

## NEW ENGLAND RECREATIONAL FISHERS' ATTITUDES TOWARD MARINE PROTECTED AREAS: A PRELIMINARY INVESTIGATION

Robert A. Robertson  
Associate Professor, Department of  
Resource Economics & Development,  
University of New Hampshire, 309 James Hall,  
Durham, NH 03824.

Gregg Caporossi  
M.S. Candidate in Resource Administration  
& Management  
University of New Hampshire, 309 James Hall,  
Durham, NH 03824.

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**Abstract:** The purpose of this research is to examine support of marine recreational fishers for each of the various types of Marine Protected Areas (MPA) in the Northwest Atlantic. Further, to explore the extent that differences exist between those who strongly support MPAs and those who do not strongly support MPAs within a specific region of the Northwest Atlantic across a wide variety of demographic, behavioral, perceptual and attitudinal variables. The primary research instrument for this study was a mail questionnaire administered using a mixed method research design yielding 208 completed surveys by persons meeting qualifying characteristics (fish in open ocean). Our research found that roughly half of participating marine recreational anglers support MPAs. However, the extent and strength of that support depends on the specific objectives of the MPA, the restrictions imposed on saltwater anglers and the specific location of the MPA. The research also suggests that anglers who support MPAs are more likely to believe specific benefits, such as increased size of fish stocks, will result from the MPA.

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### Introduction

That many of the ocean's pelagic fish species are overexploited is beyond debate. As many as 25 to 30 percent are over fished, and another 44 percent are fully exploited (FAO 1999; NRC, 1999). In an effort to protect remaining fish stocks and allow for recovery, a variety of fishery management proposals have been proffered. One such strategy is the adoption of Marine Protected Areas (MPAs)

as a means to limit disturbance from human economic activities on specified marine ecosystems. A recent National Research Council (1999) report on Sustaining Marine Fisheries defined marine protected areas as a spatially defined area in which all populations are free from exploitation. The report considered the primary purposes of the "no take" zones to be the protection of target species from exploitation and to allow their population to recover, to protect critical habitat, to provide some protection from pollution, to provide a vehicle for learning about marine ecosystems and to protect against uncertainty. In practice however, there are as many different definitions for MPAs as there are management objectives. The Fisheries Management Act requires that social impact assessments must be incorporated into the decision-making process prior to implementing new policies. As such, it is important for managers and policy-makers to recognize that the impact of MPAs on the users of marine resources will depend on the definition of marine protected areas, the specific goals of the MPA, and the specific user of marine resources. Furthermore, the NRC (1999) concluded that any attempt to establish MPAs without adequate knowledge of local socioeconomic conditions (to include important attitudes and concerns of specific stakeholder groups) would surely fail.

This exploratory study focuses on attitudes and behaviors of those persons who use marine resources for recreational fishing. The purpose of this research is to examine support of marine recreational fishers for each of the various types of Marine Protected Areas in the Northwest Atlantic. Further, to explore the extent that differences exist between those who strongly support MPAs and those who do not strongly support MPAs within a specific region of the Northwest Atlantic across a wide variety of demographic, behavioral, perceptual and attitudinal variables.

### Literature Review

The human dimensions of fishing literature has a variety of techniques for assessing the relationship between specific resource management strategies and recreational fishing, these include their motivations for fishing, their sense of attachment to the region, and the level of specialization of the fishermen. This information is important because it allows for a preliminary understanding of what

an important stakeholder group thinks about marine protected areas and helps determine if there are differences within this group. This paper is a preliminary investigation into the various components that may influence recreational fishers' perceptions of the costs and benefits of implementing MPAs. We will briefly discuss the rationale of utilizing MPAs and define commonly implemented strategies. The next section will contain a review of research that identified the factors that motivate saltwater recreational fishers to angle and formulated the basis for our survey questions. Finally, we will examine the existing literature to identify how recreational fishers' motivations, attitudes and expectations can predict attitudes toward management decisions.

### Marine Protected Areas

The advent of MPAs as a management tool is a distinct departure from single species management philosophies towards a holistic approach to resource use. The establishment of MPAs has the potential to negatively affect marine recreational fishing. This is especially true if the persons engaging in recreational fishing lack mobility (i.e., small boat, lack of time, etc.) and the MPA excludes them from traditional fishing areas (NRC, 1999). The establishment of marine protected areas could also improve the quality of marine recreational fishing by enhancing the health of marine fish populations and improving habitat.

Marine Protected areas are discrete geographical areas designated to enhance the conservation of marine and coastal resources. MPAs are managed by an integrated plan that includes MPA-wide restrictions on some activities (oil and gas extraction), provides increased levels of protection on delimited zones, and establishes fishery and ecological reserves within the MPA. Currently, there are four main types of MPAs in practice today as identified by the NRC (2001):

- *Economic Enterprise Zones*: Areas specifically licensed and managed for economic activities such as open ocean aquaculture, mineral extraction and commercial shipping.
- *Marine Sanctuary*: Zone that prohibits dumping, but a limited amount of extraction is allowed including commercial and recreational fishing. Additionally, economic activity such as laying telecommunications

cables and whale watching are permitted.

- *Fishery Reserve*: Zone prohibiting dumping, commercial fishing and extraction. However, limited shipping lanes and recreational fishing is permitted.
- *Marine Preserve*: Zone defined as off limits to all traffic, including recreational fishers. Non-motorized boats are permitted.

These broad definitions solicit a stakeholder approach to resource management. This expansive management philosophy demands that stakeholder involvement in the planning process associated with MPAs is critical in determining whether management objectives will be met or undermined by stakeholders (NRC, 2001). Each group of stakeholders will view policy changes differently depending on their level of risk, political organization and the management goals and objectives under consideration. Like existing fishery management doctrines, "...any policy changes resulting from establishing an MPA will alter the mixture of services, the set of beneficiaries of those services, and potentially the level of benefits from these services" (NRC, 2001).

### Marine Recreational Fishing

As alternative methods of harvesting seafood and interest in pursuing leisure activities have increased, recreational saltwater fishing has gained in popularity and economic importance in coastal communities. It is estimated that 9 million anglers spend more than \$9 billion annually on recreational saltwater fishing (Dalton, NMFS 2000). The total impact on the U.S. economy in direct and indirect expenses in goods and services is more than \$25 billion annually (Dalton, NMFS 2000). By virtue of these facts, recreational anglers have become increasingly important stakeholders, gaining recognition in the political process, and now have seats on some fishery management councils such as the North East Consortium, among others.

Beyond economic considerations, recreational fishermen possess useful knowledge and resources that may; both influence locational decisions, and facilitate implementation and management of the MPA. By failing to include important stakeholder groups in the decision-making and management process, stakeholders may undermine the integrity of the MPA. Alternatively, inclusion in the process

**Table 1. — Perceptions of Use by Type of MPA**

	Extremely Bad (1)	Somewhat Bad (2)	Neither (3)	Somewhat Good (4)	Extremely Good (5)
Economic Enterprise Zones (c = 3.06)	15 (7.9%)	42 (22.2%)	59 (31.2%)	62 (32.8%)	11 (5.8%)
Marine Sanctuaries (c = 3.5979)	7 (3.6%)	18 (9.3%)	51 (26.3%)	88 (45.4%)	30 (15.5%)
Marine Reserves (c = 3.9691)	9 (4.6%)	15 (7.7%)	21 (10.8%)	77 (39.7%)	72 (37.1%)
Marine Preserves (c = 2.8299)	47 (24.2%)	49 (25.3%)	26 (13.4%)	34 (17.5%)	38 (19.6%)

often results in stakeholder support and enforcement of the rules of the MPA (NRC, 2001). In order for managers to appreciate recreational anglers attitudes towards proposed regulations, we must gain a better understanding of variables that determine angler's motivations, attitudes and expectations.

A review of social considerations in regards to recreational anglers has concentrated on freshwater anglers but we believe that many of the motivations and measures of satisfaction apply to saltwater recreational anglers as well. The few preliminary studies available for marine anglers point out that motivations for fishing are multifaceted and that different types of anglers rank the importance of those motives differently (Dawson and Wilkins 1980). Moeller and Engelken (1972) find that experiencing the natural environment, relaxation, and companionship were consistently rated higher by anglers than were catch. Bryan (1974) and Spaulding (1970) find that relaxation, experiencing the outdoors and catching fish are strong motives for marine recreational anglers. Knopf et al. (1973) suggested that temporary escape, achievement, exploration, and the experience of natural settings were important. Fedler and Ditton (1994) identified relaxation and getting away, environmental enjoyment and time with family and friends as the primary motivations for recreational saltwater anglers; whereas, experiences related to the catch (i.e. size, number) and testing equipment were of relatively little importance among all subgroups except trophy and big game anglers. Angler motivations also change over time as some anglers become more experienced and specialized resulting in changing motivations and satisfactions (Hendee and Bryan 1978).

Social scientists have written a great deal about

each of the variables discussed briefly above. However, surprisingly little work has incorporated that understanding of angler's behavior into policy recommendations for fishery management. This is unfortunate since knowledge of these various expectations and motivations for each type of fishing can provide some guidelines for fishery managers to determine management alternatives, redirect expectations or change expectations (Dawson and Wilkins 1980). What, if any role do these factors play in predicting angler's attitudes toward management strategies - specifically MPAs? Of the variables discussed above, our finding suggest that prior fishing experience, skills and satisfaction, motivations for fishing, attachment to region and importance of catch offer potential explanations for angler attitudes toward MPAs.

### Objectives

This research was begun with three main objectives in mind:

1. To measure angler support for four classifications of Marine Protected Areas.
2. To measure demographics, behaviors, motivations and attitudes of New Hampshire Seacoast and Southern Maine (USA) anglers.
3. To interpret the results to provide direction for future research and to begin to frame conceptual models for fishery managers.

### Research Procedure

*Data Collection:* The primary research instrument for this study was a mail questionnaire administered using a mixed method research design. Names and addresses of people that boat and fish were collected using two primary methods. The first method involved the use of postcards that were placed on the windshield of cars that were parked at access sites along the New

Hampshire and Southern Maine (USA) coasts. The post card described the objectives of the study, asked a couple of short questions and solicited their participation in the larger study questionnaire. The second method used to obtain names for the study was membership mailing lists from three groups: persons renting dock space at Little Harbor Marina (n=296), members of NH Coastal Conservation Association (n=250); and members of the Southern Maine Conservation Association (n=250). The NH and Southern Maine Coastal Conservation Association are chapters of a National Coastal Conservation Association, an organization focused on issues and topics associated with marine recreational fishing. These two data collection methodologies yielded 208 completed surveys by persons meeting qualifying characteristics (fish in open ocean).

*Measurement of Attitudes toward MPAs:* The questionnaire measured attitudes towards three specific type of marine protected areas that included a description of the activities allowed in the area: 1) Marine Sanctuaries:-No Dumping, but a limited amount of resource extraction is allowed (including commercial fishing); 2) Marine Reserves:- No dumping, no commercial fishing, no extraction. Limited shipping lanes and recreational fishing is allowed; and 3) Marine Preserves:- This zone is off-limits to all traffic, including recreational fishing. Non-motorized boats are okay. Attitudes were measured by asking if the respondent felt that each type of protected area was an extremely good or extremely bad use of marine resources use (measured on a five point scale).

The study also includes a number of measures of attitudes towards a more general definition of marine protected areas. The respondents were provided with the following general definition of marine protected areas. A marine protected area is "any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein". A single measure of attitude towards MPAs (i.e., I strongly support the establishment of MPAs) was used. As stated earlier, each MPA (regardless of classification) will be defined according to specific management objectives and will therefore impact users differently. Given this uncertainty we used the general definition as our

dependent variable. We then aggregated the responses into a two-category variable: support or non-support. In other words, this variable was operationalized by collapsing a five-point scale into a two-point scale (See Table 1). Out of 178 responses to the general question, "I strongly support the establishment of Marine Protected Areas", 51 percent of respondents disagreed [7 Strongly Disagree, 22 Disagree, 62 Unsure], whereas, 49 percent agreed [68 Agree, 19 Strongly Agree].

*Angler Motivations, Attitudes and Expectations:* The independent variables for this study included socio-demographic and behavioral characteristics (i.e., age, income, education, years of residence) of the respondents. Detailed information was also collected on the use characteristics (size of boats, years boating, fishing practices and years fishing, etc.) of recreational anglers. The study also included measures of motivations for marine recreation behaviors. The respondents were provided with the following information: "Below is a list of reasons why people tend to fish. Please indicate how important each reason to fish is to you personally". This was followed by seventeen specific statements (e.g., To be outdoors; For relaxation; To obtain fish for eating; To obtain trophy fish, etc.).

The next section focused on measuring attachment to the study area. The respondents were provided with a chart of the study area and a set of statements that included the following instructions: "Below is a list of statements that address your feelings about the region represented on the chart. Please indicate your level of agreement with each of the statements listed below" (measured on a five point strongly agree to strongly disagree scale). The specific items included a variety of measures of attachment (e.g., This region of the ocean means a lot to me; I am very attached to this region of the ocean; For me, lots of other regions could substitute for this one, etc.).

This study also asked the respondents the extent that they agreed or disagreed with a series of statements focused on different attributes associated with the catch measured on a five point strongly agree to disagree scale (e.g., The more fish I catch the happier I am; A fishing trip can be successful even if no fish are caught; I would rather catch one

or two big fish than five smaller fish, etc.).

The final set of measures included some specific outcomes that may be associated with MPAs (i.e., MPAs will improve the quality of fish stocks; MPAs will negatively impact my use of the open ocean), and measures of more general goals of marine protected areas (i.e., More attention should be given to habitat restoration; I would discontinue my recreation fishing if it would increase fish stocks) were also used. These measures of specific and general attitudes towards marine protected areas serve as the dependent variables for this study.

*Statistical Procedures:* The study utilizes distributional and bivariate statistical techniques to examine the respondents' attitudes towards marine protected areas and identify relationships between these attitudes and the various personal, behavioral and socio-psychological measures included in the study. The results from this analysis suggest that the respondents are supportive of some types of marine protected area and not supportive of other types. This support (i.e., positive attitudes) can be partially explained by socio-demographic, behavioral/motivational characteristics of the respondents. The results from this study are discussed in terms of a series of recommendations for managers and policy makers interested in establishing marine protected areas in the Northwest Atlantic.

## Results

*Support for Different Types of MPAs:* This section will highlight the findings of our research by first presenting angler support for specific types of MPAs. In response to the questions of support for specific types of MPAs, the results are what one might expect. Mean responses ranged from 2.83 for Marine Preserves to 3.97 for Marine Reserves. Sixty-two percent of respondents were not in support of Marine Preserves as defined. Whereas, only twenty-three percent of respondents were not in support of Marine Reserves, where recreational fishing is allowed, but with limited entry of competing users.

*Differences Between Supporters and Non-Supporters of MPAs:* This section will compare how specific socio-demographic, behavioral and motivational variables affect angler attitudes across those that support MPAs.

*Socio-demographic and Use Behavior:* Education, Income, Age or Years of Residence, were found to be statistically insignificant in determining the extent to which an individual supported MPAs. Of the use variables measured, only boat size was found to be significant (.009), with anglers supporting MPAs having slightly smaller boats on average.

Years boating in the seacoast, and the amount of time spent in the open ocean were both marginally significant (.086) and (.077). Anglers with less years boating and less time spent in the fishing in the open ocean tend to have greater support of MPAs. There were no differences in angler support of MPAs based on the target species sought.

*Motivations and Satisfaction:* It is important to note that, of the 32 measurements of motivations and satisfactions, there was only one strongly significant difference between supporters and non-supporters (i.e. supporters were more likely to identify experiencing marine surroundings as important as non-supporters (.008)). Of the five marginally significant variables, supporters for MPA scored higher for fish type (.039), fish size (.088), thrill of catching a fish (.089), experience of catch (.080) and promise of catch (.086).

*Attachment to the Region:* Two of the 18 variables measuring angler attachment to the region were found to be significant. Non-supporters were more likely to agree with the statements, 'People should be free to do whatever they want in this region' and 'there should be no use restriction of this region' were both significant (.001). Non-supporters were also marginally more likely to agree with the statement, 'I feel no commitment to this region' (.065).

*Attitudes and Perceptions:* Attitudes appear to play an important role in angler's perceptions of MPAs. We used thirty variables to measure angler attitudes about the state of fisheries in New England, support of MPAs and perceptions of various policies. The statement, supporters of MPAs thought: New England fisheries are in crisis (.031); and that the topic of MPAs are important (.001). Supporters also indicated that MPAs will improve the quality of fish stocks (.001). While those that did not support MPAs indicated a belief that

MPAs will negatively impact their use of the open ocean (.001). Finally, anglers who supported MPAs were more likely to have positive attitudes toward habitat restoration (.001).

## Conclusions

This preliminary study lays the foundation for future research that investigates the relationship between marine recreational fishing and the establishment of marine protected areas. Our research found that roughly half of participating marine recreational anglers support MPAs. However, the extent and strength of that support depends on the specific objectives of the MPA, the restrictions imposed on saltwater anglers and the specific location of the MPA. For example, marine recreational anglers were much more likely to support the less restrictive types of marine protected areas. The research also suggests that anglers who support MPAs are more likely to believe specific benefits, such as increased size of fish stocks, will result from the MPA. Other important findings include:

- Marine anglers were more supportive of the less restrictive marine reserves than they were for the more restrictive marine preserves. This can likely be attributed to the lack of restrictions on recreational fishing in the description of marine reserves provided.
- Marine anglers with boat lengths of 19' - 21' were more likely to be supportive of MPAs. One plausible explanation for this finding is that angler's with smaller boats would not be directly affected by an MPA. It is important to note that the mean was the measure of central tendency used in this finding.
- Recreational angler's that are supportive of MPAs also support habitat restoration. Since MPAs are essentially designed to protect and restore ecosystems, this finding is consistent with what one would expect.
- Recreational angler's support of MPAs depends on their perception of the effect that MPAs will have on the outcome of their fishing trips. Non-supporters believe that MPAs will negatively impact their access rights; whereas, supporters tend to believe that MPAs will improve fish stocks.
- Both supporters and non-supporters place a strong degree of motivation and satisfaction on experiencing marine surroundings. Our findings suggest that this is an important

component of the marine angling experience. Consequently, there was little measurable difference between the two groups.

The small sample size and specific membership lists used in this study limited some meaningful differences that one would expect to find in the data. A larger study looking at the impact of marine protected areas on the Seacoast region of New Hampshire is ongoing.

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