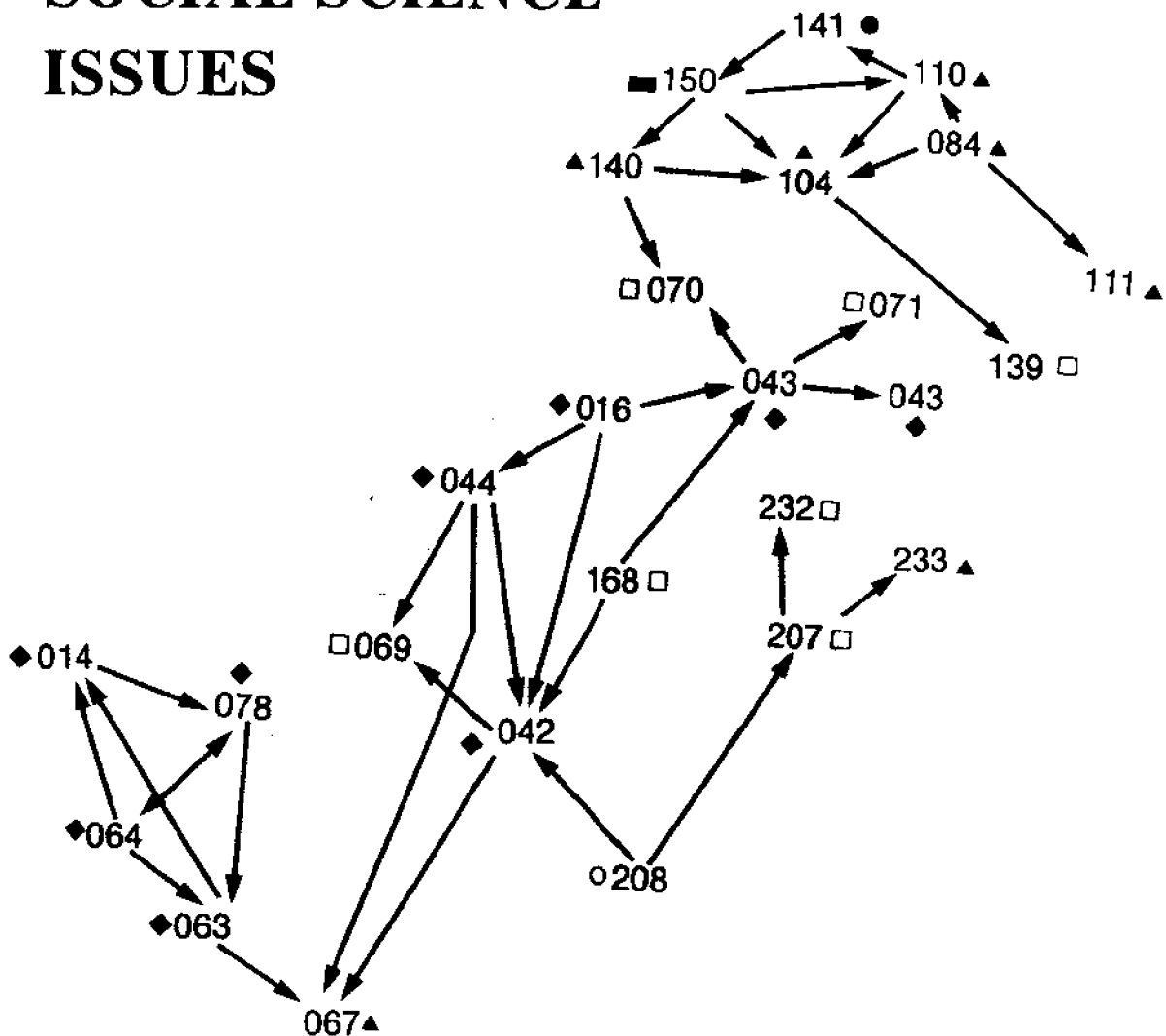


MARINE RESOURCE UTILIZATION:

A CONFERENCE ON SOCIAL SCIENCE ISSUES

CIRCULATING COPY
Sea Grant Depository



This work is sponsored in part by NOAA National Sea Grant College Program, US Department of Commerce grant number NA85AA-D-SG005, the Mississippi-Alabama Sea Grant Consortium, the University of South Alabama, and the University's Coastal Research and Development Institute. The US Government and the Mississippi-Alabama Sea Grant Consortium are authorized to produce and distribute reprints not withstanding any copyright notation that may appear hereon.

COVER

A portion of a sociogram showing the network linkages between king mackerel fishermen in North Carolina. The sociogram was constructed based on interviews with 238 individuals. The complete diagram appears on page 72.

**MARINE RESOURCE UTILIZATION:
A CONFERENCE ON SOCIAL SCIENCE ISSUES**

**4-6 MAY, 1988
MOBILE, ALABAMA**

PROCEEDINGS

**J. STEPHEN THOMAS
LEE MARIL
E. PAUL DURRENBERGER**

**UNIVERSITY OF SOUTH ALABAMA
COLLEGE OF ARTS AND SCIENCES PUBLICATION VOLUME 1
AND THE MISSISSIPPI-ALABAMA SEA GRANT CONSORTIUM**

MASGP-88-039

Citation:

**Thomas, J. Stephen, Lee Maril and E. Paul Durrenberger
1989 Marine Resource Utilization:**

Proceedings of a Conference on Social Science Issues.

**Mobile: University of South Alabama College of Arts and Sciences Publication Vol. 1
and the Mississippi-Alabama Sea Grant Consortium.**

MASGP-88-039.

Introduction

These are the papers presented at a conference entitled Marine Resource Utilization: Social Science Issues. The purpose of the conference was to bring together individuals who shared a common area of research, the utilization of marine resources; from a specific research perspective, the social sciences. Doing this allowed participants in the conference to be exposed to and explore the range of interests currently being pursued under the aegis of "maritime social science research."

The papers presented here represent a good sampling of the current macro to micro level issues which serve to define a social science approach to marine resource use. In this regard participants shared a diversity of theoretical and methodological approaches used to explicate specific issues. Part of the conference was also designed to provide a forum for participants to explore the variety of funding opportunities available to them for their research.

Acknowledgments

This conference was made possible by a grant from the Mississippi-Alabama Sea Grant Consortium under the direction of Dr. James Jones. The University of South Alabama's Coastal Research and Development Institute directed by Dr. Robert Shipp also contributed funds. Gigi Armbrrecht and Lynn Chronister managed the details that brought the conference into being and made it run so smoothly. Mike Jepson, Diane Silvia and members of the University's anthropology club; Steve Sherry, Cathy Clinton, Carrie Atnip, Luis Williams, Chris Ratliff and Catherine Potter, helped with the mechanics of registration and the technical aspects of the paper sessions. Cheryl Shirley collected the manuscripts and Cheryl and Gunn-Bente Olsen worked hard to put them in their present form. Finally, Jim Broadus of Woods Hole Oceanographic Institute presented a talk entitled "Fifteen Years of Social Science in Oceanography: Lessons from the Experience", and Peter Fricke of the Office of Fisheries Management presented a paper entitled "People of Fish: The Human Dimensions of the Allocation of Scarce Resources". Finally, Dr. Shirley Fiske of the National Sea Grant Office organized a session on funding opportunities.

CONTENTS

John T. Deiner	International Implications of Domestic (U.S.) Fisheries Regulation 5
Bonnie J. McCay and Carolyn Creed	From Stinting to Privatization: Social Process and Management of the Surf Clam Industry of the Mid-Atlantic Region 11
David R.M. White	Knocking 'em Dead: The Formation and Dispersal of Work Fleets Among Alabama Shrimp Boats 25
Duane A. Gill	Environmental Impact Assessment as a Design for a Marine Fishery Research Agenda 41
James Absher	The Sociological Carrying Capacity of Georgia's Coast for Recreational Sportsfishing 47
John B. Gatewood and Bonnie McCay	The Role of Job Satisfaction Data in Selecting Among Alternative Regulatory Policies 53
Michael K. Orbach and Jeffrey C. Johnson	The Transformation of Fishing Communities: A Public Policy Perspective 65
John Maiolo and Jeffrey Johnson	Discovering Communication Networks in Marine Fisheries: Implications for Management 71
James N. Nance, Nina Garfield, and J. Anthony Paredes	Studying the Social Impact of the Texas Shrimp Closure 83
A. Lewis Rhodes	Can Laws Protect the Marine Environment? 87
Dennis Soden	Community-Oriented Analysis: Viewing Policy Alternatives for the Gulf Coast Region 95
Linda L. Lampl	Fishery Allocation: To the Fish or the Fish Eaters? 103
Peter Sinclair	The Fishing Industry or Regional Development: Contradictions of Canadian Policy in the Newfoundland Concept 107
Roberta M. Hammond	Fishermen and Coastal Planning: The Human Element 117
E. Jane Luzar, Steven A. Henning, and Mike Liffmann	Assessing Tourism Preparedness of Coastal Communities: The Missing Leadership Factor 121
Sarah Keene Meltzoff	Politics of Conservation in the Florida Keys 125
Gísli Pálsson	The Political Ecology of Fishing: The Case of Iceland 133
Connor Bailey	Social Issues in Third World Fisheries Development 139
John R. Bort and James Sabella	Appropriate Technology and Autonomous Development Strategies in the Azuero Peninsula of Panama 147
Svein Jentoft	Fisheries Co-management: Delegating Government Responsibility to Fisherman's Organization 155
M. Margaret Overbey	Self-Regulation Among Fishermen of the Gulf of Mexico? 167
David C. Griffith and Jeffrey C. Johnson	"Eat Mo' Fish:" Using Anthropology to Increase and Diversify U.S. Seafood . . . 169

INTERNATIONAL IMPLICATIONS OF DOMESTIC (U.S.) FISHERIES REGULATION

John T. Deiner
University of Delaware

ABSTRACT

The battle over regulating fisheries in the Gulf of Mexico is usually conceptualized in terms of: (a) the need to protect an endangered living resource or (b) a conflict between the interests of commercial and recreational fisherman. This paper views the regulation issue from a dependency perspective, arguing that traditional ways of viewing the issue exemplify the continuing dominance of "core" over "periphery" interests in the renewable resources policy area.

Introduction

News about the Gulf of Mexico fishery usually concerns topics such as red fish closings, bans on shrimping activity for certain months, or tonnages of various species landed.¹ The Gulf of Mexico fishery is seldom used as a focus for discussing the position of the United States in world affairs. This paper will use a dependency perspective to suggest how maritime resource utilization in the Gulf of Mexico fishery provides insights into United States relations with the Third World.²

The battle over regulation of the Gulf of Mexico fishery is usually conceptualized in terms of (1) a need to take measures to protect an endangered living natural resource, or (b) a conflict arising from the competing interests and demands of commercial versus recreational fishermen. Regulations undertaken in response to the first conceptualization usually stress biological or environmental factors, while the second conceptualization usually leads to regulations based on economic or political factors. In any of the cases the regulations are based on an analysis of the situation which considers the fishery as part of a bounded system within the control of the United States.

Arguments and discussion about regulation of the fishery center on how it should be used as a source for United States food or United States pleasure. The goal of the regulation is to maximize U.S. economic benefits and/or political harmony. It is also accepted that the United States or regional U. S. agencies have the unquestioned right to undertake the regulatory task. There is no tendency to think of managing the resource for the benefit of Third World countries, which in this particular fishery might logically include Mexico, Cuba, or even neighboring Caribbean nations.

This paper views the regulation and utilization of maritime resources from a dependency perspective, arguing that existing conceptualizations (such as those depicted above) assist in the continuing dominance of "core" over "periphery" interests, and will never be beneficial for the poor countries of the world. In this respect contemporary policy regarding maritime resources parallels previous world experiences regarding the development and exploitation of the world's natural resources.

Dependency Theory

Dependency theory is a theory about how and why national development takes place. It differs from other development theories in a number of ways. One difference is that dependency theory originated in the Third World, among Third World (primarily Latin American) thinkers concerned with explaining the unequal and unjust situations in which they and their nations found themselves.³ Third World countries were poor while developed countries were rich. Third World countries had poor health conditions, while developed countries had good health conditions. Third World countries had little military power, while developed countries had tremendous military power. Third World countries faced starvation while citizens of developed countries had to worry about losing weight. Third World economies were agriculturally based, while developed countries were industrialized.

By almost any measure used, Third World countries were at the bottom of the scale. They had less, were weaker, and were dominated politically and economically by the First World. Dependency theorists asked why such inequalities existed. They looked at historical events and relations among nations in their search for answers.

Dependency theory, then, is centered around the concept of inequality. It seeks to understand the causes of world inequality, and assumes that existing inequalities, whether at the national or world level are unjust, and should be remedied. Dependency theorists are dissatisfied both with the way the world is, and with standard explanations for why it is that way.

Dependency theory has always been quite controversial; in part because it addresses the sensitive issue of inequality, and in part because it places the blame for inequality on the developed nations. A brief discussion of dependency theory will be useful background for understanding the dependency perspective on marine resource utilization in the Gulf of Mexico, or elsewhere.

Major Propositions of Dependency Theory

Although there are differences among dependency theorists, the following positions are commonly held:

1. Countries do not exist in isolation. They cannot be understood as self-contained political units, but only in the context of the world economic and political system. Political events in Third World countries are directly related to, and often dominated by, events in First World countries. However, relations between First and Third World countries are not symmetrical. In reality the flow of power and control is from the First World (center or core) to the Third World (periphery). Political and economic events in the First World have an immediate impact on the politics and economics of Third World countries, but Third World political and economic events usually have little impact on the First World.
2. Within the world political and economic system there is a tremendous amount of interaction among core countries and peoples, and between the core and the periphery. There is very little interaction among periphery countries. The consequences of this are great, since this pattern of interaction usually results in an isolated and weak periphery country being involved in an unequal relationship with the united and strong core.
3. Politics and economics are related, and can not be understood apart from each other. Economic ties and relationships between core and periphery countries are particularly important. These

are advantageous for the core, and disadvantageous for the periphery. The historical pattern has been for the periphery countries to trade low priced natural resource products (particularly foods and minerals) to the core in exchange for high-priced finished products. Core-periphery trading patterns result in continuous growth of political and economic power for the core at the expense of the periphery. Economic intercourse causes a widening of the gap between developed and developing countries, rather than a narrowing of that gap.

4. Given the situation depicted in #3, it follows that underdevelopment is not a natural state, but rather a condition that is caused. In fact the developed nations have, and are, actively underdeveloping the Third World countries as a result of the systems of interactions between them.
5. Put another way, the underdevelopment of weak Third World countries is directly related to, and makes possible, the "development" of the powerful countries of the industrialized core. Both the center and the periphery are part of the world political-economic system, and neither would exist without the other. Both "developed" and "underdeveloped" are relative concepts.
6. Furthermore, given the dominant existing world economic system (capitalism), there is no reason for the situation of developed and underdeveloped countries to change. Underdevelopment is not a temporary condition, as had been thought in the past, but is a permanent condition. In fact, if the present world system does not change we can expect the core to become more powerful and the periphery weaker in the future. Rather than "catching up" to the developed countries, the currently underdeveloped countries will fall farther behind.
7. Dependency theorists contend that the worldwide system of relationships is duplicated within individual Third World countries. There is a core area (usually the capital) which dominates and exploits the periphery (interior) of the country. The nation's centers of economic, political, cultural, and military power are found at the core, and the core's power and wealth grows more rapidly than that of the interior as a result of contacts and interactions between the two areas. The urban sector becomes increasingly powerful, while the rural sector becomes increasingly weaker. Resources flow from the periphery to the center, and the center profits at the expense of the periphery as a result of the movement of products and resources. The passage of time does not bring a growing equality within the country, but rather brings about an increasing gap between life in the capital and that in the countryside.
8. Dependency theorists argue that national leaders in the capital exploit the people for their own personal benefit and power. These national leaders can really be considered agents of the international system. They (the military, government officials, and commercial and financial leaders) act as links between the Third World country and the world political and economic system. They direct the country's contacts with the world, and they direct those contacts in such a way that the core benefits more than their own country. At the same time they themselves clearly benefit at the personal level.

Solutions

Dependency theorists propose a wide range of solutions for the central problem of inequality, reflecting differing emphases on various factors. At one extreme are the "moderates". They argue that Third World countries can themselves take steps to improve their situation, such as forming common markets, trading blocs,

or cartels. Third World countries share many common economic problems, and common relations with the industrialized core. By joining together and presenting a common front to the core they will gain leverage, and be able to secure greater advantages from their interactions with core countries. By forming groups or cartels the periphery nations will have more power than any individual Third World country has in its relations with the core.

A second moderate solution would be to force Third World elites to take voluntary steps to alter their country's condition of dependency. Elites in the capital might be convinced to use some of their wealth to invest in national roads, or literacy programs, rather than importing luxury automobiles, or taking expensive vacations abroad. The goal is for the elites to suspend their selfish habits of conspicuous consumption, and to use their wealth for national development.

More radical dependency theorists argue that it is unrealistic to expect elites currently in positions of power to take voluntary actions which would be personally disadvantageous. Altruistic solutions may be appealing in the abstract, but will never be implemented in reality. The only realistic solution is a revolution to rid the country of those leaders who have sold it out, and to institute sweeping change to end inequality.

It should be noted that, in a theoretical sense, the dependency position is fundamentally revolutionary. Dependency theorists blame the existing national and international economic and political systems for their unjust situations. They argue that fundamental, systemic, change is necessary. Obviously their perceptions and analytical approach are quite different from those of other development theorists.

Dependency theory, then, is a product of Third World thinkers who are trying to determine the reasons for their nations' underdevelopment. They seek explanations in systems terms, and they treat the entire world as the relevant political and economic system. They emphasize the importance of the relationship between economics and politics. They argue that the history of the world is a history in which rich countries act, either consciously or unconsciously, in ways which affect poor countries negatively, resulting in situations of inequality and injustice among the peoples of the world.

Dependency theorists argue that the present economic and political situation of the world gives advantages to the developed countries, which attempt to maximize their own national interests. Although the situation of the underdeveloped countries is affected by such actions, the rich nations seldom if ever take the effects on underdeveloped countries into account when taking their actions. The outcome for their own (developed) countries is their sole criterion for evaluating policy and action.

The question is what does dependency theory have to say concerning the utilization of marine resources in the Gulf of Mexico?

Dependency Theory And The Gulf of Mexico Fishery

From a dependency perspective, domestic (U.S.) regulation of fisheries, including the Gulf of Mexico fishery, has international implications. Essentially, such regulation continues the pattern of the last 500 years in which powerful countries have used their economic and technological resources to affect the world in ways which widen their advantage over weak countries.⁴ In the past the common pattern has been for the developed countries to manage the exploitation of resources — usually non-renewable resources — often located in underdeveloped countries, for the benefit of the developed countries. These resources were usually grains or minerals.

Colonial and neocolonial rulers changed Third World agricultural production patterns so as to provide food crops for export and consumption in the developed countries. One result today is that areas which had formerly been self-sufficient in food, and where few starved, have now become food importers, where starvation is a major problem. Peoples who used to live on locally grown sorghum and millet now produce peanuts for the world market. First world peoples eat the peanuts, and First World agribusinesses market and distribute the product for a profit, most of which stays in the First World. More total food may be produced, but the distribution pattern is vastly different, and the producing area suffers food shortages and nutritional deficiencies.⁵

Mineral production has been even more spectacularly beneficial to the First World, at the expense of the Third. The exploitation of Chilean copper, for example, was largely under the control of three United States based copper companies, Braden, Kennecott, and Anaconda. They developed the mines, provided the technology, mined and exported the copper, and made their profits. The great bulk of the profits stayed in the United States, with Chile benefiting only slightly through local salaries. And the end result was that the copper was gone, never to be effectively used as a resource by Chileans for the benefit of Chile.⁶

The historic pattern has been one of First World actors using their technology and economic skill to exploit resources located in the Third World for the benefit of the First World. Such resources were often nonrenewable, as in the case of minerals.

Even in the case of theoretically renewable resources, such as timber, exploitation has threatened to make the resource nonrenewable. The current deforestation problems in Brazil, Costa Rica, and parts of Africa are examples of operations in the Third World which have primarily benefited the First World while destroying or gravely endangering a theoretically renewable resource located in the Third World.

How does utilization/exploitation of the Gulf of Mexico fishery fit, or differ from, the historic pattern? The fishery is a renewable natural resource. People are aware of the dangers of overexploitation, and theoretically can and will take the necessary steps to prevent destruction of the resource. And the fishery resource is located within the boundaries of a First World nation, the United States.

One question is whether the resource should, in fact, be considered renewable. Is there a realistic danger that the needed care and management will not be provided, and the resource will be destroyed? If destruction is a possibility, then the Gulf of Mexico fishery is potentially in the same category as those Third World natural resources which have been endangered by overexploitation.

A second question is, does location matter? The mineral and agricultural resources mentioned previously were not within the boundaries of First World countries, but were exploited by the First World countries for their own benefit. Now, with the resource inside the boundaries of a First World country, what outcomes can be expected? Who will be the exploiters and who the beneficiaries of the exploitation? Are natural resources, no matter where in the world they are located, to be exploited only by wealthy countries, and only for the benefit of wealthy countries? Where is the justice in such a system? And when, if ever, are Third World countries going to benefit from the exploitation of natural resources? Is there any effective way to stop First World countries from destroying the resources that they are exploiting, even the supposedly renewable natural resources? These questions follow from the dependency theory perspective of viewing the entire world and its resources as one system, with inequalities resulting from the exploitation of the resources.

Nationalism plays a role in the development/exploitation picture. Nationalism justified the growth of the Spanish Empire in Latin America, European colonization in Africa, and the idea of manifest destiny in the United States. Conquest and economic control over others were interpreted by nationalists as the rightful rewards accruing to great nations. Historic boundaries offered no protection to natives in Africa and Latin America. Dominant countries simply went in and colonized, "civilized", or otherwise "aided", the local inhabitants, arguing that this was a duty and obligation of advanced, superior, countries. Despite any accompanying rhetoric, the result was to use the host area for the benefit of the dominant country. There was little thought of development of the host area for the benefit of its inhabitants. Its resources and working population existed for the benefit of the mother or imperial country. During the years after 1500 nationalism became the philosophical basis for expansion of core countries and offered no protection to periphery countries. The Gulf of Mexico fishery is a twentieth century example of how nationalism was used to expand and preserve the maritime resource base of the United States. In 1945 President Truman declared a unilateral extension of United States territorial jurisdiction in order to assert expanded U. S. ownership and the right to exploit offshore oil resources for United States use. Periphery countries have since climbed on this nationalistic bandwagon, and have declared their national right to control resources up to 200 miles from their coasts. In fact the original 200 mile limit claims were made by Chile, Ecuador, and Peru shortly after the Truman declaration.

Nationalism has moved periphery countries to claim control over maritime resources in vastly expanded areas, but they lack the technology necessary to enforce their claims, or to exploit the new resources claimed. Argentina has had this problem in the South Atlantic, and many African countries also have the problem.⁷ The situation is that in contemporary times nationalism aids in the exploitation of an expanded resource base for core countries. It also allows periphery countries to claim expanded resources, but nationalism alone provides little effective help in exploiting the newly claimed maritime resources. The core remains the principal extractor/exploiter of the world's natural resources.

In addition to nationalism, rapidly changing technology is the key to effective maritime resource utilization in fisheries, including the Gulf of Mexico fishery. Advanced technology has made the exploitation of fisheries more efficient, but also greatly increases the danger of over-exploitation and destruction of the resource.

Improved technology now makes identification and location of marine resources easier (radio communications, spotter planes, loran, sophisticated fishfinder electronics, even remote sensing from satellites). Technological advances also improve the chances of catching marine life (improved nets, downriggers, doors, winches, baiting machines). Preservation of the seafood, once captured, is greatly improved due to new techniques for storing, freezing, and cleaning. And technological advances in communications and transportation systems have created larger markets for seafood, and enabled its rapid delivery to consumers. Advances in marketing techniques, as well as new knowledge about nutrition, have also led to the creation of larger and more demanding consumer markets, putting increased pressure on the resource. Fads such as cajun food and blackened redfish exemplify situations in which marketing techniques can change consumer food tastes, and have unanticipated and possibly devastating effects on a fishery resource. The combination of all these technological advances makes exploitation of a fishery resource more likely, much easier, more efficient, and increases the potential for exhaustion of the resource. The important point is that technology increases the *speed* of exploitation. This

in turn increases the potential danger of overexploitation and destruction of a fishery before people realize what is happening, or have the ability to prevent it.⁸ One result is a confusing and often controversial rash of regional and national regulatory measures in the United States designed to manage and protect endangered fishery resources.⁹

Technological advances (developed in the core countries) have been aimed essentially at finding better ways of exploiting maritime resource. The goal has been to develop technology to extract food for consumption in the core countries. Much less research has been directed toward finding effective ways of expanding or preserving the resource itself, and few technological advances have improved distribution of the resources outside of the core areas. Virtually none of the new technology specifically aims at sharing benefits of the exploited resources with people in the periphery. In other words, the result of the technological advances has been that there has been increased exploitation of the fishery resource for the benefit of peoples of the core countries.

"Development" in the past resulted from the core using superior technology to extract non-renewable resources from the periphery for the benefit of the core. The periphery didn't benefit or develop, and the resources were lost forever (oil, tin, copper). Today in the Gulf of Mexico fishery the United States (a core country) is using superior technology to extract food from a resource it has claimed for itself for the exclusive benefit of its people. The periphery certainly doesn't benefit in the short run, and activities in the fishery may lead to exhaustion of the fishery resource so that the periphery will never benefit.

From a dependency perspective, history is repeating itself. Improved technology leads to more effective resource exploitation. The improvements in technology come about from investments of capital for research and development. Core countries have the capital to invest, while periphery countries do not. Consequently, core countries come to develop, control, and use the improved technology. The resource, wherever it may be, is exploited for the exclusive benefit of the core peoples, while the periphery countries receive no benefits during the exploitation. Ultimately, the results of core exploitation of maritime resources may now be such as to exclude the possibility of the periphery countries ever benefiting.

CONCLUSION

Exploitation of the Gulf of Mexico fishery illustrates a continuing situation of injustice, when viewed from a dependency perspective. Technology and nationalism contribute to a situation in which a natural resource is exploited by a core nation. Benefits of the exploitation flow only to the core nation. The exploitation or utilization of resources (in this case maritime resources) is advantageous for the core, and therefore relatively disadvantageous for the periphery. Exploitation of the resource by the core (whether located in the periphery or outside of it) may result in destruction of the resource. In any case, the periphery has little or no say in how resources are used. Consequently, the periphery does not benefit in the short run and the resource is gone in the long run.

Core nations (those with capital and technology) exploit the resource and the gap between them and those in the periphery widens without the periphery having a chance to utilize the resource to "catch up". The core controls the resource and uses it for its own purposes.

"Development" of the Gulf fishery is a misnomer from the dependency perspective. Planners and regulators are not thinking of development in the sense of enlarging or expanding the resource for the good of all. There is no consideration of the wants or

needs of periphery countries. Actually the idea is not development at all, but rather simply preservation, preservation for U.S. use. Even here the regulatory actions of the core country may have come too late. The resource, though in theory renewable, may be exploited beyond a safe limit. It may become exhausted beyond repair.

Whether the resource is renewable or non-renewable, whether it is located in the periphery or the core itself, the idea remains the same: The resource is to be exploited, utilized, and managed for the benefit of the core. There is no thought of managing, exploiting, or developing the resource to benefit the periphery.

Conservation ("regulation") comes only after actions by those in the core may have destroyed the resources (fisheries, forests, atmosphere). In any case, the conservation involved in no way suggests that the resource is being conserved for world use. The Third World and its inhabitants are not, and never have been, considered as the basis for the distribution of the benefits of the world's natural resources. Core country nationalism contributes to the continuance of periphery underdevelopment.

NOTES

1. The preliminary list of paper topics for the Marine Resource Utilization conference itself illustrates this practice of discussing the fishery in terms closely related to its immediate geographical vicinity. Three examples are: "Work Fleet Formation among Shrimp Boats in the Gulf of Mexico", "Perceptions of Lacey Act Enforcement Among South Texas Shrimpers", and "Studying the Social Impact of the Texas Shrimp Closure".
2. The term Third World is imprecise. For the purposes of this paper Third World refers to the non-industrialized, non-Communist countries of Africa, Asia, Oceania, and Latin America. The First World refers to the industrialized, non-Communist countries of the world. And the Second World refers to the Communist countries of the world. Much of the Third World is located in the Southern Hemisphere, and is sometimes referred to as the South. None of the commonly used terms, such as Third World, lesser developed countries, underdeveloped countries, developing countries, etc., is really satisfactory, and all represent somewhat arbitrary classifications.
3. The literature on dependency theory is vast. The following titles either represent major dependency thinkers, or contain extensive bibliographies for readers who want to pursue the literature further. David E. Apter. *Rethinking development: modernization, dependency, and postmodern politics*. Newbury Park, California: Sage Publications, 1987. Fernando Henrique Cardoso and Enzo Faletto. *Dependency and Development in Latin America*, translated by Marjorie Mattingly Urquidí. Berkeley: University of California Press, 1979. Ronald H. Chilcote.(ed.) *Dependency and Marxism: toward a resolution of the debate*. Boulder, Colorado: Westview Press, 1982. Ronald H. Chilcote. *Theories of development and underdevelopment*. Boulder, Colorado: Westview Press, 1984. Ronald H. Chilcote and Dale L. Johnson. (eds.) *Theories of development: mode of production or dependency?* Beverly Hills: Sage Publications, 1983. Wüfred L. David. *Conflicting paradigms in the economics of developing nations*. New York: Praeger, 1986. Andre Gunder Frank. *Dependent accumulation and underdevelopment*. New York: Monthly Review Press, 1979. Celso Furtado. *Accumulation and development: the logic of industrial civilization*, translated by Suzette Macedo.

- Oxford: M. Robertson, 1983. R. Felix Geyer and Johannes van der Zouwen. (eds.) *Dependence and inequality: a systems approach to the problems of Mexico and other developing countries*. Oxford: New York: Pergamon Press, 1982. Vincent A. Mahler. *Dependency Approaches to international political economy: a cross-national study*. New York: Columbia University Press, 1980. Vicky Randall and Robin Theobald. *Political change and underdevelopment: a critical introduction to Third World politics*. Durham, North Carolina: Duke University Press, 1985. Mary Ann Tetreault and Charles Frederic Abel. (eds.) *Dependency theory and the return of high politics*. Westport, Connecticut: Greenwood Press, 1986.
4. Immanuel Wallerstein and a group of scholars who share his perspective, know as world systems theory, argue that a fundamental change toward the dominance of capitalism in the world economy began in the sixteenth century, in Europe. Wallerstein is a prolific writer, but his major theoretical ideas can be found in the following books he has authored: *The modern world-system: capitalist agriculture and the origins of the European world-economy in the sixteenth century*. New York: Academic Press, 1974. *The capitalist world-economy: essays*. Cambridge, New York: Cambridge University Press, 1979. *The politics of the world-economy: the states, the movements, and the civilizations: essays*. Cambridge, New York: Cambridge University Press, 1984. and *Processes of the world-system*. (edited with Terence K. Hopkins). Beverly Hills, California: Sage Publications, 1980.
 5. The general argument about the harmful effects of the change from self-subsistence food crops to cash crops has been made by a number of scholars. A particularly well-argued discussion occurs in Robert E. Garner. *The developing nations: a comparative perspective*. Boston: Allyn and Bacon, 1976. The particular situation regarding a change to cash cropping for peanuts in Senegambia was presented in remarks by Dr. Peter Weil at the University of Delaware, April 18, 1988.
 6. Discussion of the Chilean copper industry figures prominently in much of the writing about the turbulent years of Chilean politics from 1964 to 1973. Divergent views of the situation can be found in the following sources: Richard S. Eckaus and P. N. Rosenstein-Rodan. (eds.) *Analysis of development problems. Studies of the Chilean economy*. New York: American Elsevier Publishing Company, 1973. Sergio Molina Silva. *El proceso de cambio en Chile: la experiencia 1965-1970*. Santiago de Chile: Editorial Universitaria, 1972. Paul Sigmund. *The overthrow of Allende and the politics of Chile, 1964-1976*. Pittsburgh: University of Pittsburgh Press, 1977. Arturo Valenzuela and Samuel Valenzuela. (eds.) *Chile: politics and society*. New Brunswick, New Jersey: Transaction Books, 1976. Gary M. Walton. (ed.) *The national economic policies of Chile*. Greenwich, Connecticut: Jai Press, 1985.
 7. Even in cases where the periphery country claims to control the use of the resource, as with 200 mile jurisdiction claims, the periphery countries are often unable to patrol or supervise its use. They find themselves at the mercy of well-equipped fishing vessels of core/foreign countries. These vessels enter the resource area, exploit the resource, even deplete it, and leave with the periphery country either unaware of their presence, or unable to stop their activities. The United States is currently taking some steps to aid African countries in this regard, particularly against suspected Soviet intrusions. However, the problem of monitoring the vast areas which fall within the 200 mile jurisdiction is a difficult one. Even core countries find that patrolling/protecting fishery resources located far from shore is difficult. Recently some commercial fishing interests in the United States privately funded an overflight of U. S. waters to secure photographic documentation of Japanese incursions into U. S.-claimed areas. The United States government and Coast Guard patrols had not previously discovered that such incursions were ongoing. See *National Fisherman*, March 1988 and May 1988 for discussion of the Japanese incursions and resolution of the cases. See John T. Deiner, "Fishing and Politics in Latin America", a paper presented at the seventh conference of the Mid-Atlantic Council of Latin American Studies (MACLAS), March 22, 1986 for discussion of the earlier Argentine case.
 8. An extreme example of the power of improved technology to exhaust a fishery can be seen in the herring fisheries of Alaska. Some fisheries are open for less than a day per year for fear of decimation if commercial fishermen were allowed to operate for a longer period. See articles on Alaska herring fisheries in *National Fisherman*, 1985-present.
 9. These regulations are often aimed at settling controversies between commercial and recreational fishermen over use of the resource. Both sides blame the other for overexploitation leading to the depletion of fishing stocks. Their arguments are chronicled in virtually every issue of *National Fisherman* and *Salt Water Sportsman*, journals which speak for the commercial and recreational interests, respectively. The discussion of overexploitation as possibly deriving from recreational fishing is almost incomprehensible to those in the Third World. The maritime sportsfishing public in the Third World is very small, and much of the salt water sportsfishing that does go on is engaged in by foreign tourists or a very small portion of the national elite. Dependency theorists would say that neither of these groups can be expected to act in the interests of the periphery nations. A particularly well-argued discussion occurs in Robert E. Garner. *The developing nations: a comparative perspective*. Boston: Allyn and Bacon, 1976.

DIVIDING UP THE COMMONS: CO-MANAGEMENT OF THE U.S. SURF CLAM FISHERY

Bonnie J. McCay and Carolyn F. Creed
Rutgers University

ABSTRACT

This paper is an ethnographic appraisal of political, social, and cultural aspects of the transition from a common property fishery, albeit highly "stinted" or regulated, to one involving near-privatization of rights to valuable shellfish resources. The focus is on the management arena: meetings of the fishery management council, industry lobbying groups, scientific and industry advisory groups, government/council task forces, etc. This essay is background to an ongoing study of a community engaged in negotiation and conflict over how to manage and allocate rights to common resources.

Introduction

This essay on the surf clam fishery of the United States sketches (1) the development of a tragedy of the commons; (2) early attempts to regulate surf clam fishing; (3) the development of very elaborate management systems by state and federal governments, with, however, active participation by members of the industry; and (4) subsequent management issues and the social groups engaged in cooperation and conflict over them. The essay is background to an ongoing study of a community engaged in negotiation and conflict over how to manage and allocate rights to common resources.¹

The surf clam fishery provides a classic case of a tragedy of the commons: it developed rapidly in response to profit-seeking motives and came close to imperiling the resource on which it depended. It also provides a case of successful social action to check the tragic process. State and federal governments imposed and enforced strict regulation, in consultation with members of the industry. The resource recovered and is not now in danger. Finally, it is a case of social deliberation and conflict over whether and how to alter the fundamental condition of common property rights to a fishery.

The surf clam fishery is unusual in the United States for the extent to which limited entry and privatization are being used and entertained to manage the fishery. Limited entry and privatization run counter to the rule and idea in America that tidewater lands and resources are the open-access common property of all citizens, available to them subject only to their willingness to acquire licenses and to consent to regulations developed by the state (either state or federal), in its role as holder of the public trust (*res publicum*). Economists have long promulgated the virtues of limited entry and privatization as against open access (e.g. Scott 1979), but fishermen and others have also and long resisted.

We are studying the effects of limited entry since 1977, when a moratorium on new vessels was imposed in the surf clam fishery.

We are also studying the social process of privatization, as participants in the fishery and in the management process debate and negotiate the terms of a system that may allocate exclusive rights to shares of the quota to individual vessels. We can imagine similarities between this process and what must have occurred over and over as villagers, lords, and entrepreneurs considered enclosure of common fields and common pastures in 17th and 18th century England.

Development Of The Fishery And The Tragedy

The Resource

The surf clam, *Spisula solidissima*, lives along the northwestern Atlantic coast, from Gulf of St. Lawrence to Cape Hatteras, N.C., but particularly in fairly shallow waters off the states of New Jersey, Maryland, and Virginia, extending from the beach to as many as 40 miles from shore.² The major inshore fishery (within 3 miles) is in New Jersey; elsewhere the clams are usually found farther away from shore, within the 3-200 mile "exclusive economic zone claimed and managed by the federal government since 1977 under the "Magnuson Act." Surf clams grow to "recruitment" size (between 4 1/2 and 5 1/2," depending on management rules and industry desires) within five to seven years. They are sedentary creatures who burrow into the sandy and gravel bottoms they prefer. They mate and breed a lot, but rarely do their offspring survive to form an appreciable bed of clams.

Success of year-classes is infrequent and unpredictable. Another way of saying this is that there appears to be no direct relationship between stock and recruitment (Fogarty and Murawski 1986), a fact true of many fishery stocks and of considerable interest given the fact that modern fishery science is based on the idea that the stock of today affects the recruitment of tomorrow.³ In the entire region there have been only three strong year classes since 1965 (perhaps one more since 1982), and fishery yields have been sustained by the accumulated biomass of those year classes. The 1976 year class of the New Jersey area is one of the most abundant; it is the focus of much of the fishery since ca. 1982 and, combined with a 1977 year class, will be the sustenance of the fishery into the 1990s. The management question since 1977 has been, at what rate should the 1976 year class be taken, given much uncertainty about when and whether a new year class will appear. The answer has been to take it at an annual quota of ca. 3 million bushels of clams. The rationale for that answer includes the industry's concern not to overproduce for a limited market. We will return to the 1977-management system after discussion of the fishery itself, early attempts at "self-management," management responses to crises of the mid-1970s, and the development of "co-management," through the Mid-Atlantic Fishery Management Council under the Magnuson Fishery Conservation and Management Act of 1977.

An industrialized food fishery

The surf clam is an inelegant but useful bivalve. It was once known as the "skimmer clam," its empty shells fun to throw across the water and useful as ashtrays, and its meat a source of bait for anglers. In the 1940s it was developed as a cheaper and more abundant substitute for hard clams (*Mercenaria mercenaria*) and soft clams (*Mya arenaria*); it was discovered that the meats of surf clam, when properly taken from the shell and cut or minced, could be substituted for bay clams in clam chowder, spaghetti-and-clam-sauce, clam juice, and fried clam dishes.

All surf clams are purchased by consumers as part of prepared (canned or frozen) foods. Hence, the fishery was, from the outset,

integrated into industrialized processing and distribution systems. Although the harvesting sector of the fishery is divided into "independents" and vertically-integrated vessels owned by companies that also own and run clam-shucking and processing factories, the product of all vessels goes to the processing industry.⁴ The distinction between "processors" and "independents" is the most obvious and perhaps the most fundamental social distinction in this fishery.⁵

Expansion and development of the surf clam fishery depended on processing and marketing innovations, on exploration, charting, and measurement of abundance on the surf clam beds, and on technological innovation in fishing.⁶

Today, as during most of the 1960s and 1970s, the bulk of the fishing fleet is found in the state of New Jersey, closest to the best beds of these clams in the region, while most of the processing takes place there and to the south. The largest vertically-integrated fishing fleets are found at ports on the Delmarva Peninsula: Ocean City, Maryland, Chincoteague, Va., Oyster, Va., and Willis Wharf, Va., although one of the 3 largest vertically-integrated firms keeps several of its boats at a New Jersey port. The "independents" are often talked of as the "Jersey boats," because of their reliance on the New Jersey inshore fishery and because of the fact that most of them are located in the New Jersey ports of Atlantic City, Wildwood, and Cape May. Most of the "independents" are involved in both a state "inshore" fishery (within 3 miles of the coast) and a fishery in the federal exclusive economic zone (EEZ; between 3 and 200 miles of the coast) managed by the federal government. Some of the "independents" and most of the "processor" vessels focus on surf clams in the EEZ, as well as dredging ocean quahogs⁷ in the EEZ and/or involvement in the New England surf clam fisheries.

Managing The Commons

"Self-Regulation" and Government-Industry Cooperation

The surf clam industry is relatively small and geographically distinct. Today there are only about 140 vessels in the fishery and fewer than 70 individuals who own these vessels. At any time there are fewer than 5 or 6 buyers for clams and only a few processing plants.⁸ Investments and incomes, hence the stakes, are high. With these conditions, and applying ideas from the sociology of collective action (Olson 1965; cf. Hardin 1982; Ostrom 1987; Oliver and Marwell 1988), one might expect the emergence of some degree of self-regulation within the industry, in contrast to a fishery that is highly dispersed, with large numbers of people, making transaction costs of decision-making and monitoring very high. What we find instead is collaboration between government and industry, but industry has been given (or has taken) a strong role in decision-making.

The surf clam industry, or rather the small group of processors and clam boat owners that dominated harvesting and processing,⁹ became aware of the likelihood of depletion and the need to conserve very early. The problem and their awareness increased through the 1970s, but the major response remained the classic one of tragedians of the commons: search and fish harder.¹⁰ The strategy of the harvesting sector of the fishery was to concentrate on an abundant year-class until it was depleted and then move on to another population elsewhere. There were serious signs of decline: fishing effort increased and moved south; New Jersey landings declined drastically. More vessels entered the fishery every year. The early 1970s were times of declining catch per unit of effort, and overall landings peaked in 1974.

In 1972 state and federal fisheries officials and members of the

surf clam industry began to consider a management system. Clam processors often limited how many clams they would buy, but this was in relationship to plant capacity and short-term market limitations. They either could not agree among themselves and with the harvesters about voluntary limitations and recognized the difficulty of doing so given "free riding" incentives (see Olson 1965), and/or, as a former processor explained, were not allowed to do so because of federal laws forbidding "restraint of trade" in interstate commerce. This would amount to "withholding production," a behavior attributed to monopolies and illegal in the United States. In either case, the industry *needed* government's involvement in surf clam management.

The U.S. government did not engage in marine fisheries management prior to 1977, when the Magnuson Fishery Management and Conservation Act came into effect. All management of marine fisheries, within 3 miles, was done by the states. However the U.S. Bureau of Commercial Fisheries (later the National Marine Fisheries Service [NMFS]) actively engaged in fisheries development and, indirectly, management before that time, in cooperation with the industry, and a state-federal system of cooperation existed in the Atlantic States Marine Fisheries Commission.

Close connections between the industry and government were apparent from the outset.¹¹ The major contribution of the Bureau of Commercial Fisheries was to carry out what some today call "search-and-destroy" missions: surveys of Mid-Atlantic and other waters to identify and measure the populations of surf clam stocks (e.g., Ropes 1980). In that sense, the government helped cause "tragedies of the commons."

How closely the federal fisheries agency's work fit in with the needs and plans of the industry can also be seen in accounts of advice given by government biologists to industry concerning deployment of fishing effort on clam beds.¹² There were signs of "self-management" in the use of a trade association to meet with biologists about moving south to Cape May in 1967 to give the clams off Point Pleasant a chance to recuperate.¹³

Crisis and State Management

No regulations came of numerous meetings held under various auspices, including the Atlantic States Marine Fisheries Commission, in the early 1970s.¹⁴ Near-crisis conditions were required. These came soon enough. In the mid-1970s it became evident that there were no more new clam beds to discover and no new year-classes in old clam beds. A fishery off southern Virginia virtually annihilated stocks there. Accordingly, the clam fleet returned to New Jersey inshore surf clam stocks during the last 3 months of 1975. Clammers and officials in New Jersey feared that all effort would concentrate on the remaining New Jersey inshore clams. The inshore clams would soon be decimated, a particular threat to the smaller New Jersey clam vessels unable to go far for clams. A state emergency was declared,¹⁵ and on January 1, 1976, the New Jersey Department of Environmental Protection imposed an emergency closure of N.J. inshore clam beds.

A natural disaster led to transition from emergency to management system. Protection of the inshore beds seemed all the more urgent later in 1976. An anoxic condition in the ocean in the summer and fall of 1976 killed much of the offshore stock of clams¹⁶ and prompted an even more desperate movement of the surf clam fleet in search of other stocks.

Soon thereafter the State of New Jersey enacted a limited entry program, which restricted the number of vessels in the fishery by issuing permits only to those already in it. Having thus redefined

the commons, the state's Chief of Shellfisheries worked closely with the clambers to develop a management system that combined limited entry with weekly catch limits, and restricted the season of clamming in New Jersey inshore waters to the period between December and May. In its essentials the state's program remains as it was then, and is known to favor the smaller-scale and "independent" clambers.¹⁷ In deciding how many clams each boat could harvest each week, neither historical performance nor vessel capacity was used. No matter how many clams a vessel had caught or could catch, each received exactly the same allotment. (These clambers also engage in the fishery beyond 3 miles, and beyond New Jersey jurisdiction).

Crisis and Federal Management

Anoxic conditions in the summer of 1976 virtually eliminated the concentration of clams off New Jersey's shore and stimulated the state's stringent management program. This was mainly because boats were ready to move into already hard fished inshore New Jersey areas and wipe out the one year class there. A more southern fishery that developed during the 1970s was concentrated on only one year class, too, and the federal surf clam plan of 1977 was largely in response to fear that the fleet of boats, which had grown tremendously in number and fishing capacity, could annihilate the entire year-class. There would be nothing left.

By late 1977 management was in place at the federal level: the surf clam became the first species to be managed under the auspices of the new Mid-Atlantic Fisheries Management Council, one of the regional councils established by the Magnuson Act to manage fisheries between 3 and 200 miles. This management scheme created an emergency moratorium on licensed vessels, catch and trip limits, and emergency closures (see below).

Management had two goals: (1) to rebuild the stocks; and (2) to prevent further overcapitalization and perhaps reduce the level of capitalization in the industry. The 1977 management system and its successors helped with the former but failed miserably at the latter. The major debate in the 1980s is how to change it to better deal with the fact that 140 vessels are in the fishery but fewer than 1/10th of that number could easily take the entire year's quota. Put another way, given the number of boats and their catching power, the entire year's quota is now taken in the equivalent of about one week...spread out over the entire year, in 6 hour stretches. Of course, this does not include catches of New Jersey inshore clams, made between December and May by those vessels with permits (when there is a market for these clams, which are generally less desirable), nor does it include catches of ocean quahogs or catches of surf clams in New England waters. However, most surf clam boats are tied up much of the time, even given these other opportunities.

The Federal Management System

The surf clam management program of New Jersey and of the federal government is one of the most extreme management systems in the United States in the extent to which it interferes with the tradition of "freedom" in fishing and with the notion of common property rights. In 1977 the number of boats involved in the Middle Atlantic surf clam industry was frozen, through a moratorium. Open access no longer exists, although it may be recreated in the future. The "commoners" are no longer all citizens of the U.S. or New Jersey, depending on which waters we are talking about, but instead those people fortunate enough to own or work on one of those boats.

Within that framework, the fishery is managed in some traditional and some novel ways. There is an annual quota, but it is divided into quarterly quotas. In addition, there are restrictions on the number of hours and days each boat can go surf-clamming in the EEZ, and vessel-operators must give 10 days notice to NMFS about when they will go out. Bad-weather "make-up" days are allowed only in the winter months. Sometimes the Regional Director of NMFS (who administers the management system) shuts down the clamming for a couple of weeks or longer, when it appears that the quarterly quota has been taken or is almost taken. There is, now, a minimum size limit. There are also "sanctuaries," or large areas of the ocean, off Atlantic City, N.J. and off Chincoteague, Va., where clamming is forbidden in order to protect the growth of a strong year-class.¹⁸ This degree of governmental management of a fishery is unique in the United States to the Middle Atlantic surf clam fishery. It is also remarkable that the clam industry has played a major role in management.

Constituency contracting

In management of the EEZ of the United States, members of the industry can play a major role in deciding on the goals, nature, and details of fisheries management. Participatory democracy is the model for the regional management councils created through the 1976 Magnuson Fishery Conservation and Management Act. The Mid-Atlantic Fishery Management Council relies heavily on industry advisory panels for certain issues. In addition, a member of the commercial fishing industry—most years a surf-clammer or former surf-clammer—sits as a member of the council itself, and almost all of the state directors of fish and game who sit on the council have, in this region, fairly strong political directives to represent commercial as well as recreational fishermen.

Moreover, through a somewhat special status afforded to the surf clam management process by the Mid-Atlantic Council and the National Marine Fisheries Service (NMFS), members of the industry play a major role in deciding on the goals, nature, and details of fisheries management.¹⁹ From the perspective of NMFS, the system is one of "constituency contracting" (Turgeon (1977:133), whereby the council and government agency essentially ratify agreements reached within the user group being managed.

Although it is debatable how much the industry as a collectivity as opposed to a handful of competing lobbyists, has made decisions, there is no question that the council and NMFS have from time to time said "All right, you guys, make up your minds about what you want and we'll go along with it." They have also said, "All right, you guys, if you can't reach an agreement, then we'll do it for you," but neither the Council nor NMFS has followed through, yet, on that threat.

Why is there such a high degree of industry involvement in management in this fishery? It is widely agreed within the council, which is made up of state fishery managers and political appointees, and its scientific advisory group that "social" questions should be decided by the industry itself, as they are beyond the purview of the technical, scientific expertise of the council's staff and scientific advisors. To some extent this understanding may reflect the passing-the-buck method of avoiding responsibility and hassles. Surf clam management is unusual in having had to deal with the question of direct, overt allocation of exclusive fishing privileges: since 1979 a major issue has been how to allocate per-vessel quotas. This issue has clear social implications and thus is politically charged. Both NMFS and the Council have passed the buck on to the industry. NMFS appears not to want to get into the politically sticky business of making direct, overt allocation decisions.²⁰ The

regional council tries to avoid it too.

Another reason is that members of the industry have worked hard to be involved, to the extent of using and creating political backing in the states and in Washington, D.C. When NMFS, the Mid-Atlantic council—or its staff, or its surf clam committee—is on the verge of making a decision, at least one and probably more members of the industry or their lobbyists or lawyers will try to exert political influence. This has been very frustrating to agency and council staff, some of whom respond by saying, in effect, "Who cares? If they don't like what we're doing, let them do it themselves." (Note: this quote is our creation, intended to condense what we've heard and interpreted). And finally, some state and federal officials and staff think that it is right and proper to allow those whose lives and businesses are to be regulated to have some say in the nature of regulation.

The surf clam industry is not the only one to be engaged in sanctioned "contracting," (Turgeon 1977) nor is the process of contracting unproblematic (see below). But it is worth underscoring as an example of communal management within a complex, highly structured political system, and, within that system, as an alternative to the use of the free market on the one hand (with its classic failures, especially in relation to the commons), and the government on the other hand to manage common property resources. This mode of management may help ensure higher levels of compliance (Turgeon 1977) but also fulfills the need of user groups for the legitimation and monitoring and enforcement power that are monopolized by the state.

Special Features Of The Surf Clam Management System

The surf clam management system is unusual because of the following:

1. The main objective of restoring depleted clam stocks has been met.
2. The people involved in the fishery are making very good incomes.
3. Today, the issue is less how to prevent depletion than how to manage abundance.
4. Most participants in surf clam management agree that the major management issues are social and economic.

1. Restoration of depleted stocks

Whether increased clam density was due to the 1986 anoxic blight, which may have exterminated predators of juvenile surf clams letting the 1976 and 1977 year classes have a chance, or whether it was due to management, or both, remains an interesting but unanswerable question. In any case, in July 1986 the council staff could accurately write: "Total Mid-Atlantic EEZ clam biomass has recovered to levels slightly higher...than those of the mid-1960s (prior to the rapid increase in landings)" (MAFMC 1986: 12).

2. High incomes

In Mid-Atlantic fishing ports, it is widely known that surf clamming is a sure way to make a lot of money, lacking only the adventure and risk of fisheries for more elusive prey to be ranked among the most desirable fisheries (Gatewood and McCay 1988). Our studies (Gatewood and McCay 1988; McCay and Creed 1987; McCay *et al.* 1987) have shown that surf clambers do, on the average, make more money than do other fishermen in the area. Their incomes in the mid-1980s were comparable to or better than incomes for college professors and middle-management types; their education was on the average that of high school, and

no special training was required.

The incomes of surf clambers vary mostly with the price of clams. Although there is intense competition within the clam fleet for the quota, limited entry has kept a lid on the number of competitors. Incomes within the fleet can vary greatly (with vessel dimension, captain's skill, etc.). However, limited entry means that aggregate profits are not dissipated by newcomers (the economics of the commons problem).

3. Managing Abundance

If depleted stocks have been restored, why continue the management system at all? One answer goes back to the problem of sporadic and unpredictable successful year-classes. There are no clear stock-recruitment relationships in the surf-clam fishery (Murawski pers. comm., Fogarty and Murawski 1986, Haskin, pers. comm.). There are instead many surprises²¹ and as of 1988 still only two important year classes, those of 1976 and 1977. The infrequent success of surf clam year-classes has a strong effect on management philosophy: the choice is whether to take, at a high rate, whatever is there, hoping (against realistic hope) that nature will do its job quickly enough to replenish the stocks; or whether to husband the strong year-class until one can be sure another is coming along. The choice has been for the latter.

This choice is strongly influenced by the nature of the industry: surf clams go to processors; processors have limited capacity and more-or-less limited markets; processors do not want a lot of clams this year, or even this season, and none next year or next season. They need "sustained yield" for economic reasons. However, because of the infrequent and unpredictable nature of strong year-classes, they and the biologists must essentially consider the resource as nonrenewable, and determine the rate at which they wish to take it, just as do the Saudis with their oil wells. In 1986 the prediction was a 10 year "supply" at the level of 40-50 million pounds a year (i.e. the present quota range). There is obviously an incentive to keep a quota.

The management system has emerged as a major tool for coordinating production in relation to market demand. Anti-trust laws make it difficult for an industry to coordinate production and market opportunities in other ways; fishery cooperatives (McCay 1980) and government fisheries management provide legal alternatives. Markets have not expanded greatly, and the industry tends toward oversupply in warehouses. The difference between 50 and 40 million pounds per year can signify the difference between a "glut" and a healthy market. Both "independents" and the "processors" share a strong interest in maintaining a management system that gives them some control over the level of production and hence price, although threatened by the rise of competing clam fisheries outside the jurisdiction of the management council (i.e. a flash-in-the-pan inshore New York fishery in 1986 that virtually destroyed the market for over a year afterwards; and the recent development of a Canadian fishery for a related sea clam).

There are other rationales for strong controls on the rate of exploitation, but they vary a great deal depending on whose perspective is taken and will be discussed in the section on social and economic considerations below.

4. Social and Economic Management Issues

Just about everybody involved in surf clam management agrees that the major issues are social and economic.

Overcapitalization

Limited entry by itself does not solve the problem of overcapitalization and may indeed worsen it.²² The 1977 moratorium on entry into the surf clam fishery actually resulted in an increase in surf clam vessels, as people scrambled to get into the limited entry fishery. In 1977 a total of 155 licenses had been issued as of December 31st of that year, the first of the moratorium. This was far more than had been engaged in surf-clamming prior to the moratorium.²³ More licenses were issued in the next two years, as some vessel owners successfully claimed the right to be in the fishery, but the maximum number of vessels active in the fleet, based on logbook reports, was 162 (in 1979)(MAFMC 1986: 58). The number quickly fell in 1980, by 22%, thence in smaller increments to a low of 113 in 1983, largely due to movement of some of the vessels to ocean quahog fishing as the market for that clam species improved.²⁴ The number has since moved up, to 135 in 1987.

Very early on it was recognized that the emergency system enacted in 1977, and amended in subsequent years, was seriously flawed. It did help save and even restore clam stocks due to fairly strict enforcement of a quota. But the way that that quota was reached created evident inefficiency in the use of labor and capital; moreover, incentives remained for increased overcapitalization. In the interests of processors, who needed a fairly stable and predictable supply of clams for their factories, the quota was divided into quarters; within each quarter, effort was controlled so that it would not be lumped into one end or the other. This was done by limiting the length of fishing trips and the number of trips that could be taken per unit of time (limits on the timing of fishing trips were also essential to law enforcement).

However, there were no controls on technology, beyond restrictions on the length of the vessel used, and the incentive structure remained that of open access. Accordingly, clambers adjusted to these limits by becoming better at getting more clams over shorter periods of time, using technological improvements such as increased dredge blade size, increased number of dredges, culling machines, increased pump hose capacity, etc. Their adaptations make the situation worse: the faster they can catch up the quota the fewer the allowable fishing hours and the longer the closed periods, given the present law and administrative system.²⁵ The clams, meanwhile, were doing just fine. Indeed, their density had increased, increasing CPUE.

The fishery is overcapitalized. There are more vessels engaged than before 1977. Moreover, the composition of the entire fleet has shifted to larger vessels. They are monitored as size classes: 0-50 tons, 50-100 tons, 100 tons. In 1985 52 out of 125 (42%) were over 100 tons, whereas in 1968 only 6 out of 86 (7%) were that large (MAFMC 1986: 58). And the vessels go clamming very seldom: no more than 6 hours every 3 weeks on the average by 1987. What overcapitalization means is that a handful of vessels and men could harvest what the entire fleet of ca. 135 vessels harvests now.

Independents vs. Processors

A major social problem is the unequal market and political power of two groups—"independents," people who own and work on boats and sell their clams to others; and "processors," people who own clam processing firms and may own a fleet of boats as well.²⁶ Independents depend on processors to buy their clams. Processors vary in how dependent they are on independents for clams. Some own enough catching capacity to supply their plants

without buying much from others; some processors do not own boats at all, relying entirely on independents. Processors also tend to have greater political power, representing as they do greater wealth and status and ability to hire lawyers and other lobbyists or engage in lobbying themselves. Independents have, however, learned to cooperate politically, to lobby and hire lobbyists and lawyers.

Conflicts between independents and processors appear in almost every management decision made over the past ten years. From a review of these conflicts one can generalize that the "independents"—ranging from owner-operators of one vessel to owners of small and large fleets,—are afraid of any change in management that would reduce their bargaining power over price and supply of clams vis-a-vis the processors. The processors, excepting firms that have avoided vessel ownership entirely so far, have an interest in reducing their dependence on the "independents," and thus favor any management measure that would enable their own vessels to catch more clams, including lowering the minimum size of clams and basing an allocation system on historic performance alone (see below).

Quotas

This conflict appears in what would otherwise seem to be a solely "biological" decision: how large is the annual quota. Every year the Mid-Atlantic Fishery Management Council must decide on the surf clam (and ocean quahog) quota. The council decides on a quota within a range predetermined in the official fishery management plan, which in 1982 became a "framework" plan allowing administrative changes yearly under a general framework of management policies. Biologists present data on the status of the stocks, and the council's Scientific and Statistical Committee, comprised of agency and university scientists, reviews these data and makes a recommendation to the council.

As noted above, the evidence shows very high stock abundance. One might, then, expect a significant increase in the quota. Such is not, however, the case; the surf clam quota has remained fairly stable since 1977. There are several reasons for this, and we have already given the most important, that managing abundance in a situation in which future "recruits" cannot be predicted means trying to make the existing, known supply last a long time, and that the industry as a whole wants to prevent market gluts. In specific situations, other reasons emerge. One is that in some situations the "independents" influence the council and managers' decisions to maintain low quotas for both surf clams and ocean quahogs. It is hard to believe that a group of fishermen will ask for a smaller quota, but it happens. When it does, it usually means that the independents are afraid that the the processors will gain market power by an increase in supply. A larger quota means that the vessels owned by the processors will catch more and the processors will need to buy less from the independents. Hence the price to independents will decline. As simple as that.

Size Limits

Determinations of minimum size limits also affect positions in the market. A size limit of 5 1/2" was implemented in the early 1980s for both biological and economic reasons: 4 3/4" is optimal yield per recruit, and 5 1/2" was the optimal size for the most valuable product, clam strips (MAFMC 1984: 22). A smaller size limit was proposed in 1984 and approved in 1986²⁷ primarily on the grounds that too many smaller clams—and hence wasteful discards (and costly apprehensions)—were being taken on certain

clam beds. One argument against this was based on the notion that a smaller size would mean that the annual quota would be met faster, independents would have a hard time making it during the lengthier closures imposed, the processors could get all they needed from their own boats, and independents would lose their markets. The independents and others who made this argument lost in this case. The size was reduced. Independents had a more difficult time selling their clams.²⁷

Time-based Management

Social and economic issues underlie support for continued management of abundance and for particular features of the management system. For example, the time-based feature that spreads out the catch over the year is said by processors to be essential for maintaining a reliable labor force in the plants. Moreover, some buyers and clambers observe that the quarterly quotas and time limitations protect the power of the buyers against that of the sellers, who have little choice about when to fish. However, others note that the buyers have power in any case.

Now that the stocks are in pretty good shape, the task is to manage abundance. It would seem logical to increase quotas, decrease minimum sizes, etc. However, arguments like those given above—based on shrewd observation and a lot of experience—play a major role in the politics of surf clam management and support the idea that conflict and competition among social groups over market power is the motivating and causal force behind management of the surf clam fishery. Biologists are very often dismayed at how their work, estimating stock abundance, MSY, optimal clam sizes, etc. is transformed within these politics. However, the more experienced biologists understand: this is life, and essentially what clam management is all about, as is, ultimately, any form of resource management.

Privatization And Vessel Allocation

In concluding this discussion of social aspects of surf clam management, we turn to the most radical, in its context, development in marine fisheries management: privatization.

As early as 1979 the Mid-Atlantic fisheries management council began to seriously explore an alternative management system. The terms "stock certificate" and "allocation" were used in draft documents and in the first amendment of the plan, prepared in 1978. The idea was to divide the annual or quarterly quotas up into shares for each vessel. The intent appears to have been to eliminate the costly motivations to compete to capture the quota and hence the incentive structure for overcapitalization. If each vessel has a guaranteed, and limited, right to clams, then each also has the motive to catch those clams as efficiently as possible.

A vessel allocation system comes closer to private property than does limited entry per se. Private property was created by the limited entry system: the value of a vessel is inflated by the license it holds for the fishery, and there is an open market for these licenses (they are not, in theory, separable from the vessels but are thought of that way; in the state management system they are separate from the vessels). But the clam fishery itself is a regulated commons: the clams are common property of all licensees, who compete with each other for them. Hence the tendency toward overcapitalization (as well as unsafe practices such as overloading vessels).

Vessel allocation or stock certificates take the next step toward enclosure; they amount to true "stinting,"²⁸ in attaching to licenses definite quantities of a resource that may be used or taken (Moloney and Pearce 1979). They create exclusive property in the resource

itself, whether legally conceived of as ownership of the clams or ownership of the right to take a certain amount of clams. If these rights are transferable, the value of the rights and hence the price of access to them is determined by supply and demand, a market. They are private property rights.

Sentiment in the surf clam management case favors free transferability of rights, but most discussions in the recent past reflect concern about how a market in clam property will affect the distribution of ownership in the industry. The clear intention of council staff, economists, and many others involved in preparing documents for surf clam management is that privatization will reduce the number of vessels in the fleet. That is what it is supposed to do.

Privatization is also said to allow those who wish to leave the fishery a way to leave "gracefully," i.e. with cash in the pocket from the sale of clam rights. Those who have large vessels may be able to buy enough clam rights to work those vessels up to their capacity and divest themselves of inefficient vessels. An important question is whether the clam rights can be sold independently of the vessels (the limited license cannot). If they can, many vessels will be retired from the fishery. Indeed, a computer simulation by the National Marine Fisheries Service showed market equilibrium at about six vessels (versus 135 now active).

Many people are uneasy about the prospect of a rapid decline in participation in the fishery, with or without money in their pockets, and uncertain about what this will really mean for them. Accordingly, proposals made by the industry typically include constraints on the process of concentration of ownership. One example is a stipulation that a vessel owner can combine the clam rights of only three vessels onto one, at least in the first year or so of the plan.

Given the technical ability of just a few of the very large clam vessels to catch the entire annual quota, some features of the present management system have prevented rapid concentration of ownership and the creation of oligopolies or a monopoly in the industry. No matter how big or efficient a vessel is, it is held to the prevailing time limit (i.e. 6 hours every two or three weeks), reducing the competitive advantage of large vessels and the ability of processors to obtain all of the supply they need by themselves. This in turn has helped maintain a market for the smaller vessels and the independents.

The "independents" and the clam processors that rely on them rather than or in addition to the catches of their own vessels have particular interest in features of management that prevent oligopsonistic markets, but many of the independents want vessel allocations rather than time-based management so that they can better use their time, labor, and capital, perhaps improve their bargaining power, have a safer fishery, and have property that they can use, buy, sell, or lease. However, judging from a strong consensus within the industry to impose controls on the rate of "consolidation" of permits, if and when vessel owners are allowed to combine permits and get rid of un-needed vessels, it appears that everyone is uncertain and anxious about the outcome of further concentration of ownership. As of December 1987, 49% of the surf clam vessels (and an even higher share of catching power) were owned by only six firms, of which four are vertically integrated companies. Eliminating management and restoring open-access competition would unleash very powerful forces. Moreover, even the "big" players cannot predict with confidence what would happen, lending support to the alternative of slowly phasing in vessel consolidation.

Vessel Allocation

Since 1979 the issue of "vessel allocation" has remained a live, but persistently unresolved, one. There is much to be said about privatizing schemes in the clam management system. The general point is that for over 9 years industry-wide and management council consensus in favor of some sort of vessel allocation scheme has existed, but there has never been agreement on a critical component of the scheme: the basis on which shares or stocks or rights will be divided up among participants.

The surf clam fishery is indeed unusual in the extent to which allocation questions appear; since about 1980 managers and the industry have debated variations on the theme of per-vessel allocations of the quota, to do away with the unsafe²⁹ race to catch as much as possible within a brief allowed time. The problem is, on what basis shall the quota be divided among participants? In the State of New Jersey management system, the quota is divided equally. In federal management, through the Mid-Atlantic council, debate has raged since 1980 or before about whether to use equal shares, shares based on historical performance, shares based on vessel capacity, or some combination. Stakes are high; someone "loses" in any combination; and responsibility for deciding is consistently passed down to industry advisory panels or the council's surf clam committee, which in turn insists on lengthy sessions of industry comment on proposals.

Arguments expressed over the years reflect the interests and positions of people in different social relationships to production and marketing. Some of the vertically-integrated processors who own large fleets hold to the view that allocation should be based on historic performance: the vessels that caught the most in the past should get the largest shares. Independents (and certain others) usually argue that vessel size, with or without consideration for historic performance, should be the basis of allocation. Those with large vessels should get large shares of the clam quota no matter what their historic performance. This stance reflects the fact that many independents (and some processors) responded to restrictions in surf-clamming by devoting most of their time to ocean quahog fishing, while maintaining their licenses in surf-clamming. Another argument is that historical performance is unfair in that it rewards cheating (i.e. taking undersize clams or clamming in sanctuaries). Yet another, is that the vertically-integrated firms have had an unfair advantage in that when the market for clams was poor, their boats could continue fishing for clams while independents lost buyers.

Finally, for some time (roughly 1980-1985) a group argued with passion that all vessels should have equal shares of the quota, no matter what their size or catch history.³⁰ Their argument was that this was the only equitable thing to do; given that overcapitalization existed at the outset, it is not fair to reward those who invested in larger vessels. Rather, those who stayed with small vessels should be rewarded. In addition,—and here all independents chime in—it is not fair to reward those with high historic catches, because many of these catches were heavily based on illegally caught, usually undersized, clams.

Research Perspectives

Research is underway to account for why efforts to resolve the tough social question of who gets how much have failed, and to better identify the social forces underlying surf clam management and mismanagement, as well as the social consequences of privatization. In closing, we offer these observations from that research.

In our model, debates over fishery management plans and amendments to them (such as over Amendment 8 of the Surf Clam and Ocean Quahog Fishery Management Plan) are debates by people who hold common rights, together with experts and representatives of the public trust, over the rights, obligations, and uses that pertain to the common resource. The negotiations that take place are embedded in political, social, and economic institutions that comprise culture.

Hardin's model of the tragedy of the commons and its assumptions are the products of the same culture that pervades the management process. Cooperation, when it occurs, is the result of opportunistic maneuvering on the part of self-interested individuals. Individual self-sacrifice for the collective good will not occur unless the individual is able to calculate some advantage from that sacrifice. The model is embedded in American law and culture concerning the commons (McCay 1987) and is consistent with American core values of individualism and self-reliance (Hsu 1972). From this paradigm, the context of meetings and the larger management process is adversarial and individualistic (or interest-group dominated), and the participants are potential winners and losers in a zero-sum game for control of a limited resource.

The Perils of Numbers

From time to time members of the industry, through their participation in an advisory committee of the management council or through their lobbyists or lobbying organizations (such as patriotic U.S.A., United Shellfishermen's Association), took seriously the admonitions of the management council and the National Marine Fisheries Service to come to agreement on this vital social matter of how the allocation would be made. Compromises were painfully reached, and with the help of officials in the National Marine Fisheries Service and staff of the management council, complicated formulas giving variable weights to history, capacity, and equal shares were developed. The NMFS officials and council staff even computed for each vessel owner just what his share would be under each of the alternatives.

Consistent with the above model, in the management process conventions have been created that rely heavily on numbers. The Council staff generates numbers—of bushels or pounds or dollars—that show how each vessel's allotment would vary according to management alternative (i.e., whether based on historical performance or vessel capacity). The numbers are kept confidential, but are sent privately to each vessel owner. The owner can see how his/her vessels fare under different alternatives and is supposed then to make decisions on that basis. The staff, trying to be objective and fair and to facilitate the decision-making process, generates numbers in the hope that quantification will lead to a politically palatable compromise that will, ultimately, lead to economic rationalization of this fishery. The staff also generates graphs that show the relative distribution of shares for the entire system.

Although we would agree that all available information should be provided to as many people as possible, this use of numbers and the effects of this use are bothersome. The very act of referring to the numbers, done almost routinely now in management debates, signifies that this is indeed a situation of atomistic competition. Moreover, the fact, soon shown as people compare numbers and look at the system-wide graphs, that some people "win" and others "lose," signifies to participants that there really cannot be any truly fair and equitable compromise. Accordingly, the extraordinary personal and social efforts that go into achieving such a compromise—replicated year after year after year—come to very little.

The Perils of Polls

Similarly, the way that surveys or polls of the industry are used reinforces the tendency toward self-seeking competition and diminishes the strength of compromise and consensus (see also Gatewood and McCay this conference). Once or twice in the past 3 years, the executive director of the Mid-Atlantic Council has called for a poll of the industry on the issue of how to allocate clam rights. This happened just when, through advisory panels, the council's surf clam committee, and the industry's own conferences, negotiations had come to the point at which eighty or ninety percent of the industry agreed. But the executive director, John Bryson, called for a survey. His doing so said the following to participants: (1) 100% agreement is the only acceptable consensus; and (2) what you achieve together, in groups, is less meaningful than what your attitudes are as individuals. Whether intended or not, the move was a good way to discourage those who sought a resolution to the debate about allocation.³¹

Market Share

The limited resource in this case is really the market for surf clams as much as the surf clams themselves. Both harvesting and processing capacity are greater than consumer demand for clam products. Market share is a term used often by members of the industry and their lobbyists and lawyers in the context of management conflicts. It is one's percentage of a scarce resource in the zero-sum game, and characterizes their assumptions about the relationship of each individual to the whole industry. Individuals assess their status in the fishery not only in terms of how many bushels of clams they caught or how much profit they made now as opposed to then, but also in terms of how their market share compares with that of others. Market share is a fair index of future earning ability because of the ways that market share affects bargaining power vis-a-vis buyers as well as efficiency of operation.

Perils of Speaking and Interpretation

Public debate over proposed options, at meetings of the Council and its surf clam committee, is colored by the above. What each speaker says seems to be interpreted by each hearer as strategic speech intended to advantage the speaker relative to others. Participants interpret what speakers have to say in terms of a calculus that includes the number of vessels they own, who the partners are, relationships with processors, and market share.

The effectiveness of industry participation is partly determined by effectiveness in such public debate. Many clambers who come to meetings prepared to be persuasive feel ill-at-ease and inarticulate: "When I try to talk I get all red in the face and sound like a dumb fisherman." Not all fishermen feel or are this inarticulate, but many feel that the rules according to which one is judged as competent to engage in the arguments are unclear. All speakers change the way they talk according to the context, but the rules for context-acceptable speech vary by subgroup (see Gumperz and Gumperz 1982; Labov 1972; Goffman 1981; Hymes 1974). The initial assumption of self-interest and adversarial relationships is reinforced and institutionalized by linguistic miscommunication. Different speech rules dichotomize managers and fishermen unless they can learn to interpret successfully the messages they send each other. Fishermen have, on their side, responded to the problem by hiring lawyers as spokespersons. Lawyers are members of a profession that claims some sovereignty over the ability to say what counts according to the rules of the state. Moreover, in the fishery

management context, lawyers are coming to count the most. One of the bottom lines used in writing management plans is "Can it be defended in court?"

Participants—clambers and staff—have also used anthropologists as resources. We have become informants about cultural assumptions, and are professional interstitial persons allowed to move among groups and thus bridge gaps of communication by trying to translate what was meant when something was said. We do not see ourselves as social workers shaping events, or as advocates. We may be seen as busy-bodies by all sides, at times. And we may have overstepped the boundaries that many participants would have us keep by participating in the attempt to interpret the Magnuson Act itself and its implications for surf clam management, in a letter directed to the executive director of the regional council. Lawyers suggested that we had invaded their domain, but one offered what we choose to regard as a compliment: in a speech to the council in April 1988 in which he denigrated our attempt to show that there is no greater argument for historical performance than vessel capacity, the lawyer referred to the two of us as "a group of anthropologists."

CONCLUSION

Community and the Commons

Garrett Hardin (1968) used the image of a herdsman deciding whether to add more animals to a communal pasture to illustrate the tragedy of the commons. His use of the image suggests that the Old World village common-lands were, like many open-ocean resources, open-access and unregulated. Hence they were prone to overuse and abuse unless a strong government intervened or rights to the resource were privatized. Hardin ignored the historical evidence for regulation of the village commons in medieval and post-medieval England, the supposed source of the parable. In so doing, he misrepresented the ability of people to successfully manage common property resources. In Hardin's version, "each herdsman (entrepreneur) acts essentially alone for his own good without regard for the good of others; *there is no community*" (Fife 1977: 76, emphasis added). But there *was* community (Tawney 1912; Yelling 1977), and communities often dealt with conflicts and ecological problems associated with their common lands by creating and enforcing rules about their use, as shown in studies of agrarian systems in Switzerland and Japan (Ostrom 1987), Ethiopia (Bauer 1987), Indonesia (Vondal 1987), and Spain (Fernandez 1987) and in the vast body of literature on the old English commons (e.g. Yelling 1977; Cox 1985).

A consequence of the gibbness of Hardin's account is that we are forced to emphasize and underline the point that "common property" is not reducible to open-access (Ciriacy-Wantrup and Bishop 1975). A further distinction should be made between the resource-type and the social system that affects its use and regulation. A "common property resource" is a resource that has properties such that it is difficult for one user to exclude others from it, and the activities of one user can subtract from the benefits obtainable by another (Feeny *et al.* 1988; Ostrom 1986:604). Many fisheries are clearly of this sort. It is important to distinguish such a resource from the cultural and legal regime that is also often called "common property" and to recognize variation among the cultural and legal regimes that pertain to common property resources. In fact, institutional regimes that concern such resources are comprised of variations ranging from totally open-access and unfettered use of a resource to various communal systems of controls over access and use, to different levels and kinds of centralized government

intervention, and to quasi- or total privatization (Feeny *et al.* 1988; Ciriacy-Wantrup and Bishop 1975; Moloney and Pearse 1979; Bromley 1986).

There can be community even in a highly commercialized fishery, especially if one expands the notion of community to include government officials and biologists as well as industry (see Miller and Van Maanen 1983 for a related definition of a fishery), and if one avoids the view of community as necessarily implying solidarity, homogeneity, and collective action. Many critics of the tragedy of the commons model dislike the abstract individualist bias of the model and pose instead models of communal behavior that emphasize interdependence, communication, and cooperation (Godwin and Shepard 1979; Runge 1981). The only problem with this approach is that it misrepresents community (Peters 1987). An alternative, following a major theme of a recent volume on the commons (McCay and Acheson 1987; especially McCay 1987, Peters 1987, Taylor 1987), is that commons dilemmas should be viewed in terms of the dynamics of conflict and competition between different social groups located in history and culture rather than between the rational economizing individual—unspecified—and the group—also unspecified. The surf clam management community is defined primarily in terms of those dynamics as its members try to redefine the commons.

NOTES:

1. The research on which this paper is based was supported in part by the National Office of Sea Grant (U.S. Department of Commerce), New Jersey Sea Grant contract #NA 84 AA-D-SG084, through grants in 1985-87 to B.J. McCay and J.B. Gatewood and in 1987-89 to B.J. McCay and to C.F. Creed. It was also supported by the New Jersey Agricultural Experiment Station. This is Number J-26424-4-88 of the Journal Series of the New Jersey Agricultural Experiment Station. The research also benefited from McCay's participation in meetings of the Scientific and Statistical Committee of the Mid-Atlantic Fishery Management Council from 1979 to the present. We are indebted to members of that committee, council staff, N.M.F.S. staff, and the clambers and processors with whom we have talked, but blame none of them for our interpretation.
2. The surf clam is most abundant in the Middle Atlantic Bight, but in recent years good stocks were found in Nantucket Sound and in 1982 on Georges Bank, supporting a relatively new "New England" fishery (only about 6 New England vessels are involved in the Nantucket Sound and Georges Bank fisheries for surf clams; Mid-Atlantic vessels continue to account for most of the catch, even in New England waters). The surf clam lives on the continental shelf, from lower edge of intertidal zone to about 140 feet (43 m) or more, and prefers sand or gravel bottoms. "Inshore" populations (within 3 miles) are found primarily along the New Jersey, the southwest end of Long Island, and Nantucket Sound beds off Rhode Island (some beds are closed because of pollution). The major offshore populations are: (1) 5-40 miles off mid-New Jersey shore (Asbury Park-Atlantic City); (2) off the Delmarva Peninsula; (3) off the southern Virginia coast.
3. The stock-recruitment relationship is fundamental to scientific fisheries management as we know it. The reason to regulate the behavior and technology of fishermen is to allow the survival of enough fish of breeding size and vigor to repopulate the stock at an adequate level in the future. But evidence for a deterministic relationship between today's stock and tomorrow's recruitment is lacking for most species. Very rarely, however, do fishery scientists consider implications of this fact for fisheries management. See Townsend and Wilson (1987).
4. An exception to the fact that all surf clams go to clam-shucking and processing firms is the sale as bait of clams taken from inshore waters that have been "condemned" for shellfishing for human consumption. The State of New Jersey licenses a handful of vessels to take surf clams for bait.
5. Very little is known about the labor force of the clam processing firms; we have just begun that investigation. But clearly there are other, and perhaps even more fundamental, social class lines, including that between owners/managers and workers in the plants.
6. The most important technological innovation was the hydraulic jet cage dredge (1945). At first surf clams were caught with metal dredges pulled behind boats that scraped the bottom of the sea and lifted up clams encountered; these were similar or identical to dredges used, illegally, for harvesting bay clams (especially the hard clam). The clam dredges were found to be inappropriate: surf clams are larger, have relatively thin shells which could be broken easily in the bay clam dredges, and are able to bed, or settle into and under, hard, coarse-drained sand. Fishermen developed a specialized hydraulic dredge, equipped with a hose through which sea water is pumped under pressure into the ocean floor, washing sand from over and around the clams and allowing the deep-set knife blade of the dredge to lift them from the bottom so that they pass back into the "sled" section of the dredge, from which they can be dumped onto the deck or into the hold of the boat when the dredge is lifted. On the processing side, the creation of an effective drum washer in 1943 was essential to the task of ridding meats of sand; automated shucking methods appeared in the early 1970s.
Vessel dimensions and dredge sizes increased rapidly. For example, the first dredges were very small, about the width of a desk, or ca. 30". By 1965 they were 48", by the 1970s some of those at Point Pleasant, N.J. were 60" or more in width (B. Brown, per. comm., and by the 1980s most dredges were at least 120" wide, and some were as many as 240" wide. The diameter of the hydraulic hoses also increased, and in the 1970s vessels began managing two dredges at a time instead of one, with or without major modifications in vessel layout.
7. See footnote above on biology of ocean quahogs. They go to similar or the same markets as surf clams but generally are of lower value.
8. These figures should not diminish the importance of the fishery; it is clearly the most valuable shell-fishery of New Jersey, and with the decline of oystering in the Chesapeake Bay, close to that for the states of Maryland and Virginia.
9. As Oliver and Marwell (1988) have shown, "group size" itself is not the key variable in determining whether or not collective action will succeed, contra Olson (1965). Among other, more important variables is the presence of a "critical mass" of especially interested and resourceful members of an interest group.
10. The fishing fleet's history from the late 1940s to the mid-1970s was one of movement from one dense population of a year class to another. This movement went roughly north to south along the coast, starting with beds off southern Long Island, then concentrating for many years on beds off the northern and central coast of New Jersey (the "Jersey inshore" fishery),

then shifting south, particularly to the "Delmarva" beds off the coast of the Delmarva Peninsula (states of Delaware, Maryland, and Virginia). The clam factories generally followed. The first fishery and factory were located on Long Island, New York; by 1950 the fishery and business had moved to Wildwood, N.J., by the 1960s it was centered in Point Pleasant, N.J., to the north of Wildwood, but by the 1970s it had begun a process of expansion and movement to the south that reached its peak in the early 1980s, when much of the fleet and most of the factories were found in the states of Delaware, Maryland, and Virginia, on what is known as the Delmarva Peninsula.

By 1972 the New Jersey fleet was moving to Virginia ports, fleets located in Ocean City, Maryland and in places like Oyster, Virginia were expanding, and the fishery was in general much more migratory than before (Ropes et al. 1975:22-23). The vessels still fishing from New Jersey ports began going farther offshore (Ibid: 27); inshore beds, especially north of Atlantic City, off Point Pleasant, showed very low returns.

11. Individuals involved in the early development of the surf clam industry had long been engaged in bay clamming and oystering; the Oyster Institute of North America and similar national associations were active in lobbying federal legislators and agencies. As the surf clam business developed and affiliated with the Oyster Institute, it was thus logical that the Bureau of Commercial Fisheries was pressured to help the growing industry.
12. In 1965-66 the landings of the surf clam fleet based in Point Pleasant, N.J. were record highs, but in 1966 and 1967 the catch rate declined. The U.S. Bureau of Commercial Fisheries surveyed the surf clam beds off Point Pleasant and elsewhere. The staff of the bureau met with the Sea Clam Packers Committee of the Oyster Institute of North America and recommended that the packers (owners of processing companies and most of the clamming vessels) reduce effort on the local surf clam beds to allow them to recover from intensive fishing. Accordingly, in 1967 many of the vessels owned by the processors were sent to the port of Cape May (Cape May/Wildwood) at the southern tip of New Jersey (Ropes 1972:25).
13. It would, however, be a mistake to infer that the association was able to generate coordinated, concerted action for the common good against individual self-interests. The movement south to Cape May was, like other such moves, was not only warranted in terms of helping clam beds recover but also, and mostly, in terms of the economics of moving on to higher yielding beds. This is, of course, an old interpretive dilemma, found in ecology as well. If a forager moves away from a depleted patch, is it to give the depleted patch a chance to restore itself or to maximize foraging efficiency by avoiding areas of lower returns? (Hames 1987; Charnov 1976). And is the question a red herring if conservation is achieved in either case?
14. All agreed that there was trouble. New acquaintances and alliances were formed between members of the industry and between industry people and state and federal agency people. And in retrospect it seems that the high level of information about the fleet and the stocks generated in numerous reports by the government during that period helped members of the industry plan their strategies; it may have prompted even more escalation in fishing effort.
15. In December 1975 the state imposed an emergency limit on the size of surf clams and a 1.5 cent per bushel fee for clams caught within its 3-mile limit, hoping thereby to halt the flow of surf clambers from southern waters and their effects on an already endangered resource (New York Times 12/31/75), but these measures must have been seen as ineffective; in any case they were replaced by the emergency closure in January 1976.
16. Weather and ocean circulation patterns conspired to produce a huge "fish kill" that suffocated slow-moving creatures on the ocean floor over a 8,600 km² area of the continental shelf off the coast of New Jersey, especially north of Atlantic City. Sedentary forms of marine life—surf clams, ocean quahogs, other benthic animals—suffered the greatest mortalities from extreme oxygen depletion and hydrogen sulfide formation in bottom waters (Sindermann and Swanson 1976:1). Dredge surveys in September 1976 showed that anoxia destroyed 69% of the offshore stock of surf clams (Figley, Pyle and Halgren 1976:317).
17. The New Jersey management system had a quota of 250,000 bushels for the December-April period (the quota has since been adjusted upwards), weekly catch limits, per vessel, of 500 bushels, a landings tax of .05/bushel, a license fee adjusted by tonnage, logbook reporting requirements, a ceiling on the number of licenses issued, and a dredge size limit (to 60"). The system helped smaller (<50 gross ton) vessel operations by providing a safe and reliable fishery during the winter months, when small vessels have trouble out at sea, and by the dredge size limit and weekly catch limit discouraged larger vessels with greater fixed and variable costs. The dredge size limit has, however, been abandoned, as the majority of the New Jersey inshore clambers have increased their technological ability to catch clams; all Jersey inshore clambers are federal EEZ clambers as well.
18. The Chincoteague sanctuary is believed to be one in which high clam density has slowed the growth of clams so that relatively few are legal size (5") or above. A major concern that has delayed the re-opening of closed areas is that harvesting for legal size clams where clam beds contain clams of different sizes, and perhaps different ages, results in death of the undersized/younger clams due to trauma from dredging and culling. Another concern is that re-opening will flood the market with clams, again hurting everyone to some degree but the "independents" the most. Accordingly, even though it is difficult, costly, and probably not very effective to monitor and enforce these closures, they remain closed.
19. William G. Gordon, Assistant Administrator for Fisheries in NMFS for much of the time between 1977 and 1986, even went so far as to suggest that management of the fishery be contracted out to a cooperative or corporation formed by the industry (Gordon, pers. comm. 2/88). Agency lawyers advised that this could not be done under the Magnuson Act.
20. A "Blue Ribbon Panel" that reviewed the fishery management system administered by NMFS in the Department of Commerce recommended that NMFS deal only with biological conservation, leaving allocation matters up to the regional councils.
21. The anoxic event of 1976 decimated a major resource, but the 1976 year-class, spawned after anoxia left, survived well, perhaps better than if there had been no such event, which may have removed some of the clam's predators, e.g. the horseshoe crab. In addition, the surf clams were never totally decimated, and large areas "condemned" because of pollution in the New York and New Jersey area, off Rockaway, New York Harbor, and along the New Jersey coast, serve as

- sanctuaries for brood stocks (Haskin, pers. comm. 11/3/82). This 1976 year class is among the commercially valuable clams of the mid and latter 1980s, and what will follow it and the 1977 year class, also important in some areas, is still an open question.
22. It is by now widely understood that Hardin's prescription of coercive government intervention in the workings of fisheries commons may protect a resource from overexploitation but very often creates inefficiency in the use of labor and capital. That is why economists argue for limited entry, doing away with open-access (Crutchfield and Pontecorvo 1969). However, management systems based on the idea that property rights must be changed but that are forced to simulate such through licensing and effort limitation programs tend to be self-defeating (Townsend and Wilson 1987). The user groups have "disharmonious incentives," that is, they capitalize even more (see Pinkerton 1987 for the B.C. salmon fishery). They also cheat and misreport, serious problems in the surf clam management regime (see Durrenberger and Pálsson 1987 for a comparable example in Iceland). In turn, managers continue to promulgate rules that encourage inefficiency, creating a situation little different from open-access management.
 23. There were never more than 104 licensed vessels between 1964 and 1975, but in 1976 there were 122, probably in anticipation of the moratorium. It is probably true, although of necessity confirmed only by gossip, that vessel owners involved in the management process had enough information to anticipate not only limited entry but also some sort of restriction on vessel size, as was indeed the case (a vessel that sinks may be replaced, but only by one roughly the same dimension). To the point: anticipating some sort of regulation of vessel catching efficiency, the better-placed members of the industry began to invest in even bigger and more efficient vessels so as not to be closed out.
 24. Part of the attrition was due to the concomitant development of the ocean quahog fishery, which is only moderately managed. A concern is that these vessels, many of which still hold surf clam permits, will return to the surf clam fishery, i.e. if the price for ocean quahogs declines (as it is likely to when the quota for surf clams increases, because of shifting supply-demand relationships), and worsen the overcapitalization problem. Part of the attrition, a relatively small part, actually, is due to people and vessels leaving surf-clamming because they were essentially forced out by features of the new management regime (i.e., not able to make a living given the quotas, hour restrictions, etc.) or by loss of buyers as the processors moved even farther south. The latter reflects the structurally vulnerable position of the "independents" versus the "company boats" within the industry.
 25. There are many examples of technological changes to improve catching effectiveness. For example, dredge width was about 60' in the mid-1970s; by 1987 the largest dredge size was 240' (MAFMC 1986: 55). Catch-per-unit-effort (CPUE) rose consistently from 1979 on; in 1979 CPUE (Landings divided by hours fishing) was 27 overall; in 1985 it was 169, more than a six-fold increase (MAFMC 1986: 55). Given retention of a quota, this meant that every year the regional director of NMFS had to reduce the allowable number of fishing days and periods of time fished: in 1981 each vessel could work Monday through Thursday, for for as many as 36 hours a week. By 1986 each could clam for only 6 hours every other week. Moreover, in order to keep catches spread over the year, the director had to increase the amount of time the fishery was closed. There were few closures in the late 1970s and 1980s, but in 1985 there were two two-week closed periods (MAFMC 1986: 64), and more in 1986.
 26. The other major social groups affected by management are the hired captains/crews of the vessels, and the clam factory workers; we recently addressed issues concerning the former (McCay and Creed 1987, McCay, Creed, and Gatewood 1987) and have begun work on the latter.
 27. In April 1988 the size limit issue reappeared at a Mid-Atlantic Fishery Management Council meeting, in the context of discussion of the reopening of a surf clam "sanctuary" off Chincoteague, Va. Although the council had voted to reopen this sanctuary in 1986 or 87, it voted to delay the reopening partly because reopening would necessitate a lowering of the size limit of surf clams, given the smaller size of apparently stunted clams in the Chincoteague beds. Effects of more clams on the market were the concerns that led to this decision to keep the size limit and not reopen the Chincoteague beds.
 28. "Stinting" is the English term for the practice, associated with common-field farming, of limiting common rights to pasture to specified numbers of animals, as for example "a mare and a colt, or a milking cow, two bullocks and twelve sheep" (cited in Yelling 1977: 229).
 29. Safety emerged as an issue in surf clam management in the mid-1980s, in the context of escalating liability insurance rates and the imposition of "cage" limits on some of the surf clam boats by insurers. Cages are metal mesh boxes in which clams are put, in the hold or on deck, from the dredges. In the race to catch as many clams as possible in 6 hours of legal dredging time, captains are pressured to add more and more cages to their vessels and thereby threaten the stability of the vessel, particularly in the narrow, often rough and tricky, inlets of the Jersey ports.
 30. This group, known as "the New Jersey clambers," was comprised mostly of the small-scale clambers who participated in the winter New Jersey inshore clam fishery as well as the clam fishery in federal waters. They argued that federal management should be like New Jersey state management, which restricts all vessels to 520 bushels per week during the season, no matter what.
 31. However, the group known as U.S.A. responded to the last poll by taking one of its own, and has been effective in using the results of that to counter uses of the council's poll.

REFERENCES CITED

- Berkes, Filkret and Dorothy Pocock. 1987. Quota Management and "People Problems: A Case History of Canadian Lake Erie Fisheries. *Transactions of the American Fisheries Society* 116:494-502.
- Bromley, Daniel W. 1986. Closing Comments at the Conference on Common Property Resource Management. Pp. 593-498 in *Proceedings of the Conference on Common Property Resource Management April 21-26, 1985*. Washington, D.C.: National Academy Press.
- Charnov, E. 1976. Optimal Foraging: The Marginal Value Theorem. *Theoretical Population Biology* 9:129-36.
- Ciriacy-Wantrup, S.V. and Richard C. Bishop. 1975. "Common Property" as a Concept in Natural Resources Policy. *Natural Resources Journal* 15(4):713-727.

- Cox, S.J.B. 1985. No Tragedy on the Commons. *Environmental Ethics* 7:49-61.
- Crutchfield, James A. and Giulio Pontecorvo. 1969. *The Pacific Salmon Fisheries: A Study of Irrational Conservation*. Baltimore: The Johns Hopkins Press.
- Durrenberger, E. Paul and Gísli Pálsson. 1987. The Grassroots and the State: Resource Management in Icelandic Fishing. In McCay and Acheson (see below).
- Fernandez, J. W. 1987. The Call to the Commons: Decline and Recommitment in Asturias, Spain. In McCay and Acheson, ed. (see below).
- Fife, Daniel. 1977. Killing the Goose. In *Managing the Commons*, G. Hardin and J. Baden, eds. pp. 76-81. San Francisco: W.H. Freeman.
- Fogarty, M.J. and S.A. Murawski. 1986. Population Dynamics and Assessment of Exploited Invertebrate Stocks. Pp.228-244 in G.S. Jamieson and N. Bourne, eds., *North Pacific Workshop on Stock Assessment and Management of Invertebrates*, Canadian Spec. Pub. of Fisheries and Aquatic Sciences 92.
- Gatewood, John B. and Bonnie J. McCay. 1988. "Job Satisfaction and the Culture of Fishing: A Comparison of Six New Jersey Fisheries." *Marine Anthropological Studies* 1(2) (Fall 1988)
- Godwin, R. Kenneth and W. Bruce Shepard. 1979. Forcing Squares, Triangles and Ellipses into a Circular Paradigm: The Use of the Commons Dilemma in Examining the Allocation of Common Resources. *The Western Political Quarterly* 32(3): 265-277.
- Goffman, Erving 1981. *Forms of Talk*. Philadelphia: University of Pennsylvania Press.
- Gordon, William G. , Executive Vice-President, N.J. Marine Sciences Consortium, Fort Hancock, N.J. Personal communication 2/88.
- Gumperz, John J. and Jenny Cook-Gumperz. 1982. Introduction: Language and the Communication of Social Identity. In J.J. Gumperz, ed., *Language and Social Identity*. Cambridge: Cambridge University Press: 1-21.
- Hames, Raymond. 1987. Game Conservation or Efficient Hunting? Pp.92-107 in McCay and Acheson, eds., *The Question of the Commons*. Tucson: University of Arizona Press.
- Hardin, Garrett. 1968. The tragedy of the commons. *Science* 162: 1243-1248.
- Hardin, Russell, 1982. *Collective Action*. Baltimore: Johns Hopkins University Press.
- Haskin, H.H. personal communication 11/82 (Scientific and Statistical Committee Meeting, Mid-Atlantic Fishery Management Council). Rutgers Shellfish Laboratory, Bivalve.
- Hsu, Francis K. 1972. American Core Values and National Character. In F. Hsu, ed., *Psychological Anthropology*. Cambridge, MA: Schenkman Pub. Co.: 241-262.
- Hymes, Dell 1974. *Foundations in Socio-Linguistics: An Ethnographic Approach*. Philadelphia: University of Pennsylvania Press.
- Labov, William 1972. *Socio-linguistic Patterns*. Philadelphia: University of Pennsylvania Press.
- Lloyd, William Forster. 1977 [1833]. On the Checks to Population. In *Managing the Commons*, G. Hardin and J. Baden, eds. pp.8-15. San Francisco: W.H. Freeman.
- McCay, Bonnie J. 1980. A Fishermen's Cooperative, Limited: Indigenous Resource Management in a Complex Society. *Anthropological Quarterly* 53: 29-38.
- McCay, Bonnie J. 1987. The Culture of the Commoners: Historical Observations on Old World and New World Fisheries. In McCay and Acheson (see below)
- McCay, Bonnie J. In press. Muddling Through the Clam Flats: Cooperative Management of New Jersey's Hard Clam Spawner Sanctuaries. *Journal of Shellfish Research*.
- McCay, Bonnie J. and James M. Acheson, eds. 1987. *The Question of the Commons*. Tucson: University of Arizona Press.
- _____. 1987. The Human Ecology of the Commons. In McCay and Acheson *op cit*.
- McCay, Bonnie J. and Carolyn F. Creed. 1987. "Crews and Labor in the Surf Clam and Ocean Quahog Fleet of the Mid-Atlantic Region," A Report to the Mid-Atlantic Fisheries Management Council 19pp.
- McCay, Bonnie J., Carolyn F. Creed, and John B. Gatewood. 1987. "Part II: Crews and Labor in the Surf Clam and Ocean Quahog Fleet of the Mid-Atlantic Region," A Report to the Mid-Atlantic Fisheries Management Council. 12pp.
- Merrill, A.S. and J. W. Ropes. 1969. The General Distribution of the Surf Clam and Ocean Quahog. *Proceedings of the National Shellfisheries Ass.* 59:40-45.
- Mid-Atlantic Fishery Management Council (MAFMC). 1977. Surf Clam and Ocean Quahog Fishery Management plan. 42 FR 60438.
- _____. 1986. Surf Clam and Ocean Quahog Fishery Management Plan Review.
- Moloney, David G. and Peter H. Pearse. 1979. Quantitative Rights as an Instrument for Regulating Commercial Fisheries. *Journal of the Fisheries Research Board of Canada* 36:859-866.
- Murawski, S.A. personal communication, 11/1982 (Scientific and Statistical Committee Meeting, Mid-Atlantic Fishery Management Council). Northeast Center, National Marine Fisheries Service, Gloucester, MA.
- Oliver, Pamela E. and Gerald Marwell. 1988. The Paradox of Group Size in Collective Action: a Theory of the Critical Mass.II. *American Sociological Review* 53 (February:1-8).
- Olson, Mancur. 1965. *The Logic of Collective Action*. Cambridge, MA: Harvard University Press.
- Ostrom, Elinor. 1987. Institutional Arrangements for Resolving the Commons Dilemma: Some Contending Approaches. In McCay and Acheson *op cit*.
- Peters, Pauline E. 1987. Embedded Systems and Rooted Models: The Grazing Lands of Botswana and the 'Commons' Debate. In McCay and Acheson, *op cit*.
- Pinkerton, Evelyn. 1987. Intercepting the State: Dramatic Processes in the Assertion of Local Comanagement Rights. In McCay and Acheson *op cit*.
- Ostrom, Elinor. 1986. Issues of Definition and Theory: Some Conclusions and Hypotheses. Pp. 599-616 in *Proceedings of the Conference on Common Property Resource Management*. Washington, D.C.: National Academy Press.
- Ropes, J.W. 1980. Biological and Fisheries Data on the Atlantic Surf Clam, *Spisula solidissima*. National Marine Fisheries Service, Northeast Fisheries Center, Technical Series Report No. 24.
- Runge, C. Ford. 1981. Common Property Externalities: Isolation, Assurance and Resource Depletion in a Traditional Grazing Context. *American Journal of Agricultural Economics* 63: 595-606.

- Scott, Anthony. 1979. Development of Economic Theory on Fisheries Regulation. *Journal of the Fisheries Research Board of Canada* 36(7): 725-741.
- Tawney, R.H. 1912. *The Agrarian Problem in the Sixteenth Century*. London.
- Taylor, Lawrence. 1987. "The River Would Run Red With Blood": Community and Common Property in an Irish Fishing Settlement. In McCay and Acheson *op cit*.
- Townsend, Ralph and James Wilson. 1987. An Economic View of the Tragedy of the Commons. In McCay and Acheson *op cit*.
- Turgeon, Donna D. 1985. Fishery regulation; Its use under the Magnuson Act and Reaganomics. *Marine Policy*, April 1985: 126-133.
- Vondal, Patricia J. 1987. The Common Swamplands of Southeastern Borneo: Multiple Use, Management, and Conflict. In McCay and Acheson *op cit*.
- Yelling, J.A. 1977. *Common Field and Enclosure in England 1450-1850*. London: Macmillan Press.

KNOCKING 'EM DEAD: ALABAMA SHRIMP BOATS AND THE "FLEET EFFECT" ¹

David R. M. White
Environmental Affairs Division
Southern California Edison Company
Rosemead CA.

ABSTRACT

Previous treatments of fleet fishing have distorted the basic nature of fleets by failure to examine relationships between individual decisions and patterned aggregate behavior. Work fleets among shrimp boats in the Gulf of Mexico are ephemeral and opportunistic aggregations which may last only a few hours or endure over several days; a range of environmental, technological, social, and cultural factors are involved in the dynamics of these groups, but varying search strategies are very important in fleet formation and dispersal. A "fleet effect" is suggested wherein variable discovery techniques and information-sharing result in larger catches than if all boats fished alone.

Introduction

Fredrik Barth (1966) portrayed fleet fishing as "grotesquely unadaptive" behavior, explaining group efforts among Norwegian herring fishermen as the result of social transactions between skippers and crews. His view rested on an incorrect assumption, i.e., "that a vessel's chance of finding herring is greater if it strikes out on its own than if it follows other vessels."

Barth's argument has become entangled with what is called "the skipper effect." Seen simply as a notion that differential skill among captains attracts good crews and leads to greater catches, this has been challenged by recent work suggesting that catch size is best explained by boat size and frequency of fishing trips (Pálsson and Durrenberger 1982, 1983; Durrenberger and Pálsson 1983, 1986). The reinsertion of material factors into consideration of fishing success was refreshingly appropriate; it had been underemphasized too long, particularly in the context of technologically diverse mechanized fisheries. But although Durrenberger and Pálsson's argument has merit, it does not address the question of whether fleet fishing is an uneconomic behavior. Too, it is ironic that Barth's viewpoint is now identified closely with the "skipper effect" (see, in particular, Durrenberger and Pálsson 1983). His premise was clearly that self-confidence, rather than skill, causes a skipper to venture off on his own and hence to make larger catches by random intersection with herring.

Regardless of how it is stated, the "skipper effect" hypothesis relates to individual and small-group behavior (interactions between captains and crewmen, and success of particular boats). Distinct questions relative to group behavior are needed; I group the questions together as a "fleet effect" hypothesis which asks (1) whether perceived differences in individual skill, experience, and/or intuition contribute

differentially to formation of work fleets; (2) whether fishing alone may at least result in *occasional* success in finding prey and, if so, (3) whether this has a systemic (fleet) effect beyond individual success or failure.

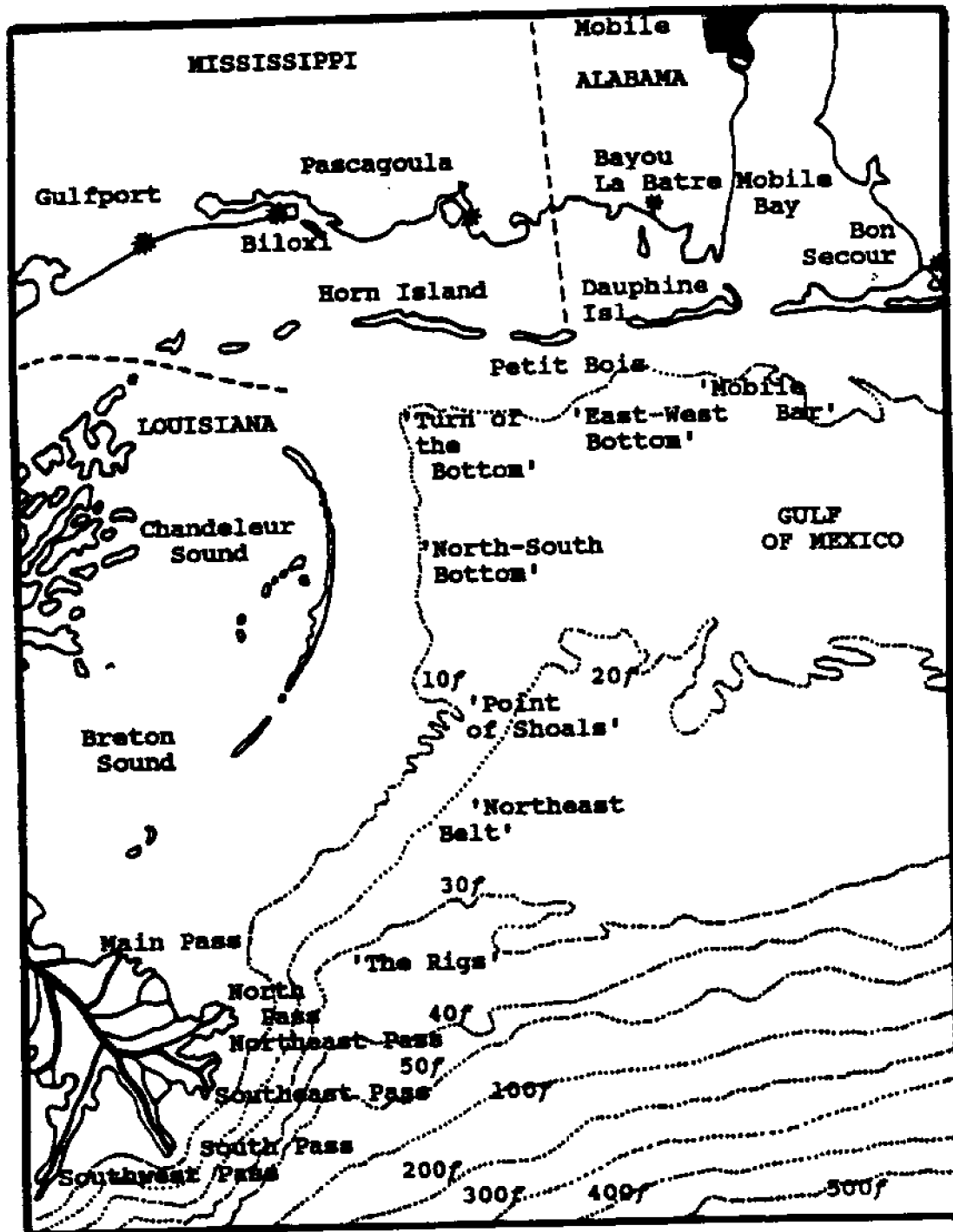
In Barth's consideration of fleets, he assumed an additive relationship between individual and larger group behavior; I assume a synergistic relationship. The key to the difference lies in Heath's odd suggestion (1976) that staying in a fleet would give a boat access to more information. What matters instead is the variety, not the amount, of available information. John Gatewood (1984) has shown the importance of non-redundant information; its predictive value when shared is synergistic rather than additive.

Examination of work fleet dynamics among Alabama shrimp boats demonstrates that solitary fishing, rather than standing in contrast to congregative fishing, is an integral part of the pattern. Solitary boats make the discoveries, but consistent catch success occurs in fleets. From this perspective, fleet fishing is not "grotesquely unadaptive" behavior but is instead a socially grounded device for assuring both discovery and intensive exploitation. It is, in short, most often within "work fleets" that shrimpers succeed in working good concentrations of shrimp or, as they say, "knocking 'em dead."

Shrimping The East-Central Gulf

The geographic area considered here (see Figure 1) is the Gulf of Mexico between the Mississippi River and Mobile Bay, from the shoreline to a depth of about 100 fathoms (600 feet). Here the shrimp fishery primarily exploits three species: white shrimp, brown shrimp, and pink shrimp (usually called "hoppers"). These species have relatively distinct habitats and behavior, which affect fleet formation and duration. The effects of biota on fleet dynamics demonstrate that work fleets are rationally constituted groups which congregate on the basis of observable environmental variables, rather than being random clusters of confused fishermen (as Barth's explanation would have it). White shrimp occur only near shore, and are daylight feeders; the "spottiest" of the shrimps, they occur in small, dense "herds" which may be no more than a few hundred yards in diameter. Brown shrimp and hoppers normally feed only in the dark, and in shallower water must be fished for at night; in waters deeper than 30 or 40 fathoms they can be caught around the clock. Whether boats are able to fish only at night or twenty-four hours per day (see White 1977b) has a clear effect on fleet durability, but in either case dispersal of these species is broader than that of white shrimp, and less clearly delineated work fleets often result. However, as discussed below, configurations of fleets working for brown shrimp and hoppers vary in ways which also require consideration of bottom topography. Technological characteristics of shrimp boats must be taken into account when considering which vessels may work which areas. Inshore "Bay boats" range from 27' to 52' in length, overlapping in size with "Gulf boats" which begin at 42' and range upward to >95' in length.² Bay boats seldom carry enough net cable to allow trawling in depths greater than 10 or 15 fathoms. The smaller wooden Gulf boats work in the nearshore Gulf; all are technologically prevented from working much beyond 40 fathoms, and most work inside the 30 fathom contour. The larger boats, most of which are steel hulls (derogatorily called "slabs" by people on smaller boats [White 1977a:108-109]), can work in nearshore areas but generally frequent deeper waters offshore.³ Smaller boats are physically prevented from fishing deeper waters, while boats with big nets are legally prevented from fishing inshore waters.

Figure 1. Map of the East-central Gulf of Mexico. Shrimpers' placenames in single quotation marks. Water depth shown in fathoms.



The shrimp boats considered here fish the bottom with trawl nets, each set is called a "drag." A dragging boat must remain in constant forward motion, either looking for or maintaining location on shrimp. Boats move about three knots per hour dragging and nine knots per hour running. The time required for picking up, dumping the catch, and putting nets back out varies by water depth, but takes a short time compared to the drags. In 50 fathoms, it takes slightly over 15 minutes to pick up the nets, and about the same to set back out; in shallow water, the entire process of picking up, dumping the catch, and putting the nets back out takes less than 10 minutes. In contrast to the quick process of picking up and setting out, drags usually last three to five hours (depending on the amount of fish and "trash" being caught). These factors are important in understanding shrimping strategy, compared to other sorts of fishing. For example, unlike seiners (Orbach 1977, Gatewood 1983, 1984) or gill-net fishermen (Durrenberger and Pålsson 1986), bottom trawlers such as shrimp boats must fish areas rather than spots and they have the option of making short-distance relocations while dragging.

The geographic area under consideration constitutes home range for most Alabama boats, although some extend their territory west of the Mississippi River. During the peak season (roughly, May through November),⁴ most boats from Bon Secour and Bayou La Batre work nowhere else. But at the same time, there are numbers of Florida boats in the area: some Pensacola boats, and others from Niceville, Panama City, St. Joe, and Apalachicola. The area is also home range for Mississippi boats, and a major portion of home range for many Louisiana boats. There are usually a few Texas boats in the area as well,⁵ although most of their home range is further west. During the off season, many bay boats and some smaller Gulf boats tie up, and these boatmen switch to other fisheries (e.g., oystering or trout fishing) or to non-fishery work; a few boats work the home range, particularly in the offshore portions, but most leave the area. Some boats go west of the Mississippi River, even as far as Texas, but most go east or south to Apalachicola, Carrabelle, Tampa, or Key West.

The preceding description generally applies to the past two decades, except as noted. What follows applies most specifically to 1971-1973; a separate section notes subsequent changes. The descriptions of work fleets are based on home range observations during peak season but the same general patterns and processes were seen on the wintering grounds (e.g., Apalachicola) as well.

Types Of Work Fleets

Work fleets can be classified in various ways; one obvious approach is in terms of social parameters. The social composition of inshore and offshore fleets varies considerably. The former are often community-based, with close and often multiplex social networks among their personnel; the latter are often made up of boats from multiple states, and social ties among fleet personnel may be nonexistent and, when present, are more often single-strand than multiplex.⁶ This helps explain why "cooperating fleets" (White 1977a:290-295) occur almost exclusively in the bays and inshore Gulf waters.⁷

For present purposes, though, a morphological typology of work fleets is most useful. This rests on the observation that any work fleet involves both cooperation and competition, regardless of motivations leading to its formation. Cooperation occurs, even if inadvertently, as boats watch each other for clues as to catch progress, and navigational cooperation is necessary. But at the same time, boats inevitably are competing for the catch. These types have little to do with function; that is, the general function of all shrimp

fleets is much the same. Still, it is necessary to note and explain observable differences, so that similarities may clearly emerge. Two broad types, "tight" and "loose" fleets, are further broken down into subtypes, as follows:⁸

Tight fleets

(1) *Ball fleets* (Figure 2A) occur mostly in bays, but also in the Gulf along the beaches in late summer and fall. Boats are tightly packed together, making frequent or nearly continuous turns. Ball fleets are exclusively associated with white shrimp and hence occur among boats "working days" or "working days and nights" (see White 1977b:199); they are usually small (seldom more than six or eight boats) and they rarely last more than a few hours.

(2) *Gully fleets* (Figure 2B) occur in "gullies" or channels, usually in the inshore Gulf. Boats are constrained into tight locations (e.g., the "Outside Slough" south of Mobile Bay, one-half mile wide by two miles long) due to bottom terrain and perceived catch concentrations. The prey species are usually brown shrimp and hoppers, and gully fleets occur among boats "working nights" (see White 1977b:199). These fleets tend to be relatively small (two dozen boats would be approaching the upper limit) but they are relatively durable.

Loose fleets

(3) *Line fleets* (Figure 3A), in a sense, are intermediate between tight and loose fleets. They occur on steeply contoured bottom (i.e., >2% grade; in some areas off the Mississippi River mouths, grade approaches 5%) where a certain depth has been identified as the maximum production zone. Often tighter along the drag axis than gully fleets, they are always extended over greater lengths. Thus crowding usually occurs between only two boats at a time (when passing in opposite directions), in contrast to the situation with tight fleets where a turning boat must often dodge two or three others. Line fleets are found among "clocking" boats (see White 1977b: 199-200) and are directed toward brown shrimp and hoppers. They can be very large, and tend to be highly durable.

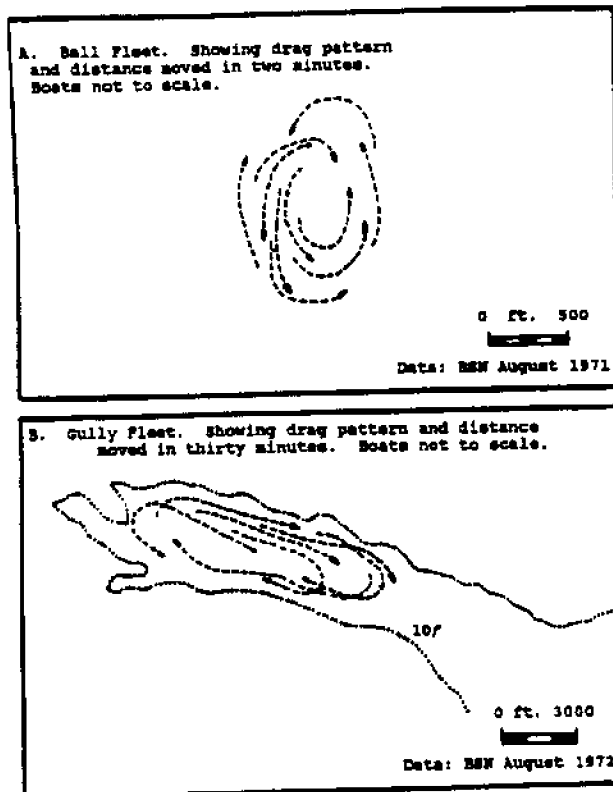
(4) *Bunch fleets* (Figure 3B) are found on gently sloped or relatively flat open bottom (generally <1% grade, such as at the "Turn of the Bottom" south of Horn Island, Mississippi). Boats are usually rather widely spaced, and navigational conflicts are easily avoided. Drag direction is usually the long axis of such fleets, and where the bottom grade is between 1-2% there are fleets transitional in morphology between bunch fleets and line fleets. Bunch fleets are directed toward brown shrimp and hoppers, and occur among boats "working nights" or "working days and nights." These fleets range considerably in size (sometimes consisting of fewer than a dozen boats but sometimes including several dozens) and duration (from a night or two to nearly a week).

Briefly summarizing, the tightest fleets occur with the very spotty, dense herds of white shrimp; looser fleets are generally appropriate with brown shrimp and hoppers, except where bottom terrain intervenes. This happens in narrow channels or "gullies," and to a lesser extent with steep grades. The loosest fleets occur where brown shrimp and hoppers are found on level bottom.

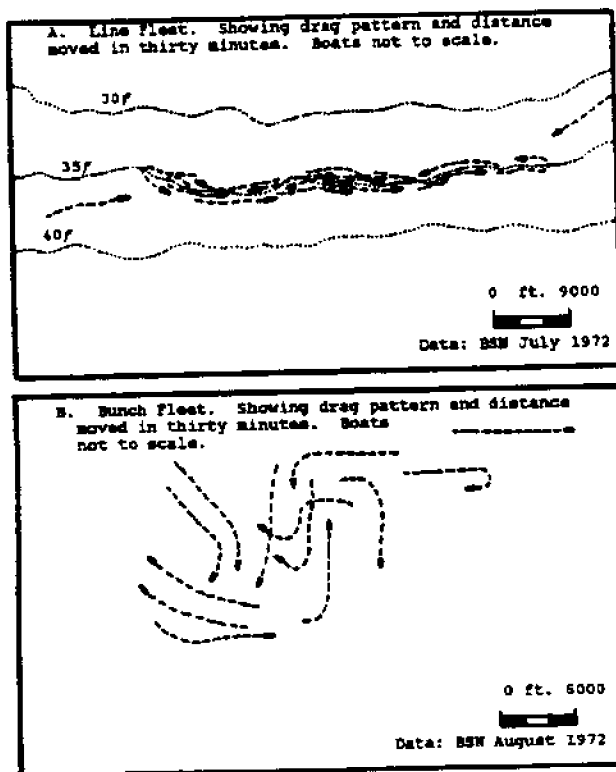
Search And Deployment Strategies

Consideration of how work fleets are formed requires emphasis on the fact that they are seldom found to have anyone in an overt "leadership" role; even in "cooperating fleets" leadership is

**Figure 2. Configurations of Tight Work Fleets:
Ball Fleets and Gully Fleets.**



**Figure 3. Configurations of Loose Work Fleets:
Line Fleets and Bunch Fleets.**



usually temporary and provisional except with the uncommon kinship fleets. Instead of converging on an area because of any sort of integrated control mechanism within the fishery, boats arrive in a fleet due to information flow and convergence of strategies. Thus before the "life cycle" of fleets can be discussed, we must give detailed attention to strategies followed by individual shrimpers.

Shrimping strategies are so varied, and so apparently individualistic, that many shrimpers would vehemently deny the possibility of defining types of strategy. One man commented,

There ain't no two or three shrimpers that'll agree on anything about shrimping ... but there is *one* thing every shrimper will agree on, and that is, you catch more shrimp with your lines off the dock than what you do with your lines on the dock. (BSN February 1973.)

Jokes aside, several broad generalizations provide a context for more varied specific strategies.

First, nearly all shrimpers guide their decision-making according to a "Simon satisficer criterion" (Simon 1955, Jochim 1976:6), i.e., they formulate a minimum acceptable catch, on a trip by trip basis. Meeting this is "to make the trip." It is not time spent fishing that makes a trip; it is the catch:

This has been about twelve years ago now. White ones was just beginning to show and the World Series was on. A man went out two days and got forty boxes. He come back to the dock and the man said, "What's the matter, you break down?" He said "No, I got forty boxes, so I come in to watch the World Series." That's just an old fisherman's tale, but it's true. (BSN/CB radio, October 1972.)¹⁰

Second, shrimpers believe that shrimp are at best difficult to predict; some consider it a challenge, while others think it impossible. As one man said, voicing a typical opinion,

You wouldn't think something with guts in its head instead of brains could outsmart a man. But them shrimp'll damn sure do it. (BSN November 1977.)

Third, largely due to perceived unpredictability of shrimp, nearly all shrimpers pay close attention to what one called "old school shrimping" — that is, they watch other boats knowing that when a boat turns around again and again "she's in the shrimp."

Fourth, there is a general consensus that travel time should be minimized insofar as possible. A related value that falls short of consensus is that one should be a "steady dragger"; this tenet is intentionally violated by high-risk strategists.

Finally, within the constraints of minimum acceptable catch and acceptable running distance, there is a process of evaluating how the trip goal may best be reached and how it might be exceeded. Evaluations of this sort involve both strategic and non-strategic considerations. Nearly all shrimpers make liberal use of a small, frequently-pulled sample net called a "try net," but this is a tactical tool rather than a strategic principle; most also make use of CB or other radios, but this is an element of diverse strategies. Other considerations bear on decision-making, and these are often counted as elements of strategy; for example, Gatewood (1984a:359) and Durrenberger and Pálsson (1986:220) list crew expertise, travel time and fuel cost, weather, condition of equipment, and dangers in particular areas. Here I treat the latter items simply as constraints, elements which may cause a prudent captain to refrain from following strategic preferences. Of course, this is not to suggest that these are constants; the importance of such elements varies from boat to boat (seas too heavy for one boat may be a mere nuisance to another), and may change over time (fuel cost is the best example).

Beyond the topics of general agreement, major strategic differences emerge. Units of description are problematic, and what is presented here is an explicitly idealized list of "types of individuals" when in fact we are dealing with a range of ideas from which individuals select different approaches for different situations. Very few individuals conform closely to only one of the "types"; nearly all shrimpers switch to related strategies from time to time. The "types" are loosely based on shrimpers' stereotyped characterizations and descriptions of themselves and their peers, but some of the terminology used is my own; typical actual references to men whose actions generally or momentarily fit each of the types are included parenthetically below.¹¹

(1) *Home Boy* ("He always stays close to home"; "He don't like to get out of sight of the Sea Buoy"; "He won't work noplace but Mobile Bar unless he has to"). The penultimate "steady dragger" and travel minimizer, the Home Boy trusts traditional fishing spots and believes in letting shrimp come to him. He begins trips in the nearest place with potentially acceptable production, and ventures away only when necessary; his second choice is always the next closest area, and he exhausts nearby possibilities before going farther away. His dictum is "don't never leave shrimp to find shrimp." He considers shrimp unpredictable and thinks the only way to catch them is to keep his nets in the water. He keeps dragging so long as there are enough shrimp to pay for the fuel.¹² Fleet fishing is the usual work situation for Home Boys, who are comfortable working in tight spots. Many shrimpers who fit the profile make "week trips," arriving at Mobile Bar on Monday night, and decisions that the area is "played out" often represent a consensus.

(2) *Joiner* ("Let's pick up and run over with that other fleet"; "We're gonna leave this little fleet and drag on out to that offshore fleet"). In any fleet there will be some who chaff at working for marginal returns and are uncomfortable with the plodding routine of waiting for shrimp to pick up. They want to do something about it, but distrust their ability to locate shrimp independently, on their own. Their dictum is, "Anywhere there's shrimp, there'll be one or two boats." When they begin to be disappointed with their catch they look for another fleet to join, whether one within visual range or one they've heard quite a bit about over the radio.

(3) *Looker* ("I ain't never seen nothing like this—twenty boats, all going in different directions. I guess that's what you call looking"). Like the Joiner, the Looker gets impatient with marginal catches and resolves to do something about it. His dictum is "there's gotta be something better'n this." He usually decides the shrimp have moved, and he leaves the fleet, dragging, looking for shrimp rather than another fleet that has already found them. He chooses his own search direction, but he doesn't abruptly leave the fleet; if he fails in his search he may return later. If the fleet disperses, he may drag some distance looking or may switch to chasing or trail blazing.

(4) *Tagalong* ("I'll run with you tomorrow, but I ain't gonna be no Tagalong"; "O! Tommy, he's Jim's Tagalong"). The Tagalong trusts the judgment of a certain friend or relative more than his own, or the collective judgments of tradition or active fleets. Wherever Jim goes, for whatever reason, whether a short drag away or a long run, Tommy the Tagalong will follow.

(5) *Chaser* ("We're gonna chase a hot flash"; "Well, it looks like Billy went off chasing some more radio shrimp"). Even more than Joiners and Lookers, Chasers get impatient with poor catches, and like Tagalongs they will sacrifice steady dragging for a chance at something better. Also like Tagalongs, they place confidence in other individuals, but they lack Tagalong loyalty. Chasers are inveterate radio listeners, and as soon as they "get a hot flash"

(hear the first report on a good catch) they are off and running. Their dictum is "we're gonna get 'em while the getting's good." Inclined to believe in bonanza catches, they doubt their ability to find one unassisted. They believe that if shrimp can be predicted, someone else has the capability.

(6) *Trail Blazer* ("We're gonna blaze a trail"; "He's a Trail Blazer"). The Trail Blazer picks up and goes to a new location without information that catches are being made there. The destination is specific rather than general; it may be chosen due to the phase of the moon, or because of good catches there at the same time in a previous year, or simply on a hunch. The Trail Blazer may go alone, or may invite a friend to go with him; he may lead a small fleet of cohorts who are convinced by his good idea. He talks a lot about making bonanza catches, and his dictum is, "we might get lucky!" This is a high risk strategy, not only because the Trail Blazer travels farther than others but because he also does so strictly on his own judgment. The Trail Blazer believes that shrimp are at least moderately predictable, and that if anyone can figure them out, he can. At the same time, Trail Blazers often have "fallback" options in mind. This may mean reformulating strategy, for instance, taking advantage of a futile inshore run one night to explore the beaches for white shrimp the next morning.¹³ Alternatively, it may involve shifting to a different resource, e.g., deciding to drag for croakers instead of shrimp, or to go reef fishing with hooks and line.¹⁴ Still, Trail Blazers recognize that their forays may be "double or nothing" propositions; most use the strategy judiciously, and are inclined to revert to less risk-prone and more sociable strategies (e.g., becoming a Joiner) in between schemes.

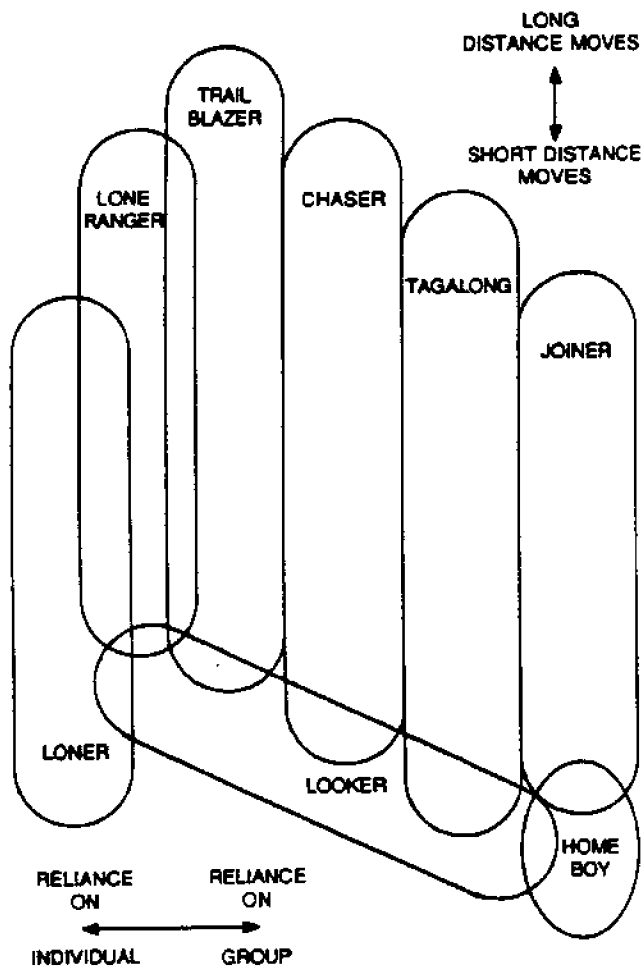
(7) *Lone Ranger* ("I ain't gonna be no Lone Ranger"; "I'm getting to be a Lone Ranger"). Like the Trail Blazer, the Lone Ranger trusts his own judgment more than that of others, yet he is generally unwilling to pick up and travel a long distance in search of shrimp. He may accept a running partner, but takes offense if someone follows without an invitation. When he selects a new location, it is more likely general rather than specific. He tends to drag while he travels, and he settles down on decent catches; if he is running, he stops and tests the waters with the try net along the way. The Lone Ranger may investigate a fleet that he comes across, and he may join it for a while. This is not necessarily the case; he believes that fleets are sometimes entirely fortuitous.¹⁵ When he does join a fleet, he is impatient with it, and unless catches are exceptional, he will leave. He is ambivalent about the predictability of shrimp, but often says that shrimp don't like boats (engine noise frightens them). Because of this, he may work around the periphery of a fleet until it disperses, noting that "sometimes after the boats are all gone, the shrimp come back." Persistence is a key characteristic of the Lone Ranger; being a Lone Ranger often means staying in an area after everyone else has given up and left.

(8) *Loner* ("He's a Loner"). The Loner is a Lone Ranger in extreme form, but he is less likely to go off trail blazing. Like the Home Boy, he tends to be a "steady dragger." He accepts no running partners; when he encounters a fleet he works around its margins and, barring very good catches, he moves again if the fleet shifts toward him. What he believes about predictability of shrimp is unclear, as he seldom uses the radio and generally holds back from sharing opinions; it seems likely that he considers occurrences to be random, and thinks his chances roughly equal regardless of location. When he finds shrimp and his actions attract a fleet, he is likely to be the first to leave and go looking elsewhere. He may share the Lone Ranger's belief that shrimp are frightened by engine noise, but his behavior seems more antisocial than strategic.

A more analytic look at strategy is facilitated by means of Figure 4. This Venn diagram plots individual strategic behavior in two dimensions. The horizontal axis is a "locus of decision reliance" variable, with individual self-reliance on the left, trending toward reliance on a single other at middle right, to reliance on group and tradition at far right. The vertical axis represents distances a person will travel looking for shrimp, with short distances at the bottom and long distances at the top.

The diagram indicates the fuzziness of distinctions between many of the strategy types; for instance, merely observing the location of a boat and its activities during a twelve or twenty-four hour period would in no sense clarify whether the captain is a Loner, a Lone Ranger, or a Looker some distance from where he started.¹⁶ At the same time, it shows the range of activity involved in collective efforts to land a catch, and it indicates that this range includes not only physical distance but diverse potential information sources. The key role of Lookers is noteworthy; the diagram shows that as they move farther from the fleet where they started, they move through social space as well as physical space, and in the process they may well shift (no matter how temporarily) to one of the more self-reliant strategies.

Figure 4. Strategic Behavior, Locus of Decision Reliance, and Travel Distance.



In order to emphasize the strategic flexibility of individuals, the example of a captain with whom I made several trips can be briefly noted. When feeling confident with his boat, crew, recent success

in finding shrimp, and the weather, he primarily acted as a Lone Ranger, he sometimes became a Joiner but rather quickly thereafter would shift first to Looker and then back to Lone Ranger, and on occasion he got inspired and played Trail Blazer. When feeling a lack of confidence, for whatever reason, he alternated between being a Joiner and a short-distance Looker; when coming out of his darker moods he often had difficulty resisting being a Chaser. Regardless of his outlook at the moment, he scorned Loners and made fun of Home Boys.

What the diagram does not show is any sort of comparison between the numbers of boats that are shrimping in a fleet at any given time versus those that are not, nor does it give any sense for numbers of boats which might be following various strategies. By rough estimate, during the peak season in 1972, an average of 70% of boats working the easternmost Texas-Louisiana Shelf at any particular time were working in fleets.¹⁷ Of the 30% not in a fleet, about 30% were playing the role of Joiner (moving between fleets but heading toward a fleet), while 60% were Lookers. Only 10% of those not in fleets were Tagalongs, Chasers, Trail Blazers, Lone Rangers, and Loners; hence the latter strategists constitute only about 3% of the total number of boats working. The numbers are misleading, however. Although by this estimate Lookers make up slightly less than 20% of the total population, nearly half of the boats in work fleets were probably Lookers before moving into the fleet. Thus, active and near-past Lookers constitute about 60% of all boats.

What must be understood is that Lookers search nearby (perhaps more expectable) places for shrimp, while minority strategists generally look in more distant and/or less expectable places. The "structural" significance of minority strategists for fleet dynamics is clarified below; briefly, given information flow between them and majority strategists, they are the ones who inform the fishery about potential catches which, for various reasons, are less easily anticipated and might otherwise be overlooked.

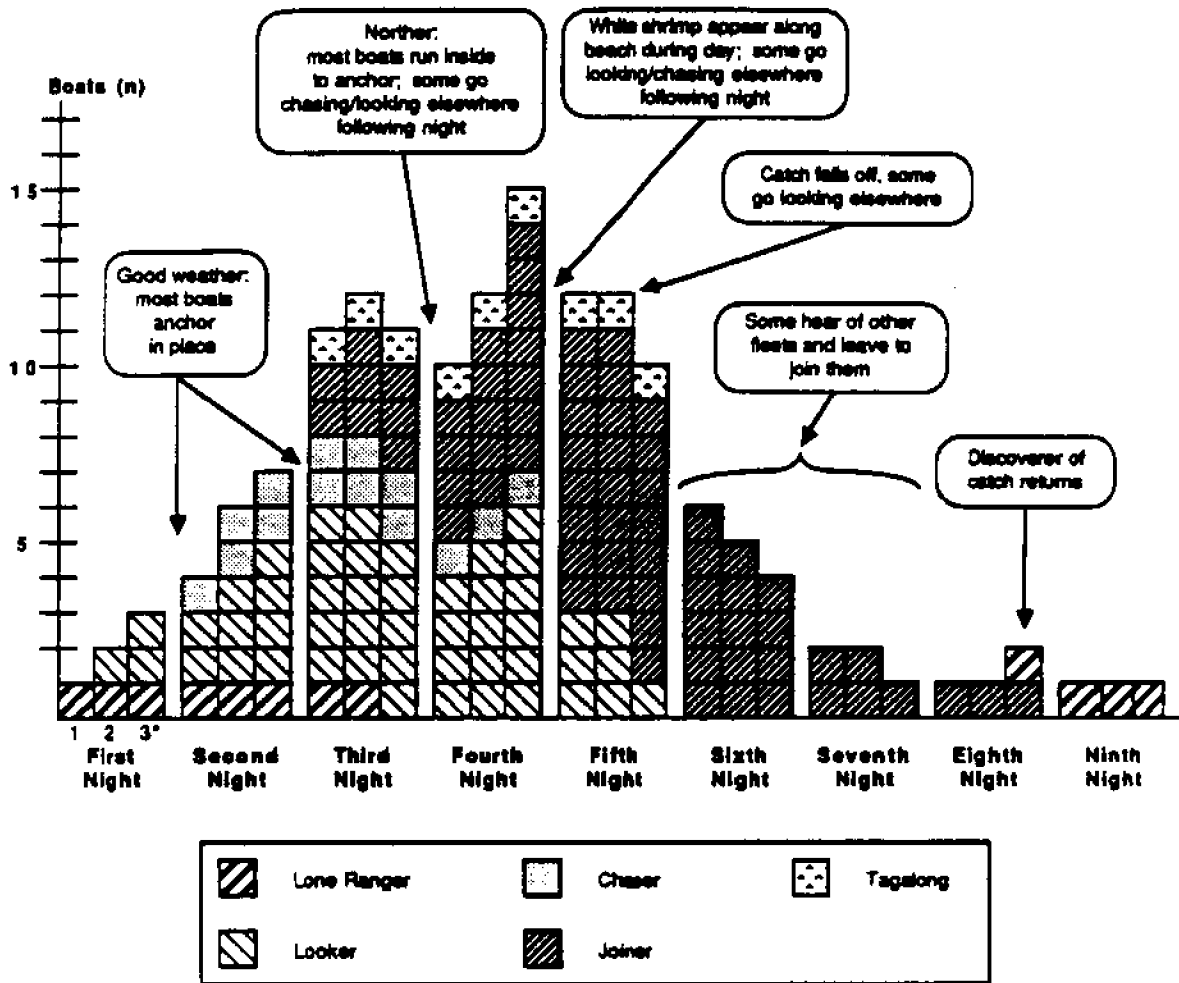
Fleet Formation And Dispersal

Flexibility and switching of strategies are hallmarks of individual behavior in shrimping. There is also an aggregate flexibility which results from simultaneous operation of varied individual strategies. Explanation of this aggregate flexibility requires looking at initiation, growth, and ultimate dispersion of fleets, and at relationships between accretive and dispersive phases of fleet shrimping.

Fleets may be started intentionally or accidentally. Home Boys go out in a group and start their trips with fleet fishing, as do the uncommon kin-based "cooperating fleets," whereas Lone Rangers and Loners only start fleets when their intensive dragging is observed by a passing boat or boats. Fleets also may be started by Trail Blazers or Lone Rangers, but Lookers are responsible for starting more fleets than any other type of strategist. All it takes to provoke formation of a fleet is for one boat, turning around every half hour and sweeping back across the same location, to be noticed by two other boats.¹⁸ In accordance with the key principle of "old-school shrimping," almost any strategist will be dissuaded from prior intentions and become a Joiner if he discovers a boat obviously turning around on shrimp.

There is thus a pre-fleet discovery phase in shrimping, in which one boat discovers a good catch and another boat discovers the first. With arrival of the third boat, a fleet has formed, and the accretive phase of fleet development often accelerates quickly thereafter. As shown in Figure 5, Lookers are the first major contributors to fleet growth, as they impulsively become Joiners. The first members of a fleet generally try to keep its existence

Figure 5 - Composite Discovery, Formation and Dispersal Pattern of a Typical Bunch Fleet Showing Strategic Participation and Effects of Weather and Alternative Resources Availability.



* 1st, 2nd and 3rd columns for each night represent boat arrivals between 7 - 11 pm, 11 pm - 3 am, and 3 - 7 am

a secret, but the only real question is how soon the effort will fail.

Radio silence often marks the first night or two of a fleet's existence, but this cannot be counted on. The general ethic of radio use was (in 1971-73) one of open communication, and volumes of "small talk" might have given the impression that this was the case; the actual practice was what I have called "open secrecy" (White 1977a:261). This took two forms: codes and what one man called "talking between the lines." Overt codes were frowned upon, because they blatantly violated the ethic; covert or subtle codes are not readily identifiable as such and were used more often. For instance, one man would mention lima beans or coffee ("anything thicker than water") to his code partner whenever he was in the shrimp. Talking between the lines involves incomplete or riddle-like messages which require prior knowledge in order to be understood (White 1977a:262-263). One or more of the early members of a fleet is likely to feel that he owes a favor to someone, and will call with a coded or between-the-lines message; two things can go "wrong" here. Either a number of people will successfully break the message, or one who does will openly pass it on to others. Once this happens, the rush is on. After a few Chasers and passing Lookers have come into the group, the Joiners will not be far behind.

During the accretive phase, a fleet brings numbers of boats into an area with good catches underway, and generally speaking it may be argued that accretion serves solely to increase aggregate catches of the fishery. But even as accretion is continuing, the dispersive phase usually gets underway.

Fleets inadvertently started by a Loner lose their founder as soon as the fleet itself is in existence. The purely accretive phase lasts longer if the fleet was started by a Lone Ranger or a Trail Blazer, but Lone Rangers also tend to leave as soon as the area starts getting crowded. Trail Blazers stay longer, but their attention, and that of Chasers, is fragile. Peak development of a fleet is marked by the moment when catch dissatisfaction generates a larger number of dispersing Lookers than there are new Joiners. Peak development is also marked by a shift to open and direct radio communication, as everyone rushes to discharge information exchange debts. Catches are more or less accurately reported, locations are freely given, and fleet descriptions are used to draw out information about what is happening in other areas. This burst of information may bring in more boats (hard-core Joiners who wait to make sure something is really going on before making a move), but Lookers are already beginning to leave.

Once dispersion gets well underway, it creates a state of anxiety among remaining shrimpers, a growing sense that there must be a better catch elsewhere. After a day or two if the catch is slowly declining, and in a matter of a few hours if there is a precipitous decline, the fleet disperses and boats variously go off looking or running to join yet another fleet.

Most susceptible to rapid fluorescence and collapse are ball fleets, which may last only an hour or two and seldom endure more than four or five hours; at the other extreme, some offshore line fleets may last for weeks, with gradual shifts in composition as some boats depart for home and others come in to begin their trip. The gully fleets frequented by Home Boys often last until the weekend termination of trips, unless catches fall to the point that some switch to Joiner or Looker strategies.

Bunch fleets exhibit some peculiar patterns not observed in any of the more constrained types of fleets. They frequently "drift," that is, the entire fleet moves progressively in one direction or another, both through a given night and over a period of several days. Sometimes they bifurcate, with part of the fleet going one direction

and the other part another. Occasionally, two such fleets converge into the same area; this process can create minor navigational havoc if the fleets were dragging in different directions. Another noteworthy fact is that bunch fleets occur relatively close inshore, and when white shrimp are running along the beaches many boats switch to "working nights and days"⁷⁹ instead of anchoring in place during the day. One consequence is that some may not return to the same fleet that night, especially if they have chased the "white ones" quite some distance. This gives added volatility to bunch fleets in the fall of the year.

The dispersive phase, in contrast with the accretive phase, serves to begin anew the process of locating more shrimp in different locations. The search is aided by a post-fleet phase, carried out by the least impatient strategists: "steady draggers" who may be Home Boys or Loners. These men keep working an area after the fleet leaves, and if the shrimp pick up again they will be there to notice it. The Home Boy does so by staying put, the Loner by moving a few miles away while the fleet runs its course and then coming back after the fleet has departed.

At any given time there will be a number of fleets, in various stages of accretion or dispersion, within a thirty-mile radius (a little over three hours running time). Combined with different individual search strategies, this insures that widely separated, out-of-the-way locales are tested for shrimp and worked when productive, and that most boats find opportunities to home in on good catches in progress. At the same time, the fragility of fleets and their rapid dispersion could conceivably act to prevent overfishing of specific concentrations of shrimp. In sum, it is possible that the life cycle of fleets creates a sort of optimum catch situation, neither allowing major concentrations of shrimp to go unnoticed nor permitting detected concentrations to be decimated. This could not help but be an advantage, on the whole, to individual shrimpers as well as to the aggregate fishery.

But does fleet fishing really work? Do boats in fleets catch more than boats working alone? Table 1 presents a sample of pertinent data, a compilation of detailed catch statistics for an inshore Gulf trawler (a 55' LOA 52 gross tonnage wood boat with a GM 671 diesel engine), showing search strategies being followed during each drag of a 9.5-night trip along with times when the boat was in a fleet (and if so, the number of boats in the fleet).

Although the data are complicated by considerations of weather, shrimp size, and movements toward port near the close of the trip, the fleet/nonfleet catch differential is relatively clear. In Table 2, totals are shown by strategy type, whether shrimping took place in context of a fleet, and if so whether the catch was discovered first and a fleet subsequently developed (Discovery Fleet) or the fleet was previously existing (Chasing/Joining Fleet).²⁰

Statistical interpretations of these data are not particularly relevant; the numbers themselves more closely resemble the results of rough calculations which shrimpers make in deciding what to do. It is obvious from Table 1 that daylight drags generally do not "pay off," but once in a while they do, so shrimpers keep testing. Looking outside of a fleet may pay off very well, with a new discovery; if it were simply a matter of choosing to discover a new concentration of shrimp, this is what shrimpers would do. But making such discoveries involves more time spent "looking," unproductive time during which discoveries are *not* made and catches are lower than average.

Simply put, it is easier to find fleets (which are visible) than it is to find shrimp (which are not). Furthermore, it is clear to shrimpers, regardless of their theories about finding shrimp, that some of their best discoveries are indeed random (or, as they would say, the result of "pure dumb luck"). For instance, notice that the

Table 1. Catch Data and Shrimping Strategy, By Drag

Date,	Drag No.	Strategy/Fleet size	Drag Hrs.	Lbs./hr	Total lbs.
0726-27	#1	Looking	5.8	24.0	140
0727-28	#1	Looking/discovery	3.5	28.6	100
	#2	Fleet (4 @ 1:30 am)	6.5	26.9	175
	#3*	Fleet	2.4	6.2	15
0728-29	#1	Fleet (9)	4.8	26.3	125
	#2	Looking	5.5	10.9	60
0729-30		Chasing/Joining			
	#1	Fleet (4-9)	4.8	26.3	125
	#2	Fleet (17)	5.3	28.1	150
0730-31	#1	Looking**/discovery	5.3	33.3	175
	#2	Fleet (6)	4.6	49.1	225
	#3*	Fleet	2.8	0.7	2
0731-0801	#1	Fleet (7)	5.3	32.8	175
	#2	Fleet (14)	4.7	42.9	200
0801-02	#1	Fleet (28-30)	3.3	27.7	90
	#2	Fleet (22)	3.5	28.6	100
	#3	Fleet	3.5	28.6	100
0802-03		Chasing/Joining			
	#1	Fleet (4-13)	3.4	29.3	100
	#2	Fleet (27)	5.9	33.8	200+
0803-04		Joining			
	#1	Fleet (20)	5.2	17.4	90++
	#2	Fleet	3.1	29.2	90
	#3	Fleet	2.2	18.5	40
0804-05		Joining inshore fleet			
	#1	Fleet (6)	4.3	28.9	125
	#2	Fleet	5.6	26.9	150

Data from BSN July-August 1972, Trawler Trip #07.

* Daylight test drag.

**Bad weather forecast - looked inshore.

+ Small shrimp (bring lower price)

++ Large shrimp (bring higher price)

Table 2. Catch Data and Strategy/Fleet Context

Strategy/Fleet Context	Drag Hrs.	Lbs./hr.
Daylight drags/Fleet	5.2	3.3
Looking/Nonfleet	11.3	17.7
Looking/Discovery (Nonfleet)	8.8	31.3
Discovery Fleet	36.2	32.9
Chasing/Joining Fleet	39.8	26.9
(Combined Nonfleet)	20.1	23.6
(Combined Fleet)*	76.0	29.7

Data from BSN July-August 1972, Trawler Trip #07.

Note: * Excluding daylight test drags.

best drags represented in Table 1 (the nights of 0730-31 and 0731-0801) resulted from a discovery made due to a bad weather report.

Catches in discovered spots do (as Barth suggested) generally pay off better than catches found by others, but the average figures of 23.6 lbs/hour while looking, versus 29.7 pounds per hour in fleets, are what really matters (if, as I would argue, comparable differences apply to most boats most of the time).

This is the fundamental choice: to search on one's own or stay with a fleet. The outcome of the trip cited above is apparently representative, as evidenced by observations that most boats, most of the time, do choose to work in fleets. The difference between 23.6 and 29.7 pounds per hour may seem slight, but in 100 hours of dragging this adds up to 610 pounds of shrimp. At \$1.60 per pound, this would be nearly \$1,000 worth of shrimp.²¹

Changing Exploitative Patterns, 1973-1987

The description above applies, most precisely, to the years 1971-1973. Numerous changes took place between 1974 and 1977, and continued through the next decade. The technological composition of the Bon Secour fleet changed, patterns of fuel use changed, communication networks and habits changed, and there were some changes in deployment patterns. Causes of the changes are complex, but much of the impetus seems to have come with marked increases in fuel prices beginning late in 1973.

The price of diesel fuel went from \$0.135/gallon in 1972 to \$0.45 in 1977; at the peak it reached \$1.35. The most immediate effect was in the way shrimpers ran to and from the fishing grounds. Bay boats which had gone in and out daily started making 3 to 4 day trips, small Gulf boats that routinely ran in behind Fort Morgan Peninsula or Horn Island to anchor in sheltered waters began enduring moderate southeasters more often, and even the biggest boats made changes. The fuel crisis resulted in boats being less willing to travel west of the Mississippi River, and working "this side of the River" became the preferred mode.

At the same time, the technology and technological balance of the Alabama shrimp fleet was changing. Boats were experimenting with "four-bangers" (four nets instead of the usual two) by 1977. There was a previous trend toward fewer Bay boats and increasing numbers of Gulf boats (National Fisherman 1974), but the most noticeable difference between 1973 and 1977 was that small Gulf boats were diminishing both in number and in percentage of the Bon Secour fleet. By 1987, a few of the same small Gulf boats present in 1971 were still fishing, but there was no longer an appreciable small-boat sector in the Gulf fishery (Bay boats, on the other hand, had increased along with large Gulf boats).²² With effective removal of the small Gulf boat sector, competition for the nearshore niche was diminished, and it became more feasible (as well as desirable, due to fuel cost) for large Gulf boats to work nearshore waters and minimize running.²³

Changes in communication networks and habits were substantial, even between 1973 and 1977. CB radio was the predominant mode of communication in 1973, and most Alabama boats stood by on channel 10; VHF radios were used, but as an adjunct to CB. By 1977, VHF was preferred to CB, and the remarkable difference was in number of channels frequented. CB channels 5, 11, and 19 were used along with several others, and on VHF, channels 68, 70, and 72 were but a few among a dozen others. "Private channels" became more popular, by means of which certain boats could keep information among themselves. By 1987 some boats were equipped with cellular telephones, which allow confidential communication not only with selected other boats but with shore-side stations as well.

In 1977 shrimpers seemed more willing than before to categorize their peers as "liars." Some justified restricted communication on that basis, but the most relevant observation is that the newly restricted communication network removes much of the temptation to "chase radio shrimp." When fuel was cheaper, such risks were apparently worth taking, but no longer, with a tighter margin of profit, shrimpers were taking pains to validate information on which they based running decisions.

Several deployment shifts have occurred since 1973. Aside from staying closer to home and running less often, these include less chasing, more reliance on steady dragging, more frequent "working days and nights", more coordinated search efforts within small kin- or ownership-based fleets (mostly the latter) and, in some cases, an increased willingness to work alone. For a time, at least, it also included more frequent "poaching" (use of oversized rigs) in Mobile Bay and Mississippi Sound.²⁴ But all of these changes are essentially quantitative rather than qualitative.

Fleet shrimping continues, and it is likely to continue so long as shrimp are "spotty." Fuel prices appear to have created a new generation of Home Boys, but when catches fall off boats still go looking for a better spot. Trail Blazers are more cautious now, and there are fewer Chasers on the contemporary scene. But "old school shrimping" remains valid: when you see a boat turning around on shrimp, you know it is time to go check it out.

Discussion

Ethnographic examination of fleet fishing among Alabama shrimp fishermen is supportive of a "fleet effect" hypothesis. Many shrimpers believe that individual skill and experience, or simple good luck, make a difference in ability to find shrimp, and strategic decisions are made in terms of the various evaluations of capability. Various strategic decisions, in turn, lead to catch discoveries in various places, and this contributes differentially to formation of work fleets. For purposes of the "fleet effect" hypothesis, it is essentially irrelevant whether discoveries are made as a result of skill or random interception; what is important is that boats fishing alone find concentrations of shrimp and become the nuclei of new work fleets. Catch data show larger catches in newly located spots, but search time (on average) more than cancels out the benefits.

The high cost of search time may be a lesser problem for some, if individual shrimp-finding skills actually differ significantly, but it is clear that for most boats fleet fishing leads to larger average catches. Besides, given the pattern of fleet fishing, it is not feasible to *avoid* working in fleets at least part of the time unless one is willing to forego good catches just to avoid the crowd. Whether or not there is a statistically identifiable "skipper effect," subjective evaluations of ability²⁵ result in broad sampling of the environment, and synergistic information flow results in a "fleet effect": i.e., in optimal fishing for most boats.

The ethnographic data presented here were neatly anticipated in a simulation model developed by Allen and McGlade for groundfish fisheries of Nova Scotia. They note (1986:1194) two possibilities for fisheries in which species must be hunted: either there will be "an 'unstructured' population of 'generalist' fishermen" who both locate the prey and mobilize and direct effort toward its capture, or there will be "various structured possibilities involving 'risk taking' skippers who are specialized in 'discovery' and others who only go to locations where present information tells them the 'highest returns' can be found." In the structured situation, high risk discoverers are "stochasts" while low risk followers are "cartesians."

Tentatively, the Alabama ethnographic data appear to fit this model as follows. Both major possibilities have been realized; there is a core of unstructured generalists, and a more structured periphery of specialists. The core consists of Lookers, who set out to discover new catches but immediately settle in to exploit their discoveries and also (by their frequent proximity to established fleets) give out information which mobilizes others. The stochasts are Trail Blazers (most prominently), Lone Rangers, and Loners. The cartesians, and the information sources upon which they rely, are Home Boys (tradition), Joiners (the crowd), Chasers (the clue), and Tagalongs (the friend).²⁶ The adaptive significance of having both stochasts and cartesians within any social system is cogently discussed by Allen and McGlade (1986:1199).

Possible validity of the "skipper effect" cannot be addressed here, but one point which deserves consideration in any further treatment of the question is that statistical significance may be less important than qualitative or structural effects, if such can be shown clearly. At least two types of significant "weak effect" can be suggested: first, those which trigger structural shifts, and second, those which result in a critical margin of economic return. The "fleet effect" rests precisely on effects of this sort. A discovery by a single boat, when information about it is shared, is a structural "trigger" which leads to reorganization of activities by many boats, and it is often a minority element among strategists which finds the good catches. Also, the difference between yields of solitary fishing and fleet fishing provides a small but important margin of catch for many of the boats.

One further point about the "fleet effect" which should be mentioned is that it has clear potential for "leveling" catches within the fleet.²⁷ If, per the "skipper effect" hypothesis, catches are found by those boatmen with greater skills but, per the "fleet effect," those catches are shared in by those with lesser skills, landings will expectably mask the effects of skill. Considerations of the "skipper effect" should take this into account before concluding that no such effect is operative.

Although the "fleet effect" is described primarily in terms of its economic repercussions, the observed cycle of convergence and dispersal of boats involved in fleet fishing is explained in essentially ecological terms as a result of patchy resources and catch fluctuations which cause cyclical information needs and responses. Ethnographic data from the Alabama shrimp fishery indicate that work fleets permit dealing with environmental uncertainty and result in optimized catches for individuals and maximized catches for the fleet at large.²⁸ There is thus no objective basis for suggesting that fleets are "grotesquely unadaptive" in terms of shrimpers' economic interests, and there is reason to seriously question whether this could be the case elsewhere.

In closing, it is necessary to note that not all fisheries are characterized by work fleets. Detailed ethnographic descriptions of work fleets in various fisheries are sorely needed, but on the basis of observations in this paper it should be possible to state a general hypothesis on conditions under which work fleets are expectable.

Hypothesis: Spatially well-defined work fleets will be found in fisheries where the following necessary conditions apply:

1. The target species is both mobile and patchy in occurrence (whether behaviorally, as with herring, or to some extent environmentally as well, as seems to be the case with brown shrimp).
2. The environment is sufficiently open to allow multiple unit deployment within a resource patch.

3. The technology permits multiple unit deployment within a resource patch without causing an unacceptable level of conflict among personnel of different units.
4. The fishery is equipped with communication technology which permits some degree of alternate dispersion and convergence of fishing units.

Future theoretical inquiry could be directed toward testing these necessary conditions, and identifying sufficient conditions as well. In addition, attention needs to be given to social and economic parameters of fleets. Some of the pertinent variables were alluded to here, but none were examined closely. Yet it is important that we understand the social basis for voluntary sharing of information among fishery units, and consider the various possible effects of different ownership patterns. One question which could be examined in terms of the Alabama shrimp fishery is whether owner captains and hired captains contribute differently, in any patterned sense, to work fleet dynamics.

Practical research could focus on interactive effects of fleet fishing and fishery stocks. Some species, such as haddock (Warner 1984:57-58), have been decimated by intensive fleet deployment (see also Andersen 1979:18), but the fault may not reside with technology or fishing techniques *per se*. Other stocks, such as shrimp and prawns (Clark 1982:282, Clark and Kirkwood 1979, GMFMC 1980:74274, Griffin and Beattie 1978), are apparently all but immune to recruitment overfishing with present technological deployment. It is clear that differing biological characteristics of fishery species are involved in susceptibility to fleet fishing, but it is not clear whether variant forms of fleet fishing may change susceptibility to overfishing. Again we see that fisheries management must not disregard cultural and social variables, if plans are to be in approximate accord with reality. Technology and information management, in particular, must be better understood if wild fisheries are to be maintained.

NOTES

Acknowledgments. I wish to thank the people of Bon Secour, Alabama, whose cooperation made my research possible. Discussions with J. Stephen Thomas and M. Estelle Smith were helpful in initial development of this paper. Wendell Suyama deserves credit for production of Figures 4 and 5, and thanks are also due to John Gatewood, Bob Hull, Lynn Thomas, and Maria-Lydia Spinelli for reading and commenting on earlier drafts of the paper; any deficiencies are, of course, my responsibility.

Opinions stated in this paper are my own, and are not intended to reflect policies, positions, or interests of the Southern California Edison Company.

1. Research for this paper was conducted between 1971 and 1987. As a crewman on seven different shrimp trawlers, I made 29 trips, including four trips in 1971, ten in 1972, eight in 1973, and seven in 1977; trip lengths ranged from 1 to 14 nights (average, 6.7 nights), a total of 195 nights at sea. We worked from south of Ship Shoal (Louisiana) to Cedar Key (Florida), but mostly between South Pass (Louisiana) and Mobile Bar (Alabama). Data on recent work patterns are from 1987 interviews with Alabama shrimpers.
2. Data pertain to vessel sizes in 1973 (U.S. Coast Guard, 1973). Vessel size is considered less important than how the owner of the boat equips and uses it (i.e., rigging a boat with twin 25' nets permits it to work legally in inshore waters, while larger nets make a *de facto* Gulf boat).

3. As discussed further on, the tendency to work distant waters diminished somewhat after the early 1970s. The basic attraction of deeper Gulf waters was the possibility of fishing around the clock (White 1977b).
4. As noted elsewhere (White 1977b:201), it is not a fixed rule that the good season begins in May or June; it begins when shrimp appear in good quantity. Similarly, it ends when shrimp catches decline substantially.
5. This is primarily based on observations in 1971-73. Mexico declared a 200-mile limit in 1976 and began a scheduled phase-out of U.S. boats in Mexican waters by 1980 (Reynolds 1976:2A), and by mid-1977 Louisiana shrimpers were complaining about the number of Texas boats that had moved into their waters (Kirkpatrick and Kirkpatrick 1977:29D). The shift was no doubt exacerbated when the Fishery Management Plan (FMP) for shrimp was instituted in 1981, including June 1-July 15 closure of Texas Gulf waters (GMFMC 1980); fleet migration due to extended Texas closure is now an explicit management concern (GMFMC 1987:6).
6. For discussion of factors involved in differential social characteristics of technological sectors of the fishery, see White (1977b:204-210).
7. A "cooperating fleet" is three or more boats (often a momentary arrangement of convenience, sometimes a more enduring purely kin-based group) among which there is an explicit agreement to work together; it may or may not involve coordinated search and convergence procedures.
8. Analytic categories here are based on my own observations, but are believed to be congruent with shrimpers' perceptions. The terms "tight" and "loose" are my own, while the others reflect but do not replicate native usage. Thus shrimpers will talk of "a ball of boats," "that bunch of boats," "that fleet in the gully," and "a long line of boats," but would rarely if at all use the terms as adjectival modifiers of "fleet."
9. For instance, one man having a run of bad luck commented, "If I don't make a trip this trip, that's gonna be about it." (BSN November 1972.) The minimum acceptable catch figure may be calculated on a short-term basis (due to immediately anticipated boat and family/household expenses) or long-term basis (attempting to meet a schedule for accumulating a minimum annual income), or some combination of such goals; also, calculations are adjusted according to season, boat condition, crew experience, and other potential considerations. Similar balancing of effort against results has been widely observed among hunters (e.g., see Siskind 1973:93, 205).
10. A "box" is one hundred pounds of shrimp, de-headed. Forty boxes (4,000 pounds) is a respectable trip for a small Gulf boat, even for eight or ten nights of effort.
11. If these were purely "native" or "emic" types, they could be called "stereotypes," but they are neither this nor strictly "etic" constructs. Representing a mix of shrimpers' terminology and my own, the types must be seen as strictly heuristic devices.
12. "Break-even" dragging is justified by some on the basis that shrimp may "pick up" at any given time; if they do, benefiting from it requires being there with your nets in the water.
13. Inshore-offshore moves while working "days and nights" do not fit precisely into the strategic typology. By my definitions, such moves would be short-distance Trail Blazing, but shrimpers often refer to inshore moves as "chasing" and to return moves as "running back offshore" or going "back to that fleet out there."
14. A notable example involved a man who went to a new area on a hunch; when his nets brought up a few scallops but no shrimp, he picked up the rigs, heavily weighted the lead line, and "plowed" the bottom for scallops. This proved so profitable that he made several additional trips fishing exclusively for scallops.
15. For example, one Bayou La Batre man said, "Fleets are deceptive. You might think that's where the shrimp are, but sometimes it's just that two or three people went to sleep and told their crewmen to follow somebody--and then everybody else starts following them." (BSN March 1973.)
16. This highlights a methodological problem in relying on officially reported location data (no matter how accurate it may be) in an attempt to decipher fishing strategies (see Hilborn and Ledbetter 1979, Durrenberger and Pálsson 1986). Such data are useful for discerning larger-scale patterns, but of uncertain utility for identifying strategies or decision constraints.
17. It requires emphasis that this was the average situation; sometimes more boats were in fleets, while at other times fleets were difficult to find and boats were "scattered everywhere." The extent of fleet fishing also appears to vary from year to year, according to peculiarities of the annual stock.
18. A watchful captain can attempt to prevent this sort of giveaway by refraining from turning around while another boat is in sight, but this is attempted at risk of losing one's location.
19. This is a particularly attractive option insofar as white shrimp always bring a slightly higher price, and usually run a size grade or two larger than brown shrimp or hoppers at any given time of year.
20. Each of the two "Chasing/Joining" moves in Table 1 began as "chasing" but by the time the boat arrived where a catch had been reported, a small fleet had already formed. Thus it became a matter of "joining."
21. The price paid to the boat for 26/30 count shrimp was \$1.60 per pound in 1972. Specifically regarding the trip reported in Tables 1 and 2, 76 out of 96.1 hours of "normal" dragging (not counting daylight test drags) were spent fleet fishing; a 6.1 lb./hr. average difference suggests that about 465 fewer pounds of shrimp would have been caught if fleet fishing had been eschewed in favor of solitary searching. This amount represents 17% of the gross catch, and of the gross crew share.
22. Precise counts are not available. The trend has been noted by the GMFMC (1987:1).
23. Thus in 1987, reportedly a very bad year for shrimping, many of the largest boats from Bon Secour continued on into the fall working nearshore waters for white shrimp. In 1972, the big boats left this work pattern to the smaller boats.
24. This was in 1977; it seems to have been a desperation measure on the part of small Gulf boats which were having extreme difficulty coping with inflated operating expenses.
25. See Jepson, Thomas, and Robbins (1987) for discussion of a subjectively defined "skipper effect" among Gulf Coast shrimp fishermen.
26. At least two qualifications are required: (1) the cartesians among shrimpers may opt for moderate but relatively certain, rather than "highest", returns; and (2) stochasts among shrimpers are graded in extent of risk which they take (Lovers, in particular, moderate risk by steady dragging).
27. For indication that larger-scale boat movements result in leveling of catches, see Hilborn and Ledbetter (1979).
28. "Maximization" as used here refers primarily to increased chances of group pay-off resulting from dispersed effort, as discussed by Moore (1957) and Balikci (1968:80). The concept

is often an abstract one, based upon technocratic assumptions of "entrepreneurial profit maximization under conditions of complete market knowledge and optimal rationality" (Giddens 1973:161). In the latter sense, I use the term in an essentially negative manner, indicating the lack of evidence that "rational" re-ordering of the search and deployment pattern could serve to increase the yield of the fishery (I hasten to add that I refer only to fleet actions within the normal trip cycle, not to manipulation of seasonal deployment as instituted by the Gulf of Mexico Fishery Management Council [GMFMC 1980]). "Optimization" is used in an idealized sense, intended to mean (1) that individuals may choose among a variety of strategies with varying risks and pay-off probabilities, and (2) that the leveling of catches is, in effect, a redistributive mechanism for the products of such differential skill as may exist.

REFERENCES

- Allen, P. M., and J. M. McGlade. 1986. Dynamics of discovery and exploitation: the case of the Scotian Shelf groundfish fisheries. *Canadian Journal of Fisheries and Aquatic Sciences* 43(6):1187-1200.
- Andersen, Raoul. 1979. Introduction: north Atlantic maritime peoples in transition. *In North Atlantic Maritime Cultures: Anthropological Essays on Changing Adaptations*, R. Andersen, editor, pp. 1-28. The Hague: Mouton Publishers.
- Balikci, Asen. 1968. The Netsilik Eskimos: adaptive processes. *In Man the Hunter*, Richard B. Lee and Irven DeVore, editors, pp. 78-82. Chicago: Aldine.
- Barth, Fredrik. 1966. Models of Social Organization. Royal Anthropological Institute of Great Britain and Ireland, Occasional Papers No. 23.
- BSN. 1971-1987. Bon Secour Notes, David R. M. White.
- Clark, Colin W. 1982. Models of fishery regulation. *In Essays in the Economics of Renewable Resources*, L. J. Mirman and D. F. Spulber, editors, pp. 273-287. Contributions to Economic Analysis 143. Amsterdam: North-Holland Publishing Company.
- Clark, Colin W. and G. P. Kirkwood. 1979. Bioeconomic model of the Gulf of Carpentaria prawn fishery. *Journal of the Fisheries Research Board of Canada* 37(11):1304-1312.
- Durrenberger, E. Paul, and Gísli Pálsson. 1983. Riddles of herring and rhetorics of success. *Journal of Anthropological Research* 39(3):323-335.
1986. Finding fish: the tactics of Icelandic skippers. *American Ethnologist* 13(2):213-229.
- Gatewood, John B. 1983. Deciding where to fish: the skipper's dilemma in southeast Alaskan salmon seining. *Coastal Zone Management Journal* 10:347-367.
1984. Cooperation, competition, and synergy: information-sharing groups among southeast Alaskan salmon seiners. *American Ethnologist* 11:350-370.
- Giddens, Anthony. 1973. *The Class Structure of the Advanced Societies*. New York: Harper & Row.
- GMFMC. 1980. Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico. Tampa FL: Gulf of Mexico Fishery Management Council. Federal Register 45(218):74178-74308.
1987. Amendment 4 to the Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico United States Waters. Tampa FL: Gulf of Mexico Fishery Management Council.
- Griffin, W. L. and B. R. Beattie. 1978. Economic impact of Mexico's 200-mile offshore fishing zone on the U.S. Gulf of Mexico shrimp fishery. *Land Economics* 54:27-38.
- Heath, A. F. 1976. Decision making and transactional theory. *In Transaction and Meaning: Directions in the Anthropology of Exchange and Symbolic Behavior*, Bruce Kapferer, ed., pp. 25-40. Philadelphia: Institute for the Study of Human Issues.
- Hilborn, Ray, and Max Ledbetter. 1979. Analysis of the British Columbia salmon purse-seine fleet: dynamics of movement. *Journal of the Fisheries Research Board of Canada* 36(4):384-391.
- Jepson, Michael E., J. Stephen Thomas and Michael C. Robbins. 1987. The "skipper effect" among Gulf Coast shrimp fishermen. *Sociology and Social Research* 72(1):20-24.
- Jochim, Michael A. 1976. *Hunter-Gatherer Subsistence and Settlement: A Predictive Model*. New York: Academic Press.
- Kirkpatrick, Kirk, and Dorothy Kirkpatrick. 1977. Gulf fishermen worried about high costs, limits, politics. *National Fisherman* 58(7):3D, 29D.
- Moore, Omar K. 1957. Divination—a new perspective. *American Anthropologist* 59:69-74.
- Pálsson, Gísli and E. Paul Durrenberger. 1982. To dream of fish: the causes of Icelandic skippers' fishing success. *Journal of Anthropological Research* 38(2):227-242.
1983. Icelandic foremen and skippers: the structure and evolution of a folk model. *American Ethnologist* 10:511-528.
- Reynolds, Phil. 1976. Phase-out of all foreign effort is goal of Mexican shrimp regs. *National Fisherman* 57(6):2A, 35A.
- Simon, Herbert A. 1955. A behavioral model of rational choice. *Quarterly Journal of Economics* 59:99-118.
- Siskind, Janet. 1973. *To Hunt in the Morning*. London: Oxford University Press.
- U.S. Coast Guard. 1973. *Merchant Vessels of the United States 1973 (Including Yachts)*. CG-408, U.S. Department of Transportation. Washington, D.C.: Government Printing Office.
- Warner, William O. 1984 [orig. 1977]. *Distant Water: The Fate of the North Atlantic Fisherman*. New York: Penguin Books.
- White, David R. M. 1977a. *Social Organization and the Sea: A Gulf Coast Shrimp Fishery*. Ph.D. dissertation, Department of Anthropology, Southern Methodist University, Dallas TX.
- 1977b. Environment, technology, and time-use patterns in the Gulf Coast shrimp fishery. *In Those Who Live from the Sea*, M. E. Smith, editor, pp. 195-214. American Ethnological Society, Monograph 62. St. Paul: West Publishing Company.

ENVIRONMENTAL IMPACT ASSESSMENT AS A DESIGN FOR A MARINE FISHERY RESEARCH AGENDA

Duane A. Gill
Mississippi State University

ABSTRACT

Fisheries managers in the Gulf of Mexico area make policy decisions and implement regulations to manage public resources for the public good. Their decisions impact numerous groups with divergent interests. Managers are in need of information to properly manage resources and minimize adverse impacts. This paper suggests a design for developing a marine fisheries research agenda by applying principles of environmental impact assessment (EIA). Environmental impact assessment provides an interdisciplinary approach (including biology, social sciences and economics) which can be used to establish a research agenda that will provide information to guide management decisions. The EIA approach also includes a monitoring phase of research to assist in long-term decision-making.

In 1987, the National Marine Fisheries Service (NMFS) sponsored a two-day social and economic recreational fishery workshop. One objective of the workshop was to improve future research on recreational fisheries by facilitating communication and understanding between fishery managers, NMFS personnel and researchers. This was accomplished by presentations of research being conducted in the region and by a series of panel discussion between managers and researchers. A second objective was to discuss and develop future research priorities. This was unsuccessful and disappointing. Some participants argued that a workshop was not an appropriate forum and that NMFS was responsible for the development of research priorities. It seemed apparent however, that NMFS was struggling to develop a research agenda; at least in terms of recreational fisheries.

Fishery managers make policy decisions and implement regulations to manage public resources for the public good. Their decisions and regulations not only affect fish species, they impact a broad range of social groups and activities as well as local, state and regional economies. Managers are in need of information from researchers to make decisions for protectively managing the resources while minimizing social and economic impacts. The workshop indicated a need for a research agenda to assist fishery managers in developing and implementing policies.

This paper provides a framework for developing a research agenda which can give managers information needed to improve their decisions. Using environmental impact assessment (EIA) as an organizing principle, the suggested framework can guide research which can provide information on the social, economic, biological and ecological impacts of fishery policies and regulations. The paper begins with a review of basic issues in fishery management. This is followed by a discussion of the

environmental impact assessment (EIA) approach. Next, the EIA design is applied to the problems of fishery management and basic social science research needs are noted. Finally, some implications of the model for social science research are discussed.

Issues in Fishery Management

The primary objective of the fishery managers is to develop management plans that protect fish stocks from overfishing while providing an optimum yield on a continuing basis. The plans that managers develop must be approved by the Secretary of Commerce who acts through the National Marine Fisheries Service (NMFS) under the National Oceanic and Atmospheric Administration (NOAA). A plan must consider a variety of federal management institutions including: Office of Ocean and Coastal Resource Management within NOAA; the National Park Service and Fish and Wildlife Service within the Department of the Interior; the Environmental Protection Agency (EPA) and the Army Corps of Engineers (NMFS, 1986: 7.2). Furthermore, the management plan must consider international treaties and agreements and numerous federal laws, policies and regulations including the Magnuson Fishing Conservation and Management Act of 1976, the Marine Protection, Research, and Sanctuaries Act of 1972, the Clean Water Act, the Oil Pollution Act of 1961, the Coastal Zone Management Act of 1972, the Endangered Species Act of 1973, the National Environmental Policy Act of 1969, the Fish and Wildlife Coordination Act, the Fish Restoration and Management Project Act and the Lacey Act Amendment of 1981.

This charge is further complicated by user groups who are often in competition with each other; particularly commercial and recreational users. These user groups make important contributions to local, state and regional economies. Commercial fishing is a major industry in some coastal communities while recreational fishing is an important industry in other coastal communities. The social lives of many groups are profoundly influenced (directly or indirectly) by fishing in terms of occupation and livelihood, leisure activities, environmental concern and political action. These social groups and economies must be considered in a comprehensive fishery management plan.

Fishery managers currently face problems in several fisheries. King mackerel, spanish mackerel, red snapper and red drum are species which have been stressed in recent years. These species are targeted by commercial and recreational user groups. In addition, billfish, particularly martin, have begun to be stressed primarily as a result of harvests by recreational user groups. These species of fish are currently being regulated by policies developed and implemented by fishery managers. The results of these policies, however, are unclear without adequate information on the potential impacts.

Fishery managers need information on the potential biological, social and economic impacts of their management plans and regulatory policies. This fact is demonstrated in the 1987 MARFIN research agenda published in the Federal Register. Research on "regulatory impacts" was mentioned in nine of the 12 research areas with funding priorities. However, the current approach to marine research does not provide clear guidance for information needed to assess the impact of regulations. The research design proposed in the next section provides a framework for conducting a regulatory impact analysis.

Environmental Impact Assessment

Environmental impact assessment developed as a result of the National Environmental Policy Act (NEPA) of 1969. NEPA was designed to encourage federal officials to consider the potential consequences of decisions and policies which could significantly affect the environment. When significant impacts were expected or anticipated, an environmental impact statement (EIS) was to be prepared to certify that the environmental implications had been investigated and considered in the decision-making process.

The Council on Environmental Quality (CEQ) and the Environmental Protection Agency (EPA) were established and given oversight responsibilities. These organizations were responsible for establishing guidelines for the preparation of an EIS (CEQ, 1973, 1978a, 1978b; EPA, 1975). Environmental impact statements initially focused on the physical and natural environment. In 1978 however, the CEQ emphasized the need to consider the social environment, thus giving broader meaning to the term 'environment'. There is no absolute definition of "environmental impact". In principle, it is any change in the environment which is attributable to an identifiable event and which would not have occurred had the event been absent. The various scientific disciplines which investigate the physical, natural and social domains of the environment have developed various conceptual and methodological approaches to define and measure impacts (e.g., Leistriz and Murdock, 1981; Rau and Wooten, 1980; Wolf, 1983). Each discipline however, follows a basic methodological design for conducting an environmental impact assessment (EIA).

In terms of an ideal type, an EIA should consist of the following phases:

1. identification of the impact area (the geographical, ecological and social boundaries of the area);
2. the baseline profile (a detailed description of the 'environment' prior to implementation of a plan or policy, including a biological, ecological, social, economic, demographic and cultural description);
3. a baseline projection (a description of the anticipated future condition of the environment if no action is taken);
4. the project profile (a detailed description of a preferred plan or policy and all feasible alternatives);
5. the project/policy projection (the anticipated condition of the environment if a particular plan is implemented; for each of the alternatives);
6. assessment and mitigation (a comparison of the baseline projection with the impact projections with an evaluation of the impacts and possible means of mitigating negative impacts) and
7. the monitoring process (a means for providing longitudinal analysis of the long-term impacts of a plan or policy).

Environmental impacts can be measured by comparing the baseline projection with the project/policy projection. Differences between the expected condition of the environment under "no action" (i.e., the baseline projection) and the expected condition under a particular project or policy are environmental impacts. These impacts must be evaluated by considering a variety of factors including whether the impact is positive, negative or neutral and the degree of importance. As part of the evaluation process, mitigation strategies should be developed and considered for negative impacts. Since the impacts are derived from *expected* conditions, a monitoring process is essential as a means for providing more accurate information on the impacts as well as providing long-term analysis.

Precise measurement of impacts depends on the identification of the impact area and the accuracy of the baseline profile. The delineation of the impact area identifies segments of the environment likely to experience an impact. The environment can be categorized as physical, natural and social with each category having important subcategories. Information on these categories is necessary to accurately describe the environment in the baseline profile. The baseline profile in turn, provides the base for developing the baseline and project/policy projections.

Ideally, the EIA design takes an interdisciplinary approach. The social, physical and natural environment is intertwined with networks of vital relationships. Changes in one domain of the environment can significantly alter other domains. Working relations between scientists investigating particular domains leads to more knowledge and greater understanding of the environment. This provides for more informed decision-making that can be developed for "environmental" managers.

EIA Research Issues

The environmental impact assessment design provides an orientation from which to develop a research plan and agenda for fishery management. In general, research which contributes to understanding one or more phases of the design should be developed and implemented. The interdisciplinary nature of fishery management problems demands an approach which includes marine biology, marine ecology, economics and sociology. The following discussion elaborates each phase of the EIA design and suggests some areas of basic research.

Impact Area. Research for this phase identifies and delimits the region of impact. Boundaries should enclose the area likely to experience the greatest impact but should not ignore secondary impact areas. Likewise, the time-frame of the impacts should be considered when identifying the impact area. A variety of other factors enter into the definition and highlight the interdisciplinary networking. Marine ecosystems and the life-cycles of fish species provide areas for biological and ecological research. For social scientists, political and economic boundaries are important considerations in terms of determining political jurisdiction and identifying user groups. Local, state and regional economics and communities, organizations and other social groups are additional social factors to be considered in identifying the impact area.

The social impact area is delimited by identifying problems and determining their scope. Problems are identified at a general level from policy goals and objectives and other legislative acts. Problems are further defined from the input of the public in the form of community interest groups. These social groups represent a variety of social and economic interests which might be impacted. These groups however, are not equally organized and may not reflect individual interests.

The scope of the problem can be determined from a needs assessment. This scoping process allows community interest groups to have input into identifying problems and formulating alternative solutions. Furthermore, it provides vital information for developing criteria for evaluating the impacts. The value judgments of the various interest groups form the basis of determining beneficial and detrimental consequences of a policy.

Baseline Profile. The baseline profile describes the environment of the impact area as it "currently" exists. This is done by establishing the dimensions and categories of impacts and by developing appropriate measures. Research disciplines have distinct criteria for selecting impact categories and assigning

indicators. However, these criteria need to be further developed and specified in the case of fishery management.

Biological baseline research describes the natural environment of fishery including the flow of energy and materials, food chains, populations and life cycles. Ecological research investigates the physical environment of the ecosystem including changes in the ecosystem and ecological stress. Social science research is concerned with describing the social environment of the impact area. The economy is described in terms of indicators of economic activity (e.g., industrial output, retail sales, employment and personal income). The social structure is described in terms of social groups, organizations and communities.

Baseline Projection. The baseline projection describes the expected condition of the environment at a specified time in the future if current trends continue. Baseline projections are made on the basis of assumptions regarding general trends which influence the environment. The scenarios produced by the projection may be uncertain because assumptions tend to be problematic. As a result, projection assumptions should be specified. Each research discipline has developed projection techniques which can be applied to marine fisheries.

Projecting the population viability of a fishery is a primary focus of biological research. Ecological research projects the anticipated condition of the ecosystem given current trends. The social environment is projected in terms of economics and social structure. The economy can be projected in terms of economic value, expenditures, revenues, investment and demand. The social structure can be projected in terms of user group demographics, characteristics, attitudes, opinions, social interaction and other social networks.

Project/Policy Profile. This phase of the EIA design describes the details of the project/policy under consideration. In addition, details of feasible alternatives are also presented. Regulatory policies should be developed on the basis of established goals and objectives, policy inputs from community interests available data on the environment. A description of the regulatory policy should include specific rules and procedures for implementation, an identification of groups to whom the policy applies and details of policy enforcement.

Project/Policy Projection. The project/policy projection describes the expected condition of the environment at a specified time in the future if a project or policy is implemented. This is completed for each alternative policy described in the policy profile. The research issues are similar to those found in the baseline projection. Projection techniques similar to those used in the baseline projection are used to describe the environment. These projections however, depend on precise data and accurate modeling techniques. Precise dynamic systems models elaborate the environmental trends, the various underlying assumptions and the interaction between research domains.

Assessment and Mitigation. The baseline projection and policy projection are compared to identify and assess environmental impacts. As previously noted, the criteria for evaluation should be developed during the identification of the impact area. Biological, ecological, economic and social impacts are measured and rated in terms of the degree in which they are positive, negative or neutral. The specific methods of assessment vary among disciplines but in general, the assessment differentially weighs certain impact categories and considers trade-offs among the various issues. Mitigation strategies can be developed in response to significant negative impacts. These strategies may involve adjustments in the policy or the development of additional policies and programs aimed at reducing negative impacts. It is important

to note that these evaluations of impacts and subsequent policy decisions are made by the managers and they must rely on the best available information.

Monitoring. Environmental monitoring compares actual impacts against the expected impacts. The same indicators used in profiling and the projections serve as a basis of monitoring. The same population would be sampled and observed in an ideal design. The results of the comparison of actual and expected impacts should be reported to decision makers and affected groups. This should guide policy adjustments warranted by actual impacts and improve research designs and modeling techniques.

Social Science Research

A social science research agenda for fishery management can be developed by determining basic data requirements for each phase of the EIA design. This section provides a brief discussion of social science research objectives. Initial areas of research are noted with some specific reference to marine recreational fishing. Rather than suggesting an all-inclusive social science agenda, the intent of this section is to facilitate discussion and development of specific research needs.

In order to delineate the impact area of the social environment, social science research should identify social structures and institutions which are affected by policy decisions and which affect policy development. Basic groups in the social structure, specifically commercial and recreational fishermen, consumers, merchants, environmental groups and community residents, respond to each other on the basis of social interaction patterns. Management policies may significantly alter these patterns of interaction and change other structural patterns (e.g., exchange, dominating, cooperation). These policies potentially can alter the way of life in an area and create conflicts between various groups. The scoping process of public needs assessment insures that various interest groups are included in the problem statement and delineation of the impact area. This process needs application at state and community levels.

Once the social elements of the impact area are identified, a basic description of the social environment surrounding the fishery should be developed. Social groups typically have been described in terms of demographic characteristics, and economic contributions (this type of data is available from secondary sources as part of on-going government data collection activities). Specific studies of recreational anglers have also looked at a variety of management-related social variables. These include: participation (Romso and Girling, 1976; U.S. Department of Commerce, 1980), level of specialization (Bryan, 1977; Graefe, 1981), motives for fishing (Dawson and Wilkins, 1980; Ditton et al., 1978; Driver and Knopf, 1976), attitudes toward fishing trip experience (Fedler, 1984; Hiatt et al., 1983), species preference, socialization into the activity and perceptions towards management problems and policies (Ditton, 1977). However, there is relatively little data on communication and group networks, patterns of social interaction and other causal processes. More data are required to fully describe the impacted social environment.

A similar level of data collection is needed to develop descriptions of policy alternatives. Information is needed on the social and economic contributions of social groups in order to develop reasonable alternatives. The interdisciplinary approach is also important in developing alternatives that are feasible from the perspective of all disciplines. Secondary data on the effects of similar policies may be available to guide these research efforts.

The baseline projection and policy projection are based on the development of models of social and economic processes. While generic social science causal models have been developed within the disciplines, applications to fisheries management issues have not generally occurred. One reason is that current descriptive data is not adequate for causal modeling. Causal modeling implies the development of the theories and hypotheses to drive the data collection. A second reason is that few social models have been developed methodologically which results in questions of validity and reliability. Modeling is a major research area which must be developed in order to achieve accurate measures of social impacts.

Social scientists are responsible for assessing the social and economic impacts of alternative policies. Since these assessments are submitted to decision makers for evaluation and possible implementation, it is important that the data be presented in a usable format. Research reports typically do not provide adequate public communication of the assessed impacts. They are typically difficult to assess and too technical to be understood. Qualitative analysis of quantitative data is necessary to facilitate accurate evaluation. Furthermore, mitigation measures should be included along with their implementation strategies.

Monitoring the social and economic environment requires additional research efforts. Social science research has typically relied on cross-sectional data collection strategies. These strategies are relatively ineffective in uncovering long-term trends, producing causal models and conducting ongoing monitoring of social and economic processes. Longitudinal research is needed to measure the actual impacts of policy decisions. This type of research provides ongoing data collection using the same indicators selected for profiling and projections. Longitudinal designs such as panel studies and cohort studies sample the same population. However, longitudinal research has been viewed as too expensive and is not accommodated by research funding processes founded on a yearly basis. The value of this type of research needs to be demonstrated in practical terms in order to gain funding support.

CONCLUSIONS

Fishery managers need information on the impacts of their policy decisions in order to effectively accomplish their goals. Most of their information has traditionally come from government funded research and the research agenda was heavily influenced by funding levels. Biological research has been the customary winner in the competition for research funds while social science research has lagged behind. Compared to natural and physical science research in fisheries, social science research has been meagerly funded, after-the-fact, ad hoc and poorly supported. The result has been a paucity of applied social science research and a decline in the current pool of researchers.

In the face of these traditional funding priorities, decision makers are becoming aware that many of their management issues are "people" problems. Furthermore, the social environment is being recognized as an important domain in the total environment and the social impacts of decisions must be considered. These emerging views indicate a need for quality social science research in the area of fisheries. This research however, requires a reallocation of research funding and a long-term commitment to social science research.

A viable research design and agenda is needed to effect funding reallocations and commitments. The EIA design provides a framework from which to reorganize and develop a comprehensive research agenda. However, important developments must be

made. Researchers need to specify operational methodologies and integrate specific techniques and relevant data to the research process. More importantly, disciplinary weakness must be strengthened. For example, applied researchers need to make theoretical contributions to their disciplines to provide greater understanding of the subject and to refine the assessment process. The intended contribution of this paper is to provide a point of departure for these endeavors.

REFERENCES

- Bryan, H. 1977. Leisure value systems and recreational specialization: the case of trout fishermen. *Journal of Leisure Research*. 9(3): 174-187.
- Council on Environmental Quality (CEQ). 1973. CEQ, Preparation of EIS's Guidelines. *Federal Register*. 38(147): 20550-20562.
- Council on Environmental Quality (CEQ). 1978a. National environmental policy act-regulations. *Federal Register*. 43(112, June 9): 25230-25247.
- Council on Environmental Quality (CEQ). 1978b. Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act. Washington, D.C.: U.S. Government Printing Office.
- Dawson, C.P. and B.T. Wilkins. 1980. Motivations of New York and Virginia boat anglers and their preferences for potential fishing constraints. *North American Journal of Fisheries Management*. 1: 151-158.
- Ditton, R.B. 1977. Human perspectives in optimum sustainable yield fisheries management. Pp.29-41 in H. Clepper (ed.). *Marine Recreational Fisheries*, vol 2. Washington, D.C.: Sport Fishing Institute.
- Ditton, R.B., T.J. Mertens and M.P. Schwartz. 1978. Characteristics, participation, and motivations of Texas charter boat fishermen. *Marine Fisheries Review*. 40(8): 8-13.
- Driver, B.L. and R.C. Knopf. 1976. Temporary escape: one product of sport fisheries management. *Fisheries*. 1(2): 21-29.
- Environmental Protection Agency. 1975. Preparation of environmental impact statements. *Federal Register*. 40(72 April 14): 16814-16827.
- Fedler, A.J. 1984. Elements of motivation and satisfaction in the marine recreational fishing experience. Pp. 75-83 in H. Clepper (ed.). *Marine Recreational Fisheries*, vol 9. Washington, D.C.: Sport Fishing Institute.
- Graefe, A.R. 1981. Understanding diverse fishing groups: the case of drum fishermen. Pp. 69-79 in H. Clepper (ed.), *Marine Recreational Fisheries*, vol 6. Washington, D.C.: Sport Fishing Institute.
- Hiatt, R.L., K.A. Chandler, A.K. Reniere and A.R. Bolsteen. 1983. Socio-economic aspects of marine recreational fishing. Report prepared for the National Marine Fisheries Service, Washington, D.C.
- Leistritz, F. Larry and Steven H. Murdock. 1981. *The Socioeconomic Impact of Resource Development: Methods for Assessment*. Boulder, Colorado: Westview Press.
- National Marine Fisheries Service. 1986. Proposed Secretarial Fishery Management Plan, Regulatory Impact Review, Initial Regulatory Flexibility Analysis, and Draft Environmental Impact Statement for the Red Drum Fishery

- of the Gulf of Mexico - August, 1986. Washington, D.C.: Department of Commerce.
- Rau, John G. and David C. Wooten (eds.). 1980. *Environmental Impact Analysis Handbook*. New York: McGraw-Hill.
- Romsa, G.H. and S. Girling. 1976. The identification of outdoor recreation market segments on the basis of frequency of participation. *Journal of Leisure Research*. 8(4): 247-255.
- U.S. Department of Commerce. 1980. Marine Recreational Fishery Statistics Survey, Atlantic and Gulf Coasts, 1979. Current Fishery Statistics Number 8063. Washington, D.C.: National Marine Fisheries Service.
- Wolf, C.P. 1983. Social impact assessment: a methodological overview. Pp. 15-33 in K. Finsterbusch, L.G. Llewellyn and C.P. Wolf (eds.), *Social Impact Assessment Methods*. Beverly Hills, CA: Sage Publications.

SOCIOLOGICAL CARRYING CAPACITY FOR MARINE RECREATIONAL FISHERIES: A Proposed Direction for Implementation

James D. Absher
University of Georgia

ABSTRACT

Marine fisheries provide an important benefit to recreational anglers, including psychological and sociological aspects of the experience. To be more effective, managers need to understand the recreationist just as much as the resource base upon which their activities depend. How to gain this understanding is an open issue: one promising approach is to apply sociological carrying capacity (SCC) theory. The key to SCC is the ability to identify, and incorporate into decision making, crucial experiential attributes and primary recreational needs of anglers. This paper concludes with a step by step review of how SCC theory can be applied to marine recreational fisheries. SCC is a planning and management framework that can make recreational management easier. However, further work is needed to add it to the manager's repertoire.

Introduction:

In a recent article in Fisheries Peter Larkin (1988) presented a valuable perspective on sportfishing. He emphasized that not only is there an important relationship between the angler and the resource but also important experiential components of a) sharing the experience with others (whether or not they tell the truth), b) implicitly or explicitly competing with other anglers and c) responding to increasingly specialized and regulated opportunities (e.g. catch-and-release, barbless hooks, slot limits). Clearly fishing is as much a sociological phenomenon as it is a biophysical one.

This leads to the obvious implication that the job of managing recreational fishing resources/opportunities is going to require a sophisticated understanding of the recreationist just as it has required a detailed knowledge of the various components of the resource base upon which the activity depends. Toward this end a national recreational fisheries policy is now emerging (AFS, 1988) that emphasizes, among other things, the need to involve deeply the constituent groups and individual anglers in the management process. Managers must now become facile with the use of information from the users themselves in their decisionmaking on recreation use allocation issues. But just as twenty years ago managers realized that there was no "average camper" toward which a unitary policy might be directed, fisheries managers are well aware of the need to provide various types of fishing opportunities. Excellent studies are being done that look at the motivations and satisfactions of fishers. There are many from which to choose a couple of examples might be the work of Ditton, Mertens, and Schwartz (1978) and Fedler (1984).

Taken together these studies suggest that a highly satisfying trip 1) usually involves multiple experience attributes, and that 2) sometimes taking fish home, or even catching one, is not among the "critical elements" of satisfaction. Other times, of course, it is. The key is to know when, where, or for whom one or another attribute is paramount.

How, then, can managers decide when, or if, a certain experiential attribute other than catch is crucial? Similarly, what constitutes an acceptable probability of catch for a given group of anglers? And how is this pattern to be reflected in resource management decisions? Naturally, the answer being promoted here is that sociological information, especially as it is related to recreational fishing behavior.

Before discussing this point further, a caveat is necessary. This is not a call for wholesale changes. On the contrary, most of what is currently being done by managers is not likely to change at all with this new direction of user-information inputs. This is comforting in that decisionmaking systems would not have to be drastically altered, but also in the sense that managers are doing very well at an already difficult job. This notwithstanding, one premise of this paper is that efficient allocation of limited resources, not to mention equitable access, will benefit from a more sophisticated analysis of user needs.

But as alluded to earlier there are structural problems to overcome. The typical marine fisheries situation involves multiple agencies, many specific site objectives, and often only partial jurisdiction over the choices of an individual angler. Many States, Georgia included, don't even have a saltwater license. As a result a two-stage response is suggested. First, all relevant parties (agencies, etc.) must formally acknowledge the role that recreational fisheries play vis-a-vis other fishery utilizations. It seems that this process is already underway: there have been open discussions about commercial versus recreational allocation of many fishstocks, e.g. redfish, crabs or shrimp.

Second, and more germane to the thesis here, is the need for these involved agencies to work closely together throughout some logically defined geographic area to focus attention on the *primary recreational* needs of the anglers that rely on that area. This aspect, especially as it takes into account multiple experiential preferences, has not been done very often.

For this a cross-agency recreational carrying capacity process is ideally suited, at least in theory. The goal is not to create legally binding agreements across agencies but rather to foster a coordinated, information-rich (rather than the currently information-poor) environment relative to recreational sportfishing. If nothing else each agency will be apprised of the roles that each other plays in providing sportfishing opportunities. Hopefully through active participation they will also become committed to recreational uses as important to the social and economic fabric of the area.

Carrying capacity studies: Historically, recreational carrying capacity is based on the old familiar premises of range or wildlife population management. But the working definitions now emphasize the quality of experience relative to the ability of the resource base to provide opportunities within some management regime. It's almost as if you can no longer recognize the old roots. It's now more metaphorical than numerical.

Contemporary carrying capacity studies are usually split into either physical or social dimensions. By physical carrying capacity is meant a combination of biological and physical/spatial aspects. Most of these are immediately familiar. And even though the information base is far from complete most fisheries-related agencies excel at their understanding of some of the biological

details, habitats, life-cycles, etc. They may be a less familiar with physical processes such as the per hour launch capacity of a two-lane boat ramp, but at least the concept is clear.

Less well understood are the sociological dimensions of recreational fishing. As noted above, a lot of progress has been made toward understanding why people fish, but this type of work is still in its infancy. Even less well articulated is a systematic way to bring this individual-level data together. It is for this reason that the rest of this paper will focus on so-called sociological carrying capacity (SCC).

Two main approaches to SCC are currently in development in the academic literature. One, primarily from the work of Graefe and others focuses attention on developing "key management indicators" for a specific place (Graefe, Kuss and Vaske, 1987). It was originally developed as a decisionmaking system for National Park Service sites and has the immediate advantage of being similar to existing decisionmaking logic. It emphasizes a practical comparison of existing conditions with standards based on management objectives. This model is also known as the Visitor Impact Management (VIM) process (see figure 1).

The other dominant approach to SCC is that of Shelby and Heberlein (1986). They emphasize more specifically defined concepts such as "impact parameters" and "evaluative standards" which are not as readily apparent. Compared to the first approach they place greater emphasis on a separate determination of the evaluative standards by which objective conditions will be judged. (See figure 2.)

Both systems are consistent with the overall goal of managing the relationship between known use levels or use patterns and the perceptions/evaluations of experiential quality that participants receive. They both rely on the user to supply critical bits of information about their desired experiences and how conditions will be evaluated/tolerated. In some ways the differences are semantic: Shelby and Heberlein (1984:434) analytically distinguish between the "workings of the recreation system" and the value judgments involved. Yet in the end the SCC assessment is a comparison of these two elements. Graefe, *et al.* place more on the shoulders of the managers in that they are to incorporate user evaluation standards in the "management objectives" section near the beginning of the process. For this reason, their process seems to be slightly preferable for application to marine recreational fisheries.

The SCC process of Graefe, *et al.* begins with a review of existing databases, including policy directives, if any, and a synopsis of the management objectives for a site so that the type of experience to be provided can be defined in terms of appropriate ecological and social conditions (Graefe, Kuss and Loomis, 1986). The evaluation of conditions is implicit in the review of management objectives. (Meaning, of course, that managers need to be good predictors of sociological phenomena at their sites.)

Because the marine recreational situation is so diverse in terms of types of uses, settings and agency perspectives the Graefe *et al.* SCC process is technically easier to implement and is likely to be viewed by managers as more immediately applicable to their own decisionmaking. More importantly, this model explicitly calls for information on the acceptability of potentially detrimental impacts or events (Graefe, Kuss and Vaske, 1986:419). This allows for a clearer link to "conflict resolution." However, managers, or researchers, must decide on the use groups from which this input is needed. For instance, if the focus is on crabbing and if catch-per-unit-effort is the impact parameter then the manager needs to know at what point this standard becomes unacceptably low for a given group. Subsequent simple monitoring could then

establish if, or when, the decision point might be reached for one or more of the groups.

SCC steps: What are the basic steps to the Graefe, *et al.* process and how might they be applied to a complex situation such as on the Georgia coast? The initial step calls for a background information that can be "used to establish a perspective" on the on the area(s) in question. For the Georgia coast this might mean policy documents and plans, management guidelines and any previous recreationist surveys. Agencies to be contacted would be federal (e.g. NPS, NMFS, FWS), State (DNR-CRD, DNR-State Parks, Transportation, etc.), and local/private (Tybee, Chatham Co., and so on). The information will include national surveys like the fishing and hunting studies done by the Fish and Wildlife Service, local visitor studies (e.g. Absher and Bratton, 1987), finfishing studies (Pafford and Nicholson, 1986), and general population information from statistical abstracts or census estimates.

The second step in the process is to assess management objectives. In particular, for a coastal example different objectives will apply for various locations. A matrix is implied that would expand the usual single place analysis to multiple sites or aggregations of sites (e.g. bank fishing). In each column specific visitor experience and resource management objectives would be listed. For instance, one column might be for State Parks. Because of their interest in promoting camping and developed recreation they provide more amenities for the angler such as fish cleaning stations or toilets. They also might reasonably be expected to attract more people and thus offer more social contact/interaction than at remote sites. Cells in the parks column that contain information on the social interaction and facility/amenity objectives would reflect this. Other sites such as the fishing piers made from abandoned bridges would likely to be at the other end of the spectrum on these experience attributes.

The third step is straightforward in concept. Specify a measurement device for each indicator in step 2. Such things as group size, number of others present, catch-per-unit-effort, or possession limits are examples.

Next comes a crucial step (4): restate the objectives in quantitative terms. That is specify an evaluative standard by which the performance or adequacy can be judged. Here again the objective standard may vary across user groups, agency regulation, or facility design. At other times it may be uniform across all settings, as with a creel limit. In this step, it is crucial to be as specific as the different user groups dictate. Activity specialization is just emerging as an important topic in recreationist research (Absher and Collins, 1987). For the Georgia coast it could be important to break apart some user groups in order to maintain their distinctive needs in the decision process. An example might be the emerging "upscale" boater from the urbanized areas, or the more subsistence based rural, poor angler. They may be after the same species but their motivations differ greatly.

There are successive steps in the SCC process on through "comparisons," "causes," "strategies," and "implementation," but the first four are where the essential differences with the simpler, park based application of the Graefe, *et al.* model are most evident. For marine recreation the basic logic of the SCC process is preserved, but the number of agencies and user groups will have to be expanded in order to apply it to a marine setting. This review is not meant to be a complete proposal for SCC determination, but rather an introduction to the idea with some concrete examples from the Georgia coast. SCC is a planning and management framework that *can* make recreational fisheries

management easier. Its utility depends in large part on the quality of the discussion as the process is adapted to this setting. Now is the time enter into a constructive, yet critical dialogue.

References:

- Absher, J. D. and S. P. Bratton. 1987. Social carrying capacity at Cumberland Island National Seashore: perceptions of three types of overnight visitors. IN *Proceedings 1986 Conference on Scientific Research in the National Parks*. Denver, CO: USDI- National Park Service.
- Absher, J. D. and J. Collins. 1987. *Southern Lake Michigan Sportfishery: Angler Profiles and Specialization Index for Illinois and Indiana*. IL-IN Sea Grant Report 87-2. Champaign, IL: Office of Sea Grant.
- American Fisheries Society (AFS). 1988. National recreational fisheries policy. *Fisheries* 13(2):35.
- Graefe, A. R., F. R. Kuss and L. Loomis. 1986. Visitor impact management in wildland settings. *Proceedings-National Wilderness Research Conference: Current Research*. USDA- Forest Service General Technical Report INT-212. Ogden, UT: Intermountain Research Station.
- Graefe, A. R., F. R. Kuss and J. J. Vaske. 1986. *Recreation Impacts and Carrying Capacity: A Visitor Management Framework*. Washington, D.C.: National Parks and Conservation Association.
- Pafford, J. M. and N. Nicholson. 1986. *Georgia Marine Recreational Fisheries*. Brunswick, GA: Georgia Department of Natural Resources, Coastal Resources Division.
- Shelby, B. and T. A. Heberlein. 1984. A conceptual framework for carrying capacity determination. *Leisure Sciences* 6(4):433-451.
- Shelby, B. and T. A. Heberlein. 1986. *Carrying Capacity in Recreation Settings*. Corvallis, OR: Oregon State University Press.

Figure 1. Graefe, et al. Carrying Capacity Model

VISITOR IMPACT MANAGEMENT/PLANNING PROCESS

BASIC APPROACH—Systematic process for identification of impact problems, their causes, and effective management strategies for reduction of visitor impacts.

CONDITIONS FOR USE—Integrated with other planning frameworks or as management tool for localized impact problems.

STEPS IN PROCESS

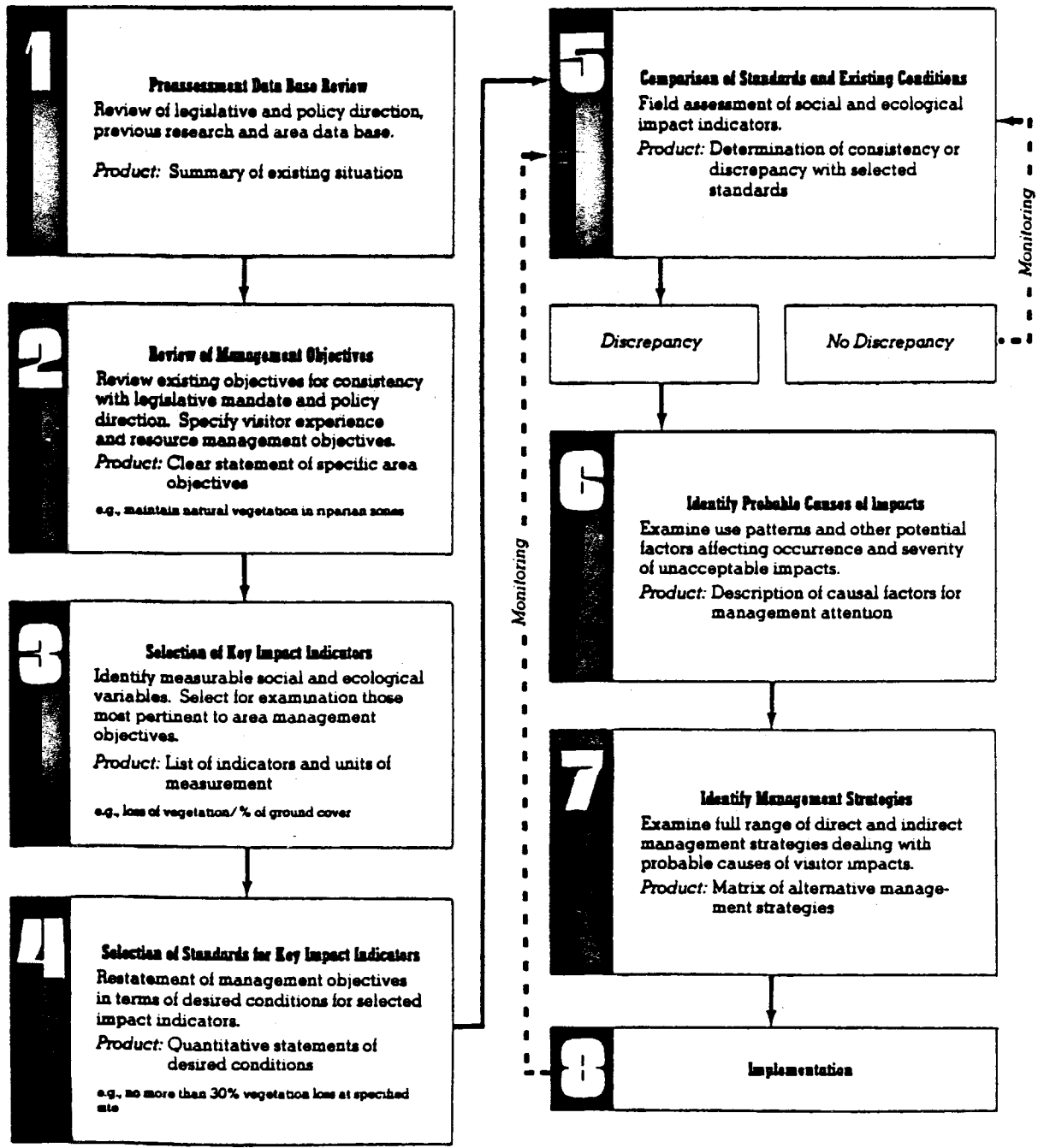
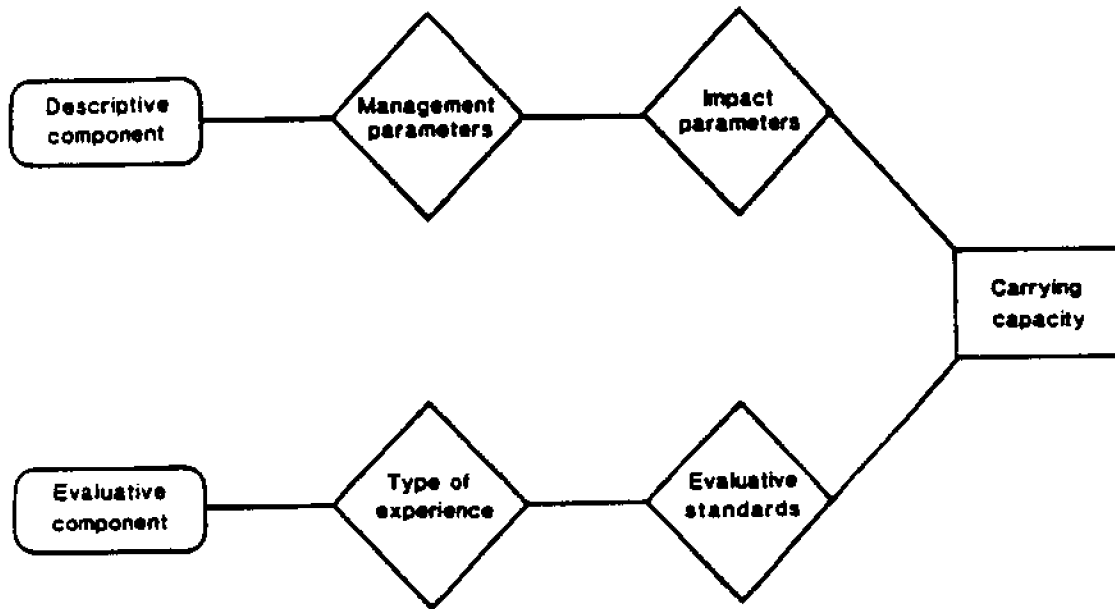


Figure 2. Shelby and Heberlein Carrying Capacity Model



THE ROLE OF JOB SATISFACTION DATA IN SELECTING AMONG ALTERNATIVE REGULATORY POLICIES

John B. Gatewood
Lehigh University
and
Bonnie J. McCay
Rutgers University

ABSTRACT

Given that there are many ways fishing effort can be regulated, enlightened management should choose that constellation of tactics that preserves as much as possible what fishermen like about the work they do. The paper illustrates this point with examples drawn from different New Jersey fisheries and then compares the job satisfaction approach with its primary alternative – straw polls of fishermen regarding their preferred management regime.

In 1984, 1985, and 1986 we collected data on job satisfaction among commercial fishermen in New Jersey as part of an effort in applied anthropology. We believe findings from surveys such as ours should be taken into account, along with biological and economic considerations, when formulating fisheries management plans.

Here, we have two objectives. Firstly, we want to illustrate how job satisfaction data can be put to use in developing management plans. Secondly, we shall argue that job satisfaction data are, in several respects, a better kind of information than one would get from straw polls of fishermen's policy preferences.

Toward these ends, the paper begins by reviewing why managers should be concerned about fishermen's job satisfaction, in general. Then, using the New Jersey data, we show that fisheries differ considerably in terms of their job satisfaction profiles and discuss how these profiles may be used when evaluating alternative regulatory tactics. Finally, we compare and contrast the job satisfaction approach with the more common practice of polling fishermen for their preferences regarding proposed regulatory policies.

Job Satisfaction and Fisheries Management

In 1977 the United States joined most other nations of the world in carving out new national territories from what was once a vast and, for the most part, unregulated commons – the sea. The Magnuson Fishery Conservation and Management Act (Public Law 94-265 as amended in 1983) established a 200-mile fisheries conservation zone (now exclusive economic zone) around the shores of the United States and its sovereign territories. The act recognized that fisheries management involves much more than fisheries biology. In it, Congress explicitly charged fishery managers and the new councils to consider all "relevant social, economic and ecological factors" when developing fishery management plans.

However, data on these aspects of fisheries are not routinely collected by any statistical agency, leaving it to the councils, the federal government, and independent researchers to fill in the gaps. Thus, anthropologists and sociologists have both the opportunity and the challenge to provide useful information and insights on U. S. fisheries.

Despite the legal mandate, potentially helpful social science findings have not been incorporated very often into fishery management decisions or even into plans and accompanying documents. Reasons for this are many, including the resilience and resistance of traditional disciplinary biases, as shown in the problems faced by anthropologists who have participated in the regional councils' Scientific and Statistical Committees (Paredes 1985, with comments by Acheson, Leary, McCay, Orbach, Peterson, and Spoehr; Fricke 1985). Another reason is that there is little appropriate, published research to use (Ladner, et al 1981). Perhaps more to the point, social scientists have had difficulty finding foci for their work that clearly fit the bioeconomic orientation of fisheries management.

Pollnac and Littlefield (1983) have proposed the study of fishermen's job satisfaction as a highly promising way to focus social science talents on a topic of importance to fisheries management. Studies of a wide range of occupational groups have shown significant relations between worker's job satisfaction and their overall health and longevity (see, for example, those reviewed by Pollnac & Littlefield 1983:217-219; O'Toole 1974).

In addition to the humanistic reason noted by Pollnac, Lee Anderson (1980a) and Courtland Smith (1981) have provided what may be called a dire consequences argument to explain why job satisfaction is particularly important in fisheries management. Unless fishermen's "satisfaction bonus" is taken into account – i.e., unless one realizes that fishermen really like fishing – management plans may well be inefficient. Regulatory policies that presume fishermen are "only in it for the money" are prone to underestimate the perseverance of fishing effort, the possible consequence being over-fishing of the resource.

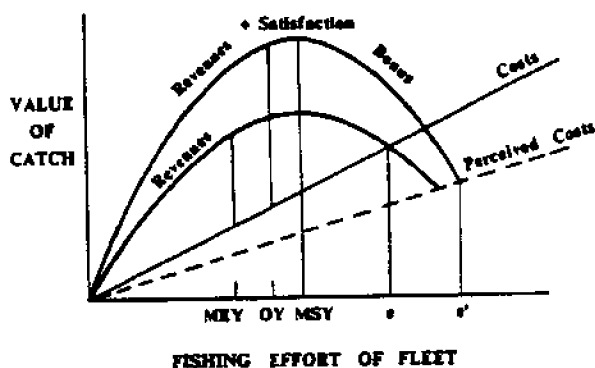
Considered from the positive side, by including job satisfaction in management objectives, we recognize explicitly that what is economically optimal may not provide the maximal human benefits, because the rewards of work take two forms: monetary and nonmonetary. To see why this is so, compare, for example, H. Scott Gordon's (1954) purely economic model with Courtland Smith's (1981) socioeconomic model.

Gordon's economic model (superimposed in Figure 1 on Schaefer's, 1954, density-dependent biological model of stock replenishment) shows that the common-property/open-access nature of marine fisheries will, unless fishing effort is regulated, lead to over-fishing, stock depletion, and profit loss. Without external limitations, the fleet's collective effort will increase to the equilibrium point where revenues equals costs (e in Figure 1). The point of maximum economic yield (MEY) is determined by the level of fishing effort at which the greatest profit is realized, and this is well below the biological point of maximum sustainable yield (MSY). Economists argue that profit-maximization is the proper management target and that fisheries must be regulated to achieve this goal, whether through catch quotas, temporal and gear restrictions, limited entry licenses, and/or landing fees.

Smith's socioeconomic model includes Gordon's plus two additional features. Firstly, he notes that fishing is an enjoyable activity – it has intangible rewards in addition to revenues. Secondly, one's perception of the costs involved in an enjoyable activity tend to underestimate real costs. It follows that the natural, or unregulated, equilibrium level of fishing effort (e' in Figure

1) will result in even greater over-fishing than Gordon's model predicts. Further, the level of fishing effort at which the greatest profits obtain is not necessarily the point at which the greatest overall rewards are to be had. The inclusion of satisfaction bonus (i.e., positive nonmonetary rewards derived from the very activity of fishing) indicates that the proper management objective (the point *OY*, or optimal yield) would allow somewhat greater fishing effort than one based on *MEY*. Although management for optimal yield may yield slightly lower profits, this loss is offset by a more felicitous combination of monetary and nonmonetary rewards, one that allows fishermen greater opportunity to do the work they find so enjoyable.

Figure 1. Economic versus Socioeconomic Models of Management Objectives



Because fishing tends to be positively valued as a way of life, the "Optimal Yield" occurs at that level of fishing effort where the net returns, including satisfaction bonus, to the factors of production is greatest.

Assumptions: Costs are proportional to effort.
Satisfaction bonus is proportional to revenues.
Price per unit of catch is constant.

In summary, both Gordon's and Smith's models agree that unless fisheries are regulated in some manner – if competition for the common-property resource persists without some controls – they will be exploited at socially sub-optimal levels. But, because fishing has considerable nonmonetary rewards, fishermen do not quit fishing when purely economic models of fishermen's motivations predict they should. In some cases, they even subsidize their fishing with other income. Thus, if management plans hope to work, then fishermen's satisfaction bonus, in general, must be taken into account and management targets and tactics adjusted accordingly.

Granting Smith's arguments, there remains a long-standing question about the utility of "soft," or non-quantitative assessments, of nonmonetary values (e.g., Crutchfield 1975:18; 1979:751). The problem is that the mathematics of most decision models require interval or ratio-scaled variables and an homogeneous unit of measure. One way of dealing with this problem is to try to quantify nonmonetary rewards by transforming them into dollar values and thereby incorporate them into standard economic models. This has been done extensively in studies of sports fishing by measuring the transfer or variable costs incurred by sportsfishermen (e.g., Stevens 1969; Gordon, et al. 1973) or by asking fishermen how much they would be willing to pay, hypothetically, for their

fishing experiences (e.g., Hilborn & Walters 1977; McConnell & Sutinen 1979; Bishop & Samples 1980; Anderson 1980b).

In our survey, we do *not* try to develop a single measure of job satisfaction. As Pollnac and Poggie (1979) found in their study among New England fishing communities, job satisfaction is a multi-dimensional phenomenon, making quantification in terms of a single unit-measure very difficult if not impossible (Pollnac & Littlefield 1983). Taking account of this, we use a battery of Likert-scale questions to obtain quantitative measures of sociocultural values (see Smith 1981). Our approach, thus, focuses on the qualitative components of fishermen's job satisfaction and the relative importance of these in different fisheries.

The New Jersey Fisheries Survey

New Jersey is a good location for a comparative study of fishermen and fisheries for several reasons. Firstly, the ports of New Jersey are important among the nation's commercial fisheries. For example, Cape May/Wildwood, at the southern tip of the state, is the third largest seafood port on the eastern seaboard of the United States (based on average dollar value of landings since 1974, computed from National Marine Fisheries Service statistics). Secondly, the fisheries of New Jersey are highly diverse within a fairly small geographical area. Within a radius of 50 miles or so from any port can be found small-scale estuarine clamming and fishing, inshore gillnetting, trap fishing, and dragging, and offshore dredging, trawling, and longlining. And thirdly, the possible confounding effects of community and ethnicity are relatively unproblematic in New Jersey because the various fisheries are dispersed among several multi-fishery, multi-ethnic ports.

The state's fisheries differ from one another in many objective ways, including: (1) the prey, (2) seasonality, (3) trip length, (4) crew size, (5) technology used, (6) method of payment of labor, (7) level of capitalization, (8) level of returns to capital and labor, (9) physical danger, (10) economic risk and uncertainty both in catch and in market value of catch, (11) relations between harvesters and buyers/processors, (12) whether conditions are improving or declining, (13) interfishery mobility, and (14) government regulation.

Our survey includes six fisheries that range along an inshore-offshore continuum – baymen, oystermen, sea clammers, scallopers, dragners, and longliners (for ethnographic sketches of these, see Gatewood & McCay 1988; 1989). We restrict the term "fishery" in this study to the harvesting sector: the vessels, captains, mates, and crew members involved in catching fish or shellfish. Processors, owners, buyers, lobbyists, managers, and others important to the fishery in the larger sense were not interviewed unless they were also working on the boats.

Method

We used the "dockside intercept" method, i.e., we went to the fishing docks to find people willing to complete an interview that lasts from thirty minutes to an hour and a half, including filling out our 12-page questionnaire. Interviews were conducted by ourselves, by trained graduate students, and by a colleague. Fishermen were remarkably cooperative; fewer than 10% refused.

The questionnaire is given in two parts. The first part, completed by the fisherman himself, consists of 33 specific job satisfaction questions where the answers range on a 1-to-5 scale from "very dissatisfied" to "very satisfied." The first part concludes with three overall questions about job satisfaction, two questions about other economic opportunities, and three questions about how his family

views his work. The second part, administered by the interviewer, asks a wide range of biographical-demographic questions.

The survey spanned three years, beginning in June of 1984 and ending in May of 1986, with the large majority of interviews being done in the summer months of June, July, and August. A total of 391 commercial fishermen from the six targeted fisheries completed both parts of the questionnaire.

To achieve as representative a sample as possible for each fishery, we tried to interview no more than three individuals from each boat encountered at the docks: the captain and two crew members (including the first mate when possible). If a given vessel had alternating captains and crews, these "shifts" were considered independent for sampling purposes. Although compliance with these rules-of-thumb was not always feasible, the sample of 391 does conform to the design rather well. Table 1 shows the sample broken down by fishery and status on board, as well as the number of boats represented for each fishery. (Note that the status "one-man" applies only to bayfishermen and that the issue of boat representation does not apply to this fishery.)

The most general hypotheses of the research are that features of job satisfaction should correlate with objective characteristics of the various fisheries and with biographical/demographic characteristics of the fishermen. Here, we summarize findings on job satisfaction by two variables: fishery and status on board. As will become clear, both of these independent variables are significant predictors of fishermen's subjective responses to their work. That is, the fishery in which one works and one's status on the vessel create significantly different work experiences (something frequently overlooked in studies of commercial fishing!), and these differences give rise to different levels and patterns of satisfaction.

Table 1. The Sample by Status and Fishery

	Bay	Oyster	Clam	Scallop	Dragger	Longline
Captain	—	24	25	22	26	20
Mate	—	1	14	12	10	11
Crew	—	25	29	41	42	19
One-Man	70	—	—	—	—	—
Boats	—	26	30	24	34	19

NOTE: There are more longline captains than boats in the sample because alternating shifts work the same vessel.

Demographic Summary

Descriptive statistics on the demographics of our sample are available elsewhere (Gatewood & McCay 1987). Here, we mention only a few selected findings.

Over three-quarters of those interviewed are "full time" fishermen in the sense that their earnings from fishing constitute more than 75% of their annual incomes. The average income is about \$22,400 from an average of 9.5 months of fishing.

There are statistically significant contrasts in education level, age, and income derived from fishing across the six fisheries. Speaking generally, longliners have the most years of formal education and oystermen the least. Oystermen are typically older than other fishermen, and longliners are the youngest group. Clammers, scallopers, draggers, and longliners depend on fishing

as their source of income more than oystermen and baymen (ca. 80% versus ca. 60%), and they make considerably more money from fishing as well (ca. \$25,000 versus ca. \$15,000).

Contrasting the same demographic variables across four status categories, there are significant differences with respect to age and fishing income, but not with respect to education level. As expected, captains of fishing boats tend to be older than their crews, depend more heavily on fishing for their incomes, and make more money. An interesting point is that even crew members make more money from fishing than do the one-man baymen operations, even though both groups depend on fishing to the same extent (ca. 68% of their total annual income is derived from fishing).

The six fisheries differ significantly in terms of the size and power of their vessels and in terms of several personnel variables dealing with fishing experience (see Table 2). Of the five "large boat" fisheries, scalloping involves the largest boats, both in terms of length and horsepower, whereas oystering uses the smallest and least powerful vessels.

Table 2. Hardware and Personnel Variables by Fishery

	Bay	Oyster	Clam	Scallop	Dragger	Lgline	F prob
HARDWARE							
Boat Length	19'	69'	82'	86'	78'	69'	.000 ^a
Horsepower	79 hp	176 hp	404 hp	631 hp	576 hp	496 hp	.000 ^a
PERSONNEL							
Age when began	18.59	18.08	19.85	17.49	17.77	19.46	.385 ^b
Years fishing	16.56	25.18	12.42	11.80	14.72	9.62	.000 ^b
No. Boats	6.00	9.74	9.63	15.91	12.01	6.80	.000 ^b
No. Fisheries	2.04	2.56	3.35	3.41	3.46	2.70	.000 ^b
Fisheries tried last year	1.20	1.44	1.31	1.65	1.35	1.28	.001 ^b
No. Fishing Kin	3.73	4.30	3.53	3.27	4.00	1.78	.025 ^b

^a Significance computed excluding Baymen.

^b Significance computed including Baymen.

The average age at which fishermen began fishing commercially is roughly the same across fisheries (18.5 years old). Fishermen in the six fisheries contrast markedly, however, with respect to their years of fishing experience, the number of boats they have worked on, the number of fisheries they have tried in their careers, the number of fisheries tried within the previous twelve-month period, and the number of kin who have tried commercial fishing at one time or another. Longlining, in particular, stands out as the fishery for relatively inexperienced crew members to get their feet wet. It is less common for longliners to come from a "fishing family," and they have the fewest years of fishing experience.

Direct Comparisons of Fishing with Non-Fishing Work

In light of Anderson's and Smith's arguments about fishing being an especially enjoyable form of work, our survey asked

respondents to compare fishing with other kinds of work they may have tried. In particular, we asked the 315 individuals who had some non-fishing work experience whether fishing is better, about the same, or worse than their previous jobs with respect to four general concerns: earnings, enjoyment of the work itself, having time for other things, and overall satisfaction.

Roughly 70% answered that fishing is better with respect to their earnings, their enjoyment of the work itself, and their overall satisfaction. Other jobs, however, were better than fishing with respect to having time for other things. The same pattern of responses held true for a smaller subsample (n = 189) who compared fishing with a second kind of non-fishing work.

When the direct comparisons are broken down by fishery, there are significant differences with respect to the earnings question and having time for other things, but not with respect to enjoyment of the work itself or overall satisfaction (see Table 3). In particular, fishing is less lucrative for baymen, compared to other jobs they have had, than it is for other groups of fishermen. And, 62% of the baymen think fishing is better than previous jobs in terms of having time for other activities, whereas scallopers, longliners, and dragger think exactly the reverse.

Comparing the responses of three status groups – i.e., captains versus mates versus crew (baymen excluded) – there are significant differences with respect to enjoyment of the work itself and overall satisfaction (fishing vs. non-fishing), but not with respect to earnings or time for other things. Put simply, captains derive relatively more intangible satisfaction from fishing than do their mates and crew, although all three groups like fishing much more than non-fishing work.

A second general indication of fishermen's attachment to fishing comes to light from their responses to questions about non-fishing economic opportunities. We asked how long they estimate it would take to find some kind of non-fishing work and how long it would take to find some kind of work that they would enjoy as much as fishing. Response categories were as follows: (1) a few days, (2) a few weeks, (3) a few months, (4) a year or longer, and (5) never. We then computed what may be called the psychic cost of leaving fishing by simply subtracting their first response from the second.

Whereas there are significant differences among the six fisheries in terms of perceived non-fishing economic opportunities and how long it would take to find work as enjoyable as fishing, the psychic cost is roughly the same, irrespective of current fishery.

Comparing these matters by status, we find that perceived non-fishing economic opportunity is roughly the same for captains, mates, and crew members. But, captains would experience more of a psychic cost than mates and mates more than crew if they were forced out of fishing.

One last consideration is the image or desirability different fisheries have among fishermen. We asked each person, "What is your favorite kind of fishing, whether you have actually tried it or not?"

Roughly two-thirds of those interviewed (i.e., 250) are currently participating in their favorite form of fishing, whereas about one-third (i.e., 126) would rather be doing some other kind of fishing. What is interesting here is the different percentages of "contented" fishermen in each of the six fisheries and the preferences of those who are "discontented" with their current fishery.

Three basic patterns are evident (see Table 4). Drugging, longlining, and sea clamming are fisheries with high percentages of contented fishermen, and they are also fisheries others would like to be doing. Bayfishing has a high percentage of contented workers, but few others are interested in it. Lastly, scalloping and

oystering have relatively few contented fishermen, and few others want to do them.

Table 3. Comparison of Fishing with Job #1 by Fishery

Comparison		Fishing is better	They are about the same	Job #1 was better
EARNINGS			[F = 7.988, p = .000] *	
Bay	(61)	48%	18%	34%
Oyster	(35)	63%	14%	23%
Clam	(59)	88%	7%	5%
Scallop	(56)	71%	18%	11%
Dragger	(62)	84%	10%	6%
Longline	(42)	66%	24%	10%
ENJOYMENT OF WORK ITSELF			[F = .553, p = .736]	
Bay	(61)	79%	11%	10%
Oyster	(35)	71%	12%	17%
Clam	(59)	66%	22%	12%
Scallop	(56)	64%	23%	13%
Dragger	(62)	71%	21%	8%
Longline	(42)	74%	16%	10%
TIME FOR OTHER THINGS			[F = 10.868, p = .000] *	
Bay	(61)	62%	20%	18%
Oyster	(35)	46%	11%	43%
Clam	(59)	41%	15%	44%
Scallop	(56)	11%	27%	62%
Dragger	(62)	29%	11%	60%
Longline	(42)	17%	14%	69%
OVERALL SATISFACTION			[F = .878, p = .496]	
Bay	(61)	82%	15%	3%
Oyster	(35)	77%	9%	14%
Clam	(59)	70%	27%	3%
Scallop	(56)	66%	23%	11%
Dragger	(61)	74%	16%	10%
Longline	(42)	74%	14%	12%

*Significant at $p < .0125$, i.e., experiment-wise adjusted.

Table 4. Favorite Fisheries as Evidenced by "Contentedness" and the Preferences of "Discontented" Fishermen

	FISHERY						
	Bay	Oyster	Clam	Scallop	Dragger	Longline	"Other"
% "contented" with current fishery	79%	44%	75%	36%	82%	83%	—
Preferences of the 126 "discontents"	4%	2%	14%	3%	30%	17%	30%

These patterns are understandable in terms of the objective characteristics of the different fisheries. Dragging, longlining, sea clamming, and scalloping contrast with oystering and bayfishing in being larger-scale, open ocean, year round, and relatively lucrative operations. Scalloping differs from its counterparts, however, in terms of work schedule, i.e., two week trips on crowded boats with crews working in daily shifts. Thus, although scallopers make good money, the living conditions on board are relatively unpleasant, and other fishermen are aware of this. Conversely, the Delaware Bay oyster fishery, lasting only a few weeks per year, is not especially attractive to those who want to fish full time and make more money, and many oystermen would prefer to do open ocean fishing, but find entry into such fisheries difficult. Finally, bayfishing, being a one-man operation, is attractive to those who value personal freedom and independence more highly than making money. Further, because it involves relatively little capital investment, those who become disenchanted with crew life and the temporal demands of the other fisheries can easily set themselves up as baymen. In other words, the ready accessibility of bayfishing tends to make it the most self-selecting fishery in the sample.

Summarizing to this point, the direct comparisons show that fishermen like fishing much better than other forms of work they have tried. The strength of these feelings are variable, both by fishery and by status group. They would experience considerable psychic cost were they forced to leave fishing. And, those fisheries with the highest levels of contentedness also tend to be those considered most desirable by discontented fishermen.

These findings should be tempered by noting a possible bias toward satisfaction with whatever occupation one is presently doing. Just as the fishermen we interviewed like their present occupation more than others they have tried, steel workers may enjoy their work in the mills more than previous jobs. Whether such a bias exists or not, it remains true that fishermen are the population most affected by fisheries management, and our survey makes it abundantly clear that they would suffer considerable angst were they forced out of fishing.

Specifics of Fishermen's Job Satisfaction

The specific features of fishermen's job satisfaction were measured by responses to 33 items. The items include the 22 used by Poilnac and Poggie (1979) in their study of New England fisheries and the 26 used by Apostle, Kasdan, and Hanson (1985) in their study of Canadian Maritime fisheries, plus a few additional questions we thought relevant.

To reduce the complexity of the multi-item responses, as well as relate them to larger theoretical issues in the study of job satisfaction, we organized the 33 specific items according to Maslow's (1954) "hierarchy of needs." Maslow divides people's needs into several broad categories, which, in his view, must be satisfied sequentially. Survival/security needs are the most basic, and their fulfillment is supposed to be necessary before other, higher level needs become much of a concern. Belongingness/esteem, or social, needs are the next most basic. Finally, if the previous needs are fulfilled sufficiently, people require a sense of personal fulfillment and growth, that is, self-actualization needs are at the top of the hierarchy.

In consultation with Thomas Blank and Robert Rosenwein, social psychologist colleagues, and using our ethnographic knowledge of fishing, we assigned each of our items to its most appropriate Maslow category. We emphasize that this is an a

priori assignment and, thus, allows us to test Maslow's notion of sequential fulfillment.

By-item analyses of variance show that 23 of the 33 specific items evidence significant contrasts in their average levels of satisfaction across the six fisheries at the $p < .05$ confidence level. Using the more stringent, "experiment-wise adjusted" cut off of $p < .0015$ (i.e., .05 divided by 33 tests),² 15 items still evidence significant differences in levels of satisfaction. Table 5 shows the average levels of satisfaction by fishery, with the items arranged according to their Maslow assignments.

Similar by-item comparisons of the three status groups (the one-man baymen operations being excluded) show fewer contrasts than exist among fisheries. The average satisfaction levels of captains, mates, and crew members differ with simple statistical significance on only 11 items, and only 4 of these achieve experiment-wise significance: performance of officials, pitting skill against nature, competing with others, and opportunity to be your own boss.

Using the assignment of items to Maslow's categories, we computed three composite-indices. These indices are defined as the sum of an individual's responses to constituent items divided by the number of items in a category; there was no weighting of items. Also, when computing a given index, we did not substitute average values for missing data; individuals with missing data on any constituent item were excluded.

Table 6A shows the average level of satisfaction for the three Maslow-indices for the six fisheries. The most general point to note is the high levels of satisfaction evidenced in all three areas. In view of Anderson's and Smith's arguments concerning job satisfaction and fisheries management and contrary to Maslow's notion of hierarchical fulfillment, it is especially interesting that the highest levels of satisfaction occur with respect to the most intangible of rewards, i.e., the category of self-actualization needs. The only statistically significant contrast among fisheries, however, occurs in the belongingness/esteem index.

Table 6B shows the average levels of satisfaction for the three Maslow-indices by status (baymen excluded). There is no significant difference among captains, mates, and crew members with respect to their satisfaction with survival/security needs. They differ significantly, however, with respect to both belongingness/esteem needs and self-actualization needs, captains being more satisfied than crew, and first mates in between.

The statistical analyses reviewed in this section show that different fisheries, and to a lesser extent the different statuses, evidence very different profiles of job satisfaction. An easy way to get a sense of these profiles is to examine the relative rankings of items for each fishery. Table 7 shows, for each fishery, the 6 items receiving highest satisfaction ratings and the 6 items receiving the lowest ratings.

One discernible trend in Table 7 is that those fishermen who stay out on the ocean for longer stretches of time also tend to appreciate the "romance of the sea" more than do shorter-trip fishermen. Longliners and scallopers, and to a lesser extent druggers and clammers, differ from baymen and oystermen in the satisfaction they derive from the "challenge" and "adventure" aspects of their work. Longliners, in particular, seem to enjoy the strategic aspects of fishing (the hunt for highly mobile and invisible prey), whereas baymen enjoy most the personal independence and freedom their one-man operations provide.

Table 5. Levels of Job Satisfaction by Fishery

Item	Bay (70)	Oyster (50)	Clam (68)	Scallop (75)	Dragger (78)	Longline (50)	F prob
Scale = (1) very dissatisfied — (5) very satisfied							
SURVIVAL/SECURITY							
Physical demands	3.77	3.73	3.74	3.95	3.83	3.88	.683
Job safety	3.74	3.76	3.46	3.56	3.74	3.55	.284
Cleanliness	3.61	3.92	3.72	3.65	3.85	3.50	.173
Future as a fisherman	3.03	3.61	3.68	3.39	3.36	3.36	.036
Healthfulness	4.30	4.12	3.77	4.09	4.13	4.00	.033
Mental pressure	3.86	3.78	3.43	3.40	3.42	3.46	.022
Peace of mind	4.28	3.90	3.79	3.74	3.90	3.86	.015
Living conditions on board	3.51	3.74	3.82	3.96	4.01	3.84	.012
Predictability of earnings	3.51	2.98	3.57	3.05	2.90	3.08	.001*
Earnings last trip	3.53	3.33	3.94	3.43	2.97	3.50	.000*
Amount of earnings	3.59	3.38	4.00	3.48	3.09	3.72	.000*
Performance of officials	2.40	3.42	2.04	2.18	2.07	2.08	.000*
Time you get to fish	3.74	3.70	2.56	3.60	3.56	3.65	.000*
Crowding on fishing grounds	2.76	3.84	3.45	2.51	2.56	2.46	.000*
BELONGINGNESS/ESTEEM							
Community where you live	3.96	3.92	4.16	4.08	4.21	3.98	.289
Competing with others	3.64	3.83	3.82	3.84	4.05	3.94	.052
Fellow workers	3.71	3.90	4.12	3.65	3.88	3.98	.026
Respect as a fisherman	3.24	3.90	3.47	3.32	3.23	3.54	.010
Trip length (dock to dock)	3.81	3.37	3.43	3.20	3.76	3.30	.000*
Time to fishing grounds	3.76	3.46	3.44	3.52	3.35	2.82	.000*
Work schedule (daily, weekly)	3.90	3.38	2.87	3.53	3.23	3.36	.000*
Opportunity to be own boss	4.54	4.11	3.84	3.95	3.88	3.94	.000*
Come and go as you please	4.37	3.94	3.24	3.69	3.74	3.50	.000*
Time away from home	3.83	3.41	3.29	2.70	3.06	2.44	.000*
Time for family and recreation	3.71	3.75	3.21	2.62	2.61	2.42	.000*
SELF-ACTUALIZATION							
Working outdoors	4.57	4.45	4.53	4.45	4.50	4.62	.573
Doing something worthwhile	4.10	3.94	4.13	4.04	4.01	4.24	.387
Identity as a fisherman	3.77	3.98	3.99	3.99	4.10	4.00	.256
Doing deck work	3.63	3.82	3.59	3.72	3.94	3.80	.117
Being out on the water	4.46	4.20	4.34	4.11	4.21	4.14	.084
Challenge	4.17	3.82	4.10	4.16	4.12	4.44	.015
Adventure	4.12	3.75	3.99	4.15	4.16	4.52	.000*
Pitting skill against nature	4.23	3.42	4.04	4.04	4.01	4.16	.000*

*Significant at $p < .0015$, i.e., experiment-wise adjusted.

Table 6. Maslow-Indices by Fishery and Status

A. BY FISHERY							
Maslow-Index	Bay	Oyster	Clam	Scallop	Dragger	Longline	F prob
Scale = (1) very dissatisfied — (5) very satisfied							
Survival/Security	3.57 (62)	3.66 (45)	3.52 (61)	3.42 (71)	3.40 (74)	3.40 (41)	.034
Belongingness/ Esteem	3.85 (69)	3.72 (44)	3.54 (67)	3.49 (69)	3.54 (77)	3.38 (50)	.000*
Self-Actualization	4.12 (67)	3.94 (46)	4.09 (66)	4.08 (73)	4.12 (75)	4.24 (50)	.062
B. BY STATUS							
Maslow-Index	Captain		1st Mate		Crew		F prob
Scale = (1) very dissatisfied — (5) very satisfied							
Survival/Security	3.52 (109)		3.48 (41)		3.43 (142)		.332
Belongingness/ Esteem	3.66 (114)		3.48 (46)		3.44 (147)		.001*
Self-Actualization	4.18 (114)		4.18 (47)		4.01 (149)		.006*

Table 7. Items Showing the Most and Least Satisfaction by Fishery

	Most Satisfied	Least Satisfied
BAYMEN	<ul style="list-style-type: none"> 1 Working outdoors 2 Opportunity to be own boss** 3 Being out on the water 4 Come and go as you please** 5 Healthfulness* 6 Peace of mind* 	<ul style="list-style-type: none"> 28 Predictability of earnings** 29 Living conditions on board* 30 Respect as a fisherman* 31 Future as a fisherman* 32 Crowding on fishing grounds** 33 Performance of officials**
OYSTERMEN	<ul style="list-style-type: none"> 1 Working outdoors 2 Being out on the water 3 Healthfulness* 4 Opportunity to be own boss** 5 Identity as a fisherman 6 Doing something worthwhile 	<ul style="list-style-type: none"> 28 Time away from home** 29 Work schedule (daily, weekly)** 30 Amount of earnings** 31 Trip length (dock to dock)** 32 Earnings last trip** 33 Predictability of earnings**
CLAMMER	<ul style="list-style-type: none"> 1 Working outdoors 2 Being out on the water 3 Community where you live 4 Doing something worthwhile 5 Fellow workers* 6 Challenge* 	<ul style="list-style-type: none"> 28 Time away from home** 29 Come and go as you please** 30 Time for family and recreation** 31 Work schedule (daily, weekly)** 32 Time you get to fish** 33 Performance of officials**
SCALLOPERS	<ul style="list-style-type: none"> 1 Working outdoors 2 Challenge* 3 Adventure** 4 Being out on the water 5 Healthfulness* 6 Community where you live 	<ul style="list-style-type: none"> 28 Trip length (dock to dock)** 29 Predictability of earnings** 30 Time away from home** 31 Time for family and recreation** 32 Crowding on fishing grounds** 33 Performance of officials**
DRAGGERS	<ul style="list-style-type: none"> 1 Working outdoors 2 Community where you live 3 Being out on the water 4 Adventure** 5 Healthfulness* 6 Challenge* 	<ul style="list-style-type: none"> 28 Time away from home** 29 Earnings last trip** 30 Predictability of earnings** 31 Time for family and recreation** 32 Crowding on fishing grounds 33 Performance of officials**
LOGLINERS	<ul style="list-style-type: none"> 1 Working outdoors 2 Adventure** 3 Challenge* 4 Doing something worthwhile 5 Pitting skill against nature** 6 Being out on the water 	<ul style="list-style-type: none"> 28 Predictability of earnings** 29 Time to fishing grounds** 30 Crowding on fishing grounds** 31 Time away from home** 32 Time for family and recreation** 33 Performance of officials**

*Items differing among fisheries with simple statistical significance.

**Items differing among fisheries with experiment-wise significance.

Despite the differences, there are a few aspects of job satisfaction that characterize fishermen in general. "Working outdoors" is uniformly the highest ranking source of satisfaction, and "performance of officials" ranks at the bottom for all except oystermen, who have a long history of successful dealings with fisheries biologists and managers. Similarly, the physical setting and time demands of fishing – that is, being away from family, friends, and recreational opportunities ashore – are regarded as major drawbacks to fishing as a kind of work, except by baymen, who return to port every day.

When a similar tabulation is done for what captains, mates, and crew members find most and least satisfying, we find, again, that "working outdoors" is uniformly the most rewarding item, and "performance of officials" is at the bottom. All statuses enjoy the challenge or adventure of fishing and dislike the unpredictability of their earnings and the separation from loved ones and/or recreational activities. The different job responsibilities associated with the status groups are nonetheless reflected in the item rankings.

Captains enjoy what might be called the "head game" of fishing and take considerable pride in their identity as a fishermen. Mates enjoy the challenge and adventure of fishing, but in a more abstract sense. They also show stronger community attachments and concerns about healthfulness than do their captains. Crew members, who are generally cut off from the important decision-making, include the sociability of crew life (i.e., "fellow workers") among the aspects providing most satisfaction. And, because they are the ones who do the physical labor of shucking or icing as well as the end of day clean up, they tend to resent the work schedule.

Finally, responses to the three global, summarizing questions (which immediately followed the specific questions) show little difference among the fisheries. On a 1-to-7 scale, where 1 means "fishing is the worst kind of work" and 7 means "fishing is the best kind of work," the average ratings ranged between 5.50 and 5.85, indicating that fishermen are generally quite satisfied. Similarly, when asked, "Knowing what you do now, if you had your life to live over, would you still go into fishing?" the average responses ranged between 2.53 and 2.69 (where 1 means "no," 2 means "maybe," and 3 means "yes"). Despite this general willingness to repeat life's experience, all except oystermen and sea clammers would *not* recommend fishing as a career to their friends.

The discrepancy between assessments of fishing as a good career for oneself and the advice one would give to friends probably reflects respondents' perceptions of larger economic trends within the various fisheries. Despite strong attachments to fishing as way of life, or perhaps because of it, fishermen are generally pessimistic concerning the future of their occupation. When asked to estimate on a 1-to-10 scale the economic conditions in their fisheries as they were five years ago, as they are currently, and to estimate how they will be five years into the future, all groups evidenced a clear sense that things are getting worse. Thus, recommending fishing as a career to friends would be poor advice. Not only might one lose friends by recommending a career with such an uncertain future, but were they to take the advice, this would only aggravate matters by over-crowding the fisheries and accelerating their (perceived) decline.

Implications For Fisheries Management

The major point we have been trying to substantiate in the previous section is that fisheries differ considerably from one another in their specific components and levels of job satisfaction. We illustrate how such information may be put to practical use

in formulating management policies³ with the following, and at this time, hypothetical example.

Suppose additional regulation of two New Jersey fisheries were to become necessary, let us say, bayfishing and longlining. Further suppose that two regulatory tactics are being considered – boat quotas versus fleet quotas – and the biologists agree that either one will accomplish the needed restriction of effort if the quotas are properly calibrated. The question is, then, which kind of quota system should become policy.

From the viewpoint of purely economic efficiency, Crutchfield (1979) and Wilen (1979) provide a general argument in favor of the individual boat quota system over a fleet quota, *irrespective* of the fishery. Because the full configuration of fishing effort (e.g., boat size, horsepower, gear type, number of boats, etc.) is not fixed, fleet quotas increase the competition among boats to get their portion of the limited goods, resulting in over-capitalization and profit loss. So long as one considers only economic issues, this argument is quite sound.

But what if we admit to consideration, as Orbach (1978) suggests we do, that fishermen, for whatever their non-profit-maximizing reasons, derive considerable nonmonetary rewards from their work in addition to an income? Crutchfield dismisses this as an important consideration, saying that "surely the same combination of benefits from employment accrues to most occupations – teaching, farming, professional and managerial work, and professional sports come to mind as obvious examples" (1979:751). Yet, from fishermen's own direct comparisons of fishing versus non-fishing experiences, it is clear that fishermen do not derive a comparable combination of monetary and nonmonetary rewards from the other kinds of work they have tried. Those data alone provide ample justification for believing that fishermen are interested in more than just economic rationalization, that they are motivated by more than money.

Given, then, that fishermen are motivated by both monetary and nonmonetary rewards, how does knowing the patterns of job satisfaction in bayfishing and longlining bear on our policy question? Does inclusion of sociocultural data, specific to each fishery, along with the biological and economic considerations lead to different policy recommendations?

From the item-rankings in Table 7, above, we see that baymen show little interest in competition and prestige issues. After working outdoors, it is the opportunity to be one's own boss, being out on the water, having the ability to come and go as one pleases, the healthfulness, and the peace of mind that top their list of nonmonetary rewards. These reflect the strongly independent nature of bayfishing as key components of satisfaction.

By contrast, longliners derive most satisfaction from the adventure, the challenge, feeling they are doing something worthwhile, pitting their skill against nature, and their identity as a fishermen. What these rankings confirm is the fact that longliners regard themselves as "real fishermen," and they really enjoy the hunt of deep-sea fishing and the competition for prestige it entails.

Given these differences in nonmonetary rewards, bayfishing versus longlining, we may make the following observations. Baymen, whose highest nonmonetary rewards revolve around being fiercely independent, should respond reasonably well to limitations on each boat's catch. Boat quotas allow each baymen to decide when and where he wants to work, thereby preserving his essential independence, without setting up the conditions that would drive him to increased capitalization. Thus, at least in this fishery, Crutchfield's and Wilen's general policy recommendation is

congruent with our findings concerning the specific nature of bayfishing's nonmonetary rewards.

In longlining, however, competition is an essential ingredient of the work experience, and fishermen like it that way. The imposition of boat quotas would substantially diminish this aspect, but fleet quotas would not. Thus, provided over-capitalization is controlled through other regulations (such as limitations on boat size and horsepower), the fleet quota system would be more compatible with the nature of job satisfaction among longliners. Contrary to the economists' context-free argument, here then is a fishery in which the configuration of nonmonetary rewards would argue for a management plan built around fleet quotas.

To summarize, the logical connection between fishermen's job satisfaction surveys and fisheries management is as follows.

1. There is more than one way to skin a cat, and there is more than one way to regulate fishing effort.
2. Given alternative regulatory schemes, and other things being equal, the one that preserves as much as possible what fishermen like about their work, the one that takes account of the full range of occupational rewards, is the better policy. This is for two reasons:
 - a. Its adoption may cause less resentment among the fishermen, which in turn means they should be less likely to try and circumvent the regulations.
 - b. Employing such criteria in formulating regulatory policies is more congruent with the central charge of fisheries management, which is management for optimal human benefits.
3. Thus, if we know the components of job satisfaction in a given fishery, this information can be used to select more appropriate regulatory policies, when and if additional regulation becomes necessary.

Comparison of Job Satisfaction and Straw Poll Approaches

Whereas social scientists tend to be sympathetic with the above arguments concerning job satisfaction data and fisheries management, managers themselves usually have reservations. After listening to us explain how job satisfaction surveys can be used in developing fisheries management plans, they nod their understanding and abstract agreement, but counter with two questions. The first, almost rhetorical, goes something like, "Is there an explicit procedure for relating the survey findings to specific regulatory policies?" The second follows rapidly, "Why not get fishermen's input by letting them vote for their preferred form of regulation?"

The quick answers are, "No," and "Do that, too." Unfortunately, quick answers obscure the larger issues, and these are among the reasons social science has so little effect on the day-to-day business of fisheries management. Therefore, we want not only to answer the questions, but also to consider what their asking reflects about the manager's role in society and the social pressures the job entails.

The first question reflects the issue of accountability, or how managers must justify their decisions. Regier's (1981:5) comments about effective management notwithstanding, it seems most managers are reluctant to make qualitative interpretations from survey findings. Unless interpretation can be reduced to a cut-and-dried procedure linking specific findings with specific policy recommendations, the manager puts himself at risk, for he feels unable to justify his decisions should they be challenged in court. By contrast, social science advisors are relatively free in this regard. Thus, if job satisfaction data are to become a factor in fisheries management, it will be up to the social scientists who conduct

the surveys to draw the policy implications of their findings. No doubt, this will proceed on a case-by-case basis in the form of concluding recommendations relative to some specified list of policy alternatives.

Implications of the second question go to the heart of contemporary "middle-of-the-road" fisheries management philosophy (Larkin 1977:9). As Edwards (1981) observes, fisheries managers are caught in the middle of several interest groups, each having a legitimate claim to represent the public interest. The consumer wants quality food at minimal cost; the fish-processor/retailer wants to make a profit; and the fisherman wants both his livelihood and his way of life. In the midst of these potentially competing interests, it is the manager's responsibility to intervene in predator-prey (human-fish) relationships in such a way that the benefits derived from the common-property resource are equitably distributed. The key word here is "equitably," for that implies politics.

Under these social conditions, managers and management councils find it expedient to consult technical experts when designing specific intervention policies. Not only does this make sense on the grounds that scientists may better understand the biological, economic, and sociological aspects of fisheries, but also the mere fact of consultation helps to legitimize decisions when, and if, these are challenged. On the other hand, managers seem keenly aware that the most effective way to prevent political responses to their decisions is to bring the population most directly involved in fisheries into the planning process.

From the manager's viewpoint, putting regulatory schemes to a straw vote among fishermen has several advantages.

1. The process reveals straightforwardly the relation between fishermen's preferences and specific policies. Knowing this, managers can determine which among the options appearing on the ballot will cost the least politically.
2. To the extent that polling resembles true voting, it taps into the deeply held, democratic political philosophy of Anglo-America and buttresses an image of co-determination. Thus, although the straw poll is non-binding, it has the latent function of reinforcing the manager's image as a facilitator of the public will rather than autocratic decision-maker. This, in turn, may foster a more cooperative, less hostile relation between management and fishermen.
3. Despite superficial appearances to the contrary, managers have not relinquished any control over what becomes public policy, and this for several reasons:
 - (a) managers select which alternatives appear on the ballot;
 - (b) managers determine when the balloting occurs;
 - (c) when the polling shows fishermen sharply disagree with one another, managers are pretty much free to do what they want; and
 - (d) even when the polling does produce a clear winner, managers can always overrule it by referring to other aspects of the "public interest" that must be served.
4. Finally, straw polling is a relatively cheap (in terms of both time and money) means of obtaining fishermen's input.

Despite the so-called advantages enumerated above, there are at least two drawbacks that should be noted. Firstly, polls can be easily manipulated, subverting their expressed purpose to serve latent functions of impression management. If fishermen think this has happened, they tend to become recalcitrant and even more politicized. Secondly, even when used in good faith as a means of including fishermen's interests, the polling process presumes that fishermen understand the consequences of each regulatory alternative when casting their votes. This seems most

unlikely, for the relations between policies and their consequences are usually complex and very indirect. Unraveling these is a matter of special expertise, quite independent of expertise in catching fish.

In conclusion, although polls may provide valuable political information, they are no substitute for the job satisfaction approach advocated in this paper. Our approach seeks to include fishermen's interests as part of the scientific, technical information in terms of which *managers* (management councils) evaluate alternative regimes. In this sense, the job satisfaction approach appeals to a more "technocentric model" (Larkin 1977:9) of the manager's role in society. In particular, it recognizes that social science is not synonymous with politics, and it endorses the view that skillfully interpreted science is a better guide to policy than quasi-political processes, especially when only one of the relevant interest groups is invited to participate. Thus, job satisfaction surveys and straw polls provide different kinds of information and at different stages of the decision-process. For these reasons, our answer to the second question is, "Do that, too."

Conclusions

Our survey of job satisfaction in six New Jersey fisheries reveals several general points about the culture of fishing. Firstly, fishermen derive a considerable satisfaction bonus from their work. Fishing is not merely a means to an end, but is intrinsically rewarding. This shows up clearly when fishermen compare fishing with other work experiences and in the fact that fishermen are much more satisfied in terms of their self-actualization needs than they are with social or survival needs. Fishing is not merely a livelihood, it is a way of life.

Secondly, despite a core of similar responses, the objective characteristics of different fisheries give rise to strongly significant contrasts with respect to a variety of specific job satisfaction items. These distinctive profiles are obscured by global, summarizing questions, but come to light when fishermen are asked a wide variety of specific questions. In other words, job satisfaction is truly multi-dimensional and attempts to reduce it to a single unit-measure are ill advised.⁴

Thirdly, one's status on a boat significantly affects the nature of job satisfaction. In very broad terms, the more one is involved in the strategic aspects of fishing and has control over the means of production, the more rewarding the experience.

We hope these points regarding variability in and among fisheries will lay to rest the notion that fishermen, or even commercial fishermen, are a homogenous group. Although perhaps useful when comparing fishing with other occupations, such a crude categorization glosses over very significant differences. The specific harvesting techniques, work schedules, and divisions of labor associated with different fisheries, as well as one's status on board, give rise to distinctive subjective responses.

Social scientists should take this diversity into account when describing the culture of fishing. So, too, in the applied context of formulating regulatory policies, managers should consider not only how to achieve their conservation and economic goals, but also the specific nonmonetary rewards of fishing as these vary among different fisheries. Because the total configuration of rewards is fishery-specific, it is both naive and mistaken to think there is a single, best way to regulate fishing effort, for there is no regulatory tactic that applies equally well to all marine fisheries.

Finally, we hope to have made clear why opinion polls are not really substitutes for job satisfaction data. In a nutshell, opinion polls pertain to the political acceptance of management plans,

whereas job satisfaction surveys, along with biological and economic studies, comprise the scientific information from which professional managers and management councils should formulate plans. The two means of including "fishermen's input" should be seen as additive rather than substitutive.

NOTES

1. Pollnac and Poggie (1979), who initiated this style of survey research on fishermen's job satisfaction, include fishery, in the guise of an inshore-offshore categorization, and status on board in their analyses. The two variables play a more central role in Binkley's (1987) recent study of Nova Scotian offshore fishermen, and she, too, notes their usual disregard by social scientists.
2. We thank Donald T. Campbell for drawing our attention to the concept of "experiment-wise" adjustments to statistical confidence intervals.
3. It perhaps needs to be emphasized that our intention is to address the question of how job satisfaction data may be put to use in the process of policy development, that is, as part of the pre-implementation impact assessment. This is not to deny that such data may also play an important role in post hoc evaluations of already implemented policies.
4. This point applies equally to translations of nonmonetary rewards into dollar values. While such conversion may be necessary to fit overall levels of job satisfaction into economic optimization equations, it is guaranteed to obscure qualitative variations.

REFERENCES CITED

- Anderson, Lee G. 1980a. Necessary Components of Economic Surplus in Fisheries Economics. *Canadian Journal of Fisheries and Aquatic Sciences* 37:858-870. 1980b. Estimating the Benefits of Recreational Fishing under Conditions of Congestion: Comments and Extension. *Journal of Environmental Economics and Management* 7:401-406.
- Apostle, Richard, Leonard Kasdan, and Arthur Hanson. 1985. Work Satisfaction and Community Attachment among Fishermen in Southwest Nova Scotia. *Canadian Journal of Fisheries and Aquatic Sciences* 42:256-267.
- Binkley, Marian E. 1987. Working Conditions and Job Satisfaction among Nova Scotian Offshore Fishermen. Paper presented at the annual meetings of the Atlantic Sociology and Anthropology Association, Sackville, New Brunswick.
- Bishop, R. C. and K. C. Samples. 1980. Sport and Commercial Fishing Conflicts: A Theoretical Analysis. *Journal of Environmental Economics and Management* 7:220-233.
- Cattell, E. V., Jr., G. Grant, B. J. McCay, G. Charles, and W. R. Belvin. 1986. A State Supported Fisherman's Mutual Insurance Company. Report prepared for the National Marine Fisheries Service, NOAA, and the New Jersey Fisheries Development Commission.
- Crutchfield, James A. 1975. An Economic View of Optimum Sustainable Yield. In P. Roedel, ed., *Optimum Sustainable Yield as a Concept in Fisheries Management*, pp. 13-19. Washington, D.C.: American Fisheries Society.
1979. Economic and Social Implications of the Main Policy Alternatives for Controlling Fishing Effort. *Journal of the Fisheries Research Board of Canada* 36:742-752.
- Edwards, Robert L. 1981. The Excluded Middle - or the Need for a New Paradigm. *Fisheries* 6:12-16.

- Fricke, Peter H. 1985. Use of Sociological Data in the Allocation of Common Property Resources. *Marine Policy* 9(1):39-52.
- Gatewood, John B. and Bonnie J. McCay. 1987. Job Satisfaction in Six New Jersey Fisheries: A Statistical Summary. Report to the New Jersey Sea Grant Program.
1988. Job Satisfaction and the Culture of Fishing: A Comparison of Six New Jersey Fisheries. *Maritime Anthropological Studies* 1:103-128.
1989. Comparison of Job Satisfaction in Six New Jersey Fisheries: Implications for Management. *Human Organization* (in press).
- Gordon, D., D. W. Chapman, and T. C. Bjornn. 1973. Economic Evaluation of Sport Fisheries - What Do They Mean? *Transactions of the American Fisheries Society* 103:293-311.
- Gordon, H. Scott. 1954. The Economic Theory of a Common-Property Resource: The Fishery. *Journal of Political Economy* 62:124-142.
- Hilborn, R. and C. J. Walters. 1977. Differing Goals of Salmon Management on the Skeena River. *Journal of the Fisheries Research Board of Canada* 34:64-72.
- Ladner, R., L. J. Smith, S. Peterson, and J. Wilson. 1981. Socioeconomic Data Inventory: Northeast Fisheries. Woods Hole, Mass.: Woods Hole Oceanographic Institution.
- Larkin, Peter A. 1977. An Epitaph for the Concept of Maximum Sustained Yield. *Transactions of the American Fisheries Society* 106:1-11.
- Maslow, Abraham H. 1954. *Motivation and Personality*. New York: Harper and Row.
- McConnell, K. E. and J. G. Suzinen. 1979. Bioeconomic Models of Marine Recreational Fishing. *Journal of Environmental Economics and Management* 6:127-139.
- McFadden, James T. 1969. Trends in Freshwater Sport Fisheries of North America. *Transactions of the American Fisheries Society* 98:136-150.
- Orbach, Michael K. 1978. Social and Cultural Aspects of Limited Entry. In R. B. Rettig & J. C. Ginter, eds., *Limited Entry as a Fishery Management Tool*, pp. 211-229. Seattle: University of Washington Press.
- Paredes, J. Anthony. 1985. "Any Comments on the Sociology Section, Tony?": Committee Work as Applied Anthropology in Fishery Management. *Human Organization* 44(2):177-182.
- Pollnac, Richard B. and Susan Jacke Littlefield. 1983. Sociocultural Aspects of Fisheries Management. *Ocean Development and International Law Journal* 12:209-246.
- Pollnac, Richard B. and John J. Poggie, Jr. 1979. The Structure of Job Satisfaction among New England Fishermen. *Anthropology Working Paper #31*. Kingston, R.I.: University of Rhode Island.
- O'Toole, James, ed. 1974. *Work and the Quality of Life: Resource Papers for Work in America*. Cambridge, Mass.: The M.I.T. Press.
- Regier, Henry A. 1981. Optimum Use, Fisheries Management. *Fisheries* 6:4-7.
- Schaefer, Milner B. 1954. Some Aspects of the Dynamics of Populations Important to the Management of the Commercial Marine Fisheries. *Inter-American Tropical Tuna Commission Bulletin* 34:583-603.
- Smith, Courtland L. 1981. Satisfaction Bonus from Salmon Fishing: Implications for Management. *Land Economics* 57:181-196.
- Stevens, J. B. 1969. Measurement of Economic Value in Sport Fishing: An Economist's Views on Validity, Usefulness, and Propriety. *Transactions of the American Fisheries Society* 98:352-359.
- Wilén, James E. 1979. Fisherman Behavior and the Design of Efficient Fisheries Regulation Programs. *Journal of the Fisheries Research Board of Canada* 36:855-858.

Acknowledgments

This work is the result of research sponsored by NOAA, Office of Sea Grant, Department of Commerce, under Grant No. NA85AA-D-SG084, (Project No. R/F-18). The U.S. Government is authorized to produce and distribute reprints for governmental purpose notwithstanding any copyright notation that may appear hereon. We thank Carolyn Creed and Joyce Tiemens, graduate research assistants, and Dr. Lawrence Taylor for their excellent work as interviewers.

THE TRANSFORMATION OF FISHING COMMUNITIES: A PUBLIC POLICY PERSPECTIVE

Michael K. Orbach and Jeffrey C. Johnson
East Carolina University

ABSTRACT

Coastal maritime peoples the world over are experiencing a rapid transformation from largely rural, subsistence or commercial existences to more urbanized, leisure and tourism-oriented ones. The transformation is particularly evident in the United States. This paper will explore this phenomenon as it is occurring in South Florida, an area of particularly appealing leisure and tourism qualities. The paper is based on research carried out at the request of a number of federal and state agencies, and supported by university research programs. Conclusions are drawn concerning the appropriate roles for social science researchers in both applied research and policy-making positions.

Introduction

In the past quarter century coastal communities the world over have been undergoing an increasingly rapid process of transformation. Traditional industries have changed or have been displaced, physical ecosystems have been altered, often significantly, and the demographics of coastal populations have reflected a trend towards heavier and more diverse use of coastal and near-ocean areas (Miller and Ditton, 1986; Johnson and Metzger, 1983; NCMSC, 1984). In part because of their dependence on coastal environments, fishing industries and communities have been principal actors in this process. Changes in physical environments due to factors ranging from channelization to water pollution and changing social, economic and political circumstances have combined to exert a multitude of pressures on fishermen, their families, communities and industries.

The intervening variable for many of these changes has been the public policy process – specifically, those decisions made by public sector agencies that translate legislative mandates and the political economy of implementation into specific rules and regulations that affect the daily lives of coastal constituents, in this case fishermen (Maioio and Orbach, 1982). While the majority of the literature on social and economic change in fishing communities has focused on factors internal to the fishing industries and communities themselves (Wadel and Anderson, 1972; Smith, 1975), in the U.S. in particular it is increasingly the case that public policy decisions external to the fishery itself have significant effects on the prosecution of the fishing industry. The agents for such decisions and their activities are truly myriad: The U.S. Army Corps of Engineers (channels, jetties and docks); the U.S. Environmental Protection Agency and state environmental regulatory agencies (water quality, aquatic habitat, waste disposal); the U.S. Food and Drug Administration (product quality and

food handling processes); the U.S. Coast Guard (vessel inspections and drug interdiction). All of these agencies, and many others at the local, state and federal levels set public policy that often has significant effects on the fishing industry in addition to the effects of direct regulation of the industry through fishery policy and management.

In this paper we will explore selected examples from public policy processes as they have operated in South Florida, and in particular in the Florida Keys with respect to the fishing industry. Our emphasis will be on the ways in which public policy processes in a variety of sectors, both land- and water-based, have combined with on-going processes of social and economic change. Our premise is that both land- and water-based policies must be examined to account for present trends in any given coastal sector such as fisheries.

The Policy Context

The Florida Keys are a chain of low-lying islands that stretch over 100 miles from the southern tip of the Florida mainland in a south-southwesterly direction to Key West, the last island – or “key” – in the chain. Although the Keys are a relatively isolated physical environment, they lie in close proximity to a major metropolitan area – Miami – and are the object of a large tourist visitation and considerable attention in popular myth and fancy (Johnson and Orbach, 1988). The history of Hemingway, Tennessee Williams and other luminaries has combined with the proximity to Cuba (90 miles) and attendant large Cuban exile presence and the reputation as a haven for both sportsmen and pirates to give the region its unique flavor (Little, 1985).

In 1975 commercial fishermen comprised 14% of the total work force in Monroe County, a percentage which was rising rapidly (GMFMC, 1982). These fishermen formed a much more important part of the historical Keys culture and economy than even this figure would indicate. Besides the economic multipliers that might be applied to the employment and ex-vessel landings of those fishermen, fishing – both commercial and recreational – played an important part in the traditional economy of the Keys. The fishermen themselves segment into “Conchs” – traditional Keys residents – of Anglo, Hispanic and Black Bahamian descent, more recent Cuban immigrants (immediate post-1959 Cuban Revolution and Marielitos) and recent Anglo migrants many of whom are part time or “gentlemen” fishermen (Orbach and Johnson, 1987). The majority of the fishermen fish in ‘annual rounds’, moving from one fishery to another by season and depending on the availability and price of the various fish species and other factors. Despite the variability and heterogeneity of their fishery and fishing community, commercial fishing has been a central feature of Keys life for over a hundred years.

On a more general level, however, the people in the Keys – and in particular the fishermen – are at the nexus of a complex political economy (Meltzoff, 1987) and a complex set of overlapping political and regulatory jurisdictions that create a good deal of conflict and competition that overlays the already complex socio-cultural and political-economic questions. In the general public policy arena there are local, state and national jurisdictions and authorities. In the fisheries sector there are multiple state and federal authorities. Although a complete analysis of all of these jurisdictions and authorities is beyond the scope of this paper, we will examine a selection of these issues at each level.

The County Level

The entire Keys region lies within, and in fact comprises most of, Monroe County, Florida. Because of our nation-wide tradition of leaving most land use decisions such as planning and zoning policy, even under such national laws as the Coastal Zone Management Act of 1972, under local control (Archer and Knecht, 1987) the authority and responsibility for virtually all land use policy lies with Monroe County. This local authority and responsibility occurs within a hierarchical set of policy authorities discussed further below, but even within this hierarchy the degree of policy flexibility for the county is great. Within the county there are municipalities such as Key West that have their own jurisdictions and authorities, but the majority of land area of the Keys falls under direct county jurisdiction.

In 1986, Monroe County produced a land use plan (MCBC, 1986) that had potentially severe effects on the commercial fishing industry in the Keys (Edwards, 1987a; Meltzoff, 1987; Johnson and Orbach, 1988). Under this plan, zoning restrictions were placed on the storage of fishing equipment and on the locations at which fishery products could be landed or processed. The plan contained "grandfather" provisions that allowed present uses of certain properties subject to the continued use by the present owner of the property. Once the property is sold, the subsequent use must conform to that specified in the land use plan (MCBC, 1986). Commercial fishing-related uses were restricted to many fewer parcels than are presently in use for that purpose, and the impact on the fishing community over the next several years is predicted by many to be severe.

The justification for the restriction on commercial fishing in the land use plan is clearly related to logic underlying public policy trends in coastal areas throughout the U.S. According to this logic, leisure and tourism development (the predominant use under the plan) has economic multiplier effects that far outweigh those of the commercial fishing industry, and therefore the land should be allocated to the use with the highest economic potential. In addition to this is a strong socio-political factor: A large proportion of the new residents coming to the Keys are retirees or upper income individuals who value their new location for its aesthetic and recreational, not commercial opportunities (Meltzoff, 1987). In general, such residents prefer not to live in close proximity to commercial operations, which generates serious planning problems on the small land masses of the Keys -- there is simply not enough room to separate the different uses. This phenomenon applies to water-adjacent property nationwide.

The State Level

As we pointed out above, much of the principal authority for land use policy under the states' coastal management programs, including Florida's, is left to local governments with some form of review function by state and national governments (Archer and Knecht, 1987). However, the state has a significant amount of public policy authority relevant to the residents of the Keys in areas other than land use. Florida, like many other states and the federal government itself, experienced a boom in environmentally-related legislation in the late 1960's and throughout the 1970's (Cicin-Sain, 1982; Florida, 1984). In 1975, the Governor declared the Keys an "area of critical state concern", which initiated the activity that eventually led to the Monroe County Land Use Plan (Meltzoff, 1987). Virtually all of this legislation and policy directive, although directed primarily at subjects other than direct

fishery regulation (i.e., water quality, environmental planning, tourism development), had effects on the fishing industry.

For example, public policy decisions on infrastructure investment for roads and bridges (particularly important in the Keys, which are basically a string of islands connected by a 108-mile bridge!) are made by the state and carried out using substantial amounts of federal dollars. Such infrastructure decisions can be crucial determinants of the fate of fishing and other industries and communities (Maiolo and Tschetter, 1982). Facilities such as docks and marinas are critical to commercial as well as recreational water uses, and they are expensive items whose initial capital requirements are a major impediment to their development (Murray, 1987).

Leisure and recreation development is a second example. "Tourism is generally conceded to be the most important sector of the Florida economy" (p-40), and "the most popular places to visit are coastal areas" (p-41). "Florida must protect the integrity of its [tourism] product" (p-41) (Florida, 1984). Such policy statements translate into specific regulatory actions that often serve allocative purposes for coastal space and resources, purposes different from those of the commercial fishery. This situation is not unique to Florida; most of the other Gulf of Mexico states, such as Texas, are experiencing similar trends (Maril, 1983). In addition, private environmental organizations such as the Florida League of Anglers, the Florida Conservation Association and the Gulf Coast Conservation Association have had powerful voices in the conservation and allocation debate, to some extent balanced by the commercially-oriented voice of the Organized Fishermen of Florida.

Because of the nature of the coastal and ocean ecosystem in the area of the Keys a higher proportion of the valuable commercial and recreational fisheries are prosecuted within the three mile territorial sea controlled by the State of Florida. Thus the Florida Marine Fisheries Commission and the Florida Department of Natural Resources exert important policy and regulatory authority over fisheries -- and fishermen -- in the Keys. The state maintains regulations on all of the important commercial and recreational species: mackerels, spiny lobster, billfish, stone crabs and other fin- and shellfish.

Many of these state regulations address allocation of fishery resources in the same way that the Monroe County Land Use Plan addresses the allocation of land resources. The basic objective of the fishery policy and management agencies is conservation of the fish species and to some extent protection of the fish habitat, but fishery management clearly takes place in a socio-political context and both the Florida and federal fisheries legal mandates include provision for taking economic, social and cultural factors into account in management decisions (Orbach, 1978; Cao, Orbach et al 1978). Thus, for example, the Florida Marine Fisheries Commission has the authority to recommend the designation of certain species as "gamefish", which allocates any species so designated entirely to recreational fishermen. Several such recommendations have been made and approved in Florida. Allocation can also occur through gear restrictions, such as Florida's ban on fish traps in state waters. Certain areas are designated as preserves or parks, and others are reserved for only certain types of fishing gear or for fishing during designated times. Taken together, such policy and management actions have the cumulative effect of allocating the use of the marine environment and its resources in Florida to leisure and recreational interests as a matter of public policy. Meltzoff has referred to this process as the "naturalization of the political economy" (Meltzoff, 1987).

The National Level

It is not only public policy decisions made in the Monroe County or in Florida that affect Keys residents, including commercial fishermen, but decisions made by regional or national bodies under federal authority that have significant effects as well. The principal example in the fisheries arena is that of the Department of Commerce and the Regional Fishery Management Councils.

The Magnuson Fishery Conservation and Management Act of 1976 created eight Regional Fishery Management Councils that have the responsibility to develop fishery management plans for all fishery resources which occur predominantly in the federal Exclusive Economic Zone, from three to two hundred miles off the U.S. coastline. The management plans developed by these Councils are reviewed, approved and implemented through federal regulation by the National Marine Fisheries Service, a subagency of the National Oceanic and Atmospheric Administration (NOAA), itself a subagency of the U.S. Department of Commerce (Kelly, 1978; Knight, 1978).

Florida is involved with two of the eight Councils – the South Atlantic Fishery Management Council (SAFMC), whose jurisdiction runs from the Virginia-North Carolina border to the East coast of Florida, and the Gulf of Mexico Fishery Management Council (GMFMC), whose jurisdiction runs from the lower East coast of Florida to the U.S.-Mexico border. Florida has representation on both of these Councils, and many of the fishery management plans that affect South Florida fisheries have been developed jointly between these two Councils (Coastal Pelagics (mackerels); Spiny Lobster; Billfish).

The relationship between state and federal policy and regulation is an interesting one. Although it has been found that states have the ability to regulate their residents even when the resident is outside of state waters, similar to the ability of the U.S. to regulate its citizens even when they are out of the country, the MFCMA takes precedence over state law outside of three miles. In addition, there is a "pre-emption" section of the MFCMA that allows the Secretary of Commerce to apply federal rules in state waters if it is found that the state either has no regulations or has regulations deemed not in the interest of conservation (Taylor and Rieser, 1983).

In general, the federal management process is more administratively and legally rigorous in that there are a wider variety of standards and procedures that apply in the federal rule-making process, such as the National Standards of the FCMA and the requirements of the federal National Environmental Policy Act. This, combined with the more diverse nature of the federal constituency compared to Florida, or more specifically to the Keys, results in federal regulations that are generally less biased towards leisure and recreation interests. Some claim that federal regulations are also less conservation oriented in that they allow more commercial take of certain resources than should be allowed under a strict conservation regime, and it is clearly true that many of Florida's regulations are more restrictive on the commercial fishing industry than the federal regulations (see, for example, GMFMC, 1987). The ideal situation would be for the state and federal regulations to be compatible if not identical. This is not the case although the tendency has been towards more compatibility with the main area of difference being the level of conservation standard and the degree of allocation of resources between commercial and recreational interests.

There are other federal policy arenas that affect commercial fishermen in the Keys as well. Foreign nationals cannot captain a boat of over five net tons (approximately 30 feet long) in the

U.S., a rule that affects many of the immigrant Cuban fishermen in the Keys (Cruz, 1987). Policies and regulation on everything from federally subsidized coastal flood insurance to social security programs affect many Keys fishermen, again with the tendency being away from programs that support or assist more economically-marginal individuals, a category into which many commercial fishermen clearly fit. Fishery management plans under the MFCMA are currently required to assess the relationship between those plans and other policies and regulations such as approved state coastal plans under the Coastal Zone Management Act and policies developed under the Marine Protection, Research and Sanctuaries Act, the Lacey Act and the Endangered Species Act.

One recent example from a non-fisheries environmental policy arena that may have a major effect on the fishing industry is a new federal requirement for all boats using shrimp trawls in the South Atlantic and Gulf regions to install Trawl Efficiency Devices (or, stemming from their derivation, "Turtle Excluder Devices"). We say 'non-fisheries' because the impetus for the regulation comes from an entirely separate federal environmental policy mandate – the Endangered Species Act (ESA). Under the ESA, any species on a federally-approved list of threatened or endangered species cannot be killed or affected in any way by human activity. Because shrimp trawls occasionally catch turtles in their nets, NOAA (which besides fisheries also administers the marine jurisdiction of the ESA) recently issued regulations requiring that all shrimp trawls used in the ocean in the South Atlantic and Gulf install and use TED's. According to most fishermen this is a costly, dangerous, unnecessary and probably unenforceable regulation.

Besides the practical difficulties with TED's, many in the fisheries sector claim that the new regulations are indicative of a new approach being used by environmental groups to curtail commercial fishing activity in general – the use of a federal law intended for one purpose (to protect endangered species) for another different purpose (the curtailment of commercial net fishing in general). The new regulations are now the subject of lawsuits from both the private (shrimpers) and public (Gulf coast states) sectors. Aside from the involvement of the fishing industry, the state response is indicative of an entire set of new state coastal and ocean policy initiatives intended to reassert the right of the states to be full partners in marine policy off their coasts (CS, 1985).

Discussion

What we have in the Keys, then, is a case of a group of fishermen who fish for a variety of species from bases in a relatively isolated, but increasingly urbanized environment. Completely aside from their fishing activity itself – the availability of the fish, the market price, the costs of fishing gear and supplies – these fishermen are affected by a plethora of public policies that converge on the Florida Keys. These public policies are driven by demographic changes (leisure and tourism development), public health concerns (water quality and seafood processing), environmental restrictions (TED's, parks and preserves), fiscal frugality (the difficulty of infrastructure development), and U.S. immigration and labor policy (restrictions on Cuban fishermen) as well as those policies and regulations directed specifically towards their own industry's principal activity – fishing. And, some aspects of each of these public policy arenas are in evidence at the local, state and national levels.

Whether these factors will ultimately overwhelm those factors directly relevant to the fishermen's direct operations – the availability of fish and the internal economics of fishing – is not clear. It is clear that fishing is becoming increasingly "gentrified" in the Keys (Johnson and Orbach, 1988), with a trend towards participation by only those who have outside, non-fishing sources of support or income. Such a trend has been seen in other areas of the country (Edwards, 1986, 1987b), where the non-fishing same pressures we see today in South Florida have essentially driven commercial fishermen out of the picture.

Various adaptations to these circumstances by the commercial fishing industry have been noted, from increased politicization of the commercial fishing industry (Meltzoff, 1987) to form a more effective lobby for sympathetic legislation to proposals for a more controlled, 'professionalized' fishery, perhaps under a 'limited entry' system (Orbach and Johnson, 1987). At this point it is not clear whether any internal dynamic within the industry itself will be sufficient to compensate for the other, external forces we have referred to above.

What is clear is that the fishing industry is only a small part of an increasing expanding and increasingly complex coastal environment. In an analytical sense, the challenge is to go beyond traditional cultural ecology approaches (McCay, 1978) towards the formal incorporation of broader studies of the role of the public policy process and its actors (Nader, 1975; Orbach, 1980). In a practical sense, when we speak of the involvement of any particular sector in public policy discussions, we must investigate all of the potential effects of all public policy arenas on each sector to obtain a true picture of the cumulative effects of policy decisions on the various constituencies. It is not just the Florida fishery agencies whose actions affect Florida fishermen – it is individuals and agencies throughout Florida, in South Carolina, Washington, D.C. and many other locations whose actions have important effects on South Florida's commercial fishermen. There is, of course, a practical limit to the extent to which we can trace or account for such effects, to the extent to which we can assign causality. We can, however, be expected to look for and take into account important effects in clearly related policy sectors.

References

- Archer, J. and R. Knecht, 1987. The U.S. national coastal zone management program – problems and opportunities in the next phase. *Coastal Management* 15:103-120.
- Cicin-Sain, B. 1982. Managing the ocean commons: U.S. marine programs in the seventies and eighties. *Marine Technology Society Journal* 16:6-19.
- Coastal States Organization, 1985. *America's coasts: Progress and Promise*. Washington, D.C.: Coastal States Organization.
- Cruz, M., 1987. *The Cuban fishermen of Key West*. Master's Thesis, Graduate Program in Anthropology, State University of New Jersey, New Brunswick, NJ.
- Edwards, M., 1986. Preserving the working waterfront: Protecting working harbors from "development". *National Fisherman* 67:2-64.
- Edwards, M., 1987a. Florida Keys fishermen are being zoned out of their own backyard. *National Fisherman* 68:25-28.
- Edwards, M., 1987b. Dockage struggle in San Diego. *National Fisherman* 67:8-33.
- State of Florida, 1984. *The proposed Florida state plan*. Tallahassee: Office of the Governor.
- Gulf of Mexico Fishery Management Council, 1982. *Fishery management plan, environmental impact statement and regulatory impact review for spiny lobster in the Gulf of Mexico and the South Atlantic* (joint with the South Atlantic Fishery Management Council). Tampa: Gulf of Mexico Fishery Management Council.
- _____, 1987. Amendment number one to the spiny lobster fishery management plan for the Gulf of Mexico and South Atlantic (joint with the SAFMC). Tampa: Gulf of Mexico Fishery Management Council.
- Johnson, J. and D. Metzger, 1983. The shift from technical to expressive use of small harbors: The "play-full" harbors of Southern California. *Coastal Zone Management Journal* 8:319-339.
- Johnson, J. and M. Orbach, in press. A fishery in transition: The impact of urbanization on Florida's spiny lobster fishery. *City and Society*.
- Kelly, J., 1978. The Fishery Conservation and Management Act of 1976: Organizational structure and framework. *Marine Policy* 2:30-37.
- Knight, G., 1978. Management procedures in the U.S. fishery conservation zone. *Marine Policy* 2:22-30.
- Little, E., 1985. One hundred years of commercial fishing in the Florida Keys. Unpublished manuscript, Key West, FL.
- Maiolo, J. and P. Tschetter, 1982. Infrastructure investments in coastal communities: A neglected area in studies of maritime adaptations. In J. Maiolo and M. Orbach, eds., *Modernization and marine fisheries policy*. Ann Arbor: Ann Arbor Science Publishers.
- Maril, R. 1983. *Condos and cannibals: Texas and Texans along the coast*. College Station: Texas A&M University Press.
- McCay, B., 1978. Systems ecology, people ecology and the anthropology of fishing communities. *Human Ecology* 6:397-421.
- Meltzoff, S., 1987. The cross-currents of occupation, ethnicity and class: Conservation and conflict in the Florida Keys. Unpublished manuscript, Rosenstiel School of Marine and Atmospheric Science, University of Miami.
- Miller, M. and R. Ditton, 1986. Travel, tourism and marine affairs. *Coastal Zone Management Journal* 10:369-386.
- Monroe County Board of Commissioners, 1986. *Monroe County comprehensive plan*. Key West: Monroe County.
- Murray, T., 1987. Fish for food or fish for fun: A simultaneous valuation model. Proposal to the National Coastal Resources Institute, Newport, OR.
- Nader, L., 1972. *Studying up*. In D. Hymes, ed., *Reinventing anthropology*. New York: Pantheon Press. North Carolina Marine Science Council, 1984.
- North Carolina and the sea: An ocean policy analysis. Raleigh: Office of Marine Affairs, NC Department of Administration.
- Orbach, M., 1980. The human dimension. In R. Lackey and L. Nielsen, eds., *Fisheries management*. London: Blackwells Scientific Publishers.
- Orbach, M., J. Cato et al, 1978. *Social and economic aspects of fisheries management*. Charleston: South Atlantic Fishery Management Council.
- Orbach, M., and J. Johnson, 1987. *Limited entry alternatives for the Florida spiny lobster fishery*. Report to the Gulf and South Atlantic Fishery Management Councils.
- Smith, M.E., 1975. *Those who live from the sea*. Minneapolis: West Publishing Company.

Taylor, R. and A. Rieser, 1983. Federal fisheries and state coastal zone management consistency: Florida tests the waters. *Territorial Sea* 3:1-12. Portland: Maine Marine Law Institute.

Wadel, C. and R. Anderson, 1972. *North Atlantic Fishermen*. St. Johns: Memorial University of Newfoundland.

DISCOVERING COMMUNICATION NETWORKS IN MARINE FISHERIES: IMPLICATIONS FOR MANAGEMENT

John R. Maiolo and Jeffrey C. Johnson
East Carolina University

ABSTRACT

It is widely recognized that effective fisheries management greatly depends upon the extent to which managers and their constituents communicate with each other. Communication networks in marine fisheries are easily determinable and can facilitate important two way information flows between managers and the targets of marine resource regulations. This paper demonstrates a workable methodology for identifying networks; examines the various ways in which people are located within the networks; addresses the question of variables available to predict location and information flow; provides an alternative protocol for comparatively tight budgets; and specifies how managers and fishermen can benefit from such information. The research is based on data gathered from the king mackerel fishery in the Southeast and, to a limited extent, the shrimp fishery. Some of the data from the shrimp fishery involve fishermen who pursue the resource in the Gulf of Mexico.

Introduction

Under the rubric "upward aggregation of responsibility and authority," Maiolo and Orbach take note of the growing "...involvement of people and entities increasingly farther removed from the fishery resources, fishing activity and fishing communities themselves...." This is especially true in regard to decisionmaking affecting the allocation of marine resources (1982:3). The most telling example of such a process is the Magnuson Fishery Conservation and Management Act (MFCMA) of 1976 (which has been revised several times since then). Justification for the extension of national jurisdiction over marine resources, in addition to conservation, was based on the desire to manage the distribution of benefits which derive from the exploitation of such resources. Clearly, technological development affecting harvesting, processing and distribution; and the related increased fluidity (e.g., Orbach 1982:6).

An important aspect of this shift of control from local to regional or national groups involves adaptive responses on the part of fishermen, themselves. Fishermen's adaptations involve not only the process of adopting new physical materials, objects and organizational technologies in their occupation and in their lifestyles, but also the process of learning to work within the newly created political and administrative system, and having to deal with the constraints (and, we would add here, opportunities) imposed by the upward aggregation of management regimes (Maiolo and Orbach 1982:7). To this, one must add that a similar process must occur at the management level itself, if newly developed policies are to be judged as effective and equitable by

those affected by the policies. Pollnac and Littlefield (1983:226) note that "Perceptions of rules as 'bad' or 'unfair' can have negative sociocultural consequences." They go on to cite evidence of noncompliance with fishery regulations as an important consequence. Wilson (1983) found a similar pattern among clam fishermen. In this case, patterned deviance, ignored by law enforcement officials with local community ties, resulted, when confidence in the basis for regulations (and the regulators!) was low.

Clearly, the nature and frequency of the communication among the various players in the newly developed management system will play a key role in both the perceptions and the reality (they are not always the same, as we know) of the dynamics and outcomes of policy decisions. This problem area was recognized from the outset in the development of the MFCMA, as evidenced by its structure, to wit: the creation of regional councils, composed of representatives of various other management bodies, different user groups, and consumer groups, and which have remained intact in spite of attempts to combine some of them; and the statutory mandates to have Scientific and Statistical Committees, and advisory groups involving various interest groups. Despite the enabling legislation, in reality, the newly created system has several impediments to the facilitation of communication between managers and their constituents. For example, Gale and Miller have noted,

...communication in the fishery system tends to be disjointed and incomplete. For example, nonfishing constituencies have remained peripheral to the decisionmaking process. Communication among major constituencies is unequal in both type and amount. Councils are bombarded with evidence and testimony from fishing interests, yet these groups and their representatives rarely interact with scientific and technical personnel. (1985:69-70).

The absence of effective management/constituency communication has been countered, in some cases, by the emergence of fishermen organizations (Pollnac and Littlefield 1983). Nevertheless, even in those cases, communication problems exist insofar as such examples were "not to the liking of managers (233)." Probably, too, such an arrangement whereby fishermen have to force their way into the process isn't to their liking either!

In fairness to the management groups, historically, councils have had rather limited frameworks at their disposal to choose participants for the various roles defined under the MFCMA. The result has been selections which, regardless of intent, have been open to criticism in the nature of political cronyism, homogeneity of philosophy (to the exclusion of competitive ideas, e.g., the controversy over the balance of recreational and commercial interests), and diversity of skills, such as, for example, the number of social scientists on a technical committee, or on the council staff.

In 1985, under a continuing technical assistance contract between East Carolina University and the South Atlantic Fishery Management Council, in Charleston S. C., which is charged with the responsibility of managing fisheries in the Southeastern portion of the FCZ, ECU social scientists were asked to address the problem of identifying communication networks in the king mackerel fishery in the Southeast, and search for an alternative to the usual survey technique, which was viewed as too costly and time consuming. Further, we were asked to examine protocols associated with identifying specific opinion leaders and centrally located players, and to provide the council with a list of people who could enhance a two-way communication process between the fishery and the council. Utilizing such information, the intention of the council

was to appoint representatives of the industry on key advisory committees. The research group decided to take the opportunity farther by establishing a number of different protocols for identifying central figures which council staff, or other researchers, could utilize in other fisheries.

The project first concentrated on North Carolina king mackerel fishermen. Subsequent funding was made available to continue the research in South Carolina, Georgia, and Florida. Then, funding was made available in late 1987 for similar research in the shrimp fishery. This paper reports on the findings, the research protocols, and the management implications. We will focus on the North Carolina king mackerel research, reporting on the rest of the project to the extent that confirmation and/or rejection of our points is illustrated with the use of such data. The shrimp study is not yet completed, so we are limited in our reporting of findings from that effort.

Methods

Sites and Fisheries.

As noted previously, the research was undertaken initially in North Carolina, and focused on communication networks in the king mackerel fishery. That fishery was chosen because of the salient problems at the time, namely, overharvesting in the Gulf waters, the potential for overharvesting in the South Atlantic waters, debates surrounding the biology of the stock(s), e. g., whether one or two separate stocks existed, and competition between commercial and recreational fishermen (SAFMC/GMFMC, Fishery Management Plan and Plan Amendment, 1983 and 1986). Two reports resulted from our initial research (Johnson and Maiolo, and Maiolo and Johnson 1986). It was then decided to continue the study to include South Carolina, Georgia and Florida (Maiolo and Johnson 1987). Concern about the status of the shrimp fishery in the Southeast, in conjunction with a desire to update a previously published profile on that fishery (SAFMC November 1981) prompted the council to request a replication of the network study for the shrimp fishery in North and South Carolina, and then in Georgia and Florida.

We approached each fishery from the standpoint of domains and sectors. For example, we view the mackerel fishery in North Carolina as having the two primary domains of recreational and commercial. Any further subdivisions within this designation are referred to as sectors within each industrial domain. The recreational domain includes charter/headboat and "pure" recreational sectors. The commercial domain includes harvesting and dealer sectors.

How The Respondents Were Chosen. Determination of The Networks.

Opinion leader research has a distinguished history in the social sciences (see, for example, Hovland, et. al. 1953, Rogers 1977, Lauman and Pappi 1977, and Burt 1983. Also, see Maiolo 1965, for an extensive listing and discussion of classic research dealing with attitude and opinion change). Social network analysis has been of particular value as an analytical approach (see Barnes 1972, Burt 1983). Systems of relationships among actors are seen to have a number of structural characteristics, such as graph centrality and density. Also, actors within a system are structurally positioned in that they vary in the extent to which they are the focus of relations with others. Thus, it is assumed that an actor who is central has high amounts of power, prestige, access to

information, brokerage capacity, and so on. As such, centrally located actors can be very useful in the exchange of information, and the capacity to influence the actions of others, as in the case of fishery regulations.

In attempting to capture the network of fishing participants, we employed a snowball sampling technique similar to those discussed by Goodman (1961) and Erickson (1979). The procedure involves the random selection of an initial set of actors. Each actor would then be asked to identify k other actors in which they engage in communication (e.g., who are the people with whom you most frequently discuss matters concerning mackerel [shrimp] regulations?). The people named in the first wave, who were not interviewed in the initial sample, would then be asked to name k other people with whom they share the specified communication relationship. This would then be repeated for s stages or waves as determined by the research design for a specific problem, e.g., until a high degree of network closure is reached.

Much consideration was given to the decision regarding the fixed number (k) of individuals to be named in each additional stage. Although others have used this sampling procedure without a fixed number of choices, Goodman (1961) provides some statistics for making inferences about a sample when the number of choices are fixed. Based on the successful implementation of our initial work, we set k equal to three. There are, of course, advantages and disadvantages to this procedure. However, a fixed k of three choices alleviates a high degree of bias that would be introduced because of individual variations with respect to the relevant specified network relations. In a procedure with an unspecified k , some respondents would be inclined to provide a large number of choices (or small number) that would display a high degree of variance with respect to strength of network ties. By reducing the number of choices to three we hoped to reduce the amount of variance with respect to these sociometric strengths (see Erickson 1979 and Johnson, et. al. under review for a discussion of this and other factors related to snowball sampling). In pretests of this procedure we experimented with a combination of unlimited and fixed choices. We finally chose a procedure which asked informants to name three individuals with whom they "talked to most often about the mackerel fishery." This procedure was viewed as an aid to decrease the bias which might be introduced by informant variance.

In addition to gathering data on proposed names of central people, selected attributes of each individual in the samples were compiled. These included occupation, age, level of education, sector of the industry predominately involved in, and so on. We added some variables as we learned from previous field work, and as we shifted from the mackerel to the shrimp fishery. In the former, we included respondents from both the commercial and recreational domains, and regardless of the location of fishing and size of vessel. In the latter, we restricted the research to the commercial domain, and vessels of 45' in length or greater. This would capture mainly FCZ vessels, and was conducted in such a manner in order to keep the respondent size to a level commensurate with budget constraints.

The purpose of this portion of the research was two-fold. First, the attributes could be compared to measures of centrality within a communication network in order to discover patterns of association. So, for example, it may be the case that major dealers in a particular sector are the most central links in the network. These findings may then be applied in other similar contexts without having to employ any extensive snowball sampling. Second, we were interested in producing a matrix of transition probabilities. This matrix will allow us to make structural inferences about the flow of information between groups in a sector delineated on

the basis of known attributes. Transition probabilities are defined as the ratio of choices within a delineated group to choices made outside the same group. We are interested, for example, in identifying a group within an industry or fishery sector that has the highest ratio of outside ties. Once a group is identified that has many ties outside their own group, it may be most efficient to channel information through them. In addition, we would be able to investigate the existence of status levels within and between sectors and the characteristics of the flow of information between and among such statuses (e.g., information may only flow from low statuses to high statuses).

Third, in the absence of specific network information, and the names of actors, information about the characteristics of centrally located people would be useful to managers faced with the problem of selection of advisors. Often, managers are faced with severe time and budget constraints. Our objective was to provide them with a useful selection tool under such conditions. The danger, of course, is that this protocol might be utilized as a priority procedure, instead of an alternative. As we develop the narrative for this procedure, we caution the reader to view the results as very tentative.

The initial data gathering in North Carolina in the king mackerel fishery utilized both telephone interviewing, and interviewing fishermen at their homes and work places (e.g., docks). We found no difference in quality, and no difference in the number of refusals. We did have problems with some fishermen not having telephones or listed numbers. We designed the out of state studies to involve only telephone interviewing, because of cost savings. Had we attempted to do on site interviewing, the costs would have been so high, even with trained, local people, that the research could not have been undertaken.

Refusal rates and rates of no contacts remained at an acceptable level (less than five percent) until we encountered problems in Florida during the data gathering phase of the shrimp research. Fishermen were found to be so excited over the Turtle Excluder Device (TED) issue (see Fee, in *National Fisherman*, September, 1987), and were so angry with both the South Atlantic and Gulf Councils, that many refused to participate.

Project interviewers were trained for several hours in the delivery of the instrument, and then monitored by the senior staff, or experienced interviewers. The most frequent problem encountered was eliciting names (nominations). This became an increasing problem as we entered the Florida study dealing with the shrimp fishery. Interviewers were trained to prompt the respondents, and explain the need for the names, but not to press beyond that point.

Findings

Mapping The Network: The King Mackerel Fishery in North Carolina.

A sociomatrix was constructed based on interviews with 238 fishermen. This 238 x 238 binary matrix was subjected to a structural equivalence algorithm similar to those discussed by Burt (1983) and Johnson (1986). The resulting Euclidean distance matrix was then subjected to a clustering procedure in order to identify sets of structurally equivalent actors (status/role sets). The clustering analysis was used to help construct the sociogram in Figure 1.

Table 1 identifies individuals having primary importance (e.g., centrality) in the network. In addition, the ratio of outside ties to the total number of ties is given for each. The manner in which these data can be used is largely determined by any number

of different questions. These questions may relate to theoretical notions concerning centrality or prestige, the degree to which an actor has wide ranging social ties, network density, inter-clique communication, or some other idea concerning communication behavior. As an example of one of the many ways this information can be used, we will briefly explore the utility of centrality and the ratio of "outside" ties to the total number of ties for each of the individuals in Table 1.

Centrality has three basic conceptual and graph theoretic definitions (Freeman et. al. 1979). The first of these concepts is based on the number or degree of ties an actor has within a system of actors and is labeled point centrality. Related to this is relative point centrality which adjusts for the size of the network. The second is point betweenness which determines the extent to which an actor is located between other actors in a network. The third is based on the centralization of the entire network, and reflects the degree to which the network is dominated by a single point. These three forms of centrality have implications with respect to control, independence and the amount of activity within a network.¹

If we are interested in central actors who maintain a large number of ties with individuals who are not from the same domain or sector of the industry, we can measure this by simply counting the number of ties to actors not of the same domain or sector and then dividing that number by the total number of ties. This ratio of outside ties to the total number is presented in Table 1 for each of the central actors (similar in nature to the transition probabilities discussed earlier). Figure 1 is the visual representation of the network derived from the data. As is quite evident, actors from the charter/headboat sector tend to dominate the network in terms of centrality and diversity of ties.

An interesting feature of the structure of this network is the fact that each of the central actors is directly linked to one or more other central actors. In the cases where there are no direct links (actors 174, 176, and 008), other central actors are no more than three links away. Thus, the central actors within this network are generally well connected.

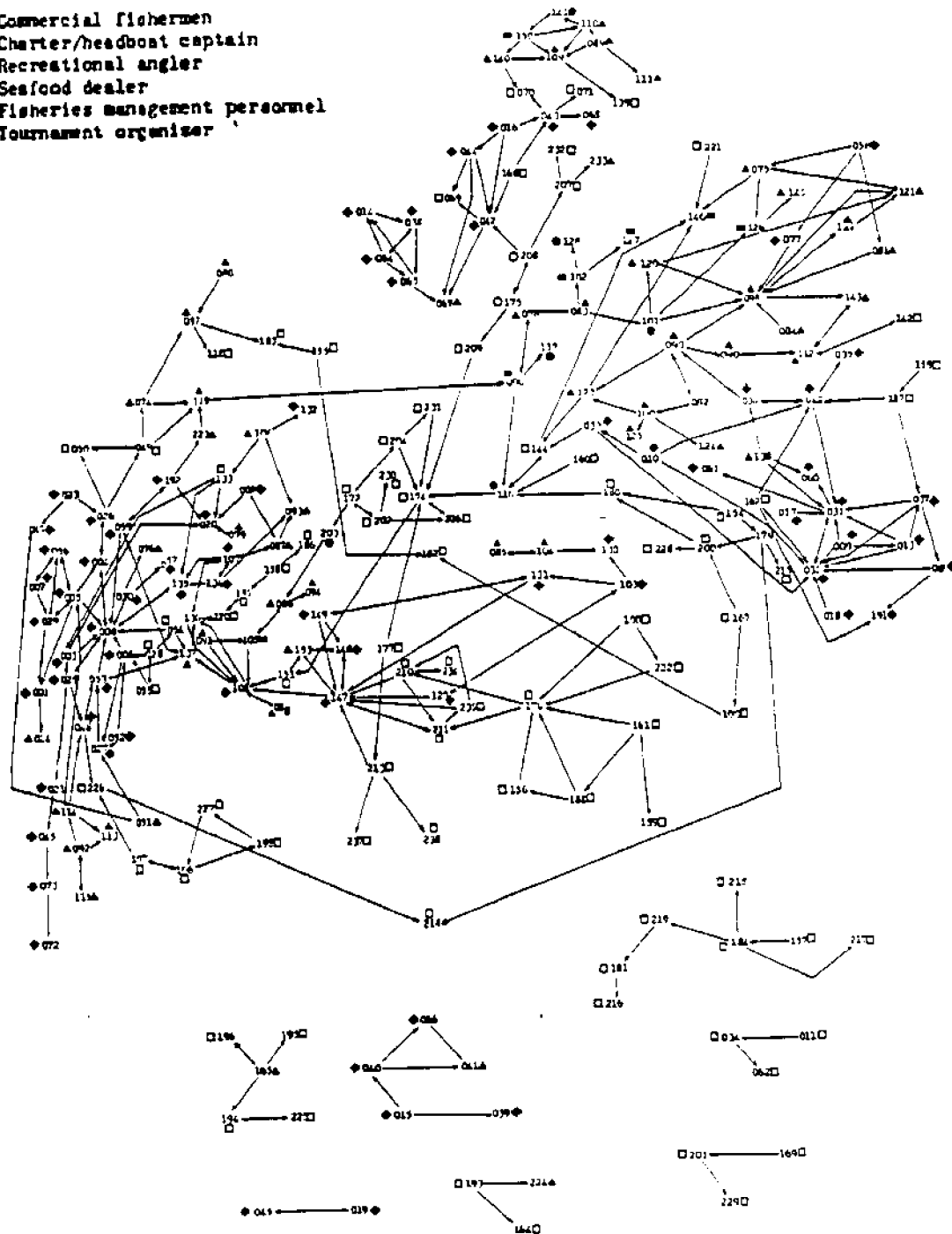
This has implications in terms of the flow and nature of information. Actor 108, for example, is somewhat between actors 147 and 008. Actor 008 has a larger number of ties, but most are with actors from within his own sector of the industry. We would expect him, for example, to have a high degree of access to information concerning problems within the charter/headboat sector. Actor 108, on the other hand, has 86% of his ties with individuals outside his sector and has a direct link to 147 another central actor within the sector of the industry. We would hypothesize that 108 would have a higher degree of access to a wider range of kinds of information (at least information crossing sector boundaries).

Similar analysis can be performed on other actors listed in Table 1. In addition, a whole range of other theoretical concepts can be applied to these data. What is important to recognize is that these types of methodological and theoretical approaches provide basic guidelines for interpreting the data.

Data were collected representing the "guesses" or "intuitions" of various state and federal marine resource managers about who (fishing participants) they thought were important from the three sectors of the commercial and recreational domains. More specifically, a sample of mid to top level individuals responsible for the management of various marine resources from the North Carolina Division of Marine Fisheries (NCDMF), the South Atlantic Fishery Management Council (SAFMC), and the North Carolina Marine Fishery commission were asked to provide one

Figure 1.

- ▲ Commercial fishermen
- ◆ Charter/headboat captain
- Recreational angler
- Seafood dealer
- Fisheries management personnel
- Tournament organizer



or more names from each of the three sectors who they thought would be important in the North Carolina king mackerel fishing communication network. These "guesses" constituted resource managers' perceptions concerning who is important, at least from the standpoint of the flow of information. This portion of the research was performed to assess the adequacy and utility of the network approach.

In addition, the SAFMC's newsletter mailing list was obtained to test 1) the degree to which active (e.g., central) participants in the communication network were included on the list, and 2) the extent to which people sampled in the study were listed. Finally, the actual North Carolina membership of the SAFMC's king mackerel advisory panel was obtained.

Table 1. Fisherman identified as having primary importance in the communication network and the ratio of ties outside their sector to their total number of ties.

	Recreational Ratio	Charter/Headboat Ratio	Commercial Ratio
174	.14	8 .10	98 .22
176	0	12 .33	121 0
		12 .33	
		31 .13	
		32 .11	
		108 .86	
		147 .40	

Table 2. Resource Manager's "intuitions" about importance of participants in the NC King Mackerel fishery.

	Division Marine Fisheries (N = 4)	SAFMC (N = 1)	NC Marine Fish Commission (N = 1)	SAFMC Mailing List (N = 58)	SAFMC King Mackerel Advisory Panel (N = 10)
Recreational	174* 226 (2)	VP Raleigh	174*	174*	—
	2 not listed**				
Charter/Headboat	192 (2) 20, 31	13	226	129 134	—
Commercial	78 (3) 61 221	146	226	78 146 221	221

*Central person from the recreational sportfishing sector.

**This also includes 105 names that were elicited but not interviewed.

A Comparison of Methods

Table 1 contains fishermen who have been identified as important from both the relational and positional analysis of the network data. This importance is determined on the basis of in-degree centrality, betweenness, diversity in types of relations, and structural uniqueness. The basis for this selection is evident from an examination of Figure 1.

Table 2 contains the responses of resource managers concerning their "intuitions" about who is important, and also includes names from mailing lists and the advisory panel membership list. In comparing the two tables, there appears to be little overlap. One exception is sport fishermen 174. The tie between 174 and 138, then Director of the NCDMF, and currently Executive Director of the SAFMC, clearly exposes 174 to a wide range of management personnel. In addition, 174 has become known within the state as a spokesman for sportfishing interests. Among fishermen of other sectors, however, there is overlap in only one of the sectors, and if the SAFMC mailing list and advisory panel participants are also considered, this discordance becomes even more glaring.

An Alternative Protocol

Mapping network relations with the use of snowball techniques is effective, and while less costly and time consuming than general surveys, still costly and time consuming nonetheless, even with the use of telephone interviewing. Without telephone interviewing, the costs are very high (up to \$75 per sample point, for long distance interviewing). We began to look for an even less costly, roughly equivalent alternative to the network mapping protocol, in order to provide agencies and organizations with at least another option, depending on need, and available time and funding, as noted above.

We have noted, too, that we gathered selected socio-demographic information. Similar to studies on innovation and diffusion (Kim and Palmore n. d.), number of nominations (dependent variable) was correlated with age, education, years fished, and so on. Such analysis was conducted in the hope of identifying socio-demographic characteristics which might predict varying degrees of centrality.

A comparison of means on some of the variables between the commercial and recreational domains is presented in Table 3. Statistical significance was found in regard to two variables, viz., age and education. However, these are not felt to be very meaningful for making decisions. What is important, we feel, is that the variables listed in the table give clues as to the profiles of network participants in a way to be useful for selecting advisors, in the absence of specific network information. Taking into account the standard deviations, most of the network members fall between the ages of 32 and 54; have some high school to some graduate college training, and belong to at least one fishermen's organization. (The s.d. for years lived in the community rendered the variable unimportant—16.95 and 15.57). These variables indicate grounding in the fishery in terms of experience, to some extent, through age (as a proxy variable); formal education and attendant calculating behavior, including the choice to belong to a special interest group. We do not have mackerel specific comparisons on other fishermen, but the data are not different from findings we have on general fishermen populations, except for educational level, which is higher in this study than we have seen in others (see, for example, Maiolo, et. al. 1985, Spring 1985, Summer 1985, and Summer, 1986. Also, see Johnson, et. al. 1986).

Table 4 displays correlations between selected variables in each of the domains and the number of times nominated during the conduct of the research (using the snowball sample). In the commercial domain, three variables attracted our interest. The number of periodicals refers to the subscriptions to magazines and newsletters to which fishermen subscribe. This is an indication of an interest in fishing technology and other issues, such as management. Second in value is years of education, followed by number of fishing organizations to which the respondents belong, their years lived in the community, and the amount of yearly exvessel sales of fish.

Table 3. Comparison of Means on Selected Variables: Recreational Vs. Commercial Domains

Variable	Recreational	Commercial	Level of Statistical Significance
Age	43.27	40.21	.028
Years Lived In Community	22.62	18.30	.076
Years of Education	14.02	13.06	.015
Number of Fishermen's Organizations belonged to	1.50	1.35	.252

Table 4. Correlations of Selected Variables With Number of Times Nominated

Variable	Correlation Value
Commercial Domain (N = 66)	
Age	-.026
Years Lived in Community	.110
Years of Education	.202
Number of Organizations	.156
Number of Periodicals	.401
Yearly Exvessel Sales	.109
Recreational Domain (N = 172)	
Age	.123
Years Lived in Community	.064
Years of Education	-.105
Number of Organizations	.121
Number of Periodicals subscribed to	.097
Years Run Charter/Headboat	.239
Fish in FCZ	.166
Percent Income from King Mackerel	.416

In the recreational domain, the charter/headboat captains showed their presence with years of such experience exhibiting the highest coefficient. Years of education was negative in sign primarily due to the presence of the large number of charter/headboat captains (n 72), and their strong presence in the network. When the recreational domain was split into sectors, the negative correlation held up for charter/headboat captains. The "pure" recreational and the "other" category (e.g., tournament directors and governmental agency people) were positive in sign but not

significant. Other variables of note for further analysis were the percentage of recreational fishing which occurred in the Fishery Conservation Zone (FCZ), and age.

The most notable correlation in the recreational domain, of course, is that between the percent of total income derived from the sale of king mackerel and number of times nominated. Much of this is explained by the presence of the charter/headboat captains who gain supplemental income from the sale of kingfish, but not all of it. Some is attributable to the "pure" recreational fishermen who sell kingfish.

Table 5 displays results of Stepwise Regression routines for both domains combined (recreational and commercial). The number of organizations belonged to and age, in combination, creates a Multiple R of statistical but, perhaps, not meaningful level of significance since, in spite of the .0474 level, only .02561 percent of the variation is explained. The finding does provide a lead for further analysis, however.

When the domains were separated, some viable findings for council application are indicated (Table 6). Commercial fishermen who are centrally located, as measured by number of nominations, tend to be the most widely read, the more highly educated, belong to more organizations, have the larger boats and most exvessel sales, and tend to be more grounded in the community than their less centrally located counterparts. Also, insofar as the purpose of the study, in the first place, was to identify people with whom council could communicate, the "periodicals read" variable should be good news to managers who would want to select key people who would read materials sent to them for comment. Twenty-five percent of the variance is explained, and we believe that the data can be utilized to more effectively select advisors in the absence of specific network information, including the identities of central figures. Selection could be made on the basis of profiles where candidates match up on the socio-demographic variables examined here.

Table 7 displays the stepwise regression results in the recreational domain. Note that percent income from sales of king mackerel was entered first. The second variable entered was frequency of effort (for kings, in the FCZ) and then years as charter/headboat captains, indicating a separate effect of non-professional recreational fishing, which apparently translates itself into network location. The number of organizations belonged to apparently produces an effect for non-charter headboat captains insofar as it adds some value, but the zero order correlation between organizational membership and the charter/headboat variable was found to be -.042.

Table 5. Stepwise Regression on Selected Variables. Commercial and Recreational Domains Combined. Dependent Variables in Number of Times Nominated*

Step	Variables	Multiple R	R ²	Level of Significance
1	No. Organizations	.11989	.01437	.0648
2	Plus Age	.16004	.02561	.0474
3	Plus Years in Community	.16720	.02795	.0840
4	Plus Years in Education	.16764	.02810	.1544

*A second regression which included number of fishing related periodicals read added .05 to the R, raising the R² to .04733.

Table 6. Stepwise Regression on Selected Variables. Commercial Domain. Dependent Variable is Number of Times Nominated.

Step	Variables	Multiple R	R ²	Level of Significance
1	Periodicals Read	.40079	.16063	.0009
2	Years of Educaiton	.45387	.18999	.0013
3	Yearly Exvessel Sales	.44957	.20211	.0028
4	Number of Organizations	.47810	.22858	.0029
5	Boat Length	.48873	.23886	.0005
6	Years in Community	.50012*	.25012	.0075

*Other variables shown to add little to the R include percent King Mackerel catch sold, percent of King Mackerel sold to total sales, number years commercial fishermen, and age.

When the domain was split to compare "pure" recreationals with the Charter/Headboat sector, the picture changes somewhat. For non-charter people in the recreational domain, experience as a fishermen, tournament participation and reading habits seem to be good predictors. Income from sales of king mackerel appears to be behavior emanating from the first two variables mentioned (see Table 8).

For Charter/Headboat Captains, years spent at that job, a counterpart to experience among the "pure" recreationals is the best single predictor, followed by the community residence and then the sales variable, and then interestingly, number of organizational memberships. Years of education adds some value but it must be kept in mind that it is a negative insofar as the less educated are more probable to be nominated than the more educated among Charter/Headboat Captains.

Table 7. Stepwise Regression on Selected Variables. Recreational Domain. Dependent Variable is Number of Times Nominated.

Step	Variables	Multiple R	R ²	Level of Significance
1	Percent Income from King Mackerel Sales	.415786	.17285	.0000
2	Fish in FCZ	.43759	.19148	.0000
3	Years Run Charter/Head Boat	.45546	.20744	.0000
4	Number of Organizations	.47254	.22330	.0000
5	Number of Periodicals	.47880	.22925	.0000

Table 8. Stepwise Regression to Compare Recreationals with Charter/Headboat Sample: Dependent Variable is Number of Times Nominated.

Recreationals (Exclusive of Charter/Headboat Captains)				
Step	Variables	Multiple R	R ²	Level of Significance
1	Years as Rec. Fishermen	.22347	.04994	.0332
2	Number of Tourn-aments Entered	.31410	.09866	.0104
3	Number of Periodicals	.33604	.11292	.0149
4	Percent Income from King Mackerel Sales	.34469*	.11880	.0265

*Number of Organizations belonged to, age and years in the community added virtually nothing to the R.

Charter/Headboat Sector				
Step	Variables	Multiple R	R ²	Level of Significance
1	Years Run Charter Boat	.28451	.08095	.0154
2	Years in Community	.32524	.10578	.0211
3	Percent Income from King Mackerel Sales	.36463	.13295	.0206
4	Number of Organizations	.38389	.14737	.0284
5	Years of Education	.39723	.15779	.0409

Mackerel Fishery; Other States:

Several new twists were added to the analysis for the remaining three states. The North Carolina research focused on centrality and characteristics of central figures. The data obtained from the three subsequent states were subjected to analysis which introduced relative betweenness and graph centralization. The first locates the actor along paths between clusters within the networks (networks within the overall network). The second allows us to examine the extent to which the network relations are intensely focused on one or more actors, sectors of domains.¹ Thus, in a case where an actor exhibits a moderate centrality score but high betweenness, while another has a similar centrality but lower betweenness score, if only one could be selected for an advisory panel, the former is the better choice. However, the protocols and data were still not far along enough to attempt to get predictors for those with high betweenness and transitional values, i.e., the ratio of choices within a delineated group to choices made outside the same group sector delineated on the basis of known attributes. Ethnographic, multiple species data are required in order to yield more data on central figures. This meant that our predictor analysis was still limited to analyzing data with number of nominations only.

The South Carolina and Georgia networks displayed high graph centralization for comparatively small networks (.10 and .11 coefficients, with 120 and 75 respondents, respectively). Also management personnel dominated the networks in both states with varying, but consistently high indegree centrality and betweenness scores, indicating both intensity and diversity in their network relations. Only one recreational fisherman, and no commercial fishermen indicated high scores in South Carolina. One charter captain exhibited a high score in Georgia, along with several sportfishermen, but no commercial fishermen.

The Florida network exhibited low graph centralization, with a score near zero. No actors were found to display high indegree centrality, and the network was extremely large (205). Also, the scores showed more distribution across domains than in the other states. Management ties were found to be mostly in the direction of sportfishing interests. Five charter captains demonstrated comparatively high indegree centrality, but low betweenness. Florida demonstrated a larger number of recreational figures who were comparatively high in regard to centrality scores than the other states (10 respondents), but they varied by indegree centrality and betweenness scores, and in the symmetry of relationships. Seven commercial fishermen emerged as central, which is clearly different from the other states, and obviously due to the importance of the commercial fishery in that state. Three dealer/processors and one marina operator emerged as central, too.

In regard to the predictor analysis, we found inconsistencies in the data but organizational affiliation and subscriptions to fishery periodicals still were borne out as the best way to proceed in regard to identifying central figures (except for commercial fishermen) where years lived in the community stood out as important.²

The Shrimp Fishery: North and South Carolina

A total of 382 respondents were interviewed in the two states, 227 in North Carolina before closure was attained, 155 in South Carolina. The actor with the highest relative indegree centrality in North Carolina was found to be a dealer, and was cited by a wide range of different other actors, including two central management people (see 1058 in Figure 2). Seven captain/owners were found to have high indegree centrality but exhibited small geodesic distances, i.e., they are all within a couple of edges or links of one another (see 1082, 1112, 1113, 1231, 1120, 1062, and 1106). In addition, they all tend to have similar centrality scores with no one score being higher than the others, and tend to talk almost exclusively with other fishermen, i.e., they have low transition probabilities.

There are a number of other captain/owners with high indegree centrality who are not connected to fishermen in this portion of the network. These include 1019, 1017, 1021, and 1100. Although their relative indegree centrality scores are similar in magnitude to those of the previous group, there is a tendency among these four to have more varied patterns of communication, i.e., relatively higher transition probabilities. We found only one commercial captain who exhibited a high relative indegree centrality score, actor 1033.

Two management personnel were found to have high relative indegree centrality scores (1166 and 1059). But, they tend not to be cited much by commercial captains or captain owners.

The South Carolina shrimp communication network was found to contain twenty actors with relatively high indegree centrality, with six others having a significant degree of relative betweenness, and another three having only high relative betweenness. There

is some degree of centralization in the network (graph centralization = .06) due largely to the high centrality of a single actor (0019). However, this is not as centralized as, for example, the networks in the South Carolina and Georgia king mackerel fisheries (.10 and .11 respectively). The actor with the highest relative indegree centrality is actor 0019 (Figure 3). A dealer/processor, actor 0019 received the majority of his incoming ties from a wide range of different types of actors. In addition, he is one of only a few bridges between two major subgroupings. Figure 3 shows this actor's relative position whereby he is the focus of many relations from the subgroup at the left of the figure while only receiving one citation from an actor connected to the subgroup to the right in the figure. Similar to the North Carolina network, most of the actors with high relative indegree centrality are captain/owners. These include actors 0026, 0035, 0037, 0070, 0081, 0087, 0098, 0101, 0105, 0109, 0121, 0137, 0175, 0213, 0244, 0250, and 0270. Additionally, captain/owners 0041 and 0045 have high relative betweenness but not centrality. Of these, 0109, 0175 and, to some degree, 0037 have larger centrality scores in comparison. Actors 0109 and 0175 maintain central positions in two distinct areas of the network; one in the left corner of Figure 3 (near 0037) and the other in the upper right. Actor 0109 is cited by three other central captains: 0026, 0121, and 0270, indicating his importance. Of these two, however, only 0175 has a relatively high betweenness score, indicating his ties may be reaching into more distant areas of the network. Actor 0105 is another important captain/owner. He has half ties with actors other than commercial fishermen and is connected to two central dealers (0181 and 0212). This diversity in types of ties is reflected in his relatively high betweenness score (0.05).

In contrast to the North Carolina network, management did not play a central role in any way. In fact, only one manager was interviewed, and only because he was chosen in the initial sample as a captain.

In regard to personal attributes as predictors, when comparing all respondents in both states in terms of number of times nominated correlated with selected variables utilized in the prior studies, only the number of organizational affiliations was found to be statistically significant. For the shrimp research, we added number of boats owned and number of fisheries management meetings attended. When the data were examined by sector, with states combined, the results were identical. In North Carolina, the relationship held up in all cases where the data could be analyzed the category vessel owner only, who hired a captain different from himself, did not have an *n* large enough to analyze.

In South Carolina, the sample sizes were too small for analysis in the captains and dealers categories. The significance of the organizational variable was revealed in the captain/owner, and captains/owners with 90% income or more derived from fishing.

Other variables pursued for this analysis were number and sizes of vessels owned, and other indicators of income (e.g., estimated income from shrimping). One produced findings of value. We ran the variable "estimated income" from fishing against nominations and found that in both states, among fishermen expecting to receive more than 90% income from fishing, such income was related to the number of nominations: N.C. = .387 (n=88) .001; S.C. = .313 (n=66) .01.

Figure 2. Shrimp Communication Network
 — North Carolina —

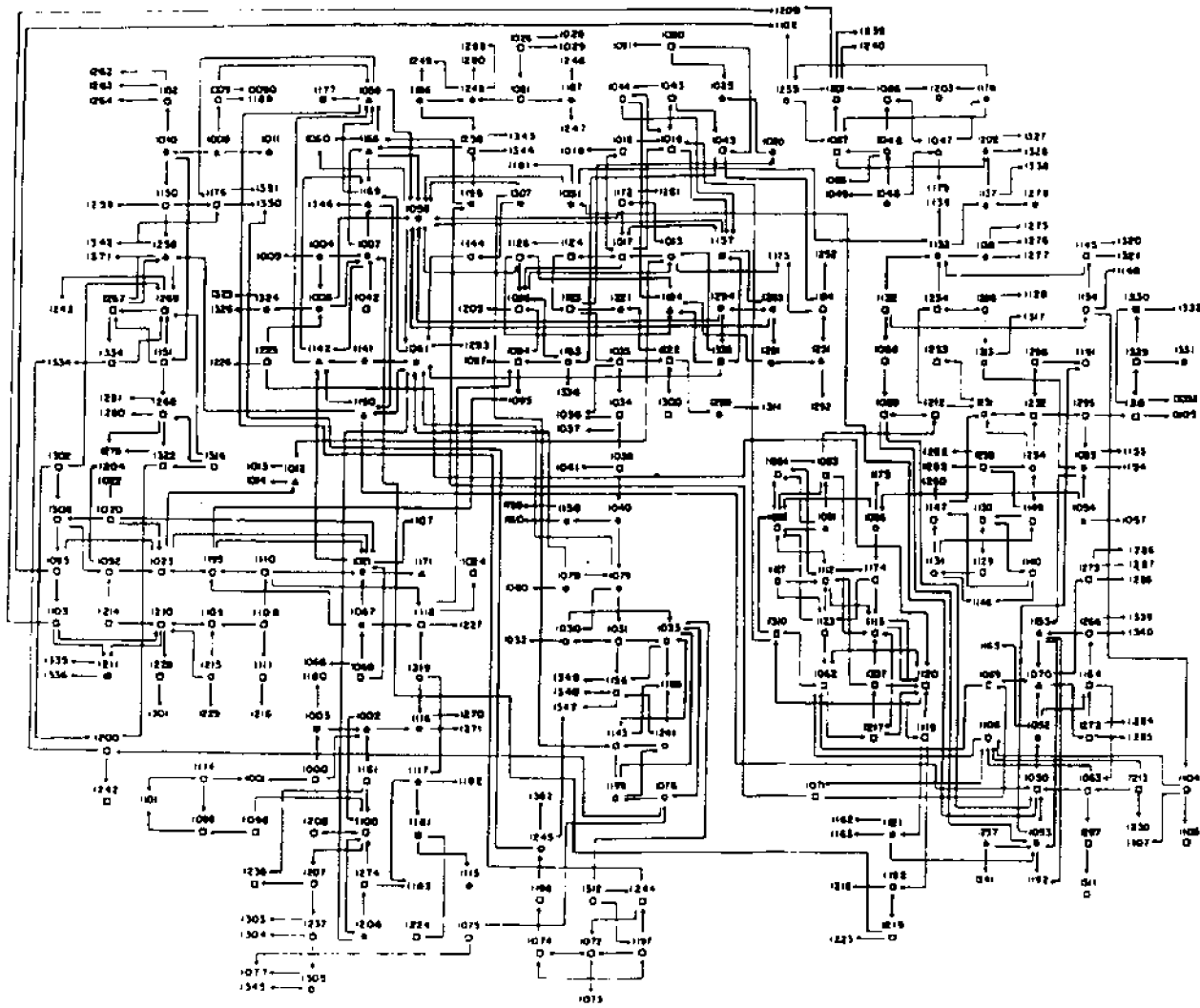
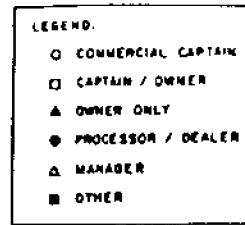
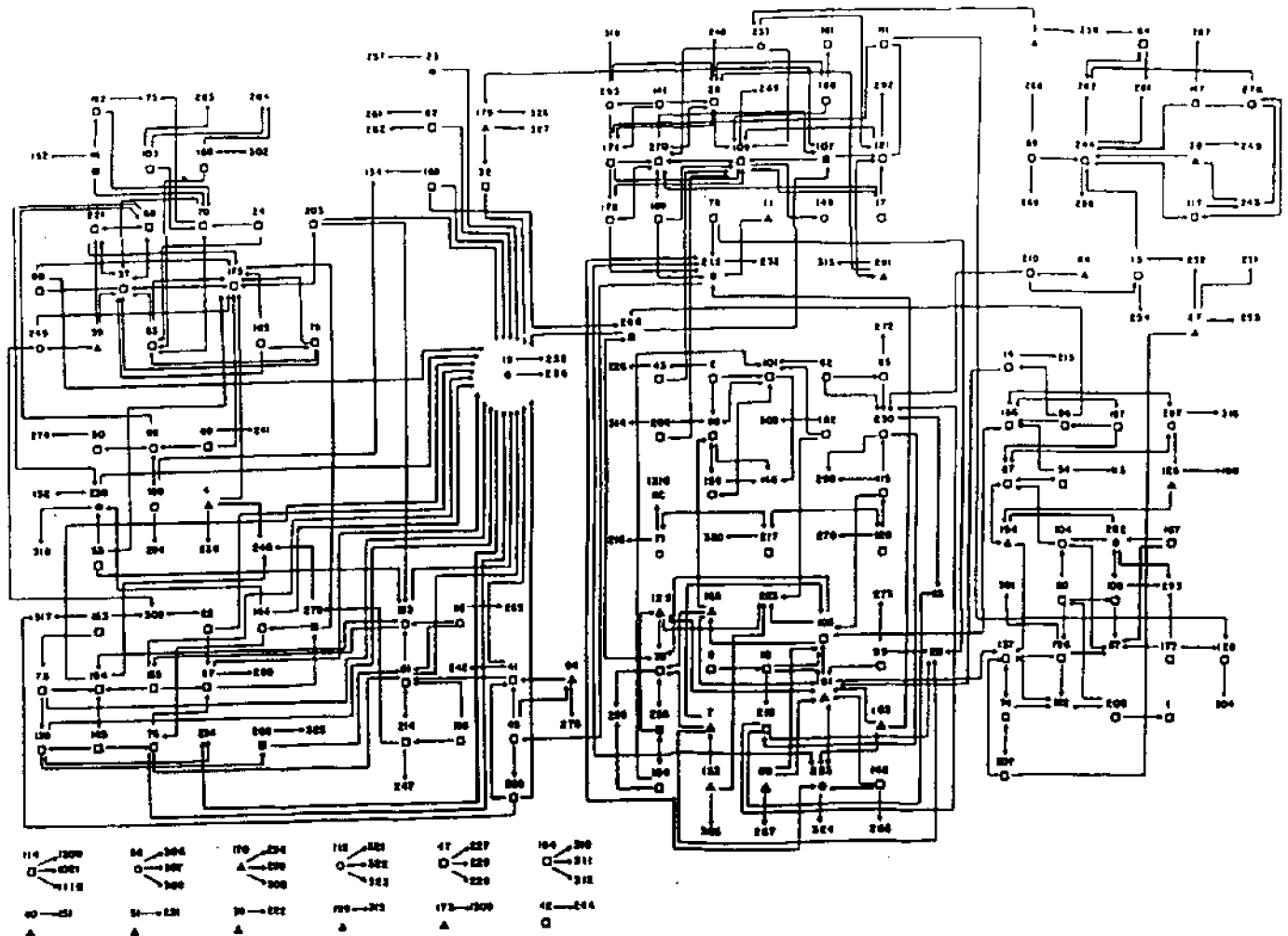


Figure 3. Shrimp Communication Network
— South Carolina —



*South Carolina, as in all of our communication studies, had four digit codes. In this case, the first digit was 0. Where unnecessary, 0's are eliminated (for Figure 2 for aesthetic purposes). Thus, respondent 2 (in the figure) is 0002 in the tables and narrative; 19 is 0019; 382 is 0382, and so on. Figure 2 is the only case where respondent numbers are adjusted.

LEGEND:

- COMMERCIAL CAPTAIN
- CAPTAIN / OWNER
- ▲ OWNER ONLY
- PROCESSOR / DEALER
- △ MANAGER
- OTHER

Conclusions and Implications

Within the mackerel fishery, it is interesting that people located in management positions are important network figures in North and South Carolina, and Georgia, but not in Florida. Parallel to that is the finding that Florida exhibited low graph centralization as compared to South Carolina and Georgia (recall that the technique was introduced after the N.C. portion of the project). And, it is noteworthy that Florida has the largest developed commercial fishery for mackerel, along with the more highly developed and diverse political framework among the Southeastern states.

Thus, we would conclude that small, tight networks prevail in N.C., S.C. and Georgia with a heavy dependence on state management personnel for information (and vice versa). Regional and national management groups would have to rely on those actors to gain input from the fishery, and to communicate important information (e.g., regulations) through those actors. There are some "pure" recreational and charter/headboat fishermen who are sufficiently central to be useful, as well. Indeed, they should not be ignored in the management system.

Florida presents a problem in the selection of advisors to the extent that each domain, and sector within them, should have at least one representative in management advisory groups to ensure network coverage. It is interesting to observe the relationship between the graph centralization (low) and the presence of distinct sub-networks with dominant actors.

When the project shifted to the more commercially developed shrimp fishery in North and South Carolina, captain/owners and dealer/processors dominated the networks. One can conclude, then, that the degree of development of the fishery affects the shape of the networks, in terms which domains and sectors represented, and to what extent.

In the absence of specific actor information, our data lead one to conclude that managers could rely on organizational affiliation and subscriptions information to select advisors. That is, let us assume that the managers had to get information about fishermen occupational patterns, attitudes, perceptions, and/or circulate information about impending regulations. Surely the best procedure would be to identify the network using the snowball technique, if key people were to be relied on for the information or reaction (instead of a full scale survey). But, let us also assume there are severe time and/or budget constraints. We would suggest gathering data on as many people as possible, focusing on number and types of organizational affiliations, and subscriptions to fishing periodicals. In fact, the SAFMC has begun to do just that and the results look promising at this point. One fear we have, however, is that such a protocol would be relied upon, entirely, when the importance of the issue(s) warrant(s) taking the time and spending the money to get the information in the most reliable way, namely, with the use of the snowball technique.

Notes

1. Graph centralization and relative betweenness could not be calculated for the North Carolina network. The size of the sociomatrix was found to be too large for the computer program.
2. Because of the lack of any specific theory driving this analysis, and because of the crude nature of the resulting estimates, we felt that simple correlations would be sufficient for the remaining analyses of the predictor variables.

References Cited

- Barnes, J. 1972. *Social Networks*. Reading, Mass.: Addison-Wesley.
- Burt, R. 1983. *Toward a Structural Theory of Action*. New York: Academic Press.
- Erickson, B.H. 1979. Some Problems of Inference From Chain Data. *Quantitative Methods in Sociology*.
- Fee, Russ 1987. New TED Regs Endorse Limit on Tow Lines. *National Fisherman*. 68:5. September.
- Freeman, L.C., D. Roeder, and R.R. Mulholand 1979. Centrality in Social Networks: II. Experimental results. *Social Networks* 2:119-141.
- Freeman, L.C., T.J. Fararo, W. Bloomberg, Jr., and M.H. Sunshine 1963. Locating Leaders in Local Communities: A Comparison of Some Alternative Approaches. *American Sociological Review* 28:791-798.
- Gale, R.P., and M.L. Miller 1985. Professional and Public Natural Resource Management Arenas: Forests and Marine Fisheries. *Environment and Behavior* 17:651-678.
- Goodman, L.A. 1961. Snowball sampling. *Annals of Mathematical Statistics* 32:148-170.
- Hovland, C. I., et. al. 1953. *Communication and Persuasion*. New Haven: Yale University Press.
- Johnson J. C. J. S. Boster, and D. Holbert Estimating Relational Attributes From Snowball Samples Through Simulation. Under review for publication.
- Johnson, J.C., P.F. Fricke, M. Hepburn, J. Sabella, W. Still, and C.R. Hayes. 1986. *Recreational Fishing in The Sounds of North Carolina*. Raleigh, N.C.: University of North Carolina Sea Grant College. UNC-SG-86-12.
- Johnson, J.C. 1986. Social Networks and Innovation Adaptation: A Look at Burt's Use of Structural Equivalence. *Social Networks*, 6:343-364.
- Johnson, J. C. and J.R. Maiolo 1986. *Communication Networks In The King Mackerel Fishery: A Case Study From North Carolina*. Report submitted to the South Atlantic Fishery Management Council. Charleston, S. C.
- Kim, J.I., and J. A. Palmore. N. D. *Personal Networks and the Adoption of Family Planning in Rural Korea*. Honolulu, Hawaii. East-West Center.
- Kitner, K.R. 1987. *TEDS: A Study of the South Atlantic Shrimp Fishermen's Beliefs, Opinions and Perceptions Regarding the Use of Turtle Excluder Devices*. Prepared for South Atlantic Fishery Management Council. Charleston, S.C. September.
- Lauman, E. O. and F.U. Poppi 1977. New Directions in the Study of Community Elites. In *Social Network: A Developing Paradigm*. Leinhardt, Samuel, ed. N.Y.: Academic Press
- Laumann, E. O. 1963. *Bonds of Pluralism*. New York: Wiley.
- Maiolo, John R. 1965. *Patterns of Adoption of Land Use Controls in Interchange Communities*. University Park, Pa.: Pennsylvania State University. Doctoral Dissertation.
- Maiolo, J.R., and M.K. Orbach. 1982. *Modernization and Marine Fisheries Policy*. Michigan: Ann Arbor Science Publishers.
- Maiolo, J. R., and J.C. Johnson. 1986. *Communications (Network) Study: Part II*. Report submitted to the South Atlantic Fishery Management Council. Charleston, S. C. May.
- Maiolo, J.R. and J.C. Johnson. 1987. *Current Contract Task #5—Expansion of Mackerel Communication Network Study*. Report submitted to the South Atlantic Fishery Management Council. Charleston, S. C. July.
- Maiolo, J.R., R. Kearns, C. Williams, S. Simpson, H. Bean, A. Matthews, and H. S. Kim. 1985. *A Socioeconomic Profile of Shrimp Fishermen in Selected Harvest Areas of North*

- Carolina. Report to the N. C. Division of Marine Fisheries. Morehead City, N. C. Summer.
- Maiolo, J.R., R. Kearns, C. Williams, and S. Mozdierz. 1986. A Socioeconomic Profile of Shrimp Fishermen in Selected Harvest Areas of North Carolina: A Replication. Report to the N. C. Division of Marine Fisheries. Morehead City, N. C. Summer.
- Maiolo, J. R., C. Williams, R. Kearns, H. Bean, and H.S. Kim. 1985. Social and Economic Impacts of the Blue Crab Fishery in North Carolina. UNC-Sea Grant Technical Publication. Raleigh, N.C. Spring.
- Pollnac, R.B., and S.J. Littlefield 1983. Sociocultural Aspects of Fisheries. *Ocean Development and International Law Journal* 12 209-245.
- Rogers, E., and D. L. Kincaid. 1981. *Communication Networks: Toward a New Paradigm For Research*. New York: Free Press.
- South Atlantic Fishery Management Council. 1983. *Fishery Management Plan for The Coastal Migratory Pelagic Resources (Mackerel)*. Charleston, South Carolina. Feb.
- South Atlantic Fishery Management Council. 1985. *Plan Amendment No. 1. For The Coastal Migratory Pelagic Resources (Mackerel)*. Charleston, South Carolina. April.
- South Atlantic Fishery Management Council. 1987. *Plan Amendment No. 2. For The Coastal Migratory Pelagic Resources (Mackerel)*. Charleston, South Carolina. March.
- Wilson, Michele. 1983. Folk Crime: Patterns of Accommodation. *Deviant Behavior: An Interdisciplinary Journal* 4:123-140.

A STUDY OF THE SOCIAL IMPACT OF THE TEXAS SHRIMP CLOSURE

J. M. Nance
NMFS Galveston Lab

N. Garfield
University of Rhode Island

J. Anthony Paredes
Florida State University

ABSTRACT

The Gulf of Mexico Fishery Management Council is one of eight such councils established by federal law in 1976. One of the most controversial management measures adopted by the Council has been a seasonal closure of the shrimp fishery in federal waters off Texas, beginning in 1981, which coincided with the long-standing seasonal closure of Texas state waters. Biological and economic effects of the federal closure have been monitored annually, but efforts to assess social impacts of the closure did not begin systematically until 1986. This paper reports the results of surveys initiated from the Galveston Laboratory of the National Marine Fisheries Service to study the social effects of the Texas shrimp closure in the offshore fishery throughout the Gulf during 1986 and 1987 and the inshore fishery of selected areas in Texas and Louisiana in 1987. Topics include vessel movements, employment patterns, and attitudes toward the closure, with an examination of differences and similarities in relation to such variables as age, years fishing experience, ethnicity, and geographic area.

Introduction

The Gulf of Mexico Fishery Management Council is one of eight such councils established under the Federal Fisheries Conservation and Management Act of 1976. One of the most controversial management measures adopted by the Council was an annual, early summer closure of the shrimp fishery in federal waters off the coast of Texas to coincide with a long-standing closure of state waters. The federal closure has been in effect since 1981; but the size of the area closed was reduced from 200 miles to 15 miles in 1986. The objective of the closure is to allow brown shrimp to reach a larger size before harvesting to increase the value of the fishery, since larger shrimp bring a higher price than smaller ones.

Each year the National Marine Fisheries Service has monitored the biological and economic effects of the closure. Despite urging by Paredes, an anthropologist, and others on the Council Advisory Committees, the Council did not request, until 1986, that data be systematically gathered to study the social impacts of the closure. In that year a few "social questions" were added to the interview schedule used by port agents in gathering biological and economic data on the closure. In 1987 NMFS again collected social data on the offshore shrimp fishery using an interview form that built

upon and refined the previous year's effort. In addition, the Galveston Laboratory of NMFS secured funding to conduct a study of the inshore shrimp fishery of the upper Texas coast and adjacent parts of Louisiana, giving special attention to possible effects of the Texas Closure on those areas.

Here we present some of the results from the 1986 and 1987 surveys pertaining to the offshore fishery and preliminary findings from the 1987 inshore study.

Offshore

To determine the sociological impact of the Texas Closure Regulations on the offshore shrimp fishery in the Gulf of Mexico, vessel captains were interviewed in thirteen port areas by National Marine Fisheries Service port agents in the summers of 1986 and 1987. The selected port areas included six Texas areas, three Louisiana areas, one Mississippi port, one Alabama port, and two Florida ports. Interviews in each area were conducted with the first thirty captains who agreed to be interviewed. Questions asked during the 1986 survey dealt with topics such as number of years they had been fishing for shrimp, what employment captains had during the 1985 and 1986 closures, and what they thought of the closure of federal waters off Texas.

Questions asked during the 1987 survey were developed from answers received during the initial survey and were much more sharply directed. Questions dealt with such topics as vessel type, ethnicity of captain, their opinions on the purpose of closure, the best distance of closure, and advantages and disadvantages of the closure. Responses of captains during the 1987 survey that were from similar questions to those asked in 1986 were analyzed in the same fashion as the 1986 data so comparisons could be made. Data were summarized either by state, if the vessel was from a non-Texas port, or by location (lower or upper coast) if the vessel was from a Texas port. A total of 346 captains were interviewed in 1986. During 1987 only 277 vessel captains were interviewed.

Chi-squared analysis by area revealed that responses to questions about the federal closure off Texas were independent of the date the survey was conducted each year, thus increasing confidence that opinions were not biased by exogenous factors occurring over the several days of the surveys.

Captains from Florida, Alabama and lower Texas ports were generally in favor of a closure of federal waters off Texas during 1986. Captains from Louisiana and upper Texas ports were generally against the closure of federal waters off Texas, while captains from Mississippi generally did not have opinions about the Texas closure.

Most of the captains from non Texas ports who favored a closure of federal waters off Texas did not state a preferred closure distance. For the few captains who did have an expressed opinion, those from Florida wanted a 15 mile closure, while those from Alabama and Louisiana wanted a 200 mile closure.

On the other hand, most captains from Texas who wanted a closure had an opinion about the distance of the closure off Texas. Most of the captains from lower Texas ports wanted a 200 mile closure, while most captains from upper Texas ports wanted only a 15 mile closure.

When the 1986 closure responses were split into different classes by number of years a particular Gulf captain had been in the commercial shrimp fishing business, differences in opinions were seen. The greatest percentage of captains in favor of the closure were in the middle age groups while the least number in favor were in the earliest age group.

In the 1987 survey, captains were asked what they thought was the purpose of federal closure off Texas. Responses were summarized into four broad categories: 1) no opinion, 2) I don't know, 3) allow shrimp to grow larger and 4) political. Overall, a little over half of the Gulf captains seemed to know that the purpose of the Texas Closure was to allow small brown shrimp to grow before capture. Only Florida, Alabama, Mississippi and lower Texas ports had a majority of their captains respond in this manner to the question. Answers from Louisiana were divided between shrimp growth and no opinion, while responses from upper Texas ports were split into three categories: shrimp growth, I don't know, and political. The upper Texas coast results are partly accounted for by ethnicity. The majority of those that did not know the reason for the closure or that had no opinion about the closure were of Asian descent; 31% of the upper Texas coast interviewees. All other ethnic groups seemed to be better informed about the purpose of the closure.

Opinions gathered in 1987, about whether or not to have a federal closure, were similar to those received in 1986. Alabama and lower Texas ports had the most captains in favor of a closure, with most of the Alabama captains in favor of a closure wanting a 15 mile closure and most of the lower Texas port captains in favor of the 200 mile closure. Florida captains also showed a majority in favor of the closure, with a large percentage favoring a 200 mile closure. Mississippi captains were equally split with regards to opinions about the closure. Most did not select a closure distance, but those who did select, selected the 200 mile closure distance. Again in 1987, captains from Louisiana and upper Texas ports were against the closure of federal waters off Texas. Of the small percentages in favor of the closure, most selected the 15 mile closure as the one they preferred.

Overall, thirty-nine percent of the captains in the Gulf were against the closure, while fifty-one percent were in favor of it. Among those captains who knew the managerial purpose of the closure, however, the number in favor of the closure was greatly increased, while the number against the closure was reduced.

When captains were categorized by the type of vessel, ice or freezer, captains of freezer boats were mostly in favor of the closure, with most favoring a 200 mile closure. A great majority of the freezer boats were from the lower Texas coast. Captains from ice boats were almost equally split between not having a closure and having a closure. Those favoring the closure were more in favor of the 15 mile closure than the 200 mile closure.

When responses about the closure were placed into different groups by the number of years the captain had been a commercial shrimp fisherman, it appeared that an almost equal percentage of the captains in each age group were in favor of the closure. Negative responses increased as years in the fishery increased.

Captains were also asked what they felt was the biggest advantage of the closure and the biggest disadvantage of the closure. Most frequent answers about advantages fell into four major categories: 1) no opinion, 2) better catches, 3) no advantage and 4) better enforcement of closure. Most captains from Louisiana and upper Texas ports said there was no advantage to the closure. Perceived disadvantages of the closure comprised six major categories of responses: 1) no opinion, 2) pulse fishing, 3) too many out-of-state boats in home state, 4) no disadvantage, 5) not making any money because of closure, and 6) no enforcement. Captains from Mississippi were equally split between no opinion and too many out-of-state vessels in their state. Captains along the upper Texas coast most often responded that pulse fishing was a problem, while captains from Louisiana said that too many out-of-state vessels came to their state because of the closure. Captains along

the lower Texas coast said enforcement was the worst problem, with less money because of closure being the next most frequent response.

Analysis of the employment data revealed that the percentage of captains who did not shrimp during the 1985 closure period (200 mile closure) was high only in the home ports of Florida, Freeport, Port Aransas and Brownsville, Texas. In Florida 12% of the captains interviewed did not shrimp during the closure in 1985 and the majority of them said they were unemployed. The percentage of Florida captains who did not shrimp during the 1986 closure period (15 mile closure) dropped to only 4%. In Freeport, 29% of the captains did not shrimp during the 1985 closure, but 50% said they were employed at another job. The number of captains not shrimping during the 1986 closure was only 14%. In port Aransas, 29% of the captains interviewed did not shrimp during the 1985 closure and most (90%) of them also said they were unemployed. During the 1986 closure the percentage that did not shrimp was reduced to 19%, but again most of these captains said they were employed. In Brownsville, Texas, 25% of the interviewed captains did not shrimp during the 1985 closure, but a little over half said they were employed at another job. This value was reduced to 11% during the 1986 closure and again most said they were employed at another job.

Inshore

A survey was administered to inshore shrimp captains from Galveston Bay, Texas, and Calcasieu Lake, Louisiana, in the summer of 1987. Interviewees were randomly selected from 1986 license lists of captains, supplied by the Texas Parks and Wildlife and the Louisiana Department of Wildlife and Fisheries. Three sets of lists containing 75 names each were generated for each region representing three pre-selected vessel size categories. Interviews were conducted with captains by telephone when possible. Questionnaires were mailed to those captains with unlisted numbers or without telephones. To supplement this effort, interviews were conducted at docks around the perimeter of each bay. This additional effort ensured that enough interviews were completed in the limited available time, that all regions around each Bay were represented in the survey, and that individuals unable to understand English were represented. In total, 159 interviews of captains were completed, 89 from Galveston Bay and 70 from Calcasieu Lake.

Most of the shrimp from Calcasieu Lake's inshore harvest were channeled through fish houses to markets outside of the community. Most of the remaining shrimp were used for personal consumption and a small amount was sold directly from the boat.

The fish houses, in turn, sold most of their shrimp to processors and brokers. The remaining shrimp were sold to other dealers. Thus, the vertical marketing integration within this fishery existed largely between the fish houses and the processing plants.

In contrast, the shrimp distribution patterns of Galveston Bay was more directly tied into the local economy. As in Louisiana, most of the inshore harvest were sold to fish houses with the remainder distributed to bait camps, tourists, peddlers, or used for personal consumption. The fish houses sold only 40% of their shrimp to processors and brokers, with the remaining distributed to walk-in customers, other dealers, stores and restaurants and peddlers. Thus, the vertical marketing integration within the Galveston Bay fishery existed between harvesters, fish houses, and retail stores. The demographic profiles indicate that compared to Galveston Bay's inshore fishery, proportionally more of Calcasieu Lake's inshore shrimpers were younger and had entered the fishery

more recently. The median age of Galveston shrimpers was 47 compared to 39 for Calcasieu Lake shrimpers. Therefore, it is not surprising that greater numbers of Calcasieu Lake shrimpers had entered the fishery more recently than their Galveston Bay counterparts. Thirtyfive percent of the interviewed Galveston Bay captains had been commercial shrimpers for less than 10 years, compared to 44% of the interviewed Calcasieu Lake shrimpers. The greatest difference in the number of shrimpers who had entered each fishery in a given time period occurred between 6 and 10 years ago. Within this time period, 7% of the interviewed Galveston Bay population entered the fishery compared to 19% of the Calcasieu Lake population.

Fewer Calcasieu Lake shrimpers had come from families involved in fishing than Galveston Bay shrimpers. This trend in family involvement in fishing seems to reflect the age distribution that characterized the fisheries. In both regions those shrimpers with a family history in fishing tended to have been shrimpers themselves for longer than 10 years.

The Calcasieu Lake population differed from those in Galveston with respect to their occupational histories. Calcasieu Lake shrimpers were characterized by less diversity in their occupational histories compared to Galveston Bay shrimpers. The results indicate that Calcasieu Lake shrimpers had occupational histories dominated by skilled manual labor (70%). Of the remaining: 7% were previously employed in service occupations, 9% were small business owners or managers, 2% were technicians, and 9% had no other skills.

Galveston Bay shrimpers had a more diverse range of occupational histories. Like the Calcasieu Lake population, most Galveston Bay shrimpers were previously employed in skilled manual labor jobs (48%). Of the remaining: 9% were employed in service occupations, 9% were owners or managers of small businesses, 8% were technicians, 4% were professional, 9% were un-skilled labor, and 10% had no other skills.

Age distribution, years as commercial shrimpers, family history in fishing, and employment histories suggest that growth in the inshore Calcasieu Lake fishery may have resulted from native residents being displaced from other employment, most notably from the oil and gas industry and other jobs involving manual labor. The inshore shrimp fishery of Galveston Bay is an older fishery experiencing an out-migration of native participants replaced by a growing number of Southeast Asian immigrants. This is evidenced by a 280% increase in the number of Southeast Asian boats from approximately 154 to 437 despite a 33% decrease in the overall number of boats in Galveston Bay's inshore fishery from 1981 to 1986.

The Texas Closure had little reported perceived impact on either inshore fishery. However, Galveston Bay shrimpers felt more impacted by the offshore closure than Calcasieu Lake shrimpers. Overall, thirty percent of Galveston Bay's inshore shrimpers reported being affected by the closure, approximately equally divided between medium and large boats. The reported impacts upon this group of Galveston Bay shrimpers included displacement during the closure to either Louisiana or distances greater than 15 miles from shore, overcrowded fishing grounds in Galveston Bay, and reduction in the price of shrimp prior to the opening. Only 20% of Calcasieu Lake's inshore shrimpers reported personal impacts of the Texas Closure. Most of these were captains of larger boats that participated in both the inshore and offshore fisheries. The reported impacts of the closure on these Calcasieu Lake shrimpers were crowded fishing grounds and reduction in catch, available dockspace, and supplies.

CONCLUSIONS

With these limited data and analyses it is impossible to reach detailed conclusions about the social impacts of the Texas Closure, much less the policy implications of our results. In general, however, we observe that while direct impacts of the closure on the social patterns of shrimpers and their communities appear to be negligible in most areas, in others the effects are more noticeable. Much more sophisticated research must be done to determine any social impacts that are beyond detection through direct reporting of interviewees.

At the opinion level there are important differences in response to the closure along geographic and ethnic lines and in relation to vessel size. One of the clearest findings of this research is the extent to which the closure is negatively perceived in the border area between Texas and Louisiana, while the closure is supported strongly in south Texas where there is a larger number of freezer boats. The first finding can be interpreted as an instance of the closure compounding interstate competition, while the latter appears to reflect the competitive advantage that is given vessels who can harvest the larger shrimp in greater quantities once the closure ends. In any event, it is clear that at the very least the effects of the closure are perceived collectively very differently from one area of the Gulf to another.

Simply doing this research appears to have had some beneficial effects in this management process. The report on the 1986 social survey received considerable notice among managers and their advisory committees. Referring to the sometimes scatological, uncensored opinions reproduced verbatim in the 1986 write-up, the director of the Galveston lab joked, "this is the first X-rated reported we've produced." Perhaps more telling than any other response is that a number of the members of the scientific and statistical committee of the Gulf Council expressed great surprise and dismay when it was reported to them in January 1988 that 40% of the interviewees in the 1987 study did not know the management objectives of the closure. On the other hand, some NMFS workers closer to the fishery found it encouraging that there was only 40% who did not know the purpose of the closure. Nonetheless, given the long delay in beginning to assess the social impacts of the Texas closure it is ironic but heartening that on January 13, 1988, following the presentation of the annual review of the Texas closure by NMFS staff, the SSC unanimously adopted a position, introduced by a biologist, that concludes with:

The Committee also recognized that the sociological studies conducted in 1986 and 1987 indicate that the adverse impacts or benefits of the closure may not be equally distributed among participants in the fishery. Therefore, the Committee recommends that these studies be continued. The Committee does not, however, see the need of continuing a complete analysis of the biological implications of the Texas closure, since each analysis to date has documented the benefits of the closure.

CAN LAWS PROTECT THE MARINE ENVIRONMENT?

A. Lewis Rhodes
Florida State University

ABSTRACT

This paper views overlapping missions and jurisdictions of federal, state and local agencies for protecting the marine environment in a structural perspective. Interests of commercial and sports fishermen and environmentalists collide with interests of developers and other businesses. Some of these disputes over issues of coastal resources come to the courts. Advantages and limitations of the court system for resolving such disputes are reviewed in the light of several key court decisions. Efficacy of public-interest suits in protecting the marine habitat has not been fully researched. Leads for further study are suggested.

Introduction

The Problem. Among the several threats to the marine ecosystem, there are two which have received considerable attention from environmentalists, selected interests in the commercial and sports fisheries, and academics. These are the reduction (and near elimination) of some marine life through overfishing and the destruction of habitat, especially the estuaries (Council on Environmental Quality, 1985). These concerns were successfully carried to Congress during the late 1960's and early 1970's, resulting in several laws intended to preserve fisheries. This paper will partially explore some outcomes of laws such as the Magnuson Fishery Conservation Management Act of 1976 (henceforth, the "MFCMA") and laws to protect estuaries such as the Coastal Zone Management Act of 1972 (henceforth, the "CZMA"). Both are examples of law as an instrument of social change, the first more through threat of federal legal sanctions and the second more through inducements to states. An overall evaluation of the efficacy of such laws for protecting the marine ecosystem is needed (Bishop, et al., 1981:211; Dewar, 1983).

Limits of this study. Full assessment of the success of this legislation must await the collection of relevant data which is unlikely given political and budgetary constraints (Warner, 1983:128-9; Gale, 1985:299). The present paper will merely suggest some obstacles to their implementation. Appellate court decisions are treated as data. Sociologists have suggested that legal struggles illuminate our understanding of issues, contending parties, and the structure of power in America (Molotch, 1970; Turk, 1976:282-288; Chambliss and Seidman, 1982:153-155, 207-255).

People And The Magnuson Fishery Conservation Management Act

The detailed provisions of the MFCMA (PL 94-265, 1976 as amended 11 times but especially in 1980 in PL 96-561 and in 1983 in PL 97-453) have been extensively covered in the law reviews

(Rogalsky, 1980; Greenberg and Shapiro, 1982; Warner, et al., 1981, Juda, 1986) and in environmental and management publications (Knight, 1977; Harville, 1980; Bishop, et al., 1981; Hennessey, 1983; Warner, 1983). These evaluations suggest that since enactment of the MFCMA, numerous problems of implementation and legal interpretation have surfaced.

Although the MFCMA provides for review of its impacts by the regional councils, such reviews focus more on effects of plans on stocks and area-wide harvesting—marketing of individual species of fish, not on people. Impacts of FMP's on participants at all levels of implementation (in the Councils, in NMFS, in the Coast Guard and state enforcement agencies, and in the industry—afloat and ashore) have not been assessed because such research is impossibly expensive (politically as well as economically; see Kiers, 1973; Hennessey, 1981; Barber, 1987). One problem is access to informants. Regulatory and enforcement agencies survive by secrecy. So do fishermen (Rogalski, 1980). There are probably intra- and interagency conflicts that escape the attention of outsiders. For example, William G. Gordon, a NMFS administrator, complained that NMFS personnel in regional offices overemphasized environmental protection (Sullivan, 1984). However, outsiders (social scientists) may have several windows on the regulatory process. One of these is through MFCMA-required participation in the creation and implementation of Fishery Management Plans (FMP's). What can be seen through that narrow window on the management process? Here, I will rely on the observations of Smith (1982); Blomo, et al. (1983); Gale (1985); Parades, Acheson, McCay, Orbach, and Spoehr (1985); Barber (1987); and my own brief experience with an FMP to sketch gaps between MFCMA's intentions and social reality.

Limitations of the Planning Process. The MFCMA was enacted to prevent overfishing. Politically, it was born out of American fishing interests' frustration with the success of heavily-capitalized foreign fleets (Japanese, Russians, etc.) and declining fish stocks (Rogalsky, et al., supra). The Act establishes 8 Fishery Management Councils to make plans for relevant species of fish and amend such plans as conditions change. The patently political nature of planning is concealed behind the biological concept of maximum sustainable yield (MSY) and a hybrid concept of optimum yield (OY) which joins economic and social considerations with MSY. OY is to be established using the "best available" scientific information on the advice of Scientific and Statistical Committees (SSC's). Politically, the inputs of the biologists are the safest—hence they constitute the backbone of the plan. Economists' inputs are next, since these are based on the "hard data" of official statistics on landings and prices (which ignore an underground economy). The sociologist or anthropologist's inputs come last. These have a double handicap of being more politically sensitive and being based on fragmentary or grossly aggregated data (there are few detailed studies of fishing communities such as the excellent social-impact analysis by Blomo, Orbach and Maiolo, 1983 and none for a whole region). Given the politics, the pecking-order of scientists and "available" data constriction, the allowance for social impact is somewhat mythical (Rhodes' Law # 1: If it can't be represented by catch size, pounds or dollars, it doesn't really matter—see Hennessey, 1981; Dewar, 1983; Gale, 1985; Barber, 1987).

Bishop, Bromley and Langdon (1981:210) are economists who seem to think multiobjective studies can be performed to establish weights for all relevant factors in a plan and plugged into an equation of the form:

$$U(A) = W U A x$$

Where $U(A)$ is a multiattribute utility function, W is a weight assigned to the j th single attribute utility level, A represents a matrix and x represents values of attainment levels for competing attributes (assuming linearity). There are several problems with this apparently straightforward solution. Biologists' inputs to the plan depend upon past area-specific trawls. With over half a million tons of pesticides produced annually, and a 267% increase in America's polluted streams (Stat. Abstr., 1987:189-192), catastrophic depletion of fish species in a local area is no longer a remote possibility (there are now 41 endangered and 23 threatened species of fish in our waters, Stat. Abstr., 1987:192). Chestnut and Davis (1975:1) conclude there isn't a technical way of figuring out when a stock will reach a point of serious decline. Given the slow turnaround time for plan amendment (Harville, 1980:124; Barber, 1987:11-12), the house may be burnt to the ground by the time the fire department gets there. Likewise, dramatic fluctuations in the seafood market may upset the elegant calculations of the economists.

Perhaps the most vexing problem is that of establishing weights for variables in what is essentially a linear-programming problem. There is the matter of weighing benefits and costs to the present generation against benefits and costs to future generations (see Gujarati, 1984; DiMento, 1986 on difficulties in establishing "discount rates"). I find little reference to this issue in the FMP literature. Mark Sagoff (1981), a philosopher, has poignantly raised the more general question of whether society is something more than a market. He quotes Henry Adams at the Paris Exposition of 1900 who, on viewing the dynamo, observed that it functioned as the modern equivalent of the Virgin; i.e., efficiency replaces infinity as the central conception of value (1981:1284). Sagoff observes that devotees of the Shrine have greatly decreased, but the cult of Pareto Optimality has many. Thus, the planner's approach to value is pitched entirely at the level of the consumer, i.e., how much is the individual willing to pay to preserve the _____ (insert "sea turtle," "porpoise," etc.). He raises the question as to whether those capable of paying the most should prevail? Placing the greatest weight on efficiency, the highly-capitalized large scale fishery business can harvest the sea more efficiently than the "cottage-industry" fisherman. The cost of relegating the small-scale fishermen to the unemployment line is an "externality" to the business economist (meaning that the firm will not have to bear costs of this displacement). Yet, fishing villages are often located in depressed local economies, and fishermen are less easily adapted to alternative employment (Blomo, Orbach and Maiolo, 1983; Rhodes, 1986). Some "limited-entry" plans provide for inclusion of traditional fishermen (Parades, et al., 1985). However, the long-term prospects for them are not encouraging. Based on West (1982) and modifying Leo Durocher's famous dictum, I offer Rhodes' Law # 2: "Little guys finish last"—referred to in another context (Merton, 1973) as the "Matthew effect" after Matthew 25:29. M. Estelle Smith has brilliantly exposed the disadvantage of the small-time fisherman in the FMP process (1982). The small-scale operator may be the most endangered species. If small operators are less efficient in sweeping the ocean clean, they may provide the best hope for the fisheries (Bell, 1981; Maiolo and Orbach, 1982: Section 2; McCay, 1984). If the marine habitat includes the small-scale fisherman as well as the fish, perhaps biologist's trawls should include an assessment of this "endangered species".

Appellate Court Decisions As A Window On The Fishery Management Process

It may be useful to examine what happens to environmental and fishery conservation in the courts. Court records and proceedings are public. However, only appellate court decisions are readily available. Again, much vital information on the legal decision-making process is unavailable to the social scientist. As Lenny Bruce once remarked, "In the Halls of Justice, the justice is in the halls." However, the courts are final arbiters of disputes arising from environmental legislation. Indeed, environmentalists have turned to the courts when otherwise overwhelmed by powerful business interests (Rosenbaum and Roberts, 1972; Weisbrod, 1978; Rogers, 1986; Wandesforde-Smith, 1986). In a sense, no legislation is law until it is tested in the courts (Holmes, 1897). Appellate court decisions make law incrementally (Baum, 1976; Chambliss and Seidman, 1982:207-264; Daniels, 1985). The lawyer's "stock in trade" is predicting what the courts will do in your case. From the enforcement officer's perspective, a good "bust" is one that will be successfully prosecuted in court. Thus, appellate court decisions may be one useful indicator of how law is used to protect the fisheries and marine habitat.

How has the MFCMA fared in the courts? Most cases involve the issue of jurisdiction but some challenge regulatory procedure. Because courts are constrained by precedent, the "how" and the "why" of MFCMA's tests in court go back to English common law on King's sovereignty over coastal waters and to U. S. Supreme Court's affirming federal supremacy over navigable waters. However, the first landmark case on limits of state jurisdiction is *Bayside Fish Flower Co. v. Gentry* (297 U.S. 422, 1936) which upheld California's right to regulate sardines brought into the state even though caught outside territorial waters. The court rejected the argument that the landing law placed an improper burden on interstate commerce and justified its decision as a shield against evasion of local policy, there being no way to tell where fish are caught. The next important case is *Skiriotes v. Florida* (313 U.S. 69, 1941) which upheld a Florida resident's conviction for harvesting sponges with illegal gear outside the state's waters. The court recognized the state's power to regulate its citizens absent any conflict with federal law. Other decisions by federal and state appellate courts (e.g., *State v. Bundrant*, 546 P.2d 536; *Toomer v. Witsell*, 334 U.S. 402; *Takahashi v. Fish & Game Comm'n*, 334 U.S. 410, 1948; *United States v. Louisiana*, 363 U.S. 1, 1960; etc.) refined federal-state and state-state jurisdictions prior to MFCMA.

Federal and state court decisions since MFCMA have upheld supremacy of federal over state jurisdiction and the power of the Secretary of Commerce (as advised by the FMC's) to regulate the fisheries and police powers of agencies to enforce that regulation. In *State of Maine v. Kreps* (563 F. 2d at 1043, Aug. 1977 and at 1052, Sep. 1977) the U. S. Court of Appeals (1st Cr.) upheld the authority of the Secretary to set quotas for foreign fishing of herring stock and that allotting of only 12,000 metric tons to U. S. fishermen was not "arbitrary and capricious." The court observed that international relations with Canada may outweigh herring in over-all benefit to the nation. As occurs so often in decisions on regulation, the court observed that it "may not substitute its own judgment as to values and priorities for that of MFCMA." In the second hearing the court satisfied itself that the Secretary had sufficient basis for OY and the foreign quota and he had complied with Congress's intended standards. At 1096 it states, "We have neither the authority nor the expertise to project future policies for the Secretary to follow."

Two important cases were settled in 1980. In *People v. Weeren* (26 Cal. 3d 654; 607 P.2d 1279, 163 Cal. Rptr. 255; cert. denied, 449 U.S. 839) the federal court affirmed the state court's conviction of California citizens for taking broadbill swordfish outside state waters with assistance of spotter aircraft. It ruled that even though the boat was federally registered, it had a California license for swordfish and that there was no FMP to preempt state law. The second case, *Pacific Coast Federation of Fishermen's Ass'n, Inc. v. Secretary of Commerce* (D. C. Cal. 1980; 494 F. Supp. 626) challenged the Secretary's emergency interim regulation restricting salmon fishing off the coasts of Washington, Oregon and California. The Federation sought an injunction to set aside the regulation closing the fishery. Both the district and appellate courts denied the request for injunction, holding that the regulation was in accord with MFCMA. The plan was supported by "best available data" under the circumstances, the EIS was adequate, the ruling was "not arbitrary or capricious," and "the Secretary and the Council made a good faith effort to fulfill the mandate of the act."

In 1982, the relationship between federal and state regulation was further defined in *Anderson Seafoods, Inc. v. Graham* (529 F. Supp. 512, N.D. Fla.) in which Anderson Seafoods sought an injunction to forbid Florida to enforce its law prohibiting taking of food fish "without the waters of" the state with a purse seine or possessing food fish so taken, claiming federal preemption. Ruling against Anderson, the court held that MFCMA allows exercise of state police power where there is no conflict with federal fishery regulation, the vessel is registered in the state, and the state's legitimate interest in the fishery justifies effect of its regulating fishing in the FCZ. However, other court decisions have raised questions about the limits of state interest in fishery protection. In *Bethell v. Florida* (741 F.2d 1341, 11th Cir., 1984), the court overturned the conviction of fishermen arrested 8 miles outside Florida's territorial sea for possession of illegal fish traps. It held that the state must prove intent to use the traps within territorial waters. In writing that decision, the court referred to a Florida Supreme Court decision (*Southeastern Fisheries v. Department of Natural Resources*, 453 So. 2d 1351, Fla. 1984) which held that state law was preempted by MFCMA in the FCZ. More recently, two cases illustrate the greater power of oil companies over that of states and environmentalists. In 1984, *California v. Secretary of Interior* (104 S. Ct. 656), the Supreme Court ruled that oil lease sales in the OCS are not subject to state review. In *Exxon v. Fischer* (CV No. 84-2362, C. D. Cal. Oct 11, 1985) the Court found that oil exploration did not have sufficient effect on a thresher shark fishery. These recent developments do not bode well for fishery protection.

Perhaps the most intriguing case on the jurisdiction issue is last year's *Florida v. Eugene Raffield, et al.* (515 So. 2d 283). Raffield's company processed fish legally taken off Louisiana's coast and trucked to Florida, and was cited for possession of fish taken with the use of "a purse seine, purse gill net, or other net using rings other devices on the lead line thereof" (FS 370.08, 3). The Gulf County Court (where Raffield's firm is located) determined on June 30, 1986 that MFCMA preempted Florida's right to regulate commercial fishing outside its territorial waters. However, the Florida Court of Appeal (515 So. 2d 283) on October 20, 1987 reversed that decision. Citing *Bayside* (supra), *New York ex rel. Silz v. Hesterberg* (211 U.S. 31; 29 S. Ct. 10, 52 L. Ed 75, 1908) and *State v. Millington* which banned the importing of undersized shrimp into Florida (377 So. 2d 685, 688, Fla. 1979), the court held that without "possession" provisions, conservation laws would be unenforceable.

Enforcement Of The MFCMA

The evaluation of how fishery regulations are being enforced constitutes a "black hole" in the literature on fishery management. There are numerous decisions by federal and state courts upholding authority of enforcement officers to board and inspect vessels for compliance with fishing regulations (for examples see *Kenney v. Kirk*, 212 So. 2d 296, 1968; *State v. Casal* 410 So. 2d 152 which cites 459 U.S. 821; *Fulford v. Graham*, 418 So. 2d 1204, 1982).

There is an interesting federal case, *Jones v. Gordon*, 621 F. Supp. 7, in which Greenpeace (and State of Alaska Tour Boat Operators) sought injunction against NMFS (with Sea World as codefendant) alleging that NMFS violated its duties in not requiring an EIS for a permit to capture up to 10 killer whales and do research on up to 90 more near the southeast coast of Alaska. On January 16, 1986, the court agreed that NMFS failure to require an EIS for interfering with 100 out of an estimated 300 animals in the face of uncertainty of environmental impact and unknown risk to the species was a violation of the NEPA 42 U.S.C. §4321. On June 18, 1986 the court upheld an appeal by NMFS (No. 85-3739 9th Cir.) with an exception that NMFS was to reconsider its decision not to prepare an EIS. Although this case involves a challenge to permitting, it suggests that environmental public interest groups can take enforcement agencies to court for failing to enforce procedural requirements of MFCMA or the Lacey Act of 1981 (see *Newell v. Baldridge* 548 F. Supp. 39, 1982). However, such suits are difficult to win (*Houck*, 1981).

The Coast Guard is responsible for enforcing FMP's in the EFZ. I find no evaluation research on how well it is performing this function. Review of U. S. Senate hearings (Committee on Commerce, Science and Transportation, 1982 and 1988) suggests that the war on importation of controlled substances and the interdiction of illegal aliens competes with enforcement of fishery regulation—perhaps to the disadvantage of the latter even though budgeted separately. Enforcement of regulations among foreign fishing fleets consumes about two-thirds of the total budget for enforcing fishery laws (1988:57). The Coast Guard has a goal of detecting or deterring 95% of foreign violations of fishery laws (1982:39). Its estimated success in detecting and deterring both foreign and domestic violations is around 50 to 75% but this may be overly optimistic (1982:46-47). Hoagland (1985:69-71) gives figures indicating only 10.4% of total patrol boat time is available for law enforcement; 64.1% is either for maintenance (of 40-year-old boats) or standby (personnel constraints). Given the federal budget crunch, user fees for environmental protection are being considered (Hoagland, 1985). Although there are observers on foreign vessels in the EFZ, there are none on domestic vessels (*Barber*, 1987:16). State enforcement in the adjacent territorial sea probably has similar enforcement problems (*McCay*, 1984). In Texas waters at least 85% of illegal netting escapes enforcement (*Anonymous*, April, 1983). It is not unlikely that protected species of fish are illegally taken in the EFZ and off-loaded at obscure times and places before any enforcement official is the wiser. To sum up the enforcement situation: probably the MFCMA is not fully protecting the EFZ.

The Coastal Zone Management Act And Protecting The Estuaries

The CZMA of 1972, like the MFCMA, is a child of the late-1960's peak of environmental concern. It provides funding for states to plan and administer programs for the territorial sea and adjacent lands according to guidelines set out in the act (16 U.

S. C. 1456; see also Christie, 1985:231-297 for overview and court cases). Although state participation is voluntary, the state bureaucrats' thirst for federal money has spurred participation. Yet, success of the act in protecting estuaries is doubtful. Wolf (1985:9) reports that the Act's Office of Ocean and Coastal Zone Management and officers of state and local agencies "find themselves mired in a morass of territorial jealousy, confusion, red tape and litigation." Citing *Cape May Green, Inc. v. Warren* (698 F 2d 179, 3rd Cir. 1983), he observes that the courts have been deferential to states and localities in their efforts to plan for the coastal zone, except where state interests interfere with oil interests (*Sec. of Interior v. California*, 104 S. Ct. 662). There are a host of court decisions supporting the planning authority of state and local governments (Hamann, 1986). It is subject to legal recognition of standing, estoppel, and due process. Perhaps the most interesting test of state planning power in the coastal zone is *Graham v. Estuary Properties* (Fla. S. Ct., 339 So. 2d 1374, 1381) which upheld protection of sensitive areas and pollution control as a legitimate state concern. In that case, the developer sought a permit to dredge and fill a mangrove swamp near Ft. Meyers from the county commission. The Southwest Regional Planning Council recommended that the commission deny the permit because it would adversely affect commercial fishing in the adjacent bay and the developer sued. The developer won on 5th Amendment grounds ("taking" without compensation) in the state appellate court, but the state supreme court ruled that damage to the general public (i.e., fishermen) outweighed potential benefit to the developer, observing that owners have no unlimited right to change the essential character of their land. The origins of this limitation on rights to use of property are based on the common laws of nuisance and negligence. Although the outcome of this legal battle is encouraging regarding protection of estuaries, an over-all assessment of attacks on the estuaries is not (see Caplin, 1977; Chisolm, 1986; U. S. Coast Guard, 1986:34-35; and Atwood, et al. 1987:28-32; especially testimony of Donald F. Boesch before a U.S. Senate hearing on Coastal Zone Management, 1987). Hays (1987:168-170) concludes that change from the "consistency" (with state plans) to the "multiple use" doctrine has shifted implementation of CZMA in favor of business interests. Generally, these interests have successfully attacked state protection of the CZ through the preemption clause of the Constitution (*Granite Rock v. California Coastal Commission* 768 F. 2d 1077 9th Cir., 1985, appeal No. 85-1200, 1985; also *Chemical Waste Management Inc. v. Baldrige* No. 86-624 D.D.C. June 4, 1986). However, in *Norfolk Southern Corp., et al. v. Oberly, et al.* (632 F. Supp. 1225 D. Del. 1986, appeal pending 86-5322 3rd Cir. May 7, 1986) it was ruled that when the secretary of Interior approved Delaware's CZMP, that state's law was immune from the Commerce Clause. However, it is hard to be optimistic when NOAA has backed off defense of the CZ following a White House directive of June 6, 1986 that regulation not interfere with meeting the nation's energy needs (Eichenberg, 1987).

The politics of protecting one estuary are very complex (see Figure 1 from Rhodes, 1986). A local man in the business of collecting marine specimens for research laboratories may have summed up Florida's coastal situation more poignantly (if not as elegantly as academicians): "Planning commissions rubber-stamp developers proposals ... environmentalists have to fight with their own money while the Corps of Engineers is on the side of the developers ... the coast is being eaten alive, like being devoured by termites, and the legislature says 'we'll save this little strip of green marsh' ... the whole coastal environment is going down the tube very rapidly" (Apalachicola Times, 1976).

Some Thoughts On Courts As Defenders Of The Environment

Defenders of the ecosystem have often been disappointed with the outcomes of public interest suits. Rogers (1986: Vol. I:227, Vol. II:9) notes that none of the air pollution cases and only one out of three clean water cases have been victories for environmentalists. The courts have been a better friend of fishery management in the EFZ than in the CZ, primarily because of the general tendency of federal courts to support federal agency decisions (assuming there are no critically powerful interest groups like oil or chemical cartels challenging agency rulings). Rhodes and Christie (1987) have contrasted the ideology of the court system with its realities of operation and raised questions about the courts' bias in favor of business and political interests over preserving the environment. They note (1987:4) that less than 1 percent of all cases coming to trial before federal courts are environmental issues. Judges as a group have neither the mind-set nor the expertise that would make them dependable friends of the ecosystem (Oakes, 1977; Jasanoff and Nollin, 1981; Rhodes and Christie, 1987). Basically, their strategy is to bounce tough environmental problems back to the agency or the Congress (see cases cited above). Also, lower-level courts are vulnerable to political pressure. The judge who affirmed Indian treaty rights in the Payallup salmon fishery against organizations representing 6,600 commercial fishermen and 280,000 licensed recreational fishermen was soundly defeated in the next election (Brun, 1982:283). The implication of this review is that passage of legislation in defense of the marine environment is a first step in protecting the marine environment and the small-scale fishermen who depend on it. Contrary to ideology, the courts are not invulnerable to pressures from powerful business interests. Defenders of the ecosystem need to win the general public's attention and support and translate that support into stronger protective legislation and adequately funded and agency-committed enforcement of fishery and coastal-zone regulation.

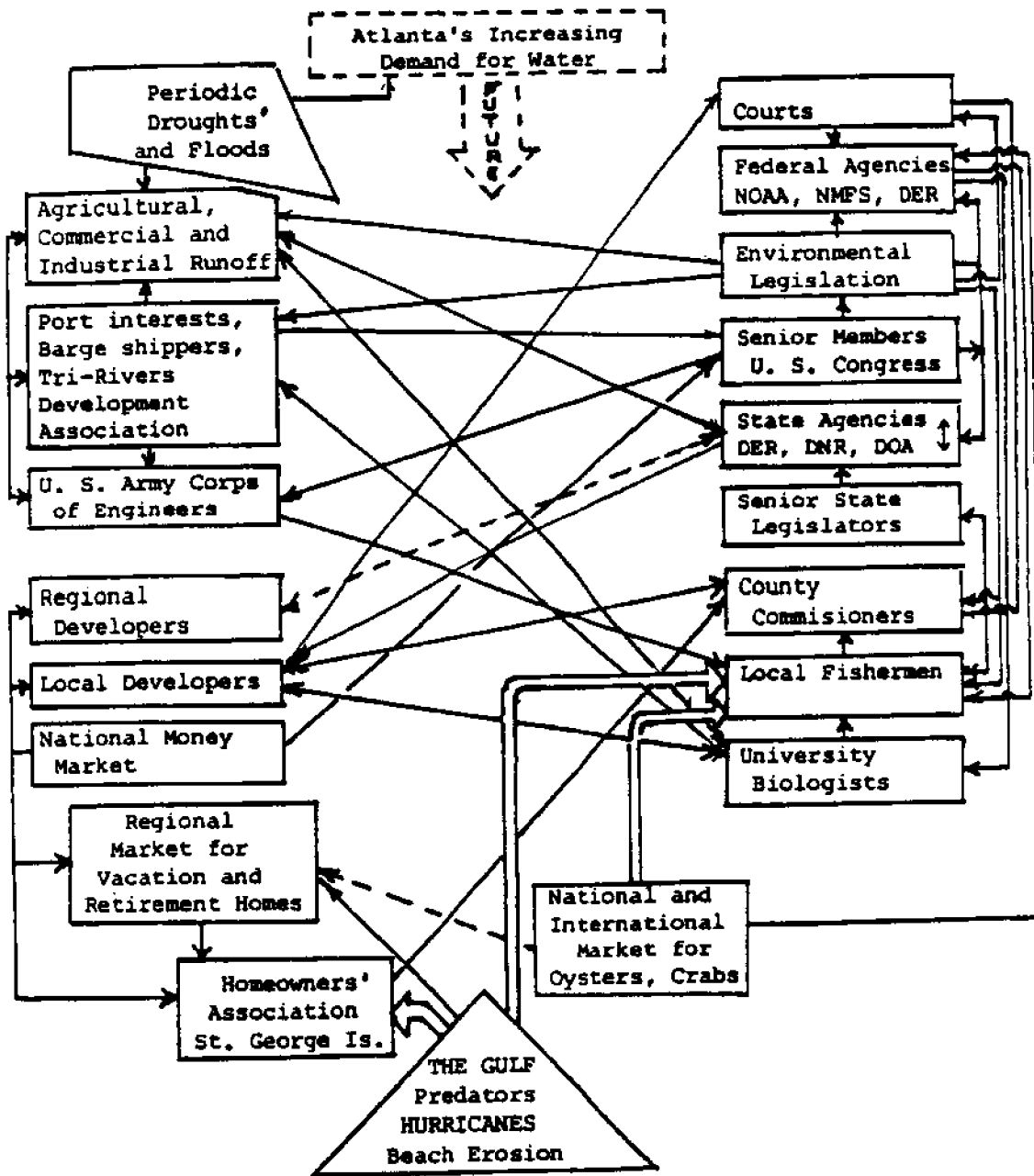
REFERENCES

- Anonymous 1983 Port News—South Atlantic and Gulf. Fishing Gazette 100(April):62.
- Apalachicola Times, 1976 March 25: 1,4,5.
- Atwood, Donald K., et al. 1987. Petroleum pollution in the Caribbean. *Oceanus* 30(Win.):25-32.
- Barber, William E. 1987 The fisheries management structure and process under the MFCMA. *Fisheries* 12(Nov.-Dec.):10-17.
- Baum, Lawrence 1976 Implementation of judicial decisions. *Amer. Politics Qtr.* 4:86-114.
- Bell, Frederick 1980 Fishery economics. pp. 197-218 in Robert T. Lackey and Larry A. Neilson (eds.) *Fisheries Management*. New York: Halstead-Wiley.
- Bishop, Richard C., Donald Bromley and Steven Langdon 1981 Implementing multiobjective management of commercial fisheries. pp. 197-218 in Lee G. Anderson (ed.) *Economic Analysis for Fishery Management Plans*. Ann Arbor, MI: Ann Arbor Science Pubs.
- Blomo, Vito J., Michael Orbach and John Maiolo 1983 Estimated socio-economic impacts in North Carolina of a shortened mehaden season. Working Paper 83-4. Sea Grant Pub. UNC-SG-WP 83-4. Greenville, NC: East Carolina U.
- Boesch, Donald F. 1987 Committee on Commerce, Science & Transportation. U.S. Senate. S. Hrg. 100-21 Washington: USGPO.

- Brun, Rita 1982 The Boldt decision: Legal victory, political defeat. *Law & Policy Qtrly.* 4(July):271-298.
- Caplin, L. E. 1977 Is Congress protecting our water? *U. Miami Law Rev.* 31 (Spr.):445.
- Chambliss, William and Robert Seidman 1982 *Law, Order, and Power* (2nd ed.) Reading, MA: Addison-Wesley.
- Chestnut, A. F. and Harry S. Davis 1975 *Synopsis of Marine Fisheries in North Carolina.* Sea Grant Pub. UNC-SG-75-12, Raleigh, NC: North Carolina State U.
- Chisholm, Clarence 1986 *The Nation's Environmental Laws—Conflict and Stalemate, 1980-1984.* No. P 1878 2-24. Monticello, IL: Vance Bibliographies.
- Committee on Commerce, Science and Transportation, United States Senate 1982 *Reauthorization of the U. S. Coast Guard for Fiscal Year 1982.* Washington: USGPO.
- _____ 1988 *Reauthorization of the U. S. Coast Guard for Fiscal Year 1988.* Washington: USGPO.
- Council on Environmental Quality 1985 *Annual Report.* Washington, DC: Council on Environmental Quality.
- Daniels, Stephen 1985 *Ladders and bushes: the problem of caseloads and studying court activities over time.* *Amer. Bar Found. Res. J.* 1984-5(Fall):751-95.
- DiMento, Joseph F. 1986 *Environmental Law and American Business.* New York: Plenum.
- Dewar, Margaret E. 1983 *Industry in Trouble: The Federal Government and the New England Fisheries.* Philadelphia: U. Pennsylvania Press.
- Eichenberg, Timothy 1987 *Federalism and federal consistency: the state perspective.* pp. 542-555 in Orville Magoon, et al. (eds.) *Coastal Zone '87* Vol. 1 New York: Amer. Society of Engineers.
- Gale, Richard P. 1985 *Federal management of forests and making fisheries: A comparative analysis of renewable resource management.* *Nat. Resources J.* 25:275-315.
- Greenberg, E. V. C. and M. E. Shapiro 1982 *Federalism in the fishery conservation zone.* *Sou. Cal. L. Rev.* 55:641-690.
- Gujarati, Damour 1984 *Government and Business.* New York: McGraw-Hill.
- Harmann, Richard G. 1986 *Constitutional Planning Issues in Local Coastal Resource Protection.* Rept. No. 85. Gainesville, FL: College of Law.
- Harville, John 1980 *Management needs and interactions.* pp. 115-135 in Janet Caudle (ed.) *State and Interstate Jurisdiction: Problems and Progress.* UNC-SG-80-02 Raleigh, NC: Water Res. Inst., N. Car. State U.
- Hays, Samuel P. 1987 *Beauty, Health and Permanence: Environmental Politics in the United States 1955-1985.* Cambridge: Cambridge U. Press.
- Hennessey, Timothy M. 1981 *Toward a positive model of fishery management decision-making.* pp. 239-260 in F. W. Hooke, R. L. Friedman and T. M. Hennessey (eds.) *Making Ocean Policy.* Boulder, CO: Westview Press.
- Hoagland, Porter III 1985 *The role of the U. S. Coast Guard.* *Oceanus* 28(Sum.):67-68.
- Holmes, Oliver Wendell 1897 *The path of law.* *Harvard L. Rev.* 10:457-478.
- Houck, Oliver A. 1981 *Judicial review under the Fish and Wildlife Coordination Act: a plaintiff's guide to litigation.* *Envmtl. L. Reporter* 11:50043-50.
- Jasanoff, Shiela and Dorothy Nolkun 1981 *Science, technology and the limits of judicial competence.* *Science* 214(Dec. 11):1211-15.
- Juda, Lawrence 1986 *The Exclusive Economic Zone: Compatibility of national claims and the U.N. Convention on Law of the Sea.* *Ocean Devpm't. and Int. L.* 16:1-58.
- Kiers, Albert W. 1973 *International regulation of marine fisheries.* Surrey, England: Fishing News Limited (no vol. or date).
- Knight, Gary 1977 *Managing the Sea's Living Resources.* Lexington, MA: Lexington Bks.
- Koch, Christopher 1978 *A constitutional analysis of limited entry.* pp. 251-68 in R. Bruce Rettig and J. C. Ginter, *Limited Entry as a Fishery Management Tool.* Seattle: U. Washington Press.
- Maiolo, John R. and Michael K. Orbach 1982 *Modernization and Marine Fisheries Policy.* Ann Arbor, MI: Ann Arbor Science Pubs.
- Maril, Robert Lee 1983 *Texas Shrimpers.* College Station, TX: Texas A & M U. Press.
- McCay, Bonnie J. 1984 *The pirates of piscary: ethnography of illegal fishing in New Jersey.* *Ethnography* 31:17-37.
- Molotch, Harvey 1970 *Oil in Santa Barbara and power in America.* *Soc. Inquiry* 40:131-44.
- Morey, Edward P. 1980 *Fishery economics: An introduction and review.* *Nat. Res. J.* 20:827-51.
- Oakes, James L. 1977 *Environmental law.* *Envmtl. L. Repr.* 7:50029-33.
- Orbach, Michael K. 1978 *Social and cultural aspects of limited entry.* pp. 211-29 in R. B. Rettig and J. Ginter (eds.) *Limited Entry as a Fishery Management Tool.* Seattle: U. of Washington Press.
- Paredes, J. Anthony and comments by J. Acheson, T. Leary, B. McCay, M. Orbach, S. Peterson, and A. Spochr. 1985 "Any comments on the sociology section, Tony?". *Committee work as applied anthropology in fishery management.* *Hum. Org'n.* 44:177-86.
- Prescott-Allen, Christine and Robert 1986 *The First Resource.* New Haven: Yale U. Press.
- Radovich, John 1981 *The collapse of the California sardine fishery: What have we learned?* pp. 107-36 in Michael H. Glantz and J. Dana Thompson (eds.) *Resource Management and Environmental Uncertainty.* New York: Wiley.
- Rhodes, A. Lewis 1986 *Competing interests at Apalachicola Bay.* paper presented at annual meeting of Society for Study of Social Problems, New York.
- Rhodes, A. Lewis and Donna R. Christie 1987 *The legal system and environmental protection.* paper presented at annual meeting of Society for Study of Social Problems, Chicago.
- Rogalski, W. R. 1980 *The Unique federalism of the regional councils under the Fishery Conservation and Management Act of 1976.* *Boston Coll. Envmtl. Affairs L. Rev.* 9:163-203.
- Rogers, William H. 1986 *Environmental Law: Air and Water.* St Paul, MN: West. Pub.
- Sagoff, Mark 1981 *At the Shrine of Our Lady of Fatima or why political questions are not all economic.* *Ariz. L. Rev.* 23 (Fall):1283-98.
- Smith, M. Estelle 1982 *Fisheries management: Intended results and unlimited consequences.* pp. 57-93 in J. R. Maiolo and M. Orbach, *Modernization and Marine Fisheries Policy.* Ann Arbor, MI: Ann Arbor Science Pubs.
- Sullivan, Carl 1984 *The National Marine Fisheries Service habitat conservation policy: an interview with William G. Gordon.* *Fisheries* 9(May-June):3-5.
- Turk, Austin 1976 *Law as a weapon in social conflict.* *Soc. Probs.* 23 (Feb.):276-91.

- U. S. Coast Guard 1986 Polluting Incidents In and Around U. S. Waters Calendar Years 1983 and 1984 COMDTINST M16450.2G (Sept.) Washington, DC:USGPO.
- Wandesforde-Smith, Geoffrey 1986 Learning from experience, planning for the future: Beyond the parable (and paradox?) of environmentalists as pin-stripe pantheists. *Ecology Law Qtry.* 3(3)715-58.
- Warner, L. S., R. Finamore and R. Bean 1981 Practical application of the conservation aspects of the Fishery Conservation and Management Act. *Harvard Envmtl. L. Rev.* 5:30.
- Warner, Langdon S. 1983 Conservation aspects of the Fishery Conservation Management Act and the protection of critical marien habitat. *Nat. Resources J.* 23(Jan.)97-130.
- Weisbrod, Burton A. (ed.) 1978 *Public Interest Law: An Economic and Institutional Analysis.* Berkeley: U. of California Press.
- West, Patrick 1982 *Natural Resources and Rural Poverty: A study of the political sociology of natural resources.* Ann Arbor: School of Natural Resources, U. of Michigan.
- Wolf, Michael Allen 1985 Accommodating tensions in the coastal zone: An introduction and overview. *Nat. Resources J.* 25(Jan.)7-20.

Figure 1. Conflicting Interest and Factors Affecting Apalachicola Bay



COMMUNITY-ORIENTED ANALYSIS: VIEWING POLICY ALTERNATIVES FOR THE GULF COAST REGION

Dennis L. Soden
University of West Florida

ABSTRACT

It is increasingly apparent that the coastal region of the Gulf of Mexico is involved in a struggle about how best to manage the important coastal resources. At the core of this issue is a struggle brought about by increased land- and water-use patterns which are often at odds with existing standards. As the gulf coast region continues to develop, it may be assumed that public attention will focus upon proper land- and water-use policies aimed at balancing preservation and development. This paper assesses two theoretical frameworks which will guide regulation and policymaking: the "commons model" and "New Resource Economics." This research proposes that a community-based approach be employed as one viable alternative for policymaking and management as they relate to Gulf Coast resources.

Introduction

Increasingly it is apparent that the Gulf of Mexico's Coastal Regions are involved in a struggle about how to best manage the region's important coastal resources. At the core of this struggle are increased land and water-use patterns which are often at odds with past or existing standards. The Gulf Coast region is one having two reputations. At one extreme, every effort is being made to preserve the pristine and unspoiled natural environment, many with attributes unique to the Gulf Coast (i.e., Apalacticola National River Estuarine, Big Cypress National Preserve, Padre Island National Seashore). At the other extreme, the Gulf Coast has opened its doors to development both offshore, witnessed by the oil industry present off the coasts of Louisiana and Texas, and onshore, evidenced by the plethora of condominium and gulfside developments lining the coastlines in many locales from Brownsville, Texas to Key West, Florida. As population continues to increase in this portion of the Sunbelt, new demands are being placed on our coastal resources; problems which many contend will create widespread problems for the coastal environment of the Gulf of Mexico (O'Connell, 1985; Chasis, 1985). As this problem develops, it can be assumed that public attention will increasingly focus upon proper land and water use policies aimed at balancing both preservation or developmental interests. Thus, it is timely to assess theoretical frameworks which will guide regulation and policymaking as part of our search for a viable future on the Gulf Coast. Such a future is one in which development is nurtured, while the character of the region's valuable natural resources is maintained. This paper is a first step in assessing the present period—a period of transition—which is occurring on the Gulf Coast. This transition can be characterized as a search for an appropriate balance between

economic development, paramount to the growth and vitality of the Gulf area, and environmental quality, upon which the history and much of the economy, in fact, is based. This paper is far from definitive. The field of coastal zone policy is very complex, interdisciplinary and dominated by interlocking sets of technical, scientific, legal, social, political and economic considerations. A grasp of the available approaches for reaching the future can, however, be obtained. The basic policy issues are not exceedingly difficult to analyze, and when technically complex, still not beyond the ken of the general public (see, for example, Soden, 1987a). Three arenas of coastal zone policy important to the Gulf Coast are considered in this paper. First, the potential for conflict which exists as part of coastal zone use and development will be addressed. Second, a consideration of the two major management concepts which are predominant in the current natural resource and environmental policy literature is undertaken. Third, a management concept for the future "safe development" of the region's natural resources—a community-based model, based on the work of Stephen B. Mumme and Helen Ingram will be forwarded, as an alternative for policymaking and management relative to Gulf Coast resources. Lastly, implications for future research will be forwarded.

Potential Conflicts Among Resource Users

Changes which have impact on coastal resources in the Gulf Coast can be considered in relationship to the conflict which exists when one use is incompatible with one or more other uses. Historically, the largely available and high quality of coastal resources has been taken for granted. Times, however, have changed. In short, both the available quantity and the relative quality may be in short supply in the not-too-distant future.

Because of the evolution which is occurring in most of the Gulf Coast region, considerable potential for conflict among competing resource users exists. Figure 1 displays some coastal resource uses which may come in conflict. While Figure 1 oversimplifies, it does, clearly demonstrate potential conflict which residents and natural resource managers in the Gulf Coast region must be made aware of. The cells in Figure 1 indicate the impact of a particular use upon other uses. It is important to note those uses which are incompatible with each other; these are the areas where the greatest conflict may be expected to emerge. This is clearly a subjective chart, and there may be disagreement with some cells or envisioned impacts which are not noted. The intent is not to imply that appropriate management cannot accommodate multiple uses, but simply to underscore likely conflicts. "Compatible or beneficial" uses may be viewed as consumptive or non-consumptive. Consumptive uses are those which use resources in a generally non-renewable way; removing it from its natural state and not returning it in its original form. In contrast, non-consumptive uses would use the resource and immediately return it to its original state. Use of coastal waters via the Intracoastal Waterway is a non-consumptive use, as is beach recreation. Consumptive uses tend to conflict with one another and, more often than not, non-consumptive uses. The severity of these impacts depends primarily on the quantity of the resource utilized. If non-consumptive uses are maximized, it is obvious that they will be in conflict with consumptive uses. Further, non-consumptive uses may be incompatible with each other (i.e. the use of coastal waters for wastewater disposal is in conflict to recreation or preservationist goals within the same area).

Figure 1 can, therefore, provide a perspective for capturing the essence of the conflict which increasingly characterizes resource management on the Gulf Coast. The current set of situations in

the Gulf Coast region suggest that we are undergoing a transition in population, demography and economic development which will force changes in the use of many of our natural resources. Simultaneously, parallel changes are occurring in the institutional mechanisms designed to manage our natural resources and the environment. For the Gulf Coast, the critical question may well be, can changes in our institutional mechanisms be perfected in time to resolve conflict likely to arise among new and competing users in an era of transition? The answer to this question clearly is not easily attained. Asking it, however, provides a springboard for consideration of management alternatives. Alternatives by which coastal resource issues may be examined in general. A system of management for the resources of the Gulf Coast requires a coordinating comprehensive planning process as the most efficient means of implementing decisions regarding both development and preservation of the region's unique natural resources. The move towards comprehensive planning systems, such as Florida's Growth Management effort, have been heralded as important first steps (DeGrove, 1984; deHaven-Smith, 1987). Nevertheless, deficiencies exist. A framework for best management of our coastal resources requires a "gameplan", "framework", or, in the jargon of the academic, a "theoretical thrust" to direct policymaking. In the next section, a discussion of the most dominant conceptual frameworks which are used in the natural resource policy arena today are examined in light of the Gulf Coast experience. By reviewing these frameworks a sense of alternative futures for use and development of coastal resources may be obtained. Without consideration of these policymaking and planning alternatives a primitive and incomplete view of the issue is obtained.

Approaches to Coastal Water Resource Management: Contending Views

A central issue concerning the use and development of natural resources in the the Gulf Coast region, as in any other, is the need to develop consistent analytical devices. Put another way, it is paramount that a "gameplan" be formulated for resource use and development. In this section two of the more commonly used resource management frameworks are reviewed. Following this, a third framework is put forward in light of the unique social, economic and political characteristics which hold in much of the Gulf Coast region. This exercise may seem frivolous or trivial to many, however, only by beginning to promote discussion of what could become one of the most serious problems we face regionally in the next decade can steps in the right direction may be taken. The two models reviewed include: first, the model of the "Commons", and; second, the private ownership approach labeled "New Resource Economics" by scholars in the field. In response to these a derivative of the populist approach called community-based management will be proposed as an alternative for natural resource management for the region's future.

The Commons Model

One consideration of resource development and protection brings to light the classic questions of equitable choices—namely, who pays and who doesn't pay for development or protection, pollution and degradation versus preservation and aesthetics. In the case discussed here, the "common property resource" belonging to the Gulf Coast community is the set of natural resources, both onshore and offshore, the development or protection of which can politically benefit or cost all or none, in one way or another. The attainment of community-wide benefits requires that disproportionate costs be borne by some citizens, while at the same time greater benefits

accrue to some rather than to others. The decision to undertake management of coastal resources is based on a belief in the common property aspects, namely, that each citizen has a right to access of some portion of a potentially diminishing resource. The decision to avoid what we have come to know, in natural resource and other policy fields, as a "Tragedy of the Commons" (Hardin, 1968) is a situation where "the remorseless working of thing leads individuals, acting in their own best interest, to produce joint consequences not in their long-term interest." The natural resources of the Gulf Coast are an excellent example of a commons, in as much as: (1) ownership of the resource is subject to many common ownership characteristics (i.e., the shared beaches, bays and rivers, or the sharing of groundwater pools); (2) a large number of users are exercising independent rights to the resource (i.e., through public access rights or permit systems); (3) no other user is able to effectively control the activities of others without utilization of specified instructional mechanisms (i.e., the court system), and; (4) in the long-term, total demand upon the resource will exceed the capacity of the common resource to provide benefits (Hardin, 1968).

In the case of a commons dilemma, recognition of a pending crisis within the area eventually triggers community decisions to formulate plans and to initiate development of commons management institutions as a way of responsibly managing the available resources for the "benefit of the community". Presently, the characteristic "commons" nature of Gulf Coast resources has been only partially recognized. A few efforts to achieve collective action among regional neighbors to avert Hardin's predicted "tragedy" exist, however as a whole there is a paucity of regional cooperation.

If institutional measures designed to protect the region's natural resources from overuse are not implemented, the commons will be exhausted and each individual will lose the economic or intangible values associated with use of the resource (Ciriacy-Wantrup, 1975). In such a case, government intervention at the state, interstate-regional, as well as local levels, is required to prevent overuse and excess degradation of the resource. The Commons Model is popular and intuitively makes sense. It has a long and rich history among natural resource managers and scholars (Soden, 1988). Recently, however, it has been challenged by a new wave of literature which also focuses upon institutional needs required for the management of scarce national resources.

New Resource Economics

The New Resource Economics school of thought has been characterized by one commentator as "an almost libertarian outpouring of market-oriented recommendations" for allocating natural resources (Griffin, 1984). From the New Resource Economics perspective shortages of natural resources and conflicts about usage come about because of the lack of balance between supply and demand, not a shortage of total available resources. Natural resources are treated as any other economic commodity and proponents of the school propose that shortages, in either quality or quantity, can be solved by transferring the commodity from lower to higher valued uses (Andersen, 1983; Libecap, 1981; Mumme and Ingram, 1984). Proponents of this view suggest that the existing institutions (i.e., government management, especially at the state level) acts as an impediment to "accurate translation of society's real preference" for resources (Mumme and Ingram, 1984:1).

A recent book by Terry L. Andersen exemplifies this perspective in discussing water resources:

Water prices have been kept below market clearing levels, and the inevitable shortages have followed. The government has responded by attempting to constrain demand, ration water, and increase the available supply. Except in isolated cases where shortages have been caused by drought and where a cooperative community spirit have developed, efforts to ration water have not been successful. Increased water supplies have only been possible through the construction of massive water projects, which have dammed many of our free-flowing rivers and built thousands of miles of aqueducts. These projects have been extremely costly, and it is questionable whether funds for them will continue to be available. Without a price mechanism operating on water supply and demand, crisis situations will continue to arise (Andersen, 1983:5).

Andersen, one of the "gurus" of this movement, prescribes developing a free market for natural resources, whereby individual property rights would supersede state or other government's control.² Any "crisis" of natural resource shortage are dealt with under the New Resource Economics approach by having prices sufficiently attractive to bid resources away from owners whose uses are of low value.

This literature adopts very strong value positions at odds with much of traditional thinking about most of our natural resources (See, for example, Cahn, 1978; Nash, 1982). Considering coastal resources as a commodities which can be privately traded is, obviously, in sharp contrast to the long-standing notions that they are common goods or public goods, with special characteristics meeting needs which are not "practically" dealt with in market transactions (Soden and Vreeland, 1988). Further, the New Resource Economics recommendation seriously threatens the interest of some poor, rural groups who view control over natural resources as essential to community security, self-determination, and culture and lifestyle. Much of the Gulf Coast region, it can be contended, is represented by communities with these attributes.

This study takes exception to the basic assumptions of New Resource Economics with respect to Gulf Coast resources and suggests that the commons model has greater validity. The commons model in conjunction with an alternative framework—community-based management—may prove a means more amenable to the communities of the region. It is also useful to note that New Resource Economics gained political appeal at the same time as the beneficiaries of federal intervention (money supply to large scale development projects) have shifted. In addition, the New Resource Economics school may be expected to outline the economic and the political movement (i.e., Reaganomics) which hastened its rise and visibility. As Stephen Mumme and Helen Ingram suggest:

It is widely conceded that the era of (natural resource) development has given way to one of management where available (resources are) *reallocated* among users rather than new supplies being developed. Few new projects are being authorized which serve the interest of developmental constituencies (Mumme and Ingram, 1984:4, emphasis added).

We are entering a period where other interests who have not previously shared in the benefits of federal projects are beginning or need to begin to assert themselves. More specifically, as demands are pressed close upon available supplies, *coastal regions may be seen as having the necessary resources to alleviate crises elsewhere*. Are the resources of the Gulf Coast threatened? Inasmuch as 75 percent of the nation is expected to live within 50 miles of the coast by 1990 (Milleman, 1986), it is apparent that the demands on the relatively sparsely populated Gulf Coast will be accelerated. New Resource Economics proposes that we transfer

institutional control to individuals and "radically decentralize policymaking" a move which could have dramatic and perhaps damaging implications for the region.

The present, which it may be suggested is a time of transition on the Gulf Coast. Such a period may provide a useful case for re-evaluating New Resource Economics and to suggest an alternative management framework for development and use of the regions Coastal resources.

Searching for Alternatives: Community-Based Management

The incompatibility between the New Resource Economics approach and natural resource allocation problems in the Gulf Coast region can be demonstrated. The political plight of the many low-income rural communities of the Gulf Coast, and the importance of control over their natural resources, can be illustrated by drawing parallels from John Gaventa's work, *Power and The Powerless* (1980). Gaventa discusses the lack of political power among historically less-advantaged communities, and the continued economic poverty which prevails in much of the Appalachian Mountain region in the southern U.S. Gaventa sees three aspects of political power for less-advantaged communities: (1) that the participation in politics is ineffective for reasons relating to a lack of economic resources, lack of political skills, poor political strategy and failure to build support; (2) they are excluded from channels of participation by existing biases in the political system, values of elite decision-makers or procedural biases within the political system; and, (3) they are excluded because these communities themselves accept the policy norms of the prevailing system as their own, contrary to their material and cultural interest, and thus acquiesce in their exclusion from the political and policy process systems. Gaventa's explanations have been used to study the politics of water use in the western United States, particularly the water crisis which has come to the fore on the numerous Indian reservations in the Southwest (Ingram and Mumme, 1984; 1985), as well as water issues in the Appalachian mountains (Soden, 1987b).

Gaventa's first explanation emphasizes the importance of economic and political resources as a base of political power and influence. The natural resources of the Gulf Coast have long standing political and economic values. Further, natural resources are closely linked to political cohesion and calls for forceful government action (Soden, 1985; Mumme and Ingram, 1984; 1985; Pierce and Lovrich, 1980; Steel, Soden and Steger, 1988).

The natural resources of the the Gulf Coast region are not commodities which are absent of special meaning for coastal communities, but are indeed a "different" set of resources with effects and significance beyond their material value. At the core, coastal resources can be described as "fundamental social resources". Natural resources provide the social characteristic of coastal communities and the link to economic and political power, social welfare and equity, community security, cultural cohesion, and the nature of economic and social change within a community (Mumme and Ingram, 1984:26). Along this line of reasoning, Robert and Eva Hunt conclude that "...there is a strong case to be made for a linkage between control over (natural) resources and control over other decisions in the local unit" (Hunt and Hunt, 1976).

Other findings by researchers in the natural resource and environmental policy field point to the connection between control over natural resources and levels of public participation (Hutchinson, et al., forthcoming; Mass and Andersen, 1978; Ingram, et. al, 1980; Pierce and Doerksen, 1976). In studying rural communities, control over natural resource use and development has been recognized as a strong incentive which obtains political cohesion. The most

powerful conclusion which has emerged from a number of case studies of rural natural resource issues is the extent to which resource users in these communities seek control over their destinies and the use of their resources (Soden, 1985, 1987b).

Control over natural resources can be a primary source of political power, organization, and political participation for low income rural communities. Maintaining and reinforcing this control is likely to be crucial for survival or development of some communities, and is an important base upon which communities must build political influence and pursue economic development vital to their community's interest whether those interests be monetary or non-monetary in value.

Gaventa's second explanation for the lack of political power of poor rural communities relates to the bias of political institutions particularly as biases affect what issues are placed upon the political agenda for solution. There does not exist, nor is there a major effort to impose a single regulatory system over the nation's or the region's natural resources, whether coastal or upland, although efforts to move in this direction do exist. The federal rule in the area of natural resource policy has historically been limited to ensuring rights exist to support federal projects such as the major water projects of the west (i.e., Colorado River Basin) or the flood control projects of the east (i.e., T.V.A.). State institutions, laws and regulations predominate, but their focus, more often than not, is on ways to enhance the large population centers. As in other parts of the nation, state boundaries and institutions often do not serve the broader needs of the region. The area which includes northern Idaho's panhandle, western Montana and eastern Washington is an example of a region (known as the Inland Empire in the Northwest) which maintains unique regional concerns unattended to by political institutions of both the state and federal governments designed to service the area. Likewise, it might safely be suggested that a Gulf Coast regionalism exists and that as a region the Gulf Coast is often overlooked or at least its unique set of natural resources are not recognized by the political institutions which govern them. As a result, policy making and planning at both the state and federal levels often may involve decisions which may adversely affect the communities in the region. As demands are pressing closer to supplies, it may be suggested that uncertainty threatens to deprive regional control over natural resources.

This issue is far from the top of the political agenda. Given the nature of the multiple agenda which exist in environmental politics about natural resource usage (Soden, 1986) the result may be that when the issues of use and development do rise to top of the agenda they will not be framed in a way which proves beneficial to the region. This appropriately introduces Gaventa's third face of power.

Gaventa explains that powerless people tend to be highly dependent and susceptible to the "internalization of value of the dominant." Put another way, they accept the definitions of political reality as offered by the dominant classes or governmental institutions (Gaventa, 1980:17). Until recently, the majority of the development in the Gulf Coast region has been framed in terms of "economic development" or "pork barrel," whereby federal and state government moneys were made available to localities which had political support and a "worthy project". In general, environmental quality and natural resource preservation have been non-issues mainly on the grounds that the time was not ripe for their politicalization.

Currently, the political reality is changing. Private management is increasingly suggested as a replacement for federal development projects or public management. With this in mind, New Resource Economics would suggest use of an economic efficiency criterion

as the governing process. Viewed from Gaventa's perspective, a set of normative tenets, such as those of New Resource Economics, to the extent to which they prevail or act as guideposts in the larger political system, may "well underwrite the exclusion of low income rural communities from participation in the policy process," perpetuating political and economic relation among a core (urban-metropolitan) and its periphery (rural poor).

Since Graham Allison's (1971) seminal study of the Cuban Missile Crisis, political scientists have recognized that the choice of framework for evaluation of political alternatives is far from benign. Instead, the choice of analytic framework influences the interests that are considered legitimate, the information that is relevant, and the values and conclusions drawn. The application of New Resource Economics (based on notions of economic man) to natural resources biases the definition of public interest in property rights and disregards the non-mobilized rural poor. Ingram and Mumme (1984; 1985) have proposed in their studies of Indian communities in the southwestern United States, that a different, more community-oriented mode of analysis would be more appropriate. Table 1 illustrates the characteristics of the community-oriented mode as compared with the New Resource Economics.

Community-oriented analysis relies heavily upon political and bureaucratic approaches to policymaking. While rational action based models such as New Resource Economics have proved useful, as Allison notes (1971:5), "there is powerful evidence that it must be supplemented, if not supplanted, by frames of reference that focus on the governmental machine—the organization and political actors involved in the policy process."

Ingram and Mumme's community-based approach recognizes the *group* rather than the individual as the basic unit of interest (Mumme and Ingram, 1984:29). This fits the issue of natural resource management which historically, even in the most riparian-type situations, has been regarded as a community or "common" resource. Within rural communities, Maas and Andersen observe that there have evolved strong traditions of community control over natural resources stemming from the desire to maintain the integrity of the social and economic community. In these communities community control seeks protection from inordinate injury resulting from the actions of individuals, to promote values which pertain specifically to the community proper, and to prevent alienation of natural resources from the community as a whole. This point has clearly emerged at some points in time having been expressed cyclically in natural resource politics (Downs, 1972; Soden 1986; 1987b). Consequently, it can be expected to return as the "stakes" become higher.

The collective mode of analysis is obviously far more emotional and symbolic rather than purely objective and material. In this regard, natural resources are valued by communities not primarily for the economic return, but for what it means for the security and community self-determination.

The community-oriented perspective on coastal resource management relies on the notion that rationality is a social and political process of collective evolution, consent and action. From one community to another this process may vary considerably, ranging from "informal councils to the establishment of task forces and natural resource management districts" (Mumme and Ingram, 1984:30). Whatever the form, this collective action essentially serves, to varying degrees, the individual interests of the members of the community. Community values are reinforced in the process, galvanizing the citizenry as well as providing the potential for innovation and adaptation by the community body.

The basis for decision-making in the community-oriented analysis model emphasizes reciprocity, sharing and cooperation; in contrast to market procedures, which reward egoistic pursuit of one's own interests. In the community-oriented model altruistic values tend to provide the glue for community bonds. Systems of mutual cooperation "encourage individual participation and responsibility, mutual trust, and nurture a sense of security and equity with the community" (Ingram and Mumme, 1984:31). The result is diminished conflict and increased social cohesion within the community itself.

Participation is not seen simply as a cost to the individual, but as an opportunity for individual development and strengthening of community bonds. "Empowerment" is the term Gaventa proposes for the solidarity fostered by reciprocal, cooperative relations. As a collective body, communities have the strength to hang onto their natural resources and to distribute them in ways more serving to their social, as well as, economic goals (Maas and Andersen 1978:368). Repeatedly, studies have shown that rural communities, when they perceive threats to their natural resources by actions of outside actors behave in this way (Soden, 1985); Maas and Andersen, 1978; Mumme and Ingram, 1984, 1985).

Contrary to New Resource Economics' distrust of government and politics in natural resource management, a community-based approach views politics and administrative processes as essential. As Ingram and Mumme note, low income rural communities and rural areas outside the political mainstream face political and market challenges to their resources, by those seeking to secure abstract entitlements; or otherwise enlarge their resource base. By being outside the political mainstream, they lack the economic clout to achieve these results through the marketplace (Mumme and Ingram, 1984:32). There are many communities along the Gulf Coast who are often removed from mainstream politics and economically non-competitive. Subsequently, they must learn to use their community solidarity as a resource, participate in the political and administrative system, lobby, negotiate and influence political outcomes. Political activism and collective action is no panacea, indeed it entails risk, but it does afford the possibility of building on the basic political resources of heretofore non-mobilized rural communities to achieve greater equity.

Conclusions

In reviewing the conflict among resource use and development which may arise in the Gulf Coast region, it is apparent that natural resource issues can become politically salient. Obviously, lawmakers and policymakers view natural resource issues, especially coastal issues, as part of the political agenda in the Gulf, but do not always accord the same salience as other issues.

Historically, coastal resources have been viewed as a commons in many areas, but more recently have been challenged by free market economists through the literature of New Resource Economics. The New Resource Economics movement proposes to alleviate resource management problems by radically decentralizing control over decision-making by employing market mechanisms. If these proposals gain wide support, the interests of rural communities—politically and economically poor—could be adversely affected. This paper has examined the policy model of the commons and proposes that a community-oriented process under assumptions of collective action will best serve the long term interests of residents and communities of the Gulf Coast better than will New Resource Economics in managing natural resources.

In many areas of the Gulf Coast, natural resources comprise a "fundamental social resource". Globally, social values such as security, equity, and community self-determination have been more important than economic efficiency, particularly in the long-term management of natural resources. Successfully laying claim to and managing socially and community binding natural resources is a challenge and an opportunity for the less advantaged of the region, especially as the current legal system attendant to property rights undergoes pressures. For the people of the Gulf Coast, participation in the legal and political process necessary to secure "their" resources can be a process of empowerment in the present political environment, empowerment unattainable under the scheme of New Resource Economics.

The proposal or prescription of a community-oriented framework, by which collective action to protect the region's resources emerges, can be a first step in the process of securing a viable future for the region, as it relates to coastal resources. The community-based proposal draws on the insights of experienced scholars like John Gaventa, Helen Ingram and Stephen Mumme, to better help us understand the political, administrative and economic processes which may parallel experience in the coastal resource issues area when regional residents are short on political and economic clout. Hopefully, laying a framework for establishment of policy direction at the subnational level as we search for our future in the Gulf Coast.

Notes

1. The Garret Hardin example (1968) is the best known of the conventional views on thinking about common property. Hardin tells a parable about a pasture that is open for use by all with no restrictions. Each person grazing livestock on the pasture looks only at the private benefits and costs of grazing. All the additional benefits of adding an additional animal to the pasture are captured by the owner of the animal, while the costs of reduce forage are spread to all users. The results are overgrazing and the depletion of the commons.
2. *The New Resource Economics: The Relevance of Its Core Concepts*. Fundamental to the New Resource Economics critique of contemporary U.S. natural resource policy is a set of assumptions derived from utilitarian social thought. These notions are currently expressed as basic principles of public choice and micro-economic theory. They include: (1) reducing collective decisions to individual choice; (2) a utilitarian concept of rationality involving the ranking of value preferences and consistency of choices to maximize values; (3) exchange agreements among individuals (contracts and markets) to adjust individual interests while equitably and efficiently satisfying social welfare requirements; and (4) a highly limited role for government regulation of market processes, functionally restricted to enforcing the legitimacy of a contract legally made through officially sanctioned procedures. These precepts are interactive and mutually reinforcing.

REFERENCES

- Allison Graham (1971) *Essence of Decision: Explaining the Cuban Missile Crisis*, (Boston: Little Brown and Co., Inc.).
- Andersen, Terry L. (1983) *Water Crisis: Ending the Policy Drought*, (Baltimore: John Hopkins University Press).
- Cahn, Robert (1978) *Footprints on the Planet: A Search for An Environmental Ethic*, (New York: Universe Books).
- Chasis, Sarah (1985) "The Coastal Zone Management Act: A Protective Mandate," *Natural Resources Journal*, 25, 1:21-30.

- Congressional Quarterly, Inc. (1981) *Environment and Health*, (Washington, D.C.: Congressional Quarterly, Inc.).
- Ciriacy-Wantrup, S.V. (1975) "Common Property as a Concept in Natural Resource Policy" *Natural Resources Journal*, 15:713-27.
- DeGrove, John M. (1984) *Land Growth and Politics* (Chicago: American Planning Association).
- deHaven-Smith, Lance (1987) *Environmental Publics: Public Opinion on Environmental Protection and Growth Management* (Cambridge, MA: Lincoln Institute of Land Policy).
- Downs, Anthony (1972) "Up and Down with Ecology: The issue-attention cycle," *The Public Interest*, 28 (Summer):38-50.
- Gaventa, John (1980) *Power and the Powerlessness: Quiescence and Rebellion in an Appalachian Valley*. (Urbana, IL: University of Illinois Press).
- Gordon, H. Scott (1954) "Economic Theory of a Common Property Resource: The Fisheries," in *Journal of Political Economy*, 62:124-142.
- Griffin, Ronald C. (1984), "Institutionalized Economic Efficiency in Water Allocation." Paper presented at the 20th Annual Meeting of the American Water Resources Association Conference, Washington, D.C., August.
- Hardin, Garret (1968) "The Tragedy of the Commons," *Science* 162, 3059 (December 13): 1243-1248.
- Hunt, Robert C. and Hunt, Eva (1976) "Canal Irrigation Social Organization," *Current Anthropology*, 17, 3:394-397.
- Hutchison, John, Noe, Frank and Snow, Rob (eds.) (forthcoming) *Pleasure and Preservation: An Outdoor Recreation Dilemma* (New York: Greenwood Press).
- Ingram, Helen M., Laney, Nancy K. and McCain, John R. (1980) *A Policy Approach to Political Representation: Lessons from the Four Corner States* (Baltimore: John Hopkins University Press).
- Libecap, Gary D. (1981) *Locking Up the Range: Federal Land Controls and Grazing* (Cambridge, MA: Ballinger Publishing Co.).
- Maas, Arthur and Andersen, Raymond (1978) *.....and the Desert Shall Rejoice: Conflict, Growth and Justice in Avid Environments*, (Cambridge, Mass: MIT Press).
- Millemann, Beth (1986) *And Two if By Sea* (Washington, D.C.: Coastal Alliance, Inc.).
- Mumme, Stephen P. and Ingram, Helen M. (1984) "Empowerment and the Papago Tribe: Water Politics in Southern Arizona." Paper presented at the Annual Meeting of the American Political Science Association, Washington, D.C., September.
- Mumme, Stephen P. and Ingram, Helen M. (1985) "A Comparative Analysis of Three Southwestern Indian Communities' Participation in Water Resources Decision-making." Paper presented at the Annual Meeting of the American Political Science Association, New Orleans, LA, September.
- Nash, Roderick (1982) *Wilderness and the American Mind*, 3d. Ed. (New Haven, CT: Yale University Press).
- O'Connell, Daniel W. (1985) "Florida's Struggle for Approval Under the Coastal Zone Management Act," *Natural Resources Journal*, 25, 1:61-72.
- Pierce, John C. and Doerksen, Harvey R. (1976) *Water Politics and Public Involvement*, (Ann Arbor, MI: Ann Arbor Science Publishers, Inc.).
- Pierce, John C. and Lovrich, Nicholas P. (1980) "Belief Systems Concerning the Environment: The General Public, Attentive Public and State Legislation," *Political Behavior*, 2, 3.
- Soden, Dennis L. (1985) "Small-Hydro Development and Public Decision-making" in *Waterpower/85*. (New York, American Society of Civil Engineers).
- Soden, Dennis L. (1986) "Public Perceptions of Low-Head Hydroelectric Development in Idaho: Background to Controversy," *Idaho Journal of Politics*, Vol. 5, No. 1 (Spring).
- Soden, Dennis L. (1987a) "The Technical Information Quandary in Coastal Water Resources: Developing an Understanding of Public Involvement and Conflict Resolution," Paper presented at Coastal Water Resources: Toward a Better Understanding of Technical Issues, Savannah, GA, June.
- Soden, Dennis L. (1987b) "Past Commitments, Current Problems, and Future Choices: Water Use in Appalachia," in Carl Ross, ed., *Contemporary Appalachia: In Search of a Useable Past* (Boone, NC: Appalachian Consortium Press).
- Soden, Dennis L. and Vreeland, James P. (1988) "Public, Private and Common Goods: A Primer," Occasional Papers in Coastal Studies No. 88-2 (Pensacola, FL: University of West Florida).
- Soden, Dennis L. (1988) *Tragedy of the Commons: 20 Years of Policy Literature* (Monticello, IL: Vance Bibliographies).
- Steel, Brent S., Soden, Dennis L. and Steger, Mary Ann (1988) "Public Activist and Legislator Attitudes Toward Acid Rain Policy in Canada and the United States," in *Proceedings of the Sixth World Water Congress* (Ottawa, Canada: International Water Resources Association).

Table I. Alternative Frameworks For Analyzing Water Policies and Institutions

	New Resource Economics	Community Oriented Analysis
Basis of the Interest	Individual	Group or Collective
Nature of the Interest	Material and Quantifiable	Affective and Symbolic
Basis of Decision Making	Instrumental to Maximizing Individual Benefit	Support and Maintenance of Institutions; Conformity to Norms and Practices
Mode of Interaction	Strategic Action to Maximize Private Interest	Reciprocity, Sharing and Cooperation
Participation	A Cost Incurred In Obtaining Relevant Information to Make Individual Exchanges	An Intrinsic Good That Increases Sense of Belonging; Community Self-Determination
Arenas for Action	Markets and Individualized Exchanges	Politics and Administrative Processes

Source: Mumme and Ingram, 1984

Figure 1. Potential Conflicts Among Coastal Resource Uses

Domestic	-	-	-	-	-	-
Agricultural (irrigation)	-	-	-	-	-	-
Energy	-	-	+	+	-	-
Transportation	-	-	+	+	-	-
Industrial	-	-	+	+	-	-
Recreation	-	-	-	-	-	+
Preservation (Esthetics)	-	-	-	-	+	-

+ = Compatible or Beneficial
 - = Incompatible or Harmful

FISHERY ALLOCATION: TO THE FISH CATCHERS OR THE FISH EATERS?

Linda Lampl

T.A. Herbert & Associates, Inc.
Tallahassee FL 32302

ABSTRACT

Fishery allocation issues generally focus on the most visible users: sport fishermen, who use the resource for pleasure, and commercial fishermen, who use the resource for profit. Such an approach to divvying up the fish ignores the "invisible" users, such as the non-fishing consumers, who depend on commercial fishermen for market access to the common resource. This paper uses the 1986-87 "redfish" issue in the Gulf of Mexico and Florida to explore the long-term ramifications of allocating fishery resources exclusively to those individuals who have the time, money, and inclination to harvest their own protein.

Broadly stated, the regulation and control of fishery resources are associated with and are influenced by a wide range of concepts and uses that reflect human values and opinions. Fisheries can be conserved, exploited, and developed. Some human groups value fish as a source of food, while others view the resource as a source of income, and still others associate fish with leisure or sporting activities. Fishery resources also may be used to enhance the prestige or status of individuals, particularly those who have access to regulatory power or to specialized knowledge, e.g. fishery managers, biologists, and other professionals, including anthropologists and sociologists.

Fishery conflicts, therefore fishery issues, are born at the intersection of these differences in values.

This paper examines a single component in fishery conflicts – the issue of allocation – or, simply put, **who gets the fish**. I will use what is known in coastal states around the Gulf of Mexico as the "redfish issue," which seemed to spring fully grown from the blackened skillet of New Orleans Chef Paul Prudhomme in 1985-86. After presenting an overview, with an emphasis on Florida management, I will consider the following components of allocation:

- * the users and the uses, real and potential
- * how the users gain access to the common resource
- * why users are allocated a share of the resource or excluded from the resource
- * how do the users gain access to information regarding resource allocation decisions, therefore power in the process.

The long-term implications of allocation issues also are discussed.

Redfish 1986-1987

For the uninitiated, redfish (*Sciaenops ocellatus*) have been harvested commercially in the United States since the 18th century. Redfish are harvested in the Atlantic Ocean as far north as Charleston, South Carolina. Traditionally the preponderance of commercial landings are from the Gulf coast area. Gulf redfish are also landed in Mexico.

The redfish is a coppery color and is easily distinguished by a single black spot at the base of the tail (occasionally several spots). Depending on geographic location, the redfish is also known as "red drum," which is probably the most widely used, or "channel bass." The smaller, juvenile "reds" typically caught inshore are known as "puppy reds" or "rat reds" while the larger fish, caught offshore in recent years are known as "bull reds." For the record, I will use "redfish," not red drum, primarily because I was "socialized" into the fishery in an area where the term "red drum" is assigned to a different species of fish.

This paper evolved from research conducted at Pine Island, Florida, which is an estuarine island located adjacent to Charlotte Harbor and Pine Island Sound off the mainland coast of Lee County in southwestern Florida. I lived at Pine Island from April through July, 1986, conducting participant observation research among the small boat, inshore fishermen to assess the social impact on this community of a proposed fishery management rule. The rule, as proposed by the Florida Marine Fisheries Commission, sought to prohibit the commercial harvest and sale of redfish. Two of the top three redfish-producing fish houses in Florida were located at Pine Island. The research was sponsored by the Gulf & South Atlantic Fisheries Development Foundation, and the results were presented to the Marine Fisheries Commission prior to the final decision (Lampl 1986). The results eventually were used by the commercial industry as part of its successful attempt to rebuff the rule.

In 1985 newspaper headlines began to appear around the country declaring that redfish populations were threatened in the Gulf of Mexico and that "blackened redfish" and purse seines were the culprit. As might be expected, this fishery issue, like so many others, was not so clear cut, nor was it new. Redfish were the subject of controversy between sport/recreational fishermen and commercial fishermen at the turn of the century in Texas (Matlock 1978). In Florida, as retirees migrated South in the early 1960s, sport fishermen in the Charlotte Harbor area of Southwest Florida complained that commercial fishermen were depleting the stocks of redfish and spotted seatrout (Woodburn 1960). In Mississippi, a decade later, scientists conducted a three-year research program to assess the "depleted the populations of spotted seatrout and red drum" after recreational fishermen complained about monofilament nets used by commercial fishermen (Lorio et al 1980:3).

The early controversies generally resulted in one or more restrictions on the commercial harvest. In Texas, regulators restricted the kinds of gear that could be used to harvest redfish for commercial purposes and in other Southeastern coastal states gear restrictions, minimum and maximum size of the fish, and catch sizes were imposed.

By 1981, however, the politics of redfish had changed in the Gulf of Mexico; the commercial industry faced exclusion not restriction. The Texas legislature declared redfish and spotted seatrout a "gamefish," which in management circles means that a particular species cannot be harvested for sale. Alabama followed suit in 1984. The redfish resource was then removed from open

market channels in those states and was allocated to the exclusive use of sport and recreational fishermen.

The same year, 1984, the Gulf of Mexico Fisheries Management Council at Tampa issued a profile of redfish in the Gulf of Mexico, indicating that it would not be necessary to prepare a management plan nor to regulate the redfish resource in the exclusive economic zone (EEZ) at that time (NMFS 1986). Two years later, however, after market demand and commercial harvest increased with the advent of blackened fish, a plan was prepared at the Secretarial level. By June 1986 the Secretary had imposed a 90-day, 1 million pound limit for the directed commercial harvest; the fishery was closed after the quota was filled in 19 days and remains closed. The most recent recommendations from the Council are to prohibit harvest by sport and recreational and commercial fishermen in the EEZ in the Gulf. The move to restrict, if not eliminate, the commercial harvest of redfish continues in Florida and other coastal states.

Redfish and Florida

Redfish have been controversial in Florida for more than 25 years. A number of legislators over the years introduced bills to declare redfish a gamefish; each time the bills died. In 1983, shortly after the Florida Marine Fisheries Commission was created to manage the state's saltwater fisheries, sportsmen and recreational groups suggested that the credibility of the Commission would hinge on its ability and its willingness to "tackle the tougher issues...(FMFC 1983)." According to the minutes of the Commission, redfish was one of the tougher issues. By 1985, two commissioners publicly advocated gamefish status; eight months later, in May 1986, the Commission formally proposed the regulation to impose a "no-sale" provision on redfish.

The regulation was approved by the Commission but was challenged successfully by the commercial industry. The ruling was subsequently overturned, however, at the state appellate level after an appeal by the Marine Fisheries Commission and the Florida Conservation Association. To digress for a moment, the Florida Conservation Association (FCA), is a sport/recreational fishing group created in 1985 by the Gulf Coast Conservation Association (GCCA). The GCCA was formed in Texas in 1976 "...out of a concern for the commercial fishing threat to the redfish and speckled (sea) trout recreational fishing (Ditton and Holland 1984:55)."

Ultimately, the Florida gamefish regulation was rejected April 2, 1987, by the Governor and the Cabinet, which have final approval on all Marine Fishery Commission regulations. A subsequent emergency rule declared redfish off limits to all harvest, but the fishery was opened briefly to all (with strict limitations) in the fall of 1987. In April, 1988, the Commission considered and narrowly rejected a new attempt to declare redfish a gamefish and is considering instead a proposal to limit individual recreational fishermen to a year-round one-fish daily bag limit and commercial fishermen to 200 pounds per day in February; as proposed, commercial harvest will be prohibited from March through January. Outdoor writers around the state are predicting, however, that if sportsmen voice a preference for gamefish, at least four of the seven commissioners will vote to eliminate the sale of Florida redfish in months to come.

Who Gets the Fish

The trend in fishery management in coastal states appears to be to restrict the harvest of redfish to sport and recreational

fishermen. Phrased another way, redfish is being allocated to those individuals who fish for sport or for their own consumption, to those individuals who have the time, money, geographic advantage, and/or the inclination to harvest their own food. Indirectly, the resource is also being allocated to the sport/recreational fishing industry, e.g. guides, bait and tackle shops, boat and motor manufacturers, waterfront condominium developers, publishers...the list goes on. By the same token, at least two groups of peoples are systematically being *excluded* either directly or indirectly from the resource: commercial fishermen, its supporting industry, and the non-fishing consumer, who depends on the commercial industry to harvest, process, and sell the fish as food.

The key word in the preceding paragraph is indirect. The fishermen, whether they are sport/recreational or commercial, are the only groups that have direct access to the resource; all others, including the vast service and processing industries have only indirect or vicarious access. Even guides do not have direct access to the resource; their economic access is indirect, dependent on the sport/recreational fishermen who buy the guides' services. Similarly, manufacturers of sport and commercial boats have no direct way to make money from the resource; they depend on the fishermen who use the products; likewise, if there were no fishermen to use the common resource, there would be no need for the myriad of other support services, i.e. the magazines and periodicals that depend on the fisherman for audience. Similarly, the non-fishing consumer lacks direct access to the resource and is, as noted above, dependent on the services of the fishermen.

What are the criteria for allocation?

What is the justification for allocating a food resource to a certain type of user?

The Florida Marine Fisheries Commission's "Finding of Fact," which was issued to support its gamefish rule, provides some insight. In the Finding of Fact, the Marine Fisheries Commission reported that, from a biological standpoint, redfish were overfished, then reasoned that since:

- 1) redfish was predominantly a recreational fishery - an estimated 88 per cent of the harvest in 1982-84 was attributed to sport and recreational fishermen
- 2) the best use of the resource would be to prohibit sale
- 3) the fishery should be managed for recreational users only.

The economic benefit to the state would be greater if the resource were used for recreational purposes, the Commission argued, since recreational fishermen outnumber commercial fishermen and spend more money to catch fish. Further, it was necessary to prohibit the sale of redfish in order to prevent recreational fishermen from circumventing the daily bag limits by buying a commercial license, which is what I consider a sort of reverse Robin Hood approach to fishery management: Allocate the resource to those persons who can spend the most to harvest food for their own consumption and to those persons who are expected to disobey the laws needed to protect the resource.

Economics and sheer numbers of direct users, not biology, were the crux of the Florida redfish debate, a point that did not go unnoticed by Robert T. Benton, II, the state Hearing Officer who overturned the rule when it was as challenged by the commercial fishing industry. Reading from Benton:

....The proposed rule would end the inshore commercial fishery not so that all the redfish commercial fishermen are now harvesting (for sale to consumers) would be spared, but in order that recreational fishermen who are already taking as much as seven eighths of the total catch could

have all the redfish taken from state waters (Division of Administrative Hearings 1986:32).

Further, the Hearing Officer attacked the notion that access to the fishery resource should be awarded to those individuals who are willing, and able, to spend the most in terms of money and time. Again, reading from Benton, whose Final Order is, by the way, as entertaining as it is enlightening:

Another way to view the economic consequences of reallocation from the commercial to the recreational sector is to compare the relative costs of production and efficiencies of distribution. Commercial fishermen produce redfish at an approximate cost of \$.50 per pound, then introduce them into marketing channels, where they become available to all segments of the population. In contrast, SFI's (Sport Fishing Institute) economist acknowledged that it costs recreational fishermen somewhere between \$19.94 and \$31.37 per pound to harvest redfish, which is then available only to the sportsman and his circle of acquaintance (1986:27).

Benton did not address, however, the "numbers" criterion: are there indeed more sport and recreational fishermen than there are non-fishing consumers? An excerpt from the minutes of the October 6-7, 1986, meeting of the Gulf Council's Red Drum Advisory Panel suggests, however, that sport and recreational users believe there are more potential consumers and that this very issue – legitimization of the non-fishing consumer as a user of the resource – is viewed as a threat or competition for the resource.

The following excerpt is taken from a discussion that deals specifically with allocation issues and with the legality of discriminating between residents of various states (RDAP 1986:77-78). The first speaker is a representative of the Gulf Coast Conservation Association, referenced above; the last speaker is a guide. Beginning with the GCCA representative, I quote:

...The (Gulf) Council's calling for a 20 per cent escapement...All right, that allocation shall be (a) fair and equitable to all such fishermen, (b) reasonably calculated to promote conservation, (c) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges. No where does it say the consumers' got a stake in it. Once you get to a situation where you have to allocate the take because of biological problems, the consumers are out...

The Moderator asks: "Does anyone else have a problem with consumers?"

To which the guide responds:

Yeah, I do. I think he's got a very valid point. I believe that the consumer is directly tied to the commercial. The consumer has no relation to the recreational fisherman except for self-consumption....And if we're in an effort to gather support for any one particular swing on this thing, throwing the consumer concerns in there is a good way to do it. Because if we're going to let everybody that has ever had a piece of fish delivered to him have a say so, well, sure, they got more people than own rods and reels. But it seems to me that the commercial fisherman's interest can produce a consumer interest (through marketing)...the problem is between those who use the resource in the real sense of physical hands on use, not as a byproduct which is created by one of the main two components.

Ironically, if we follow the guide's line of reasoning, it appears that economic issues should not be introduced into management decisions. Neither group has an economic advantage, since the economics of the situation are only a "by-product" of "those who use the resource in the real sense of physical hands on use (RDAP

1986)," not the indirect users. The sport/recreational industry "economic impact" would not count, eliminating a perceived advantage to allocating the resource to a single user group.

Access to Information, Access to the Resource

Fishermen, both sport/recreational and commercial, have lobbies or special interest groups to keep them informed of impending regulatory changes. Further, outdoor writers, published in general circulation newspapers and magazines of special interest keep sport and recreational fishermen informed, if not inflamed. Trade and industry publications function similarly, focusing instead on commercial users. In addition, management groups, e.g. the Florida Marine Fisheries Commission, maintain mailing lists and regularly notify interested parties of pending actions.

Consumers are not exactly at the fore front of fishery issues. At best, consumers are present in a "vague sense" in the fisheries (Miller and Van Maanen 1983). Why? Do not consumers care about the food that has become so popular, largely because of its reported dietary benefits?

The non-fishing consumer, who has access to the resource only through the services of the commercial fishing industry, may be ignorant of the entire situation, not aware that rights to a common resource are subject to abrogation by a management group. I suspect that non-fishing consumers do not even know "fishery management" exists. A preliminary review of four Florida newspapers in 1986 suggests that the "redfish issue" was played out in one of three ways in one of two areas of the news pages. Redfish tended to be "threatened" or "decimated" by commercial fishermen in articles published on front and city pages; blackened redfish was a fad on food pages; and redfish were "threatened" or "decimated" by commercial netters on outdoor pages. Management issues and user groups were never discussed; it appears that newspapers may assume that the redfish resource – and other fishery resources – are owned by sport/recreational fishermen and commercial fishermen.

A second, more recent example is even more telling. The Florida Marine Fisheries Commission, is purging its mailing list. As a part of the process, survey cards have been mailed to those persons who now receive press releases and other commission notices. The card requests several kinds of information including the identity of the respondent in terms of use of the resource. There are eight categories which appear under the "I am..." heading. These categories reflect the user and the areas of interest. The eight possible choices under the "I am..." column are, in descending order:

1. recreational angler
2. charter boat capt./ guide
3. journalist
4. fisheries mgr./ adm
5. bait/tackle/marina/pier operator
6. seafood dealer/restaurant owner
7. diver
8. other

Presumably, the commercial fisherman and his/her non-fishing consumer customers are "other."

The Long Term Implications of Allocation Decisions

Access to information is access to power. I submit that the non-fishing consumers of Florida – and most likely the nation – are powerless in the fishery management arena. Non-fishing consumers do not know they are being managed out of the common resource.

What are the implications of this type of policy, that allocates a food resource exclusively to those individuals who have the time, money, and inclination to harvest their own protein? Some of the ramifications are obvious, e.g. increasing reliance on imported fish, foreign control of prices, supplies, and competition from other fish-consuming countries for protein. What happens if we, as a nation become dependent on politically unstable countries for our fish supplies? Do we enter covert and military actions to "protect" our access, a situation analogous to competition for foreign oil and gas.

Beyond the immediate issues of competition for food resources, it is instructive to look at the consequences for the fishery resources. In many cases, particularly in redfish, the fishery is being managed as if George Foster's (1965) "image of limited good" applies to the commercial industry, non-fishing consumers, and the individual sport/recreational fisherman; fishery regulations are designed to limit or eliminate commercial and consumer access and curtail the harvest of the individual recreational fisherman, e.g. gamefish, limited entry schemes, and daily bag limits. At the same time, however, the regulations encourage, for economic reasons, increases in the *aggregate* of sport/recreational users, suggesting a form of "unlimited good" for the sport/recreational fishing industry which is virtually free of direct regulation in the fishery management setting and which, through ever expanding shoreside development, depends on a form of *unlimited* entry into the use of the fisheries. Other components in the world view of fishery managers also are questionable. For instance, do individual, transient fishermen, e.g. vacationers who have "interval ownership" of the fishery resource, have a sense of responsibility, a "bioethic" (Potter 1974), "to the resource? Is the sense of responsibility comparable to that of the commercial fisherman whose way of life is embedded in the shoreside community that is economically dependent on the fishery?

Allocation of Florida's and perhaps the nation's fisheries habitually are focused on the fish catchers. I suggest that the time has come to derail this wrong-headed notion, that the time has come to bring all users, direct and indirect, to the management table for benefit and regulation; I suggest that those individuals who want and need access to fish as a food should get a voice when it comes to dividing up what is increasingly labeled a scarce common resource.

Notes

1. In December 1988 the Florida Governor and Cabinet approved a rule proposed by the Florida Marine Fisheries Commission to prohibit the commercial harvest of Florida Redfish for three years.

CITED REFERENCES

- Diton, Robert B. and Stephen M. Holland. 1984. *Understanding Involved Fishermen: A Survey of Members of the Gulf Coast Conservation Association*. College Station: Texas A&M University.
- Division of Administrative Hearings. 1986. Final Order, Case N. 86-2761R. Tallahassee: Florida Division of Administrative Hearings.
- Florida Marine Fisheries Commission. 1983. *Minutes Marine Fisheries Commission, Orlando, Florida, November 2-3, 1983*. Tallahassee: FMFC.
- Foster, George. 1965. Peasant Society and the Image of Limited Good. *American Anthropologist* 67:293-315.
- Lampl, Linda L. 1986. *Feeding the People from Generation to Generation: An Ethnography of the Pine Island Fishermen*. Tampa: Gulf & South Atlantic Fisheries Development Foundation.
- Lorio, Wendell, Teresa Heaton, and Opal Dakin. 1980. The Relative Impact of Netting and Sport Fishing on Economically Important Estuarine Species. NSTL Station, Mississippi: Mississippi State University Research Center.
- Matlock, Gary C. 1978. History and Management of the Red Drum Fishery. *In Proceedings of the Red Drum and Seatrout Colloquium Oct. 19-20, Gulf States Marine Fisheries Commission May 1980 No. 5:37-53*.
- Miller, Marc L. and John Van Maanen. 1983. The Emerging Organization of Fisheries in the United States. *Coastal Zone Management Journal* 10(4):369-386.
- National Marine Fisheries Service. 1986. *Final Secretarial Fishery Management Plan Regulatory Impact Review Regulatory Flexibility Analysis for the Red Drum Fishery of the Gulf of Mexico*. Miami: Southeast Fisheries Center.
- Potter, Van Rensselaer. 1974. The Tragedy of the Sabel Commons. *Science* 185:183
- Red Drum Advisory Panel. 1986. *Minutes of October 6-7, 1986, Meeting, Metairie, Louisiana*. Tampa: Gulf of Mexico Fisheries Management Council.
- Woodburn, Kenneth D. 1960. *Charlotte County Survey with Special Reference to Port Charlotte Sports Fishery*. Florida State Board of Conservation Marine Laboratory Report 60-27. St. Petersburg, Florida: Florida Board of Conservation Marine Laboratory.

FISHERIES AND REGIONAL DEVELOPMENT: CONTRADICTIONS OF CANADIAN POLICY IN THE NEWFOUNDLAND CONTEXT

Peter R. Sinclair
Memorial University of Newfoundland

ABSTRACT

This paper argues that the quota and licensing strategies of the Canadian government hinder regional development of marginal areas of Newfoundland. These fisheries policies have been deficient as contributors to the development of marginal regions in that they have focused on fishing rather than on the full range of economic activity related to fishing; they have been concerned with economic efficiency before social equity; and they have placed the interests of people in marginal, fishery dependent areas too low on the list of priorities. Two recent disputes highlight the issue - the licensing of factory freezer trawlers and the allocation of scarce cod stocks to France. My interpretation of the limits of Canadian fisheries policy in relation to development focuses on the structural and cultural forces in the state that underlie policy formation.

Introduction

The central point of this paper is that Canadian fisheries policy hinders rather than promotes regional development of the marginal areas that depend on fisheries, in particular rural Newfoundland. Although the federal government has frequently expressed concern about the relatively impoverished condition of the country's rural areas and has allocated considerable resources to regional programs, Canadian fisheries policy has been implemented with only grudging acknowledgment of social issues and often in contradiction to social needs. This disjunction will be documented in the paper with reference to key events in recent fisheries management strategy. To explain what happened, I turn to the structural and cultural forces that condition state action, although no existing sociological theory of the state fits the observed experience neatly.

Following a brief consideration of existing state theory, the paper offers an overview of the economic underdevelopment of Newfoundland and Labrador relative to the rest of Canada and of the place of fisheries as a source of employment. The analysis then proceeds by setting out the general framework of fisheries policy since the commitment to active management in 1976. Incorporated in this review of licensing and quota controls is discussion of two recent issues, the licensing of factory freezer trawlers and the allocation of cod to France, which serve to highlight the basic point that fisheries policy is not directed in the first instance to the development needs of Newfoundland and Labrador. The overall picture is that of a dependent region that cannot escape from underdevelopment until fisheries policy is linked on a priority basis to regional issues.

State Theory: A Theoretical Foundation?

This paper analyses how federal Canadian policies on fisheries contradict other objectives in Newfoundland. To understand why such a situation can occur requires a theory of the state from which the policies emanate. Here the state refers to that set of procedures and organizations concerned with creating, administering and enforcing decisions that are binding on the inhabitants of a specified territory. Although I follow convention in referring to "the state", the term should not be taken as indicating a unified and reified structure. In practice, the parts of the state are loosely integrated and often work at cross-purposes.

I argue that explanation of state action should treat policy as an active creation limited by the structural location and cultural vision of actors. The focus of decision making theories on the psychology of individual actors, the inability of incrementalist theory to cope with rapid, large scale policy changes, the empirical limitations of ruling elite theories, the neglect of structural bias in state processes by pluralist theory, the structural determination of functionalism, and the excessive emphasis on class structure by most neo-marxist theories of the state make each of these approaches unacceptable as general models. Instead, we should build on recent work that permits a degree of real independence to state actors based on their control of power resources.

Marxist theory has dominated recent analyses of the state, which is generally viewed as a structure protecting the long-term interests of capital, even when concessions are made to the immediate interests of other social groups. But the teleological, functional analysis of modern marxists does not permit a satisfactory account of why the state serves to maintain capitalist society because it simply asserts that the state *must* do so (Koch 1980; Crouch 1979:26-9; Giddens 1981:203-29). Precisely the kind of historical investigations of the process of state formation that are needed to establish why states act as they do are missing. Structural necessity is thought to suffice, but (1) the continuation of capitalism is not necessary; (2) other forms of state or institutional action might meet the 'needs' of capitalism; and (3) much state action is opposed by those for whom it is thought to be essential. Is it then possible that the state can be independent of capital?

Claus Offe (1984) sees the state as an independent mediator of class conflict. As a result of its mediating activities, however, the state becomes the key location for system crises. Although the state must respond to capitalist crises, it is not simply responding to externally defined class interests, but to state actors' own interests in maintaining the base of employment, taxation and legitimacy that a successful capitalist economy provides. In a crisis situation, the state cannot take over accumulation itself because bureaucratic procedures cannot allow for the anticipation and planning that is required for productive investment. This assertion is vital to Offe's theory, but it is unconvincing. Ultimately, Offe does not move far enough away from a structural-functional theory of the state.

For a more radical theoretical break, we need to switch to Theda Skocpol's work. She argues that the state should be recognized as "a structure with a logic and interests of its own not necessarily equivalent to, or fused with the interests of the dominant class in society or the full set of member groups in the polity" (Skocpol 1979:27). Thus we are directed to the interests of state actors themselves and to the policy formation process in order to explain the policy that is actually produced. Skocpol does acknowledge that the state often protects dominant class interests - but not in all circumstances; in particular, not when to do so would threaten political stability. She charges neo-marxists

with failing to accord sufficient independence to state and party and with an unjustified insistence that the state *must* work towards the reproduction of capitalism (Skocpol 1981).

Without accepting that politics is a free-for-all competition among equals, this position goes some way towards the pluralist interpretation by recognizing that the capitalist class is not consistently dominant. The state acts through the people who fill its positions and they have particular experiences and interests that affect how they deal with problems. The personnel of the state are important because they cannot be treated as passive recipients and processors of external demands. They may themselves identify environmental problems and they may act to further their *own* interests as actors located in the state structures. To that degree, agency and cultural orientations are necessary to understand state policies.

State decision makers have a fundamental interest in maintaining order and stability, i.e., in ensuring the conditions of their own legitimation. This makes them at times open to courses of action that go against the demands of particular interest groups because compliance or support from other affected people is important. State actors prefer enthusiastic support, but they know they cannot survive without at least the degree of acceptance that compliance with state policy requires. Finally, the state cannot act without resources, principally information and finance, that are procured from the environment. In the absence of a willingness to undergo the costs of economic revolution, it is the need to maintain a functioning economy, which ensures an adequate taxation base and contributes to legitimacy (as noted by many marxists), that keeps state policy consistent with the interests of private capitalists. In the short term, state control of law, force and information allows independent action by state managers. In the long term and without a revolutionary strategy, support of capitalist accumulation becomes necessary to protect state managers' interests. It is thus no surprise to find conflicting interpretations within the state over what should be done and vacillation in policies. Such a "loose", state-centered theory of the state provides the best chance of understanding Canadian state policy as it affects Newfoundland.

Relative Underdevelopment: Newfoundland and Labrador

Regional disparity has been an important issue in Canadian politics and social science for decades. Federal-provincial agreements on programs of agricultural and rural development (ARDA) date from the early 1960s, and, soon afterwards, special regional development programs were established, notably for the Gaspé region of Québec and northeastern New Brunswick. In Ottawa, a separate Department of Regional and Economic Expansion was established (later renamed the Department of Regional Industrial Expansion), an indicator of the importance placed on regional problems. Furthermore, the budgets of the poorer provinces have been subsidized by transfers from the federal treasury, known as equalization payments, which are intended to reduce the burden of poorer provinces in providing public services.

Thus problems of marginal regions have had some space on the political agenda. Yet, despite these efforts, regional disparity continues to be a major unacceptable feature of Canadian society, as will now be demonstrated with regard to Newfoundland and Labrador. Although some development has taken place, this region, especially its fishery-dependent rural communities, is underdeveloped relative to Canada as a whole. Also, this presentation refers

to the economy without wishing thereby to imply that in health, educational and other cultural matters the situation is one of equity.

From the late nineteenth century to the 1970s (during the years of independence, under commission of government, and as part of Canada), Newfoundland has experienced policies to build its economy by promoting industrialization based largely on external ownership and control. Although a few examples of success, notably in the pulp and paper industry, can be noted, this strategy proved largely unsuccessful (see, for example, Bursey 1980; Matthews 1983; House 1980; Newfoundland and Labrador 1986:41-51). Whereas aid was given to a wide range of enterprises, the one resource in which Newfoundland might enjoy a comparative advantage (that is, fish) was shunned for the most part until the 1930s, and thereafter economic development focused upon the harvesting and processing of traditional species rather than on the development of a diversified industry, including the manufacturing of fisheries-relevant equipment (Sinclair 1987).

The result of decades of mismanagement is that Newfoundland and Labrador lags behind the rest of Canada on major economic indicators. Considering income first, it is evident that this province is at or close to the bottom of the Canadian rankings whether the measure be family income, average per capita income, average weekly earnings or annual income. Although full-time earnings in Newfoundland and Labrador are close to the Canadian mean, the significance of unemployment and part-time work is such that average earnings are only 80 per cent of the Canadian average (Newfoundland Statistical Agency 1986:71). Per capita income in Newfoundland and Labrador is usually about two-thirds of the Canadian average. At \$9,703 in 1984, it was 67 per cent of that average, up slightly from 64 per cent in 1971 (*ibid.*:168). If transfer payments are deducted and only earned income is considered, the situation in Newfoundland and Labrador is much worse. Mean earned income is only 55 per cent of the Canadian average which shows no improvement since 1971 (*ibid.*:169).

For many years the unemployment rate in Newfoundland and Labrador has been roughly double that of Canada as a whole, while the labour force participation rate has been somewhat lower. In 1985, the official rate of unemployment was 21.3 per cent in comparison with 10.5 per cent for Canada (Newfoundland and Labrador 1986:75) based on a participation rate that is 12.5 percentage points lower than the total Canadian figures (*ibid.*:60). This difference has been almost static for the last decade.

Of particular significance to this study are the poor employment prospects of people in rural compared with urban areas. In these areas, primarily dependent on fishing, participation in the labour force is less than in the urban centers, while unemployment is particularly high. Rural youths (those aged 15 to 24) have only a 25 per cent chance of being employed compared with 38 per cent in urban areas and 51 per cent in Canada as a whole (Newfoundland Statistical Agency 1986:53). Thus any contraction in the fishing industry in such a depressed area would be particularly serious.

As a source of employment, the fisheries are vitally important. The number of registered fishers climbed from 15,802 in 1975 to a peak of 35,271 in 1980 and then fell off to 26,615 by 1985, although this decline has been entirely due to a reduction in the number of part-timers. By 1985, the province had 13,324 full-time fishers. Persons employed in fish plants rose from 10,283 in 1975 to 25,021 by 1984, but much of this increase is in part-time work. In terms of full year employment the 25,021 positions in 1984 amounted to 7,900 person years (Newfoundland and Labrador 1986:125).

The importance of the fisheries may also be viewed from the perspective of their contribution to the goods-producing sector. Fish harvesting accounted for 28.8 per cent and fish processing for 19.5 per cent of total employment in this core sector in 1984, although their shares of the gross domestic product (7.7 per cent and 11.3 per cent respectively) were much less (ibid.:120-121). Apart from pulp and paper, there is very little secondary manufacturing in the province. Most other jobs are in construction, transportation and services; indeed, only 4,500 are employed in non resource manufacturing industries (ibid. 1986:15-9). With this background we can consider fisheries policy and its relationship to regional issues of employment and social equity.

The Fisheries Management Strategy

It is important to remember that the federal structure of the Canadian state influences policy. Fish harvesting and international trade (most Canadian fish are exported) are federal responsibilities, whereas manufacturing is under provincial control. Fish plants must obtain provincial licenses, but supplies of fish and fish catching licenses are federal matters. It has been particularly critical to Newfoundland's recent problems that many key policy decisions have been made in Ottawa where both fisheries and regional development are usually low on the political agenda.

Since 1976, Canadian fisheries policy has been concerned increasingly with the management of fish resources and necessarily with the practices of fishers and fish companies.

Until then, government involvement in the industry was limited to research and development of technology, providing capital assistance to various enterprises, supplementing fishers' incomes (especially through unemployment insurance payments), building infrastructure and encouraging the relocation of small settlements. The shock caused by a sharp fall in fish prices in 1974 was met by temporary aid, while an investigation of the industry in Atlantic Canada led to a major policy initiative intended to place the fisheries on a sounder footing. By 1976, with the publication of *Policy for Canada's Commercial Fisheries* (Canada 1976), the federal state was publicly committed to a comprehensive policy of resource management. This document is one of the most important in the history of Canadian fisheries policy. The new fisheries program was adopted as official policy with the recognition that fundamental change was involved:

The strategies adopted reflect a fundamental redirection in the government's policy for fisheries management and development... Implicit in the new orientation is more direct intervention by government in controlling the use of fishery resources, from the water to the table, and also more direct participation by the people affected in the formulation and implementation of policy (Canada 1976:5).

The government's identification of the causes of distress showed the powerful influence of economic theories of open access resources. Overfishing and the economic problems of fishing enterprises were identified as a consequence of the "tragedy of the commons" in fishing. The main argument of this theory is as follows. As a fishery becomes commercially attractive, capital investment and labour is directed towards it in anticipation of profit. When no controls are exercised, however, individual fishers acting in their own interests will catch as much as possible rather than leave fish for their competitors. If prices fall, they fish harder to increase their returns. A frequent result of this spiral is economic decline as costs of production rise, and resource extinction is even a possibility. According to the 1976 report, the open access character of the fisheries (this was true of the deep-sea, if not of the inshore

fishing grounds) was responsible for overcapacity, i.e., "too many vessels and fishermen in relation to the available fish" (Canada 1976:40). Also related to open access were congestion on the fishing grounds and the increasing conflicts between fishers who relied on different technologies: inshore stationary gear versus mobile craft for the most part.

Change was considered vital because existing policies were "simplistic" and "relatively non-interventionist" (Canada 1976:50), whereas a strategy that treated the fisheries as a complex ecosystem of inter-related stocks and managed them on the basis of economic, biological and social criteria was preferred. However, it was impossible to escape the tension between economic criteria, which stressed reducing capital and labour relative to the amount produced, and social criteria, which stressed maximization of employment and equitable distribution of resources. Despite the recognition of social problems and the concern to avoid "drastic dislocation", the report noted that "One requirement for a viable and prosperous commercial fishery is that fewer people be employed in relation to output in primary production" (Canada 1976:58). Similarly, extension of jurisdiction to 200 miles, reduction of effort by foreign fleets and the rebuilding of the stocks were thought to provide real opportunities for future development - provided that open access was curtailed. Among the controls envisaged for Canadian fishing, the most significant was the desire to "apply systems of entry control in all commercial fisheries" (Canada 1976:64). Thus the Canadian federal government had set out on a policy of management that involved a combination of quota controls and limited entry licensing.

Quotas

A prerequisite to any effective quota policy was the extension of coastal jurisdiction. Thus, the announcement that Canada's territorial waters would be extended to 200 miles offshore from 1 January 1977 was a vital step in the new policy of resource management. With the jurisdiction limits established, Canada was in a position to allocate quotas for most of the stocks affecting the Canadian fishery, except those outside the Canadian zone on the nose and tail of the Grand Bank and the Flemish Cap. This exception has always been a matter of concern in Newfoundland.

To manage the stock the Canadian government had to implement a process whereby federal officials could obtain information and consult with provincial governments and interest groups affected by their decisions. A complex organizational network was established (as described in Sinclair 1987). The actual plan that emerges is supposed to give priority to conservation and restoration of the stocks. It should also take into account relations with other fishing countries and market forecasts, as well as the expressed needs of fish processing companies (with or without trawler fleets) and the fishers, who operate with a wide range of vessel sizes and gear. The situation is further complicated by the need to consider 40 separate stocks, some of which migrate inshore in uncertain numbers and according to uncharted routes. From this set of factors and their related political pressures a fishing plan is produced to regulate stocks by quota and season, according to vessel size and type of gear. Economic efficiency and stock conservation take priority over social considerations and general regional development issues lie outside the consideration of the Minister's advisory committees.

In the first years, the federal government constructed a management plan for the various fleet sectors in which side trawlers gained access to the Gulf of St. Lawrence and southern Atlantic

waters, while the more robust stern draggers were directed to take cod in winter off the north and northeast coasts of Newfoundland. No real limit was placed on the Newfoundland inshore fleet, although a nominal 'allowance' was specified on the understanding that it might be exceeded. The foreign cod quota was gradually reduced, stocks began to recover and, by 1979, the Newfoundland fleet was harvesting about 80 per cent of the total catch. For 1988, the TAC for northern cod (the fish harvested from areas 2J, 3K and 3L on map 1) was set at 266,000 tons, all of it reserved for Canadian vessels. From this total 115,000 tons were allocated to the inshore sector (*Fo'c'sle* 8(1), 1988).

In Canada today, harvesting capacity exceeds the quotas, which makes it inevitable that disputes should arise over this form of government regulation. Conflict between inshore and offshore interests has been paramount. Although the Newfoundland-based trawlers had no history of fishing the northern cod stock, they received an increased quota each year from 1977. However, federal policy was initially partial to small boat fishers in that the inshore allowance rose more in absolute terms until 1981 when the deep-sea fleet began to receive an increased proportion of the new stock. At present (1988), the Newfoundland inshore sector allowance is 45 per cent of the TAC, slightly less than the deep-sea trawlers. 5.75 per cent has been reserved in a special program to provide fish in winter to plants that normally depend on inshore fish available only in summer.

Owners of deep-sea vessels have protested that they do not receive enough fish in the quotas to maintain the year-round operation that is essential to keep the fish plants operating and to make the trawlers viable propositions. In contrast, the provincial government demanded in 1981 that the inshore sector be awarded 85 per cent of the TAC and that the deep-sea trawlers be given only what could clearly be demonstrated as beyond the requirements of the inshore fishers (*St. John's Evening Telegram* 30 December 1980; 14 February 1981). This policy reflects the provincial government's stress on the employment generating aspects of the fishery rather than the economic efficiencies claimed for the deep-sea fleet.

Although the general improvement in catches after the expansion of fisheries management was welcomed, it is obvious that the allocation of quotas to sectors of the fleet did not resolve the problem of competition for the fish stocks. In the early 1980s, both the nearshore draggers on the west coast and the corporate trawlers fishing northern cod rushed to catch as much as possible as soon as their fisheries opened. The excessive concentration of catches put great pressure on plant capacity and marketing. This led to the subdivision of quota to individual enterprises, first as an experiment in the offshore sector and later as a regular part of the management plan for this fleet and also for the nearshore draggers on the northwest coast (Sinclair 1985).

The Canada-France Conflict

Clearly the availability of quota has become vital if the various fleets and processors are to continue in business and provide employment. Although fisheries policy has direct impact on thousands of people in rural Newfoundland, it is not controlled from Newfoundland, which makes it difficult to ensure that local interests will be prominent when fisheries policies are formed. Within the federal government, fisheries issues and the problems of peripheral regions in general cannot be expected to enjoy priority over the interests of the powerful and populous center. In no case has this been clearer than in the Canada-France fishing

negotiations of 1986-87, which pitted Tory against Tory in a vitriolic public dispute and left feelings of bitterness in Newfoundland.

It is necessary to provide a brief backdrop to the current dispute. Even after France lost its North American mainland colonies, treaties of 1713 and 1763 left France in possession of the islands of St. Pierre and Miquelon, adjacent to the southern coast of Newfoundland. Furthermore, in recognition of earlier practices, French fishers were allowed unhindered access to the fisheries off the northeast coast of Newfoundland and along the Gulf of St. Lawrence. The boundaries of this "French Shore" were altered by the Treaty of Versailles (1783) to extend from Cape St. John to Cape Ray. In 1904, French shore rights ceased, but France was left in possession of St. Pierre and Miquelon. However, access to deep-sea fishing grounds did not become a contentious issue until the 1960s when major overfishing problems appeared.

By 1972 the terms of France's participation in Canadian coastal waters had been renegotiated. It was agreed that metropolitan French trawlers would leave the Gulf of St. Lawrence by 15 May 1986, but that as many as 10 trawlers from St. Pierre could continue there indefinitely subject to quotas set by Canada with French concurrence, or otherwise by arbitration. If Canada declared a 200 mile zone, Canada would be obliged to allow quotas to French vessels within the zone for an unspecified time. When Canada proclaimed its economic fishing zone, France did the same for St. Pierre and Miquelon over an area that encompasses the abundant fisheries and potential oil resources of the St. Pierre Bank. This French claim was rejected by Canada.

For France, the exclusion of its mainland fleet from the Gulf meant a loss of 17,000 tons per annum. French trawlers then turned to the disputed grounds south of St. Pierre, where Canada had agreed to allocate 6,400 tons of cod to France, leaving 34,600 tons for Canadians. In this area (NAFO zone 3Ps), Canada claims France landed 26,000 tons in 1986, enough to threaten the resource base. Given the general issue of sovereignty and the pressure on the fish stocks, Canada attempted to persuade France to restrict fishing and adopted the following position:

- 1) The boundary dispute with France would have to be resolved by an international judicial tribunal.
- 2) The dispute concerning French allocations in Canadian waters under the terms of the 1972 treaty, while the boundary is being settled, would have to be resolved through negotiations if possible.
- 3) The problem of overfishing in 3Ps would have to be permanently resolved through settlement of the boundary. Until this settlement is achieved the French overfishing must be reduced through negotiations (Canada 1987).

Representatives of provincial governments and the fishing industry were involved in bilateral negotiations, which included an offer of cod quotas to France in the far north, off northern Labrador.

In January, 1987, negotiations appeared to break down, but on the 24th a surprise agreement emerged from a meeting in Paris from which Newfoundland had been excluded. This agreement required Canada to allocate northern cod to France in waters off southern Labrador and eastern Newfoundland (in zones 2J, 3K and 3L) during 1988-1991 in return for which France agreed to discuss the terms under which the boundary dispute could be referred to an international tribunal - without in the meantime reducing the catch from the St. Pierre bank. For 1987, France also received 2,000 tons of "surplus" cod off northern Labrador. France did not actually agree to refer the dispute, only to discuss terms on which consensus might prove elusive. Nor did Canada agree to a specific amount of northern cod: "No way are we going to relinquish valuable cod stocks in 2J + 3KL."

However, very limited access to that zone for 1988-91 is a small price to pay to have the boundary issue resolved" (*Evening Telegram* 29 January 1987).

Since becoming premier in 1979, Brian Peckford had placed great emphasis in public on the importance of northern cod to the survival of the inshore fishing communities on the impoverished northeast coast of the island. This stance involved stern opposition to any attempt, even by a fellow Conservative government, to allow other Canadians access to this fish. It is thus no surprise that his government should express outrage at their exclusion from the meeting in Paris and at the terms of the agreement, especially at a time when Mr. Peckford was in need of an issue to boost his popularity as the provincial economy creaked along with the prospect of oil revenues postponed well into the future. However convenient the fisheries issue, there is no reason to doubt that the Newfoundland government opposed the strategy of the Canadian government because it appeared insensitive to Newfoundland interests.

Although Prime Minister Brian Mulroney felt compelled to apologize for excluding Newfoundland and the province's federal cabinet minister, John Crosbie, from the Paris meeting, it is inconceivable that this was not intentional. The prime minister's advisors knew no agreement would have been reached with France had Newfoundland been represented. It was no compensation for Newfoundland to be told after the fact that this would not happen again. Having been offered an apology for the way the process was handled, Premier Peckford responded in typical style:

...to hell with the process. It doesn't make any difference if we're there while they sell the shop on us or whether we're home. They sold the shop. So don't give me this business of apologizing to me for not inviting me (*Evening Telegram* 30 January 1987).

Representatives of the fishing industry and the provincial government believed that the federal government was so anxious to avoid friction in relations with France, particularly given the close cultural ties between Quebec and France, that it was determined to agree, at almost any cost, before the French premier's visit in 1987 (*Evening Telegram* 29 January 1987). Such an explanation is consistent with the actions taken. Whatever the motives, the Canadian government has shown its willingness to bargain with resources that are indeed vital to Newfoundland as a region. But fish simply cannot be treated as a resource to be given away according to a centralist conception of the national interest. Such a policy shows the insensitivity of the center to the needs of the periphery. The deal must look bad to Newfoundlanders, who discover that the federal government has committed itself to allocate northern cod to France when Canadian deep-sea fleets have had their allocations reduced by 10,000 tons.

Licensing

Quotas were introduced mainly to conserve the resource and to protect the inshore fishers dependent on fixed gear. However, the government has been concerned as well with the creation of a profitable fishery that would not require state subsidies and has turned to licensing to help achieve that objective. In the words of a government review, "This form of effort control is directed primarily at the economic state of specific fisheries. Resource conservation is achieved through other direct means such as the establishment of quotas and fishing seasons" (Canada 1981:29). Having accepted the standard economic analysis of the fishery as an open access resource, the government decided to restrict entry and control effort by expanding its policies of licensing

entrants to specific fisheries, controlling their gear and restricting the fishing season.

The program of limited entry licensing began in 1967 with Maritime lobster and soon spread to other shell-fish, salmon and herring. The groundfish fisheries remained unrestricted, but in the summer of 1973, a temporary freeze was placed on subsidies for new vessels, pending a review of the harvesting sector. Shortly afterwards, general licensing was introduced, yet there was no effective control of the number of vessels and fishers, except for the deep-sea trawler sector where a tight rein was kept, until 1985, on the replacement of older vessels by freezer trawlers.

Limited entry is supported by officials in the belief that it will protect the incomes of those allowed to fish and reduce the fiscal burden on the state during recessions when the fishing industry must be propped up. Recent developments have been troublesome for this theory as both the number of fishers *and* their incomes have declined in Newfoundland (House forthcoming). However, the situation might have been worse without limited entry; there seems little doubt that by keeping competition away, it contributed to the prosperity that west coast otter trawlers and Avalon crab fishers enjoyed in the early eighties. The social cost of maintaining these pockets of prosperity has been high, however, in that people are conscious of severe social inequalities protected by federal policy.

Beyond the question of the social costs of licensing has been the problem of inconsistency in its application, which probably reflects the pressures placed on various senior officials and politicians. On several occasions the policy has been breached in the inshore sector. However, the most controversial and potentially the most important change in limited entry licensing was the 1985 decision to allow National Sea Products to operate a factory freezer trawler. This case deserves attention for the light it throws on the policy making process and because it indicates a weakening of Newfoundland's influence, even with a Conservative government in both Ottawa and St. John's.

Factory Freezer Trawlers

Basically, the factory freezer trawler is an integrated catching and processing unit capable of staying at sea for weeks at a time. Approximately 15,000 tons may be processed in one year by a single vessel and its crew of 60 to 75 persons. It requires a large capital investment compared with other technologies such as wet fish trawling and appears to have few advantages for fishing enterprises close to the banks. One vessel will probably have little impact on employment and fish stocks, but fears have been aroused as to the damage that a fleet of such vessels might cause in the future. That is why so much concern was expressed about the reversal of a long-standing refusal to allow these vessels in Canada, a policy that was written into the Canada-Newfoundland fisheries agreement of 1983.

The debate over factory freezer trawlers is not new. In 1977, the Department of Fisheries and Oceans (DFO) cosponsored with National Sea an experimental charter of a West German vessel to fish underutilized species, but then denied the company's request for such a vessel. In 1979, Ocean Harvesters and Nordsee of West Germany also failed with their proposal to operate a joint venture based on this technology in Harbour Grace. In 1981, National Sea was not allowed to replace three wetfish trawlers with a factory freezer trawler. In 1984, Ocean Harvesters and Nordsee again requested a license, this time in connection with the federal program to supply plants in Atlantic Canada with fish during the winter. Again the government refused (Canada 1985:3-6).

In 1985, National Sea, now restructured with federal funds, pressed for a factory freezer trawler license to fish the company's existing allocation off Newfoundland. By the summer, serious concern was being expressed in the province. Premier Peckford was reported to have stated that the province's inshore fishery would die as a result. It was not the one license requested for 1985, but the vision of four operating by 1987 that troubled him most. "Once the door is opened, the process will simply become a numbers game. We are the only province that stands to lose in the process" (*Evening Telegram* 27 August 1985). At the same news conference, the Minister of Fisheries, Tom Rideout, expressed the view that four of these vessels would mean the loss of 1,000 shore jobs. In Burgeo, National Sea's plant workers feared their jobs would disappear if the company were allowed to proceed (*Evening Telegram* 5 September 1985). For its part, National Sea set about buying a used factory freezer trawler from Germany even before a decision had been made on its application and denied that many jobs would be lost as the vessel would take more than half its catch from allocations previously uncaught and thus unprocessed by shore labour. The President of National Sea expected a net loss of 25 jobs, none of them in Newfoundland (*Evening Telegram* 29 September 1985). In contrast to the bitter opposition in Newfoundland, the Nova Scotian government was strongly in favour, even to the point of asserting that failure to grant the license could destroy the fishery in Nova Scotia (*Evening Telegram* 18 October 1985).

In October, DFO published an analysis of the factory freezer trawler issue that recognized some potential problems. The age structure of the labour force would likely be younger and married persons, especially women, would find it difficult to spend the necessary long periods away from home. A net loss of 145 person years of employment per vessel and the displacement of existing shore capacity in processing were anticipated. However, the factory freezer trawler was perceived as more profitable than a wetfish trawler, especially if the home port is distant from the fishing grounds. Fillets frozen at sea had become highly desired in the U.S. and factory freezer trawlers could also catch redfish and turbot for European and Japanese markets (Canada 1985). With this support from DFO and the Conservative government's general desire to allow companies more freedom from regulation, it was no surprise that the pressure from Nova Scotia proved successful. On 8 November, three licenses were approved for a period of five years, one for National Sea, one for FPI (which it had not in fact requested), and one for the remaining offshore companies (*Evening Telegram* 8 November 1985).

The case of the factory freezer trawler license points out how Newfoundland's government, the Fishermen, Food and Allied Workers Union under Richard Cashin, and the inshore fishery in general have lost influence in the face of corporate demands supported by Nova Scotian politicians. This decision, which is a negative one from the perspective of Newfoundland fishing industry workers, has been justified essentially by the criterion of economic efficiency, which has become increasingly influential as a guide to policy.

Conclusion

I have reviewed the thrust of federal fisheries policy on quota controls and licensing, concentrating on two case studies - factory freezer trawlers and the handling of quota allocations to France. Had fisheries policy been bound to regional development policy, one concerned with social equity within and between Canada's regions, then decisions would surely have been different. With

priority placed on employment and on resource conservation in the interests of Newfoundland, licences for factory freezer trawlers would have been withheld and access for France would not have been traded away with so little in return. Furthermore, the licensing strategy exacerbates social differences in rural areas where people denied the right to fish for valued stocks are condemned to an impoverished existence or forced to migrate.

Local, fish-related industries have not been promoted and the conservation of the resource for the needs of local people has taken too low a priority. Essentially, the explanation rests on the imbalance of power between center and periphery in a context where federal political leaders lack commitment to regional and social equality. Faced with political pressure from organized interest groups (National Sea Products, the banks with investments in that company, and Nova Scotian politicians), the federal government moved against the concerns of rural Newfoundland on the factory freezer trawler issue. Fearing opposition in Québec to a deterioration in relations with France, Newfoundland interests were again ignored in the dispute over control of the fish stocks.

Newfoundland's structural position as a small province in a fragmented federal state means that it has little bargaining power to bring about action consistent with Newfoundland interests whenever more powerful provinces or corporate groups are opposed. The Canada-France dispute over fish became an issue of national importance because it involved relations with France and control of waters that may contain oil. Newfoundland's interests and, indeed, the those of the federal DFO were relegated to a secondary position.

Newfoundland's politicians, mindful of their need to promote provincial capital accumulation and ensure their legitimacy at the provincial level have rallied to the cause of regional development integrated with fisheries development. This may be a genuine cultural commitment, but it is certainly consistent with their material interests as provincial politicians. For this reason, the Newfoundland state, even led by a Conservative government, may act against the immediate demands of capitalist processors and banks in a way that only makes sense if we consider the state as a loosely integrated and relatively autonomous structure. At the same time, the Newfoundland state lacks the resources to act effectively when it is opposed at the federal level. In contrast, what happens in Newfoundland or to the fisheries is rarely a major concern to national politicians, unless they are aspiring politicians and senior bureaucrats in charge of the departments with responsibility for these areas. When fisheries do become an international issue, then federal politicians' interpretations of national rather than provincial interests take priority.

Fragmentation of the state is important in another sense. The state, as indicated earlier, is a disjointed institutional structure in which departments have specific responsibilities that may overlap. It is not unusual to find that programs espoused by one department are incompatible with those favoured by another or that integration of activities is simply not attempted because officials and ministers, suffering from a departmental tunnel vision, do not perceive the need to do so. This problem is evident regarding fisheries and social development in that fisheries officials see development issues as the responsibility of some other department - Regional Industrial Expansion, the new Atlantic Canada Opportunities Agency, or perhaps Health and Welfare. Connections might occasionally be acknowledged, but DFO is clearly concerned with biological issues and the profitability of fishing in the first instance. Some of the difficulties this creates for rural Newfoundlanders have been indicated.

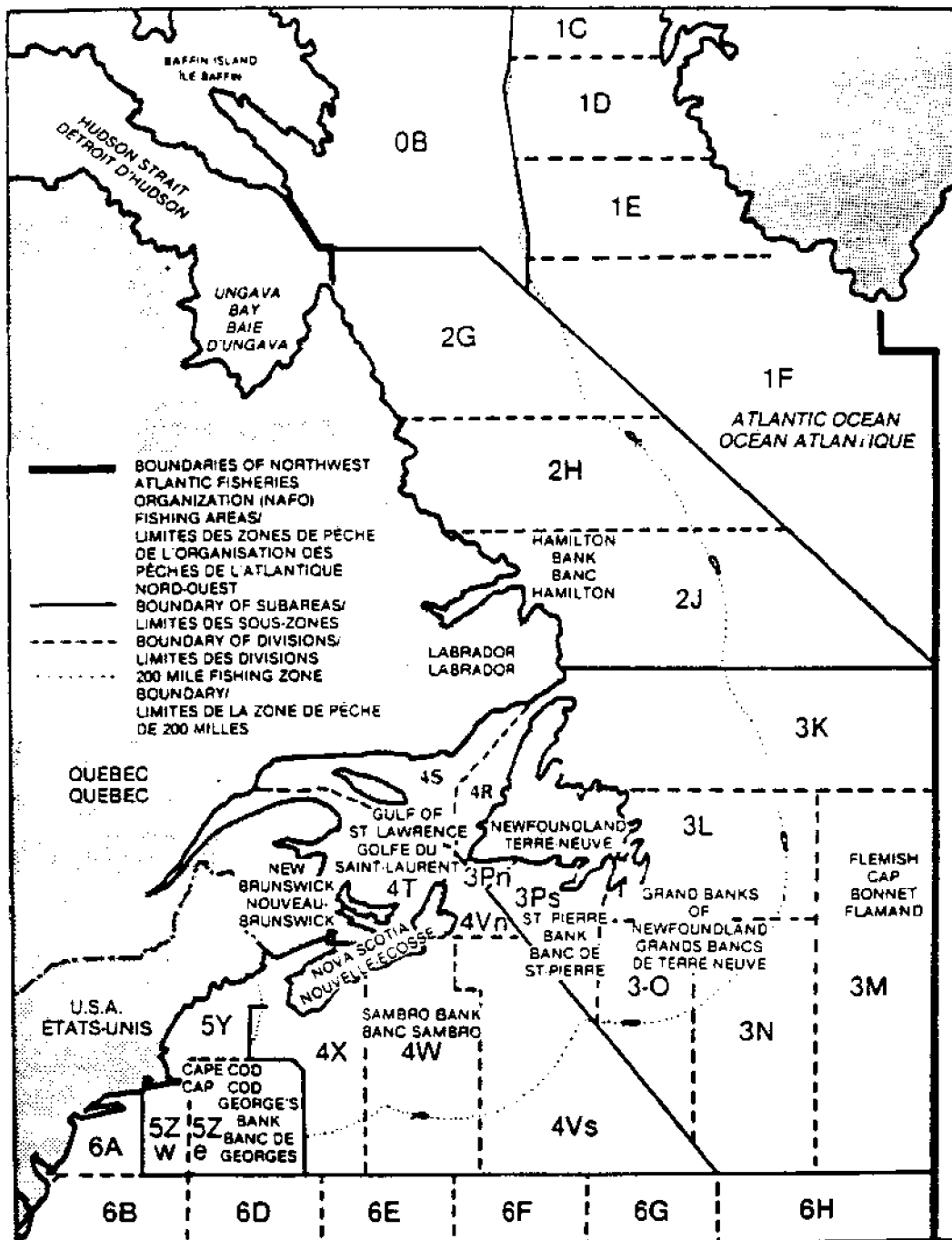
Beyond the specific cases discussed, the federal state has attempted to reduce fisheries expenditures as control of the deficit has become a major economic and political problem. This has aided the case of economists within the government, including the fisheries department, and among its advisors. They have argued that long-run development will be achieved if the market is allowed to function unhindered. Hence fisheries policy should avoid subsidies to inefficient producers, should encourage technological innovation (which usually reduces the demand for labour), and should generally support entrepreneurial, profit-oriented decisions against interventionist programs motivated by social issues. This was evident particularly in the report of the Task Force on Atlantic Fisheries (Canada 1983:186), which specified that federal fisheries policy should be guided in the first instance by an emphasis on economic viability with employment and equity in a clearly secondary position. This position was accepted by the government of the time and has never been repudiated.

If this region is to escape from high unemployment, inadequate provision of public services and low incomes, fisheries policy must be made to serve different objectives than has been the case since the mid-seventies. A context must be created in which local initiatives have a chance. In line with the recent Newfoundland Royal Commission on Employment and Unemployment (Newfoundland and Labrador 1986), this means an emphasis on new ways of processing fish, the growth of aquaculture, promotion of locally controlled co-operatives, the reform of the licensing system to allow more flexibility to inshore fishers, and, most important, the building up of manufacturing based on fisheries. With such initiatives, Canadian fisheries policy could fit the needs of regional development.

References

- Altusser, Louis. 1969. *For Marx*. London: Penguin.
- Bachrach, Peter and Morton S. Baratz. 1970. *Power and Poverty*. New York: Oxford University Press.
- Block, Fred. 1980. "Beyond Relative Autonomy: State Managers as Historical Subjects." In R. Miliband and J. Saville (eds.), *Socialist Register*. London: Merlin.
- Braybrooke, David and C.E. Lindblom. 1963. *A Strategy of Decision*. Glencoe: Free Press.
- Brym, Robert J. (ed.). 1986. *Regionalism in Canada*. Richmond Hill: Irwin.
- Burse, Brian C. 1980. "A Half Century of Progress? A History of Economic Growth and Development in Newfoundland During the Modern Period." Unpublished report prepared for the Economic Council of Canada.
- Canada. 1973. *Licensing for Atlantic Coast Fisheries: A Policy Discussion Paper*. Environment Canada: Fisheries and Marine Service.
- Canada. 1976. *Policy for Canada's Commercial Fisheries*. Ottawa: Environment Canada, Fisheries and Marine Service.
- Canada. 1983. *Navigating Troubled Waters*. Report of the Task Force on Atlantic Fisheries. Ottawa: Supply and Services Canada.
- Canada. 1981. "Policy for Canada's Atlantic Fisheries in the 1980's: A Discussion Paper." Ottawa: Department of Fisheries and Oceans.
- Canada. 1985. "Discussion Paper on Factory Freezer Trawlers." Ottawa: Communications Directorate: Fisheries and Oceans.
- Canada. 1987. "Canada-France. Our Fish Our Boundaries." Pamphlet.
- Castells, Manuel. 1980. *The Economic Crisis and American Society*. Princeton: Princeton University Press.
- Crouch, Colin. 1979. "The State, Capital and Liberal Democracy." Pp. 13-54 in *State and Economy in Contemporary Capitalism*, edited by C. Crouch. London: Croom Helm.
- Dahl, Robert. 1961. *Who Governs?* New Haven: Yale University Press.
- Ezioni, Amitai. 1968. *The Active Society*. New York: Free Press.
- Giddens, Anthony. 1981. *A Contemporary Critique of Historical Materialism*, vol.1. London: Macmillan.
- Gordon, H.Scott. 1954. "The Economic Theory of a Common Property Resource: The Fishery." *Journal of Political Economy* 62:124-142.
- Heclo, Hugh. 1974. *Modern Social Politics in Britain and France*. New Haven: Yale University Press.
- Hirsch, Joachim. 1978. "The State Apparatus and Social Reproduction: Elements of a Theory of the Bourgeois State." Pp. 57-107 in *State and Capital*, edited by J. Holloway and S. Picciotto. London: Arnold.
- House, J. Douglas. 1980. "Coastal Labrador: Incorporation, Exploitation, and Underdevelopment." *Journal of Canadian Studies* 15:98-113.
- House, J. Douglas. Forthcoming. "Canadian Fisheries Policies and Troubled Newfoundland Communities" in P.R. Sinclair (ed.), *A Question of Survival: The Newfoundland Fishing Industry*. St. John's: Institute of Social and Economic Research.
- Hunter, Floyd. 1953. *Community Power Structure*. Chapel Hill: University of North Carolina Press.
- Jessop, Bob. 1985. *Nicos Poulantzas: Marxist Theory and Political Strategy*. New York: St. Martin's.
- Koch, Koen. 1980. "The New Marxist Theory of the State or the Rediscovery of the Limitations of a Structural-functionalist Paradigm." *Netherlands Journal of Sociology* 16:1-19.
- Lukes, Steven. 1974. *Power: A Radical View*. London: Macmillan.
- Matthews, Ralph D. 1983. *The Creation of Regional Dependency*. Toronto: University of Toronto Press.
- Miliband, Ralph. 1977. *Marxism and Politics*. London: Oxford University Press.
- Miliband, Ralph. 1983. "State Power and Class Interests." *New Left Review* 138:57-68.
- Mills, C. Wright. 1956. *The Power Elite*. New York: Oxford University Press.
- Newfoundland Statistics Agency. 1986. *Employment and Unemployment in Newfoundland: A Profile*. Background report to the Royal Commission on Employment and Unemployment. St. John's.
- Newfoundland and Labrador. 1986. *Building on Our Strengths*. Report of the Royal Commission on Employment and Unemployment. St. John's: Queen's Printer.
- O'Connor, James. 1973. *The Fiscal Crisis of the State*. New York: St. Martin's.
- Offe, Claus. 1984. *Contradictions of the Welfare State*. Cambridge, Ma.: MIT Press.
- Phillips, Paul. 1982. *Regional Disparities*, 2nd edition. Toronto: Lorimer.
- Poulantzas, Nicos. 1973. *Political Power and Social Classes*. London: New Left Books.
- Poulantzas, Nicos. 1978. *State, Power, Socialism*. London: New Left Books.
- Scott, Anthony. 1955. "The Fishery: the Objectives of Sole Ownership." *Journal of Political Economy* 63:116-12.

- Simon, Herbert A. 1957. *Administrative Behavior*. New York: Macmillan.
- Sinclair, Peter R. 1985. * 'Off Course': *Navigating Troubled Waters* in the Newfoundland Context." *Newfoundland Studies* 1:99-114.
- Sinclair, Peter R. 1987. *State Intervention and the Newfoundland Fisheries: Essays on Fisheries Policy and Social Structure*. Aldershot: Gower.
- Skocpol, Theda. 1979. *States and Social Revolutions*. Cambridge, Ma.: Harvard University Press.
- Skocpol, Theda. 1981. "Political Response to Capitalist Crisis: Neo-Marxist Theories of the State and the New Deal." *Politics and Society* 10(2):155-201.
- Smith, Gilbert and David May. 1980. "The Artificial Debate between Rationalist and Incrementalist Models of Decision-making." *Policy and Politics* 8:147-161.
- Wright, Erik Olin. 1978. *Class, Crisis and the State*. London: New Left Books.



FISHERMEN AND COASTAL PLANNING: THE HUMAN ELEMENT

Roberta M. Hammond

Temple University
Philadelphia, Pennsylvania

ABSTRACT

The surge in development in the coastal communities of northwest Florida is stressing traditional, artisanal fisheries. Tourism and attendant support industries play a major role in future plans for the area. This paper discusses the commercial oyster industry of Apalachicola Bay and the part the oystermen play in economic and environmental planning. While protection of the natural resources is said to be important, the human resources are rarely figured into the equation.

The following comments are based on ongoing fieldwork observations with a focus on the oyster industry. First I will describe the context of this particular area. Then I will discuss plans for its development. Last I will look at some of the problems and issues which concern oystermen in particular.

The area in which I live, work, and where I am presently engaged in field research is a small, relatively unpopulated county on the northwest coast of Florida (1985 Estimated Population: 8,406; FDC, 1986:48). Located on the coast and on the county's only major highway from west to east, the towns are separated in various physical, political and social ways.

Apalachicola, on the west end of the county, is the largest (Estimated population 2634; Franklin County 1987 Chamber of Commerce figures) and is also the county seat. It has a rich history beginning with the Apalachicola Indians and continuing through ownership by Britain and Spain. It was a prosperous port in the cotton and lumber trade before and during the Civil War. These industries waned as railroads were built to other parts, such as Savannah, in the mid 1800's. Attention then turned to commercial fishing for oyster, mullet and blue crab.

Apalachicola is separated from Eastpoint by a wide estuary. Until the 1930's, the county's three communities were served by a daily ferry which carried mail, goods, and people. Since the 1930's a causeway, a bridge and a swing bridge both connect and effectively separate the three communities. Eastpoint was originally established as a communal colony of farmers in the late 1800s. It is now a cluster of houses, mobile homes and fish houses, next to the highway. Eastpoint is in turn separated from Carrabelle by 18 miles and another bridge over another river.

Carrabelle is built along and near the mouth of this river. It was once an important timber and turpentine port. It is now a struggling community of 1300+ (Florida Department of Commerce, 1986:48). Primary sources of income in this city include shrimp, mullet and grouper fishing, along with services provided

to passing motorists and other jobs including construction work and staff support at a private psychiatric facility.

Because of the psycho-geographical separation of the three communities from each other, there are many social, political and economic conflicts. As mentioned before, Apalachicola is the county seat, but recent development and population changes have caused the area on the east side of the river to be the one with the majority of the county's population. Carrabelle residents feel that the county seat should be moved over to their side. Although the county population does not justify the existence of two high schools, there are two, one in Apalachicola and one in Carrabelle. There is intense rivalry between the two schools which extends beyond the school years into adulthood. Although many oystermen living in Apalachicola sell to dealers in Eastpoint and vice versa, there is antagonism between the groups born and raised in each city. Fishing in Carrabelle is less concentrated on oystering, more on other sectors of fishing. Because of this and other reasons mentioned above it has been said that it is treated like the poor step-child of the county. The estuary of the main river and its tributaries is one of the last undeveloped watersheds in the country. The Bay area includes developed and undeveloped portions of the estuary with its salt marshes, the bay, and the barrier islands. With a low tax base, the county is among the poorest in the state and has a high rate of unemployment due to low skill levels and/or lack of jobs.

The Bay area was legislatively designated an Area of Critical State Concern in 1985 under the Apalachicola Bay Protection Act (Section 380.0555 F.S.). For reasons of politics and lack of funds, the county has been mismanaged for years and is perceived by state agencies as being either unwilling or unable to cope. The Act is an effort to facilitate the repair, upgrading, or replacement of faulty sewage treatment systems (both central wastewater treatment plants and individual septic tank systems), to manage growth through stricter land use ordinances and enforcement thereof, and to retrofit old development with stormwater management systems and require the same of new development. All this activity is to protect the Apalachicola Bay area's natural resources. The question is: protect which resources and for whom? The definition of natural resources is somewhat foggy, depending on the context of the conversation. It could mean the bay, the oysters, the fisheries, the wetlands, the coastline. Whenever the question, protect the resource for whom, has been voiced, no one seems clear on the answer. Federal and state managers of state parks, national reserves and wildlife preserves say they are preserving the resource for the people or for posterity. They readily admit, however, the need to keep people out by regulating access in various ways.

Non-fishing state and local officials also say that they are preserving the resources for the people, but which people, the non-fishing residents, the tourists or the fishermen? Several researchers have mentioned that when managing fisheries, it's not fish that are being managed, but people (Stephenson, 1985:16; Lampl, 1988). Biologists, environmentalists and land developers don't see it this way, however. Fishermen are not mentioned as a human resource or figured into the equation in any way except as a reserve labor force or when cataloguing the perceived excesses of their failures: overfishing, illegal fishing, low standard of living including illiteracy, high level of high school dropouts, teenage pregnancy, high infant mortality, low birth weight babies, child, spouse and substance abuse and malfunctioning septic tank systems, or no septic systems at all.

In my function as planner for the state land planning agency I have attended public meetings and had private on and off work conversations with local officials and residents regarding economic development planning. There is talk of attracting new industry to the area balanced by talk of reinforcing old industry and encouraging development of locally-owned businesses. This is one of the last undeveloped watersheds in the country. The natural resources of the area consist of sandy beaches, woodlands, wetlands, rivers and the bay, and fish. About 86% of the county's land is owned by the state, federal government or private logging companies. This leaves very little for other development. Consequently, attention has focused on the populated areas on the coast.

Many ideas have been circulated regarding light industry; however beyond vague suggestions of garment manufacturing or light electronic parts, these ideas have not been explored at any depth. Attempts have been made to attract marine-related industries also, but with little success. Questions that come to mind include what skill levels and training would be needed for such work and would the pay for such jobs be competitive with the pay for shucking and tonging? If managers are to be brought in from the outside, are there basic amenities for them such as adequate schools and housing (there are not)? Other issues that need to be considered are the demand for such light industries relative to the closest large population centers: Tallahassee (77 miles) and Panama City (69 miles).

These questions aside, the conversations with local officials and residents always turn to talk of leisure industries: sport fishing and tourism. The Apalachicola Bay area is a natural setting for this sort of idea: sun, sand, water and fish. While tourism seems to many a logical step in economic development, there is a tendency to ignore the problems associated with it. Tourism is seen as economic salvation: "It will bring money into the local economy and generate jobs." The line: "it will bring money into the local economy" omits saying that it will bring money only to a few pockets. The line about generating new jobs leaves out what kind of jobs for what kind of pay for which people.

Real estate brokers and vacation home managers with dollar signs in their eyes do not want to talk about the already desperate need for low-income housing for oystermen and other fisheries workers. People working in tourism associated service industries will also need housing and day-care. Tourist service industries are, in general, low-skill, low-paying jobs with very little opportunity for advancement. They would consist, for the most part, of maid, waitress, bartender, and sales clerk jobs. The jobs would also, in all probability, be seasonal.

Another tourism related idea that has been floated about the town of Apalachicola in particular is to turn it into an artsy-craftsy waterfront fishing village with "working waterfront" tours where fishermen would perform net-making and other traditional, picturesque crafts for crowds of onlookers. The assumption is that tourism based on the historic, working waterfront concept will promote the fishing industry. A worse case scenario points in the opposite direction.

Tourism as a local industry will displace fishermen from their habitual waterfront work areas. Already, bay shrimpers have become very sensitive to being pushed into a corner over docking space and permissible dockside activities (Apalachicola Times, 1987 & 1988; see also Edwards, 1987). Recreational boats will take the place of the fishing boats and increase the potential of contaminating the bay and wetlands with harmful pollutants. While local residents are friendly, they have become wary of outside invasions by the state in the form of regulation and planning.

Further invasions by tourists who come to see the quaint people in their cute fishing boats, presumably cleaned up for the occasion could provoke resentment on the part of the fishermen while constricting their movements and established patterns of behavior.

There seems to be an attitude that fishing for recreation is more legitimate than the non-leisure form of fishing for a living, that fishermen could easily find jobs on the hill. When conservationists and biologists talk about preserving wetlands, nurseries, etc., it becomes increasingly clear that they are emphasizing preservation for leisure use. If one looks at recent fisheries rules, access to fisheries for commercial finfishermen has been drastically reduced using the argument that they are at fault for decimating fish populations.

The complete change in tradition from a self-determined work schedule to regular days and regular shifts, that is, generations of quasi-independent fishing families changing over to wage dependency would also have to be addressed in the scheme of tourism development. The non-fisherman attitude towards oystering and other kinds of fishing is one of both envy and disdain: envy of the perceived independence and presumed grandiose and undeclared amounts of income made by fishermen; disdain of the perceived failures and lower standard of life as mentioned before. Many oystermen live in settlements of mobile homes with inadequate or malfunctioning septic tank systems. County and city officials have stated: "they like to live this way." Vacation-home managers and other real estate developers would like to see these settlements disappear. Of course, they still depend on shuckers, oystermen and other fishermen as a reserve labor force.

One might ask how oystermen fit into all of this. Oystermen themselves are unconvinced that menial jobs are better than \$100-\$300 per day made oystering. They don't automatically agree that a high school diploma is necessary to oyster. A diploma has been suggested by seven state biologists as a way to limit entry and to raise the oystermen's collective consciousness regarding the bioecology of the Bay. The oyster industry is facing its own particular set of problems. One concerns a dispute between four holders of seven old leases, who happen to be seafood dealers (leases of this type are no longer transacted). Lease-holders are demanding that they be allowed to harvest by any means desired according to the original terms of their leases. They would like to dredge oysters. Dredging has not been allowed in this county since the early 1900's. Tongers and non-lease-holding dealers are protesting that dredging will eventually spread illegally to public bars and clean them off. The Department of Natural Resources has drafted a new aquaculture rule which provides for leasing bottom and cultivating. However, because of the law against dredging and because the County Commission reserves the right to deny any new leases for oysters, DNR's current policy is not to grant any aquaculture leases for oysters in the county. There are also rumors of imposition of certain quality control procedures on all seafood in the state which will impact the oyster industry in terms of cost per oyster. It will take years of hearings and court battles, but it looks like the general transition could be in motion from tonging to dredging and from public oyster bars to private leases.

While commercial fishermen do have a statewide voice, Organized Fishermen of Florida (OFF), efforts to organize them at a local level have not been successful to date. The locally based Seafood Worker's Association is a group of about 400 oystermen and shuckers (in 1987 about 1400 oystering permits were granted). In reaction to the leaseholders' requests to dredge and over some price disputes last year, the association has pulled together more

cohesively than before. Because of what I call the psycho-geographical distribution of the county population as well as kinship, occupational, ethnic and religious alliances, oystermen in particular and fishermen in general are an acephalous group that bands together only when reacting to state-imposed rules. They are permeated by a kind of skeptical apathy resulting from previous experiences in public meetings and hearings. Because of cultural and linguistic differences, they are viewed as uneducated, ignorant, loud-mouthed hicks. Attempts to lobby on their behalf meet with exasperated sighs at best or result in insults or outright shouting matches at worst.

As a researcher, I have been cautioned to avoid the pitfalls of romanticizing the artisanal oysterman who could benefit from change, either by his own observation or by that of an outsider. This change could be de-emphasis of the fishing or oyster industry or change of the means or mode of its production. The change could be either a benefit or a detriment. The paradox is that traditional oystering is seen as quaint, as worthy of observation by transient tourists yet at the same time it is not seen as a legitimate way of making a living by many non-fishing local residents. In addition to not being wage laborers, oystermen are still perceived to be associated with illegal activities such as oystering at night, tonging in the hole or oystering in closed waters in addition to other smuggling activities endemic to many coastal areas. In these times of transition, both within the oyster industry and without, county and city officials and fishermen themselves want to retain the autonomy that comes with the Wild West image of this frontier county, yet, at the same time, conform to the image they think the tourists expect.

Local fishermen, as a group, rarely have more than high school education and many of them don't even have that. By default, they are skilled at marine engine repair, boat building and net repair. However, if the fishing industry is de-emphasized, there won't be jobs in these lines of work either, at least, not enough to employ the numbers of fishermen who could be put out of work. This points to a need for retraining. One local businessman who installs, services, and repairs air conditioners and industrial refrigerators and does electrical wiring and plumbing is interested in on-the-job training and apprenticeship programs. Because of the construction business and vacation home development, these professions are in demand. In many cases, people must be hired from out of town to do these jobs. While this particular businessman has approached both the school superintendent and the director of vocational education regarding this idea, he has encountered a wall of indifference. It must be said that it is hard to convince an oysterman who has the potential of making \$100-\$300 a day to throw it over for minimum wage, training level jobs. Never mind that there are down times in fishing due to storm, boat

and gear malfunctions and the catch rate is not always consistently high. Also oystermen are still allowed to oyster only four days a week, a rule imposed by the Marine Fisheries Commission after the series of 1985 hurricanes.

The schools, that is the superintendent, vocational education director and school board, are not interested in increasing the variety of vocational training which they offer. Right now there are classes in automotive repair, marine engine repair, carpentry and cosmetology. The reasons for this reluctance are twofold.

1. Status quo dependency: the administrative power structure of the schools likes things just the way they are, and
2. Vocational education program placement requirements: 75% of students must be placed in their field of training or the school district loses the funding for that particular program. Because of the indifference of the area's planners and educators, it begins to appear that the oystermen and shuckers are being kept as a reserve, unskilled labor force which can be incorporated into the tourism industry.

The picture for the continued health and support of the oyster industry is rather dim. Cortez, Cedar Key, Tarpon Springs, Key West are some of the towns that have emphasized tourism over fishing as an industry. The depressing reality is that tourism with all its associated labor, housing and infrastructure problems, has the potential of bringing in more money than oystering or other types of fishing can. By doing this, fishermen are gradually squeezed out and the tourists end up coming to see a re-creation of what once was, not what still is (Landry, 1987).

References

- Apalachicola Times. 1987. City shrimpers agree to long-term deal. Thursday, August 6.
- Apalachicola Times. 1988. Fishermen seek sole use of Scipio Creek and facilities. Thursday, April 12.
- Edwards, M.L. 1987. Florida Keys fishermen are being zoned out of their own backyards. *National Fisherman*, May.
- Florida Department of Commerce. 1988. Florida County Comparisons. Division of Economic Development.
- Lampl, Linda. 1988. Personal communication.
- Landry, Sue. 1987. Fishing villages would benefit as historic districts, leaders say. *St. Petersburg Times*, April 6.
- Stephenson, Frank. 1985. A Disappearing Florida. *Research Review*, September, p. 16.

ASSESSING THE TOURISM PREPAREDNESS OF COASTAL COMMUNITIES: THE MISSING LEADERSHIP FACTOR

E. Jane Luzar, Steven A. Henning, and Michael Liffmann
Louisiana State University

ABSTRACT

Generally depressed economic conditions along much of Louisiana's coastal region have increased interest in development of a local level recreation and tourism industry. In order to assist in the evaluation of this effort, the Center for Wetland Resources at Louisiana State University has recently coordinated three tourism preparedness assessments in coastal Louisiana parishes. Interdisciplinary teams composed of Sea and Land Grant researchers, other university faculty, state government officials, and parish level officials have completed intensive, on-site visits to the areas and have summarized some of their conclusions. The lack of local leadership in the area of tourism development was identified as a key limiting factor to the development of tourism as a part of the coastal economy. This paper reviews the interdisciplinary approach used to conduct the assessments and discusses the problem of leadership development in areas such as the local level coastal tourism industry.

ASSESSING THE TOURISM PREPAREDNESS OF COASTAL COMMUNITIES: THE MISSING LEADERSHIP FACTOR

Louisiana's coastal region continues to suffer the economic and social consequences of dependence on what has in recent years been a generally declining petroleum mining and refining sector. Coastal Louisiana's double-digit unemployment rates (still as high as 17 percent in some localities) have led the nation and Louisiana during this "bust" phase of the petroleum boom and bust cycle. Economic instability in the coastal region has been further increased by policy, price and production uncertainty in the agricultural sector, reduced sources of state and local tax revenues, and instability in the remaining rural retail sales and service sectors.

Recognizing the instability inherent in this regional dependence on a single economic sector, efforts to diversify local economies have been proposed and pursued with varying degrees of success. One economic diversification strategy often proposed but seldom pursued by coastal Louisiana parishes is the development of local recreation and tourism related activities.

This paper reviews the interdisciplinary approach developed by Louisiana State University that was used to conduct three separate parish level tourism preparedness assessments in coastal Louisiana. The first section of the paper explains the evolution of the tourism preparedness assessment process. A brief synopsis of the assessment team findings for the three parishes is presented in the next section, along with a summary of recommendations. The lack of local

leadership in the area of tourism development (consistently identified as a key limiting factor in the participating parishes) is discussed in the final section in terms of the potential contribution of Sea and Land Grant researchers.

THE LOUISIANA COASTAL RECREATION AND TOURISM ASSESSMENT TEAM

In general, tourism works for Louisiana. However, it works in a very regionalized area surrounding New Orleans. Travelers' expenditures directly generated 75,700 jobs within Louisiana, while employees in these travel related jobs earned \$732,700,000 in wage and salary income in 1986. Local tax revenues generated from travel spending reached \$68,200,000 in 1986. Travel spending generated \$186,700,000 in state tax revenue, approximately 5.1 percent of all Louisiana state tax collections in 1986. Orleans Parish, including the city of New Orleans, received over \$2 billion in travel spending, leading all Louisiana parishes in 1986 (Louisiana Travel Journal). The attractiveness of these figures has increased the interest of neighboring coastal communities in capturing or sharing the Louisiana travel wealth.

In a related effort to increase the involvement of the Louisiana State University (LSU) community in coastal development and marine matters, the LSU Sea Grant College Program coordinated the formation in 1986 of an Ad Hoc Committee on Coastal Recreation and Tourism. The Ad Hoc committee is currently composed of 13 faculty, staff, and extension specialists with either Land Grant or Sea Grant affiliations. The Ad Hoc Committee's primary objectives are:

1. Foster economic development in the coastal region through the conduct and provision of appropriate research and advisory services,
2. Increase awareness on the part of coastal leaders and residents as to the potential economic significance of tourism and recreation and the role it can have in stabilizing local economies,
3. Identify potential tourism and recreation resources, determine the extent of their use, and develop programs to capitalize on their potential.

Limited financial resources and personnel prompted the Ad Hoc Committee to focus its efforts on the third objective stated above. As a means of identifying potential tourism and recreation resources at a local level, the Ad Hoc Committee developed an approach that seeks to combine data collection and analytical techniques with training and technical assistance for parish and local leaders. The operational arm of this approach is an interdisciplinary team, the Louisiana Coastal Recreation and Tourism Assessment Team (LCRATAT) whose members are selected from the university as well as public and private sectors. LCRATAT members conduct a series of specialized short term, intensive, low-cost studies designed to give local interests a road map for the development of their local recreation and tourism resources.

THE STUDY AREA

Initially developed in response to a single request, tourism preparedness assessments by LCRATAT have now been conducted in three coastal Louisiana parishes: Cameron Parish, 1987, St. Mary Parish, 1987, and St. Bernard Parish, 1988 (Figure 1). These three coastal parishes represent the full range of diversity found along the Louisiana coast. Cameron Parish is a largely rural agricultural parish with a rich natural resource base that includes beaches, marshes, and wetlands. It is home to a national wildlife

refuge that is a renowned birding area as well as a refuge famous for its alligator breeding program.

St. Mary Parish is located in the center of the state's coast line and is a blend of traditional agriculture (primarily sugarcane) and petroleum based industry. St. Mary Parish is also situated at the mouth of the Atchafalaya River, which provides access to the Atchafalaya Basin. St. Bernard Parish is adjacent to Orleans Parish and the City of New Orleans. St. Bernard blends a marine economy with a heavily industrialized economic sector.

The three parishes involved to date in the tourism preparedness assessments have quite fortunately provided the Ad Hoc Committee with a representative sample of coastal parishes. The influence of the New Orleans tourism industry is felt in varying degrees by these parishes. In addition, they represent a diversity of natural resource bases and local tourism attractions. They also vary in the degree of sophistication of the existing tourism industry and supporting infrastructure.



Figure 1. Louisiana Parishes Participating in LCRATAT Tourism Preparedness Assessments

LCRATAT Composition

Although the team's composition is tailored to address a specific locality, the assessment teams have evolved to include a broader range of expertise. For example, the first assessment conducted in Cameron Parish included the Assistant Director of the LSU Sea Grant College Program, a Natural Resource Economist in the Department of Agricultural Economics and Agribusiness at LSU, the Research Director of the office of Tourism in the Louisiana Department of Culture, Recreation and Tourism, the Planning Coordinator of the Office of State Parks in the Louisiana Department of Culture, Recreation and Tourism, a Recreation Planner from the Minerals Management Service of the U.S. Department of the Interior, a Marine Economics Specialist from the Louisiana Cooperative Extension Service, and an instructor from the LSU Department of Geography and Anthropology.

Subsequent assessment teams have added representatives from the Louisiana Litter Control Commission, the Office of Cultural Development of the Louisiana Department of Culture, Recreation and Tourism, a marketing specialist from the LSU School of Business, a recreation finance specialist from the Texas A & M

Sea Grant College Program, the head of the New Orleans Hotel and Motel Association, and a representative of the Louisiana Tourism Promotion Association.

LCRATAT Procedures

The process followed by the assessment teams includes a pre-assessment visit by a sub-committee and a week long on-site visit by the full LCRATAT. Because assessments are done by local invitation only, the sub-committee works with the focus group that initiated the process to heighten local awareness of the upcoming assessment. Local media is used as an information outlet as well as arranged meetings with local civic groups and elected officials. At this point the sub-committee endeavors to explain to local leaders the purpose as well as the process of the LCRATAT that will visit the parish. After the initial visit by the sub-committee, modifications in the LCRATAT make-up can be made to address the specific character of the parish under review. The coordinator of the assessment supplies team members with background documentation of the parish prior to the actual assessment. Available team members then meet together at least once before the assessment to identify individual focus areas and to coordinate group activities.

Although the first assessment lasted only three days, subsequent assessments have involved a week long process. During this week, LCRATAT members use a combination of personal interviews, observation, compilation of available data, and traditional and non-traditional extension service education techniques to conduct their assessments. For example, four members on the St. Bernard assessment team participated on an interactive cable TV talk show, greatly expanding the number of individuals who became familiar with the assessment.

Coordinating meetings are held every evening to facilitate a flow of information among members and hosts. The assessment coordinator focuses media attention on the assessment by participating in prearranged civic meetings as well as speaking before local elected officials.

A final summary presentation of the team's recommendations is made before invited local officials, participants in the assessment, and interested residents on the final day of the visit. This presentation is of a preliminary nature as a documented, written report is eventually prepared for the parish. Rather than run the risk of losing enthusiasm developed during the assessment, the team presents what has become known locally as a road map, or a process for the development of local tourism related resources.

The road maps to date have included specific information about parish tourism attractions, an assessment of community interest, and information of the benefits and costs of developing a local tourism industry. The road maps typically include six steps:

1. Assessment of local tourism potential.
2. Development of a community-based planning approach for tourism.
3. Assessment of the locality's product and market.
4. Development of a comprehensive marketing plan.
5. Development of a hospitality industry program.
6. Identification of all sources of public and private assistance.

The Leadership Factor

Armed with individualized road maps for tourism development in their parishes, the three case study areas have to date shared one common stumbling block: a lack of trained leadership at the community level capable of implementing or facilitating the

parish's road map. Planning for growth and development in Louisiana's coastal parishes has historically been in anticipation of or in reaction to near-term economic circumstances. This is especially evident in the absence of a state or regional tourism development strategy. One unfortunate legacy of the prolonged petroleum boom years has been that the existing leadership structure did not have to consider planning for the medium or long term future. Planning for development and growth has been in anticipation of near-term economic conditions. Local level leaders in coastal Louisiana frequently lack the experience in strategic planning that will allow a broad-based community approach to the development of project or business plans. The state, its regions, and most of its communities confuse strategic and project planning and have encouraged or undertaken projects in anticipation of near-term economic circumstances rather than trying to shape the future through careful analysis and extensive input.

When Sea Grant, the Ad Hoc Committee, and LCRATAT first began the process of identifying constraints to the development of local level tourism resources, the developmental state of the industry was grossly underestimated. Our ability to facilitate an orderly development of Louisiana's coastal tourism and recreation resources are severely limited by the absence of basic local leadership and community development training programs aimed at non-farm rural residents. In assessing the tourism preparedness of coastal Louisiana, LCRATAT has repeatedly concluded that eagerness and goodwill are not substitutes for knowledge and understanding.

Concluding Comments

The information contained in this paper is more of a description of an evolving process rather than a final research product. This process is still evolving into what we see as a research phase. The lack of long-term planning and the absence of trained local level leadership to implement this planning was highlighted earlier in this paper. Mike Liffmann, Project Coordinator, continues to address this dimension of the process by exploring existing leadership development programs at LSU, in Louisiana, and around the country.

The LSU program for leadership development sponsored by the Louisiana State University Agricultural Center has been dismissed by us as a potentially useful vehicle due to its focus on the traditional commercial agriculture sector of the state. Unfortunately, the LSU leadership program appears to be typical of many of the Land Grant sponsored leadership development programs nationally that appear to be producing a more articulate, polished lobbying group for agriculture rather than address the needs of the rural non-farm population.

Mike Liffmann has also continued the leadership discussion with a number of state agencies, including the Department of Culture, Recreation and Tourism and is exploring the appropriate location for such a rural development effort in state government. Linked to this effort is the on-going discussion of a need for regional, long-term development planning in the coastal region.

Another research related result of this process has been that Steve Henning and I have been better able to make a case for natural resource based rural development research in the coastal region of Louisiana. Steve Henning is beginning a program of research in coastal communities that will, as one product, develop a local level fiscal impact model (micro-computer based) which could help local level communities better evaluate the fiscal impact of tourism and recreation activities on their communities. As mentioned earlier, tourism and recreation are often proposed as economic panaceas in the absence of the basic economic needed to ascertain their relative costs and benefits to a community.

As a relatively new faculty member at LSU, this process has allowed me an unusual opportunity to do "field work" before developing my research agenda for the next five years. Based in part on my experiences with the assessment teams, I have developed a research program that which will focus on coastal resource issues including resource valuation, changes in coastal property rights structures, and analysis of the influence of alternative management strategies on coastal land loss.

One other research related product of this process has been the formalization of a multi-disciplinary research and extension team on a campus that, not untypical of other university settings, tends to build walls around researchers based on disciplinary orientation or funding sources. We are already seeing the benefits of this network through development of other collaborative research efforts.

Current interest and activity in recreation and tourism development in coastal Louisiana communities and elsewhere can be compared to the development of cargo cults by tribesmen in the central New Guinea highlands. In anticipation of the arrival of great airborne wealth like that brought by Allied forces in World War II, innumerable runways were constructed in the bush and lighted by fires while the cult members simply waited for the inevitable arrival of cargo.

In order to prevent this sort of naive "waiting for wealth" behavior in coastal Louisiana communities, assessments such as those conducted by the LCRATAT can help identify community recreation and tourism assets (if any) and develop a realistic road map that considers costs as well as benefits of this economic activity.

REFERENCES

- Louisiana Coastal Recreation and Tourism Assessment Team. 1987. Cameron Parish: An Assessment of Recreation and Tourism Development Opportunities. Louisiana State University, Louisiana Sea Grant College Program.
- Louisiana Travel Journal*, p.1-2, August 1987. Office of Tourism, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge, La.

CLASS DIVISION AND THE POLITICS OF CONSERVATION IN THE FLORIDA KEYS

Sarah Keene Meltzoff

Rosenstiel School of Marine and Atmospheric Science

ABSTRACT

Alliances between groups competing for the insular Keys real estate, in particular the developers and the resident retirees and commercial fishermen, underscore the politics of conservation. All three groups share a dislike for the new Monroe County Land Use Plan, although for conflicting reasons, and are trying to amend it. Fishermen's and retirees' effectiveness in representing the community's dominant point of view is inflected by their different forms of social organization, and is based on differences in occupation and class. Thus, fishermen and retirees, who would both benefit from a long-range perspective not allowing high density development, have been unable to coordinate political efforts in the planning process. Rather, their different concepts of "pollution" and "freedom" and "quality of life" have resulted in shifting and unstable alliances.

Introduction

An emerging area of anthropological concern is how institutions assimilate information (Douglas 1986), especially how the production of scientific information intersects with the character of political institutions and the class structure of local communities.¹ In this vein, McCay (1978) has noted the role of larger social and political processes in orchestrating management decisions; Langdon (1982) has shown that a central weakness of formalist management models is that they cannot adequately conceptualize the local political economy, or its tie to legal-political forces; and Meltzoff (1988) has suggested that misrecognition of the relationship between social class, polity and conservation is fundamental to land use planning processes, such as that now being legislated in Florida. In this context, the paper seeks to make two theoretical points through an in-depth empirically based analysis of land use planning in the tropical, marine environment of the Florida Keys.

In the context of US fisheries, the key contribution for anthropology, theoretically and practically, is to uncover the internal form of the socio-political relationships—such as those between information processing, politics, and social stratification—that ultimately determine how communities manage the conservation process. Recent work in the Gulf has emphasized many of the same themes (Starr 1980; Maril 1983).

With this in mind, the present paper focuses on the politics of conservation, examining three issues critical to land use planning in the tropical, marine environment of the Florida Keys. The first issue is the relationship between the state and the county, especially its administrative and tourist center of Key West, where an interlocking set of conflicts and responsibilities influence the scope of the recent Monroe County Land Use Plan (LUP). The second

issue is the confrontation between local development and conservation interests over the types of studies and resulting restrictions that should be carried out in order to plan. Battle lines are drawn through the creation of information, the interpretation of that information (particularly the way in which a given interpretation is legitimated), and its dissemination. The third issue is the extent to which the coordination of distinct groups—their alliance—and thus their effectiveness in representing the community's dominant point of view, is inflected by their different forms of social organization, based on differences in occupation, ethnicity, and class (for a more detailed discussion of Anglo and Cuban ethnicity in the Keys than the scope of this paper can provide see Meltzoff 1988; See also Doeringer, Moss, and Terkla 1986). Almost all community members, from retirees to fishermen, dislike the land use plan because they feel that it threatens the very nature of the community. Yet, their differences in occupation, ethnicity, and class give rise to divergent concepts of "pollution" and "freedom" and "quality of life" with the result is that the two major community groups, fishermen and retirees, form shifting and unstable alliances with development and conservation interests during the land use planning process.

The paper analyzes the creation of a land use plan. This broaches the problem of "density" which, itself, is a surrogate for the trajectory of the community's future development. It raises the question of what the community should become and therefore what will be the lifestyle and "quality of life" in that community. To pose the political opposition of conservation and development in terms of density, and thus the very fate of the community, reveals three key fields: (1) a complex set of social relations between the various interest groups as well as their different types of interests (e.g. economic, social, environmental); (2) the coordination between class interests and community interests; and (3) the relationship between county and city, and the state with regards to planning. Within this triple context, it appears more expedient, less costly, to follow a short-term political solution that favors increasing density precisely because it ignores the underlying social characteristics of the community at large. Accordingly, the opposition arises between developers' short-term, self-interested economic solution and conservationists' long-term, community-oriented social solution. The community-based groups of retirees and fishermen share a common need for the long-term solution. Yet, because they comprise groups with distinct ethnic, occupational, and class (defined as the intersection of social, economic, and cultural capital)² backgrounds, it is difficult for them to form an alliance and function as a coherent, integrated community.

County and City, and State

Florida's land planning agency, the Department of Community Affairs (DCA), from its Key West office oversees Monroe County and Key West as two distinct Areas of Critical State Concern that receive extra planning attention from the state. The designation allows the Governor and Cabinet broad authority over local land use planning to protect areas with significant environmental or historical resources, Monroe County (the Keys) rich in the former and Key West in the latter. Areas of Critical State Concern (ACSC) must plan under specific state-generated Principles Guiding Development which therefore become bones of contention. Because the incorporated city of Key West is a separate ACSC—and now every incorporated municipality or county in Florida is required to have its own guiding document for development—Key West has an individual comprehensive plan, separate from the county.³

Although tourists, traffic, and the surrounding sea know no city limits and flow freely between jurisdictions, under this system the Monroe County Land Use Plan (LUP) does not apply to Key West. A cardinal difference between County and City plans is that the LUP, as well as being facilities-oriented, attempts protection of vast areas of natural environment (e.g. uplands), while the Key West plan basically deals with facilities (e.g. parking, traffic levels, sewage), state opinion being that Key West no longer has a significant natural environment left to defend.

Elected County and City Commissioners, each appointing separate Planning Commission members, mirror and perpetuate the segmentation of planning authority. The only overlap in commissions is that Key West elects one of the five County Commissioners, giving Key West 20% representation for county LUP decision-making. City Commissioners, whether pro-growth or environmentalist (quality-of-life), ignore the county's LUP and call it "one less cumbersome document to wade through." The internal political interests of the two separate bureaucracies prevent them from cooperating, but the fight between Commissioners is not for political jurisdictional control. Rather the nature of being a Commissioner is seen as a means to express personal power, gain, or ideology (e.g. pro-growth versus quality-of-life). With studied disinterest, County and City Commissioners rarely consult each other on common planning issues. Structural relations between City and County Commissioners disintegrated when one side denied permits to the personal development project of a commissioner of the other side. A few joint meetings, where one side snubbed the other, further exacerbated the lack of coordination.

The tensions can be seen in the fact that County and City governments have undergone similar resistance to the state assignment of Area of Critical State Concern status. The Keys were designated an ACSC in April 1975, and Key West in 1976. Neither wanted to be especially "protected" and both had controlling pro-growth majorities at the time who feared restraint on development. Key West was redesignated in 1976 when a Key West "conch" (native) in the State House of Representatives held sway in Tallahassee. Freed from supervision, the city entered a period of unbridled development. When the state finally reined Key West back in and redesignated it an ACSC, state supervision of the county as an ACSC also intensified. The Department of Community Affairs was set in charge of assuring that Monroe County produce a land use plan by (1) watching and advising the County Planning Office; (2) attending the LUP public hearings where policy was to be debated and voted upon by the Commissioners; and (3) retaining the right to block by appeal zoning decisions and future amendments.

In response to the DCA's supervision of its Area of Critical State Concern status, Monroe County entered into a contract on 24 February 1984 with the joint venture planning consultant of Lane Kendig, Inc. (Illinois) and the law firm of Siemon, Larson & Purdy (Sarasota, Florida with main offices in Illinois) to prepare a new comprehensive plan for the county. The land use plan Siemon and Kendig devised had to meet a number of specifications outlined in the contract and Ch. 27F-8, F.A.C., New Principles for Guiding Development for the Florida Keys ACSC, adopted 23 August 1984 by the Governor and Cabinet, superseding the original Principles adopted by the Legislature in 1975 (Nocerini, 1987). The ACSC New Principles call for limiting development to the ability to provide facilities and services (e.g. traffic, sewage and trash disposal). And throughout, the New Principles use the strong language of "shall" instead of "should" (DCA:1984), still a subject hotly protested by the county. The state also insisted that the Keys, given the mandate to maintain or improve water

quality, set a model for managing a marine environment through the control of density of development on land (Selz 1986).

Density and its Essence

The regulation of density (defined as the number of dwelling units per gross acre) has become the Land Use Plan's prime consideration. Its stated aim is to permit the maximum level of density through development without degrading the environment, managing and controlling the use of land so that the unique island environment of Monroe County is protected (LUP Vol.II:27).

Given the plethora of social and economic issues raised in the context of discussions about density, it is evident that density is the surface form for arguments over the community's future economic and social organization. Density encodes three structural features: (1) overt economic and ecological concerns; (2) the community's right, acting as a community, to self-determination; (3) the maintenance of especially class and ethnic interests. Encompassed by the concept of density, these dimensions are unequally transparent to the participants in the system. There is a descending order of native awareness. Almost everyone recognizes and argues for their economic and ecological interests. These are the most immediate and ideologically legitimated concerns insofar as they focus on individual maximization. Far fewer participants are cognizant that the future of the community is at stake, and that the community as a social form can have interests that stand above those of its individual members. And, finally, virtually nobody is conscious that their actions are implicitly guided by, and serve to maintain, their class and ethnic interests. The coexistence of these sets of interests, which as will be seen are often contradictory, provide one of the main dynamics driving the LUP political process.

The individuals who participate in the LUP process can be classified into three principal categories of local actors: fishermen, retirees, and developers, each with their attendant lawyers and public officials. And within the three categories, there are factions and class fractions based on internal differences such as ethnicity, education, and immediate economic interest.

The initial category, fishermen, is occupationally grounded in a primary industry. Key's fishermen formed the pioneer community that developed the crawfishing industry during the 1950s and 1960s. Fishermen are divided among ethnic lines, but share economic and ecological concerns that would materially benefit through political cooperation. In particular, they share an occupational need for political cohesion to retain their share of Keys real estate for backyard shorebases and fish houses. However, fishermen are divided along two lines. The most salient is their ethnic division into Anglo and Cuban fishermen, each of which has its own language and tradition of separation. The Anglo fraction dominates in the public political sphere due to its majority status as well as advantages in English language and education. The second division is between pioneer fishermen and newcomers. This division is highly correlated with, and receives impetus from (1) ethnic division, insofar as Marielitos and Miami Cubans are the most recent entrants into the Keys fishery, and (2) the organization of production. Predominately Anglos in the Lower and Middle Keys, joined by some Miami Cubans in the Upper Keys, depend upon backyard shorebases. By contrast, about 77% of Cuban fishermen (including Marielitos) in the Keys are based around the Latin community of Key West where canal backyards are scarce. They must depend upon fish houses in Key West's commercial fishing area of Stock Island.

The fishing sector is estranged from the political process. In one dimension, ethnic divisiveness makes it difficult to develop trust, raise funds for the common cause, or mobilize the power of numbers. In another dimension, fishermen, because of their inability to speak "well" publicly or "dress for success"—that is, because of their class "habitus" (Bourdieu 1984)—feel themselves being placed at the bottom of the class hierarchy by the middle class retirees, politicians, developers, planners, and lawyers within the forum of public land use hearings. The social result is that only a handful of Anglo fishermen, representing Organized Fishermen of Florida (fishermen's only political arm), attend public LUP hearings.⁵ Almost by default, they constitute the dominant faction, politically and economically.

Moreover, fishermen not only lack an effective political presence, but have difficulty joining associations which would further their own interests. They view conservation groups as middle class institutions where they will be made to feel uncomfortable outside their class ken. This corresponds with fishermen's disposition to avoid public politics (i.e. including membership in their own organization, OFF, which only generates 10% of potentially active members) as a waste of time, and to distrust fishermen who become embroiled in leading OFF because the political process, itself, is seen as (1) corrupting and (2) engendering dispositions different from those of other fishermen.

The second category of agents are retirees. They are largely Anglo urban professionals who have moved to the Keys for a bit of palm lined paradise. A number are lawyers and in real estate themselves. With their free time, disposable income, distance from the necessity to work, positive disposition towards political activism, and middle class social and cultural capital, they comprise the highly vocal, local majority involved in the LUP process. In contrast to fishermen, retirees have both the resources, social as well as economic, and the cultural disposition to join conservation groups and participate in public political action. Conservation associations are run by and attract retirees, who make up some 63% of Keys conservationists.

Developers initially dug canals in the scantily inhabited Keys running northeast of Key West up towards Miami, as post-World War II real estate speculation. With the advantages of air-conditioning and pesticides, as well as air travel and the post-war prosperity, second-home owner/retirees began pouring into the Keys in the 1960s. These newcomers moved in next to those who had started settling these new neighborhoods a decade earlier to fish for a living. Many of these fishermen were either fishermen from Miami or northern working class who had come to Florida originally with the Navy or for construction jobs. That fishermen were often the pioneer inhabitants in canal neighborhoods now presents a moral contradiction for retirees and the civic and conservation associations they run. Retirees' cultural concept of justice leads them to agree to the fairness of grandfather zoning clauses for backyard fishing operations. But because American society accepts the letter of the law over the spirit of the law, retirees are seeking to by-pass the 1980 grandfather clause for backyard fishermen called for by the LUP. Instead, they are harkening back to an obsolete, original 1973 land use plan's grandfather clause because it could eliminate more fishermen without breaking faith with retirees' American legal value system.

Retirees note specific differences in social and cultural capital between themselves and their fishermen neighbors, as well as ethnic stereotypes, especially in those areas like the Upper Keys where they live near Cubans. Miami Cuban extended families crowd into small houses for the spiny lobster season and proceed to fish intensively, taking advantage of their cohesive family structure

for manpower. The retirees, like many Anglo fishermen, think the Cuban fishermen are oblivious to, or disdainful of, conservation and the management regulations. They also think that the Cubans practice amoral familism, stealing others' traps and hiding behind the language barrier when confronted. By the same token, many Cuban fishermen understand conservation, not as a critical element in the community's future, but as a political interest of, and part of a political struggle with, the Anglo retirees and fishermen. To put this differently, because the community is rent by ethnic and class antagonisms, the community itself cannot become a common interest. The prevalence of class and ethnic divisions ultimately puts fishermen in a double bind. On one hand, if they subscribe to the conservation interests that the Anglo retirees are uniquely qualified to carry forth, then they pass political control of the community to a group whose class and ethnic interests motivate them to eliminate fishermen. On the other hand, if fishermen ignore conservation concerns, then they ultimately undermine the basis of their own livelihood. Given this Hobson's choice, plus an absence of the social capital and time needed to participate in the LUP process, it is no wonder that Keys fishermen are apt to maintain distance from conservation movements. The point to be underlined is that class divisions, both at the level of embodied attitudes and at the level of the intra-community power struggle, make it difficult for fishermen and retirees to join forces on the issue of conservation.

The contradiction between the retirees' class interests and their concern for the community as a totality surfaces in the way that retirees' level of awareness and scope of concern for the environment divides them into two factions, narrow-issue and broad-issue conservationists. The majority of retirees are narrow-issue conservationists: actively focused on their own neighborhoods, joining local civic and conservation associations to push for issues effecting local property. The way narrow-issue conservationists conceive of, and argue for, individual, overt economic and ecological neighborhood concerns directly expresses their middle class attitudes towards aesthetics, orderliness, safety, pollution, etc. In the LUP process, they implicitly seek to maintain their class status by assuming that they are justified in attempts to rezone fishermen out of "their" neighborhood on the grounds that fishermen are dirty, polluting, and disorderly by nature. These retirees feel a fair haven is their prerogative as good citizens, a reward for years of hard work. They believe their sense of conservation is informed by their sense of neighborhood aesthetics, and are unaware that it is part of a set of class views guiding "what is good for the community" (e.g. that sees trap-building and diesel work boats as "polluting"). Ironically, narrow-issue conservationists, because they are unconsciously guided by class concepts, tend to take a short-term and immediate focus, making it difficult for them to address the more long-term and serious environmental problems; they do not attempt to fight the long-term environmental dissolution caused by increasing density. Similarly, some avid sportfishing groups—who also tend to have a core membership of retirees—form conservation associations whose primary agenda is to lobby for recreational against commercial fishing in the name of conservation. They, too, pass over long-term threats to the marine resource base emanating from density and reduced water quality (e.g. agricultural and stormwater runoffs of fertilizers, pesticides, heavy metals). Instead, they hope to increase stocks by eliminating commercial pressure, which is at best a short-term, class-motivated solution to protecting marine resources.

The minority faction of retirees are broad-issue conservationists, who are concerned with the future of the community and its environment. Broad-issue conservationists—overall in the minority—are more aware of the community as a totality, and thus able to move beyond class lines onto the broader conservation issues such as water quality, ultimately summarized as density. They argue for conservation beyond personal, immediate neighborhood concerns insofar as they focus their efforts on long-term solutions to community-wide problems. Notable examples are the retiree leadership of the Florida Keys Citizens Coalition and Izaak Walton League's Keys Chapter. Retirees within these organizations address density issues and aim to challenge (e.g. via the state's 120 Administrative Challenge) the LUP's non-geophysical basis for its zoning decisions. Predictably, the need for a parallel socio-economic investigation to define the internal structure of the community and its trajectory—including ethnic interests—is less transparent.

The final category of agents in the LUP process are real estate developers. Included within this group are a small set of retiree real estate investors whose main motive has become to override the LUP's restrictions in order to develop their land profitably (e.g. the Tax Payers League). Developers are predominantly an Anglo middle-class occupational group whose impetus and interest is profit maximization. Developers have little self-motivation to tailor their development projects to fit the structure and needs of community residents because this would run counter to (1) their immediate economic interests and (2) their concept of the individual's rights to maximize profit regardless of environmental and social problems. Developers perceive the community's interests as hurdles to be cleared, like the hurdles of environmental regulations and LUP restrictions. Their arguments avoid the future of the community, focusing instead on present economic and ecological concerns and rewards. Developers adhere to the set of community interests defined by political fiat: the interests of whoever controls local government. Hence developers are ardent supporters of pro-growth candidates, even running themselves as well as pushing spouses into positions of political policy-making (e.g. Planning Commission and Tourist Development Council).

Developers and retirees, although they do not share the same occupational status, are largely drawn from the same social stock, maintaining similar class/ethnic attitudes. Thus they stand in contrast to fishermen in general, and particularly to Cuban fishermen. Developers differ from fishermen principally in terms of their class and ethnic interests, and mode of investment in the local community. To a large extent, the legal and political battle waged over the implementation of the LUP pits retirees against developers, with OFF stepping in as best it can for the fishermen, who remain bystanders. When LUP decisions go against developers, they have the capital and financial incentive to employ lawyers to amend and appeal permit decisions. Broad-issue conservation associations, alternatively, prepare the long, involved cases themselves, drawing on their retiree members' free time and educational capital. In this respect, retirees via their associations stand a fighting chance in the jural-political arena against developers. By contrast, OFF chapter members in the Keys lack the finances for lawyers, let alone the professional writing and speaking skills of developers' lawyers and the retirees, themselves. OFF also faces the apolitical attitudes and noncohesiveness of fishermen, who prize individualism. A socio-political triangle has crystallized. On one leg, fishermen and retirees share conservation needs but have distinct occupational and class interests for utilizing property inside the community (and ethnic concerns where there are Cuban fishermen) that have blocked political alliance. On the

second leg, developers and retirees share class and ethnic attitudes including a belief in working through the political system. But broad-issue conservationists, in particular, have diametrically opposed concepts of the community's right to decide the fate of the environment and regulate density. On the third leg, fishermen and developers share a concept of individualism that has been grounds for political alliance, yet their views of the right to "work without restrictions" arise from conflicting class and occupational interests. Fishermen have backed developers politically to gain a voice against the narrow-issue retirees trying to eliminate backyard fishing. Developers and fishermen agreed that regulation is anathema to American freedom. Until now, developers have been more willing to form alliances with fishermen in that developers are not inhibited by short-term class conflicts over land allocation within neighborhoods or fishing rights (i.e. sport vs. commercial). OFF has tried alliances with both sides in order to leverage their immediate survival interests. OFF first sought an alliance with the Florida Keys Citizens Coalition, the initial objective being to allay the fears of retiree neighbors and gain support for the formation of special Commercial Fishing District (CFD) "villages" (e.g. on No-Name Key in the Key Deer sanctuary area of Big Pine Key) where fishermen could live as well as base their operations. OFF had proposed the CFD villages despite awareness that it would be difficult to obtain federal environmental permits (e.g. Fish and Wildlife). Meeting neither meeting with open arms nor success, OFF turned to the Tax Payers League and pro-growth candidates in the 1986 election. OFF's alliance with developers helped to re-elect a pro-development faction called the "Concrete Coalition" as County Commissioners. The development interests had successfully attracted fishermen by appealing to their desires for "freedom" from regulation, while also holding out the immediate economic promise of construction jobs for sons and political support for the LUP special zoning designation of Commercial Fishing Districts, often against the will of conservationists. In this way, developers' political possibilities for implementing a project that the community believes is contrary to its own environmental interests hinged on the class antagonisms that divide the community.

However, OFF leadership is beginning to realize that their occupational and environmental concerns diverge from developers and match the retirees in the long run. The complexion of the socio-political triangle will change. Broad-issue conservationists, who as neighbors still hold their own narrow perspective on fishermen, are starting to discuss development of CFDs and saving their common property, the water, with OFF. Their joint efforts to sustain appropriate density and water quality levels, as well as preserve the occupation of fishing, could help fishermen and retirees by creating long-term environmental and community stability. In theory, Commercial Fishing Districts will enable fishermen to secure use rights and hence survive as an occupation in a real estate market of escalating prices. Fishermen will require CFDs as (1) fish houses convert into the three to five times more profitable recreational marinas and (2) the next generation of fishermen can no longer buy a canal house as a shorebase, let alone be grandfathered in. The LUP's creation of the CFDs has not resolved fishermen's growing shorebase problems. Low cost housing is short supply, while only the CFD village allows onsite living. Most CFDs are only for work. Just one or two of several dozen CFD sites designated by the LUP exclusively for commercial fishing have been purchased and developed into commercial fishing bases. OFF actually feels commercial fishermen may be forced to turn zoning restrictions back to permit recreation fishing uses (e.g. marinas, fish restaurants) in order to entice developers to finance and build CFDs.

Rising land prices, triggered by resort and upper end condominium development, are limiting incoming Miami Cuban and other fishermen to trailers instead of canal houses, or to illegal rental of ground floor conversions in stilt houses. This process also effects recruitment of fishermen's children who depend on the availability of low income housing, traditionally trailer homes, to stay in the Keys and join the fishing sector. All are being closed out by soaring prices. The LUP has exacerbated this shift away from low income housing by (1) encouraging developers to maximize value on finite construction and (2) forbidding trailers to be rebuilt after a hurricane, and prohibiting new ones because they cannot withstand hurricane floods and winds. Even RV parks, for example, are blocked by Anglo residents of the Upper Keys because they think RV parks bring in Cubans. Ethnic and class divisiveness of the Keys renders it unlikely that developers will receive sufficient financial incentives from the County to build low income housing. CFD shorebases may become superfluous, even if they are build, if fishermen cannot find an affordable place to live.

Perceptions of Paradise

The overt short-term economic interests of developers are served by the Keys Tourist Development Council (TDC). The TDC's operating budget from a 3% "bed" tax⁶ on tourists promotes tourism by advertising "Paradise." In a litany extolling the virtues of an unspoiled, undeveloped nature that, ironically, only results from maintaining low density, they pay a local ad agency \$200,000—coincidentally the TDC and the agency have the same head—to "sell" the idea of secluded beaches lapped by turquoise waters. The use of the word "paradise" in US real estate marketing is in vogue precisely where remaining pockets of nature are being built up. In line with tapping the industrialized world's desire for the natural in an increasingly artificial (man-made) environment, the TDC's national ad campaign angles for mass tourism to maximize short-run tourist incomes. They advertise in *Spring Break*, *Modern Maturity*, and *Golden Age* instead of *Smithsonian* or *The New Yorker*. In response, tourists on low budgets packed the Keys in unprecedented numbers during the 1987-88 season. Because crowding by a 20% increase in tourists was accompanied by a significant 7% decline in upper-end tourist-related business, the Tourist Development Council is under fire. Predictably, those who wish to sell T-shirts, local cigars and perfumes, and one-time tourist attractions are lined up against owners of antique stores, and fancy clothing stores and restaurants who seek change. So TDC is forced to consider altering its campaign (e.g. from ads in *Spring Break* to Key lime pie bakes at Iowa county fairs). Fishermen and broad-issue conservationists could join in the political push to stem mass tourism, and so maximize their own community interests. But recall, their very recognition of a common problem is slowed by covert interests of class and ethnicity which inform their dispositions to trust, listen to, engage, and otherwise depend on each other.

Developers, except those who also own tourist businesses, stay aloof from the controversy over the type of tourist to attract. Their income is derived from construction, not the actual population and use of the Keys. They continue seeking permits under the LUP for more "destination resorts" and condos in a drive towards maximizing density of high-priced units to achieve today's economic gain. Meanwhile, developers privately describe their own vacation spots, hide-aways far from the rapidly crowding Keys, citing the very traits that they intend to sacrifice in the Keys in exchange for immediate return: uncrowded tranquility,

unpolluted natural beauty. In their personal lives, developers share the values of the retirees and tourists to whom they market the Keys "Paradise."

Production of Information and its Political Power

The types of information produced and used in the planning process shape public debate and alliances, and thus the politics of conservation. To determine density for the LUP, Siemon and Kendig carried out neither a sociological nor a geophysical study. Rather, they utilized a folk concept of "visual perception and community character," drawing an analogy between the urbanization process and "natural succession, where the area ultimately reaches the climax state of the City" (Siemon and Kendig 1985:250). Their concept, devoid of social structure, focuses on the loss of "visual dominance of the natural environment" as the city state encroaches (1985:251); land use is seen as the surface continuum from "commercial, residential" and "industrial resort" to "natural, residential" and "resort, fishing" (1985:253). The pro-development County Commissioners, who constituted a majority and favored the contract, appreciated that this general approach would be least likely to hamper future development since it was not rooted in scientific investigation. They understood correctly that it would be politically simpler to amend a LUP founded on folk concepts and fluid specifications, yet with the appearance of being scientific, because then they could concretize the study based on their own economic and ideological concerns. "Visual perception and community character" is indicative of the considerable range of para-scientific concepts that have sprung up around the public planning process. Siemon and Kendig relied on the invention of "magic triangles" which in graphic form measured the transition from native to suburban to urban land. The triangles aim to describe character in terms of "aesthetics," "congestion," "privacy," "landscaping," "remaining habitat," etc. Such concepts, in terms of linguistic form and presentation (i.e. graphics, language, and statistics), seek to parody science in an effort to imbue economically interested products with "objectivity" and thus legitimacy. Siemon, himself, wore a cardboard "magic triangle" headdress at Key West's October Fantasyfest to poke fun at the "scientific" mystery few had fathomed. In this vein, the "research" done underlying the concept of "visual perception and community character" was methodologically flawed because it failed to take into account the wide range of environmental impacts of increasing density. The triangles relied on superficial categories (e.g. "encounter ratios," "open space") to map the extant structure of the community. The cultural (e.g. on ethnicity and social economy), social institutional (e.g. on how government and civic organizations interact), and environmental (e.g. on geophysics) data that would lend substance to the concept are absent. Of course, the goal was not to produce a document that passes muster as science, but which serves its political function. In this regard, the Siemon and Kendig approach served the interests of its creators: it transformed a potentially interested LUP document into a disinterested one via the legitimization of science. The LUP ends up asserting that other high density communities in the USA have experienced water quality troubles, and therefore DER studies should monitor the Keys water quality in the future (Vol I 28 Feb 1986:92). With this, the LUP acknowledges that water quality problems do have a high probability of surfacing. But, no specific analyses on Keys geophysics examined density's impact on the tropical marine environment. Therefore none could be quoted during the LUP process to impede the rise in density. Similarly,

no one analyzed the community's concepts (e.g. "quality of life," "pollution," "freedom") or examined its social economy and goals.

The most diffuse community concept which appeared in the planning process is "quality of life." The folk notion, or ideology, of "quality of life" depends on one's class and habitus, though it is not understood this way by participants in the system, including Siemon and Kendig (1985:250). County and City Commissioner elections reverberate with this slogan, countered by the "pro-growth" campaign. Conservationists rally behind "quality of life." For them, it denotes maintaining a bastion for the wildlife and those fortunate enough to live in an "unpolluted" world protected by law and government from rampant self-serving, destructive forms of individualism. On the pro-growth side, individual freedom to build as one chooses, just as freedom to fish where one wishes, have been construed by developers and fishermen as upholding a primary American value. In the Concrete Coalition's campaign, they portrayed broad-issue conservationists as provoking the deterioration of individual rights and being anti-American for seeking government intervention.

"Pollution" is another core community concept used in the politics of conservation and land use planning. It reflects far more than the biological and chemical condition. Depending on one's social perspective, "pollution" shifts meaning; indeed, as Mary Douglas noted in another context (see Douglas 1986), it refers to the disruption of the right social order as a disruption in the rightful design of the community. For retirees in the canal neighborhoods common throughout the Keys, "pollution" among other things, has come to signify the signs of working class fishermen in the neighborhood: diesel engine and drill noises; stacks of traps and the rotten smells emanating from them at season's close; and projection of the working class image of Waylon Jennings and a guard dog. "Pollution" becomes the secular equivalent of a religious concept, receiving its legitimization not from God but from science which frequently serves as a semi-mystical and autonomous form of authority whose wisdom must be divined by those anointed to do so. What is polluting and who "pollutes" depends on one's perspective and interests.

In the context of competing with fishermen for allocation of neighborhood land use, retirees blame fishermen for the "pollution" or demise of water quality in backyard canals. Recognizing the power embedded in quantitative scientific research in political debate, Keys conservation groups are applying for grants and commissioning studies themselves. They have been instrumental in initiating water quality studies based on physical properties. However, these studies at one level have produced surprising results vindicating fishermen, pointing the finger at sewage leakage and stormwater run-off (Lapointe et al. 1988), both density problems.

Public hearings for the LUP—which numbered nearly 100 up and down the Keys—functioned contrary to their intent in the planning process. Public hearings were supposed to reveal the "community character" and debate its future. The whole institution of public zoning hearings, however, merely served to cement oppositions. In the act of testifying in front of friends and neighbors, a person's point of view solidifies. In practice, the public forum acts in counterpoint to its American town square ideology of free speech and flow of ideas. It fails to create a feedback situation where people can influence each other's opinions. Rather, it codifies fixed stances in public record, hardening positions, making it more difficult to reach compromise and sway thought. The public hearing cannot be a forum in which the expression of opposing interests yields a consensus because (1) the interests are layered, some social, some economic, some political; (2) the legal system provides a forum for continuing the debate almost indefinitely; and (3) the

stating of a public opinion reduces the possibility of a compromise because those involved would lose face if they backed down. Moreover, the symbolic power of language intimidates and "humiliates" those without native, middle-class mastery of English used in the hearings (e.g. through lack of formal education or English being a second language as it is for many Cuban fishermen). Public hearings cannot be expected to provide the LUP with an ethnographically sound base for making decisions about the community's future. The structure of the hearings, itself, reflects the dominant factions and class interests.

The absence of ethnographic and quantitative studies to provide information for the LUP is paralleled by the dearth of a density build-out report in the LUP. This information gap, too, politically avoids discussion of the consequences of increasing density. There is an implicit fight between developers and conservationists as to what type of information gets produced since documentation on density and its impacts generally fuels the conservation cause. A build-out report, for example, is a basic tool for determining potential density patterns, therefore it is no accident that through 1987, none has been produced by the LUP. Build-out reports offer an account of how many units, and in what price range, will be permitted by the Plan's zoning regulations and includes already existent units. The report is essential for long-range planning, projecting the LUP's impact. It is needed to estimate necessary facilities and services (e.g. schools, hospitals, libraries, roads, bridges, sewage, jails, fire fighters, trash landfills) to accommodate the maximum build-out, and so determine costs. The unofficial projections of increased density range from 24,000 new units to 100,000 new units, depending on which side is speaking and the context. Developers day dreaming in private, and conservationists predicting grave trouble in public, concur on the upper spectrum. The dearth of a build-out report, itself, underscores the political struggle between short and long-term interests. It reflects the short-term profit orientation of developers interested in maximizing build-out today, operating at the expense of long-term residents who will have to bear in perpetuity the cost of facilities and services, as well as lack of affordable housing and environmental degradation.

Conservationists feel their most popularly based argument against high density is the danger of high taxes to cover the cost of services and facilities. They extrapolate this type of cost information during LUP public hearings, founding it on their own build-out estimates. Taking the middle estimate of 37,000 new units, multiplying by the \$2,100 impact fee charged each new unit, ostensibly to cover the cost for community facilities and services (not charged "affordable housing" defined as 25 units/acre), the funds raised would be almost \$80 million. The Commissioners were also promised \$100 million by the state as recompense for taxes lost on wetlands not to be developed. This revenue, \$180 million, falls far short of projected costs. The LUP, itself, calls for \$120 million to catch up on facilities and services prior to creating higher density, plus \$338 million to accommodate an increase in units, totaling \$458 million. The LUP estimate, done without the benefit of a build-out report, remarkably fails to include hospitals, jails, roads and bridges, sanitary services,⁷ etc.. Kendig acknowledged this mistake at a LUP public hearing when it was brought out by the Izaak Walton League president, one of the most active broad issue conservation leaders. The planners promised to recalculate their figures, but 1.5 years after LUP was signed into effect the figures stood unrevised. The true financial cost for 37,000 new units lies closer to \$1.2 billion.⁸ Allowable land for development under the LUP is assessed at \$578 million. Therefore, it would be socially, and in the long-run economically,

cheaper to buy it and set it aside in a program following the philosophy of Nature Conservancy, than to develop it to maximum allowable densities and pay at least triple the assessed land value for facilities and services. The inevitable demise in water quality from individual septic tank leakage and traffic-polluted stormwater run-off is a further long-range consideration. Even Siemon at a LUP public hearing agreed with conservationists that increasing density will turn out to be more expensive more than buying up the land. The heart of the density debate for residents, who take a long-run perspective unlike developers, is who will shoulder the costs usually born by taxation. Taxes focus residents' common interest in maintaining low density levels, whether working class fishermen or retirees, conservationists or not. Developers unconvincingly argue (trying to convince voters) that increased density gets more units on the tax rolls which lowers taxes. The debate over cost and taxes is really a debate over the fate of the community. Cost is manifest, material and objective, whereas the trajectory and nature of the community is not. So cost serves as a surrogate for this larger set of concerns, concerns that the individualist nature of American ideology held by fishermen, retirees and developers alike, has trouble making room for.

The Department of Community Affairs never fully approved the final version of LUP in September 1986, but it could not afford the alternative: to write its own version. So the LUP became, according to DCA and County officials alike, the "Vietnam of Planning." The DCA, representing the state, was empowered to appeal permit decisions, thus effectively stalling a builder for upwards years if he could withstand the stiff legal fees, otherwise forcing development plans to be dropped. In another example, the DCA in early 1988 denied 60% of the text of the massive number of first-year LUP amendments that had already been approved by the County Planning Commission. The cumbersome law had only allowed DCA to say "yes"/"no" instead of editing. This forced the Planning Commission director to go through each rejection with his DCA counterpart to see if it could be reformulated. The stalemate is applauded by conservationists starting to produce quantitative scientific information which they intend to wield in the political arena of planning just as the developers had manipulated the its void into the LUP. Meanwhile, the developers continue to ask for (1) additional intensity and (2) reversion to what they could have done under the zoning regulations prior to the LUP.

The Politics of Conservation

The evidence from the Keys indicates that the most important factor informing allocation and management of resources is the politics of conservation. The politics of conservation determine management and allocation of resources, despite the ideology that scientific, impartial knowledge prevails (e.g. be it fish stock assessments in the sea or public hearings for understanding the community on land). There are political and ideological forces at work in allocating and "conserving" limited island real estate through the land use planning process. The LUP public hearings are where density and its economic costs are argued as a surrogate for debating the fate of the community where the class, ethnic, and occupational interests of developers, fishermen, and retirees are imbricated. The social and political elements of a community—those of ethnicity, occupation, and class—determine what alliances emerge in the process of determining the community's future. The LUP differentially effects the main interest groups, however all unite in their dissatisfaction with the Plan, albeit for opposing reasons. This fact of "something for everyone to hate" is cited by Siemon

as proof of having created a balanced plan. On one hand, the real estate developer-tourism interests, as well as real estate investment-minded civic associations (e.g. Tax Payers League), are anti-LUP because it blocks the use of wetlands and native areas and is generally "too restrictive." On the other hand, the conservation associations, particularly the broad-issue ones, are anti-LUP because they fear development of myriad new condos and resorts leading to crowded roads and reefs, excess trash and wastes. Loss of community "quality of life" is couched in economic terms as the threat of taxes needed to cover the cost of services and facilities passed on to the residents, especially the retirees, who tend to be on fixed incomes.

Conservationists see the role of state intervention as the potential community savior from the "Concrete Coalition" of the County Commissioners, developers taking the opposite view. They decry state intervention and depend on maintaining a local pro-growth political front. Organized Fishermen of Florida officially has wavered between developers and conservationists, searching for alliances with those who promised to support the fishermen's rights to continue fishing by maintaining shorebases. They are unaware of their shared interest with conservationists in maintaining low density.

Narrow, short-term allocation arguments, whether over zoning land or managing fisheries (i.e. the recreational/commercial fishing controversies), although class-based, revolve around which group is best for the economy, who can generate the most capital for the economy. In this, narrow-issue conservationists ironically remain on the short-term time horizon that favors developers, instead of seeking alliances with the working class fishermen or the broad-issue conservationists.

Fishermen and retirees could unite within the opposition of low density/high density because both need low density to satisfy their separate class and occupational interests. Fishermen want to continue having land bases from which to fish and they want their children to be able to afford housing to stay in the Keys, neither of which is possible in a high density world of maximum value real estate where fish houses are replaced by more profitable marinas. Retirees want low density to keep down facilities and service costs triggering tax increases, and prevent the decline of water quality and the crowding of paradise. However, the alliance between the two is compromised because each has different concepts structuring their vision of how the low density should be allocated.

Unaware that low density is in their mutual best interest, fishermen and Organized Fishermen of Florida, and the civic and conservation-minded groups, have been unable to coordinate their efforts and ally, although some of their members hold out hope. Formidable barriers are the retirees' class-based resistance to having working class neighbors; and the commercial fishermen's resistance to community-wide interests that limit individual "freedom." Fishermen fear conservationists who, like sportfishermen, are seen as favoring regulation that will end commercial fishing. There is a concept of individualism among the majority of fishermen who stay outside the whole political process, be it LUP hearings or OFF meetings. Many fishermen continue to work out of their backyards in residential neighborhoods to the protests of retiree neighbors despite the change in law. They believe it is their American god-given right to fish from their own property; they don't intrude on anyone else and nobody else should intrude on them. They declare that law enforcement officers will have to come stop them by force; extreme cases say they will defend their rights with guns. By April 1988, the LUP regulations pertaining to commercial fishing had not been enforced so defiance remained at the level

of rhetoric, representing feelings of (1) helplessness as the political system advances without their participation and (2) self-righteousness since government seems to turn its back on fishermen's ability to earn a living in the way they know and love. Code enforcement, itself, is an overall LUP problem and the panel established to write a report on it (which later was called off as overzealous) noted that there were only 1-2 investigations/day and that only 1 of 17 complaints had resulted in real action. Developers can fight with political forces and defend themselves with lawyers. They feel justified in earning a living by transforming the landscape within the boundaries of the law by maintaining a majority of City and County Commissioners on their side. Retirees can also wield political power and they feel justified in seeking to defend a hard-earned, beautiful corner of the USA in the name of conservation. Their weapons are astute use of state and national law, petitioning the state to intervene, and attempting to overcome the pro-growth coalition by electing local quality-of-life commissioners.

Conflict in the LUP process over whether to allow developers to increase density, is determined on the one hand by the overt, explicit reference to economic and environmental interests, at the highest level of native awareness, and on the other by covert maintenance of implicit class practices and dispositions of the three major groups. Competing class, ethnic, and occupational interests of developers, and of retiree and fishermen community members, are left below the surface by the groups themselves. The argument whether the community has social and political rights to self-determination is also phrased by the participants in terms of which degree of density is best for the county's economy and ecology. Overall, the LUP process has sidestepped to what extent a community will be allowed to determine its own fate.

References

- Bourdieu, Pierre. 1984. *Distinction*. Cambridge, Mass.:Harvard University Press.
- Department of Community Affairs. 1984. *Boundary and Principles for Guiding Development for the Florida Keys Area of Critical State Concern*. Chapter 27F-8:Land Planning Part VIII.
- Doeringer, P., P. Moss, and D. Terkla. 1986. *The New England Fishing Economy*. Amherst:Univ. of Massachusetts Press.
- Douglas, Mary. 1986. *How Institutions Think*. Syracuse:Syracuse Univ. Press.
- Foucault, M. 1973. *Madness and Civilization: A History of Insanity in the Age of Reason*. New York: Random House.
- _____. 1975. *The Birth of the Clinic: An Archaeology of Medical Perception*. New York:Random House.
- Langdon, S. 1982. *Managing Modernization: A Critique of Formalist Approaches to the Pacific Salmon Fisheries*. In *Modernization and Marine Fisheries Policy*. ed. Maiolo, J. and M. Orbach. Ann Arbor: The Butterworth Group.
- Lapointe, B.E., J. O'Connell, and G. Garrett. 1988. *Effects of on-site disposal systems on groundwater and surface water quality*. Water Research submitted 10/87.
- Maril, R. L. 1983. *Texas Shrimpers: Community, Capitalism, and the Sea*. College Station:Texas A&M Univ. Press.
- McCay, B. 1978. *Systems Ecology, People Ecology, and the Anthropology of Fishing Communities*. *Human Ecology* 6(4):397-422.
- Meltzoff, Sarah Keene. 1988. *The Cross-Currents of Occupation, Ethnicity, and Class: Conservation and Conflict in the Florida Keys*. *Cultural Anthropology* accepted 3/88.
- Meltzoff, Sarah Keene and Edward LiPuma. 1988. *Class and Culture in Spanish Ethnography*. *American Ethnologist* submitted 4/88.
- Nocerini, K. 1987. *Key West Land Use Plan Hearings Legal Position Paper*. n.d.
- Selz, Michael. 1986. *A Face-Off over the Future of the Keys*. *Florida Trend*. July:52-56.
- Siemon, C. et al. 1986. *Marine Industries*. In *Monroe County Comprehensive Plan: Background Data Element*. Adopted by Monroe County Board of County Commissioners 2/28/86. Vol. I:541-551.
- Siemon, C and Lane Kendig. 1985. *Community Character*. In *Monroe County Comprehensive Plan: Background Data Element*. Proposed Initial Draft July 2 1985. Vol. I:250-261.
- Starr, P. 1980. *Vietnamese Fisherfolk on the Gulf Coast*. *Sociology*: Auburn Univ. n.d.

Endnotes

1. From the standpoint of theory and history, Foucault has stressed, particularly in his studies on madness (1973) and medicine (1975), the extent to which the very origins of the human (including biological) sciences were directly tied to socio-political concerns.
2. For an extended definition of class as the intersection of cultural, social, and economic capital, see Bourdieu (1984, 1984a).
3. Monroe County's two other functioning, though small, incorporated towns, Key Colony Beach and Layton, have their own comprehensive plans.
4. Environmental protection in Key West takes the form of a Tree ordinance and an extended fight over development of the Salt Pond area near the airport which technically covers one third of the island.
5. Cuban OFF leaders, arising from the newly Latin-renovated Key West OFF Chapter, only emerged in 1987 after formation of the LUP. They have been more circumspect as an ethnic minority, backing all sides through the Key West Latin Chamber of Commerce and its paper *La Voz de Cayo Hueso*.
6. The initial move to tax restaurants as well was not approved because it effected residents.
7. The main connecting highway, US1, and its bridges are under the Department of Transportation and thus the county considers them a state cost responsibility. The DOT, however, feels it has already given more than its share to the county in expanding bridges and roads. Sanitary services are also debatable. They depend on whether or not one includes a costly central sewage system to overcome the problem of septic tank leakage.
8. The \$1.2 billion figure would be significantly higher if the central sewer system sought by conservationists were included.

THE POLITICAL ECOLOGY OF ICELANDIC FISHING

Gísli Pálsson
University of Iceland

ABSTRACT

Human ecology may be defined as the study of how humans use nature and what they do to themselves, nature, and society in the process. But since humans appropriate nature as social beings and in an institutional context of their own design, human ecology is necessarily political ecology. This article discusses the political ecology of Icelandic fishing. I argue that while the process of management incorporates local demands and initiative to a very high degree important change is not always anticipated. In the case of the new quota system in cod fishing, a structural transformation has taken place with grave consequences for small-scale production. I conclude that an efficient and responsible fisheries policy must seriously consider the social context of management and the fishing industry.

Introduction

Human ecology may be defined as the study of how humans use nature and what they do to themselves, nature, and society in the process (see Bennett 1976:3). Human ecology recognizes that humans cannot escape ecological realities, but it emphasizes that they appropriate nature as social beings in an institutional context of their own design, and that direct biological analogies are misleading. As Marx argued, "nature ... taken abstractly for itself and fixed in isolation from man—is nothing for man." Nature, he said, is always "humanized nature" (Marx 1961:169). In this perspective, human ecology is necessarily political ecology. This article discusses the political ecology of Icelandic fishing. The process of management incorporates local demands and initiative to a very high degree and complex political negotiations take place between different levels of the industry and different interest groups before decisions are taken. But important change is not always anticipated. In the case of the new quota system in cod fishing, introduced in 1983, a structural transformation has taken place with grave consequences for small-scale production. I argue that an efficient and responsible fisheries policy must seriously consider the social context of management and the fishing industry.

A number of case studies of the social aspects of fisheries management are already available (see, for instance, Pollnac and Littlefield 1983, Sinclair 1983, Young 1983, Lamson and Hanson 1984). Together they show that while biological and economic aspects of fisheries management often pose major problems for management, its social aspects are no less important. To manage only fishing itself is to manage a fraction of the industry. Young (1983) distinguishes between the stated objectives of management schemes, unstated objectives, and unintended side effects. Usually the stated objectives of management proposals are to bring the

industry under control, to promote conservation and sustained yield, and to ensure reasonable returns to the average fisherman. Often there are also important unstated objectives which tend to reflect the special interests of particular groups. Those responsible for fisheries management are often faced with serious value judgments concerning the "fair" distribution of resources and income. The formation of policies therefore tends to involve politically sensitive issues. The stated objectives of entry restrictions, for instance, may be to make participation more lucrative for those who get the permission to fish, while the unstated objectives may be simply to restrict competition, to secure the position of a class of fishermen, to maintain a particular balance of power, and to provide a guarantee against radical changes in the organization of the industry. Innovation often also involves some unintended side effects. Research into some of the effects of limited-entry schemes is revealing in this respect. In some cases, in Alaska for instance, the operation of a market in fishing permits has resulted in windfall profits associated with entry permits and significant changes in the composition of the group of permit holders. Increasingly, fishing has become monopolized by well-organized business firms, while individuals who identify themselves as fishermen and regard fishing as a way of life are put aside (Young 1983). This has of course far-reaching consequences for the social structure of local communities.

The organizational context of fisheries research and policy making presents an important area of social science research. Some of the barriers for the success of management schemes lie in the management organizations themselves. Knowledge about the innovating organization, the construction of knowledge in bureaucratic institutions, is therefore just as important as knowledge about fishing stocks and the people who exploit them (Parades 1985:177).

The Icelandic Case

The national economy of Iceland is heavily dependent on fishing. This means that government policy must be responsive to "grass roots politics" and the "needs" of the fishing industry. Also, since Iceland is a small country, with a population of 230,000 people, the distance between management and fishing, between bureaucrats and workers, is relatively short. For these reasons, the Icelandic fishing industry is an interesting example (see Durrenberger and Pálsson 1987a). The implications of management are visible at different levels of society; the political ecology of fishing is more or less the same as the political economy of the economy.

The Context of Management

Cod (*Gadus morhua*) has always been the most important species exploited by Icelandic fishermen. Environmental conditions in Icelandic waters vary from one season to another and the numbers of cod migrating from the coast of Greenland, sometimes a significant part of the catch, are highly variables. The size of the stock is subject to periodic fluctuations which are largely independent of humans. Human exploitation has its effect too. During the first decades of the twentieth century the fishing effort multiplied as trawlers and motorboats replaced open rowing boats. The new vessels extended the range of exploitation of the fisheries resources. At the same time a dynamic market economy replaced the stagnant household economy of earlier centuries. In 1944 Iceland gained full independence from Denmark. The first independent government of Iceland was committed to a policy of economic development and concentrated on the fishing industry

as a means to that end. Full-time fishing was rapidly becoming the livelihood of Icelanders and the focus of government development policy.

Increased effort has resulted in periodic declines in catches. The cod catch on Icelandic fishing grounds decreased from 1933 to World War II. During the war the stock recovered, but after that the Icelandic fleet expanded and foreign fleets resumed fishing. From 1955 to 1975 the fishing effort doubled, but despite this increase in effort Icelandic catches fell from 306,000 to 266,000 tons. This process led to a classic open-access, common-property tragedy (see Durrenberger and Pálsson 1987a). The opportunistic exploitation of fishing stocks by freely competing skippers who tried to get what they could from the sea while stocks lasted led to sharply diminished returns. The "natural" limit to overexploitation, the "maximum sustainable yield," had been exceeded. Responding to recognition of this tragedy and the pressures of fishermen, the Icelandic government took the international move of trying to expand its jurisdiction and exclude foreign fishing vessels from waters around Iceland. It drew Great Britain into "cod wars" that resulted in the exclusion of British trawlers from Icelandic fishing grounds in December 1976. The task of restoring depleted stocks and preventing future tragedies remained. It resulted in increased use of scientific models and policies for fisheries management within Iceland's domain. Iceland's fishermen were forced to accept constraints on their activities.

Since governmental decisions influence all sectors of the fishing industry, those involved organize to affect government policy in their favor. Some of these organizations are formal and permanent associations, such as associations of fishermen and boat owners, the various groups of processors, and the various departments of the semigovernmental Fisheries Association (Fiskifélag Íslands), which embraces many of the interest groups involved. Boat owners and skippers also organize informally as technical coalitions to lobby for particular fishing gear in particular areas. All of these groups take part in a complicated political process, the results of which change from one season to another.

Administrative regulations are made within the framework of a general body of legislation passed by Parliament in 1976 to regulate fishing within the Icelandic waters to two hundred miles from the coast. These regulations are changed in response to the condition of the stocks, as evaluated by the biologists of the Marine Research Institute, and the demands of various contending groups. Some of these regulations respond only to the demands of local fishermen, whereas others meet the recommendations of the biologists. These regulations are the results of a series of compromises among local branches of the Fisheries Association and coalitions of trawler and net-boat skippers.

The threat of overfishing has usually been met with measures that do not discriminate between groups of fishermen. Thus, for some years the government tried to put a ceiling on the total catch of cod by deciding upon the length of the winter season and by closing particular popular fishing areas. Such measures affected most fishermen in a similar way. Indeed, there seems to have been general agreement among fishermen that no one should be denied access to the fish. The solutions tended to be ones that guaranteed that the benefits and the costs were spread among all the fishermen rather than concentrated among a few, even though the latter choice might be simpler to design, administer, and enforce and might ensure a more coherent management policy. Generally, fishermen saw the policy of licensing as a threat that would undermine the previously held assumptions about equal access. With the introduction of the quota system in cod fishing,

this context has been radically changed. As a result, a new differentiation is taking place.

In Iceland there is a fundamental difference between independent skipper-owners and capitalistic firms (Durrenberger and Pálsson 1985). Independent boat owners typically own the smaller vessels. They tend to have permanent crews from one season to another. Their production is usually an integral part of their domestic economy, the household, and they make no clear distinction between work and leisure. Fishing is a way of life and not simply a source of income. In pooling available resources the skipper-owner safeguards himself against the vulnerability of the business. The capitalistic vertically integrated firms, on the other hand, combine trawling on larger vessels and the freezing of the catch. On these vessels there is a high turnover of crew men from one time to another. The business has to conform the strict laws of the market for capital and labour. When fishing becomes unproductive, the owners have two choices: to transfer their capital to a more profitable endeavor, or to lobby for protection from the state (for another context see, for instance, Barrett 1984, and Davis 1904).

Even though government policy in Iceland is generally responsive to local demands, it is not necessarily equally responsive to the demands of different kinds of production units. In the case of the cod fishery, an apparently neutral and technical solution to the problem of management, the quota system, has resulted in a massive transfer of power and capital.

The Quota System in the Cod Fishery

While capitalist production has been subject to an intricate institutionalized machinery since the last "Cod War," the present system of management was introduced late in 1983 and it became clear that the prevailing fishing policy needed to be changed. By then the total annual cod hatch was even less than the amount recommended by fisheries biologists, and the forecast for 1984 was bleak. The government decided to reduce the cod quota for 1984 to 220 thousand tons, from an estimated catch of around 290 thousand tons. At the annual conference of the Fisheries Association, most interest groups were rather unexpectedly in favor of a boat-quota system that would divide this reduced catch within the industry itself. The precise allocation of quotas was debated, but each boat was to be allocated an annual quota on the basis of its average catch over the past three years. This meant that some ships would get higher quotas than the rest of the fleet, a fundamental departure from traditional policy. The individual quota system was recommended by the fishing industry and administered by the Ministry of Fisheries. The maximum catch of each boat is decided upon in advance, largely on the basis of its catch in the past.

This policy has been reevaluated every year, but the system remains more or less the same. By now, there is emerging a rather clear picture of the long-term effects of the quota system on the structure of the industry. The political debate is not so much concerned with the technical details of quota allocation, but rather with the large-scale social and political consequences of the system. The most serious criticism of the present system is that it transfers immense resources into the hands of a relatively small group of people, the boat owners (Helgason 1987).

During the cod wars Iceland claimed national ownership of the fishing stocks in coastal waters, a highly valuable resource. The quota system divides access to this resource among those who happened to be boat owners when the system was introduced, and this privileged access is free of charge. Increasingly, this "gift"

from the state is being transferred into capital. On the one hand, boat owners may sell their boats and thereby their share of the catch. On the other hand, they may sell their quota for any one year, or part of it, that is rent out the catch they are entitled to.

In both cases an independent market has developed whereby boat owners are able to turn their free licenses into profits in accordance with the laws of supply and demand. There are reports of vessels being sold at a price which is two or even three times that of their "real" value. Permanent access to the resource, therefore, is no less valuable in monetary terms than the vessel itself. The temporary transfer of quotas, that is between vessels, is subject to some restrictions and it is difficult to estimate the amount of capital involved in such transactions, but a sizable part of the annual quota, possibly one quarter, is already changing hands. In 1984 11.6% of the total vessel quota changed hands, and 13.5% in 1985 (see Arnason 1986). Given the price of a permanent license, embodied in the excessive value of fishing vessels on the free market, one can assume that temporary tenure is generally being sold at very high prices. The estimated total value of outstanding quotas in 1984 was 24 million U.S.\$ and 35 million in 1985 (Arnason 1986). These figures indicate, Arnason argues, the economic rents produced by the quota system.

These transactions are likely to have profound implications for the distribution of power and income, and indeed the whole structure of Icelandic society. Not only has a permanent right to fish been given to an exclusive group, but this right is increasingly being turned into marketable commodity. As access has to be bought and prices of boats and quotas are subject to the mechanism of the market, it becomes increasingly difficult for newcomers to enter the industry. In the past, successful skippers were often able to become boat owners and a relatively large proportion of the fleet is still the property of share-holding companies of crew men and their families. In a few years it will be extremely difficult for skippers to state their own business, since the present system is bound to favor the wealthy speculators. The independent skipper-owner is likely to become obsolete.

Alternative management schemes are now being discussed. There are demands for a return to the system prior to the introduction of quotas, but this is unlikely, given the inadequacies, in economic and ecological terms, of the previous system. Also, there are demands for communal quotas where local authorities would be given a certain amount of autonomy as regards the allocation of quotas, a limited revival of the grass roots politics of earlier decades. Furthermore, some critics of the present system favor public auctions of quotas, whereby the state would receive incomes in return for the selling of the right to fish.

The demands for alternative policies are partly a response to recent developments in marketing and processing. Over the last years boat owners have sold part of their cod catch directly to foreign markets, approximately 8% in 1985 and 12% in 1986. As the marketing and processing of a significant part of the catch takes place abroad, employment is being reduced domestically. Some people have therefore questioned the privileged access of the "lords of the sea" to the most valuable national resource, arguing that fishing could become like third world mining where raw materials are exported with little returns to the domestic economy. While this is unlikely, the sheer possibility of such a development has called for a redefinition of the notion of "interest group." No longer is it seen to be restricted to boat owners and fishermen. Already workers in fish processing plants are demanding their share of the cake.

The main stated objective of the quota system was to control the total annual catch and to make fishing more economical. The cost side of the economic equation has been significantly reduced (see Helgason and Ólafsson 1987). However, there has been less success as regards the ecological objective. Generally, the total annual catch of cod is higher than that recommended by the marine biologists and the proportion of immature cod in the catch has been increasing. It is rather surprising, then, that politicians have been willing to institutionalize a system so costly in social terms, given its failure to secure the reproductive potential of the stock. As we have seen, the quota system has favored some groups of producers over others. Apparently neutral management decisions have had important effects on the balance of power and the structure of the fishing industry by changing the possibilities and alternatives with respect to access to fish. This transformation was, perhaps, unforeseen. However, a policy of fisheries research and management which ignores the social context of the industry is bound to generate much unforeseen change. A narrowly technical approach to the problems of management always invites the kind of morality epitomized in the words the songwriter Tom Lehrer credits to the nuclear technicians: "Once the rockets are up, who cares where they come down?"

Rationalities of Fishing

In Iceland, the understanding of fish and fishing activities has undergone a series of transformations with the development of economic and social relations. During the period of household production, until early this century, folk theories of fishing reflected the social and technical constraints of fishing. There was a ceiling on production. Humans were seen to be manipulated by nature and supernatural beings, they were passive recipients of what was allotted to them, the "gifts of God." As domestic economy gave way to capitalist production and the ceiling on production was lifted, the rationality of fishing changed. Humans became active, their labor was said to create value, and the resources were redefined as infinite and there for the taking (see Pálsson and Durrenberger 1983, Pálsson 1988).

Recently, with the threat of over-exploitation of fishing stocks and the development of marine biology, the resources have been redefined once again. Humans are seen to be collectively responsible for the maintenance of fish. Catches and quotas are allotted to individual producers, there is a new ceiling on production. The institutionalization of fisheries fosters the notion of homeostatic fisheries and a "harvesting" orientation, a "scientific" rationality. This, of course, is not peculiar to Iceland.

A fishing skipper's prestige is still determined by "his" catch relative to that of others during a fishing season, but with the quota system the size of the catch—the main criterion for success in the folk model of the previous decades—has largely been removed from the skipper's sphere of influence. One may, therefore, predict a decline in the emphasis on human agency. Already one hears the argument that it is the boat and its technology which catches fish and not the skipper or the crew.

Some marine biological research occurred in Iceland already at the beginning of the twentieth century, but full-time research started later, in the 1940s. The present Marine Research Institute was established in 1965. Fishermen and the general public regarded the first marine biologists as strange and eccentric men who operated on fish and "spent hours fiddling with all kinds of disgusting little things" (Hagafin 1964:321). The disrespect seems to have been mutual. One of the pioneers in marine biology was said to "have quickly realized that various kinds of superstitious

beliefs prevented the natural development of this important industry" (Bergsson 1940:240). As the state became increasingly involved in the making of the industry, the balance of power shifted in favor of the biologists.

Since the introduction of the quota system politicians and biologists have cooperated closely. The politicians need the scientific arguments and therefore encourage research. However, they have often regarded the biologists' measurements and analyses with suspicion. Former Ministers of Fisheries have argued that if the scientists had been right in their estimates and predictions, the fisheries would have collapsed. Contrary to the "Black Report" predictions of 1975, a report of the Marine Research Institute that was influential in the cod wars, the cod stock remained fairly stable until a sharp decline in catches in 1982. One former Minister has referred to the "religion of the biologists." Another former Minister of Fisheries points out that "in the biologists' own calculations, the size of the 1976 year class of cod keeps increasing" (see *Sjávarfréttir* 1980:17).

Fishermen frequently complain that "nowadays everything is being banned." The biologists are usually the target of fishermen's criticism since all major decisions are based on their models and forecasts. Some have complained that all initiative is being taken from fishermen. Others question the basic assumptions of biologists and managers. One skipper has argued, for instance, that "knowledge of fish migrations and the size of different stocks is still infinitely small" and that "those who have come to know the fishing grounds around Iceland, during a lifelong career in fishing, must become mute when the wise man (*spekingar*) announce their precise measurements of the stocks, to the ton" (Hermannsson 1984). It is understandable that skippers, aware of the discrepancy between reality and the "pessimistic" forecasts of the past, fail to be impressed with the rhetoric of the scientists. As one skipper commented, "They always knew about all this fish. They only used the 'Black Report' to scare the British away."

The proposals put forward by the marine biologists have been met with distrust and emotional reaction among fishermen. During the last cod wars, the fishermen tended to regard internal limitations to access with some scepticism, arguing that if they didn't catch the fish, the British and Germans would anyway. Once the common enemy disappeared, conflict between fishermen and biologists increased. Each has accused the other of following an "irrational" policy. Fishermen have become increasingly dominated by technoscientific knowledge and the agencies of the state. Confronted with the details of scientific research, fishermen have become powerless, in their words "mute." Management becomes increasingly the business of wise men who speak a strange language. While their wisdom is based on precise measurements and logical mathematical models, it is not unaffected by the social context in which it is produced and used. Knowledge, it may be argued, the knowledge of scientists no less than that of fishermen, is socially constructed.

The professionalism of marine biology in Iceland is the result of rapidly increased involvement of state and government in the management of the fishing industry in recent years. One observer notes that political decision-makers have built "effective constraints in the actual operation design of the research institute, which allows it to be easily influenced by political (and social) considerations" (Hoonard n.d.:258). Research is subject to immense political pressures.

Conclusions

The thesis which suggests that access to the ocean is open for everyone in most fishing societies, and that this is the root of all environmental problems, is contrary to facts. Studies have shown that in many fishing societies people have developed indigenous means of regulating access to fishing grounds—sometimes for the purpose of preventing overexploitation (see, for instance, Durrenberger and Pálsson 1987, McCay and Acheson 1987, Ruddle and Akimichi 1984). In industrial society, indigenous management methods are often combined with or replaced by public policies—regional, national or even international ones. People opt for public solutions because of the complexity of industrial fishing systems and the need for striking a balance between different political factions and interest groups.

Some of the major problems of fisheries policy concern the relationship between the local level and the national level—between the grass roots and the state. Public policies, by definition, remove decision making from the local community, but to be effectively constructed and implemented policy must somehow ensure feedback between the two levels of government. Even though major decisions are taken by regional or national agencies, it is possible to incorporate informal, indigenous management techniques in the planning process. The history of Icelandic fishing provides several examples of democratic solutions to management problems.

Even though the extraction of food from the sea seems to present somewhat similar problems in most societies and people seem to deal with them in similar ways (Acheson 1981), one should not overemphasize the common characteristics of fishing societies. After all there are substantial differences between fisheries, even within the same society. The process of extraction may be the same, but social relations are often very different since people organize their production in various ways. Indeed, one of the significant differences in fishing systems concerns the nature of production units. While in industrial societies production is usually geared for the market, the units of production may differ widely in terms of organization, ideologies and motive. It is important, not the least for practical purposes, to pay attention to such differences. Organizations have systemic properties, any management scheme is consequently likely to have repercussions beyond the narrow context of implementation. Also, the perception of environmental problems is likely to vary from one type of organization to another. One type of organization may encourage fishermen to define environmental conditions as problematic and to take direct action to redress the balance. Another type of organization may do just the opposite.

In the modern world, reality is increasingly defined by full-time scientific experts, who monopolize "universe-maintenance," to borrow the jargon of Berger and Luckman (1966). Their knowledge is often conceived as an "objective" representation of the physical world. Such a view of the scientific enterprise needs to be reevaluated. It is important to recognize that ecological facts do not speak for themselves and that ecological realities are inevitably socially constructed. Worster has shown, for instance, that ecological ideas are rooted in their times and that scientists cannot isolate their perception of nature from the rest of their mental life. "The history of ecology," he says, "shows how impossible it has been, even when men have most desired it, to screen out ... biases. Any attempt to so divorce nature from the rest of the human condition leads to a doctrine of alienation, where the science must occupy one realm and the social and historical consciousness another" (Worster 1977:345).

The history of the quota system in the Icelandic cod fishery shows the limits and potential political implications of a narrowly technical or "scientific" approach to the problem of management, even in a relatively democratic system. In the absence of a holistic, contextual analysis of the fishing industry, a discriminatory but seemingly fair and neutral policy was adopted. The fear of environmental disaster has not so much resulted in successful attempts to redress the ecological balance; rather it has instituted a policy which radically alters the balance between social groups. This example shows that it is necessary to incorporate sociological analysis into fisheries research and decision making in order to ensure a sound and responsible fisheries policy. Management must seek an understanding of the organization of fishing systems and how the parts relate to one another. To translate this in practical terms, one may ask for example: To what extent should management address individual operators and to what extent the holistic nature of fleets, fisheries and fishing communities? To properly assess such considerations, we need comparative knowledge of the systemic properties of fisheries activities and their place in fishing communities.

Acknowledgements

I thank E. Paul Durrenberger and Arnór Guomundsson for their comments upon some of the arguments presented. An earlier version of the article was submitted to *Marine Resource Utilization: A Conference on Social Science Issues*, May 5-6, 1987, Mobile, Alabama. The concept of "political ecology" is not a new one. Befue (1980) has applied it in relation to Japanese fishing, in a rather different sense, though, emphasizing "techno-ecological" circumstances more than the social context of exploitation, management, and research.

References

- Acheson, James M. 1981. "Anthropology of Fishing," *Annual Reviews in Anthropology*, 10:275-316.
- Árnason, Ragnar. 1986. "Management of the Icelandic Demersal Fisheries," pp. 81-101 in N. Mollett (ed.): *Fisheries Access Control Programs Worldwide*. Proceedings of the Workshop on Management Options for the North Pacific Longline Fisheries. Fairbanks.
- Barrett, L.G. 1984. "Capital and the State in Atlantic Canada: The Structural Context of Fishery Policy Between 1939 and 1977," pp. 77-104 in C. Lamson and A.J. Hanson (eds.): *Fisheries Decision-Making Case Studies*. Halifax: Dalhousie Ocean Studies Programme.
- Befue, H. 1980. "Political Ecology of Fishing in Japan: Techno-Environmental Impact of Industrialization in the Inland Sea," *Research in Economic Anthropology*, 3:323-347.
- Bennet, John W. 1976. *The Ecological Transition: Cultural Anthropology and Human Adaptation*. New York: Pergamon Press.
- Berger, P. and T. Luckman. 1966. *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*. Middlesex: Penguin.
- Bergsson, Kr. 1940. "Dr. Bjarni Sæmundssonog fiskimennirnir," *Ægir*, 11:239-241.
- Davis, Anthony. 1984. "Property Rights and Access Management in the Small Boat Fishery: A Case Study from Southwest Nova Scotia," pp. 133-64 in C. Lamson and A.J. Hanson (eds.): *Atlantic Fisheries and Coastal Communities: Fisheries Decision-Making Case Studies*. Halifax: Dalhousie Ocean Studies Programme.
- Durrenberger, E. Paul and Gísli Pálsson. 1985. "Peasants, Entrepreneurs and Companies: The Evolution of Icelandic Fishing," *Ethnos*, 1-2:103-122.
- _____. 1987. "Ownership at Sea: Fishing Territories and Access to Sea Resources," *American Ethnologist*, 14(3):508-22.
- _____. 1987a. "The Grass Roots and the State: Resource Management in Icelandic Fishing," pp. 370-92 in B.J. McCay and J.M. Acheson (eds.) *1987 Questions of the Commons: The Culture and Ecology of Communal Resources*. Tuscon: University of Arizona Press.
- Hagalín, Guðmundur G. 1964-5. *Í fararbroddi: Ævisaga Haralds Böðvarssonar*. I. Hafnarfjörður. Skuggsjá.
- Helgason, Þorkell. 1987. Opínber kvótasala tryggir hagkvæma og sanngjarna stjórn fiskveiða, Morgunblaðið, 4 November.
- Helgason, Þ. and S. Ólafsson. 1987. Ahrif kvótakerfisins árin 1984-1986 á sóknararköst botnfiskeiðflotans og nýtingu fiskstofnanna. A report submitted to the 110 session of the Icelandic parliament.
- Hermannsson, Halldór. 1984. Svipull er sjávarafli, Morgunblaðið, 17 March.
- Hoonzaard, W.C. van den. n.d. Fishing for Identity—The Fishermen of Iceland. (Unpublished manuscript.)
- Lamson, Cynthia and Arthur J. Hanson (eds.). 1984. *Atlantic Fisheries and Local Communities: Fisheries Decision Making Case Studies*. Halifax: Dalhousie Ocean Studies Programme.
- Marx, Karl. 1961[1844]. *Economic and Philosophical Manuscripts of 1844*. Moscow: Foreign Language Publishing House.
- McCay, Bonnie J. and James M. Acheson (eds.). 1987. *Quest of the Commons: The Culture and Ecology of Communal Resources*. Tuscon: University of Arizona Press.
- Pálsson, Gísli. 1983. Representations and Reality: Cognitive Models and Social Relations among the Fishermen of Sandgerði, Iceland. Ph.D. dissertation. University of Manchester.
- _____. 1988. "The Idea of Fish: Land and Sea in Icelandic World-View," in R. Willis (ed.): *Signifying Animals: Human Meaning in the Natural World*. London: Unwin Hyman Ltd. In Press.
- Pálsson, Gísli and E. Paul Durrenberger. 1983. "Icelandic Foremen and Skippers: The Structure and Evolution of a Folk Model," *American Ethnologist*, 10(3):511-528.
- Parades, J. Anthony. 1985. "Any Comments on the Sociology Section, Tony?": Committee Work as Applied Anthropology," *Human Organization*, 44(2):177-82.
- Pollnac, Richard B. and Susan J. Littlefield. 1983. "Sociocultural Aspects of Fisheries Management," *Ocean Development and International Law Journal*, 12(3-4):209-246.
- Ruddle, Kenneth and Tomoya Akimichi (eds.). 1984. *Maritime Institutions in the Western Pacific*. Osaka: National Museum of Ethnology.
- Sinclair, Peter R. 1983. "Fishermen Divided: The Impact of Limited Entry Licensing in Northwest Newfoundland," *Human Organization*, 42(4):307-313.
- Sjávarfréttir. 1982(12). "Stjórnun fiskveiða." Reykjavík.
- Worster, Donald. 1977. *Nature's Economy: A History of Ecology*. Cambridge: Cambridge University Press.
- Young, Oran R. 1983. "Fishing by Permit: Restricted Common Property in Practice," *Oceanic Development and International Law Journal*, 13(2):121-170.

SOCIAL ISSUES IN THIRD WORLD FISHERIES DEVELOPMENT

Conner Bailey
Auburn University

ABSTRACT

A conceptual framework is presented for understanding the social issues involved in Third World fisheries management and development. In the context of resource scarcity, emphasis is given to the need for balance between fisheries development programs and resource management policies, especially those which consider the allocative and distributive consequences of induced change. The narrow set of variables traditionally used by biologists and economists, who have dominated fisheries policy, is expanded through introduction of the concept "optimum yield" (OY). OY incorporates biological and economic concerns with a broader set of social goals (e.g., employment, income distribution, and nutrition). The concepts of common property and traditional resource use rights are introduced as tools for designing socially sound fisheries policies. A fisheries research agenda for social scientists is presented which links substantive and theoretical interests shared by sociologists, anthropologists, political scientists and resource economists.

Introduction

The basic argument made in this paper is that a balance needs to be struck between marine fisheries development and resource management and that this balance would be best achieved by involving social scientists in the policy process. This is true because what is being developed and managed are not fish but rather people, and specifically the capacity of people to exploit a biologically renewable resource that is by definition vulnerable to overexploitation and depletion. For present purposes, this point will be made primarily with reference to the Third World, though it is no less applicable to fisheries of the United States or other economically developed nations.

Rapid adoption of new production technologies in a context of resource scarcity describes the common setting for this discussion. A strong element of competition between fishers is introduced by the virtual absence of property rights, a condition which characterizes most capture fisheries. The capital-intensive nature of most new technologies has led to increasing concentration of production capacity in the hands of relatively few individuals. The net result has been (1) a *de facto* reallocation of resources favoring those who control the most powerful technologies, (2) increased economic inequalities within and between fishing communities, and (3) a substantial alteration in the social relations of production within the fisheries sector of many developing nations.

Fisheries development efforts make little sense unless they are designed to be sustainable over time and are socially beneficial. Resource scarcity and the social disruption caused by rapid

technological innovation in the fisheries sector of many Third World countries make it necessary to integrate and balance fisheries development programs with management policies that address fundamental issues of resource sustainability and allocation between competing users.

Technological Innovation and Resource Scarcity

Most important fisheries within the Third World are being exploited at or near the level where resource depletion is a real threat (Robinson 1982). Despite mounting evidence of resource scarcity, national policymakers and international development agencies continue to promote programs based on capital-intensive fishing technologies. Frequently these programs are tied to development of export-oriented fisheries (e.g., trawling for shrimp) and are pursued without adequate appreciation of the impact of this form of development either on the resource or on established fishing communities (Bailey, Cycon and Morris 1986).

All too frequently, fisheries development programs have a direct detrimental effect on small-scale fishing communities. Competition between fishers for a finite resource may be likened to a zero-sum game, where technological advantages enjoyed by a few translate into declining shares of the total harvest by all others. As small-scale producers with limited capital resources, the majority of Third World fishers lack the means to remain competitive with those who adopt more powerful production technologies.

Competition between small- and large-scale fishers is both direct and indirect. Direct competition occurs when both types of fishers exploit the same fishing grounds and/or the same species of fish. This commonly is the case when large-scale trawlers operate in shallow coastal waters. Most small-scale fishers are restricted to these fishing grounds by the size of their boats; moreover, most small-scale fishing gear are designed for operation in relatively shallow waters. Although communities of small-scale fishers generally do not "own" coastal fishing grounds (in the sense of having government sanctioned property rights), until recently they have enjoyed exclusive use of this resource.

The widespread adoption of trawlers during the 1960s and 1970s changed all of that. Trawlers are attracted into coastal waters by the relative abundance of high-valued shrimp (Pauly 1982a). In the process of trawling for shrimp, large quantities of other organisms also are captured, including a high proportion of sexually immature individuals of commercially valuable fish and shrimp (Azhar 1980). These either are cast overboard or are processed into fish meal. The effect on the biological resource is to reduce its capacity for renewal. Driven by strong international demand (primarily from Japan and the United States), high prices offered for shrimp have encouraged heavy exploitation of coastal resources by trawlers. This, in turn, has led to serious declines in catches and incomes among large numbers of small-scale fishers (Bailey 1982, 1985, 1986).

Competition also takes place indirectly through government support, including subsidies, of large-scale fisheries. The growth of large-scale fisheries has led to a major shift in the center of fishing activities from small coastal communities to urban fishing ports equipped to handle larger boats. Government funds for fisheries development have tended to be diverted away from the small-scale subsector and into infrastructural development associated with these urban ports (e.g., dredging, docks, ice plants, coldstores, etc.). Moreover, the increasing importance of large-scale fisheries has attracted the attention of many of the most able civil servants. The prestige of working on large-scale fisheries development as a growth industry is buttressed by the active

participation of international donor agencies, which have focused most of their effort on this sub-sector (Bailey, Cycon and Morris 1986; Bailey 1988). These international agencies frequently pay honoraria to supplement the often meager salaries earned by government officials in many Third World nations. Finally, many government officials find it more pleasant to work in an urban setting, maybe in an air-conditioned office, rather than become involved with the physically more strenuous work entailed in visiting numerous small and isolated coastal communities.

Small-scale fishers may not appreciate the importance of competition for the attention of national and international agencies, but they are aware of competition in the marketplace. Purse-seiners and other capital-intensive fishing units are capable of landing large quantities of fish at one time. The technical effectiveness of large-scale fishing units often means that per unit production costs are lower than those of small-scale fishers. As a result, in some places large-scale operators have been able to displace small-scale fishers as suppliers of fish to certain domestic markets. Urban consumers, in particular, have benefited from this development. Rural consumers, however, have been adversely affected wherever an increasing proportion of the catch is landed at urban ports, because from there distribution patterns tend towards other urban markets rather than to rural areas.

The apparent economic efficiency of large-scale fishing units, which lies at the heart of their ability to compete in the market, frequently is increased by direct or hidden subsidies to large-scale fishers (e.g., access to credit, infrastructure, government sponsored research and gear trials, subsidized fuel costs, etc.). In the Philippines, it was shown that differential tax rates on diesel (used by trawlers) and gasoline (used by small-scale fishers) were the sole basis for the profitability of trawlers (Smith and Mines 1982). This indirect subsidy for trawler operators made possible the increased fishing effort by trawlers and had a direct negative impact on the catches and incomes of small-scale fishers in that area. In this particular case, the 95 trawlers operating in San Miguel Bay were owned by only 25 out of the 3,500 families directly involved in the fishery (Bailey 1982), yet the catch was nearly equally divided between trawlers and small-scale fishers (Pauly 1982b).

Policy Concepts

The field of fisheries policy traditionally has been dominated by biologists and economists. They accordingly have shaped policy in the image of their disciplines' key variables. The essence of their concerns is captured by the concepts of "maximum sustainable yield" (MSY) and "maximum economic yield" (MEY). (See Emmerson [1980] for a more complete review of the theoretical underpinnings and assumptions of MSY and MEY than is presented here.)

Maximum Sustainable Yield

Simply stated, MSY is that level of fishing effort which produces the highest catch levels which can be sustained over time. Exploitation beyond MSY tends to reduce the total catch and may lead to resource depletion.

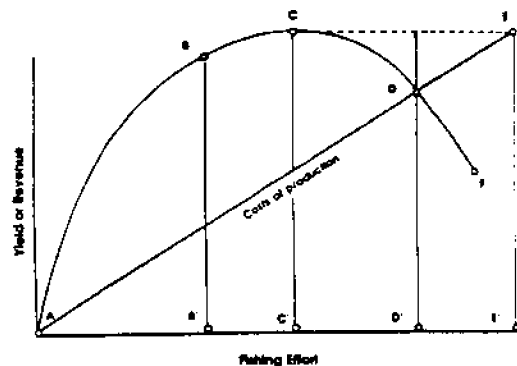
Figure 1 represents a simple model illustrating this point. Once MSY has been reached (point C on Figure 1), additional fishing effort (i.e., more boats and nets, or more efficient fishing units, or more time spent fishing, or some combination of these factors) may result in decreased total harvests along the curve C → D → F. The central concern behind the concept of MSY is to protect

fish stocks from overexploitation, certainly a valid policy concern. But the science of stock assessment is inexact. This certainly is the case in most Third World fisheries, where necessary data on fish populations often are lacking. Under these conditions, estimates of MSY often are based on extrapolations and educated guesswork.

Maximum Economic Yield

The concept of MEY refers to that level of fishing effort which provides maximum profit to the fishing industry. Because the slope of the curve flattens as fishing effort approaches MSY,

Figure 1. Simple Static Model of an Open Access Fishery



maximum profits to the industry are earned before MSY is reached (point B on Figure 1). Thus, policies based on the principle of MEY would tend to limit fishing effort below MSY as a means of maximizing profit. The MEY concept has nothing to say about who should obtain this profit, though there appears to be an inherent bias towards large-scale types of fishing units, which generally are regarded (though this is not always true) as being economically more efficient. As with estimates of MSY, establishing the point at which MEY occurs is a slippery business where adequate data on costs-and-returns and catch-per-unit-effort are unavailable, as is the case in virtually all developing nations.

How, then, should Third World policymakers proceed if biologists and economists are able to provide at best rough approximations of development potentials or management needs? Certainly the sustainability of harvests must be assured, and no nation can afford to completely ignore economic efficiency. But the question is, are these the only two variables of concern to policymakers? The answer clearly is "no". There are people employed in the fishery and consumers who depend on their products for a significant portion of their dietary protein. Neither MSY nor MEY adequately address their needs.

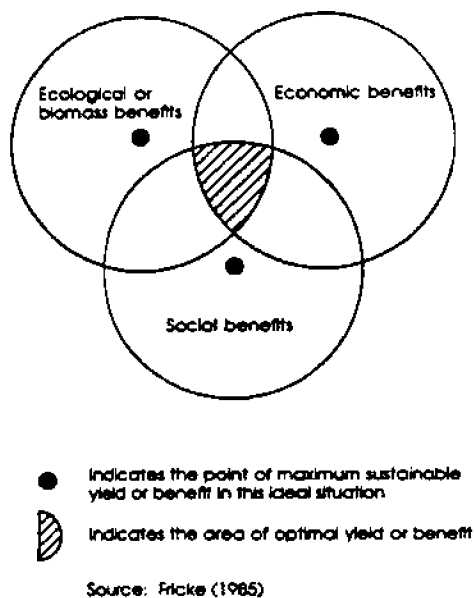
Optimal Yield

An alternative is provided by the idea of "optimal yield" (OY), a conceptual tool useful in clarifying the often conflicting goals of fisheries development and resource management. The OY concept combines social and cultural variables in addition to the biological and economic variables which traditionally have dominated most fisheries policies. The intended effect is to encourage policymakers to combine and balance, as locally appropriate, concerns for resource sustainability and economic efficiency with concerns for employment generation and income

distribution. Implicit in this model is the understanding that there may be trade-offs as policymakers attempt to maximize for multiple variables (Figure 2).

Whatever their limitations, estimates of MSY have to be given serious consideration by policymakers concerned with the biological sustainability of marine fisheries resources. The result of overfishing may be a catastrophic collapse, as in the case of the Peruvian anchoveta. However, most tropical fish populations are multi-species stocks. When a tropical multi-species fishery experiences levels of fishing effort beyond MSY, the likely result is reduced prevalence of certain species (e.g., those at the top of the food chain) but not others. The effect will be a shift in population composition rather than an absolute decline in the biomass, with total harvests

Figure 2. Optimal Yield: Social, Economic and Biological Variables



following the curve C — E rather than C — D — F (Figure 1). Thus, it may be possible to allow fishing effort to expand beyond the limits of MSY, depending on the particular mix of policy goals being pursued. For example, if the primary goal is to increase employment opportunities, labor-intensive small-scale fisheries may be encouraged even where resources are fully exploited. Such a decision should only be made with clear realization that increasing fishing effort is virtually synonymous with increasing costs of production (A — D — E). As levels of fishing effort increase along the curve A — E, resource rents available to society as a whole are diminished.

Fisheries policy must be consistent with resource sustainability, but the fundamental question raised by the OY concept is not level of fishing effort but rather resource allocation and distributional equity. While the phrase "optimal yield" helps us conceptualize the complex and potentially conflictual nature of fisheries policy, the concept itself provides little operational guidance regarding the fundamental issue of resource allocation. To meet this need, it is necessary to address the issue of property rights,

a topic of growing interest to social scientists interested in fisheries and other natural resource systems.

Common Property Resources

To this point, it has been assumed that fisheries policies, including those pertaining to resource allocation, were made at the national level. It is important to recognize that the involvement of national governments in such local affairs is a comparatively recent development in most Third World nations. In many cases, the effective capacity of government agencies to regulate what goes on in widely scattered fishing grounds is almost non-existent. Under these conditions, devolution of major resource management and allocation decisions to the local level may be more effective than central government efforts. To accomplish this shift in responsibility, it would be necessary to vest local communities with property rights that provide the authority to exclude outsiders and allocate resource access to individual members of the community. This is the essence of a "common property" resource system, wherein all members of a community own and are involved in decisions that affect allocation of access to the resource.

The existence or absence of property rights over the resource itself is a matter of fundamental importance in conceptualizing issues of fisheries policy. Problems of over-exploitation generally are attributed to the lack of clear property rights and the consequent efforts of individual fishers to maximize benefits even at the expense of resource sustainability and long-term societal good (Gordon 1954). Hardin's (1968) statement of this problem as "The Tragedy of the Commons" served to focus attention on the unique management needs of renewable natural resource systems. However important and oft-cited is this article by Hardin, it has clouded discussion by confusing the concept of common property with that of open access. More recent studies follow Ciriay-Wantrup and Bishop (1975) in distinguishing between "common property" and "open access" resources.

An open access system is one where no boundaries exist around the resource, no limits are placed to the entry of individuals who wish to share in exploitation of the resource, and no restrictions are placed on how the resource is to be exploited. In short, there are no property rights over the resources in question. In common property resource systems, boundaries and limits to entry *do* exist and are imposed by the community which controls or "owns" the resource in question. Property rights are held in common by members of some community. The resource in question may be exploited equally by all, used to support a religious or educational institution, or allocated to certain individuals based on need, privilege, or luck of the draw.

There is a rapidly growing literature describing the workings of common property institutions in a variety of marine settings around the world (McCay and Acheson 1987). This said, it is obvious that common property systems are the exception rather than the rule in fisheries management. Whether common property resource systems at one time were more prevalent remains an open question. One can hypothesize that such systems once were more common and identify several factors which may have tended to undermine such systems had they existed. Consolidation of power by colonial regimes during the first part of the twentieth century, and the expanded presence in rural areas of independent states since the middle of this century may have undermined the authority of local institutions responsible for common property resource management. Growing populations certainly generated increased demand for fish. This, combined with establishment of a cash economy created new opportunities to sell surplus catches.

New fishing technologies were introduced to generate these surpluses. More recently, fisheries products have become important export commodities. This process of commodification fundamentally altered the value attached to fish, altered the basic mode of fisheries production, and encouraged increasingly intensive exploitation of fisheries resources. Temptations for personal profit entailed in the historical process described above would have placed tremendous internal pressure on common property resource systems.

In the absence of common property systems, the principle of open access has come to dominate fisheries management policies throughout the Third World. These policies tend to favor development of commercial fisheries wherein certain individuals and groups use financial and institutional advantages to support adoption of new technologies. As fisheries resources become fully exploited, technological advantages enjoyed by certain fishers have a direct negative impact on others. Under conditions of rapid technological change, small-scale fishers tend to become marginal producers who have little hope of finding alternative employment (Bailey 1982).

In the foreseeable future, it is unlikely that the common property model will achieve widespread acceptance for management of fisheries resources in most parts of the Third World (Polunin 1984). The open access model, however, has proven both biologically and socially unworkable due to increased pressure on the resource caused by population growth, technological innovation, and new marketing opportunities. Increasingly it has been accepted that some form of restriction on access needs to be imposed. Such restrictions entail allocational decisions which are inherently political. Powerful economic interests often are able to influence political processes to their advantage. The concept of traditional resource use rights introduces a countervailing perspective on resource allocation based on historic usage and focuses our attention on employment generation and income distribution as important considerations in fisheries policy.

Traditional Resource Use Rights

As used here, traditional resource use rights differ from the concept of "territorial resource use rights" advanced by Christy (1982). Christy's formulation emphasizes the ability to identify and establish a boundary around particular resources and is more applicable to shellfish and enclosed fishing grounds than to fisheries conducted along open coastlines. As such, Christy's focus is on the practical mechanics of resource management rather than on allocational issues. The concept of traditional use rights explicitly addresses issues of resource allocation, drawing attention to these rights as important determinants of policy.

Conceptually, these rights occupy an intermediate position between open access and common property models of resource management. Traditional resource use rights modify the principle of open access by giving precedence to those who have historical claims based on past usage. Generally in the Third World, these rights pertain to small-scale fishers as a class rather than to communities of fishers; in the latter case, a common property system would exist. The utility of traditional resource use rights as a concept is that it can be applied to a wide range of circumstances and provides an ethical basis for restricting access to fisheries resources.

Allocation of access to fisheries resources based on traditional use rights may be supportive of broad social goals concerning employment and income distribution, as is illustrated by the case of Indonesia's trawler ban (Bailey 1984, 1986; Bailey, Dwiponggo

and Marahudin 1987). In that country, rapid expansion of trawler fleets greatly increased pressure on marine resources and resulted in declining catches and incomes among large numbers of small-scale fishers. The encroachment of trawlers into shallow coastal waters also led to damage and destruction of small-scale fishing gear and the death of an unknown number of small-scale fishers, whose boats were rammed by the larger trawlers. Small-scale fishers responded with violence. After a long series of unsuccessful efforts to restrict trawlers from the traditional inshore fishing grounds of small-scale fishers, the Indonesian government imposed a virtually complete ban on all trawling. In terms of employment, income distribution, and the supply of fish to domestic consumers, the trawler ban had a positive impact on Indonesia's fisheries sector and marked an important turning point in that country's fisheries development strategy. Traditional resource use rights of small-scale fishers have been confirmed in a manner consistent both with sound biological management and with important social goals of improving incomes and employment opportunities for the majority of those employed in the fisheries sector.

Outline of a Social Science Research Agenda

Many Third World nations have initiated systematic efforts to promote changes (e.g., credit programs, technological innovation, new marketing arrangements) which are bound to have a profound impact on small-scale fishing communities. Yet relatively little is known about these communities, limiting our ability to predict the consequences of induced change or measure the distributional consequences of development efforts. In this section, attention is drawn to three broad research issues that are both policy-relevant and of theoretical interest to social scientists.

Social Relations of Production

Over the past two decades, the rapid pace of technological change in Third World fisheries has profoundly altered social relations of production. An example will illustrate this general trend. Raymond Firth, a British economic anthropologist, studied a Malay fishing community named Perupuk during the late 1930s and conducted a restudy in 1963. His classic *Malay Fisherman* (Firth 1966) is a seminal work both in economic anthropology and in the study of fishing communities. During the time between the two studies motors and nylon netting had been introduced to Perupuk, greatly increasing available fishing power but also increasing investment costs. The result was a concentration in the ownership of productive assets, though boats and nets still were owned by local residents subject to informal social sanctions.

In 1976, I began to conduct dissertation research in Malaysia and briefly considered updating Firth's studies. What I found when I reached Perupuk was a vastly changed situation. Most fishers from that community no longer owned their own boats and nets but rather worked as crewmen on relatively large purse-seiners based at a port about 20 miles away. (Primarily for this reason, I decided to study a fishing community about 40 miles south of Perupuk; see Bailey 1983.) The fishers from Perupuk had shifted from the status of owner-operators (and crewmen working for owners who lived in the local community and who often were kinsmen) to workers operating on a share basis. The owners in this case were ethnic Chinese entrepreneurs who consciously separated themselves from their crew, dealing with their crew through the captain.

In short, what we have in the case of the fishers of Perupuk is a shift from a peasant mode of production in the 1930s to domestic commodity production in the 1960s to an advanced form of free-market capitalism during the 1970s. During this process the fishers of Perupuk experienced a shift in class status from owner-operator (or at least a crewman who could reasonably expect to become an owner) to that of worker whose sole productive asset was physical labor. In the Philippines during 1980-81, I observed a similar process occur (Villafuerte and Bailey 1982). In this case, we were able to document the gradual shift in sharing systems that occurred during the 1970s which resulted in progressively larger shares being paid to the owners.

The concentration of fishing power in the hands of relatively few individuals not only affects the prospects of small-scale fishers but also the women of coastal fishing communities, who are primarily responsible for processing and marketing the local catch. Women displaced from the local marketplace may find employment in a large-scale fish processing facility, but this will be as a worker rather than as an independent entrepreneur. Here again we find a fundamental shift taking place in the basic mode of production within the fisheries sector of many developing nations.

Such proletarianization is widespread, though by no means have all Third World fishers experienced this process. The formation of new class relationships is a matter of inherent interest to social scientists. Despite major differences in social and economic organization, a similar process appears to be occurring in North America, where domestic commodity producers are attempting to hold out against better financed capitalist fishers (Sinclair 1985).

Community Organization

There is a need to increase our knowledge of community organization among fishers to increase our understanding of the social relations of both production and marketing, and to better appreciate the potential role of local communities in resource management.

Within coastal fishing communities, informal social sanctions often serve to regulate relationships between capital and labor. Sharing systems which divide proceeds from sale of the catch are an explicit manifestation of the relative values placed on these two factors of production. These may or may not reflect objective market values. Often there is great diversity of sharing systems for the same type of fishing unit in the same community, suggesting that non-economic values are important modifiers of economic relationships (Bailey, Dwiponggo and Marahudin 1987; Collier et al. 1979; Villafuerte and Bailey 1982). These values can only be understood within a community context. Longitudinal examinations of sharing systems provide good measures of how benefits of development are being distributed.

Similarly, the nature of the relationship between fishers and fish buyers needs to be understood from the community perspective. Frequently, outsiders (i.e., government personnel and foreign donor agencies) perceive these buyers, who often provide production and consumption credit to local fishers, as exploitative. This perception is so pervasive that one Indonesian grammar school text characterizes fish buyers as *liniah darat*, literally "land leeches" (Halian et al. 1962). There is growing appreciation of the role which local buyers play in providing credit and thereby fostering technological innovation. Nonetheless, there is a pressing need for research which focuses attention on the role of the middleman/financier. We know relatively little about their relationships with fishers; we know even less about their ties to fish wholesalers and the larger marketing system. Personal experience suggests that,

if exploitative relationships exist in fish marketing, they are to be found at the level of the wholesaler, who often is the source of production and consumption credit given to fishers by local buyers (Bailey, Dwiponggo and Marahuddin 1987). The continued prevalence of development efforts to circumvent local buyers (e.g., through formation of government-run cooperatives) suggests the need for further examination of these relationships.

An understanding of community dynamics also is of fundamental importance to determining the potential role of local communities in resource management. The existence or absence of property rights over fisheries resources is a matter of fundamental importance in conceptualizing issues of resource allocation. Social scientists are just beginning to explore the range of possible social constructs which would allow for effective local-level resource management. We know relatively little about how community-based common property systems operate, but we do know that in certain conditions they represent low-cost and socially sound alternatives to the state.

Fisheries management policies generally call for regulation of fishing effort, often by specifying larger mesh sizes on nets or by restricting certain types of fishing units from operating in certain fishing grounds or during certain seasons or times of day. Consider the difficulty of enforcing these regulations in hundreds of communities along thousands of kilometers of coastline. The costs of enforcement (boats, airplanes, personnel, etc.) are prohibitive and as a result there is no effective regulation of fishing effort in most Third World nations.

Neither is this situation likely to change so long as government agencies retain exclusive authority to regulate fishing operations. Mobilizing fishermen to manage local resources is not the only solution to problems of resource management, but it is difficult to visualize achieving this goal without the active involvement of those who will be most affected. Fishermen generally have a clear conception of resource scarcity and understand intuitively the basic principles of fisheries management. The problem is to obtain their acceptance, which often means achieving agreement among all members of the community on the goals of resource management and a willingness among all individuals involved to restrain themselves rather than to maximize personal gain at the expense of the collective good (the essence of the "Tragedy of the Commons").

A case study from a reef fishery in the Philippines illustrates both opportunities and problems involved in establishing a community-based management system. Researchers at a local university worked with local fishers from Sumilon Island over a three year period, convincing the fishers that by setting aside a portion of the reef to serve as an undisturbed breeding and nursery ground, they would experience an increase in sustainable harvests (White 1984). After much debate the experiment began and quickly proved successful. Indeed, the experiment was so successful that the reef attracted the attention of powerful outsiders, who threatened the life of the watchman assigned by the local community to monitor fishing activities in the sanctuary (Maclean 1986). Only a call from the university to national authorities in Manila brought this outside encroachment to a halt. National authorities were moved to act in part because the Sumilon Island experiment was supported by the United Nations Environmental Program and had attracted international attention. However, after police protection was removed, the outsiders renewed their operations. A year later, an underwater survey identified evidence of damage to the coral by explosives and muro-ami fishers, and a dramatic decrease in the population of groupers and other important species. However, the usefulness of sanctuaries did not

go unnoticed in three neighboring municipalities, which subsequently established similar reserves actively controlled by local residents (Maclean 1986; Flores and Silvestre 1987).

There are two morals to this tale. The first is that it may take considerable time to convince and organize local fishing communities to play a significant role in resource management. Both the community and the outside agency must work together closely and on the basis of trust and mutual respect. Cynics in the audience are directed to examine successful instances where a "learning process" approach to agency/community interactions have been applied (Bagadion and Korten 1986; Korten 1980).

The second theme that bears attention is the issue of property rights and the ability of the local community to exclude outsiders from encroaching on their fishing grounds. These rights must be enforceable and supported by national authorities. One must keep in mind that resource allocation is an inherently political act. In many cases, without outside support from a university or other non-governmental organization, local communities lack the ability to defend their interests against powerful outsiders.

Roles of the State and International Development Agencies

Elsewhere I have argued that international development agencies have contributed significantly to the promotion of capital-intensive fisheries development programs in many Third World nations (Bailey, Cycon and Morris 1986; Bailey 1988). National policymakers have been willing participants in this development process, favoring large- rather than small-scale development, particularly when linked to export-oriented fisheries.

There remains considerable research to be done on the role of the state and the influence of international agencies in shaping the direction of fisheries development. Detailed case study materials are woefully lacking. No studies of the largest bilateral donor (Japan) to my knowledge have been published, nor has the role of the Asian Development Bank (the largest multilateral donor) been examined. Finally, I would note that no detailed study has been made of the actual linkages between national and international agencies: whose priorities determine the direction of funding?

Summary and Conclusions

Most important fisheries within the Third World are being exploited at or near the level where there exists a clear threat of resource depletion. Despite mounting evidence of resource scarcity, national policymakers and international development agencies continue to promote programs based on capital-intensive fishing technologies. These programs increase pressure on the resource and have a negative impact on small-scale fishers, who lack the means to adopt these new technologies and so remain competitive.

Third World fisheries development efforts need to be balanced with resource management programs which address a clearly defined set of policy goals. It is necessary to recognize that, in the context of scarcity, management all but inevitably involves allocating the resource among competing users. In this political arena, small-scale fishers often are at a serious disadvantage compared with their well-financed competitors.

This paper offers a conceptual framework for understanding the social issues involved in management and development of Third World fisheries. For a variety of reasons, Third World fisheries policymakers have accorded primary importance to biological and economic factors and paid relatively little attention to those aspects of fisheries which sociologists tend to find most interesting

(community organization, industry structure, resource allocation, distributional equity in development, etc.). The concept "optimal yield" (OY) draws attention to the need to balance biological, economic, and social needs (e.g., employment, nutrition, income distribution).

Two additional concepts are discussed which serve to focus attention on the social aspects of fisheries management and development. Community-based management mechanisms are explored within the framework of "common property" resources.

Common property systems in the Third World have broken down under the combined pressures of population increase, technological innovation, the general commodification of fisheries products, and the encroachment of the state into local matters. Where community-based systems are not an option, management decisions need to be made by government agencies. Here the bias towards "modern" capital-intensive technologies has produced a *de facto* reallocation of the resource to a distinct class of entrepreneurs at the expense of small-scale producers. The concept of "traditional resource use rights" addresses this issue of resource allocation between classes of fishers and provides an ethical basis for policy decisions based on patterns of historic usage.

Despite the inherent interest of fisheries to social scientists, our disciplines have been slow to recognize opportunities in this field. I offer, as a broad-stroke outline, an agenda for research which focuses attention on matters that are of substantive and theoretical importance, hoping that this distinction gives no cause for offense. In brief, these matters of interest and concern involve the examination of the social relations of production, community organization, and the role of the state and international agencies in promoting Third World fisheries development.

References

- Azhar, T. 1980. Some preliminary notes on the by-catch of prawn trawlers off the west coast of Peninsular Malaysia. Report of the Workshop on the Biology and Resources of Penaeid Shrimps in the South China Sea Area - Part 1. SCS/GEN/80/26. Manila: South China Sea Fisheries Development and Coordinating Programme.
- Bagadion, B.U., and F.F. Korten. 1986. Developing irrigators' organizations: a learning process approach. In M.M. Cernea (ed.), *Putting People First: Sociological Variables in Rural Development*. New York: Oxford University Press. pp. 52-90.
- Bailey, C. 1982. Small Scale Fisheries of San Miguel Bay, Philippines: Occupational and Geographic Mobility. ICLARM Technical Reports No. 10. Manila: International Center for Living Aquatic Resources Management; Institute of Fisheries Development and Research, College of Fisheries, University of the Philippines in the Visayas; and the United Nations University.
- Bailey, C. 1983. *The Sociology of Production in Rural Malay Society*. New York and Kuala Lumpur: Oxford University Press.
- Bailey, C. 1984. Managing an open access resource: the case of coastal fisheries. In D.C. Korten and R. Klaus (eds.), *People-Centered Development: Contributions Toward Theory and Planning Frameworks*. West Hartford, Conn.: Kumarian Press. pp. 97-103.
- Bailey, C. 1985. The blue revolution: the impact of technological innovation on Third World fisheries. *The Rural Sociologist* 5(4):259-66

- Bailey, C. 1986. Government protection of traditional resource use rights: the case of Indonesian fisheries. *In* D.C. Korten (ed.), *Community Management: Asian Experience and Perspectives*. Hartford, Conn.: Kumarian Press. pp. 292-308.
- Bailey, C. 1988. The political economy of fisheries development. *Agriculture and Human Values* 5 (1 & 2):35-48.
- Bailey, C., D. Cycon, and M. Morris. 1986. Fisheries development in the Third World: the role of international agencies. *World Development* 14(10):1269-1275.
- Bailey, C., A. Dwiponggo, and F. Marahudin. 1988. Review of Indonesian Marine Capture Fisheries. ICLARM Studies and Reviews. Manila and Jakarta: Directorate General of Fisheries, Marine Fisheries Research Institute, and the International Center for Living Aquatic Resources Management.
- Bailey, C., C.K. Harris, R. Ladner, and C. Heaton. 1986. Proceedings of the Workshop on Fisheries Sociology, 26-27 April 1985, Woods Hole, Massachusetts. Woods Hole Oceanographic Institution.
- Christy, F.T. 1982. Territorial use rights in marine fisheries: definitions and conditions. FAO Fisheries Technical Paper No. 227. Rome: FAO.
- Ciriy-Wantrup S.V., and R.C. Bishop. 1975. "Common property" as a concept in natural resources policy. *Natural Resources Journal* 15:713-727.
- Collier, W.L., H. Hadikoesworo, and M. Malingreau. 1979. Economic development and shared poverty among Javanese sea fishermen. *In* A. Libroero and W.L. Collier (eds.), *Economics of Aquaculture, sea-fishing and coastal resource use in Asia*. Los Banos, Philippines: Agricultural Development Council and the Philippine Council for Agriculture and Resources Research. pp. 218-236.
- Comitini, S. 1966. Marine resources exploitation and management in the economic development of Japan. *Economic Development and Culture Change* XIV(4):414-427 (July 1966).
- Emmerson, D.K. 1980. Rethinking artisanal fisheries development: Western concepts, Asian experiences. World Bank Staff Working Paper No. 423. Washington, D.C.: The World Bank.
- Firth, R. 1966. *Malay Fishermen; Their Peasant Economy*. Hamden, Conn.: Archon Press.
- Flores, E. and G. Silvestre. 1987. Community based coral reef fishery resource management in the Philippines: the Balicasag Island experience. Proceedings, Symposium on the Exploitation and Management of Marine Resource in Southeast Asia. Indo-Pacific Fisheries Commission, Darwin, Australia, 16-19 February 1987.
- Fricke, P. 1985. Use of sociological data in the allocation of common property resources: a comparison of practices. *Marine Policy* (January 1985), pp. 29-52.
- Gordon, H.S. 1954. The economic theory of a common-property resource: the fishery. *Journal of Political Economy* 62:124-42.
- Hardin, G. 1968. The tragedy of the commons. *Science* 162:1243-48.
- Halian, B. et.al. 1962. Bahasa Kita. Buku Pelajaran Bahasa Indonesia untuk sekolah dasar kelas VI. Bandung: Remadja Karya CV.
- Iwakiri, S. 1983. Mataqali of the sea - a study of the customary right on reef and lagoon in Fiji, the South Pacific. Mem. Kagoshima University Research Center for the South Pacific 4(2):133-43.
- Johannes, R.E. 1981. *Words of the Lagoon: Fishing and Marine Lore in the Palau District of Micronesia*. Berkeley: University of California Press.
- Korten, D.K. 1980. Community organization and rural development: a learning process approach. *Public Administration Review* 40:480-511.
- Maclean, J. 1986. End of a marine reserve: Sumilon Revisited. *Naga, The ICLARM Quarterly* 9(1):13.
- McCay, B.M. and J. M. Acheson (eds.) 1987. *The Question of the Commons: The Culture and Ecology of Communal Resources*. Tucson: University of Arizona Press.
- Pauly, D. 1982a. The fishes and their ecology. *In* D. Pauly and A.N. Mines (eds.), *Small-scale fisheries of San Miguel Bay, Philippines: biology and stock assessment*. ICLARM Technical Reports No. 7. Manila: International Center for Living Aquatic Resources Management; Institute of Fisheries Development and Research, College of Fisheries, University of the Philippines in the Visayas; and the United Nations University. pp. 15-33.
- Pauly, D. 1982b. History and status of the San Miguel Bay Fisheries. *In* D. Pauly and A.N. Mines (eds.), *Small-scale fisheries of San Miguel Bay, Philippines: biology and stock assessment*. ICLARM Technical Reports No. 7. Manila: International Center for Living Aquatic Resources Management; Institute of Fisheries Development and Research, College of Fisheries, University of the Philippines in the Visayas; and the United Nations University. pp. 95-124.
- Pollnac, R.B. 1986. Social and cultural characteristics in small-scale fishery development. *In* M.M. Cernea (ed.), *Putting People First: Sociological Variables in Rural Development*. New York: Oxford University Press. pp. 189-223.
- Polunin, N.V.C. 1984. Do traditional marine reserves conserve? A view of Indonesian and Papua New Guinea evidence. Draft manuscript dated 12-3-84.
- Robinson, M.A. 1982. Prospects for world Fisheries to 2000. FAO Fisheries Circular No. 722, Revision 1 (June). Rome: Food and Agriculture Organization.
- Ruddle, K., and R.E. Johannes (eds.). 1985. *The traditional knowledge and management of coastal systems in Asia and the Pacific*. Jakarta: UNESCO, Regional Office for Science and Technology for Southeast Asia.
- Sinclair, P.R. 1985. From traps to dragnets: domestic commodity production in northwest Newfoundland, 1850-1982. *Social and Economic Studies* No. 31. Institute of Social and Economic Research. St. John's: Memorial University of Newfoundland.
- Smith, I.R. 1979. A research framework for traditional fisheries. ICLARM Studies and Review No.2. Manila: International Center for Living Aquatic Resources Management.
- Smith, I.R., and A.N. Mines. 1982. Implications for equity and management. *In* I.R. Smith and A.N. Mines (eds), *Small-scale fisheries of San Miguel Bay, Philippines: economics of production and marketing*. ICLARM Technical Reports No. 8. Manila: International Center for Living Aquatic Resources Management; Institute of Fisheries Development and Research, College of Fisheries, University of the Philippines in the Visayas; and the United Nations University. pp. 130-143.
- Villafuerte, E.D. and C. Bailey. 1982. Systems of sharing and patterns of ownership. *In* C. Bailey (ed.), *Small-scale Fisheries of San Miguel Bay, Philippines: Social Aspects of Production and Marketing*. ICLARM Technical Reports No. 9. Manila: International Center for Living Aquatic Resources Management; Institute of Fisheries Development and Research, College of Fisheries, University of the Philippines in the Visayas; and the United Nations University. pp. 25-41.
- White, A. 1984. Effects of protective management on coral reefs in the Philippines. *ICLARM Newsletter* 7(4):9-11.

APPROPRIATE TECHNOLOGY AND AUTONOMOUS DEVELOPMENT STRATEGIES IN THE AZUERO PENINSULA OF PANAMA

John R. Bort
East Carolina University

and

James C. Sabella
University of North Carolina - Wilmington

ABSTRACT

In the 1970s cooperatives were established by the Panamanian government as part of a development project designed to assist small-scale fishermen and their communities. The governmentally sponsored cooperatives failed and a locally organized cooperative emerged among some of the same men who had participated in one of the government sponsored cooperatives. This examines the causes of the failure of the government sponsored cooperatives and the reasons why the locally organized cooperative is succeeding. The analysis suggests that both the organizational frameworks and technologies introduced in the governmentally sponsored cooperatives were inappropriate to the needs and interests of the communities involved. The members of the locally organized cooperative have selected technologies and organizational frameworks consistent with their resource base and previous patterns of association.

Introduction

In response to the question: "What scale of technology is appropriate?" E. F. Schumacher (1973) focused attention on an issue that continues to bedevil promoters of economic development. His advocacy of intermediate (alternative) technology in lieu of more modern (conventional) high technology alternatives still makes sense, especially in third-world context, where resources are limited and high unemployment is the rule. The record of development projects over the subsequent decade and a half tends to confirm the wisdom of his position.

The technologies, organizational systems and related infrastructural changes promulgated by development planners frequently do not achieve the desired results and development projects often fail. When projects are deemed "successful" the populations who are supposed to benefit do not. All too often impacts of the projects prove detrimental to those who are ostensibly to be benefited. Because of the generally lackluster and frequently disastrous results of conventional development approaches, increasingly attention has turned toward alternative strategies.

Efforts to develop Panama's small-scale fisheries illustrate many of the difficulties inherent in conventional externally planned and initiated development projects. The national government sponsored efforts to institute small-scale fishermen's cooperatives in the 1970s.

The governmentally promoted cooperatives failed. In the shadow of one of the failed cooperatives a locally organized aquacultural cooperative emerged.

Both organizational efforts occurred in the same social and cultural setting and faced the same or very similar constraints. Many of the same individuals were participants in both cooperatives. Therefore, the factors contributing to success or failure can be unambiguously related to the design and implementation of the cooperatives. This permits an evaluation of the appropriateness of the technological and organizational features of the respective development efforts.

Following a brief discussion of appropriate and inappropriate technological and organizational systems, this paper presents a comparative examination of development efforts in the area of Panama's Azuero Peninsula. Case study analyses of both externally promoted and internally generated cooperative efforts among small-scale fishermen are presented. The analysis delineates the factors which contributed to the failure of conventional externally promoted cooperatives and the elements which have been crucial to a promising locally generated organization.

Appropriate Technology

Two broad views of appropriate technology can be extracted from the literature despite the lack of consensus on a definition (Divan and Livingston 1977). One perspective reflects the tradition of western economics that tends to narrow the view of technology to a technique of production. This focus is often limited to modern, highly capitalized, large-scale industrial economies that are judged on the efficiency of the production process (e.g. financially remunerative) (Stewart 1977). From this perspective the most modern (high technology), least labor intensive, highly productive technology is usually deemed appropriate.

An alternate conceptual framework which is more relevant to a third world, or developing nation dominates much of the recent literature. (Schwartz 1981, Streeten 1981, Stewart 1977, Moore 1979). In this view the appropriateness of technology is judged within a wider context of natural environmental, socioeconomic, and cultural variables. The appropriateness of technology is measured in terms of its suitability for a specific human population instead of a more limited abstract assessment of the efficiency of hardware and techniques of production. Technology deemed appropriate from this perspective may be less modern, more labor intensive and even less productive than more advanced technologies. Yet, it be more suitable for a population. The same criteria apply to organizational frameworks. The most streamlined and efficient organizational patterns may not be those most compatible with the needs and interests of a specific group.

To judge the appropriateness of technology in this sense requires some explanation of the underlying presuppositions and perspectives inherent in the concept. This can best be accomplished by contrasting conventional development strategies (CDS) with alternative development strategies (ADS) (Schwartz 1981, Diwan and Livingston 1977). The former characterizes the classic approach of Western industrial societies where growth of gross national product (GNP) is frequently employed as a measure of development. The ADS perspective eschews abstract quantitative measures in favor of qualitative, humanistic evaluative criteria.

Two fundamental assumptions underly the ADS approach. First, even underemployed, illiterate and poor people are intelligent and able to define their own needs. Also, they are capable, if given the opportunity, of solving their own problems. Second, the notion of development embraces human beings and their

attempts to satisfy basic material and non-material needs (Diwan and Livingston 1977).

Since developing countries often have large numbers of unskilled people, high unemployment, scarce capital, plentiful labor, and a shortage of training/educational facilities, the technology selected should be suited to local conditions.

Following Diwan and Livingston, appropriate technology from the ADS perspective can be recognized by various characteristics. From a material standpoint the use of renewable energy resources and durable materials are emphasized, destructive environmental impacts are minimized, and self-reliance and the maximum use of local human resources, especially labor and ingenuity are stressed. In sum appropriate technology is less costly, less sophisticated and more compatible with local cultural conditions.

The ADS criteria will be applied to the evaluation of development efforts among Panama's small-scale fisheries on pragmatic rather than ideological grounds. The preferability of either CDS or ADS perspectives is a mute point if the development efforts fail.

The Changing Fisheries of the Azuero Peninsula

The Azuero, jutting south into the Pacific Ocean, is Panama's largest peninsula. Its topography ranges from low flat coastal areas dominated by mangroves and tidal salt flats, to rolling hills, to mountains transecting the peninsula from northwest to southeast. Its east coast is the driest region in Panama with rainfall increasing to the south and the west. The entire peninsula experiences a pronounced four to five month dry season which is characteristic of the Pacific side of the isthmus (West and Augelli 1976).

The waters around the peninsula support a diverse and abundant array of marine resources. The combination of a strong tidal flow, wide tidal flats, and extensive fringing mangrove estuaries create conditions stimulating high biological productivity and provide natural breeding and nursery areas for many species. The shallow nearshore waters also provide excellent fishing conditions for fishermen using small watercraft and simple fishing gear. Coastal residents from the Precolumbian era to the present have exploited the marine resources of the area with simple hook and line, net, and weir technologies.

Until the late 1950s the fisheries of the region remained locally-oriented. Fish have been harvest for sale since the colonial era but predominant market was in the area of the Azuero Peninsula. Salted and sun-dried preserved fish was also marketed into interior mountain areas. This was done on a modest scale by small-scale peddlers who obtained fish directly from fishermen and resold it in interior areas.

In the 1960s the regional orientation of the fisheries began to change. The development of strong international markets for shrimp, coupled with an improving road system and the introduction of refrigeration and ice-making equipment, promoted a shift to shrimp fishing. Before international marketing began shrimp were of very minor importance in the local fisheries. Both capture and marketing efforts focused on fin fish. Today shrimp fishing dominates the fisheries of the Azuero and the fisheries in areas throughout the country where shrimp are found in commercial quantities.

These changes in species emphasis and marketing orientation have had a significant impact on traditional small-scale fisheries. In the past fishermen employed generalized fishing and eclectic overall economic strategies. Fishing was done using hook and line, beach seine, and weir techniques which had been in use in the area since the colonial era. A wide spectrum of species were

sought and catches sold to a large number of small-scale buyers serving local and regional markets. Overall economic strategies were similarly generalized. Fishing activities were combined with agriculture and cattle raising or wage labor. The resulting pattern of mixed activities provided a relatively diverse economic base for the households of fishermen. No single activity was depended upon exclusively and variability in the productivity of fishing was offset by other remunerative pursuits.

As the importance of shrimp fishing increased, fishing strategies began to shift. Greater efforts were devoted to the capture of shrimp and the pursuit of other species declined. At the same time marketing patterns underwent a major reorientation and restructuring. In contrast to the decentralized regionally-oriented fin fish marketing patterns involving a large number of small-scale buyers, shrimp moved through a centralized hierarchical arranged market structure. Local buyers who purchased shrimp from fishermen resold them to a handful of large firms involved in the processing and freezing of shrimp for export. Because of the capital requirements and equipment needed, there are typically only one or two shrimp buyers in any local area. Since the local market for shrimp is extremely limited, fishermen have no alternative to selling their catches to middlemen. Middlemen in turn have no option except sale to processors.

The emergence of internationally-oriented shrimp marketing has also strongly affected pre-existing marketing patterns. Shrimp buyers also purchase fish and have taken over a large portion of fish marketing. Fish, however, are of lesser importance to shrimp buyers. Fish can be profitably and conveniently handled with the same equipment and facilities used to handle shrimp. Some fish is marketed locally and larger specimens of preferred species are shipped to Panama City to more lucrative outlets such as restaurants.

Externally Promoted Cooperatives

The increasing importance of international markets to Panama's seafood industry through the 1960s and early 1970s was clear to Panama's government. In 1974 the government with FAO-BID (Food and Agriculture Organization of the United Nations and the Inter-American Development Bank) technical and financial assistance undertook a program of fisheries development (Dept. of Commerce 1982:11). Part of the development program involved the establishment of small-scale fishermen's cooperatives. Cooperatives were viewed as a vehicle for assisting small-scale fishermen, promoting the overall development of rural Panama, and benefiting the national economy. Nine cooperatives were established and financial, technical, and administrative assistance was provided to them. The goals of the attempt to establish cooperatives were to develop frameworks within which fishermen could organize to help themselves to manage the marketing of their products, secure services, modernize fishing methods, and deal with financial needs.

These efforts have not gone well. This is strongly evidenced by the fact that the Inter-American Development Bank revoked the remaining \$1.2 million of a \$3.5 million loan to Panama for fisheries development (Dept. of Commerce 1982:11). Some new fishing gear, such as monofilament gillnets for taking shrimp and other species, have been introduced but efforts to establish fishermen's cooperatives have not succeeded. Official sources indicate that three of the nine cooperatives established had totally collapsed by 1982 while the others were estimated to be operating at 25% of potential capacity (Dept. of Commerce 1982:11). Even these figures are misleading.

Visits to seven of the cooperative locations in 1983 and 1984 revealed that six had been totally out of operation since before 1980. The one that might be considered to still be functioning was not the same organization which was originally established. The original organization had collapsed. The physical facilities it had used were now occupied by a small group of fishermen forming a loosely organized, essentially private, marketing organization. Visits were not made to the other two cooperative locations but fishermen familiar with these areas indicated that none of the cooperatives were still in business and that all had ceased to exist before 1980.

Detailed questioning of fishermen who had been members of the cooperatives revealed that the cooperatives had begun to deteriorate shortly after they were introduced. Within two to three years all were in serious trouble or had already failed. By the fourth year the cooperatives that were still considered to be operating were functioning in name only. They had been abandoned by the fishermen even if they had not been officially declared defunct.

If failure had been restricted to one or two of the cooperatives, it might be possible to attribute the failures to local difficulties or organizational problems unique to the specific cooperatives involved. The rapid failure of all of the cooperatives strongly suggests that the same or very similar underlying or latent problems may have been present.

Causes of Cooperative Failure

To develop a better understanding of the failures interviews were conducted in 1983 and 1984 with fishermen who had been members of four of the cooperatives. Over thirty fishermen were questioned about their experiences in detailed in-depth interviews during multiple interviewing sessions. Thirty more fishermen were also surveyed in briefer single session interviews. In addition six government officials who had experience with the cooperative development effort were contacted and asked to provide information about their experiences.

When discussing the problems of the cooperatives, fishermen presented their own highly detailed accounts of their involvement, expressed what they disliked and liked about it, and offered their views on why it had not worked. Understandably, they did not present an analytical overview of the strengths and weaknesses of the cooperative organization. Government officials provided exactly the same type of accounts even though their presentations were superficially more objective and analytical. Their discussions revolved around highly specific details and their own impressions.

Both fishermen and government officials tended to portray themselves favorably. The implicit and often explicit view of both fishermen and government officials was that since the cooperatives failed someone was to blame. No one attributed the blame to themselves but everyone was quickly willing to assign it to others. Unwillingness to accept the blame for failure is understandable but the ways in which fault was assigned to others proved enlightening.

The information gathered does not indicate any single or small number of problems occurred in all of the cooperatives. To the contrary, the specific problems and difficulties discussed by fishermen are highly diverse ranging from accusations of embezzlement, to equipment ill-suited to local conditions, to poor management. In each of the cooperatives a variety of serious problems definitely occurred but the cooperatives shared no clear-cut set of common specific problems.

A consistent pattern did emerge as individuals presented their views on why the cooperatives failed and who was to blame for the failures. Explanations clustered around two major issues. Either some aspect of the organization or administration of the cooperative did not work. Equally revealing was assignment of blame for failures. Statements including phrases such as, "We did not know ..."; "They did not understand ..."; "He would not listen ..."; "They would not cooperate ..."; and "He would not explain ...", abound in all presentations. A very clear picture emerged indicating that a great deal of misunderstanding and miscommunication occurred between government officials and members of cooperatives. Lack of clear communications among members of the cooperatives was an equally serious problem.

Fishermen presented repeated detailed accounts of situations in which they were told they had misunderstood something by officials and administrators. After repeated incidents they assumed they were being lied to or deliberately misinformed. This was exacerbated by the tendency of government officials to make only sporadic and brief visits to the cooperatives. Fishermen interpreted this to mean that officials did not care and spent all of their time in air-conditioned offices or riding around in their cars. The actions of local fishermen who were placed in administrative roles in the cooperatives were another consistent area of difficulty. Repeated mistakes, particularly in areas such as accounting were soon skeptically viewed as ploys for self enrichment at the expense of other members. These individuals were not prepared to act as administrators in complex multipurpose cooperative organizations. They simply did not have the needed skills.

In retrospect, it appears that the factors which finally caused disintegration of the cooperatives were not the wide range of specific obstacles encountered by any of the cooperatives. The cooperatives failed because of underlying organizational difficulties which made addressing specific problems difficult if not impossible. The cooperatives were administratively very weak. Problems such as confused accounting, frequently equipment breakdown, and erratic scheduling procedures which should have been soluble were not dealt with effectively. Instead, they grew to chronic proportions and fostered even more problems. In sum, the cooperatives lacked the capacity to resolve small problems which inevitably arise in any organization. Finally the weight of accumulating problems undermined the fishermen's confidence and willingness to participate.

Small-Scale Aquaculture

A locally originated cooperative at Boca de Parita contrasts sharply with the government sponsored ventures. In 1981 several members of the community of Boca de Parita became interested in shrimp aquaculture. The idea was stimulated by the example of Ralston-Purina's efforts to cultivate shrimp in the company's Agromarina facility near Aguadulce. (The shrimp are raised in an elaborate artificial impoundment.) The example provided by Agromarina was viewed as a potential alternative or at least supplement to fishing and other economic activities.

The men at Boca de Parita realized they could not afford to build an elaborate water pumping and multiple tank system such as that used at Agromarina. But, because of their observation of natural shrimp nursery areas, they thought that raising shrimp using less complex methods might be possible. Shrimp trapped in the evaporation impoundments (*salinas*) used in the dry season for salt production are routinely captured with cast nets during the rainy season. The impoundments are constructed in natural

salt flats (*albinas*) and are naturally flooded several times per month when tides are high enough to inundate them. The flooding seawater carries larval and juvenile shrimp into the impoundment which are left behind when the water recedes. The trapped shrimp grow rapidly feeding on algae growing in the brackish sea and rainwater mix trapped in the impoundments during the wet season.

The shrimp ponds envisioned in Boca de Parita were based on the model of shrimp growth in the salt evaporation ponds. There are unused salt flats in the area which are frequently flooded by seawater. The elegantly simple idea for shrimp raising was to use a low walled tank penetrated by simple sluice gates. On flood tides the gates would be opened to admit water and then closed to retain it as the tide receded. The walls of the tank could be constructed of earth and the water control gates built with a simple arrangement of removable wooden planks set in a concrete framework. In short, the basic design is technologically simple, relatively inexpensive to construct, and employs natural tidal flow for water circulation rather than costly diesel pumps.

Indigenous Cooperative Formation

Translation of the idea of raising shrimp into actuality illustrates the development of a locally generated cooperative organization. It also contrasts sharply with the failed externally promoted fishermen's cooperative which was organized in the area. The development of both organizations occurred within the same social and cultural setting with many of the same individuals involved in both organizations. This provides a good basis for the comparison of organizational patterns and evaluation of the strengths and weaknesses of both efforts.

The first stage of going from the idea of raising shrimp to its implementation involved a long process of discussion, consultation and information gathering. To outside appearances nothing was occurring, yet this was probably one of the most crucial components in the development of the aquacultural cooperative. The idea of raising shrimp was initially discussed among small groups of fishermen and other community members when they congregated around a small store or the house of the local outboard motor mechanic. Both are focal points of social interaction in the community where men frequently congregate to relax and talk. During these interactions bits and pieces of information about Agromarina were contributed by men with knowledge of the operation. The possibility of using local salt flats for shrimp tanks was discussed and a wide range of details considered. Before any concrete actions were taken, a variety of ideas about how to raise shrimp were considered, reconsidered and reconsidered again. Superficially, the conversations could be dismissed as idle chatting to pass time. In fact, they served to both provide information and coalesce interest in raising shrimp.

The information about shrimp raising originally possessed by members of the community was very limited. While conversations were taking place about the possibility of raising shrimp, men began seeking additional information. At first acquaintances in the Aguadulce area with some familiarity with the Agromarina operation were queried. These investigations provided information on shrimp cultivation and also led to additional sources of information. Eventually through a chain of contacts personnel of the Ministerio de Desarrollo Agropecuario (MIDA) where contacted. MIDA is conducting ongoing research on shrimp cultivation and was able to provide added information on relatively simple impoundment and water management designs.²

While the technical aspects of shrimp cultivation were being investigated, legal and financial questions were also being examined. Again, a long consultation process was involved as individuals sought out detailed information. With advice and help from a trusted local businessman and a lawyer arrangements were made to form a legally recognized cooperative, secure the use of a nearby salt flat (*albina*), obtain a bank loan, and have a shrimp tank dredged.³ After two years of discussion, investigation, planning, and preparation a tank was dredged in 1983. A second tank was completed in 1984.

The development and operation of the cooperative was by no means been smooth or trouble free. Disagreement arose at virtually every stage of its development. Similarly, there were perennial tensions over the relative contributions of the 31 members of the cooperative. Some members frequently failed to do a fair share of the work required to maintain and operate the shrimp tanks.

By 1986 the cooperative's membership had declined to 26. The individuals leaving were the least involved throughout the cooperative's history. However, the progress of the cooperative's shrimp farming efforts continued steadily forward and to all appearances a stable long-term enterprise had been established. In 1987 things took a surprising and unexpected turn. The shrimp tanks were sold to a Panamanian/Japanese firm and the cooperative disbanded. The sale resulted in a return of approximately \$1000 per member on an original investment of \$150.

The sequence of events leading to the sale was particularly interesting because the cooperative had been approached previously by Panamanian businessmen wishing to buy a part interest in the operation or purchase it outright. Although the offers were discussed, the cooperative's members, with a couple of exceptions, were not interested. The consensus was that, although selling a part interest would provide needed capital, the intrusion of outside interests was not desirable. The members were dubious of their ability to maintain control or even ownership in such an arrangement. They feared that the prospective partners would attempt to usurp the entire operation with some sort of sophisticated legal maneuver. The offer of outright purchase was never seriously considered because the price offered would have yielded a very small profit, if any, after the cooperative's debts had been liquidated. When the Panamanian/Japanese concern expressed an interest in the shrimp tanks the cooperative was not seeking a buyer but the offer was viewed as an opportunity too favorable to refuse.

Before the sale opportunity arose the feasibility of establishing more shrimp tanks in adjacent *albinas* had been investigated and the rights to use the *albinas* secured. This was done with an eye to expansion in the indeterminate future if the initial aquaculture effort proved to be viable. With the sale of the existing shrimp tanks advantage was quickly taken of the situation. A new sixteen-member cooperative was formed. With three exceptions, all had been members of the disbanded cooperative. Once the cooperative was formed new shrimp tanks were begun immediately and were well underway before the final closing of the deal with the Panamanian/Japanese firm.

The transition from the old to the new cooperative revealed several interesting patterns not detected before the dissolution of the old organization. The individuals joining the new cooperative were all relatively active members of the disbanded organization. Few of the marginally active members reentered. This is not surprising. Some self-selection was taking place as well as some peer group pressure discouraging marginal members.

The most enlightening feature of the transitions was the conspicuous absence of some active members of the previous cooperative. They did not join the new cooperative. The most notable case, which illustrates the general pattern, is that of a very influential individual in the community who played a major role in shaping the opinions of other members and the directions of the cooperatives's activities. His reasons for not joining were quite simple. He has a full-time night watchman's job, does the repair work on most of the outboard motors in the area, grows corn and beans, and raises pigs. Contributing work to the cooperative is more than he can handle.

This does not indicate a loss of interest in the cooperative and shrimp aquaculture. He is still very interested and continues to play an active role in informal discussions of the cooperative's activities. He also retains a direct involvement because close family members are in the cooperative. His retired father, son-in-law and brother-in-law are all members. The brother-in-law and son-in-law were not a member of the old cooperative. The brother-in-law joined the cooperative because his circumstances changed. He secured a job as a part-time truck driver and now fishes part-time. In the past he was a full-time fisherman and was frequently away from home on fishing trips lasting three to five days. Now he only makes day-trips so participation is much easier. The son-in-law works full-time at an ice plant and engages in some agricultural activities. His younger brother works at the same plant. His participation is possible because his brother is willing to substitute for him at work when matters relating to the cooperative come up. When the old cooperative was formed his brother was too young to get a job and lived in another province. The brother now lives next door. The third new member has experienced a similar shift in his economic pursuits which makes his participation possible. He also obtained a part-time job and went from full-time fishing to part-time day fishing.

In sum, joining or not joining the new cooperative was often a matter of coordinating its demands with other remunerative activities. The experience with the first cooperative allowed many to make their decisions with a clearer appreciation of the time commitments involved as well as the expectations of other members. Members of the present cooperative indicate that things are working more smoothly than in the old cooperative. Disagreements are less frequent, members tend to make more equal labor contributions, and there is a greater sense of cohesiveness in the group. We attribute this to the experience gained from the original cooperative.

Organizational and Structural Patterns

The prevailing organizational patterns and economic structure of the local community have a great impact on the willingness of individuals to engage in new enterprises. It is especially important to recognize that the extended family, to varying degrees, is socially and economically the dominant entity. Individuals rarely make economic decisions without extensive informal consultation with many other kinsmen.

It is clear that theoretical characterizations of this local economy as composed of dichotomous subsistence and wage labor elements or as a system of scheduling in response to annual agricultural rhythms and fishing rounds distort its true complexity and obscure the dynamics of decision making. While it is partially true that the general outline of the local economy can be delineated in such terms, the actual dynamics of the system are much more problematic. A hallmark of the local economy is short-term unpredictability in virtually all economic arenas. The community

has to contend with the vicissitudes of nature in an environment alternatively plagued by drought or flood. It also participates marginally in regional and national economies which are well beyond local control. However, the economic decisions of the local populace do make sense when evaluated in this context of volatility and unpredictability.

The decision-making processes and the patterns of individual economic strategies that we have observed in action leads us to conclude that flexibility, especially short-term flexibility, is a critical indispensable feature of the system. No one knows which way the wind will blow or how hard, but like a green reed the local economy bends with the prevailing breeze. This is easily illustrated by examples from past fishing efforts, commercial activities, and responses to natural cycles.

Flexibility is very evident in the development of local shrimp tanks and the recent decision to sell them. These folks are clearly sharp eyed capitalists. They saw a rare opportunity to realize a capital gain—an immediate rather large return on their initial investment. However, in the preceding months they had strongly resisted overtures from outsiders to buy them out or buy into the operations. Why the dramatic change of attitude? In colloquial terms, they saw an opportunity to have their cake and eat it too. The Japanese are highly regarded for their technological ingenuity and ability to turn a profit. By selling the members of the cooperative perceived a concrete opportunity to increase their economic options without jeopardizing their ability to engage in shrimp aquaculture. By selling they realized an immediate economic return; the prospect of new wage labor opportunities working for the incoming firm; the opportunity to learn new and more efficient ways of growing shrimp by observing the new firm's techniques and experimentation; and finally they did not have to give up shrimp farming because they could develop new tanks nearby. The sale of the existing shrimp tanks and the formation of a new cooperative meshes perfectly in context of the pre-existing economic patterns. Advantage was taken of an obvious opportunity and short-term economic options were extended in a manner which limits potential risk.

Contrasts Between Locally and Externally Organized Cooperatives

If compared in terms of the advantages enjoyed and the handicaps faced, the government sponsored cooperatives were initiated under far more auspicious circumstances than the original locally organized cooperative discussed above. They had financial support, technical assistance and administrative guidance. The locally organized cooperative had none of these supports. The men involved lacked virtually all of the things which are conventionally assumed to be important to successful development efforts. They had no technical expertise, no administrative or managerial experience and they lacked financial resources. By these criteria the government sponsored cooperatives should have been far more likely to succeed.

Even the scope of the government sponsored cooperatives was more in line with pre-existing phenomena. They were oriented toward enhancing already established fisheries. They were supposed to build on something which already existed. The local organization undertook an aquaculture project which had no established analog. None of the individuals involved in the cooperative had had any experience with aquaculture in the past.

When other less conventional considerations are taken into account the advantages are reversed. The government sponsored cooperatives were planned and initiated by external agent with

minimal inputs from local populations. They also involved rapidly introduced and complex alien organizational patterns which were untried in the local settings into which they were introduced. In contrast, the locally organized cooperative developed gradually. Its slow development in a local setting helped insure that it evolved in a manner suited to local conditions. Both organizational and technical details could be formulated and modified to suit local needs and the advantages and disadvantages of different courses of action could be considered before commitments were made.

A final critical consideration is the way in which members of the cooperative participated in its development. Unlike the government sponsored cooperatives, members of the local group were intimately involved in all aspects of its development and continued to be aware of its activities. Regardless of what was done, everyone had a part in it and was well aware of the factors influencing a particular course of action. Because of this, problems within the cooperative were dramatically reduced when things did not go as planned. Members may have been unhappy with the outcome of some action but they were well aware of what happened and why. This reduced the potential for mistrust and suspicion that someone mishandled some aspect of the cooperative's activities. It also removed the potential for extremely disruptive acrimonious attempts to assign blame to someone when problems did occur. Everyone had a part in making decisions; so the reaction to an unforeseen difficulty was that no one individual was culpable. It is simply the way it turned out.

From an analytical perspective the success of the local cooperative can be attributed to the inherent flexibility of the organization in dealing with problems as they arose. In addition, the local cooperative was able to accommodate less active members because capital was a minuscule factor and equal for all. Labor however was a major production factor and the membership agreed that those who worked more should receive a proportionately greater share of the profit. In an environment where the labor requirements of other economic pursuits are highly variable and unpredictable this accommodation was very important. It insured a sense of equitability while allowing individual members to attend to the demands of their other activities.

Flexibility is also demonstrated by the surprising (to us) agreement to sell out. Earlier we would have predicted that the cooperative's members were in for the long haul because they seemed to be content with the steady but not spectacular rewards from harvests and had assiduously resisted pressures to sell. In retrospect we should have been more alert to such an event given our familiarity with the local system. Taking an immediate and significant return on capital proved acceptable because members could actually increase their future economic options by selling out. This clearly illustrates the capacity to respond quickly to unexpected opportunity and simultaneously minimize short term risk while preserving long term options.

The high degree of participation by the members of the locally organized cooperative goes beyond reducing potential conflict between members. It also influences the way new technologies are evaluated and adopted. Before any action is taken it is discussed in detail and potential benefits and disadvantages are very carefully weighed. This process of group deliberation tends to prevent hasty decisions. It also tends to promote technologically simple means over more complex and inevitably more expensive methods of accomplishing desired ends.

The Appropriateness of Technology

The approach of this local cooperative contrasts sharply with the approach employed in the governmentally sponsored cooperatives. In the governmentally sponsored cooperatives expensive new technologies were introduced rapidly. Large buildings, expensive refrigeration equipment, elaborate docks, new types of boats, and new capture technologies were all put into place simultaneously. The buildings constructed were far more elaborate than necessary and often poorly located, the refrigeration equipment was very expensive to operate, and the elaborate docks were poorly suited for the boats used locally. Even the new boats were problematical. They were equipped with motors unsuitable for marine use and they were poorly designed for handling nets. Very little was introduced which was suited to local circumstances nor was anything adequately evaluated in advance. In short, strong preferences for technological simplicity, within the financial and experiential capacity of local communities, and organizational patterns compatible with the local economy were not considered.

For Panama's small-scale fisheries there can be no serious debate over the merits of conventional and alternative development strategies. Conventional development strategies have failed badly. Technological and organizational approaches advocated within the perspective of an appropriate technology strategy are succeeding. This does not mean that such an approach is a panacea nor does it guarantee success. However, development efforts which take into consideration appropriate technology criteria are more likely to succeed than efforts formulated in conventional terms.

The way the locally organized cooperatives operate and the successes they have achieved illustrate the pragmatic considerations which would be vital to the success of future externally sponsored efforts. The cooperative were organized from the "bottom up" without external intervention or assistance. Therefore, the options selected should reflect the preference of those involved. Organizationally, participation in all aspects of the cooperative's activities is stressed. The members wish to be informed of all aspects of the cooperative's activities and want to participate in decisions. The technological choices also indicate that the members of the cooperative tend to be cautious of rapid change especially when risks are poorly understood, excessive, or untempered by mitigating factors. As we have seen, when economic advantage presents itself in a context that fits the local situation the community is quick to take advantage of the situation. The pattern followed is to affect one small modification at a time. As one element proves itself another will be tried. This deliberate approach allows time for the new feature to be integrated into the existing system and time for modification, if necessary, before dealing with the impact another new element.

The cautious or tentative approach of the local population brings into focus major flaws in the the governmental initiative to organize cooperatives. Governmentally organized cooperatives represented high risks in terms of economic investment and demanded organizational alterations which would impact a whole range of existing local economic strategies. Accepting government plans would have meant modifying patterns that are known to provide effective responses to variability for an alien system totally controlled by outsiders.

Conclusion

The socioeconomic system we have detailed cannot be adequately analyzed within the framework of current models of economic development which attempt to describe systems in terms

of regular patterns of seasonal variability or scheduling of activities in response to other predictable phenomena. Models contrasting subsistence and wage labor and treating these artificial constructs as dichotomous and competing sphere of activity are equally inappropriate. It is patently not true that the fishermen are incapable of responding rationally to a clear-cut economic opportunity or that the traditional local economy and ignorance are impeding their development. To the contrary, as we have seen, these fishermen are exceedingly adept at seeking advantage when opportunity knocks. However, the perception of opportunity, or conversely risk, is conditioned by one's assets, liabilities, experiences and "rules of the game." Inappropriate technology presents unacceptable risks. Appropriate technology encourages risk because local participants can really understand costs and benefits in terms of their previous experiences and limitations in their resource base.

This case would seem to require a more responsive development model that is capable of dealing with a much more dynamic and complex set of interactive and unpredictable variables which operate in the relatively short term. The actual economic and social system currently copes well with precisely such conditions. The recent experience with a new economic opportunity which fits within the context of the local economic system reinforces this conclusion.

It is not surprising that the government efforts failed. Perhaps even more important the failure is not simply attributable to the application of inappropriate technology. The fundamental reasons for the failure should be looked for in terms of the absolute incompatibility of the proposed system (which presents exceedingly high risk) with the relatively successful adaptations that presently prevail in the local community.

It is tempting to blame the failures on idiosyncratic and primarily technological mistakes. If the only difficulties involved were technological remedies for at least some of the nine failed cooperatives in Panama should have been feasible. Clearly this is not the case. The problem is of a far more fundamental nature. The organizational model of cooperatives employed by outside planners was fatally flawed from the outset.

BIBLIOGRAPHY

- Arellano-Lennox, Carlos. 1975. Artisan Fisheries of Panama. In: Thomas S. Estes (ed.), *Proceedings of the Seminar-Workshop on Artisan Fisheries Development and Aquaculture in Central America and Panama*, Kingston, Rhode Island: International Center for Marine Resource Development, University of Rhode Island.
- Borda, Orlando Fals. 1971. *Cooperatives and Rural Development in Latin America*. Geneva: United Nations Research Institute for Social Development.
- Cochrane, G. 1979. *The Cultural Appraisal of Development Projects*. New York: Praeger Publishers.
- Department of Commerce. 1982. ECRP 0404: Industrial Outlook Report: Panama Fishing Industry. Message Reference No. A-45, August 31, 1982, from the United States Department of State.
- Diwan, R.K. and Dennis Livingston. 1979. *Alternative Development Strategies and Appropriate Technology*. New York: Pergamon Press.
- Dunn, P.D. 1978. *Appropriate Technology: Technology with a Human Face*. New York: Schocken Books.
- Emmerson, Donald K. 1980. *Rethinking Artisanal Fisheries Development: Western Concepts, Asian Experiences*. Staff Working Paper No. 423, Washington, D.C.: World Bank.
- Gerhardsen, E.D. 1977. *Strategies for Development Projects in Small-Scale Fisheries*. W/L0595, Rome: Food and Agriculture Organization of the United Nations.
- Larson, James S. 1980. *Why Government Programs Fail: Improving Policy Implementation*. New York: Praeger Publishers.
- Long, F.A. and A. Oleson. 1980. *Appropriate Technology and Social Values - A Critical Appraisal*. Cambridge: Ballinger Publishing Co.
- Long, F.A. and A. Oleson. 1980. *Appropriate Technology and Social Values - A Critical Appraisal*. Cambridge: Ballinger Publishing Co.
- Long, Norman. 1977. *An Introduction to the Sociology of Rural Development*. Boulder, Colorado: Westview Press.
- McGoodwin, James R. 1982. Aquaculture Development in Atomistic Societies. In: *Aquaculture Development in Less Developed Countries: Social, Economic, and Political Problems*. Westview Special Studies in Agriculture/Aquaculture Science and Policy, Boulder, Colorado: Westview Press, pp. 61-76.
- Moore, Wilbert E. 1979. *World Modernization*. New York: Elsevier, North Holland, Inc.
- Nyrop, Richard F. 1980. *Panama: A Country Study*. Foreign Area Studies, American University, United States Government Printing Office, Washington, D.C.
- Pollnac, Richard B. 1988. *Evaluating the Potential of Fishermen's Organizations in Developing Countries*, International Center for Marine Resource Development, University of Rhode Island, Kingston, Rhode Island.
- _____. 1981. *Sociocultural Aspects of Developing Small-Scale Fisheries: Delivering Services to the Poor*. World Bank Working Paper No. 490, Washington, D.C.: World Bank.
- Pollnac, Richard B. (ed.) 1976. *Panamanian Small-Scale Fishermen: Society, Culture, and Change*. University of Rhode Island Technical Report Series #44, International Center for Marine Resource Development, University of Rhode Island, Kingston, Rhode Island.
- Sainsbury, John C. 1977. *Practical Technology Transfer in Small-Scale Fisheries*. International Center for Marine Resource Development, University of Rhode Island, Kingston, Rhode Island.
- Schumacher, E.F. 1973. *Small is Beautiful*. New York: Harper & Row.
- Schwartz, Norman. 1981. Anthropological Views of Community Development and Community Development. *Human Organization* 40:113-122.
- Smith, Leah J. and Susan Peterson. 1982. Aquaculture Development in Less Developed Countries: Social, Economic, and Political Problems. *Westview Special Studies in Agriculture/Aquaculture Science and Policy*. Boulder, Colorado: Westview Press.
- Stewart, Francis. 1977. *Technology and Underdevelopment*. (2nd. ed.), New York: Macmillan, London and Basingstoke.
- Streeten, Paul. 1981. *First Things First Meeting Basic Human Needs in Developing Countries*. World Bank, London: Oxford University Press.

Notes

1. Very similar difficulties are reported in the literature on Latin America as well as other parts of the world (Borda 1971, Cochrane 1979, Long 1977, McGoodwin 1982, Pollnac 1988).

2. MIDA has recently (1984) published a pamphlet on shrimp aquaculture designed to provide information for small-scale aquaculture efforts.
3. The *albinas* around Boca de Parita are public property controlled by the national government. However, exclusive right to the use of an area for productive purposes can be obtained by petition.

FISHERIES CO-MANAGEMENT: DELEGATING GOVERNMENT RESPONSIBILITY TO FISHERMEN'S ORGANIZATIONS

Svein Jentoft¹
University of Tromsø

ABSTRACT

This paper addresses the role of co-operative organizations in fisheries management and the extent to which fishermen's organizations are capable of handling regulatory functions. What are the problems inherent in the co-operative management approach, and what may be the benefits compared to other regulatory systems? Which circumstances may be beneficial for the success of co-management? The paper draws on comparative international experiences to form conclusions regarding the efficacy of a co-operative management regime.

"The only kind of coercion I recommend is mutual coercion, mutually agreed upon by the majority of the people affected."

(Garret Hardin: *The Tragedy of the Commons*, Science, 1968, Vol 162: 1243-1248).

1. Introduction

In order to ensure sustainable harvests of fisheries resources and avoid what is generally known as the "Tragedy of the Commons", strict management practices are needed. Generally, it is assumed that fisheries management is a government responsibility. Various management mechanisms have been used, including licensing systems, catch quotas and other control-measures. However, the experience from most countries shows that very often these management systems have met mixed success (cf. Davis & Thiessen, 1988; Copes, 1986; Hannesson, 1985; Mikalsen, 1985; Chatterton & Chatterton, 1981). This has raised questions concerning the role of the government in fisheries management.

One focus for this debate has been what kind of regulatory means should the government use. For instance, should input regulations (licenses) be replaced by output regulations (fish-quotas)? A more recent issue for debate, which will be the focus in this paper, has been the division of responsibility between the government and the fishing industry. Should the government take full responsibility for all management functions, including the establishment of quotas, deciding which fishermen should be allowed access into the fishery, promulgating detailed rules for the conduct of the fishery, and monitoring the fishery to see that all the rules are being obeyed? Or could some, perhaps all, of these functions be more efficiently carried out by fishermen's co-operative organizations? If the answer to the second question is affirmative, why is this so?

These are questions which will be addressed in this paper. More specifically we will discuss: What explains the failure of government regulations in the fisheries? What exactly makes fishermen's organizations suitable instruments for fisheries management? What are the organizational implications of delegating responsibility? What are the possible negative effects of delegating management tasks to fishermen's organizations? What circumstances may be beneficial for a successful result?

Experiences with fisheries co-management in different countries will be used as a basis from which to address these questions and draw conclusions regarding the efficacy of co-operative regimes as a management tool. Fishermen's organizations take an active part in designing, implementing and enforcing fisheries regulations have by various authors been termed "co-management" (cf. for instance McCay & Acheson, 1987; Pinkerton, 1987; Kearney, 1985). This concept will also be used here.

2. Expediency and Legitimacy in Fisheries Management

The rationale for government action in fisheries management is at least threefold. First, it is argued that the government should get involved for *efficiency reasons*. Fish as a common pool resource introduces externalities which, with open access, frequently leads to depletion of the resource base and dissipation of the potential resource rent (Gordon, 1954; Munro, 1982). To prevent this from happening, the state is called upon to exercise strict control over harvesting capacity and the total volume of catches. Second, it is argued, the state must be involved for *equity reasons*. It has a role in securing a fair distribution of fishing opportunities and incomes among participant groups. In many countries development policy is closely connected to management schemes. Thus, one motivation for government control is to allow marginal regions and small scale fisheries a chance to survive. Third, it is argued that the state must be involved for *administrative reasons*. Only the state is seen to have authority and resources sufficient to implement management schemes. And only the state has at its disposal the means of force to ensure that the rules are followed.

These arguments have motivated extensive government involvement in fisheries management in most industrialized countries. However, in performing the management role, the governments have faced "tragic choices" (Calabresi & Bobbit, 1978). Keeping the industry viable and profitable while at the same time securing equitable income distribution may be mutually exclusive goals. Somehow these goals must be balanced. Also, for a given quota, the fishermen's race for fish is a zero-sum game. The government can influence the outcome of this game, but there will still be losers as well as winners. It is a general experience, not only in the fishing industry, that solving such conflicts is a political process, requiring hard decisions (Thurow, 1980; Jentoft, 1983).

In fisheries management governments usually choose between two general options: indirect regulation and direct regulation. Indirect regulations try to control the total harvesting effort by regulating the number of participant fishermen, the size of their boats, and/or the number and type of gear. Territorial and season regulations, which restrict fishermen's access to certain fishing grounds at certain periods of time also belong to this category. While *indirect regulations* try to control the inputs of manpower and/or capital, *direct regulations* seek to limit output. Fixing a level for a total allowable catch (TAC) is one way. Dividing the TAC into individual quotas (per man or per boat) is another.

Experiences with indirect regulations are primarily negative: they have scarcely obtained the intended results and often produced unintended consequences. For instance, such regulations fail to cope with overcapitalization and resource depletion because they stimulate the adoption of more efficient technology. They close the door to new entrants, and, as a consequence, they establish privileges which make the fishery a "rich man's club". Indirect regulations also are difficult to administer and enforce. They also create a very inflexible regulatory system: once adopted they are hard to change (Mikalsen, 1985).

Today most fisheries economists contend that indirect regulations should be replaced by direct regulations (cf. for instance Christy, 1973; Hannesson, 1985; Flaten, 1983; Scott and Neher, 1981). They argue that the introduction of individual quotas will simplify the regulatory system dramatically. Fishermen should receive quotas, free or for some price, and they should be allowed to trade their quotas. Transferability, it is argued, will help to increase economic efficiency.

There are some promising reports on successful management systems based on output control, from countries such as New Zealand, Canada and Iceland (cf. Hannesson, 1987). However, as has been the lesson from many years of input regulations, there have been unintended effects. As Copes (1986) has demonstrated, individual quota management also has its pitfalls. For instance, it has proved difficult to ensure that fishermen do not exceed their quotas. Fishermen will often misreport their catches (cf. also Arnason, 1986; Gulland, 1983; Stokes, 1979). Thus, Copes finds reasons to conclude that fisheries are exceptionally vulnerable to Murphy's Law: "If anything can go wrong with a new fisheries management scheme ... it will." (Copes, 1986:281). Regulations, both indirect and direct, mean by definition that the government imposes restrictions on fishermen. Fishermen almost always have an immediate economic interest in finding ways to bypass them. "There is no reason to assume that fishermen, when confronted with the rules of individual quota management, will lose either their ingenuity at circumvention or their incentive to promote individual interests at the expense of collective interest" (Copes, 1986:281).

The crucial question for the success of any management scheme is what measures are needed to get fishermen voluntarily to advance their collective interests at the expense of their private ones. In other words, what could motivate fishermen to adhere loyally to the regulations? A keyword here is "legitimacy"; i.e. to what extent fishermen willingly accept the regulations as appropriate and consistent with their persisting values.² If fishermen find the regulatory scheme legitimate, there is more reason to believe that they will follow the rules. Then, how could legitimacy be improved?

We suggest that the legitimacy of a regulatory scheme is related to at least four general hypotheses: 1) *Content of the regulations*: The more that regulations coincide with the way fishermen themselves define their problems, the greater will be their legitimacy. 2) *Distributional effects*: The more equitably are restrictions imposed, the more legitimate will the regulations be regarded. 3) *Making of the regulations*: The more fishermen are involved in the decision making process, the more legitimate the regulatory process will be perceived. 4) *Implementation of the regulations*: The more directly involved are fishermen in installing and enforcing the regulations, the more the regulations will be accepted as legitimate.

Thus, there may be at least four ways to improve the legitimacy of fisheries regulations and to increase their prospects of success; each requires taking the fishermen's point of view into closer consideration. In the first two hypotheses, the content and quality

of the regulations per se are the focal points. The last two hypotheses concern the organization of the decision-making process.

In this paper we are particularly interested in hypothesis 3 and 4 above. How can the legitimacy, and hence the expediency, of fisheries regulations be improved by involving fishermen's organizations directly in the regulatory making process? At best, one should expect both a direct and an indirect effect. Participation would in itself tend to advance legitimacy, but in addition participation should also improve the quality of the regulations as such. In other words, by reorganizing the regulatory process (hypothesis 3 and 4), the content as well as the distributional effects of the regulations (hypothesis 1 and 2) should be improved. This argument will be outlined in the following sections. We start, however, by describing some international experiences with fisheries co-management.

3. International Experiences

The existence of locally organized informal fisheries management systems have been well documented by social anthropologists with interest in fisheries and maritime communities (cf. Acheson, 1975; Berkes, 1985; Davis, 1985; Dahl, 1988; Durrenberger & Palsson, 1987; McCay & Acheson, 1987; McGoodwin, 1983). These regulations usually take the form of territorial use rights. Here, fishermen from a certain community share tacit agreements on the conduct of the fishery within waters which they consider as "theirs", and which they actively protect from "intruders". Sometimes these regulations are established for reasons of resource protection. Very often their main rationale is to create order and avoid gear conflicts or to ensure fair distribution of access opportunities to the fishing grounds.

Compared to the many studies of informal regulations by fishermen, there are few reports on regulations by formal fishermen's co-operative organizations. But those which are available give a clear picture of a fisheries management system which can not be discarded as utopian or irrelevant, not even in industrialized fisheries. These reports demonstrate that fishermen, if properly organized, can handle management functions, and that they are able to solve their conflicts of interest even if they take the form of zero-sum games.

In some cases, management by co-operatives has developed spontaneously and exists in addition to central government regulations. McCay's study (1980) of a fishermen's co-op in the New York Bight Region of the Mid-Atlantic coast, can be classified here. The co-op performs management tasks, based on exclusive control of dock facilities, restriction of access of newcomers as members, and the imposition of catch quotas among its members. This is done primarily for the purpose of controlling the price on the products the co-op is selling. Nevertheless, the co-op's success in regulating the fishery leads McCay to draw the conclusion that this is a way of fisheries management with a much wider potential.

Berkes (1986) also regards co-operatives as positive tools in fisheries management, particularly as they relate to small scale fisheries. In a Turkish case study he describes several examples of co-operatives actively taking part in management functions. Berkes argues that effective local-level management is impossible "without the existence of institutions and mechanisms suitable for achieving consensus among fishermen participating in the fishery" (p. 226).

This conclusion is also supported by a Norwegian case-study of the Lofoten Fishery (Jentoft and Kristoffersen, 1987). They describe an example of fishermen's co-operative management which has been in existence, codified by law, for more than ninety years.

Fishing takes place from January to April off the Lofoten Islands in north Norway where the arctic cod has its spawning grounds. For hundreds of years the Lofoten fishery has attracted fishermen from north to south in the country. The high number of participant fishermen caused enormous crowding problems on the fishing grounds which led to frequent conflicts, particularly between fishermen using different kinds of gear. During the nineteenth century, various kinds of regulatory systems were tried, but none of them seemed to be able to solve the regulatory problems; not until co-management principles were introduced in the late 1890s. The Norwegian government enacted special legislation for the Lofoten Fishery which actually delegated responsibility for the regulation of the fishery to the fishermen themselves. Special district committees of fishermen representing different gear groups were set up to make the rules for the fishery, such as: allowable fishing times; which gear is allowed on which fishing grounds; and, how much space should be reserved for certain gears such as handlines, gillnets, longlines, seines. In addition to elected fishermen inspectors, a public enforcement agency was established to assure that the rules initiated by the fishermen committees were being obeyed. This system still prevails today. Some minor changes have been initiated, but the co-management principles are intact.

An example of fisheries co-management that failed is reported by Kearney (1984) in the Bay of Fundy herring fishery on the east coast of Canada. The co-op was established in the mid-1970s. In addition to fisheries regulations, the co-operative also had a marketing function. Thus, it was able to strengthen the bargaining position of the fishermen vis-a-vis the fish processors. The control over the harvesting operations given by allocating quotas among the member fishermen from a total fleet quota reserved for the co-op by the government, contributed to this strong bargaining position. A further contributing factor was that the co-op was authorized to organize "over-the-side" sales to foreign vessels. This gave the fishermen an alternative sales outlet to the private local fish processors. The co-op was also responsible for policing the vessel quotas, allocating nightly markets, distributing surplus quotas among the fleet, and collecting statistical information for the government. Thus, according to Kearney, the co-operative "assumed many administrative functions normally performed by the government, and in its day-to-day control of harvesting effort in relation to market availability, the AHFMC had taken on a decision-making function usually associated with government regulation of a common property resource" (Kearney, 1984:194).

However, the co-op failed after a few years. A general decline in the fishery made it difficult to enforce its regulatory scheme. Gear conflicts and tensions over the distribution of resource benefits among traditional small scale fishermen and fishermen using modern capital intensive fishing technology had a similar impact. As a consequence, some fishermen left the co-op and established individual marketing arrangements. After a couple of years, and as a result of intense lobbying by the processors who also grew dissatisfied with the co-operative, the government withdrew the co-op's authority to negotiate contracts for over-the-side sales. This was the straw that broke the camels back.

The most successful example of fishermen's co-operatives playing a prominent role in fisheries regulations occurs in Japan. While the cases of fisheries co-management referred to above are exceptions in the regulatory system of those countries, this is not the case in Japan where co-management is the main principle in coastal waters.³

The management function of the co-operatives has roots in feudal times, and was, until the turn of this century, largely administered by village guilds. In 1901 a new fisheries law was

promulgated. Inspired by the famous Rochdale Pioneers' Society in England in 1844, in which the original co-operative principles were formulated, these guilds were redesigned as fisheries co-operatives and granted their legal status. They started as organizations to administer fisheries regulations, but gradually expanded into other areas, such as marketing, processing, leasing out fishing equipment, purchasing supplies, education and the like. Today, there are close to 5000 fisheries co-operatives scattered all around the coast (Zengyoren, 1984). On the regional and national level these co-ops form federations and an umbrella organization. In addition there are supportive co-operative institutions for finance, insurance and the like.

The Japanese fisheries management system is based on two pillars: fishery rights and fishing licenses. Fisheries rights concern fixed gears and fish or marine plants which are relatively stable. Thus, fisheries rights are mainly confined to the inshore waters. Fishing licenses concern offshore fisheries and fishermen that operate throughout a wider area with non-stationary fishing gear like the trawl and purse seine. Fishery rights are defined by territory. Each co-op has exclusive ownership to the area outside their port, extending as far as 10 km out to sea. Depending on the type of fishery or aquaculture, the co-ops have either a monopoly or priority over private individuals or companies. Fishing licenses are seldom held by co-ops in the offshore or distant water fishery, even though they are eligible to do so. In the inshore fishery, however, the co-ops apply to the government for licenses which they distribute among their members.

The high percentage of organizational coverage of fisheries co-ops in Japan is because they have been authorized to regulate fishing rights, and fishermen have to be members of a co-op in order to engage in fishing (Zengoryen, 1984). Member fishermen which do not abide by the rules established by the co-op risk being expelled from the co-operative by the general membership.

While the principle of co-management in Japan is primarily restricted to the inshore fisheries, this is not the case in the British fisheries. Here, co-management also is introduced in the offshore fisheries. Another difference is worth noticing. In Japan, inshore regulations have a territorial basis: by reserving a limited area at sea for members of a certain co-operative, fishermen cannot expand into another co-op's territory. In Britain, on the other hand, regulations are enforced through quota allocations.

In the early 1970s, when Britain joined the EEC, producers' organizations were set up all around the country. Their function was to organize raw fish sales and to administer the EEC price support scheme. (In 1986 there were fourteen such organizations.) Fisheries regulations were a government responsibility, and quota allocations were a matter between the government and individual fishermen. However, in 1984 the government decided to decentralize the management function by transferring the regulatory responsibility to the producers' organizations. Instead of dividing the TAC among individual fishermen, the government now allocated sectorial quotas to the producers' organizations. Thus, these organizations became responsible for the distribution of quotas among their members. Rules for fishing operations and enforcement of the quotas also became a task for the organizations.

How this system works has not yet been closely studied, but apparently it works well.⁴ There has been little opposition among the fishermen to the arrangement. John Goodlad, Chief executive of the Shetland Fish Producers' Organization Limited, concludes that it has been "a successful experiment in the devolution of fisheries management responsibility from National Government to the fishermen" (Goodlad, 1986). Other chief executives in the Scottish fish producers' organizations voiced similar opinions when

interviewed by this author. A problem stressed by all, however, was that these organizations do not have any monopoly power. Membership is voluntary and fishermen outside the organizations can get individual quotas directly from the Government. According to the same chief executives, this tends to undermine the system. (In 1984, 65 percent of the British quota was administered by the producers' organizations.) Another problem is that different producers' organizations, even when located in the same port, may have different regulations. This creates tensions between fishermen belonging to different organizations. A positive factor voiced by several representatives of the producers' organizations was the fact that they, in addition to management, also are responsible for fish-marketing. The market situation could be taken into account when regulatory decisions were made, thereby ensuring a stable fish price. Also the other co-ops described above, with the exception of the Norwegian case, are multi-purpose organizations in this respect, and similar effects are obtained.

The general rules applying to all producers' organizations in Scotland and the Islands (Shetland, Orkneys, Hebrides) are outlined in a consultation paper from Department of Agriculture and Fisheries of Scotland (December 1986). For instance, the calculation of sectorial quotas is based on the track record of particular vessels. The track record calculation is applied to the vessels currently holding membership of a producers' organization. If, during the course of the year, it becomes clear that a producer organization will not catch its quota allocation, reallocation to other organizations is made. Account is then taken of the "need" of the different groups for additional quotas. When a producers' organization overfishes its quota, a ton for ton reduction is made from the group's corresponding quota in the following year.

Summing up, these examples show that delegating responsibility for fisheries regulations to fishermen has been carried out in various countries, but with mixed results. Co-management systems have been introduced in both inshore and offshore fisheries, for stationary as well as highly mobile fleets. In some cases co-management takes the form of territorial regulations, in other cases quota-allocation is the tool. We will return to these examples of fisheries co-management later for a closer analysis of what may explain the variable success. In the next section, however, we will discuss the co-management concept. What does co-management really mean? What are the implications of delegating responsibility to fishermen's co-operative organizations?

4. Delegating Responsibility

By definition, fisheries co-management means that government agencies and fishermen, through their co-operative organizations, are sharing responsibility for management functions (Bailey, 1984; Kearney, 1985; Pinkerton, 1985). The point of departure for initiating co-management agreements as part of a political process can vary from country to country. In one case it can mean that the government formally recognizes regulations which are already being enforced in an informal manner by the fishermen themselves. In another, the actual regulatory power is transferred from the government to fishermen's organizations. This would normally be the situation in fisheries where the state already plays a prominent management role.

Organizational conditions affecting the decentralization of regulatory responsibility differ from country to country. In the British system organizations suitable for fisheries management were already in place when the government decided to introduce sectorial quota allocations. If such organizations had been absent prior to the decision to introduce co-management, they would have

had to be formed as part of the process of introducing co-management. This, for instance, happened in the Lofoten Fishery of Norway, described by Jentoft and Kristoffersen (1987). When organizational formation becomes a component of the new regulatory strategy, co-management becomes a more ambitious, and certainly a more complicated, process. The prospects of success of co-management will largely depend on whether or not such organizations can function as viable institutions. That was indeed one of the problems which caused the failure of the Canadian experience (Kearney, 1984).

Co-management also means that fishermen's organizations are granted authority by law to enforce regulations on member fishermen. In some cases, as in the Japanese, this authority is based on legislated ownership rights to fishing territories. In Lofoten regulations follow a somewhat similar principle in that different gear types are allocated different territories. In other cases, as in the British one, each fishermen's organization gets quotas for its own discretionary disposal. In all three cases, the organizations have the right to exclude non-members from sharing the territory or the quota and to sanction members who violate the rules.

Co-management is to be distinguished from "consultative" arrangements which, for instance, have been in existence for several years in Norway as well as in many other countries like Canada (Kearney, 1984) and USA (Fricke, 1985). Such arrangements usually involve an advisory board, in which representatives of the fishing industry are consulted by the government before regulations are introduced. In contrast, co-management means that fishermen's organizations not only have a say in the decision making process, but also have the authority to make and implement regulatory decisions on their own. Thus, in Norway, the regulation of the Lofoten Fishery is an exception from the general rule. The law which delegates regulatory responsibility to the fishermen's committees has nothing to say on the content of the decisions *per se*, only on how the decision making process is to be organized.

How, then, is co-management to be distinguished from other common property management systems, such as government regulations or community initiated regulations? Co-management takes a middle course. It is a meeting point between overall government concerns for efficient resource utilization and protection, and local concerns for equal opportunities, self-determination and self-control. The responsibility for initiating regulations is shared. The government's responsibility may be to provide the general framework for operation of the co-operatives such as: the general legislation to install co-management principles; fixing total allowable catch; allocation of quotas between different fishermen's organizations; and, perhaps, also deciding the general framework for the organization of the regulatory process as in the Lofoten case. The government could also retain control over the total catching capacity through a licensing system. This is, for instance, the situation in the U.K. However, the practical use of the license is very much influenced by the fishermen's organizations. The producers' organization controls who is to become a member and thereby obtaining a share of its quota. In Japan, when a licensing system is installed for a fishery, the co-op may receive a number of licenses leaving it to the co-op to distribute them among its members at its own discretion (Hirazawa, 1980).

Such overall rules could also be worked out in co-operation between government agencies and fishermen's organizations, as suggested by Chatterton and Chatterton (1981:134) in the case of Australia:

"Negotiations could take place between fishermen in a particular fishery and government for a contract that would lay down important principles of ownership, participation and conservation. Once the contract had been negotiated the government could hand the day-to-day management of the fishery over to a cooperative board of fishermen elected from among the fishermen themselves."

Co-management is formal in the sense that regulations are made explicit and public and that the decision making process itself has to follow certain procedures which ensure active participation from the affected interests. Importantly, fishermen are not necessarily the only affected group. Co-management allows the rules to be less detailed and comprehensive, and decisions can be made in a more *ad hoc* fashion. In comparison, local community regulations often result from a process of mutual adjustment, taking the form of unwritten norms and carried out through informal sanctions (cf. for example Acheson, 1975). Co-management requires formal leadership and an executive staff. Leaders are elected from among the membership, and an executive staff has administrative responsibility for ensuring that regulatory decisions are implemented.

The essential characteristics of co-management as distinguished from government management systems and informal community based management systems are summarized in Table 1.

Table 1. Main characteristics of fisheries management systems

Fisheries management systems:			
Characteristic	Government	Co-operative	Community
* Initiative	Central	(De-)central	Local
* Organization	Formal	Formal	Informal
* Leadership	Hierarchy	Participat.	Mutual adj.
* Control	Central	(De-)central	Decentral
* Autonomy	No	Some	Yes
* Participation	No	Yes	Yes

Having discussed the concept of co-management, the questions to be addressed in the sections that follow are: Section 5: What may be the benefits of delegating functional responsibility for fisheries regulations to fishermen's organizations? Section 6: What are the possible problems and negative effects of such an endeavor? Section 7: Which circumstances may be beneficial or threatening to a successful result? We will discuss the lessons which can be drawn from the international experiences presented in this paper as well as literature on fisheries co-management and general organization theory.

5. Why Co-Management

The fishing industry is extremely complex, characterized by a wide range of social conditions and technological processes. Furthermore, fishing operations may vary over the years, seasons and places. There is no simple management solution appropriate for integrating all the different needs, demands, and interests within the sector. Thus, co-management agreements will hardly be a panacea for solving all the problems of fisheries management.

However, when benefits and costs are taken into account, co-management must be considered a viable option in comparison to other management alternatives.

A central argument in this paper is that the expediency of fisheries regulations hinges upon their legitimacy. From international experience one may conclude that there is little chance fisheries regulations can succeed unless they have the active support of affected interests, particularly the fishermen. Without the active support of fishermen they will find ways to bypass the regulatory measures. The legitimacy of fisheries regulations is largely contingent upon the decision making process itself. The distributive effects on incomes of fisheries regulations are important, but so also is the distribution of influence in the decision making process.

The distribution of influence is an organizational matter, and that is basically what co-management is all about. Co-management entails "mutual coercion, mutually agreed upon by the majority of the people affected" (Hardin, 1968). In contrast, government management is management from the top down. If the decision making process is fair and just, which is co-management at its best, the majority rule is more likely to be followed by all. Jentoft and Kristoffersen (1987) contend that this has been the effect of the co-management system in the Lofoten Fishery, where violations of the regulations are few. In the British case, Goodlad (1986) argues that regulations by fishermen's organizations "are generally more 'respected' than regulations by Government".

Another key point in this paper is that content of the decisions and organizational form are closely related: what comes out of the decision making process is heavily dependent on how the decision-making process is organized. In other words, as hypothesized in section 2, when co-management is introduced the quality of the regulations will improve, and this will also increase legitimacy. The purpose of this section is to discuss why fishermen's organizations can be expected to make better regulations than governments.

First, and perhaps the most common argument, is that fishermen's organizations are in a position to make more equitable regulations than are governments (cf. Hannesson, 1987; Pinkerton, 1987; Zengyoren, 1984).⁵ Not only are fishermen's organizations better able to determine what the relevant equity considerations are, they are also more capable of responding adequately to the special needs, demands and interests of individual fishermen or fishermen groups. Governments tend to follow principles of "universalism" when dealing with client fishermen. This may guarantee neutral, but not necessarily fair, treatment.⁶ Fishermen's organizations, on the other hand, can be more "particularistic", which is sometimes needed to ensure fairness and equal opportunities. For instance, an accident may hinder a fisherman from catching his quota. It would therefore be fair if his quota was increased next year to compensate for his loss. Representatives of the British producers' organizations, when interviewed by this author, pinpointed this as one of the important improvements of co-management. In Japan lottery systems combined with a rotation principle are used to ensure equal opportunities. When fishermen obtain through a lottery certain use rights, they may be excluded from participating in lotteries for other fisheries rights. Needs of individual fishermen are also taken into consideration. For instance, the number of nets a fisherman operates can be

determined by the size and age bracket of his family (cf. Hirazawa, 1980).

Second, following Pinkerton (1987), information about the resource base should be improved as a consequence of direct fishermen involvement in fisheries management. Fishermen have more detailed information based on their practical experience than do governments. Hence, more fine-grained decisions can be made. Also co-management, according to Pinkerton, has the potential to "increase the responsible sharing of information ... with consequent reduction in conflicts between state and fishermen". The willingness to share local catch information is a function of being trusted as responsible participants in management schemes - and not adversaries who have to be controlled by government. Fishermen's behaviour and attitudes alter as a result of the changes in their role which the introduction of co-management principles brings, Pinkerton argues.

Third, government bureaucracies have a limited capacity to oversee the many local and seasonal variations within different regions and sectors of the fishery. For regulations to be efficiently carried out they must be fair, and to be fair this diversity must be taken into account. This however, requires a large amount of detailed knowledge of local circumstances in the fishing industry and the ecological conditions which exist in various fisheries. Government agencies usually do not have this stock of knowledge, and if they try to get it, the costs are prohibitive. This was an important reason why the British government, after several years of centralized fisheries management, decided to delegate responsibility for fisheries regulations to the producers' organizations. The increased management effort which was needed caused an "overload" on government agencies which was eased by transferring regulatory functions to the producers' organizations. In Lofoten, the importance of local knowledge of the conduct of the fishery and the natural conditions on each fishing ground, was the main reason for introducing co-management in the 1890s.

Fourth, variations entailed in the nature of the fisheries require flexible management systems. A central argument for introducing co-management is that government bureaucracies are less flexible than fishermen's organizations in enforcing management schemes. Goodlad for instance, argues that the British producers' organizations "are generally more able to react to a situation more quickly than National Governments" (Goodlad, 1986). This was also an important factor in the Lofoten fishery leading to the institutionalization of co-management. Decisions to change the rules of fishery could be reached much more quickly by the fishermen's committees than by the government.

Fifth, delegating responsibility to fishermen's co-operatives means that fishermen become active and responsible individuals in the decision making process. By definition, co-operatives rely on membership participation, which is reflected in the internal structure of the organization. Member fishermen form the general assembly and the board of directors which make the strategic decisions. Transferring responsibility for management functions should therefore indicate that more democracy is introduced in the regulatory process. This should not only result in better management solutions, as suggested above, but it would also be a valuable societal benefit in its own right.

After having discussed the positive aspects of fisheries co-management, we now turn to a critique of this management solution.

6. What Are The Problems of Co-Management?

The responsibility for fisheries regulations can become a heavy burden for government agencies, as seen, for example, in the British case. The same is true for fishermen's organizations. It requires sophisticated administrative resources and skills to handle fisheries regulations. This can be an obstacle for some organizations. On the other hand, some organizations have adopted the resources required. By the means of a computer used for keeping control of how much each member is fishing, the British producers' organizations have managed well and with minimal administrative costs.

A more serious problem for co-operative organizations are internal conflicts and disputes which may arise among members or groups. Delegating management responsibility does not alter the conflict nature of fisheries regulations. Co-management simply represents another way of handling such conflicts. Fishermen's co-operative organizations are usually established to provide various benefits to their members (cf. Jentoft, 1986). Assuming additional responsibility for fisheries regulations means that restrictions on members behaviour have to be enforced. While the benefits obtained by the co-operative members are experienced as good, the same is not necessarily the case with fisheries regulations. Importantly, a classic co-operative principle is that co-ops are fundamentally voluntary organizations. However, co-management involves the non-voluntary imposition of restrictions on the membership. By enforcing strict regulations, the members get easily frustrated, and as a consequence, the co-op risks that members leave. Thus, the political costs of regulating fishing behaviour can be high.

The legitimacy of regulations enforced by the co-op can be challenged by member fishermen for other reasons. There may be conflicting views among members concerning the rules for the fishery. This is especially true when the membership is heterogeneous, for instance, according to boat size, gear types, capital costs, and ownership. Even if the membership is homogenous, there may still be variations in skills, and, consequently, catch results. How, then, should skills be accounted for when regulations are defined? Should variations in skills be reflected in the distribution of quotas? In fact, the explanation of variations in catches, and the effects of the skill-factor, is among the most controversial issues among fishermen (cf. Palsson, 1983).

A common co-operative principle, usually stated in the charter of the organization, is open membership and a low entrance fee. In order to keep the total fishing effort under control fisheries management requires limited entry, which means that this principle is abandoned, as illustrated in the U.S. case reported by McCay (1980). Therefore, it should not come as a surprise if fishermen's organizations are skeptical of carrying out the responsibility for management functions. They may prefer to act as a pressure group vis-a-vis government authorities. Inevitably, someone will be blamed when fisheries regulations are implemented and enforced. To have the state targeted for the blame lessens the local impact on co-operative decision makers.

The Japanese case may provide a solution to this problem. Certain exclusive rights accompany the delegation of responsibility for fisheries regulations. The co-ops have ownership rights to fishing territories and a fisherman must be a member of a co-op to be granted access. Ownership rights are a main reason for the success of Japanese fisheries co-operatives. The British producers' organizations do not have similar monopoly rights. A fisherman can obtain an individual quota directly from the government if he feels uncomfortable with the regulations of the producers' organizations. This seriously weakens the organizations' ability to enforce restrictions.

If co-management is going to have any real effects, the fishermen's organizations must have a certain amount of *autonomy*. This concerns the relation between the co-op and its environment. As to fisheries management, the environment tends to be rather turbulent. As Foreman (1984) points out, fisheries are particularly difficult to manage because accurate data on the state of the fish-stocks is hard to provide. However, when it is provided it is often, and unexpectedly, portraying the fish stocks on the brink of depletion. This calls for immediate protective action. In the New England case which he studied, the Regional Management Council (more below) had to make frequent changes in its management responses, which put the the Council under heavy stress. After having put much effort in working out a compromise solution, the decision making process would have to start all over again. There were other implications as well. Regulatory decisions were often made under great uncertainty. Also, the Council became very dependent upon external expertise and information provided by resource biologists.

The autonomy of fishermen's organizations in fisheries management is also determined by the division of responsibility; i.e. how many regulatory functions which are actually delegated from the government to the fishermen's organization. The greater the number of functions delegated, the greater the autonomy. In the Japanese and British cases presented above, the government has retained the responsibility for fixing the size of the TAC. In the Norwegian case, the government in the early 1900s. withdrew the fishermen committees' authority to decide what kind fishing gear is to be allowed on the Lofoten grounds. The government claimed that the fishermen were too conservative in letting new and more efficient gear get in.

Thus, there may be reasons to exclude some functions from being delegated. There are limitations on what functions can or should be transferred to fishermen's organizations. In general, these limitations are influenced by the number of organizations involved. The higher the number of organizations involved, the fewer the functions which can be delegated. Competition among organizations of fishermen can be quite as devastating for the resource base as competition among individual fishermen. On the other hand, if there was only one organization, all the regulatory functions, including the decision of deciding the TAC, could, in theory, be delegated. Competition would be replaced by internal command within the organization. In the fisheries management literature, this is defined as the "sole ownership option" (cf. Keen, 1983).

Whether co-management will in all cases promote a more democratic process with proper consideration of equity and fairness is an open question. A crucial variable pertains to the social

dynamics of the participatory process. Even though co-operative organizations entail participatory decision making, in practice this could be more formal than real. Participation of members in a real sense could be limited to just casting votes. Democratic organizations are often victims of oligarchic tendencies, group rivalry, conspiracy, and elite expropriation. Consequently, instead of advancing participant democracy, delegating responsibility can be a contribution to the consolidation of rigid, inequitable power structures (cf. Bailey, forthcoming). If this is the case, a government agency may be preferred as a mediator in conflicts and may be a more democratic institution than a co-operative organization.

Fishermen are not the only group with an interest in how the fishery is regulated. Other groups within the fishing industry, such as processors and fish plant workers, are also affected by the regulations. Groups external to the fishing industry may have an interest as well. Internationally, environmental groups have become increasingly concerned with fisheries management practices. In many countries, recreational fishermen struggle for more influence on management decisions which they claim exclusively benefit commercial fishermen. In Norway, for instance, the effects of fisheries regulations on the settlement structure is a major concern among the public at large. Consequently, while delegation of responsibility for fisheries regulations to fishermen's organizations may improve legitimacy among fishermen, the opposite may be the result among the other groups. Fishermen's organizations are often powerful relative to such other groups (cf. Jentoft and Mikalsen, 1987), and delegating responsibility for fisheries regulations would strengthen their power base even further. Thus, one may expect external opposition to the co-management concept.

A solution may be to create organizations with a broader representation allowing all affected interests to take part in the decision making process. The regional fisheries management councils in the U.S.A., established under the Magnuson Act of 1976, have such a broad representation. They include, in addition to fishermen representatives, public officials, processors, consumers, recreational interests and environmentalists. The councils also arrange public hearings in various communities to ensure participation from the public at large. The councils, however, have their responsibility restricted to making recommendations to the government concerning fisheries management.

However, allowing additional affected interests a say in the decision making process may lead to other problems. The organizations become more complex and internal conflicts are more likely to arise. As Foreman (1984:21) argues in the New England case:

"In important respects the council has proved to be less an "organization" (with the sense of coherence and mission that term implies) than an "arena" where diverse fishing constituencies contest with one another."

As Dahl (1970) has pointed out, one concern here should be the extra costs of decision making that the broader representation will lead to. Another is the fact that groups are affected disproportionately by fisheries regulations. They may have more or less economic risk at stake. How then should this be reflected in the decision making process and the voting?

A third problem is the question of competence. Fisheries management requires special knowledge of the fishery; but, such competence may be unevenly distributed among the participant

decision makers. One of the alleged advantages of allowing affected interest into the decision making process is the special competence which they will bring with them; and consequently, this will result in more qualified decisions. But, when there are conflicts of interest, special competence may be an obstacle rather than a help in the decision making process. As contended by Foreman (1984:14):

"Indeed, one is often left with the sense that greater knowledge of management technique on the part of "generalist" council representatives could prove a double-edged sword in the search for consensus; such sophistication could result in nothing more than more elegant (but undiminished) conflict."

Our final concern with the co-management solution is hypothesis 4 outlined in section 2, which argues that legitimacy will be improved if fishermen are involved in implementation and enforcement. Peer group pressure to adhere to the rules can obviously be very effective, but also quite as intimidating and repressive as government control. Nothing is worse than losing face among colleagues. Fishermen would also have to be each others' policemen, and reporting may be another way to lose face. In the Lofoten case, in addition to serving as ombudsmen for fellow fishermen, the elected fishermen inspectors are supposed to report on other fishermen if they discover that regulations are broken. The fact that the fishermen know that inspectors are fishing next to them, and may follow their actions, restrains them from rule-busting. However, the fishermen inspectors usually find it difficult to carry out the role as "informers" and will rarely report on other fishermen. Therefore, the public enforcement agency, which has inspection vessels on the fishing grounds, is, in practice, solely carrying out this function. If there is a general lesson to be learned from this it is that enforcement is one of the regulatory functions which seems better handled by government than by a fishermen's organization.

7. CONCLUSION

This paper has addressed the division of responsibility between the state and the fishing industry in fisheries management. Some of the achievements and problems of assigning more responsibility to fishermen's co-operative organizations have been discussed. When strengths and weaknesses are considered, what conclusions can be drawn for the potential success of introducing co-management arrangements? Is co-management to be recommended? The answer is conditional. Experience show that while some co-management systems have persisted, others have failed. From the case studies presented, some generalizations regarding critical variables can be identified.

1. The importance of legislation which gives fishermen's organizations not only the responsibility but also the authority to implement and enforce restrictions on fishermen's behaviour, should not be underestimated. The Canadian experience failed because of reluctant support from the government. The British co-management system is vulnerable because fishermen can escape the collective regulations by obtaining quotas directly from the government. The two most long-lasting and successful examples of fisheries co-management are the Norwegian and Japanese cases. In both countries, fishermen's organizations are, by law, given exclusive rights which rule out an exit-option. If fishermen are dissatisfied with the regulations, they have to use their voice and vote. It is noteworthy to point out that

this does not necessarily entail a less democratic process than the exit option (cf. Hirschmann, 1970).

2. Successes which have been noted in this paper to a large degree reflect the scale of the organizations. A common feature of all co-management systems described in this paper is the limited scale of the co-operatives, both in terms of membership and regional jurisdiction. In general, participant democracy seems to flourish in smaller rather than in larger organizations. Small organizations allow direct, personal participation. Large organizations must rely on indirect, intermediary representation in the decision making processes. The problem of free riders is found to occur more often in large organizations. In small organizations, free riders breaking the rules are easier to identify and control by informal sanctions. This problem is also a question of fishermen's sense of belonging to an organization. Members tend to feel a stronger identification with a small organization rather than a large organization. After evaluating international experiences with fisheries co-ops in developing countries, Polnac (1988:34) argues: "There are cases where fishermen's organizations failed because they were made so large that members no longer felt that the group was their own." Another consequence of organizational scale is that, when organizations grow in membership, regulations will affect a larger number of individuals. Hence, it is more likely that some individuals will find that the regulations are contrary to their interests. As pointed out by Young (1982:79):

"Assuming that actor preferences are distributed normally, every increase in the size of a regime will lower the probability that programs chosen will conform precisely to the preferences of any individual member of the beneficiary group."

Consequently, when organizations grow in scale, dissatisfaction, frustration and internal conflicts within the membership are more likely to arise.

3. Organizations with a relatively homogeneous socio-economic membership will have less internal conflicts of interest and this will make decision making easier. In the Canadian case, conflicts arose between small scale and large scale fishermen, and this was a contributing factor to the failure of the co-operative. The success of co-management is contingent upon fair and equal distribution of resource benefits. When the membership is homogeneous, equal distribution will also be fair distribution. On the other hand, when the membership is heterogeneous as in the Canadian case, fair distribution is not necessarily the same as equal distribution. For instance, quota allocations may have to be made relative to capital invested in boats and gear. What is fair would then have to be negotiated among the member groups. If this is the case, conflicts are likely to arise which may threaten the organization.
4. The answer to the problem of heterogeneity, as well as the problem of participation in large organizations, may be as suggested by Robert A. Dahl (1970:57):

"In an association where members are competent but greatly in conflict, it may make sense to dissolve the association into more harmonious groups that will be able to honor political equality and majority rule. But this solution rarely is completely attainable. For a broader association (which may be that peculiarly important

association known as the state) may be necessary to regulate conflict among the smaller, more homogeneous associations."

At first glance, Dahl's solution seems to indicate a dilemma. More participant democracy, enhanced by dissolving fishermen into smaller organizations, necessitates state intervention which leads to less self-management. However, a state agency is not the only possible external mediator. A co-operative umbrella organization may serve a similar role. In Poland, for instance, the national quota is divided by the government between the state corporate sector, the co-operative sector, and the private sector. Thereafter, The National Union of Fishery Co-operatives allocates the co-operative quota among its member co-ops. (Anon, 1987).⁸

5. As Berkes argues in the Turkish case, the traditions of co-operation among fishermen may be important. The Japanese are well known for their strong commitment to collective values and participatory decision making in business management (cf. Ouchi, 1981; Pegels, 1984). Undoubtedly, this is a main factor in explaining their success of fisheries co-management. Co-operation is in itself a learning process, and collective values are reinforced through such a process. If fishermen lack a positive experience of co-operation and collective action, introducing co-management have less chances of becoming successful.
6. The fact that the British government could delegate management functions to already existing co-operative organizations, eased the transition period required for assuming full management responsibility. If such organizations do not exist, they will have to be established before delegation of responsibility for management functions can take place. However, delegating responsibility to *existing* organizations may be regarded negatively by fishermen. Fishermen do not always trust co-operatives more than government. In fact, internationally, skepticism among fishermen of co-operative models is widespread (Jentoft, 1986; Pollnac, 1988). Important for a successful result, therefore, are the factors which produce trust in organizations and whether or not these factors are prevalent in the existing organizations (cf. Granovetter, 1985; Zucker, 1986).
7. In part, trust is dependent upon fishermen's previous relations with these organizations. Trust develops over time and through experience. For instance, the regulatory system in the Lofoten fishery of Norway has worked well for so long that fishermen take it for granted. The concrete regulations are often questioned among fishermen, but not the co-management principle itself. Trust is also based upon the quality of the social relations fishermen have to each other. Some of the main findings of organizational research are the existence of *informal* organization within formal organizational structures, and informal rules and relationships among members which have crucial impacts on organizational behavior. Some of these relationships are developed within the organization; others stem from outside interaction (cf. Perrow, 1986). The argument here would be that trust is crucial for the workability of fisheries co-management. However, trust is not only a product of formal organization, but also of informal organization. Informal organization develops through long term interaction among members inside and/or outside the organization. This leads

to the proposition that the more long-lasting and multifaceted relations among fishermen, the more likely is the success of co-management. This is also why community self-management often works well in small scale, inshore fisheries, in contrast to large scale, offshore fisheries where the mobility of the fleet is much higher. Consequently, relationships of trust have less chances of being developed in offshore fisheries. The British case, however, suggests that mobility is not an insurmountable obstacle.

8. The British producers' organizations, as well as the Japanese, the Canadian and the U.S. co-ops described above, are multi-purpose organizations. They combine fisheries management with fish marketing, as well as other important functions (e.g. credit, supplies, gas etc.). These are tasks which should be coordinated for the attainment of economic and social objectives (cf. MacSween, 1983; Jentoft, 1985), and transaction costs can be saved if such coordination takes place within the same organization rather than among several independent organizations (cf. Williamson, 1975). The fact that these co-ops have other functions reinforces the management function. The costs and burdens fishermen experience because of the regulations installed by the co-operative can be compensated for by the various benefits of belonging to the same organization.
9. The long term effect of introducing co-management agreements is hard to predict, as it is with most major institutional reforms (cf. Elster, 1984). In particular this is pertinent in the special case of the fishing industry. The short term effects may be quite different from the long term effects. There may be transitional problems. The history of fisheries management schemes tells us that unexpected effects will occur. Moreover, the prospects of success will be contingent upon the way co-management is introduced, for instance, depending on whether it is introduced "incrementally" or as a "grand scheme". Co-management in small enclaves, as in the Canadian case, may have different possibilities of success than if co-management was made the system for the whole sector, as in Japan. When co-management is implemented incrementally it must operate within an environment which may be dysfunctional or even hostile to the experiment. When co-management is introduced as a macro reform such environmental factors will be minimized. Importantly, however, one cannot uncritically draw conclusions from how co-management works in a small enclave to how it will work as a global solution (Elster, 1984). The most important contribution one can realistically hope for is that co-management will imbue the regulatory process with legitimacy. This will tend to make management both more effective and less costly compared with government control. Legitimacy, we have argued, will be improved for both procedural and substantive reasons; procedurally because co-management introduces participatory decision making; and substantively, because fishermen's organizations will be more inclined to base their regulatory decisions on considerations of fairness and equity. In view of the devastating effects the absence of legitimacy has had on management schemes in the past, this would be no small achievement.

NOTES

1. This is a slightly revised version of a paper presented to a symposium on "Gulf Coast Maritime Utilization", Mobile, Alabama, May 4-6, 1988, organized by The University of South Alabama.
Preparation of this paper was supported by the Norwegian Fisheries Research Council and written while in residence at Department of Agricultural Economics and Rural Sociology at Auburn University, Alabama. The paper has benefited from constructive critiques made by Conner Bailey, Soren Christensen, Petter Holm, Helge O. Larsen, Leigh Mazany, Mike Skladany and Jim Stallings. Responsibility for accuracy of fact, interpretation and analysis is mine.
2. "Legitimacy refers to the degree of acceptance which the political regime enjoys among the community" (Ponton & Gill, 1982:97). Plano & Riggs (1973:45) provide a more elaborate definition. They see legitimacy as the quality "of being justified or willingly accepted by subordinates that converts the exercise of political power into "rightful authority." The classical treatise of the foundations of legitimacy can be found in Weber (1964).
3. The Japanese management system is well documented in the academic literature, see Comitini (1967), Hirasawa (1980), Asada, Hirasawa & Nagasaki (1983), Shima (1983). This author visited fisheries co-ops in Japan in June 1987.
4. This author interviewed representatives of several producers' organizations in Scotland and Shetland in April 1987.
5. Hannesson (1987) sees equity improvement as the main contribution of fisheries co-management:
"The arguments for collective solutions of the common property problem are arguments of equity and social justice rather than efficiency, while pseudo-market solutions based on transferable catch quotas or fishing licenses held by individuals or firms seem more likely to promote efficiency." (p. 39).
The same equity effects could also, he argues, be obtained through leasing or taxing licenses or quotas, and by making transferability subject to certain conditions. He thus concludes that "In theory the case for this type of solution (i.e. co-management) is not entirely convincing" (p. 39). As pointed out in this paper, co-management has in several cases proved viable in practice. The empirical evidence for the efficiency and workability of market solutions in fisheries management is still very scarce.
6. The neutrality of government may be questionable. Government agencies are often exposed to lobbying and political pressure from powerful economic interests within the fishing industry. This may, for instance, result in favoritism of large scale operators at the expense of small-scale operators when regulations are implemented. Cf. Barret and Davis (1984) for a discussion of the Canadian case, and Bailey (1988) for the case of many Third World countries. Also the rationality of government agencies may be questioned. In the case of Norway Orebech (1982) finds that fisheries authorities are sloppy in following their own rules for the distribution of licenses.
7. The producers' organizations have made complaints to the government and asked for revision. However, by April 1987, no corrective action had been taken.

8. This author visited Polish fisheries co-operatives and had interviews with the Chief Executive of the National Union of Fishery Co-operatives in October 1987.

REFERENCES

- Acheson, J. M. (1975): "The Lobster Fiefs: Economic and Ecological Effects of Territoriality in the Maine Lobster Industry", *Human Ecology*, Vol. 3, No. 3: 183-207.
- Anonymous, (1987): *Fisheries and Related Industries in Poland*. Office of Maritime Economy and Central Union of Work Cooperatives in Poland. Prepared for the First UNIDO consultation on fisheries industry, Gdansk, 1-5 June.
- Arnason, R. (1986): *Management of the Icelandic Demersal Fisheries*. A Report for the Workshop on North Pacific Fishery Management Options. April 21-24.
- Asada, Y., Y. Hirasawa & F. Nagasaki (1983): "Fishery Management in Japan." *FAO Fisheries Technical Paper No. 238*, Rome.
- Bailey, C. (1984): "Managing an Open Access Resource: The Case of Coastal Fisheries", in D.C. Corten & R. Klaus (eds.): *People-Centered Development: Contributions Toward Theory and Planning Framework*. Kumarian Press.
- Bailey, C. (forthcoming): "Optimal Development of Third World Fisheries", in M. Morris (ed.): *North South Perspectives on Marine Policy*. Westview Press, Boulder.
- Bailey, C. (1988): "The Political Economy of Fisheries Development in the Third World". Forthcoming in *Agriculture and Human Values*.
- Barret, G. & A. Davis (1984): "Floundering Troubled Waters: *Journal of Canadian Studies*, Vol. 19, No. 1:125-137.
- Berkes, F. (1985): "Fishermen and 'The Tragedy of the Commons'." *Environmental Conservation*, Vol. 12, No. 3: 199-205.
- Berkes, F. (1986): "Local Level Management and the Commons Problem". *Marine Policy*, Vol. 10, pp. 215-229.
- Calabresi, G. & P. Bobbitt (1978): *Tragic Choices: The Conflicts Society Confronts in the Allocation of Tragically Scarce Resources*. W.W. Norton & Co. New York.
- Chatterton, L. & B. Chatterton (1981): "How Much Political Compromise Can Fisheries Management Stand? Premiums and Politics in Closed Coastal Fisheries". *Marine Policy*, April:114-134.
- Christy, F.T. (1973): *Fishermen Quotas: A Tentative Suggestion for Domestic Management*. Occasional Paper No. 19 of the Law of the Sea Institute. University of Rhode Island.
- Comitini, S. (1967): "Economic and Legal Aspects of Japanese Fisheries Regulation and Control". *Washington Law Review*, Vol. 43:179-196.
- Copes, P. (1986): "A Critical Review of the Individual Quota as a Device in Fisheries Management." *Land Economics*, Vol. 62, No. 3: 278-291.
- Dahl, C. (1988): "Traditional Marine Tenure: A Basis for Artisanal Fisheries Management." *Marine Policy*, January: 40-48.
- Dahl, R.A. (1970): *After the Revolution: Authority in a Good Society*. Yale University Press, New Haven.

- Davis, A. (1985): "Property Rights and Access Management in the Small Boat Fishery: A Case Study from South Western Nova Scotia", in C. Lamson & A. Hanson (eds.): *Atlantic Fisheries and Coastal Communities: Fisheries Decision-making Case Studies*. Institute for Resource and Environmental Studies, Dalhousie University, Halifax.
- Davis, A. & V. Thiessen (1988): "Public Policy and Social Control in the Atlantic Fisheries." *Canadian Public Policy*, XIV:1: 66-77.
- Durrenberger, E.P. & G. Palsson (1987): "Ownership at Sea: Fishing Territories and Access to Sea Resources". *American Ethnologist*, 14 (3): 508-522.
- Elster, J. (1984): "Skeptiske tanker om samfunnsplanlegging", *Forskning og framtid*, nr. 1: 27-36. Resource Policy Group, Oslo.
- Foreman, C.H. Jr. (1984): *Fisheries and the Search for Regulatory Consensus: Lessons from New England*. Paper prepared for the meeting on the American Fisheries Society, Cornell University, Ithaca, New York, August 12-16.
- Fjaten, O. (1983): "Fiskeriplanlegging og bioøkonomisk teori", in B. Hersoug (ed.): *Kan fiskerinaeringa styres?* Novus Forlag, Oslo.
- Fricke, P. (1985): "Use of Sociological Data in the Allocation of Common Property Resources: A Comparison of Practices". *Marine Policy*, January: 39-52.
- Goodlad, J. (1986): *Regional Fisheries Management: The Shetland Experience*. Notes prepared for the Norwegian/Canadian Fisheries Management Workshop, Tromsø, June 16-21.
- Gordon, H. Scott (1954): "The Economic Theory of a Common Property Resource: The Fishery". *Journal of Political Economy*, 62(2): 124-42.
- Granovetter, M. (1985): "Economic Action and Social Structure: The Problem of Embeddedness". *American Journal of Sociology*, Vol. 91, No. 3, p. 481-510.
- Gulland, J.A. (1983): "Control of the Amount of Fishing by Catch Limits." *FAO Fisheries Report No. 289 Supplement 2*, Rome.
- Hannesson, R. (1985): "Inefficiency Through Government Regulation: The Case of Norway's Fishery Policy." *Marine Resource Economics*, Vol. 2, pp. 115-141.
- Hannesson, R. (1987): *Fishermen's Organizations and their Role in Fisheries Management. A study undertaken for the FAO*. The Norwegian School of Economics and Business Administration, Bergen.
- Hardin, G. (1968): "The Tragedy of the Commons". *Science*, Vol. 162: 1243-1248.
- Hirasawa, Y. (1980): *Coastal Fishery and Fishery Rights*. Paper delivered at the Symposium on Development and Management of Small-scale Fisheries, Indo-Pacific Fishery Commission, Kyoto, May.
- Hirschman, A.O. (1970): *Exit, Voice and Loyalty; Responses to Decline in Firms, Organizations, and States*. Harvard University Press, Cambridge, Mass.
- Jentoft, S. (1983): "Fiskeripolitikk som nullsum-spill", in B. Hersoug (ed.): *Kan fiskerinaeringa styres?* Novus Forlag, Oslo.
- Jentoft, S. (1985): "Models of Fishery Development: The Cooperative Approach." *Marine Policy*, October: 322-331.
- Jentoft, S. (1986): "Fisheries Co-operatives: Lessons Drawn from International Experiences". *Canadian Journal of Development Studies*, Vol. VII, No. 2: 198-209.
- Jentoft, S. & T. Kristoffersen (1987): *Fishermen's Self Management: The Case of the Lofoten Fishery*. Paper presented to the Ninth International Seminar on Marginal Regions, Skye and Lewis, 5-11. July.
- Jentoft, S. & K.H. Mikalsen (1987): "Government Subsidies in the Norwegian Fisheries: Regional Development or Political Favouritism?" *Marine Policy*, July, p. 217-228.
- Kearney, J. (1985): "The Transformation of the Bay of Fundy Herring Fisheries in 1976-1978: An Experiment in Fishermen-Government Co-management", in Lamson, C & A. Hansson (eds.): *Atlantic Fisheries and Coastal Communities: Fisheries Decision-making Case Studies*. Institute of Resource and Environmental Studies, Dalhousie University, Halifax.
- Keen, E.A. (1983): "Common Property in Fisheries: Is Sole Ownership and Option?", *Marine Policy*, July, p. 197-211.
- MacSween, I. (1983): "The Interaction Between Fisheries Management and the Marketing of Fish." *FAO Fisheries Report No. 289. Supplement 2*. Rome.
- McCay, B.J. & J.A. Acheson (1987): *The Question of the Commons: The Culture and Ecology of Communal Resources*. The University of Arizona Press, Tucson.
- McCay, B.J. (1980): "A Fishermen's Cooperative Limited: Indigenous Resource Management in a Complex Society." *Anthropological Quarterly*, Vol. 53, pp. 29-38.
- McGoodwin, J.R. (1983): "Some Examples of Self-regulatory Mechanisms in Unmanaged Fisheries." *FAO Fisheries Report No. 289 Supplement 2*, Rome.
- Mikalsen, K.H. (1985): *Limits to Limited Entry? Entry Limitation as a Fishery Management Tool*. Paper presented at the 20th Annual Meeting of the Atlantic Association of Sociologists and Anthropologists, University of Prince Edward Island, March 14-16.
- Munro, G. (1982): "Fisheries, Extended Jurisdiction and the Economics of Common Property Resources", *Canadian Journal of Economics*, XV, No. 3: 405-425.
- Orebech, P. (1982): *Konsesjoner i fisket*. Tanum-Norli, Oslo.
- Ouchi, W.G. (1981): *Theory Z: How American Business can Meet the Japanese Challenge*. Addison-Wesley Publishing Company, Reading, Massachusetts.
- Palsson, G. (1983): *Representations and Reality: Cognitive Models and Social Relations among the Fishermen of Sandigerdi, Iceland*. Ph.D. dissertation, University of Manchester.
- Pegels, C. (1984): *Japan vs. the West: Implications for Management*. Kluwer-Nijhof Publ., Boston.
- Perrow, C. (1986): *Complex Organizations: A Critical Essay*. Random House, New York.
- Pinkerton, E. (1987): "Co-operative Management of Local Fisheries: A Route to Development," in J.W. Bennett & J.R. Bowen (eds): *Production and Autonomy: Anthropological Perspectives on Development*. Society for Economic Anthropology and University Press of America, Lanham, Maryland.

-
- Plano, J.C. & R.E Riggs (1973): *Dictionary of Political Analyses*. The Dryden Press, Hinsdale, Illinois.
- Polnac, R. (1988): *Evaluating the Potential of Fishermen's Organizations in Developing Countries*. ICMRD-report, Univ. of Rhode Island, Kingston.
- Ponton, G. & P. Gill (1982): *Introduction to Politics*. Martin Robertson, Oxford.
- Scott, A.& P.A. Neher (1981): *The Public Regulation of Commercial Fisheries in Canada*. Economic Council of Canada, Ottawa.
- Shima, K. (1983): "The Role Of Cooperatives in the Exploration and Management of Coastal Resources in Japan." *FAO Fisheries Report, No. 295 Supplement*, Rome.
- Stokes, R.L. (1979): "Limitation of Fishing Effort: An Economic Analysis of Options." *Marine Policy*, October: 289-301.
- Thurrow, L. (1980): *The Zero Sum Society*. Basic Books.
- Weber, M. (1964): *The Theory of Social and Economic Organization*. The Free Press, New York.
- Williamson, O.E. (1975): *Markets and Hierarchies: Analysis and Antitrust Implications*. The Free Press, New York.
- Young, O.R. (1982): *Resource Regimes: Natural Resources and Social Institutions*. University of California Press, Berkeley.
- Zengoryen (1984): *Fisheries Cooperative Associations in Japan*. National Federation of Fisheries Cooperative Associations, Tokyo.
- Zucker, L.G. (1986): "Production of Trust: Institutional Sources of Economic Structure, 1840-1920", *Research in Organizational Behaviour*, Vol. 8, p. 53-111.

SELF-REGULATION AMONG FISHERMEN OF THE GULF OF MEXICO?

M. Margaret Overbey
University of Florida

ABSTRACT

One of the contributions of social science to fisheries management has been the finding that some fishermen regulate their fishing behavior through a variety of mechanisms, such as territoriality, secrecy and spacing conventions. This finding tends to support the idea that fishermen do not always overexploit their resources to the detriment of their livelihood - a situation commonly referred to as the tragedy of the commons. Research among stone crabbers and shrimpers on Florida's Gulf Coast indicates that these fishermen attempt to regulate their fishing behavior through a community-level resource management system. The research findings suggest further research opportunities for social scientists in these and other fisheries of the Gulf of Mexico.

An area of current interest to maritime social scientists is that of "self-regulation" among fishermen. Self-regulation refers to the formal or informal means that fishermen practice to control their fishing behavior. The concept of self-regulation has particular application to fisheries management for two reasons. First, it challenges the notion that the oceans and their resources are common property open to exploitation by any and all fishermen. Secondly, it provides data on local fishing behavior that may be incorporated into the fishery management process.

Maritime social scientists have demonstrated that fishermen regulate their fishing behavior and manage their resources through a variety of mechanisms, such as territoriality, secrecy, and spacing conventions (Acheson 1975; Andersen 1976; Berkes 1977; Forman 1967; McCay 1978, 1980; McGuire 1983; Stiles 1976). Through controlling their fishing behavior, fishermen may be conserving the very resources they exploit. Further, particular self-regulating mechanisms appear to be related to certain fishery technologies. Lobster fishermen in Maine (Acheson 1975) and cod fishermen in Newfoundland (Stiles 1976), both of whom utilize stationary trap gear, have established property rights in nearby waters. Cod fishermen in Newfoundland utilizing mobile trawl gear observe informal spacing conventions.

This paper analyzes the concept of self-regulation through a model of fishing behavior developed from research among stone crabbers and shrimpers of the west coast of Florida. Specifically, the paper presents the common fishing practices, or norms, observed by stone crabbers and shrimpers as a system: a community-level resource management system. Within the system are two components: a territorially-based, stone crabbing component and an open-access, shrimping component. Both components include the common elements of the system, but the expression of these elements varies in each fishery. Despite

inherent differences, however, the stone crabbing and shrimping components operate together within the context of the community-level resource management system.

The community-level resource management system represents a process that can change in response to internal and external pressures. A model of this transformation process is presented for a territorially-based community-level resource management system.

Methods

This model of a community-level resource management system is developed from research conducted between 1984 and 1986 on the stone crab and shrimp fisheries conflict in the state and federal waters off Pasco-Hernando-Citrus Counties. Supplemental research was undertaken in the counties directly north and south of the conflict area and included Pinellas, Levy, Dixie and Taylor Counties. The research was funded by National Science Foundation (#BNS-8418926) and Sea Grant (#R/LR-E-10-PD).

Field research methods entailed interviews with fishery managers and enforcement personnel; interviews with a sample of 55 fishermen; interviews with managers and owners at 24 fishhouses; in-depth interviews with selected fishermen; mapping of areas fished by selected stone crabbers and shrimpers; and participant observation. Documentary data gathered from the National Marine Fisheries Service, the Gulf of Mexico Fishery Management Council, and the Florida Department of Natural Resources were analyzed. The documentary data included tape recordings of public hearings and advisory panel meetings, state and federal landings and enforcement data, as well as agency file materials.

Findings

Social Factors Contributing To The Conflict

The conflict between stone crabbers and shrimpers of Pasco-Hernando-Citrus Counties is classified by fishery managers as a "gear" conflict due to the generally recognized inability of the two fisheries to fish the same waters at the same time. Stone crabbers catch commercial stone crab (*Menippe mercenaria*) by deploying stationary bottom traps equipped with cable and float to mark their location. Stone crabbing is a day fishery with traps being left overnight for three to ten days.

Shrimpers trawl for the nocturnal *Penaeus* sp. at night. Traditionally, shrimpers use "door nets" or otter trawls that drag the sandy bottoms for shrimp. The Pasco-Hernando-Citrus Counties area, however, is characterized by a grassy bottom with low relief rubble and open sandy areas. Since otter trawls cannot operate well in the grassy beds, shrimpers in the area have adopted a specialized rigid frame roller trawl that rides over the bottom. Shrimpers in the Pasco-Hernando-Citrus Counties area, particularly bait shrimpers, fish on a daily basis, while the majority of commercial shrimpers' fishing trips last from three to five days.

Conflict between stone crabbers and shrimpers occurs when shrimp trawls encounter crab traps and trap buoy lines. The entanglement of trawls and traps results in gear damage and lost fishing time, generally with stone crabbers losing crab traps and shrimpers losing trawling time and potential product as they untangle or repair their trawl nets.

While fishery managers perceive the conflict as one between stone crabbers and shrimpers, the research reveals that area stone crabbers and shrimpers were able to work the same bottom in

the past despite the incompatibility of gear. Further, fishermen in the area identify newcomers and the large-scale, commercial shrimpers, referred to as the "big boats", as the major cause of the conflict.

Newcomers are blamed because "they didn't know how or where to fish". The big boats are blamed for overfishing and "not respecting" the local ways of fishing. The research concludes that the conflict is more aptly represented as one between old-timer stone crabbers and shrimpers, or insiders, and outsiders comprised of newcomer stone crabbers and shrimpers and the transient big boat shrimpers. Further, the research reveals that it is the fishing behavior of these outsiders, not merely their presence, that is at issue. Local norms previously observed are being violated by these outsiders, and the traditional means of controlling fishermen's behavior are ineffective on outsiders.

Community-Level Resource Management Systems

A community-level resource management system is defined as the way in which a community of fishermen regulate themselves in a specified area. The system is referred to as "community-level" because common fishing practices, or norms, tend to be found among groups of fishermen who reside in the same area and know each other. Community residence serves as a cohesive force for fishermen. A community is a place where cooperation among fishermen takes place; it is also a place where unacceptable fishing behavior may be socially controlled by informal means.

The research reveals that stone crabbers and shrimpers use informal means to control fishing behavior. These include peer pressure behaviors such as criticism and rumors, and - when these measures fail - direct intervention such as gear sabotage. Using informal means of social control such as criticism, slander and condemnation is found in communities of classic peasant societies. Foster (1965: 83) defines them as "negative sanctions" used "...in the hope that [they] will discourage what is seen as antisocial behavior".

The research suggests that the county is an appropriate unit for defining the community within the study area. Arensberg and Kimball (1972: 109) define the form of community in the American South as the county, and interviews with fishermen tend to bear this out in the research area. Stone crabbers and shrimpers in the Pasco-Hernando-Citrus Counties area acknowledge insider-outsider distinctions among each other based on their residence as well as their fishing behavior. For instance, shrimpers in Pasco County state that Citrus County fishermen regard them as "foreigners". Similarly, stone crabbers from Pasco County complain that Citrus County fishermen cut their trap lines when they attempt to fish Citrus County waters.

There is evidence that the county defines the community in other coastal areas of the South. Paredes, Sabella and Hepburn (1977: 191-192) state that blue crabbers in "Medicine Springs", a pseudonym for a northwest Florida Gulf Coast fishing community, respect county lines "... as boundaries between themselves and crabbers of adjoining counties." Further, shrimpers from the nearby county also recognize, but may not always respect, the county boundaries of Medicine Springs crabbers.

The nature of community-level resource management systems, or the pattern of fishing behavior expressed by the system, appears to be related to the types of fisheries that characterize the community, the mobility or lack thereof of the resource, the gear types associated with the respective fisheries, and the relative dominance of the respective fisheries within the community. There are two components of the community-level resource management

systems in the Pasco-Hernando-Citrus Counties area: a territorially-based, stone crabbing component and an open-access, shrimping component.

The stone crabbing component differs from that for shrimping because the trap technology of stone crabbing requires different fishing behavior than the trawl technology of shrimping. While the gear associated with the stone crabbing and shrimping components are distinct and incompatible, the fisheries may co-exist in a community-level resource management system. The dominance of either fishery, however, will determine the overall character of the system.

In fact, stone crabbing and shrimping components co-exist in each of the three communities of the study area. In Citrus County, the stone crabbing component is dominant and thus influences the overall nature of the community-level resource management system. In contrast, the shrimping component dominates in Pasco County, and thus characterizes the community-level resource management system of that county. Hernando County serves as a buffer area where the systems overlap and the dominance of the two components are negotiated.

The stone crabbing component

Territoriality is perhaps the distinguishing feature of the stone crabbing component. This is due to the fact that stone crabbing is a trap technology and crab traps are a fixed gear. Acheson (1975) documents territoriality among Maine lobstermen, who also utilize a trap technology and fixed gear.

Stone crabbers put out lines of traps marked at each end with color-coded buoys that match the color code on the stone crabber's boat. Stone crabbers leave their traps to soak from three to ten days. In the Pasco-Hernando-Citrus Counties area, stone crabbers traditionally fish all of their traps. Local stone crabbers thus know where each other fishes or is fishing. Placing traps on the bottom is, in a sense, an expression of territoriality. The act of covering the bottom with crab traps is interpreted by shrimpers as a statement of territoriality or ownership. As one shrimper stated: "...they cover up the bottom and say 'That's mine'" (Gulf of Mexico Fishery Management Council public hearing 3/29/83).

Historically, stone crabbers had their own areas to fish. One stone crabber stated: "Eighteen years ago, you had your own patch and no one bothered it. But that changed pretty quickly." The change noted by this stone crabber refers more to the phrase "no one bothered it" than "you had your own patch", because when asked to map the areas they fished before the state and federal zoning configuration was formalized in 1985, stone crabbers mapped discrete areas with very little overlap.

The present system for stone crabbers is territorial, with an emphasis on claiming bottom through the expanded placement of traps. One stone crabber stated that stone crabbers were still territorial and described his fishing behavior to illustrate it. He starts out the season in the same area each year, but every year he moves his traps out a little farther to expand his territory. This stone crabber explained the reason for this annual expansion: "You have to, because you lose your area if you don't. The stone crabber next to you will move his traps over into your area."

Stone crabbing is dominated by big crabbers who have larger boats and a large number of traps. As the fishery developed and the value of stone crab increased, the distinction between crabbers became more marked as big crabbers invested in larger boats and more traps. In some instances, big crabbers who

overcapitalized suffered economically when the stone crabbing seasons were poor in 1984-1985 and 1985-1986.

The tendency for stone crabbers to increase the number of their traps as the number of fishermen in the fishery increased can be seen as a manifestation of the old-timer stone crabbers' attempt to maintain their territorial boundaries. Since the historical system of having your own patch or territory among old-timer stone crabbers was not recognized by the newcomers, the old-timers claimed territories by covering the bottom with their traps. The newcomers' behavior followed suit.

The defense of stone crabbers' territories through the cutting of others' traps is another manifestation of territoriality. That the big crabbers of Citrus County were able to chase the small crabbers to Hernando County waters by simply cutting their traps whenever they placed them in Citrus County waters indicates their dominance of the area and their ability to maintain their territories.

A shrimper described the territoriality among stone crabbers in Citrus County as "the good-old boy deal. This is mine and you stay out. Fish like I do, or else." This territorial system among the big crabbers of Citrus County appears to fit Acheson's definition of "perimeter-defended territories". In perimeter-defended territories, boundaries are sharply defined and strictly defended. Entry into fishing the area is also limited (Acheson 1975: 189-191).

Acheson differentiates nucleated and perimeter-defended territories found among lobstermen in Maine according to land ownership and the strictness of entry into the fishery. While both nucleated and perimeter-defended territories are related to formal ownership of land, this is particularly the case in perimeter-defended areas (Acheson 1975: 190).

The "critical difference" between the two forms of territoriality, however, "...is the extent to which entry is more severely limited and controlled" in perimeter-defended areas (Acheson 1975: 191). Entry into nucleated territories, while by no means open, tends to be based on a "...critical single factor...a man's willingness to abide by the local norms of the industry" (Acheson 1975: 191, n.7).

Further, nucleated territories tend to be associated with "harbor gangs". In contrast, perimeter-defended territories tend to be associated with individual fishermen, who have established "little fiefs", or harbor gangs composed of fishermen, who have formed "highly effective political groupings" (Acheson 1975: 195).

Finally, fishermen in perimeter-defended territories tend to be more violent in defending their territories (Acheson 1975: 192-193 n.8). They are also more likely to invade another's territory than fishermen in nucleated territories (Acheson 1975: 193-194).

There are indications that the perimeter-defended territorial character of stone crabbing in Citrus County is changing. Illustrating a change in the historical claims to territories and ownership is the story of a stone crabber, regarded locally as a big crabber, who had suffered major trap losses in his territory. During the research, stone crabbers and stone crabber-shrimpers expressed dissatisfaction with the big crabber's alleged behavior of cutting off other crabbers' traps in his area. One stone crabber explained the big crabber's trap losses as resulting from retaliation: "He made too many enemies". Acheson (1975: 189) cites retaliation for trap cutting in the form of destruction of traps among lobstermen in Maine. The fear of retaliation usually serves to keep trap cutting at a minimum among lobstermen.

Other norms of fishing associated with the stone crabbing component include secrecy, the use of deceptive behavior, and the practice of conservation measures. The element of secrecy

and the use of deceptive behavior appears to be a recent fishing norm that old-timer stone crabbers now utilize to discourage and deceive newcomer stone crabbers.

In the past, when stone crabbers had their own patch to fish which no one disturbed, there was no need for secrecy. The increase in the number of newcomers and, particularly, the advent of Loran-C that, according to old-timer shrimpers and stone crabbers "allows any fool to fish", have encouraged secrecy and deceptive behavior among stone crabbers. One stone crabber described his use of deceptive behavior: "If there's another stone crabber out there, I won't go to my hot spot, I'll go to an unproductive area nearby and fish that day. And sure enough, the next day his traps will be there." Another stone crabber described his use of secrecy, and the practice of sharing secrets with friends: "Last year, I found a good area offshore. I told a friend about it and we caught a lot of stone crabs. Then people started watching me and went there, too. Crabbers will still tell their friends where the good areas are."

Stone crabbers also practice conservation methods to protect the stone crab stock. Of the stone crabbers interviewed, 82 percent reported practicing some conservation measures. These measures include: no "boxing" or "bulking" of crabs; careful measuring and breaking of crab claws; and no taking of egg-bearing female crab claws. This latter practice was observed even before it was codified by statute.

Boxing or bulking crabs refers to the holding of whole stone crabs on board the boat until the crabbing is complete or there is a break in the pulling of trap lines. Crab claws are then broken off and the crab is returned to the water. Many stone crabbers in the Pasco-Hernando-Citrus Counties area and those stone crabbers interviewed in Steinhatchee and Cedar Key believe that boxing or bulking of crabs increases their mortality rate and will eventually adversely affect the stone crab stock. These stone crabbers break off the stone crabs' claws as the crabs are removed from the traps when the traps are pulled on board. The stone crabs are returned directly to the water after the claws are removed. Stone crabs are thus returned to the waters from which they are caught.

There is an art to breaking off stone crab claws. If a clean break of the claw at the joint is not made, the stone crab may not survive. Further, the stone crab cannot regenerate the improperly broken claw.

State and federal law presently prohibit the taking of claws from egg-bearing female stone crabs, but claws were allowed to be taken prior to regulation. These stone crabbers recognized that the removal of claws from egg-bearing females might adversely affect the stone crab stock, and made a practice of returning the egg-bearing female crabs caught in traps immediately to the water.

The territorially-based, stone crabbing component herein described is exemplified by Citrus County. The majority of old-timer stone crabbers and big crabbers reside in Citrus County, and stone crabbing appears to be the dominant and most valued fishery. Blue crabbing, which also uses a trap technology, is also an important, although less valued, fishery in Citrus County.

Historically, stone crabbers from Citrus County had no conflict with local shrimpers, since the local shrimping was confined to bait shrimping. Bait shrimping was practiced in inshore, state waters. The commercial shrimpers located in Citrus County tend to be shallow-draft shrimpers who also confine their shrimping to inshore waters.

Shrimpers and stone crabbers who reside in Citrus County generally get along with each other. As one commercial shrimper in Citrus County stated: "There's no conflict between the shrimper and the crabber. It's between shrimpers. The big boats are the problem". This shrimper further illustrated the compatibility between Citrus County stone crabbers and shrimpers by recounting an incident where a television station came to cover the conflict.

Channel 8 came here from Tampa and asked us about the conflict. We said there was no problem with the stone crabbers. They went to the stone crabbers in Homosassa and they said the same thing...there was no problem with the shrimpers. Then they went to Yankeetown shrimpers who said there was a problem. Well they took out the part where they talked to us and only showed the Homosassa crabbers and the Yankeetown shrimpers.

Fishermen from outside of Citrus County characterize Citrus County fishermen as "possessive of their local waters". One stone crabber-shrimper remarked: "They won't let you in there to crab if you're not from there". A group of Pasco County shrimpers noted that the fishermen from Citrus County did not want to let them shrimp off Citrus County, despite the fact that they resided nearby. When asked if the reason might be that they did not reside in the county, they responded "Exactly!"

The shrimping component

The shrimping component is somewhat territorial, but not in the same sense as the stone crabbing component. Shrimping entails a trawl technology and mobile gear. Shrimpers recognize certain areas as shrimping grounds, but individual shrimpers do not claim individual territories. Shrimpers, however, tend to shrimp the same general areas and concentrate on particularly productive areas. The shrimping component is more aptly described as open access on an individual basis, but territorial in relation to shrimping grounds on a group basis.

Shrimpers in the Pasco-Hernando-Citrus Counties area recognize certain areas as shrimping territory. The Big Bank, for example, is readily identified as one such area. The territorial nature of shrimping is illustrated by the fact that whenever stone crabbers place traps in the Big Bank area they are immediately cut off by shrimpers.

Stiles (1976: 247) notes that cod fishermen in Newfoundland utilizing mobile trawl gear observe informal spacing conventions. Cod trawlers keep a respectful distance from each other. Shrimpers in the Pasco-Hernando-Citrus Counties area, however, do not appear to observe spacing conventions. On the contrary, their trawling activities are best described as a free-for-all. One shrimper described the local trawling: "If there's a bunch of shrimp concentrated in one area, that area may be from this kitchen to that next house [approximately 30 feet]. And you'll have all these boats in there fishing that same area, right on top of each other. And they're cursing...You hear it all over the radios, people cursing at each other when they're trying to work an area".

Of the shrimpers who mapped their fishing areas for the author, only one outlined a discrete area. Shrimpers were more vague than crabbers about their fishing areas, preferring to map the general range of their fishing north to south and east to west. The shrimpers' inability to map the areas fished relates to the most important characteristic of their fishery: secrecy.

Just as territoriality is the most expressive form of the stone crabbing component, secrecy appears to be the most expressive form of the shrimping component. Shrimpers jealously guard

the locations of particularly productive areas or hot spots. One shrimper explained that, while stone crabbers can cut others' traps to keep them out of their territory, shrimpers can not do anything comparable to other shrimpers to keep them out of their areas. A shrimper described his deceptive behavior as follows: he is careful about where he fishes when other boats are around; if there are other boats out in his area, he will not go to his hot spots; he will go to a less productive area and act as if he is catching shrimp.

The shrimpers' need for secrecy adversely affected their ability to participate in the actions of the State's Shrimping and Crabbing Advisory Committee and the Gulf of Mexico Fishery Management Council's Ad Hoc Shrimp/Stone Crab Advisory Panel in designing the zones. Designing the zones required stone crabbers and shrimpers to map the areas that they fished. Requiring shrimpers to map the areas they fished was perceived by shrimpers in general as well as those shrimpers on the Committee and Panel as a "no-win situation". A shrimper described the problem: "Everyone was afraid to map the areas they fished, because they would be tipping off other shrimpers as to the most productive areas". Shrimpers felt that if they mapped their areas, they might lose those areas to the stone crabbers; and, if they did not lose them to the stone crabbers, they would lose them to other shrimpers.

A stone crabber acknowledged the difficulty shrimpers have in mapping the areas they fish. He said that some shrimpers approached him about designing zones for Pasco County, but when he asked them to map the areas, they refused. His explanation was that secrecy among shrimpers prohibited them from mapping the areas they fished: "You know how shrimpers hide".

Shrimpers, like stone crabbers, observe conservation practices. Of the shrimpers interviewed, 69 percent reported that they practice conservation measures. These measures include: using a larger mesh net size; throwing undersized shrimp overboard; observing a moratorium on shrimping for two or more months of the year; making short tows for bait shrimp; and not shrimping in the inshore areas which serve as a nursery for shrimp.

Most commercial shrimpers consider undersized shrimp to be 40 to 50 count or smaller. Even bait shrimpers, for whom there is no size limit, will throw undersized shrimp overboard. Shrimpers criticize other shrimpers who utilize smaller mesh sizes that catch undersized commercial shrimp, such as 80 count shrimp. Berkes (1977) notes the effectiveness of controlling the catch by size and species by way of the mesh size of gill nets among native Canadians.

A two month moratorium on shrimping is observed during the summer months when shrimping is poor. Commercial shrimping generally stops, but bait shrimping continues. A bait shrimper stated that he does not shrimp in July and he would prefer not to shrimp in August either, but he is forced to do so in order to keep his contract with the bait house. This shrimper and many commercial shrimpers stated that they would like to see a moratorium on all shrimping in the area from July through August.

Other shrimpers make short tows for bait shrimp in order to keep them alive, and refrain from shrimping in areas recognized as productive shrimp nursery grounds. One commercial shrimper stated that he does not shrimp inside the 20 line because "it is strictly an estuary". Other shrimpers mentioned that they would like to see nursery areas established where shrimping would be restricted or prohibited.

Some shrimpers believe that their roller trawls are a conservation measure in themselves because they "mow" the bottom grasses and keep the bottom clean. These shrimpers contrasted the use of the roller trawls with the use of the 70-pound stone crab traps, weighted with concrete. These shrimpers felt that the stone crab traps destroyed the bottom grasses by crushing them and prohibiting the growth of grasses for sea life.

The open-access, shrimping component herein described is exemplified by Pasco County. The majority of old-timer shrimpers reside in Pasco County and shrimping appears to be the dominant fishery. While stone crabbing is also found in Pasco County, there are fewer stone crabbers and stone crabbing is conducted on a smaller scale, with one or two exceptions, than in Citrus County.

Indicative of the fact that shrimping dominates Pasco County fishing is that shrimpers enforce their territoriality of shrimping grounds by cutting stone crabbers' traps that are placed there. The Big Bank, as indicated earlier, is regularly protected by shrimpers. A Pasco County netter related that local shrimpers control the activities of stone crabbers in the county who are newcomers to the fishery. "Shrimpers talk on their radios a lot. They'll notice newcomers', stone crabbers', traps and notify other shrimpers who say 'Just cut the buoys', and they do", he stated.

The stone crabbers who successfully fish the Pasco County waters fish the peripheral areas and deeper waters. One stone crabber noted the increase in his trap losses when he moved his traps into state waters one season: "They were trampled by shrimpers". This stone crabber has since moved to deeper waters and thus avoided such problems with shrimpers or other stone crabbers.

The Community-Level Resource Management System In Action

As we have seen, the stone crabbing and shrimping components of the Pasco-Hernando-Citrus Counties area share common themes of territoriality, secrecy and conservation measures. However, the way in which these themes are carried out appears to vary from fishery to fishery.

These common themes also characterize the community-level resource management system. The dominance of a particular fishing behavior within the community of fishermen, such as the territoriality associated with stone crabbing in Citrus County, and the secrecy associated with shrimping in Pasco County, determine the overall character of the community-level resource management systems in those counties. This is illustrated by the fact that shrimpers in Citrus County confine their shrimping to inshore, state waters and stone crabbers in Pasco County confine their crabbing to the peripheral areas offshore. Shrimpers in Citrus County and stone crabbers in Pasco County give a wide berth to their respective communities' dominant fisheries.

An additional characteristic of the community-level resource management system is the practice of conservation measures among both stone crabbers and shrimpers in Pasco, Hernando and Citrus Counties. Acheson (1975: 195-199) notes that lobstermen practice conservation efforts in the perimeter-defended territories. These lobstermen curtail their fishing effort by limiting the number of traps they fish. Acheson (1975: 199-204) concludes that the reduction in fishing effort provides biological benefits to the lobsters in the perimeter-defended territories (i.e. more lobsters reach maturity) and economic benefits to the lobstermen in the perimeter-defended territories (i.e. the lobstermen catch

bigger lobsters and receive more money per pound for the lobsters they catch).

Community-level resource management systems vary from community to community. The differences between Citrus County and Pasco County provide an example. Citrus County is dominated by a territorially-based community-level resource management system, that is exemplified by the stone crabbing component. Pasco County is dominated by an open-access community-level resource management system, that is exemplified by the shrimping component.

While the differences between the stone crabbing component and the shrimping component can contribute to the conflict between the two fisheries, research indicates that the components are compatible within the context of a community-level resource management system. Stone crabbers and shrimpers who operate within the same community-level resource management system cooperate with each other through a variety of ways.

Generally, stone crabbers and shrimpers who operate within a community-level resource management system know where the fishermen in the respective fisheries fish and avoid disturbing each other. Other means of cooperation are evident as well. Fishermen may have an arrangement in which they schedule fishing in the same area to avoid conflict. They may avoid fishing areas recognized as a particular fisherman's grounds. Stone crabbers may place their traps far enough apart so that trawlers may fish between traps. Shrimpers may dodge stone crab traps; carefully untangle the traps they encounter; and notify the crabber of the traps' new location. These means of cooperation are cited by stone crabbers and shrimpers as the historical situation, when fishermen in the Pasco-Hernando-Citrus Counties area "knew each other".

The disruption of the community-level resource management system by outsiders who do not observe the norms of fishing inherent in the system appears to be the cause of the conflict between stone crabbers and shrimpers of the Pasco-Hernando-Citrus Counties area. Certainly, it explains old-timer stone crabbers' and shrimpers' complaints about "uneducated" newcomers and the transient, larger-scale shrimp boats.

The Community-Level Resource Management System as Process

That the Pasco-Hernando-Citrus Counties stone crabbing and shrimping conflict resulted from the disruption of the community-level resource management system suggests the death of the system. This is not the case, however. The community-level resource management system represents a process that responds to external and internal perturbations.

Over time the system may transform as the community of fishermen changes and the norms of fishing change. The transformation process is not evolutionary, but represents a spectrum of potential responses of fishermen's behavior to changes in the nature of the system. The homeostatic model best represents the process of system transformation. McCay (1978: 399-400) suggests the use of homeostatic models rather than equilibrium models to represent systems of fishing behavior.

The community-level resource management system of Pasco-Hernando-Citrus Counties area from the beginning of the conflict in 1980 and throughout the research period can be characterized as a system undergoing change or transformation. The very occurrence of the conflict, the inability of local fishermen to resolve the conflict themselves through the gentlemen's agreement that they attempted in 1980, and the request by local fishermen for

fishery management's intervention suggest as much. The traditional means of controlling non-system behavior were ineffective against outsiders. In fact, many old-timer fishermen stated during the research that they now only cooperated with friends, and acted very differently toward newcomer fishermen.

Further evidence of the system's transformation has been the adoption of a new form of behavior among stone crabbers in Citrus County: secrecy. Historically, when each fisherman had his own patch to fish, there was no need for secrecy. Rather, old-timer stone crabbers would cooperate with each other and share hot spots with friends. During the research, however, old-timer stone crabbers reported that they practiced secrecy in order to conceal their hot spots from newcomer stone crabbers. The historic climate of "mutual aid" was now replaced by an atmosphere described as "cut-throat".

Research indicates that the perimeter-defended territories associated with the old-timer stone crabbers of Citrus County are breaking down. The necessity of these crabbers to cut through trap lines in order to reach their territories or to maintain their territories suggests the breakdown of boundaries. Even more illustrative of a breakdown of perimeter-defended territories is the retaliatory behavior invoked to force a big stone crabber out of business. This successful challenge to the original hierarchy of crabbers reflects a change in the territorial format of Citrus County stone crabbing.

According to Acheson (1975: 193), boundary breakdown or boundary maintenance results from conflict or political pressure. Perimeter-defended territories dominated the lobstering areas of Maine prior to 1920, but since then the majority of perimeter-defended territories have changed to nucleated territories (Acheson 1975: 192). This change in territorial format indicates a system's transformation from an historic state, characterized by a perimeter-defended territory to a new state, a nucleated territory.

Levine (1984) presents variations in fishing patterns associated with crayfishing in three New Zealand villages in an attempt to explain their causality. Motunau Beach fishermen have perimeter-boundary territories. Ngawhi fishermen have nucleated territories. Stewart Island fishermen, however, are associated with a common property day fishery and a "social boundary" system in the outer waters.

Viewing the fishing patterns associated with these three villages as a process rather than a typology provides an alternative interpretation of Levine's data. The different patterns of crayfishing can be seen as representing the stages of transformation in a territorially-based community-level resource management system.

Territorially-based, community-level resource management systems are initially manifest in a pattern of individual patches or territories fished by resident fishermen. Internal and external changes in the fishery and among the fishermen, however, may necessitate the boundary defense of these individual patches. Perimeter-defended territories result from the defense of these individual patches.

In Citrus County, for example, the initial pattern of stone crabbing was one of individual patches fished by resident fishermen. This historic situation changed as the fishery developed and the value of stone crab increased. The distinction between crabbers became more marked as the more successful crabbers invested in larger boats and more traps. According to local fishermen, the big crabbers expanded their territories by invading the small crabbers' territories. The big stone crabbers eventually "kicked out" the small stone crabbers from Citrus County waters by "just cutting their traps whenever they put them in that area".

Acheson (1975) cites perimeter-defended territories as the historic situation in the lobstering areas of Maine. Perimeter-defended territories will be maintained in the communities where the original resident fishermen, or old-timers, and their associated community-level resource management system control the fishery. Newcomers rarely attempt to enter the fishery and transient trespassers are infrequent and easily deterred. In Motunau Beach, where perimeter-defended territories are the norm, all fishermen are resident fishermen and territorial boundaries are easily maintained. One can assume that, due to the success of enforcement, the rate of trespassing is low. The perimeter-defense territories associated with stone crabbing in Citrus County also exemplify this pattern.

With the introduction of newcomers and more transient trespassers to the community and fishing areas, the boundaries of perimeter-defended territories are difficult to enforce by individual fishermen. In response to more frequent trespassing, individual fishermen band together to defend the boundaries of their joint, and now perhaps adjoining, individual territories. Distinctions appear between insiders, the old-timer fishermen, and outsiders, newcomers and transient trespassers. Facing a potential threat to their control of the good fishing areas, old-timer fishermen adopt more easily defended, nucleated territories. In a nucleated territorial situation, newcomers can be more readily controlled and "educated" and, perhaps, eventually incorporated into the operating system. Transient trespassers, although more frequent, are now dealt with more effectively by a band of nucleated fishermen.

This pattern of change, from perimeter-defended territories to nucleated territories, is noted in the lobstering areas of Maine by Acheson (1975: 192-195). The crayfishermen of Ngawhi have nucleated territories. Although all Ngawhi fishermen are village residents, the fact that they attempt to keep "new" fishermen from moving into the community and using the beach (Levine 1984: 92) suggests that newcomers to the fishery are perceived as a potential problem by local fishermen. The territorial pattern of stone crabbing in the Pasco-Hernando-Citrus Counties area during the conflict and resolution process can be characterized as nucleated.

The boundaries of nucleated territories can break down when the influx of outsiders overwhelms the enforcement capabilities of the old-timers. Indications of an imminent breakdown of the nucleated territories are the occurrence of fishery conflicts or disputes among fishermen, the inability of area fishermen to resolve the conflicts by themselves, and government intervention in resolving the conflicts or regulating the fisheries.

The breakdown of nucleated territories is exemplified by Stewart Island, where a "surge of entry beginning the mid 1960s" resulted in increased "...competition, social stratification, and fishing disputes and...government controls" (Levine 1984: 91). Old-timer fishermen blamed the entry of newcomer fishermen for the breakdown in their previous system of "patches" or territories (Levine 1984:91).

Nucleated territories break down to form an open access or common property situation in the original fishing waters. This is, in part, due to the government's intervention, usually through fishery management, to resolve the conflicts associated with the breakdown of the territories.

In cases where the resulting fishery management strategy delineates zones for specific fishing activities, as in gear conflicts, the zones become the common property of the respective fishermen. For example, the fishery management strategy for resolving the Pasco-Hernando-Citrus Counties stone crab and

shrimp fisheries conflict was to designate exclusive fishing zones for crabbing and shrimping. Technically, stone crabbers and shrimpers have open access to fishing in their respective zones. An open access or common property situation is also represented by the Stewart Island day fishery (Levine 1984).

A potential response of old-timer fishermen to the breakdown of nucleated territories, however, will be to re-establish their territorial system in other areas. Levine notes this behavior among Stewart Island crayfishermen. These fishermen fish the outer areas in socially-bounded clusters. The clusters are composed of old-timer, related fishermen and a few favored newcomers. Due to the perceived lack of individual patches and boundary defense, Levine refers to the clustering phenomenon as social boundary (Levine 1984: 91-92). Actually, this may represent a newly established nucleated territory where boundary defense is unnecessary.

While recognizing the integration of ecological and social factors in explaining the pattern of fishing, Levine concludes that land-based, social relations, i.e. "community cooperation and connectedness" determine the pattern of territoriality. Where cooperation and connectedness are high, a nucleated territory will be found. Where cooperation and connectedness are low, either a common property situation or perimeter-defended territory will be found (Levine 1984: 96-97). Thus Ngawhi, marked by nucleated territories, represents a community with high connectedness; Motunau Beach, marked by perimeter-defense territories, and Stewart Island, marked by common property, represent communities with low connectedness.

Using a community connectedness or social cohesion approach to predict the type of fishing pattern is misleading. If community cooperation or connectedness are low in Stewart Island, how does this explain the social boundary or nucleated territories established by Island fishermen in the outer areas? Further, community connectedness may not be so much low in Motunau Beach and Stewart Island as it is high in Ngawhi. I believe that cooperation is particularly prevalent among fishermen in nucleated territories. The nature of nucleated territorial fishing demands a high degree of cooperation among fishermen in order to maintain commonly-defined boundaries of their fishing area. This is perhaps why the term "harbor gangs" that Acheson uses in describing nucleated lobstermen in Maine seems so appropriate.

A better approach to determining the fishing pattern operating among fishermen entails an understanding of the related community-level resource management systems. In determining the overall pattern of fishing that dominates in an area - e.g. an open-access system associated with a mobile gear, or a territorial system associated with a fixed gear or resource - one may be able to predict change in the system. Internal and external factors that impinge on the original community-level resource management system will affect the course of change.

Internal and external factors that affect the community and the community of fishermen are identified in the transformation process of a territorially-based, crabbing system. Internal factors include the size and cohesiveness of the original community of fishermen, the rate of growth in the community and the fisheries, the number of newcomers to the fisheries, and the compatibility or incompatibility of newcomers' fishing behavior with that of the community of fishermen. External factors include the number of transient fishermen using the fishing waters, the compatibility or incompatibility of transients' fishing behavior with that of the community of fishermen, and the influence of the government measures in regulating or managing the associated fisheries.

Given the above, a prediction can be offered as to the course of change of the territorially-based community-level resource management system associated with Citrus County. As we have seen, the stone crabbing component of Citrus County has changed from perimeter-defense territories to nucleated territories. The disruption of the community-level resource management system by outsiders can be characterized as a breakdown of the nucleated territories attempted by area fishermen. The presence and intensity of the conflict among fishermen and the eventual role of state and federal fishery managers in resolving the conflict through the designation of exclusive fishing zones are further evidence that the community-level resource management system has changed from perimeter-defense to nucleated territories.

Following the transformation process model, an open access or common property situation is predicted to develop in the conflict area waters that are now zoned for crabbing and shrimping. Old-timer fishermen, allied with a few newcomers, however, will probably establish new territories in outlying areas.

Conclusions

This paper has presented various self-regulating mechanisms found among fishermen as elements of a community-level resource management system. The community-level resource management system is, as the name implies, community-based, rather than associated with a particular fishery. The overall pattern of fishing behavior expressed by the community-level resource management system will be determined by the types of fisheries that characterize the community, the mobility of the resource, the gear types associated with the respective fisheries, and the relative dominance of the fisheries within the community. Two systems of fishing behavior are presented: a territorial system exemplified by the stone crabbing component of Citrus County, and an open access system exemplified by the shrimping component of Pasco County.

The community-level resource management system is characterized by the common themes of territoriality, secrecy and conservation measures. These themes are found among stone crabbers and shrimpers of the Pasco-Hernando- Citrus Counties area. The manner in which these themes are expressed, however, vary from fishery to fishery. Territoriality is the dominant theme of the stone crabbing component, and secrecy is the dominant theme of the shrimping component.

Finally, community-level resource management systems are processes. Accordingly, they may change or transform due to the effects of internal or external factors that include population growth in the community as well as the fisheries, the presence of outside fishermen in the fishing waters, and the influence of government regulation on the fisheries.

A model of a transformation process associated with a territorial system is proposed. Territorial systems will appear, initially, as individual patches or territories. The boundary defense of these individual patches is expressed initially as perimeter-defended territories. Perimeter-defended territories break down, in the face of overwhelming pressure by outsiders, to form nucleated territories. When nucleated territories break down, two responses are likely to occur. The original territories become open access, and old-timers may establish new territories in outlying areas.

Further research on community-level resource management systems will wed land-based, community studies with sea-based, fisheries research. Land-based research in maritime social science research is suggested by Durrenberger and Palsson (1987) and Levine (1984). This research, too, substantiates the need for an

integrated land- and sea-based focus for maritime social science research in the area of self-regulation among fishermen.

Through determining the various expressions of community-level resource management systems and the way in which these systems change in response to internal and external factors, we should be able to identify systems of fishing behavior from community to community and region to region. Ultimately, we can use our understanding of these systems to predict changes in response to internal or external pressures.

REFERENCES CITED

- Acheson, James M. 1975. The Lobster Fiefs: Economic and Ecological Effects of Territoriality in the Maine Lobster Industry. *Human Ecology* 3(3): 183-207.
- Andersen, Raoul. 1976. The Small Island Society and Coastal Resource Management. In *Marine Policy and the Coastal Community*, Douglas M. Johnston, ed. pp. 255-277.
- Arensberg, Conrad M. and Solon T. Kimball. 1972. *Culture and Community*. Gloucester, Massachusetts: Peter Smith.
- Berkes, Fikret. 1977. Fishery Resource Use in a Subarctic Indian Community. *Human Ecology* 5(4): 289-307.
- Durrenberger, E. Paul and Gisli Palsson. 1987. Ownership at Sea: Fishing Territories and Access to Sea Resources. *American Ethnologist* 14(3): 508-522.
- Forman, Shepard. 1967. Cognition and Catch: The Location of Fishing Spots in a Brazilian Coastal Village. *Ethnology* 6(4): 417-426.
- Foster, George M. 1965. Peasant Society and the Image of Limited Good. *American Anthropologist* 67: 293-315.
- Gulf of Mexico Fishery Management Council. 1983. *Tape Recording of Shrimp/Stone Crab Public Hearing held 3/29/83 in Apalachicola, Florida*.
- Levine, H.B. 1984. Controlling Access: Forms of "Territoriality" in Three New Zealand Crayfishing Villages. *Ethnology* 23(2): 89-99.
- McCay, Bonnie J. 1978. Systems Ecology, People Ecology, and the Anthropology of Fishing Communities. *Human Ecology* 6(4): 397-422.
1980. Fishermen's Cooperative, Limited: Ecological Analyses of a New Jersey Fishery. *Anthropological Quarterly* 53 (1): 29-38.
- McGuire, Thomas R. 1983. The Political Economy of Shrimping in the Gulf of California. *Human Organization* 42(2): 132-145.
- Paredes, J. Anthony, James C. Sabella and Marcus J. Hepburn. 1977. Human Factors in the Economic Development of a Northwest Florida Gulf Coast Fishing Community. Final Report for Project Number R/As-1 of the State University System of Florida Sea Grant College Program. Gainesville: University of Florida.
- Stiles, Geoffrey. 1976. The Small Maritime Community and its Resource Management Problems: A Newfoundland Example. In *Marine Policy and the Coastal Community*, Douglas M. Johnston, ed. pp. 233-254.

"Eat Mo' Fish:" Using Anthropology to Increase and Diversify U.S. Seafood¹

David C. Griffith and Jeffrey C. Johnson
East Carolina University

ABSTRACT

This paper demonstrates the need for developing middle-range theory that is capable of brokering the insights of grand theoretical schemes and of organizing and interpreting the often mundane and trivial actions of daily life. The paper explores the application of such grand anthropological theory to problems posed by trends in U.S. seafood consumption based on a discussion of three important aspects of food: food as an energy source, food as a commodity, and food as a symbol.

Introduction

Food has been present at many of anthropology's theoretically memorable occasions. From structuralist searches for hidden meanings among the appetizers to cultural ecological cost-benefit comparisons between cattle, pigs, horses, and dogs, the things and ways people eat have drawn anthropologists from backgrounds more various than dishes at a United Nation potluck. And why not? As Kandel, Pelto, and Jerome once said: "Food, by virtue of its pivotal place in human experience, is, at once, a bundle of energy and nutrients within the biological sphere, a commodity within the economic sphere, and a symbol within the social and religious spheres" (1980:1). This passage points to the three key ways that anthropologists have dealt with food: 1) as symbols, signaling or reinforcing group or ethnic identity (usually the domain of symbolic anthropology—e.g. Douglas et al. 1984; Sahlin 1976); 2) as biological necessities or energy sources (usually the domain of cultural ecology or cultural materialism—e.g. Ross 1980); and 3) as commodities or consumer goods (usually the domain of political economy or economic anthropology—e.g. Mintz 1986).

In the U.S., fish and seafood consumption derives sustenance from common mythical and symbolic references, such as oyster aphrodisiacs or Christ's feeding of the five thousand, from common biological/nutritional issues, such as the recent type over omega-3 fatty acids and heart disease, and from common political economic phenomena, such as the prestige value of lobster or differential rates of consumption based on seafood prices and supplies. A study attempting to determine how American consumers learn about seafoods and incorporate new seafoods into their diets thus encounters cultural noise from all sides. Why has per capita fish consumption jumped from around 12 to between 15 and 17 pounds in the past ten years? Why have different ethnic groups, regions, and rural and urban areas incorporated fish into their diets at variable rates? Is fish emerging as a symbol of a healthy diet? Have increased fish imports and more efficient distribution networks led to price reductions? Are people eating more fish as a high quality, low-fat protein, consciously and unconsciously responding to the stresses of post-industrial life? Or have the Japanese been flooding the market

with advertising and new products in a calculated attempt to stimulate domestic research and investment that they will eventually steal, use to kill the competition, buy up their capital, and monopolize the market? As the perspectives underlying these questions suggest, an understanding of U.S. seafood and fish consumption requires recognizing that symbolic, ecological, and political economic phenomena influence how much, how often, and in what social contexts we consume various species of fish.

Addressing Problems Posed by Trends in U.S. Seafood Consumption

While the past ten years have witnessed record increases in per capita consumption of fish and seafood, this consumption has been anything but uniform. Unevenly distributed over regions, ethnic groups, rural and urban areas, and species of fish and shellfish, its varied character has caused problems for U.S. seafood industry personnel from the harvesting and processing sectors to the wholesale and retail outlets, as well as for end consumers of seafood products and recreational fishermen. First, consumption is so concentrated that ten species of fish and shellfish account for over 70% of all consumption. Two years ago 60% of all fish and seafood consumed in the U.S. was imported; today 65% is imported and observers predict that in another two or three years 70% of all seafood will be imported. Such concentrated consumption of imported fish and seafood underlies seafood trade deficits, threatens fish stocks, generates conflict between recreational and commercial fishermen, and stimulates national and international political response such as the Magnusen Act of 1976, Fishery Management Plans that allocate stocks, season and bed closures, and limited entry programs.

Responding to regional discrepancies in seafood consumption, to seafood trade deficits, to the unequal distribution of pressure on marine resources, and to the gaps in research just described, we developed a series of research projects to understand the seafood consumption process. One research agenda was aimed at the recreational fishing community and a second targets intermediate and end consumers in an attempt to determine the optimal ways of introducing new seafood products, particularly those that use latent or underutilized marine resources. The essence of these studies has been to understand the social formation of the market for fish, seafood, and seafood products, particularly from the perspective of consumer demand. Thus we are interested in how people learn about new seafoods, and how the various learning processes influence consumers' perceptions toward seafood products and actual use.

The complex, vague, and nebulous nature of learning forces us to draw on many sources and kinds of data to piece together something we call "the learning process." Among the sources we utilized were ethnographic studies or regional foodways in the U.S. and a series of informal, open-ended interviews with what Mary Douglas (1984) calls "key kitchen persons," restaurant and supermarket chain executives, and recreational fishermen. From these interviews we designed three questionnaires, one administered to 350 key kitchen persons randomly selected throughout the southeast, a second administered to 100 randomly selected restaurant, supermarket, and seafood market managers, and a third consisting of fill-in-the-blank questions (belief frames) that asked recreational fishermen to complete sentences with appropriate species of fish (e.g. "You can cook _____ any number of ways"). We also administered "pile-sort tasks" to recreational fishermen and key kitchen persons, having the recreational fishermen sort pictures of fish into piles based on

how they perceived them to be similar and having the key kitchen persons sort photographs of meats and fish. While a complete discussion of the findings is forthcoming, here we present a summary of our analysis, to show how we are piecing together the learning process. The complexity of the problem presents us with a unique opportunity to combine comparative, ethnoscientific, and cultural or symbolic analyses.

Aspects of the Learning Process: Comparing Seafood Consumers by Residence

From national statistical sources we know that people living inland consume less seafood than people living near the coast, and that rural dwellers consume less seafood than urban dwellers. Nevertheless, anthropology sensitizes us to the fact that mere distance from a food's point of production cannot, by itself, explain frequency of consumption, nor can population density or social complexity. Other features of social and cultural landscapes commonly intervene in regional foodways, changing, revising, or elaborating consumption patterns that are related to a food's visibility or availability. Comparing consumers by residence confirms this: a rank ordering reveals that seafood consumption is higher in coastal *rural* areas (67.1 days/year), second highest in *inland* urban areas (62.9), third highest in coastal urban areas (60.8), and lowest in inland rural areas (43.5) (ANOVA F -ratio=3.057; p =.028). While rural dwellers seem most influenced by proximity to sources of seafood, urban dwellers consume seafood with more or less the same frequency, regardless of how near or far away they live from the coast. Certainly this reflects the extent to which urban dwellers, as compared to rural dwellers, are dependent on outside markets for their food; rural dwellers, on the other hand, are often directly tied to local food production (e.g. Whitehead 1984). Thus we would expect coastal rural dwellers to have ready access, through direct or indirect ties with fishermen, to seafood, while in inland rural areas these same sorts of ties would be with beef, pork, and poultry producers.

While these comparisons imply that distance from the coast and social complexity combine to influence seafood consumption, they tell us nothing about changes in consumption, or the reasons for changing consumer behaviors, and thus offer little information about the process of learning and nutritional change. To investigate changes in consumption, we asked respondents to describe differences in meat and fish consumption between childhood and today.

Comparisons between regions again testified to the fact that proximity to the supply of commodities affects their consumption in rural areas; we documented, for example, an increase in beef consumption in inland rural areas compared to the highest increase in fresh fish consumption in coastal rural areas. At the same time, beef consumption in all other areas decreased, suggesting that urban dwellers and rural coastal dwellers, with access to fresh fish, substituted fresh fish for beef and pork, even though rural coastal dwellers may live in beef and pork producing areas. Rural inland dwellers, on the other hand, actually increased their beef consumption between now and childhood, reported no change in fresh fish consumption, and increased their consumption of canned fish. Interestingly, too, both rural coastal and rural inland dwellers showed the largest increases in chicken consumption and the largest decreases in pork consumption, suggesting that they have been substituting chicken for pork in their diets. As mundane as these findings may seem, they carry profound implications regarding different nutritional opportunities

and decisions and suggest that fundamental differences may exist among coastal, inland, rural, and urban areas in terms of factors accounting for changes in eating habits.

Particularly interesting in this regard are the responses concerning the reasons for changes in eating behaviors. Most evident here is the influence of "family/household" reason (e.g., marriage) in the countryside as opposed to the city, where "individual" (e.g. more money) and "cultural" (e.g. friends, region) reasons seem to prevail. Most urban dwellers gave health and nutrition (here classed as an "individual" reason) as the primary reason for switching to leaner meats and seafoods, while a greater proportion of rural dwellers seemed somewhat more influenced—in their own minds—by marriage or some other change in their living arrangement. Interpreting these responses, we must keep in mind the ethnic nature of these data: they reflect respondents' beliefs about their eating behaviors and not necessarily actual behaviors. Thus, although urban dwellers may be as influenced by family or household situations as by health and nutrition, they perceive the latter to be a heavier influence on their lives. Their relatively low estimation of family and household influences may suggest that menu negotiations within the urban household may be a subtler process than within the rural household, where marriage, the birth of children, and other changes in living arrangements are perceived to more heavily influence the complexion of the household's fare. Further, urban respondents' emphasis on extrafamilial influences such as a friend's eating habits or a move from one region of the country to another reflects the primacy of jobs and other social activities outside the home, along with the high value placed on perceived individual freedom, in the culture of late capitalism. Thus urban individuals are not willing to admit the influence of family over reasons which, to them, are their own choosing or, phrased negatively, their own fault. This merely reinforces the idea that family life is more important, on a day to day basis, in the country than in the city, where integration into wider social networks may be perceived to be a greater influence on all behaviors.

These observations receive both reinforcement and revision from a second group of questions concerning perceived reasons for changes in eating behaviors. After asking respondents which seafood products they consumed more, less, or the same between now and five years ago, we asked them what accounted for the change. These responses revealed uniformity among all consumers, regardless of reason, in the *primary* reasons for adopting or rejecting seafood, but regional differences emerged in the secondary reasons and in the contrasts between reasons for rejection and reasons for adoption. Respondents in all regions gave "health and nutrition" as the main reason for eating more of a specific seafood, and all gave personal reasons ("bad taste," "difficult to prepare," "just didn't like it," etc.) for rejecting a specific seafood.

Other reasons cited for eating more seafood included ease of preparation, having more money, and developing a taste for seafood; other reasons cited for eating less seafood included cost, a bad experience with the taste of a seafood, and personal choice.

Finally, comparing the four groups by all the reasons for changing food consumption habits further testifies to the uniqueness of inland rural consumers. Compared to the other three groups, inland rural consumers are more likely to cite ease of preparation as a reason for eating more seafood and more likely to cite difficulty of preparation as a reason for eating less seafood. Further testimony to their unique position relative to the other three groups comes from the time of like they learned to cook. In general, rural dwellers learned to cook slightly earlier

than urban dwellers, but inland rural learned at the youngest age of all four groups. Around ninety percent of the entire total sample learned to cook between the ages of 9 and 22.

No differences between regions were uncovered concerning the major social influences on their learning, however: in all four regions the three major circumstances of their learning to cook were 1) learning from mother, 2) experimenting; and 3) having to learn upon marriage.

The above discussion gives an indication of how we are piecing together that nebulous process we call "learning." Although preliminary, these findings point to phases in the learning process and variable influences upon that process during each phase. First, regardless of region, most respondents developed their initial experiences with food while learning to cook, between the ages of 9 and 22, under the tutelage of their mothers. Yet the eating habits they developed and refined during this period underwent a change upon leaving the natal home, suggesting that the transition from household of orientation to household of procreation ushers in a new period of consumption and experimentation with food. There is some indication, however, that over time these eating habits and ideas become less likely to change: comparing households in terms of consumption of shrimp between now and five years ago, we found that those who reported that their consumption was the same were significantly older than those who reported eating more or less shrimp. It thus seems likely that it is during the transitional period from one's natal to one's own household, during most individuals' twenties, that the learning process comes under regional, national, social network, and cultural influences, altering cooking styles, menu formats, and specific food items. While in each region these influences are somewhat different, suggesting different strategies for introducing new seafood products to consumers, other features of seafood consumption remain uniform across regions. Seafood's image as a healthy and nutritious food, obviously, underlies its adoption in a majority of context, yet our data suggest that the specific ways to educate consumers about seafood as a *health food* would benefit by a knowledge of differences between coastal rural, inland urban, coastal urban, and inland rural populations. Such educational efforts would be enhanced, as well, by a knowledge of consumer perceptions of fish and seafood set within a larger body of anthropological knowledge about food.

Perceptions of Seafood: Symbolic and Ethnoscience Analyses

Every time we eat fish we run the risk of conjuring up the sacred and the sexual, the pure and impure, where Jesus competes with Disney's Daryl Hannah for a share of our cultural attention. The sexual connotations derive from myths such as the power of oysters to promote virility, the long association in American literature between water and sexuality, the phallic characteristics of fish, and the exotic diets of tropical island paradises from the Bahamas to Tahiti.

The sacred quality of fish is even more entrenched in Western culture than its sexual connotations. In a recent study of Italian Americans, for example, Goode et al. found that a meal including fish is associated with symbolic fasting once mandated by the Catholic church:

"The week's end is marked by a 'fasting' or 'fish' meal...a Friday night meal which symbolically reiterates the church's former ban on meat. It is a 'fasting' night. In many cases, this avoidance pattern is only partially adhered to. In some

cases, meat is served but fish is also present.... During lent more rigid restrictions are enforced concerning 'fast' days" (Good et al. 1984:75-6).

The Christian distinction between meat and fish enhances a third, important symbolic quality we associate with fish, one which our analysis above has shown to be crucial to seafood adoption: fish as a cornerstone of a healthy ("meatless") diet.

This healthy and sacred quality influences our expectations about how a fish ought to taste; similar to many health foods, particularly those low in sodium, fish is perceived to be "good" if it is bland or tasteless. Fish that tastes "strong," in a negative sense connoting "rotten," is similar to fish that tastes "fishy." In short, most people don't want fish to taste like fish.

In support of these we turn to our research on recreational fishermen, whom we consider, in the present context, experts on seafood from their experience as hunters, handlers, and consumers of products from the sea. Based on the similarity data we elicited from them, they seem to group "good fish" (trout, flounder, grouper, snapper, etc.) with characteristics that connote blandness and tastelessness, such as "white, flaky meat," "mild taste," and "tender." More interestingly, however, is the finding that bland tasting fish also connote other things about a fish that are "good." Foremost among these is the ease with which one can deal with these bland species. That is, other attributes associated with mild tasting meat include "ease of preparation" and "can cook any way you like." These fish thus connote simplicity, which is itself a common theme in today's promotions of supposedly healthy foods. These observations are important in pointing to a strong connection, in fishermen's minds, between ease of preparation, versatility, simplicity, and the bland, white, mild-tasting fish currently so highly demanded by recreational fishermen and end consumers alike.

How do these observations correspond to similar observations among end consumers? From pile-sort tasks administered to a small sample of "key kitchen persons" we examined how these individuals perceived fish in relation to other meat products. Respondents differentiated seafood from other meats is a combination of packaging and something we might call "nonseafood." Interestingly, seafood products are perceived to be more similar to one another than beef products are similar to other beef products, than pork products are similar to other pork products, or than chicken products are similar to other chicken products. It is likely that this reflects consumer knowledge about the various sausages and prepared versions of chicken, pork, and beef, as opposed to a lack of finer knowledge about various forms of seafood. Although consumers did differentiate between canned seafoods and other seafood products, we found that their perceptions of meats and fish were split roughly in half between seafoods and nonseafoods. Nevertheless, two seafood prepared entrees in the stimuli were perceived to be more similar to other, nonseafood prepared entrees than were other seafoods.

Examining seafoods only in relation to one another again testified to the importance of packaging. The positions of these products testify to the influence of packaging over the ways people classify meats and seafoods they find in the store, reflecting the twin American concerns with the degree to which a food is processed (usually seen as a negative quality) and the degree to which a food is easy or ready to prepare (usually seen as a positive quality). These two attributes, in some contexts, contradict one another: on the one hand, while most of our respondents expressed positive reactions toward prepared, single-meal entrees, they

viewed highly processed foods (including fish) in a more negative light. Yet food processing itself is largely geared toward making food easier to prepare.

How to manage this contradiction, to work with it in an educational program, is suggested by the relationship between two imitation crab products among the stimuli. One, a boxed product, was seen to be more similar to fish products perceived to be highly processed: fish sticks, fried flounder filets, etc. The imitation crab product in the store package, on the other hand, was viewed somewhat more positively, falling nearer to the highly desired seafood products, such as the store packaged flounder and shrimp. Imitation crab packaged in this way seems to combine attributes pleasing to American consumers, falling between the "natural," unprocessed seafood products and the easy, ready-to-heat and eat entrees.

Conclusion

This study, as with many applied anthropological studies, shows the particular need for developing middle range theory that is capable of brokering the insights of grand theoretical schemes and of organizing and interpreting the often mundane and trivial actions and ideas of daily life. For example, support Ross (1980) and other cultural materialists are correct to argue that our foodways are responses to changes in technology and infrastructural developments or the working out of ecologically and economically sound processes, what room do such observations leave for developing educational programs to get end consumers to eat species that are not overfished and threatened with extinction? Or, if Sahlins (1976) is correct in saying that our "food system...composes a sustained metaphor on cannibalism," that "Edibility is inversely related to humanity," and that "It is this symbolic logic that organizes demand," would he have educators and Marine Advisory personnel giving lectures on how fish are not like people? While grand theoretical discussions may be stimulating and intriguing as intellectual exercises, in applying anthropology to contemporary problems polemics tend to follow the route of ideas Elizabeth Bishop (1986) once so eloquently observed at the confluence of the Tapaj'os and Amazon Rivers:

"I like the place; I like the idea of the place. Two rivers. Hadn't two rivers sprung from the Garden of Eden? No, that was four and they'd diverged. Here only two and coming together. Even if one were tempted to literary interpretations such as: life/death, right/wrong, male/female—such notions would have resolved, dissolved, straight off in that watery, dazzling dialectic."

Instead of extreme stances, the theories we develop to address questions of culture and nutrition, of regional foodways, or, more specifically, of seafood consumption, must mediate among the three aspects of food that introduced this paper: food as an energy source, food as a commodity, and food as a symbol. We have attempted, in this study, to initiate this task.

Acknowledgments:

The research underlying this research was funded by the National Marine Fisheries Service Saltonstall-Kennedy Program (Grant# NA 88 WC-H-06067), the Gulf and South Atlantic Fisheries Development Foundation (Grant# 33-08-25000/6748/NA86-wg-H-0615) and the University of North Carolina Sea Grant College Program (Grant# NA86AA-D-SG046). The authors wish to thank, primarily, the many respondents who participated in the study. Thanks also to Claudia Williams, Ed Frankfort, and Dena Plemmons for collecting much of the data. As always, the authors are responsible for any errors this paper may contain.

References

- Bishop, Elizabeth. 1966. *The Complete Poems: 1927-1977*. New York: Sunburst Books.
- Douglas, Mary, ed. 1984. *Food in the Social Order: A Study of Food Use in Three American Communities*. N.Y.: Russell Sage.
- Goode, Judith, Karen Curtis and Janet Theophano. 1984a. "Meal Formats, Meal Cycles, and Menu Negotiation in the Maintenance of an Italian-American Community" in (Douglas, ed.) (*ibid.*) 143-218.
- Kandel, R.F., G. Pelto and N. Jerome. 1980. *Introduction to Nutritional Anthropology: Contemporary Approaches to Diet and Culture*. Peasantville, N.Y.: Redgrave Publishing. 1-12.
- Mintz, Sidney. 1986. *Sweetness and Power*. New York: Viking.
- Ross, Eric. 1985. *Beyond the Myths of Culture: Essays in Cultural Materialism*. New York: Academic Press.
- Sahlins, Marshall. 1976. *Culture and Practical Reason*. Chicago: Aldine.

CONFERENCE PARTICIPANTS

- James Absher, Department of Recreation and Leisure Studies, Peabody Hall, The University of Georgia, Athens, GA 30602.
- Conner Bailey, Alabama Agricultural Experimental Station, Auburn University, Auburn, AL 36849.
- John R. Bort, Department of Sociology and Anthropology, East Carolina University, Greenville, NC 27834.
- James Broadus, Marine Policy Center, Woods Hole Oceanographic Institute, Woods Hole, MA 02543.
- Carolyn Creed, Department of Anthropology, Rutgers University, P.O. Box 231, New Brunswick, NJ 08903.
- John T. Deiner, Political Science Department, University of Delaware, Newark, DE 19716.
- Shirley Fiske, National Sea Grant Office, R/SEI, 6010 Executive Bldg. Rockville, Maryland 20852.
- Peter H. Fricke, Office of Fisheries Management, NOAA/NMFS Washington, DC 20235.
- Nina Garfield, Department of Sociology and Anthropology, University of Rhode Island, 2057 Post Road, Matunuck, RI 02879.
- John B. Gatewood, Department of Social Relations, Lehigh University, Price Hall, No. 40, Bethlehem, PA 18015
- Duane A. Gill, Social Science Research Center and Department of Sociology and Anthropology, P.O. Box 5287, Mississippi State University, Mississippi State, MS 39762.
- Roberta M. Hammond, Department of Community Affairs, 33 9th St., Apalachicola, FL 32320.
- Steven A. Henning, Department of Agricultural Economics and Agribusiness, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, Baton Rouge, LA 70803.
- Marcus Hepburn, Senate Committee on Commerce, Washington, D.C.
- Svenin Jentoft, Institute of Fisheries, University of Tromso, N-9000 Tromso, Norway.
- Jeffrey Johnson, Institute for Coastal and Marine Resources, East Carolina University.
- Linda Lampl, T.A. Herbert & Associates, P.O. Box 10129, Tallahassee, FL 32302.
- Michael Liffman, Center for Wetland Resources, Louisiana State University, Baton Rouge, LA 70803.
- E. Jane Luzar, Department of Agricultural Economics and Agribusiness, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, Baton Rouge, LA 70803.
- John Maiolo, Department of Sociology and Anthropology, East Carolina University, Greenville, NC 27834.
- Bonnie J. McCay, Department of Human Ecology, Cook College Rutgers University, P.O. Box 231, New Brunswick, NJ 08903.
- Sarah Keene Meltzoff, Marine Affairs, Rosenstiel School of Marine and Atmospheric Science, University of Miami, 4600 Rickenbacker Cswy, Miami, FL 33149.
- James M. Nance, Galveston Lab, National Marine Fisheries Service, 4700 Avenue U, Galveston, TX 77550.
- Michael K. Orbach, Department of Sociology and Anthropology, East Carolina University, Greenville, NC 27834.
- M. Margaret Overbey, Department of Anthropology, 1350 Turlington Hall, University of Florida, Gainesville, FL 32611.
- Gisli Pálsson, Faculty of Social Science, University of Iceland.
- J. Anthony Paredes, Department of Anthropology, Florida State University, Tallahassee, FL 32306.
- A. Lewis Rhodes, Department of Sociology, Florida State University, Tallahassee, FL 32306.
- James Sabella, Department of Sociology and Anthropology, University of North Carolina - Wilmington, NC 28403.
- Peter Sinclair, Department of Sociology, Memorial University of Newfoundland, St. John's, Newfoundland, Canada, A1C 5S7.
- Dennis Soden, Coastal Zone Management Studies, University of West Florida, Pensacola, FL 32514.
- David R. M. White, Environmental Affairs Division, System Planning and Research Department, Southern California Edison Company, P.O. Box 800, Rosemead, CA 91770.

