A Brief History of Oyster Aquaculture in Rhode Island

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Shellfishing and consumption of shellfish from Narragansett Bay and Rhode Island’s coastal salt ponds has been known to be an important part of Rhode Island’s history from pre-colonial times. Roger Williams in a chapter on fish and fishing in his 1643 treatise on the language of the Narragansett Indians, noted that during the summer months they would wade and dive deep for shellfish.\(^1\) During the early colonial period, extensive oyster reefs were harvested for the consumption of the meats, but the oyster shells had higher value as a raw material for the manufacture of lime for use in masonry mortar. Limestone, a traditional raw material for lime kilns, is not readily available in southern New England, and surely contributed to the value of oyster shell as a source of calcium carbonate. By the early 1700s, the harvest of oysters exclusively for use as a raw material for lime production was a wasteful use of the marine resource so the Colonial Assembly outlawed the practice by statute in 1734 noting the unacceptable waste of oyster meats as unshucked oysters were fed into the kilns.\(^2\) This may well be the first instance of legislative action to promote conservation of Rhode Island’s marine resources.

During the later colonial period, oysters were not considered a luxury food as they are today, but growing populations in Rhode Island’s coastal towns provided a ready market. By 1766 the Colonial Assembly recognized that the oyster beds were being overfished and as a result they promulgated a statute specifying that oysters could only be taken by tongs.\(^2\) This early instance of the Colonial Assembly managing the shellfishery by specifying a specific fishing gear type certainly presages our modern fishery management protocols of restricting shellfishing effort by regulation of gear type. After the Revolution, the Rhode Island General Assembly enacted laws aimed at restricting harvest of oysters during the spawning season to further protect the resource. In 1798, a law mandating a seasonal closure of the oyster beds from May 1 to September 30 was enacted.\(^2\)

All of the early legislation by both Rhode Island’s Colonial Assembly and the post-Revolution General Assembly to regulate the oyster fisheries led to the state issuing the first grants of exclusive private harvest grants of the oyster banks. The first of these grants was to Samuel Thurber who petitioned the General Assembly in June 1798 for a two-acre grant near Sabin Point for the purpose of cultivating oysters. The General Assembly provided a renewable charter to Mr. Thurber for the term of six years and forbade the general public from “molesting or disturbing the said Samuel in his enjoyment of the provisions of his charter.”\(^3\) It is unclear if Mr. Thurber was successful in his oyster farming venture, but his pioneering charter was not renewed in 1804 upon its expiration. In 1822, the General Assembly granted another 2 acre charter in the Providence River to Mr. Earl Carpenter and Mr. Leonard Wilcox for their oyster farm. The success of
Carpenter and Wilcox in their oyster farming is attested by the 1828 renewal of their charter. Another early grant in 1827 was to Mr. Ephraim Gifford of Bristol who was granted several acres near Common Fence Point in Mount Hope Bay. Despite the granting of the exclusive rights to cultivate oysters on their grant areas, Thurber, Carpenter and Wilcox, and Gifford were not charged a lease fee for their grants. This fact of no lease fees and the exclusion of the public from harvesting in the grant areas generated considerable controversy among fishermen. At this time prior to the adoption Rhode Island’s 1843 constitution, the colonial King Charles Charter of 1646 was considered the unofficial constitution of Rhode Island. Fishermen seized upon the Charter provision:

\[
\text{Our Express Will and Pleasure is and we do by these Presents for Us our Heirs and Successors, ordain and Appoint, that these Presents shall not in any manner hinder any of our Loving Subjects whatsoever from using and exercising the trade of Fishing upon the Coast of New England in America; But that they, and every, or any of them shall have full and free power and liberty to Continue and use the Trade of Fishing upon the said Coasts in any of the Seas thereunto adjoining, or any Armes of the Seas, or Salt Water, Rivers and Creeks when they have been accustomed to Fish.}
\]

Despite the context of this 1646 passage referring to a statement that marine fisheries were to be treated as a common property resource, as opposed to long-standing common English law that game and wildlife was the property of the landowner (i.e. the King), the fishermen took this as evidence that the General Assembly had no right to make grants of commonly held fishing grounds or to regulate the fisheries. However the common property principle and the States’ right to manage their resources were reinforced by the 1842 U.S. Supreme Court decision in the case of Martin v. Lessee of Waddell:

\[
\text{When the revolution took place the people of each state became themselves sovereign; and in that character hold the absolute right to their navigable waters and the soils under them for their own common use, subject only to the rights since surrendered by the Constitution to the general government.}
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One year later in 1843, Rhode Island adopted its new Constitution in which the special status of the fisheries was set forth:

\[
\text{The people shall continue to enjoy and freely exercise all the rights of fishery, and the privileges of the shore, to which they have been heretofore entitled under the charter and usages of this state. But no new right is intended to be granted, nor any existing right impaired, by this declaration.}
\]

In light of the controversy surrounding the early aquaculture leases and the U.S. Supreme Court decision in the Martin v. Lessee of Waddell case, the General Assembly passed the Oyster Act of 1844, which was Rhode Island’s first aquaculture law. The Act established a system of leasing tracts of submerged land for the purpose of culturing oysters, as well as setting up a board of three shellfishery commissioners who served without salary and a fee structure for the leases. The fee structure ranged from a high of $10 per acre per year to a low of $1 per acre per year for larger multiple acre leases.
During that first year of leasing in 1844, $60 was generated in lease fees.\textsuperscript{8} One of the first lessees under the Oyster Act was Mr. Robert Pettis of Providence who by 1890 became one of the largest leaseholders in the state.\textsuperscript{8}

\textbf{Figure 1.} Growth and decline of Rhode Island’s oyster aquaculture industry between 1864 and 1933 as evidenced by oyster lease fees paid to the state. Data from Annual Reports of the Rhode Island Commissioners of Shellfisheries 1864 to 1933. Data are actual fees paid by lessees without correction for inflation.
Despite the clarity of legislative intent of the 1844 Oyster Act to enhance oyster production and to establish a clear set of leasing protocols, the newly established Rhode Island Shellfisheries Commission got off to a very rocky start. The fishermen on the public oyster grounds became openly rebellious. Stealing of oysters from the leases became rampant and arrests were made leading to a number of court cases in the 1850s that upheld the power of the General Assembly to grant the leases. By 1855, the General Assembly authorized the use of lease fees for the purchase of a patrol boat to watch the leases, but this also proved to be unsuccessful as those willing to lease new grounds were few and lease income declined in the 1850s. Further laws were passed in the 1850s aimed at improving the climate for shellfish aquaculture. An 1852 statute required all shell to be returned to beds to serve as setting substrate for oysters, and an 1854 statute allowed private aquaculture lessees to harvest five bushels of oysters per day from public beds to serve to seed the leased farms. Despite these legislative actions, by the end of the decade lease fees declined to zero prompting the General Assembly to require a report from the Commissioners as to the reasons. That report made in 1859 made reference to the above poaching problems and mentioned possible pollution of the oyster grounds by the Providence Gas Works. This was the first mention by any official publication of the state about possible deleterious effects of pollutants on oyster beds and a presaging of later (1905-1910) legal actions to be taken by oyster farmers and the Commissioners against the Providence Gas Company.

In 1864, the General Assembly amended the 1844 Oyster Act to improve the operations of the Shellfisheries Commission. The number of commissioners was reduced to one who would be elected to a five year term. Professionalization of the Commission was promoted by initiating an annual salary of $400 per annum for the Commissioner, and to increase the level of accountability and oversight, an annual report to the General Assembly was required. The first Commissioner of Shellfisheries after the 1864 restructuring of the Commission was the Honorable Judge John P. Knowles (later to be appointed Federal District Judge in Providence). During his five year tenure, Judge Knowles improved the performance of the office by improving collection of lease fees, terminating leases of lessees for non payment of fees, and establishing the annual report to the General Assembly. In that period of time from 1864 to 1869, confidence was restored and oystermen began taking out leases and the lease fees collected increased from $61 to $1,949.15.

Judge Knowles was replaced as Commissioner in 1869 by three elected commissioners with the Honorable James C. Collins serving as chairman. Collins served as a commissioner until his death in 1910. Under the able leadership of Collins, the oyster industry in Rhode Island grew into a multi-million dollar operation with lease fees paid to the State exceeding $100,000 (Figures 1 & 2). The amount of submerged lands leased for aquaculture peaked in 1911 & 1912 at about 21,000 acres or about 20 percent of the entire bottom of Narragansett Bay.

During the growth of the oyster aquaculture industry in the 1890s and 1900s the Shellfisheries Commissioners became concerned about the application of scientific methods to improve the production of the oyster farms. The annual reports of the Commissioners to the General Assembly became a primary outlet for the dissemination of studies contracted by the Commissioners aimed at improving oyster production. Studies
included population surveys of starfish in Narragansett Bay, studies on oxygen levels in Narragansett Bay waters, studies on pollutants in Narragansett Bay and studies on oyster spatfall rates.

Figure 2. Growth and decline of Rhode Island’s oyster aquaculture industry between 1864 and 1933 as evidenced by area of oyster farming leases. Data from Annual Reports of the Rhode Island Commissioners of Shellfisheries 1864 to 1933.
During this period of time, scientists at the newly established (1888) Rhode Island Agricultural Experiment Station (RIAES) and the Rhode Island College of Agriculture and Mechanical Arts (founded in 1892 & forerunner of the University of Rhode Island) became involved with the activities of the Shellfisheries Commissioners. Oyster farmers with leases in Point Judith Pond noticed that oyster production was declining in the pond for several years, so in 1895 they approached marine scientist Dr. George W. Field of the RIAES about investigating the reason for the decline in oyster production while at the same time production in Narragansett Bay was substantially increasing. As a result of these meetings, College President John H. Washburn authorized the establishment of Rhode Island’s first marine laboratory in the village of Jerusalem on Point Judith Pond in July 1896 (Figure 3). This laboratory is the third oldest marine laboratory in the United States, only preceded by the U.S. Fisheries Commission Laboratory founded in Woods Hole in 1875, and the Marine Biological Laboratory also founded in Woods Hole by famed Harvard naturalist Louis Agassiz in 1888. The Jerusalem Laboratory building has long been demolished, but the original site is now the Coastal Fisheries Laboratory of the Department of Environmental Management Division of Fish and Wildlife.

Figure 3. Rhode Island Agricultural Experiment Station Marine Laboratory at Jerusalem on Point Judith Pond. Photo taken in 1897 shows a steam tractor and nets for sampling the pond bottom. (Photo courtesy of University of Rhode Island Special Collections)

During the summer of 1896, Dr. Field measured oxygen levels in Point Judith Pond and measured rates of siltation on the oyster beds and measured levels of ammonia in the water as well as determining dissolved oxygen levels in the pond using the then new Winkler titration method. Dr. Field then reported his finding in an Agricultural Experiment
Station Annual Report concluding that the oyster beds were being smothered by silt being deposited on the oyster beds from the Saugatucket River and low oxygen conditions caused by lack of a permanent breachway in the pond and thus the lack of adequate tidal flushing. Interestingly, the 1896 RIAES report made no mention of the fact that two major textile mills in Peace Dale and Wakefield on the Saugatucket River were known to discharge a variety of ammonia and dye-laden effluents as a byproduct of their manufacturing processes. Never-the-less, Dr. Field concluded that a solution to the problem of declining oyster production would be to open and maintain a permanent breachway in Point Judith Pond. The Commissioners invited Dr. Field to abstract his findings in the 1899 Annual Report to the General Assembly. As a result of these reports, the General Assembly began the process to raise funds to open the permanent breachway into Point Judith Pond. A 1901 statute moved the responsibility of leasing oyster farms in Point Judith Pond from the Shellfisheries Commission to the Towns of South Kingstown and Narragansett (provided that they use the funds to open and maintain the breachway). Of course these early actions eventually led to the initial opening of a permanent breachway in the early 1900s and the build up of the major fishing port at the village of Galilee.

As an additional note, the 1901 delegation of leasing authority by the legislature to the towns led to yet another court challenge of oyster leases. In State v. Nelson (1910) the defendant Nelson was arrested for taking a peck of oysters from the lease of George Griffin of South Kingstown. Nelson alleged that there was an unlawful delegation of authority by the legislature under the aegis of RI Constitution Article I Section 17 because the towns did not reserve any part of the pond for the free and common fishery. The court found yet again that the General Assembly was well within its right to delegate authority to the towns and further that it was proper for the towns to raise funds from benefiting parties to recoup expenses for opening and maintaining the breachway.

During the decades of the 1900s through the 1920s the Shellfisheries Commissioners reports began to show greater concern about the chemical and bacteriological integrity of shellfish growing waters. In 1905, a landmark court case was first brought by oyster lease holders Payne and Butler against the Providence Gas Company for discharging coal tar and other noxious pollutants on their oyster leases thereby killing the oysters. In the case the Court reaffirmed that the oyster leases granted by the General Assembly or the Shellfisheries Commission were valid but in the trial there was considerable back and forth expert testimony about the actual toxicity of the discharged chemical wastes on the oyster health. Dr. George Field (who gained notability for his 1896 RIAES recommendations about pollution abatement in Point Judith Pond, but he had since moved to Massachusetts to work on other water quality projects) served as a consultant to the plaintiffs and the Shellfisheries Commissioners. Field reported his findings on the toxicity of coal tar to oysters to the Court and the ultimate 1910 Court finding was that the destruction of the shellfish bed by pollution did in fact constitute a nuisance.

Growing interstate trade of shellfish and documented outbreaks of various illnesses associated with consumption of raw shellfish since the late 19th Century led to national effort to develop a National Shellfish Sanitation Program. Prior to the adoption of the NSSP nationwide in 1925, the RI Shellfisheries Commissioners undertook pioneering of bacteriological studies in 1910 on water and shellfish meat quality to assess Rhode Island’s
sanitary water quality status. Oyster beds north of Conimicut Point were shown to be most contaminated.\textsuperscript{20}

Peak production of oysters in Rhode Island occurred around 1911 with 1,394,983 bushels of oysters landed, with an additional 1,331,192 gallons of shucked oyster meats sold as well.\textsuperscript{21} Assuming 80 pieces per bushel, 8 lbs/gallon and today’s retail prices of 75 cents apiece and $5.00/lb shucked meats, these oysters would collectively be worth about $135 million. It was a substantial industry in its day (Figure 4).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{oyster_shell_piles.png}
\caption{Oyster shell piles from two oyster shucking houses at Fields Point, Providence 1911. (Photo from 1912 Annual Report of the RI Shellfisheries Commissioners).}
\end{figure}

The decline of the oyster industry was evident to the Shellfisheries Commissioners by the early 1920s. According to an account in the 1921 Annual Report:

\begin{quote}
The main cause for our decline of our oyster industry is large quantities of oil floating on the waters of our rivers, bay and tributaries; but all authorities agree that the instant spawn come in contact with any oil, it is instantly killed.\textsuperscript{22}
\end{quote}

Despite the Commissioners’ recognition that oil pollutants might have a negative effect on oyster larvae, there were other potential pollutants discharged in the 1920s that could have affected the shellfish. For example, the modern electroplating process invented in England in the 1840s is well known to have been adopted as an industrial process in Providence.\textsuperscript{23} Heavy metal ion effluents from waste electroplating baths are known to have deleterious effects on oyster and other bivalve larvae.\textsuperscript{24} Alternatively, the sewering of
Providence during the 1910s has lead to greater nutrient and carbon loading to the Upper Bay that could lead to hypoxic events. Silt-laden runoff from deforested upland farm areas common in the 1920s and 1930s could be another explanation. Whatever the exact cause or combination of causes, pollution of some form was likely to have been the reason for the oyster industry decline in the 1920s.

In the 1921 report, the Commissioners made lengthy note of Dr. William F. Wells’ successful establishment of an oyster hatchery in West Sayville, New York, and suggested that artificial propagation of seed oysters might be a means to escape pollution’s effects on larval and juvenile oysters. Clearly finances were a barrier to establishing an oyster hatchery in the 1920s, but in the following decade, famed oyster biologist Dr. Paul S. Galtsoff of the U.S. Bureau of Commercial Fisheries was invited in 1936 to the Rhode Island State College’s Narragansett Marine Laboratory (now URI’s Narragansett Bay Campus) to experiment with the propagation of oysters. Rhode Island’s first oyster hatchery was established by Galtsoff in a small building known as the North Laboratory near the end of South Ferry Road that is now known as the Helen Mosby Center (Figure 5). Dr. Galtsoff’s very valuable collection of oyster literature and scientific reprints is now housed in the Challenger Room of URI’s nearby Pell Marine Science Library.

Figure 5. Building at the URI Narragansett Bay Campus that was used by oyster biologist Dr. Paul S. Galtsoff at the invite of Dr. Charles Fish to establish Rhode Island’s first oyster hatchery in 1936. (Photo by M.A. Rice 2005)

The Rhode Island oyster industry continued its decline into the 1930s, with the great depression taking its toll on marketing and sales. Political change in Rhode Island during the mid-1930s may also have had a negative impact on the oyster industry.
major shift in the political landscape of Rhode Island occurred with the 1932 election of Governor T.F. Green and a subsequent shift in the General Assembly to be dominated by more populist policies. A number of social historians suggested that the demise of Rhode Island’s textile industry and the ‘mill town’ system were brought about as a result of the policy shifts and this is likely to be so for the oyster industry as well. The industry was dealt a crushing blow on September 21, 1938 when the Great Hurricane roared up Narragansett Bay damaging shucking houses, shipping wharves and the oyster vessels (Figure 6). Many oyster companies never reopened as a result of the hurricane. In addition to the 1938 Hurricane, the onset of World War II in 1941 deprived the remaining oyster companies of able-bodied labor, further eroding the business.

Figure 6. The Great Hurricane of 1938 severely damaged wharves, warehouses and other shoreside facilities throughout the state. (Photo by Providence Journal)

In 1949, there was a major shift in the governance of the oyster leasing system. The Commissioners of Shellfisheries was abolished and their function was subsumed into the newly formed Department of Fish and Wildlife, which continues on to the present as a division within the Department of Environmental Management. By the early 1950s there were only two of the remaining oyster companies in business. The Blount Oyster Company of Warren transformed itself into the Blount Seafood Corporation processing offshore ocean quahogs for the manufacture of soups, and the last remaining oyster lessee, the Warren Oyster Company ceased operations in 1954.

For the next two decades there was very little interest in any aquaculture and the state’s aquaculture leasing system became moribund. In 1971, the Coastal Resources Management Council was established by the General Assembly and the Council took office
in August of that year. Among the responsibilities of the CRMC was the processing of leases for aquaculture. Beginning in 1976, there was a renewed interest in shellfish leases beginning with Mr. Luther Blount, a Warren Shipbuilder and member of the Blount family who was prominent as oyster growers during the heyday of the industry. On December 14, 1976, the CRMC granted permission to Mr. Blount to construct two tidally flushed ‘oyster ponds’ on the north end of Prudence Island along Jenny’s Creek. As an educational program, Mr. Blount worked with the curation staff of the Roger Williams Park Museum to create a model of the farm for display. Although few oysters grew to salable size in the ponds, they did serve to educate the public about the potential for restoring shellfish aquaculture to Rhode Island. Between 1977 and 1980, under the old oyster leasing permit laws CRMC granted 13 more aquaculture permits, most of them small 1 acre or less plots in the coastal salt ponds. The exception to this was the 1978 granting of 60 acres to Blue Gold Mussel Farm in the East Passage adjacent to the old Navy Base facilities in Middletown.

This granting of a 60 acre lease for aquaculture under the old leasing system caused a storm of protest by quahoggers, who pointed out that the leasing of such public trust land was done with not so much as a formal public hearing. The controversy prompted then-Governor J. Joseph Garrahy in 1980 to ask CRMC to issue a moratorium on aquaculture leases and to conduct a study on aquaculture as a compatible use in the Bay. After a year’s study there was a conclusion that aquaculture was indeed a compatible use, but there was a complete rewrite of the aquaculture laws (Chapter 20-10 of the General Laws) to include a system of public hearings and review of all aquaculture lease applications by the Rhode Island Marine Fisheries Council. In 1983, the CRMC published their Coastal Resources Management Program (CRMP) or ‘red book’ which contained Section 300.11 that outlined procedures for aquaculture lease application. After the promulgation of the revised aquaculture laws and CRMP, there were few new aquaculture applications received by CRMC, and most of the aquaculture leases granted during the 1977 to 1980 time period were left to expire and were not renewed. By 1990 there were only four small leases left in the coastal ponds. The Blue Gold Company moved their operations to New Bedford in 1988 and ceased growing mussels in Rhode Island.

Renewed interest in aquaculture leasing began in 1988 when Robert B. Rheault, Jr. and his partner Robert Bergen of Spatco Ltd. submitted an application for a very small 50 ft by 50 ft aquaculture lease in Point Judith Pond. This was the first real ‘test case’ of the revised 1981 aquaculture laws. The Spatco (aka Moonstone Oysters) application was finally approved in 1990 but only after 14 different public hearings by several different agencies and boards. The whole process of multiple hearings and nearly two-year time frame to obtain an aquaculture lease was seen as an impediment to the promotion of Rhode Island’s nascent aquaculture industry. The year 1993 brought the incorporation of the Ocean State Aquaculture Association and the publication of its OSAA Newsletter, aimed at educating the policy makers and the public about the benefits of a Rhode Island aquaculture industry. A year later, a report by URI Resource Economists James Anderson and Mark Spatz provided a comprehensive review policy and economic constraints faced by Rhode Island’s aquaculturists. As a result of the findings in this report and other publications, CRMC member Rep. Eileen S. Naughton of Warwick created the Legislative Commission on Aquaculture with a charge to investigate the means to promote and foster
environmentally sound forms of aquaculture in Rhode Island. The first act of the Commission was to further study the opportunities and constraints of aquaculture. During the 1995 & 1996 legislative sessions, the Aquaculture Commission held televised hearings on the opportunities and constraints of aquaculture and heard from a wide variety of witnesses ranging from regulators, fishermen, seafood marketers, economists, gear suppliers and aquaculture practitioners. As a result of the Commission’s work, legislation was passed in 1996 that established CRMC as the coordinating agency for the permitting of all aquaculture projects in the state regardless of location and type. Further, it streamlined the hearing process and created a coordinated application process and required annual reporting to the General Assembly. As part of this legislative package, funds were appropriated to CRMC to create a position of ‘Aquaculture Coordinator’.

Since the implementation of the 1996 revisions to the aquaculture laws, aquaculture has grown in value of product sales from $83,518 in 1995 to $744,319 in 2005 and the number of farms has grown from six to 24. The Rhode Island aquaculture industry is no longer moribund as evidenced by this steady and healthy rate of growth. But the industry is still dominated by the aquaculture of oysters that goes to what the old oystermen knew, which is, there was no better place to grow oysters but in Rhode Island.