The U.S. Cranberry Industry:
Historical Changes and the Current Situation.

Matthew Lambert
Daniel Lass
and
Richard Rogers [†]

Department of Resource Economics
University of Massachusetts
Amherst, MA

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[†] The authors are, former graduate research assistant and professors of Resource Economics, respectively. This summary of the history and developments in the cranberry industry was taken from Matt Lambert's MS thesis: ***Supply Response for U.S. Cranberry Producers: 1965-2001***, Department of Resource Economics, University of Massachusetts, May 2003. Contact information: Dr. Daniel Lass, 211 Stockbridge Hall, University of Massachusetts, Amherst, MA 01003. Or by email at: dan.lass@resecon.umass.edu.

Introduction

After a number of years of favorable prices, the U.S./Canadian cranberry industry has seen dramatic declines in the prices received by its growers during the last few years. Prices have dropped so low that many growers can no longer cover their production costs and are considering non-production as the economical option. The cranberry market can be characterized as one with a market leader, an agricultural cooperative (Ocean Spray), followed by a handful of independent handlers and processors. There has been a tremendous amount of finger pointing about who is to blame for the current crisis among the growers; various culprits include Ocean Spray, the independents, and even public officials. It appears that the most unbiased explanation comes directly from economic theory.

The cranberry industry went through a boom in the eighties and early nineties when consumer demand for cranberry products surged past available supply and, as a result, drove up the price of cranberries. Growers responded to these high prices for their fruit by increasing acreage and renovating bogs by planting higher yielding varieties in order to maximize their profits. Such a reaction, although common in agriculture, led to a sequence of increased supplies and falling prices in recent years.

Growers were making long-term investment decisions based on short-term prices. Cranberries are a perennial crop that requires three to five years between preparations of bogs and the first harvest of fruit. Cranberry vines do not reach full production until several years after planting, but once established, such bogs have a seemingly endless bearing life. The industry wide expansion was coupled with the unfortunate stalling of demand growth. Consumer excitement for cranberry's healthful qualities lessened and there was increasing competition from other juice blends. The short-term industry shortage in the early nineties had become a mountainous surplus by the end of the decade. The mid to late nineties saw the accumulated effects of lagged supply response of growers coupled with a stagnant demand causing cranberry prices to plummet.

In 2000, growers voted to use a powerful but controversial tool that they hoped would help restore profitability to their industry. They voted to enact the quantity control provision of a federal marketing order to reduce the supply of cranberries to a level that would improve prices for growers. The Secretary of Agriculture oversees this marketing order, which is legally binding under the authority of the United States Department of Agriculture (USDA).

The Early Cranberry Industry

The cranberry is one of only three fruits that have their roots in North American soil.[1] For centuries, Native Americans used wild cranberries in foods, medicines, and dyes. They did not attempt to cultivate this versatile fruit because their needs were met with the natural available supply. When English settlers arrived, Native Americans showed them the many uses of cranberries. In time, the supply of wild berries was insufficient to meet demand, which led to cultivation of cranberries.

It wasn't until 1816 that the first attempt at cultivation took place by Captain Henry Hall, of Dennis, Massachusetts. He saw that wild cranberries flourished, rather than suffered, when sand blew over them. He transplanted the vines to designated areas

[1] For more on the history of cranberries and cranberry production, see: Thomas, Joseph D. *Cranberry Harvest.* New Bedford: Spinner Publications Inc., MA, 1990. Also, the Cape Cod Cranberry Growers' Association website, www.cranberries.org.

and fenced them in for protection in what he called “cranberry yards.” Captain Hall’s technique of manually spreading sand over cranberry vines has been a practice used ever since.

Massachusetts’s Cape Cod is credited with being the birthplace of the modern cranberry industry. The characteristics of the land provide the perfect combination of nutrients and environmental conditions for cranberry plants: acidic peat soil, an adequate supply of fresh water, sand, and a growing season from April to November. Neighboring Plymouth County, having similar geographic characteristics, soon joined Cape Cod and by the 1850’s was a major producer of cranberries.

Massachusetts settlers were not the only ones aware of cranberry’s profitability. Not far away in New Jersey, during the 1830s and 1840s, growers were catching on. The “Pine Barrens,” consisting of the Ocean, Burlington, and Atlantic counties, also possessed the ideal cranberry growing conditions found in Cape Cod and Plymouth. By the late 1850s, the cranberry was becoming a true production commodity. Landowners were turning swamps, bogs, and marshes once viewed as worthless, into profitable cranberry yards as growers could now support themselves entirely by selling berries.

Growers were also inventing more advanced technologies. The first cranberry scoop, a basket like tool with teeth used to collect cranberries ready for harvesting, was introduced to make the hand picking process more efficient. There also were early attempts at water harvesting, where the bog is flooded so that loose berries float to the surface. However, it was not adopted because it seemed like a costly alternative to dry harvesting and was thought to damage the berries, lessening their value.

Wisconsin entered the cranberry industry by the 1860s. The marshes of Berlin County were the focus of early growers' efforts, but the swamplands in the central part of the state, including Jackson, Monroe, and Wood counties, soon became the major producing areas of Wisconsin.

The cranberry industry had stretched from the east to the west coast by 1885. Cranberry growers were emerging in Oregon; some were from Massachusetts and were in search of warmer climates. Around the same time, Washington cranberries made their first appearance. Pacific County was the site of the state's first bog, but eventually growers emerged in Gray's Harbor and Whatcom counties. Canada also became a player in this growing industry. The two main cranberry producing provinces were British Columbia and Quebec.

The Development of Grower Cooperation

By the end of the century, growers were sharing their knowledge and working together. The formation of the American Cranberry Growers' Association in New Jersey in 1873 and the Cape Cod Cranberry Growers' Association in Massachusetts in 1888 brought a sense of community to the local growers. The main purpose of these associations was to promote the interests of cranberry growers in their regions.

A more direct marketing approach for growers came with the entrance of commission companies like the Growers' Cranberry Company, formed in New Jersey and Massachusetts in 1895. Unlike the growers' associations, commission companies paid growers the market value for their berries minus a five to seven percent commission, which they retained as payment for their services.

The 20th century led to even more growth in this relatively new industry with the establishment of the first market cooperative, the Wisconsin Sales Company in 1906. Headed by A.U. Chaney and Judge Gaynor, the grower-owned marketing cooperative enrolled almost all of Wisconsin's growers in the first year. They enticed members by offering an "orderly market" in which each grower was paid the same price for their berries.

Cooperative marketing quickly moved east following a visit by Chaney and Gaynor. Growers adopted the Wisconsin model and formed both the New England Cranberry Sales Company in Middleboro, Massachusetts and the New Jersey Cranberry Sales Company in 1907. Shortly thereafter, all three cooperatives merged to form the National Fruit Exchange, with Chaney as general manager. Competition between the National Fruit Exchange and the Growers' Cranberry Company led to decreases in prices to growers, but not drastically. A bumper crop in 1910 provoked a short-lived price war between the two that ended in their merger into the newly titled American Cranberry Exchange (ACE).

As the industry grew, there was an increasing need for general research. Frost and insects that historically had been handled by flooding were major problems. The University of Massachusetts established the Cranberry Experiment Station in Wareham, Massachusetts in 1910, with its purpose being to provide cranberry growers with information on cultivation, management, and harvesting. In short, it was established to do the research that a typical grower did not have the time, money, or expertise to conduct.

The newly strengthened ACE operated like a well-oiled machine. It was owned and directed by the growers and represented their own principles. All members formed contracts to give their whole crop to the individual sales companies, while the ACE handled the promotion, placement, and sales of the berries. The berries were pooled by grade, type, and state and sold under the “Eatmor” brand name. Growers were paid a small portion upon delivery and received the rest when the crop was finally sold. The net proceeds from the pool were divided based on the quantity and quality of the berries that each grower delivered.

The ACE soon realized the financial implications for the interplay of supply and demand in agriculture. They faced an annual supply of cranberries that had almost doubled since its formation ten years before. Furthermore, any options to limit supply were simply not feasible. First, individual growers were reluctant to reduce their crop size. Second, not all growers were members of the cooperative; so any supply restriction to raise prices would simply entice independent growers to increase their supply.

One solution was to increase the demand for cranberries through advertising. ACE growers resisted, knowing that advertising without consumer loyalty could benefit the independents as well. Given few choices, the ACE decided to promote their “Eatmor” brand and increase new membership to help lessen the burden of the advertising costs. It seemed they had solved the problem of fresh fruit marketing.

The American Cranberry Exchange always prided itself on having quality cranberries sold under their brand name. The only problems were the waste from dumping the low quality berries and the growing trend in American kitchens to switch to processed canned goods rather than prepare foods with fresh ingredients. Both of these led to an increasing market opportunity for less expensive processed fruit, which used the previously wasted lower quality, but wholesome, cranberries.

The Emergence of a Dominate Cooperative

Marcus L. Urann was the entrepreneur who saw that the future of cranberries was in processing and that it would change the industry forever. Urann was a founder and member of the board of directors of both the New England Cranberry Sales Company and the American Cranberry Exchange. He believed in Chaney's ideas about cooperation as a means of defense against the possibility of destructive competition damaging the cranberry industry. However, after his unsuccessful attempt to convince Chaney of the beneficial aspects of processing, Urann started canning his own berries with the "Ocean Spray" brand name.[2] His main sources of competition were John C. Makepeace, a major partner in the ACE, and Elizabeth Lee, who owned the Cranberry Products Company in New Jersey.

Because processed berries were viewed as having little value, they were sold at very low prices. This was a problem for the canners because they were also the growers and wanted fair prices for their berries, as well as profits from canning. The competition combined with the characteristics of a perishable agricultural commodity led to long periods of low prices as the companies engaged in price wars.

Urann thought that the only way to control the price of processed berries was through a merger. On August 14, 1930, the Ocean Spray Preserving Company of South Hanson, MA, the Makepeace Preserving Company of Wareham, MA, and the Enoch F.

[2] For more on the history of Ocean Spray® company, visit their website: www.oceanspray.com.

Bills Company of New Egypt, NJ, joined together to form Cranberry Canners Inc. and essentially dissolved the rivalry that was hindering the profitability of the market. There was a concern that they would now have the majority of the market and be considered a monopoly. However, they received the approval of the government under the Capper-Volstead Act, which partially exempts agricultural marketing cooperatives from the monopoly restrictions of antitrust laws.

Cranberry Canners Inc. (CCI) did not want to compete directly with the ACE, but they did need some of its members' fruit. The New England Cranberry Sales Company joined CCI in 1934, supplying 10 percent of its supply of cranberries. The New Jersey and Wisconsin sales companies similarly joined in 1938 and 1940 respectively. Growers in the ACE were allowed to deliver their berries to Cranberry Canners Inc., but the ACE would still be the seller, keeping their contracts in tact.

Cranberry Canners Inc. started out with a small line of products, initially distributing whole and jellied cranberry sauces under the "Ocean Spray" label. They later added cranberry juice cocktail and Ocean Spray® Cran®, a heavier concentrate intended for mixing with alcohol. While building their product line, they were also acquiring more diverse growers. In 1940, several growers from Wisconsin joined to form the Midwest Cranberry Cooperative within CCI and one year later growers in Washington State and Oregon did the same, giving the cooperative a national presence. They were now able to get berries from different U.S. regions to help protect themselves against a bad crop year in Massachusetts.

World War II was a set back for the ACE as consumer sales of fresh fruit dropped due to sugar rationing, along with the army's need for processed berries. Most of the harvested cranberries were dehydrated and used to supply the Armed Services who required nearly one million pounds per year. By October 1943, CCI had proven to be resilient and had a total of 15 facilities surpassing the ACE in cranberry sales for the first time. Following the war, there was a steep drop in prices from the reduction in orders during the peacetime, which left the ACE in a very vulnerable position. CCI entered the fresh fruit market, mainly due to increased membership and the amount of cranberries they were handling.

While CCI was increasing their own national presence, the market for cranberries was expanding. The cooperative decided to rename itself the National Cranberry Association (NCA) to better position itself for the larger national market. By the fall of 1946, NCA was selling fresh cranberries in a 16-ounce cellophane bag under its name.

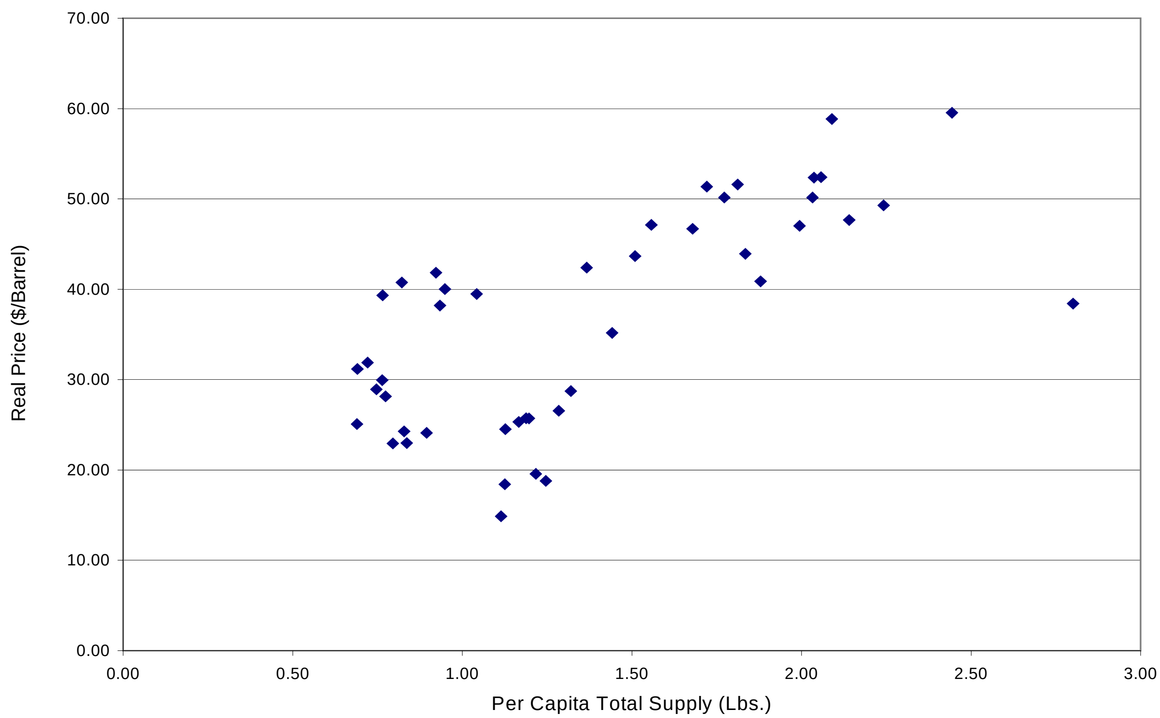
The competition between the American Cranberry Exchange and the National Cranberry Association waged on with growers caught in the middle. There was increased anxiety concerning the reasons for their cooperatives competing instead of cooperating. Growers were forced to pick sides and hope that everything worked out.

In 1953, the ACE finally gave up the fight. However, their offer to merge with the NCA was denied. Urann was only willing to accept individual growers. So, in February 1954, the New England Cranberry Sales Company, the major player for the ACE, voted to dissolve itself and sell all of its assets to the NCA. Most of the growers became members with the exception of a few who disagreed with Urann’s business philosophy. The stage was set for the industry structure observed today, a dominant cooperative with a handful of independents.

Three Important Periods

Jesse and Kesecker (2000) prepared an unpublished report for the Cranberry Marketing Committee (CMC), in which they attempted to estimate a cranberry demand relationship for the period 1954 to 1998.[1] They examined the relationship between U.S. season average grower returns (price) and total available supply (current year production plus previous year ending inventory) and other variables expected to have an effect on price. By plotting real price[4] versus the U.S. per capita total supply (Figure 1), they noticed a general positive relationship between the two. They discovered that by separating the data into three time periods, they could better explain some of the clusters and unusual data points. The three time periods are explored in detail below.

Figure 1: Real price versus total supply, 1954-1998.



[1] Jesse, Edward V. and Kevin Kesecker. 2000. *Forecasting Cranberry Price*. Department of Agricultural and Applied Economics, University of Wisconsin-Madison.

The Development Period, 1954-1976

In 1955, Marcus Urann finally retired from the cranberry industry having won the struggle between the cooperatives. John Makepeace, another original partner, retired two years later leaving the cooperative in the hands of new management for the first time since 1930. The NCA gained an international presence by bringing in Canadian growers as members of the cooperative in 1958. In 1959, the cooperative renamed itself for the final time to capitalize on the strong brand name it had been using since its creation. Thus, Ocean Spray Cranberries Inc. as it is known today, was officially born.

A year of new beginnings almost brought disaster, as the U.S. Department of Health, Education and Welfare announced that a weed killer, Aminotriazole, was shown to cause cancer in laboratory animals. Some cranberry growers had been experimenting with this chemical and the public viewed the entire year's crop as suspect. Grocers were pulling cranberry products and restaurants were banning the use of food items containing the "tainted" berries. The cooperative ceased all Aminotriazole use and diverted funds to test cranberry products. Government subsidies were given for those products that were not contaminated to lessen the damaging effects the news had on the industry. Growers were in danger of losing their bogs as their financial losses mounted. Ironically, total production actually increased from the previous year.

The 1960s featured more modernized production technologies, increases in new product introductions and the marketing efforts to support them, and the use of quantity restrictions under a federal marketing order. The U.S. average yield per acre surpassed 60 barrels for the first time ever in 1960, one indicator of the technological advances.

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[4] Real (deflated) price is defined as U.S. season average grower returns (nominal price), dollars per barrel, deflated by the Index of prices received by farmers, all commodities, 1990-92=100.

Ocean Spray Cranberries, Inc. (OSC) still had whole and jellied cranberry sauces as their main source of income, but the new cranberry juice cocktail was becoming a significant contributor.

Supply Controls, 1962, 1970-1971

In 1962, the struggling cranberry industry decided to use a powerful public policy tool to limit the supply of berries to raise returns to growers. Under the Agricultural Marketing Agreement Act of 1937, growers enacted a quantity control provision under the Federal Cranberry Marketing Order.[5]

The Cranberry Marketing Committee (CMC) manages the responsibilities of the marketing order. The Secretary of the USDA, appoints members who include seven industry members and one non-industry public member as well as the alternates for each. Any cooperative that maintains more than two-thirds of the total volume of production can nominate four members and alternates, while independent growers, not involved with any cooperative, can nominate the remaining three members and alternates. Each marketing order district is allowed to vote for the independent seats. The committee itself nominates the public member and alternate who both act as representatives for consumers and hence cannot have any financial interests in the industry.

For any committee action to be approved, at least five of the eight members, or a member's alternate if the member is not voting, must be in favor of the action. However, if the public member, or his/her alternate, is present and willing to vote, there must be six members in favor of the motion. This is designed so that there must be an agreement

[5] The Federal Cranberry Marketing Order, Title 7, Part 929, Code of Federal regulations, August 15, 1962. More information can be obtained from the Wisconsin State Cranberry Growers Association (www.wiscran.org,) and the Cranberry Marketing Committee (www.uscranberries.com).

between the cooperative and independent members for any action to pass. The advantage of this is that neither the cooperative nor the independent members can act alone to approve any committee motions. The disadvantage is that if there is a proposed action that could benefit the industry, one group could "block vote" the other and no motion will be approved.

The CMC conducts yearly surveys of growers, handlers, and processors on production, acreage, sales, utilization, and inventories to analyze the current economic conditions of the cranberry industry. Based on these numbers, the committee forecasts the upcoming year's production and desired ending inventory and compares them to projected demand. They then submit a recommendation to the Secretary of the USDA, in reference to the total "marketable quantity" of berries necessary to meet demand. If there is evidence that the market could be flooded with excess supply, the committee can recommend the establishment of a one-year volume regulation program, which would limit the quantity of cranberries, fresh and processed, that enter commercial markets to an amount that equals the projected demand.

In 1962, the CMC recommended a handler "withholding" provision of 12 percent. This meant that growers could deliver all contracted berries to their handlers, but the handlers were only allowed to market the "free" 88 percent in any outlet, while the "restricted" 12 percent had to be withheld from handling, or if possible, used in noncompetitive markets or destroyed. The next year, the committee voted for a five percent withholding (also termed a set aside), but it was not put into action.

During all of this, the OSC cooperative sought to increase demand for cranberries with more year-round products. They expanded the juice market in 1963 by introducing the world's first juice blend, CRANAPPLE®, a cranberry apple juice drink. Coincidentally, that year harvested acreage bottomed out. That was short lived as harvested acreage, yield per acre, real price, and per capita total supply all rose the following year.

During the mid-1960's, harvesting methods were evolving. The common technique of manually scooping berries was being replaced by dry harvesting with mechanical pickers. These years also marked the first successful water harvesting using sprinkler systems, which were installed on most bogs. The advances were improving growers' farming abilities, shown by the increases in yields per acre.

By 1968, the real price peaked at $41.84 per barrel while harvested acreage had finally begun to rise. A year later, the industry was supplying 2 million barrels of cranberries, although ending inventory accounted for 30 percent of the total. Even though demand had grown (per capita total supply had reached 1.0 lb.), the industry was supplying more cranberries to the market than consumers desired at current prices.

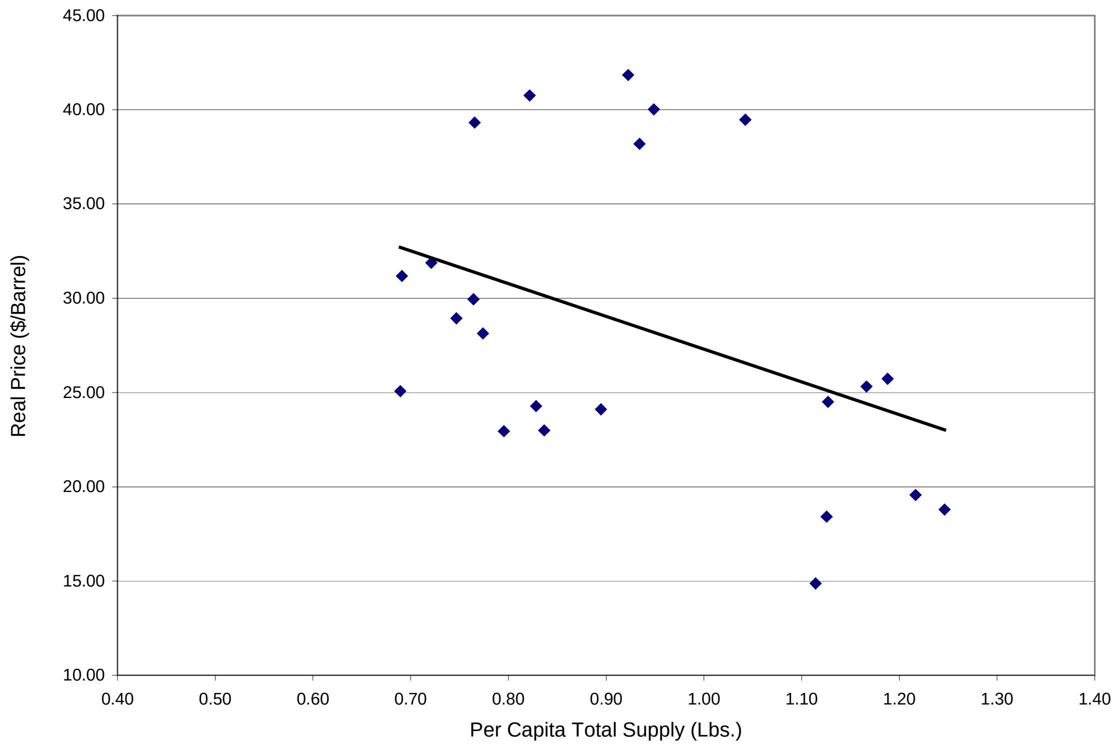
Consequently, in 1970, with the real price having dropped to around $25 per barrel, the cranberry industry again looked for help from the federal marketing order. The marketing order had been amended in 1968 to allow for another type of volume regulation—producer allotments. The idea was to have a more economical way to reduce excess supply. It was supposed to discourage growers from increasing acreage and to allow them to reduce their own production to meet the marketable quantity, prior to berries going to the handlers. Growers were assumed to have the option to either harvest less rigorously or to leave some acreage unharvested altogether. During the 1970 crisis, the industry enacted a 10 percent handler withholding. In the following year, the committee again approved a set aside, this time of 12 percent. The committee felt it had restored an acceptable balance between supply and demand in the cranberry industry and did not approve any supply control actions available under the marketing order for 1972.

The early 70's showed a growing, more efficient industry but at the same time, it was rapidly losing its hold on high prices. Total production had broken the 2 million mark, as harvested acreage and yield per acre were on the rise. By 1973, the real price had fallen below $20 per barrel, something that had not happened for 13 years. On a positive note, OSC exceeded $100 million in sales for the first time in 1974.

The cooperative had a big year in 1976, with both the purchase of a 73,000 square-foot plant in Vero Beach, Florida and the joining of a local cooperative of citrus growers from the Indian River region. This enabled fresh grapefruit and grapefruit cocktail to become the newest additions to Ocean Spray's product line. The addition did add to grower diversity and added difficulty in studying the cranberry industry, since the leader was now reporting results that often combined its grapefruit and cranberry lines.

Figure 2 shows the real price (dollars per barrel) versus per capita total supply (lbs.) for the years 1954 to 1976. Upon close examination, there seems to be three clusters of data points and no linear relationship fits the clusters well. The industry was experimenting with new technologies and products during the "Development Period" from 1954 to 1976. There was a sense of accomplishment as both sales and aggregate supply reached new heights, but the next 15 years would bring the industry into its most profitable and prolific years to date.

Figure 2: Real price versus per capita total supply, 1954-1976.



The Great Expansion, 1977-1990

The year 1977 marked the starting point of a huge growth wave that would accelerate the cranberry industry's growth in every category. Harvested acreage, yield per acre, per capita total supply, and even the real price would all rise this year. Previously, when production had increased, the real price decreased.

During this prosperous period, OSC moved its headquarters from South Hanson, MA to Plymouth, MA. It also opened Cranberry World, a visitor's center and museum that display the history of the native berry. At the close of the decade, OSC again moved its headquarters to the Lakeville-Middleboro line in Massachusetts, where it remains today.

Over the next 5 years, the industry grew in size as well as profitability. Harvested acreage was increasing, which had previously been relatively stable around 23,000 acres.

Also, production was expanding and by 1982 it surpassed 3 million barrels while ending inventory had been relatively level for the past 13 years. With all of these increases, one would expect that the price per barrel would have been falling. Contrary to expectations, the real price also rose. Moreover, per capita total supply had reached over 1.5 pounds. The international market for cranberries was developing as well. It appeared that consumers were finally demanding cranberry products and growers were supplying them, just not to the degree that would cause prices to fall.

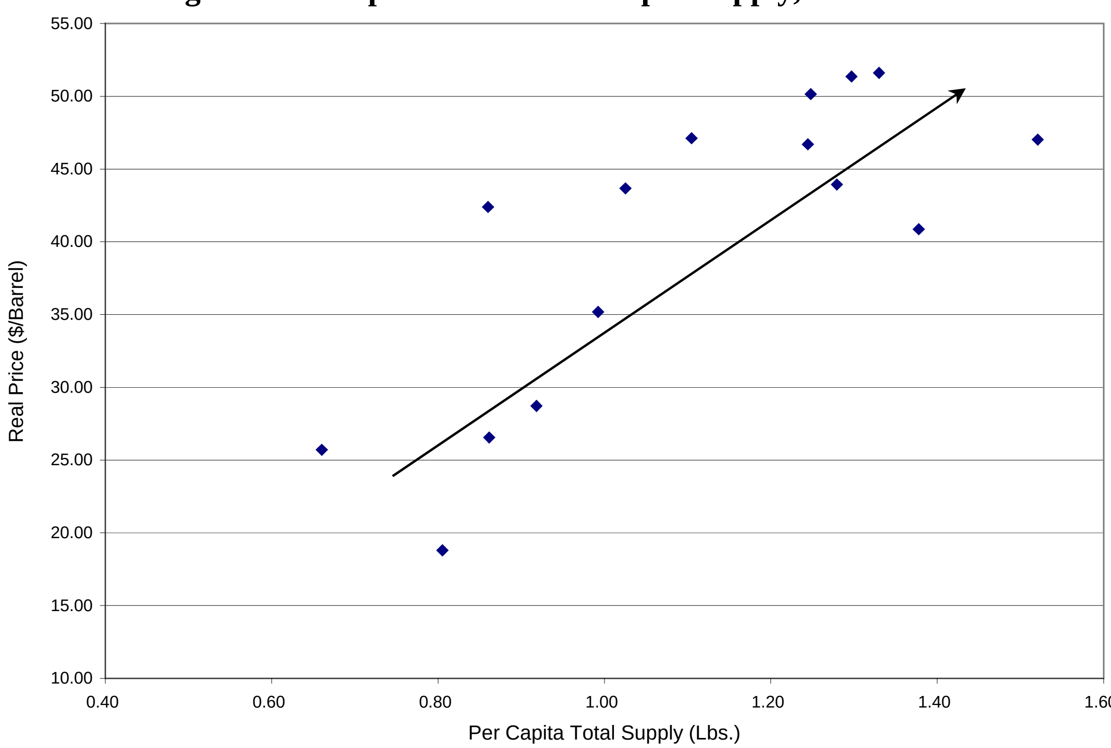
By 1986, production had climbed past 3.5 million barrels with ending inventory putting total supply over 4 million barrels, the highest total supply to date. At the same time, the real price had broken $50 per barrel, which had not been done in almost 40 years. Cranberries were exploding onto the market at record pace and the industry was experiencing the most lucrative years it had ever seen. OSC released more juice blends to expand its product line and created the first aseptically packaged juice drinks in America.

The next year was the birth of Ocean Spray's soon to be biggest rival, Northland.[6] Northland was established as a publicly traded corporation with the consolidation of five individual limited partnerships. Northland originally became a member of OSC and was guaranteed a market for their fruit with a 3-year contract. In just one year of joining, Northland became the largest cranberry grower in Wisconsin. They quickly made two acquisitions and expanded their planted acreage by 32 percent under the flourishing market conditions.

[6] Northland company information can be found at www.northlandcran.com.

The scatter plot below (Figure 3) shows the real price (dollars per barrel) versus per capita total supply (lbs.) for the years 1977 to 1990. There appears to be a positive relationship between the two, unlike the clusters in the previous period. Considering the growing popularity for this product at this time, it is possible to conceive that the demand for cranberries was essentially growing allowing for the simultaneity of higher prices and larger quantities produced. With product innovations and positive health reports, the industry demand was expanding at a rate that seemed to outpace supply. The "Great Expansion" spawned a new attitude in the industry's mind, that higher prices could be sustained at high levels of production. Having relatively stable prices, producers were encouraged to simply produce more. However, it soon appeared that "what goes up must come down" held true for cranberry prices as the industry finally reached the end of this booming period.

Figure 3: Real price versus total capita supply, 1977-1990.



The Carry-Over Effect, 1991-1999

The year 1991 was the third year in a row that the industry had over 1 million barrels in ending inventory. Total industry supply had broken the 5 million barrel mark and also stamped the first time in industry history that per capita total supply had surpassed 2.0 pounds. The industry still appeared in good shape; the price per barrel was high and so was consumption.

Meanwhile, Northland was expanding its planted acreage in Massachusetts with the lease of bogs on Nantucket Island. Northland, now the largest grower in the cooperative, decided to leave OSC in 1993 and begin under its own brand name. A year later, Northland began construction of a $5 million receiving, processing, storage and packaging facility in Wisconsin Rapids, Wisconsin. However, they sold the majority of their annual crop to two large private label suppliers. Also, in their first step at establishing brand recognition, they sold fresh cranberries to supermarkets across the country under their own label. While Northland was growing, the overall industry was expanding and efficiency kept improving. Total harvested acreage finally hit 30,000 acres and yields per acre passed 150 barrels in 1994.

OSC remained the main player in the cranberry industry, although Northland posed a threat as it tried to distinguish itself through new products. In 1995, the Northland brand introduced a line of "100% juice" cranberry blends to presumably battle against its rival in perceived quality as consumers might consider 100% juice superior to juice plus water and sugar, even though nutritionists see little if any difference.

Aggressive new product introductions were coming from Ocean Spray as well. Their ammunition to maintain market domination were the additions of a new line of

Ruby Red grapefruit juice drinks, two cranberry blends, and the signing of a long-term distribution agreement with Pepsi. While the rivalry waged on, total ending inventory dropped below 1 million barrels for the first time since 1989. However, this would ironically foreshadow a “carry-over effect” that would soon shake the industry.

Still surging onward in 1997, OSC and Northland were buying up more partners. Ocean Spray and Nantucket Nectars, a premium juice maker and one of the fastest growing private companies in the nation, formed a partnership in which Nantucket Nectars would operate on its own with Ocean Spray holding a major interest in the company. Northland was busy as well, buying two additional marshes in Wisconsin making it the world’s largest cranberry grower.

Although the real price had reached $59.53 per barrel, the highest in over 50 years, it would be quickly overrun by the excessive production of an industry caught in a seemingly stagnant consumer market after years of increased consumer interest. Industry production jumped from 4.7 million in 1996 to 5.5 million in 1997. This would not have been a problem if demand for cranberries had continued to expand. On the contrary, ending inventory jumped from 1.3 million to 2.2 million signifying that berries were not getting sold as fast as they came in. Total supply had broken 6.5 million barrels and all of the carry-in harvest was finally going to have damaging effects on the entire cranberry industry.

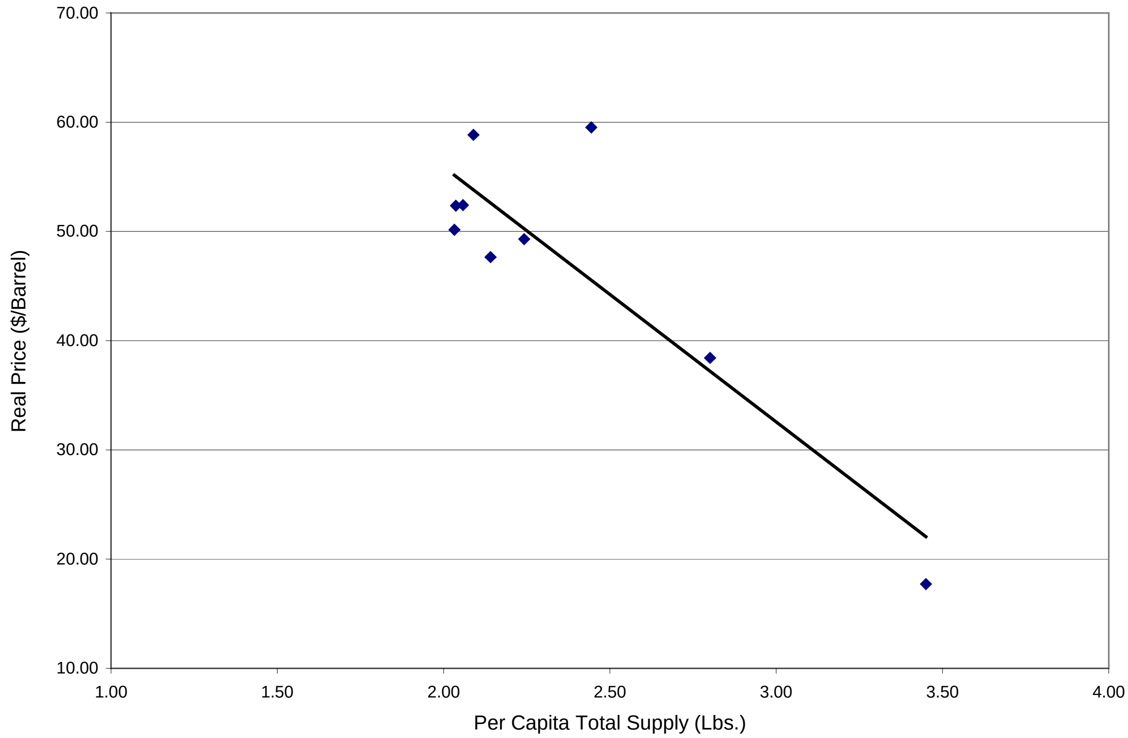
The best of times were definitely behind the industry by 1998. Consumer demand was saturated with excessive supply sending the real price into a rapid decent, hitting $38.42 per barrel. However, the industry was still expanding as harvested acreage was now at 36,600 acres. Production did not show any signs of relenting, nor did ending inventory as it reached a mountainous 3 million barrels.

During all of this, Northland was still growing. They acquired Minot Food Packers Inc., a private label juice manufacturer. This allowed them an immediate expansion in the private label juice and drink category as well as an entrance into the cranberry sauce market. They were introducing new products and entering the foodservice business making their products available to schools, hospitals, and restaurants. Northland also announced a letter of agreement to purchase the juice division of Seneca Foods Corporation. They gained the rights to various brand names including the exclusive license of the Seneca® brand for all juice products.

The deepest price drop came in 1999, when production increased to over 6.3 million barrels, leaving an astounding ending inventory of 4.27 million barrels. There was as much carry-in as there was total supply, just 14 years earlier. Per capita total supply had almost reached 3.5 lbs., while the real price dove to $17.71 per barrel, which was below nearly all growers' cost of production. The industry was in turmoil and it seemed that there was no relief from the incessant over supply.

The scatter plot below shows the real price (dollars per barrel) and per capita total supply (lbs.) for the years 1991 to 1999 (Figure 4). The relationship between real price and per capita total supply shows a negative pattern during this time period, consistent with the damaging surplus and falling prices.

Figure 4: Real price versus total capita supply, 1991-1999.



Questions and accusations about the worsening conditions of the cranberry industry came from all directions, from the growers to the heads of the leading corporations. Many in the industry were pointing the finger at the "big guy," Ocean Spray, with remarks about relentless production and flooding of the market. Others blamed the demand side of the equation, in that consumption leveled-off following the "Great Expansion" while the industry unknowingly maintained its high rate of production. Another view was simply that individual growers increased their own production to take advantage of the high returns and when aggregated, the industry production levels were so high, that the record harvests were piling up as unneeded inventory.

An Industry Divided, 2000-2002

The industry needed to work together to bring itself out of its slump. In 2000, cranberry growers and handlers remembered a similar situation 30 years ago and decided to once again enact a quantity control restriction under their federal marketing order. However, the CMC decided to recommend a provision that had never been used before—the producer allotment. With the already mountainous inventory and extremely productive acreage that had been built up over the past 10 years, they were not willing to chance a bumper crop getting delivered to handlers which would devastate the entire industry.

On July 11th 2000, the USDA's Agricultural Marketing Service (AMS) gave the final rule on the producer allotment under the cranberry marketing order. The following summary was taken from the Federal Register:

> This rule establishes the quantity of cranberries that handlers may purchase from, or handle for, growers during the 2000-2001 crop year, which begins on September 1, 2000, and ends on August 31, 2001. The order regulates the handling of cranberries grown in 10 States[7] and is administered locally by the Cranberry Marketing Committee (Committee). This rule establishes a marketable quantity of 5.468 million barrels, allows for some adjustment of this figure based on final calculations of sales histories, and establishes an allotment percentage of 85 percent. This action is designed to stabilize marketing conditions and improve grower returns. Fresh and organically-grown cranberries are exempt from the volume limitations to facilitate marketing of these products. This rule also revises the method in which growers' sales histories are computed and suspends certain dates in the order which are impractical. This final rule becomes effective July 12, 2000. [8]

The 2000 crop year's supply restriction didn't have as much immediate success in raising returns to growers in the following year. Unhappy with its results, growers and

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[7] Cranberries grown in Massachusetts, Rhode Island, Connecticut, New Jersey, Wisconsin, Michigan, Oregon, Washington, and Long Island in the State of New York.

[8] Federal Register, Vol. 65, No. 133, Department of Agriculture, Agricultural Marketing Service, 7 CFR part 929.

committee members once again voted to enact another producer allotment provision. However, this time they voted to make the restriction even more severe.

On Wednesday, June 27th 2001, the USDA's AMS gave the final rule on the second use of the quantity control power of the cranberry marketing orders in two years.

> This rule establishes a marketable quantity of 4.6 million barrels and an allotment percentage of 65 percent for the 2001-02 cranberry season which begins September 1. The marketable quantity is the total amount of fruit that handlers may purchase from, or handle for, growers during the season. Fresh and organically-grown cranberries are exempt from the volume limitations to facilitate marketing of these products. This final rule also modifies the way growers' sales histories are calculated (including deducting fresh sales), streamlines the sales history appeals procedure, adds a deadline for transfers of sales histories, clarifies the outlets for excess cranberries, and withdraws a proposed reinstatement of the June 1 allotment notification date. These actions are designed to stabilize cranberry market conditions, improve grower returns, provide for a more equitable allocation of the marketable quantity among growers, and improve the administration of the cranberry producer allotment program. This final rule becomes effective June 28, 2001. [9]

The 2000 producer allotment was able to stop the declining price of cranberries, but the more strict 2001 marketing order seemed to be the driving force to raise them (see Table 1). As we can see, the producer allotment provisions had a direct impact on the level of harvested acreage. By restricting the amount that each grower could market, there was am immediate effect on total production and hence on prices.

Table 1: U.S aggregate production and price, 1999-2002

Year	Harvested Acres (Acres)	Yield (Bbls/acre)	Production (Bbls)	Price ($/Bbls)
1999	37,500	169.5	6,357,000	17.2
2000	36,600	156.1	5,712,000	18.1
2001	34,200	155.8	5,329,000	23.1
2002	36,400	155.0	5,642,000	27.4

Source: NASS, USDA

[9] Federal Register, Vol. 66, No. 124, Department of Agriculture, Agricultural Marketing Service, 7 CFR part 929.

The key players in the cranberry industry were finding themselves in harder times than others. By the end of 2001, Northland Cranberries Inc., who had been struggling to avoid bankruptcy, finalized a "debt and equity restructuring" that allowed it to keep its head above water.[10] Sun Northland LLC, an affiliate of Sun Capital Partners, Boca Raton, Florida, (a merchant banking firm) invested $7 million of equity capital into Northland, in return for common shares and preferred stocks, resulting in 77.5% of Northland's common shares. Northland also announced a one-for-four reverse stock split and announced its voluntary removal from the NASDAQ listing. It is now traded on the over-the counter bulleting board under "NRCNA."

A clear demonstration of the dividing industry was on September 27, 2001, when A. R. Demarco Enterprise Inc., (one of Ocean Spray's largest growers) filed suit against Ocean Spray Cranberries, Inc.[11] J. Garfield Demarco, president and CEO, charged Ocean Spray and the Board of Directors with 7 counts, including conspiracy to drive smaller growers, "minority shareholders", out of the market in order to gain a larger portion of the "control premium" that could be expected as a result of selling the company. He also accused them of "lobbying the United States Department of Agriculture to impose volume restrictions," ultimately reducing shareholder value as it is based on the number of barrels delivered to Ocean Spray.

To add more fuel to the feuding industry, Northland Cranberries, Inc., along with Clermont Inc. (a former OSC competitor forced out of the industry in 1999), filed an

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[10] Press Release, November 6, 2001, Northland Cranberries Inc. website, www.northlandcran.com, as well as the over-the-counter bulletin board website, www.otcbb.com.

[11] Source: A. R. Demarco Enterprise Inc. v. Ocean Spray Cranberries Inc. and board…, Civil Action No. 19133 NC, in the court of the chancery of the state of Delaware in and for New Castle county. Complaint found at www.cranberrystressline.com.

antitrust lawsuit against Ocean Spray Cranberries, Inc. on November 8, 2001.[12] They alleged that Ocean Spray's activities (e.g., price fixing) were partially responsible for Northland's reorganization to avoid bankruptcy the year before.

At the annual CMC meeting in February 2002, the year's harvest was projected along with the previous years carry-over and sales forecast. Each state gave their projections, which ultimately were combined to give the overall U.S. forecast. The final calculations were announced and then the meeting was open for any motions. There were motions involving supply control under the provisions of the marketing orders and hiring outside consultants. The votes deadlocked, hence no supply control or outside help were approved.

The main issue that seemed to persist throughout the meeting was that there was a power struggle on the board of the CMC. The Ocean Spray cooperative held four seats, the independents held three, and the public member held the last seat. Essentially, what was happening was that OSC was not in favor of using the supply control tools of the marketing order for the 2002 harvest year. Thus, any motion to enact any volume restriction or hire an outside consultant's advice on the matter was "blocked" with their four votes (recall that it takes six affirmative votes to pass any motion, given the public member votes). It would be impossible to pass any motion unless at least two representing members for OSC voted in the affirmative. OSC felt that the market for cranberries would improve in 2002 for various reasons and that there was no need to depend on a supply restriction any longer. With no other means of forecasting the future

[12] Northland Cranberries Inc. et al. v. Ocean Spray Cranberries Inc., No. 1-02-02214-RCL, found at LexisNexus, provided by Andrews Publications, Inc., Antitrust Litigation Reporter (Vol. 10, No. 7 pg.14).

market situation, the cranberry industry rested its hopes on Ocean Spray being correct in its views of the industry.

Growers now had to await actual production volumes to determine the accuracy of the decision not to limit production in the 2002 to 2003 crop year. Although the 2002 values in Table 1 are preliminary, they seem to show that with increased acreage and production, the industry was able to increase the market price of cranberries. However, these data are preliminary, especially price.

In a rather bold and controversial move, Northland Cranberries, Inc. made an offer to buy a portion of its largest rival. On Friday February 21, 2003, Northland released a statement that it wanted to purchase Ocean Spray Cranberries, Inc.'s juice business, including a royalty agreement for the Ocean Spray brand name.[13] Sun Capital Partners, Inc., the key player in bailing Northland out of bankruptcy troubles, was financially backing the offer.

The modern cranberry industry has come a long way since its beginning in Cape Cod, but much remains the same as competing parties differ in who will lead the industry. Many of the unifying ideas that existed during the early years of the industry are still being practiced today. Growers still try to bridge the gaps between knowledge and distance through local and national associations. However, increased profitability allowed for the entrance of other growers outside the usual cooperative setting and the rebirth of challenges to the leader cooperative. Hence, the cranberry industry is evolving and currently adapting to a growing presence of independent firms competing with long standing marketing cooperatives. This competition in recent years has consumed everyone from growers to high-level management.

[13] Sources: Press Release, February 27, 2003, Northland Cranberries Inc. website, www.northlandcran.com.

Trends in Cranberry Production and Prices

The story of changes in the cranberry industry was told above without detailed examination of trends in data and exhaustive presentation of statistics. In this section, we take a look at the data behind the story. These data provide empirical evidence that is important to understanding the cranberry industry situation today. They are also the requisite inputs for more careful modeling of cranberry production. Without more accurate ways to model the current market and forecast trends, the cranberry industry is susceptible to its current plight in the future.

Much of the finger pointing about over supply involved the "traditional" states (Massachusetts and New Jersey with their smaller, more natural bogs) charging that there was irresponsible expansion by factory farms in Wisconsin and Canada. There was little opportunity for Massachusetts or New Jersey to expand, given the lack of open space for new bogs when the profitable prices were signaling the need for more supply. Wisconsin and Canada responded with more modernized, efficient bogs and selected higher yielding hybrids well suited for big yields and intended for the growing cranberry juice market.

The total supply of cranberries in the U.S. market is the sum of the domestic production plus imports from Canada. Domestic production is the sum of the total quantity produced by a handful, but increasing, number of states. The vast majority of cranberries are produced in Wisconsin, Massachusetts, New Jersey, Oregon, and Washington (in order of current production levels). Imports from Canada are generally defined as the total quantity of berries that Canada delivers to the U.S., without defining any specific producing regions, but two Canadian provinces, British Columbia (BC) and Quebec (QC) account for most of the Canadian production. Here, we will focus on the

U.S. states exclusively; although it would be of interest, Canadian production will not be included in the analysis, except in a general descriptive manner.

The U.S. cranberry industry has expanded geographically over time following the general trend of market globalization. The lowering of trade tariffs through agreements like NAFTA has allowed the U.S. cranberry market to move towards a U.S./Canadian cranberry market. The United States based Ocean Spray Inc. actually accounts for the majority of Canadian cranberries, hence U.S. and Canadian production are highly correlated. One can assume that all U.S. and Canadian cranberry production are near perfect substitutes and the producing regions in each country have very similar characteristics. However, examining each region individually should yield additional insights into the truly unique supply decisions as well as highlight some marginal advantages and disadvantages.

The two Canadian provinces, British Columbia and Quebec, produce similar cranberries to those in the United States, although there are some distinct production differences. The key difference is that they are not subject to the U.S. federal marketing order program. The importance of this exclusion is lessened dramatically because Ocean Spray Cranberries Inc. restricts their Canadian growers in a fashion similar to that required by the U.S. marketing order, removing any advantage that might exist, at least for Canadian OSC growers.

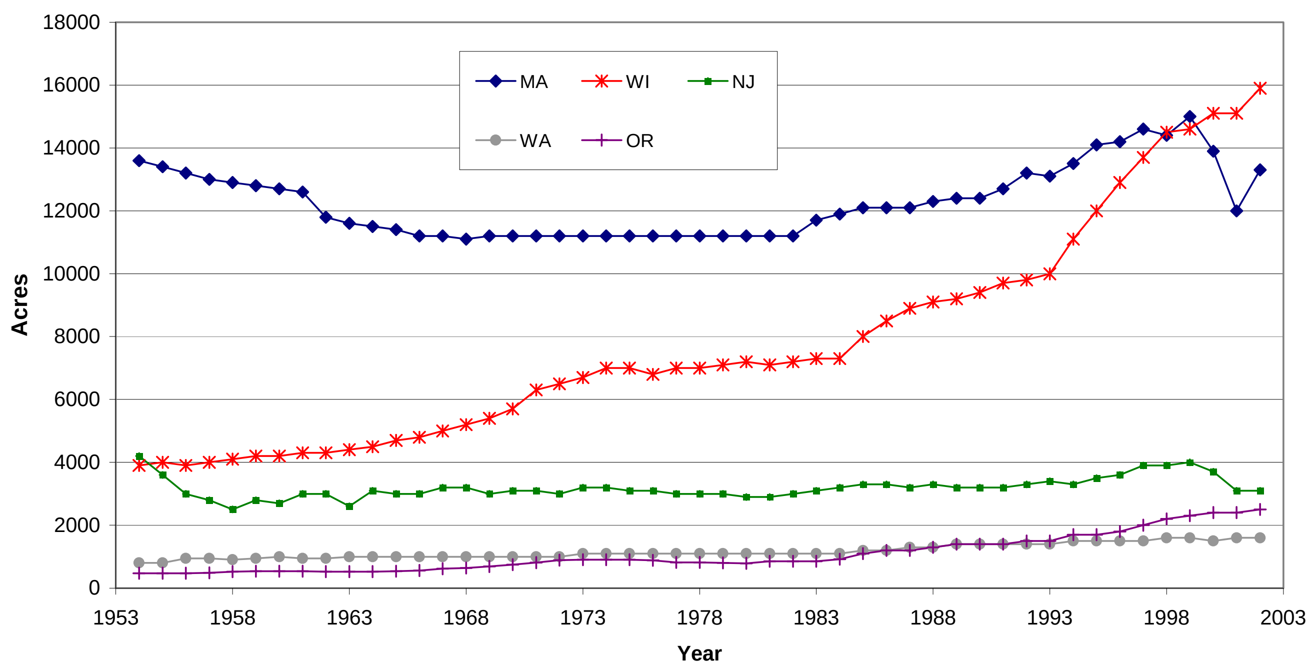
The most dramatic and also most relevant trend in the cranberry industry was the growth of Wisconsin in both acreage and production. Massachusetts, who was the largest producer of cranberries for most of the industry's history, was challenged and eventually overtaken as the world's leader in cranberries. State level comparisons of harvested acreage, yields and production clearly show the change in power from 1954 to 2002.

Harvested Acreage

Massachusetts was the birthplace of modern day cranberry growing, so it is appropriate to start there and then move west. For most of the last 50 years, Massachusetts was the leader in harvested acreage (see Figure 5). After the first use of volume control under a marketing order in 1962, harvested acreage was relatively stagnant until the early 1980's where it began to rise with the increasing prices. The 2000 and 2001 restrictions seemed to again dramatically reduce harvested acreage (Figure 5).

New Jersey has ranked third in harvested acreage and production for the past 50

Figure 5: State Comparisons of Harvested Cranberry Acreage, 1954 - 2002.



years (Figure 5). New Jersey harvested acreage followed the same pattern as Massachusetts, stagnant growth followed by increases until the recent supply control years. However, the increases were not on the same scale as Massachusetts. Some of the stagnant acreage growth could be linked to the lack of available land for bogs and increased environmental restrictions on wetlands.

The western states, Washington and Oregon, have had a small and somewhat increasing role over the past 50 years. Similar to Massachusetts and New Jersey, Washington's harvested acreage was stagnant after the 1962 supply restriction under the marketing order (Figure 5). However, after the 1980's it followed a "stair" like pattern, increasing one year and then remaining stagnant for a period of time (keeping in mind that the scale is many times smaller than Massachusetts). Oregon was the smallest state in terms on harvested acreage and production 50 years ago, but has been making a push since the late 1980's and now rivals New Jersey for the third place. Oregon harvested acreage has been constantly rising since the 1950's and did not seem to be affected by supply restrictions imposed under the marketing order.

The most influential player in the U.S. cranberry industry in the last 50 years has been Wisconsin. Wisconsin was the second largest state in harvested acreage with less than one third of Massachusetts's acreage in the 1950s. Wisconsin became largest state in acreage harvested by the year 2000 (see Figure 5). Unlike the eastern states, Wisconsin had constant growth in harvested acreage with no slowing down during the supply reduction years under the provisions of the marketing order. The largest increases occurred around 1993, the same time that Northland left the Ocean Spray cooperative.

Yields

Yield trends for the two biggest players' in the cranberry industry, Massachusetts and Wisconsin, are compared in Figure 6. During the last 50 years, Massachusetts's cranberry yields have been growing as well. Up until the late 1980's, yields were rising and with relatively little variation from year to year. Beginning in the late 1980s, growth in yields seems to have stopped while variability has dramatically increased. Variability in yields was considerably increased during the early 1990's, which led to sporadic levels of production, as we will see. Wisconsin's yields have been constantly increasing, especially since the early 1990s. Unlike Massachusetts, there was less variation over time, with an exception being the large spike in 1999 (Figure 6).

New Jersey and the western states have had a small and somewhat increasing role over the past 50 years. New Jersey, like Wisconsin has shown a strong trend upward in

Figure 6: Massachusetts and Wisconsin Cranberry Yields, 1954 - 2002.

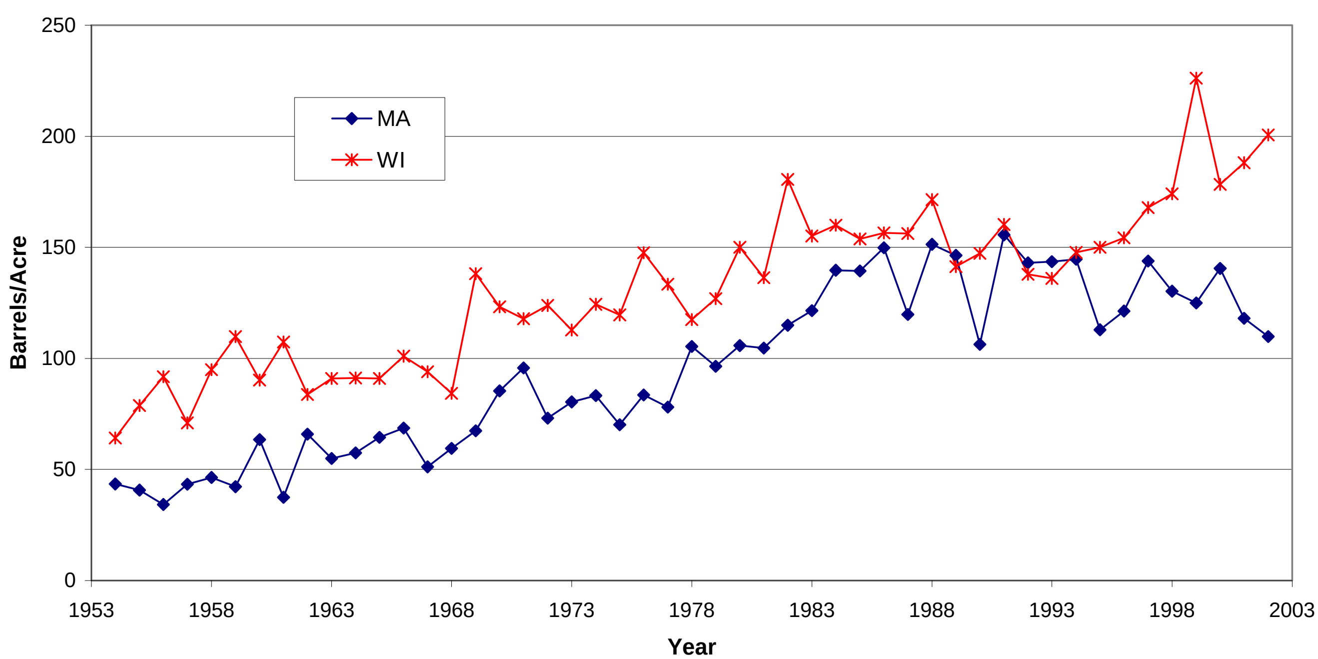
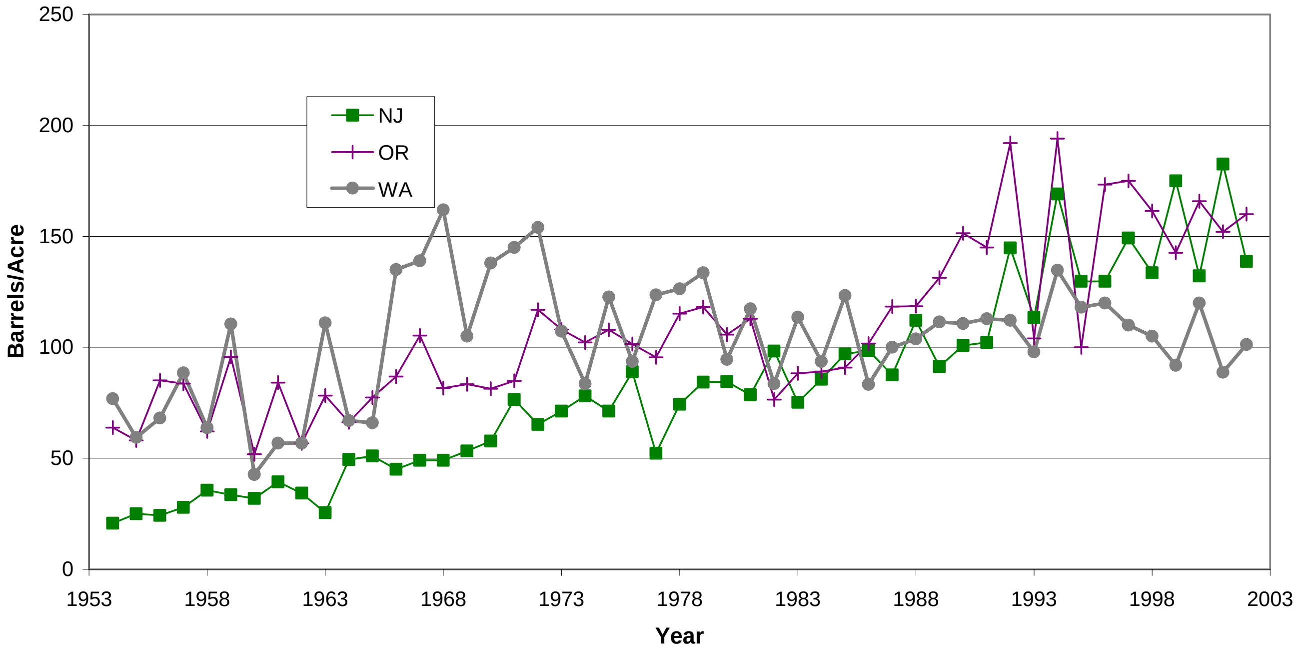


Figure 7: New Jersey, Oregon and Washington Cranberry Yields, 1954 - 2002

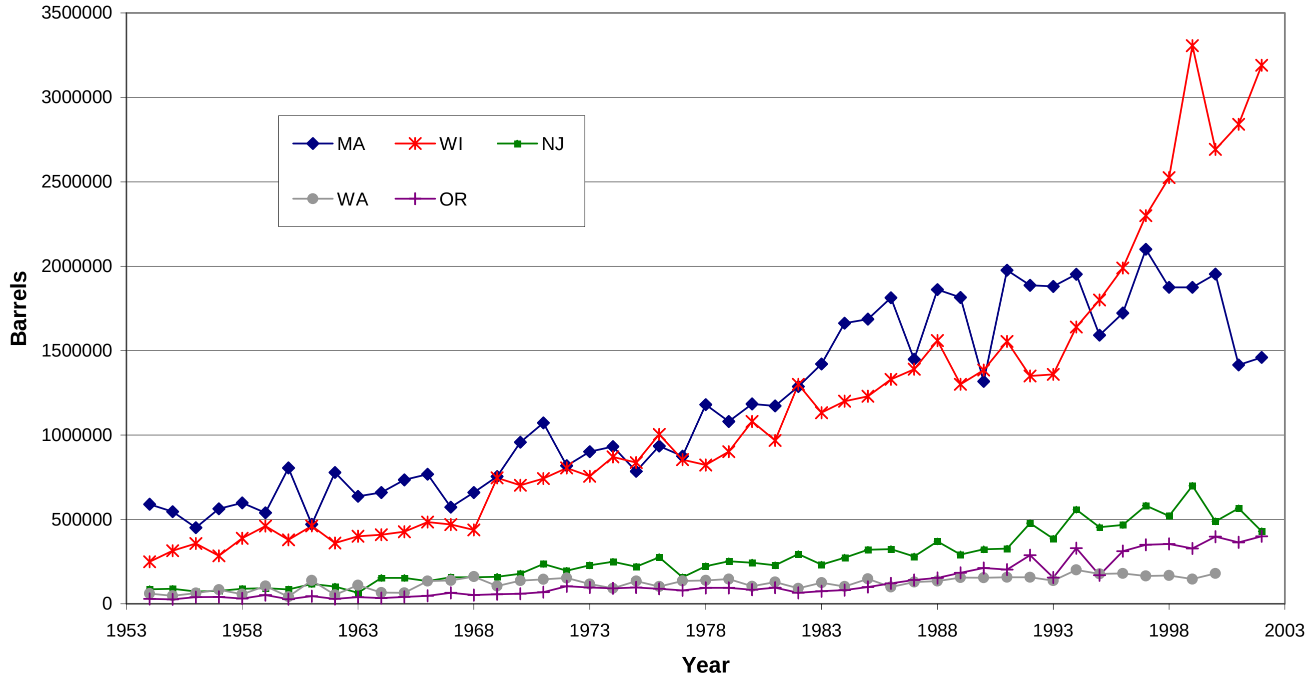


yields that has continued through the 1990s. But, like Massachusetts, the 1990s also brought increased variation. Washington has had an unusual yield history. Washington yields are by far the most variable, although the variation seems to have lessened since the mid 1980's (Figure 7). Washington yields have not shown the upward trends that the other states showed through the 1980s. Oregon yields have been increasing with little variation through the 1980s. Oregon's yields continued to trend upwards through the 1990s, although there are years with large variations (Figure 7).

Production

Combining acreage harvested and yields gives state level production. Figure 8 shows a comparison of state level production. Massachusetts was the dominant cranberry producing state through the 1980s. In the early 1960s, Massachusetts produced over 60 percent of U.S. cranberries. Wisconsin, with strong increases in acreage harvested and

Figure 8: State Comparison of Total Cranberry Production, 1954 - 2002.



yields took over the top spot in 1995. In 2002, Massachusetts produced less than 40 percent of the nations cranberries. The trend in cranberry production appears to have turned downward in the past 5 years as growers struggle with the economic conditions in the industry. New Jersey has also seen a decline in production in the past few years. These trends are in contrast to those seen in Wisconsin, Oregon and Washington, to a lesser degree.

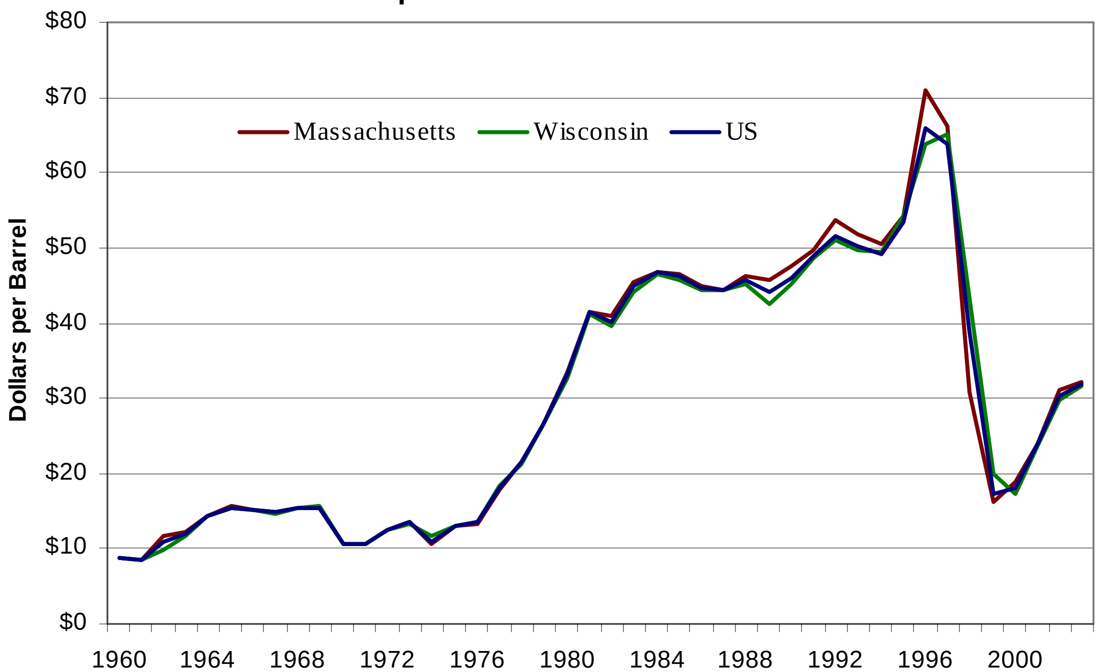
The different regions in the United States have some similar characteristics as far as harvested acreage and yields, a key component to understanding the current situation in the cranberry industry. It was clear that harvested acreage and yields were growing simultaneously, especially in the last 20 years. These state level growths in acreage and yields, showing changes in production technology or efficiency, led to large increases in total production.

Cranberry Prices – Major Changes at the End of the Century

The graphs above eloquently depict the production side of the story that led up to the market crisis. One can imagine that with demand leveling off in the mid 1990s there was virtually no way for the market to sustain high levels of supply and price. The dramatic effect on prices of the boom in cranberry production is shown in Figure 9. The cranberry industry went through a boom in the 1980s and early 1990s when consumer demand for cranberry products surged past available supply, driving up the price of cranberries. Growers responded to high prices by increasing acreage and renovating bogs by planting higher yielding varieties in order to maximize their profits.

Growers were making long-term investment decisions based on short-term prices. Cranberries are a perennial crop that requires three to five years between bog preparations and the first harvest. Cranberry vines do not reach full production until

Figure 9: Massachusetts, Wisconsin and U.S. Cranberry Prices per Barrel: 1960 - 2003.



several years after planting, but once established, such bogs have a seemingly endless bearing life. The industry-wide expansion was coupled with the unfortunate stalling of demand growth. Consumer excitement for the cranberry's healthful qualities lessened and there was increasing competition from other juice blends. The short-term industry shortage in the early nineties had become a mountainous surplus by the end of the decade. The mid to late nineties saw the accumulated effects of lagged supply response of growers coupled with a stagnant demand causing cranberry prices to plummet (Figure 9).

Massachusetts is not alone in suffering from depressed prices. Cranberry prices are shown for Massachusetts, Wisconsin and the U.S. in Figure 9. The average annual cranberry prices received in Wisconsin are virtually the same. But, Wisconsin bogs and production technologies allow producers to grow at lower costs per acre. For Massachusetts's growers, prices have dropped so low that many growers can no longer cover their production costs. In Massachusetts, as in other states across the U.S., cranberry growers will watch with interest efforts to control output and changes that occur in the industry. Massachusetts has lost its dominant position in the industry and now fears losing an important agricultural commodity that is part of its rich history.