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The Economic Contribution of the SPORT FISHING, COMMERCIAL FISHING, and SEAFOOD INDUSTRIES to New York State

Prepared by TECHLAW INC.
for New York Sea Grant

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NOTICE

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See page xxiii for author acknowledgments.

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The Economic Contribution of the Sport Fishing, Commercial Fishing, and Seafood Industries to New York State

(Final)

#R/FHD-10

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EXECUTIVE SUMMARY

New York has a diverse economy with concentrations of employment in many industries including the sport fishing, commercial fishing, and seafood industries. This report presents the results of a study to estimate the contribution of these three industries to the state's economy, an estimate that had previously been unknown. The study was sponsored by New York Sea Grant and conducted in consultation with an Advisory Committee of stakeholders from industry and government.

Economic contribution is expressed in terms of dollar value (in 1999 dollars) and employment. Employment contributions have two parts – jobs in the industries themselves and full-time equivalent jobs created as an impact of the economic activity within the three industries. The two employment impacts are not additive because one is measured in jobs and the other in full-time equivalent jobs (i.e., a job for each 2000 hours of employment regardless of how many people work those hours). The dollar value of economic contribution is also expressed in two ways—first, the value of activity in the industry itself, and then the impact of this activity on total output (i.e., the sales of goods and services by New York businesses).

The economic contribution of the sport fishing, commercial fishing, and seafood industries are presented below. First, the overall contribution of the three industries combined is presented and then each individual industry.

It is useful to note that, although the three industries are presented collectively here, comparisons across these three industries are difficult. Sport fishing is an industry with customers who are final consumers of these recreational services and goods. As a result, the impacts made by anglers are the final contribution to the economy. By contrast, commercial fishing, like farming, is the beginning of a chain of value-added events each of which contribute to the economy. Almost all fish landed by commercial fishers are sold to seafood industry establishments which process, distribute, prepare, or sell at retail the fish or seafood harvested by commercial fishers. The seafood industry is a mix of establishments, all buying fish and seafood from other businesses. Some seafood industry establishments like restaurants and retail markets sell directly to final consumers, but many others sell their products to other seafood industry establishments. Each time one seafood establishment sells its products to another seafood establishment (rather than a final consumer), there is another opportunity to add value and to increase the industry's overall contribution to the economy.

Given the close ties between the commercial fishing and seafood industries, these industries can be seen as one integrated industry. In response to the original charge for this study, this report presents them as separate industries.

The estimates of economic contribution were made using an econometric model. Basic expenditures for each industry were the drivers for these estimates, which were made using inputs from the IMPLAN input/output model.

Overall Economic Contribution of the Sport Fishing, Commercial Fishing, and Seafood Industries to New York State

The overall economic contribution of the sport fishing, commercial fishing, and seafood industries to New York State is estimated at $11.5 billion. The contribution of the activity within the three industries themselves is estimated at $5.7 billion. This activity in turn creates an economic impact on sales of goods and services by New York businesses worth $5.9 billion. The overall contribution of the three industries by dollar value of activity is summarized below.

Contribution of the Fishing and Seafood Industries to New York Economy, Dollar Value of Activity (millions of 1999 dollars)

	Expenditures, Revenues, Value Added in Sector (millions of 1999 dollars)	Impacts on Sales of Goods and Services (millions of 1999 dollars)	Total Economic Contribution (million of 1999 dollars)
Sport Fishing	$1,912.6	$1,688.9	$3,601.5
Commercial Fishing	77.9	73.6	149.6
Seafood Industry	3,672.0	4,117.9	7,789.9
Total Contribution of the Fishing and Seafood Industries	$5,662.5	$5,880.4	$11,541.0

Sources: U.S. Fish and Wildlife Service, 1997; NMFS, 2000c; Great Lakes Fishery Commission, 2000; USDA, 2000; Appendix C; and estimates by TechLaw.

The employment contribution of the three industries includes 113,300 jobs in the industries themselves and an additional 64,600 full-time equivalent jobs created as an impact of the economic activity within the three industries. As noted above, these two estimates are not directly comparable as the 113,300 industry jobs include a mix of full-time, part-time, and seasonal jobs while each of the 64,600 full-time equivalent jobs is equal to one full-time, year round job. This contribution is summarized in the following table:

Contribution of Fishing and Seafood Industries to New York Economy, Employment

Industry	Employment in Sector (thousands of jobs)	Total Employment Impacts (thousands of FTE jobs)
Sport Fishing	17.1	19.0
Commercial Fishing	10.5	0.8
Seafood Industry	85.7	44.8
Total Fishing and Seafood Industries	113.3	64.6

FTE – full-time equivalent

Sources: U.S. DOC, BOC, 2000b; NYS DEC, 2000a; Gall, 1999; analysis of loan applications to the New York State Department of Economic Development, Long Island Fisheries Assistance Program; Weinberg, 2001; Sasanow, 2001; and estimates by TechLaw.

Overall Economic Contribution of the Sport Fishing Industry to New York State

The overall economic contribution of the sport fishing industry to New York State is estimated at $3.6 billion in 1996, the latest year for which comprehensive data are available. The contribution of the activity within the industry is estimated at $1.9 billion. This activity in turn creates an economic impact on sales of goods and services by New York businesses worth $1.7 billion. The overall contribution of the sport fishing industry by dollar value of activity is summarized below first by geographic area (i.e., either marine[1] or freshwater[2]) and then by type of expenditure.

Contribution of the Sport Fishing Industry to New York Economy, Dollar Value of Activity (millions of 1999 dollars)

Sport Fishing Segment	Value of Expenditures	Impact on Sales of Goods and Services	Total Contribution
Sport Fishing by Area			
Marine	$708.7	$625.8	$1,334.5
Freshwater	1,203.9	1,063.1	2,267.0
• Total Sport Fishing	$1,912.6	$1,688.9	$3,601.5
Sport Fishing by Type of Expenditure			
Sport Fishing Expenditures	$541.1	$452.5	$993.6
Head and Charter Boat Fees	56.0	57.3	113.3
Marina Fees	52.5	90.9	143.3
Bait	42.5	28.6	71.1
Fishing Rods, Reels, Tackle	239.7	221.0	460.6
Boats, Motors, Trailers	150.4	54.7	205.1
Ancillary Fishing Expenditures	1,371.5	1,236.4	2,607.9
Other Trip Expenses	493.0	525.1	1,018.2
Auxiliary Equipment	20.4	18.4	38.8
Special Equipment	302.0	135.1	437.0
Miscellaneous Expenses	37.5	54.5	92.0
Owned, Leased Property	518.7	503.2	1,021.9
• Total Sport Fishing	$1,912.6	$1,688.9	$3,601.5

Sources: U.S. Fish and Wildlife Service, 1997; and estimates by TechLaw.

The employment contribution of the sport fishing industry includes 17,100 jobs in the industry and an additional 19,000 full-time equivalent jobs created as an impact of the economic within the industry. The overall employment contribution by geographic area and type of expenditure is summarized in the following table:

[1] Marine – includes the waters of the Atlantic Ocean, Long Island Sound, various estuaries and embayments of the Atlantic and the Sound, and the tidal portion of the Hudson River.

[2] Freshwater – includes Lake Ontario, Lake Erie, their tributaries, the Niagara River and embayments, the St. Lawrence River south of the bridge at Cornwall, Lake Champlain, the Finger Lakes, other New York Lakes, and the non-tidal portions of New York's rivers.

Contribution of the Sport Fishing Industry to New York Economy, Employment

	Employment in Sport Fishing Industry (thousands of jobs)	Total Employment Impacts (thousands of FTE jobs)
Sport Fishing by Area		
Marine	6.3	7.1
Freshwater	10.8	11.9
• Total Sport Fishing	17.1	19.0
	Employment in Sector (thousands of jobs)	Total Employment Impacts (thousands of FTE jobs)
Sport Fishing by Type of Expenditure		
Sport Fishing Expenditures	4.8	6.1
Head and Charter Boat Fees	0.5	0.5
Marina Fees	0.5	0.9
Bait	0.4	0.4
Fishing Rods, Reels, Tackle	2.1	3.4
Boats, Motors, Trailers	1.3	0.8
Ancillary Fishing Expenditures	12.2	13.0
Other Trip Expenses	4.4	6.1
Auxiliary Equipment	0.2	0.3
Special Equipment	2.7	1.9
Miscellaneous Expenses	0.3	0.7
Owned, Leased Property	4.6	4.0
• Total Sport Fishing	17.1	19.0

FTE – full-time equivalent

Sources: U.S. Fish and Wildlife Service, 1997; and estimates by TechLaw.

The other major findings related to sporting fishing include:

- Freshwater sport fishing accounted for about 63 percent of the economic activity generated by sport fishing and of sport fishing employment.

- Marine sport fishing accounted for about 37 percent of the economic activity generated by sport fishing and of sport fishing employment.

- When considering the type of expenditures made by anglers, those most closely tied to sport fishing—head and charter boats[3], marina fees, bait, fishing equipment, boats and motors—account for only 28 percent of the value of economic activity that sport fishing contributes. Other expenses for fishing trips (e.g., food and lodging), other types of equipment (e.g., trucks, other vehicles), leased or owned property, and miscellaneous expenses account for the rest of the dollar value of sport fishing's contribution. As shown in the table above, the employment contribution similarly shows a minority of this contribution related to expenditures most closely tied to sport fishing and the great majority related to ancillary expenditures.

[3] A head boat is a boat on which fishing space and privileges are provided for a fee. The vessel is operated by a licensed captain and crew. A charter boat is a boat that carries passengers who have pre-arranged their fishing trip for certain species. Fees are based on species to be fished and distance.

Overall Economic Contribution of the Commercial Fishing Industry to New York State

The overall economic contribution of the commercial fishing industry to New York State is estimated at $149.6 million in 1999. The contribution of the activity within the industry is estimated at $77.9 million. This activity in turn creates an economic impact on sales of goods and services by New York businesses worth $73.6 million. The overall contribution of the commercial fishing industry by dollar value of activity is summarized below. The categories represent high value species (lobster, inshore and offshore; mollusks and shellfish; and dredge clams) and gear type (inshore, multi-species trawler, and longline). Mollusks and shellfish include clams other than surf clams, conch, crabs, mussels, oysters, scallops, and squid.

Contribution of the Commercial Fishing Industry to New York Economy, Dollar Value of Activity (millions of 1999 dollars)

Commercial Fishing Segments	Value of Landings	Impact on Sales of Goods and Services	Total Economic Contribution
Lobster Inshore	$21.8	$21.3	$43.1
Lobster Offshore	5.5	5.4	10.9
Mollusks, Shellfish	26.9	26.2	53.2
Surf Clam Dredges	2.2	2.3	4.5
Inshore Fisheries	3.8	3.7	7.4
Multi-Species Trawlers	11.6	10.8	22.4
Longline	4.2	3.9	8.2
Great Lakes	0.0	(1)	NA
Aquaculture	1.9	(1)	NA
• Total Commercial Fishing	$77.9	$73.6	$149.6

(1) – Not calculated because of lack of data. The value of landings in 1999 was estimated at $2,000
NA – not available because of lack of data on impacts for these segments of the commercial fishing industry

Sources: NMFS, 2000c; Great Lakes Fishery Commission, 2000; USDA, 2000; and estimates by TechLaw.

The employment contribution of the commercial fishing industry includes 10,500 full-time, part-time, and seasonal jobs in the industry and an additional 800 full-time equivalent jobs created as an impact of the economic activity within the industry. While it was possible to estimate employment impacts by commercial fishing segment, comparable estimates of commercial fishing employment by segment were not possible. The overall employment contribution is summarized in the following table:

Contribution of the Commercial Fishing to New York Economy, Employment

Commercial Fishing Segments	Employment in Sector (thousands of jobs)	Total Employment Impacts (thousands of FTE jobs)
Lobster Inshore	NA	0.2
Lobster Offshore	NA	0.1
Mollusks, Shellfish	NA	0.3
Surf Clam Dredges	NA	0.0
Inshore Fisheries	NA	0.0
Multi-Species Trawlers	NA	0.1
Longline	NA	0.0
Great Lakes	NA	NA
Aquaculture	NA	NA
• Total Commercial Fishing	10.5	0.8

NA – date not available to estimate employment by commercial fishing segment
FTE – full-time equivalent

Source: NYS DEC, 2000a; Gall, 1999; analysis of loan applications to the New York State Department of Economic Development, Long Island Fisheries Assistance Program; and estimates by TechLaw.

Findings related to commercial fishing include:

- Marine fisheries accounted for over 99 percent of all commercial fishery landings in New York.

- The top ten species landed by volume in 1969 and 1999 accounted for more than 80 percent of total landings in both years. Five species are common to both lists – quahog clam, Atlantic surf clam, silver hake, American lobster, and bluefish.

- The top ten species by value landed in 1969 and 1999 accounted for approximately 92 percent of total landings in 1969 and approximately 88 percent in 1999. Half of the species are common to both lists – quahog clam, American lobster, Atlantic surf clam, striped bass, and yellowtail flounder.

- The volume of landings in 1999 was 16 percent higher than in 1969, while the value of landings was 25 percent higher than in 1969.

- Lobsters accounted for over one-third of the value of economic activity of commercial fishing in 1999. Similarly, mollusks and shellfish (other than surf clams) also accounted for over one-third of the economic activity in 1999.

- Almost all fish harvested by New York commercial fishers is sold to the state's seafood industry which adds additional value to this harvested fish and seafood before it reaches final consumers.

Overall Economic Contribution of the Seafood Industry to New York State

The overall economic contribution of the seafood industry to New York State is estimated at $7.8 billion in 1999. The contribution of the activity within the industry is estimated at $3.7 billion. This activity in turn creates an economic impact on sales of goods and services by New York businesses worth $4.1 billion. The overall contribution of the seafood industry by

dollar value of activity is summarized below by the five segments considered in the study. Fulton Market is considered separately from other wholesalers because of its size, history, and unique place in the state's seafood industry.

Contribution of the Seafood Industry to New York Economy, Dollar Value of Activity (millions of 1999 dollars)

Seafood Industry Segments	Value Added	Impact on Sales of Goods and Services	Total Contribution
Fulton Market	$253.2	$292.4	$545.5
Wholesalers	535.6	662.3	1,197.8
Processors	181.8	204.8	386.6
Supermarkets, Retail Fish Stores	332.3	365.5	697.8
Restaurants, Food Services	2,369.1	2,592.9	4,962.1
• Total Seafood Industry	$3,672.0	$ 4,117.9	$7,789.9

Sources: Appendix C and estimates by TechLaw.

The employment contribution of the seafood industry includes 85,700 jobs in the industry and an additional 44,800 full-time equivalent jobs created as an impact of the economic activity within the industry. The overall employment contribution is summarized in the following table:

Contribution of the Seafood Industry to New York Economy, Employment

Seafood Industry Segments	Seafood Industry Employment (thousands of part-time and full-time jobs)	Seafood Industry's Employment Impacts (thousands of FTE jobs)
Fulton Market[1]	0.6	3.0
Wholesalers[2]	3.5	6.9
Processors	1.5	2.2
Supermarkets, Retail Fish Stores	10.1	4.1
Restaurants, Food Services	70.0	28.6
• Total Seafood Industry	85.7	44.8

[1]Estimate from the Office of the Assistant Commissioner for Public Markets, New York City
[2]Wholesaler employment figure excludes Fulton Market employment
FTE – full-time equivalent

Sources: Estimates by TechLaw, except as noted for Fulton Market.

Of the three industries studied, the seafood industry was the largest contributor to the New York economy. Over 60 percent of the economic sales activity and employment contribution of the fishing and seafood industries to the state economy is provided by the seafood industry. Other study findings include:

- The seafood industry in New York purchased over 90 percent of the landings of New York commercial fishers in 1999. This is only a small part of the overall fish and seafood inputs for the state's seafood industry.

- In 1999, the largest source of fish and seafood purchased by New York seafood industry as inputs was imports from outside the U.S. The state's seafood industry and others

purchased an estimated $786 million worth of fish and seafood products from foreign sources.

- Shrimp, almost all of which is frozen, accounted for 42 percent of the value of fish and seafood imported to New York in 1999.

- The New York seafood industry purchased an estimated $535 million worth of fish and seafood products from sources in other states in 1999. This is in addition to purchases from other countries.

- Fulton Market accounts for about one-third of the value of all seafood wholesale activity in the state.

- The great majority of sales of fish and seafood products by the New York seafood industry are made to other New York businesses or consumers.

- Restaurants make the greatest economic contribution from among the seafood industry segments. This contribution is attributable to the substantial value added by restaurants to the fish and seafood products they purchase and from the great number of jobs generated in restaurants.

Fishing and Seafood Industries Versus Other Raw Food Products

Commercial fishing is like agriculture in that it produces food products. In 1999, the major edible farm products in New York State with values exceeding $50 million were milk, meat, apples, potatoes, and grapes. Commercial fishing landings were $76 million in 1999. This value would follow milk, apples, and meat in the listings of the New York's major raw food products for 1999.

- Milk production: $1.8 billion.
- Apple production: $138 million.
- Meat (beef, lamb, and pork) production: $131 million.
- Commercial fish landings: $76 million.

Comparisons for the other fish and seafood related industries are more problematic. The most recent economic census did not disclose total amusement and recreational services spending for New York state. The seafood industry is so complex that it would be difficult to find ready comparisons to other food processing and distribution industries (e.g., beef, dairy).

Abstract

This study estimates the economic contributions of the sport fishing, commercial fishing, and seafood industries to New York State. Economic contribution is expressed in terms of dollar value and employment. The economic activity of the three industries is estimated at $5.7 billion. This activity in turn creates an economic impact on sales of goods and services by New York businesses worth $5.9 billion. In total, these industries are responsible for a total contribution to the state's economy of $11.5 billion.

Employment contributions include 113,300 jobs in the industries themselves and an additional 64,600 full-time equivalent jobs created as an impact of the economic activity within the three industries. These two employment contributions are not additive because one is measured in terms of jobs and the other in terms of full-time equivalent employment, that is 1 job for each 2000 hours of employment regardless of how many people work those hours. Most of these employment contributions are linked to the seafood industry which accounted for 76 percent of the jobs created within the industries and 69 percent of the employment impact.

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List of Abbreviations

BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
BOC	Bureau of the Census
FTE	Full-time equivalent
NAICS	North American Industry Classification System
NMFS	National Marine Fisheries Service
NYC	New York City
NYS	New York State
NYS DEC	New York State Department of Environmental Conservation
NYS Dept. of Ag. and Markets	New York State Department of Agriculture and Markets
PIERS	Port Import Export Reporting System
SIC	Standard Industrial Classification
USDA	U.S. Department of Agriculture
U.S. DOC	U.S. Department of Commerce
U.S. DOL	U.S. Department of Labor

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1.0 INTRODUCTION

New York has a diverse economy with concentrations of employment in many industries including three that rely on the state's freshwater and marine resources – sport fishing, commercial fishing, and seafood. This report presents the results of a study to estimate the importance of these three industries to the state's economy, an estimate that to this point has been unknown. The study is statewide in scope and does not address substate geographical areas.

1.1 Background and Project Objectives

Information on the economic contributions of the sport fishing, commercial fishing, and seafood industries is important for a number of reasons. Descriptive information about components of the state's economy indicates the industries' relative importance in the state. This information can be used by public policy and decision makers to weigh the consequences of changes in policy and allocation of scarce resources. The information also has value for public awareness programs about the proper use and conservation of freshwater and marine resources.

However, limited information about the importance of the sport fishing, commercial fishing, and seafood industries to New York State has been available. What information there was did not address the three industries using the same methodology, much less the combined economic contributions of these three industries. The purpose of this project was to fill the information void and estimate the economic contributions of the three industries, individually and collectively, to New York State using a consensus-based framework. The study was sponsored by New York Sea Grant and was conducted in consultation with an Advisory Committee of stakeholders from industry and government.

1.2 The Context for the Sport Fishing, Commercial Fishing, and Seafood Industries in New York State

Before looking at the three freshwater and marine-based industries, it is important to understand the larger economy and state in which they operate. New York State is big no matter how you look at it. Geographically, the state covers 53,989 square miles of which 6,766 square miles are water area (U.S. DOC, BOC, 2000a). The state borders two of the Great Lakes -- Lake Erie and Lake Ontario. In 1999, the state's population was estimated at 18,197,000, accounting for about 7 percent of the total U.S. population. New York ranked third, behind California and Texas, in terms of population.

New York State's gross state product, that is, the value added in production by the labor and property located in a state, was $780.4 billion 1998 (expressed in 1999 dollars) (U.S. DOC, BEA, 2000). The state has a diverse employment base with more than 6,993,800 total employees. The top five sectors in terms of employees are: manufacturing; finance and insurance; professional, scientific, and technical services; accommodation and food service; and administration, support, waste management, and remediation services. Each of these sectors accounted for more than 440,000 employees in 1998 (latest available data) (U.S. DOC, BOC, 2000a).

There is no single economic sector that captures all the activities of the sport fishing, commercial fishing, and seafood industries. Instead, their activities cross multiple sectors of the classification scheme used to categorize economic activity. One of the challenges of estimating the economic contributions of industries that involve multiple sectors is to capture the activities of all involved sectors. Employees in some of the state's top employment sectors, such as manufacturing and food services, have jobs related to the sport fishing, commercial fishing, and seafood industries. Employment related to these industries is also found in other sectors.

1.3 Definition of Economic Contribution of New York's Fishing and Seafood Industries

For this study, economic contribution is defined within the three industries as well as by the impacts of those industries on the New York economy and in terms of employment and economic activity. The first estimates are the jobs and the dollar value of economic activity that occurs initially in the fishing (sport and commercial) and seafood industries as they respond to customers' demands for sport fishing recreation, fish, or seafood. Second is the impact of this demand for recreation, fish, or seafood on other industries in New York. (See Appendix A for a fuller discussion.)

The first contribution starts with customers' demands for goods and services from New York's fishing and seafood industries. For sport fishing, these demands encompass anglers' purchases of fishing gear and tackle, use of party boats, payments for marina services, and other purchases of goods and services that are immediately associated with sport fishing. The initial economic contribution of sport fishing to New York's economy, however, is substantially larger because in the course of fishing, recreational anglers spend money on fishing trips at restaurants and hotels, buy fuel for their vehicles and boats, and purchase boating and other equipment. To pursue their interests in fishing, anglers may also purchase or lease motor vehicles and real property. All of these expenditures create jobs and business for the sport fishing industry in New York and constitute that initial contribution to the state's economy from this industry. For commercial fishing, the initial contribution is defined as the value of fish landed and sold by New York commercial fishers and the employment of commercial fishers themselves and other jobs in commercial fishing establishments. For the seafood industry, the economic contribution includes the new value that wholesalers/distributors, processors, restaurants, and retail markets add to fish and seafood as they handle and sell these products and the jobs these types of businesses create in their establishments.

The second type of contribution begins with expenditures by individual establishments in these three industries. For example, bait and tackle shops, lobster boats, and fish markets all need to buy goods and services in order to operate. These include office supplies, the services of accountants, specialized fishing equipment, utility services, and many others. These expenditures by the fishing and seafood industries will create new business for many New York establishments supplying these goods and services, creating jobs and income for those establishments. The purchases made by fishing and seafood establishments are called direct impacts. The establishments that deal directly with the fishing and seafood industry will in turn need to purchase goods and services from other New York businesses as a result of the demands initially created by the fishing and seafood industries. These purchases are

called indirect impacts. These indirect impacts continue to generate economic activity as the indirectly impacted firms continue to buy goods and services from New York businesses. This ripple effect of dollars spent repeatedly by business establishments in New York is a substantial part of the economic impact of the state's fishing and seafood industries.

The impact of the fishing and seafood industries also includes the spending in New York by workers whose wages are dependent on the fishing and seafood industries. The workers included range from lobster boat crews, tackle shop clerks, and fish processors to office supply store cashiers, accountants, and electric utility line workers. Some or all of the wages of these workers are ultimately dependent on the fishing and seafood industries. As these wages are spent on groceries and haircuts, rent and entertainment, new demands for goods and services are created for New York businesses. The impact of the fishing and seafood industry then extends to the sales that these businesses enjoy and the jobs they create because of these sales, and is referred to as the induced impact.

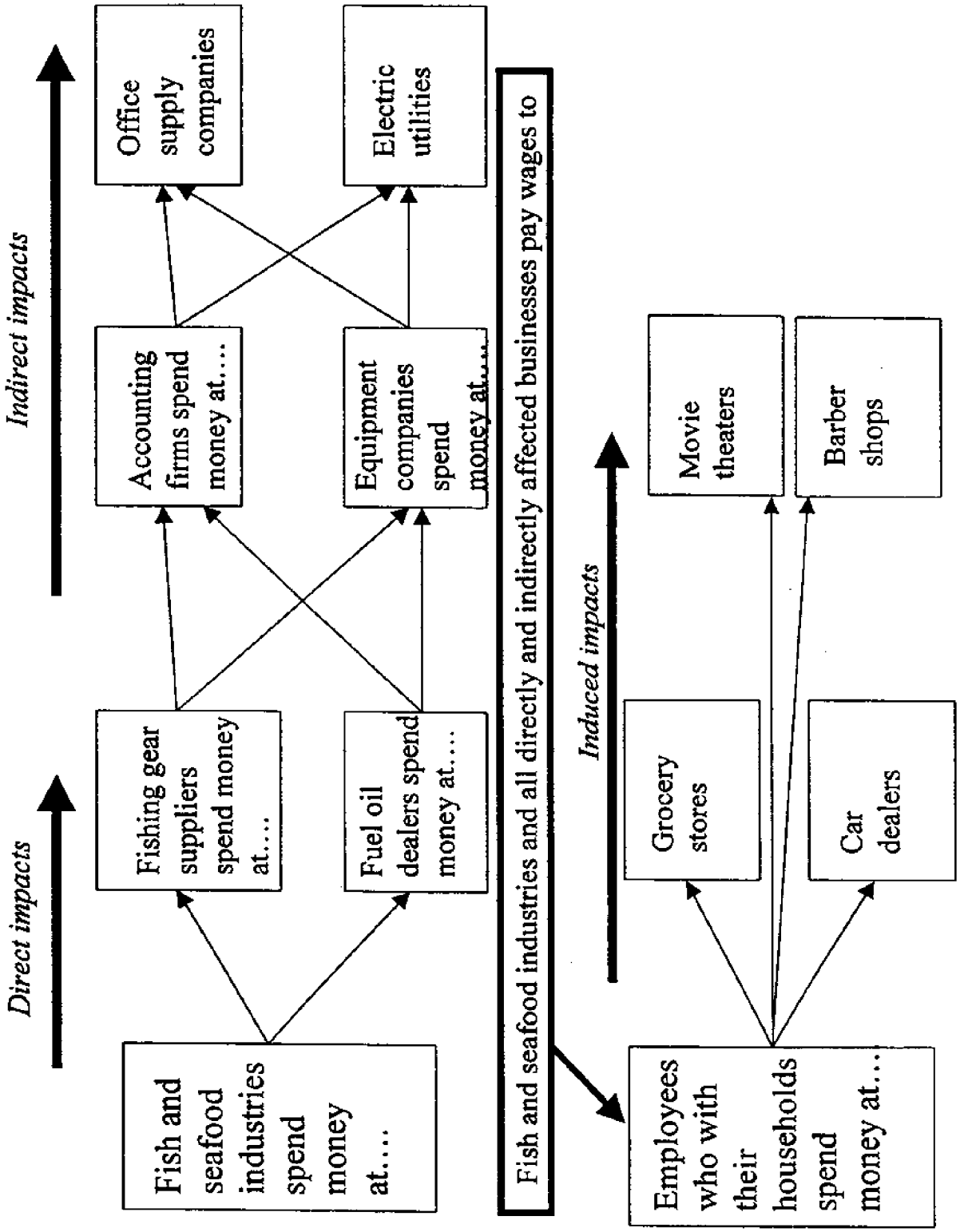
A simplified example of these economic impacts is shown in Figure 1-1. Direct impacts occur as the fishing and seafood industries spend money for goods and services supplied by New York business establishments. As these directly impacted businesses spend money (initially received from the fishing and seafood industries) to buy goods and services they require, indirect impacts are generated. Finally, the employees of the fishing and seafood industries and the directly and indirectly impacted receive wages. The spending of these wages creates additional economic activity in New York that is referred to as the induced impacts of the fishing and seafood industries.

As is true in all regional or state economies, the circulation of spending in New York State is not endless. Monies leave New York, for example, as businesses and workers make purchases outside of the state, federal taxes are paid, or monies are set aside as savings. As a result, the impact of the initial expenditures on the economy of New York State reaches a limit.

The contribution of the fishing and seafood industries on New York's economy is measured in terms of employment and the dollar value of economic activity. Employment within the fishing and seafood industries is defined as a mixture of full-time, seasonal, and part-time jobs. This is particularly true for commercial fishing, which creates many seasonal and part-time jobs. Employment impacts in other industries are measured in terms of full-time equivalent jobs. One full-time equivalent job is equal to about 2000 hours of employment or what an individual working full-time would work in a year. Because it is not possible to add a mixture of full-time and part-time jobs to full-time equivalent jobs, this study will discuss these contributions separately.

The dollar value of activity both for the fishing (sport and commercial) and seafood industries and for the impacted industries is essentially a measure of the new economic value created by demand for goods and services. This new value is represented by expenditures for sport fishing by anglers in New York, the value of fish landed by New York commercial fishers, and by the value that each segment of the seafood industry adds to the fish and seafood products they sell. For the impacted industries, this new value is represented by the sales of goods and services to New York businesses or to New York

Figure 1-1. Examples of Economic Impacts



workers and their households. These estimates can be added together to get a summary figure for the economic contribution to New York State.

It is useful to note that, although the three industries are presented collectively here, comparisons across these industries are difficult. Sport fishing is an industry with customers who are final consumers of these recreational services and goods. As a result, the impacts made by anglers are the final contribution to the economy. By contrast, commercial fishing, like farming, is the beginning of a chain of value-added events each of which contribute to the economy. Almost all fish landed by commercial fishers are sold to seafood industry establishments which process, distribute, prepare, or sell at retail the fish or seafood harvested by commercial fishers. The seafood industry is a mix of establishments, all buying fish and seafood from other businesses. Some seafood industry establishments like restaurants and retail markets sell directly to final consumers, but many others sell their products to other seafood industry establishments. Each time one seafood establishment sells its products to another seafood establishment (rather than a final consumer), there is another opportunity to add value and to increase the industry's overall contribution to the economy.

Additional information on the methodology used in this study can be found in Appendices A through E to this report.

1.4 Sources Used

For each of the three industries, the report provides a profile, discusses trends, and estimates its economic contribution to New York State. Two types of sources were used – primary and secondary. Primary data were collected on commercial fishing expenditures by gear type and major species and for seafood industry establishments that process and/or distribute fish and seafood products. These data were collected through confidential personal interviews with commercial fishing management companies and boat owners and seafood establishment proprietors and managers. These data were used as inputs to the econometric model used to estimate the economic contribution of the commercial fishing and seafood industries. The second primary data collection effort was a survey of Fulton Fish Market wholesalers on product flow at the market. The results of the survey are described in Section 4.1 and were used as inputs to the model to estimate the economic contribution of the seafood industry to New York State.

The remainder of the information used in the report came from secondary sources. These included federal sources such as U.S. Bureau of the Census publications *County Business Patterns* and *Economic Survey;* U.S. Bureau of Labor Statistics *Covered Employment and Wages;* U.S. Department of Agriculture *Census of Aquaculture;* the U.S. Fish and Wildlife Service *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* (source of the expenditure data used in the model); and data from the National Marine Fisheries Service. These are standard sources of information for studies of this type. These sources were augmented with data from several New York State agencies (e.g., Department of Environmental Conservation and Agriculture and Markets) in the profile and trends sections of each chapter. A brief description of some of the data series used in the report is included in Appendix F.

The study used the most recent available information from these standard sources. For sport fishing, this is 1996. The profile information is generally for 1996 and estimates of the sport fishing industry's economic contribution to the state are for 1996 (expressed in $1999). Estimates of the commercial fishing and seafood industries' economic contributions to the state are for 1999. Some profile information is, however, is limited to earlier years. It should be noted that the non-expenditure data provided in the profiles are not inputs to the model used to estimate the economic contributions of these three industries. (See Appendices A through E.)

1.5 Report Organization

The report is divided into four remaining sections, that address the fishing industries (sport fishing in Section 2 and commercial fishing in Section 3), the seafood industry in Section 4, and the overall contribution of these three industries to New York State's economy in Section 5. Sections 2, 3, and 4 include a profile of the respective industry, industry trends, and the economic contribution of the industry to the State's economy. Section 5 summarizes the total contribution of these three industries to the State's economy. Data measured in dollars in this report were collected in current dollars and converted to 1999 dollars using the consumer price index (U.S. DOL, BLS, 2000a). (Also, see Appendix A.)

2.0 NEW YORK STATE'S SPORT FISHING INDUSTRY

This chapter profiles the sport fishing industry in New York and estimates its economic contribution to the state's economy. The sport fishing industry is profiled in two ways – by type of expenditure and by the areas where these expenditures occurred (marine, Great Lakes, and other freshwater). See Sections 2.1 through 2.3.

New York's marine fisheries include the waters of the Atlantic Ocean, Long Island Sound, various estuaries and embayments of the Atlantic and the Sound, and the tidal portion of the Hudson River. The Great Lakes area refers to sport fishing on Lake Ontario, Lake Erie, their tributaries, the Niagara River and embayments, and the St. Lawrence River south of the bridge at Cornwall. Other freshwater excludes the Great Lakes areas. Included in other freshwater are Lake Champlain, the Finger Lakes, other New York lakes, and the non-tidal portions of New York's rivers, except for those rivers that are tributaries of the Great Lakes.

The information provided in the profile is based primarily on the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation conducted by the U.S. Bureau of the Census for the U.S. Fish and Wildlife Service.[1] The most recent available survey was conducted in 1996. The information from this survey reflects participation and expenditures of U.S. residents 16 years of age and older. A description of the survey is included in Appendix F. Some information from the National Marine Fisheries Service is used to augment U.S. Fish and Wildlife Service data in the discussion of marine recreational fishing.

The chapter concludes with a summary of sport fishing's overall contribution to the state's economy (see Section 2.4). While the profile of sport fishing activities provides a range of statistical and quantitative data, the estimate of sport fishing's contribution to the New York economy is based solely on the expenditures that anglers made in 1996 on fishing trips, equipment, and other related expenses in pursuit of this recreational activity. Unlike the profile, the estimate of sport fishing's contribution to the New York economy distinguishes only between marine and freshwater activities. To be consistent with other dollar values in this report, these estimates are presented in 1999 dollars. Dollar values were adjusted using the consumer price index.

2.1 Sport Fishing by Type of Expenditure

Sport fishing is an activity that requires trip and equipment expenditures. Some of these purchases are made from businesses that cater frequently or exclusively to the sport fishing industry. For example, head and charter boats and bait and tackle shops cater largely or exclusively to anglers. While marinas and boat dealers frequently serve anglers, they may also have many customers who do not fish. Other purchases clearly related to fishing are made from businesses that are not exclusively related to sport fishing customers. Fishing gear is bought at sports equipment stores carrying a broad range of sports-related products and is also purchased at stores such as Wal-Mart that carry an even broader range of consumer products. Regardless of where these types of expenditures are made, most people tend to associate them with sport fishing and recreation.

[1] The New York State Department of Environmental Conservation conducted a freshwater angler survey in 1996. However, these data were not used. See Appendix F for a description of this source and the U.S. Fish and Wildlife Survey.

Most of what is purchased by anglers is goods and services not exclusively related to sport fishing. Fishing trips encompass food and lodging expenses at establishments that serve the general public. Similarly, anglers spend money on motor vehicles, camping equipment, and real estate in part because these purchases allow for or enhance the sport fishing experience. These ancillary expenditures are clearly part of the basic economic activity that defines the sport fishing industry despite the fact that they may not be as clearly associated with sport fishing as are expenditures for bait and tackle.

Since most businesses catering to sport fishing also serve other types of customers, the standard data sources that provide information on employment and establishments are of little use in profiling these businesses. The U.S. Census and other sources used for this study do not separately address the types of businesses that deal almost exclusively with anglers (e.g., head and charter boats, bait and tackle shops). Accordingly, this report does not provide profile data on sport fishing businesses. Employment associated with these expenditures is presented as part of estimating the economic contribution of sport fishing as discussed at the end of this chapter.

Table 2-1 provides categories of anglers' expenditures that are most closely associated with sport fishing and those made for ancillary goods and services. This distinction is also used when the economic contribution of the sport fishing industry is presented at the end of this chapter.

Table 2-1. Sport Fishing Expenditures by Type of Expenditure

Type of Expenditure	Estimated Expenditure (millions of 1999 dollars)
Sport Fishing Expenditures	$541.1
• Head and charter boat fees	56.0
• Marina fees	52.5
• Bait	42.5
• Fishing rods, reels, and tackle	239.7
• Boats, motors, trailers	150.4
Ancillary Fishing Expenditures	1,371.5
• Other trip expenses (e.g., food, drink, lodging)	493.0
• Auxiliary equipment (e.g., camping equipment)	20.4
• Special equipment (e.g., ice chests, boat accessories)	302.0
• Miscellaneous expenses (e.g., books and magazines)	37.5
• Owned, leased property (e.g., cabins or land used in connection with fishing trips)	518.7
Total sport fishing expenditures	$1,912.6

Source: U.S. Fish and Wildlife Service, 1997.

2.2 Sport Fishing by Area

Sport fishing in New York State occurs in three distinct geographic areas—marine (or salt) waters, the Great Lakes, and other freshwaters. Data on anglers, fishing effort, and expenditures can be allocated to each of these three areas.

2.2.1 Overview of Fishing Activity

Table 2-2 shows the number of anglers, total trips, days of fishing, and average days of fishing per angler for New York, New York residents, and non-New York residents fishing in all New York State waters in 1996. Anglers are 16 years of age and older and include those with licenses for hook and line fishing, those with no license, and those who use special methods such as spears. Table 2-2 shows that anglers fished a total of 29.4 million days, or about 17 days per angler, and made 24.9 million fishing trips. About 80 percent of the 1.7 million anglers in New York were state residents. State residents fished almost 90 percent of all fishing days (26.2 million days), or about 19 days per angler. Non-state residents numbered 344,000 in 1996 and fished in New York State for 3.2 million days or, on average, 9 days per angler. Non-state residents made 2.3 million fishing trips in New York State1996.

Table 2-2. Anglers and Days of Fishing, 1996
(Population 16 years and older.)

Measure of Activity	Activity in New York State					
	Total		New York Residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Anglers	1,706,000	100.0%	1,362,000	79.8%	344,000	20.2%
Total Trips	24,914,000	100.0%	22,621,000	90.8%	2,293,000	9.2%
Days of Fishing	29,359,000	100.0%	26,181,000	89.2%	3,178,000	10.8%
Average Days of Fishing	17		19		9	

Source: U.S. Fish and Wildlife Service, 1997.

2.2.2 Marine Sport Fishing

New York's marine fisheries include the waters of the Atlantic Ocean, Long Island Sound, various estuaries and embayments of the Atlantic and the Sound, and the tidal portion of the Hudson River. There are two major sources of information on marine fishing activity in New York State. The U.S. Fish and Wildlife Service, in cooperation with the U.S. Bureau of the Census, conducts a periodic survey on fishing, hunting, and wildlife-associated recreation.

The most recent U.S. Fish and Wildlife Service survey was conducted in 1996. It includes marine fishing as well as Great Lakes and other freshwater fishing. The National Marine Fisheries Service (NMFS) conducts an annual survey on marine recreational fisheries. The most recent NMFS data are from the 1998 survey[2] and cover only marine recreational fishing. Data from these two surveys used in this study related to marine recreational fishing are presented below. The information is supplemented from other studies, as appropriate.

[2] 1999 data are under review.

2.2.2.1 Anglers and Fishing Activity

Table 2-3 shows the results of the U.S. Fish and Wildlife Service survey for marine anglers in New York State in 1996. There were an estimated 476,000 anglers, about 88 percent of whom were New York residents and the remaining 13 percent, non-state residents. New York residents made about 87 percent of the fishing trips, accounted for about 88 percent of the fishing days, and averaged 11 days of fishing. In comparison to total fishing activity reported by the U.S. Fish and Wildlife Service survey (see Table 2-2), marine trips and fishing days accounted for 20 percent and 18 percent, respectively, of all 1996 New York fishing activity.

Table 2-3. Marine Anglers, Trips, and Days of Fishing, 1996
(Population 16 years and older.)

Measure of Activity	Activity in New York State					
	Total		New York Residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Anglers	476,000	100.0%	416,000	87.4%	60,000	12.6%
Total Trips	4,901,000	100.0%	4,282,000	87.4%	619,000	12.6%
Days of Fishing	5,151,000	100.0%	4,530,000	87.9%	621,000	12.1%
Average Days of Fishing	11		11		10	

Source: U.S. Fish and Wildlife Service, 1997.

In contrast, the NMFS survey estimated 539,540 marine recreational fishers in 1996, of whom an estimated 93 percent were state residents (see Table 2-4). For 1998, there were an estimated 475,720 marine fishers, of whom 91 percent were New York State residents.

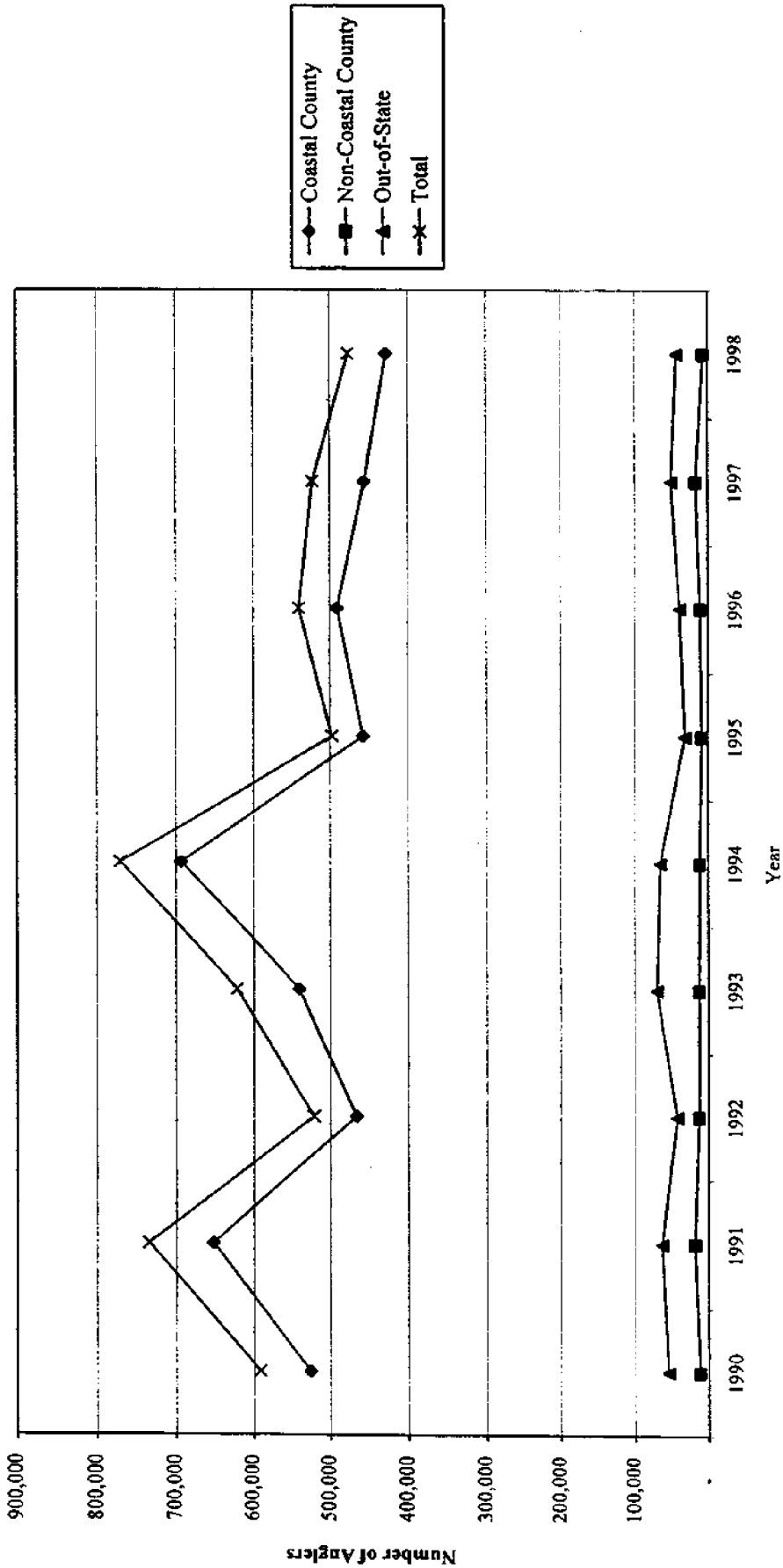
Table 2-4. Marine Anglers, 1996 and 1998
(Population 16 years and older.)

Number of Anglers	Activity in New York State					
	Total		New York Residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
1996	539,540	100.0%	501,130	92.9%	38,410	7.1%
1998	475,720	100.0%	433,226	91.1%	42,494	8.9%

Source: NMFS, 2000d.

Figure 2-1 shows NMFS estimates of number of marine recreational anglers from 1990 to 1998 by residence. Total participation peaked in 1994 at about 770,000 people. Since 1996, there has been an annual decrease in the number of people participating in marine recreational fishing. Coastal county residents accounted for most of the anglers throughout the 9-year period and follow the same pattern of increase and decrease as total marine recreational fishers. Out-of-state marine recreational fishers accounted for between 6 percent and 11 percent of the total throughout the 9-year period. Non-coastal county residents

Figure 2-1. Number of Marine Recreational Anglers by Residence, 1990-1998



Source: NMFS, 2000d.

accounted for between 1 and 3 percent of the participants in marine recreational fishing during the 9-year period.

2.2.2.2 Fishing Trips by Mode and Fishing Area

The NMFS survey collects information on number of fishing trips by mode (shore, party/charter boat,[3] and private/rental boat) and fishing area (inland[4], ocean 3 miles or less from shore, and ocean more than 3 miles from shore). In 1998, about 58 percent of the 3.5 million fishing trips were made in private or rental boats and about 83 percent of the trips were in the inland area (see Table 2-5).

Table 2-5. Number of Trips by Mode and Fishing Area, 1998

Mode	Inland	Percent	Ocean <= 3 Miles	Percent	Ocean > 3 Miles	Percent	Total
Shore	1,043,064	36.0%	131,686	30.5%	N/A	0.0%	1,174,750
Party/Charter	163,394	5.7%	106,071	24.6%	25,431	16.3%	294,896
Private/Rental	1,687,595	58.3%	194,141	44.9%	130,342	83.7%	2,012,078
Total	2,894,053	100.0%	431,898	100.0%	155,773	100.0%	3,481,724

Source: NMFS, 2000d.
N/A - not applicable

Figure 2-2 shows the number of fishing trips by mode from 1990 to 1998. During this period, private or rental boats consistently accounted for the most trips, followed by fishing from shore, and then party or charter boats. Total trips peaked in 1991 at 4.4 million. Following a decline in 1992, the number of trips increased in 1993 and 1994 then declined in 1995 and 1996. Following a slight increase in trips in 1997, the number of trips declined in 1998.

A 1997 survey of the party and charter boat industry found that 83 percent of the passengers on half-day charter fishing trips and 89 percent of half day party fishing trips were from New York. The percent of passengers from New York on full day fishing trips was 83 for charter trips and 88 for party boats (McCay et al., 1997).

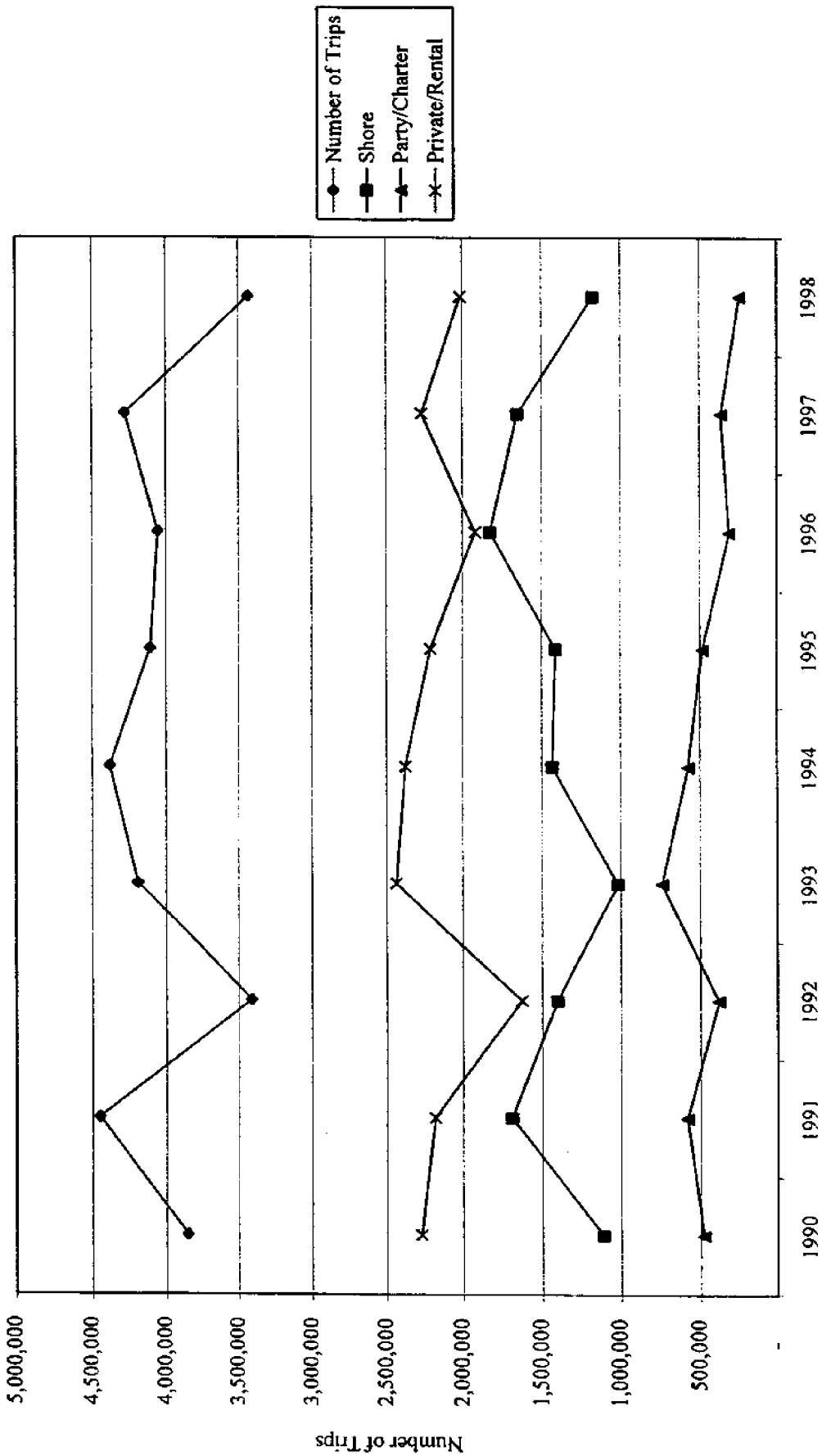
2.2.2.3 Fishing Days and Species

Table 2-6 summarizes the U.S. Fish and Wildlife Service survey data on marine anglers and days of fishing by type of fish. Bluefish and flatfish had the highest numbers of anglers, but striped bass had the highest number of fishing days.

[3] Party boats conduct daily, scheduled trips and provide anglers with the ability to go fishing without advanced planning. There is a fee that covers their fishing needs. Party boat vessels carry 30 or more passengers. Charter boats carry passengers who have pre-arranged fishing trips for certain species. Fees are based on species to be fished and distance. Charter boats carry six to eight passengers, although some carry more (McCay et al., 1997).

[4] Other bodies of saltwater besides the ocean; sounds, inlets, tidal portions of rivers, bays, and estuaries.

Figure 2-2. Number of Fishing Trips by Mode, 1990-1998



Source: NMFS, 2000d.

Table 2-6. Marine Anglers and Days of Fishing, by Type of Fish, 1996
(Population 16 years and older.)

Measure of Activity	Activity in New York State					
	Total		New York Residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Anglers						
Total, All Types of Fish	476,000	100.0%	416,000	87.3%	60,000	12.6%
Striped Bass	139,000	100.0%	*111,000	79.9%	*28,000	20.1%
Bluefish	215,000	100.0%	188,000	87.5%	*26,000	12.1%
Flatfish	209,000	100.0%	193,000	92.3%	...	...
Anything [1]	*77,000	100.0%	*70,000	90.9%	...	...
Other Freshwater Fish	155,000	100.0%	*132,000	85.0%	*23,000	14.8%
Days of Fishing						
Total, All Types of Fish	5,151,000	100.0%	4,530,000	87.9%	621,000	12.1%
Striped Bass	1,943,000	100.0%	*1,567,000	80.6%	*376,000	19.4%
Bluefish	1,635,000	100.0%	1,458,000	89.2%	*177,000	10.8%
Flatfish	1,891,000	100.0%	1,701,000	89.9%	...	...
Anything [1]	*182,000	100.0%	*170,000	93.4%	...	...
Other Freshwater Fish	754,000	100.0%	*699,000	92.7%	*55,000	7.3%

Source: U.S. Fish and Wildlife Service 1997.

*- Estimate based on a small sample.
...- Sample size too small to report data reliably.
[1]Respondent identified "anything" from a list of categories of fish.
Note: Detail does not add to total because of multiple responses. Excludes species where the estimate of the total was based on a sample that was too small to report data reliably.

Figure 2-3 shows total marine recreational catch from 1990 to 1998. Total catch includes fish brought back to the dock in a form that can be identified by trained interviewers, fish used for bait, released dead or filleted (i.e., they are killed but identification is by individual anglers), and fish released alive and identification is by the angler (NMFS, 2000d). Figure 2-4 presents the number of marine recreational fish by selected species caught annually between 1990 and 1998.

2.2.2.4 Employment

Since most businesses catering to sport fishing also serve other types of customers, the standard data sources that provide information on employment and establishments are of little use in profiling these businesses. The U.S. Census and other sources used for this study do not separately address the types of businesses that deal almost exclusively with anglers (e.g., head and charter boats, bait and tackle shops). Accordingly, direct and comprehensive data on employment in the marine sport fishing industry are not available. Employment associated with marine fishing activities is presented as part of estimating the economic contribution of sport fishing at the end of this chapter.

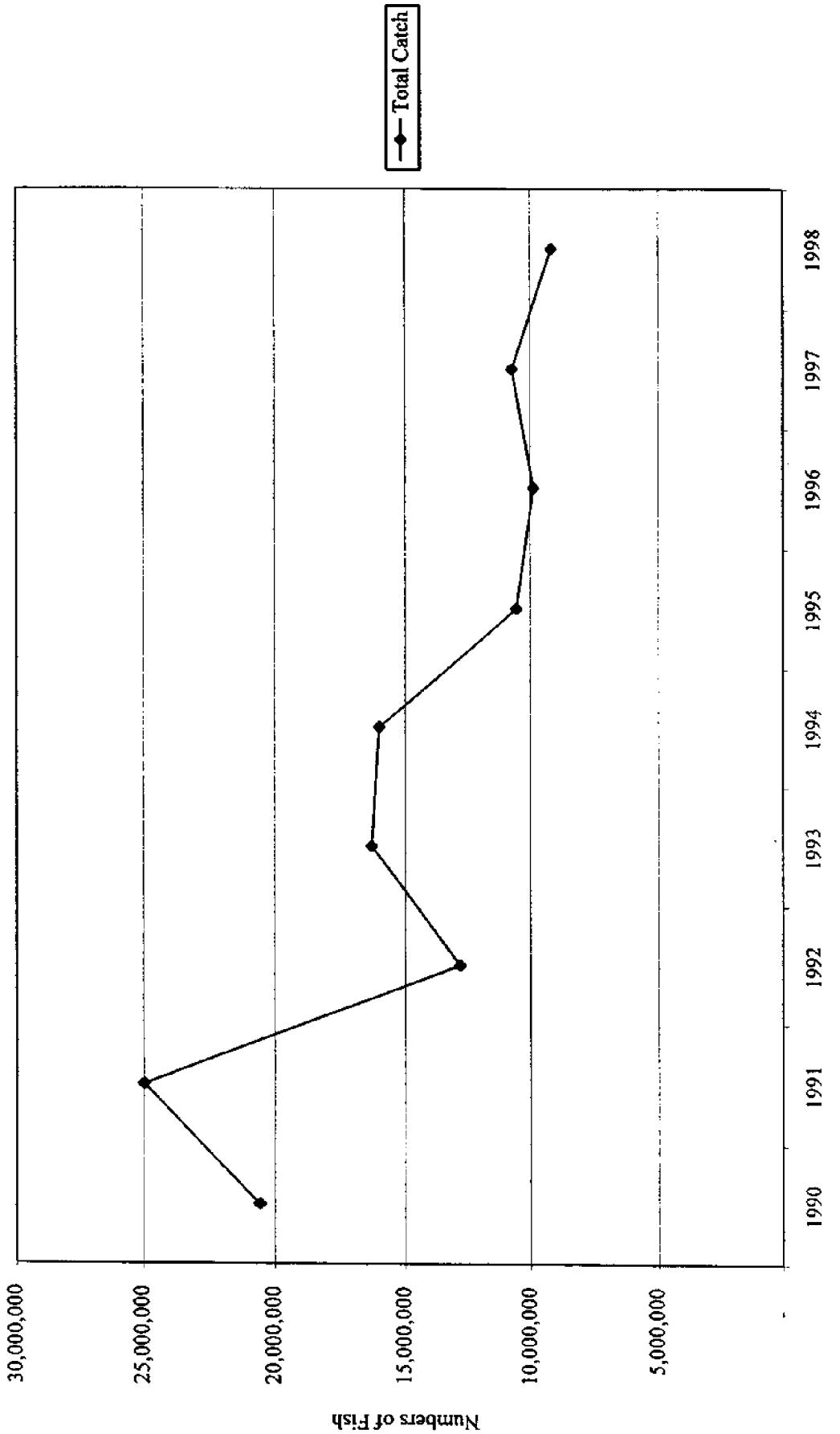
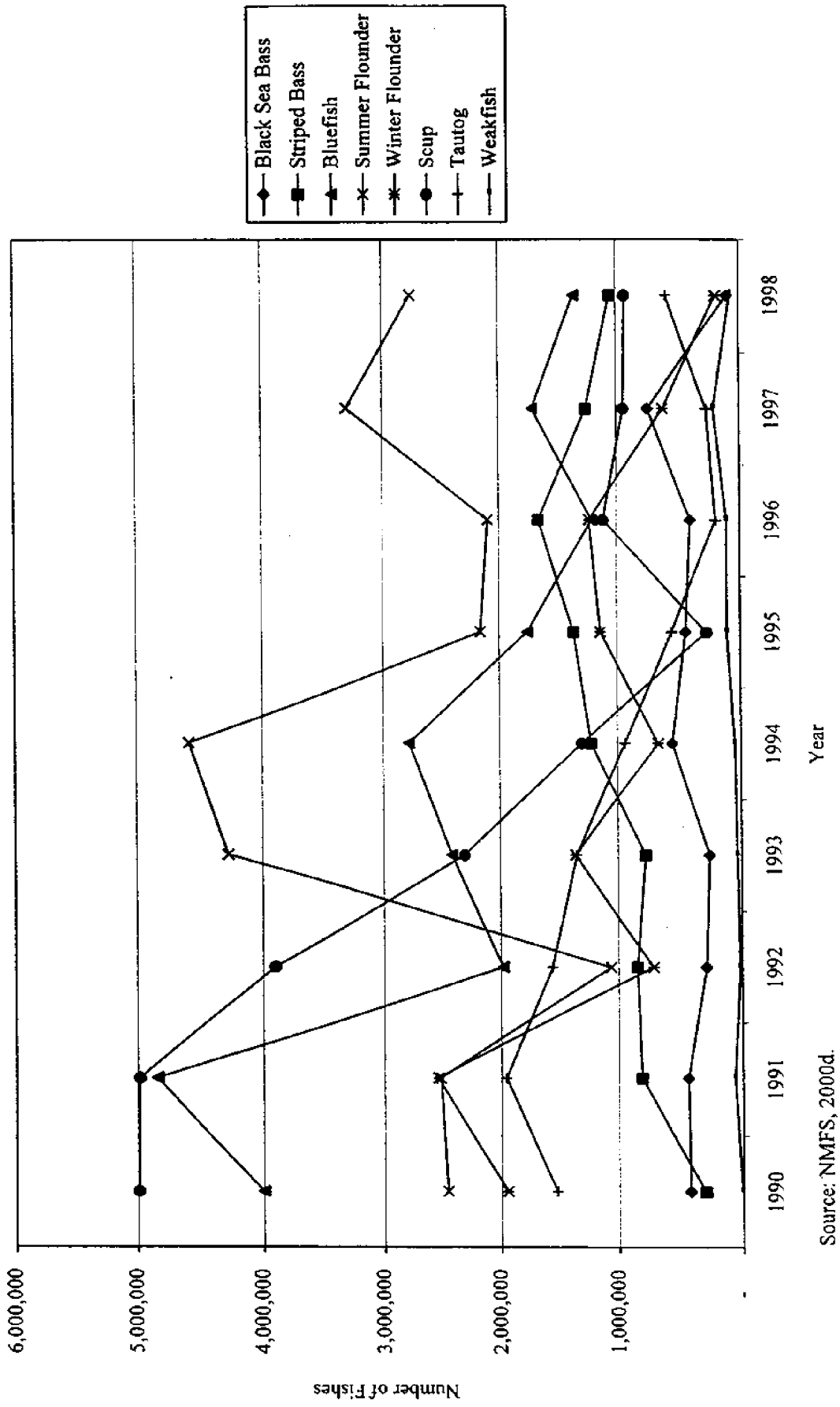


Figure 2-3. Total Marine Recreational Catch, 1990-1998

Source: NMFS, 2000d.

Figure 2-4. Marine Recreational Catch for Selected Species, 1990-1998



Source: NMFS, 2000d.

2.2.3 Great Lakes Sport Fishing

The Great Lakes area refers to sport fishing on Lake Ontario, Lake Erie, their tributaries, the Niagara River and embayments, and the St. Lawrence River south of the bridge at Cornwall.

2.2.3.1 Anglers and Fishing Activity

Table 2-7 presents information on Great Lakes anglers and days of fishing from the U.S. Fish and Wildlife Service survey for New York State in 1996. There were an estimated 415,000 anglers, 78 percent of whom were New York residents and the remaining 22 percent, non-state residents. New York residents made about 96 percent of the fishing trips, accounted for about 91 percent of the fishing days, and averaged 18 days of fishing. In comparison to total fishing activity reported by the U.S. Fish and Wildlife Service survey (see Table 2-2), Great Lakes trips and fishing days accounted for 22 percent of all New York fishing activity in 1996.

Table 2-7. Great Lakes Anglers, Trips, and Days of Fishing, 1996
(Population 16 years and older.)

	Activity in New York State					
	Total		New York Residents		Nonresidents	
Measure of Activity	Number	Percent	Number	Percent	Number	Percent
Anglers	415,000	100.0%	324,000	78.1%	91,000	21.9%
Total Trips	5,486,000	100.0%	5,278,000	96.2%	209,000	3.8%
Days of Fishing	6,419,000	100.0%	5,860,000	91.3%	560,000	8.7%
Average Days of Fishing	16		18		6	

Source: U.S. Fish and Wildlife Service, 1997.

Note: Detail does not add to total because of multiple responses.

2.2.3.2 Fishing Days and Species

Table 2-8 summarizes the U.S. Fish and Wildlife Service survey on Great Lakes anglers and days of fishing by type of fish. Black bass and salmon had the highest numbers of anglers, and black bass had the highest number of fishing days.

2.2.3.3 Employment

Since most businesses catering to sport fishing also serve other types of customers, the standard data sources that provide information on employment and establishments are of little use in profiling these businesses. The U.S. Census and other sources used for this study do not separately address the types of businesses that deal almost exclusively with anglers (e.g., head and charter boats, bait and tackle shops). Accordingly, direct and comprehensive data on employment in the Great Lakes sport fishing industry are not available. Employment associated with Great Lakes fishing activities is presented as part of estimating the economic contribution of sport fishing at the end of this chapter.

Table 2-8. Great Lakes Anglers and Days of Fishing, by Type of Fish, 1996
(Population 16 years and older.)

Measure of Activity	Activity in New York State					
	Total		New York Residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Anglers						
Total, All Types of Fish	415,000	100.0%	324,000	78.1%	91,000	21.9%
Perch	*74,000	100.0%	*74,000	100.00%	...	...
Black Bass	187,000	100.0%	176,000	94.1%	...	...
Walleye, Sauger	*101,000	100.0%	*87,000	86.1%	...	...
Salmon	160,000		*111,000	69.4%	*49,000	30.6%
Steelhead	*123,000	100.0%	*86,000	69.9%	*37,000	30.1%
Lake Trout	*85,000	100.0%	*61,000	71.8%	...	...
Other Trout	*94,000	100.0%	*73,000	77.7%	*20,000	21.3%
Anything [1]	*75,000	100.0%	*75,000	100.0%	...	...
Other Freshwater Fish	*94,000	100.0%	*74,000	78.7%	...	...
Days of Fishing						
Total, All Types of Fish	6,419,000	100.0%	5,860,000	91.3%	560,000	8.7%
Perch	*1,040,000	100.0%	*1,040,000	100.0%	...	...
Black Bass	3,517,000	100.0%	3,454,000	98.2%	...	...
Walleye, Sauger	*1,694,000	100.0%	*1,599,000	94.4%	...	...
Salmon	924,000	100.0%	*780,000	84.4%	*144,000	15.6%
Steelhead	*786,000	100.0%	*555,000	70.6%	*231,000	29.4%
Lake Trout	*500,000	100.0%	*361,000	72.2%	...	...
Other Trout	*939,000	100.0%	*869,000	92.5%	*70,000	7.5%
Anything[1]	*673,000	100.0%	*673,000	100.0%	...	...
Other Freshwater Fish	*1,500,000	100.0%	*1,367,000	91.1%	...	...

Source: U.S. Fish and Wildlife Service, 1997.
*- Estimate based on a small sample.
...- Sample size too small to report data reliably.
[1]Respondent identified "anything" from a list of categories of fish.
Note: Detail does not add to total because of multiple responses. Excludes species where the estimate of the total was based on a sample size that was too small to report data reliably.

2.2.4 Other Freshwater Sport Fishing

Other freshwater excludes the Great Lakes areas. Included in other freshwater are Lake Champlain, the Finger Lakes, other New York lakes, and the non-tidal portions of New York's rivers, except for those rivers that are tributaries of the Great Lakes.

2.2.4.1 Anglers and Fishing Activity

Table 2-9 presents information on other freshwater anglers and days of fishing from the U.S. Fish and Wildlife Service survey for New York State in 1996. There were an estimated 1.1 million anglers, 81 percent of whom were New York residents and the remaining 19 percent, non-state residents. About 82 percent of the anglers fished on ponds, lakes, or reservoirs, and about 49 percent fished on rivers or streams. New York residents accounted for about 90 percent of the fishing trips, 89 percent of the fishing days, and averaged 17 days of fishing. About 71 percent of total fishing days occurred on ponds, lakes, or reservoirs, and 28 percent occurred on rivers or streams.

Table 2-9. Freshwater Anglers and Days of Fishing, 1996
(Population 16 years and older.)

	Activity in New York State					
	Total		New York Residents		Nonresidents	
Measure of Activity	Number	Percent	Number	Percent	Number	Percent
Total Anglers	1,111,000	100.0%	901,000	81.1%	210,000	18.9%
Ponds, Lakes, or Reservoirs	914,000	100.0%	739,000	80.9%	175,000	19.1%
Rivers or Streams	540,000	100.0%	460,000	85.2%	80,000	14.8%
Total Trips	14,527,000	100.0%	13,062,000	89.9%	1,465,000	10.1%
Total Days of Fishing	17,412,000	100.0%	15,569,000	89.4%	1,843,000	10.6%
Ponds, Lakes, or Reservoirs	12,280,000	100.0%	10,822,000	88.1%	1,458,000	11.9%
Rivers or Streams	4,879,000	100.0%	4,362,000	89.4%	517,000	10.6%
Average Days of Fishing	16		17		9	

Source: U.S. Fish and Wildlife Service, 1997.

Note: Detail does not add to total because of multiple responses.

As noted above, other freshwater fishing accounts for the majority of fishing activities in New York State. In comparison to total fishing activity reported by the U.S. Fish and Wildlife Service survey (see Table 2-2), other freshwater trips and fishing days accounted for 58 percent and 59 percent, respectively, of all New York fishing activity in 1996.

2.2.4.2 Fishing Days and Species

Table 2-10 summarizes the U.S. Fish and Wildlife Service survey on other freshwater anglers and days of fishing by type of fish.[5] Black bass and trout had the highest numbers of anglers, and black bass had the highest number of fishing days. New York residents accounted for most of the anglers by species and fishing days by species.

[5] For readers interested in other data sets on freshwater fishing in New York State, see New York State Department of Environmental Conservation, New York Statewide Angler Survey, 1996.

Table 2-10. Freshwater Anglers and Days of Fishing, by Type of Fish, 1996
(Population 16 years and older.)

Measure of Activity	Activity in New York State					
	Total		New York Residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Anglers						
Total, All Types of Fish	1,111,000	100.0%	901,000	81.1%	210,000	18.9%
Crappie	*95,000	100.0%	*85,000	89.5%	...	...
Panfish	242,000	100.0%	205,000	84.7%	*37,000	15.3%
White Bass, Striped Bass, And Striped Bass Hybrids	*123,000	100.0%	*107,000	87.0%	...	...
Black Bass	548,000	100.0%	466,000	85.0%	82,000	15.0%
Catfish, Bullheads	*128,000	100.0%	*112,000	87.5%	...	...
Walleye, Sauger	*116,000	100.0%	*102,000	87.9%	...	...
Trout	468,000	100.0%	393,000	84.0%	75,000	16.0%
Salmon	*59,000	100.0%	...	...	*25,000	42.4%
Anything[1]	201,000	100.0%	*145,000	69.0%	...	...
Other Freshwater Fish	214,000	100.0%	180,000	84.1%	*34,000	15.9%
Days of Fishing						
Total, All Types of Fish	17,412,000	100.0%	15,569,000	89.4%	1,843,000	10.6%
Crappie	*1,770,000	100.0%	*1,282,000	72.4%	...	...
Panfish	2,767,000	100.0%	2,159,000	78.0%	*608,000	22.0%
White Bass, Striped Bass, And Striped Bass Hybrids	*864,000	100.0%	*809,000	93.6%	...	...
Black Bass	7,051,000	100.0%	6,679,000	94.7%	372,000	5.3%
Catfish, Bullheads	*1,352,000	100.0%	*1,311,000	97.0%	...	...
Walleye, Sauger	*992,000	100.0%	*935,000	94.3%	...	...
Trout	3,161,000	100.0%	2,688,000	85.0%	473,000	15.0%
Salmon	*335,000	100.0%	...	...	*142,000	42.4%
Anything[1]	3,360,000	100.0%	*3,174,000	94.5%	...	...
Other Freshwater Fish	3,353,000	100.0%	3,221,000	96.1%	*132,000	3.9%

Source: U.S. Fish and Wildlife Service, 1997.
*- Estimate based on a small sample.
...- Sample size too small to report data reliably.
[1]Respondent identified "anything" from a list of categories of fish.
Note: Detail does not add to total because of multiple responses. Excludes species where the estimate of the total was based on a sample size that was too small to report data reliably.

2.2.4.3 Employment

Since most businesses catering to sport fishing also serve other types of customers, the standard data sources that provide information on employment and establishments are of little use in profiling these businesses. The U.S. Census and other sources used for this study do not separately address the types of businesses that deal almost exclusively with anglers (e.g., head and charter boats, bait and tackle shops). Accordingly, direct and comprehensive data on employment in the other freshwater sport fishing industry are not available. Employment associated with other freshwater fishing activities is presented as part of estimating the economic contribution of sport fishing at the end of this chapter.

2.3 Trends in Sport Fishing

There is no consistent story about trends in sport fishing when the two most recent U.S. Fish and Wildlife Service surveys are compared. As shown in Table 2-11, the number of anglers in New York declined between the 1991 and 1996 surveys, as they did in the Middle Atlantic region where New York is located, and in the nation. However, the number of fishing days was up in New York and the nation in 1996 compared to 1991.

Table 2-11. Trends in Sport Fishing, 1991–1996: Anglers, fishing days, trips, expenditures

Anglers (freshwater and saltwater)	1991	1996
U.S.	35.6 million	35.2 million
Middle Atlantic	3.9 million	3.6 million
New York	1.8 million	1.7 million
Fishing Days (freshwater and saltwater)		
U.S.	511 million	626 million
New York	23.0 million	29.4 million
Fishing Trips (freshwater and saltwater)		
U.S.	454 million	507 million
New York	20.3 million	24.9 million
Trip-Related Expenditures (freshwater and saltwater)		
U.S. (1999 dollars)	$14.3 billion	$16.5 billion
New York	$0.620 billion	$0.644 billion

Sources: U.S. Fish and Wildlife Service, 1993 and 1997.

The data suggest that in New York, as in the Middle Atlantic region and the U.S. as a whole, the number of anglers is slowly declining but that these anglers are devoting more time and money to this form of recreation. Despite a very small reduction in anglers from 1991 to 1996, fishing days increased in New York and the U.S. by 28 percent and 23 percent, respectively. When controlled for inflation, trip-related fishing expenditures (e.g., food and lodging and transportation) in that period increased by 15 percent in the U.S. and by 4 percent in New York.

2.4 Sport Fishing's Contribution to the Economy of New York State

Using an econometric model based on the IMPLAN input/output model (see Appendix A), the sport fishing industry's contribution to New York's economy was measured in two ways. The first is the dollar value of economic activity of sport fishing itself, the New York businesses that directly and indirectly serve this industry, and the New York businesses that serve the employees of affected support businesses and their households. The second way of measuring this contribution is the employment that is created in the sport fishing industry and in all other New York businesses that serve either the industry directly or indirectly or serve the employees of affected support businesses and their households.

2.4.1 Expenditures on Sport Fishing and Their Impact on the State's Economy

The value of expenditures made by anglers in New York in 1996 constitutes the basic revenues of the sport fishing industry. As noted above, in 1996 anglers spent $1.9 billion (in 1999 dollars) on fishing trips, fishing equipment, real property, and other goods and services. (See Table 2-1.) These expenditures represent a substantial share of the overall dollar activity associated with the sport fishing industry's contribution to New York's economy.

The impact of these expenditures by anglers in New York is the creation of demands for $1.7 billion of goods and services from the state's businesses. Together with the expenditures made directly by anglers, the sports fishing industry in 1996 was responsible for sales of goods and services worth $3.6 billion.

This contribution to the New York economy can be allocated by type of expenditure or by the area where these fishing activities occurred. Table 2-12 allocates anglers' expenditures to various expenses that are clearly linked to sports fishing and to ancillary expense categories. Table 2-13 allocates anglers' expenditures by geographic area (i.e., marine and freshwater). Because the original data on anglers' spending did not specify the geographic area for 14 percent of total spending, the allocation in Table 2-13, which accounts for all spending, may somewhat misrepresent the distribution of spending. The 14 percent of expenditures not allocated geographically by the U.S. Fish and Wildlife Service survey were attributed to marine or freshwater on the basis of the distribution of allocated expenditures. Thus, because marine fishing accounted for 37.1 percent of allocated expenditures, 37.1 percent of unallocated expenditures were attributed to the marine sector. To the extent that this is either an overestimate or underestimate of the actual allocation, the resulting estimate of impacts will also overestimate or underestimate the impacts of the marine sector. The unallocated expenditure data include equipment that may be used in either marine or freshwater or expenses such as books and periodicals that are similarly difficult to allocate. This analysis chose to allocate all expenses as a way of simplifying the estimates.

Tables 2-12 and 2-13 summarize the dollar value of the total contribution of sport fishing to the state's economy. This contribution is the sum of the original expenditures and the impact of this spending of additional sales of goods and services by New York businesses.

Table 2-12. Contribution of New York Sport Fishing to State Economy by Type of Expenditure, 1996, Dollar Value (millions of 1999 dollars)

Type of Expenditure	Value of Expenditures	Impact on Sales of Goods and Services	Total Contribution
• Sport fishing expenditures	$541.1	$452.5	$993.6
Head and charter boat fees	56.0	57.3	113.3
Marina fees	52.5	90.9	143.4
Bait	42.5	28.6	71.1
Fishing rods, reels, tackle	239.7	221.0	460.6
Boats, motors, trailers	150.4	54.7	205.1
• Ancillary fishing expenditures	1,371.5	1,236.4	2,607.9
Other trip expenses	493.0	525.1	1,018.2
Auxiliary equipment	20.4	18.4	38.8
Special equipment	302.0	135.1	437.0
Miscellaneous expenses	37.5	54.5	92.0
Owned, leased property	518.7	503.2	1,021.9
• Total Sport Fishing	$1,912.6	$1,688.9	$3,601.5

Sources: U.S. Fish and Wildlife Service, 1997, and estimates by TechLaw.

Table 2-13. Contribution of New York Sport Fishing to State Economy by Area, 1996, Dollar Value (millions of 1999 dollars)

Location of Fishing Activity	Value of Expenditures	Impact on Sales of Goods and Services	Total Contribution
• Marine	$708.7	$625.8	$1,334.5
• Freshwater	1,203.9	1,063.1	2,267.0
• Total Sport Fishing	$1,912.6	$1,688.9	$3,601.5

Sources: U.S. Fish and Wildlife Service, 1997, and estimates by TechLaw.

2.4.2 Sport Fishing Employment and Sport Fishing's Employment Impacts

As noted above, comprehensive data on employment in the sport fishing industry are not available from the most common federal government sources. The types of establishments that cater to sport fishing usually also serve other types of customers. The U.S. Census and other sources used for this study do not separately address the types of businesses that deal almost exclusively with anglers (e.g., head and charter boats, bait and tackle shops). As a result, the standard data sources that provide information on employment and establishments are of little use in estimating employment in sport fishing.

Sport fishing employment can, however, be estimated by using U.S. Census sales per employee data for the service and retail businesses that make up the sport fishing industry. For example, if an industry averages $100,000 in sales per employee and sport fishing generates $1 million in sales for that industry, then this method estimates that 10 employees are associated with that $1 million in sales. Using this method, it is estimated that the

employment impact in the sport fishing industry is over 17,000 jobs. These jobs are a mix of full-time and part-time positions.

In addition to these jobs in the sports fishing industry, the anglers' expenditures that generate $1.7 billion in demands for goods and services supplied by New York businesses also create jobs in these businesses. This employment impact is estimated at the equivalent of 19,000 full-time jobs. Estimates of sport fishing employment and sport fishing's employment impacts are summarized in Tables 2-14 and 2-15 which allocate this employment by type of expenditure and by area, respectively. These measures of employment are not additive, however, since sport fishing employment is measured in jobs, both part time and full time, and sport fishing employment impacts are measured in full-time-equivalent jobs.

Table 2-14. Contribution of New York Sport Fishing to State Economy by Type of Expenditure, 1996, Employment

Type of Expenditure	Employment in Sport Fishing Industry (thousands of jobs)	Total Employment Impacts (thousands of FTE jobs)
• Sport fishing expenditures	4.8	6.1
Head and charter boat fees	0.5	0.5
Marina fees	0.5	0.9
Bait	0.4	0.4
Fishing rods, reels, tackle	2.1	3.4
Boats, motors, trailers	1.3	0.8
• Ancillary fishing expenditures	12.2	13.0
Other trip expenses	4.4	6.1
Auxiliary equipment	0.2	0.3
Special equipment	2.7	1.9
Miscellaneous expenses	0.3	0.7
Owned, leased property	4.6	4.0
• Total Sport Fishing	17.1	19.0

Sources: U.S. DOC, BOC, 2000b, and estimates by TechLaw.

Table 2-15. Contribution of New York Sport Fishing to State Economy by Area, 1996, Employment

Location of Fishing Activity	Employment in Sport Fishing Industry (thousands of jobs)	Total Employment Impacts (thousands of FTE jobs)
• Marine	6.3	7.1
• Freshwater	10.8	11.9
• Total Sport Fishing	17.1	19.0

Sources: U.S. DOC, BOC, 2000b, and estimates by TechLaw.

3.0 NEW YORK STATE'S COMMERCIAL FISHING INDUSTRY

This chapter profiles the commercial fishing industry in New York State and estimates its economic contribution to the state's economy. The commercial fishing industry includes marine, freshwater, and aquaculture fisheries, although marine fisheries accounted for over 99.9 percent of the volume and value of total commercial fishery landings in New York State. The chapter profiles these sectors of the commercial fishing industry in Sections 3.1 through 3.4.

While the profile of commercial fishing activities provides a range of statistical and quantitative data, the estimate of commercial fishing's contribution to the New York economy is driven solely by the revenues received by marine commercial fishers in 1999; those revenues are defined as the value of landings. Unlike the profile, the estimate of commercial fishing's contribution to the New York economy only addresses marine activities (see Section 3.5). Two other activities—freshwater commercial fishing and aquaculture—were not included due to lack of data. Both activities were relatively small in 1999. So, not including these activities accounts for a very modest underestimate of the industry's total economic contribution. To be consistent with other dollar values in this report, the estimates are presented in 1999 dollars. Dollar values were adjusted using the consumer price index.

It should be noted that unlike recreational fishing, commercial fishing is a primary production activity. From an economic perspective, commercial fishing is more akin to agricultural production—dairy farming or wheat production—than it is to the recreational activities of sport fishing, despite the fact that both involve catching fish. Most commercially harvested fish in New York are sold to seafood establishments in the state. These establishments—addressed in Chapter 4—add value to the fish and seafood they purchase. As a result, the commercially harvested fish may generate an economic impact several times as it moves from the commercial fishing industry through one or more segments of the seafood industry before finally being purchased by a consumer. This chapter addresses the start of that chain of events—the commercial fishing industry in New York State.

3.1 Marine Commercial Fishing

New York's marine fisheries include the waters of the Atlantic Ocean, Long Island Sound, various estuaries and embayments of the Atlantic and the Sound, and the tidal portion of the Hudson River.

The major marine commercial fishing ports in New York State are found on Long Island. Three Long Island ports, Montauk, Hampton Bay-Shinnecock, and Greenport accounted for 61 percent of the volume of landings and 31 percent of the value in 1999 (NMFS, 2000e).

3.1.1 Landings

Total Landings. In 1999, marine landings totaled 48.2 million pounds with a dockside value of $76.0 million (NMFS, 2000c). Of this total, finfish accounted for 23.7 million pounds (49 percent of total landings) valued at $19.5 million (26 percent of the value of total landings) and shellfish for 24.4 million pounds (51 percent) valued at $56.6 million (74 percent). The average dockside value per pound of all New York landings overall was $1.58. However, shellfish, at an average dockside value per pound of $2.32, was over two and one-half times the average value per pound of finfish, $0.82.

Ten species, although not always the same ones, accounted for 82 percent of the volume of 1999 landings (see Table 3-1) and 87 percent of the value of landings (see Table 3-2). American lobster and quahog clam accounted for almost 60 percent of the total value of landings. Six species, silver hake, longfin squid, American lobster, Atlantic surf clam, quahog clam, and monkfish (goosefish), were among the top ten species by volume and value. Bluefish, spiny dogfish shark, red hake, and skates were among the top ten species by volume, but not by value. And, tilefish, summer flounder, striped bass, and yellowtail flounder were among the top ten species by value, but not by volume.

Landings by Category. Table 3-3 summarizes commercial fish landings in 1999 by selected category. The categories represent high value species (lobster, inshore and offshore; mollusks and shellfish; and dredge clams) and gear types (inshore, multi-species trawler, and longline). These categories were used in the economic impact analysis.

Table 3-3. Commercial Fish Landings, New York State, 1999

Category	Volume (pounds)	Value (dollars)
Lobster, inshore	5,640,687	$21,831,344
Lobster, offshore	1,422,000	$5,501,255
Mollusks, shellfish (except dredge clams)	12,484,918	$26,948,962
Dredge clams	4,878,235	$2,202,563
Inshore fisheries	3,745,779	$3,766,470
Multi-species trawler	18,157,199	$11,575,533
Longline	1,846,006	$4,222,413
Total landings, 1999	48,174,824	$76,048,540

Source: NMFS, 2000c.

Table 3-1. Top Ten Species by Volume (pounds), 1999

Rank	Species	Volume	Percent of Total
1	Silver Hake	9,531,698	19.8%
2	Longfin Squid	9,312,719	19.3%
3	American Lobster	7,062,687	14.7%
4	Atlantic Surf Clam	4,878,235	10.1%
5	Quahog Clam	2,647,320	5.5%
6	(Monkfish) Goosefish	1,528,796	3.2%
7	Bluefish	1,423,772	3.0%
8	Shiny Dogfish Shark	1,380,356	2.9%
9	Red Hake	971,742	2.0%
10	Skates	872,668	1.8%
	Total Volume	39,609,993	82.2%

Source: NMFS, 2000c.

Table 3-2. Top Ten Species by Value (dollars), 1999

Rank	Species	Value	Percent of Total
1	American Lobster	$ 27,332,599	35.9%
2	Quahog Clam	$ 17,777,034	23.4%
3	Longfin Squid	$ 7,450,515	9.8%
4	Silver Hake	$ 4,629,950	6.1%
5	Atlantic Surf Clam	$ 2,202,563	2.9%
6	Tilefish	$ 1,897,571	2.5%
7	Summer Flounder	$ 1,837,474	2.4%
8	Striped Bass	$ 1,225,973	1.6%
9	(Monkfish) Goosefis	$ 1,150,194	1.5%
10	Yellowtail Flounder	$ 1,012,239	1.3%
	Total Value	$ 66,516,112	87.5%

Source: NMFS, 2000c.

Table 3-5. Top Ten Species by Volume (pounds), 1969

Rank	Species	Volume	Percent of Total
1	Atlantic Menhaden	9,762,400	23.6%
2	Quahog Clam	7,516,200	18.2%
3	Yellowtail Flounder	4,698,600	11.4%
4	Atlantic Surf Clam	3,431,300	8.3%
5	Silver Hake	2,131,700	5.2%
6	Scups or Porgies	1,637,400	4.0%
7	Striped Bass	1,535,100	3.7%
8	Winter Flounder	1,444,800	3.5%
9	American Lobster	1,416,300	3.4%
10	Bluefish	1,119,600	2.7%
	Total of Top Ten Specie	34,693,400	83.8%

Source: NMFS, 2000c.

Table 3-6. Top Ten Species by Value 1999 dollars), 1969

Rank	Species	Value	Percent of Total
1	Quahog Clam	$35,406,515	58.3%
2	American Lobster	$6,303,645	10.4%
3	Sea Scallop	$2,780,277	4.6%
4	Eastern Oyster	$2,047,866	3.4%
5	Atlantic Surf Clam	$1,686,641	2.8%
6	Bay Scallop	$1,630,048	2.7%
7	Yellowtail Flounder	$1,628,792	2.7%
8	Striped Bass	$1,598,442	2.6%
9	Scups or Porgies	$1,525,931	2.5%
10	Atlantic Menhaden	$995,411	1.6%
	Total of Top Ten Spe	$55,603,567	91.5%

Source: NMFS, 2000c.

3.1.2 Landing Trends

Commercial landing trends are examined in three ways: a comparison of landings in 1969 and 1999, a longer view of trends in landings of American lobster (1967 to 1999), and 10-year landings data for selected species.

For a broader view of trends in commercial fishing, Table 3-4 compares total landings by volume and value in 1969 and 1999. The volume of landings in 1999 was 16 percent higher than in 1969, while the value was 25 percent higher than in 1969. The proportion of shellfish to finfish changed between the two periods, with finfish decreasing in percent of total landings by pound from 64 percent in 1969 to 49 percent in 1999. Shellfish increased from 36 percent of the pounds landed in 1969 to 51 percent in 1999. However, the overall value of shellfish landings declined relative to finfish, with shellfish accounting for 84 percent of landings by value in 1969 and 74 percent in 1999.

Table 3-4. Commercial Fish Landings by Volume and Value, 1969 and 1999

Type	1969 Volume (in pounds)	1999 Volume (in pounds)	1969 Value (in $1999)	1999 Value (in $1999)
Finfish	26,552,000	23,743,456	$10,053,983	$19,469,117
Shellfish	14,835,400	24,431,458	$50,726,255	$56,579,423
Total	41,387,400	48,174,914	$60,780,238	$76,048,540

Source: NMFS, 2000c.

In terms of species, commercial landings also underwent substantial changes during the 30-year period. Such changes result from an array of factors, including fisheries management regulations, changes in biological stocks, and consumer interests. Table 3-5 (see page 27) shows the top ten species by volume landed in 1969. Like the top ten species landed by volume in 1999 (see Table 3-1), they accounted for more than 80 percent of total landings. However, there are significant differences in the species on the lists in the two years. Five species are common to both lists: quahog clam, Atlantic surf clam, silver hake, American Lobster, and bluefish. The top species landed by volume in 1969, Atlantic Menhaden, along with scup or porgy, yellowtail flounder, striped bass, and winter flounder, are not on the top ten species landed by volume list for 1999. Half of the top ten species on the 1999 list (longfin squid, monkfish, spiny dogfish shark, red hake, and skates), are not on the 1969 top ten species list.

Table 3-6 (see page 27) shows the top ten species by value landed in 1969. These species accounted for 92 percent of total landings by value in 1969, compared to 88 percent for the top ten species landed by value in 1999 (see Table 3-2). Half of the species are common to both lists. American lobster and quahog clam are listed one and two on both lists, with quahog clam being ranked one in 1969 and two in 1999. Sea scallop, eastern oyster, bay scallop, scup or porgy, and Atlantic menhaden are on the top species by value of landings in 1969, but not 1999. Similarly, longfin squid, silver hake, tilefish, summer flounder, and

monkfish, which are among the top ten species landed by value in 1999, are not on the 1969 list.

Though American lobster was among the ten largest volume and value species in both 1967 and 1999, its relative importance to New York's commercial fishing industry increased significantly over the period. Trends in the volume and value of lobster landings are presented in Table 3-7. Factors affecting these trends include fishing effort and regulations. Lobster went from being the species with the third highest value of landings, accounting for 7 percent of the total in 1967, to the most valuable in 1999, accounting for 36 percent of the total. (Lobster surpassed quahog clams as the most valuable species in 1995.) However, lobster landings experienced a sharp decline between 1998 and 1999 as a result of disastrous lobster mortalities in western Long Island Sound. Landings declined from about 8.6 million pounds in 1998 to 7.1 million pounds in 1999, or by 17 percent. The authorities in New York and Connecticut began to receive reports from western Long Island Sound of abnormal lobster mortalities. By the fall of 1999, ports in the western Sound were reporting declines in commercial lobster landing of 90 percent or more. Data available for Connecticut show that fall 1999 lobster landings for all ports from Norwalk to Greenwich declined by 91 percent to 99 percent compared to the average landings for the period from 1995 through 1998 (CT DEP, 2000a). Similar declines in New York landings also occurred in the western Sound. While attention has been focused on the western Sound, landings throughout the Sound have shown large declines. For example, Connecticut ports east of Norwalk reported declines in landings of 64 percent to 91 percent. In addition to the declines in commercial landings, it is reported that publicity about the die-off has made it more difficult to market the lobster that is landed.

An assessment of the lobster population in Long Island Sound conducted by the Connecticut Department of Environmental Protection between April and June 2000 showed "a decrease in the abundance of legal size lobsters for harvest in the Sound" compared to 1998 and 1999. This is expected to lead to a decline in harvests in 2000 and 2001. However, an abundance of small lobsters indicate that the industry is likely to rebound (CT DEP, 2000b).

An assessment of the impact of the decline in lobster landings on lobster fishers in Connecticut found that 70 percent of those surveyed reported losing 100 percent of their total income and the remainder reported losing between 30 and 90 percent. At the time of the survey, respondents reported that loss of income had lasted from 2 to 16 months with an average of 6.8 months of lost income (Dyer and Poggle, 2000). A similar impact assessment has not been performed for lobster fishers in New York, but the impact is believed to be comparable.

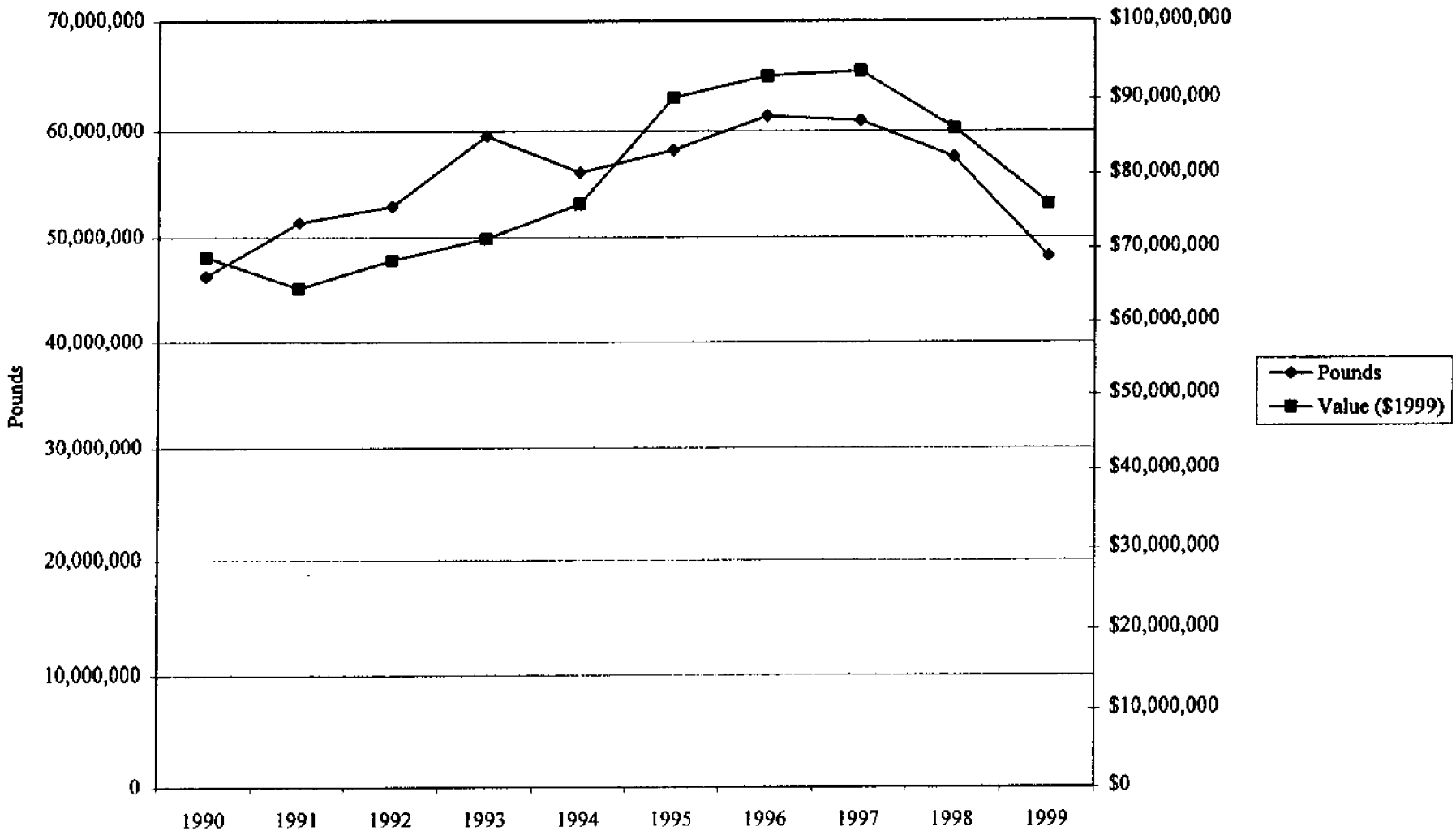
Figure 3-1 shows trends in total commercial fish landings by volume and value from 1990 to 1999. By both measures, commercial fish landings in 1999 were about what they were in 1990. Both measures peaked in 1997 and declined in 1998 and 1999. Figure 3-2 presents trends in commercial fish landings by volume for selected species for the 10-year period 1990 to 1999. Trends in commercial fish landings by value for the same species and in the same time frame are presented in Figure 3-3. None of the species shown, except landings by

Table 3-7. Trends in Landings and Value of Landings for American Lobster, 1967-1999

Year	Landings by Volume		Landings by Value	
	Volume (Pounds)	Percent Change from Previous Year	Value ($1999)	Percent Change from Previous Year
1967	879,000	-	$3,923,160	-
1968	1,166,700	32.7%	$5,371,273	36.9%
1969	1,416,300	21.4%	$6,303,645	17.4%
1970	1,647,300	16.3%	$7,569,209	20.1%
1971	1,790,500	8.7%	$8,149,937	7.7%
1972	1,145,000	-36.1%	$6,965,363	-14.5%
1973	892,500	-22.1%	$4,824,848	-30.7%
1974	730,600	-18.1%	$4,142,039	-14.2%
1975	669,300	-8.4%	$3,824,579	-7.7%
1976	593,100	-11.4%	$3,550,355	-7.2%
1977	530,700	-10.5%	$2,986,958	-15.9%
1978	581,900	9.7%	$3,311,130	10.9%
1979	702,100	20.7%	$3,817,751	15.3%
1980	734,800	4.7%	$3,696,884	-3.2%
1981	890,200	21.2%	$4,565,727	23.5%
1982	1,121,600	26.0%	$5,417,347	18.7%
1983	1,207,500	7.7%	$5,722,680	5.6%
1984	1,308,100	8.3%	$6,418,332	12.2%
1985	1,240,900	-5.1%	$5,778,371	-10.0%
1986	1,407,100	13.4%	$6,204,807	7.4%
1987	1,146,700	-18.5%	$5,469,487	-11.9%
1988	1,779,890	55.2%	$8,224,029	50.4%
1989	2,345,051	31.8%	$10,212,066	24.2%
1990	3,431,111	46.3%	$13,517,427	32.4%
1991	3,128,246	-8.8%	$10,828,593	-19.9%
1992	2,651,067	-15.3%	$10,284,840	-5.0%
1993	2,667,107	0.6%	$10,526,790	2.4%
1994	3,954,634	48.3%	$14,835,455	40.9%
1995	6,653,781	68.3%	$24,439,272	64.7%
1996	9,408,689	41.4%	$35,265,277	44.3%
1997	8,878,395	-5.6%	$32,449,425	-8.0%
1998	8,525,590	-4.0%	$30,491,160	-6.0%
1999	7,062,687	-17.2%	$27,332,599	-10.4%
1967-1999		703.5%		596.7%

Source: NMFS, 2000c.

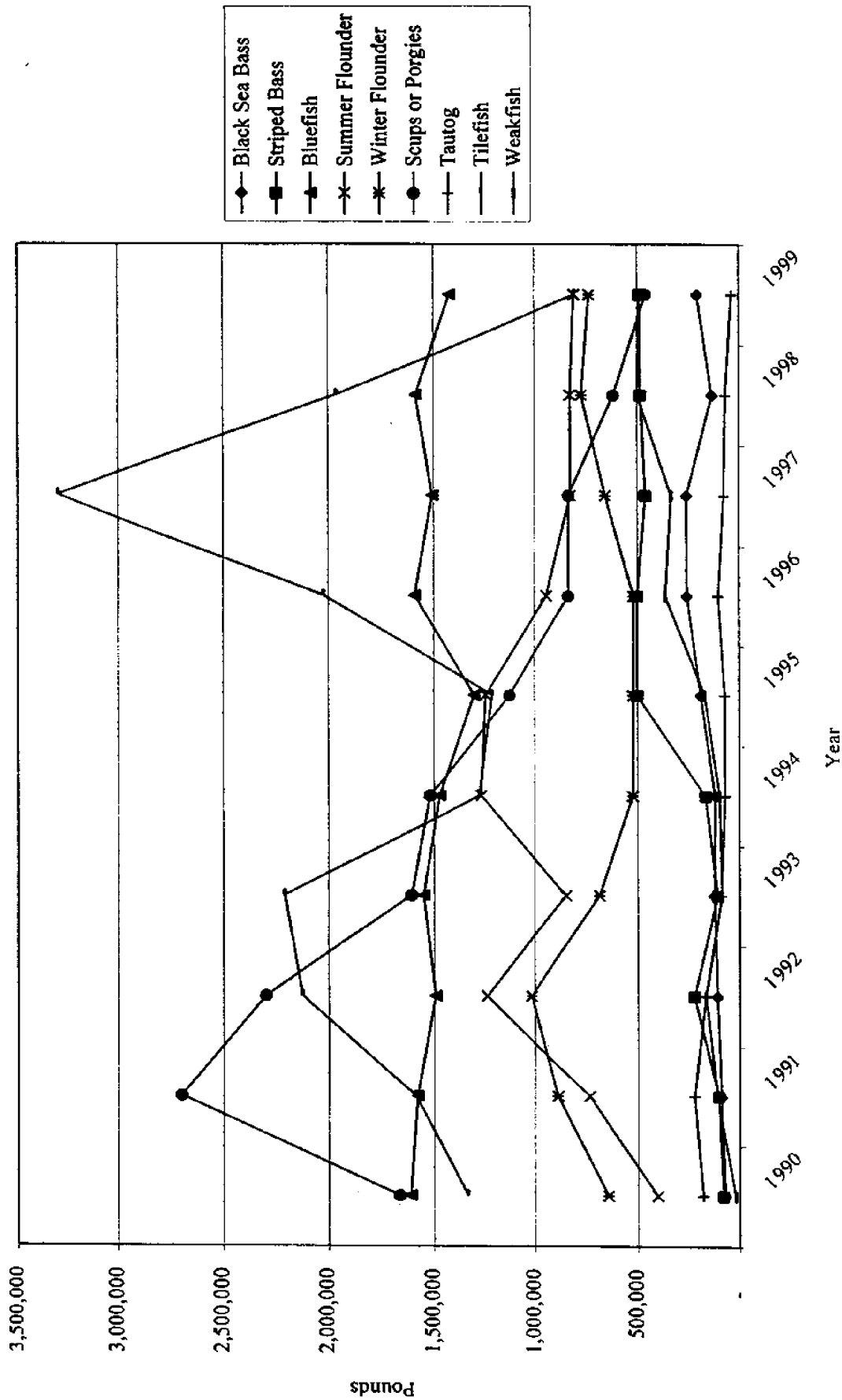
Figure 3-1. Trends in Commercial Fish Landings, 1990-1999



Note: Apparent decline in 1999 largely due to unusual lobster mortality event in western Long Island Sound

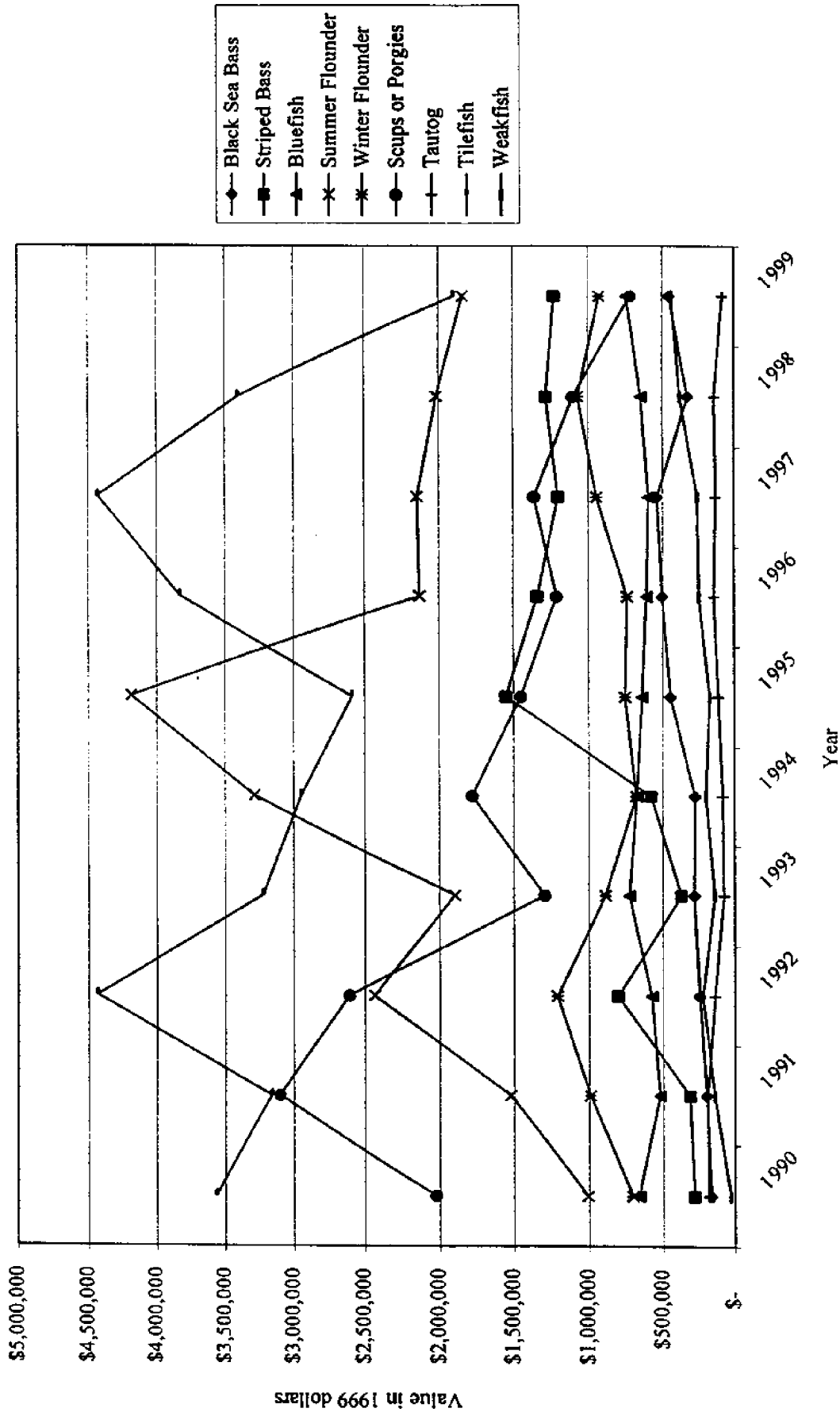
Source: NMFS, 2000c.

Figure 3-2. Trends in Commercial Fish Landings by Volume for Selected Species, 1990-1999



Source: NMFS, 2000c.

Figure 3-3. Trends in Commercial Fish Landings by Value for Selected Species, 1990-1999



Source: NMFS, 2000c.

volume for scup, experienced sustained growth or decline over the 10 years. Landings of scup by volume declined annually from 1992 to 1999. Of the species shown, tilefish accounted for the largest number of pounds landed (17.8 million pounds) and value of landings ($33.5 million) for the 10-year period.

3.1.3 Employment in the Marine Commercial Fishing Industry

Data on employment in the commercial fishing industry is limited. Neither the U.S. Bureau of the Census nor the U.S. Bureau of Labor Statistics (BLS), the two primary sources of employment data for the United States, collect information on self-employed persons. The majority of fishers in New York are self-employed. Table 3-8 presents available data from BLS. These data were collected for commercial fishing establishments from six counties in New York State in 1998 (U.S. DOL, BLS, 2000b). However, due to confidentiality concerns, no data were released for four counties, Kings, Saratoga, Sullivan, and Ulster, and only partial data were released for the two remaining counties, Nassau and Suffolk. The BLS data do, however, provide information on employment and wages for the small number of commercial fishing operations in New York State with employees. The annual pay data provide some idea of the annual income of fishers in New York, assuming that employers must provide income competitive with contract fishers who receive payment in the form of crew share.

Table 3-8. U.S. Bureau of Labor Statistics Data on Employment and Earnings in SIC 0912 -- Commercial Fishing, 1997 and 1998

Variable	Nassau County	Suffolk County	N.Y. Total
No. of Employees			
1997	ND	55*	129
1998	22	53*	127
No. of Establishments			
1997	ND	22*	52
1998	10	23*	57
Total Wages (000s of $1999)			
1997	ND	$1,420*	$4,223
1998	$912	$1,194*	$3,753
Avg. Weekly Wage (000s of $1999)			
1997	ND	$497	$629
1998	$814	$433	$568
Avg. Annual Pay (000s of $1999)			
1997	ND	$25,832	$32,736
1998	$41,447	$22,532	$29,550

Source: U.S. DOL, BLS, 2000b.
ND: Non-disclosed data.
*- Employment for SIC 0912 "Commercial Fishing – Finfish" only.

In 1998, the New York Seafood Council estimated that there were approximately 8,850 persons employed in the commercial fishing industry in New York State (Gall, 1999). Their method of estimation was to multiply the number of commercial fish and shellfish harvesting permits by the average number of persons employed per permit. The Council estimated that an average of 3 individuals (captain, crew, support personnel) were employed for each food fish permit, 1.8 persons for each crustacean (lobster and blue crab) permit. The Council estimates of the average number of employees per permit was based on the experience and expert opinion of the Council board members (Gall, 1999).

During field work conducted for this study, information was collected in order to refine the Council's estimates of the average number of persons employed per permit. A review of a sample of loan applications to the New York State Department of Economic Development, Long Island Fisheries Assistance Program was conducted. The results of the review of loan applications for 13 commercial fishing vessels showed an average of 4.4 employees per vessel, considerably higher than the 3 employees estimated by the Council. A review of loan applications from owners of lobster and crab vessels showed in an average of 1.9 employees per vessel, or, very similar to the Council's estimate of 1.8 employees per crustacean permit.

Table 3-9 presents three estimates of the number of persons employed for each of five types of fish and shellfish harvesting permits, the total number employed by permit type, and the total number employed in the commercial fishing industry in New York in 1999. The first estimate uses the Council's estimates of the average number of employee per permit. No data on employment per surf clam permit and menhaden vessel permit were available. However, in 1999, 125 surf clam permits and 35 menhaden vessel permits were issued by the State. Making the conservative assumption of 1.5 employees per surf clam permit and 3 employees per menhaden vessel permit, surf clam permits accounted for 188 employees and menhaden vessels for 105. By regulation, there is one person per shell digger permit. Including these with the estimates based on number of employees per permit yields an estimate of about 9,455 persons employed in the New York commercial fishing industry in 1999. These are jobs, so that the number includes many part time positions.

The second estimate is based on TechLaw's estimates of employment per permit for lobster, crab, and resident food fish and Council estimates for diggers, surf clam, and menhaden vessels. This approach results in an estimate of 8,755 employees excluding shellfish diggers, surf clams, and menhaden vessels and 11,499 with them. Again, these are jobs, which includes many part time positions.

The third estimate is based on an average of the Council's and TechLaw's estimates of the number of employees per permit, and estimates for surf clam permit, menhaden vessel permits, and shell diggers. This approach results in an estimate of about 10,500 persons employed in the industry in 1999.

Table 3-9. Estimated Number of Employees in New York's Commercial Fishing Industry, 1999

Type of Permit	No. of Permits	Based on Seafood Council's Estimate of Employees Per Permit: No. of Employees Per Permit	Based on Seafood Council's Estimate of Employees Per Permit: Estimated No. of Employees	Based on TechLaw's Estimate of Employees Per Permit: No. of Employees Per Permit	Based on TechLaw's Estimate of Employees Per Permit: Estimated No. of Employees	Average of the Two Estimates of Employees Per Permit[3]: No. of Employees Per Permit	Average of the Two Estimates of Employees Per Permit[3]: Estimated No. of Employees
Lobster, Resident	746	1.8	1,343	1.9	1,417	1.85	1,400
Crab, Resident	724	1.8	1,303	1.9	1,376	1.85	1,350
Resident Food Fish	1,355	3	4,065	4.4	5,962	3.7	5,000
Total	2,825		6,711		8,755		7,750
Shell Diggers	2,451	1	2,451	1	2,451	1	2,450
Surf Clam[1]	125	1.5	188	1.5	188	1.5	200
Menhaden Vessel[2]	35	3	105	3	105	3.0	100
Total	5,436		9,455		11,499		10,500

Sources: NYS DEC, 2000a.; Gall, 1999; and analysis of loan applications to the New York State Department of Economic Development, Long Island Fisheries Assistance Program conducted for this study by Thomas Murray, consultant to TechLaw, Inc., June 2000.

[1]No information available on the number of employees per surf clam permit. A conservative estimate of 1.5 person per permit was assumed.

[2]No information available on the number of employees per menhaden vessel. A conservative estimate of 3 persons per permit was assumed.

[3]Rounded to nearest fifieth.

Trends in numbers of finfish and shellfish harvesting permits issued provide an idea of trends in employment in the New York State commercial fishing industry. Table 3-10 presents numbers of permits and estimated numbers of persons employed by permit type and total number employed for the years 1970, 1988, 1993, 1998, and 1999 (NYS DEC, 2000a). Data from these years are provided for the following reasons: 1970 was the earliest year for which lobster, crab, and menhaden vessel permit data were available; the food fish permit was introduced in 1988; the surf clam permit was introduced in 1993; and 1998 and 1999 are the most recent years for which data on numbers are available.

Between 1970, the first year for which permit information was available, and 1999 the number of lobster permits issued increased by 47 percent. During the same period, the number of crab permits issued increased by 18,000 percent reflecting the growth of blue crab from no reported landings in 1970 to one of the 10 most valuable species landed in 1999. The number of shellfish digger permits issued, however, declined by 56 percent between 1970 and 1999.

However, between 1993, the first year during which all the permit types were required, and 1999 the overall number of permits issued, excluding shellfish digger permits, declined by 23 percent. The largest decline, 38 percent, was in lobster permits. This is attributable, at least in part, to the drastic decline in lobster landings resulting from an as yet unexplained lobster die-off that began in the fall of 1998. The number of surf clam permits issued also declined by over a third during the period. The only permit issued in greater numbers in 1999 than in 1993 was the menhaden vessel permit, which increased by 35 percent. The number of shellfish digger permits declined by 10 percent between 1993 and 1999 and the overall number of permits declined by 18 percent.

3.1.4 Numbers of Fishing Vessels and Boats in the New York Commercial Fishing Industry

NMFS reported 689 fishing vessels (i.e., a craft of greater than 5 net registered tons) in the New York marine fishery in 1999 and 2,931 fishing boats (i.e., a craft of less than 5 net registered tons) (NMFS, 2000a). However, these numbers may be lower than the actual number of vessels operating in New York. These data do not include vessels with no federal permit (i.e., inshore commercial vessels) and individuals who live in New York, but keep their vessels in non-New York ports.

3.2 Great Lakes Commercial Fishing

The Great Lakes account for substantially less than 1 percent of the total volume and value of landings of the commercial fishing industry in New York State. The limited amount of commercial fishing in the New York portion of the Great Lakes occurs primarily in the embayments and nearshore open water of the eastern end of Lake Ontario (NYS DEC, March 2000b).

Table 3-10. Number of Permits Issued for Finfish and Shellfish Harvesters, 1970-1999

Permit	1970	1977	% Change 70-77	1987	% Change 77-87	1988	% Change 87-88	1993	% Change 88-93	1997	% Change 93-97	% Change 70-97	1998	% Change 97-98	1999	% Change 98-99	% Change Since 1970 or First Year Required	% Change Since 1993
Lobster, Resident	508	246	-51.6%	551	123.9%	959	74.1%	1,211	26.3%	888	-26.7%	74.8%	761	-14.3%	746	-2.0%	46.9%	-38.4%
Crab, Resident	4	26	550.0%	85	226.9%	535	529.4%	816	52.5%	1,027	25.9%	25575.0%	715	-30.4%	724	1.3%	18000.0%	-11.3%
Menhaden Vessel	10	29	190.0%	16	-44.8%	24	50.0%	26	8.3%	55	111.5%	450.0%	33	-40.0%	35	6.1%	250.0%	34.6%
Resident Food Fish	*	*	--	*	--	1,575	*	1,616	2.6%	1,473	-8.9%	--	1,285	-12.8%	1,355	5.5%	-14.0%	-16.2%
Surf Clam, Total	*	*	--	*	--	*	*	195	--	236	21.0%	--	152	-35.6%	125	-17.8%	-35.9%	-35.9%
Surf Clam, Atlantic	*	*	--	*	--	*	*	110	--	117	6.4%	--	60	-48.7%	61	1.7%	--	-44.6%
Surf Clam, Sound	*	*	--	*	--	*	*	85	--	119	40.0%	--	92	-22.7%	64	-30.4%	--	-24.7%
Subtotal	522	301	-42.3%	652	116.6%	3,093	--	3,864	--	3,679	-4.8%	--	2,946	-19.9%	2,985	1.3%	--	-22.8%
Shellfish Diggers	5,547	8,363	50.8%	2,561	-69.4%	2,844	11.1%	2,736	-3.8%	3,130	14.4%	-43.6%	2,504	-20.0%	2,451	-2.1%	-55.8%	-10.4%
Total	6,069	8,664	42.7%	3,213	-62.9%	5,937	--	6,600	--	6,809	3.2%	--	5,450	-20.0%	5,436	-0.3%	--	-17.6%

Source: NYS DEC, 2000a.

* - no license required.

3.2.1 Landings

In 1996, the latest year for which detailed data for New York State are available, Great Lakes landings totaled only 95,000 pounds. Of this total, landings from Lake Ontario accounted for 78,000 pounds (82 percent of total landings) and landings from Lake Erie for 17,000 pounds (18 percent) (Great Lakes Fishery Commission, 2000). Later data from the National Marine Fisheries Service reported landings of only 1,000 pounds in both 1998 and 1999 (NMFS, 2000a). These landings were valued at $2,000, or $2 per pound. Applying this value per pound to 1996 landings data results in an estimated value of landings of $190,000.

Landings of 16 species of finfish were reported for the New York Great Lakes in 1996. However, five species accounted for almost 75 percent of total landings. These species are shown in Table 3-11.

Table 3-11. Largest Volume Species Landed in the New York Great Lakes, 1996

Species	Percent of Total 1996 Volume of Landings
Yellow Perch	39.0%
Bullheads	14.7%
Buffalo	7.4%
Channel Catfish	6.3%
Burbot	4.0%
Total	72.6%

Source: Great Lakes Fishery Commission, 2000.

3.2.2 Landing Trends

Table 3-12 shows trends by pounds of New York Great Lakes landings over a 30-year period. Between 1967 and 1996 the volume of landings declined 82 percent. With one exception, every species landed in 1967 experienced a major decline in landings during the period. Of the 13 species landed in 1967, four experienced a decline in landings of 100 percent and four experienced declines of greater than 90 percent. The remainder experienced declines of 45 percent or more. Only channel catfish experienced an increase in landings during the period.

While New York landings from both Lake Ontario and Lake Erie declined substantially during the period, the decline for Lake Erie was more severe. Between 1967 and 1996 landings for Lake Erie declined 93 percent compared to 71 percent for Lake Ontario. Of the seven species landed from Lake Erie in 1967, landings of five had declined by 100 percent by 1996 and landings of the remaining two had declined by over 90 percent. Three species not landed in 1967, buffalo, burbot, and rock bass, accounted for 7 percent of the total New York landings for Lake Erie in 1996.

Table 3-12. New York Great Lake Landings, 1967-1996

(000s of Pounds)

Species	1967			1977			1987			1996			Change 1967 to 1996		
	Ontario	Erie	Total	Ontario	Erie	Total	Ontario	Erie	Total	Ontario	Erie	Total	Ontario	Erie	Total
1 Amercian Eel	34	0	34	0	0	0	0	0	0	2	0	2	-94.1%		-94.1%
2 Bowfin	0	0	0	0	0	0	0	0	0	1	0	1			- -
3 Buffalo	0	0	0	0	0	0	0	0	0	0	7	7			- -
4 Bullheads	27	0	27	46	0	46	49	1	50	14	0	14	-48.1%		-48.1%
5 Burbot	0	0	0	0	0	0	0	0	0	1	4	5			- -
6 Carp	22	2	24	2	2	4	0	0	0	1	0	1	-95.5%	-100.0%	-95.8%
7 Channel Catfish	3	1	4	2	0	2	0	0	0	6	0	6	100.0%	-100.0%	50.0%
8 Crappie	0	0	0	0	0	0	2	0	2	1	0	1			- -
9 Drum	0	0	0	0	0	0	1	0	1	4	0	4			- -
10 Herring	2	0	2	0	0	0	0	0	0	0	0	0	-100.0%		-100.0%
11 Northern Pike	0	0	0	0	0	0	0	0	0	2	0	2			- -
12 Rock Bass	0	0	0	0	0	0	3	3	6	1	2	3			- -
13 Sheepshead	0	9	9	0	21	21	0	0	0	0	0	0		-100.0%	-100.0%
14 Smelt	0	0	0	13	1	14	0	0	0	0	0	0			- -
15 Suckers	9	12	21	2	19	21	1	2	3	3	1	4	-66.7%	-91.7%	-81.0%
16 Sunfish	14	0	14	9	0	9	2	0	2	3	0	3	-78.6%		-78.6%
17 Walleye	1	121	122	1	68	69	0	1	1	2	0	2	100.0%	-100.0%	-98.4%
18 White Bass	0	2	2	0	6	6	0	0	0	0	0	0		-100.0%	-100.0%
19 White Perch	146	0	146	68	0	68	43	0	43	3	0	3	-97.9%		-97.9%
20 Whitefish	2	0	2	0	0	0	0	0	0	0	0	0	-100.0%		-100.0%
21 Yellow Perch	12	106	118	49	154	203	108	15	123	34	3	37	183.3%	-97.2%	-68.6%
Total	272	253	525	192	271	463	209	22	231	78	17	95	-71.3%	-93.3%	-81.9%
As % of Total	51.8%	48.2%	100.0%	41.5%	58.5%	100.0%	90.5%	9.5%	100.0%	82.1%	17.9%	100.0%			

Source: Great Lakes Fishery Commission, 2000.

Of the eleven species from Lake Ontario for which New York landings were recorded in 1967, landings of two had declined by 100 percent by 1996, landings of two had declined by over 90 percent, and landings of three by over 45 percent. However, landings of three species, yellow perch, channel catfish, and walleye had increased by 100 percent or more. In 1996, yellow perch was by far the largest volume species landed in New York from Lake Ontario, accounting for 44 percent of total landings compared to 4 percent of landings in 1967.

Commercial fishers in Ontario continue to land substantial volumes of fish from both Lake Ontario and Lake Erie. Comparing landings from Lake Ontario only (New York only has a small shoreline on Lake Erie), Ontario's landings were almost 500 percent larger than New York's in 1967 and 1,540 percent larger in 1996. While Ontario landings from Lake Ontario declined over the period 1967 to 1996, the decline, 21 percent, was much smaller than the decline experienced by New York, 71 percent.

Commercial fishing in the Great Lakes has been under several pressures that tend to reduce landings. There are federal prohibitions on the sale of fish affected by toxic contaminants. Additional pressure to limit commercial fishing is also exerted by sport fishing groups anxious to manage the fishery in their interests. In addition, there have been efforts to reduce the pressure on the fishery by restricting commercial fishing to trapnets that harvest species selectively, without killing species preferred by recreational fishermen (Environment Canada, 1995).

3.2.3 Employment in the Great Lakes Commercial Fishing Industry

In 1999, there were seven licensed, active fishers in Lake Ontario. In 1997 and 1998, there were 12 and 11 licensed fishers, respectively, 5 of these, however, had their licenses revoked for the illegal harvest and sale of eel and walleye (NYS DEC, 2000b).

3.2.4 Numbers of Fishing Vessels and Boats in the Great Lakes Commercial Fishing Industry

NMFS reports a single fishing vessel (i.e., a craft of greater than 5 net registered tons) on the New York portion of the Great Lakes. NMFS indicated that data on the number of fishing boats (i.e., a craft of less than 5 net registered tons) were not available (NMFS, 2000a). As stated previously, the NMFS data do not include vessels with no federal permit or vessels whose owners live in New York, but are kept in non-New York ports.

3.3 Other Freshwater Commercial Fishing

Small quantities of fish are landed from the Hudson River and from Lake Champlain, however no information on the volume or value of landings was available.

3.4 Aquaculture

New York has a relatively small aquaculture industry. The U.S. Department of Agriculture's (USDA) 1998 Census of Aquaculture reported 54 farms with total sales of $1.9 million (in $1999) (USDA, 2000). This represents only about 0.2 percent of total U.S. aquaculture sales. Table 3-13 shows number of farms and value of aquaculture product sales for New York broken down by type of product.

Of the 54 aquaculture operations in the state, 51 were freshwater and 3 were saltwater. A total of 946 freshwater acres were used for aquaculture in New York in 1998. Data on acres of saltwater used were not available (USDA, 2000).

Table 3-13. Number of Farms and Value of Sales by Type of Aquaculture Product, 1998

Type of Aquaculture Product	Number of Farms [1]	Value (000s of $1999) [2]
Food Fish	38	$1,047
Bait Fish	14	$152
Ornamental Fish	7	$37
Sport or Game Fish	12	$127
Crustaceans/Crawfish	10	$47
Mollusks	2	ND
Other Animals	4	ND
Total	54	$1,872

Source: USDA, 2000.
ND: Not disclosed
[1]Column adds to greater than total because some farms produce more than one type of aquaculture product.
[2]Column adds to less than total because value of mollusk and other aquaculture products was not disclosed by USDA.

It should be noted that according to the New York DEC, in 1999 there were 40 off-bottom shellfish growing permits (Barnes, 2001).

Table 3-14 shows the percent of total 1998 sales of New York aquaculture products by point of first sale. Over 50 percent of sales were made either to retailers (32 percent) or directly to the consumer (19 percent). Almost 35 percent of sales were for fee fishing or other recreational uses. Almost no first sales were made to processors (0.6 percent).

Only limited data on the location of aquaculture farms in New York State were available. The USDA 1997 *Census of Agriculture* reported 28 trout farms in New York of which four (14 percent) were in Franklin County and three (11 percent) were in Sullivan County. The locations of the remaining farms were not provided. Trout sales by the four farms in Franklin County accounted for about $101,200 (12 percent) of the total value of sales of farm-raised trout in New York in 1997 (USDA, 1999).

Table 3-14. Percent of Sales of New York Aquaculture Products by Point of First Sale, 1998

Point of First Sales	Percent of Sales by Point of First Sales
Processor	0.6%
Retail	32.4%
Direct to Consumer	18.5%
Live Hauler/Broker	10.9%
Fee Fishing and Recreational Use	34.6%
Other Aquaculture Producers	2.8%
Government Agencies	0.0%
Others	0.2%
Total	100.0 %

Source: USDA, 2000.

Of the total of 24 farms reported as raising finfish, other than catfish and trout, in New York in 1997, four (17 percent) were in Erie County and three (13 percent) were in Wyoming County. The locations of the remaining farms were not provided. No information on the value of sales of other finfish by county was available (USDA, 1999).

In 1998, trout accounted for 50 percent ($939,000) of the total value of aquaculture products raised in New York State. Trout were raised at a minimum of 24 (44 percent) of the 54 farms in New York. The 1998 Census of Aquaculture provides the number of farms raising each of three sizes of trout – food size, stockers, and fingerlings – but not the total number of farms raising trout. Simply adding the number of farms raising each size will result in an overestimation of the number of farms because some farms raise more than one size of trout. The largest number of farms, 24, is reported to raise food size trout.

Table 3-15 shows the percent of total 1998 sales of farm-raised trout by point of first sale. Sales for fee fishing and other recreational uses were the largest point of first sale for food size trout, accounting for over 41 percent of total sales of food size trout. Sales to retailers accounted for almost 40 percent of total sales of food size trout, while direct sales to consumers accounted for almost 20 percent. No sales to processors were reported. Sales for fee-fishing and other recreational uses were also the largest point of first sale for stocker size trout, accounting for 41.0 of total stocker sales.

Table 3-15. Percent of Trout Sales by Point of First Sale, 1998

Point of First Sales	Percent of Sales by Point of First Sales
Food Size	
Retail	37.5 %
Direct to Consumer	19.2 %
Fee Fishing and Recreational Use	41.3 %
Other Aquaculture Producers	2.0 %
Total	100.0 %
Stockers	
Live Hauler/Broker	10.8 %
Fee Fishing and Recreational Use	41.0 %
Other Aquaculture Producers	6.6 %
Government Agencies	1.3 %
Other	40.3 %
Total	100.0 %

Source: USDA, 2000.

In 1998, three farms in New York were raising catfish. However, information on pounds raised and value of sales was not available (USDA, 2000). In 1992, the latest year for which data were available, four farms raised a total of 1,000 pounds of catfish with sales totaling $4,745.

Other finfish raised in New York in 1998 included carp, hybrid striped bass, perch, salmon, tilapia, and walleye. In 1998, a total of 11 farms were raising one or more of these species. The total value of sales of these finfish in 1998 was $99,080. Table 3-16 shows the number of farms raising each of these fish and, where available, value of sales. Tilapia accounted for more than three-quarters of the value of sales of finfish other than trout and catfish. Information on sales for the other species was not available.

In 1998, a total of 12 farms in New York were raising shellfish. Of these, 10 were raising crawfish. Crawfish sales totaled $47,000. The two remaining farms were raising mollusks. Both were raising oyster seed stock and one was also raising oysters. Data on sales of farm-raised oysters were not available (USDA, 2000).

Four farms were producing other aquaculture products in 1998: one was producing turtles and three trout eggs. No data on the value of sales of these products were available (USDA, 2000).

Table 3-16. Number of Farms and Value of Sales of Other Finfish Raised in New York State, 1998

Species	Number of Farms	Sales
Carp	1	ND
Hybrid Striped Bass.	1	ND
Perch	4	ND
Salmon	1	ND
Tilapia	5	$78,600
Walleye	1	ND
Total	11	$99,080

Source: USDA, 2000.
ND: Not disclosed
[1]Column adds to greater than total because some farms produce more than one type of aquaculture product.
[2]Column adds to less than total because value of mollusk and other aquaculture products was not disclosed by USDA.

Except for trout, reliable historical data for aquaculture production in New York State are not available (Amidon, 2000; Lang, 2000). Table 3-17 presents data on sales of farm-raised trout by liveweight and value for the years 1992 through 1999. As can be seen from the table, the data for trout do not show a clear trend. The number of farms producing trout has changed little over the period. The pounds of fish produced have varied substantially year to year but show no clear trend; virtually the same number of pounds of trout were produced in 1999 as were produced in 1992. However, 1999 production was down by 30 percent compared to 1998.

Table 3-17. Sales of Farm-Raised Trout by Liveweight and Value, 1992–1999

	1992	1995	1996	1997	1998	1999
Number of Producers	29	27	29	28	30	30
Liveweight Pounds (000)	153	126	233	183	228	159
Value (000s of $1999)	$670	$640	$1,088	$839	$940	$696
Average Price per Pound ($1999)	NA	$5.08	$4.66	$4.58	$4.12	$4.38

Sources: Data for 1995 through 1999 are from: New York Agricultural Statistics Service and New York State Department of Agriculture and Markets, 2000.
Data for 1992 are from: USDA,1999.
NA: Not available.

3.5 Commercial Fishing's Contributions to the Economy of New York State

Using an econometric model based on the IMPLAN input/output model (see Appendix A), the commercial fishing industry's contributions to New York's economy was measured in two ways. The first is the dollar value of economic activity of commercial fishing itself, the New

York businesses that directly and indirectly serve this industry, and the New York businesses that serve commercial fishers, the employees of affected support businesses, and their households. The second way of measuring this contribution is the employment that is created in the commercial fishing industry and in all other New York businesses that serve either the industry directly or indirectly or serve commercial fishers, the employees of affected support businesses, and their households.

The estimation of the economic contribution of commercial fishing to the state economy is based exclusively on the expenditures associated with marine commercial fishing operations. Excluded from these estimates are the activities associated commercial fishing in the Great Lakes and aquaculture. The value of commercial landings for the Great Lakes has been declining for many years for several reasons noted above. In 1999, the value of Great Lakes commercial fishing landings was estimated at $2,000 or 0.003 percent of marine commercial fishing landings. Thus, the failure to include the economic impact of these landings represents a very small understatement of the total effects of the commercial fishing industry. Alternatively, the value of aquaculture products in 1999 was estimated at $1.9 million. This reflects a more significant economic activity, approximately 2 percent of the value of marine commercial fishing landings. Nonetheless, this study did not collect sufficient data on the destinations of these products as they are sold by aquaculture establishments or on the typical expenditures of aquaculture operations. Thus, there was insufficient data to model the impacts of the aquaculture industry in New York. Along with other issues where more data would be useful, we suggest the economics of New York's aquaculture industry be more closely examined in the future (see Appendix G).

3.5.1 The Value of Commercial Fish Landings and Its Impact on the State's Economy

The value of landings constitutes the basic revenues of the commercial fishing industry. As noted above, the value of landings in 1999 was $76.0 million. As shown in Table 3-3, the value of landings can be allocated to categories defined either by high-value species or gear types. This $76.0 million represents the dollar value of economic activity in the commercial fishing industry itself and is a substantial part of the industry's overall economic contribution to New York.

These revenues are spent on boats, fishing gear, bait, ice, and other business expenses necessary for the operation of commercial fishing establishments. These expenditures create new demands for sales by other New York businesses that supply goods and services directly to the commercial fishing industry as well as for New York businesses that sell goods and services to the businesses that directly support the commercial fishing industry.

The range of products and services that commercial fishing requires in order to operate is broad. In estimating the total impact of commercial fishing on the New York economy, the types of expenditures shown in Table 3-18 were considered.

Table 3-18. Representative Expenditures by Commercial Fishing Establishments

• Fishing gear, purchases	• Accounting
• Fishing gear, repair	• Insurance
• Vessel & engine maintenance and repair	• Moorage
• Groceries, food, & supplies	• Interest expenses
• Fuel & lubricants	• Depreciation, boats
• Bait	• Depreciation, motor vehicles
• Ice	• Miscellaneous business services
• Shipping	• Crew & captain shares, wages
• Licenses, permits, dues & fees	• Profit, other income

Source: Appendix B.

The impact of these expenditures on the New York economy was estimated as new demands for goods and services worth $73.6 million. This estimate of the impact on the sales of goods and services includes the direct, indirect, and induced impacts of the expenditures made by New York commercial fishing establishments. When combined with the value of New York commercial landings, the total dollar value of economic activity related to commercial fishing in 1999 was $149.6 million. This contribution can be allocated to the various categories of commercial fishing operations as shown in Table 3-19.

Table 3-19. Contribution of New York Commercial Fishing to State Economy, 1999, Dollar Value (millions of 1999 dollars)

Commercial Fishing Species or Gear Type	Value of Landings	Impact on Sales of Goods and Services	Total Contribution
Lobster, inshore	$21.8	$21.3	$43.1
Lobster, offshore	5.5	5.4	10.9
Mollusks, shellfish	26.9	26.2	53.2
Surf clam dredges	2.2	2.3	4.5
Inshore fisheries	3.8	3.7	7.4
Multi-species trawlers	11.6	10.8	22.4
Longline	4.2	3.9	8.2
Great Lakes	0.0	(1)	NA
Aquaculture	1.9	(1)	NA
Total commercial fishing	$77.9	$73.6	$149.6

Sources: NMFS, 2000c; Great Lakes Fishery Commission, 2000; USDA, 2000; and estimates by TechLaw.
Notes. (1) Not calculated, see text for explanation.
NA: Not available because of the lack of data on impacts for these segments of the commercial fishing industry.

3.5.2 Commercial Fishing Employment and Commercial Fishing's Employment Impacts

As noted above, comprehensive data on employment in the commercial fishing industry are not available from the most common federal government sources. Federal government data underestimate total employment by not capturing commercial fishers who are self-employed, a common arrangement in the industry. (See Table 3-8.) Estimates based on workers associated with commercial fishing permits are more comprehensive and, consequently, a better measure of the industry's employment, but include jobs filled by part-time or seasonal workers as well as full-time workers. Estimates of commercial fishing employment and commercial fishing's employment impacts are summarized in Table 3-20. They are not additive, however, since fishing employment is measured in jobs, both part time and full time, and fishing employment impacts are measured in full-time equivalent jobs.

Table 3-20. Contribution of the Commercial Fishing to New York Economy, Employment

Commercial Fishing Segments	Employment in Sector (thousands of jobs)	Total Employment Impacts (thousands of FTE jobs)
Lobster Inshore	NA	0.2
Lobster Offshore	NA	0.1
Mollusks, Shellfish	NA	0.3
Surf Clam Dredges	NA	0.0
Inshore Fisheries	NA	0.0
Multi-Species Trawlers	NA	0.1
Longline	NA	0.0
Great Lakes	NA	NA
Aquaculture	NA	NA
• Total Commercial Fishing	10.5	0.8

Sources: NYS DEC, 2000a; Gall, 1999; analysis of loan applications to the New York State Department of Economic Development, Long Island Fisheries Assistance Program conducted for this study by Thomas Murray, consultant to TechLaw, Inc., June 2000; and estimates by TechLaw.
NA: date not available to estimate employment by commercial fishing segment
FTE: full-time equivalent

Based on the number of permits issued, the commercial fishing industry created an estimated 10,500 full-time and part-time jobs in 1999. As shown in Table 3-9, this estimate is derived from an estimate of the average employment associated with each permit. This is part of commercial fishing's employment contribution to the New York economy.

The other part of the industry's employment contribution to the New York economy is the employment associated with the New York businesses that enjoyed $73.6 million in sales of goods and services because of the commercial fishing industry in 1999. The employment impact is estimated as approximately 800 full-time equivalent jobs with wages and other earnings of approximately $29.3 million. This employment impact is expressed in terms of full-time equivalent jobs (i.e., one job for each 2000 hours of employment regardless of how many people work those hours), rather than a mix of full-time and part-time jobs (i.e., paid

work regardless of part-time or full-time status). As a result, the total employment contribution cannot be estimated by adding the 10,500 part- time and full-time jobs in the commercial fishing industry to the 800 full-time equivalent jobs created in the various businesses that are impacted by the commercial fishing industry.

The contributions of the commercial fishing industry reported here are those directly tied to the operation of commercial fishing establishments. Commercial fishers in New York, as elsewhere, are primary producers whose products (i.e., harvested fish) are sold primarily to the state's seafood industry. Only an estimated 2 percent of the value of New York's commercially caught fish are sold directly to consumers, while an estimated 92 percent are sold to New York seafood establishments. The remaining share of landings are sold to customers outside New York. For the estimated 92 percent of products sold to seafood industry establishments, more value is added by those seafood industry establishments before the fish or seafood is finally sold to an end consumer. This added value means additional contributions to the state economy for the fish or seafood originally harvested by New York commercial fishers. This contribution is discussed in the next chapter, which addresses the seafood industry.

4.0 NEW YORK STATE'S SEAFOOD INDUSTRY

This chapter profiles the seafood industry in New York and estimates its contribution to the state's economy. The seafood industry includes foreign trade (i.e., import, export, and re-export of seafood products); wholesale trade and distribution; seafood processing; and supermarkets/fish markets, and restaurants/food services. The chapter profiles each of these sectors of the seafood industry (see Sections 4.1 through 4.6).

One characteristic of New York's seafood industry that complicates the development of a profile is the interweaving of seafood-related activities with other activities. Whether it is the wholesaler or processor that deals in fish as a part of a broader line of products or the grocery store or restaurant that relies on fish and seafood for a fraction of overall sales, this pattern of activity makes isolating and quantifying seafood industry activities difficult. As will be discussed below, direct measures of activity for each segment of the seafood industry often fail to describe the industry adequately. Accordingly, the best measures of economic activity are provided by estimates of sales, value added, and employment developed for this study based on the flow of fish and seafood through the segments of the industry.

The chapter concludes with a summary of the seafood industry's overall contribution to the state's economy (see Section 4.7). While the profile of seafood industry activities provides a range of statistical and quantitative data, the estimate of the industry's contribution to the New York economy is based solely on the expenditures made by seafood industry establishments. To be consistent with other dollar values in this report, all estimates of value are presented in 1999 dollars. Dollar values were adjusted using the consumer price index.

4.1 The Seafood Industry and Product Flow

For this study, the seafood industry was divided into five major segments—foreign trade, wholesalers/distributors, processors, restaurants/food services, and supermarkets/fish markets. This framework is somewhat arbitrary as some establishments defined as wholesalers are also importers and exporters and others process fish. Certain grocery stores or retail fish markets also process fish and seafood. The primary function of each establishment determines its classification by the Bureau of the Census so that a grocery store that bakes or cooks some fish or seafood is classified as a grocery store, not as a processor.

In looking at these five segments of New York's seafood industry, an exception is made for Fulton Market. Although Fulton Market is a collection of wholesale fish establishments, it is separately considered in this study because of its size, history, and unique place in the state's seafood industry.

Establishments in the seafood industry purchase fish and seafood products from other businesses, add value to these purchased products, and then sell them to customers. These customers may be other businesses or final consumers. The movement of fish and seafood into, within, and out of the seafood industry is termed product flow.

While certain paths are more common as fish and seafood enter, move within, and then leave the seafood industry, product flow is complex. Any given establishment may have a range of types of customers. For example, Fulton Market wholesalers sell most of their products to retail markets, but also include processors, restaurants, and individual consumers among their customers. A diagram of the flow of products in the seafood industry is shown in Figure 4-1. Heavier lines indicate the primary customer for each segment.

Data on where each segment in the seafood industry purchases inputs and sells products are presented graphically in a series of pie charts. These provide an additional level of detail to the product flow outlined in Figure 4-1. New York commercial fishers sell virtually all their landings to New York seafood industry establishments with the most common customer being Fulton Market wholesalers (see Figure 4-2). Seafood processors purchase almost two-thirds of their fish and seafood inputs from foreign sources (see Figure 4-3) and sell three-fourths of their products to wholesale or retail operations (see Figure 4-4). Like processors, wholesalers (other than those at Fulton Market) purchase most of their inputs of fish and seafood from foreign sources (see Figure 4-5) and sell virtually all their products to retail operations (see Figure 4-6). Unlike other wholesalers, Fulton Market relies primarily on sources in other states when purchasing fish and seafood (see Figure 4-7). The most common customer of Fulton Market wholesalers is supermarkets and other retail markets (see Figure 4-8). Grocery stores and other retail markets purchase over two-thirds of their fish and seafood from wholesalers or from Fulton Market (see Figure 4-9). Restaurants rely on wholesalers (other than those at Fulton Market) for the great majority of the fish and seafood they purchase (see Figure 4-10.)

As shown in Figures 4-1, 4-4, 4-6, and 4-8, each segment of the seafood industry sells some portion of its products to customers outside New York. Given the large population available in New York, sales to customers out of New York are a small share of total sales. For business-to-business sales, this tendency for seafood industry establishments to sell their products to other New York seafood industry establishments increases the impact of the seafood industry on the state's economy. Each time a New York seafood industry establishment purchases fish and seafood products, it adds value to that product before selling it, thereby adding value to the state economy. Conversely, when sales are made to out-of-state customers, the opportunity for adding more value to New York's economy is lost.

As discussed in Appendix A, tracing the purchases of fish and seafood inputs and the destination of fish and seafood product sales among the seafood industry segments can also be used to develop estimates of total fish and seafood related sales for each segment. By estimating the value of purchases of fish and seafood products made by each segment, the value added to these inputs by that segment can be estimated. The total of the value of purchases of fish and seafood products and the value added equals the value of products sold by that segment. For example, in 1999 New York processors purchased an estimated $187.4 million of fish and seafood as inputs to their processing operations. On average, a processor increased the value of each purchased fish or seafood product by 97 percent according to data from the National Marine Fisheries Service (NMFS, 2000a). Thus, New York processors added $181.8 million in value to their fish and seafood

Figure 4-1. Flow of Fish and Seafood Products in New York State

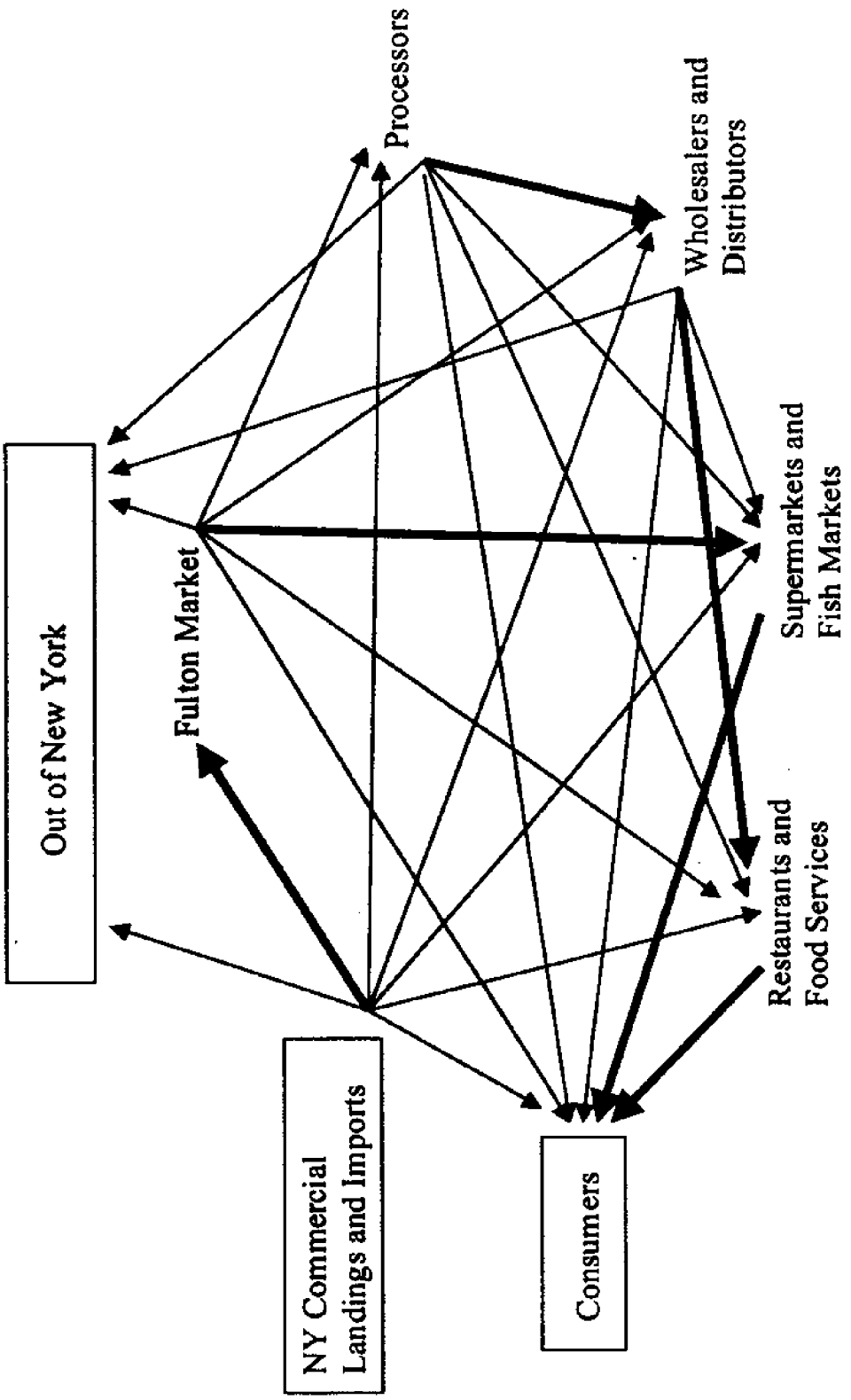
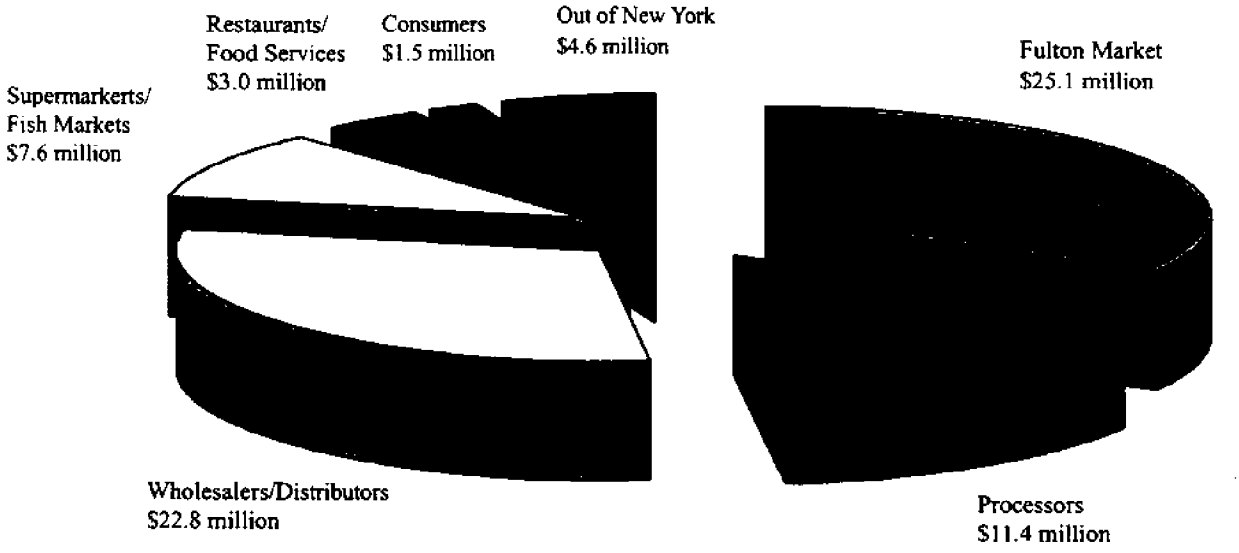
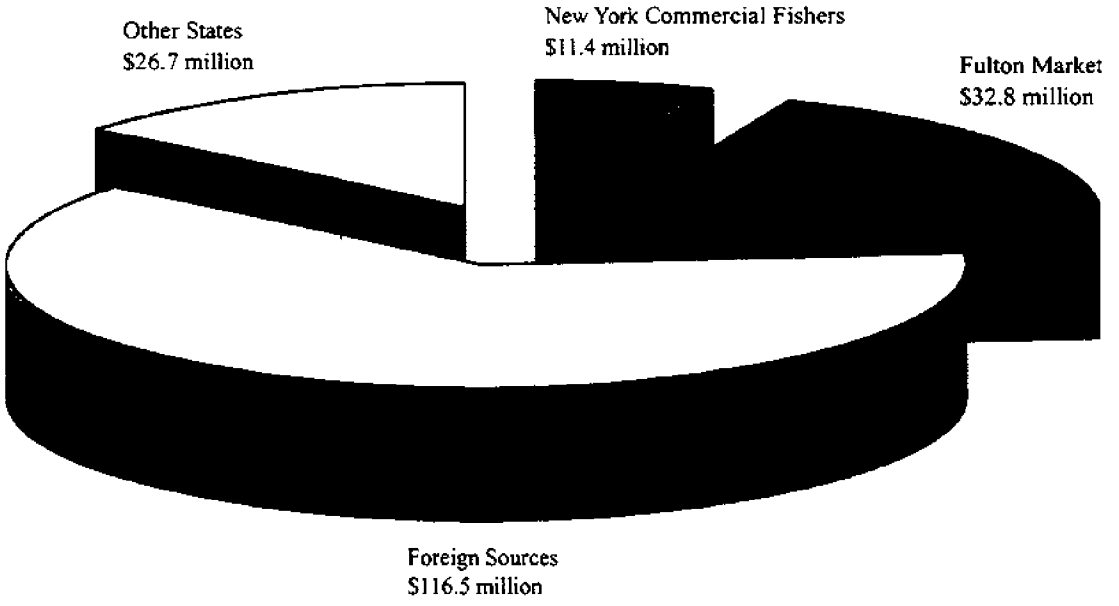


Figure 4-2. Commercial Fishers' Sales Destinations



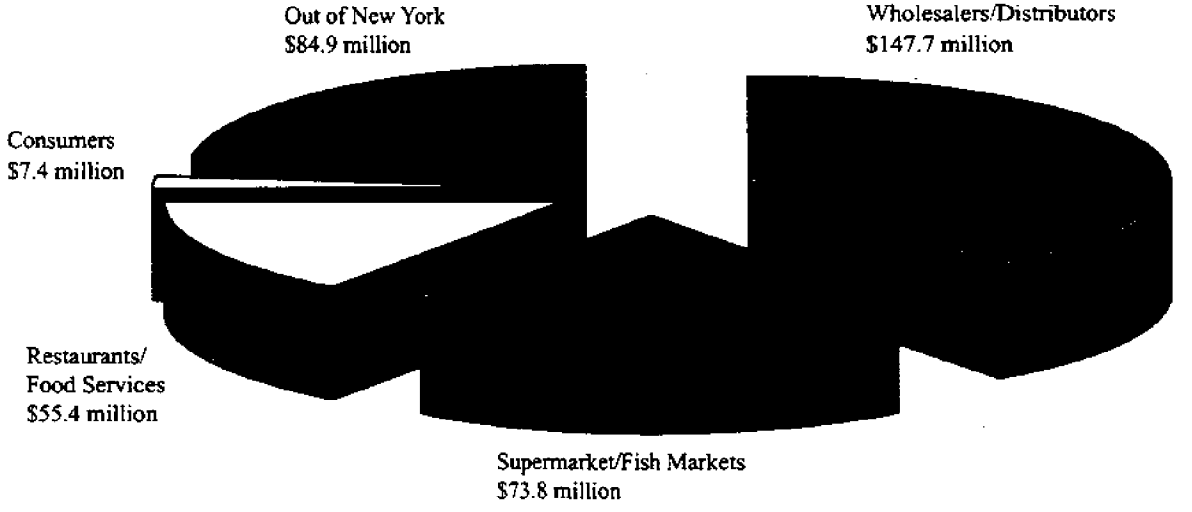
Source: Appendix C.

Figure 4-3. Processors' Sources of Purchased Fish and Seafood Inputs



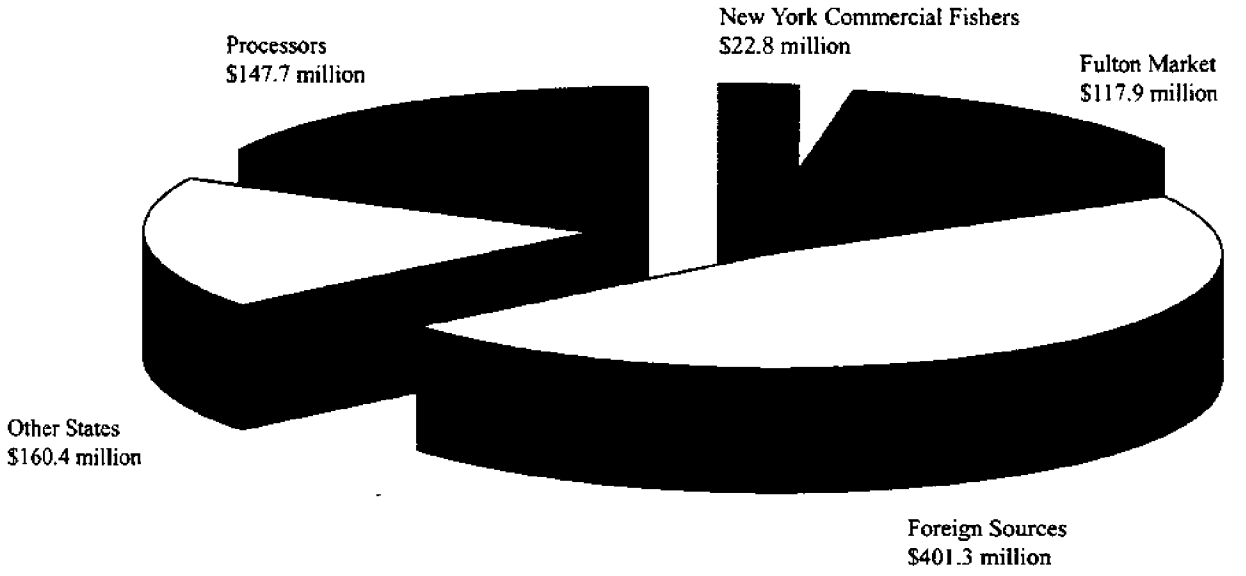
Source: Appendix C.

Figure 4-4. Processors' Sales Destinations



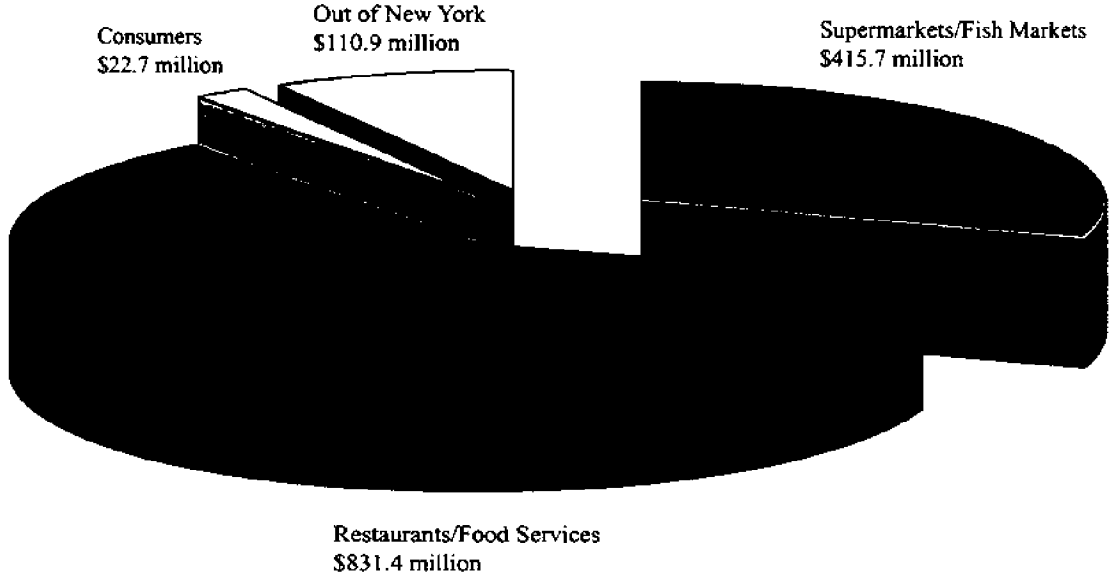
Source: Appendix C.

Figure 4-5. Wholesalers/Distributors' Sources of Purchased Fish and Seafood Inputs



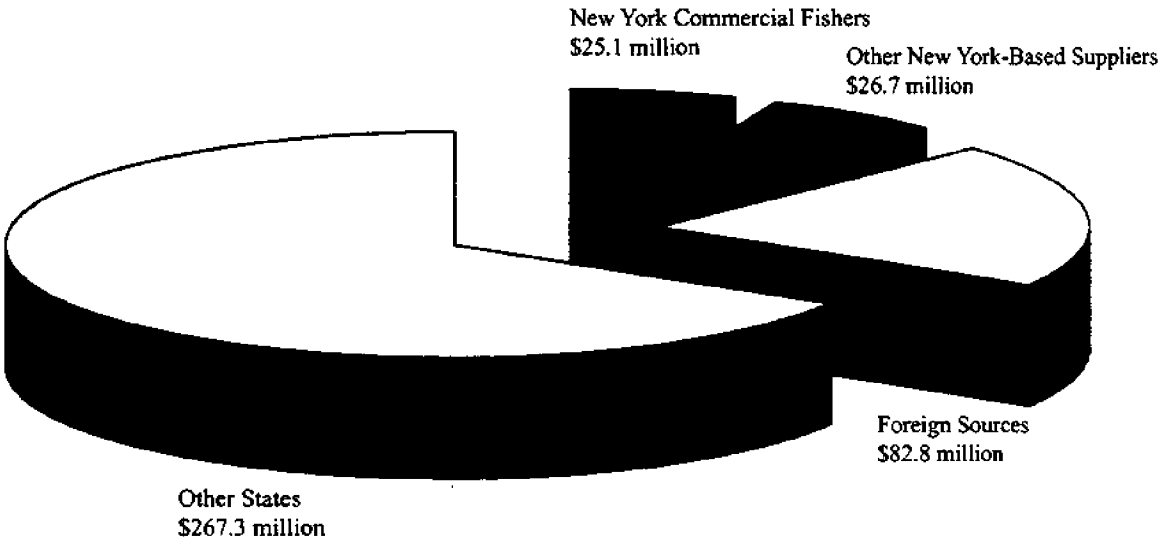
Source: Appendix C.

Figure 4-6. Wholesalers/Distributors' Sales Destination



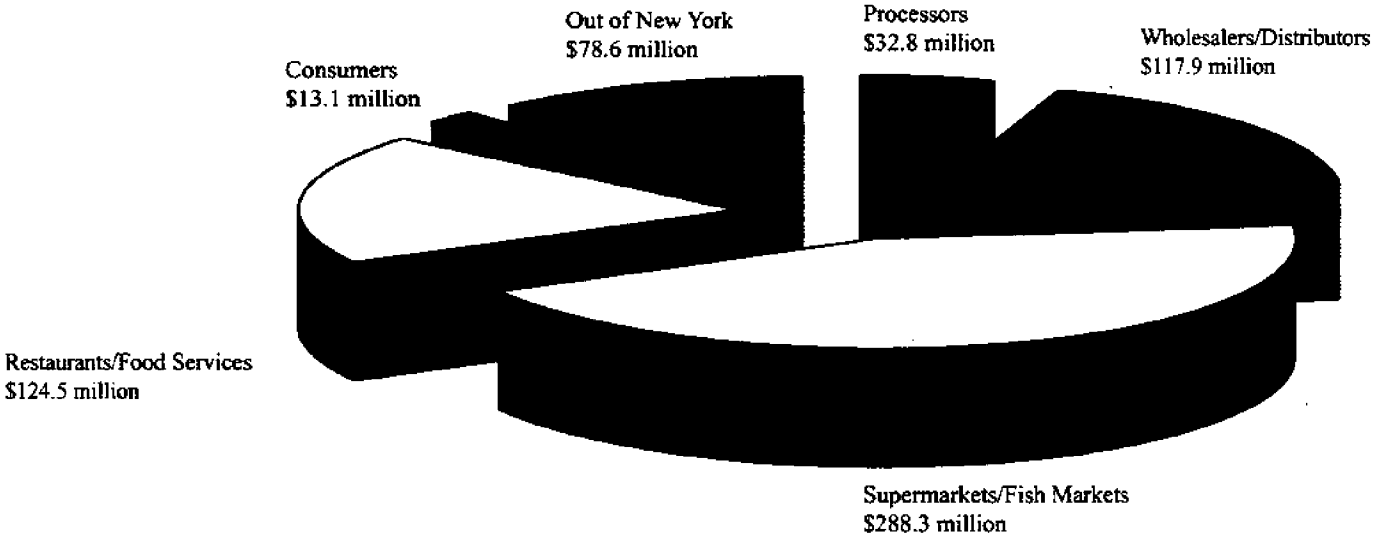
Source: Appendix C.

Figure 4-7. Fulton Market's Sources of Purchased Fish and Seafood Inputs



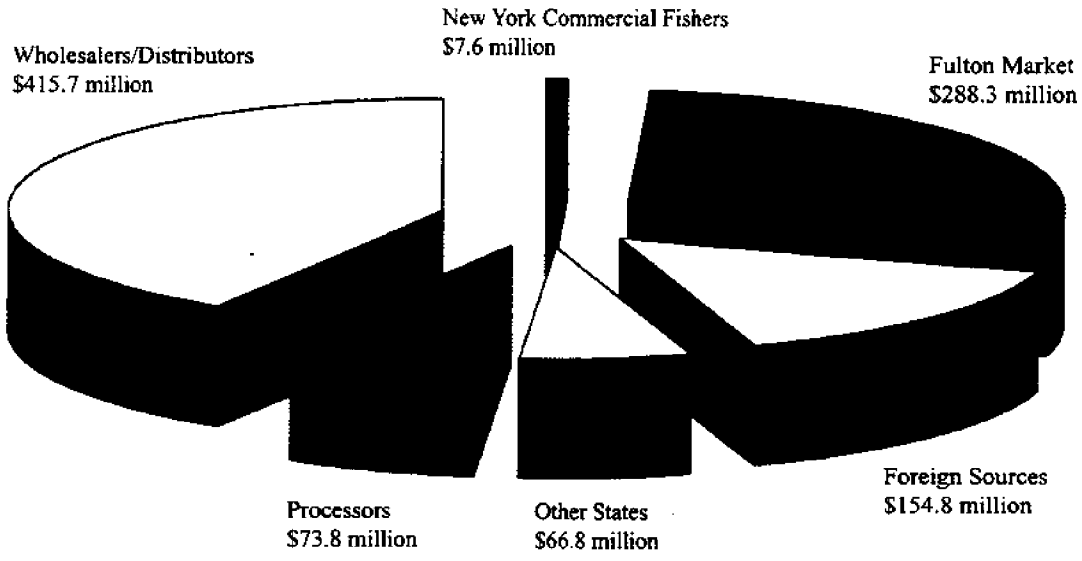
Source: Appendix C.

Figure 4-8. Fulton Market's Sales Destinations



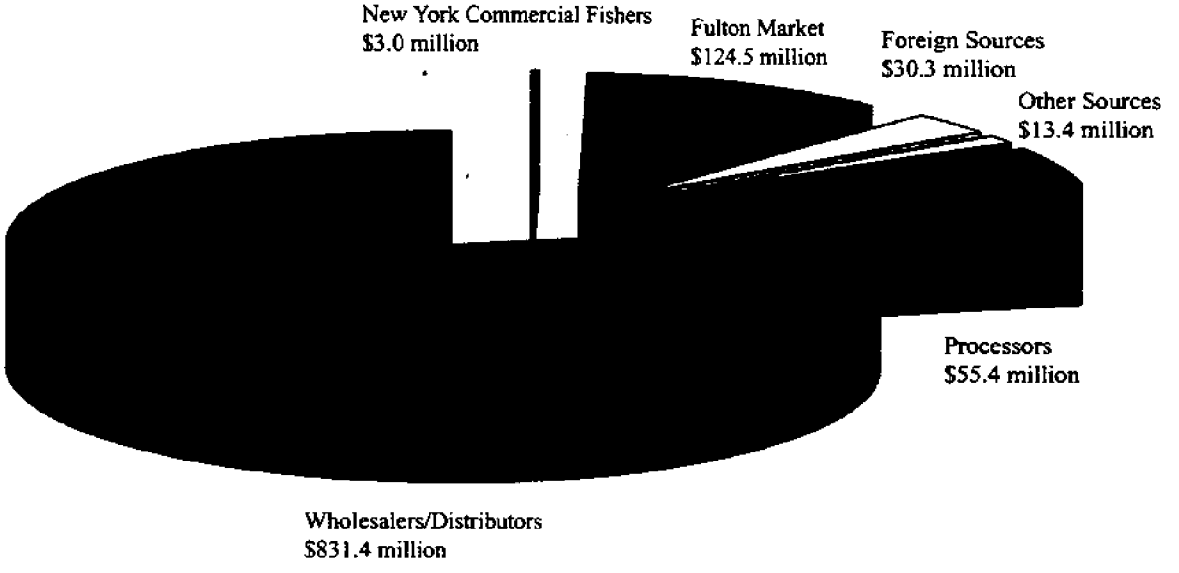
Source: Appendix C.

Figure 4-9. Supermarkets/Fish Markets' Sources of Purchased Fish and Seafood Products



Source: Appendix C.

Figure 4-10. Restaurants/Food Services' Sources of Purchased Fish and Seafood Products



Source: Appendix C.

inputs. Total 1999 sales by processors are then estimated at $369.2 million (the sum of $187.4 million and $181.8 million).

This method was used to estimate value added and fish and seafood related sales for Fulton Market, wholesalers/distributors, processors, restaurants, and supermarkets. The particular advantage of this method is that it allows for the estimation of fish and seafood sales by all establishments in the New York seafood industry, not just those clearly identified in standard data sources. Thus, fish and seafood related sales for all supermarkets can be estimated despite the fact that these sales are only a part of supermarkets' total sales. Similarly, total sales of processed fish and seafood can be estimated despite the fact that much fish and seafood processing is carried out at establishments, particularly retail fish markets, where processing is not the principal line of business.

4.2 Foreign Trade

New York State is a major importer and exporter of seafood products accounting for almost 7 percent of U.S. seafood product imports and 4 percent of exports. As shown in Figure 4-1, imports from foreign countries are a source of inputs for the state's seafood industry. In fact, such imports are the largest source of inputs for New York's seafood industry.

4.2.1 Imports

In 1999, a total of 501.1 million pounds of seafood products valued at $1.15 billion were imported through three ports of entry in New York State. The New York City Customs District accounted for 91 percent of the total volume of seafood products imported through the state's three ports of entry and 95 percent of the total value (NMFS, 2000b). New York accounted for approximately 7 percent of the total value of seafood products imported into the U.S. in 1999 (NMFS, 2000a).

Table 4-1 presents import trends for New York State for the period 1975 through 1999. The table shows imports through each of the three Customs Districts, Buffalo, Ogdensburg, and New York City, as well as total imports. During the period the total volume of imports increased by 148 percent while the total value increased 54 percent (in 1999 dollars). However, imports through the Buffalo Customs District declined during the period. The volume of imports into Buffalo declined 27 percent and the value by 43 percent (NMFS, 2000b).

While these imports enter the U.S. through New York's three ports of entry, not all imports are destined for New York customers. This is particularly true for imports that enter the U.S. through New York City, a port serving New Jersey and other states as well as New York. While there are no readily available data indicating the customers for these imports, an estimated one-third of imports through New York City are destined for New Jersey and other locations outside New York.[1]

[1] This estimate is based principally on a comparison of New York and New Jersey populations. No port of entry in New Jersey is shown on Customs Service data on imports.

Table 4-1. Trends in Volume and Value of Seafood Imports from New York State by Customs District, 1975-1999

Year	Imports by Customs District (Pounds)				Percent Change in Volume of Imports From Previous Year	Value of Imports by Customs District (1999 Dollars)				Percent Change in Volume of Imports From Previous Year
	Buffalo	Ogdensburg	NYC	NYS Total		Buffalo	Ogdensburg	NYC	NYS Total	
1975	14,807,106	16,634,297	170,542,416	201,983,819	--	$ 28,360,520	$ 23,377,379	$ 690,318,532	$ 742,056,430	--
1976	14,972,108	15,317,090	180,474,676	210,763,874	4.3%	$ 29,322,548	$ 20,352,056	$ 875,196,747	$ 924,871,351	24.6%
1977	15,528,357	15,228,485	153,306,385	184,063,227	-12.7%	$ 28,670,514	$ 19,008,001	$ 784,519,244	$ 832,197,759	-10.0%
1978	11,044,099	22,244,553	153,020,093	186,308,744	1.2%	$ 26,235,691	$ 25,790,248	$ 688,767,425	$ 740,793,364	-11.0%
1979	9,364,112	26,573,295	162,553,916	198,491,324	6.5%	$ 25,770,534	$ 27,691,231	$ 821,197,855	$ 874,659,620	18.1%
1980	7,149,068	18,506,478	137,653,007	163,308,553	-17.7%	$ 22,210,963	$ 16,987,717	$ 630,822,565	$ 670,021,245	-23.4%
1981	7,847,720	25,761,441	154,398,300	188,007,460	15.1%	$ 18,585,685	$ 21,424,931	$ 689,990,645	$ 730,001,262	9.0%
1982	9,332,185	35,583,359	168,021,941	212,937,485	13.3%	$ 16,846,166	$ 27,884,011	$ 690,157,602	$ 734,887,779	0.7%
1983	10,890,628	26,258,870	203,970,963	241,120,460	13.2%	$ 24,476,756	$ 19,935,797	$ 836,088,641	$ 880,501,194	19.8%
1984	9,551,566	26,848,251	242,131,672	278,531,489	15.5%	$ 20,448,058	$ 19,551,154	$ 900,596,859	$ 940,596,070	6.8%
1985	8,815,742	21,920,438	279,605,240	310,341,421	11.4%	$ 17,056,571	$ 15,412,749	$ 932,493,694	$ 964,963,014	2.6%
1986	11,089,051	22,169,311	318,406,289	351,664,650	13.3%	$ 22,942,291	$ 52,831,750	$ 1,132,397,910	$ 1,208,171,950	25.2%
1987	9,425,786	16,823,991	322,863,350	349,113,128	-0.7%	$ 23,973,250	$ 43,428,841	$ 1,198,984,590	$ 1,266,386,681	4.8%
1988	8,118,026	14,070,819	300,611,507	322,800,352	-7.5%	$ 19,803,538	$ 31,210,097	$ 1,059,531,407	$ 1,110,545,042	-12.3%
1989	8,825,837	16,673,227	328,850,115	354,349,178	9.8%	$ 17,138,213	$ 29,142,913	$ 1,055,980,213	$ 1,102,261,340	-0.7%
1990	6,455,996	14,445,278	305,097,081	325,998,355	-8.0%	$ 15,037,837	$ 30,210,168	$ 875,354,225	$ 920,602,229	-16.5%
1991	6,719,465	8,445,678	290,372,009	305,537,152	-6.3%	$ 10,716,193	$ 20,560,729	$ 836,264,459	$ 867,541,380	-5.8%
1992	9,405,233	6,202,104	298,510,388	314,117,725	2.8%	$ 16,625,122	$ 15,609,463	$ 830,260,432	$ 862,495,017	-0.6%
1993	9,337,156	13,307,485	291,029,872	313,674,513	-0.1%	$ 26,012,600	$ 28,833,542	$ 840,921,445	$ 895,767,587	3.9%
1994	10,962,526	8,626,452	267,115,311	286,704,289	-8.6%	$ 19,333,408	$ 20,808,899	$ 872,952,530	$ 913,094,836	1.9%
1995	10,962,526	12,045,040	247,733,341	270,740,907	-5.6%	$ 11,219,646	$ 23,441,181	$ 791,759,039	$ 826,419,867	-9.5%
1996	17,125,703	20,548,782	254,692,203	292,366,687	8.0%	$ 11,550,584	$ 39,846,525	$ 725,857,419	$ 777,254,528	-5.9%
1997	12,675,271	28,631,786	285,323,756	326,630,813	11.7%	$ 10,300,840	$ 51,861,311	$ 815,981,627	$ 878,143,777	13.0%
1998	16,542,857	20,576,707	309,239,623	346,359,187	6.0%	$ 15,038,311	$ 34,763,053	$ 886,841,598	$ 936,642,962	6.7%
1999	10,775,588	32,916,877	457,391,051	501,083,515	44.7%	$ 16,262,434	$ 41,030,249	$ 1,087,907,504	$ 1,145,200,187	22.3%
% Change 1975-1999	-27.2%	97.9%	168.2%	148.1%		-42.7%	75.5%	57.6%	54.3%	

Source: NMFS, 2000b.

4.2.2 Exports

In 1999, 158 million pounds of seafood products valued at $339.2 million were exported from New York State. The New York City Customs District accounted for 55 percent of the total volume of seafood products exported from the State and 69 percent of the total value (NMFS, 2000b). New York accounted for approximately 3 percent of the total value of seafood products exported from the U.S. in 1999 (NMFS, 2000a).

Table 4-2 presents export trends for New York State for the period 1975 through 1999. The table shows exports through each of the three Customs Districts, Buffalo, Ogdensburg, and New York City, as well as total imports. During the period the total volume of exports increased by 255 percent while the total value increased 279 percent (NMFS, 2000b).

4.2.3 Re-exports

The Bureau of the Census defines re-exports as "products which have entered the U.S. as imports and not sold, which at time of re-export, are in substantially the same condition as when imported." Imported seafood products sold in the U.S. and then exported are counted as exports by the Bureau of the Census (NMFS, 2000b).

In 1999, 22.1 million pounds of seafood products valued at $45.72 million were re-exported from New York State. [Most re-exports are intended for Canada.] The Ogdensburg Customs District accounted for 44 percent of the total volume of seafood products re-exports and 45 percent of their total value. Buffalo accounted for 40 percent of the volume of re-exports and 43 percent of their value. New York City accounted for the remainder (NMFS, 2000b).

Table 4-3 presents re-export trends for New York State for the period 1975 through 1999. The table shows imports through each of the three Customs Districts, as well as total re-exports. During the period the total volume of re-exports increased by 121 percent while the total value increased 101 percent. Buffalo experienced the largest growth in re-exports with a 465 percent increase in volume and a 299 percent increase in volume.

4.2.4 Trade Balance

While the value of seafood imports remained more than three times the value of exports in 1999, the gap narrowed over time. Table 4-4 shows trends in the seafood trade balance for the period 1975 through 1999. During this period, the ratio of the value of imports to the value of exports has improved from 8.28 to 1.0 in 1975 to a low of 1.96 in 1995. The ratio rose steadily after 1995 and was 3.38 to 1.0 in 1999.

4.2.5 Mode of Import and Export

Seafood imports arrive in New York by sea, air and land. In 1999, about 54 percent of imports arrived by land, 36 percent by sea and 11 percent by air. About 54 percent of exports by pounds from New York were by land, 23 percent by sea, and 24 percent by

Table 4-2. Trends in Volume and Value of Seafood Exports from New York State by Customs District, 1975-1999

Year	Exports by Customs District (Pounds)				Percent Change in Volume of Exports From Previous Year	Value of Exports by Customs District (1999 Dollars)				Percent Change in Volume of Exports From Previous Year
	Buffalo	Ogdensburg	NYC	NYS Total		Buffalo	Ogdensburg	NYC	NYS Total	
1975	7,285,927	16,634,297	20,563,927	44,484,152	--	$ 23,168,152	$ 23,377,379	$ 43,025,269	$ 89,570,800	--
1976	10,588,137	15,317,090	41,051,449	66,956,676	50.5%	$ 29,145,896	$ 20,352,056	$ 54,760,520	$ 104,258,473	16.4%
1977	10,097,822	15,228,485	28,553,819	53,880,126	-19.5%	$ 26,978,725	$ 19,008,001	$ 44,893,314	$ 90,880,041	-12.8%
1978	10,152,969	22,244,553	30,989,452	63,386,974	17.6%	$ 28,186,906	$ 25,790,248	$ 66,833,841	$ 120,810,995	32.9%
1979	8,775,813	26,573,295	31,025,960	66,375,068	4.7%	$ 25,988,308	$ 27,691,231	$ 86,257,209	$ 139,936,748	15.8%
1980	7,547,685	18,506,478	58,146,800	84,200,963	26.9%	$ 22,541,599	$ 16,987,717	$ 97,864,046	$ 137,393,362	-1.8%
1981	6,822,855	25,761,441	54,837,570	87,421,866	3.8%	$ 21,167,117	$ 21,424,931	$ 80,522,062	$ 123,114,110	-10.4%
1982	6,241,894	35,583,359	29,412,487	71,237,740	-18.5%	$ 16,770,529	$ 27,884,011	$ 67,165,264	$ 111,819,804	-9.2%
1983	14,712,557	26,258,870	37,727,172	78,698,599	10.5%	$ 27,122,605	$ 19,935,797	$ 70,342,328	$ 117,400,730	5.0%
1984	9,580,117	26,848,251	48,199,352	84,627,720	7.5%	$ 28,259,947	$ 19,551,154	$ 77,455,236	$ 125,266,336	6.7%
1985	4,835,654	21,920,438	26,799,108	53,555,200	-36.7%	$ 17,204,094	$ 15,412,749	$ 54,162,640	$ 86,779,482	-30.7%
1986	4,042,478	22,169,330	29,086,101	55,297,910	3.3%	$ 12,662,202	$ 52,831,750	$ 76,002,217	$ 141,496,170	63.1%
1987	5,069,855	16,823,991	30,617,319	52,511,165	-5.0%	$ 16,584,608	$ 43,428,841	$ 91,543,355	$ 151,556,803	7.1%
1988	4,788,861	14,070,687	37,762,542	56,622,090	7.8%	$ 14,531,281	$ 31,210,097	$ 109,953,381	$ 155,694,759	2.7%
1989	8,836,934	16,673,227	47,668,137	73,178,297	29.2%	$ 14,147,907	$ 29,142,913	$ 128,929,142	$ 172,219,961	10.6%
1990	24,359,577	14,445,278	73,121,088	111,925,943	52.9%	$ 65,079,520	$ 30,210,168	$ 175,265,670	$ 270,555,357	57.1%
1991	20,778,093	8,445,678	116,082,531	145,306,302	29.8%	$ 68,199,236	$ 20,560,729	$ 240,972,270	$ 329,732,235	21.9%
1992	34,396,760	6,202,104	112,399,055	152,997,919	5.3%	$ 55,790,751	$ 15,609,463	$ 248,616,235	$ 320,016,449	-2.9%
1993	30,042,941	13,307,485	117,738,326	161,088,751	5.3%	$ 66,212,546	$ 28,833,542	$ 283,984,168	$ 379,030,256	18.4%
1994	32,857,306	8,626,452	137,259,004	178,742,762	11.0%	$ 58,881,457	$ 20,808,899	$ 321,033,675	$ 400,724,031	5.7%
1995	32,857,306	12,045,040	128,221,771	173,124,117	-3.1%	$ 62,290,894	$ 23,441,181	$ 336,978,542	$ 422,710,617	5.5%
1996	29,866,322	20,548,782	114,696,174	165,111,278	-4.6%	$ 53,267,495	$ 39,846,525	$ 279,430,650	$ 372,544,670	-11.9%
1997	43,103,562	28,631,786	120,936,978	192,672,326	16.7%	$ 64,574,333	$ 51,861,311	$ 272,798,662	$ 389,234,306	4.5%
1998	35,390,694	20,517,236	120,936,978	176,844,907	-8.2%	$ 60,963,925	$ 34,763,053	$ 261,811,717	$ 357,538,695	-8.1%
1999	37,611,786	32,916,877	87,438,456	157,967,119	-10.7%	$ 63,456,062	$ 41,030,249	$ 234,749,880	$ 339,236,191	-5.1%
% Change 1975-1999	416.2%	97.9%	325.2%	255.1%		173.9%	75.5%	445.6%	278.7%	

Source: NMFS, 2000b.

Table 4-3. Trends in Volume and Value of Seafood Re-exports from New York State by Customs District, 1975-1999

Year	Re-exports by Customs District (Pounds)				Percent Change in Volume of Re-exports From Previous Year	Value of Re-exports by Customs District (1999 Dollars)				Percent Change in Volume of Re-exports From Previous Year
	Buffalo	Ogdensburg	NYC	NYS Total		Buffalo	Ogdensburg	NYC	NYS Total	
1975	1,562,148	6,329,073	2,080,079	9,971,300	--	$ 4,932,095	$ 8,894,703	$ 8,886,497	$ 22,713,294	--
1976	2,085,769	7,075,786	2,117,077	11,278,632	13.1%	$ 6,753,422	$ 9,401,707	$ 11,083,326	$ 27,238,455	19.9%
1977	1,710,760	9,800,042	1,520,661	13,031,463	15.5%	$ 5,412,286	$ 12,232,288	$ 11,303,898	$ 28,948,472	6.3%
1978	2,378,423	9,140,905	1,975,852	13,495,181	3.6%	$ 7,860,458	$ 10,597,930	$ 10,171,650	$ 28,630,038	-1.1%
1979	2,283,993	9,167,264	1,802,716	13,253,974	-1.8%	$ 5,265,113	$ 9,552,930	$ 7,362,093	$ 22,180,137	-22.5%
1980	1,111,090	6,426,432	1,492,104	9,029,626	-31.9%	$ 4,142,753	$ 5,899,037	$ 5,510,428	$ 15,552,219	-29.9%
1981	1,060,932	5,123,066	1,172,143	7,356,141	-18.5%	$ 3,371,346	$ 4,260,683	$ 3,441,984	$ 11,074,014	-28.8%
1982	1,112,540	4,668,004	1,122,778	6,903,322	-6.2%	$ 4,018,096	$ 3,657,965	$ 3,917,694	$ 11,593,755	4.7%
1983	1,314,573	6,474,568	1,809,218	9,598,359	39.0%	$ 3,505,672	$ 4,915,508	$ 5,076,758	$ 13,497,938	16.4%
1984	1,751,656	7,446,390	1,311,421	10,509,467	9.5%	$ 5,267,109	$ 5,422,532	$ 2,952,215	$ 13,641,856	1.1%
1985	763,744	6,539,575	1,215,163	8,518,482	-18.9%	$ 2,879,613	$ 4,598,121	$ 5,747,664	$ 13,225,397	-3.1%
1986	636,991	8,839,361	772,394	10,248,747	20.3%	$ 2,784,876	$ 16,161,440	$ 2,714,937	$ 21,661,253	63.8%
1987	1,526,945	8,434,300	1,283,674	11,244,919	9.7%	$ 4,696,813	$ 21,413,887	$ 5,678,138	$ 31,788,838	46.8%
1988	1,179,236	8,188,357	2,268,317	11,635,910	3.5%	$ 3,067,585	$ 21,007,555	$ 8,649,125	$ 32,724,265	2.9%
1989	1,706,493	8,841,163	2,730,509	13,278,165	14.1%	$ 3,506,340	$ 16,845,201	$ 10,619,969	$ 30,971,509	-5.4%
1990	6,942,819	11,260,919	1,387,731	19,591,469	47.5%	$ 25,775,205	$ 29,090,680	$ 6,523,535	$ 61,389,420	98.2%
1991	5,952,511	8,994,901	2,474,112	17,421,524	-11.1%	$ 27,265,557	$ 27,127,180	$ 6,681,186	$ 61,073,922	-0.5%
1992	7,375,280	7,619,059	2,135,861	17,130,200	-1.7%	$ 22,693,064	$ 22,300,859	$ 5,345,734	$ 50,339,657	-17.6%
1993	6,388,086	10,046,112	2,426,971	18,861,170	10.1%	$ 24,272,469	$ 21,513,296	$ 5,664,891	$ 51,450,656	2.2%
1994	9,475,432	7,714,110	5,291,427	22,480,969	19.2%	$ 20,425,224	$ 18,765,493	$ 12,291,095	$ 51,481,812	0.1%
1995	9,475,432	9,565,053	5,154,564	24,195,048	7.6%	$ 27,207,741	$ 18,087,503	$ 11,725,777	$ 57,021,021	10.8%
1996	11,988,927	14,840,808	4,301,914	31,131,650	28.7%	$ 28,737,533	$ 25,904,361	$ 10,993,104	$ 65,634,998	15.1%
1997	6,550,733	8,075,381	1,765,480	16,391,595	-47.3%	$ 18,071,967	$ 18,593,597	$ 8,239,138	$ 44,904,702	-31.6%
1998	6,657,963	8,773,377	1,765,480	17,196,819	4.9%	$ 17,501,064	$ 18,348,928	$ 5,221,909	$ 41,071,901	-8.5%
1999	8,827,725	9,714,705	3,523,247	22,065,676	28.3%	$ 19,659,710	$ 20,592,220	$ 5,472,202	$ 45,724,132	11.3%
% Change 1975-1999	465.1%	53.5%	69.4%	121.3%		298.6%	131.5%	-38.4%	101.3%	

Source: NMFS, 2000b.

Table 4-4. Trends in the Seafood Product Trade Balance: Ratio of Value of Imports to Value of Exports

Year	Ratio of Imports to Exports (Exports = 1)
1975	8.3
1976	8.9
1977	9.2
1978	6.1
1979	6.3
1980	4.9
1981	5.9
1982	6.6
1983	7.5
1984	7.5
1985	11.1
1986	8.5
1987	8.4
1988	7.1
1989	6.4
1990	3.4
1991	2.6
1992	2.7
1993	2.4
1994	2.3
1995	2.0
1996	2.1
1997	2.3
1998	2.6
1999	3.4

Source: Derived from Tables 4-1 and 4-2.

air. Table 4-5 provides information on imports and exports by mode of transport (Journal of Commerce, 2000).

Table 4-5. Mode of Import and Export, 1999

	Imports				Exports			
Mode	Volume (pounds.)	Percent of Total Volume	Value	Percent of Total Value	Volume (pounds.)	Percent of Total Volume	Value	Percent of Total Value
Land	267,842,482	53.5%	NA	NA	85,085,512	53.9%	NA	NA
Sea	180,532,000	36.0%	NA	NA	35,574,000	22.5%	NA	NA
Air	52,710,033	10.5%	$66,487,000	5.8%	37,307,607	23.6%	$49,626,000	14.6%
Total	501,083,515	100.0%	$1,145,200,187	100.0%	157,967,119	100.0%	$339,236,191	100.0%

Sources: NMFS, 2000b; Journal of Commerce, 2000; and U.S. DOC BOC, 2000b.
NA – not available.

4.2.6 Number of Importers and Exporters

In 1999, the Port Import Export Reporting Service (PIERS) reported a total of 171 firms involved in the oceanborne import and export of seafood products into New York State (Journal of Commerce, 2000). Of the 171 firms, 147 were listed as importers of seafood products and 50 were listed as exporters. Table 4-6 shows the location of those firms in New York State. About 83 percent are located in New York City.

Table 4-6. Oceanborne Imports and Exports of Seafood Products, 1999

Location of Importer/Exporter		Total Number of Importers and Exporters	Number of Importers	Imports (pounds)	Percent of Total Imports	Number of Exporters	Exports (pounds)	Percent of Total Exports
Location	Borough (NYC only)							
Unknown		2	2	636,000	0.4%	0	0	0.0%
Other than NYC		27	19	27,944,000	15.5%	13	9,546,000	26.8%
NYC	Borough unknown	2	2	334,000	0.2%	1	38,000	0.1%
NYC	Bronx	9	3	1,698,000	0.9%	8	78,000	0.2%
NYC	Brooklyn	39	38	33,106,000	18.3%	5	3,992,000	11.2%
NYC	Manhattan	58	51	84,856,000	47.0%	16	12,002,000	33.7%
NYC	Queens	34	32	31,958,000	17.7%	7	9,918,000	27.9%
NYC Total		142	126	151,952,000	84.2%	37	26,028,000	73.2%
NY State Total		171	147	180,532,000	100.0%	50	35,574,000	100.0%

Source: Journal of Commerce, 2000.
NYC – New York City.

No information was found on the number of firms involved in the import and export of seafood products by land and air, though many of the companies involved in oceanborne import and export are assumed to also import and export by air and land.

4.3 Seafood Wholesaling and Distribution

Wholesale and distribution establishments are generally in the business of purchasing large volumes of fish and seafood and packaging or repackaging these products in quantities suitable for retail establishments. A small share of sales is to processors or other customers. Many wholesalers also store and distribute fish and seafood as a part of their general business activities.

As is true for all other segments of the seafood industry, developing a profile of the wholesale and distribution segment is complicated by the fact that much of this activity is carried out by establishments that are involved in other activities. For example, a wholesale grocer may handle a broad range of products including fish and seafood. If fish and seafood constitute a minority of this establishment's business, it will be classified as a wholesale grocer, but not as a wholesale fish and seafood establishment. Distinguishing the portion of such a wholesaler's business that depends on fish and seafood is not directly possible from standard data sources such as the U.S. Census. Alternatively, large retail grocery businesses also engage in wholesale purchases of products as well as transportation services and other non-retail business activities. Nonetheless, because that company's prinicipal business is retail, all activities will be reported under the retail category by the U.S. Census.

A unique feature of the wholesale segment in New York is Fulton Market. Techlaw estimates that Fulton Market accounts for roughly one-third of sales by the state's wholesalers. Accordingly, it is separately discussed.

4.3.1 Fulton Market

Fulton Market is a collection of wholesale establishments, located in lower Manhattan, where fish has been sold since the 19th century. One of five public markets, managed by New York City, Fulton comprises approximately 50 separate establishments. In addition, to the wholesale businesses, the market includes workers whose job is to load and unload fish and to move fish within the market.

Employment in the market is currently estimated at 600 workers. These include employees of the wholesale establishments as well as those workers who load, unload, and move fish. This estimate is based on 539 workers at Fulton who receive photo identification from the City of New York. Any worker who actually handles fish is required to have such identification although the city will provide photo identification to Fulton Market workers who do not handle fish and are, therefore, not required to have this identification (Weinberg, 2001; Sasanow, 2001). Office workers (e.g., bookkeepers) for the 50 wholesale establishments do not need this identification. The estimate for total Fulton Market employment assumes that on average about 1 employee per establishment does not have a New York City photo identification.

Sales in 1999 by Fulton Market establishments are estimated at $655 million. This estimate is based on the volume of fish handled by Fulton Market in that year when 218.3 million pounds were handled by the market's establishments, estimates of the sources and value of these inputs, and the value added by Fulton Market establishments.

4.3.2 Number of Wholesale Establishments

There were 310 New York wholesale establishments exclusively or primarily devoted to fish and seafood in 1997. These 310 establishments included all the Fulton Market establishments, but included none of the state's wholesale establishments for which fish and seafood was a secondary line of business. These 310 fish and seafood wholesalers constituted 7 percent of all New York wholesale groceries in that year. See Table 4-7.

Table 4-7. Economic Characteristics of New York Wholesale Groceries and Wholesale Fish and Seafood Markets, 1997 and 1992

SIC Code—Industry Name	Number of establishments		Sales (millions of 1999 dollars)		Number of employees	
	1997	1992	1997	1992	1997	1992
514, Groceries and related products	4578	4797	NA	$49,543.1	50,000-99,999	54,264
5146, Fish and seafood	310	319	NA	$1,076.7	1000-2499	2135

Source: U.S. DOC, BOC, 2000b.
NA- not available.

4.3.3 Employment

For the 310 fish and seafood wholesalers, employment in 1997 was estimated at between 1,000 and 2,499 employees. (See Table 4-7.) This range of employment is provided by the Bureau of the Census to avoid disclosing data. As this range of employment only pertains to wholesale establishments exclusively or primarily devoted to fish and seafood, it undercounts the total by excluding employment in other wholesale groceries that is related to fish and seafood.

Total employment in the wholesale sector can be estimated by using sales per employee for all U.S. fish and seafood wholesalers and an estimate of total fish and seafood sales by New York wholesalers. This estimate, discussed below as a part of the seafood industry's contribution to New York's economy, is 4,100 workers and includes the estimated 600 workers at Fulton Market.

4.3.4 Industry Sales

As shown in Table 4-7, wholesale establishments exclusively or primarily devoted to fish and seafood had sales of $1.1 billion in 1992. Sales for 1997 were not reported by the Bureau of the Census to avoid data disclosure. As is true for employment and establishments, this estimate of sales excluded sales of fish and seafood by establishments for which these products were a secondary line.

Total sales of wholesale fish and seafood products in 1999 are estimated at $2.0 billion, including sales by Fulton Market establishments estimated at $655 million. Sales of wholesale fish and seafood products in 1999 by establishments other than those at Fulton Market are estimated at $1.4 billion. This estimate is based on estimates of the sources and value of purchases made by wholesalers and the value added by wholesale establishments.

4.4 Seafood Processing

The seafood processing industry in New York is characterized by a small number of establishments that exclusively or primarily process seafood and many more that process seafood as one of a number of activities. In the latter case, the establishments may be primarily engaged in retail, wholesale or other activities; as a result, U.S. Census and other standard data sources do not characterize these establishments as seafood processors. To respond to these difficulties in developing a profile of the seafood processing segment, a variety of data sources are used.

In 1998, the Bureau of the Census reported a total of 18 establishments in New York where seafood production, preparation and packaging (NAICS 3117)[2] was the primary activity. In addition to these 18 establishments, an analysis of data from the New York Department of Agriculture and Markets shows that there are over 1,200 establishments that do at least a limited amount of seafood processing.

4.4.1 Number of Establishments

Of the 18 firms reported by Bureau of the Census where seafood production, preparation and packaging (NAICS 3117) was the primary activity, 7 were involved in seafood canning (NAICS 311711) and 11 in fresh and frozen seafood processing (NAICS 311712). Table 4-8, presents information on employment and value of shipments in these industries.

[2] Until recently, the Bureau of the Census used the Standard Industrial Classification (SIC) Code system to describe the various sectors of the economy. However, the Bureau is currently in the process of adopting a new coding system, the North American Industry Classification System (NAICS). Beginning with 1997 data, the Bureau began reporting data on the basis of both systems, however, the latest data available for the seafood processing industry, 1998, is available only on a NAICS basis. The NAICS codes for seafood canning (NAICS 311711) and fresh and frozen seafood processing (NAICS 311712) are very nearly equivalent to the SIC Codes for canned and cured fish and seafoods (SIC 2091) and fresh and frozen prepared fish (SIC 2092), respectively. The marine fats and oils portion of the SIC Code for animal and marine fats and oils (SIC 2077) is now included in part in each of the two NAICS codes for seafood processing.

Table 4-8. Seafood Processors in New York State, 1997 and 1998
[North American Industrial Classification System (NAICS) Basis]

NAICS Code—Industry Name	Number of Establishments		Number of Paid Employees		Value of Shipments (millions of 1999 dollars)	
	1997	1998	1997	1998	1997	1998
3117—Seafood Product Preparation and Packaging	12	18	293	339	$70.9	NA
31171—Seafood Canning	6	7	245	225	$59.0	NA
31172—Fresh and Frozen Seafood Processing	6	11	48	114	$11.9	NA

Source: U.S. DOC, BOC, 2000a.
NA – not available.

An analysis of recent New York Department of Agriculture and Markets records shows that there are at least 1,250 establishments that do some seafood processing (NYS Dept. of Ag. and Markets, 2000). Table 4-9 shows the number of establishments by type of seafood product processed. (It is not known whether this 1,250 includes any of the 18 establishments identified by the U.S. Census Bureau.) Of these, 1,172 are also retail markets or grocery stores (see Table 4-10). Employment data for these establishments include all workers, not just those who process fish and seafood.

Table 4-9. Number of Establishments and Employment by Seafood Product Processed, 2000

Seafood Product	Number of Establishments	Number of Employees Full-Time	Number of Employees Part-Time	Total Number of Employees
Fish (Non-Smoked)	1,051	16,186	29,617	45,803
Smoked Fish	70	1,682	6,27	2,309
Shellfish	166	3,024	4,885	7,909

Source: NYS Dept. of Ag. and Markets, 2000.

Types of seafood processing identified by the New York Department of Agriculture and Markets include:

- Baking
- Blending
- Chemical Treating
- Cooking or Other Heat Treatment
- Curing
- Dehydrating
- Grinding
- Mixing
- Packing
- Pickling
- Roasting
- Smoking
- Vacuum Packaging

Table 4-10 shows the number of establishments performing each of these processes and the full-time, part-time, and total employment at these establishments. It also shows the number of these establishments that are retail markets or groceries. By far the greatest number of establishments, 930, are packing seafood while 614 are cooking or otherwise

heat treating seafood. Most of these establishments are believed to be packing or cooking seafood for retail sale at the establishment.

Table 4-10. Number of Establishments and Employment for Establishments Processing Seafood, 2000

Process	Number of Establishments	Employment			Number that are Retail Markets or Groceries
		Full-Time	Part-Time	Total	
Baking	2	21	4	25	2
Blending	1	20	4	24	0
Chemical Treating	1	2	1	3	1
Cooking or Other Heat Treatment	614	9,646	21,402	31,048	614
Curing	22	1,293	265	1,558	22
Dehydrating	9	72	23	95	9
Grinding	83	485	72	557	83
Mixing	92	773	777	1,550	92
Packing	930	11,859	15,164	27,023	930
Pickling	9	162	349	511	9
Roasting	3	12	9	21	3
Smoking	70	1,682	627	2,309	63
Vacuum Packaging	26	1,346	194	1,540	26
Total[1]	1,250	20,931	36,952	57,883	1,172

Source: NYS Dept. of Ag. and Markets, 2000.
[1]Columns add to greater than the total because many establishments perform more than one process.

The Department of Agriculture and Markets data show that 63 establishments are smoking seafood and 9 are pickling seafood. Table 4-11 presents data on number of establishments and employment for these processors.

Table 4-11. Number of Establishments and Employment for Establishments Smoking and Pickling Seafood, 2000

Process	Number of Establishments	Employment				Number that are Retail Markets or Groceries	Number that Report Processing Solely Seafood
		Full-Time	Part-Time	Total	Average Total Employment per Establishment		
Smoking[1]	70	1,682	627	2,309	33	63	13
Pickling	9	162	349	511	57	9	3

Source: NYS Dept. of Ag. and Markets, 2000.
[1]Employment data were only available for 68 of the 70 establishments smoking seafood.

4.4.2 Employment

In 1998, the 18 establishments listed by the Census Bureau as seafood processors (NAICS 3117) had a total of 339 employees. Of this total, 225 were employed by establishments involved in seafood canning (NAICS 311711) and 114 by establishments involved in fresh and frozen seafood processing (NAICS 311712). Most of the establishments reported by the Bureau of the Census as seafood processors were small, 11 having fewer than 10 employees, with 3 additional establishments having fewer than

20 employees. Table 4-12 shows the distribution of employment in these establishments by size category.

Table 4-12. Distribution of Seafood Processors in New York State by Employment Size Category, 1998
[North American Industrial Classification System (NAICS) Basis]

NAICS Code—Industry Name	Employment Size Category						
	Total	1-4	5-9	10-19	20-49	50-99	100-249
3117—Seafood Product Preparation and Packaging	18	9	2	3	1	2	1
31171—Seafood Canning	7	2	1	2	0	1	1
31172—Fresh and Frozen Seafood Processing	11	7	1	1	1	1	0

Source: U.S. DOC, BOC, 2000a.

A substantial portion of processing activity is carried out at establishments primarily devoted to other activities, particularly retail sales. The Bureau of the Census data on seafood processors do not capture employment related to this processing activity. By estimating the total value of sales related to all seafood processing activities and estimating typical sales per employee, an estimate of total fish and seafood processing employment can be made. Using this method, New York's total seafood processing employment in 1999 is estimated at 1,500.

4.4.3 Industry Sales

Table 4-8 shows the sales for the 18 seafood processors reported by the Census Bureau. In 1997, the latest year for which data were available, sales for the seafood production, preparation and packaging industry (NAICS 3117) totaled almost $71 million. Of this total, fresh and frozen seafood processing (NAICS 31172) accounted for $11.9 million (17 percent) and seafood canning (NAICS 311711) accounted for $59 million (83 percent).

The 1,250 processors identified from the New York Department of Agriculture and Markets data are primarily retail operations. Sales of the retail sector or the seafood industry are discussed in the following section (Section 4.4).

As was noted above, a substantial portion of seafood processing is done at establishments not classified as seafood processors. By estimating the value of fish and seafood purchased by all New York processors and the value added in the course of processing, an estimate of $369 million in total 1999 sales by these processors was made.

4.4.4 Geographic Distribution of Processors

Because of concerns about disclosure of confidential data, the Bureau of the Census did not report the distribution of the 18 seafood processors by New York counties. In previous years, the Census also did not report the geographic distribution of seafood processors.

Table 4-13 shows the geographic distribution of the 1,250 establishments that process fish and seafood identified from New York State Department of Agriculture and Markets data. Slightly more than half the number of processing establishments are located in New York City. However, only about 31 percent of employment by establishments that process fish and seafood is in the city.

Table 4-13. Geographic Distribution of Seafood Processors in New York State, 2000

	Establishments		Employment	
Location	Number	Percent of Total	Number	Percent of Total
Total New York City	651	52.1%	17,730	30.6%
Manhattan	116	9.3%	5,517	9.5%
Staten Island	10	0.8%	864	1.5%
Bronx	70	5.6%	1,249	2.2%
Queens	189	15.1%	4,461	7.7%
Brooklyn	266	21.3%	5,639	9.7%
Nassau and Suffolk Counties	264	21.1%	16,268	28.1%
Rest of New York State	335	26.8%	23,885	41.3%
Total	1,250	100.0%	57,883	100.0%

Source: NYS Dept. of Ag. and Markets, 2000.

4.5 Supermarkets and Fish Markets

This sector of the seafood industry includes supermarkets/grocery stores as well as small markets. Virtually all supermarkets/grocery stores and many markets sell at least a limited quantity of seafood products, with some of the latter selling primarily or solely seafood. As noted above, larger retail grocery chains are engaged in wholesale and processing activities; but, because their main business is retail grocery sales, all activity is reported as retail by the U.S. Census and other standard data sources.

4.5.1 Number of Establishments

In 1997, the latest year for which data are available from the Bureau of the Census, there were 10,418 grocery stores (SIC 5411) and 1,175 meat and fish markets (SIC 5421) in New York State. (See Table 4-14.)

Table 4-14. Grocery Stores and Meat and Fish Markets in New York State, 1997 and 1992

SIC Code	Industry Name	Number of Establishments		Number of Employees		Sales $1999 ($000)		Amount of Payroll $1999 ($000)	
		1997	1992	1997	1992	1997	1992	1997	1992
5411	Grocery Stores	10,418	10,740	176,923	168,170	$24,325,606	$199,490	$2,590,402	$2,635,356
5421	Meat and Fish Markets	1,175	1,445	4,902	5,861	$758,847	$970,458	$81,903	$10,135

Source: U.S. DOC BOC, 2000b.

An analysis of data from the New York Department of Agriculture and Markets showed a total of 1,220 markets selling seafood.[3] Of these, 396 appeared to sell primarily or solely seafood products (NYS Dept. of Ag. and Markets, 2000).

4.5.2 Employment

In 1997, grocery stores in New York State had 176,923 employees and markets had 4,902 employees. Some, but clearly not all, of these employees were dependent upon fish and seafood for their jobs.

An analysis of data from the New York Department of Agriculture and Markets showed that the estimated total of 1,220 markets in New York State selling seafood employed a total of 7,322 people.[4] The 396 markets that sell primarily or solely seafood products had 1,465 employees. Again, because these markets sell products other than fish and seafood, not all these employees are part of the seafood industry.

By estimating the total value of sales of fish and seafood by retail grocery stores and specialty markets, total employment at these establishments related to fish and seafood can also be estimated. Based on typical sales per employee at these establishments, the estimated total employment directly related to fish and seafood is 10,100.

4.5.3 Industry Sales

Sales for grocery stores in New York State totaled $24.3 billion in 1997 and sales for meat and seafood markets totaled $759.0 million. It is estimated that seafood accounts for approximately 5 percent, or $1.3 billion of the total sales of grocery stores and markets in New York State. (See Table 4-14.)

Assuming that per employees sales for employees at markets selling primarily or solely seafood products is roughly the same as average per employee sales for the meat and seafood market industry as a whole, the 396 markets that sell primarily or solely seafood

[3] For the purpose of the analysis, it was assumed that a market was a retail food outlet of smaller than 10,000 square feet.

[4] For the purpose of the analysis, it was assumed that a market was a retail food outlet of smaller than 10,000 square feet.

products would have sales of approximately $217 million (1,465 employees x sales of $148,302 per employee).

4.6 Restaurants

New York restaurants are a major part of the state's seafood industry. By virtue of the value they add to each fish and seafood product they purchase, restaurants contribute a substantial amount to New York's economy. They are also a significant source of employment.

4.6.1 Number of Establishments

The Bureau of the Census estimated that there were 30,329 restaurants in New York state in 1997 (see Table 4-15.) This was an increase of 8 percent over the number of restaurants in 1992. These establishments include full-service and limited-service restaurants. Fish and seafood sales are made by many, but not all of these establishments.

Table 4-15. Restaurants in New York State, 1997 and 1992

SIC Code—Industry Name	Number of Establishments		Number of Employees		Sales (millions of 1999 dollars)	
	1997	1992	1997	1992	1997	1992
5812—Eating Places	30,329	28,020	375,706	338,988	$15,741.5	$14,282.2

Source: U.S. DOC, BOC, 2000b.

4.6.2 Employment

As shown in Table 4-15, total employment in New York restaurants in 1997 was estimated at 375,706. A significant portion of restaurant employment is related to fish and seafood. This employment can be estimated by considering the portion of total restaurant sales related to fish and seafood and typical sales per employee for restaurants of approximately $44,000 (in 1999 dollars). Using this method, total restaurant employment related to fish and seafood is estimated at 70,000.

4.6.3 Industry Sales

Total sales for all New York restaurants reached $15.7 billion in 1997 (see Table 4-15). Based on an estimate of the sources and value of the fish and seafood products and the value added by restaurants, sales related to fish and seafood made by restaurants in 1999 was estimated at $3.4 billion, including tip income (see Appendix B and Appendix C).

4.7 Seafood Industry's Contribution to the Economy of New York State

Using an econometric model based on the IMPLAN input/output model (see Appendix A), the New York seafood industry's contribution to New York's economy was measured in two ways. The first is the dollar value of economic activity of the seafood industry itself, the New York businesses that directly and indirectly serve this industry, and the New York businesses that serve the employees of the seafood industry, affected support

businesses, and their households. The second way of measuring this contribution is the employment that is created in the seafood industry and in all other New York businesses that serve either the industry directly or indirectly or serve the employees of the industry, affected support businesses and their households.

4.7.1 Value Added of the Seafood Industry and Its Impact on the State's Economy

The value created by the New York seafood industry as it purchased, handled, and then sold fish and seafood products in 1999 constituted a major part of the economic contribution of the industry in that year. In the way that they handle or process these purchased inputs, these seafood industry establishments create more valuable products which are then sold to customers, either other businesses or final consumers. By looking at the value added by seafood industry establishments, this study avoids the problem of double counting the contribution of the seafood industry to the state's economy. For example, the value of lobsters caught by New York commercial fishers creates economic activity that is captured in the analysis of the state's commercial fishing industry. Since many of those lobsters are purchased by the New York seafood industry, it would be double counting to consider the value of those sales of lobsters by commercial fishers as part of the economic activity of the seafood industry. What is considered part of the seafood industry's contribution to the state economy is the value added by New York processors or wholesalers that make purchases of lobsters from the state's commercial fishers.

Table 4-16 provides estimates of the value of fish and seafood purchases, value added, and sales for basic segments of the seafood industry—Fulton market, wholesalers/distributors, processors, restaurants, and supermarkets. Although it is a part of the wholesaler/distributor segment of the seafood industry, Fulton Market is treated separately because of its size and unique status within the New York seafood industry. As a result, the wholesaler/distributor data exclude Fulton Market.

Table 4-16. Financial Data for Major Segments of New York Seafood Industry
(millions of 1999 dollars)

	Fish/Seafood Purchases	Value Added	Sales
Fulton Market	$401.9	$253.2	$655.2
Wholesalers/Distributors	850.1	535.6	1,385.6
Processors	187.4	181.8	369.2
Supermarkets/Fish Markets	1,007.0	332.3	1,339.3
Restaurants/Food Services	1,057.9	2,369.1	3,427.0
Total	$3,504.3	$3,672.0	$7,176.3

Source: Appendix C.
Note: Columns may not add due to rounding.

The value added by the seafood industry is also a wide range of expenditures for goods and services required by wholesale, processing, and retail operations (see Table 4-17). These expenditures are frequently made at New York businesses. A substantial portion of the value added also represents wages paid to workers in New York's seafood

industry. These wages are also spent by workers and their households at New York establishments.

Table 4-17. Representative Expenditures by Seafood Industry Establishments

• Packaging materials	• Rent, other real estate
• Shipping	• Utilities
• Storage	• Insurance
• Maintenance and repairs	• Taxes
• Truck, other vehicles	• Ads, promotion
• Interest	• Music, entertainment
• Depreciation	• Office supplies
• Equipment rentals	• Wages

Source: Appendix B.

The expenditures that account for the value added of the seafood industry are the source of the economic impact the industry creates in New York State. This impact along with the value added created by the seafood industry constitute the dollar value of the industry's contribution to the state economy and are summarized in Table 4-18.

Table 4-18. Contribution of the New York Seafood Industry to State Economy, 1999, Dollar Value (millions of 1999 dollars)

Seafood Industry Segment	Value Added	Impact on Sales of Goods and Services	Total Contribution
Fulton Market	$253.2	$292.4	$545.5
Wholesalers/Distributors	535.6	662.3	1,197.8
Processors	181.8	204.8	386.6
Supermarkets/Fish Markets	332.3	365.5	697.8
Restaurants/Food Services	2,369.1	2,592.9	4,962.1
Total	$3,672.0	$4,117.9	$7,789.9

Sources: Appendix C and estimates by TechLaw. Note: Columns may not add due to rounding.

4.7.2 Seafood Industry Employment and Seafood Industry Employment Impacts

As noted above, comprehensive data on total seafood industry employment are not available from standard sources of employment data. Much of this employment is found within establishments that handle fish or seafood as part of a larger range of products. This is true for each segment of the industry—wholesalers, processors, restaurants, and retail markets. Data for establishments within these segments that are primarily dedicated to fish and seafood are available as shown above, but underestimate total fish and seafood related employment.

Accordingly, employment for each segment has been estimated based on the volume of sales per employee for the overall segment and the total sales for each segment related to fish and seafood as shown in Table 4-16. For example, in 1999 New York grocery stores and retail fish markets averaged about $138,000 in sales per employee and had total fish and seafood related sales of $1.3 billion. Estimated employment in grocery stores and

and seafood related sales of $1.3 billion. Estimated employment in grocery stores and other retail markets related to fish and seafood is approximately 10,000. The exception to this method of estimating employment is the figure for Fulton Market which was obtained from New York City government officials (Weinberg, 2001; Sasanow, 2001).

The other part of the seafood industry's employment contribution to the state economy is the employment associated with the New York businesses that enjoyed $3.7 billion in sales of goods and services because of the value added by the seafood industry in 1999. The employment impact is estimated as approximately 44,800 full-time equivalent jobs with wages and other earnings of approximately $1.7 billion (see Table 4-19). This employment impact is expressed in terms of full-time equivalent jobs (i.e., one full-time equivalent job for each 2000 hours of employment, regardless of how many people work those hours), rather than a mix of full-time and part-time jobs (i.e., paid work regardless of its part-time or full-time status). As a result, the total employment contribution cannot be estimated by adding the 87,500 part- time and full-time jobs in the seafood industry to the 44,800 full-time equivalent jobs created in the various businesses that are impacted by the seafood industry.

Table 4-19. Contribution of the New York Seafood Industry to State Economy, 1999
Employment (thousands of jobs)

Seafood Industry Segment	Seafood Industry Employment (part-time and full-time jobs)	Seafood Industry's Employment Impacts (full-time equivalent jobs)
Fulton Market[1]	0.6	3.0
Wholesalers/Distributors[2]	3.5	6.9
Processors	1.5	2.2
Restaurants/Food Services	70.0	28.6
Supermarkets/Fish Markets	10.1	4.1
Total	85.7	44.8

Source: Estimated by TechLaw, except for Fulton Market as noted above.
[1]Estimate of Fulton Market obtained from the Office of the Assistant Commissioner for Public Markets, New York City.
[2]Wholesaler/distributor employment figure excludes Fulton Market employment.

5.0 OVERALL CONTRIBUTION OF THE THREE INDUSTRIES TO NEW YORK STATE

This chapter provides a summary of the economic contribution of the fishing (sport and commercial) and seafood industries to New York State. Major findings and conclusions of this study are also presented.

5.1 Summary of the Economic Contribution of the Sport Fishing, Commercial Fishing, and Seafood Industries to New York State

It is useful to note that, although the three industries are presented collectively here, comparisons across these three industries are difficult. Sport fishing is an industry with customers who are final consumers of these recreational services and goods. As a result, the impacts made by anglers are the final contribution to the economy. By contrast, commercial fishing, like farming, is the beginning of a chain of value-added events each of which contributes to the economy. Almost all fish landed by commercial fishers are sold to seafood industry establishments which process, distribute, prepare, or sell at retail the fish or seafood harvested by commercial fishers. The seafood industry is a mix of establishments, all buying fish and seafood from other businesses. Some seafood industry establishments like restaurants and retail markets sell directly to final consumers, but many others sell their products to other seafood industry establishments. Each time one seafood establishment sells its products to another seafood establishment (rather than a final consumer), there is another opportunity to add value and to increase the industry's overall contribution to the economy.

The contribution of the fishing and seafood industries to New York's economy is expressed in terms of dollar value of economic activity and in terms of employment. All dollar values are presented in 1999 dollars. Employment is expressed as a mix of full-time and part-time positions and in full-time equivalent positions.

These three industries are responsible for a total contribution to the state's economy of $11.5 billion. The contribution of the economic activity within the three industries themselves is estimated at $5.7 billion. This activity in turn creates an economic impact on sales of goods and services by New York businesses worth $5.9 billion.

Table 5-1 summarizes the overall and individual economic contribution of the three industries and important segments within each industry to New York State. For sport fishing, the contribution is presented by geographic area and by type of expenditure.

Table 5-2 presents the overall employment contribution to the state economy of the three industries as well as their individual contribution. This contribution encompasses 113,300 jobs in the industries themselves and an additional 64,600 full-time-equivalent jobs created as an impact of the economic activity within the three industries. Most of these employment contributions are linked to the seafood industry, which accounts for 76 percent of the jobs created within the industries and 69 percent of the employment impact. Restaurants are responsible for the majority of the employment contribution of the seafood industry. Sport fishing employment—both that related to sport fishing expenditures and that related to ancillary fishing expenditures—accounts for 15 percent of the employment within the industries and 30 percent of the employment impact. Commercial fishing employment

Table 5-1: Contributions of Fishing and Seafood Industries to New York Economy, Dollar Value of Activity (millions of 1999 dollars)

Industry and Industry Segment	Expenditures, Revenues, Value Added in Sector (millions of 1999 dollars)	Total Output Impacts (millions of 1999 dollars)	Total Economic Contribution (millions of 1999 dollars)
Sport Fishing by Area			
Marine	$708.7	$625.8	$1,334.5
Freshwater	1,203.9	1,063.1	2,267.0
• Total Sport Fishing	$1,912.6	$1,688.9	$3,601.5
Sport Fishing by Type of Expenditure			
Sport Fishing Expenditures	$541.1	$452.5	$993.6
Head and Charter Boat Fees	56.0	57.3	113.3
Marina Fees	52.5	90.9	143.4
Bait	42.5	28.6	71.1
Fishing Rods, Reels, Tackle	239.7	221.0	460.6
Boats, Motors, Trailers	150.4	54.7	205.1
Ancillary Fishing Expenditures	1,371.5	1,236.4	2,607.9
Other Trip Expenses	493.0	525.1	1,018.2
Auxiliary Equipment	20.4	18.4	38.8
Special Equipment	302.0	135.1	437.0
Miscellaneous Expenses	37.5	54.5	92.0
Owned, Leased Property	518.7	503.2	1,021.9
• Total Sport Fishing	$1,912.6	$1,688.9	$3,601.5
Commercial Fishing			
Lobster Inshore	$21.8	$21.3	$43.1
Lobster Offshore	5.5	5.4	10.9
Mollusks, Shellfish	26.9	26.2	53.2
Surf Clam Dredges	2.2	2.3	4.5
Inshore Fisheries	3.8	3.7	7.4
Multi-Species Trawlers	11.6	10.8	22.4
Longline	4.2	3.9	8.2
Great Lakes	0.0	(1)	NA
Aquaculture	1.9	(1)	NA
• Total Commercial Fishing	$77.9	$73.6	$149.6
Seafood Industry			
Fulton Market	$253.2	$292.4	$545.5
Wholesalers	535.6	662.3	1,197.8
Processors	181.8	204.8	386.6
Supermarkets, Retail Fish Stores	332.3	365.5	697.8
Restaurants, Food Services	2,369.1	2,592.9	4,962.1
• Total Seafood Industry	$3,672.0	$4,117.9	$7,789.9
Total Fish/Seafood Industries			
• Total Fish/Seafood Industries	$5,662.5	$5,880.4	$11,541.0

Sources: U.S. Fish and Wildlife Service, 1997; NMFS, 2000c; Great Lakes Fishery Commission, 2000; USDA, 2000; Appendix C; and estimates by TechLaw.

(1)– Not calculated because of lack of data. The value of landings in 1999 was estimated at $2,000

NA – not available because of lack of data on impacts for these segments of the commercial fishing industry

Table 5-2: Contributions of Fishing and Seafood Industries to New York Economy, Employment

Industry and Industry Segment	Employment in Sector (thousands of jobs)	Total Employment Impacts (thousands of FTE jobs)
Sport Fishing by Area		
Marine	6.3	7.1
Freshwater	10.8	11.9
• Total Sport Fishing	17.1	19.0
Sport Fishing by Type of Expenditure		
Sport Fishing Expenditures	4.8	6.1
Head and Charter Boat Fees	0.5	0.5
Marina Fees	0.5	0.9
Bait	0.4	0.4
Fishing Rods, Reels, Tackle	2.1	3.4
Boats, Motors, Trailers	1.3	0.8
Ancillary Fishing Expenditures	12.2	13.0
Other Trip Expenses	4.4	6.1
Auxiliary Equipment	0.2	0.3
Special Equipment	2.7	1.9
Miscellaneous Expenses	0.3	0.7
Owned, Leased Property	4.6	4.0
• Total Sport Fishing	17.1	19.0
Commercial Fishing		
Lobster Inshore	NA	0.2
Lobster Offshore	NA	0.1
Mollusks, Shellfish	NA	0.3
Surf Clam Dredges	NA	0.0
Inshore Fisheries	NA	0.0
Multi-Species Trawlers	NA	0.1
Longline	NA	0.0
Great Lakes	NA	NA
Aquaculture	NA	NA
• Total Commercial Fishing	10.5	0.8
Seafood Industry		
Fulton Market	0.6	3.0
Wholesalers	3.5	6.9
Processors	1.5	2.2
Supermarkets, Retail Fish Stores	10.1	4.1
Restaurants, Food Services	70.0	28.6
• Total Seafood Industry	85.7	44.8
Total Fish/Seafood Industries		
• Total Fish/Seafood Industries	113.3	64.6

Sources: U.S. DOC, BOC, 2000b; NYS DEC 2000a; Gall, 1999; analysis of loan applications to the New York State Department of Economic Development, Long Island Fisheries Assistance Program conducted for this study by Thomas Murray, consultant to TechLaw; Weinberg, 2001; Sasanow, 2001; and estimates by TechLaw.
NA: data not available to estimate employment by commercial fishing segment
FTE – full-time equivalent

accounts for 9 percent of total employment for the three industries and 1 percent of the employment impact.

As has been noted previously, the employment within the industries is a mixture of full-time, seasonal, and part-time jobs while the employment impact measures full-time equivalent employment. For example, the employment estimate of 10,500 employees in the commercial fishing industry represents a mixture of part-time, seasonal, and full-time jobs where a given individual may hold more than one position within the course of a year. Full-time equivalent employment assigns 1 job to each 2000 hours of employment, regardless of how many people work those hours. This lack of direct comparability eliminates the possibility of adding these types of employment together to obtain a summary of all employment related to the fishing and seafood industries.

5.2 Findings and Conclusions

Sport fishing contributed $3.6 billion to New York's economy in 1996, the latest year for which comprehensive data are available. The other major findings related to sporting fishing include:

- Freshwater sport fishing accounted for about 63 percent of the economic activity generated by sport fishing and of sport fishing employment.

- Marine sport fishing accounted for about 37 percent of the economic activity generated by sport fishing and of sport fishing employment.

- When considering the type of expenditures made by anglers, those most closely tied to sport fishing—head and charter boats, marina fees, bait, fishing equipment, boats and motors—account for only 28 percent of the value of economic activity that sport fishing contributes. Other expenses for fishing trips (e.g., food and lodging), other types of equipment, leased or owned property, and miscellaneous expenses account for the rest of the dollar value of sport fishing's contribution. The employment contribution similarly shows a minority of this contribution related to expenditures most closely tied to sport fishing and the great majority related to ancillary expenditures.

Commercial fishing is the smallest of the three industries analyzed in this study. The 1999 landings worth $76 million generated an additional impact of $73.6 million in sales activity for New York businesses.

- Marine fisheries accounted for over 99.9 percent of all commercial fishery landings in New York.

- The top ten species landed by volume in 1969 and 1999 accounted for more than 80 percent of total landings in both years. Five species are common to both lists – quahog clam, Atlantic surf clam, silver hake, American lobster, and bluefish.

- The top ten species by value landed in 1969 and 1999 accounted for approximately 92 percent of total landings in 1969 and approximately 88 percent in 1999. Half of the species are common to both lists – quahog clam, American lobster, Atlantic surf clam, striped bass, yellowtail flounder.

- The volume of landings in 1999 was 16 percent higher than in 1969, while the value of landings was 25 percent higher than in 1969.

- Lobsters accounted for over one-third of the value of economic activity of commercial fishing in 1999. Similarly, mollusks and shellfish (other than surf clams) also accounted for over one-third of the economic activity in 1999.

- The commercial fishing industry included an estimated 10,500 jobs, a mixture of full-time, seasonal, and part-time positions. It is assumed that many individual commercial fishers occupied two or more of these jobs during 1999.

- Almost all fish harvested by New York commercial fishers is sold to the state's seafood industry which adds additional value to this harvested fish and seafood before it reaches final consumers.

Of the three industries studied, the seafood industry was the largest contributor to the New York economy. Over 60 percent of the economic sales activity and employment contribution of the fishing and seafood industries to the state economy is provided by the seafood industry.

- The seafood industry in New York purchased over 90 percent of the landings of New York commercial fishers in 1999. This is only a small part of the overall fish and seafood inputs for the state's seafood industry.

- In 1999, the largest source of fish and seafood purchased by the New York seafood industry as inputs was imports from outside the U.S. The state's seafood industry and others purchased an estimated $786 million worth of fish and seafood products from foreign sources.

- Shrimp, almost all of which is frozen, accounted for 42 percent of the value of fish and seafood imported to New York in 1999.

- The New York seafood industry purchased an estimated $535 million worth of fish and seafood products from sources in other states in 1999. This is in addition to purchases from other countries.

- Fulton Market accounts for about one-third of the value of all seafood wholesale activity in the state.

- The great majority of sales of fish and seafood products by the New York seafood industry are made to other New York businesses or consumers.

- Restaurants make the greatest economic contribution from among the seafood industry segments. This contribution is attributable to the substantial value added by restaurants to the fish and seafood products they purchase and from the great number of jobs generated in restaurants.

5.3 Fishing and Seafood Versus Other Industries

These industries can be compared to other food production and natural resource industries. Commercial fishing is like agriculture in that it produces food products. In 1999, there were 39,000 New York farmers who used about 25 percent of the state's land. The major edible farm products with values exceeding $50 million were milk, meat, apples, potatoes, and grapes. Other significant crops included eggs, onions, cabbage, and snap beans, although the value of these crops was below $50 million.[1] The major crops in order of value are listed below.

- Milk production was valued at $1.8 billion, third in the nation.
- Apple production was second in the nation and valued at $138 million.
- Meat (beef, lamb, and pork) sold by New York farmers was worth $131 million, fourth in the nation.
- Sweet corn was valued at $65 million and ranked fourth in the nation for the fresh market, fifth for the processing market.
- Potato production was valued at $61 million and ranked 13th nationally.
- Grape production ranked third in the nation and was valued at $59 million.

Commercial fishing landings were $76 million in 1999. This value would follow milk, apples, and meat in the listings of the New York's major raw food products.

Comparisons for the other industries are more problematic. The most recent economic census (i.e., 1997) does not disclose total amusement and recreational services spending for New York State. The seafood industry is so complex that it would be difficult to find ready comparisons to other food industries (e.g., beef, dairy). Nonetheless, as noted below, TechLaw estimates that fish and seafood are a significant part of the estimated final sales of all New York restaurants and retail food stores—a clear sign of the importance of fish and seafood products to these establishments.[2]

- Fish and seafood related sales equal 18.6 percent of total sales for restaurants in New York State.
- Fish and seafood related sales equal 5.1 percent of total sales for all retail food markets in New York State.

[1] All data on farm production are from the New York Department of Agriculture and Markets, Agricultural Statistics Service, www.nass.usda.gov/ny.

[2] Final sales of restaurants and retail food stores are estimates by TechLaw based on data from U.S. Economic Census, National Restaurant Association, and Food Marketing Institute.

APPENDICES

A. Methodology
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A. Methodology

The input/output (I/O) methodology employed here measures economic impacts in terms of business sales (referred to as "output" in I/O terminology), total income, and employment generated. These impact measures are defined as follows:

- Total output is the gross sales by businesses within the economic region affected by an activity.

- Total income includes personal income (wages and salaries) as well as proprietors' income (income from self-employment), and property-type income (corporate income, rental income, and interest).

- Employment is specified on the basis of person-years calculated on a full-time equivalent basis (e.g., two individuals working halftime are reported as one full-time equivalent position). This is important because there is significant part-time and seasonal employment in the industries supporting commercial fishing.

Multipliers are presented for direct, indirect, induced and total impacts. Multipliers express the respective impacts resulting from demands for goods or services associated with a particular activity such as commercial fishing. The types of impacts are defined as follows:

- Direct effects express the economic impacts (for output, income or employment) in the sector in which the expenditure was initially made. For example, the direct income multiplier for the wholesale trade sector would show the total income generated among wholesale employees and proprietors per unit of sales by the wholesale trade sector. This direct impact would result, for example, from expenditures made by commercial fisher in wholesale establishments.

- Indirect effects measure the economic impacts in the specific sectors providing goods and services to the directly affected sector. For directly affected wholesalers, indirect effects would include the purchases of products from manufacturers and purchases of accounting services. These indirect impacts extend throughout the economy as each supplier purchases from other suppliers in turn. For example, the accounting firms would need to purchase office supplies and business equipment. Thus, the indirect output multiplier would represent the total output generated in the various supplier sectors per unit of sales by the direct sector.

- Induced effects are the economic activity generated in turn by personal consumption expenditures due to income generated by employees in the directly and indirectly affected sectors, as wholesalers, accountants, and other directly and indirectly affected employees spend their paychecks. These household purchases have additional "indirect" and "induced" effects as well, all of which are defined as induced effects. Induced effects are also expressed as a function of the dollar sales by the direct sector.

- Total effects are the sum of the direct, indirect and induced economic impacts. Total effects quantify the total impact (i.e., for output, income or employment) throughout the economy per unit of sales by the direct sector.

The multipliers express the economic impacts, which occur within a defined study area, in this case, the State of New York. The multipliers do not account for economic impacts taking place outside of the study area.

Figure A-1 presents an overview of the I/O methodology for determining the impacts of the sport fishing, commercial fishing, and seafood industries in New York. A combination of primary and secondary sources has been used to estimate budgets and expenditures for each industry and its major components. These estimates of expenditures serve as the base for estimating economic impacts of the three industries' activities. They represent sales by key businesses of their goods and services to anglers, commercial fishermen, and seafood businesses.

Given the estimated expenditure patterns of the three industries, regional I/O multipliers were developed by business sector for the State of New York (see Appendix E). These multipliers express the economic impacts generated as a function of the amount of these expenditures. The multiplier analysis resulted in the development of expenditure multipliers for output (sales), total income and employment. For each of these measures, impact ratios were developed for direct, indirect, induced and total multipliers.

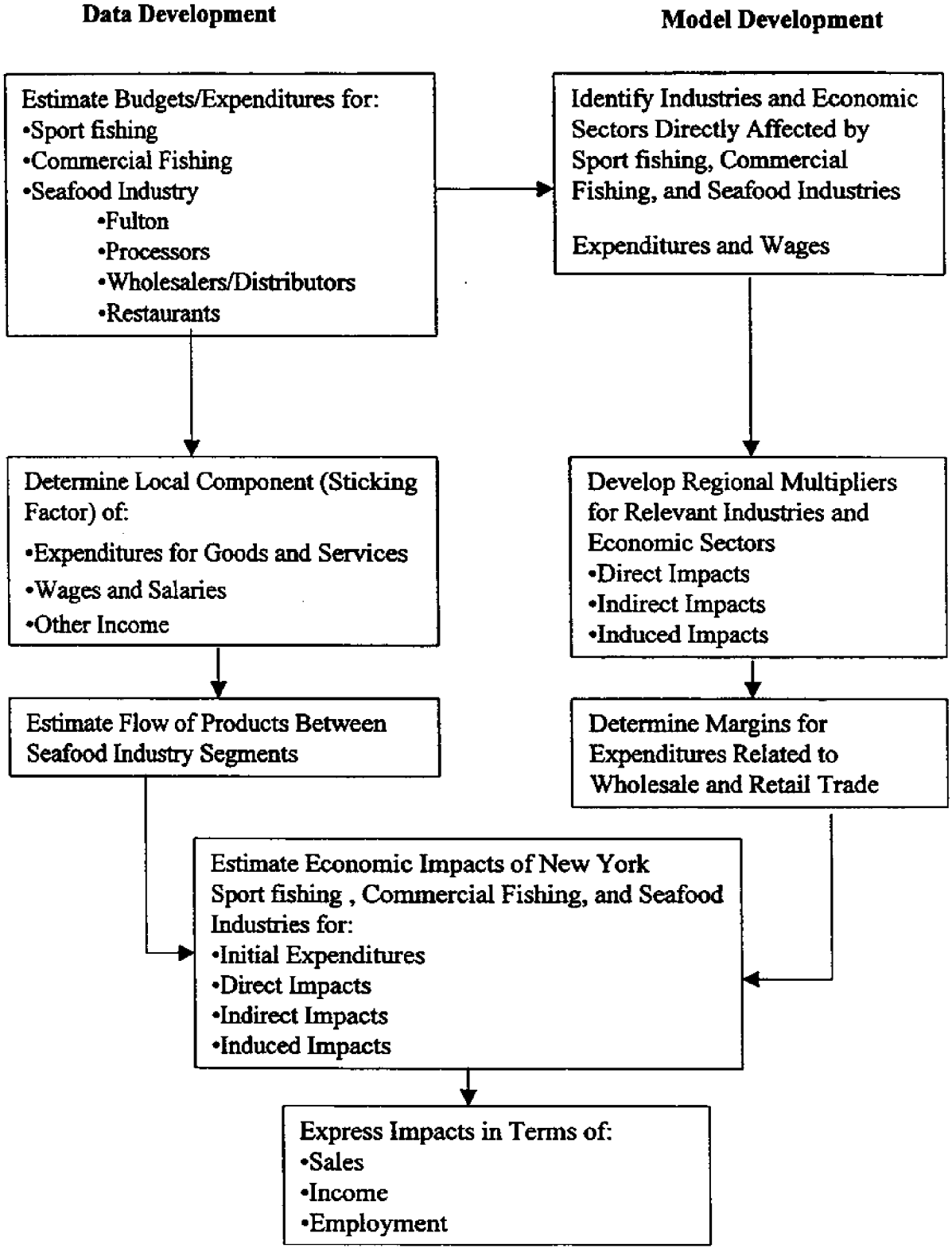
In estimating the impacts of expenditures on manufactured goods, it is important to realize that a substantial portion of the value of any expenditure is related to the manufacturing of the item. As a result the economic impact associated with that expenditure will be felt where that item is manufactured which may be different than the location of the sale. Thus, if a New Yorker purchases fuel or trucks or fishing gear, a substantial share of the economic impact from that purchase will occur where that fuel is produced and refined (e.g., Texas), the truck is assembled (e.g., Michigan) or the gear is manufactured (e.g., Pennsylvania). The impact in New York will result from the value added by New York businesses (e.g., wholesalers or retailers).

Custom multipliers were developed for several types of expenditures which did not directly correspond to a specific sector in the IMPLAN multiplier system (see appendix D for discussion of IMPLAN). This resulted in custom multipliers, analogous to the standard IMPLAN industry sector multipliers. These consisted of expenditures for:

- Charter boats
- Personal car/truck costs
- Grocery or food expenditures
- Party boats
- Wages

For sectors representing goods or products, which can be sold through the producer, wholesale and retail level, expenditures had to be allocated to the appropriate level using data on typical margins for these respective levels. For this analysis, it is assumed that all

Figure A-1. Overview of the Approach to Modelling Economic Impacts



purchases of goods and products by commercial fishers or seafood industry establishments are made from wholesalers rather than retailers. On the other hand, it is assumed that all purchases of goods by anglers are made from retail establishments.

For each expenditure category, the portion of the expenditure which remains within the State of New York study area had to be determined. This was estimated using the Regional Purchase Coefficients (RPCs) which are calculated by IMPLAN for each business or industry sector. (See Appendix E.)

The I/O methodology converted aggregate expenditures to cumulative state economic impacts. Impact ratios by business sector were developed using the IMPLAN economic impact system. The impact ratios for business sectors corresponding to particular types of expenditures were used to estimate economic impacts by sector. For example, impacts of purchases of diesel, gasoline and other fuels and lubricants were estimated using the IMPLAN multipliers for several sectors: petroleum refining, transportation services, and wholesale businesses. Purchases of repair and maintenance services for the harvester sector were estimated using the boat manufacturing and repair sector .

Finally, an overall model was developed which integrates the above data in an EXCEL spreadsheet. This model allows the user to input the survey expenditure data to produce the impact estimates. The model also allows for modifications to structural parameters such as the RPCs, distribution of expenditures and other economic parameters.

As has been noted in the report, the three industries analyzed for this study are distinct and in many ways not exactly comparable. The analysis has had to accommodate those differences in various ways. For example, anglers, commercial fishers, and seafood establishments all purchase equipment such as vehicles. For anglers, the model addresses these big-ticket purchases by looking at the monies actually spent in 1996 by anglers on trucks and other vehicles.

The following summarizes the key aspects of the I/O analysis.

- The IMPLAN multiplier system served as the starting point for the I/O analysis and generated most of the multipliers.
- Sets of multipliers were developed for New York as a whole.
- IMPLAN multipliers for approximately 45 economic sectors were directly applied to the relevant expenditure categories.
- Custom multipliers were developed for critical sectors not effectively represented by the IMPLAN model.
- A custom weighing of the IMPLAN multipliers was developed for food expenditures.
- Regional Purchase Coefficients were applied to estimate the portion of each expenditure which remained within the study area.
- Appropriate margins were applied to sectors having components at the wholesale or retail as well as the producer level.

B. Expenditure Profiles

The tables on the following pages provide information on the expenditures made by anglers, commercial fishers, and seafood industry establishments. These expenditures are a basic input to the model and drive the creation of economic impacts in New York. Each industry's expenditures are derived in a distinct manner.

Sport fishing expenditures by region are presented in Table B-1. These expenditures are derived from the 1996 recreational survey by the U.S. Fish and Wildlife Service. Expenditures are presented in terms of the 1996 dollars used in the U.S. Fish and Wildlife Service survey report. These were converted to 1999 dollars for the study's analysis. This table allocates all expenditures to two areas—saltwater and freshwater, while the U.S. Fish and Wildlife Service survey left 14 percent of total expenditures unallocated. For this study, the 14 percent of unallocated expenditures was distributed between saltwater and freshwater in the same proportion as the allocated expenditures. The allocation process inevitably creates certain errors such as the creation of significant party and charter boat expenditures in freshwater locations that almost certainly overstates actual expenditures. These errors are felt to be minor in nature and do not significantly misrepresent the overall spending patterns or the impacts of sport fishing expenditures.

Table B-2 presents expenditure profiles for the commercial fishing industry by major categories of species or gear types. The distribution is presented in terms of the percentage of the value of landings for each category. These profiles are derived from primary data collected for this study as well as TechLaw's database of commercial fishing expenditure patterns.

Expenditure profiles for major segments of the seafood industry are presented in Table B-3. The profiles show expenditure distributions in terms of the percentage of value added by each segment. For Fulton Market, wholesalers, and processors, these profiles are derived from primary data collected for this study as well as TechLaw's database of expenditure patterns for the seafood industry. Expenditures for restaurants and supermarkets are derived from TechLaw's database of expenditure patterns for these segments.

Exhibit B-1: Sport fishing expenditures by location
(millions of 1996 dollars)

	Saltwater	Freshwater	Total
Trip expenses			
Food and lodging	85.0	144.5	229.5
Food	59.6	101.3	160.9
Restaurants	26.4	44.8	71.2
Groceries	33.3	56.5	89.7
Lodging	25.4	43.2	68.6
Transportation	57.3	97.3	154.6
Public	5.6	9.6	15.2
Public transportation systems	2.4	4.1	6.5
Rental vehicles	3.2	5.5	8.7
Private	51.7	87.8	139.4
Other trip costs	80.5	136.8	217.3
Boat fuel	15.5	26.4	41.9
Party, charter boats	19.4	32.9	52.3
Party boats	6.1	10.4	16.6
Charter boats	13.2	22.5	35.7
Access fees: public lands	2.2	3.7	5.9
Access fees: private lands	1.2	2.1	3.4
Boat launching fees	1.2	2.0	3.2
Boat mooring, storage, maintenance	17.0	28.8	45.8
Equipment rental	3.8	6.4	10.2
Bait	14.7	25.0	39.7
Ice	4.4	7.6	12.0
Heating and cooking fuel	1.1	1.8	2.9
Fishing equipment	82.9	140.9	223.8
Auxiliary equipment	7.0	12.0	19.0
Camping equipment	2.2	3.7	5.9
Binoculars, field glasses	0.4	0.7	1.1
Fishing clothing	3.2	5.4	8.6
Taxidermy, other services	1.3	2.2	3.5
Special equipment	156.5	265.9	422.4
Boats	46.8	79.5	126.3
Boat motors, trailers	5.2	8.9	14.2
Pickups, campers, motor homes	94.3	160.2	254.4
Motorcycles, snowmobiles	10.1	17.1	27.1
Other special equipment	0.1	0.3	0.4
Magazines and books	3.4	5.8	9.3
Membership dues, contributions	1.8	3.0	4.8
Fishing licenses, other fees	7.8	13.2	21.0
Owned, leased property	179.5	304.9	484.3
Total	661.8	1,124.2	1,785.9

Exhibit B-2: Expenditure Profile for Commercial Fishers

Species/gear type		Share of value of landings
Lobster inshore and offshore		
Fishing gear, purchases and repair	Fishing gear	3.0%
	Fishing gear repair	3.0%
Vessel & engine maintenance and repair		17.7%
Groceries, food, & supplies		6.9%
Fuel & lubricants		15.2%
Ice & bait	Ice	1.0%
	Bait	1.0%
Licenses, permits, dues & fees	Dues, fees	0.4%
	Licenses, permits	0.4%
Accounting		0.8%
Insurance		3.5%
Moorage		2.2%
Interest expenses		2.4%
Depreciation	Motor Vehicles	2.7%
	Boats	10.7%
Miscellaneous services		6.9%
Crew & captain shares, other income		22.3%
Total		100.0%
Mollusks, shellfish, value of landings		
Fishing gear, purchases and repair	Fishing gear	3.0%
	Fishing gear repair	3.0%
Vessel & engine maintenance and repair		17.7%
Groceries, food, & supplies		6.9%
Fuel & lubricants		15.2%
Ice & bait	Ice	1.0%
	Bait	1.0%
Licenses, permits, dues & fees	Dues, fees	0.4%
	Licenses, permits	0.4%
Accounting		0.8%
Insurance		3.5%
Moorage		2.2%
Interest expenses		2.4%
Depreciation	Motor Vehicles	2.7%
	Boats	10.7%
Miscellaneous services		6.9%
Crew & captain shares, other income		22.2%
Total		100.0%

Exhibit B-2: Expenditure Profile for Commercial Fishers

Species/gear type		Share of value of landings
Surf clam dredges, value of landings		
Fishing gear, purchases and repair	Fishing gear	4.1%
	Fishing gear repair	4.1%
Vessel & engine maintenance and repair		18.0%
Groceries, food, & supplies		3.2%
Fuel & lubricants		14.3%
Ice & bait	Ice	0.4%
	Bait	0.0%
Shipping		3.0%
Licenses, permits, dues & fees	Dues, fees	1.8%
	Licenses, permits	1.9%
Accounting		0.5%
Insurance		5.0%
Moorage		2.7%
Interest expenses		1.9%
Depreciation	Motor Vehicles	1.1%
	Boats	2.6%
Miscellaneous services		3.4%
Crew & captain shares, other income		32.0%
Total		100.0%
Inshore fisheries, value of landings		
Fishing gear, purchases and repair	Fishing gear	3.0%
	Fishing gear repair	3.0%
Vessel & engine maintenance and repair		17.7%
Groceries, food, & supplies		6.9%
Fuel & lubricants		15.2%
Ice & bait	Ice	1.0%
	Bait	1.0%
Licenses, permits, dues & fees	Dues, fees	0.4%
	Licenses, permits	0.4%
Accounting		0.8%
Insurance		3.5%
Moorage		2.2%
Interest expenses		2.4%
Depreciation	Motor Vehicles	2.7%
	Boats	10.7%
Miscellaneous services		6.9%
Crew & captain shares, other income		22.2%
Total		100.0%

Exhibit B-2: Expenditure Profile for Commercial Fishers

Species/gear type		Share of value of landings
Multi-species trawlers, value of landings		
Fishing gear, purchases and repair	Fishing gear	0.8%
	Fishing gear repair	0.8%
Vessel & engine maintenance and repair		9.7%
Groceries, food, & supplies		2.4%
Fuel & lubricants		13.1%
Ice & bait	Ice	0.9%
	Bait	0.9%
Shipping		5.2%
Licenses, permits, dues & fees	Dues, fees	0.6%
	Licenses, permits	0.6%
Accounting		0.9%
Insurance		7.0%
Moorage		1.1%
Interest expenses		7.4%
Depreciation	Motor Vehicles	1.2%
	Boats	10.4%
Miscellaneous services		2.0%
Crew & captain shares, other income		35.3%
Total		100.0%
Longline, value of landings		
Fishing gear, purchases and repair	Fishing gear	5.7%
	Fishing gear repair	5.7%
Vessel & engine maintenance and repair		9.6%
Groceries, food, & supplies		2.0%
Fuel & lubricants		10.8%
Ice & bait	Ice	3.0%
	Bait	3.0%
Shipping		2.0%
Licenses, permits, dues & fees	Dues, fees	0.6%
	Licenses, permits	0.6%
Accounting		2.0%
Insurance		5.4%
Moorage		2.2%
Interest expenses		6.0%
Depreciation	Motor Vehicles	2.4%
	Boats	11.0%
Miscellaneous services		2.0%
Crew & captain shares, other income		26.0%
Total		100.0%

Exhibit B-3: Expenditure Profile for Seafood Industry

Industry Segment	Share of value added
Fulton Market	
Ice	3.0%
Packaging supplies	2.9%
Storage	22.9%
Ads, promotion	4.4%
Real estate	7.4%
Maintenance and repairs	0.8%
Utilities, telephone	4.5%
Insurance	6.6%
Accounting	0.8%
Interest expenses	1.5%
Depreciation	4.5%
Wages, other income, profit	40.7%
Total	100.0%
Wholesalers	
Ice	2.8%
Packaging supplies	2.7%
Shipping costs	4.1%
Storage	14.7%
Ads, promotion	4.0%
Real estate	6.8%
Maintenance and repairs	7.0%
Truck	4.1%
Utilities, telephone	4.2%
Insurance	6.1%
Accounting	0.7%
Interest expenses	1.4%
Depreciation	4.1%
Wages, other income, profit	37.4%
Total	100.0%
Processors	
Ice	2.4%
Packaging supplies	12.0%
Shipping costs	3.1%
Storage	0.9%
Ads, promotion	2.4%
Real estate	2.4%
Maintenance and repairs	3.2%
Truck	2.5%
Utilities	2.9%
Insurance	3.2%
Taxes	2.4%
Supplies	2.0%
Accounting	3.1%
Interest expenses	4.3%

Exhibit B-3: Expenditure Profile for Seafood Industry

Depreciation	2.4%
Miscellaneous	6.3%
Wages, other income, profit	44.5%
Total	100.0%

Supermarkets and retail fish stores

Ads, promotion	4.3%
Real estate	5.3%
Equipment rentals	1.1%
Maintenance and repairs	3.2%
Utilities	5.3%
Insurance	4.3%
Taxes	5.3%
Supplies	3.2%
Accounting, purchased svc	6.4%
Depreciation	1.1%
Other operating expenses	2.1%
Wages, other income, profit	58.5%
Total	100.0%

Restaurants and food services

Ads, promotion	5.0%
Music, entertainment	1.0%
Real estate	8.0%
Maintenance and repairs	2.0%
Utilities	5.0%
Insurance	2.0%
Taxes	2.0%
Accounting, purchased svc	5.0%
Interest	2.0%
Depreciation	5.0%
Other operating expenses	7.0%
Wages, other income, profit	56.0%
Total	100.0%
Tip income @ 12% of total sales or 18% of value added	18%
Total sales plus tip income	118.0%

C. Model Inputs

The expenditure data for commercial fishers and the seafood industry presented in Appendix B is combined with value of commercial landings and seafood industry value added data to estimate that dollar value of expenditures by these industries. These expenditures are the basis of the industries' impacts on the state economy.

The value of commercial landings was obtained from the National Marine Fisheries Service database. Those data provide volume and value by species for all landed fish. Data are also provided by gear type. For this study, the 1999 landings data were aggregated into the species/gear type categories shown in Exhibit C-1.

Table C-1: Commercial Landings, New York, 1999

Category	Volume (millions of pounds)	Share of total	Value (millions of 1999 dollars)	Share of total
Lobster, inshore	5.6	12%	$ 21.8	29%
Lobster, offshore	1.4	3%	$ 5.5	7%
Mollusks, shellfish	12.5	19%	$ 26.9	10%
Dredge clams	4.9	10%	$ 2.2	3%
Inshore fisheries	3.7	8%	$ 3.8	5%
Multi-species trawler	18.2	38%	$ 11.6	15%
Longline	1.8	4%	$ 4.2	6%
Total	48.2	100%	$ 76.0	100%

Determining the value added by the seafood industry to the fish and seafood they purchase is a multi-step process. This process starts with the various sources of fish and seafood used by the seafood industry. These include New York commercial fishers, imports from other states, imports from other countries, and a small amount of input from other New York-based sources.

The largest source of fish and seafood purchased by New York seafood establishments is foreign countries. Over 500 million pounds of fish and seafood worth over $1.1 billion were imported through New York's three ports of entry in 1999 (see Table C-2 and Table C-3). An estimated one-third of the fish and seafood that is imported through New York City is diverted to states other than New York and does not enter the New York economy.

Once fish and seafood products enter the New York economy, they flow through various segments of the seafood industry as described in Chapter 4 (see section 4.1). As seafood establishments purchase this fish and seafood, they add value and sell their products to other businesses or consumers. The nature of this product flow is shown in Exhibit C-4, which focuses on the major sources of fish and seafood and Exhibit C-5, which focuses on commercial fishers and the major segments of the seafood industry.

The determination of destinations of sales for commercial fishers and seafood segments and the distribution of sales is based on primary data collected for this study, TechLaw's database for the seafood industry, and interviews with industry experts. The determination of sales

destinations also determines the value of purchases of fish and seafood purchased by other segments of the seafood industry.

In Table C-5, the process of adding value is modeled by estimating how much value is added by each segment to the purchases it makes. The estimate of average mark-up for fish and seafood products is based on data from the National Marine Fisheries Service (NMFS, 2000a).

This estimation of the value added by each segment also allows for an estimate of total sales of fish and seafood related products. Total sales are estimated by combining the value of purchased fish and seafood with the value added to those purchased inputs.

Table C-2: Foreign Imports to New York State Ports of Entry, 1999, by Volume (1)

Products/Product Categories	Pounds Imported through Buffalo (millions)	Pounds Imported through Ogdensburg (millions)	Pounds Imported through New York City (millions)	Total Pounds Imported through NY Ports of Entry (millions)	Pounds Diverted to Other States (2) (millions)	Pounds Remaining in New York State (millions)
Edible products, top 5	**1.2**	**0.8**	**303.6**	**305.7**	**101.2**	**204.5**
Marine fish, all types	0.1	0.0	31.5	31.7	10.5	21.2
Shrimp, all types	0.2	0.4	109.5	110.1	36.5	73.6
Tuna, all types	0.0	0.0	124.8	124.8	41.6	83.2
Lobster, all types	0.2	0.1	8.1	8.4	2.7	5.7
Salmon, all types	0.7	0.3	29.8	30.7	9.9	20.8
All other edible products	**5.7**	**18.6**	**133.6**	**157.8**	**44.5**	**113.3**
Inedible products, top 5	**3.1**	**5.6**	**18.9**	**27.7**	**6.3**	**21.3**
Agar	0.0	0.0	1.1	1.1	0.4	0.7
Cod and other fish oils	0.6	0.2	6.2	7.0	2.1	5.0
Fish, shellfish products unfit for human consumption	2.2	5.1	5.0	12.2	1.7	10.6
Seaweed products	0.1	0.1	4.3	4.4	1.4	3.0
Waxes	0.2	0.2	2.4	2.8	0.8	2.0
All other inedible products	**0.7**	**7.9**	**0.7**	**9.3**	**0.2**	**9.1**
Total for all products	**10.8**	**32.9**	**456.8**	**500.5**	**152.3**	**348.2**

(1) Source for foreign imports is the U.S. Customs Bureau as reported by the National Marine Fisheries Service through its web site--www.st.nmfs.gov/st1/

(2) Estimated one-third of all imports through New York City diverted to other states. Based largely on a comparison of the populations of New Jersey and New York. New Jersey accounts for 31 percent of the combined population of the two states, hence the estimate that about one-third of the fish and seafood entering the U.S. through New York City exits New York State.

Table C-3: Foreign Imports to New York State Ports of Entry, 1999, by Value (1)

Products/Product Categories	Dollars Imported through Buffalo (millions)	Dollars Imported through Ogdensburg (millions)	Dollars Imported through New York City (millions)	Total Dollars Imported through NY Ports of Entry (millions)	Dollars Diverted to Other States (2) (millions)	Dollars Remaining in New York State (millions)
Edible products, top 5	**5.3**	**2.3**	**816.7**	**824.3**	**272.2**	**552.1**
Marine fish, all types	0.2	0.0	48.0	48.2	16.0	32.2
Shrimp, all types	0.7	1.3	487.9	489.8	162.6	327.2
Tuna, all types	0.0	0.0	131.5	131.6	43.8	87.7
Lobster, all types	3.0	0.4	80.0	83.4	26.7	56.7
Salmon, all types	1.4	0.7	69.2	71.3	23.1	48.2
					0.0	0.0
All other edible products	**9.7**	**36.7**	**240.1**	**286.5**	**80.0**	**206.4**
					0.0	0.0
Inedible products, top 5	**1.1**	**1.2**	**30.3**	**32.6**	**10.1**	**22.5**
Agar	0.0	-	7.9	7.9	2.6	5.3
Cod and other fish oils	0.3	0.3	6.0	6.6	2.0	4.6
Fish, shellfish products unfit for human consumptio	0.2	0.5	1.1	1.8	0.4	1.4
Seaweed products	0.2	0.1	11.5	11.7	3.8	7.9
Waxes	0.4	0.4	3.9	4.6	1.3	3.3
					0.0	0.0
All other inedible products	**0.1**	**0.9**	**0.8**	**1.8**	**0.3**	**1.5**
					0.0	0.0
Total for all products	**16.3**	**41.0**	**1,087.9**	**1,145.2**	**362.6**	**782.6**

(1) Source for foreign imports is the U.S. Customs Bureau as reported by the National Marine Fisheries Service through its web site--www.st.nmfs.gov/st1/

(2) Estimated one-third of all imports through New York City diverted to other states. Based largely on a comparison of the populations of New Jersey and New York. New Jersey accounts for 31 percent of the combined population of the two states, hence the estimate that about one-third of the fish and seafood entering the U.S. through New York City exits New York State.

Table C-4: NY Product Flows--Major Sources of Fish and Seafood Products

	Pounds (millions)		Value (millions)	Value/ Pound
Imports, non-US sources				
Land	267.5	53%	644.4	$ 2.41
Sea	180.3	36%	434.3	$ 2.41
Air	52.6	11%	66.5	$ 1.26
Total	500.5	100%	1,145.2	$ 2.29
Imports, non-US sources, to Fulton				
Land	26.7	65%	64.3	78%
Sea	-	0%	-	0%
Air	14.6	35%	18.5	22%
Total	41.3	100%	82.8	100%
Imports, non-US sources, to other than Fulton				
Land	240.8	52%	580.1	55%
Sea	180.3	39%	434.3	41%
Air	38.0	8%	48.0	5%
Total	459.2	100%	1,062.4	100%
Destinations: imports, non-US sources				
Out of NY	152.3	30%	362.6	32%
Fulton	41.3	8%	82.8	7%
Wholesalers	175.6	35%	401.3	35%
Processors	66.4	13%	116.5	10%
Retail	48.0	10%	154.8	13%
Restaurants	16.8	3%	30.3	3%
Total	500.5	100%	1,148.3	100%
Destinations: imports, other states				
Fulton	116.8	50%	267.3	50%
Non-Fulton	116.8	50%	267.3	50%
Wholesalers	70.1	30%	160.4	30%
Processors	11.7	5%	26.7	5%
Retail	29.2	12%	66.8	13%
Restaurants	5.8	2%	13.4	3%
Total	233.6	100%	534.6	100%
Other NY-based suppliers to Fulton	11.7	100%	26.7	100%

C-5: NY Product Flows--Purchases and Sales of Fish and Seafood Products by Segment

		Value (millions)
Commercial fishers		
Total value of landings		$ 76.0
Sales destinations		
Fulton	33%	$ 25.1
Processors	15%	$ 11.4
Wholesale/distributors	30%	$ 22.8
Supermarkets/fish markets	10%	$ 7.6
Restaurants/food services	4%	$ 3.0
Consumers	2%	$ 1.5
Out of NY	6%	$ 4.6
Processors		
From NY commercial fishers	6%	$ 11.4
From Fulton	17%	$ 32.8
From foreign sources	62%	$ 116.5
From other states	14%	$ 26.7
Value of fish/seafood purchases	100%	$ 187.4
Average mark-up		97%
Value added		$ 181.8
Total value of sales		$ 369.2
Sales destinations		
Fulton		$ -
Processors		$ -
Wholesale/distributors	40%	$ 147.7
Supermarkets/fish markets	20%	$ 73.8
Restaurants/food services	15%	$ 55.4
Consumers	2%	$ 7.4
Out of NY	23%	$ 84.9
Restaurants/food services		
From NY commercial fishers	0%	$ 3.0
From Fulton	12%	$ 124.5
From foreign sources	3%	$ 30.3
From other states	1%	$ 13.4
From processors	5%	$ 55.4
From wholesale/distributors	79%	$ 831.4
Value of fish/seafood purchases	100%	$ 1,057.9
Average mark-up		189%
Value added plus 12% tip income		$ 2,369.1
Total value of sales		$ 3,059.9

		Value (millions)
Fulton		
From NY commercial fishers	6%	$ 25.1
From other NY-based suppliers	7%	$ 26.7
From outside the U.S.	21%	$ 82.8
From other states	67%	$ 267.3
Value of fish/seafood purchases		$ 401.9
Average mark-up		63%
Value added		$ 253.2
Total value of sales		$ 655.2
Sales destinations		
Processors	5%	$ 32.8
Wholesale/distributors	18%	$ 117.9
Supermarkets/fish markets	44%	$ 288.3
Restaurants/food services	19%	$ 124.5
Consumers	2%	$ 13.1
Out of NY	12%	$ 78.6
Wholesalers/distributors		
From NY commercial fishers	3%	$ 22.8
From Fulton	14%	$ 117.9
From foreign sources	47%	$ 401.3
From other states	19%	$ 160.4
From processors	17%	$ 147.7
Value of fish/seafood purchases	100%	$ 850.1
Average mark-up		63%
Value added		$ 535.6
Total value of sales		$ 1,385.6
Sales destinations		
Fulton	0%	$ -
Processors	0%	$ -
Wholesale/distributors	0%	$ -
Supermarkets/fish markets	30%	$ 415.7
Restaurants/food services	60%	$ 831.4
Consumers	2%	$ 27.7
Out of NY	8%	$ 110.9
Supermarkets/fish markets		
From NY commercial fishers	1%	$ 7.6
From Fulton	29%	$ 288.3
From foreign sources	15%	$ 154.8
From other states	7%	$ 66.8
From processors	7%	$ 73.8
From wholesale/distributors	41%	$ 415.7
Value of fish/seafood purchases	100%	$ 1,007.0
Average mark-up		33%
Value added		$ 332.3
Total value of sales		$ 1,339.3

D. IMPLAN

IMPLAN, is a microcomputer-based system for developing non-survey based I/O multipliers. The IMPLAN (IMpact analysis for PLANning) system was originally developed by the U.S. Forest Service and has gained wide acceptance in a variety of impact assessment environments. In addition to the Forest Service, users of IMPLAN have included the U.S. Army Corps of Engineers, the National Park Service, the Soil Conservation Service, the Federal Emergency Management Agency, the Bureau of Land Management, over 40 universities, and numerous state and regional planning agencies. The IMPLAN package is available from the Minnesota IMPLAN Group, Inc., Stillwater, MN.

The basic IMPLAN model performs an I/O analysis for a given region in terms of 528 economic sectors. The capability is also provided to add custom sectors for a particular application. Impacts are specified in terms of total output, total income, and employment. The multipliers are calculated using the IMPLAN system package, using a separate IMPLAN data file for each study area. In this case the IMPLAN data file for the State of New York was used for the statewide study area.

There are a number of key assumptions implicit in the I/O methodology and how it was applied in this analysis. An understanding of these principles is critical to an understanding of this analysis, as well as the correct interpretation of the results. There are different conceptual perspectives for evaluating the economic contribution of natural resources. The first, economic impact, can be called the market approach and shows the direct, indirect, and induced contribution of the activity to the regional economy. This approach is based on the money spent on an activity, but does not address the value of a resource. The economic impact approach shows the relationship between commercial fishing activities and local economic activity. This framework basically: 1) estimates total sales driven by commercial fishing within a region; 2) determines how much income (wages, salaries, commissions, rents, and profits) is created by these activities; and 3) answers the critical question of how many local jobs are dependent on commercial fishing expenditures. This is the approach reflected in this analysis.

E. Tables of Employment, Income, and Output Multipliers

On the following pages are tables showing multipliers for employment (Table E-1), income (Table E-2), and output (Table E-3) for those sectors of the New York economy included in the analysis for this study. Exhibit E-1 also presents regional purchase coefficients for those sectors. As described in Appendix A, these multipliers are used to estimate the impact of expenditures by the fishing and seafood industries on the state's economy.

Table E-1: Employment Multipliers for New York State

IMPLAN Sector Description	IMPLAN Sector	Regional Purchase Coefficient	Employment Multipliers (FTE's per Million in Expenditures) Direct	Indirect	Induced	Total
Commercial fishing	25	0.0494	23.3855	0.7697	3.5934	27.7487
Residential construction	48	1.0000	10.9074	4.1879	3.0643	18.1595
New Industrial and Commercial Buildi	49	1.0000	8.4172	4.3988	4.6729	17.4889
Manufactured ice	101	1.0000	14.7591	2.3622	5.4233	22.5446
Apparel Made From Purchased Materi	124	0.0128	10.1209	3.0618	4.2129	17.3957
Paperboard Containers and Boxes	164	0.7476	5.5783	2.3386	3.1241	11.0410
Stationery Products	172	0.4570	5.2787	2.6702	2.5641	10.5130
Periodicals	175	0.3895	4.3371	2.5115	3.5312	10.3799
Petroleum Refining	210	0.1814	0.5932	1.0936	1.1904	2.8771
Motor Vehicles	384	0.0464	1.8170	3.2227	2.3535	7.3933
Motor Vehicle Parts and Accessories	386	0.2056	4.2068	2.2955	3.7136	10.2159
Boat Building and Repairing	393	1.0000	10.7096	2.6560	4.1003	17.4659
Motorcycles, Bicycles, and Parts	395	0.0941	7.3166	2.7261	2.8468	12.8895
Search & Navigation Equipment	400	0.6497	4.2321	4.7467	5.4612	14.4400
Optical Instruments & Lenses	406	0.7733	7.3409	3.3074	4.0345	14.6829
Sporting and Athletic Goods, N.E.C.	421	0.0165	8.0086	3.5628	3.7961	15.3676
Railroads and Related Services	433	0.7013	5.5958	2.8269	4.7924	13.2152
Local, Interurban Passenger Transit	434	0.7262	24.6706	2.1292	6.1058	32.9056
Motor Freight Transport and Warehou	435	0.7335	9.5614	5.1447	4.5732	19.2794
Water Transportation	436	0.9630	4.5340	5.1965	4.2962	14.0267
Air Transportation	437	0.4618	8.6066	2.5825	4.6806	15.8697
Pipe Lines, Except Natural Gas	438	0.1794	1.8078	2.4626	1.9943	6.2646
Transportation Services	440	0.6999	13.7277	2.7820	4.8870	21.3967
Communications, Except Radio and T	441	0.5680	3.1681	2.6256	2.5665	8.3601
Electric Services	443	0.8971	2.1890	0.5392	2.1074	4.8356
Gas Production and Distribution	444	0.5633	1.9604	1.2684	1.9343	5.1631
Water Supply and Sewerage Systems	445	0.5680	6.1994	2.7878	4.9628	13.9501
Wholesale Trade	447	0.9949	7.6653	2.4109	4.7129	14.7891
Eating & Drinking	454	0.7356	26.0196	3.1718	4.6493	33.8407
Retail Trade	455	0.9500	24.0124	1.4810	5.3268	30.8202
Banking	456	0.7000	3.0839	1.8596	3.3432	8.2866
Insurance Agents and Brokers	460	0.6723	12.8441	2.1383	7.0788	22.0612
Real estate	462	0.7000	4.7568	2.8669	1.4531	9.0767
Hotels and Lodging Places	463	0.5230	13.3780	3.4542	5.0453	21.8775
Advertising	469	0.8000	7.2831	2.9644	4.8321	15.0797
Other Business Services	470	0.8000	10.1607	3.7013	5.2266	19.0886
Equipment Rental and Leasing	473	0.7717	9.1853	3.9817	3.7267	16.8936
Automobile Rental and Leasing	477	0.7277	7.8915	3.0998	3.5895	14.5807
Automobile Repair and Services	479	0.6479	12.6283	2.7457	3.7240	19.0979
Electrical Repair Service	480	0.8420	13.0958	3.0907	4.5144	20.7009
Amusement and Recreation Services,	488	0.6079	28.2753	3.4679	3.6084	35.3516
Legal Services	494	0.9000	8.0480	2.4969	7.4803	18.0252
Other Nonprofit Organizations	502	0.8000	19.3688	6.1409	4.2134	29.7231
Business Associations	503	0.6045	21.8878	2.8384	6.5941	31.3203
Accounting, Auditing and Bookkeepin	507	0.9000	11.8890	1.2140	7.7574	20.8604
State & Local Government - Non-Educ	523	1.0000	16.8057	-	7.3997	24.2055
Charter Boats	Custom	0.6839	9.0254	2.1126	4.0346	15.1726
Cost of Personal Car/Truck Operation	Custom	0.6507	8.5527	1.8410	3.0752	13.4689
Groceries	Custom	0.5870	4.2671	3.5565	2.6868	10.5104
Party Boats	Custom	0.6839	9.4769	1.9660	4.0493	15.4922
Wages, other income	Custom	0.6835	-	-	17.0626	17.0626

Table E-2: Income Multipliers for New York State

IMPLAN Sector Description	IMPLAN Sector	Income Multipliers (per dollar of expenditure) Direct	Indirect	Induced	Total
Commercial fishing	25	0.3638	0.0320	0.1190	0.5148
Residential construction	48	0.2999	0.1495	0.1008	0.5503
New Industrial and Commercial Buildi	49	0.3413	0.1734	0.1548	0.6694
Manufactured ice	101	0.4819	0.1154	0.1796	0.7769
Apparel Made From Purchased Materi	124	0.3388	0.1252	0.1395	0.6035
Paperboard Containers and Boxes	164	0.2401	0.1040	0.1035	0.4475
Stationery Products	172	0.1689	0.1135	0.0849	0.3673
Periodicals	175	0.3915	0.1277	0.1162	0.6355
Petroleum Refining	210	0.0879	0.0432	0.0394	0.1705
Motor Vehicles	384	0.1097	0.1495	0.0779	0.3371
Motor Vehicle Parts and Accessories	386	0.2959	0.1131	0.1230	0.5320
Boat Building and Repairing	393	0.3244	0.1272	0.1358	0.5874
Motorcycles, Bicycles, and Parts	395	0.2909	0.1291	0.0937	0.5137
Search & Navigation Equipment	400	0.3920	0.2094	0.1809	0.7823
Optical Instruments & Lenses	406	0.4238	0.1723	0.1329	0.7290
Sporting and Athletic Goods, N.E.C.	421	0.2447	0.1733	0.1257	0.5438
Railroads and Related Services	433	0.3975	0.1303	0.1587	0.6865
Local, Interurban Passenger Transit	434	0.5695	0.1030	0.2022	0.8747
Motor Freight Transport and Warehou	435	0.3009	0.2027	0.1515	0.6551
Water Transportation	436	0.2398	0.2334	0.1423	0.6154
Air Transportation	437	0.4039	0.1116	0.1550	0.6705
Pipe Lines, Except Natural Gas	438	0.1166	0.1030	0.0660	0.2857
Transportation Services	440	0.5656	0.1540	0.1609	0.8805
Communications, Except Radio and T	441	0.2419	0.1331	0.0844	0.4595
Electric Services	443	0.2063	0.0257	0.0698	0.3019
Gas Production and Distribution	444	0.1607	0.0523	0.0641	0.2771
Water Supply and Sewerage Systems	445	0.4207	0.1259	0.1644	0.7109
Wholesale Trade	447	0.4071	0.1120	0.1561	0.6751
Eating & Drinking	454	0.3784	0.1337	0.1540	0.6660
Retail Trade	455	0.5204	0.0662	0.1764	0.7631
Banking	456	0.2486	0.1196	0.1107	0.4789
Insurance Agents and Brokers	460	0.6858	0.0938	0.2344	1.0140
Real estate	462	0.1028	0.1099	0.0478	0.2605
Hotels and Lodging Places	463	0.4187	0.1369	0.1671	0.7227
Advertising	469	0.5601	0.1459	0.1590	0.8650
Other Business Services	470	0.4036	0.1720	0.1731	0.7487
Equipment Rental and Leasing	473	0.3450	0.1998	0.1226	0.6674
Automobile Rental and Leasing	477	0.2665	0.1288	0.1189	0.5142
Automobile Repair and Services	479	0.2957	0.1145	0.1233	0.5335
Electrical Repair Service	480	0.3462	0.1509	0.1495	0.6467
Amusement and Recreation Services,	488	0.3771	0.1484	0.1187	0.6442
Legal Services	494	0.7171	0.1067	0.2477	1.0715
Other Nonprofit Organizations	502	0.3574	0.2605	0.1387	0.7565
Business Associations	503	0.5981	0.1281	0.2184	0.9446
Accounting, Auditing and Bookkeepin	507	0.7862	0.0682	0.2569	1.1113
State & Local Government - Non-Educ	523	0.8150	-	0.2451	1.0600
Charter Boats	Custom	0.3458	0.0986	0.1336	0.5780
Cost of Personal Car/Truck Operation	Custom	0.2671	0.0814	0.1048	0.4534
Groceries	Custom	0.1522	0.1437	0.0890	0.3849
Party Boats	Custom	0.3539	0.0921	0.1341	0.5801
Wages, other income	Custom	-	-	0.5704	0.5704

Table E-3: Output Multipliers for New York State

IMPLAN Sector Description	IMPLAN Sector	Output Multipliers (per dollar of expenditure) Direct	Indirect	Induced	Total
Commercial fishing	25	1.0000	0.0793	0.3080	1.3872
Residential construction	48	1.0000	0.3720	0.3497	1.7217
New Industrial and Commercial Buildi	49	1.0000	0.4001	0.4005	1.8006
Manufactured ice	101	1.0000	0.2821	0.4648	1.7469
Apparel Made From Purchased Materi	124	1.0000	0.3507	0.3610	1.7117
Paperboard Containers and Boxes	164	1.0000	0.2700	0.2677	1.5377
Stationery Products	172	1.0000	0.2993	0.2197	1.5190
Periodicals	175	1.0000	0.2936	0.4040	1.6976
Petroleum Refining	210	1.0000	0.1670	0.1020	1.2690
Motor Vehicles	384	1.0000	0.4195	0.2017	1.6212
Motor Vehicle Parts and Accessories	386	1.0000	0.2870	0.3183	1.6052
Boat Building and Repairing	393	1.0000	0.3802	0.3514	1.7316
Motorcycles, Bicycles, and Parts	395	1.0000	0.3327	0.3268	1.6595
Search & Navigation Equipment	400	1.0000	0.5145	0.4680	1.9825
Optical Instruments & Lenses	406	1.0000	0.4102	0.4638	1.8740
Sporting and Athletic Goods, N.E.C.	421	1.0000	0.4335	0.3253	1.7589
Railroads and Related Services	433	1.0000	0.2854	0.4107	1.6961
Local, Interurban Passenger Transit	434	1.0000	0.2445	0.5233	1.7678
Motor Freight Transport and Warehou	435	1.0000	0.5198	0.3919	1.9117
Water Transportation	436	1.0000	0.5403	0.3682	1.9085
Air Transportation	437	1.0000	0.2531	0.4011	1.6542
Pipe Lines, Except Natural Gas	438	1.0000	0.2363	0.1709	1.4072
Transportation Services	440	1.0000	0.3060	0.5600	1.8660
Communications, Except Radio and T	441	1.0000	0.3258	0.2918	1.6177
Electric Services	443	1.0000	0.0539	0.1806	1.2345
Gas Production and Distribution	444	1.0000	0.1481	0.1658	1.3139
Water Supply and Sewerage Systems	445	1.0000	0.2449	0.4253	1.6702
Wholesale Trade	447	1.0000	0.2537	0.4039	1.6576
Eating & Drinking	454	1.0000	0.3723	0.3984	1.7708
Retail Trade	455	1.0000	0.1628	0.4565	1.6193
Banking	456	1.0000	0.2226	0.2865	1.5091
Insurance Agents and Brokers	460	1.0000	0.1994	0.6067	1.8061
Real estate	462	1.0000	0.2711	0.1655	1.4366
Hotels and Lodging Places	463	1.0000	0.3164	0.4324	1.7488
Advertising	469	1.0000	0.3190	0.5494	1.8684
Other Business Services	470	1.0000	0.3719	0.4479	1.8199
Equipment Rental and Leasing	473	1.0000	0.4163	0.4240	1.8402
Automobile Rental and Leasing	477	1.0000	0.2949	0.3076	1.6025
Automobile Repair and Services	479	1.0000	0.2986	0.3191	1.6177
Electrical Repair Service	480	1.0000	0.4127	0.3869	1.7996
Amusement and Recreation Services,	488	1.0000	0.3415	0.4089	1.7504
Legal Services	494	1.0000	0.2294	0.6411	1.8704
Other Nonprofit Organizations	502	1.0000	0.5553	0.4808	2.0361
Business Associations	503	1.0000	0.2170	0.6423	1.8593
Accounting, Auditing and Bookkeepin	507	1.0000	0.1217	0.6648	1.7865
State & Local Government - Non-Educ	523	1.0000	-	0.6342	1.6342
Charter Boats	Custom	0.9138	0.2516	0.3458	1.5112
Cost of Personal Car/Truck Operation	Custom	1.0000	0.2408	0.2712	1.5120
Groceries	Custom	1.0000	0.4404	0.2303	1.6707
Party Boats	Custom	0.8894	0.2322	0.3470	1.4686
Wages, other income	Custom	-	-	1.3838	1.3838

F. Description of Selected Data Sources

- **National Marine Fisheries Service (NMFS)**

Fisheries of the United States. This annual publication provides data on commercial and recreational fisheries of the United States with catches in the U.S. waters and foreign Exclusive Economic Zones. The data come from many sources including the field office of the National Marine Fisheries Service, with the cooperation of coastal states collect and compile data on the U.S. commercial landings and processed fishery products. The recreational statistics are collected and compiled by the NMFS Fisheries Statistics and Economics Division in cooperation with state and interstate fisheries commissions. Other data are from the U.S. Bureau of the Census; U.S. Bureau of Labor Statistics; U.S. Coast Guard; U.S. Customs Services; U.S. Department of the Interior; U.S. Department of Agriculture; and the Food and Agriculture Organization of the United Nations.

Fisheries Statistics and Economics: Foreign Trade Information. This database is purchased by NMFS from the Bureau of the Census (BOC). The BOC compiles the information submitted by importers and exporters to the U.S. Customs Service. Importers and exporters submit their transactions to the U.S. Customs Service using the International Harmonized Commodity Description and Coding System, which was developed by the World Customs Organization to classify goods in international trade. The database includes imports of fishery products, exports of fishery products, and re-exports of fishery products.

Landings Query. This is an online database that provides data on commercial fishery landings. Collection of the information is a joint state and federal effort. Statistics represent a census of the volume and value of finfish and shellfish landed and sold at the dock. Principal landing statistics are pounds and ex-vessel dollar value of landings identified by species, year, month, state, county, port, water and fishing gear.

Total Commercial Fishery Landings at an Individual U.S. Port for all Years After 1980. This is an online database that provides landings by year in pounds and value by individual port since 1980.

- **Port Import Export Reporting Service (PIERS).** PIERS is an electronic data service that provides statistics on global cargo movements transiting seaports in the United States, Mexico, and South America. PIERS collects bills of lading from U.S. Customs' Automated Manifest System data tapes and import and export information from actual ills of lading and vessel manifests from every leading U.S. port. The data are verified against the U.S. Customs list of vessels exiting and arriving at U.S. ports. PIERS is a division of The Journal of Commerce and was started in the 1970's.

- **New York State Department of Environmental Conservation (NYS DEC), New York Statewide Angler Survey, 1996.** This is a series if five reports that document the results of the fourth statewide angler survey. The survey was conducted in 1997 and focused on resident and nonresident fishing experiences in calendar year 1996. The survey is restricted to freshwater fishing.

This survey provides data of a similar nature to that provided by a 1996 survey sponsored by the U.S. Fish and Wildlife Service. The NYS DEC survey provides a substantial quantity of data on anglers, fishing days, and total fishing-trip-related expenditures by location within New York State. These location data are possible because of the large sample used by this survey. This survey, however, provides only three categories of expenditures: at location, en route, and capital expenditures. No disaggregation of at location or en route expenditures is provided. Capital expenditure estimates are overestimated although the report authors do not know to what extent. The NYS DEC capital expenditures estimate is roughly three times the equipment cost estimate of the U.S. Fish and Wildlife Service survey. Lack of specificity for expenditure data, lack of saltwater angler data, and the apparent substantial overestimation of capital expenditures were problems with the NYS DEC data that resulted in the selection of the U.S. Fish and Wildlife Service survey as the source of data for sport fishing expenditures.

- **U.S. Bureau of Labor Statistics, Covered Employment and Wages.** Commonly called the ES 202 program, the covered employment and wages program is a cooperative endeavor of the Bureau of Labor Statistics and the employment security agencies of the states, the District of Columbia, Puerto Rico, and the Virgin Islands. It is a standard source of information on employment and wages, by industry, at the national, state, and county levels. It is a census of nonagricultural employees and their wages. About 47 percent of workers in agricultural industries are covered. While it is one of the primary sources of employment data in the U.S., it does not collect information on self-employed persons which would account for most commercial fishers.

- **U.S. Fish and Wildlife Service, 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (New York).** This is a national survey conducted every 5 years on the number of anglers, hunters, and wildlife watching participants in the United States. The survey is conducted by the U.S. Bureau of the Census for the U.S. Fish and Wildlife Service. The data are aggregated by state as well as for the nation. The survey covers both marine (saltwater) and freshwater fishing, the only standard source to do so. The survey is based on a sample. The criteria used for statistical validity of samples are 95-percent confidence intervals and 0.05 levels of significance. For smaller samples, this can lead to larger standard errors.

- **U.S. Department of Commerce, Bureau of the Census**

County Business Patterns. This is an annual series that provides economic data by industry. It is a standard source for data on number of establishments, number of employees, and payroll. It does not include data on self-employed individuals, employees in private households, railroad employees, agricultural production employees, and most government workers.

Economic Census. This is a 5-year mandated by law census that collects information on such things as employees, fringe benefits, value of depreciable assets, number of establishments, payroll, purchased electric energy, rental payments, capital expenditures, value added, and value of shipments. It is a standard source of information on economic activity. Data are collected by establishment. For this study, data on number of establishments, employees, and sales were used for the profile section of some segments of the seafood industry.

- **Note on Survey Errors**

Most of the data sources for this study are compilations of information derived from surveys. This is true of the primary data collected specifically for this study from commercial fishers and seafood establishments as well as secondary sources such as the Fish and Wildlife Service's surveys of anglers, hunters, and others engaged in outdoor recreation. Even the *Economic Census* produced by the Bureau of the Census relies on surveys to collect data on smaller firms and businesses.

Any survey produces an estimate of whatever activity it is being measured at a given point in time. This quality of any estimate can be affected by the survey methodology employed in collected the survey data. The factors influencing the accuracy of estimates can be grouped into two broad categories—nonsampling error and sampling error.[1]

Nonsampling error refers to a range of problems that precede the selection of a survey sample or that are independent of the sample selected. The survey questions may be difficult to interpret and may lead those surveyed to interpret questions inconsistently. For example, according to the study's authors, the NYDEC survey of anglers appears to have confused many respondents when they were asked about expenditures for such expansive items as trucks and vacation homes. The inclusion or exclusion of related questions may alter responses. If respondents are unwilling or unable to provide correct information a survey will be inaccurate. People are frequently unwilling to disclose their income. Many studies have also demonstrated that the ability to remember information accurately quickly fades. Inevitably, those taking surveys will make mistakes in recording responses. Similarly, entering data from individual surveys into compiled databases provides another potential error source. Attempts to estimate the value of missing data can introduce error. A final example of nonsampling error is selecting a sample from a universe that is not representative of the population being surveyed. For example, selecting a sample for a city or region from a listing of households in the phone book would introduce error because the phone book excludes households without phones and households with unlisted phone numbers. Generally, it is difficult or impossible to estimate the degree of error attributable to nonsampling error.

Sampling error derives from the likelihood that the response of any sample is different than the response from a complete census of the population being studied. Sampling error can be evaluated quantitatively. As many samples of the same size could be drawn from a given universe, it follows that estimates from each of these samples would differ from one another despite the fact that each sample could be asked the same questions. This sampling variability can be measured using a measure called the standard error of the estimate. This standard error is used to provide a confidence interval around a survey's estimates which indicates the likelihood that the average result (or estimate) from all possible samples lies within that interval. The standard error can be larger or smaller depending on the sample size and other factors. It is generally true, however, that smaller sample sizes lead to larger standard errors of the estimate.

[1] Discussion of sample accuracy largely based on Appendix D, *1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* (U.S. Fish and Wildlife Service, 1997).

For the standard secondary data sources used in this study, the statistical validity of samples is based on commonly accepted levels of accuracy. For example, the criteria for the statistical validity of samples used by the *1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* is 95-percent confidence intervals and 0.05 levels of significance. For smaller samples, this can lead to larger standard errors.[2] When such issues arise, the general precaution is to understand that any estimate is only an attempt to measure a true value. Particularly when differences between survey estimates are small, one should be careful about investing too much significance to these small differences.

Despite these important caveats, research is constantly conducted on the basis of survey data. Findings and conclusions can be and are routinely made from survey-based analyses. The fact that much of the information that we use in policy and other types of analyses is subject to error should not stand in the way of using these analyses to inform our work and our decisions.

[2] See various tables in Appendix D, *1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* (U.S. Fish and Wildlife Service, 1997).

G. Data Needs for Improving Modeling Inputs

Industry/Data Need	Approach	Estimated Cost
Sport Fishing		
Data on anglers actual use of big-ticket equipment. That is, are purchases of cars and boats truly a fishing expense? Would anglers have purchased these items if they did not fish? If the answer to the last question is yes, then the purchases should not be considered part of sport fishing expenditures.	Surveys of anglers, with particular attention to survey instrument to avoid errors in the answers.	Relatively expensive primary data collection exercise, in and of itself, but could and should be coupled with other angle surveys. There may be some opportunity to work with Fish and Wildlife Survey.
Data on anglers actual use of real property. That is, are leases or purchases of cabins, property, or other real property truly a fishing expense? Would anglers have purchased these items if they did not fish? If the answer to the last question is yes, then the purchases should not be considered part of sport fishing expenditures.	See above.	See above.
Current expenditure data for sport fishing-related activities	These data are collected every 5 years by the U.S. Fish and Wildlife Service. They would be prohibitively expensive to collect for a specific study. A more cost effective approach would be to time economic modeling activities to coincide with the release of the U.S. Fish and Wildlife Service survey results.	Not cost effective to undertake
Commercial Fishing		
Expenditure data for commercial fishers	Primary data collection for more detailed expenditure data on what is purchased and where it is purchased.	$15,000 to $20,000
Current landings data for Great Lakes	Given the minor role of Great Lakes commercial fishing to New York State, it is unlikely to be cost effective to correct the data deficiency	Not cost effective to undertake

Industry/Data Need	Approach	Estimated Cost
Employment in aquaculture industry	Survey aquaculture operations in New York State	$5,000 to $10,000
Flow study of aquaculture	Survey of aquaculture operations in New York State	$5,000 to $10,000
Employment in commercial fishing	Interviews with commercial fishers by species and gear types	$25,000 to $100,000
Seafood Industry		
Expenditure data for seafood industry establishments	Primary data collection for more detailed expenditure data on what is purchased and where it is purchased	$30,000 to $40,000
Expenditure data on unloading, icing, and packing for transport of fish to market	Primary data collection on unloading, icing, and packing for transport of fish to market	$10,000 to $15,000
Volume and value of finfish and shellfish landed in other states and shipped to New York State	Survey seafood wholesalers and processors in New York State	$15,000 to $20,000
Volume and value of foreign imports of fish and seafood that enter the three New York ports of entry and 1. Are purchased by New York establishments 2. Are purchased by establishments in other states	Survey importers of seafood in New York State	$15,000 to $20,000
Sales, payroll, and employment data for seafood wholesalers and retailers	Request a special run for fish wholesaling and retailing industries that include withheld data from the U.S. Bureau of the Census, County Business Patterns	To be determined in consultation with the Census Bureau

Industry/Data Need	Approach	Estimated Cost
Degree of overlap between importers and the modeled segments of the New York seafood industry. For establishments that primarily import and export, collect expenditure, sales, payroll, and employment data. This segment of the industry may underreported by the model.	Survey importers of seafood in New York State	$15,000 to $20,000 (could be combined with survey of importers noted above)
Sales destination of product	Product flow study of all the segments	$100,000 or more

H. Glossary

Charter boat.	Boats that carry passengers who have pre-arranged fishing trips for certain species. Fees are based on species to be fished and distance (McCay et al., 1997).
Full time Equivalent (FTE) jobs.	One FTE job for each 2000 hours of employment, regardless of how many people work those hours.
Jobs.	Paid work regardless of its part-time or full-time status.
Inland.	Other bodies of saltwater besides the ocean; sounds, inlets, tidal portion of rivers, bays, and estuaries (NMFS, 2000d).
Great Lakes fishing.	Fishing on Lake Ontario, Lake Erie, their tributaries, the Niagara River, embayments, and the St. Lawrence River south of the bridge at Cornwall (U.S. Fish and Wildlife Service, 1997 and Aiken, 2001).
Head boat.	A boat on which fishing space and privileges are provided for a fee. The vessel is operated by a licensed captain and crew (NMFS, 2000d).
Marine fisheries.	In New York, this includes the waters of the Atlantic Ocean, Long Island Sound, various estuaries and embayments of the Atlantic and the Sound and the tidal portion of the Hudson River (NMFS, 2000d).
Party boat.	Boats which conduct daily, scheduled trips and provide anglers with the ability to go fishing without advanced planning. There is a fee that covers their fishing needs (McCay et al., 1997).
Re-Exports.	Products which have entered the U.S. as imports and not sold, which at time of re-export, are in substantially the same condition as when imported (NMFS, 2000b).
Total catch.	The sum of Type A, B1, and B2. Type A catch is fish that are brought back to the dock in a form that can be identified by trained interviewers. Type B1 catch is fish that are used for bait, released dead, or filleted (i.e., they are killed but identification is by individual anglers). Type B2 catch is fish that are released alive and identification is by individual anglers (NMFS, 2000d).
Value added.	As used in this study, value added is the difference between the cost of fish and seafood purchased as inputs by a seafood industry establishment and the price it charges for its products made from those inputs.
Value of landings.	Revenue received by the harvester for fish, shellfish, and other aquatic plants and animals.

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