A Brief History of the American Fish Culture Company:
Rhode Island's Pioneering Trout Aquaculture Farm, 1877-1997

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Aquaculture—the rearing of farming of fish or other aquatic organisms under controlled conditions—is frequently equated in Rhode Island with the cultivation of oysters. Indeed, the very substantial oyster aquaculture industry in Narragansett Bay from the mid-1800s to the mid-twentieth century contributed mightily to the state’s economy, and the considerable growth of oyster cultivation in recent years is testimony to the importance of this segment of Rhode Island aquaculture.¹

But while shellfish as a commodity have been most prominent in its aquaculture production and sales, the state also contributed significantly to the development of the nation’s trout-farming industry, introducing a number of technical innovations in production and marketing. At one time in the 1920s Rhode Island boasted the country’s largest freshwater fish farm in terms of gross production and sales of brook trout (Salvelinus fontinalis). Yet despite this farm’s commercial success, which extended to the 1970s, and its expansion into the farming of brown trout (Salmo trutta) and rainbow trout (Oncorhynchus mykiss), the American Fish Culture Company ultimately failed to innovate, modernize its facilities, realize the advantages of environmental legislation, or partner with the scientific community; and as a result the company disappeared entirely in 1997.²

The approximately 570 acres of land on which the American Fish Culture Company would become established were purchased by Rowland Gibson Hazard I (1801-1888) in 1843 as part of his acquisition of a textile mill on the Pawcatuck River in the town of Richmond. Hazard expanded the mill shortly thereafter and founded the village of Carolina, naming it for his wife, Caroline Newbold Hazard of South Kingstown.³

By the mid-1850s fish culturists had become concerned about the loss of anadromous fish runs, the natural habitat of trout, to dams and industrialization throughout New England, and they turned to the farming of brown trout for stocking streams and rivers.⁴ Beginning in 1856 in Massachusetts, fishery commissions were set up in the Northeast to restock their states’ depleted waterways, and by 1870 all the New England states, as well as Pennsylvania, New York, and New Jersey, had established such commissions.⁵ The Rhode Island commission, known formally as the Commissioners for Inland Fisheries, was instituted in 1872.⁶ With freshwater fisheries depleted and a strong demand for trout in seafood markets, Rhode Island entrepreneurs recognized the economic incentive for the development of fish farms.

The first fish farmer in Rhode Island was John W. Hoxie of Richmond (1828-1903), who in 1877 established the Clearwater Trout Farm on land acquired in Carolina on a ten-year lease from Rowland Hazard I. Owing to his careful study of the habits of the brook trout during his first year of operation Hoxie was able to sell the state’s Commissioners of Inland Fisheries some 40,000 eyed eggs (fertilized eggs with developing fish embryos) for stocking Rhode Island waters; and his production quickly climbed to some 2 million fish fry (young fish hatched from eggs) annually, most of which were sold out of state.⁷ In 1879 Charles A. Hoxie started his own brook-trout farm, White Brook Trout Hatchery, on a plot of land, also leased from Hazard for ten years, adjacent to his brother John Hoxie’s farm.⁸ By 1890 Charles Hoxie, too, was selling 40,000 eyed eggs to the Rhode Island commissioners. By 1900, after the commissioners had determined that yearling brook trout were superior for stocking waterways, Charles Hoxie was annually
The main pond at the Perryville fish hatchery in South Kingstown remains much the same as it was when the hatchery was operated by the American Fish Culture Company. Here the pond is shown being mechanically aerated to keep midsummer dissolved oxygen at an acceptable level for fish survival. Photograph by the author, 1994.
supplying 40,000 yearling trout, rather than eyed eggs, to the state.9

Water usage rights were a major concern from the earliest days of the farms. A mill and dam owner downstream from the farms, Abel Tanner, could potentially flood the farms if his millpond behind his dam were to be filled to capacity. The matter was apparently settled when an agreement between Tanner and Charles Hoxie, with a fifteen-year term and a monetary payment, was signed in May 1881. (The issue of water rights would later reappear with Tanner's descendants, and at that time it would be settled by a similar agreement, executed in 1928 between Elias Tanner and the American Fish Culture Company.)10 Both Hoxie brothers continued in the brook-trout culture business through the 1880s, with John Hoxie renewing his lease with Rowland Hazard I in 1887. When his own lease expired in 1889, Charles Hoxie purchased the land on which his White Brook Trout Hatchery stood, with a $1,400 mortgage held by Rowland Hazard II (1829-1898).11

The Hazard family began to take a direct interest in the business of the White Brook Trout Hatchery in 1892, when, at the urging of Rowland Hazard II, the American Fish Culture Company (AFC) was incorporated in Maine, with an office in Saco. Charles A. Hoxie was the principal stockholder in the new company, and Rowland Hazard II and others were minority shareholders.12 Upon the death of Rowland Hazard II in 1898, his interest in the AFC was transferred to the R. Hazard Estate, which consisted of Rowland’s children: Rowland Gibson Hazard II (1855-1918), Caroline Hazard (1869-1945), Helen Hazard Bacon (1861-1925), Margaret Hazard Fisher (1867-1947), and the estate of Frederick R. Hazard (1858-1896). The R. Hazard Estate gained a controlling interest in the corporation in 1899 with an agreement between the estate and Charles Hoxie that also canceled Hoxie’s 1879 mortgage.13

Ozias C. Goodwin (1850-1921), who had been the estate’s secretary, was now appointed its president, maintaining his offices at the Hazard office block on Kingstown Road in Peace Dale. Charles Hoxie remained on the farm as manager, with his son Fred Dean Hoxie (1871-1944) as assistant manager and on-site bookkeeper. The five years during which Goodwin served as president were a time of considerable activity and growth for the AFC. Several extant letters between Goodwin in Peace Dale and Charles and Fred Hoxie at the fish farm detail a major effort to develop canned trout as a product to augment the company’s sale of fresh brook trout and eggs and fry for stocking purposes. Goodwin first discussed the canning of fish in a letter of July 31, 1899, and on August 29 and September 2, 1901, he discussed the methods of cost accounting for canned fish in comparison to those for live fish.14

With the company selling cans containing two-thirds of a pound of fish for fifty cents a can, the same price per pound as it charged for whole fresh fish, its production of canned fish grew considerably during 1902 and 1903. On
May 16, 1903, Goodwin wrote to Hazard family business associate Armand Solvay (the son of famed industrial chemist Ernst Solvay) in Brussels, Belgium, informing him that the accompanying case of canned trout, packed in Bordeaux olive oil, was an example of the American Fish Culture Company’s best product, and that the AFC’s production of canned trout was then exceeding 30,000 pounds a year. But despite such attempts to market in Europe, the company engaged in sales of canned trout for only a relatively short time, until 1909.15

Although Goodwin spent most of his time in Peace Dale, he seems to have kept a very tight watch on farm operations in Carolina. Examples abound in the outgoing letters file, including a letter dated February 25, 1903, in which Goodwin provided detailed guidance for setting up the water supply and plumbing within a new hatch house. In other letters he provided guidance on accounting procedures, kept tabs on farm expenditures, and was always looking for marketing opportunities. While serving as the estate’s secretary-treasurer after his service as its president, Goodwin was responsible for developing lucrative markets for fish in the Detroit area, as evidenced by a letter to Goodwin dated March 1, 1915, from Hazard family business associate J. D. Sanders, in which a number of contacts with major fish wholesalers were established.16

The R. Hazard Estate acquired full interest in the Clearwater Trout Farm when John Hoxie died in 1903, and the farm was leased to the American Fish Culture Company shortly thereafter.17 Between 1903 and 1926 the two farms were operated separately under the American Fish Culture Company’s name, with the Clearwater Trout Farm known informally as the Upper Works and the White Brook Trout Hatchery as the Lower Works; fish were mainly produced in a series of raceways along the White Brook stretching from the Upper to the Lower Works. After the death of Charles Hoxie in 1904, his son Fred D. Hoxie became vice president of the corporation and general manager of the operations in Carolina.

Administered primarily by Rowland Gibson Hazard II, the R. Hazard Estate was maintained as an unincorporated family trust into the second decade of the twentieth century, but after Hazard fell ill in 1915, a decision was made to incorporate the trust and divest some of its very extensive financial holdings. When the estate was incorporated in Rhode Island in 1917, the controlling interest in the American Fish Culture Company (a Maine corporation) was transferred to the newly incorporated estate trust.18 Goodwin served as the secretary-treasurer of the estate corporation until his death in 1921, when he was succeeded by John R. Carpenter, who would continue in that position until the corporation was dissolved in 1950.19

After the death of Rowland G. Hazard II in 1913, his son, Roland Hazard III (1881-1949), assumed the management of the R. Hazard Estate holdings and became the president of the AFC.20 During this time the company’s operations had grown considerably, as reported in the Providence Journal in 1921: “For annual shipments as high as 18,000,000 trout fry, and of full grown fish, as many as 60,000 pounds are being made from the hatchery of the American Fish Culture Company, which has by far the biggest trout hatchery in this country at its estate in Carolina. State authorities as far west as Michigan, Wisconsin and Minnesota depend for their stocking supplies on the Rhode Island product, while millions of the fry have been used for replenishing the depleted native stock in other states, including New York, New Jersey and Connecticut.”21

For its substantial fish production, the company required a reliable source and amount of fish feed. Prior to the early 1920s, when the first practical prepared fish diets were produced widely on a commercial scale, trout farms used a variety of feeds that consisted mostly of animal byproducts, including pork and sheep plucks (lungs, hearts, and windpipes), other animal entrails and livers, fish meal (dried and ground-up trash fish), condemned canned salmon (spoiled and unfit for human consumption), and fish processing wastes.22 A 1907 contract provides some insight into the volume of feed the AFC required. On a specified schedule between September 7, 1907, and August 22, 1908, the North
Packing and Provision Company of Boston agreed to ship to Carolina a total of 1,160 iced barrels, of 216 pounds net weight each, containing hog placers for fish feed, at a price of sixty-five cents per dozen hog placers—a total of 250,560 pounds of feed for that period, which appears to be a reasonable amount of feed for the production of about 60,000 pounds of trout. The 1921 Providence Journal article explains how the feed was prepared and fed to the fish: “Another use for [the farm’s] machinery is in the preparation of food for the fish. For this purpose, lamb and sheep’s livers are used. They are ground to a pulp by a food chopper for the smallest fish, and to a larger size, somewhat resembling worms, for the bigger fish. ‘Feeding the fish’ is simply the process of carrying this ground meat in a pail and throwing it by dipperfuls into the water. The fish are always ‘hungry’ and will dash wildly to the point where the food is thrown into the water.”

The Westerly Sun reported in 1929 that the company had produced 60,000 pounds of three species of trout (brook, brown, and rainbow) the previous year. By 1929 the entrails and other meat byproducts used for feeding these trout were replaced by herring, menhaden, and other abundant “trash fish.” In that year the AFC built a freezing plant-ice house at Carolina capable of making ice and freezing 2.5 tons of trash fish a day. Most of the fish feed used during the 1930s and 1940s was the by-catch, or trash fish, that came from Point Judith and was frozen into 300-pound blocks and stored in the Carolina ice house. The company employed a fishing boat and a crew of four at Point Judith, Galilee, for supplying the feed. The AFC’s 32-foot eastern-rigged trawler Jane Elizabeth, built in Narragansett by Clifford Whaley in 1937, was sunk at Galilee harbor during the great hurricane of 1938, after which it was salvaged and repaired. In addition to catching fish by boat, beached seines were used by the AFC crew during spring fish runs to supplement the trout feed supply.

An administrative reorganization of the American Fish Culture Company occurred in 1926 while Rowland Hazard III was its president. At that time the principal investors in the Hazard Estate began the process of liquidating and distributing the estate trust’s assets. As part of that process it was decided at a November 1926 meeting of the AFC’s board of directors that the Maine corporation would be dissolved and the company reincorporated under the laws of Rhode Island, with an authorized capital of 5,000 shares of common stock without par value. Corporate papers were filed in Rhode Island on November 10, 1926, and six days later the old Hoxie leaseholds of the Upper Works
and the Lower Works were joined and transferred from the R. Hazard Estate to the American Fish Culture Company, now a Rhode Island corporation. Rowland Hazard III remained as the company's president until 1928, when he was succeeded by his younger brother Thomas Pierronet Hazard (1892-1968). Rowland Hazard III nevertheless remained active as a stockholder with the company from his residence in New York City, where, until his death in 1949, he oversaw the AFC's sales of fish at the Fulton Fish Market and other market outlets in the city and served as the manager of the Eastern Trout Growers Association, an organization that was begun in the 1920s with the AFC as one of its founding members and that remained active through the 1930s and 1940s.

President Dwight D. Eisenhower (center) holds a speckled brook trout at Hianoland, the fishing retreat of W. Alton Jones (right), circa 1955. The person at the left is unidentified. Courtesy of the University of Rhode Island's Special Collections.

Sales reports from 1928 to 1934 indicate that there were substantial sales of whole iced brook trout to New York and several notable restaurants and hotels throughout the Northeast. However, most of the company's sales were of live trout for stocking ponds. These were bought by fishing clubs and private individuals, including former president Herbert Hoover, Rhode Island senator Peter Gerry, and boxing champion Gene Tunney, all of whom enjoyed fly fishing and maintained their own trout ponds. One of the AFC's Rhode Island clients in the 1930s was "Hianoland" in West Greenwich. The fishing retreat of Cities Service Petroleum Company chairman W. Alton Jones, in 1962 Hianoland became the W. Alton Jones Campus of the University of Rhode Island.

Through the 1930s the company employed a crew of traveling salesmen whose pay was based upon commissions from their sales. With company president Thomas Hazard classifying customers according to the frequency and size of their purchases, salesmen were paid commissions of 1 percent for sales to "Certain" customers, 5 percent for sales to "Doubtful" customers, and 10 percent for sales to "Open/New" customers. Despite the generally abysmal economic conditions during the 1930s, the AFC received a "Satisfactory" financial rating in 1936 from Dun & Bradstreet: "This company has a well equipped plant for this type of business, is well stocked, and controls a good sized following. Those interested are highly regarded, have good means, and watch the company's affairs closely. Expenses are well in hand, and it has sufficient capital to properly finance affairs."

Business during the 1930s was brisk enough for the company to develop a satellite fish-production facility in 1938 at the village of Perryville in South Kingstown. The Perryville hatchery consisted mainly of a large artesian spring-fed pond that provided supplemental water and space for adult fish production. This facility operated as part of the AFC for about seventeen years, until it was transferred to the Rhode Island Department of Fish and Wildlife in 1955 to serve as a state hatchery. Another development of the time was the establishment of the Carolina Black Bass Hatchery in April 1935 by William F. Tanner and AFC manager Roland E. Eddy on land leased from Tanner's father, Elias, downstream from the Carolina Lower Works. Although it was not directly connected with the American Fish Culture Company, the new hatchery was welcomed by the AFC because it relieved the company's long-standing concerns about the possibility of flooding behind the Tanner family's mill dam. In 2001 this hatchery was also sold to the state.

During the late 1940s it was recognized that access to water supplies was the largest impediment to expanding
the company’s production. Despite having facilities in Carolina and Perryville, in 1949 the AFC began to look toward purchasing the Cross Mills Pond and associated buildings in Charlestown. The purchase of this property, near the southern end of the state’s Route 2 near its intersection with U.S. Route 1, was made in February 1951. With springs at the site producing about 200 gallons a minute at a steady temperature of 48°F throughout the year, the Cross Mills property was used as a satellite fish production facility, mainly for rainbow trout until it was deeded to the Nature Conservancy in 1995.26

By all accounts the decades of the 1940s and 1950s were the zenith of the American Fish Culture Company’s success and expansion, as the demand for cultured trout increased throughout the country with the growth of interest in sportfishing after World War II. Even more significantly, the company boosted its production in 1939 and the 1940s, when it became the first trout farm in the nation to commercially apply the technique of photoperiod manipulation, artificially controlling the number of daylight hours to induce brook trout to spawn four months earlier than their normal spawning period in November.30 This photoperiod manipulation was carried out in a specially designed building with window shutters and an internal electric lighting system constructed over a concrete raceway for holding broodstock fish. The spawning of the fish out of season allowed for the more efficient use of raceway space and water resources on a year-round basis, and thus for greater sales in the off season.38 Prior to its use of photoperiod manipulation, the company was producing about 260,000 fish annually; by 1950 its annual production had increased to about 750,000 fish.39 In 1944, during the initial experimental work, Roland E. Eddy (1910-1972)—a skilled fish culturist, a long-time farm employee, and the key person responsible for the photoperiod manipulation project—became the AFC’s farm manager.

A major development in the early 1950s was the introduction of a practical pelleted dry diet for trout.40 The AFC was a very early adopter of pelleted feeds, as evidenced by a photo in the South County-Western edition of the Providence Evening Bulletin in 1955 showing Roland Eddy stacking 100-pound bags in the feed storage barn at Carolina.41 By reducing costs, this early adoption of pelleted feeds was undoubtedly a major factor in the company’s increased profits. The previous practices of maintaining a fishing boat and crew at Galilee to catch and freeze trash fish or of using raw slaughterhouse wastes as feeds were instantly rendered obsolete, and substantially fewer laborers were now required on site in Carolina.42 Not only are pelleted feeds more cost effective than so-called wet feeds; with pelleted feeds the feed conversion ratios (i.e., the pounds of feed required to produce a pound of fish flesh) are generally much more favorable than that with meat and fish diets, thereby decreasing the amount of food-waste pollutants in the effluent water of downstream farms.43

By the late 1950s the AFC was growing concerned about the marketing of trout because of increasing competition from trout farms in the West, particularly in the Hagerman Valley of Idaho, which had considerable water resources in terms of flow rate and quality. For example, Idaho’s Snake River Trout Company, purchased

Built by Roland E. Eddy about 1939, this broodstock house was designed with interior window shutters and doors to exclude sunlight, and it was fitted with banks of electric lights to simulate sunlight during the dark winter months. Brook trout held here spawned months earlier than their normal spawning season. Photograph by the author, 1994.
by Robert Erkens in 1952, grew to be the most productive trout farm in the world by 1969, although it was situated on only ten acres of land. Using concrete raceways with high water-flow rates, it was able to produce 400,000 pounds of marketable fish annually per acre, which was roughly equivalent to AFC’s entire annual production output. The Snake River Trout Company was only one of the dozens of producers in Idaho that began marketing trout in the 1950s and 1960s. Aided by their use of flash freezing to market their output nationwide, western trout producers posed a serious threat to producers in the Northeast.

In an effort to build strength in the northeastern market, and recalling his brother’s efforts and moderate success with the Eastern Trout Growers Association in the 1930s and 1940s, in October 1955 Thomas Hazard called together a number of trout producers from around New England and New York, and a new trade group—the Trout Growers Cooperative Association—was organized. According to the minutes of its initial meeting, the cooperative was formed to stabilize prices in the southern New England and New York markets and to attempt to keep Pennsylvania growers out of the lucrative trout market in New England, where the State of Connecticut was the major purchaser. The association was incorporated in Rhode Island in 1957, with Earl W. G. Howard, a Hazard family administrator, serving as its secretary-treasurer. As a sales cooperative for its twelve members, the organization was to take a 15 percent commission on all sales in order to cover its expenses; but despite high hope at the onset, the cooperative failed to meet expectations of stabilizing trout prices, and a number of the member farms refused to contribute commissions and withdrew their memberships in 1961 and 1962. The remaining members voted to dissolve the group at their meeting in August 1962, and the corporation was formally dissolved in 1963.45

A major blow to the American Fish Culture Company occurred in 1971 when the State of Connecticut, which had been its largest and most reliable customer, developed its own state-of-the-art facility for stocking trout into the state’s waters. Operated by the Connecticut Department of Environmental Protection, the Quinebaug Valley Hatchery, at Central Village at the confluence of the Moosup and Quinebaug Rivers, was able to produce about 600,000 two- or three-year old trout annually when it opened, and it was said to be the largest hatchery east of the Mississippi.46

From time to time the AFC utilized a small but important supplementary stream of income from fees charged the general public for permission to fish on the Carolina property. The first report of such fee fishing appeared in a March 1921 article in the Providence Journal, in which farm manager Fred Hoxie explained that the four-acre pond between the Upper and Lower Works would be stocked beginning in April of that year and that the public could buy admission to fish there.47 This practice was apparently discontinued later, but beginning in 1963 the four-acre pond and other ponds on the property were again stocked with trout as part of a “Fishing Valley” fee-fishing operation. For an annual fee of $200 (which would rise to $400 by 1990), fishermen were allowed to fish the various stocked ponds on the property and were allowed to keep 100 pounds, per year, of the fish they caught, with a record of these weights kept on the permit cards they were issued.48

In 1982, when the company’s sales of 24,535 pounds of live trout provided $104,442 in gross income, the Fishing Valley operation took in $19,890 in fees. Although these constituted 15.9 percent of the company’s total income, calculations showed that the Fishing Valley was actually operating at a financial loss.49 The company’s gross profits that year were in fact very low, as was confirmed in a letter from the firm handling AFC’s insurance coverage.50

Records show that fish production from 1977 to 1991 ranged from 42,410 to 62,744 fish, which was roughly equivalent to the company’s production in the early part of the twentieth century but well below the peak production levels of 500,000 to 750,000 fish in the company’s heyday of the 1950s.51 Gross sales figures for these fifteen years varied from a low of $59,502 in 1977
to a high of $171,299 in 1989, and although these figures might seem to reflect considerable financial growth, regulatory costs and substantially escalated feed costs during these inflationary years were leaving the AFC financially weak. Further, the extent and value of the company's approximately six hundred acres of taxable real estate in Carolina and Cross Mills were barely supported by the modest level of sales.

In addition to shrinking markets for privately produced live trout purchased for state stocking programs in the 1960s and 1970s and the relative high value of the hatchery's taxable lands in comparison to its annual sales, the passage of the Federal Clean Water Act in 1972, as well as other environment-protection legislation, had a profound affect upon the AFC's viability as a sustainable business enterprise. Initially contacted in April 1974 by the Region I office of the Environmental Protection Agency (EPA) in Boston, the company began work to obtain the proper wastewater permits (required by the National Pollution Discharge Elimination System (NPDES) for the Carolina and Cross Mills fish farms. It was quickly determined by the EPA that the fish production at Cross Mills was below the 20,000 pounds per year threshold adopted by the agency, so no NPDES permit was required at that time. However, calculations by Walter Eddy (who became the manager of the AFC facilities at his father Roland's death in 1972) showed that there were 39,000 pounds of fish at Carolina, necessitating a discharge permit. The first NPDES permit for the AFC, valid for five years, was issued in July 1974, and it was subsequently renewed in June 1980.

During the early 1980s the EPA delegated responsibility for regulating discharges under the Clean Water Act to the Division of Water Resources of the Rhode Island Department of Environmental Management (RIDEM). While permitting a more local review process, the state-run system was financed by user fees levied on the permittees, and from July 1, 1984, to June 30, 1985, the state levied a total of $2,229.50 in monitoring and permitting fees on the AFC. Despite the change in permitting from federal to state and increased fees, in 1986 a Rhode Island Pollution Discharge Elimination System permit was issued to AFC as a renewal of its expired 1980 NPDES permit.

As a secondary source of income, between 1971 and 1987 the AFC leased gravel extraction rights on its property to outside contractors. In December 1987 a complaint to RIDEM culminated in a formal cease-and-desist order from RIDEM's Division of Groundwater and Freshwater Wetlands halting the wetland alteration attendant to the gravel extraction operations. Although this relatively minor matter was quickly resolved by consent agreement and sanctions were promptly lifted, the incident appears to have led Oliver C. Hazard—Thomas P. Hazard's son and the last AFC president—to investigate alternative uses for, or sale of, the AFC properties. Coincident with the wetland alteration complaint, a December 1987 letter to Oliver Hazard, marked "Confidential," from Hidell-Eyster Technical Services president Henry R. Hidell III committed Hidell's Accord, Massachusetts, company to engage in a major study of water resources (both quantity and quality) on both the Carolina and Cross Mills fish farm properties.

In August 1988 Hidell-Eyster Technical Services submitted a very extensive report on the water output levels from all the wells on the Carolina property, ranging from 1,700 to 2,200 gallons per minute at 48° to 50°F. The quality of water from the wells, as tested by two subcontracting laboratories—Resource Analysts of Hampton, New Hampshire, and Skinner and Sherman Laboratories of Waltham, Massachusetts—was found to be excellent, with most contaminants tested for well below analytical detection limits. In February 1989 Oliver Hazard sent a memorandum to AFC shareholders developing ideas for closing down fish production and leasing the Carolina property as a site for bottling water:

O. C. Hazard (40.75%) and his brother Thomas P. Hazard [Jr.] (39.75%) together control 80.5% of the outstanding stock of AFC. TPH is 64, single and has no children. He currently plans to leave his estate to a charitable trust or organization, and OCH is currently his executor. Both have agreed to add a cross-buy-out clause to their wills to allow the survivor to maintain majority control, but this has not yet been
implemented. TPH wants to phase out of any active role with AFC and would like to sell his interest. OCH feels that a higher future value for the company may be achieved after the viability of the water source has been established. OCH would therefore prefer to lease or sell water under a long-term contract, and have AFC keep title to the land. However, if a high enough value was offered for the entire company now, OCH would go for sale as well. The main problem therefore, is how to buy out the 40% and be able to enter into an attractive long-term lease agreement.64

Shortly after the water-quality report was issued, Hidell-Eyster consultants began contacting various companies engaged in the bottled-water business to explore possibilities for sale or lease of the Carolina property.65 However, after several years of negotiations, the decision was made in 1994 to sell the Carolina property to the State of Rhode Island for $2.54 million.66 Town officials in Richmond had mixed emotions about the sale, since the hatchery—which was to pay Richmond $10,502.90 in property taxes for 1994—would be removed from the town tax rolls.67 The actual transfer of the lands involved was carried out in a phased process as individual details were agreed upon. The hatchery and its immediate grounds were transferred to RIDEM in February 1995.68 The house and one-acre lot of manager Walter Eddy were transferred to RIDEM in August 1995, after an employment and lifetime residency agreement for Eddy was worked out with the state.69 The AFC lands at Cross Mills were transferred to the Nature Conservancy in December 1995.70 The final transfer of remaining AFC lands in Carolina to the state occurred in August 1997.71

Why is it that the one-time largest trout farm in America fell into decline and was eventually dissolved? From its founding, the AFC had established a track record of experimentation and innovation that paid off well for the company, with attention directed both to production and to marketing. The Foxie brothers’ early experiments in spawning fish led to the development of raceway production on a commercial scale; Ozias Goodwin’s experiment with selling canned fish helped to establish the company’s marketing niches; Roland Eddy’s development of out-of-season fish spawning in the 1940s, and the constant improvements in feed technology employed by the company from its earliest days through the 1950s, served to cut costs and improve production efficiency and capacity. The period from the late 1920s through the 1940s, when Rowland Hazard III was overseeing AFC sales at the Fulton Fish Market and managing the Eastern Trout Growers Association cooperative from his office in New York City, appears to have been the high point for the company’s marketing efforts.

But beginning in the late 1950s the company seemed to move toward less experimentation and innovation, despite considerable growth and innovation elsewhere in the trout industry. When trout sales contracts were lost in the New York City markets to lower-priced fish coming in from Idaho and elsewhere, the AFC did little to boost its production, which might have decreased its unit production costs; instead, it simply elected to focus on the relatively small niche market of live-fish stocking, a market that became even smaller when Connecticut and other states established their own large-scale hatcheries in the 1960s and 1970s. For the AFC, the emphasis was apparently on the kind of trout production it had been engaging in since the early 1930s, directed toward markets with a long-term client base. Further, company managers were reluctant to interact with aquaculture trade associations, although such groups provided valuable information about the latest industry practices; for instance, Oliver Hazard seems not to have responded to a May 1989 letter from Joseph P. McCraren, of the Hespers Ferry-based U.S. Trout Farmers Association, explaining the benefits of USTFA membership and inviting the AFC to join that century-old organization.72

Neither is there any evidence that the company was involved with any scientific group, such as the Fish Culture Section of the American Fisheries Society.

During the 1970s, when the U.S. Environmental Protection Agency was first charged with developing regulations and enforcing the provisions of the Federal Clean Water Act, a great deal of research was undertaken to develop techniques aimed at decreasing the amount
This aerial view shows Connecticut's Quinebaug Valley Trout Hatchery shortly after its opening in 1971. At the center of the photo are the hatchery's forty main production ponds; the two large rectangular ponds nearby are used for treating the facility's effluent waters before their discharge into the Moosup River. Photograph courtesy of Professor Emeritus Wayne K. Durfee of the University of Rhode Island.
of water used in trout farming and reducing the amount of suspended solids that such farming released into its effluent waters. One research project, conducted from 1969 to 1975 at the University of Rhode Island by Professors Thomas L. Meade and Lewis T. Smith, showed that trout could be successfully grown in relatively low volumes of water if adequate systems for converting toxic ammonia to relatively nontoxic nitrate were utilized. In another example of pollution-control technology, the high-production Quinebaug Valley Hatchery, built in 1971, was designed such that suspended solids could be collected and effluent waters treated in two treatment ponds prior to discharge into the Moosup River.

Except for limiting the biomass of fish held in its raceways, the American Fish Culture Company never used direct methods to manage its effluents. With the 1972 passage of the Clean Water Act, this failure to upgrade its facilities limited the AFC's fish production and eventually made it unprofitable, leading to the company's demise.

But despite the ultimate failure of the American Fish Culture Company, its 120-year history demonstrated the feasibility of culturing fish in Rhode Island's freshwaters, and it suggests the possibility of a resurgence of commercial freshwater fish culture in the state. With current pressures for Rhode Island government to justify the economic value of the services it provides, it is not unreasonable to explore the value of using private-sector contract growers, rather than state-owned facilities, for stocking waters with trout and other fish. The system of state purchasing of fish for stocking from private growers appears to have worked well, and cost effectively, in the days of the old Rhode Island Commissioners of Inland Fisheries, and rising fuel and transportation costs may make locally produced fish still more economically attractive in the future.

Ironically, the largest publicly owned fish farm in Rhode Island is the former AFC farm in Carolina, and the fish-producing techniques used there today, in 2010, have remained completely unchanged from the AFC's methods of the early 1950s, including the flow-through use of water at the rate of about 2,000 gallons per minute. Although the authority for Rhode Island Pollution Discharge Elimination System permits rests with the same state agency that operates the farm, RIDEM, the requirements for discharge permitting, as set by minimum federal EPA standards, must be followed. The biomass fish production of the Carolina Fish Hatchery is as limited as it was when the farm was under private ownership, and the hatchery still lacks even the most rudimentary of effluent control systems. It is thus highly doubtful that the fish production there is any more cost-effective now than it was when the farm was sold to the state in 1995.
Notes


2. Substantial primary documents from nearly the entire history of the American Fish Culture Company are housed at the library of the Rhode Island Historical Society as MSS 483. These include a collection of American Fish Culture Company records (14.25 linear feet) from 1891 to 1996; sg (subgroup) 17; records between 1990 and 1996 that cover the dissolution of the corporation and sale of its farm to the State of Rhode Island are to remain closed until 2010. Additional records and correspondence concerning the farm are found in the Hazard Family Papers, donated by members of the family (the most recent donation in 2001 by Oliver Cope Hazard, the last president of the American Fish Culture Company); these include the Rowland Hazard II Papers, 1845-1918, at sg 6; R. Hazard Estate Records, 1917-1953, at sg 41; Thomas P. Hazard and Anne F. (Cope) Hazard Papers, 1892-1979, at sg 9; Ozias C. Goodwin Papers, 1881-1921, at sg 52; and Trout Growers Cooperative Association Records, 1957-1962, at sg 44. All subgroups (sg) references in the following notes are to materials in the RIHS's MSS 483 collection.


4. An American fish culturist movement that began farming brown trout for stocking streams and rivers followed the practices first established in 1741 by Stephen Ludwig Jacobi in the village of Hohenhausen, which was part of the municipality of Kallehal in the Prussian state of Nordrhein-Westfalen. Earl Leitritz and Robert C. Lewis, *Trout and Salmon Culture (Hatchery Methods)*, California Fish Bulletin no. 164, University of California, Division of Agriculture and Natural Resources, 1976.


7. 1890 Annual Report of the Commissioners of Inland Fisheries to the General Assembly of the State of Rhode Island, January Session, 1891.

8. Minutes of the Richmond Town Council, Mar. 31, 1879, Richmond Town Hall.


13. Mortgage cancellation transferring controlling shares in American Fish Culture Company from C. A. Hoxie to

14. Ozias C. Goodwin Papers, Book of Outgoing Correspondence, 1886-1921, sg 52 (oversized volume 1).

15. Sales Records, 1895-1909, sg 17, box 6, folder 25.

16. Correspondence file, 1915, sg 17, box 1, folder 1.


18. Articles of Incorporation, 1917, R. Hazard Estate Records, sg 41, ser. 1 (Corporate Records), box 1, folder 1.


20. Annual reports filed with the secretary of state in Rhode Island, 1919 and 1920, stated that the officers of the American Fish Culture Company were Roland Hazard III, president; Ozias C. Goodwin, secretary-treasurer; and Fred Dean Fosse, superintendent.


23. Contract, Aug. 27, 1907, sg 17, box 1, folder 1.


26. This information was supplied to the author by Walter E. Eddy, the AFC's last farm manager, who is currently employed on the same site by the State of Rhode Island.

27. An Oct. 26, 1926, letter to Rowland Hazard III from Roger T. Clapp, an attorney with the Providence law firm of Hinckley, Allen, Tillinghast, and Phillips, outlined the process for incorporation in Rhode Island. Sg 17, ser. 1, box 1, folder 3.

28. Minutes of the Board of Directors meeting, Nov. 5, 1926, sg 17, box 1, folder 17.

29. Quitclaim deed, Nov. 16, 1926, sg 17, box 1, folder 15.

30. Correspondence file, 1928, sg 17, box 1, folder 5.


34. Quitclaim deed transferring property at assessors plat 79-2, lot 3, Town of South Kingstown, from American Fish Culture Company to State of Rhode Island, May 5, 1955, South Kingstown Land Evidence Records, 76:434, South Kingstown Town Hall.

35. Title to this hatchery was transferred to the Carolina Black Bass Hatchery upon the death of Elias Tanner in 1952, and then to Walter E. Eddy upon the deaths of William Tanner and Roland Eddy in 1972; the hatchery was finally sold to the state by Walter E. Eddy, Roland Eddy's son. Lease of land from Elias Tanner by Roland E. Eddy and William F. Tanner (dba Carolina Black Bass Hatchery), Apr. 3, 1935, Richmond Land Evidence Records, 20:333: deed of land transfer, Aug. 8, 1952, ibid., 23:154; land transfer history in quitclaim deed, Nov. 9, 1998, ibid., 112:369; land transfer title from Walter E. Eddy to State of Rhode Island, Nov. 28, 2001, ibid., 156:774.


41. "This 'Fam' Raises Trout."

42. "Originally, when they were feeding them wet food, as we used to call it—meat and fish—we had 14 men working here. Now we're running the place with three men." Farm manager Walter Eddy, quoted in "102-Year-Old Hatchery: A Trout Fisherman's Dream," Charlestown Times, Dec. 13, 1978.

43. For a comprehensive discussion of fish feeds and aquaculture effluent waters, see Jennifer Mugg, Augusto Rennano, Angelo Liberti, and Michael A. Rice, Aquaculture Effluents: A Guide for Water Quality Regulators and Aquaculturists, NFAC Publication 00-003 (North Dartmouth: Northeastern Regional Aquaculture Center, University of Massachusetts, 2000).

45. Trout Growers Cooperative Association, minutes of meeting, Oct. 14, 1975, sg 44, box 1, folder 13; articles of incorporation, sg 44, box 1, folder 1; charter and by-laws, sg 44, box 1, folder 1; records of membership withdrawals, sg 44, box 1, folder 12; minutes of meeting, Aug. 15, 1962, sg 44, box 1, folder 13; articles of dissolution, sg 44, box 1, folder 8.

46. David Sumner, manager, Quinebaug Valley Trout Hatchery, personal communication to the author, 2008. Upgrades to the Quinebaug Valley Trout Hatchery from 2001 to 2005, costing about $10 million, have increased its production capacity to about 1.2 million fish annually.

47. "Country’s Largest Trout Hatchery."


49. Profit-loss calculation worksheet, 1982, sg 17, box 5, folder 54. Calculations for the Fishing Valley in this worksheet—based on an estimated 6,600 pounds of trout caught, with feed costs and such overhead expenses as salaries taken into account—showed that the Fishing Valley was losing about $0.02 for every pound of fish caught.

50. Deborah L. Sacchina, Babcock and Hollis Insurance Agency, Wakefield, R.I., to Oliver C. Hazard, Nov. 22, 1982, sg 17, box 1A, folder 21. In calculating the insurance, the agency assumed AFC sales of $120,000 and a payroll of about $42,000 for that year.

51. Production reports prepared by Walter E. Eddy, sg 17, box 5, folder 54.


53. EPA Region I, Boston, to Oliver C. Hazard, Apr. 22, 1974, sg 17, box 2A, folder 1.

54. Edward C. Corley, chief of Permits Branch, EPA, Boston, to Oliver C. Hazard, June 6, 1974, sg 17, box 2A, folder 1.

55. Handwritten notes by Walter E. Eddy, sg 17, box 2A, folder 1.


60. Dean Albro to Oliver C. Hazard, Feb. 25, 1988, sg 17, box 2A, folder 3; release of violation, Mar. 11, 1988, Richmond Land Evidence Records, 64:104.

61. Henry R. Hidell III to Oliver C. Hazard, Dec. 17, 1987, sg 17, sect. 6, box 3A, folder 12. The letter expressed initial concerns about possible groundwater contamination from pesticides used at nearby turf farms and leachates from septic systems from nearby housing developments.


63. Resource Analysts; subcontract report, Dec. 8, 1988 (results: pH = 6.25; nitrate = 1.2 mg/l; nitrite = 0.05 mg/l; orthophosphate <0.2 mg/l; chloride = 6 mg/l; sulfate = 61 mg/l; bromide = 0.1 mg/l; 2.4D = BDL [below detection limit]; silvex = BDL; dalapon = BDL; dinoseb = BDL; pentachlorophenol = BDL; piclernetam = BDL; Skinner and Sherman Laboratories, subcontract report, Dec. 22, 1988 (results: gas chromatographic analysis of suite of 42 common organic groundwater contaminant compounds were all BDL). Sg 17, ser. 6, box 3A, folder 16.

64. Memorandum to American Fish Culture Company shareholders, dated Feb. 27, 1989, sg 17, sect. 6, box 3A, folder 12.

65. Among the companies initially contacted were Ferrier, Sunroy International, Blue Hill Spring Water Company, Anjou International, Clorox, Pokka Corporation, McKesson Corporation, Simmons Enterprises, Coca Cola Corporation-Belmont Springs Division, Evian Waters, Pleasant Valley Investments, BSN Group, Adolph Coors, and Kuitin, USA; Hydell-Eyster Technical Services. Invoice to Oliver C. Hazard, Mar. 10, 1989, sg 17, sect. 6, box 3A, folder 12. When word of the AFC’s willingness to sell the land became generally known in the business community, a letter from the Downing Corporation (a real estate development company whose president was Richard Baccari of Cranston) expressed a strong interest in purchasing the property for residential development. Salvatore D. Pandolfi to Walter Eddy, July 27, 1989, sg 17, box 1A, folder 22.


69. Warranty deed, Aug. 29, 1995, ibid., 101:193. Since 1995 Mr. Eddy has been serving as the manager of the RIDEM Carolina Fish Hatchery, as it is has been known since the sale to the state.


72. Joseph P. McCraren to Oliver C. Hazard, May 2, 1985, sg 17, ser 1, box 1A, folder 22.