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ECONOMIC ACTIVITY ASSOCIATED
WITH MARINE RECREATIONAL FISHING

FINAL REPORT

Prepared for
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By
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FOREWORD

This report for the National Marine Fisheries Service (NMFS) is organized into three chapters and twelve appendices. Chapter 1 describes the study objectives, provides background information on the need and purpose of the study, and summarizes the research approach used to perform the study. Chapter 2 presents the detailed results of the study; that is, the national economic activity or impacts associated with marine recreational fishing. Chapter 3 provides estimates of economic impacts associated with marine recreational fishing taking place in the seven NMFS Regions and presents a methodology for disaggregating impacts by "manageable fishery unit." The twelve appendices present the detailed data analyses, and provides a listing of data, procedures and sources, used in compiling the results of this study.

Completion of this report required the assistance and cooperation of numerous individuals. The assistance of Mort Miller, Contracting Officer's Technical Representative in the NMFS is especially appreciated. He provided guidance and assistance to the contractor throughout the study. At Centaur Management Consultants, those responsible for the study include Sandy Fain, Brad Ingram and Paul Kolp.

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EXECUTIVE SUMMARY

OVERVIEW

The major purpose of this study was to estimate the economic contribution that marine recreational fishing makes to the national economy. Economic impact estimates associated with marine recreational fishing were developed from the associated sales value of goods and services. Impacts measures included value added, wages and salaries, employment, annual capital investment and numbers of firms involved in these sales. These were developed for the business sectors directly impacted by marine recreational fishing, consisting of fishing tackle, boats, outboard motors, boat trailers, commercial sport-fishing vessels, marinas/boat yards, bait, food, lodging, travel, boat fuel, boat insurance, and a category consisting of other goods and services. The "other" category consisted of such items as special fishing clothing, magazines, and boat launching fees. Where appropriate, these impacts were estimated at the manufacturing, wholesale distribution, and retail levels. The economic impact estimates were provided for the years 1972 and 1975. In addition comparisons were drawn between the economic activity associated with marine recreational fishing and the total activity in those business sectors supplying these goods and services.

It should be noted that the figures presented in this study do not purport to represent the total "value" of recreational fishing in the sense of the aesthetic or recreational importance of the fishing experience. These are considerations beyond the actual economic contributions presented in this report.

Approximations were also provided of the indirect and induced impacts across the economy which are associated with marine recreational fishing. Indirect impacts are those economic effects (value added, wages and salaries, and employment) in other sectors of the economy caused by spending for materials and services by the directly impacted business areas. Induced impacts are additional economic effects across the economy caused by consumer spending created through the wages and salaries and other income provided by virtue of the directly and indirectly created economic activity.

The study also disaggregated the national economic impacts into seven regions. This disaggregation estimated the economic impacts (occurring both within the region and for some impacts in other parts of the country) associated with marine recreational fishing activity occurring in a particular region. That is, national economic impacts are disaggregated based on the region of fishing (or use and consumption) as opposed to point of production or purchase (though frequently these are all in the same location, such as bait, charter boat fees and other on-site expenditures). A methodology was also developed for disaggregating national economic impacts by "fishery management unit" for which Regional Councils anticipate preparing management plans.

Data were also compiled on the amount of government expenditures, wages and salaries, and employment at the state level related to marine recreational fishing. While the main thrust of this study was to provide economic impact estimates of recreational fishing taking place in saltwater, an estimate was also developed of a likely bound of the additional economic impact associated with fishing for anadromous species of fish in freshwater. In addition, an extensive bibliography relating to the economic impact of marine recreational fishing has been compiled.

APPROACH

The general approach to estimating the direct impacts consisted of a four step procedure. First, total annual sales for the particular good or service at each level of economic activity was estimated. Second, an estimate was made of the portion of total annual sales that are attributable to marine recreational fishing for each good or service. Third, economic impact ratios of value added to sales, sales to employment, wages and salaries to sales, and annual capital investment to sales that characterize each overall good or service were derived. Fourth, the respective economic impact ratios were applied to the total value of sales and to the portion of total sales attributable to marine recreational fishing for each good or service to determine the remaining economic impacts.

The total value of sales for each good or service was estimated by examining as many sources of data as could be located. These sources included original surveys, various industrial and business censuses, trade associations, market research firms and government and university research in both published and unpublished form. The estimates from the various sources were compared and analyzed to assess the reasons for any inconsistencies observed. From this, point estimates for total sales were chosen.

The portion of total annual sales in a business sector attributable to marine recreational fishing were then estimated. For boats, motors, trailers, marinas/boat yards, boat fuel, and boat insurance the allocations were made based on an estimate of the amount of time boats (motors) are used for fishing in saltwater. For fishing tackle the allocation was made based on a ratio of expenditures for tackle purchased for use in saltwater fishing to expenditures for all fishing tackle. The ratio was determined from historical data on tackle expenditures by fishermen as well as data from a survey of fishing tackle manufacturers. For the remaining goods and services, which include bait, food lodging, travel, commercial sportfishing vessels, and "other" goods and services, estimates of sales attributable to marine recreational fishing were based on historical trend analyses of consumer expenditures for each of these items.

For each good or service economic impact ratios were calculated using available data that most accurately appear to characterize the particular sector. The U.S. Bureau of Census was the primary data source. For example, the economic impact ratios for fishing tackle manufacturing were determined from Census data on establishments that specialize in the production of fishing

tackle. However, such production specific data were not available at all levels of economic activity. So, for instance, retail trade impact ratios for fishing tackle were based on data for all sporting goods stores. This is a more highly aggregated grouping, but one which reasonably typifies the activity.

For some sectors the above approach was not adequate and alternative methods were employed. For instance, several survey instruments were developed to assist in the determination of sales estimates and impact ratios where other data were thought to be lacking. A survey of fishing tackle manufacturers was conducted to assist in the determination of the portion of total tackle sales attributable to marine recreational fishing. Instruments were also developed for bait outlets and charter and head boats. These were used in both field and telephone interviews.

The basic approach used in estimating the indirect and induced impacts makes use of input/output economic analysis. Data were taken from the 1967 85-industry category input-output tables for the U.S. economy. This is the latest input/output table for the U.S. economy currently available. The multipliers were calculated using standard mathematical procedures, including a series of approximations of the inverse of the Leontief matrix. These multipliers were estimated in a prior study performed by Centaur for the NMFS. The approach provides an approximation to the expected multiplier effects associated with the direct impacts.

While direct surveys of marine recreational fishing impacts in regional areas were beyond the scope of this study, estimates of impacts associated with fishing activity in regional areas were made using an analytical allocation model. This model prorated expenditures to regions based on number of saltwater anglers per region participating in various types of fishing, as well as data on relative per capita saltwater fishermen expenditures on the Atlantic, Gulf, and Pacific Coasts.

The methodology developed to allocate national impacts to manageable fishery units (i.e., specific species within a region for which Regional Councils anticipate preparing management plans) is a further extension of the allocation model used for the regional allocation. It uses, in addition, data on effort expended on specific species within a region. This methodology was reviewed for one management unit for which more specific data from local studies were available.

RESULTS

The total sales at the retail level of goods and services associated with marine recreational fishing were estimated to be \$1,333 million in 1972. These sales generated an estimated \$510 million of value added and \$285 million in wages and salaries in business sectors where direct spending associated with marine recreational fishing took place. These impacts include those at the manufacturing and trade levels for manufactured goods. Further impacts include an estimated 46,550 person-years of employment generated, as well as an estimated \$45.1 million worth of capital expenditures in 1972.

In 1975 consumers purchased an estimated \$1,840 million worth of goods and services at the retail level which are associated with marine recreational fishing. These sales generated approximately \$699 million of value added, \$343 million of wages and salaries, 50,580 person-years of employment, and \$52.8 million of capital expenditures in these directly-impacted business sectors.

Retail sales in 1975 associated with marine recreational fishing by category were estimated as follows:¹

o	Fishing tackle	\$138 million
o	Boats	208 million
o	Motors	45 million
o	Trailers	18 million
o	Marinas	240 million
o	Commercial Sportfishing Vessels	122 million
o	Boat fuel	86 million
o	Food	247 million
o	Lodging	63 million
o	Travel	233 million
o	Boat insurance	56 million
o	Bait	216 million
o	Other	170 million
	Total	<hr/> \$1,840 million

Exhibit I shows a detailed breakdown of the economic impact estimates for 1975.

In 1975 spending for private boats and boat-related goods and services constituted the largest expenditures and corresponding economic impacts. Fishermen's expenditures in the private boating areas (including boat, motor, and trailer purchases, expenses for fuel, and marina, boat yard, and boat insurance services) accounted for \$653 million or approximately 35

1

These totals do not include the impacts of purchases of accessory equipment for recreational boats. Because of the diverse manufacture and distribution of such equipment, reliable economic impact estimates were not available. However, based on an analysis of composite dealer sales data, sales of such equipment would add five percent (or about \$92 million or less) to the impact estimates presented here.

Exhibit I

Direct Economic Impacts Associated With
Marine Recreational Fishing
1975

	Sales (millions of dollars)	Value-Added (millions of dollars)	Wages and Salaries (millions of dollars)	Employment (person-years)	Annual Capital Expenditures (millions of dollars)
Fishing Tackle					
Manufacturing	57	36	15.7	2,480	2.5
Wholesale Trade	64	6	4.7	490	0.4
Retail Trade	136	52	15.8	2,290	3.9
Boats					
Manufacturing	139	61	29.5	4,120	1.7
Retail Trade	208	33	15.6	2,030	1.2
Motors					
Manufacturing	33	15	5.6	390	1.0
Retail Trade	45	7	3.4	440	0.3
Trailers					
Manufacturing	15	7	2.5	280	0.5
Retail Trade	18	3	1.4	180	0.1
Marinas	240	96	64.8	6,500	4.8
Commercial Sportfishing Vessels	122	73	35.4	4,900	8.5
Boat Fuel					
Manufacturing	49	8	0.9	50	2.2
Wholesale Trade	73	7	1.5	160	1.1
Retail Trade	86	14	4.9	1,060	0.7
Food	247	89	56.8	12,000	6.7
Lodging	63	33	16.7	3,470	1.7
Travel					
Manufacturing	133	23	3.1	200	5.9
Wholesale Trade	198	19	4.8	500	3.0
Retail Trade	233	27	17.0	2,970	1.9
Boat Insurance	56	13	4.9	400	-
Bait	216	43	17.7	2,670	1.3
Other	<u>170</u>	<u>34</u>	<u>20.4</u>	<u>3,000</u>	<u>3.4</u>
TOTAL	1,840	699	343.1	50,580	52.8

percent of the total. Expenditures for travel and lodging for fishing excursions accounted for \$296 million or 16 percent of the total. Expenditures for food in conjunction with fishing outings was estimated at \$247 million or approximately 13 percent of the total. Expenditures for bait at \$216 million accounted for about 12 percent of the total. Fishing tackle with a retail value of sales of \$136 million was about 7 percent of the total. Expenditures for outings on head (or party) and charter boats at an estimated \$122 million accounted for approximately another 7 percent of the total.

The national direct impacts were disaggregated into the following regions:

- Region I - North Atlantic: Atlantic Coast from Maine to and including New York.
- Region II - Middle Atlantic: Atlantic Coast from New Jersey to Cape Hatteras, North Carolina.
- Region III - South Atlantic: Atlantic Coast from Cape Hatteras, North Carolina, to southern Florida including the Florida Keys.
- Region IV - East Gulf of Mexico: Gulf Coast from the Florida Keys to and including the Mississippi River delta.
- Region V - West Gulf of Mexico: Gulf Coast from the Mississippi River delta to the Mexican border.
- Region VI - South Pacific: Pacific Coast from the Mexican border to Point Conception, California.
- Region VII - North Pacific: Pacific Coast from Point Conception, California, north to Washington and including Alaska.

While direct surveys of marine recreational fishing impacts in regional areas were beyond the scope of this study, estimates of impacts associated with fishing in regional areas were made using an analytical allocation model. This model prorated expenditures to regions based on data on the number of saltwater anglers per region participating in various types of fishing as well as data on relative per capita expenditures for marina recreational fishing for the Atlantic, Gulf, and Pacific coasts. The model first allocated various fishermen expenditure categories to the regions based on the relative number of fishermen participating in a particular type of fishing activity. For example, the expenditure categories of fishing tackle, food, lodging, travel, bait, and "other" were allocated on the basis of the relative number of total fishermen. The boat-related expenditure categories including boats, motors, trailers, marinas, boat fuel, and boat insurance were allocated on the basis of the relative number of fishermen who participated in fishing on private or rented boats. Expenditures for commercial sportfishing vessels (charter and head boats) were allocated on the basis of the relative number of fishermen participating in party or charter boat fishing. Data on the relative number of fishermen participating were taken from the 1970 Saltwater Angling Survey.

The model then adjusted the above determined regional expenditures for variations in relative per capita expenditures of fishermen for the Atlantic, Gulf, and Pacific coasts. These data were taken from the 1970 National Survey of Fishing and Hunting. Unfortunately, at the time of the study, results were not yet available from the 1975 National Survey of Fishing and Hunting. Thus, if the data showed Atlantic coast fishermen spending relatively more or less per capita for a particular expenditure item, total allocated expenditures for that item were adjusted accordingly for the regions corresponding to the Atlantic Coast. Exhibit II summarizes the Regional economic impacts of marine recreational fishing.

These disaggregations represent the economic impacts (which may occur either in the region itself or in other parts of the nation) associated with marine recreational fishing carried on in that particular regions (i.e., by place of activity or consumption). Impacts associated with business areas such as retail trade, marinas, commercial sportfishing vessels, food, and bait would for the most part occur within the particular region where fishing occurs. Economic impacts such as value added, employment, and wages and salaries in these business areas typically represent roughly 60 percent of total economic impacts. Impacts associated with manufacturing frequently would occur in other parts of the country, however, these are disaggregated by region of product use.

Of the total national 1975 direct impacts associated with marine recreational fishing, it was estimated from the disaggregation model that approximately 16 percent were due to fishing in Region I (North Atlantic), 18 percent in Region II (Middle Atlantic), 16 percent in Region III (South Atlantic), 23 percent in Region IV (East Gulf of Mexico), 12 percent in Region V (West Gulf of Mexico), 6 percent in Region VI (South Pacific), and 9 percent in Region VII (North Pacific).

In addition to the above national direct economic impacts there are economic multiplier effects associated with marine recreational fishing. These are approximated as follows. In 1975 in addition to the \$699 million of value added in the directly impacted businesses, marine recreational fishing had an associated \$1,773 million of direct and indirect value added, and \$3,957 million of direct, indirect, and induced value added. Total direct plus indirect employee compensation and property-type income was an approximated \$1,578 million, and total direct plus indirect plus induced employee compensation and property-type income in the economy as a whole was an estimated \$3,526 million. Beyond the estimated total 1975 direct employment of 50,600, the total direct plus indirect employment was estimated at 123,300, and total direct plus indirect plus induced employment was estimated at 241,600.

The preceding results do not include impacts due to capital spending. In 1975, capital investment associated with marine recreational fishing in the directly impacted sectors generated an additional \$46 million of direct plus indirect and \$102 million of direct plus indirect plus induced employee compensation and property-type income. These investment purchases also generated an additional \$49 million of direct plus indirect and \$110 million of direct plus indirect plus induced value added. Additional direct plus

Exhibit II

Economic Impacts of Marine Recreational
Fishing by Region
1975

<u>Region</u>	<u>Sales (thousands of dollars)</u>	<u>Value- Added (thousands of dollars)</u>	<u>Wages and Salaries (thousands of dollars)</u>	<u>Employment (person- years)</u>	<u>Annual Capital Expenditures (thousands of dollars)</u>
Region I	305,080	114,360	55,970	8,300	8,050
Region II	328,670	124,580	60,990	9,050	9,580
Region III	288,910	107,690	52,400	8,090	8,820
Region IV	424,270	164,250	81,290	11,560	11,550
Region V	219,420	83,230	41,000	5,970	5,840
Region VI	108,030	41,890	19,190	3,020	4,430
Region VII	164,110	62,530	30,690	4,550	5,010

indirect employee generated by this capital investment amounted to an estimated 2,400 person-years. Additional direct plus indirect plus induced employment related to this spending amounted to an estimated 5,800 person-years.

The above impacts relate to fishing in saltwater below tidal limits. An "upper bound" analysis indicated that recreational fishing for anadromous fish in freshwater accounted for no more than \$132 million of spending at the retail level in 1975. This is about seven percent of total retail spending associated with marine recreational fishing.

Results of the survey of state activity associated with marine recreational fishing indicated that total expenditures associated with marine recreational fishing were just over \$8 million in 1975. This excludes several states not responding or unable to disaggregate such data. About 70 percent of state level activity reported was in administration and research. Direct services accounted for about 20 percent of state level activity and construction account for about another 10 percent.

TABLE OF CONTENTS

	Page
FORWARD	i
EXECUTIVE SUMMARY	ii
CHAPTER 1 - INTRODUCTION	1
1.1 Study Objectives	1
1.2 Background	1
CHAPTER 2 - NATIONAL ECONOMIC IMPACTS	11
2.1 Impacted Economic Sectors	12
2.2 Direct Economic Impact Results	13
2.3 Multiplier Effects	20
2.4 Expenditures, Wages and Salaries, and Employment of State Agencies Related to Marine Recreational Fishing in 1975	28
2.5 Impact Related to Anadromous Species	30
CHAPTER 3 - DISAGGREGATION OF NATIONAL IMPACTS	34
3.1 Impacts of Fishing in Regional Areas	34
3.2 Methodology for Relating Impacts to Manageable Fishery Units	44
BIBLIOGRAPHY	50
APPENDIX A - ECONOMIC IMPACTS RELATED TO FISHING TACKLE	54
APPENDIX B - ECONOMIC IMPACTS RELATED TO BOATS	82
APPENDIX C - ECONOMIC IMPACTS RELATED TO OUTBOARD MOTORS	99
APPENDIX D - ECONOMIC IMPACTS RELATED TO BOAT TRAILERS	111
APPENDIX E - ECONOMIC IMPACTS RELATED TO MARINA/BOAT YARD	121
APPENDIX F - ECONOMIC IMPACTS RELATED TO COMMERCIAL SPORTFISHING VESSELS	136
APPENDIX G - ECONOMIC IMPACTS RELATED TO BAIT	153
APPENDIX H - ECONOMIC IMPACTS RELATED TO BOAT FUEL	164

TABLE OF CONTENTS (Cont.)

APPENDICES (Contd.)

	Page
APPENDIX I - ECONOMIC IMPACTS RELATED TO FOOD, LODGING, AND TRAVEL	174
APPENDIX J - ECONOMIC IMPACTS RELATED TO BOAT INSURANCE	185
APPENDIX K - ECONOMIC IMPACTS RELATED TO "OTHER EXPENDITURES" ...	196
APPENDIX L - ESTIMATED SALES AND IMPACT RATIOS FOR 1975	202

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

1.1 Study Objectives

The general purpose of this study was to estimate the economic contribution that marine recreational fishing makes to the national economy. Determinations were to be made of the economic impacts associated with the value of goods and services purchased by marine recreational fishermen. In particular the research objectives were to provide point estimates of:

- o The value of goods and services sold in association with marine recreational fishing in total and by type for the years 1972 and 1975.
- o The annual value added, annual employment, annual wages and salaries, and annual capital investment for 1972 and 1975 in total and by industrial sector associated with purchases made by marine recreational fishermen.
- o The economic activity associated with purchases of goods and services that are consumed for marine recreational fishing in comparison with the total activity in industrial sectors supplying these goods and services.
- o The regional distribution of the national economic impacts associated with marine recreational fishing.

Of secondary importance was the amount of government expenditures at the state level related to marine recreational fishing.

It should be noted that the figures presented here do not purport to represent the total "value" of recreational fishing in the sense of the aesthetic or recreational importance of the fishing experience. There may be considerations beyond the actual economic contributions of marine recreational fishing which are presented in this report.

1.2 Methodology

In fulfilling the research objectives this report provides estimates of the direct national economic contribution related to purchases of goods and services by marine recreational fishermen for the years 1972 and 1975. General approximations are also made of potential multiplier (i.e., indirect and induced) effects associated with these direct impacts for 1975. To provide an indication of the size and scope of marine recreational fishing these estimates are compared with the total economic activity in industrial sectors supplying these goods and services. To provide a regional perspective, the regional distribution of the national impacts are estimated. In addition, a methodology is provided for estimating the economic impacts associated with a "fishery management unit" and the method is applied to one unit. Finally, data on public expenditures and employment of state agencies related to marine recreational fishing are presented.

This section describes the research approach utilized in estimating the desired economic impacts. The discussion includes definitions of the terms used in this research along with a description of each research task. The appendices of the report provide a complete description of the procedures used to arrive at particular impact estimates.

1.2.1 Defining Marine Recreational Fishing and the Marine Recreational Fishing Industry

The initial task of the research effort defined marine recreational fishing and economic or industrial activity associated with spending by marine recreational fishermen. Marine recreational fishing may encompass a variety of fishing experiences. It is frequently thought of as the use of a hook and line from a boat or from some point on shore to catch fish in saltwater or brackish water. It may also include hook and line methods used in freshwater for catching anadromous fish; that is, those species that return from marine waters to spawn in freshwater. Digging for clams along the beach, using a speargun underwater to catch fish, or trawling for shrimp (for personal as opposed to commercial purposes), may also be considered forms of recreational fishing. Thus it is difficult to define marine recreational fishing based on the particular method of fishing used or the type of water in which the fish are caught.

The definition used in this study was shaped largely by the secondary data available for analysis. There is virtually no data base on shorebased recreational shellfishing activity or on fishing for anadromous fish in freshwater rivers and streams. Therefore, for the purpose of this analysis marine recreational fishing is defined to be:

The act of catching, or attempting to catch, fish in the ocean, coastal bays and estuaries, and coastal streams below tidal limits using a hook and line, rod and reel, or spearfishing equipment.

Excluded from this definition are efforts to catch anadromous fish in freshwater⁴ and shellfishing along coastal beaches and in estuaries.

It is almost equally as difficult to define the marine recreational fishing industry. It is not an "industry" in the conventional sense. The commercial fishing industry, for example, harvests, processes, and distributes fish for personal consumption and industrial uses. There is no similar group of enterprises which provides a "recreational fishing experience." In one sense it is quite reasonable to believe that the fisherman is both the producer and consumer of the industry's final output. However, there is a rather specialized complex of manufacturing and service establishments that provide the goods and services fishermen need to "create" their recreational fishing experiences. It is these establishments upon which this research focuses. For the purposes of this study the marine recreational fishing industry is defined as:

⁴ However, in the presentation an effort is made to estimate an upper bound of economic activity associated with fishing for anadromous species in freshwater.

Those establishments which produce, distribute, and sell goods and/or services to consumers for use as a part of marine recreational fishing activity.

Exhibit 1-1 outlines the goods and services consumed directly by recreational fishermen that are included as part of this study. It also illustrates the levels of economic activity (i.e., manufacturing, wholesale trade, and retail trade) for which direct economic impact assessments were made. Exhibit 1-2 provides definitions for these goods and services.

The industries associated with purchases of accessory equipment for recreational boats were not analyzed in detail. The manufacture and distribution of accessory equipment for boats is quite diverse and reliable economic impact estimates associated with this equipment were not available. However, an attempt was made to estimate the probable bounds of such impacts. Operating expenditures for use of recreational vehicles associated with marine recreational fishing are included in the analysis. However, purchases of recreational vehicles were excluded from the analysis. This is because such purchases are, in general, incidental to marine recreational fishing, and no reliable means were available to prorate such purchases to marine recreational fishing vis-a-vis all other recreational activity.

The geographical area which this research covers includes the fifty states. For several items (including fishing tackle, boats, outboard motors and trailers) the Virgin Islands, Puerto Rico, and Guam are also included.

1.2.2 Assessing the Direct Impacts of Marine Recreational Fishing

The primary objective of the study was to assess the direct contributions (i.e., associated with the final consumption of goods and services by fishermen) of marine recreational fishing to the national economy. The economic impacts are measured here in terms of five economic variables:

- o Annual sales are the value of shipments (excluding excise taxes) for manufactures, the value of purchases (including excise taxes) by retailers at the wholesale level, and consumer expenditures (including excise taxes) for goods and services at the retail (or business services) level in a particular year;
- o Annual employment is an estimate of person-years of employment in a particular year;
- o Annual wages and salaries is an estimate of the personal income associated with annual employment and includes employee compensation prior to deductions for social security, withholding taxes, group insurance, union dues, and savings bonds.

Exhibit 1-1

ECONOMIC CONTRIBUTION MATRIX
Direct Activity

<u>Type of Goods or Service</u>	<u>Manufacturing</u>	<u>Wholesale Trade and Distribution</u>	<u>Retail Trade or Business Services</u>
Fishing Tackle	1	1	1
Boats	1	0	1
Outboard Motors	1	0	1
Boat Trailers	1	0	1
Commercial Sport- fishing Vessels	0	0	1
Marinas/Boatyards	0	0	1
Bait	*	*	1
Food	0	0	1
Lodging	0	0	1
Travel	1	1	1
Boat Fuel	1	1	1
Boat Insurance	0	0	1
Other	*	*	1

Note: A "1" indicates that an activity exists and that the impacts were assessed. A "0" indicates that an activity does not exist.

*

Economic impacts associated with these levels of activity are included in the analysis of multiplier effects.

Exhibit 1-2

Definition of Goods and Services Comprising
the Marine Recreational Fishing Industry

1. Fishing Tackle includes fishing rods and reels; fishhooks; casting plugs, spinners and spoons, flies, lures, and similar artificial baits; and other fishing tackle including tackle boxes, creels, fish and bait buckets, nets, lines, sinkers, snap swivels; and fishing tackle of unspecified kind. Economic impacts related to marine recreational fishing are compared with those associated with all fishing tackle purchases.
2. Boats include outboard, inboard and inboard/outdrive watercraft. Economic impacts related to marine recreational fishing are compared to those of all outboard, inboard, and inboard/outdrive boats purchased for use in all kinds of boating activity.¹
3. Outboard Motors include those motors which are produced for external attachment to recreational boats. Economic impacts related to marine recreational fishing are compared with those related to all boating activity.
4. Boat Trailers include those trailers which are used to transport private recreational watercraft to and from launching sites. Economic impacts related to marine recreational fishing are compared with those of all boating activity.
5. Marinas/Boat Yards includes all establishments located in salt-water coastal areas that provide berthing, storage or repairs to hulls and/or motors among the mix of services offered. Economic impacts related to marine recreational fishing are compared with those of all coastal marinas/boat yards.
6. Commercial Sportfishing Vessels include those boats which are commonly referred to as charter boats and head boats. This analysis includes only those operating in marine waters and thus economic impacts are not compared to another activity.
7. Boat Fuel includes gasoline and diesel fuel used during marine recreational fishing. Economic impacts related to marine recreational fishing are compared with those associated with boat fuel used for all recreational boating activity.
8. Food includes all food purchases at commercial eating places during marine recreational fishing trips and outings less the value of food that would have been consumed at home had the trip not occurred. Food consumed during marine recreational fishing is compared to that consumed for all outdoor recreational trips of two hundred miles (round trip) or more.

9. Travel includes outlays for auto, bus, train, air, boat, or ship to get to or from the trip destination. Travel outlays for marine recreational fishing are compared with those for all outdoor recreational trips of two hundred miles (roundtrip) or more.
10. Lodging includes outlays for nights spent in a commercial accommodation (hotels, motels, trailer parks or campgrounds). Outlays related to marine recreational fishing are compared to those for all outdoor recreational trips of two hundred miles (roundtrip) or more.
11. Boat Insurance includes premiums paid for coverage of all inboard, outboard, and inboard/outdrive boats. Premiums related to marine recreational fishing are compared with those associated with use of these boats for all boating activity.
12. Bait includes all natural bait both live and frozen. Bait used for marine recreational fishing is compared with bait used for all recreational fishing.
13. "Other" includes special fishing clothing, tents, magazines, boat launching fees, guide fees, spearfishing equipment and other miscellaneous items not separately identified. Impacts related to these items are not compared with any grouping.

¹ While other types of boats such as sailboats, canoes, etc. are occasionally used for marine recreational fishing, they were excluded from this analysis because their use in marine recreational fishing is not a predominant reason for their purchase.

- o Annual value added, for manufacturing, is the value of shipments (excluding excise taxes) in a particular year less the cost of materials, supplies, fuel, electric energy, cost of resales and miscellaneous receipts. For wholesale and retail trade, value added is the gross margin (including excise taxes) less the cost of containers, fuel, electric energy, water purchased from other firms and the cost of contract work on materials of the wholesaler in a particular year.⁵ This provides a measure of income (i.e., wages, interest, rent, and profit) generated by an industry; that is the returns to all factors of production (labor, capital, land).
- o Annual capital expenditures are an estimate of the purchases of plant and equipment chargeable to fixed asset accounts for a particular year.

The general approach to estimating the direct impacts consisted of a four step procedure.⁶ First, total annual sales for the particular good or service at each level of economic activity was estimated. Second, an estimate was made of the portion of total annual sales that are attributable to marine recreational fishing for each good or service. Third, "economic impact ratios," ratios of value added to sales, sales to employment, wages and salaries to sales, and annual capital investment to sales that characterize each overall good or service were derived. Fourth, the respective economic impact ratios were applied to the total value of sales and to the portion of total sales attributable to marine recreational fishing for each good or service to determine the remaining economic impacts. This procedure was utilized to estimate both the 1972 and 1975 impacts.

The total value of sales for each good or service was estimated by examining as many sources of data as could be located. These sources included original surveys and various industrial and business censuses, trade associations, market research firms and government and university research in both published and unpublished form. The estimates from the various sources were compared and analyzed to assess the reasons for any inconsistencies observed. From this point estimates for total sales were chosen.

The portions of total annual sales attributable to sportfishing were then estimated. For boats, motors, trailers, marinas/boat yards, boat fuel, and boat insurance the allocations were made based on an estimate of the amount of time boats are used for fishing in saltwater. For fishing tackle the allocation was made based on a ratio of expenditures for tackle purchased

⁵ These definitions coincide with those used by the Bureau of the Census. The definition for manufacturing differs with that used by the Bureau of Economic Analysis in that it excludes excise taxes.

⁶ For a detailed analysis of direct impacts for each of the goods and services, see the appropriate appendix.

for use in saltwater fishing to expenditures for all fishing tackle. The ratio was determined from historical data on tackle expenditures by fishermen as well as data from a survey of fishing tackle manufacturers. For the remaining goods and services, which include bait, food lodging, travel, commercial sportfishing vessels, and "other" goods and services, estimates of sales attributable to marine recreational fishing were based on historical trend analyses of consumer expenditures for each of these items. In a few cases the 1970 Survey of Fishing and Hunting, published by the Bureau of Sportfishing and Wildlife was used for certain supporting data using appropriate cross-checking procedures. Unfortunately data from the 1975 Survey of Fishing and Hunting was not yet available at the time of this study effort.

"Economic impact ratios" are measures of the magnitude of impact per dollar of sales. (In the case of employment the ratio represents the inverse, the dollar volume of sales required to generate one person-year of employment.) For each good or service the ratios have been calculated using available data that most accurately appear to characterize the particular item. For example, the economic impact ratios for fishing tackle manufacturing were determined from data on establishments that specialize in the production of fishing tackle. However, such production specific data were not available at all levels of economic activity. So, for instance, retail trade impact ratios for fishing tackle were based on data for all sporting goods stores. This is a more highly aggregated grouping, but one which is very similar to the recreational fishing item.

The economic impact ratios were first calculated for 1972. The U.S. Bureau of Census was the primary data source. The ratios for 1975 were estimated by adjusting the 1972 ratios based on national trends at each level of economic activity. For example, the 1972 ratio of sales to employment for retail trade in fishing was adjusted by a factor expressing the relative change in employment and in sales for all retail trade between 1972 and 1975. Between 1972 and 1975 total retail sales for the nation increased by 31 percent. Much of that was the result of inflation. However, employment in retail trade increased by only 4.8 percent.⁷ The 1975 impact ratios reflect the fact that the value of sales increased faster than employment. The estimated 1972 impact ratio of sales to employment for fishing tackle is \$47,600 per person-year. The adjusted impact ratio for 1975 is \$59,500 per person-year. This procedure implicitly adjusts for inflation and for changes in productivity.

Impact ratios were developed for each of the goods and services listed above except commercial sportfishing vessels and marinas/boat yards. For these two items alternative methods were used. The procedures are fully explained in the appropriate appendices.

Several survey instruments were developed to assist in the determination of sales estimates and impact ratios where other data were thought to be lacking. A survey of fishing tackle manufacturers was conducted to assist in the determination of the portion of total tackle sales attributable to marine recreational fishing. Instruments were also developed for bait outlets and charter and head boats. These were used in both field or telephone interviews in all NMFS regions.

⁷ The percentages were determined using Bureau of Economic Analysis data published in the Survey of Current Business.

To determine the magnitude of the economic impacts for each good or service the economic impact ratios were then applied to the respective estimated value of sales: both total sales and those associated with marine recreational fishing. The ratios of value added to sales, wages and salaries to sales, and annual capital expenditures to sales were then applied to their respective sales estimates to obtain impact estimates.

1.2.3 Assessing the Indirect and Induced Economic Impacts of Marine Recreational Fishing

In addition to the direct economic impacts in the aforementioned industries, there are additional impacts generated in other sectors due to the spending in these directly impacted industries. These additional impacts are referred to as:

- o Indirect impacts, and
- o Induced impacts.

Indirect impacts (for employment, wages and salaries, or value added) are defined as those generated in industries which supply goods and services to the industries where direct impacts occur. For example, boat manufacturers purchase materials from other industries. This generates additional employment, value added, etc. in these industries.

Induced impacts are additional impacts generated throughout the economy due to additional spending by employees and owners resulting from wages and salaries and profits generated in the industries where the direct and indirect impacts occur.

The basic approach used in estimating the indirect and induced impacts makes use of input/output economic analysis. Using the 1967 85-industry input/output tables, multipliers have been developed showing the indirect (Type I multiplier) and indirect plus induced (Type II multiplier) effects for direct employment, employee compensation, and value added generated in any one of the 85-industry categories. Multipliers for the appropriate industry category were chosen and applied to the direct impacts developed in this study to provide general estimates of the additional indirect and induced economic impacts.

1.2.4 Assessing the Economic Impacts Associated with Marine Recreational Fishing in Regional Areas

a) Regional Impacts

While direct surveys of marine recreational fishing impacts in regional areas were beyond the scope of this study, estimates of impacts associated with fishing in regional areas were made using an analytical allocation model. This model prorated expenditures to regions based on data on the number of saltwater anglers per region participating in various types of fishing as well as data on relative per capita expenditures for marina recreational fishing for the Atlantic, Gulf, and Pacific coasts. The model first allocated

various fishermen expenditure categories to the regions based on the relative number of fishermen participating in a particular type of fishing activity. For example the expenditure categories of fishing tackle, food, lodging, travel, bait, and "other" were allocated on the basis of the relative number of total fishermen. The boat related expenditure categories including boats, motors, trailers, marinas, boat fuel, and boat insurance were allocated on the basis of the relative number of fishermen who participated in fishing on private or rented boats. Expenditures for commercial sportfishing vessels (charter and head boats) were allocated on the basis of the relative number of fishermen participating in party or charter boat fishing. Data on the relative number of fishermen participating were taken from the 1970 Saltwater Angling Survey, (published by NMFS, 1973).

The model then adjusted the above determined regional expenditures for variations in relative per capita expenditures of fishermen for the Atlantic, Gulf, and Pacific coasts.⁸ That is, if the data showed Atlantic coast fishermen spending relatively more or less per capita for a particular expenditure item, total allocated expenditures for that item were adjusted accordingly for the regions corresponding to the Atlantic coast.

b) Impacts Related to Manageable Fisheries Units

In addition a methodology was developed to further allocate national impacts to fishery management units (i.e., specific species within a region for which Regional Councils anticipate preparing management plans). This methodology is a further extension of the allocation model used for the regional allocation. It uses, in addition, data on effort expended on specific species within a region. This methodology was tested for one management unit for which more specific data from local studies were available.

1.2.5 Expenditures by State Governments Related to Marine Recreational Fishing

With the assistance of the National Marine Fisheries Service all of the coastal states and the U.S. territories were contacted and asked to provide data on the budgets and staffing levels related to marine recreational fishing. The responses were then compiled for presentation.

8

These data were taken from the 1970 National Survey from Fishing and Hunting, published by the Bureau of Sportfisheries and Wildlife. Unfortunately, at the time of the study, results were not yet available from the 1975 National Survey of Fishing and Hunting.

CHAPTER 2

NATIONAL ECONOMIC IMPACTS

2.0 NATIONAL ECONOMIC IMPACTS

2.1 Impacted Economic Sectors

As discussed in Section 1.1 the purpose of this study was to analyze the contribution that marine recreational fishing makes to the U.S. economy. In addition to the social value of the recreational experience of fishing, fishermen as consumers make purchases which support several industry segments to varying degrees. These purchases have a value to the economy in terms of employment, wages and salaries, and other economic measures. These economic values are but one component of the overall value to society of recreational fishing. There is no one "marine recreational fishing" industry as such. Rather purchases made in conjunction with fishermen's participation in marine recreational fishing contribute to economic activity in a variety of sectors. In this analysis the following commercial/industrial sectors have been determined to be those where marine recreational fishermen spending generates direct economic activity:

- o Fishing tackle,
- o Boats,
- o Motors,
- o Trailers,
- o Marinas/boat yards,
- o Commercial sportfishing vessels,
- o Boat fuel,
- o Food,
- o Lodging,
- o Travel,
- o Boat insurance, and
- o Bait.

In addition spending in conjunction with this fishing generates economic activity for a variety of miscellaneous products and services such as special fishing clothing, magazines, boat launching fees, spearfishing equipment, and so on.

The above industries of course vary in their dependence upon or direct association with marine recreational fishing. At one extreme commercial sportfishing

vessels or bait shops (in saltwater regions) are totally associated with marine recreational fishing. At the other extreme marine recreational fishing is a small proportion of the total business activity in, for instance, the travel and lodging industry (although in certain localities the travel and lodging industry may be highly dependent upon fishing activity). Nevertheless, even in this sector a sizeable amount of spending is made in conjunction with marine recreational fishing. The fishing tackle industry serves, of course, both the saltwater and freshwater fishermen. A majority of firms serve both, and sales of equipment for use in saltwater constitute about one-fifth of total industry sales. The several commercial/industrial segments surrounding boating activity (i.e., boats, motors, boat trailers, marinas/boat yards, boat fuel, and boat insurance) have an important association with marine recreational fishing. While not all boaters buy boats expressly for fishing, data show that a large proportion of total boating time is devoted to fishing. The opportunity to partake in marine recreation fishing must certainly influence the purchase of a boat used in saltwater and the related goods and services.

Where appropriate the direct economic activity in the above sectors have been analyzed at the retail, wholesale, and manufacturing levels. Certain sectors (e.g., commercial sportfishing vessels or lodging) do not have a direct, distinct economic tier at other than the "retail" level. Similarly certain goods such as boats, in general, do not have a significant wholesale activity.

In addition to the direct economic impacts in the areas described above, there are multiplier or "ripple" effects throughout many other sectors of the economy due to spending associated with marine recreational fishing. These include what are termed the indirect effects and the induced effects. Indirect effects include that economic activity generated in those industries which supply goods and services needed in the course of business of the above outlined "directly" impacted business sectors. For instance, fishing tackle manufacturers purchase certain raw materials to produce their items of tackle. These suppliers purchase additional materials and services and so on. Induced effects consist of additional economic activity generated in the economy through spending caused by the income (e.g., employee wages and salaries, profits, dividends, cost) generated in the direct and indirect industrial sectors.

Section 2.2 presents the results of the analysis of the economic activity of the directly-impacted business sectors. Included is a summary of the value of the economic measures associated with marine recreational fishing to the affected industries. Section 2.3 presents the results of an analysis of the multiplier effects (indirect and induced) throughout the total U.S. economy which can be associated with marine recreational fishing. Section 2.4 presents a compilation of certain expenditures and other economic impact measures occurring in the public sector which are associated with marine recreational fishing. Section 2.5 provides an analysis of likely bounds of additional economic impacts due to spending for fishing for anadromous fish above tidal limits. Appendices A through K provide detailed discussion of the analysis of the economic impacts in the directly affected business sectors.

The interpretation of the economic impacts presented in this study will vary somewhat according to the particular affected industry. Consumable fishing supplies and services (such as offered by bait dealers and commercial sportfishing vessels) would be very directly affected by short-term changes in marine recreational fishing opportunities. Sectors with a high dependence on marine recreational fishing (such as boats, motors, trailers, marinas, etc.) would be impacted significantly by medium and long-term changes in marine recreational fishing policies. While if fishermen were to spend less on marine recreational fishing, spending in other sectors of the economy would increase, these industries would face dislocations. Over the long-term the indirect and induced economic impacts associated with marine recreational fishing would be compensated for by spending in other sectors if spending for marine recreational fishing were to change. However, the indirect and induced economic impacts are indicative of the measure of possible dislocation due to short-term perturbations in spending for marine recreational fishing. The conclusion to be drawn is that this analysis is indicative of the relationship between marine recreational fishing expenditures and national economic activity (as measured by direct, indirect and induced impacts). Nevertheless it should be remembered that most of the resources utilized in fishing (or any other economic activity) could in the long-run after a period of adjustment be channeled into other industries, through national or public policies and programs or personal tastes, giving rise to other economic impacts.

2.2 Direct Economic Impact Results

The total sales at the retail level of goods and services associated with marine recreational fishing were estimated to be \$1,333 million in 1972. These sales generated an estimated \$510 million of value-added and \$285 million in wages and salaries in business sectors where direct spending associated with marine recreational fishing took place. These impacts include those at the manufacturing and trade levels for manufactured goods. Further impacts include an estimated 46,550 person-years of employment generated, as well as an estimated \$45.1 million worth of capital expenditures in 1972. Exhibit 2-1 shows these impacts broken down by sector. In the sales column (Column 1) sales at each marketing tier (where appropriate) are shown although the total includes only the totals at the final (retail) level.

Similar data are shown in Exhibit 2-2 for 1975. In 1975 consumers purchased \$1,840 million worth of goods and services at the retail level which are associated with marine recreational fishing.¹ These sales generated approximately \$699 million of value-added, \$343 million of wages and salaries, 50,580 person-years of employment, and \$52.8 million of capital expenditures in these directly-impacted business sectors. In 1975 spending for private boats and boat-related goods and services constituted the largest expenditures and corresponding economic impacts. Fishermen's expenditures in the private

¹ These totals do not include the impacts of purchases of accessory equipment for recreational boats. Because of the diverse manufacture and distribution of such equipment, reliable economic impact estimates were not available. However, based on an analysis of composite dealer sales data sales of such equipment would add in all likelihood less than five percent to the impact estimates presented here.

Exhibit 2-1

Direct Economic Impacts Associated
With Marine Recreational Fishing
1972

	<u>Sales</u> (millions of dollars)	<u>Value-Added</u> (millions of dollars)	<u>Wages & Salaries</u> (millions of dollars)	<u>Employment</u> (person-years)	<u>Annual Capital</u> <u>Expenditures</u> (millions of dollars)
Fishing Tackle					
Manufacturing	37	22	10.1	1,870	1.4
Wholesale Trade	42	4	2.9	330	0.3
Retail Trade	88	33	10.7	1,800	1.8
Boats					
Manufacturing	117	53	29.0	4,190	2.3
Retail Trade	176	28	17.2	2,200	1.4
Motors					
Manufacturing	35	16	6.4	560	0.5
Retail Trade	48	8	4.7	610	0.5
Trailers					
Manufacturing	12	5	2.2	300	0.2
Retail Trade	15	2	1.5	190	0.1
Marinas	203	81	59.0	6,400	6.0
Commercial Sportfishing Vessels	94	56	30.0	4,800	7.0
Boat Fuel					
Manufacturing	15	3	0.7	50	0.6
Wholesale Trade	34	3	1.2	150	0.6
Retail Trade	42	7	3.9	1,000	0.5
Food	165	60	41.3	10,600	6.1
Lodging	45	24	13.1	2,730	5.8
Travel					
Manufacturing	48	8	2.2	180	1.9
Wholesale Trade	99	9	3.6	450	1.9
Retail Trade	135	22	12.7	2,700	1.6
Boat Insurance	37	9	3.5	340	-
Bait	165	33	15.0	2,450	1.3
Other	<u>120</u>	<u>24</u>	<u>14.4</u>	<u>2,650</u>	<u>3.1</u>
TOTAL	1,333	510	285.3	46,550	45.1

Exhibit 2-2

Direct Economic Impacts Associated With
Marine Recreational Fishing
1975

	<u>Sales</u> (millions of dollars)	<u>Value-Added</u> (millions of dollars)	<u>Wages and Salaries</u> (millions of dollars)	<u>Employment</u> (person-years)	<u>Annual Capital</u> <u>Expenditures</u> (millions of dollars)
Fishing Tackle					
Manufacturing	57	36	15.7	2,480	2.5
Wholesale Trade	64	6	4.7	490	0.4
Retail Trade	136	52	15.8	2,290	3.9
Boats					
Manufacturing	139	61	29.5	4,120	1.7
Retail Trade	208	33	15.6	2,030	1.2
Motors					
Manufacturing	33	15	5.6	390	1.0
Retail Trade	45	7	3.4	440	0.3
Trailers					
Manufacturing	15	7	2.5	280	0.5
Retail Trade	18	3	1.4	180	0.1
Marinas	240	96	64.8	6,500	4.8
Commercial Sportfishing Vessels	122	73	35.4	4,900	8.5
Boat Fuel					
Manufacturing	49	8	0.9	50	2.2
Wholesale Trade	73	7	1.5	160	1.1
Retail Trade	86	14	4.9	1,060	0.7
Food	247	89	56.8	12,000	6.7
Lodging	63	33	16.7	3,470	1.7
Travel					
Manufacturing	133	23	3.1	200	5.9
Wholesale Trade	198	19	4.8	500	3.0
Retail Trade	233	27	17.0	2,970	1.9
Boat Insurance	56	13	4.9	400	-
Bait	216	43	17.7	2,670	1.3
Other	<u>170</u>	<u>34</u>	<u>20.4</u>	<u>3,000</u>	<u>3.4</u>
TOTAL	1,840	699	343.1	50,580	52.8

boating areas (including boat, motor, and trailer purchases, expenses for fuel, and marina, boat yard, and boat insurance services) accounted for \$653 million or approximately 35 percent of the total. Expenditures for travel and lodging for fishing excursions accounted for \$296 million or 16 percent of the total.² Expenditures for food in conjunction with fishing outings was estimated at \$247 million or approximately 13 percent of the total.³ Expenditures for bait at \$216 million accounted for about 12 percent of the total. Fishing tackle with a retail value of sales of \$136 million was about seven percent of the total. Expenditures for outings on head (or party) and charter boats at an estimated \$122 million accounted for approximately another seven percent of the total.

Much basic data necessary to develop the preceding economic impact estimates were obtained from secondary sources (particularly Census of Manufacturers, Census of Wholesale Trade, and Census of Retail Trade) which were most recently available for 1972. Thus, 1972 was chosen as a base year. Detailed development of the sales and economic impact estimates by industrial sector are provided in Appendices as follows:

Fishing Tackle	- Appendix A
Boats	- Appendix B
Motors	- Appendix C
Trailers	- Appendix D
Marinas	- Appendix E
Commercial Sportfishing Vessels	- Appendix F
Bait	- Appendix G
Boat Fuel	- Appendix H
Food, Lodging and Travel	- Appendix I
Boat Insurance	- Appendix J
Other	- Appendix K

² Travel expenditures include travel by both public transportation and private vehicle. The bulk of the expenditures were for travel by private vehicle. These were evaluated by assigning a cost approximating the typical variable cost of operating a private vehicle to estimates of the number of miles driven. The majority of this is fuel. Economic figures for the manufacturing and wholesale tiers for travel are for gasoline production and distribution.

³ It should be noted that food expenditures as shown here represent outlays for food, snacks, and refreshments while engaged in a fishing outing less an amount to account for the average cost of meals eaten at home. The cost of groceries brought from home was not included.

Sales estimates were developed for 1975 using a combination of primary and secondary sources. Economic impact measures were in some cases adjusted from 1972 to 1975 using appropriate extrapolation techniques. The development of data for 1975 is described in Appendix L. In most cases where it was necessary to rely on secondary data sources cross checks were made among independent sources to determine validity.

Estimates were made of the number of establishments relating to the business sectors impacted by marine recreational fishing. These estimates are provided in Exhibit 2-3 along with a description of the category to which the estimates pertain. Descriptions of the determinations of the estimates are provided in the appropriate appendices. Estimates of the number of establishments for the marine fuel; food, travel and lodging; marine insurance; and other categories could not be provided because of the extreme fragmentation of these business sectors.

Comparisons were made in the study on a sector-by-sector basis of total economic activity which is associated with marine recreational fishing to that of the total sector. In some cases, of course, the definition of the scope of the total sector to which comparisons are made can be somewhat arbitrary. However, certain insight is provided on the relative importance of marine recreational fishing to various business sectors. Exhibit 2-4 compares sales associated with marine recreational fishing to total sales of the sectors to which they relate. The sectors in the "Total" column were defined as follows:

Fishing tackle	- All fishing tackle sold for use in both fresh and saltwater.
Boats	- All recreational inboard, outboard, and inboard/outdrive boats (excluding houseboats, sailboats, canoes, dingies, etc.) sold for use in both fresh and saltwater.
Motors	- All outboard motors sold for use in both fresh and saltwater.
Trailers	- All boat trailers sold for use in conjunction with boats used in both fresh and saltwater.
Marinas	- All marinas both in fresh and saltwater areas.
Commercial Sportfishing Vessels	- All saltwater commercial sportfishing vessels (the number of such vessels used in freshwater is negligible by comparison).
Boat Fuel	- Fuel used in all recreational boating activity both in salt and freshwater.
Food, Travel, and Lodging	- Food, travel, and lodging consumed in conjunction with all outdoor recreation in the country.
Insurance	- All recreational boat insurance for boats used in both salt and freshwater.
Bait	- All natural bait for fishing in both fresh and saltwater.

Exhibit 2-3

Number of Establishments in Business
Categories Related to Marine Recreational Fishing

<u>Product or Service</u>	<u>Number of Establishments</u>	<u>Category Description</u>
Fishing Tackle Manufacturing	239	Manufacturers of freshwater and and saltwater tackle in U.S.
Wholesale Trade	868	Establishments which distribute freshwater and saltwater tackle in U.S.
Retail Trade	10,781 +	Retailers selling tackle through- out U.S. not including department stores
Boats Manufacturing	228	Manufacturers primarily engaged in producing outboard, inboard and inboard/outdrive boats
Retail Trade	6,650	Retail boat dealers throughout U.S.
Motors Manufacturing	7	Manufacturers of outboard motors in U.S.
Retail Trade	6,650	Retail boat dealers throughout U.S.
Boat Trailers Manufacturing	100 +	
Retail Trade	6,650	Retail boat dealers throughout U.S.
Marinas	2,800	Coastal marinas and boat yards
Commerical Sport- fishing Vessels	3,870 ¹	Saltwater head (party) and charter boats
Boat Insurance	130	Number of insurance carriers selling insurance for recreational boats
Bait	5,000	Establishments that sell bait for use in saltwater as a primary activity

¹ Includes 2,251 charter boats (those that carry six or fewer passengers) and 1,619 head boats (those that carry seven or more passengers).

Exhibit 2-4

Comparison of Sales Associated With Marine
Recreational Fishing With Total Sector Sales¹

	Sales in Total Sector (millions of dollars)	Sales Associated with Marine Recrea- tional Fishing (millions of dollars)	Percentage of Sector Sales Associated With Marine Recrea- tional Fishing
Fishing Tackle	620	136	22
Boats	989	208	21
Motors	411	45	11
Trailers	88	18	21
Marinas	540	240	44
Commercial Sport- fishing Vessels	122	122	100
Boat Fuel	410	86	21
Food	2,435	247	10
Lodging	1,234	63	5
Travel	2,238	233	10
Boat Insurance	266	56	21
Bait	810	216	27

¹ Sales figures are at the retail level (i.e., final sales to fishermen).

Exhibits 2-5 and 2-6 show the economic impacts for 1972 and 1975, respectively, associated with the sales for the "total" sectors as defined above. As such, they correspond with Exhibits 2-1 and 2-2.

2.3 Multiplier Effects

In addition to the direct economic impacts presented in the preceding section, additional impacts for value added, personal income, and employment occur in other sectors of the economy due to spending created in the sectors directly impacted by marine recreational fishing. Both indirect (effects due to purchases of goods and services in the direct sectors) and induced (effects due to spending of employee income created in the direct and indirect sectors) multiplier effects approximations for value added, employee compensation and property-type income, and employment were computed for marine recreational fishing for 1975.

The basic approach and the actual multipliers used to generate the above estimates were taken directly from a previous study performed for the NMFS.⁴ A brief description of the approach follows.

Data were taken from the 1967 85-industry category input/output tables for the U.S. economy.⁵ This is the latest input/output table for the U.S. economy currently available. For a detailed discussion of the input/output approach see The Elements of Input/Output Analysis by William H. Miernyk, Random House, New York, 1965. Table 3 of the above input/output tables show the total direct and indirect requirements in each of the 85-industry categories per dollar of demand in any given category. Value added and employee compensation and property-type income ratios (per dollar of demand) were then applied to these direct and indirect requirements to obtain the direct and indirect multiplier effects for each sector. This was performed using standard mathematical procedures, including a series of approximations of the inverse of the Leontief matrix. Employment was computed similarly, except that adjustments were made for changes in the employment to output ratios due to inflation in each appropriate sector over the period 1967 to 1975. Calculation of the induced effects were performed similarly, except that the analysis included the linkages in the input/output tables by sector between output and a change in payments to households.⁶ This approach provides an approximation to the expected multiplier effects associated with the direct impacts.

⁴ Centaur Management Consultants, Economic Impacts of the U.S. Commercial Fishing Industry, prepared for the National Marine Fisheries Service, Washington, D.C., January, 1975. See Chapter I and Appendix A. The multipliers are found on pages 267-269.

⁵ See Survey of Current Business, Volume 54, Number 2, U.S. Department of Commerce, February, 1974.

⁶ For additional discussions and descriptions of multiplier effects and their calculation see Harry W. Richardson, Input-Output and Regional Economics, Redwood Press, Ltd., Great Britain, 1972; Hollis B. Chenery and Paul G. Clark, Interindustry Economics, John Wiley & Sons, 1959; Richard Stone, Input-Output and National Accounts, Organization for European Economic Cooperation, 1961; and Richard H. Puckett, Introduction to Mathematical Economics, D.C. Heath and Company, 1971, pp. 63-72.

Exhibit 2-5

Total Economic Impacts in Sectors
Associated With Marine Recreational Fishing
1972

	Sales (millions of dollars)	Value-Added (millions of dollars)	Wages and Salaries (millions of dollars)	Employment (person-years)	Annual Capital Expenditures (millions of dollars)
Fishing Tackle					
Manufacturing	168	100	45.5	1,870	6.4
Wholesale Trade	189	20	13.0	1,470	1.5
Retail Trade	400	152	48.8	8,400	8.4
Boats					
Manufacturing	559	254	138.0	20,000	11.2
Retail Trade	836	133	81.9	10,600	6.7
Motors					
Manufacturing	320	146	59.0	5,120	4.8
Retail Trade	432	69	42.1	5,550	3.4
Trailers					
Manufacturing	58	21	10.6	1,400	1.2
Retail Trade	72	5	7.1	920	0.2
Marinas	450	180	130.0	14,300	14.0
Commercial Sportfishing Vessels	94	56	30.0	4,800	7.0
Boat Fuel					
Manufacturing	72	12	3.3	260	2.9
Wholesale Trade	163	15	5.9	740	3.1
Retail Trade	200	32	19.0	3,990	2.4
Food	1,086	391	271.0	69,600	40.0
Lodging	910	482	264.3	55,150	117.0
Travel					
Manufacturing	366	62	17.3	1,300	15.0
Wholesale Trade	749	71	27.1	3,400	14.0
Retail Trade	1,025	164	96.1	20,460	12.0
Boat Insurance	174	41	16.7	1,600	-
Bait	650	130	60.0	9,660	4.9

Exhibit 2-6

Total Economic Impacts in Sectors
Associated With Marine Recreational Fishing
1975

	<u>Sales</u> (millions of dollars)	<u>Value-Added</u> (millions of dollars)	<u>Wages and Salaries</u> (millions of dollars)	<u>Employemnt</u> (person-years)	<u>Annual Capital</u> <u>Expenditures</u> (millions of dollars)
Fishing Tackle					
Manufacturing	260	164	71.5	11,260	11.2
Wholesale Trade	292	29	21.3	2,100	1.8
Retail Trade	620	236	71.9	10,420	18.0
Boats					
Manufacturing	661	291	140.1	19,610	8.0
Retail Trade	989	158	74.2	9,680	5.9
Motors					
Manufacturing	304	140	52.0	3,520	9.4
Retail Trade	411	66	30.8	4,020	2.5
Trailers					
Manufacturing	77	32	11.7	1,300	2.2
Retail Trade	88	14	6.6	860	0.5
Marinas	540	216	145.8	14,600	10.8
Commercial Sportfishing Vessels	122	73	35.4	4,900	8.5
Boat Fuel					
Manufacturing	233	40	4.4	280	10.3
Wholesale Trade	348	33	7.6	780	5.2
Retail Trade	410	66	23.9	4,230	3.3
Food	2,435	876	560.1	18,800	65.8
Lodging	1,234	654	327.0	67,800	116.0
Travel					
Manufacturing	1,274	217	23.6	1,430	56.1
Wholesale Trade	1,903	181	36.2	3,740	28.5
Retail Trade	2,238	358	125.8	60,610	17.9
Boat Insurance	266	64	23.4	1,900	-
Bait	810	162	66.4	10,000	4.9

Multiplier effects associated with capital expenditures in the directly impacted business sectors were calculated separately as the above input/output tables do not account for capital expenditure transactions. This was done as follows. Data was obtained separately on capital expenditure transactions between the input/output sectors for 1967.⁷ From these data the sectors and their relative contribution supplying capital goods to the business sectors directly impacted by marine recreational fishing could be estimated. Direct, indirect and induced impacts were then calculated for those sectors supplying capital goods weighted by the annual capital expenditure estimates presented in Section 2.2.

The approximated multiplier effects for value added are presented in Exhibit 2-7. The first column for direct impacts is the same as those presented in Exhibit 2-1. The second column includes both the value added in the directly impacted sectors and the indirect value added in sectors supplying materials and services to the corresponding direct sector. The third column includes all of the direct, indirect, and induced value added throughout the economy created in conjunction with the economic activity associated with marine recreational fishing in the corresponding direct sector. The induced value added occurs across all sectors of the economy due to consumer spending out of earnings (wages and salaries, other labor income and proprietors' income) created in the direct and indirect sectors. Thus in 1975 in addition to the \$699 million of value added in the directly impacted businesses, marine recreational fishing has an associated \$1,773 million of direct and indirect value added, and \$3,957 million of direct, indirect, and induced value added.

Exhibit 2-8 presents similar approximated multiplier effects for employee compensation and property-type income for 1975. Because of data limitations the first column of direct impacts includes only employee compensation (i.e., wages and salaries and other labor income). These were determined from the results of Section 2.2 (see Exhibit 2-1). Thus, in 1975 direct wages and salaries associated with marine recreational fishing were \$343 million. Total direct plus indirect employee compensation and property-type income was an approximated \$1,578 million, and total direct plus indirect plus induced employee compensation and property-type income in the economy as a whole was an estimated \$3,526 million.

Exhibit 2-9 presents the multiplier impacts for employment in person-years associated with marine recreational fishing. In 1975 total direct employment (as in Exhibit 2-1) was 50,580, the total direct plus indirect employment was estimated at 123,300, and total direct plus indirect plus induced employment was estimated at 241,600.

The preceding results do not include impacts due to capital spending. These effects were estimated for 1975 and are presented in Exhibit 2-10. The first column shows the annual capital investment for each of the direct sectors. These are taken from Exhibit 2-1. The remaining columns show the multiplier effects associated with the capital spending in each of the directly impacted sectors. Thus in 1975, capital investment associated with marine recreational fishing in the directly impacted sectors generated an additional \$46 million

⁷ From Interindustry Transactions in New Structures and Equipment, 1963 and 1967, Department of Commerce.

Exhibit 2-7

Value-Added Multiplier Impacts

	<u>Direct</u> (millions of dollars)	<u>Direct Plus Indirect</u> (millions of dollars)	<u>Direct Plus Indirect Plus Induced</u> (millions of dollars)
Fishing Tackle			
Manufacturing	36	50.6	112.9
Wholesale Trade	6	6.9	15.5
Retail Trade	52	71.4	159.1
Boats			
Manufacturing	61	130.5	291.9
Retail Trade	33	68.4	152.5
Motors			
Manufacturing	15	30.6	68.3
Retail Trade	7	11.9	26.5
Trailers			
Manufacturing	7	14.1	31.5
Retail Trade	3	11.9	26.5
Marinas	96	225.8	504.0
Commercial Sport- fishing Vessels	73	121.0	269.6
Boat Fuel			
Manufacturing	8	44.6	99.5
Wholesale Trade	7	23.8	53.0
Retail Trade	14	12.9	28.7
Food	89	245.0	545.9
Lodging	33	62.2	138.6
Travel			
Manufacturing	23	121.0	270.0
Wholesale Trade	19	64.5	143.7
Retail Trade	27	34.7	77.4
Insurance	13	55.4	123.8
Bait	43	210.3	471.1
Other	34	155.7	347.3
TOTAL	699	1,773.2	3,957.3

Exhibit 2-8

Employee Compensation and Property-Type
Income Multiplier Impacts

	Direct ¹ (millions of dollars)	Direct Plus Indirect (millions of dollars)	Direct Plus Indirect Plus Induced (millions of dollars)
Fishing Tackle			
Manufacturing	15.7	48.2	107.2
Wholesale Trade	4.7	5.8	13.0
Retail Trade	15.8	59.3	133.2
Boats			
Manufacturing	29.5	124.5	276.6
Retail Trade	15.6	56.9	127.7
Motors			
Manufacturing	5.6	29.2	64.7
Retail Trade	3.4	9.9	22.2
Trailers			
Manufacturing	2.5	13.4	29.9
Retail Trade	1.4	2.5	5.6
Marinas	64.8	209.8	468.0
Commercial Sport- fishing Vessels	35.4	116.8	261.1
Boat Fuel			
Manufacturing	0.9	43.7	97.0
Wholesale Trade	1.5	19.8	44.4
Retail Trade	4.9	10.7	24.1
Food	56.8	203.5	457.0
Lodging	16.7	57.0	127.3
Travel			
Manufacturing	3.1	96.8	215.5
Wholesale Trade	4.8	53.6	120.3
Retail Trade	17.0	28.8	64.8
Insurance	4.9	51.2	114.2
Bait	17.7	193.5	434.1
Other	20.4	142.8	318.2
Total	343.1	1,577.7	3,526.1

¹ Includes only employee compensation (i.e., wages and salaries) and excludes property type income.

Exhibit 2-9

Employment Multiplier Impacts

	<u>Direct</u>	<u>Direct Plus Indirect</u>	<u>Direct Plus Indirect Plus Induced</u>
Fishing Tackle			
Manufacturing	2,480	3,226	7,119
Wholesale Trade	490	501	972
Retail Trade	2,290	5,155	10,001
Boats			
Manufacturing	4,120	7,423	17,458
Retail Trade	2,030	4,940	9,584
Motors			
Manufacturing	390	1,544	3,901
Retail Trade	400	859	1,667
Trailers			
Manufacturing	280	801	1,884
Retail Trade	180	215	417
Marinas	6,500	20,736	29,088
Commerical Sport- fishing Vessels	4,900	10,516	20,057
Boat Fuel			
Manufacturing	50	1,245	4,121
Wholesale Trade	160	1,718	2,334
Retail Trade	1,060	931	1,806
Food	12,000	17,685	34,308
Lodging	3,470	6,722	11,529
Travel			
Manufacturing	200	3,378	11,185
Wholesale Trade	500	4,654	9,029
Retail Trade	2,970	2,506	4,862
Insurance	400	3,399	7,560
Bait	2,670	14,870	30,849
Other	3,000	10,321	21,866
TOTAL	50,580	123,345	241,597

Exhibit 2-10

Economic Multiplier Impacts Due to
Capital Investment in Direct Sectors

	Annual Capital Investment	Employee Compensation and Property-Type Income (millions of dollars)			Value-Added (millions of dollars)			Employment (person-years)		
		Direct Plus Indirect	Direct Plus Indirect	Plus Induced	Direct Plus Indirect	Direct Plus Indirect	Plus Induced	Direct Plus Indirect	Direct Plus Indirect	Plus Induced
Fishing Tackle										
Manufacturing	2.5	2.26	5.05		2.36	5.27		127	311	
Wholesale Trade	.40	.35	0.77		.38	.84		18	46	
Retail Trade	3.9	3.39	7.53		3.70	8.23		180	453	
Boats										
Manufacturing	1.67	1.51	3.39		1.58	3.54		86	209	
Retail Trade	1.2	1.04	2.32		1.14	2.53		56	139	
Motors										
Manufacturing	1.0	.91	2.02		.95	2.12		51	125	
Retail Trade	0.3	.26	.58		.28	.63		14	35	
Trailers										
Manufacturing	.47	.42	.95		.44	.99		24	59	
Retail Trade	.11	.10	.21		.10	.23		5	13	
Marinas	4.8	4.36	9.69		4.57	10.22		254	608	
Commercial Sport-fishing Vessels	8.5	7.61	16.91		7.98	17.85		454	1,068	
Boat Fuel										
Manufacturing	2.2	1.94	4.46		2.10	4.68		54	128	
Wholesale Trade	1.1	.96	2.12		1.04	2.32		51	128	
Retail Trade	0.69	.59	1.32		.65	1.44		32	79	
Food	6.7	5.82	12.93		6.35	14.14		310	778	
Lodging	1.7	1.52	3.37		1.63	3.64		85	207	
Travel										
Manufacturing	5.0	4.41	10.13		4.77	10.63		123	291	
Wholesale Trade	3.0	2.61	5.79		2.84	6.33		139	348	
Retail Trade	1.9	1.65	3.66		1.79	4.00		88	220	
Boat Insurance	-	-	-		-	-		-	-	
Bait	1.3	1.12	2.50		1.23	2.74		60	151	
Other	3.4	2.95	6.56		3.22	7.17		157	395	
TOTAL	52.8	45.78	102.26		49.10	109.54		2,368	5,791	

of direct plus indirect and \$102 million of direct plus indirect plus induced employee compensation and property-type income. These investment purchases also generated an additional \$49 million of direct plus indirect and \$110 million of direct plus indirect plus induced value added. Additional direct plus indirect employment generated by this capital investment amounted to an estimated 2,400 person-years. Additional direct plus indirect plus induced employment related to this spending amounted to an estimated 5,800 person-years.

2.4 Expenditures, Wages and Salaries and Employment of State Agencies
Related to Marine Recreational Fishing in 1975

The National Marine Fisheries Service (NMFS) also requested that activity associated with expenditures by state agencies for marine recreational fishing be examined. With the assistance of the NMFS, all appropriate agencies in coastal states, Hawaii and the territories of Guam, Puerto Rico, and the Virgin Islands were contacted. The agencies were asked to provide information on their total expenditures, wages and salaries, and employment for three categories of activity associated with marine recreational fishing in 1975. These categories were administration and research, direct services, and construction of facilities. Administration and research includes licensing, law enforcement, special sportfishing programs, data collection and analysis, and so on. Direct services include maintenance on existing facilities related to marine recreational fishing (e.g., fish hatcheries, marinas, piers, and artificial reefs). Construction of facilities includes the development of new projects such as hatcheries, piers, marinas, and artificial reefs.

A large portion of fisheries related state government activity does not discriminate between commercial and recreational fishing. For example, the benefits of fish hatcheries are shared between both types of fishermen. For items such as these, agency officials were asked to provide their best estimates of the portion of the effort (in terms of expenditures, wages and salaries, and employment) that was attributable to marine recreational fishing. Officials of several states responded that they were unable to estimate their marine fisheries management activity. These states include Connecticut, Florida, and Texas. New Jersey officials could provide only a very rough estimate of expenditures and wages and salaries in total. California officials were able to provide only an estimate of total expenditures.

Exhibit 2-11 presents the information provided by those states that responded to the request. No responses were received from Massachusetts, Maryland, Pennsylvania, Georgia, and the territories. Also excluded are Connecticut, Florida and Texas since they were unable to provide activity estimates.

Several states provided employment estimates based on the number of personnel who devote at least part of their time on work related to marine recreational fishing. In these instances the estimates were converted from the number of employees to person-years based on the salaries and wages data provided and assuming an average value of \$12,000 per person-year of employment.

Exhibit 2-11
Expenditures, Wages and Salaries,
and Employment by State Agencies
Related to Marine Recreational Fishing
1975

State	Administration and Research				Direct Services				Construction				Total	
	Expendi- tures (dollars)	Wages & Salaries (dollars)	Employment (person-years)		Expendi- tures (dollars)	Wages & Salaries (dollars)	Employment (person-years)		Expendi- tures (dollars)	Wages & Salaries (dollars)	Employment (person-years)		Wages & Salaries (dollars)	Employment (person-years)
Maine	50,000	34,500	3		0	0	0		0	0	0		34,500	3
New Hampshire	46,000	40,000	3.3*		90,830	44,000	5		38,300	35,000	5.0		119,000	12.3
Rhode Island	24,000	16,000	1.5		27,000	21,000	3		0	0	0		37,000	4.5
New York	93,000	77,000	6.4*		8,275	1,315	0.1		0	0	0		78,315	6.5
New Jersey	**	**	**		**	**	**		**	**	**		65,000	5.4*
Delaware	342,016	217,331	18		70,650	20,238	1.8*		78,700	27,150*	1.8*		264,719	21.6
Virginia	26,457	6,035	0.7		0	0	0		76,092	15,911	1.0		21,946	1.7
North Carolina	75,700	30,900	2.6*		8,000	6,000	0.5*		205,000	100,000	6.7*		136,900	9.8
South Carolina	45,157	34,296	3.25		12,999	9,883	1		33,525	8,133	0.75		52,312	5.0
Alabama	40,000	25,000	4		43,500	30,000	4.2		10,000	3,450*	0.2*		58,450	8.4
Mississippi	30,789	30,789	6		0	0	0		17,228	5,930*	0.4*		36,719	6.4
Louisiana	305,569	150,094	13.2*		15,000	10,000	2		25,000	6,000	1.0		174,094	16.2
California	**	**	**		**	**	**		**	**	**		1,457,456*	121.5*
Arkansas	1,100,442	562,546	56.25		49,302	24,880	2.5		101,066	34,500*	2.3*		631,926	61.1
Washington	220,000	120,000	6		5,000	2,500	0.2*		28,000	9,600*	0.6*		132,100	6.8
Alaska	1,436,500	1,001,400	57.9		762,000	604,800	24.2		-	-	-		1,606,200	62.1
Hawaii	211,339	169,246	11.8		0	0	0		0	0	0		169,246	11.8
TOTAL	4,046,969	2,523,137	193.9		1,092,556	774,616	44.5		612,911	245,674	19.75		5,065,833	395.1

* Agency contracted for construction. Employment and wages and salaries are estimated based on Bureau of Labor Statistics on civil works project construction.

** Employment estimated based on \$12,000 of income per person-year.

*** Data not disaggregated in agency response.

**** Data limited from ratio of wages and salaries to expenditures for responding states.

***** Source: From State personnel.

Similarly, several states reported that construction of new facilities took place through contracts to private firms. Employment and wages and salaries which were generated from these expenditures were estimated based on data for civil works (dredging) construction projects obtained from the Bureau of Labor Statistics.⁸

In 1975 total expenditures related to marine recreational fishing were estimated at \$8.2 million for those states that responded. Of that total, wages and salaries amounted to an estimated \$5.1 million and employment totalled approximately 385 person-years. Excluding the responses of California and New Jersey which did not disaggregate the totals by expenditure category, about 70 percent of state level activity reported was in administration and research. Direct services accounted for about 20 percent of state level activity and construction accounted for about 10 percent.

2.5 Impact Related to Anadromous Species

As explained in Chapter 1 the definition of marine recreational fishing used in this analysis includes only that activity which takes place below tidal limits. This definition was chosen largely because of the limitations in the data base on fishing activity for anadromous species in freshwater. While an accurate estimate of expenditures and associated economic impacts cannot be made for this activity, it is possible to provide an estimate of the upper bound of expenditures for recreational fishing activity for anadromous species occurring above tidal limits.

It is estimated that recreational fishermen spent no more than \$132 million in 1975 fishing in freshwater for anadromous species. These expenditures amount to about seven percent of the estimated expenditures for marine recreational fishing occurring below tidal limits in that year. The remaining direct economic impacts (i.e., wages and salaries, employment, value added, and annual capital expenditures) can also be expected to increase by about seven percent at most.

This estimate was obtained using the following procedure. With the help of NMFS biologists, species of anadromous fish caught by recreational fishermen in freshwater were identified and estimates were made of the percent of associated recreational fishing activity occurring above tidal limits. The number of anglers fishing in freshwater for anadromous fish were then estimated. Average expenditures per angler for fishing above tidal limits were estimated based on data for steelhead fishing in the Pacific Northwest. Finally, average expenditures per angler were multiplied by the estimated total number of anglers fishing for anadromous species in freshwater to obtain an estimate of expenditures for this activity.

⁸ Estimates of on-site and off-site employment generated by construction are based on 0.023 person-years of employment per \$1,000 of construction. Salaries and wages are based on \$15,000 per person-year of employment.

Exhibit 2-12 lists the anadromous species and the estimated number of anglers fishing above tidal limits.⁹ Using data for 1970 from the 1970 Saltwater Angling Survey the number of anglers by species group was estimated for 1975.¹⁰ However, the 1970 Saltwater Angling Survey includes only those anglers that fish below tidal limits. Using the estimates of the percent of fishing activity occurring above tidal limits, estimates of the total number of anglers in both freshwater and saltwater were determined.¹¹ From the estimated number of total freshwater and saltwater anglers the number of freshwater anglers was then determined based upon the assumed percent of anglers fishing above tidal limits. In total these anglers number an estimated 818,600.

An estimate of the average expenditures per freshwater angler was determined from data on the number of steelhead anglers and their expenditures in the State of Washington. According to officials there, steelhead fishing in Washington occurs almost entirely in freshwater. In 1973 the average expenditures per steelhead angler were \$134.¹² Expressed in 1975 dollars the average expenditures were \$162 per angler.¹³ Thus expenditures for fishing for anadromous species above tidal limits is estimated at \$132 million.

This estimate should be viewed as an upper bound for two reasons. First, the estimate of the number anglers is high because of double counting in the 1970 Saltwater Angling Survey. The survey estimates the number of anglers by species caught. So, for example, an angler who caught a coho and a chinook salmon is entered as an angler for each of these species. In the expenditure estimate presented here this angler (and his expenditures) is counted twice, once for each species of salmon caught. But it is highly unlikely that in reality his annual expenditures would be double that of the average angler. Second, the dollar amount of average expenditures per freshwater fishermen, \$162, is high. For example, freshwater fishing has been shown to be the

⁹ River herring and sturgeon are anadromous fish, but according to NMFS officials there is very little recreational fishing that occurs for these fish above tidal limits. They are excluded from this estimate.

¹⁰ This estimate was made assuming that the percent increase in anglers for all anadromous species was the same as that for salmon anglers between 1970 and 1975. According to the Washington State Sport Catch Report (Washington Department of Fisheries) the number of salmon anglers increased by eleven percent between those years.

¹¹ For example it is estimated that in 1975 the number of chinook salmon anglers fishing in marine waters was 242,000 and that this figure represents 90 percent of all anglers (i.e., freshwater anglers are 10 percent of the total number of anglers). Thus, the total number of anglers is $242,000 / .90 = 268,000$.

¹² Data obtained from NMFS Pacific Northwest Region, Marine Recreational Fisheries Program Development Plan., January, 1976, p. 3.

¹³ This estimate was obtained using price indices for all consumer items taken from The Economic Report of the President, January, 1977.

Exhibit 2-12

Estimated Upper Bound of the Number of Anglers and
Expenditures for Fishing Activity Occurring
Above Tidal Limits for Anadromous Species

	Number of* Saltwater Anglers 1970	Estimated Number of Saltwater Anglers 1975**	Assumed Percent of Anglers Fishing Above Tidal Limits†	Estimated Total Freshwater and Saltwater Anglers	Estimated Number of Freshwater Anglers 1975
Salmon Chinook	218,000	242,000	10	268,000	26,800
Salmon Coho	321,000	356,000	10	396,000	39,600
Salmon Pink	54,000	60,000	10	67,000	6,700
Shad American	72,000	80,000	50	160,000	80,000
Smelts	180,000	120,000	50	240,000	140,000
Steelhead	--	--	90	345,000**	310,500
Striped Bass	946,000	1,050,000	2	1,071,000	21,000
Trout Cutthroat	48,000	53,000	70	177,000	124,000
Trout, Dolly Varden	27,000	30,000	70	100,000	70,000
TOTAL	1,910,000	2,336,000		2,824,000	818,600

Estimated Expenditures per angler for Freshwater Fishing in 1973 = \$134 #

Estimated Expenditures per angler for Freshwater Fishing in 1975 = \$162

Estimated Total Expenditures for Freshwater Fishing for Anadromous Fish in 1975 \$162 x 818,600 = \$132.2 million

* Source: National Marine Fisheries, 1970 Saltwater Angling Survey.

** Assume number of anglers for all anadromous fish increased by same amount as anglers for salmon in Washington. According to the Washington Department of Fisheries, Washington State Sport Catch 1975, salmon anglers increased by 11 percent between 1970 and 1975.

† Estimates made by NMFS Officials.

++ Total freshwater and saltwater anglers estimated from NMFS Pacific Northwest Region Report, Marine Recreational Fisheries Program Development Plan, January, 1976.

Estimated from data on number of steelhead anglers and their expenditures in NMFS Pacific Northwest Region Report, Marine Recreational Fisheries Program Development Plan, January, 1976. 1975 estimated obtained using a consumer price index for all commodities and services in the Economic Report of the President, January, 1977.

least expensive mode of fishing for salmon in Washington.¹⁴ Also, as additional evidence, the average annual expenditure per fisherman for all saltwater fishing in 1970 was only \$157 (in 1975 dollars).¹⁵ These per fishermen expenditures include the costs of boat related purchases. However, most freshwater angling does not require the use of a boat. As was explained in the preceding sections boat related expenses account for about 35 percent of all recreational fishing expenditures. Thus the expenditures per angler for freshwater fishing should be less than those for all saltwater recreational fishing, and the expenditures estimate used to determine this upper bound is purposely overestimated. Thus it is highly unlikely that the direct impact estimates presented earlier in this chapter are substantially affected by the exclusion of fishing for anadromous species above tidal limits.

It should also be noted that salmon and steelhead fishing in the Pacific Northwest account for about fifty percent of the estimated activity for all anadromous species. In this region fishing for anadromous species in freshwater is quite significant relative to recreational fishing in marine waters. However, looking just at fishing for other anadromous species in freshwater throughout the rest of the country, the direct impact estimates for the nation as a whole presented in the previous sections would increase by no more than three to four percent.

¹⁴ Stephen B. Mathews and Gardner S. Brown, Economic Evaluation of the 1967 Sport Salmon Fisheries of Washington, Technical Report 2, Washington Department of Fisheries. The average cost per angler for salmon fishing in freshwater was \$5.97; for Puget Sound, \$7.60; for straits, \$16.17; and for the ocean \$23.42.

¹⁵ This estimate was obtained by inflating to 1975 dollars the average annual expenditures of saltwater fishermen in 1970 of \$129.46 obtained from the 1970 National Survey of Fishing and Hunting, p. 46. The consumer price index for all consumer commodities and services were used to convert expenditures to 1975 dollars and were obtained from the Economic Report of the President, January 1977. This estimate does not account for any changes in average fishing effort or expenditure patterns of fishermen between 1970 and 1975.

CHAPTER 3

DISAGGREGATION OF NATIONAL IMPACTS

3.0 DISAGGREGATION OF NATIONAL IMPACTS

3.1 Impacts of Fishing in Regional Areas

This section provides a disaggregation of the national economic impacts for 1975 of marine recreational fishing into seven Regions. These Regions are defined as follows and correspond to those in the 1970 Saltwater Angling Survey:

- Region I - North Atlantic: Atlantic Coast from Maine to and including New York.
- Region II - Middle Atlantic: Atlantic Coast from New Jersey to Cape Hatteras, North Carolina.
- Region III- South Atlantic: Atlantic Coast from Cape Hatteras, North Carolina, to southern Florida including the Florida Keys.
- Region IV - East Gulf of Mexico: Gulf Coast from the Florida Keys to and including the Mississippi River delta.
- Region V - West Gulf of Mexico: Gulf Coast from the Mississippi River delta to the Mexican border.
- Region VI - South Pacific: Pacific Coast from the Mexican border to Point Conception, California.
- Region VII- North Pacific: Pacific Coast from Point Conception, California, north to Washington and including Alaska.

An allocation model was developed to prorate the national economic impacts to the Regions based on where the fishing activity occurred. The basic approach for the allocation was to use the relative number of fishermen in various types of fishing (i.e., those using private or rented boats, those fishing from head or charter boats, and total fishermen) in each Region,¹ as well as data on relative per capita expenditures of marine recreational fishermen for various items on the Atlantic Coast, Gulf Coast, and Pacific Coast.² From the latter study it is apparent that per capita expenditures are highest on the Gulf Coast and lowest on the Pacific Coast. This had to do with length of season, variations in the type of fishing, as well as relative propensities to spend for various classes of expenditure items.

¹ These were taken from the 1970 Saltwater Angling Survey, National Marine Fishery Service, April, 1973.

² These were taken from the 1970 National Survey of Fishing and Hunting, Bureau of Sport Fisheries and Wildlife. These three areas or regions are the finest level of disaggregation shown for expenditure data.

Calculations of the regional impacts were performed using the following equation:

$$E_{ij} = \left[\frac{n_{ik}}{n_{tk}} \right] \left[\frac{p_{ij}}{p_t} \right] E_{tj}$$

where,

E_{ij} = economic impact measure in Region i for expenditure category j,

n_{ik} = number of fishermen who fished in Region i by type of fishing k,

n_{tk} = sum of the number of fishermen fishing in each Region by type of fishing k,

p_{ij} = per capita expenditure in Region i for expenditure category j,

p_t = average per capita expenditure in all Regions,

E_{tj} = economic impact measure for total nation for expenditure category j.

Values of the variable n_{ik} were taken from the 1970 Saltwater Angling Survey. This provides data on the total number of fishermen in each Region as well as total number of fishermen who fished by private or rented boat and who fished by party or charter boat. Exhibit 3-1 shows how the number of fishermen by type of fishing were assigned to various economic expenditure categories.

Values of the variable p_{ij} and p_t were taken from those expenditure categories in the 1970 National Survey of Fishing and Hunting which most closely resembled the economic expenditure categories estimated in this study (see Exhibit 3-1). Per capita values for the Atlantic Coast were assigned to Regions I, II, and III; for the Gulf Coast to Regions IV and V; and for the Pacific Coast to Regions VI and VII.

Values of the variable E_{tj} are the national economic measures for sales, value added, wages and salaries, employment, and annual capital expenditures. These are the figures presented in Exhibit 3-1.

Exhibits 3-2 through 3-8 present the results of the regional disaggregation of the national economic impact measures. These represent the impacts (which may occur either in the Region itself or in other parts of the nation) associated with marine recreational fishing carried on in that particular region. Impacts associated with business areas such as retail trade, marinas, commercial sportfishing vessels, food, and bait would for the most part occur

Exhibit 3-1

Basis for Allocating Type of Fishing to
Economic Impact Categories

<u>Economic Expenditure Category</u>	<u>Type of Fishing Used to Determine Relative Number of Fishermen</u>
Fishing Tackle	All fishermen
Boats	Private or rented boat
Motors	Private or rented boat
Trailers	Private or rented boat
Marinas	Private or rented boat
Commercial Sportfishing Vessels	Party or charter boat
Boat Fuel	Private or rented boat
Food	All fishermen
Lodging	All fishermen
Travel	All fishermen
Boat Insurance	Private or rented boat
Bait	All fishermen
Other	All fishermen

Exhibit 3-2

Economic Impacts of Marine Recreational Fishing
in the North Atlantic Region (Region I)
1975

	<u>Sales</u> (thousands of dollars)	<u>Value-Added</u> (thousands of dollars)	<u>Wages & Salaries</u> (thousands of dollars)	<u>Employment</u> (person-years)	<u>Annual Capital</u> <u>Expenditures</u> (thousands of dollars)
Fishing Tackle					
Manufacturing	9,110	5,760	2,510	400	400
Wholesale Trade	10,230	960	750	80	10
Retail Trade	21,750	8,310	2,530	370	60
Boats					
Manufacturing	21,310	9,350	4,520	630	260
Retail Trade	31,890	5,060	2,390	310	180
Motors					
Manufacturing	7,610	3,460	1,290	90	230
Retail Trade	10,380	1,610	780	100	70
Trailers					
Manufacturing	2,300	1,070	380	40	80
Retail Trade	2,760	460	210	30	20
Marinas	36,790	14,720	9,930	1,000	740
Commercial Sport- fishing Vessels	18,000	10,780	5,230	720	1,250
Boat Fuel					
Manufacturing	7,510	1,230	140	10	340
Wholesale Trade	11,190	1,070	230	20	170
Retail Trade	13,180	2,150	750	160	110
Food	43,100	15,530	9,910	2,090	1,170
Lodging	10,090	5,280	2,670	560	270
Travel					
Manufacturing	23,160	4,000	540	30	1,030
Wholesale Trade	34,470	3,310	840	90	520
Retail Trade	40,570	4,700	2,960	520	330
Boat Insurance	8,580	1,990	750	60	-
Bait	39,400	7,840	3,230	490	240
Other	28,590	5,720	3,430	500	570
TOTAL	305,080	114,360	55,970	8,300	8,050

Exhibit 3-3

Economic Impacts of Marine Recreational Fishing
in the Middle Atlantic Region (Region II)
1975

	<u>Sales</u> (thousands of dollars)	<u>Value-Added</u> (thousands of dollars)	<u>Wages & Salaries</u> (thousands of dollars)	<u>Employment</u> (person-years)	<u>Annual Capital</u> <u>Expenditures</u> (thousands of dollars)
Fishing Tackle					
Manufacturing	9,670	6,110	2,660	420	420
Wholesale Trade	10,850	1,020	800	80	70
Retail Trade	23,070	8,820	2,680	390	660
Boats					
Manufacturing	22,520	9,880	4,780	670	280
Retail Trade	33,700	5,350	2,530	330	190
Motors					
Manufacturing	8,040	3,660	1,360	100	240
Retail Trade	10,970	1,710	830	110	70
Trailers					
Manufacturing	2,430	1,130	410	50	80
Retail Trade	2,920	490	230	30	20
Marinas	38,880	15,550	10,500	1,050	780
Commercial Sport- fishing Vessels	25,100	15,020	7,280	1,010	1,750
Boat Fuel					
Manufacturing	7,940	1,300	150	10	360
Wholesale Trade	11,830	1,130	240	30	180
Retail Trade	13,930	2,270	790	170	110
Food	45,720	16,470	10,510	2,220	1,240
Lodging	10,700	5,600	2,840	590	290
Travel					
Manufacturing	24,250	4,190	570	40	1,080
Wholesale Trade	36,100	3,460	880	90	550
Retail Trade	42,480	4,920	3,100	540	350
Boat Insurance	9,070	2,110	790	60	-
Bait	41,800	8,320	3,420	520	250
Other	30,330	6,070	3,640	540	610
TOTAL	328,670	124,580	60,990	9,050	9,580

Exhibit 3-4

Economic Impacts of Marine Recreational Fishing
in the South Atlantic Region (Region III)
1975

	<u>Sales</u> (thousands of dollars)	<u>Value-Added</u> (thousands of dollars)	<u>Wages & Salaries</u> (thousands of dollars)	<u>Employment</u> (person-years)	<u>Annual Capital</u> <u>Expenditures</u> (thousands of dollars)
Fishing Tackle					
Manufacturing	9,890	6,260	2,720	430	430
Wholesale Trade	11,100	1,040	820	90	70
Retail Trade	23,600	9,020	2,740	400	680
Boats					
Manufacturing	14,150	6,210	3,000	420	170
Retail Trade	21,170	3,360	1,590	210	120
Motors					
Manufacturing	5,060	2,300	860	60	150
Retail Trade	6,890	1,070	520	70	50
Trailers					
Manufacturing	1,530	710	260	30	50
Retail Trade	1,830	310	140	20	10
Marinas	24,430	9,770	6,600	660	490
Commercial Sport- fishing Vessels	22,260	13,320	6,460	890	1,550
Boat Fuel					
Manufacturing	4,990	810	90	10	220
Wholesale Trade	7,430	710	150	20	110
Retail Trade	8,750	1,430	500	110	70
Food	46,780	16,860	10,760	2,270	1,270
Lodging	10,950	5,740	2,900	600	300
Travel					
Manufacturing	24,800	4,290	580	40	1,100
Wholesale Trade	36,930	3,540	900	90	560
Retail Trade	43,450	5,040	3,170	560	350
Boat Insurance	5,700	1,320	500	40	-
Bait	42,770	8,510	3,500	530	260
Other	30,330	6,070	3,640	540	610
TOTAL	288,910	107,690	52,400	8,090	8,820

Exhibit 3-5

Economic Impacts of Marine Recreational Fishing
in the East Gulf of Mexico Region (Region IV)
1975

	<u>Sales</u> (thousands of dollars)	<u>Value-Added</u> (thousands of dollars)	<u>Wages & Salaries</u> (thousands of dollars)	<u>Employment</u> (person-years)	<u>Annual Capital</u> <u>Expenditures</u> (thousands of dollars)
Fishing Tackle					
Manufacturing	11,450	7,230	3,150	500	500
Wholesale Trade	12,850	1,200	940	100	80
Retail Trade	27,310	10,440	3,170	460	780
Boats					
Manufacturing	43,300	19,000	9,190	1,280	530
Retail Trade	64,790	10,280	4,860	630	370
Motors					
Manufacturing	7,090	3,220	1,200	80	210
Retail Trade	9,670	1,500	730	100	60
Trailers					
Manufacturing	4,670	2,180	780	90	160
Retail Trade	5,610	930	440	60	30
Marinas	74,760	29,900	20,190	2,030	1,500
Commercial Sport- fishing Vessels	23,560	14,100	6,840	940	1,640
Boat Fuel					
Manufacturing	15,260	2,490	280	20	690
Wholesale Trade	22,740	2,180	470	50	340
Retail Trade	26,790	4,360	1,530	330	220
Food	47,420	17,090	10,910	2,300	1,290
Lodging	14,420	7,550	3,820	790	390
Travel					
Manufacturing	24,290	4,200	570	40	1,080
Wholesale Trade	36,150	3,470	880	90	550
Retail Trade	42,550	4,930	3,100	540	350
Boat Insurance	17,440	4,050	1,530	130	-
Bait	44,300	8,820	3,630	550	270
Other	25,650	5,130	3,080	450	510
TOTAL	424,270	164,250	81,290	11,560	11,550

Exhibit 3-6

Economic Impacts of Marine Recreational Fishing in the
West Gulf of Mexico Region (Region V)
1975

	<u>Sales</u> (thousands of dollars)	<u>Value-Added</u> (thousands of dollars)	<u>Wages & Salaries</u> (thousand of dollars)	<u>Employment</u> (person-years)	<u>Annual Capital</u> <u>Expenditures</u> (thousands of dollars)
Fishing Tackle					
Manufacturing	6,750	4,260	1,860	290	300
Wholesale Trade	7,580	710	560	60	50
Retail Trade	16,100	6,160	1,870	270	460
Boats					
Manufacturing	20,250	8,890	4,300	600	250
Retail Trade	30,310	4,810	2,270	300	170
Motors					
Manufacturing	3,320	1,510	560	40	100
Retail Trade	4,520	700	340	40	30
Trailers					
Manufacturing	2,190	1,020	360	40	70
Retail Trade	2,620	440	200	30	10
Marinas	34,970	13,990	9,440	950	700
Commercial Sport- Fishing Vessels	7,370	4,410	2,140	300	510
Boat Fuel					
Manufacturing	7,140	1,170	130	10	320
Wholesale Trade	10,640	1,020	220	20	160
Retail Trade	12,530	2,040	710	150	100
Food	27,990	10,080	6,440	1,360	760
Lodging	8,510	4,460	2,250	470	230
Travel					
Manufacturing	14,320	2,480	330	20	640
Wholesale Trade	21,320	2,050	520	50	320
Retail Trade	25,100	2,910	1,830	320	200
Boat Insurance	8,130	1,890	710	60	--
Bait	26,140	5,200	2,140	320	160
Other	15,130	3,030	1,820	270	300
TOTAL	219,420	83,230	41,000	5,970	5,840

Exhibit 3-7

Economic Impacts of Marine Recreational Fishing
in the South Pacific Region (Region VI)
1975

	<u>Sales</u> (thousands of dollars)	<u>Value-Added</u> (thousands of dollars)	<u>Wages & Salaries</u> (thousands of dollars)	<u>Employment</u> (person-years)	<u>Annual Capital</u> <u>Expenditures</u> (thousands of dollars)
Fishing Tackle					
Manufacturing	4,090	2,580	1,130	180	180
Wholesale Trade	4,590	430	340	40	30
Retail Trade	9,750	3,730	1,130	160	280
Boats					
Manufacturing	6,000	2,640	1,270	180	70
Retail Trade	8,990	1,430	670	90	50
Motors					
Manufacturing	640	290	110	10	20
Retail Trade	870	140	70	10	10
Trailers					
Manufacturing	650	300	110	10	20
Retail Trade	780	130	60	10	10
Marinas	10,370	4,150	1,530	210	210
Commercial Sport- fishing Vessels	12,800	7,660	3,710	510	890
Boat Fuel					
Manufacturing	2,120	350	40	neg.	1,000
Wholesale Trade	3,150	300	60	10	50
Retail Trade	3,720	600	210	50	30
Food	14,520	5,230	3,340	710	390
Lodging	3,360	1,760	890	190	90
Travel					
Manufacturing	9,080	1,570	210	10	400
Wholesale Trade	13,520	1,300	330	30	200
Retail Trade	15,910	1,840	1,160	200	130
Boat Insurance	2,420	560	210	20	-
Bait	8,680	1,730	710	110	50
Other	15,860	3,170	1,900	280	320
TOTAL	108,030	41,890	19,190	3,020	4,430

Exhibit 3-8

Economic Impacts of Marine Recreational Fishing in
the North Pacific Region (Region VII)
1975

	<u>Sales</u> (thousands of dollars)	<u>Value-Added</u> (thousands of dollars)	<u>Wages & Salaries</u> (thousands of dollars)	<u>Employment</u> (person-years)	<u>Annual Capital</u> <u>Expenditures</u> (thousands of dollars)
Fishing Tackle					
Manufacturing	6,000	3,790	1,650	260	260
Wholesale	6,730	630	490	50	40
Retail Trade	14,310	5,470	1,660	240	410
Boats					
Manufacturing	11,370	4,990	2,410	340	140
Retail Trade	17,010	2,700	1,280	170	100
Motors					
Manufacturing	1,210	550	210	10	40
Retail Trade	1,660	260	130	20	10
Trailers					
Manufacturing	1,230	570	200	20	40
Retail Trade	1,470	250	110	10	10
Marinas	19,630	7,850	5,300	530	390
Commercial Sport- fishing Vessels	12,850	7,690	3,730	520	900
Boat Fuel					
Manufacturing	4,010	650	70	10	180
Wholesale Trade	5,970	570	120	10	90
Retail Trade	7,030	1,150	400	90	60
Food	21,290	7,670	4,900	1,030	580
Lodging	4,930	2,580	1,310	270	130
Travel					
Manufacturing	13,330	2,300	310	20	590
Wholesale Trade	19,840	1,900	480	50	300
Retail Trade	23,350	2,710	1,700	300	190
Boat Insurance	4,580	1,060	400	30	-
Bait	12,740	2,540	1,040	160	80
Other	23,260	4,650	2,790	410	470
TOTAL	164,110	62,530	30,690	4,550	5,010

within the particular region where fishing occurs. Economic impacts such as value added, employment, and wages and salaries in these business areas typically represent roughly 60 percent of total economic impacts. However, impacts associated with manufacturing frequently would occur in other parts of the country.

Of the total national impacts associated with marine recreational fishing, it is estimated that approximately 16 percent are due to fishing in Region I (North Atlantic), 18 percent in Region II (Middle Atlantic), 16 percent in Region III (South Atlantic), 23 percent in Region IV (East Gulf of Mexico), 12 percent in Region V (West Gulf of Mexico), 6 percent in Region VI (South Pacific), and 9 percent in Region VII (North Pacific).

3.2 Methodology for Relating Impacts to Fishery Management Units

The recently created Regional Fishery Management Councils as of this writing have selected 57 fisheries for which they anticipate preparing fishery management plans. The fisheries constitute a species or group of related species which inhabit a common geographic area. The Regional Councils established in the Fishery Conservation and Management Act have jurisdiction over the fishery resources in waters extending from 3 to 200 nautical miles offshore. The boundaries of the seven Councils can be roughly defined as the offshore areas off the following states or territories:

New England Council:	Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut
Mid-Atlantic Council:	New York, New Jersey, Delaware, Pennsylvania, Maryland, Virginia
South Atlantic Council:	North Carolina, South Carolina, Georgia, Florida
Caribbean Council:	Virgin Islands, Puerto Rico
Gulf Council:	Texas, Louisiana, Mississippi, Alabama, Florida
Pacific Council:	California, Oregon, Washington, Idaho
North Pacific Council:	Alaska (with authority over the fisheries in the Arctic Ocean, Bering Sea, and Pacific Ocean seaward of Alaska)
Western Pacific Council:	Hawaii, American Samoa, Guam

Washington and Oregon are in two councils because of migratory habits of certain anadromous species (i.e., salmon) and because their fishermen participate in the fisheries off the Coast of Alaska.

Exhibit 3-9 lists the 57 fisheries selected by the Councils for the preparation of fishery management plans as of Mid-April, 1977. From information supplied by the NMFS certain of these fisheries have been designated as having a significant amount of recreational fishing activity. Similarly, for certain fisheries it has been indicated that most United States fishing (not considering foreign catch) takes place within three miles of shore. For this latter category the Regional Councils would not be able to preempt management authority from states. However, presumably regulation of foreign catch, if any, between the 3 and 200 mile limits would be within the purview of the NMFS.

Thus it may be appropriate for Regional Councils to consider the economic impact of recreational fishing for those fisheries where U.S. fishing occurs mostly within three miles, for species for which there is a substantial amount of migration across the three mile limit. This is because management of the fishery may be necessary to help preserve appropriate allocations to U.S. recreational fishermen.

There are several methodological considerations involved in allocating economic impacts to specific "fishery management units." These include:

- o The fact that most fishermen fish for several types of fish and certain common expenditures such as tackle, boats, and other non-trip related expenses may be common for several types of fishing.
- o Per capita expenditures will vary greatly by species being fished for depending on type of gear needed, frequency of fishing, etc.
- o The various Councils aggregate species to different degrees in defining a "fishery management unit." Some may include only one species. Others may include a wide range of species in a "fishery management unit."
- o There is presently a general lack of data showing actual level of effort expended on a particular species, as well as typical expenditures used in pursuing particular species.

In spite of the above limitations a methodology was developed for making at least a first attempt to allocate economic impacts to "fishery management units." Because of the diversity of the "fishery management units," a rather eclectic approach must of necessity be used. Because of data voids rather gross assumptions must be applied in some cases.³

³

The approach shown here was devised solely on the basis of the availability of existing national data. A more comprehensive approach requiring substantial data collection would be to attempt (e.g., through surveys) to estimate expenditures by species (e.g., by activity level), with the development of a related procedure for allocating expenditures across species when several are sought simultaneously.

Exhibit 3-9

Fishery Management Units for Which
Councils Anticipate Preparing Plans

<u>Council</u>	<u>Fishery Management Unit</u>	<u>Recreational Fish</u>	<u>Fished Mostly Within 3 Miles From Shore</u>
New England	Haddock	*	
	Yellowtail flounder		
	Sea herring		#
	Cod	*	#
	Pollock	*	
	Northern shrimp		
	Redfish		
	Hake	*	#
	Sea scallops		
Mid-Atlantic	Mackerel	*	#
	Other flounder	*	#
	Squid		
	Scup	*	#
	Butterfish		
	River herring	*	#
	Sea bass	*	#
	Pelagic sharks	*	#
	American shad	*	
	Surf clam		
	Ocean quahog		
South-Atlantic	Billfish	*	
	Snapper/grouper complex	*	#
	King and Spanish mackerel	*	#
	Corals		
	Spiny lobster	*	
Caribbean	Billfish	*	
	Spiny lobster	*	
	Reef fish	*	
	Migratory coastal pelagic	*	
	Sharks	*	
	Corals		
	Ornamental aquarium fishes		
	Marine turtle		
Gulf of Mexico	Billfish/pelagic shark		#
	Shallow water shrimp		
	Groundfish		
	Reef fishes		
	Migratory coastal pelagics		
Pacific	Salmon	*	#
	Anchovy		
	Groundfish	*	
	Jack mackerel		#
	Dungeness crab		
	Pink salmon	*	#
North Pacific	King crab	*	
	Tanner crab		
	Shrimp		
	Dungeness crab	*	
	Scallop		
	Groundfish (Bering Sea and Aleutians)		
	Groundfish (Gulf of Alaska)		
Western Pacific	Ocean salmon	*	
	Spiny lobster	*	
	Precious corals		
	Groundfish		
	Pelagic fishery resources	*	
	Snapper/grouper complex	*	

The basic suggested methodology given the present state of data is suggested as follows. It is suggested that economic impacts be allocated on the basis of the relative number of anglers fishing for a particular species of fish in the Regions presented in Section 3.1. While those Regions do not correspond exactly to the areas of the Regional Councils, the approximations may still be useful as a first estimate. Regions I, II, and III (as given in Section 3.1) correspond fairly closely to the New England, Mid-Atlantic, and South Atlantic Councils respectively. Regions IV and V together correspond to the Gulf Council. Regions VI and VII correspond fairly closely to the Pacific Council except that Region VII includes Alaska which is not in the Pacific Council. The North Pacific Council corresponds to the waters off Alaska. A previously published study has estimated certain of the economic impacts associated with fishing in Alaska.⁴

Using this rather gross approximating method, allocations of economic impacts can be assigned to specific species based on the number of fishermen who fished for a particular species based on data in the 1970 Saltwater Angling Survey, Table 4. To allocate impacts to a specific species in a region (corresponding to a "fishery management unit"), the ratio of the number of fishermen fishing for a particular species (in a given Region) to the sum of the numbers of fishermen who fished for all species in that region would be calculated. Note that the above sum is not equal to the total number of fishermen in that region because fishermen fish for more than one species. This procedure however does tend to allocate on the relative importance of the species for which fishermen fished. The above ratio would then be used to allocate the economic impacts to a species using the regional economic impacts for the appropriate Region presented in Exhibits 3-2 through 3-8. If a "fishery management unit" were to include more than one species, it would be appropriate to aggregate the results for the various species involved.

As an example of this technique, estimates were made of the economic impacts associated with recreational fishing for the "fishery management unit" ocean salmon for the Pacific Council. From Table 4, pages 14 through 16 of the 1970 Saltwater Angling Survey, it was determined that 593,000 anglers fished for various salmon in Region VII (218,000 for chinook, 321,000 for coho, and 54,000 for pink). Region VI, also a part of the Pacific Council had negligible salmon fishing. The sum of the column showing anglers equals 2,269,000. Thus the allocation ratio is 0.261 (593/2,269). When this ratio is applied to the economic impact measures presented in Exhibit 3-8, the resultant values for the year 1975 are:

Sales	\$42,800,000
Value Added	\$16,320,000
Wages and Salaries	\$ 8,010,000
Employment	1,190 person-years
Annual Capital Expenditures	\$ 1,310,000

⁴ Alaska Department of Fish and Game, Alaska Sportfishing Survey, Juneau, Alaska, 1973. Data have not currently been uncovered to disaggregate impacts for the Caribbean and Western Pacific Regional Councils.

In this particular case the above figures would also include salmon fishing in Alaska which is the North Pacific Council. This would in general not be encountered in the Councils located on the Atlantic and Gulf coasts.

As one means of checking the relative validity of this procedure, data from independent studies estimating the value of expenditures associated with saltwater salmon fishing were reviewed.

A rough estimate of saltwater salmon fishing in Alaska in 1973 was made from a study of Alaska fishing.⁵ Total expenditures associated with all fishing (both freshwater and saltwater) was estimated to be \$52 million. Of an estimated 3,743 thousand fish landed 614 thousand were salmon. Using these figures a rough measure of

$$\$52 \text{ o } \frac{614}{3,743} = \$8.5 \text{ million}$$

in expenditures was estimated to be associated with recreational angling for salmon. (Note that because a certain amount of salmon are caught in freshwater, this figure overestimates somewhat expenditures associated with salmon caught only in saltwater.)

From a study of marine recreational fishing in the Pacific Northwest,⁶ \$42.2 million was estimated as spent in Washington in 1973 on total recreational salmon fishing. In the same study data showed that 86.5 percent of salmon angling trips were made for fishing in the ocean. On this basis

$$\$42.2 \text{ o } 0.865 = \$36.5 \text{ million}$$

in expenditures were allocated to saltwater salmon fishing.

The same study estimated the number of ocean salmon angling trips for Oregon in 1973 at 256,000. Using the same expenditure per angler trip as in Washington which was \$24.20, total Oregon expenditures associated with saltwater salmon fishing was estimated at

$$\$24.20 \text{ o } 256,000 = \$6.2 \text{ million}$$

in 1973.

Using these data total expenditures for marine recreational fishing for salmon in the Pacific and North Pacific Council Area in 1973 was estimated to be:

Alaska	\$ 8.5
Washington	\$36.5
Oregon	<u>\$ 6.2</u>
	\$51.2

⁵ Alaska Department of Fish and Game, Alaska Sportfishing Survey, Juneau, Alaska, 1973.

⁶ NMFS Pacific Northwest Region, Marine Recreational Fisheries Program Development Plan, January, 1976.

Adjusting this figure for inflation from 1973 to 1975 (where the consumer price index rose by a factor of 1.21) this figure becomes \$62.0. This figure can thus be compared with the total sales figure of \$42.8 million calculated using the previously described methodology for disaggregating the national impacts by "fishery management unit." Consequently the reviewed approach appears to provide only a rough estimate of national impacts that may be associated with a "fishery management unit."

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APPENDIX A

**ECONOMIC IMPACTS RELATED
TO FISHING TACKLE**

A.0 ECONOMIC IMPACTS RELATED TO FISHING TACKLE

A.1 Summary of Impacts

It is estimated that in 1972, total expenditures by recreational fishermen at the retail level for all types of fishing tackle amounted to approximately \$400 million. Of that total, an estimated \$88 million was spent on fishing tackle for use in saltwater angling. Exhibit A-1 summarizes the economic impacts associated with these consumer expenditures.

In 1972 total sales in wholesale trade of all fishing tackle amounted to an estimated \$188.7 million. In manufacturing the value of all tackle shipments amounted to \$167.7 million.* In comparison, sales of fishing tackle for use in saltwater amounted to an estimated \$41.5 million in wholesale trade and \$36.9 million in manufacturing in that year.

The value added to the economy in the production, distribution, and sale of all fishing tackle is estimated to have been \$99.8 million, \$20.1 million and \$152.1 million respectively. In comparison value added attributable to fishing tackle used in saltwater fishing is estimated to have been \$22.1 million, \$4.4 million and \$33.4 million respectively. In total, value added amounted to an estimated \$272 million for all fishing tackle compared with \$59 million for tackle used in saltwater fishing.

Employment generated by consumer demand for fishing tackle amounted to an estimated 18,340 person-years for all fishing tackle and some 4,000 person-years for fishing tackle purchased for use in saltwater. Estimates of the distribution of employment among manufacturing, wholesale trade, and retail trade are 8,740; 1,470; and 8,400 person-years respectively for all fishing tackle. Purchases of fishing tackle for use in saltwater generated 1,870 person-years of employment in manufacturing; 330 person-years in wholesale trade; and 1,800 person-years in retail trade.

The salaries and wages impact associated with the production, distribution, and sale of all fishing tackle is estimated to have been just over \$107 million in 1972 as compared to some \$23.5 million for fishing tackle purchased for use in saltwater. In manufacturing, \$45.5 million was paid in salaries and wages for all fishing tackle, and \$10.1 million of that amount was attributable to fishing tackle used in saltwater. In wholesale trade, salaries and wages totaled some \$13 million, and \$2.9 million of that amount was associated with fishing tackle used in saltwater. In retail trade, salaries and wages related to all fishing tackle sales and sales of fishing tackle used in saltwater were \$48.8 million and \$10.7 million respectively in 1972.

Finally, annual capital expenditures in 1972 by all producers, distributors, and retailers of fishing tackle are estimated to have been \$6.4 million in manufacturing, \$1.5 million in wholesale trade, and \$8.4 million in retail trade, or a total of \$16.3 million. The portion estimated to have been associated with fishing tackle used in saltwater was \$1.4 million in manufacturing, \$0.3 million in wholesale trade and \$1.8 million in retail trade or \$3.5 million in total.

*

Does not include the Dingell-Johnson excise tax on certain fishing gear amounting to \$13 million which is paid at the manufacturing level.

Exhibit A-1

Summary of Impacts Related to
Fishing Tackle Purchases in 1972

	<u>Manufacturing</u>	<u>Wholesale Trade</u>	<u>Retail Trade</u>	<u>Sum of Impact</u> *
Number of Establishments**	239	868	10,781 +	
<u>Sales</u> (millions of dollars)				
Total#	167.7	188.7	400.0	
Marine Recreational Fishing	36.9	41.5	88.0	
<u>Value Added</u> (millions of dollars)				
Total	99.8	20.1	152.0	271.9
Marine Recreational Fishing	22.1	4.4	33.4	59.2
<u>Employment</u> (person-years)				
Total	8,470	1,470	8,400	18,340
Marine Recreational Fishing	1,870	330	1,800	4,000
<u>Wages and Salaries</u> (Millions of dollars)				
Total	45.5	13.0	48.8	107.3
Marine Recreational Fishing	10.1	2.9	10.7	23.5
<u>Capital Expenditures</u> (millions of dollars)				
Total	6.4	1.5	8.4	16.3
Marine Recreational Fishing	1.4	0.3	1.8	3.5

* Consists of sum of impacts in manufacturing and wholesale and retail trade.

** Includes establishments dealing in freshwater and saltwater tackle.

Includes both freshwater and saltwater tackle sales, manufacturers estimate does not include ten percent excise tax on some tackle items.

A.2 GENERAL APPROACH

Four steps were used in the general approach for determining the economic impact estimates for fishing tackle and equipment summarized above.

- o Estimates of total fishing tackle sales were made for each level of economic activity (i.e., manufacturing, wholesale trade and retail trade).
- o Economic impact ratios were estimated for value added, employment, salaries and wages, and annual capital expenditures, each as a function of fishing tackle sales and by level of economic activity.
- o Estimates were made of the amount of sales of fishing tackle purchased for use in saltwater angling.
- o Economic impact ratios were applied to the values of total fishing tackle sales and sales of fishing tackle used in saltwater to determine the profile of economic impacts.

These impact estimates are based on a definition of fishing tackle which includes the following items: fishing rods and reels; fishhooks; casting plugs, spinners and spoons; flies, lures and similar artificial baits, and other fishing tackle including tackle boxes, creels, fish and bait buckets, nets, lines, sinkers, snap swivels; and fishing tackle of unspecified kind.

It should be noted that there is a distinct difference between "saltwater fishing tackle" and "fishing tackle used in saltwater". Several items are manufactured specifically for use in saltwater (e.g., rods and reels). However, a number of tackle items are produced for use in both freshwater and saltwater fishing (e.g., tackle boxes, bait buckets, sinkers). In addition, there is evidence that a significant number of fishermen purchase freshwater equipment, particularly rods and reels, for use in saltwater angling. According to the 1970 National Survey of Fishing and Hunting, over 6 percent of all tackle expenditures by saltwater fishermen were purchases of freshwater fishing rods and reels.¹ An estimating procedure which includes only tackle produced especially for saltwater use will underestimate the economic impacts associated with saltwater fishing. The approach used here takes into account all expenditures by fishermen on tackle and related equipment for use in saltwater fishing.

A.3 Estimating the Total Value of Sales of Fishing Tackle

Estimates for the value of total sales were determined through an analysis of multiple sources of secondary data. The secondary data varies from source to source both in its statistical reliability and in the definitions of fishing tackle employed. As will be shown below, there was considerable agreement among the various sales estimates when definitional differences are taken into account. Whenever possible Census data was used as the "best" source because of the uniformity in which it is gathered and analyzed and because of its reliability.

The detailed discussion below describes the ranges of sales value estimates, the sources of data and the reasons for the selection of particular point estimates.

(a) Manufacturing

Three sources of data provided three independent estimates of the value of shipments of tackle manufacturers. According to the 1972 Census of Manufacturers, the value of all fishing tackle shipments amounted to \$167.7 million in that year.² That includes the value of shipments reported as secondary products as well as those reporting fishing tackle as their primary product. Of that total, fishing rods accounted for \$36.3 million; fishing reels accounted for \$43.4 million; and fishhooks, lures, and other artificial bait accounted for \$43.5 million. The value of other fishing tackle such as tackle boxes, creels, fish and bait buckets, nets, line, and sinkers amounted to \$40.7 million. The remaining \$3.9 million was reported as fishing tackle of unspecified kind.

A second source of data used to make an estimate was excise tax revenues. The Dingell-Johnson Act places 10 percent excise tax on the manufacture of rods, reels, creels, lures, flies, and other artificial bait. In 1972, the revenues from the Dingell-Johnson Tax amounted to \$13,023,000.³ Thus, the total value of sales of the items included in the tax was \$130 million. According to the 1972 Census of Manufacturers, the value of the items not included in the tax was approximately \$40 million. The total estimate then, is \$170 million for all fishing tackle.

The third source of data was the American Fishing Tackle Manufacturers Association (AFTMA). Data on sales are collected from its membership on a voluntary basis. In 1972, 167 members reported a sales volume of \$152,343,376.⁴ That amount included rods, reels, lines, artificial bait, and sundries. Sundries comprised 13.7 percent of total value of sales.

From the three sources of data, the range of estimates varies from \$152 million to \$170 million. The value of shipments taken from the 1972 Census of Manufacturers is shown in Exhibit A-1. It is considered most reliable for three reasons. An all inclusive definition of fishing tackle was used. All producers of fishing tackle were included. And last, the method for collecting data was uniform for all establishments

that reported. The estimate from the AFTMA does not include all manufacturers. It is important to note, however, that this estimate is in the proper range (i.e., somewhat less than) of the value reported in the 1972 Census of Manufacturers. The estimate from the Dingell-Johnson tax revenues alone does not include all fishing tackle items. But when the appropriate corrections are made, the Dingell-Johnson estimate strongly agrees with the Census statistics.

(b) Wholesale Trade

Two estimates of the wholesale value of fishing tackle were compiled. The first estimate is taken from the 1972 Census of Wholesale Trade and shows the value of sales for merchant wholesalers of fishing tackle to be \$188.7.⁵

A second means of obtaining an estimate of the value of fishing tackle is by marking up the value of sales at the manufacturing level according to generally accepted price differentials of the industry. A number of sources were contacted to determine if such a "rule of thumb" markup was accepted in the industry. Those contacted included representatives of the American Fishing Tackle Manufacturers Association, the National Sporting Goods Association as well as three members of the National Association of Sporting Goods Wholesalers. They agreed that while markups for specific items varied by item and through time, a "10 and 50" rule for markups could generally be applied to the fishing tackle industry. That is, a wholesaler's price is generally 50 percent of the suggested retail price and a manufacturer's price is 10 percent less than that of a wholesaler. For example, an item which has a retail value of \$10 will be sold by a wholesaler for \$5.00 and by a manufacturer for \$4.50.

When this rule of thumb is applied to the value of shipments of manufacturers (which does not include excise taxes) the resulting estimate is \$186 million. Adding on the excise tax which is passed on to wholesalers the estimate increases to \$199 million. This estimate is quite similar to the statistics published in the 1972 Census of Wholesale Trade. The estimate from the 1972 Census of Wholesale Trade appears in Exhibit A-1.

(c) Retail Trade

Two estimates of retail sales were determined. The National Sporting Goods Association conducts an annual consumer survey to determine the value of sales of many kinds of sporting goods including fishing tackle. In 1972 an estimated \$360.0 million was spent by recreational fishermen on rods, reels, lures, and lines.⁶ The NSGA study was conducted using a sample of 40,000 households. The response rate was approximately 80 percent. The estimate of total sales was made from data on the number of units per household purchased and the average purchase price per unit. Not included in the NSGA estimate are items such as creels, tackle boxes, floats, sinkers, nets, etc. The sales value for these items was disaggregated (using the statistics of the 1972 Census of Manufacturers) and was increased using the generally accepted markup values to reflect the value of retail sales. That value amounted to \$60 million. The result was added to the \$360 million estimate of NSGA for rods, reels, lures and lines to yield a

total estimate of \$420 million in the retail sales value for all tackle. A second estimate was arrived at by applying the "rule of thumb" markup to the sales value of wholesale trade. In general, as explained above, the retail price is twice the wholesale price. The estimate using this method is \$380 million in retail sales.

There are no strong objective reasons for selecting either of the estimates. Based on existing information, the strongest statement that can be made is that the value of retail sales of fishing tackle lies somewhere in the range of \$380-\$420 million. The midpoint of the range, \$400 million, is a reasonable point estimate and appears in Exhibit A-1.

A.4 Estimating Economic Impact Ratios

Economic impact ratios were derived to determine value added, employment, salaries and wages, and annual capital expenditures associated with the estimated saltwater fishing sales. They are expressions of the size of impact per dollar of sales for fishing tackle and are defined for tackle manufacturing, wholesale trade, and retail trade as follows:

- 1) Value added impact ratio = $\frac{\text{Value added}}{\text{Total sales}}$
- 2) Employment impact ratio = $\frac{\text{Total sales}}{\text{No. of employees}}$
- 3) Salaries and wages ratio = $\frac{\text{Total salaries and wages}}{\text{Total sales}}$
- 4) Annual capital expenditures impact ratio = $\frac{\text{Annual capital expenditures}}{\text{Total sales}}$

Exhibit A-2 presents the economic impact ratios for fishing tackle. The discussion below describes the sources of data and methods used to compute each of the ratios.

The impact ratios for manufacturing were determined using Census data from 128 establishments that are at least 75 percent specialized in the production of fishing tackle.⁸ For example, these 128 firms had a total value of shipment of \$150.3 million and paid \$40.7 million in salaries and wages. Thus the salaries and wages impact ratio is $0.271 \left(\frac{40.7}{150.3} \right)$.

The 1972 Census of Manufacturers provides similar data for the other impact categories.

Estimating impacts ratios for wholesale and retail trade was complicated because specific data related to fishing tackle were not available. Data from the sector most closely related to fishing tackle (i.e., sporting goods) were substituted for more disaggregated statistics. This substitution is appropriate because the inputs (e.g., labor, capital) are very similar for all sporting goods at the wholesale and retail level.

Exhibit A-2

Fishing Tackle
Economic Impact Ratios for 1972

	Manufacturing	Distribution	Retail Trade
Value Added (\$/\$ Sales)	0.595	0.107	0.380
Employment (\$ Sales/ Person-years)	\$19,800	\$128,000	\$47,600
Salaries & Wages (\$/\$ of sales)	0.271	0.069	0.122
Annual Capital Investment (\$/\$ sales)	0.038	0.0078	0.021

The 1972 Census of Wholesale Trade for sporting goods provides the data necessary to compute impact ratios of employment to sales and salaries and wages to sales for wholesale trade.⁹ Similarly, the data for retail trade impact ratios of employment to sales and salaries and wages to sales are available from 1972 Census of Retail Trade.¹⁰

The procedure for determining the ratio of value added to sales in wholesale and retail trade was more indirect because detailed data on value added were not readily available. However, data do exist for the gross margin and value added aggregated at the level of "sporting goods and amusements" in wholesale trade and "sporting goods" for retail trade.

To obtain estimates for value added for wholesale trade the gross margin for fishing tackle was calculated by taking the difference in the estimates of total sales of wholesale trade (distribution) and manufacturing. That is,

$$\begin{aligned} 1) \quad \text{Gross margin} &= \text{Whole trade sales} - \text{Manufacturers sales} \\ &= \$188.7 \text{ million} - \$167.7 \\ &= \$21.0 \text{ million} \end{aligned}$$

The Gross Margin was then reduced to reflect value added using the following equation:

$$\begin{aligned} 2) \quad \text{Value added} &= \text{Gross margin} \times r \\ \text{Where } r &= \text{the ratio of value added to gross margin for all} \\ &\quad \text{sporting goods and amusements.} \end{aligned}$$

The Census of wholesale trade publishes the data necessary for the determination of r .¹¹

Thus:

$$\begin{aligned} \text{Value added} &= \$21.0 \text{ million} \times \frac{23.3}{24.3} \\ &= \$20.1 \text{ million} \end{aligned}$$

The value added to sales ratio for wholesale trade (0.107) was then determined by calculating the quotient of the value added to the total sales estimate.

A similar procedure was used for the retail trade estimates. The National Sporting Goods Association was the source of data.¹² The gross margin and value added as a percent of sales for all sporting goods were determined from data on operating ratios. The gross margin was determined to be 34.4 percent of total sales and value added was 24.8 percent of total sales. Using equation 2), the total value added in retail trade of fishing tackle is estimated to have been \$152 million in 1972 and the resulting impact ratio of value added to sales is 0.380.

The 1972 Census of Wholesale Trade is the only source of capital expenditures data for wholesale trade located during the course of this research, and it is available only in a highly aggregated form. The annual capital investment to sales impact ratio for wholesale trade was determined using data from "Wholesalers not elsewhere classified" (SIC 5099) which include sporting goods.¹³

As in the case of wholesale trade, data on annual capital expenditures in retail trade are also available only in a highly aggregated form.¹⁴ The levels of aggregation are: the food group; eating and drinking places; general merchandise group (with line item for department stores); furniture and appliances; building materials, hardware, farm equipment; automotive group; and gasoline service station. Fishing tackle is included in the general merchandising group. For two reasons it was decided to calculate the ratio of capital expenditures to sales using data on department stores. First, according to research conducted for the National Sporting Goods Association, an estimated fifty percent of all fishing tackle is purchased through department stores.¹⁵ Second, an analysis of the impact ratios for department stores showed a very high consistency with those being used for fishing tackle determined from data on sporting goods.

All sales to employment ratios have been adjusted to reflect person-years of employment based on Bureau of Labor Statistics data on the average number of hours worked per week by employees in manufacturing wholesale trade and retail trade.

A.5 Estimating the Value of Sales of Fishing Tackle Used in Saltwater Angling

Two methods were used to estimate the proportion of sales of fishing tackle used in saltwater to total fishing tackle sales. A mail survey of fishing tackle manufacturers was conducted. Manufacturers were asked to provide data on their total sales volume, the percent of sales associated with tackle produced specifically for saltwater use, the estimated percent of sales of all tackle that is used in saltwater fishing. From the results a ratio of sales of tackle used in saltwater sales to total tackle sales was completed. The second means of estimating sales of tackle used in saltwater angling involved the use of consumer expenditure data from the National Survey of Fishing and Hunting which have been compiled every five years since 1955. Each survey presents separate estimates of consumer expenditures for tackle used in saltwater and freshwater fishing. Using data from surveys taken in 1955, 1960, 1965, and 1970, an expression of consumer expenditures for tackle use in saltwater fishing was calculated as a percent of total fishing tackle expenditures for each survey year. The mean value of these estimates was then computed. The results of these two independent methods are surprisingly similar and are shown in Exhibits A-3 and A-4.

As Exhibit A-3 shows, the ratio computed from the various years of the National Survey of Fishing and Hunting is historically reasonably stable. On an average sales of fishing tackle used in saltwater angling amount to about 22 percent of total fishing tackle sales.

From the results of the mail survey it is estimated that manufacturers' shipments of tackle that are used in saltwater were about 21 percent in 1975. Questionnaires were sent to 252 tackle manufacturers listed in the 1976 Directory of the American Fishing Tackle Manufacturers Association. Three weeks later a second wave of questionnaires was mailed to all nonrespondents. The estimate of 21 percent is based on complete responses. Although a total of 146 responses were received, 19 manufacturers had gone out of business and 64 responses did not include data on total sales. These responses could not be used in the computation of the ratio. The total sales of the firms that did complete the questionnaire amounted to \$124.9 million, or an estimated 45% of total sales for 1975. Although respondents in the second wave tended to have a smaller sales volume than those in the first wave, there was no significant difference between the resulting ratios of the first and second waves. A slight positive bias was introduced by a difference between the percent of incomplete responses from manufacturers that produce at least some tackle used in saltwater and manufacturers that produce no saltwater tackle. Of the total number of respondents that produced no tackle used in saltwater, 62 percent declined to provide sales data. Of the total number of respondents that produced some tackle used in saltwater, 41 percent declined to provide sales data. No attempt was made to estimate the size of the bias. The bias should result in only a slight overestimation of the ratio because the difference in the rate of refusals to provide sales data is relatively small for these two groups of manufacturers.

Exhibit A-3

Ratio of Expenditures for Fishing Tackle
Used in Saltwater to Total Expenditures
for Fishing Tackle*

	<u>Expenditures for Tackle Used in Saltwater Fishing</u>	<u>Total Expenditures for Fishing Tackle</u>	<u>Ratio of Saltwater Expenditures to Total Tackle Expenditures</u>
1955	\$54,458,000	\$243,626,000	0.22
1960	73,945,000	308,326,000	0.24
1965	73,098,000	323,543,000	0.23
1970	93,309,000	469,149,000	0.20

mean value = 0.22

*From U.S. Department of Interior, Bureau of Sport Fisheries and Wildlife,
National Surveys of Fishing and Hunting for years 1955, 1960, 1965, and
1970.

Exhibit A-4

Results of Mail Survey of
Fishing Tackle Manufacturers

Sample Size 252

<u>Dispositon of Responses</u>	<u>First Wave</u>	<u>Second Wave</u>	<u>Total</u>
Out of Business	19	0	19
Incomplete	24	40	64
Complete	48	15	63
TOTAL	91	55	146

Results

	<u>Total 1975 Tackle Sales</u>	<u>1975 Sales of Tackle Used in Saltwater</u>	<u>Saltwater Sales Total Sales</u>
First Wave	\$ 119,561,000	\$ 25,326,500	.21
Second Wave	5,330,000	1,304,500	.24
TOTAL	\$ 124,891,000	\$ 26,631,000	.21

To determine the economic impact of consumption of tackle for marine fishing, the mean value of the ratio determined from historical data (0.22) was applied to the estimates of the total value of sales (described in Section 3.1) at the manufacturing, wholesale trade, and retail trade levels, to obtain estimates of sales of tackle for saltwater use. The resulting estimates are \$36.9 million in manufacturing, \$41.5 million in wholesale trade, and \$88.0 in retail trade sales.

A.6 Application of the Impact Ratio

The final step in the estimating procedure was the application of the impact ratios to the estimates of total sales of fishing tackle and sales of fishing tackle used in saltwater. It is appropriate to apply the same ratios to both freshwater and saltwater equipment. While the material inputs required for the two tackle types vary somewhat, there are no significant differences in the labor requirements or in the technology required for production of freshwater and saltwater tackle. In wholesale and retail trade there is little difference for saltwater and freshwater tackle in the personnel required per unit sales of tackle or in the floor space requirements. Impact ratios for value added for sales, salaries and wages to sales, and capital expenditures to sales for manufacturing, wholesale trade, and retail trade were multiplied with the corresponding sales estimates. For example, the estimate of retail sales of fishing tackle used in saltwater is \$88 million and the corresponding value added to sales impact ratio equals 0.380. Thus the estimate of value added by retail sales of fishing tackle used in saltwater is $0.380 \times \$88 \text{ million}$ or \$33.4 million.

The sales to employment impact ratio is expressed in terms of dollars of sales per person-years of employment. Thus in order to obtain an estimate of employment the ratio is divided into the sales estimate. For example, it is estimated that approximately \$47,600 in retail sales supports one-person-year of employment. Therefore, the \$88 million in retail sales of fishing tackle used in saltwater provides 1,800 person-years of employment.

A.7 Estimating the Number of Establishments

There are two sources of information on the number of establishments involved in the manufacturing of fishing tackle. The 1972 Census of Manufacturers lists only those establishments that claim fishing tackle as their primary product. There were 139 such firms in 1972.¹⁷ However, the American Fishing Tackle Manufacturers Association (AFTMA) has 239 members which produced tackle in that year.¹⁸ AFTMA does not represent all manufacturers so that this estimate represents a lower bound of the size of population.

At the level of distribution, the 1972 Census of Wholesale Trade lists 868 establishments that distribute fishing tackle.¹⁹ These are merchant wholesalers. They do not include distribution through manufacturers' representatives. According to the AFTMA some manufacturers distribute directly to retail outlets. There is a National Association of Sporting Goods Wholesalers, but it has less than one hundred members and could provide no estimate of the total number of wholesalers of fishing tackle.

The Census of Retail Trade details data only on those stores which specialize in the selling fishing of tackle. In total they number 519.²⁰ The National Direct Mail Advertising Service, however, has compiled a current list of 10,781 retail stores which sell tackle.²¹ These do not include department stores which, as explained above, account for a large portion of tackle sales. As in the case of manufacturing this estimate must be seen as a lower bound on the total number of retail outlets for fishing tackle.

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APPENDIX B

ECONOMIC IMPACTS RELATED TO RECREATIONAL BOATS

B.0 ECONOMIC IMPACTS RELATED TO RECREATIONAL BOATS

B.1 Summary of Impacts

In 1972 total sales of outboard, inboard, and inboard/outdrive boats are estimated to have been \$558.9 million at the manufacturing level and \$835.6 million at the retail level. Of these totals it is estimated that the portion of boats attributable to marine recreational fishing was \$117.4 million at the manufacturing level and \$175.5 million at the retail level. These types of boats are in general not distributed through wholesalers. Rather, they pass directly from manufacturer to retail dealer. Thus no impact estimates are made for wholesale trade. Exhibit B-1 presents the economic impacts associated with these sales.

Value added resulting from these sales amounted to an estimated \$388.8 million in 1972. Value added by manufacturers is estimated to have been \$254.3 for all outboard, inboard and inboard/outdrive boats of which an estimated \$53.4 million is attributable to saltwater sportfishing. In retail trade, value added totalled an estimated \$133.7 million of which \$28.1 million is associated with marine recreational fishing.

It is estimated that in 1972, 30,600 person-years of employment are associated with the production and final sale of all inboard, outboard and inboard/outdrive boats. The employment impact associated with saltwater sportfishing was an estimated 6,400 person years. Some 20,000 person-years were required for the production of boats of which 4,200 are attributable to saltwater sportfishing. In retail trade an estimated 10,600 person years were required in selling boats of which 2,200 person years were associated with boats used in saltwater sportfishing.

Payment of wages and salaries for this total activity is estimated to have been \$219.9 million in 1972. Wages and salaries that were attributable to boats used in saltwater sportfishing amount to some \$46.2 million. In production a total of 138.0 million in wages and salaries were paid, and \$29.0 million of that amount were associated with boats used in saltwater fishing. An estimated total of \$81.9 million in wages and salaries was paid in retail trade, of which \$17.2 million were attributable to boats and in saltwater angling.

Annual capital expenditures were estimated to total \$17.9 million for outboard, inboard, and inboard/outdrive boats. Approximately \$3.7 million of that total is attributable to boats used in saltwater sportfishing. Manufacturing and retail trade accounted for \$11.2 million and \$6.7 million respectively. Annual capital expenditures attributable to boats used in saltwater sportfishing amounted to an estimated \$2.3 million in manufacturing and \$1.4 million in retail trade.

Exhibit B-1

Summary of Impacts
Related to Recreational Boat Purchases
1972

	<u>Manufacturing</u>	<u>Retail Trade</u>	<u>Sum of Impact</u> [*]
Number of Establishments **	228	6,650	
Sales (Millions of dollars)			
Total#	558.9	835.6	
Marine Recreational	117.4	175.5	
Fishing			
Value Added (Millions of dollars)			
Total#	254.3	133.7	388.8
Marine Recreational	53.4	28.1	81.5
Fishing			
Employment			
Total#	20,000	10,600	30,600
Marine Recreational	4,200	2,200	6,400
Fishing			
Wages and Salaries (Millions of dollars)			
Total#	138.0	81.9	219.9
Marine Recreational	29.0	17.2	46.2
Fishing			
Annual Capital Expenditures (millions of dollars)			
Total #	11.2	6.7	17.9
Marine Recreational	2.3	1.4	3.7
Fishing			

*

Consists of the sum of the economic impacts at the manufacturing and retail levels.

**

Consists of total number of manufacturers who produce inboard, inboard/outdrive, or outboard boats as their primary product.

#

Impacts associated with total sales of inboard, inboard/outdrive, and outboard boats used both in salt and fresh water.

B.2 General Approach to the Determination of Impact Estimates

To obtain estimates of the economic impacts associated with the use of recreational boats in saltwater sportfishing, a four step procedure was employed.

- o Estimates of the value of sales of recreational boats were made for each level of economic activity.
- o Economic impact ratios for value added, employment, salaries and wages, and annual capital expenditures were each estimated as functions of boat sales.
- o An estimate was made of the portion of total boat sales that were attributable to saltwater sportfishing.
- o The economic impact ratios were applied to the values of total boat sales and sales of boats attributable to saltwater sportfishing to determine the profile of economic impacts.

The type of recreational boats used in saltwater fishing consist predominately of outboard, inboard, and, inboard/outdrive motorboats of all lengths. Other types of boats such as sailboats, houseboats, canoes, pontoon boats, etc. are not used for the predominant purpose of saltwater fishing and are excluded from these estimates.

Through discussions with representatives of Boating Industry Magazine and the Boating Industry Association it was learned that over 90% of outboard, inboard, and inboard/outdrive boats are sold directly to retail dealers from the manufacturer through factory salesmen. Thus impact estimates are only presented for manufacturing and retail trade and not for wholesale trade.

B.3 Estimation of the Value of Total Sales of Outboard, Inboard
and Inboard/Outdrive Boats

Two sources of data were used to estimate the total value of manufacturer's shipments of outboard, inboard, and inboard/outdrive boats. First, the 1972 Census of Manufacturers includes data on manufacturer's shipments detailed by type of boat and by boat length. In 1972 there were \$558.9 million in shipments of these three boat types.¹ The value of shipments of outboard, inboard and inboard/outdrive boats amounted to \$233.9 million, \$229.1 million, and \$95.9 million respectively.

Data from the National Association of Engine and Boat Manufacturers (NAEBM) on boat shipments in 1972 support this estimate. NAEBM representatives estimate that the reports that they receive directly from manufacturers represent about 80% of all shipments. Manufacturers reported \$413.9 million in shipments in 1972.² Inflated to reflect shipments of all manufacturers, the total value of shipments is about \$520 million.

Two sources of data were examined to estimate the value of retail sales in 1972. The 1972 Census of Retail Trade reports that total sales of boat dealers in that year were \$1.560 billion.³ However, this amount includes sales of boats other than the outboard, inboard and inboard/outdrive type as well as sales of marine hardware and accessories.

The estimate used for this analysis was made using data provided by the Boating Industry Association (BIA). BIA data show that retail sales of outboard boats amounted to \$267.8 million in 1972. Similarly, retail sales of inboard boats were \$260.0 million, and sales of inboard/outdrive boats totaled \$307.8 million. These estimates are based on a monthly sample of 750 retail dealers throughout the United States stratified by dollar volume of sales and by Census region. The total estimate of sales of all three types of boats in 1972 is \$835.6 million.⁴

B.4 Estimating Impact Ratios Related to Recreational Boats

The determination of the valued added, employment, wages and salaries, and annual capital expenditures impact estimates was made using derived impact ratios. The ratios are presented in Exhibit B-2. All ratios are functions of total sales and are defined as follows:

- o Value added impact ratio = $\frac{\text{Total value added}}{\text{Total sales}}$
- o Employment impact ratio = $\frac{\text{Total sales}}{\text{No. of employees}}$
- o Wages and salaries impact ratio = $\frac{\text{Total wages and salaries}}{\text{Total sales}}$
- o Annual capital expenditures ratios = $\frac{\text{Total annual capital expenditures}}{\text{Total Sales}}$

In manufacturing the set of impact ratios was determined for the three boat types included in this analysis from Census data on producers which are at least 75 percent specialized in production of outboard, inboard, and inboard/outdrive boats.⁵

Ratios for retail trade were derived from several sources of data. The employment and salaries and wages ratios were determined from Census data on boat dealers (SIC 555).⁶

Sales to employment ratios were adjusted to reflect person-years of employment based upon Bureau of Labor Statistics data on average hours worked per employee in 1972 for the appropriate level of activity (i.e., manufacturing or retail trade).

The annual capital expenditures to sales ratio was determined from Census data aggregated in two-digit SIC groupings. The Census publishes data on seven major groupings: Building Material; General Merchandise, Food, Eating and Drinking Places, Automotive, Furniture, Gasoline Service Stations. Boat dealers are included in the Automotive Group (SIC 55), and are most like automotive dealers than the other six groups in their capital requirements. Both sell large, high priced items which in general require showroom floor space, storage space and repair facilities. The annual capital expenditures impact ratio (.008) for the Automotive Group is used here for lack of more specific data on boat dealers alone.⁷ The value added to sales ratio was determined from data on the marine dealership portion of combined marine dealer/marine establishment.⁸ The equipment sales components of these establishments

Exhibit B-2

Economic Impact Ratios for Boats in 1972

	<u>Manufacturing</u>	<u>Retail Trade</u>
Value added (\$/\$ sales)	0.455	.16
Employment (\$ Sales/Employment)	\$27,900.	\$78,650.
Wages and Salaries (\$/\$ Sales)	0.247	0.098
Annual Capital Expenditures (\$/\$ Sales)	0.020	0.008

operate in an economic environment not significantly different from marine dealers in general, and thus should adequately reflect value added for this product.

B.5 Estimation of the Value of Sales of Recreational Boats Used in Saltwater Fishing

It is estimated here that in 1972, \$175.5 million of the \$835.6 million in retail sales of boats was attributable to saltwater sportfishing activities. Similarly \$114.9 million of the \$547.3 million in manufacturers' shipments could be associated with saltwater angling.

There are several theoretical ways to allocate the proportion of sales of recreational boats used in saltwater to marine recreational fishing. Some boats, of course, are specialized pieces of fishing equipment which are purchased for the sole purpose of fishing. At the other extreme, some boats are not used for fishing at all. Many boats, however, are used for a combination of activities including fishing, cruising, water skiing. Choosing to allocate to recreational fishing only those boats bought expressly for fishing and no other activity would, indeed, underestimate the true economic impact associated with recreational fishing. The opportunity to participate in marine recreational fishing certainly does enter into the decision of a potential boat purchaser even if other uses are contemplated.

Manufacturers and retailers in general do not know how their boats are going to be used after final purchase. Thus, the above estimates are made indirectly. The value of sales of private watercraft used in sportfishing is estimated by determining a factor, r , which expresses saltwater fishing activity from boats as a function of total boating activity such that,

$$(1) \quad s = S \times r$$

where s = value of annual sales of boats (including outboard, inboard, and inboard/outdrive types) used in saltwater sportfishing.

S = total value of annual sales of outboard, inboard, and inboard/outdrive boats.

r = the ratio of saltwater fishing activity from boats to total boating activity.

The factor r has been estimated here using two basic approaches. The first technique is based on the assumption that the portion of the value of a boat that is attributable to saltwater sportfishing depends upon the amount of time that the boat is used for fishing vis-a-vis time spent in other boating activity. That is, an owner may purchase a boat and use it an average 50 days each year. But it might be used for saltwater fishing only 25 days each year. Thus, by this method one half of the boat's value can be allocated to saltwater fishing. The second method of estimating r assumes that the full value of a boat is attributable to saltwater sportfishing if the boat was used for that activity. Both methods are employed to determine a range for r .

The first technique is, however, preferred because it is based more precisely on fishing effort.

All estimates of r are derived from secondary data sources, most of which include the entire boat population rather than just new boats. It is therefore additionally assumed that the distribution of boating activity of new boats is the same as that of the boats in the existing boat population.

The preferred estimate, r_1 , of r was determined using the following equation:

$$(2) \quad r_1 = t \times \frac{e_1}{e_2}$$

where t = total time all boats are used for fishing

e_1 = expenditures by saltwater fishermen for boats

e_2 = expenditures by all fishermen for boats

The data necessary for this computation were obtained from two sources. According to a study on recreational boat by the U.S. Coast Guard, 46.5% of all boating time is spent fishing.⁹ Recent research in saltwater boating activity indicates that the percent of time boats are used for fishing in saltwater only does not vary greatly from this national average.¹⁰ Estimates of expenditures by fishermen for boats were obtained from the 1970 National Survey of Fishing and Hunting and are \$211.66 million and \$260.48 million for freshwater and saltwater fishermen respectively.¹¹ The results of the 1970 National Survey of Fishing and Hunting have been criticized because of the small sample size and urban bias in its sampling procedure. However, any constant error (resulting in overestimation or underestimation) of the expenditures of freshwater and saltwater fishermen is almost completely cancelled out by computing the ratio of these expenditures estimates.

Thus, using equation (2)

$$\begin{aligned} r_1 &= 0.465 \times \frac{211.66}{211.66 + 260.48} \\ &= 0.21 \end{aligned}$$

A second method of estimating r involves determining the proportion of boats that fish in saltwater to the total boat population. That is,

$$(3) \quad r_2 = \frac{b_1}{b_2} \times v$$

where b_1 = number of recreational boats that fish in saltwater

b_2 = total number of recreational boats^{*}

v = weighting factor to compensate for the difference in value between boats used for saltwater fishing and the total boat population.

Using equation (3), the portion of total boat sales attributable to saltwater sportfishing is estimated to be 0.25.

This method assumes that the total value of the boat is attributable to saltwater sportfishing if the boat is used for fishing in saltwater. Thus one would expect the estimated value of r_2 to exceed that of r_1 .

A study conducted for the National Marine Fisheries Survey provides estimates of b_1 and b_2 . The number of boats that fished in saltwater (b_1) during the 12 month period from September, 1972 to September, 1973 is estimated to have been 1,009,671.¹² The estimate of the total boat population of inboard, outboard, and inboard/outdrive boats was made using data on the distribution of boats by type from a study conducted by the U.S. Coast Guard.¹³ According to the Coast Guard estimates, these three boat types account for 66% of all boats. Thus b_2 equals 5,291,003 ($8,007,717 \times .66$) boats.

One would expect that boats used in saltwater would be somewhat larger and would have a different distribution by type than the boat population as a whole because of the water conditions in which they are used. Consequently one would also expect that an average boat used in saltwater (for fishing) would be more expensive than a typical boat of the entire outboard, inboard, and inboard/outdrive boat population.

To compensate for this difference in value, a weighting factor, v , was estimated. A value for v of 1.3 (i.e., a boat used in saltwater fishing costs an average 1.3 times as much as an average boat in the population of outboard, inboard, and inboard/outdrive watercraft) was obtained by computing a proportion of the replacement costs (in 1972 dollars) of a boat used in saltwater to a boat typical of the population as a whole.

Exhibit B-3 presents the computation of the value of v . Estimates for the replacement value of boats were obtained from the Boating Industry Association. The estimate of the distribution of all boats by type was obtained directly from U.S. Coast Guard data.¹⁴ The estimate of the distribution by type of boats used for saltwater fishing was determined through the conversion of NMFS data on the length of these boats.¹⁵ The conversion was made from Coast Guard data on the distribution of all boats by both type and length.¹⁶ As Exhibit B-4 shows the population of boats that fish in saltwater includes fewer outboard boats (of less value) and more inboard and inboard/outdrive boats (of greater value) than the boat population as a whole. Thus, an average boat used for saltwater fishing cost approximately \$4,974 as compared to an average of \$3,802 for all boats. The ratio of the two values yields v . Using equation (3), the estimate is computed as follows:

*

Includes only outboard, inboard and inboard/outdrive boats.

Exhibit B-3

Boat Type	<u>Boats Used in Saltwater</u>			<u>All Boats</u>		
	<u>% of Total No.</u>	<u>Replacement Cost (1972\$)</u>	<u>% x Cost</u>	<u>% of Total No.</u>	<u>Replacement Cost (1972\$)</u>	<u>% x Cost</u>
Outboards	75.6%	\$ 714	\$ 540	80.4%	\$ 714	\$ 574
Inboards	14.3	27,370	3,914	10.1	27,370	2,764
Inboard/ Outdrive	10.1	4,885	493	9.5	4,885	464
TOTAL	100.0		\$ 4,947	100.0		\$ 3,802

$$\begin{aligned}
 v &= \frac{\$4,947}{\$3,802} \\
 &= 1.30
 \end{aligned}$$

$$r_2 = \frac{1,009,671}{5,291,003} \times 1.30$$

$$= 0.25$$

A third method for computing an estimate of r is simply to calculate the ratio of expenditures by saltwater fishermen for boats to total sales of boats. This method also assumes that the entire value of the boat is attributable to the primary activity for which it is used. The estimate of 1970 total sales of outboard, inboard and inboard/outdrive boats was made using data from the Boating Industry Association. The only available estimate of boat expenditures by fishermen is in the 1970 National Survey of Fishing and Hunting. However, the constant error introduced in the expenditure estimates by choosing a small and primarily urban sample for the survey results in an overestimation of the actual expenditures of fishermen. A ratio, r_3 , computed using this data would thus overestimate the proportion of total boat sales that may be attributable to saltwater fishing. The calculation of r_3 is made here to determine an estimate of the upper bound of r .

$$(4) \quad r_3 = e_1/s_1$$

where e_1 = estimated expenditures by saltwater fishermen for boats.

s_1 = estimated value of sales of all inboard, outboard and inboard/outdrive boats.

$$r_3 = \frac{\$211.7 \text{ million}}{675.0 \text{ million}}$$

$$= .31$$

Thus the upper limit of the percent of total boat sales which are attributable to saltwater sportfishing activity is 31%.

In summary, the estimated values of r are 0.21, 0.25 and 0.31. The preferred value is 0.21 because it is based upon estimates of the actual amount of time boats are used for fishing. Using this value for r and the estimated value of total retail sales of boats, the retail sales value of boats used in saltwater angling, S_{retail} was estimated using equation (1):

$$S_{\text{retail}} = \$835.6 \text{ million} \times .21$$

$$= \$175.5 \text{ million}$$

Similarly, the value of manufacturers' boat shipments that may be attributable

to saltwater fishing, $S_{\text{manufacturing}}$, was also determined using equation (1):

$$\begin{aligned} S_{\text{manufacturing}} &= \$547.3 \text{ million} \times .21 \\ &= \$114.9 \text{ million} \end{aligned}$$

B.6 Application of Economic Impacts Ratios to Obtain Impact Estimates

The application of the impact ratios (presented in Section 3.2) to the estimates the value of total sales of boats and value of sales of boats used in saltwater fishing is the final step in the impact estimation procedure.

In manufacturing and retail trade, the impact ratios of value added to sales, wages and salaries to sales, and annual capital expenditures to sales were multiplied with the respective total sales estimates, and estimates of sales attributable to boats used in saltwater sportfishing. To estimate employment the impact ratio of sales to person-years of employees was divided into the estimated boat sales for manufacturing and retail trades. The resulting impact estimates are summarized in Exhibit B-1.

B.7 Estimation of the Number of Establishments

According to the Census of Manufacturers there were 1,778 boat manufacturers in 1972. This number however includes manufacturers of all types of boats. The producers of outboard, inboard and inboard/outdrive boats number approximately 228.¹⁷ This estimate represents manufacturers that list these three types of boats as a primary product and therefore underestimates the total number of producers.

The number of retail boat dealers in 1972 is estimated to be 6,650 based on returns of the Census of Retail Trade. Between 60% and 69% of all boat dealers or 4,318 establishments, reported in the Census.¹⁸ The above estimate was obtained by inflating the actual returns to reflect the total number of dealers.

APPENDIX B

1. U.S. Department of Commerce, Bureau of the Census, 1972 Census of Manufacturers, Ship and Boat Building, Railroad and Miscellaneous Transportation Equipment, pp. 37c/20-21.
2. Data provided by National Association of Engine and Boat Manufacturers, New York, New York.
3. U.S. Department of Commerce, Bureau of the Census, 1972 Census of Retail Trade, Establishment and Firm Size, p. 1/17.
4. Data provided by the Boating Industry Association, Chicago, Illinois.
5. U.S. Department of Commerce, Bureau of the Census, 1972 Census of Manufacturers, Ship and Boat Building, Railroad and Miscellaneous Transportation Equipment, p. 37c/16.
6. U.S. Department of Commerce, Bureau of the Census, 1972 Census of Retail Trade, Establishment and Firm Size, p. 1/17.
7. Annual Capital Expenditures Data are from 1972 Census of Retail Trade, Capital Expenditures, Fixed Assets, and Rental Payments p. 2/6. Total sales data used for determining the impact ratio are from 1972 Census of Retail Trade, U.S. Summary, p. 7.
8. National Association of Engine and Boat Manufacturers, Marinas Cost/Revenues, 1974.
9. U.S. Coast Guard, Recreational Boating in the Continental United States in 1973, (1974) p. 93.
10. In a special report prepared for Centaur by C. Bruce Austin and Linda D. Seifert of the University of Miami, entitled "Recreational Boating Activity in Dade County" it is estimated that 127,249 out of a total of 259,992 saltwater boating trips, or 48.9%, were made for the purposes of recreational fishing.
11. U.S. Department of the Interior, 1970 Survey of Fishing and Hunting, pp. 45-46.
12. Bromber, Kenneth, Determination of the Number of Commercial and Non-Commercial Recreational Boats in the U.S., Their Use and Selected Characteristics. A report prepared for the National Marine Fisheries Service, U.S. Department of Commerce. (1973), p. C-5.
13. U.S. Coast Guard, p. 35.

14. U.S. Coast Guard, p. 35.
15. Bromberg, p. C-5.
16. U.S. Coast Guard, p. 35.
17. U.S. Department of Commerce, U.S. Bureau of the Census, 1972 Census of Manufacturers, Ship and Boat Building, p. 37c/16.
18. U.S. Department of Commerce, Bureau of the Census, 1972 Census of Retail Trade, United States Summary, p. 9.

APPENDIX C

ECONOMIC IMPACTS RELATED
TO BOAT MOTORS

C.0 ECONOMIC IMPACTS RELATED TO BOAT MOTORS

C.1 Summary of Impacts

In 1972, retail sales of all outboard motors totalled an estimated \$432 million. Manufacturers' shipments were valued at \$320 million in that year. Motor sales associated with marine recreational fishing are estimated to have been \$48 million and \$35 million in retail trade and manufacturing respectively. Exhibit C-1 summarizes the impacts associated with these sales.

Value added of all motor sales totalled \$215 million, manufacturing and retail trade contributing \$146 million and \$69 million respectively. Value added attributable to saltwater sportfishing totalled \$24 million of which \$16 million and \$8 million were associated with manufacturing and retail trade respectively.

Employment for the manufacturing and retail trade of all outboard motors amounted to an estimated 5,120 and 5,500 person-years respectively, or a total of 10,620 person-years. Employment on motor production and retail sales attributable to saltwater sportfishing is estimated to have totalled 1,170 person-years. Of that total an estimated 560 person-years were required in production and 610 person-years were required in retail trade.

Wages and salaries amounted to a total of \$101 million in 1972 of which \$59 million were in manufacturing and \$42 million were in retail trade of outboard motors. The portion of wages and salaries generated from purchases of outboard motors attributable to saltwater fishing amounted to \$11 million in total, or \$6 million in manufacturing and \$5 million in retail trade.

In 1972 capital expenditures related to outboard motor production and retail sale totalled an estimated \$8 million as compared with about \$1 million in capital expenditures attributable to saltwater sportfishing. In manufacturing annual capital expenditures amounted to \$5 million. In retail trade these expenditures are estimated to have totalled \$3 million. In comparison capital expenditures for motors used in saltwater sportfishing amounted to an estimated \$0.5 million in manufacturing and \$0.5 million in retail trade.

Exhibit C-1

Summary of Impacts
Related to Outboard Motors
1972

	<u>Manufacturing</u>	<u>Retail Trade</u>	<u>Sum of Impacts*</u>
Number of Establishments	7**	6,650 #	
Sales (millions of dollars)			
Total##	\$320	\$432	
Marine Recreational Fishing	35	48	
Value Added (millions of dollars)			
Total##	\$146	\$69	\$215
Marine Recreational Fishing	16	8	24
Employment (person-years)			
Total##	5,120	5,500	10,620
Marine Recreational Fishing	560	610	1,170
Wages and Salaries (millions of dollars)			
Total##	\$59	\$42	\$101
Marine Recreational Fishing	6	5	11
Annual Capital Expenditures (millions of dollars)			
Total##	\$ 5	\$ 3	\$8
Marine Recreational Fishing	0.5	0.5	1

* Sum of economic impacts at the manufacturing and retail levels.

** Total number of outboard motor manufacturers in U.S.

Estimated total number of dealers selling outboard motors in U.S.

Refers to impacts associated with total sales of outboard motors.

C.2 General Approach

The procedure used to estimate economic impacts associated with outboard motors is similar to that used for impact estimates related to fishing tackle and recreational boats. A four-step sequence was used:

- o The total value of sales was estimated for the production and final purchase of outboard motors.
- o Economic impact ratios for value added, employment, wages and salaries, and annual capital expenditures were estimated as functions of motor sales.
- o An estimate was made of the portion of motor sales that was attributable to saltwater sportfishing.
- o The economic impact ratios were applied to the value of total motor sales and to the value of motor sales attributable to saltwater sportfishing to determine the estimates of economic impacts.

The definition of outboard motors used here includes those motors which are produced for external attachment to recreational boats. Thus modified motors that are produced for installation into inboard/outdrive boats are excluded from this analysis. (Impacts associated with the production and sale of these motors are included in the analysis of recreational boats.)

Like recreational boats, outboard motors are shipped directly from manufacturers to retail dealers. Thus no impact analysis is made for wholesale trade.

C.3 Estimation of the Total Value of Outboard Motor Sales

The value of manufacturers' shipments of outboard motors was estimated based on the generally accepted mark-up for boat motors. From contacts with three (of seven) manufacturers of motors, it was learned that while mark-ups may vary by motor size, in general the retail price is about 35 percent higher than manufacturers' selling price.¹ The estimated value of manufacturers' shipments in 1972 is \$320 million based on a retail sales estimate of \$432 million.

Data on motor shipments from the National Association of Engine and Boat Manufacturers (NAEBM) were also examined. The NAEBM data do not include all manufacturers, (one major manufacturer is excluded) and therefore represent a lower bound for the total value of shipments. NAEBM member companies reported a total of \$194.1 million in shipments of motors in 1972.

The 1972 Census of Manufacturers provided a third source of data on motor shipments. However, to avoid disclosing information on individual companies, outboard motor data are combined with those of tank and converted internal combustion engines, and these overstate the value of outboard motor shipments. The combined value of shipments for these two product classes was \$425.9 million in 1972.³

C.4 Estimation of Economic Impact Ratios Related to Boat Motors

To estimate the value added, employment wages and salaries, and annual capital expenditures impacts of boat motor sales, economic impact ratios were derived. The ratios are all determined as functions of sales and are computed separately for manufacturing and retail trade. They are defined as follows:

- o Value added impact ratio $= \frac{\text{Total Value Added}}{\text{Total Sales}}$
- o Employment impact ratio $= \frac{\text{Total Sales}}{\text{Number of Employees}}$
- o Wages and salaries impact ratio $= \frac{\text{Total Wages and Salaries}}{\text{Total Sales}}$
- o Annual capital expenditure impact ratio $= \frac{\text{Total Annual Capital Expenditures}}{\text{Total Sales}}$

The estimated impact ratios for outboard motors are presented in Exhibit C-2. The ratio estimates for manufacturing were all computed from data published in the 1972 Census of Manufacturers on manufacturers that list outboard motors as their primary product.⁴

Impact ratios for retail trade were determined from several sources of data. The ratios of employment to sales and wages and salaries to sales were determined using data on boat dealers from the 1972 Census of Retail Trade.⁵ The employment to sales ratio was adjusted to reflect person-years based on Bureau of Labor Statistics data on the average hours worked per employee in 1972. These data are applicable because the vast majority of outboard motors are sold through retail boat dealers.

The value added to sales ratio was computed from data on the boat and motor dealership portion of combined marine dealer/marina operations. The data were obtained from a study of the cost and revenues of marinas.⁶ The dealership portion of these establishments operates in virtually the same economic environment as boat and motor dealers in general and thus these data should reasonably reflect the value added characteristics of the population of boat and motor dealers.

The annual capital expenditures ratio was determined from 1972 Census data on automotive dealers. The data are aggregated in two-digit SIC groupings. Boat dealers are the primary sellers of outboard motors and are included in the automotive group. They are much like automotive dealers in their capital requirements. Both types of dealers sell large high priced items which in general require showroom floor space, storage space and repair facilities. For these reasons the ratio of annual capital expenditures to total sales for the automotive group is 0.008 and is used here in estimating the impacts related to boat motors at the retail level.⁷

Exhibit C-2

Impact Ratios
Boat Motors
1972

	<u>Manufacturing</u>	<u>Retail Trade</u>
<u>Value Added</u> Sales	0.455	0.160
<u>Sales</u> Employment	\$62,500	\$78,650
<u>Salaries & Wages</u> Sales	0.183	0.098
<u>Capital Expenditures</u> Sales	0.015	0.008

C.5 Estimating the Value of Outboard Motor Sales Used in Saltwater Sportfishing

It is estimated that in 1972 \$48 million of the \$432 million in retail sales of boat motors were attributable to marine recreational fishing activities. Similarly \$35 million of the \$320 million in manufacturers' shipments were estimated to be associated with saltwater angling.

Outboard motors are used for a variety of boating activities in freshwater and saltwater. Below we estimate, s , that portion of motor sales that is attributable to saltwater sportfishing using the following equation:

$$(1) \quad s_i = S_i \times F$$

where s = Value of annual sales of outboard motors used in saltwater sportfishing.

S = Total value of annual sales of outboard motors

F = The ratio of saltwater sportfishing activities using outboard motors to total boating activities using outboard motors.

i = The level of economic activity, i.e., manufacturing or retail trade.

The value of S is estimated in Section 3.1. To compute s , the factor f must be determined. Several estimates, f , of the actual value of F are derived below. The first estimate is based on the assumption that the portion of the value of an outboard motor that is attributable to saltwater angling depends on the amount of time that the motor is used for fishing vis-a-vis other boating activities (e.g., cruising or skiing) which require boat motors. The first estimate of F was determined using the following equation:

$$(2) \quad f = \frac{m_1}{m_2} \times t$$

where m_1 = Expenditures for outboard motors by saltwater fishermen.

m_2 = Expenditures for outboard motors by all fishermen.

t = The percent of time outboard motors are used for fishing.

The estimates of m_1 and m_2 are taken from the 1970 National Survey of Fish... and Hunting.⁸ The results of this survey have been criticized because of the small sample used and urban bias in the sampling plan. However, any constant

error in the estimates of expenditures resulting from these difficulties is almost completely cancelled out by computing the ratios of expenditures for motors by saltwater fishermen and expenditures by all fishermen.

For lack of more detailed data specifically on the use of boat motors it is necessary to assume that outboard boats (and thus motors) are used for fishing the same amount of time as the boat population in general. The U.S. Coast Guard estimates that 46.5 percent of all boating time (and thus boat motor time) is spent fishing. Because boating activity data include the entire boat population it is necessary to additionally assume that new boat motors are used in the same way as boat motors in the existing population.

$$\begin{aligned} \text{Thus using equation (2),} \quad f &= \frac{\$51.9 \text{ million}}{\$224.2 \text{ million}} \times 0.465 \\ &= 0.11 \end{aligned}$$

Two additional estimating procedures were employed in an attempt to corroborate this estimate. The procedures and the estimates are described below.

A simple proportion of the number of outboard boats (and thus motors) used in saltwater fishing and the total number of outboard boats (and thus motors) was computed as a second estimate of the actual value of F. That is,

$$(3) \quad f = \frac{n_1}{n_2}$$

where n_1 = Number of outboard boats used for fishing in saltwater.

n_2 = Total number of outboard boats.

One would expect this estimate to overestimate F because this procedure implicitly assures that the total value of the motor is attributable to saltwater sportfishing if it is used for that activity.

An estimate of the total number of outboard boats was obtained directly from U.S. Coast Guard data. From Coast Guard data on the number of boats by length and type and NMFS data on the number of boats that fish in saltwater by boat length, an estimate of the number of outboard boats that fish in saltwater was determined.¹¹ From this data the second estimate of F was computed using equation (3):

$$\begin{aligned} f &= \frac{764,000}{4,246,000} \\ &= 0.18 \end{aligned}$$

As a third estimate of the actual value of F, a ratio of estimated expenditures for boat motors by saltwater fishermen to total consumer expenditures for motors was computed. Data on expenditures of saltwater fishermen were taken directly

from the 1970 National Survey of Fishing and Hunting. The estimate of total motor sales in 1970 was obtained using data from the Boating Industry Association.

As explained above the urban bias in the sample of the 1970 National Survey of Fishing and Hunting introduced some constant error which resulted in an overestimation of actual expenditures. Thus this estimate should also overestimate the portion of total boat motor sales that are attributable to saltwater sportfishing.

The third estimate was computed as follows:

$$(4) \quad f = e_1 / e_2$$

where e_1 = Expenditures for boat motors by saltwater sportfishermen.

e_2 = Total expenditures for outboard motors.

$$\text{thus } f = \frac{\$52 \text{ million}}{\$310 \text{ million}}$$

$$= 0.17$$

To summarise, F has been estimated three different ways resulting in values of 0.11, 0.17, and 0.18. The first estimate of F which equals 0.11 is the most reasonable because it is based upon the amount of time outboard motors are actually used for fishing. The second and third estimates (0.17 and 0.18 respectively) were computed to provide corroborative evidence for the first estimate. As explained above one would expect these latter two estimates to be larger than the actual value of F because they each implicitly allocate the total value of the motor to sportfishing if the motor is used for that activity. The results above support these expectations and point to the value 0.11 as the most reasonable choice for an estimate of F given the data available for these estimates.

Using 0.11 as the approximation for determining the portion of total motor sales that is attributable to saltwater angling the value of sales for retail trade and manufacturing was estimated from equation (1):

$$S_{\text{Retail}} = \$432 \text{ million} \times 0.11$$

$$= \$48 \text{ million}$$

$$S_{\text{Manufacturing}} = \$420 \text{ million} \times 0.11$$

$$= \$35 \text{ million}$$

C.6 Application of Economic Impact Ratios to Obtain Impact Estimates

To determine estimates of the value added, employment, wages and salaries and capital expenditure impacts, the economic impact ratios (presented in Section C.4) were applied to the estimates of total sales of boat motors and sales of boat motors attributable to saltwater sportfishing.

In manufacturing and retail trade the ratios of value added to sales, wages and salaries to sales, and annual capital expenditures to sales are multiplied with the respective total sales estimates and estimates of sales associated with sportfishing. The employment impact is determined by dividing the ratio of sales to person-years of employment into the estimated values of motors sales for manufacturing and retail trade. The resulting impact estimates are summarized in Exhibit C-1.

C.7 Number of Establishments

According to the 1972 Census of Manufactures there are seven manufacturers that list boat motors as their primary product.¹² According to the National Association of Engine and Boat Manufacturers these establishments produce over 90 percent of all outboard boats.

Nearly all boat motors are sold through boat dealers at the retail level. The 1972 Census of Retail Trade reports 4,318 boat dealers in that year.¹³ Only between 60 and 69 percent of all dealers reported. Assuming that 65 percent of all establishments reported to the Census Bureau, the total number of establishments is estimated to be 6,650. This does not include department stores that sell motors. According to several manufacturers, however, motors sold through department stores generally have very low horsepower and are not likely to be used in saltwater.

APPENDIX C REFERENCES

1. The companies contacted were Chrysler Outboard Corporation, Outboard Marine Corporation, and Mercury Motors.
2. National Association of Engine and Boat Manufacturers, New York, New York.
3. U.S. Department of Commerce, Bureau of the Census, 1972 Census of Manufacturers; Engines and Turbines and Farm Machinery and Equipment, p. 35A/16.
4. 1972 Census of Manufacturers, p. 35A/12.
5. U.S. Department of Commerce, Bureau of the Census, 1972 Census of Retail Trade, Establishment and Firm Size, p. 1/-17.
6. National Association of Engine and Boat Manufacturers, Marinas: Costs/Revenues - 1974.
7. Annual Capital Expenditures data are from 1972 Census of Retail Trade, Capital Expenditures Fixed Assets and Rental Payments, p. 2/6. Total sales data used for determining the impact ratio are from the 1972 Census of Retail Trade, U.S. Summary, p. 7.
8. U.S. Department of the Interior, Bureau of Sport Fisheries and Wildlife, 1970 National Survey of Fishing and Hunting, pp. 44 and 46.
9. U.S. Coast Guard, Recreational Boating in the Continental United States in 1973, October, 1974, p. 93.
10. U.S. Coast Guard, p. 35.
11. Kenneth Bromberg, Determination of the Number of Commercial and Non-Commercial Recreational Boats in the U.S., Their Use, and Selected Characteristics, a report for the National Marine Fisheries Service, 1973, p. C-5; and U.S. Coast Guard, Recreational Boating in the Continental United States, 1974, p. 35.
12. 1972 Census of Manufacturers, p. 35A/12.
13. 1972 Census of Retail Trade, U.S. Summary, p. 9.

APPENDIX D

ECONOMIC IMPACTS RELATED TO
BOAT TRAILERS

D.0 ECONOMIC IMPACTS RELATED TO BOAT TRAILERS

D.1 Summary of Impacts

The estimated value of retail sales of boat trailers was \$72 million in 1972. Manufacturers' shipments totalled an estimated \$58.1 million. Sales attributable to marine recreational fishing amounted to an estimated \$15 million in retail trade and \$12 million in manufacturing. The impacts associated with these sales are presented in Exhibit D-1.

In 1972 value added from boat trailer purchases totalled about \$32.8 million, \$21.3 million in manufacturing and \$11.5 million retail trade. Value added attributable to saltwater angling amounted to an estimated \$4.5 million in manufacturing and \$2.4 million in retail trade, or a total of \$6.9 million.

Employment amounted to an estimated 1,400 and 920 person-years for the production and final sale of all boat trailers respectively, or a total of 2,320 person-years. Employment from boat trailers attributable to saltwater sportfishing is estimated at 490 person-years, 300 person-years in manufacturing and 190 person-years in retail trade.

Wages and salaries for this total activity amounted to an estimated \$17.7 million, or about \$10.6 million in manufacturing and an estimated \$7.1 million in retail trade. Wages and salaries attributable to saltwater sportfishing from boat trailers were an estimated \$2.2 million in manufacturing or \$1.5 million in retail trade for a total of \$3.7 million.

Annual capital expenditure in 1972 were an estimated \$1.8 million for the production and retail sale of trailers. Capital expenditures were evenly divided between manufacturing and retail trade. Approximately \$0.3 million of that total is attributable to saltwater angling activity.

Exhibit D-1

Summary of Impacts
Related to Boat Trailers
1972

	<u>Manufacturing</u>	<u>Retail Trade</u>	<u>Sum of Impact*</u>
Number of Establishment	100+**	6,650#	
Sales (millions of dollars)			
Total##	\$58.1	\$72.0	
Marine Recreational	12.2	15.1	
Fishing			
Value Added (millions of dollars)			
Total##	\$21.3	\$11.5	\$32.8
Marine Recreational	4.5	2.4	6.9
Fishing			
Employment (person-years)			
Total##	1,400	920	2,320
Marine Recreational	300	190	490
Fishing			
Wages and Salaries (millions of dollars)			
Total##	\$10.6	\$7.1	\$17.7
Marine Recreational	2.2	1.5	3.7
Fishing			
Annual Capital Expenditures (millions of dollars)			
Total##	\$1.2	\$0.6	\$1.8
Marine Recreational	0.2	0.1	0.3
Fishing			

-
- * Sum of direct economic impacts at the manufacturing and retail levels.
 ** Total number of boat trailer manufacturers.
 # Total number of retailers selling boat trailers.
 ## Economic activity of total boat trailer industry.

D.2 General Approach

The estimates summarized above were determined using the following procedure.

- o The total value of manufacturers' shipments and retail sales of boat trailers were estimated.
- o Economic impact ratios of value added to sales, sales to employment, salaries and wages to sales, and other capital expenditures to sales were separately estimated for manufacturing and retail trade.
- o An estimate was made of the portion of total trailer sales that were attributable to saltwater sportfishing.
- o The economic impact ratios were applied to the values of total trailer sales and sales of trailers attributable to saltwater sportfishing to determine the profile of economic impacts.

The definition of boat trailers used in this analysis include those trailers that are used by private boat owners to transport their watercraft to and from launching sites.

According to industry sources boat trailers pass directly from manufacturers to retail dealers primarily. Wholesale distributors are not used because the bulkiness of the product makes packaging difficult and inhibits handling by distributors. The analysis, therefore, includes only manufacturing and retail trade activities.

D.3 Estimation of the Value of Total Sales of Boat Trailers

Two sources of data were used in determining the value of manufacturers' shipments in 1972. The better estimate, \$58.1 million, which appears in Exhibit D-1 was taken from the 1972 Census of Manufactures.¹ The Census data is the better estimate because the Census survey included all manufacturers and all data are collected uniformly.

An estimate of \$54 million in shipments was obtained using data from the National Association of Engine and Boat Manufacturers (NAEBM). While the procedure for reporting data is uniform for all manufacturers participating, the NAEBM data does not include all manufacturers. In calendar year 1972 the shipments of some 35 companies reporting to NAEBM amounted to \$43,377,000. NAEBM estimates that their reports include about 80 percent of all manufacturers' shipments.² Inflating this value to reflect all shipments results in an estimate of about \$54 million. This estimate generally corroborates the value reported in the census.

The estimated 1972 value of boat trailers at the retail trade level was \$72 million. This was obtained from the Boating Industry Association and was determined from data on 750 retail dealers stratified by sales volume and geographic region and then inflated to reflect the national sales volume.³ This estimate is within the proper range of the generally accepted mark-up for boat trailers manufacturers to retail dealers. According to industry sources there is a 20 percent to 25 percent mark-up on trailers. The estimate of \$72 million in retail sales implies about a 24 percent margin.

D.4 Estimation of Economic Impact Ratios Related to Boat Trailers

The determination of value added, employment, wages and salaries, and annual capital expenditure associated with these sales were made using derived impact ratios. The ratios are presented in Exhibit D-2. All impact ratios are functions of sales and are defined as follows:

- o Value added impact ratio $= \frac{\text{Total Value Added}}{\text{Total Sales}}$
- o Employment impact ratio $= \frac{\text{Total Sales}}{\text{Number of Employees}}$
- o Wages and salaries impact ratio $= \frac{\text{Total Wages and Salaries}}{\text{Total Sales}}$
- o Annual capital expenditures impact ratio $= \frac{\text{Total Annual Capital Expenditures}}{\text{Total Sales}}$

In manufacturing the set of impact ratios for boat trailers was determined from Census data on SIC 37999.⁴ The SIC group includes boat trailers along with other products such as automobile utility trailers, chassis for automobile trailers and handcars. The items included in this group are similar to boat trailers in the manpower and equipment required for their production. Thus data for this product group are a reasonable choice for computing boat trailer impact ratios of production.

The economic impact ratios for sales to employment and wages and salaries to sales in retail trade are determined from Census data on marine dealers.⁵ The sales to employment ratio was then adjusted to reflect person-years based on Bureau of Labor Statistics data on the average hours worked per employee in 1972. Since virtually all boat trailers are purchased through marine dealers, these ratios should provide reasonable impact estimates. The value added to sales ratio was determined from the data on the marine dealer-ship portion of combined marine dealer/marina establishments.⁶ However, it is not likely that the equipment sales components of these establishments operate in an economic environment significantly different from marine dealers in general and thus this ratio should adequately reflect value added for this product. The ratio of annual capital expenditures to sales was determined from census data aggregated in two-digit SIC groupings. Marina dealers are included in the automotive group. They are similar to automotive dealers in their capital requirements. Both dealerships sell large, high priced items which in general require showroom floor space, storage space and repair facilities. For this reason, data on the automotive group were used to estimate annual capital expenditures related to retail sales of boat trailers.⁷

Exhibit D-2

Boat Tailers
Economic Impact Ratios

	<u>Manufacturing</u>	<u>Retail Trade</u>
<u>Value Added</u> Sales	0.367	.16
<u>Sales</u> Employment	\$41,100	\$78,650
<u>Wages and Salaries</u> Sales	0.183	0.098
<u>Annual Capital Expenditures</u> Sales	0.020	0.008

D.5 Estimation of the Value of Sales of Boat Trailers Associated With
Saltwater Sportfishing

It is estimated here that about 21 percent of all boat trailers sales is attributable to saltwater sportfishing activity. That estimate is based on the following argument.

Trailer "activity" is directly associated with boat activity. That is, if a boat is hauled to a launching site to be used for a fishing trip, then the trailer is also being used for fishing. Boats (and thus trailers) are used for a variety of water activities (e.g., cruising, skiing, or fishing). Their value may be allocated to any activity according to the portion of time that boats (trailers) are used for that activity. We have estimated that about 21 percent of all boat sales are attributable to saltwater sportfishing (see Appendix B for a detailed explanation of this allocation procedure), and therefore assume that about the same amount of trailer sales may be allocated to marine recreational fishing.*

* The method used for estimating the portion of boat sales attributable to saltwater sportfishing is weighted for the larger size of boats (and thus trailers) that are used in marine waters.

D.6 Application of Economic Impact Ratios to Obtain Impact Estimates

To obtain estimates of the economic impacts associated with trailer sales the impact ratios (presented in Section D-3.2) were applied to the value of sales of all boat trailers and the value of sales of trailers attributable to saltwater fishing. The ratios of value added to sales, wages and salaries to sales, and annual capital expenditures to sales for manufacturing and retail trade were each multiplied with the respective sales values to determine the impact estimates. The ratios of sales to employment in manufacturing and retail trade were divided into the respective sales values to determine the employment impact.

D.7 Estimating the Number of Establishments

The National Association of Engine and Boat Manufacturers is the only source of information on the number of manufacturers of boat trailers. NAEBM estimates that there were over 100 trailer producers in 1972.⁸ As for establishments in retail trade, there were about 6,650 boat dealers in 1972. The returns of 4,318 establishments are included in the 1972 Census of Retail Trade, but only between 60 percent and 69 percent of all dealers reported.⁹ The above estimate was obtained by assuming that 65 percent (the midpoint of the range) of all establishments reported to the Bureau of the Census. The total number of responses were then, inflated to reflect the estimated total number of dealers.

APPENDIX D REFERENCES

1. U.S. Department of Commerce, Bureau of the Census, 1972 Census of Manufacturers Ship and Boat Building; Transportation Equipments, p. 37c/24.
2. Special correspondence with National Association of Engine and Boat Manufacturers.
3. Private correspondence with Boating Industry Association.
4. 1972 Census of Manufacturers, p. 37c/16.
5. U.S. Department of Commerce, Bureau of the Census, 1972 Census of Retail Trade, Establishment and Firm Size, p. 1/17.
6. National Association of Engine and Boat Manufactures, Marinas: Costs/Revenues - 1974.
7. Data on capital expenditures are from U.S. Department of Commerce, Bureau of the Census, 1972 Census of Retail Trade, Capital Expenditures, Fixed Assets, and Rental Payments, p. 2/6. Sales data required for computing the ratio are from 1972 Census of Retail Trade, U.S. Summary, p. 7.
8. National Association of Engine and Boat Manufacturers, Recreational Boating and the Fuel Shortage: Position Paper.
9. 1972 Census of Retail Trade, U.S. Summary, pp. 9, 31.

APPENDIX E

ECONOMIC IMPACTS RELATED TO MARINAS/BOAT YARDS

E.0 ECONOMIC IMPACTS RELATED TO MARINAS/BOAT YARDS

E.1 Summary of Impacts

In 1972 gross revenues of coastal marinas/boat yards were an estimated \$450 million. About \$203 million are attributable to expenditures by marine recreational fishermen. The economic impacts associated with these expenditures are summarized in Exhibit E-1. Value added, employment, wages and salaries and annual capital expenditures totalled an estimated \$180 million, 14.3 thousand person-years, \$130 million, and \$14.4 million respectively. Impacts attributable to saltwater angling were an estimated \$81 million in value added, 6.4 thousand person-years of employment, \$59 million wages and salaries, and \$6 million in annual capital expenditures.

Exhibit E-1

Summary of Impacts Related to Marinas/Boat Yards
1972

Number of Establishments [*]	2800
Sales (millions of dollars)	
Total ^{**}	\$ 450
Marine Recreational Fishing	203
Value Added (millions of dollars)	
Total ^{**}	\$ 180
Marine Recreational Fishing	81
Employment (person-years)	
Total ^{**}	14,300
Marine Recreational Fishing	6,400
Wages and Salaries	
Total ^{**}	\$ 130
Marine Recreational Fishing	59
Annual Capital Expenditures	
Total ^{**}	\$ 14.4
Marine Recreational Fishing	6

* Represents total number of coastal marinas and boat yards.

** Represents total impacts associated with all coastal marinas.

E.2 General Approach

To obtain estimates of the economic impacts from marinas/boat yards related to saltwater sportfishing the following procedure was used:

- o The total number of coastal marinas/boat yards was estimated.
- o The gross revenues, value added, employment, and wages and salaries characteristics of a "typical" marina/boat yard were estimated.
- o The gross revenues, value added, employment, and wages and salaries related to all marinas/boat yards were estimated from the foregoing.
- o Annual capital expenditures of all marinas/boat yards were estimated based on estimates of expansion of facilities and typical construction costs.
- o The economic impacts related to marinas/boat yards attributable to saltwater sportfishing were estimated based on the amount of time boats are used for fishing.

In general marinas are considered to be establishments that provide summer berthing and related waterfront services. Boat yards on the other hand typically provide repair, storage, launching and hauling services. Many facilities, however, provide all or a combination of services of both boat yards and marinas so that it is difficult to distinguish between them. Additionally, many marinas and boat yards sell boats and engines and can be considered retail dealers of these items. Thus, marinas/boat yards cannot be easily defined using specific groupings of services. Instead, the following criteria were applied in estimating the population of marinas/boat yards for use in this research:

- o Establishments that are located on saltwater frontage.
- o Establishments that provide berthing, storage or repairs to hulls and/or motors among the mix of services offered at the facility.

The specific procedures for determining estimates of gross revenues and associated impacts were highly dependent on the sources of available data. In all, eight studies on marinas/boat yards were located that provided economic data.

Only one study was national in scope. It was conducted by the National Association of Engine and Boat Manufacturers (NAEBM). This study provides a breakdown of revenues and costs for 75 establishments (31 marinas, 7 boat yards, and 37 combined marina/boat yards). The study was conducted in 1974.¹

The remaining seven studies all focus on the marina/boat yard industries of particular states and were conducted in 1972. They include studies of marinas/boat yards in Maine, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, and Texas.² Like the NAEBM study, several of the state studies include businesses on freshwater and saltwater frontage (i.e., studies of Maine, New Hampshire and Massachusetts). An additional difficulty with this body of research is the strong northeastern bias of the data.

Other things being equal one would expect the volume of business of marinas/boat yards to be affected by the length of the boating season. New England's shorter season relative to most other coastal areas of the nation would most likely result in a lower average sales volume per establishment than marina/boat yards in other areas. The specific use of the studies is described in the detailed discussion of the impact estimates presented below. The basic procedure for estimating the total economic impacts of marina/boat yards consisted of multiplying the estimated impacts of a typical marina/boat yard times estimates of the total number of coastal marinas.

E.3 Estimating the Number Establishments

It has been estimated that there are a total of 4,600 marinas and boat yards in all of the United States.³ An estimate of 2,800 marinas/boat yards on saltwater frontage was arrived at by compiling lists of establishments either by state or by region and counting the facilities that fit the definition of marina/boat yard described above.

Three sources were used in preparing the estimate. Privately published boating guides were the primary source. The Boating Almanac provided a comprehensive listing of facilities on salt water locations for the east coast from Maine to North Carolina.⁴ It provides an illustration of the locations as well as descriptions of the services offered by the establishments listed. The Boating Almanac was used in the marina industry study of Massachusetts conducted by the Massachusetts Agricultural Experiment Station. There it was determined that only 13 out of 222 marinas identified in that state (6 percent) were not listed in the publication.⁵ The Boating Almanac was also recommended by staff members of the Virginia Institute of Marine Science and the Army Corps of Engineers, who have used it successfully in their own field research.

A similar publication, the Waterway Guide 1976 was used to estimate the number of establishments in the Gulf region.⁶ It, too, provides descriptions of location and services offered. Several individuals contacted who have used it in field research believe it to be somewhat less complete than the Boating Almanac. It is, however, the only publication for that region which includes the necessary descriptive data. Similarly, The Sea Boating Almanac was used to supplement other data sources for the Pacific Coast.⁷

A second source of listings was those compiled by state agencies either for their own research or for use in promoting tourism. With the exception of California and Washington, the lists that were obtained did not include information on services and facilities provided.⁸ Thus they were not as useful as the boating guides in determining whether specific establishments fit the definition of marina/boat yard used here. Third, local Marine Dealer Associations provided some information, but it, too, suffered from a lack of detail on service offerings.

The available marina/boat yard listings were, however, all recent publications. They, therefore, included some establishments that did not exist in 1972 and excluded some establishments that have since gone out of business. The total number of marinas is, however, expanding slowly, primarily because of the lack of suitable undeveloped sites. In addition the financial environment has discouraged new development. The increase in the number of environmental factors that must now be considered also hampers development. Less than 3 percent of the marinas/boat yards sampled in a Massachusetts study were newly opened between 1971 and 1973.⁹ Likewise in New York only five out of 160 establishments sampled were newly opened from 1967 to 1972.¹⁰

On the Texas Gulf Coast there have been no new marinas built since 1966.¹¹ Thus, error due to inclusion of facilities built after 1972, if the studies cited above are a reasonable indication, is apt to be about one percent per year or three percent in total.

On the other hand, the listings used may have excluded establishments that have gone out of business since 1972 resulting in a change in land use on those sites. For example, a study of marinas in New York State showed that approximately one percent of the facilities included in the sample had gone out of business within the year previous to the survey.¹² Assuming an average loss of one percent per year of established marinas/boat yards, about three percent of all establishments operating in 1972 were not open in 1975. Thus, error in the total estimate of 2,800 establishments in 1972 arising from inclusion of new businesses and exclusion of establishments that did operate in 1972 is assumed to be relatively minor.

The largest source of error in this estimate of the coastal marina/boat yard population is from incomplete listings. As stated above, the error in the Boating Almanac which covers most of the Atlantic Coast has been estimated to be six percent. The listings used for the Gulf and Pacific Coast are somewhat less accurate. Thus the initial count of about 2,600 establishments was adjusted upward to account for an assumed eight percent error introduced by incomplete listings. The resulting estimate used for this analysis is therefore 2,800 marinas/boat yards.

E.4 Estimating An Impact Profile For A Typical Marina/Boat Yard

Exhibit E-2 presents a profile of economic impacts of a typical marina/boat yard. The discussion below describes how these estimates were made.

Exhibit E-2

Economic Impact Profile of a Typical Marina

Gross Revenues	\$ 159,000
Value Added	65,000
Employment	5.1 person years
Wages and Salaries	48,000

E.4.1 Estimating Average Gross Revenues Per Firm

The process of determining an estimate for the gross revenues of coastal marinas/boat yards in the U.S. involved a series of steps to arrive at a reasonable value for the average revenues per firm.

First, the total annual gross revenues presented in each marina/boat yard study was converted into an average annual revenue per establishment for 1972. As Exhibit E-3 shows, the average revenues for firms as determined through state wide research was \$219,000, ranging from \$155,300 in Rhode Island to about \$327,00 in Texas. In comparison the national sample in the NEABM study shows an average of \$360,770 per firm.

These estimates, however, represent revenues from all goods and services provided by the establishments including sales of boats and boat motors. (as explained above the impacts associated with these sales are assessed separately and are presented in Appendices B and C). An adjustment of these estimates was made to subtract out all revenues received from the sale of boats and boat motors. This adjustment is also shown in Exhibit E-3.

Six of the studies presented enough detail on sources of revenue to permit the calculation of the adjusted gross revenues. The resulting weighted mean value of revenues per establishment in 1972 was \$133,000 for studies with statewide samples and \$159,000 for the one national study.

Exhibit E-3

Mean Gross Revenues of Marina/Boat Yards in 1972

<u>State Studies</u>	<u>Sample Size</u>	<u>Total No. of Marinas</u>	<u>Total Gross Revenue</u>	<u>Mean Gross Revenue</u>	<u>Adjusted Mean Gross Revenue</u>
New York	75	301	\$ 17,100,000	\$ 228,000	*
Rhode Island	69	88	10,716,600	155,313	\$ 98,389
Massachusetts	119	222	27,560,785	231,603	172,146
Connecticut	86	170	18,082,000	187,000	123,000
New Hampshire	45	45	11,202,070	248,935	115,335
Maine	42	125	7,436,460	177,058	109,610
Texas	88	88	28,800,000	327,272	*
Weighted Average				\$ 219,000	\$ 133,000
<u>National Study</u>					
NAEBM	75	4,600	\$ 27,057,928	\$ 360,800	\$ 159,000

* Data insufficient to adjust for sales of boats and motors.

The national estimate of \$159,000 per establishment was determined from several pieces of evidence. First, from the NAEBM data it was estimated that establishments grossed \$420,000 for all goods and services sold, and \$184,000 for goods and services sold excluding boat and motor sales in 1974. Boat fuel consumption for the years 1972 to 1974 was examined as an indicator of boating activity for those years. From U.S. Department of Transportation estimates it was found that marine fuel consumption for recreational boats was only 1.5 percent higher in 1974 than in 1972.¹³ Assuming that marina revenues are positively correlated with boating activity the fuel consumption data imply no significant change in the revenues of marinas/boat yards. The 1974 data were then deflated to 1972 dollars using price deflator indices for services resulting in the estimate of \$159,000 per establishment.

It is reasonable to assume that because of the shorter boating season revenues of New England marinas/boat yards should be somewhat less than the revenues of establishments in the rest of the country. While revenues may also depend on the volume of business per unit of time, an indicator of intensity of facility use could not be estimated because of insufficient data. The initial assumption points to the choice of \$159,000 in gross revenues per establishment as the better estimate of national activity.

E.4.2 Estimating Value Added Per Establishment

From the cost and revenue data of the NAEBM study it is estimated that 41 percent of the gross revenue (i.e., sales) of marinas/boat yards (excluding boat and motor sales) or \$65,000 per establishment represents value added. That estimate was determined by summing data on the costs of labor, indirect taxes, payments to management, insurance, interest on loans, and advertising and expressing the results as a percent of gross revenues.

E.4.3 Estimating Employment Per Establishment

Six of the published studies (including studies of Maine, Massachusetts, New York, New Hampshire, Rhode Island and Texas) provided sufficient data on full-time and part-time employment year-round at marinas/boat yards to compute a weighted average for employment per establishment.* The average employment per establishment in the studies ranges from 4.1 to 7 person-years. The weighted average is 6.1 person-years per establishment.

This average represents all full-time and part-time employment for all activities in the marina/boat (e.g., yard, slip rental, equipment sales, etc.). As explained above the estimates here exclude impacts resulting from the sales of boats and engines. Thus the estimate had to be reduced

* A part-time employee unit was assumed to be one-half of a labor unit.

by an amount attributable to those sales.* The resulting figure for average employment per establishment is 5.1 person-years.

E.4.4 Estimating Wages and Salaries

According to cost and revenue data included in the NAEBM study wages and salaries related to employment other than that associated with the sale of boats and boat motors amounts to about 30 percent of total revenues (also excluding boat and motor revenues). Thus labor costs per marina/boat yard are estimated at 30 percent of \$159,000, or \$48,000.

* Eliminating employment due to boat and motor sales was accomplished using the following technique. It was assumed that,

$$a = \frac{e_o}{e_t} = \frac{w_o}{w_t}$$

Where e_o = employment other than that associates with boat and motor sales

e_t = total employment

w_o = wages and salaries other than those associated with the sales of boat and boat motors

w_t = total wages and salaries

Then $e_o = a(e_t)$

From the study conducted by NEABM it was determined that

$$a = \frac{w_o}{w_t} = \frac{4,297,838}{5,112,478} = .84$$

Thus $e_o = .84(6.1)$
 $= 5.1$

E.4.5 Estimating Annual Capital Expenditures

The estimate of total annual capital expenditures was determined by separately computing estimates of capital invested in new marinas/boat yards and capital invested in expansion in berthing capacity of existing facilities. No data were available on replacement of structures such as restaurants, dry storage, floor space for boating supplies, or fuel pumps at existing marina/boat yard sites. As a result this estimate may be somewhat low.

As explained above (see section E-3.1) the number of marinas is expanding at about one percent annually. Thus in 1972 about 28 new marinas (one percent of 2,800) were built on saltwater frontage. Assuming a berthing capacity of 100 boats capital costs of a new marina have been estimated at 175,300 in 1972 by the Bureau of Outdoor Recreation.¹⁵ Therefore, capital expenditures for new facilities amounted to an estimated \$4.9 million in 1972.

The estimated capital expenditures for expansion of berthing capacity in existing marinas/boat yards was \$9.5 million in 1972. This estimate was arrived at by multiplying the estimated total number of additional slips by the cost per slip. An estimate of average increase in berthing capacity per establishment was determined from data on marina/boat yards in Rhode Island, New Hampshire and New York. Average number of berths added to existing facilities in those states was 4.0, 3.5, and 2.6.* Assuming an average of 3.5 additional spaces per establishment for the nation, an estimated 9,500 new berths were built in 1972. Costs per berth ranged from \$500 to \$1,500 or on average about \$1,000 in 1972, according to several marine consultants contacted, depending on the type of berth and the site.

In total, then, capital expenditures for marinas/boat yards were an estimated \$14.4 million in 1972.

* These averages are all for Northeastern states and may exhibit a regional bias. However, no data are available that will permit the determination of the size or the direction of the bias.

E.5 Determining the Portion of Economic Activity From Marinas/Boat Yards Attributable to Saltwater Activity

No secondary source of data for the nation describing the expenditures patterns of boaters at marinas/boat yards which correlates expenditures with type of boating activity was uncovered during the course of this research. However, there are several pieces of evidence that suggest that expenditures of fisherman at marinas/boat yards account for about 45 percent of all expenditures at marinas/boat yards.

While no national data source was available, a special report on boaters in Dade County, Florida was obtained from the School of Marine and Atmospheric Science at the University of Miami.¹⁶ The report includes results from a 1975-1976 survey of expenditures (e.g., costs of trip, supplies, fuel, and maintenance) by boaters at marinas. Also the estimated number of boating trips and expenditures per trip are presented for fishing and non-fishing activities. According to the results of the survey (sample size 835), 43 percent of the expenditures were associated with saltwater fishing activity. The report also includes results of a survey of 4,275 boaters concerning their boating activity. The results show that 49 percent of all boating trips in Dade County were made for the purposes of saltwater fishing.

From the data it can be inferred that expenditures by fisherman as a percent of expenditures by all boaters are highly correlated with fishing activity of boaters as a percent of all boating activity. That is, while the expense for a particular item may vary by type of boating activity (e.g., water skiing may require more fuel than fishing, or unlike other activities fishing requires outlays for bait), in the aggregate the percent of total expenditures by boaters associating with fishing activity may be approximated by the percent of time boats are used for fishing vis-a-vis other boating activities.

According to a study conducted by the U.S. Coast Guard, fishing activity¹⁷ from boats accounts for 46.5 percent of all boating activity in the U.S. However, this estimate includes freshwater and saltwater boating. The data from Dade County when compared with Coast Guard estimates suggest that boating time spent fishing in saltwater does not vary significantly from boating time spent fishing in all waters. Indeed, the ratios from both studies of time spent fishing from boats to all boating time are conspicuously close in magnitude. Additionally, the studies provide at least a preliminary indication that the percent of total boating activity devoted to fishing is relatively stable over short time intervals. (The Coast Guard study was conducted in 1973 and the Dade County data were collected during 1975 and 1976.)

It is, therefore, assumed that the Coast Guard's estimate that 46.5 percent of all boating time is spent fishing is a reasonable approximation of the amount of time boaters spent saltwater angling in 1972. Since data from

Dade County showed the percent of boating expenditures accounted for by fishermen interviewed from marinas is somewhat less than the percent of time all boaters at marinas spent fishing, it was assumed that 45 percent of all expenditures at marinas/boat yards is attributable to saltwater angling.

The economic impacts related to marinas/boat yards that are attributable to marine recreational fishing have thus been estimated here by computing 45 percent of the estimated total value added, employment, wages and salaries, and annual capital expenditures impacts. The results are shown in Exhibit E-1.

Appendix E References

- ¹ National Association of Engine and Boat Manufacturers, "Marina Costs/Revenues Study - 1974".
- ² F. Richard King, Maine's Pleasure Boat Industry, Part 1: Marinas in Maine University of Maine at Orono, 1976. George W. Shaw and William F. Henry, New Hampshire Marina Industry Study, University of New Hampshire, 1974. David A. Storey, The Massachusetts Marina Boat Yard Industry 1972-1973, University of Massachusetts at Amherst, Agricultural Experiment Station, 1974. Raymond O.P. Farrish and Donald C. Pyne, Boating in Connecticut: The Connecticut Shore - Based Marina Industry, University of Connecticut, 1973. Robert Kelly and Niels Rorholm, An Analysis of the Rhode Island Marina Industry, University of Rhode Island Marine Technical Report 29, 1974. Dick Noden and Tommy Brown, The New York Commercial Marina and Boat Yard Industry, 1972 Cornell University, New York Sea Grant Institute, 1975. John Crompton and Robert Ditton, A Feasibility, Management and Economic Study of Marinas On the Texas Gulf Coast, Texas A & M University, Texas Agricultural Experiment Station, 1975.
- ³ The Statistical and Research Department of Boat and Motor Dealer (1975) identified 5950 marinas boat yards and yacht clubs with waterfront stations. The estimated breakdown is 4630 marinas and boat yards and 1320 yacht clubs.
- ⁴ Boating Almanac 1976, Vols. 1-4, Boating Almanac Co., Inc, Saverna Park Maryland.
- ⁵ David A. Storey, p. 53.
- ⁶ The Waterway Guide 1975, Southern Edition, Waterway Guide, Inc. Anapolis, Maryland, 1975.
- ⁷ Sea Boating Almanac, Sea Boating Almanac, Inc., Ventura California 1975.
- ⁸ Boating Facilities Guides, Southern, Central and Northern Areas, Department of Navigation and Ocean Development, State of California, 1974. Washington Boating Directory, Department of Commerce and Economic Development, Washington State (No. Date).
- ⁹ David A. Storey, p. 17.
- ¹⁰ Dick Noden and Tommy Brown, p. 19.
- ¹¹ John Crompton and Robert Ditton, p. 2.
- ¹² Dick Noden and Rommy Brown, p. 7.

Appendix E References
(cont.)

- 13 The Department of Transportation estimates marine fuel consumption annually in its publication, Highway Statistics.
- 14 To deflate revenues for 1972 dollars, price deflation indices from The Economic Report of the President, U.S. Government Printing Office, 1975, p. 252 were used.
- 15 United States Department of the Interior Bureau of Outdoor Recreation, "Appendix A, An Economic Analysis", Outdoor Recreation, A Legacy For America, p. III-40.
- 16 C. Bruce Austin and Linda D. Liefert, Recreational Boating in Dade County, A Special Report to Centaur Management Consultants, School of Marine and Atmospheric Science, Miami University, 1976.
- 17 Rolf M. Wolfsberg and Darryl A. Lang, Recreational Boating in the Continental United States in 1973, U.S. Coast Guard Office of Boating Safety, p. 93.

APPENDIX F

ECONOMIC IMPACTS RELATED TO
COMMERCIAL SPORTFISHING VESSELS

F.0 ECONOMIC IMPACTS RELATED TO COMMERCIAL SPORTFISHING VESSELS

F.1 Summary of Impacts

In 1972 there were an estimated 3,870 commercial sportfishing vessels operating in saltwater from U.S. shores. The estimated gross revenues of these vessels was \$94 million. Valued added in this industry amounted to an estimated \$56 million. This industry accounted for an estimated \$30 million in direct wages and salaries and 5,300 person-years of direct employment. Annual capital expenditures were an estimated \$7 million. Exhibit F-1 summarizes these impacts of this industry. Virtually all of the economic activity of this industry is associated with marine recreational fishing.

Exhibit F-1

Summary of Impacts Related to
Commercial Sportfishing Vessels
1972

Number of Boats	3,870
Total Sales (millions of dollars)	94
Value Added (millions of dollars)	56
Employment (person-years)	4,800
Wages and Salaries (millions of dollars)	30
Capital Expenditures (millions of dollars)	7*

* Includes only the costs of head boats. Charter boat capital costs are accounted for in (Appendix B) the analysis of boats.

F.2 General Approach

The following procedure was used to estimate the economic impacts associated with commercial sportfishing vessel activity.

- o From secondary sources estimates were made of the number of head boats and charter boats by region.
- o From secondary sources the total revenues were estimated using historical trends.
- o Employment and wages and salaries were estimated based on the typical characteristics of head boats and charter boats and regional variations in the length of the fishing season.
- o Value added was estimated based on secondary data of the cost and revenues of commercial sportfishing vessels.

This analysis of commercial sportfishing vessels includes those vessels that are commonly referred to as charter boats and head boats.* Charter boats are generally considered to be those boats that carry six or less passengers, and for which a fixed fee per trip is charged regardless of the total number of passengers. Usually, all fishing tackle and bait are provided, and the sailing schedule is somewhat flexible, governed by the type of fish and fishing methods expected to be encountered. In comparison, head boats are larger vessels charging a fixed price per passenger (thus the name "head" boat) per trip. Bait is generally provided by the vessel. Fishing tackle may be rented at an extra charge, but most passengers use their own tackle. These definitions are not strictly adhered to, however. In California for example there are a number of boats carrying more than 6 passengers which charge a fixed fee for a fishing trip and in Oregon there are 6 person boats which charge a per person fee. Because the employment and payroll characteristics of boats carry six or less passengers and those carrying more than six passengers are distinctly different, this analysis used a definition of a charter boat as a six-passenger vessel and a head boat as a vessel carrying more than six passengers.

* Also referred to as party boats, open boats, or drift boats.

F.3 Estimating the Number of Head Boats and Charter Boats Fishing
in Saltwater

A "best point estimate" of the number of charter and head boats operating in saltwater in 1972 was determined to be 3,870. This estimate breaks down into 2,251 charter boats and 1,619 head boats. These estimates are based on aggregating data for individual states collected through state and Federal agencies, universities, published research, and local charter/head boat associations. Exhibit F-2 shows the estimated number of charter boats and head boats by state.

Some of the data used for making these estimates were for different years ranging from 1971 to 1976. Estimates were normalized for the year 1972 based on regional trends. For example, in the Northeast and mid-Atlantic, the number of boats has been declining in recent years. The number of head boats in New Jersey dropped to 97 in 1975 from 220 in 1955, and the number of charter boats declined to 218 in 1975 from 335 in 1955.¹ However boats have gotten larger, and the carrying capacity has increased slightly. The 1972 estimate of the number of boats for New Jersey was derived by interpolation assuming a constant rate of change in the number of vessels. The Northwest, in contrast, has seen an increase in the number of boats according to researchers in universities there.²

The fleets of Washington and Oregon states were estimated to have been 425 and 258 vessels respectively in 1976. No data on the rate of growth in the fleet is available. It is assumed that the size of the fleets in 1972 were 400 in Washington and 225 in Oregon. The number of boats operating in California is well documented because of state registration requirements. There were 467 boats in 1972 and 371 boats in 1975.³

The total estimate of 3,870 vessels in 1972 is supported by a 1976 estimate of 4,172 vessels made by the Oregon State University Extension Services.* It, too, was derived by contacting knowledgeable individuals in each of the coastal states.

Two other national estimates were identified during the course of this research. A study conducted for the NMFS estimated the total number of commercial sport-fishing vessels at 2,496 in 1972.⁴ This study made use of techniques as follows. Through an examination of characteristics specified on Coast Guard inspection certificates which are required for vessels carrying seven or more passengers (i.e., head boats), 1,965 boats were identified as being likely to be commercial sportfishing boats.** However, the number of boats carrying six passengers or less (i.e., charter boats) was determined using an estimate of the ratio of "charter boats" to "party boats." This ratio was estimated based on a survey of a sample of 163 operators of commercial recreational vessels identified from association membership lists, advertising brochures, and telephone directories.

* The extension service estimate is preliminary and was made for the purposes of developing a sampling plan for a telephone survey. Also, this estimate does not include Hawaii, Alaska, and Guam.

** Note that this corresponds with the total of 1,619 head boats specified in the estimate given in Exhibit F-2.

Exhibit F-2

Estimated Number of Charter Boats and
Head Boat Fishing in Saltwater in 1972

<u>State</u>	<u>Number of Charter Boats</u> (6 or less passengers)	<u>Number of Head Boats</u> (7 or more passengers)	<u>Total</u>
Washington	*	460	400
Oregon	225	--	225
California	*	467	467
Alaska		15	15
Hawaii, Guam		50	50
Pacific	225	932	1,157
Texas	80	30	110
Louisiana	10	3	13
Mississippi	28	5	33
Alabama	30	5	35
Florida	550	200	750
Gulf	698	243	941
Georgia	10	5	15
South Carolina	37	13	50
North Carolina	210	14	224
South Atlantic	257	32	289
Virginia	120	20	140
Maryland	198	20	218
Delaware	59	16	75
New Jersey	235	114	349
New York	150	100	250
Mid-Atlantic	762	270	1,032
Connecticut	110	30	140
Rhode Island	34	11	45
Massachusetts	125	55	180
New Hampshire	14	16	30
Maine	26	30	57
New England	309	142	451
U.S., Total	2,251	1,619	3,870

* The distinction between head boats and charter boats does not hold for the Pacific Coast. For example, virtually all boats in California carry more than six passengers, but some charge a per head fee and others a flat fee per boat trip. In Oregon, there are a number of six passenger boats that charge a per person fee.

From the survey it was estimated that 68 percent of all commercial sportfishing vessels carry seven or more passengers.

There is strong reason to believe, however, that this sample was biased in favor of larger boats. From contacts with charter boat associations it was learned that a significant number of charter boat operators (6 passenger boats) do not depend entirely on sportfishing revenues for their livelihood and do not always aggressively advertise their boats. Larger boats, on the other hand, are more likely to be used in full-time operations and are more highly publicized. Thus it is likely that the sample may not adequately reflect the population of boats carrying six passengers or less, and thus underestimates the total population of boats.

In another case in 1976 the Coast Guard estimated that there were 4,530 commercial sportfishing vessels that carry seven or more passengers.⁵ This figure was derived using a computer sort of all boats licensed to carry passengers for hire. The number of commercial sportfishing boats was then estimated through subjectively evaluating vessel counts by ports to eliminate boats known to be operating in services other than commercial sportfishing (e.g., ferries, sightseeing boats, oil rig supply vessels). The Coast Guard's estimate is apparently too large. For example, the estimated number of vessels in the Eighth District (including the Coast of Texas, Louisiana and Alabama) is 625. But a recent on-site survey of all head boats on the Texas Coast conducted through Texas A&M University identified only 25 vessels.⁶ According to state officials there are less than 75 vessels (including charter boats and head boats) operating in coastal areas of Louisiana and Mississippi. Similarly, the Coast Guard estimates that there are 927 sportfishing boats in the Third District (including New York, New Jersey, and Delaware) carrying seven or more passengers. But recent estimates of the fleet size for each of these states from other sources totals indicates that the number must be less than 400 boats. According to a port by port inspection of the New Jersey coast there are only 114 head boats operating there (or 349 vessels including charter boats) and the number of vessels has been declining.⁷ Through a port inspection, the New York Department of Environmental Conservation determined that there are less than 250 vessels (including head boats and charter boats) operating in marine waters from New York shores.⁸ The number of boats has also declined in recent years. Recent research conducted at the University of Delaware identified only 16 head boats in operation from Delaware ports.⁹ It appears, therefore, that the Coast Guard estimate of 4,530 overestimated the number of these commercial sportfishing vessels.

F.4 Estimating Total Revenues of Commercial Sportfishing Vessels

To estimate the 1972 revenue of commercial sportfishing vessels operating in coastal waters historical data from the National Survey of Fishing and Hunting was used. This survey has been conducted every five years since 1955 by the Department of the Interior. It presents expenditures by saltwater fishermen in detail. However, it was not until 1970 that expenditures for charter and head boat fees were published as a separate category. In the 1955 survey they were included in a highly aggregated category, "other expenditures," which included everything except equipment and trip expenditures and licensing fees. In the surveys taken in 1960, 1965, and 1970 expenditures for charter boat and head boat trips were included in a category called "bait, guide fees and other trip expense." In estimating 1972 revenues, expenditures for this category for the last three surveys were used. It was assumed that historically the percent increase in charter boat and head boat fees were the same as the percent increase in expenditures for "bait, guide fees, and other trip expenses."

In 1960, 1965 and 1970 the estimated expenditures by saltwater fishermen for bait, guide fees and other trip expense were \$182,127,000; \$236,958,000; and \$374,396,000 respectively.¹⁰ These points were converted to constant (1970) dollars using a price index for recreation and reading services.¹¹ A curve was then estimated using an ordinary least squares approximation.* The approximation is shown in Exhibit F-3. In 1970 charter and head boat fees accounted for 22 percent of bait, guide fees and other trip expense. Assuming that this ratio remained constant, estimates of charter and head boat fees were made from extrapolations of the historical trends in expenditures for bait, guide fee, and other trip expense. Expressed in current dollars it is estimated that head and charter boat fees in 1972 and 1975 were \$94 million and \$122 million respectively.

As a check on these numbers, data from the study Determination of the Number of Commercial and Non-Commercial Recreational Boats in the U.S., Their Use, and Selected Characteristics were analyzed.¹² This study estimated total revenues of commercial saltwater sportfishing vessels in 1972 at \$85.9 million. However, this study is believed to have underestimated the number of charter boats carrying six persons or less (see Section F.3). Exhibit F-4 shows the breakdown of this estimate. The average annual gross revenue per vessel was determined by a survey of a sample of 163 commercial saltwater sportfishing vessels. If the difference between the total number of boats presented in Exhibit F-2 of 3,870 and the 2,496 in Exhibit F-4 were distributed in proportion between the less than 40 foot class and 40 to 65 foot class, the total revenue estimate in Exhibit F-4 would be increased to \$106.0 million. This would adjust for the suspected underestimation of charter boats carrying six persons or less assuming such boats were distributed in these two size classes. If the total number of boats suspected to have been underestimated were in the less than 40 foot size class, the estimate in Exhibit F-4 would be increased to \$95.0 million. The above analysis tends to corroborate the total revenue estimate for 1972 of \$94 million described earlier.

* The least squares approximation is, $Y = 228.2 + 13.8 X$.

Exhibit F-3

Estimated Commercial Sportfishing Vessel Fees
Based on Expenditures for "Bait, Guide Fees, and Other Trip Expenses"

Exhibit F-4

Alternative Estimate of Vessel Revenues

<u>Vessel Size/Class</u>	<u>Number of Vessels</u>	<u>Average Annual Gross Revenue (dollars)</u>	<u>Total Annual Gross Revenue (thousand dollars)</u>
Less than 40 feet	549	\$ 6,610	\$ 3,329
40 feet - 65 feet	1,747	17,211	30,068
Greater than 65 feet	200	260,891	52,178
Total	<u>2,496</u>		<u>\$85,875</u>

F.5 Estimating Employment and Wages and Salaries Related to Charter Boats and Head Boats

In 1972 the employment associated with the operation of commercial sport-fishing vessels is estimated to have been 5300 person-years. The estimated wages and salaries were \$34 million. Estimates of regional impacts are shown in Exhibit F-5. These estimates are based on the estimated average number of days spent fishing in each region, the typical manpower requirements for operating charter and head boats, the typical salaries and wages for the captain crew and office employees, and the estimated number of boats in each region.

Exhibit F-5 shows the average number of days fished by charter and head boats in each region. These estimates are based on a secondary data sources as well as contacts with knowledgeable people in each region. The estimates of days fished in New England are based on an unpublished survey of commercial sportfishing activity conducted by the Massachusetts Department of Fisheries Wildlife and Recreational Vehicles in 1975.¹³ Personal contacts with boat captains in Maine and Rhode Island confirmed that these were reasonable estimates for a typical season.

Estimates for the mid-Atlantic are based upon a detailed unpublished survey of trips made by boats leaving from New Jersey ports. The NMFS Laboratory at Sandy Hook conducted the research during 1975 and 1976.¹⁴ The rather high figure for the number of days fished by head boats in that region may be explained by the makeup of the large New Jersey fleet. Many head boats there are equipped to fish in cold weather. The dense population in the New York - New Jersey area provides a demand for fishing trips that begins in early spring and stretches to late December. On the average head boats in New Jersey fish over 175 days each year, but boats in Delaware, Maryland and Virginia for the most part fish from late May to October.¹⁵ The regional average was reduced to 125 to reflect this difference.

The average number of days fished by head boats in South Atlantic Region was determined from NMFS trip data gathered from 30 boats in the region during 1976.¹⁶ NMFS officials there believe that the number of days fished in that region does not vary greatly from year to year, and in general variation that does occur is associated with the weather. With no data available on charter boat fishing, it was assumed that days fished by charter boats followed the trends of other regions and were fewer in number than head boats. Average operation of 65 days per year was used to compute the employment, and wage and salary impacts of charter boats in the South Atlantic Region.

Estimates of days fished in the Gulf region were based on trip data provided by NMFS for boats on the Atlantic Coast,* and contacts with boat captains in the Florida Keys and Western Gulf area.

* The entire state of Florida is included in the Gulf region for this analysis.

Exhibit F-5

Charter Boats

<u>Region</u>	<u>Estimates No. of Boats</u>	<u>Estimates Days Fished</u>	<u>Employment* in Person Years</u>	<u>Salaries** and Wages</u>
New England	309	70	185	1.3
Mid Atlantic	762	60	380	2.7
South Atlantic	257	65	130	1.0
Gulf	698	110	630	4.6
Pacific	<u>225</u>	75	<u>135</u>	<u>1.0</u>
Subtotal	2,251		1,460	10.6

Head Boats

New England	142	90	205	1.2
Mid Atlantic	270	125	540	3.2
South Atlantic	32	85	45	0.3
Gulf	243	150	585	3.5
Pacific	<u>932</u>	130	<u>1,940</u>	<u>11.5</u>
Subtotal	1,619		3,315	19.7
TOTAL	3,870		4,775	30.2

* For head boats assume 1 captain, 2 mates and 1 office employee per boat.
For charter boats assume 1 captain and 1 mate per boat.

** For head boats assume wages are \$95 per day per boat, and for charter boats assume wages are \$60 per day per boat.

The Pacific Region estimates are based on discussions with officers of charter and head boat associations in Washington and California and on recent research conducted by the Oregon State University Extension Service. Boats in Hawaii were assumed to operate like those in Southern California, and Alaskan boats were assumed to fish as many days as boats in Washington.

Employment estimates were determined for head boats and charter boats in each region using the following equation:

$$\text{Employment}_{i,j} = \left(\frac{1}{250}\right) (d_{i,j}) \times c_{i,j} \times b_{i,j}$$

Where $d_{i,j}$ = number of days fished in region i by boat type j
(it is assumed that 250 days equal one year of employment)

$c_{i,j}$ = size of the crew for boat type j in region i

$b_{i,j}$ = the number of boats of type j in region i

From discussions with boat captains in Maine, Massachusetts, Rhode Island, and Florida and from research conducted in Texas and Oregon it was learned that charter boats (i.e., boats carrying 6 or fewer passengers) almost always operate with a captain and one mate and that trip reservations are usually made directly through the captain. Therefore, to estimate employment impacts of charter boat fishing it was assumed that two persons per boat were employed for each fishing trip. In similar discussions with head boat operators in Maine, Massachusetts, Rhode Island, Florida, California and Washington it was learned that a head boat is generally manned by a captain and a crew of one to five mates depending on the size of the boat and the length of the fishing trip. Also, there is usually an office employee who sells tickets for the trip from an office at the dock. In this analysis employment related to head boats is based upon the employment of a captain, two mates and an office employee for each boat. Employment estimates for each region are shown in Exhibit F-5.

Estimates of wages and salaries were made using the following equation:

$$\text{Wages and Salaries} = d_{i,j} \times w_j \times b_{i,j}$$

Where $d_{i,j}$ = the number of days fished by boat type j in region i

w_j = the wages paid per boat for the captain crew, and office employees for boat type j in region

$b_{i,j}$ = number of boats of type j in region i

According to boat operators contacted charter boats the captain and mate are generally paid a daily wage. For head boats the captain may be paid by salary or daily wage, but the crew and other employees are paid by the day. In 1972 a captain's daily wages ranged from about \$30 to \$55 per day and wage rates for crew members ranged from about \$12 to \$35. This analysis assumes that in 1972 the captain's wage is \$40/day, a mate's wage is \$20/day. Thus wages of charter boats and head boats were assumed to be \$60/day and \$95/day respectively in 1972.

Using these estimates total wages and salaries are estimated to have been \$30.2 million in 1972, on about 32 percent of the estimated gross revenues for that year. (Regional estimates are shown in Exhibit F-4.) As a means of cross-validating this estimate, wage and salary data were compared to total revenues of seven head boats surveyed in the Northwestern Gulf coast. They ranged in length from 65 to 85ft. For these boats wages and salaries amounted 21 percent of gross revenues.¹⁸ It can be expected that for large boats such as these, wages and salaries should be a smaller percentage of gross revenues than for boats of shorter length because of increased passenger capacity. Thus it can reasonably be expected that on average the wages and salaries as a percent of revenues would be somewhat more than 21 percent. This comparison, therefore, supports the above estimate of total wages and salaries paid to employees of charter and head boats in the U.S.

F.6 Estimating Value Added

To estimate value added associated with commercial sportfishing vessels data on the revenues and costs of seven head boats surveyed in the Northwest Gulf region were used. According to the data presented in the study the components of value added which include wages and salaries, rent, interest, depreciation, profits and insurance account for 60 percent of gross revenues.¹⁹ Similar costs are incurred by charter boats. Without any data suggesting how these costs vary by region it is assumed that the ratio of value added to sales is the same for both head boats and charter boats in all regions. Using this ratio estimated value added in 1972 was \$59.8 million.

Estimating Capital Expenditures

In 1972 it is estimated that capital expenditures for head boats totalled \$7 million. Expenditures for charter boats are accounted for in Appendix B. Expenditures for equipment such as fishing tackle or electronic gear (radar, radios, etc.) have been excluded because no data could be located that provide an indication of annual expenditures for replacement or new purchase of these items.

The above estimate was determined by first estimating the number of head boats entering the fleet in 1972. The result was then multiplied by the typical costs of a new boat.

The average number of boats entering the fleet was estimated by assuming that the population of head boats (and charter boats) grows by the same percent as the population of documented passenger vessels (which include head boats).

Using historical data on the number of documented passenger vessels, a curve was fitted using an ordinary least squares approximation. (See Exhibit F-6.) Accordingly it is estimated that the population of documented passenger vessels grew about 2.7 percent in 1972. Assuming the same rate of growth of head boats, then about 44 head boats entered the national fleet in 1972.

Several head boat manufacturers were contacted by telephone with the assistance of the National Party Boat Owners Alliance. Costs of building head boats vary greatly depending on length, the type of hull material, and the region in which the boats are constructed. For example, a fiberglass hull boat 60 feet in length built in one Florida yard in 1976 cost about \$2,300 per foot. In a New England yard a aluminum and steel boat 75 feet long cost about \$5,300 per foot in 1976. According to ship builders contacted costs have increased by 25 to 50 percent since 1972.

To estimate the value of boats entering in the fleet during 1972 it is assumed that boats averaged 65 feet in length and cost \$2,500 per foot to construct. Thus total investment is estimated to have been about \$7 million.

Exhibit F-6

No. of Documented Passenger Vessels

<u>Year</u>	<u>No. of Vessels</u>
1970	6086
1971	6165
1972	6298
1973	6411
1974	6679
1975	6806
1976	7048

Appendix F References

- ¹ Unpublished research provided by the NMFS Laboratory at Sandy Hook, New Jersey.
- ² This general trend has been observed by Professor J. Crutchfield at the University of Washington and John Ball at the Oregon State University Extension Service.
- ³ Resources Agency of California, Department of Fish and Game, "The Report of the California Party Boat Fleet," Long Beach, annual. (mimeographed)
- ⁴ Kenneth M. Bromberg, Determination of the Number of Commercial and Non-Commercial Recreational Boats in the U.S., Their Use, and Selected Characteristics, Report for the National Marine Fisheries Service, Washington, D.C., December 28, 1973. (U.S. Department of Commerce: NOAA, 1973), p.C-51.
- ⁵ From a special report submitted by W. J. Ecker, Commander, U.S. Coast Guard to James Murdock of NMFS in a memorandum dated May 7, 1976.
- ⁶ Boat count provided by Prof. Robert Ditton of Texas A & M University from current research to be published.
- ⁷ Boat count provided by Bruce Freeman of NMFS Laboratory at Sandy Hook, New Jersey from unpublished research.
- ⁸ From unpublished research by the Department of Environmental Conservation at Stoneybrook.
- ⁹ Ronal W. Smith, Sport Fishing in Western Delaware Bay: Assessment of Critical Areas (Newark, Delaware: University of Delaware, College of Marine Studies, 1975), p. 16.
- ¹⁰ U.S. Department of the Interior, 1970 National Survey of Fishing and Hunting, (Washington, D.C.: U.S. Government Printing Office, 1972). p. 46. Expenditures for 1960 and 1965 are on page 44 of the publications for each of those years.
- ¹¹ From the U.S. Department of Commerce Bureau of Economic Analysis, Survey of Current Business.
- ¹² Bromberg, p. C-52.
- ¹³ Unpublished research by Russel H. Iwanowicz, Cat Cove Laboratory, Salem, Massachusetts, 1976.

Appendix F References
(cont.)

- ¹⁴ Data provided by Bruce Freeman.
- ¹⁵ For example, see Ronal W. Smith, p. 17.
- ¹⁶ Unpublished data provided by Robert Dickson and Gene Huntsman of the NMFS Laboratory at Beaufort, North Carolina.
- ¹⁷ Description of the general activity were provided by W. A. Nott of the Sport Fishing Association of California, Long Beach, California and Edward Manary of the Washington State Commercial Passenger Fishing Vessel Association, Westport, Washington.
- ¹⁸ Fred J. Prochaska and James C. Cato, "Northwestern Florida Gulf Coast Red Snapper - Grouper Party Boat Operations, An Economic Analysis, 1974", A University of Florida Extension Service Bulletin, 1975, p. 4.
- ¹⁹ Prochaska and Cato, p. 4.

APPENDIX G

ECONOMIC IMPACTS RELATED TO BAIT

G.0 ECONOMIC IMPACTS RELATED TO BAIT

G.1 Summary of Impacts

The estimated total value of sales of natural bait in 1972 were \$650 million. Bait sales associated with saltwater sportfishing were an estimated \$165 million. The impacts associated with these sales are summarized in Exhibit G-1. Total value added is estimated to have been \$130 million. Employment and wages and salaries related to total bait sales were 9,660 person-years and \$60 million respectively. Total capital expenditures impacts were about five million. In contrast estimated impacts associated with marine recreational fishing were \$33 million in value added, 2,450 person-years of employment, \$15 million in wages and salaries, and one million in annual capital expenditures.

Exhibit G-1

Estimated Economic Impacts Associated With Bait 1972

Number of Establishments [*]	5,000
Sales (millions of dollars)	
Total ^{**}	650
Marine Recreational Fishing	165
Value Added (millions of dollars)	
Total	130
Marine Recreational Fishing	33
Employment (person-years)	
Total	9,660
Marine Recreational Fishing	2,450
Wages and Salaries (millions of dollars)	
Total	60
Marine Recreational Fishing	15
Capital Expenditures (millions of dollars)	
Total	5
Marine Recreational Fishing	1

^{*} Estimate of total number of establishments that sell bait for use in saltwater as a primary activity.

^{**} Refers to total natural bait sales in U.S.

G.2 Estimating Impacts Associated With Bait Sales

To estimate the impacts associated with bait sales the following procedure was used:

- o The value of sales of natural bait was estimated in total and for saltwater fishing based on an historical trend extrapolation of consumer expenditures for bait.
- o Economic impact ratios of value added to sales, sales to employment, wages and salaries to sales were derived from data on retail establishments with similar operating characteristics as bait shops.
- o The economic impact ratios were applied to the estimated value of sales to determine the value added, employment and wages and salaries impacts.
- o Capital expenditures were determined based on estimates of the number of bait shops and the average capital outlays per bait outlet.

In this analysis bait is defined as all natural bait including that which is sold live or frozen. Artificial baits are included in the analysis of fishing tackle (see Appendix A).

G.3 Estimating the Value of Sales of Natural Bait

The value of bait sales both in total and for saltwater sportfishing was estimated using an historical trend analysis based on data from the National Survey of Fishing and Hunting. This survey has been conducted every five years since 1955 by the Department of the Interior. It includes separate estimates of expenditures by freshwater and saltwater fishermen for the goods and services consumed in recreational fishing. It was not until the 1970 survey that expenditures for bait were estimated separately. In the 1960 and 1965 surveys these expenditures were included in a category named "Bait, Guide Fees, and Other Trip Expense". "Other Trip Expense", included head and charter fees, boat fuel, ice, rental equipment, magazines, and club dues. In the 1955 survey trip expenditure categories were much more aggregated.

Data from the 1960, 1965 and 1970 surveys for the items included in the category "Bait, Guide Fees, and Other Trip Expense" were used to plot the historical growth in these consumer expenditures. These data were converted to constant (1970) dollars using a consumer price index for recreation and then a curve was estimated using an ordinary least squares approximation. Separate curves were estimated for expenditures of all fishermen and expenditures of saltwater fishermen. The results are presented graphically in Exhibit G-2. As the exhibit shows the real rate of growth is relatively constant.

Extrapolating to 1972, estimated expenditures (in current dollars) for bait guide fees, and other trip expense by all fishermen were \$1,086 million.* For saltwater fishermen these expenditures were \$426 million. In 1970 the ratio for all fishermen and for saltwater fishermen of bait expenditures to expenditures for bait, guide fees and other trip expense was 0.60 and 0.39 respectively.¹ Assuming this ratio remains relatively constant over short time intervals, bait expenditures by all fishermen amounted to \$650 million in 1972. Similarly, bait expenditures in 1972 by saltwater fishermen were an estimated \$165 million.

* The least square approximation for bait guide fees and other trip expense are:

$$\text{ALL FISHERMEN:} \quad y = 771.2 + 19.3x$$

$$\text{SALTWATER FISHERMEN:} \quad y = 228.1 + 13.8x$$

Exhibit G-2

Estimated Bait Sales

G.4 Estimating Employment, Wages and Salaries, and Value Added Related to Bait Sales

To estimate the employment, wages and salaries and value added, bait wholesale and retail dealers and knowledgeable individuals in state agencies and universities were interviewed in each region to learn the general characteristics of retail bait operations. Then economic impact ratios were determined for retail enterprises with similar characteristics. These ratios are all functions of sales. To obtain impact estimates they were applied to the estimated value of bait sales.

From the interviews it was learned, as was expected, that bait outlets are generally, owner-operated enterprises. Natural bait is sold either live or frozen from businesses such as marinas, grocery stores, and gasoline service stations as well as bait and tackle shops and road side bait stands. The greatest volume of bait is sold through bait stands and bait and tackle shops. For example, the gross revenues for bait sales alone of ten bait stands and bait and tackle shops interviewed in New England ranged from \$12,000 to \$69,000 in 1975, with most enterprises taking in between \$25,000 and \$50,000. (The fishing season generally runs from April to October.) In contrast five marinas in that region reported that their sales were less than \$5,000 and that bait is sold merely as an extra service for the customers and not as major source of income. Second, the interviews revealed that the basic equipment required to operate a bait outlet does not vary by region even though the type of bait sold may vary considerably. In general all that is needed is a holding tank with an aeration system, a refrigerator, and a freezer. This equipment is often purchased second hand, usually lasts for three to five years, and generally costs the bait dealer no more than \$1,000. Third, bait stands and bait and tackle shops usually employ between one and three persons. In many instances employees are members of the shop owner's family.

From these characteristics impact ratios for employment and wages and salaries were determined from data on fish markets with three or less employees, a type of operation similar to bait shops. These fish stores are often family run businesses, operating from a small store front or a dockside stand. They sell similar goods as bait stands, both fresh and frozen seafood. Their capital requirements, at least in terms of the type of equipment are similar to bait stands. And, of course, the employment patterns are similar. Using data for these fish stores ratios of sales to employment and wages and salaries to sales were calculated.² The ratio of sales to employment is \$67,300 per person-year of employment.* The ratio of wages and salaries to sales is 0.091. Data on the components of value added were available only for a more aggregated grouping. As a result the value added to sales ratio is determined from data on all retail proprietorships.³ Its value is 0.20.

* This estimate has been adjusted to reflect "person-years" based on Bureau of Labor Statistics data of the average weekly hours worked for all food store employees.

Using these ratios economic impact estimates were determined. To obtain estimates of the wages and salaries and value added the ratios were multiplied with the estimates for the value of retail bait sales. The employment estimate was determined by dividing the sales to employment ratio into the bait sales estimates.

G.5 Estimating the Number of Establishments

A gross estimate of the number of retail bait dealers was determined by dividing an estimate of the average gross revenues per bait dealer into the estimated total bait sales. As stated in section G.4 in personal interviews with ten bait dealers in New England it was revealed that gross revenues in 1975 ranged from \$12,000 per year to \$69,000 for the establishments visited, with most enterprises having total bait receipts of \$25,000 to \$50,000. This range may or may not be typical of the rest of the country. New England has a shorter fishing season than most other regions in the country. This suggests that average bait sales might be less than in other areas of the country. If the average sales are \$25,000, then given that bait sales totalled \$165 million in 1972, then there were an estimated 6,600 bait dealers selling saltwater bait. Using an figure of \$50,000 per year, the number of bait dealers is estimated at 3,300. As a point estimate it is assumed that the number of bait shops is 5,000, the midpoint of the range. Assuming the same average revenue for all saltwater and freshwater bait dealers a total estimate of 19,500 bait establishments is obtained using the same method.

Two other methods of obtaining an estimate for the number of dealers were attempted in an effort to substantiate the above result. First, state agencies were contacted to determine whether bait dealers are required to register with the state. Only five states have such a requirement. In 1975 the number of dealers in Texas was 420; in Massachusetts, 111; in Georgia, 89; in Mississippi, 40; and in South Carolina, 110. According to state officials there are likely to be many unregistered dealers, but no individual dealer operating illegally is likely to sell bait in any large quantities.

A second attempt was made by contacting wholesale dealers in each region and asking them to estimate the number of retail outlets in their area. This method was apparently successful in New England, but it did not work for other regions. The New England bait industry appears to be more centrally organized than bait industries of other regions largely because of the way blood and sand worms are gathered and distributed. Both worms are indigenous only to northern New England and are distributed through a relatively small number of wholesalers. (Maine officials report that there were 43 wholesale dealers there in 1975.)* Contacts with wholesalers in Maine, Massachusetts, and Rhode Island were made and each was asked to estimate the total number of retail dealers in the New England states. The four dealers contacted estimated that there were about forty dealers in Rhode Island and in New Hampshire, 110-120 dealers in Massachusetts, and less than twenty retailers in Maine (not counting the wholesalers there who also deal in retail trade). Some frozen baits as squid, clam necks and cut bait are also distributed through wholesale dealers, but often they are purchased by the retail dealer directly from the boats.

* Dealers called "cellars" because many operate their businesses out of their basements.

In other regions no clear industry structure could be discerned. Retail dealers tend to buy directly from the boats or to harvest the bait themselves. The geographic areas are much larger than in New England. Where shrimp is the primary bait used, most dealers apparently harvest their own. According to university researchers in Louisiana, there are very few live bait dealers in that state because recreational fishermen can trawl for their own shrimp. According to wholesalers in California the industry there is very localized. There are hundreds of outlets (e.g., grocery and liquor stores, marinas) selling small quantities of frozen bait. None of the dealers would venture to guess the total number of retail outlets. In the Northwest, frozen herring and shrimp are used. Much of the herring is bought directly off of the boats and shrimp is purchased from other areas of the country.

G.6 Capital Expenditures

A gross estimate for capital expenditures was obtained by multiplying the number of retail establishment by an estimate of the average value of capital replaced each year. As stated above, through discussion with bait dealers and knowledgeable state and university personnel in all coastal regions it was learned that the capital requirements for operating a bait shop include primarily equipment purchases (stores are generally rented) of a freezer, a refrigerator and a holding tank. The equipment is generally bought second hand, usually does not cost more than \$1,000 and lasts from three to five years. Assuming that the equipment lasts four years, then on average every year one-fourth of the dealers would replace their equipment. Also assuming that one-fourth of the cost of the equipment is \$250 then total capital expenditures are estimated at just over \$1 million. Under the same assumptions capital expenditures by all retail establishments are estimated at just under \$5 million. These are, admittedly very gross estimates, but they at least provide an indication of the order of magnitude of capital expenditures in this sector.

Appendix G References

1. U.S. Department of Interior, Bureau of Sportfishing and Wildlife, 1970 National Survey of Fishing and Hunting (Washington, D.C.: U.S. Government Printing Office, 1972), pp. 44 and 46.
2. U.S. Department of Commerce, U.S. Bureau of the Census, 1972 Census of Retail Trade, Establishment and Firm Size (Washington, D.C.: U.S. Government Printing Office, 1975), p. 41.
3. U.S. Department of Treasury, Internal Revenue Service, Statistics of Income, 1972, Business Income Tax Returns (Washington, D.C.: U.S. Government Printing Office, 1976), p. 13.

APPENDIX H

ECONOMIC IMPACTS RELATED TO BOAT FUEL

H.0 ECONOMIC IMPACTS RELATED TO BOAT FUEL

H.1 Summary of Impacts

In 1972 retail sales of marine fuel^{*} for recreational boating totalled an estimated \$200 million. The wholesale trade and manufacturers' values of this fuel are estimated at \$163 million and \$72 million respectively.** The estimated value of sales related to marine recreational fishing are \$15 million in manufacturing, \$34 million in wholesale trade and \$42 million in retail trade. The economic impacts associated with the sales are presented in Exhibit H-1.

Value added totalled about \$60 million. In manufacturing, wholesale trade, and retail trade it amounted to an estimated \$12.2 million, \$15.4 million and \$32 million respectively. In contrast value added attributed to marine recreational fishing totalled \$12.5 million, or an estimated \$2.6 million in manufacturing, \$3.2 million wholesale trade each, \$6.7 million in retail trade.

Total employment estimates are 260 person-years in manufacturing, 740 person-years in wholesale trade, and 3990 person-years in retail trade, for a total of 4990 person-years of employment. Employment attributable to marine recreational fishing totalled 1200 person-years. Distributed among manufacturing, wholesale and retail trade, employment amounts to an estimated 50, 150, and 1000 person-years respectively.

The estimated salaries and wages impacts were \$28.2 million related to all boat fuel, and under \$6 million related to marine recreational fishing activity. For all boat fuel purchases, wages and salaries amounted to \$3.3 million in manufacturing, \$5.9 million in wholesale trade, and \$19 million in retail trade. Wages and salaries attributable to saltwater sportfishing were approximately \$1 million in manufacturing and in wholesale trade and an estimated \$4 million in retail trade.

Annual capital expenditures totalled about \$8 million for all fuel purchases or \$3 million in each wholesale trade and manufacturing, and about \$2 million in retail trade. Capital expenditures in 1972 related to marine angling were less than \$2 million in total.

* Consists of boat fuel purchase at places other than boat yards and marinas.

** The value of manufacturers' shipments does not include the excise tax.

Exhibit H-1*

Economic Impacts Associated With Boat Fuel Consumption - 1972

	<u>Manufacturing</u>	<u>Wholesale Trade</u>	<u>Retail Trade</u>	<u>Sum of Impact</u> ^{**}
Sales (millions of dollars)				
Total#	#			
Marine Recreational Fishing	72	163	200	
	15	34	42	
Value Added (millions of dollars)				
Total#	12.2	15.4	32.0	59.6
Marine Recreational Fishing	2.6	3.2	6.7	12.5
Employment (person-years)				
Total#	260	740	3,990	4,990
Marine Recreational Fishing	50	150	1,000	1,200
Wages and Salaries (millions of dollars)				
Total#	3.3	5.9	19.0	28.2
Marine Recreational Fishing	0.7	1.2	3.9	5.8
Capital Expenditures (millions of dollars)				
Total#	2.9	3.1	2.4	8.4
Marine Recreational Fishing	0.6	0.6	0.5	1.7

* Includes boat fuel purchased at places other than marinas/boat yards.

** Consists of the sum of economic impacts in manufacturing, and wholesale and retail trade.

Impacts associated with total consumption of fuel in recreational boating (both salt and fresh water), less fuel sold at marinas.

Does not include excise tax on fuel.

H.2 General Approach

The economic impact estimates related to fuel consumption were determined using the following approach:

- o Estimates of marine fuel consumption (in gallons) obtained from secondary sources were converted to their dollar value of sales.
- o Sales of fuel at marinas were netted out because these sales are accounted for elsewhere (see Appendix E).
- o The portion of total fuel sales attributable to marine recreational fishing was estimated based on the percent of boating time that boats are used for saltwater fishing.
- o Economic impact ratios of value added to sales, employment to sales, wages and salaries to sales, and annual capital expenditures to sales were estimated.
- o The economic impacts associated with total marine fuel sales and the sales of fuel attributable to salt water angling were estimated by applying the economic impact ratios to these sales estimates.

Marine fuel is defined for the purposes of this analysis to include gasoline and diesel fuel consumed by outboard, inboard and inboard/outdrive boats at places other than marinas/boat yards. Fuel consumed at boat yards/marinas has already been accounted for in the analysis of marinas/boat yards. Other boats (e.g., motor powered sail boats, canoes or houseboats) have been excluded because they consume relatively little fuel, are used infrequently for marine recreational fishing, and are, therefore, assumed to have negligible impact.

Estimates are presented at the levels of manufacturing, wholesale trade and retail trade. Manufacturing impacts are those associated with refining of petroleum products. Wholesale trade impacts are those related to the storage and distribution of fuel. Retail trade impacts represent those associated with fuel sales directly to boat owners.

H.3 Estimating the Value of Sales of Marine Fuel

To obtain an estimate of the total value of marine fuel sales in 1972, the estimated volume of fuel consumed by outboard, inboard, and inboard/out-drive boats was converted to its dollar value. According to a U.S. Coast Guard study of recreational boating, fuel consumption by these three types of boats accounts for just over 90 percent of all marine fuel consumed by privately owned watercraft.¹ Based on this study it is estimated that diesel fuel accounts for about 30 percent of all fuel consumed by inboard boats, or about 9 percent of total fuel consumption of all outboard, inboard, and inboard/outdrive boats.²

The Department of Transportation annually estimates the consumption of gasoline by state and by fuel use. In 1972, an estimated 686,763,000 gallons of gasoline were consumed by all recreational watercraft.³ Since outboard, inboard and inboard/outdrive boats account for 90 percent of all recreational watercraft fuel consumption, it is estimated that 621,000,000 gallons of gasoline were consumed by boats included in this analysis and diesel fuels consumed in 1972 totalled an estimated 60,000,000 gallons.

In 1972 the average retail price of gasoline in the U.S. was 36 cent per gallon and the average retail price for diesel fuel was 25 cent per gallon.⁴ Thus the retail value of marine fuel purchased at launching ramps, marinas, and road side filling stations is estimated at \$240 million.* However, fuel purchased at marinas/boat yards has already been accounted for elsewhere. Fuel purchases at marinas/boat yards account for about 6 percent of marina/boat yard revenues.⁵ As shown in Appendix E marina/boat yard gross revenues average \$159,000, and there were about 4,600 marinas/boat yards in the nation in 1972. Thus fuel sold at marinas/boat yards is estimated at \$40 million.** The estimated sales of marine fuels from sites other than marinas/boat yards is, therefore, estimated to have been \$200 million in 1972. The wholesale value of this fuel is estimated at \$163 million. The value of manufacturers' shipments (which excludes the excise tax) is estimated at \$72 million.⁶ The estimated State and Federal excise taxes paid on these fuel purchases amounted to \$64 million.

* This estimate does not adjust for the fact the price of fuel at some waterfront sites may be slightly higher than prices of fuel at other locations.

** 4,600 establishments x \$159,000 per establishment x 0.06 = \$44 million.

H.4 Estimating Sales of Marine Fuel Attributable to Saltwater Sportfishing

The portion of marine fuel sales attributable to saltwater sportfishing is assumed to be equivalent to the estimated percent of total boating time that recreational watercraft are used for saltwater fishing, or 21 percent. (For details on the determination of this estimate see Appendix B.) The estimate is weighted for differences in the size of boats (and thus motors) used in saltwater and freshwater. It is recognized that fuel consumption is also affected by the intensity of motor use, and that different boating activities (cruising, water skiing, or fishing) may require varying throttle speeds. No data are available on fuel consumption by type of activity and thus the above percentage estimate is not weighted for this factor. However, in the aggregate the percent of time that boats are used for saltwater fishing should reasonably reflect fuel consumption for this activity. Assuming that 21 percent of all marine fuel consumption is associated with marine recreational fishing, an estimated \$42 million for marine fuel was spent in 1972 for saltwater sportfishing activity. Of this amount about \$13 million are State and Federal excise taxes.

H.5 Estimation of Economic Impact Ratios Related to Marine Fuel

To estimate the value added, employment, wages and salaries, and annual capital expenditures impacts of marine fuel sales, economic impact ratios were derived. The ratios are all determined as functions of sales. They are defined as follows:

o	value added impact ratio	=	$\frac{\text{Total Value Added}}{\text{Total Sales}}$
o	employment impact ratio	=	$\frac{\text{Total Sales}}{\text{No. of Employees}}$
o	wages and salaries impact	=	$\frac{\text{Total Wages and Salaries}}{\text{Total Sales}}$
o	annual capital expenditures impact ratio	=	$\frac{\text{Total Annual Capital Expenditures}}{\text{Total Sales}}$

The impact ratios for marine fuel are presented in Exhibit H-2. The ratios for manufacturing (i.e., refining) are determined from Census data on petroleum refining.⁷ The wholesale trade impact ratios for sales to employment, wages and salaries to sales and annual capital expenditures to sales are determined from Census data on petroleum bulk stations and terminals.⁸ The value added to sales ratio is estimated by reducing the gross margin of petroleum wholesalers by the amount that reflects value added. The gross margin of wholesalers of fuel is 10.1 percent.⁹ According to the 1972 Census of Wholesale Trade, value added represents 94 percent of the gross margin in wholesale trade.¹⁰ Thus value added to sales ratio is estimated at 0.095. The ratio estimated for sales to employment, wages and salaries to sales, and annual capital expenditures to sales are derived from Census data on gasoline service stations.¹¹ The sales to employment ratio is adjusted to reflect person-years of employment based on Bureau of Labor Statistics data on average hours worked weekly in retail trade. The value added to sales ratio was determined from income statements of gasoline service stations.¹²

Exhibit H-2

Economic Impact Ratios Related to
Boat Fuel Consumption in 1972

	<u>Manufacturing</u>	<u>Wholesale Trade</u>	<u>Retail Trade</u>
Value Added (\$/\$ Sale)	0.17	0.095	0.16
Employment (\$ Sales/Person-Year)	273,800	220,400	50,100
Wages and Salaries (\$/\$ Sales)	0.046	0.036	0.094
Annual Capital Expenditures (\$/\$ Sales)	0.04	0.019	0.012

H.6 Applying the Economic Impact Ratios to Determine Impact Estimates

To determine estimates of the economic impacts related to total marine fuel sales and sales of marine fuel associated with saltwater fishing, the economic impact ratios were applied in the following manner. The ratios of value added to sales, wages and salaries to sales, and annual capital investment to sales were each multiplied with the values of total marine fuel sales and sales of marine fuel attributable to saltwater angling. The ratio for employment was divided into these two values of sales estimates. The resulting impact estimates are presented in Exhibit H-1.

Appendix H References

- ¹ Rolf M. Wulfsberg and Darryl L. Lang, Recreational Boating in the United States in 1973, U.S. Coast Guard, Office of Boating Safety, 1974, p. 67-71.
- ² This figure of 9 percent was obtained by computing the volume of diesel fuel consumed by inboard boats and then dividing that number by all fuel consumed by outboards, inboards, and inboard/outdrive boats.
- ³ U.S. Department of Transportation, Federal Highway Administration, Highway Statistics 1972, (1973), Table MF-24.
- ⁴ Platt's Oilgram Price Service, New York, New York.
- ⁵ The National Association of Engine and Boat Manufacturers estimated in their study Marinas Cost/Revenues - 1974, that fuel sales accounted for 5.5 percent of gross revenues. The Boating Industry Magazine estimated fuel sales to be 7.7 percent of marina gross revenues in their publication The Boating Business 1974.
- ⁶ Fuel prices used to compute these estimates were obtained from Platt's Oilgram Price Service, New York, New York.
- ⁷ U.S. Department of Commerce, Bureau of the Census, 1972 Census of Manufacturers, Petroleum and Coal Products, p. 29A-14.
- ⁸ U. S. Department of Commerce, Bureau of the Census, 1972 Census of Wholesale Trade, Petroleum Bulk Stations and Terminals, p. 2/3. Capital expenditures data are from p. 2/154.
- ⁹ Robert Morris Associates, Annual Statement Studies, (Philadelphia, Pa.: Robert Morris Associates); 1976, p. 135.
- ¹⁰ U.S. Department of Commerce, Bureau of the Census, 1972 Census of Wholesale Trade, Value Produced, Capital Expenditures, Fixed Assets, Rental Payments, and Supplemental Costs of Merchant Wholesalers, p. 3/10.
- ¹¹ Data on employment and wages and salaries are from U.S. Department of Commerce, Bureau of the Census, 1972 Census of Retail Trade, Miscellaneous Subjects, p. 3/20. Capital expenditures data are from the 1972 Census of Retail Trade, Capital Expenditures, Fixed Assets, and Rental Payments, p. 2/6.

Appendix H References
(cont.)

- ¹² U.S. Department of the Treasury, Internal Revenue Service, Statistics of Income 1972, Income Tax Returns (Washington, D.C.: U.S. Government Printing Office) 1976, pp. 13, 91, and 175.

APPENDIX I

ECONOMIC IMPACTS RELATED TO FOOD, LODGING, AND TRAVEL

I.0 ECONOMIC IMPACTS RELATED TO FOOD, LODGING AND TRAVEL

I.1 Summary of Impacts

In 1972 the estimated expenditures by saltwater fishermen for food, lodging and transportation were \$165.4 million, \$44.8 million, and \$135.1 million respectively. In comparison expenditures on trips a distance of 200 miles or more (round trip) for all outdoor recreation activities were \$1,085.5 million for food, \$909.8 million for lodging, and \$1,024.9 for transportation. Exhibit I-1 summarizes the economic impacts associated with these expenditures.

Expenditures by fishermen for food had an estimated employment impact of 10,600 person-years. The wages and salaries impact was an estimated \$41.4 million, and the capital expenditures impact was about \$6.1 million. Estimated value added was \$59.5. Impacts resulting from food expenditures for all outdoor recreation trips 200 miles or greater in 1972 were 69,580 person-years of employment, \$271.4 million in salaries and wages, and \$40.2 in capital expenditures.

Estimated economic impacts associated with lodging expenditures of saltwater fishermen were \$23.7 million in value added, 2,730 person-years of employment, \$13.1 million in wages and salaries, and \$5.8 million in capital expenditures. Impacts related to food expenditures for all outdoor recreation trips were \$482.2 million in value added, 55,150 in years of employment, \$263.8 million in wages and salaries, and \$117.3 million in capital expenditures.

Total impacts associated with travel expenses of saltwater fishermen were \$39.6 million in value added, 3,330 person-years of employment, \$18.9 million in wages and salaries, and \$5.4 million capital expenditures. Travel expenditures for outdoor recreation trips resulted in estimated total impacts of \$297 million in value added, 25,200 person-years of employment, \$140 million in wages and salaries, and \$41 million in annual capital expenditures.

Exhibit I-1

Economic Impacts Associated with Food, Lodging
and Travel in 1972

	Food (Retail)	Lodging (Retail)	Production	Travel Wholesale Trade	Retail Trade	Sum of Impacts
Sales (millions of dollars)						
Total*	1,085.5	909.8	366	749	1,024.9	
Marine Recreational Fishing	165.4	44.8	48	99	135.1	
Value Added (millions of dollars)						
Total*	391	482.2	62	71	164	297
Marine Recreational Fishing	59.5	23.7	8.2	9.4	22	39.6
Employment (person years)						
Marine Recreational Fishing	69,580	55,150	1,300	3,400	20,500	25,200
	10,600	2,730	180	450	2,700	3,330
Wages and Salaries (millions of dollars)						
Total*	271.4	263.8	17	27	96	140
Marine Recreational Fishing	41.3	13.1	2.2	3.6	12.7	18.9
Capital Expenditures (millions of dollars)						
Total*	40	117.3	15	14	12	41
Marine Recreational Fishing	6.1	5.8	1.9	1.9	1.6	5.4

*

Total represents expenditures for all outdoor recreational.

I.2 General Approach

To estimate economic impacts related to food, lodging, and travel expenditures the following procedure was used.

- o Expenditures by fishermen in 1972 for food, lodging and travel using an historical trend analysis based on data from the National Survey of Fishing and Hunting. Similar expenditure estimates for all outdoor recreation trips were taken from other published sources for 1972.
- o Economic impact ratios of value added to sales, sales to employment, wages and salaries to sales, and annual capital expenditures to sales were computed.
- o Impacts were then estimated by applying the impact ratios to the expenditure estimates.

The following definitions were used in this analysis:

- o Food - Outlays for food by fishermen are the costs of prepared meals, snacks and refreshments purchased at commercial eating places. The average cost of meals that would have been eaten at home have been deducted from food expenditures.
- o Lodging - Outlays for nights spent in a commercial accommodations, including hotels, motels, trailer parks or camping grounds.
- o Travel - Outlays for auto, bus, train, air boat, or ship to get to and from the trip destination.

For food and lodging the economic impacts are assessed only at the retail level. There are no direct impacts to trace in manufacturing or wholesale trade in the provision of lodging services. In the case of food production, economic impacts related to food processing and distribution are excluded because they would have resulted from food purchased for consumption at home had the fishing trips not occurred.

The bulk (89 percent) of the travel costs are associated with private automobile travel. Expenditures for private automobile travel were assessed using estimates of the incremental cost of operating a privately-owned automobile. Most of these expenditures are associated with direct operating costs such as fuel and maintenance.

Thus, for travel the retail trade impacts are those associated with sales at gasoline service stations (including fuel, and maintenance and repairs). Wholesale trade economic impacts are predominantly those associated with storage and distribution of gasoline. Production economic impacts are those associated with petroleum refining.

I.3 Estimating Expenditures for Food, Lodging, and Travel Related to Saltwater Sportfishing.

The 1972 expenditure estimates for food, lodging, and travel are historical extrapolations based on data from the National Survey of Fishing and Hunting which have been conducted every five years beginning in 1955.* Each survey provides separate estimates for food, lodging, and travel. To obtain an estimate for 1972, data for 1955, 1960, 1965, and 1975 were converted to (1970) constant dollars. A curve was then fitted to each set of data using an ordinary least square approximation. The historical trend was then extended beyond 1970. The curves are plotted in Exhibits I-2 and I-3.**

According to the National Survey of Fishing and Hunting in 1970, estimated expenditures for food, lodging, and transportation were \$135.1 million, \$35.7 million, and \$122.5 million respectively.² Food expenditures include the cost of food purchased in restaurants, snack bars, and other commercial eating places less the average costs of meals that would have been eaten at home. Groceries brought from home or purchased during the trips are excluded. Lodging expenditures are the actual costs for lodging services at hotels, motels, and campgrounds as reported by fishermen. Travel outlays on automobile transportation were computed at five cents a mile and were divided among the sportfishermen making a trip together. Expenditures on all other types of transportation were determined directly from outlays reported by fishermen. From the Exhibits it can be seen that historically growth has been relatively constant in all three expenditure categories. Between 1970 and 1972 there were no major changes in the national economy that would lead one to expect a radical shift in these historical patterns. Extrapolating the trend to 1972, expenditures (expressed in 1970 dollars) are estimated to have been \$151.3 million for food, \$40.9 million for lodging, and \$131.9 million for transportation. Converting these estimates to current dollars,³ the resulting expenditure estimates are \$165.4 million, \$44.8 million, and \$135.1 million for food, lodging, and travel respectively. These estimates were used in determining the associated economic impacts.

The estimated expenditures for all outdoor recreation trips of 200 miles or more (roundtrip) were taken from the 1972 National Travel Expenditure Study.⁴

* The 1975 survey was not available at the time this analysis was conducted.

** The least squares approximations are:

Food: $Y_f = 47.6 + 6.1x$

Lodging: $Y_l = 20.3 + 1.7x$

Transportation: $Y_t = 53.7 + 4.6x$

Exhibit I-2

Estimated Food and Lodging Expenditures

Exhibit I-3

Estimated Travel Expenditures

I.4 Determining Economic Impact Ratios

The estimated value added, employment, wages and salaries, and capital investment impacts associated with these expenditures were determined using derived impact ratios. The ratios are expressed as functions of sales of the appropriate good/service and are defined as follows:

value added impact:	$\frac{\text{total value added}}{\text{total sales}}$
employment impact:	$\frac{\text{total sales}}{\text{total employment}}$
wages and salaries impact:	$\frac{\text{total wages and salaries}}{\text{total sales}}$
annual capital investment impact:	$\frac{\text{total annual capital expenditures}}{\text{total sales}}$

The value of the ratios are presented in Exhibit I-4. For food expenditures the ratios for employment, wages and salaries, and annual capital expenditures were determined from census data on Eating Places (SIC 58).⁵ The value added to sales ratio was determined for the same SIC category from a detailed break down of cost and revenue data from the Internal Revenue Service.⁶

For lodging, employment, wages and salaries, and capital expenditures the ratios were derived using data from the 1972 Census of Selected Services, on hotels, motels, trailer parks and camp grounds (SIC 701,3).⁷ The value added to sales ratio was determined for the same SIC grouping from Internal Revenue Service data.⁸

The travel ratios for (i.e., refining) are determined from Census data on petroleum refining.⁹ The wholesale trade impact ratios for sales to employment, wages and salaries to sales, and annual capital expenditures to sales are determined from Census data on petroleum bulk stations and terminals.¹⁰ The value added to sales ratio is estimated by reducing the gross margin of petroleum wholesales by the amount that reflects value added. The gross margin of wholesalers of fuel is 10.1 percent.¹¹ According to the Census of Wholesale Trade value added represents 94 percent of the gross margin in whole trade.¹² Thus value added to sales ratio is estimated at 0.095.

The retail trade impact ratios for sales to employment, wages and salaries to sales, and annual capital expenditures to sales are derived from Census data on gasoline service stations.¹³ The sales to employment ratio is adjusted for part-time help so that it reflects person-years of employment based on Bureau of Labor Statistics data on average hours worked weekly in retail trade. The value added to sales ratio was determined from income statements of gasoline service stations.¹⁴

Exhibit I-4

Economic Impact Ratio for Food, Lodging,
and Transportation

	Food	Lodging		Transportation	
	<u>Retail Trade</u>	<u>Retail</u>	<u>Manufacturing</u>	<u>Wholesale Trade</u>	<u>Retail Trade</u>
Value Added/Sales (\$/\$ Sales)	0.36	0.53	0.17	0.095	0.16
Sales/Employment (\$/person-year)	\$15,600	16,500	273,800	220,400	50,100
Wages and Salaries (\$/\$ Sales)	0.25	0.29	0.046	0.036	0.094
Annual Capital Expenditures (\$/\$ Sales)	0.037	0.129	0.04	0.019	0.012

I.5 Applying the Economic Impact Ratios to Determine the Economic

To determine estimates of economic impacts the impact ratios were applied in the following manner. The ratio of value added to sales, wages and salaries to sales, and annual capital expenditures to sales were each multiplied with the respective estimated expenditures for food, lodging, and travel. The impact ratio for employment is expressed in terms of dollars of sales per unit of employment. To estimate the employment impact the ratio is, therefore, divided into the expenditures estimate.

Appendix I References

1. The price indices includes used: "Food Purchased Away from Home" for food; "Services" for lodging; and "Gasoline and Motor Oil" for transportation. All indices were obtained from the Bureau of Labor Statistics.
2. U.S. Department of the Interior, Bureau of Sport Fisheries and Wildlife, 1970 National Survey of Fishing and Hunting (Washington, D.C.: U.S. Government Printing Office), 1972, p. 46.
3. See footnote 1.
4. United States Travel Data Center, 1972 National Travel Expenditure Survey, (Washington, D.C.: U.S. Travel Data Center), 1973, p. 13 .
5. Data for employment and payroll were taken from U.S. Department of Commerce, Bureau of the Census, 1972 Census of Retail Trade, Establishment and Firm Size, p. 1/26. Capital expenditure data are from the subject series Capital Expenditures, Fixed Assets and Retail Payments, p. 2/6.
6. Department of the Treasury, Internal Revenue Service, Statistics of Income 1972, Business Income Tax Returns (Washington, D.C.; U.S. Government Printing Office), 1976, pp. 13, 91, and 175.
7. Data for employment and payroll were taken from the U.S. Department of Commerce, Bureau of the Census, 1972 Census of Selected Services, Summary Statistics, p. 7. Data in capital expenditures are from P. 8/81.
8. Department of the Treasury, pp. 13, 91, 175.
9. U.S. Department of Commerce, Bureau of the Census, 1972 Census of Manufacturers, Petroleum and Coal Products, p. 294-14.
10. U. S. Department of Commerce, Bureau of the Census, 1972 Census of Wholesale Trade, pp. 2/3 and 2/154.
11. Robert Morris Associates, Annual Statement Studies, (Philadelphia Pa.: Robert Morris Associates), 1976, p. 235.
12. U.S. Department of Commerce, Bureau of the Census, 1972 Census of Wholesale Trade, Value Produced, Capital Expenditures, Fixed Assets Rental Payments, and Supplemental Costs of Merchant Wholesalers, p. 3/10.
13. Data on employment and wages and salaries are from U.S. Department of Commerce, Bureau of the Census, 1972 Census of Retail Trade, Miscellaneous Subjects, p. 3/20. Capital expenditures data are from the 1972 Census of Retail Trade, Capital Expenditures, Fixed Assets and Rental Payments. p. 2/6.

Appendix I References
(cont.)

14. U.S. Department of the Treasury, Internal Revenue Service,
Statistics of Income 1972, Income Tax Returns, (Washington,
D.C.: U.S. Government Printing Office) 1976, pp. 13, 91, and
175.

APPENDIX J

ECONOMIC IMPACTS
RELATED TO MARINE INSURANCE FOR
RECREATIONAL BOATS

J.0 ECONOMIC IMPACTS RELATED TO MARINE INSURANCE FOR RECREATIONAL BOATS

J.1 Summary of Impacts

In 1972, boat owners paid an estimated \$173.7 million in insurance premiums to cover their recreational watercraft. About \$36.5 million of these premiums are attributable to saltwater sportfishing activity.* The economic impacts associated with the payment of these premiums are presented in Exhibit J-1. Value added totalled an estimated \$40.9 million of which about \$8.6 million is associated with marine recreational fishing. An estimated 1,600 person-years of employment and \$16.7 million in wages and salaries were generated in the sale of recreational boat insurance. Of these totals an estimated 340 person-years of employment and \$3.5 million in wages and salaries are attributable to saltwater sportfishing. Capital expenditures related to insurance purchased were insignificant.

* These premiums are not to be confused with marine insurance premiums paid for coverage of commercial vessels or the transport of cargo by water. These payments totalled over \$1 billion in 1972.

Exhibit J-1

Estimated Economic Impacts Related to
Insurance for Recreational Boats
1972

Number of Establishments*	130
Value of Premiums (millions of dollars)	
Total**	\$173.7
Marine Recreational Fishing	36.5
Value Added (millions of dollars)	
Total**	\$40.9
Marine Recreational Fishing	8.6
Employment (person-years)	
Total**	1,600
Marine Recreational Fishing	340
Wages and Salaries (millions of dollars)	
Total**	\$16.7
Marine Recreational Fishing	3.5

* Total number of insurance carriers selling insurance to recreational boaters.

** Refers to insurance for all recreational boats.

J.2 General Approach

Impacts associated with the purchase of recreational boat insurance in 1972 were estimated in the following manner:

- o The value of premiums purchased was estimated from data on the number of boats insured and the typical cost of insurance by boat type.
- o The portion of premiums attributable to saltwater fishing was determined based on the percent of total time boats are used for marine sportfishing.
- o Economic impact ratios for value added to sales, sales to employment, and wages and salaries to sales were estimated based on industry averages.
- o The economic impacts associated with insurance premiums for all recreational boats and those impacts attributable to recreational boats used for saltwater sportfishing were estimated by applying the economic impacts ratios to the estimated value of premiums purchased.

This analysis includes those premiums paid for separate insurance coverage for recreational watercraft and homeowner's insurance covering recreational boats. According to representatives of four national insurance companies, boats that are used in the open ocean are generally covered by separate policies.¹ Small boats that are used in bays, rivers and estuaries may be covered through a homeowner's policy for a small additional fee. The cost of separate insurance policies depends on the type, size and age of the boat as well as the body of water in which it is generally used and the experience of the operator.

J.3 Estimating the Value of Insurance Premiums for Recreational Watercraft

The value of insurance premiums paid in 1972 for coverage of privately owned recreational watercraft was estimated from data on the number of insured boats and the typical costs of insurance for an outboard, inboard, and inboard/outdrive boat.

Exhibit J-2 presents by boat type the estimated number of insured and non-insured boats in 1972. These estimates were determined using similar estimates for 1973 obtained from the U.S. Coast Guard.² The 1973 figures were reduced by the increase in the boat population for that year.* The proportion of insured boats to total boats was assumed to be constant in 1972 and 1973.

The value of premiums sold was estimated from typical costs of insurance for outboard, inboard and inboard/outdrive boats as determined from information provided by four major insurers of recreational watercraft.³ Accordingly, boat owners generally obtain liability coverage for their boats for about \$12 per year. Typical insurance costs for inboard, outboard and inboard/outdrive boats are \$395, \$45, and \$130 respectively. In total insurance premiums amounted to an estimated \$173.7 in 1972. Exhibit J-3 shows the calculation of the estimated total value of premiums.

* Estimates of the increase in the boat population were obtained from the Boating Industry Association.

Exhibit J-2

Estimated Total Number of Boats
Insured in 1972

<u>Boat Type</u>	<u>Homeowner's</u>	<u>Separate Policy</u>	<u>None</u>	<u>Total</u>
Inboard	190,600	239,600	94,700	524,900
Outboard	1,628,500	679,200	1,191,600	3,499,300
Inboard/ Outdrive	177,000	189,600	59,800	426,400
TOTAL	1,996,100	1,108,400	1,346,100	4,450,600

Exhibit J-3

Estimate of Total Premiums
Paid to Insure Recreational Boats
1972

<u>Boat Type</u>	<u>Cost of Homeowner's Liability Insurance Per Boat</u>	<u>Number of Boats</u>	<u>Value of Liability Premiums (millions \$)</u>	<u>Cost of Separate Policy per Boat</u>	<u>Number of Boats</u>	<u>Value of Premiums for Separate Policies (millions \$)</u>
Inboard	\$12	190,600	\$ 2.3	\$395	239,600	\$30.6
Outboard	12	1,628,500	19.5	45	679,200	94.6
Inboard/ Outdrive	12	177,000	2.1	130	189,600	24.6
TOTAL		1,996,100	\$23.9		1,346,100	\$149.8

J.4 Determining the Portion of Premiums Attributable to Saltwater Sportfishing

The allocation of the portion of total premiums to marine recreational fishing was based on the proportion of marine angling activity from boats to total boating activity. It is estimated that about 21 percent of total boating time (including activity in freshwater and saltwater) is spent sportfishing in saltwater. (See Appendix B for details on the determination of this estimate.) Accordingly, 21 percent of the total insurance premiums, or an estimated \$36.5 million, is associated with marina recreational fishing.

J.5 Estimating the Economic Impact Ratios

To estimate the economic impacts associated with the sale of insurance for recreational boats, economic impact ratios were derived as functions of sales using aggregated data on the insurance industry. These were then applied to the estimated value of 1972 premiums. The impact ratios are presented in Exhibit J-4.

To determine the ratios of sales to employment, the value of premiums aggregated for marine, fire, and casualty insurance was divided by the total number of employees of these insurance carriers.⁵ The ratio was then adjusted to reflect person-years of employment using Bureau of Labor Statistics data on the average weekly hours worked by service related employees. Similar aggregated data were used to determine the ratio of wages and salaries to sales.⁶

The estimate for value added was determined from data in the 1967 national input-output tables for the insurance and finance industries. Value added is composed of employee compensation, property-type income and indirect business taxes. According to the input-output tables employee compensation represents 40.8 percent of the total value added by the insurance and finance industries. The salaries and wages estimates determined above (\$16.7 million in total and \$3.5 million attributable to saltwater sport-fishing) were then divided by 0.408 to determine the value added estimates that appear in Exhibit J-1.

Data on capital expenditures in the insurance industry are unavailable. However, it is reasonable to assume that such expenditures related to boat insurance premiums are insignificant. The major capital requirements are office space and office equipment. Office space is generally rented, and equipment needs are minimal.

Exhibit J-4

Economic Impact Ratios for Boat Insurance

Value Added
Sales

*

Sales
Employment

\$107,700

Wages and Salaries
Sales

0.096

Capital Expenditures
Sales

*

* An alternate method was used to estimate the impact. See preceding discussion.

J.6 The Number of Carriers of Insurance Covering Recreational Boats

The American Institute of Marine Underwriters estimates that there are between 120 and 140 companies that will write separate policies covering recreational watercraft.⁸

APPENDIX J REFERENCES

1. These companies are Aetna Insurance, Insurance Company of North America, Nationwide Insurance, and Allstate Insurance.
2. U.S. Coast Guard, Recreational Boating in the Continental United States in 1973, p. 51.
3. See reference 1.
4. From U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business, Volume 54, February, 1974, p. 42.
5. The value of premiums from fire, marine and casualty insurance was obtained from the Insurance Information Institute, 110 William Street, New York, New York. Data on employment and wages and salaries were taken from U.S. Department of Commerce, County Business Patterns 1972: United States Summary, p. 25.
6. See reference 5.
7. U.S. Department of Commerce, Bureau of Economic Analysis, "The Input-Output Structure of the U.S. Economy," Survey of Current Business, Washington, D.C., U.S. Government Printing Office (February, 1977), p. 42.
8. Obtained directly from the American Institute of Marine Underwriters, 99 John Street, New York, New York.

APPENDIX K

ECONOMIC IMPACTS RELATED

"OTHER" EXPENDITURES

K.0 ECONOMIC IMPACTS RELATED TO "OTHER" EXPENDITURES

K.1 Summary of Impacts

There are several items purchased by marine recreational fishermen that when taken alone represent a very small portion of total expenditures. These are not analyzed individually. They include special fishing clothing, tents, magazines, boat launching fees, guide fees, spearfishing equipment and other items not separately listed. However, in the aggregate these expenditures are significant. In 1972 these items accounted for an estimated \$120 million in retail sales. The estimated impacts associated with these expenditures were \$24 million in value added, 2,650 person-years of employment, \$14.4 million in wages and salaries, and \$3.1 million in annual capital expenditures all at the retail level.

Exhibit K-1

Summary of Impacts Related to "Other"
Expenditures for Marine Recreational Fishing
1972

Sales (millions of dollars)	\$ 120
Value Added (millions of dollars)	24
Employment (person0years)	2,650
Wages and Salaries (millions of dollars)	14.4
Annual Capital Expenditures (millions of dollars)	3.1

K.2 Estimating Economic Impacts Related to "Other" Expenditures

To estimate impacts for goods and services not included elsewhere the following procedure was used.

- o Based on data from the 1970 National Survey of Fishing and Hunting, a list of items and associated expenditures was compiled. A ratio of "other" expenditures to total expenditures was then computed.
- o Economic impact ratios of value added to sales, sales to employment, wages and salaries to sales and annual capital investment to sales was estimated based on secondary data on all retail sales.
- o The impact ratios were applied to the estimated expenditure values to determine the impacts.

K.3 Estimating the Value of "Other" Expenditures

From the 1970 Survey of Fishing and Hunting expenditures for special clothing, tents, magazines, boat launching fees, guide fees, other equipment (e.g., sleeping gear, cooking and eating utensils, cabin lanterns, etc.) and other unspecified expenses were totalled. They amount to \$112.8 million. This value was then used to determine "other" expenditures as a proportion of expenditures for all remaining items. From the survey those remaining expenditures amount to \$1,112.9 million. Thus other expenditures are ten percent of the expenditures for all remaining items.

The estimated expenditures by recreational fishermen for all goods and services described in the preceding appendices amount to \$1,221 million. Thus other expenditures are ten percent or about \$120 million in 1972.

K.4 Estimating Economic Impact Ratios for "Other" Expenditures

The economic impact ratios of value added to sales, sales to employment, wages and salaries to sales, and annual capital investment to sales are estimated using data on all retail trade for 1972 from the Bureau of Economic Analysis Survey of Current Business. The ratios are shown in Exhibit K-2. The ratio of sales to employment has been adjusted to reflect person-years of employment based on Bureau of Labor Statistics on the average number of hours worked weekly by retail employees.

The impact estimates were then determined by applying the impact ratios to the expenditure estimates. The ratio of sales to employment was divided into the expenditure estimate to obtain the employment impact. All other ratios were multiplied with the expenditure estimate to determine the respective impact.

Exhibit K-2

Economic Impact Ratios Related to
"Other" Expenditures for Saltwater
Sportfishing in 1972

Value Added/Sales (\$/\$ sales)	0.20
Sales/Employment (\$ sales/person-year)	45,350
Wages and Salaries/Sales (\$/\$ sales)	0.12
Annual Capital Investment/Sales (\$/\$ sales)	0.026

APPENDIX L

ESTIMATED SALES AND ECONOMIC IMPACT RATIOS FOR 1975

L.0 ESTIMATED SALES AND ECONOMIC IMPACT RATIOS FOR 1975

The 1975 estimated impacts were determined using the same general method as the 1972 estimates which are described in detail in the preceeding appendices. To obtain economic impact estimates for 1975, impact ratios for value added to sales, sales to employment, wages and salaries to sales, and annual capital expenditures to sales were estimated and applied to expenditures estimates for each of the goods and services included in the 1972 analysis. The estimated expenditures and impact ratios are presented below along with a brief description of the estimating procedure. For a detailed explanation of each procedure see the appropriate appendix for the 1972 estimates.

Exhibit L-1 presents the expenditure estimates for 1975. Estimated expenditures for boats, motors, and trailers are based on the Boating Industry Association data for retail sales. (See Appendices B, C and D.) Manufacturers' shipments are estimated using the gross margins determined from the estimates made for 1972. Fishing tackle sales are based on revenues from the ten percent excise tax on a large portion of manufacturer's shipments. The proportion of tax revenues to total value of shipments in 1972 was calculated. Assuming that proportion remains relatively constant, the value of 1975 tax revenues was then used to estimate the 1975 value of shipments. The sales estimates for wholesale and retail trade were made assuming the same gross margins as existed in 1972. (See Appendix A.)

The value of marina/boat yard revenues in 1975 was based on an estimate of 2,900 coastal marinas (an increase of about one percent per year in number) and average revenues of \$159,000 per marina. The result was then inflated based on consumer price index for recreation taken from the Survey of Current Business published by the Bureau of Economic Analysis. (See Appendix E.)

Estimated boat fuel sales are based on the volume of marine fuel sold in 1975, obtained from the Department of Transportation and the average price of gasoline in 1975. For details on the estimating procedure see Appendix H.

The value of boat insurance premiums was estimated by adding the value of premiums for new watercraft entering the boat population between 1972 and 1975 to the 1972 estimate of premiums paid. The result was inflated by fifteen percent to account for an average increase in the cost of boat insurance over the three year period. The total premiums for new boats entering the population was based on the average value of an annual premium for each of the three boat types (outboard, inboard and inboard/outdrive). The number of insured boats was estimated assuming that the percent of boats insured to total boats in the population remained constant between 1972 and 1975. (See Appendix J.)

Estimates of retail revenues from food, lodging, transportation, bait, and commercial sportfishing vessels associated with marine recreational fishing were made using an historical trend analysis based on data from the National Survey of Fishing and Hunting conducted every five years beginning in 1955. The least squares approximation and details of the estimating procedure for each of these items is described in Appendix I.

Exhibit L-1

Expenditures Estimates For 1975

	Manufacturing	Wholesale Trade	Retail Trade
Fishing Tackle			
Total	260	292	620
Marine Recreational Fishing	57.2	64.3	136
Boats			
Total	661	-	989
Marine Recreational Fishing	139	-	208
Motors			
Total	304	-	411
Marine Recreational Fishing	33	-	45
Trailers			
Total	71	-	88
Marine Recreational Fishing	15	-	18
Marinas			
Total	-	-	540
Marine Recreational Fishing	-	-	240
Commercial Sportfishing Vessels	-	-	122
Boat Fuel			
Total	233	348	410
Marine Recreational Fishing	49	73	86
Food			
Total	-	-	2,435
Marine Recreational Fishing	-	-	247
Lodging			
Total	-	-	1,234
Marine Recreational Fishing	-	-	63
Transportation			
Total	1,274	1,903	2,238
Marine Recreational Fishing	133	198	233
Boat Insurance			
Total	-	-	266
Marine Recreational Fishing	-	-	56
Bait			
Total	-	-	810
Marine Recreational Fishing	-	-	216
Other			
Total	-	-	170

"Other" sales are assumed to be ten percent of the total value of retail sales for saltwater sportfishing. This is the same amount in terms of percent of total sales for 1972 and was determined using data from the 1970 National Survey of Fishing and Hunting. (See Appendix K.)

Economic impact ratios for 1975 are presented in Exhibit L-2. To determine the economic impact ratios for 1975, the 1972 ratios (described in detail in the preceding appendices) were adjusted based on national trends in manufacturing, wholesale trade, and retail trade. For example, to estimate the 1975 ratio of sales to employment for fishing tackle, the 1972 ratio was multiplied by a factor equal to the percent change in retail sales between 1972 and 1975 divided by the percent change in employment.

That is,

$$r_{1975,j,k} = r_{1972,j,k} \times a_{j,k}$$

Where $r_{i,j,k}$ = economic impact ratio in year i for impact j
(j = value added, employment, wages and salaries,
j annual capital expenditures) for good or service
k.

$a_{j,k}$ = adjustment of impact j relative to sales from
1972 to 1975 for good or service k.

In the above example the 1972 ratio of sales to employment for fishing tackle, \$47,600/person-year, was adjusted by a factor of 1.25. The adjustment factor was determined as follows: the value of total retail sales increased 31 percent between 1972 and 1975, while the total increase in employment in retail trade was 4.8 percent. The adjustment factor equals 1.31 divided by 1.048 or 1.25. The 1975 ratio is estimated at \$59,500 per person-year. Implicitly this adjusts for the inflationary effects on the value of sales while controlling for the real increase (or decrease) in employment (or wages and salaries, and capital expenditures). Data for the adjustment factors were obtained from the Bureau of Economic Analysis Survey of Current Business for the years 1972 and 1975. These adjustments were made under the assumption that the economic characteristics of each good or service conformed to the national trend. If the value of retail sales for the nation increased by 31 percent while employment increased only 4.8 percent nationally, then the value of retail sales and employment for fishing, or boats, or motors, etc. increased in the same proportion between 1972 and 1975.

Adjustment factors for employment wages and salaries and annual capital investment in manufacturing fishing tackle, boats, motors, and trailers were determined from national data for durable goods. The factors for these items as well as food, bait, and other expenditures at the level of retail trade (and wholesale trade) were based on data for all retail (and wholesale) trade. Adjustment factors for lodging, insurance, marinas and commercial sportfishing vessels were based on data for all services.

Exhibit L-2

Estimated Economic Impact Ratios For 1975

	<u>Sales</u> <u>Employment</u> (\$/person-year)	<u>Wages and Salaries</u> <u>Sales</u> (\$/\$ Sales)	<u>Value Added</u> <u>Sales</u> (\$/\$ Sales)	<u>Capital Expend.</u> <u>Sales</u> (\$/\$ Sales)
Fishing Tackle				
Manufacturing	\$ 23,100	0.275	0.63	0.043
Wholesale Trade	138,900	0.073	0.10	0.006
Retail Trade	59,500	0.116	0.38	0.029
Boats				
Manufacturing	33,700	0.212	0.44	0.012
Retail Trade	102,100	0.075	0.16	0.006
Motors				
Manufacturing	86,250	0.171	0.46	0.031
Retail Trade	102,100	0.075	0.16	0.006
Trailers				
Manufacturing	54,300	0.165	0.45	0.031
Retail Trade	102,100	0.075	0.16	0.006
Marinas	37,000	0.27	0.40	0.02
Commercial Sport- fishing Vessels	25,000	0.29	0.60	0.07
Food	20,500	0.230	0.36	0.027
Lodging	18,200	0.265	0.53	0.094
Insurance	137,600	0.088	0.24	0.0
Bait	81,000	0.082	0.20	*
Other	56,300	0.12	0.20	0.02

* Estimate determined using an alternate procedure.

Impacts related to boat fuel and travel were estimated separately to take into account the large increase in petroleum prices between 1972 and 1975. Impact estimates for boat fuel were based on the increase in fuel consumption between 1972 and 1975. During that period boat fuel consumption increased by six percent.* Employment is assumed to have increased by that amount. The remaining impacts are estimated based on that net increase plus an inflationary adjustment. Impacts related to travel were adjusted in a similar fashion. Based on the least squares approximation in Appendix I, the real increase in travel expenditures between 1972 and 1975 was ten percent. Employment was increased by that amount, and the remaining impacts were adjusted based on the real growth plus inflation in wages and salaries and capital costs.

The value added to sales ratios in manufacturing were made using data from the Annual Survey of Manufacturers published by the Bureau of the Census. Similar type data for wholesale and retail trade were not available. It was assumed that at these levels of activity the ratios of value added to sales remained constant between 1972 and 1975. That is, employee compensation, rent, property-type income, and indirect business taxes increased in a constant proportion with sales.**

The estimated economic impacts were then determined by applying the impact ratios to the sales estimates. The value added, wages and salaries, and annual capital investment impacts were determined by multiplying the sales estimate by the appropriate impact ratio. To obtain the employment impact the sales estimate is divided by the sales to employment ratio.

* Boat fuel consumption estimates obtained from the U.S. Department of Transportation, Federal Highway Administration. In 1972 and 1975 gallons of boat fuel consumed were 686,763,000 and 729,718,000 respectively.

** Indirect business taxes are excluded from value added in manufactures.

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