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## **Finding Common Ground in the Commons: Intracultural Variation in Users' Conceptions of Coastal Fisheries Issues**

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*Population growth in U.S. coastal areas has spawned conflicts due to increasing competition between commercial and leisure uses of coastal resources. Organizations representing different user groups routinely misrepresent the causes and severity of environmental stresses to further their political and economic agendas, often predicting extinctions of fish and shellfish and undermining balanced and reasoned management alternatives. This article illustrates this phenomenon with data on conflicts stemming from perceived problems concerning marine resources involving recreational and commercial fishers, with additional attention to managers' roles in such disputes. Cultural consensus analysis is used to understand variation in cultural conceptions concerning coastal resource problems among the different groups. Finally, the method's application for resolving environmental conflicts is discussed.*

**Keywords** common property, cultural beliefs, cultural consensus analysis, marine resource conflicts, perceptions

Commons dilemmas must be explained in terms of the dynamics of conflict and competition between different social groups located in history and social systems rather than between the rational economizing individual unspecified and the group also unspecified. (McCay and Acheson 1987, 22)

Over the past three decades, growing numbers of people have been moving to the U.S. coastal margins (Crossett et al. 2004; Hinrichsen 1995). As this growth continues, conflicts have developed among fishers based on gear incompatibilities (fixed vs. mobile gear), territory problems, habitat degradation, differing motives for fishing (e.g., recreational vs. commercial), ideologies about how to manage coastal resources (e.g., conservation vs. preservation), concerns over fish stocks, and questions about the sustainability, health, and safety of marine resources. As the preceding quote implies, these conflicts arise out of the competition among

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groups representing different social backgrounds, often issuing from divergent norms about coastal resource management.

Local, state, and federal government responses to fisheries conflicts have had mixed results. These range from instituting Band-Aid fixes that exacerbate the social determinants of the conflict, to implementing of regulations that modify access to marine resources through limited entry programs, season closures, or other legal mechanisms. Often these regulatory initiatives become arenas for continued negotiations, and continued conflict, among resource users (Berkes 1984; Sinclair 1983; Orbach 1987). Extreme government responses to coastal conflicts are also possible, including the complete "privatization" of a resource through quota systems (McCay and Creed 1989) or the complete "publicization" of a resource through the establishment of a marine protected area (Murray 2005; Valdes-Pizzini 1990; Johnston 1989; Koester 1985). Even more extreme are complete bans on certain forms of fishing, as in the Florida net ban, which was instituted through a ballot initiative that circumvented traditional regulatory pathways (Smith and Jepson 1993). Similarly, recent legal action by environmental groups in New England fisheries has forced the shift from what Layzer (2006) calls permissive management, primarily influenced by commercial fishers' risk-tolerant conceptions, to a more protective fishery management regime reflecting the more precautionary views of environmentalists.

In addition to the more formalized government interventions, some studies have shown how local groups manage marine resources through institutionalized, informal means for resolving conflicts among resource users (McCay and Acheson 1987; Overby 1989; Orlove 1991). Such practices are often referred to as "traditional resource management," a term that designates management practices that have not been codified into law. While these have been effective in some settings, the immigration of new resource users into an area often undermines the effectiveness of informal understandings about resource allocation. This is especially the case when resource users are temporary, with little enduring interest in the long-term sustainability of the resource, as in the case of tourist or "weekend" fishermen. Such circumstances warrant either the revision of informal management methods or an increased government role in resource management. Under new management, conflicts can emerge as historical resource users perceive that their "traditional" claims have been infringed upon (Valdes-Pizzini 1990). While negotiations over access to resources continue, they may be disrupted by daily conflicts between fishermen who question the legitimacy of the regulations and enforcement personnel. In some cases, however, the informal resource management may be useful as a model for future management, particularly as a means for building consensus.

Fisheries conflicts occur in a socioeconomic context characterized by a number of economic actors exploiting common property resources. The conventional theoretical position concerning common property resources is that they are subject to overexploitation when access to the resource is free and the costs of resource depletion are borne by society at large instead of by individuals (Hardin 1968). This perspective has been the subject of critical debate (Feeny, Hanna, and McEvoy 1996; Dietz, Ostrom, and Stern 2003), particularly by social scientists who have demonstrated that common properties may be managed and their use regulated with local, informal methods. In addition, access to common property resources is rarely entirely free, becoming particularly costly when the resource becomes threatened (McCay and Acheson 1987). To utilize marine resources, users

initially incur the costs of acquiring equipment. Extensive, resource-threatening exploitation (as in overcapitalized fisheries; McCay and Creed 1989) may involve a variety of other social and economic costs and risks as well. The time and equipment necessary for marketing marine products, for example, or the probability of raising public concern to a level that one's access to marine resources is completely cut off, serve to constrain how much individuals can exploit the marine environment. This is particularly true in coastal environments where public agencies and private conservation groups monitor the practices of local industry for potential environmental damage. In these contexts, as well, social and psychological costs may derive from increased awareness that one's practices may be threatening water quality, estuarine health, or fish populations.

The difficulty of resolving fisheries conflicts is further complicated because they occur in coastal regions suffering from other conflicts that directly or indirectly involve fishers. Most of these can be traced directly to population growth. More precisely, many conflicts derive not from population growth itself, but from the methods that governments, businesses, and user and interest groups employ to direct, manage, or control such growth. Tourist and real estate development, for example, both a cause and a consequence of population growth, routinely spark disputes over revisions in zoning and building codes, the annexation of unincorporated areas, and other attempts to manage human activity (Johnson and Orbach 1990). Environmental health issues that arise from population growth (e.g., increased sewage, destruction of wetlands) have led to the formation of conservation groups or movements oriented toward stiffening pollution standards, reclaiming or preserving wetlands, increasing government inspections of seafood, and preventing further real estate development (Griffith 1999). Such movements may directly oppose efforts by coastal municipalities (e.g., Chambers of Commerce) to develop port and other coastal infrastructural facilities to meet the increasing needs of international commerce. Finally, influxes of new and different immigrant groups, attracted to coastal regions by expanding opportunities for employment or leisure, have led to new conflicts based on ethnic diversity, regional differences, and the uses of marine resources (e.g., allocating stocks between recreational and commercial fishermen). As Johnson and Pollnac (1989) note in the introduction to *Managing Marine Conflicts*, the expansion of ever more user groups has also led to the development of differing perceptions, philosophies, and dynamic coalition formations that complicate conflict resolution.

Within such a context, conflicts involving fisheries have become entangled in and confused by conflicts occurring due to other pressures. This often has both concrete and symbolic consequences. Alliances formed during one conflict may provide the political organization, structure, and "savvy" for soliciting funds, spreading information, and gaining public support for other conflicts. A well-known example of this is the growth of marine resources preservationist groups fueled primarily by public concern over humpbacked whale and other marine mammal killings; these groups have now branched out and become effective in other conservation issues (Griffith and Maiolo 1989). In another example, images of dolphins caught in nets were used in the media campaign supporting the Florida net ban. These images, although far from accurate in the Florida case, appeared to have influenced voter behavior.

Another important concern is the ability of various resource and environmental stakeholders to make moral rationalizations about the "other," creating a kind of

moral exclusion by justifying what is right and fair relative to these “others” (Opatow and Weiss 2000; Pollnac and Johnson 2005). Taking the environmental moral high ground, although possibly politically expedient, often involves denying one’s own potential contribution to the problem. Such denial can relieve one of moral responsibility while eliminating the need for the constraints afforded by a dialogue of just what might be fair and the potential inconvenience suggested by facts. With such bias, one is free to spin attitudes and beliefs to fit any political or social agenda with less risk of suffering the consequences of cognitive dissonance. Thus, we would expect this bias to influence an individual’s subjective assessment of, conceptions of, and beliefs about the nature of environmental problems, as well as to aid in production of moral justifications for the existence of multiple use environmental conflicts.

Conflicts frequently arise from competing beliefs that help shape individual attitudes and behaviors (Dietz, Ostrom, and Stern 2003; Deutsch 1973). Analyzing the beliefs underlying conflicts is a necessary first step in determining effective methods for avoiding conflicts before they develop, as well as for managing or, where possible, resolving conflicts after they emerge. A critical component of such an analysis is the modeling of environmental cultural beliefs and determining the extent to which they may vary across various stakeholder groups. More generally, work of this nature engages theoretical positions concerning the fundamental social and cultural causes and consequences of both conflict and consensus. We utilize cultural models that examine relationships between cultural knowledge, cultural beliefs, and social position (whether knowledge or beliefs are shared or unevenly distributed), between knowledge and perception, and between perception and behavior (Romney et al. 1987; Johnson and Griffith 1996; Paolisso and Maloney 2000; Miller et al. 2004; Ross, Medin, and Cox 2007). The ultimate goal of the modeling is to better characterize variation in environmental beliefs across various stakeholder groups that will help in facilitating an understanding of common and contrasting conceptions and values. Such an understanding is crucial for resolving environmental and resource conflicts.

## Background and Hypotheses

The North Carolina coastal region has been the setting for conflicts between commercial and recreational fishermen (Orbach 1987) and fixed-gear and mobile-gear fishermen (Griffith and Maiolo 1989) for some time now. Other, less publicly acknowledged conflicts have also occurred within fisheries based on a variety of factors relating to population growth (Griffith 1999; Maiolo, Johnson, and Griffith 1992) and coastal development. In this article, we focus on conflicts surrounding recreational and commercial fishers and fishing interests, testing three hypotheses related to variations in conceptions of cultural beliefs concerning marine resource problems and their root causes:

H1: Participants in conflicts will agree on *general* issues or basic values (e.g., the cultural belief that in general resources should be conserved).

This hypothesis derives from Kempton, Boster, and Hartley’s (1995) study of American’s environmental values. Although they interviewed stakeholders across the entire environmental spectrum (Earth First! members to dry cleaning business

owners), they found consensus among these disparate groups with respect to general beliefs about the environment reflecting basic environmental values. This is also similar to Gregory and Keeney's (1994) work on stakeholder values and policy formation, where they found that different stakeholder groups in Sabah, Malaysia, tended to disagree more about the facts and less with regard to underlying environmental values. Thus, we might expect the commercial and recreational fishers to similarly share consensus at a more general level of abstraction reflecting these basic environmental values.

H2: Recreational and commercial fishers will depart from consensus on specific issue domains (e.g., beliefs about the effects of inshore trawling), as will commercial fishers who are involved in user conflicts with one another (e.g., fixed gear versus mobile gear fishermen).

This hypothesis comes from issues raised with respect to moral exclusion and denial discussed earlier. In addition, these propositions reflect more the perceived facts or specific causes rather than any general environmental values (Gregory and Keeney 1994). Thus, we would expect a tendency for individuals to blame the "other" with respect to the facts surrounding the root causes of environmental problems, instead of reflecting on what might be fair or just given some more balanced evaluation of the environmental, social, political, and economic problems faced by all concerned.

H3: Mediators (i.e., resource managers) will lie between the two opposing groups in terms of the patterns of agreement across statements (i.e., consensus).

We also examine resource managers' conceptions and beliefs concerning North Carolina fisheries problems. Given managers' roles as mediators and regulators, one might expect them to be more fair and balanced in their assessments of environmental problems; this should be reflected in their beliefs. But the presence of balance can also be the result of what Boykoff and Boykoff (2004) refer to as "balance as bias" in that in an attempt to be balanced in the reporting of the facts, or in our case the perception of the facts, reports or perceptions are not weighted properly based on the objective evidence, thus treating all positions, no matter how misguided, as equally reasonable. This is, in and of itself, an interesting question, given that frequently both commercial and recreational fishers distrust fisheries and environmental managers.

## Methods

We included commercial fishers, recreational fishers, and select fisheries managers in our sample. Lacking an adequate sampling frame for recreational fishermen (e.g., a saltwater sportfishing licensing system), we drew our recreational fishermen sample randomly from the membership roster of the Atlantic Coast Conservation Association (ACCA), an organization whose members are predominantly saltwater sport fishers. We drew the commercial sample randomly from the North Carolina Division of Marine Fisheries commercial license list, using only full-time fishermen. The small fisheries managers' sample was more purposive than probabilistic, in that

nearly all individuals in the state with primary responsibilities in this area were considered for selection. This included informants who were members of the North Carolina Marine Fish Commission, the state legislature, upper level management in the Division of Marine Fisheries, and environmental management organizations in the state. We first conducted semistructured in-depth interviews with key informants from each sample group, asking them to explain the underlying causes of resource decline and environmental problems found in North Carolina sound and ocean waters. Three researchers reviewed transcriptions of interviews for statements that reflected beliefs about the causes of marine resource and other coastal environmental problems in the state. The statements were compared and the 59 statements most commonly found were worded in an agree/disagree format representing propositions reflecting cultural conceptions of marine environmental problems (Johnson and Weller 2002). To limit potential agree or disagree biases, approximately half of the statements were worded negatively and half positively. For the manager sample, high-level knowledgeable informants were selected for interviewing. Respondents were asked, by means of a mail survey, whether they agreed or disagreed with each of the 59 statements concerning cultural environmental beliefs, generating a set of binary responses across the 59 propositions that is amenable to cultural consensus analysis (Romney et al. 1987). Managers were interviewed in person while the other groups were surveyed using a mail-out questionnaire. A random sample of 125 respondents was selected from each of the sampling frames, with a return rate of 38.4% for the commercial sample and 55% for the recreational sample.

We employed a method successfully implemented in previous research on variation in knowledge about seafood safety and ocean pollution (Johnson and Griffith 1996). We operationalized consensus using the cultural consensus model (Romney et al. 1987). The model constitutes a theory of culture, based on reliability analysis, which formalizes the proposition that agreement reflects shared cultural knowledge. Individual cultural knowledge levels can be estimated from interinformant agreement, or what Romney et al. (1987) refer to as cultural competency. Miller et al. (2004) have used a similar approach in their study of the Hawaiian yellowfin tuna fishery, Paolisso and Maloney (2000) have used this approach in the study of cultural beliefs about *Pfiesteria* in the Chesapeake Bay, and Ross, Medin, and Cox (2007) used a similar method in studying cultural conflicts between Euro-American and Menominee Native American hunters. The approach is well suited for testing hypotheses concerning patterns of agreement and factors accounting for intracultural variation in beliefs (e.g., stakeholder identity, income, social class, etc.).

## Results

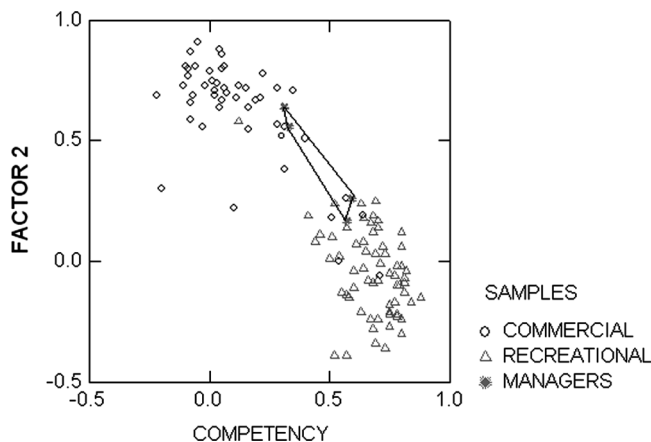
A consensus analysis of the combined sample of commercial and recreational fishers revealed a violation of two of the major requirements of the consensus model, reflecting a lack of consensus and suggesting the presence of two or more subcultures (see Table 1). Specifically, commercial and recreational fishers reveal an overall pattern of limited consensus concerning the causes of marine resource problems over the 59 cultural propositions. In this approach the people rather than the statements are factor analyzed to understand levels of agreement. For data to fit the cultural consensus model, the first eigenvalue in a minimum residual factor analysis should be at least 3 to 4 times that of the second (i.e., a single-factor solution), there should

**Table 1.** Results of the consensus analysis showing mean, standard deviation, and minimum and maximum cultural competency values (first factor scores) for each run of the analysis, with the ratio of first to second eigenvalues

Commercial and recreational ( <i>n</i> = 113)	Commercial ( <i>n</i> = 48)	Recreational ( <i>n</i> = 65)	Managers ( <i>n</i> = 4)
Mean = 0.42	Mean = 0.63	Mean = 0.68	Mean = 0.63
SD = 0.34	SD = 0.21	SD = 0.13	SD = 0.11
Min = -0.26	Min = 0.01	Min = 0.07	Min = 0.43
Max = 0.89	Max = 0.91	Max = 0.90	Max = 0.70
Ratio = 1.444	Ratio = 6.632	Ratio = 9.729	Ratio = 5.316

be no negative scores on the first factor, and the mean of the first factor scores should be 0.5 or greater; the first-factor scores reflect each individual’s level of knowledge of the cultural domain or what Romney et al. (1987) refer to as cultural competence (i.e., each individual’s correlation to the consensus or first factor). Thus, the degree of shared cultural understanding will be reflected by the extent to which the factor analysis yields a single-factor solution. Figure 1, a graph of the factor scores for the first two factors of the analysis, shows a clear separation between commercial (circles) and recreational (triangles) fishers who cluster in two tight but separate groups, reflecting individual variations in cultural beliefs or separate subcultural patterns of belief across the groups. We return to the place of the managers in the figure in a later section.

In a consensus analysis of each group, each displays a high degree of within-group consensus. Of the three, the recreational fishers had the most consensus, reflected by a ratio of the first to second eigenvalues of 9.7 and a higher mean competency with relatively lower variation. The lower ratio (6.6) within the commercial sample reflects more intragroup variation. The presence of more variation within



**Figure 1.** Minimum residual factor analysis of the informants and their group designation in terms of responses to the 59 environmental propositions (convex hull encompasses the managers).



the commercial fisher analysis as compared to the recreational fishers may be due to at least two factors. First, ACCA members are probably more homogeneous in terms of socioeconomic background than are the commercial fishers. Second, commercial fishers tend to use a variety of competing gear. Because some of our questions dealt with the effects of specific gear on the resource, higher within-group variation may reflect these gear and spatial conflicts (Bavinick 2005). By contrast, ACCA members are probably more likely to demonstrate homogeneity regarding their motives for fishing and to receive more uniform information regarding fishing, particularly given that they all belong to an organization that provides them with regular news about fishing and regulations.

In an attempt to understand possible reasons for the presence of more variation among the commercial fisher sample as we would expect given hypothesis 2, we grouped commercial fishers by primary gear types known to be involved in conflicts in the area (mobile gear such as trawls versus fixed gear such as crab traps). Comparing factor scores for the first two factors of the commercial sample, although not as well delineated as in the earlier analysis, we found some degree of separation between the two gear types, with most departures from consensus deriving from fixed gear fishers (figure not shown). Thus, although there is overall consensus within the commercial sample (i.e., it fits the cultural consensus model), what little intracultural variation there is within the sample is due primarily to gear differences and associated economic and spatial competition. Boster and Johnson (1989) and more recently Berges et al. (2006) have found patterned information in the second-factor scores within some consensus structures (see also Handwerker 2002). Thus, in some cases even though the data fit the cultural consensus model (i.e., there is a single-factor solution) there can be patterned information, or what we refer to as residual knowledge, found in the second factor.

Although most of the agreement is captured in the first factor (i.e., cultural competency score), there is some variation within this first factor due to gear type, although not statistically significant at the .05 level (separate variance  $t = -1.934$ ,  $df = 43.7$ ,  $p = .060$ ). However, an analysis of the second factor scores, the residual knowledge, reveals a greater degree of patterned variability, with statistically significant differences between the gear types (separate variance  $t = 3.362$ ,  $df = 44.5$ ,  $p = .002$ ). Divisions of this type reflect the sentiment expressed in the following statement from a commercial fisher:

With the South Atlantic Council, there's 13 members and there's only 2 that's even had anything to do with commercial fishing. And you know damn well a stone crab fisherman ain't gonna get along with a dragger, right?

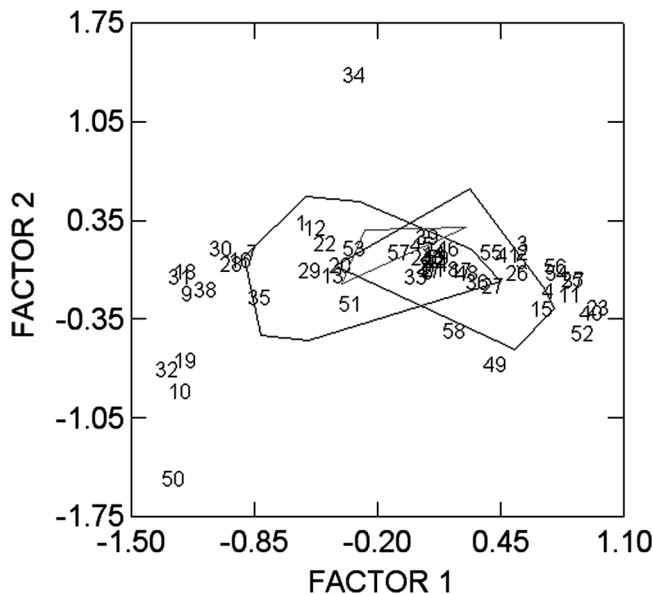
Given the lack of consensus between the commercial and recreational groups, we ask: Where do different groups of fishers agree and disagree? Testing hypotheses 1 and 2 (that commercial and recreational fishers will agree at general levels but disagree on specific issues) directly addresses this question and can help us determine and understand the potential and means for conflict resolution. To determine areas of agreement and disagreement, we compared the "answer keys" for each of the groups. Based on majority responses within groups and a Bayesian weighting of split responses (those close to or at 50% consensus), answer keys for both groups can be constructed as described by Romney et al. (1987). Thus, one works backward from

**Table 2.** Intercorrelations among answer keys for the three groups (two-tailed significance in parentheses)

	Manager	Commercial	Recreational
Manager	1.000		
Commercial	0.303 (.020)	1.000	
Recreational	0.433 (.001)	-0.110 (.409)	1.000

the patterns of responses to produce a key containing the “culturally correct” answers. Imagine not having the answer key to a true/false exam in introductory biology. A relatively valid answer key can be found by using the modal response as a reasonable estimate of the true answer. In cases where no clear modal response exists, the responses of students who did well on the answers derived using the mode can be used to better estimate the correct answer (Bayesian weighting). Thus, a valid answer key can be reproduced by an examination of the patterns of modal responses across the true/false questions and by weighting the responses of the students who more frequently answered the modal responses correctly (see Romney et al. 1987).

A simple comparison of the keys from both samples (Table 2) reveals a negative but nonsignificant correlation ( $r = -.11, p < .409$ ). Figure 2 is from a correspondence analysis of the 59 propositions by both commercial and recreational respondents.<sup>1</sup> Like the factor analysis earlier, this graphical representation shows a clear separation between commercial and recreational fishers based on their patterns of response



**Figure 2.** Correspondence analysis of the informants by propositions showing the spatial proximity of propositions with groups designated by convex hulls (Commercial to the left, Recreational to the right, and Managers in the center).

(as denoted by the convex hulls for each group leaving out the labels for better readability). It also reveals spatial proximities among the propositions vis-à-vis the fishers, showing in graphical form those statements held as true for each of the user groups (at the extremes of the first dimension in the graph) and those that were shared in common (in the middle of the space). The numbers in the figure refer to propositions in Tables 3 and 4.

Table 3 summarizes areas of agreement between the two groups (designated as “shared” in Figure 2). These statements mostly reflect more general beliefs or values, with members of each group agreeing that they sometimes contribute to the problem, that all users should be regulated, that there are general misunderstandings between the groups involved, and that the resources should not be the exclusive domain of any one group. In addition, they agree that only commercial fishers should sell fish and that recreational fishers should contribute to the costs associated with conservation. Finally, there is consensus that factors besides resource use may be contributing to the declines in available resources and that the management process is too politicized. This appears to confirm the first hypothesis in that agreement between the two groups was primarily with regard to statements that are broad or more general. We now turn to statements on which there was clear disagreement.

A glance at Table 4 shows that groups of fishermen disagree more than they agree across the 59 propositions (the regions of space marked at the far ends of “Commercial” and “Recreational” convex hulls in Figure 2). Although we found agreement at a more general level, here they part ways regarding each group’s perception of who or what is to blame for resource problems, what specific fishing practices should be regulated, and the specific impacts of commercial gear. Another set of statements can be categorized as value judgments about both the economic and cultural value of the respective fishing enterprises. These statements underscore the arguments by either group in terms of a rationale for some favored status designation. The recreational fishermen are staking out the financial high ground, claiming their activities generate significantly more dollars than commercial fishing activities (e.g., proposition 56). As one recreational fisherman put it:

Income. Enhancing the shorter season for—I guess now it’s for the merchants, the motel owners, the restaurant owners—they’re reaping the benefits of all these recreational fishermen. Whereas the commercial fishermen are only really supporting very few numbers, I guess, today.

On the other hand, those in the commercial group are taking the moral and symbolic high ground by pointing to the importance of cultural traditions and evoking images of hard work and family livelihoods. Although such “traditions” are recognized by recreational fishers, they are often viewed as causing more problems than contributing to any understanding of the commercial fishermen’s plight (see Egan and Luloff 2000 for a similar discussion of this process in traditional logging communities). As one sport fisher stated:

I guess you’d have to talk with the commercial fishermen and ask them to be reasonable in their approach. But I think their mind set is, “I did it, my grandfather did it, my great-grandfather did it, and *I’m* going to do it.

**Table 3.** Areas of common ground or statements in which the various groups were in consensus, with culturally correct answers shown (1 = agree, 0 = disagree; M = managers, C = commercial fishers, R = recreational fishers)

Answer key			Number	Cultural statement
M	C	R		
0	0	0	3	Trawlers catch mostly trash fish or scrap.
0	0	0	10	Turtle excluder devices or trawl efficiency devices (TEDs) will eventually kill the commercial trawl industry.
0	0	0	24	All marine species are affected in the same way by heavy metals and pesticides.
0	0	0	32	The commercial fisherman can hardly fish because there are so many sportsmen.
0	0	0	34	Pollution is only harmful near its source, since the ocean is so big and the pollutants get dispersed rather quickly.
0	0	0	49	A recreational fisher can never catch enough fish to do any harm.
0	0	0	50	Recreational fishing is the main cause of the decline in fish stocks, since the numbers of commercial fishermen have stayed the same while the number of recreational anglers has gone up tremendously.
0	0	0	19	Trawling can be beneficial since it may stir up nutrients on the bottom.
1	1	1	6	Herbicide runoff from farm fields often kills sea grass and alters marine environments.
1	1	1	8	Regulations should apply to everyone, whether commercial or recreational fishermen.
1	1	1	14	The kinds of fish that live in rivers, marshes, and sounds are more likely to be hurt by industrial waste than those found in the open ocean.
1	1	1	17	There are a lot of people moaning and groaning about fishing getting worse, but some of these same people will go out and figure ways of getting around any limits.
1	1	1	20	Trawlers are not the cause of decline in oyster stocks since it would be crazy for fishermen to drag a shrimp trawl across oyster rock.
1	1	1	21	Development is the primary factor affecting water quality and degradation of nursery areas.
1	1	1	36	Little rigs and all should stay off of shallow water where there's little shrimp, where they're spawning and breeding, catching them as they grow and move into deeper water.
1	1	1	42	While not always lethal, pesticides can affect the reproductive success of many marine organisms.

(Continued)

**Table 3.** Continued

Answer key			Number	Cultural statement
M	C	R		
1	1	1	43	The sale of fish should be limited to commercially licensed fishermen only.
1	1	1	44	Recreational fishermen need to help pay to keep up the fisheries.
1	1	1	45	Fluctuations in stocks are due not just to pollution and overfishing, but to natural cycles in fish populations, too.
1	1	1	46	There are abuses by both the recreational and commercial fishers.
1	1	1	47	There is a general lack of understanding between different users of the coast and its resources.
1	1	1	48	The management process in the state is so political that very little gets done in terms of protecting our resources.
1	1	1	57	Often these economic arguments between sport and commercial fishermen about who is more economically important leaves out the consumer and their needs.
1	1	1	59	Any solution to the marine resource problem that reserves a public trust resource for the exclusive of just one.

And the hell with you.” I’ve seen it. I mean, I’ve seen it first-hand and they’re pretty arrogant and belligerent toward people coming in and coming onto the beach.

Finally, in agreeing that the fisheries management process was too politicized, each group saw the other as responsible for this state of affairs, assigning more cohesion and power to opposing groups than actually exists. The nature of these disagreements leads us to conclude that disagreement between groups centers on the specifics and that consensus on these details is found only within groups.

Finally we examine where the managers lie with respect to the two major groups in a test of hypothesis 3. As seen in Table 1, the managers also fit the consensus model, reflecting agreement. Although we only interviewed four managers, given the level of informant agreement this may be sufficient to estimate levels of agreement for this small group of managers. Weller and Romney (1988) estimate the number of informants needed for correctly classifying cultural propositions in consensus analysis for a given confidence level. Given that the mean cultural competency for the managers was between 0.6 and 0.7, at a 90% confidence level for 90% of the statements to be classified correctly we would need a sample of around four to six informants.

As discussed earlier, Figure 1 is based on a minimum residual factor analysis of the statements including the four managers. This figure is similar to Figure 2 of the

**Table 4.** Statements in which the various groups lacked consensus, with culturally correct answers shown (1 = agree, 0 = disagree; M = managers, C = commercial fishers, R = recreational fishers)

Answer key			Number	Cultural statement
M	C	R		
0	1	0	1	Most changes in fish populations and behaviors are due to changes in water temperatures.
1	0	1	2	North Carolina fish stocks are being depleted faster than they can reproduce themselves.
0	0	1	4	Shrimpers don't need to catch shrimp in the sounds because all the shrimp move out into the oceans eventually.
1	0	1	5	Fish populations have been declining since the 1960s.
1	1	0	7	Commercial fishermen don't stick together.
0	1	0	9	Commercial fishing dollars are more beneficial to North Carolina's economy because they stay here longer than recreational fishing dollars.
0	0	1	11	Commercial trawlers scoop everything from the ocean and sounds.
1	1	0	12	Trawling in the sounds needs to be restricted or, at the very least, monitored, but the banning of trawlers goes too far.
0	1	0	13	If the government restricts commercial fishing heavily, then the government should assist the fishermen the same way they assist farmers.
1	0	0	15	The only way some of the major species will survive in the sounds is to ban both the commercial and recreational take of these species.
0	1	0	16	Any depletion in stocks is due more to pollution problems and habitat degradation than overfishing by commercial or recreational fishermen.
0	1	0	18	Increasing tourism and weekend residents are putting more pressure on the fish and shellfish stocks than commercial fishermen.
1	1	0	22	Commercial fishers are often blamed for depletion of fish stocks because they are readily and highly visible.
0	0	1	23	The only thing that will save the fisheries resources in the sounds is to ban commercial trawling.
0	0	1	25	Trawling should be limited to the ocean only.
1	0	1	26	Long hauls are almost as bad as the trawlers as far as indiscriminately catching too many fish.
0	0	1	27	There are so many flounder nets that sometimes you can hardly steer your boat through them.

(Continued)

**Table 4.** Continued

Answer key			Number	Cultural statement
M	C	R		
0	1	0	28	Regulations are forcing commercial fishers out of business.
0	1	0	29	Even though sport fishers are harvesting fish too, most of the regulatory burden falls on the shoulders of the commercial fishers.
0	1	0	30	All this concern for the turtle is really hurting people; they think more about the turtles than they do human beings.
0	1	0	31	The hardworking, deep-rooted, cultural traditions of commercial fishers should take precedence over any strict economic argument about who brings in more money to the economy.
0	1	1	33	The Pamlico Sound is one of the most productive areas for fishers on the East Coast.
0	1	0	35	Most fish populations rise and fall on a seven-year cycle.
0	0	1	37	There are not that many sport fishers; they haven't caught enough in their lifetime to add up to what one of those big boats kills in a week.
0	1	0	38	A man who is doing fishing for a living should have priority over somebody who's sitting there with a hook and a line.
1	1	0	39	The TED apparatus on shrimpers helps to let the smaller fish out.
0	0	1	40	The commercial fishermen have always had it their way.
1	0	1	41	The inability to control harvest levels is a major problem in the proper management of fish stocks.
0	1	0	51	As far as recreational fishing goes, it's not your average sport fisher but those people who spend the weekend hand-clamming, oystering, shrimping, and floundering that are causing problems.
0	0	1	52	Commercial fishers seem to have little respect for the law.
1	1	0	53	The problem between recreation and commercial groups is not a matter of conservation of resources, but is really more a matter of allocation of these resources.
1	0	1	54	It's not a matter of water quality; even if the water were clear as could be today there still wouldn't be as much fish, due to trawlers in the rivers and sounds.

*(Continued)*

**Table 4.** Continued

Answer key			Number	Cultural statement
M	C	R		
1	0	1	55	Improving fishing technologies and methods are major culprits in the depletion of marine resources today.
0	0	1	56	Sport fishermen spend significantly more dollars per fish caught than commercial fishermen and are, therefore, more economically important to many local economies.
0	1	1	58	There is little hope for compromise between commercial and recreational fishing interests in this state.

correspondence analysis in terms of the relative proximity of the managers vis-à-vis their responses as compared to recreational and commercial fishers. The convex hull encompassing the four managers shows their position relative to the two groups. Both analyses place these managers squarely between the two groups, reflecting possible “balance.” Still, managers at the fringes of either group reveal slight leanings one way or the other. The intercorrelations of the answer keys among the three samples are presented in Table 2, confirming the spanning nature of responses by managers, with only a slightly higher correlation to the recreational answer key. However, this analysis seems to confirm the third hypothesis that “mediators (i.e., resource managers) will lie between the two opposing groups in terms of agreement on statements (i.e., consensus),” albeit with some slight biases. We note that this reflects the political realities of resource and environmental management in North Carolina. This may not be the case in other management contexts, but the point here is that this approach allows for the empirical examination of managers and experts patterns of beliefs relative to other stakeholder groups.

There are clear differences in beliefs between the groups; these perceived differences are real and have important political implications. However, the analysis does inform us that commercial and recreational fishers agree on a number of general issues, possibly reflecting shared values, and that each group’s fundamental philosophy concerning resource utilization and management (i.e., conservation) is basically the same (Gregory and Keeney 1994). These areas of agreement can form the foundation for further consensus building with the eventual goal of conflict resolution. At the same time, the groups seem to have little understanding of one another given some of the responses to the propositions, a reflection of the highly politicized nature of the conflict and their lack of a communication outside of political settings such as public hearings. Although other approaches, such as the initial in-depth interviews collected in the course of this study, could have revealed the general nature of these conflicts, a more systematic approach fine-tunes our understanding of the specific issues on which the groups agree and disagree. A more systematic investigation can aid in developing more targeted strategies for dispelling myths and common misunderstandings (for an example see Johnson, Griffith, and Murray 1987). The analysis



seems to show that although there is a general lack of agreement on some of the more specific facts concerning environmental problems, there is nevertheless sufficient consensus and overlap in general ideologies and values that lead to us to propose that these differences are far from intractable.

### Summary and Conclusions

It is clear from the analysis of the environmental propositions that commercial fishers assign problems to natural cycles, tourists, and pollution. Although certainly willing to shoulder some of the responsibility for perceived or real reductions in harvestable resources, commercial fishers as a group displayed somewhat less consensus, reflecting gear conflicts. However, these differences (the result of economic competition based on gear type) have little to do with differences in environmental or leisure philosophies.

Recreational fishers, by contrast, assign problems to commercial overharvesting, although they generally recognize that pollution, water quality issues, and some natural fluctuations in marine populations may contribute to this problem. As a group, recreational fishers in this sample are less divided, generally of higher socioeconomic status, and therefore represent a potentially powerful political force. We note, however, that this may be partly a function of the group studied and may not reflect the possible consensus in a broader sample of recreational fishers.

Ironically, each group perceives the other as more cohesive, more powerful, and receiving special treatment. In particular, special treatment was perceived to be accorded to the other group by managers and other state officials. But as we saw, the managers interviewed were “straddling the fence.” Although these individuals may have leanings in one direction or another, by and large they attempt to maintain some degree of balance.

What does this analysis say about the potential for conflict resolution? Both groups agreed there is “little hope for compromise.” However, with respect to this statement, both groups were split: About half from each group felt compromise is possible. Had agreement on this proposition within groups been much stronger, the chances for compromise in the future would be less certain.

This illustrates the value of this method for identifying specific areas of agreement and disagreement across a broad range of propositions among resource user groups, as well as understanding the subtleties in variation among members of the same user group. This information is critical for addressing and resolving resource conflicts and, jointly with other conflict resolution approaches (Pellow 1999), can go a long way toward improving the chances for resolving the problems inherent in multistakeholder interactions and in the development of better policies (Gregory and Keeney 1994).

Finally, current changes in American culture are contributing even more players to the competitive game of resource utilization—some with vastly different philosophies. These generally follow the contrast between the conservation ideas of the past and the ever more emerging management frameworks based on more preservationist ideals as reflected in Layzer’s (2006) recognition of the trend from permissive to more protective management regimes in New England. Gil Radonski, the former executive director of the Sport Fishing Institute, once referred to the people representing these ever more passive and anticonsumptive philosophies as “nature zealots” who can be found “tiptoeing through the tulips.” This emergence of a whole

new kind of user has implications for both the nature of future political alliances and, more importantly, the dynamics of conflict resolution.

With respect to these probable future worlds, with the ever increasing growth of these more passive environmental orientations whose philosophies are preservationist and nonconsumptive (i.e., the animals are to be viewed and enjoyed), the gaps between those battling within the confines of a consumptive conservationist philosophy (i.e., both commercial and recreational interests) may, due to political realities, potentially diminish. This could lead to the possibility of more cooperation as consumption-based constituencies direct their conflict toward other issues and other groups. Thus, the tractability of a given environmental problem and potential solutions can change as a function of the number and type of stakeholders involved (Johnson and Pollnac 1989).

We suspect that the basis for conflicts—a definable group's beliefs at a given moment—reflect more individual and group self-interests and have less to do with the actual facts on the ground (Jost et al. 2003). Individuals are highly motivated to see the world in ways that satisfy their current needs, that reflect the state of their current values, and that reflect various cognitive and knowledge constraints (Abelson 1995). Ironically, it is just this uncertainty surrounding the facts that has the potential to facilitate shifts in beliefs, however subtle (see Boykoff and Boykoff 2004). The ability to alter beliefs is essential in a politically dynamic world where group belief systems may need to adjust to be in parity with the current state of political coalitions, thereby avoiding any kind of political cognitive dissonance. Although politics makes for strange bedfellows, it necessarily requires the ability to alter perceptions to fit ever-changing individual needs resulting from changes in social and political alliances. "Truth" is only a momentary convenience in a world responding to an ever-changing political landscape.

## Note

1. Although the advantage of correspondence analysis is its ability to show the spatial relationships among both row (fishers) and column (propositions) items of an  $n \times m$  matrix (Blasius and Greenacre 1998), the fishers are shown in terms of convex hulls surrounding the spatial boundaries of each for the sake of readability, although the individual points for both fishers and propositions could have been shown in a single figure in the same normalized two-dimensional space.

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