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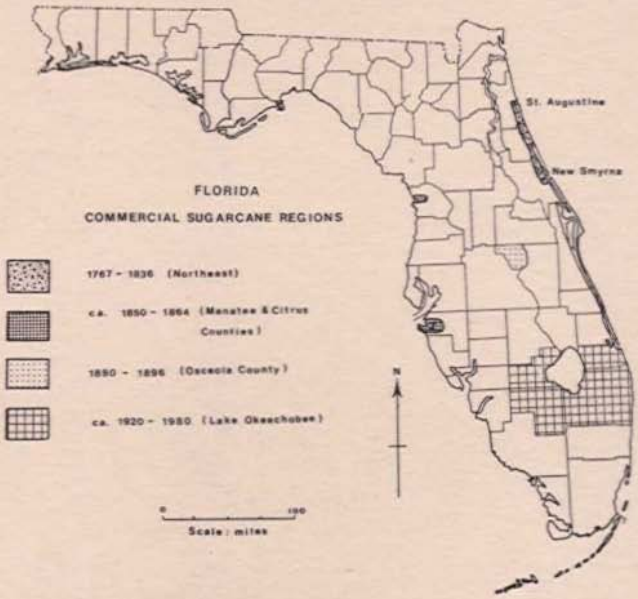

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The Florida Geographer is a state-wide journal, with broad coverage of geographical topics relating to the state and its several regions. No restrictions are placed on the content of articles, providing that they deal with some aspect of the geography of Florida, i.e., local studies within the state, matters of the state generally, or studies of the U.S. South, of which Florida is a part.

Manuscripts are solicited from all who feel they have research worthy of dissemination. No specific format requirements are presently in force, although the editor would prefer manuscripts to be typed double-spaced following the general format of the articles in the present number. The University of Chicago Press's *Manual of Style* (12th ed.) is the editor's guide on format issues. However, authors should not be dissuaded from submitting manuscripts because of format considerations; the editor is willing to undertake extensive revisions. As this number demonstrates, we are able to reproduce maps, charts, and tables.

We would like to publish an original map on the cover of each number, so a special request is made to all who have maps of the state or regions of the state which would be of interest to the Society's membership.

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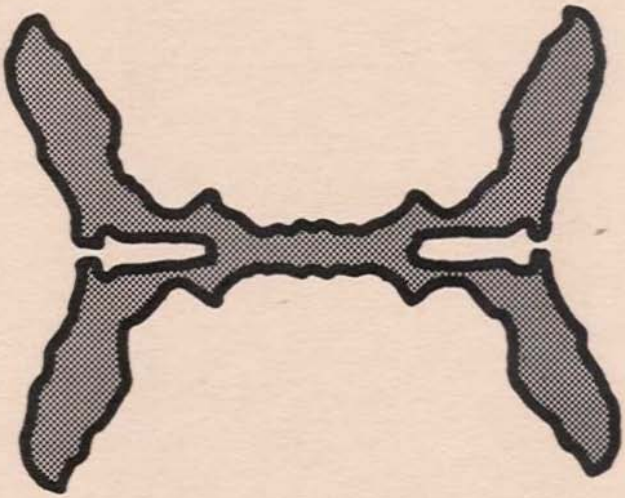

THE FLORIDA

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CONTENTS

SPATIAL AND TEMPORAL PERSPECTIVES ON FLORIDA'S SUGARCANE INDUSTRY

Sam Sheldon

One of the hallmarks of Florida's long history of commercial sugarcane production is spatial instability. Unlike Louisiana, where the cane growing area has remained essentially the same for almost two hundred years, sugar production in Florida has concentrated in diverse regions at different times. This article traces Florida's sugarcane industry from its beginnings in the eighteenth century to the present day. Emphasis is placed on the changes in location of the industry, and the environmental, economic, and political forces instrumental in effecting these changes. Four periods of development of the industry can be identified: (1) ca. 1767 to 1836; (2) ca. 1850 to 1864; (3) 1880 to 1896, and (4) ca. 1920 to the present (Fig. 1, Cover).

The Northeast, ca. 1767 - 1836

Sugarcane was introduced to Florida by the Spanish shortly after the founding of St. Augustine in 1565. However, the limited records available for the first Spanish occupation (1565 - 1763) provide no indication that the sucrose yielding grass was cultivated on a commercial basis. Experiments were doubtless conducted with cane, as they were with other crops, but no marketable commodities were developed. Indeed, mercantile activity in Spanish Florida was so inconsequential that the territorial governor referred to his domain as a "land of no commerce" in a letter written to the King in 1675.[1] The absence of commerce was particularly notable in agriculture. Spanish land policy discouraged widespread settlement, and religious, political, and military motives took precedence over agrarian concerns.

The first record of commercial sugarcane production in Florida is associated with the brief era of British control that lasted from 1763 to 1783. Unlike the Spanish, who emphasized missions and forts, the British settled primarily as large planters from South Carolina and Georgia, or associations of capitalists who established colonies of indentured white servants.[2] Florida was perceived by Great Britain as a source of tropical agricultural commodities, and the plantation system was deemed the most effective means to maximize production. Accordingly, large holdings were dispensed to planters, and bounties were provided to stimulate farm production.

The plantation system that evolved between 1763 and 1783 focused on the province of "East Florida."[3] St. Augustine was the locus of activity for this region, and the new agrarian enterprises were close to the city. Since land transportation was almost non-existent, estates were situated on the Halifax, Tomoka, Matanzas, and St. John's Rivers.

The planters who migrated to Florida initially devoted their efforts to rice and indigo. The latter emerged as the leading agricultural commodity of the province, but other crops were tried and successfully produced on a limited scale. Exports from East Florida between 1776 and 1778 included small quantities of rice, coffee, Indian corn, oranges, vinegar, tobacco, cotton, ginger, pimento, pinkroot, sarsaparilla and sugar.[4]

Plantation owners expected sugarcane to evolve into one of East Florida's most successful crops, and cane was cultivated as early as 1767 on some estates (including Dr. Andrew Turnbull's utopian colony at New Smyrna). Lieutenant Governor John Moultrie, an ardent proponent of cane cultivation, harvested a crop on his plantation south of St. Augustine in 1770. Yields were excellent and during the following year all the farmers in the southern part of the province planted small fields of cane.[5]

But despite promising experiments and sporadic commercial productivity, the crop failed to achieve notable success. Occasional frosts injured the cane and impeded large-scale production. With the retrocession of the territory to Spain (1783), the plantations in East Florida were abandoned. Most of the British inhabitants departed and the province temporarily regressed into the economic stagnation that had prevailed prior to English occupation.

The foundation for Florida's first sugar "empire" was laid during the early years of the nineteenth century. Threatened by United States territorial expansion, Spain adopted a policy that encouraged settlement of its Florida domain. The Crown offered land grants to Spanish subjects and foreigners in the hope that widespread occupation of Florida would counter the anticipated incursions of the increasingly powerful neighbor to the north. A number of British planters residing in the Bahamas availed themselves of the Spanish offer and settled along the Matanzas, Tomoka, and Halifax Rivers.

During the first two decades of the nineteenth century lands along all three rivers were rapidly brought under cultivation. The change in political control from Spain to the United States in 1819 did little to stem the flow of migrants or alter the general prosperity of the area, a prosperity increasingly based on sugarcane. From the early 1820s until 1836 lands along the Matanzas, Tomoka, and Halifax Rivers emerged as the first large-scale commercial cane producing district in Florida.[6]

By 1825 sixteen estates were producing sugar along Florida's east coast between St. Augustine and New Smyrna. Land had been cleared and drained, diversion ditches were constructed, and thousands of acres were planted to cane. Hundreds of slaves harvested the crop, and at least ten steam-driven sugar mills were in operation. Production continued to increase during the 1830s. The September 29, 1832 edition of the *Niles Register* reported that ten plantations were each producing 80 to 100 hogsheads of sugar annually.

Florida's Atlantic Coast "Sugar Empire" was abruptly terminated during the Second Seminole War, which commenced in December 1835. Within weeks after the conflict started, the Seminoles embarked on a burning and pillaging spree that laid waste to the sugar plantations. By February 10, 1836 the estates were in ruins, and shortly thereafter, an unknown correspondent wrote from St. Augustine:

> The whole of the country south from St. Augustine has been laid waste during the past week, and not a building of any value left standing. There is not a single house now remaining between the city and Cape Florida, a distance of 250 miles. All, all have been burnt to the ground.[8]

With destruction of the cane plantations and the departure of planters from the area, large-scale sugarcane production in East Florida ended. All that remains of this once thriving enterprise are the remnants of sugar mills at New Smyrna, Port Orange, Ormond Beach, and "Bulowville."

Manatee and Citrus Counties, ca. 1850 - 1864

The demise of Florida's first sugar "empire" did not halt cane production in the territory. Successful experiments in sugar cultivation were reported by numerous cotton planters in northwestern and central Florida during the 1830s and 1840s, but the cost and time required to initiate and sustain large-scale production negated any attempts to do so.[9] The combination of time, money, and effort requisite for a profitable sugar industry *did* occur along Florida's Gulf Coast during the 1840s and 1850s. In an effort to attract settlers to the sparsely populated region around Tampa Bay the U.S. government enacted the "Armed Occupation Act" in 1842. Under its provisions 160 acres were allotted to

any "head of family or single man over 18 who was able to bear arms and was willing to live on the land for five years and cultivate at least five acres."[10] The act coincided with the end of the Second Seminole War, and the prospect of obtaining fertile land at little or no cost in an area where the Indian menace was diminished spurred a rush of new settlers into the area. Most of the pioneers were small subsistence farmers, but large sugar planters hoping to exploit virgin lands were also attracted to the region. Many of the latter came from Leon County in northcentral Florida, where they had suffered severe financial losses when the Union Bank of Tallahassee collapsed in 1837. Hoping to recoup lost fortunes, they commenced growing cane on the fertile bottomlands adjacent to the Manatee River south of Tampa Bay.

The number of sugar plantations established in the Manatee area during the 1840s was small, but in terms of acreage and production they surpassed their predecessors on the east coast. The largest and most successful enterprise was the estate of Robert Gamble.[11] A complex drainage system was installed on Gamble's plantation, and by 1849 he had 1,400 acres in cane. Over 150 slaves worked the fields, and the cane they harvested was processed in an enormous mill located on the plantation. Gamble's estate was the largest and most thoroughly equipped in the nation. The refinery contained the most expensive and modern machinery of the day, and produced an average of 220,000 pounds of sugar and 10,000 gallons of molasses between 1849 and 1855.[12]

The efforts of men like Gamble transformed a raw wilderness into the largest sugar producing region in Florida in less than a decade. But the success of this second sugar empire was short-lived. A nation-wide depression during the late 1850s reduced sugar prices drastically. Planters located along the Manatee accumulated large debts and were forced to dispose of their holdings. Gamble's estate, slaves, and mill were sold to the Louisiana firm of Cofield and Davis in 1858 for $190,000.[13]

The sale of the sugar estates marked the end of commercial cane production in the Manatee area. The census of 1860 enumerates only 18 slave owners and 253 slaves for the county. Cofield, the sole slave-owner to list his occupation as "planter," had under his control 190 slaves, 75% of the county total. No other slave-holder had over eleven chattels, and fourteen of the eighteen owned one to five slaves.[14] These figures suggest that by 1860 only Cofield possessed the work force necessary to operate the labor-intensive undertaking that is a sugar plantation. However, shortly before hostilities between the states commenced Cofield's slaves were transferred to Louisiana, and work on Manatee's largest sugar plantation ceased.

Sugar continued to be produced in Manatee County during and after the war, but on a greatly reduced basis. In 1870, less then 15 years after the Gamble estate alone had produced 300,000 pounds of sugar, the combined output from Manatee County was only 41,000 pounds.[15] Currently, the most visible legacy of Manatee's nineteenth century flirtation with large-scale commercial sugarcane production is the Gamble Plantation Mansion, a state historic site located in Ellenton.

Antebellum sugar production along Florida's Gulf Coast was not totally confined to the Manatee River area. At least one other large plantation was operating ninety miles north of the Manatee in present-day Citrus County. David Levy Yulee, a personage of some import in Florida history, owned a 5,100 acre estate on the Homosassa River that started producing sugar around 1851. Yulee's steam-powered mill supplied sugar products to the Confederacy during the war, but both the mill and the plantation were abandoned during 1864 when Federal troops destroyed the Yulee home. After the war Yulee's agricultural interests waned, and commercial sugar production along the Homosassa ended.

Cane continued to be cultivated on hundreds of small farms throughout Florida after the Civil War, but for domestic consumption only. However, as the state's southern peninsular area became settled, increasing attention was devoted to developing Florida's Everglades.[16] The sugar industry in particular received a new impetus during the 1880s when the Disston Drainage Company set out to reclaim millions of acres of swampland surrounding Lake Okeechobee. In 1881 Hamilton Disston and his associates purchased four million acres of state land with the goal of converting much of it to sugarcane. Disston's company directed its initial efforts at reclaiming lands around the headwaters of the Kissimmee River near the Tohopekaliga Lakes, some seventy miles north of Okeechobee. The soil in the area was a rich black loam considered by experienced cane growers to be unsurpassed for sugar production.

Drainage operations commenced in the vicinity of the lakes during 1881, and by 1885 several canals had been completed, the level of the lakes had been lowered, and prairie land between the lakes reclaimed for cultivation.[17] In conjunction with the reclamation project Disston acquired interest in the St. Cloud plantation, Osceola County, in 1887. A factory was erected, almost 1,000 acres of drained land were planted to cane, and 600 to 700 laborers were contracted to work the fields. Cane produced so well on Osceola's muck soils that sugar yields were adjudged to be "superior to any American record up to that time."[18] By 1892, St. Cloud accounted for 80 percent of Florida's total sugar output, and at the peak of its productivity in 1895 the plantation mill produced more than 1.5 million pounds of sugar.[19]

Despite its record output the St. Cloud operation failed to make a profit. Excessive drainage costs, the financial panic of 1893, Congressional repeal of an 1890 sugar bounty, winter freezes, and Disston's untimely death combined to end the venture. The estate was sold in 1896-97, and the mill was dismantled and shipped to Mexico. Dissolution of the St. Cloud plantation once again signaled a reversion to small-scale subsistence sugar cultivation in Florida, and by 1908 state-wide production had plummeted to a mere 7,000 pounds.[20]

Lake Okeechobee, ca. 1920 - 1980

Although Disston's attempt to produce sugar commercially at St. Cloud failed, many individuals continued to believe the plant could be successfully produced on the reclaimed lands of southern Florida. The marshlands adjacent to Lake Okeechobee were considered particularly suitable for cane cultivation because their rich organic soils required no fertilization, and frosts were rare. Furthermore, the flat, treeless Everglades made large-scale mechanization feasible. Rising sugar prices in 1918 and 1919 impelled a number of entrepreneurs to take advantage of these fortuitous environmental circumstances, and the cane industry was revived along Okeechobee's shores. Thousands of acres of sugarcane were planted on the southern and eastern margins of the lake during the 1920s, and the harvested product was processed in newly erected mills at Canal Point, Moore Haven, and Miami.

The early attempts to grow cane on lands bordering Okeechobee met with mixed results. Inadequate drainage, high overhead costs and climatic problems (including hurricanes in 1926 and 1928) severely hampered production. Additionally, an oversupply of sugar on the world market forced many capitalists to abandon their operations.

Notwithstanding these early difficulties, commercial sugar production took hold in the Everglades, and has persisted to the present day. The success of the industry is largely a consequence of two events that occurred during the 1930s and 1940s. First, researchers developed sugarcane varieties suitable to southern Florida's climatic, biological, and agronomic conditions. Second, a

water management system was constructed to remove flood waters from agricultural lands during south Florida's wet season (June - September), and conserve excess water for the dry season (October - May).[21]

Florida's sugarcane industry is currently located in four contiguous counties (Glades, Hendry, Martin, and Palm Beach) surrounding Lake Okeechobee. During the 1978-79 crop season 316,000 acres of cane were harvested for sugar, and seven sugar houses in Palm Beach and Hendry Counties ground out 972,000 short tons.[22] Florida, one of only four sugarcane growing states in the Union (Louisiana, Texas, Hawaii) presently produces 17 percent of U.S. output.[23]

Conclusions

Sugar, a location-specific commodity, has exhibited a high degree of locational change throughout its commercial history in Florida. However, the peripatetic industry now appears to have settled in the Everglades. Conditions there compare favorably with Louisiana, the other major cane producing state. The Everglades has a growing season longer then Louisiana's, and it produces a higher yielding cane. Florida's role as a supplier of domestic sugar has increased in recent years, and the Everglades cane industry anticipates capturing a greater share of the future market. Thus, it appears that the state's sugar industry, so long characterized by spatial instability, has at last found a permanent home.

* * *

1. Pablo de Hita y Salazar to the King, June 15, 1675, in *The Unwritten History of Old St. Augustine*, ed. A.M. Brooks (St. Augustine, Florida: p.u., 1909), p. 126.

2. L. C. Gray, *History of Agriculture in the Southern United States to 1860*, 2 vols. (Washington, D.C.: Carnegie Institution of Washington, 1933), 1:111.

3. The territory acquired by Great Britain from Spain and France under provisions of the 1763 Treaty of Paris was divided into the two provinces of East and West Florida. The former consisted of the Florida peninsula and the mainland west from the Atlantic coast as far as the Apalachicola River. Land between the Apalachicola and the Mississippi River delta comprised West Florida. C. L. Mowat, *East Florida as a British Province, 1763 - 1784* (Gainesville, Florida: University of Florida Press Facsimile Reproduction, 1964), pp. 5-6. Also, Craig Miller and Patrick O'Sullivan, "The Obliteration of Colonial West Florida," *The Florida Geographer* 14, no. 2 (August 1980): Figs. 1 and 2.

4. London, Public Record Office, Colonial Office, 5/559, pp. 461, 465, 469 (Transcripts, Library of Congress), in W. H. Siebert, ed., *Loyalists in East Florida, 1774 to 1783*, 2 vols. (Deland, Florida: The Florida State Historical Society, 1929), 1:66-67.

5. C. Doggett, *Dr. Andrew Turnbull and the New Smyrna Colony of Florida* (Florida: The Drew Press, 1919), p. 51.

6. Published materials on the planters and plantations of Florida's first sugarcane "empire" are numerous. The more notable works include: M. Schene, *Hopes, Dreams, and Promises: A History of Volusia County, Florida* (Daytona Beach, Florida: News-Journal Corporation, 1976), chapter 6; E. P. Stanton, *Early Plantations of the Halifax - Concerning the Ruins* (Ormond Village, Florida: Ormond Village Improvement Association, 1949); and, A. Strickland, *The Valient Pioneers: A History of Ormond Beach, Volusia County, Florida* (Miami, Florida: Center Printing Co., 1963), chapters 1 and 2.

7. W. H. Simmons, G. Clarke, and P. Mitchell, "East Florida - A Condensed View of Its Climate, Soil, Extent, and Natural and Cultivated Productions," *American Farmer* 6(3 September, 1824): 187.

8. *Niles Register*, 27 February 1836.

9. E. R. Fairbanks reported that "the sugar cane will, however, in a few years, become the staple of the Peninsula... It is now cultivated for home consumption by almost every planter, small and great; but the expense of machinery, and the time required to get underway, has deterred many from abandoning their cotton to raise cane" (*DeBow's Review*, January 1848, p. 12).

10. Cited in J. W. Covington, "The Armed Occupation Act of 1842," *Florida Historical Quarterly* 40 (July 1961):45.

11. Other plantations along the Manatee River were operated by Dr. Joseph Braden and Hector Braden, and Josiah Gates. For a comprehensive description of the settling of the Manatee River area, see L. B. McDuffie, *The Lures of Manatee* (Bradenton, Florida: Manatee County Historical Society, 1961).

12. R. Gamble, Jr., Letter to the Tallahassee *Floridian*, 28 September 1888.

13. Ibid.

14. W. P. Fuller, *1860 Census, Manatee County, Florida* (filed 1968), n.p.

15. *Ninth United States Census - 1870*, Table IV - Productions of Agriculture in Each State and Territory (by Counties), for the Census Year Ended June 1, 1870, Sugar and Molasses (Florida), p. 119.

16. For a more detailed description of commercial sugar production in Florida's Everglades see J. C. Sitterson, *Sugar Country: The Cane Sugar Industry in the South, 1753 - 1950* (Lexington, Kentucky: University of Kentucky Press, 1953), chapter 18.

17. Ibid., p. 362.

18. Statement made by D. C. Sutton, Head Chemist at the St. Cloud Plantation. Quoted in M. W. Oodson, III, "Hamilton Disston's St. Cloud Sugar Plantation, 1887 - 1901," loose paper, n.d., p. 5.

19. *Louisiana Planter* 9(1892): 372; Ibid., 14 (1895): 338.

20. Biennial Reports of the Florida Department of Agriculture, 1908, n.p.

21. B. Abbitt and M. Morton, "Florida's Sugarcane Industry: Progress to Date," Florida Sugar Cane League Publication, 1979, p. 2.

22. Ibid., pp. 9-10.

23. Ibid., p. 7.

HOMESITE CHARACTERISTICS AND THE SELECTION OF ADJUSTMENTS TO HURRICANE HAZARD IN THE LOWER FLORIDA KEYS

John A. Cross

The Lower Florida Keys, including Big Pine through Saddlebunch Keys, are among the most vulnerable locales with respect to the hurricane hazard within the United States. Hurricanes have struck these islands, whose highest elevation is eight feet, an average of one out of seven years, though the area has gone unscathed by a direct hit since Hurricane Inez (1966). Since then thousands of newcomers, most lacking hurricane experience, have taken up residence on these islands.

The potential for calamity resulting from the settlement within the Florida Keys has prompted the Florida Coastal Coordinating Council to caution:

> Disaster preparedness experts feel that we are well on the way in the Keys to producing one of the greatest man made natural disasters in history.[1]

Official concern in 1974 prompted a county resolution and subsequently an ordinance regulating new construction within the flood hazard districts. Essentially the ordinance requires that the ground floor of all new buildings be elevated above the level of the 100-year flood.[2] Within the Lower Florida Keys, where 96 percent of the land is below five feet in elevation, new dwellings must be elevated at least eight feet above sea level.

Elevated houses, usually constructed upon stilts but occasionally upon mounded fill, had been constructed even before the enactment of the county ordinance. Large-scale speculative building was uncommon. Most of the houses were custom built for (and often by) their occupants, so the dwellings directly reflect the attitudes of the builders toward various considerations, including hurricane hazard. This study of 361 homes attempts to determine the nature of the hazard-related structural adaptations evident in the dwellings of the Lower Keys.[3] It differs from other studies on human response to natural hazards in that it examines the behavior of inhabitants (as shown by their selection of adjustments) rather than their perceptions of the environmental hazard, a research paradigm suggested by Guelke.[4]

The role of the immediate local environment upon hazard perception and adjustment behavior has not been thoroughly examined in previous research. Geographic variations in the perception of the hurricane hazard and attitudes toward damage prevention between widely separated sites were considered by Baker[5] and Fuller.[6] Burton, Kates, and Snead[7], in their study of the coastal flood hazard, considered general variations in the vulnerability of coastal communities because of elevation. The only evaluation of differences in the perception of hurricane hazard by residents of nearby communities (South Miami Beach and Key Biscayne) was made by Bartnick[8] who related the differences to the socio-economic characteristics of the populations. In the analysis of hurricane evacuation behavior, most post-event evacuation studies[9] have only considered the general area of residence (i. e. beach, bay, or inland), although Wilkinson and Ross[10] found that evacuation was related to perceived homesite elevation.

Homesite Location and the Selection of Adjustments

Residents of the Lower Florida Keys may make several major long-term adjustments to minimize hurricane loss, such as selecting a permanent house rather than a mobile home, choosing an elevated house instead of a ground level

house, and purchasing flood insurance. If the spatial patterns of the adjustments accurately represent actions taken primarily to reduce potential hurricane losses, a close relationship between the selection of these adjustments and the physical homesite characteristics would be expected, since the vulnerability of the homesites to hurricane destruction varies locally.

A variety of physical parameters may be expected to affect the potential for hurricane flood damage to a dwelling. They include whether or not the homesite is adjacent to a canal or the shore, as well as the distances from the nearest canal and shore; the distance from the southern coasts of the keys (which would be exposed to storm surges from the open waters of the Straits of Florida); whether or not the homesite is on filled land; the ground elevation; and the types of vegetation about the homesite.

Environment of Elevated Versus Ground Level Houses

The selection of the elevated versus ground level house adjustment is statistically related to many of the physical characteristics of the homesite. Two statistical tests were run, chi-square and Automatic Interaction Detector (AID3).

Results from Chi-Square Analysis

A chi-square analysis was run on the data set with the following null hypothesis: there is no significant difference between the elevated houses and the ground level houses with respect to the sites examined. The results are given below and in Table 1.

TABLE 1

CHI-SQUARE RELATIONSHIPS: RESIDENTIAL ADJUSTMENTS AND PHYSICAL HOMESITE CHARACTERISTICS

Physical Variables	Elevated/Ground Level House Selection
Filled/unfilled land	*
Adjacency to canal	*
Adjacency to shore	
Distance to canal	*
Distance to shore	*
Distance to southern coast	*
Ground elevation	
Flood hazard zone	
Natural vegetation	*
Vegetation height	*

* Indicated chi-square significant at .05 level.

Distance to Shore. Elevated houses are disproportionately located on homesites within 500 feet of the shore. In fact, some two-thirds of all the elevated houses studied are so located, compared with only 44 percent of the ground level houses. Nevertheless, even within this area ground level houses are more numerous than elevated houses. While the relationship between the distance to the nearest shore and the elevated/ground level house selection is significant, that between these house types and the adjacency of the homesite to the shore is not significant.

Location Vis-a-vis Canals. Canals run alongside the majority of homesites occupied by both elevated and ground level houses. Elevated houses, however, are over-represented on such homesites---they comprise 41 percent of all houses located along canals but only 21 percent of the houses located away from canals. This relationship is shown more strongly when distance of the house to the nearest canal is considered. Only 4 percent of the elevated houses surveyed are located over 300 feet from a canal, contrasting with 26 percent of the ground level houses.

Filled Land and Natural Vegetation. Ground level houses are under-represented upon filled land homesites, but the elevation of the homesite is not statistically associated with the elevated/ground level house adjustment. The type of natural vegetation about the homesite is statistically associated with the house type upon the site, illustrating the fact that the vegetation patterns covary with many of the other physical characteristics. For example, while 9 percent of all houses are upon landfill areas (usually mangrove swamps) where little or no revegetation has occurred, this is much more characteristic for stilt houses (17 percent) than for ground level houses (5 percent). On the other hand, only 6 percent of the stilt houses are located within areas where the Caribbean slash pines are found, whereas 15 percent of the ground level houses are located amid these pines. There is no significant relationship, however, between the choice of ground level or elevated houses and the height of the vegetation.

Results from AID3 Analysis

Certain combinations of physical homesite characteristics are more frequently associated with the siting of elevated houses than others. The use of the Automatic Interaction Detector (AID3) program illustrates how the various physical variables interact to explain the sitings of elevated and ground level houses (Fig. 1). It is possible to characterize the physical environments of those homesites most and least likely to be occupied by elevated and ground level houses.

Certain physical variables, which do not significantly discriminate between homesites with elevated and ground level houses when considering the entire sample, are significant with smaller segments of the population. A case in point is elevation. While elevated houses comprise 33 percent of all houses occupying homesites upon filled land situated over 7,000 feet from the southern coast, this figure drops to 14 percent on those homesites over five feet in elevation and rises to 36 percent for those homesites under five feet in elevation.

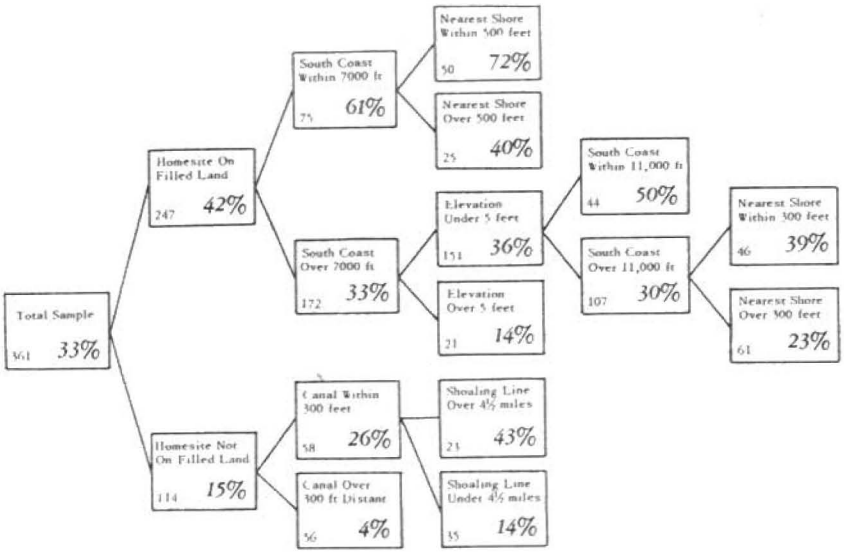

Fig. 1. Physical characteristics of homesites occupied by elevated houses. Percentage figures indicate the proportions of all houses within various environments which are elevated. Example: Of the 56 residents sampled who lived over 300 feet from a canal and upon unfilled land, only 4 percent occupy elevated houses. AID3 Analysis, explained variation equals 21 percent.

Conclusion

The chi-square tests and the AID3 analysis both demonstrate that significantly greater proportions of elevated houses are located upon the homesites most vulnerable to hurricane flood damage. Homesites upon filled land, near the shore or canals, and at low elevations are all particularly vulnerable for ground level houses. The acceptance of elevated houses as an adjustment to these hazardous circumstances is indicated by their distribution--primarily within areas which may receive the most severe wave action, with relatively few elevated houses within other areas. On the other hand, elevated houses are over-represented within neighborhoods with scant vegetation cover. They may also be more vulnerable to wind damage, an aspect of the hurricane hazard from which elevated houses may not be adequately protected.

While these findings provide valuable insights into the environmental factors associated with the adoption of the elevated house adjustment, the AID3 analysis explains only 21 percent of the variation between elevated and ground level houses, leaving much of the spatial pattern unexplained.

* * *

1. Florida Coastal Coordinating Council, *Florida Keys Coastal Zone Management Study* (Tallahassee: Florida Department of Natural Resources, 1974), p. 9.

2. Monroe County, Florida, *An Ordinance Regulating Development within Flood Hazard Districts within the County of Monroe* (Ordinance No. 3-1975), Section 4 (a).

3. The population used in this study was drawn from a larger sample which also included mobile home residents. Characteristics of the mobile homes are described in John A. Cross, "Residential Adjustments to the Hurricane Hazard in the Lower Florida Keys" (Ph.D. diss., University of Illinois, 1979).

4. Leonard Guelke, "Interdisciplinary Research and Environmental Perception," *Proceedings of the Association of American Geographers* 8 (1976): 184-88; and Leonard Guelke, "Environmental Perception and Behavior: a Methodolcgical Examination," paper presented at the 73rd annual meeting of the Association of American Geographers, Salt Lake City, April 1977.

5. Earl J. Baker, "Cognitive Factors Relating to Response and Adjustment to Hurricane Hazard" (M.A. thesis, Florida State University, 1972).

6. Clark W. Fuller, "People and Hurricanes: A Study of Attitudes in Belize" (M.A. thesis, Ohio University, 1975).

7. Ian Burton, Robert W. Kates, and Rodman E. Snead, *The Human Ecology of Coastal Flood Hazard in Megalopolis*, Department of Geography Research Paper No. 115 (Chicago: University of Chicago, 1969).

8. Howard A. Bartnick, "Hurricane Perception in Selected Study Sites in Southeastern Florida" (M.A. thesis, University of Miami, 1975).

9. Earl J. Baker, "Predicting Response to Hurricane Warnings: A Reanalysis of Data from Four Studies," *Mass Emergencies* (1979): 18-19.

10. Kenneth P. Wilkinson and Peggy J. Ross, *Citizens' Responses to Warnings of Hurricane Camille*, Social Science Research Center Report No. 35 (State College: Mississippi State University, 1970), p. 19.

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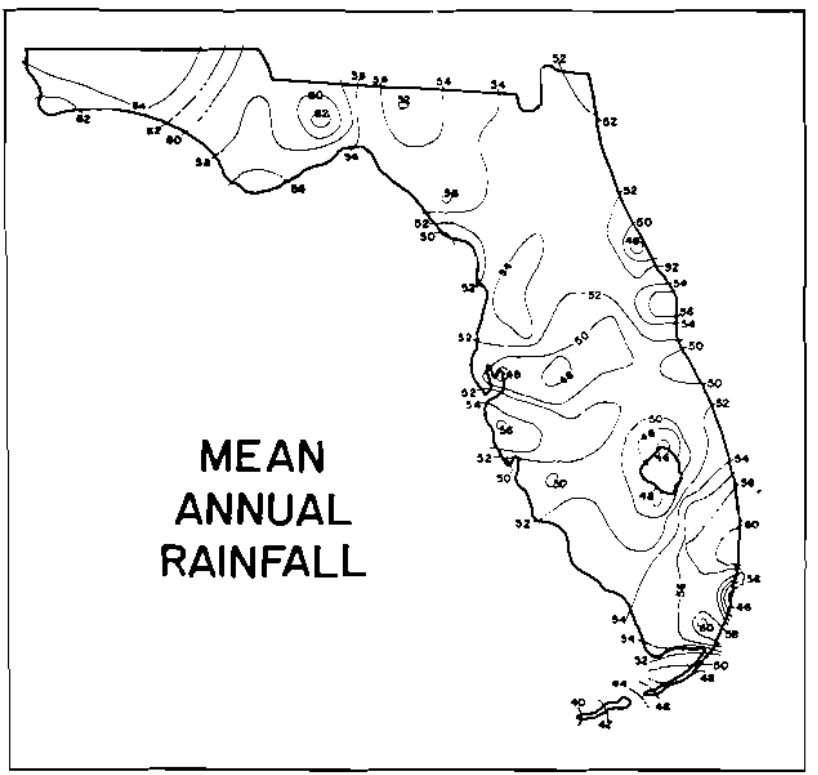
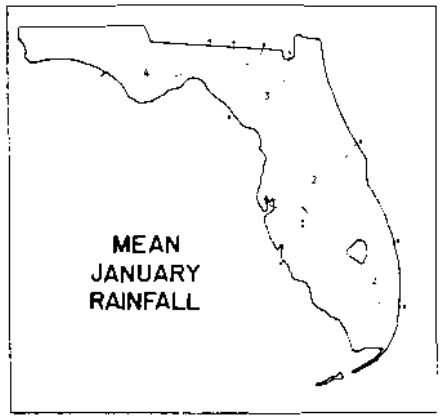
FLORIDA RAINFALL MAPS

Jeffrey A. Isaacs and Donald Brandes

The accompanying maps illustrate Florida rainfall for a thirty-year period, 1949-78. The maps and the data from which they were derived were used in Isaacs' (1980) master's thesis "Precipitation Regimes Of Florida: Spatial Analyses And Time Series" and are being used in Brandes' current research on the significance of hurricane rainfall to the South Florida water budget. The isohyets were based on data from sixty-two stations chosen for location and data continuity. Values were taken from Summaries of Climatological Data of the National Climatic Center (NCC), published by the National Oceanic and Atmospheric Administration (NOAA). The original maps from which these were redrawn were produced by a line printer from SYMAP software of the Laboratory for Computer Graphics and Spatial Analysis, Harvard University (1975). This program contains an isoline mapping routine incorporating an algorythm to interpolate data values for all points on the map surface. The smallest feasible isohyet intervals were used to illustrate the great spatial variability of rainfall distribution in Florida. Values are in inches, the unit used originally to record the data. Thanks to Professors James A. Henry and David L. Niddrie, University of Florida, for their advice on these maps and the larger research projects in which they are being used.

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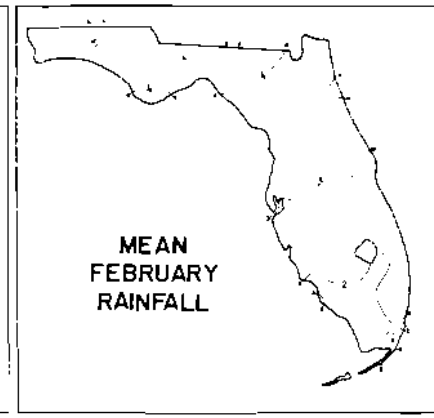
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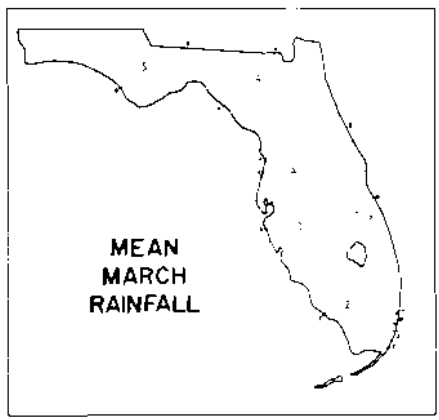
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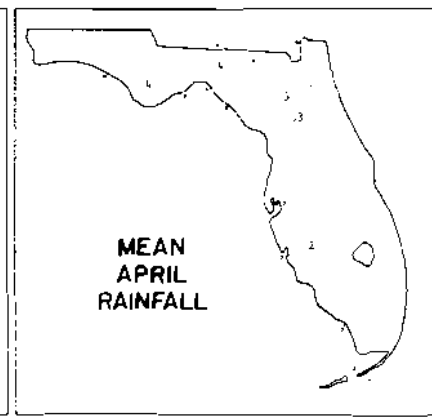
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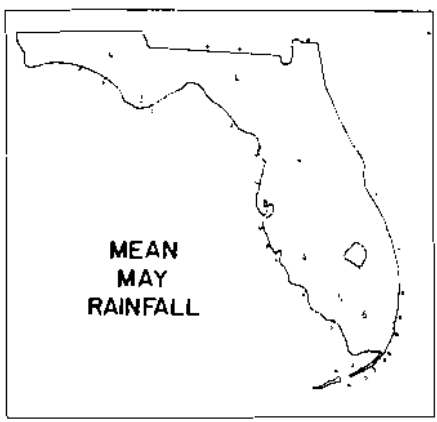
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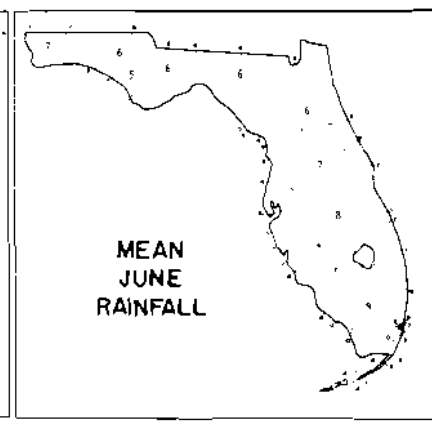
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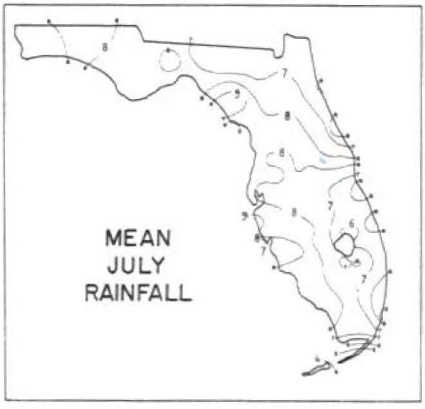
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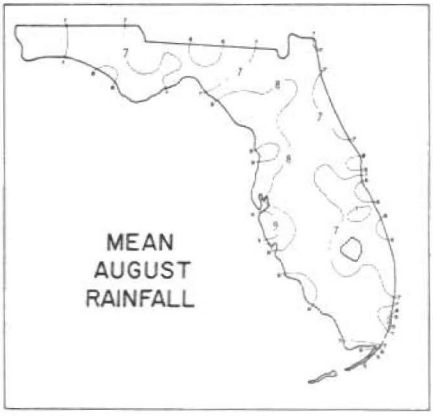
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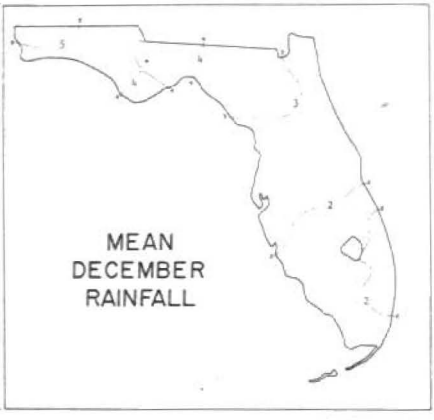
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LOCATION OF SHOPLIFTERS IN BOCA RATON, FLORIDA[1]

Millard H. Wafle

Shoplifting in the United States is epidemic. Estimates of the magnitude of this crime suggest conservatively that in each supermarket nationwide shoplifting occurs at least six times a day, and probably twenty to fifty times is more accurate. Estimating only ten thefts per day, the annual loss per supermarket is some fourteen thousand dollars per year. Nationwide the figure becomes a staggering 1.7 billion dollars taken from retail stores, and indirectly from consumers.[2] For Florida the loss estimate (1976) was 1.3 million dollars.[3]

Research has investigated the problem of shoplifting and the nature of the shoplifter; little has been said about where the shoplifter lives relative to the place of the crime. Does the shoplifter live and steal in close proximity? Or does he/she journey long distances from home in order to avoid recognition which might result from frequenting the same stores too often?

The present research was conducted on arrest data from the Boca Raton Police Department during October 1978 to September 1979. Some 181 shoplifting arrests were made (excluding juveniles); these amounted to 23 percent of all arrests. The data used for this study are for three stores in Boca Raton: Jeffersons, Star Value (both variety stores), and Boogarts (a supermarket). The distance variable in the study is the distance to nearest mile that the arrested person lived from the place of arrest. The data for all three stores were aggregated together so that a single, overall model could be presented.

It can be seen that there is a clear distance decay function (home from site of crime) with an exponentially declining curve. That is, most shoplifters live close to the store they shoplift. Typically, the person shoplifting in a given store lives nearby, and probably does most of his/her legitimate shopping there as well.

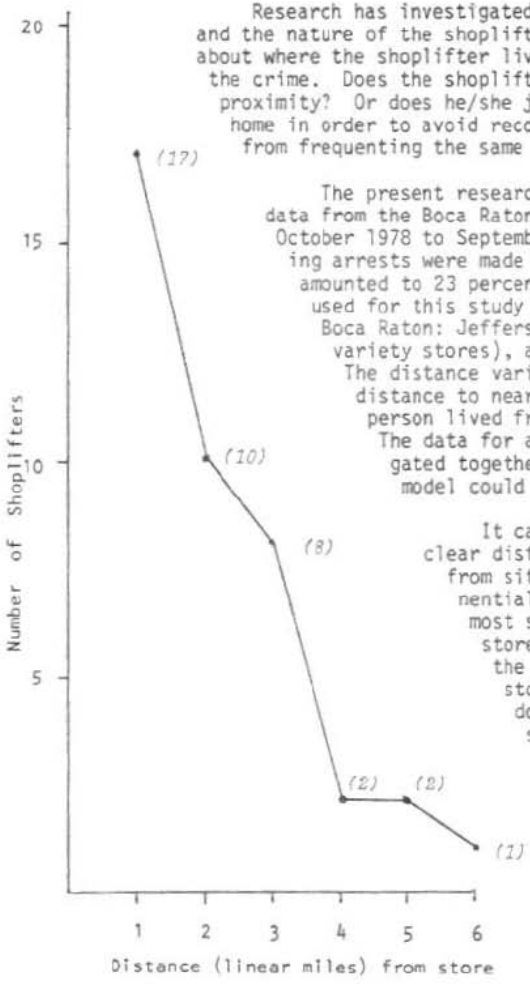

Fig. 1. Number of shoplifters (by distance from site of crime: aggregate of three stores).

The proximity of the shoplifter to the place of crime is even more dramatic when considered from the point of view, not of numbers per linear mile (as in Fig. 1), but in terms of the numbers per square mile of space surrounding the store, i.e., shoplifter density.

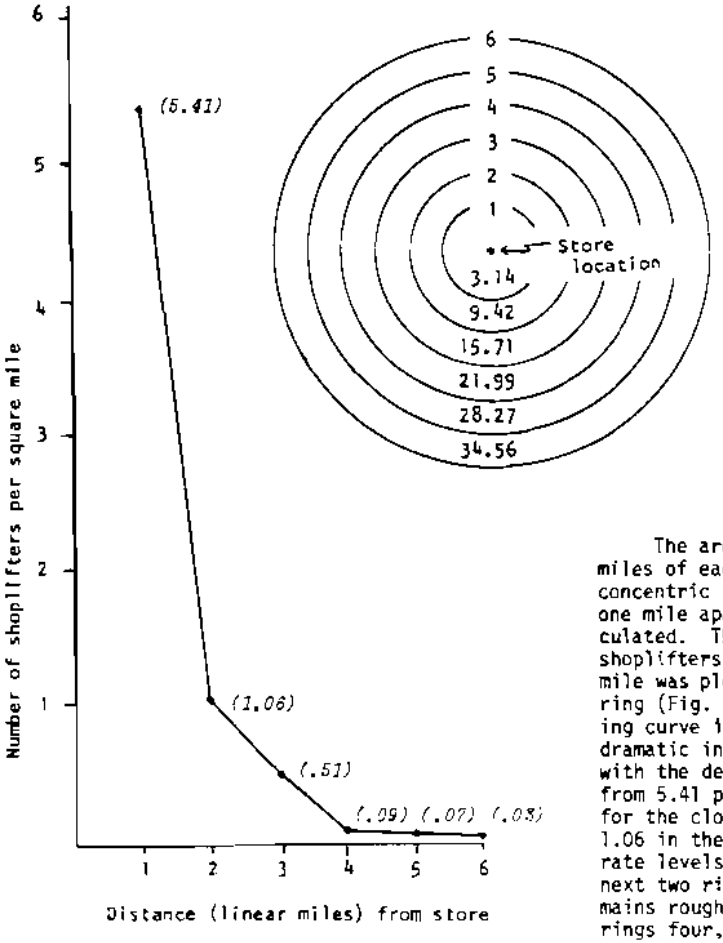

Fig. 2. Shoplifter density (by distance from site of crime: aggregate of three stores). Inset: areas of rings in square miles (lower numbers) and distance from store (upper numbers).

The area in square miles of each of six concentric rings spaced one mile apart was calculated. The number of shoplifters per square mile was plotted for each ring (Fig. 2). The resulting curve is even more dramatic in its decay rate, with the density dropping from 5.41 per square mile for the closest ring, to 1.06 in the second. The rate levels off for the next two rings, and remains roughly the same for rings four, five and six.

Concluding from the Boca Raton data, one can say that the shoplifter lives close to the store he/she shoplifts. Distance from a store has a pronounced effect on the likelihood that a potential shoplifter will steal from that store. Shoplifters, then, are not migrants coming from outside the local area to commit their crime---they are people of the neighborhood.

* * *

1. Grateful appreciation is extended to Jerry Koontz who assisted on this manuscript.

2. Margaret Hughes, *Shoplifter: Who and Where* (Los Angeles: Security Publishing Inc., 1974), p. 34. See also Loren Edwards, *Shoplifting and Shrinkage Protection for Stores* (Springfield, Ill.: publisher unknown, 1958).

3. Florida, Governor's Crime Preventive Committee, *Help Stop Crime, Retail Theft* (Tallahassee, 1976 [?]).

AGING AND MOBILITY IN DADE COUNTY, FLORIDA[1]

Ira M. Sheskin and Helen A. Friedman

The elderly in the United States comprised about 10.8 percent of the population in 1977. Florida, with its 1.4 million elderly residents, has the greatest proportion of elderly in the nation with 16.4 percent of its population in the over sixty-five cohort. Dade County has one of the largest concentrations due in part to the large in-migration of elderly from other states who seek the tropical climate and a somewhat lower cost of living than is found in northern metropolitan areas.[2] The elderly population of Dade County has been increasing in both absolute and relative terms. In 1970, approximately 172,700 (13.6 percent) of Dade County's residents were sixty-five or over; the comparable figures for 1975 were 221,500 (15.5 percent), a 28 percent increase. Approximately one-third of the elderly persons in Dade County are considered to be of low income. Dade County has large numbers of Jewish, Black, and Spanish elderly. South Miami Beach has been characterized as an urban geriatric ghetto; other elderly neighborhoods are suburban in nature. Thus Dade County is an excellent location to conduct aging research. The results of research in Dade County should be generalizable, particularly to other Florida and Sunbelt cities with large concentrations of elderly.

This paper discusses the importance of transportation to Dade County's elderly, the need for elderly travel behavior data, a survey instrument designed to provide such data, and some results from this survey.[3]

Transportation: A Critical Problem for Dade's Elderly

In 1974 the Dade County Office of Human Resources[4] identified four "significant problems" faced by most elderly: 1) Reduced and/or static incomes coupled with inflation; 2) Increased demand for health care; 3) Deficits of decent housing; and 4) Alienation and frustration.

Although mobility problems were not identified as "significant," they obviously underlie other difficulties. Income problems affect automobile ownership and the ability to afford public transit. Income-related mobility problems may restrict a person's access to lower-priced shopping opportunities. Health care problems are often related to difficulty in accessing health care institutions. Mobility restrictions caused by either monetary considerations or physical deterioration often lead to the elderly being forced to live in less desirable areas. Alienation and frustration may well result when a formerly mobile individual becomes spatially restricted.

If transportation needs of the elderly were not recognized explicitly in 1974, they certainly came to the forefront by 1978 when a four-volume study was issued by the Dade County Office of Transportation Administration (OTA).[5] Senior citizens, via the "Concerned Seniors of Dade," and handicapped persons, via the "Commission for the Advancement of the Physically Handicapped," have been lobbying for improved transportation services. Riders over sixty-five represent over 25 percent of all public transit users. A number of Dade County social workers have indicated their feelings that mobility is a serious problem for the elderly.

The Need for Travel Behavior Information

An examination of current programs and population trends point to the necessity to obtain detailed information on elderly travel behavior.

Conclusions Expressed in The Study

A large number of tax supported and charity transportation programs were examined in *The Elderly and Handicapped Transportation Needs Study*, and were found to be "totally disorganized and uncoordinated." Fred Silverman, an OTA transportation planner, was quoted in the 28 November 1978 *Miami Herald* as saying "the data we've got are so bad we really can't tell how much is being spent on [transportation for the elderly]." He indicated that because the records are so poor, the Metro transit planners cannot determine whether the transportation needs of the elderly and handicapped are being met. "The main thing we found is that we're spending a lot of money, but people may not be getting a lot of service."

Two major interrelated areas of research needs were identified in *The Study*. The first involves the need to establish a "brokerage system" in which the available transportation services, both public and private, are coordinated by a central agency. Currently, transport services to the elderly are provided under 40 different federal grant programs by 24 government agencies and 103 charitable organizations by approximately 300 vehicles, at an annual cost of some six million dollars. In many cases, costs run six to ten dollars per rider. The need for coordination is obvious and Dade County has taken the first steps toward the institution of a brokerage system. The county contends that efficient planning for such a system depends on the existence of an adequate data base.

The second major research need identified by *The Study* involves detailed survey work designed to elicit information concerning the travel behavior of the elderly and handicapped. The report states: "Having a bus route within 3-4 blocks does not necessarily solve the transportation problems if the bus does not go where people need to go. Survey work could be undertaken during upcoming fiscal years when MTA equipment could be re-routed and new equipment used for expansion of the MTA system to satisfy these special needs."

Other Reasons for Investigating Elderly Travel Behavior

Planning and Feasibility Study. A planning and feasibility study issued by OTA (April 1978) concluded that "rider demand is difficult to estimate."[6] The report cites evidence of wide margins of error in ridership estimates for other cities, including estimates made by Harvard University for Cleveland's Community Responsive Transit (CRT) and for Westport, Connecticut, Haddonfield, New Jersey, and several Canadian communities.

Lessons from "The Ride." Dade County's own experience with STS (Special Transportation Services) and particularly with "The Ride" indicates the need to study travel behavior prior to project implementation. "The Ride" was a 1.5 million dollar Metro transportation project with four fixed route minibuses in Little Havana and Hialeah and demand-responsive (dial-a-ride) taxi service in the Northeast sector and in Southwest Dade. This project was initiated as a result of citizen pressure; little data existed to help determine routes and schedules. Only about 9 percent of eligible persons became certified users. The result was that ridership levels were poor. The most heavily traveled fixed route service carried only one rider per hour. Average daily trip demand per fixed route was 3.16 trips for an eight-hour day. The net deficit per passenger trip was $46.15.

For the demand responsive service, "The Ride" carried about twenty to twenty-five passengers per day. Each vehicle averaged 1.25 passengers per hour. The deficit was $54.81 per passenger trip. The Hialeah and Little Havana services were cancelled at the end of December 1979; the taxi service in the Northeast and Southwest ended in February 1980. An evaluation report concluded: "Clearly, the planning process did not develop enough valid, base data about senior citizen trip making and travel desires."[7]

In spite of the apparent lack of success, "The Ride" had been reinstituted on a countywide basis using a dial-a-ride system during 1980. About 125 trips per day were being made. Eligible persons over sixty-five could travel anywhere within the "transportation neighborhood" in which they resided. In late 1980, The Ride was again cancelled due to a lack of ridership.

Integrated Rapid Transit. Dade County has just initiated construction of a multi-million dollar integrated rail rapid transit, downtown people mover, and bus transit system. Since the elderly form such a large percentage of transit riders, and since they have special needs, it would seem logical to plan bus routes with elderly travel behavior in mind, particularly in areas of great elderly concentration.

Elderly Flight to the Suburbs. A final reason which emphasizes the need to obtain detailed travel information is that recent evidence indicates that as the elderly population of Dade County has been increasing, and as housing has thus become more difficult to find in traditional central city elderly areas, the elderly have been moving to suburban areas. Such areas are characterized by lower density residential development and opportunities for shopping, medical care, and government services. Thus, we may expect to see an intensification of elderly transportation problems as the elderly suburbanize to lower density areas.

The above factors all speak to the need for an accurate, detailed data base concerning the travel behavior and needs of the elderly in Dade County.

Survey Design

A survey instrument was developed to elicit travel behavior information on Dade's elderly. Initially, five graduate students conducted unstructured interviews with twenty-five elderly persons to discern opinions concerning transportation needs. The instrument was developed and then pretested by the five graduate students on twenty-five elderly residents, leading to a number of improvements.

The resulting survey instrument was then circulated to eight persons, two at each of the following: the University of Miami, the Kaiser Transit Group, the Dade County Office of Transportation Administration, and the Division of Elderly Services. Maximum input was sought since the desire was to produce a document which would be useful to local planners. The survey instrument underwent final revisions and was translated into Spanish. This self-administered questionnaire was given to ninety persons age fifty and over who attended functions at five senior citizen centers in Dade County. This resulted in a tremendous cost savings over a door-to-door interview procedure, but led to a sample that is biased. That is, those elderly who have the physical and mental acuity to attend senior citizen center functions are obviously more mobile than those who do not. Thus, all results need be interpreted with this bias in mind.

The design and administration of surveys to the elderly entails a number of problems somewhat unique to this population subgroup.

First, our experience with administering questionnaires to more than ten elderly persons at a time, many of whom had problems---illiteracy, vision problems, language problems, senility, etc.---led to the conclusion that personal interviews, and not a self-administered questionnaire, is the superior survey methodology to employ with this population subgroup.

Second, while the length of a questionnaire is always a problem, it is critical in dealing with the elderly. The attention span of an elderly person is often short.

Third, questions must be kept particularly simple. Many elderly persons had problems following the directions of a filter question. (A filter question sends some respondents to one part of the questionnaire and other respondents to another, depending on the answer to the question.) Also, fill in the blank questions were difficult for those with writing problems.

Fourth, a special awareness of the life style of the elderly is important to a successful survey. Elderly travel behavior is likely to be significantly different from that of the general population. Thus, the survey must include questions about medical and recreational trips. In asking about the mode of transportation used for grocery shopping, the answer "I do not go grocery shopping, someone does it for me" is important; questions about physical problems in negotiating a bus trip are also important.

Fifth, answers which indicate some degree of dependence on others should be the first choice given, implying the expectation that many people will check this answer.

While self-administered surveys are in vogue both because of cost savings and the biases introduced by the interviewer, our experience on this survey seems to indicate a preference for the employment of an interviewer when dealing with an elderly population.

Survey Findings

Socio-economic Characteristics

The sample used in the study to some extent reflects Dade County's elderly. Seventy percent of the sample are women. Almost half are Jews; over one-third are Cubans. Education and income levels are low: 58 percent did not complete high school, the same percentage have an income below $5,800; 85 percent have incomes below $10,000; 83 percent are retired. The average age is 70.6 years; the median age, approximately 70. Most (86 percent) have lived in south Florida for more than two years; 96 percent live in south Florida year round. Automobile availability is low: 38 percent of the sample have access to an automobile on a regular basis; 41 percent currently have valid drivers' licenses.

Travel Behavior

Three different types of analyses were undertaken. First, the mode of transportation employed for various trip purposes is examined. Second, the distances traveled for various activities are investigated. Third, differences are tested between the travel behavior of the young old and the old old.

Mode of Transportation. Transportation mode varied with the purpose of the trip. For shopping, 44 percent of the sample used the automobile for grocery shopping and 32 percent walked (Table 1). Only 16 percent used the bus, probably due to the difficulty of carrying packages on the bus. Similar results were found for shopping for higher order goods, although the bus mode replaces the walk mode as most important.

For medical care, we again see the automobile accounting for over 40 percent of all trips. Thirty percent of respondents used the bus; only 10 percent walked. Here a large percentage traveled by modes other than bus, walk, or car. This is because there are special jitneys or taxi services available for medical care. Looking at social trips to friends and neighbors, about 30 percent used the automobile mode, reasonably equal numbers used the bus, walked, or did not make trips to friends and neighbors.

Table 1

Mode of Transportation

Mode	Grocery Shopping		Clothes and Household Goods		Medical Care		Visit Friends and Neighbors		Visit Relatives	
	N	%	N	%	N	%	N	%	N	%
Walk.....	29	32.2	11	12.2	9	10.0	19	21.1	3	13.3
Car driver...	20	22.2	19	21.1	19	21.1	14	15.6	15	16.7
Car passenger	20	22.2	18	20.0	20	22.2	15	16.7	18	20.0
Bus	14	15.6	33	36.7	27	30.0	22	24.4	16	17.8
Other ...	7	7.8	9	10.0	15	16.7	1	1.1	3	2.2
Do not visit/ they visit me	NA		NA		NA		19	21.1	36	40.0
Total	90	100	90	100	90	100	90	100	90	100

NA = Not applicable

The mode of transportation for visiting relatives reflects the fact that it is usually easier for younger relatives to visit older people than for older people to go on their own to visit relatives. Also reflected is the fact that many of the elderly are transported from the north and have few or no relatives in South Florida. Again, however, over 35 percent of the sample use the auto to make these trips.

A major conclusion from this analysis of means of transportation is that while the percentage of elderly using the automobile for various trip types is much lower than is usual for the non-elderly, the idea that all elderly have mobility problems is not supported by the information provided by our sample. For the various trip types, between 33 and 44 percent use the automobile to get around. For those without access to automobiles, the bus clearly is being used as the most prevalent alternative. Similar results were found by Wynn and Levinson, and Marble, Hanson, and Hanson.[8]

Distance Traveled. A second variable examined is the distance people travel for various activities. For grocery shopping, 60 percent traveled one mile or less; 83 percent, less than two miles. The respondents traveled significantly farther to shop for clothes and household goods than for groceries:

a t-test showed a significant difference (95 percent confidence level) between the means (Table 2). Travel to the doctor necessitated even longer trips, with the average respondent going 3.8 miles; those making trips to a hospital traveled an average of 5.5 miles (Table 3).

For visits to friends and neighbors, over 70 percent do not travel beyond their own neighborhoods. Thus for trips which are not for basic necessities the respondents do not travel far. Similar results were found for social trips made by the elderly of two communities in Erie County, New York.[9] Also, few leave south Florida to visit relatives in other areas and almost half either have no contact with relatives or have relatives travel to them (Table 4).

Table 2

Distances Traveled For Shopping

Distance (in miles)	Grocery Shopping			Clothes And Household Goods		
	Number	Percent	Cumulative Percent	Number	Percent	Cumulative Percent
<1	38	59.5%	59.5%	18	37.5%	37.5%
1-2	15	23.5	83.0	16	33.5	71.0
>2	11	17.0	100.0	14	29.0	100.0
Total	64	100.0		48	100.0	
	$\bar{X}$ = 1.34		S = 2.03	$\bar{X}$ = 2.15		S = 2.23

Table 3

Distances Traveled For Medical Care

Distance (in miles)	Doctor			Hospital		
	Number	Percent	Cumulative Percent	Number	Percent	Cumulative Percent
<1	14	33.4%	33.4%	5	20.0%	20.0%
1-5	16	38.2	71.6	6	24.0	44.0
5.1-10	6	14.2	85.8	12	48.0	92.0
>10	6	14.2	100.0	2	8.0	100.0
Total	42	100.0		25	100.0	
	$\bar{X}$ = 3.8		S = 4.5	$\bar{X}$ = 5.5		S = 3.7

Table 4

Distance to Visit Friends and Relatives

	Number	Percent	Cumulative %
Distance to visit relatives			
Do Not Visit	21	23.9%	23.9%
They Come To Me	21	23.9	47.7
Within 5 Miles	15	17.0	64.8
Within Dade County	23	26.1	90.9
Within South Florida	4	4.5	95.5
Outside South Florida	4	4.5	100.0
Total	90	100.0	100.0
Distance to visit friends			
Friends Visit Me	24	27.6%	27.6%
Same Block	13	14.9	42.5
Neighborhood	25	28.7	71.3
Within 5 Miles	14	16.2	87.4
More Than 5 Miles	11	12.6	100.0
Total	90	100.0	100.0

Thus, in general it is found that the elderly persons in our sample are tied to their own neighborhoods except for medical care, which is simply not always available within a few miles of one's home. These results are in agreement with those reported by Stutz for the San Diego Comprehensive Planning Organization using a 1966 origin-destination survey which shows elderly persons making mostly short-length trips.[10]

Old Old vs. Young Old. Recently interest has been growing in the investigation of differences between the old old (persons over seventy) and the young old (persons under seventy). Interestingly, we found little difference between the travel behavior of these two age cohorts. Using chi-square tests, no significant differences were found in: 1) automobile ownership; 2) possession of a driver's license; and 3) mode of transportation used in distance traveled for grocery shopping, higher order goods shopping, medical services, and visiting friends and relatives. This lack of difference is probably because our respondents were all mobile enough to attend senior citizen center functions regardless of age. Another possiblity is that age is a poor surrogate for distinguishing the mobile elderly from the frail and vulnerable.

Conclusion

Dade County has a large and growing elderly population. The importance of transportation to the elderly was recognized by county planners, but no data base existed by which to judge the extent of their mobility problems and by which to plan transportation to alleviate these problems. The failure of The Ride is indicative of the lack of information about elderly travel patterns. This study represents a first attempt to develop such a data base. The results, although based on a sample biased toward the more mobile, seem to indicate that elderly travel patterns are clearly different from those of the general population. However there also seems to be significant numbers of elderly who can fend for themselves.

* * *

1. We would like to thank Ellen Casebeer and Fred Silverman of the Dade County Office of Transportation Administration, Francis Kramer and Howard Russell of the Dade County Division of Elderly Services, and Howard Eisenstadt of the Kaiser Transit Group for their assistance during various phases of this project.

2. R. Schultz and T. Camarco, Jr., "Migration to and from Southeast Florida, 1965-70," *Southeastern Geographer* 17 (1977): 33-48.

3. The elderly and their spatial behavior has become a topic of concern among geographers. See, for example: S. Golant, *The Residential Location and Spatial Behavior of the Elderly: A Canadian Example*, The University of Chicago, Department of Geography Research Paper no. 143, 1972; S. Golant, *Location and Environment of Elderly Population* (Washington, D C: V. H. Winston & Sons, 1979); G. Rowles, *Prisoners of Space? Exploring the Geographical Experience of Older People* (Boulder, Colorado: Westview Press, 1978); R. Wiseman, Spatial Aspects of Aging, Association of American Geographers Resource Paper no. 78-4 (Washington, D C, 1978); and the July, 1980 issue of *The Pennsylvania Geographer*. The most complete work on elderly travel is: M. Wachs, *Transportation for the Elderly* (Berkeley, California: University of California Press, 1979).

4. Dade County, Office of Human Resources, *Profile of the Elderly, Dade County, Florida*, 1974.

5. Dade County, Office of Transportation Administration, Division of Planning and Programming, *Elderly and Handicapped Transportation Needs Study*, 1978, 4 vols.

6. Dade County, Office of Transportation Administration, *Planning and Feasibility Study for Special Demand Responsive Transportation Systems*, 1978, p. 35.

7. Dade County, Office of Transportation Administration, *The Ride Evaluation Report*, 18 December 1979, p. 28.

8. F. Wynn and H. Levinson, "Some Considerations in Appraising Bus Transit Potentials," *Highway Research Record* 197 (1967): 1-24; D. Marble, P. Hanson, and S. Hanson, "Household Travel Behavior Study: Intraurban Mobility Patterns of Elderly Households: A Swedish Example," *Proceedings of the International Conference on Transportation Research*, Bruges, Belgium (May 1973): pp. 655-64.

9. I. Sheskin, "The Social Trip Behavior of Suburban Residents" (M.A. thesis, State University of New York at Buffalo, 1974).

10. F. Stutz, *Social Aspects of Interaction and Transportation*, Association of American Geographers Resource Paper no. 76-2 (Washington, D C, 1976).

Florida Society of GEOGRAPHERS

The Florida Society of Geographers was chartered in 1964 as a non-profit organization for the purpose of furthering professionalism in geography through the application of geographic techniques in all areas of education, government, and business in Florida.

The society supports these objectives by promoting acquaintance and discussion among its members and with scholars and practitioners in related fields by stimulating research and field investigation, by encouraging publication of scholarly studies, and by performing services to aid the advancement of its members and the field of geography in Florida.

The society holds a meeting once a year, usually in February. At this meeting papers are presented and matters of mutual concern are discussed.

Persons interested in membership in The Florida Society of Geographers should contact:

Regular membership is $5.00 for a calendar year; student membership is $2.50.