EFFECT OF BALANCED INFORMATION ON ATTITUDES TOWARDS OPEN OCEAN AQUACULTURE DEVELOPMENT IN NEW ENGLAND

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Abstract: Assessing public support for natural resource management initiatives requires an understanding of how information will affect public attitudes. Using the development of marine aquaculture in New England as a case study, an experimental design was used to investigate the effects of balanced information on attitudes. The moderating effects of familiarity on attitudes were also examined. Results indicate that balanced information has a negative effect on attitudes, especially among individuals who are unsure of their level of familiarity with the issue.

Introduction

Global seafood demand is expected to grow by 70% in the next 35 years as the global population increases. At the same time, worldwide wild catches of many fish species are declining or have leveled off at maximum sustainable yield. For example, the near collapse in the stocks of cod, halibut, and a number of other species has caused the U.S. and Canadian governments to impose severe harvesting cutbacks in the Georges Bank fishing area of the northern Atlantic (Wirth & Luzar, 1999). As a result, the United States and Canada have placed increased priority on cultivating these species (U.S. Department of Agriculture, ERS 1995). To meet worldwide seafood demand, it is projected that aquaculture production will have to increase seven-fold, from 11 to 77 million metric tons by the year 2025 (U.S. Department of Agriculture, CSRS 1994).

The United States government is actively supporting the commercial development of open ocean aquaculture. The potential benefits of an open ocean aquaculture industry also include increased regional economic development, improved balance of trade, new employment opportunities, and the replenishment of wild stocks of commercially and recreationally important aquatic species (Royal, 1993). Opponents of aquaculture, in attempt to slow its development, have identified issues such as coastal water rights, jurisdictional conflicts, ecological disruption, processing plant pollution and conflicts with traditional users groups (Weeks, 1992). The scientific community is on the fence with respect to the costs and benefits associated with open ocean aquaculture and the general public is unaware of the issues associated with the development of open ocean aquaculture. There is a need for research that documents what the public knows about open ocean aquaculture and what their attitudes towards aquaculture development are.

A planned program of social science research should allow for the integration of the social dimensions with information from the natural sciences. This research when available will allow the public to be more involved in activities associated with the management and development of marine resources. This heightens the need for managers to improve the way that they communicate with the public to obtain informed public involvement and acquire support for proposed plans and programs (Bright & Manfredo, 1997). Information campaigns are often prescribed for situations in which the public is uninformed on a topic. In these situations, managers set out to provide the public with the different sides of the issue without persuading them to either side. A balanced two-sided message provides arguments for two conflicting sides of an issue without refuting either side. However, the actual effect of these campaigns is largely unknown (Bright & Manfredo, 1997). To data, little research has examined the effect of balanced information about natural resource issues on public attitudes. No research has been completed with a focus on the effects of balanced information on attitudes towards open ocean aquaculture. Likewise, little research has been completed that looks at the potential moderating effects of familiarity on the impacts of information on attitudes (Manfredo & Bright, 1991).

Objectives

This study sought to determine what effect, if any, balanced information on potential advantages and disadvantages of aquaculture has on public attitudes towards aquaculture and how prior familiarity of aquaculture moderates the effect of information. Specifically, the following questions were considered:

- How familiar are the participants with aquaculture?
- What are their attitudes towards open ocean aquaculture development?
- Does the inclusion of balanced information in a survey effect participant response to attitude questions?
- Does the level of prior familiarity with the issue interact with the effect of information on attitudes?
- If balanced information does have an effect on attitudes, what is the nature of that effect?

Methodology

Sampling and Data Collection. An onsite survey of visitors to the 10th Annual Hampton Beach Seafood Festival was completed. Survey participants were asked to volunteer in the seafood survey as they passed by a booth space located

among restaurant vendors. Incentives for participation included a bottle of cold water, a seat in the shade, and the opportunity to taste test two seafood products; wild caught summer flounder and aquaculture summer flounder. The four-page questionnaire collected information on seafood consumption behaviors, self-reported knowledge of marine aquaculture and marine fisheries, and attitudes towards marine aquaculture development in New England.

Participants filled out the self-administered questionnaire while seated at the booth space. The first page provided a general description of the study being conducted and a definition of marine aquaculture. It also asked some general questions about the participants' seafood consumption patterns. The second page measured self-reported knowledge by asking the participants to indicate their familiarity with marine aquaculture and New England marine fisheries. Personal relevance on the importance of marine aquaculture and fisheries issues was also measured. The third page included balanced information (on half of the surveys) and three attitudinal questions. The last page collected information on preferences for the two seafood samples and demographic information.

An experimental design was used to determine the effect of balanced information on attitudes. Balanced information was provided to half of the participants prior to the attitudinal measurements in the form of several statements on the potential advantages and disadvantages of aquaculture (Table 1). The statements were developed with experts in aquaculture management and were intended to provide equal weight by providing an equal number of statements on the advantages and disadvantages. The order of the statements was alternated so that half of the participants were presented with the advantages first and half were presented with the disadvantages first. A total of 232 surveys were completed, 113 with balanced information and 119 surveys without information.

Table 1: Balance Information

Open-ocean aquaculture is defined as the cultivation (or farming) of certain fish species in containment structures, in the open ocean, away from the protection of land.

Some people believe we <u>should</u> develop marine aquaculture in New England for the following reasons:

a. improves the condition of the fisheries
b. provides jobs for displaced fishermen
c. provides economic development for coastal communities
d. helps meet the global demand for fish products
e. restores wild fish stocks
f. provides a safer, higher quality product
g. makes seafood products more affordable and readily available
h. preserves the cultural heritage of New England fishing communities
i. helps the United States compete in the global marketplace

Some people believe we <u>should not</u> develop marine aquaculture in New England for the following reasons:

a. causes pollution from feed and fish wastes
b. causes marine mammal entanglements
c. spreads disease to wild fish stocks
d. threatens the genetic makeup of wild fish stocks, when cultivated fish escape into the wild
e. introduces non-native species into the ecosystem
f. requires lethal control of predatory animals who seek the easy prey of farmed fish
g. privatizes what should remain a free, open-access resource
h. is aesthetically undesirable
i. negatively impacts commercial fisherman and New England coastal communities

Three attitude questions were asked to both the information and the no information group to test the effect of balanced information on attitudes; the three dimensions of attitudes were used to provide a more complete and reliable measure of attitudes. Participants were asked to indicate their responses to each of the following questions: (1) "Do you think developing marine aquaculture in New England is a GOOD or BAD idea?" (2) "Do you think developing marine aquaculture in New England is a BENEFICIAL or HARMFUL idea?" (3) "Do you think developing marine aquaculture in New England is a WISE or FOOLISH idea?" Responses were measured using five-step Likert scale ranging from "extremely bad" (or harmful or foolish), "moderately bad" (or harmful or foolish, "neither", "moderately good" (or beneficial or wise), and "extremely good" (or beneficial or wise).

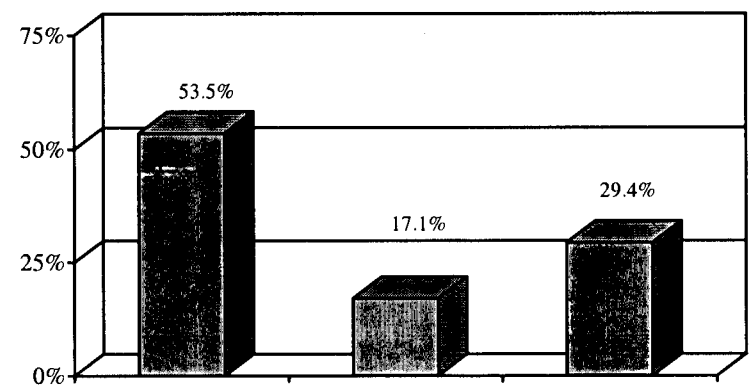
As noted earlier, participants were asked their familiarity with marine aquaculture prior to answering the attitude questions. Familiarity was used as a proxy measure of self-

reported knowledge to determine whether prior information or knowledge had a moderating effect on the change in attitudes. Participants were asked to indicate their level of familiarity of aquaculture using a five-step Likert scale of "very unfamiliar", "unfamiliar", "unsure", "familiar", and "very familiar". For analysis, the participants were divided into three groups representing three levels of familiarity that included "not familiar", "unsure of familiarity", and "familiar". The data were analyzed using the Statistical Package for Social Scientists (SPSS). One-way analysis of variance was used to determine the effect of balanced information and prior familiarity of the issue on attitudes.

Results and Discussion

Familiarity was used to get an idea of how knowledgeable participants believed they were about marine aquaculture issues. Figure 1 provides the percentage of participants in each of the three categories of familiarity: unfamiliar, unsure of familiarity, and familiar. A majority of participants (53.6%) were unfamiliar with aquaculture, while 29.4% were familiar with aquaculture. The remaining participants, approximately seventeen percent, indicated that they were unsure of how familiar they were. The mean familiarity score was 2.63 and no significant difference in familiarity was found between the no information and information groups.

Figure 1: Familiarity with Aquaculture (n=228)



Participants showed favorable attitudes towards marine aquaculture in each of the three attitude questions (Figure 2). The results indicate that over 70% of participants had positive attitudes towards aquaculture development across all three dimensions (GOOD or BAD mean = 4.09, BENEFICIAL or HARMFUL mean = 3.98, WISE or FOOLISH mean = 4.05). Using the three attitude measures, a scale variable was calculated with a mean of 4.06 and an alpha number of 0.92. This variable was used in comparisons of means to determine the effect of information and familiarity on attitudes.

The relationship between familiarity and attitudes is shown in Table 2. The results indicate that familiarity does have an effect on attitudes, with participants who were familiar with aquaculture having more positive attitudes towards it than those who are unfamiliar or unsure of their familiarity.

The results of measurements of ANOVA indicate that the information group had less positive attitudes than the no information groups (Table 3). A significant difference in attitudes between the information and no information group was found for all three of the attitude measurements, GOOD or BAD, BENEFICIAL or HARMFUL, and WISE or FOOLISH. Similarly, the scaled attitude variable also indicated that the balanced information provided in the questionnaire had a negative effect on attitudes.

The interactive effect of information and familiarity on attitudes was measured across the three levels of familiarity. Using univariate analysis of variance on the scaled attitude variable relative to familiarity and balanced information, the marginal means of attitude across the no information group and information group indicate that information had a negative effect on all participants (Figure 3). The negative effect on attitudes was found to be greatest among those participants who were unsure of their familiarity with aquaculture.

Figure 2: Attitude Measurements

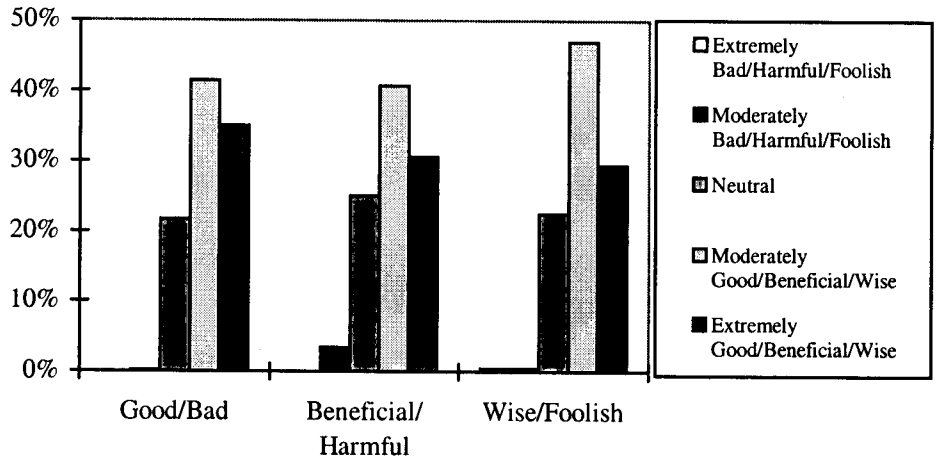


Table 2: Bivariate Relationship Between Familiarity and Attitudes

Level of Familiarity	Mean	Sig.
Not Familiar	3.8776	.000
Unsure Familiarity	3.8687	
Familiar	4.4570	

Table 3: The effect of balanced information on the attitudes towards marine aquaculture development in New England

Attitude	Group	Mean	F #	Sig.
good/bad	info	3.9537	7.279	.008
	no info	4.2526		
beneficial/ harmful	info	3.8333	8.007	.005
	no info	4.1648		
wise/foolish	info	3.9439	4.074	.045
	no info	4.1613		
scaled variable	info	3.9333	6.877	.009
	no info	4.2051		

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Implications

As a new and emerging issue in New England, the public's attitudes towards marine aquaculture development are generally unknown. The results of this study show that participants had favorable attitudes towards aquaculture, suggesting that the public is supportive of aquaculture development in New England. These favorable attitudes were held almost despite the fact that they were unfamiliar with aquaculture. Although attitudes may be positive at this time, a lack of familiarity with aquaculture can have an impact public opinion in the future. The results suggest that persons provided with balanced information on the positive and negative aspects of open ocean aquaculture development were less likely to believe that the development of aquaculture was a good idea. This finding points to the importance of effective communication between open ocean aquaculture developers and the public. The attitudes towards aquaculture of participants who were unsure of their familiarity with aquaculture were the most effected by information. This really points to the importance of understanding what the public knows about aquaculture prior to developing information campaigns. Understanding the complex relationship between information, familiarity, and attitudes requires further study.

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