

The Life and Death of a Small-Scale Fishery

Surf Clam Dredging in Southern Maine

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ABSTRACT This paper describes the history of small-scale surf clam dredging along the coast of southern Maine. By identifying the economic, social, and environmental factors leading to the adoption and subsequent abandonment of surf clam dredging, this history illustrates the interaction of two major factors in the social and ecological conditions of Maine lobstermen. The first is the importance of seasonally pursuing other species in order to supplement lobster fishing. The second is the fragile relationship between lobstermen and regulatory agencies. Through their management of potential pollution problems in surf clams, regulatory agencies became the primary determinant of the seasonal fishing tactics of some lobstermen. Hence, the paper stresses the importance of commercial fishermen having easy access to the evidence on which regulatory decisions are based.

Introduction

The following history of surf clam dredging in Southern Maine is set in the context of three problems: seasonal fluctuations in the supply of lobsters, pollution, and a deteriorating relationship between fishers and regulatory agencies. The innovation, adoption, and abandonment of this fishery are traced with data from published sources, conversations with state officials in charge of regulating the fishery, interviews and questionnaire surveys of area fishermen, financial records and daily journals of the lobsterman who started the new fishery, and five years of participant observation as a sternman on his boat. Although this paper is only a case study (indeed, it is largely the story of one man's fishing career), it illustrates the potential problems in the relationship between fishers and regulatory agencies. The fact that surf clam dredging (locally referred to as 'dragging') remained nearly the private domain of its innovator for two decades, and then failed almost immediately after it began to be adopted by others, provides a unique opportunity to examine the role of regulatory decisions throughout the entire history of a local fishery (see Sinclair 1985).

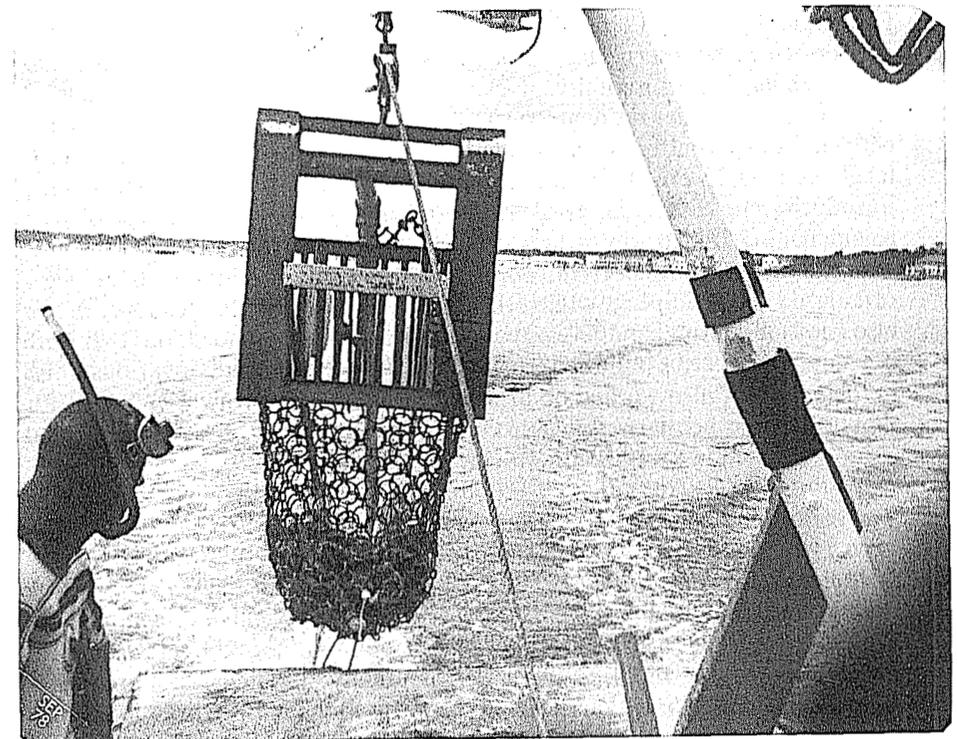
Maine Lobstermen

The term 'lobsterman' refers to a commercial fisherman whose primary prey species is the American Lobster (*Homarus americanus*). However, the actual activities of many lobstermen are not nearly as monolithic as the name implies (see Acheson 1980a). This is because the lobster industry's 'chronic seasonal gyrations between scarcity and abundance' (Martin and Lipfert 1985:89) has required lobstermen to make various seasonal shifts throughout their 200-year

history. Although each location has its unique variations, lobsters tend to be abundant in shallow water during late summer and early fall, while they are found only in less accessible deep water during the winter and early spring (see Wilder and Murray 1958; Dow 1969; Cooper and Uzmann 1971; Acheson 1980b, 1988).

Lobstering had to be abandoned during the winter months until recent technological advances such as engines, radar, sternmen (known as 'helpers'), and larger boats made winter lobstering possible. In fact, 'The forties and fifties were the first years in which lobster fishing was at least marginally profitable as a full-time year-round endeavor' (Martin and Lipfert 1985:87; see also Wilson and Acheson 1980). Even now, offshore lobstering is not a practical alternative for many lobstermen, and few earn enough from lobstering during the summer months to last through the winter. This means that 'the difference between financial success and failure in many cases is closely connected with the ability to change species fished as prices or the availability of various fish stocks change' (Acheson 1980a:452).

Although there are over a dozen commercial species of fish and shellfish caught off the coast of Maine (see Acheson 1988:108), and short-trip fishing



is often the preferred source of supplemental income (Acheson, Poggie, Pollnac & Wilson 1980; see also Pollnac & Poggie 1980a, 1980b, 1980c; Poggie & Pollnac 1980), most lobstermen are quite limited in their ability to pursue other species. This ability is limited by the location of alternative species, markets, the need for specialized equipment (including crew), regulations, climate, opportunities for non-fishing sources of income, and the need for specialized skills. Access to many species and types of fishing would require lobstermen purchasing larger boats than their typical 28 to 38-foot crafts. While some lobstermen have made such a switch in fishing styles (see Acheson 1980a), the majority of Maine lobstermen have chosen against such an option. This limits them primarily to shrimping, scallop dragging, and using some type of fixed gear for ground fishing (see Wilson and Acheson 1980; Acheson 1980a).

The Study Area: 'Southern Harbor'

The small fishing community that I will call 'Southern Harbor' has existed since the 1870's. It is located in the southwestern part of Maine where economic development, particularly tourism, is rapidly increasing. However, the majority of the 18 full-time, and several of the part-time lobstermen come from families who have lived and fished in the area for generations (see Palmer 1989, 1990a, 1990b, 1991). The traditional winter occupation of the lobstermen in Southern Harbor has been the digging of soft-shelled clams (*Mya arenia*). The proximity of clam flats enabled several generations of lobstermen and other residents to supplement both their income and their diet with clams. This pattern began to change in the early 1960's when many of the local clam flats were closed due to pollution. While a few took non-fishing jobs during the winter, many of the lobstermen attempted some type of year round fishing. Since winter lobstering proved to be of only limited value, many of the lobstermen tried other types of fishing. The larger boats were often used for shrimping, while others were used to drag for scallops. A few also tried gill-netting, and several continued to dig clams in locations that were not closed because of pollution. Some of the lobstermen had, at various times in their careers, also worked on draggers (also known as trawlers) fishing for groundfish in other harbors. Table One lists the ages and types of commercial fishing engaged in by 19 Southern Harbor lobstermen.

The Birth of a Fishery: 1967-1971

Surf clams (*Spisula solidissima*) also known as hen clams or sea clams, have been a source of food on the east coast since the seventeenth century (see Parker 1971; Yancy 1970). Their commercial use did not really develop until hydraulic dredging replaced the use of manually-operated rakes and tongs after the Second World War. During the 1950s and 1960s, hydraulic dredges were used off the coast of New Jersey, New York, Maryland, Delaware and

Table 1. Type of additional commercial fishing engaged in by each lobstermen at some point in his career (Survey performed in 1988).

Age of Lobsterman	Scallop	Shrimp	Surf Clam	Soft-Shell Clams	Gillnet	Dragger
24	-	-	x	-	-	-
25	-	-	-	-	-	-
25	-	-	x	-	-	-
30	x	-	-	-	-	x
30	x	x	-	-	-	x
31	-	-	-	-	-	-
34	x	-	-	-	x	-
34	-	-	-	-	-	x
35	x	-	-	-	-	-
35	x	-	-	-	-	x
35	x	x	x	-	-	x
38	x	-	-	x	-	-
46	-	-	-	-	x	-
47	-	x	-	-	-	x
48	-	-	-	-	-	x
49	-	-	-	-	-	x
54	-	-	-	x	-	-
59	x	x	x	x	-	-
78	-	-	-	-	x	-

Virginia. By the early 1980s surf clam dredging was also done along the coast of Rhode Island, Massachusetts, and along the Georges Banks. During the 1950s and 1960s most of the dredging was done with forty inch drags on boats from 40 to 60 feet in length (see Parker 1971; Lothrop 1954). By the 1980s boats up to 100 gross registered tons with up to 240-inch dredges were being used (see MAFMC 1986; Strand et al. 1981; Ropes 1980; and McCay and Creed in press).

Surf clams have long been known to wash up on the beaches around Southern Harbor following storms. Residents of the area have also been known to wade out along the beaches at low tide to dig surf clams for dinner. However, the only commercial exploitation of this resource was an unsuccessful attempt at dry dredging (dredging without the use of hydraulic jets of water used to loosen the sand in front of the dredge) along a nearby beach in 1949. The lack of interest in applying the large-scale hydraulic dredging to Maine surf clams was probably due to the small area of suitable beaches in Maine and the extremely limited stock of clams compared to other areas of the Atlantic coast.

In 1967 a local clam processing plant that had been using surf clams from

New Jersey asked local engineers to construct and test a small-scale hydraulic clam dredge as a prototype for one to be used in the search for new clam sources off the coast of South America. In early autumn, the dredge with its twelve-inch blade, two three-inch pumps, and fifty feet of fire hose was taken out on the only local boat equipped with the necessary winch and boom. A state official and a local lobsterman accompanied the crew out of curiosity. They picked a spot where surf clams were known to wash up in storms and made a short five-minute tow. The two bushel chain net attached to the dredge came up overflowing with clams. The accompanying lobsterman immediately saw a possibility to 'make some money without breaking my back at lobstering,' and the small-scale commercial surf clam 'industry' of Maine was born.

Due to the originality of the idea, there were no regulations, no established capturing or processing techniques, and no established market. Hence, the first step was to find a buyer. The lobsterman managed to talk his uncle who owned a local shell-fish market to 'take a look' at his clams. With this minimal assurance, the lobsterman had a duplicate dredge made, borrowed a pump from the state, and bought the other necessary equipment for a total of \$1325.



Photo 2. The original surf clam dredger's boat hauled out for the winter.

He tried the dredge for the first time the following spring. His log book for May 22, 1968 reads 'tried new drag, not much luck, I think pump isn't big enough.' On July 17, 1968 he bought a larger pump and was able to deliver clams he shucked on the boat to his uncle for 25 cents per pound. Surf clam dredging started off very slowly during the years of 1968 and 1969. Since the dredging equipment did not interfere with the hauling of lobster traps, the lobsterman continued to devote most of his time to lobstering. The time that was spent on dredging consisted of experimenting with equipment adjustments and searching for beds of clams. There was no particular seasonality to the activity during these early years and its economic contribution was minimal (see Table 2).

Surf clam dredging was little more than a 'hobby' during 1968 and 1969, but it became an economic necessity during the summer of 1970. Southern Harbor had been plagued by a few lobstermen stealing lobsters and destroying the traps of the other lobstermen. This problem came to a violent climax during

Table 2. Sources of Fishing Income for Original Surf Clam Dredger: 1967-1987.

Year	Surf Clams	Lobster	Soft-Shell Clams	Shrimp	Yearly Income Compared to 1967*
1967	—	67%	21%	12%	100.0%
1968	7%	61%	13%	19%	95.6%
1969	9%	72%	16%	3%	94.1%
1970	17%	21%	50%	12%	73.1%
1971	60%	—	40%	—	81.5%
1972	37%	22%	41%	—	78.0%
1973	—	—	incomplete records		—
1974	34%	41%	25%	—	86.7%
1975	—	85%	15%	—	116.2%
1976	34%	48%	18%	—	127.8%
1977	67%	33%	—	—	103.6%
1978	26%	74%	—	—	102.5%
1979	35%	65%	—	—	153.2%
1980	34%	66%	—	—	166.7%
1981	8%	92%	—	—	142.0%
1982	11%	89%	—	—	155.2%
1983	10%	90%	—	—	156.7%
1984	15%	85%	—	—	158.3%
1985	28%	72%	—	—	163.0%
1986	2%	98%	—	—	172.5%
1987	—	100%	—	—	180.3%

Source: Original Surf Clam Dredger's Personal Records

*Incomes Not Adjusted for Inflation.

July of 1970. Having so many of their lobsters stolen and traps destroyed was forcing many of the lobstermen to consider abandoning the industry, at least until the trouble was over. The lobsterman who had started the clam dredging 'industry' decided that his only options were to become a 'helper' on a friend's boat (a degrading position for an established lobsterman), or to rely on the surf clams. He decided to take a chance on the new 'industry.' Just as the surf clam dredging started to improve in the late summer, and it looked as if his decision had been correct, he was forced to abandon all fishing three months early due to mechanical problems with his boat on September 21, 1970.

Although the new 'industry' had not prevented an economically disastrous year in 1970 (see Table 2), the lobsterman had been impressed with the number of surf clams in the late summer. The price for surf clams had also risen from 25 to 40 cents per pound due to rising prices for local soft-shell clams and imported surf clams. Hence, even though the trap thefts had ended the previous fall with the arrest of the culprits, the lobsterman relied again on the surf clams the following year and did not set any lobster traps during 1971. The new fishery responded moderately well, providing the largest source of fishing income that year (see Table 2).

The income from 1971 was enough for the lobsterman to again decide to invest in a larger pump and continue pursuing surf clams instead of lobsters the following year. With the new pump, the 'industry' looked very promising during the spring and summer of 1972. For the first time, the lobsterman saw a future in which surf clam dredging would replace lobstering as his predominant source of income. This optimism ended abruptly that autumn.

Red Tide: 1972-1976

September 16, 1972 is a crucial day in the history of Maine surf clam dredging and in the relations between the local commercial fishermen and state regulatory agencies. It was on this date that the toxic plankton *Gonyaulix tamasensi*, better known as 'red tide,' was found in the state's surf clams and other shellfish. Red tide had caused few problems when it appeared in small concentrations in Maine during the 1950's, but the concentrations found in 1972 forced an end to the harvesting of all infected species (see Manville 1972). The surf clam dredger was now forced to become a 'helper' on a friend's lobster boat until he was able to lobster for himself again the following spring (see Table 2).

The period from 1972 to 1975 was marked by periodic red tide closures for different species and different areas. Throughout these years, the clam dredger continued to dredge when allowed, although he was now having to market many of his clams in small quantities to private individuals since his previous market had been withdrawn due to the threat of red tide. Despite the economic hardship caused by the red tide, the clam dredger fully cooperated with state officials. In fact, he voluntarily provided the first evidence that the surf clams had been infected with red tide. He also showed state officials the

location of clam beds when they needed clams for testing, and helped the state test a hydraulic dredge to be used for quahogs (*Mercenaria mercenaria*) see Mahogany 1976; Mathieson and De Rocher 1974).

After three years of periodic closures, a turning point in relations with the state came when the surf clams were prohibited continuously from August 1975 until June 1976. Up until this point the closures had been perceived by the clam dredger as the direct result of tests finding pollution in the surf clams of a given area. During this year-long closure he began having difficulty finding out the results of tests, or even when and where tests had been done. His journal records numerous telephone conversations and letters with various state officials (including the governor) expressing growing frustration over the apparent infrequency of tests and secretiveness of the testing and closure procedures.

Competitors and Complaints: 1977-1978

The years 1977 and 1978 saw a general pattern of red tide closures during the summer months. This helped turn surf clam dredging into a seasonal fishery

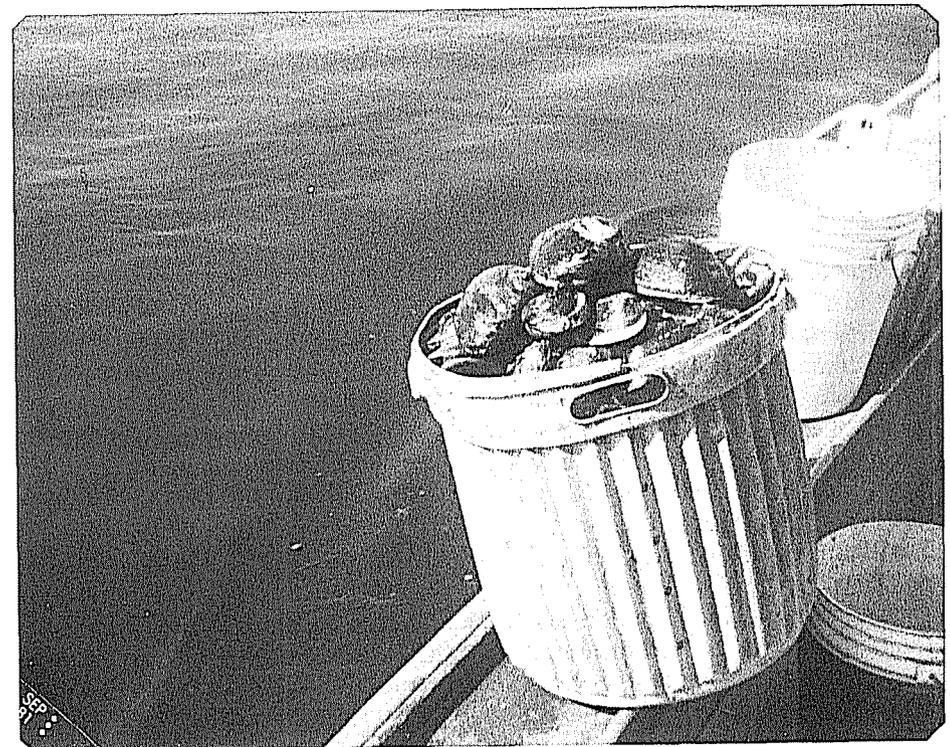


Photo 3. A bucket of surf clams about to be shucked on the deck of the boat.

that replaced lobstering during the early spring and late fall. Despite the restrictions, new markets in local restaurants and a rise in price to approximately 75 cents per pound (see table three) enabled the clam dragger to make a major part of his income from surf clams (see Table 2). It also brought about new interest in surf clams, as one local fisherman and two from out of state brought larger boats with 36-inch dredges into the bay and met with considerable success. Although none of the three new boats would last more than a season, their presence was to have two significant effects.

The first effect was to provide the circumstances for the last instance of cooperation between the original clam dredger and state regulatory agencies. This was in the form of a petition in 1978 by the original clam dredger that banned dredging with blades larger than 24 inches, thus effectively excluding the two out of state boats. The second effect was that the dredging of surf clams now drew the attention of the local tourist industry that dominated this section of Maine coast. While the presence of one small boat dredging along the beaches was just a quaint amusement to tourists who often waded out to the boat, a 'fleet' of four boats – some sixty feet long – brought complaints from tourists and hotel owners. Tourists claimed that the boats were polluting the beaches and their mere presence degraded the scenic quality of the area. The owners of the many beach-front hotels petitioned to have the boats banned. Although the pollution was found to be the result of a dredging operation in a nearby river, the area was closed to surf clam dredging. Red tide was given as the reason, but the original clam dredger was convinced that the complaints of tourists had been the real reason for the closure.

Red Tape: 1979-1983

For the original clam dredger, the problem was now a matter of 'red tape' instead of 'red tide' (see Morrison 1981). He no longer perceived the surf clam closures to be based on evidence of pollution. The conflict between the clam dredger and the state Department of Marine Resources (D.M.R.) centered on several aspects of the red tide testing procedures. The first was the infrequency of red tide tests. His other major complaint was the closing of areas below the acceptable level of contamination because nearby areas were polluted. Letters from the D.M.R. explained to the clam dredger that such decisions were based on the 'judgement' of one man. This helped transform the conflict into a personal battle between the original surf clam dredger and the D.M.R. official in charge of red tide testing.

The frequent red tide closings and the failure of the price to rise above 70 cents per pound reduced the economic contribution of surf clams (see Table 2). It also kept other local fishermen from becoming interested in the industry, and the original clam dredger again had the surf clams to himself until 1984.

Boom and Bust: 1984-1986

While the price of lobsters remained fairly constant, local catches began to decline in the mid 1980s (see Acheson 1984; Townsend and Briggs 1982). Most of the lobsterman in Southern Harbor attributed this to overfishing, resulting largely from the end of a self-imposed trap limit that had been in effect for over ten years (see Morrison 1976). Expenses, particularly the price of bait, also rose dramatically (see Acheson 1980a). Some of the lobstermen had a few good winters exploiting scallops and shrimp, but these proved to be unreliable sources of income (see Acheson 1980a). At the same time several local restaurants and shellfish dealers became willing to buy local surf clams. The increase in markets brought the price of surf clams up to nearly one dollar per pound.

These conditions brought two of the local lobstermen into the surf clam 'industry.' While the original clam dredger had pursued the surf clams in the early spring and late fall, ceasing fishing during the winter months, the newcomers saw surf clams as a winter fishery. They exploited the resource primarily from the end of the in-shore lobster season in December until it began again in April. With larger pumps, 24-inch dredges, and two 'helpers' shucking the clams on the boat, these boats were quite successful during the 1984-85 season, making several times more from the industry than the original clam dredger had ever made. Even though the price dropped back down to around 75 cents per pound, their success brought another local lobsterman and one from a nearby harbor into the 'industry' the following season. The market for the local surf clams was growing dramatically among local restaurants and shellfish dealers, with some surf clams even being exported to other states.

In 1981, the original surf clam dredger had chastised state officials for neglecting to help what he claimed was an economic 'sleeping giant' for the state of Maine (see Morrison 1981). By 1986 his prediction about the potential of local surf clams was at least partially materializing. Over forty local people were employed in the capture, processing, and marketing of the resource. This growth did bring increased interest from state authorities, but it was an interest that would mean the death of the industry.

The increasing production of surf clams, particularly the expansion of markets into other states, led state officials to incorporate surf clams under the same regulations that govern other shellfish. This meant that the surf clams would have to be processed in the same sanitary conditions as regular soft-shell clams. This necessitated bringing the unshucked clams to markets since such sanitary processing was impossible on the small boats. Since shucking the clams reduces their weight by over 75%, the clam dredgers were concerned about their boats being overloaded and dismayed at having to unload fifty or more 90-pound trays at the end of each day. The new regulation would make the exploitation of surf clams nearly impossible.

The local fishermen felt the regulation was unfair and questioned whether

it was really based on a question of sanitation (see Morelli 1986). In a series of public meetings they emphasized that there had been no problems with contamination in the past and pointed out irregular procedures used in the D.M.R. tests for contamination. They also pointed to the fact that it was legal to shuck scallops on boats (an argument countered by the fact that only the muscles of scallops are marketed, and the muscles contain lower levels of contamination than other parts of shellfish). Finally the fishermen suggested that the clams simply be limited to Maine markets. Although attempts to find such compromises were promised, the regulation eventually went into effect in 1987. A sympathetic state representative pointed to the irony of the situation:

In a way, it's the industry's success in developing a market for the clams that has drawn the State's attention. If these guys hadn't been so successful, they wouldn't be in the mess they're in now (Linwood Higgins, quoted in Morelli 1986).

Many of the fishermen added that while the surf clam industry had become too big to escape state attention, it was not big enough to fight for its rights the way larger industries like scallop dragging could. They also pointed to the ironical fact that Maine will now have to import surf clams from other states in order to continue to produce chowders and clam cakes.

Nearing the end of his career, needing new equipment, and knowing he would be unable to deal economically with unshucked clams the following year, the original clam dredger gave up the fight and removed his dredging gear. In an attempt to salvage something from their newly purchased, and now unsaleable equipment, two of the new clam dredgers tried to market the bulky unshucked clams for brief periods in 1988. One boat dredged for clams for about one month in 1989, but the owner doubts that he will ever dredge for clams again.

Discussion

Although this is only a case study limited to a small number of commercial fishermen in one area of Maine, the history of the surf clam dredging operation in southern Maine adds to our understanding of the relationship between commercial fishermen and regulatory agencies. It also illustrates the importance of this relationship in changing the outcome of attempts to diversify fishing endeavors.

Although he remembers being pessimistic about the lobster industry, the original clam dredger was attracted to the new industry mainly because it would be an easier way to make a living. While the new fishery required new technology and skill, it was also generally compatible with the material, social, and cultural traditions of lobstermen. The dredging could be done from a lobster boat in the same local lobstering 'territory' (see Acheson 1975a, 1975b, 1987) which was both convenient (especially important during winter months)

and intimately familiar to the local lobstermen. It was compatible with established social patterns of work organization since it could be done alone or with a 'helper.' It also involved the same sense of self-employed independence as lobstering. In fact, it is clear that the original clam dredger highly valued the extra challenge and independence of pioneering a type of fishing never before attempted in the area.

For the original clam dredger, these incentives were enough to offset the very shaky market for the new product. In fact, Table 2 indicates that the clam dredger's yearly income from fishing did not increase during the first seven years after he began surf clam dredging. While there are numerous variables involved in these figures, it is clear that surf clam dredging was not of significant economic advantage to the lobsterman. It did, however, allow him to remain self-employed as a fisherman during certain times when he would have otherwise been forced to seek other employment.

Despite an awareness of the problems the clam dredger was having with regulatory agencies, the lack of an economic advantage is clearly the main reason the new fishery was not adopted by other lobstermen in the area for over fifteen years. Adoption of the new industry would have almost certainly entailed an economic loss for many of the other lobstermen in the area. Since the original clam dredger had never made more than a moderate living from lobstering, the limited income from surf clams was sufficient to maintain his overall income. For lobstermen who had invested more into lobstering and were used to greater incomes, a shift to surf clams would have meant a substantial drop in income. It was the rise in price in 1984 that influenced two local lobstermen to adopt clam dredging. They had observed the quantities of clams brought in by the original clam dredger for many years and calculated they could now make more from surf clams than winter lobstering or scalloping. The fact that they did much better than expected their first year brought the fourth lobsterman into the fishery.

Although the small number of people involved makes it impossible to generalize, the adoption of surf clam dredging does not appear to be the result of some general type of innovative personality (see Barnett 1953; Barth 1967; Acheson and Reidman 1982; Downs and Mohr 1976). For example, the original clam dredger has failed to adopt many of types of navigational technology possessed by most of the lobstermen in Southern Harbor. Neither is there a clear correlation between exploiting other alternative prey species and the adoption of surf clam dredging (see Table 1). While the men who adopted surf clam dragging in the 1980s were all fairly successful lobstermen in their prime, if the original clam dredger had been an extremely successful 'highliner' the clam dredging industry would probably have never been started (see also Andersen 1979:308). The adoption of surf clam dredging occurred at different times because it solved different problems for different lobstermen.

The adoption of surf clam dredging at different times also entailed different problems in regard to markets, competition, complaints from tourists,

pollution, and especially regulatory agencies. Since he was the only one exploiting the resource, the original clam dredger's complaints against red tide closures often drew little or no attention. This lack of power may have been a blessing in disguise since he was able to dredge clams, at least periodically, for nearly twenty years. Instead of greater strength, an increase in the number of clam dredgers eventually brought an end to the industry.

The relationship between commercial fishermen and regulatory agencies is likely to entail a certain amount of conflict since it may be inevitable that resource management sometimes 'means putting people out of business, with all that indicates for social and economic dislocation' (Acheson 1980a:452; see also McCay 1981; Sinclair 1985). However, the history of surf clam dredging in Maine indicates certain factors that may increase or decrease the degree of conflict. These can be illustrated by examining the regulatory problems occurring during various stages of the 'industry's' history.

During the nearly two decades in which the original surf-clam dredger had the 'industry' virtually to himself, communication appears to be the key variable in determining the relationship with regulatory agencies. It is crucial to remember that the detection of red tide, and the subsequent closing of the surf clam beds, did not immediately produce a hostile relationship between the surf clam dredger and the D.M.R. As long as the closing was perceived by the surf clam dredger as the result of a health risk, the relationship was marked by cooperation. Conflict only developed when the fisherman no longer saw a clear correlation between dangerous levels of pollution and the closing of certain areas. The key feature in this change was the surf clam dredger's perception of the testing procedure as inadequate and secretive. Tests appeared to be done at arbitrary times, causing the fisherman to feel his problems were being ignored by the regulatory agency as areas remained closed for weeks after the pollution levels might have dropped below acceptable limits. The secrecy with which tests were conducted and evaluated led to requests for independent tests, which were also denied.

Conversations with the D.M.R. official in charge of testing surf clams indicated that much of the conflict over closures was simply the result of the different interests of fishermen and regulatory agencies. Other conflicts may have resulted from discrepancies between the 'scientific' authority of regulatory agencies and the fishermen's 'practical experience' (see van den Hoonard 1983) concerning such issues as the frequency of testing necessary for proper management. There does, however, appear to have been one crucial flaw in the testing procedure. The regulation governing the harvest of surf clams sets a specific limit of 80 micrograms of toxin for every 100 grams of shellfish. The D.M.R., however, only announced whether an area was open or closed, and fishermen were not allowed access to the exact 'scores' of tests. The official in charge of testing told me that this policy was followed because he needed to have flexibility in determining which areas should be closed. For example, he might close an area as it 'approached' the official level because of the ability of toxin levels to increase rapidly. He stated that keeping the exact

scores of tests secret helped him to avoid arguments with the fishermen over these decisions.

The secrecy of test scores appears to be the key to the deterioration of the relationship between fishermen and regulatory agencies because it created a pervasive attitude of distrust. I have no reason to believe that the desire for greater flexibility in closing certain areas was based on anything other than a genuine concern for public health. However, if the current criteria of closing an area at a given amount of contamination is inadequate, then a new criteria needs to be established and followed. Using secrecy to improve an inadequate regulation is clearly unacceptable.

The regulatory conflicts eventually ending the industry, although also based on health risks, were different and more complex than those previously faced by the original surf clam dredger. Throughout the negotiations over the new shucking regulations, the fishermen had a sense that there must be some other reason for the regulation, or at least for the inability to find a compromise solution. Unlike the earlier discovery of 'red-tide,' there had been no health problems resulting from the shucking of clams on board the boats. Tests for evidence of contamination in the clams were equivocal, and numerous improvements in handling procedures were suggested in order to insure quality. The surf clam dredgers were also more than willing to restrict their clams to in-state markets since the law in question referred to only the transfer of shellfish across state lines. The inability to establish any such compromise led to speculation among the fishermen of ulterior motives for wanting the surf clam operations to end. These suspicions ranged from pressure from other fishing industries such as soft-shell clams, quahogs, and scallops, to the desire for some type of alleged government grant in order to 'further study the problem.' While none of these speculations can be substantiated, there was general agreement among the fishermen that a compromise would have been worked out if the industry had been on a larger regulations destroy what would have otherwise been a major new fishery that would have greatly improved the standard of living for many people along the Maine coast? Or did the regulation problems simply tip the scales against what was destined to be a very marginal and short-lived enterprise? The answer depends on your point of view. There are probably few areas of Maine in which surf clams could be commercially harvested, and the original surf clam dredger estimates that the beds of surf clams around Southern Harbor could never support more than five boats with small 18' blades. To these few fishermen, some of whom grossed over thirty thousand dollars more by surf clam dredging one winter than they would have made by lobstering during those months, the end of the fishery was a major blow to their long term economic future.

For the state of Maine as a whole, the greatest loss entailed by the death of the surf clam dredging industry may not be the immediate economic loss, but in the relationship between state authorities and commercial lobstermen in an industry that badly needs cooperation for its continued survival. Sinclair

(1989) points out that communication between fishers and regulatory agencies is crucial to successful fishery management: 'Distrust and jealousy must be overcome by creating a structure for management that involves openness with regard to information and policy formation' (Sinclair 1987:13). The history of surf clam dredging provides further evidence for this position, and supports calls for greater co-management of fisheries.

Acknowledgements

The author wishes to thank the fishermen and officials of the Department of Marine Resources who cooperated in this study. Reed Wadley also made helpful suggestions on an earlier version of this manuscript.

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