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Vol. 12 No. 2

POPULATION DENSITY OF FLORIDA
(BY COUNTY)

The Florida Geographer is the official publication of The Florida Society of Geographers, and is distributed without cost to members of the Society. Two numbers per year will be published, pending receipt of an adequate number of acceptable manuscripts.

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 the relation of Florida to other areas.

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. 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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About the Cover...

The three-dimensional histogram of population density by counties was submitted by Cpt. David R. Bowen, U.S.M.A., West Point, NY. It was produced on a Tektronix-4631 Plotter using a program developed by W. R. Tobler and adapted by Cpt. Bowen and his colleague Cpt. John Seck. The source of the data was Hammond's *Contemporary World Atlas*, 1971.

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THE INFLUENCE OF THE DADE COUNTY MASTER PLAN UPON DEVELOPMENT AROUND THE FLORIDA TURNPIKE

Drew B. Vella and Ira M. Sheskin

Dade county is one of the fastest growing regions in the United States. This growth is to be channeled by the Metropolitan Dade County Master Plan and thus will be controlled growth rather than the haphazard growth that has occurred in other urban areas. Prior research suggests that intensive development should occur at the interchanges of the Florida Turnpike. However, because the Comprehensive Master Plan allows for only specific residential and industrial densities, it is believed that development will be restricted at some interchanges. This paper attempts to show the influence of the Comprehensive Master Plan on development around three interchanges of the Florida Turnpike using land values and zoning regulations as surrogates for development.

Review of Literature

The notion that accessibility affects urban residential land values has roots with von Thünnen. Later researchers found that improved transportation hastens development and increases land values in adjacent areas. One of the first studies by geographers of highway development which noted resulting geographic change was by Garrison et al.[1] They concluded that location at strategic places was critical to the success of business establishments and that location influences the price one must pay to purchase or rent facilities.

Illustrative of highway impact studies is a 1968 report by the Secretary of Commerce of a nationwide highway impact analysis. He found that 172 of 183 study segments along highways increased in land values. The largest concentration of annual rates of change was between 6 and 18 percent. Lands adjacent to the Dallas Central Expressway appreciated in value an average of 74.1 percent. Lands adjacent to the Jacksonville Expressway were studied from 1952 to 1960. Within 150 feet of the roadway land prices increased 36 percent, within 300 feet, 47 percent and within 500 feet, 25 percent.[2]

During the late 1960s and early 1970s controlled access highways came into prominence. Attention focused on interchanges as sites of reduced travel time for commuters and where maximum visual and physical exposure for businesses prevailed. "Among areas affected by highways, interchange areas have experienced relatively great economic activity, especially through more intensive forms of land use."[3]

Research by Hart and Bourne illustrated how highways caused development to "leapfrog" partially developed land and focus on subdivisions farther from the central city.[4] Muller envisioned suburbia emerging as the outer city, spatially arranged about freeway interchanges. He opined that we are witnessing the rise of curvilinear outer cities whose freeway spines function as both lifelines and main streets of suburbia.[5]

Numerous reports provide empirical evidence of the influence of highways on interchange development.[6] The consensus was that highways profoundly influence land values and subsequent development. Tremendous appreciation in land values and numerous changes in zoning often were seen. However, none of the studies were performed where a comprehensive development plan was present. Since development densities are restricted about the Florida Turnpike, the changes in land use and land values usually induced by transport improvements may be less than those reported elsewhere.

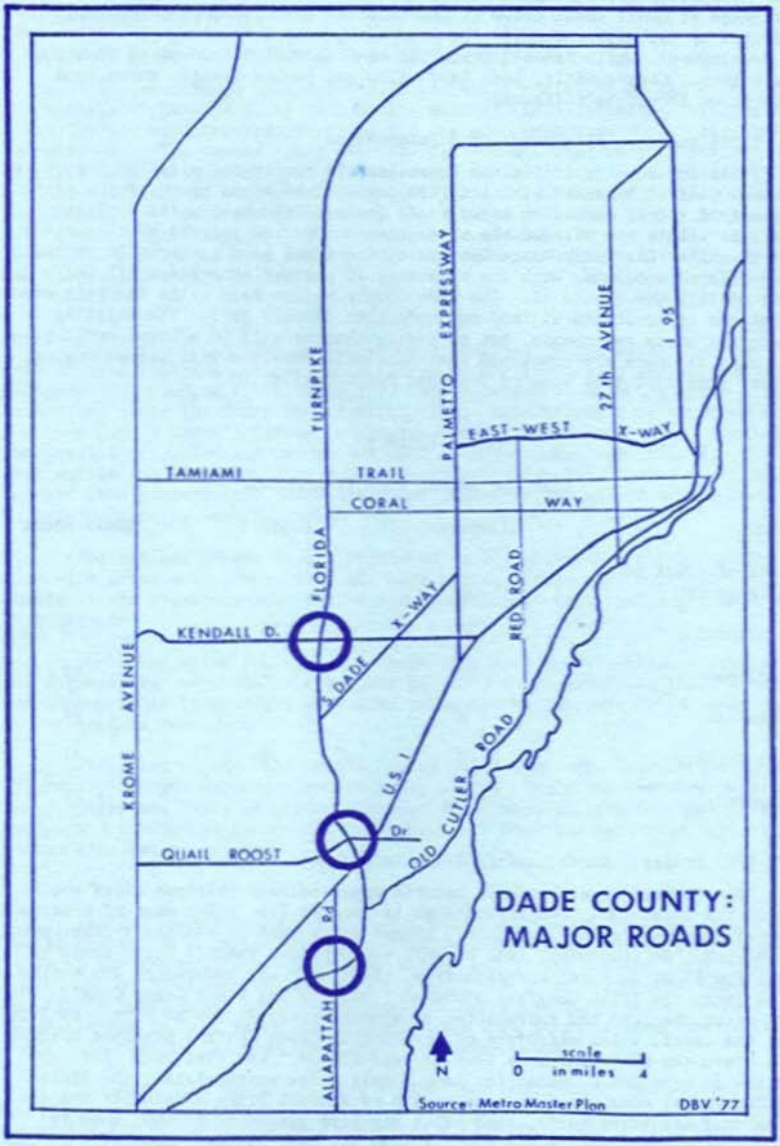
TURNPIKE
PALMETTO EXPRESSWAY
27th AVENUE
I 95
EAST-WEST X-WAY
TAMIAMI TRAIL
CORAL WAY
FLORIDA
KENDALL D.
X-WAY
RED ROAD
S DADE
KROME AVENUE
U.S. 1
OLD CUTLER ROAD
QUAIL ROOST Dr
Rd
ALLAPATTAH
DADE COUNTY:
MAJOR ROADS
N
scale
0 in miles 4
Source: Metro Master Plan
DBV '77

Fig. 1

Study Area

Three interchange areas of the Florida Turnpike were chosen for the study: Allapattah Road, Kendall Drive, and Quail Roost Drive (Fig. 1). The interchange at Quail Roost Drive is permitted to have the most development, as prescribed by the Master Plan.[7] The Allapattah Road interchange is restricted from development, while Kendall Drive has an intermediate amount of zoning restrictions. Consequently, both land value and zoning changes about each intersection should be different.

S. W. 112th Avenue - Allapattah Road Interchange

This interchange is located approximately twenty-one miles southwest of the Miami Central Business District (CBD), and eight miles north of the city of Homestead. Only one other major road, Coconut Palm Drive, (S. W. 248th Street) is within one mile of the interchange. Over 30 percent of the census tract in which this interchange lies is agricultural land. Almost 60 percent is undeveloped woodland, with the remaining 10 percent in residential and public utility use (Table 1). The Dade County Master Plan calls for this area to continue as agricultural land and open land through 1985. The existing residential units can remain, but no zoning changes will be allowed until after 1985. The planners are concerned that available farmland will become scarce. However, some feel this area is destined for urbanization.[8]

TABLE 1

LAND USE AROUND EACH INTERCHANGE

LAND USE	Allapattah	Kendall	Quail Roost
Percent of tract in each category			
Agricultural	30	75	0
Undeveloped	60	0	21
Residential	3	5	33
Public Utility	7	20	41
Commercial	0	0	5

S. W. 88th Street - North Kendall Drive Interchange

The Kendall interchange is located approximately thirteen miles southwest of the Miami CBD. The interchange is located five miles west of a large regional shopping center (Dadeland), around which much of Kendall's development is centered. In the 1930s, land on what would become Kendall Drive could be bought for $1.00 an acre; unfortunately, the "land" was underwater six months of the year. In 1958, Congress approved funds for the Black Creek Canal. Two years later the land had appreciated to approximately $1,000 an acre. By late 1962, the canal, which officials of the Florida Flood Control District claimed would "turn the wasteland into fertile farm fields," was finished. Yet, the farm fields were not to exist for long. Only a few months later, the State Road Department made the four-lane paving of Kendall Drive a priority project. As the road was being built, land value per acre jumped to $2,000, then to $5,700. Many felt land in the Kendall area was the "hottest" commodity in the real estate market. Today, the average family income of $20,000 (twice the Dade County average) reflects the affluent nature of the area.

The census tract data (1970) for this interchange shows five percent of the land in residential and 75 percent in agricultural use. The remaining 20 percent is divided among inland water, public utilities, and parks. The Master Plan allows for all this development, and calls for a low medium density of five homes per acre until 1985.

S. W. 200th Street - Quail Roost Drive Interchange

This interchange is located eighteen miles southwest of the Miami CBD. South Dixie Highway (U.S. 1) is one mile east of the interchange, via Quail Roost Drive. This interchange is by far the most urbanized of all the studied interchanges. The census tract data (1970) indicate that only 21 percent of the area is undeveloped. Over 33 percent of the vicinity is in residential use and 5 percent is commercial or industrial. Institutional public utilities and agriculture compose the remaining 41 percent. The Dade County Master Plan allows this interchange the most intensive development of the studied regions. Low medium density of five homes per acre as well as industrial and business use is permitted through 1985.

Data Sources

Land values and zoning changes were obtained (where available) for parcels of land within a one-half mile radius of the Turnpike's three study interchanges. The changes for 1960 to 1977 were recorded to determine sale prices before and after the Turnpike's construction. Land values were obtained from the Dade County Clerk's Office, where recorded deeds of land sales, listing the legal description and the buyers' and sellers' names were on file. Transfers within the same family to governmental or semi-public agencies, or those entered into by executors, administrators, trustees, or others acting in a fiduciary capacity were excluded.

The selling prices of all tracts of land displaying a change in ownership were noted and reduced to a per acre basis. Those with more than one change in the seventeen-year period were transformed into change per acre per year figures.

Since inflation could play a large role in a tract's price appreciation, all figures were adjusted to represent prices for the base year 1959. This was accomplished by dividing each land value by the Consumer Price Index for its respective year.

The files of the Dade County Zoning Department were consulted to ascertain all zoning changes approved for the study areas. The files reported owners' names, years and types of zoning change. These were tallied for each interchange and subdivided according to whether they occurred before or after the Master Plan was instituted.

Analysis

Table 2 presents the results of a data analysis of land values and zoning changes in a format which facilitates comparison. Significant support is shown for the hypothesis that land values and zoning changes have been influenced by the Comprehensive Master Plan. The interchange with the least permissive development (Allapattah Road) showed great differences in land value, change in land value and zoning change when compared with the Quail Roost interchange, the most permissive for development.

The mean land value per acre of $587 for Quail Roost was substantially higher than Allapattah's $92 [($t=1.88$), significant at $\alpha=.05$]. The mean *change* in land value per acre per year exhibited a disparity from 6.18 percent to 35.62 percent for Allapattah and Quail Roost [($t=1.27$), insignificant at $\alpha=.05$].

TABLE 2

STATISTICAL RESULTS

	Allapattah	Kendall	Quail Roost
Number of tracts	18	24	23
Number of tracts with value changes	12	20	18
Number of value changes before Master Plan enactment	8	30	18
Number of value changes after Master Plan enactment	7	4	4
Number of value appreciations	13	33	20
Number of value depreciations	2	1	2
LAND VALUE			
Land value per acre, in adjusted dollars			
mean	91.78	397.39	586.98
standard deviation	119.19	1167.12	1212.76
median	37.60	134.64	155.31
minimum	3.82	16.67	7.15
maximum	879.12	5850.00	5372.01
range	875.30	5833.33	5364.86
Change in value per acre, in percent			
mean	42.23	415.13	204.05
standard deviation	97.21	660.02	586.12
median	-2.10	134.37	36.51
minimum	-90.58	-87.06	-94.77
maximum	240.85	2352.01	2399.65
range	331.43	2439.07	2494.42
Change in value per acre, per year, in percent			
mean	6.18	117.33	35.62
standard deviation	15.46	254.45	92.42
median	1.70	46.16	10.27
minimum	-22.65	-12.44	-11.85
maximum	33.28	1176.01	399.94
range	55.93	1188.45	411.79
Regression, land value versus year*			
Y intercept	-364.94	-834.15	-636.79
slope	6.48	13.63	11.45
t	1.12	3.10	2.02
r	.2070	.4410	.3204
N	30	42	38
ZONING CHANGES			
number of zoning changes	0	19	34
Number of zoning changes before Master Plan enactment	0	5	21
Number of zoning changes after Master Plan enactment	0	14	13

*For the Quail Roost and Kendall interchanges a few outliers are omitted from the regressions because their radical land value increases are due to zoning changes.

The results of regression calculation between land value and year illustrated that an acre of land appreciates $11 per year for the Quail Roost interchange area, while an acre appreciated only $6 per year about Allapattah Road.

This information, utilized in conjunction with the fact that thirty-four zoning changes occurred for the Quail Roost area while none occurred for the Allapattah Road area, helps depict the dissimilar developmental pressure about these two interchanges. More development and hence more zoning changes and higher land prices may have occurred about Quail Roost due to its proximity to U.S. 1 and its history of previous development. Yet this development can take place only because of the more permissive zoning. If development is restricted, as it is about the Allapattah Road interchange, land price and zoning changes would not be so evident.

The Kendall interchange seems to be somewhat of an anomaly. Due to its proximity to the CBD, Miami International Airport, and other areas of very intensive development just to the east, land speculators seem to be ignoring the ramifications of the Master Plan. Presently, land prices are too high for development with the given zoning restrictions, so it is theorized that the land owners are holding their lands until after the 1985 Master Plan restrictions are removed. The revised Master Plan (year 2000) allows for more liberal development, and the affluent nature of the area suggests that these land owners can "wait out the plan."

Although the number of zoning changes (nineteen) at Kendall is lower than Quail Roost's thirty-four, some of the other data are contradictory. The land value per acre was consistent with the hypothesis, as Kendall's $397 is less than Quail Roost's $587, and more than Allapattah's $92 [(t=.53 and 1.23), insignificant at α=.05]. The mean *change* in land value per acre per year, however, departs from the expected value. Kendall's data depicted an increase of 117.33 percent per year [(t=1.66), insignificant at α=.05]. Kendall's percent change per year of 117.33 percent was substantially greater than Allapattah's 6.18 percent [(t=2.50), significant at α=.05].

The results of the regression were also somewhat contradictory. Kendall's regression illustrates a per acre change of $13 per year, while Quail Roost's was only $11 per year. Both of these figures illustrated greater appreciation than Allapattah's $6 per year, however.

Conclusion

The current Dade County Master Plan appears to be fulfilling its function of shaping development and preventing urban sprawl. Since the Plan was adopted over two years ago, twenty-eight Plan amendments have requested development in areas set aside for open space and agriculture; all were refused by Metro commissioners.

Despite strong pressure from some political groups and almost all contractors and builders, the plan has been upheld. The Commission continues in its belief that more than enough property remains available for development without necessitating undue economic pressures on residents by forcing them to fund urban services for outlying areas. Thus the plan does not inhibit all growth; rather, it attempts to encourage growth in an orderly, rational, and most importantly, economic manner.

It must be remembered, however, that the Master Plan was incorporated during a period of sky-rocketing land sales in South Dade. These two conflicting forces, the plan and the sky-rocketing of land prices, inhibit an adequate prediction of the future development about a major new access route leading to areas prime for development.

The results of this paper have significance for urban planners and geographers contemplating the effects of a master plan on highway interchange development. Differences in land value and zoning changes about three differently zoned interchanges show the influence of a master plan in this study. Quail Roost Drive, with permissive zoning, appears destined for the most intensive development, whereas the interchange at Allapattah Road seems to be undergoing the least developmental pressures, a fact consistent with its restrictive zoning. The Kendall interchange, while somewhat inconsistent with the hypothesis, represents an area that deserves more research to uncover the basis for the anomalies in its development.

* * *

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7. For a description of the master plan see Drew B. Vella, "Land Value and Zoning Changes at Three Interchanges of the Florida Turnpike" (Master's Thesis, Department of Geography, University of Miami, 1977). See also Metropolitan Dade County Planning Department, *Land Use Characteristics: 1960-1970* (1971); Metropolitan Dade County Planning Department, *Formulation of the Metropolitan Dade County Comprehensive Development Master Plan* (1973); Metropolitan Dade County Planning Department, *Recommended Metropolitan Development Policies* (1974).

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THE ROLE OF DISTANCE IN THE MIGRATION OF RETIREES TO ST. PETERSBURG, FLORIDA

John C. Catau

Introduction

The participants in post-retirement migration constitute a small proportion of the total aged population, yet their residential flows have created numerous social science research issues. The very fact that the favorite destinations of interstate aged migrants have been concentrated in the warm weather states of the South, the Southeast, and the West is intriguing. As an example, since the conclusion of World War II, Florida alone has gained more than 650,000 people aged 65 years and over through *net* migration. Needless to say, the impact of such a large influx of senior citizens has been considerable.[1] This is particularly true for those favored destinations within the state where elderly concentrations exceed 25 to 30 percent. Proportions of this magnitude influence the demand for various services and facilities, tax structures, social networks, and similar phenomena.

The actual process of aged migration is another subject which warrants the attention of social scientists. We need to know if the general migration theories that have been developed to describe the flow of young and middle-age adults accurately portray the residential movements that follow retirement. In particular, do retired migrants respond to the same motivations as the general populace? Controlling for age and employment status, do the personal characteristics of retired migrants differ significantly from those of the younger group?

This paper focuses on the role of distance in the interstate migration of households in which the major wage-earner had retired. The origins of 230 such households who migrated to St. Petersburg, Florida, will be examined. Specifically, the locations of those origins will be compared with those that might be expected on the basis of the migration-interaction literature. In the event that significant inconsistencies emerge, revisions in the general theory will be identified and discussed.

The Role of Distance in Migration - Interaction Literature

Through the years, there have been many attempts to identify the nature of the relationship between intervening space and migration. Ravenstein, Thomas, Olsson, and Lee are among those who have presented general statements on the subject.[2] In many instances, the importance of distance (space) as a component of all migration systems emerged with the realization that migration is more than a simple calculus of the comparative advantages and disadvantages of the point of origin and the potential destinations. Intervening obstacles also play an important role; and undeniably the most salient of these obstacles is distance. In order for migration to occur, the deterrent effect of intervening space must be surmounted. From this perspective, therefore, distance comes to represent the costs of migration, both the actual transportation or monetary costs, and the psychic costs of moving. Psychic costs result from the reluctance of an individual to leave his/her family and friends and move to unfamiliar surroundings.

The notion that "not only the number, but also the characteristics and perhaps also the motivations of migrants, very well could be a function of distance" is virtually unchallenged.[3] As efforts to define more precisely the specific nature and impact of distance have proceeded, however, several points of disagreement have emerged. One of the differences developed as the efforts in migration analysis merged with those of a more general nature to

produce a series of mathematical formulations known as interaction models. The most popular format, the gravity model, is patterned after principles of Newtonian physics and postulates that the amount of interaction between two areas of human activity varies directly with some function of the population size of the two centers and inversely with some function of the distance between them. This general inverse relationship, which supports the concept of distance friction, is common to most interaction models, however, there is little agreement as to the precise function that is involved. Various exponents for the distance variable have been suggested ranging from one-half to over three.

Another point of controversy concerns the best method of measuring and therefore expressing distance. Geographers have questioned the value of simply utilizing intervening physical space and among the suggested alternatives are those which reflect time, monetary costs, and psychological or perceptual considerations.

Through all this complexity and disagreement, one fact remains virtually undisputed: as the intervening space increases, the financial and psychic costs of overcoming that distance also increase, and consequently the propensity to migrate decreases. But is even this simple distance-decay proposition applicable in aged migration?

The Distribution of Migrant Origins

Obviously if the distance-decay principle is applicable in aged interstate migration, the major origins of Florida-bound retirees should be concentrated in the near and adjacent states. Conversely, as one moves farther north and west away from Florida, the contributions should become proportionately smaller and smaller.

To test the accuracy of these expectations, the origins of a group of 230 survey respondents were analyzed (Fig. 1).[4] The results are striking. An overwhelming majority of the subjects came to St. Petersburg from the Northeastern quadrant of the country. In fact, if we rank the states on the basis of their contribution to the total migration stream (Table 1), the seven leading states, which account for 79 percent of the national migrants, comprise a nearly continuous horizontal belt stretching from Massachusetts to Illinois. Of the nine census divisions, just three (New England, Middle Atlantic, and East North Central) are responsible for 87 percent of the national total.

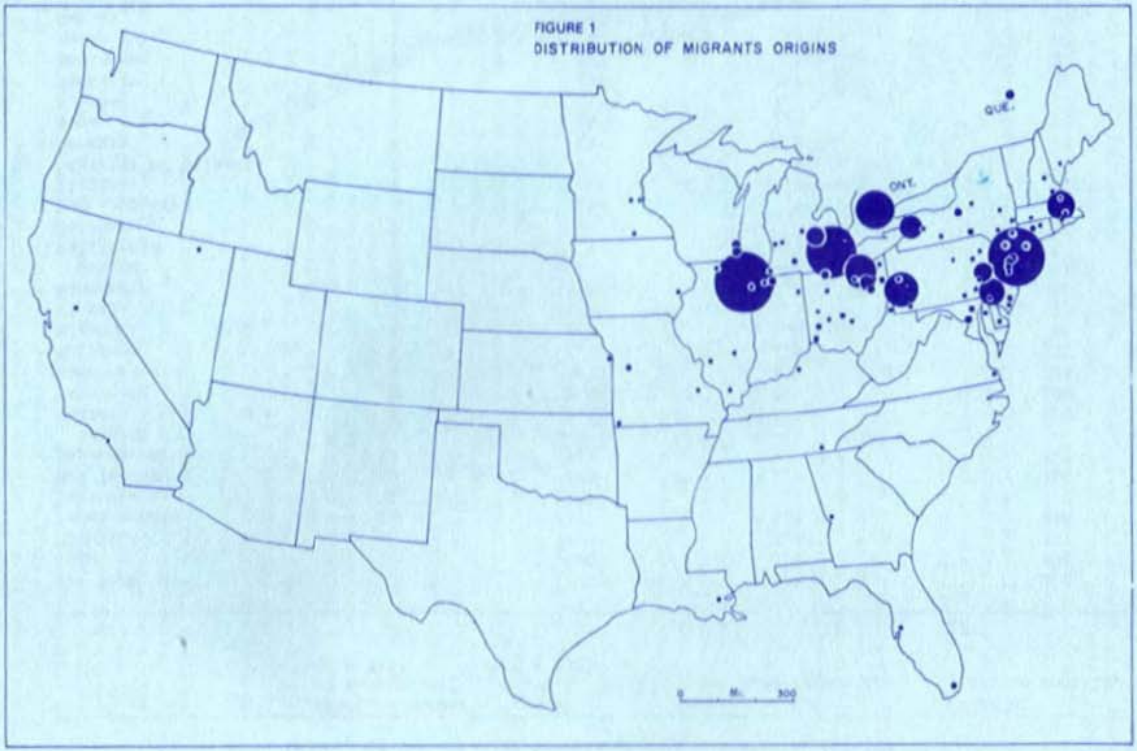
The pre-eminence of the Northeast quadrant could be the result of a relative predominance in the number of people aged sixty-five years or more residing there.[5] If this were true, instead of the regional patterns in Figure 1 representing a distance or directional bias in elderly migration, they would simply reflect the regional distribution of elderly residents in the United States. As an indication that this may in fact be the case, four of the five leading states in terms of the absolute number of residents aged sixty-five years or more (New York, Ohio, Pennsylvania, and Illinois) also rank high as contributors to the sample. The lone exception is California.

In an effort to neutralize this condition, and thereby gain a clearer image of the migration patterns, an index was calculated for each state, composed of two variables: the percentage of the total sample which originated in that state and the percentage of the total U.S. aged population which resided in that state. A value of 100 indicates that the number of migrants sent to St. Petersburg was in exact proportion to the number of senior citizens in the population. Figures exceeding 100 occur whenever a state is over-represented in the migration stream; and conversely, an index of less than 100 indicates that the state sent fewer migrants than would be expected from the magnitude of its aged segment. The distribution of this index is portrayed in Figure 2.[6]

TABLE 1
INDICES OF THE RELATIVE IMPORTANCE OF THE STATES OF ORIGIN*

	Absolute Number of Respondents (N = 245)	Percent of the U.S. Total (N = 230) A	Percent of U.S. Total Aged Population B	Index of Relative Contribution $\frac{A}{B}$
New York	39	17.0	9.8	173
Ohio	34	14.8	5.0	296
Michigan	30	13.0	3.8	342
Pennsylvania	27	11.7	6.3	186
Illinois	25	10.9	5.5	198
New Jersey	15	6.5	3.5	186
Massachusetts	12	5.2	3.2	163
Ontario	11	---	---	---
Indiana	6	2.6	2.5	104
Wisconsin	6	2.6	2.4	108
Connecticut	4	1.7	1.4	121
Maryland	4	1.7	1.5	113
Missouri	4	1.7	2.8	61
Florida	3	1.3	4.9	27
Minnesota	3	1.3	2.0	65
Quebec	3	---	---	---
California	2	.9	9.0	10
Delaware	2	.9	.2	450
New Hampshire	2	.9	.4	225
Virginia	2	.9	1.8	50
District of Columbia	1	.4	.4	100
Georgia	1	.4	1.8	22
Iowa	1	.4	1.7	24
Kansas	1	.4	1.3	31
Kentucky	1	.4	1.7	24
Louisiana	1	.4	.6	27
Maine	1	.4	.6	67
Nevada	1	.4	.2	200
Tennessee	1	.4	1.9	21
West Virginia	1	.4	1.0	40
Panama Canal Zone	1	---	---	---

FIGURE 1
DISTRIBUTION OF MIGRANTS ORIGINS



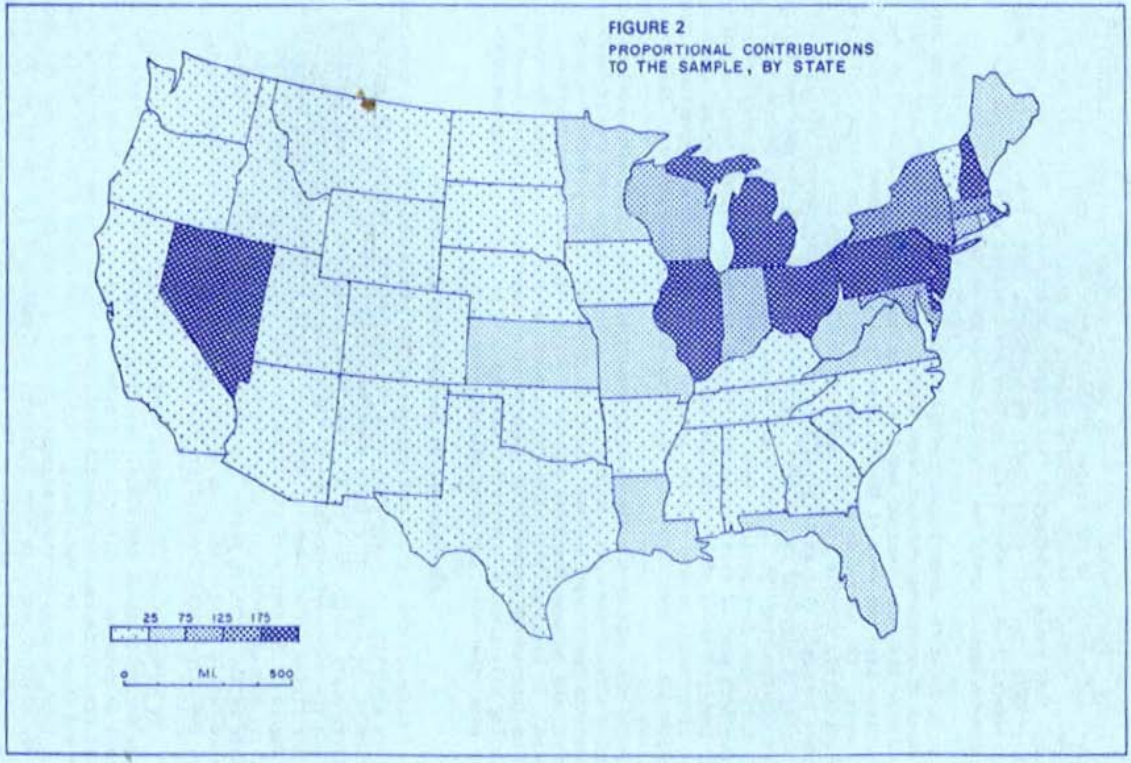


FIGURE 2
PROPORTIONAL CONTRIBUTIONS
TO THE SAMPLE, BY STATE

The patterns in this map are such that most of the preceding comments still apply. The Northeast and North Central regions continue to dominate as origins; and several of the states in these areas were truly outstanding contributors. Perhaps the most notable example is Michigan, where for every 100 migrants that could be expected, 342 actually originated. The other leaders include: Ohio (296); Illinois (198); Pennsylvania (186); New York (173); and Massachusetts (163).[7] When these indices are compared with the absolute rankings in Table 1, only the order of the major origins changes.

In order to comment upon the theoretical implications of these patterns, the areas of under-representation must also be examined. As Figure 2 indicates, with the exceptions of Nevada and Maryland, every state south of the Mason-Dixon Line and west of the Mississippi River, was under-represented in the sample. The situation in the states to the east of the Mississippi River is particularly notable since it seems to further contradict the friction of distance concept. The anticipated inverse relationship between distance and the number of migrants is, in fact, positive! Instead of the near and adjacent states contributing the largest share of retirees, the states farther to the north hold that distinction. More specifically, the fourteen states comprising the northern part of this region contributed 87 percent of the national migrants. Their combined index of contribution was 195. The twelve states and the District of Columbia in the southern portion, on the other hand, contributed just 7 percent of the national total, and their combined index was only 33.[8]

If the only factor which determined the number of migrants was the relative size of the aged component, both areas would have an index of 100. Because the South supplied only about one-third of its proportional share, however, and because the North supplied nearly twice as many migrants as expected, it is clear that other determinants were also involved. In order for the friction of intervening space to be an appropriate explanation, the preceding values would have to be reversed. As it stands, it appears that there were other more important elements involved.

Alternatives to the Distance Explanation

Although the precise motivations of the respondents cannot be examined in this analysis, it is apparent that for many of the retirees the costs of overcoming the intervening space were secondary to the pull of amenities, and in particular, to the pull of St. Petersburg's climate. This may partially explain the under-representation of the southern states. Specifically, as Lee has postulated, "the volume of migration within a given territory varies with the degree of diversity of the areas included ...; a high degree of diversity ... should result in high levels of migration."[9] In this case, the climate of the northern states and Florida is clearly sufficiently different to stimulate a substantial flow of retirees. But in the southern states, where the differences are smaller, the flow is reduced.

It is important to recognize that the crucial element in the evaluation of the disparity is an individual perceptual judgement. If the retiree is to migrate in response to climatic (and other) amenities, he/she must perceive a significant difference between the conditions in the pre-retirement environment and those in St. Petersburg. Apparently the winter differential is the key. Thus, whereas northern migrants discern a clear disparity, the residents farther south do not. In some instances a significant difference may be evident, but since it is exceeded by the forces of inertia (e.g., the friction of distance), the retiree decides not to migrate to St. Petersburg.

Needless to say, it is naive to think that climatic amenities are the only pertinent explanation for the patterns in Figure 2; other elements play significant roles in the retired migration process. There are, in fact, clear indications that spatial considerations become significant *after* the decision to respond to amenities is finalized. With the exception of Nevada, every

state in the area west of the Mississippi River was under-represented in the St. Petersburg sample. Perhaps a distance threshold exists between the South (Florida) and the West (California and Arizona). Although hardly impenetrable, this threshold could help to differentiate between the primary source regions of each destination. Some support for this view can be derived from a recent survey study of two retirement communities, one in Florida and one in Arizona. Based upon the origins of their respondents, the authors concluded that:

> the more industrialized North Central States (with the exception of Illinois) sent a greater porportion of migrants to Florida. The more agricultural and more western states predominated in Sun City, Arizona. This effect may be interpreted as regional since the respondents from the older mid-western, industrial states are closer to Florida, and the agricultural states are closer to Arizona.[10]

Unfortunately, the two sociologists did not pursue this subject in any greater detail. And without information concerning the specific origins of retirees in Arizona and California, it would be presumptuous to expand on this idea in this analysis. It is a subject which would certainly benefit from additional field surveys.

Conclusions

Because retired interstate migrants are free from many of the job-related considerations that generally influence migration decision-making, they are able to respond directly to amenity differentials. For those who elect to do so, the result is a migration process in which the role of distance is revised if not altogether eliminated. This discovery is compounded by the fact that amenities appear to be an increasingly important consideration among migrants of all ages.[11] As an example, consider the rapid growth through migration of many of the "Sunbelt states." Clearly, if our migration models are to be accurate descriptions of reality they must be revised to include an amenity component.

* * *

1. Among the many terms used to identify older age groups are: the elderly, the aged, senior citizens, and retirees. These items will be used interchangeably in this study. Also, the term "retired" migration is in reference to movements which occur after retirement. Throughout this paper, aged migration is used interchangeably with retired migration.

2. E. G. Ravenstein, "The Laws of Migration," *Journal of the Royal Statistical Society* 48 and 52 (1885, 1889): 241-301; 157-227; Dorothy S. Thomas, *Research Memorandum on Migration Differentials* (New York: Social Science Research Council, 1938); Gunnar Olsson, *Distance and Human Interaction*, Regional Science Research Institute Bibliography Series no. 2 (Philadelphia: Regional Science Association, 1965); Everett S. Lee, "A Theory of Migration," *Demography* 3 (1966): 47-57.

3. Olsson, *Distance and Human Interaction*, p. 27.

4. The materials in this analysis were derived through a personal interview cluster survey of 245 retired migrants in St. Petersburg, Florida during the early months of 1972. The survey population was identified as those households that migrated to the city *after* the retirement of the major family wage-earner. To reach the total of 230 respondents used in this analysis, the fifteen subjects who originated in areas outside the U.S. (fourteen from Canada and one from the Panama Canal Zone) are not included.

5. Although retirement and age sixty-five years or more are not synonymous, the latter can be utilized as a rough estimate of the number of retirees in the total population.

6. The index value for each contributing state is presented in Table 1. States that failed to send any migrants to St. Petersburg have a value of zero.

7. It should be noted that the high indices of three other states, namely, Delaware (450), New Hampshire (225), and Nevada (200), are more a result of their relatively low levels of aged residents than their high levels as migrant origins. Together they only accounted for five migrants. It would be misleading, therefore, to include them in a list of the leading origins.

8. Although nine of the thirteen "areas" in the South contributed to the sample, only four sent more than one retired household: Maryland (4); Florida (3); Delaware (2); and Virginia (2). The three respondents who had originated in Florida, of course, were not interstate migrants, and if they are removed from the total, the South's contribution to the national total declines from 6.8 percent to 5.5 percent.

9. Lee, "Theory of Migration," p. 292.

10. John Smith and Douglas C. Marshall, *Retirement and Migration in the North Central States: Two Planned Retirement Communities*, Population Series no. 23 (Madison: University of Wisconsin Press, 1970), p. 8.

11. Curtis C. Roseman, *Changing Migration Patterns Within the United States*, Resource Papers for College Geography no. 77-2 (Washington, D.C.: Association of American Geographers, 1977).

POPULATION GROWTH AND HOUSING DENSITY AROUND THE JACKSONVILLE INTERNATIONAL AIRPORT

Afolabi Adegbite Adedibu

Airports have negative or positive effects on the community where they are located,[1] and the relationship of an airport to the development of a community can be measured in several ways. In the present study emphasis is placed on the impact of an airport on population growth and housing density in the immediate area of the airport. It is hypothesized that although an airport tends to support an increase in population growth and housing density within the total area of a given community, population growth, and housing density are retarded in its immediate vicinity. Data from Jacksonville, Florida, were used to test this hypothesis. The Jacksonville International Airport, which began operation in 1968, was the airport of concern.

Rationale for Research Hypothesis

Economic geographers, regional economists, and land-use planners have noted the relationship between airports and the employment multiplier concept.[2] These studies indicate that such multipliers will affect the population and housing density around the airport. The rationale is that the payroll of airport employees may filter down to all members of the community.

Indirect employment, as a component of the multiplier, consists of ancillary activities created to serve the airport. Airport service activities such as hotels, car rentals, and catering firms generate income which adds to the community's economy, and this in turn may attract more population to the community. Secondly, there are employment sectors such as laundries and grocery stores which depend on the needs of those directly employed by the airports. These basic jobs induce population increase. For example, many people displaced from the agricultural sector when an airport is built may be absorbed into basic jobs provided by the airport, or better still, some farmers so displaced may use their land rent to establish businesses to serve the airport community, which may bring more population to the community.[3]

Many people so displaced and many of those working in the airport may, however, reside far from the airport because of the noise around the airport. For example, the majority of the employees at Heathrow Airport near London live about five miles away--an evidence of how an airport favors daytime population increase.[4]

A work-place census reveals that airports have a tremendous impact on population increase in their immediate areas, but that residential population may be retarded. At Tampa International Airport, the two thousand people employed caused a population increase of 40 percent in the tract where the airport was located, while other tracts in the city increased by 12.3 percent.[5] It must be noted, however, that this result was based on both business and residence populations and may not reflect the true population and residential increase. From 1966 to the time the new terminal was opened in 1974, 660 hotel units were added to the existing 700--this alone is an increase of nearly 90 percent and may account for the rapid increase in that census tract.

Another major factor that retards residential development near airports is land value. Many local studies show that land values around airports increase at a higher rate than the rest of the areas of the city. The increase in land values may automatically divert the population to other areas of the city, where land will be cheaper and less prone to accident and noise-pollution risks. In San Francisco, land value increased more than 500 percent in a few

years, making it impossible for new home owners to move near airports.[6] The same trend is found in King County, Washington; Dallas/Ft. Worth Regional Airport; Miami; Tampa; and Jacksonville.[7] Government regulations sometimes prevent people from living very close to airports. The most commonly given reason for reduced housing density, however, is the effect of noise on the residents.

Notwithstanding, residents are found around airports for many reasons. First, people respond to noise at different levels in different ways, and it may be that those living around the airport are less sensitive to airport noise. Secondly, such people may not have any choice of where to build their homes because of extensive urban development. The two airports in Louisville, Kentucky, are good examples of places where residents surround the airports.[8] It must, however, be said that there are very few cases like this. Wherever such incidents occur, suits are usually filed against the airport authorities for noise and accidents.[9] Another major reason for the low density of housing around airports is the inability of the Veterans Administration (VA) and Federal Home Administration (FHA) to insure home mortgages in high-noise areas.[10] In 1954, 38 percent of homes near airports were insured by these associations; but by 1964, only 17 percent were insured and this proportion continues to decrease.

Local ordinances concerned with building codes and land use around airports can also contribute to the low housing density. In many airports, noise contours have been used to guide residential location.[11] However, in some areas, zoning regulations are not in force and there often occur many non-conforming land uses. Dulles International Airport near Washington, D.C., is a case in point. In spite of the vast amount of land acquired for the airport, and an attempt by the federal government to induce local jurisdiction to zone the surrounding land for compatible uses, subdivisions have developed near the airport.[12] As long as zoning can be changed by local zoning commissions, it is obvious that homes and other noise-sensitive land uses will continue to be built in noise-affected areas, simply because of the demand for residential sites in a convenient location.

Data and Analysis

Data for the study were collected through the census of population and some local planning documents, with Jacksonville's ninety-seven census tracts serving as the data base. The years between 1960 and 1970 were used as the study period because the airport was opened in 1968, and the planning for the airport had actually started some eight years before its opening.[13] It is assumed that if those tracts chosen were homogenous in 1960, a change in a ten-year period would show the differences in development, and the effect of the airport would be demonstrated.

Fourteen demographic and socioeconomic variables were subjected to a grouping analysis in order to determine which census tracts had the same attributes in 1960 as Census Tract 103 in which Jacksonville International Airport is located. The result showed this tract to be very similar to six others in 1960. Percentage changes of the fourteen variables from 1960 to 1970 were then calculated to find the changes in development (Table 1). Analysis of variance showed that the seven census tracts which were homogenous in 1960 were significantly different in 1970 (Table 2).

For further explanation of the differences, a Duncan New Multiple Range Test was conducted, and the mean values of the changes in the tracts used for the study were mapped (Fig. 1). Tract 103 where the airport was located developed almost at the same rate as Tract 105 next to it. This was not expected. Better accessibility of Tract 103 via Interstate 95 should have caused it to develop more than Tract 105 with limited accessibility. The opposite, however, is true. Only a 42 percent increase in housing units of

TABLE 1

PERCENTAGE OF CHANGE IN SOME VARIABLES FROM 1960 TO 1970

	Census Tracts						
	103	105	117	133	135	136	137
% Professional Workers	52.8	34.4	16.2	32.4	742.3	-21.4	36.8
% Employed in Managerial Jobs	-5.6	49.0	-41.0	-66.6	-152.9	-100.0	340.6
% Clerical Workers	50.9	51.3	49.1	-14.8	425.1	-78.0	516.6
% in Manufacturing	221.3	161.9	44.2	-37.5	247.5	-77.9	223.6
% in Wholesale	8.5	136.7	-17.8	-90.2	375.5	-100.0	9.3
% in Education Services	205.5	131.5	12.5	186.9	936.4	100.0	278.6
Total Housing Units	42.0	50.0	5.4	-29.3	154.6	-77.9	125.4
% Sound Units	73.3	123.8	91.0	-22.2	385.2	-100.0	251.8
% Owner-Occupied	17.3	13.2	24.5	-12.0	16.9	-100.0	23.2
% Rental Occupied	-28.9	-21.4	-35.0	-0.6	58.0	117.4	-31.6
% Vacant All Year Round	-47.0	-35.0	-1.6	-74.0	-40.0	-58.0	-70.0
% Negro	7.5	65.5	-95.2	67.3	17.4	176.2	-90.9
Total Population	45.4	38.0	6.9	-36.3	200.7	17.6	105.7
Density	25.5	14.6	3.3	-65.4	165.1	-67.4	100.0

Tract 103 was recorded within this period, and a 50 percent increase for Tract 105. No other reason can be advanced for this than that the location of the airport retarded housing units that much in ten years.

Although the two tracts developed almost at equal rates, the population density for Tract 103 increased significantly, while there was very little increase in Tract 105. The reason for this may still be attributed to the airport, which occupied most of the better residential land, and to the presence of I-95, which encouraged commercial land use, making it difficult for residences to be where theory suggests they ought to be. Tract 105, on the other hand, did not have these impediments and could spread out to develop with low density.

Tracts 133 and 136 have negative development scores. Among the reasons for this are that the U.S. Navy has taken control of Tract 136 completely. In 1960, most of the houses in this tract were privately owned, but by 1970, the Navy had control of all the houses, and 100 percent were rental-occupied homes. The development of this tract, both in population density and housing density, depended on the Navy's choice. The Navy could have developed more residences, but a Navy airport on the tract served as a barrier for the construction of more dwellings. The Ortega River and the nearness of Jacksonville Naval Air Station are the major reasons for the negative score for Tract 133. Also, most of the tract was not served by adequate roads, and limited residential facilities were provided. This diverted population to other parts of the city.

TABLE 2

ANALYSIS OF VARIANCE

Source	DF	SS	MS	F	$F_{.01}$	$F_{.05}$
Total	98-1 = 97	870,340.4				
Treatment	14-1 = 13	833,328.7	64,102.21	145.48**	2.45	1.90
Error	84	37,011.7	440.62			

Correction Term: $\frac{(\Sigma X..)^2}{n} = \frac{(6,550.9)^2}{98} = \frac{42,914,290}{98} = 437,900.91$

Total SS: ΣX^2 - CM - 1,308,241.3 - 437,900.91 = 870,340.4

Treatment SS: $\frac{(\Sigma X.)^2}{r}$ - Cm = 1,271,229.6 - 437,900.91 = 833,328.7

Error SS = TSS - Treatment SS = 870,340 - 833,328.7 = 37.011.7

MST = $\frac{833,328.7}{13}$ = 64,102.21 MSE = $\frac{37,011.7}{84}$ = 440.62

Duncan New Multiple Range Test

Mean arranged in order, from the lowest to the highest:

Tract	136	133	117	103	105	137	135
Mean	-26.38	-10.75	3.99	46.53	58.03	144.22	252.27

SSR	3.730	3.890	4.000	4.080	41.400	4.230
LSR	78.292	81.651	83.960	85.639	86.898	88.780
RP	5.590	5.820	5.990	6.140	6.211	6.330

W which is constant = $\sqrt{1/2 + 1/14 + 1/14}$ = .0714

$\sqrt{MSE} = \sqrt{440.615}$ = 20.99

RP = SSR (20.99) (.0714)

Tract 117 had a very small increase, and does not fall into any of the development categories. The main cause of this may be the lack of city facilities in this tract. Tract 106, adjacent to 117, had no major road, and the land in the tract was mainly owned by corporations whose aim may have been to produce timber rather than residences, causing the retardation of the population.

So far, discussion has centered upon those tracts in which population growth and residential development lagged behind. In contrast, Tracts 135 and 137, with very little if any impediment to development, developed rather more rapidly than expected. Tract 135 is zoned residential and equipped with roads,

sewage treatment, and a fire station. This, coupled with lack of noise pollution and accident risk from plane crashes, might have accounted for the rapid development of the tract. Tract 137 might have developed as rapidly as 135, since the two have similar facilities, but it did not for two reasons. First, Tract 136, which belonged to the Navy is surrounded by 137. Second, Tract 137 is larger than any of the others, and full facilities could not be provided for the entire tract in a short time.

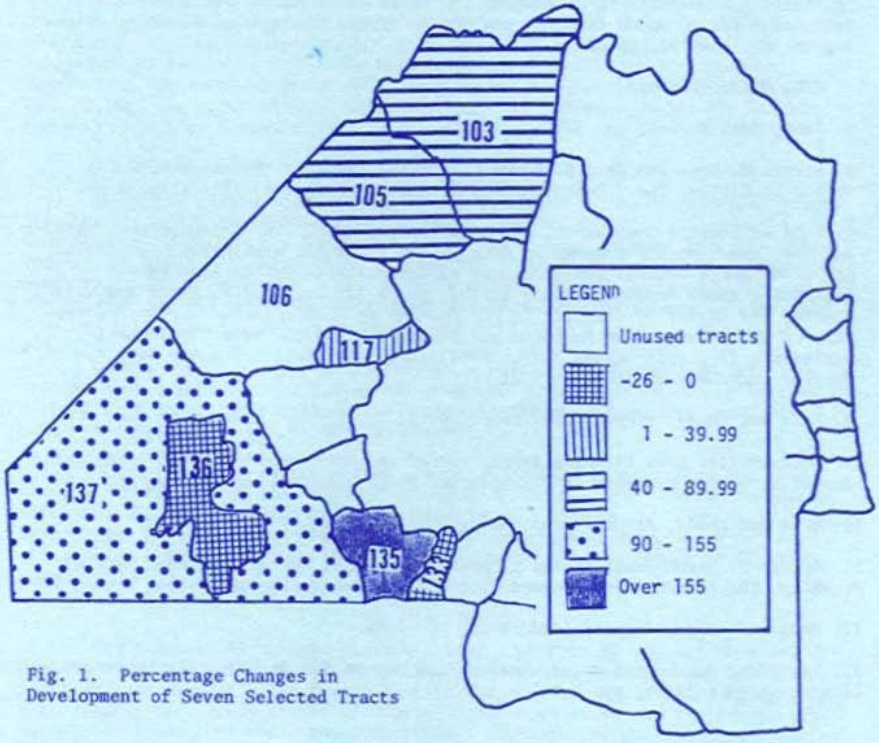


Fig. 1. Percentage Changes in Development of Seven Selected Tracts

Conclusion

Through the use of analysis of variance we are able to reject the null hypothesis of no significant differences in the development of the seven census tracts used. The analysis showed that the homogenous census tracts of 1960 in Jacksonville became heterogenous in 1970 for different reasons. The most conspicuous reason is that the airport location influenced housing density and population increase in three of the seven tracts studied.

* * *

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7. Port of Seattle Commission, *Airborne Traffic of Sea-Tac International Airport and Its Impact on the Economy of King County* (Seattle, Washington, June 1974), pp. 1-43; North Central Texas Council of Governments, *Dallas/Fort Worth Regional Airport Economic Impact* (1975), pp. 1-14; Reinhold F. Wolff and Maja Slotta, *The Impact of Airports on the Economy of Southeastern Florida*, University of Miami, Bureau of Business and Economic Research, Area Development Series no. 11 (Coral Gables, Fla., 1964); Edward N. Hall, "The Air City," *Traffic Quarterly* 26 (1972): 15-31.

8. Deen and Reeds, *Airport Land Needs*, p. 11.

9. Jacksonville Area Planning Board, *Social and Environmental Conditions* (Jacksonville, Fla., September 1970); Deen and Reeds, *Airport Land Needs*, pp. 1-85.

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11. Angelo J. Cerchoione; Victor E. Rothe; and James Vercellino, eds., *Master Planning, The Aviation Environment* (Tucson: The University of Arizona Press, 1969).

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13. Reynolds; Smith; and Hills, *Master Plan Report for Jacksonville International Airport* (August 1965), pp. 1-14.

COMMERCIAL FISHING AT CEDAR KEY, LEVY COUNTY, FLORIDA

Jeanne Fillman-Richards and Storm L. Richards

Cedar Key is a small, somewhat isolated fishing community located on Way Key in Levy County on the west coast of Florida (Fig. 1). Way Key is surrounded by a number of keys and islands known collectively as the Cedar Keys. It is accessible by sea, air, or by one road, State Highway 24, and its nearest neighboring community, Otter Creek, is 22 miles northeast. According to the 1970 census, the population of Cedar Key was 714. However, Cedar Key was not always so small or isolated.

Sequent Occupance

The first settlement of Cedar Key consisted of a summer resort on Atsena Otie Key in 1842. By 1853 regular steamship lines to the Gulf Coast ports and some foreign countries had been established and all mail coming into the United States from Havana passed through this port. In that same year, State Senator David Yulee began promoting sales of stock in the Florida Railroad which was to run between Fernandina on the east coast and Cedar Key to the west. This railroad was completed in 1861 and operated until 1932.

During the Civil War, Cedar Key had a population of approximately 100, and was home base for several blockade runners. Also, although under federal control from 1862, the mainland area continued throughout the war to supply evaporated sea-water salt to the Confederacy.

After the Civil War, the town prospered because of timbering and commercial fishing and by 1885 had a population of about 5,000. During the great hurricane of 1896, the town on Atsena Otie Key was destroyed. Eventually, all salvageable buildings were moved by barge to the present location on Way Key where they continue to exist today in the form of a small close-knit fishing community.

Economic Trends

The economic history of the area shows a pattern of exploitation and exhaustion of natural resources. A timber boom, which had begun in 1855 when Eberhard Faber bought mixed forest land in the area to supply cedar for pencil factories in New Jersey (Faber and Eagle), continued after the Civil War with shipments of prepared cedar and turpentine. Although the peak timbering period was not until 1885-88, in 1882 one million cubic feet of prepared cedar was shipped from the area. By 1900 the timber had been exhausted, and today the Cedar Keys are almost completely without cedar trees.

It was also during the 1880s that Cedar Key sea products came into demand because of rapid cross-country transit. Greek divers were imported to harvest sponges but the supply was quickly exhausted. Stone crabs (*Menippe mercenaria*), green sea turtle (*Chelonia mydras*), clams (*Mercenaria campechiensis*), and oysters (*Crassostrea virginica*) were also soon depleted.

The Cedar Key oyster is renowned for its flavor, and the state of Florida is trying to rebuild the industry in the area by sponsoring an oyster-planting program in which it supplies the oysters and pays local residents to plant them. Stone crabs seem to have made a comeback on their own.

Fig. 1

Sea trout (*Cynoscion nebulosus*) was for many years an important product, and cane-pole fishing for them was profitable. Residents state that at one time a man could catch 200 pounds of fish in a day with hook-and-line, and in the late fifties enough fish were caught in one weekend to pay for a boat and motor.

Today the important products of Cedar Key are blue crab (*Callinectes capidus*), mullet (*Mugil cephalus*), and stone crab. The two varieties of crabs accounted for 57.2 percent of the Levy County seafood landings during the period 1970-72.[1] For the next two-year period, 1973-75, blue crabs accounted for 50 percent of the landings and stone crabs accounted for 4.5 percent.

The Crab Fishery

Crabbing did not come into economic prominence in Cedar Key until after World War II when young men returning from the war began to exploit the new market created by increasing tourist consumption.[2] During the 1950s blue and stone crab fishing landings increased (Table 1). In 1960 blue crab production peaked and has been declining since then, but continues to be important. Stone crab production, however, has continued to increase except for a market drop in 1966 and 1967. In both cases there has been considerable year-to-year variation.[3]

The basic method of catching each type of crab is similar. There is much variation in season for stone and blue crabs, and in state regulations governing the taking of each species, as well as type of pots used and distance traveled to catch each species.

Blue crabbing is allowed year-round; however, the peak season is normally December through February. This may vary from year to year. During 1976-77, for example, the peak did not come until May.[4]

State regulations require that a blue crab must be five inches wide and have no egg sac before it can be taken. These conservation regulations are resented by many of the crabbers and ignored by some. During the summer months, when the blue crab is actively moving toward shore and is easier to catch, a large percentage must be thrown back because they are egg-bearing females. This type of crabbing, where only the male crab may be kept, is called "jimmy crabbing" by local residents.[5]

TABLE 1

SUMMARY OF FLORIDA COMMERCIAL LANDINGS: LEVY COUNTY

Year	Blue Crab	Stone Crab
1953	500	8,700
1954	5,540	6,910
1955	700	12,568
1956	539,712	15,446
1957	2,262,994*	12,661
1958	2,790,768*	11,135
1959	5,559,296*	49,123
1960	7,126,939*	12,537
1961	6,819,307*	41,256
1962	4,702,489*	98,710
1963	1,194,700	84,100
1964	1,128,537	85,756
1965	2,993,233	31,420
1966	1,943,893	8,826
1967	2,329,050	9,506
1968	1,911,593	35,988
1969	2,070,304	99,486
1970	1,568,375	97,095
1971	1,026,041	100,700
1972	770,124	62,170
1973	514,277	110,060
1974	713,179	88,570
1975	1,987,462	92,042

*Includes crab landings from Dixie and Citrus counties

Source: "Summary of Florida Commercial Landings, 1953-1975"

Blue crab pots are made of poultry wire mesh with a funnel-like entrance made of the same material. These are usually set in relatively shallow water near shore and are identified by an attached styrofoam buoy on which is marked the license number assigned each crabber by the state.

Stone crab season has been limited by a recent law to the months between November 15 and May 15. This law also allows the taking of only one claw (measuring two and three-quarter inches from knuckle to claw), after which the crab must be thrown back. A single claw will be regenerated when the crab molts, but, if both claws are taken, the crab probably will not survive. Since by law either claw may be taken if it is of proper size, it is impossible for the processor to tell if both claws have been taken.

Stone crabbing is done offshore and, although wire pots are sometimes used, the most common traps for stone crabs are made of wood slats. A short length of large-size PVC pipe inserted vertically through the top of the pot provides an easy entrance, but is too slippery for an exit. The floor of the trap is coated with several inches of concrete which has the crabber's license number marked in it. As with the wire pots, this number is also marked on an attached buoy. These pots with rope and floats cost between $6 and $10 in 1977, depending on whether the person makes his own or buys them already constructed.

Traditionally, two types of boats have been used for crabbing. The larger type is usually about 25 feet long with a cabin and a centrally located inborn motor. The smaller type is a skiff approximately ten feet in length. Recently, however, another type of boat called a "bird-dog" has come into favor. This is a medium-sized boat with a flat bottom, and an outboard motor which is situated in a well toward the front of the boat so that the operator can sit on the bow and guide the boat. Such boats can run at high speeds in as little as six inches of water. "Bird dogs" are constructed locally and cost approximately $750.

There are both opponents and proponents of the "bird dog" in Cedar Key. Those in favor of the boat say that because much of the water around the Cedar Keys is shallow, the "bird dog" is an efficient time-saving method of getting from one crabbing area to another. Opponents say that the "bird dogs," along with sport fishermen and airboats, are destroying breeding grounds for aquatic life.

Processing and Marketing

There are presently two fish houses in Cedar Key but no crab-processing plant, although a small amount of processing for sale to tourists is done at one of the fish houses supplying local restaurants. One crab-processing plant did operate in Cedar Key from 1955 until the late sixties but was forced to close because of lack of labor.

Both fish houses now sell their catch to the same processing company, the Gulf Stream Crab Company. This presents problems because the Gulf Stream Crab Company's processing capacity is limited. When they stop buying from fish houses, the crabbers must temporarily stop crabbing.

Catch figures (Table 1) were examined to determine long-range trends. They show some year-to-year variation but no substantial pattern of gain or loss. This may be too short a period for any such pattern to materialize. The year-to-year variation may be explained by such factors as climate, selling price of crabs, and available picking labor.

The demise of the local processing plant has been too recent to determine the effect. The closing of the plant could decrease the number of crabs caught by eliminating that portion of the market. If this were the case, the effect could be beneficial, as more crabs would thus be allowed to mature and reproduce. Conservation laws, if adhered to, could also have a positive effect, but again, they have been enacted only recently. Although the crab, especially the blue crab, is a hardy and prolific creature, it may take years for a pattern to emerge.

* * *

1. F. J. Prochaska and J. C. Cato, *Landings, Values, and Prices in Commercial Fisheries for the Florida West Coast* (Marine Advisory Program), pp. 41, 44.

2. George de Cergueira Leite Zarur, "Seafood Gatherers in Mullet Springs: Economic Rationality and the Social System" (Ph.D. diss., Department of Anthropology, University of Florida, 1975), p. 59.

3. Prochaska and Cato, *Landings*, p. 44.

4. According to an employee of Brown's Cedar Key Fish and Oyster Company, this late season was probably due to the unusually cold winter which he believed caused the crabs to bury themselves.

5. An interesting sidelight is that even before the law was passed limiting the taking of she-crabs to periods when they have no egg sacs, the fish houses would buy only "jimmy crabs" during the summer months (the time when the females have egg sacs) because the "jimmy crab" was fatter and much more profitable to pick. This may partially account for the passage of this conservation regulation.

THE GEOGRAPHIC EXPANSION OF NATIONAL AIRLINES

Harold M. Elliott

Historical Context of National's Development

The American airline industry originated in 1917 when the U.S. Post Office received an appropriation from Congress to begin an experimental air service. For the next decade the mail was flown first by the U.S. Army and later by the Post Office itself.[1] In 1925 airmail operations were transferred to private industry, with specific routes being awarded to individual companies on the basis of competitive bidding.[2] Broad powers granted to the Postmaster General during this period allowed him to extend or to consolidate certain routes when he felt this was in the public interest.[3]

Interpreting these provisions quite liberally, the Postmaster General during the Hoover administration used his powers to build up certain airlines at the expense of others in an effort to create a system of financially independent companies that could provide efficient service over long distances.[4] However, in 1933 the Roosevelt administration charged that the contracts awarded during the Hoover years had involved collusion and favoritism. All existing airmail contracts were cancelled, and a general reorganization of the airline industry took place. It was during this reorganization that National Airlines came into existence.

Spatial Expansion of National's Network

National was founded in 1934 after having bid successfully on the new airmail contract between Tampa and Daytona Beach.[5] This route was initially operated with a small fleet of Stinson Trimotors. Later in the year the route was extended to Jacksonville (Fig. 1; Table 1).[6]

Fig. 1

In 1937 the company expanded operations into Miami and in 1938 service to New Orleans began. By 1940 National was operating a fleet of Lockheed Electras serving eleven cities (Fig. 2) over a route network of about 900 miles.[7] At this time both Miami and New Orleans were marginal points in National's overall operation. However, with advances in aviation technology they steadily acquired more central positions within the airline's route structure. Jacksonville's early position of prominence within the National system, which is readily apparent in Fig. 2, owes partly to its central location and partly to its large population. During the 1930s and until shortly after 1940 Jacksonville was the largest city in Florida. The early routes between Jacksonville and New Orleans, and between Jacksonville and Miami were the nuclei around which all of National's later growth occurred. Significantly, this growth took place without the mergers and takeovers that have characterized most other airlines in this country. Northwest Airlines is the only other carrier that has grown in this steady, individualistic fashion.

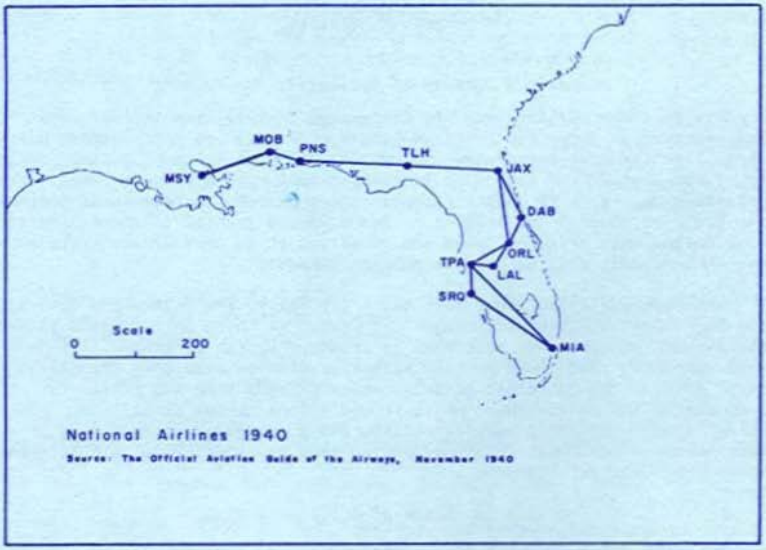


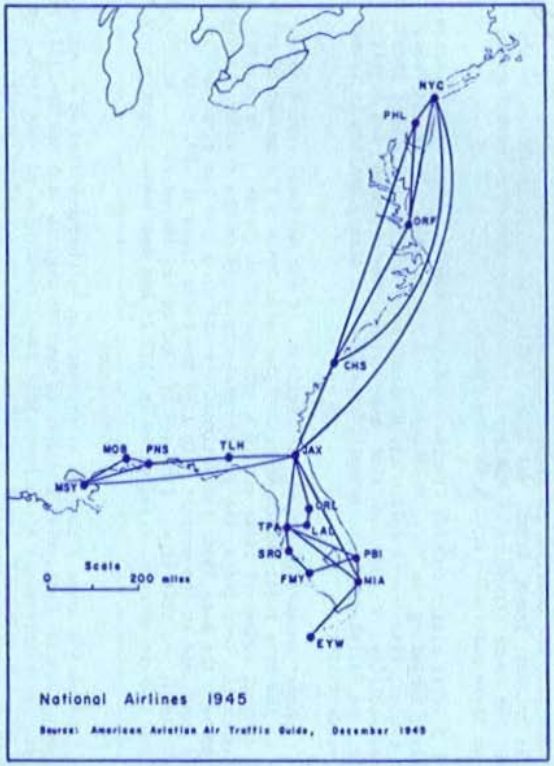
Fig. 2

In 1944 National was granted permission to provide service between Florida and New York in competition with Eastern Airlines.[8] This extended National's route mileage to over 2400 miles and transformed it from a small regional airline into a major domestic carrier. This was the first of a series of important routes awarded to National that provided direct connections between Florida and cities outside the Southeast (Fig. 3).

In 1946 National received a route from Florida to Cuba. Although service was suspended in 1962, National still holds the rights to this route and when commercial air traffic is eventually reinstated between the United States and Cuba, National will fly there.

National's growth in the 1950s was characterized by extensions into Boston and Houston, as well as the addition of a number of intermediate cities located along the routes it already possessed (Fig. 4). In 1951 a planned merger with Colonial Airlines, a small carrier operating in the Northeast, failed to gain stockholder approval.[9] Had the merger occurred, National's development probably would not have changed substantially. Since Colonial's route structure had developed along a New York to Montreal and a Washington to Ottawa axis, a great deal of traffic would still have been funneled into Florida from the Northeast. Colonial was eventually taken over by Eastern Airlines.

National's growth during the 1960s was highlighted by the extension of its route network into California. This was the first time that direct service had been offered between California and Florida. Several competitors were later to provide similar service. The 1960s also saw the elimination of several smaller cities from the National system. Many of these cities had been important


NYC
PHL
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JAX
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TLH
MSY
ORL
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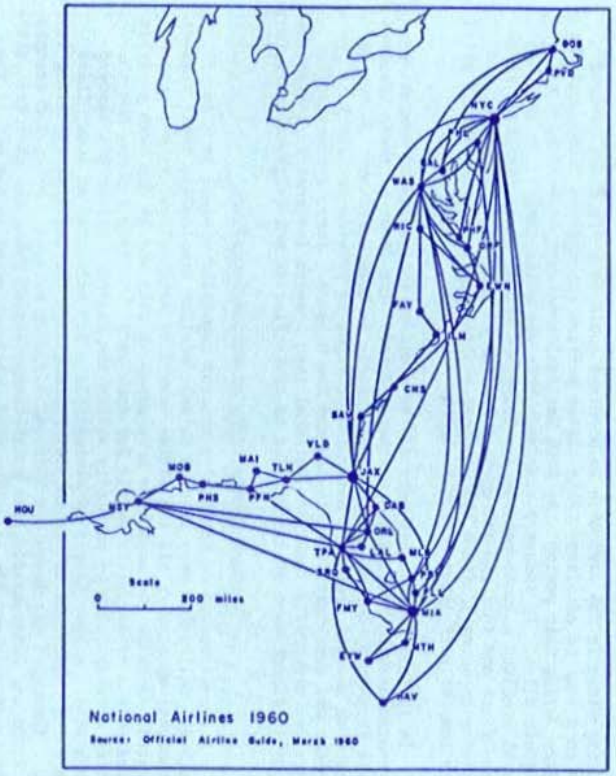
FMY
MIA
EYW
Scale
0 200 miles
National Airlines 1945
Source: American Aviation Air Traffic Guide, December 1945

Fig. 3


NYC
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EYW
Scale
0 200 miles
National Airlines 1960
Source: Official Airline Guide, March 1960

Fig. 4

refueling stops in the days when an airplane could only fly a few hundred miles on a tank of gasoline. This latter pattern was typical throughout the industry during this period. By 1965 National's network covered more than 5700 route miles. By industry standards this was quite small. In 1969 National acquired a route between San Francisco and Atlanta (Fig. 5). This was the first one that did not connect Florida with an outside region, and it remains an anomaly within the National system today. Atlanta should ultimately connect with other cities served by National.

In 1977 National again entered the field of international operations with routes between Florida and northern Europe. The first of these involved service from Miami to London and Paris. Early in 1978 additional routes to Europe were awarded that gave National the right to provide service into Amsterdam and Frankfurt from Florida and New Orleans. These transatlantic flights may eventually transform National into a major international carrier that will direct much of its traffic to south Florida and neighboring regions.

Network Connectivity of National Airlines

A visual record of National's spatial expansion appears in Figs. 1 through 5. Unlike the maps printed in most airline timetables, these reflect all connections between all the cities served by National during the periods indicated. Because the maps have been drawn in this way it has been possible to construct a connectivity matrix for each year.[10] Table 1 shows how the relative accessibility of each city within the National system has changed through time. Higher levels of accessibility are reflected in lower index numbers. A comparison of the data in Table 1 with the patterns appearing in Figs. 1 through 5 discloses how National Airlines evolved. Note, for example, that Tampa and Jacksonville have consistently ranked among the most accessible of National's cities. On the other hand, although Miami is now one of the primary foci of the National system, it did not achieve the premier position until 1960. Miami's early position within the network was somewhat peripheral. The reasons for this shift, of course, involved the rapid growth of the Miami area as well as the increasing range of each new generation of aircraft. Cities that have held the position of highest accessibility at one time or another include Orlando, Tampa, Miami, and Jacksonville. From its inception to the present the route structure of National Airlines has therefore been focused more on these particular cities than on others.

Several cities outside Florida have consistently ranked high in accessibility, including New York, Washington, and New Orleans. In recent years other cities, like San Francisco and Houston, have exhibited dramatic increases in accessibility. At the same time, many cities (Newport-News, Los Angeles, Mobile, and Tallahassee, for example) experienced a steady decline in system-wide accessibility.

Another measure of network connectivity of the National system as a whole is the Beta index, which describes the ratio between the number of cities and the total number of links within a transportation system.[11] In general, the higher the Beta index, the greater the complexity of the system. As might be expected, the Beta index for National's route structure has risen considerably from 1934 to the present. In 1934 the index stood at .80, rising to 1.27 by 1940. In 1945 it was 1.52 and by 1960 it had increased to 2.02. In 1965 and 1969 it stood at 2.51, while by 1977 it had decreased slightly to 2.48.

Conclusion

National's route structure at present can be characterized as a series of linear channels connecting a number of outside regions with one specific area, Florida. Most international carriers have route structures of this type. In the past a number of U.S. trunk airlines exhibited this kind of structure (Northeast and Capital for instance), but only National does so today. All of

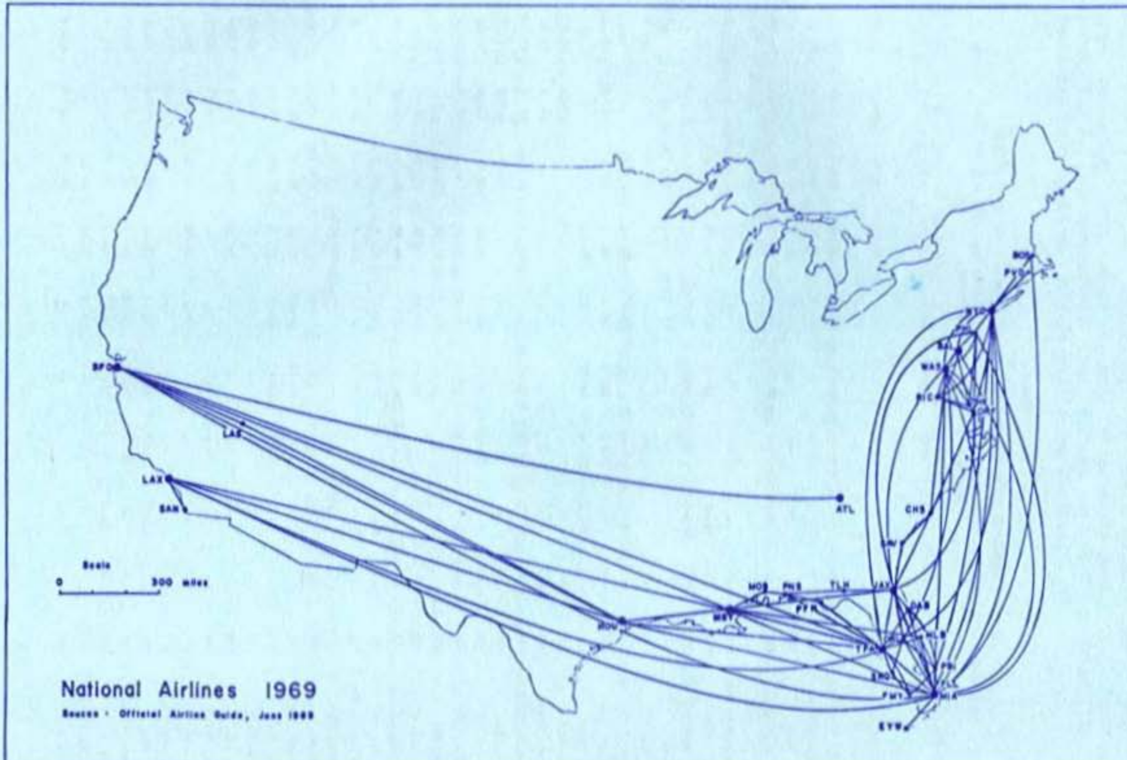
National Airlines 1969
Source - Official Airline Guide, June 1969
Scale
0
300 miles
SFO
LAS
LAX
SAN
ATL
CHS
JAX
TLH
PNS
MOB
PFN
MSY
HOU
TPA
MLB
DAB
PBI
FMY
MIA
EYW
NYC
BAL
WAS
RIC
BOS
PVD

Fig. 5

TABLE 1

RELATIVE ACCESSIBILITY OF CITIES WITHIN THE NATIONAL AIRLINES ROUTE NETWORK

First number indicates the total number of direct links connecting each city with all other cities.
Second number indicates rank-order.

		1934	1937	1940	1945	1947	1950	1960	1965	1969	1977
Atlanta, Ga.	ATL	--	--	--	--	--	--	--	--	97-32	92-30
Baltimore, Md.	BAL	--	--	--	--	--	79-20	90-16	80-23	68-14	79-20
Boston, Mass.	BOS	--	--	--	--	--	--	91-18	70-12	73-16	80-24
Charleston, S.C.	CHS	--	--	--	36- 4	63-15	69- 9	89-15	78-19	79-23	65-10
Daytona Beach, Fla.	DAB	7- 2	21- 6	26- 5	--	52- 8	73-14	86-12	71-13	67-12	73-18
New Bern, N.C.	EWN	--	--	--	--	--	95-28	92-20	--	--	--
Key West, Fla.	EYW	--	--	--	47-12	--	82-22	94-25	78-19	78-21	--
Fayetteville, N.C.	FAY	--	--	--	--	--	--	123-36	--	--	--
Fort Lauderdale, Fla.	FLL	--	--	--	--	--	--	87-14	--	72-16	65-10
Fort Myers, Fla.	FMY	--	16- 4	--	55-17	62-14	79-20	85-11	75-16	76-19	71-17
Gulfport, Miss.	GPT	--	--	--	--	70-23	94-27	--	--	--	--
Havana, Cuba	HAV	--	--	--	--	51- 7	72-11	81- 8	--	--	--
Houston, Tex.	HOU	--	--	--	--	--	--	116-33	84-25	65- 9	63- 7
Wilmington, N.C.	ILM	--	--	--	--	64-17	88-25	120-34	--	--	--
Jacksonville, Fla.	JAX	10- 4	--	22- 1	26- 1	39- 2	48- 1	62- 2	56- 4	57- 3	53- 4
Lakeland, Fla.	LAL	7- 2	13- 2	28- 6	44-10	56-12	75-16	93-23	--	--	--
Las Vegas, Nev.	LAS	--	--	--	--	--	--	--	112-30	94-31	82-25
Los Angeles, Calif.	LAX	--	--	--	--	--	--	--	63- 8	67-12	69-15
Miami, Fla.	MIA	--	21- 6	34- 8	32- 3	44- 3	55- 4	61- 1	48- 1	47- 1	49- 2
Melbourne, Fla.	MLB	--	--	--	--	--	--	93-23	67-11	70-15	73-18
Mobile, Ala.	MOB	--	--	37-10	50-16	64-17	83-24	110-31	86-28	89-28	83-27
New Orleans, La.	MSY	--	--	46-11	37- 6	50- 6	70-10	83- 9	62- 7	59- 5	56- 6
Marianna, Fla.	MAI	--	--	--	--	64-17	90-26	113-32	--	--	--
New York, N.Y.	NYC	--	--	--	36- 4	57-13	73-14	65- 4	56- 4	58- 4	51- 3
Norfolk, Va.	ORF	--	--	--	49-13	47- 5	96-29	86-12	73-14	74-18	70-16
Orlando, Fla.	ORL	6- 1	16- 4	22- 1	39- 8	69-22	65- 6	68- 6	59- 6	63- 7	63- 7
West Palm Beach, Fla.	PBI	--	--	--	42- 9	63-15	67- 8	79- 7	66-10	64- 8	66-12
Panama City, Fla.	PFN	--	--	--	--	--	82-22	91-18	75-16	79-23	91-28
Newport News, Va.	PHF	--	--	--	--	--	--	92-20	79-21	88-26	99-31
Philadelphia, Penn.	PHL	--	--	--	49-13	64-17	75-16	83- 9	64- 9	65- 9	79-20
Pensacola, Fla.	PNS	--	--	30- 7	49-13	45- 4	62- 5	122-35	74-15	77-20	67-13
Providence, R.I.	PVD	--	--	--	--	--	--	92-20	84-25	89-29	79-20
Richmond, Va.	RIC	--	--	--	--	--	76-19	94-25	83-24	93-30	--
San Diego, Calif.	SAN	--	--	--	--	--	--	--	89-29	97-32	91-28
Savannah, Ga.	SAV	--	--	--	--	53-9	72-11	94-25	84-25	66-11	82-25
San Francisco, Calif.	SFO	--	--	--	--	--	--	--	112-30	78-21	65- 7
Sarasota, Fla.	SRQ	--	13- 2	34- 8	44-10	55-11	75-16	95-30	75-16	78-21	68-14
Tallahassee, Fla.	TLH	--	--	25- 3	38- 7	54-10	66- 7	90-16	79-21	84-25	79-20
Tampa, Fla.	TPA	10- 4	12- 1	25- 3	31- 2	35- 1	51- 2	63- 3	51- 2	51- 2	47- 1
Valdosta, Ga.	VLD	--	--	--	--	58-14	72-11	94-25	--	--	--
Washington, D.C.	WAS	--	--	--	--	--	54- 3	66- 5	55- 3	61- 6	54- 5

the other major domestic airlines either blanket entire regions (e.g., Eastern, Braniff, Delta, Western, and Continental) or provide primary connections between the east and west coasts via many intermediate points (e.g., United, American, T.W.A., and Northwest). Thus, perhaps more than any other line, National can be considered to be Florida's own airline.

* * *

1. R. E. G. Davies, *A History of the World's Airlines* (London: Oxford University Press, 1964), p. 40.

2. Ibid., p. 55

3. John H. Frederick, *Commercial Air Transportation* (Homewood, Illinois: Richard D. Irwin Co., 1961), p. 72.

4. Frank J. Taylor, *High Horizons* (New York: McGraw-Hill, 1964), p. 77.

5. Davies, *History*, p. 132.

6. *The Official Aviation Guide of the Airways* (Chicago: The Official Aviation Guide Co., August 1935), p. 48.

7. *The Official Aviation Guide* (Chicago: The Official Aviation Guide Co., August 1939), p. 47.

8. Davies, *History*, p. 252.

9. Roy Roadcap, ed., *World Airline Record* (Chicago: Roadcap and Associates, 1965), p. 370.

10. For a discussion of connectivity matrices see K. J. Kansky, *Structure of Transport Networks: Relationships Between Network Geometry and Regional Characteristics*, University of Chicago, Department of Geography Research Paper no. 84, (Chicago, 1963), pp. 28-29; and Peter Haggett, *Geography: A Modern Synthesis* (New York: Harper and Row, 1972), p. 337.

11. For a description of the Beta index see Peter Haggett, *Locational Analysis in Human Geography* (New York: St. Martin's Press, 1966), p. 238.

THE STATUS OF GEOGRAPHY IN FLORIDA'S COMMUNITY AND JUNIOR COLLEGES

Harry J. Schaleman, Jr.

Geography is visible, but not overly viable, in the community and junior colleges. It is healthier in Florida than in most other states in the Southeast, but has much room for improvement. Marked variation is evident in course offerings, credentials of faculty teaching geography, library holdings of geography publications, and role of support for the subject area within the institution.

This report on Florida results from a larger survey conducted in 1977 by the author in nine Southeastern States. Of the thirty-three two-year institutions listed for Florida in the *1976 Community and Junior College Directory*, twenty-eight responded to a questionnaire, yielding a favorable return of 89%.

Of the twenty-eight institutions surveyed, geography is included in the curriculum of nineteen (68%). In all instances, the geography course or courses are placed within the area of Social Science. Annual enrollment statistics vary widely, with three schools reporting fewer than thirty geography students and two reporting 200 to 300 students. The median annual enrollment for all responding institutions is in the 100 to 200 category.

Variety abounds in course offerings. Because of similar course titles and the unavailability of course syllabi, assessment of course offerings is difficult. By far the most common course title is "World Regional Geography" with eleven schools represented. Other course titles and number of institutions offering that course are as follows: "Conservation of Natural Resources" (8), "World Geography" (5), "Introduction to Geography" (4), "Cultural Geography" (4), "Introduction to Physical Geography" (3), "Principles of Geography" (2), "Regional Geography" (2), "Latin America" (1), "Anglo-America" (1), "US & Canada" (1), and "USSR" (1). As many as five geography courses are offered at one institution, Florida Keys Community College, but more modest offerings prevail in other schools, with one or two selections common.

Geography is rarely required as part of a major program and when it is, it is usually in the field of Education. As an elective course, therefore, Geography must be a "drawing card" on its own merit.

Library holdings in geography periodicals are meager. As might be expected, *National Geographic* leads with representation in 84% of the reporting colleges. *The Journal of Geography* is second with 74% of the responding schools holding this publication. Next in frequency is the *Geographic Review* (42%), *Annals*, Association of American Geographers (26%), *Geographic Magazine* (London) (21%), *Economic Geography* (21%), *Professional Geographer* (16%), and *Focus* (16%). The range varies from the twenty plus publications at Miami-Dade Community College to none, which three institutions indicated by neglecting to complete the list of check-off publications.

As for the faculty who teach the geography courses, only two are employed full-time in geography. In all other cases, the geography instructor shares another field, usually history or political science. Most faculty hold a Master's degree with two having earned non-geography doctorates in their respective fields. At least half of the institutions responding supplied no data concerning the credentials of their faculty and their major course work areas. Of those that did, geography represented only half of the MA/MS degree holders. About half of the institutions employ part-time faculty adjuncts to teach geography courses.

Working liaisons with other educational institutions in the state are limited. In particular, informal or working arrangements with the secondary schools are most slighted. Where contact exists, it tends to be with other community colleges. In summary, the "state of geography" in Florida's junior and community colleges is generally one of neglect or indifference. In fairness, all is not gloom. Many well-qualified, dedicated instructors are struggling to improve their programs despite apathy, ignorance, and lack of financial and administrative support. A definite need exists to educate students, faculty peers, administrators and the general public as to the nature of the geography discipline and its applicability to today's rapidly changing complex society.

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POINT OF VIEW: GEOGRAPHY AND PLANNING

Geographers: Planners of the Future

Cindy Aaronson

With today's decreasing job market for college graduates, students more and more seek majors which train toward a career related to their discipline. Geography is such a field. There are many meaningful job opportunities in geography; planning, for example, is among the most popular. City, regional, rural, and environmental planning are new horizons for geographers.

John Stafford, Chairman of the Geography Department at University of South Florida, finds the geography major popular because it offers an internship program and provides courses at night to attract the already employed.[1] "Geography doesn't train you to be a geographer solely," said Stafford. "It trains you to do a lot of other things," including the tasks required of planners. The department at USF is the largest in the Southeast based on the size of the undergraduate program, even though the staff is relatively small.

Graduates from the USF program have entered many traditional and non-traditional careers: A local realtor hired a geographer because of his background in land use; the South Florida Water Management District employs ten geographers; Walt Disney World has a geographer working in grounds management; the Air Force offers opportunities for geographers because of their abilities in map reading.

The USF program specializes in land use, and most of the graduates go into planning. The Hillsborough County Planning Commission has, out of a staff of sixty-five, twelve who have bachelors and/or masters degrees in geography. One of these, Mary Leffler, is a community planner. According to her, "Geography trains you to look at land and people. It's natural to take the geographical perspective and put it into urban planning."

Geography and Planning: Some Notes of Caution[2]

Robert L. Keber

About one planner in five has an academic background in geography (a major or minor).[3] Obviously, the planning profession sees value in geographic training. In spite of this success in placing geographers (if a person with a minor can be called a geographer), the future should be viewed with some caution. First, the position of geography as a training ground for planners is not secure. Given a slight shift in planning philosophy, public administration, sociology, political science, or economics could easily supplant geography as the leading producer of social scientists going into planning. Often a planning program resides in the geography department because of internal university politics, not because of the intrinsic merit of geography. Secondly, training in geography alone is not sufficient preparation for a professional planner. The training must be multi-disciplinary, with a view toward employment in government. Geographers must not over-sell the merits of geography. A final caution is that the ties linking geography and planning will be jeopardized if geographers are perceived to be oriented to non-professional pursuits. Already there are signs that geographers employed as planners affiliate with AIP, not with the A.A.G. If planning is to continue as a viable job market for geographers, geographers engaged in training programs should be affiliated with a professional planning organization as well as with the A.A.G.

* * *

1. For a description of the program see R. C. Holmes, "Applied Geography at the University of South Florida," *The Florida Geographer* 11 (July, 1977): 19-21.

2. Originally published as the summary to "Geography and Planning: Some Notes of Caution" by Robert L. Keber in *Transition, Quarterly Journal of the Socially and Ecologically Responsible Geographers* 8 (Spring, 1978): 22. Reprinted with permission.

3. Paul F. Mattingly, "On the Value of Geography in Planning Practice," *The Professional Geographer* 26 (1974): 310-14.

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.

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

Mary L. Leffler
P. O. Box 2361
Tampa, Florida 33601

Regular membership is $4.00 for a calendar year; student membership is $2.00.