Sport Fishing Expenditures and Perceptions of Fishing Quality:

An Assessment of Saltwater Fishing in Northern New England

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Preface

During the summer of 1989, a preliminary study of coastal sport anglers in New Hampshire and southern Maine was funded by the Hubbard foundation (Donnelly, Vaske, Lindsay, & Nelson, 1990). A total of 855 saltwater anglers were surveyed in that investigation; 235 bridge and jetty anglers, 160 private boat anglers, and 460 charter boat anglers. This brief on-site survey included questions on (1) the anglers' experiences the day they were interviewed [e.g., number of fish caught, species sought, length of fishing trip, etc.]; (2) their prior fishing experiences and preferences; (3) their evaluations of New Hampshire and Maine as fishing destinations; and (4) their assessment of alternative management actions. To minimize the imposition on the angler's recreation, only a limited number of questions were included from each of these categories.

The current project built on the knowledge gained from the 1989 investigation. Anglers who provided their names and addresses on the 1989 survey, as well as individuals who completed other surveys conducted by the New Hampshire Fish and Game Department were mailed a questionnaire to (1) obtain a more in-depth assessment of their perceptions, and (2) evaluate the economic expenditures associated with coastal sport fishing in the region. Perceptual questions included items pertaining to stock size, existing regulations, future management proposals, and the substitutability of saltwater and freshwater fishing.

This research is intended to supplement current information on fish harvests and stocks, and to assist managers in assessing the types of impacts different management practices have on sport fishing. By providing decision-makers with an improved understanding of the size and economic impact of the sport fishing industry, and an awareness of the sport fishermen's beliefs about management actions, more representative resource allocations among sport fishing and other user groups such as commercial fishing can be made.

Major Findings

* This project builds on the knowledge gained from a preliminary study of coastal sport anglers conducted in New Hampshire and southern Maine in 1989. A total of 535 anglers were mailed a questionnaire; 325 of these individuals completed and returned the survey (Response rate = 61%).

* Saltwater fishermen in our New Hampshire and Maine samples were experienced anglers. On average, both groups had been saltwater fishing for about 20 years. Bluefish was the preferred species; striped bass and haddock ranked next in popularity.

* The three most important motivations for saltwater fishing were relaxation, being outdoors, and getting away from the regular routine. Catching fish was not considered to be the most important part of the fishing experience for our samples.

* About a half of the New Hampshire sample and two thirds of the Maine respondents evaluated their state as providing high quality saltwater fishing. More New Hampshire fishermen than Maine anglers, however, believed that the number of saltwater gamefish in their state had declined since they started fishing there. Both groups attributed this decline to overharvesting by commercial fishermen. Overfishing by sport anglers was not considered a problem.

* A saltwater fishing license was not viewed favorably by either group. While about half felt that the revenue from a license would help to improve fishing access and the fish stocks, a majority believed that a license would be an unfair burden on saltwater fishermen, that fishing along the coast has always been free and should remain so, and that if a license were required they would go somewhere else.

* Placing a moratorium on species which are at low levels, minimum size limits, daily bag limits, and stocking fish were rated as the most acceptable management practices. The least acceptable practices for both samples were restricting fishing to certain designated areas, and prohibiting the use of certain types of bait and hooks.

* Almost all of the individuals in our sample also participated in freshwater fishing. While freshwater fishing was considered to be a good substitute for saltwater angling, only about a third of each group, believed freshwater provides the same kind of experience as saltwater, and nearly three quarters preferred to catch saltwater over freshwater fish.

* The 231 individuals in the New Hampshire sample reported a total of $152,763 in *operating* costs during the 1990 season. Food and beverages ($28,967), fuel for their vehicles ($23,170), charter / party boat fees ($20,370), and bait and fishing tackle ($20,039), accounted for most of these total expenditures.

* On a per person basis, the highest average expenditures were for boat maintenance ($226.95), boat storage ($222.31), and taxidermy and mounting ($221.20). Only a third of our sample, however, had boat maintenance expenses, and a much smaller percentage reported boat storage (6%) or taxidermy and mounting (2%) expenses. For the majority of items, most of the expenditures were made in New Hampshire.

Major Findings (cont.)

* A total of $65,345 was spent by the Maine sample (n = 94) for 1990 saltwater fishing *operating* expenses. Similar to the New Hampshire respondents, the largest amounts were spent on fuel for their vehicle ($11,935), food and beverages ($11,659), and bait and fishing tackle ($8,885). Lodging and overnight fees ($9,471), also contributed substantially to the expenses noted by the individuals from Maine.

* Among the Maine respondents, the highest average per person cost was for lodging and overnight fees ($326.59), however, less than a third of the individuals reported these expenses. Average food and beverage expenses ($153.41) and auto fuel costs ($147.35), which were reported by most of the Maine sample were also fairly high. The highest proportion of these expenditures were made along the Maine coastline or inland.

* The 1990 *capital* expenditures for saltwater fishing by the New Hampshire sample totaled $112,525. The highest expenditures were for vehicles used for saltwater angling ($60,328), followed by tent trailers, campers and motorhomes ($10,500), boats, motors and trailers ($10,233), and fishing rods, reels, and rod holders ($9,455). While the average per person capital expenses were very high for certain items (e.g. $5,250 for tent trailers, campers or motorhomes; $2,872.74 for vehicles; and $1,333.33 for recreational property), very few individuals made these types of expenditures.

* The highest proportion of money spent along the New Hampshire coast was for recreational property, other marine fishing equipment, fishing tackle, and boat accessories. For the largest expenditures, however, most of the money was spent in inland New Hampshire.

* A total of $68,391 was spent by the Maine sample in 1990 on *capital* expenditures. Most of the money was spent on vehicles used for saltwater fishing ($26,365), boats, motors and trailers ($16,325), and recreational property ($8,741). Most of the expenditures were made along the Maine coastline or in inland Maine. A fairly high proportion of the expenditures for vehicles, tent trailers, campers and motorhomes, camping equipment and boats, motors and trailers, however, were made out-of-state.

* When these expenditures were expanded to the entire New Hampshire saltwater fishing *population*, the estimated total 1990 *operating* expenditures were $52,631,484, while the total 1990 *capital* expenditures were estimated at $37,286,509. Combining the operating and capital expenses resulted in an estimated total of $89,917,992 spent by the New Hampshire saltwater fishing population during 1990.

Acknowledgements

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Credits for the strength of this study are clearly shared. Responsibility for it's shortcomings rests solely with the authors.

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Introduction

Although commercial fishing has traditionally been viewed as the driving economic force in New England coastal communities, the available evidence suggests that the economic and harvests impacts associated with recreational fishing can no longer be considered inconsequential uses of fisheries resources. Adult anglers participated in about 1 billion man-days of recreational fishing during 1985, a 15% increase over 1980 (U.S. Dept. of the Interior, 1985). One in four adults fished in 1985 and over a third of the children participated in the activity. Total U.S. expenditures on fishing and fishing related items were $28.2 billion ($604/adult angler), up from $17.3 billion in 1980. These numbers translate into substantial revenue for communities associated with the sport.

Studies of the economic impacts associated with recreational angling conducted in Texas, Florida, Hawaii, Ohio, Michigan, Delaware, and California,[1] all indicate that anglers contribute significantly to local economies, and that coastal businesses rely heavily upon the sport fishing industry for economic stability. Hotels, service stations, local supply stores, and restaurants, as well as those who operate charter fishing boats all benefit (SFI, 1980; Munda & Hastings, 1987). Data collected by Hushak (1985), for example, shows that the charter boat industry on Lake Erie was a five million dollar industry which accounted for ten million dollars in total sales impact. The economic contribution of the charter boat industry to sport fishing on Lake Erie increased from under one percent in 1975 to about nine percent in 1984. To date, a similar type of analysis has not been completed in Northern New England.

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1. See for example: Texas (Ditton, Graefe & Lapotka, 1980), Florida (Milon, Ellerbrock, Brinkman & Logan, 1982; Milon, Mulkey, Riddle & Wilkowske, 1983; Ellerbrock & Milon, 1984; Milon & Adams, 1987), Hawaii (Meyer, 1987), Ohio (Hushak, 1985; Hushak, Morse & Apraku, 1986), Michigan (Jordan & Talhelm, 1982), Delaware (Falk, Graefe, Alkire & Swartz, 1983) and California (CIC Research, 1987; King & Flagg, 1982)

The current project complements the above mentioned studies and builds upon previous research conducted at the University of New Hampshire. During the summer of 1989, the investigators were funded by the Hubbard foundation to conduct a survey of coastal sport anglers in New Hampshire and southern Maine (Donnelly, Vaske, Lindsay, & Nelson, 1990). A total of 855 saltwater anglers were surveyed in that investigation; 235 bridge and jetty anglers, 160 private boat anglers, and 460 charter boat anglers. The brief on-site survey included questions on (1) the anglers' experiences the day they were interviewed [e.g., number of fish caught, species sought, length of fishing trip, etc.]; (2) their prior fishing experiences and preferences; (3) their evaluations of New Hampshire and Maine as fishing destinations; and (4) their assessment of alternative management actions.

This report expands on the knowledge gained from the 1989 investigation. Anglers who provided their names and addresses on the 1989 survey, as well as individuals who completed other surveys conducted by the New Hampshire Fish and Game Department were mailed a questionnaire to (1) obtain a more in-depth assessment of their perceptions and (2) evaluate the economic expenditures associated with coastal sport fishing in the region. Perceptual questions included items pertaining to stock size, existing regulations, future management proposals, and the substitutability of saltwater and freshwater fishing.

Given the growing numbers of recreational anglers, conflicts with commercial fishermen are likely to increase. Competition between sport and commercial fishermen in New England, for example, led to a recommendation for a daily catch limit of cod (McConnell & Sutinen, 1979). Concerns voiced by recreational anglers over the harvesting of bluefin tuna has stimulated an allocation program in the Northeast. Other popular species such as haddock and flounder may also be adversely affected by commercial catch.

Because conflicts between commercial and recreational anglers can occur with respect to resource use or allocation issues regarding access rights, it is important to understand the economic impact of coastal sport fishing upon regional economies. By systematically examining the characteristics and spending patterns of coastal sport anglers, the impact of sport fishing can be viewed in the total context of fisheries management policy. A companion document examines the economic impacts of commercial fisheries (Vaske, Donnelly, & Zwick, 1992).

The specific objectives of this study were to:

1) assess the economic expenditures associated with coastal sport fishing on the regional economies of New Hampshire and southern Maine,
2) assess sport fishermen's perceptions of fishing quality and the impact of management practices (e.g., catch limits, changes in amount and diversity of supply),
3) examine the substitutability of saltwater and freshwater fishing.

The results of this study are intended to assist decision-makers and resource managers at state and local levels in their planning efforts. Businesses which are supported by the sport fishing industry may also find the results useful. By providing decision-makers with an improved understanding of the economics of the sport fishing industry, more representative resource allocations among sport fishing and commercial fishing can be made. An assessment of the impact of the sport fishing industry may justify expansions in both management programs and sport fishing-related facilities.

Methodology

Study Design

Mailed questionnaires were used to collect the information needed to assess the study's objectives. The sample consisted of the individuals who provided a name and address on the 1989 on-site sport fishing survey (See Donnelly, et al. 1990 for details) and those who indicated that they participated in saltwater fishing on two other surveys conducted by the New Hampshire Fish and Game Department. A total of 535 usable

names and addresses were identified. These individuals were mailed the survey, a postage-paid return envelope and a cover letter describing the intent of the study. To ensure the best possible response rate, one follow-up mailing of the questionnaire, and a reminder post-card after the first mailing were used. Of the 535 individuals in the sample, 325 completed and returned the questionnaire (Response rate = 61%).

Survey Design

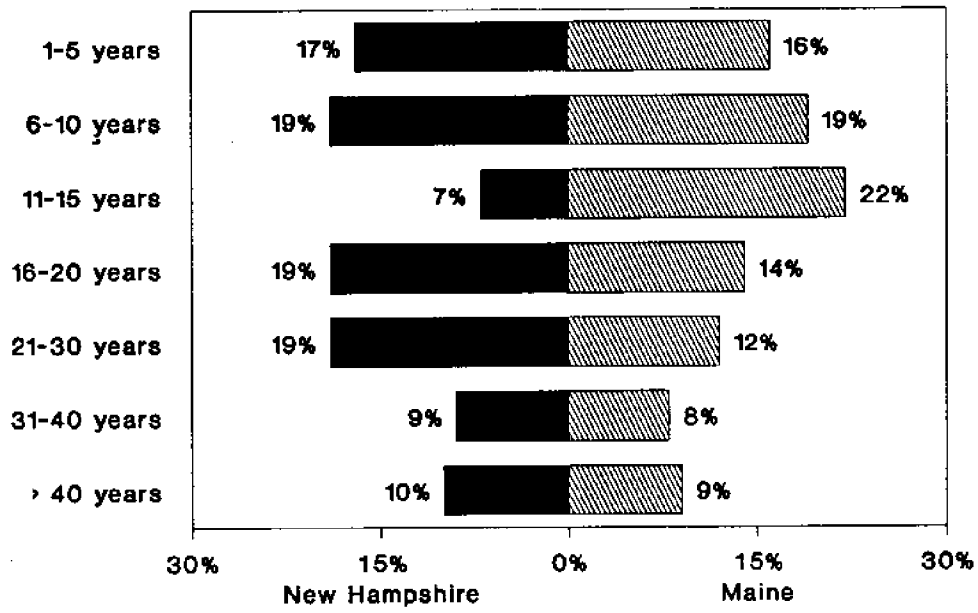
The mailed survey evaluated five general categories of issues. First, the amount and location of fishing related expenditures were measured (economic expenditures). Second, angler characteristics (e.g., socioeconomic, past experience, etc.), behavior patterns (e.g., participation rates, distribution of activity by season, etc.) and motivations for fishing were examined. Third, the study explored fishermen's perceptions of what constitutes a high quality fishing experience (e.g., importance of catch, type of species caught, amount and diversity of services, etc.). Fourth, the survey measured sport fishermen's perceptions of the substitutability of saltwater and freshwater fishing. Finally, their reactions to specific management practices, such as licensing and stocking were assessed.

Results

Prior Saltwater Fishing Experience

Saltwater fishermen in both New Hampshire and Maine were experienced in the sport (Figure 1). Just under a fifth of each group had participated between 1 to 5 years, and about an equal number had fished for 6 to 10 years. Twenty-six percent of the New Hampshire sample had saltwater fished for between 11 to 20 years, compared to 36 percent of the Maine sample. Over a third of the New Hampshire fishermen and 29 percent of the Maine sample had over 20 years fishing experience. The average number of years of saltwater fishing was similar for the two states (New Hampshire - 21 years; Maine - 19 years).

Figure 1
Number of Years Saltwater Fishing



Both the New Hampshire and Maine samples participated in a variety of types of saltwater fishing (Figures 2 to 5). For the New Hampshire angler, private boat fishing and charter boat fishing were most frequently reported. Pier fishing and private boat fishing were reported most often by the Maine sample.

Bluefish was the species that both the New Hampshire (29%) and Maine (42%) fishermen liked to catch most (Figure 6). Next in popularity for both samples were striped bass and haddock. The least desired species were Atlantic mackerel (New Hampshire - 3%) and winter flounder (Maine - 5%).

Figure 2
Number of Days Pier Fishing

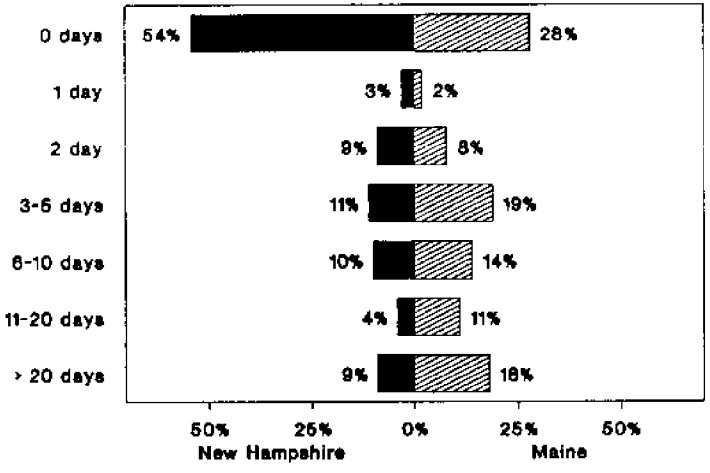


Figure 3
Number of Days Surf Casting

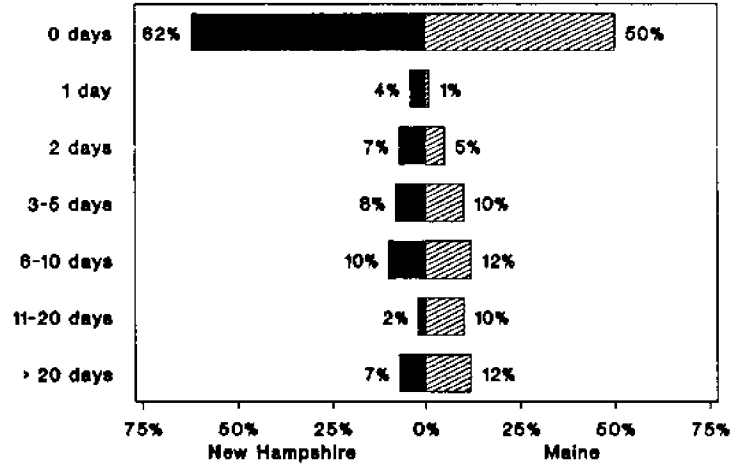


Figure 4
Number of Days Private Boat Fishing

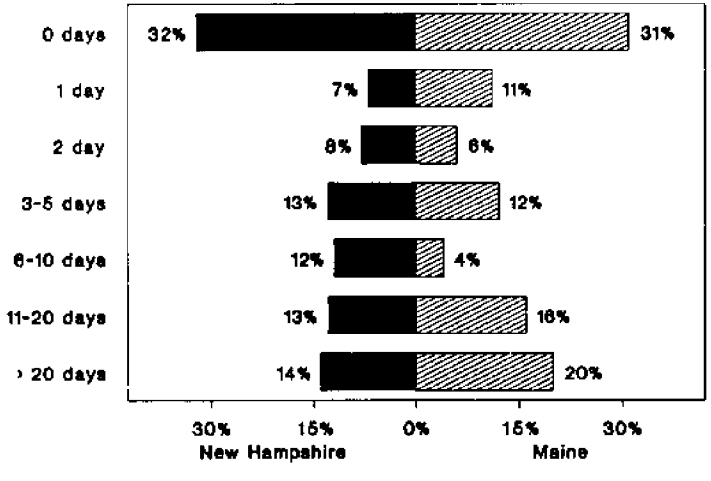


Figure 5
Number of Days Charter Boat Fishing

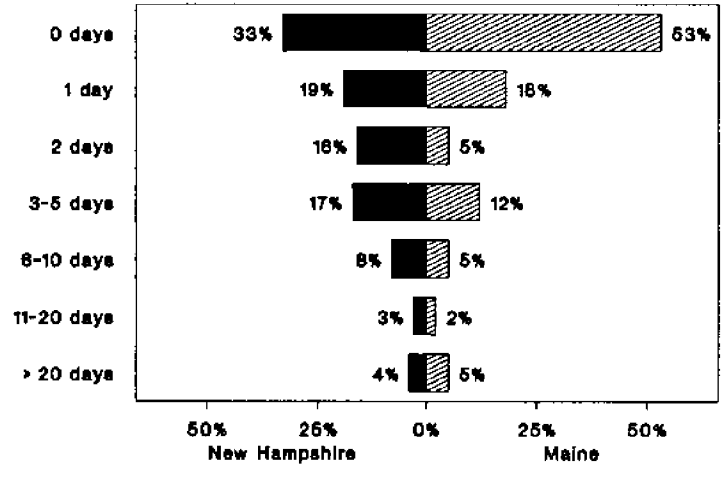
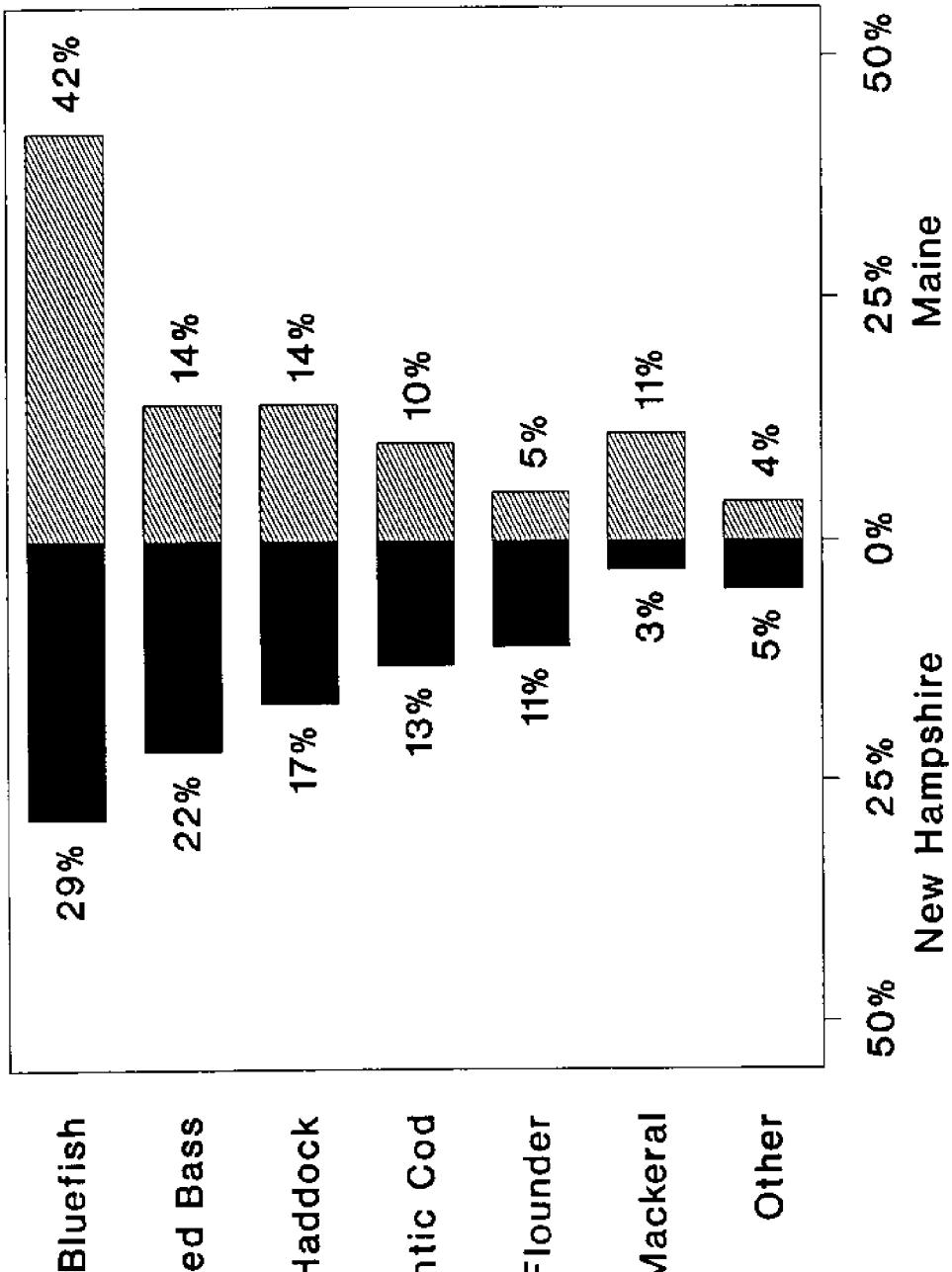


Figure 6
Most Desired Saltwater Species



Social Aspects of Saltwater Fishing

A quarter of the New Hampshire anglers and over a third (35%) of the Maine sample reported that most of their friends saltwater fish; about two thirds of both groups had at least some friends who participated in the sport (Figure 7). None of the Maine fishermen and only 3 percent of the New Hampshire respondents had no friends who saltwater fish.

A similar pattern was found for the number of co-workers who saltwater fish (Figure 8). While more of the respondents (11% for both groups) said they had no co-workers who sport fish, about two thirds reported some co-workers who participate in the sport. Nine percent of the New Hampshire sample and 16 percent of the Maine anglers stated that most of the individuals they work with saltwater fish.

The largest percentage of both the New Hampshire (82%) and the Maine (88%) samples reported saltwater fishing with friends (Figure 9). Seventy-six percent of the New Hampshire sample and 68 percent of the Maine respondents fished with family, while about half of each sample (New Hampshire - 43% and Maine - 57%) reported fishing alone. Only about a fifth of the respondents saltwater fished with business associates. Individuals in both samples most often fished with friends and family (Figure 10).

In terms of the respondents' typical fishing party, few individuals (New Hampshire - 1%, Maine - 3%) fish alone (Figure 11). About a fifth of each group fished with one other person, and about an equal percentage fished in groups of three. While just about a fifth went fishing in a group of 4 or more, over a third of each group could not specify a group size, because the numbers varied for each fishing trip. Around three quarters of both samples participated in other recreation activities with their saltwater fishing friends (Figure 12).

Figure 7
Close Friends Who Saltwater Fish

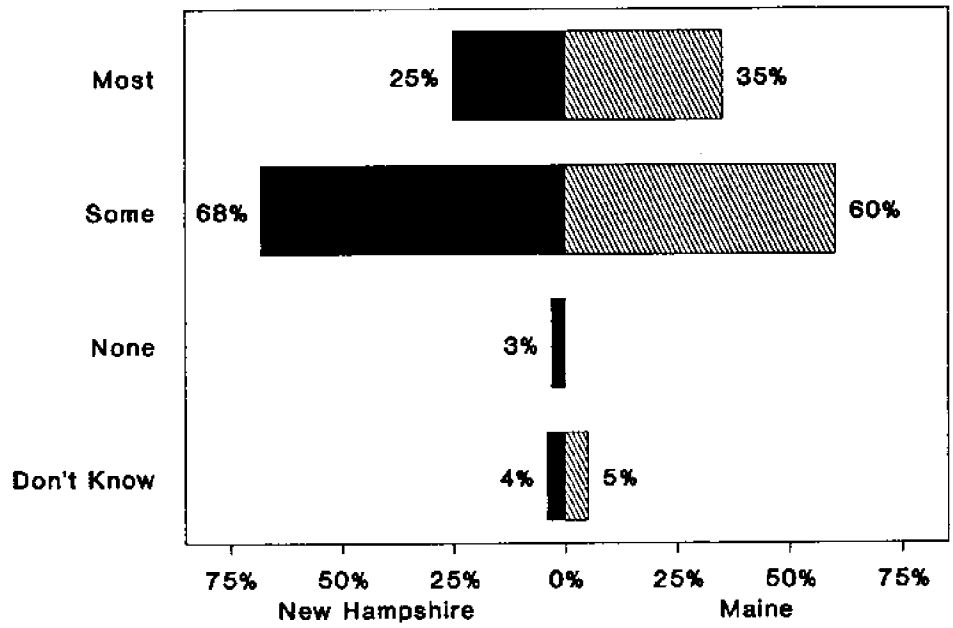


Figure 8
Co-workers Who Saltwater Fish

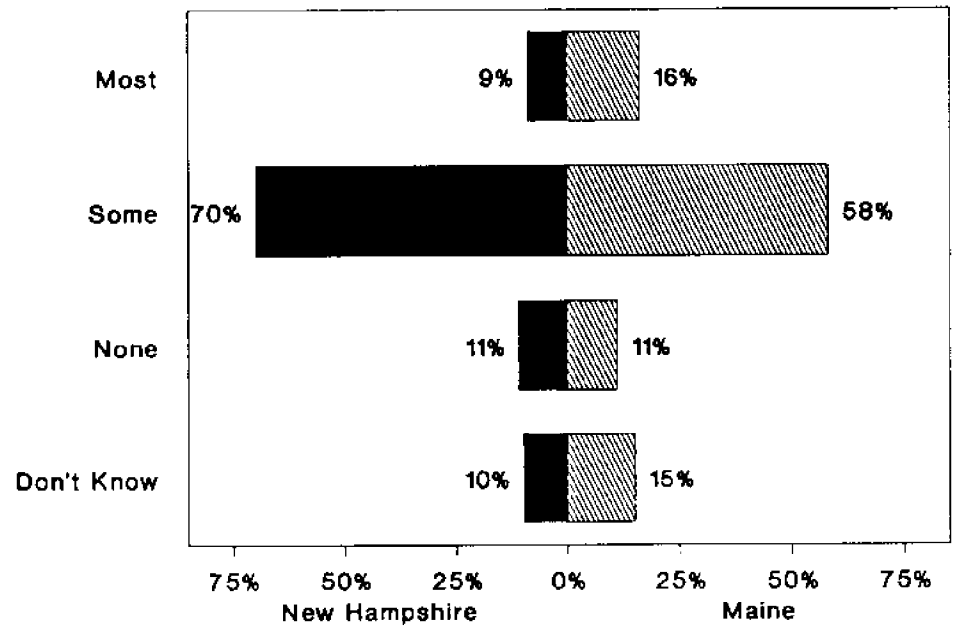


Figure 9
Fishing Party Members (In General)

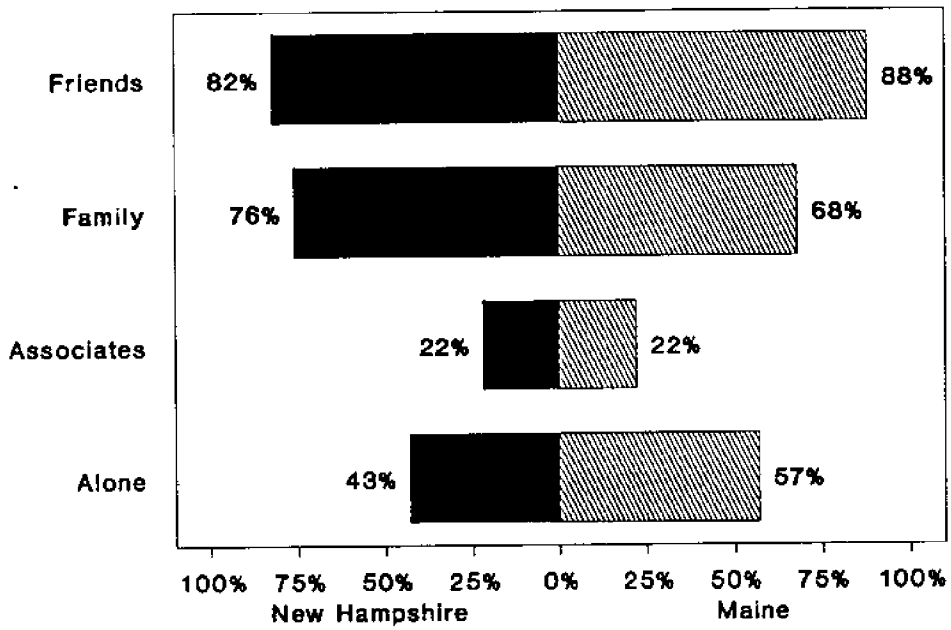


Figure 10
Fishing Party Members (Most Often)

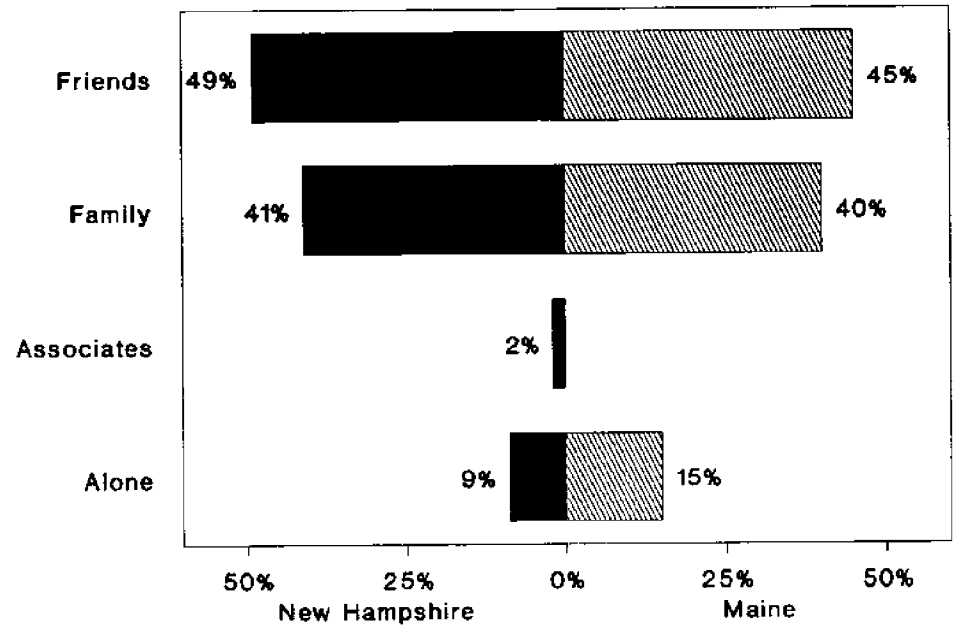


Figure 11
Number of People in Fishing Group

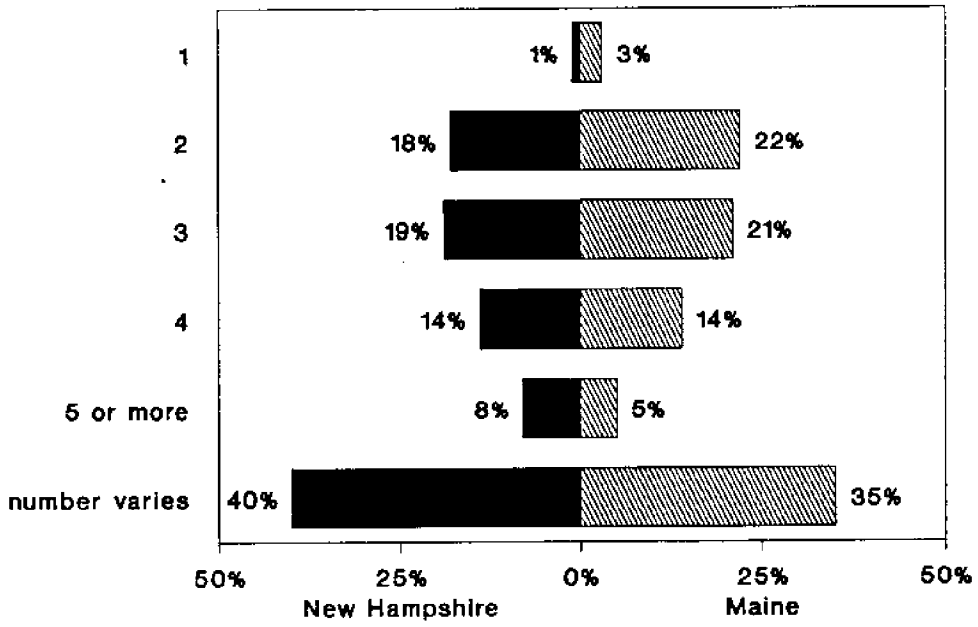
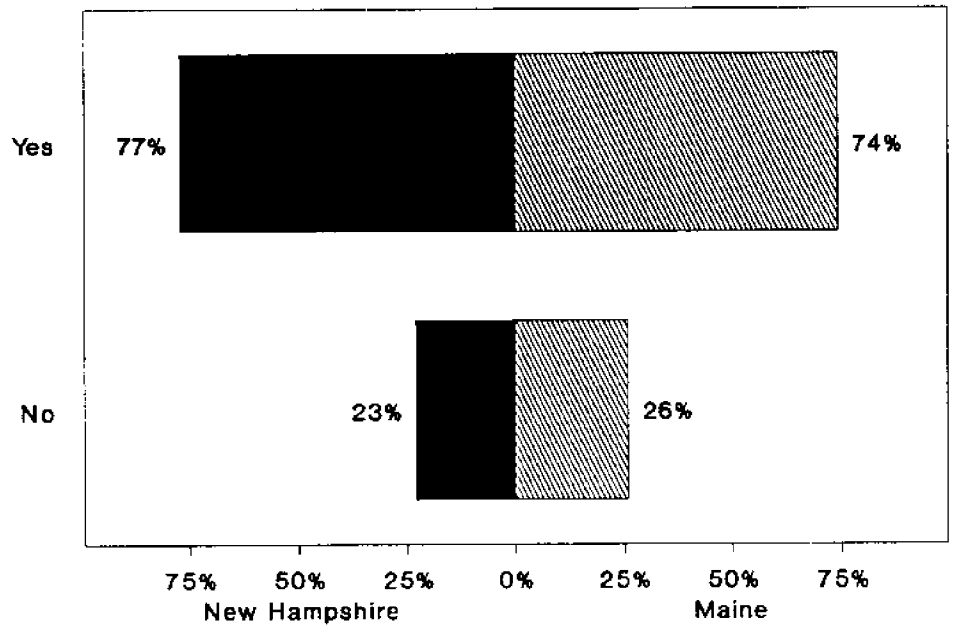


Figure 12
Do Other Activities With Fishing Group?



The Saltwater Fishing Experience

The most important reason for saltwater fishing for the New Hampshire sample was relaxation (86%), followed by being outdoors (85%), getting away from the regular routine (80%) and experiencing natural surroundings (80%) (Table 1). Being outdoors (98%), relaxing (86%) and getting away from the regular routine (85%) were also the three top rated motivations for the Maine fishermen, followed by experiencing peace and solitude (81%) and being close to the sea (80%).

Table 1. Motivations for saltwater fishing

	Percent of Fishermen		
I go saltwater fishing:[1]	New Hampshire	Maine	Chi-Square
for relaxation	86%	86%	n.s.
to be outdoors	85	98	10.7**
to get away from the regular routine	80	85	n.s.
to experience natural surroundings	80	75	n.s.
for peace and solitude	77	81	n.s.
for the experience of the catch	76	75	n.s.
to be close to the sea	75	80	n.s.
for the challenge	59	71	n.s.
to be with family	57	59	n.s.
to experience new and different things	55	51	14.1**
to be with my fishing buddies	49	53	n.s.
to catch specific kinds of fish	45	49	n.s.
to obtain fish for eating	39	33	n.s.
to get away from other people	39	35	n.s.
to develop my fishing skills	38	43	n.s.
to obtain a trophy fish	24	34	n.s.
for physical exercise	19	24	8.5*
to test by equipment	10	14	n.s.
to catch my limit	10	12	n.s.

1 Cell entries represent the percentage of individuals who responded moderately or very important to each reason for fishing.
* Chi-square values are significant at the $p < .05$ level.
** Chi-square values are significant at the $p < .01$ level.

Catching fish was not considered to be the most important part of the fishing experience for our samples (Table 2). Although half of the New Hampshire and Maine fishermen felt that bringing home fish to the table is an important outcome of fishing, about two thirds of each group would still go fishing even if they thought they wouldn't catch any fish, and about 80 percent of the entire sample rated a fishing trip as successful even if no fish are caught. Although over half of both groups (New Hampshire - 61%, Maine - 54%) felt that the fishing trip was better if they caught big fish, under a third believed that a full stringer was the best indicator of a good fishing trip. Just under two thirds of the New Hampshire fishermen and over half of the Maine sample would rather catch big fish. Catching a trophy fish, however, was more important for the Maine fishermen (43%) than for the New Hampshire respondents (30%). Both groups (New Hampshire - 66%, Maine - 76%) enjoyed catching challenging gamefish, but for over half of the New Hampshire respondents (58%) and two thirds of the Maine fishermen (65%), it didn't matter what kinds of fish they caught. Most of the respondents fished for pleasure rather than food, supported using catch-and-release practices, and felt they are knowledgeable in catch-and-release techniques. Releasing fish was more enjoyable for our sample than keeping them and they kept only the fish they were going to eat.

Beliefs About the Quality of Sport Fishing and Fisheries Management

Maine anglers rated the overall fishing quality higher than New Hampshire fishermen (Figure 13). About a fifth of the New Hampshire sample rated fishing as poor, 41 percent as fair, just over a quarter as good, and 12 percent as very good or excellent. Only 3 percent felt that the quality of sport fishing in Maine was poor, 40 percent rated it as fair, over a third as good and just over a fifth (21%) as very good or excellent.

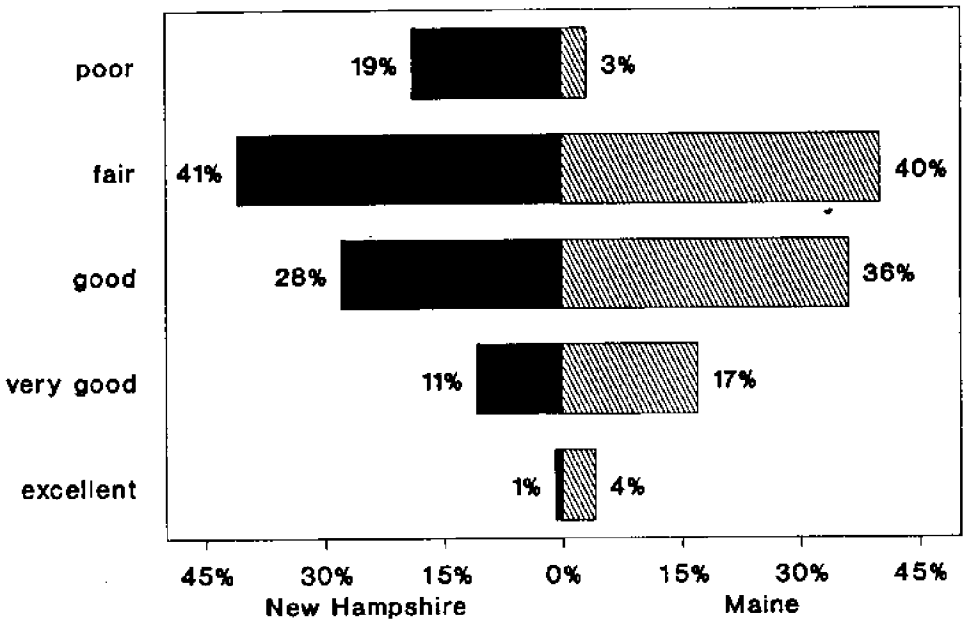
Table 2. Importance of the catch while saltwater fishing

When fishing in saltwater:[1]	Percent of Fishermen New Hampshire	Maine	Chi-Square
Bringing home fish to the table is an important outcome of fishing	50%	52%	n.s.
If I thought I wouldn't catch any fish, I wouldn't go fishing	36	35	n.s.
A fishing trip can be successful to me even if no fish are caught	79	81	n.s.
A full stringer is the best indicator of a good fishing trip	32	31	n.s.
The bigger the fish I catch, the better the fishing trip	61	54	n.s.
I would rather catch one or two big fish than ten smaller fish	60	57	n.s.
Catching a "trophy" fish is the biggest reward to me	30	43	10.6**
I'm happiest with a fishing trip if I can catch challenging game fish	66	76	n.s.
It doesn't matter to me what type of fish I catch	58	65	n.s.
I catch fish for pleasure rather than for food	70	73	n.s.
More fishermen should use catch and release techniques	92	91	n.s.
Keeping the fish I catch is more enjoyable than releasing them	30	27	n.s.
I know how to release fish so they will survive	89	95	n.s.
I keep only those fish I'm going to eat and release others alive	91	87	n.s.

1 Cell entries represent the percentage of individuals who responded agree or strongly agree to each statement.

** Chi-square values are significant at the $p < .01$ level.

Figure 13
Overall Rating of Fishing Quality



Just under half of the New Hampshire sample (46%) and about two thirds of the Maine respondents (65%) evaluated their state as providing high quality saltwater fishing (Table 3). More of the New Hampshire fishermen (82%) than the Maine anglers (67%) believed that the number of saltwater gamefish in their state has declined since they started fishing there. Over half of the New Hampshire sample (59%) and just under two thirds of the Maine respondents (65%) felt that the poor fishing was caused by environmental problems, such as agricultural runoff and sewage discharge. A more substantial percentage of each group (92%) blamed commercial fishermen for overharvesting the fish. Overfishing by sport anglers was not considered a problem (New Hampshire - 19%, Maine - 26%). A saltwater fishing license was not viewed favorably by the two groups. Just under a third of the New Hampshire sample (31%) and about a fifth of the Maine anglers (22%) supported a license as a way of maintaining

management programs, and about a half of both groups believed the money from a license could help to improve fishing access and restore the stocks. A majority of each group, however, felt that a license would be an unfair burden on saltwater fishermen, that fishing along the coast has always been free and should remain so, and that if a license were required they would go somewhere else.

The most acceptable management practices for both the New Hampshire and Maine anglers were placing a moratorium on species which are at low levels (New Hampshire - 92%, Maine - 91%), a minimum size limit (New Hampshire - 91%, Maine - 87%), and a daily bag limit (New Hampshire - 85%, Maine - 87%) [Table 4]. Stocking fish in saltwater was also acceptable for a majority of both groups (New Hampshire - 72%, Maine - 80%). More of the New Hampshire anglers than the Maine fishermen supported closed seasons and prohibiting certain kinds of fishing gear (Table 4). The least acceptable practices for both samples were restricting fishing to certain designated areas (New Hampshire - 31%, Maine - 28%), and prohibiting the use of certain types of bait (New Hampshire - 36%, Maine - 29%) and hooks (New Hampshire - 43%, Maine - 36%).

Table 3. Beliefs about saltwater fishing

	Percent of Fishermen[1]		
	New Hampshire	Maine	Chi-Square
New Hampshire/Maine provides high quality saltwater fishing	46%	65%	16.6**
The number of saltwater gamefish in the state has declined since I started fishing here	82	67	13.3**
Environmental problems such as agricultural runoff and sewage discharge are the main reasons for poor coastal fishing	59	65	n.s.
Overharvesting by commercial fishermen is the main reason for poor coastal fishing	92	92	n.s.
Overfishing by recreational fishermen is the main reason for poor coastal fishing	19	26	n.s.
Saltwater fishermen should be required to buy a license to support management programs	31	22	n.s.
A saltwater fishing license would be a fair way to pay for:			
improving fishing access	48	48	n.s.
the restoration of fishing stocks	56	57	n.s.
A saltwater fishing license would be an unfair burden on saltwater fishermen	60	64	n.s.
Fishing along the coast has always been free and should remain so	74	85	n.s.
If a saltwater fishing license were required in New Hampshire/Maine, I would go somewhere else to fish	51	40	n.s.

1 Cell entries represent the percentage of individuals who responded somewhat agree or strongly agree to each statement.

** Chi-square values are significant at the $p < .01$ level.

Table 4. Acceptability of management practices for saltwater fishing

Management Practice[1]	Percent of Fishermen New Hampshire	Maine	Chi-Square
Placing a harvest moratorium on certain species which are at low levels	92%	91%	n.s.
Releasing fish below a certain length (minimum size limit)	91	87	n.s.
Being able to keep only a certain number of fish you catch in a day (daily bag limit)	85	87	n.s.
Stocking fish in saltwater	72	80	n.s.
Closing fishing areas during part of the year (closed season)	57	36	12.1**
Not being able to retain certain species in certain areas	57	54	n.s.
Releasing fish above a certain length (maximum size limit)	54	52	n.s.
Releasing fish within a certain length range, but keeping the fish above and below this range (slot limit)	54	45	n.s.
Prohibiting the use of certain types of:			
fishing gear	48	37	8.7*
hooks	43	36	n.s.
bait	36	29	n.s.
Restricting fishing to certain designated areas	31	28	n.s.

1 Cell entries represent the percentage of individuals who responded somewhat support or strongly support for each management practice.

* Chi-square values are significant at the $p < .05$ level.

** Chi-square values are significant at the $p < .01$ level.

Importance of Saltwater Fishing and Substitutability Issues

Both the New Hampshire and Maine saltwater anglers rated the activity as important to them (Figure 14). About a fifth of the New Hampshire fishermen (19%) and a quarter (26%) of the Maine respondents rated saltwater fishing as an extremely important activity in their lives. Approximately a third of each group felt the activity was moderately important, and a similar number rated it as somewhat important. Only about a tenth of the sample (New Hampshire - 13%, Maine - 8%) believed saltwater fishing was not at all important to them.

More of the Maine anglers planned their vacation around saltwater fishing than the New Hampshire fishermen (Figure 15). Almost a fifth (17%) of the Maine sample always planned a trip around saltwater fishing, compared to 6 percent of the New Hampshire respondents. About a quarter of both groups (New Hampshire - 25%, Maine - 29%) sometimes took a saltwater fishing vacation, while about a third (New Hampshire - 37%, Maine 33%) did not usually plan this kind of trip. Only a fifth (21%) of the Maine sample never took a saltwater fishing vacation, compared to about a third (32%) of the New Hampshire anglers.

The Maine fishermen are also somewhat more committed to their sport than the New Hampshire respondents (Table 5). About a tenth (11%) of the New Hampshire sample would not miss saltwater angling if they could not go for some reason, and 39 percent would miss it some, but could do other activities. In comparison, four percent of the Maine sample would not miss saltwater fishing at all, and just over a third would miss it some, but could do other activities instead. Over half of the Maine sample (52%) and 45 percent of the New Hampshire sample would miss saltwater fishing a great deal if they were unable to participate, and few other activities would give them the same satisfaction. A small percentage of each group (New Hampshire - 5%, Maine - 8%) would miss it more than any other recreation activity they do.

Figure 14
Importance of Saltwater Fishing

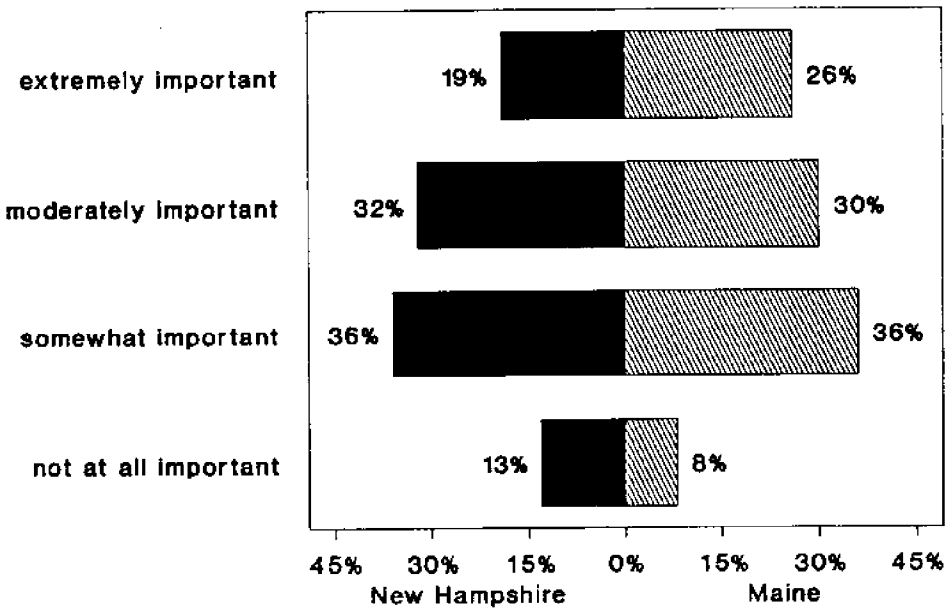


Figure 15
Plan Vacation Around Saltwater Fishing

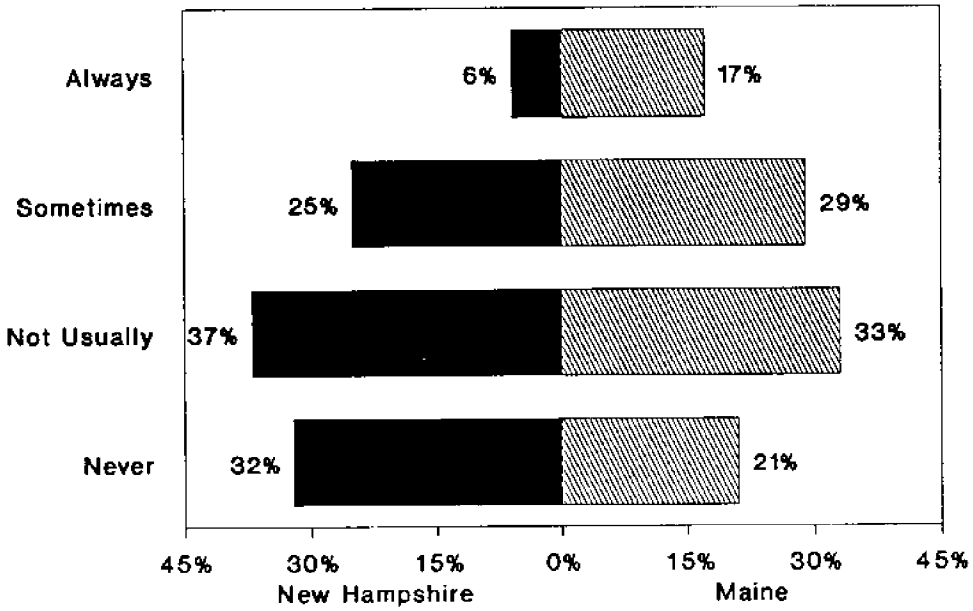


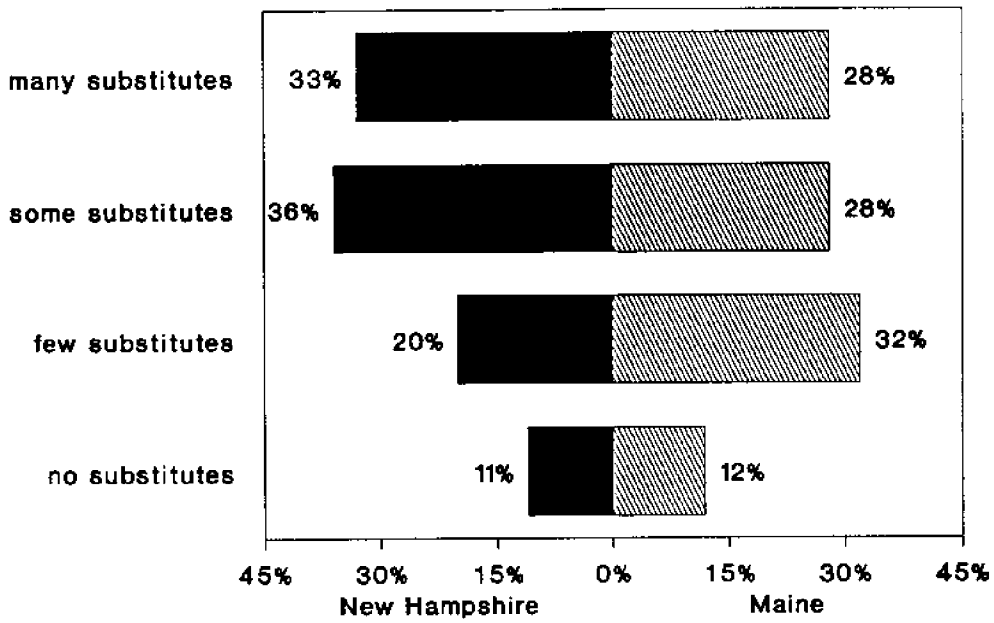
Table 5. Substitutability of saltwater fishing

If I couldn't go saltwater fishing, I would:	Percent of Fishermen	
	New Hampshire	Maine
not miss it, other activities could easily be substituted	11%	4%
miss it some, but could do other activities	39	36
miss it a great deal, few other activities give me the same satisfaction	45	52
miss it more than anything else I do, for me there is no substitute	5	8

Chi-square = 4.62, n.s.

A third of the New Hampshire anglers and just over a quarter of the Maine fishermen (28%) felt that they have many substitutes for saltwater fishing, and about an equal percentage (New Hampshire - 36%, Maine - 28%) reported some substitutes (Figure 16). Whereas, approximately a third of the Maine group (32%) had few substitutes for saltwater angling, compared to a fifth of the New Hampshire respondents, about a tenth of both groups reported having no substitutes for the sport.

Figure 16
Number of Saltwater Fishing Substitutes



Almost all of the individuals in our sample also participated in freshwater fishing (Figure 17). Ninety-six percent of the New Hampshire sample and 98 percent of the Maine anglers were involved with both types of fishing. More of both groups, however, preferred saltwater fishing over freshwater fishing (Figure 18). About a third of each group (New Hampshire - 33%, Maine 31%) preferred saltwater angling, compared to 18 percent of the New Hampshire sample and 15 percent of the Maine anglers who favored freshwater. Approximately half of each group (New Hampshire- 49%, Maine - 54%) enjoyed both activities equally.

Figure 17
Participation in Freshwater Fishing?

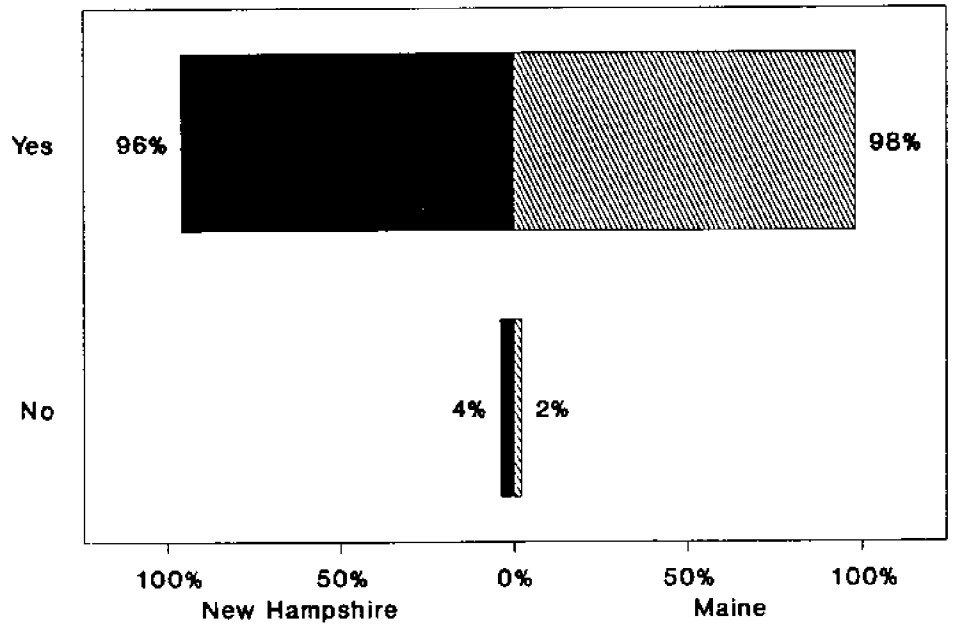
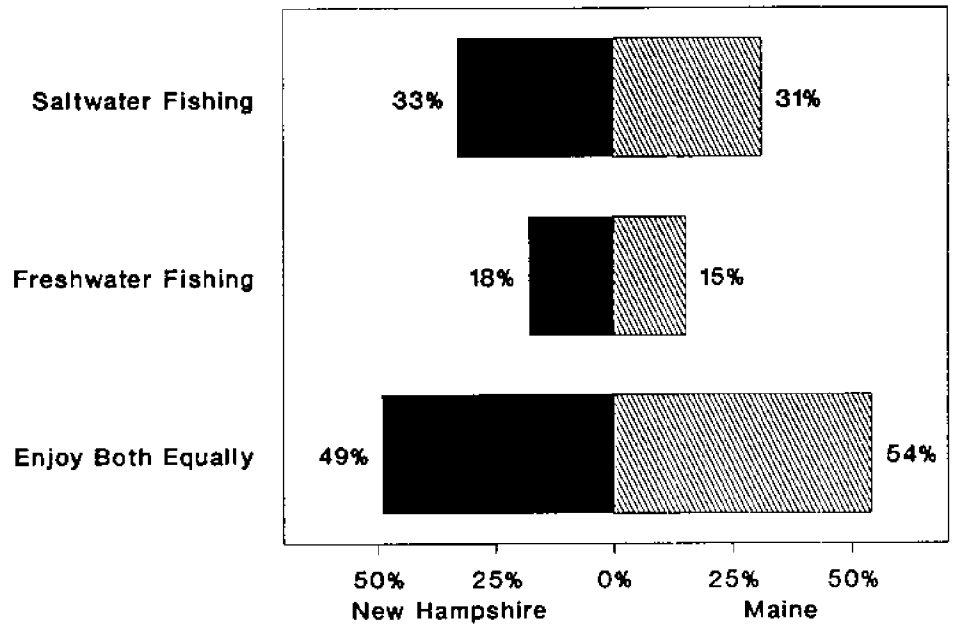


Figure 18
Prefer Saltwater or Freshwater Fishing?



More of the respondents felt that saltwater fishing was a good substitute for freshwater fishing than vice versa (Figures 19 and 20). Sixty-one percent of the New Hampshire anglers and just over three quarters (76%) of the Maine fishermen believed freshwater to be a good substitute for saltwater fishing. This compares to 81 percent of the entire sample who evaluated saltwater as a good substitute for freshwater angling.

Eighty-nine percent of the New Hampshire respondents and 95 percent of the Maine anglers said they would go freshwater fishing if they were unable to do saltwater fishing. (Figure 21). When asked how many days of freshwater it would take to equal the enjoyment of one day of saltwater, under a tenth of both groups said less than one day, with about half evaluating one day of freshwater as equal to one day of saltwater (Figure 22). About a quarter of the sample (New Hampshire - 27%, Maine - 24%) felt it would take 2 to 3 days of freshwater, and just under a fifth of both groups would need more than three days of freshwater fishing to equal the enjoyment of one day of saltwater angling.

In a comparison of saltwater and freshwater fishing, over 80 percent of both groups believed that freshwater fishing is as relaxing as saltwater, and about two thirds of the respondents (New Hampshire - 64%, Maine - 65%) felt that both activities were equally challenging (Table 6). Over two thirds of the sample (New Hampshire - 67%, Maine - 70%) evaluated saltwater fishing as more physically demanding than freshwater. Just over half of each group enjoyed fishing on the ocean more than inland waters, felt that freshwater requires more skill than saltwater fishing, and believed that saltwater angling is more fun than freshwater fishing. More of the Maine fishermen than the New Hampshire anglers felt that it is easier to catch fish (New Hampshire - 42%, Maine - 52%) and to catch large trophy fish (New Hampshire - 46%, Maine - 57%), although these differences were not significant. Only about a third of each group believed freshwater provides the same kind of experience as saltwater fishing and nearly three quarters preferred to catch saltwater over freshwater fish.

Figure 19
Freshwater Good Substitute For Saltwater

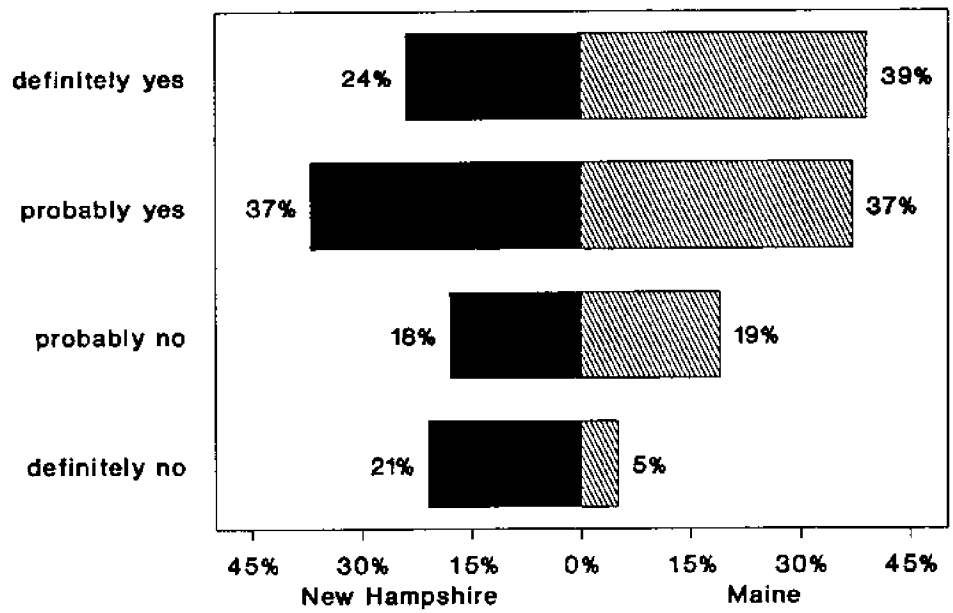


Figure 20
Saltwater Good Substitute For Freshwater

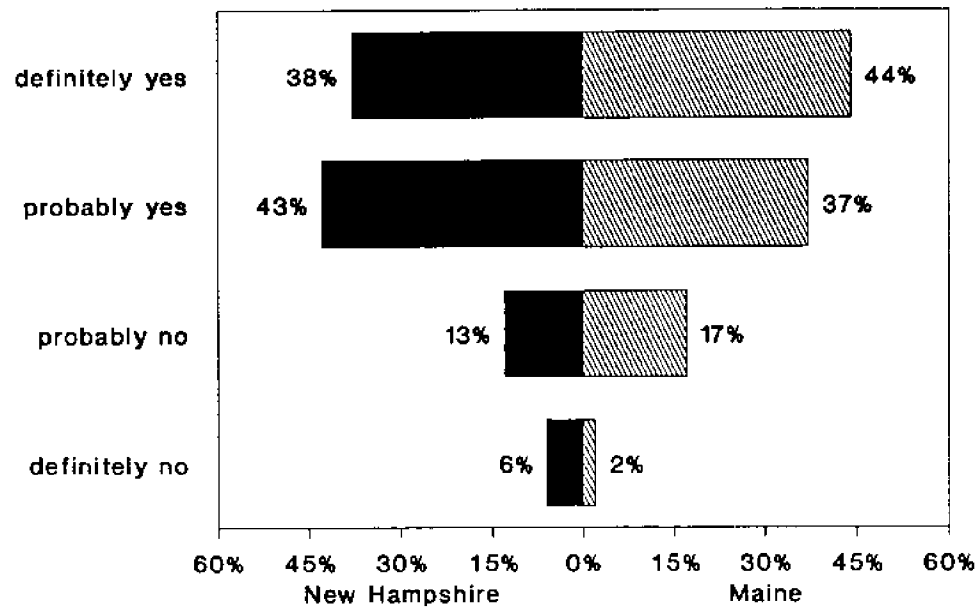


Figure 21
Do Freshwater Instead of Saltwater?

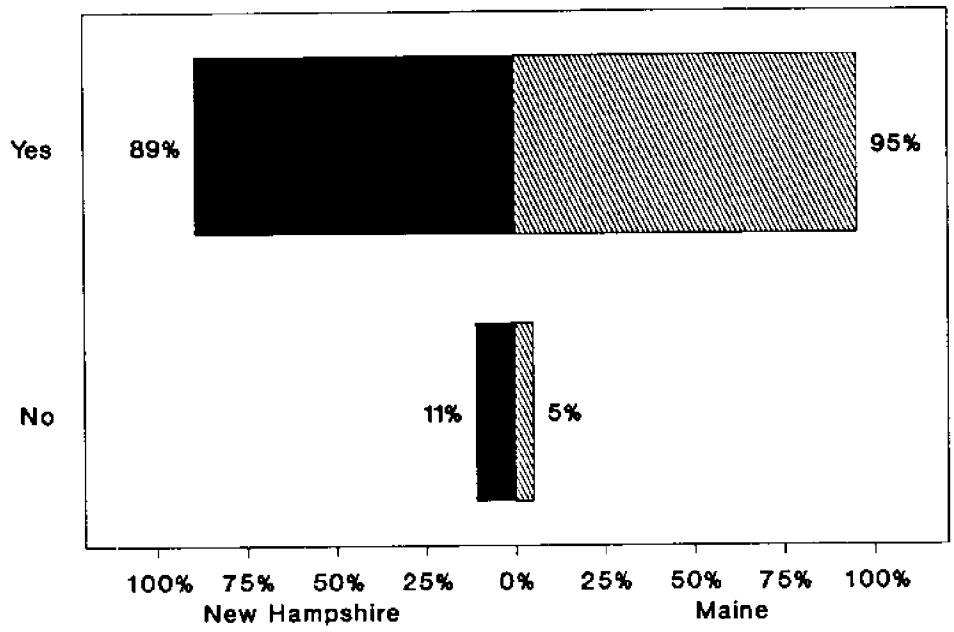


Figure 22
Days Freshwater to Equal A Day Saltwater

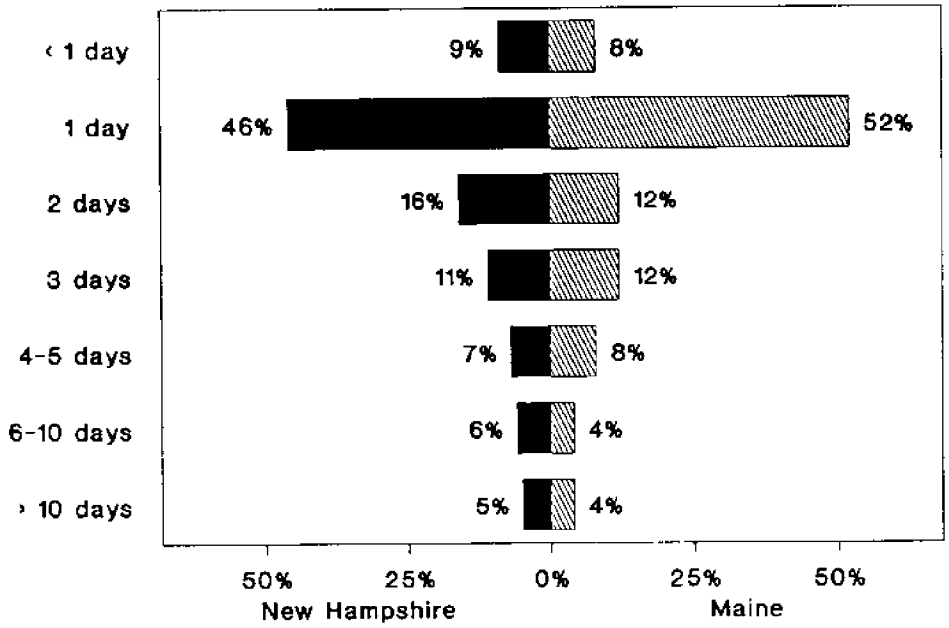


Table 6. A comparison of saltwater and freshwater fishing

	Percent of Fishermen[1]		
	New Hampshire	Maine	Chi-Square
Freshwater fishing is as relaxing as saltwater fishing	82%	85%	n.s.
Saltwater fishing is more physically demanding than freshwater fish	67	70	n.s.
Freshwater fishing is as challenging as saltwater fishing	64	65	n.s.
I enjoy fishing on the ocean more than on inland lakes or rivers	58	52	n.s.
Freshwater fishing requires more skill than saltwater fishing	56	50	n.s.
Saltwater fishing is more fun than freshwater fishing	54	51	n.s.
It is easier to catch trophy fish while saltwater fishing than while freshwater fishing	46	57	n.s.
It is easier to catch saltwater fish than freshwater fish	42	52	n.s.
Freshwater fishing provides the same kind of experiences as saltwater fishing	36	39	n.s.
I prefer to catch saltwater fish over freshwater fish	74	73	n.s.

1 Cell entries represent the percentage of individuals who responded somewhat agree or strongly agree to each statement.

Saltwater Fishing Expenditures

The New Hampshire sample (n = 231) spent a total of $152,763 in *operating* costs during the 1990 season (Table 7). The highest amounts were spent for food and beverages ($28,967), fuel for their vehicles ($23,170), charter / party boat fees ($20,370), and bait and fishing tackle ($20,039). The highest average per person expenditures were for boat maintenance ($226.95), boat storage ($222.31), and taxidermy and mounting ($221.20). Only a third of our sample, however, had boat maintenance expenses, and a much smaller percentage reported boat storage (6%) or taxidermy and mounting (2%) expenses. The highest proportion of our sample declared expenditures related to auto fuel (83%, average = $121.31), food and beverages (81%, average = $155.74), and bait and fishing tackle (69%, average = $125.24).

For the majority of items, most of the expenditures were made in New Hampshire. For expenses such as equipment rental (93%), charter / party boat fees (91%), and boat launching fees (73%), a high proportion of the money was spent along the New Hampshire coastline. For things such as boat storage (60%), boat registration (55%), boat maintenance (55%), trailer registration (55%), and taxidermy and mounting (50%), at least half of the expenditures were made in inland New Hampshire. The highest percentage of out-of-state expenditures were made for taxidermy and mounting (33%), repair of saltwater fishing gear (24%) and boat storage (20%).

A total of $65,345 was spent by the Maine sample (n = 94) for 1990 saltwater fishing *operating* expenses (Table 8). The largest amounts were spent on fuel for their vehicle ($11,935), food and beverages ($11,659), lodging and overnight fees ($9,471), and bait and fishing tackle ($8,885). Similar to the New Hampshire fishermen, around 80 percent of the Maine sample spent money on fuel for their automobile (86%), food and beverages (81%), and bait and fishing tackle (78%). Approximately half (52%) of the sample reported boat fuel expenses. Other types of operating costs were listed by less than 50 percent of the fishermen. The highest average per person cost was for lodging and overnight fees ($326.59), however, less than a third of the individuals reported these expenses. Average food and beverage expenses ($153.41) and auto fuel costs ($147.35), which were reported by most of the Maine sample were also fairly high.

Table 7. 1990 saltwater fishing operating expenses of the New Hampshire sample[1]

Type of Saltwater Fishing Expense	Amount Spent in 1990	Percent of Sample Spending Money	Average Amount Spent	Where Item Was Usually Bought		
				NH Coast	NH Inland	Out of State
fuel for automobile	$23,170	83	$121.31	39%	49%	12%
fuel for boat	18,724	47	171.78	51	40	9
boat launching fees	5,344	20	116.17	73	11	16
boat registration	2,929	32	40.12	39	55	6
boat maintenance	17,475	33	226.95	38	55	7
boat storage	2,890	6	222.31	20	60	20
trailer registration	1,322	31	18.62	37	55	8
food and beverages	28,967	81	155.74	62	32	6
lodging and overnight fees	6,098	17	156.36	62	27	11
equipment rental	2,003	28	30.82	93	5	2
charter or party boat fees	20,370	60	146.55	91	2	7
bait and fishing tackle	20,039	69	125.24	66	22	12
repair of saltwater fishing gear	2,326	23	43.07	38	38	24
taxidermy and mounting	1,106	2	221.20	17	50	33
Total Expenditures	$152,763					

1. Sample size = 231

Table 8. 1990 saltwater fishing operating expenses of the Maine Sample[1]

Type of Saltwater Fishing Expense	Amount Spent in 1990	Percent of Sample Spending Money	Average Amount Spent	Where Item Was Usually Bought		
				Maine Coast	Maine Inland	Out of State
fuel for automobile	$11,935	86	$147.35	54%	30%	16%
fuel for boat	7064	52	144.16	64	25	11
boat launching fees	1751	17	109.44	80	7	13
boat registration	1288	46	29.95	50	35	15
boat maintenance	5978	37	170.80	53	29	18
boat storage	435	4	108.75	50	50	--
trailer registration	642	40	16.91	54	26	20
food and beverages	11,659	81	153.41	67	24	9
lodging and overnight fees	9,471	31	326.59	82	18	--
equipment rental	555	4	138.75	100	--	--
charter or party boat fees	4,742	35	143.70	96	--	4
bait and fishing tackle	8,885	78	120.07	74	20	6
repair of saltwater fishing gear	780	22	37.14	68	21	11
taxidermy and mounting	160	2	80.00	50	50	--
Total Expenditures	$65,345					

1. Sample size = 94

The highest proportion of these expenditures were made along the Maine coastline or inland. Only a small percentage of the money (20 percent or less) for each item was spent out-of-state.

The 1990 *capital* expenditures for saltwater fishing by the New Hampshire sample (n = 231) totaled $112,525 (Table 9). It should be noted that the figures for items which are not used exclusively for saltwater fishing reflect the percentage of time each of the pieces of equipment is used for the activity. Vehicles used for saltwater angling had the highest expenditures ($60,328), followed by tent trailers, campers and motorhomes ($10,500), boats, motors and trailers ($10,233) and fishing rods, reels, and rod holders ($9,455). The least amount was spent on waders ($670) and camping equipment ($551). Only fishing tackle costs were reported by more than 50 percent of our sample, with rods, reels, and holders purchased by about a third of the New Hampshire anglers. The average expenditures for these items were $65.05 and $129.52, respectively. A fifth or less of the sample listed other capital expenditures. While the average per person capital expenses were high for certain items (e.g., $5,250 for tent trailers, campers or motorhomes; $2,872.74 for vehicles; and $1,333.33 for recreational property), few individuals made these types of expenditures.

Between 17 to 72 percent of these capital expenditures were made in the New Hampshire coastal area. The highest proportion of money spent along the coast was for recreational property (72%), other marine fishing equipment (56%), fishing tackle (49%), and boat accessories (41%). For the largest expenditures, most of the money was spent in inland New Hampshire. The largest out-of-state expenditures were for waders (30%), fishing rods and reels (29%), boat accessories (27%), and camping equipment (23%).

A total of $68,391 was spent by the Maine sample in 1990 on *capital* expenditures (Table 10). Most of the money was spent on vehicles used for saltwater fishing ($26,365), boats, motors and trailers ($16,325), and recreational property ($8,741).

Table 9. 1990 saltwater fishing capital expenditures by the New Hampshire sample[1]

Type of Saltwater Fishing Expenditure	Amount Spent in 1990	Percent of Sample Spending Money	Average Amount Spent	Where Item Was Usually Bought		
				NH Coast	NH Inland	Out of State
boat, motor, trailer	$10,233	5	$852.71	17%	66%	17%
boat accessories	5,471	10	248.68	41	32	27
tent trailer, camper, motorhome	10,500	1	5,250.00	33	67	--
vehicle used for saltwater fishing	60,328	9	2,872.74	36	55	9
recreational property	4,000	1	1,333.33	72	14	14
fishing rods, reels, rod holders	9,455	32	129.52	29	42	29
fishing tackle	7,806	52	65.05	49	30	21
tackle box, bait bucket, nets	1,346	16	37.39	36	44	20
waders	670	4	67.00	30	40	30
other marine fishing equipment	2,165	4	240.56	56	22	22
camping equipment	551	3	78.75	23	54	23
Total Expenditures	$112,525					

1 For equipment items which are not used solely for sport fishing, respondents were asked what percentage of time they used this equipment for fishing. The expenditures were then multiplied by these percentages to obtain a value for the equipment for saltwater usage.

Table 10. 1990 saltwater fishing capital expenditures by the Maine sample[1]

Type of Saltwater Fishing Expenditure	Amount Spent in 1990	Percent of Sample Spending Money	Average Amount Spent	Where Item Was Usually Bought		
				Maine Coast	Maine Inland	Out of State
boat, motor, trailer	$16,325	7	$2,332.14	38%	37%	25%
boat accessories	3,115	6	519.17	67	17	16
tent trailer, camper, motorhome	3,256	4	814.06	17	50	33
vehicle used for saltwater fishing	26,365	12	2,396.82	23	31	46
recreational property	8,741	6	1,456.83	100	--	--
fishing rods, reels, rod holders	4,225	36	124.26	62	21	17
fishing tackle	4,230	63	71.69	70	20	10
tackle box, bait bucket, nets	833	20	43.84	53	37	10
waders	220	4	55.00	50	50	--
other marine fishing equipment	250	3	83.33	33	67	--
camping equipment	831	12	75.57	47	27	26
Total Expenditures	$68,391					

1 For equipment items which are not used solely for sport fishing, respondents were asked what percentage of time they used this equipment for fishing. The expenditures were then multiplied by these percentages to obtain a value for the equipment for saltwater usage.

About two thirds (63%) of the fishermen purchased fishing tackle at an average cost of $71.69, while over a third spent about $124.26 each on fishing rods, reels, and holders. Similar to the New Hampshire sample, the most expensive items (e.g., vehicles, boats and recreational property) were purchased by a relatively small proportion of the Maine anglers. Most of the expenditures were made along the Maine coastline or in inland Maine. A fairly high proportion of the expenditures for vehicles (46%), tent trailers, campers, and motorhomes (33%), camping equipment (26%) and boats, motors, and trailers (25%), however, were made out-of-state.

Estimated New Hampshire Population Saltwater Fishing Expenditures

The expenditures for the total New Hampshire saltwater fishing population were calculated by multiplying the estimated total population of sport fishermen in New Hampshire by the percent of our sample who spent money on each item by the average amount spent for each item. A total population figure was obtained from the U.S. Department of Interior, Fish and Wildlife Service, which estimated 88,000 saltwater fishermen in New Hampshire (U.S. Dept. of Interior, 1985). For the capital expenses, items that are not used exclusively for saltwater fishing were multiplied by the percentage of time the equipment is used for sport fishing. To determine the in-state expenditures, the estimated dollar amounts for the total population were weighted by the percentage which was spent in New Hampshire.

The estimated total for the 1990 *operating* expenditures for the New Hampshire saltwater fishing population was $52,631,484 (Table 11). The largest expenditures were for food and beverages ($10,373,174), automobile fuel ($7,767,537), charter / party boat fees ($7,216,959), bait and fishing tackle ($6,717,635), and boat fuel ($6,490,993). The smallest expense items were for trailer registration ($463,336) and taxidermy and mounting ($282,293).

Table 11. Estimated population saltwater fishing operating expenditures in New Hampshire

Type of Saltwater Fishing Expenditure	Average Amount Spent in 1990 Per Respondent	Percent of Sample Spending Money	% Spent in New Hampshire	Total New Hampshire Expenditures
fuel for automobile	$121.31	83	88	$ 7,767,537
fuel for boat	171.78	47	91	6,490,993
boat launching fees	116.17	20	84	1,710,022
boat registration	40.12	32	94	1,048,775
boat maintenance	226.95	33	93	6,191,196
boat storage	222.31	6	80	880,771
trailer registration	18.62	31	92	463,336
food and beverages	155.74	81	94	10,373,174
lodging and overnight fees	156.36	17	89	2,067,526
equipment rental	30.82	28	98	747,899
charter/party boat fees	146.55	60	93	7,216,959
bait and fishing tackle	125.24	69	88	6,717,635
repair of fishing gear	43.07	23	76	673,368
taxidermy and mounting	221.20	2	67	282,293
Total Expenditures				$52,631,484

1 The expenditures for the total population were calculated by multiplying the total estimated New Hampshire sport fishing population (estimated to be 88,000 by the U.S. Department of Interior, Fish and Wildlife Service) X the percentage of our sample who spent money on each item X the average spent on each item X the percentage that was spent in New Hampshire.

The total 1990 *capital* expenditures for the New Hampshire saltwater fishing population were estimated at $37,286,509 (Table 12). The largest expenditure was for vehicles used for saltwater fishing ($20,913,547). Other major expenses were for boats, motors, and trailers ($3,235,425), fishing rods and reels ($2,557,341), and fishing tackle ($2,349,234). Combining the 1990 operating and capital expenses results in an estimated total of $89,917,992 spent by the New Hampshire saltwater fishing population.

Table 12. Estimated population saltwater fishing capital expenditures in New Hampshire

Type of Saltwater Fishing Expenditure	Average Amount Spent in 1990 Per Respondent	Percent of Sample Spending Money	% Spent in New Hampshire	Total New Hampshire Expenditures
boat, motor, trailer	$852.71	5	83	$3,235,425
boat accessories	248.68	10	73	1,521,448
tent trailer, pickup camper, motorhome	5,250.00	1	100	4,000,000
vehicle used for saltwater fishing	2,872.74	9	91	20,913,547
recreational property	1,333.33	1	86	1,310,473
fishing rods, reels, rod holders	129.52	32	71	2,557,341
fishing tackle	65.05	52	79	2,349,234
tackle box, bait bucket, nets	37.39	16	81	415,349
waders	67.00	4	70	178,666
other marine fishing equipment	240.56	4	78	643,326
camping equipment	78.75	3	77	161,700
Total Expenditures				$37,286,509

1 The expenditures for the total population were calculated by multiplying the total for the sample by the estimated total population of sport fishermen in New Hampshire and dividing by the sample size (N = 231). The total population (N = 88,000) was based on estimates provided by the U.S. Department of Interior, Fish and Wildlife Service.

Characteristics of the Sample

The majority of both the New Hampshire (89%) and Maine (86%) samples were not members of a fishing club (Figure 23). Just under half of each group (New Hampshire - 43%, Maine - 46%) subscribed to fishing magazines (Figure 24). Approximately half of the New Hampshire anglers read outdoor columns occasionally (49%) or frequently (45%), compared to 40 percent and 56 percent of the Maine sample, respectively (Figure 25). Only 6 percent of the New Hampshire fishermen and 4 percent of the Maine anglers never read outdoor columns.

The majority of the New Hampshire sample grew up in small cities (29%), small towns (25%) or rural areas (18%) (Figure 26). Most of the Maine anglers also grew up in small cities (28%), rural areas (28%), and small towns (26%). Almost all of the fishermen in both the New Hampshire (92%) and Maine (96%) samples were male (Figure 27).

About a fifth (18%) of the New Hampshire anglers and a quarter (24%) of the Maine fishermen were 30 years of age or younger (Figure 28). A third (34%) of the New Hampshire sample and a quarter of the Maine group were between 31 and 40 years of age, and about a fifth of each group fell in the 41 to 50 year age category. Over a quarter of the New Hampshire (27%) and Maine (29%) fishermen were 51 years of age or older.

Most of the respondents to the survey had a high school diploma or better (Figure 29). About a third (32%) of the New Hampshire sample and 43 percent of the Maine sample had a high school diploma, and nearly a third of each group (New Hampshire - 29%, Maine - 32%) had some college education. Another third of the New Hampshire anglers had an undergraduate or graduate degree, compared to 12 percent of the Maine fishermen.

Figure 23
Member of a Fishing Club?

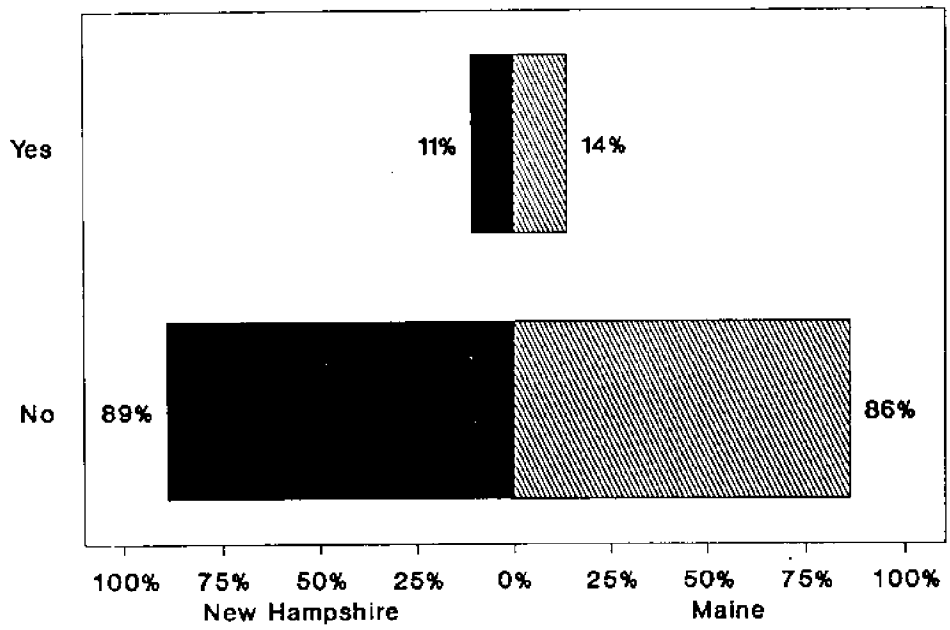


Figure 24
Subscribe to Fishing Magazines?

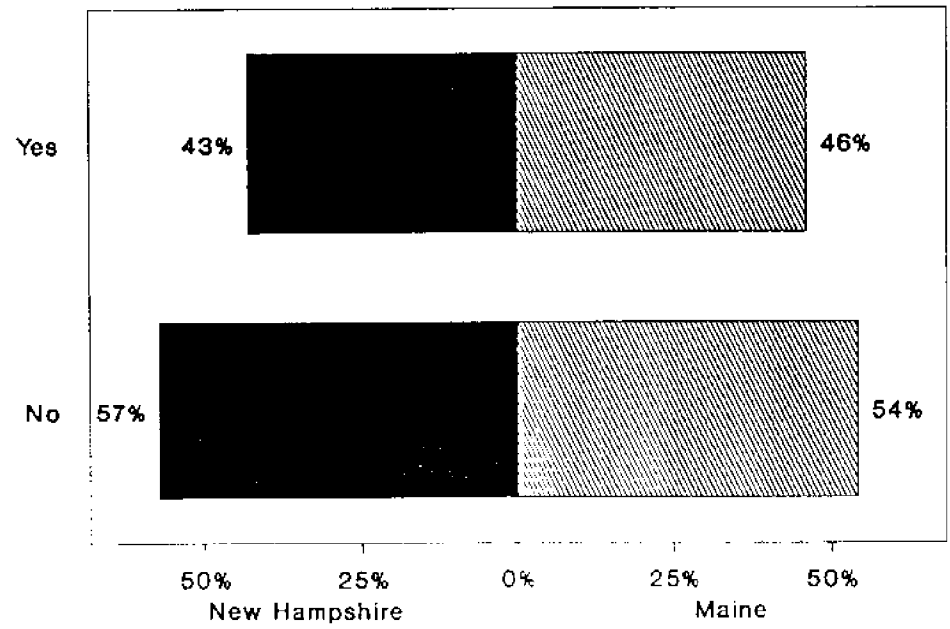


Figure 25
Frequency of Reading Outdoor Columns

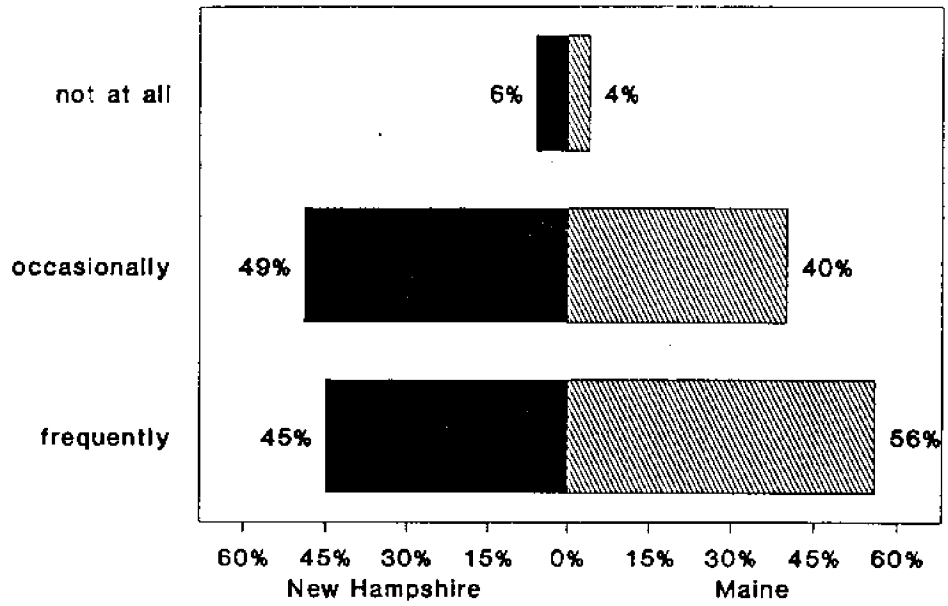


Figure 26
Childhood Residence

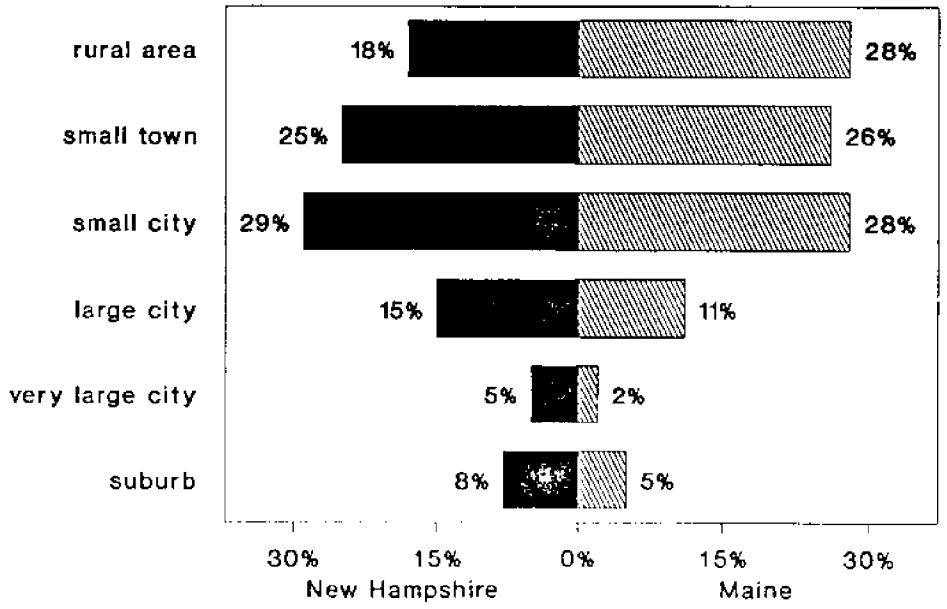


Figure 27
Sex of Respondents

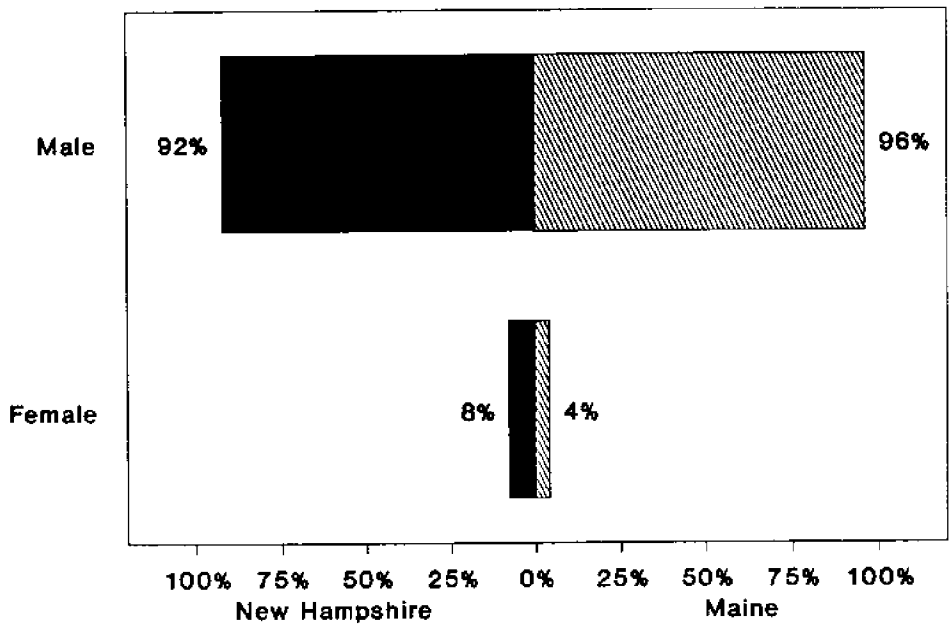


Figure 28
Age of respondents

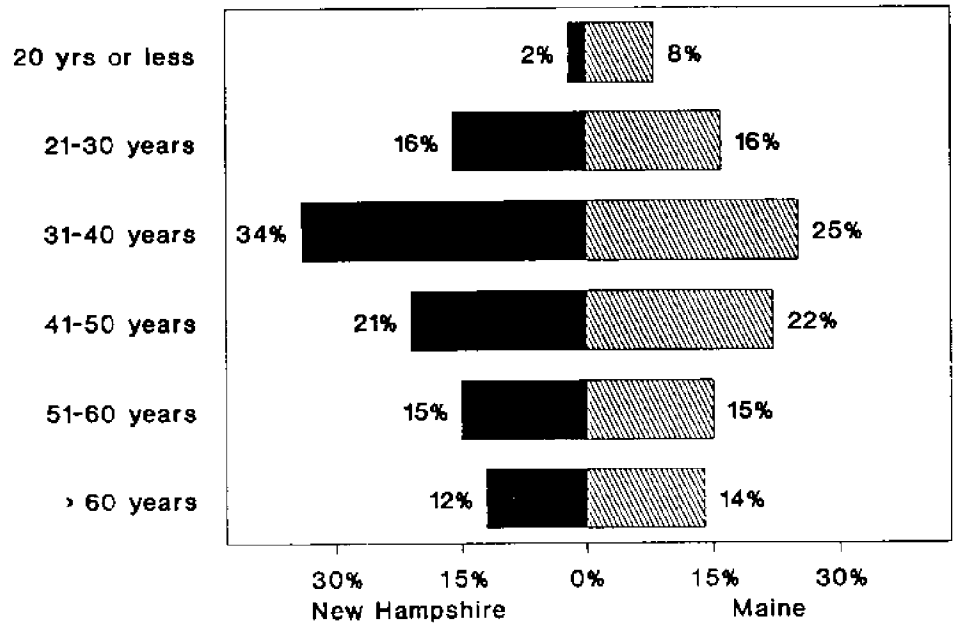
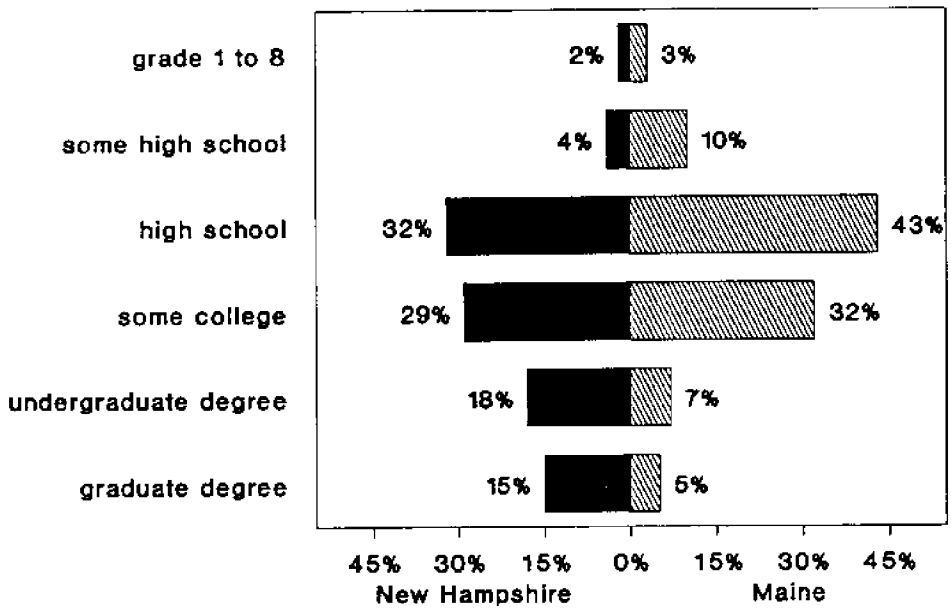


Figure 29
Education Level of Respondents



For the New Hampshire sample, the highest percentage of individuals were in white collar positions (57%), followed by blue collar jobs (29%) and retirees (11%). The Maine sample was evenly divided between white collar (42%) and blue collar (41%) jobs, with 15 percent classifying themselves as retirees (Figure 30).

Over a tenth of both the New Hampshire (12%) and Maine (14%) groups made less then $15,000 in annual income, and another tenth earned between $15,000 and $19,999 (Figure 31). About a quarter (24%) of the New Hampshire anglers and a fifth (21%) of the Maine fishermen fell in the $20,000 to $29,000 income category, with approximately a third of each group making between $30,000 to $49,999. Just over a fifth of the New Hampshire respondents made $50,000 or more, compared to 11 percent of the Maine sample.

Figure 30
Occupation of Respondents

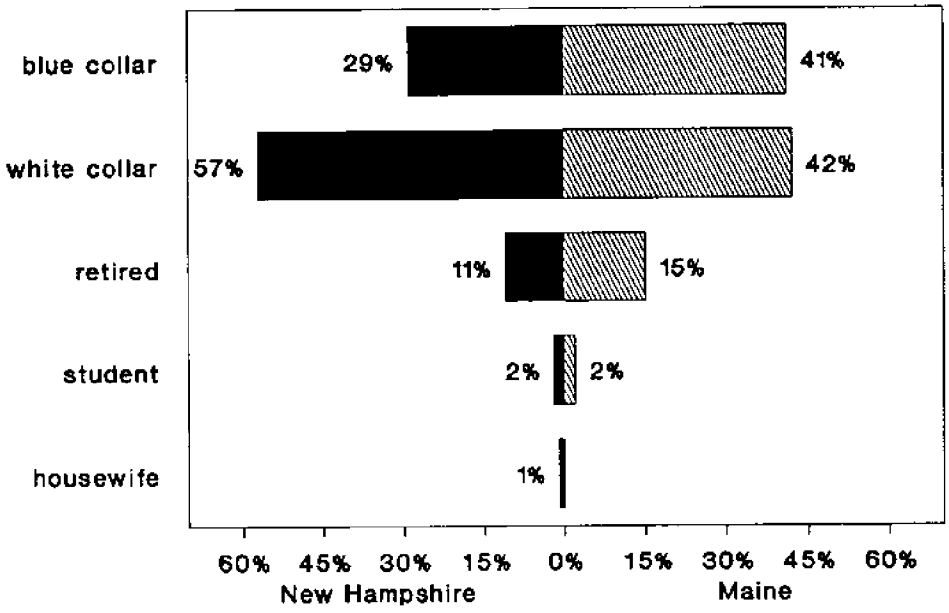
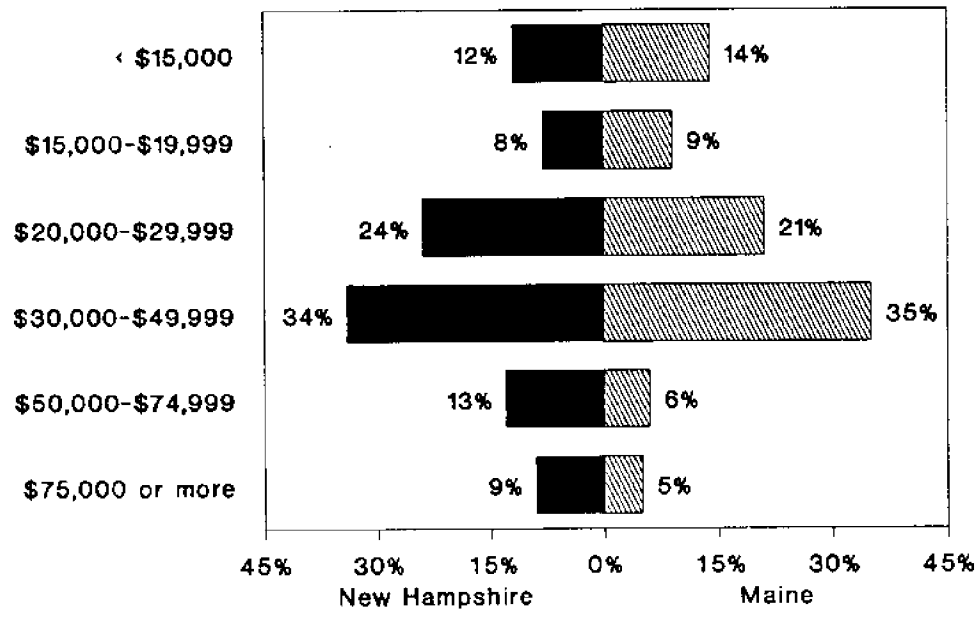


Figure 31
Income Level of Respondents



Policy Implications

Just as managers are reluctant to make decisions without substantial information about the biological aspects of a species, they should be equally reluctant to make decisions without information on how the public feels about their actions. The public often demands a voice in decisions of public agencies. Managers who have ignored this demand have had management decisions reversed, become tied up in expensive court suits, and have found it necessary to redo lengthy planning efforts. Understanding the characteristics and perceptions of fishermen can supplement the harvest data collected by state and federal agencies, and indicate to managers the types of impacts different management practices have on fishing quality. Policy questions included in this survey lead to several conclusions and recommendations.

Saltwater Fishing License

Licensing is a controversial issue among coastal sport anglers. Less than a third of the New Hampshire respondents and about a fifth of the individuals in the Maine sample felt that saltwater fishermen should be required to obtain a license. Comments given by the respondents indicate that tradition has a major influence on this reaction. Unlike freshwater fishermen, licenses have never been required of saltwater participants. Any agency attempt to institute such a license would undoubtedly be criticized and could result in less demand for the activity. Half of the New Hampshire respondents and two-fifths of the Maine respondents indicated they would fish elsewhere if a license were imposed. If a license was deemed necessary, an education program should be established to explain the rationale. Research has repeatedly demonstrated that individuals who understand the reasoning underlying management actions are more supportive of the policies.

Perceived Acceptability of Management Policies

In addition to the licensing issue, the survey addressed the perceived acceptability of other management policies. Reactions to these alternatives are listed below in rank order from the highest level of acceptability to the lowest:

1) placing a moratorium of species which are at low levels
2) setting a minimum size limit
3) establishing a daily bag limit
4) stocking fish in saltwater
5) closing fishing areas during part of the year
6) restricting the catch of certain specific species in designated areas
7) establishing a maximum size limit
8) establishing a slot limit
9) prohibiting the use of certain types of equipment
10) restricting fishing to designated areas

Size Limit Considerations

Bluefish was the preferred species among both New Hampshire and Maine anglers. Based on our previous research (Donnelly, et al. 1990), roughly half of the charter and private boat fishermen would support a size limit on bluefish. Two thirds of the individuals surveyed on bridges and jetties in this earlier study rejected the idea. Concern for their personal safety when removing the hook seems to be a major determinant of this mixed reaction. Because these concerns are real, undersized fish that would be returned to the ocean are likely to either still have the hook in their mouths or be near death from the process of removing the hook. Given that education of the fishermen cannot change the nature of bluefish, size restrictions are not likely to be effective.

Catch Limit Considerations

Because the majority of fishermen believe that gamefish populations have been depleted over the years, they were generally tolerant of catch limits on their preferred

species. Nearly two thirds of the respondents from our earlier study (Donnelly, et al. 1990) indicated they would continue to fish in the region without focusing on a particular species if the number of fish caught was restricted. Under a fifth said they would go to another state to fish for their preferred species. Taken together, these findings suggest that catch limits could help preserve the integrity of the game population without having a negative economic impact on the region. Acceptance of this policy would again be enhanced by promotional efforts explaining the need for the action.

Economic Expenditures

Based on our population estimates for economic expenditures in New Hampshire, the dollar contributions of coastal sport anglers to the state are substantial. Combining the operating ($52,631,484) and capital ($37,286,509) expenditure estimates for the entire population resulted in a total expenditure of $89,917,992. This figure represents a conservative estimate from at least two perspectives. First, the projected population (N = 88,000) on which the expenditure data were expanded was derived from 1985 figures provided by the U.S. Fish and Wildlife Service. Using the population numbers from the National Marine Fisheries Service produces an even larger total expenditure. Second, the nearly 90 million dollar figure represents total direct expenditures. Not included in this estimate are any multipliers which would increase the economic impacts even further. Regardless of the actual projected total, it is evident that saltwater fishing makes an important contribution to the State's economy.

Overall, saltwater fishermen have a positive image of New Hampshire and southern Maine as sport fishing destinations. They perceive that the region provides high quality fishing opportunities close to their homes. Concerns over licensing and stock depletion represent issues that need attention if this positive image and the associated economic consequences are to be retained.

References

CIC Research, Inc. 1987. *An economic eurvey of saltwater fishing in California's San Francisco bay area*. San Diego, California.

Ditton, R. B., Graefe, A.R. & Lapotka, G. 1980. *Economic impacts of recreational boat fishing in the Houston-Galveston area of the Texas Coast*. Texas A&M University Sea Grant Report TAMU-56-80-206.

Donnelly, M.P., Vaske, J.J., Lindsay, B. & Nelson, J.S. 1990. *The image of coastal sport fishing in northern New England: The fishermen's view*. (OPACS-90-02). Office of Public and Commercial Services, Department of Leisure Management and Tourism. University of New Hampshire. Durham, New Hampshire.

Ellerbrock, M. & Milon, J.W. 1984. *A methodology for estimating the economic impact of sportfishing tournaments*. Florida Sea Grant, SGR-59.

Falk, J. M., Graefe, A. R., Alkire , C. & Swartz, D. 1983. *1982 Head/Charter-Boat fishing in Delaware: An analysis of customers and their economic impact*. University of Delaware Sea Grant College Program. Newark, Delaware.

Hushak, L. 1985. The economic contribution of Ohio's Lake Erie charter boat industry. *The Great Lakes Charter boat Fishing Industry*. Great Lakes Sea Grant Workshop. Michigan. November 12-13.

Hushak, L.J., Morse, G.M., & Apraku, K.K. 1986. Regional impacts of fishing allocations to sport and commercial interests: A case study of Ohio's portion of Lake Erie. *North American Journal of Fisheries Management*. 6: 472 - 480.

Jordon, S. & Talhelm, D.R. 1983. *Economics of Sportfishing in Alcona County*. Ann Arbor: Michigan Sea Grant Program.

King, D.M. & Flagg, V.G. 1982. *The Economic Structure of California's Commercial Fisheries*. California Sea Grant No. P-T-32.

McConnell, K.E. & Sutinen, J. 1979. Bioeconomic models of marine recreational fishing. *Journal of Environmental Economics and Management*. 6: 127 - 139.

Meyer, P. 1987. *A report on resident fishing in the Hawaiian islands*. Davis, California: Meyer Resources, Inc.

Milon, J.W. & Adams, C.M. 1987. *The Economic Impact of Florida's Recreational Boating Industry in 1985*. Florida Sea Grant, Technical Paper Number 50.

Milon, J.W., Mulkey, D., Riddle, P. & Wilkowske, G. 1983. *Economic impact of marine recreational boating on the Florida economy*. Florida Sea Grant, SGR-54.

Milon, J.W., Ellerbrock, M.J., Brinkman, G.L., & Logan, C.M. 1982. *Economic impact and participant characteristics for the first annual Greater Jacksonville National Light Kingfish Tournament*. Dept. of Food and Resource Economics. University of Florida, Florida. Technical Paper Number 21.

Munda, J.O. & Hastings, S.E. 1987. *An analysis of community attitudes toward growth and development in the Inland Bays Area of Delaware.* Agricultural Experiment Station Bulletin No. 468. University of Delaware. Newark, Delaware.

Sport Fishing Institute. 1980. *Economic activity associated with marine recreational fishing in 1980.* Saltonstall/Kennedy Contract No. NA82AA-H-00054. Washington, D.C.

U.S. Department of Interior. 1985. *1985 National survey of fishing, hunting, and wildlife associated recreation.* U.S. Department of Interior, Fish and Wildlife Service. Washington, D.C.

Vaske, J.J., Donnelly, M.P., & Zwick, R. 1992. *The commercial saltwater fishermen in New Hampshire.* New Hampshire Fish and Game Department. Concord, New Hampshire.