THE PROMISES OF AQUACULTURE AND *CAVEAT EMPTOR*

Since the science-centric zeitgeist of the post-Sputnik 1960s, aquaculture has captured the imagination of much of the general public in America and elsewhere. In its origins, American President John F. Kennedy said in a letter to the President of the Senate and the Speaker of the House of Representatives, May 29, 1961, "We are just at the threshold of our knowledge of the oceans . . . [This] knowledge is more than a matter of curiosity. Our very survival may hinge upon it."

*By Michael A. Rice**

Kennedy's successor President Lyndon Johnson along with his former colleague and close friend in the U.S. Senate, Senator Warren Magnuson of Washington championed the formation of a national ocean policy commission in 1965 focusing on a host of ocean and environmental protection policies, including aquaculture. This commission soon became known as the Stratton Commission, named after its chairman Julius A. Stratton of the Ford Foundation and it had members from federal government agencies, leading universities with marine science programs, the business community, and advisors.

The Stratton Commission had a strong influence on ocean and environmental legislation in the United States, which included the National Sea Grant College Program of 1966, National Environmental Policy Act of 1969, Clean Water Act of 1972,

Figure 1. Carolina shellfishing.

Coastal Zone Management Act of 1972, and the Magnuson Fishery and Conservation Management Act of 1976. And the Commission's findings even influenced discussions about marine resource usage internationally, most notably through the highly influential Third United Nations Conference on Law of the Sea (UNCLOS III) that began in 1973.

Beyond the active legislative and policy discussions of the 1960s and 1970s, the public imagination was captured about the promises of aquaculture as a key player in feeding the world. Famed scuba pioneer, explorer, ocean conservation proponent and film maker, Jacques Y. Cousteau became a very high profile advocate for farming of the oceans:

"With Earth's burgeoning human populations to feed, we must turn to the sea with new understanding and new technology. We must farm it as we farm the land." Jacques Cousteau, 1973

Figure 2. RI-Quahog Rake.

"In his exploitation of the sea man is still a barbarian, a ruthless hunter slaughtering whole species of animals without heeding the consequences. With earth's burgeoning human populations to feed we must turn to the sea with new understanding and new technology. We need to farm it as we farm the land. This is called mariculture. It has just begun. … with properly managing limited bodies of water. In such controlled volumes the ideal conditions can be maintained all year and by ensuring fertilization and protecting the larvae from predators, incredibly high yields can be obtained from a number of protein-rich populations. High efficiency sea farms totaling the size of Switzerland would produce more food than all fisheries combined." Jacques Cousteau, 1973.

And, *"In the past 10,000 years we have learned to irrigate, fertilize, and develop hardy breeds of grain and stock. An acre of land, scientifically farmed, is far more useful in human terms than an agriculturally idle one. Yet thousands of years after we abandoned hunting on land as an inefficient method of obtaining food, we continue to pursue the creatures of the sea with the attitudes of cavemen. Ocean farming – mariculture – can protect the natural stock in the sea as well as vastly supplement our food supply."* Jacques Cousteau, 1979.

Much of this exciting marine policy and public advocacy work was going on while I was still in high school and an undergraduate student in California. At the time, there were two influential books that helped set me upon my career path, they were: *Aquaculture; the Farming and Husbandry of Fresh Water and Marine Organisms*, by Drs. John Bardach, John Ryther and William McLarney, published by Wiley and Sons in 1972; and *Underwater California* by Dr. Wheeler J. North, published by University of California Press in 1975. Dr. North, based at Cal Tech's Kerckhoff Marine Laboratory in Corona del Mar, was also a scuba pioneer and considered to be the Jacques Cousteau of Southern California, having expertise in kelp forest ecology, mariculture and economic uses for harvested kelp.

I was fortunate to meet and get to know Dr. North when I was in graduate school at nearby UC Irvine as he was a close friend in the social circles of my major professor Grover Stephens. And I was a direct beneficiary of these heady days of the Stratton Commission by being one of the first California Sea Grant Graduate Student Fellows at UCI. There was lots of economic promise for this new field of aquaculture at the time. However, for me and many of my colleagues, the attractive business aspect of private aquaculture was not the primary impetus for getting involved. Most of us entered this field with some sense of idealism, recognizing that seaweeds as well as invertebrates and fish feeding low on the food chain may have the greatest promise for providing relatively inexpensive protein and alleviating world hunger in the long term. Some of this same excitement about the promise of aquaculture has carried forward over the years inspiring new generations of aquaculture scientists and professional practitioners.

However, uncritical excitement about the promises of aquaculture

can be problematic by fostering conditions ripe for unscrupulous or under-informed individuals to exploit. For example, in the early 1990s there was a high profile legislative effort to improve the regulatory climate for commercial aquaculture in my home state of Rhode Island. At issue was the ease (or lack of it) with which privately held aquaculture leases would be granted in the state's public waters. Reform of the aquaculture laws had come to the forefront in state legislative affairs and it caught the imagination of the popular press, creating great angst among members of the state's iconic quahog or hard clam *(Mercenaria mercenara)* wild harvest fishery.

In the summer of 1997 during the height of all the legislative controversy, an aquaculture promoter stepped forward to work with the quahoggers to develop a shellfish aquaculture hatchery and nursery system to seed all the natural shellfish beds of the state. The quahog hatchery would be located at one of the marinas where many quahoggers had their boats docked, and the boat docks in turn would hold the then newly developed floating upweller shellfish nursery systems (FLUPSYs) to be managed by the shellfishers themselves (Figure 3). A certain percentage of their quahog catch revenues would be reinvested into the hatchery and quahog nursery systems. The idea was unqualifiedly popular with quahoggers, the shellfish dealers serving the existing industry, and some members of the shellfish regulatory community, including the state's Division of Fish and Wildlife and its parent agency the Rhode Island Department of Environmental Management (RIDEM) who were well vested in the procedures for managing the wild harvest fishery. Everybody seemed to love *public aquaculture.*

As part of the public aquaculture promotion effort, Warwick Marine Resources, Inc. was created as a Delaware non-profit corporation, and key stakeholders, potential investors and community opinion leaders were recruited into its board of directors. One of the first investors approached to join the board was an executive from Rhode Island based G-tech Corporation, a manufacturer of electronic gaming devices supplying the growing casino industry on Native American reservation lands in nearby Connecticut. As an electronics firm, G-tech was interested in possibly developing an electronic water monitoring apparatus for the FLUPSYs. As a gesture of goodwill, they funded helicopter overflights of Narragansett Bay for the promoter and quahoggers to locate possible areas for quahog seeding.

Other members of the board of directors included the president of the Rhode Island Shellfishermen's Association, the chief legal counsel of RIDEM, Eileen S. Naughton the member of the Rhode Island House of Representatives who was the primary author of the aquaculture reform legislation then under consideration, myself as a shellfish researcher and extension faculty member at the University of Rhode Island, and Dr. Robert Rheault, who was the proprietor of Rhode Island's only operating shellfish hatchery at the time. He is currently the executive director of the East Coast Shellfish Growers Association. Rheault was contracted by Warwick Marine Resources, Inc. to produce initial batches of quahog seed in his hatchery to supply a highly publicized "First Seeding Effort" on the shellfishing grounds in October 6, 1997 (See Figure 4).

Figure 3. FLUPSY Rheault.

Problems began to arise with the effort about the time "First Seeding" was scheduled. First, from the time I was first contacted to be on the board late in the summer 1997, I had asked to see the *pro-forma* financial plan because I could not figure out from the pretty diagrams and summaries presented at the board meeting where the money was coming from to fund the helicopters and R&D for electronic monitoring systems for the FLUPSYs. Furthermore, I could not understand how all this was going to work in the long run given the known knowledge about quahog seed mortality rates in the wild. Nothing was forthcoming from the promoter and there were indications that he was very annoyed by my questions. Then, there was an issue arising when Rheault had delivered several batches of quahog seed for the preliminary seeding ef-

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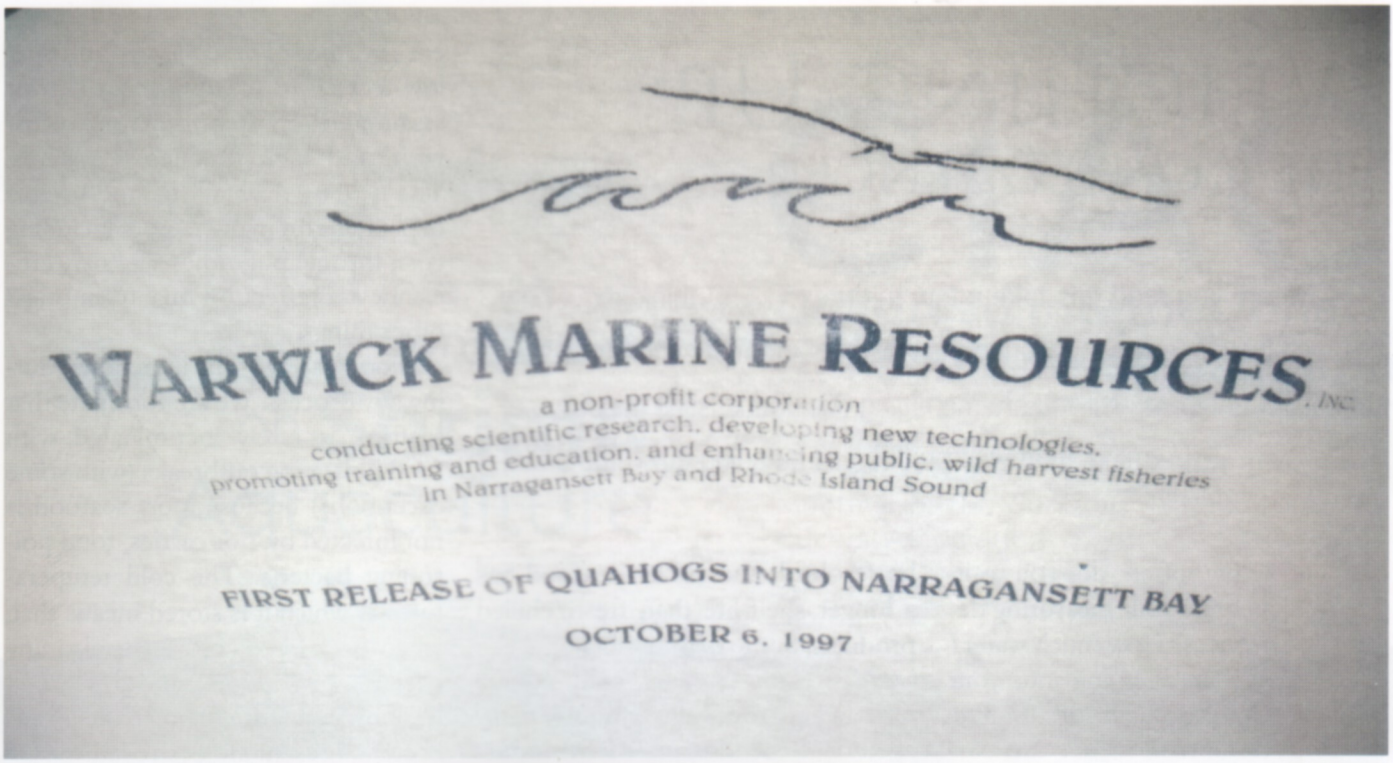

Figure 4. Warwick Marine Resources.

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forts and had not gotten paid a dime for any of it.

But the clincher occurred when the chief legal counsel of RIDEM was contacted by a real estate broker in Arizona asking if it was true that the Board of Directors of Warwick Marine Resources, Inc. had authorized the co-signing of a real estate investment deal in metro-Phoenix. Of course there was no such authorization, and this prompted the RIDEM legal counsel to contact both the RI State Police and the local office of the FBI to begin investigations. Everybody involved was questioned. In the end it did not go so well for the promoter who was eventually convicted of financial fraud and was sent to prison. One of the final unpaid bills coming in was from a law firm in Delaware for services to incorporate Warwick Marine Resources as an IRS non-profit organization under Section 501(c), thus exempting the organization from Delaware corporate income tax.

Fortunately it is very rare to see such blatant cases of outright premeditated financial fraud associated with aquaculture, but the more common problem is in unqualified yet very enthusiastic individuals after catching the 'aquaculture bug' being overly confident and promising more than can be realistically delivered. Be sure to take a hard look at their business plan and especially the *pro-forma* financial numbers and projections, and read all that fine print. The old Romans had it right with the classic warning, *Caveat emptor*!

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