AN INDUSTRIAL LOCATION POLICY

FOR PUERTO RICO

BY

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ABSTRACT

A study and evaluation of the industrial development policies followed by the industrial development program of Puerto Rico is made in order to determine their effectiveness in achieving the goals and objectives set by the government of Puerto Rico, specially in relation to urban development, the proportion's of the island's economy in Puerto Rican hands, and the elimination of poverty.

It was found that some of the policies are in conflict with the general objectives proposed by the present Administration, and an alternate policy is formulated, based on the government goals and objectives and using the existing programs, although modified, in order to attain the expressed goals.

Cambridge, Mass.
May 22, 1964

Professor Frederick J. Adams
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Dear Professor Adams,

In partial fulfillment of the requirements for the degree of Master in City Planning, I submit to your consideration this thesis entitled " An Industrial Location Policy for Puerto Rico".

I wish to thank you, Professor Friedmann, Gerald F. Hodge, and all the other members of the Staff of the Department for the help, guidance and advice that I received during my studies and in the preparation of this thesis.

Cordially yours,

Pedro Francisco Mora Mena

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DEFINITION OF TERMS

Economic Development Administration (EDA)	A Puerto Rican government agency devoted to promote the economic development of the island.
Puerto Rico Industrial Development Company (PRIDCO)	A public corporation of the Commonwealth of Puerto Rico, the operational arm of EDA. Has as major function to provide the physical facilities required by the industrialization program.
Fomento	Spanish word for promotion, which is indiscriminately applied both to EDA and PRIDCO, and generally refers to the industrial development program.
Fomento Promoted Plants (Industries)	Manufacturing plants established in the island through the promotional efforts of EDA, PRIDCO, or both.
Fomento Assisted Plants (Industries)	Plants that have established in the island without aid or help of PRIDCO or EDA, but which at a later stage received some type of aid from one or the two agencies.
Marketing Corporation	A public corporation of the Commonwealth of Puerto Rico, operating under PRIDCO to provide marketing assistance to locally owned industries.
Municipio	The smallest political subdivision in the Commonwealth. Within a "municipio" there are both urban and rural areas, the urban varying from major cities to small villages.
Industrially deppressed areas	Those municipios in which manufacturing employment is less than 1 employment per 100 population.

INTRODUCTION

Before attempting to discuss and analize the industrial development program of Puerto Rico, we need to understand the reasons behind its development, and the setting in which it was formulated.

Puerto Rico has always been characterized by the lack of natural resources, and for its dependence on few agricultural crops such as sugar, coffee and tobacco. The scarcity of arable land lead to agricultural specialization, and in the 1920's the island had become highly specialized in the exportation of sugar, coffee and tobacco to the U. S. mainland and foreign countries. In the late 1920's and early 1930's, two hurricanes and the economic depression experienced in the United States and Puerto Rico completely disrupted the economy of the island and brought the population near the point of starvation.[1] By 1940, sugar was the main crop of the island, and accounted for over two thirds of Puerto Rico's exports. Coffee and tobacco had been reduced to minor crops, and never again regained their former position.

The 1940 elections brought a change in the political structure of the island, which, with the increased income of the war years, managed to establish the foundations of a industrial development program. The first manufacturing plants established under the program (Fomento)[2] were fully owned and operated by the government, and were geared to supply the local needs (cement, glass, clay, paperboard, shoes, etc.) which were ill supplied due to the war.

After the war, management and operation problems forced the government to sell all the factories, and since then has specialized in promoting industries and supplying the physical facilities needed to carry out the program.

In 1953, an industrial incentives act was approved by the local legislature, which granted up to 10 years tax exemption to new industries locating in the island, and the industrial buildings, built by the Puerto Rico Industrial Development Company (PRIDCO), were leased at very low rents, [3] which coupled with the low wages prevailing in the island, served as further inducement to attract industries to the island.

By 1958, there was a marked centralization of industrial plants and population in the San Juan Metropolitan Area, which created grave problems of housing, transportation and the provision of government services. In an effort to reduce the migration to this area, additional incentives in the form of 3 additional years tax exemption, were granted to some towns which did not had any Fomento promoted [4] industries established in it. These towns usually are located in the more remote areas of the island, which, due to their geographical location and topographical characteristics, are ill suited for the location of industries.

Additional locational incentives in the form of grants, varying from $5,000 to $40,000, which could be utilized for training personnel, payment of rent, transportation of machinery, etc., were given to all the towns and cities located outside the San Juan Metropolitan Area, the amount of the grant depending on the industrial development of the town or city.

In order to be eligible for these grants, the plant must comply at least with one of the following requirements:

(1) Encourage or facilitate the establishment of other plants.

(2) Help in the integration of other businesses.

(3) Use of local raw materials.

(4) Have substantial employment.

(5) Help to develop local enterpreneurship.

(6) Help in broadening the industrial base of the island.

(7) Provides high wages or has high investment per worker ratio.

The main difficulty in promoting industries in the most remote towns is found in the higher transportation costs, lack of an adequate infra-structure capable of supplying the needs of the plant, small labor force, lack of adequate housing, social, recreation, and educational facilities, etc., which can not be supplied or improved by the use of incentives.

Due to these reasons, the number of plants promoted in these towns within the last 5 years was very small compared to the total number of plants locating in the island.

By 1963, when it became evident that these additional incentives were not enough to alter the locational pattern of industries, a complete revision of the incentives act was made, granting 17 years tax exemption to "industrially deppressed areas"[5], and 12 years tax exemption to the rest of the towns and cities of the island, with the exemption of the San Juan Metropolitan Area.

As the industrial development program is relying heavily on the use of tax concessions for attracting industries to the island and encouraging their dispersion, it will be the main purpose of this study to determine if these additional tax concessions are adequate to fulfill the proposed goals and objectives of the industrial development program, and to determine the possible effects they may have in the future locational pattern of the industries establishing in the island.

CHAPTER I

EXISTING PATTERN OF INDUSTRIAL LOCATION

A. <u>Definition of Regions</u>

The urban development of Puerto Rico has been shaped by its distinct topographic features. The island is divided by a ridge of mountains running east-west, which define three major regions, namely, the north eastern coastal plain, the south western coastal plain, and the central mountain area. (See Map No. 2 and 3). These three areas are very distinct and different, as the topographic features, climate and type of development vary greatly from region to region.

The north eastern plain is the most highly developed and has the most fertile land in the island. The main crops are sugar and tobacco, the latter in the Caguas-Cayey area. The topography is flatter than the south western plain, and there is abundance of rivers which provide ample quantities of water for agricultural and urban uses.

In this region, the largest urban area is that formed by the San Juan Metropolitan Area, which with a 1960 population of 648,000 is the largest urban area in the island.

The south western plain generally is more dry, hot and sparsely developed. The agricultural land is not as fertile as in the north eastern plain, and generally needs irrigation.

Also, this region usually has to depend on deep wells for water supply, which generally hinders the possibility of promoting industries requiring large amounts of water.

The largest urban areas in the South western plain ar the Ponce and Mayaguez Metropolitan Areas, which had 1960 populations of 146,000 and 84,000 respectively. These two urban areas are the second and third largest on the island.

The central mountain area is devoted primarily to crops such as coffee, tobacco, and minor fruits, which due to the poor quality of the land, do not yield adequate crops, and the farms usually do not provide the owner adequate returns for his investment. The population of this region is mainly rural, and the poorest in the island.

As the three regions present different problems and allow different solutions, this study will be made according to these three regions, rather than by the regions delineated by the Puerto Rico Planning Board, which are shown on Map Number 4, and vary from the above defined regions in the fact that the Planning Board includes part or the plain and the central mountain area in defining regions.

B. Existing Industrial Location Pattern

Since the establishment of the industrial development program, the number of industries operating under it has increased tremendously, as can be seen in Table Number 1. In fiscal year 1946-47 there were a total of 15 industries operating under the program, while in 1962-63, the number had reached a total of 1,031.

These industries are highly concentrated in the north eastern plain, and primarily in the San Juan Metropolitan Area. This region accounted for 77.0% of the industries in 1958, and 74.0% in 1963. The San Juan Metropolitan Area alone had around 65.0% of
~ 50% OF TOTAL
the industries located in the region. (See Table Number 2 and Maps No. 5 and 6)

The south western plain had a total share of 18.3% of the total number of plants in 1958, which was increased to 24.0% by 1963, and the central mountain area accounted for around 5.0% in both years.

The great bulk of these plants are included in the non-durable goods, which accounted for around 60.0% of all the industries (See Table No. 3). This meant an increase of 3.5% over 1958. In this group, the main share is held by the textiles-apparel group, which had a small decline from a total share of 34.6% in 1958 to 32.3% in 1963. The other most important groups are food and leather products, holding 1963 shares of 7.5% and 5.5% respectively.

TABLE NUMBER I
FOMENTO PROMOTED AND ASSISTED PLANTS
DISTRIBUTION PER FISCAL YEARS

Year	Promoted Industries	Assisted Industries	Total
1946-47	13	2	15
1947-48	24	2	26
1948-49	52	2	54
1949-50	83	2	85
1950-51	114	2	116
1951-52	166	5	171
1952-53	229	7	236
1953-54	282	14	296
1954-55	303	32	335
1955-56	364	53	417
1956-57	427	62	489
1957-58	475	75	550
1958-59	538	90	628
1959-60	608	103	711
1960-61	678	108	786
1961-62	777	120	897
1962-63	882	149	1,031

Source: Economic Development Administration,
Office of Economic Research

TABLE NUMBER 2

DISTRIBUTION OF FOMENTO PROMOTED AND ASSISTED PLANTS

BY TOPOGRAPHIC REGIONS

	1958			1963		
	No. of Plants	% of Total	% of Region	No. of Plants	% of Total	% of Region
TOTAL PUERTO RICO	546	100.0	---	1,001[1]	100.0	---
North Eastern Plain	420	77.0	100.0	742	74.1	100.0
San Juan M. A.	279	51.1	66.4	477	47.6	64.4
Caguas	37	6.8	8.8	61	6.1	8.2
Rest of Region	104	19.1	24.8	204	20.4	27.4
South Western Plain	100	18.3	100.0	204	20.4	100.0
Ponce M. A.	36	6.6	36.0	64	6.4	31.3
Mayaguez M. A.	19	3.5	19.0	50	5.0	24.5
Rest of Region	45	8.2	45.0	90	9.0	44.2
Central Mountain Area[2]	26	4.7	100.0	55	5.5	100.0
Aibonito	5	0.9	19.2	11	1.1	20.0
Coamo	5	0.9	19.2	5	0.5	9.0
Rest of Region	16	2.9	61.6	39	3.9	71.0

(1) According to this source there were 1,001 Fomento Promoted and Assisted Plants operating on the island. According to the employment statistics, the figure was 1,031. For the purpose of this study the 1,001 will be used. (2) Includes Vieques and Culebra.

Source: Economic Development Administration, 1958 and 1963 Directory of Manufacturers

In the durable goods, the most important group is that formed by the lumber-furniture, stone-clay-glass, and the metal products, which alltogether accounted for 21.1% of all the plants in 1963, up from 18.4% in 1958. The machinery, professional equipment, and miscellaneous industries have been loosing in relative numbers, especially the instruments and miscellaneous industries, which experienced way below average increases in the last 5 years.

In both groups, the highest percentage increase are found in those industries supplying local markets, while the lowest increases are found in some of the export categories. (See Table Number 4).

In Table number 3, it was also noted that the industrial composition of the North eastern plain is specializing in the non-durable goods, while the south western plain and the central mountain area had increases in the durable goods. This can be attributed to the number of plants supplying the San Juan market, which tend to locate near the market, while the durable goods which mainly export to the U. S. mainland tend to follow the additional incentives offered in the other areas.

As most of the industries producing for export depend on the U. S. mainland for both raw materials and market, their location is influenced greatly by accesibility to the major ports of

TABLE NUMBER 3

DISTRIBUTION OF FOMENTO PROMOTED AND ASSISTED PLANTS

BY INDUSTRY GROUP 1958-63

		1958		1963		
		No. of Plants	% of Total	No. of Plants	% of Total	% Change 1958-63
TOTAL PUERTO RICO		546	100.0	1,001	100.0	83.1
NON DURABLE GOODS		306	56.0	596	59.5	94.1
SIC 20	Food Products	32	5.9	75	7.5	134.1
SIC 21	Tobacco Mfrs.	6	1.1	16	1.6	166.7
SIC 22	Textile Mills	47	8.6	60	6.0	27.7
SIC 23	Apparel	142	26.0	263	26.3	85.2
SIC 26-27	Paper, Printing	16	2.9	43	4.3	168.8
SIC 28	Chemicals	20	3.7	43	4.3	115.0
Sic 29-30	Petroleum, Rubber, Plastics	20	3.7	41	4.1	105.0
SIC 31	Leather	23	4.1	55	5.5	139.0
DURABLE GOODS		239	43.8	402	40.2	68.2
SIC 19	Ordnance	--	---	2	0.2	---
SIC 24-25	Lumber, Furniture	35	6.5	76	7.6	117.0
SIC 32	Stone, Clay, Glass	21	3.8	43	4.3	105.0
SIC 33-34	Metal Products	45	8.2	92	9.2	105.0
SIC 35-37	Machinery	16	2.9	24	2.4	50.0
SIC 36	Electrical Machinery	47	8.6	75	7.5	59.5
SIC 38	Professional Equipment	15	2.8	18	1.8	20.0
SIC 39	Miscellaneous	60	11.0	72	7.2	20.0

Source: Economic Development Administration, 1958 and 1963 Directory of Manufacturers

the island, i. e., San Juan, Ponce and Mayaguez. The location on these urban areas, and in the road network connecting them, is overwhelmingly preferred by the majority of the industries established in the island. As these three urban areas are also the major markets in the island, the plants supplying these markets also exhibit the same locational behavior as the plants producing for export. This can be appreciated in Table Number 5, and Map No. 5, which shows that around 92.0% of all the industries are located either in the major urban areas or along the major road network.

The major departures from this pattern is found in the apparel group, which have the highest number of plants operating outside the major road network (26 in 1963, an increase of 15 over 1958), and the leather and leather products which tends to concentrate around previously established industries of the same group. (See Map No. 11 and 19)

Studying the different industry groups separately, it was found that in the non-durable goods, the food, textile mills, paper, printing and publishing have tended to concentrate in the north eastern plain in that last 5 years. (See Table Number 4.) The south western plain managed to attract more plants in the apparel, chemicals and the petroleum-rubber-plastics group of the non durables, and in all the durable goods except machinery.

TABLE NUMBER 4

DISTRIBUTION OF FOMENTO PROMOTED AND ASSISTED PLANTS BY REGION AND INDUSTRIAL GROUP 1958-63

INDUSTRY GROUP	TOTAL NO. OF PLANTS 1958	TOTAL NO. OF PLANTS 1963	TOTAL % CHANGE 1958-63	NORTH EASTERN PLAIN NO. OF PLANTS 1958	NORTH EASTERN PLAIN NO. OF PLANTS 1963	NORTH EASTERN PLAIN % CHANGE 1958-63	SOUTH WESTERN PLAIN NO. OF PLANTS 1958	SOUTH WESTERN PLAIN NO. OF PLANTS 1963	SOUTH WESTERN PLAIN % CHANGE 1958-63	CENTRAL MOUNTAIN AREA NO. OF PLANTS 1958	CENTRAL MOUNTAIN AREA NO. OF PLANTS 1963	CENTRAL MOUNTAIN AREA % CHANGE 1958-63
NON- DURABLE GOODS	306	596	95.0	218	418	91.8	70	139	98.5	18	39	116.5
SIC 20 FOOD PRODUCTS	32	75	134.1	19	48	152.8	11	23	109.0	2	4	100.0
SIC 21 TOBACCO MANUFACTURES	6	16	166.7	5	13	160.0	—	—	—	1	3	200.0
SIC 22 TEXTILE MILLS	47	60	27.7	27	39	44.5	15	16	6.7	5	5	—
SIC 23 APPAREL & RELATED PRODUCTS	142	263	85.1	104	177	70.0	30	65	116.5	8	21	162.5
SIC 26-27 PAPER - PRINTING	16	43	168.5	13	39	200.0	2	4	100.0	1	—	—
SIC 28 CHEMICALS	20	43	115.0	18	34	89.0	2	9	350.0	—	—	—
SIC 29-30 PETROLEUM - RUBBER	20	41	105.0	18	34	89.0	2	6	300.0	—	1	—
SIC 31 LEATHER PRODUCTS	23	55	139.0	14	34	143.0	8	16	100.0	1	5	400.0
DURABLE GOODS	239	402	66.2	204	326	60.0	29	63	117.0	6	13	117.0
SIC 19 ORDNANCE & ACCESORIES	0	2	—	—	2	—	—	—	—	—	—	—
SIC 24-25 LUMBER & WOOD PRODUCTS	35	76	117.0	27	55	103.5	8	20	150.0	—	1	—
SIC 32 STONE, CLAY, GLASS PRODUCTS	21	43	105.0	18	35	48.5	3	8	166.7	—	—	—
SIC 33-34 METAL PRODUCTS	45	92	104.5	42	82	95.5	2	7	250.0	1	3	200.0
SIC 35-37 MACHINERY	16	24	50.0	12	20	66.7	3	2	- 33.3	1	2	100.0
SIC 36 ELECTRICAL MACHINERY	47	75	59.6	42	67	59.5	3	5	66.7	2	3	50.0
SIC 38 PROFESSIONAL INSTRUMENTS	15	18	20.0	10	10	—	—	4	—	1	2	100.0
SIC 39 MISCELLANEOUS PLANTS	60	72	20.0	53	55	3.8	6	15	150.0	1	2	100.0
TOTAL	546	1,001	83.0	422	744	76.3	99	202	104.0	24	52	116.5

SOURCE: ECONOMIC DEVELOPMENT ADMINISTRATION
1958 AND 1963 DIRECTORY OF MANUFACTURERS

TABLE NUMBER 5

DISTRIBUTION OF FOMENTO PROMOTED AND ASSISTED PLANTS

BY URBAN AREAS AND ROAD NETWORK

	1958		1963	
	No. of Plants	% of Total	No. of Plants	% of Total
San Juan M.A.	279		477	
Road to Fajardo	19		44	
Road to Vega Alta	27		41	
	325	59.5	562	56.1
Caguas	37		61	
Road to Cayey	10		19	
Road to Humacao	17		33	
	64	11.7	113	11.3
Ponce M.A.	36		64	
Road to Guayama	7		23	
Road to Yauco	12		16	
	55	10.0	103	10.3
Mayaguez M.A.	19		50	
Road to Isabela	4		11	
Road to Sabana Grande	13		25	
	36	6.6	86	8.6
Arecibo	7		23	
Road to Quebradillas	4		5	
Road to Vega Baja	14		28	
	25	4.6	56	5.6
Sub Total	505	92.4	920	91.9
Rest of Puerto Rico	41	7.6	81	8.1
TOTAL PUERTO RICO	546	100.0	1,001	100.0

Source: Economic Development Administration, 1958 and 1963 Directory of Manufacturers

The central mountain areas experienced relative increases in the tobacco, apparel, machinery and professional instruments, although in most cases it simply meant the establishment of one or two plants in the region, and can not be considered as major changes.

Leather and leather products showed relative increases on the three regions, the greatest being on the south western plain.

In order to study the locational behavior of the different industry groups regarding city size, location on core or fringes, road location, etc. we will procede to study in greater detail the different industry groups.

C. Non Durable Goods

1. SIC 20 - Food and Food Products.

The location of this group of plants is shown on Map No. 8 and from it is evident that this industry seeks a market oriented location. Of the total of 75 plants operating in 1963, 52 (70%) were located in the San Juan, Ponce and Mayaguez metropolitan areas, while the San Juan fringes contributed with another 6, which clearly indicates the market orientation of this industry. The plants operating in the central mountain area were utilizing raw materials produced in the region, and therefore their location was governed by this fact.

2. SIC 21 Tobacco Manufactures

The location of this group is shown on Map No. 9, and it is evident the agglomeration of plants around the major source of raw materials, namely, the Caguas-Cayey area. This industry, which process the tobacco grown in the island, is definitely raw material oriented, and its future location will continue to be governed by the availability and location of the raw material.

3. SIC 22 - Textile Mill Products

As was stated before, this industry is experiencing way below average increases, as compared with its own group and the island as a whole. The large number of plants that ceased operations and the low number of new additions has increased the proportion of this industry in the San Juan-Vega Alta area, which in 1963 had around 42% of the total number of mills in the island. This industry clearly shows tendencies toward nucleation and location on the major road network, although road location is preferred to the major urban areas.

4. SIC 23 - Apparel and Other Finished Products

Being this the largest and oldest industry group in the island, it is logical that the major concentration be found in the San Juan Metropolitan Area. According to Map No. 11 the majority of the plants promoted in the last 5 years have tended to locate outside the San Juan Metropolitan Area, and to prefer the

San Juan Ponce-Mayaguez road network, with a very high rate of dispersion in the area. The area to the west of San Juan, along the road network, received a very meager part of the new plants.

This industry seems well suited to locate almost anywhere, and its location seems to be highly influenced by the availability of incentives.

5. SIC 26 - Paper and Allied Products

This is an incipient industry in the island, and is centered around the San Juan Metropolitan area, with several plants locating along the road network, but with the exception of two in the Ponce Metropolitan Area, close to San Juan (See Map No. 14).

As this industry supplies mainly local markets, it is logical to assume that it will continue to locate near the major markets, which in this case is the San Juan Metropolitan Area. The bulk of these plants have been established in the last 5 years, with only one of the older plants ceasing operations.

6. SIC 27 - Printing, Publishing and Allied Industries

This group, like the preceding, is in its infancy, and most of the plants follow the San Juan market (See Map No. 15). There are very few plants operating outside the San Juan area, and the only plant established outside the road network was one of the four that ceased operations in the last 5 years. The other three were located in the San Juan area.

Up to the present, this industry is heavily oriented toward market, and therefore prefers location close to markets.

7. SIC 28 - Chemical and Allied Products

The location of these plants is shown on Map No. 16, which shows that the majority are located in the San Juan Metropolitan Area, with a new nucleus established in the Ponce-Peñuelas area. Outside this two areas, there are a few plants located in a scattered fashion around the island.

The Ponce-Peñuelas nucleus is expected to grow around the petrochemical complex established in the area.

8. SIC 29 - Petroleum Refining and Related Industries

As petroleum must be imported, the two refineries operating in the island are located in waterfront sites, at the north and south coasts of the island. The related industries are mainly concentrated around the San Juan area (See Map No. 17).

As the Peñuelas refinery by products are used mainly in the chemical industry, it is highly difficult to estimate if related industries will be established in this area. As the total number of plants is so small, we can only notice the usual concentration around the San Juan area, and assume that this industry will continue to locate in central areas, and close to the source of raw materials.

9. SIC 30 - Rubber and Miscellaneous Plastic Products

The bulk of this industry is located on the San Juan area and its fringes, although some of the recently established plants are locating in the area between Ponce and Salinas. (See Map No. 18). All these plants are located in or near the major road network, and always near major urban areas.

10. SIC 31 - Leather and Leather Products

As shown on Map No. 19, this industry is highly centered around the San Juan Metropolitan Area, although there are few plants located in the central area. Another small group is located near the Mayaguez area, and another group is being formed in the Ponce Metropolitan Area.

It seems that this industry shies away from the major metropolitan areas, but is able to locate in the minor metropolitan areas. The trend in this industry is toward concentration around existing nucleus, as it is noticed that the majority of the plants established in the last 5 years preferred areas in which similar plants were already operating.

D. Durable Goods

1. SIC 19 - Ordnance and Accessories

As there are only two plants in this group operating in the island (See Map No. 7), it is impossible to conclude anything in their location behavior, although from their location and the skills they require in their operation we may assume that they will seek proximity to major urban areas.

2. SIC 24 - Lumber and Wood Products

In 1963 there were 12 plants in this industry group operating in the island, of which only 2 were established prior to June 1958 (See Map No. 12). The location pattern of this industry is very undefined, as there are scattered plants around the island, following the major road network, with a very small nucleus in the San Juan-Toa Baja area. As most of these plants are small operating units supplying local markets, it is safe to assume that they are supplying very small markets, which in turn determines their location pattern.

It is expected that the future location of this industry will continue to be determined by the location of the market, and possibly, the succesfull operation of some of the existing small plants will encourage the extension of the markets served and the industry will seek proximity to major urban areas.

3. SIC 25 - Furniture and Fixtures

As shown in Map No. 13, this industry is highly centralized, as the majority of the plants are located in the San Juan-Caguas area. As most of these plants were established in the last 5 years, their locational behavior suggest that they follow closely the location of the market, and can be safely assumed that they will continue to do so in the future.

4. SIC 32 - Stone, Clay and Glass Products

This industry is centralized around the 3 major urban areas of the island (See Map Number 20), which suggests the orientation to markets. This may be a coincidence, as the location of the major sources of raw materials utilized by these plants are located around the San Juan and Ponce Metropolitan Areas.

This industry can be subdivided in two different groups: the cement, clay, glass, and lime plants; and the cement products such as terrazo and cement tiles. The first group is definitely influenced by the location of the sources of raw materials, while the second is influenced by the location of the markets, which generally are the major urban areas.

5. SIC 33 - Primary Metal Industries

With the exception of one plant in the Mayaguez Metropolitan Area, the rest of the plants in this industry group are located around the San Juan Area (See Map Number 21).

Plants in this category can also be divided in two groups, those using discarded metals, wich are reprocessed, and those supplying basic aluminum products used mainly in the manufacturing of aluminum windows and other products used in the construction of houses and buildings.

The first group depends on the great volume of old and discarded metal available in the San Juan Metropolitan Area, while the second supplies the large construction market in the metropolitan area. Although both are attracted to the San Juan region, they do so for different reasons, one as a supplier of raw materials and the other as market.

6. SIC 34 - Fabricated Metal Products

As in the preceding industry group, this industry is geared toward supplying the construction industry of the island, and especially that in the San Juan area. Therefore, its location pattern is determined mainly by the availability of markets. Although there seems to be a wide dispersion of plants around the San Juan Area (See Map No. 22), this may be caused by a group of plants that supply mainland markets, and they probably are taking advantage of additional incentives offered in areas outside the San Juan Metropolitan Area, thus causing this dispersion.

7. SIC 35 - Machinery, except Electrical

This industry group managed just to maintain the number of plants operating on the island in 1958, as the 7 new plants that were promoted in the last 5 years, just served to replace 6 plants that ceased operations in the same period.

The bulk of this industry is located in the San Juan area, with several industries scattered around the island, in a fashion which suggests that their location is determined by the availability of industrial incentives.

8. SIC 36 - Electrical Machinery

The bulk of this industry is located in the San Juan Metropolitan Area, and the roads leaving it. (See Map No. 24). A small group is located in the Ponce-Juana Diaz area, and some recent location in the central mountain is noticed. This industry group, as the one preceding, seems to be highly influenced by the availability of incentives, and their location pattern seems to be defined either by incentives or central areas. The majority of these plants manufacture small machinery and electrical appliances, which require considerable manual skill, such as that found in women used to do sewing work. As this type of labor is widespread in the island, it is reasonable to assume that most of the plants locating in the central mountain area are doing so induced by the available incentives.

9. SIC 37 - Transportation Equipment

This is a very infant industry which partly supplies local needs and partly supplies mainland markets. The majority of the plants operating in the island were established in the last 5 years (4 out of 5, See Map No. 25), and are located in the vicinity of San Juan.

As it is impossible to determine any specific location pattern it can only be assumed that their location will continue to be influenced by the location of markets, either local or mainland. In the case of mainland markets, the basic location pattern will be that which supplies that greatest benefits and the minimum transportation costs.

10. SIC 38 - Professional Equipment

This industry is centered around the San Juan Metropolitan Area, with only 3 industries of the total of 18 located outside the road network (in the central mountain area, See Map No. 26). From this limited information, and the fact that the majority of these plants supply mainland markets with articles of high value in relation to weight, their location can be influenced by the use of incentives and the availability of a labor force that can be trained.

11. SIC 39 - Miscellaneous Industries

This industry is mainly located in the major urban areas of San Juan, Ponce and Mayaguez (See Map No. 27). The plants located in the San Juan area had the highest mortality rate, while the industry group as a whole had a very low rate of increase as compared to the island industrial plants increase rate.

The reason for this relative decline can be found in the articles that these plants produce, which consist mainly of toys, jewelry, and novelties, which must be in continuous contact with the market. As the major markets for this type of products is in the mainland, it is reasonable to assume that the industrial incentives offered by Puerto Rico are not enough to offset the lack comunication with the market. Nevertheless, as in the case of all the industries supplying mainland markets, their location pattern tends to favor major urban areas and road location over areas inaccesible to ports.

CONCLUSION

The industries located in the island can be divided in two major groups: those supplying local markets, and those supplying mainland and foreign markets. Their locational behavior is basically similar, as both are attracted toward the major urban areas, although for different reasons. The first group looks upon the urban areas as a market, while the second group is interested in the accesibility these areas offer to the shipping of goods to the mainland.

Generally, the group supplying local needs is experiencing above average growth, while some of the exporting groups are rapidly becoming stagnant.

The availability of incentives is more likely to influence the location of exporting industries, which due to their peculiar situation of using the island as a processing center, base the decision of establishing in the island according to the relation between the available incentives and the added cost of transporting the goods to and from the island. As the majority of these plants are part of a major unit, the island operation is a means of evading payment of taxes to the Federal Government, and accordingly base their decisions on the profitability of the operation in the island (incentives minus additional transportation costs).

The industries supplying local needs have a different motivation for establishing their operations in the island, and therefore must be more market and transportation conscious, prefering market proximity to the added cost of transportation required by locating according to the availability of incentives. The great difference in size between exporting plants and local market plants, make the latter more conscious of competition and therefore must seek security in the closeness to market.

Due to the need of importing most of the raw materials, and the limited local market for durable goods, this group is developing at a slower rate than the non-durable group. The only industries that are somewhat exempt from this problem are the electrical machinery, professional instruments and miscellaneous industries, which produce rather small products and can compete in mainland and foreign markets. The metal products, furniture, etc., find very difficult to export their products, as the cost of transportation plays a very important factor in the total cost of the product. These industries will continue to supply mainly local markets, and their future growth will be determined by the size and location of the local markets.

CHAPTER II
GOALS AND OBJECTIVES OF THE INDUSTRIAL DEVELOPMENT PROGRAM

Since the beginning of the industrial development program the overriding goal was to abolish poverty on the island, and this is still one of the major goals of the program, although great improvements have been made since 1940 [6]. Recently, [7] the governor of the island summarized the goals that his administration will continue to pursue in the coming years, which are:

1. To improve the living standards of the population.
2. The right of every family to own a home.
3. The balance of urban and rural development.
4. Increased proportion of the island's economy on Puerto Rican hands.
5. Abolition of poverty.

The industrial development program plays a very important role in achieving some of these objectives, as it is recognized that in order to raise the living standards, the proportion of the labor force employed in agriculture must decline, while employment in manufacturing and services must increase.

The Puerto Rico Planning Board has made projections of future population for the island, (Table No. 6), and targets have been set for total employment, manufacturing employment, Fomento promoted manufacturing employment and distribution of population by regions. These goals can be seen in Tables 7, 8 and 9.

It must be emphasized that these are not projections, but rather goals which the industrial development program must attempt to accomplish.

The industrial development program also is expected to play a vital role in goal number 4, Increased proportion of the island's economy in Puerto Rican hands. This is expected to be achieved through the increased proportion of locally owned and mixed capital plants. Recently there has been an increase in the efforts to promote locally owned enterprises, and industrial buildings, designed to meet the needs of the smaller local industries are being constructed.

A Marketing Corporation, under PRIDCO, has been established to provide aid to local industries in developing local and export markets. As the whole program is very young, it is very difficult to judge its effectiveness, but its provisions should be carefully considered in the future years.

TABLE NUMBER 6
PUERTO RICO POPULATION DISTRIBUTION GOALS 1975 (000's)

	1930	1940	1950	1960	1975
P. R. (total)	1,544.2	1,869.3	2,210.7	2,349.5	3,218.0
North eastern plain	725.1	903.8	1,140.1	1,281.2	1,900.0
San Juan M. A.	235.4	338.5	508.6	648.0	979.0
South western plain	491.6	592.3	678.1	691.6	965.0
Ponce M. A.	87.6	105.1	126.8	145.6	204.0
Mayaguez M. A.	58.3	76.5	87.3	83.9	113.0
Central Mountain Area	327.5	373.2	392.5	376.7	353.0

Source: P. R. Planning Board

TABLE NUMBER 7
PUERTO RICO EMPLOYMENT GOALS 1975 (000's)

	1950	1955	1960	1975
P. R. (total)	596.0	550.0	551.7	823.0
North eastern plain	n.a.	n.a.	327.8	500.0
San Juan M. A.	n.a.	n.a.	180.0	352.0
South western plain	n.a.	n.a.	152.4	245.0
Ponce M. A.	n.a.	n.a.	33.7	66.0
Mayaguez M. A.	n.a.	n.a.	21.5	53.0
Central Mountain Area	n.a.	n.a.	69.5	78.0

Source: P. R. Planning Board

TABLE NUMBER 8

PUERTO RICO MANUFACTURING EMPLOYMENT GOALS 1975 (000's)

	1950	1955	1960	1975
P. R. (total)	106.0	95.0	94.1	208.0
North eastern plain	n.a.	n.a.	57.6	129.0
San Juan M. A.	n.a.	n.a.	28.4	54.7
South western plain	n.a.	n.a.	28.8	70.0
Ponce M. A.	n.a.	n.a.	7.9	16.6
Mayaguez M. A.	n.a.	n.a.	5.4	15.9
Central Mountain Area	n.a.	n.a.	7.7	9.0

Source: P. R. Planning Board

TABLE NUMBER 9

FOMENTO PROMOTED MANUFACTURING EMPLOYMENT GOALS 1975 (000's)

	1958	1963	1975
P. R. (total)	30.3	66.6	160.0
North eastern plain	21.2 *	43.6 *	98.5
San Juan M. A.	11.2	21.9	43.0
South western plain	7.3 *	18.1 *	54.5
Ponce M. A.	2.5	5.1	13.2
Mayaguez M. A.	1.5	5.4	14.4
Central Mountain Area	1.8 *	4.9 *	7.0

* Approximate figures

Source: P. R. Planning Board

CHAPTER III
FUTURE INDUSTRIAL LOCATION PATTERN

It is expected that as the living conditions in the island improve, the attractiveness of Puerto Rico as a source of cheap labor force will decrease considerably. This will reduce the possibilities of promoting industries such as a textiles, apparel, electrical machinery, etc., which require cheap labor force. Nevertheless Puerto Rico still will have some locational advantages over most of the states of the union due to its tax concessions, and by its location inside the United States economy over foreign countries.

As the gap of labor costs between the mainland and Puerto Rico is reduced, the major consideration for the location of plants supplying mainland markets will be the relationship between added transportation costs and locational incentives. As the industrial incentives are of a fixed nature and last for a definite period of time, these industries must either be certain that their operation is competitive even if they had to pay their full share of taxes, or Puerto Rico will be flooded with industries that will cease operations as soon as the tax concessions expire.

Due to these reasons, it is proposed that those industries that have a greater relation to the island, either as a market, or to gain access to the U. S. market (e.g. tuna canneries and petroleum refining), will be able to benefit more from the industrial incentives and will form a more reliable industrial base for Puerto Rico.

As the program to increase local capital and initiative in the industrial development program of the island gains acceptance, it is to be expected that more import substitution industries will be established, although this will be limited by the size of the local market. If local industry, with the aid of the Marketing Corporation is able to open new markets either in the mainland or in Latin America, the rate of increase of local industries will certainly step up.

It is expected that the apparel, textiles, electrical machinery, professional instruments, and miscellaneous industries will continue to increase their operations in the island, although at a continued reducing rate. These industries will find their locational advantages decreasing as years go by, and this will be reflected in slower rates of increase.

A. 1975 INDUSTRIAL PATTERN FORECAST

Based on the above reasoning, the goals of Fomento promoted manufacturing employment (Table No. 8), and the policies governing the industrial development of Puerto Rico, a distribution of employment by industry group has been estimated. This distribution was guided by the estimates prepared by Adams, Howard and Greeley in their 1962 model [8], although some adjustments were made to take into consideration the most recent

TABLE NUMBER 10
FOMENTO PROMOTED MANUFACTURING EMPLOYMENT
1958-63 AND 1975 ESTIMATES

	1958			1961			1962			1963			1975			1975
	PLANTS	EMPLOYMENT	AVERAGE EMPLOYMENT PER PLANT	PLANTS	EMPLOYMENT	AVERAGE EMPLOYMENT PER PLANT	PLANTS	EMPLOYMENT	AVERAGE EMPLOYMENT PER PLANT	PLANTS	EMPLOYMENT	AVERAGE EMPLOYMENT PER PLANT	PLANTS	EMPLOYMENT	AVERAGE EMPLOYMENT PER PLANT	ADAMS, HOWARD & GREELEY ESTIMATES
TOTAL PUERTO RICO	447	34,883	73	619	50,516	82	796	58,843	74	882	60,574	69	2,250	160,000	67	160,000
NON-DURABLE GOODS	248	23,367	94	N.A.	35,685	N.A.	480	42,364	88	540	44,271	82	1,370	106,000	77	102,000
SIC 20- FOOD PRODUCTS	14	605	43	–	2,345	–	38	2,380	63	51	3,661	72	200	14,000	70	10,700
SIC 21 TOBACCO MANUFACTURES	3	1,435	478	–	2,737	–	12	4,032	336	13	3,864	297	35	8,700	250	9,900
SIC 22 TEXTILE MILLS	42	4,094	97	–	4,695	–	53	4,674	88	58	4,610	80	110	8,800	80	9,300
SIC 23 APPAREL	123	11,917	97	–	17,751	–	227	21,070	93	258	21,690	84	500	40,000	80	46,000
SIC 26-27 PAPER - PRINTING	11	489	44	–	988	–	32	1,087	34	35	1,126	32	100	3,500	35	2,900
SIC 28 CHEMICALS	11	388	35	–	1,030	–	33	1,186	36	34	1,312	39	110	5,500	50	4,100
SIC 29-30 PETROLEUM-RUBBER-PLASTICS	22	2,072	94	–	2,018	–	37	2,551	69	37	2,582	70	115	7,500	65	6,000
SIC 31 LEATHER PRODUCTS	22	2,367	108	–	4,121	–	48	5,384	112	54	5,426	100	200	18,000	90	13,100
DURABLE GOODS	189	11,516	61	N.A.	14,831	N.A.	316	16,479	52	342	16,303	48	880	54,000	61	58,000
SIC 24-25 LUMBER & WOOD PRODUCTS	16	485	30	–	887	–	34	1,308	37	41	1,383	34	125	5,500	44	4,600
SIC 32 STONE, CLAY, GLASS	20	1,881	94	–	2,159	–	39	2,418	62	40	2,219	55	120	6,000	50	5,600
SIC 33-34 METAL PRODUCTS	34	1,024	30	–	1,698	–	66	1,766	27	79	1,939	25	140	7,000	50	5,600
SIC 35-37 MACHINERY	13	259	20	–	349	–	24	438	18	23	470	20	50	2,000	40	1,600
SIC 36 ELECTRICAL MACHINERY	45	3,107	69	–	4,365	–	68	4,346	64	72	4,859	68	240	19,000	79	20,200
SIC 38 PROFESSIONAL INSTRUMENTS	12	1,332	111	–	1,814	–	16	2,076	130	18	2,037	113	85	8,500	100	10,200
SIC 39-19 MISCELLANEOUS PLANTS	49	3,428	70	–	3,559	–	69	4,127	60	69	3,396	49	120	6,000	50	10,200

SOURCE: ECONOMIC DEVELOPMENT ADMINISTRATION OFFICE OF ECONOMIC RESEARCH developments and the establishment of the program to promote local participation in the industrial development of the island.

These estimates, as well as those prepared by Adams, Howard and Greeley are presented in Table No. 10. The number of plants was estimated by projecting the future average employment per plant in each industry group, and dividing the total employment estimated in the group by this figure.

B. FUTURE INDUSTRIAL LOCATION REQUIREMENTS

The requirements that will guide the location of industries in the future are basically the same ones that are guiding the location of industries at present, and may be summarized as follows:

1. Export Industries

This group is characterized by its reliance on the U. S. mainland as a supplier of the raw materials, un-processed or semi-processed, used in the industrial operation, and as a market for the finished products.

In this group there are, and will continue to be, plants that are willing to locate in the most remote areas of the island, but the question arises if they will be willing to pay the additional transportation costs this location requires after the tax concessions expire.

It is certain that in the life span of this plan there will be some plants that will locate according to the total amount of incentives available, but the great majority will locate in those areas which offer the greatest accesibility to ports.

2. Market Oriented Industries

This group includes most of the food products, and the paper, printing, lumber, stone, clay, glass, and metal products.

As this group supplies mainly local markets, its main locational requirement is accesibility to markets. Due to this, it is expected that these industries will locate close to San Juan, Ponce and Mayaguez.

Due to this relationship to markets, it is proposed that this group is the least influenced by locational incentives. This proposition is based in the fact that the majority of these plants are in their infancy, therefore are very small units. Their posibilities of surviving depend greatly on being able to adjust rapidly to changes in the markets, and therefore must be in close contact with it. Location distant from market will tend to reduce this communication linkages, or will require additional personnel, which added to the increased transportation costs, may place the plant out of competition.

In the life span of this plan, it can be assumed that these plants will continue to locate close to the major markets.

3. Raw Material Orientation

This group includes the tobacco manufactures, some of the food products, and the chemicals which use the by products of petroleum refining.

The location of these industries, therefore, will be determined exclusively by the location of the source of raw materials, although as they have to transport their goods to local or mainland markets, major road network location, when possible, is desirable.

4. Access to United States Markets

This group covers those industries which import their raw mater ials from foreign countries, and look at the island as a place which offers some locational advantages in the form of lower wage rates, tax concessions, and accesibility to U. S. markets.

Included in this group we find some of the petroleum refining, some of the food products (e.g. tuna canneries), and any other plant that locates in the island to gain access to mainland markets.

As in the case of the export industries, these plants must base their decision to locate in the island according to the relationship between the source of raw materials, cost of transportation to Puerto Rico, cost of processing, and shipping finished products to the mainland. The only locational advantage the island offers is in the cost of processing, which must be able to compensate for any added transportation cost, although in this instance, the custom dues play a very important factor in the cost of the product, and may influence location in Puerto Rico.

C. FORECAST OF 1975 DISTRIBUTION OF PLANTS

Based on the above location requirements and characteristics, and assuming the continuation of the present policies regarding incentives, tax concessions, and development of the south western plain, a forecast of a 1975 distribution of plants was prepared (See Map No. 28, and Tables No. 11, 12, 13, and 14). It was assumed that the goals set by the Planning Board are attainable, although in many respects they seem to be too generous.

Comparing the expected Fomento promoted employment by regions (Table No. 11) with the Planning Board goals (Table No. 9), we notice that the goals fell short in the South Western Plain, while they were exceeded in the North Eastern Plain and Central Mountain Area. The goals set for the San Juan and Ponce Metropolitan Areas were exceeded (Tables 12 and 13), while they fell short in the Mayaguez Metropolitan Area (Table No. 13).

According to this forecast, the Greater San Juan Area[9] is expected to hold 75,800 Fomento promoted manufacturing employment, or over 47 % of the total employment promoted under the Fomento program. As the San Juan Metropolitan Area is expected to hold over 30% of the

TABLE NUMBER 11
1975 DISTRIBUTION OF INDUSTRIES - BY REGIONS

	TOTAL PUERTO RICO				NORTH EASTERN PLAIN			
	No. of Plants	% of Total	Employ-ment	% of Total	No. of Plants	% of Total	Employ-ment	% of Total
GRAND TOTAL	2,250	100.0	160,000	100.0	1,455	100.0	103,500	100.0
NON DURABLE GOODS	1,370	61.0	106,000	66.4	840	37.3	66,000	41.2
SIC 20 Food Products	200	8.9	14,000	8.8	130	5.8	9,100	5.7
SIC 21 Tobacco Manufactures	35	1.5	8,700	5.4	30	1.3	7,500	4.7
SIC 22 Textile Mills	110	4.9	8,800	5.5	65	2.9	5,200	3.2
SIC 23 Apparel & Rel. Prods.	500	22.2	40,000	25.0	300	13.3	24,000	15.0
SIC 26-27 Paper & Related Prds.	100	4.5	3,500	2.2	70	3.1	2,500	1.6
SIC 28 Chemicals	110	4.9	5,500	3.4	65	2.9	3,250	2.0
SIC 29-30 Petroleum-Plastics	115	5.2	7,500	4.8	70	3.1	4,550	2.8
SIC 31 Leather Products	200	8.9	18,000	11.3	110	4.9	9,900	6.2
DURABLE GOODS	880	39.0	54,000	33.6	615	27.2	37,500	23.4
SIC 24-25 Lumber & Wood	125	5.6	5,500	3.4	85	3.8	3,750	2.3
SIC 32 Stone, Clay & Glass	120	5.3	6,000	3.7	95	4.2	4,750	3.0
SIC 33-34 Metal Products	140	6.2	7,000	4.4	90	4.0	4,500	2.8
SIC 35-37 Machinery	50	2.2	2,000	1.2	35	1.5	1,400	0.9
SIC 36 Electrical Machinery	240	10.6	19,000	11.9	170	7.5	13,400	8.4
SIC 38 Professional Instms.	85	4.8	8,500	5.3	55	2.4	5,500	3.4
SIC 39-19 Miscellaneous Inds.	120	5.3	6,000	3.7	85	3.8	4,200	2.6

TABLE NUMBER 11 (CONT.)
1975 DISTRIBUTION OF INDUSTRIES - BY REGIONS

		SOUTH WESTERN PLAIN				CENTRAL MOUNTAIN AREA			
		No. of Plants	% of Total	Employ-ment	% of Total	No. of Plants	% of Total	Employ-ment	% of Total
GRAND TOTAL		655	29.3	45,000	28.1	140	6.2	11,500	7.3
NON DURABLE GOODS		440	19.6	31,800	19.8	90	4.0	8,200	5.1
SIC 20	Food Products	60	2.7	4,100	2.6	10	0.5	800	0.5
SIC 21	Tobacco Manufactures	-	--	---	--	5	0.2	1,200	0.8
SIC 22	Textile Mills	40	1.8	3,200	2.0	5	0.2	400	0.2
SIC 23	Apparel & Rel Prods.	150	6.7	12,000	7.5	50	2.2	4,000	2.5
SIC 26-27	Paper & Rel. Prods.	30	1.3	1,000	0.6	-	--	---	--
SIC 28	Chemicals	45	2.0	2,250	1.4	-	--	---	--
SIC 29-30	Petroleum-Plastics	45	2.0	2,950	1.8	-	--	---	--
SIC 31	Leather Products	70	3.1	6,300	3.9	20	0.9	1,800	1.1
DURABLE GOODS		215	9.7	13,200	8.3	50	2.2	3,300	2.2
SIC 24-25	Lumber & Wood	35	1.5	1,550	1.0	5	0.2	200	0.1
SIC 32	Stone, Clay & Glass	25	1.2	1,250	0.8	-	--	--	--
SIC 33-34	Metal Products	40	1.8	2,000	1.2	10	0.5	500	0.4
SIC 35-37	Machinery	10	0.5	400	0.2	5	0.2	200	0.1
SIC 36	Electrical Machinery	50	2.2	4,000	2.5	20	0.9	1,600	1.0
SIC 38	Professional Instms.	25	1.2	2,500	1.6	5	0.2	500	0.4
SIC 39-19	Miscellaneous Inds.	30	1.3	1,500	1.0	5	0.2	300	0.2

TABLE NUMBER 12
1975 DISTRIBUTION OF PLANTS AND EMPLOYMENT
NORTH EASTERN PLAIN

	TOTAL		NON-DURABLE		DURABLE	
	Plants	Employ-ment	Plants	Employ-ment	Plants	Employ-ment
TOTAL-REGION	1,455	103,500	840	66,000	615	37,500
Aguas Buenas	18	1,350	12	1,000	6	350
Arecibo	63	3,900	46	3,100	17	800
Barceloneta	18	1,350	10	850	8	500
Caguas	153	12,400	85	8,000	68	4,400
Camuy	6	500	4	350	2	150
Cayey	37	4,700	29	4,200	8	500
Ceiba	8	700	4	350	4	350
Dorado	24	1,900	18	1,500	6	400
Fajardo	24	1,600	8	600	16	1,000
Gurabo	22	2,300	12	1,600	10	700
Hatillo	6	450	4	300	2	150
Humacao	28	2,050	16	1,250	12	800
Juncos	12	1,250	8	850	4	400
Las Piedras	8	650	6	500	2	150
Loiza	62	4,050	30	2,150	32	1,900
Luquillo	21	1,550	12	950	9	600
Manati	16	1,150	12	900	4	250
Naguabo	8	650	6	500	2	150
Quebradillas	5	500	5	500	-	-
Rio Grande	41	2,800	29	2,100	12	700
San Juan M.A.	686	43,700	365	24,750	321	18,950
San Lorenzo	15	1,600	13	1,500	2	100
Toa Alta	42	3,000	28	2,100	14	900
Toa Baja	63	4,300	34	2,600	29	1,700
Vega Alta	27	2,000	19	1,400	8	600
Vega Baja	32	2,300	17	1,450	15	850
Yabucoa	10	800	8	650	2	150

TABLE NUMBER 13
1975 DISTRIBUTION OF PLANTS AND EMPLOYMENT
SOUTH WESTERN PLAIN

	TOTAL		NON-DURABLE		DURABLE	
	Plants	Employ-ment	Plants	Employ-ment	Plants	Employ-ment
TOTAL REGION	655	45,000	440	31,800	215	13,200
Aguada	10	700	6	500	4	200
Aguadilla	20	1,150	6	500	14	650
Anasco	8	500	6	350	2	150
Arroyo	8	650	8	650	-	-
Cabo Rojo	18	1,400	10	900	8	500
Guanica	15	900	12	700	3	200
Guayama	16	1,200	10	700	6	500
Guayanilla	10	600	8	500	2	100
Hormigueros	6	500	4	300	2	200
Isabela	6	450	4	300	2	150
Juana Diaz	28	1,900	10	900	8	1,000
Lajas	6	500	6	500	-	--
Maunabo	2	150	2	150	-	--
Mayaguez M.A.	148	10,600	98	7,000	50	3,600
Moca	8	650	6	500	2	150
Patillas	6	400	4	300	2	100
Penuelas	34	2,100	32	2,000	2	100
Ponce M.A.	220	14,400	142	10,000	78	4,400
Rincon	2	150	2	150	-	--
Sabana Grande	10	800	10	800	-	--
Salinas	19	1,550	14	1,200	5	350
San German	23	1,700	20	1,600	3	100
Santa Isabel	10	450	8	300	2	150
Yauco	22	1,600	12	1,000	10	600

TABLE NUMBER 14
1975 DISTRIBUTION OF PLANTS AND EMPLOYMENT
CENTRAL MOUNTAIN AREA

	TOTAL		NON-DURABLE		DURABLE	
	Plants	Employ-ment	Plants	Employ-ment	Plants	Employ-ment
TOTAL REGION	140	11,500	90	8,200	50	3,300
Adjuntas	6	500	6	500	-	--
Aibonito	16	1,500	10	1,150	6	350
Barranquitas	5	400	2	200	3	200
Ciales	11	1,050	4	600	7	450
Cidra	8	650	6	500	2	150
Coamo	15	1,200	7	650	8	550
Comerio	11	950	5	600	6	350
Corozal	8	570	6	400	2	170
Jayuya	8	600	4	300	4	300
Lares	5	380	4	300	1	80
Las Marias	2	150	-	--	2	150
Maricao	2	150	-	--	2	150
Morovis	7	600	7	600	-	--
Naranjito	8	580	6	500	2	80
Orocovis	6	500	6	500	-	--
San Sebastian	5	450	3	300	2	150
Utuado	5	370	4	300	1	70
Villalba	6	400	4	300	2	100
Culebra	2	200	2	200	-	--
Vieques	4	300	4	300	-	--

total population of the island, it is safe to assume that this concentration of employment in the area will contribute to attract to the fringes another 20% of the population of the island, so that the Greater San Juan Area will in 1975, account for around 50% of the population of the island.

This concentration of population around the San Juan Metropolitan Area will certainly increase the activities in the construction and service industries, and will mean an increase of the area's share of the total employment in the island, and will help to maintain San Juan as the major focus of attraction for population, business, industry, etc., thus impairing the attainment of the Planning Board Goals regarding the distribution of population and employment.

The development of the South Western Plain will be impaired by the great attraction of San Juan, and by the fact that the Ponce and Mayaguez Metropolitan Areas will still compete with the Greater San Juan Area for additional industries in a very disadvantageous position. The revision of the Industrial Incentives Act, although granting additional incentives to Ponce and Mayaguez over San Juan, still is very favorable to location near the San Juan Area, as the neighboring towns are also eligible for the additional tax concessions. The result of this revision is that the industries which seek proximity to market, or location near a major city, will locate in the fringes of San Juan, at a very short distance from it, and still enjoying the additional tax concessions granted.

By granting additional tax concessions to the fringes of San Juan, the urban growth of the Metropolitan Area is encouraged, with the accompanying problems of services, transportation, housing shortages, etc. This urban expansion clearly is working against the goals and objectives outlined by the governor in his message to the Legislature.

On the other hand, the South Western Plain and Central Mountain Area exhibit great reliance on the textiles, apparel, leather products, and electrical machinery industry groups. As these industries use the island as a processing center, importing unfinished products, and exporting the finished product, they are very sensitive to changes in labor and transportation costs. With the expected increase in living conditions in the island, it is evident that there will be increases in labor costs, and possibly in the transportation costs. Up to what point in time the island will offer an advantageous location for these industries is not known, but it places an uncertainty in the attainment of the goals and objectives for these two regions. As these industries do not induce additional development, unforseen changes in labor and transportation costs may reduce the possibility of promoting the expected number of plants, or may force the existing ones to cease operations, thus destroying the economy of these two regions, that depend so much in this type of industries.

CHAPTER IV

ALTERNATE INDUSTRIAL LOCATION POLICY

An alternate policy for industrial location will be formulated, which will try to accomplish the following goals and objectives formulated by the governor of Puerto Rico:

1. Improve the living standards of the population.
2. Balance of urban and rural development.
3. Increased proportion of the island's economy in Puerto Rican hands.

The following programs are proposed to achieve the above goals and objectives.

1. Promote and encourage the recreation-vacation-forestry use of the Central Mountain Area, as a mean of improving living and economic conditions in this area and provide for the leisure requirements of the island population.
2. Promote and encourage the rapid industrial development of Ponce and Mayaguez, in order to attract population to these areas, therefore decreasing the existing population pressures on San Juan, and creating additional concentrated markets which will encourage the development of market oriented industries which are primarily locally owned.
3. Encourage controlled migration from the Central Mountain area to the South Western plain.

Due to the great disbalance in economic and living conditions between the three regions, and specially between the San Juan

Metropolitan Area and some of the towns in the Central Mountain Area, the industrial location policies followed by the government are based on improving and equalizing the economic and living conditions of the whole population of the island. It is thought that the promotion of some manufacturing plants in every "municipio", regardless of size or location, will achieve this goal. Due to this, great efforts are placed on the promotion of plants that will locate in the "industrially deppressed areas", which usually are areas ill suited to support industry due to their geographical and topographical conditions, as well as their limited population.

The problems that this type of policy creates is that while great efforts are placed in developing areas clearly ill suited for supporting industry, those areas which have the greatest opportunities of developing and balancing the urban development of San Juan are neglected.

The cost of providing manufacturing employment in the Central Mountain Area is much higher than in the rest of the island, as they involve longer tax concessions, aid grants, increased construction costs, and usually special industrial buildings, which alltogether place a high cost tag on each employment opportunity created, while the social benefits provided are reduced by the fact that these plants do not induce any further development, as they usually are only a processing operation that besides employing local people, have no other relationship to the community.

Up to present, the plants that have established in the Central Mountain Area primarily employ females. This creates social problems in the community, as due to the lack of suitable male employment, the male labor force has to rely on low wage, seasonal agricultural employment, which at present do not have capacity for employing the existing labor force. This increases the needs for male migration, as men are forced either to migrate, or depend on women for support, a situation which clearly affects male vanity and is a focus of family problems.

Thus, the provision of manufacturing employment in the least developed areas of the island is faced with high costs, reduced social benefits, and social and psychological problems which increase the needs for migration.

If the living and economic conditions in the Central Mountain Area are to be improved, it is necessary that the population be reduced and that programs that provide male employment be initiated. It has to be realized that this region is not, and will not be able to support its present population, and therefore migration to other areas will continue until the population reaches a level in which the resources of the region may support. It is evident that manufacturing employment alone is not the answer to the problem, and that other sources of employment and economic activity must be developed.

In order to provide additional male employment in this region, programs such as soil conservation, forestry, creation of recreation and vacation areas in lakes and wooded areas, etc. must be initiated. This will reduce unemployment, and at the same time will set the foundations for a future recreation, vacation and forestry use of this region. The present recreation and vacation facilities for the local population are very limited, and the provision of such facilities in this region will induce travel to it and provide additional economic activity.

As the living conditions improve, and working hours are reduced, it is evident that the need for recreation and leisure activities will increase greatly, and this region, due to its cooler climate and abundance of lakes and forests, is well suited to supply a major portion of the present and future local vacation and recreation needs.

These programs, coupled with a reduced population, will certainly improve to a greater extent the living and economic conditions in this area, than just the sole provision of some manufacturing plants.

The problems present in the North Eastern and South Western plains are completely different from those experienced in the Central Mountain Area. The North Eastern plain, and specially the San Juan Metropolitan Area, hold a disproportionate share of the population and economic activity of the island. The South Western plain generally is loosing population, and is lagging in economic activity.

As the Central Mountain Area population is expected to decrease, the plains will have to support this additional population, as well as their own natural increase. In order to balance this urban development of Puerto Rico, and to control the urban growth of San Juan, it is necessary to develop Ponce and Mayaguez into large urban areas that will compete with San Juan for econimic activity and population. It is believed that these two metropolitan areas are the only areas in Puerto Rico which, due to their size, population, and geographical location, are best suited for rapid growth and able to balance the urban development of the island.

The actual policies of dispersing industry around the island have contributed to reduce the possibilities of creating additional strong urban centers which may compete with San Juan. In order to develop Ponce and Mayaguez rapidly, it is required that the employment opportunities increase rapidly, so as to stimulate further economic activity and attract population. As there is a large group of industries which are highly influenced by industrial incentives, their proper use may be the factor required for the rapid industrial development of these two areas, as a pre-requisite of urban growth.

As urban growth requires the provision of housing, business, schools, roads, etc., it means great activity is the construction and service industries. These activities will provide the bulk of employment, specially male, and will develop the required infrastructure for continued urban growth.

As there is a great disbalance between Ponce and Mayaguez and the San Juan Metropolitan Area in industrial location factors, as well as in education, entertainment, social life, shopping facilities, etc., it is necessary that these disadvantages be compensated if a large number of industries is to be attracted in a short time.

In order to achieve this, it is proposed that the tax exemption in Ponce and Mayaguez be increased to 17 years, while the exemption in the San Juan fringes and adjacent towns be reduced to 10 years (See Map No. 29). It is expected that these additional attractives will induce the location of a large number of plants in these two areas and as employment opportunities increase, population is attracted.

Based on the above expressed objectives, programs and incentive policies, desirable population and employment goals have been formulated (Tables Number 15, 16, 17 and 18). Map Number 30 shows the 1975 Proposed Distribution of Fomento Promoted Plants, while Table Number 19 shows its tabulation by geographical regions.

TABLE NUMBER 15
1975 PROPOSED POPULATION DISTRIBUTION GOALS (000's)

	1960	1975
Puerto Rico Total	2,349.5	3,218.0
North Eastern Plain	1,281.2	1,800.0
San Juan Metropolitan Area	648.0	940.0
South Western Plain	691.6	1,080.0
Ponce Metropolitan Area	145.6	250.0
Mayaguez Metropolitan Area	83.9	150.0
Central Mountain Area	376.7	338.0

TABLE NUMBER 16
1975 PROPOSED EMPLOYMENT GOALS (000's)

	1960	1975
Puerto Rico Total	551.7	823.0
North Eastern Plain	327.8	450.0
San Juan Metropolitan Area	180.0	320.0
South Western Plain	152.4	300.0
Ponce Metropolitan Area	33.7	90.0
Mayaguez Metropolitan Area	21.5	70.0
Central Mountain Area	69.5	73.0

TABLE NUMBER 17
1975 PROPOSED MANUFACTURING EMPLOYMENT GOALS (000's)

	1960	1975
Puerto Rico Total	94.1	208.0
North Eastern Plain	57.6	110.0
San Juan Metropolitan Area	28.4	45.0
North Western Plain	28.8	90.0
Ponce Metropolitan Area	7.9	25.0
Mayaguez Metropolitan Area	5.4	22.0
Central Mountain Area	7.7	8.0

TABLE NUMBER 18
1975 PROPOSED FOMENTO PROMOTED MANUFACTURING EMPLOYMENT GOALS (000's)

	1963	1975
Puerto Rico Total	66.6	160.0
North Eastern Plain	43.6 *	90.0
San Juan Metropolitan Area	21.9	38.0
South Western Plain	18.1 *	64.0
Ponce Metropolitan Area	5.1	18.0
Mayaguez Metropolitan Area	5.4	18.0
Central Mountain Area	4.9 *	6.0

* Approximate figures.

TABLE NUMBER 19

PROPOSED 1975 DISTRIBUTION OF PLANTS AND EMPLOYMENT
BY REGIONS

		TOTAL PUERTO RICO				NORTH EASTERN PLAIN			
		No. of Plants	% of Total	Employ-ment	% of Total	No. of Plants	% of Total	Employ-ment	% of Total
GRAND TOTAL		2,250	100.0	160,000	100.0	1,245	55.0	90,000	56.5
NON-DURABLE GOODS		1,370	61.0	106,000	66.4	745	33.0	60,000	37.5
SIC 20	Food Products	200	8.9	14,000	8.8	115	5.1	8,000	5.0
SIC 21	Tobacco Manufactures	35	1.5	8,700	5.4	30	1.3	7,500	4.7
SIC 22	Textile Mills	110	4.9	8,800	5.5	40	1.8	4,500	2.8
SIC 23	Apparel & Rel. Prods.	500	22.2	40,000	25.0	260	11.6	21,000	13.1
SIC 26-27	Paper & Rel. Prods.	100	4.4	3,500	2.2	70	3.1	2,500	1.6
SIC 28	Chemicals	110	4.9	5,500	3.5	60	2.7	3,000	1.9
SIC 29-30	Petroleum-Plastics	115	5.2	7,500	4.7	60	2.7	4,000	2.5
SIC 31	Leather Products	200	8.9	18,000	11.3	110	4.9	9,500	5.9
DURABLE GOODS		880	39.0	54,000	33.6	500	22.0	30,000	19.0
SIC 24-25	Lumber & Wood	125	5.5	5,500	3.5	77	3.4	3,400	2.2
SIC 32	Stone, Clay & Glass	120	5.3	6,000	3.7	80	3.5	4,000	2.5
SIC 33-34	Metal Products	140	6.2	7,000	4.4	83	3.6	4,100	2.6
SIC 35-37	Machinery	50	2.2	2,000	1.2	30	1.3	1,200	0.8
SIC 36	Electrical Machinery	240	10.7	19,000	11.8	110	4.9	9,000	5.6
SIC 38	Professional Instms.	85	3.8	8,500	5.3	45	2.0	4,500	2.8
SIC 39-19	Miscellaneous Inds.	120	5.3	6,000	3.7	75	3.3	3,800	2.5

TABLE NUMBER 19 (CONT.)

PROPOSED 1975 DISTRIBUTION OF PLANTS AND EMPLOYMENT
BY REGIONS

		SOUTH WESTERN PLAIN				CENTRAL MOUNTAIN AREA			
		No. of Plants	% of Total	Employ-ment	% of Total	No. of Plants	% of Total	Employ-ment	% of Total
GRAND TOTAL		935	41.5	64,000	39.8	70	3.5	6,000	3.7
NON-DURABLE GOODS		585	26.0	41,800	26.0	40	2.0	4,200	2.5
SIC 20	Food Products	75	3.3	5,200	3.2	10	0.5	800	0.5
SIC 21	Tobacco Manufactures	-	-	--	-	5	0.2	1,200	0.7
SIC 22	Textile Mills	65	2.9	3,900	2.4	5	0.2	400	0.2
SIC 23	Apparel & Rel. Prods.	230	10.3	18,200	11.3	10	0.5	800	0.5
SIC 26-27	Paper & Rel. Prods.	30	1.3	1,000	0.6	-	-	--	-
SIC 28	Chemicals	50	2.2	2,500	1.6	-	-	--	-
SIC 29-30	Petroleum-Plastics	55	2.5	3,500	2.2	-	-	--	-
SIC 31	Leather Products	80	3.5	7,500	4.7	10	0.5	1,000	0.6
DURABLE GOODS		350	15.5	22,200	13.8	30	1.5	1,800	1.2
SIC 24-25	Lumber & Wood	45	2.0	2,000	1.2	3	0.1	100	0.1
SIC 32	Stone, Caly & Glass	40	1.8	2,000	1.2	-	-	--	-
SIC 33-34	Metal Products	50	2.2	2,500	1.6	7	0.3	400	0.2
SIC 35-37	Machinery	15	0.7	700	0.5	5	0.2	100	0.1
SIC 36	Electrical Machinery	125	5.5	9,500	5.9	5	0.2	500	0.3
SIC 38	Professional Instms.	35	1.5	3,500	2.2	5	0.2	500	0.3
SIC 39-19	Miscellaneous Inds.	40	1.8	2,000	1.2	5	0.2	200	0.1

Note: Percentages ocasionally do not add to total due to rounding.

The existing planning controls, coupled with the power of the Land Administration to acquire reserve land in advance, will allow to plan and develop the South Western Plain in a rational way, so as to insure the best living conditions for the population.

Information on employment opportunities in Ponce and Mayaguez should be disseminated in the Central Mountain Area, so as to encourage migration to these areas instead of San Juan. This should be done in such a way as to prevent large scale migrations which would lead to social and squatter problems. The use of programs such as core housing, minimum facilities subdivisions and the selling of prefabricated frame houses, which would be cheap and easily built, would help to alleviate the housing problems in these areas, and at the same time allow their inhabitants to improve them according to their own needs and resources.

As there will be a great development of construction and service industries, there should be programs to induce local capital participation in these industries. The establishment of an aid program to locally owned service industries should be carefully considered in order to avoid great concentration of mainland capital in these activities.

In the case of existing locally-owned service industries, they should be encouraged to expand and modernize in order to supply the increased market. This will require primarilly financial and marketing aid.

Studies should be made regarding the possibility of transferring some of the government agencies now located in San Juan to Ponce and

Mayaguez, so as to reduce the importance of San Juan, create a new outlook for these two areas, and help in the creation of an infrastructure capable of promoting further development.

NOTES

(1) Puerto Rico Industrial Development Program 1942-60, H.C. Barton Center for International Affairs Harvard University, Oct. 1959

(2) See definition of terms, page number vii.

(3) See Map Number 1, PRIDCO Industrial Building Rental Rates Zones.

(4) See definition of terms.

(5) Basically the same "municipios" receiving additional tax concessions in 1958.

(6) In 1940, the per capita income was roughly $ 125, while in 1963 it had risen to about $ 800.

(7) Governor Munoz message to the Legislature, February 1964.

(8) A Regional Model for Programming Industrial Development in Puerto Rico, Adams, Howard and Greeley, Cambridge, Mass. June, 1962 pp. 18.

(9) Comprising the following "municipios" - San Juan, Caguas, Loiza, Toa Altá, Toa Baja, Dorado, Rio Grande, Gurabo, and Aguas Buenas.

MAPS

Map Number 1 PRIDCO Industrial Buildings Rental Rates Zones

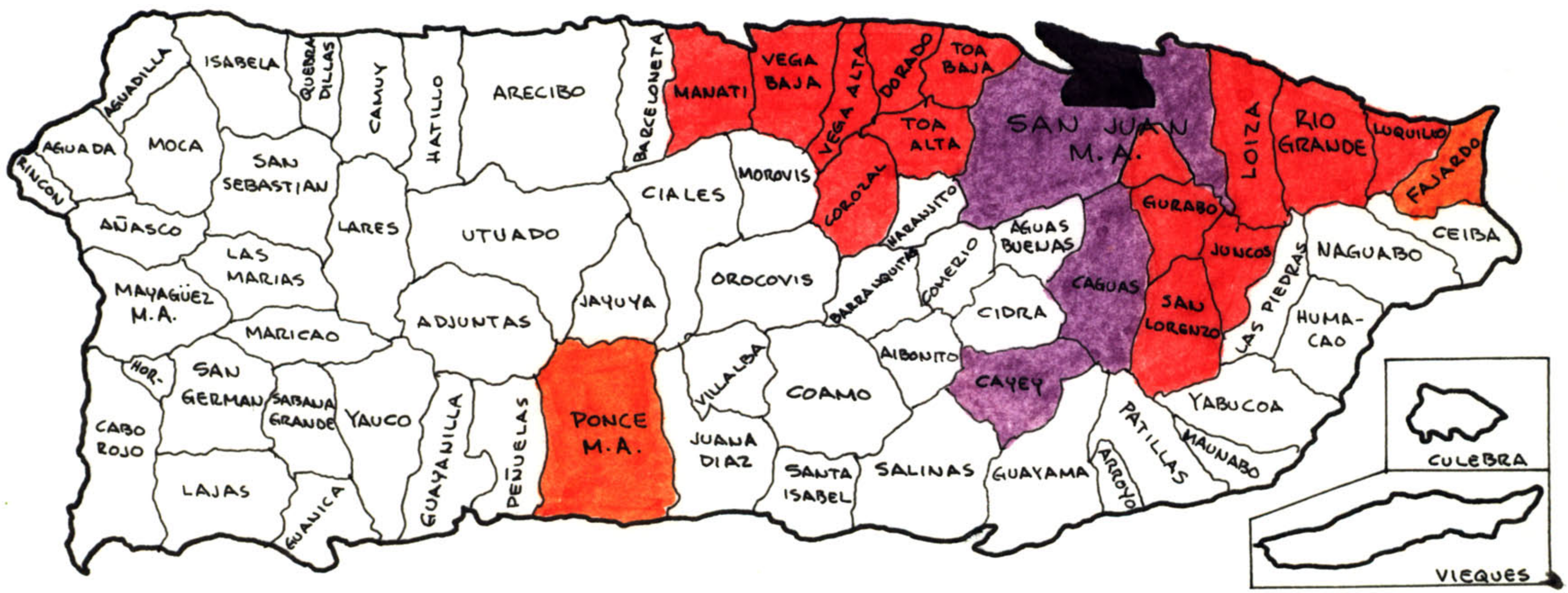
Zone 1 $ 0.85 per sq. ft.

Zone 2 0.75 per sq. ft.

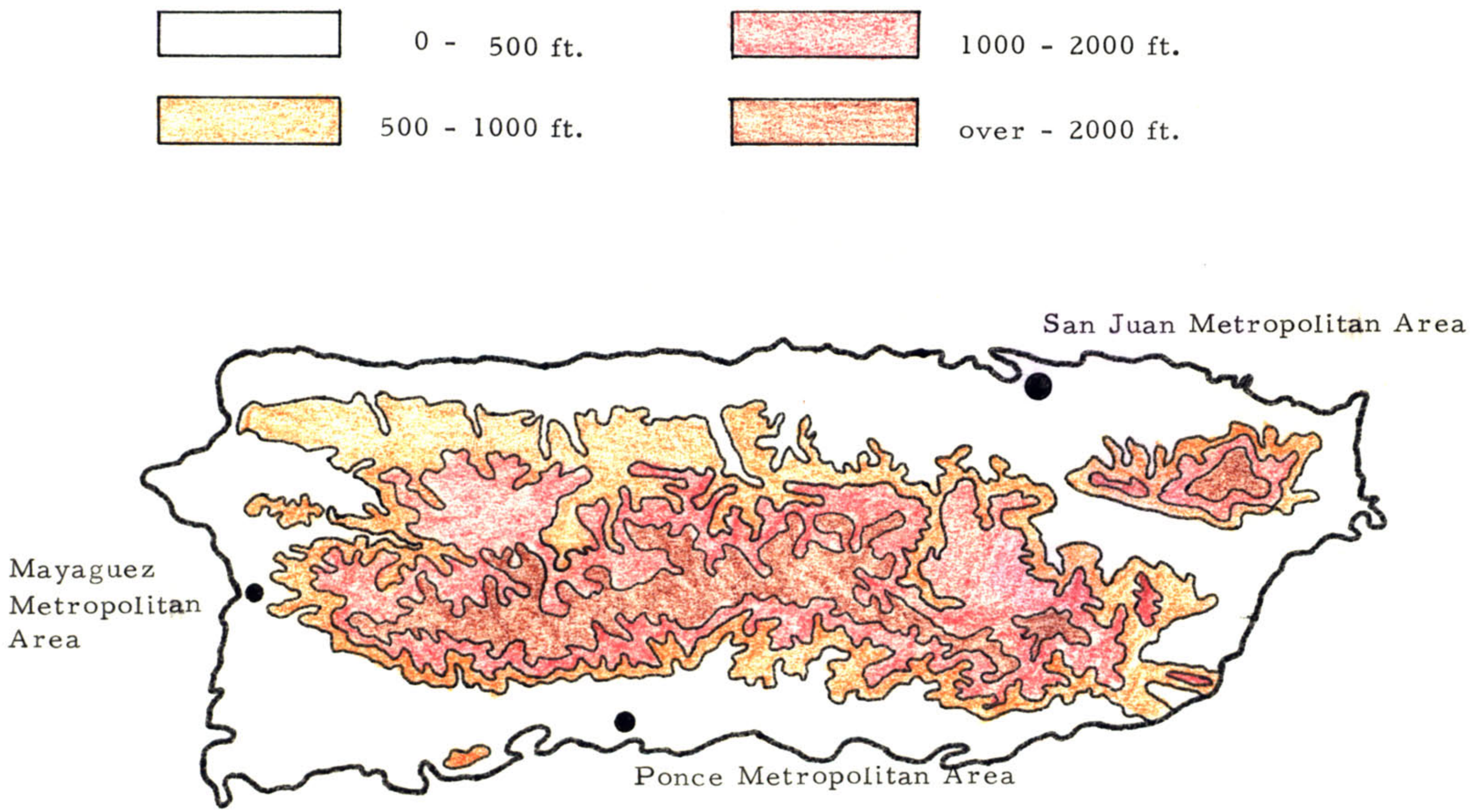
Zone 3 0.70 per sq. ft.

Zone 4 $ 0.60 per sq. ft.

Zone 5 0.50 per sq. ft.



Map Number 2 - Topographic Map of Puerto Rico

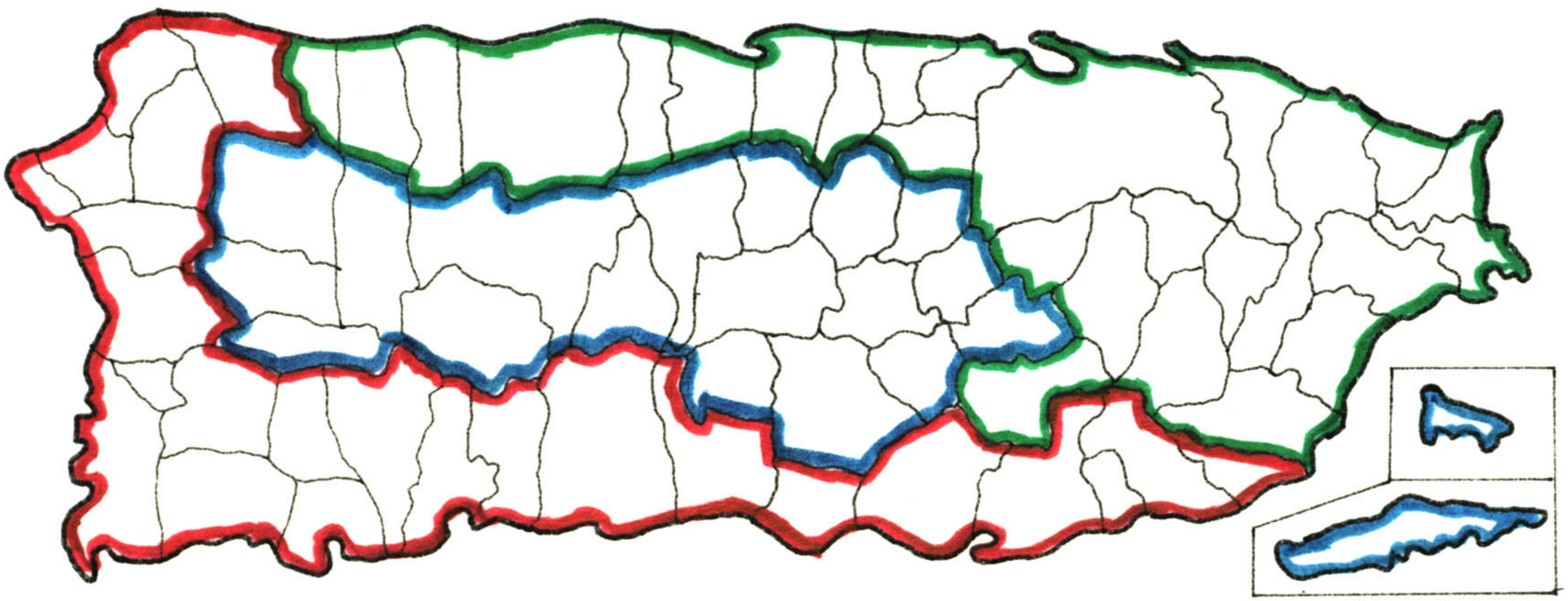


Map Number 3 - Topographical Regions

North Eastern Plain

South Western Plain

Central Mountain Area

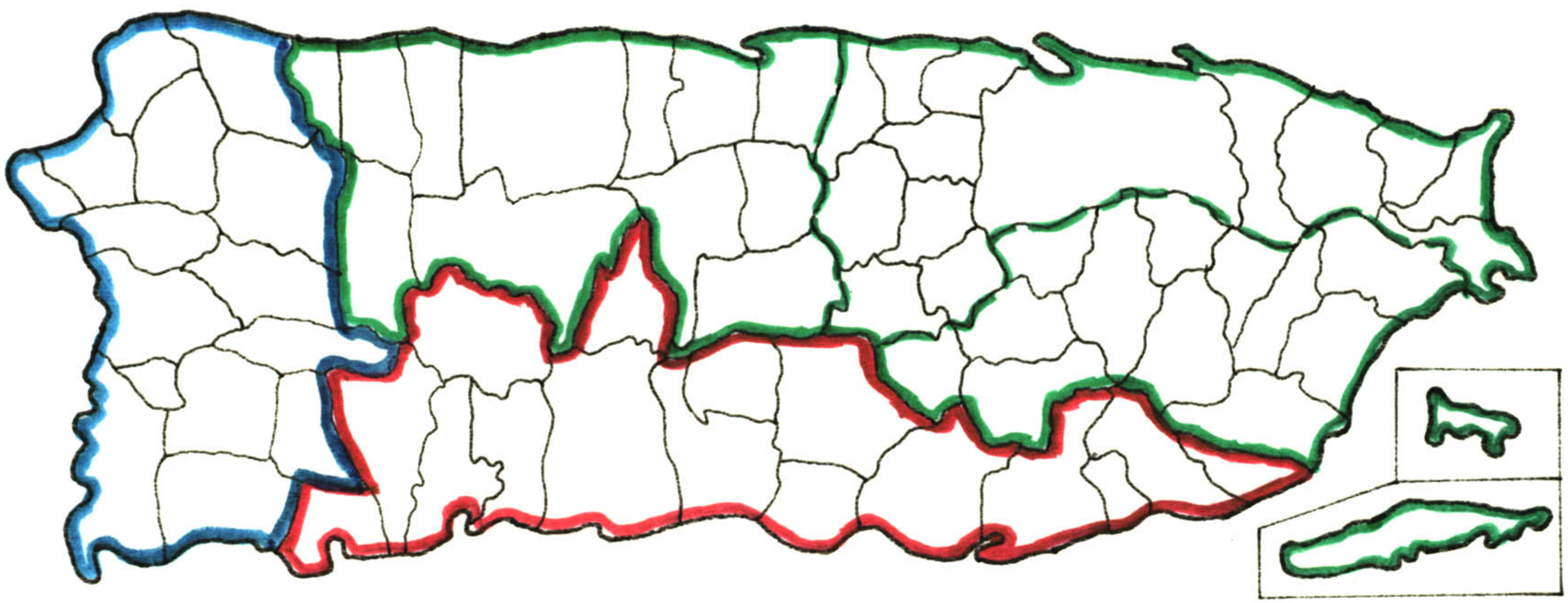


Map Number 4 - Regions as Puerto Rico Planning Board

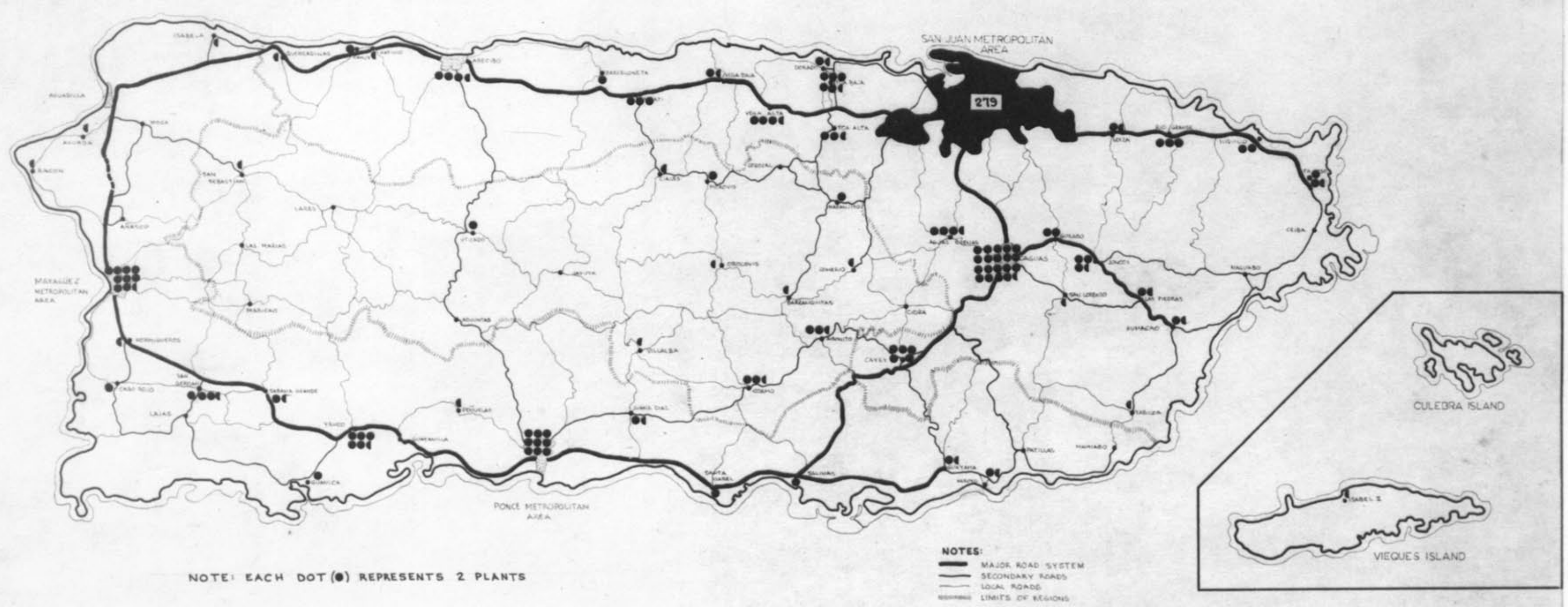
San Juan Region

Ponce Region

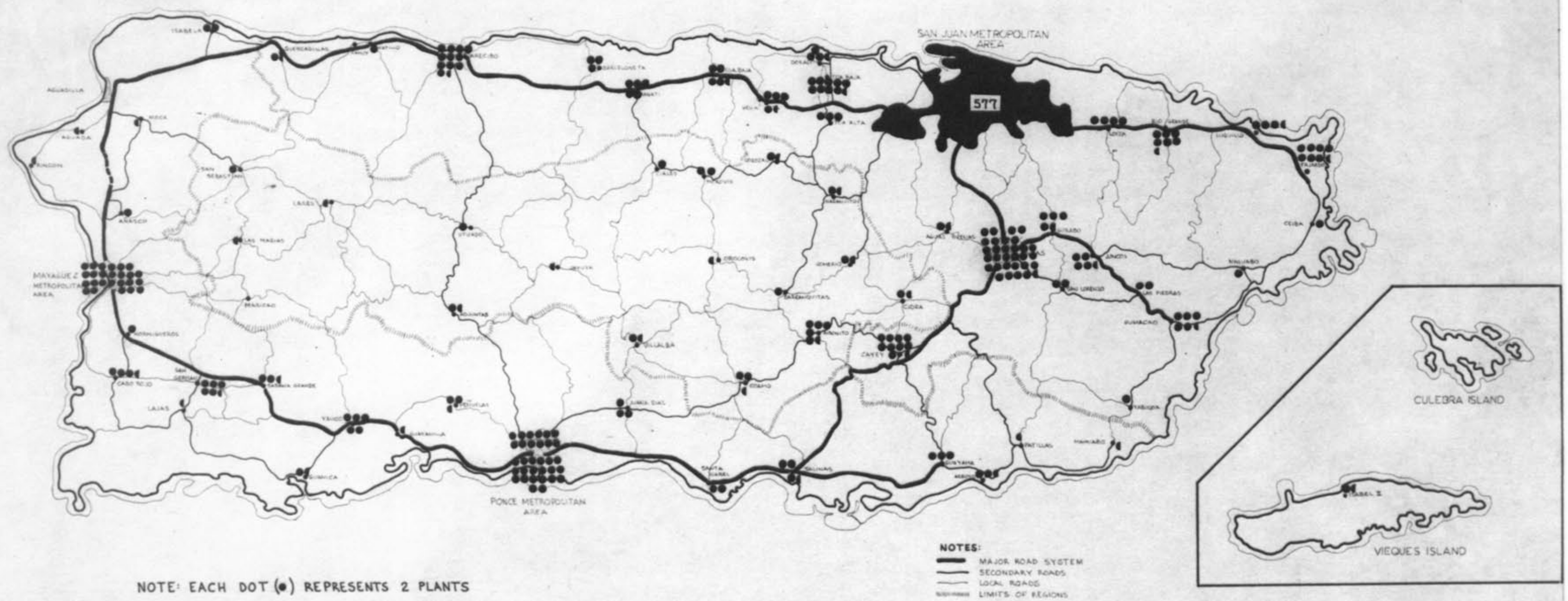
Mayaguez Region



MAP NO.5 - LOCATION OF PLANTS 1958



MAP NO.6 - LOCATION OF PLANTS 1963



NOTE: EACH DOT (●) REPRESENTS 2 PLANTS

MAP NUMBER 7 - LOCATION OF SIC 19 PLANTS - ORDNANCE AND ACCESSORIES

INDUSTRIES OPERATING ON JUNE 30, 1963, which

STARTED OPERATIONS AFTER JUNE 30, 1958

STARTED OPERATIONS PRIOR TO JUNE 30, 1958

INDUSTRIES OPERATING ON JUNE 30, 1958, which

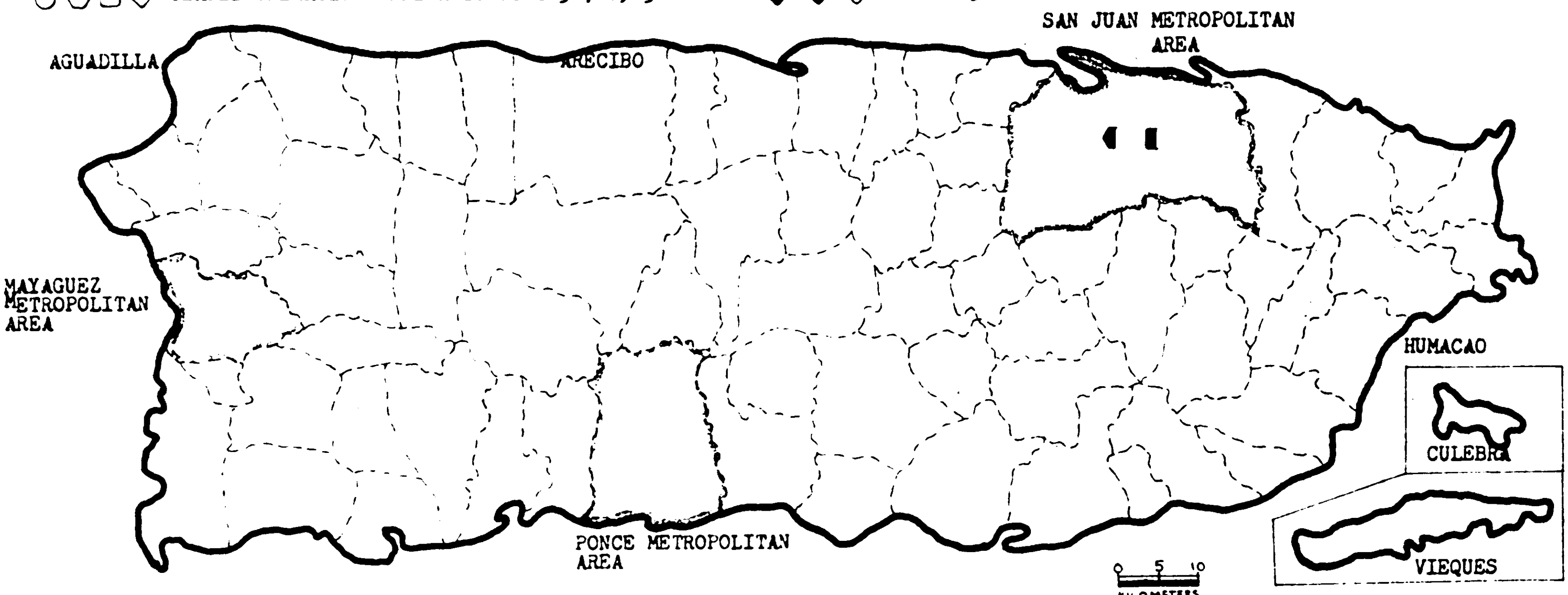
CEASED OPERATIONS PRIOR TO JUNE 30, 1963

0- 49 EMPLOYEES

50- 99 EMPLOYEES

100- 249 EMPLOYEES

OVER 250 EMPLOYEES



Note: Each full symbol represents 2 plants,

MAP NUMBER 8 - LOCATION OF SIC 20 PLANTS - FOOD AND FOOD PRODUCTS

INDUSTRIES OPERATING ON JUNE 30, 1963, which

STARTED OPERATIONS AFTER JUNE 30, 1958

STARTED OPERATIONS PRIOR TO JUNE 30, 1958

INDUSTRIES OPERATING ON JUNE 30, 1958, which

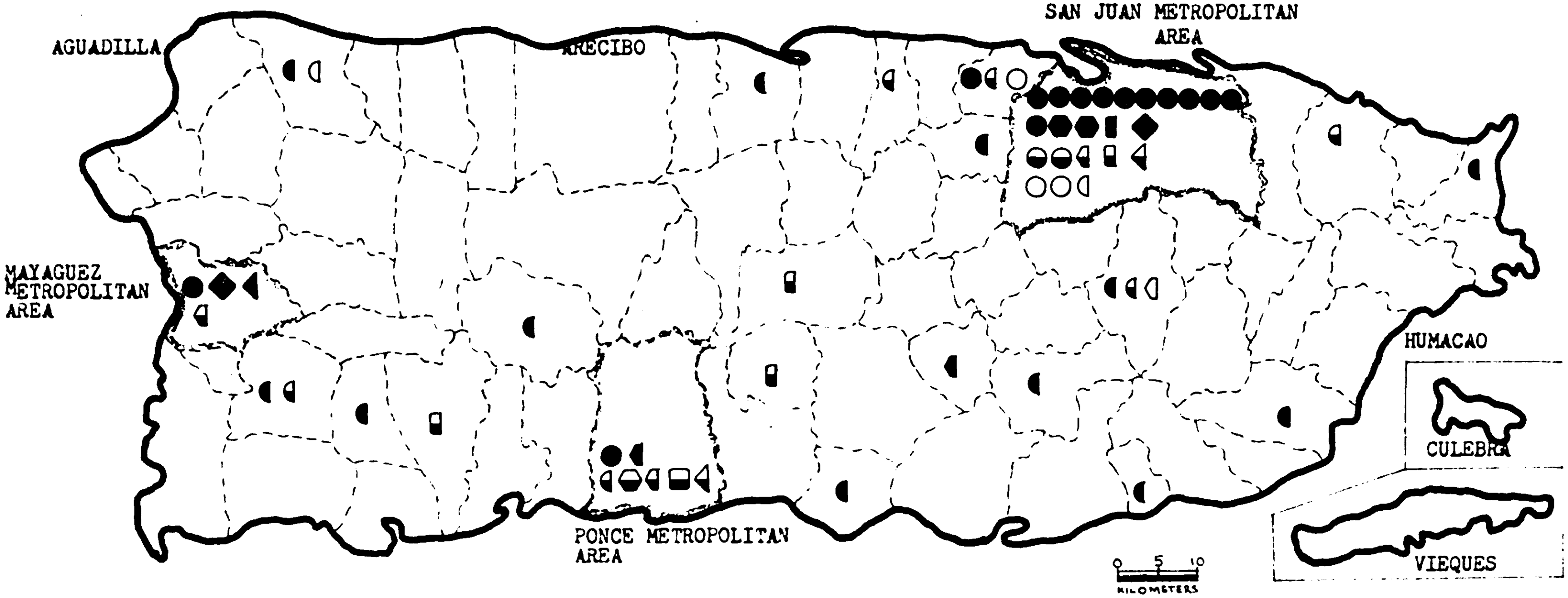
CEASED OPERATIONS PRIOR TO JUNE 30, 1963

0- 49 EMPLOYEES

50- 99 EMPLOYEES

100- 249 EMPLOYEES

OVER 250 EMPLOYEES



Note: Each full symbol (● ⬢ ■ ◆) represents 2 plants.

MAP NUMBER 9 - LOCATION OF SIC 21 PLANTS - TOBACCO MANUFACTURES

INDUSTRIES OPERATING ON JUNE 30, 1963, which

STARTED OPERATIONS AFTER JUNE 30, 1958

STARTED OPERATIONS PRIOR TO JUNE 30, 1958

INDUSTRIES OPERATING ON JUNE 30, 1958, which

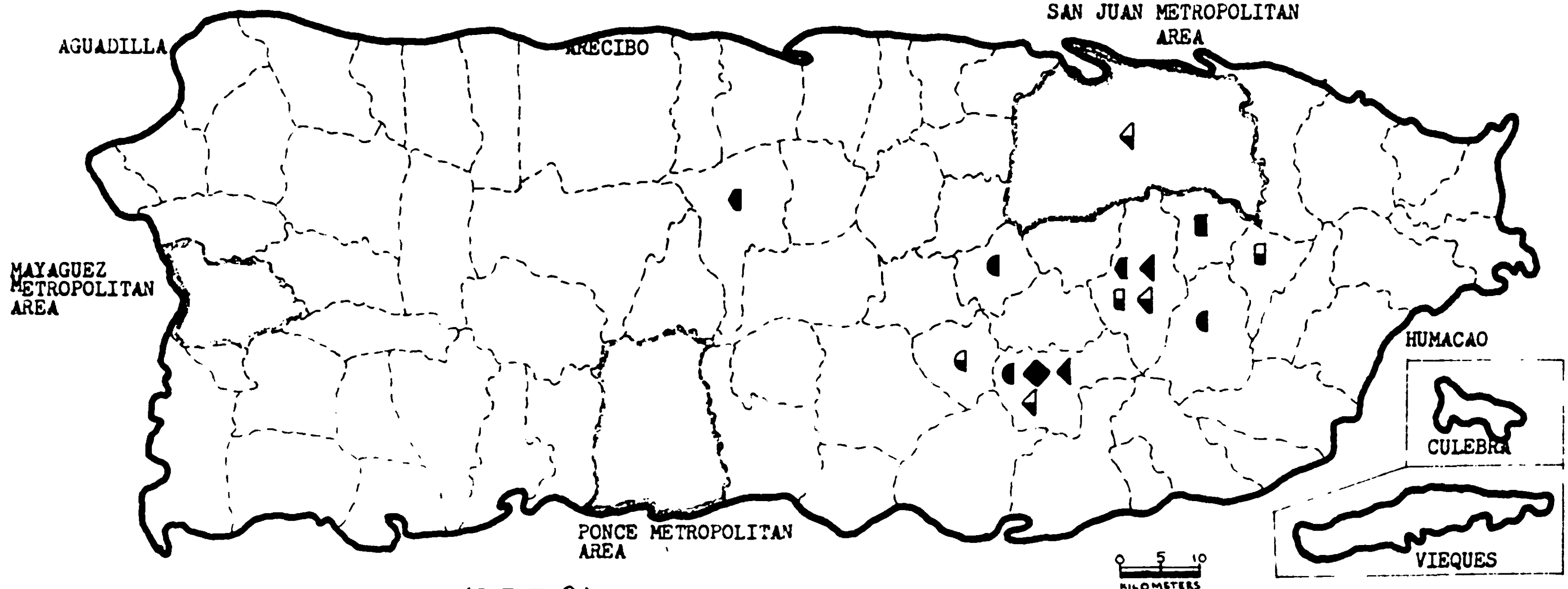
CEASED OPERATIONS PRIOR TO JUNE 30, 1963

0- 49 EMPLOYEES

50- 99 EMPLOYEES

100- 249 EMPLOYEES

OVER 250 EMPLOYEES



Note: Each full symbol ( ) represents 2 plants.

MAP NUMBER 10 - LOCATION OF SIC 22 PLANTS - TEXTILE MILL PRODUCTS

INDUSTRIES OPERATING ON JUNE 30, 1963, which

STARTED OPERATIONS AFTER JUNE 30, 1958

STARTED OPERATIONS PRIOR TO JUNE 30, 1958

INDUSTRIES OPERATING ON JUNE 30, 1958, which

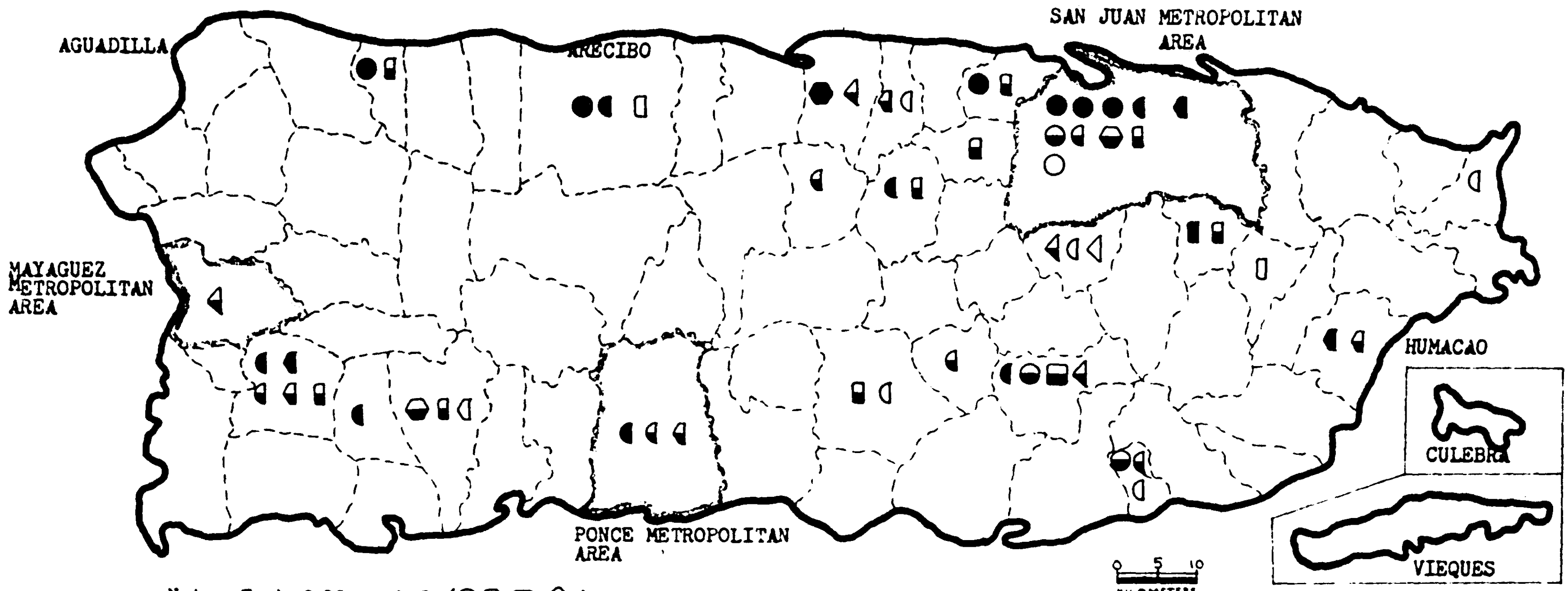
CEASED OPERATIONS PRIOR TO JUNE 30, 1963

0- 49 EMPLOYEES

50- 99 EMPLOYEES

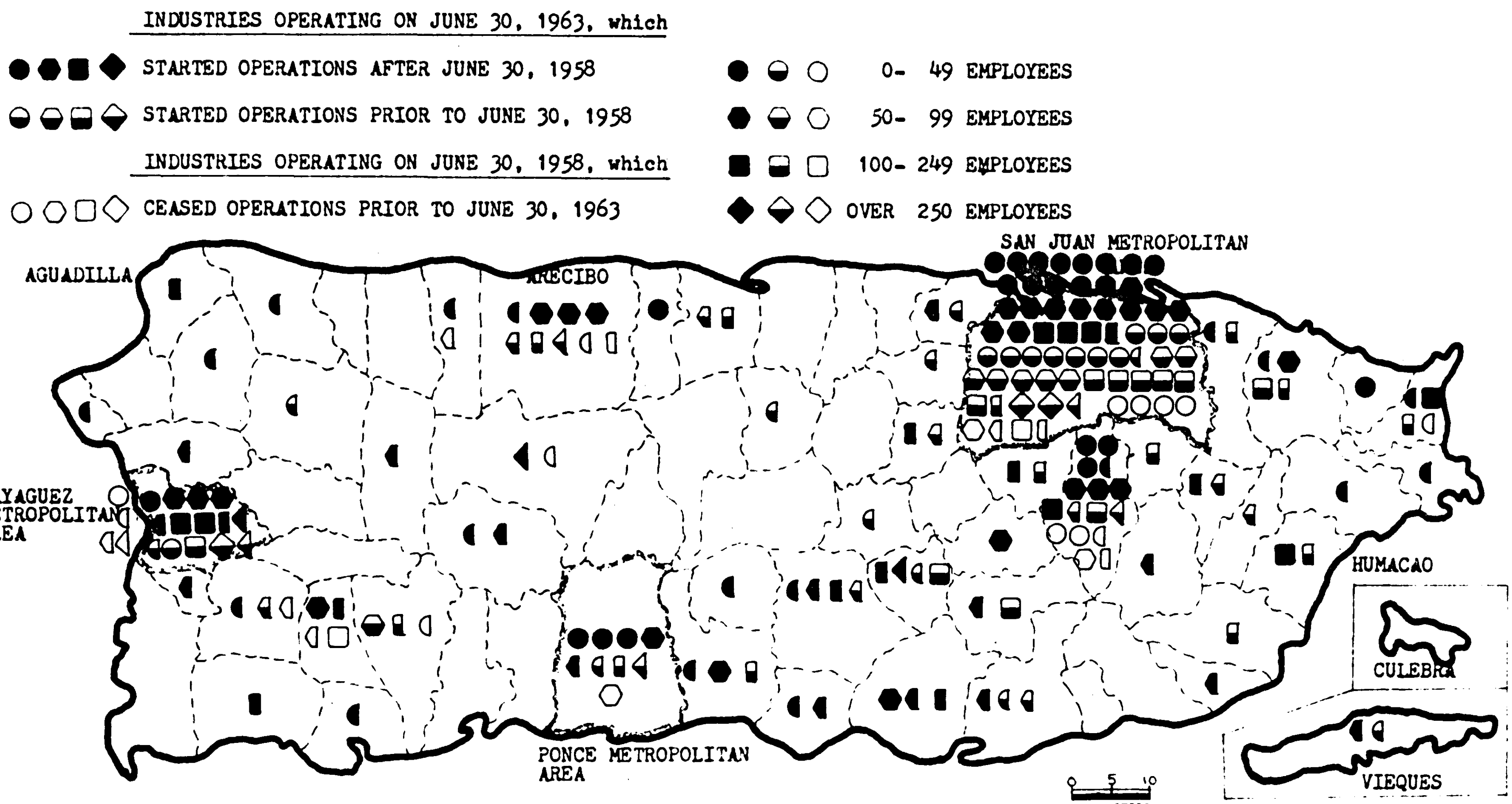
100- 249 EMPLOYEES

OVER 250 EMPLOYEES



Note: Each full symbol ( ) represents 2 plants.

MAP NUMBER 11 - LOCATION OF SIC 23 PLANTS - APPAREL & RELATED PRODUCTS



Note: Each full symbol (○⬡□◇) represents 2 plants.

MAP NUMBER 12 - LOCATION OF SIC 24 PLANTS - LUMBER AND WOOD PRODUCTS

INDUSTRIES OPERATING ON JUNE 30, 1963, which

STARTED OPERATIONS AFTER JUNE 30, 1958

STARTED OPERATIONS PRIOR TO JUNE 30, 1958

INDUSTRIES OPERATING ON JUNE 30, 1958, which

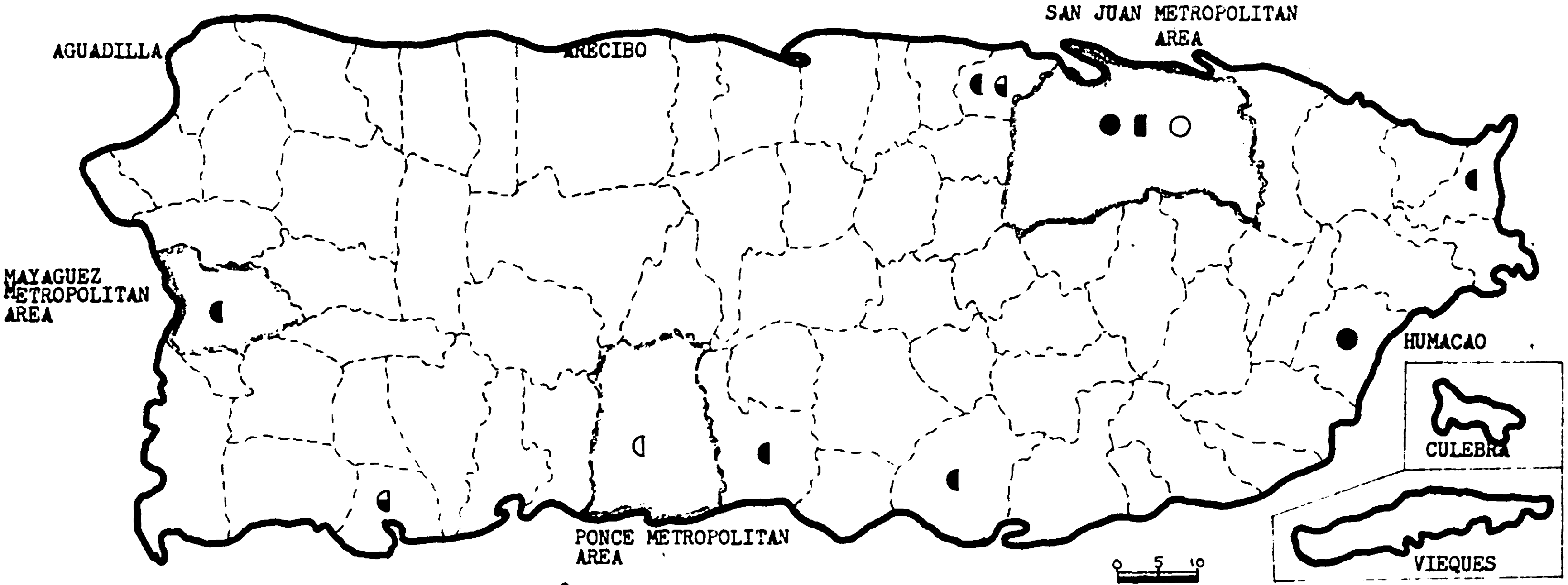
CEASED OPERATIONS PRIOR TO JUNE 30, 1963

0- 49 EMPLOYEES

50- 99 EMPLOYEES

100- 249 EMPLOYEES

OVER 250 EMPLOYEES



Note: Each full symbol (○⬡□◇) represents 2 plants.

MAP NUMBER 13 - LOCATION OF SIC 25 PLANTS - FURNITURE AND FIXTURES

INDUSTRIES OPERATING ON JUNE 30, 1963, which

● ⬢ ■ ◆ STARTED OPERATIONS AFTER JUNE 30, 1958

STARTED OPERATIONS PRIOR TO JUNE 30, 1958

INDUSTRIES OPERATING ON JUNE 30, 1958, which

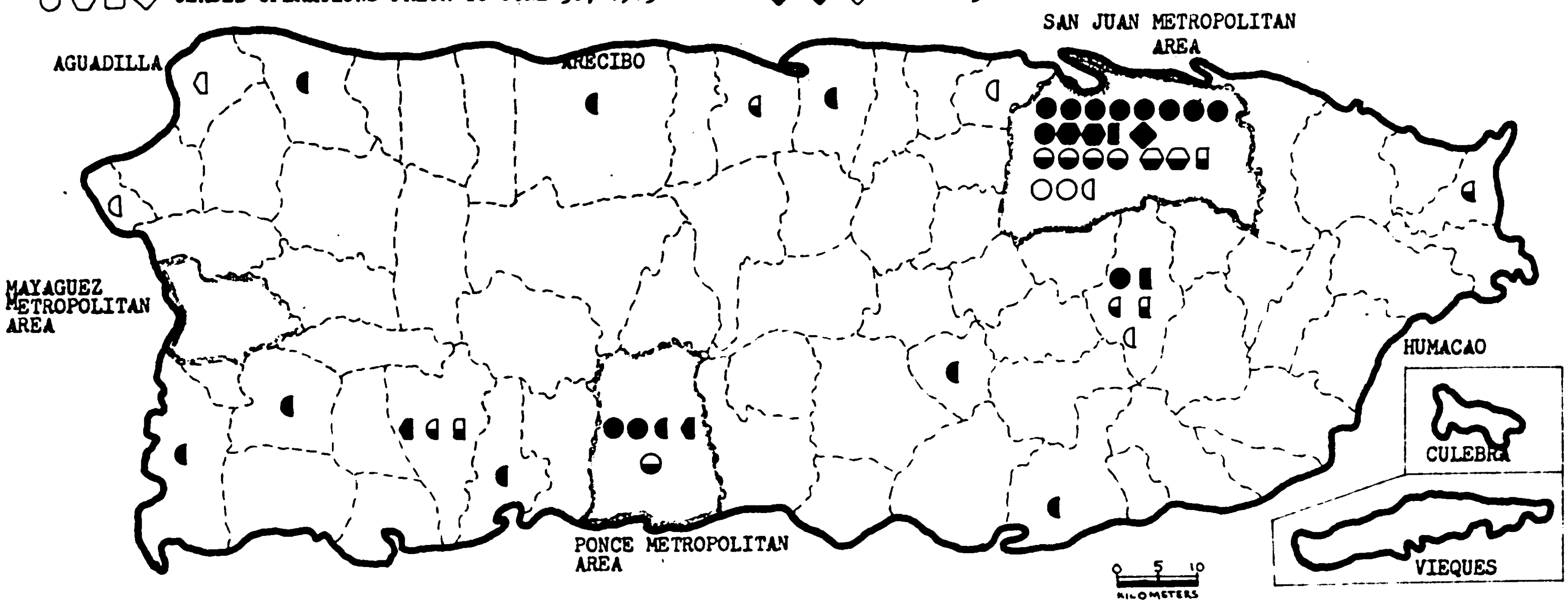
○ ⬡ □ ◇ CEASED OPERATIONS PRIOR TO JUNE 30, 1963

0- 49 EMPLOYEES

50- 99 EMPLOYEES

100- 249 EMPLOYEES

OVER 250 EMPLOYEES



Note: Each full symbol (● ⬢ ■ ◆) represents 2 plants.

MAP NUMBER 14 - LOCATION OF SIC 26 PLANTS - PAPER AND ALLIED PRODUCTS

INDUSTRIES OPERATING ON JUNE 30, 1963, which

STARTED OPERATIONS AFTER JUNE 30, 1958

STARTED OPERATIONS PRIOR TO JUNE 30, 1958

INDUSTRIES OPERATING ON JUNE 30, 1958, which

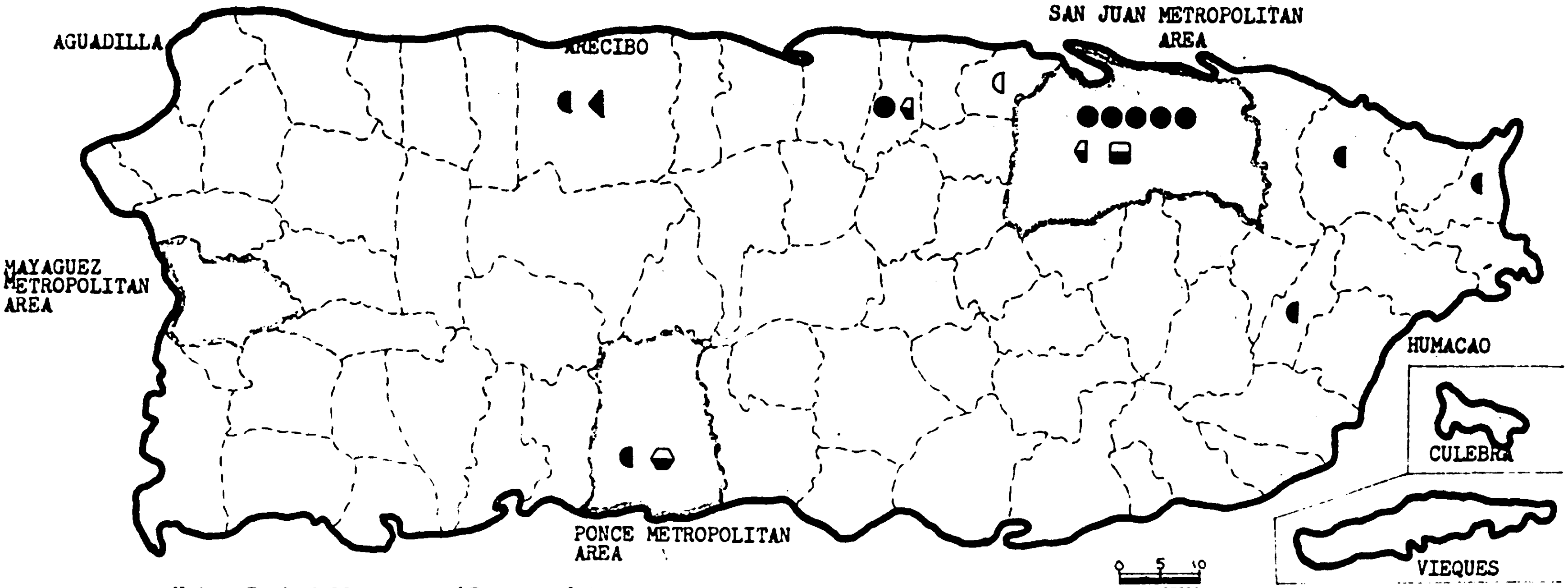
CEASED OPERATIONS PRIOR TO JUNE 30, 1963

0- 49 EMPLOYEES

50- 99 EMPLOYEES

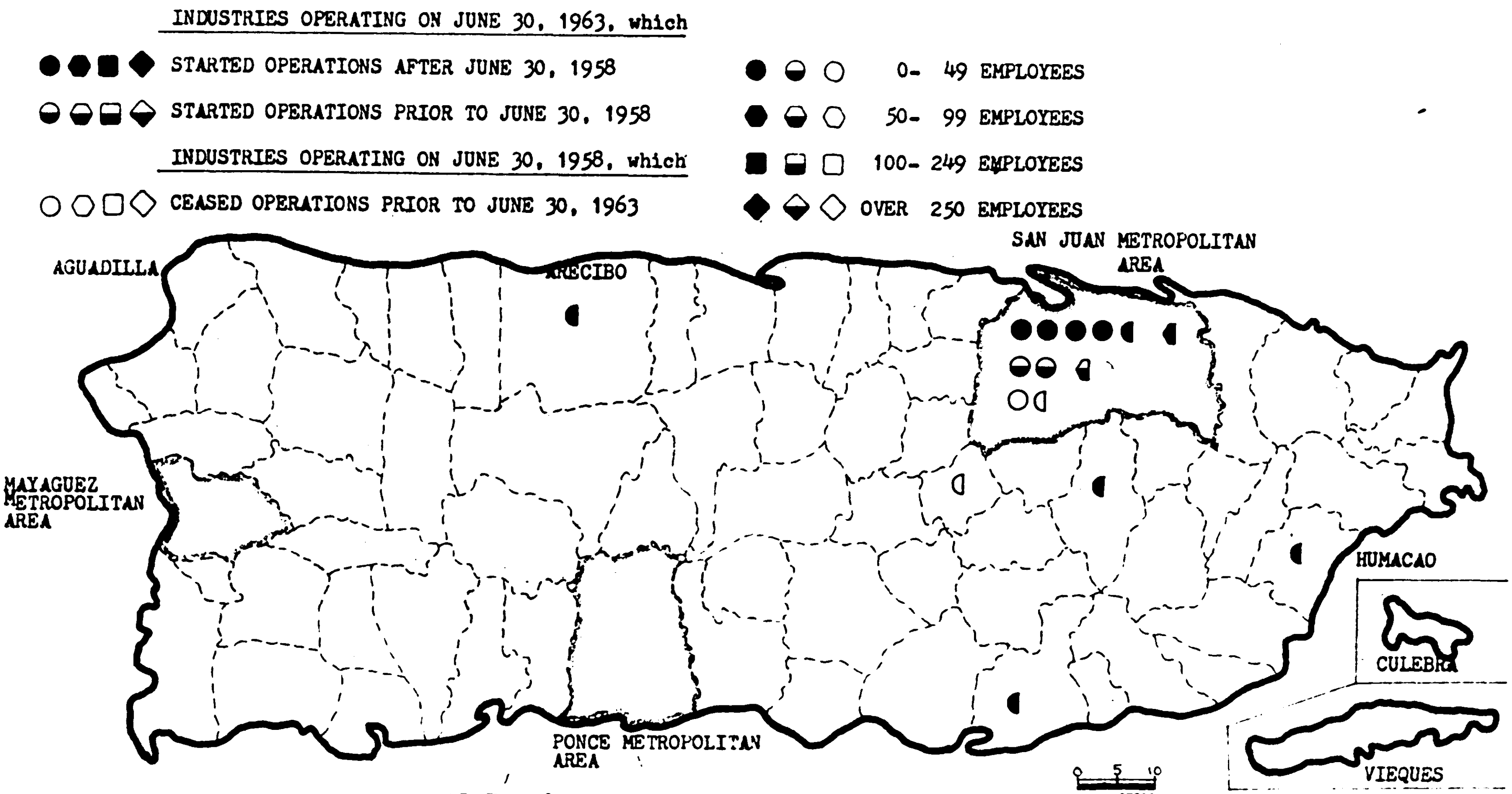
100- 249 EMPLOYEES

OVER 250 EMPLOYEES



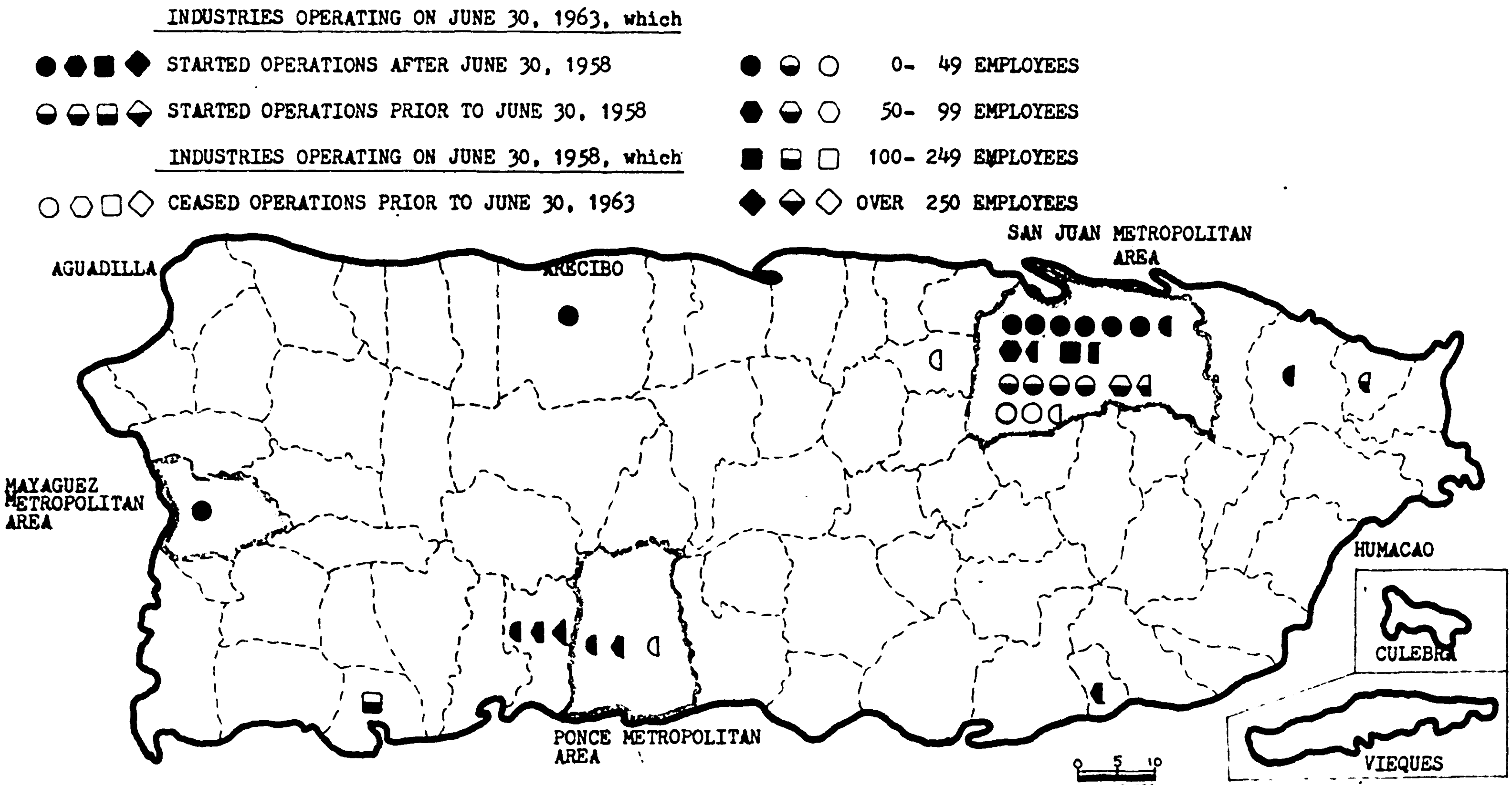
Note: Each full symbol (●⬢■◆) represents 2 plants.

MAP NUMBER 15 - LOCATION OF SIC 27 PLANTS - PRINTING, PUBLISHING, AND ALLIED PRODUCTS



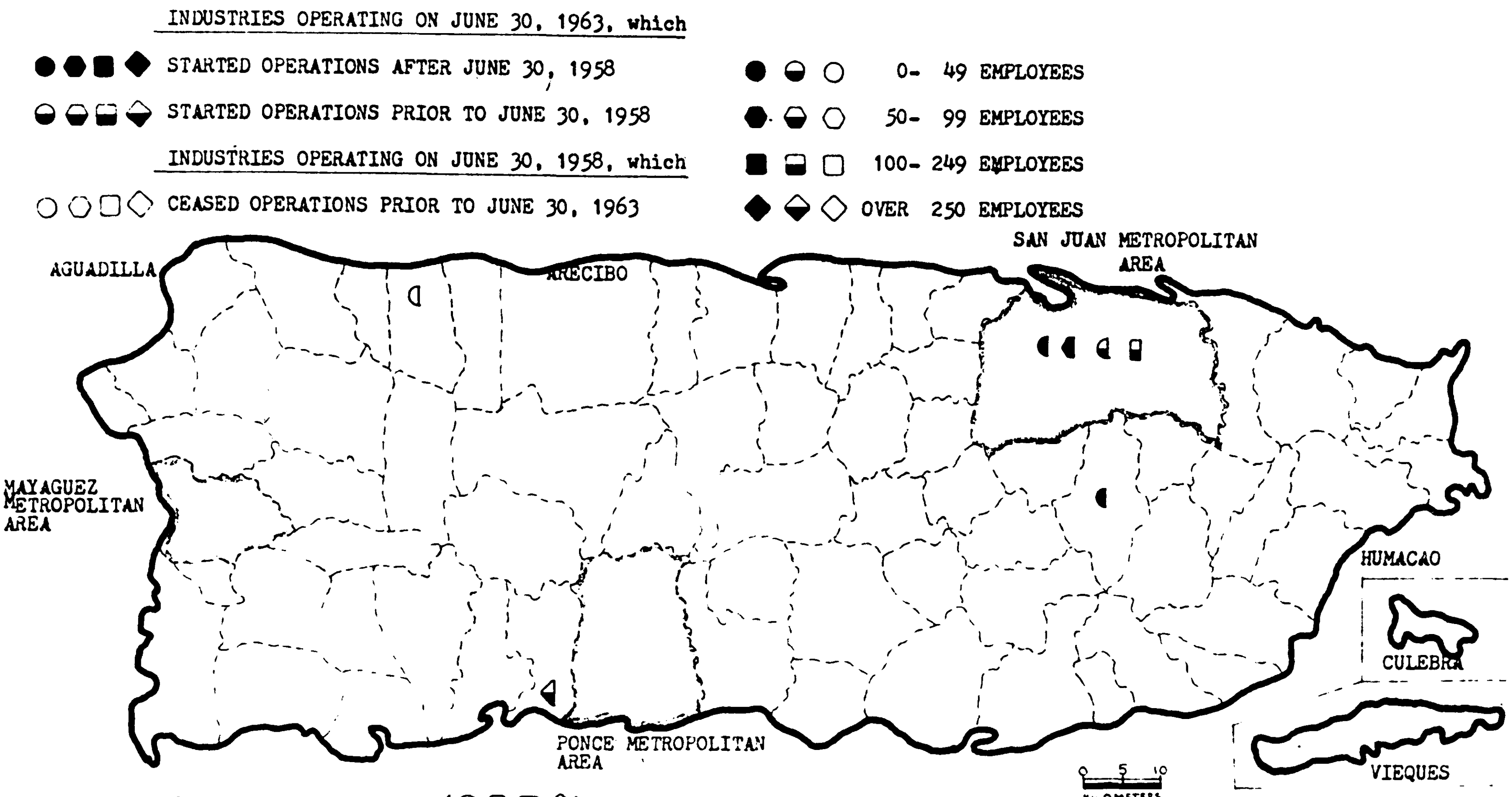
Note: Each full symbol (◒◒◒◒) represents 2 plants.

MAP NUMBER 16 - LOCATION OF SIC 28 PLANTS - CHEMICALS AND ALLIED PRODUCTS



Note: Each full symbol (◒⬙⬓⬙) represents 2 plants.

MAP NUMBER 17 - LOCATION OF SIC 29 PLANTS - PETROLEUM REFINING AND RELATED INDUSTRIES



Note: Each full symbol (○⬡□◇) represents 2 plants.

MAP NUMBER 18 - LOCATION OF SIC 30 PLANTS - RUBBER AND MISCELLANEOUS PLASTIC PRODUCTS

INDUSTRIES OPERATING ON JUNE 30, 1963, which

●⬢■◆ STARTED OPERATIONS AFTER JUNE 30, 1958

STARTED OPERATIONS PRIOR TO JUNE 30, 1958

INDUSTRIES OPERATING ON JUNE 30, 1958, which

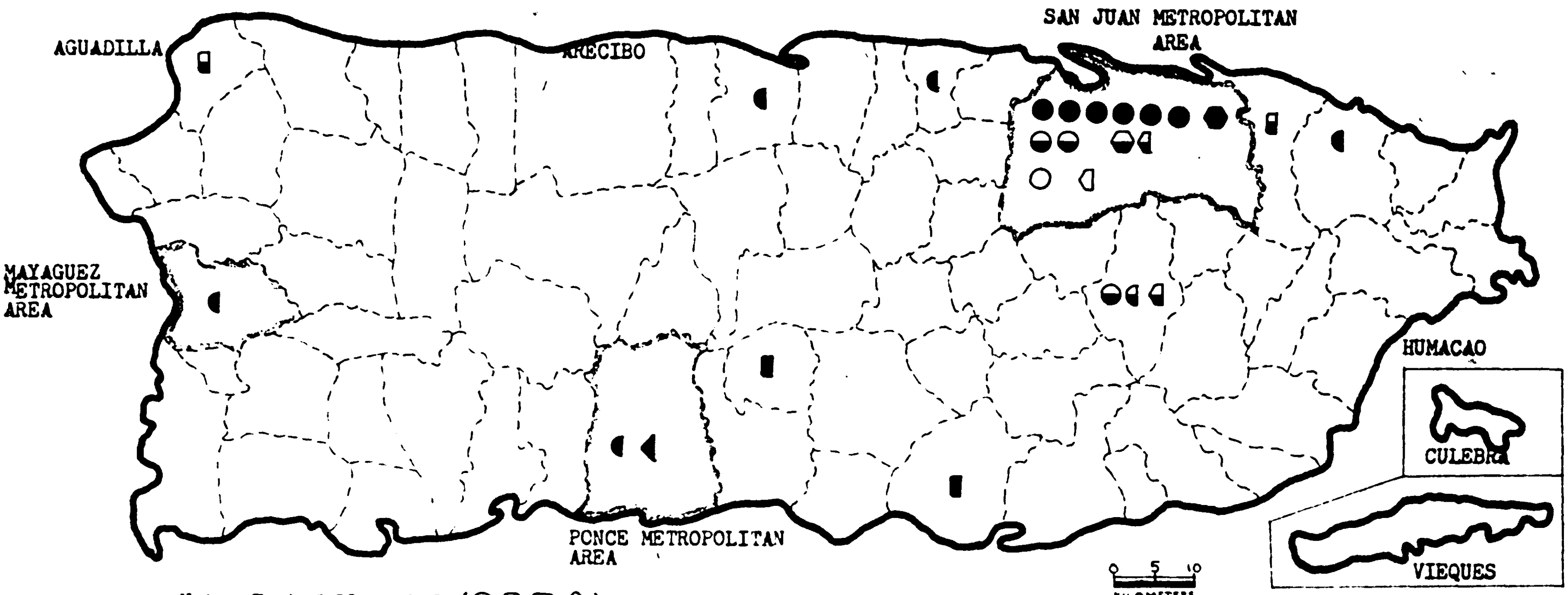
○⬡□◇ CEASED OPERATIONS PRIOR TO JUNE 30, 1963

0- 49 EMPLOYEES

50- 99 EMPLOYEES

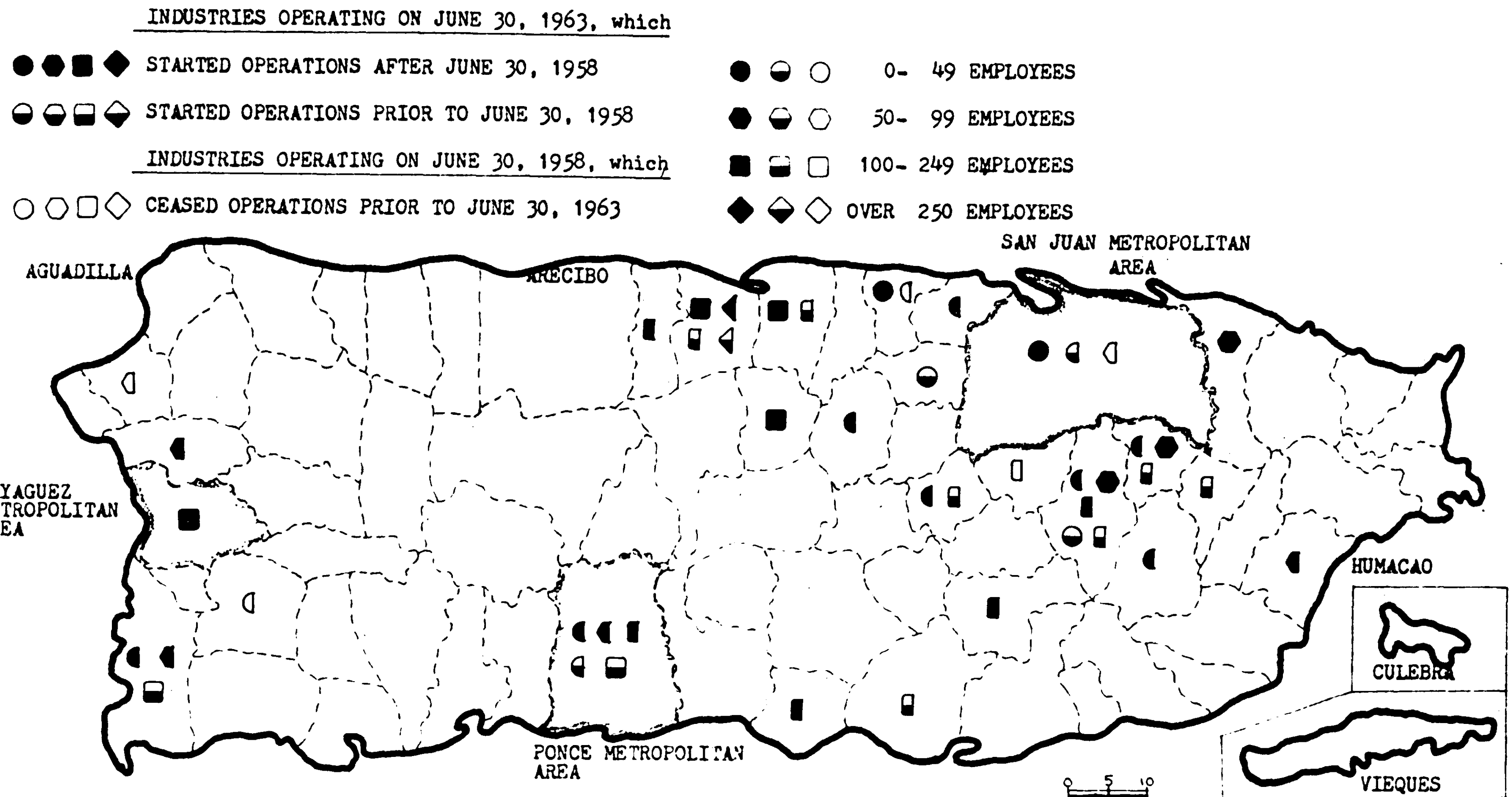
100- 249 EMPLOYEES

OVER 250 EMPLOYEES



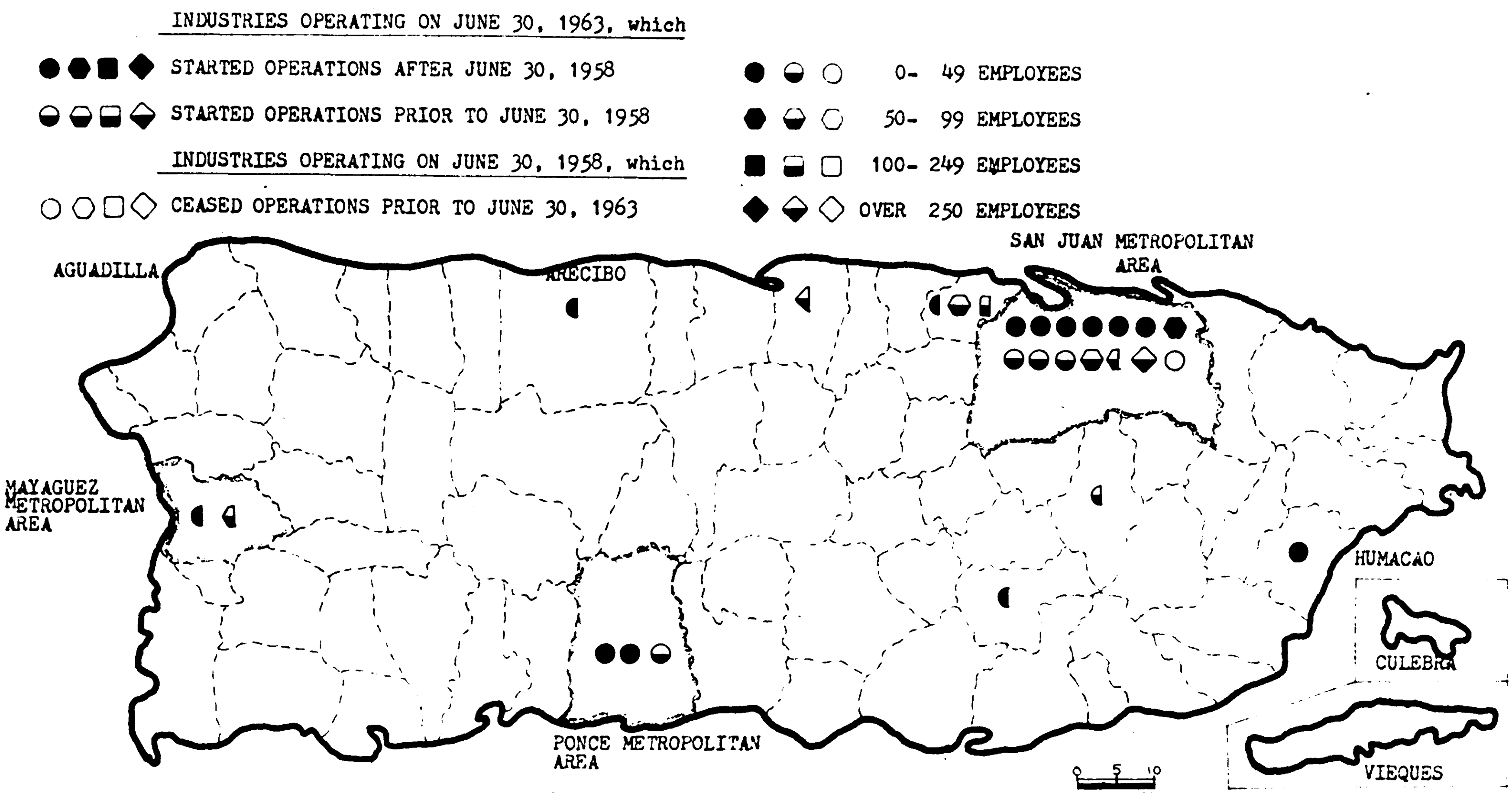
Note: Each full symbol (○⬡□◇) represents 2 plants.

MAP NUMBER 19 - LOCATION OF SIC 31 PLANTS - LEATHER AND LEATHER PRODUCTS



Note: Each full symbol (●⬢■◆) represents 2 plants.

MAP NUMBER 20 - LOCATION OF SIC 32 PLANTS - STONE, CLAY, AND GLASS PRODUCTS



Note: Each full symbol (●⬢■◆) represents 2 plants.

MAP NUMBER 21- LOCATION OF SIC 33 PLANTS - PRIMARY METAL INDUSTRIES

INDUSTRIES OPERATING ON JUNE 30, 1963, which

STARTED OPERATIONS AFTER JUNE 30, 1958

STARTED OPERATIONS PRIOR TO JUNE 30, 1958

INDUSTRIES OPERATING ON JUNE 30, 1958, which

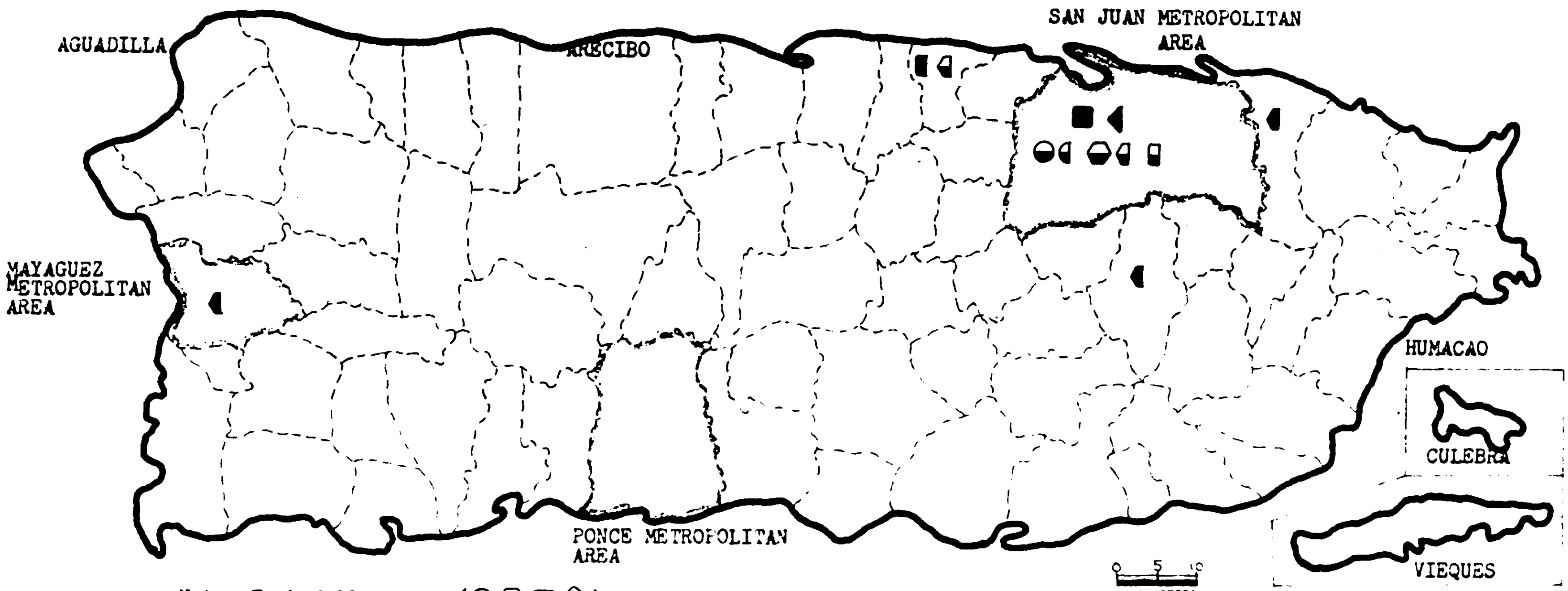
CEASED OPERATIONS PRIOR TO JUNE 30, 1963

0- 49 EMPLOYEES

50- 99 EMPLOYEES

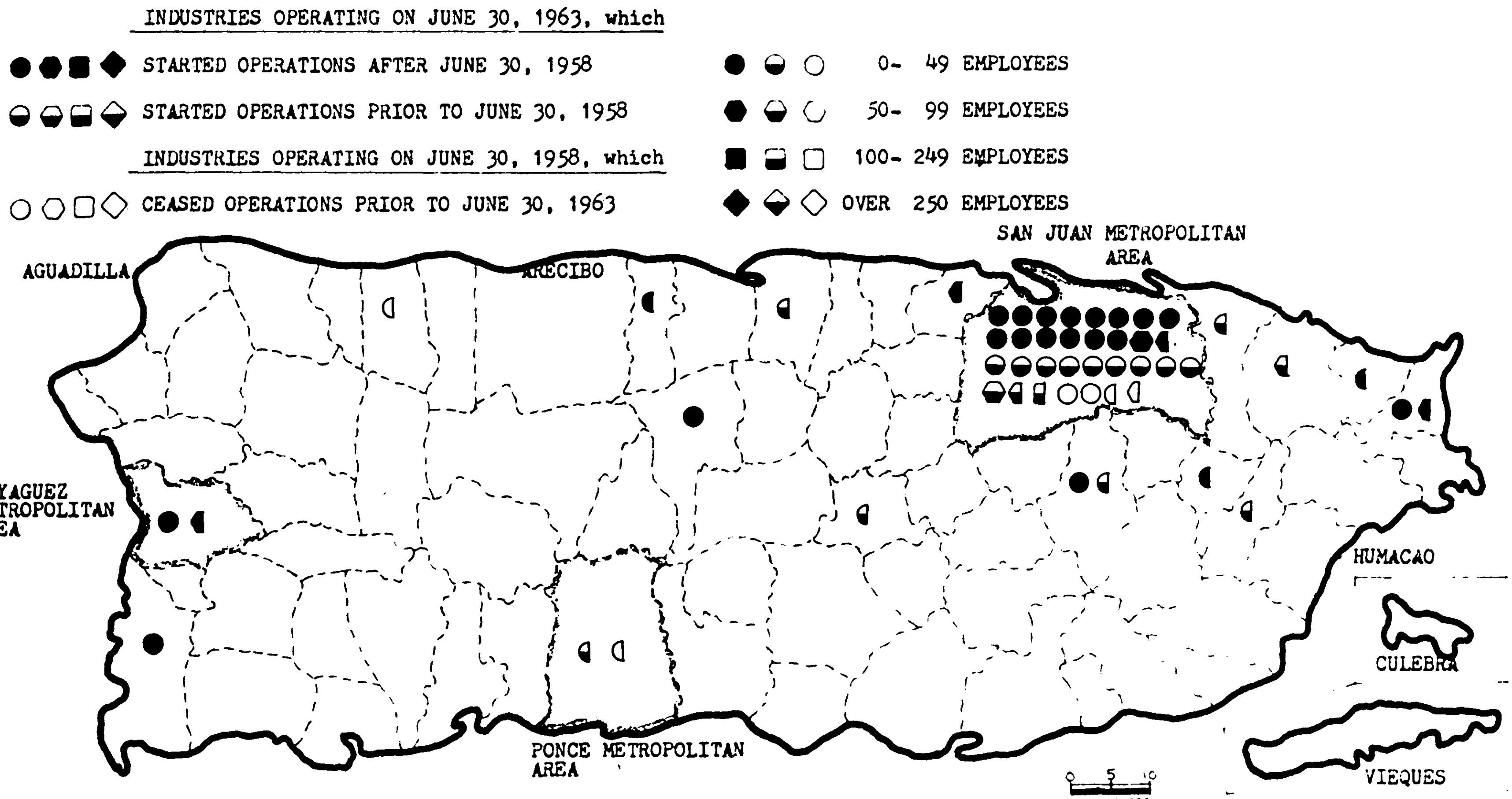
100- 249 EMPLOYEES

OVER 250 EMPLOYEES



Note: Each full symbol (◒◒◒◒) represents 2 plants.

MAP NUMBER 22 - LOCATION OF SIC 34 PLANTS - FABRICATED METAL PRODUCTS



Note: Each full symbol ( ) represents 2 plants.

MAP NUMBER 23 - LOCATION OF SIC 35 PLANTS - MACHINERY, EXCEPT ELECTRICAL

INDUSTRIES OPERATING ON JUNE 30, 1963, which

STARTED OPERATIONS AFTER JUNE 30, 1958

STARTED OPERATIONS PRIOR TO JUNE 30, 1958

INDUSTRIES OPERATING ON JUNE 30, 1958, which

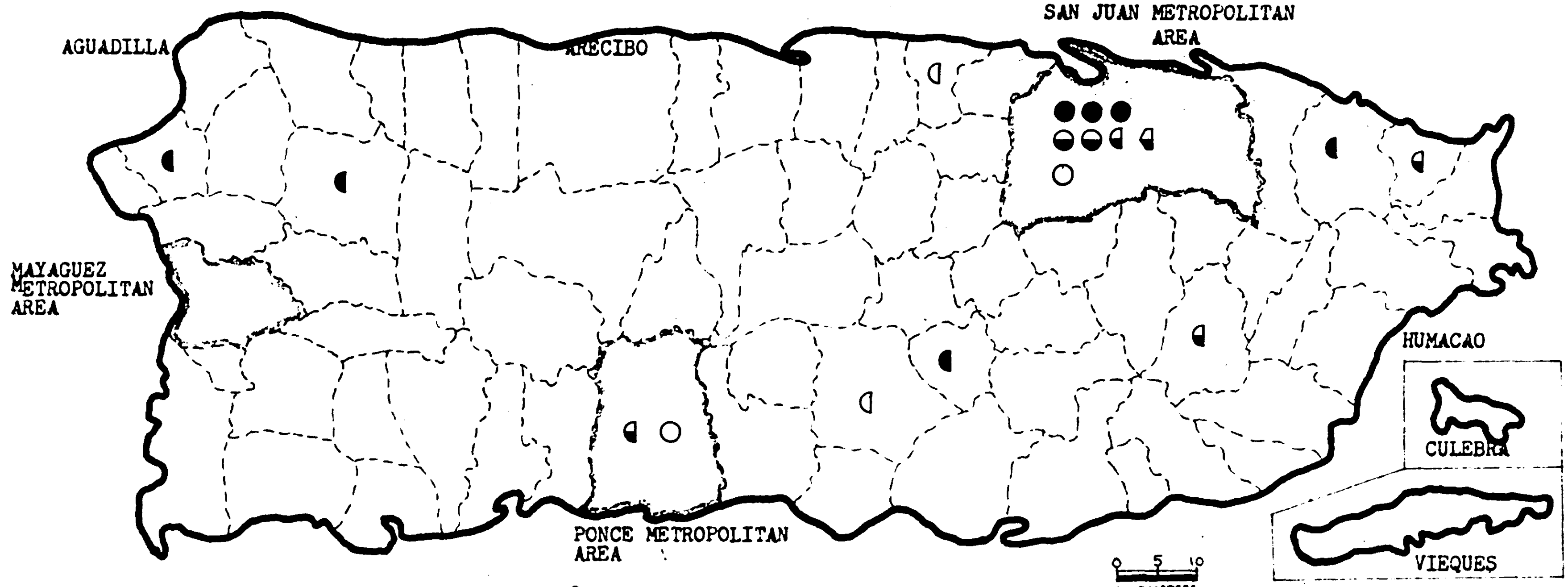
CEASED OPERATIONS PRIOR TO JUNE 30, 1963

0- 49 EMPLOYEES

50- 99 EMPLOYEES

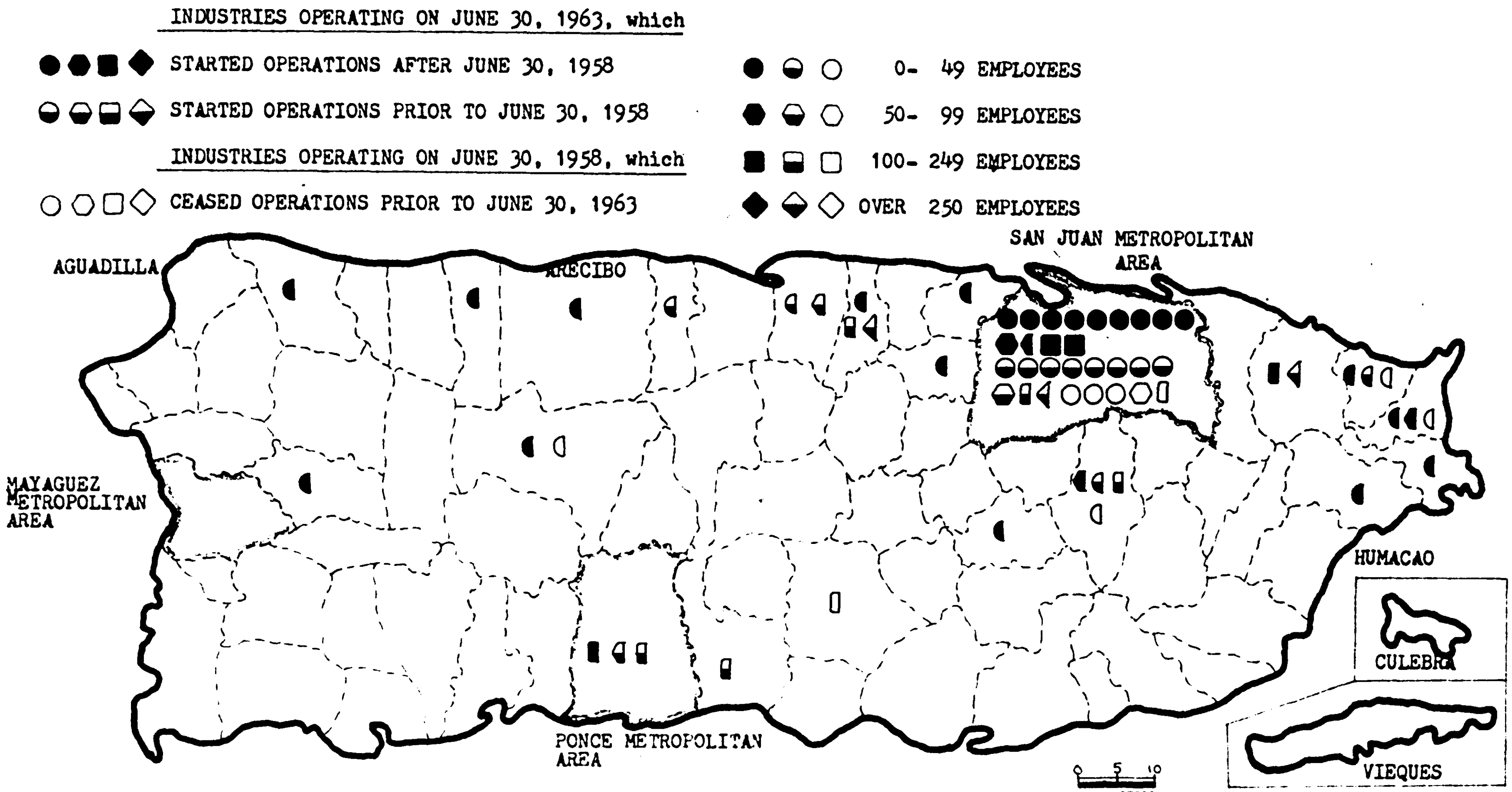
100- 249 EMPLOYEES

OVER 250 EMPLOYEES



Note: Each full symbol (○ ⬡ □ ◇) represents 2 plants.

MAP NUMBER 24 - LOCATION OF SIC 36 PLANTS - ELECTRICAL MACHINERY, EQUIPMENT, AND SUPPLIES



Note: Each full symbol (○⬡□◇) represents 2 plants.

MAP NUMBER 25 - LOCATION OF SIC 37 PLANTS - TRANSPORTATION EQUIPMENT

INDUSTRIES OPERATING ON JUNE 30, 1963, which

●⬢■◆ STARTED OPERATIONS AFTER JUNE 30, 1958

◒◒◒◒ STARTED OPERATIONS PRIOR TO JUNE 30, 1958

INDUSTRIES OPERATING ON JUNE 30, 1958, which

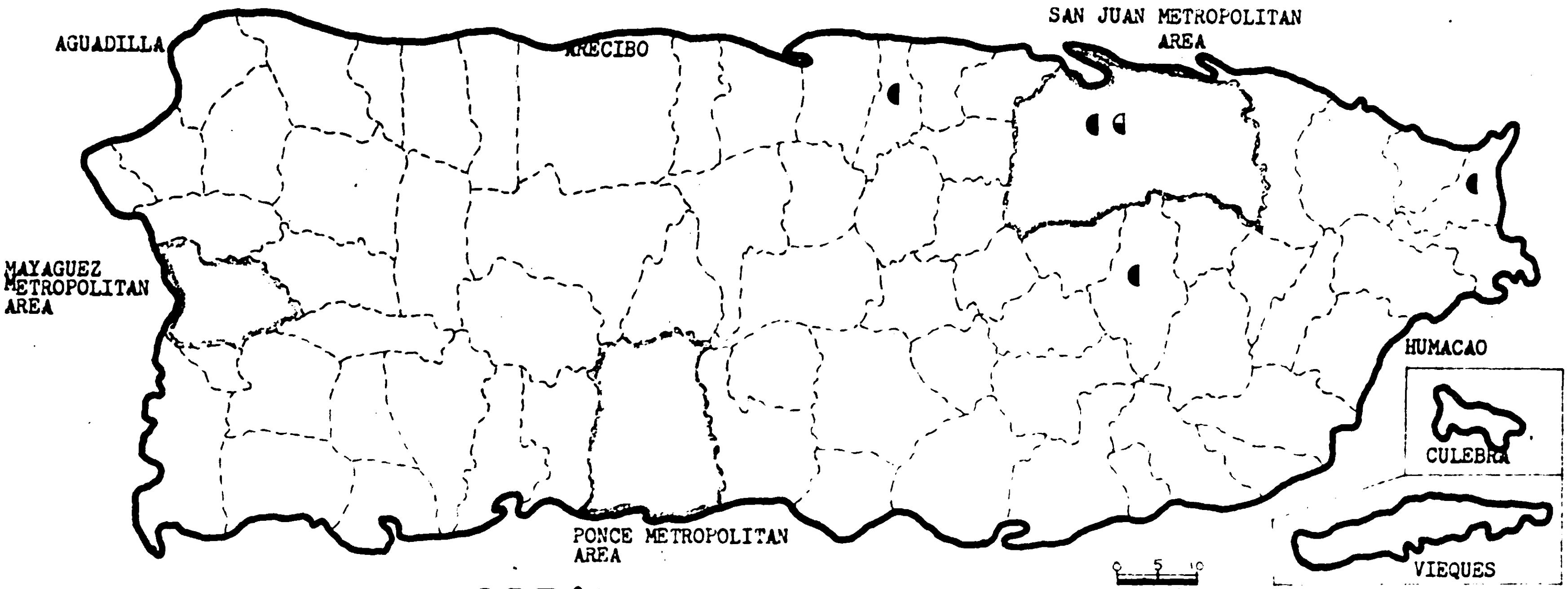
○⬡□◇ CEASED OPERATIONS PRIOR TO JUNE 30, 1963

● ◒ ○ 0- 49 EMPLOYEES

⬢ ◒ ⬡ 50- 99 EMPLOYEES

■ ◒ □ 100- 249 EMPLOYEES

◆ ◒ ◇ OVER 250 EMPLOYEES



Note: Each full symbol (●⬢■◆) represents 2 plants.

MAP NUMBER 26 - LOCATION OF SIC 38 PLANTS - PROFESSIONAL, SCIENTIFIC AND CONTROLLING INSTRUMENTS

INDUSTRIES OPERATING ON JUNE 30, 1963, which

STARTED OPERATIONS AFTER JUNE 30, 1958

STARTED OPERATIONS PRIOR TO JUNE 30, 1958

INDUSTRIES OPERATING ON JUNE 30, 1958, which

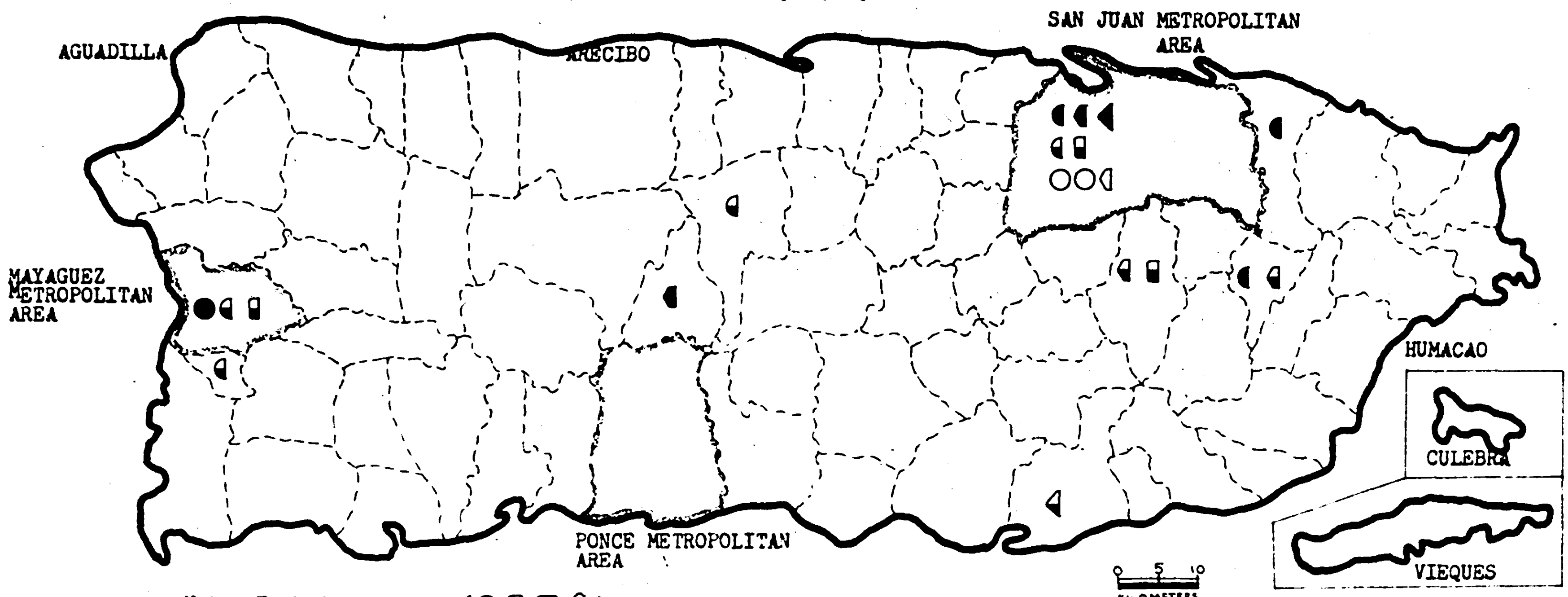
CEASED OPERATIONS PRIOR TO JUNE 30, 1963

0- 49 EMPLOYEES

50- 99 EMPLOYEES

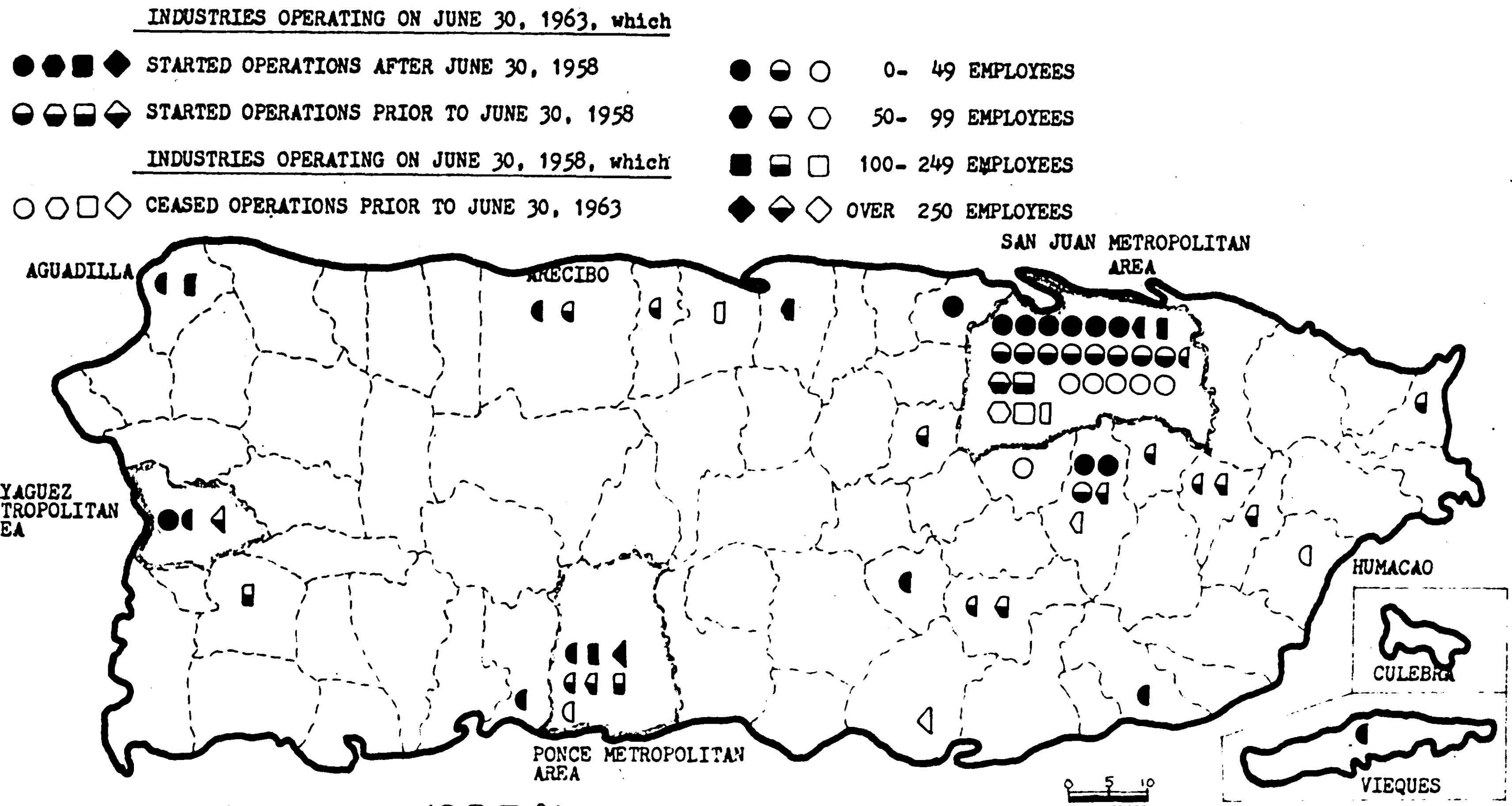
100- 249 EMPLOYEES

OVER 250 EMPLOYEES



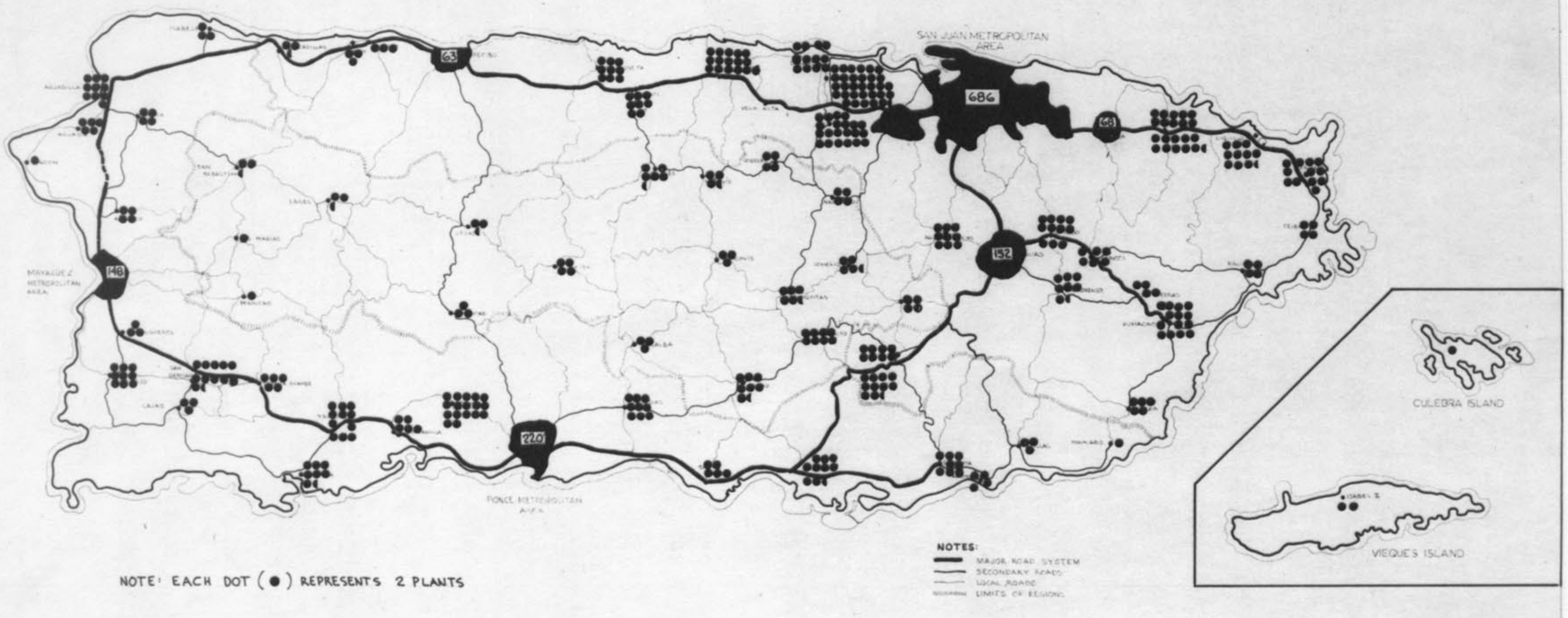
Note: Each full symbol (◒◒▤◈) represents 2 plants.

MAP NUMBER 27 - LOCATION OF SIC 39 PLANTS - MISCELLANEOUS MANUFACTURING INDUSTRIES

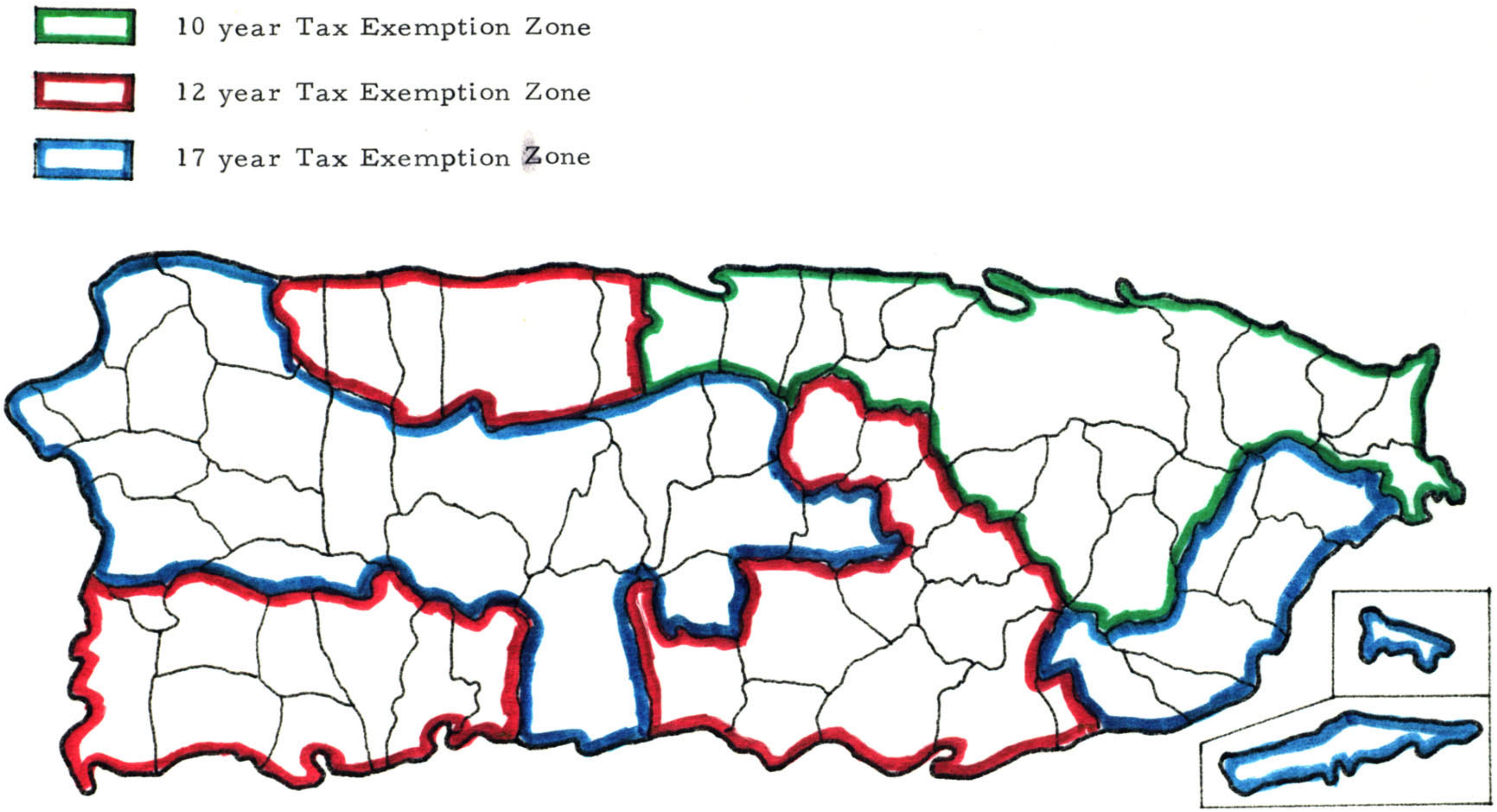


Note: Each full symbol (○⬡□◇) represents 2 plants.

MAP NO.28 LOCATION OF PLANTS 1975 (FORECAST)



Map Number 29 - Proposed Tax Exemption Zones



MAP NO.30 LOCATION OF PLANTS 1975 (PROPOSED)