# *Shelters from the storm: A note on the geography of hurricane-shelters in Barbados, 1982*

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**Barbados, a small island of 166 square miles in the Caribbean, with a population of 246,416 persons, has a total of 177 emergency shelters with a known capacity of 20,623 persons. The average shelter capacity is 117 persons and the total known shelter capacity represents 8.4% of the population.**

**The spatial arrangement of the grade I shelters, as seen relative to the 1980 population census map by grouped enumeration districts, reveals that there are many areas and persons, who, in time of emergency, will not be able to avail themselves of the protection of a shelter.**

**Keywords: Storm shelters; Barbados; Emergency management.**

## INTRODUCTION

In countries that are prone to natural disaster, be they hurricane, flood or earthquake, the population living in disaster prone areas needs to be assured that there are places of safety to which they can go, where they will be given adequate care and protection.

Governments are faced with the need for such protection and are bound by the financial constraints of building shelters against such an eventuality. Consequently governments use public buildings for such purposes when the need arises.

In Barbados, 51 churches and 126 schools and other educational institutions are used as emergency shelters (Ministry of Education, 1982).

These 177 shelters can accommodate 20,623 persons, or 8.4% of the Barbadian population. There are three grades of shelters: Grade 1; "those shelters which the Ministry considers suitable for use during an emergency," Grade 2; traditionally used buildings, but presently in need of repairs and thus "persons who seek shelter do so at their own risk," and Grade 3; shelters that should be avoided, but if standing after the emergency may be used as relief stations (Ministry of Education, 1982, Foreward p. i).

It is the geography of the 124 Grade 1 shelters that is being considered in this paper, since the Grades 2 and 3 shelters could not provide safe shelter in the event of an emergency. The Grade I shelters have a known capacity of 16,416 persons.

## ANALYSIS

### Parish distribution of shelters

Table 1 provides a breakdown of the parish distribution of shelters, the number of Grade I shelters in each parish, their known capacity, and the percentage of the parish population that these shelters can accommodate. From this Table it is evident that Christ Church, St. James and St. Andrew are at a marked disadvantage, having low shelter capacity relative to the parish population. This is even more significant when it is considered that both St. Andrew and Christ Church are prone to flooding and the former has a known history of landslides.

However, it would be unrealistic to assume that the total population would be in need of shelter in time of emergency. It is much more realistic to assume that persons who deem themselves to be in unsafe dwellings might seek shelter. Such being the case, one could assume that shelter would be more readily sought by those living in wooden houses than by those living in other types of structures. If the figure of four persons per household (the national average is 3.7) is applied to the 1980 population census data on the number of "wooden householders" by parish, one can derive the total number potentially most vulnerable and likely to require shelter. If one further assumes that 10% of these wooden householders would need public shelter accommodation in the event of any one emergency, it is seen that Christ Church, St. Andrew, St. James and St. Lucy are in a

Table 1. Parish Grade I shelter capacity relative to total parish population

| Parish | Grade I shelters | | Parish population | % accom-odated |
|---|---|---|---|---|
| | No. | Capacity | | |
| St Lucy | 5 | 559 | 9,148 | 6.1 |
| St. Peter | 9 | 1,006 | 10,618 | 9.5 |
| St. James | 7 | 734 | 17,599 | 4.2 |
| St. Andrew | 4 | 295 | 6,727 | 4.4 |
| St. Thomas | 7 | 696 | 10,608 | 6.7 |
| St George | 13 | 1,271 | 17,347 | 7.3 |
| St. Joseph | 7 | 1,044 | 7,210 | 14.5 |
| St. John | 12 | 1,485 | 10,291 | 14.4 |
| St. Philip | 7 | 1,408 | 18,400 | 7.7 |
| Christ Church | 14 | 1,560 | 40,628 | 3.8 |
| St. Michael | 39 | 6,358 | 97,840 | 6.5 |

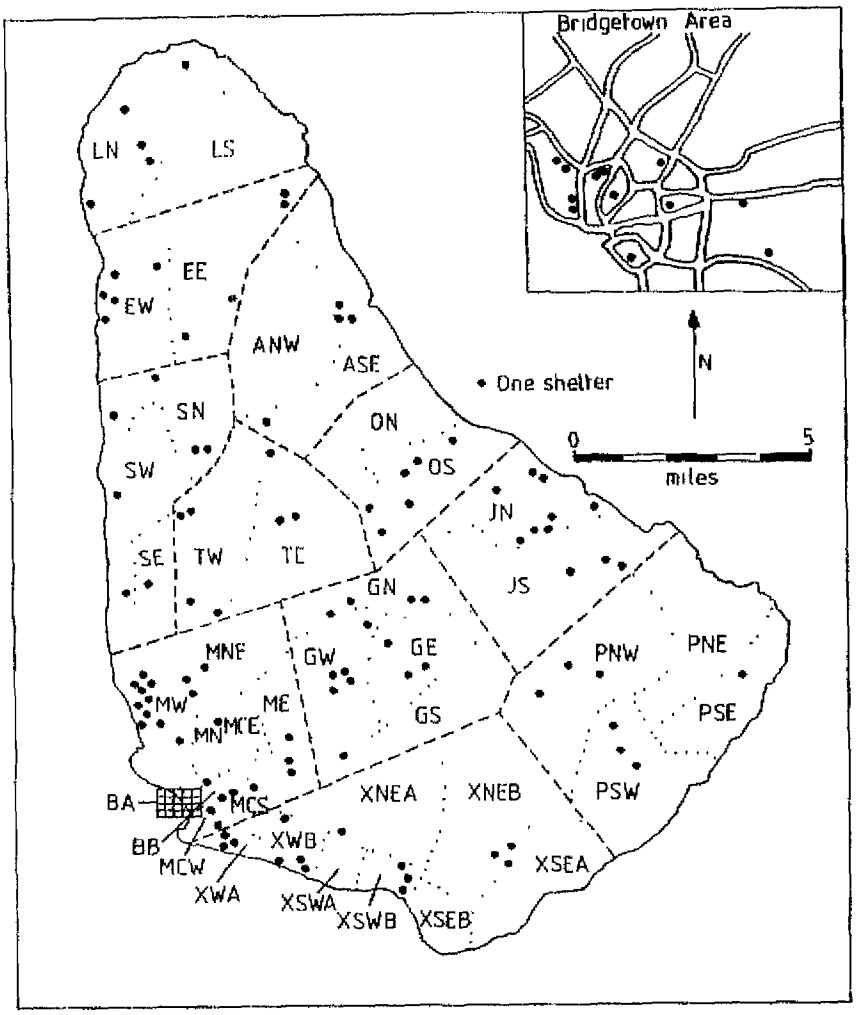


Fig. 1. Shelters by location

ANW — St. Andrew North West
ASE — St. Andrew South East
BA — Bridgetown A
BB — Bridgetown B
EE — St. Peter East
EW — St. Peter West
GN — St. George North
GE — St. George East
GW — St. George West
GS — St. George South

MW — St. Michael West
ON — St. Joseph North
OS — St. Joseph South
PNE — St. Philip North East
PNW — St. Philip North West
PSE — St. Philip South East
PSW — St. Philip South West
SN — St. James North
SE — St. James East
SW — St. James West

JN — St. John North
JS — St. John South
LN — St. Lucy North
LS — St. Lucy South
MCE — St. Michael Central East
MCS — St. Michael Central West
MCW — St. Michael East
ME — St. Michael East
MN — St. Michael North
MNE — St. Michael North East

TE — St. Thomas East
TW — St. Thomas West
XNEA — Christ Church NE A
XNEB — Christ Church SE A
XSEA — Christ Church SE A
XSEB — Christ Church SE B
XSWA — Christ Church SW A
XSWB — Christ Church SW B
XWA — Christ Church West A
XWB — Christ Church West B

deficit position of assumed need being greater than the known Grade 1 shelter capacity (see Table 2).

This may be acceptable at the parish level, but when the micro level is examined, other disparities become evident.

## GROUPED ENUMERATION DISTRICT LEVEL

### Distribution of shelters

If the shelters are plotted by location on the 1980 Census Map of Population by Grouped Enumeration Districts, it is evident that some areas are definitely disadvantaged — St. Lucy South, St. Andrew North-West, St. Joseph North and St. Philip North-East all have no shelters located in them. Other areas without shelters are Christ Church North-East B, St. Michael Central East and Christ Church South-West A.

St. Joseph South reveals a clustering of shelters — producing a high capacity relative to assumed need, while just to the north there is a noted deficit of shelters and shelter capacity (see Fig. 1).

If the base of 10% of the estimated population living in wooden housing is once again applied to represent net demand at this micro level, Fig. 2 shows that 50% of the

Table 2. Parish surplus or deficit shelter situation based on the estimated need

| Parish | 10% wooden households | Estimated need | Shelter capacity (Grade 1) | Surplus/ deficit |
|---|---|---|---|---|
| St. Lucy | 163.5 | 605 | 559 | Deficit |
| St. Peter | 188.8 | 699 | 1,006 | Surplus |
| St. James | 234.4 | 867 | 734 | Deficit |
| St Andrew | 129.3 | 478 | 295 | Deficit |
| St. Thomas | 182.2 | 674 | 696 | Surplus |
| St. George | 267.4 | 989 | 1,271 | Surplus |
| St. Joseph | 124.1 | 459 | 1,044 | Surplus |
| St. John | 167.1 | 618 | 1,485 | Surplus |
| St. Philip | 293.3 | 1,085 | 1,408 | Surplus |
| Christ Church | 526 9 | 1,950 | 1,560 | Deficit |
| St. Michael | 1,570.7 | 5,812 | 6,358 | Surplus |

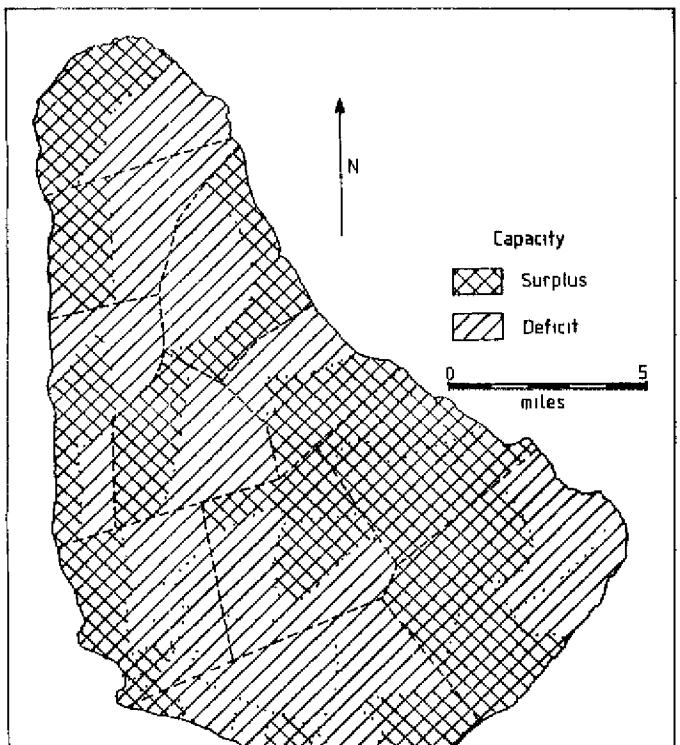


Fig. 2. Shelter capacity by district.

districts are in a deficit situation of need being greater than the known shelter capacity.

## DISCUSSION

Only one hurricane — Janet 1955 — has hit Barbados directly in the past 100 years, though all the Caribbean hurricanes and tropical storms in the period 1877 to 1970 have passed within 100 miles of the island (Wallace Evans and Partners, 1973), causing flooding in many instances. There is therefore no recorded data on shelter use in time of emergency and only estimates, such as those put forward in this paper, can be used in the planning of shelters.

In spite of the use of these estimates, it is evident that on a national level, there is an acceptable ratio of persons per known shelter capacity, though at the micro level there needs must be a more even distribution of the system of shelters so that no area is at a marked disadvantage.

This brings into perspective the debate as to whether shelters should be built specifically for this purpose, or should existing buildings, which are centrally located relative to possible need be used on the occasion of an emergency. In poor third-world countries, the former is out of the question, the latter is therefore more appropriate, though there must be monitoring of the capacity and state of repair of these buildings.

## CONCLUSION

In Barbados the awareness of the need for an adequate system of emergency shelters exists in the Central Emergency Relief Organization (C.E.R.O.). This body faces many problems, not the least of which is an absence of background data on shelter users, the numbers in each area that need to be planned for in the event of an emergency and the careful selection of buildings that will be easily accessible in time of emergency. It is hoped that the 1984 list of emergency shelters will reflect a greater spread in the network of this vital emergency service.

## REFERENCES

Ministry of Education, *Shelters.* Central Emergency Relief Organization, Bridgetown, Barbados (1982).

Statistical Service Barbados, *Population Census 1980,* Barbados Statistical Service, Bridgetown, Barbados (1981).

Wallace Evans and Partners, *Stormwater Drainage Study Barbados.* Engineering Report, Overseas Development Administration Foreign and Commonwealth Office, London (1973).