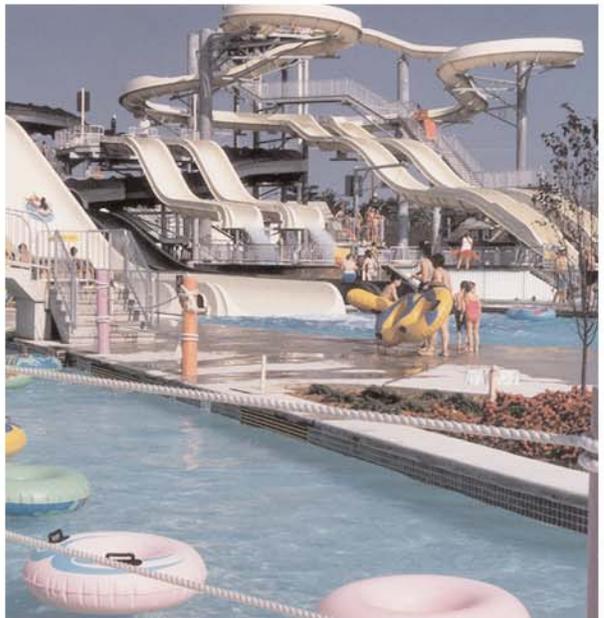


MONMOUTH COUNTY



SUMMER COASTAL POPULATION STUDY

Prepared by the Monmouth County Planning Board
November 2008

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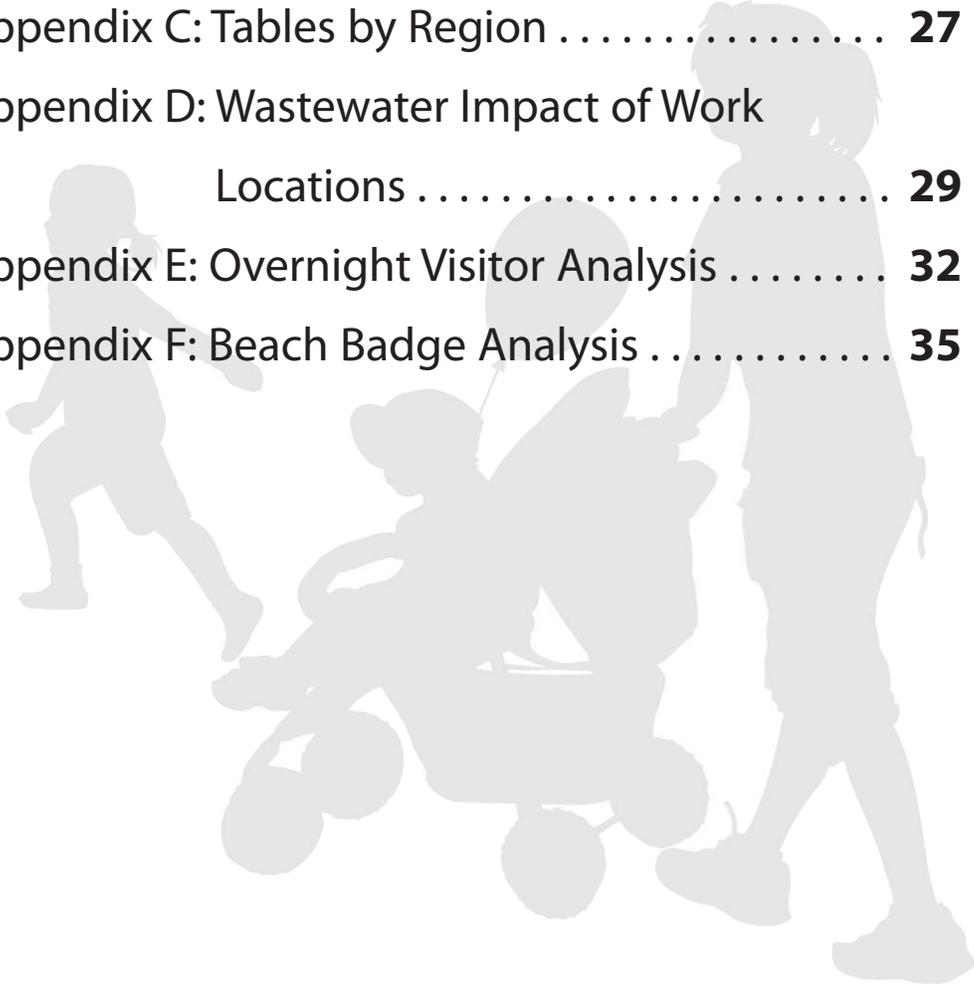
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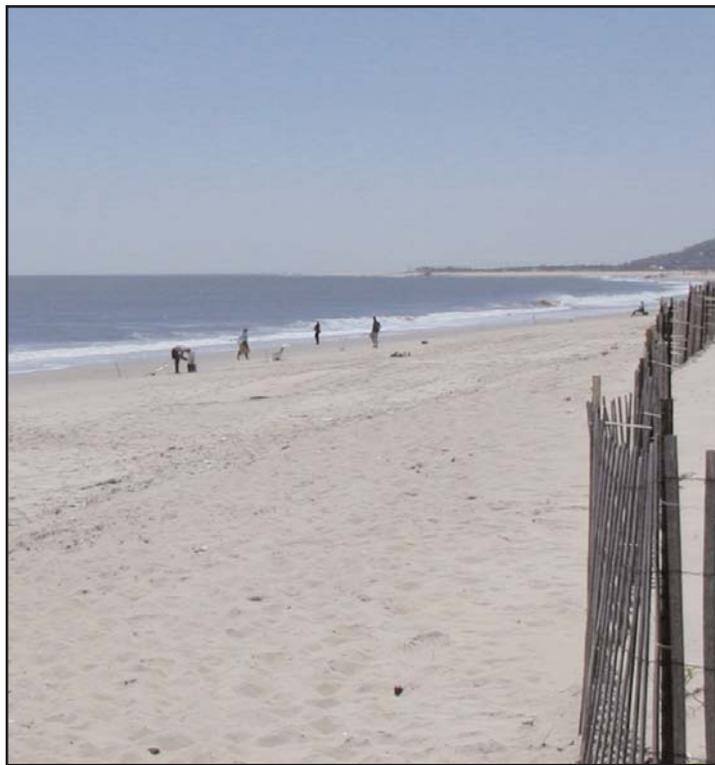
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EXECUTIVE SUMMARY

The staff of the Monmouth County Planning Board undertook a study to estimate the population of the county's Shore Region during the summer, when population increases significantly as visitors are drawn to the area's beaches, marinas, shoreline, restaurants, and other attractions. Summer population, for purposes of this study, includes year-round residents, overnight visitors, and daytrippers. The immediate reason for this study was to support emergency and non-emergency transportation planning, and in particular a Monmouth County Coastal Evacuation Routes Improvement Study. The Shore Region includes the county's Coastal and Bayshore Planning Regions, as well as portions of the county's Central Region.

Using a methodology based principally on differences between winter and summer wastewater flows, the average daytime population of the Shore Region during the summer was determined to be approximately 762,000; this includes the area's year-round, permanent population of 439,331, as well as overnight visitors and daytrippers. In other words, the average summer daytime population increases about 73% over the region's year-round population. As this estimate represents an average of all days, including weekends and holidays, the population on non-holiday weekdays would be somewhat lower than this average figure and the population on weekends and holidays would be higher than the average figure.

The peak summer daytime population of the Shore Region of Monmouth County, which is only attained on some weekends and holidays, was determined to be approximately 908,000, an increase of about 107% over the region's year-round population. This estimate of 908,000 includes the area's year-round, permanent population of 439,331, as well as overnight visitors and daytrippers.

Following is a summary table of the estimated summer population of Monmouth County's Shore Region.

Coastal Area Population

	Average Summer Day	Peak Summer Day
Permanent Population	439,331	439,331
Day Trippers	234,561	333,497
Sandy Hook Day Trippers	13,564	23,000
Overnight Visitors	74,072	112,026
TOTAL	761,528	907,854



INTRODUCTION

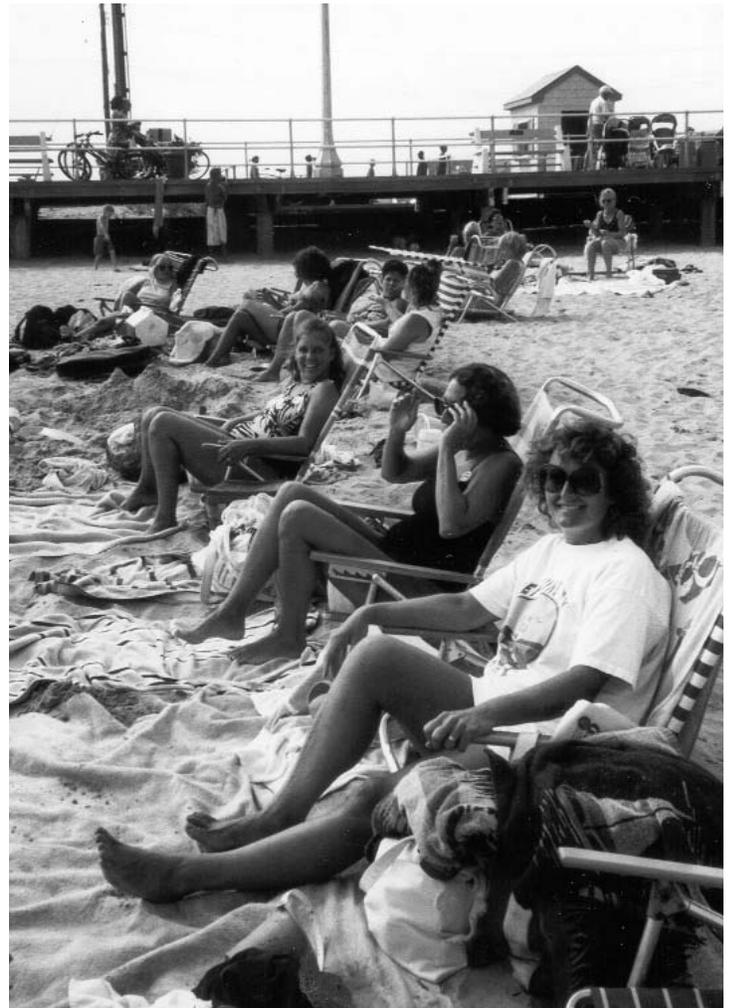
The staff of the Monmouth County Planning Board undertook a study to estimate the population of the county's Shore Region during the summer, when population increases significantly as visitors are drawn to the area's beaches, shoreline and other attractions. The immediate reason for this study was to support emergency and non-emergency transportation planning, and in particular a Monmouth County Coastal Evacuation Routes Improvement Study. However, these estimates should also be useful for potential quantification of the impact of tourism on the local economy, and for research into long-range (non-transportation) infrastructure, utility, and other needs.

Monmouth County's Shore Region includes many communities. While the character of these towns is varied, collectively they attract the largest number of visitors during the warmer months due to their beaches, shoreline, and other attractions. During the summer in general, and in particular on peak summer weekends - for example, during the period around the Fourth of July - the local population can more than double its year-round level.

This annual increase in population presents challenges with regard to infrastructure. Utility infrastructure and transportation networks must be planned to accommodate annual peak populations.

The lack of information regarding seasonal population changes needed for the Coastal Evacuation Routes Study led the Monmouth County Planning Board to undertake this project to estimate the peak population of the county's Shore Region.

The question of year-round versus seasonal peak population is not unique to Monmouth County. Rather, it is common to any area with a resort activity that is seasonal, such as a beach, lake, or ski area. However, Monmouth County is perhaps somewhat different from many other seasonal resort areas, even in New Jersey, in that its beachfront communities include a high proportion of year-round residents. Many beach resorts further south in New Jersey do not share this characteristic, and therefore have fewer year-round residents - though in many cases their gains in

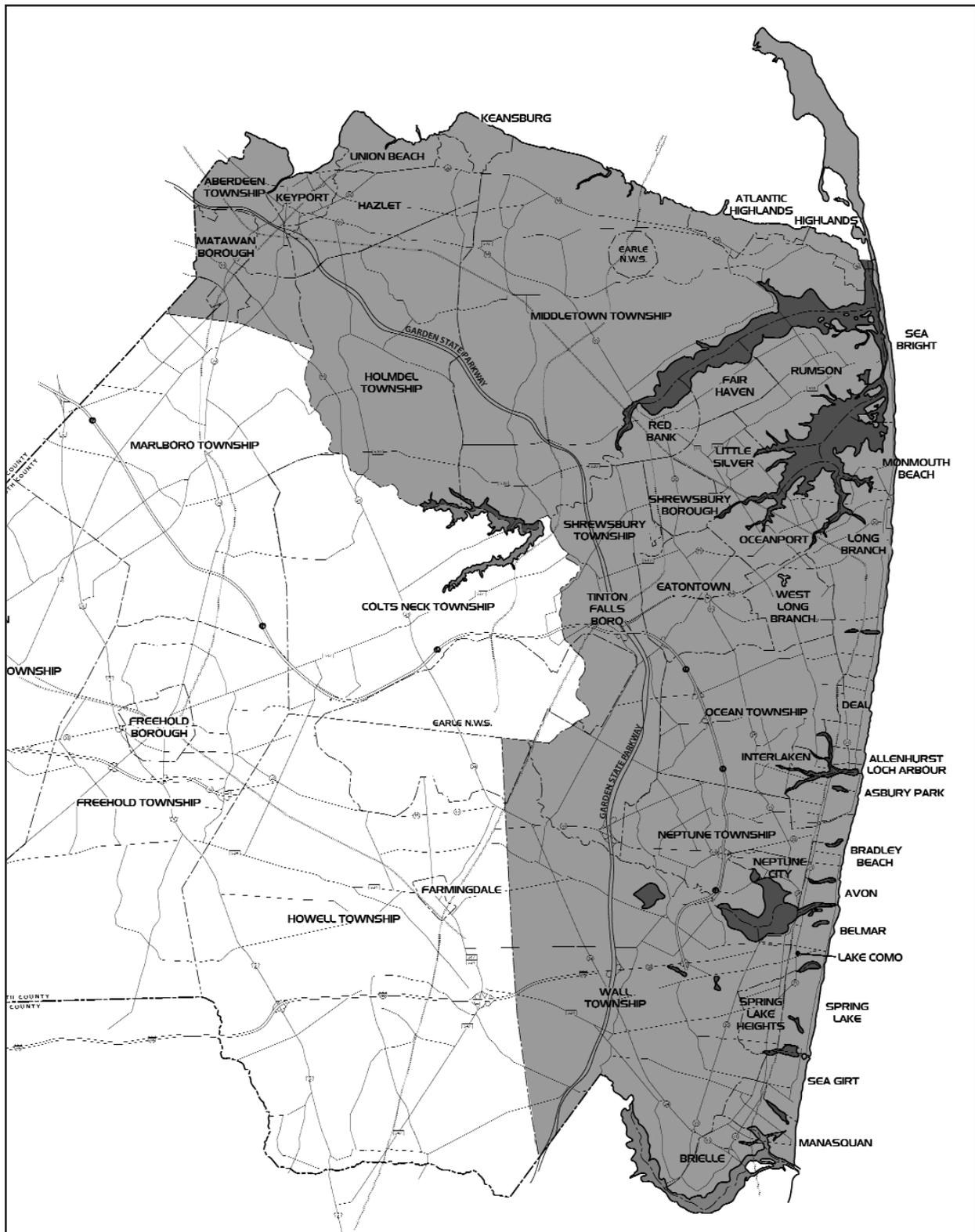


summer population may outweigh those of Monmouth County communities, both proportionally and in absolute numbers. Nevertheless, the county's beaches and waterfront are warm-season attractions for those who live elsewhere; thus there is a visible increase in the summer population, and the question of how much the population increases at its peak remains.



For purposes of this study, the Shore Region includes the county's Coastal and Bayshore Planning Regions, as well as portions of the county's Central Region. The area considered in this study was rather broad, encompassing all municipalities between the Garden State Parkway and the Atlantic Ocean, as well as all municipalities traversed by the Parkway (see Figure 1). In summary, the study area (i.e., the Shore Region) includes all municipalities which are traversed by the Garden State Parkway, as well as all municipalities between the Parkway and the ocean or bay; that is, those municipalities along, east and north of the Garden State Parkway.

Figure 1: Study Area



Approaches Considered

Several methods were considered for use in deriving estimates of the county's peak summer population:

- Direct contact with municipalities
- State and County tourism departments
- Volume of retail sales / sales tax
- Utility consumption - electric, gas, water, wastewater

Wastewater volume was ultimately selected as the best measure for estimating the Shore Region's summer population. A method based on wastewater generation has been used to estimate the fluctuating seasonal population in Ocean City, Maryland, since the 1970s.

More detail about the various approaches considered can be found in Appendix A.

WASTEWATER POPULATION ANALYSIS

Wastewater was selected as the best measure to estimate peak summer population because, under ideal circumstances, it varies most directly with population. People generate wastewater in the course of bathing, washing, cooking, and flushing the toilet, and these activities are fairly constant throughout the year.



Major factors other than human domestic activity that can affect wastewater flow volume include:

- Infiltration from groundwater
- Inflow from surface runoff

These factors are minimized during periods of severe drought. The most recent significant drought year was 2002. Therefore the wastewater estimates used in this analysis come from 2002 - both the baseline winter generation of wastewater, and the summer peak generation of wastewater. The study area is served by eight sewer authorities:

- Bayshore Regional Sewerage Authority: *Aberdeen, Matawan, Keyport, Union Beach, Keansburg, Hazlet, Holmdel*
- Township of Middletown Sewerage Authority: *Middletown, Atlantic Highlands, Highlands*
- Two Rivers Water Reclamation Authority: *Sea Bright, Monmouth Beach, Rumson, Fair Haven, Little Silver, Shrewsbury Township, Shrewsbury Borough, Red Bank, Oceanport, Eatontown, Tinton Falls (part), West Long Branch*
- Long Branch Sewerage Authority: *Long Branch*
- Township of Ocean Sewerage Authority: *Ocean, Deal, Allenhurst, Loch Arbour, Interlaken*
- City of Asbury Park: *Asbury Park*
- Neptune Township Regional Sewerage Authority: *Neptune Township, Neptune City, Bradley Beach, Tinton Falls (part), Avon*
- South Monmouth Regional Sewerage Authority: *Wall, Belmar, Lake Como, Spring Lake, Spring Lake Heights, Sea Girt, Manasquan, Brielle*; note that part of Wall is outside this authority's service area, but as that part consists largely of Allaire State Park, for purposes of this analysis, the entire population of Wall was assumed to be served by the South Monmouth Regional Sewerage Authority.

The study area also includes Sandy Hook, but Sandy Hook is not served by any of the above authorities, as it has its own onsite wastewater facility. Because Sandy Hook charges admission and keeps a count of entrants, a separate figure for the daily population at Sandy Hook was provided by park authorities. Sandy Hook was not included in wastewater-based population estimates.

For each authority, the average daily wastewater flows for the months of January and August 2002 were evaluated. The individual daily flows for each day of July and August 2002 were also evaluated, and the highest level of daily flow that occurred in the absence of rain events was identified. The average January flow was assumed to be the baseline level - that is, the amount of wastewater generated by the year-round population and average levels of infiltration / inflow. Therefore, the difference between the baseline level and the summer flow was assumed to be the amount added by the additional summer population. The assump-

tion used herein is that while the year-round population of Monmouth County has increased by several percent since 2002, the number of overall visitors to the shore is not much different now than in 2002. While it is true that both Asbury Park and Long Branch have changed substantially since that time and now attract a greater number of visitors, it is likely that some of these additional visitors would otherwise be visiting other towns within the Shore Region, so the net impact on overall study area summer population may not be that significant.

This analysis presupposes that the year-round population generates wastewater - i.e., uses water inside the house - at the same rate in summer that it does in winter. Although it seems intuitive that people would bathe more frequently in the summer (about one third of indoor water use is for bathing / showering), thus generating more wastewater, a review of some formal research into this matter in a variety of communities across the United States suggests that there is no appreciable difference between winter indoor water use and summer indoor water use.

Because the average monthly flows for the summer were evaluated, as well as the peak flows, two levels of summer population were considered: the average summer population and the peak summer population. While the average summer population is likely to be higher than the year-round population, there are significant variations within the course of the summer. The number of people at the shore can be expected to be much higher over the July Fourth weekend, for example, than on a midweek day during a non-holiday week (indeed, the peak days for the summer of 2002 were found to be July 4 and July 6). Therefore the average summer monthly wastewater flow was used to estimate the average summer population, and the peak daily flow was used to estimate the peak summer population. Note that days with high wastewater flow were excluded from consideration for use in the summer peak estimate if they occurred on days with significant precipitation, since infiltration and inflow are likely to be responsible for a substantial percentage of wastewater flow on such days. Days were also excluded from consideration if they occurred within the few days following significant precipitation, since during these days the water table was likely to be higher and therefore some of the elevated wastewater flow level may have been due to increased infiltration.

To determine the number of visitors responsible for generating the additional wastewater flow, it was necessary to determine how much wastewater is generated by each visitor. Ocean City, Maryland is an oceanfront summer resort community and has a substantial seasonal variation in its population. For many years, Ocean City has used an approach based on wastewater volumes to determine its population at any given time. Ocean City has a simple formula based on the following assumptions regarding how much wastewater a given person will generate per day, and what percentage of the population during the summer is composed of year-round residents, overnight visitors, and daytrippers:

Volume of wastewater per person:

Year-round resident:	60 gallons per day
Overnight visitor:	40 gallons per day
Daytripper:	7 gallons per day

Percentage of summer population represented by each category (according to longstanding assumptions used by Ocean City):

Year-round residents:	4%
Overnight visitors:	86%
Daytrippers:	10%

These assumptions are only partially applicable to Monmouth County. It is reasonable to apply the gallons-per-day-per-person estimates to visitors to Monmouth County as the figure of approximately 60 gallons per day for indoor water use for year-round residents is also used in documents from the federal EPA. But because Ocean City, Maryland, is much more remote from major employment and population centers than is coastal Monmouth County, the percentage of year-round residents and daytrippers in coastal Monmouth can be expected to be much higher than in Ocean City, and the proportion of overnight visitors would likely be much lower.



One method of estimating the distribution of the summer population among year-round residents, overnight visitors, and daytrippers in coastal Monmouth County would be to draw inferences from existing data on coastal resorts which are similar to Monmouth County. Point Pleasant, New Jersey, performed a study of its summer population and summer visitors in 2007. Point Pleasant is located in Ocean County, New Jersey, adjacent to Monmouth County, and is served by highways and mass transit in a manner similar to coastal sections of southern Monmouth County. Point Pleasant also shares southern coastal Monmouth County's proximity and access to major employment and population centers.

According to the Point Pleasant study, the summer population of the community can be broken down as follows:

Year-round residents:	20%
Overnight visitors:	34%
Daytrippers:	46%

According to the author of the Point Pleasant report, Dr. Harold Nolan from the Institute for Tourism & Recreation at Georgian Court University in Lakewood, New Jersey, this distribution of visitor categories is likely similar, though not identical, to Monmouth County's distribution. It should be noted that Point Pleasant is considerably further south than the northern portion of coastal Monmouth, and Point Pleasant has a concentration of boardwalk amusements and attractions which is for the most part no longer found in Monmouth County. Dr. Nolan suggested that coastal Monmouth, overall, probably has one-third fewer overnight visitors (on a percentage basis) than Point Pleasant, and that the figure for daytrippers would be commensurately higher. Based on Dr. Nolan's findings and suggestions, the following breakdown could be assumed for communities in coastal Monmouth:



Year-round residents:	20%
Overnight visitors:	23%
Daytrippers:	57%

The volume of wastewater generated by the year-round population is already a known figure (from January flow data). Therefore the difference between winter wastewater flows and summer wastewater flows can be assigned to overnight visitors and daytrippers. According to the figures above, 80 out of every 100 people along the coast is a visitor during the summer period.

Therefore, based on the figures above, 71.7% of the additional area population in the summer is represented by daytrippers, who generate wastewater at a volume of 7 gallons per day, and 28.3% of the summer increase in population is represented by overnight visitors, who generate wastewater at a rate of 40 gallons per day.

These, and other, assumptions were further refined by direct interviews on the beach during the Summer 2008 Monmouth County Beach Survey - see Appendix B for the results of this survey, about which more is discussed later in this report. According to the results of the survey, 76% of the additional summer population is daytrippers, and 24% is overnight visitors. These proportions are fairly close to the proportions inferred by adjusting the Point Pleasant findings, as discussed above. The proportions used in this report's estimates are those found through direct interviews on the beach (76% / 24%) through the Summer 2008 Monmouth County Beach Survey.

FINAL POPULATION ESTIMATE
(Not including Sandy Hook)

The average wastewater generation in the study area during the winter (January 2002) in a drought year was calculated to be 38.26 million gallons per day. The average summer wastewater volume for the entire study area (in a drought year, using the average for the month of August 2002) is 42.86 million gallons per day, and the peak summer wastewater volume (for dry-weather days in a drought year) is 45.22 million gallons per day (attained on July 4 and 6, 2002).

Assuming no seasonal variation in the generation of wastewater by year-round residents, the estimated additional population in the study area is as follows:

Coastal Area Population
(does not include Sandy Hook)

	Average Summer Day	Peak Summer Day
Permanent Population	439,331	439,331
Day Trippers	234,561	333,497
Overnight Visitors	74,072	112,026
TOTAL	747,964	884,854

Average summer day

As shown in the table above, on an average summer day there will be an additional 308,633 people in the study area (exclusive of Sandy Hook), including 234,561 daytrippers and 74,072 overnight visitors. See Table 1 in Appendix C.

Peak summer day

During a peak summer day there will be an additional 445,523 people in the study area (exclusive of Sandy Hook), including 333,497 daytrippers (see Appendix D for additional detail on the derivation of the daytripper figure) and 112,026 overnight visitors. See Table 1 in Appendix C.

Subsequent sections of this report assess other prospective indicators of the summer population and examine their possible relationship to the figures derived from wastewater flows.

Due to its special status as a national park, Sandy Hook was examined separately from other coastal areas, and its summer peak visitor levels were assessed separately, as described later in this report.

CORROBORATING EVIDENCE

To gauge the accuracy of the methodology used to estimate the summer population using wastewater flows, it was necessary to evaluate other viable means of estimating summer population. Apart from the measures already discussed, the remaining potential measures include dwelling units, including summer rentals, vacation homes, hotels, bed and breakfasts, etc., as well as beach badges (and membership in beach clubs). The occupancy of dwelling units in excess of the year-round population should have some relationship to the temporary overnight population, while the sale of daily beach badges should reflect a small portion of the summertime daytripper population. To ascertain the number of people on or near the beach, data was gathered through the Summer 2008 Monmouth County Beach Survey (Appendix B). However, most daytrippers to the Shore Region are distributed among a range of other locations and activities and therefore beach badges, which at best represent a fraction of total daytrippers to the area, serve to put the wastewater estimates into a broader context rather than to corroborate them. Following are analyses of these prospective measures of the overnight visitor population and the beach visitor component of the daytripper visitor population.

Overnight Visitor Population

Further examination of the overnight visitor population estimate was conducted through an examination of the occupancy of dwelling units in the shore area. Dwelling units and their occupancy present several facets. Dwelling units, for purposes of this study, can be divided into three categories:

- Hotel rooms
- Year-round residences
- Seasonal residences

Based on census data and on the results of the Summer 2008 Monmouth County Beach Survey (Appendix B), dwelling units near the beach can house an estimated 87,876 additional people during the summer at peak times (see Appendix E for an explanation of this estimate). Hotels can accommodate an additional 10,000 - 14,000 (see Appendix E), for a total of approximately 100,000 additional overnight visitors. This is fairly close to the wastewater estimate of about 112,000 overnight visitors on a peak day.

On an average day, there could be approximately 35,000 additional overnight visitors housed in dwelling units near the beach, plus approximately 10,000 - 14,000 guests in hotels, for a total of approximately 45,000 - 50,000 overnight visitors in the Shore Region (see Appendix E for detail about the derivation of this estimate). According to the wastewater methodology, there are about 74,000 overnight visitors on an average day, but this is an average of midweek days and weekends / holidays. Therefore the figure of 45,000 - 50,000 overnight visitors may more closely reflect the number of overnight visitors on a midweek non-holiday period.



Note that the impact of seasonal workers on the summer population was considered; however, evidence suggests that most seasonal workers in Monmouth County are local, year-round residents of the Shore Region and therefore they are already counted in the census.

Daytripper Visitors

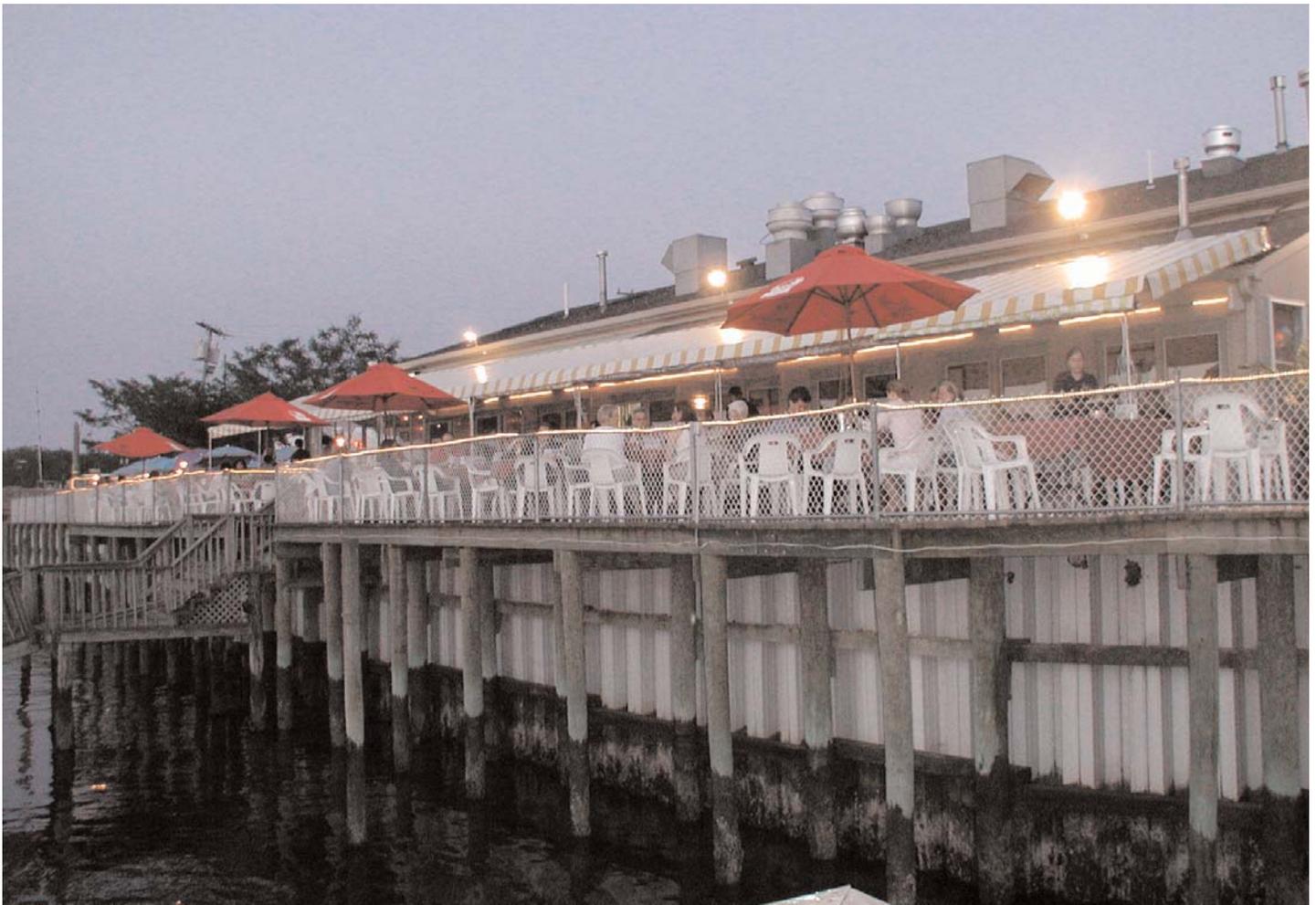
While overnight visitors can be examined by focusing specifically on hotels and residences / vacation homes, particularly those near the beach, daytrippers to the Shore Region are drawn to a wide range of locations and attractions. The geographic scope of the study area is extensive, and includes not only the Atlantic shoreline and its environs but also the entirety of the county's Bayshore Region. Summer daytrips to the Shore Region might include (but not be limited to) visits to the following:



- Beaches
- Boardwalks
- Marinas
- Fishing sites
- Golf courses
- Friends and relatives
- Water park / amusements in Keansburg
- Restaurants / nightlife in a number of towns (e.g., Red Bank, Highlands, Asbury Park, Belmar)
- Monmouth Park Racetrack
- Festivals / Fireworks displays

Therefore there is no single alternative measure (other than wastewater flows) which can be used to reliably estimate the total summer daytripper population in the region. However, it was possible to gather extensive information on beach badge purchases through the Summer 2008 Monmouth County Beach Survey (Appendix B). Though visitors to the beach and its immediate environs (i.e., boardwalks / promenades) represent only a fractional share of daytrippers to the Shore Region, it is instructive to examine the results of this survey, as they provide some context to the overall number of daytripper visitors.

Every beach community in Monmouth County charges a fee for entry onto the beach during the summer. Note that because the Summer 2008 Monmouth County Beach Survey was focused on beach badges and daytime visitors to the immediate beachfront, it does not capture late afternoon or evening visitors to the Shore Region (beach badges are generally



not required in the late afternoon or evening, usually from around 5 PM on). Particularly on a weekend or holiday, there are many people who will visit the area only for the latter part of the day - in some cases for the beach, but in many other cases for nightlife opportunities and restaurants. Visitors who come to the beach early in the morning also avoid purchasing beach badges and therefore would not be included in a beach badge count either.

The first section below assesses beach visitation on an average day based on beach badge purchases, and the second section assesses peak day beach visitation based on beach badge purchases.

Average Summer Day Analysis

According to the wastewater methodology, the average number of daytrippers to the entire Shore Region is approximately 235,000. According to an analysis of beach badge purchases (see Appendix F), on an average day, there are about 32,000 people on or near the beach. If there were about 32,000 people on or near the beach, this would leave 203,000 daily visi-

tors to the area distributed among area marinas, attractions, restaurants, golf courses, and friends or relatives. As shown in Table 1, Appendix C, 31,000 of the average summer day's population increase is in the Bayshore and Middletown Township sewerage service areas, where beach badges are not even issued. This suggests that the summer population increase in the Shore Region is not limited to the immediate beachfront and that visitors may be found along bays, rivers, at marinas, and other attractions in the other sewerage service areas as well. Additionally, note that the wastewater-derived daytripper figure assesses the number of daytrippers visiting the region in a 24-hour period; not all daytrippers will necessarily visit at the same time.

Peak Day analysis

According to the wastewater methodology, the peak number of daytrippers is approximately 333,000. According to an analysis of beach badge sales (see Appendix F), on a peak day, there are about 94,000 people on or near the beach, leaving approximately 239,000 additional daytrippers distributed among area marinas, attractions, restaurants, golf courses, and friends or relatives. This is admittedly a large number. However, as discussed earlier, beach badges and visitors to the immediate beachfront represent only a fractional share of daytrippers to the region. There are also other factors to consider:

- Because the survey methodology was focused on beach badges and daytime visitors to the immediate beachfront, it does not capture late afternoon or evening visitors to the Shore Region. Particularly on a weekend or holiday, there are many people who will visit the area only for the latter part of the day - in some cases for the beach, but in many other cases for nightlife opportunities and restaurants. Visitors who come to the beach early in the morning also avoid purchasing beach badges and therefore would not be included in a beach badge count.
- Collectively, the service areas of the Bayshore Sewerage Authority and the Township of Middletown Sewerage Authority account for about 49,000 visitors on a peak day



(see Table 1, Appendix C); none of these visitors are accounted for by beach badge purchase records since there are no beach badges sold in these areas. As is the case with average daily beach badge purchases, this fact suggests that the summer population increase in the Shore Region is not limited to the immediate beachfront.

- There are summer increases in visitors to attractions, golf courses, parks, friends and relatives, and other attractions throughout the study area.
- The wastewater-derived daytripper figure assesses the number of daytrippers visiting the region in a 24-hour period; not all daytrippers will necessarily visit at the same time.

SANDY HOOK

Sandy Hook is included in the study area and, as a national park with several miles of beachfront, it is a major summer attraction. However, due to its special status, Sandy Hook is not included in any of the previous analysis. Therefore it is examined separately within this section of the report.



Sandy Hook is not served by any of the sewer authorities considered in this study; rather, it is served by its own small wastewater treatment plant. As visitors to Sandy Hook are charged for entry during the summer, and the park service conducts traffic counts of entrants, the park service is able to provide an estimated visitor count. The park service estimates, based on vehicle / passenger counts, that the maximum visitors in a single day to Sandy Hook total

about 23,000. Therefore an estimate of 23,000 is used as the peak-day figure for Sandy Hook.

The average daily attendance at Sandy Hook during the months of July and August is 13,564, according to data provided by the National Park Service for the summer of 2006 (2007 data was not available). The Summer 2008 Monmouth County Beach Survey found that well over 90% of Sandy Hook visitors were from outside the study area (Appendix B).

These peak and average day figures for Sandy Hook must be added to the estimates derived from the analysis of wastewater flows (as corroborated by the examination of beach badges and dwelling units).

CONCLUSION

Following are the final estimates of the average and peak summer population of the study area, including both daytrippers and overnight visitors. Unlike the numbers shown earlier in this report, the numbers below include visitors to Sandy Hook.

Study Area Analysis Shore Region Population

	Average Summer Day	Peak Summer Day
Permanent Population	439,331	439,331
Day Trippers	234,561	333,497
Sandy Hook Day Trippers	13,564	23,000
Overnight Visitors	74,072	112,026
TOTAL	761,528	907,854

TOTAL AVERAGE SUMMER POPULATION:

As shown in the table above, on an average summer day the total area population is estimated to be 761,528, representing an increase of 73% over the permanent population. See Table 2, Appendix C.

TOTAL PEAK SUMMER POPULATION:

As shown in the table above, on a peak summer day the total area population is estimated to be 907,854, representing an increase of 107% over the permanent population. See Table 2, Appendix C.

Sewerage Authority Breakdown

The basic estimates of average and peak summer population, as outlined above, do not break down the summer population by sub-area of the Shore Region. However, given that the population estimates were derived by looking at the various sewerage authorities in the region in aggregate, it is possible to look at these regions individually and estimate the distribution of the increased population during the summer. Figure 2 graphically illustrates the differences in year-round, average summer, and peak summer population in the various segments of the Shore Region. The segments are broken down by sewerage authority. The breakdown of summer population, by region, is also shown on Table 1 and Table 2 (both in Appendix C).

Figure 2

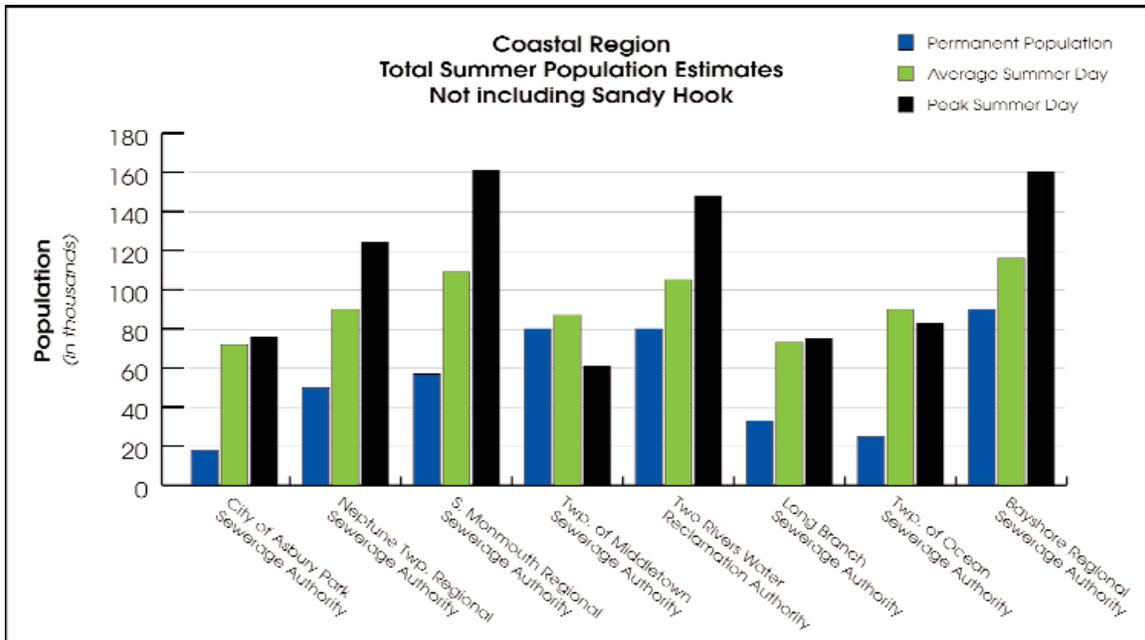
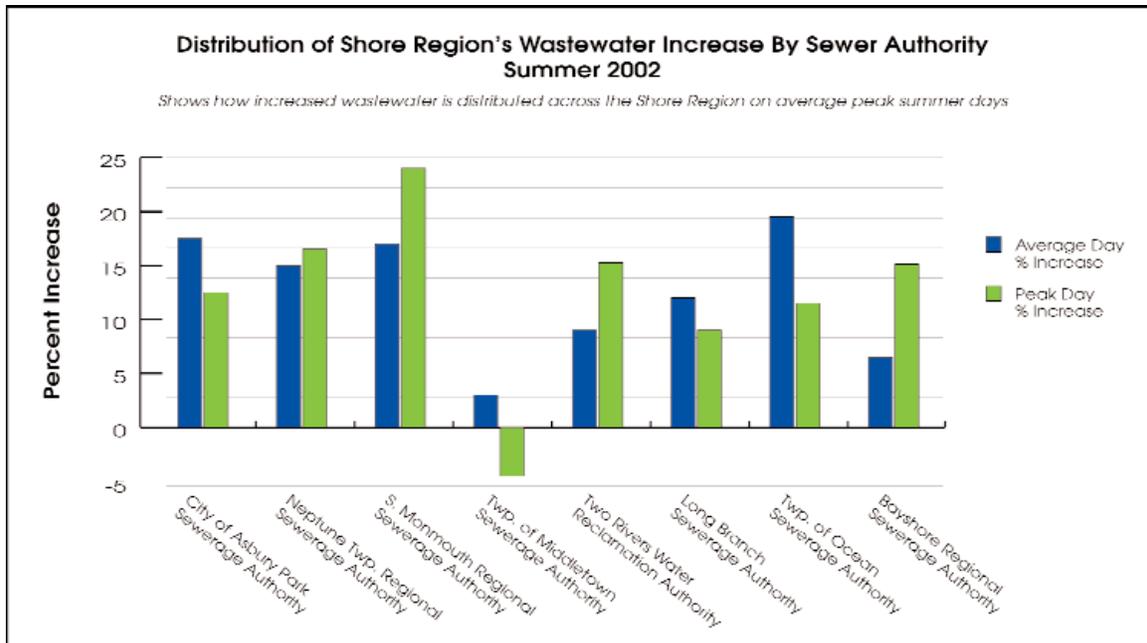


Figure 3 shows another side of the summertime population distribution: it graphically illustrates how the total summertime increase in population is distributed among the sewerage authorities' service areas.

Figure 3



APPENDICES

APPENDIX A

Approaches Considered

Several methods were considered for use in deriving estimates of the county's peak summer population:

- Direct contact with municipalities
- State and County tourism departments
- Volume of retail sales / sales tax
- Utility consumption - electric, gas, water, wastewater

Direct contact with municipalities

Shore Region municipalities in the county were contacted and asked for any estimates of their summer population. However, the information available was inadequate to derive a viable, comprehensive, and consistent picture of the county's summer population.

State and County tourism departments

Neither the New Jersey Division of Travel and Tourism nor the Monmouth County Department of Economic Development and Tourism compile or maintain estimates of the peak summer population in Monmouth County. However, the state has sponsored several studies of tourism which include the average party size per hotel room, and the Monmouth County Department of Economic Development and Tourism maintains a comprehensive inventory of hotels throughout the county, including the number of rooms in each hotel.

Volume of retail sales

The use of retail sales volume, as indicated by sales tax revenues as compiled by the New Jersey Division of Taxation, was investigated as a possible proxy for seasonal population fluctuations. However, after discussions with the Division of Taxation, it was determined that the available sales tax data would not be useful for assessing seasonal population fluctuations.

Supermarket chains in the study area were also contacted to determine whether any available data regarding seasonal fluctuation patterns in sales volumes could be used to measure changes in seasonal population. After conversations with representatives of several supermarkets, it was determined that available supermarket sales data would not provide a reasonable measure for population. This may be due, in part, to the fact that the Shore Region has a large year-round population and, given its relatively high off-season sales volumes, any seasonal swings it may experience are small on a percentage basis, since presum-

ably vacationers and daytrippers do not buy groceries in the same quantity as year-round residents.

Utility consumption

Consumption of water, natural gas, and electricity were all considered as measures of population. However, consumption of each of these utilities varies seasonally in a way that is not directly correlated with population. Increases in summer water consumption are partially attributable to the watering of lawns and gardens, the filling of swimming pools, and the like. Natural gas is used for heat in the winter but not in the warmer months when the population increases, so it is difficult to calculate a baseline consumption level, on a per-person basis, that can be used to calculate the summer population. Electricity suffers from the reverse problem, in that it is used for air conditioning in the summer; its usage varies with temperature more than with population, and it requires, for example, more electricity to cool a 10,000-square foot house occupied by a family of four than to cool a 1,000-square foot bungalow occupied by multiple college students.

Wastewater was selected as the best measure of population, since the generation of wastewater, on a per-person basis, is more consistent throughout the year than any of the other utilities discussed. A method based on wastewater generation has been used to estimate the fluctuating seasonal population in Ocean City, Maryland, since the 1970s.

APPENDIX B

Summer 2008 Monmouth County Beach Survey

During the summer of 2008, the Monmouth County Planning Board interviewed people in beach towns in the county to assess and refine the accuracy of this study's assumptions with regard to the character of tourists and the nature of tourism in the county. Respondents were questioned to determine a number of attributes:

- place of residence (either inside or outside the study area)
- the composition of their parties (total size, number of children and number of adults)
- whether they were daytrippers or overnight visitors (for visitors from outside the study area only)
- if they were overnight visitors, the nature of their accommodation, as well as the number of people sharing that accommodation
- whether they would be going on the beach
- if they were visiting the beach, whether they were using daily or seasonal beach badges

A total of 859 interviews were conducted with parties from outside the study area, representing 3,175 people. A total of 492 interviews were conducted with parties from inside the study area, representing 1,666 people. In total, 1,351 interviews were conducted, representing 4,841 people.

Following are more findings pertaining to the areas of inquiry enumerated above:

- Composition of parties visiting the beach:
 - Parties from outside the study area
 - ▲ The average party size was 3.997 people.
 - ▲ Respondents in this group consisted of 675 parties, comprising 2,067 adults and 631 children age 12 and under, or a total of 2,698 people.
 - ▲ For each adult who visited the beach, there was an average of .305 children ($631/2,067$). Therefore, for every 100 beach badges purchased, there were approximately 131 people on the beach.
 - Parties from inside the study area
 - ▲ The average party size was 3.50 people.
 - ▲ Respondents in this group consisted of 412 parties, comprising 1,180 adults and 264 children age 12 and under, or a total of 1,444 people. (Note that these counts include guests of the respondents, and these guests may have been from either inside or outside the study area)
 - ▲ For each adult who visited the beach, there was an average of .224 children ($264/1,180$). Therefore, for every 100 beach badges purchased, there were approximately 122 people on the beach.

- Average of all parties
 - ▲ The average size of all parties, regardless of place of residence, who went on the beach, was 3.81 people.
 - ▲ Respondents consisted of 1,087 parties, comprising 3,247 adults and 895 children age 12 and under, or a total of 4,142 people.
 - ▲ For each adult who visited the beach, there was an average of .275 children (895/3,247). Therefore, overall, for every 100 beach badges purchased, there were approximately 128 people on the beach.

- Visitors from outside the study area: overnight visits / daytrips:
 - Total number surveyed from outside the study area, including both children and adults, was 3,175.
 - 654 parties, comprising 2,415 people, were daytrippers
 - 205 parties, comprising 760 people, were overnight visitors.
 - Approximately 76.14% of all parties visiting from outside the study area are daytrippers.
 - Approximately 76.06% of all individuals visiting from outside the study area are daytrippers.
 - 23.93 % of those from outside the study area, including both children and adults, or 760 people, were overnight visitors

- Overnight Accommodations:
 - For people staying in dwelling units other than hotels - i.e., staying with friends/family, in summer rentals, or in summer homes - the average number of people per dwelling unit (including permanent residents) was 4.93. Note that an analysis of summer population in Cape May County found the average occupancy of dwelling units near the beach to be very close to this figure - 5 people per dwelling unit - during the summer.
 - The average occupancy of hotel rooms (including bed & breakfasts) was 3.295 people per room. Note that statewide estimates of leisure travel assume an occupancy of 2.5 people per room, and Cape May County's analysis also resulted in an estimate of 2.5 people per hotel room.

- Parties from outside the study area - breakdown of activities:
 - 675 parties, comprising 2,698 people, were going on the beach
 - 184 parties, comprising 477 people, were not going on the beach
 - Among visitors from outside the study area:
 - ▲ approximately 78% of parties and 84.97% of people were visiting the beach
 - ▲ 22% of parties and 15% of people were not visiting the beach
 - For each person from outside the study area who went on the beach, approximately 0.177 people (477/2,698) did not go on the beach.
 - Therefore, for every 100 people visiting the beach, there were 18 visitors in

the immediate vicinity of the beach who were not going on the beach. This figure would not include other visitors to the study area who were not in the immediate vicinity of the beach (e.g., visitors to marinas, golf courses, backyard barbecues, etc.).

- Types of beach badges used:
 - Of all people using badges to enter the beach, 1,670, or 40.3%, used seasonal badges
 - ▲ 59.46% of all seasonal badges were used by beachgoers residing in the study area
 - ▲ 40.53% of all seasonal badges were used by beachgoers from outside the study area
 - Of those from outside the study area who used seasonal badges:
 - ▲ 352 people, or 51.99%, were daytrippers
 - ▲ 325 people, or 48.0%, were overnight visitors
 - ▲ More than half (about 59%) of season badgeholders from outside the study area live within a reasonable daytrip distance from the beach
 - There were 412 beachgoing parties from within the study area
 - ▲ 70 of these parties, or 16.99%, used daily badges
 - ▲ 342 of these parties, or 83%, used other than daily badges (e.g., seasonal, beach clubs, lifeguards, etc.)
 - A total of 493 parties purchased daily badges
 - ▲ 70 parties, or 14.2%, were from inside the study area
 - ▲ 423 parties, or 85.8%, were from outside the study area
 - ▲ Applying the average party size of beachgoing parties from within and outside the study area, daily beach badge purchases by person (rather than by party) were most likely distributed as follows:
 - △ 12.66% of daily beach badges were purchased by residents of the study area
 - △ 87.34% of daily beach badges were purchased by visitors from outside the study area

Sandy Hook

Surveys conducted at Sandy Hook during the summer showed that well over 90% of visitors to Sandy Hook were found to reside outside of the study area. Therefore this study assumes that all Sandy Hook visitors represent a net increase in the shore region's summer population.

APPENDIX C

Table 1

Increase in Summer Population, By Sewerage Authority

Average Summer Day

Sewerage Authority	Average Baseline Population 2007 County Occupancy Study	# Additional People Average Summer Day
City of Asbury Park Sewerage Authority	16,862	54,759
Neptune Township Regional Sewerage Authority	50,292	45,898
South Monmouth Regional Sewerage Authority	56,949	52,279
Township of Middletown Sewerage Authority	79,061	10,054
Two Rivers Water Reclamation Authority	79,505	26,810
Long Branch Sewerage Authority	33,066	37,534
Township of Ocean Sewerage Authority	31,840	59,853
Bayshore Regional Sewerage Authority	91,757	21,448
Sandy Hook National Park Attendance	n/a	13,564
Shore Region Total	439,331	308,633
Total Population w/Sandy Hook	439,331	322,197

Peak Summer Day

Sewerage Authority	Average Baseline Population 2007 County Occupancy Study	# Additional People Peak Summer Day
City of Asbury Park Sewerage Authority	16,862	56,932
Neptune Township Regional Sewerage Authority	50,292	74,917
South Monmouth Regional Sewerage Authority	56,949	103,476
Township of Middletown Sewerage Authority	79,061	-18,296
Two Rivers Water Reclamation Authority	79,505	68,656
Long Branch Sewerage Authority	33,066	40,462
Township of Ocean Sewerage Authority	31,840	52,714
Bayshore Regional Sewerage Authority	91,757	67,203
Sandy Hook National Park Attendance	n/a	23,000
Shore Region Total	439,331	445,526
Total Population w/Sandy Hook	439,331	468,526

TABLE 2
Shore Region Total Summer Population, By Sewerage Authority

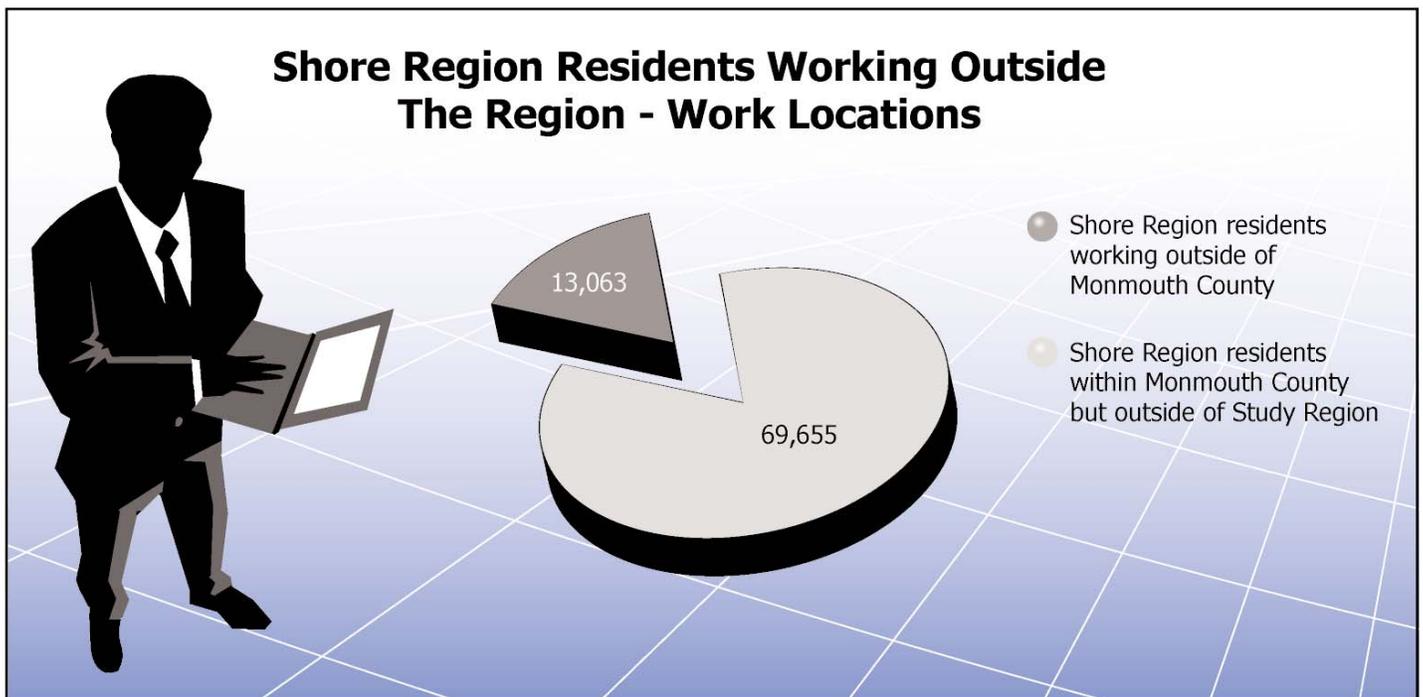
Sewerage Authority	Population on Average Summer Day	Population on Average Peak Day
City of Asbury Park Sewerage Authority	71,621	73,254
Neptune Township Regional Sewerage Authority	96,190	125,209
South Monmouth Regional Sewerage Authority	109,228	160,426
Township of Middletown Sewerage Authority	89,114	60,765
Two Rivers Water Reclamation Authority	106,315	148,161
Long Branch Sewerage Authority	70,559	73,529
Township of Ocean Sewerage Authority	91,693	84,554
Bayshore Regional Sewerage Authority	113,205	158,960
Sandy Hook National Park Attendance	13,564	23,000
Shore Region Total	747,964	884,857
Total Population w/Sandy Hook	761,528	907,857

APPENDIX D

Analysis of Wastewater Impact of Residents Who Work Outside Study Area

Unlike many other coastal resort areas, the Shore Region of Monmouth County includes a significant year-round population of people who commute outside the region for work. According to the 2000 census, there were 69,655 individuals who lived in the study area but worked outside of Monmouth County. There were also 13,063 residents in the study area who worked in sections of Monmouth County that are not within the study area. So the total number of people who leave the Shore Region for work each day is 82,718, according to the 2000 census.

Figure 5



The wastewater-based approach to peak population evaluates the difference in population between an average day during the baseline period (i.e., the winter) and a summer day. The average baseline day represents the average of all days in a month, including weekdays, weekends, and holidays. The average summer day also represents a combination of weekdays, weekends, and holidays. Therefore the comparison of an average baseline (winter) day and an average summer day is valid. However, a peak summer day is not an average - it represents a single day, almost invariably a weekend day or a holiday (e.g., July Fourth). Therefore, in a comparison of this peak day to an average baseline (winter) day, some adjustment is required to keep the comparison valid. This adjustment is explained in the following paragraphs.

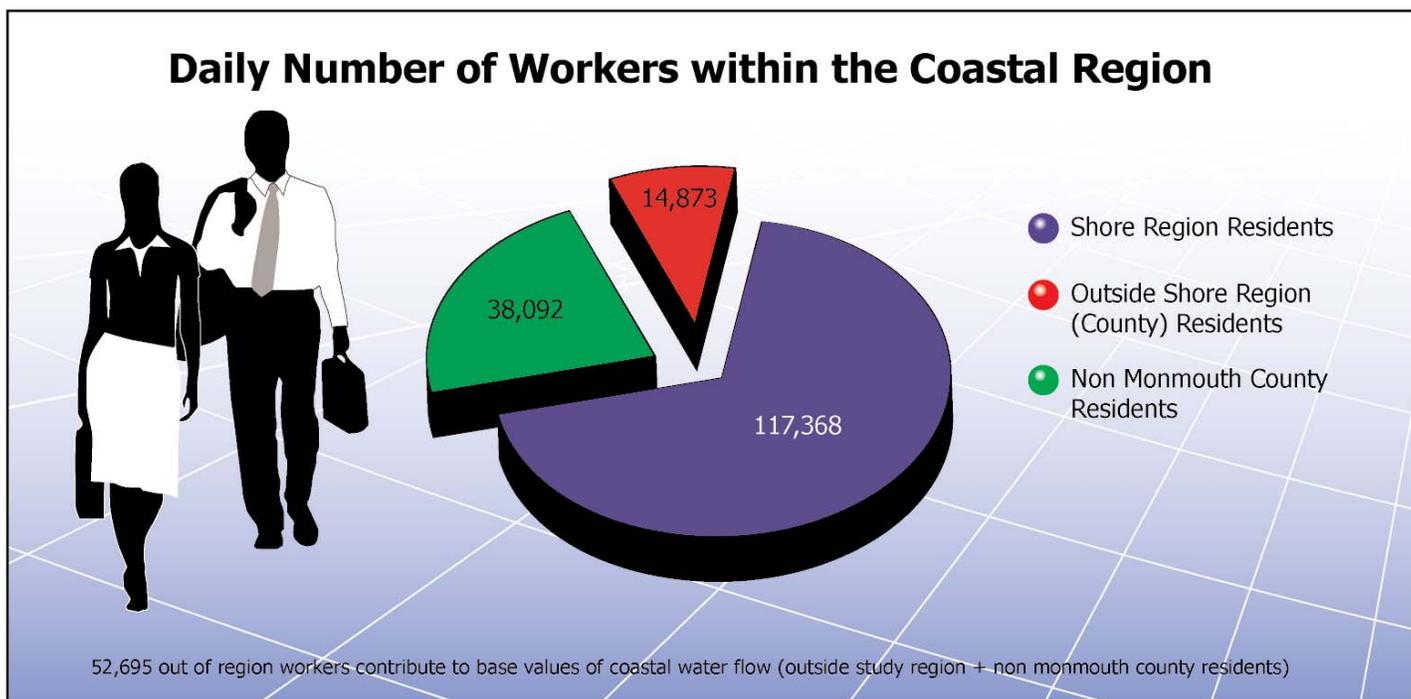
On an average workday, people who live in the study area but work outside of it are not present in the study area for a number of hours. Since they are, on average, not in the area on an average day, care must be taken to make sure that they are not seen as daytrippers to the area on a peak day - the wastewater figures could suggest that these 82,718 people are daytrippers to the study area during a peak day, rather than people who are already counted as area residents by the census but leave the area on an average weekday. The same people also leave the study area on an average weekday during the summer; however, they most likely do not leave the area on a peak day during the summer. Therefore, the comparison of an average baseline (winter) day to an average summer day is direct and requires no adjustment to reflect work-related travel. By contrast, in the comparison of an average baseline day to a peak summer day, the absence of these workers from the study area on an average day could result in double counting on a peak day unless the population estimate is adjusted accordingly.

To elaborate: these individuals are absent from the study area during the average winter day, but they are likely to be in the area (i.e., home from work) during peak (though not average) summer periods, which tend to be on weekends or holidays. The winter baseline period covers an entire month, including both weekdays and weekend days. But because there are five weekdays for every two weekend days, the baseline period, on average, includes five days when these people are out of the area during the day for every two days that they are in the area. So during the winter baseline period, five sevenths of the time (i.e., on weekdays), those who live within the study area but work outside of it do their showering, clothes-washing, etc., at home, but probably do daytripper things - that is, flush the toilet and maybe have a few drinks of water - several times elsewhere. In effect, they are daytrippers outside of the county during off-peak times. Thus, during the baseline period, their weekday contribution (that is, their contribution five-sevenths of the time) to wastewater flows is equal to that of a year-round resident (at 60 gallons per day) minus that of a daytripper (at 7 gallons per day), or $60 - 7 = 53$ gallons per day. During peak summer periods, which tend to fall on a weekend or a holiday, they are most likely at or near home, so they probably contribute these toilet flushes to the wastewater volume within the study area. Therefore their contribution to the baseline January flow is closer to 53 gallons per day than 60 gallons per day, but on peak days they contribute an additional 7 gallons (the daytripper average) to local wastewater flows, so that their contribution to wastewater flow on a peak summer day is 60 gallons per day.

Thus, although study area residents who work outside the study area are counted in the census as part of the year-round population, they are responsible for some of the additional wastewater flow in the study area on peak days; this is because on average, during the baseline period, they leave the area for work on five out of seven days, but on peak days they are likely to be within the study area. Unless this situation is accounted for, the numbers derived from wastewater flows will inflate the number of daytrippers. So the number of people living in the area but working outside of it must be subtracted from the peak-period daytripper estimate to arrive at the true number of daytrippers on a peak day- otherwise, year-round residents who work outside of the coastal area will be included in the estimated number of peak

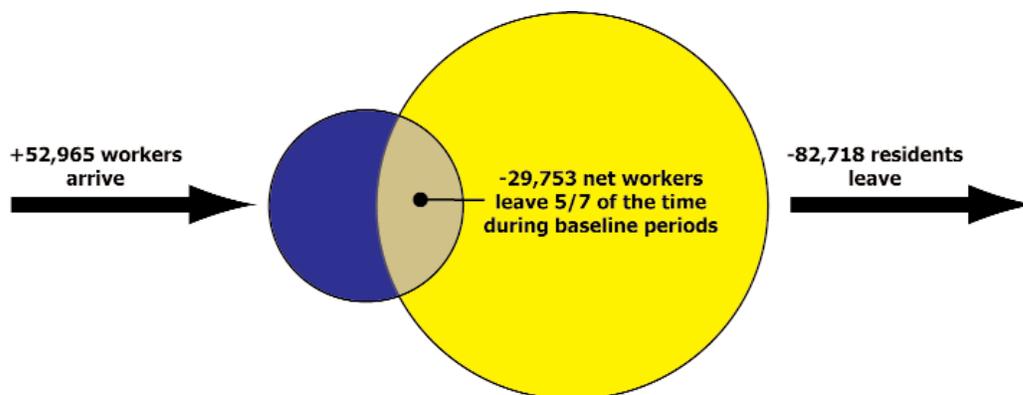
day visitors. But since they are already counted in the census as part of the permanent population, this would result in double counting.

Figure 6



According to the 2000 census, there were also 14,873 people from elsewhere in Monmouth County who worked in the coastal area, and 38,092 from outside the county who worked in the coastal area, for a total of 52,965 people from outside the coastal region who travel there for work. Therefore the net number of people who leave the coastal region for work on an average workday is 29,752. Since the baseline wastewater figure does include weekends, when out-of-area workers are home, five sevenths of this number, or 21,251, should be subtracted from the estimated number of peak-day daytrippers.

Figure 7



APPENDIX E

Overnight Visitor Analysis

Further examination of the overnight visitor population estimate was conducted through an examination of housing / dwelling unit occupancy in the Shore Region. Dwelling units and their occupancy present several facets. Dwelling units, for purposes of this study, can be divided into three categories:

- Hotel rooms
- Year-round residences
- Seasonal residences

Even year-round residences can account for a portion of the summer population increase through family and friends visiting on weekends and holidays. Cape May County, which experiences very large changes in population between the winter and the summer, has come up with comprehensive estimates of its own summer peak population. From detailed surveys of its summer population, Cape May County has concluded that, in its beach communities (which, as defined by the county, represent nearly all housing in the county), the average occupancy of all dwelling units - including both seasonal and year-round units - is 5 people per unit during peak summer periods. Through 1,351 direct interviews of beach visitors in Monmouth County during the summer of 2008 (the Summer 2008 Monmouth County Beach Survey), it was found that the occupancy of such dwellings near the beach in Monmouth County also averages approximately 5 per unit during the summer (4.93 per dwelling unit, rounded to 5 for this analysis; see Appendix B).

Cape May County determined that the average occupancy of hotel rooms during the summer is 2.5 people per room. The State of New Jersey has come to very similar conclusions on a statewide basis. In its 2006 Overnight Leisure Visitor Profile Study, the State of New Jersey found that statewide, during both 2005 and 2006, the average party size occupying hotel rooms was 2.46 people per hotel room when that hotel room was used for leisure use (hotel rooms for business use had a lower average party size). Most likely, the vast majority of hotel rooms in the coastal Monmouth region are used for leisure rather than business visits during the summer. The Cape May estimate and the estimate from the state for the party sizes of hotel guests are essentially identical. The Summer 2008 Monmouth County Beach Survey found the average hotel room occupancy to be slightly higher, at 3.295 people per room (see Appendix B). Both the statewide / Cape May number and the Monmouth County number are considered in this analysis.

Hotel Rooms

According to data available from the Monmouth County Department of Economic Development & Tourism, there are 4,270 hotel rooms in the study area. Therefore hotel rooms in the area can reasonably be estimated to account for somewhere between 10,675 and

14,070 overnight visitors during peak periods (i.e., at full occupancy, assuming a range of 2.5 to 3.295 people per room).

Year-round residences and seasonal residences

According to 2000 census data, there are 7,008 dwelling units in the study area which are for seasonal or recreational use. However, there are also likely to be overnight visitors staying with friends and relatives in year-round residences, particularly during peak periods. Cape May County's methodology assumes that ALL residences in the county host five people per dwelling unit during peak periods, irrespective of whether they are occupied year-round or only seasonally. This approach is not applicable to Monmouth, however, as Cape May County consists largely of summer resort communities, whereas Monmouth County has a much larger year-round population and the study area for this analysis includes municipalities which see relatively little tourism. Therefore this study applies the standard of approximately 5 per dwelling unit (as found by the Summer 2008 Monmouth County Beach Survey) only to summer resort areas within the study area (i.e., places within the study area to the east of the Garden State Parkway but without beaches, such as Eatontown or Shrewsbury, are not included in this residential summer peak analysis). These resort areas would include the following communities:

- Sea Bright
- Monmouth Beach
- Long Branch
- Deal
- Allenhurst
- Loch Arbour
- Asbury Park
- Neptune (Ocean Grove area)
- Bradley Beach
- Avon
- Belmar
- Lake Como
- Spring Lake
- Spring Lake Heights
- Sea Girt
- Manasquan

This list includes two cities, Asbury Park and Long Branch, which are larger than the other communities, contain significant lower-income populations, and feel more like major urban centers than resorts in many areas. These cities have no real counterpart anywhere in Cape May County and it is not realistic to assume that they will, citywide, manifest the same proportion of summer houseguests as the other communities on this list. After consultation with city officials, the assumption is used in this study that 5% of the dwellings in Asbury Park and 7.5% of

the dwellings in Long Branch are subject to "summer peaking."

This list also includes two municipalities, Spring Lake Heights and Lake Como, which do not have beach frontage. However, the entirety of Lake Como is sufficiently close to the beach that it can be considered as a beachfront community for purposes of this study. Spring Lake Heights is a bit further from the beach, and after consultation with municipal officials, 15% of the community is assumed to be "summer peaking."

Note that Interlaken is as close to the beach as Spring Lake Heights, but it is not included in this grouping; according to census data, approximately 10% of the dwelling units in Spring Lake Heights are for seasonal or recreational use, while less than 1% of the dwelling units in Interlaken are. While this analysis attempts to consider occupancy in all housing, not just in seasonal homes, the presence of a large proportion of seasonal homes is an indication that an area serves a fluctuating beachgoing population in the summer. Therefore, summing up the housing stock of the places listed above, and adjusting the numbers as discussed, there are a total of 26,145 housing units which are likely to experience peaks in occupancy during the prime beach season. If the factor of 5 people per dwelling unit is applied to these units, then their total peak occupancy is 130,724. Since the year-round population of these dwelling units is 42,848, the additional population of seasonal and year-round residences in the area during the summer (exclusive of hotel guests), according to this methodology, amounts to 87,876. When combined with the figure for hotel guests of 10,675 to 14,070 (as discussed earlier, assuming full occupancy), the total number of overnight guests in peak periods would be close to 100,000. This is fairly close to the wastewater estimate of about 112,000 overnight visitors on a peak day.

A different approach to this analysis yields a similar result for the average summer population. According to census data, there are 7,008 dwelling units (exclusive of hotel rooms) in the study area which are for seasonal / recreational use. If the factor of 5 people per dwelling unit is applied to this number of dwelling units, the result is 35,040 overnight visitors in seasonal accommodations (exclusive of hotels). Adding 10,675 to 14,000 hotel guests will bring the total average overnight visitors to approximately 45-50,000. According to the wastewater methodology, there are about 74,000 overnight visitors on an average day, but this is an average of midweek days and weekends / holidays. Therefore the figure of 45-50,000 overnight visitors may more closely reflect the number of overnight visitors on a midweek non-holiday period.

Note that the impact of seasonal workers on the summer population was considered; however, evidence suggests that most seasonal workers in Monmouth County are local, year-round residents of the Shore Region and therefore they are already counted in the census.

APPENDIX F

Beach Badge Analysis

Daytripper Visitors

Further examination of the summer daytripper visitor population in the shore area focused on beach badge sales. Every beach community in Monmouth County charges for access to the beach during the summer. The following communities in the study area sell beach badges during the summer months:

- Sea Bright
- Monmouth Beach
- Seven Presidents Park (located in Long Branch but has distinct beach charge)
- Long Branch
- Deal
- Allenhurst
- Loch Arbour
- Asbury Park
- Neptune (Ocean Grove area)
- Bradley Beach
- Avon
- Belmar
- Spring Lake
- Sea Girt
- Manasquan

Beach badges are sold for one-day entry to the beach (daily badges), as well as season-long entry. Since daytrip visitors are most likely to buy daily badges, purchases of daily badges may reflect some percentage of daytrippers to the Shore Region. Overnight visitors or permanent residents are more likely to buy seasonal/multi-day badges¹, or have beach club memberships, rather than buying daily badges. Some seasonal badge purchasers most likely live outside of the study area, but live close enough that they are frequent daytrippers to the Shore Region.

Beach badge sales figures significantly undercount the actual number of people on the beach. Children under a certain age (typically 12 or 13, depending on the town) are not charged for beach entry (in Monmouth County, Long Branch does not charge for senior citizens either). Assuming that beach-going is frequently a family activity, the percentage of beachgoers represented by non-paying children is likely to be substantial, as suggested by

¹ In Monmouth County, only Manasquan and Ocean Grove sell weekly badges as well as daily and seasonal badges, and Ocean Grove also sells weekend badges.

the results of the Summer 2008 Monmouth County Beach Survey (these results are further discussed below). Furthermore, there are some people who arrive at the beach at an hour when beach badges are not required (either early morning or late afternoon). It should also be noted that not all daily visitors to the area go to the beach, but may visit for a variety of other reasons. So daily beach badge purchases should be viewed as a fractional portion of daytrippers rather than as a proxy for the total number of daytrippers. The behavior and characteristics of beach visitors were researched by direct interviews and observation in beach areas during the summer, as described below.

Beach clubs accommodate a significant number of beachgoers who are not purchasing beach badges. However, available evidence suggests that the majority of beach club members are drawn from nearby municipalities. Therefore beach club members are for the most part already counted as part of the year-round population of the coastal region and are not further considered in this analysis.

In short, the existence of seasonal badges, multi-day beach badges, and beach clubs - all of which appeal to local residents and overnight visitors - increases the likelihood that purchases of daily beach badges will be largely by daytrippers to the Shore Region. The Summer 2008 Monmouth County Beach Survey found that over 87% of daily badges were purchased by visitors from outside the Shore Region. The survey also found that visitors from outside the study area who were using seasonal badges were split roughly evenly between daytrippers and overnight visitors (see Appendix B).

The Shore Region's coastal municipalities were asked to provide beach badge sales data for the summer of 2007. The municipalities were asked to provide the peak day sales of daily beach badges, the average summer sales of daily beach badges, and the total number of seasonal badges (including senior badges) sold. Data was received for all municipalities along the coastline except for Deal; therefore daily and seasonal beach badge purchases were estimated for this municipality based on available data for Monmouth Beach, but prorated down to reflect the fact that Deal has fewer housing units than Monmouth Beach.

In many cases, the peak day for daily beach badge purchases occurred near July 4th - in the case of summer 2007, July 8th (the Sunday following July 4th) was frequently the peak day. Not every municipality had the same peak day for daily beach badge purchases; for study purposes the individual municipal peak days were aggregated into a single peak day figure. The underlying assumption is that the true peak population will occur on a day when all of the region's municipalities experience coincident peaks.

Given the above assumptions, following are the regional aggregate figures for beach badge purchases:

Average daily beach badge purchases:	13,745
Peak daily beach badge purchases:	48,910
Seasonal badges:	69,313

The following sections examine these beach badge purchase totals in the context of the population estimates derived from wastewater flow analysis. The statistics cited in these two sections, with the exception of beach badge purchase figures, are derived from the Summer 2008 Monmouth County Beach Survey / Appendix B).

Average Day Analysis

- Average region-wide sales of daily beach badges: 13,745.
 - About 90% purchased by visitors from outside the study area.
- Some beach daytrippers from outside the area use seasonal badges.
 - Total region-wide seasonal badge purchases: 69,313.
 - Approximately 41% of season badgeholders are from outside of the study area.
 - About 59% of visitors from outside the area who use seasonal badges live within a reasonable daytrip distance from the beach.
 - Estimate: perhaps half (i.e., 29.5%) of season badgeholders within daytrip distance will visit the beach on an average day.
- Only adults and older children (generally around 13+) buy badges.
 - Younger children are admitted to the beach for free. For every 100 visitors purchasing badges, there are 31 children who don't need badges.
- Not everyone who is near the beach (e.g., on the boardwalk) goes on the beach.
 - For every 100 people from outside the study area on the beach, there are another 18 people in the immediate vicinity who are not on the beach (walking, having lunch, etc).

Therefore, on an average day, there are about 32,000 people on or near the beach, as shown below.

Average Summer Day: Total Beach Population

	Purchases Throughout Study Area		% from Outside Area		% Purchasers Visiting on Average Day		Total Purchases
Daily Beach Badge Purchases	13,745 (average day)	x	90%	x	100%	=	12,371
Seasonal Beach Badge Purchases	69,313	x	41%	x	29.5% est.	=	8,383
Total Beach Badges Purchased (12,371 + 8,383)						=	20,754
Total Beach Badges Purchased (total daily + total seasonal)		# Children per Adult Beach Visitor	Total Children on Beach				
20,754	x	.31	=	6,434			
Total Beach Badges Purchased	Total Children on Beach	Total People on Beach (total beach badges + total children)					
20,754	+	6,434	=	27,188			
Total People on the Beach	# Visitors Near (but not on) Beach per Beach Visitor	Total Number of People Near (but not on) the Beach					
27,188	x	.18	=	4,894			
Total People on the Beach	Total Number of People Near (but not on) the Beach	Average Summer Day Beach Population					
27,188	+	4,894	=	32,081			

Peak Day analysis

- Peak region-wide sales of daily beach badges: 48,910.
 - About 90% purchased by visitors from outside the study area.
- Some beach daytrippers from outside the area use seasonal badges.
 - Total season badge purchases throughout the region: 69,313.
 - Approximately 41% of season badgeholders are from outside of the study area.
 - On a peak day, by definition, all season badgeholders will be at the beach, some as daytrippers and some as overnight visitors.
 - ▲ A likely percentage of them as daytrippers would be 59% (based on the per-

centage living within daytrip range).

- Only adults and older children (generally around 13+) buy badges.
 - Younger children are admitted to the beach for free. For every 100 visitors purchasing badges, there are 31 children who don't need badges.
- Not everyone who is near the beach (e.g., on the boardwalk) goes on the beach.
 - For every 100 people from outside the study area on the beach, there are another 18 people in the immediate vicinity who are not on the beach (walking, having lunch, etc).

Therefore, on a peak day, there are about 94,000 people on or near the beach, as shown below.

Peak Summer Day: Total Beach Population

	Purchases Throughout Study Area		% from Outside Area		% Daytrippers on Peak Day		Total Purchases
Daily Beach Badge Purchases	48,910 (peak day)	x	90%	x	100%	=	44,019
Seasonal Beach Badge Purchases	69,313	x	41%	x	59%	=	16,767
			Total Beach Badges Purchased (44,019 + 16,767)			=	60,786
Total Beach Badges Purchased (total daily + total seasonal)			# Children per Adult Beach Visitor				Total Children on Beach
60,786	x		.31	=			18,844
Total Beach Badges Purchased			Total Children on Beach				Total People on Beach (total beach badges + total children)
60,786	+		18,844	=			76,629
Total People on the Beach			# Visitors Near (but not on) Beach per Beach Visitor				Total Number of People Near (but not on) the Beach
76,629	x		.18	=			14,333
Total People on the Beach			Total Number of People Near (but not on) the Beach				Peak Summer Day Beach Population
76,629	+		14,333	=			93,969