Study of Potential TDM and Transit to Serve Seasonal Residents

By

Francis Cleland,
Jennifer S. Perone,
& Lisa Tucker

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STUDY OF POTENTIAL TDM AND TRANSIT SERVICE ADJUSTMENT TO SERVE SEASONAL RESIDENTS

Final Report

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University of South Florida

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Florida Department of Transportation
605 Suwannee Street
Tallahassee, Florida 32399-0450
(850) 488-7774
Fax: (850) 922-4942

Project Manager: Michael Wright

Center for Urban Transportation Research
University of South Florida
4202 E. Fowler Avenue, CUT 100
Tampa, Florida 33620-5350
(813) 974-3120
Suncom 574-3120
Fax: (813) 974-5168

Principal Investigators: Francis Cleland
Jennifer S. Perone
Research Associate: Lisa Tucker

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16. Abstract

This report identifies and summarizes methods for estimating, locating, and forecasting seasonal residents, and then provides recommendations for a unified method based on the literature review and easily available data. The method for estimating and forecasting residents is applied to all Florida counties for the year 2000 using 2000 census data. In addition, travel data was collected from seasonal residents of the Tampa/St. Petersburg area. From the analysis of these data sets, recommendations are made for transportation systems improvements that could reduce vehicle needs for seasonal residents.

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Executive Summary

This report identifies and summarizes methods for estimating, locating, and forecasting seasonal residents, and then provides recommendations for a unified method based on the literature review and easily available data. The method for estimating and forecasting residents is applied to all Florida counties for the year 2000 using 2000 census data. In addition, travel data was collected from seasonal residents of the Tampa/St. Petersburg area. From the analysis of these data sets, recommendations are made for transportation systems improvements that could reduce vehicle needs for seasonal residents.

There are two general methods for identifying temporary residents: direct and indirect. The census count, state collected data, data collected by civic, business and trade groups, and surveys are all examples of direct data collection to identify temporary residents. Indirect methods for identifying temporary residents include estimating the fluctuation in seasonal usage of electricity from active residential electric companies, water customer data, traffic counts, tax receipts, hotel/motel occupancy data, and local post office records.

After assessing all of these methods, it becomes clear that here is no standard method of estimating seasonal residents because the data comes from a variety of independent, unconnected sources, is not collected in a consistent way, and the different sources are likely not to have a high level of agreement. A model predicting the number of seasonal residents present in the Tampa/St. Petersburg area during the time of the 2000 census was constructed and tested. Please note that this model does not represent the number of seasonal residents present throughout the year, only those present on the day of the census.

From analyzing the diary data, it was found that most (87 percent) seasonal residents arrive between the months of October and January and most depart from the area between March and May. The mean length of stay for most seasonal residents is 118.5 days. Most of the seasonal residents tend to stay in Mobile Home Parks or Apartments/Condominiums. The majority of seasonal residents reside in Hillsborough, Pasco, and Pinellas counties. The top five migratory states/providences, from which seasonal residents come, are New York, Ontario, Michigan, Pennsylvania, and Massachusetts. In addition, most seasonal residents are 55 years of age or older, with the majority (75 percent) being 65 years or older. Only 2 percent of seasonal residents were under the age of 55. Most seasonal residents state that their main reason for visiting the Tampa/St. Petersburg area is the good weather.

From the activity diaries, 19 categories of activities were established. On average, each day listed in the diary required 2.5 trips, with shopping, socializing, and dining being the most frequent activities. One-half of the out of home activities begin by noon; three-fourths of out of home activities start by 3:00 pm; ten percent of out of home activities start after 6:00 pm. In addition, one-half of out of home activities are completed by 1:15 pm and 80 percent of out of home activities are completed by 7:00 pm.

The top five places for out of home activities were: 1) the store; 2) in the neighborhood; 3) the restaurant; 4) other; 5) recreation hall in residence park. Most of our respondents drove to get to their activities. The most frequent activities that residents drove to were: 1) doctor visit; 2) flea market; 3) shopping; 4) other activities. The most frequent activities which residents walk to or for were: 1) exercise/walking; 2) socializing; 3) work/volunteer; 4) recreation. The following activities had the higher percentage of people taking a bus or shuttle to them: 1) Entertainment; 2) State fair. Biking was the mode of choice to engage in these two activities: 1) Exercise/walking; 2) Traveling. In addition, golf cart was a mode of choice limited to Hillsborough county seasonal residents. Many seasonal residents also carpool, as 40 percent of all car trips occur with 2 or more people.

The approach to reducing congestion caused by seasonal residents should follow a multi-pronged approach. The first step will be to reduce the need for the automobile as an every day requirement for simple chores such as shopping and attending doctor's appointments. Having accomplished this end, the next step would be to encourage alternative auto ownership models such as carsharing to reduce the financial burden of car ownership and provide a financial benefit from reducing car dependence. Finally, implementation of the above steps will allow for the development of financially sustainable transportation systems (shuttles and charter buses) to service seasonal resident needs.

In the current study, shopping trips and doctor visits required a median trip of 5 miles (average of 10 miles). The percentage of trips that were walkable or bikeable (3 miles or less) was 37%.

In order to encourage more biking and walking and allow seasonal residents to be less automobile dependent, perhaps even to the point of realizing major cost savings through not owning an automobile, the following steps should be taken:

1. Survey areas that have high proportions of seasonal residents (identifiable through census tract-level data on seasonal home vacancies, and with cursory research into facilities that primarily serve seasonal residents) for levels of sidewalk connectivity and bike paths

2. Improve connectivity so that there are continuous walking and biking facilities from (and through) major residential areas to shopping and medical facilities.

3. Examine required crossings and signal timings. Investigate increasing allowed walk time for requested crossings, and eliminating right-turn-on-red during those crossings. (From this investigators personal experience, right-turn regulations may be difficult to change, as drivers will go through a red on right turns, even red right arrows that are obviously intended for that lane alone).

4. Examine the level of sidewalk lighting to ensure the adequacy of the facility for use after dark.

A second method for reducing automobile dependence for these types of trips involves the use of smaller low-speed motorized vehicles such as golf carts, motorized scooters or three-wheeled vehicles, the "Segway", and so forth. These vehicles involve an additional expense on the part of the user. To the extent that they would be used on roadways (likely for golf carts and other relatively large vehicles), they would not provide much in the way of congestion relief – they might even add to it. To use the vehicles off-road might require sidewalk improvements to allow for passage of golf carts, particularly when pedestrians are also using the facility.

In enclosed areas, or neighborhoods where the speed limit is low, golf carts are a viable option. The average speed is approximately 25-35mph, so they are suitable for short or longer trips than biking. 37% of trips were 2 miles or less, so given the appropriate road conditions, golf carts might work for those, and longer trips. They are not really suitable for driving on public roads, and could involve driving in traffic, the stress of which is a major reason for senior women to stop driving. [ref] However, this could also be an advantage, because golf carts may be driven on special paths or sidewalks, off the roads.

In order to implement these approaches, the following steps should be taken:

1. Examine pedestrian facilities to determine if sidewalk characteristics allow for off-road use of golf carts.

2. Develop some type of trade-in incentive for people to replace automobiles with motorized vehicles that can be used on sidewalk and bikepath facilities

3. As above, analyze crossing intersections to ensure safety for users of these vehicles, although there are considerably less problems for users of small motorized vehicles than for elderly pedestrians.

A final method of reducing senior dependence on automobiles is to employ concierge services that have a financial interest in reducing the amount of time spent fulfilling multiple tasks with minimum travel. The net results could be fewer shopping-type trips and less traffic created by those types of trips. Concierge services such as www.nomorechores.com can provide this type of service, particularly if seasonal housing organizations can employ single providers to maximize the efficiency of these services.

Having implemented the above steps to the extent possible, the foundation will have been laid for the development of sustainable transportation services such as local shuttles and charter buses to help provide coverage for both shorter trips and longer trips and provide efficient, convenient service for seasonal residents around seasonal resident communities.

Charter Buses for Special Attractions have the potential of being a very popular option amongst seniors [find reference], because, as indicated in the analysis of the activity diary, a primary activity of seasonal residents is socializing. The bus ride in itself would be a social activity, and may cause people not to want to drive. At Lake Towers, in Sun City, one man even mentioned that he did not replace his car, after it

was stolen, because he made more friends using the transportations services offered by Lake Towers. Charter buses would allow for large groups of friends to travel together, and for people to make new friends. The driver is charged with the responsibility of driving, and can assist passengers if needed; therefore, riding a charter bus should be a stress-free experience for riders.

Local shuttles that run within a community to shopping areas, post offices, and banks would also allow seniors to travel in groups. If it transported them to the places where they needed to run their daily errands, this would likely be a popular option. Shuttles from hospital or doctors' offices may be a partnership opportunity. Hospitals or medical office complexes may be willing to subsidize the cost of shuttle service, if it would draw patients to their facility. Also, local businesses may wish to partner in providing shuttle service to draw customers to those businesses.

One of the major challenges in implementing these solutions is that seniors have very strong feelings about maintaining their independence, and, in the car-dependent living designs that characterize most of Florida, independence is difficult to achieve without the use of a personal vehicle. Infrastructure redesigns of the sort described in the preceding pages could go a long way to alleviating this concern and reducing seniors' perceptions that owning their own vehicle is a requirement to maintain independence.

Introduction

In Florida, seasonal residents have substantial impact on local economies and traffic conditions. Various disparate methods have been developed to estimate the number of seasonal residents or even just to identify where they live, but there is no single methodology for estimating, and particularly for forecasting, the number and location of seasonal residents in different areas. The travel patterns of seasonal residents are not currently well understood, either. What types of trips do they tend to make? Are there specific types of attractions that are more/less frequented by seasonal residents, and to what degree? How can metropolitan planning organizations handle planning needs without knowing more about seasonal resident travel patterns? What kinds of changes to transportation plans and local infrastructure can reduce vehicle travel demand from Florida seasonal residents?

This report identifies and summarizes methods for estimating, locating, and forecasting seasonal residents, and then provides recommendations for a unified method based on the literature review and easily available data. The method for estimating and forecasting residents is applied to all Florida counties for the year 2000 using 2000 census data.

Travel data was collected from seasonal residents in the Tampa/St. Petersburg metropolitan area. Activity diaries were distributed to volunteers, who kept records of their activities over a three-day period, including travel required to conduct those activities. From the analysis of this data, recommendations are made for transportation systems improvements that could reduce vehicle needs for seasonal residents.

Seasonal Residents Literature Review

There are two general methods in identifying temporary residents: 1) direct methods, and 2) indirect methods (Smith 1989:433). Direct methods, such as surveys or censuses, attempt to directly represent temporary residents while indirect methods reflect the movements of temporary residents. The appropriate method or combination of methods to be implemented is determined largely by the project's focus. More specifically, the level focused on (county, state, national, etc.) and the type of temporary resident (i.e. snowbird, tourist) affect the method(s) implemented. In the context of this project, the focus is on seasonal residents at the county level, although diverse methods of identifying temporary residents are discussed.

Direct Methods

The census provides a count of people who are temporarily in a state or local area other than their usual place of residence at the time of the census (Smith1989: 431-432; Hogan 1987:119; Gober and Mings 1984: 164-173). This method represents only a small proportion of overnight temporary residents since it covers only those staying in housing units occupied entirely by non-permanent residents, therefore excluding all those staying with permanent residents or in hotels, motels or campgrounds. This method also is limited to those out of town on one day of the year (April 1st), thus excluding seasonal

variations in temporary residence. Although, it is important to note that in 1990 the Census Bureau eliminated the question that identifies people temporarily away from their primary residence (Galvez 1997:1).

The census also provides housing data, which can be used to estimate overnight temporary residents. If a housing unit is intended for occupancy only during certain seasons of the year, then it is classified as "seas and migratory" (Smith 1989:432). If a housing unit is used only on weekends or short periods of time through the year, then it is classified as "held for occasional use." This data can be utilized then as a means to estimate the number of housing units available for temporary residents. The data are reliable and available for small geographic areas, but information on the number of people occupying these units is not provided and excludes temporary residents staying in other types of lodging. (1989:432)

State collected data can also serve as a direct method since every state has an agency devoted to travel promotion and development and the vast majority of these state agencies collect travel data and make estimates. State produced data are useful for local level data since national sources usually are not collected on the local level (Smith 1989:432). Visit Florida serves as the state's official tourism bureau. A couple of years ago Visit Florida changed from a state agency to a private/public partnership. Visit Florida publishes the Florida Visitor Study annually, which served as a repository of tourism data (Trager, Bales and Clark 1986:6).

Another sound method for local level data is data collected by civic, business and trade groups, such as the chamber of commerce, local planners, realtors and managers of hotels, motels, campgrounds and trailer parks. A positive element in utilizing data garnered from these groups is the fact that these groups have access to small-area data unavailable elsewhere. It may be difficult to acquire the data from these groups and to evaluate the data reliability. (Smith 1989:432).

Surveys are a commonly used direct method of collecting data on temporary residents. The Bureau of Economic and Business Research at the University of Florida conducts statewide telephone surveys in the middle of every month, except April, August and December. The sample is composed of approximately 500 households per month selected by random digit dialing. Respondents are 18 or older. The surveys exclude people staying in hotels, motels, campgrounds and other types of lodging without residential telephones. As a result, short-term tourists and some longer staying tourists are excluded. They surveys provide an estimate of the minimum number of temporary residents in Florida (Smith 1988:1).

Another means of sampling temporary residents to conduct surveys is to focus on areas where the temporary residents are often found. Researchers in the Phoenix metropolitan area concentrated on the types of lodging that are most popular among the area's snowbirds, which are mobile homes and travel trailer/RV parks. To conduct the surveys of the parks, they used a list of the area's mobile home and travel trailer parks. They contacted the owners or managers of the parks to determine the number of spaces,

occupancy levels, and proportion of winter residents in their park. This method does not integrate those temporary residents in motels, hotels, apartments, houses condominiums, or campgrounds (Happel and Hogan 1987:1-3).

Carr Smith Corradino conducted structured interviews with visitors on the premises of hotels and motels for the Southeast Florida Regional Travel Characteristics Study (1998:2). The purpose of the survey was to provide travel information for visitor travel since there are certain locations heavily impacted by visitor travel. Since the winter is the peak season of visitors and seasonal residents, the survey was conducted during this time.

The Florida Department of Transportation, District 7 conducted a survey of a sample of seasonal residents in the Tampa Bay area (Florida Transportation Engineering, Inc. 1996). First, they directly interviewed seasonal residents at six regional attractions and at four residential sites. The survey was designed to screen seasonal residents from non-seasonal residents with the first few questions. In the context of this study, a seasonal resident was defined as a person residing in the Tampa Bay area for more than four weeks but less than six months (1996:3-1). They also attempted to conduct telephone interviews, although this was not successful due to the inaccuracy of the purchased telephone list.

Researchers at the Pan Am University conducted a self-administered survey of seasonal residents in Texas. The survey was conducted during a time identified as the peak window of the seasonal residents where most have already arrived and very few have left (1985:1). The surveys were administered in a variety of ways. Chamber of Commerce representatives administered the majority of the surveys by visiting recreational vehicle and mobile home parks. Surveys were distributed at trade shows for recreational vehicle and mobile home industries, and were also circulated at social functions conducted by tourist clubs. Although this method provided a large sample, the sample is not completely representative of the seasonal residents mainly due to the fact that response was voluntary.

Business surveys can also provide data on temporary residents (Chadwick 1994:70). Receipts are normally the information provided by business surveys. As a result, it is difficult to distinguish between receipts from local residents and temporary residents, although the business operator can be interviewed in order to provide context and an informed interpretation of the receipt information (1994:71).

Indirect Methods

There are also indirect methods to estimate temporary residents. These methods reflect the movements of the temporary residents as opposed to methods that attempt to directly represent temporary residents. One indirect technique is the number of active residential electric companies (RECs). An electric company can tabulate REC data monthly for small geographic areas. From the REC data, patterns and fluctuations in usage can reflect seasonal movement. (Smith 1989:434).

The local post office often has data on the number of addresses to which mail is delivered. If this data are available for different times of the year, then it can be used to estimate seasonal movement (Smith 1989:433). Other indirect sources of data are water customer data, traffic counts, tax receipts, and hotel/motel occupancy data. (1989:433).

An econometric model is a mathematical method often used for tourism projections. The supply and demand characteristics of the tourism industry are identified by a set of simultaneous equations (Trager, Bales and Clark 1986:4; Archer 1994:106). Econometric projections provide an implied causality, but no consistent data are available to directly measure tourism although data are available for explanatory variables (1986:5).

The Florida Statistical Analysis Center (SAC) looks to respond to the fact that Florida does not have a method to objectively estimate tourism on a disaggregated level despite the fact that tourism is a central industry to the state with various influences. Trager et al. identify the central obstacle to the methodology as the absence of a unified database since tourism is not reported in the National Income and Product Accounts, in addition to the fact that a universal definition of tourism does not exist (1986:1-3). They used a tourism tax base methodology to capture nonresident population monthly on a countywide basis to address the needs of the state's law enforcement community, although this method is applicable within other contexts (Trager, Bales and Clark 1986). An advantage of this method is that it is not necessary to create a tourist database from scratch. The tax data are objective, audited, disaggregated by county, and available on a monthly basis (1986:1). The taxable sales tax data collected and reported by the Florida Department of Revenue are the crux of this method. The sales tax data are collected by category and by county. Tourism and resident expenditures are captured in the taxable sales data. Tourism estimates necessitate that all fluctuations in the taxable sales database due to reasons beyond tourism, such as increase in state residents or legislative changes, are isolated and normalized (1986:1).

Positive and Negatives of Direct and Indirect Methods

In general terms, there are pros and cons to both types of methods to estimate temporary residents. And again, the appropriate method(s) implemented are determined by the central focus or question of the project and by the allocated project resources. Direct methods are more commonly implemented than indirect methods, but there are drawbacks to the direct approach. A key drawback with direct methods is the lack of comprehensive, reliable and readily available data (Smith 1989:433). Direct methods require much time and therefore are expensive. Direct methods are more appropriate when the scope to estimate temporary residents is narrower, such as focusing on a particular type of temporary resident, or a limited geographic area or a limited time frame.

Although indirect methods are not often used for temporary resident estimations, indirect methods can be implemented at the local level at regular intervals inexpensively (Smith

1989:434). But with indirect methods, the symptomatic variables may be due to a number of factors other than changes in temporary residents and at the same time may neglect changes in temporary residents (1989:434). These relationships between the symptomatic variable and the temporary residents may be temporal, thus the variable may represent an inaccurate relationship (1989:434). Moreover, the assumption made regarding a relationship may not be valid at all, and as a result, the data would be incorrect. Also, an inclusive count of the number of temporary residents in the base year is nearly never available (1989:434).

Seasonal Resident Estimation Methodology

Clearly, from the literature review, there is no standard method of estimating seasonal residents – the data comes from a variety of independent, unconnected sources, is not collected in a consistent way, and the different sources are likely not to have a high level of agreement. Our task in this section is to develop a method of coming up with the 'best estimate' from the readily available data sources.

The initial approach was to collect all relevant census data for seasonal residents, which for 1990 and 2000 is limited to the vacant residences for seasonal use by type. The definitions of census data show that, even if the building is occupied, if it is primarily a seasonal-use residence it is still classified as "vacant for seasonal; purposes." This data, analyzed by census tract, provides a rough idea of the concentration of seasonal resident populations.

There are two major difficulties with this data. First off, it does not provide an idea of the number of seasonal residents that are *present* in place at the time of the census. Secondly, not all seasonal residents use structures that would be counted in this fashion – there are a number that stay in homes of relatives, hotels and motels, campgrounds, and so forth. An independent source of data is required to conduct these types of estimations.

To address, the first problem, CUTR obtained a special census report that was conducted in 1980. The 1980 and 1990 census forms have a section to check if the respondent is filling out the census in an area that is not their permanent residence. Unfortunately, the Census bureau was unwilling to provide CUTR with the 1990 data. Thus our analysis was limited to the 1980 data.

TABLE 1. DEFINITION OF HOUSING UNIT TYPES*

Housing Unit	A house, apartment, a group of rooms, or a single room occupied as a separate living quarters.
Occupied Housing Unit	The usual place of residence of the person or group of persons living there at the time of the census enumeration, or the unit from which the occupants are only temporarily absent (away on vacation, etc.).
Owner-Occupied Housing Unit	One is which the owner or co-owner lives, whether the unit is owned without lien or mortgaged.
Renter Occupied Unit	Any unit not classified as owner-occupied, including a unit rented for cash rent or one occupied without payment of cash rent.
Vacant Housing Unit	Has no one living in it at the time of census enumeration, unless the occupants are only temporarily absent. May be classified as "seasonal and migratory," or "year-round." Seasonal unit is intended for occupancy during only certain seasons of the year. Migratory unit is held for occupancy for migratory labor employed in farm work during crop season. Year-round vacant unit is available or intended for occupancy at any time of the year.

* Definitions obtained from *Florida Statistical Abstract 2001*, 35th edition, Bureau of Economic and Business Research, Warrington College of Business Administration, University of Florida.

1980 figures are available by county for the total number of seasonal residents, i.e. those residents who report that they are staying somewhere other than their permanent residence. The only data that is available for 1990 and 2000 that relates to seasonal residents is the number of vacant seasonal homes. Fortunately both the vacant seasonal homes and the number of seasonal resident households, by county for 24 Florida counties, are available in the 1980 census. While this is not a perfect representation of the number of seasonal residents, it serves as an excellent indicator. Therefore the number of vacant seasonal homes in an area can be used to provide an estimate of the number of non-permanent households present in the area, at least as of the time the census is conducted.

Census Housing Definitions

In order to make this methodology as accurate as possible, the definitions of housing are examined closely. In 1990, the Census Bureau changed its method of counting vacant

seasonal homes, which affects its comparison with 1980 correlations. In its report, "Historical Census of Housing Tables Vacation Homes," the U.S. Census bureau explains changes made in counting housing.

> In order to make the vacation home category consistent over the decades, "seasonal," "held for occasional use," and "for migrant workers" have been combined. The "occasional use" category was not used in the census of 1940 or 1950. This could partly explain a surge in vacation housing in 1960, although there were not too many units of this type then, when the classification was first used. Counts of seasonal and occasional use vacants are separately provided from 1960 to 1980, but be aware that they were combined in 1990 because evidence indicated enumerators had great difficulty telling them apart.
>
> Housing for migrant workers is included with seasonal before 1990. For comparability, this housing type was added to the 1990 count of seasonal, recreational, or occasional units. Separate counts of migratory vacants are provided for 1990 in case you want to subtract them in order to obtain a cleaner count of vacation homes. The number of migratory vacants has been quite small over the decades."

This approach combines data from "Held for Occasional Use" with the "Vacant Seasonal Homes" to give a more accurate result for the correlation between 1980 Vacant Seasonal Homes and 1980 Non permanent households. The data used for this correlation is shown in the table below, which gives the data by Florida county. The column entitled "1980 Vacant Seasonal Homes and Occasional" reflects the combination of Vacant Seasonal Homes and Occasional Use counts. The correlation is then performed using the columns titled "1980 Nonpermanent Households" and "1980 Vacant Seasonal Homes and Occasional." Data for 1980 nonpermanent households is not provided for every Florida County, as the 1980 census report lists estimates for only 24 counties.

TABLE 2. 1980 VACANT SEASONAL HOMES, HELD FOR OCCASSIONAL USE HOMES, AND NONPERMANENT HOUSEHOLDS.

Florida Counties	1980 Vacant Seasonal Homes	1980 Held for Occasional Use	1980 Vacant seasonal homes and Occasional	1980 nonpermanent households
Alachua	145	298	443	
Baker	27	22	49	
Bay	2,474	1060	3,534	
Bradford	51	249	300	
Brevard	930	3092	4,022	2894
Broward	9,780	29689	39,469	12824
Calhoun	77	57	134	
Charlotte	902	5707	6,609	2327
Citrus	2,091	1696	3,787	
Clay	842	386	1,228	
Collier	1,016	11358	12,374	3502
Columbia	135	134	269	
Dade	3,428	11017	14,445	4773
DeSoto	161	638	799	
Dixie	743	293	1,036	
Duval	466	975	1,441	
Escambia	759	619	1,378	
Flagler	287	539	826	
Franklin	925	261	1,186	
Gadsden	217	130	347	
Gilchrist	337	56	393	
Glades	1,019	45	1,064	
Gulf	643	42	685	
Hamilton	83	34	117	
Hardee	96	210	306	
Hendry	304	275	579	
Hernando	1,222	1327	2,549	670
Highlands	4,491	834	5,325	1867
Hillsborough	3,228	2606	5,834	1893
Holmes	41	139	180	
Indian river	1,094	2723	3,817	1568
Jackson	160	195	355	
Jefferson	9	52	61	
Lafayette	180	63	243	
Lake	830	2394	3,224	1079
Lee	2,415	15098	17,513	6823

Florida Counties	1980 Vacant Seasonal Homes	1980 Held for Occasional Use	1980 Vacant seasonal homes and Occasional	1980 nonpermanent households
Leon	336	208	544	
Levy	425	566	991	
Liberty	261	125	386	
Madison	17	62	79	
Manatee	906	10236	11,142	7311
Marion	4,124	1520	5,644	
Martin	2,415	3211	5,626	1765
Monroe	2,036	4800	6,836	1572
Nassau	350	329	679	
Okaloosa	265	1088	1,353	
Okechobee	1,329	520	1,849	
Orange	1,532	1118	2,650	1287
Osceola	925	1871	2,796	1144
Palm Beach	9,066	6587	15,653	13978
Pasco	4,208	7995	12,203	3098
Pinellas	17,483	12486	29,969	12018
Polk	8,294	2037	10,331	4347
Putnam	2,295	1221	3,516	
Santa Rosa	148	293	441	
Sarasota	1,153	13407	14,560	7727
Seminole	685	421	1,106	596
St. Johns	385	1157	1,542	
St. Lucie	2,416	2802	5,218	1518
Sumter	655	893	1,548	
Suwanee	214	182	396	
Taylor	700	40	740	
Union	7	29	36	
Volusia	3,191	5163	8,354	2966
Wakulla	211	759	970	
Walton	505	762	1,267	
Washington	137	106	243	

Methodology of Data Collection

Data from the 1990 United States Census was consulted to identify those areas in which seasonal residents typically stay during their winter visits to the Tampa Bay area. A population density map was generated from these data, and the following areas were identified as having a relatively significant seasonal resident population:

- Sun City Center/Ruskin in southern Hillsborough County;
- Zephyrhills in southeastern Pasco County;
- The western edge (coastline) of Pasco County;
- The western edge (coastline) of Pinellas County; and,
- Pinellas Park/Largo in central Pinellas County.

The names and locations of many mobile home and RV parks, retirement communities, condominium/apartment complexes, as well as hotels and motels in these areas were compiled and used as a beginning point of reference in the attempt to locate seasonal residents. Using this information, field reconnaissance was undertaken in the early fall within each of the above locales to physically identify those properties most likely to house seasonal residents. These trips were also an effort to determine the most appropriate and effective means of making contact with property managers and seasonal residents.

At those properties with on-site management, the office staff or managers were provided with a verbal explanation of the seasonal residents project. They were given the opportunity to ask any questions they may have had about the project, their involvement, or that of their residents. Office staff and/or managers were also provided with several flyers announcing the project and soliciting seasonal resident volunteers to contact CUTR if they were interested in participating. In those instances when granted permission, a flyer was posted on the community's bulletin board as well. In some cases no one was present in the community's office, and flyers with a letter of explanation and request to post were left at the office.

This method of contact elicited very few responses from seasonal residents interested in participating in the survey. With the peak time for seasonal residents rapidly approaching, other means of recruiting participants were explored.

In addition to thousands of visitors, the Florida State Fair attracts hundreds of volunteers in February of each year. The majority of the Fair's volunteers are seasonal residents spending their winter in the area. Because this group was already involved in a local volunteer activity, it was anticipated they would be amenable to participating in the seasonal residents study. Appropriate contacts were made, and CUTR set up a recruitment table at the Florida State Fair. Volunteers work at the Fair each day that it is open, but "Senior Days," a three-day period during which senior citizens receive discount admission to the Fair, were targeted to maximize the opportunity for contact with visitors as well as volunteers. An incentive to participate was offered in the form of a canvas tote bag, in which study participants could keep all of the survey materials they were given.

This approach proved to be successful, with 300 Fair volunteers and visitors signing up to participate in the seasonal residents study.

Although many more survey participants could have been recruited at the Florida State Fair, the decision was made to limit the number to 300 that were recruited using this means in order to pursue other methods of contacting seasonal residents. Geographic analysis of the winter addresses of those who were recruited at the Fair revealed some areas to be underrepresented in terms of the number of study participants. Another local event provided the opportunity to reach seasonal residents in one of these underrepresented areas. The "Senior Free Fest" was held in St. Petersburg, and is a one-day event featuring organizations and products of interest to senior citizens. This event draws large numbers of seasonal residents and was considered an appropriate means of recruiting winter visitors staying in Pinellas County and western Pasco County. Recruitment at the Senior Free Fest was limited to 80 participants, all of whom were signed up within the first two hours of the event. As at the Florida State Fair, canvas tote bags were used as an incentive for those participating in the study. Once the 80 participants were signed up at this event, demographic information was obtained from those willing to complete the information sheet for a smaller gift. Those providing this information were not required to complete the activity diaries, simply the preliminary information completed by all participants in the study.

Sun City Center was another area underrepresented in the large recruitment from the State Fair. Contact was made previously with the assistant activity director at the largest property in that area, and information from the original flyers was posted on their closed-circuit television system. However, CUTR received no inquiries based upon this method. Given the success of face-to-face interaction with seasonal residents at the two aforementioned public events, a recruitment table was placed in the lobby area of the main clubhouse of the community. Forty seasonal residents, the targeted goal, were recruited to participate in the study. The canvas tote bag, which in all cases proved to be a popular item, was used as an incentive to participate in the survey.

The approach taken at the community clubhouse differed from CUTR's participation in the two public events, the Florida State Fair and the Senior Free Fest, in that there was no scheduled event and potential participants were recruited within their own community, rather than a public venue serving as an attraction. Although foot traffic was of lesser volume at the community location as compared to the public events, the same general interest on the part of seasonal residents and success in recruiting participants was encountered.

Resulting Correlations

The resulting correlation for the number of Temporary Residents and Vacant Seasonal Homes is 0.885. Temporary Households and Vacant Seasonal Homes result in a correlation of 0.866.

Numerous tests of additional housing variables such as rooming houses and rooming house units, apartment buildings and units, condominium buildings and units, hotels and motels and their respective units (i.e. # of rooms) resulted in models which could more accurately predict 1980 non-permanent resident households and 1980 non-permanent residents, but also resulted in wildly improbable predictions when applied to 2000 data. For instance, these models tended to predict that the number of seasonal residents in Broward County dropped by almost half between 1980 and 2000, even when the number of vacant seasonal residences went up. For these reasons, these models were rejected. The most stable model, which gave 'reasonable' predictions for 1980 data and also predicted believable figures for 2000, incorporated just two variables, the number of vacant seasonal homes and the number of mobile homes in the county. The model was run without an intercept, as the intercept did not pass the *p*-value test. The regression equation for the number of non-permanent (i.e. seasonal) residents is shown in the table below:

TABLE 3. COEFFICIENTS OF THE REGRESSION EQUATION FOR THE NUMBER OF NONPERMANENT RESIDENTS.

Variable	Coefficient value	Standard Error	Model p value for inclusion	T
Homes held for seasonal & occasional use	.61036	.10874	<.0001	5.61
Mobile homes	.10144	.07224	.1716	1.40

Even though the standard t value of 1.96 is not met by the mobile home variable, it was included based on a more liberal allowance for inclusion of variables due to the small number of observations and the inherent reasonableness of using this variable to predict seasonal residence patterns.

R-squared for this model is 0.8928, 29 observations used

A similar model was run for the number of non-permanent (i.e. seasonal) households, which yielded the following results:

TABLE 4. COEFFICIENTS OF THE REGRESSION EQUATION FOR THE NUMBER OF NONPERMANENT HOUSEHOLDS.

Variable	Coefficient value	Standard Error	Model p value for inclusion	T
Homes held for seasonal & occasional use	.32208	.06508	<.0001	4.95
Mobile homes	.05654	.04316	.2037	1.31

It should be noted that the model predicts the number of seasonal residents *at the time of the census*, and not the total number present in the area throughout the year.

Application of the model for 2000 to Florida Counties

Applying this model to the Florida counties in which the number of seasonal residents was determined in 1980 using the 2000 data yields the following estimates for temporary households for the year 2000 at the time of the census:

TABLE 5. COMPARISON OF SEASONAL RESIDENTS ESTIMATES.

Florida Counties	2000 Vacant Seasonal Homes	2000 Mobile homes	2000 Temporary Resident Households Estimate	2000 Nonpermanent Residents Estimate
Alachua	684	3609	424	784
Baker	98	482	59	109
Bay	8,816	2807	2998	5666
Bradford	222	661	109	203
Brevard	10,458	11,654	4027	7565
Broward	46,503	15,469	15852	29953
Calhoun	214	219	81	153
Charlotte	10,506	5,241	3680	6944
Citrus	5,197	5,046	1959	3684
Clay	810	1282	333	624
Collier	34,331	5,695	11379	21532
Columbia	417	1990	247	456
Dade	29,598	8,933	10038	18972
DeSoto	1,809	1,781	683	1285
Dixie	1,374	209	454	860
Duval	1,458	17008	1431	2615
Escambia	3,073	4,701	1256	2353
Flagler	1,933	1354	699	1317
Franklin	1,363	104	445	842
Gadsden	230	783	118	220
Gilchrist	384	677	162	303
Glades	1,401	402	474	896
Gulf	1,272	137	417	790
Hamilton	192	360	82	154
Hardee	933	1134	365	684
Hendry	527	2377	304	563
Hernando	3,563	4,692	1413	2651
Highlands	6,165	10,860	2600	4865
Hillsborough	6,056	36,717	4026	7421
Holmes	151	548	80	148
Indian river	5,294	9,426	2238	4187
Jackson	672	1613	308	574

Jefferson	91	393	52	95
Lafayette	265	104	91	172
Lake	6,718	17,751	3167	5901
Lee	39,480	31,091	14474	27251
Leon	708	10686	832	1516
Levy	1,084	810	395	744
Liberty	119	154	47	88
Madison	280	1128	154	285
Manatee	16,838	22,790	6712	12589
Marion	5,250	15012	2540	4727
Martin	6,721	4,792	2436	4588
Monroe	12,332	1,646	4065	7694
Nassau	1,402	1436	533	1001
Okaloosa	4,264	2376	1508	2844
Okechobee	1,167	1,696	472	884
Orange	5,363	14,644	2555	4759
Osceola	6,597	7,413	2544	4779
Palm Beach	52,889	15,753	17925	33879
Pasco	14,906	21,159	5997	11244
Pinellas	34,102	45,666	13566	25447
Polk	19,102	45,186	8707	16243
Putnam	2,955	1630	1044	1969
Santa Rosa	4,315	1815	1492	2818
Sarasota	9,056	15,899	3816	7140
Seminole	975	3,795	529	980
St. Johns	20,461	2591	6737	12751
St. Lucie	1,171	14,597	1202	2195
Sumter	2,283	2476	875	1645
Suwanee	588	2483	330	611
Taylor	1,324	478	453	857
Union	48	223	28	52
Volusia	15,594	25,104	6442	12065
Wakulla	512	487	192	362
Walton	7,684	1000	2531	4791
Washington	626	508	230	434

Counties with sophisticated data collection procedures for seasonal residents, such as Hillsborough and Pinellas counties, may not find this approach useful. The essence of this approach is it simplicity and ease of use for counties with no other means of projecting seasonal residents.

Demographics of surveyed seasonal residents

An initial screener sheet was used to recruit people for the seasonal resident activity diary survey. Of those initially surveyed, 488 provided answers for the screener information. Out of those who received diaries, 202 returned the diaries, with a total of 608 diaries.

Arrival month

January had the highest percentage of arrivals. Out of those seasonal residents surveyed, 31.17% arrived in January. Arrivals for fall months of 2001 were also very high, indicating that most or 87% of seasonal residents arrive in Florida between October and January.

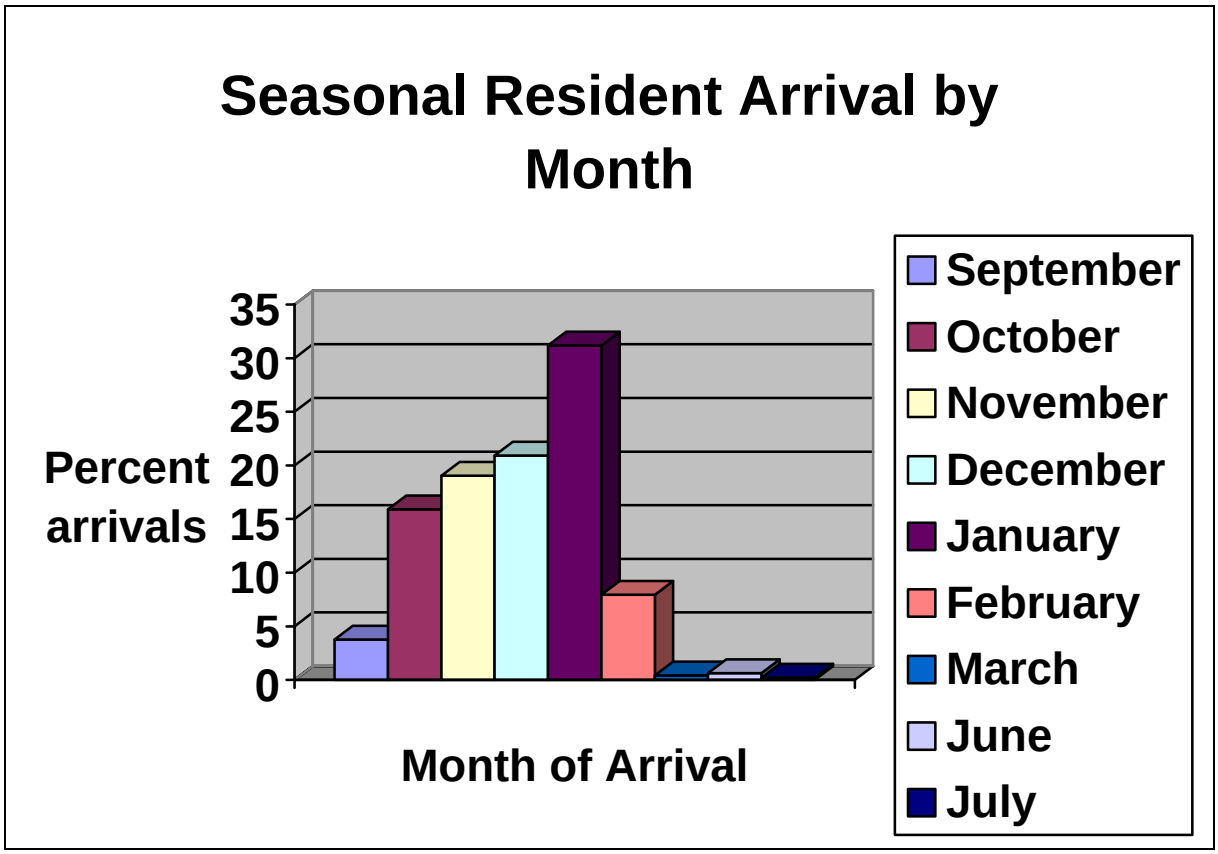

Figure 1. Seasonal Resident Arrival by Month.

Departure month

There is a consistent time period when seasonal residents appear to depart Florida for their other homes. Of all individuals surveyed, 94.3 % leave between March and May, with close to half of all departures taking place in April.

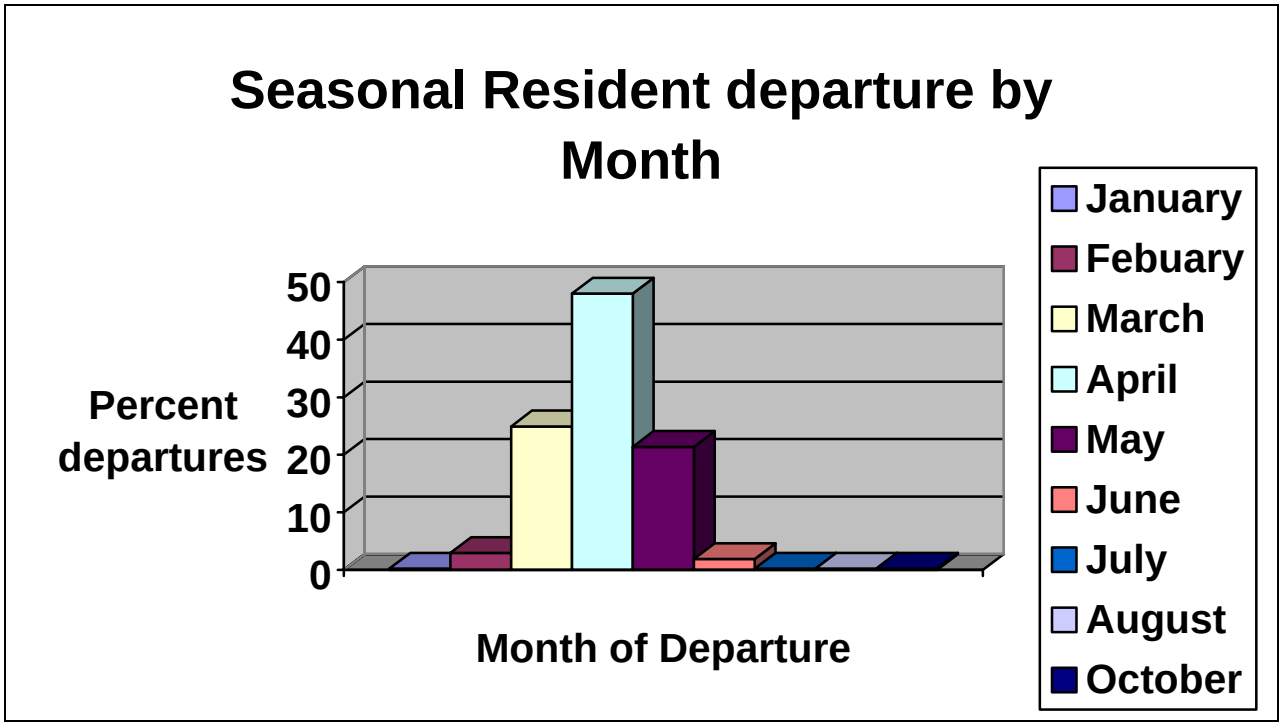

Figure 2. Seasonal Resident Departure by Month.

Length of stay

The mean length of stay is 118.5 days, with 107 days being the median length of stay.

Housing type

Seasonal residents tend to stay more frequently in Mobile Home Parks or Apartment/Condominiums. Of those seasonal residents surveyed, 42.41% stay in Mobile Home Parks. This may be due to the large amount of Hillsborough county seasonal residents that responded to the survey.

TABLE 6. TYPE OF HOUSING FOR SEASONAL RESIDENTS.

Hotel/Motel	3.53
Apartment/Condo	26.20
Mobile Home Park	42.41
Friends/Relatives	5.41
RV Campground	12.68
House	9.15
Other	.62

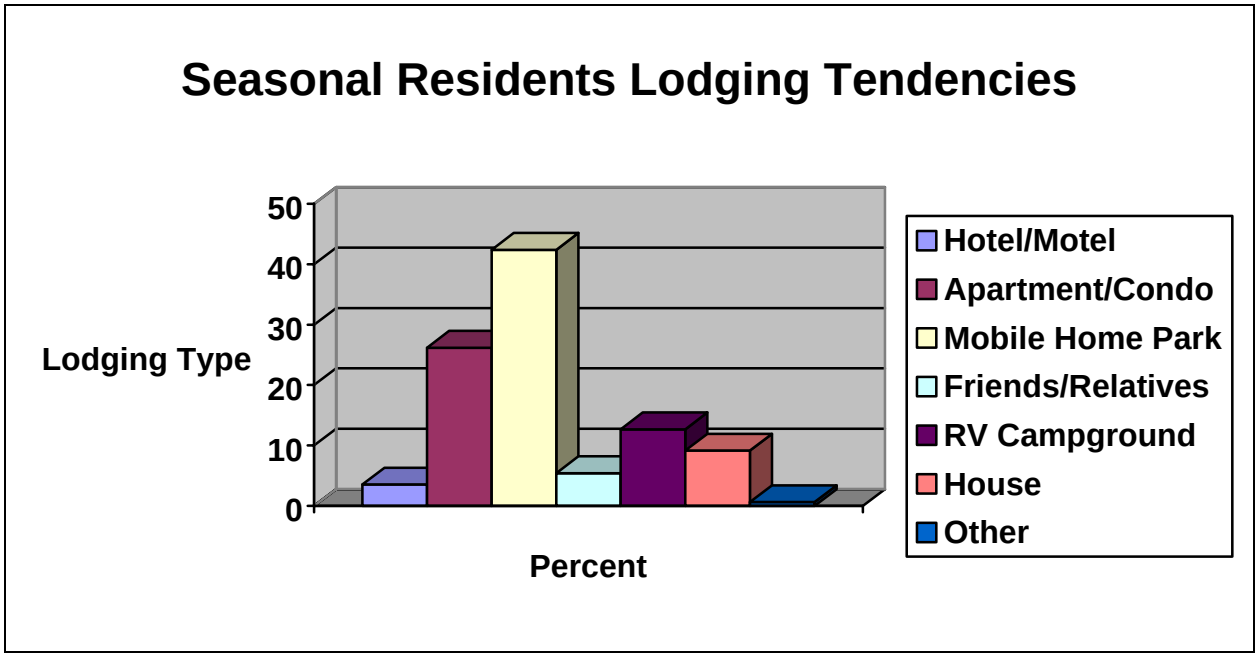

Figure 3. Seasonal Residents Lodging Tendencies.

County Distribution

County distribution reflects the recruitment methods used for the survey. An analysis of data from the 1980 and 2000 Census resulted in estimated seasonal populations for the Tampa Bay area. Using these estimations, it was attempted to recruit an accurate distribution of seasonal residents in the Tampa Bay counties. Two screening sessions were held in Hillsborough county and one in Pinellas county. The following graph shows the distribution of seasonal resident by reported Florida county.

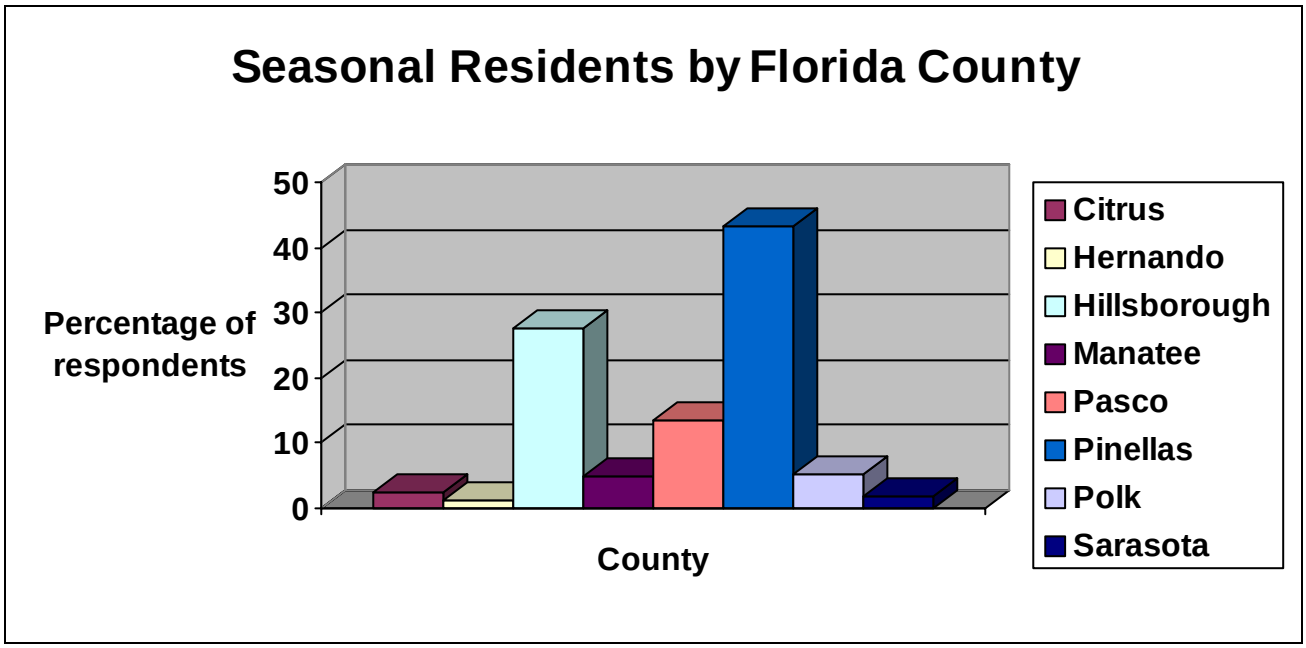

Figure 4. Seasonal Residents by Florida County.

Area of Permanent Residence

Top 5 reported States/provinces

New York 16.18%
Ontario 14.52%
Michigan 12.86%
Pennsylvania 7.68%
Massachusetts 4.36%

Age

The majority of seasonal residents indicated that they were 65 years of age or older. This category of age makes up 74.75% of total respondents to the survey. Those aged 55 to 64 make up 23.74% of respondent. Less than 2% indicated that they were under the age of 55.

Reasons for visiting Florida

Seasonal residents indicated that their main reason for visiting in Florida is for the weather. Other top choices were local attractions, Beaches/environment and visiting friends or relatives.

Activity Diary Analysis

Activities

Seasonal residents appear to be fairly active individual enjoying a broad range of activities. Attempting to capture that range, we established 19 categories of possible activities in their diaries. Those activities are listed below, ranked by the highest averages overall. From this distribution, it is determined that other than at-home activities, seasonal residents typically spend more time dining, shopping, socializing, exercising and enjoying recreational activities.

TABLE 7. ACTIVITY DIARY ANALYSIS FOR SEASONAL RESIDENTS.

Activity	Average
At-Home Activity	1.82
Dining	0.66
Shopping	0.64
Socializing	0.32
Exercising/Walking	0.29
Recreation (cards, bingo, bowling, etc.)	0.19
Church	0.14
Sightseeing	0.12
Other	0.106
Traveling	0.07
Entertainment (Movies/theater)	0.06
Other Special Event	0.054
Work/volunteer	0.05
Golf	0.05
State Fair	0.047
Flea Market	0.04
Doctor Visit	0.02
Strawberry Festival	0.006
Bank	0.003

On average, each diary a day requires 2.5 trips, with a total of 1624 trips for the entire data collection. Of those trips that require travel (out of home activities), shopping is the most frequent activity. Listed below are the most frequent activities of those, which require travel.

TABLE 8. MOST FREQUENT ACTIVITIES OF SEASONAL RESIDENTS.

21%	Shopping
20%	Socializing
35%	Dining

Time of Activities

50% of out of the home activities start by noon. 75% begin by 3:00. Only 10% of out of the home activities start after 6PM. Furthermore it appears that 50% of activities are complete by 1:15 PM, and 80% are completed by 7PM.

Location of Activities

The majority of activities analyzed from the diaries occurred in the seasonal residents homes. This was due partly to the design of the diary, and also because seasonal residents tend to due many activities at home. Of all activities that were not located in their homes, these were the top five locations that seasonal residents complete their activities.

1. Store
2. Neighborhood
3. Restaurant
4. Other
5. Recreation Hall

Activity type by mode

Overall, most people drive or ride in a car to get to most of their activities. However, there are some interesting trends by activity. Of those individuals who reported a mode for their activities these are the trends in mode choice by activity. It should be noted that some of these percentages such as biking and bus/shuttle use are a result of smaller sample sizes.

Of all the activities, these are the activities that had the highest percentages of people who chose driving or riding in a car as their mode of choice.

Doctor Visit 100%
Flea Market 100%
Shopping 93.4%
Other 90.5%

Of all the activities, these are the activities that had the highest percentages of people who chose walking as their mode of choice.

Exercise/walking 50.7%
Socializing 29.2%
Work/volunteer 53.3%
Recreation 26.8%

Of all the activities, these are the activities that had the highest percentages of people who chose riding a bus or shuttle as their mode of choice.

Entertainment 7.89%
State fair 6.9%

Of all the activities, these are the activities that had the highest percentages of people who chose biking as their mode of choice.

Exercise/walking 17.1%
Traveling 9.5%

Mode information

Overall mode split of those who reported a mode:

TABLE 9. OVERALL MODE SPLIT FOR SEASONAL RESIDENTS.

Drive or ride in car	78.21
Walk	15.26
Bus/shuttle	1.52
Bike	2.53
Golf Cart	2.08
Trolley	.06
Boat	.17

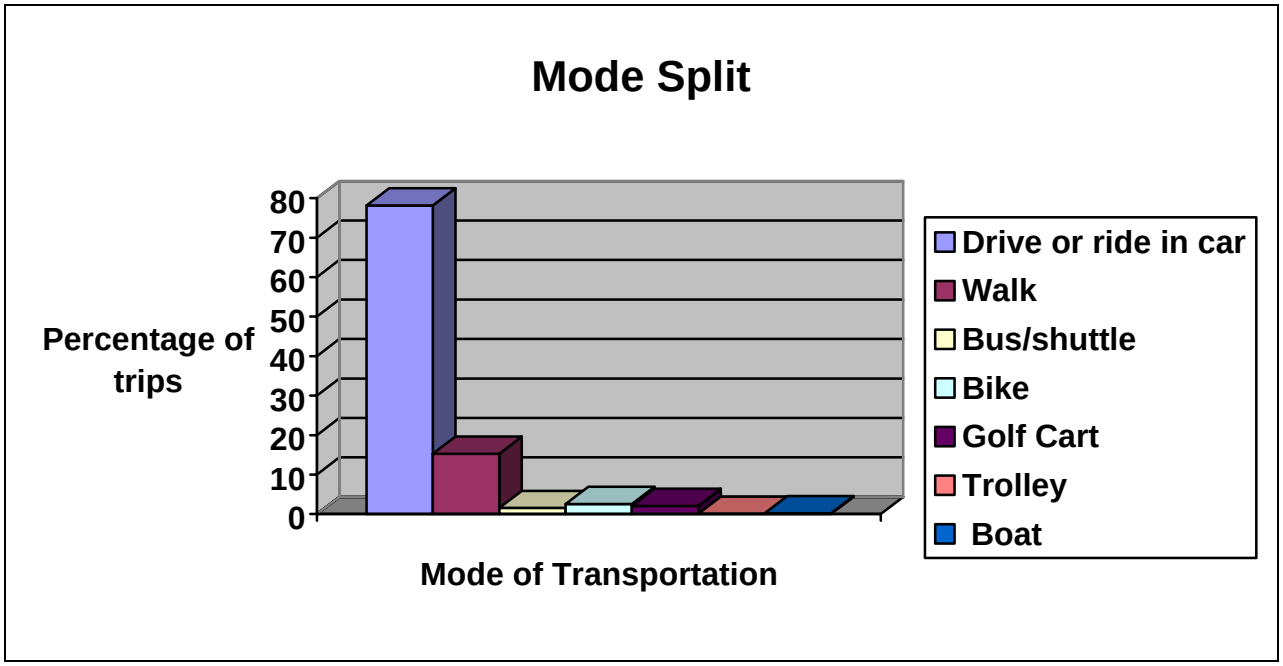

Figure 5. Mode Split.

Length of Stay by Mode Split

People who drive or walk have the same length of stay. Those who use others modes have slightly longer length of stay.

Based on an analysis of mode split by day, the sample of 1776 observations did not show much difference between mode choices by the days of the week.
However, the one anomaly observed was a higher rate of golf cart use on Fridays. Of all golf cart use, 46% occurs on Fridays. When checked by activity, there was an even distribution of activities. Furthermore, golf cart use as a mode choice was limited to Hillsborough County.

Carpooling

It appears that 40% of car trips occur with 2 or more people. 60% drive alone.

Arrival Mode Effects on Mode Split

Further analysis of mode choice by mode of arrival reveals that people who arrive by air are less likely to use alternative modes.

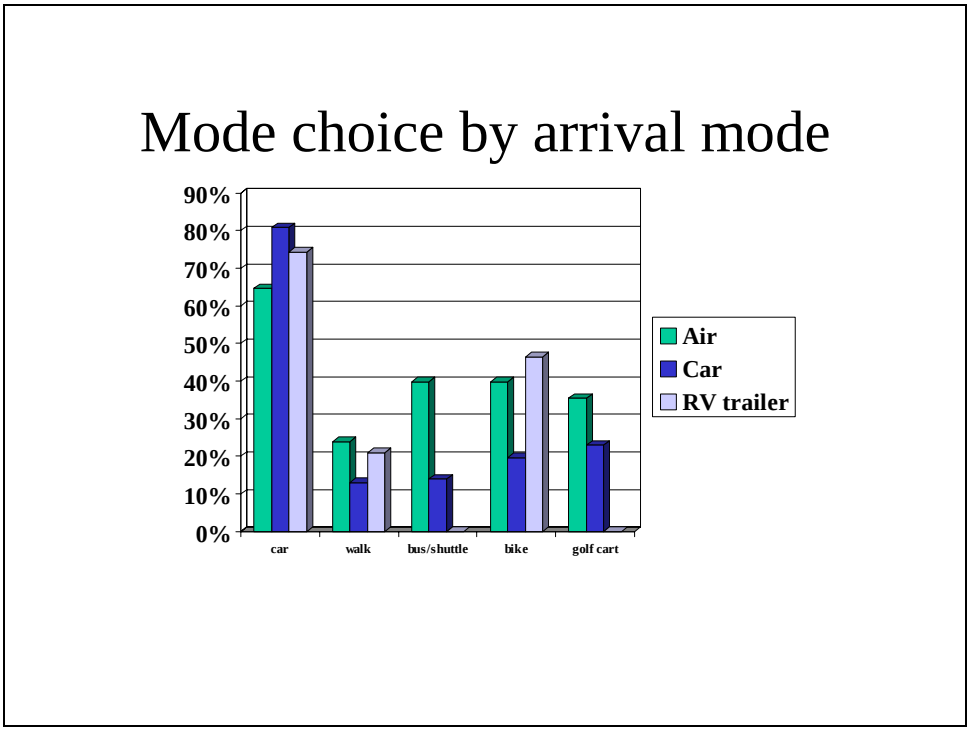

Figure 6. Mode Choice by Arrival Mode

County Analysis

High percentage of Golf cart use in Hillsborough County as a mode of transportation. 4.75% of Hillsborough trips by golf cart vs. less than 1% for other.

People outside the three county area take shorter trips, travel less, but do more activities.

32% of trips are from people outside the three county areas. These people do slightly more activities outside of the house.

Distance analysis

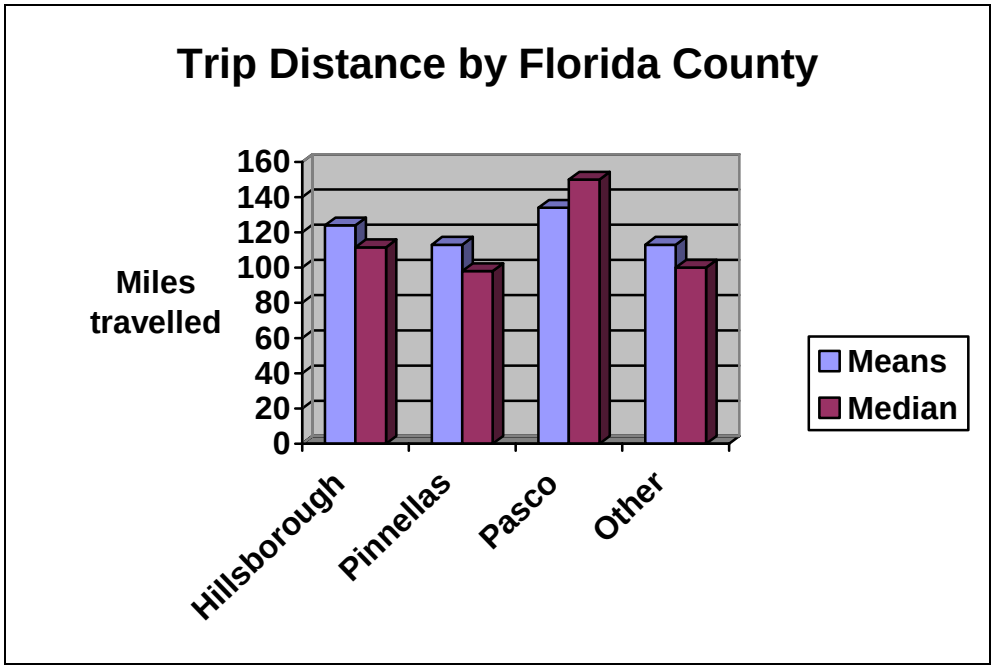

Figure 7. Trip Distance By Florida County.

Activity type by trip distance

Analysis of the average distances per activity shows that sightseeing and traveling require longer distances of travel than any other activity. Additionally, the State Fair and Flea market activities have average distances longer than twenty miles. This measure could be used significantly to show which activates are more likely supportive of alternative modes like walking and biking, and other longer activities that may benefit from a bus or shuttle.

TABLE 10. ANALYSIS OF AVERAGE DISTANCES PER ACTIVITY OF SEASONAL RESIDENTS.

Activity	Average Distance
At-Home Activity	11.24
Exercising/Walking	3.21
Shopping	10.05
Socializing	9.84
Work/volunteer	6.52
Dining	8.18
Sightseeing	32.46
Flea Market	21.07
Entertainment (Movies/theater)	12.5
Doctor Visit	10.78
Golf	6.85
Recreation (cards, bingo, bowling, etc.)	9.98
Bank	2.25
State Fair	25.13
Strawberry Festival	9.75
Other Special Event	26.4
Church	10.51
Traveling	54.76
Other	9.81

Average trip distance by day of the week

Additionally, the distance means was analyzed by days of the week. This exercise showed a fairly even distribution of distance over the entire week with slightly higher distances traveled on Wednesdays.

TABLE 11. AVERAGE TRIP DISTANCE BY DAY OF THE WEEK.

Day	Average Trip Distance
Monday	10.21
Tuesday	9.9
Wednesday	18.73
Thursday	12.45
Friday	12.37
Saturday	10.81
Sunday	12.76

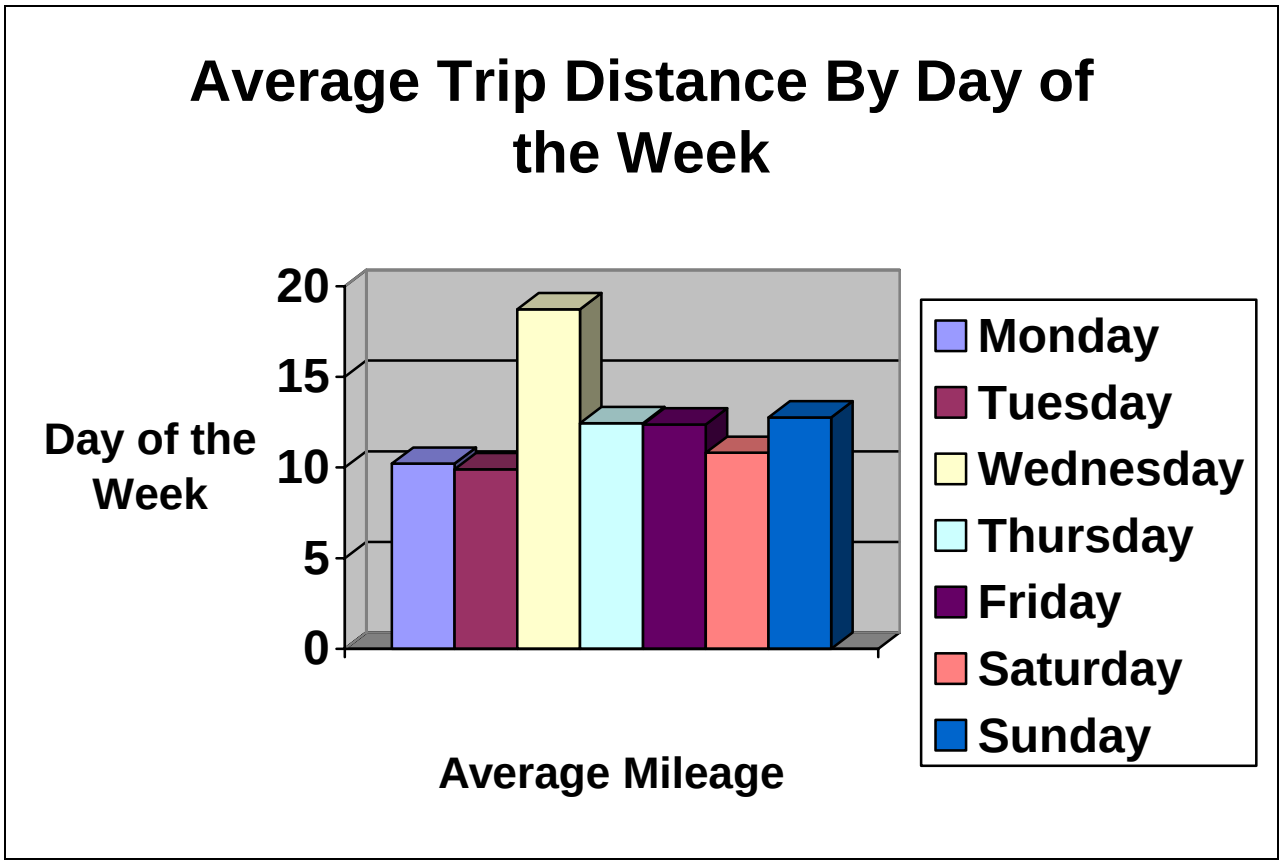

Figure 8. Average Trip Distance by Day Of The Week.

Average trip distance by county

County distribution of trip distance was evenly distributed in the Tampa Bay area with a slightly higher average trip distance in other counties.

TABLE 12. AVERAGE TRIP DISTANCE BY COUNTY.

Day	Average Trip Distance in Miles
Hillsborough	10.33
Pasco	12.59
Pinellas	11.11
Other	14.69

Average trip distance by mode of arrival

Mode of Arrival showed an interesting variation in trip distances. It should be noted that several modes of arrivals had significantly smaller groups of observations such as train and other modes of arrival. However, Air, car and RV/trailer had large enough groups to have some statistical significance. Those individuals who arrived by car tend to take longer trips versus those that arrive by air or by RV.

TABLE 13. AVERAGE TRIP DISTANCE BY MODE OF ARRIVAL.

Mode of Arrival	Average Trip Distance in Miles
Air	7.01
Car	13.36
Train	4.45
RV/trailer	10.38
Other	13.85

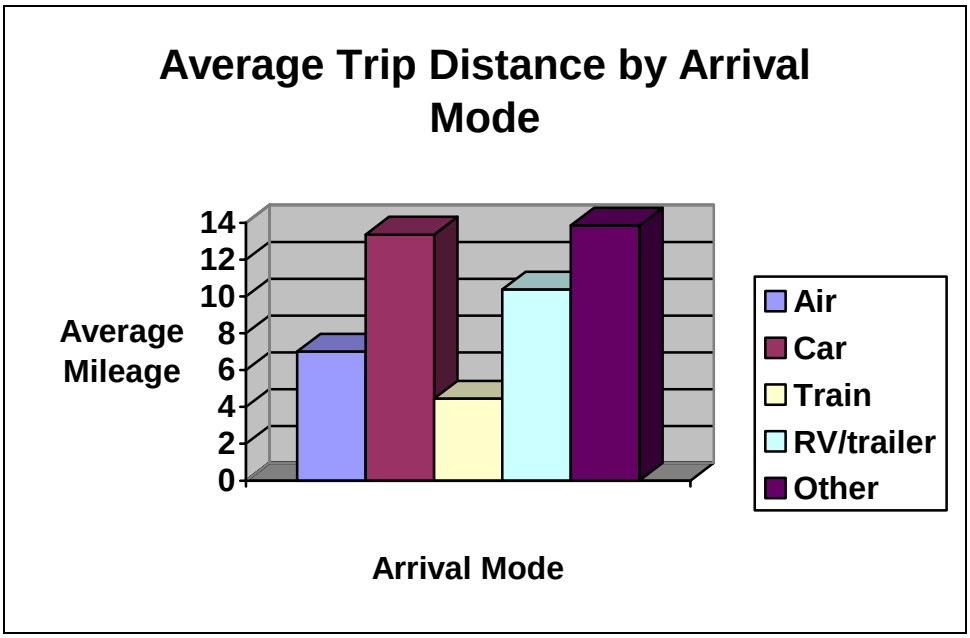

Figure 9. Average Trip Distance by Arrival Mode.

Implementation Suggestions

The approach to reducing congestion caused by seasonal residents should follow a multi-pronged approach. The first step will be to reduce the need for the automobile as an every day requirement for simple chores such as shopping and attending doctor's appointments. Having accomplished this end, the next step would be to encourage alternative auto ownership models such as carsharing to reduce the financial burden of car ownership and provide a financial benefit from reducing car dependence. Finally, implementation of the above steps will allow for the development of financially sustainable transportation systems (shuttles and charter buses) to service seasonal resident needs.

Unfortunately, current land use patterns and policies work heavily against this approach. Distance to be covered in conducting simple trips for shopping and doctor's appointments virtually requires the use of automobiles in most cases.

Our sample of seasonal residents was composed almost exclusively of people aged 55 and up. While our sample was not entirely representative of the population of seasonal residents, there is no question that the majority of them fall into this age group. An analysis of data from 1996 drawn from the Florida Visitor survey indicates that the household heads of 76% of seasonal households (defined as residing in Florida for 1-6 months during the year) were over the age of 55, versus only 30% of non-seasonal visitors. For the small sample (187 observations) of seasonal residents for the Tampa Bay region in the Florida Visitor Survey, over 83% of household heads were over the age of 55. Clearly, most of the transportation strategies will need to be directed towards the transportation needs of seniors.

In the current study, shopping trips and doctor visits required a median trip of 5 miles (average of 10 miles). The percentage of trips that were walkable or bikeable (3 miles or less) was 37%.

For the purposes of this study, the maximum distance for a walking trip is defined as .6 mile, approximately 10-15 minutes. Therefore, walking is an appropriate alternative for trips to neighborhood, dining establishments and shopping areas. However, since the weather is usually mild during the winter, seasonal residents may choose to combine their travel time with an opportunity to get their daily exercise and enjoy the outdoors. [A good cardiovascular workout requires elevating the heart rate for at least 20 minutes; women with osteoporosis are told by their doctors to perform load-bearing exercise, like walking 30 minutes per day, 5 days per week] Also, since there is no limit to the number of people who can walk together, walking would be ideal for solo trips or large group trips. According to the seasonal residents' activity diaries, socializing was one of the activities in which they engaged the most often.

For the purposes of this study, the maximum distance for a bicycle trip is considered to be 3.2 miles. This figure may need to be adjusted down for seasonal residents, since they are mostly seniors. 37% of all trips made by the seasonal residents, in this study, were 2

miles or less. Biking is another opportunity to get a low-impact workout, socialize and enjoy the outdoors. Also, it would allow seasonal residents to take much longer trips than walking. Furthermore, baskets can be mounted on bicycles and therefore, it is possible to use bicycles for transporting groceries, small pets or other items.

Many senior citizens in Florida opt for the more stable 3-wheel design, which may significantly increase the safety of the activity. Bicycle accident rates were rather high for the 75+ group in Hillsborough County [get exact figure from Chris' spreadsheet]. Safety becomes a bigger issue if there are no bike lanes/paths or shoulders along the sides of roads.

One of the problems with converting even short-distance trips to walking and biking is connectivity of sidewalks and bike paths. It is not uncommon in Florida to observe a piece of sidewalk that begins and ends around a development without connecting to any other facility in the area. While this may not be an insurmountable obstacle for those who are younger and relatively fit (and one only need observe these areas briefly to see that very few people choose to bridge the connectivity gaps), to ask older residents to navigate these obstacles does not form the basis of a sustainable trip reduction strategy.

Another difficulty for both bikers and walkers exists at crosswalks, where frequently a 6-lane high-speed thoroughfare must be negotiated, with an almost constant stream of turning traffic (right turn on red regulations allowing pretty much constant vehicle use of intersection), in a relatively short period of time. For seniors (again forming the majority of our sample and the population and question) this is an extraordinarily difficult task.

Another potential issue related to walking is the need for alternative transportation in case of inclement weather. After dark, there is also the issue of adequate street lighting.

Therefore, in order to encourage more biking and walking and allow seasonal residents to be less automobile dependent, perhaps even to the point of realizing major cost savings through not owning an automobile, the following steps should be taken:

1. Survey areas that have high proportions of seasonal residents (identifiable through census tract-level data on seasonal home vacancies, and with cursory research into facilities that primarily serve seasonal residents) for levels of sidewalk connectivity and bike paths

2. Improve connectivity so that there are continuous walking and biking facilities from (<u>and through</u>) major residential areas to shopping and medical facilities.

3. Examine required crossings and signal timings. Investigate increasing allowed walk time for requested crossings, and eliminating right-turn-on-red during those crossings. (From this investigators personal experience, right-turn regulations may be difficult to change, as drivers will go through a red on right turns, even red right arrows that are obviously intended for that lane alone.

4. Examine the level of sidewalk lighting to ensure the adequacy of the facility for use after dark.

A second method for reducing automobile dependence for these types of trips involves the use of smaller low-speed motorized vehicles such as golf carts, motorized scooters or three-wheeled vehicles, the "Segway", and so forth. These vehicles involve an additional expense on the part of the user. To the extent that they would be used on roadways (likely for golf carts and other relatively large vehicles), they would not provide much in the way of congestion relief – they might even add to it. To use the vehicles off-road might require sidewalk improvements to allow for passage of golf carts, particularly when pedestrians are also using the facility.

In enclosed areas, or neighborhoods where the speed limit is low, golf carts are a viable option. The average speed is approximately 25-35mph, so they are suitable for short or longer trips than biking. 37% of trips were 2 miles or less, so given the appropriate road conditions, golf carts might work for those, and longer trips. They are not really suitable for driving on public roads, and could involve driving in traffic, the stress of which is a major reason for senior women to stop driving. [ref] However, this could also be an advantage, because golf carts may be driven on special paths or sidewalks, off the roads.

In order to implement these approaches, the following steps should be taken:

1. Examine pedestrian facilities to determine if sidewalk characteristics allow for off-road use of golf carts.

2. Develop some type of trade-in incentive for people to replace automobiles with motorized vehicles that can be used on sidewalk and bikepath facilities

3. As above, analyze crossing intersections to ensure safety for users of these vehicles, although there are considerably less problems for users of small motorized vehicles than for elderly pedestrians.

A final method of reducing senior dependence on automobiles is to employ concierge services that have a financial interest in reducing the amount of time spent fulfilling multiple tasks with minimum travel. The net results could be fewer shopping-type trips and less traffic created by those types of trips. Concierge services such as www.nomorechores.com can provide this type of service, particularly if seasonal housing organizations can employ single providers to maximize the efficiency of these services.

Having implemented the above steps to the extent possible, the foundation will have been laid for the development of sustainable transportation services such as local shuttles and charter buses to help provide coverage for both shorter trips and longer trips and provide efficient, convenient service for seasonal residents around seasonal resident communities.

Charter Buses for Special Attractions have the potential of being a very popular option amongst seniors [find reference], because, as indicated in the analysis of the activity diary, a primary activity of seasonal residents is socializing. The bus ride in itself would be a social activity, and may cause people not to want to drive. At Lake Towers, in Sun City, one man even mentioned that he did not replace his car, after it was stolen, because he made more friends using the transportations services offered by Lake Towers. Charter

buses would allow for large groups of friends to travel together, and for people to make new friends. The driver is charged with the responsibility of driving, and can assist passengers if needed; therefore, riding a charter bus should be a stress-free experience for riders.

Local shuttles that run within a community to shopping areas, post offices, and banks would also allow seniors to travel in groups. If it transported them to the places where they needed to run their daily errands, this would likely be a popular option. Shuttles from hospital or doctors' offices may be a partnership opportunity. Hospitals or medical office complexes may be willing to subsidize the cost of shuttle service, if it would draw patients to their facility. Also, local businesses may wish to partner in providing shuttle service to draw customers to those businesses.

One of the major challenges in implementing these solutions is that seniors have very strong feelings about maintaining their independence, and, in the car-dependent living designs that characterize most of Florida, independence is difficult to achieve without the use of a personal vehicle. Infrastructure redesigns of the sort described in the preceding pages could go a long way to alleviating this concern and reducing seniors' perceptions that owning their own vehicle is a requirement to maintain independence.

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List of Contacts

John A. Krout @ SUNY-Fredonia, NY Department of Anthropology and Sociology