An Assessment of the Wisconsin Swine Production Sector

UW –Extension Swine Team
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Executive Summary

Even though it has been largely overshadowed by Wisconsin's "America's Dairyland" title, swine production has historically played a key role in the state's economy. However, changing economic forces within agriculture over the last three to four decades -- especially those prompting on-farm specialization and packer consolidation -- have resulted in significant changes to the face of pork production in Wisconsin, the most significant being a decline in both numbers of operations with hogs and pigs, and in total swine produced annually.

While many of the challenges and conditions that drove these declines continue today, this assessment also shows that there is significant opportunity for re-growth and renewal of Wisconsin's swine industry, if focus is put on those attributes that give the state a competitive advantage. Key among these are the availability of low-density locations critical to disease prevention, supportive siting legislation, available land for nutrient application, a positive tax climate, and a significant number of local processor markets.

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Introduction

The hog industry has long played an important role in Wisconsin's diverse agriculture. The 1920 Census of Agriculture reported 152,000 farms with hogs, 80 percent of all the farms in the state. The hog count in the 1920 census was more than 1.6 million. While many hogs were raised for farm home consumption, the state's hog farmers provided the raw product for hundreds of sausage-makers catering to the culinary preferences of Wisconsin's large first and second generation German and Polish population and for countless small retail meat markets throughout the state.

But consolidation and specialization in the meat packing industry dealt a blow to Wisconsin hog producers. Within a span of less than 10 years beginning in 1978, Wisconsin lost the bulk of its hog slaughter capacity. Remaining markets were either small local butcher shops/locker plants or major packers in other states. More distant markets elevated shipping costs (or reduced auction prices to adjust for higher shipping costs), putting Wisconsin hog producers at a competitive disadvantage to producers located closer to slaughter facilities. Hog production in the state began a long slide that has left the industry much smaller and vulnerable to losing supporting resources.

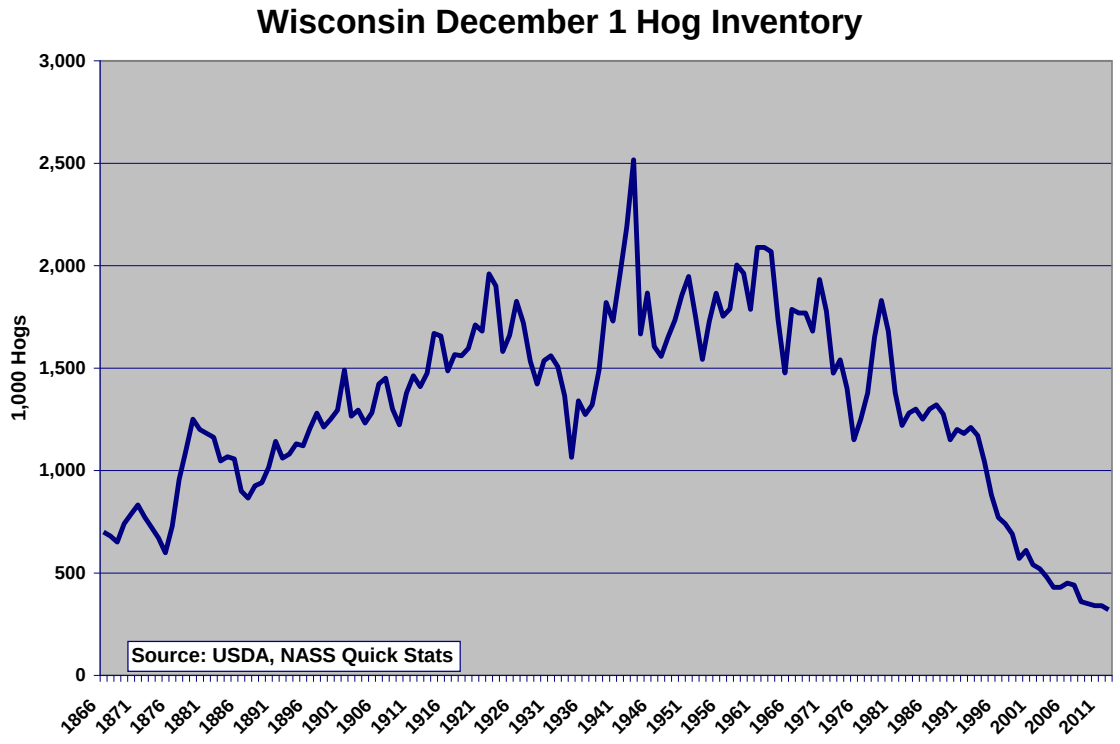
The purpose of this paper is to identify options for strengthening Wisconsin's swine sector. We begin by describing the current status of the industry. We then conduct a "SWOT" analysis, discussing strengths, weaknesses, opportunities and threats related to hog production in the state. Finally, we note some possible growth strategies that involve exploiting markets that are favorable to swine industry conditions in Wisconsin; strategies that build on strengths, overcome weaknesses, take advantage of opportunities, and avert threats.

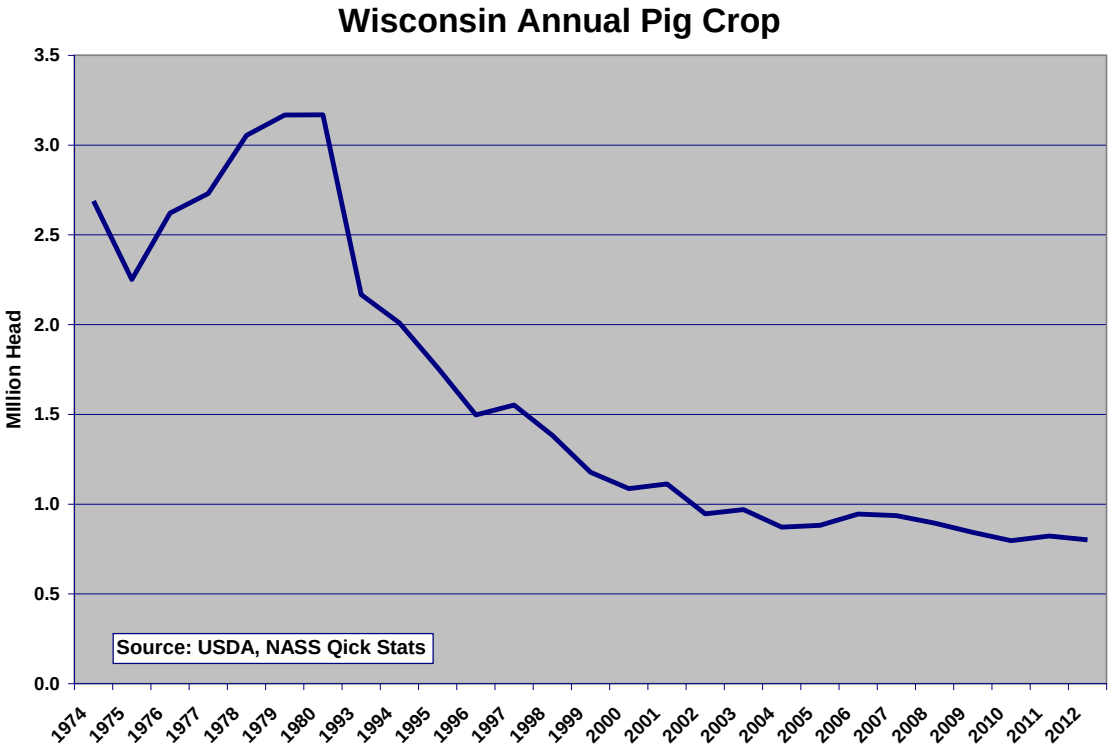
Current State of the Industry

The number of hogs in Wisconsin increased steadily from the mid 1800s, when hog numbers were first reported by USDA, through the early 1920s, when nearly 2 million hogs were counted. The count dropped by nearly a million during the depression and drought years of the mid 1930s. Wartime and European recovery efforts brought government incentives to expand pork production. That plus very good corn yields caused hog numbers to soar in the 1940s, peaking at more than 2.5 million. Inventories fell back after these incentives were terminated, but remained fairly steady at between 1.5 and 2.0 million for the next 40 years. A significant fall-off in hog numbers began in the early 1980s and accelerated in the early 1990s. At 320,000 on December 1, 2012, Wisconsin hog numbers were the lowest in 150 years.

The Wisconsin pig crop has not fallen as rapidly as the December 1 hog inventory. Wisconsin's total pig crop in 2012 was about 800,000 compared to about a million 10 years ago. The slower drop in pigs farrowed is a result of both larger litter size (9.41 in

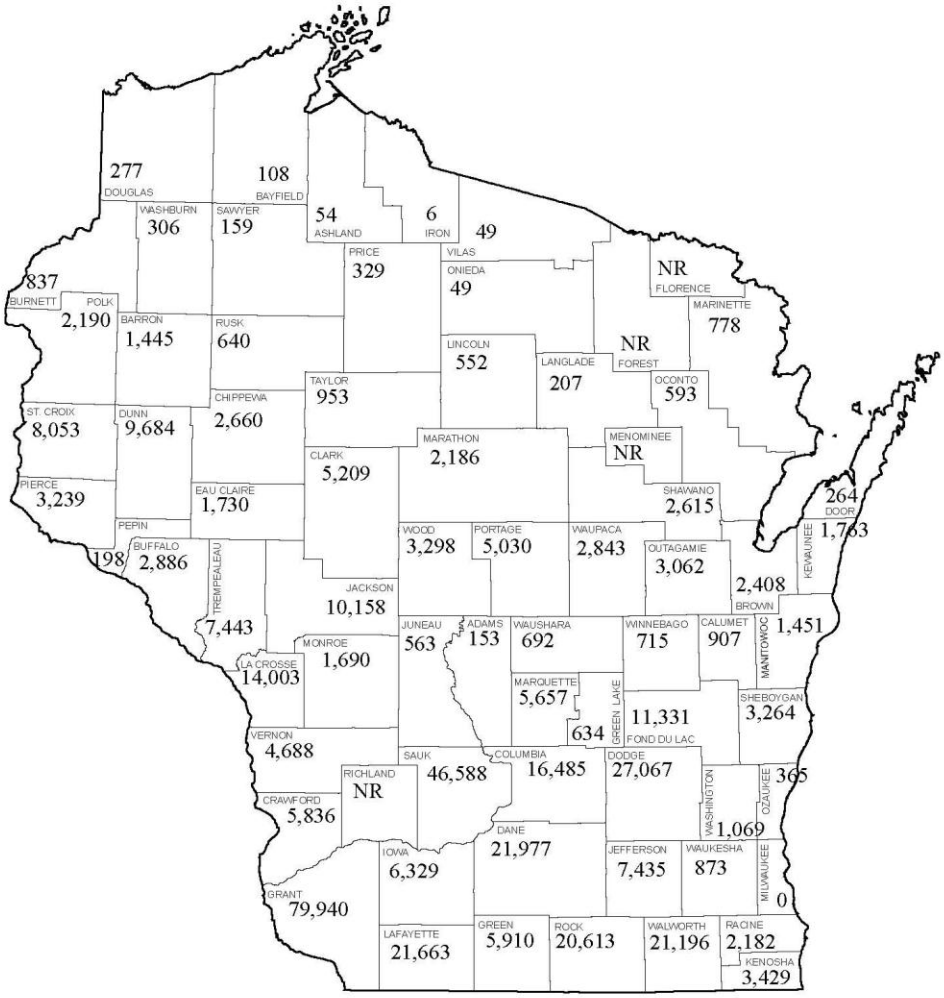
2012 compared to 8.52 in 2002) and breeding stock (mostly sows) making up a larger proportion of the hog inventory (26.6 percent in 2012 compared to 21.3 percent in 2002)





The 2007 Census of Agriculture (last available; a new census is being conducted in 2013 based on 2012 conditions) reported hogs in every county except Milwaukee. A few counties denoted "NR" on the map below had too few hogs to allow reporting under census disclosure rules. Hog farms are concentrated in the southwest and south central part of the state, with 61 percent of the total 2007 hog inventory in the 13 counties within those two Wisconsin Agricultural Statistics reporting areas. Grant County is home to the largest number of Wisconsin hogs, with nearly 80,000 head, 18 percent of Wisconsin hogs in 2007.

Wisconsin Hog Inventory by County: 2007 Census of Agriculture

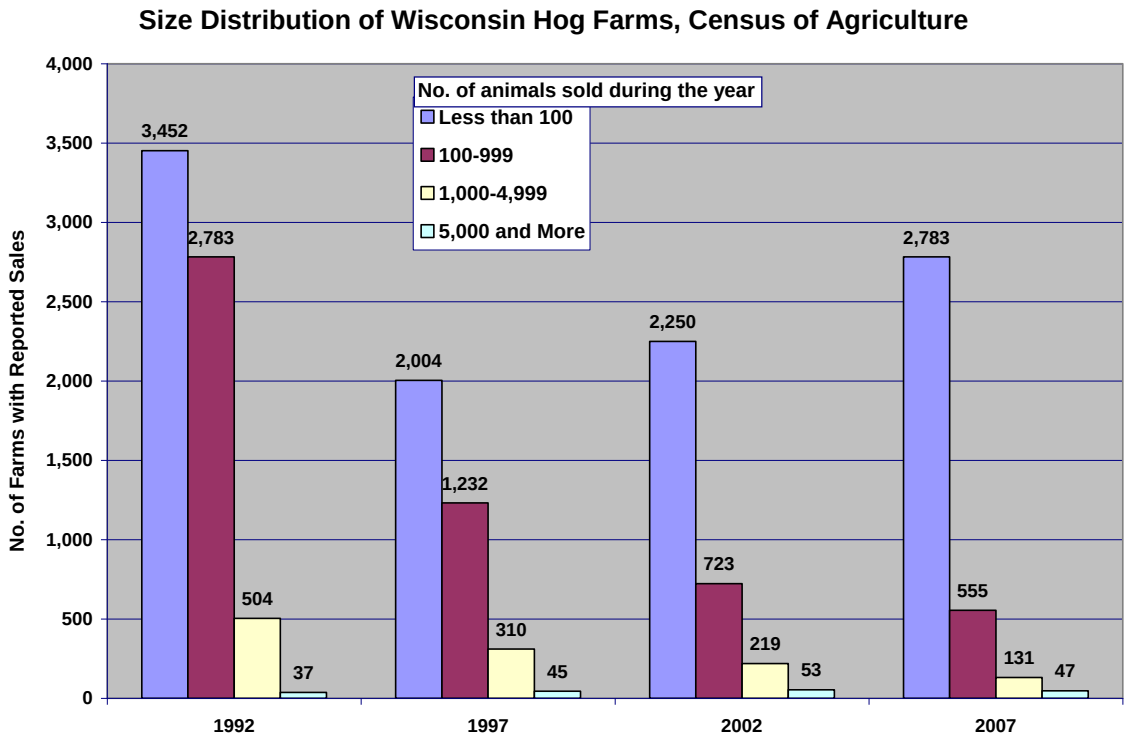


State Total: 486,814

The size distribution of Wisconsin hog farms is heavily skewed toward smaller units, which is common among all agricultural enterprises. According to the Census of Agriculture, 79 percent of hog farms sold fewer than 100 hogs or pigs in 2007 and accounted for less than 4 percent of hog sales. At the other extreme, the 47 herds with more than 5,000 hogs were 1.3 percent of farms and accounted for more than half of hog sales.

An unusual feature of the size distribution of Wisconsin hog farms is that the number of small farms has grown in number over the last three agricultural censuses. Most of this growth has come in the smallest size category, 1-24 animals sold. The number of farms in this sales class nearly doubled between 1997 and 2007, increasing from 1,218 to 2,252 herds. This may be related to the growing popularity of youth swine projects and the related sale of show pigs at fairs and other events.

Farms in the intermediate size classes showed substantial attrition. Farms selling 100-999 animals dropped from nearly 2,800 in 1992 to 555 in the latest census year (an 80 percent decrease). Their share of pig sales fell from 41 percent to 16 percent. The falloff in hog farms in the 1,000-4,999 sales category was almost as large, at 74 percent, and the percent of sales by hog farms in that category fell from 38.3 to 26.5 percent. In the largest sales category, farm numbers fell between 2002 and 2007, but the number of hogs sold stayed even, an indication that farms in this size category are getting larger. In fact, the average annual sales of farms in this top size category increased by more than 1,000 between 2002 and 2007, from 11,173 to 12,409 animals.

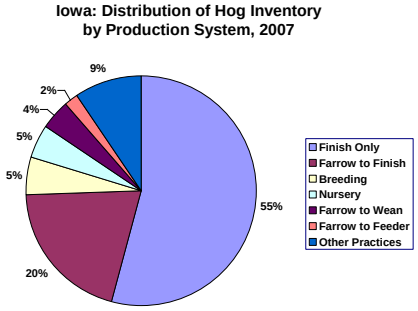


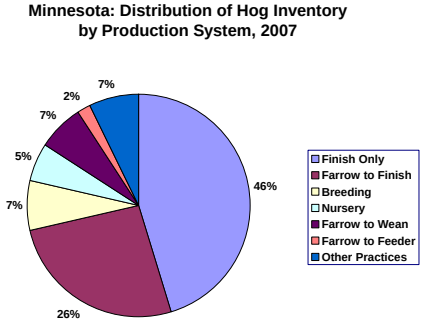
Size Distribution of Wisconsin Hog Farms by Annual Sales				
Size Class: No. of Hogs and Pigs Sold	***No. of Farms***	***Hogs & Pigs Sold (No.)***	***Percent of Farms***	***Percent of Sales***
1992 Census				
Less than 100	3,452	110,671	50.9%	4.9%
100-199	955	131,083	14.1%	5.8%
200-499	1,220	372,832	18.0%	16.6%
500-999	608	412,767	9.0%	18.4%
1,000-1,999	364	477,168	5.4%	21.3%
2,000-4,999	140	381,290	2.1%	17.0%
5,000 and More	37	358,862	0.5%	16.0%
Total	6,776	2,244,673	100.0%	100.0%
1997 Census				
Less than 100	2,004	53,955	55.8%	3.5%
100-199	387	52,995	10.8%	3.5%
200-499	541	165,701	15.1%	10.9%
500-999	304	211,035	8.5%	13.9%
1,000-1,999	203	276,284	5.7%	18.1%
2,000-4,999	107	311,083	3.0%	20.4%
5,000 and More	45	452,437	1.3%	29.7%
Total	3,591	1,523,490	100.0%	100.0%
2002 Census				
Less than 100	2,250	40,460	69.3%	3.1%
100-199	254	34,852	7.8%	2.7%
200-499	301	94,076	9.3%	7.3%
500-999	168	115,134	5.2%	8.9%
1,000-1,999	138	179,458	4.3%	13.9%
2,000-4,999	81	238,289	2.5%	18.4%
5,000 and More	53	592,171	1.6%	45.7%
Total	3,245	1,294,440	100.0%	100.0%
2007 Census				
Less than 100	2,783	39,742	79.2%	3.7%
100-199	218	30,753	6.2%	2.8%
200-499	227	68,781	6.5%	6.3%
500-999	110	76,012	3.1%	7.0%
1,000-1,999	64	88,508	1.8%	8.2%
2,000-4,999	67	198,737	1.9%	18.3%
5,000 and More	47	583,260	1.3%	53.7%
Total	3,516	1,085,793	100.0%	100.0%

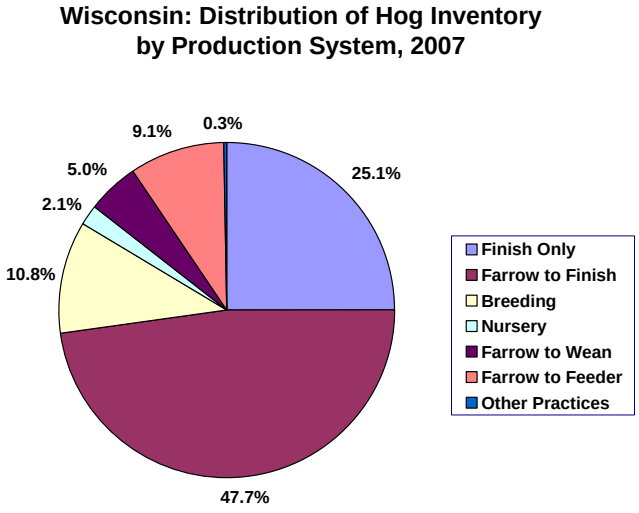
Source: Census of Agriculture.

Wisconsin hog producers use a distinctly different combination of production systems than their neighbors to the west. Iowa and Minnesota systems were very similar as measured by the 2007 Census of Agriculture. Finish only systems were most prominent in both states, followed by farrow to finish systems. The two most common systems housed about three-quarters of the total hog inventory in both states.

Finish only and farrow to finish systems also represent three-quarters of Wisconsin hog production systems, but in reverse order — almost half of Wisconsin systems were farrow to finish. Wisconsin was also different in having a significantly larger proportion of units classed as breeder and farrow to feeder.







Other differences between Wisconsin hog production and that of contiguous states are highlighted in the table below. Note that Iowa, Minnesota and Illinois ranked first, third and fourth, respectively; among states in hog inventory on December 1, 2012. Michigan was 13th and Wisconsin was 18th.

Fifteen percent of Wisconsin's hog inventory on December 1, 2012, was designated breeding stock. This compares to l0 percent or less in the contiguous states, with Iowa having 5 percent and Minnesota 7 percent.

Forty percent of Wisconsin's hogs weighed less than 50 pounds compared to less than one third for contiguous states. Wisconsin hog producers achieved an average litter size of 9.41, well below that of their neighbors, which is explained by the relatively small size of Wisconsin producers. The December 2012 NASS *Quarterly Hogs and Pigs Report* noted that on average for the U.S., the September-December 2012 litter rate for operations in the 1-99 size group was 7.6. Only operations larger than 2,000 animals achieved a litter rate of 10 or more.

The larger proportion of breeding stock and lighter pigs reflects Wisconsin's expanded production of weaned pigs. The 2012 census of agriculture will undoubtedly show a substantially larger percentage of Wisconsin's hog and pig inventory in the farrow to wean category.

Hog Statistics: Wisconsin and Contiguous States, 2012

	Iowa	Minnesota	Illinois	Michigan	Wisconsin
Dec. 1, 2012 Total Inventory (1,000 Head)					
Breeding	1,030	560	490	110	47
Market	19,570	7,090	4,110	970	273
Total	20,600	7,650	4,600	1,080	320
Market Hogs and Pigs Inventory by Weight Group (1,000 Head))					
Under 50 Lbs.	5,150	2,450	1,310	300	108
50 to 119 Lbs.	6,000	2,130	1,180	210	55
120 to 179 Lbs	4,700	1,430	750	220	60
180 Lbs. and Over	3,720	1,080	870	240	50
Total	19,570	7,090	4,110	970	273
2012 Pig Crop					
Sows farrowing (1,000)	1,960	1,190	1,010	205	85
Pigs per litter	10.36	10.25	10.03	10.08	9.41
Pig crop (1,000)	20,311	12,199	10,126	2,066	800

Source: USDA, NASS, *Quarterly Hogs and Pigs, December 2012*

Strengths, Weaknesses, Opportunity and Threats

In this section, we outline Wisconsin hog industry strengths that can be built on, weaknesses that need to be addressed, opportunities that can be exploited, and threats that need to be avoided. It is important to stress that this is only a partial listing. Industry participants and stakeholders should view this as a starting point for a more comprehensive assessment of industry drivers.

Strengths

- ***Dispersed production largely in areas of sparse population.*** Dispersed production is a major benefit in helping to prevent the introduction and spread of swine diseases, especially Porcine Respiratory and Reproductive Syndrome (PRRS). Raising pigs in a PRRS-free area can yield a sizeable price premium. Hog production in sparsely-populated areas minimizes complaints from residents unfamiliar with modern farming practices in general and swine farming specifically.

- ***Adequate and increasing supplies of corn.*** The southern counties of Wisconsin have become part of the Corn Belt. Strong corn prices have encouraged expanded production of corn in areas near more concentrated hog production areas of the state, but it has also sharply elevated swine production costs. Also high corn prices provided an incentive for those hog producers who raised their own corn to switch from marketing their corn through hogs to selling corn to buyers willing to pay a high price. There is also a question about how much expanded corn acreage has increased the "free" supply of corn. This question is difficult to answer with available data. A large portion of the larger corn crop is committed through producer contracts to ethanol plants (there are nine operating corn ethanol plants in Wisconsin) and an increasing number of large dairy farms that do raise all of their own corn.

- ***Rational and consistent livestock facility siting regulations.*** In 2006, Wisconsin formally adopted a set of rules and procedures that apply to new or expanded livestock facilities exceeding 500 animal units, regardless of location within the state. Prior to adoption of ATCP 51, local units of government had the discretion to issue permits, and when they elected to do so, there was no uniformity in how it was done. Under current law, municipalities retain the discretionary authority to issue permits, but the permitting process cannot impose siting restrictions that supersede those in ATCP 51. Specific information on ATCP 51 can be found at: *http://datcp.wi.gov/Environment/Livestock_Siting/index.aspx*

- ***Positive tax climate***. Wisconsin's use-value assessment of agricultural land provides a strong incentive to keep farmland in agriculture, discouraging residential encroachment – a critical concern for livestock producers, both from land availability and "good neighbor" standpoints. In addition, as of January 1,

2013, Wisconsin has instituted a tax credit which, after a staged implementation over the next four years, will offset state income tax on profits generated by a farm enterprise (see http://www.revenue.wi.gov/taxpro/fact/manufandagr.pdf).

- ***Strong, supportive trade associations***. The Wisconsin Pork Association is active on several fronts, providing access to swine husbandry information from many sources. The Wisconsin Association of Meat Processors serves a similar role on the finished product end of the pork market. These organizations are connected to national counterparts, which leverages their effectiveness in supporting members in producer and consumer education. There are also allied trade groups of direct importance to pork producers. These include the Wisconsin Livestock Identification Consortium (WLIC) and the Wisconsin Animal Agriculture Sustainability Initiative (WAASI). These formal groups, along with less formal partnerships with other livestock groups in the state, link up dairy and other livestock producers, forming large blocs to more effectively address common issues.

- ***Education and research support.*** The UW-Madison Swine Research and Teaching Center maintains an active research and education program on disease prevention, animal care, manure management, and other hog production issues. The Center is located at the Arlington Agricultural Research Station and includes a state-of-the-art production facility as well as classrooms and labs. UW-River Falls and UW-Platteville also have hog facilities as part of their animal science programs. Discovery Farms, affiliated with UW-Madison and UW-Extension, has provided critical nutrient management and air quality information from participating hog farms (http://uwdiscoveryfarms.org). UW also partners with several other land grant universities in supporting the U.S. Pork Center of Excellence, which offers on-line resources to producers and allied industry (www.usporkcenter.org). UW-Extension does not have a campus-based specialist in swine husbandry and the UW-Madison School of Veterinary Medicine elected not to refill its only swine position. Attempts to "swap" Extension expertise with Iowa and Minnesota (e.g., Wisconsin trades dairy marketing expertise for swine husbandry expertise with Iowa) have been attempted, but efforts have been fraught with problems relating to equity issues. UW-Extension does have a livestock marketing specialist located at UW-River Falls and has created a swine team consisting of county agents with expertise in hog production.

- ***Strong animal husbandry culture and long history of meat production in the state.*** Despite recent growth in crop revenue, Wisconsin agriculture is largely animal agriculture — cash receipts from sale of livestock products averaged more than 70 percent of total farm cash receipts over the past decade. There is an historic recognition by state government and agencies of the importance of agriculture to the state's economy, and the significant portion of that contribution that comes from livestock.

- ***Good rural roads and interstate highway system.*** In contrast to many other hog-producing states, most rural roads in Wisconsin are hard-surfaced. This facilitates seasonally uninterrupted movement of feedstuffs into and animals out of hog production facilities. The predominance of hard-surfaced town roads also provides the opportunity, where beneficial, to locate operations in more remote locations off state and county roads. Wisconsin's Interstate Highway System (especially I-90/94) and limited access 4-lane system (especially US Highway 151) permits rapid truck access to finishing and slaughter facilities in Minnesota, Illinois, and Iowa.

- ***Adequate land for manure disposal.*** Wisconsin animal agriculture requires a large land base to provide animal feeds and forages. Consequently, land available for spreading manure includes both land used for growing crops destined for off-farm markets and land used to produce home-grown animal feed. There is strong competition for land to spread manure in areas in the state where dairy expansion has tied up the majority of land for nutrient application. This means hog production expansion or relocation might best be planned for areas of the state that are suitable for hogs but not saturated by large scale dairy farms.

- ***Stable demand for pork.*** While this strength is not unique to Wisconsin, it is important in determining overall industry growth potential. Total per capita meat consumption in the United States has been declining over the past several years. Between 2001 and 2012, beef consumption per capita fell by 8.8 pounds; pork was down 4.6 pounds. Broiler and turkey consumption combined went up 2.4 pounds. For 2013, USDA is forecasting a further drop for beef of 2 pounds per capita and level consumption of pork and poultry. Relatively stable per capita pork consumption combined with population growth should maintain total domestic consumption at close to current levels. The consumption picture is even brighter for export sales. Pork exports increased from 1.6 million pounds in 2001 to 5.5 million pounds in 2012, when they accounted for 24 percent of U.S. pork production. Non-Muslim East and Southeast Asian countries are major markets. These countries have experienced and are expected to continue to experience economic growth exceeding the rate of growth in the United States. This is a good sign for further gains in overseas purchases of U.S. pork.

Weaknesses

- ***Limited in-state hog slaughter capacity***. Four major Wisconsin meat processors ceased slaughtering hogs over a ten year period beginning in 1978: Oscar Mayer, Jones Dairy Farm, Hillshire Farms, and Patrick Cudahy. These companies remain major producers of branded pork products, but elected to purchase carcass cuts specific to their product lines from large out-of-state meat packers. Consequently, Wisconsin hog farmers producing finished market hogs had to find new market outlets, mainly in Iowa and Minnesota. Wisconsin sow markets remain strong, with Johnsonville and Abbeyland, two of the largest sow slaughterers in the

United States, located here. The loss of hog slaughtering capacity in the state brought structural change in at least two forms. First, a significant number of pigs now are moved, post-weaning, to states where slaughter markets and, to a degree, feed grain, are more readily available. Second, the inability to conveniently (and profitably) market small lots of finished pigs led to a substantial exit of many smaller producers who raised pigs as a secondary enterprise to other farming alternatives.

- ***Higher cost structure than competing states***. There are demonstrated economies to size in hog farming, including volume discounts on purchases, greater labor efficiency, and lower hauling costs. Most Wisconsin hog farms are too small to be able to take advantage of these size economies. The relatively small size of Wisconsin operations also limits options to manage input cost and output price risk, crucial to good business management. On the output side, the CME lean hog contract size is 40,000 pounds, or about 160-200 market weight hogs. Very few Wisconsin hog farms meet that sales volume on a monthly basis and there are no apparent convenient opportunities for consolidating hog volumes across producers to match futures and options contract volume. Similarly, the CME corn contract volume is 5,000 bushels, a monthly volume much larger than required for all but a few Wisconsin hog operations.

- ***Critical mass issues.*** It is possible that the Wisconsin hog production sector may be close to or has fallen below critical mass in the sense of maintaining an effective support infrastructure. That includes knowledgeable veterinarians; specialized feed, animal medicine, and equipment suppliers; bankers who understand hog farming; and swine consultants in the private and public sector. The reduction in University of Wisconsin faculty support noted above is related to critical mass. When state support for higher education is cut, difficult staffing decisions have to be made. Revenue generated by commodity sectors is often used as criteria in making difficult staffing decisions.

Opportunities

- ***Expanded sales of Wisconsin pork products out of state.*** The 2008 federal farm bill removed certain restrictions on state-inspected meat plants selling to out of state customers. Wisconsin's meat inspection procedures and standards are equivalent to those applying to federal meat inspection, which is a necessary condition for certification. While a number of bureaucratic hang-ups have delayed full implementation, a few locker plants have been granted authority to sell out-of-state. It is only a matter of time before new markets for state meat plants will open up, thereby increasing demand for nearby Wisconsin hogs.

- ***"Buy Local" movement.*** Consumers are showing increasing interest in knowing where their food is produced. They are seeking out local food sources and putting pressure on grocers, restaurants, and other food outlets to procure products close

to home. Buy Local is not a passing fad. It offers promise as a stimulus for local pork production.

- ***Strong demand for weaned pigs and feeder pigs from Iowa, Illinois and Minnesota.*** Finishing units represent the largest proportion of hog operations in these three states; hence they need a continuous supply of pigs for finishing. Wisconsin would appear to be better capable of supplying disease-free animals to these operations than local suppliers.

- ***Increased value of animal manure.*** Escalating costs for commercial fertilizers, along with expanded production of corn, has made animal manure more attractive to crop producers.

Threats

- ***Local opposition to new or expanding facilities***. Pigs and people who don't understand swine husbandry are frequently not good neighbors. While opposition to large scale livestock facilities has been somewhat muted by the implementation of statewide siting rules, it has not disappeared. New or expanding operations can be delayed by lawsuits and other tactics.

- ***Pressure to modify production systems.*** Responding to demands from some customers, some large-scale fast food companies and other food outlets are beginning to play a larger role in determining farm-level production practices. Note that this threat extends beyond the Wisconsin swine sector and beyond swine. Some of this pressure is initiated by animal rights groups vilifying particular production practices. In the case of hogs, gestation stalls have become the related focal point, with an increasing number of pork buyers seeking assurance that gestation stalls in farms directly or indirectly shipping hogs to their pork suppliers are being phased out over time. This is a threat to the extent that adopting "acceptable production practices" may significantly elevate costs while generating no offsetting price increase.

  Similarly, the use of antibiotics in raising livestock has been called into question because of possible links to antibiotic resistance in humans. The cost to the overall swine industry of banning the use of livestock antibiotic use would be very large. But restrictions on food animal antibiotic use could enhance Wisconsin's strength in raising and providing high health status pigs, thus increasing the state's competitive advantage.

- ***Devastating new disease outbreak.*** This is an industry threat that could more seriously affect Wisconsin hog farmers, who have a stronger reputation for low disease incidence. At the same time, Wisconsin is better prepared than many states to quickly respond to a major disease threat because of its strong premise and animal identification efforts.

- ***Demand deflating trends.*** Per capita consumption of meats, especially red meats, has trended downward for several years. So far, there does not appear to be a single dominant underlying cause. Decreasing meat consumption among older consumers (a growing proportion of the population) and greater attention to and interest in low-fat/high-fiber diets emphasizing fruits and vegetables are contributing factors, as is interest in vegetarian and vegan diets. The threat here is that the relatively glacial pace of dietary changes could accelerate as a result of social movements, dietary trends, or disease outbreaks. Again, this threat is industry-wide; it is not specific to Wisconsin but neither is Wisconsin immune.

- ***High and rising corn prices.*** Another industry-wide threat is high corn prices, which bring high pork prices (though often slower than desired by producers). In turn, high pork prices bring a negative consumption response that could become permanent if corn prices remain high or become higher. Moreover, meat species with a smaller feed conversion ratio (FCR) than pork (poultry and farmed fish) are relatively less costly when corn and other feed prices are high, leading to some substitution in the meat consumption mix. Markets do work, and the recent high profitability of corn production should bring expanded acreage and lower corn prices. But with increasing weather and climate uncertainties that is not a sure bet.

Strategies for Growth

Given the current state of the industry and identified strengths, weaknesses, opportunities and threats, we suggest some potential strategies for strengthening the Wisconsin swine sector to ensure growth and long-term sustainability. These strategies involve exploiting three types of markets for Wisconsin hogs: (1) smaller Wisconsin locker plants/meat retailers and other local outlets for pigs and pork; (2) large nearby out-of-state meat packers; and (3) large hog finishers in Iowa, Illinois and Minnesota.

These suggested strategies are not original — they essentially summarize recommendations from two important recent studies:

Consistent Quality Pork: A Local Meat Processor Pork Demand & Source Analysis, Final Report, Wisconsin Department of Agriculture, Trade and Consumer Protection ADD Grant #25019, September 2012 (Referenced ADD).

Wisconsin Pork Association, Long Range Plan, January 2012 (Referenced LRP).

The three markets noted below suggest different business models to successfully exploit market opportunities. The focus here is on the markets. The LRP paper is an excellent source of information about business models and collaborative arrangements appropriate to these markets.

Local value-added markets

These markets best fit small and mid-sized operations. The primary value added market outlet is local processors who prefer to procure live animals or carcasses from local sources. The potential size of this market is estimated to be in excess of 80,000 hogs per year (ADD), about 10 percent of Wisconsin's pig crop.

This market option exploits the "Buy Local" movement, which is picking up steam. Direct marketing of pork and other meats, sometimes through farmers' markets or as part of CSAs, is also expanding. More consumers want to know very specifically where their food is coming from. Wisconsin hog farmers—beyond a few individuals— can benefit from this new and increasing source of demand.

Broadening this market will require producers to collectively assume some responsibilities presently handled by local hog buyers, in particular promotion and assuring product source identity. Formal collaboration with smaller meat packers and food retailers would likely be necessary. Assistance is available through the Wisconsin Department of Agriculture, Trade and Consumer Protection educational and grants program, *Buy Local, Buy Wisconsin.*
http://datcp.wi.gov/Business/Buy_Local_Buy_Wisconsin

Other value-added options include show/project pig production, purebred/seed stock production, and small, highly-specialized consumer pork markets such as ethnic, natural, and organic.

Significant growth in value-added sales, especially to local meat markets, is possible with expanded effort, and can contribute to the diversity of the state's pork industry. But despite anticipated growth, these outlets will likely continue to represent a minority of Wisconsin swine sales.

Large out-of-state packing plants

Attracting a major meat packer to locate or relocate a slaughter plant in Wisconsin is not feasible. Scale economies in hog slaughtering yield astounding plant sizes. The daily slaughter capacity of the largest single slaughter plant in the U.S. is 34,000 hogs (Smithfield facility in Tar Heel, NC). Within 200 miles of the Wisconsin border there are five hog slaughtering plants with a combined daily capacity of 96,400 hogs: Tyson Foods, Waterloo, IA – 19,500; Hormel, Austin, MN – 19,000; Swift, Marshalltown, Iowa – 18,500; Excel, Beardstown, IL – 21,000 and Ottumwa, Iowa – 18,400 (capacity as of April 2012 as reported by National Hog Farmer, May 15, 2012). Given their similar size, these 5 plants can be reasonably assumed to be of minimally efficient scale. Any one of these plants would have the capacity to slaughter Wisconsin's entire 2012 pig crop in less than two months.

At the same time, these large out-of-state plants represent a good market for Wisconsin hog finishing units that are large enough to *consistently* supply *consistent* lots of market

hogs to large pork packers in other states, principally Iowa and Minnesota. Most of the Wisconsin hog farms in the 5,000+ annual sales class noted earlier are capable of that. And this would appear to be a fertile market for new or expanding finishing units in the state.

The key, of course, is the nature of competition with large-scale hog finishers located in Iowa and Minnesota, who have an obvious cost advantage in trucking market hogs. The question is whether there are offsetting cost advantages (or quality premiums) for Wisconsin producers.

Large out-of-state hog finishing operations.

As noted earlier, finish only productions systems accounted for about half of the hog inventories in Iowa and Minnesota. These finishing units need a steady supply of weaned pigs or feeder pigs to operate at capacity and minimize costs. Because of its reputation for strong biosecurity and producing disease-free pigs, Wisconsin is in a good position to supply them.

Farrow to wean systems have several advantages. Facilities are less expensive than for systems that include grow-out. Much less feed per marketed animal is required compared to other production systems. There is a large in-state market for sows. Farrow to feeder systems have similar advantages, but require more feed and more extensive facilities.

Collective action through a cooperative or some other arrangement would likely be necessary to assemble suitably-sized loads and also handle contracts and shipping logistics. Joint ventures between out-of-state finishers and Wisconsin weaned or feeder pig suppliers might also be necessary as a means of effectively exploiting this market.

There are hog operations that are subsidiary to/supportive of farrow to wean and farrow to feeder systems. These include boar studs, breeding stock nucleus herds, and gilt development units. Hence, expanding sales of young pigs to out-of-state finishers would benefit these operations as well.

Conclusions

Based on this assessment, significant re-growth and renewal of Wisconsin's swine industry is possible if focus is put on those attributes that give the state a competitive advantage in the production of pork. While there is room for all types and sizes of swine operations in the state, and in fact a mix is highly desirable, any significant growth in numbers will require attracting operations that dovetail with the needs of today's U.S. pork industry. This "most likely" list includes:

- CAFO-sized farrow-to-wean units to provide high-health-status pigs for nursery/finishing operations.
- Breeding stock/nucleus operations, boar studs and similar, specialized production units that profit most from maximum bio-security.

- Moderate-size farrow-to-finish operations that can meet the quality and often variable supply demands of the state's local processors
- Finishing units, possibly established in cooperation with cash grain operations, where the value of manure has the potential to offset the higher costs involved in distance to markets.

The areas of the state most logical for growth of swine operations are those where dairy expansion has not yet, and is not likely to, tie up the available land base. This assessment shows that those areas do exist, and that competition from dairy should not be a significant limiting factor.

Last but not least, the challenge will be to encourage and achieve desired growth while at the same time protecting the attributes that currently make the state uniquely suited for pork production -- superior bio-security being chief among them. That said, given the current low density of production in most of the state, there is ample room for prudent growth. Efforts such as the current PRRS project involving the Wisconsin Pork Association, the Wisconsin Department of Agriculture and Consumer Protection, the University of Wisconsin, the veterinary community and other industry stakeholders will help maximize advantages and minimize risks to both current and future producers.

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Appendix

A question often raised in discussing the potential for growth of the Wisconsin swine sector is, "where is the best place in the state to locate a new or expanded hog facility?" The simple answer is: it depends — on countless factors, not all economic in nature. However, two factors are generally applicable. Since corn is the principal "raw" ingredient in hog rations, one important factor is the availability of a sufficient supply of competitively-priced corn or, in the case of an integrated corn-hog system, the ability to economically produce a sufficient supply of corn. The second general factor is the availability of land for manure application. Given the prominence of dairying in Wisconsin, this depends heavily on competition with larger dairies for land to apply nutrients. Some insights relating to these factors can be gleaned from the table below, which reports harvested corn acreage, corn yield, and the number of dairy cows by county for 2011. Note that corn acreage is area harvested for grain, i.e., it does not include corn harvested for silage. Hog inventory by county from the 2007 Census of Agriculture is also shown in the table.

Aggregate regional density values are shown for the nine agricultural statistics reporting districts used by USDA's National Agricultural Statistics Service (see map following the table). The density values are simply acres of corn, number of dairy cows, and hog inventory divided by the area of the district in square miles (shown in parentheses following the county and district names).

Some observations:

- The Central district appears to be very promising for hog expansion. Cow density is relatively low. Corn acreage density is low, but corn yields were close to the state average in 2011.

- The East Central district is the least promising for new or expanded hog operations. Cow density is more than 3 times the state average and dairy herds are, on average, the largest in the state. Corn yields are only marginally better than the Central district.

- The Southwest district, with by far the highest hog density, faces significant competition for land with dairy, suggesting growth there may be constrained by land available for manure application.

- Other Districts are a mixed bag. There is some potential in some counties in the North Central, Northeast, and Northwest, but counties in these districts with the largest corn acreage and highest corn yields tend to have the highest dairy cow density. The South Central, Southeast and West Central districts have substantial corn acreage and high corn yields. But they also have large numbers of dairy cows. And, while not reflected in the table, they also have large non-farm rural populations that may discourage large-scale hog operations.

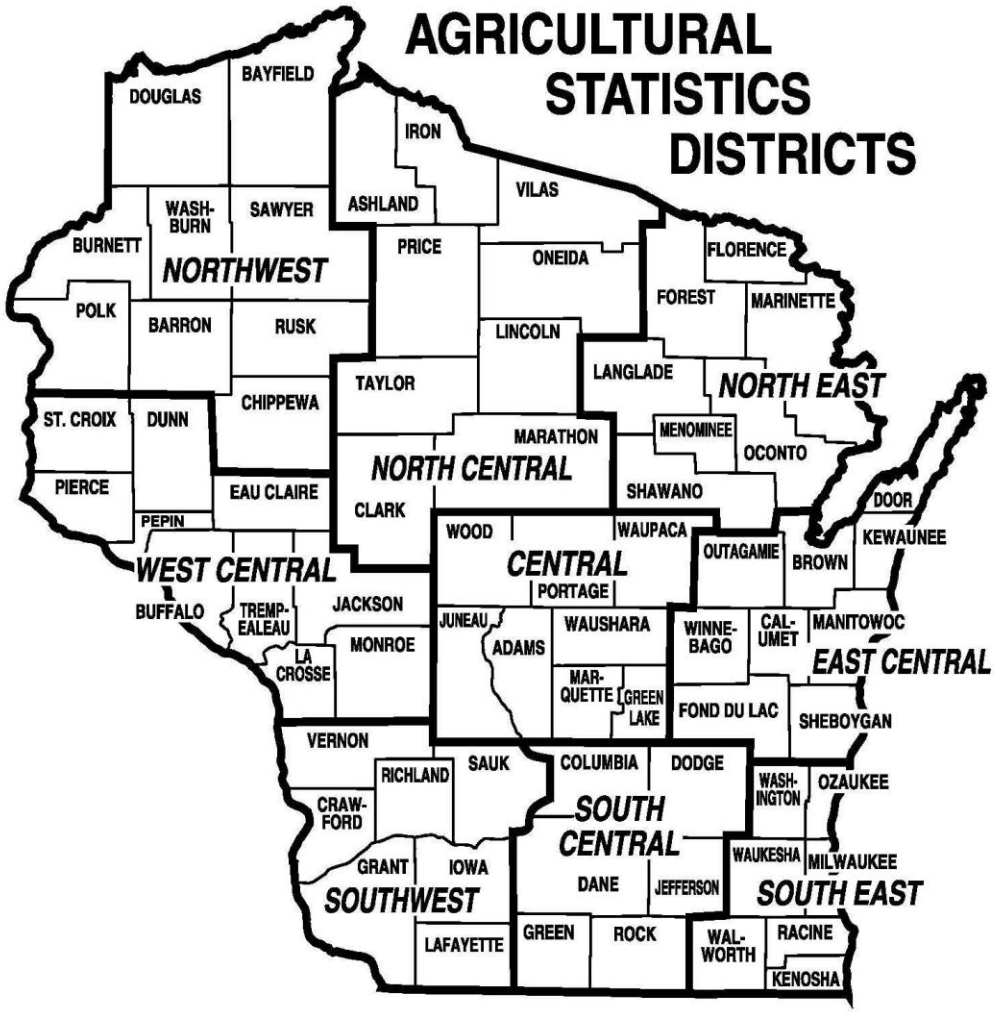
Wisconsin Corn, Cow and Pig Density Statistics by County				
District/County (Area in Square Miles)	***Corn Harvested for Grain***	***Corn Yield per Harvested Acre***	***Milk Cows***	***2007 Ag Census Hog Inventory***
	Acres	Bu/Acre	Number	Number
CENTRAL				
ADAMS (645)	22,400	130.4	1,100	153
GREEN LAKE (349)	48,700	156.5	7,500	634
JUNEAU (767)	38,000	157.6	10,600	563
MARQUETTE (456)	35,100	116.2	5,600	5,657
PORTAGE (801)	36,600	157.9	13,500	5,030
WAUPACA (748)	39,800	139.4	23,000	2,843
WAUSHARA (626)	34,100	174.2	5,000	692
WOOD (793)	28,300	149.1	19,300	3,298
District Total/Average (5,185)	283,000	148.8	85,600	18,870
Density (units per sq. mile)	***54.6***		***16.5***	***3.6***
EAST CENTRAL				
BROWN (530)	24,300	139.7	42,000	2,408
CALUMET (318)	31,100	152.4	29,500	907
DOOR (482)	20,400	99.8	7,200	264
FOND DU LAC (720)	67,500	176.9	54,000	11,331
KEWAUNEE (343)	30,600	125.2	42,000	1,763
MANITOWOC (589)	42,300	159.0	51,000	1,451
OUTAGAMIE (638)	59,300	145.8	38,000	3,062
SHEBOYGAN (511)	33,700	152.8	26,500	3,264
WINNEBAGO (434)	33,800	149.1	14,900	715
District Total/Average (4,565)	343,000	150.2	305,100	25,165
Density (units per sq. mile)	***75.1***		***66.8***	***5.5***
NORTH CENTRAL				
ASHLAND (1,045)	700	112.9	2,000	54
CLARK (1,210)	50,100	137.9	66,000	5,209
LINCOLN (879)	4,900	133.1	4,300	552
MARATHON (1,545)	70,700	143.1	65,000	2,186
OTHER** (3,982)	2,900	110.0	*	404
TAYLOR (975)	31,700	128.7	16,500	953
District Total/Average (9,636)	161,000	137.6	153,800	9,358
Density (units per sq. mile)	***16.7***		***16.0***	***1.0***

District/County (Area in Square Miles)	*Corn Harvested for Grain*	*Corn Yield per Harvested Acre*	*Milk Cows*	*2007 Ag Census Hog Inventory*
NORTHEAST				
MARINETTE (456)	29,400	121.8	11,800	800
OCONTO (998)	34,400	137.8	20,000	600
OTHER*** (2,731)	9,300	123.7	*	207
SHAWANO (893)	49,900	144.3	37,000	1,500
District Total/Average (5078)	123,000	135.5	68,800	3107
Density (units per sq. mile)	***24.2***		***13.5***	***0.6***
NORTHWEST				
BARRON (863)	75,000	146.7	24,500	1,445
BURNETT (822)	12,600	117.5	3,300	837
CHIPPEWA (1,008)	86,800	147.1	30,000	2,660
DOUGLAS & BAYFIELD (2,782)	2,300	103.5	2,500	277
POLK (912)	54,100	157.1	15,800	2,190
RUSK (914)	17,900	124.0	11,500	340
SAWYER (1,257)	5,600	138.8	2,600	159
WASHBURN (797)	10,700	137.9	2,800	306
District Total/Average (9,385)	265,000	145.1	93,000	8,214
Density (units per sq. mile)	***28.2***		***9.9***	***0.9***
SOUTH CENTRAL				
COLUMBIA (766)	126,500	160.5	15,900	16,485
DANE (1,197)	171,000	163.5	52,000	21,997
DODGE (876)	134,000	171.6	39,500	27,067
GREEN (584)	97,200	164.6	30,000	5,910
JEFFERSON (556)	81,300	158.7	14,500	7,435
ROCK (718)	157,000	161.5	12,500	20,613
District Total/Average (4,697)	767,000	163.6	164,400	99,507
Density (units per sq. mile)	***163.3***		***34.9***	***21.2***
SOUTHEAST				
KENOSHA (272)	29,100	164.3	3,300	3,429
OZAUKEE & MILW. (474)	15,500	152.3	9,100	365
RACINE (332)	34,700	152.2	3,600	2,182
WALWORTH (555)	103,000	164.4	12,900	21,196
WASHINGTON (431)	25,700	158.4	14,400	1,079
WAUKESHA (550)	25,000	148.4	2,500	863
District Total/Average (2,614)	233,000	159.4	45,800	29,114
Density (units per sq. mile)	***89.1***		***17.5***	***11.1***

District/County (Area in Square Miles)	*Corn Harvested for Grain*	*Corn Yield per Harvested Acre*	*Milk Cows*	*2007 Ag Census Hog Inventory*
SOUTHWEST				
CRAWFORD (571)	36,000	145.0	8,400	5,836
GRANT (1,147)	157,500	171.1	45,000	79,940
IOWA (763)	72,600	171.2	23,500	6,329
LAFAYETTE (634)	127,000	179.5	29,500	21,663
RICHLAND (586)	33,700	136.5	14,800	NR
SAUK (831)	75,400	149.2	26,500	46,588
VERNON (792	54,800	154.2	24,500	4,688
District Total/Average (5,324)	557,000	164.6	172,200	165,044
Density (units per sq. mile)	***104.6***		***32.3***	***31.0***
WEST CENTRAL				
BUFFALO (672)	62,700	160.4	18,300	2,886
DUNN (850)	95,300	157.1	21,500	9,684
EAU CLAIRE (638)	43,300	148.7	10,200	1,730
JACKSON (988)	45,800	150.7	13,200	10,158
LA CROSSE (452)	32,300	157.3	9,000	14,003
MONROE (901)	44,400	150.0	25,500	1,690
PEPIN (232)	29,200	157.9	8,200	198
PIERCE (574)	72,000	165.6	15,900	3,239
ST CROIX (722)	86,500	164.6	9,700	8,053
TREMPEALEAU (733)	76,500	154.5	21,500	7,443
District Total/Average (6762)	588,000	157.7	163,000	59,084
Density (units per sq. mile)	***87.0***		***24.1***	***8.7***
STATE TOTALS (54,158)	3,320,000	156.0	1,265,000	486,814
Density (units per sq. mile)	***54.5***		***20.8***	***8.0***

Sources: Corn acreage and yield and dairy cow numbers — USDA-NASS Values are for 2011. Hog inventory — 2007 Census of Agriculture. NASS no longer publishes county estimates for hogs.

*Not separately reported, but included in state total
** Iron, Oneida, Price and Vilas Counties
***Florence, Forest, Langlade and Menominee Counties


AGRICULTURAL
STATISTICS
DISTRICTS
DOUGLAS
BAYFIELD
IRON
ASHLAND
VILAS
WASH-
BURN
SAWYER
BURNETT
NORTHWEST
PRICE
ONEIDA
FLORENCE
FOREST
MARINETTE
POLK
BARRON
RUSK
LINCOLN
LANGLADE
NORTH EAST
TAYLOR
CHIPPEWA
ST. CROIX
DUNN
MARATHON
MENOMINEE
OCONTO
NORTH CENTRAL
PIERCE
EAU CLAIRE
CLARK
SHAWANO
DOOR
PEPIN
WOOD
WAUPACA
KEWAUNEE
WEST CENTRAL
CENTRAL
OUTAGAMIE
BROWN
PORTAGE
BUFFALO
TREMP-
EALEAU
JACKSON
JUNEAU
WAUSHARA
WINNE-
BAGO
CAL-
UMET
MANITOWOC
LA
CROSSE
MONROE
ADAMS
EAST CENTRAL
MAR-
QUETTE
GREEN
LAKE
FOND DU LAC
SHEBOYGAN
VERNON
RICHLAND
SAUK
COLUMBIA
DODGE
WASH-
INGTON
OZAUKEE
CRAW-
FORD
SOUTH
CENTRAL
GRANT
IOWA
WAUKESHA
MILWAUKEE
DANE
JEFFERSON
SOUTHWEST
SOUTH EAST
LAFAYETTE
GREEN
ROCK
WAL-
WORTH
RACINE
KENOSHA

The density table does not consider competition for local corn supplies from ethanol plants. Corn used for ethanol by state is not reported. But at the national level, ethanol absorbs about 40 percent of corn production. Given there are nine operating ethanol plants in Wisconsin, it is likely that something close to that percentage applies here. In general, the existence of an ethanol plant would generally discourage new or expanded hog operations within a wide radius of the plant because of competition for corn. However, higher corn costs might be partially offset by large local supplies of distillers grains.

Operating Wisconsin ethanol plants are shown in the map below.