

ILLINOIS CRITICAL BRIDGE ASSESSMENT AND ECONOMIC IMPACT RELATIVE TO SOYBEAN AND SOYBEAN PRODUCT MOVEMENTS

EXECUTIVE SUMMARY

Prepared for:

ILLINOIS SOYBEAN ASSOCIATION



Funded by the **Illinois** soybean checkoff.

Prepared by:



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Illinois, a major producer of soybeans, produced approximately 466 million bushels of soybeans in 2010/11. Infrastructure is the means to realize value for farmers shipping their harvest from a farm to a market position. A crumbling infrastructure will marginalize the economic returns to a farmer through higher costs associated with fuel, lower velocity, light loading of equipment, and excessive wear and tear on equipment. All of these added costs will reduce the farm gate price of soybeans. In 2010, 15.4% of the state's more than 26,000 bridges were deficient and obsolete. Across the state there are 1,200 bridges that are posted for a lower weight limit or closed. Many of these structures directly impact the price of soybeans received by farmers. This report is intended to raise the attention of the value and importance of infrastructure to the soybean industry in Illinois, with a specific focus on Illinois bridges.

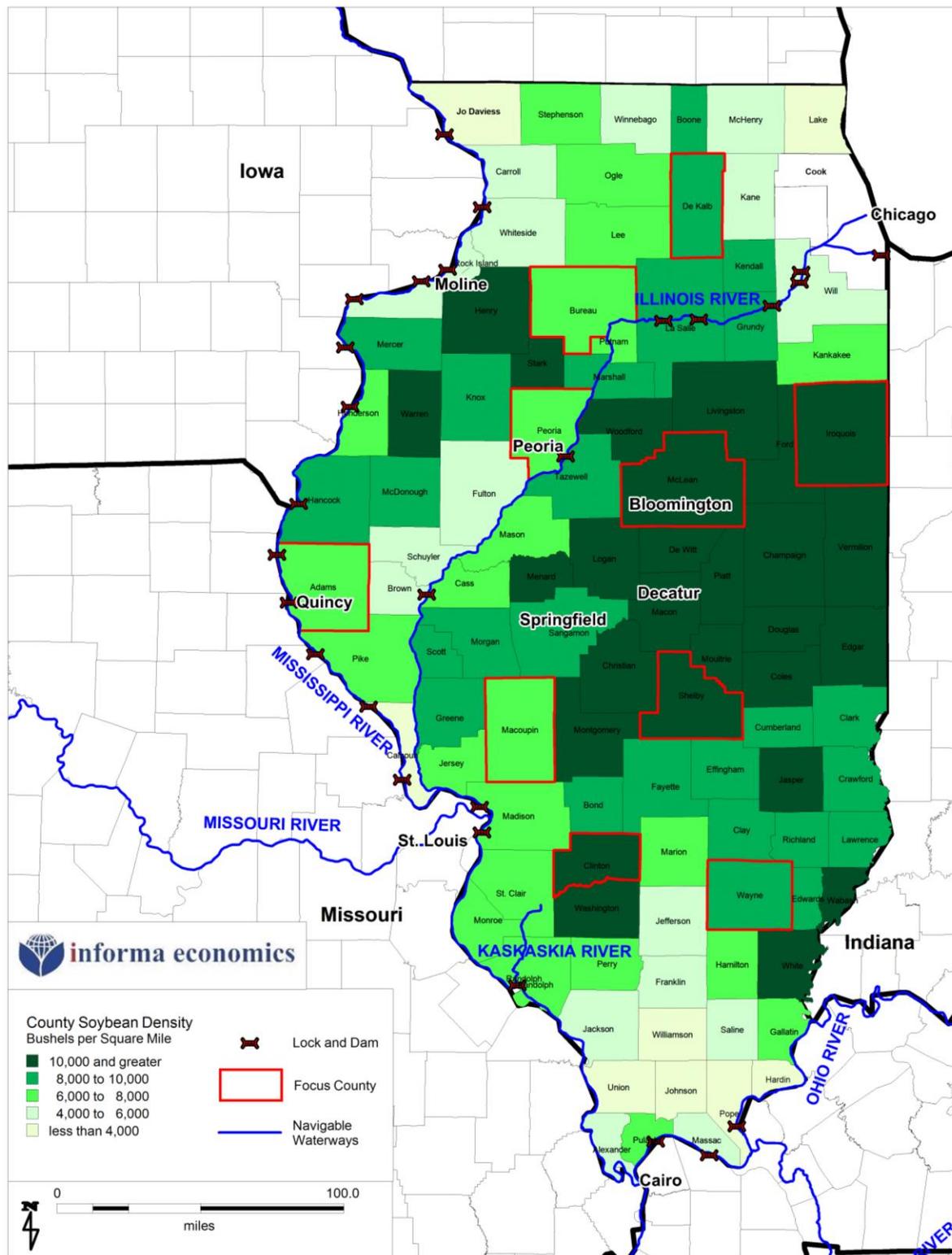
Bridge infrastructure is important to soybean marketing efforts, which is why the Illinois Soybean Association (ISA) commissioned an analysis of Illinois' bridge infrastructure and its impacts on agribusiness focused economic development.

The bridges within ten target counties in Illinois were evaluated for effectiveness of servicing agriculture needs. The ten counties selected include Adams, Bureau, Clinton, DeKalb, Iroquois, McLean, Macoupin, Peoria, Shelby, and Wayne. These ten counties represent each Crop Reporting District (CRD) plus Peoria because this county is a central point for grain origination and river staging.

These counties are shown in Figure 1. Within the ten target counties there are 407 bridges rated structurally deficient and obsolete, representing less than 2% of all bridges in the state. These 407 bridges represent less than 12% of all the deficient bridges in the state. To demonstrate the impacts of Illinois bridges, 12 example bridges were chosen for the analysis.



Figure 1: Focus Counties within Illinois



A. Interviews with County Engineers

In person interviews were conducted with county engineers in Adams, Bureau, Clinton, McLean and Shelby Counties. Telephone interviews were conducted with engineers in DeKalb and Peoria counties. The following section summarizes the interviews, and includes Informa's impression from site visits to the representative bridges.

1. General Comments on Roads

- Federal highway and state highways are in adequate condition.
- County highways for the most part are in decent condition.
- Township roads are in various degrees of decay (some poor and some good).
 - Many bridges along township roads were left to decay giving the farmer (or individual household) an extended driveway. The road is extended only to the individual's home to allow them access to and from their home.
 - Engineers stressed that the greatest need for repair on bridges among all the counties are those on the township road network.
- Most of the county highways were not designed to support 80,000 pound vehicles.
 - Many roads did not appear to have much of a right-of-way; i.e., road widening would mean relocating of utility lines that are currently near the road.

2. General Comments on Bridges

- Timber pile bridges are an area of focus for county engineers.
 - Most were built from 1955-1965
 - At the time, these bridges were less expensive
 - Timber is the support and concrete is on top to form the structure vehicles drive on.
 - This is an example of saving money on the front end that is costing a large amount of money in the future.
- Precast concrete bridges received both good and poor reviews depending on the county engineer.
 - Precast structures have not had problems since the manufacturers started coating the concrete.
- Bridges have to be longer than 20 feet to be included in the NBI database.

3. General Comments on Funding

- Funding for bridge repairs are evaluated independently at the bridge level. Also, there is a difference of allowed funding between "repairs" and "rehabilitation or replacement". Some funds are only allowed for rehabilitation or replacement on township bridges (Township Bridge Program fund). Some funds are only allowed for rehabilitation or replacement on federally approved routes (such as Highway Bridge Program). Some bridges are wholly or partially funded locally (Motor Fuel Tax or county bridge fund, which can also be used for repairs). Most of the

county engineers stated that they had encountered few to no instances where a private entity paid for a bridge repair; the only occurrences were related to mining or quarrying operations.

- Farmers in Illinois do not have to pay certain taxes on diesel fuel for their farming operations.
 - In order to get low priority roads and bridges repaired, some individual farmers provide the materials required to enable the county engineer to update and maintain a specific road or bridge. County equipment and labor is used to finish the project.
- Cities, populations over 15,000 people, primarily pay for their own roads and bridges. For a growing city, roads and bridges are considered to be part of economic development that will have a large revenue enhancement from property and sales taxes.
- For populations less than 15,000 people, counties have to repair township bridges and in return the state of Illinois provides the county with either state funds or funds from the Township Bridge Program (TBP). TBP is administered by the state and is funded with motor fuel tax funding.
 - Since the 1970s, the level of funding has not increased for this program, but over the last 10 years, the price of repairing a bridge has doubled while the cost of liquid asphalt has increased from \$0.80 per gallon to \$2.40 per gallon.¹ From 2003 to 2007, the cost of highway and road construction increased by an average of 10% annually compared with the average annual increase of 2.4% the two decades before².
 - Roads that were chip sealed every other year are now chip sealed every sixth year.
- The two largest funding programs for the construction and maintenance of bridges is the state bridge program (SBP), and the federal bridge program (FBP).
 - The state bridge program allocates funding to the counties based on the miles of roads within the county.
 - This provides incentive to the county to register obsolete roads in order to get additional funding.
- The federal bridge program allocates funding to the counties based on the square footage of bridges in the county.
 - Federal money can help fund a project but it takes longer to meet all the federal requirements.
 - For example, an environmental program to save pigmy rattle snakes resulted in a one year delay in the building of a bridge in one of the focus counties.
 - Federal assistance to repair a bridge is available when the rating is 80 or less, while replacement funds are available for a rating of 50 or less. For both these conditions, eligibility criteria must be met as well. One county

¹ Liquid asphalt is a product from the petroleum refining process that is the main ingredient in asphalt.

² Congressional Budget Office, Public Spending on Transportation and Water Infrastructure, November 2010



engineer stated that a law mandating funding of this program at a level that could keep up with the increasing demand for repair and replacement would be the best option.

- Some engineers explained that there is an incentive to be aggressive in the bridge evaluation process that creates the bridge sufficiency rating, because of the time lag between the county engineer inspection and federal engineer inspection.
- The state of Illinois imposed a six percent sales tax on gasoline that is used in general funding.
 - Citizens of Illinois are keenly aware that they pay a higher price for fuel than their neighboring states but they are not aware that this money does not necessarily pay for transportation projects. The general feeling by the citizens of Illinois is they, already, under existing fee and revenue programs pay enough for infrastructure which limits the ability to raise funds.
 - The consensus among the engineers is a portion of the gasoline sales tax should specifically be spent on infrastructure in Illinois.
 - The Road Fund and the Construction Fund are both funded with Motor Vehicle Registration fees and the Motor Fuel Tax. Both of these funds are used for infrastructure improvements in Illinois.
 - The General Revenue Fund (GRF) is not used for highway infrastructure improvements. However, the GRF pays the debt service on bonds issued for transit, aeronautics, and other state infrastructure.
 - The sales tax is only one of the sources that go into the GRF—the other main sources are the personal and corporate income tax and the public utility tax.

4. General Comments on Factors Impacting Infrastructure

- As roads deteriorate, county engineers and road commissioners have to make decisions as to which roads have priority. For counties that lack the funding to properly manage the infrastructure, they are effectively deciding which roads revert to gravel. So it is imperative that soybean growers understand the criteria used to determine priority.
 - The two major goals are public safety and schools. Public safety includes a clear route to hospitals and individual households.
 - The movement of agriculture products is not a priority.
 - For example, a bridge posted to 50,000 pounds is not considered a priority because school buses that weigh up to 36,000 pounds can still cross the bridge.
- The size of farmers' crops has increased over the years and so has truck weights. Combined, these two factors are increasing the deterioration of roads and bridges.
 - The U.S. interstates, state highways and most county highways are designed to be able to withstand 80,000 pounds trucks.



- County roads and township roads were not designed for 80,000 pounds trucks.
 - New structures can carry 80,000 pound vehicles. However, many of the older structures were designed to a much lower standard, or were constructed for an unknown design load.
 - On the local system, roads were designed for 73,280 pound vehicles for many years. The 80,000 pound designation was for truck routes only. Illinois recognized the need for these special truck routes on the local system by implementing the Truck Access Route Program (TARP) to encourage the design and construction of roads for 80,000 pounds. However, TARP only funds a small portion of the actual cost needed to upgrade a road to 80,000 pounds, and the remaining local match is at the expense of the road jurisdiction agency.
- In another example, it was suggested that the lack of weight distribution on manure spreaders has caused damage to roads and bridges. Plus wide equipment having to drive on the edge of roads has caused damage to the roads and bridges.
- A priority of the agriculture community is an infrastructure that can handle 80,000 and 100,000 pound trucks. This will require a well thought out separate plan that includes additional funding through a new program specifically designed to meet the needs of agriculture. If funding is increased through the current infrastructure programs, agriculture concerns may not be met.
- Spring thaw is a time period when roads are vulnerable to higher truck weights. Roads are posted for a number of reasons and at different times during the year. For example, bridges can be posted up to 90 days during the winter and spring, January 15 to April 15.
 - Some counties do not post during the spring due to warmer temperatures or because of drivers not obeying the posted rules. So, rather than post and have low compliances the county opts not to post the bridge.
- The geographical location of a county can play a major role in the condition of its roads and bridges.
 - If a county is located between two metropolitan areas, the county will likely benefit from an interstate or state highway that will provide a backbone to the county infrastructure. County vehicle traffic will be diverted to these well-constructed four lane roads, which will effectively reduce the wear and tear on the county roads. Likewise for a county with little to no interstate or state highway mileage, all the traffic will travel on county roads which are paid for out of the county budget.
 - A county without cities with populations above 50,000 people will have to fund all the road maintenance within the county.
 - Cities above 50,000 people receive Surface Transportation Program (STP) funds to pay for transportation and maintenance. By law, any urban area of over 50,000 must undertake a process to develop transportation plans and programs formulated on the basis

of transportation needs and with due consideration to comprehensive, long-range land use plans, development objectives, and social, economic, environmental, and energy conservation goals³.

- Cities smaller than 50,000 people have the option to fund their own transportation projects. For example Carlyle, IL, has over 15,000 people with approximately 9 miles of road and has a vested interest in insuring the infrastructure is able to handle the tourism season.
- Due to county funding being primarily based on miles of road, those counties without cities with population over 15,000 people and federal and state funded roads have less funds available for county and township road and bridge infrastructure.

5. Priorities for Bridges

The Illinois Department of Transportation calculates and dictates to local agencies the load posting they are to place on bridges. The posting is a factor of the capacity of the bridge and not to the convenience of the potential users. Local agencies alert schools and first responders when a load limit is placed on a bridge. Load postings do not consider who the user is and apply to all vehicles regardless of the user. However, it was mentioned that some county engineers do access the repair or rehabilitation of bridges among a number of priorities, including:

- Public safety and schools – goal is to keep the roads open to accommodate emergency equipment and school buses.
 - Schools – the largest buses weigh up to 36,000 pounds
 - Hospitals
 - Emergency personal
 - Snow plowing
- Postal services
- Agriculture
 - Loaded grain trucks can weigh up to 80,000 pounds in Illinois.
 - The goal is to have a set of roads that can handle agriculture commodities from farm to market; i.e. heavy corridor.
 - Trying to make heavier roads a priority.
 - Farmers working within heavier road context, place on-farm storage on these corridors.
- Concluding thought from a county engineer – One suggestion is a percentage of check off dollars or some form of increased revenue percentage goes towards helping rural infrastructure.
- Some of the county engineers feel that a major collision is about to occur as larger production of crops creates additional truck moves that will further deteriorate the roads and bridges much faster than designed. This will leave areas that cannot afford to upgrade or fix infrastructure with minimized access to market position. These events are already happening in areas like Shelby

³ Bureau of Local Roads and Streets: Loads Roads and Streets Funding Dec. 2009 page 4-1(3)



County but will spread to other parts of the state in the near future. With increased yields expected, farmers will be limited to smaller loads to move the grain instead of using current truck configurations let alone larger equipment if the infrastructure is going to hold up.

B. Bridge Profiles

Twelve focus bridges were studied. The bridges were evaluated based on the benefit they provide to area businesses and citizens. This benefit was measured by the cost that would be incurred if an alternative route were needed. In addition to these costs, estimation of the indirect and induced impacts was made for each bridge. Indirect and induced impacts are the “trickle” down impact from citizens keeping their income as a result of efficient roads and bridges. These impacts are possible because detours are essentially income transfers from local citizens and businesses to the revenue streams of the gas and diesel industry. As a result of local citizens and businesses spending a greater portion of their income in the local community than the revenue of the gasoline and diesel sector, there is a net positive impact when bridges create more efficient, fuel saving routes.

A simple average of the benefit cost ratios for the twelve bridges analyzed yields 10.24, which means that the combined benefits are over ten times greater than the costs. This can be interpreted as a return of \$10.24 for each \$1 invested, on average that is added to the local economy as a result of the annualized cost to build and maintain the select bridges.

Illinois has a terrain that is suitable for quality farming operations as well as an abundance of road and bridge access points. Extensive road networks in Illinois somewhat minimizes the risk incurred when a road or bridge is closed, because often there are nearby alternative routes. This study focuses on 12 key bridges within the state. In order to fully analyze each bridge’s impact, groups of bridges, or bridge networks, were evaluated for the alternative access points they cumulatively provide. Of the 12 focus bridges for the study all were analyzed for their individual merits and five of the twelve were considered to be part of a larger bridge network. The analysis also includes the economic impact from bridge networks when applicable. A summary of annual net benefits and benefit cost ratios for each focus bridge is shown in Table 1.



Table 1: Ranking of Benefit Cost Ratios for Focus Bridges

Focus Bridge	County	Annual Net Benefits	Benefit Cost Ratio
740 [†]	DeKalb	\$1,088,037	37.27
1094	Bureau	\$865,274	29.84
934	Macoupin	\$209,972	15.06
963	Peoria	\$700,956	12.68
882	Iroquois	\$110,387	8.36
174	Shelby	\$106,506	5.73
405	McLean	\$97,551	5.34
457	Shelby	\$64,407	3.86
480	Iroquois	\$41,488	2.84
353	Adams	\$1,648	1.07
1301*	Macoupin	(\$11,748)	0.47
587	Adams	(\$15,197)	0.32

[†]Bridge is currently closed

*Network shows positive annual net benefits

The average of the twelve bridges' benefit cost ratios is 10.24

Important takeaways from the analysis include:

- ✓ All but two of the twelve bridges show a positive economic benefit based on their merits alone.
- ✓ The bridges in Table 1 are sorted by the benefit cost ratio and the ratio can be interpreted as the number of dollars that are annually generated in terms of income and tax revenues per each dollar of the annualized cost and maintenance that is estimated for the bridge.
- ✓ At the time of the analysis Bridge 740 in DeKalb County was closed and all others were posted for weight restrictions. Bridge 740 was evaluated based on its activity prior to closing.
- ✓ When Bridge Network 1301 in Macoupin County was analyzed, a benefit cost ratio of 1.54 is achieved for the network. Under this scenario, the focus bridge, Bridge 1301, is near break-even (0.96) because of the value it provides to the network. However, as shown in Table 1, when Bridge 1301 is analyzed without the network, its benefit cost ratio is significantly less (0.47). In fact, all the bridges in Bridge Network 1301 have negative individual annual net benefit of (\$49,248), but when analyzed as a group annual net benefits are \$32,236.

C. Conclusions

Enhancing transportation requirements and future needs starts at the local level. County, state and federal engineers inspect and assign a sufficiency rating to bridges. Even though a bridge may have a low sufficiency rating and be labeled as deficient and obsolete, seldom used bridges on county and township roads are more likely to remain deficient and obsolete for a longer time despite the rating. These bridges are then



susceptible to weight limits that effectively restrict truck traffic from using the bridge, which lowers the profitability of agribusiness.

Elevating suspect bridges and infrastructure to funding status starts at the local level with businesses and communities highlighting the value of the infrastructure to the county public works office and the state funding office. The infrastructure enables agribusiness to enhance local communities. Few communities are capable to organize and demonstrate economic need to attract attention. Agriculture supports many of the towns in Illinois. One bridge in the study (Bridge structure number 06630012) was located in Bureau County and had very little agriculture land around its immediate vicinity. Given the demographics and local commuting patterns, many of the local farm workers that live in the area rely on that bridge to get to work and to other supporting businesses each day.

An important finding in this study and, the previous infrastructure work identified, has been that although one bridge outing has a negative impact; additional outages create proportionally greater impacts. The risk of an outing is magnified because high repair costs are causing a rationing of repair projects available to county engineers. Turning paved roads into gravel is allowing some county engineers to have available funding for bridges.

Illinois Soy is in a position to work with its members to educate and articulate the importance of infrastructure on local communities and heighten the need for adequate infrastructure funding in rural areas. County engineers have shown interest in working with farmers and farming organizations like the Illinois Farm Bureau to establish heavy corridors for agriculture commodities. It is important that Illinois Soy and county engineers work together to “bridge” the gap between farmers and public officials. An envisioned program could involve periodic local infrastructure roundtable meetings across the state to discuss infrastructure needs. In addition to members of Illinois Soy, the meetings would engage local and state transportation authorities and leadership from the local communities. Illinois Soy and county and city engineers/planners would then communicate the results of those meetings to the local and state authorities. The creation of media opportunities through television, newspaper, magazines, social networking and push media will be very effective in communicating findings from meetings and this study. Working with other agriculture interest as well as other industries such as mining companies who also use heavy truck loads is important for outreach and expanding the umbrella of support.

