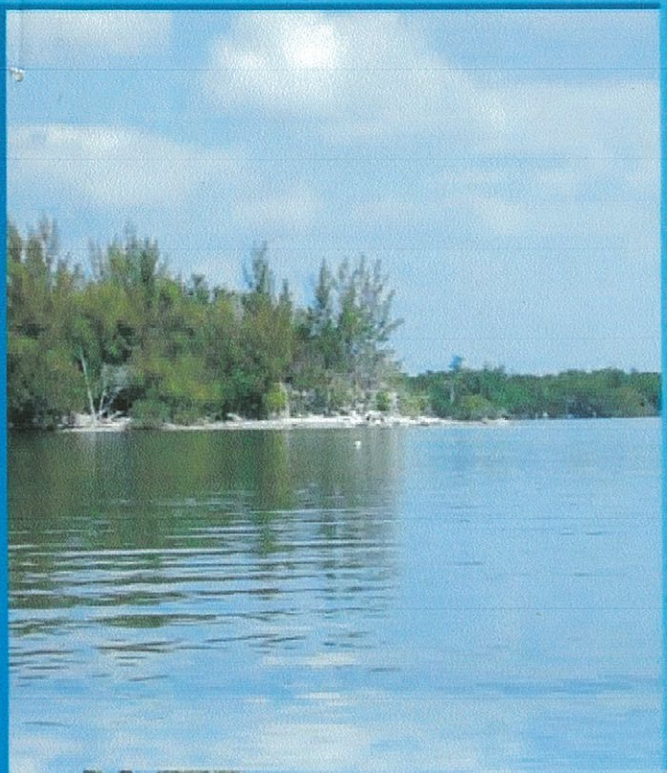
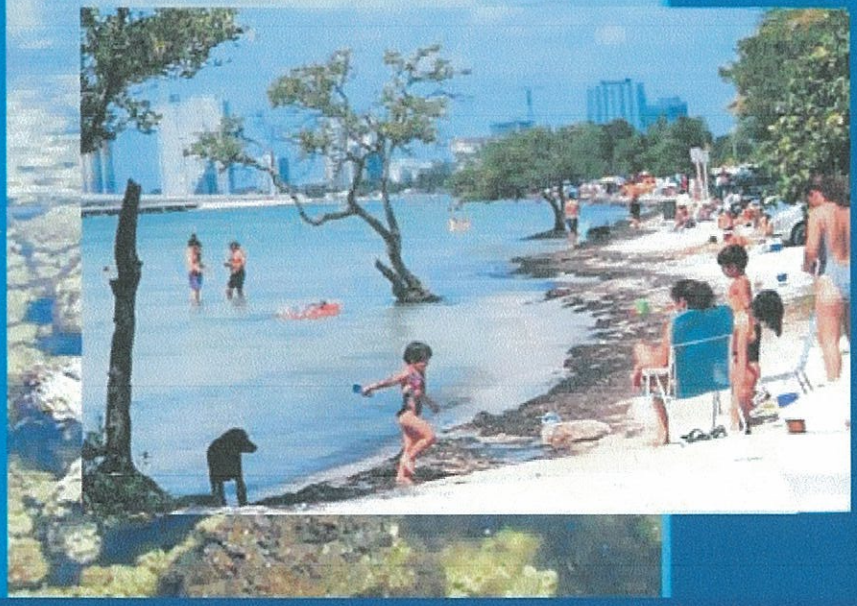
South Florida Water Management District





Biscayne Bay Economic Study

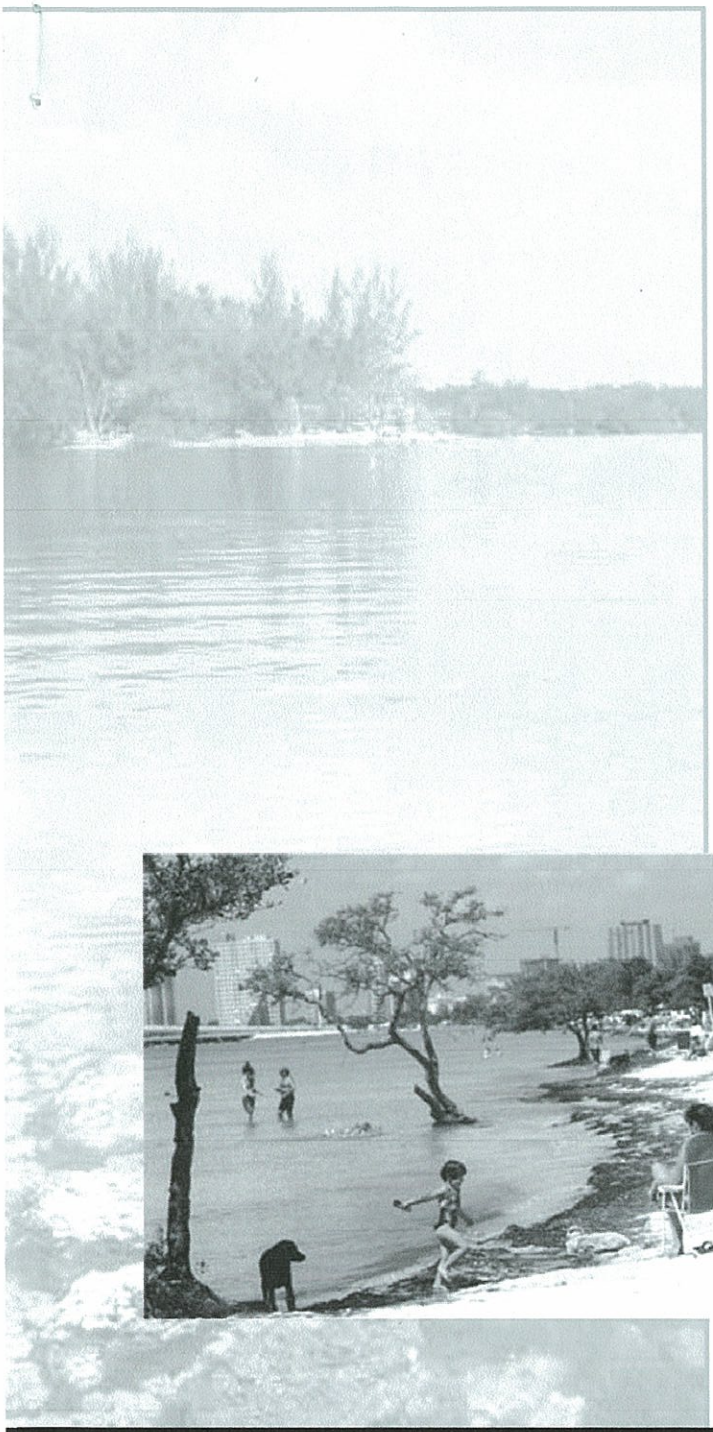
Task 3 Report – Final Biscayne Bay Economic Baseline and Trend Report

April 2005

HAZEN AND SAWYER
Environmental Engineers & Scientists
In association with
Planning and Economics Group

40507C005

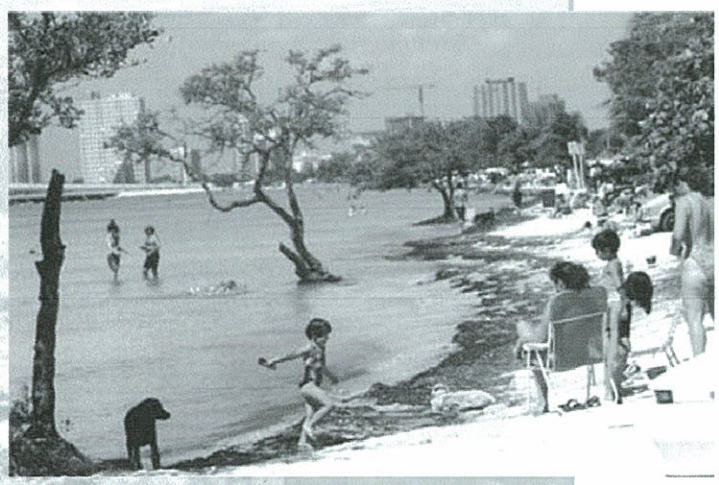
South Florida Water Management District



Biscayne Bay Economic Study

Task 3 Report – Final Biscayne Bay Economic Baseline and Trend Report

April 2005



405077005.cdr

HAZEN AND SAWYER
Environmental Engineers & Scientists
In association with
Planning and Economics Group

HAZEN AND SAWYER
Environmental Engineers & Scientists

Hazen and Sawyer, P.C.
4000 Hollywood Boulevard
Seventh Floor, North Tower
Hollywood, FL 33021
954 987-0066
Fax: 954 987-2949

April 27, 2005

Ms. Trisha Stone
Staff Environmental Scientist
Coastal Ecosystems Department
SOUTH FLORIDA WATER MANAGEMENT DISTRICT
3301 Gun Club Road
West Palm Beach, Florida 33406

Biscayne Bay Economic Study, C-15869 Task 3
Economic Baseline and Trend Report - Final

Dear Ms. Stone:

We are pleased to submit the final Task 3 Report titled "Economic Baseline and Trend Report". This document describes the estimated uses and economic contribution of Biscayne Bay and the Miami River to Miami-Dade County, southeast Florida and Florida from 1980 to 2004. The methods and data used to construct these estimates are also provided in this report.

Project team members responsible for this study are myself, as project manager, and economists Dave Sayers, Bill Hutchinson of Planning and Economics Group, Maria Delores Espino, Ph.D. and J. Walter Milon, Ph.D. Rife Market Research provided the survey researchers and the survey team management for this study.

We have enjoyed working with you and the Independent Technical Review Team throughout this project.

Very truly yours,

HAZEN AND SAWYER, P.C.

Grace M. Johns, Ph.D.
Senior Associate and Economist
Project Manager

Enclosure
c: File No. 40507-001

O\40507.001L037

Acknowledgements

Biscayne Bay Economic Study – Economic Baseline and Trends

This project's success was directly attributable to the assistance and support of all those individuals involved in this 18 month long effort.

The Biscayne Bay Regional Restoration Coordination Team (BBRRCT) is part of the Working Group of the South Florida Ecosystem Restoration Task Force created by Congress. Based on recommendations identified through the Biscayne Bay Partnership Initiative, the BBRRCT recommended that this project be funded with State of Florida legislative appropriations for Biscayne Bay. This project was funded by the State and the Florida Inland Navigation District.

Once the Biscayne Bay Economic Study began, the members of this project's Independent Technical Review Team spent significant effort to review the three project deliverables and to provide advice regarding methods and data. They consistently provided meaningful comments and guidance during the three team meetings where interim results were presented. The members are Trisha Stone of the South Florida Water Management District who was also the District's manager for this project; Phil Everingham of the Miami Marine Council; Cynthia Guerra of the Tropical Audubon Society, Frank Herhold of the Marine Industries Association of South Florida; Ken Lipner of Florida International University; Don Pybas of the Miami-Dade County Cooperative Extension Service, University of Florida; and David Roach of the Florida Inland Navigation District. We also recognize Keith Revell who was a member of this team during the early stages of this project and provided meaningful comments during the development of this project's work plan.

The principal investigators and their responsibilities included Grace Johns, Ph.D. of Hazen and Sawyer who served as project manager; Bill Hutchinson of Planning and Economics Group who collected and evaluated the business data and provided GIS support; J. Walter Milon, Ph.D. and Maria Delores Espino, Ph.D. who provided technical oversight, review and guidance during this project and Dave Sayers of Hazen and Sawyer who managed this project's literature collection and review and the survey research data.

We wish to thank Sandy Palmer of Rife Market Research in Miami, Florida for providing and supervising the survey researchers. These survey researchers worked with energy and in earnest to conduct the resident and visitor intercept interviews in Miami-Dade County. Without these individuals, the study of recreational uses and their economic contribution would not have been possible. The survey researchers were Gita Bai, Lourdes Jones, Maria Lichtenberger, Helen Linger, Karla Mejia, Jason Quade, Jeannie Sponza and Robert Sponza. We thank them and all of the residents and visitors who responded to our intercept and mail surveys.

We send a special thanks to all of the owners of the properties used as survey sites who gave us permission to conduct resident and visitor surveys at their locations. The Miami International Airport was an important survey site and we thank Irving Fourcand and Grazyna Stasiulis for their support and effort in allowing our survey researchers access to this site.

We also wish to thank Brett Bibeau of the Miami River Commission, Frances Bohnsack, Ph.D. of the Miami River Marine Group, Professor Jerald S. Ault of the University of Miami Rosenstiel School of Marine and Atmospheric Sciences, and Amy Condon and Breece Robertson of the Trust for Public Land for the advice, publications and data they provided during this study. We thank Diane Camacho at the Port of Miami for sharing the Port's economic information with us for use in estimating the economic contribution of the Port of Miami and Bill Anderson of the Greater Miami Convention and Visitors Bureau for providing important visitor information.

Executive Summary

Biscayne Bay is a large, shallow tropical saline lagoon surrounded by the large and diverse metropolitan area of Greater Miami and Miami Beach. Biscayne Bay is the most prominent feature in Miami-Dade County's landscape, extending for almost the entire length of the county from Haulover Inlet in the north to the upper reaches of Key Largo in the south. Biscayne Bay is an important component of the county's quality of life and economy. However, there is very little definitive understanding of the magnitude or extent of the Bay's economic contribution to the community. This study is the first to assess the current and historic uses and economic contribution of the Bay that provides baseline information to evaluate the impact of Bay management on the local economy.

Biscayne Bay supports a wide variety of recreational and economic uses. They include:

- Recreational fishing, swimming, boating, sailing and other activities
- Commercial Fishing
- Shipping operations at the Port of Miami and the Miami River
- Cruise Ship Operations at the Port of Miami

These activities were the focus of this study. The objectives of this project were to:

(1) Estimate the intensity of Biscayne Bay uses from 1980 to 2004; and,

(2) Estimate the economic contribution of Biscayne Bay uses to the economies of Miami-Dade County, southeast Florida and Florida from 1980 to 2004 in terms of the direct, indirect and induced sales, income, employment and tax revenues generated by the uses of the Bay.

Biscayne Bay provides other benefits to the community in addition to those evaluated during this study. The aesthetic qualities of Biscayne Bay contribute to the market values of real estate surrounding the Bay and its use as scenery for movies, television and print media. The annual Miami International Boat Show benefits from the easy access that the Bay provides for the transport of boats to the show site and public access to boaters who attend the event. These benefits were not valued during this study.

Recreational users of Biscayne Bay receive non-monetary benefits beyond what they spend to use the Bay. This "wellbeing" generated from recreational uses can be measured in monetary terms. Also, those who do not use the Bay for recreation benefit from knowing that the Bay exists and some value the Bay because it is available to future generations. These values were not estimated during this study.

This study provides a wealth of information regarding the uses and economic contribution of Biscayne Bay. All values and numbers are estimates based on the best available information at the time this study was prepared. Some of the conclusions of this study are as follows.

- Miami-Dade County residents and visitors spent 65.5 million person-days participating in a wide-variety of recreation activities on or at Biscayne Bay in 2004. A person-day is one person participating in a primary recreation activity for all or part of one day. Of the many activities that are enjoyed by recreators during a day, only one "primary" activity is counted per day.

- The four most popular recreation activities on Biscayne Bay were: (1) viewing the Bay from shore while dining, shopping, jogging or strolling (25 percent); (2) swimming from shore (17 percent); (3) fishing from a boat (13 percent); and (4) sailing (9 percent).

- In 2004, the expenditures made to recreate on or at Biscayne Bay generated $3.8 billion in additional county production; provided $2.1 billion in income to county residents, created 57,100 jobs and produced $257 million in tax revenues.

- Biscayne Bay-related recreation contributes to 3.4 percent of Miami-Dade County's economy, 1.3 percent of the southeast Florida economy and 0.5 percent of Florida's economy as measured by its relative contribution to income.

- Biscayne Bay-related recreation use intensity and its economic contribution grew steadily since 1980 with the exception of 1992 and 1993. Recreation activity fell during these two years after Hurricane Andrew struck the county on August 24, 1992. By 1995, Bay-related recreation use intensity had completely recovered.

- In 2002, the $13.2 million in sales associated with commercial marine landings related to Biscayne Bay generated $28 million in additional county production, provided $17 million in income to Miami-Dade County residents, created 470 jobs and produced $1.8 million in tax revenues. The Biscayne Bay-related commercial fishery represents 0.03 percent of the Miami-Dade County economy.

- The value of commercial marine species caught in Biscayne Bay has increased significantly since 1980. Meanwhile, the harvested value of species dependent on Biscayne Bay for survival and caught outside of the Bay has declined significantly since 1993.

- The value of cargo shipped into and out of the Miami River is about $4 billion while the value through the Port of Miami is about $17 billion. This $21 billion worth of goods represents about 42 percent of the value of all cargo passing through Florida's seaports. Of this 42 percent, 34 percent represents the Port of Miami and 8 percent represents the Miami River. About 4 million people boarded cruise ships at the Port of Miami in 2003 which is 29 percent of all cruise ship passengers using Florida's seaports.

- The $3.9 billion in sales of businesses that directly depend on the Port of Miami generated $8.2 billion in additional county production; provided $3.9 billion in

income to county residents, created 74,000 jobs and produced $331 million in tax revenues.

- The Port of Miami contributes to 6.2 percent of Miami-Dade County's economy, 2.5 percent of the southeast Florida economy and 0.9 percent of Florida's economy as measured by its relative contribution to income.

- Cargo shipping and cruise ship services through the Port of Miami and their associated economic contributions have grown steadily and significantly since 1980.

- The $353 million in sales of businesses that directly depend on the Miami River generated $683 million in additional county production; provided $339 million in income to county residents, created 6,100 jobs and produced $37 million in tax revenues.

- The Miami River contributes to 0.6 percent of Miami-Dade County's economy, 0.2 percent of the southeast Florida economy and 0.09 percent of Florida's economy as measured by its relative contribution to income.

- Cargo shipping services through the Miami River and their associated economic contributions grew steadily from 1980 to 1995 and has since fallen and become cyclical through 2002.

- Overall, the activities on Biscayne Bay in 2004 contributed $12.7 billion in output, $6.3 billion in income, 137,600 jobs and $627 million in tax revenue to Miami-Dade County. These values represent 10 percent of all income earned in the county, 11 percent of employment in the county and 11 percent of all excise taxes, property taxes, fees, licenses, and sales tax revenues collected in the county.

The remainder of this Executive Summary provides an overview of the results of this study. A wealth of additional information also exists in Section 7.0, Uses and Economic Contribution of Biscayne Bay, and in the other sections of this report.

Use Intensity of Biscayne Bay

Recreation. Survey research and recreational modeling found that residents and visitors spent 65.5 million person-days participating in Biscayne Bay-related recreation activities in 2004. These activities included fishing, swimming, sailing, snorkeling, picnicking and viewing the Bay from shore. A person-day is one person participating in a recreation activity for all or part of one day. About 36 million of these person-days were spent by visitors to Miami-Dade County and 30 million person-days were spent by county residents.

The number of person-days by primary activity is provided in Table ES-1. A person-day is attributed to an activity only if it was the "primary" activity that day even though people may participate in several activities during a day. The distribution of person-days by activity is provided in Figure ES-1.

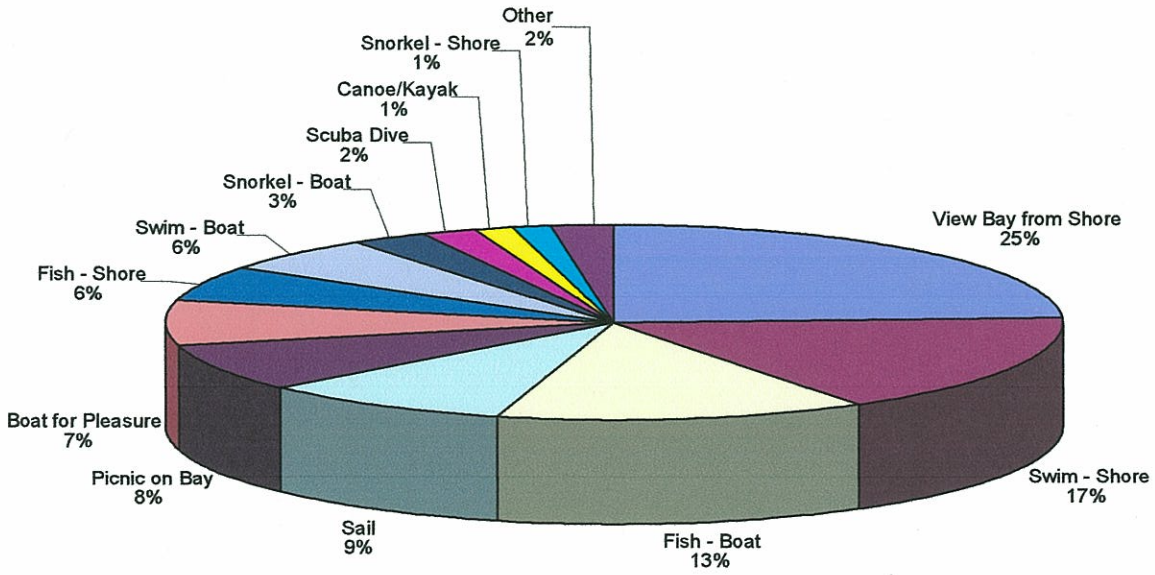
The four most popular recreation activities on Biscayne Bay were (1) viewing the Bay from shore while dining, shopping, jogging or strolling; (2) swimming from shore; (3) fishing from a boat; and (4) sailing. County residents and visitors spent 15.9 million person-days viewing the Bay from shore which is 25 percent of all Bay-related recreational person-days. About 10.9 million person-days were spent swimming from shore which comprised 17 percent of all person-days. Fishing from a power boat comprised 8.7 million person-days or 13 percent of all Bay-related person-days. Sailing on the Bay comprised nine percent of all Bay-related recreation days with 6.0 million person-days.

Table ES-1
Number of Person-Days Spent Participating in Biscayne Bay-Related Activities, 2004

Primary Activity (a)	Visitors to Miami-Dade County	Residents of Miami-Dade County	Total
Fishing – From Shore	505,000	3,349,000	3,854,000
Fishing – From Boat	5,139,000	3,541,000	8,680,000
Snorkeling – From Shore	293,000	606,000	899,000
Snorkeling – From Boat	835,000	992,000	1,827,000
Scuba Diving	500,000	736,000	1,236,000
Swimming – From Shore	6,198,000	4,742,000	10,940,000
Swimming – From Boat	1,646,000	2,121,000	3,767,000
Boating for Pleasure/Partying	2,668,000	2,151,000	4,819,000
Water-skiing	28,000	187,000	215,000
Parasailing	19,000	7,000	26,000
Windsurfing	8,000	137,000	145,000
Kite Sailing	17,000	233,000	250,000
Personal Watercraft (jet skis, etc.)	114,000	249,000	363,000
Sailing	3,986,000	2,054,000	6,040,000
Canoeing / Kayaking	239,000	725,000	964,000
Viewing Bay from Shore while dining, shopping, jogging and strolling	10,591,000	5,265,000	15,856,000
Sunset Cruise	333,000	143,000	476,000
Glass Bottom Boat Tour	3,000	3,000	6,000
Picnicking on Biscayne Bay	2,547,000	2,558,000	5,105,000
Total	**35,668,000**	**29,799,000**	**65,467,000**

(a) A person-day is one person participating in a recreational activity for all or a portion of a day. A person-day is attributed to an activity only if it was the "primary" activity that day even though people usually participate in several activities during a day. Sailing is any activity conducted on a sail boat.

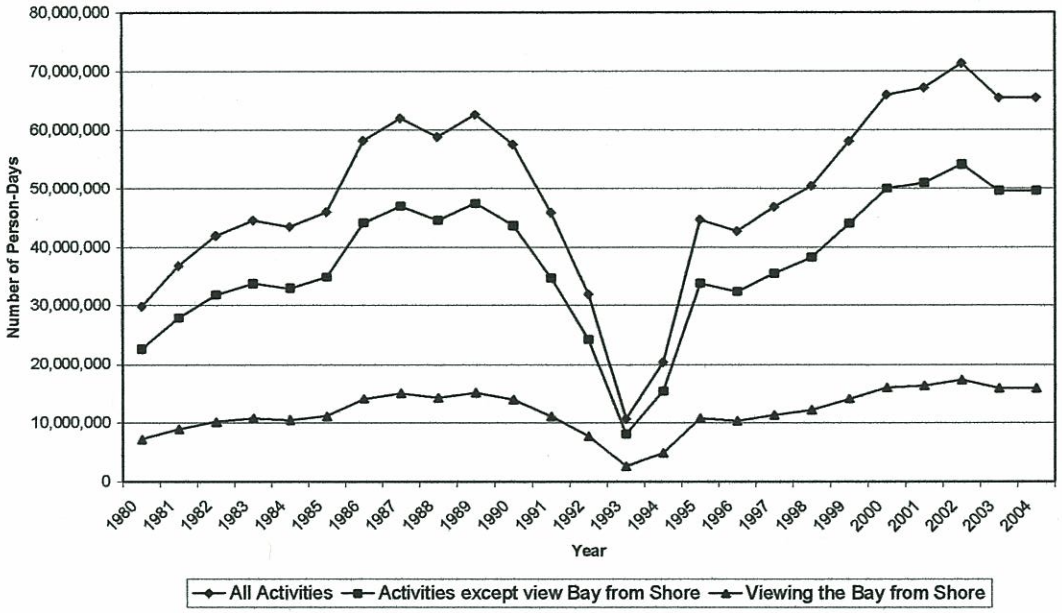
Figure ES-1
Percent Distribution of Biscayne Bay Recreation Activities 2004



Other popular recreation activities included picnicking on the Bay with 8 percent of all person-days, pleasure boating on the Bay with 7 percent of all person-days, and fishing from shore and swimming from a power boat, each with six percent of all person-days.

The historic recreational uses of Biscayne Bay are summarized in the graph provided in Figure ES-2. The historic number of person-days in all activities, in all activities except viewing the Bay from shore, and viewing the Bay from shore are provided from 1980 to 2004. The numbers of person-days in all activities show a strong upward trend from 1980 through 1989. The steep reduction in person-days observed from 1992 through 1993 is due to the effects of Hurricane Andrew which struck Miami-Dade County on August 24, 1992. It affected Bay-related recreation through the end of 1992 and for all of calendar year 1993. In 1994, recreation activity-days began a recovery. By 2000, the number of recreation person-days exceeded the level of 1989, the previous peak year. Recreation use continued to grow in 2001 and 2002 and fell a bit in 2003.

Figure ES-2
Biscayne Bay Recreation, Number of Person-Days, 1980 to 2004



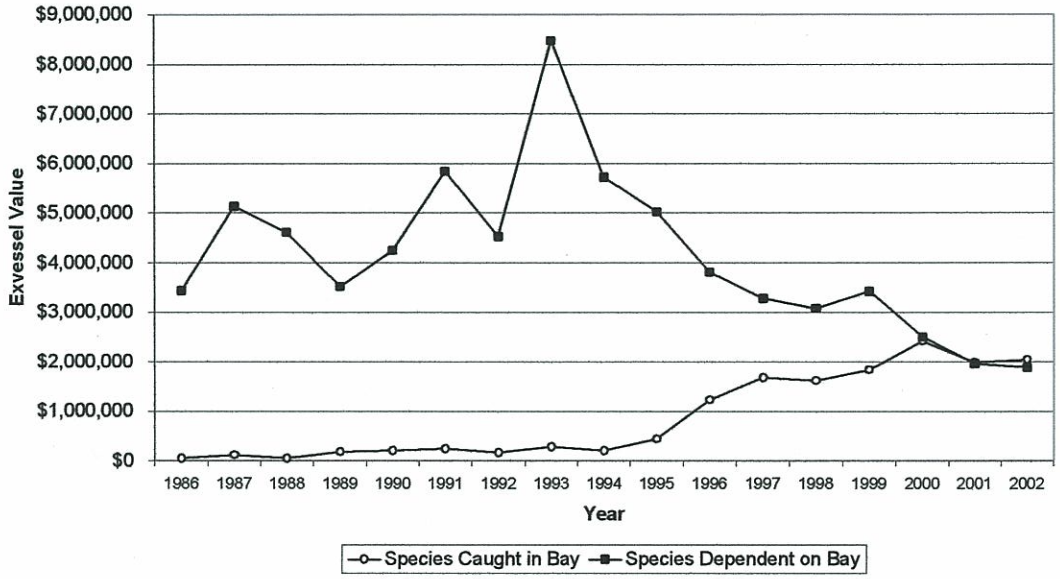
Commercial Fishing. The contribution of Biscayne Bay to commercial fishing is two-fold. First, commercial fishing takes place in the Bay for the harvest of fish and shellfish, particularly pink shrimp. Second, Biscayne Bay and Florida Bay are very important grounds for the lifecycle of many fish species that are commercially harvested in Miami-Dade County. These species are ballyhoo, barracuda, goggle-eye, several grouper species (black, gag and red), grunts, hog snapper, several species of jack (almaco, crevalle, yellow), mullet, parrotfish, snapper (all species), white snapper, spiny lobster, live marine life, bait shrimp, pink shrimp and white shrimp. Both Biscayne Bay and Florida Bay are essential habitats for these species, so their values are attributable to both bays. Other commercial fishing areas of Florida may also benefit from species dependence on these Bays. However, insufficient information was available to allocate the percent of these species harvested in other areas that migrated from these Bays so these areas were not included in the evaluation.

The exvessel values[1] of Biscayne Bay-dependent and Bay-caught commercial fish species from 1985 through 2002 are plotted in Figure ES-3 and are in 2004 dollars. Values prior to 1985 and after 2002 were not available for Bay-dependent species and values prior to 1986 and after 2002 were not available for Bay-caught species.

[1] Exvessel value means the value of the fish at dockside (just off the boat).

In 1986, commercial species harvested in Biscayne Bay were valued at $51,000 and Bay-dependent commercial species were valued at $3.4 million. Since 1986, the exvessel value of commercially harvested Bay-dependent fish species peaked in 1993 at $8.5 million and then declined to its current low of $1.9 million. This reflects the volume of fish harvested, not their per unit values. Meanwhile, the value of fish caught in Biscayne Bay increased steadily over time to $2.1 million in 2002. Most of this increase in value is due to increases in blue crab and pink shrimp landings.

Figure ES-3
Exvessel Value of Bay Dependent and Bay Caught Species by Year, 2004 Dollars



Miami-Dade County Shipping Industry. The Port of Miami and the Miami River comprise the Miami-Dade County shipping industry. Both ports provide inbound and outbound cargo shipping services. The Port of Miami also provides cruise ship services. While the Port of Miami supports large deep draft ships, the Miami River provides services to the smaller ships coming from and going to Caribbean ports that tend to accommodate only shallow draft ships.

The intensity of uses at the Port of Miami and the Miami River are provided in Table ES-2. The value of cargo shipped into and out of the Miami River is about $4 billion while the value through the Port of Miami is about $17 billion. This $21 billion worth of goods represents about 42 percent of the value of all cargo passing through Florida's seaports. Of this 42 percent, 34 percent represents the Port of Miami and 8 percent represents the Miami River. About 4 million people boarded cruise ships at the Port of Miami in 2003 which is 29 percent of all cruise ship passengers using Florida's seaports.

The estimated 2004 sales associated with the businesses that benefit from the Port of Miami and the Miami River shipping industry is also provided in Table ES-2. The estimated sales of shipping and cruise operations which includes water transportation, related air transportation, arrangement of passenger transportation, ship building and repairing, and port construction activities, was estimated to be $3.5 billion. Of this value, $3.3 billion was attributed to the Port of Miami and $192 million was attributed to the Miami River shipping operations.

Table ES-2
Estimated Uses and Direct Sales Associated
With Port of Miami and Miami River Shipping Businesses, 2004

Economic Generator	Total	Port of Miami	Miami River
Port Uses:			
Value of Cargo through Port, 2003	$21,000,000,000	$17,000,000,000	$4,000,000,000
Value of Cargo as % of Florida Seaports	42%	34%	8%
Number of Cruise Ship Passengers	4,000,000	4,000,000	0
Cruise Ship Passengers as % of Florida Seaports	29%	29%	0%
Estimated Sales, 2004 Dollars:			
Shipping and Cruise Operations (a)	$3,447,569,026	$3,255,805,147	$191,763,878
Passenger and Crew Expenditures in County (b)	$323,824,232	$323,824,232	$0
Export Contribution from Shipping (c)			
Exports by Miami-Dade County businesses	$379,052,743	$256,272,621	$122,780,122
Exports by Southeast Florida businesses	$499,075,743	$337,421,621	$161,654,122
Exports by Florida businesses	$499,075,743	$337,421,621	$161,654,122
Total Sales in Miami-Dade County	$4,150,446,000	$3,835,902,000	$314,544,000
Total Sales in Southeast Florida and Florida	$4,270,469,000	$3,917,051,000	$353,418,000

(a) Businesses involved in Water Transportation, related Air Transportation, Arrangement of Passenger Transportation, Ship Building and Repairing, and port construction activities.

(b) Businesses in Miami-Dade County that sell goods and services to cruise passengers prior to embarkation and during ports of call and crew members who temporarily leave the ship.

(c) Increased value of exports produced in the area due to the Port's existence.

The estimated expenditure values of cruise passengers and crew members as they spend money in Miami-Dade County prior to embarkation and during ports of call is $324 million all of which is attributed to the Port of Miami.

The export contributions from shipping are the values of exports that are produced in Miami-Dade County, in southeast Florida, and Florida because the Port of Miami and the Miami River exist. They are order-of-magnitude estimates based on specific assumptions described in Section 5.0 of this report. They reflect the additional sales to local export businesses generated because they have a nearby port from which to ship their goods. In 2004, this additional export sales (or value) to Miami-Dade County businesses was

estimated to be $379 million of which $256 million is attributed to the Port of Miami and $123 million is attributed to the Miami River.

The value of additional export sales to southeast Florida businesses was estimated to be $499 million of which $337 million is attributed to the Port of Miami and $161 million is attributed to the Miami River. The value of export sales to Florida businesses is equal to that for southeast Florida businesses because it was assumed that all of the affected exports would be produced relatively close to Miami-Dade County.

Overall, the direct sales in Miami-Dade County associated with the Port of Miami and the Miami River was estimated to be $4.1 billion of which $3.8 billion was attributed to the Port of Miami and $315 million was attributed to the Miami River. The total direct sales in southeast Florida and Florida associated with the Port of Miami and the Miami River was estimated to be $4.3 billion of which $3.9 billion was attributed to the Port of Miami and $353 million was attributed to the Miami River.

The historic uses at the Port of Miami from 1979 to 2003 are graphed in Figure ES-4. The Port's operating revenue, the short tons of imports and exports shipped through the Port, and the number of cruise ship passengers using the Port are provided. All three measures of use have grown steadily since 1979, with Port operating revenue and weight of goods shipped increasing significantly. In 1979, 2.3 million short tons of exports and imports were shipped through the Port. By 2003, 9.0 million short tons were shipped. In 1979, 1.3 million cruise ship passengers passed through the Port. This value grew to 4.0 million by 2003. In 1979, Port operating revenue was $12.6 million in 2004 dollars and grew to $83.4 million by 2003.

The historic short tons of imports and exports through the Miami River from 1979 through 2002 are graphed in Figure ES-5. Tons shipped increased steadily from 1979 through 1993 from 368,000 short tons to 739,000 short tons. They fell to 615,000 short tons in 1994, then increased to the peak of 884,000 short tons in 1995. Tons shipped has been cyclical since 1995. In 2002, 506,000 short tons were shipped through the Miami River.

Figure ES-4
Historic Ship and Cruise Activities at the Port of Miami, 1979 to 2003

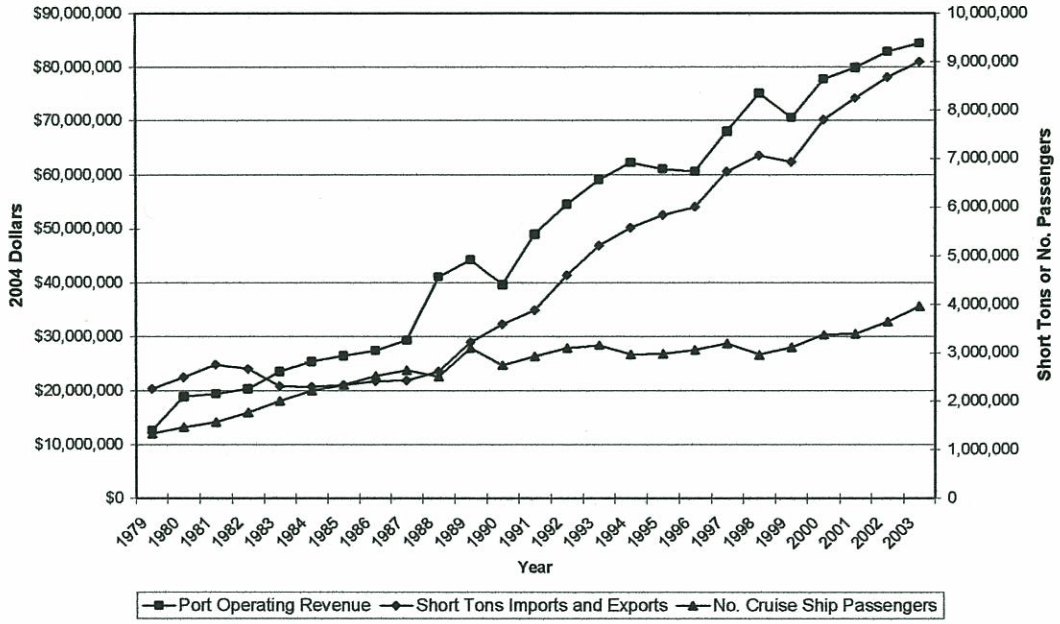
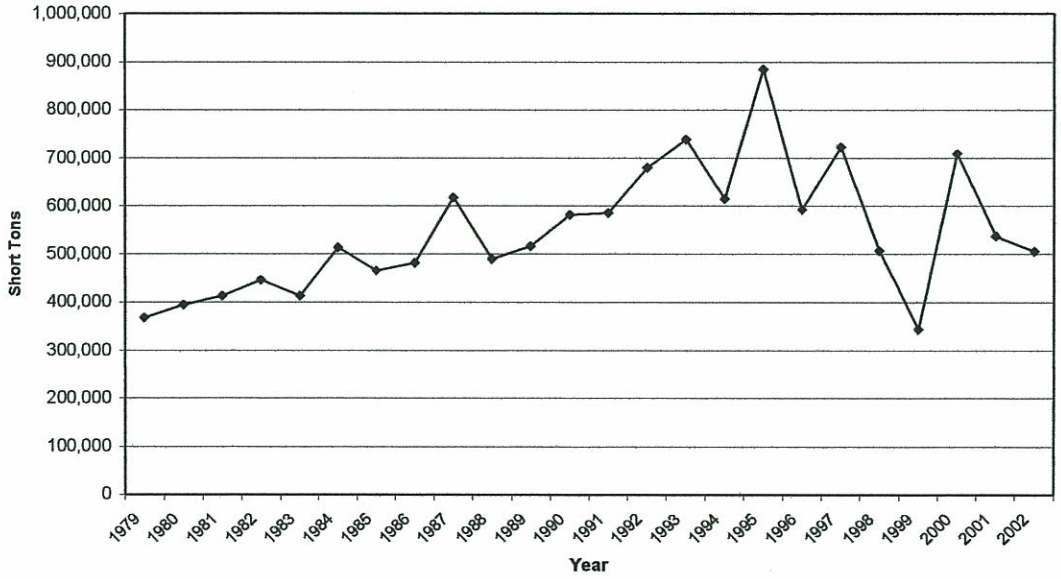


Figure ES-5
Imports and Exports Through the Miami River, 1979 to 2002



Economic Contribution of Biscayne Bay

This section summarizes the economic contribution to Miami-Dade County, southeast Florida and Florida as Biscayne Bay was used for recreation, commercial fishing, waterborne commerce, and cruise ship services from 1980 to 2004.

2004 Economic Contribution to Miami-Dade County. A summary of the output, income, employment and tax revenue created in Miami-Dade County in 2004 as Biscayne Bay was used for recreation, commercial fishing, waterborne commerce and cruise ship services is provided in Table ES-3. The economic contribution of Biscayne Bay-related activities as a percent of the overall Miami-Dade County economy is provided in Table ES-4.

Overall, the activities on Biscayne Bay in 2004 contributed $12.7 billion in output, $6.3 billion in income, 137,600 jobs and $627 million in tax revenue to Miami-Dade County. These values represent 15 percent of total output produced in the county, 10 percent of all income earned in the county, 11 percent of employment in the county and 11 percent of all excise taxes, property taxes, fees, licenses, and sales tax revenues collected in the county.

The recreation component of this economic contribution generated about $3.8 billion in output, $2.1 billion in income, 57,100 jobs and $257 million in tax revenues in Miami-Dade County. Recreation represents about 3.4 percent of the county's economy as measured by the percent of income generated in the county. Bay-related commercial fishing generated $28 million in output, $17.4 million in income, 469 jobs and $1.8 million in tax revenue and represents about 0.03 percent of the county's economy.

Waterborne commerce and cruise ship services at the Port of Miami generated $8.2 billion in output, $3.9 billion in income, 74,000 jobs and $331 million in tax revenues and represents about 6.2 percent of the county's economy. Waterborne commerce at the Miami River generated $683 million in output, $339 million in income, 6,100 jobs and $37 million in tax revenues and represents about 0.6 percent of the county's economy.

Table ES-3
Total Economic Contribution of Biscayne Bay to Miami-Dade County in 2004

	Direct, Indirect and Induced Economic Contribution (a)			
Activity	**Output (b)**	**Income (c)**	**Employment (d)**	**Tax Revenue (e)**
Recreation	$3,789,000,000	$2,112,000,000	57,100	$257,000,000
Commercial Fishing (f)	$28,336,000	$17,404,000	469	$1,837,000
Port of Miami Shipping	$8,231,254,000	$3,857,275,000	73,958	$331,011,000
Miami River Shipping	$682,539,000	$338,889,000	6,106	$37,347,000
Total	**$12,731,129,000**	**$6,325,568,000**	**137,633**	**$627,195,000**

[a] *Includes direct, indirect and induced effects in 2004 dollars.*

[b] *Output is defined as the value of the goods and services produced in the study area due to the activity.*

[c] *Income is the sum of wages, salaries, proprietor's income, profits, rents, royalties and dividends due to the activity. It is the sum of labor income and other property type income.*

[d] *Employment includes the number of full-time and part-time jobs created due to the activity.*

[e] *Tax revenue is the sum of the excise taxes, property taxes, fees, licenses, and sales taxes collected due to the activity. It excludes taxes on profit and income.*

[f] *Commercial fishing values represent the year 2002. Data for 2003 and 2004 were not available.*

Table ES-4
Total Economic Contribution of Biscayne Bay as a Percent of the Miami-Dade County Economy in 2004

Activity	Direct, Indirect and Induced Economic Contribution			
	Output	Income	Employment	Tax Revenue
Recreation	4.44%	3.40%	4.42%	4.33%
Commercial Fishing	0.03%	0.03%	0.04%	0.03%
Port of Miami Shipping	9.66%	6.22%	5.72%	5.58%
Miami River Shipping	0.80%	0.55%	0.47%	0.63%
Total	**14.93%**	**10.20%**	**10.64%**	**10.57%**

2004 Economic Contribution to Southeast Florida. A summary of the output, income, employment and tax revenue created in southeast Florida in 2004 as Biscayne Bay was used for recreation, commercial fishing, waterborne commerce and cruise ship services is provided in Table ES-5. The economic contribution of Biscayne Bay-related activities as a percent of the overall southeast Florida economy is provided in Table ES-6.

Overall, the activities on Biscayne Bay in 2004 contributed $14 billion in output, $7 billion in income, 143,000 jobs and $686 million in tax revenue to southeast Florida. These values represent 6 percent of total output produced in southeast Florida, 4 percent of all income earned in southeast Florida, 5 percent of the employment in southeast Florida and 5 percent of all excise taxes, property taxes, fees, licenses, and sales tax revenues collected in southeast Florida.

The recreation component of this economic contribution generated about $4.0 billion in output, $2.2 billion in income, 58,800 jobs and $272 million in tax revenues to southeast Florida. Recreation on Biscayne Bay represents about 1.3 percent of the southeast Florida economy as measured by the percent of income generated in southeast Florida. Bay-related commercial fishing generated $30 million in output, $18 million in income, 473 jobs and $2.0 million in tax revenue and represents about 0.01 percent of the southeast Florida economy.

Waterborne commerce and cruise ship services at the Port of Miami generated $8.9 billion in output, $4.3 billion in income, 77,000 jobs and $368 million in tax revenues and represents about 2.5 percent of the southeast Florida economy. Waterborne commerce at the Miami River generated $805 million in output, $406 million in income, 6,700 jobs and $44 million in tax revenues and represents about 0.24 percent of the southeast Florida economy.

Table ES-5
Total Economic Contribution of Biscayne Bay to Southeast Florida in 2004

Activity	Direct, Indirect and Induced Economic Contribution (a)			
	Output (b)	Income (c)	Employment (d)	Tax Revenue (e)
Recreation	$3,992,000,000	$2,243,000,000	58,800	$272,000,000
Commercial Fishing (f)	$29,859,000	$18,234,000	473	$1,954,000
Port of Miami Shipping	$8,894,946,000	$4,259,185,000	77,048	$368,385,000
Miami River Shipping	$804,807,000	$406,395,000	6,741	$43,911,000
Total	**$13,721,612,000**	**$6,926,814,000**	**143,062**	**$686,250,000**

Note: See Table ES-3 for footnote explanations.

Table ES-6
Total Economic Contribution of Biscayne Bay as a Percent of the Southeast Florida Economy in 2004

Activity	Direct, Indirect and Induced Economic Contribution			
	Output	Income	Employment	Tax Revenue
Recreation	1.80%	1.31%	2.01%	1.91%
Commercial Fishing	0.01%	0.01%	0.02%	0.01%
Port of Miami Shipping	4.01%	2.48%	2.64%	2.59%
Miami River Shipping	0.36%	0.24%	0.23%	0.31%
Total	**6.18%**	**4.03%**	**4.89%**	**4.83%**

2004 Economic Contribution to Florida. A summary of the output, income, employment and tax revenue created in Florida in 2004 as Biscayne Bay was used for recreation, commercial fishing, waterborne commerce and cruise ship services is provided in Table ES-7. The economic contribution of Biscayne Bay-related activities as a percent of the overall Florida economy is provided in Table ES-8. Overall, the activities on Biscayne Bay in 2004 contributed $14.7 billion in output, $7.5 billion in income, 157,600 jobs and $732 million in tax revenue to Florida. These values represent 2.3 percent of total sales in Florida, 1.5 percent of all income earned in Florida, 1.7 percent of the employment in Florida and 1.9 percent of all excise taxes, property taxes, fees, licenses, and sales tax revenues collected in Florida.

The recreation component of this economic contribution generated about $4.6 billion in output, $2.6 billion in income, 65,300 jobs and $305 million in tax revenues in Florida. Recreation on Biscayne Bay represents about 0.5 percent of the Florida economy as measured by the percent of income generated in Florida. Bay-related commercial fishing generated $31 million in output, $19 million in income, 500 jobs and $2.0 million in tax revenue and represents about 0.004 percent of Florida's economy.

Waterborne commerce and cruise ship services at the Port of Miami generated $9.2 billion in output, $4.4 billion in income, 84,300 jobs and $380 million in tax revenues and represents about 1.5 percent of Florida's economy. Waterborne commerce at the Miami River generated $842 million in output, $427 million in income, 7,500 jobs and $45 million in tax revenues and represents about 0.09 percent of Florida's economy.

Table ES-7
Total Economic Contribution of Biscayne Bay to Florida in 2004

	Direct, Indirect and Induced Economic Contribution (a)			
Activity	Output (b)	Income (c)	Employment (d)	Tax Revenue (e)
Recreation	$4,567,000,000	$2,565,000,000	65,300	$305,000,000
Commercial Fishing (f)	$31,118,000	$18,958,000	500	$1,991,000
Port of Miami Shipping	$9,242,492,000	$4,439,473,000	84,311	$380,122,000
Miami River Shipping	$841,836,000	$427,334,000	7,502	$45,081,000
Total	**$14,682,446,000**	**$7,450,765,000**	**157,613**	**$732,194,000**

Note: See Table ES-3 for footnote explanations.

Table ES-8
Total Economic Contribution of Biscayne Bay as a Percent of the Florida Economy in 2004

	Direct, Indirect and Induced Economic Contribution			
Activity	Output	Income	Employment	Tax Revenue
Recreation	0.71%	0.52%	0.71%	0.79%
Commercial Fishing	0.0048%	0.0038%	0.01%	0.01%
Port of Miami Shipping	1.44%	0.89%	0.92%	0.98%
Miami River Shipping	0.13%	0.09%	0.08%	0.12%
Total	**2.29%**	**1.50%**	**1.72%**	**1.89%**

Historic Economic Contribution to Miami-Dade County. The direct, indirect and induced output, income and employment generated in Miami-Dade County from Biscayne Bay-related activities during the period 1980 through 2004 are provided in Figure ES-6. All three measures of economic contribution increased throughout most of the 24 year period. In 1992 and 1993, Hurricane Andrew significantly reduced recreation activity on the Bay. Output, income and employment begin to recover in 1994 and by 1995 the upward trend is back to pre-1992 levels.

Historic Economic Contribution to Southeast Florida. The direct, indirect and induced output, income and employment generated in southeast Florida from Biscayne Bay-related activities during the period 1980 through 2004 are provided in Figure ES-7. Output, income and employment also exhibit an upward trend throughout the period and the impact of Hurricane Andrew in 1992 and 1993 is evident.

Figure ES-6
Economic Contribution to Miami-Dade County of Activities On or Related To Biscayne Bay, 1980 to 2004
Includes direct, indirect and induced effects

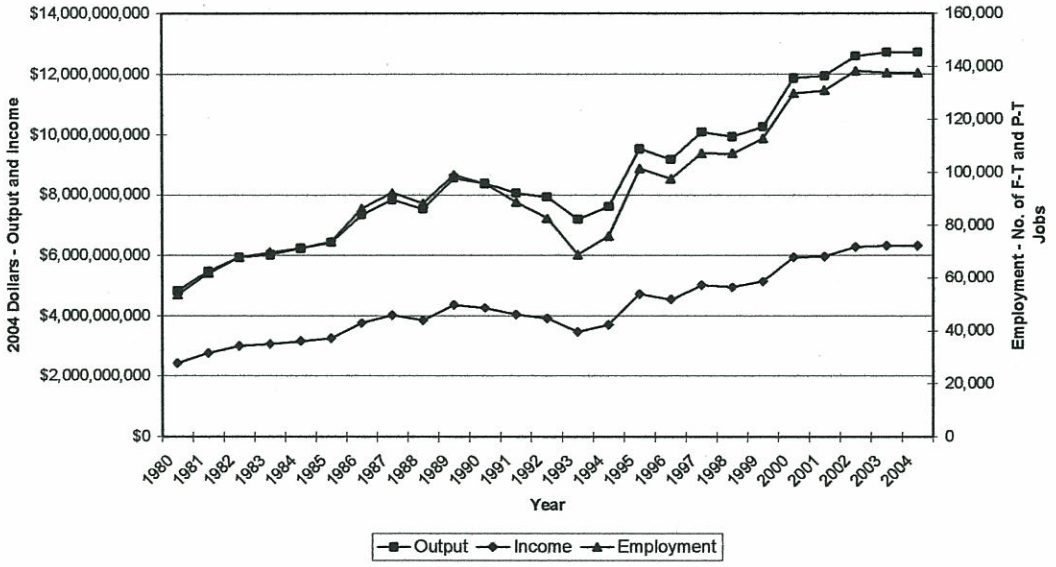
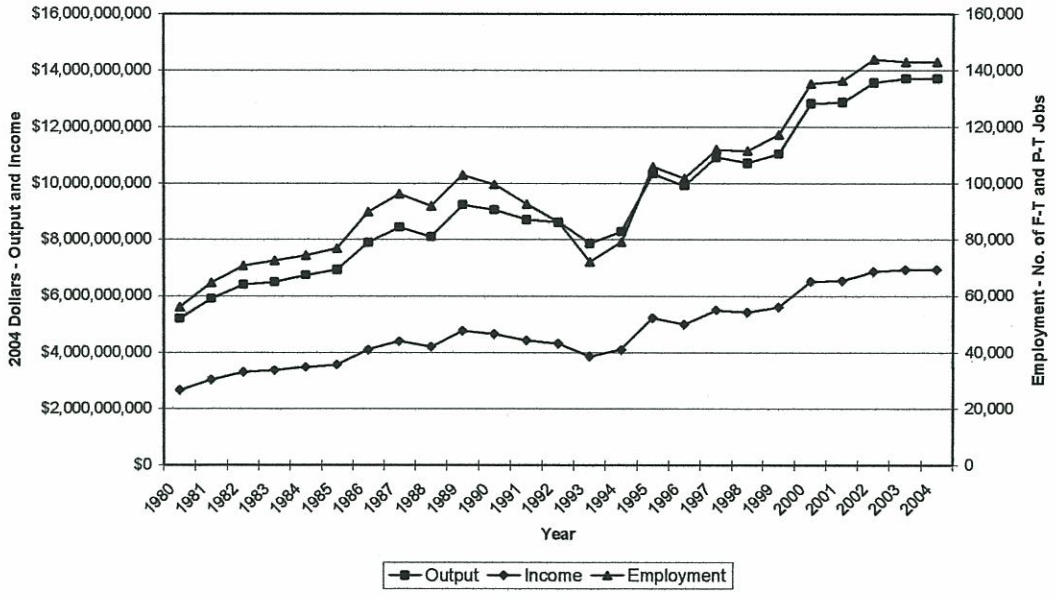
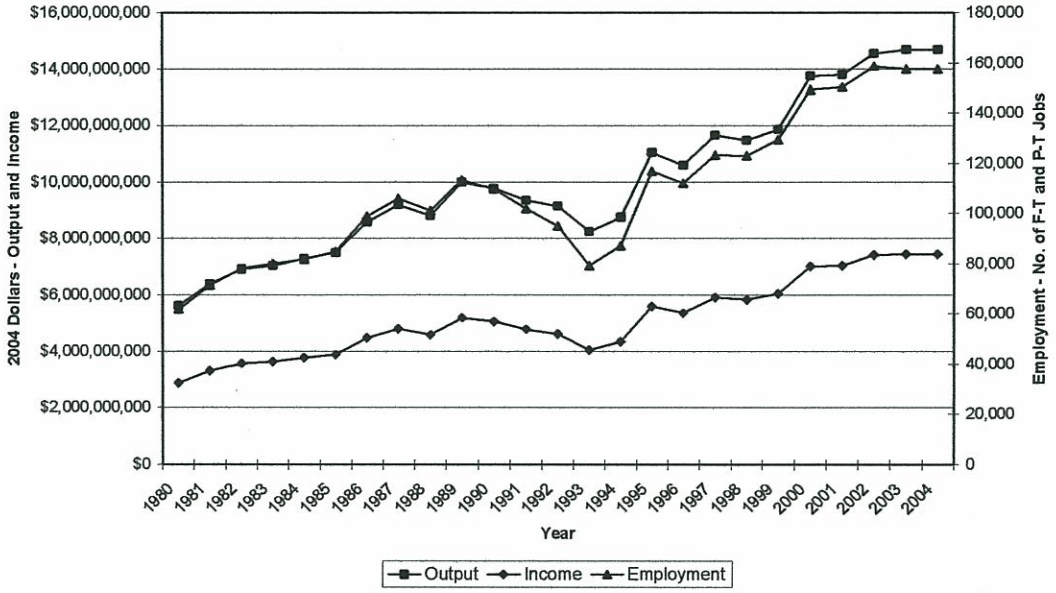


Figure ES-7
Economic Contribution to Southeast Florida of Activities On or Related To Biscayne Bay, 1980 to 2004, Includes direct, indirect and induced effects



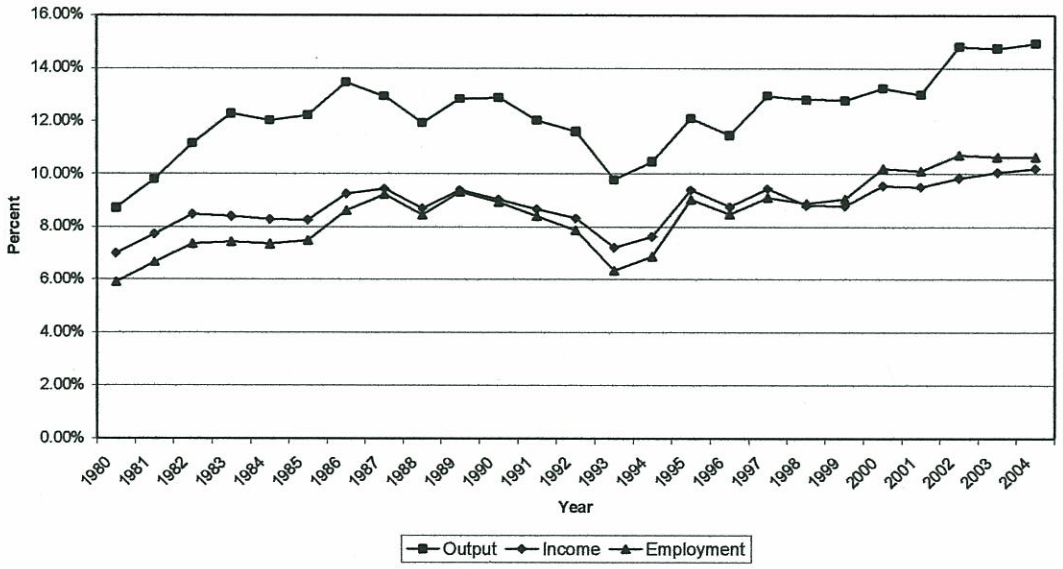
Historic Economic Contribution to Florida. The direct, indirect and induced output, income and employment generated in Florida from Biscayne Bay-related activities during the period 1980 through 2004 are provided in Figure ES-8. The trend mirrors the trend observed for southeast Florida because most of the economic contribution of Biscayne Bay to Florida benefits southeast Florida.

Figure ES-8
Economic Contribution to Florida of Activities On or Related To Biscayne Bay, 1980 to 2004, Includes direct, indirect and induced effects



Historic Economic Contributions as Percent of Overall Economy. The economic contributions of Biscayne Bay-related activities as a percent of the Miami-Dade County economy from 1980 to 2004 are presented in Figure ES-9. Since 2000, activities on Biscayne Bay represented more than 10 percent of the county's economy as measured by income. The economic importance of Biscayne Bay to Miami-Dade County increased from 7.0 percent of county income in 1980 to 10.2 percent of county income in 2004. After 1980, the lowest economic contribution occurred in 1993 when Bay-related activities represented 7.2 percent of the county's economy. This relatively low value was due to the impact of Hurricane Andrew which struck the county in August 1992. By 1995, Bay-related activities recovered to their pre-1992 levels.

Figure ES-9
Economic Contribution of Activities On or Related
To Biscayne Bay as a Percent of the Miami-Dade County Economy, 1980 to 2004
Includes direct, indirect and induced effects



The economic contributions of Biscayne Bay-related activities as a percent of the southeast Florida economy from 1980 to 2004 are presented in Figure ES-10. The economic importance of Biscayne Bay has been stable throughout the period. In 1980, income generated from Bay-related activities was 3.5 percent of total income earned in southeast Florida. By 2004, the Bay's relative contribution to the southeast Florida economy was 4.0 percent.

The economic contributions of Biscayne Bay-related activities as a percent of the Florida economy from 1980 to 2004 are presented in Figure ES-11. The economic importance of Biscayne Bay to Florida has also been stable throughout the period. In 1980 and in 2004, income generated from Bay-related activities was 1.5 percent of total income earned in Florida.

Summaries of the industry types that benefit from Biscayne Bay uses and the historic economic contribution associated with each use type (recreation, commercial fishing, Port of Miami shipping, and Miami River shipping) are provided in Section 7.0 of this report.

Figure ES-10
Economic Contribution of Activities On or Related
To Biscayne Bay as a Percent of the Southeast Florida Economy, 1980 to 2004
Includes direct, indirect and induced effects

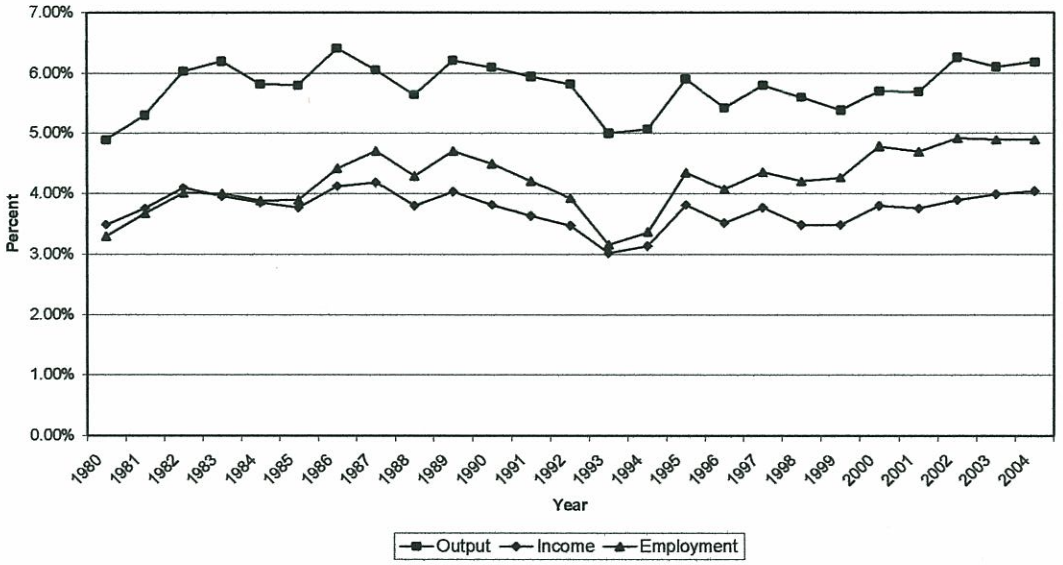
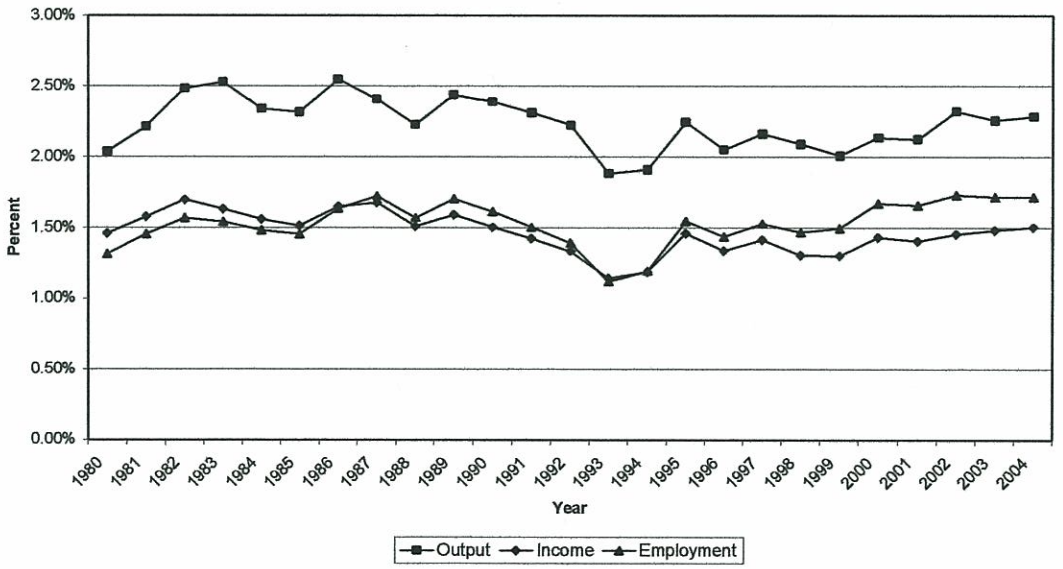



Figure ES-11
Economic Contribution of Activities On or Related
To Biscayne Bay as a Percent of the Florida Economy, 1980 to 2004
Includes direct, indirect and induced effects