Appendix C
Review of Economic Studies of Beach Tourism and Recreation

The following section provides an overview of the information currently available for describing beach tourism and recreation activities in the following states: Florida, California, Texas, New Jersey, and North Carolina. In general, beach tourism data in each state was available through either a state economic development agency, a state department of tourism, or through academic research conducted by one of the state universities. In some cases, beach related tourism data was not reported independent of other types of tourism. In other cases, detailed recreation data was available for one or two beaches in a state, but not for all beaches, statewide.

C.1 Florida

Origin and Destination of Beach Visitors: The best estimates found for beach-related tourism in Florida were provided by a survey of 4,556 recreational beach users in Broward County, Florida to determine the effect of recreational benefits on mainland property values. The survey, described in Stronge, 1997, was conducted over the period of one year (May 1995 - 1996). The survey results distinguish between beach visitors that are Broward County residents, residents elsewhere in Florida, residents elsewhere in the United States, or international visitors. Survey results indicated that Broward County beaches received a total of 7,169,446 beach visits during the 1995-1996 time period. 48.2% of all visits were made by Broward County residents (3,457,371 visits), 8.6% of all visits were made by Florida residents outside of Broward county (618,139 visits), 30% of all visits were made by US residents coming from outside of the state of Florida (2,140,824 visits) and 13.2 of all visits were made by international visitors (953,112 visits). (Stronge, 1997)

The survey results indicated that 3,093,936 of the total 7,169,446 visits made to Florida beaches in the 1995-'96 time period were made by out of state visitors. These visits were made by a total of 768,359 out-of-state visitors, including both US residents and international visitors. The total number of out-of-state visitors was broken out according to the permanent residence of the visitor. Of the 556,413 out-of-state visitors coming to Broward County beaches from elsewhere in the U.S., 273,662 (35.6%) came from the Northeast, 122,872 (16%) came from the Midwest, 123,772 (16.1%) traveled from the South and 36,107 (4.7%) came from the West. Of the 211,946 international visitors, 135,802 originated from Canada, 63,392 originated from Europe, 9,318 came from Latin America and 3,434 arrived from other international locations. (Stronge, 1997)

Of the total 3,093,936 visits made to Broward county beaches by out-of-state visitors, 69.2% (2,140,824 visits) were made by visitors residing elsewhere within the United States and 30.8% (953,112 visits) were made by international travelers. Of the total visits made by out-of-state visitors, 41% (1,267,677 visits) were made by U.S. residents from the Northeast, 13.1% (405,367 visits) were made by U.S. residents from the Midwest, 11.8% (365,061 visits) were made by U.S. residents from the South and 3.3% (102,719 visits) were made by U.S. residents from the West. The remaining visits were made by international travelers, with 21.6% of visits (668,826 visits) paid by Canadians, 7.3% (225,695 visits) paid by Europeans, 1.5% (47,435 visits) made by residents of Latin America and the remaining 0.4% of visits (11,156 visits) made by residents of other international locations. (Stronge, 1997)

Including both in-state and out-of-state residents, 1,661,233 people visited Broward County beaches from May 1995-April 1996. In the summertime, 814,509 visitors paid 3.1 million visits and 846,724 visitors paid 4 million visits in the winter. (Stronge, 1997)

A measure of state-wide beach related tourism activities can be found in *Outdoor Recreation in Florida 2000 Florida's Statewide Comprehensive Outdoor Recreation Plan (SCORP, 2000).* This comprehensive plan was developed by the Department of

Environmental Protection's Division of Recreation and Parks for the purpose of evaluating current and future recreation demand in the state of Florida. In *SCORP, 2000*, the demand for saltwater beach activities is measured using actual participation rates in beach-related activities. Estimates of the demand for beach activities were based on information collected in a August 1992 – July 1993 survey of 3,169 randomly selected Florida residents and tourists conducted by the University of Florida, Department of Recreation, Parks and Tourism. The survey data was compiled into demand estimates for 1999 and projections were then made for future demand for beach activities in 2005 and 2010. Estimates of demand are expressed in terms of "user occasions". Each user occasion represents one individual participating in one event at one time, regardless of the length of time over which the activity takes place. The estimated demand for saltwater beach activities in 2000 (study used 1999 estimates for the year 2000) was 154,932,616 user occasions. Projected for the year 2005, the number of user occasions involving saltwater beach activities are projected to rise to 174,017,175. In the year 2010, the projected number of user occasions involving saltwater activities increases to 192,946,060.

No other measures of beach related tourism were found for the entire state of Florida, with the exception of one study, also conducted by Dr. Stronge. Stronge (1994) reports that in 1993, 7 million international visitors 7 million international visitors came to Florida's beaches. This estimate was produced from a statistical analysis of data from the Florida Division of Tourism that is reported in greater detail in Stronge (1994).

Activities: The survey results reported in Stronge, 1997 distinguished between visitors that considered the beach to be the main destination of their trip, and visitors considering the beach to be a secondary destination. Of the total 768,359 visitors to Broward county beaches arriving from out-of-state, 648,339 (84.4%) indicated that the

beach was their main destination and 120,019 (15.6%) indicated that the beach was not their main destination.[40] (Stronge, 1997)

Of those visitors to Broward County beaches, the survey results indicated that 86% of all subjects surveyed visited Broward County beaches to swim or sunbathe. 7.1% came to the beach to walk or search for seashells. 0.2% visited the beach to fish and 6.6% came to the beach for other reasons. (Stronge, 1997) On average, a beach visit lasted 3.3 hours.

The same survey subjects were asked to describe any spending done as part of their beach visit. The survey results indicate that mainland and barrier island residents of Broward County spent a total of $23,102,343 (1995-'96 dollars) on recreational beach use. $12,250,987 of total expenditures were spent at or on the way to the beach and the remaining $10,851,356 was spend on beach equipment and accessories. Beach visitors that were not residents of Broward County spent a total of $285,253,992 on beach related expenditures as well as on other, travel related expenses such as lodging, food, local transportation, etc. (Stronge, 1997)

The Broward county survey also provided information on spending per tourist and per tourist-day for lodging, dining, food/groceries, recreation/entertainment, shopping, car/gas, and other expenditures. (Stronge, 1997) Spending on each of these categories was broken out by geographic origin of the tourist, including tourists from elsewhere in Florida, tourists from outside of Florida, but within the United States, and international tourists. (Stronge, 1997)

Characteristics of Tourists: The survey conducted for Stronge, 1997 collected information on the length of stay of visitors in the county, the age, occupation and income of beach users. (Stronge, 1997) Results of the Broward County survey indicated that the average age of an adult visiting Broward County beaches is 40 years old. Winter

[40] This breakdown is done in even more detail (e.g. how many visitors would not have come to Broward Co. at all if there were no beaches, how many would come less often and how many would come as often if there were no beaches) for both main-destination and not-main-destination visitors.

visitors tended to be older, on average, than summertime visitors. Winter visitors were also more likely to be retired (19.3%) than summertime visitors (9.6%). Of those visitors not retired, 9.6% were students, 4.9% were homemakers, 1.4% were unemployed, 66.9% were employed and 1.9% were in some other occupation. The median income of Broward County beach users was $43,600 (1995-'96 dollars), with a slightly higher median for summertime visitors ($44,900) than for wintertime visitors ($42,700). (Stronge and Schultz, 1997)

C.2 California

Origin and Destination of Beach Visitors: In a 1995 survey conducted by the Public Research Institute (PRI) at San Francisco University, 641 randomly selected California residents were questioned about the types of beach related activities they participate in. (King and Potepan, 1997) This 1995 survey reports the average household spending for one-day trips and for overnight trips by state residents as well as out-of-state residents and foreign tourists. The survey results indicated that, of the 641 households in California responding to the survey, 409 (63.8%) had taken at least one day-trip (a trip lasting no longer than one day) during the previous year. Of those households that took day trips to the beach, the average number of day trips taken in a year was 15.24, with an average of 4 people taking the trip together. 234 households (36.5%) indicated that they had taken at least one overnight trip to the beach over the preceding year. Of those households taking overnight trips, 4.6 overnight trips were taken per year, with each trip lasting an average of 2.65 days. (King and Potepan, 1997)

In a 1997 study by Philip King and Michael Potepan, an estimate of out-of-state tourists visiting California beaches was calculated using information from a 1996 survey of 13,279 beach visitors conducted by the California Department of Boating and Waterways. (King and Potepan, 1997) In this survey, beach visitors were asked to indicate whether their permanent residence was in- or out-of- state. Using data from the California Department of Boating and Waterway survey, King and Potepan estimate that 85.01 M beach attendance days attributable to California beaches are from out-of-state

beach was their main destination and 120,019 (15.6%) indicated that the beach was not their main destination.[40] (Stronge, 1997)

Of those visitors to Broward County beaches, the survey results indicated that 86% of all subjects surveyed visited Broward County beaches to swim or sunbathe. 7.1% came to the beach to walk or search for seashells. 0.2% visited the beach to fish and 6.6% came to the beach for other reasons. (Stronge, 1997) On average, a beach visit lasted 3.3 hours

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The Broward county survey also provided information on spending per tourist and per tourist-day for lodging, dining, food/groceries, recreation/entertainment, shopping, car/gas, and other expenditures. (Stronge, 1997) Spending on each of these categories was broken out by geographic origin of the tourist, including tourists from elsewhere in Florida, tourists from outside of Florida, but within the United States, and international tourists. (Stronge, 1997)

Characteristics of Tourists: The survey conducted for Stronge, 1997 collected information on the length of stay of visitors in the county, the age, occupation and income of beach users. (Stronge, 1997) Results of the Broward County survey indicated that the average age of an adult visiting Broward County beaches is 40 years old. Winter

[40] This breakdown is done in even more detail (e.g. how many visitors would not have come to Broward Co. at all if there were no beaches, how many would come less often and how many would come as often if there were no beaches) for both main-destination and not-main-destination visitors.

The California Office of Tourism defines travel as requiring a trip that includes at least one night spent away from home or requires traveling at least 50 miles from home. (The Resources Agency, 1997)

Characteristics of Tourists: No source of information was found providing demographic characteristics of beach tourists in California.

C.3 Texas

Origin and Destination of Beach Visitors: Estimates are provided for participation in recreational activities along Texas bays and estuaries in a series of reports prepared by the Texas Department of Recreation and Parks and the Texas A&M University Department of Agricultural Economics. (Fesenmaier et al., 1987) Activities accounted for in the estimates include sports fishing, hunting, picnicking, swimming, camping, pleasure boating and sightseeing along six, Texas Gulf Coast estuaries, including the Nueces and Mission-Aransas estuary, the Laguna Madre estuary, the Guadalup Estuary, the Lavaca-Tres Palaacios estuary, the Trinity-San Jacinto estuary and the Sabine-Neches estuary. Surveys were used, along with published information on commercial fishing to develop estimates of the number of visits to the Gulf Coast of Texas by Texas state residents. The survey results indicated that approximately 10,251,901 visits are paid to the Texas coast by Texas state residents in 1986. (Fesenmaier et al., 1987)

The only other source of beach-related tourism data for the State of Texas was found in *The 2000 Report of Travel to Texas* prepared by the Texas Department of Economic Development and D.K. Shifflet & Associates Ltd.. (TDED, 2001) This annual report collects data describing tourism activities in Texas during the preceding year, including the number, origins and activities of tourists visiting different regions of Texas. While much information is available on the activities and characteristics of tourists in Texas, the report does not isolate this information for beach-related tourism, alone. The only beach related tourism information contained in the report is the estimate that 7%

(12.4M) of the total 177M person-trips made to Texas, involved a visited to the beach or a waterfront. A person-trip is equal to one trip, taken by one person, regardless of the length of the trip. (TDED, 2001)

Activities: Of the 10,251,901 visits recorded in the 1987 reports prepared by the Texas Department of Recreations for six bays and estuaries along the Gulf Coast, 55% of these visits (6,032,892) were by fishermen. It was found that camping and sport fishing accounted for 43.3% of the time allocated to recreational activity on beach visits, swimming was allocated 20.6% of recreational time and sightseeing was allocated 17.1% of recreational time. Of the total $586,579,324 expenditures in 1986 by Gulf coast visitors, the survey data indicated that 32.3% ($189,908,202) was spent on transportation, 10% ($58,774,446) was spent on Lodging, 24.9% ($145,985,311) was spent on restaurants, 18.7% ($109,662,105) was spent on groceries, 2.6% ($15,353,460) was spent on rental of recreation equipment, 4% ($23,510,020) was spent on entrance, participation and guided tour fees, and 7.5% ($43,385,780) was spent on fishing-related items. (Fesenmaier et. al., 1987)

Characteristics of Tourists: No information was found on the characteristics of tourists visiting beaches along the Texas Gulf Coast.

C.4 New Jersey

Origin and Destination of Beach Visitors: The number of both day and overnight trips in the shore region of New Jersey is recorded in a report presenting data for the 2000 travel year, prepared by Longwoods International for the New Jersey Office of Travel and Tourism. The Longwoods report also indicates that, of the 37.4 M overnight, non-business related trips taken in New Jersey, 9% (4.1M) were taken for the primary purpose of going to the beach. Of the 117.5 M non-business related day-trips taken in New Jersey, 13% (16.4 M) were taken for the primary purpose of going to the

beach. These estimates suggest that a total of 20.5 M trips were taken in New Jersey for the purpose of going to the beach during the 2000 travel year.

Of the total number of trips identified as trips to the beach, 85% of trips were taken by travelers originating from the Mid-Atlantic area of the U.S., 2% originated from the New England area, 10% originated from the South Atlantic region of the U.S. and 3% originated from other locations.

Activities: The Longwoods report also describes the types of activities travelers participated in during both day and overnight trips in New Jersey during the year 2000. Of the total 44 M overnight trips (including both business and non-business related trips) taken in New Jersey, on 23% of the trips (10.2 M trips) travelers went to an ocean beach. 20% (8.8 M trips) of overnight trips involved participating in boardwalk activities. On 2% of the overnight trips (1.1 M), travelers participated in saltwater fishing. Of the total 125 M day trips taken in New Jersey, 24% (30 M trips) involved visiting an ocean beach, 18% (22.4 M trips) involved participating in boardwalk activities, 2% (2.4 M trips) included saltwater fishing and less than 1% (0.3 M trips) involved surfing.

Of all adults visiting N.J. beaches for at least one night in 2000, 56% visited a casino, 98% visited the beach, 46% spent time touring and 22% attended special events. Of all adults visiting N.J. beaches in 2000, 11% engaged in cultural tourism activities, 5% engaged in Eco-Tourism activities and 6% engaged in historic tourism activities.

Characteristics of Tourists: The average age of an adult taking an overnight trip to a N.J. beach in the year 2000, was 41, according to the Longwoods study. Of the adult individuals taking overnight trips to N.J. beaches in 2000, 38% had an income of $75K or greater, 24% had an income of $50 – $75K, 25% had an income of $25-$49K and 13% had an income of less than $25K. 89% of the adult individuals taking overnight trips to N.J. beaches traveled under 300 miles to reach their destination. 6% traveled 300-500 miles, and 5% traveled 500-1,000 miles. The total average number of nights away for adults taking overnight trips to the beaches in N.J. is 6.2 nights. 0.1 of these nights is

spent in other states. with the remaining 6.1 nights spent in N.J. Throughout the year, 7% of overnight beach trips are taken from January to March, 26% are taken from April to June. 63% are taken from July through September and 4% are taken from October through December.

C.5 North Carolina

Origin and Destination of Beach Visitors: The only estimate found of beach related tourism in the state of North Carolina is provided as part of the North Carolina Department of Commerce's. Tourism Division's 1999 Domestic Coastal Region Travel Summary (available on the web at www.nccommerce.com/tourism/econ/demo). According to this report. in 1999 close to 11 million visitors from the U.S. visiting the North Carolina coastal region. Of these 11M visitors, 53% (5.83 M) went to the beach. While the report contains additional information pertaining to the activities and attributes of tourists in North Carolina. this information is not broken out for beach related tourism, alone

Table C.1: Information Sources Explored

California	• King, Philip and Potepan, Michael, J.: *The Economic Value of California's Beaches a Report Commissioned by the California Department of Boating and Waterways*; Public Research Institute; May, 1997. • King, Philip; *TheFiscal Impact of Beaches in California A Report Commissioned by the California Department of Boating and Waterways*; Public Research Institute, San Francisco State University; September, 1999 • Burroughs, James T.; Baird, Brian E.; Miller-Henson, Melissa; Hatfield, Sheila; *California's Ocean Resources: An Agenda for the Future*; The Resources Agency of the state of California; March 1997. • Resource Agency of California; *Draft Policy on Coastal Erosion Planning and Response and Background Material*; March 26, 2001. • Philip King, Public Research Institute (415) 338-2108, pgking@sfsu.edu or sharking@pacbell.net (this is a home e-mail), Personal communication • King, Philip G.; Potepan, Michael; *An Economic Evaluation of Beaches in California*; Public Research Institute at San Francisco State University (date unknown)
Florida	• William Stronge, PhD, strongew@fau.edu or strongew@acc.fau.edu (561) 297-2833 • Pat Evans (805) 488-2200 @ Florida Parks and Planning (Evans responded to a call that I placed for either Gail Baxley or Al Gregory, also at Parks and Planning. Wayne Stevens at Recreation and Parks at (850-414-8558) recommended I contact them.) • Steve Holland, PhD, Center for Tourism Research and Development (352-392-4042 ext. 1313 • Fred Bell – Florida State University (850) 644-7092 • Department of Environmental Protection, Division of Recreation and Parks, Parks and Planning; *Outdoor Recreation in Florida 2000 Florida's Statewide Comprehensive Outdoor Recreation Plan (CORP 2000)*; • Stronge, William B. (1994) "Beaches, Tourism and Economic Development", Shore and Beach, 62, 2 68 April, 1994 • Stronge, William B.; Schultz, Ronald R., *Broward County Beaches: An Economic Study 1995-96*; Prepared for Broward County Department of Natural Resource Protection, Biological Resources Division; January, 1997. • Stronge, William B., *The Economics of Government Funding for Beach Nourishment Projects: The Florida Case* • Stronge, William B.; *The Economic Benefits of Florida's Beaches: Local, State and National Impacts*, Florida Atlantic University • Stronge, William B.; *The Economic Value of Our Beaches and Coastal Properties*; Florida Atlantic University • Barry Pettigoff at Visit Florida (850) 488-5607 ext. 346
Texas	Fesenmaier, Daniel R.; Um, Seoho; Roehl, Wesley S.;, Mills, Allan S.; Ozuna, Teofilo Jr.; Jones, Lonnie, L., Guajardo, Ramon Q.; *Regional and Statewide Economic Impacts of Sport Fishing, Other Recreational Activities, and Commercial Fishing Associated with Major Bays and Estuaries of the Texas Gulf Coast Executive Summary.*, Prepared for the Texas Water Development Board by Department of Recreation and Parks and Department of Agricultural Economics, Texax A&M University; August, 1987. TDED (Texas Department of Economic Development and D.K. Shifflet & Associates, Ltd. *2000 Report on Travel to Texas*; August, 2001. Also spoke with Dee Lindsay (512) 936-0438 of the Texas Travel Research and Statistics Office. She directed me to the TDED, 2001 document. She also indicated that data was available describing demographic information of Texas tourists, tourism spending by county and the resulting state and local tax impacts of tourist activity in Texas; however, none of this information is isolated for beach-related tourism, alone. Dan Quandt – 1-800-SOPADRE - South Padre Island Convention and Visitors Bureau
North Carolina	• Wakeman, Douglas J.; *The Economic of Beach Replenishment in North Carolina What We Don't Know CAN Hurt Us.*; School of Business at Meredith College, Raleigh, NC; March 5, 2000. • Jim Robertson, Media Assistant at the North Carolina Department of Commerce (919) 733-7559. • Regional Demographic Travel Scope Study, prepared by the Travel Industry Association of America www.nccommerce.com/tourism/econ. • 1999 Domestic Coastal Region Travel Summary; prepared by the North Carolina Department of Commerce, Tourism Division, http://www.nccommerce.com/tourism/econ/demo.
New Jersey	• International, *2000 New Jersey Travel Research Program Travel and Tourism in New Jersey* New Jersey Commerce and Economic Growth Commission Office of Travel and Tourism, Trenton, New Jersey, May 2001. • Noreen Bodman - Executive Director of the Office of Travel & Tourism, New Jersey Commerce & Economic Growth Commission

Appendix D
Issues Related to Estimating Regional Economic Effects Of Recreational Spending

D.1 Input-Output Methodology

Most impact analyses of beach-related spending are carried out using input-output models.[41] Two of the most popular input-output modeling systems currently in use are IMPLAN and RIMS-II.[42] IMPLAN is produced privately from the Minnesota IMPLAN Group, Inc. (1996) and RIMS-II (Bernat, Ambargis, Repice, and Szczesniak, 1997) is available from the U.S. Bureau of Economic Analysis. Input-output models developed by both systems have been used in studies of the regional economic effects due recreation-related activities—including beach activities. Because regional input-output tables are no longer compiled from locally surveyed data sources, these regional input-output modeling systems share one very basic characteristic. They both use the national input-output accounts as the source of technological and trading patterns. From there they use different methods and data to adjust these national relationships to reflect the availability of goods and services from local sources. One important structural difference between the two systems is that IMPLAN produces impact multipliers not only for output and employment, but also for all components of value added (employee compensation, proprietors' income, other property income, and indirect business taxes). On the other hand, RIMS-II generates impact multipliers for output, employment, and earnings.

An input-output model is based on a set of double entry accounts, for example, as shown in Figure D.1. Along the rows, the transaction table records deliveries of goods and services either to other industries (intermediate demand) or to final demand

[41] For a detailed presentation of input-output analysis, the reader should refer to either Hewings (1985) or Miller and Blair (1985).

[42] Other input-output modeling systems (e.g., ADOTMATR, RSRI, and SCHAFFER) have been developed and used for many regional economic analyses, however, they appear to be used less frequently than either IMPLAN or RIMS-II. These systems have been compared and evaluated by Brucker, Hastings, and Latham (1987 & 1990).

also displays the inputs (by column) for industrial production processes for required commodities and for value added (such as wages and salaries, taxes, profits, rents, etc.). These latter elements of the transaction table (i.e., the value added) provide a convenient and consistent connection with the income product accounts discussed earlier. In fact, the value added concept of the income and product accounts (that define gross regional product) is exactly the same as the value added concept of within the input-output accounts.

Figure D.1: Simple Regional Input-Output Transactions Table

		Intermediate Sector by Industry				Final Demand				Total Output
Intermediate Sector by Industry		A	B	C	D	Household	Gov't	Exports	Capital	
	A	$300	$400	$100	$500	$1,600	$500	$200	$700	$4,300
	B	$50	$200	$1,000	$300	$100	$200	$100	$900	$2,850
	C	$1,000	$200	$100		$100	$300	$200	$500	$3,100
	D	$0	$800	$200		$700	$0	$0	$400	$2,600
Primary Sectors										
	Households	$1,900	$300	$1,000						
	Government	$200	$100	$200						
	Imports	$200	$300	$300	$0					
	Capital	$650	$550	$200	$100					
	Total Input	$4,300	$2,850	$3,100	$2,600					

Source: Edgar M. Hoover, 1975. *An Introduction to Regional Economics, 2nd Edition.* New York: Alfred A. Knopf, p. 226.

The input-output accounts are transformed into a predictive model of regional economic impacts when four basic assumptions are applied. First it is assumed that the projects being analyzed will not substantially change methods of production used businesses or the spending behavior of the consumers within the economy, at least during the time frame of the impact analysis. This usually means that size of the project is "small" in relation to the size of the economy. Second, the production processes used by businesses are linear meaning that for every sector doubling the use of all required inputs (such as labor) will result in a doubling of the sectors output level. Third, industrial inputs are used by sectors in fixed proportions to output levels. That is, if 0.5 percent of

output is used to hire and use a particular input (e.g., labor) then this proportion will not change regardless of the production level (see Figure D.2). And fourth, there are no possibilities of substitution between input requirements.

Figure D.2: Input Coefficients for Intermediate Sectors

Purchases From ($)		Per Dollar's Worth of Gross Output			
		A	B	C	D
Intermediate Sectors					
	A	0.070	0.140	0.032	0.192
	B	0.012	0.070	0.323	0.115
	C	0.233	0.070	0.032	0.269
	D	0.000	0.281	0.065	0.192
Primary Sectors					
	Households	0.442	0.105	0.323	0.154
	Government	0.047	0.035	0.065	0.038
	Imports	0.047	0.105	0.097	0.000
	Capital	0.151	0.193	0.064	0.038
Totals		1.000	1.000	1.000	1.000

Columns do not always add exactly to to totals due to rounding.
Source: Edgar M. Hoover. 1975. *An Introduction to Regional Economics*, 2nd Edition. New York: Alfred A. Knopf, p. 226.

Mathematically, an input-output model is a large set of simultaneous equations that are solved to derived changes in industrial output levels that are necessary to satisfy changes in the final demand for goods and services (see Figure D.3). The input-output model will develop a unique estimate of output change for every sector defined by the model (the number of sectors can be as few as ten or twenty or as many as several hundred or more) The output changes calculated by the model will be larger than the final demand changes because certain commodities are necessarily produced and consumed during the process of producing the goods and services for final demand. For

example, in order for bread to be purchased by a consumer at a grocery store wheat has to be first produced and then consumed (i.e., converted to flour) so that the bread can be made for the consumer to buy. These "intermediate" stages of production and consumption are the reason for the multiplier or "ripple" effects generated by tourist expenditures at the beach. They also represent "double-counting" of effects and are the reason why they are not included in income and product accounts. However, they form the basis on which other types of impact effects are derived. For example, once the total output changes due to a change in final demand have been computed, then the process of converting the output changes to employment changes are relatively easy. Project related employment changes are computed by assuming a proportional and fixed relationship between each industry's employment and output levels and applying these proportions to their respective estimated output changes. Similar calculations can be made for project-related changes in value added and each of its components (i.e., employee compensation, proprietor's income, other property-type income, and indirect business taxes).

D.2 Capture Rate

The capture rate is the rate at which the beach area is able to capture money being spent by beach visitors that provide a direct stimulus to the region's economy. As mentioned above, the number of capture rate required for an impact analysis of beach spending will depend on the number of industrial sectors in the regional economic model. An economic base model only requires one capture rate, however, input-output models can require several hundred or more capture rates.

Figure D.3: Total Direct and Indirect Effects of an Increase in Final Demand

Purchases From ($)	Per Dollar of Increased Final Demand				A, B, C, & D Combined
	A	B	C	D	
Intermediate Sectors					
A	1.118	0.289	0.157	0.359	0.661
B	0.126	1.234	0.439	0.352	0.439
C	0.297	0.284	1.171	0.501	0.477
D	0.068	0.452	0.247	1.400	0.400
Total	1.609	2.259	2.014	2.612	**1.977**
Primary Sectors					
Households	**0.614**	**0.419**	0.532	0.574	0.554
Government			0.108	0.115	0.092
Imports			0.167	0.103	0.123
Capital			0.193	0.207	0.231

Figures in combined column show the impact of an added dollar of aggregate final demand sales by all intermediate activities, apportioned in the same proportions as these activities shared in the final demand sales shown in transactions table (Figure D.1). This means added final demand sales of $0.46 by A, $0.20 by B, $0.17 by C, and $0.17 by D.
Source: Edgar M. Hoover, 1975, *An Introduction to Regional* Economics, 2nd Edition. New York: Alfred A. Knopf, p. 226.

Economic base model use an impact multiplier that is akin to the "Keynesian" income multiplier found in traditional macroeconomics. In this formulation, the multiplier is equal to one divided by the propensity of people to save plus their tax rate. Alternatively, the multiplier is also equal to one divided by one minus the propensity for people to consume out of their income. Suppose that people in the U.S. consume approximately 80 percent of their personal income.[43] This means that they save and are taxed about 20 percent of the personal income. The implied multiplier is 5 (1 + 0.2). By knowing the value of the multiplier and using simple algebraic manipulation of the multiplier formulation, the propensity to consume can be identified as 0.8. The value of

[43] According to the National Income and Product Accounts compiled by the U.S. Bureau of Economic Analysis, historical consumption rates have been approximately 80 percent for the last 50 years (BEA, 2001).

saving and tax rate (0.2) is a measure of leakage in the economic system. The greater the leakage is in the system, the smaller the multiplier effect will be. Within a regional economy, leakages within the economic system are much greater due to their "openness' in the form of regional import of goods and services. As a consequence, regional economic base multipliers or less than two are not uncommon. A regional multiplier of two implies propensity to consume from locally available markets of 0.5 or approximately half of what consumers want to purchase can be found in local markets. Alternatively, a propensity to consume from local sources of 0.25 (or one-fourth) implies a regional multiplier of 1.333.

Two very commonly used methods of estimating capture rates by industrial sectors are "location quotients" and "regional purchase" coefficients.[44] Location quotients (*LQ's*) are used by RIMS-II to adjust the national input-output table to reflect local demand and supply conditions. A location quotient for a local industry is the ratio of the industry's local concentration (e.g., the percent of local employment in the sector) to its national counterpart (i.e., the percent of national employment in the sector). The basic idea is that if the industry's local concentration is equal to or greater than the national concentration then the industry must be satisfying the local needs for the industry's production. If, on the other hand, the industry's local concentration is lower than that for the nation, then there are greater demands for its products that can be met from local sources—or the region must be importing the remainder of its requirements. The value of each industry's *LQ* is then the "key" for its regional capture rate. That is, if the industry's location quotient is greater than or equal to one, then its capture rate is set to one. If the location quotient is less than one, then the industry capture rate is set equal to the location quotient. The source of data required to compile a set of industry capture rates based on the location quotient procedure is most often the latest County Business Patterns (CBP) data from the U.S. Bureau of the Census.

[44] Interregional trade flow estimates that are estimated using the U.S. Department of Transportations' Commodity Flow Surveys are under investigation by several research teams: Peterson and Beck (2000) and Southworth and Peterson (2000).

Regional purchase coefficients (*RPC's*) are used by IMPLAN for its regional adjustment of the national input-output table. A regional purchase coefficient represents the proportion of local demand for a specific commodity that is available from local production. This definition uses a concept that is very much the same as is used by RIMS-II based on location quotients. However, in addition to the use of location quotients, IMPLAN computes its regional purchase coefficients via "regression analysis" with added demand and supply indicators. These additional demand and supply indicators include regional employee compensation for the industry, regional employment relative to national employment for the respective industry, and the relative size of the region (measured by land area). Regional purchase coefficients are available through the IMPLAN modeling system.

D.3 Defining Regions for Economic Impact Analysis

How does one decide to define the region that is going to provide the geographic setting for socioeconomic impact analysis? Of the many factors in performing an economic impact analysis, one of the most subjective issues is the definition of the geographic region to be used. For people not accustomed to conducting regional economic impact analysis, justifying a particular study area may not be easy and is often surrounded by many thorny and uncomfortable issues. The justifications of most study areas often are ignored—perhaps because the region is predefined (e.g., for an analysis of the fiscal impact of a tax cut within Alabama) or maybe because the regional was the only available unit of observation for a "cross-section" study. Unfortunately, few universally accepted rules are available to help choose an appropriate study area. As a result, careful thought should always be exercised when delineating an appropriate area for analysis.

Other than a geographic aggregate, what is a region? There are as many answers to this question as there are people who use geographic settings for their analyses. Such diversity of opinion is due mostly to the different uses of spatial aggregates. The regional definitions commonly used in recent studies of the economic effects of beach activities

appear to be the geographic are within convenient access to the beach under study. For example, this may include those counties whose population centers fall within 30 or 50 miles from the beach. This is a practical, though arbitrary approach to an issue that can be sensitive at times.[45] Most regional and urban analysts performing socioeconomic impact analysis prefer to use a "functional area" concept for defining study regions.[46] Regions defined in this way explicitly consider the economic linkages and spatial dimensions between the residential population and the businesses in the geographic area. In other words, commuting and trading patterns are of prime concern. This type of regional is often called "nodal" because:

> *... the region is perceived as being composed of heterogeneous nodes of different size (cities, towns, villages, and sparsely populated rural areas) that are linked together functionally. These functional links can be identified through observation of flows of people, factors, goods, and communications* (Richardson, 1979, p. 21).

An examination of a map shows that population and businesses are not spread evenly over space, but are concentrated at specific locations called "agglomerations". The factors that generate these agglomerations are varied; e.g., transportation advantages (such as the confluence of several rivers), resource deposits, factor endowments, local infrastructure (such as good schools and public transportation facilities), climate, and even proximity to firms that supply needed production requirements or provide ready markets

Beyond the general guidelines for region types (above) and the restriction of using counties as the smallest geographic units, there is little formal advice about defining

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[45] Two other methods of defining regions are frequently used. First, regions are sometimes delineated along administrative or political boundaries (e.g., the State of Alabama or Montgomery County, Maryland). It is often claimed that since the institutional framework within which economic and social policies are designed and implemented is of overriding importance, then the geographic unit of analysis should coincide with the same administrative or political boundaries. Second, homogeneneity of one form or another can be used to justify some regions. For example, one can envision coal mining regions, river-basin regions, air pollution regions, or even German-speaking areas. What binds these areas is usually some common physical, economic, social, or statistical characteristic.

[46] The concept of a functional economic area (FEA) appears attributable to Karl Fox: see K.A. Fox and T.K. Kuman, "The Functional Economic Area: Delineation and Implications for Economic Analysis and Policy." Papers and Proceedings, Regional Science Association, Vol. 15 (1965), pp. 57-85.

regions. However, when an analyst decides to delineate a study area, the decision is based on his/her considered judgment, possibly from past experience and specific knowledge of the area under study. At a practical level, another important issue is determining the smallest geographic unit for when relevant data are available. For the most part, counties provide these data.[47] With respect to economic impact analysis, it is probably obvious that a region should be the geographic area in which the significant economic and social consequences of a project occur.

The definition of the affected region must include all of the ingredients of a self-sustaining region--local businesses, local government, and local population. The region must reflect the limits of the economic activity associated with the affected population. This is not an easy definition to satisfy and numerous "simplistic" attempts at a standard methodology have failed. However, it is obvious that the following considerations should be included in the definition of an economic region:

- The ***availability of local shopping opportunities*** is a factor in an appropriate regional definition. The location of new malls or other popular shopping opportunities can dictate an expansion in the region's size if no comparable opportunities exist in the immediate vicinity.

  The ***"journey-to-work" time*** for local employees often dictates part of the regional definition. On average, a journey-to-time of one hour or so is considered common. However, some regions in the country are characterized by longer travel times than others. The perception of travel time is affected significantly by the quality of the transportation network, the availability of mass transit, and what impacts are felt during "rush hour" peaks.

- ***Local customs and culture*** also can often influence where the boundaries of a region should be set. Long versus short commute patterns, willingness to approach the "inner city," the sense of local community, and other factors can be used for the region definitions.

[47] Although some data are available at the census tract level (e.g., population and income) that could possibly be used to delineate regions, the data needed to analyze economic impacts are most readily available only at the county level, unless one is willing to conduct expensive and time-consuming surveys.

An important note should be made of the relationship between the size of the study region and the subsequently estimated impacts (Chalmers and Anderson, 1977, p. 13). A larger area usually implies larger populations, greater factor endowments, richer resource deposits, and more readily available productive supplies. All these attributes make for more integrated and more diverse economic structures that, in turn, lead to larger socioeconomic impacts. On the other hand, larger regions also tend to dilute the significance of socioeconomic impacts, which means that the relative significance of impacts tends to become smaller as the region gets larger.

D.4 Other Types of Regional Economic Impact Models

Regardless of its purpose, a regional economic impact analysis has two basic ingredients: converting the alternative scenarios that comprise the proposed action into sets of final demand changes and estimating the factors that relate the initial changes in final demand to the resulting total changes in local economic activity (i.e., the model). The objective of an economic analysis can be quite involved; e.g., an analyst may be interested in evaluating the effects of introducing a new plant in an area, of changing the local tax structure, of a military realignment action, of constructing a public works project, etc. Regional analysts have several alternative modeling frameworks other than input-output at their disposal for regional economic studies. This section reviews two widely used regional economic impact models, economic base and econometric. In addition, the estimation of final demand changes for proposed scenarios is not discussed here.

Economic Base Model: To introduce the economic base model one can think of a household with one wage earner. Obviously, the household's income and it standard-of-living increases and decreases as the wages earned by the head fluctuates. Just like the household, one can envision a local economy that has a great dependence on external sources of demand for the level of its internal welfare; in other words, if it is an "open

economy. The economic base model provides a simple framework in which to analyze such situations. The economic base model has a considerable history (Isard etal, 1998).

Economic base models "bifurcate" or classify local economic activities into two general sectors; i.e., either into an export sector or into a service sector. The export sector includes those firms that sell their products to businesses and households outside the boundaries of the local economy. In addition, establishments within the local economy that cause funds to flow into the area by their activities (such as tourist facilities and federal government offices) are also considered export industries. The local service sector, in contrast, is made up of those firms that sell their goods and services within the local economy, either to firms in the export sector or to the local populace. The model works to the extent that, external changes resulting in increases (decreases) in export activity cause increases (decreases) in the payroll or export firms which are transmitted to the local service sector establishments. Furthermore, the inflow or outflow of money causes activity in local services to change by a multiple of the original change (i.e., the multiplier effect) as the influx of funds is spent and re-spent in the local economy or as the initial withdrawal of funds causes decreases in local sales which, in turn, causes further decreases in local sales as payrolls and employment shrink. For expansions, re-circulation continues until the leakages from the system (such as imports, savings, and taxes) exhaust the amount of initial influx. In cases of decreases in export activity, the cumulative decline is halted by decreases in imports, savings, and taxes. Note that export based models predict that, without "new" injections of funds to the local economy through its export sector, the local economy will stagnate because service activities can only respond to changes in local economic conditions.

Most derivations of economic base models use an analogy from Keynesian income-consumption theory. This approach has at least two advantages. One, it couches economic base theory in the mainstream of economic thought. This leads to the economic base framework for no other reason than it is consistent with historic development of economic theory. And two, it also provides a formal structure within which the reasons for economic change can be analyzed.

The economic base model is essentially "short-run" in nature. The model assumes an economy is initially in equilibrium and describes the changes required to reach a new equilibrium position after an exogenous change occurs. Prices, wages, and technology are assumed constant. Changes in the distribution of income and resource allocations are also not permitted.

Economic base models emphasize the "openness" of regional economies; that is, the importance of trade in inducing regional change. The high degree of interrelatedness between the local economy and the "rest of the world" that drives the model is based solely on a demand orientation where exogenous changes in demand for exports determine regional income and employment changes. Export sales in practice are not the only activity that responds to exogenous forces, even in the short-run, and their omission from the model suggest that economic base studies are appropriate primarily for smaller economies.

Regional Econometric Models: Regional econometric models are multi-equation systems that attempt to describe the structure of a local economy and to estimate its components such as income, employment, and output. Often the Keynesian income-consumption framework provides the theoretical basis for the development of econometric models. But, because of the problems with the availability of relevant data, model builders generally take an eclectic approach and have incorporated specifications that seem to fit special situations rather than what "theory" would suggest. Most econometric models have employed time-series data and have generally been applied to areas with sufficient data (e.g., state or large metropolitan areas). These models and their component relationships are estimated by means of various regression techniques.

Econometric models vary considerably in their degree of sophistication and complexity (see Treyz, 1993). However, a popular theoretical framework for regional econometric models is the economic base theory. But unlike the economic base model (described earlier), where a reduced form summarizes the relationship between initial

changes in export demand and total changes in local economic activity, regional econometric models adopt an explicit system of equations to explain and predict levels of endogenous variables by either exogenous variables or other endogenous variables that are determined by exogenous variables. These types of equation systems can either be simply recursive in nature or more complex to require sophisticated simultaneous equation solving techniques

Given the great diversity in the construction of econometric models and the lack of a specific theory of regional growth that forms a basis for the structure of these models, it is difficult to identify a general body of conceptual problems common to these undertakings. In fact. the major conceptual problem is the lack of a consistent theoretical base. Constraints on data availability as well as the unique situation of each area are partly responsible for the variation in structure. There are econometric models that contain only eight stochastic equations while other may contain more that one hundred (Treyz, 1993).

In their most elementary form, econometric models offer little information beyond that available from an economic base study. They are typically demand oriented and treat wages and prices as given. They are thus open to many of the same criticisms raised to the economic base model. An elementary econometric model will have a recursive structure and will generally relate endogenous variables to exogenous national variables. The more sophisticated econometric models consider supply-side influences such as investment and the labor force; wages are also estimated by the model as well as non-wage income These models tend to be simultaneous rather than recursive. These models supply considerable detail and much emphasis is placed on those variables that the modeler considers important.

Implicit in the econometric models is the theory of growth that identifies the sources of growth with external and internal forces. External forces include export industries, which give them similar difficulties in identifying export sectors and in

allocating sales or employment into export and service sectors. Oftentimes, an assumption approach is used to categorize these activities.

Econometric models that incorporate investment and migration into the income-consumption framework are capable of producing dynamic multipliers. As such, they can show the cumulative impact of an exogenous shock over a number of years. As a result, econometric models can be useful for long term forecasting as well as for providing short-run predictions of impacts. The reliability of long-run impact studies is determined to a considerable extent on the availability of data on local investment and interregional migration.

Appendix E
State Participation in and Funding of Corps Beach Nourishment Projects

E.1 California

The State of California does contribute funds for Corps shore protection projects.

For beach nourishment projects, the State pays 100% of the non-federal share if the project is located at a state park. If the project is not a state park, then the State of California pays 85% of the non-federal share.

For structural Corps projects, the State pays up to 50% of the non-federal share.

There is a State shore protection program, independent of the Corps. It is fairly small at the moment, but there are 6 feasibility studies in the works, so it may be growing. The cost sharing formulas for these State shore protection projects are:

Beach nourishment in a state park – State pays 100%
Beach nourishment not in a state park – State pays 85%/ local municipality 15%

Structural projects – State pays 75% / Local municipality 25%

The source of all of this State funding is the State legislature.

Kim Sterrett, California Department of Boating and Waterways, 2000 Evergreen St. Sacramento, CA 95815, (916) 263-8157

E.2 Florida

Until 1998 the State of Florida funded a beach erosion control program which paid up to 75% of the non-federal share of Corps beach nourishment projects. Projects funded under this program were required to meet certain public access and parking criteria. And the typical funding was at the 75% level. The money was appropriated by the state legislature on a line item basis, for specific projects.

In 1998, the policy was changed (even though the law still allows up to 75%), so that now the state pays 50% of the non-federal share of Corps beach nourishment projects. The funding mechanism has changed also. Now $30 million per year is dedicated to beach erosion control projects. A priority list is developed. Some of the criteria factored into this are whether or not there is federal funding (i.e., Corps projects), and whether or not the project is ready to go (with the plans and studies completed and the local sponsor ready to spend money on it).

Some beach erosion control projects are carried out without any federal funding. They are subject to the same funding policy, and must be high enough on the priority list. In these projects, the state pays 50% and the local sponsor pays 50%.

Steve Higgins from Broward County, Florida. (954) 519-1230. The following web site that contains the type of information we are looking for http://www.dep.state.fl.us/beaches.

Delaware

The state of Delaware pays 100% of the non-federal share of Corps beach nourishment projects. or at least it will pay 100% if any projects are ever built in Delaware. Thus far. there have been lots of studies and planning, but no actual construction. no actual Corps beach nourishment in Delaware.

The State of Delaware funds beach nourishment on all of the Chesapeake Bay beaches, and it has been funding interim beach nourishment at the Atlantic Ocean beaches. The interim beach nourishment is intended to provide protection for 2 or 3 years. When Corps funding begins. more long-term protection will be built. with foredunes as well as beaches.

The state money is derived from two sources. First, since 1971 there has been a Bond Bill which provides $1 million every year for capital improvements to beaches. which includes beach nourishment. The state beach nourishment projects are nominally funded 50/50 state/local. However. in order to lessen the burden on local governments. the state legislature increased the accommodation (hotel) tax by 1%, and this money is given to localities to use as their share of the cost of beach nourishment. This is used as the "local" 50%. So the local governments really don't have to pay anything.

Tony Pratt hopes that the IWR study will take a broad view of the benefits of beach nourishment projects. and 'track the sand'. including the benefits which it generates as it moves along the coast. out of one project area. but into another area where benefits are generated. He offered to give any of us who are interested a guided tour/field trip of the beaches in his area.

Tony Pratt of the State of Delaware. (302) 739-441

New Jersey

The state of New Jersey pays 75% of the non-federal share of Corps beach nourishment projects. The remaining 25% of the non-federal share is paid by municipalities (towns. cities. etc). If there is more than one municipality in the project area. the cost is divided among them based on how much shoreline each one has. There is also a program whereby the coastal counties will reimburse the municipalities for 10% of the non-federal share of these projects. This reimbursement, however, is not paid until after the project has been completed.

New Jersey also has state beach nourishment projects, independent of the Corps. These projects are funded on a 75% State and 25% Local basis. Coastal counties also reimburse the municipalities for 10% of their share, after the project is completed.

Source of funds. Before 1991, funding for beach nourishment was derived directly from the state legislature via annual appropriations. Bonds were issued in 1977 and 1983 to raise money for shore protection. Since 1993. the program has had stable funding. This

year there was $25 million of dedicated money available for beach nourishment. The source of this money is the real estate transfer tax, which is levied on all real estate transactions. So $25 million of this tax money is dedicated to the beach nourishment program, and the rest goes into the state treasury. There is also a "poison pill" provision, which states that if the $25 million is not given to the beach nourishment program, then the remainder of the tax revenue cannot be used to balance the state budget.

A major force in achieving this stable funding was the Jersey Shore Partnership, an organization of businesses, utility companies, other stakeholders, which was formed following the destructive storms in 1991 and 1992. This group pressured the State legislature into establishing the mechanism for stable funding of the beach nourishment program.

Bernie Moore of the State of New Jersey

E.5 North Carolina

North Carolina has a program that provides for paying up to 75 percent of the non-Federal share of Corps beach nourishment projects. The money is derived directly from the State legislature, and there is usually enough to pay for the 75 percent. In some cases, it may be slightly less.

John Morris of North Carolina

Appendix F
Detailed Tables

Table F.1:Distribution of National Economic Development Benefits of Shore Protection Project (Low Energy Protection) With No Additional Recreation Demand (000 dollars in 2000 prices)

	Beach Area Benefits	Rest of Nation Benefits	Total NED Benefits	Benefits ($/CY) of Sand	Sand (000 CY)
Typical Beach Region					
Storm damage reduction	**$269**	**$497**	**$766**	**$1.5329**	**500**
Recreation for existing demand	$250	$359	$609	$4.4431	137
Other NED	$0	$102	$102	$0.2045	500
Total	$519	$959	$1,477		
Regional distribution	35.1%	64.9%			
Rural Beacn Region					
Storm damage reduction	**$353**	**$413**	**$766**	**$1.5329**	**500**
Recreation for existing demand	$370	$239	$609	$4.4431	137
Other NED	$0	$102	$102	$0.2045	500
Total	**$723**	**$754**	**$1,477**		
Regional distribution	**49.0%**	**51.0%**			
Urban Beach Region					
Storm damage reduction	$411	$356	**$766**	**$1.5329**	**500**
Recreation for existing demand	**$177**	**$432**	**$609**	**$4.4431**	**137**
Other NED	**$0**	**$102**	**$102**	**$0.2045**	**500**
Total	**$587**	**$890**	**$1,477**		
Regional distribution	**39.8%**	**60.2%**			

Table F.2: Distribution of National Economic Development Benefits of Shore Protection Project (High Energy Protection) With No Additional Recreation Demand (000 dollars in 2000 prices)

	Beach Area Benefits	Rest of Nation Benefits	Total NED Benefits	Benefits ($/CY) of Sand	Sand (000 CY)
Typical Beach Region					
Storm damage reduction	$377	$696	$1,073	$1.5329	700
Recreation for existing demand	$250	$359	$609	$4.4431	137
Other	$0	$143	$143	$0.2045	700
Total	$626	$1,199	$1,825		
Regional distribution	34.3%	65.7%			
Rural Beach Region					
Storm damage reduction	$495	$578	$1,073	$1.5329	700
Recreation for existing demand	$370	$239	$609	$4.4431	137
Other	$0	$143	$143	$0.2045	700
Total	$865	$960	$1,825		
Regional distribution	47.4%	52.6%			
Urban Beach Region					
Storm damage reduction	$575	$498	$1,073	$1.5329	700
Recreation for existing demand	$177	$432	$609	$4.4431	137
Other	$0	$143	$143	$0.2045	700
Total	$752	$1,073	$1,825		
Regional distribution	41.2%	58.8%			

Table F.3: Distribution of National Economic Development Benefits of Shore Protection Project (Medium Energy Protection) With Varying Recreation Demand, Unit-Day Value is $5.17 (000 dollars in 2000 prices)

	Beach Area		Rest of the Nation		Total NED	
	Benefits	%	Benefits	%	Benefits	New Visits
Typical Beach Region						
No increase in beach use	$572	34.6%	$1,079	65.4%	$1,651	0
5% increase in beach use	$606	35.0%	$1,127	65.0%	$1,733	15,840
10% increse in beach use	$640	35.3%	$1,175	64.7%	$1,815	31,680
15% increase in beach use	$673	35.5%	$1,224	64.5%	$1,897	47,520
20% increase in beach use	$707	35.7%	$1,272	64.3%	$1,979	63,360
25% increase in beach use	$740	35.9%	$1,320	64.1%	$2,060	79,200
Rural Beach Region						
No increase in beach use	$794	48.1%	$857	51.9%	$1,651	0
5% increase in beach use	$844	48.7%	$889	51.3%	$1,733	15,840
10% increse in beach use	$894	49.3%	$921	50.7%	$1,815	31,680
15% increase in beach use	$943	49.7%	$953	50.3%	$1,896	47,520
20% increase in beach use	$993	50.2%	$985	49.8%	$1,978	63,360
25% increase in beach use	$1,043	50.6%	$1,018	49.4%	$2,061	79,200
Urban Beach Region						
No increase in beach use	$670	40.6%	$982	59.4%	$1,652	0
5% increase in beach use	$693	40.0%	$1,040	60.0%	$1,733	15,840
10% increse in beach use	$717	39.5%	$1,098	60.5%	$1,815	31,680
15% increase in beach use	$741	39.1%	$1,156	60.9%	$1,897	47,520
20% increase in beach use	$765	38.7%	$1,214	61.3%	$1,979	63,360
25% increase in beach use	$788	38.3%	$1,272	61.7%	$2,060	79,200

Table F.4: Distribution of National Economic Development Benefits of Shore Protection Project (Medium Energy Protection) With Varying Recreation Demand, Unit-Day Value is $17.38 (000 dollars in 2000 prices)

	Beach Area		Rest of the Nation		Total NED	
	Benefits	%	Benefits	%	Benefits	New Visits
Typical Beach Region						
No increase in beach use	$572	34.6%	$1,079	65.4%	$1,651	0
5% increase in beach use	$685	35.6%	$1,241	64.4%	$1,926	15,840
10% increse in beach use	$798	36.2%	$1,404	63.8%	$2,202	31,680
15% increase in beach use	$911	36.8%	$1,566	63.2%	$2,477	47,520
20% increase in beach use	$1,024	37.2%	$1,728	62.8%	$2,752	63,360
25% increase in beach use	$1,137	37.5%	$1,891	62.5%	$3,028	79,200
Rural Beach Region						
No increase in beach use	$794	48.1%	$857	51.9%	$1,651	0
5% increase in beach use	$961	49.9%	$965	50.1%	$1,926	15,840
10% increse in beach use	$1,129	51.3%	$1,073	48.7%	$2,202	31,680
15% increase in beach use	$1,296	52.3%	$1,181	47.7%	$2,477	47,520
20% increase in beach use	$1,464	53.2%	$1,289	46.8%	$2,753	63,360
25% increase in beach use	$1,631	53.9%	$1,397	46.1%	$3,028	79,200
Urban Beach Region						
No increase in beach use	$670	40.6%	$982	59.4%	$1,652	0
5% increase in beach use	$749	38.9%	$1,177	61.1%	$1,926	15,840
10% increse in beach use	$829	37.6%	$1,373	62.4%	$2,202	31,680
15% increase in beach use	$909	36.7%	$1,568	63.3%	$2,477	47,520
20% increase in beach use	$989	35.9%	$1,763	64.1%	$2,752	63,360
25% increase in beach use	$1,069	35.3%	$1,959	64.7%	$3,028	79,200

Table F.5: Distribution of National Economic Development Benefits of Shore Protection Project (Low Energy Protection) With Varying Recreation Demand, Unit-Day Value is $2.00 (000 dollars in 2000 prices)

	Beach Area		Rest of the Nation		Total NED	
	Benefits	%	Benefits	%	Benefits	New Visits
Typical Beach Region						
No increase in beach use	$519	35.1%	$959	64.9%	$1,478	0
5% increase in beach use	$532	35.2%	$978	64.8%	$1,510	15,840
10% increse in beach use	$545	35.4%	$996	64.6%	$1,541	31,680
15% increase in beach use	$558	35.5%	$1,015	64.5%	$1,573	47,520
20% increase in beach use	$571	35.6%	$1,034	64.4%	$1,605	63,360
25% increase in beach use	$584	35.7%	$1,052	64.3%	$1,636	79,200
Rural Beach Region						
No increase in beach use	$723	49.0%	$754	51.0%	$1,477	0
5% increase in beach use	$743	49.2%	$766	50.8%	$1,509	15,840
10% increse in beach use	$762	49.4%	$779	50.6%	$1,541	31,680
15% increase in beach use	$781	49.7%	$791	50.3%	$1,572	47,520
20% increase in beach use	$800	49.9%	$804	50.1%	$1,604	63,360
25% increase in beach use	$820	50.1%	$816	49.9%	$1,636	79,200
Urban Beach Region						
No increase in beach use	$587	39.7%	$890	60.3%	$1,477	0
5% increase in beach use	$597	39.5%	$913	60.5%	$1,510	15,840
10% increse in beach use	$606	39.3%	$935	60.7%	$1,541	31,680
15% increase in beach use	$615	39.1%	$958	60.9%	$1,573	47,520
20% increase in beach use	$624	38.9%	$980	61.1%	$1,604	63,360
25% increase in beach use	$633	38.7%	$1,003	61.3%	$1,636	79,200

Table F.6: Distribution of National Economic Development Benefits of Shore Protection Project (Low Energy Protection) With Varying Recreation Demand, Unit-Day Value is $5.17 (000 dollars in 2000 prices)

	Beach Area		Rest of the Nation		Total NED	
	Benefits	%	Benefits	%	Benefits	New Visits
Typical Beach Region						
No increase in beach use	$519	35.1%	$959	64.9%	$1,478	0
5% increase in beach use	$552	35.4%	$1,007	64.6%	$1,559	15,840
10% increse in beach use	$586	35.7%	$1,055	64.3%	$1,641	31,680
15% increase in beach use	$619	35.9%	$1,104	64.1%	$1,723	47,520
20% increase in beach use	$653	36.2%	$1,152	63.8%	$1,805	63,360
25% increase in beach use	$686	36.4%	$1,200	63.6%	$1,886	79,200
Rural Beach Region						
No increase in beach use	$723	49.0%	$754	51.0%	$1,477	0
5% increase in beach use	$773	49.6%	$786	50.4%	$1,559	15,840
10% increse in beach use	$823	50.2%	$818	49.8%	$1,641	31,680
15% increase in beach use	$873	50.7%	$850	49.3%	$1,723	47,520
20% increase in beach use	$923	51.1%	$882	48.9%	$1,805	63,360
25% increase in beach use	$972	51.5%	$914	48.5%	$1,886	79,200
Urban Beach Region						
No increase in beach use	$587	39.7%	$890	60.3%	$1,477	0
5% increase in beach use	$611	39.2%	$948	60.8%	$1,559	15,840
10% increse in beach use	$635	38.7%	$1,006	61.3%	$1,641	31,680
15% increase in beach use	$659	38.2%	$1,064	61.8%	$1,723	47,520
20% increase in beach use	$682	37.8%	$1,123	62.2%	$1,805	63,360
25% increase in beach use	$706	37.4%	$1,181	62.6%	$1,887	79,200

Table F.7: Distribution of National Economic Development Benefits of Shore Protection Project (Low Energy Protection) With Varying Recreation Demand, Unit-Day Value is $17.38 (000 dollars in 2000 prices)

	Beach Area		Rest of the Nation		Total NED	
	Benefits	%	Benefits	%	Benefits	New Visits
Typical Beach Region						
No increase in beach use	$519	35.1%	$959	64.9%	$1,478	0
5% increase in beach use	$631	36.0%	$1,121	64.0%	$1,752	15,840
10% increse in beach use	$744	36.7%	$1,284	63.3%	$2,028	31,680
15% increase in beach use	$857	37.2%	$1,446	62.8%	$2,303	47,520
20% increase in beach use	$970	37.6%	$1,609	62.4%	$2,579	63,360
25% increase in beach use	$1,083	37.9%	$1,771	62.1%	$2,854	79,200
Rural Beach Region						
No increase in beach use	$723	49.0%	$754	51.0%	$1,477	0
5% increase in beach use	$891	50.8%	$862	49.2%	$1,753	15,840
10% increse in beach use	$1,058	52.2%	$970	47.8%	$2,028	31,680
15% increase in beach use	$1,226	53.2%	$1,078	46.8%	$2,304	47,520
20% increase in beach use	$1,393	54.0%	$1,186	46.0%	$2,579	63,360
25% increase in beach use	$1,560	54.7%	$1,294	45.3%	$2,854	79,200
Urban Beach Region						
No increase in beach use	$587	39.7%	$890	60.3%	$1,477	0
5% increase in beach use	$667	38.0%	$1,086	62.0%	$1,753	15,840
10% increse in beach use	$747	36.8%	$1,281	63.2%	$2,028	31,680
15% increase in beach use	$827	35.9%	$1,476	64.1%	$2,303	47,520
20% increase in beach use	$907	35.2%	$1,672	64.8%	$2,579	63,360
25% increase in beach use	$987	34.6%	$1,867	65.4%	$2,854	79,200

Table F.8: Distribution of National Economic Development Benefits of Shore Protection Project (High Energy Protection) With Varying Recreation Demand, Unit-Day Value is $2.00 (000 dollars in 2000 prices)

	Beach Area		Rest of the Nation		Total NED	
	Benefits	%	Benefits	%	Benefits	New Visits
Typical Beach Region						
No increase in beach use	$626	34.3%	$1,199	65.7%	$1,825	0
5% increase in beach use	$639	34.4%	$1,217	65.6%	$1,856	15,840
10% increse in beach use	$652	34.5%	$1,236	65.5%	$1,888	31,680
15% increase in beach use	$665	34.6%	$1,255	65.4%	$1,920	47,520
20% increase in beach use	$678	34.8%	$1,273	65.2%	$1,951	63,360
25% increase in beach use	$691	34.8%	$1,292	65.2%	$1,983	79,200
Rural Beach Region						
No increase in beach use	$865	47.4%	$960	52.6%	$1,825	0
5% increase in beach use	$884	47.6%	$973	52.4%	$1,857	15,840
10% increse in beach use	$903	47.8%	$985	52.2%	$1,888	31,680
15% increase in beach use	$923	48.1%	$997	51.9%	$1,920	47,520
20% increase in beach use	$942	48.3%	$1,010	51.7%	$1,952	63,360
25% increase in beach use	$961	48.5%	$1,022	51.5%	$1,983	79,200
Urban Beach Region						
No increase in beach use	$752	41.2%	$1,073	58.8%	$1,825	0
5% increase in beach use	$761	41.0%	$1,096	59.0%	$1,857	15,840
10% increse in beach use	$770	40.8%	$1,118	59.2%	$1,888	31,680
15% increase in beach use	$779	40.6%	$1,141	59.4%	$1,920	47,520
20% increase in beach use	$788	40.4%	$1,163	59.6%	$1,951	63,360
25% increase in beach use	$798	40.2%	$1,186	59.8%	$1,984	79,200

Table F.9: Distribution of National Economic Development Benefits of Shore Protection Project (High Energy Protection) With Varying Recreation Demand, Unit-Day Value is $5.17 (000 dollars in 2000 prices)

	Beach Area		Rest of the Nation		Total NED	
	Benefits	%	Benefits	%	Benefits	New Visits
Typical Beach Region						
No increase in beach use	$626	34.3%	$1,199	65.7%	$1,825	0
5% increase in beach use	$660	34.6%	$1,247	65.4%	$1,907	15,840
10% increse in beach use	$693	34.9%	$1,295	65.1%	$1,988	31,680
15% increase in beach use	$727	35.1%	$1,344	64.9%	$2,071	47,520
20% increase in beach use	$761	35.3%	$1,392	64.7%	$2,153	63,360
25% increase in beach use	$794	35.5%	$1,440	64.5%	$2,234	79,200
Rural Beach Region						
No increase in beach use	$865	47.4%	$960	52.6%	$1,825	0
5% increase in beach use	$915	48.0%	$992	52.0%	$1,907	15,840
10% increse in beach use	$964	48.5%	$1,024	51.5%	$1,988	31,680
15% increase in beach use	$1,014	49.0%	$1,056	51.0%	$2,070	47,520
20% increase in beach use	$1,064	49.4%	$1,089	50.6%	$2,153	63,360
25% increase in beach use	$1,114	49.8%	$1,121	50.2%	$2,235	79,200
Urban Beach Region						
No increase in beach use	$752	41.2%	$1,073	58.8%	$1,825	0
5% increase in beach use	$775	40.7%	$1,131	59.3%	$1,906	15,840
10% increse in beach use	$799	40.2%	$1,190	59.8%	$1,989	31,680
15% increase in beach use	$823	39.7%	$1,248	60.3%	$2,071	47,520
20% increase in beach use	$847	39.3%	$1,306	60.7%	$2,153	63,360
25% increase in beach use	$870	38.9%	$1,364	61.1%	$2,234	79,200

Table F.10: Distribution of National Economic Development Benefits of Shore Protection Project (High Energy Protection) With Varying Recreation Demand, Unit-Day Value is $17.38 (000 dollars in 2000 prices)

	Beach Area		Rest of the Nation		Total NED	
	Benefits	%	Benefits	%	Benefits	New Visits
Typical Beach Region						
No increase in beach use	$626	34.3%	$1,199	65.7%	$1,825	0
5% increase in beach use	$739	35.2%	$1,361	64.8%	$2,100	15,840
10% increse in beach use	$852	35.9%	$1,524	64.1%	$2,376	31,680
15% increase in beach use	$965	36.4%	$1,686	63.6%	$2,651	47,520
20% increase in beach use	$1,078	36.8%	$1,848	63.2%	$2,926	63,360
25% increase in beach use	$1,191	37.2%	$2,011	62.8%	$3,202	79,200
Rural Beach Region						
No increase in beach use	$865	47.4%	$960	52.6%	$1,825	0
5% increase in beach use	$1,032	49.1%	$1,068	50.9%	$2,100	15,840
10% increse in beach use	$1,200	50.5%	$1,176	49.5%	$2,376	31,680
15% increase in beach use	$1,367	51.6%	$1,284	48.4%	$2,651	47,520
20% increase in beach use	$1,534	52.4%	$1,392	47.6%	$2,926	63,360
25% increase in beach use	$1,702	53.2%	$1,500	46.8%	$3,202	79,200
Urban Beach Region						
No increase in beach use	$752	41.2%	$1,073	58.8%	$1,825	0
5% increase in beach use	$832	39.6%	$1,269	60.4%	$2,101	15,840
10% increse in beach use	$911	38.4%	$1,464	61.6%	$2,375	31,680
15% increase in beach use	$991	37.4%	$1,660	62.6%	$2,651	47,520
20% increase in beach use	$1,071	36.6%	$1,855	63.4%	$2,926	63,360
25% increase in beach use	$1,151	35.9%	$2,051	64.1%	$3,202	79,200

Table F.11: Impacts in the Typical Beach Region Due to a Hypothetical Million Outside Beach Visitors ($000 in 2000 prices)

Industry	Business Sales		Full-Time Employment	Value Added	Employee Compensation	Proprietors' Income	Property Income	Indirect Bus. Taxes
	Direct	Total						
Agriculture	$702	$952	32.5	$779	$276	$341	$152	$9
Mining	$0	$0	0.0	$0	$0	$0	$0	$0
Construction	$0	$2,449	22.2	$826	$436	$142	$239	$10
Manufacturing	$437	$1,124	14.6	$431	$278	$10	$136	$7
TCPU	$980	$3,109	23.3	$1,442	$889	$56	$508	$189
Trade	$27,701	$32,603	1,094.3	$22,374	$12,868	$2,313	$2,641	$4,562
FIRE	$0	$5,176	34.8	$3,390	$428	$33	$2,113	$817
Services	$20,095	$25,756	756.6	$18,864	$10,335	$3,205	$3,600	$1,714
Government	$0	$289	3.6	$204	$162	$0	$42	$0
Other	$0	$2	0.1	$2	$2	$0	$0	$0
Total	$49,914	$71,461	1,981.9	$48,302	$25,466	$6,098	$9,430	$7,308

Table F.12: Impacts in the Rural Beach Region Due to a Hypothetical Million Outside Beach Visitors ($000 in 2000 prices)

Industry	Business Sales		Full-Time Employment	Value Added	Employee Compensation	Proprietors' Income	Property Income	Indirect Bus. Taxes
	Direct	Total						
Agriculture	$140	$208	11.9	$155	$108	$47	$0	$0
Mining	$0	$0	0.0	$0	$0	$0	$0	$0
Construction	$0	$1,663	14.1	$611	$335	$86	$184	$6
Manufacturing	$68	$313	4.5	$149	$95	$4	$48	$2
TCPU	$1,263	$2,787	17.9	$1,199	$596	$42	$400	$162
Trade	$18,236	$21,353	621.8	$14,888	$9,134	$1,243	$1,846	$2,666
FIRE	$0	$3,605	21.5	$2,316	$363	$20	$1,443	$501
Services	$14,117	$17,590	466.6	$12,566	$6,831	$2,134	$2,589	$1,011
Government	$0	$318	3.5	$217	$140	$0	$78	$0
Other	$0	$45	5.5	$45	$45	$0	$0	$0
Total	$33,825	$47,880	1,167.3	$32,147	$17,637	$3,576	$6,587	$4,347

Table F.13: Impacts in the Urban Beach Region Due to a Hypothetical Million Outside Beach Visitors ($000 in 2000 prices)

Industry	Business Sales		Full-Time Employment	Value Added	Employee Compensation	Proprietors' Income	Property Income	Indirect Bus. Taxes
	Direct	Total						
Agriculture	$190	$433	15.8	$293	$99	$166	$27	$2
Mining	$0	$3	0.0	$1	$0	$0	$1	$0
Construction	$0	$4,614	36.1	$1,755	$957	$257	$524	$17
Manufacturing	$874	$4,154	31.9	$1,921	$1,066	$36	$787	$42
TCPU	$2,025	$6,850	52.4	$3,428	$1,761	$136	$1,154	$378
Trade	$55,066	$65,016	1,964.6	$41,196	$25,233	$3,590	$4,962	$6,421
FIRE	$0	$11,314	64.2	$7,044	$1,450	$77	$4,081	$1,436
Services	$33,867	$47,310	1,339.8	$35,599	$20,789	$4,154	$6,454	$4,202
Government	$0	$701	7.6	$496	$352	$0	$143	$0
Other	$0	$126	13.8	$126	$126	$0	$0	$0
Total	$92,012	$140,522	3,528.2	$91,858	$52,823	$8,414	$18,123	$12,499