



THE CONTRIBUTION OF THE COASTAL ECONOMY TO THE STATE OF DELAWARE

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ABOUT THE AUTHORS

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The authors have completed economic impact studies for private companies (e.g., Valero, Sunoco) and public agencies (University of Delaware, Greater Dover Committee). They have performed economic impact analyses of the Delaware Estuary, recreation in Delaware, a county park in Luzerne County, Pa., the arts in Delaware, a steel company in Wilmington, deepening the channel of the Delaware River, and Sunday sales of alcoholic beverages. Examples of their work can be found at www.udel.edu/CABER.

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FOREWORD

The Delaware Sea Grant College Program advances the understanding, development, use, and conservation of state and regional marine and coastal resources. That mission is accomplished through an integrated program of excellence in research, education, and outreach built upon active partnerships with state and federal agencies, the private sector, and citizens.

Delaware Sea Grant provides sound scientific information on issues affecting our coasts and our coastal economy. Our research and outreach programs help businesses make better economic decisions, protect coastal residents' and visitors' lives, and provide resource managers and community leaders with fact-based information that informs their decisions and enhances public understanding of coastal issues.

Our coastal economy is a multi-billion dollar sector, employing tens of thousands of Delawareans and attracting millions of visitors annually to our pristine Atlantic coast beaches, Inland Bays, and coastal areas. Maintaining these natural attributes is vital to ensuring a robust coastal economy and high quality of life for coastal residents.

Safe and clean beaches, ocean and bay access for recreational opportunities, parks and open space, coastal towns with rich cultural heritages, high-quality medical facilities and schools, a diverse real estate sector, and quality retail and service industries provide an interconnected web of activities that drive our coastal economy.

This report defines and quantifies the economic contributions of coastal activities on the Delaware economy and provides data and examples of how coast-related jobs, payroll, output, and taxes generate additional economic impact. We believe this report will provide guidance for decision makers considering infrastructure investments and land use policies, businesses looking for new market opportunities, and citizens advocating for sustainable economic activity.

We are grateful to authors Bill Latham and Ken Lewis, co-directors of the Center for Applied Business and Economic Research at the University of Delaware Alfred Lerner College of Business and Economics, for sharing their wealth of expertise in regional economic analysis.

—Joseph Farrell, project coordinator
Delaware Sea Grant College Program



EXECUTIVE SUMMARY

Coast-related activity is a very important economic sector in coastal states and it makes a substantial contribution to the overall economy of Delaware. In recent decades, Delaware's coast has experienced dynamic changes in response to continued increases in economic activity. These changes are related to population growth in the mid-Atlantic region and a major demographic shift in the population in coastal areas. The population has been shifting toward more retired persons who require different types of economic activities to support them, such as health care. In light of these developments, it is important to develop an accurate accounting of the economic value and contributions of coast-related activity to the rest of the state economy.

The purpose of this project is to identify and quantify the economic impacts of coast-related activity on Delaware's economy. In addition to direct coast activities, our quantification includes the multiplier effects that result from the coast activities. In order to measure all the economic transactions generated by the affected industries in Delaware, a widely accepted economic input-output model is used.¹ The analysis calculates the effects of coast-related activities in terms of jobs, business production, household income, and taxes for all government. In addition, the analysis permits calculation of "multipliers," showing the "ripple effects" of directly measured coastal activity throughout the rest of the state's economy.



KEY FINDINGS

The total economic contributions of coast-related activity to the state of Delaware are:

- **\$6.9 billion** added to total industry production
- **59,000** additional jobs supported
- **\$711 million** of additional local, state, and federal taxes

The jobs include full-time, part-time, and seasonal employment, converted to full-time positions.

Direct coast-related activity has multiplied effects on the state's economy. For example:

- **\$67** of additional production is added throughout the state for every \$100 of coast-related production (a production multiplier of 1.67)
- **48** additional jobs are added throughout the state for every 100 coast-related jobs (a jobs multiplier of 1.48)



¹ IMPLAN, The Minnesota IMPLAN Group, 2010.

INTRODUCTION

Coast-related activity is important business in Delaware. It generates jobs and income for many Delawareans and tax revenues for local and state governments. The objective of this study is to measure the size of this activity and the contributions it makes to the state's economy.

Some aspects of coast-related activity are obvious: The several hundred seasonal ocean lifeguards employed by municipalities, state parks, and private associations in coastal communities and the hordes of visitors crowding the boardwalks in Rehoboth Beach and Bethany Beach would not be there if not for the coast. In the same way, all the businesses that cater to people on the beaches and boardwalks are there only because of the coast. Similarly, non-beachfront businesses and residential developments in the coast communities are important parts of the coastal economy. For example, recreational fishing can involve marinas, boat dealers and services, charter boat operations, 4x4 vehicles for surf fishing, fishing equipment, retail sales, and other related businesses. Less obviously connected to the coast are the businesses in the Inland Bays and lower Delaware Bay area whose

production is directly tied to coastal activity. Businesses in this category include construction, maintenance, and landscaping companies. Still less obvious are the businesses that use coastal resources as important inputs to their production processes. For example SPI Pharma extracts magnesium from seawater for use in pharmaceutical applications at its Lewes facility, and Sea Watch International processes clam products harvested off the mid-Atlantic coast at its facility in Milford.²

These examples illustrate the difficulty of specifying precisely which geographic area includes the "coast."

In the Methodology section below, we describe our approach to measuring coast-related activity. There we also describe the economic impact model that we use to capture all of the direct and indirect (multiplier) contributions of coast-related activities. Later, we present the results of our analysis and offer some concluding remarks. First, however, we provide some examples to explain exactly what our impact analysis does.

METHODOLOGY

The four components required to measure the economic contributions of the coastal economy to the state of Delaware are:

- 1 identification of the activities that are included in the coastal economy,
- 2 measurement of the magnitudes of coast-related activities,
- 3 selection of an appropriate analytical model for calculating the impacts or contributions of coast-related activities, and
- 4 calculation of the contributions to the state economy using an analytical model.



² SPI Pharma Inc. is a worldwide leader in custom formulation solutions for pharmaceutical and nutraceutical manufacturers and Sea Watch International Ltd. is the largest harvester and processor of clam products in the world.



Defining the Coast from an Economic Point-of-View: Coast-related Economic Activity

Understanding the contributions of Delaware's coast-related activity to the economy of the state requires a careful identification of what constitutes "coast-related activity." Delaware is a marine-oriented state, with no part more than eight miles from tidal waters. It has a rich coastal environment, with 24 miles of ocean coastline and 381 miles of tidal shoreline including coastal bays, tributaries, and Delaware Bay. Delaware is one of 30 states identified as a "coastal state," and in a broad sense, all three counties are regarded as coastal. In addition, all Delaware watersheds are considered coastal because they drain directly into the ocean, Chesapeake Bay, or Delaware Bay. However, such broad definition of the coast would require the inclusion of all the economic activity in the state, which would overstate the extent of coast-related activity. The example of beachfront activities points us toward a narrow definition based on close proximity to the coast. However, the examples in the Introduction identified a broader geographic scope where coast-related activity may occur.

Our approach to measuring coast-related activity is similar to the approach of other analysts such as Charles Colgan, who proposed that the coastal economy is that portion of economic activity that takes place on or near the coast.



In addition, Colgan notes that the coastal economy has a geographical aspect and consists of a particular set of economic activities within a larger region. Postal zip code areas are the smallest geographic units for which the kinds of economic data required for our analysis

(employment, production, incomes, and taxes) are available.

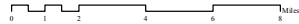
Fortunately, there is commercially available, highly professional software that can calculate all of the economic impacts for areas of the United States as small as zip code areas. We used a well-known and widely used example of this software—described later in this report—for our project.

Thus, we turn to zip code areas to construct our geographic region that contains coast-related activity.³ Four zip code areas that border the coast—19930, 19944, 19958, and 19971—are areas we have identified as containing the most directly coast-related activities. These zip code areas are shown on the map on page 6. Coast-related activity can be measured in terms of all the employment, production, incomes, and taxes from these coastal zip code areas.

³ Charles S. Colgan, Chief Economist, National Ocean Economics Project. "The Changing Ocean and Coastal Economy of the United States: A Briefing Paper for Governors." Prepared for National Governors Association, March 2004. Colgan calls it the "near shore area" which he maps as "Near Shore Zip Codes."

Zip Code Areas Map

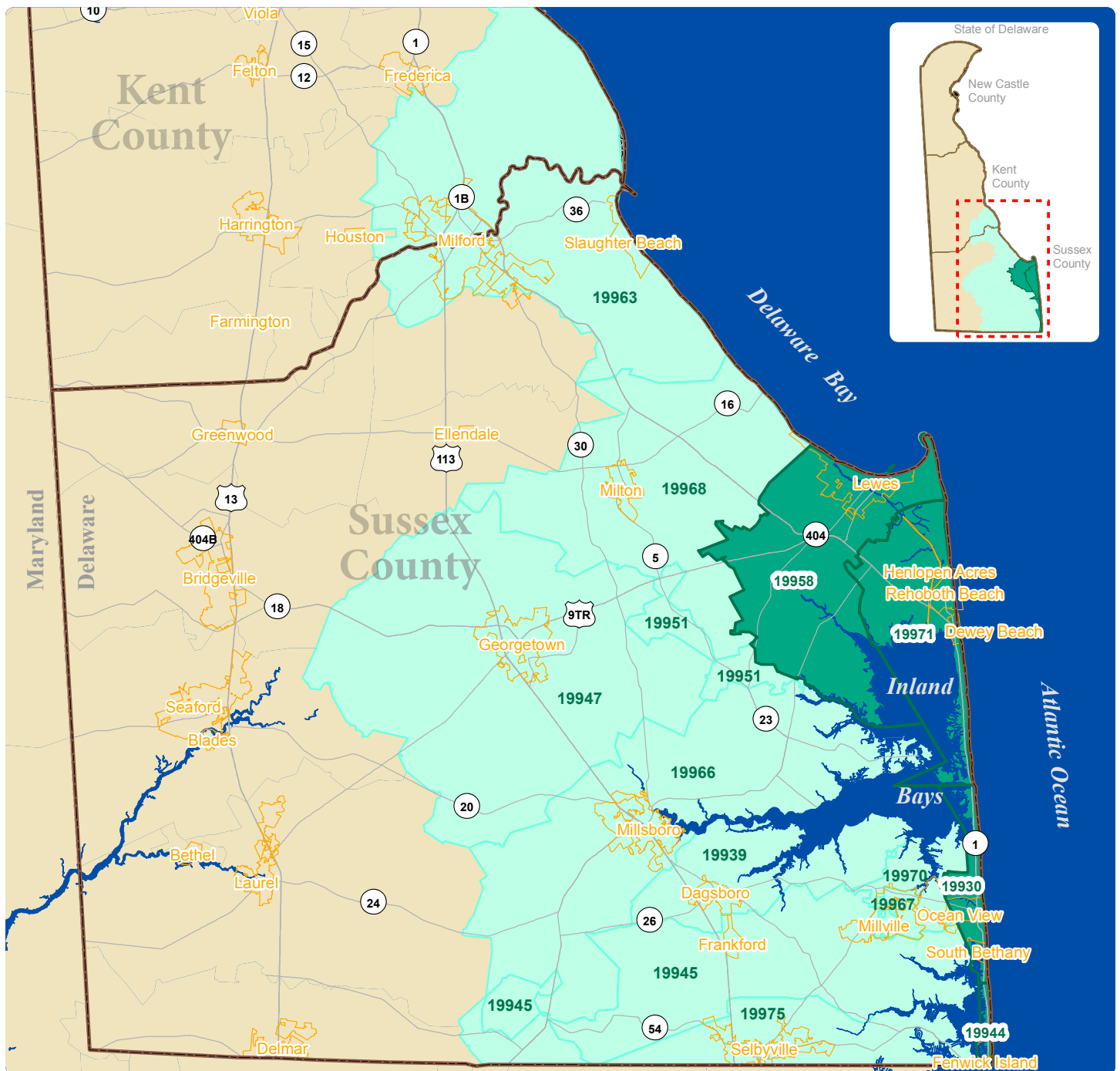
Legend



-  Atlantic Coast Zip Codes
All Economic Activity Included
-  Non-Coast Zip Codes
Only Economic Activities Supporting Coastal Activity Included
-  Out of Study Area
-  County Boundaries
-  Municipal Boundaries
-  Major Roads
-  Water Bodies

Sources:
Municipal Boundaries - Office of State Planning Coordination (OMB), 2012.
Roads - Delaware Department of Transportation, 2011.
Zipcodes - U.S. Post Office, Sussex County boundaries are edited and maintained by Sussex County Mapping and Addressing Department, April 2011.

Note:
This map is provided by the Institute for Public Administration (IPA) solely for display and reference purposes and is subject to change without notice. No claims, either real or assumed, as to the absolute accuracy or precision of any data contained herein are made by IPA, nor will IPA be held responsible for any use of this document for purposes other than which it was intended.



In addition, we expand the geographic region of potential coast-related activities to include the zip code areas (19939, 19945, 19947, 19951, 19963, 19966, 19967, 19968, 19969, 19970, and 19975) that border the Inland Bays and lower Delaware Bay or contain concentrations of activities supporting coast-related activities. They are considered part of the coastal economy because of the coast-related activities they contain. However, the Inland Bays and lower Delaware Bay area also contain many non-coast-related activities—especially agriculture, including poultry processing. Thus in order to not give economic impact credit for agriculture and other strictly non-coast-related activities, we select only coast-related activities that occur in the Inland Bays and lower Delaware Bay zip code areas (this is Colgan’s “specific economy” within a larger region). This approach enables us to incorporate the fact that “the coast” or “coastal economy” is moving inland due to finite coastal real estate, lower real estate prices farther inland, and continuing population growth. To identify coast-related activity in the Inland Bays and lower Delaware Bay zip code areas, we focus on the businesses in specific industries located in these areas. What are coast-related industries? The Bureau of Labor Statistics (BLS) publishes a list of industries identified as coast-related.⁴ Other studies of coast-related activities have also produced their own lists of industries, which

may differ, to some extent, from the BLS list. In addition to the BLS list, we also relied on a list produced as part of a study conducted by the University of Massachusetts.⁵ The BLS and Massachusetts lists imply that all businesses in the identified industries in the Inland Bays and lower Delaware Bay area should be considered coast-related. However, this procedure would overstate the magnitude of coast-related activities. For example, even the commercial fishing industry in Delaware, which both BLS and Massachusetts would identify as coast-related, includes activities not related to the coast (those related purely to Delaware Bay and Delaware River). Thus we examined each of the industries identified by BLS and Massachusetts that are part of the Inland Bays and lower Delaware Bay economy and included as coast-related only the proportion of the industry’s employment, output, income, and taxes that might be reasonably included in Delaware’s coast-related activity. We also examined the industries and individual businesses in coastal Sussex County excluded by both BLS and Massachusetts and found some among them (e.g., amusement and water parks, residential construction, medical, legal, and insurance services) that had coast-related components. We added reasonable proportions of those activities excluded by BLS and Massachusetts but nonetheless had distinct and obvious coast-related aspects in our study areas.



⁴ U.S. Department of Labor, Bureau of Labor Statistics, “Exhibit 2. Ocean Economy Sectors and Industries by SIC and NAICS Codes,” *Monthly Labor Review*, November 2004. A listing showing the way in which we used each of these detailed industries is available at www.deseagrant.org/products/2012-coastal-economy-appendix.

⁵ University of Massachusetts President’s Office, *An Assessment of the Coastal and Marine Economies of Massachusetts*, June 29, 2006. A listing showing the way in which we used each of these detailed industries is available at www.deseagrant.org/products/2012-coastal-economy-appendix.

Measuring the Magnitudes of Coast-Related Activities

For the coastal economy we defined in the preceding paragraphs, we need measures of its magnitude. We measure the coastal economy in terms of jobs, payroll, output, and taxes. The totals of all coastal economy activities, in terms of any of the measures, are referred to as the direct effects. These direct effects lead to indirect and induced effects. The three effects together constitute the totality of “coast-related” economic activities.

Direct effects are the jobs, payroll, and output created directly by coastal economy activities—such as coastal businesses. **Indirect effects** are the additional jobs, payroll, and output created when a coastal business purchases goods and services from the many diverse businesses that support it. These businesses include equipment suppliers, construction services, transportation services, management services, food services, and many other types of support businesses. **Induced effects** measure the additional jobs, payroll, and output created throughout the economy when the employees of a direct or indirect employer spend their personal incomes on consumer goods, other property, services, and taxes.

The relationship (the ratio) between the total impact of a coastal activity and its initial direct effect is a **multiplier effect**. Local firms purchase input supplies that they need for their businesses from other local firms. They pay their employees, who then also make local purchases. The initial spending has a ripple effect through the economy as successive rounds of spending and re-spending magnify its impact. In each round of spending and re-spending, some of the additional spending is lost from the local economy because some money goes into saving or non-local purchases. This is why multipliers have values for smaller regions (such as states) that are typically not as large as they are at the national level. A multiplier’s size depends on the residency of the workforce, the average wages paid, and the portion of intermediate purchases that are supplied locally.

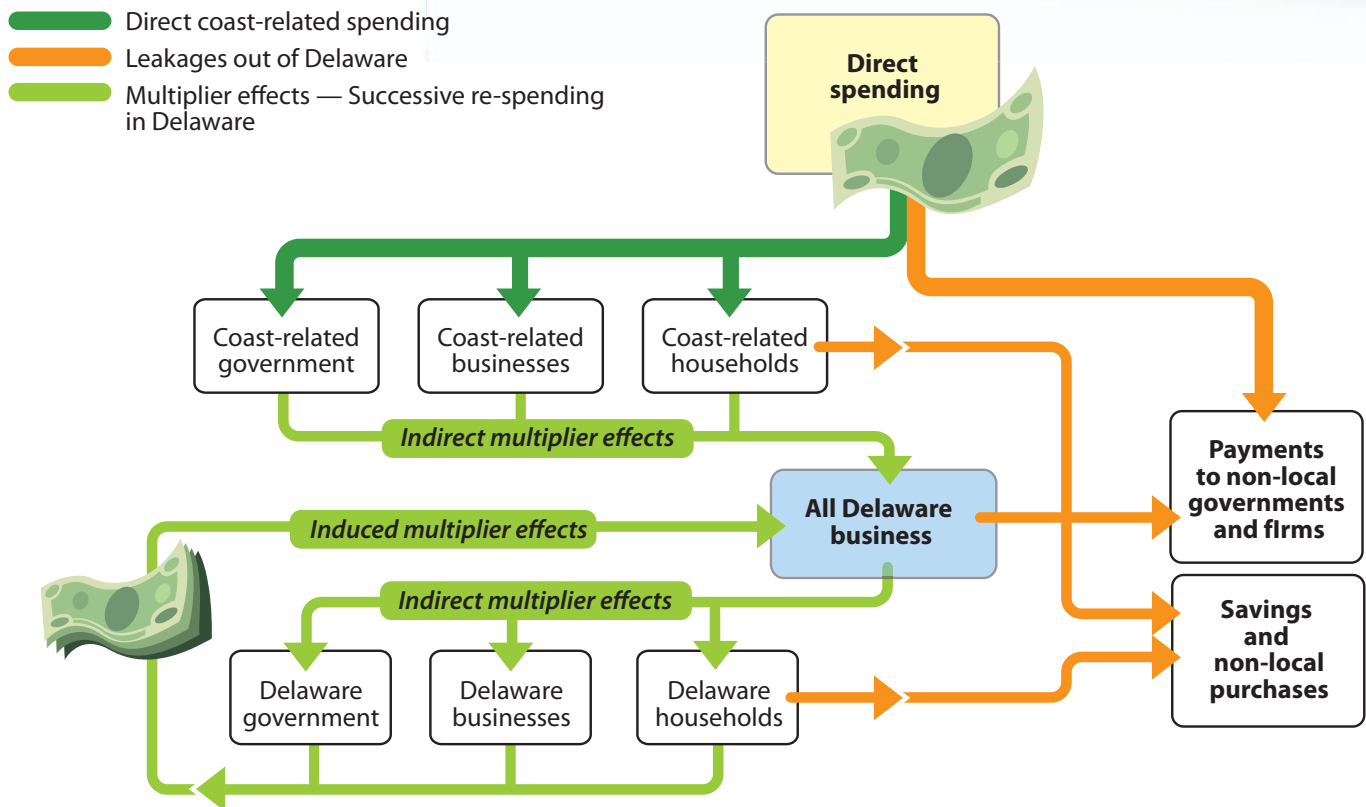
A multiplier is simply the numerical relationship between an original change in economic activity and the ultimate change in activity that results as the money is spent and re-spent through various sectors of the economy. An example of “re-spending” in our analysis is when an employee of a coast business spends some of her wages on locally produced goods. The production of the goods the employee purchases, such as groceries or entertainment, is economic activity that can be indirectly attributed to the operations of the coast business. Thus, a one-dollar increase in local direct activity at the coast results in expansion of total economic activity of more than one dollar throughout the rest of the state.



There are several kinds of multipliers used to assess the economic impacts of any kind of activity. The main varieties, and the ones that we utilize in this report, are output multipliers, employment multipliers, and income multipliers. The effects of coast-related business activities can be measured in terms of the value of the output they produce, the number of individuals they employ, and the wages and salaries they pay to those employees. Just as one dollar of output produced by a coast-related business has a total effect of creating more than one dollar's worth of output in the impact economy (this is the output multiplier), a single job at the coast business can be given credit for creating more than one job in the impact economy (this is the employment multiplier).⁶ Likewise, an additional dollar of wages paid to one coast employee results in more than one additional dollar of total income for the impact region's households (this is the income multiplier).

Figure 1 illustrates the multiplier process. Coast-related expenditures are disbursed in four different ways: (1) to local government (which includes state government), (2) to other local firms, (3) to local households, and (4) as payments to non-local governments and firms. The three local recipients of the disbursement will continue to spend this money in the same four ways over successive rounds of spending. Money that flows out of Delaware (e.g., purchases from non-Delaware suppliers, payments to non-Delaware employees, and non-Delaware taxes) leak out of the multiplier process so that eventually the effects of the original spending cease to cause additional increases.

Figure 1. The Multiplier Effects



⁶ An employment multiplier is the total change in *full-time equivalent* (F.T.E.) jobs generated in the local economy for each direct change of one F.T.E. position in the economy (note that one F.T.E. can be a full-time job, or it can be two or three part-time positions with total hours worked equaling one full-time job).

Illustrative Examples of Economic Impacts

In this study, we measure the economic contributions (impacts) of coast-related activities. The following three examples should help to clarify what we mean by economic impacts and how we measure them.

Example 1: The vacationing family

Consider the case of a family that spends a week at the beach. Family members may have decided to stay in a motel near the beach. They will dine out at local restaurants for the week. They will spend some time (and money) shopping on the boardwalk and at the outlets or on a fishing boat excursion. The children will go to the movies, Funland, a water park, and play games on the boardwalk. They may rent bikes, kayaks, or other equipment. They will buy gas and car services locally and maybe take the ferry to Cape May for a day.



What do these activities mean in terms of our impact analysis? The key is to recognize that each activity results in spending that can be measured. This part of the activity is called **direct spending**. For example, the family pays the motel for lodging, pays restaurants for meals, and pays for their outlet store purchases, bike rentals, movie tickets, etc. Next, we consider what recipients of the family's dollars do with that money. The motel purchases linen service, pool maintenance and cleaning supplies, and water, electricity, and cable service. They also pay taxes to state, local, and federal government and pay other government license and related fees.

Finally, the motel pays its manager, desk personnel, cleaning and maintenance staff, lifeguard, etc.

However, the spending does not end with these "first round" purchases. Each supplier of the purchased services or materials in turn purchases its own services and materials and pays its employees. So the linen service firm purchases sheets from a wholesaler, buys detergent and other supplies from Walmart, pays for washing machines, the lease on its building, and maintenance. These purchases continue to reverberate through the local economy. Some of the dollars "leak" out of the local economy either when the purchases are made directly from vendors outside the area or when the items purchased are manufactured outside the area and shipped into it. Eventually the size of the incremental purchases becomes very small. The total of all the spending in these rounds and rounds of purchases is called **indirect spending**.

All firms and government agencies involved in the process of directly or indirectly supplying the items the family purchases also pay wages and salaries to their employees, rents to their landlords, profits to their owners, and interest to their creditors. The recipients of these income components have the income available to spend on the things they like to purchase in the local economy. Of course, their spending sets off additional rounds of indirect spending and more income payments. The total of all the spending that results from the income components is called **induced spending**.

To measure the **total impact** that the family's visit has on the coastal economy we add up all the direct, indirect, and induced spending.



Example 2: The summer resident

As a second example, consider a family that rents or owns a house that they stay in for the entire summer season. They engage in many of the same coast-related activities as the short-term visitor, but do so less intensively over an extended period. The major difference may be that they do a lot of meal preparation at home and, because they are in the community for a longer period, they may also seek medical attention, obtain prescription drugs, and use more personal services such as hair salons, fitness facilities, and automotive maintenance and repair centers. They are more likely to play golf and engage in boating. Owners will perform maintenance on their houses, contract for many services, and purchase materials, appliances, and equipment as needed. The nature of the spending flows for the seasonal family is not essentially different from that of the short-term visiting family, but the detailed direct-spending categories and amounts are different, and consequently so are the subsequent indirect and induced spending and the specific firms impacted throughout the multiplier process. For example, direct spending is larger in food stores and home-maintenance companies for the longer-term visitors and the indirect and induced effects for them will be in a somewhat different group of firms in the local economy than is the case for the short-term visiting family.



Example 3: The permanent resident

A third example is provided by permanent residents, perhaps a retired couple living in one of the beach communities or other permanent residents such as those who own, operate, and work at local businesses or commute to Dover and other non-coastal communities. These individuals incur the whole array of expenses required for year-round living, including all health and medical, automobile, banking, insurance, and legal services. They purchase clothing for all seasons. They patronize businesses that cater to summer visitors, making it possible for many of those businesses to remain open throughout the year. Again the nature of the impacts is the same, but the mix of particular firms affected will be different: The permanent residents will consume more health, medical, legal, and financial services, which will cause a somewhat different set of firms to be part of the indirect and induced effects.



Identification of an Appropriate Analytical Model for Calculating the Impacts of Coast-Related Activities

The analytical model used for calculating the impacts of coastal economic activities in this report was developed by the Minnesota IMPLAN Group. Their IMPLAN (IMPact analysis for PLANning) software is a well-recognized, standard tool for modeling impacts in regional economies. The IMPLAN modeling system is based on official U.S. government data sources for production, employment, wages, incomes, and taxes for more than 400 detailed industry classifications as specified by federal statistical agencies such as the Department of Labor's Bureau of Labor Statistics and the Department of Commerce's Bureau of Economic Analysis.

IMPLAN permits us to keep track of the number of incremental full-time-equivalent employees employed by all of the firms that have direct, indirect, and induced effects. We also keep track of all the incremental "labor income" paid to all the employees as well as all of the taxes and fees paid to state, local, and federal government entities.



The Jobs include full-time, part-time, and seasonal employment, converted to full-time positions.





Direct coast-related activity has multiplied effects on the state's economy. For example:

- \$67 of additional production is added throughout the state for every \$100 of direct coast-related production (a production multiplier of 1.67)
- 48 additional jobs are added throughout the state for every 100 direct coast-related jobs (a jobs multiplier of 1.48)
- \$59 of additional labor income is added throughout the state for every \$100 of direct coast-related labor income

RESULTS

Application of Multiplier Analysis to Delaware's Coast-Related Activities

In the following tables we present the results of analysis of the economic impacts of coast-related activity on the economy of the state of Delaware. Table 1 shows that direct coast-related activity accounts for 39,900 additional jobs, \$4.1 billion in added industry production, and \$1.6 billion in added labor income. After adding in indirect and induced (multiplier) activity, the total economic contributions of coast-related activity to the state:

- **\$6.9 billion** added to total industry production
- **59,000** additional jobs supported
- **\$2.5 billion** of additional labor income
- **\$711 million** of additional local, state, and federal taxes

Table 2 shows the top-ten industry sectors impacted by coast-related activity, whether direct, indirect, or induced. These sectors (which include a large number of component activities) can be regarded as barometers of coastal economic activity.

Not surprisingly, restaurants, bars, and other places where food is served to consume on premises or to take out (in Table 2 the sector is called food services and drinking places) comprise the top sector in terms of jobs (7,332). As would be expected, retail stores (including grocery stores, supermarkets, and outlet malls) have high employment impacts, representing the third-largest employment impact (3,537) when both retail categories in Table 2 are combined.

Table 1. The Contributions of the Coastal Economy to the State of Delaware

Economic Activity Types	Total Contribution			
	Jobs	Labor Income	Value of Production	Total State, Local and Federal Taxes Paid
Direct Coast Activity	39,900	\$1,578,277,224	\$4,147,200,862	
Indirect Supplier Activity	8,131	\$441,154,859	\$1,290,069,917	
Induced Activity from Employee Spending	10,914	\$492,448,703	\$1,474,782,149	
Total Contribution	58,945	\$2,511,880,786	\$6,912,052,928	\$711,042,856
Multipliers	1.48	1.59	1.67	

The Coastal Economy is defined as all economic activity in the four oceanfront zip code areas plus coast-related activity in the Inland Bays and lower Delaware Bay zip code areas.

Table 2. The Top 10 Industries Impacted by Coastal Economic Activity (Statewide Impacts)*

<i>Industry Names</i>		Jobs	Labor Income	Value of Production	Production Multipliers
1.	Food services and drinking places	7,332	\$163,932,752	\$445,716,880	1.6
2.	Real estate rental and management establishments	4,128	\$63,221,538	\$504,900,768	1.4
3.	Hospitals, nursing homes and other medical care facilities	2,706	\$205,483,728	\$370,372,256	1.8
4.	State and local government other than education	1,956	\$132,436,396	\$103,284,820	2.5
5.	Offices of physicians, dentists, and other health practitioners	1,883	\$141,326,648	\$252,451,736	1.7
6.	Retail Stores—Food and beverage	1,822	\$51,198,950	\$127,784,316	1.7
7.	Retail Stores—Clothing and clothing accessories	1,715	\$35,183,764	\$120,464,075	1.6
8.	Employment Placement Services Including Temporary Workers	1,638	\$50,876,013	\$69,997,104	1.8
9.	Business, professional, labor, political, civic, social and homeowners organizations	1,580	\$47,206,746	\$78,448,400	2.2
10.	Services to buildings and dwellings—janitorial, pest control, landscaping, carpet and upholstery cleaning, pool maintenance, power washing, etc.	1,435	\$33,162,843	\$82,585,528	1.7

*In Terms of Additional Jobs Contributed

The top sector for labor income is medical facilities (\$205.5 million) because of the high wages paid in this sector. The medical facilities sector also ranks high (third) in terms of job impacts. In addition, the sector comprising offices of dentists, physicians, and other health practitioners is ranked third for income and fifth for jobs. The high ranks of medical facilities (hospitals, etc. in Table 2) and services (offices of health practitioners in Table 2) attest to the importance of retirees to Delaware's coastal communities as well as to the continuing rise of the importance of the health care sector in the national economy (it now generates 18 percent of gross domestic product).

The top sector in terms of the value of production is real estate (\$504.9 million) because of its high level of direct activity. Real estate is also high (second) in terms of job impacts.



The top sectors in terms of production multipliers are government (2.5) and business and professional associations, a category that includes organizations such as homeowners associations, the CHEER home health care agency, volunteer firefighters, and chambers of commerce (2.2). These two sectors both purchase proportionately more inputs from other sectors than most sectors do.

The last three sectors in the table (employment services, business and professional associations, and services

to buildings) reflect the importance of service activities both in the coastal community and in the economy as a whole. In the coastal area these sectors are especially important in supporting both the short-term and long-term tourism communities.

The Impact of Seasonal Homes

Seasonal homes in the coastal area are part of coast-related activity, but their effects are not fully measured through the channels enumerated in the Methodology section.



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Seasonal homes are occupied by visitors who shop, dine, purchase entertainment, sightsee, and go to the beach. All of these activities are captured in the analysis presented. In addition, the rental payments that the visitors make when they occupy seasonal homes are largely handled by coastal real estate agencies, which collect their fees (often 10 percent) from the rents.

However, the balance of the rents is remitted to the owners. If the owners live in the coastal community themselves, then the impact of the rental income is already accounted for in our estimates. If the owners live outside of Delaware (e.g., Washington, DC, Philadelphia, New York, etc.), then the rental income they receive has no impact in Delaware except to the extent that they spend part of it when they make trips to stay for vacationing or for maintenance and taxes.

The part of the rental income that has not been accounted for in the preceding analysis is the rental income of non-coastal resident Delaware owners not spent in the coastal community when they make visits to the coast and not paid to rental agencies. Even this amount is largely paid to the banks that hold the mortgages on the properties and these banks may be out of state. New construction is already captured in the preceding analysis.

A recent report on the value of tourism in Delaware attributes a total rental value for the roughly 35,000 seasonal second homes in Sussex County of \$869.3 million in 2010. Of course, all of those are not in the coastal area—perhaps 10 percent—leaving approximately \$783 million for the coastal area. If 10 percent is typically paid to rental agents, the balance is \$705 million. If 15 percent is received by coastal area residents and another 65 percent is received by non-Delaware residents, the balance for Delaware non-coastal residents (20 percent) is \$141 million. If owners on average retain 25 percent of the income after mortgages, taxes, and other expenses, this amounts to a \$35 million increase in direct incomes to statewide non-coastal area residents that might be spent in the state. This compares with the total direct spending in the coastal area of \$2.5 billion (Table 1), so the increment to total spending might amount to 1.4 percent. We do not include this amount in the preceding analysis and tables of results because we regard it as being subject to more assumptions, creating more uncertainty about it than for the other parts of the analysis. This omission is one factor that, other things being equal, makes our reported results conservative.

Comparing to Other Economic Sectors

These results compare to a recent analysis of the contributions of the agricultural sector (including the processing of agricultural products), which total approximately \$8 billion in industry production. Thus the production contributions of coast-related activities are closely comparable to those of agriculture.^{7,8}

However, because agriculture requires fewer workers to produce each dollar of production, the total number of jobs attributable to the agricultural sector is substantially smaller than those attributed to the coastal economy in this study.⁹

	Additional Jobs	Jobs Multiplier	Additional Output	Output Multiplier
Coastal Activity	59,900	1.48	\$6.9 billion	1.67
Agriculture-Related Activity	30,000	1.75	\$8 billion	1.36

These results can also be compared to a recent analysis of the value of tourism in Delaware.¹⁰ That study found total tourism spending in all of Sussex County of \$1.5 billion, whereas our analysis of coast-related direct spending found a total of \$4.1 billion. A similar comparison can be made in terms of jobs where the tourism study found 15,000 jobs in tourism, while we find 40,000 direct coast-related jobs. The tourism figure is based on short visits whereas the coastal zip code activities include not only short tourism visits but also the activities of long-term coastal residents. The tourism study found that food and beverage spending in all of Sussex County by short-term tourists amounted to \$189 million, while our analysis of coast-related activity finds \$446 million annually for the combination of short- and long-term spending in food service and drinking places.

	Direct Jobs	Direct Spending	Food and Beverage Expenditures
Coastal Activity (Short-term and long-term visitors and permanent residents)	40,000	\$4.1 billion	\$446 million
Sussex County Tourism (Short-term visitors only)	15,000	\$1.5 billion	\$189 million



Coast-Related Activity Effects on State, Local, and Federal Taxes

Table 3 shows that the total of all additional taxes paid to local, state, and federal governments as a result of coast-related activity (including its multiplier effects) is \$711 million. The significant tax effects of coast-related activity should therefore be of great interest to various governments. The total includes \$226 million in state and local taxes (32 percent of the total) and \$485 million in federal taxes (68 percent). The state and local tax payments of \$226 million represent roughly 4 percent of total state and local taxes paid by businesses and households in Delaware. The federal tax payments of \$485 million represent roughly 3 percent of the total federal taxes paid by businesses and households in Delaware.

⁷ **The Impact of Agriculture on Delaware's Economy**, T. Awokuse, T. Ilvento and Z. Johnson, College of Agriculture and Natural Resources, University of Delaware, December 2010.

⁸ Note that the contributions measured in this study are in 2011 dollars while those in the agriculture study are 2008 dollars. Given the low level of price changes in recent years, these figures are comparable.

⁹ Because the number of jobs in the agricultural sector is small, the measured jobs multiplier is larger than for the coastal economy (1.75 vs. 1.48) and because the direct agricultural output is large compared to the total, the measured multiplier is smaller than for the coast (1.36 vs. 1.67).

¹⁰ Delaware Tourism Office, **The Value of Tourism in Delaware**, 2010.

Table 3. Additional State, Local and Federal Taxes Paid by All Impacted Entities Statewide as the Result of Coastal Economic Activity and its Multiplier Effects

<i>Description</i>	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations	Totals
State and Local Taxes Paid by All Sectors						
Dividends					\$9,476,701	
Social Insurance Tax: Employee Contribution	\$373,340					
Social Insurance Tax: Employer Contribution	\$1,606,225					
Indirect Business Tax: Receipts			\$19,799,733			
Indirect Business Tax: Property Tax			\$24,280,406*			
Indirect Business Tax: Motor Vehicle Licenses			\$585,663			
Indirect Business Tax: Other Taxes			\$59,465,461			
Indirect Business Fees			\$25,959,734			
Corporate Profits Tax					\$11,775,210	
Personal Tax: Income Tax				\$63,170,777		
Personal Tax: Fines, Fees				\$6,899,481		
Personal Tax: Motor Vehicle License				\$1,368,883		
Personal Tax: Property Taxes				\$534,373*		
Personal Tax: Other Tax (Fish/Hunt)				\$255,526		
Total State and Local Taxes by Source	\$1,979,565		\$130,090,997	\$72,229,040	\$21,251,911	
Total of All State and Local Taxes						\$225,551,513
Federal Taxes Paid by All Sectors						
Corporate Profits Tax					\$25,446,627	
Indirect Business Tax: Excise Taxes			\$7,880,687			
Indirect Business Tax: Custom Duty			\$3,670,113			
Indirect Business Tax: Federal Fees			\$6,058,201			
Personal Tax: Income Tax				\$174,707,545		
Social Insurance Tax: Employee Contribution	\$130,069,540	\$6,118,905				
Social Insurance Tax: Employer Contribution	\$131,539,725					
Total Federal Taxes by Source	\$261,609,265	\$6,118,905	\$17,609,001	\$174,707,545	\$25,446,627	
Total of All Federal Taxes						\$485,491,343
Total of All Taxes						\$711,042,856

* Total property taxes in the table, both business plus personal, are approximately \$25 million. Rental properties' taxes are included as Indirect Business Taxes.

Of the state and local taxes, more than half (\$130 million of the total of \$226 million) are paid as indirect business taxes, including business gross receipts taxes of \$59 million and non-tax fees (e.g., licenses, inspections, government owned utility charges, permits, etc.) of \$26 million. Corporate income taxes add an additional \$12 million in state tax revenues. Households throughout the state pay roughly one-third (\$72 million) of state and local taxes generated by the coastal economy, the majority of which is in the form of personal income

tax (\$63 million). Households also pay \$175 million in federal income taxes and an additional \$130 million in payroll (social insurance—Social Security, Medicare, etc.) taxes, which together constitute 63 percent of additional federal taxes. The balance comes mostly from the employers' share of payroll taxes (\$132 million) and corporate profits taxes (\$25 million). Small business proprietors pay \$6 million and various indirect business taxes paid to the federal government total \$18 million.

SUMMARY AND CONCLUSIONS

This study has demonstrated the importance of the coastal economy as an essential source of jobs, incomes, and taxes for the state. The coastal economy contributes more than 10 percent of the state's total employment, taxes, and value of production and almost 10 percent of state residents' incomes. This sector's demonstrated importance should make it a high priority for public and private investment. It will be important for policy makers in Delaware to be proactive in protecting and expanding the use of coastal resources in the state. Importantly, the analysis shows that coast impacts come not just from direct beach or water activities, but also from the way coastal residents spend their incomes, especially for medical and other support services.

Multipliers for direct-coast activities were found to be significant, but they are smaller for Delaware than they would be for larger states because more of the indirect supporting activity is outside Delaware's borders. The multipliers across the top sectors vary from 1.4 to 2.5 depending upon the degree to which the sectors utilize in-state and out-of-state resources. Eight of the top ten sectors have multipliers less than 2. The kinds of activities that might be expected to expand in the future, such as residential construction, have multipliers not significantly different from those observed for the coast-related activities already present, so the multiplier effects of future coast activities are not likely to change dramatically.



The results of this study provide a baseline for comparison with others sectors in the state economy or with other coastal economies. If replicated on a regular basis it could also be used to monitor the development of the coastal economy over time. In that regard the whole study could be viewed as a “barometer” for the economic health of the coast. It might be desirable to have a simpler, more easily-executed barometer of coastal economy health. This study helps to identify the specific types of economic activity and the kinds of data that need to be collected to construct such a barometer. However, the fact remains that no single sector or activity can, by itself, capture the complexity and magnitude of the impacts of coast activity.

In addition, the study can be used to assist in economic development. For example, by clearly demonstrating the ways in which coastal economic activities contribute to the state economy, coastal community officials can more effectively make the case that such activities deserve resources to support infrastructure development. Understanding the magnitudes of the contributions of coast-related activity can also be used to make better informed land-use decisions. The multiplier analysis also can assist planners in forecasting the ultimate magnitudes of the effects of new developments so that infrastructure can be appropriately sized.





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