of November 2021

Because the US Census does not separate data based off of communities the information below is from the block group

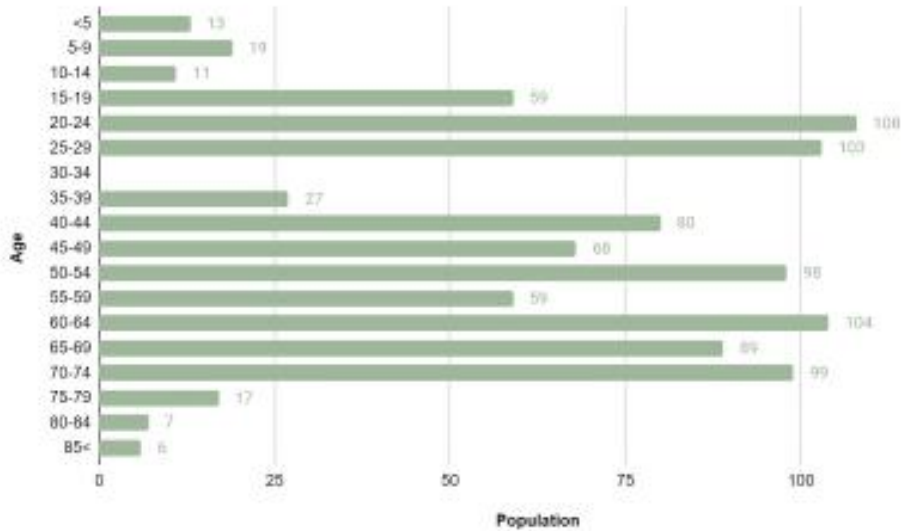
that most of Cialitos falls under.

	<u>Cialitos</u>	<u>Puerto Rico</u>
Population	967	3,285,874
Median age	49.9	43.1
Percent Under the Poverty Line	64.4	44.1
Unemployment Rate	11.4	7.1
Percent of Population with High School Diploma	24.3	27.9
Percent of Households With Internet	57.6	60.4
Percent of Households with One Resident Over 60	56.7	39.5
Percent of Households with One Resident under 18	18.1	37
Homes Built before 1970	26.7	-
Percent Building Occupancy	64.3	76.4

The table above compares relevant Census data for the Cialitos block group against the island of Puerto Rico.

From the table above, the block group that includes most of Cialitos is considered more vulnerable in the following categories based on the Puerto Rico average: Median age, percent of people living under the poverty line, unemployment rate, percent of population with high school diploma, percent of households with internet, and households with at least one resident over 60.

**Population by Age of Cialitos Block Group**



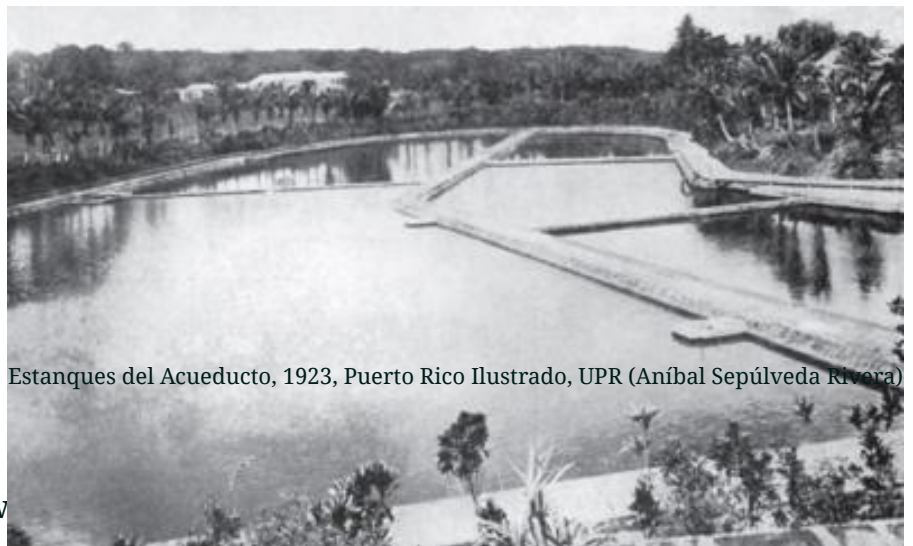
The graph above shows the age breakdown of the population within the Cialitos block group.



## El Antiguo Acueducto

### History of El Acueducto

El Aquaducto was one of the largest aqueduct systems on the island of Puerto Rico. In 1847, Juan Manuel Lomber, an engineer, proposed the San Juan area w



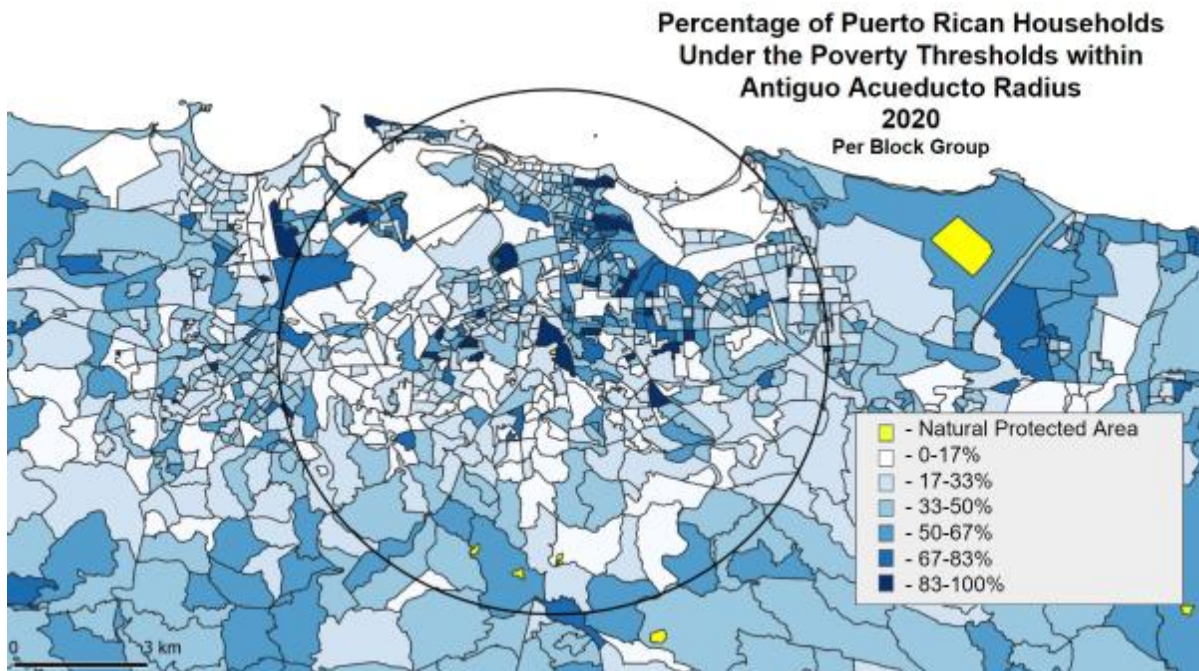
Estanques del Acueducto, 1923, Puerto Rico Ilustrado, UPR (Aníbal Sepúlveda Rivera)

between many engineers, the aqueduct was finished in 1917 after the American-Spanish war. This aqueduct is the only one remaining in the United States from the Spanish period. While



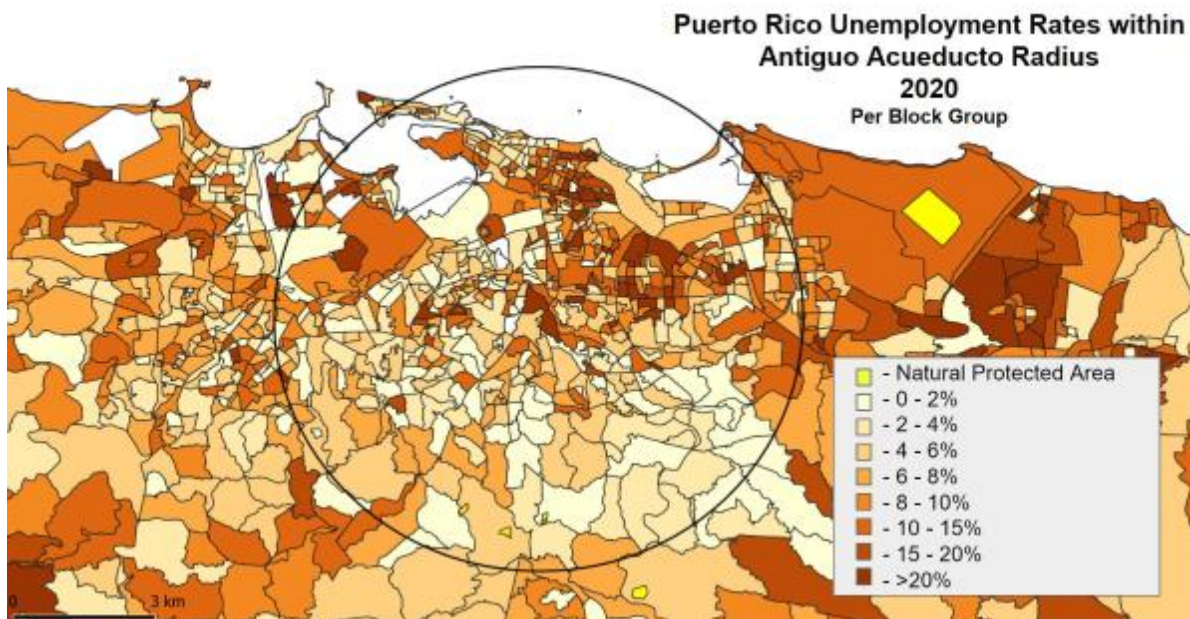
this is a historic site, it also is an important landmark to the river. The Río Piedras is the river that moves around the aqueduct and this aqueduct is one of the only major turns the river takes. This is very important for flooding because, without these bends in the river, the river would move faster causing more erosion and more dangerous waters.

## El Acueducto Vulnerability Maps



The map above shows block groups within a 10km radius from Antiguo Acueducto using 2020 Census data. The darker colors represent areas with a higher percentage of population living under the poverty threshold.

There are several areas within the radius that are above 67% under the poverty line. This could highlight areas with less ability to repair and renovate important infrastructure.

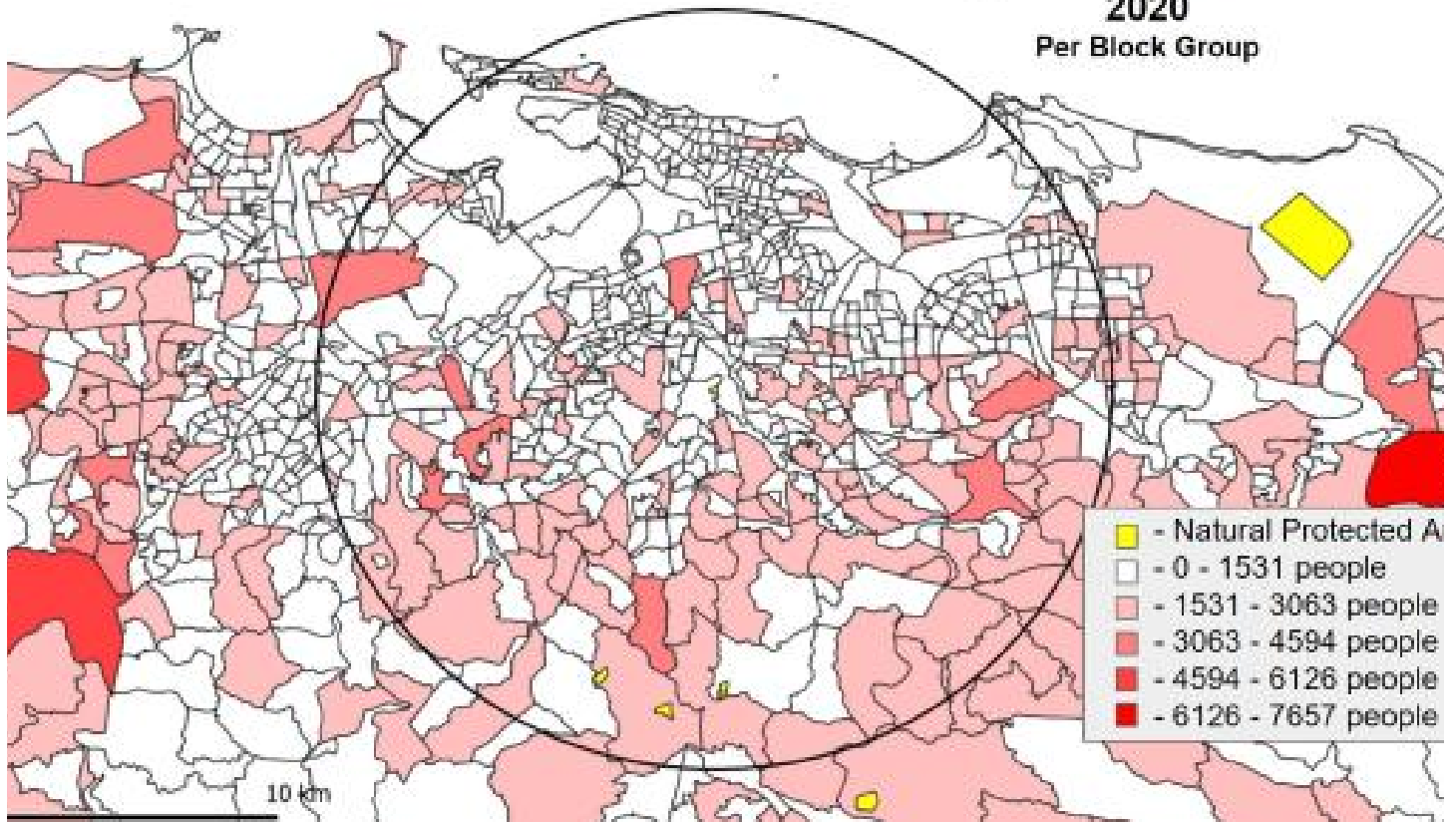


There are several areas within the radius experiencing unemployment above 10%, higher than the island average of 7%. The darker areas represent areas with a high rate of unemployment. This could indicate areas with less economic opportunity.

## Changes Over Time Trends

Mapping the population and age changes over a ten years identified the areas that were effected the most by the young population emigration that is predominant in Puerto Rico.

## Puerto Rico Total Population with Antiguo Acueducto Radius 2020 Per Block Group

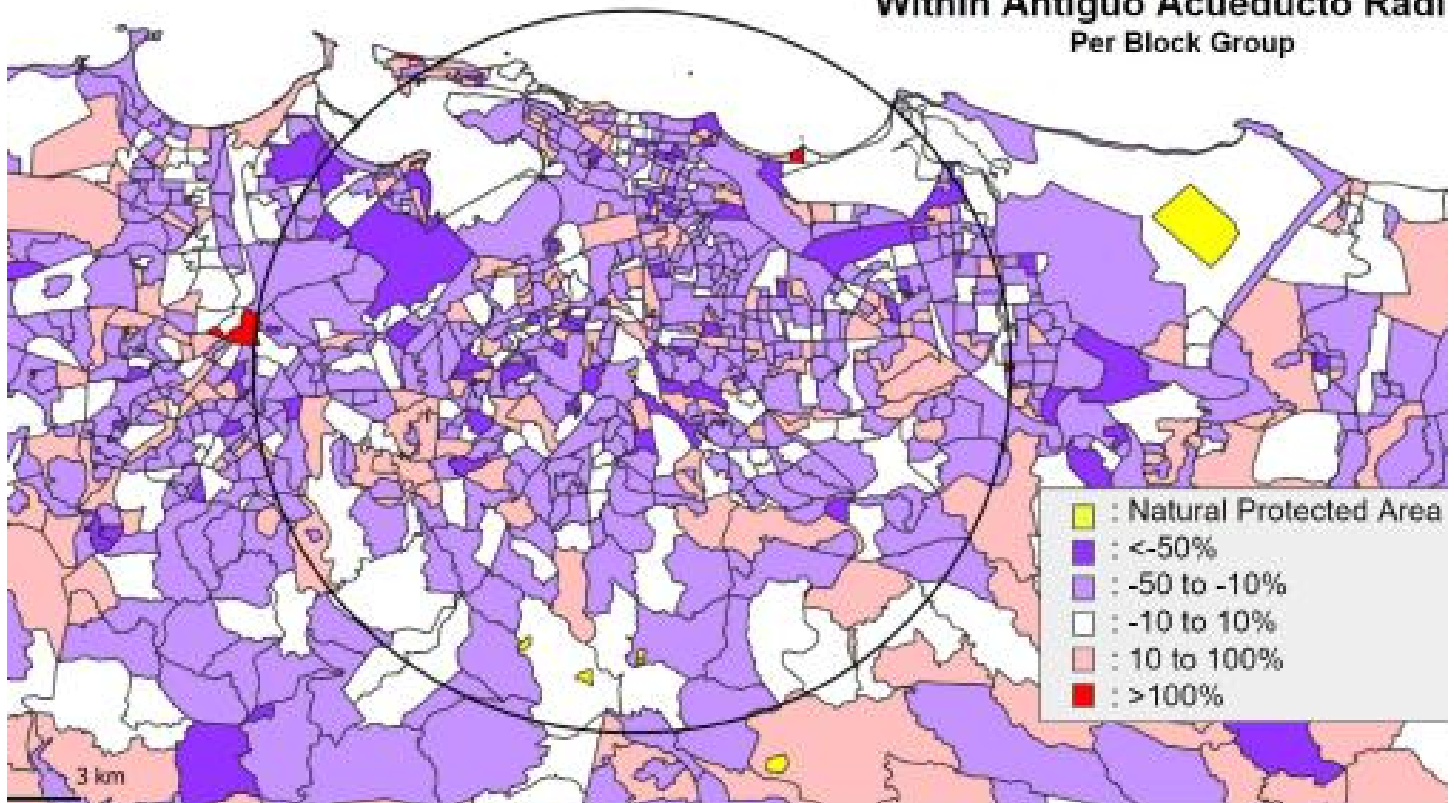


This map shows the Total Population of Antiguo Acueducto from 2020.

Lighter colors represent lower populations while darker colors indicate areas of high population

Within the radius, there are no areas of extremely high or dense population. But it is worthy to note that the block groups are very small, which indicates areas of high population.

## Puerto Rico's Population Percent C Between 2010 and 2020 Within Antiguo Acueducto Radi Per Block Group



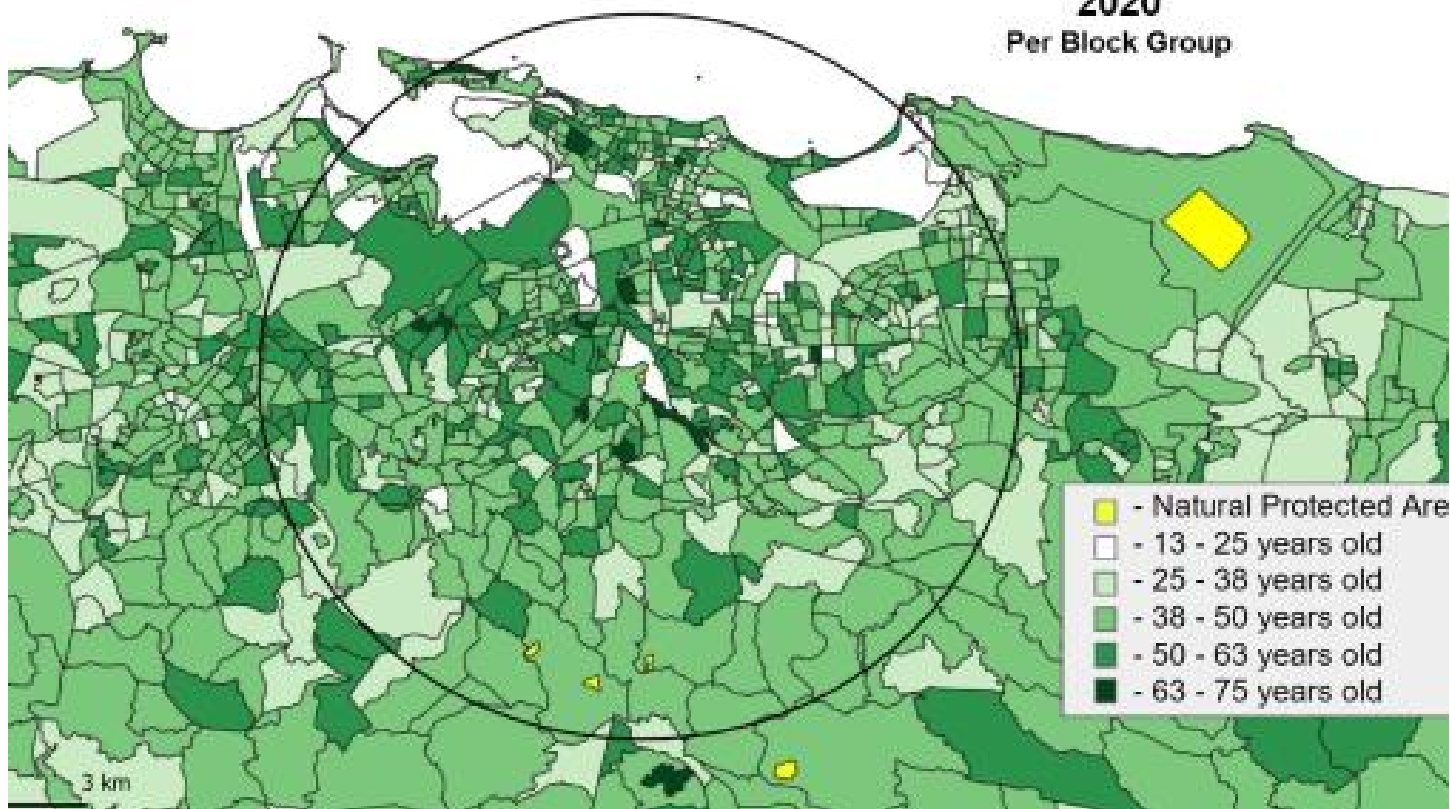
This map shows the Population Percent Change from 2010 to 2020.

The dark purple areas experienced a decrease in population, while the red areas experienced an increase in population. The white areas roughly maintained their population.

Areas with a sharp decrease in population are considered more vulnerable because there is a strain on the local economy and workforce. Additionally, there can be more vacant buildings.



## Puerto Rico Median Age within Antiguo Acueducto Radius 2020 Per Block Group

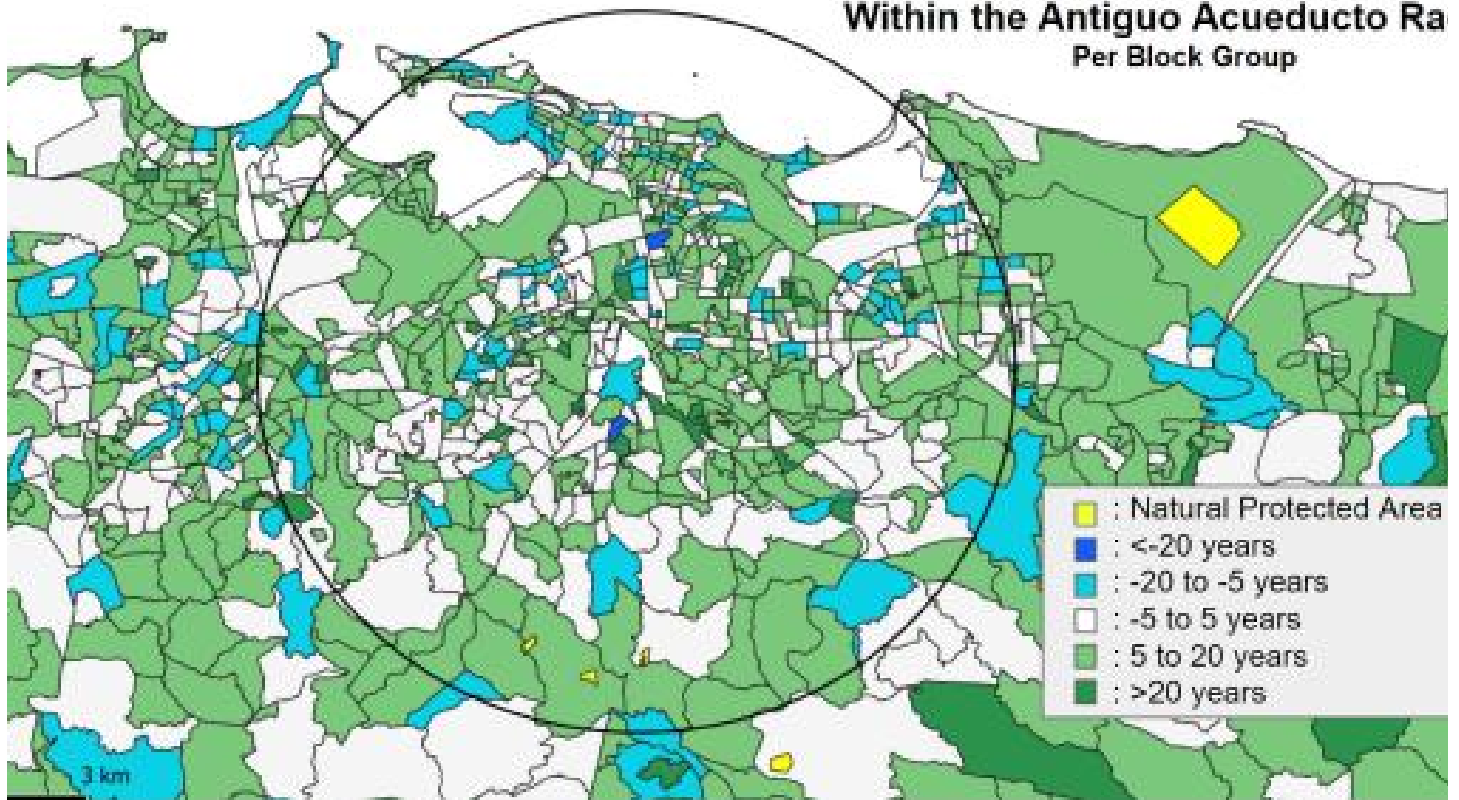


This map represents the Median age around Antiguo Acueducto in 2020.

The dark green areas indicate areas with older populations and the light green areas indicate locations with younger populations.

There are several areas within the radius with the median age older than the island average of 45.

**Puerto Rico Median Age Differer  
Between 2010 and 2020  
Within the Antiguo Acueducto Ra  
Per Block Group**



This map represents the Median Age Difference from 2010 to 2020.

The blue areas indicate locations that decreased in average age and the green areas signify locations that increased in average age.

Areas with an aging population, which is usually combined with a decrease in population can cause added pressure to social and economic structures. This includes higher demands on social security, hospitals, and labor force.

Areas with young populations can be an opportunity for PLN's education programs.



## Buen Consejo

### About Buen Consejo

Buen Consejo is a community in Río Piedras, close to Antiguo Acueducto. It is an urban neighborhood based on el Río Piedras. The river establishes a relationship between the NPA and the community. Buen Consejo is an AComPAÑA community, which PLN is continuing to build its relationship with.

“If you are going to Buen Consejo a lot of people know us and many can say good news or good things about us.” -Karina Rodríguez

## Buen Consejo Comparisons

Because the US Census does not separate data based off of communities the information below is from the block group that Buen Consejo falls under.

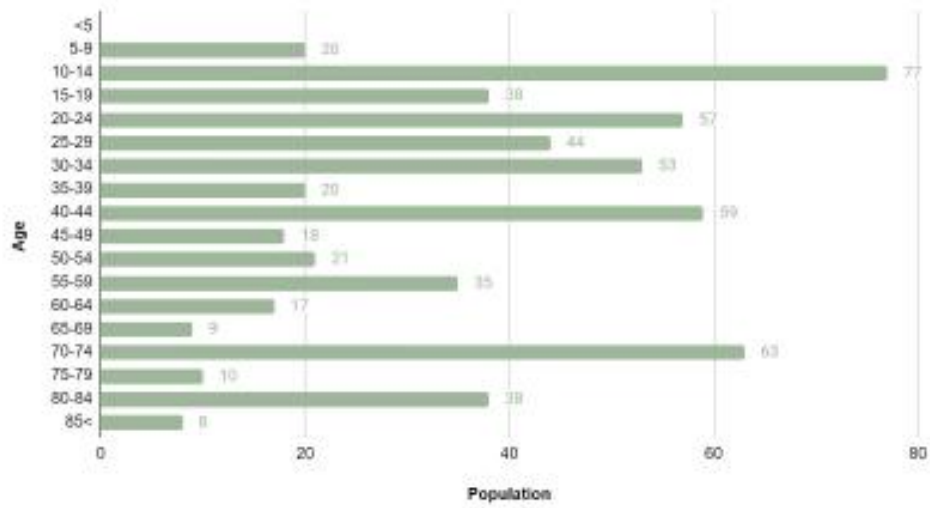
	Buen Consejo	Puerto Rico
Population	587	3,285,874
Median age	39.2	43.1
Percent Under the Poverty Line	38.3	44.1
Unemployment Rate	1.8	7.1
Percent of Population with High School Diploma	38.2	27.9
Percent of Households With Internet	17.4	60.4
Household with One Resident Over 60	41.5	39.5
Household with One Resident under 18	35.7	37
Homes Built before 1970	84.5	-
Percent Building Occupancy	60.7	76.4

*The table above compares relevant Census data for the Buen Consejo block group against the island of Puerto Rico.*

From the table above, the block group that includes Buen Consejo is considered more vulnerable in the following categories based on the Puerto Rico average: Percent of households with internet, households with at least one resident over 60, and percentage building occupancy.



### Population by Age of Buen Consejo Block Group



*The graph above shows the age breakdown of the population within the Buen Consejo block group.*