

ing also produces a significant amount of the greenhouse gas carbon dioxide, it's a wash over the entire production cycle because of the amount of carbon dioxide absorbed by the corn and other plants used to make ethanol, said David Morris, vice president of the Institute for Local Self-Reliance. The group promotes environmentally sound economic development.

And with ethanol having a slightly lower energy content

carbon monoxide or ozone pollution.

Ethanol contains 35 percent oxygen, and the additional oxygen content results in more complete combustion in automotive engines, thus reducing harmful tailpipe emissions, according to the RFA. Overall, the use of grain-based ethanol reduces greenhouse emissions by 35 to 46 percent compared with conventional gasoline.

"Ethanol is the safest component in gasoline today," Mr. Shaw said, noting that it is rapidly biodegradable in surface water, ground water and soil.

Still, ethanol's environmental slate isn't unblemished.

While the use of ethanol generally

than gasoline, using ethanol blends typically results in a 3 percent decrease in fuel economy.

Some critics also claim that ethanol's environmental benefits are overblown because the claims don't take into account all of the energy consumed to grow the plants used to make ethanol. But a 1996 USDA study reviewed the entire fuel cycle and concluded that ethanol contains 34 percent more energy than is used to produce it.

To promote even greater environmental benefits, many government auto fleets, including Wisconsin's, are required to use flexible fuel vehicles that can operate on an 85 percent ethanol blend called E85, gasoline or any combination of the two in the



While such vehicles are becoming more widely available, it's still hard for people who would like to use E85 to find the fuel. The Minneapolis-St. Paul area is the national leader in E85, with about 50 of the 200 refueling stations nationwide.

Agricultural boost
As the third-largest use of corn behind feed and exports, ethanol provides a market for more than 600 million bushels of U.S. corn and adds \$4.5 billion in farm revenue annually, according to the RFA.

About 90 percent of domestic ethanol — also known as grain alcohol — is made from corn, the NCSE study showed. Corn is used because it's a relatively cheap source of starch that can be converted to simple sugars, fermented and distilled. The added demand created by the ethanol market raises

the average price of corn by 25 to 30 cents a bushel, according to the U.S. Department of Agriculture. The exact impact depends upon the corn supply and other market factors.

Much of the recent growth in the ethanol industry has come from farmer-owned cooperative plants, although none of the seven plants proposed in Wisconsin have that structure.

In Minnesota, where 12 plants are co-ops, that model has been extremely successful and popular among farmers.

"The whole goal of the co-op movement was to get money back to the farmers, and so far it's working," said Ralph Groschen, senior marketing specialist with the Minnesota Department of Agriculture. "In general, they're all profitable, and

The co-ops give corn growers a financial stake in the processing of their product and thus increase their potential income. The cost of corn typically accounts for 65 percent of an ethanol plant's operating costs, Mr. Guthmiller said.

The 10 percent of U.S. ethanol production not derived from corn comes mostly from grain sorghum, barley, wheat, cheese whey and potatoes.

While the proposed ethanol plants in Menomonie and Stanley would use corn, the small new plants in Plover and Spring Green use cheese whey, potatoes and other agricultural products.

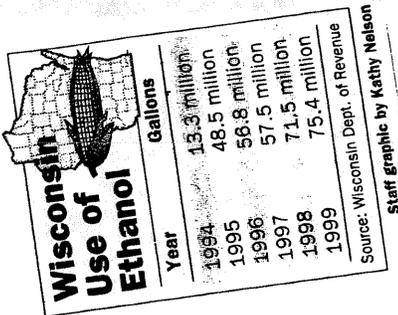
Economic development
A Midwestern Governors' Conference report showed that ethanol production boosts total employment by 195,200 jobs, improves the U.S. trade balance by \$2 billion and adds more than \$450 million in state tax receipts.

By the time income taxes and Social Security taxes and reduction in unemployment

benefits are balanced with the subsidies that go to the industry, the federal ethanol program results in a net savings to the U.S. Treasury of \$3.6 billion a year, according to a study by the Kellogg Graduate School of Management at Northwestern University.

On a smaller scale, local communities are looking at ethanol plants as a growing source of sought-after manufacturing jobs.

A typical Minnesota plant with the capacity to make 20 million gallons a year of ethanol likely would employ 25 to 30 workers at an average annual salary of slightly more than \$30,000, Mr. Groschen said. Studies show the plants typically pay workers \$10 to \$15 an hour.



Year	Gallons
1994	13.3 million
1995	48.5 million
1996	58.8 million
1997	57.5 million
1998	71.5 million
1999	75.4 million

Source: Wisconsin Dept. of Revenue
Staff graphic by Kathy Nelson

Ethanol plant pays off for investors, community

By Eric Widholm

Special contributor

PRESTON, Minn. — Jim Simonson was driving home from a winter vacation in Florida when he felt his car's engine gasp.

He pulled over at a southern Wisconsin truck stop in frigid temperatures to buy a fuel filter. But an employee there offered him a bottle of ethanol instead.

Mr. Simonson had no idea if it would help, but the man promised the additive to his gasoline would solve his problems. So he gave it a shot.

After pouring the alcohol into the fuel tank and filling it with gasoline, Mr. Simonson fired up his car and drove off, having no problems the rest of the way.

That was about 10 years ago.

"That's how I got to be an ethanol man," he says. "I became a 100 percent ethanol boy that day." Mr. Simonson vowed that his hometown of Preston, a city of 1,500 in

southern Minnesota, would have a corn-based fuel ethanol plant some day.

And when that opportunity arose about four years ago, Mr. Simonson, then chairman of the Fillmore County Corn Growers Association, jumped at the chance. He proposed the idea to the other association members, and they embraced it.

Just 2½ years after it opened, managers of the Pro-Corn ethanol plant on the fringes of the city limits already are planning to double its size.

And the once-risky investment is so profitable that stock in the cooperative plant has tripled in value. Plus, investors all have earned back their \$12,500-per-share investment.

The plant also has been an economic boon for the city, providing 30 good-paying jobs, adding \$20 million to the tax base and offering a year-round, stable market for corn, Preston Mayor Clarence Quanrud said.

By Eric Lindquist and Eric Widholm

Special contributors

Wisconsin motorists used more than 75 million gallons of ethanol-blended gasoline last year, but not a single drop of ethanol was produced in the state.

Meanwhile, other Midwestern states have seized the opportunity to turn their struggling corn farms into fields of dreams, fueled by the rising demand for grain alcohol to raise the oxygen content of gasoline.

Led by Minnesota, where 13 of the its 14 ethanol plants started in the 1990s, the number of production facilities has skyrocketed in the past decade.

Nationwide, ethanol production reached 1.6 billion gallons in 2000, up 78 percent from a decade earlier. Usage in Wisconsin last year was nearly six times the volume in 1994.

It's no mystery why U.S. ethanol plants are concentrated in the nation's breadbasket: That's where the corn is, and corn is the most common core ingredient in ethanol.

Of the 50 ethanol plants

with the most common core ingredient in ethanol.

Of the 58 ethanol plants nationwide, 38 can be found in the top six corn-producing states: Iowa, Illinois, Nebraska, Minnesota, Indiana and Kansas.

Wisconsin, ranked No. 7 among states with corn production of 408 million bushels in 1999, has been the exception. Until now.

Despite arriving late to the ethanol party, Wisconsin appears poised to dive whole hog into the home-grown fuel market.

With tiny recently opened ethanol plants in Plover and Spring Green and six larger ones in the planning stages, Wisconsin could go from a major importer of ethanol to a net exporter as soon as next year, said Don Wichert, energy resources chief in the state

60,000 tons of the feed a year.

Division of Energy.

Based on developers' projections, the eight plants could have a total production capacity of more than 100 million gallons a year, Mr. Wichert said.

State officials don't have a magic number yet as to how many ethanol plants they would like operating in Wisconsin but are pleased with the

surging interest, said Joseph Tregoning, deputy secretary of the state Department of Agriculture, Trade and Consumer Protection.

Wisconsin Gov. Scott McCallum has thrown his support behind ethanol production, including \$3 million in his proposed budget for incentives to producers.

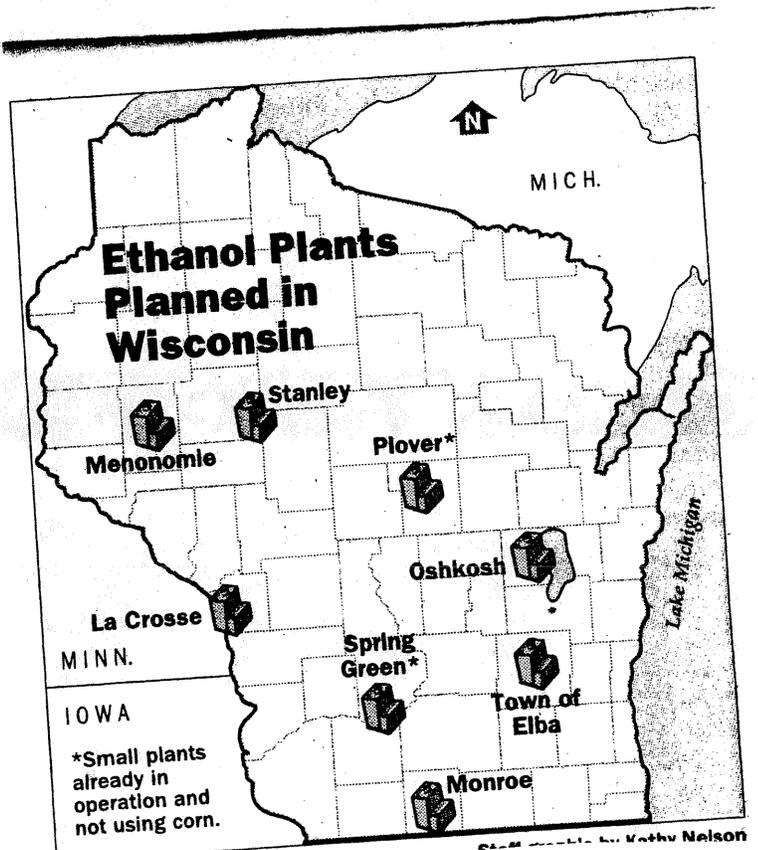
The incentives will encourage investors to build

plants in Wisconsin and allow other states to compete with production assistance, he said.

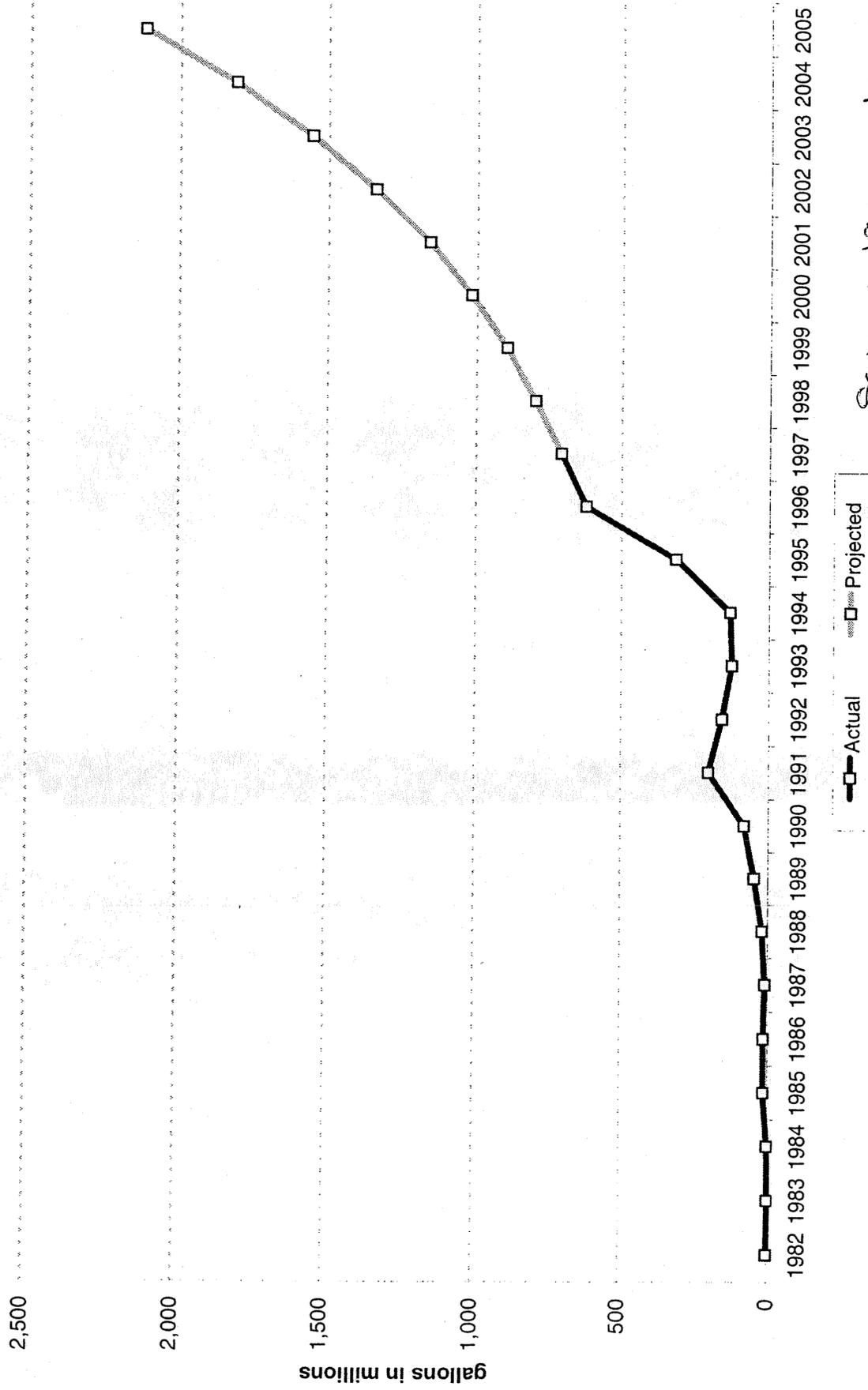
At the national level, U.S. Rep. Ron Kind, D-Wis., and President Bush also have expressed support for federal incentives promoting ethanol because of the benefits to farmers and air quality.

"Ethanol is good for the economy because it's produced locally and good for the environment because it reduces greenhouse gases, so it's really a win-win situation for Wisconsin," said David Morris, vice president of the Institute for Local Self-Reliance, a group promoting environmentally sound economic development with offices in Minneapolis and Washington, D.C. "We are thrilled to see Wisconsin following in the footsteps of Minnesota."

See related stories on Page 1C



Ethanol use in Wisconsin



Source: 1982 - 1997
Federal Highway
Administration

1998 - 2005 TDA Projections

Harsdorf Shares Vision

By Joan Sanstadt
News Editor

James Harsdorf, the new secretary of the Department of Agriculture, Trade and Consumer Protection, shared his vision for the agency with board members at last week's regular meeting.

Harsdorf, who resigned from the board in 1996 to seek retiring Congressman Steve Gunderson's seat in Washington, said he's grateful "for the wisdom of the board" which includes citizens from various backgrounds.

A dairy farmer and former state legislator, Harsdorf said the DATCP and its board have access to the press which "gives you an immediacy to the general public. You have the ability to communicate what this agency is doing directly to the public."

Harsdorf introduced his new deputy director, Les Lamb, who will be coming back to the department he once served from his current post at the Wisconsin Milk Marketing Board.

As a producer, Harsdorf said he had been involved in production policy. "The way I was raised, if you want to make changes, you do it by being active. So I've tried to live my life that way.

"These are critical times for this industry and (they are) not the best of times," Harsdorf said. In general, the issues facing the industry over the next few years can represent "a window of opportunity to make changes both nationally and in our state. Those changes include dealing with the environment, animal health issues and land use.

"Environmental issues are critical for the livestock industry," Harsdorf believes. He's served on an Interstate Committee that met with USDA and other ag interests to determine guidelines in dealing with agricultural policy.

"We have a consumer today that no longer wants to know about his food choices but also where that food was produced and under what conditions," he added.

Besides dealing with animal diseases, particularly foot-and-mouth, Harsdorf's first days on the job included the opportunity to testify before the Joint Finance Committee. "Like all

five percent budget cut. The economy obviously affects the budget," he noted. But dealing with the department's budget was both "a great challenge and a great honor," he added.

"A big part of our budget is the ethanol proposal Wisconsin has for too long not taken the lead in terms of a value added industry," Harsdorf continued.

"The Ag Stewardship Initiative will require all of us to take a strong interest in establishing the research farm at Platteville, that includes other parts of the UW System. It will be looked at with interest across the country. The whole Discovery Farm aspect will help us look at the impact.

"I look forward to working with all of you," Harsdorf told the board.

Ethanol rule

The DATCP board approved the final draft rule relating to ethanol subsidies last week. Under the rule, an ethanol producer may apply each year for an ethanol production payment/subsidy for a consecutive 12-month period.

Subject to the availability of funding, the department will award each eligible applicant a payment of 20 cents per gallon for up to 15 million gallons of "eligible ethanol" produced during the production period identified in the application.

During the public hearing process, the department received a number of suggestions, which have been incorporated into this final rule. Some of those changes include:

- Change in definition of "commodity" so that it is not limited to "crops" but may include other ag sources of starch or sugar, giving ethanol producers the flexibility to experiment with whey, cellulose byproducts and other types of feedstock.

- Changes the annual application date from April 1 to March 1.

- Prohibits the department from making a payment to an ethanol producer who stops producing ethanol before the department makes the payment.

- If necessary, the department will prorate payments based on production (15 million gallon maximum) and will not count production in excess of 15 million gallons annually.

ethanol" presumes that a bushel of corn yields 2.5 gallons of ethanol, unless the ethanol producer proves a different conversion rate.

- Producers must keep all related ethanol production records for at least three years.

The department is submitting the final draft rule for legislative committee review. If the Legislature takes no action to stop the rule, the rule will take effect following publication in the Wisconsin Administrative Register.

Aquaculture report

Stan Shaw, DATCP's marketing administrator, reported on the development of the state's aquaculture plan that began in 1988.

"Nationally, Wisconsin is known as a scrappy bunch of diverse interests: cat fish farmers, fish for stocking (recreation) and fish for food - who have made significant progress on many fronts in a relatively short time. We are proud of that reputation," Shaw said.

The department coordinates the work of a 16-member industry council whose purpose it is to identify significant regulatory/policy, fish health, research and development and business/marketing issues that affect aquaculture's well being. Attending quarterly meetings of the council are representatives of the DNR, the UW System, Seagrant, the technical colleges and the vo-ag education system.

Currently there are 150 commercial fish farms. According to the 1998 industry survey, these farms sold \$10.5 million and expected to increase their sales to \$17.1 million by the current year. About 2,000 requests for aquaculture information are received each year.

Gov. Scott McCallum's budget proposes \$300,000 annually to fund a Northern Aquaculture Research and Development facility at the Red Cliff Hatchery, north of Bayfield. This is in addition to an earlier capital budget of \$3 million for UW-Superior.

Additional funding for aquaculture programs has come through the Agricultural Development and Diversification Grant Program, which has made 22 aquaculture industry grants for a total of \$386,657 over the next 12 years.

11 APR 21

Seriously consider ethanol plant risks

To the editor:

Everyone who lives in the city of Menomonie and its surroundings should be very concerned about the odor from Stonic Energy's proposed ethanol plant. Since wind does not just blow due east, but circulates and changes directions, any resident within miles of the plant can expect odor.

There may be something to learn from the experience of other communities that already have such a facility. Last fall, neighbors of Central Minnesota Ethanol Cooperative, an ethanol plant in Little Falls, Minn., again voiced their complaints about odor at a hearing held by the Minnesota Pollution Control Agency to consider plant expansion. This is the plant that recently favorably impressed Menomonie officials.

According to a report in the *Morrison County Register*, Sept. 29, 2000, Little Falls residents agreed that, "while they supported

ethanol, they often had to keep their doors and windows closed and curtail their outdoor activities." One resident stated, "We were here first it's going from intolerable to even worse."

At the meeting residents learned that the additional technology needed to reduce odor were probably too costly because of the size of the plant. Residents also learned that because the plant was in compliance with state regulations, odor and noise, even though offensive could not be challenged through the Minnesota Pollution Control Agency (MPCA) channels.

Residents of Little Falls, aware that an ethanol plant would bring odor and noise allowed the plant to be built but now found themselves with no recourse when the situation was worse than anticipated.

A board member for Central Minnesota Ethanol Cooperative spoke and "tried to

Continued on Page A

Ethanol plant concerns...

Continued from Page A4

diminish the anger still expressed by some residents." He said, "We never said there wouldn't be a smell. We're trying everything humanly possible. But sometimes you have to give up something to gain something."

And so residents of Little Falls are expected to accept the fact that on some days, they need to shut the windows, not garden or hike in the park or allow their children to play outside.

The same could certainly be true in Menomonie.

I am wondering what research and evidence the Menomonie City Council used as the basis for their approval of the development of an ethanol plant in Menomonie.

We have been told that Stonic Energy's plant

will use technology not available when the Little Falls plant was built. What are the technologies Stonic Energy proposes? Are these technologies proven and if they fail, who will pay for correction and clean up?

What regulations are in place to control odor and noise? How are these regulations enforced? Are they strong enough to protect the near-by neighbors and those in the surrounding area?

Once built, Stonic Energy's proposed plant, north of I-94, near exit 45, could have a negative impact on our air quality, on recreation, tourism, and health. Now, before the plant is approved, is the time to seriously consider the risks and act accordingly.

Marion Lang
Menomonie

Ag Board Chair Is Founder Of Ethanol Plant

*Ag view
12 APR*

The chair of the Department of Agriculture, Trade and Consumer Protection's board is a founder and investor in a company poised to build Wisconsin's first large-scale ethanol plant.

The department, meanwhile, is writing rules on how it would manage and pay \$3 million in direct subsidies to ethanol producers in the state.

Agriculture board chair John Malchine is vice president and chief financial officer of Badger State Ethanol LLC, a Monroe company that is raising \$59 million to construct a plant that would turn corn and other products into ethanol. Malchine said he cleared the matter with the state Ethics Board. Farm groups and some agriculture department officials have encouraged Gov. Scott McCallum to include \$3 million in the 2001-03 budget to jump-start the industry by paying new plants that produce ethanol.

The Legislature last year approved the subsidy legislation without funding it. Badger State Ethanol is one of a half-dozen projects that have surfaced as a result.

When he began working to start the company, Malchine said he asked an attorney at the state Ethics Board whether the business and his role at the Agriculture Department would violate Wisconsin's ethics law.

- Ethanol

Continued from Page 1

He said he did the same with other business interests that might conflict with his government duties.

"He said it was not a problem," Malchine said, referring to Jonathan Becker, legal counsel for the Ethics Board. "He advised me not to be present during discussions or votes (on the matter)."

Malchine said he has refrained from participating in discussions or votes on the ethanol subsidy.

Malchine, a farmer and businessman, has been a member of the state Agriculture Board since 1994. He was board chair in 1997 and 1998, and was elected chair again in 2000.

Like many grain farmers, Malchine said he has been promoting ethanol production in Wisconsin for years because it gives the slumping farm economy an important new market for corn. He owns a 1,100-acre dairy, beef, hog and grain farm with two sons in Racine County.

Becker said Malchine's

conduct would be proper if he did not participate in discussions or vote on such matters before the board. But Becker also acknowledged that if the Agriculture Department begins doling out subsidies, "certainly the appearance issue becomes more real."

Former Agriculture Secretary Ben Brancel said he advised Malchine he might have to consider whether to stay on the board if his company gets subsidies paid by the agriculture department.

If Badger State Ethanol starts getting state money, Malchine said he will again ask the Ethics Board for an opinion.

Badger State Energy is raising \$10 million to \$12 million in equity and \$45 million in debt funding to build the plant, according to documents filed with the state Office of Financial Institutions.

It is also seeking a \$300,000 grant from the state Department of Commerce and a \$2.3 million loan from Madison-based Alliant Energy Corp. to fund electrical improvements.

ChH Herald 4/19/01

Ethanol bill clears first hurdle

LINCOLN, Neb. (AP) — A bill to require all gasoline stations in Nebraska to offer ethanol-blended fuel has gotten first-round approval, but it still faces considerable hurdles.

Lawmakers voted 28-13 Monday to advance the bill. But Omaha Sen. Ernie Chambers, who calls the corn-based fuel an inferior product, said he would con-

tinue his fight when the bill comes up for second-round debate.

"You can eat corn on the cob. You can eat corn out of a can," Chambers said Monday. "But it should not be in cars."

Supporters said the measure would boost the ethanol and corn industries. The bill's sponsor, Sen. Matt Connealy of Decatur, said

many Nebraskans would like to fill up with ethanol-blended gasoline but cannot because their filling stations don't offer it.

Chambers and others counter that the market should decide.

The bill was amended to give gas stations with just one underground tank five years to comply with the law.

Now, about 38 percent Nebraska's gas stations not sell ethanol Nebraska, even though the state makes one out of every five gallons of ethanol produced in the United States and is the nation's third largest ethanol state.



Ethanol on Corn Growers' Minds

Editor's Note: Bob Oleson, a Palmyra farmer and executive director of the Wisconsin Corn Growers Association and Wisconsin Corn Promotion Board, debuts this week as a new columnist in Agri-View's crops section. He'll be covering issues and activities in Wisconsin's corn industry.

With wife Kathy, Oleson runs the Wisconsin Corn Program office from the farm in Jefferson County that's been in the family for more than 100 years. He and Kathy grow mostly corn and soybeans on 800 acres. Oleson also custom plants and harvests another 1,000 acres of corn and beans every year. Kathy, meanwhile, tends a hobby-size flock of sheep. The Olesons have three children and three grandchildren. Oleson is past president of the National Corn Development Foundation and a past Corn Growers officer. Readers can reach Oleson at 262-495-2232 or wicorn@idc-net.com.

Ethanol is on the mind of many Wisconsin corn growers this spring because several ethanol plants have been proposed in the state. Any new corn buyer in an area should raise the price in that locality and, historically, ethanol plants have raised local demand enough to increase local prices 15 to 20 cents per bushel. The best part of that is they grind corn for ethanol every day, so the demand is there every day.

Why Wisconsin and why now? Nationally, about one-fifth of all the corn produced is processed for industrial uses, but very little is processed in Wisconsin. As a result, Wisconsin Corn Growers has promoted industrial uses as a way to raise the demand for Wisconsin corn

for a long time. Last year a new law passed putting into place a state incentive for ethanol producers, and there were hopes for one plant, probably in LaCrosse, where the old Heileman Brewery was under new ownership and hoped to produce ethanol in part of the brewery. Since that time five other plants have been proposed, and they virtually circle the state, with plants also proposed in Monroe, Menomonie, Gilman, Oshkosh and Columbus. The plants vary in size, from 15 to 40 million gallons of ethanol production per year. One bushel of corn yields more than 2 gallons of ethanol, so that means the plants will each grind from 6 to 16 million bushels of corn each per year. To put these numbers in perspective, Wisconsin produces about 400 million bushels of corn per year and about 240 million bushels of that is sold out of state each year without any processing, usually just put on a barge for export.

If these plants are all built, they would add value to about one-fourth of all the corn presently exported from Wisconsin. By increasing demand in the state, millions of dollars would be added to the value of Wisconsin corn.

In addition, distillers grains, also called corn gluten feed, is produced. Only the starch part of the corn is used for the ethanol, leaving a high protein feed complete with all the vitamins and minerals originally in the corn. Presently a lot of gluten feed is hauled into Wisconsin, and freight costs of \$300 per semi-load are common, so having a local source would decrease costs for livestock producers.

Several of these plants are proposed to be financed by farmer investment, another way to add value. The stock in

similar plants in Minnesota has increased dramatically in value, and pays dividends to the shareholders.

These plants are huge. They have to be to handle the volume, and they cost \$25 to \$60 million each to build. Most take about 18 months to build after the permits are received, and that process alone can take six months or more. As a result, we probably won't see ethanol produced in Wisconsin right away, but fully expect to see an ethanol industry adding value to Wisconsin corn in the near future.

Farm programs

Several factors are driving the idea of a new Farm Bill. First of all the '95 Farm Bill is due to expire soon. Secondly, with a new President and administration, there is a call to change and rewrite lots of laws. Lastly, and most importantly, there is a sense that the '95 Bill didn't work. The name of the Farm Bill after all was the Agricultural Marketing Transition Act (AMTA) and was supposed to transition the government out of making payments to farmers.

Instead, prices have gone to record low levels for all farm commodities, and "extra" AMTA payments were made. The name applied to those payments under recent law is also significant, "Market Loss Payments." The feeling seems to be that the Federal Government didn't keep up its part of the Farm Bill bargain by opening more world markets for farm products. Record U.S. production the last few years added to the drop in exports due to the economic crash in Asia, caused prices to drop.

The AMTA payments were based on crops with loan rates, like corn, soybeans, rice, etc. But in the last couple of years, payments were made to lots of "non program" crops, like pork, milk and even cranberries, as every sector of agriculture was affected. The '95 Farm Bill also brought a new alliance with environmental groups increasing CRP

acres, funding the Wetland Reserve program and the CREP programs. As a result there are a lot of new groups interested in the Farm Bill.

The National Corn Growers Association (NCGA) supported the '95 Farm Bill and supports changes to it now. No one knows how the debate will turn out, or when a new bill might be signed into law, but several interesting proposals have surfaced. The NCGA has offered a "countercyclical concept" which simply means that payments would go down when prices are up and payments would go up as prices go down. This is meant to replace the decreasing annual AMTA payments and would leave in place the loan programs and LDP payments. Crop insurance programs would be improved to take care of local problems that would not affect national prices and payments.

There are also calls for acreage reduction programs like the old set aside programs.

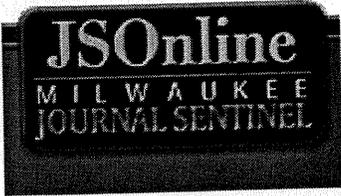
It is becoming more apparent however, that if the US decreases production, other countries will increase their production, and the net result will simply be low prices on lower production. Also, there are serious problems with World Trade Organization (WTO) rules when those kinds of payments are made to producers, so there are all kinds of considerations to a new Farm Bill.

Lastly, there is a growing call for "green payments" to producers to encourage environmental stewardship. Again, no one knows where this is going, but payments for conservation programs would probably not be subject to the same payment limitations as the crop based payments.

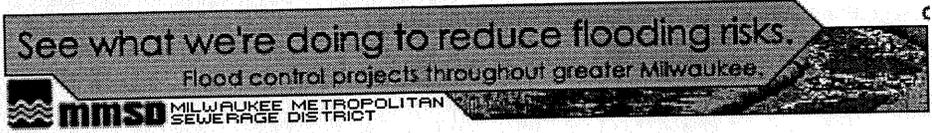
The CRP program, for example, is widely regarded as a conservation program and not an acreage set aside because it doesn't target "average" cropland that a set aside typically requires, but rather targets poorer land that perhaps shouldn't be cropped anyway.

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Ruling could boost gas prices

Bush weighing California ethanol waiver

By LARRY SANDLER of the Journal Sentinel staff

Last Updated: April 21, 2001

The future of Milwaukee-area gasoline prices and Wisconsin corn farmers' earnings could be riding on a decision from President Bush on fuel for California.

While drivers are focused on rising gas prices this year, Bush's upcoming ruling on using ethanol in California gas could influence whether prices rise even more in 2003 and beyond, Wisconsin officials and oil industry representatives say.

But the decision also could have a far-reaching effect on the profitability of the corn industry and on priorities for fighting air and water pollution, California officials and corn farm representatives say.

At issue is the content of reformulated gas, the cleaner-burning fuel required by law to fight air pollution in 17 U.S. metropolitan areas, representing about one-third of all gas sold nationwide. One of the ingredients in that fuel is called an oxygenate, which reduces carbon monoxide emissions.

In most metro areas, the oxygenate is a chemical called MTBE, which is

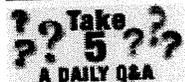
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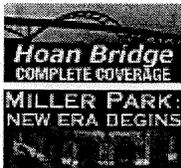
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derived from natural gas. However, MTBE has been linked to cancer and has been found to contaminate groundwater. Instead, fuel in the Milwaukee and Chicago areas is made with ethanol, which is usually produced from corn.

Because of MTBE's harmful effects, California Gov. Gray Davis has banned the substance from gas in his state, starting in 2003. The Environmental Protection Agency wants to phase out MTBE nationwide as well, but it hasn't set a timetable for doing so.

Under existing EPA rules, California would have to substitute ethanol for MTBE. But Davis has asked the EPA to waive those rules and let California use gas without any oxygenates.

California already has reformulated gas rules stricter than the federal requirements, and oxygenates won't make that gas any cleaner, the Davis administration says. Also, California officials fear obtaining enough ethanol for the nation's most automobile-oriented state could slow down their MTBE ban, thereby endangering California's water supply.

An EPA spokeswoman said the decision on the waiver rests with Bush. The request is under consideration, but the White House won't say when a decision is expected, a Bush spokesman said.

Demand could double

If Bush refuses to grant the waiver and forces California to use ethanol in its gas, the market for ethanol would more than double, from about 1.3 billion gallons a year to as much as 3 billion gallons, said George Gaspar, managing director of petroleum research for Robert W. Baird & Co., and Robert Oleson, executive director of the Wisconsin Corn Growers Association.

And unless ethanol production increases in time to meet the expanded demand, "the price of ethanol could skyrocket," taking the price of reformulated gas along with it, warned Erin Roth, executive director of the Wisconsin Petroleum Council.

California "would soak up much of the ethanol production" now targeted for Milwaukee and Chicago, potentially creating a shortage in the Midwest, Wisconsin Gov. Scott McCallum said. And California refiners are already starting to increase their ethanol purchases in the Midwest, Gaspar said.

Oil companies blamed a shortfall in a new summer-blend version of reformulated gas for last summer's gas prices, which peaked at \$2.08 a gallon in the Milwaukee area. Roth said the transition to the summer blend is pushing prices up again this year, although he and Gaspar don't expect those prices to reach last year's levels.

Still, the ethanol industry believes it can boost production in time to handle the increased demand from California, said Oleson and Richard Varenchik,

spokesman for the California Air Resources Board.

Ethanol plants proposed

Plans for new ethanol plants are on the drawing board nationwide, Gaspar and Oleson said. In Wisconsin, six new plants with a combined capacity of 150 million to 200 million gallons have been proposed, Oleson said.

McCallum said he's doing his part to encourage ethanol production. The governor's 2001-'03 state budget includes \$3 million to subsidize Wisconsin ethanol plants, none of which currently exist.

Building an ethanol plant takes about 18 months, Oleson said. That means construction on new plants would have to start soon if they are to open by 2003.

The larger question, Gaspar said, will be when and if the Bush administration decides to phase out MTBE nationwide. That could further boost demand for ethanol, he said.

Drivers aren't the only ones watching this debate. Bush's decision also means a lot to farmers.

Nationwide, the use of ethanol in gas has boosted the price of corn by 15 to 20 cents a bushel, Oleson said. And whenever a new ethanol plant is built, the price of corn within 40 miles of that plant jumps another 15 to 20 cents a bushel, he said.

On the other hand, corn farmers are worried that if Bush grants California's waiver request, other states could seek waivers as well, eventually dismantling the reformulated gas program, Oleson said.

Gaspar said he doubts that will happen. The Bush administration should recognize the economic benefits for corn farmers outweigh whatever the substance adds to the cost of gasoline, Gaspar said.

Corn isn't the only source of ethanol. California also is looking at the possibility of building ethanol plants that could use agricultural waste, such as rice stalks, instead of corn, Oleson and Varenchik said.

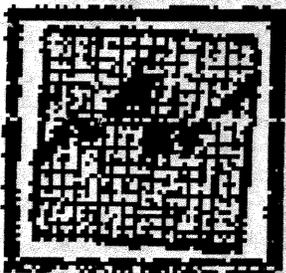
Overall, "we think it's very possible" to meet the possible California demand for ethanol without depriving Midwestern customers, Oleson said.

Appeared in the Milwaukee Journal Sentinel on April 22, 2001.

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ECONOMIC IMPACT OF THE ETHANOL INDUSTRY IN MINNESOTA:

*Present Situations and
Future Opportunities*



**February 2001
Updated Report**

Prepared by:
Ag Marketing Services Division
Minnesota Department of Agriculture

**Economic Impact of the
Ethanol Industry in Minnesota:**

PRESENT SITUATIONS AND FUTURE OPPORTUNITIES

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2000

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Economic Impact of the Ethanol Industry in Minnesota

Executive Summary

This document, expanded and revised many times since January 1994, began with the purpose of projecting the impact of increased ethanol production on the State of Minnesota. The study was based on a mid - 1990's scenario that assumed the annual production and use of 200 million gallons of ethanol made from Minnesota-grown crops. The 200 million gallons per year would provide enough ethanol to replace 10% of the 2.0 billion gallons of gasoline used in the state (today, the state uses over 2.4 billion gallons of gasoline). Minnesota Has had lower corn prices and higher gasoline prices than other leading corn growing states, such as Iowa and Illinois. (pp. 24 and 25). Compared to one-third of corn crop exports on a national level, Minnesota exported two-thirds of its corn as an unprocessed, raw commodity.

LEGISLATION

Depressed agricultural prices and long gas lines in Minnesota prompted legislation in 1980 that defined "agricultural alcohol" and created a 4¢ per gallon gas tax credit as incentive for retailers to blend ethanol in gasoline. After achieving a significant ethanol market by 1985, the blenders tax credit was reduced to 2¢ per gallon. In 1986 20¢ per gallon producer payment was created to provide the incentive for developers to build ethanol plants in the state. In June of 1988, the first New Generation Coop (NGC) ethanol plant was built. This plant accounted for most of the state's production. Unfortunately, ethanol blending decreased due to the reduction in the tax credit and ethanol was unfairly blamed for a variety of problems. In addition, no new plants were being developed.

In 1987, the Minnesota Department of Agriculture initiated a program to provide public education and to promote the growth of the ethanol industry. The Federal Clean Air Act Amendments of 1990 required carbon monoxide non-attainment areas to use an average of 2.7% oxygen in gasoline for the winter months. The Twin Cities Area, including Minneapolis and St. Paul, was out of compliance with EPA carbon monoxide standards and therefore was required to use oxy-fuel starting as of the winter of 1992. In 1991 the state legislation required a year-round 2.7% minimum oxygen content for gasoline sold in the Twin Cities by 1995, and statewide requirement by 1997.

This legislation set the stage for opponents to launch a series of attempts to repeal the oxy-fuel law. In the mean time, annual ethanol use exceeded 50 million gallons in 1992 and then grew to 100 million gallons in 1993. The state's 2.7% oxygen content requirement for gasoline prevailed and ethanol was the only oxygenate used. Today, ethanol replaces almost 10% (240,000,000 gallons) of the gasoline sold in Minnesota. In 1995 two more New Generation Coop (NGC) ethanol plants began production and since that time ten additional plants were built or expanded for a statewide total of 240 million gallons of ethanol production capacity. Twelve of Minnesota's fourteen ethanol plants are designed to be like NGCs, owned by over 8,000 farmers.

BENEFITS

Ethanol as a gasoline additive produced in the state, provides the following benefits for Minnesota, its citizens, the economy and our quality of life:

- It is made from corn and other biomass products which reduce CO² emissions and global warming.
- It is produced domestically, reducing our state's and nation's oil imports.
- It contributed to fuel self-sufficiency and improved the Minnesota's balance of payments.
- Rich in oxygen, it helped the Twin Cities to become "in attainment" for carbon monoxide in 1999.

- It added value to Minnesota crops, helping rural economies and enhancing farmers' financial independence as federal farm programs were phased out.
- It provided 8,000 farmers with ownership and control of the processing and marketing of 13% of the state's corn crop in 1999.

State Economic Parameters

To gauge the major benefits of 100% market penetration by ethanol blends, this study estimated the economic impact according to the categories below (figures vary between wet mills and dry mills):

Balance of Trade (Dollars saved on imported oil)	\$100 million/year (see Page 7)
Value Added (Value of ethanol & by-products less value of corn)	\$118-145 million/year (see Page 8)
Jobs Created (including construction & service jobs)	4,746-5,138 (see Page 10)
Capital Investment (Plants, equipment, design, etc.)	\$300-400 million (see Page 12)
Total Economic Impact	\$403-437 million (see Page 12)

Ethanol in Minnesota

Ethanol consumption in the state has increased twelve-fold since 1988, to an estimated 240 million gallons per year in 2000 replacing nearly 10% of the 2.5 billion gallons of gasoline we use. About 97 % of the states gasoline is now blended with ethanol. In-state ethanol production capacity in the year 2000 has exceeded 240 million gallons per year. Some of the fourteen existing plants are considering further expansion. There are about 80 million bushels utilized in 12 dry mill corn-ethanol plants. About 55 million additional bushels are used in the state's single wet mill. While most of the wet mill product is starch and sweeteners about 11 million bushels are converted to ethanol.

An expanded ethanol industry has helped add value to our most abundant crop, created jobs, stimulated the rural economy, enhanced manufacturing infrastructure and expanded the tax base. State support for both the production and use of fuel ethanol provided confidence to bankers and investors who built the ethanol plants. Consumers were educated on the benefits of using ethanol in their gasoline. The state's Oxy-Fuel Hot Line, established in 1992, allowed consumers to talk to Department of Agriculture staff about problems they assumed, or had been told, were caused by ethanol blends. Staff worked with consumers and their mechanics to determine the real cause of the problems experienced. As time went on, opposition to the use of ethanol faded and the blend market steadily improved.

Analysis

According to this study the increased utilization of corn, Minnesota's largest crop, in the production of ethanol and other related products will provide the state with a net monetary gain of at least \$259-\$295 million a year (difference between dry mills and wet mills). Properly developed, the ethanol industry could stimulate hundreds of millions more in economic activities via capital investment in ethanol plant construction and equipment, new payrolls within and in support of an expanded fuel industry, and an improved state balance of payments due to reduced dependence on imported petroleum products.

Ethanol is ethyl alcohol (C₂ H₅ OH), a fuel made primarily from corn and other grains. It offers a number of environmental and economic benefits, especially for Minnesota farmers. Fuel ethanol:

- Can be made from potatoes, cheese whey, sugar beets, forest products; or other renewable resources including residue and waste from crops and products.
- Is produced domestically, making it independent of imports.
- Enhances our fuel self-sufficiency and our balance of payments.
- Is rich in oxygen, helpful in reducing CO and other toxic emissions from automobiles.
- Is a new market for corn and other crops that will enhance overall farm income.

Titled the "Economic Impact of the Ethanol Industry in Minnesota: Present Situations and Future Opportunities", the study postulated that the above benefits would arise from a best-case scenario in which all of the ethanol is produced from Minnesota crops and used as an additive to gasoline at a 10% blend ratio. This scenario has actually been realized.

The study postulated that the state would annually save \$100 million on imported oil, but given the crude oil and gasoline price spikes of late 1999 and early 2000, these estimates are probably understated. Another \$118-\$145 million (difference between dry mills and wet mills) would come in the form of value added to the unprocessed corn -- some 80 million bushels per year -- by producing ethanol and its co-products: gluten feed and meal, distillers dried grains (DDG), corn oil, etc. Again in mid 2000 these estimates seem understated as the cash value of rural Minnesota corn plummeted to \$1.25 per bushel in many locations and the rack price of ethanol exceeded \$1.40 per gallon.

Equally impressive were the following benefits a 200 million gallon ethanol industry would contribute to Minnesota and its citizens:

- A \$300-\$400 million net capitol investment in plant construction and equipment.
- 4,746 to 5,138 new jobs, which include all production, construction, and support/service jobs.
- The total annual payroll of \$115 to \$124 million including construction and support/service jobs.
- The state will benefit from the total multiplier effect of \$403 to \$437 million for all economic sectors including agriculture, manufacturing, transportation, wholesale and retail trade, services, utilities, as well as finance, insurance, and real estate.

The importance of the study in dramatizing the state (and the nation's) dependence on imported petroleum, is underscored by the chart **(on Page 20)** tracking weekly prices of ethanol, gasoline, corn and MTBE (a gasoline oxygenate derived from petroleum and methanol) in the days bracketing the war in the Persian Gulf.

During the Persian Gulf war, the price of unleaded regular gasoline in the Twin Cities area shot up some 66%. Petroleum additives ethanol and MTBE also showed dramatic price increases providing a market hedge for farmers invested in ethanol facilities.

The price of ethanol has historically followed the price of gasoline, up and down, so it was no surprise that the same results held true in this case. If the price of ethanol did not increase with gasoline, marketers of gasoline would have switched to ethanol blends and caused shortages of the limited supplies of ethanol. It is questionable whether they would then have passed on this lower product cost to the consumer.

Minnesota agriculture was doubly vulnerable to the market dislocation triggered by the Gulf War as the farm segment was held hostage to higher petroleum prices without the countervailing economic force that higher ethanol-from-corn prices might have provided. The blunt truth is that Minnesota is crop rich and energy poor.

"If ethanol production is not dramatically increased in Minnesota," says the MDA report, "we will face the inefficient reality of exporting two-thirds of our corn as a raw commodity, while importing ethanol from Iowa and Illinois."

"The irony of this is that Minnesota has lower corn prices than either of those two states. We have the opportunity to add value to our most abundant crop, create jobs, stimulate rural economic development and expand the tax base by encouraging the agricultural processing industry."

Several graphs in the study document these contentions: one (Page 33) shows that Illinois, with 1996 corn production of 1.468 billion bushels, processed 16% (or 234 million bushels) of its corn crop; and Iowa, a 1.711 billion bushel producer, converted 9% of that harvest (150 million bushels) at home; while Minnesota processed only a scant 3% (27 million bushels) of its 869 million bushels corn crop to produce ethanol.

In 1996, Minnesota was responsible for only 4% of national ethanol production, while Iowa fully 25% and Illinois a whopping 38% (Page 24).

Finally, in calculating wet mill output, this study only included the ethanol portion of wet mill production. In reality, ethanol generally represents only one-third of the bushels of corn processed and income generated by wet mills. These wet mills also produce syrup, starch and sweeteners, generating much more economic benefit than ethanol alone. In 1993, 84% of the 38 million gallons, or 32 million gallons of ethanol production capacity in Minnesota, were from the wet mill process." In 2000, nearly 60 million bushels of Minnesota corn will undergo wet milling but nearly 80 million bushels will be processed in dry mills representing 215 of our 245 million gallons of ethanol production capacity.

Related Information From Other Sources

In 1997 Minnesota's Office of the Legislative Auditor published an ethanol program audit, based on 180 million gallons of state ethanol production capacity. Their study concluded that, after subtracting the cost of the state ethanol producer payments the program "will generate an estimated \$341 to \$549 million in annual statewide economic benefits."

In June of 2000, an industry survey of the thirteen, corn to ethanol plants in Minnesota was conducted by the Minnesota Coalition for Ethanol. (one of the state's plants makes ethanol from cheese whey and was not included in the survey) Results from that 13 plant survey include one large wet mill, therefore, figures can not be attributed solely to ethanol production.

The data from that study is listed below:

Economic Impact

Total Project Cost	\$564 million
Annual Payroll	\$25 million
Average Annual Salary	\$33,330
Jobs in plant.	750
Taxes Paid Annually	\$15 million
Annual Purchases	\$535 million
Coop/LLC Members	8,750

Products Manufactured

Ethanol	244,000,000 gallons of ethanol.
Dried Distillers Grain	620,000 tons
Wet Distillers Grain	9,000 tons
Distillers Syrup (feed)	41,000 tons
Industrial Corn Starch	144,000,000 pounds
Wet mill feed by products	430,000,000 tons
Corn Syrup	1,500,000,000 pounds
High Fructose Corn Syrup	850,000,000 pounds

The Larger Context

Minnesota's \$20-plus billion agribusiness sector can boast first, second or third place ranking in fourteen agricultural products that are produced nationwide. Minnesota's total farm cash receipts ranked 7th in the nation in 1999. Yet, into the first decade of the 21st century the state's farm economy is still experiencing a long period of low commodity prices. For many, the production of farm commodities has become a non-profit business. The only long-term salvation for farm commodity producers may be to participate in the profits realized from the processing and marketing of their crops.

Ethanol blends comprise over 97% of all gasoline sold in the state. In addition to the state oxygenated fuel requirement, the increase in ethanol market share was partially due to heightened demand triggered by positive state and federal legislation and the vigorous educational efforts of state agricultural interests and the Minnesota Department of Agriculture. For 2000, ethanol consumption in Minnesota was projected to be about 240 million gallons.

Conversion of cellulose to ethanol has been an illusive goal for federal, state and private sector researchers alike. But the commercialization of that technology seems to be closer than ever before. Development of this technology will allow the production of ethanol from many waste materials and energy crops. Waste or byproduct options include; municipal solid waste, food processing waste and the cellulose portions of byproducts from timber and corn processing facilities. Eventually ethanol may be made from energy crops such as grass, legumes and trees.

IMPACT OF ETHANOL ON MINNESOTA'S ECONOMY

The following statistics are developed to measure the economic impacts of the ethanol industry on the state economy. The information illustrates three scenarios: ethanol consumed at previous and current levels, and ethanol with 100% market penetration. (**Assuming all ethanol consumed in Minnesota is produced in Minnesota**).

BALANCE OF TRADE

	<u>25% Market Share</u>	<u>50% Market Share</u>	<u>100% Market Share</u>
<u>Fuel Without Ethanol</u>			
Gasoline consumed*	2,000 million gallons	2,000 million gallons	2,000 million gallons
Total Gasoline spending 2) (imported product cost)	\$1,000 million	\$1,000 million	\$1,000 million
<u>Fuel With Ethanol (10% blend)</u>			
Gasoline consumed	1,950 million gallons	1,900 million gallons	1,800 million gallons
Ethanol consumed	50 million gallons	100 million gallons	200 million gallons
Total Gasoline spending	\$975 million	\$938 million	\$900 million
Dollars Saved on Imported Oil, or Impact on Trade Balance	\$25 million	\$50 million	\$100 million

* Approximate Minnesota consumption on an annual basis.

Notes:

- 1) Source: Minnesota Department of Public Service.
- 2) Ditto.

IMPACT OF ETHANOL ON MINNESOTA'S ECONOMY (continued)

ETHANOL INDUSTRY'S VALUE-ADDED

<u>Economic Benefits</u>	<u>25% Market Share</u>	<u>50% Market Share</u>	<u>100% Market Share</u>
Corn use	20 million bushels	40 million bushels	80 million bushels 1)
Ethanol production	50 million gallons	100 million gallons	200 million gallons
Value of ethanol production 2)	\$62 million	\$123 million	\$247 million
<u>A. Wet Milling</u>			
Value of by-products*	\$24 million	\$49 million	\$98 million
-- Gluten feed 3)	\$9 million	\$18 million	\$36 million
-- Gluten meal 4)	\$6 million	\$11 million	\$22 million
-- Corn oil 5)	\$9 million	\$18 million	\$35 million
-- CO2 6)	\$1 million	\$2 million	\$4 million
<u>B. Dry Milling</u>			
Value of by-products	\$18 million	\$36 million	\$71 million
-- DDG 7)	\$17 million	\$34 million	\$67 million
-- CO2	\$1 million	\$2 million	\$4 million

* Excluding solubles and steep water which also have a market value.

Notes:

- 1) 80 million bushels are approximately 9% of Minnesota's average annual corn production (916 million bushels, 1994). For comparison, 80 million bushels of corn at \$2.50/bushel, if exported, would bring \$200 million to our farmers. When processed, it would bring more than \$400 million to the state, plus jobs and other economic benefits as summarized on Page 12.
- 2) At the March 1995 market price of \$1.23 per gallon for ethanol.
- 3) At the March 1995 market price of \$82 per ton for gluten feed.
- 4) At the March 1995 market price of \$216 per ton for gluten meal.
- 5) At the March 1995 market price of \$0.28 per pound for corn oil.
- 6) Since CO2 price varies from \$3 to \$40 per ton, a \$9 per ton quote is used for the purpose of analysis.
- 7) At the March 1995 market price of \$94 per ton for DDG.

IMPACT OF ETHANOL ON MINNESOTA'S ECONOMY (continued)

ALL INDUSTRIES' TOTAL VALUE-ADDED & OUTPUT*

	<u>25% Market Share</u>	<u>50% Market Share</u>	<u>100% Market Share</u>
<u>Total Value Added 1)</u> (For corn milling industry and all other supporting economic sectors)			
A. Wet Milling	\$67 million	\$134 million	\$268 million
B. Dry Milling	\$62 million	\$124 million	\$248 million
<u>Total Industry Output 2)</u> (Including output of corn milling industry and all other supporting economic sectors)			
A. Wet Milling	\$163 million	\$326 million	\$653 million
B. Dry Milling	\$151 million	\$301 million	\$603 million

* This analysis is performed using the IMPLAN (Impact Analysis for Planning) regional input/output estimation model developed by the University of Minnesota.

Notes and Remarks:

- 1) Including ethanol industry and all supporting industries value-added output from direct, indirect, and induced economic impacts.
- 2) Including ethanol industry and all supporting industries total output value from direct, indirect, and induced economic impacts.

IMPACT OF ETHANOL ON MINNESOTA'S ECONOMY (continued)

JOB AND PAYROLL*

	<u>25% Market Share</u>	<u>50% Market Share</u>	<u>100% Market Share</u>
<u>Jobs Created</u> 1)			
(Including all production jobs and support/service jobs 2))			
A. Wet Milling	1,285	2,569	5,138
B. Dry Milling	1,187	2,373	4,746
<u>Increased Payroll</u>			
(Including all production jobs and support/service jobs)			
A. Wet Milling	\$31 million	\$62 million	\$124 million
B. Dry Milling	\$29 million	\$57 million	\$115 million

* This analysis is performed using the IMPLAN (Impact Analysis for Planning) regional input/output estimation model developed by the University of Minnesota.

Notes and Remarks:

- 1) Calculation is based on the total impact on the job market for all economic sectors
- 2) A "primary" job in manufacturing generates additional jobs in all other economic sectors, including transportation, distribution, marketing, communication, public utilities, wholesale and retail trade, finance, insurance, and services.

IMPACT OF ETHANOL ON MINNESOTA'S ECONOMY (continued)

FISCAL IMPACT

<u>State Tax Revenues</u>	<u>25% Market Share</u>	<u>50% Market Share</u>	<u>100% Market Share</u>
1. Payroll tax			
A. Wet Milling	\$9 million	\$18 million	\$36 million
B. Dry Milling	\$8 million	\$15 million	\$30 million
2. Taxes on increased dividends or personal income for stock holders	\$2 million	\$4 million	\$9 million
3. Local property tax	\$2 million	\$4 million	\$8 million
	\$4-5 million	\$7-10 million	\$8-9 million
	\$10 million	\$20 million	\$30 million
<u>Ethanol Subsidy</u>			
-- Producer's payment 1)	\$10 million	\$20 million	\$30 million
-- Blender's credit 2)	\$0 million	\$0 million	\$0 million
<u>State & Local Fiscal Impact 3)</u>			
A. Wet Milling	-\$1 million	-\$2 million	\$6 million
B. Dry Milling	-\$2 million	-\$5 million	\$0.3 million

Notes and Remarks:

- 1) There is a \$30 million cap of producer payment per year.
- 2) Blenders' credit will phase out by 1997.
- 3) State & local fiscal impact equals state & local tax revenues minus ethanol subsidy.

IMPACT OF ETHANOL ON MINNESOTA'S ECONOMY (continued)

OVERALL ECONOMIC IMPACT*

	<u>25% Market Share</u>	<u>50% Market Share</u>	<u>100% Market Share</u>
<u>Economic Gains for MN</u> (Dry mill -- Wet mill difference)			
Balance of trade 1)	\$25 million	\$50 million	\$100 million
Industry capitol investments 2)	\$75-100 million	\$150-200 million	\$300-400 million
Value-added (ethanol & by-products) 3)	\$34-41 million	\$68-81 million	\$136-162 million
Jobs created 4)	1,187-1,285	2,373-2,569	4,746-5,138
Payroll -- wages and salaries 5)	\$29-31 million	\$57-62 million	\$115-124 million
State & local fiscal impact 6)	(\$1-2 million)	(\$2-5 million)	\$0.3-6 million
TOTAL MULTIPLIER EFFECT			
TO THE STATE ECONOMY** (Dry mill -- wet mill difference)	\$101-109 MILLION	\$202-218 MILLION	\$403-437 MILLION

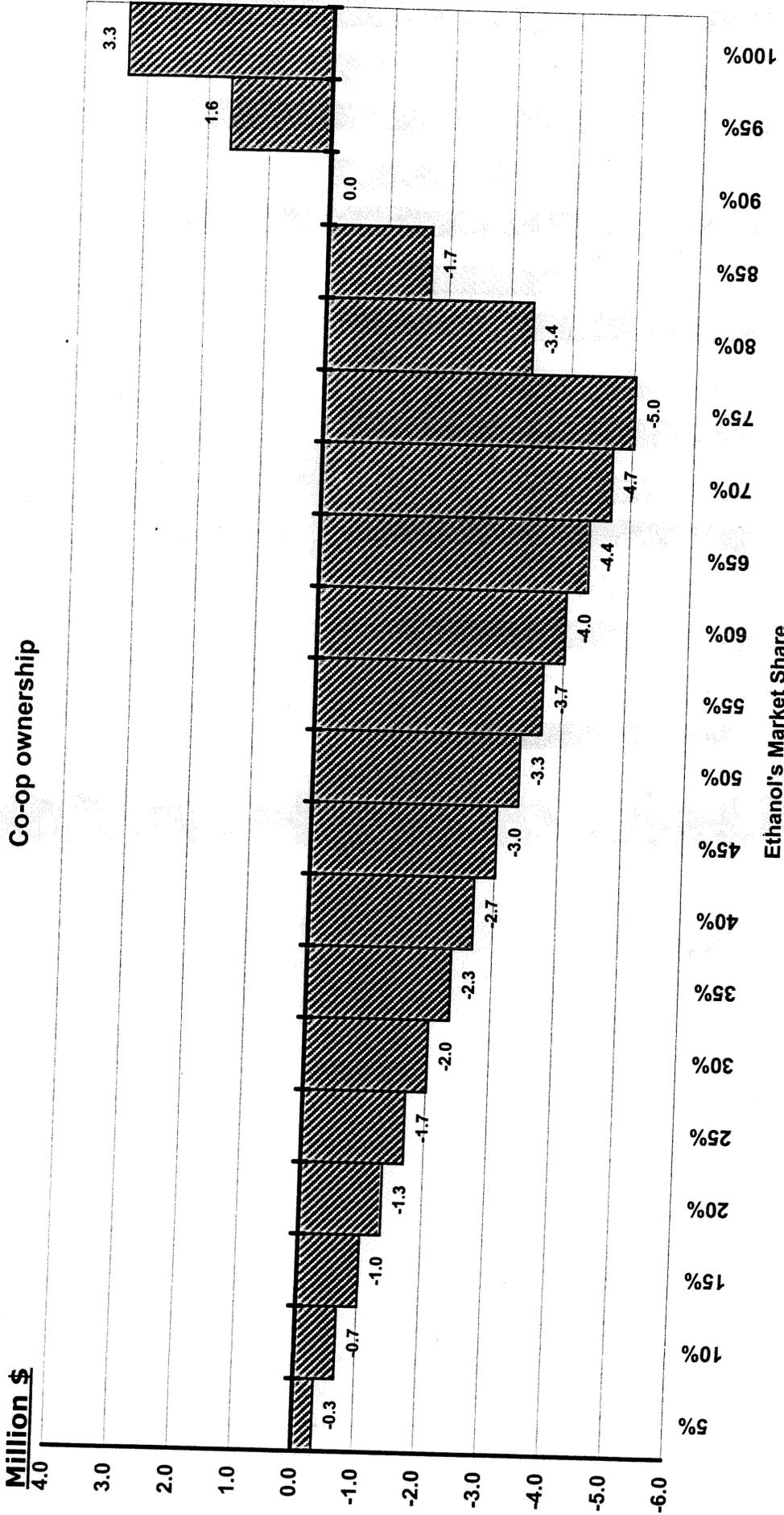
* This analysis is performed using the IMPLAN (Impact Analysis for Planning) regional input/output estimation model developed by the University of Minnesota.

**The overall economic impacts include the direct, indirect and induced short-term and long-term effects on all the following economic sectors: agriculture, manufacturing/processing, transportation/distribution, construction, wholesale and retail trade, services, utilities, and finance, insurance & real estate, etc.

Notes:

- 1) Balance of trade is derived from dollars saved from import oil when ethanol is used. Please see Page 7.
- 2) For ethanol industry, to produce one gallon of ethanol, \$1.5-\$2 of capitol investment is required.
- 3) Please see Page 8 for value of ethanol production and value of by-products (wet milling).
Value-added = Value of ethanol + Value of by-products - Value of corn (at an average market price of \$2.28/bushel)
- 4) Please see Page 10.
- 5) Please see page 10.
- 6) Please see Page 11.

State & Local Fiscal Impact of Ethanol Production in Minnesota

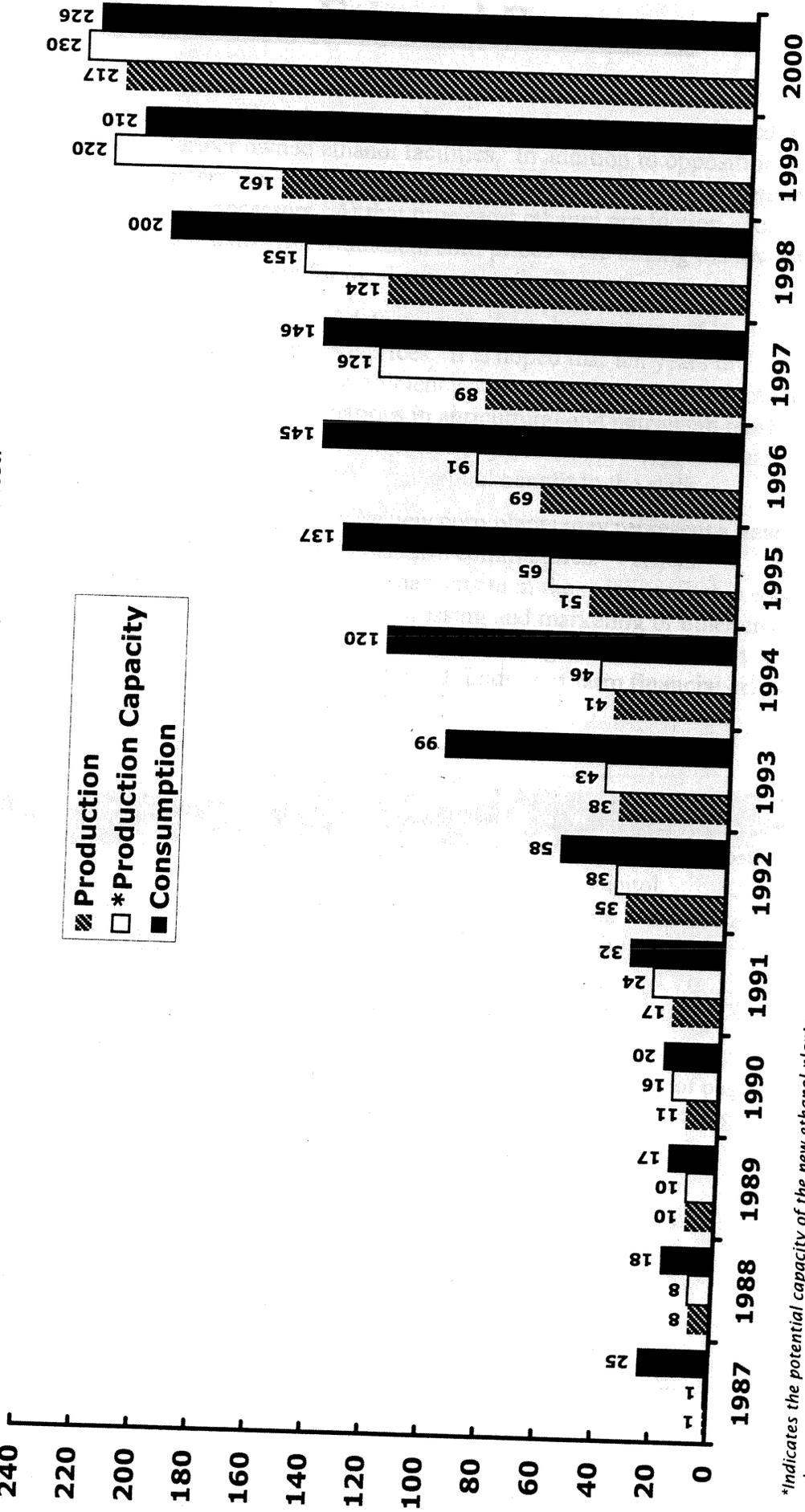


Source: Market Development and Promotion Division of MDA.

Minnesota Ethanol Potentials (Fiscal Year)

Fiscal year ends on June 30 of the year indicated

Million Gallons



*Indicates the potential capacity of the new ethanol plants that are built by the end of the fiscal year.

The Minnesota Ethanol Program

Background:

The 20-cent ethanol producer payment legislation initially provided the security required by lenders to invest in these small farmer owned ethanol facilities. In addition to opposition from the petroleum industry, bankers were concerned that these plants could not compete in the market with large agribusiness processors. At that time most ethanol production occurred in large corporate mills outside the state. But Minnesota corn prices were among the lowest in the country, which might be an advantage for local processing by farmers.

Although these ventures have been successful to date, margins have been squeezed by periods of record high corn prices and low ethanol prices. It is hoped that ten years of payments will allow plants to retire debt, increase efficiency and to develop new products so they can survive the competition and price fluctuations in agricultural and petroleum markets. Unique aspects of the ethanol industry made these incentive payments necessary, but our ethanol industry will contribute over \$350 million in net annual benefit to the state.

Since low farm commodity prices are common, these new corn plants may represent a new strategy for the long-range profitability of farmers and farm communities. Vertical integration from the bottom up could allow farmers to participate in the more profitable end of agriculture. Promoting farmer investments in the processing and marketing of other crop or livestock enterprises may not require the high level of state funding as did ethanol. It is hoped that such initiatives can reduce the need for continual funding of farm financial crisis measures and allow farmers to make it on their own.

The main components of the Minnesota Ethanol Program are:

1. Oxygenated fuel statute that requires state-wide oxy-fuel (ethanol) use,
2. The ethanol producer incentive provides payment for ethanol produced,
3. \$550 million in total corn/ethanol plant project spending for construction and startup costs.
 - ◆ \$370 million in private sector financing was contingent on local equity capitol.
 - ◆ \$180 million in local equity capitol raised by over 8,000 farmers and local businesses.
4. \$240 million worth of corn is committed for processing annually by local farmers.

The goals of the program include:

1. To build a new market for the state's largest crop (corn).
2. To develop corn processing/ethanol production facilities in Minnesota.
3. To increase the number of New Generation Farmer Coops (NGC). (See other side of page)
4. To replace 10% of imported petroleum we use for gasoline. (\$100 million annual savings)
5. To help the Twin City Area meet U.S. EPA standards for carbon monoxide.

Results to date:

1. 130 million bu. of corn (17% of MN. crop) is made into ethanol and other products.
2. Minnesota's 14 plants can produce over 220 million gallons of ethanol /yr.
3. Twelve of Minnesota's 14 ethanol plants are NGCs**. (see next page)
4. Nearly 10% of our gasoline is being replaced by ethanol each year.
5. The Twin Cities Area met EPA's carbon monoxide standard and has recently achieved "attainment" status. The continued use of ethanol is required to keep emissions low.

The Minnesota Ethanol Program

Ethanol Production -vs- Market Penetration

Year	(mm = million) Production	Estimated Consumption	% MN Ethanol Produced Here
1994	24 mm gal.	125 mm gal.	20% of total
1997	112 mm gal.	177 mm gal.	63% of total
1999	190 mm gal.	200 mm gal.	95% of total
2000	240 mm gal.	240 mm gal.	100% of total
TOTAL	240 mm gal.	240 mm gal.	100% of total

Ethanol Plants & Capacities.

& (plant name)	Capacity Gallons/year	mm. bushel corn/year	Start-up year	New Generation Co-op** Members
Shelburne (MCP)	30 million	11.0 *	1988	4,000
Wisconsin (DENCO)	15 million	5.5	1991	300
Waseca (Corn Plus)	20 million	7.4	1994	650
Whitworth (Heartland)	17 million	6.3	1995	502
Wadena (CVEC)	19 million	7.0	1996	650
Wright (AI-Corn)	17 million	6.3	1996	358
Wright Lake (Ethanol2000)	28 million	10.4	1997	244
Wright Lake (MN. Energy)	12 million	4.4	1997	325
Wright (Kraft)	2.6 million	cheese whey	1986	(private)
Wright (Pro-Corn)	18 million	6.6	1998	170
Wright (Corn-er Stone)	17 million	6.3	1998	201
Wright Falls (CMEC)	18 million	6.7	1999	854
Wright Lea (Exol/Agri Resources)	17 million	6.3	1999	496
Wright Hill (Gopher State Ethanol)	15 million	5.6	1999	(private)

245.6 mm gal. 89.8 mm bus.

8,750 memb.

Using corn products instead of exporting raw corn more than doubles the value of each bushel. In addition to fuel ethanol, corn plants produce 650,000 tons of high protein livestock feed and other products including; industrial ethanol, starch, sweeteners and carbon dioxide.

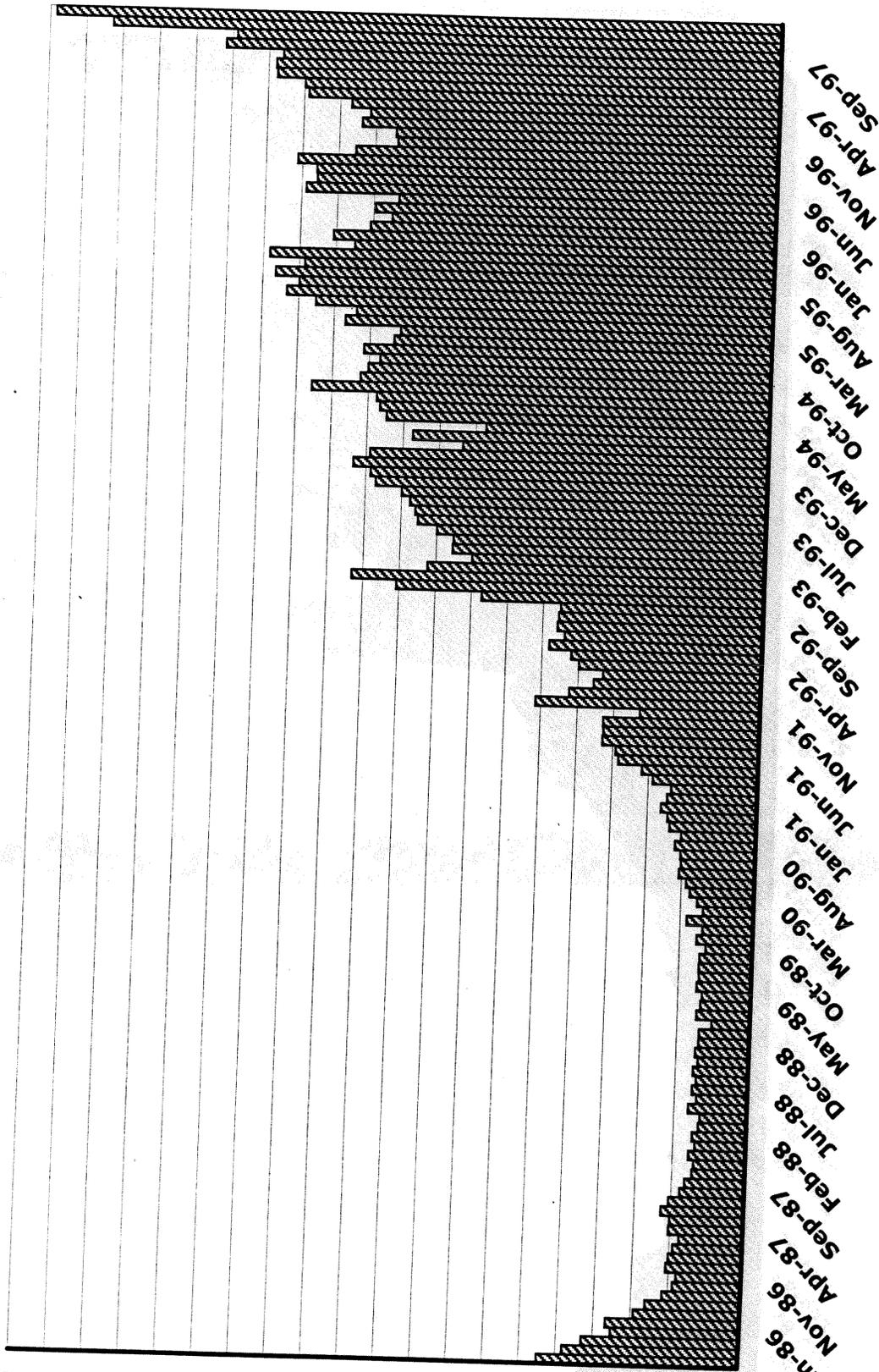
Minnesota Corn Processors (MCP) can also grind 45,000,000 bushels of corn for starch, sweeteners and other products. Therefore, total corn milling capacity in Minnesota is 135 million bushels, or 17% of the state's average crop.

Generation Farmer Co-ops (NGC) may be combined with or converted to limited liability companies or partnerships that are generally designed to: be built by farmers to process member crops, return more cash to farmers than conventional markets would provide, be controlled by farmer board members so that farmer profits remain a top priority, and create a stable source of local jobs and economic development.

Ethanol Consumption in Minnesota (Monthly)

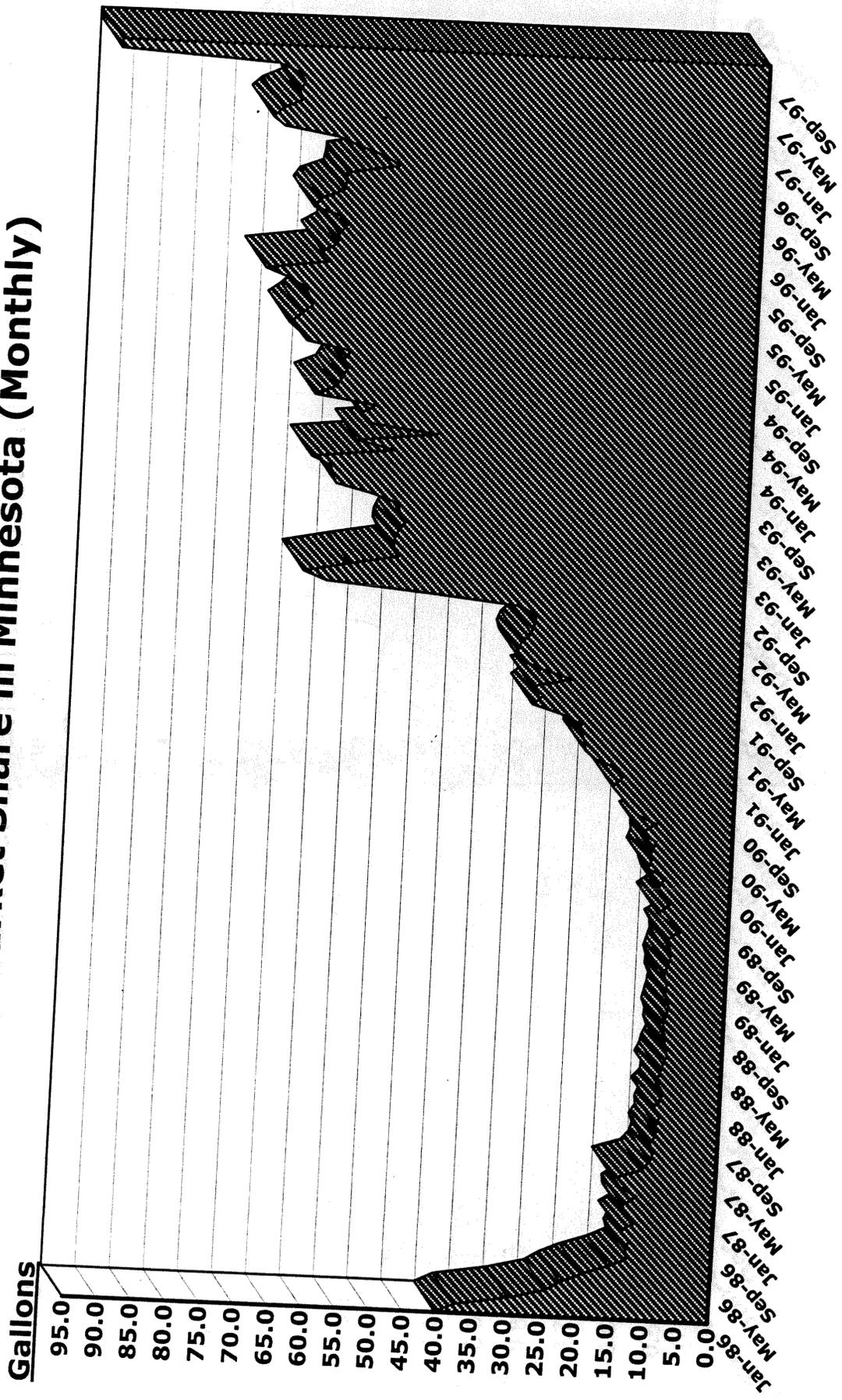
Gallons

20,000,000.0
 19,000,000.0
 18,000,000.0
 17,000,000.0
 16,000,000.0
 15,000,000.0
 14,000,000.0
 13,000,000.0
 12,000,000.0
 11,000,000.0
 10,000,000.0
 9,000,000.0
 8,000,000.0
 7,000,000.0
 6,000,000.0
 5,000,000.0
 4,000,000.0
 3,000,000.0
 2,000,000.0
 1,000,000.0
 0.0



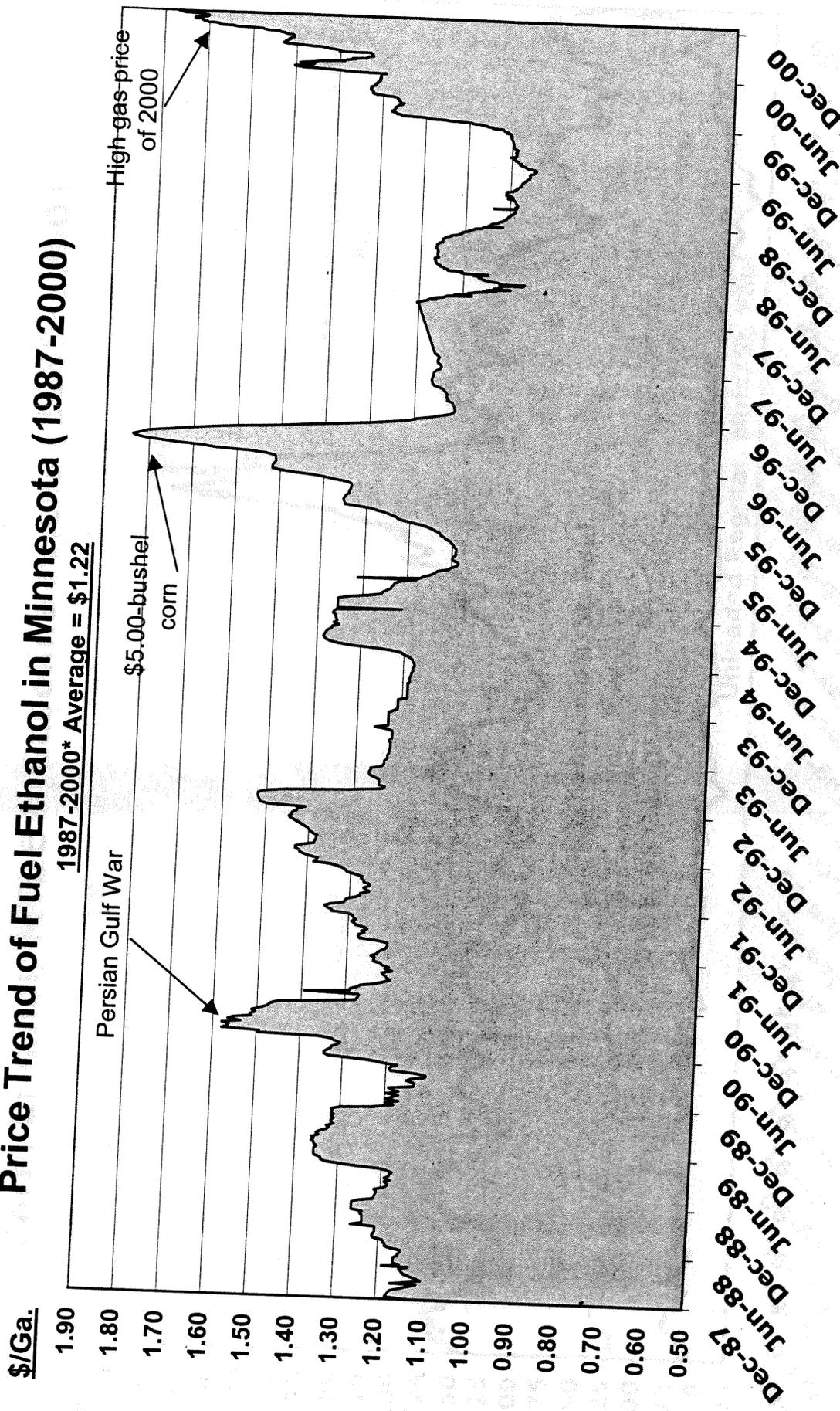
Source: Minnesota Department of Transportation.

Ethanol Market Share in Minnesota (Monthly)



Price Trend of Fuel Ethanol in Minnesota (1987-2000)

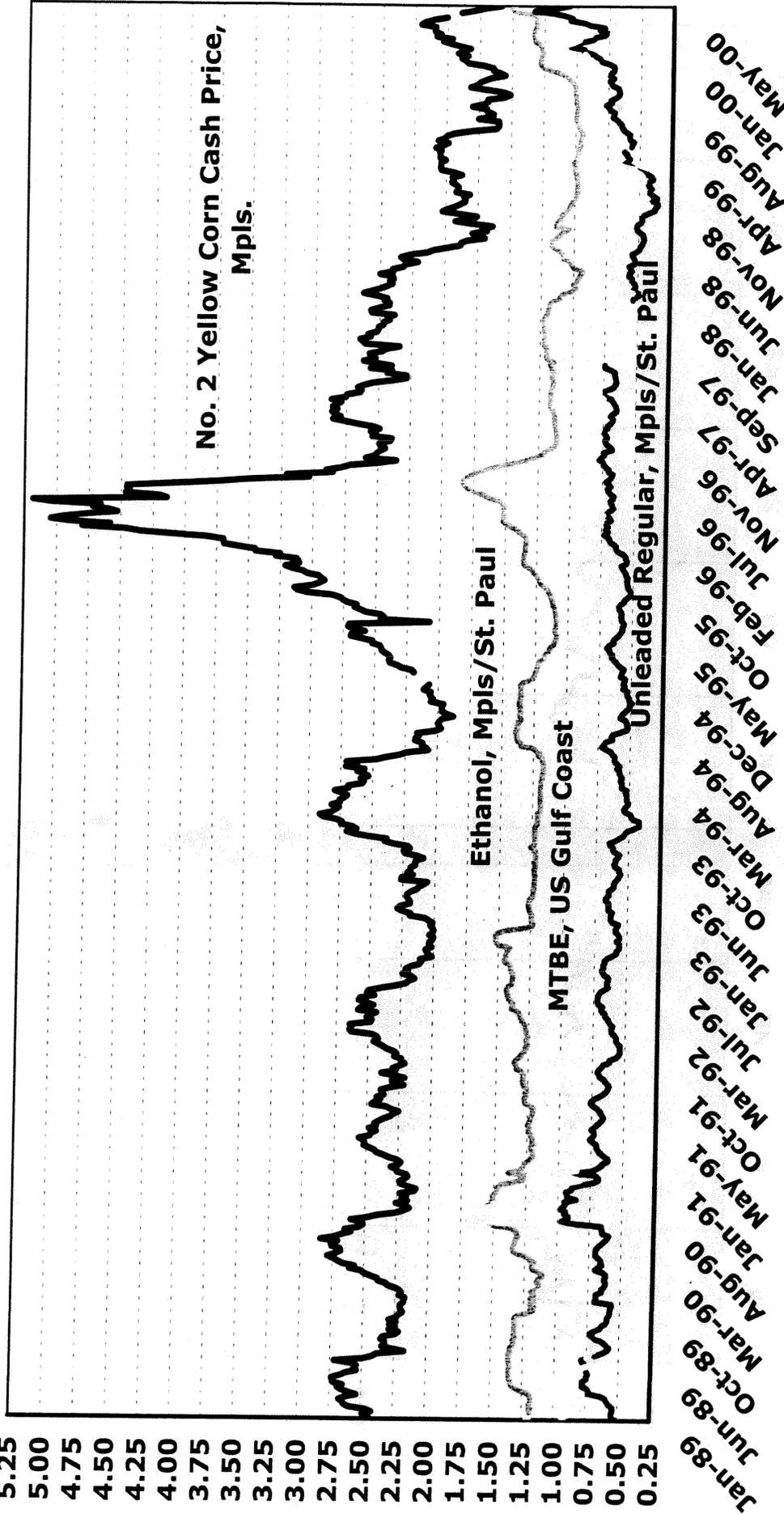
1987-2000* Average = \$1.22



Corn, Ethanol, MTBE & Gasoline Prices (1989-2000)

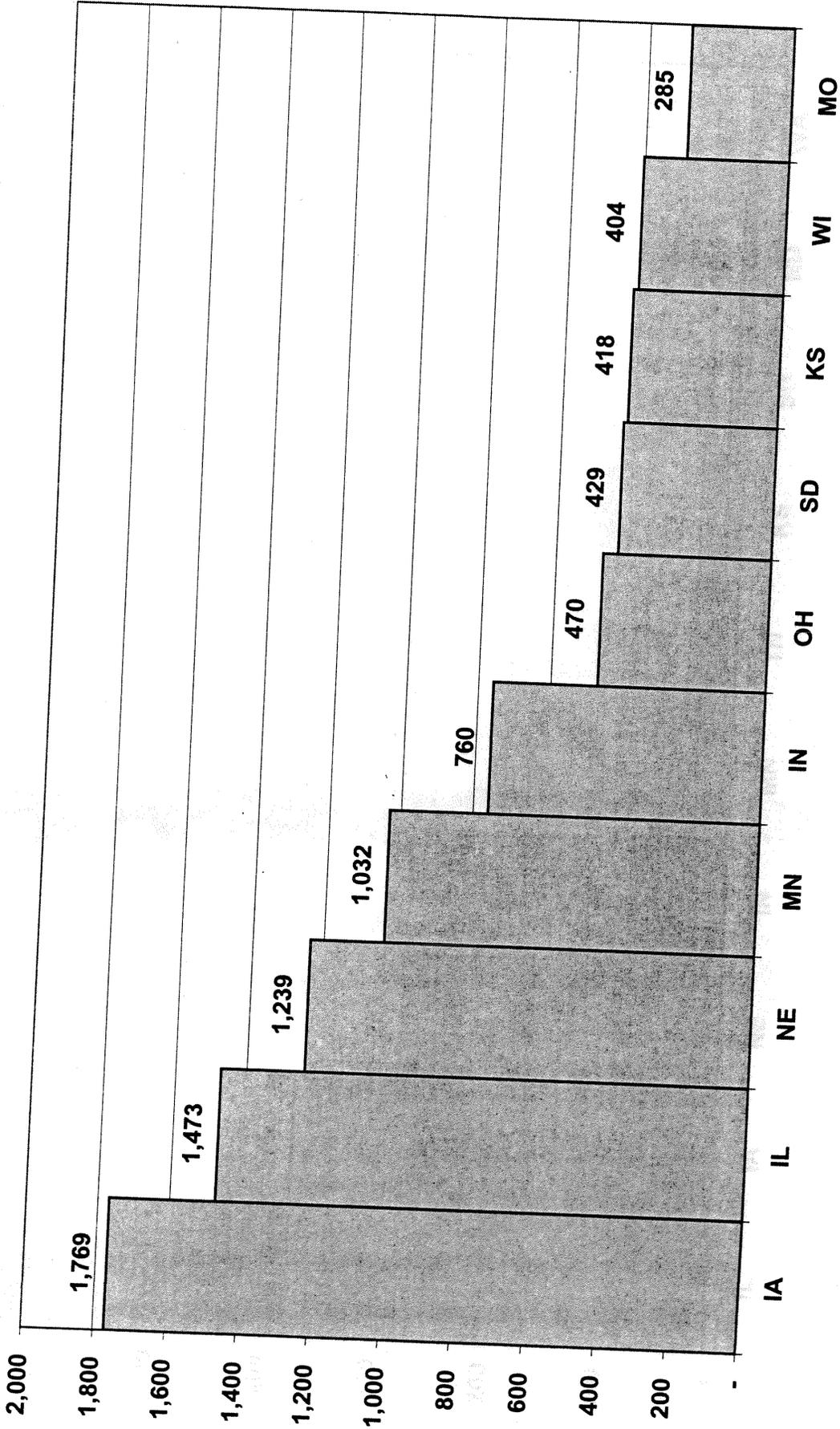
Dollars

- 5.25
- 5.00
- 4.75
- 4.50
- 4.25
- 4.00
- 3.75
- 3.50
- 3.25
- 3.00
- 2.75
- 2.50
- 2.25
- 2.00
- 1.75
- 1.50
- 1.25
- 1.00
- 0.75
- 0.50
- 0.25



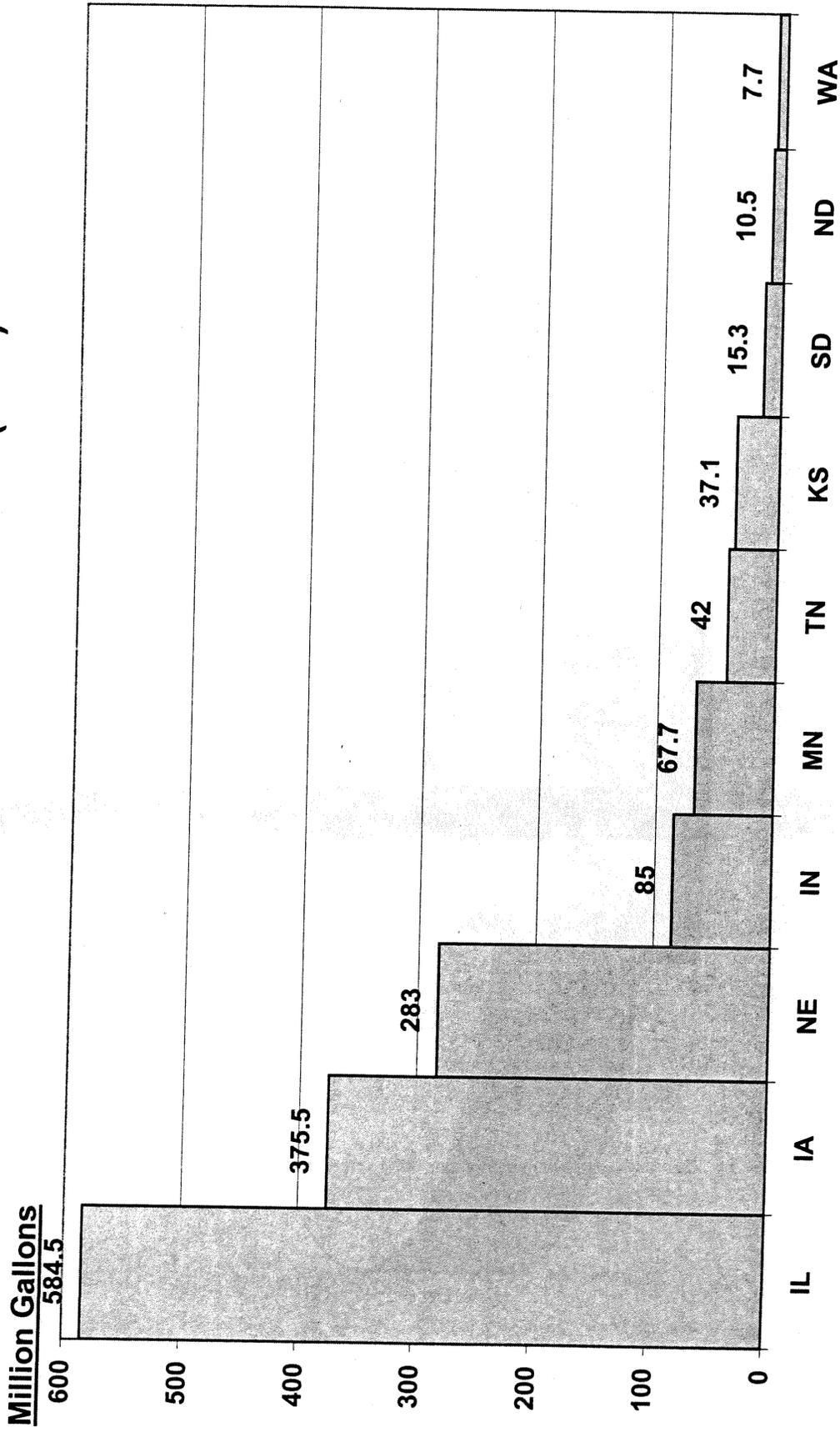
State Ranking in Corn Production (1998)

Million Bushels



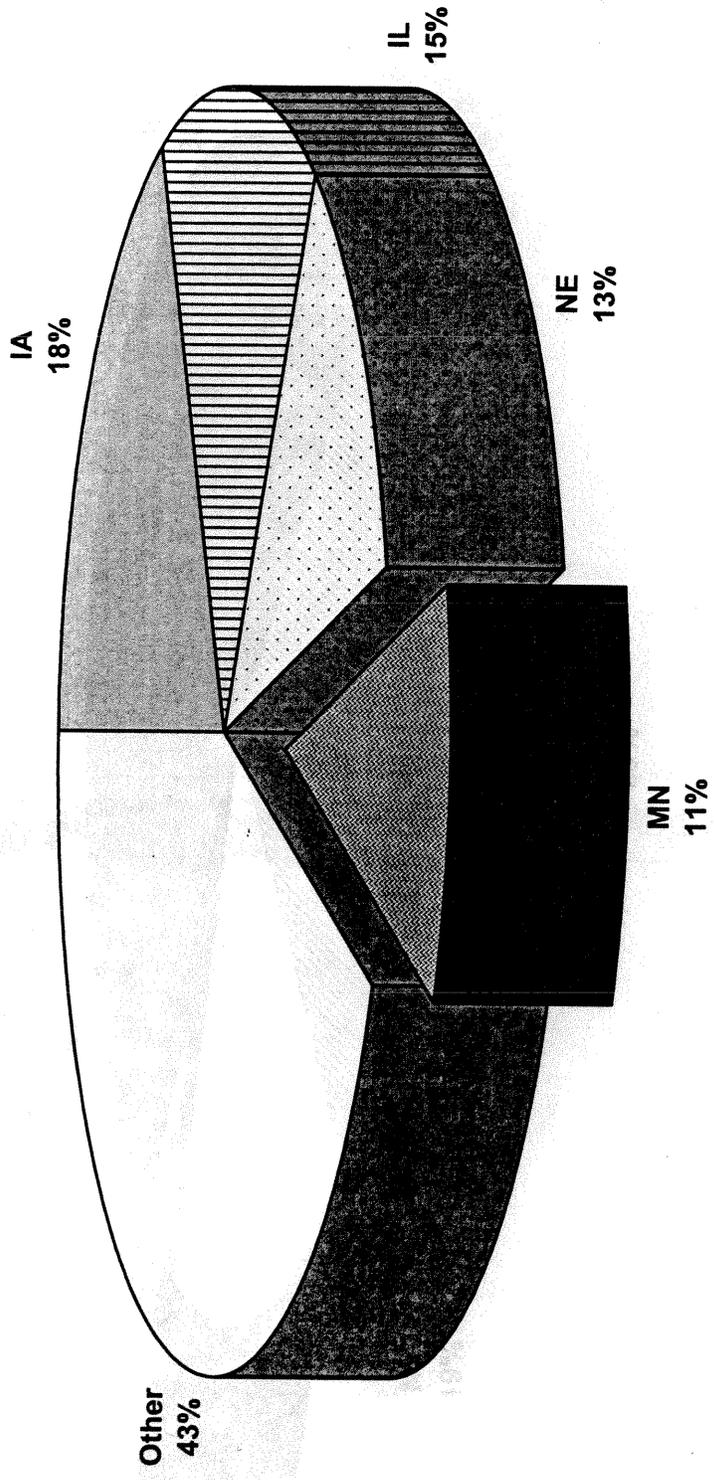
Source: USDA.

State Ranking in Ethanol Production (1996)

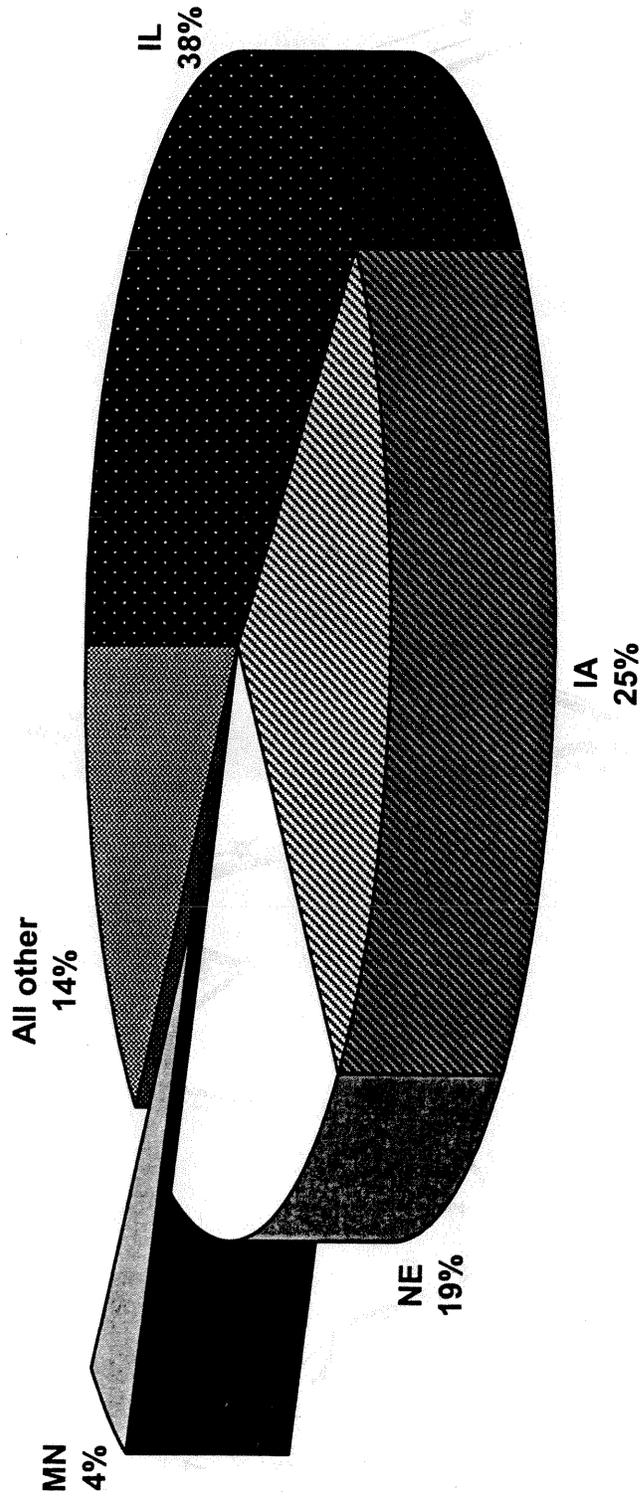


Source: National Corn Growers Association.

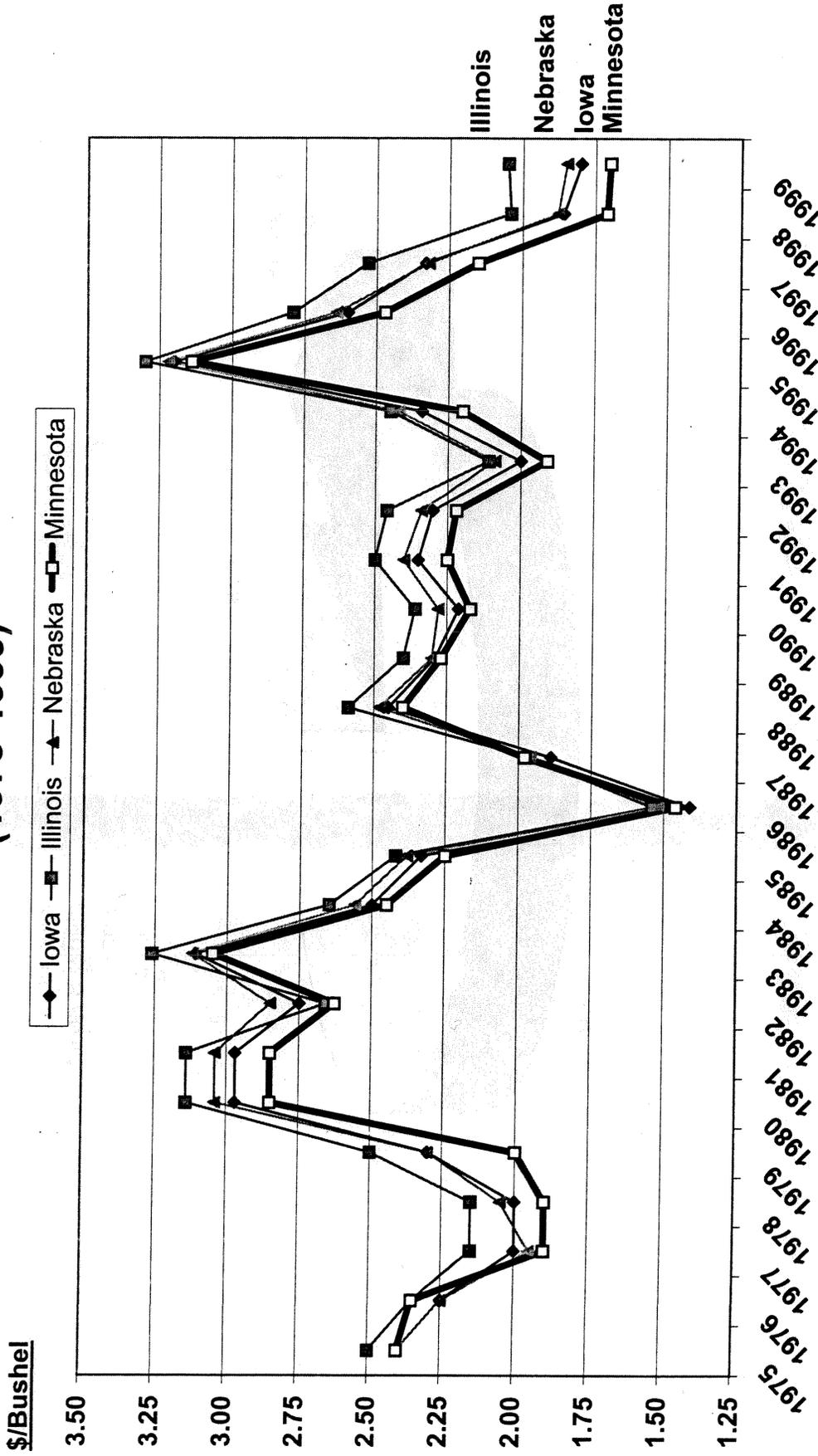
Corn Production in 4 States -- % of U.S. Total (1998)



Ethanol Production in 4 Corn States -- % of U.S. Total (1996)

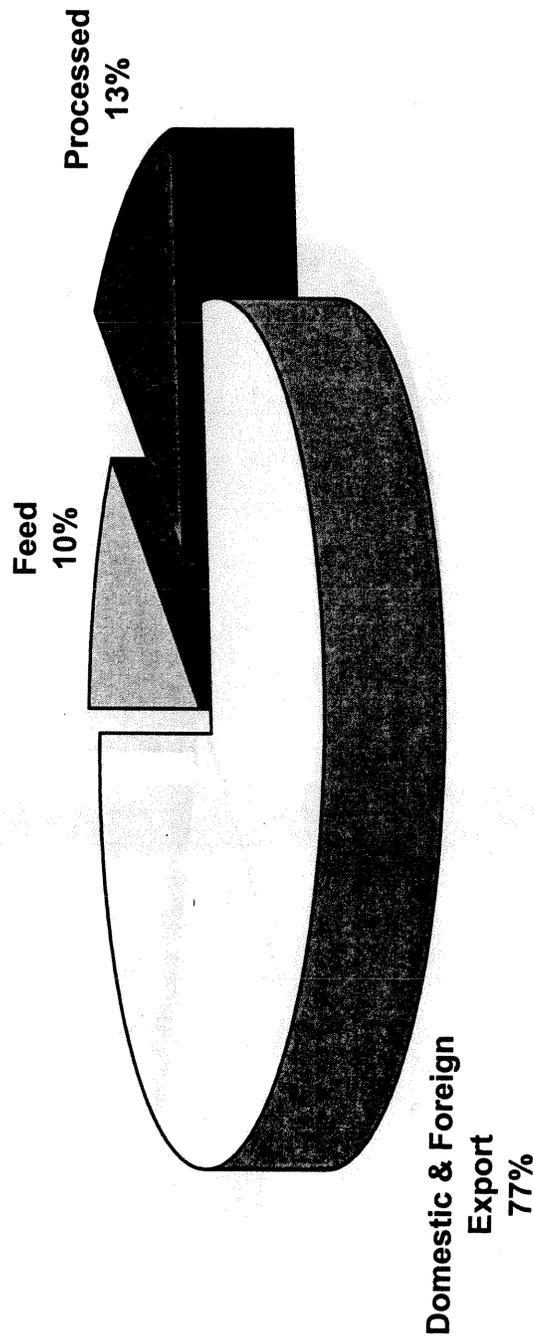


Corn Prices: Iowa, Illinois, Minnesota & Nebraska (1975-1999)

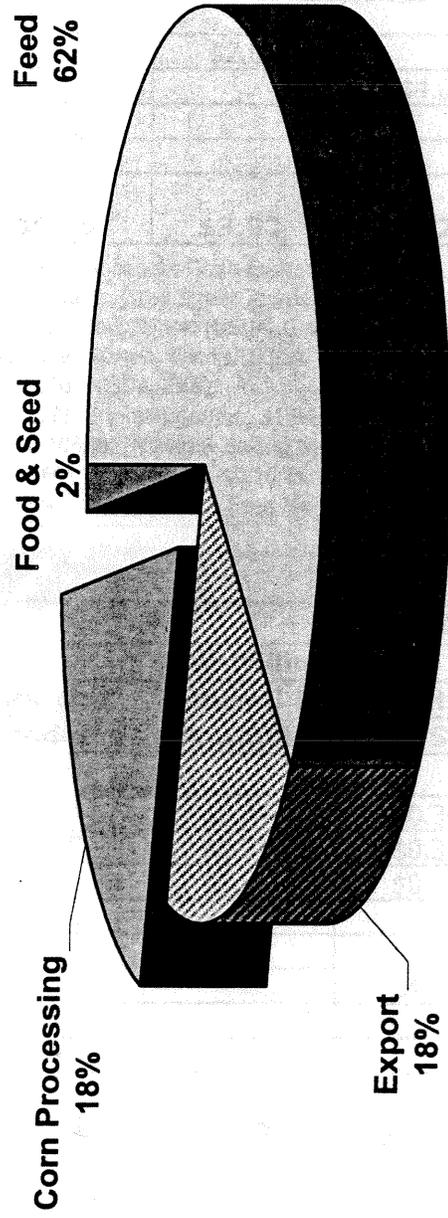


Corn Utilization in Minnesota 1999

Total Production: 990 Million Bushels
Feed: 96 Million Bushels
Corn Processing: 130 Million Bushels
Domestic & Foreign Export: 764 Million Bushels



Corn Utilization in the U.S. (1998)



Value of Corn

Raw Commodity vs. Value-Added (per bushel of corn)

Dec. 1998 Prices

Products	Corn	Value-Added				
	Raw Commodity	Wet-Milling				Dry-Milling
		Starch & Products	Ethanol & Products	Sweeteners & Products		Ethanol & DDG
				Corn Syrup	HFCS	
Corn	\$1.87					
Corn Oil		\$0.47	\$0.47	\$0.47	\$0.47	
Gluten Feed		\$0.39	\$0.39	\$0.39	\$0.39	
Gluten Meal		\$0.38	\$0.38	\$0.38	\$0.38	
Starch		\$3.81				
Ethanol			\$2.68			\$2.55
Corn Syrup				\$4.02		
HFCS					\$3.31	
DDG						\$0.71
Total Value	\$1.87	\$5.05	\$3.92	\$5.26	\$4.55	\$3.26

Computation based on the following:

Corn: \$1.87/bu. cash price (Minneapolis Grain Exchange).
 Corn oil: 1.6 lb./bushel, \$0.30/lb. (Wall Street Journal).
 Gluten feed: 10.9 lb./bu., \$71/ton, Illinois (USDA, Grain & Feed Market News).
 Gluten meal: 2.6 lb./bu., \$292.50/ton, Illinois (USDA, Grain & Feed Market News).
 Starch: 31.5 lb./bu., \$0.12/lb. (USDA, ERS).
 Ethanol: 2.45 (wet-mill)/2.58 (dry-mill) ga./bu., \$1.04/ga. (Mpls/St. Paul market, CPC).
 Corn syrup: 40 lb./bu., \$0.105/lb. (Milling & Baking News).
 HFCS: 33.3 lb./bu. 55% HFCS (dry weight), \$0.10/lb. (Milling & Baking News).
 DDG: 18 lb./bu., \$84.50/ton (USDA, Grain & Feed Market News).

Dec. 1999 Prices

Products	Corn	Value-Added				
	Raw Commodity	Wet-Milling				Dry-Milling
		Starch & Products	Ethanol & Products	Sweeteners & Products		Ethanol & DDG
				Corn Syrup	HFCS	
Corn	\$1.62					
Corn Oil		\$0.34	\$0.34	\$0.34	\$0.34	
Gluten Feed		\$0.33	\$0.33	\$0.33	\$0.33	
Gluten Meal		\$0.31	\$0.31	\$0.31	\$0.31	
Starch		\$3.73				
Ethanol			\$2.77			\$2.63
Corn Syrup				\$4.30		
HFCS					\$4.05	
DDG						\$0.76
Total Value	\$1.62	\$4.71	\$3.75	\$5.28	\$5.03	\$3.39

Computation based on the following:

Corn: \$1.62/bu. cash price (Minneapolis Grain Exchange).
 Corn oil: 1.6 lb./bushel, \$0.22/lb. (Wall Street Journal).
 Gluten feed: 10.9 lb./bu., \$61/ton, Illinois (USDA, Grain & Feed Market News).
 Gluten meal: 2.6 lb./bu., \$235/ton, Illinois (USDA, Grain & Feed Market News).
 Starch: 31.5 lb./bu., \$0.12/lb. (USDA, ERS).
 Ethanol: 2.45 (wet-mill)/2.58 (dry-mill) ga./bu., \$1.0732/ga. (Mpls/St. Paul market, CPC).
 Corn syrup: 40 lb./bu., \$0.1075/lb. (Milling & Baking News).
 HFCS: 33.3 lb./bu. 55% HFCS (dry weight), \$0.12/lb. (Milling & Baking News).
 DDG: 18 lb./bu., \$84.50/ton (USDA, Grain & Feed Market News).

Value of Corn

Raw Commodity vs. Value-Added

(per bushel of corn)

July 1995 Prices

Products	Corn		Value-Added			
	Raw Commodity	Wet-Milling				Dry-Milling
		Starch & Products	Ethanol & Products	Sweeteners & Products		Ethanol & DDG
				Corn Syrup	HFCS	
Corn	\$2.68					
Corn Oil		\$0.43	\$0.43	\$0.43	\$0.43	
Gluten Feed		\$0.45	\$0.45	\$0.45	\$0.45	
Gluten Meal		\$0.28	\$0.28	\$0.28	\$0.28	
Starch		\$4.26				
Ethanol			\$2.83			\$2.69
Corn Syrup				\$4.56		
HFCS					\$6.16	
DDG						\$0.88
Total Value	\$2.68	\$5.42	\$3.99	\$5.72	\$7.32	\$3.56

Computation based on the following:

Corn: \$2.68/bu. cash price (Minneapolis Grain Exchange).
 Corn oil: 1.6 lb./bushel, \$0.27/lb. (Wall Street Journal).
 Gluten feed: 10.9 lb./bu., \$83/ton, Illinois (USDA, Grain & Feed Market News).
 Gluten meal: 2.6 lb./bu., \$213/ton, Illinois (USDA, Grain & Feed Market News).
 Starch: 31.5 lb./bu., \$0.14/lb. (USDA, ERS).
 Ethanol: 2.45 (wet-mill)/2.58 (dry-mill) ga./bu., \$1.10/ga. (Mpls/St. Paul market, CPC).
 Corn syrup: 40 lb./bu., \$0.13/lb. (Milling & Baking News).
 HFCS: 33.3 lb./bu. 55% HFCS (dry weight), \$0.23/lb. (Milling & Baking News).
 DDG: 18 lb./bu., \$98/ton (USDA, Grain & Feed Market News).

July 1996 Prices

Products	Corn		Value-Added			
	Raw Commodity	Wet-Milling				Dry-Milling
		Starch & Products	Ethanol & Products	Sweeteners & Products		Ethanol & DDG
				Corn Syrup	HFCS	
Corn	\$5.18					
Corn Oil		\$0.40	\$0.40	\$0.40	\$0.40	
Gluten Feed		\$0.58	\$0.58	\$0.58	\$0.58	
Gluten Meal		\$0.40	\$0.40	\$0.40	\$0.40	
Starch		\$5.87				
Ethanol			\$3.95			\$3.76
Corn Syrup				\$5.26		
HFCS					\$6.86	
DDG						\$1.45
Total Value	\$5.18	\$7.26	\$5.34	\$6.64	\$8.24	\$5.20

Computation based on the following:

Corn: \$5.18/bu. cash price (Minneapolis Grain Exchange).
 Corn oil: 1.6 lb./bushel, \$0.25/lb. (Wall Street Journal).
 Gluten feed: 10.9 lb./bu., \$106/ton, Illinois (USDA, Grain & Feed Market News).
 Gluten meal: 2.6 lb./bu., \$308/ton, Illinois (USDA, Grain & Feed Market News).
 Starch: 31.5 lb./bu., \$0.19/lb. (USDA, ERS).
 Ethanol: 2.45 (wet-mill)/2.58 (dry-mill) ga./bu., \$1.53/ga. (Mpls/St. Paul market, CPC).
 Corn syrup: 40 lb./bu., \$0.13/lb. (Milling & Baking News).
 HFCS: 33.3 lb./bu. 55% HFCS (dry weight), \$0.21/lb. (Milling & Baking News).
 DDG: 18 lb./bu., \$161/ton (USDA, Grain & Feed Market News).

Value of Corn

Raw Commodity vs. Value-Added

(per bushel of corn)

October 1993 Prices

Products	Corn		Value-Added			
	Raw Commodity	Wet-Milling				Dry-Milling
		Starch & Products	Ethanol & Products	Sweeteners & Products		Ethanol & DDG
				Corn Syrup	HFCS	
Corn	\$2.27					
Corn Oil		\$0.34	\$0.34	\$0.34	\$0.34	
Gluten Feed		\$0.41	\$0.41	\$0.41	\$0.41	
Gluten Meal		\$0.38	\$0.38	\$0.38	\$0.38	
Starch		\$3.58				
Ethanol			\$2.94			\$3.10
Corn Syrup				\$4.76		
HFCS					\$7.83	
DDG						\$1.06
Total Value	\$2.27	\$4.71	\$4.07	\$5.89	\$8.96	\$4.16

Computation based on the following:

Corn: \$2.266/bu. cash price (Wall Street Journal).
 Corn oil: 1.55 lb./bushel, \$0.22/lb. (Wall Street Journal).
 Gluten feed: 10.9 lb./bu., \$76.69/ton, Illinois (USDA, Grain & Feed Market News).
 Gluten meal: 2.6 lb./bu., \$296.2/ton, Illinois (USDA, Grain & Feed Market News).
 Starch: 31.5 lb./bu., \$0.11/lb. (USDA, ERS).
 Ethanol: 2.45 (wet-mill)/2.58 (dry-mill) ga./bu., \$1.20/ga. (Mpls/St. Paul market, CPC).
 Corn syrup: 40 lb./bu., \$0.12/lb. (Milling & Baking News).
 HFCS: 33.3 lb./bu. 55% HFCS (dry weight), \$0.24/lb. (Milling & Baking News).
 DDG: 18 lb./bu., \$117.5/ton (USDA, Grain & Feed Market News).

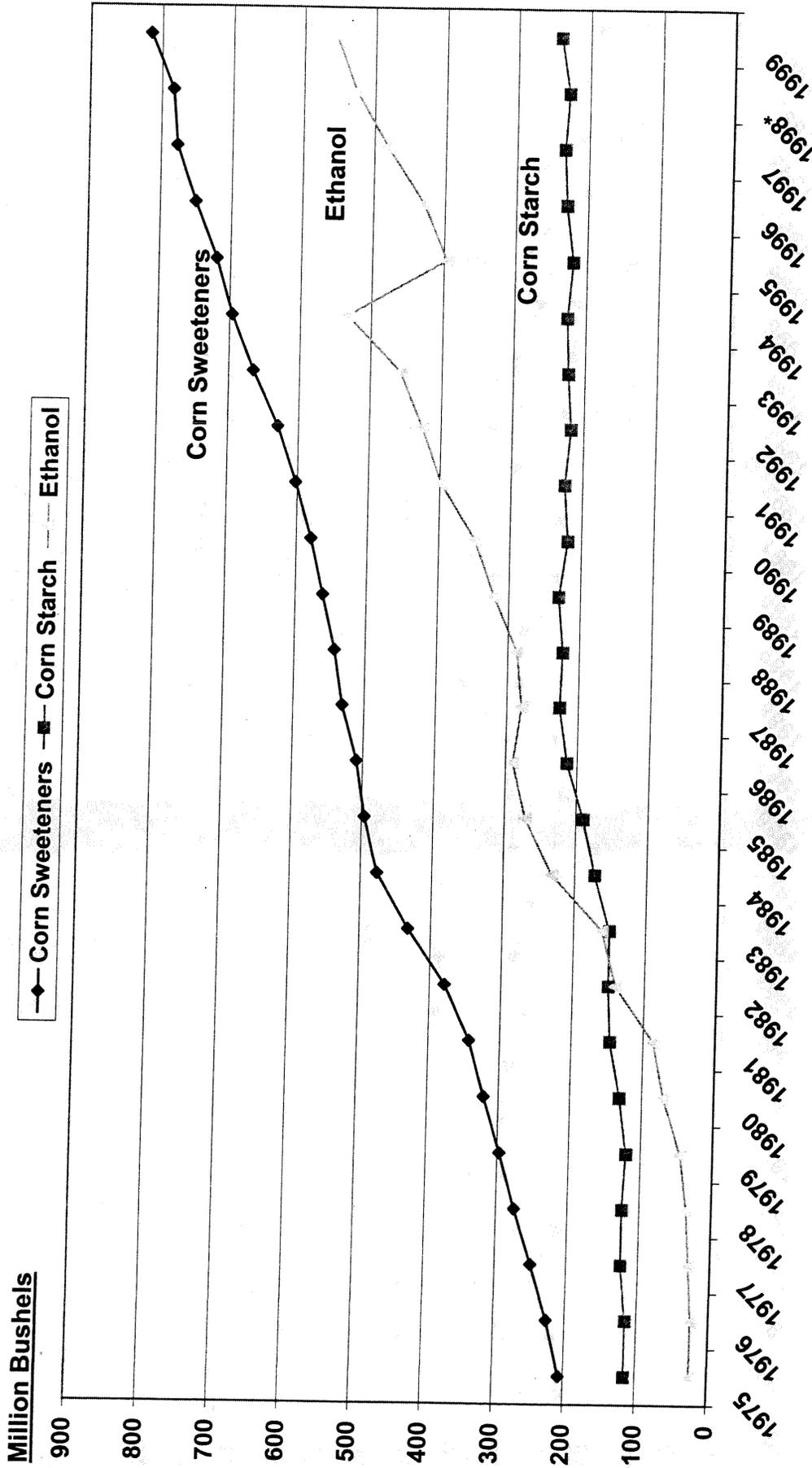
October 1994 Prices

Products	Corn		Value-Added			
	Raw Commodity	Wet-Milling				Dry-Milling
		Starch & Products	Ethanol & Products	Sweeteners & Products		Ethanol & DDG
				Corn Syrup	HFCS	
Corn	\$1.93					
Corn Oil		\$0.41	\$0.41	\$0.41	\$0.41	
Gluten Feed		\$0.44	\$0.44	\$0.44	\$0.44	
Gluten Meal		\$0.29	\$0.29	\$0.29	\$0.29	
Starch		\$3.71				
Ethanol			\$3.34			\$3.52
Corn Syrup				\$4.86		
HFCS					\$6.70	
DDG						\$1.08
Total Value	\$1.93	\$4.85	\$4.48	\$6.00	\$7.84	\$4.60

Computation based on the following:

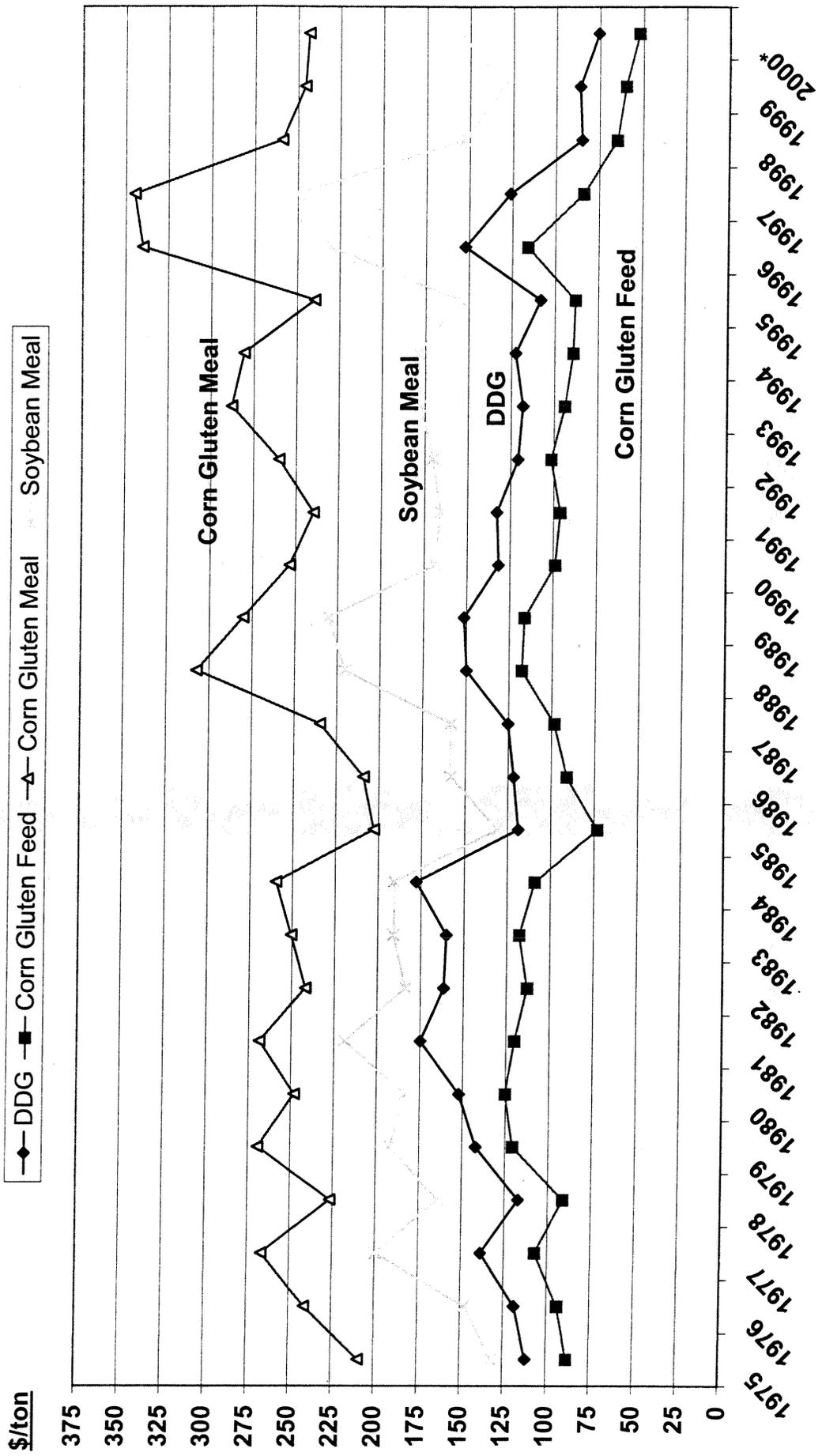
Corn: \$1.929/bu. cash price (Wall Street Journal).
 Corn oil: 1.55 lb./bu., \$0.27/lb. (Wall Street Journal).
 Gluten feed: 13.5 lb./bu., \$86/ton, Illinois (USDA, Market News).
 Gluten meal: 2.65 lb./bu., \$226.9/ton, Illinois (USDA Market News).
 Starch: 31.5 lb./bu., \$0.12/lb. (USDA, ERS).
 Ethanol: 2.45 (wet-mill)/2.58 (dry-mill) ga./bu., \$1.36/ga. (Mpls/St. Paul market, CPC).
 Corn syrup: 40 lb./bu., \$0.12/lb. (Milling & Baking News).
 HFCS: 33.3 lb./bu. 55% HFCS (dry weight), \$0.20/lb. (Milling & Baking News).
 DDG: 18 lb./bu., \$120.5/ton (USDA, Grain & Feed Market News).

Industrial Uses of Corn in the U.S. (1975-1998)

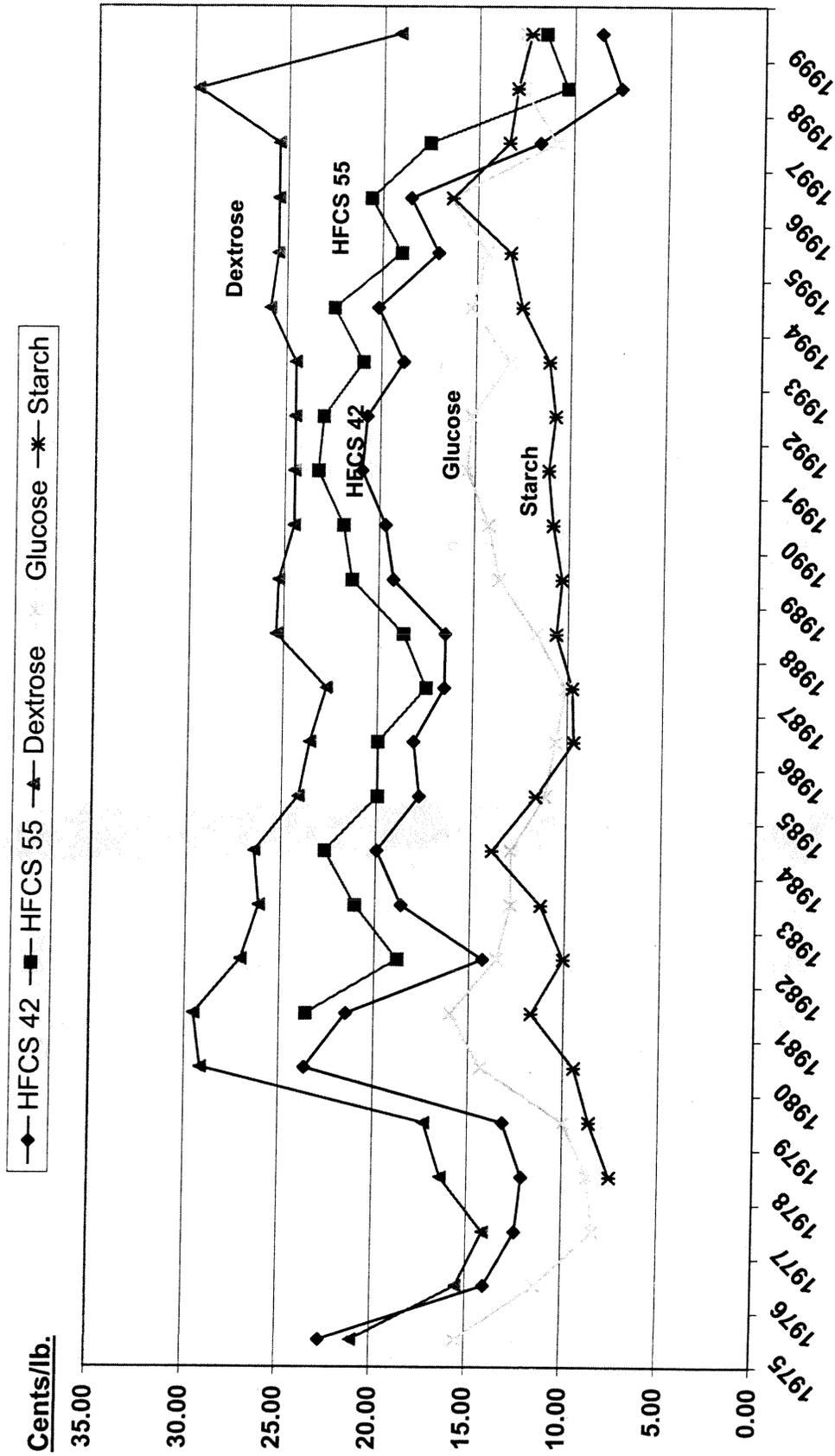


* Estimates based on Marketing Year beginning September 1.

Protein Feed Prices, 1975-2000

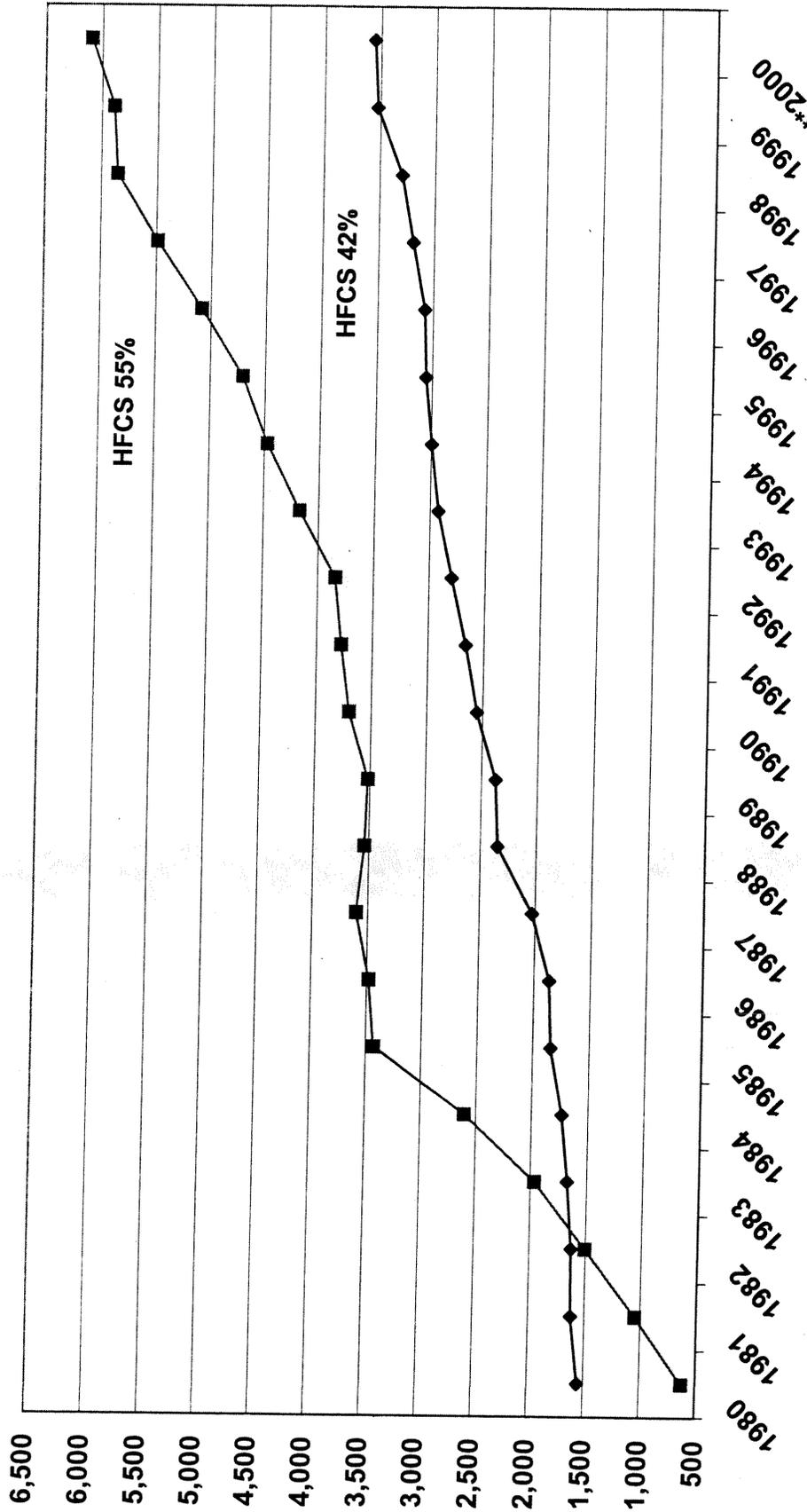


Value-Added corn Products Prices (1975-2000)



HFCS Production in the U.S.

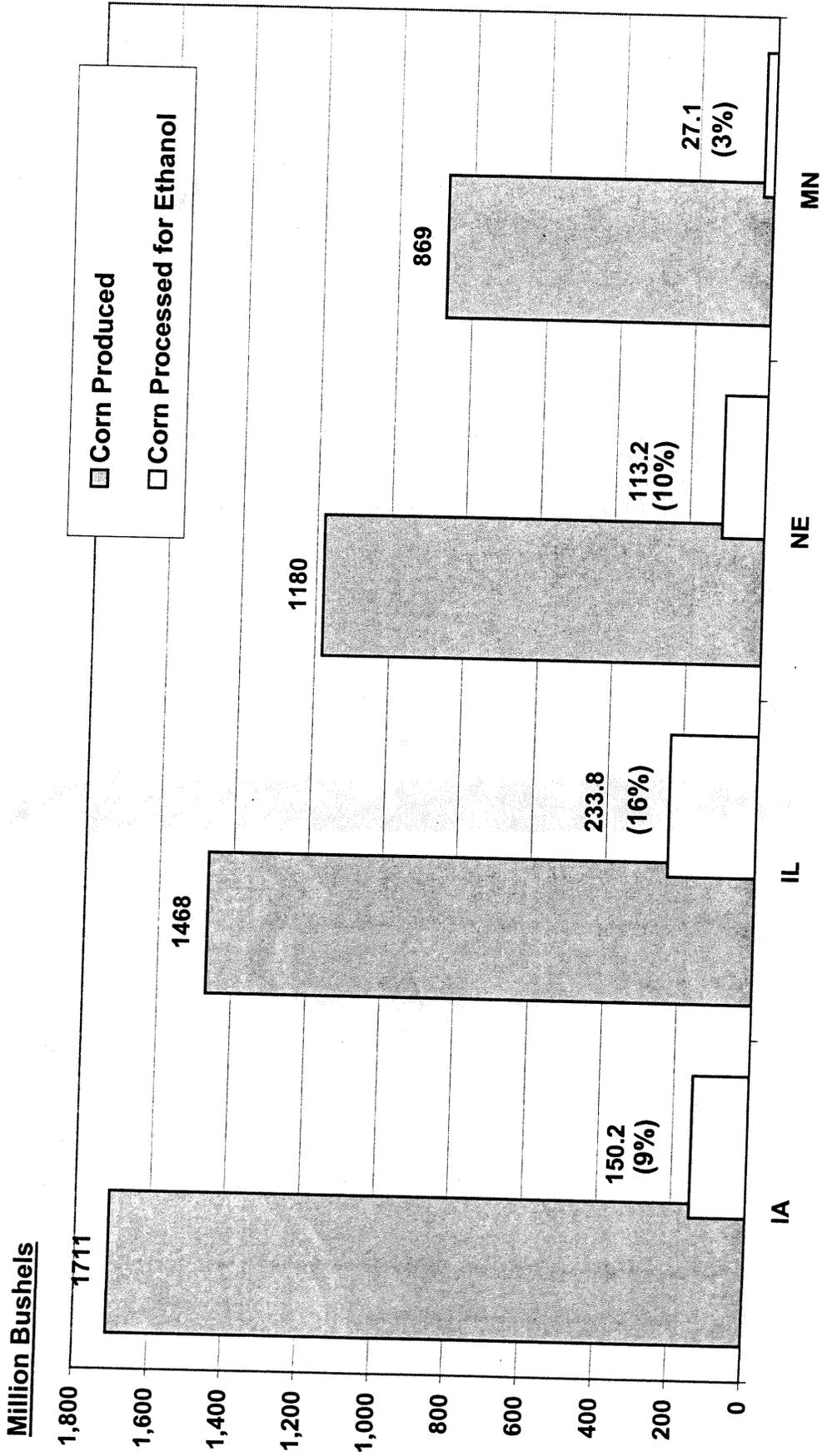
(1,000 short tons, dry weight)



Source: USDA.

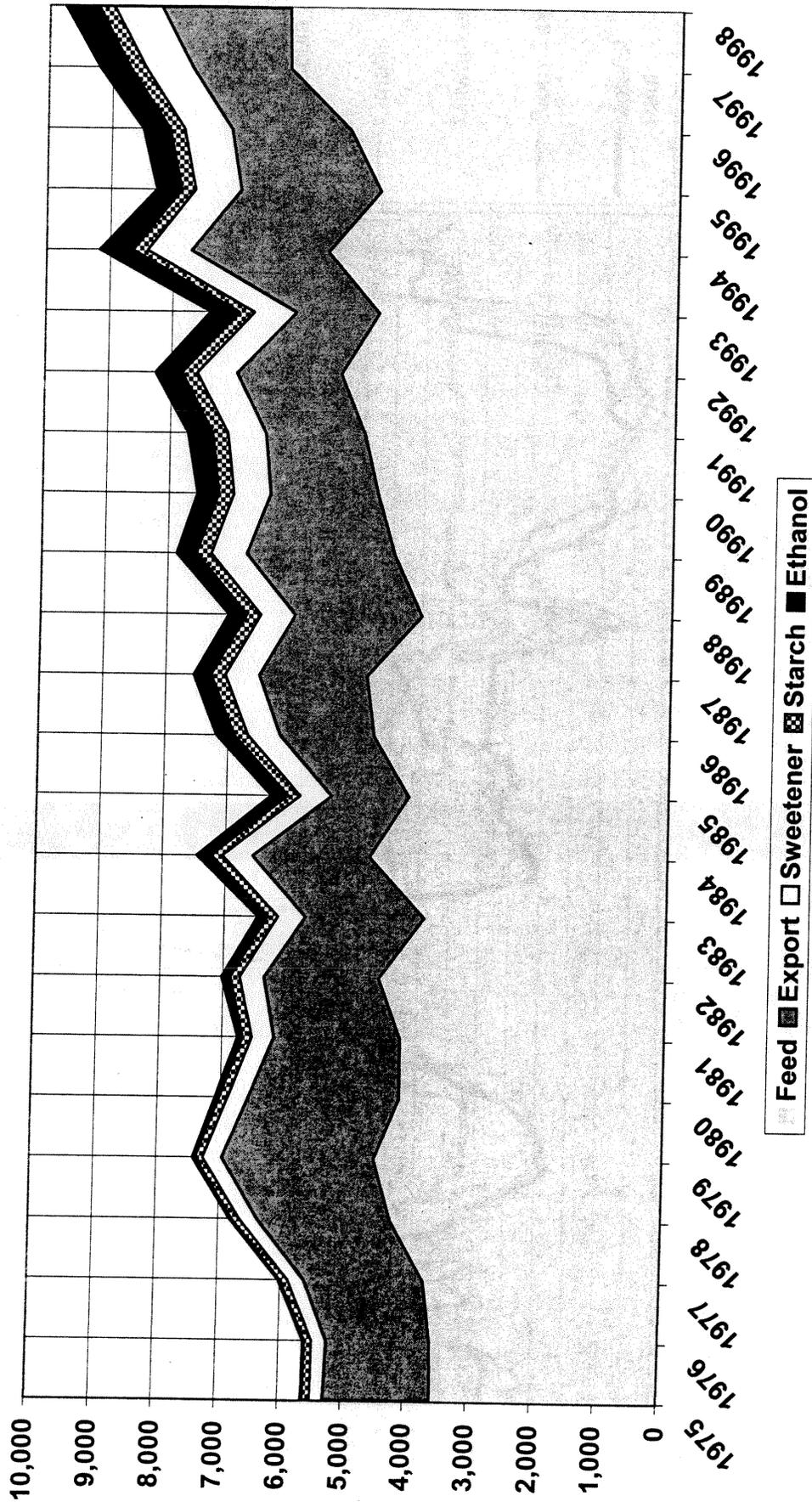
**Forecast

Corn Produced & Processed for Ethanol (1996)



Corn Utilization Trend, U.S. (1975-1998)

Million Bushels

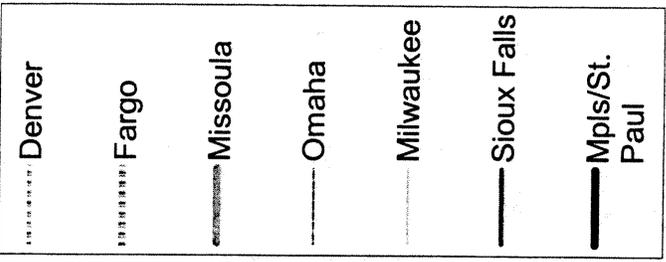
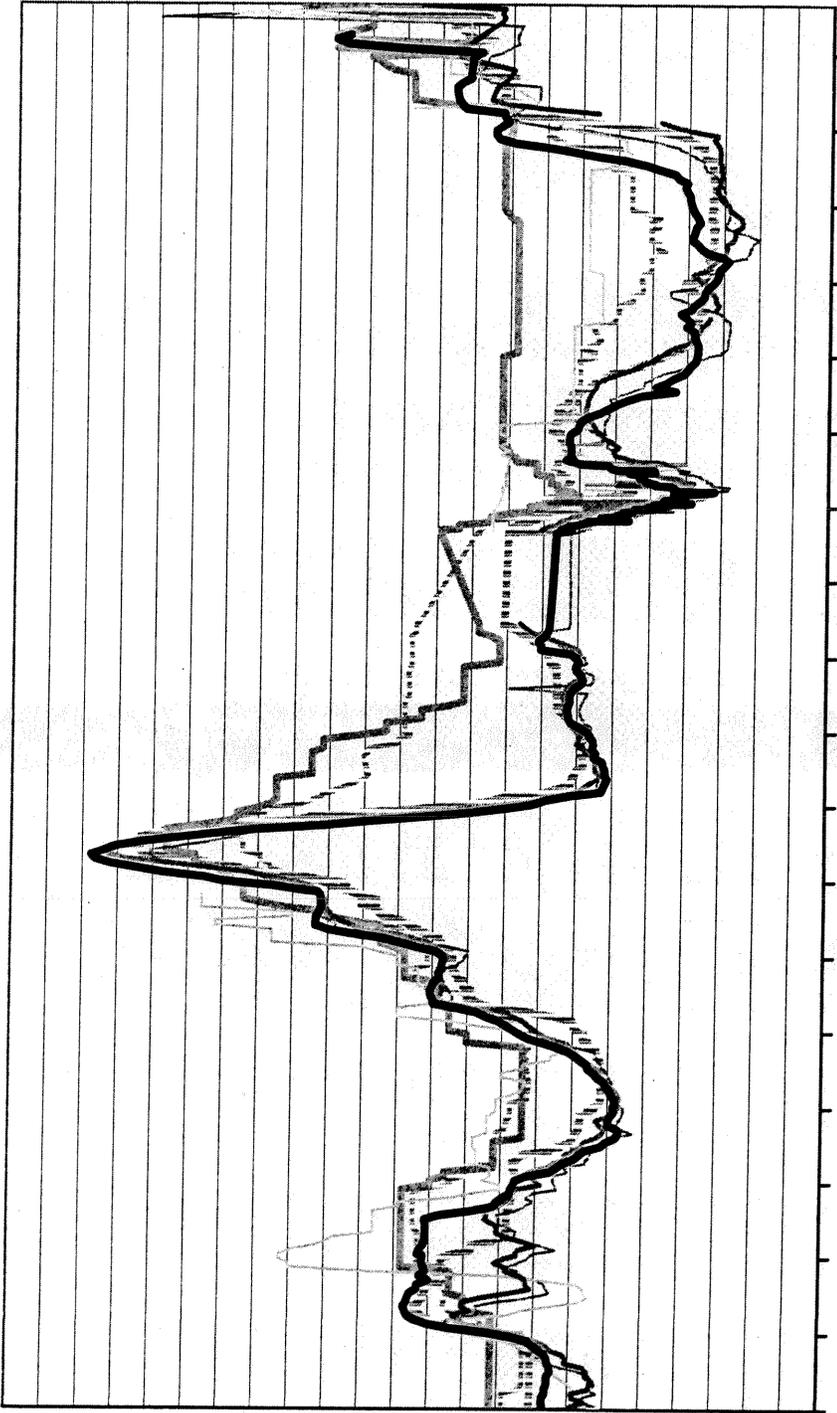


Source: USDA

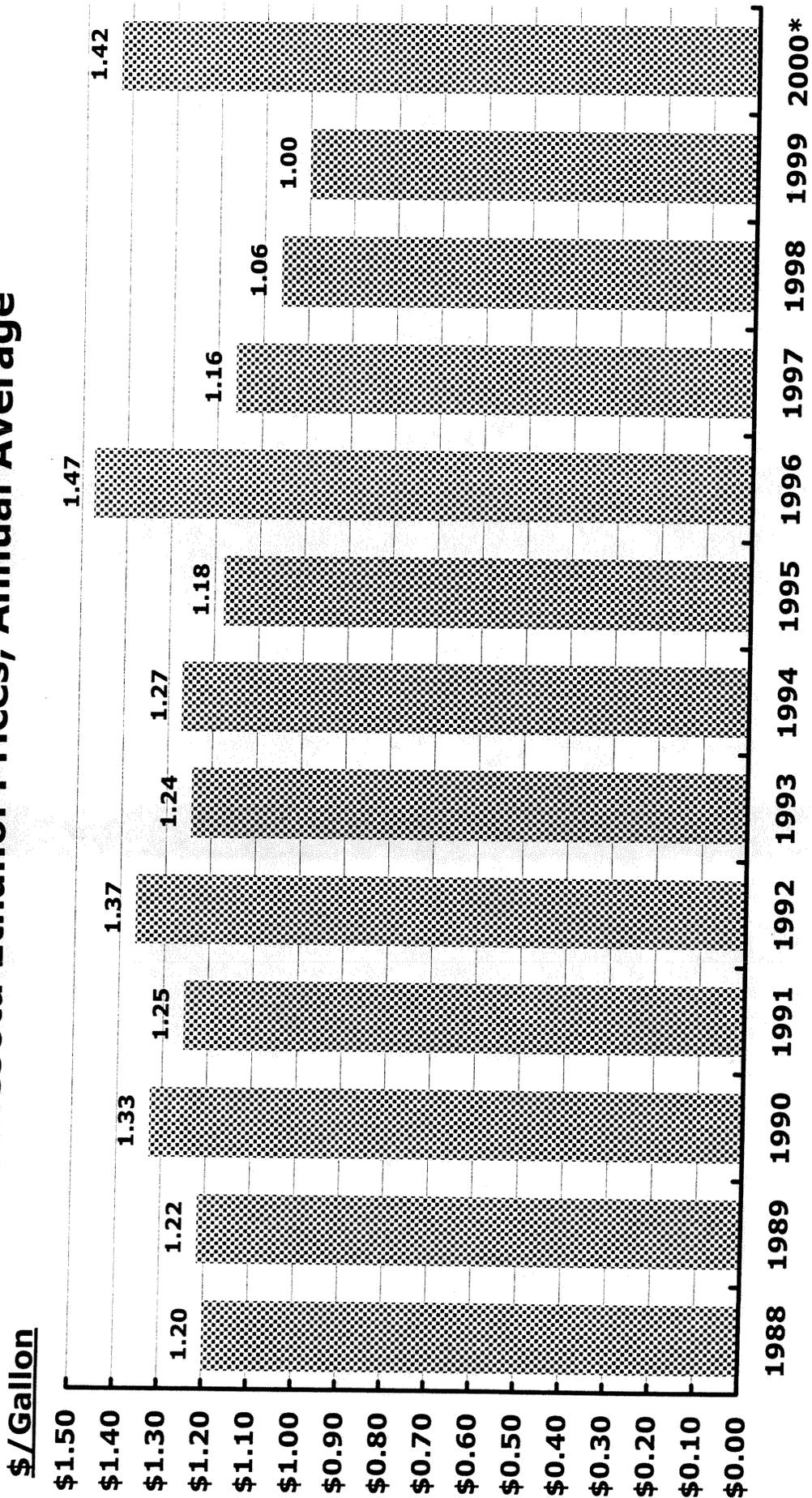
Ethanol Prices (1994-2000) - Selected Cities

\$/Gallon

1.95
1.90
1.85
1.80
1.75
1.70
1.65
1.60
1.55
1.50
1.45
1.40
1.35
1.30
1.25
1.20
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.80



Minnesota Ethanol Prices, Annual Average



*2000 - January to June average.