

Introduction

The Cultivation of Marine Soils The Hydraulic Harvesting of the Hard Shell Clam Mercenaria mercenaria

Timothy C. Visel

In 1990, a concern was raised that hydraulic clam harvesting off the coast of Madison was environmentally dangerous to the water and sediments. The group which called itself Save our Shores claimed detrimental impacts ranging from increased heavy metals to the source of bacteria on bathing beaches. The research community weighed in and dismissed these claims. Pet waste it appeared was more of a threat to Madison beaches in the form of storm water runoff than hydraulic clamming.

The conflict in the end was more about noise than anything else and it was handled the way most noise issues were – regulations and municipal ordinances. It was also suggested that shellfish resource issues were a long standing problem in Madison. According to local shellfishermen policies that had existed for more than half a century were also to blame, “if I can’t harvest them nobody else should” and references to his belief were found in the Town of Madison Shellfish records (see appendix #3). The town once founded by farmers and fishermen had become an affluent shoreline community and had a history of marine resource conflicts in recent years. In 1972 and 1973 oysters began to set strongly in town waters. Natural growth harvestors (seed oystermen) asked to harvest seed oysters in major rivers and creeks – but were continuously opposed. Only after oysters grew to depths of 6 to 8 feet deep impacting navigation in Neck River did the town allow commercial harvests, but by then approximately 80 to 90 thousand bushels of seed oysters had died from overgrowth (1978). In 1971 most of Madison waters were closed to shellfish from bacterial contamination (runoff). This accelerated the waste of oyster resources as no relaying or transplanting programs were then underway. The waste of oysters in the East and Hammonasset divers was enormous.

In March 1990 when the first concerns were raised I was employed by the University of Connecticut Sea Grant Marine Advisory Service and a life long resident in Madison. The conflict was very divisive one pitting wealthy shore front owners against people who liked to eat and harvest shellfish (for 15 years under cooperative management a part of the commercial catches were set aside for shallow recreational relays) which greatly had increased recreational permit sales – and the satisfaction of shellfishing a traditional fall activity for many Madison residents. It is in this context that the information is contained and with a slide show presented to the combined groups to demonstrate the techniques and impacts

of hydraulic clam cultivation. The aquacultural aspects are included in appendix #1. The environmental aspects are detailed in appendix #2. The resource allocation issues are reviewed in appendix #3

As it relates to the resuspension of bottom sediments clam fishermen claimed that storms and hurricanes resuspended more sediments that could possibly be accomplished by hydraulic dredging. The group opposing hydraulic clamming claimed serious long lasting negative environmental impacts.

On a final note – one prediction.

One prediction the Mr. Dolan a local shellfishermen made did come true but he did not live long enough to witness it. The State waters did pick up strong sets of mercenaria in 1987, following Hurricane Gloria and another following Hurricane Bob in 1992. The harvest of hard clams soared in 1994 and continued to the year 2000 following these widespread sets, and as he predicted this event would be followed by a decline just as the previous three cycles he had described. He told the group that storms changed the bottom and moved more sediment than the hydraulic clam dredge could ever accomplish.

Yet the association of increased resource enhancement and cultivation of marine soils refuses to go away. Rather than avoiding the issue we need to objectively look at it and involve industry resource managers and regulatory agencies in these discussions. In that way, aquacultural cultivation practices can be discussed in a non emotional way with industry and resource managers. The practice of marine soil cultivation is continuously mentioned in research and industry accounts. I have listed some references as a way to demonstrate that Connecticut's example is not unique but forms part of a international research effort. They were included after my slide lecture presentation at the Town Hall on the equipment and different types of hydraulic dredges.

Reference for the Cultivation of Marine Soils

Appendix #1 Aquaculture Aspects Associated with hydraulic clamming.

Note most of the shell fishermen that I have had the benefit of meeting and engaging in conversation all told me the benefits of "working the bottom" and negative associations of plants (Marine grasses) and decaying plant matter. They seemed to be both indicators, clean, relatively mud free habitat was good and thick grass or heavy accumulation of seaweed, sticks or leaves poor or low productive habitats. There was consensus that clean good bottom can be ruined by excess plants, both terrestrial and marine. This was more prevalent in the regions that suffer from nutrient enhancement. The working the bottom aspect can be found in many clam fisheries, raking, tonging and dredging only with hydraulic clamming

did I find reference to the activity as a farming or cultivating activity aside from harvesting. In this way, the area was prepared for a set or harvest." Much as terrestrial farmers cultivated and prepared "soil". I have listed some references for the process - We absolutely, need more research in this area. Most of the research today has been done by shellfish constables, shellfish commissions and the shell fishermen themselves. Although it is continuously mentioned by shellfish managers and the shellfish industry, it remains an area that is still poorly understood by the general public. As the concept of sediment manipulation is often contrary to accepted norms and may infringe upon long standing environmental and regulatory provisions. It needs to have a historical context of shellfish utilization by early settlers and of course native Americans. Much of the practice cultivation was utilized as a way to minimize impacts of eutrophication and siltation.

**1) Biological Effects on Hard Clams of Hand Raking and Power Dredging
October 1953 - By John B. Glude and Warren S. Landers
Fisheries #110 United States Dept of the Interior Fish and Wildlife Service**

"Narragansett Bay, Rhode Island, has supported an intensive commercial fishery for the hard-shell clam, *Venus Mercenaria*, known locally as the quahaug or quahog, for many years. Hand diggers, using tongs or bullrakes, are allowed to fish in any unpolluted waters in the State. Power dredgers have been restricted to the southern half of the Sakonnet River except for a short time during World War II when additional areas were opened to increase food production. Locations of fishing areas are shown in Figure 1.

Controversies continually arise between fishermen using power methods and those who harvest the clams by hand. Rakers and tongers claim that they are using the only method which do not harm the bottom or destroy young clams. They claim the dredges tear up the bottom, breaking many of the clams which are caught as well as those which go through the bag of the dredge and are left to die. They also believe the dredges bury the small clams so deeply that they are smothered, and that the bottom is sometimes plowed to such an extent that current action causes scouring which prevents a new "set" from surviving.

Dredges claim that they are merely cultivating the bottom and preventing it from becoming too compact for the clams to live. Dredging, they state, really improves the bottom, inducing new sets and increasing the growth rate of those clams which are left.

Bottom samples confirmed the indications of the underwater photographs that surface appearance of the three areas was similar. Mixing of the sandy-mud layer and the underlying clay was more pronounced in both fished areas than in the control. Fished areas were also softer and had less odor of decomposition than the

control. No differences in the above physical characteristics was observed between dredged and bullraked sections.

This experiment shows no biological basis for restricting either method of fishing.”

2) Fisheries Research Board of Canada 1962 -

“The Martha’s Vineyard hydraulic clam rake (Mya) is the proto type from which the present machine was developed. We believe the hydraulic rake, which operates on flats while they are submerged is a better harvesting tool. It causes so little damage to clam stocks that it must be ranked high as a saving gear. We wish to thank Dr. Matthiessen who in 1959 acquainted us with Martha’s Vineyard fishermen who were using hydraulic rakes.”

3) Yankee Magazine October 1974 -

“Rev. Richard Burton, founder of Project Dominion, demonstrates his homemade cultivator, seawater pumped through the device agitates the surface of an ecologically stagnant clam flat and adds oxygen and nutrients – resulting in a healthy set of clams.”

4) Hydraulic Harvesting of Soft Shell Clams –

Bourne – Sandwich Shellfish Assn. September 8, 1980, March 20, 1981

Results of Soil Cultivation Experiments – MacPhail Model of the Hydraulic Rake – Page 9

“When the manifold was rolled across the bottom, gases formed from the decaying matter were observed bubbling to the surface. The substrate was devoid of the usual animal life, such as sea worms and the winkles. After pumping these areas, and removing the harvestable clams, the conditions improved remarkably. The surviving seed was able to return to the newly turned over bottom, while the dead shells and decaying matter remained on the surface. The mortality rate of the remaining seed dropped drastically, and an increased growth rate was noted.

We have also encountered certain spots where this dying process is complete, and only the many clam shells remain beneath the substrate. Though the area has since repopulated with sea worms, and other marine life, as yet, no clams have re-set there. One explanation could possibly be taken from the 1930 Belding Report, which states: “Clams are usually absent from soils containing an abundance of organic material. Organic acids corrode their shells, and interfere with the shell-forming function of the mantle. Such a soil indicates a lack of water circulation within the soil itself, as indicated by the foul odor of the lower layers, the presence

of hydrogen sulfide, decaying matter, dead eelgrass, shells and worms. If such a soil could be opened up by deep plowing, or resurfaced with fresh soil to a sufficient depth, it would probably favor the growth of clams.”¹

¹ Belding, David L. MD; The Soft-shell Clam Industry of Massachusetts, November, 1930.

5) University of Maine Orono August 1984 –

Development of a Harvester for seed clams

“There had initially been some concern regarding damage to the fragile young clams, and disturbance of the flats themselves by the action of this hydraulic harvester. Both these aspects were studied. Samples of clams harvested by the machine were taken to Orono and placed in the shellfish laboratory running sea wakes system. After three days a count of dead clams was made and the percentage mortality calculated. For no sample was this figure over 5% a level considered acceptable by all concerned. Shell damage from the shore of the jetting action is simply not a problem.”

6) Producing Clams for the US Market by Jim Conrad

Aquaculture Magazine, May 1984 – Pg 38

“First of all, we own the bottom of the bay we work on,” he says. “We own six acres and lease 1.5 acres from the State. Second, we till and groom the beds-clear off the overburden of mussel shells, take away predators, and keep digging up the substrate all the time. The reason we keep digging up the beds with hand diggers is that if you let the substrate sit, silt drifts over the beach, plugging up the pores so that water won’t circulate through it. Then the clams, three or four inches down, or even a foot down, no longer can survive because they can’t get enough water filtering down to feed on. Then they start migrating upwards to a fairly thin layer at the surface of the beach. You can’t get as many clams per acre if there are all in a thin layer at the beach’s surface as you can if they are scattered through several inches of the substrate. We try to make the beach substrate ‘fluffy,’ like the soil of a well tilled agricultural field.”

7) Quahog Management

Aquaculture Magazine, November/December 1988

“By using excellent management techniques, David A. Roach, Jr. of Westport, MA has increased this community’s quahog production from 50,000 to 1,000,000 in five years, making Westport the fourth largest quahog producer in Massachusetts.

Roach has also implemented another new management program for the Westport River; he and his staff use a hydraulic dredge to turn over the river's bottom in areas that are either unproductive or have gone from good to poor production. This procedure changes the chemistry of the largest particle size, breaks up thick mud accumulation and releases sequestered nutrients."

Aquaculture Today, 1988, pg 4 to 8

8) Getting more from your sediment bottoms The effects of hydraulic harvesting

**H.K. Rask Regional Marine Resource Specialist
Cooperative Extension Service
University of Massachusetts**

"Pollution closures and the future shellfish resources are receiving increasing attention. In addition to closure restrictions, declining harvests can also be traced to poor setting and, especially, to the deterioration of bottom quality. The result is considerable acreages of nonproductive bottom sediments

Cultivation a solution

One obvious solution is to cultivate the beds to improve sediment quality. This was well known over 100 years ago, but is almost totally neglected today.

In the past, horses or oxen often were used to cultivate the flats. Today this can be done hydraulically, and tremendous yields have been found in areas that have been hydraulically harvested or naturally disturbed. Recent work with hydraulic seed harvesters and other hydraulic gear also shows that cultivating the bottom enhances setting; good sets can also be found when storms, currents or dredging activities wash the sediments free of organic material and detritus.

There is a link here to the excellent sets of shellfish found in new sand deposited by storms or currents. Clams (*Mya*), for example, are a colonizer species and can quickly populate an empty area. New sand is not only free of decaying organic detritus, but is also free from predators. Hydraulic action can easily be seen to imitate some of these natural phenomena."

**9) A MARINE RESOURCES MANAGEMENT PLAN
FOR THE STATE OF CONNECTICUT
July 1984**

**Department of Environmental Protection
Division of Conservation & Preservation
Bureau of Fisheries
Marine Fisheries Program**

“The condition of hard clam stocks on private commercial beds is enhanced by the seeding and predator control activities of the shellfish companies that own them. The hard clam is a productive species for aquacultural efforts and Connecticut waters are capable of sustaining much larger populations than they currently do. A major drawback to increased production of marketable clams is the limited amount of productive ground located in unpolluted water. The hard clam is probably the most abundant species available for recreational shellfishing in Connecticut at the present time.”

**10) CONNECTICUT AQUACULTURE FINDINGS AND RECOMMENDATIONS
AQUACULTURE COMMISSION - January, 1986**

**Compiled by John H. Volk, Chairman
Aquaculture Commission**

“In some locations in Connecticut, clams (*Mercenaria*) and oysters (*Crassostrea virginica*) are cultivated and harvested from the same leases. Commercial shellfish grounds in New Haven Harbor are an example of this. Annually, in the late fall or springtime, juvenile oysters are transplanted off the setting beds. Prior to planting cultch (shell) in preparing the grounds for oyster setting, the leaseholder will work the beds with hydraulic clam dredges for a period of several weeks or more. This cultivation allows for a reduction of overcrowded and older *Mercenaria* populations present and seems to facilitate recruitment. In anticipation of oyster setting on these same grounds, large quantities of cultch (approximately 2,000 bushel per acre) are planted. This cultch cover, which provides a substrate for oyster larvae to settle upon and attach, also seems to provide some protection from predators for the *Mercenaria* populations in the sediments below. Thus, a shellfish farmer may reap the benefits of two crops from his one lease.”

The following items have been added after the 1990 Slide Presentation.

New to File – Updated References Clam Culture and Enhancement

**11) DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
FOOD AND DRUG ADMINISTRATION**

September 22, 1992

Dear Mr. Stoecker:

You requested the Food and Drug Administration's position concerning the mechanical dredging of shellfish.

The Food and Drug Administration has no problem with the use of mechanical or hydraulic dredges for the harvesting of shellfish. In fact, the use of dredges to harvest clams and oysters from moderately polluted (restricted) waters for relaying (transplanting) into approved waters is a most efficient method as compared to hand raking, tonging, etc.

Most significant is that a renewable food resource is being removed efficiently and effectively from polluted waters so as not to be harvested illegally and placed onto the market where it can cause illness. The shellfish are then naturally purified in approved waters so they may be harvested for food use. Thus, a renewable resource is used, jobs are created, and there is a public health benefit as well.

Keep up the good work.

Sincerely,

Jerrold H. Mulnick
Senior Regional Shellfish Specialist

Copies: John Volk, CT AD
 James Citak, CT AD

12) PROCEEDINGS OF THE THIRD

RHODE ISLAND SHELLFISHERIES CONFERENCE

August 18, 1994

Narragansett, Rhode Island

Published by Rhode Island Sea Grant

Habitat Enhancement as a Means to Increase the Abundance of the North Quahog,
Mercenaria mercenaria

Shell Planting as a Habitat Enhancement Option

“Based on the distribution of quahog abundance and the environmental biology of quahogs, substrate modification – through the addition of shells to low-quahog-abundance sediments lacking shell—would appear to be an effective approach to habitat enhancement. Several anecdotal reports provide support for this approach. In Long Island Sound, for example, shell (cultch), distributed on the bottom to provide substrate for oysters to set upon, was also associated with increased quahog abundance (Volk, 1986). In the Broadkill River, Del., quahogs were found in an area that had been recently covered with surf clam shells to create oyster habitat (Maurer and Watling, 1973).

There have been three reported pilot-scale projects that added (“planted”) shell to bottom sediments in order to increase quahog abundance. In North Carolina, in the early 1970’s, Parker (1975) planted scallop shells at a density of .081 cubic meters (m³) of shell/m² of bottom, and found that the average initial recruitment was 10 times greater in the planted shell than in an unshelled control. In 1989 in the Great South Bay, N.Y., 100 m³ of surf clam shells were planted in two 0.4-hectare (ha) plots located in muddy, low-quahog-abundance areas that lacked shells (Kassner et al, 1991). The planting, however did not result in increased quahog abundance, because the shell sank in to the bottom and the project’s scale was deemed to be too small to give meaningful results (Kassner, unpublished). In 1990, 120 tons of clam shell was planted in Barneget Bay, N.J., in six plots, each measuring 20m by 70 m (Cronin, 1990). Three of the plots were covered with “light” shell, while three unshelled plots served as controls. Three years later, the shelled plots had slightly more than five times more recruits than the unshelled control.

(Clyde MacKenzie, National Marine Fisheries Service, Sandy Hook, N.J., (personal communication)

Jeffrey Kassner

Town of Brookhaven

Division of Environmental Protection

3233 Route 112
Medford, New York 11763

**13)) Atlantic Fish Farming July 21, 1997
“Sea Bottom Treatment Helps Clams”**

If cultivating agricultural field before planting a new crop of potatoes or corn is essential to the commercial success of an agricultural farm, wouldn't the same apply to clam seeding activities for an aquacultural farm? The benefits of cultivating and enriching the soils for agricultural activities are well known and special treatment for specific crops are readily available. This knowledge and various applications have evolved from many decades of research, development and trials.

Aquaculture, however, is relatively new and although culture techniques have develop rapidly over the past decade, sea bottom treatment methods for shellfish aquaculture is still relatively unknown. Liquefying the sediment with the hydraulic rake mainly affects the upper 15 cm of the sea bottom. The affected areas area looser and this is evaluated by determining the bulk density and velocity of sediment samples or cores using an x-ray like piece of equipment called the Multi Track Sensor.

Within a two week period, most of the changes in the physical properties of the upper sediments have returned to their original state. It is believed that the rapid recovery is being driven by biological activity which may be influenced by the chemical characteristics of manipulated sediment.

The chemical and biological aspects of this research is only in its infancy and will be looked at in more detail this summer in a project funded by the Canada NB Alternate Species Program. It has been documented, however, that sediment modification with the hydraulic rake does not kill newly settled clams and, in fact, may enhance their chance of survival when performed a short time before they settle. This suggests that sediment modification or cultivation of the sea bottom could, in fact, be beneficial to the development of clam culture. Providing a better environment for clams to achieve higher production has to include a better understanding of the sediment.

Appendix #2
Environmental Aspects Concerns Raised by Save our Shores a citizen group
organized to fight hydraulic clam dredging

1. Clam Dredging increases odor and debris

Clam Dredging may increase odor and debris if the operation is working in sea grass or other vegetation. This occurrence in our waters is rare, and would likely limit harvesting hard clams harvesters have told me that they avoid vegetation because it blocks the dredge grills and mudds up the dredge. In fact, they avoid areas with eelgrass and sea lettuce as they believe these can kill clams by increasing sedimentation and choking the clams, (silt is trapped in the blades of eelgrass). Several clam fishermen believe that sea lettuce is toxic to clams and avoid these areas at all costs. They do not seek vegetation areas as they are considered poor hard clam habitats.

2. Removal of clams will result in increased turbidity because clams eat silt.

Clams do not eat silt; they eat small microscopic plant life algae. Madison has had several summers of huge brown algae blooms, but that is not associated with clams or clam operations, but nitrogen enhancement and eutrophication processes. It is the brown algae that make the water look turbid –it's quite noticeable at several town beaches. It can be seen from the air adjacent to much of the Connecticut shoreline.

3. Hydraulic clam dredging increases pollutants

Not so, especially if the area has been tested for heavy metals. Madison Shellfish was tested by the Dept of Health for metals in the 1980's. Madison metal counts except for zinc in the Hammonasset River were very low. Sung Feng of the University of Connecticut, has found metals in shellfish to be decreasing not increasing, and Madison tests confirmed low levels. Higher levels of lead can be found surround almost every home built before 1960 from paint, than sediments off Madison's shores.

4. Hydraulic clam dredging will cause bacteria and close our beaches

Hydraulic clamming does not cause bacteria nor would it lead to closing of beaches. Rain water runoff and ground water contamination from poorly designed domestic septic systems are more likely sources. Because of the concerns expressed about bacteria tests (counts) at Madison beaches, the town has committed to a long term bacterial extension study of runoff – storm sewer

discharges surrounding each public beach. The study is in conjunction with the National Shellfish Sanitation Program and will be conducted by the Madison Shellfish Commission. Initial reviews realized that pet waste was responsible for high bacteria counts at East Wharf Beach, Madison. In fact, shell fisherman as a group, are probably the most environmentally concerned about water quality as their livelihood depends on it. One interesting fact is the first series of environmental lawsuits are brought by oyster companies in New Haven in the 1920's. There, oyster beds were polluted by sewage from the city causing them enormous financial losses. One landmark case, Lovejoy versus the City of New Haven went all the way to the Supreme Court. Mr. Lovejoy lost to the City of New Haven and the oyster business there lost its former prominence. But the final chapter is yet to be written. Lovejoy was finally overturned in 1967 by the Clean Water Act. So, if you research the clean water initiative, you will find arguments from the Lovejoy oyster case. And, most of the history of the Clean Water Act was based upon waters suitable for sustaining shellfish and referenced decisions from numerous shellfish industry/clean water complaints.

Appendix #3 Resource Allocation issues

Towns of Madison Resource Allocation issues and waste of shellfish reserves.

After the 1938 hurricane and hurricanes in the 1950's, clam sets occurred in a huge bed that extended from Half Acre Rock, easterly to rocks known as "the bishop," then easterly between Madison Reef to Tuxis Island and in a narrow band inside "outer Reefs" to Webster Point, Madison.

In the 1960's, fishermen approached the town of Madison about a permit to try a new type of clam dredge – the hydraulic dredge. The clams were beginning to perish and this new dredge could work in deeper waters. This is the text of a request (handwritten) by John E. Walston, Jr., a Guilford commercial fishing family, who had trawlers and operated the last of the Guilford whitefish tap nets. (The Madison Town seal has a menhaden on it for it was once Madison's most lucrative industry). This is the letter, as written:

Mr. John E. Walston, Jr.
5 Meadow Street
Guilford, CT,

March 7, 1966

Mr. Elmer Sonnichsen
Chairman of the Shellfish Committee
Madison, Conn.

Dear Sir:

I am interested in purchasing round clams in the waters of Long Island Sound under Madison's jurisdiction at a minimum water depth of your determination.

I am prepared to pay sixty cents (60c) per bushel at any interval you so desire: week or month.

I would also agree not to work the grounds during any summer months so as to avoid silting of any beaches and henceforth controversy with any waterfront land owners.

I am prepared to furnish upon request, references pertaining to my honesty and payment from previous dealings. I would also invite your committee to inspect my catches and or record books at any time, whether pre-arranged or otherwise.

If you are interested, I would like very much to take the chairman, committee or any other interested person on a spot survey of the area, so as to determine the amount of clams that might be available. I would also like an academic with your Board of Selectmen, to explain the situation in detail if they so desire.

May I hear from you soon?

Thank you.

Sincerely,
John E. Walston, Jr.

Madison's reply, dated April 19, 1966

April 19, 1966

Mr. John E. Walston, Jr.
5 Meadow Street
Guilford, CT

Dear Mr. Walston:

This is in reply to your letter of March 7th to Mr. Elmer Sonnichsen in which you stated your interest in purchasing the round clams in the waters under the jurisdiction of the Town of Madison.

The Board of Selectmen after discussions have found public reaction unfavorable to your proposal and feel Madison should not commit its resources in this manner.

Sincerely

Robert L. Adams
First Selectman

RLA: vd

Cc/ Elmer Sonnichsen
Robert Schmidt
Charles Schroeder, Jr.

By the time I surveyed with Mr. Frank Dolan – most of these clams were dead. We did find evidence of the clams out to the Red Nun #2, west end of Madison Reef to halfway between C I at the beginning of Madison Reef and Tuxis – running east to Tom's Rocks off Madison's Webster Point.

Oysters – Neck East, Hammonasset and various creeks

In 1971, Charles Beebe was a resident of Madison and owner of Beebe Marine at the East River section of Madison. His property was on the East River just north of the Route 1 Bridge. It was the week of my high school graduation, but he called me up and was very excited – so he brought me to the marina to show me something. It was an old hand oyster seed dredge and it was full of oysters. He was very excited about it, and calculated they were four or five years old. He said he hadn't seen a "set" like this in 20 years. The river he suspected was full of oysters, but had been closed to direct shell fishing since 1966. Mr. Beebe predicted many oysters would be lost if the river wasn't opened to transplanting. He arranged a meeting with the Dolans at the Sluice Creek the next day. The first time I met Frank "Nuke" and Joe Dolan. The Dolans agreed. Mr. Dolan gave me an old newspaper to copy (1949) with exactly the same situation – huge overgrowth and many dead oysters. Mr. Joe Dolan said it was 1949 all over again. It's a cycle and now the river is loaded with oysters and starving to death. Attempts were made to open the commercial oyster activity in 1974. Madison would not open the beds until controversy arose when it was detailed that tens of thousands of bushels of oysters had already died. The following article preempted "Nuke" to show me what had happened to the clams in September 1978.

Shoreline Times, page 5, August 29, 1978

Title: Clam Diggers, Oystermen Struggle to Battle a Bushel of Problems

According to Charles Schroeder, the chairman of the Madison Shellfish Commission, the round clams or quahogs in the Sound off Madison are thriving because of the ban on commercial fishing. "Those people are after the money – that's all. They're concerned about. As far as leaving seed, if they see one clam down there, they'll go for it. The town has very little to gain from letting commercial fishermen in, and what I consider a great deal to lose."

Ed Lang, an oysterman and aquaculturist responded in the same article: "Lang says the clam beds become overcrowded and produce inferior clams. If they are not cleaned regularly, what good does it do to have these clams just sit and die? He reasoned. When the extent of the resource losses became public, Madison opened its waters to commercial fishing under shellfish management plan, the first municipal plan in Connecticut.

The Clinton Recorder – December 1, 1949
“Oyster Problem is Not Simple”

Guilford Has Rare Opportunity for Development

Reuben D. H. Hill, who has tonged oysters in East River and other Guilford waters for more than sixty years, estimates that there are now in East River 100,000 bushels of oysters, but that for the most part, they are worthless heels” grown in overcrowded conditions. They might be of value only if broken apart and moved down the river where they might have more room and better feeding conditions.

Dolan Would Invest

Joseph S. Dolan Jr., who carries on probably the most extensive lobstering and fishing operations from Guilford harbor, says that he would like the opportunity to establish beds and raise oysters. He is interested primarily, he says, in grounds outside the river, either on a lease basis or preferably by developing the beds and paying a percentage of the profit to the town. The development of such beds requires a three or four year program; this must be done either by the town or by private enterprise before anyone can profit.

The improvement of oyster grounds, he asserts, has appeared to be everybody’s business when times are hard, and nobody’s business when people are prosperous. The people who most need the income from oystering in bad times are those who are in no position to maintain the development through thick and thin. He states that practically every town has had to grant some privileges to somebody in order that this difficulty may be solved.

Only when the growth of oysters restrict navigation did the 1949 oyster problem that Mr. Dolan spoke to me about, happened. The Army Corps of Engineers.

Shore Lines Times, April 12, 1979

Oyster Contract Goes to J. Dolan

The towns of Madison and Guilford have awarded a contract for the transplanting of oysters from the East River to Joseph S. Dolan, according to Nathan Walston, chairman of the Oyster Group Advisory Committee.

Of the five parties who bid for the contract, Dolan submitted the lowest bid. He will perform the transplants on a "load for load" basis; that is, Dolan will receive one boat load of oysters for every boat load transplanted for use by the towns.

Currently, the state will not certify the East River as an area where oysters may be raised for consumption due to the high level of pollution there, Walston said. In addition, the oyster population now in the East River is overcrowded and the "oysters are starving each other out." This results in poor quality oysters, he explained. Because of the competition for food, the oysters have not reproduced in years, he added.

Letter of August 8, 1983:

S. Jackson Wommach,
14 Circle Beach
Madison, Conn.

Dear Sir:

"The 200 fee of Neck River along our property has been surveyed by a member of your commission (shellfish). Oysters 1 to 3" in size were found in abundance. These oysters have accumulated rapidly over several years' to a depth of one to three feet. It was estimated that in excess of 1,000 bushels are in this area. We request these oysters be removed."

And Shoreline Times article, April 8, 1982:
"Some Oyster Areas Are Opened"

In response to many questions that have been asked about this type of permit being granted, the chairman of the Madison Shellfish Commission, J. Milton Jeffrey, explained that the oysters lay in polluted waters and were not available to the local residents for their use. The natural growers harvest the oysters that have become extremely overgrown and sell them to others who have available waters in the Long Island Sound where the oysters can be set out to cleanse themselves, he said. It is the responsibility of the local commission to maintain the shellfish under its jurisdiction in the best possible condition; this requires the cleaning out of old beds, replacing shell and maintaining the best possible harvesting techniques, he explained.

Every fall, the commission transplants a number of bushels of oysters from polluted waters to clean waters off shore for taking by local residents. It is expected that this will be done again in the fall of 1982, Chairman Jeffrey said.

Shoreline Times October 3, 1990

They explained that hydraulic dredging has been going on in Madison since 1982, not since March 1990, when Dr. Morrow first noticed it, nothing however, seemed to satisfy the residents when a live demonstration showed the operations, thanks to a new muffler, to be almost soundless, and when lobstermen and harbor officials said the water was cleaner than before the clamming started. The real issues began to emerge – residents began to say what they really feared was -- the loss of property values, as if the sight of a boat offshore would spoil the priceless view.

Shoreline Times, September 30, 1992. Surf Club, September 24

Morrow, the head of pathology at Yale University and Yale New Haven Hospital, was responsible for presenting the oppositions views on the ordinance at the town meeting. He said that shoreline residents independently grew concerned that toxic amounts of lead were stirred up along with the debris.

And “EDC endorses businesses eyeing restoration of River’s Shoreline
See Times, April 26, 1984

Dredging, environmental impact, wetlands, an oyster bed said to be five to six feet deep, the future of the accessibility to the West River waterway, and “swift and prudent” action of state, local, and federal agencies are cited by a few of the businesses as problems which need to be addressed and overcome.

They haven’t dredged the oysters out of the river in two to three years. We know there’s oysters down five or six feet deep. It’s been more than once we’ve sent out work boat our there” to remove a sailboat caught on top of the oyster bed, Mrs. Duhaime said.

That section of the river has been oystered before, she said, but the Board of Health closed it down due to pollution. State statutes prohibit mechanical dredging, Mrs. Green said.

“But the type of dredging we’re talking about the oysters is scoop dredging – a hand operated mechanism,” Mrs. Duhaime said. “Let nature take its course, and encourage the town to dredge those oysters out.”

Yale Professor Karl Turekian said dredging would disturb the sediment from the bottom of the Sound, in the same way the sediment is disturbed by frequent storms.

Professor Frank Bohlen of the University of Connecticut said the dredges only dug into the ocean floor by a few inches, he said that any sediment stirred up would be very limited and would settle before reaching the beaches.

Madison Surf Club – (Mr. Dolan is a Madison Taxpayer)
Public Meeting, September 24, 1992

Joe Dolan, Frank's brother, of Guilford, speaking at the Special Town Meeting said "Shell fishing is like forestry – you can have old big trees that shut out the younger ones, all little trees – because you cut down the big ones – or some mixture in-between. Closing it now is like putting a fence around the stumps – what you really need is to open it and plant new trees – it's all dead –the clams got old and died. That's no mystery.

We showed you what needed to be done, a lot of clams were wasted – Madison has wasted a lot of shellfish in my time, I can tell you that."