

THE ECONOMIC VALUE OF LONG ISLAND SALTWATER RECREATIONAL FISHING

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INTRODUCTION

New York's marine recreational fishery is known to be a very important part of the culture and economy of Long Island, New York City, and the counties bordering the Hudson River Estuary. The attention given this fishery is exemplified in the numerous tournaments, service businesses, retailers, marinas, magazines, and organizations associated with New York's coastal environment.

As in most fisheries, the resource generating the products and services has received much attention from biologists and management agencies. Numerous articles and reports dealing with fishery biology and management are discussed at length by state, regional, and federal agencies and councils.

Prior to 1984, however, very little research focused on the economic benefits of, and participation in, the marine sportfishery. This lack of information was recognized by the New York Sea Grant Institute, the New York State Department of Environmental Conservation (Division of Marine Resources), and other groups concerned with marine resource and recreational fishery issues. These institutions, agencies, and organizations realized that public policy decisions concerning recreational fishing were being made in the absence of any hard data on the economic benefits which arise from recreational fishing. Consequently, they supported and funded this study which provides estimates of these values.

Two types of measures of economic benefit are generally employed in studies of this nature. The first of these is what is known as "direct expenditures." These are the expenditures actually made by recreational fishermen as a result of their fishing activity, for example, expenditures for food, bait, fuel, party or charter boat fares, and boating and fishing equipment. The second type of measure, "consumers' surplus," is more abstract, but very important because it measures the net value of recreational

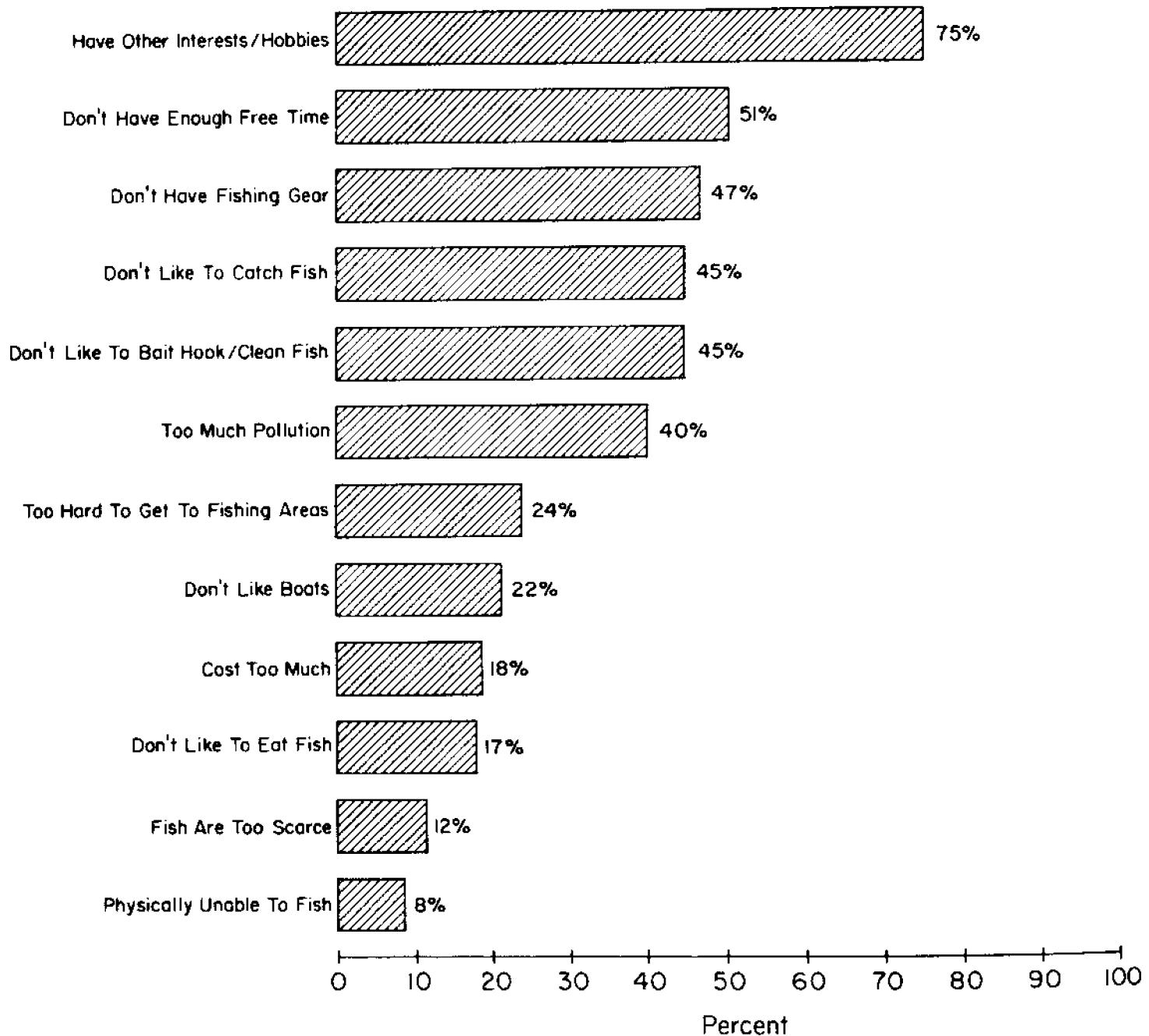
fishing to the fishermen themselves. Consumers' surplus, or net economic benefit, can be viewed as the maximum amount that an angler would be willing to pay to continue to have the opportunity to engage in saltwater recreational fishing.

THE DATA

Data for this study were collected with two types of surveys. The first of these, an intercept survey, surveyed recreational fishermen at marinas, fishing piers, party boat docks, and other places from which fishing trips originate. The intercept surveys covered fishing trips to the Long Island Sound, South Shore Bays, Peconic Bay, and Atlantic Ocean. Information was gathered on the recreational anglers' socioeconomic characteristics (e.g., income, family size, educational level), expenditures, and number of fishing trips by fishing region and season. The intercept survey began in 1985 with charter and party boat fishermen and continued in 1986 and 1987 by looking at all types of recreational fishing (charter boat, party boat, private boat, rental boat, and shore [including surf], dock or pier).

The second survey, done by telephone, was designed to determine the total number of people who participated in recreational fishing. Calls were made to randomly-selected residential telephone numbers in the New York City and Westchester, Rockland, Nassau, and Suffolk County areas, and respondents were asked if anyone in their households fished. In non-fishing households, residents were asked to indicate whether specific possible reasons for not fishing applied to them. The results of this questioning are shown in Figure 1, and indicate that many individuals have more than one reason for not fishing. In fishing households, residents were questioned on how often they fished, where they fished, and what species they fished for.

Figure 1 – Reasons for Not Fishing



PARTICIPATION IN THE FISHERY

The data from the telephone surveys were used to estimate rates of participation in saltwater fishing. Participation rates were computed separately for Long Island (Nassau-Suffolk) and Metropolitan New York City (five boroughs plus Westchester and Rockland Counties). These participation rates were then multiplied by the total number of households in each region to compute the number of households that had at least one fishing member. The mean number of fishing households was 583,000, with 409,000 from the Metropolitan New York City area and 174,000 from the Long Island area. The 95 percent confidence interval for the total number of fishing households had a lower bound of 472,000 and an upper bound of 694,000. The total number of anglers was computed by multiplying the total number of fishing households by 2.004, which was the average number of anglers per fishing household. This data is summarized in Table 1.

The number of upstate or out-of-state households that participated in this fishery was roughly 5 percent of the total (another 25,000 households, or approximately 50,000 anglers). Their economic contribution was not factored into the totals presented in this report.

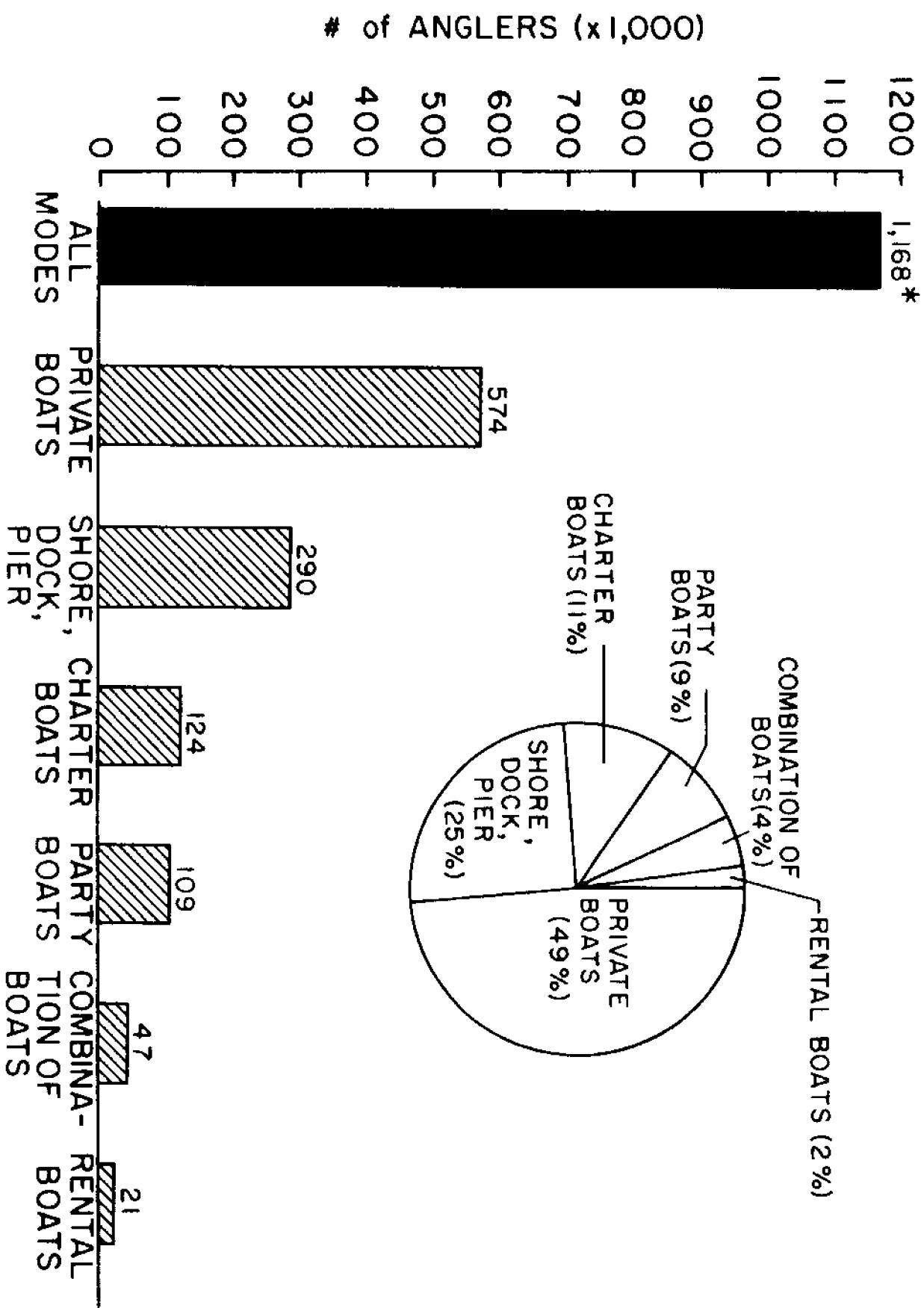
The telephone survey also gathered information on the primary fishing modes of the anglers and the area in which they primarily fished. Figure 2 contains the information on the number of anglers, by fishing mode. As seen in this graph, fishing from private boats (owned by individuals rather than businesses) was the predominant type of fishing (49%), with fishing from the shore, dock, or pier the second most frequent (25%). Charter and party boats each comprised roughly 10 percent of the total, while fishing from rental boats was the primary mode of fishing for about 2 percent of the anglers. The "combination of boats" category was for those anglers who did not have a primary mode of fishing, but did some fishing from each boating category. In

TABLE 1

ESTIMATED NUMBER OF FISHING HOUSEHOLDS
(mean estimates and 95% confidence limits)

	Mean estimate	Lower bound estimate	Upper bound estimate
Metro NYC area	409,000	322,000	496,000
Long Island area	174,000	150,000	196,000
TOTAL	583,000	472,000	694,000

Figure 2 – Total Number of Anglers, by Primary Mode of Fishing.



the analysis which follows, this category was merged into the other three boating modes, assuming an equal distribution across modes.

Figure 3 contains the total number of anglers by their primary fishing location. As can be seen in the graph, Long Island Sound and the South Shore Bays (Great South Bay, Jamaica Bay, Moriches Bay, and Shinnecock Bay) were of approximately equal importance, followed by the Atlantic Ocean and Peconic Bays. The "Elsewhere/Unreported" category includes the Hudson River, New York Harbor, and those anglers who could not identify their primary fishing location.

Figure 4 contains information about what species anglers consider most important. The cross-hatched area is the percent of anglers who said a particular species was important to the angler. Anglers were allowed to name more than one species as important in this category. The dotted area shows the percent of anglers who regarded a particular species as their single favorite species. Winter flounder, bluefish, and fluke were the most important species by either measure. For example, 57 percent of the anglers said that bluefish was an important species to them, while 40 percent identified it as their favorite species.

CONTRIBUTION TO THE REGIONAL ECONOMY

The contribution of saltwater recreational fishing to the region's economy was measured by multiplying the number of fishermen in each fishing mode, by the average number of trips taken in each mode, by the average expenditure per trip in each mode. The data for these calculations were collected in the intercept surveys, which were conducted at marinas, launching ramps, liveries, fishing piers, and shore fishing areas. Over 1,800 usable surveys were collected for party boat anglers, over 300 for charter boat anglers, over 1,300 for private boat anglers, over 900 for shore anglers, and

Figure 3 - Total Number of Anglers, by Primary Fishing Location.

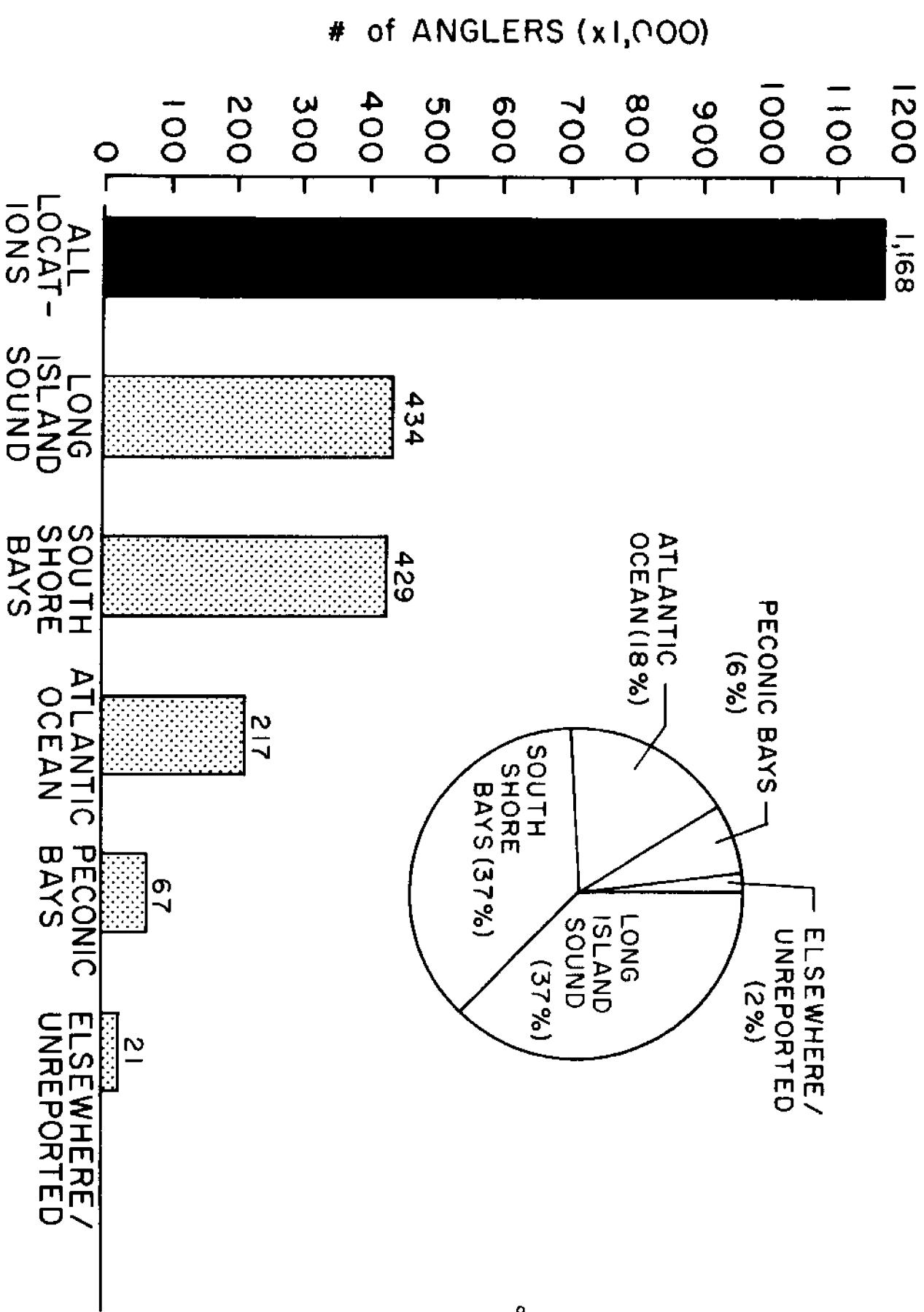
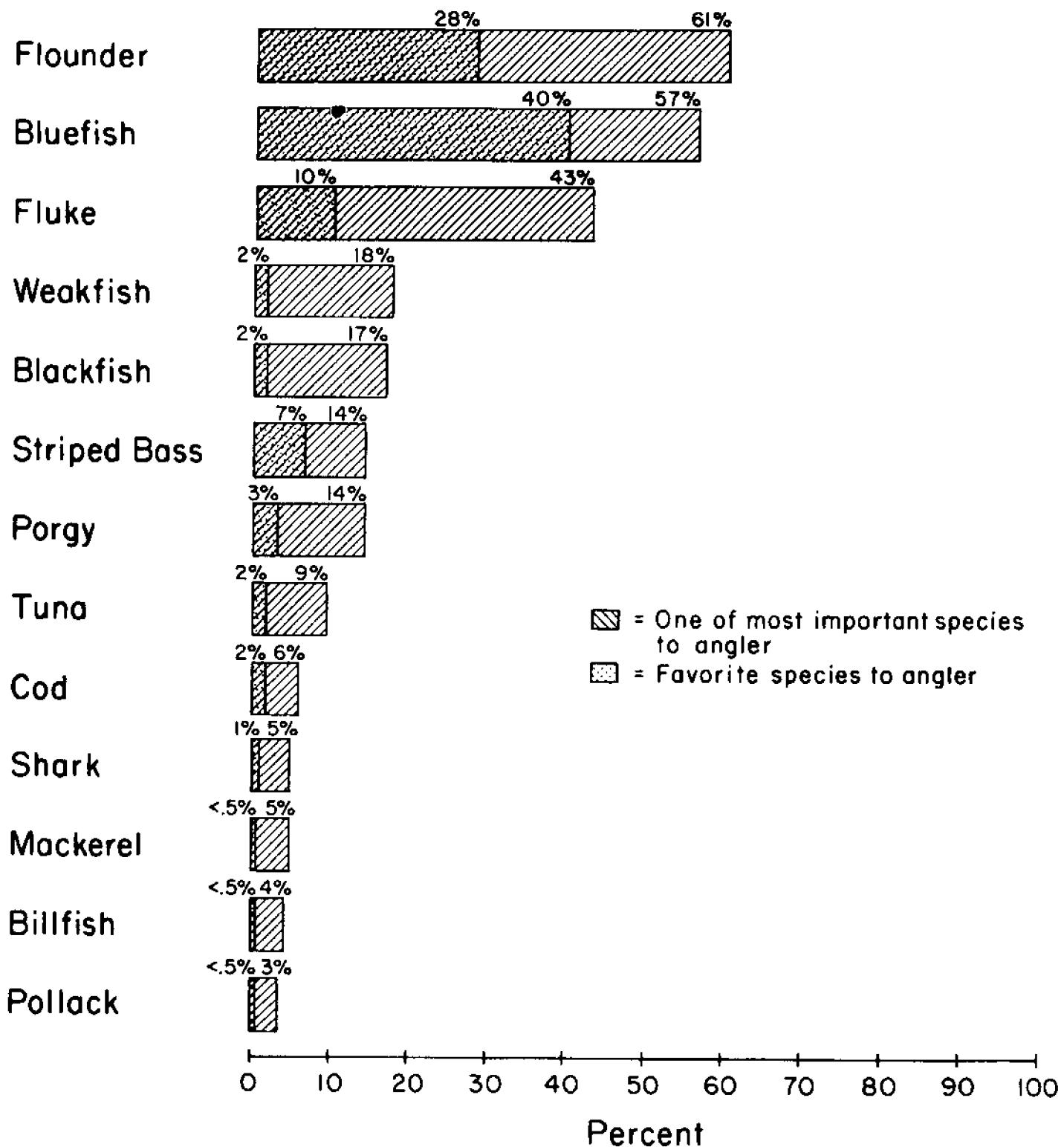


Figure 4 - Species Fished.



over 250 for rental boat anglers.

The difficult step in this analysis was computing the averages, since an intercept survey does not generate a random sample. Rather, people who fish more frequently are more likely to be sampled, which would generate an upward bias in a simple average of the number of trips. A statistical procedure was developed to eliminate this bias. Researchers who are interested in this procedure should request the complete technical report for this project, which will be available shortly from the New York Sea Grant Institute.

The final step in computing total expenditures was to add those expenditures made on a seasonal basis, such as boating and fishing equipment. Annual expenditures on equipment were taken directly from the survey, but to take the total market value of all fishermen's boats and count them as expenditures in the current year would drastically overstate the economic contribution of recreational fishing. To avoid this problem, we took the actual yearly cost of the boats. This would either be the mortgage payment for those who hold mortgages, or the interest that owners could earn if they invested their money rather than paying cash for a boat. Ten percent is taken as a rough average of the interest rates that recreational fishermen can borrow and lend at, so ten percent of the market value of the boat is included in the totals as the expenditure on the boat itself. Maintenance, fuel, insurance, mooring fees, and expenditures of this nature were also included. These seasonal expenditures (on the boat and fishing equipment) were added to the trip expenditures (such as bait, transportation, and food) in two separate fashions.

First, it was assumed that the seasonal expenditures which the angler reported on the survey were the expenditures of the entire household. This is called the lower bound of expenditures. Second, it was assumed these

expenditures which were reported were the individual's share of the total household expenditures. This is reported as the upper bound expenditures.

The terms "upper" and "lower" bound are used because the true measure of expenditures is likely to lie between the upper bound and lower bound. Table 2 reports estimates of total expenditures, given the various assumptions. The estimate which is likely to be closest to the true value would be the one which employed the mean estimates of expenditures and the mean estimates of the number of anglers. This is equal to \$1,139 million (1987 dollars). It should be noted that these measures include only the expenditures by residents of New York City, and Westchester, Rockland, Nassau, and Suffolk Counties. The expenditures by upstaters and tourists from out-of-state would increase the totals by a few percentage points, or \$20 to \$40 million.

These expenditures reported in Table 2 are the direct contributions of recreational fishing. Since part of each dollar spent is re-spent by the people who receive it as income, there will be indirect or "ripple" effects from recreational fishing. Economists employ the concept of a multiplier to measure these ripple effects. Studies from other regions indicate that a multiplier of two to three would be appropriate for New York saltwater fishing. This implies that for every dollar spent on recreational fishing, the total effect on the region's economy would be two to three dollars; or that the total effect of recreational fishing on the region's economy could be from \$1,524 million (lowest estimate from Table 2 multiplied by two) to \$4,776 million (highest estimate from Table 2 multiplied by three).

This study was conducted after both the deterioration of the striped bass fishery and the decline of the Peconic Bay due to brown tides. If these changes had not taken place, the level of fishing activity and economic contribution of the fishery might have been even higher. Other factors which may have constrained the level of fishing activity include loss of access to

TABLE 2
ESTIMATES OF TOTAL EXPENDITURES

Lower bound estimate of expenditures ¹	\$ 762,000,000
Lower bound estimate of # of anglers ²	
Mean estimate of expenditures	\$1,139,000,000
Mean estimate of # of anglers	
Upper bound estimate of expenditures	\$1,592,000,000
Upper bound estimate of # of anglers	

¹based on lower end of 95% confidence interval, 472,000 households

²assumes reported boating expenditures are per household

fishing areas, overall deterioration in water quality, and reductions in fish stocks due to fishing pressure from both commercial and recreational fisheries. Improved conditions in the recreational fisheries could result in even larger economic benefits than those documented in this report.

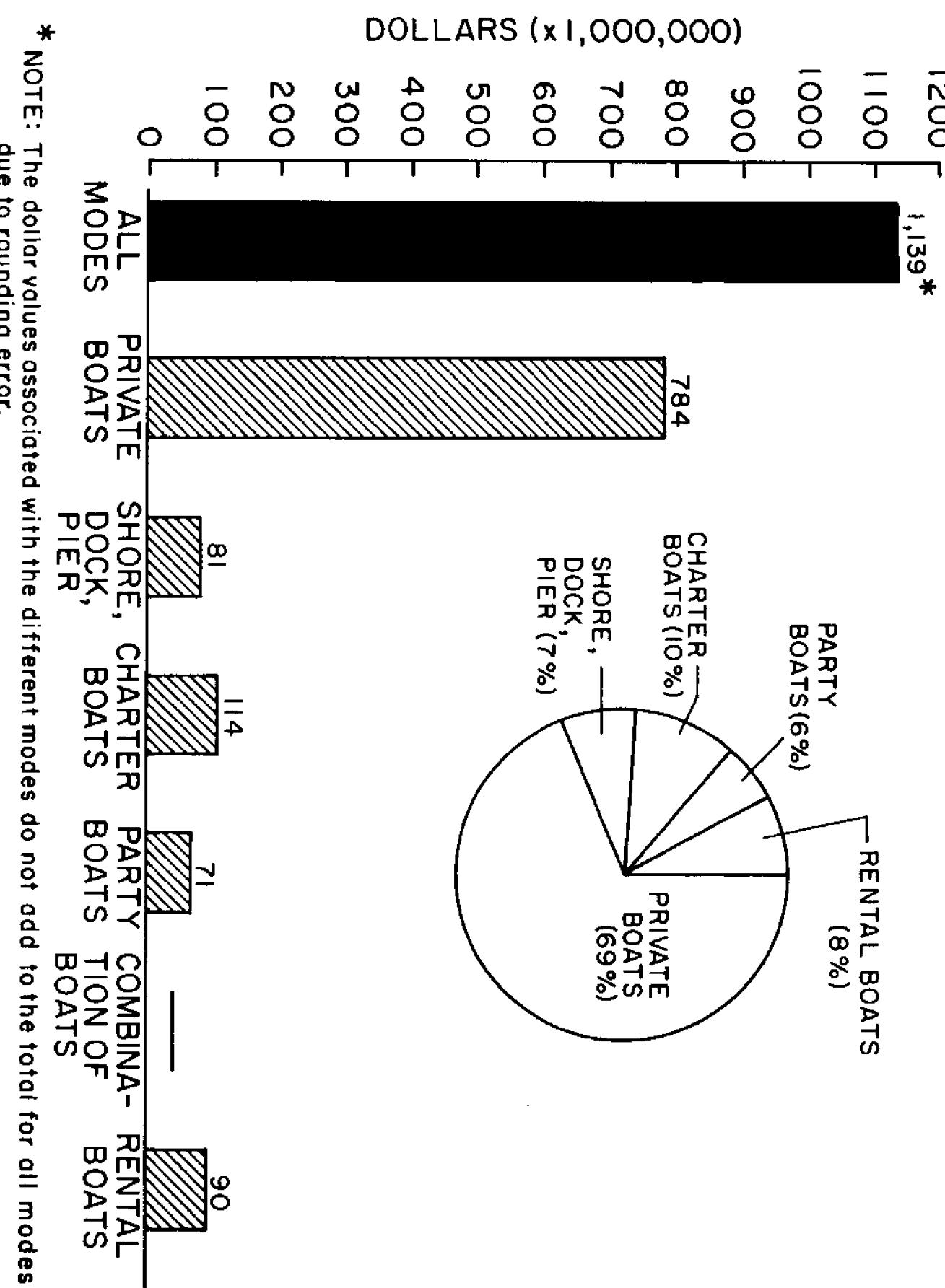
Figure 5 illustrates the direct expenditures (not counting ripple effects) by mode of fishing. While private boat fishing accounts for 49 percent of the number of fishermen (see Figure 2), it accounts for 69 percent of the total expenditures. This is due to the expenditures associated with owning and operating a fishing boat.

BENEFITS TO THE ANGLERS

The above measures of expenditures show how important recreational fishing is to the regional economy. However, there is another economically important question. How valuable is recreational fishing to the anglers who participate in it? This measure is important because public policy decisions are based not only on regional economic effects, but also on the impact such decisions have on the quality of life for various segments of society. This impact can be measured by a concept that economists refer to as consumers' surplus (net economic benefit). Consumers' surplus is defined as the difference between the maximum amount an individual would be willing to pay for an activity or good and what he currently pays for it. While this may seem to be an abstract concept, it has a straightforward interpretation when applied to recreational fishing. It can be thought of as the maximum amount an angler would be willing to pay to continue to engage in recreational fishing, or how much an angler would have to be compensated to give up recreational fishing.

Consumers' surplus can be measured as the area between the market demand curve (which reflects how much an individual is willing to pay for a good or

Figure 5 - Total Annual Expenditures (Mean Estimates), by Mode of Fishing.



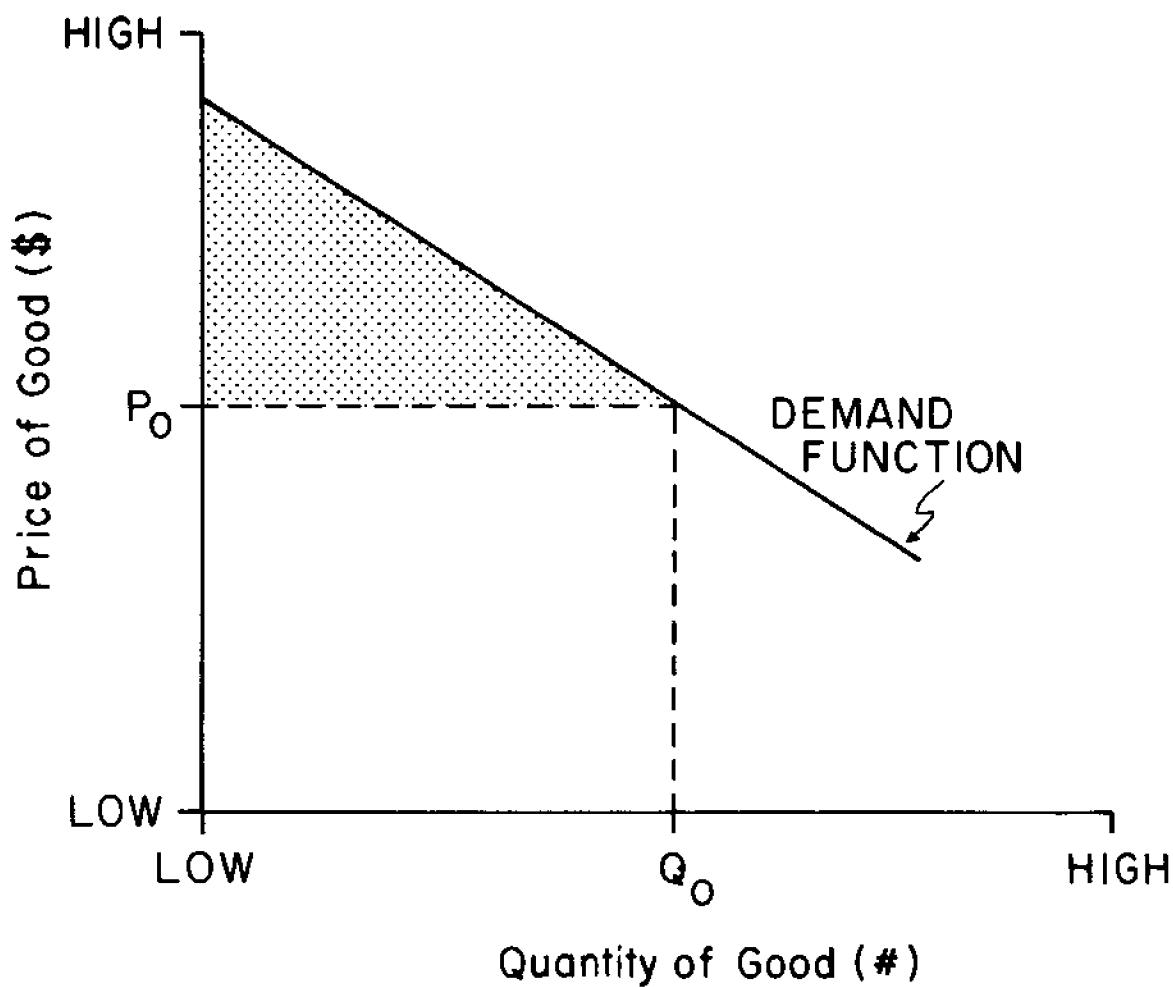
activity) and the market price (which reflects how much he has to pay). This is shown as the shaded area in Figure 6. The interested reader is referred to any principles of economics textbook for a more thorough discussion of this concept.

Although no market price exists for recreational fishing, it is possible to estimate a demand curve using the angler's travel costs as a substitute for price. Although travel cost does not represent the true (and unknown) price of recreational fishing, economists have shown that the area under a travel cost demand curve is equal to the area under the demand curve for the corresponding recreational activity. By statistically analyzing the fashion in which the number of trips varies with travel cost, it is possible to derive a demand curve for recreational fishing. This process reveals that the net economic benefit (consumers' surplus) of recreational fishing is equal to between \$341 million and \$1,024 million per year. The previously-mentioned technical report for this project explains this derivation in much greater detail.

CONCLUSIONS

It is quite apparent that New York's saltwater recreational fisheries are extremely important to the region's economy, contributing on the order of a billion dollars a year (before multiplier effects). Another measure of value, the net benefit of the activity to the anglers themselves, is approximately as great. Although the sensitivity of these economic benefits to changes in the quality of the fishery needs further study, it is apparent that the deterioration of recreational fishing would have serious economic consequences.

Figure 6 – Demand and Consumer Surplus.



P_0 = MARKET PRICE

Q_0 = ACTUAL QUANTITY DEMAND
AT MARKET PRICE

= CONSUMER SURPLUS