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**THE DEVELOPMENT OF TERRITORIALITY: THE CASE OF THE MAINE  
LOBSTER INDUSTRY**

by

**James M. Acheson**

Department of Anthropology and School of Marine Sciences, University of Maine

and

**Roy J. Gardner**

Departments of Economics and West European Studies

and

Workshop in Political Theory and Policy Analysis, Indiana University

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# **THE DEVELOPMENT OF TERRITORIALITY: THE CASE OF THE MAINE LOBSTER INDUSTRY**

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## **ABSTRACT**

Although territoriality of one kind or another exists in every society, the way territorial systems come into being and develop over time needs more attention. This paper describes the development of the informal territorial system in the Maine lobster industry over the last century. In the lobster fishery, territories result when groups of fishermen find it worthwhile to occupy an area and forcibly exclude competitors from other harbors. A very large number of variables affect this cost/benefit analysis including concentration of lobsters, law enforcement, travel costs, technical changes and the ability to organize group for offense and defense. We model these variables using non-cooperative game theory, and show that as these variables change, the Nash equilibrium played by lobster fishermen has evolved over the past century, resulting in three different stages of territoriality. We specify the circumstances under which these territorial arrangements arose. The implications of this study for understanding territoriality in general are explored.

Authors' contact information:

James M. Acheson  
Department of Anthropology  
University of Maine  
5773 South Stevens Hall  
Orono, ME 04469-5773  
email: acheson@maine.edu  
fax: 207-581-1823

Roy J. Gardner  
Department of Economics  
Indiana University  
Wylie Hall  
Bloomington, IN 47405  
email: gardner@indiana.edu  
fax: 812-855-3736

# **THE DEVELOPMENT OF TERRITORIALITY: THE CASE OF THE MAINE LOBSTER INDUSTRY**

by James M. Acheson and Roy Gardner

Although territoriality is found in virtually every society, social scientists have done surprisingly little research on the origins of territoriality or the ways that territorial rights change over time. This article studies the informal territorial system of the Maine lobster industry and describes its origin and development over the past century. We use non-cooperative game theory to model this evolution. Over the course of the past century, the local-scale territorial system has undergone a great deal of change, and may very well be on its way to extinction. In this article, we analyze the three stages that the territorial system has gone through, using the Nash equilibria of models of the fishery as our theoretical framework. We argue that territoriality results from competition between groups of lobster fishermen for fishing areas. Territories result when a group of lobster fishermen to claim an area and are successful in defending it against incursions by others. The three sequential stages are the result of changes in strategic decisions to invade or defend territorial lines, which in turn, are due changes in a number of factors including adoption of better technology, ecological changes, and increased law enforcement—all captured by crucial parameters in our model. Our goal is not only to make a contribution to our understanding of a very basic cross cultural phenomenon but also to demonstrate a technique that can be fruitfully applied in understanding territorial changes in general.

We first describe general features of the lobster industry and the local-scale territorial system. Then, we describe the three stages the local-scale territorial system has gone through and the factors

responsible for those stage changes, as represented by the games involved. Last, we discuss the implications of this study for understanding the origins of territoriality in general.

## ANTHROPOLOGICAL WORK ON TERRITORIALITY

Social scientists interested in the “new institutionalism” and rational choice theory have made great strides in understanding the conditions under which a large number of institutions have evolved (Crawford and Ostrom 1995). Boundaries and territorial rules, they recognize, are necessary if rules to manage natural resources are to develop (e.g., Ostrom 1990, 2000). However, boundaries and territories themselves are treated as a given, not phenomena that need to be explained in and of themselves. In this essay, we will explore how territories are established and how they change.

The anthropological literature on territoriality is not large. (NOTE 1) However, over the past forty years some very high quality work has been done. Today most anthropologists would agree with Cashdan, quoting MacMillan, that territoriality is “the maintenance of an area ‘within which the resident controls or restricts use of one or more environmental resources’ ” (1983:47). Behind this definition lies a number of themes and commitments. First, territories are established and changed by people motivated by a cost-benefit analysis to exclude others from an area. It is costly to defend territorial lines, but there are benefits to be had by excluding others. Territories are established when the benefits of claiming an area and defending it against intruders are higher than the costs (Cashdan 1983; Demsetz 1967; Dyson-Hudson and Smith 1978:24).

A second theme is that the primary benefit of establishing territories is to control access to scarce resources (Burke 2001; Cashdan 1983:47; Dyson Hudson and Smith 1978:22-24). Territories are not established when resources per capita are so large that anyone can have all they want (Netting 1996:222-

23). Since the benefits of controlling resources depends on the amount of resources and one's ability to gain access to them, territories are likely to come into being when resources are "dense and predictable" (Dyson-Hudson and Smith 1978:25-26). How predictable stocks of resources are depends on a number of factors, including mobility of the resource and the costs of obtaining information (Begossi 2001; Palsson 1998).

Third, a number of anthropologists see competition for scarce resources as the underlying cause of territoriality (Netting 1996:222). Territorial rules and institutions come into being in the aftermath of conflict over control of resources (Polunin 1984). Territories are sets of rules designed to reserve resources for members of particular groups. (NOTE 2)

Fourth, territories will not be established and maintained unless the group claiming that area is able to organize itself to defend its territorial claims (Aswani 2002). Cashdan (1996:1,304) points out that "anthropologists have given little attention to the internal dynamics of jointly defending a territory, but such a situation poses a potential collective action problem that deserves mention." (NOTE 3)

Last, technology is linked in important ways to the generation of territories. Whether territories develop or not depends on how resources are exploited (Netting 1996). Eggertsson (1993:110) and Begossi (2001), among others, have recognized that shifts in technology can affect territorial claims by changing the competition for resources, making possible the exploitation of new resources, or by making it possible to exploit existing resources in new places or at different costs.

While these themes show up repeatedly in articles and books concerning territoriality, different authors use them in different ways in explaining the origin or change in territoriality (see Cashdan 1996). It is our contention that not only are the factors identified by all these authors involved in generating

territoriality in the Maine lobster industry, but other factors are as well, which have not been considered by anthropologists. Moreover, we argue that the variables involved interact in a complex way so that changes in the relative importance of variables can result in different territorial patterns in the same fishery over time.

## GAME THEORY

In this article, we argue that territoriality comes into existence when groups of fishermen are motivated to claim certain areas and defend them against the incursions of outsiders. We use some concepts from game theory to model our discussion of strategic behavior on the part of Maine lobstermen.

Game theory assumes that humans are rational and will make decisions to maximize rewards. The solution to the game is the result of two or more players making such decisions.

In game theory, it is assumed that there are: (1) a number of players; (2) these players are faced with different strategies; (3) these strategies have different payoffs. Our analysis of the lobster industry assumes that there are only two players (player 1 and player 2) each of whom has two strategies. Each of these strategies brings each player a payoff which is determined by the costs and benefits of a number of variables. In our analysis, the payoffs are determined by the combined value of variables such as numbers of traps, numbers of fishermen, costs of monitoring traps and cutting them, and trap congestion. It is important to note that number of traps, numbers of fishermen, the costs of monitoring traps and cutting them, and transportation costs can all be estimated. In game theory, the numerical value of these variables is not so important. What is critical is that they combine in ways as to make one payoff higher than another.

The size of the rewards or payoffs each player receives will depend not only on their own decisions, but on those of others in the game. This makes the game very complicated, since the solution will be determined by the choices of both players simultaneously. The results can be in the interests of one or both parties; in other cases, they can be detrimental to both. To demonstrate, let us consider the following game matrix concerning the decision by two players to cooperate or not (Figure 1).

(FIGURE 1 goes here)

Each cell in the matrix has two numbers indicating payoffs. The first number in each cell is the payoff of player 1; the second of player 2. Regardless of what player 2 does, it is in the best interest of player 1 not to cooperate. If player 2 cooperates and player 1 cooperates, player 1 has a payoff of 4; but he gets 5 if he does not cooperate. Clearly it pays not to cooperate. If player 2 does not cooperate, it still pays player 1 not to cooperate since a decision to cooperate gives a payoff of 0, while a decision not to cooperate gives a payoff of 1. Player 2 goes through the same analysis, with the result that he or she, too, chooses not to cooperate regardless of what player 1 does. (Player 1 decisions are indicated by arrows marked with a \*1.; choices of players 2 are marked by an arrow \*2.) There is only one outcome toward which the arrows for both players point to simultaneously. This is the outcome where each player chooses not to cooperate. This outcome has a special property—namely each player has maximized his payoff, given what the other player does. Any pair of strategies that maximizes the payoffs of both players given what the other player does is called Nash Equilibrium, which is a solution to the game. (For a simple explanation of game theory, see Gardner 2003: Chapter 3).

In this article, we will not give the equations that were used to calculate the payoffs in the game matrices. Rather, we will give the game matrix that describes the case, discuss the variables that

influenced the payoffs, discuss the strategic choices of players, and then analyze the effect of these strategies on territorial arrangements. Those interested in the complexities of the mathematics are advised to read (Acheson and Gardner. In press).

In this game it should be noted, that the ultimate result is not one that either player would desire. Both have acted to maximize their own payoffs; but the result is the smallest payoff for both in the matrix. (Those familiar with game theory will recognize the Prisoner's Dilemma.).

As with all rational choice theories, game theory is subject to critique on a number of grounds, a critique most forcefully made by Green and Shapiro (1996). Indeed, there are strategic situations—such as voter turnout—where existing game theory is not very compelling as a formal model or as a predictive theory. However, in the contexts we are considering—monitoring and sanctioning in defense of a valuable commons, and transportation cost as a barrier to entry—game theory models are well-established and have been shown to be compelling both as formal models and as predictive theories (for instance, see Ostrom, Gardner, and Walker 1994).

#### THE MAINE LOBSTER INDUSTRY: GENERAL INFORMATION

Throughout its history, the Maine lobster industry has been an inshore trap fishery. In 2001, the typical full-time lobster fisherman had a boat about 35 feet long equipped with a diesel or gas engine, which he operated alone or with a single helper. In 1998, fishermen used an average of 550 traps made of wood or wire and baited with fish remnants (Acheson and Acheson 1998). Each trap is equipped with funnel-shaped nylon “heads,” which make it easy for lobsters to climb in the trap, but difficult to find their way out. The traps are connected by a warp line to a buoy made of wood or Styrofoam. The buoys are painted with a distinctive combination of colors registered with the state (Acheson 1988:84-90). Each

day, fishermen sell their catch to one of the eighty private dealerships or seventeen cooperatives located along the coast (Acheson 1988:115-32).

At present lobster populations are very large, and are in inshore waters. As a result, the Maine lobster fishery is one of the world's most successful. From 1947 on, catches have been very stable; since 1988, they have been at record high levels. While there is no agreement on the cause of these high catches, one factor is the conservation laws that are strongly supported by the industry (Acheson 2003).

Lobster behavior is quite predictable. Lobsters are relatively sedentary. Studies by biologists indicate that seasonal, localized migratory movements are common along much of the coast of Maine. Lobster fishermen know about these migrations, and skilled fishermen are quite adept at finding concentrations of lobsters at any time of year.

The annual cycle of fishermen is affected by the biology of the lobster, the weather, and involvement in other fisheries. During the early summer, large numbers of lobsters have migrated in to shore where they crawl into the rocks and shed their shells. At this time, fishing is very poor, and catches fall greatly.

The late summer is a time of high fishing activity. The weather is good, and lobsters are more available, since a new year class has molted into legal size. At this time of year, the number of fishermen is at its annual high since the full time fishermen have been joined by hundreds of part-time fishermen in outboard powered boats.

The fall is the most productive time of year. Approximately two-thirds of the year's catch is taken between September and December.

Winter is the slowest time of year. Catches are low, as lobsters are not active in the cold water and are not inclined to climb into traps. The best fishing is three to ten miles from shore, where wind and wave action is so bad that fishermen often cannot pull their traps for days on end. At this time of year, many fishermen put their boats and traps on shore and spend their time building traps. Those who continue to fish find solace in the fact that lobster prices are at their annual peak and trap congestion is low.

The Maine lobster industry is characterized by three different territorial systems that exist at different scales and involve different rules and principles. At the local scale is a territorial system whose rules are enforced by the fishermen themselves, sometimes by illegal means. In this system, lobster-fishing rights are held jointly by a group of people fishing from a particular harbor, or “harbor gang” (Acheson 1988). Once one gains admission to a harbor gang, one is typically allowed to go fishing only in the territory of that gang. Interlopers may be sanctioned by verbal warnings; and if they persist their traps may be molested or destroyed. This is an informal territorial system in that its rules are the result of private agreements among fishermen themselves. No unit of government recognizes or enforces these territorial rules. (NOTE 4)

Another territorial system has been established at the state level. Within state waters, laws have been passed by the legislature to conserve the resource, with enforcement by officers of the Marine Patrol. Still a third territorial system has been established for federal waters outside the three-mile line. In this article, we will be concerned primarily with the local-scale informal system. Of secondary concern is the state system, which has had some influence on the local territorial system. Throughout the article, we use the term territorial system to refer to the local-scale system.

On the surface, the local territorial system and the state-level systems appear to be completely separate. In fact, they have evolved together, and each is part of the environment in which the other has developed. The local territorial system is an encapsulated system that exists within the confines of the formal state system (Bailey 1969). That is, it is a system within a system, one in which both public officials and lobster fishermen accommodate to each other.

The territorial system requires a certain amount of inconsistent behavior on the part of all involved. Fishermen are, generally, strongly supportive of the conservation laws of the formal system, and yet will resort to illegal activities in an effort to gain additional fishing space or hold the territory they already have. The Marine Patrol is sworn to uphold the law, but will overlook small infractions. However, when serious offenses occur (i.e., gunshots, physical fights, boats sunk), law enforcement almost always gets involved, and those found guilty in court are punished. The local territorial system in this respect reflects the dark side of an otherwise very successful and law-abiding industry.

## METHODOLOGY

The data on which this article is based were collected through key informant interviews, participant observation in harbors along the central Maine coast from Penobscot Bay to Casco Bay, and the administration of formal questionnaires. Fifty-six formal interviews were conducted with lobster fishermen by the primary author in the mid-1970s concerning territoriality. Another seventy-two formal interviews were done by the primary author and graduate student Jennifer Brewer from 1998 to 2002. During these interviews, informants were asked where they and people from other harbors fished at various times of year, and about territorial conflicts and changes in territories. They were asked to draw maps of the fishing areas with which they were personally familiar. In the spring of 2002, we also

gathered data on law enforcement by administering a questionnaire to all Marine Patrol officers with over 20 years experience.

It was far more difficult to obtain information about the local-scale territorial system in the distant past. All of the information on earlier practices came from fishermen who began fishing in the late 1920s or 1930s or who had older relatives who had told them about the system in existence in the early part of the twentieth century. Their accounts were buttressed by a few newspaper stories.

Like most social scientists, we are most comfortable when our findings are buttressed by qualitative and quantitative data from several sources. Unfortunately, sources of data on territoriality are very scarce. The Maine Department of Marine Resources (DMR) records the total number of traps in use for the state as a whole, but neither the DMR nor any other agency collects information on where those traps are placed, or how they are moved over the annual cycle. Periodically, news of trap-cutting incidents and conflict does get in the newspapers, but most such incidents do not. Only a few result in court cases. As a result, the descriptions of the territorial system came almost entirely from key informant interviews and direct observation of trap placement locations.

#### GENERAL FEATURES OF THE TRADITIONAL TERRITORIAL SYSTEM

Lobster-fishing territories are typically quite small and are fished by small groups. Most territories are under 100 square miles, and many are far smaller. These areas might be fished by as few as six or eight boats, and harbors containing over fifty boats are rare indeed.

*Lobster territories are essentially common pool resources. Any member of the harbor gang defending the area may place gear in most or all of the territory claimed by that group. However, in most harbor gangs, certain high prestige fishermen have usufructory rights to*

*desirable portions of the gang's territory; and in a few, such fishermen have almost exclusive rights to a portion of the gang's territory, a kind of sub-territory.*

The territorial boundaries near shore are delineated by features on shore, such as a cove or a ledge. Further offshore, boundaries are marked by reference to landmarks on shore or on islands. In recent decades, Loran C lines are sometimes used to define fishing locations and territories. (NOTE 5)

The delineation of boundaries varies considerably with distance from shore. Close to the harbor mouth, boundaries are known to the yard and strongly defended. In the middle of large bays, men from four or five harbors might fish together, which is sometimes called “mixed fishing.” If one goes ten miles from shore, there is no territoriality at all, and people have always been free to go where they want, providing they stay away from island areas, which defend territories of their own.

Lobster-fishing territories exist because people from a particular harbor have occupied an area over time and are able to prevent those from other harbors from placing traps there. Most of the time, there is remarkably little conflict concerning territorial claims, and most territories remain intact for decades. The rules concerning territoriality are well known, and most people are reluctant to violate them and deliberately cause trouble. Moreover, in most cases there is little incentive to invade the area of another harbor gang since fishermen make a practice of placing large numbers of traps in prime fishing spots and along the borders of their fishing grounds to make their area less attractive to potential invaders.

Whether boundaries remain stable or move is the result of a political process involving competition and conflict between groups of fishermen. Territories move when a group of fishermen—usually a small group from one harbor—successfully places traps in the area occupied by another harbor gang and are able to keep them there. In some cases the successful invasion is due to the

reluctance of those of the invaded area to defend their territorial claims; in other cases, they are overwhelmed by the invaders. Of course, not all attempts to invade the territory of others succeed. Some harbor gangs have successfully defended their territorial boundaries for decades.

The decision to invade the area of another gang is met with no certain response. Fishermen usually touch the gear of other fishermen only with reluctance, knowing that their own traps are vulnerable to retaliation. Moreover, cutting traps is illegal and can result in the loss of license and a heavy fine. When traps owned by people from another harbor appear in “their” territory, they may do nothing or warn the intruder by molesting his traps in some way. Still small-scale trap cutting can be done in comparative safety because it is notoriously difficult to successfully prosecute trap-cutting incidents. As a result, there is a strong temptation to cut the traps of invaders and small scale trap cutting in defense of territorial claims occurs regularly. Usually those who are missing traps usually do little but complain, and perhaps move some of the remaining traps to a safer location. However, sometimes victims of trap-cutting incidents will defend themselves in kind. Such conflicts can escalate, with the guilty and innocent alike blindly retaliating against each other in a series of trap-cutting incidents.

Boundary movement is rarely the result of actions by a single individual. A single person who attempts to move into an area occupied by a group or to defend a boundary against a group of invaders may lose so much gear that he is forced to retreat in defeat. A successful defense or invasion depends on the ability to organize an effective and coordinated team.

The decision to defend one’s own lines or invade the area of others depends on the costs and benefits involved. The benefits of maintaining a territory stem from the fact that it reduces competition for lobster fishing area by people from other harbor gangs. This reduces the time necessary to untangle gear,

and increases catches per trap hauled. The primary costs of defending a territory are the huge losses that are sustained if one is successfully prosecuted for cutting traps, the potential for losing some of one's own gear, and the psychic costs of being involved in conflict (not be discounted).

### DEVELOPMENT OF THE TERRITORIAL SYSTEM

The territorial system of the Maine lobster industry developed in three stages, as the decisions to defend or invade fishing areas changed in response to a complicated set of variables. Each stage corresponds to a different parameter configuration that can be described using Nash equilibria of non-cooperative games.

A number of variables need to be modeled to understand this evolution. The first is the economic profitability of fishing in a particular location, which in turn depends on the density of lobsters and transportation costs. Lobster concentrations vary considerably from one season to another. In the summer months lobsters are concentrated in shallow water near shore; as fall progresses, they move into deeper water. In the middle of the winter, they are best caught in the deep water miles from shore. In the spring they migrate shoreward again.

Cost of transportation increases with distance, since it takes more time and fuel to exploit distant grounds than nearby grounds. In addition, one can fish near shore in the warm months of year in a small inboard-powered boat or even in an outboard-powered boat. To fish in the late fall and winter in stormy waters far from shore is more expensive. This type of fishing requires a much larger boat, which currently can cost over \$250,000, and trap losses are higher as well.

Over the course of the twentieth century, costs of transportation have been reduced considerably due to the adoption of larger, better-equipped boats. In the early years of the century, lobster fishing was

done from rowing “peapods” or small boats equipped with small gas engines capable of going about four miles an hour. In the past 40 years, boats have become much larger and equipped with much larger engines. Now, the largest boats cruise at 20 miles an hour, and are equipped with radar and advanced navigational gear. Such boats make it easier to exploit more distant winter fishing grounds. They require much less time to reach distant grounds; they make it possible to carry a lot more traps per trip; and they are able to operate more safely in stormy weather.

The larger the concentration of lobsters, the more worthwhile it is to travel further to fish. But boat size and transportation costs set a maximum limit on the distances it is worth while to travel. No concentration of lobsters—regardless of size— could entice Maine lobster fishermen to go to the Flemish Cap, halfway to Europe.

The second factor is the competitiveness of traps. Traps are competitive when they are placed close enough so that the number of lobsters that enter one trap subtract from the number that go into other traps in the neighborhood. If traps are hundreds of yards apart, they are not likely to affect each other’s productivity very much. Traps are usually far more competitive in the late summer and early fall when fishermen are using all of their traps and have them located in a narrow band of shallow water near shore. The competition is further increased by the entry of large numbers of part-time fishermen using outboard-powered skiffs. The competitiveness of traps is far less in winter when the best fishing is in large expanses of deep water miles from shore, and the bad weather and long distances makes it impossible for people with small boats to remain in the fishery.

Two long term trends have affected trap competitiveness. The adoption of larger and better-equipped boats has allowed people to exploit wider expanses of ocean. This has tended to reduce trap

concentrations –at least in the fall and winter. However, the last 80 years has seen an astronomical increase in the number of traps, which has been spurred by the high profits to be earned in the fishery and a number of other factors (Acheson 2001). This has certainly increased trap competitiveness—especially in the summer months.

The third important factor is the costs of defensive and offensive action by fishermen. The cost of defense is affected strongly by the ability to monitor traps against incursions by people from other harbors. It is far easier to monitor one's traps against molestation by people from other harbors if the traps are placed in areas fished exclusively by one's own gang in areas close to shore. In such areas, a boat from another harbor is very conspicuous, and the actions of the crew can be observed from shore. Further offshore, it is much more difficult to defend traps against people from other gangs, since they can claim a "legitimate" right to be in the area, and only people on nearby boats can possibly observe each other's activities on another boat. Monitoring costs go up considerably in these offshore areas.

The costs of offense are largely determined by the chances of getting caught in the act of cutting traps. Offenders not only face the possibility of retaliation by the victim and the loss of reputation in the community. They also risk being prosecuted in court.

In the early years of the century, fishermen had few compunctions about defending their lobster territories "with the knife" if nothing else worked. Since the 1970s, people have become less willing to cut traps. The Marine Patrol has become ever more professionalized and effective in prosecuting violations of the laws, and being convicted of cutting traps can bring a loss of license for up to three years. This, of course, means sacrificing all income from the fishery for this period. The incidence of trap cutting has also been reduced by a change in the culture of coastal towns, where increased educational levels and more

contact has reduced the nasty rivalry that marked relations between towns. As a result, most, but not all, of the Marine Patrol officers interviewed say that the number of trap-cutting incidents has decreased.

(NOTE 6)

A major cost of offense and defense is the costs of organizing teams to invade or defend existing territorial boundaries. Unfortunately, we know very little about this process since the activities of such groups is kept very secret to avoid both prosecution by the Marine Patrol for trap molestation and retaliation by other fishermen. A few aspects of these teams are clear, however. Usually such teams are composed of a small group (i.e., three to eight people) whose forays are coordinated by one or two leaders. The major impediment to organizing such teams is to overcome a strong tendency to be a “free rider.” It is very tempting to let others do the dirty work of invading or defending boundaries while getting the benefits of their activities. Some of the young fishermen join such teams in the spirit of “hell-raising” as a means of seeking approval of their peers. But most cases of boundary defense are undertaken by fishermen who join such teams reluctantly, feeling they must do their share to maintain the group’s fishing space (Acheson 2003).

In many instances, competing harbor gangs show a differential ability to organize teams, with the result that boundaries in some cases have moved substantial distances over a period of years. Why do some groups show far more willingness and ability to organize than others? Our ethnographic data suggest two factors are involved. First, effective teams are likely to form when the benefits of defense or offense outweigh the costs of organization. An example is afforded by events taking place in the 1950s and 1960s when fishermen from harbors at the heads of bays were strongly motivated to invade

territories of the harbors at the mouths of those bays to gain access to waters that would allow them to go fishing all year. (This will be discussed further in our analysis of Stage II below.)

The second factor influencing team organization is the characteristics of the harbors gangs themselves. Some of the groups in island areas, have shown a marked ability to defend their territorial boundaries, which have not moved in decades. These islands are occupied by groups with all of the characteristics that rational choice theorists claim lead to cooperative efforts (Acheson 2003). That is, they are small, stable groups with a strong sense of community and a high degree of dependence on the lobster resource (Coleman 1990; North 1990:12; Ostrom 1990, 2000, 2001).

Over the course of the twentieth century the variables described above have changed to produce different defensive and offensive strategies. The result is a territorial system that has evolved through three different stages.

#### *Stage I: Late Nineteenth and Early Twentieth Centuries*

At this time, lobster fishing was done mainly from the late spring to early fall in shallow waters close to one's home harbor. Small territories developed to control access to shallow water areas close to shore. These territories were held for the exclusive use of small groups who lived in communities nearby and were defended with some vigor. Fishermen generally did not venture into the areas controlled by other groups of fishermen.

In the early decades of the twentieth century, those fishermen who were using more offshore grounds in the fall and early spring faced little competition. There was a much larger amount of bottom in deep waters, and few people using it. In great part, this pattern was connected to the technology in use. Lobster fishing was done from small, slow boats so that it was both costly and dangerous to travel to

distant fishing grounds where lobsters were most easily caught in the cold months of the year. Thus, no territories developed further offshore at this time.

It was economically worthwhile to defend the small inshore areas. Only shallow water is productive in the summer, but it can be very productive in the weeks just after a new year class of lobsters has shed into legal size. Because there is a very limited amount of such “shedder bottom,” and a good deal of trap congestion, one’s own catches will be decreased considerably if even one or two additional fishermen are allowed to fish in one of these small areas. Thus, successful defense of an area brought a substantial bonus. At the same time, the costs of defending such areas were not especially high. It was relatively easy to monitor traps near one’s home harbor, and the probabilities of being apprehended for trap cutting were relatively low because the Marine Patrol force was small, poorly trained, and poorly equipped.

We depicted the fishery at this stage by using a simple two harbor model and assumed that these harbor gangs are the same size, all men use the same number of traps, and that transportation costs are high due to poor technology. Our modeling exercise showed that under the conditions in existence in Stage I, there is no sense for the men from one harbor to invade the area of another if they are far apart because distance alone makes it unprofitable to invade areas far from home. For harbors which are close, a defense is necessary and highly profitable, primarily because the costs of cutting traps are outweighed by the gain from reducing the number of fishermen in one’s area. In the latter case, the payoffs are those from the decision to defend an area or not. Player 1 has a choice of staying at his home harbor A or invading the territory of harbor B. Player 2 can either defend his area or not. Given the circumstances under which the game is being played, it pays player 2 to defend his area.

The payoff matrix of the latter game is as follows:

(Figure 2 goes here)(NOTE 7)

As a result, under the conditions predicated for Stage I, small exclusive harbors are the rule.

*Stage II: 1930s to 1960s*

During this period, as we have described, the adoption of larger, faster boats, and other new technology made it possible to fish further from shore, with many more traps. This altered the annual round substantially. Fishermen concentrated traps in inshore territories in the summer, where they had exclusive rights, and they fished in the middle of bays in the fall with men from other nearby harbors. These mixed fishing zones, however, were not open access. Only people from a few nearby harbors fished in such areas jointly; people from more distant harbors were not allowed to place traps there.

This pattern is the result of several different types of strategies which can be modeled as three different games. In modeling this situation, we depicted a bay with three different harbors on it: Harbor A at the head of the bay, and harbors B and C on opposite sides of the bay near open ocean.

One question is: why did not harbors B and C expand their exclusive fishing areas into the middle of the bay? Our modeling effort shows that if we assume that fishermen from these two harbors are fishing in the same mid-bay areas in force, have the same transportation costs and cost of monitoring traps, attempts by people from one harbor to exclude those from the other will result in a costly battle that the aggressors are uncertain to win. Sharing the area gives a higher payoff than fighting in an attempt to dislodge the other harbor gang.

This case can be modeled by assuming that there are two players who have an option to fish together peacefully or fight. As can be seen in Figure 3, both obtain a higher outcome by fishing rather than fighting in an attempt to dislodge the other.

(Figure 3 goes here)

Another question is how did harbors at the heads of bays (Harbor A or Player 1) gain access to areas near the mouth of the bay which used to belong exclusively to Harbor B (Player 2)? We know from historical evidence that men from Harbor at the heads of bays (Harbor A) were strongly motivated to gain access to deep water areas (Harbor B) since failure to do so would result in their being able to fish only in the summer. Under these conditions, our model shows that it was worthwhile for them to invade the areas once held by Harbors B. For the men of Harbors B, it was not worthwhile to defend these areas since they would not lose enough lobsters to the invaders to justify the costs of defense. In short, for the fishermen of Harbor A, the preferred strategy was “fight” (i.e., invade the area of B); for the men of B, the best payoff came as a result of “fishing” (not fighting to try to repel the men from A). In this case, the best results are obtained when Player 1 fights (i.e. invades) the area of player 2, who is not motivated to defend his area. (See Figure 4.)

(Figure 4 goes here)

Still another question is: why are people from harbors outside the bay repelled from fishing in the “mixed fishing zone”? The reason is that cutting the traps of such people is less likely to result in a major confrontation. There are apt to be few of these distant intruders, since the costs of transportation and trap monitoring will be high for them. This means they will likely lose in any confrontation. Thus, the highest payoff for the men of harbors in the bay (i.e. A, B and C) is to repel any distant interlopers; and it does

not pay the interlopers to fight back in an attempt to force their way into a distant mixed fishing area. Thus the middle of such bays remain a mixed fishing area rather than an area where people from all harbor are allowed to fish (i.e. open access).

(Figure 5 goes here)

As a result of all these different interactions, the area in the middle of bays is fished jointly (“mixed fishing”) by people from adjacent nearby harbors. No attempt to develop exclusive territories has occurred here, because any attempt to dislodge fishermen from adjacent harbors would result in a “Mexican standoff,” an expensive fight with no clear winner, or a Pyrrhic victory.

### *Stage III: 1970s to the Present*

The late 1970s and 1980s saw the beginning of two trends that have continued to the present. First, far more fishing takes place in offshore areas in the winter. Second, the amount of mixed fishing area inshore has increased.

Even though more boats are fishing in deep water offshore in the winter, it is not worthwhile to defend offshore territories. Fishing in the winter is still not superlative, even though the high ex-vessel prices make it worthwhile for some fishermen. There is really not much trap congestion since there is a large area to be exploited and few fishermen exploiting it. Thus, removing one or two other people from the area will likely not result in any substantial increases in one’s own catches. Moreover, establishing territorial rights can be achieved only by forcibly dislodging fishermen from other harbors; by the 1980s and 1990s, fewer fishermen were willing to assume the costs of territorial defense.

At the same time, there has been a gradual increase in the amount of area where mixed fishing is allowed and a retraction of the area held exclusively by harbor gangs for their own use. This has occurred because those invading the areas belonging to other harbor gangs are not sanctioned as heavily or as often as they once were. Fishermen are more reluctant to destroy the traps of those violating territorial lines, which has hampered traditional defense efforts.

Under these conditions our modeling efforts show it does not pay any group to try to establish territories in offshore waters, nor does it pay to try to maintain a large exclusive area around harbor mouths. The benefits to be had from excluding others are outweighed by costs of trap cutting, and the costs of organizing teams. In both cases, —Fighting Doesn't Pay—is the more likely strategy (i.e., a Nash equilibrium outcome).

The game matrix is as follows:

(Figure 6 goes here)

(Maps 1 and 2 about here)

It is important to note that all three territorial patterns that came into being in each of the three stages still exist today. The territorial rules established in one stage were not completely supplanted by the pattern established in the next stage. Around the mouths of harbors, small exclusive areas still exist, exploited only by members of the adjacent harbor gang. These are the vestigial remnants of the original exclusive areas established in Stage I. In the middle of bays are areas of mixed fishing that were established in Stage II. Offshore, there is no territoriality at all. What this means is that the same factors that gave rise to these different territorial patterns in the first place are still working to maintain them.

Comparing Maps 1 and 2 permits us to see all of the important changes that have taken place from Stage I to Stage III in the areas fished by New Harbor, Friendship, and Bremen, in the mid-coast region of Maine. The 1950s and 1960s saw the transition from the small exclusive areas of Stage I to the mixed fishing typical of stage II in Muscongus Bay.

This was the result of two different processes. In the late 1950s and early 1960s, fishermen from upriver communities such as Bremen, who had been skiff fishermen in the summer months, decided that they wanted to become full time fishermen. In order to do this, they had to gain access to deep water fishing area productive of lobsters in the fall and winter. This meant that they had to invade area that has been the exclusive area of Round Pond, and New Harbor. They were quite aggressive in organizing teams to invade these areas. The alternative was to be locked into a seasonal fishery. The men from the harbors at the heads of bays were not going to lose so many lobsters that they were motivated to organize effective teams to defend their areas (fighting does not pay). As a result, much of the area originally held by New Harbor and Round Pond fishermen exclusively became a “mixed fishing area” shared by men from harbors all around the bay, and the amount of exclusively-held area became much smaller. (Comparing Maps 1 and 2, one can see that the territory that was fished exclusively by the New Harbor fishermen has retracted greatly.)

Second, at that time, some of the small island areas ceased to exist and their fishing grounds were amalgamated into other areas. In the early 1960s the Louds Island area was quickly appropriated by the Bremen fishermen, when the last of the Louds Island fishermen moved to the mainland and ceased to defend their summer fishing ground. The Georges Island area ceased to exist as a separate fishing territory and has been incorporated into the Friendship area. As a result, the amount of area where

mixed fishing takes place has increased greatly. The entire central part of Muscongus Bay is fished by men from three or four harbors, while the area fished exclusively by the men from one harbor has decreased markedly.

After 1980, the amount of area fished in the winter expanded greatly (Stage III). These winter fishing grounds are generally open to fishing from all harbors, although they are usually exploited by men from harbors that are relatively nearby. In the 1960s, fishermen from the mainland did not fish south of Monhegan in the winter; a number of fishermen do so now.

### LESSONS TO BE LEARNED FROM THE MODEL

Perhaps the most important insight in the social science literature on territoriality is that territorial rights are established when the costs of defending an area are less than the benefits to be gained from repelling intruders. This is certainly true in the Maine lobster industry where territorial rights are established when it is worthwhile for groups of fishermen from one harbor to dislodge people from other harbors from fishing in an area. What is notable about the lobster case is the very large number of variables that affect the costs and benefits of territorial defense and offense, including the value of the fishery, competition between traps, transportation costs, monitoring costs, and the costs of organizing teams. Over the course of the twentieth century better technology, trap escalation, increased law enforcement, and ecological changes have tipped the decision to defend or invade areas in different ways in each of the three stages.

The interaction of these variables needs to be stressed. We cannot explain the development of territorial rules in terms of changes in any single variable. It is tempting to view competition as the cause of territoriality. To be sure, trap competition and the value of the fishery give a strong motivation to claim

territories, but these factors alone are not responsible for territoriality. In the 1980s and 1990s, when offshore areas began to be fished by larger numbers of fishermen using a lot more traps, no territories developed. Traps were more congested in these deep-water areas than they had been previously, but the gains that could be had from claiming territories there did not outweigh the costs and risks stemming from vigorous law enforcement and the defensive measures of other fishermen.

Changes in transportation costs have certainly played an important role in territorial change. The extent to which we can explain the pattern of trap placement in terms of cost of transportation alone is “not much.” Fishermen from Pemaquid Harbor, for example, find it worthwhile to fish eighteen miles south of their home harbor in open ocean in the winter, but they do not fish in the “Gut,” an exclusive area of South Bristol, under two miles away from their home harbor. In the late summer and early fall, a few fishermen place traps on Cashes Ledge, some fifty miles south of the harbors in the mid-coast region.

According to our analysis, the territorial system would not have come into being at all if the costs of sanctioning had been too high (Fighting Doesn't Pay). However, vigorous law enforcement has not done much to curb defense of the small exclusive areas around the mouths of harbors and it has not done much to diminish the successful defense of some of the outer island areas that still exist in the Penobscot Bay region (Acheson 2003). The economic and symbolic value of these areas is so high that their defenders will risk defending them.

### *Redefining the variables*

We have argued that the evolution of the lobster territorial system is due to changes in the values of a set of variables which determine the payoffs of offensive and defensive strategies. Behind our efforts to model these changes is an embedded cost benefit analysis. Such an argument is rarely used in

anthropology. However the idea of decisions being determined by benefits and costs is well established in certain fields of anthropology—especially in economic anthropology and human behavioral ecology (Smith 2000; Winterhalder and Smith 2000).

However, there are a number of factors mentioned in the anthropological literature that influence costs and benefits of territoriality. These include: the characteristics of the resource, competition for those resources, the ability to organize groups to defend an area, and technology. However, the lobster case study points out that these factors need to be specified more exactly and extended somewhat if they are to be useful in analyzing territories.

Territoriality is said to depend on the density and predictability of the resource (Dyson-Hudson and Smith 1978). The lobster is a sedentary creature. This increases the benefits of holding territory and reduces the costs of finding concentrations. Moreover, changes in the density of lobsters in offshore areas have resulted in more fishing in mid-winter. However, we maintain that density and predictability are important only as they affect profitability of exploiting lobsters. Profitability takes into account both the amount of harvest and costs of production, including the costs of transportation. Fishermen would not likely claim territorial rights over waters with a large dense concentration of lobster if that concentration were so far away that high transportation costs made it impossible to make a profit.

Competition is a necessary precondition for territorial rules to come into being, but there are many different kinds of competition and some are far more important than others. What is salient for the development of territoriality in the lobster industry is the competition between traps. There is nothing to be gained from excluding others from a location unless this increases the catches of the group defending the “territory.” Some anthropologists link changes in territoriality to competition stemming from increases

in human population (Aswani 2002: 273; Boserup 1965); others point out that developing markets can increase competition for resources (Begossi 2001; Johannes 1978); and still others state that competition and pressure on resources is due to factors such as sedentarization and growth of herds (Ensminger and Ruttan 1991:96-97). None of these factors play a role in increasing competition in the lobster industry. There have been no marked increases in either market prices in real dollars or the number of lobster license holders in the past 50 years (Acheson 2003). (NOTE 8)

No territoriality will develop unless groups are able to defend their claims. However, coordinating an effective territorial defense is not easy and, as Cashdan (1996:1,304) points out, anthropologists have done little work on this problem. Understanding the conditions influencing the organization of political teams will take a good deal of effort. There is a growing realization that cooperation in any endeavor depends on a complicated set of factors (see Ostrom 1990, 2001), and combination of variables connected to the generation of territorial rules in one case is not always the same in another (e.g., see Aswani 2002 and Begossi 2001).

It is true that certain technical factors play a role in establishing territories, but the term “technology” is far too general to be of much value. In the lobster case, several technical factors influence territoriality. The use of trap technology has made it possible to defend territories by destroying fishing gear—not the usual territorial defensive technique in worldwide perspective. Moreover, the adoption of larger and faster boats have lowered transportation costs and made it possible to fish areas far from shore in the winter. The advent of hydraulic trap haulers and larger boats has made it possible to use more traps, which has increased the competition of traps—especially in the summer. But this underlines the fact

that “technology” per se is not as important as transportation costs and trap competition in influencing territoriality.

## IMPLICATIONS AND DISCUSSION

This analysis allows us to comment on a number of questions of importance to anthropologists.

The first, key question is: To what extent can this analysis be applied to the generation of territoriality in other societies around the world? Is the lobster industry a unique case? Nothing definitive can be said about this issue because the ethnography on other fisheries around the world does not contain enough information on the variables we have identified as critical to make any judgement. We do not even have enough information to make a judgement about territoriality in other lobster fishing communities. What can be said with some certainty is that even in lobster fishing communities there is clearly a lot of variation vis a vis territoriality. In at least three lobster fishing communities in New Brunswick and Nova Scotia, it is clear that territoriality exists (Davis 1984; Flint 2002; Recchia 1998). Since the fishery in these communities appears to be very similar to nearby Maine, we speculate that the same factors that produced territoriality in Maine also are at work in Nova Scotia. In a lobster fishing community in Sardinia, no territoriality has developed. Although no complete study of territoriality has been done, we are told that it takes hours to travel to the fishing grounds, which presumably would make it difficult to guard traps. Moreover, the few fishermen who engage in lobster fishing use a maximum of 200 traps each. This suggests that traps may not be competitive (Delitala 1984). If this is the case, there is nothing to be gained by claiming and defending territorial boundaries.

But do the variables influencing the development of territoriality in the Maine lobster fishery always have the same effect on the generation of territoriality or property rights in other cases? They do

not. On land, for example, an increase in population or competition for land causes people to privatize their landholdings (Boserup 1965; Ensminger and Ruttan 1991). In ocean areas, an increase in population or competition for the resource tends to result in a breakdown of common-pool resource institutions, resulting in open access. This has occurred in the lobster industry and in societies in Oceania (Aswani 2002; Johannes 1978). This suggests that different parameter values, if not different variables, affect the devising of land territories as opposed to water territories. Clearly a lot of comparative work needs to be done before any definitive statements can be made about the conditions generating territories in general.

Second, the Maine lobster case suggests that territoriality comes into being when there is a balance of different kinds of competition. There needs to be enough trap competition to make territorial defense pay, but too much competition in the form of offensive pressure from invaders will make it impossible to successfully defend territorial claims. The idea that territoriality is due to a balance of competitive forces of different kinds has not been discussed in the anthropological literature, but it is an issue that deserves more attention.

Third, this analysis bears on issues of territoriality in hunting and gathering societies. Among hunters and gatherers, anthropologists have argued that territoriality can either be exclusive (only members of a group are permitted) or can be shared by one or more groups. In many hunting, gathering and fishing communities, people claim group territories, but they allow “outsiders” to exploit resources in their territory; in other cases, outsiders are not permitted to exploit resources in those areas, and the owners maintain more exclusive rights to them. In the literature it is stated that sharing of hunting grounds is done to allow people to build up ties that might prove critical in times of need. More exclusive

territorial rights are found in agricultural societies. The Maine lobster fishery case points out that both can exist in the same society, and it suggests the conditions under which each type will arise. Within the area exploited by one harbor gang, exclusive territorial rights can exist where one set of parameter values holds, and joint use can exist where circumstances are different. Can the case be made that hunter-gatherers allow neighboring groups to hunt in “their territory” because they cannot defend that territory (fighting does not pay)?

Fourth, this analysis raises some important questions for resource management. According to the theory of common property resources, secure property rights result in conservation and efficient use of resources (Acheson 1989; Ostrom 1990, 1999). Privately owned property and communally owned land and resources can be very well managed; open access resources are synonymous with lack of conservation and resource depletion. Circumstances that result in the demise of property rights and the advent of open access regimes are not in the interests of conservation. Unfortunately the twentieth century has seen the lobster industry go in the wrong direction. In the early years of the century, a high percentage of the lobster fishing grounds were held by small groups who defended their exclusive rights with vigor (Stage I). There is substantial evidence that these common-pool arrangements resulted in such conservation (Acheson 2003). By the end of the century, a huge amount of lobster fishing area was “open access” where no territorial rights were enforced (Stage III). We have analyzed the conditions under which common-pool territorial arrangements have arisen, and the circumstances that have caused them to decay. Our analysis suggests that the demise of territorial rules creating a common-pool resource is due to a combination of factors, including new technology making it possible to exploit more

distant areas with less cost, and a decrease in the ability to enforce traditional territorial boundaries due to increases in the effectiveness of law enforcement.

Fifth, the system of social relationships involved in the territorial system poses basic theoretical questions for anthropologists. Alan Page Fiske in a marvelous book entitled *Structures of Social Life* (1991) argues that there are four elementary forms of human relations, which he calls communal sharing, authority ranking, equality match, and market pricing. None of these comes close to describing the territorial system. In the lobster industry, the system of territorial rules and practices has evolved as a result of competition between different groups of fishermen. It is a system where social relationships are ordered through the threat or actual use of force. The outcomes depend completely on the decision of combatants to fight or submit. It is not the result of a planned process in which people divided up a common-property resource in some rational way agreeable to all.

Boulding (1963) defines such systems as “threat systems”, and we believe this term can be applied to the lobster territorial system. There are a number of key questions about such systems. One concerns stability for as Boulding (1963) points out, such systems can be very unstable. Once one party defies another or uses force, conflict can quickly escalate into a confrontation in which both sides can lose heavily. Under other circumstances they can be very stable and operate as systems of deterrence. In the long standoff between the United States and the Soviet Union in the Cold War, the technology of offense and defense, and second strike capability prevented an outbreak of war for decades. In the lobster fishery, there are very few cases where large scale violence has occurred. What maintains the peace in such systems? In the anthropological literature on societies in place such as Africa and Afghanistan, several social mechanisms have been identified as maintaining order in societies with territorial systems

that are maintained by force, including a system of “conflicting allegiances” (Gluckman 1956). Our analysis suggests that what maintains the peace in the lobster industry is another factor—namely that under many circumstances “fighting does not pay” (e.g., Stages II and III). Most of the violence has occurred in the past when it did pay to defend a territory (e.g., Stage I).

Another question about threat systems concerns political alliances. In large numbers of systems around the world where relationships between groups are dominated by the threat of force, groups in conflict will form alliances with other groups against a common enemy. The most famous of these systems are probably those described by Evans-Pritchard (1969) among the Nuer of the Sudan and by Barth (1959) for the Swat Pathans. In the lobster industry, by way of contrast, such alliances do not form. If two harbor gangs X and Z are both having a territorial conflict with harbor Y between them, one might have thought they both might profit by an alliance between them. However, no such alliances apparently have existed. Why not? The reason might be clarified if we knew more about the operation of the political teams that are involved in territorial defense and invasion. Answering these questions presents an opportunity to make some contribution to our understanding of threat and territorial systems in general.

Since the 1980s it has been recognized that there are vast differences in territorial arrangements among and between societies. These differences ultimately are linked to a wide variety of social and cultural factors (Durrenberger and Palsson 1987). In this article we have focused on specific variables such as costs of monitoring, changes in technology, law enforcement, etc. But it should not be overlooked that changes in these variables are the result of vast changes in the culture of coastal communities, the state and the nation.

## NOTES

1. So little work on territoriality has been done recently that Winterhalder and Smith (2000) do not even mention territoriality in their lengthy review of the literature on human behavioral ecology.

2. Not all territoriality among humans is connected to control over natural resources. Territoriality in insane hospitals, urban parks, and gang territories in cities are motivated by other factors (see Malmberg 1980:158-89).

3. A collective action problem occurs when there is a divergence between what is rational for the individual and what is optimal for the larger group (Elster 1989: 17). From the perspective of the individual fisherman it is rational not to contribute to group efforts to defend and invade boundaries because such activities incur substantial costs even though all members of the group would gain by such activities. It is more rational for individuals to “ride free” on the efforts of others. Of course, if everyone “free rides”, then territorial claims are not defended or the “gang” does not gain additional fishing area to the detriment of all.

4. While this system may seem exotic in a modern country, riparian rights and ownership of ocean areas are quite common worldwide (Acheson 1981:280-81; Schlager 1994). In a large number of maritime societies, rights to exploit ocean areas are variously held by communities, kinship groups, or individuals under a multiplicity of property-rights regimes.

5. Loran C is an electronic navigational system that operates by reflecting radio waves off two fixed stations on shore. Distance from a station is indicated by the amount of time it takes a wave to go to

the station and back, and is plotted on special charts. The position of a boat is located by the place where the two indicated Loran C lines cross.

6. No quantitative data exist on the number of traps cut or the number of trap-cutting incidents. It is impossible to get accurate information on such matters by interviewing because trap cutting is illegal. Moreover, we cannot gather data on arrests and conviction rates either. Case reports of crime are strictly confidential, and they are destroyed after seven years when the statute of limitations runs out. There is a consensus among both fishermen and Marine Patrol officers that the number of cases of trap cutting are down and conviction rates are up. We believe such reports should be taken seriously. However, we would have an increased level of confidence if these reports could be buttressed by additional quantitative data.

7. Note the arrow pattern in Figure 2. We have a complete cycle, in a clockwise direction, around the game matrix. This means (Gardner 1995, chapter 3) that there exists a unique Nash equilibrium in mixed strategies—a typical outcome of games with monitoring and sanctioning (Weissing and Ostrom 1991).

8. In the past 60 years there have been five to six thousand lobster licenses issued annually. The exception is a few years in the mid 1970's to the 1988 when the number of licenses was in the 7000 to 10,000 range due to rumors of impending limited entry legislation. Number of licenses cannot be easily correlated with fishing effort because since many licenses remain inactive, and an indeterminate number are part-time fishermen..

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## Map List

Map 1. Lobster-Fishing Territories in the Muscongus Bay Region of Maine: Late 1960s

Map 2. Lobster-Fishing Territories in the Muscongus Bay Region of Maine: 1998-2000

*Caption for maps:* These are nucleated areas, and the inshore lines indicate the furthest that most fishermen from a harbor can place traps without courting trouble. In most of this area, fishermen from several harbors placed traps together (i.e., “mixed fishing”). The exclusive areas, as the name suggests, were maintained for the benefit of fishermen from a single harbor gang. Monhegan, by way of exception, has long been a perimeter-defended area with a definite defended boundary. Monhegan’s fishing area is now a “conservation zone” recognized by the state of Maine; its boundaries are enforced by the Maine Marine Patrol. In addition, the areas fished by lobstermen from Round Pond and Cushing have not been drawn on these maps to avoid the confusion that would result from having too many lines and symbols on these maps. The winter fishing zones indicate where lobster fishermen place traps at this time of year. But they are open to people from all harbors, even though they are generally exploited only by people from mainland harbors in the vicinity.